CALIFORNIA HIGH-SPEED RAIL AUTHORITY
DELIVERY OF AN INITIAL OPERATING SEGMENT

RESPONSE TO EXPRESSION OF INTEREST – RFEI HSR#15-02

SEPTEMBER 14, 2015

RESPONDENT

CINTRA INFRAESTRUCTURAS, S.A.
FERROVIAL AGROMAN, US CORP.

Point of Contact

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Cintra and Ferrovial Agroman bring together a multi-disciplinary team and provide full end-to-end integration of all project stages.

Cintra – Transportation Infrastructure Developer

Cintra is a wholly-owned subsidiary of Ferrovial S.A. Ferrovial S.A. is one of the few companies with more than 40 years of experience developing, managing, operating and maintaining infrastructure projects. Cintra specializes in the development of complex PPP transportation projects. The group's first Design, Build, Finance, Operate, and Maintain ("DBFOM") project was awarded in 1968, and was recently handed-back to the grantor after successfully completing the 35-year concession term. Cintra-Ferrovial is recognized by Public Works Financing Bulletin/Magazine in 2012 and 2013 as the top transportation developer by invested capital internationally, with over $72 B in PPP contracts.

In the last 4.5 years Cintra has raised over $3.3 billion of committed financing for US roadway concession projects in addition to investing $798 million of its own equity. The LBJ and NTE projects (Texas) are two of the largest P3 projects in United States history and combined represent a total investment of nearly $5 billion. These financings included $1.5 billion in TIFIA funds, $1 billion in tax exempt private activity bonds ("PABs"), and over $1 billion in equity from private partners, all arranged under a financing plan managed by Cintra's financial team.

Cintra currently manages 20 projects in six countries comprising 1,280 miles of roadways and a cumulative investment of over $28 B. Cintra has invested more than $1.5 B of equity and manages $5.8 B of direct private investment in the United States, represented primarily by investments in the Indiana Toll Road, the Chicago Skyway, SH 130, Segments 5 & 6, the North Tarrant Express and the LBJ Express. Information on the SH 130, Segments 5 & 6, North Tarrant Express and LBJ Express is provided under relevant experience. In recognition of these successes, Infrastructure Investor named Cintra "2009 Global Infrastructure Developer of the Year," and "North American Infrastructure Developer of the Year" in 2009, 2010 and 2013, further establishing Cintra as a leading P3 infrastructure developer even during challenging financial times.

Ferrovial Agroman - Design-Build Contractor

Ferrovial Agroman will join Cintra on the Project as the Design-Build Contractor ("DB Contractor") within the Design-Build Team, managing the design and construction of the Project. The DB Contractor will not invest equity into this Project, but will be expected to have an at-risk security package to support the risks which will be transferred to them during the course of the Project. Ferrovial Agroman is one of the world's preeminent construction firms with more than 80 years of construction experience in design-bid-build, design-build, and public-private partnership projects in all types of infrastructure assets, specializing in large and complex transportation projects. Ferrovial Agroman has designed and constructed 2,700 miles of railways including 440 miles of high speed rail; 2,300 miles of highway concessions; 9,400 miles of new roads; 16,700 miles of rehab of roads; and 270 miles of tunnels. Ferrovial Agroman has been active in the North American transportation industry since 1999, and currently has five major design-build contracts in the U.S. totaling more than $6 B. Ferrovial Agroman was one of the first construction companies to achieve ISO 9001 certification. Ferrovial Agroman is OHSAS 18001:2007 Certified firm, ISO 14001 compliant and has a certified Health & Safety Risk Management Plan.

Cintra and Ferrovial Agroman have extensive experience in developing complex infrastructure projects in North America similar in complexity and magnitude as the California High Speed Rail ("the Project").

Assuming that the California High Speed Rail Authority ("CHSR") elects to proceed under a Public-Private Partnership model for the Project, Cintra would perform the role of lead developer/equity member retaining an interest in the project operations and maintenance.

We anticipate that, Cintra would form a Special Purpose Vehicle (Concession Company) that would enter into the Comprehensive Agreement with CHSR to design-build-finance-operate-maintain the Project. The equity members will provide the equity and the resources to this Concession Company. The Concession Company will enter into a lump-sum fixed price and fixed schedule contract with the Design-Build Contractor, a joint venture led by Ferrovial Agroman, for the design and construction of the Project. The Concession Company would also manage operations and maintenance as assigned in the Comprehensive Agreement for the term of the agreement.

