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Metro

PLANNING AND PROGRAMMING COMMITTEE
APRIL 18, 2012

SUBJECT: PUBLIC-PRIVATE PARTNERSHIP PROGRAM

ACTION: RECEIVE AND FILE
PROGRAM STATUS AND ANALYSIS

RECOMMENDATION

Receive and file a report on status, results and interim recommendations of the Public-Private Partnership Program (PPP) as detailed in the attached Summary of Progress and Accomplishments (Attachment A).

ISSUE

The Board has adopted the PPP Framework and requested exploration and evaluation of the potential use of PPP as a project delivery model. The PPP Workplan was subsequently adopted, setting the stage for identifying PPP candidates from among the projects included in our 2009 Long Range Transportation Plan and Measure R program. Our PPP program has placed particular emphasis on identifying projects that could attract private investment capital and thus allow for accelerated and less expensive project delivery. We have now completed screening, evaluation and significant work on the business case models for the selected projects and are preparing to move forward with recommendations for implementation and procurement of certain of those projects.

BACKGROUND

Following a rigorous procurement process, a PPP consulting team led by InfraConsult LLC of Los Angeles, and including as subcontractors KPMG LLP, Nossaman LLP, Halcrow Inc., Sharon Greene + Associates and Englander and Associates was selected in 2009 to serve as an advisory team and program management support for the PPP Program. The Scope of Work for this team consists of initial project screening and subsequent tasks to advance strategic assessments, business plan development, PPP procurement processes and an option for PPP project delivery and project management.

The initial comprehensive screening process identified fourteen transit and highway projects as the most promising candidates for private sector participation, with an initial list of six projects recommended for further consideration. These six were selected based on various factors, including modal equity, geographic distribution, PPP delivery model, public funding availability, financing options, and project readiness. The projects selected are the I-710 South Freight Corridor including the Early Action Projects, SR-710 Gap, High Desert Corridor, Crenshaw/LAX Transit Corridor, Regional Connector, and the Westside Subway Extension.

The subsequent phase of work involved comprehensive strategic assessments and the preparation of business plans for implementation of the six projects, utilizing the most appropriate project delivery model for each. Undertaking the strategic assessment of each project was essential to determine preliminary "value for money" of the P3 delivery approach, as well as life cycle cost factors and project attributes most promising for attracting private investment and/or risk sharing, as well as to recommend potential procurement strategies.

As of this date, the Strategic Assessment for each of the selected projects, and Business Plans for all three of the transit projects have been completed, with the exception of additional required analysis of project financing structure assumptions and cash flow of sources and uses of funds, which is needed to understand Metro's net funding requirements for the transit and highway projects. The Business Plans for the three highway projects are nearing completion and should be available in late May.

Included for reference as Attachments B through F are the following documents:

- Attachment B - Public-Private Partnership Delivery Options: Initial Six Measure R Projects
- Attachment C - Recommendations for Business Case Development
- Attachment D - Crenshaw/LAX Light Rail Project Business Plan
- Attachment E - Regional Connector Business Plan
- Attachment F - Westside Subway Extension Business Plan

Although the final Business Plans for the highway projects are in preparation, interim recommendations for proceeding with PPP approaches for the High Desert Corridor, SR 710 North Gap, and I-710 South Freight Corridor projects are contained in Attachment C, pages 45, 52, and 58, respectively.

Completion of the Business Plans correlates to the environmental clearance process for each of the six projects. That is the primary reason that the transit projects were completed first, while the highway project business plans are still in final development. Metro's environmental clearance work for the highway projects is about two years behind the environmental work for the transit projects. The Draft EIR/S for the I-710 South and Early Action Projects is due to be completed in early summer 2012, but the environmental work for the High Desert Corridor and the SR-710 Gap projects has only gotten underway in the last 6-8 months.

BUSINESS PLAN RECOMMENDATIONS

Transit Projects

The results of our analysis indicate that the recommendation for all three transit projects should be for partial or full design/build project delivery rather than a full PPP structure with private financial participation. While certain risks related to design and construction completion should be allocated to design/build contractors, it is unlikely that the project delivery structure would benefit from significant financial participation or transference of long-term operations and maintenance obligations. The primary reason for this is the fact that all three projects interconnect with existing service, making it difficult to establish responsibility for appropriate operations and maintenance practices, which is essential in order to establish clear and unambiguous accountability.

There are several discrete capital components of all the projects which could be designed, built and maintained by the private contractor, such as elevator, escalator and other station facilities. Additionally, there is also the opportunity to consider bridge financing by contractors to better leverage Measure R funds availability and capture the opportunity to have contractors' "skin in the game".

The recommendations are more fully detailed in the attached Business Plans.

Highway Projects

The evaluation of the highway projects indicated that all have significant potential to be delivered using one of two basic approaches to public-private partnerships, namely the *availability payment model* and the *revenue risk concession model.*

The availability payment model can be applied to all projects, regardless of the magnitude of a toll revenue stream, while the revenue risk model is generally used most effectively for a project with a robust toll revenue stream that can cover all or a significant portion of the project's capital and operating costs.

An availability payment model is generally used for those projects that either do not have a user-based revenue stream (i.e., tolls), or those that do have a user-fee or tolling program, but generate insufficient revenue from such fees or tolls to fully cover the project's capital construction costs and/or operations and maintenance costs. A combination of public subsidy and user fee revenue is often used to create a financial resource pool to cover the concessionaire's availability payments, to the extent the facility is fully "available" for use over the concession period. The payments are to be sufficient to permit a reasonable return on investment and repayment of debt services on borrowed funds. This model, of course, is also the one which applies when a project is not tolled, and a combination of public funding sources are sufficient to cover the concessionaire's availability payment series.

The revenue risk concession model can be utilized for those projects in which revenue from tolls and other user-based fees is projected to be sufficient to allow a concessionaire to undertake a full DBFOM PPP without a public subsidy. In such cases, the concessionaire or the project sponsor accepts the actual toll revenue stream as sufficient to cover repayment of a private equity investment with a suitable risk-based return, and to service outstanding debt. Often, this model is applied to a toll highway project that either has a proven toll revenue history and is in need of capacity enhancements, or a "greenfield" project that is likely to produce a robust revenue stream from opening day onward.

The highway project Business Plans reflect these two approaches. All three initial projects – the High Desert Corridor, the I-710 South Freight Corridor, and the SR-710 Gap – are recommended for public-private partnership project development and delivery using either the availability payment model or the toll revenue concession model. The Business Plans, currently nearing completion, reflect the following respective directions:

The High Desert Corridor (HDC) should be developed using an availability payment approach. The HDC is a "greenfield" project for which forecasting models indicate that toll revenues generated will be insufficient to cover the full capital costs of construction, presenting a significant funding gap. This public funding gap could be closed by potential federal investment in *"freight and travel corridors of significant national interest,"* as well as revenues generated from the development of a *"renewable energy corridor"* strategy in the HDC and a potential joint development initiative with Desert Express High Speed Train program. This initiative would involve building an extension of the proposed privately-financed high speed train between Las Vegas NV and Victorville CA, from Victorville westward to Palmdale along HDC. The long-range vision is to have a multimodal corridor interconnecting the Desert Express with California's High Speed Rail Project.

The I-710 Freight Corridor is also recommended to be undertaken as an availability-payment based public-private partnership. The PPP project is defined as a separate truck-only facility, largely on an elevated structure, paralleling the existing I-710 Long Beach Freeway from the Ports of Los Angeles and Long Beach northward. To create economic viability and to serve the primary purpose of reducing congestion and improving safety, tolls would need to be charged to all trucks using the I-710 corridor. The current operating scheme, yet to be fully endorsed by all stakeholders, envisions that tolls would be dynamic (i.e., varied by time of day and day of week, as a function of congestion), and significantly greater for trucks opting to use the I-710 general purpose lanes rather than the truck-only facility. In addition, to meet the objective of improving air quality in the region, there is discussion about lowering or eliminating tolls for trucks utilizing low-emission or zero-emission technology. Similar to the HDC, a significant funding gap exists between available funding sources and the costs necessary to construct and operate this facility.

The SR-710 Gap Project will be a five mile connection between the I-10 and the I-210 Freeway. While the environmental and engineering studies currently underway by Metro will result in a final ROD and preferred alternative for the project, a nominal tunnel project has been modeled for undertaking the PPP business planning process. As a PPP, this project would be recommended to be undertaken as a toll concession, with the concessionaire taking toll revenue risk, owing to the projected financial strength of the toll revenue stream. As a "gap closure" rather than a "greenfield" project, traffic volumes – and hence toll revenue – are projected to be extremely high from opening day forward. The Business Plan concludes that there is a strong likelihood the SR-710 Gap Project will be successful in attracting a DBFOM consortium to implement and operate the project at a cost to Metro less than that allocated in the Measure R Program.

Additional Projects

In addition to the projects discussed above, we have applied the PPP model and analysis to several other potential highway and multimodal projects. The Sepulveda Pass Transportation Corridor was conceived by the consulting team as an opportunity for a full revenue-risk concession (DBFOM) providing both transit and highway/toll road alternatives to the I-405 through the Sepulveda Pass between the north San Fernando Valley and the Westside/LAX. An initial feasibility study and evaluation of alternatives is currently underway by Metro's Planning Department, and if the Board determines to pursue a PPP alternative, it is anticipated the project could be greatly accelerated as it is likely to attract significant private risk investment that could provide all the current funding "gap" in Measure R funds allocated to the project.

The PPP consultant team and internal PPP staff have also been working with Metro's highway staff to assemble a package of several discrete highway and goods movement projects that are nearly fully funded and environmentally cleared. The concept is to bundle five or more projects that could be offered as a package to a PPP contractor, accelerating project delivery and likely assuring a reduction in construction costs.

NEXT STEPS

The schedules for advancing procurement of any of these potential PPP projects is tied to completion of the Draft Environmental Impact Reports/Statements (EIS/R) for these projects. Requests for Information ("RFI") and/or industry outreach can be conducted while the environmental work is ongoing. Requests for Qualifications ("RFQ") can be developed and distributed to interested investors, contractors and operators shortly thereafter. Requests for Proposals ("RFP") would be prepared during the Final EIS/R preparation period, and can be released as the date on which federal Record of Decision ("ROD") and state Notice of Determination ("NOD") approaches. This will allow contractor selection to be completed and construction to commence immediately upon ROD/NOD.

The strategic analysis and business plan development of the highway/goods movement package is nearly completed, and we anticipate issuing an RFI and/or inviting formal industry input in the next two months. An RFI for the I-710 Freight Corridor project could be issued in June of 2012, provided the funding gap issue is addressed. The SR-710 Gap RFI could be issued in September or October of 2012, and we anticipate starting work on the RFI for a potential Sepulveda Pass Transportation Corridor PPP project in the near future in order to be prepared to move forward immediately upon Board direction to proceed.

Supplemental Tasks 3A-1 and 3A-5 will be issued to InfraConsult LLC for the additional required analysis of project financing structure assumptions and cash flow of sources and uses of funds.

Delivery of the Business Plans completes the current contract activity of the consultant team. We anticipate returning to the Board in May with specific recommendations and will request authorization to proceed with the procurement phase of the consultant's contract.

ATTACHMENTS

A. Summary of Progress and Accomplishments, March 15, 2012
B. Public-Private Partnership Delivery Options: Initial Six Measure R Projects, July 2010
C. Recommendations for Business Case Development, February 2011
D. Crenshaw/LAX Light Rail Project Business Plan, January 2012
E. Regional Connector Business Plan, January 2012
F. Westside Subway Extension Business Plan, January 2012

Roger Moliere
Chief, Real Property Management and Development

Arthur T. Leahy
Chief Executive Officer

ATTACHMENT A

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

PUBLIC-PRIVATE PARTNERSHIP PROGRAM

Summary of Progress and Accomplishments
InfraConsult LLC
March 15, 2012

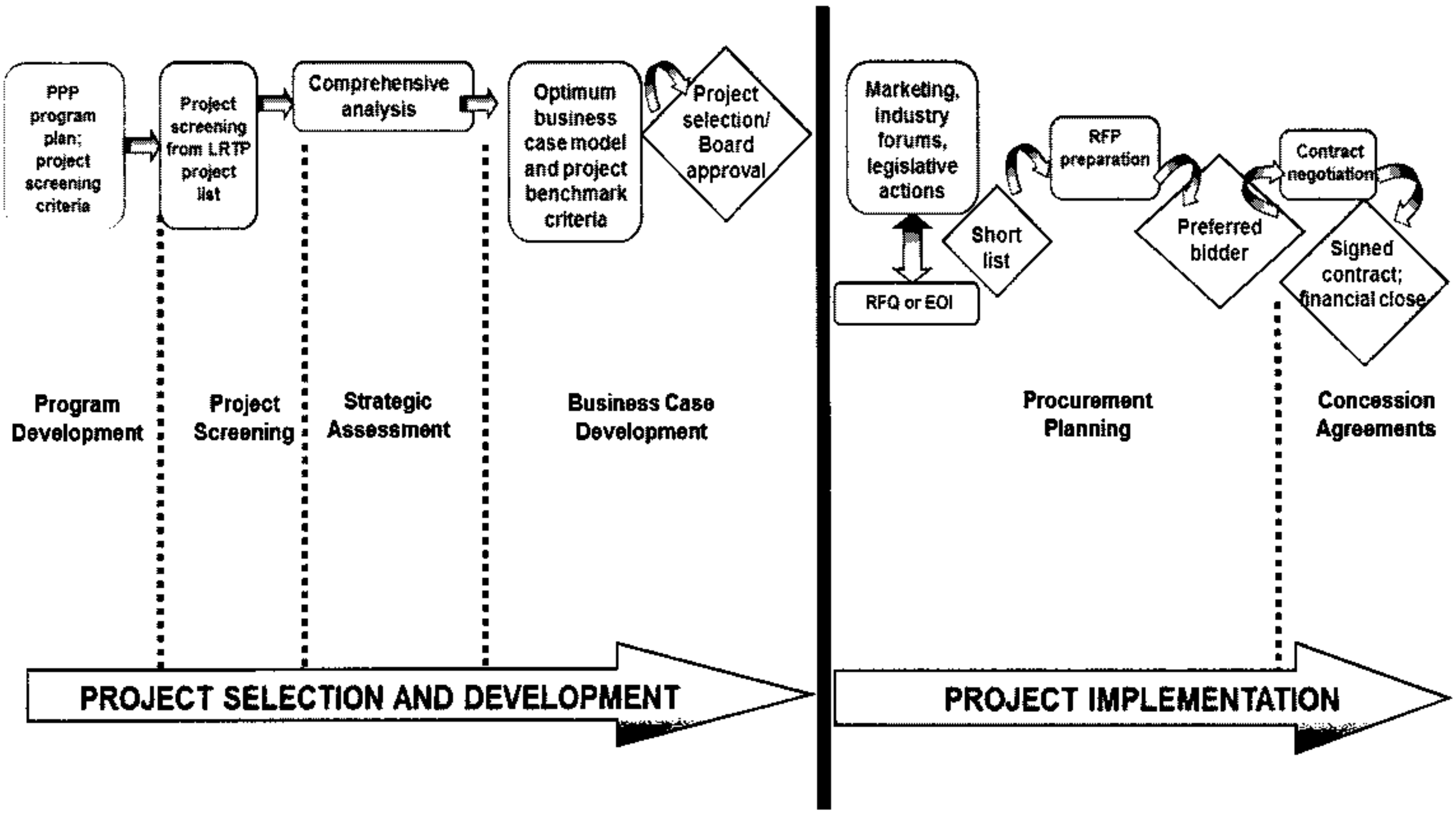
This report provides an overview of work accomplished, analyses performed, initial conclusions and recommendations, and the next steps in Metro's Public-Private Partnership Program.

By definition, public-private partnerships are contractual arrangements between a governmental agency and a private entity for the primary purpose of developing, operating and/or maintaining public infrastructure normally in the domain of the governmental sector. A variety of P3 models have been utilized throughout the world, having the common objective of facilitating private sector participation in the provision of public works and thereby transferring to or sharing with the private partners some or all of the traditional public responsibility and risks for financing, designing, constructing, maintaining and/or operating various infrastructure projects.

In 2007, the LACMTA (Metro) Board moved forward with an initiative to explore the prospect of utilizing private sector participation in the funding, financing and delivery of projects specified in the region's Long Range Transportation Plan. In response to an initial solicitation of interest and request for industry input on the potential role of public-private partnerships, the Board received numerous and varied concepts and proposals from engineers, constructors, bankers and investors throughout the United States and abroad. Once these responses were evaluated, staff produced a comprehensive RFP soliciting a consortium to serve as Metro's advisor and program manager for implementing a program to explore and increase opportunities for the private sector to partner with Metro in the delivery of projects. A highly experienced and global team, led by InfraConsult LLC and including KPMG LLP, Nossaman LLP, Halcrow Inc., Sharon Greene + Associates and Englander and Associates, was selected through a rigorous procurement process to serve as the advisory team and program management support for the P3 Program.

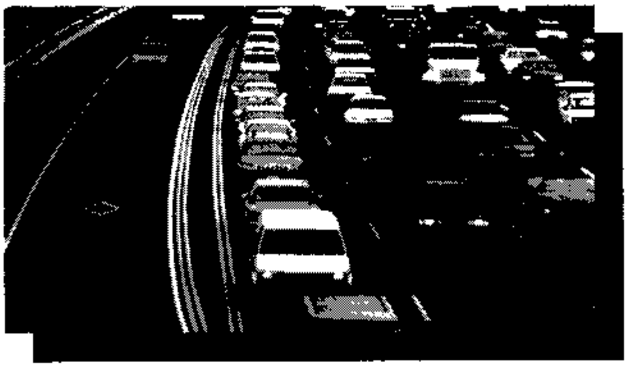
In November, 2008, Measure R was passed by the voters of Los Angeles County with a two-thirds affirmative vote. Since the primary objectives of P3s in transportation are to (1) enhance the ability to leverage effectively existing funding;(2) generate additional sources of capital for project delivery, often through user-fee revenues; (3) accelerate the delivery of projects during and beyond the environmental clearance phase; and (4) transfer certain risks of capital construction and long-term operations from the public to the private sector, Metro's Public-Private Partnerships Program took on a new and important dimension. With the availability of over $35 billion in funding for capital and operations of both transit and highway programs in the region over three decades, the opportunities for leveraging Measure R funds with financial and delivery support of the private sector increased dramatically.

The P3 Program is structured in several phases. The diagram below illustrates the process which is being utilized to move selected projects through the screening and development phases, and beyond into procurement, contracting, and delivery to the public.



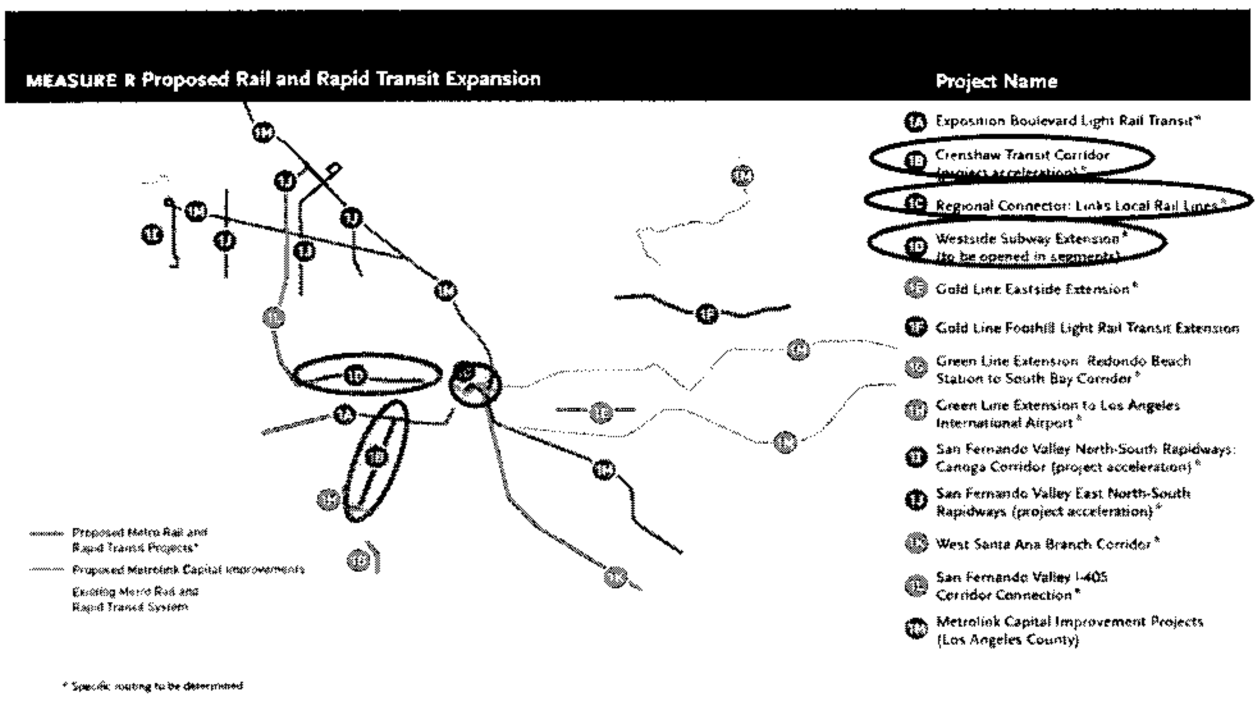
The first phases involved examining all of the more than 85 projects named specifically in the Long Range Transportation Plan and the newly adopted Measure "R" program of projects. This examination included a comprehensive screening process in which all projects – both transit and highway – were evaluated with respect to their potential for utilization of private sector participation in project delivery. Private partnership, in this context, includes financial involvement as well as life-cycle operation and maintenance. All forms of non-traditional project delivery, ranging from design-build (DB) to design-build-finance-operate-maintain (DBFOM), were included in the analysis.

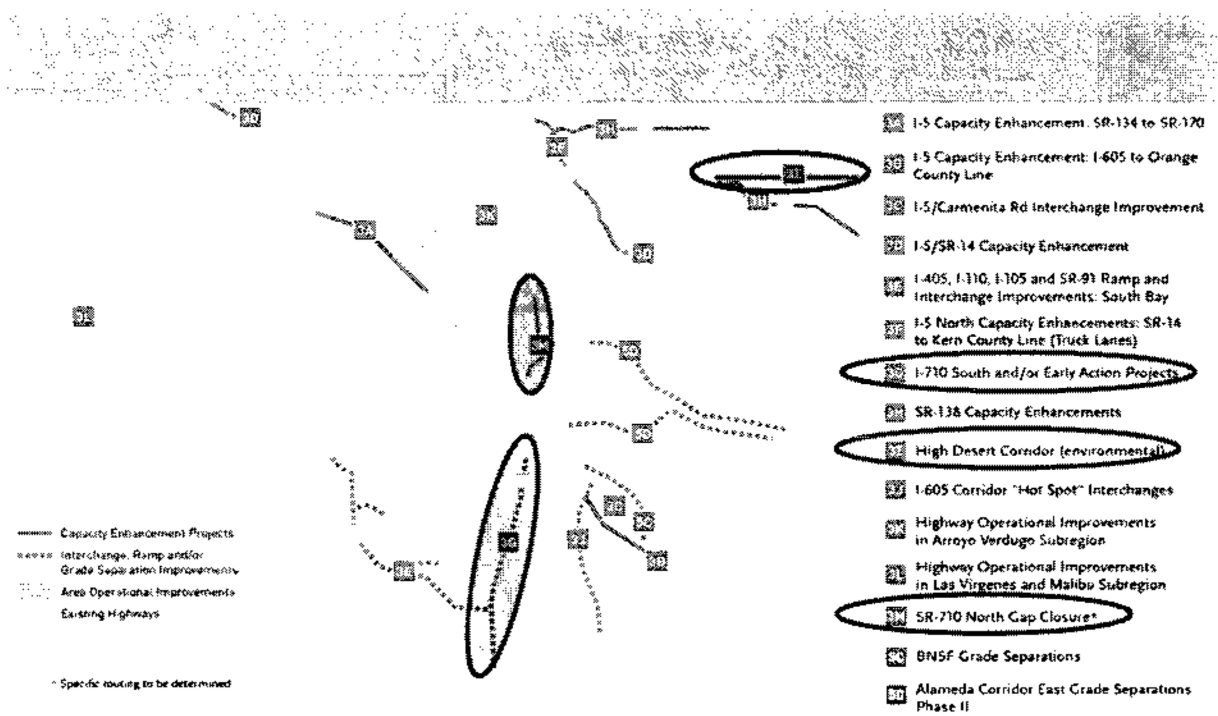
Through a comprehensive screening process, fourteen projects across the County were identified initially as having strong potential to utilize delivery processes involving a greater level of participation by private sector entities. Delivery options range from use of DB approaches with no significant financial involvement by the private sector, to DBFOM full concession schemes in which private sector project sponsors invest and lend money for project development and delivery, build and operate/maintain the projects, and ultimately realize a suitable risk-based return on investment and debt repayment during a long-term concession period.



An initial six projects were selected for further analysis, with project "readiness" being a key criterion in the selection. Three transit and three highway projects comprised this list, as highlighted on the following pages. The six projects are Westside Subway Extension, Regional Connector, and Crenshaw/LAX Rail Corridor (transit projects) and High Desert Corridor Project, I-710 South Freight Corridor Project and SR-710 Extension/Gap Closure Project (highway projects).

A comprehensive strategic analysis was undertaken to determine the optimum means by which each of the six projects could generate maximum value to Metro deriving from private sector participation. The process and outcome of the strategic analysis is contained in the report "Recommendations for Business Case Development" dated February 2011.





The next phase of work involved developing comprehensive business plans for implementation of each of the six projects utilizing the most appropriate P3 model, the results of which are described below.

Results and Recommendations from the Business Planning Process

The primary objectives, and the Board-adopted PPP goals, utilized in developing business plan recommendations for the selected projects are:

- Achieve most cost-effective use of public funds
- Accelerate project delivery
- Optimize risk sharing between the public to the private sectors
- Ensure asset quality throughout the project life cycle
- Provide highest-quality service for the traveling public

Transit Project Business Plans

The business plans for all three transit projects recommend that each should be delivered partially or fully as a design-build project. This means that while certain risks related to design and construction completion should be transferred beneficially from Metro to private sector design-build contractors, it is unlikely that significant financial participation or long-term involvement of private contractors in the operations and maintenance of these projects, once built, will be employed in project delivery. However, options do remain open – for a time – for Metro to consider extending maintenance and operation activities to design-build contractors, and/or consider selective "bridge financing" by contractors to better leverage Measure R funds availability.

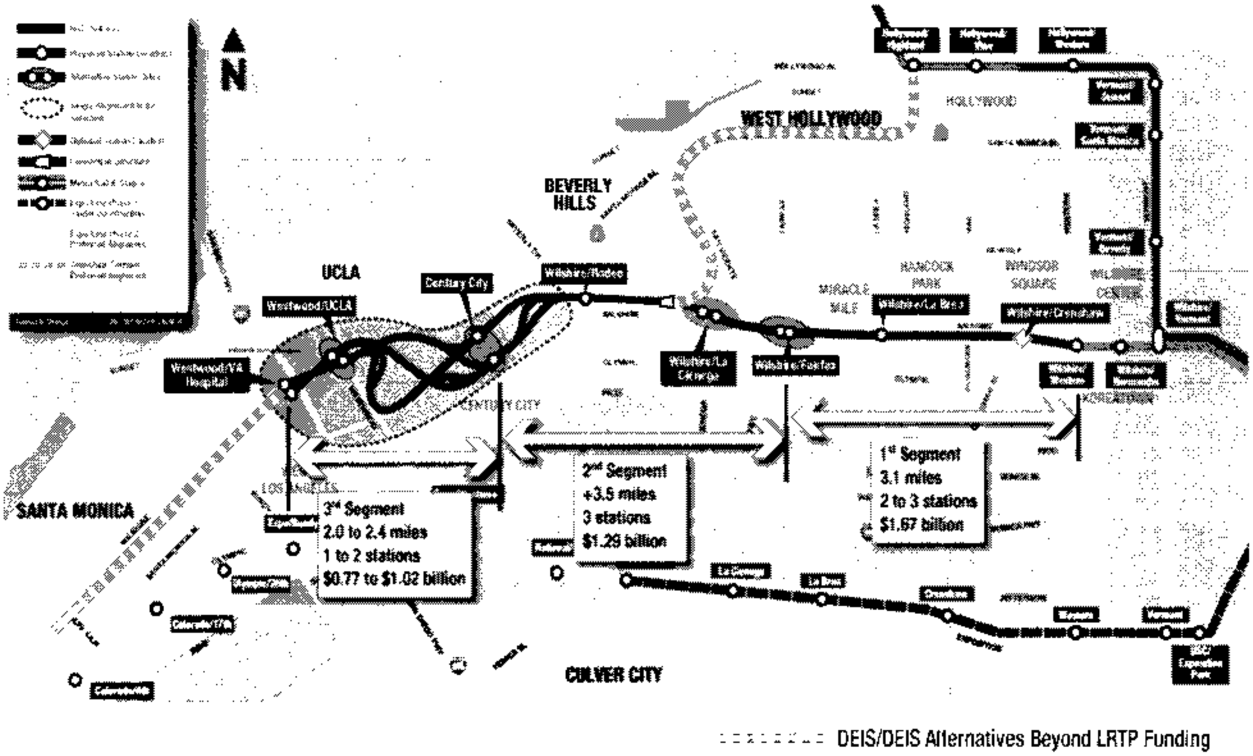
There are a number of reasons for recommending design-build project delivery rather than full concessions, all of which are detailed explicitly in the project Business Plans. First and foremost, all three projects are either extensions of existing transit lines, or interline with existing services. One of the principal reasons for undertaking a transit public-private partnership is the financial benefit resulting from the likely efficiencies of long-term private management of transit operations and maintenance services. In order for a transit P3 arrangement to realize its full potential, the public sector roles in system operation and maintenance would need to be replaced by private sector contractors, so there is little or no interdependence among various systems elements, and accountability is clear and unambiguous among parties. Public-private partnerships require a clearly defined risk allocation between the public and private sectors, so that performance metrics can be established and applied appropriately.