Cintra is interested in participating in the Project if it comprises a concession regime that entails private financing (equity+debt) coupled with O&M performed by the private partner, and a construction element that requires advanced design and construction expertise, for a fixed price and schedule. Specifically, we are interested in the Project

being procured as, an availability payment concession or a minimum revenue guaranty, or a combination of both.

We are confident we can provide a very competitive proposal assuming that the delivery method ultimately chosen by the Authority is consistent with the feedback in our EOI response. The Cintra/Ferrovial Aroman team brings a unique combination of world-class Financial, Technical and Operational expertise and prior experience with financing.

Proof of this is the recent proposals won by our Group in North America involving different delivery methods:

- **NTE** and **LBJ** (Texas), demand risk concessions – TxDOT saved 20% ($237 million) of the public equity committed to fund both projects. A bundle of value engineering (i.e. innovative design concept) and financial innovation (first time unwrapped PABs for a managed lanes/toll road concession placed in the market) made this achievement possible;
- **407 East Extension** (Canada), availability payment concession – The design concept developed jointly by Ferrovial Agroman´s DBJV and Cintra´s OM&R teams which integrated O&M and life cycle considerations lead us to submit the most efficient long term OM&R strategy. This paved the way for the optimal project capital structure crafted by our project finance team which afforded Infrastructure Ontario estimated savings of $40 million; and

  We have a strong commitment to our clients and project stakeholders. We are long distance runners and we will work with CHSR to make the California High Speed Rail System a viable project and reality for the citizens of California.

Commercial Questions

1. Is the delivery strategy 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.

For a large complex infrastructure project, generally a public private partnership under a design-build-finance-operate-maintain (DBFOM or DBFM) delivery mechanism will result in the lowest whole-life cost, greatest project acceleration and schedule certainty.

Whole-Life Costs

Transferring the responsibility for maintenance and lifecycle costs to the private sector will incentivize bidders to design with future Operations, Maintenance and Rehabilitation (OM&R) work, (and costs) in mind. A concessionaire with responsibility for future OM&R work will focus during construction, to deliver an asset which requires a minimum level of future maintenance work. For example, it can be more cost-effective to build an asset with features that are more expensive at the outset, but will result in reduced maintenance costs over the whole life-cycle of the asset. A private firm that is responsible for only one phase of the project does not have an incentive to incur these additional costs, even if those costs would be more than offset on a present-value basis by the savings achieved in a subsequent phase.

Overall, integration of design and construction with operations and maintenance can achieve lifecycle cost savings in excess of 20%.

Integrating OM&R into a P3 provides enhanced innovation in the form of Advanced Technical Concepts (ATC's). While ATCs are common in DB procurements, in a P3 whole of life considerations are taken into account, resulting in better ATC's that generate savings during operations as well as in construction.

Project Acceleration

A P3 with private financing can accelerate some projects years ahead of when they might be delivered versus publically financed projects. A DBFOM delivery can also allow for schedule certainty which is driven by the fixed-price date-certain construction contract and the oversight role of the private sector financing with strong and liquid security to project against contractor default.

California High-Speed Rail (CHSR) Delivery Model

After a thorough and complete review of the CHSR Business Plan and other supporting documentation, in our view, the following delivery models should be considered for delivery of the Project:

- **DB**
  Using a design-build delivery model, a majority of the CHSR could be financed by the public sector and delivered under numerous design-build packages. This model transfers a majority of the design and construction risk to the private sector by selecting one private construction joint venture to perform both functions. Instead of relying exclusively on the lowest bid, design-build selections are usually based on the "best value" bid using preliminary design documents (around 30%). The public agency retains the obligation to fund the project, along with O&M. This model will provide significant benefits over traditional procurement with respect to certainty of price and schedule and provide some modest level of technical innovation. However there is no consideration of life-cycle costs with this model and savings and efficiencies will be significantly less than under a P3 model.

- **DBOM or DBM**
  This model is similar to the design-build approach (with multiple DB packages) but also includes a short to medium term operational and maintenance responsibility for the private partner. This structure promotes additional innovations during the construction and design process, as the private partner is motivated to produce a high quality asset that performs well the initial life of the contract and has manageable maintenance costs. The public agency retains the obligation to fund the project and any demand risk.

- **DBFOM or DBFM (Availability Payment)**
  This model is similar to the DBOM/DBM approach (with multiple DB packages) but, with the private partner also responsible for financing. The use of private financing can allow the project to be built faster. Under this model, the public sector is still responsible for the revenue stream to support the private financing, (collected first by the public agency) or public sources (such as annual appropriations or dedicated tax revenues). These revenues are then paid in annual installments (known as "availability payments") to the private partner, on the condition that the transportation facility is "available" and meets agreed-upon performance specification. The private partner then uses these payments to pay operating and maintenance costs, cover debt service, and

provide returns to equity investors. All demand risk is borne by the public sector.

Given the inherent risks in this project, an availability payment obligation from the CHSR, backed by its limited resources would likely be inadequate to finance the Project. It is our belief that an availability payment backed by the State of California would be required to fund this project. Also we do not believe that the private sector would find a DBFOM or DBFM delivery model with full revenue risk transfer attractive.

- **DBFOM or DBFM (Minimum Revenue Guaranty)**
  A Minimum Revenue Guaranty (MRG) which is a combination of a revenue risk and availability payment project. Under this scenario, the State of California would guarantee a minimum amount of revenue per period (e.g., 70%), regardless of the project's performance. If toll revenue is below the lower bound (say 70%), the State provides a subsidy to make up some of or the entire shortfall. Revenues in excess of the upper bound are shared with or turned over entirely to the State/Authority.

  The MRG provides a great deal of security to debt holders, and leaves the majority of the remaining risk to the equity, so the project could be leveraged further than before and additionally, the cost of the private debt would also be less expensive. The combination of more leverage and less costly debt will fund more project scope and/or lower the required subsidy from the Owner.

- **Multi Delivery Models**
  A hybrid approach could be undertaken, whereby some components of the Project could be financed by the Authority while others are financed through a DBFOM (Availability) or DBFOM (Minimum Revenue Guaranty).

We would recommend the delivery of the required civil works through a series of design-build sub-packages as more fully described in question 5. Many of these design-build sub-packages could be delivered through a P3 model, subject to capacity constraints within the P3 equity sector. Some of the packages and civil sub-packages may have to be delivered by a DB model.

With DBFOM, MRG or Multi Delivery models there would be significant residual integration risk that the private sector would not be in a position to retain. An analysis would need to be undertaken to determine how much of this integration risk should remain with the public sector.

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

The delivery strategy as proposed in this Expression of Interest we believe is not executable in the private market, and would transfer excessive integration/interface risk to the private sector.

We have examined IOS North & South as one project, and separate projects for the purposes of this EOI response. As reflected in Exhibit A, the estimated combined hard and soft costs[1] associated with the IOS using end-of-year dollars is $58.6 billion. We have looked at delivering the IOS using a P3 delivery model as shown in Exhibit B. The size and scale of the IOS is outside the delivery capacity of major industry participants, both locally and globally. These reasons include balance sheet capacity, bonding limitations, single risk limitations, human capital and other resource limitations. Contractors in the U.S. market have demonstrated abilities to delivery projects up to $4 billion. Using this $4 billion limitation we have broken the $58.6 billion IOS capital needs into 6 delivery packages as follows:

- Stations, terminals, intermodal & Support Facilities $2.4bn
- Signaling Systems + Rolling Stock $3.9bn
- Electric traction $3.4bn
- Track $2.6bn
- Train & Infrastructure Operations tbd
- Civil $38.7bn

We have broken the civil works in 10 sub-packages of $3.8bn each.

While breaking down the IOS needs into 15 packages/sub packages may work from a capacity perspective, it divides the project into too many pieces, which increases the number of interfaces among different sections of the rail line, leading to potential problems with coordination. Multiple packages may drive the best value solution, but this solution creates an increased interface risk. We do not believe the private sector will be willing to accept this much interface/integration risk. We believe that these major interface risks should be retained by the public sector irrespective of the chosen delivery model.

Interface Risk Defined: With multiple packages if a defect occurs for a particular section/package this could lead to complex claims against or between multiple contractors due to the difficulty in determining which party is at fault. This may result in claims between government, contractors, operator and maintainer in relation to the impact of these defects.

[1] Soft costs include interest during construction, development costs, lender required reserves, debt fees, taxes and SPV costs.

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

As shown in the chart on the following page, assuming the State delivers CHSR under a design-build delivery model the key risks retained versus a P3 delivery would be: integration/interface, right of way, environmental for known conditions, O&M, financing and ridership/revenue

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

The following chart illustrates how major risks are generally allocated using various infrastructure delivery models.