Upon extensive evaluation and review of other transit systems around the world that have utilized a P3 approach, it was recognized that the difficulty of coordinating public sector union operations and maintenance services with newly organized private O&M services for extending an existing line (e.g., Westside Subway Extension) or interconnecting existing lines (e.g., Regional Connector, Crenshaw/LAX) would be an undertaking unlikely to yield sufficiently beneficial "*value for money*."

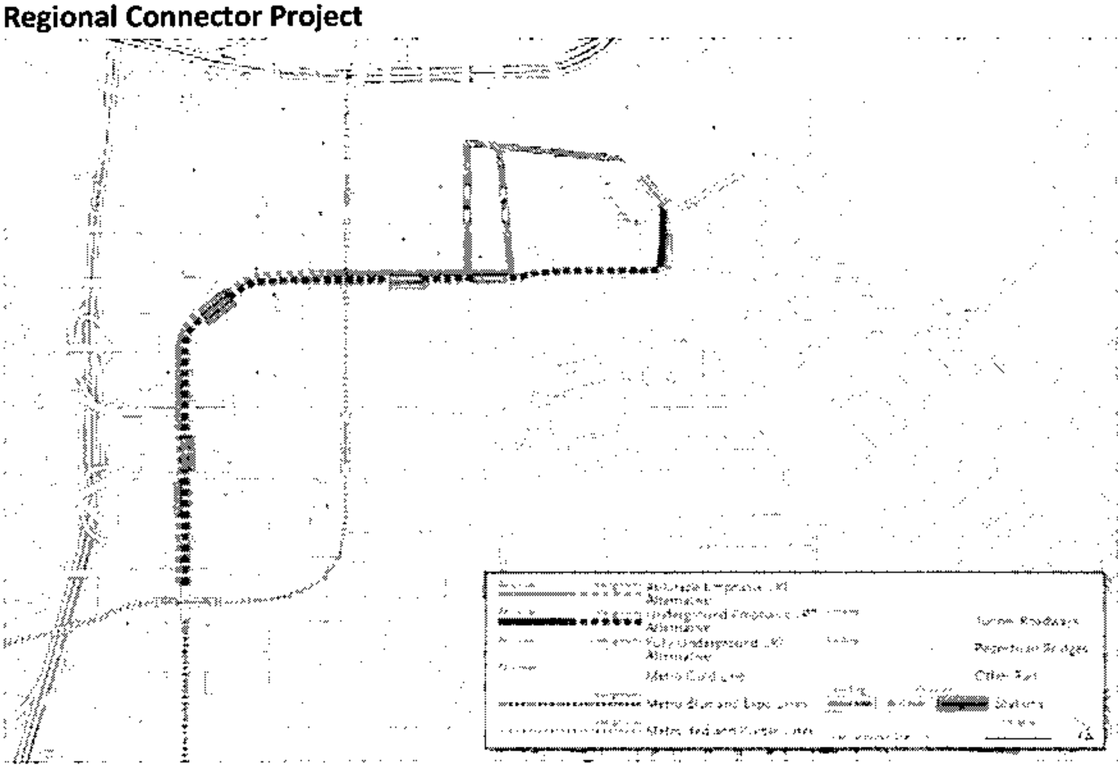
Looking at a comparable example, the Denver RTD is undertaking a public-private partnership to deliver several new commuter rail lines in the Denver Metropolitan region. The so-called "*Eagle P3 Program*" was structured to involve a private consortium in the financing, design, construction, operations, and maintenance of these new transit lines. Through a competitive procurement process, a consortium was selected last year to perform these functions. Notably, the overall cost of the capital construction and O&M during the concession period was substantially less than RTD estimated the cost to be under traditional design-bid-build project delivery.

The Eagle P3 Program in Denver differs significantly from Los Angeles, however, in that the new commuter rail lines are effectively *greenfield* projects. These systems are totally new lines, having no connections or extensions to any existing services currently offered by RTD. Where such is the case, undertaking a P3 delivery approach is much more likely to assure success and cost savings.

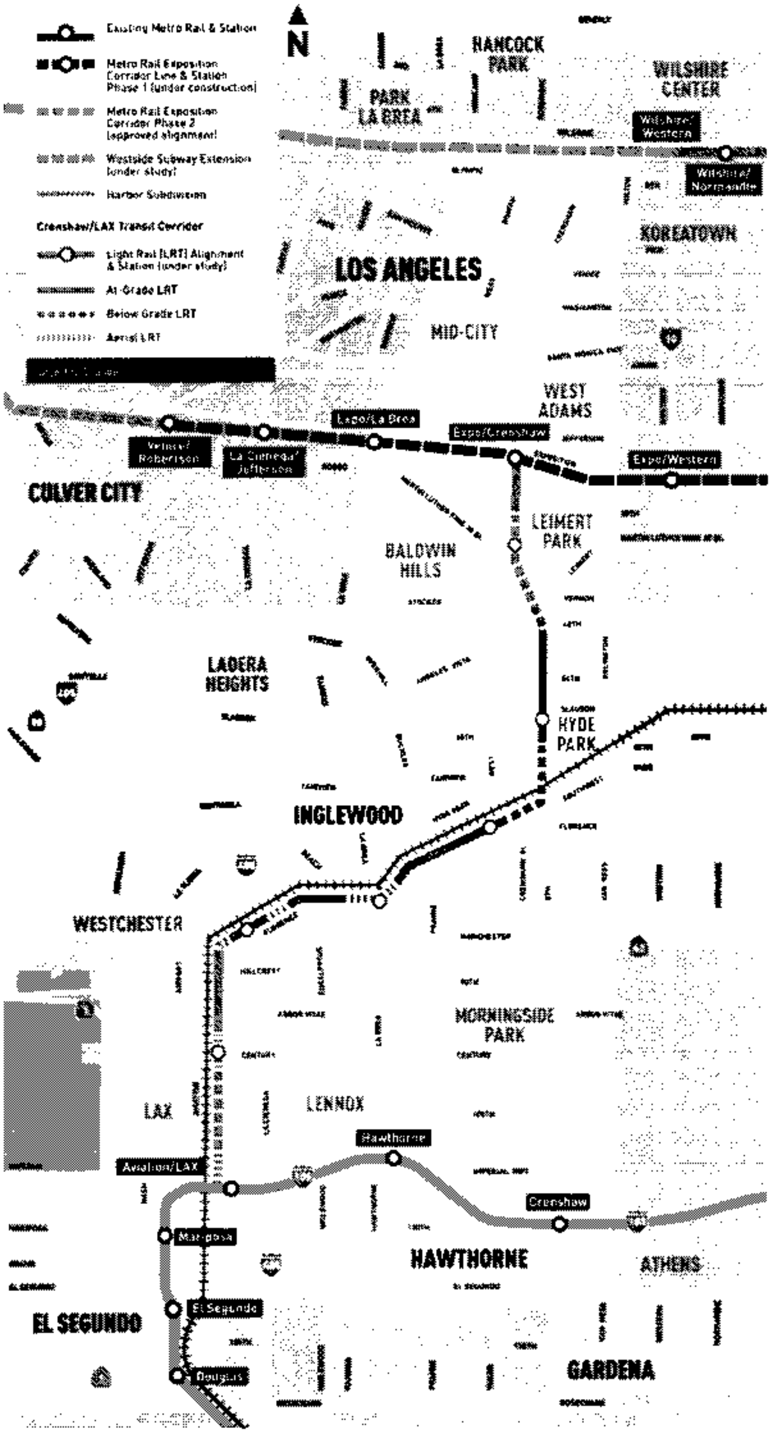
Westside Subway Extension Project



Regional Connector Project



Crenshaw/LAX Light Rail Project



Despite this overarching recommendation, there are several capital elements that could be designed, built and maintained under a long-term private contract. For example, vertical transportation systems (i.e., elevators and escalators), could be the subject of a contract in which a life-cycle P3 contract is utilized to transfer construction and maintenance risk from Metro to a supplier/maintainer. As an example, the Metropolitan Transportation Authority in New York, as part of its $8+ billion East Side Access Project, recently entered into a multi-decade contract with Shindler Corporation to design, install and maintain all elevators and escalators throughout the system, and assure their "availability" to riders through an availability-payment based public-private partnership

When Metro embarks on an entirely new transit corridor, which is neither an extension of an existing line nor an interconnected/interlined element of the regional system, it is recommended that a DBFOM-based public-private partnership be undertaken to deliver such a project. From the findings of the P3 advisory work to date, a significant sum of money and Measure R resources could be saved utilizing the P3 approach.

Highway Project Business Plans

The evaluation of the highway projects examined during the business planning process indicated that all have significant potential to be delivered using one of two basic approaches to public-private partnerships, namely the *availability payment model* and the *revenue risk concession model.* The availability payment model can be applied to all projects, regardless of the magnitude of a toll revenue stream, while the revenue risk model is generally used most effectively for a project with a robust toll revenue stream that can cover all or a significant portion of the project's capital and operating cost.

An availability payment model is generally used for those projects that either do not have a user-based revenue stream or those that dohave a user-fee or tolling program, but generate insufficient revenue from such fees or tolls to fully cover the project's capital construction costs and/or operations and maintenance costs. A combination of public subsidy and user fee revenue is often used to create a financial resource pool to cover the concessionaire's availability payments, to the extent the facility is fully "available" for use over the concession period. The payments are to be sufficient to permit a reasonable return on investment and repayment of debt services on borrowed funds. This model, of course, is also the one which applies when a project is not tolled, and a combination of public funding sources are sufficient to cover the concessionaire's availability payment series.

The second public-private partnership model, the revenue risk concession, can be utilized for those projects in which revenue from tolls and other user-based fees is projected to be sufficient to allow a concessionaire to undertake a full DBFOM P3 without a public subsidy. The concessionaire is willing to accept the actual toll revenue stream as sufficient to cover repayment of principal investment with a suitable risk-based return, and to service outstanding debt. Often, this model is applied to a toll highway project that either has a proven toll revenue history and is in need of capacity enhancements, or a "greenfield" project that is likely to produce a robust revenue stream from opening day onward.

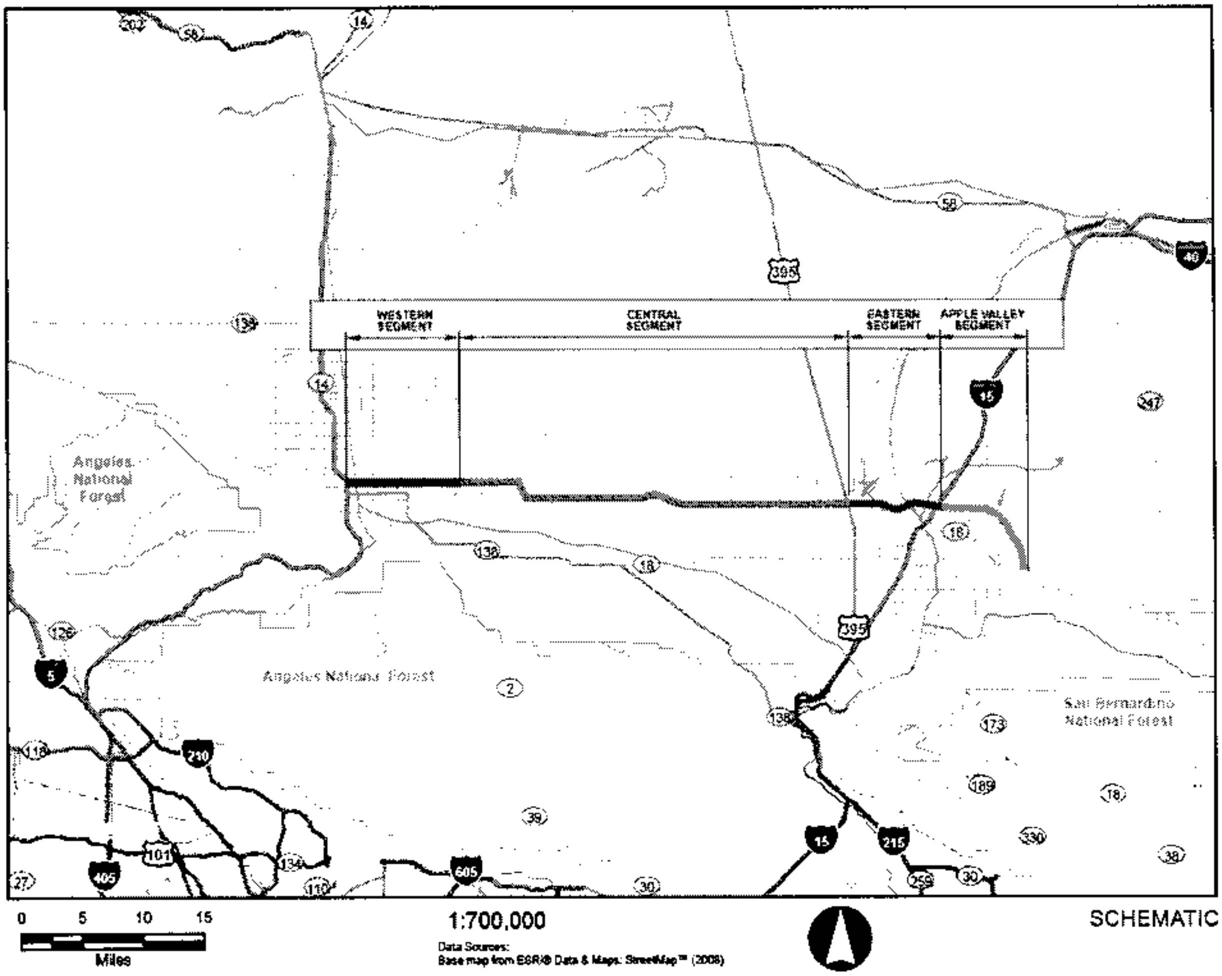
The revenue risk model can also apply in those cases where a stipulated public subsidy ("public investment") is provided to the concessionaire, and the remainder of the funding and financing is provided by private concessionaire. The risk of revenue generation from tolls and other sources is held by the concessionaire.

The highway project business plans reflect these two approaches. All three initial projects – the High Desert Corridor, the I-710 South Freight Corridor, and the SR 710 Extension Gap Closure – are recommended for public-private project development and delivery using either the availability payment model or the toll revenue concession model. The business plans report the following:

- The High Desert Corridor (HDC) should be developed using an availability payment approach. This conclusion was reached as the HDC is a greenfield project for which forecasting models indicate that toll revenues generated will be insufficient to cover the full capital costs of construction, presenting a significant funding gap. This public funding gap could be closed by potential federal investment in *"freight and travel corridors of significant national interest,"* as well as revenues generated from the development of a *"renewable energy corridor"* strategy in the HDC and a potential joint development initiative with Desert Express High Speed Train program. This initiative would involve building an extension of the proposed privately-financed high speed train between Las Vegas NV and Victorville CA, along the High Desert Corridor, from Victorville westward to Palmdale. The long-range vision is to have a multimodal corridor extending eastward from Palmdale, where the Desert Express would interconnect with California's High Speed Rail Project.

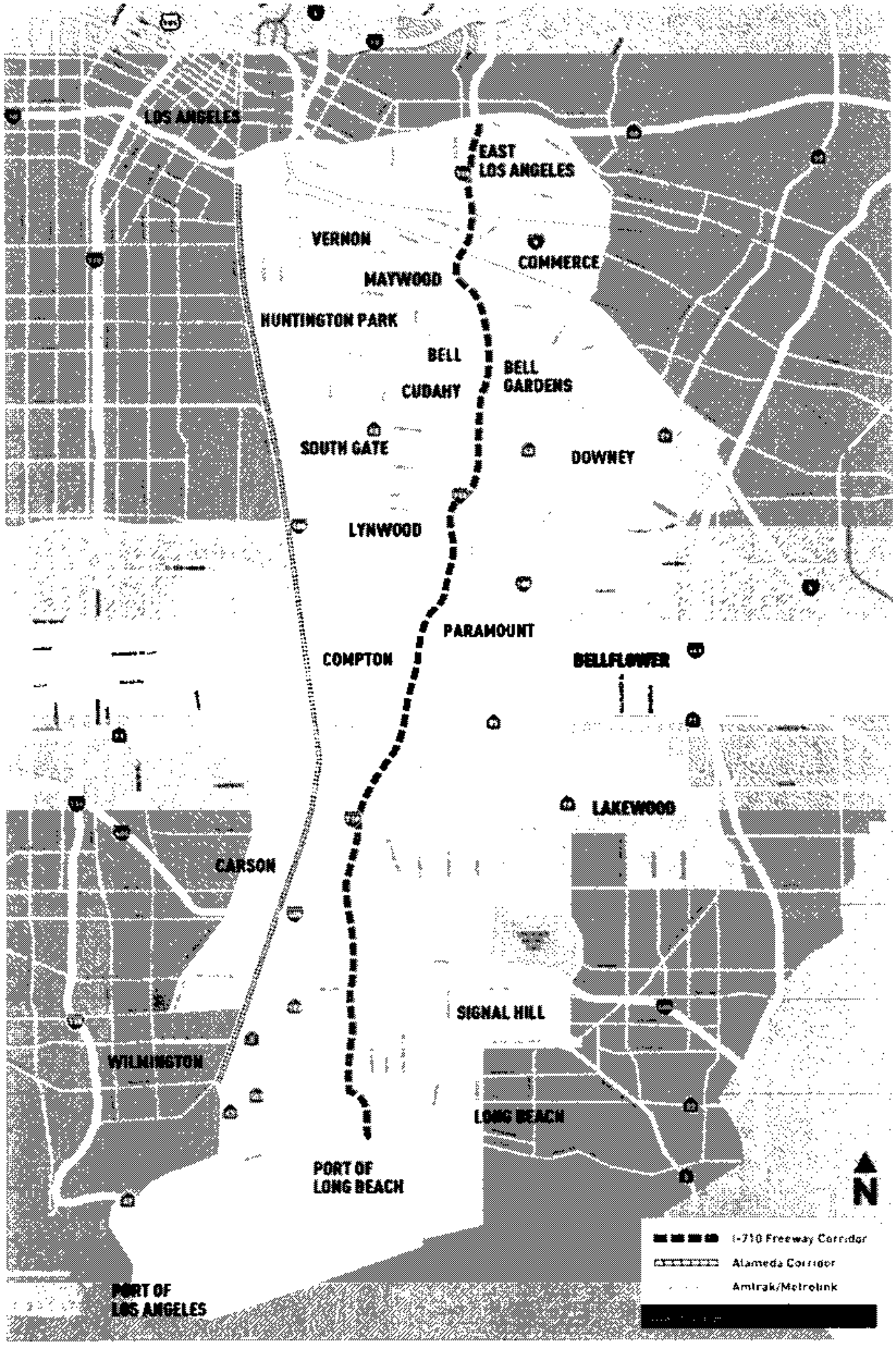
- The I-710 Freight Corridor is also recommended to be undertaken as an availability-payment based public-private partnership. The P3 project is defined as a separate truck-only facility, largely on an elevated structure, paralleling the existing I-710 Long Beach Freeway from the Ports of Los Angeles and Long Beach northward. To create economic viability and to serve the primary purpose of reducing congestion and improving safety, tolls would need to be charged to all trucks using the I-710 corridor. The current operating scheme, yet to be fully endorsed by all stakeholders, envisions that tolls would be dynamic (i.e., varied by time of day and day of week, as a function of congestion), and significantly greater for trucks opting to use the I-710 general purpose lanes rather than the truck-only facility. In addition, to meet the objective of improving air quality in the region, there is discussion about lowering or eliminating tolls for trucks utilizing low-emission or zero-emission technology. Similar to the High Desert Corridor, a significant funding gap exists between available funding sources and the costs necessary to construct and operate the goods movement facility.

High Desert Corridor Project

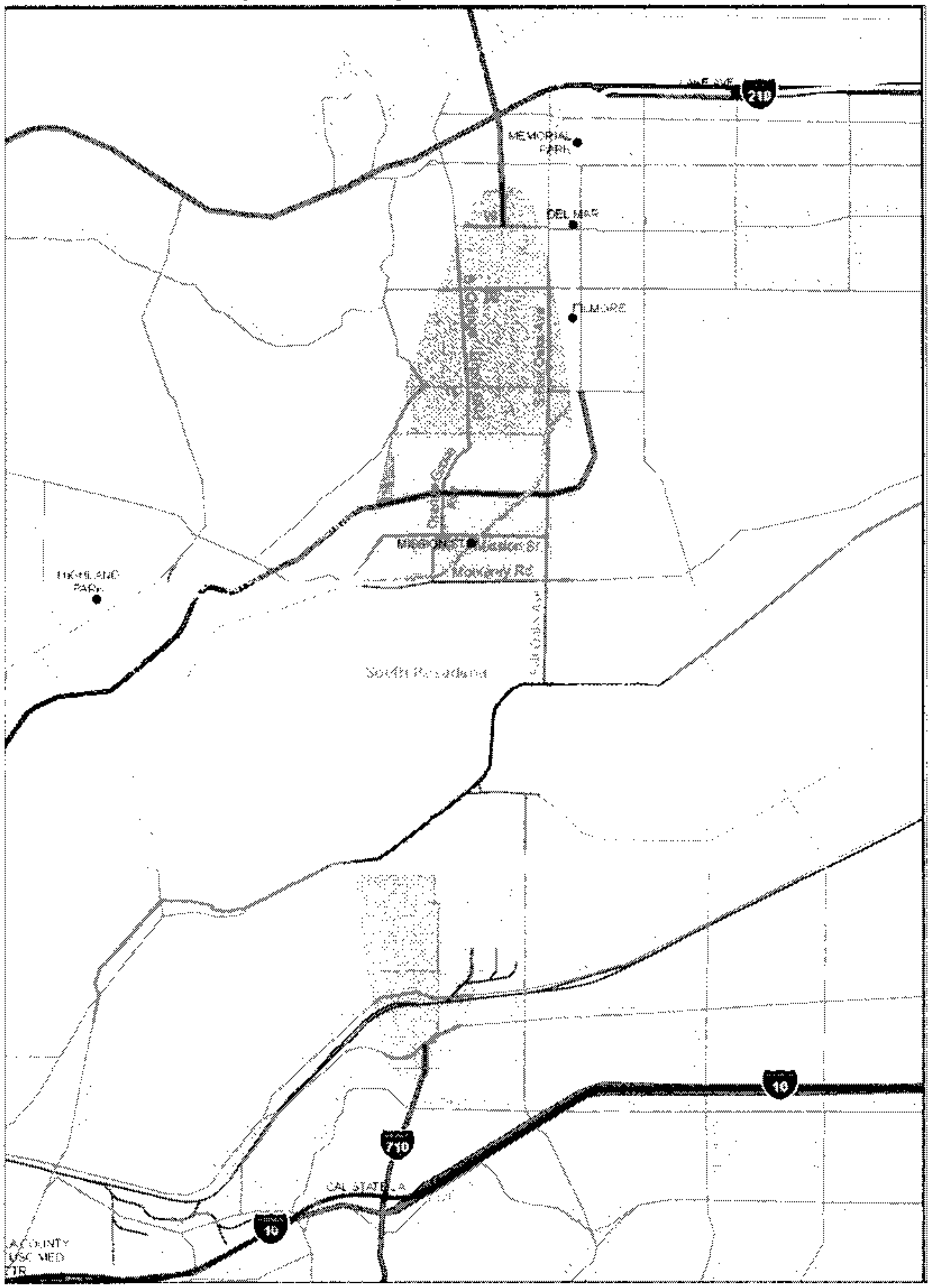


- The SR 710 Gap Closure Project will be a 5 mile connection between the I-10 and the I-210 Freeway to the north. While the environmental and engineering studies currently underway by Metro will result in a final ROD and preferred alternative for the project, a nominal tunnel project has been assumed for undertaking the P3 business planning process. As a P3, this project would be recommended to be undertaken as a toll concession, with the concessionaire taking toll revenue risk, owing to the projected financial strength of the toll revenue stream. As a "gap closure" rather than a "greenfield" project, traffic volumes – and hence toll revenue – are projected to be extremely high from opening day forward. The Business Plan concludes that there is a strong likelihood the SR 710 Gap Closure Project will be successful in attracting a DBFOM consortium to implement and operate the project at a cost to Metro less than that allocated in the Measure R Program.

I-710 South (Long Beach Freeway) Freight Corridor Project



SR 710 Extension Gap Closure Project



In addition to the initial six projects, a seventh project recently conceived by the consulting team is the Sepulveda Pass Transportation Corridor, illustrated on the following page. Metro Planning staff are currently conducting an initial feasibility study and evaluation of alternatives that could be developed, including a multi-modal grade separated transit and express toll road facility, for a project in this corridor. The feasibility study is expected to be completed later in 2012. An initial concept paper describing the basic P3 approach for developing a major multi-modal project in the Sepulveda Pass Corridor is attached as an Appendix to this Report.

- The Sepulveda Pass Project, although still in feasibility study mode by Metro staff, could likely be developed as a full revenue-risk concession, owing to the long-standing transportation needs in the Valley-Westside corridor. Providing both transit and highway/toll road alternatives to the I-405 through Sepulveda Pass could facilitate a robust tolling and possibly premium transit fare approach. This project could advance quite quickly, since it would not be a federal "New Start" project (such as the Westside Subway Extension and the Regional Connector), and thus the extensive requirements of the Federal Transit Administration for New Start Projects would be unnecessary.