INFRASTRUCTURE PROJECT DELIVERY
SUMMARY RISK ALLOCATION/TRANSFER

Risk	Design-Bid-Build	Design-Build	DBFOM - P3 (Availability)	DBFOM - P3 (Revenue)
Scope Changes (owner requested)	Public	Public	Public	Public
NEPA/CEQA Approvals	Public	Public	Public	Public
Permits & Approvals	Public	Shared	Shared	Shared
Right of Way	Public	Public	Shared	Shared
Utility Relocation	Public	Shared	Shared	Shared
Rail Relocation	Public	Public	Public	Public
Design (errors & omissions)	Public	Private (80%/20%)	Private	Private
Ground Conditions	Public	Shared	Shared	Shared
Environmental Contamination (pre-existing & unknown)	Public	Public	Public	Public
Environmental Contamination (other or known)	Public	Public	Private	Private
Construction Delays	Shared	Private (80%/20%)	Private	Private
Construction Cost Overruns	Shared	Private (80%/20%)	Private	Private
Rail Integration/Interface	Public	Public	Shared	Shared
Labor Disputes	Public	Private	Private	Private
Quality Assurance/Control	Public	Shared	Private	Private
Final Acceptance	Public	Private	Private	Private
O&M + CapEx/Lifecycle	Public	Public	Private	Private
Financing	Public	Public	Private	Private
Interest Rate/Credit Spread	Public	Public	Public	Public
Changes in Law	Public	Public	Shared	Shared
Force Majeure	Public	Shared	Shared	Shared
Ridership	Public	Public	Public	Private
Revenue	Public	Public	Public	Private
Fare Collection	Public	Public	Public	Private

3. Are there any other components of a high-speed rail system that should be included in the scope of work for each project?

Some of the components of the high-speed rail system could be bundled together to facilitate optimal packaging and procurement outcomes. As noted in our response to question #1, it could be possible to procure some, of all of CHSR as a DBFOM or a DBOM, thereby combining the design and construction with the maintenance and the operations. One of the key benefits of integrating components of the high speed rail system at key interfaces is the minimization of transaction costs and interface risks.

4. What is the appropriate contract term for the potential DBFM contract?

The proper duration for the concession will depend on the delivery method chosen by the Authority. Historically, projects procured under an availability payment model transfer less risk to the private sector, and, therefore, have a shorter payback period and require a shorter concession term. Availability payment projects can carry concession terms that commonly range from 30 to 40 years. Projects structured as revenue risk carry more uncertainty, thus require a longer concession term to compensate for this elevated level of risk assumed by the private sector. Due to the heightened risk profile of revenue risk projects, concession terms typically range from 50 to 99 years.

Will extending or reducing the contract term allow for more appropriate sharing of risk with the private sector?

Reducing the concession term from the above suggested ranges will impose additional risks on the private sector which will require some form of a higher equity required return and/or higher public subsidy. In an extreme case some private sector participants may not wish to bid a contract with a concession term that is too low. Extending the concession term may provide some marginal benefits to the public sector.

If the Respondent recommends a different delivery model, what would be the appropriate term for that/those contract(s)?

We are recommending a P3 availability model with a 30 to 40 year concession term or a MRG with a 50+ year concession.

5. What is the appropriate contact size for this type of contract?

As noted in our response to Question #2. We believe the maximum civil contract should be in the $3.8 billion range. The other contracts (stations, signaling/rolling stock, electric and track) could be in the $2.4 to $3.9 billion range.

What are the advantages and disadvantages of procuring a contract of this size and magnitude?

Using the above contract sizes as guidelines will provide the Authority with an appropriate amount of competition in procuring the Project, while also reducing interface risk and project construction duration.

Do you think that both project scopes should be combined into a single DBFM contact?

As stated earlier, we do not recommend combining all of the IOS project scope into one big $59 billion P3. The market will be unable to accommodate anything close to this size irrespective of whether CHSR elects a P3 or DB procurement. The project must be broken into manageable packages and sub-packages to achieve success for the Authority. In addition State Law would need to be modified to allow a lower level of bonding, since performance and payment bonds in this amount are likely beyond current and expected industry bonding capacities for a single contract.

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

Generally for a DB or P3 project over $300 million, private companies team in the form of consortiums to diversify risk and allocate risk to the party best able to manage that risk. For a P3 project in the $3 billion range, a typical consortium will consist of 2 to 3 equity investors/concessionaires, 2 to 3 construction joint venture contractors, several local nominated construction sub-contractors, 2 to 3 designers and 2 to 3 O&M providers.

A mentioned earlier, each project (IOS-North and South) is too large to be considered as separate DB or P3 contracts. Attempting to procure either project above the recommended $3 to $4 billion contract size will limit teaming capabilities.

Again we recommend that the Authority pursue a project specific law that allows bonding at a lower level than required by current California law. We would suggest at a maximum the performance and payment bonds be 50% of the project value. Other

states have capped the performance and payment bonds lower percentages or at fixed dollar amounts for projects over a certain dollar amount.

Does it increase or reduce competition?

If each project is procured as stated in this EOI, competition will be seriously reduced.

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?

We do believe that the IOS (both North and South) as presented in this EOI is not achievable in the private market today for the reasons listed earlier.

We have reviewed the sources of funding for the California High Speed Rail project as listed below with our comments:

- **Federal Grants**
  - Comment: As indicated in the EOI, these funds are already fully committed for CP1-4.

- **Proposition 1A**
  - Comment: $4 billion is available for the System

- **Cap-and-Trade Proceeds**
  - Comment: The value of future Cap-and-Trade revenue for CHSR funding is uncertain for the following reasons:
    - Cap-and-Trade is valued on the free market in an auction process, thus it is impossible to know with any certainty the demand and value for this financing tool.
    - Cap-and-Trade is subject to political pressure. The Public Policy Institute of California conducted a poll in 2014 and found that a majority of California voters would not support Cap-and-Trade if it meant paying more for electricity or gas. There is no guaranty that this funding source will be available for 30 to 50 years in order to repay debt and equity holders their required return.
    - Based on publically available studies we have read, its appears as if the most optimistic projections for cap-and-trade proceeds available to fund construction would be in the $20 to $25 billion range.

- **Farebox/Operating Revenue**
  - Comment:
    - Based on a review of high-speed rail lines in operation around the world, it is highly unlikely that fare box revenue from the CHSR system alone will be able to support the entire construction cost of the system.

- Therefore, a pure revenue risk concession model is unlikely to be feasible and a large portion of the construction cost of the system will likely need to be supported a public subsidy.

What are the limiting factors to the amount of financing that could be raised?

The first limiting factor is the amount of direct support/guarantees from the State of California for a P3 with private finance component. Without support from the State of California private financing is extremely unlikely.

The second factor is the amount of equity available in the market for greenfield P3's. There is a limited number of financial and industrial firms that have an appetite for investment in greenfield pre-operational infrastructure projects. We believe that the entire IOS will require in the neighborhood of $5.5 billion of equity capital, assuming that the entire project were able to be procured by a P3 concession and with a $18 billion assumed public/Authority subsidy. $5.5 billion of equity capital is well beyond the capacity of the infrastructure equity market today and in the near-term.

Lastly, funding the entire Project as a P3 may require up to $35.5 billion of private debt. It is doubtful that there is enough capacity in the debt markets for this type of project.

8. What changes, if any, would you recommend be made to the existing funding sources?

As stated earlier, we believe that private financing of some portion of the CHSR is only achievable subject to direct support from the State of California, through either an availability payment or minimum revenue guaranty.

It may be possible to privately finance some portion of the IOS over the next 10 years. The remainder of the scope could be publically financed, with a private finance take-out after construction completion and achieving certain operational income milestones.

What impact would these changes have on raising financing?

If the State of California was able to provide availability payment or minimum revenue guaranty support for the Project, this would significantly increase the likelihood that some of the IOS's $58.6 billion of required financing could be raised. As indicated earlier, even with the full support of the State of California, the sheer size of the Project, and the estimated $5.5 billion of required equity make privately funding the entire project unlikely.

9. Given the delivery approach and available funding sources, is an availability payment mechanism appropriate?

As indicated in our response to Question #1, we believe an availability payment mechanism could be an appropriate financing tool; however the counterparty behind the payment guaranty should be the State of California, and not the Authority. The Authority's payment guarantee is only backed by its limited, and to a degree uncertain financing sources which include cap-and-trade proceeds.

Also as noted earlier in our response, even if the availability payment is backed by the State of California, it is uncertain that there is enough equity appetite in the P3 market today to fund the entire estimated $5.5 billion of required equity. In this case, some portion of the project may have to be financed by the public sector with the remainder being procured by an availability or MRG payment mechanism.