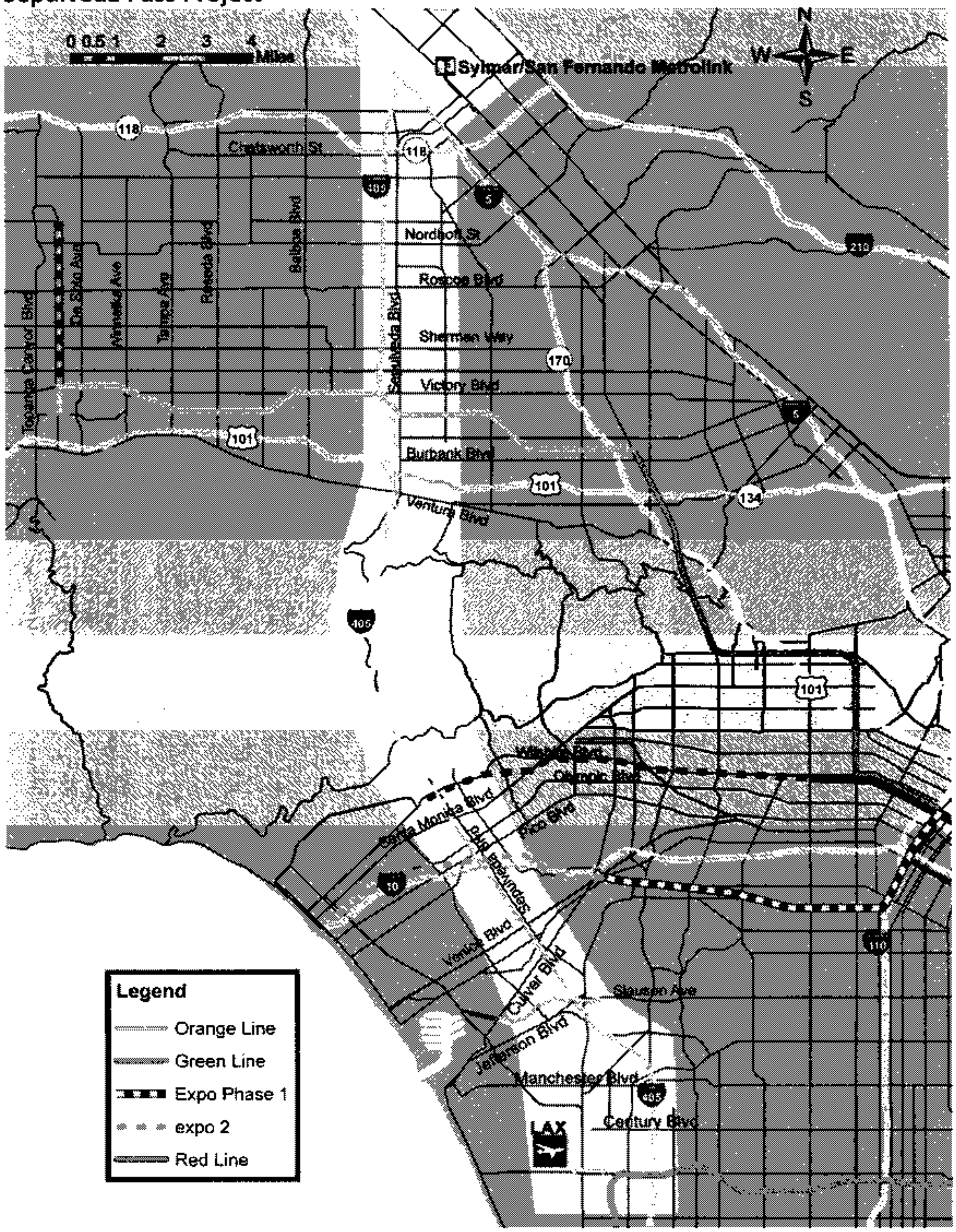
Packaging Smaller Projects for P3 Delivery

In addition to the four projects discussed above, the P3 team has also been working over the last several months on assembling a *package* of several discrete highway and goods movement projects that are essentially "shovel ready." As the environmental work for these smaller projects has been largely completed, the concept is to create a bundle of projects – including HOV lane additions, soundwalls, highway extensions, etc. – that could be offered as a package to a P3/design-build contractor, thereby accelerating the project delivery and likely assuring a scale-related reduction in construction costs. The Board will be briefed separately on this "early start" program in the next 2-3 months once the program is readied for potential procurement actions.

Next Steps

The Public-Private Partnership Program at Metro has accomplished a great deal in its short tenure. Many other states and transportation authorities have taken a decade or more to establish an embedded process for examining projects having potential for P3 delivery. In fact, it is anticipated that at least one, and possibly three, of the highway projects summarized above could be ready for initial industry solicitation within calendar year 2012. As defined in the P3 Program Advisory Services Scope of Work, and pending Board authorization, the InfraConsult team has as its next steps the development of procurement materials, potential concession agreement documents, and the initiation of a formal process to use P3s to accelerate project delivery and save substantial monies programmed in the Measure R program of projects.

Sepulveda Pass Project



InfraConsult

Sepulveda Pass Corridor Project
Preliminary Public-Private Partnership Concept

This Paper describes a concept for expediting the development and implementation of a regional transportation corridor between the San Fernando Valley and the Westside of Los Angeles, with a significant portion of the initial and ongoing costs for project development, design and construction, and operations and maintenance borne potentially by private sector.

- The transit connection between the San Fernando Valley and the Westside of Los Angeles has been discussed – in concept – for many years. There are many who believe that the existing demand for travel in this corridor, coupled with northern expansion of LA County development to the Santa Clarita and Antelope Valleys as well as the continued emphasis on jobs and the economic development of the Westside, make this corridor potentially the highest utilization travel corridor in the entire Metro region.

- Despite much discussion and the demonstrated demand for travel between the Valley and the Westside, this potential corridor remains a concept. No significant professional work or required studies have been undertaken in the corridor to date. Measure R includes about $1 billion allocated to a "project" in the Valley-Westside corridor in the "out years" of the Measure R sales tax program, unless project acceleration can be achieved. Metro's newly-branded America Fast Forward initiative seeks to achieve this acceleration.

- Metro is preparing to commence work on the long path of statutory studies, project definition, systems planning, alternatives analysis, project scoping, environmental studies (NEPA/CEQA), conceptual design, preliminary engineering, financial analyses, final design, funding, and -- perhaps in two decades or less time – actual project implementation.

- The Valley-Westside corridor can be defined in several segments, as shown on diagrams on the following page (courtesy of The Transit Coalition):

    - Mid-Valley to Westwood (Core segment)
    - Mid-Valley to potential northern extensions (Valencia, Santa Clarita Valley, Palmdale/Lancaster, etc.)
    - Westwood southward to LAX
    - LAX to potential southern extensions to PV Peninsula, Long Beach, Beach Cities, etc.

- Metro and Caltrans have embarked on the construction of the continuation of the I-405 HOV/shared ride facility from the Westside through the Sepulveda Pass on I-405. This facility will add one carpool lane in each direction using the center median. It is anticipated to be a "traditional" HOV facility, with no provisions for "HOT" lanes or managed lanes. That is, the facility will likely be a free facility to high occupancy vehicles (2+, 3+ or more) without provision for "selling" excess capacity through tolls to single occupant vehicles. It is quite likely that the single lane in each direction will be oversubscribed with such carpools from opening day.

- Many believe that to have a successful toll-based "HOT" lane program combined with free high occupancy vehicle/shared ride facility, a minimum of two lanes in each direction is required, particularly in such high demand corridors as the Valley-Westside.

- Despite the clear need for significant additional people-carrying capacity in the corridor beyond the new carpool lanes, no real source of funding other than the $1 billion identified in the out-years of Measure R has been identified.

- In order to expedite project development and delivery, Metro embarked last year on an ambitious program to identify opportunities for using public-private partnerships (PPPs, or P3s) to advance the delivery of both transit and highway projects identified in the Long Range Transportation Plan (LRTP) and the Measure R program. To date, the program has identified six initial projects (three highway projects and three transit projects) that could benefit from the potential participation of the private sector, both with respect to leveraging existing funding sources and to life-cycle cost savings deriving from private design, construction, financing, maintenance and operations of transportation facilities. The projects determined to have such potential, to date, include:

    - Crenshaw/LAX Transit Project
    - Westside Subway Extension
    - Regional Connector Transit Project
    - High Desert Corridor Highway
    - I-710 South Freight Corridor
    - SR-710 North Extension Tunnel

- The benefit of partnering with the private sector for developing, financing and operating the highway programs is largely undisputed, since doing so would create a new funding source (i.e., tolls) to supplement the funds dedicated to these projects through measure R and other local, state and federal sources. With one highway project already underway in California as a P3 (Presidio Parkway in San Francisco), it is expected that the participation of private sector partners for the new and expanded highways in the Metro region will be well accepted and will expedite their delivery to the public.

- The 3 transit projects currently underway, however, present more limited opportunities for the private sector to become involved in a significant and productive manner. Work to date on Metro's PPP contract has shown that utilizing long-term private concessions to design, build, finance, and maintain ("DBFM"), or to design, build, finance, *operate* and maintain ("DBFOM") the transit projects could result in potentially major life-cycle costs savings when measured in terms of *present value*. In order to realize such potential life-cycle savings, however, several significant issues require resolution, including transferring operating labor contracts from public to private sector; shifting design and construction risk from Metro to a concessionaire; and dealing with systems interface among other elements of currently operating rail lines in the Metro system.

- Experience from throughout the world has demonstrated that projects that create a user-based revenue stream are the most conducive to public-private partnerships. This is, of course, the reason that toll roads have seen a much greater involvement of non-recourse PPPs than transit systems. Indeed, the fare structure of typical bus and rail systems is analogous to "social infrastructure," such as public buildings, educational institutions and correctional facilities, where there is no significant source of user-based revenue and hence rely primarily on so-called "availability payments" from various levels of government. For public transportation this is equally true, owing to the inability of fares to cover the amortization of capital construction costs. Within most public transit systems, even ongoing operating and maintenance costs cannot be covered by fare revenue.

- Under the structure of Metro's PPP Program, the foregoing discussion has led to preliminary analysis of additional projects identified in Metro's Long Range Transportation Plan and within the Measure R framework that could be done potentially with private sector participation at a minimal cost to LACMTA and the taxpayers. Implementing a transit line within the Valley/Westside corridor has been considered an "unaffordable" transit investment, owing to the very high costs of going over – or through – the Santa Monica Mountains. The $1 billion allocated in Measure R represents a significant amount of funding, but not nearly sufficient to undertake this project. Additionally, conventional rail technology as currently deployed by Metro cannot easily or efficiently navigate the grades associated with the Sepulveda Pass, making the concept of a tunnel the most viable – though the most expensive – option for connecting the Valley and the Westside via rail.

- In light of the exceptionally strong demand for passenger travel between the Valley and points north, and the Westside and points south, a new and potentially robust alternative developed by Metro's PPP team for consideration has been recommended for business case assessment. The proposed project for the Valley/Westside corridor envisions a *multi-modal project that integrates an advanced transit technology <u>and</u> a multi-lane toll highway, the latter providing an express alternative to the interminably congested I-405 Freeway, routed through a tunnel between the Valley and the Westside.*

- In light of the current state-of-the-art in deep-bore, large-diameter tunneling technology, an integrated "transit/tollway" facility could be engineered to fit in a 58' diameter tunnel. A very similar tunneling program was recently awarded to a construction consortium in Washington State for replacement of the aged and seismically vulnerable Alaskan Way Viaduct along the ocean front in Downtown Seattle.

- Preliminary concepts show that a single large diameter tunnel could be built in the Valley/Westside corridor and accommodate a bi-directional transit system and 3-5 tolled highway lanes, which could be reversible, similar the I-595 program in Florida.

- As an alternative to proceeding with the normal federally-required, statutory, multi-decade planning process, it is our contention that this project could be a world-class example of a public-private partnership that would result in delivery of this project decades before otherwise possible, without jeopardizing any of the projects currently in development as part of the prescribed Measure R process. Indeed, using a P3 approach to bring such a project to reality would add luster to Metro's America Fast Forward program. As part of the ongoing Metro PPP program, a project concept and procurement process can be defined and developed that would allow the private sector to demonstrate its ability to bring efficiency, innovation, and cost-saving technology to a much-needed transportation corridor improvement program.

- Preliminary discussions with officials at the US Department of Transportation suggest that the federal government would be strongly supportive of this type of corridor investment, owing both to its multi-modal characteristics and to its innovative and potentially prudent partnership between public and private sectors. In particular, elements of the *Penta-P Program* (Public-Private Partnership Pilot Program) within the Federal Transit Administration (FTA), and the SEP-15 Program within the Federal Highway Administration could be brought together in a program demonstration representing a new and positive way to better leverage federal investment with local and private funds.

- What would make this project more attractive to private sector investment and participation than any of the 3 transit projects currently in the process of business plan preparation?

    - No previous work or designs have been developed or adopted, nor has there been any previous environmental clearance, allowing a private concessionaire/sponsor to use its ingenuity to develop a workable and financially feasible program for planning, permitting, designing, financing, constructing, operating and maintaining the combined transit line and toll facility.

    - Global bidding would be encouraged to bring in world-class suppliers, constructors and operators in a competitive bidding environment. This means that without constraint of current light rail and metro heavy rail technology, a vehicle supplier could develop a "stand-alone" transit technology that would interface with Metro's current program – in particular, the Orange Line in the Valley, the Purple Line extension to Westwood, and also to Metrolink and regional bus. For those who have seen the Docklands Light Railroad in London and its interface with the London Underground system, this project would create a similar linkage of dissimilar technologies that connect at individual multi-level stations.

    - The tollway portion of the project would have an immediate and robust demand on opening day. As evidenced by the success (and high toll rates) of the SR 91 Express Lanes Program in Orange and Riverside Counties, drivers are willing (and able) to pay hefty rates to avoid congestion. While we would leave the design and engineering to our private partner, concepts could include reversible lanes by time of day (similar to the I-595 project in Florida); variable toll rates as a real-time function of levels of congestion; fully electronic tolling without the necessity of toll booths (similar to the 407 Highway in Toronto, Canada); and the promise of congestion-free drives owing to congestion management through pricing strategies.

- "Free-market" approaches to tolling, combined with the likelihood of "premium" transit fares, would generate an extremely robust revenue stream for a concessionaire, and potentially lead to a "hybrid" concession approach between a full "revenue-risk" approach and a partially subsidized "availability payment" approach. Such hybrids are not uncommon in other parts of the world, taking best advantage of the private sector's marketing and management skills, while allowing the public sector to set transit fares (or provide suitable subsidies), thereby allowing disadvantaged transit riders to make full use of a partially tax-supported transit system.

- The ability for a concessionaire to utilize its own, proprietary transit and toll collection technology greatly encourages competition and competitive bidding most favorable to Metro. For example, many companies around the world – some with foreign government support – have developed technologies that could be most applicable in this corridor. We would expect highly aggressive bidding to result in highly favorable pricing, with potential for export credit financing and other such financial structures aimed at reducing or eliminating subsidies by Metro and/or other public agencies.

- How would we go about procuring, selecting, and implementing such a public-private partnership?

    - The Valley-Westside Corridor Program would be implemented utilizing a "Pre-Development Agreement" ("PDA") concept. A PDA approach, in this context, would suggest a 3-step procurement process that could be implemented starting in 2011:

        - An initial request for "interest and information" would be sent out by Metro's P3 team to financial, engineering, construction, and operations firms around the world, providing a description of Metro's Valley/Westside Corridor concept. We would solicit ideas, reactions, comments, and potential barriers to the concept moving forward. We would also at this time establish a mailing list of interested companies, and receive general statements of individual capabilities and experience. We would specifically seek individual firm responses, discouraging any team formation or consortium development at this juncture, and further discouraging any significant expenditure by firms in responding to this preliminary solicitation.

        - Based on refined corridor concepts, perhaps developed by a retained consultant or by Metro's P3 team, and based on input received from the initial request for interest and information from a variety of companies, we would then prepare and distribute a "Request for Qualifications" (RFQ) which would seek responses from teams/consortia assembled in specific response to the RFQ. Responders would be required to demonstrate the consortium's ability to finance, design, construct, provide rolling stock and related systems, operate and maintain the systems in the corridor – both the transit line and the toll facility. Again at this stage, the prospective concessionaires would not be required to undertake significant expenditures.

- Finally, a "Request for Indicative Proposal" (RFIP) would be distributed to a short-list of consortia best meeting the qualifications criteria established by the P3 team to review and rate the Statements of Qualifications. In brief, the short-listed consortia would be asked to respond to an "indicative" project definition, with concepts, approaches, construction means and methods, transit technology, electronic tolling methods and equipment, and an indicative pricing structure. The reason this needs to be "indicative" is that the environmental clearance process requires "purity." Specifically, final alignment, tunneling method, portal locations, ventilation systems, transit technologies, and the myriad of other project attributes cannot be adopted without an appropriate study of alternatives that meets CEQA and NEPA requirements.

- A consortium/concessionaire providing "best value" to Metro would be selected on the basis of the Indicative Proposal. The chosen project team would be required to fund project development activities (conceptual design and environmental clearance), likely using their defined project as the nominal proposed action for environmental review and clearance. Utilizing the PDA approach, Metro would commit to reimburse the concessionaire the costs of the environmental work (as it would for a normal, statutory-based planning program) – but *only* in the event the project did not go forward owing to no fault of the concessionaire. Assuming the project proceeds, the concessionaire would imbed the project development costs into its long-term financial structure, and recover costs through revenues derived from transit fares, tolls, and potentially from availability payments.

Finally, once the environmental work is completed and ROD/NOD is obtained, a final price will be negotiated with the concessionaire for the construction, operations and maintenance of the systems. The term of the concession would begin with the commencement of final design and construction, and continue with operations and maintenance over a defined period of time, generally a minimum of 30-35 years.

ATTACHMENT B

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Executive Summary

Public-Private Partnership Program
Los Angeles County Metropolitan Transportation Authority

Public-Private Partnership Delivery Options: Initial Six Measure R Projects

Metro Contract PS4370-2316
Task 3C Interim Report

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Executive Summary

Introduction

This Executive Summary describes the work to date in assessing the suitability of the six Metro Measure R projects identified in previous work as potential candidates for development in partnership with the private sector. These highway and transit projects, all included in Metro's Long-Range Transportation Plan, are:

- High Desert Corridor Highway Project
- SR 710 North Tunnel Project
- I-710 South Freight Corridor Project
- Crenshaw Light Rail Transit Project
- Regional Connector Project
- Westside Subway Extension Project

As an interim deliverable, this draft Executive Summary sets forth all data inputs utilized for the P3 delivery assessment and lays out the analytical framework established for preparation of business plans for each project. The full qualitative and quantitative analyses and recommendations for public-private partnership project delivery will be included in the final Task 3 Report. The draft Report and full Appendices are available upon request from Metro staff.

Much of the focus of this phase of the work has been to define the projects in light of their respective stage of development. The primary methodological undertaking has been to further refine these consensus-based project definitions in order to facilitate development of a series of working options for both "traditional" project delivery (i.e., "design-bid-build," or the "public delivery option") and delivery programs based on active and collaborative private sector participation in project development, delivery, and/or maintenance and operation. Once these P3 options were defined, each was assessed with respect to its risks under a variety of delivery options, and compared to the traditional design-bid-build (DBB), or "public delivery" structure. A cash flow-based financial analysis was performed for each in order to identify funding gaps/surpluses using previously identified funding sources and/or project revenues available under the P3 option.

It is important to note that much of the work in this phase of the P3 program is based on concepts and estimates developed for use in the environmental assessment processes for each of the six projects. Thus, such concepts and estimates are preliminary, and in some cases premature, particularly for those projects which have not reached the Locally Preferred Alternative (LPA) stage. Furthermore, reference to and analysis of a particular alternative alignment or configuration is in no way meant to presage the environmental process, but is purely for the purpose of illustrating how various options might play out under different delivery mechanisms. In order to prepare any of the projects for potential participation by a private partner and to accelerate the procurement, design and construction process, such work is necessary at an early stage of project development.

Project Descriptions

The definitions of the projects' scope, schedule, cost and phasing were accomplished previously and endorsed by Metro. Using these consensus definitions as a baseline, the InfraConsult team began the interactive and iterative process of defining and assessing a variety of delivery options for each project.

The work provides a clear and definable distinction between the nominal "public option" and one or more public-private partnership delivery options. In virtually all cases, the public option represents the probable configuration and delivery approach for each project assuming it is to be procured, designed, constructed, operated and maintained in the so-called "traditional" manner; that is, conceptualized, designed, engineered and built in a sequential and discrete manner, with full design of all civil and other elements completed by public sector staff and/or engineering consultants prior to normal construction bidding, followed by public sector operations and maintenance assumed for the life of the project. As is evident, this early distinction will provide a pathway for each project to be assessed in future phases through a "public sector comparator" process well accepted in such analyses.

The public option and P3 definitions were refined and optimized to result in project parameters that would be accepted in the construction and commercial marketplace. In some cases, that involved rethinking the project's phasing and timeline; in others, it meant addressing critical path issues and funding challenges.

The level of the definition is, in all cases, limited by the preliminary nature of the data available. The team brought in reference information and market data to round out the Metro-supplied data.

Each project and its options is briefly described below, and extensively detailed in the relevant Appendices available upon request from Metro staff.

High Desert Corridor

Public Option Overview

The High Desert Corridor (HDC) is defined as an east-west, 50-mile, 4 to 8 lane freeway/expressway from SR-14 in Palmdale to I-15 in Victorville. For the purpose of this analysis, the public project also includes an alternative 13-mile expressway connecting the HDC East of I-15 to SR-18 (the Apple Valley By-Pass). Total development, design, land acquisition and construction cost is estimated at 3.4 B$: 2.92 B$ for HDC (including 80 M$ for a potential toll system), and 0.47 B$ for the Apple Valley By-Pass. Initial operation could begin in 2020 on the West and East segments, with the Central Segment open to traffic in 2024. However, that schedule is almost entirely dependent on assumptions about the timing and amount of project funding available, as only $50 M of the total amount needed is currently committed.

Reasoning for Selecting P3 Options

In strategizing about possible P3 options for the HDC, the team focused on those elements that would either deliver the project sooner or create additional funding and/or financing possibilities. Introducing private sector involvement under a design-build-finance-operate-maintain structure would also potentially reduce overall costs, project delivery time, and public sector risk, as well as improving project scoping and project quality.

Tolling the project was analyzed as the optimal way to bring new revenues into the project. Initially, tolling the entire HDC was considered, as it could potentially maximize project revenues and minimize the amount of public funding. However, after initial assessment the concept of tolling the Apple Valley expressway segment was not pursued further, as its lower potential traffic and urban characteristics with a high number of at-grade intersections serving essentially local traffic are not conducive to tolling. Even though that segment would therefore have no revenue generating potential, it could nevertheless be included in a larger private concession or DB contract with other segments if public funding were available for it, but would be phased in after the East, West and Central segments.

In looking to optimize the project phasing, construction of the West and East sections would take priority under either public or P3 delivery, as these sections each have independent utility for local traffic and are essential to connect the HDC at both ends to SR 14, US 395 and I-15. However, due to their urban setting, their cost of construction is high relatively to the potential revenues they could generate. Moreover, they will carry a significant proportion of short distance traffic with local and commuter users who are typically more averse to paying tolls.

Subject to further analysis during the next phase of this study, the team concluded that excluding tolls on the East and West segments and focusing on providing a revenue stream to a private investor through tolling on the central segment would be the optimal P3 structure, reinforcing both political momentum and public support for this project.

P3 Option Overview

Under the initially preferred DBFOM alternative, a private consortium would be selected after completion of preliminary engineering to design and build the HDC project in its entirety (three segments), and finance, operate and maintain the Central Segment while the West and East Segments would be funded publicly and handed over to Caltrans at the end of construction. A modified option would be to have the private consortium operate the East and West Segments for a fee to be paid from public funds. The analysis confirms that tolling under any configuration could cover only a portion of the cost to construct, maintain and operate the facility, signaling that supplemental funding source(s) are required in addition to identified public funding and toll revenues generated.

SR 710 North Tunnel

Public Option Overview

This project is to close a 4.5 mile gap in the I-710 Long Beach freeway system running from just north of the Interstate 10 (I-10) "San Bernardino" freeway near Alhambra until the freeway resumes at Del Mar Boulevard, in the City of Pasadena, where it extends 0.6 miles to the north to its junction with the Interstate 210 (I-210) "Foothill" freeway. Given that there are numerous options being considered in the alternatives assessment, the team's analysis at this stage is route-neutral; thus, any distances used for calculating revenues and risks are considered to be working assumptions.

Reasoning for Selecting P3 Options

P3 project definitions were prepared for a total of four possible structures for a project to build a tunnel to close the SR 710 gap. These four project definitions do not represent the full universe of possible delivery structures but do represent a good cross section of possible approaches that would appeal to the private sector, given that they all seek to avoid surface interface issues, minimize disruption of existing structures and traffic, and present opportunities for technological innovation and revenue generation.

P3 Options Overview

The basic P3 alternative is referred to as the DBFOM alternative and represents a full concession: design, build, finance, operate and maintain. The concessionaire, under this scenario, would assume all traffic revenue risk.

A variation to this alternative is the DBF (design-build- finance) option, where the private partner would finance a portion of the construction of the project and be repaid on an annual payment, but operations, maintenance, and revenue risk would fall to the public sector.

Another variation to DBFOM is to begin the concessionaire in the project early through a pre-development agreement (PDA). The public sector would be responsible for environmental studies and documentation and obtaining a record of decision, but during the process, the concessionaire would be selected based on specific criteria and subject to clear terms and conditions, including cost rates, but final price would not be negotiated and set until the ROD was in hand. This process accelerates the construction completion and insures that the contractor's means and methods are addressed properly in the environmental review process thus reducing the possibility of amendments to the final environmental document and ROD being required. It also abbreviates the design period necessary between the ROD and the start of construction.

A final variation on the base DBFOM alternative is to initially commit to a single 57' bore which would initially be configured in two lanes in each direction in a stacked arrangement. Achievement of specific traffic targets would be established to trigger construction of a second bore and the simultaneous restriping of the first tunnel temporarily into three lanes in each direction, interim to the completion of the second bore and the ultimate configuration of twin tunnels with a total of four lanes in each direction. This approach minimizes traffic revenue risk for the concessionaire and therefore would result in more aggressive bidding and perhaps a higher number of competitors.

I-710 South Freight Corridor

Public Option Overview

The project description for the purposes of the P3 analysis essentially comprises freeway and freight corridor improvements in EIR/EIS Alternative 6A/B including: widening I-710 to ten lanes from Long Beach to SR-60, constructing a four-lane freight corridor for heavy-duty trucks from Long Beach to north of Washington Boulevard (16 miles), improving four freeway-to-freeway interchanges and 16 arterial interchanges in the corridor, constructing one new arterial interchange, and improving/reconstructing bridges to match the needs of the overall design concept.

Reasoning for Selecting P3 Options

Design-Build for the full project has been selected as one option for this corridor because it is likely that DB could advance the project opening by several years and reduce costs by helping to identify cost-effective solutions to the utility issues, identifying more cost-effective design concepts, reducing the level of coordination that would be involved (compared to the coordination required with the public option's approach of 6-8 separate construction projects), and utilizing alternative construction methods.

DBFOM for the full project has been selected as a second option to evaluate the viability of a full-project P3 that includes revenue risk.

DBFOM for the Freight Corridor Only is a third P3 alternative based on the fact that the Freight Corridor can be built as a separate stand-alone improvement and can achieve the main project objective of separating truck traffic from passenger cars, bring substantial traffic relief to the corridor sooner than implementation of the full project. In addition, the lower capital cost of constructing initially just the Freight Corridor may move the project closer to financial viability. In addition, it will facilitate the widening of the general purpose lanes to be implemented when Measure R and other public funding sources become available while reducing the traffic impacts during construction.

InfraConsult is also exploring the benefits of using a pre-development agreement (PDA) as an option for the full-project DBFOM and the Freight Corridor Only DBFOM because the I-710 improvement project is highly complex and involvement of the concessionaire earlier in the project development process could help shape the project in ways that save additional time and money.

Crenshaw LRT

Public Option Overview

The publically delivered Crenshaw Corridor Rail project is the Locally Preferred Alternative adopted by the Metro Board in Dec. 2009. The FEIS/FEIR is currently underway and a Record of Decision (environmental clearance) is expected during spring 2011.

The Crenshaw/LAX LRT will provide a connection between the Exposition line in the north to the Metro Green line in the south, and allow continuing direct rides onto the Metro Green line (south or east). This line will have a stop with a connection to the Los Angeles International Airport (LAX) via a proposed Automated People Mover. Connection to the LAX People Mover (a project currently proposed by Los Angeles World Airports) has not been included in this scope.

From a northern terminal at the Exposition/Crenshaw LRT station (reconstructed at-grade), the alignment follows Crenshaw Boulevard south to the Harbor Subdivision and then follows the Harbor Subdivision to a connection at the Metro Green Line Aviation/LAX station. The alignment is a combination of at-grade and below-grade along the Crenshaw Boulevard portion of the line. Along the Harbor Subdivision, the alignment is off-street in a dedicated right-of-way that is currently used infrequently by freight trains. The line includes seven stations along 8.5 miles of above, below, and at-grade alignment.

This project will require the development of a Maintenance Facility at a location to be determined. Four sites are being considered in an EA/Revised Draft EIR.

Reasoning for Selecting P3 Options

The P3 options selected for study include DBFM and DBFOM. The physical project does not change between the public and P3 delivery methods; however, there is a significant difference between the delivery method options.

DBFM was identified as Option 1 in order to expedite the schedule to meet the 30-10 plan operating dates. The key difference between the two Crenshaw options is the inclusion of operations and maintenance of both the Green and Crenshaw Lines in Option 2. This was included as Option 2 because of the potential for increased interest in private equity investment, life cycle benefits, increased flexibility for Metro's funding streams, increased incentives for operating and capital expenditures, and cost certainty. It also may allow for greater innovation in design, maintenance, and operation. Option 2 would require agreements with several labor unions.

P3 Options Overview

The physical description of both the P3 projects is the same as the public project. It would be designed and constructed as one large project, and cut-and-cover construction of the below-grade sections is assumed. The utilities relocation design and construction package would be separately procured by Metro. All required rights-of-way would be acquired by Metro.