Could financing be raised based on future revenue and ridership (i.e., a revenue concession)?

We do not believe that the project could be financed as a pure revenue risk deal without some form of support, such as a minimum revenue guaranty. This MRG would have to be fully backed by the State of California and not the Authority.

Would a revenue concession delivery strategy better achieve the Authority's objectives?

Either availability or revenue based concessions can achieve much of the Authority's key project objectives. However, we believe that revenue risk concessions have some real strategic advantages over availability payment mechanisms. Such as:

- **Integration Efficiency**: Passing through to the developer revenue responsibility allows the developer to integrate design, construction, finance, operation and revenue management, finding synergies that the public sector will be unable to find.

- **Alignment of Interests**: Interests are better aligned under a revenue risk than AP project. Under demand risk, the developer's success only takes place when the road usage is maximized or when congestion is truly relieved, which is the main public sector objective for developing the project. An AP developer does not care if the project is used or not (in fact it can be argued he benefits from low usage because this drives costs down). Interests are misaligned.

- **Private Incentive**: Transferring revenue risk encourages an enterprising approach, taps private sector insights into customer preferences and priorities, and spurs radical new ideas for scope, design and financing of the most attractive projects

As stated in our response, a pure revenue concession for this project is not advisable. However, many of the benefits of the revenue concession can be achieved by using a minimum revenue guaranty (MRG). The key MRG benefit in addition to the ones listed above is:

Better Debt Financing/Lower Subsidy – With a MRG much of the extreme downside risk to the private sector would be limited, or hedged, by the State. Financing terms (interest rates, leverage) which would be closer to an availability payment project, and would result in a lower public subsidy.

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.**

Larger projects will generally have lower total overhead costs; greater buying power; greater efficiencies in equipment and manpower use. The use of ATC's can also have greater impacts on larger projects. An example of this would be the elimination of the tunnel section on our LBJ project that saved one billion dollars.

The use of Design Build, a key component of the preferred and other recommended potential procurement methods has also proven to reduce total project timelines for design and construction. The majority of projects completed by our companies using P3 in the US are delivered significantly ahead of schedule. We have recently completed mega projects such as the LBJ project several months early and completed the North Tarrant Express project nine months early. These are from 10%-20% shorter than the contract time allowed

Examples of Cintra P3 Efficiencies

Cintra believes that the P3 model provides more savings and efficiencies than a DB or DBB procurement. P3's provide greater efficiencies (see examples below), which derives from developing projects with a lifespan perspective; from the transfer of public risks that can be better handled by the private sector; with incentivizes to innovate.

Cintra/Ferrovial Agroman Added Cost Efficiencies

3 managed lanes projects in the Dallas-Fort Worth area

Project	Estimated Cost Before Efficiencies	Implemented Efficiencies	Actual Investment
NTE 1&2W	$2.29 B	$480 M	$1.81 B
NTE 35W PDA	$1.49 B	$150 M	$1.34 B
IH 635ML (LBJ)	$3.52 B	$1.32 B	$2.20 B
Totals	**$7.30 B**	**$1.95 B**	**$5.34 B**

11. **How does this compare to separately procuring each high-speed rail component (i.e., separate contracts for civil works, rail systems, power separately)?**

The greatest savings in large complex infrastructure procurement generally happen with an integrated DBFOM. This model takes full advantages of the integration of design and construction with lifecycle and promotes the greatest quality and quantity of cost and schedule saving advanced technical concepts.

Procuring separately the civil, rail and power components can yield efficiencies provided this is coupled with some form of maintenance or maintenance and operations. Further savings can be achieved by the addition of private financing and the role of equity.

Please discuss design/construction costs, operating/maintenance/lifecycle costs, and schedule implications.

Separately procuring the different components during design and construction has both advantages and disadvantages. The advantages lie in larger more specific contracts with contractors who specialize in that particular type of work such as civil, rail, systems integration, or vehicles. These larger contracts will have greater buying power and cost efficiencies. The disadvantages lie in risk that the authority takes where these different scopes interface (civil works with tracks, tracks with systems and vehicles; systems with vehicles).

Separately procuring the components allows the specific experts to maximize total life cycle costs for their particular portion of the infrastructure – again the key difficulty will be managing the interface risk between the separate components. This risk would be certainly be a significant component in a Design-Bid-Build strategy where the Authority will absorb significantly all of this risk. In a P3 some of this risk could likely be transferred and the respective suppliers could be held responsible for their life cycle costs.