Metro would continue all environmental clearance work efforts, conduct PE (minimum 30% level), and obtain FTA and Metro approval for the method of project delivery described below. The DB procurement officially would proceed after environmental clearance (ROD), but RFQs and other activities can be ahead of that time.

The delivery method proposed for Option 1 would be a single design-build-finance-maintain contract with the DBFM contractor acting as the single point of responsibility for integration between civil/stations/systems, overall final design responsibility, and testing/commissioning. The contractor would be responsible for the maintenance of tunnels, lining to underside of rail, stations, civil structures, etc., to 2039. It does not include procurement, delivery, and acceptance of the needed LRT vehicles. Metro's design of the TBM and lining would be novated to the DB contractor for final design and construction. The finance portion of the delivery method would be optional, depending on the availability of Measure R and other funding. This would be a large contract, approximately $900 million in 2009 dollars.

Option 2 would be delivered via a single design-build-finance-operate-maintain contract and would include operations of the existing Metro Green Line and the Crenshaw Line once completed, as well as maintenance of the LRT vehicles used on these lines.

Regional Connector LRT

What is described below is the most probable LPA based on the current technical studies, community inputs, and project cost. It is important to note that this P3 analysis will focus on a single alternative described herein. The identification of the project for the purposes of this P3 study is in no way intended to circumvent the environmental process nor is it intended to indicate that this project will be selected as the locally preferred alternative. Rather, the Regional Connector project studied herein is representative of the type of project which may be ultimately selected by the Metro Board as the LPA and which then may be designed and constructed. After the environmental process has progressed to the point where the Metro Board has selected a LPA, it will be necessary to take another look at the project assumptions made for the express purposes of this study, and make the appropriate adjustments to bring this study into line with the LPA.

Public Option Overview

The Regional Connector Transit Corridor Project would connect the Gold Line (Pasadena) to the Blue Line (Long Beach) (called the North-South line, approximately 50 miles) forming one operating line and also connecting the Eastside Gold Line to the Exposition Line (called the East-West line, approximately 25 miles). These two lines would each operate at 5-minute peak headways and provide four station stops in Downtown Los Angeles.

The project defined for the purposes of this study is the Fully Underground LRT Alternative – Little Tokyo Variation 1. This is a 1.6-mile, 4-station alternative connecting the 7th St/Metro Center Station to the existing Metro Gold Line tracks to the north and east of 1st and Alameda Streets.

The public project would be delivered using traditional design-bid-build construction, and would use a combination of cut and cover construction as well as the possible use of a tunnel boring machine (twin bore similar to recently completed Eastside Gold Line project) in some reaches. All stations and cross-overs would be done by cut-and-cover construction. It is possible that a portion of the cut-and-cover construction would be delivered via Design-Build.

Because of the small number of additional light rail vehicles there will be no need for a new maintenance and operations facility.

The Draft EIR/EIS is under development and will be released during summer 2010, an LPA is expected to be selected in October 2010, with a ROD expected in August 2011.

Reasoning for Selecting P3 Options

The complex tunneling and coordination required on many levels for the Regional Connector project led the team to identify Design-Build-Maintain with concurrence as a viable P3 option. The single point of responsibility shifts the risk to the contractor and minimizes the extent to which Metro would need to staff the project.

P3 Option Overview

The physical description of the P3 project is the same as the public project. The utilities relocation design and construction package would be separately procured by Metro. All required rights-of-way would be acquired by Metro.

The delivery method proposed for the P3 project would be a single design-build-maintain contract (with concurrence) (DBM(c)) with the DBM contractor acting as the single point of responsibility for integration between civil/stations/systems, overall final design responsibility (non-tunnel components), and testing/ commissioning. This would be similar to the Metro Gold Line Eastside Extension construction contract. The DBM(c) contractor would be responsible for the maintenance of tunnels, lining to underside of rail, stations, civil structures, etc., – to 2039. It does not include procurement, delivery, and acceptance of the needed LRT vehicles.

Metro would continue all environmental clearance work efforts, conduct PE (minimum 30% level but more likely to be close to 50%) and Final Design (as needed), and obtain FTA and Metro approval for the DBM(c) method of project delivery. The procurement officially would proceed after environmental clearance (ROD), but RFQs and other activities can be ahead of that time.

Metro would do the final design of the TBM and lining and it would be novated to the DBM(c) contractor for procurement of the TBM and for tunnel construction (bored tunnel component would then be DBB). The cut and cover sections along with the stations would be design-build and would be part of the DBM(c) contract. This would possibly be a very large contract, approximately $1.0 billion in 2009 dollars.

Westside Subway Extension

It should be noted that the Metro Board has not yet adopted a LPA for this project. A number of alternatives are still being evaluated in the Draft EIS/EIR. The Metro Board is scheduled to consider a LPA in September 2010. The scenario described herein is for study purposes only.

Public Option Overview

The Westside Subway Extension Project is defined as extending Metro Rail Service to Westwood. The public project as defined for the purposes of this study is Alternative 2C, a 9.36-mile extension of the Metro Purple Line from Wilshire/Western to a terminus at the Westwood/VA Hospital. The technology is heavy rail transit and compatible to the current Metro Rail operations for the Metro Red and Purple Lines. The project would currently have eight stations and no parking will be provided.

The project is underground and would utilize a twin tunnel bore construction process with cut-and-cover construction at all stations and cross-overs. The project includes an expansion of the current Metro Red Line maintenance yard to accommodate the needed vehicles and operating and maintenance services.

Using design-bid-build delivery, this project would be constructed in three segments: Segment 1 (Wilshire/Western to Wilshire/Fairfax) by 2019; Segment 2 (Wilshire/Fairfax to Constellation/ Century City) by 2026; and Segment 3 (Constellation/Century City to Westwood/VA Hospital) by 2036.

Reasoning for Selecting P3 Options

The 30-10 Plan proposes accelerating the construction of the Westside Subway with revenue operations to Westwood beginning in October 2022. The P3 options were identified in order to meet this schedule, and two options were selected to allow differing degrees of Metro involvement and oversight.

P3 Options Overview

The physical description of the P3 projects is the same as the public project except that would not to be built in phases. It would be designed and constructed as one large project. The utilities relocation design and construction package would be separately procured by Metro. All required rights-of-way would be acquired by Metro.

Metro would continue all environmental clearance work efforts, conduct PE (minimum 30% level), and obtain FTA and Metro approval for the method of project delivery described below. The DB procurement officially would proceed after environmental clearance (ROD), but RFQs and other activities can be ahead of that time.

Option 1

The delivery method proposed for the P3 project would be a single design-build-finance-maintain contract with the DBFM contractor acting as the single point of responsibility for integration between civil/stations/systems, overall final design responsibility, and testing/commissioning. The contractor would be responsible for the maintenance of tunnels, lining to underside of rail, stations, civil structures, etc., – to 2039. It does not include procurement, delivery, and acceptance of the needed HRT vehicles.

Metro's design of the TBM and lining would be novated to the DB contractor for final design and construction. This would possibly be a very large contract, approximately $2.3 billion in 2009 dollars.

Option 2

While the physical project would remain the same as in Option 1, Option 2 would be delivered slightly differently. The delivery method proposed for Option 2 would entail the use of:

(1) a super Program Manager responsible (transfers risk to this single point contractor) to procure, oversee, and manage all interface and integration requirements between guideway/track, civil/stations, systems, overall design responsibility, and testing/ commissioning;

(2) Design-build contractors would be procured with the use of the Program Manager for the following packages:
 (a) Guideway/track/tunnel ($950 million),
 (b) Stations ($1.1 billion), and
 (c) Rail Systems ($250 million);

(3) An optional DB contract would be for Utilities but this would probably be managed by the Program Manager for Metro through 3rd party force account work with the utility companies ($350 million).

As with Option 1, the contractor would be responsible for the maintenance of tunnels, lining to underside of rail, stations, civil structures, etc., to 2039.

Review of Existing Data

Highway Projects

This section describes a review and assessment of the available reference data relating to the estimates and schedules for each of the three highway projects. The three highway projects that were reviewed are:

- High Desert Corridor
- SR-710 North Extension
- I-710 South Corridor

These three projects are each at different stages of definition and development so the scope of the review and analysis varied accordingly.

Purpose

The primary purpose of data review and assessment was to refine the project definitions as part of Task #3B and preliminary financial analysis as part of Task #3C. The technical team focused on two key criteria: project costs through each phase of design, construction, operations and maintenance; and schedule for design, construction and subsequent major maintenance or reinforcement interventions during the operations phase.

Data Review and Assessment

A review and qualitative assessment of the available data was undertaken for reasonableness of the assumptions and the methodology applied. Available data was also reviewed for completeness so that it would provide a project life cycle overview from its current status through to a period of 50 years after completion of construction. Gaps were identified where further information was either missing or not developed. Where appropriate, further data was developed in order to fill the gaps and to enable a life cycle overview for the qualitative assessment.

Project Optimization under Alternative Procurement Options

In order to optimize project viability the suitability of projects for alternative procurement delivery was considered including exploring the potential for re-scoping or phasing of the project or project elements where appropriate. For each project, cost estimates and schedules were reviewed, assessed and where appropriate, developed to enable assessment and comparison of alternative delivery methods against conventional public procurement for each of the selected alternative(s).

High Desert Corridor

This project is in the early stages of development, with extensive work still to be done on project scope, cost estimates, traffic and revenue forecasts, and operating alternatives. The current analysis possible is at the broad overview level because of the significant gaps in information detailed below.

- Traffic and Revenue
  - Updated Demographic and Land Use forecasts (SCAG)
  - Updated SCLA plans and Forecasts
  - Updated Palmdale LAWA plans and Forecasts
  - Toll Alternatives Traffic and Revenue forecasts (Full project tolled and Central Segment only tolled), 2020 and 2035. (Parsons)
- Cost Estimates
  - Refined Central Segment Construction and Soft Costs Estimates (Halcrow, Caltrans, Contractors)
  - ROW Data Sheets for Central and Apple Valley Segments (Caltrans)
  - Updated ROW Data Sheets for West, East and Apple Valley Segments (Caltrans)
  - Refined O&M and Life Cycle Costs Estimates (IC, Halcrow)
- Risks
  - Legality of Environmental Document for ROW reservation for potential future High Speed Rail
- Other
  - Updated Desert Express Status: Environmental and Project Approvals, Location of Victorville Station, Ridership estimates

SR 710 North Tunnel

To further define the P3 option for this project, additional supporting data on the cost estimate, tunneling configuration and on possible operating scenarios including revenue forecasts need to be developed as described below.

While this analysis indicates a very strong potential for tolls on a new tunnel to close the 710N "gap", further analysis to increase the level of confidence of the financial robustness of the 710N tunnel should be undertaken as part of the development of the business case. This further analysis should be in the following four areas:

- Construction Cost Estimate
  - A critical review of the back-up data that was used in developing the current cost estimate, including meeting with and holding a workshop with relevant staff and consultant advisors; or

- Development of a preliminary construction cost estimate in compliance with the Caltrans cost estimating guidelines, with a bottom up approach wherever possible based on a preliminary design developed to a greater level of detail that the currently available technical data.
- Refinement of 'soft' support costs for the project

- Operation, Maintenance and Life Cycle Cost Estimate
  - Development of planning / preliminary level assumptions on tunnel systems and infrastructure in order to advance to an estimate for operations, maintenance and life cycle cost to the next level of confidence from the current conceptual stage.
  - Obtain actual data of tunnel operations and practices in the state
  - Obtain actual data from toll operations in tunnels / bridges
- Schedule
  - Refinement of key project activities, milestones and durations. Most significant is the duration of the TBM activities in drilling the bore and the advancement rate that can be realistically achieved. In this phase of the analysis, observations on a few other tunnels, of smaller diameter, were evaluated to develop the schedule estimate. However, a more comprehensive evaluation should be completed as part of the development of the business case. Also significant is the determination of the amount of design time required between the completion of the ROD and the start of the tunnel boring machine.
- Traffic & Revenue
  - Modeling to better estimate the revenue generated, focused on the 2030 link volume as dampened by various toll rates.

I-710 South Freight Corridor

In order to better assess the potential for a viable P3 project for the Freight Corridor, new work needs to be completed including traffic and revenue forecasts and more detailed cost estimates for specific project components under optimized construction scenarios. Specifically:

- Traffic and Revenue
  - Year 2035 traffic forecasts prepared with the 710 Corridor model
  - Project Opening Year traffic forecasts prepared with the 710 Corridor model
  - Improved toll revenue forecasts
- Cost Estimates & Schedules
  - Cost data and development schedule information for the northern (Caltrans) piece of the 710 South corridor (I-5 interchange and I-5 to SR-60 segment)
  - The updated design and cost estimates for the URS portion of the corridor improvements (expected to be available by July or August 2010)
  - Specific cost and construction schedule information about alternative construction methods (e.g., prefabricated segmental construction of structures)
  - More refined and substantiated schedules of pre-construction and construction activities

	Analysis Period (yrs)	Construction Completion Date	Capital Construction	Operations & Maintenance	Major Maintenance	Total	Projected Toll Revenues	Measure R Funds	Total	% of Total Funding Need	Breakeven Discount Rate
High Desert Corridor											
Public Option	35	2023	4,520	741	1,123	**$6,384**	6,701	33	**$6,734**	105%	0.48%
Alternative Option 1	35	2022	4,200	734	1,054	**$5,988**	7,242	33	**$7,275**	121%	1.57%
Alternative Option 2	50	2019	1,701	750	1,630	**$4,081**	11,792	33	**$11,825**	290%	7.50%
SR 710 North											
P3 Alternative	50	2022	4,093	2,137	1,505	**$7,735**	29,677	1,049	**$30,726**	397%	8.37%
I-710 South											
Public Option	35	2029	10,508	1,148	426	**$12,082**	3,371	684	**$4,055**	34%	<0%
Alternative Option 1	35	2022	8,226	1,148	698	**$10,072**	4,505	684	**$5,189**	52%	<0%
Alternative Option 2	50	2021	3,909	1,178	576	**$5,663**	13,623	684	**$14,307**	253%	4.34%

Figure 1. Highway Projects – Funding Need vs. Revenues

- Other
  - A clearer determination of how a PDA could benefit each of the two DBFOM alternatives, and at what point in the process/ schedule the PDA would come.

Transit Projects

This section describes a review and assessment of the available reference data relating to the estimates and schedules for each of the three transit projects. The three transit projects that were reviewed are:

- Crenshaw LRT
- Regional Connector LRT
- Westside Subway HRT

These three projects have each proceeded to advanced environmental documentation phase with Draft EIS/EIR documents either finalized or being reviewed by the Federal Transit Administration. This level of readiness had a significant influence on the level of review that was appropriate in this assessment of potential P3 options.

Purpose

The primary purpose of data review and assessment was to refine the project definitions as part of Task 3B and preliminary financial analysis as part of Task 3C. The technical team focused on two key criteria: project costs through each phase of design, construction, operations and maintenance; and schedule for design, construction.

Data Review and Assessment

An initial review of the available data was undertaken to understand what was available for strategic assessment and what gaps needed to be filled, for example project life cycle costs for a period of 50 years after completion of construction. This process was iterative while the project definitions were being refined. Gaps were identified where further information was either missing or not developed. Where appropriate, further data was developed in order to fill the gaps and to enable a life cycle overview for the qualitative assessment.

Project Optimization under Alternative Procurement Options

In order to optimize project viability the suitability of projects for alternative procurement delivery was considered including exploring the potential for re-scoping or phasing of the project or project elements where appropriate. For each project, cost estimates and schedules were reviewed, assessed and where appropriate, developed to enable assessment and comparison of alternative delivery methods against conventional public procurement for each of the selected alternative(s).

As the three transit projects being studied in this analysis are all well into the environmental analysis process, there are fairly few significant information gaps remaining to be filled. All three projects are continuing with the federal environmental process: the Westside and Regional Connector projects are pursuing New Starts funding, while the Crenshaw project will pursue TIGER II grants and other federal funding. The Draft EIS/EIR has been released for the Crenshaw project and is expected for the Westside and Regional Connector projects by the end of the summer. The Final EIS/EIR documents will be released beginning in early 2011. As environmental work continues, the conceptual engineering work will advance into preliminary engineering and additional geotechnical, structural, and design will inform both the risk and financial elements of the PPP analysis. There are no specific information gaps identified at this time; any outstanding information needs are expected to be met by the release of the remaining environmental documents.

Financial Analysis

Initial project level cash flow analyses were performed for each project to estimate potential funding gaps and surpluses using previously identified funding sources and cost assumptions provided by Metro and InfraConsult. The initial outputs from the analyses provide an indication of the project funding deficit/surplus.

For each project, the sum total of funding sources only includes revenues programmed in Metro's Long Range Plan FY 2010-2011 and beyond.

Highway Projects

Project level cash flows were developed for both the public option and the P3 options identified by the InfraConsult team. Unless otherwise noted, the cash flow analysis covers the 35-year period from FY 2010 through FY 2044.

High Desert Corridor (HDC)

Public Option

The total project capital cost is estimated at $4.5 billion (YOE), with a completion date of 2023. Costs for O&M and major maintenance over the 35-year period are estimated at an additional $741 million and $1.12 billion, respectively.

Of the $4.5 billion capital construction cost, Measure R provides $33 million in committed funding.

Metro has identified an additional $1.5 billion in "highway strategy revenues" or uncommitted funding for the Project's capital needs. Assuming the availability of these strategic revenues, approximately $3.0 billion in additional funding is required to cover the construction cost.

Project toll revenues may be used to further reduce the net project capital funding requirement. Using the forecast provided by InfraConsult, toll revenues would generate $6.7 billion (YOE) over the 35-year period. The forecast assumes a 2.6% annual growth in traffic volume pre-2035, 2.0% from 2035 to 2040, and 1.0% thereafter. It applies an initial per-mile toll rate of $0.15 for autos and $0.38 for trucks (2010 dollars), escalating at a rate of 3.0% per year.

The break-even discount rate, at which the net present value (NPV) of the Project cash flows equal zero, is 0.48% under the public option, indicating the likely need for additional public funding or other revenues, or a reduction in capital construction costs, to make the Project viable.

For the break-even discount rate to reach 5 percent, for example, the analysis indicates that Project revenues would need to increase by 69%, or costs would need to be reduced by 48%.

Alternative Option 1

The construction cost for the Project includes the full Corridor, estimated at $4.2 billion (YOE), with completion scheduled in 2022.

Costs for O&M and major maintenance over the 35-year analysis period are estimated at an additional $734 million and $1.05 billion, respectively.

Under Option 1, the full 50-mile length of the Corridor would be tolled. Toll revenues would generate $7.24 billion (YOE) over the 35 year period. The tolling forecast assumes the same toll rates per mile and escalation in traffic volume as the public option.

The break-even discount rate, at which the net present value (NPV) of the Project cash flow equals zero, is 1.57% over the 35-year period, indicating the likely need for additional public funding or other revenues, or a reduction in capital construction costs, to make the Project viable.

For the break-even discount rate to reach 5 percent, for example, the analysis indicates that Project overall revenues would need to increase by 54%, or costs would need to be reduced by 41%.

Alternative Option 2

The cash flow analysis for this option covers a 50-year period (FY 2010 through FY 2059), compared with a 35-year period for the public option.

The construction cost for the Project includes *only* the Central segment, estimated at $1.7 billion (YOE), with completion scheduled in 2019. This assumes the East and West segments could be delivered on a schedule consistent with this completion date.

Costs for operations and asset replacement over the 50-year period are estimated at an additional $750 million and $1.63 billion, respectively.

Under Option 2, only the 31-mile Central segment would be tolled. Toll revenues would generate $11.79 billion (YOE) over the 50-year period. The tolling forecast assumes the same toll rates per mile and escalation in traffic volume as the public option.

The break-even discount rate, at which the net present value (NPV) of the Project cash flow equals zero, is 7.5% under the alternative option over the 50-

year period (5.6% over a 35-year term), indicating the potential viability of the Project as a P3.

SR 710 North Tunnel

P3 Alternative

The cash flow analysis for the P3 Alternative covers a 50-year period from FY 2010 through FY 2059.

The total Project capital cost is estimated at $4.09 billion (YOE), with a completion date of 2022, four years earlier than the public option. Costs for O&M and major maintenance over the 50-year period are estimated at an additional $2.14 billion and $1.5 billion, respectively.

Of the $4.09 billion capital construction cost, Measure R provides $1.05 billion in committed funding. The majority of Measure R funds become available between 2034 and 2036, more than 10 years after the construction completion date.

Metro has identified an additional $1.74 billion in "highway strategy revenues" or uncommitted funding for the Project's capital needs. Assuming the availability of these strategic revenues, approximately $1.3 billion in additional funding is still required to cover the construction cost.

Project toll revenues may be used to further reduce the net project capital funding requirement.

Using the forecast provided by InfraConsult, toll revenues would generate $29.68 billion (YOE) over the 50-year period. This forecast is based on a 2030 base year traffic volume of 190,000 annual average daily traffic (AADT) to which a diversion rate of 35% has been applied. An annual growth rate of 2.0% has been applied to traffic volumes. The starting toll rate is $5.00 (2010 dollars), with a price escalation of 3.0% per year.

The break-even discount rate, at which the net present value (NPV) of the Project cash flow equals zero, is 8.37% over the 50-year period (7.73% if Measure R funding is excluded), indicating the potential viability of the Project as a P3.

I-710 South Freight Corridor

Public Option

The total project capital cost is estimated at $10.5 billion (YOE). Costs for O&M and major maintenance over the 35-year analysis period are estimated at an additional $1.15 billion and $426 million, respectively.

Of the $10.5 billion capital construction cost, Measure R provides $811 million in committed funding.

Metro has identified an additional $3.38 billion in "highway strategy revenues" or uncommitted funding for the Project's capital needs. Assuming the availability of these strategic revenues, approximately $6.3 billion in additional funding is still required to cover the construction cost.

Project toll revenues may be used to further reduce the net project capital funding requirement.

Using the forecast provided by InfraConsult, toll revenues would generate $3.37 billion (YOE) over the 35-year period. The forecast assumes full tolling of trucks on the freight corridor and on the general purpose lanes, at the following rates:

- Zero emission trucks GP/FC lanes: Peak hours \$10.00 / \$5.00; Off peak hours \$2.50 / \$1.00
- Other trucks GP/FC lanes: Peak hours \$20.00 / \$10.00; Off peak hours \$10.00 / \$5.00

The break-even discount rate is less than zero for the public option, indicating the need for additional public funding or other revenues, or a reduction in capital construction costs, to make the Project viable.

For the break-even discount rate to reach 5 percent for example, the Team's analysis indicates that Project revenues would need to increase by 578%, or costs would need to be reduced by 89%.

Alternative Option 1

The total project capital cost is estimated at \$8.2 billion (YOE) or nearly 22% less than the public option, due to seven-year schedule acceleration (2022 vs. 2029 completion date) and cost reductions that were identified by InfraConsult.

Costs for O&M and major maintenance over the 35-year period are estimated at an additional \$1.15 billion and \$698 million, respectively.

Using the forecast provided by InfraConsult, toll revenues would generate \$4.5 billion (YOE), or about 34% higher than the public option due to an earlier start of operations in 2022. The forecast uses the same tolling rate structure as the public option.

The break-even discount rate is less than zero for the alternative option, indicating the likely need for additional public funding or other revenues, or a reduction in capital construction costs, to make the Project viable.

For the break-even discount rate to reach 5 percent, for example, the Team's analysis indicates that Project revenues would need to increase by 326%, or costs would need to be reduced by 82%.

Alternative Option 2

The cash flow analysis for this option covers a 50-year period (FY 2010 through FY 2059), compared with a 35-year period for the public option.

The construction cost for the Project includes only the 16-mile Freight Corridor, estimated at \$3.9 billion (YOE), with a completion date of 2020.

Costs for O&M and major maintenance over the 50-year period are estimated at an additional \$1.18 billion and \$576 million, respectively.

Using the forecast provided by InfraConsult, toll revenues would generate \$13.6 billion (YOE), based on the tolling of the Freight Corridor only. The forecast assumes an initial per-mile toll rate of \$0.625 (2010 dollars), escalating at a rate of 3.0% per year. Over the 50-year period, traffic volumes increase at an annual growth rate of 1.69% from 2020 to 2029, 1.88% from 2030 to 2034, 5.84% from 2035 to 2050, and 1.0% thereafter. These growth rates take into account the impact of the GP lanes expansion in 2030.

	Measure R	LONP Reimbursement Fund	High-Speed Rail Bonds	Subtotal	Measure R Local Matching Agency Funds	Section 5309 New Starts	Prop C (25%)	Regional Improvement Program	CMAQ - Transit	Subtotal	All Funding
	Committed										
Crenshaw	1,433			$1,433	51		40	2	173	$266	$1,699
Westside Subway	4,075	44		$4,119	169	1,706				$1,875	$5,994
Regional Connector	160	184	115	$459	44	721			31	$796	$1,255

Figure 2. Transit Projects – Committed vs. Uncommitted Funding Sources

The break-even discount rate, at which the net present value (NPV) of the Project cash flow equals zero, is 4.34% over the 50-year period, indicating the likely need for additional public funding or other revenues, or a reduction in capital construction costs, to make the Project viable.

For the break-even discount rate to reach 5 percent for example, the Team's analysis indicates that Project revenues would need to increase by 16%, or costs would need to be reduced by 14%. This indicates that some additional project development efforts could result in a project which might have viability as a P3.

Transit Projects

The preliminary analysis of project level cash flows includes the following elements:

- Capital costs (non-vehicle);
- Capital maintenance (non-vehicle);
- Maintenance; and
- Operations (Crenshaw LRT only).

The cash flows do not include fare box revenue, rolling stock (including associated rolling stock capital maintenance) or rail line operations (with the exception of Crenshaw LRT).

Crenshaw LRT

The Project has a total funding need estimated at $3.5 billion (YOE), including capital construction, capital maintenance, maintenance and operating costs over a 35-year period.

With $1.43 billion in committed Measure R funds, the Project requires just over $2.0 billion in additional funding.If an additional $266 million of proposed uncommitted funding becomes available, the remaining unfunded balance for the Project narrows to $1.77 billion.
An additional $2.0 billion of capital funds and operating revenues are required for the Project over the 35 years.

Regional Connector LRT

The Project has a total funding need estimated at $1.7 billion (YOE), including capital construction, capital maintenance, maintenance costs over a 35-year period. Of this amount, $459 million of committed funding has been identified for the Project's capital needs.

An additional $1.3 billion of capital funds are therefore required for the Project over the 35 years.

Metro has identified $796 million in additional uncommitted funding. Assuming these funds become available, the remaining unfunded balance for the Project is $949 million.

Westside Subway Extension

Public Option

The Project has a total funding need of approximately $6.9 billion (YOE) including capital construction, capital maintenance and maintenance over a 35-year period. Of this amount, approximately $4.1 billion of committed funding has been identified for the Project's capital needs.

An additional $2.8 billion in funds are therefore required for the Project over the 35 years.

Metro has identified $1.9 billion in additional uncommitted funding. Assuming these funds become available, the remaining unfunded balance for the Project is $949 million.

Accelerated Alternative Public Option

Under this option, the Project has a total funding need of approximately $5.8 billion (YOE), or nearly 16% less than the non-accelerated Public Option.

An additional $1.7 billion of capital funds and operating revenues are required for the Project over the 35 years.

Assuming the availability of $1.9 billion in additional uncommitted funding identified by Metro, $200 million in excess funds may be available Project-related uses in the future.

Risk Analysis

The final goal of Task 3C was to provide an initial qualitative view of risk transfer under various P3 options. To achieve this, a simple graphical representation of risk transfer was developed.
For each project, and for each of the six risk headings, the total number of risks that were analysed as 'unacceptable', 'undesirable', 'acceptable' and 'negligible' were presented in bar chart format for the baseline public project. All of these risks were assigned to the public sector so there were no 'shared' or 'private' risks.

The purpose of comparison is to show the difference in risks retained by Metro so next to this summary of the public project a similar chart was developed for each P3 option. Only those risks that would be retained by Metro under the P3 option or shared with the private party are shown on the chart. Risks that would be transferred to a private entity are not shown on the chart. A separate color / bar was used for shared risks.

At a glance this simple graphical view (Figure 3) shows the impact of each P3 option on the transfer of risk from Metro to a private party. A brief interpretation of the bar charts for each project is given below.

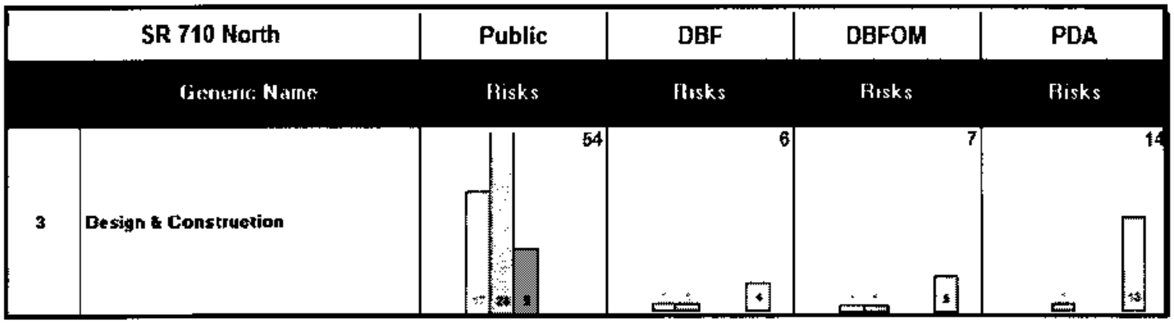

Figure 3: Sample Risk Transfer Chart

Highway Projects

SR-710 North

The risk transfer bar charts for the SR-710 North indicate that the overall risk retained by Metro is the highest for the Public option, as would be expected, with the PDA and DBFOM options presenting better risk allocation scenarios for Metro than the DBF option. An interpretation of the bar charts and risk allocation under each risk category for the different delivery methods is summarized as follows:

Planning, Permitting & Approvals

The charts show that neither of the two risks is fully transferred. The PDA option appears to present the best scenario where both risks are shared. Under the DBF and DBFOM options one risk is retained with the other shared.

Legislative / Policy

Two out of the nine risks are fully transferred under DBF and DBFOM, whereas only one is fully transferred under the PDA option. The PDA options appears to offer the best risk transfer scenario for Metro although the majority of the risks are shared.

Design & Construction

The main message derived from the charts is that a significant number of the design and construction risks are transferred under all three P3 options. Under the PDA option all but one of the risks are shared thus presenting a greater risk exposure for Metro than under the DBF or DBFOM options.

Operations Phase

The risks are fully retained under the DBF option, as would be expected because the contract has no operations related obligations. For the DBFOM and PDA options all but two of the risks are fully transferred.

Commercial / Financial

The bar charts indicate that the PDA option presents the best scenario for Metro under this risk category although two unacceptable risks are retained. More than half of the risks are fully transferred under all three P3 options.

Acceptance & Third Parties

One risk is transferred under DBFOM. No risk is fully transferred under the DBF or PDA options. Under the PDA option most of the risks (seven out of eight) are shared, therefore reducing but not transferring Metro's risk exposure.

I-710 South

The risk transfer bar charts for 710 South indicate that overall the least exposure to risk for Metro is under the DBFOM option. The DB option presents only a small improvement over the Public option. An interpretation of the bar charts and risk allocation under each risk category for the different delivery methods is summarized as follows:

Planning, Permitting & Approvals

All the planning and permitting risks are retained by Metro for all the delivery options considered.

Legislative / Policy

Three risks are transferred under the DB and DBFOM options. However, the unacceptable and undesirable risks are retained by Metro under both P3 options.

Design & Construction

As for the other projects, the majority of the design and construction risks are transferred under the DB and the DBFOM options however three undesirable risks are retained by Metro under both P3 options whereas all other risks are shared under P3.

Operations Phase

For the DB option all operational phase risks are retained as would be expected whereas all but three risks are transferred under the DBFOM option and two of the three retained risks are shared.

Commercial / Financial

The majority of commercial / financial risks are retained by Metro under. The DBFOM options present less risk exposure to Metro than the DB option.

Acceptance & Third Parties

Four of the eleven risks are fully transferred under the DBFOM option with another four shared. None of the risks are fully transferred under the DB option, although one is shared thus representing only a minor improvement over the Public option.

High Desert Corridor

The risk transfer bar charts for the High Desert Corridor indicate that there will be a significant reduction in the risks retained by Metro under the P3 (DBFOM) option when compared to the risks under the Public option. An interpretation of the bar charts and risk allocation under each risk category for the different delivery methods is summarized as follows:

Planning, Permitting & Approvals

The charts show that neither of the two risks is transferred however the acceptable risk is shared.

Legislative / Policy

One risk is transferred and four of the eight risks are shared under the DBFOM option. However, Metro remains responsible for the undesirable risks.

Design & Construction

The bar charts show that most of the design and construction risks are transferred under the DBFOM option. Only one risk is retained outright although a further seven risks are shared.

Operations Phase

For the DBFOM option all but two of the risks are fully transferred and the remaining two risks are shared.

Commercial / Financial

Although more than half of the risks are transferred under the DBFOM option, Metro still retains one unacceptable risk and two undesirable risks. One risk is shared.

Acceptance & Third Parties

One risk is transferred and four of the eight risks are shared under the DBFOM option. Retained acceptable risks are reduced from seven to three.

Transit Projects

Crenshaw LRT

Two P3 options have been considered for Crenshaw Corridor:

- DBFM
- DBFOM

(In general the "M" refers to the assumption that the contractor would be responsible for the maintenance of tunnels, lining to underside of rail, stations, and critical civil structures to 2039.)

In the DBFOM option, the operations portion of this contract would include operations of the existing Green Line as well as the Crenshaw Line, and would include maintenance of the existing and future LRT vehicles procured by Metro.

Guideway and Track

The charts below show that the majority of risks in this category are transferred to the private sector (7 out total of 9), with one "undesirable" risk being retained (regarding objections by community at grade guide way).

Stations, Stops, Terminals, Intermodal

While two thirds of the risks in this category are retained, the two transferred are "unacceptable" rating.

Support Facilities Yards, Adm. Bldg

A limited number of risks have been identified for this category at this stage, both having been retained by public sector (undesirable) due to potential public opposition to the location of the depot.

Site work and Special Conditions

While just under a third of the risks can be transferred or shared (some of these "undesirable"), the public retains the other 60% due to risks of unknown utilities and/or agreements with utility companies.

Systems

In this case the vast majority of risks can be transferred under DBFOM arrangement, with a single "undesirable" risk retained (potential changes in traffic patterns).

ROW, Land, Existing Improvements

It is unlikely that these risks can be transferred under the DBFOM.

Rail Vehicles

Not considered in this analysis as these will be procured by the public sector. There could be some transfer of maintenance risk under the DBFOM contract if vehicle maintenance is part of the contract.

Professional Services – Design

More than half the risks will be transferred under DBFOM, with a limited number retained (scope change and late design changes)

Professional Services – Project Management, Construction Administration, Surveys and Testing

The majority of risks will be transferred under DBFOM, particularly a number of "undesirable" risks, with a few retained.

Professional Services – Insurance

Whilst there are a small number of risks in total, the majority of these will be transferred under DBFOM.

Professional Services – Legal / Permits / Approvals

The majority of these risks are likely to be retained, as they concern permits and approvals that the public will need to manage.

Unallocated Contingency – General

The majority of these risks are likely to be retained, as they concern public / stakeholder management and general risks of terrorism etc.

Unallocated Contingency – Operations

Assuming a full DBFOM contract is placed, the majority of these risks can be transferred but some limited risks will be retained regarding co-ordination with other services and unanticipated changes to service will remain.

Unallocated Contingency – Commercial

The charts indicate that the majority of these risks cannot be transferred under DBFOM, although the majority are rated "acceptable".

Regional Connector LRT

Guideway and Track

The majority of risks in this category are transferred to the private sector (21 out total of 25), with 4 shared risks retained but 4 "unacceptable" risk transferred.

Stations, Stops, Terminals, Intermodal

The majority of risks in this category are transferred to the private sector (10 out total of 14), again some "unacceptable" risks transferred but with two retained and a further two "shared".

Support Facilities Yards, Adm. Bldg

There are no support facilities under this scheme.

Site work and Special Conditions

The majority of these risks have been assessed as "retained" by the public sector, but with 4 "unacceptable" risks transferred and 5 "shared" risks.

Systems

In this case all but one of the risks can be fully transferred under DBM arrangement but with one "shared" risk.

ROW, Land, Existing Improvements

Whilst there are a limited number of risks in this category, it is unlikely that these risks can be transferred under the P3 arrangement.

Rail Vehicles

Not considered in this analysis as these will be procured by the public sector.

Professional Services – Design

Majority of design risk would be transferred under P3.

Professional Services – Project Management, Construction Administration, Surveys and Testing

Majority of design risk would be transferred, with three risks being retained, one of which is shared.

Professional Services – Insurance

Majority of design risk would be transferred, with one risk being retained.

Professional Services – Legal / Permits / Approvals

The majority of these risks are likely to be retained, as they concern permits and approvals that the public will need to manage.

Unallocated Contingency – General

The majority of these risks are likely to be retained, as they concern public / stakeholder management and general risks of terrorism etc.

Unallocated Contingency – Operations

As it is unlikely that Operations would be included, these risks are retained.

Unallocated Contingency – Commercial

The majority of these risks cannot be transferred under P3, although the majority are rated "acceptable".

Westside Subway Extension

Two P3 options have been considered for Westside:

- a single contract DBFM
- multiple DBFM contract packages managed by a single "super" Program Manager

(In these options the "M" refers to the assumption that the contractor would be responsible for the maintenance of tunnels, lining to underside of rail, stations and key civil structures 2039.)

In both cases, the objective would be to transfer as much risk as is economically viable to the private sector. On the private side, the risk would be managed by either the single DBFM consortium or a combination of the "super" Program Manager and the specific package Contractor. In either case the risks identified below will be transferred from Metro to the "private" sector and there would a "single point of contact" in each option.

Further differentiation will be identified in later tasks when the individual risks are quantified and a QRA assessment is made. At that stage the effect of the two options above can be assessed in more detail.

Guideway and Track

The charts below show that the majority of risks in this category are transferred to the private sector (18 out total of 26), with 4 shared risks retained but 4 "unacceptable" risk transferred. The P3 definition assumes that Metro's design of the TBM and lining would be novated to the DB program manager and guide way/track/tunnel contractor for final design and construction. It is assumed that following appropriate "due diligence" the private contractor would adopt the design risk for these elements.

Stations, Stops, Terminals, Intermodal

The majority of risks in this category are transferred to the private sector (13 out total of 18), again some "unacceptable" risks transferred.

Support Facilities Yards, Adm. Bldg

A limited number of risks have been identified for this category at this stage; both can be transferred under P3.

Site work and Special Conditions

These risks have been assessed as "retained" by the public sector, but with 4 "unacceptable" risks transferred. In the "single" DBFM option, these risks would be directly managed, whereas in the "multiple" DBFM option, an optional DB contract would be for utilities, probably be managed by the program manager for Metro through third party force account work with the utility companies.

Systems

In this case the all risks can be transferred under DBFM arrangement.

ROW, Land, Existing Improvements

While there are a limited number of risks in this category, it is unlikely that these risks can be transferred under the P3.

Rail Vehicles

Not considered in this exercise as these will be procured by the public sector.

Professional Services – Design

Majority of design risks would be transferred.

Professional Services – Project Management, Construction Administration, Surveys and Testing

Majority of PM would be transferred, with one risk being retained. It is likely that there will be some program management required by Metro during the program but in both DBFM options, there will be a "single point of contact" between Metro and the private sector.

Professional Services – Insurance

Majority of design risk would be transferred, with one risk being retained.

Professional Services – Legal / Permits / Approvals

The majority of these risks are likely to be retained, as they concern permits and approvals that the public will need to manage.

Unallocated Contingency – General

The majority of these risks are likely to be retained, as they concern public / stakeholder management and general risks of terrorism etc.

Unallocated Contingency – Operations

As it is unlikely that Operations would be included, these risks are retained, with the exception of maintenance of tunnels and civil structures which is transferred.

Unallocated Contingency – Commercial

The majority of these risks cannot be transferred under P3, although the majority are rated "acceptable".

Summary/Next Steps

It is not a goal of this phase of the analysis to reach a conclusion or present a set of recommendations, but only to inform Metro of the work to date and to ensure that there is a consensus on the factual information provided. Over the next two months, the InfraConsult team will be using this data to complete its analyses of all six projects and present suggested P3 options for each.

To accomplish that, the team will be developing shadow bids for each project, representing how a private partner would bid it taking into account risk pricing, and will be completing the public sector comparator pricing to compare the shadow bids with. Those two calculations will allow the first iteration of the Value for Money assessments to be completed. Underpinning all of those analyses are more fulsome risk allocations, including calculating the financial value of the risks transferred away from Metro. As has been the case throughout this work, iterations of the analyses will be used to refine the initial P3 structures presented as part of this Executive Summary.

It is anticipated that the draft technical memorandum summarizing all of the Task 3 analyses and recommendations will be available to Metro in mid-September.

ATTACHMENT C

FINAL

LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION AUTHORITY

Public-Private Partnership Program

Recommendations for Business Case Development

Prepared by

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1.0 BACKGROUND AND SUMMARY

The principal objective of this phase of work (Task 3: Strategic Assessment) is to determine the suitability of the six initial Measure R projects selected by the LACMTA (Metro) Board as potential candidates for public-private partnerships (P3s). The three transit and three highway projects, all of which are included in Metro's Long-Range Transportation Plan, are:

- Crenshaw/LAX Light Rail Transit Project;
- Regional Connector Light Rail Transit Project;
- Westside Subway Extension;
- High Desert Corridor;
- State Route (SR) 710 North Tunnel Project; and
- Interstate (I)-710 South Corridor Project.

Previous work in Task 3 provided detailed information about each of the six projects and defined potential P3 options. This Task 3D report provides initial analysis to help identify which projects could potentially be developed as P3 projects, with long-range benefit to Metro and the Los Angeles region. The report supplements the *Strategic Assessment Interim Report* provided to Metro on July 8, 2010. As such, it serves as a segue to the development of business cases, in which alternate financing, delivery, and operational approaches for each project will be defined and contrasted to public delivery models and the corresponding benefits and risks to Metro will be identified and quantified.

The qualitative and quantitative assessments in this document are based on assumptions and available data provided by Metro and other agencies to compare traditional and P3 delivery methods for each project. Given the current development status of the six projects, it is not possible at this juncture to develop a final quantitative assessment of P3-related benefits of the projects to Metro. Thus, certain key drivers demonstrated to have an impact on value for money (VfM) in similar projects have been reviewed and potential ranges of values were estimated where applicable. Templates were developed to illustrate indicative results based on this subset of key assumptions. In addition, the non-quantitative aspects of the VfM assessment have been defined and evaluated, particularly in light of the program acceleration goals contained in Metro's 30/10 Plan.

The indicative results illustrate that each of the six initial projects appear to be good candidates for financial and project delivery benefits to Metro when undertaken as a public-private partnership, particularly when evaluated on a whole-life costing basis. Furthermore, each project presents a unique set of opportunities for potential acceleration and cost savings, although the benefits differ substantially among the projects. Additional analysis appears warranted relative to commercial and construction risk transfer, timing of public and private sector delivery under the 30/10 initiative, detailed tolling strategies and revenues and other information. Such analysis and detailing of project development and delivery strategies will be undertaken through preparation of the respective business plans.

2.0 VALUE FOR MONEY AND FINANCIAL ANALYSIS

2.1. Value for Money (VfM) as a Decision Tool

Achieving value for money ("VfM") in the use of public funds is an overarching consideration throughout the development, procurement, and delivery of each of the initial Metro projects being considered as possible P3s. The level of analysis performed to assess VfM in this report is directly related to the availability of information at existing stages of project development. For example, the current Metro projects have capital and operating cost data developed for environmental analysis purposes; as the project development process continues, further design and development work will improve these estimates and affect the final assessment of VfM. At this stage of development of the six candidate projects, the analysis is appropriately focused on the major drivers of VfM for each project and the presence or absence of those drivers. An indication of VfM at this stage should drive the decision to more closely analyze contract structures, financing, and other assumptions that will allow more precise quantification of the VfM for each project.

2.2. Preliminary Assessment of Value for Money

This assessment of value for money has considered quantitative evidence to assess whether the key drivers of VfM support further analysis of P3 as the preferred delivery method for these Metro projects.

2.2.1. Factors Affecting VfM and P3 Suitability

A number of factors affecting VfM have been considered in assessing each project's suitability as a P3, including:

- Capacity to provide effective management of risks for construction and operations of a major capital investment;
- Scheduling needs that drive accelerated construction requirements;
- Availability of a private-sector market with the required expertise and skills to deliver the project in an efficient and effective manner;
- Ability to clearly define those Metro service needs that can be adequately contracted under an appropriate performance regime to ensure an effective and accountable delivery of services;
- Ability to clearly define the risk allocation between Metro and the private partner(s);
- Potential to generate new or additional revenue;
- The types of assets and services that can be costed on a long-term, whole-life basis by the private sector;
- Long-term planning horizons, with assets intended to be used over long periods into the future; and
- Ability to impose robust performance standards on the private sector.

2.2.2. Initial Analysis

The key determinants of VfM for the P3 projects under consideration by Metro are construction cost efficiencies driven through risk transfer, schedule acceleration, operational efficiency, and the ability to use tolling to support project finance on road projects. We have evaluated ranges of impact for these factors as part of this work by reviewing the available research performed both in the US and other jurisdictions where P3 is widely practiced. Generally speaking, a greater proportion of risk remains with the public sector under conventional procurement methods compared to the P3 alternative. Using a P3 allows the public sector to transfer a large number of risks within both the construction and operations phases of a project and to incentivize the private partner to perform more efficiently and effectively through contractual provisions. In addition, those risks retained by the public sector are ones that it can most effectively and efficiently manage, further optimizing risk transfer and delivering VfM.

The range of procurement options available to public sponsors is shown in Figure 1. The figure arrays the major categories of risk against those procurement options, showing which have the ability to transfer such risks effectively from the public to the private partner. The potential for transfer of risk unique to each project is discussed in this report.

Figure 1: Range of Procurement Options

	Design Build	Design, Build & Maintain	Design, Build, Operate & Maintain	Design, Build, Finance & Maintain	Design, Build, Finance, Operate & Maintain
Design Risk	✓	✓	✓	✓	✓
Construction Risk	✓	✓	✓	✓	✓
Maintenance Risk	O	✓	✓	✓	✓
Operations Risk	O	O	✓	O	✓
Finance Risk	O	O	O	✓	✓
Demand Risk	O	O	O	O	✓

To supplement its direct experience, the Project Team conducted interviews and also reviewed a number of empirically-based US and international studies on the cost differentials between alternative project delivery methods, including P3, and traditional procurement approaches. As summarized in Appendix A to this report, the demonstrated level of savings achieved by P3 projects relative to conventional procurement methods has been driven by the nature and complexity of the alternative delivery method employed, the structure of the contract and concession documents, and the specific site and construction conditions present. The two most recent US examples of highway and transit capital cost differentials under P3 procurement are provided by the Caltrans / San Francisco County Transportation Authority Presidio Parkway Project in San Francisco and the Denver RTD Eagle P3 Project in Denver. For the former project, the capital cost bid in mid-2010 by the selected concessionaire for the Presidio Parkway Project was nearly 45% below engineer's estimate for conventional delivery. With respect to the Eagle P3 Project, the concessionaire selected in June 2010 provided a capital cost bid almost 22% below engineer's estimate. In addition to differentials between P3 bid prices and engineers estimates, the documented experience with projects completed under conventional design-bid-build procurement confirms a significant differential between estimated capital costs and actual capital costs at project completion that can reach as high as 50%.

Capital Cost Adjustments Applied in Task 3D

For purposes of assessing the financial impact of risk adjustments on the costs of the six projects, it has been assumed that the "public project capital cost" provided by Metro represents the project's final cost upon completion, rather than the most current estimate. This shorthand allows us to quantify the impact of various types of risk transfer on the total project cost and to create a "P3 cost" reflective of those adjustments. In subsequent full VfM analyses, both positive and negative project-specific adjustments will be made to the preliminary estimate for the public project capital cost in the areas of:

- Contracting method efficiencies;
- Scope adjustment;
- Private transaction costs;
- Design contingencies;
- Construction methods efficiencies;
- Economies of scale;
- Construction risk priced by the contractor;
- Susceptibility to project change orders
- Public costs; and
- Public retained risk reserves.

For this stage of the analysis, the Team applied a composite risk transfer number accumulating to approximately (minus) 30% to arrive at the P3 capital cost estimate, prior to applying inflation adjustments. That percentage is substantiated in the appended review of various empirical data sources. A large portion of that amount is the result of "fixing" the scope and budget upfront under a P3 procurement, thereby eliminating potential change orders, schedule adjustments, and interface costs that often push the completed public project cost to significantly exceed initial engineering estimates. Of course, this approach still permits downstream flexibility should the owner solely choose to modify the scope of the project.

Additional adjustments were made in those instances where the Team determined that there were possibilities for schedule acceleration under a P3 delivery model. These differences vary by project depending on the private sector's ability to achieve service commencement earlier and with an overall higher degree of project delivery certainty.

While significant cost savings have been demonstrated, because of the limited application of the reviewed empirical data to adjust operations, maintenance, and lifecycle cost estimates, only capital costs were adjusted in the financial models for this analysis. Other risk adjustments will be made in subsequent business plan development and those risks assessed herein will thus be further refined.

The estimated capital cost risk adjustments and schedule acceleration cost benefits in the P3 project delivery model compared to the public project capital cost estimates are broken down by project in Tables 1 and 2, showing respectively the assumed adjustments in 2010 present value dollars and in "Year of Expenditure" (YOE) dollars.

Table 1: Capital Cost Adjustments (2010 Present Value Dollars)

2010 Dollars (billions)	Public Project Capital Cost	(-) Risk/Cost Overrun Adjustment	=	P3 Capital Cost
Highways				
High Desert Corridor*	2.6	(0.7)		1.9
SR 710 North	3.5	(1.0)		2.5
I-710 S Full Corridor**	5.5	(0.8)		4.7
Transit				
Crenshaw/LAX LRT***	1.0	(0.3)		0.7
Regional Connector****	1.1	(0.3)		0.8
Westside Extension	3.5	(1.1)		2.4

Transit capital costs exclude right of way (ROW) and vehicles.
Highway capital costs exclude pre-construction activities and ROW.

*Includes costs from SR 14 to I-15, P3 Capital Cost includes E&W segments.
**Full Corridor P3 is not considered in this analysis
***Inputs received in 2008 dollars.
****Inputs received in 2009 dollars.

Table 2: Capital Cost Adjustments (YOE $)

Year of Expenditure ($ billions)	Public Project Capital Cost	(-) Reduction in Inflation due to Acceleration	(-) Risk/Cost Overrun Adjustment	=	P3 Capital Cost
Highways					
High Desert Corridor*	3.5	(0.5)	(0.9)		2.1
SR 710 North	5.0	(0.7)	(1.2)		3.1
I-710 S Full Corridor**	8.3	(1.0)	(0.7)		6.6
Transit					
Crenshaw/LAX LRT***	1.3	-	(0.4)		0.9
Regional Connector***	1.3	-	(0.4)		0.9
Westside Extension	4.4	(0.4)	(1.3)		2.7

Transit capital costs exclude right of way (ROW) and vehicles.
Highway capital costs exclude pre-construction activities and ROW.

*Risk adjustment applies to the full project from SR 14 to I-15.

**Risk adjustment applies to Freight Corridor only. Public capital cost for Freight Corridor is $4.6b, P3 capital cost $2.3b.

***No acceleration of delivery has been assumed for these projects.

At the business case stage, a full quantified risk assessment will be made specifically for each project, considering major categories such as design, construction, operations, asset and lifecycle replacement, and financing. The empirical evidence of risk value applied in this assessment will become an effective "checkpoint" at the business case stage to ensure that the specific characteristics of each project are tested robustly and that the assessment of risk value is consistent with past procurements of a similar nature. An essential first step in this more detailed assessment will be the refinement and detailing of the proper scope for each project, an iterative process involving input not just from project sponsors but also from stakeholders and potential private partners and contractors.

It should also be noted that certain project costs are not included in the Sources and Uses tables used throughout this report, either because of timing of such expenditures or because Metro's project scope excludes them. Excluded items include publicly funded pre-construction capital costs, predevelopment activities, right of way costs and transit vehicle costs. However, in order to compare the public and P3 options, such costs were added back into the Delivery Cost Comparison Tables.

2.2.3. Refinement of Commercial Risk Transfer

The business cases to be completed in Task 4 will include a full assessment of the marketability of each project as a potential P3 in order to:

- Ensure a competitive market is available to respond to the procurement process;
- Confirm at a high level our assessment of commercial, technical and financial risk transfer assumptions during the business case;
- Develop a commercial structure that optimizes risk transfer to the private sector; and
- Familiarize and prepare the market for the project.

This will establish a firmer initial basis for the commercial and scoping assumptions made for each project within the business cases.

2.2.4. Other Factors Demonstrating VfM

During this analysis, a number of other factors were considered in assessing potential P3 effects and evaluating VfM. Some of these will be quantified during the business case stage while others will remain qualitative in nature. These factors include the ability to accelerate construction, potential financing structure, and toll revenue generation, each of which is discussed below.

Acceleration of Construction Program

There is strong evidence to suggest that some of the Metro projects, such as Westside Extension or the I-710 South, can be delivered under the P3 process in quicker timeframes due to two factors:

- P3 procurement methods such as Design-Build compared to a conventional Design-Bid-Build procurement have the potential to influence the speed of final design and construction and project delivery; and
- The inclusion of private financing as part of the initial financing of the projects as P3s may reduce certain schedule constraints inherent in the use of public funding for construction costs, including Measure R and Federal Transit Administration (FTA) New Starts discretionary grant funding.

The benefits of earlier project delivery include reducing the inflationary costs assumed by conventional procurement due to an accelerated and/or shorter construction period, an aspect that will be quantified more rigorously during the business case stage. In addition, the social, job creation and economic benefits of the projects will occur earlier in Los Angeles County. Although specific quantification of these benefits is currently outside the Team's scope of work, the qualitative value associated with these benefits will be important to consider at the business case stage.

Financial Structuring

Under a typical P3, the cost of capital is higher than that of public sector procurement for a number of reasons, including the cost of the risk being transferred, limited access to tax-exempt debt, related income taxes, and return requirements for the equity portion of the capital structure.

At the business case stage, the Team will explore the potential for reduction in the cost of capital in the development of the P3 alternative, including options for tax-exempt Private Activity Bonds and rate-subsidized alternatives such as federal Transportation Infrastructure Finance and Innovation Act (TIFIA) loans. In addition, we will test a variety of structures such as the incorporation of milestone payments, which do not compromise optimizing risk transfer but have the benefit of reducing the overall cost of capital to the project.

Tolling Revenue

To date, only limited traffic and revenue studies have been performed for the highway projects under consideration. During the business case stage the Team will explore the potential value these revenues can bring to each project to reduce affordability gaps, and will also consider how a private developer may identify new and additional sources of revenue from traffic which may contribute to achieving greater VfM.

The financial analyses completed at this stage are summarized in this section. These project level analyses build on the cash flow analyses completed during previous work for each of the Metro projects, and form an important step toward the development of a full business case for each project.

2.3. Interpreting Quantitative Value for Money

The following two sections compare each of the six projects' delivery costs under the public and private options by arraying all of the estimated project cost and revenue components over time and then discounting them back to a present value. That is the proper convention for performing VfM analysis; however, the outcome of that analysis can be misleading if not interpreted in a broader context. While VfM is a broad concept that can capture both quantitative factors, such as costs, and qualitative factors, such as service quality and safety, the work has focused on those factors that can be quantified effectively. Therefore, the outputs from this analysis should not be considered in isolation and specifically should not be considered as a stand-alone case for or against P3 delivery structures.

In the next phase of work, the business case will supplement the VfM with a qualitative analysis to include those benefits that are more difficult to quantify but may be equally or in some cases more important, such as efficiency, schedule reliability, public budget certainty, and service quality, as well as external benefits such as traffic congestion reduction and air quality improvements.

At this level of analysis, we have used VfM primarily as a financial tool, and have not captured the benefits or costs that accelerating or delaying a project will produce to stakeholders. In fact, pushing project expenditures to earlier in the timeline to deliver a project sooner can actually skew the VfM by making the initial project cost look higher in present value terms, when in actuality the cost of an accelerated project in YOE dollars may be substantially less. That anomaly is due to the interplay between the inflation rate and the discount rate; in times where inflation is low but the cost of credit is relatively high, such skewing is most pronounced.