The schedule implications of separate procurements will be greatly affected by the dependent component construction. For example: Adjacent Civil packages could be constructed independently and achieve significant cost and schedule efficiencies. The rail and systems components will likely require that all of the civil be substantially complete prior to commencing construction in order to create the desired cost and schedule efficiencies. Thus one civil package that encounters difficulties or an extended schedule for unknown reasons could significantly delay follow on contracts and affect their costs and schedule..

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? Is so, please describe.**

An early review of the proposed alignment indicates that there will likely be design modifications that will optimize the tunnel, viaduct, lowered and embankment sections many general changes are being identified and modified during the current procurements. We do believe that early identification of hazardous materials, environmental constraints, and identification and acquisition of known ROW would yield significant cost and schedule acceleration. Additional Geotechnical technical investigations in tunnel and large viaduct sections and specifically near fault lines would also eliminate risk and the associated costs.

A. IOS Allocation of Costs by Segment

End of Year ($ millions)		Phase 1S IOS South Ctrl Valley to SFV	Phase 1S IOS South CP1-4 DB Contracts	Phase 1S Revised IOS South Merced to Burbank	Phase 1N IOS North San Jose to Bakersfield	Phase 1S & N San Jose/Merced to Burbank IOS
Track Structures & Track						
Civil	(civil)	$ 1,726	$ 1,727	$ (1)	$ 1,150	$ 1,149
Structures	(civil)	13,652	-	13,652	7,613	21,265
Track		1,418	-	1,418	657	2,075
Stations, terminals, intermodal		707	-	707	700	1,407
Support faciliites: yards, shops, admin bldgs		496	-	496	52	548
Sitework, row, land, existing improvements	(civil)	5,478	1,303	4,175	4,403	8,578
Communications and signaling		594	-	594	235	828
Electric traction		1,945	-	1,945	746	2,691
Vehicles		998	-	998	1,304	2,302
Professional services		3,087	-	3,087	2,015	5,102
Unallocated contingency		1,072	-	1,072	664	1,736
TOTAL HARD COSTS		31,172	3,030	28,142	19,537	47,679
TOTAL SOFT COSTS (@ 23%)		7,170	697	6,473	4,494	10,966
TOTAL COSTS TO FINANCE		$ 38,342	$ 3,727	$ 34,615	$ 24,030	$ 58,645
Multiplier to End of Year		1.122			1.325	1.363
Miles				300	110	410

B. IOS Packages Assuming a DBFM Delivery

IOS (North & South) PPP - Package Description ($ millions)	Add	Package	Sub-Package	Timing of Award	Phase 1S & N Package Value	(incl Soft Costs) Phase 1S & N Package Value
Stations, terminals, intermodal + Support Fac.	Main. + Lifecycle	1	n/a	?	$ 1,954	$ 2,404
Signaling Systems + Rolling Stock	Main. + Lifecycle	2	n/a	?	3,130	3,850
Electric traction	Main. + Lifecycle	3	n/a	?	2,691	3,310
Track	Main. + Lifecycle	4	n/a	?	2,075	2,552
Train and Infrastructure Operations	n/a	5	n/a	?	tbd	tbd
Civil - Package #1	n/a	6	1	?	3,099	3,812
Civil - Package #2	n/a	6	2	?	3,099	3,812
Civil - Package #3	n/a	6	3	?	3,099	3,812
Civil - Package #4	n/a	6	4	?	3,099	3,812
Civil - Package #5	n/a	6	5	?	3,099	3,812
Civil - Package #6	n/a	6	6	?	3,099	3,812
Civil - Package #7	n/a	6	7	?	3,099	3,812
Civil - Package #8	n/a	6	8	?	3,099	3,812
Civil - Package #9	n/a	6	9	?	3,099	3,812
Civil - Package #10	n/a	6	10	?	3,099	3,812
Other (prof. services + contingency)	n/a	1-6	n/a		6,837	8,410
Total Costs to Finance					$ 47,679	$ 58,645
Less: Assumed Public Subsidy (30%)						(17,594)
Total Private Capital (AP based P3)						41,052
Equity (13.4%)						5,501
Debt (86.6%)						35,551
Total Public Subsidy						17,594
Total Hard & Soft Costs						58,645