Simplified schedule assumptions at this stage can also skew the VfM. For appropriate comparison, the same duration for the analysis period is assumed for both the public and P3 projects. However, within that total time period, the start and end dates for the phases of development, construction, and operations may be significantly different. So, for example, if a P3 option accelerates construction to an earlier date, it will result in additional years of operation being counted as a cost during the analysis period, thus showing greater operating and maintenance expenses. On the revenue side, an earlier start will produce either more years of operation requiring public subsidy, or more years of positive cash flow, depending on the project economics. During the business case analyses, the models could be adjusted to measure such timing effects by holding the periods constant and, conversely, by letting the analysis periods float rather than being held equal for both projects.

2.3.1. What Does the VfM Show at this Level?

In light of the above discussion, the primary question is: what does the VfM actually show at this level? In the subsequent sections of this report, the costs and revenues associated with each of the six initial projects are presented in both "Year of Expenditure" (YOE) dollars and in "Present Value" (PV) dollars, discounted back to 2010. The YOE dollars are provided to reflect the effect of inflation on costs and revenues over the expenditure period. In the context of VfM, the most important take-away is the amount of public investment required for each project delivery method in 2010 present value dollars. The calculation of present value involves first inflating costs and revenues from 2010 present value dollars to the years in which they are assumed to occur (that is, to YOE dollars), and then discounting them back to 2010 at a rate of 7% to reflect the opportunity cost of capital. According to the Office of Management and Budget (OMB) Circular A-94, opportunity cost of capital refers to the rate of return that investors could have earned through an optimal alternate investment of funds in the capital markets.

As shown in the Delivery Cost Comparison tables in Sections 3 and 4, the analysis of six projects indicates varying degrees of VfM. For the three highways projects, the present value of the public investment required under the P3 option is significantly less than for the public option; the ability to leverage future toll revenues to pay for many of the project capital and operating costs clearly reduces the need for both upfront and ongoing public contributions. For the transit projects, the differences are not as dramatic over the total life of the projects, but remain significant in terms of public funds required during construction. All three transit projects show much lower upfront public funding under the P3 option.

3.0 TRANSIT PROJECTS

3.1. Quantitative Analysis Methodology

For each of the three transit projects, Crenshaw/LAX LRT, Regional Connector LRT, and the Westside Subway Extension, the following approach was followed:

Affirmation of a public option identifying the total cost of delivery if the project were to be delivered as currently proposed by Metro (the "public project"); and
Definition of a P3 option identifying the total cost to Metro of delivering the project using a P3 approach assuming adjustments in key areas (the "P3 project").

3.1.1. Scope

For each transit project and each option, the scope of the financial analysis includes:

- Capital costs – costs related to the design and construction of the project (excluding the cost of acquiring rolling stock);
- Capital maintenance – costs related to replenishment and replacement of capital facilities and equipment (with the exception of rolling stock);
- Non-vehicle maintenance costs – costs related to routine maintenance of capital facilities such as buildings, grounds, and equipment; structures, tunnels, and subways; fare collection equipment; stations; roadways and track; communication systems; and electric power facilities; and
- Operations (if applicable) – costs associated with the direct operation of transit service including salaries and benefits of operators and mechanics.

Currently, the costs associated with the purchase, operations, or maintenance of any rolling stock for the projects have been excluded from the analysis. Operation of the line itself is only included for Crenshaw/LAX LRT.

3.1.2. Structuring Assumptions

It is well understood that pricing transit as a public good inevitably results in fares not covering operating and maintenance costs. Therefore, we have assumed that the P3 partner would be compensated under an availability payment model, with all fare revenues continuing to accrue to Metro.

Under that model, Metro would make periodic payments to the P3 partner, the base amount of which would be bid during the procurement phase. These availability payments are typically structured to repay the cost of debt, to provide a return on invested capital, and to cover the projected cost of contractually required maintenance, lifecycle maintenance, and any included operating costs over a specified contractual period. In some cases, payments may begin during the construction period to cover part of the capital costs as well. Generally, the part of the availability payment related to financing is fixed, and the portion covering maintenance and operation (if applicable) is subject to escalation based on an agreed-upon index. For this analysis, no source of funding for those payments has been identified; it may be possible, however, for the portion of the availability payment related to capital costs to be paid over time from Measure R and/or other identified funds.

The following additional assumptions for the P3 structure were also made:

- The responsibility for capital costs, non-vehicle maintenance, and capital maintenance has been transferred to the P3 partner;
- The potential to transfer operating responsibility has been included for the Crenshaw/LAX LRT project only;
- Public funds will be used to contribute to the capital cost;
- The responsibility for any required financing has been transferred to a P3 partner; and
- The term of the analysis is 35 years from the construction start date.

Under the public structure, we have assumed that the full project cost is paid from public funds, and that all future maintenance, operating costs, and repair and replacement costs are borne by Metro. The source of these funds is identified when possible, but no cost of financing has been included at this time in compliance with Metro conventions.

3.1.3. Inputs to the Financial Analysis

Estimates for all project costs and the project delivery schedules have been based on information provided by Metro. InfraConsult has not verified any of the numbers provided by Metro, nor has it performed any independent review of the accuracy or completeness of the Metro inputs. In order to identify specific inputs such as Measure R funding amounts, some numbers are presented as integers of $1 million, but such specific nomenclature should not be misinterpreted as precision.

The data set for each project includes:

Capital Costs

Public Option. Public sector capital costs were provided broken out by Standard Cost Category (SCC), the standardized basket of capital costs used for New Starts projects, as defined by the Federal Transit Administration, and are presented in real dollars on an annual basis for the construction period. The Team performed preliminary project-specific quantitative risk assessments to estimate the possible contingencies under the defined public delivery option for Crenshaw/LAX and the Regional Connector projects, which were used to supplement the empirical research described above. During the performance of this analysis, the Team received revised cost estimates for the Westside subway extension project, including unallocated contingency costs, which have been used for this project in the financial analysis. Additional quantitative risk assessment will be performed for all three projects in subsequent analysis.

P3 Option. P3 capital costs were developed by the Team by adjusting the public option data for schedule acceleration where it was deemed possible. As with the public options, the Team performed preliminary project-specific quantitative risk assessments to estimate the possible contingencies under the defined P3 delivery option for Crenshaw/LAX and the Regional Connector projects, while the Westside Extension project used the unallocated contingency cost estimate from Metro. To estimate historical private sector efficiency and risk transfer in the P3 option, the total P3 construction costs were reduced by an efficiency factor based on a database of P3 projects across the world.

Maintenance, Operations, and Capital Maintenance Costs

Routine maintenance, operations, and capital maintenance costs have not been adjusted between public and P3 delivery models at this time. A more detailed analysis of risk transfer potential including this cost category will be included in subsequent work; a qualitative discussion of the benefits of this transfer of responsibilities to a private partner are included in the discussion of each project.

Routine Maintenance Costs. Routine maintenance costs have been included in the analysis.

Operations Costs. Operations costs have been included in the Crenshaw/LAX LRT project analysis only and include the following: Administration; Routine Maintenance; Transit Operations; and Insurance. Routine maintenance costs and operations costs are often bundled together and collectively referred to as "Operations and Maintenance," or O&M, costs.

Capital Maintenance. Capital maintenance costs—sometimes called repair and replacement costs-- have been included for each project. Capital maintenance costs and capital construction costs are often collectively referred to as lifecycle costs.

3.1.4. Funding

Inputs and assumptions for the timing and amount of Measure R funding available for each project have been provided by Metro and refined by the InfraConsult Team. Each project was analyzed over a 35-year period beginning with the start of construction (the "analysis period.") The following approach to project funding has been used in the analyses:

Public Option. Under each of the public options, public funds are assumed to be available as required and as currently programmed. The primary sources of funding identified at this time include Measure R as well as FTA New Starts funding for the Regional Connector and Westside Extension projects. We have used public funding assumptions, but acknowledge that some amount of that funding is assumed and not assured.

P3 Option. Under the P3 options analysis for transit projects, Measure R funds have been applied as follows:

- Measure R funds available during the construction phase for a project have been used to offset the capital costs up to a maximum of 70% of the project cost;
- For P3 options relying on grant funds in addition to Measure R, the total public funding expectation has been set at 70% of construction costs with 30% of construction funding assumed from private finance; and

- No Measure R Funds have been included to fund project operations.

3.1.5. Financing

The following approaches to financing were used:

Public Option. No cost of financing for public funds has been added to this analysis at this time. Any costs associated with leveraging Measure R funds to make them available in advance of when the sales tax receipts would actually be collected have not been included, nor have financing costs associated with use of tax-exempt bonds or TIFIA for either Westside or Crenshaw/LAX, as it is not Metro's policy to assign such financing charges to projects.

P3 Option. The P3 option includes debt and equity for the portion of capital costs to be financed. The P3 financing terms used for the transit projects include:

- Target debt to equity ratio of 90%;
- Target equity rate of return of 14%; and,
- 30 year term for debt including repayment of principal starting in the first operating period.

3.1.6. Other

The following additional assumptions have been used in the analysis for the transit projects:

Inflation Factor: a rate of 3% has been assumed and applied to all cost items, in line with Metro's approach to planning for comparisons in YOE $;
Discount Factor: a 7% discount rate has been applied to costs and revenues to reflect present value, including the opportunity cost of capital. However, it is important to note that discounting future YOE dollars at a rate higher than inflation distorts the comparison between Public and P3 delivery, as it reverses the benefit of accelerating construction provided by the P3 approach (the later the construction takes place, the lower the PV of construction cost, and with a later start of operations, the lower the PV of O&M and life cycle costs);
Cost of Borrowing: the optimization of P3 borrowings to reflect possible tax-exempt options will be done in the next phase analyses, Task 4;
Taxation:

- Federal income tax has been assumed at 35%;
- No state tax has been reflected; and
- Assets have been depreciated on a straight line basis over the 35-year concession term, consistent with current market practices that view such shorter term transactions as more akin to leases than true concessions.

It is anticipated that individual P3 partners may consider alternative approaches to strategic financial structuring options, which will be assessed where applicable in the Task 4 business cases.

3.2. Qualitative P3 Benefits

3.2.1. Operating and Maintenance Savings

In addition to quantified capital cost benefits, the adoption of various P3 strategies that combine construction with operation and maintenance will result in other, as yet unquantified, cost savings to Metro. Market precedent suggests that Metro as public owner can expect to save in areas such as routine maintenance, capital maintenance, and operations. In fact, Metro's own experience with a private contract for the provision of Foothill Transit bus service resulted in a 50% cost savings over prior Metro operation. These savings accrue due to operating efficiencies and to the enhanced focus on whole-life costing by the private entity which takes on contractual responsibility for both initial construction and long-term condition and whose compensation and return depend on a continued and contractually specified level of performance.

As presented in Appendix A, the Team supplemented its direct experience with focused interviews and an analysis of publicly available studies and reports that compare the cost of public sector delivery with private operations and maintenance services. These studies show:

- The range of savings on specific projects and transit systems were between 12% and 25%, comparable to savings reported on US highway systems;
- Based on the June 2010 concession agreement awarded for the EAGLE P-3 Program in Denver, the most recent transit project data point for the US market, overall concession costs over the 46-year concession period were more than $2.7 billion YOE below RTD estimate, with capital costs alone $367 million YOE (21.9%) below the RTD engineer's estimate;
- With respect to Denver RTD bus service contracting, hourly costs for contracted service have provided a 30% savings over the hourly cost of RTD-provided bus service ($63 versus $92 per hour in 2007);
- Cost savings on projects internationally were between 11% and 25%, consistent with the findings on US systems.

It is not possible at this stage to quantify the potential savings from private operations and maintenance because they are highly dependent on the types of services, contractual terms, local labor laws, and performance standards ultimately adopted by Metro in its P3 program. As the business cases are developed further, and the Metro P3 Policies are more concretely identified, the potential savings and benefits will be more clearly defined. However, it should be noted that even if high standards result in lower cost savings, the benefit to Metro and its riders in terms of better service levels may be equally or even more important.

3.2.2. Impact on Metro's Overall Capital Budget

The cornerstone of all the P3 strategies is the design-build construction approach, and the use of that approach in and of itself provides several key benefits to Metro: the ability to fix the project cost far earlier in the construction/procurement cycle makes capital budgeting far more accurate, while greater schedule certainty assists in cash flow and capital formation requirement planning.

The availability of private financing for Metro's program of P3 projects would reduce the potential burden on Metro's cash flow needs for other projects also scheduled to be implemented using Measure R and other public revenues during the same construction period. Given the uncertainty of future federal transportation legislation, the ability to rely on private financing could be particularly advantageous to Metro in the event that some of the financing mechanisms currently being proposed to deliver future Measure R revenue in the form of low- or zero-interest bond proceeds, such as Qualified Transit Improvement Bonds (QTIBs), and/or TIFIA assistance, do not materialize on the timetable or at the levels anticipated by Metro.

A P3 procurement approach that includes private financing would offer additional flexibility to Metro's overall capital budget, reducing the amount of public funds needed in a critical near-term horizon to construct key highway and transit projects, particularly those identified as part of the 30/10 program. This approach could create a timing benefit, but in most cases, would not generate any net new project funding over the analysis period. The balance of any Measure R funding not expended during a project's construction period would likely still be required to support future availability payments to the P3 partner, a portion of which represents repayment of any private capital provided to the project for construction.

The use of private financing as part of the overall P3 implementation strategy in the following analyses is not meant to suggest that Measure R funding could be reprogrammed to other projects because it is not required during the construction phase. Under a P3 approach, the ability to reduce the total amount of Measure R funding needed for a project would occur only if that project were to generate excess toll revenues beyond the levels required to cover the totality of a project's costs over the analysis period, including a return on equity to the P3 partner in the form of an availability payment or other P3 financial structure. A more detailed examination of potential P3 financial structures and their effect on Metro's overall capital budget will be undertaken as a next step in the business plan preparation.

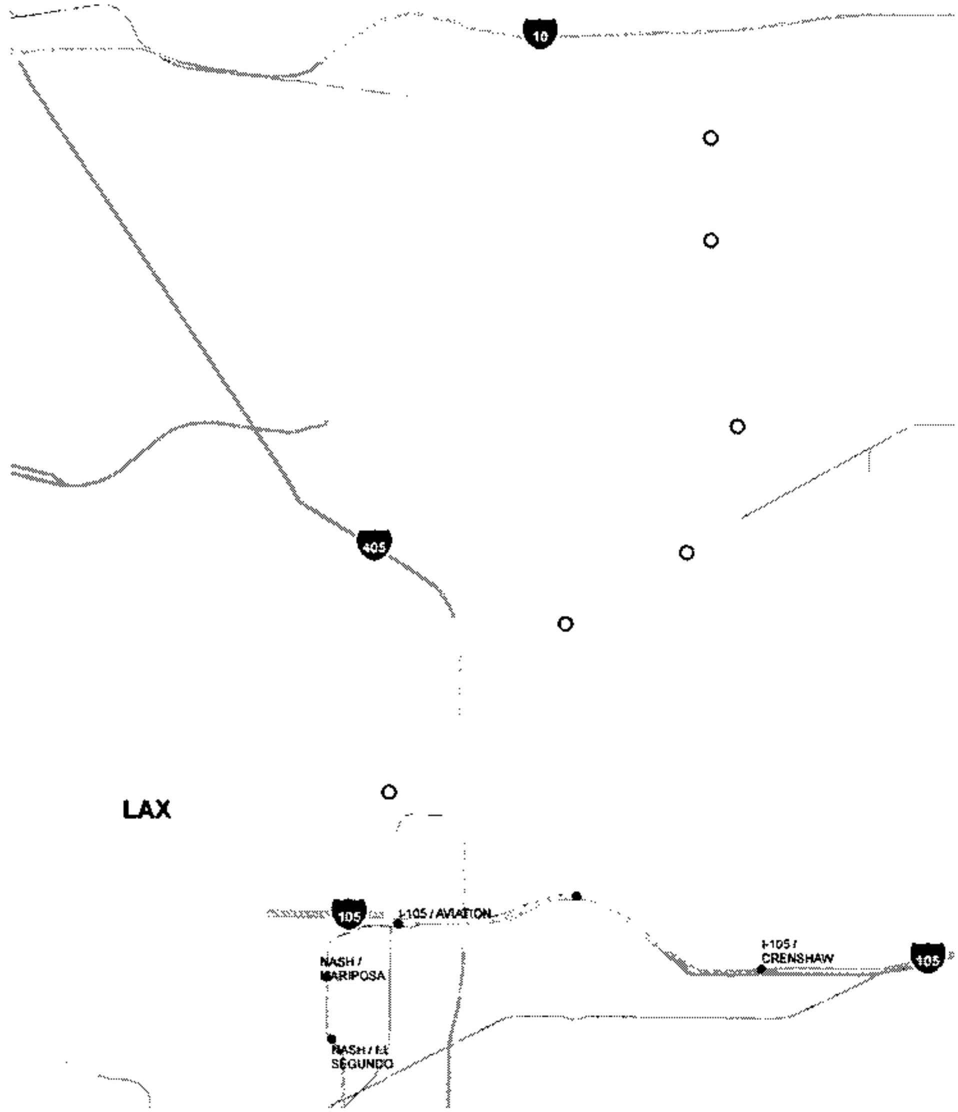
3.3. Project Analyses

3.3.1. Crenshaw/LAX LRT

Project Description

The Crenshaw/LAX LRT Project (see Figure 2) will provide a connection between the Exposition Line in the north and the Metro Green Line in the south, and allow continuing direct rides onto the Metro Green Line (south or east).

Figure 2: Crenshaw/LAX LRT Project Location



This line will have a stop with a connection to the Los Angeles International Airport (LAX) via Automated People Mover. Connection to the LAX People Mover (a project currently proposed by the Los Angeles World Airports (LAWA)) has not been included in this scope.

From a northern terminal at the Exposition/Crenshaw LRT station, the alignment follows Crenshaw Boulevard south to the Harbor Subdivision and then follows the Harbor Subdivision to a connection at the Metro Green Line Aviation/LAX station.

The alignment is a combination of at-grade and below-grade along the Crenshaw Boulevard portion of the line. Along the Harbor Subdivision, the alignment is off-street in a dedicated right of way that is currently used infrequently by freight trains and is being studied by Metro (in addition to the Crenshaw/LAX project) as a new transit line.

Seven stations are proposed, one of which is considered as an option. Stations are to be included at:

- Exposition/Crenshaw;
- Crenshaw/Martin Luther King Jr.;
- Crenshaw/Slauson;
- Florence/West;
- Florence/La Brea;
- Aviation/Manchester (optional); and
- Aviation/Century.

The alignment includes both above, below, and at-grade sections. Grade separations are to be located:

- Between 39th and 48" Streets (below grade);
- Between 60th St and Victoria Avenue (below grade);
- Across La Brea Avenue (aerial);
- Across La Cienega Boulevard/1-405 (aerial);
- Across Manchester Avenue (aerial);
- Across Century Boulevard (aerial); and
- Adjacent to the Los Angeles International Airport south runways (below grade covered trench).

The Project will require the development of a Maintenance Facility at a location to be determined. Four sites are being considered in an Environmental Assessment/ Revised Draft Environmental Impact Report (EA/Revised Draft EIR).

Scenario 1: Crenshaw/LAX LRT – Public Option

The public option assumes a design-bid-build approach with construction beginning in 2013 and ending in 2020, with initial operations commencing in 2018. The project scope includes capital costs, operations, non-vehicle maintenance, and capital maintenance replacement responsibilities for a 35 year period starting with construction in 2013 and ending in 2047 (the "analysis period").

The Project does not include construction of a required maintenance facility to be shared with the Green Line.

As shown in Tables 3 and 4, capital costs amount to approximately $1.320 billion in Year of Expenditure (YOE) dollars excluding $133 million for right of way and vehicle costs of $104 million. Measure R funds of $1.203 billion are committed to pay this capital cost (of which $546 million is to be provided as a TIFIA loan), with other public funding, including a Tiger II Grant, Proposition A, Proposition C, and local agency matching contributions currently programmed for the remainder. The capital and operations costs of the Project are assumed to be met by Metro as and when they occur.

Annual operations and non-vehicle maintenance costs start at approximately $30 million YOE in the first year of operations and increase over time to $122 million YOE, totaling $1.94 billion YOE over the analysis period, with an average annual cost of $66 million YOE. Capital maintenance costs total an additional $176 million YOE over the 35-year period. No funding source has been identified for these costs other than Metro general revenues.

Table 3: Crenshaw/LAX LRT – Public Option. Sources and Uses during the Construction Period (2013-2020)[1]

Sources of Funds During Construction ($m)		
Source	**YOE**	**PV (7%)**
Measure R	1,203	810
Other public capital funding	117	25
Other public operating funding	94	48
Total sources	**1,414**	**883**

Uses of Funds During Construction ($m)		
Use	**YOE**	**PV (7%)**
Capital costs	(1,320)	(835)
Operating costs	(16)	(8)
Non-vehicle maintenance costs	(78)	(40)
Total uses	**(1,414)**	**(883)**

[1] Note that because of variations between the optimal financing structures for public versus private project delivery methods, certain costs associated with project start-up are treated differently. The sources and uses tables show that differentiation in order to allow comparison of the options on a line-item basis. The costs of partial operation and maintenance prior to full operation of the project can be treated as project costs and paid for with private capital in the P3 model and then recovered through the availability payment, but in the public model they are deemed to be non-capital costs and therefore must be paid with funds so designated.

Table 4: Crenshaw/LAX LRT – Public Option. Sources and Uses during the Analysis Period (2013-2047)[1]

Sources of Funds During Analysis Period ($m)		
Source	**YOE**	**PV (7%)**
Measure R	1,203	810
Other public capital funding	117	25
Other public operating funding	2,116	394
Total sources	**3,436**	**1,229**

Uses of Funds During Analysis Period($m)		
Use	**YOE**	**PV (7%)**
Capital costs	(1,320)	(835)
Operating costs	(323)	(62)
Non-vehicle maintenance	(1,617)	(306)
Capital maintenance costs	(176)	(26)
Total Uses	**(3,436)**	**(1,229)**

Scenario 2: Crenshaw/LAX LRT – P3 Option

The P3 option for the Crenshaw/LAX LRT Project assumes that the capital costs, operations, non-vehicle maintenance, capital maintenance and financing for the Project are the responsibility of a P3 partner. Other options will be assessed in the business case, including a combined operation with the Green Line, inclusion of the acquisition and maintenance of the rolling stock for both lines, and construction and operation of the maintenance facility for both. All amounts used in this preliminary analysis are planning estimates, with significant refinements to be undertaken during Task 4.

Figure 3: Crenshaw/LAX LRT – P3 Option

	Design, Build, Finance, Operate & Maintain
Design Risk	✓
Construction Risk	✓
Maintenance Risk	✓
Operations Risk	✓
Finance Risk	✓
Demand Risk	O

Two forms of payment would be assumed by Metro for the Project:

Measure R funding during construction is used to meet 70% of the capital cost; and Annual availability payments during operations would be structured to meet the costs of operations, non-vehicle maintenance, capital maintenance and debt service.

The use of Measure R funding during construction for this Project is limited to 70% of the capital cost based on similar levels of public funding support for transit projects in the US. This constrained amount is less than the amount included in the current Measure R funding plan due to the need to include appropriate equity within the Project. During the next phase variable equity amounts may be considered.

Construction is scheduled to commence in 2013 with completion occurring in 2020. Initial operations are scheduled to start in 2018, 2 years before final completion of construction, for both the P3 option and public option. The Project cash flows have been analyzed over a 35 year period starting with construction in 2013 and ending in 2047. Refer to Tables 5 and 6.

The capital and operating costs for the Project are assumed to be met using a combination of public funding and private finance during construction and availability payments made annually during operations. The risk-adjusted capital costs amount to $860 million YOE and do not include pre-development costs, right of way and vehicle capital costs, totaling $198 million, which are presumed to be paid by Metro. These additional costs include the following:

- Pre-construction costs of $32 million YOE ($28 million in 2010 present value dollars) between 2010 and 2013;
- ROW costs of $133 million YOE ($98 million in 2010 present value dollars); and
- Vehicle costs of $104 million YOE ($82 million in 2010 present value dollars).

Annual operations and non-vehicle maintenance costs start at approximately $30 million YOE in the first year of operations and increase over time to $122 million YOE, totaling $1.91 billion YOE over the analysis period with an average annual cost of $66 million YOE. Capital maintenance totals an additional $226 million YOE over the 35-year period. No funding source has been identified for these costs other than Metro general revenues.

The main source of funds during the analysis period is the availability payment stream that would be funded by Metro. The total availability payment amount for the Project is estimated at $3.56 billion YOE, which represents 29 annual payments averaging approximately $123 million YOE. The initial payment would be $119 million YOE starting in the first year of operations in 2019 and increase over time to $159 million YOE. The 2010 present value of the total stream of availability payments is $778 million.

Table 5: Crenshaw/LAX LRT – P3 Option. Sources and Uses during the Construction Period (2013-2020)[1]

Sources of Funds During Construction ($m)		
Source	**YOE**	**PV (7%)**
Private financing	312	211
Measure R	602	408
Other public capital funding	-	-
Other public operating funding	-	-
Total sources	**914**	**619**

Uses of Funds During Construction ($m)		
Use	**YOE**	**PV (7%)**
Capital costs	(860)	(583)
Financing costs	(54)	(36)
Total uses	**(914)**	**(619)**

Table 6: Crenshaw/LAX LRT – P3 Option. Sources and Uses during the Analysis Period (2013-2047)[1]

Sources of Funds During Analysis Period ($m)		
Source	**YOE**	**PV (7%)**
Availability payments	3,559	778
Measure R	602	408
Other public capital funding	-	-
Other public operating funding	-	-
Private financing	312	211
Total sources	**4,473**	**1,397**

Uses of Funds During Analysis Period ($m)		
Use	**YOE**	**PV (7%)**
Capital costs	(860)	(583)
Capital maintenance costs	(226)	(50)
Operating costs	(318)	(62)
Non-vehicle maintenance	(1,593)	(313)
Taxes	(415)	(99)
Debt service and returns to equity	(1,061)	(290)
Total Uses	**(4,473)**	**(1,397)**

As part of the FY 2010 TIGER II program funded by the American Reinvestment and Recovery Act (ARRA), the Crenshaw/LAX LRT project was awarded a $20 million USDOT grant that will subsidize a $546 million TIFIA loan to Metro in support of the project's capital costs. The ability of the TIFIA loan to further leverage Metro revenues and enhance the overall financial structuring options under a P3 procurement will be further analyzed in Task 4.

Potential Benefits of a Crenshaw/LAX LRT P3

Using the broad P3 capital cost saving ranges experienced in other P3 projects and incorporated into this preliminary financial analysis, the P3 procurement structure could reduce the amount of Measure R funding required during the construction period by $601 million YOE ($402 million in 2010 present value dollars) and reduce the anticipated construction cost of the Crenshaw/LAX LRT project by $460 million YOE ($252 million in 2010 present value dollars). Under this scenario, the P3 option illustrates a lower total cost on a present value basis, indicating potential VfM in the P3 approach.

The full business case analysis will include the quantification of other benefits that can only be described qualitatively at this stage, such as reductions in the cost of routine and capital maintenance and possibly operations. Given the particular configuration of this line, we will also explore the merits of expanding the scope of the P3 operations and maintenance to include the existing Green Line and a new maintenance facility serving both lines.

The total costs of delivery for both the Public and P3 options have been compared in Table 7 in 2010 present value dollars discounted at 7%. The 2010 numbers are presented solely for the purpose of determining an indicative VfM, and do not represent real values for either capital costs or operating period expenditures, but represent a way of comparing expenditures made over different time periods.

Table 7: Crenshaw/LAX LRT – Public and P3 Options. Delivery Cost Comparison

Crenshaw/LAX LRT (PRESENT VALUE 2010 @ 7%)			
Years of Operation		**2018-2047**	**2018-2047**
		Public	**P3**
Capital cost	Pre-construction	Incl. in const.	28
	ROW	98	98
	Vehicles	82	82
	Subtotal	180	208
	Construction cost	835	583
	Total capital cost	**1,015**	**791**
Additional costs	Operating costs	62	62
	Routine non-vehicle maintenance	306	313
	Capital maintenance	26	50
	Financing costs + taxes[1]	N/A	178
	Total additional costs	394	603
Total project cost		**1,409**	**1,394**
Public funding required	Pre-construction + ROW + Vehicles	180	208
	Measure R	810	408
	Other public funding required for capital costs	25	-
	Subtotal public funding req.- construction period only	**1,015**	**616**
	Other public funding required for additional costs	394	Incl. in Avail Pmt
	Availability Payment[2]	N/A	778
Total public funding requirement		**1,409**	**1,394**

[1] assumes $211 million in private financing by the P3 partner during construction

[2] may be funded by various public sources, including balance of Measure R funds not expended during construction

3.3.2. Regional Connector LRT

Project Description

The Regional Connector Project (see Figure 4) includes a 1.9 mile light rail extension in downtown Los Angeles extending between Little Tokyo Gold Line Station and the 7th/Metro Red Line station. The Regional Connector connects the Gold Line (Pasadena) to the Blue Line (Long Beach) (called the North-South line, extending approximately 50 miles) forming one operating line, and also connecting the Eastside Gold Line to the Exposition Line (called the (East-West line, extending approximately 25 miles).

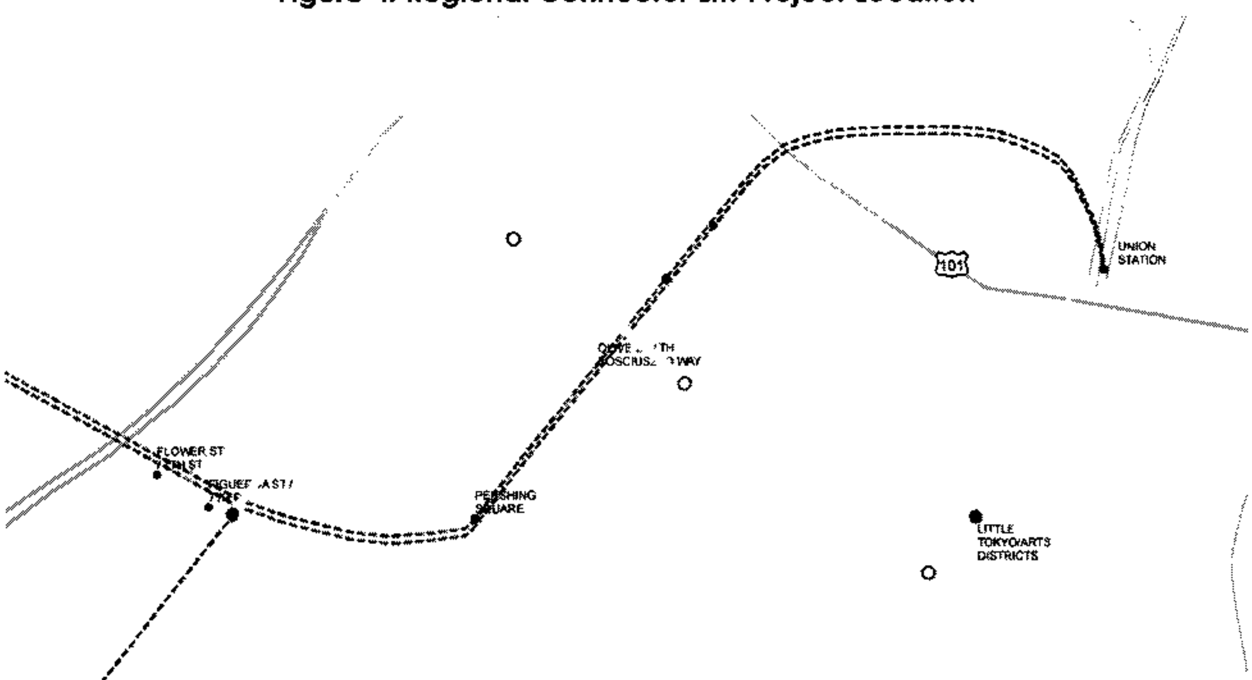
The analyses contemplated in this report have been completed using the Fully Underground LRT Alternative – Little Tokyo Variation 1, which was adopted by the Metro Board as the Locally Preferred Alternative on October 28, 2010. The Draft EIS/R was released on September 3, 2010.

The three new stations are located at:

- 2nd/Central (between Central and 1st Street);
- 2nd Street between Broadway and Spring; and
- 2nd/Hope adjacent to Disney Hall.

A Record of Decision for the Project is expected in 2011. The current construction schedule shows commencement in 2013 and completion of all segments occurring in 2019. At this time, local public funding for the Project is limited to $160 million in Measure R. Metro is applying for FTA New Starts funding to cover 60% of the Project capital cost. While New Starts is a highly competitive discretionary program, the Project performs exceptionally well based on all of the New Starts evaluation criteria, particularly transportation system user benefits, and is thus well-positioned to receive a substantial share of its funding from this source. Other sources of funding available to Metro are also proposed for the project.

Figure 4: Regional Connector LRT Project Location



Scenario 1: Regional Connector LRT – Public Option

The public option for the Project delivery assumes a design-bid-build approach; the Project scope includes the capital cost, non-vehicle maintenance, and capital maintenance replacement responsibilities for a 35 year period for the Project.

Construction is scheduled to commence in 2013, with full completion occurring in 2019; initial operation is scheduled to start in 2018. The Project cash flows have been analyzed over a 35 year period starting with construction in 2013 and ending in 2047. Refer to Tables 8 and 9.

Capital costs amount to $1.339 billion YOE, excluding costs for right of way and vehicles totaling $101 million YOE, and are assumed to be met by Metro as and when they occur. Measure R contributes $160 million YOE to the Project; the balance is projected to come from other public sources.

Annual non-vehicle maintenance costs start at approximately $2 million YOE in the first year of operations and increase over time to approximately $4 million YOE, totaling $97 million YOE over the analysis period, with an average annual cost of $3 million). Capital maintenance totals an additional $197 million YOE over the 35-year period. Public funds will be required for both, as well as for operations, which has not been included in this model.

Table 8: Regional Connector – Public Option. Sources and Uses during the Construction Period (2013-2019)[2]

Sources of Funds During Construction ($m)		
Source	**YOE**	**PV (7%)**
Measure R	160	110
Other public capital funding	1,179	783
Other public operating funding	5	2
Total sources	**1,344**	**895**

Uses of Funds During Construction ($m)		
Use	**YOE**	**PV (7%)**
Capital costs	(1,339)	(893)
Non-vehicle maintenance	(5)	(2)
Total uses	**(1,344)**	**(895)**

Table 9: Regional Connector – Public Option. Sources and Uses during the Analysis Period (2013-2047)[2]

Sources of Funds During Analysis Period ($m)		
Source	**YOE**	**PV (7%)**
Measure R	160	110
Other public capital funding	1,179	783
Other public operating funding	294	50
Total sources	**1,633**	**943**

Uses of Funds During Analysis Period ($m)		
Use	**YOE**	**PV (7%)**
Capital costs	(1,339)	(893)
Non-vehicle maintenance	(97)	(21)
Capital maintenance costs	(197)	(29)
Total Uses	**(1,633)**	**(943)**

Scenario 2: Regional Connector LRT – P3 Option

The P3 option for the Regional Connector LRT Project assumes that the capital costs, non-vehicle maintenance and financing responsibilities are assumed by a P3 partner, with Metro retaining responsibilities for the provision and cost of operations.

[2] Note that because of variations between the optimal financing structures for public versus private project delivery methods, certain costs associated with project start-up are treated differently. The sources and uses tables show that differentiation in order to allow comparison of the options on a line-item basis. The costs of partial operation and maintenance prior to full operation of the project can be treated as project costs and paid for with private capital in the P3 model and then recovered through the availability payment, but in the public model they are deemed to be non-capital costs and therefore must be paid with funds so designated.

Figure 5: Regional Connector – P3 Option

	Design, Build, Finance & Maintain
Design Risk	✓
Construction Risk	✓
Maintenance Risk	✓
Operations Risk	O
Finance Risk	✓
Demand Risk	O

Two forms of payment would be assumed by Metro for the Project:

- Measure R funding during construction is used to meet capital costs; and
- Annual availability payments during operations would be structured to meet the costs of non-vehicle maintenance, capital maintenance and debt service.

The use of Measure R funding during construction for this Project is limited to the $160 million currently programmed. Unlike the Crenshaw/LAX Project, this amount is not constrained as a percentage of the capital cost; rather it is solely limited by the Measure R funding plan. Construction is scheduled to commence in 2013 and finish in 2019, which is the same schedule as the public option. The Project cash flows have been analyzed over a 35-year period starting with construction in 2013 and ending in 2047. Refer to Tables 10 and 11.

Capital costs amount to $1.04 billion YOE and do not include the following:

- Pre-construction costs of $83 million YOE ($69 million in 2010 present value dollars) between 2010 and 2012;
- ROW costs of $78 million YOE ($58 million in 2010 present value dollars); and
- Vehicle costs of $23 million YOE ($15 million in 2010 present value dollars).

Annual non-vehicle maintenance costs start at approximately $2 million YOE in the first year of operations and increase over time to approximately $4 million YOE, totaling $97 million YOE over the analysis period, with an average annual cost of $3 million YOE . Capital maintenance totals an additional $197 million YOE over the 35-year period. Public funds will be required for both, as well as for operations, which has not been included in this model.

Table 10: Regional Connector – P3 Option. Sources and Uses during the Construction Period (2013-2019) [2]

Sources of Funds During Construction ($m)		
Source	**YOE**	**PV (7%)**
Private financing	882	610
Measure R	160	110
Other public capital funding	-	-
Other public operating funding	-	-
Total sources	**1,042**	**720**

Uses of Funds During Construction ($m)		
Use	**YOE**	**PV (7%)**
Capital costs	(876)	(610)
Net transfers to reserve accts	(1)	(0)
Financing costs	(163)	(109)
Non-vehicle maintenance	(2)	(1)
Total uses	**(1,042)**	**(720)**

Table 11: Regional Connector – P3 Option. Sources and Uses during the Analysis Period (2013-2047) [2]

Sources of Funds During Analysis Period ($m)		
Source	**YOE**	**PV (7%)**
Availability payments	4,347	1,008
Interest Income	6	1
Measure R	160	110
Other public capital funding	-	-
Other public operating funding	-	-
Private financing	882	610
Total sources	**5,395**	**1,729**

Uses of Funds During Analysis Period ($m)		
Use	**YOE**	**PV (7%)**
Capital costs	(876)	(610)
Capital maintenance costs	(186)	(28)
Non-vehicle maintenance	(97)	(22)
Taxes	(943)	(218)
Debt service and returns to equity	(3,293)	(851)
Total Uses	**(5,395)**	**(1,729)**

The main source of funds during the analysis period is the availability payment stream that would be funded by Metro. The total availability payment amount for the Project is estimated at $4.35 billion YOE, which represents 29 annual payments averaging approximately $150 million YOE. The initial payment would be $125 million YOE starting in the first year of operations in 2019 and increase over time to $182 million YOE. The 2010 present value of the total stream of availability payments is $1.01 billion.

Potential Benefits of a Regional Connector LRT P3

A P3 Could Provide Needed Upfront Capital
Planned Measure R funding for the Regional Connector LRT is insufficient to meet the cost of capital for this Project under either delivery option. The Project will therefore have to rely on other programmed funding sources, which may include FTA New Starts funding, State LONP Reimbursement Funds, Proposition 1A High-Speed Rail and Proposition 1B Bond funding, Regional Improvement Program funds and matching contributions from local agencies.

A comparison of the total costs of delivery for both the public and P3 options in 2010 present value dollars indicates that the P3 may not create VfM on a pure financial basis, assuming that all required public funding materializes. Under the public option, the present value of public funding required to construct and maintain the project over the analysis period is $1.016 billion, versus $1.260 billion for the P3 option. However, the P3 option could attract $882 million YOE in private investment, which would eliminate the need for any upfront public capital funding above the committed Measure R funds. And, by transferring the risk of capital financing and capital maintenance under the P3 option, in whole or in part, the potential for VfM may be further realizable.

Given the critical role this project plays in the interconnectivity of the entire Metro system, the Team did not consider private operation of this link, but only analyzed private maintenance and lifecycle replacement. The optimal use of Measure R and other public funding sources will be explored more fully in the next task; however, the preliminary analysis illustrates that the Project can be successfully structured using either public funds from Measure R and New Starts or a combination of Measure R and private financing. Given the project's criticality, the Team could also assess smaller-scale P3 options for key pieces of its non-transit scope, such as elevators and escalators and stations.

The total costs of delivery for both the Public and P3 options are compared in Table 12 in 2010 present value dollars. The 2010 numbers are presented solely for the purpose of determining an indicative VfM, and do not represent real values for either capital costs or operating period expenditures, but represent a way of comparing expenditures made over different time periods.

Table 12: Regional Connector – Public and P3 Options. Delivery Cost Comparison

Regional Connector (PRESENT VALUE 2010 @ 7%)			
Years of Operation		**2018-2047**	**2018-2047**
		Public	**P3**
Capital cost	Pre-construction	Incl. in const.	69
	ROW	58	58
	Vehicles	15	15
	Subtotal	73	142
	Construction cost	893	610
	Total capital cost	**966**	**752**
Additional costs	Routine non-vehicle maintenance	21	22
	Capital maintenance	29	28
	Financing costs + taxes[1]	N/A	458
	Total additional costs	**50**	**508**
Total project costs		**1,016**	**1,260**
Public funding required	Pre-construction + ROW + Vehicles	73	142
	Measure R	110	110
	Other public funding required for capital costs	783	-
	Subtotal public funding req. - construction period only	**966**	**252**
	Other public funding required for additional costs	50	Incl. in Avail Pmt
	Availability Payment[2]	N/A	1,008
Total public funding requirement		**1,016**	**1,260**

[1] assumes $610 million in private financing by the P3 partner during construction

[2] may be funded by various public sources, including balance of Measure R funds not expended during construction

3.3.3. Westside Subway Extension

Project Description

The Westside Subway Extension Project (see Figure 6) will extend Metro Rail Service to Westwood. The most probable project will be a 9.36-mile extension of the Metro Purple Line from Wilshire/Western to a terminus at the Westwood/VA Hospital. The technology is heavy rail transit and is compatible with the current Metro Rail operations for the Metro Red and Purple Lines. The project will have seven stations; no station area parking is planned. The seven stations are located at:

- Wilshire/La Brea;
- Wilshire/Fairfax;
- Wilshire/La Cienega;

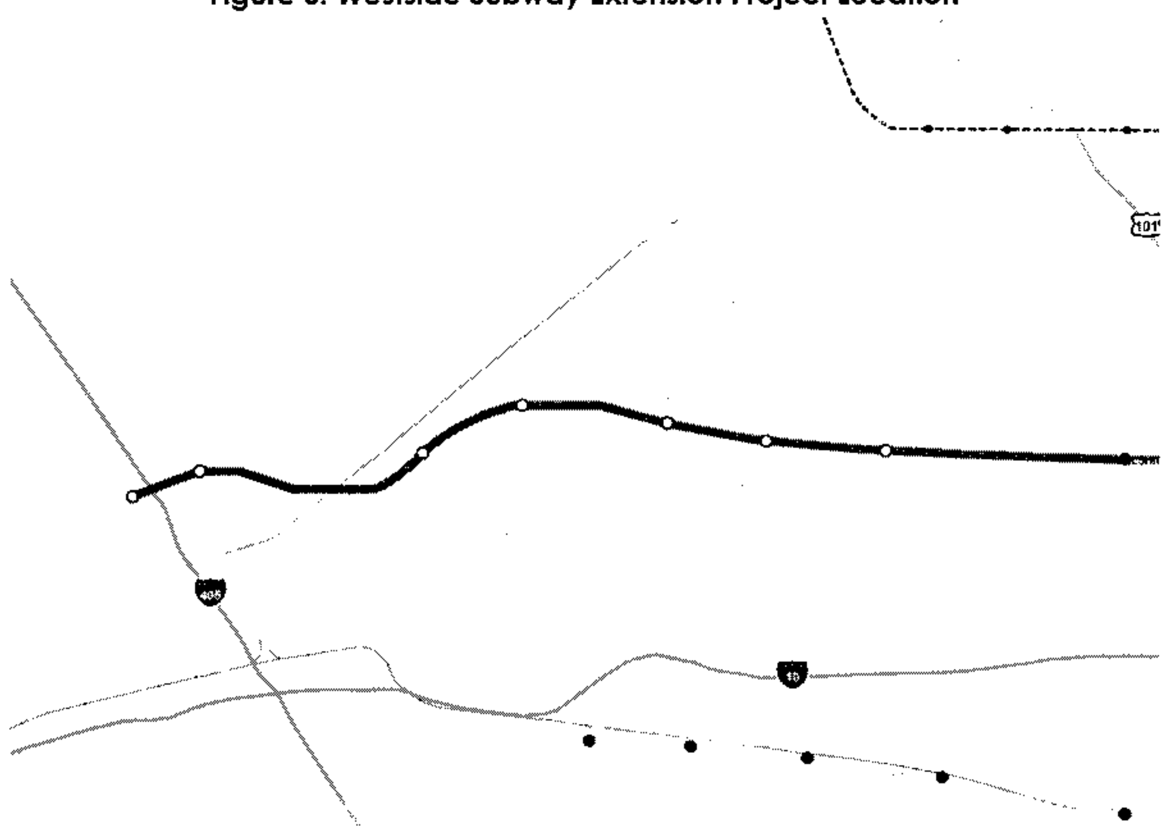
- Wilshire/Rodeo;
- Constellation/Avenue of the Stars (Century City);
- Westwood/UCLA (off-street); and
- Westwood/VA Hospital (south of Wilshire).

The most probable project will be all underground (similar to the current Metro Red and Purple Lines) and would utilize a twin tunnel bore construction process with cut-and-cover construction at all stations and cross-overs. Four tunnel boring machines (TBMs) would be required for construction. The Project includes an expansion of the current Metro Red Line maintenance yard to accommodate the needed vehicles and operating and maintenance services needed. In addition the Project includes funding towards the expansion of the existing Rail Operations Center (ROC).

Multiple alignments are still being considered in the Century City / Westwood area. The alignment between the Constellation/Century City station and the UCLA/Westwood station is assumed for the purposes of this study.

A Record of Decision for the Project is expected in 2011. The current construction schedule shows commencement in 2014 and completion of all segments occurring in 2023 for public and 2021 for private options. Public funding for the Project is $2.8 billion YOE in Measure R.

Figure 6: Westside Subway Extension Project Location



Scenario 1: Westside Subway Extension – Public Option

The public option assumes a design-bid-build approach to project delivery. The project scope includes the capital cost, non-vehicle maintenance and capital maintenance replacement responsibilities over a 35 year period for the Project.

Construction is scheduled to commence on certain elements in 2012, with a revenue operations date of approximately June 2021. The project cash flows have been analyzed over a 35 year period starting with significant construction in 2014 and ending in 2048. Refer to Tables 13 and 14.

Capital costs amount to approximately $4.4 billion YOE, with an additional $0.8 billion YOE in costs for right of way and vehicle capital costs. Measure R contributes $2.834 billion YOE; the balance of the required capital is assumed to come from other public sources including FTA New Starts funding but is currently unfunded. Project financing is proposed through TIFIA and through a federally-supported interest-free bond program proposed by Metro.

Annual non-vehicle maintenance costs start at approximately $11 million YOE in the first year of operations and increase over time to $16 million YOE, totaling $351 million over the analysis period, with an average annual cost of $13 million Capital maintenance totals an additional $637 million YOE. Public funds will be required for both, as well as for operations, which has not been included in this model.

Table 13: Westside Subway Extension – Public Option. Sources and Uses during the Construction Period (2014-2023)[3]

Sources of Funds During Construction ($m)		
Source	**YOE**	**PV (7%)**
Measure R	2,834	1,758
Other public capital funding	1,552	728
Other public operating funding	21	9
Total sources	**4,407**	**2,495**

Uses of Funds During Construction ($m)		
Use	**YOE**	**PV (7%)**
Capital costs	(4,386)	(2,486)
Non-vehicle maintenance	(21)	(9)
Total uses	**(4,407)**	**(2,495)**

[3] Note that because of variations between the optimal financing structures for public versus private project delivery methods, certain costs associated with project start-up are treated differently. The sources and uses tables show that differentiation in order to allow comparison of the options on a line-item basis. The costs of partial operation and maintenance prior to full operation of the project can be treated as project costs and paid for with private capital in the P3 model and then recovered through the availability payment, but in the public model they are deemed to be non-capital costs and therefore must be paid with funds so designated.

Table 14: Westside Subway Extension – Public Option. Sources and Uses during the Analysis Period (2014-2048) [3]

Sources of Funds During Analysis Period ($m)		
Source	**YOE**	**PV (7%)**
Measure R	2,834	1,758
Other public capital funding	1,552	728
Other public operating fund	988	137
Total sources	**5,374**	**2,623**

Uses of Funds During Analysis Period ($m)		
Use	**YOE**	**PV (7%)**
Capital costs	(4,386)	(2,486)
Non-vehicle maintenance	(351)	(65)
Capital maintenance costs	(637)	(72)
Total Uses	**(5,374)**	**(2,623)**

Scenario 2: Westside Subway Extension – P3 Option

The P3 option for the Westside Subway Extension Project assumes that the capital cost, non-vehicle maintenance, capital maintenance and financing responsibilities for the Project are assumed by a P3 partner, and the transit operations are provided by Metro.

Figure 7: Westside Subway Extension – P3 Option

	Design, Build, Finance & Maintain
Design Risk	✓
Construction Risk	✓
Maintenance Risk	✓
Operations Risk	O
Finance Risk	✓
Demand Risk	O

Two forms of payment would be assumed by Metro for the Project:

- Measure R funding during construction is used to meet the cost of capital; and
- Annual availability payments during operations would be structured to meet the costs of non-vehicle maintenance, capital maintenance and debt service.

The use of Measure R funding during construction for this Project is limited to 70% of the capital cost, or $1.9 billion, based on similar levels of public funding support for transit projects in the US. This constrained amount is less than the amount included in the current Measure R funding plan due to the need to include appropriate equity for the concessionaire within the Project. During the next phase variable equity amounts may be considered. No acceleration of funds has been included in this analysis.

Construction of certain elements (i.e., utility relocations, etc.) is scheduled to commence in June 2012 with major construction beginning in 2014 to be completed in 2021; initial operations are due to commence in June 2019. This schedule represents a one-year acceleration compared to the public option, with the non-vehicle and capital maintenance costs shown below therefore also reflecting an additional year of costs incurred over the 35-year analysis period (2014-2048) used for both the public and P3 options. The project cash flows have been analyzed over a 35 year period starting with major construction in 2014 and ending in 2048.

As shown in Tables 15 and 16, risk-adjusted project capital costs amount to $2.7 billion YOE, and do not include the following:

- Pre-construction costs of $282 million YOE ($259 million present value 2010) between 2012 and 2014;
- ROW costs of $193 million YOE ($161 million present value 2010); and
- Vehicle costs of $655 million YOE ($430 million present value 2010).

Annual non-vehicle maintenance costs start at approximately $10 million YOE in the first year of operations and increase over time to $16 million YOE, totaling $358 million YOE over the analysis period, with an average annual cost of $13 million. Capital maintenance totals an additional $590 million (YOE) over the 35-year period. Public funds will be required for both, as well as for operations, which has not been included in this model.

Table 15: Westside Subway Extension – P3 Option. Sources and Uses during the Construction Period (2014-2021)[3]

Sources of Funds During Construction ($m)		
Source	**YOE**	**PV (7%)**
Private financing	1,069	625
Measure R	1,900	1,119
Other public capital funding	-	-
Other public operating funding	-	-
Total sources	**2,969**	**1,744**

Uses of Funds During Construction ($m)		
Use	**YOE**	**PV (7%)**
Capital costs	(2,715)	(1,599)
Financing costs	(244)	(140)
Non-vehicle maintenance	(10)	(5)
Total uses	**(2,969)**	**(1,744)**

Table 16: Westside Subway Extension – P3 Option. Sources and Uses during the Analysis Period (2014-2048) [3]

Sources of Funds During Analysis Period ($m)		
Source	**YOE**	**PV (7%)**
Availability Payments	6,039	1,164
Measure R	1,900	1,119
Other public capital funding	-	-
Other public operating funding	-	-
Private financing	1,069	625
Total sources	**9,008**	**2,908**

Uses of Funds During Analysis Period ($m)		
Use	**YOE**	**PV (7%)**
Capital costs	(2,715)	(1,599)
Capital maintenance costs	(590)	(87)
Non-vehicle maintenance	(358)	(74)
Taxes	(1,346)	(256)
Debt service and returns to equity	(3,999)	(892)
Total Uses	**(9,008)**	**(2,908)**

During the construction period, sources of funds include $1.9 billion YOE of Measure R and nearly $1.07 billion YOE in private debt and equity. The most significant use of funds is for the Project's capital costs estimated at $2.7 billion YOE. As previously discussed, the capital cost shown in Tables 15 and 16 does not include an additional $0.9 billion YOE in pre-construction activities, right of way acquisition and vehicle purchases. These costs are added back in Table 17 for comparison with the public option.

The main source of funds during the analysis period is the availability payment stream that would be funded by Metro. The total availability payment amount for the Project is $6.04 billion YOE, which represents 27 annual payments during operations averaging approximately $223 million YOE. The initial payment would be $176 million YOE starting in the first year of operations in 2022 and increase over time to $234 million YOE. The 2010 present value of the total stream of availability payments is $1.16 billion.

Potential Benefits of a P3 for the Westside Subway Extension

The P3 Indicates Potential Value for Money

Planned Measure R funding as currently programmed for the Westside subway extension is insufficient to meet the cost of capital for the Project under either delivery option. The Project will therefore have to rely on other funding sources which may include a combination of accelerated Measure R funding, FTA New Starts and private financing.

As shown by comparing Tables 13 and 15 above, the P3 procurement structure could reduce the amount of Measure R funding required during the construction period by

$934 million YOE and reduce the anticipated construction cost of the Westside Subway Extension project by $1.67 billion YOE ($887 million in 2010 present value dollars). Under this scenario, the P3 option also illustrates a lower total cost on a present value basis, indicating potential VfM in the P3 approach.

In Table 17, the total costs of delivery for both the public and P3 options have been compared in 2010 present value dollars, discounted at 7%. This analysis has been developed as follows:

- Public funding for pre-construction capital cost and other costs includes predevelopment activities, right of way costs and the cost of vehicles;
- Public funding during construction includes public funding required to cover capital costs not met by public or private financing; and
- Public funding during operations represents additional costs for non-vehicle maintenance and capital maintenance in the public delivery option.

The 2010 numbers are presented solely for the purpose of determining an indicative VfM. They do not represent real values for either capital costs or operating period expenditures, but do represent a means of comparing expenditures made over different time periods.

As shown in the early stage analysis in the following Table 17, the P3 option has the potential to:

- Offer a lower total present value cost to Metro through realization of efficiencies in delivery;
- Require $628 million less in total capital costs on a present value basis;
- Reduce the public capital need for construction by $1.11 billion on a present value basis;
- Attract more than $1 billion YOE in private investment as required to fund construction;
- Advance the project schedule by a full year; and
- Require $639 million less of Measure R money during the construction period on a present value basis.

Table 17: Westside Subway Extension – Public and P3 Options. Delivery Cost Comparison

Westside (PRESENT VALUE 2010 @ 7%)			
Years of Operation		**2023 - 2048**	**2022 - 2048**
		Public	**P3**
Capital cost	Pre-construction	Incl. in const.	259
	ROW	161	161
	Vehicles	430	430
	Subtotal	591	850
	Construction cost	2,486	1,599
	Total capital cost	**3,077**	**2,449**
Additional costs	Routine non-vehicle maintenance[1]	65	74
	Capital maintenance[1]	72	87
	Financing Costs + Taxes[2]	N/A	523
	Total additional costs	137	684
Total project costs		**3,214**	**3,133**
Public funding required	Pre-construction + ROW + Vehicles	591	850
	Measure R	1,758	1,119
	Other public funding req. - capital costs	728	-
	Subtotal public funding req.- construction period only	**3,077**	**1,969**
	Other public funding required for additional costs	137	Incl. in Avail Pmt
	Availability Payment[3]	N/A	1,164
Total public funding requirement		**3,214**	**3,133**

[1] routine and capital maintenance costs include one additional year of operation for the P3 option

[2] assumes $625 million in private financing by the P3 partner during construction

[3] may be funded by various public sources, including balance of Measure R funds not expended during construction

4.0 HIGHWAY PROJECTS

4.1. Quantitative Analysis Methodology

The InfraConsult Team developed the following approach to evaluate the three Highway projects considered in Task 3:

- Development and analysis of a public option identifying the total cost to Metro of delivering the project without toll revenues; and
- Development and analysis of a P3 option identifying the total cost to Metro of delivering the project using a Private sector partner, with tolling as appropriate.

The key assumptions and approach are described below, followed by discussion of the analyses conducted for each project.

4.1.1. Scope

Each of the highway projects was analyzed as a public project (with no tolling) and a P3 option (with tolling included). The scope of the analysis included consideration of:

- Capital costs – costs related to the design and construction of the project;
- Capital maintenance – costs related to replenishment and replacement of capital facilities and equipment;
- Routine maintenance costs – costs related to routine maintenance of capital facilities such as roadways, structures and tunnels; toll collection equipment; communication systems; buildings, grounds, and equipment and electric power facilities;
- Operations – costs associated with the toll collection; and
- Toll revenue.

4.1.2. Structuring the P3 Capital and Revenue Options

Legal Issues Affecting the P3 Program

Authorization for tolling of projects developed using a public-private partnership is found in Streets and Highways Code section 143, adopted by the Legislature in 2009. This law grants Metro authority to enter into agreements with the private sector for development of new toll roads, tunnels and additional lanes on existing highways, in cooperation with Caltrans and subject to approval by the California Transportation Commission (CTC). As the law sunsets on January 1, 2017, this means that Metro would have to award its contracts before that date, unless the Legislature extends the deadline.

Section 143 and the implementing guidelines adopted by the CTC include a number of requirements that will affect Metro's projects. As the CTC has approved the Presidio Parkway under Section 143, a (non-tolled) DBFOM project using an availability payment approach, many questions relevant to Metro's projects will have already been addressed, thereby helping to expedite any potential P3 process for Metro.

Although it is not possible to predict future CTC decisions, the three potential toll projects described in this report appear to qualify for the Section 143 program. The capital structure assumed for the P3 highway projects presupposes both design-build procurement to establish a fixed cost to complete, and a tolling regime to create sufficient revenues to pay an adequate return on investment, all debt service on any debt required, both routine and capital maintenance, and all costs of operation.

California State legislative approval is required to toll projects on the State highway system, and the legislature has in the past granted tolling authority to various public agencies for specific roadways, bridges and tunnels, but it has not granted specific authority for the projects discussed in this report. In addition, the financial feasibility of a public toll project depends to some extent on the agency's ability to use design-build to develop the project, since that delivery methodology may accelerate completion and enhance the agency's ability to obtain financing based in whole or in part on future toll revenues.

In 2009, the California Legislature adopted two different statutes that could potentially allow Metro to act as a tolling authority for these projects, but neither statute provides a clear path for Metro to develop a public toll project. Specifically:

Streets and Highways Code section 143 allows Caltrans to enter into agreements with local agencies for development of highway projects, with approval of the California Transportation Commission (CTC). The statute could reasonably be interpreted to allow the public agency to use design-build to develop approved projects and also to allow the agency to impose tolls on those projects. However, the CTC has not issued any guidelines regarding public-public projects, which would delay the process of seeking approval for such a project. Furthermore, this interpretation of the law could be challenged, resulting in further delay to the process.

Government Code section 64100 (the Financing Act) allows public agencies to toll projects on the state highway system, provided that (a) the California Transportation Financing Authority (CTFA) approves issuance of bond financing and (b) non-tolled lanes are available in the same corridor. However, the CTFA is still in a start-up mode and it is not clear when it will be ready to start approving projects. Furthermore, the Financing Act does not include design-build authority. If the plan of finance contemplates design-build delivery, Metro would have the option of seeking approval from the CTC to use design-build authority under Public Contract Code section 6800, or possibly using low bid design-build under its general enabling legislation. It is not clear whether Section 6800 authority would be available, since the statute only allows a limited number of projects.

The Team has assumed that the public projects will not be tolled, due to the uncertainties associated with tolling approval for public projects, combined with questions regarding Metro's ability to use design-build and obtain toll-backed financing. Once the projects are completed, if public tolling authorization has been obtained, net toll revenues would be available for other transportation projects, thus offsetting some of the financial advantage associated with a P3 approach.

Legal Issues Affecting Truck Only Tolling

The tolling of an existing interstate and imposition of truck-only tolling raise both federal and state issues. Federal law allows FHWA to approve tolling of existing lanes (including truck-only tolling) based on a request submitted by Caltrans. State law allows new lanes to be tolled (including truck-only tolling), but special legislation would be required to toll the existing lanes.

Federal Law Issues. Congress has granted FHWA explicit authority to permit tolling of existing interstates under the Value Pricing Pilot Program. Since the California Department of Transportation has already been allocated one of the 15 slots available under the program, it has the ability to apply for approval of truck-only tolling . FHWA has been studying truck-only tolling, and based on conversations with FHWA representatives it appears that an application for a truck-only tolling project would be viewed favorably.

Truck-only tolling would not require any special approval from FHWA if the tolled facility is not part of the interstate highway system. However, if the project will be federally funded, Caltrans would have to enter into a "Section 129" agreement with FHWA for the project. This agreement would require toll revenues to be used only for specified transportation-related purposes.

State Law Issues. As noted above, state legislative authority is required in order to impose tolls on projects on the state highway system. Streets and Highways Code Section 143, the enabling legislation allowing Metro to enter into public-private agreements for development and operation of toll roads, gives the CTC authority to permit tolling of new lanes (including truck-only tolling), but does not allow tolling of existing lanes. Metro would have to obtain special legislation in order to convert existing free lanes to toll lanes.

Financing Structures

In structuring the initial P3 options, we have tried to maximize the revenue-generating capacity of each project through phasing and toll-level assumptions, and then "solved" for the amount of public capital and subsidy required once the toll revenues were maximized. During the business case development, the phasing and toll assumptions will be refined to reflect more detailed risk-adjusted traffic and revenue projections and costs.

For the highway projects considered in this analysis, two payment structures were considered: 1) an upfront public subsidy payment (with transfer of toll revenue risk to the private sector), and 2) an availability payment structure (with retention of toll revenue risk by the public sector). The analysis term for both payment structures is 50 years, and both are contemplated to cover the costs of the project scope, debt service, taxation and reasonable returns to equity investment. Each structure is briefly described below:

Upfront public subsidy payment – For the highway projects where the demand and revenue appears robust enough to support capital return and repayment, that revenue risk has been transferred to the private sector and the analysis identifies the estimated public capital payment required up-front to create a financially viable project. This

subsidy requirement is then compared to the funding requirement for the public sector delivery model to compare approaches. This option also transfers full responsibility for construction, operations, maintenance and capital maintenance to the private sector partner, as well as transferring the full revenue and demand risk.
Availability Payment structure – Where anticipated toll revenues are insufficient to cover a reasonable percentage of debt service and provide a return, the Team has assumed that annual payments to the P3 concessionaire will be made during operations to supplement toll revenues. The analysis at this point is indifferent to whether Metro or the private partner actually collects the tolls, so long as they are applied to the project. However, the full responsibility for initial capital cost, operations, maintenance and capital maintenance has been transferred to the private sector partner.

4.1.3. Inputs to the Financial Analysis

Estimates for all project costs and the project delivery schedules have been provided by the InfraConsult Team based on data from Metro, Caltrans, their consultants, and other available sources. The data set for each project includes:

Construction Costs

Public Option. Public construction costs were provided by cost category in real dollars on an annual basis for the construction period. These costs were developed by InfraConsult using available data from Metro and others as mentioned above. InfraConsult developed preliminary project-specific contingencies under the defined public delivery option that were added to the total construction costs.

P3 Option. P3 construction costs were developed based on the public options by adjusting for potential cost saving and schedule acceleration where it was deemed possible. As with the public options, the InfraConsult Team adjusted preliminary project-specific contingencies for each defined P3 delivery option. To account for a reasonable approximation of efficiency and risk transfer in the P3 option, the total P3 construction costs were reduced by an efficiency factor determined based on team experience and the database of US and international P3 projects provided in Appendix A.

Routine Maintenance Costs

Routine maintenance costs have been included in the analysis. Despite evidence that these costs can be lower under a P3 option, these costs have not been adjusted between public and P3 delivery models in the analyses at this time. A more detailed analysis of risk transfer potential including this cost category will be included in Task 4; qualitative levels of risk transfer for each project are discussed below.

Operations Costs

Operations costs have been included in the analysis and include the following: Tolling Operations (excluded from public options); Administration; Routine Maintenance; Traffic Operations; and Insurance. Despite evidence that these costs can be lower under a P3 option, these costs have not been adjusted between public and P3 delivery models in the analyses at this time, except with regard to tolling costs, which are shown only for the P3 options. A more detailed analysis of risk transfer potential including this cost category will be included in Task 4; qualitative levels of risk transfer for each project are discussed below.

Routine maintenance and operations are often bundled together and collectively referred to as "Operations and Maintenance," or O&M.

Capital Maintenance Costs

Capital maintenance costs, also known as major maintenance costs, have been included for each project. While such costs may be lower under a P3 option, these costs have not been adjusted between public and P3 delivery models in the analysis at this time, except for that equipment specifically required for tolling operations. A more detailed analysis of risk transfer potential including this cost category will be included in Task 4; qualitative levels of risk transfer for each project are discussed below.

Capital maintenance costs and capital construction costs are often collectively referred to as lifecycle costs.

Revenue

For the tolled P3 projects, each project analysis uses a preliminary traffic and revenue analysis developed by the Team based on existing traffic and revenue studies. None of these studies is considered sufficient for investment purposes, and each will need to be augmented to a higher standard in Task 4.

4.1.4. Funding

Inputs and assumptions for the timing and amount of Measure R funding available for each project have been provided by Metro. The following approach to project funding has been taken at this time:

<u>Public Option</u>. In each of the highway projects analyzed, the total required funding is assumed to be available as required under the public option analyses. Where the required funds exceed the total Measure R available during construction, this has been noted. It should be noted that this assumption is for purpose of this analysis only and has been made to facilitate comparison with the P3 Options. In reality, both the level and the timing of public funds for the highway projects are key issues that will affect delivery of these projects under the public option.

<u>P3 Option</u>. The approach taken in each of the P3 options has been to minimize the use of public funding for each project. This amount can then be compared to the funding sources proposed under the Public Option.

4.1.5. Financing

The following approaches to financing have been followed:

<u>Public Option</u>. As described above, the public option has been analyzed assuming funding is available as required. No cost of public funds has been added to the analysis at this time.

P3 Option. The P3 option includes debt and equity for the portion of construction costs to be financed. The P3 financing terms differ depending on the P3 payment option employed in the analysis.

For the availability payment option, the following were assumed:

- Target debt to equity ratio of 90%;
- Target equity rate of return of 14%;
- 30 year term for debt; and
- Cost of debt is 6.65%.

For the upfront payment option, the following were assumed:

- Target debt to equity ratio of 75%;
- Target equity rate of return of 15%;
- 30 year term for debt; and
- Cost of debt is 6.65%.

4.1.6. Other

The following additional assumptions have been used in the analysis for the highway projects.

- Inflation Factor: a rate of 3% has been assumed and applied to all cost items, in line with Metro's approach to planning for comparisons in YOE $;
- Discount Factor: a 7% discount rate has been applied to costs and revenues to reflect present value, including the opportunity cost of capital. However, it is important to note that discounting future YOE dollars at a rate higher than inflation distorts the comparison between Public and P3 delivery, as it reverses the benefit of accelerating construction provided by the P3 approach (the later the construction takes place, the lower the PV of construction cost, and with a later start of operations, the lower the PV of O&M and Life Cycle costs);
- Cost of Borrowing: the optimization of P3 borrowings to reflect possible tax-exempt options will be done as part of Task 4;
- Taxation:
- Federal income tax has been assumed at 35%;
- No state tax has been reflected; and
- Assets have been depreciated on an accelerated basis, consistent with current market practice for P3 highway transactions with 50-year terms.

It is anticipated that individual P3 partners will take a more aggressive approach to tax treatment, or be able to reduce their tax obligations through strategic financial structuring. These options will be assessed where applicable in development of the business cases.

4.2. Qualitative P3 Benefits

4.2.1. Operating and Maintenance Savings

In addition to quantified capital cost benefits, the adoption of various P3 strategies that combine construction with maintenance and operation may result in other cost savings to Metro. Although the amount of these remain to be quantified , the experience of other projects suggest that Metro as public owner can expect to save in such areas as routine maintenance, capital maintenance, and operations. These savings accrue due to the enhanced focus on whole life costing by the private entity, which takes on contractual responsibility for both initial construction and long-term condition and whose compensation and return depend on ongoing achievement of a contractually specified level of performance. It is not possible to quantify those potential savings at this stage as they are dependent on the contractual terms and performance standards ultimately adopted by Metro at either the project or programmatic level.

4.2.2. Impact on Metro's Overall Capital Budget

In addition, as the cornerstone of the P3 delivery strategy, a design-build procurement may provide key benefits to Metro, including the ability to fix the project cost far earlier in the construction/procurement cycle, which makes capital budgeting far more accurate; and greater schedule certainty, which assists in cash flow and in planning of required capital formation.

Lastly, development of highway projects as toll roads brings the benefit of a long-term revenue stream to the project and can significantly reduce the need for public funding. The benefit provided by bringing a new source of revenue into Metro's highway program could be shared across projects, as well within the particular projects tolled.

4.3. Project Analyses

4.3.1. High Desert Corridor

Project Description

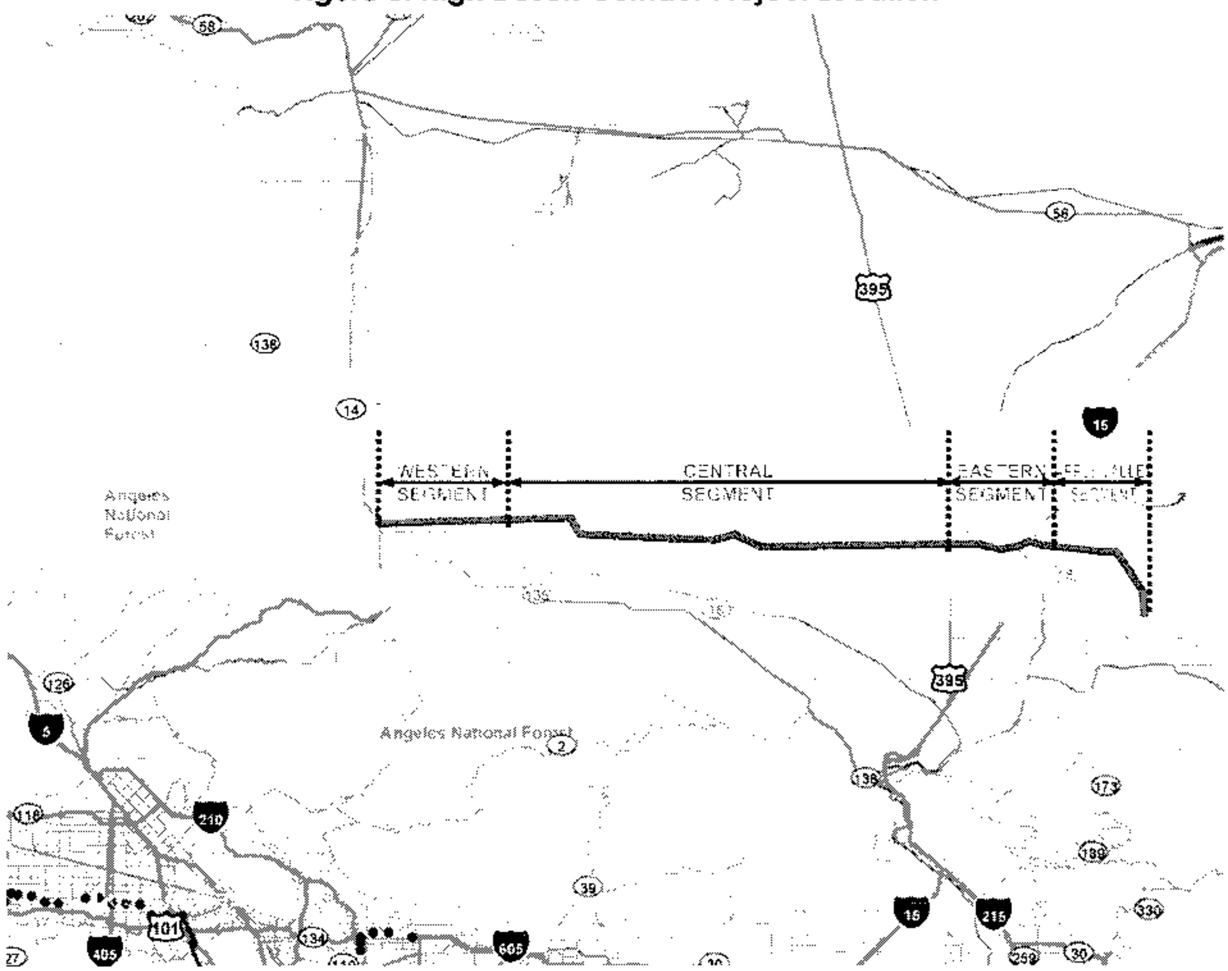
The High Desert Corridor (HDC) Project (see Figure 8) is a 4 to 8 lane, 50-mile freeway/expressway that extends from SR-14 in Palmdale to I-15 in Victorville. Also considered is an additional segment connecting the HDC east of the I-15 to SR-18 (the Apple Valley By-Pass). The segments considered in this analysis are:

- East segment – 9 miles (with an additional 12 mile segment east of the I-15);
- Central segment – 31 miles; and
- West segment – 10 miles.

To optimize the Project phasing, construction of the West and East segments would take priority under either public or P3 delivery, as these segments each have independent utility for local traffic and are essential to connect the HDC at both ends to SR 14, US 395 and I-15. Due to their urban setting, however, the cost of constructing these segments is high relative to the potential revenues each could generate; therefore, no tolling has been considered at this stage for these two segments, nor for the Apple Valley By-Pass. For the P3 option described below, the analysis contemplates tolling of the Central segment as a potential source of funding for the Project.

A Record of Decision for the HDC Project is expected in 2013. The current construction schedule shows commencement in 2015 and completion of all segments from SR 14 to I-15 occurring in 2023 under the public option and in 2019 under a P3 option, both subject to public funding being available for the East and West segments. The Apple Valley By-Pass has been assumed to be constructed from 2021 to 2023 under both options, also subject to availability of public funding. At this time, public funding for the Project is limited to $33 million YOE in Measure R for environmental work.

Figure 8: High Desert Corridor Project Location



Scenario 1: High Desert Corridor - Public Option

The public option for the Project assumes a design-bid-build approach for the full scope of the Project. The Project scope includes the design, environmental clearance, land acquisition, construction, operations, routine maintenance and capital maintenance responsibilities over a 50 year period for the High Desert Corridor Project including all segments: East, West, Central and the Apple Valley By-pass. This scenario does not include any revenue from tolling, or any costs associated with tolling facilities.

The construction costs do not include pre-construction costs of $150 million YOE ($129 million in 2010 present value dollars) between 2010 and 2015 or right of way costs of $401 million YOE ($233 million 2010 present value dollars). Construction is assumed to commence in 2015, while operations begin in 2024. Construction and operations costs are assumed to be funded by public sources as they are incurred.

Annual operations costs are projected to be $21.8 million YOE in the opening year and increase to $71.1 million YOE over the analysis period, with an average annual cost of $48.1 million YOE. Over the analysis period, these costs will total $1.75 billion YOE, as shown in Table 19.

The Project is analyzed over a 50 year period for comparison with the P3 option.

At this time the only Measure R funds amount to $33 million YOE and are programmed during the pre-construction phase for environmental studies and other planning efforts.

Table 18: High Desert Corridor – Public Option. Sources and Uses during the Construction Period (2015-2023)

Sources of Funds During Construction ($m)		
Source	**YOE**	**PV (7%)**
Measure R	33	29
Other public capital funding	4,006	1,957
Other public operating funding	36	16
Total sources	**4,075**	**2,002**

Uses of Funds During Construction ($m)		
Use	**YOE**	**PV (7%)**
Construction costs	(4,039)	(1,986)
O&M costs	(33)	(14)
Additional costs	(3)	(2)
Total uses	**(4,075)**	**(2,002)**

Table 19: High Desert Corridor – Public Option. Sources and Uses during the Analysis Period (2015-2064)

Sources of Funds During Analysis Period ($m)		
Source	**YOE**	**PV (7%)**
Measure R	33	29
Other public capital funding	4,006	1,957
Other public operating funding	3,983	323
Total sources	**8,022**	**2,309**

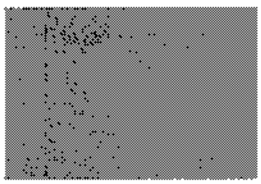
Uses of Funds During Analysis Period ($m)		
Use	**YOE**	**PV (7%)**
Construction costs	(4,039)	(1,986)
O&M costs	(1,748)	(181)
Capital maintenance	(2,235)	(142)
Total Uses	**(8,022)**	**(2,309)**

Scenario 2: High Desert Corridor – P3 Option

The P3 option scope assumes implementation of the entire Project from SR 14 to I-15 with private sector involvement in:

Design, construction, finance, operation and maintenance (DBFOM) for the Central segment as a tolled section; and
A design-build procurement for the East and West segments and the Apple Valley By-Pass (transferred to Caltrans upon completion).

Figure 9: High Desert Corridor – P3 Option



	Design, Build, Finance, Operate & Maintain
Design Risk	✓
Construction Risk	✓
Maintenance Risk	✓
Operations Risk	✓
Finance Risk	✓
Demand Risk	✓

The P3 option assumes a 50-year toll concession for the Central segment, with design, construction, tolling, operations and routine maintenance, capital maintenance and private financing responsibilities for this segment provided by a P3 partner. Construction would begin in 2015, with completion by 2019, and roadway operations commencing in 2020 from SR 14 to I-15. The toll concession would conclude in 2064.

The design-build contracts for the East and West segments would be held by the same P3 partner, but the costs associated with the construction of these segments totaling $1.42 billion YOE ($0.98 billion in 2010 present value dollars) would be publicly funded:

- Pre-construction costs of $75 million YOE ($62 million in 2010 present value dollars);
- Right-of-way costs of $173 million YOE ($136 million in 2010 present value dollars);
- Construction management costs of $73 million YOE ($49 million in 2010 present value dollars)
- Construction costs of $1.10 billion YOE ($736 million in 2010 present value dollars)

Additional costs associated with the East and West segments would also be assumed by Metro/Caltrans once the roadway operations commence in 2020:

- $638 million YOE for routine operations and maintenance over 45 years ($83 million in 2010 present value dollars); and
- $797 million YOE for major maintenance cost over 45 years ($73 million in 2010 present value dollars).

For the Apple Valley By-Pass, the same procurement, construction costs and schedule (2021-2023) as for the Public option have been assumed at this stage. An additional $0.7 billion YOE of public funding ($0.3 billion in 2010 present value dollars) would be needed for development, ROW and construction of the Apple Valley By-Pass, as detailed in Table 22.[4]

Annual operations costs for the entire Project, including tolling for the Central segment, are projected to be $11.0 million YOE in the opening year and increase to $40.5 million YOE, totaling $1.03 billion YOE over the analysis period, with an average annual cost of $22.8 million YOE.

The summary of sources and uses below (Tables 20 and 21) addresses only the P3 Central segment and excludes the following costs:

- Pre-construction costs of $44 million YOE ($36 million in present value 2010);
- Right of way costs of $188 million YOE ($138 million in present value 2010);
- Construction management costs of $73 million YOE ($45 million in present value 2010)

These costs are added back in Table 22 for comparison of the public and P3 delivery options.

[4] The costs associated with the East, West and Apple Valley segments are enumerated here in both YOE and 2010 present value dollars for indicative purposes only. Table 22 below shows these cost elements in 2010 present value dollars only in conjunction with the Value for Money analysis.

Table 20: High Desert Corridor – P3 Option – Central Segment Only. Sources and Uses during the Construction Period (2015-2019)

Sources of Funds During Construction ($m)		
Source	**YOE**	**PV (7%)**
Private financing	894	546
Measure R	33	29
Other public capital funding	218	124
Other public operating funding	-	-
Total sources	**1,145**	**699**

Uses of Funds During Construction ($m)		
Use	**YOE**	**PV (7%)**
Construction costs	(1,018)	(622)
Net transfers to reserve	(5)	(3)
Financing costs	(122)	(74)
Total uses	**(1,145)**	**(699)**

Table 21: High Desert Corridor – P3 Option – Central Segment Only. Sources and Uses during the Analysis Period (2015-2064)

Sources of Funds During Analysis Period ($m)		
Source	**YOE**	**PV (7%)**
Revenue	14,720	1,476
Interest income	19	2
Private financing	894	546
Measure R	33	29
Other public capital funding	218	124
Other public operating funding	-	-
Total sources	**15,884**	**2,177**

Uses of Funds During Analysis Period ($m)		
Use	**YOE**	**PV (7%)**
Construction costs	(1,018)	(622)
Capital maintenance	(1,068)	(87)
O&M costs	(1,026)	(123)
Taxes	(3,892)	(286)
Reserves	0	(20)
Debt service and returns to equity	(8,880)	(1,039)
Total Uses	**(15,884)**	**(2,177)**

Private financing has been included in the analysis to the extent that the toll revenue forecast supports repayment and a reasonable required rate of return. To the extent that net cash flows (toll revenues less operational and lifecycle costs) do not support the full amount of funding required to construct the Central segment, partial public funding provided through Metro has been assumed during construction. In Task 4, additional potential uses and revenue sources for the corridor will be explored, such as rail (high speed/ commuter/ freight), utilities and water.

Potential Benefits of a P3 Approach for the High Desert Corridor

Table 22 compares (in 2010 present value dollars using a 7% discount factor) the total cost to the public of delivering the High Desert Corridor under the public option and the P3 option assuming the following:

- Public funding before construction represents costs that will not be transferred to a private party and include right of way, pre-construction costs and construction management costs, as summarized above;
- Public funding during construction represents the additional public funding requirement identified in each option to cover the cost of construction not met by public or private financing; and
- E&W and Apple Valley capital costs represent Metro-retained costs for delivering the East, West, and Apple Valley segments in the P3 option that have been added back for comparison to delivery of the HDC under the public option.
- E&W and Apple Valley costs for O&M and capital maintenance is the same under both delivery options; however, the P3 option reflects two additional years of such costs compared to the public option, as the East and West segments are scheduled to open earlier under the P3 approach.

Table 22: High Desert Corridor – Public and P3 Options. Delivery Cost Comparison

High Desert Corridor (PRESENT VALUE 2010 @ 7%)						
Years of Operation		2024-2064	2020-2064			2024-2064
		Public	**P3**			
		Total	Total	P3 Central	E&W	Apple Valley
Capital cost	Pre-construction	159	128	36	62	30
	ROW	277	318	138	136	44
	Constr. supervision (CS)	Incl. in cons cost	94	45	49	Incl. in cons cost
	Subtotal	436	540	219	247	74
	Construction cost	1,986	1,605	622	736	247
	Total capital cost	2,422	**2,145**	841	983	321
Additional costs	O&M (excluding tolling)	181	214	96	83	35
	Toll operations	N/A	27	27	-	N/A
	Capital maintenance (excluding tolling)	142	164	67	73	24
	Toll capital maintenance	N/A	20	20	-	N/A
	Total additional costs	**323**	**425**	**210**	**156**	**59**
Total project costs		2,745	**2,570**	1,051	1,139	380
Public funding required	Required for pre-construction + ROW + CS	436	540	219	247	74
	Measure R	29	29	29	-	-
	Other public funding req. - construction	1,957	1,107	124	736	247
	Subtotal - public funding req. - construction period only	2,422	**1,676**	372	983	321
	Other public funding req. - operations	323	215	-	156	59
Total public funding required		2,745	**1,891**	372	1,139	380
	Net P3 revenues[1]	N/A	679	679	N/A	N/A
Total funding required		**2,745**	**2,570**	**1,051**	**1,139**	**380**

[1] represents toll revenues net of P3 financing costs and taxes

The analysis illustrates the following:

- The exclusion of revenues and costs associated with tolling under the public option widens the funding gap for the HDC Project;
- Given the early developmental status and lack of identified funding for the HDC, it is evident that a tolled solution offers a viable option for reducing the funding gap, accelerating project delivery and attracting private financing; and
- Under the broad assumptions possible at this time, it appears that a P3 option could reduce the project schedule by at least 4 years and reduce the public funds required for the entire Project by $854 million (2010 present value dollars).

4.3.2. SR 710 North

Project Description

The SR 710 North (see Figure 10) is a proposed tunnel Project that will complete an existing 4.5 mile "gap" in the I-710 (Long Beach) Freeway. The Project extends from just north of the I-10 (aka San Bernardino) Freeway near Alhambra to where the freeway resumes at Del Mar Boulevard in the City of Pasadena, which extends 0.6 miles to the north to its junction with the I-210 (Foothill) Freeway.

The estimated cost of delivering the Project is approximately $5.0 billion in YOE dollars.

The environmental process has not yet started for this Project; the earliest a Record of Decision could be received is 2013.

The current construction schedule shows predevelopment activities commencing in 2011, with construction starting in 2016. The completion of construction is planned for 2026.

Measure R funding for this Project is approximately $875 million YOE, with the majority of funding occurring beyond 2030.

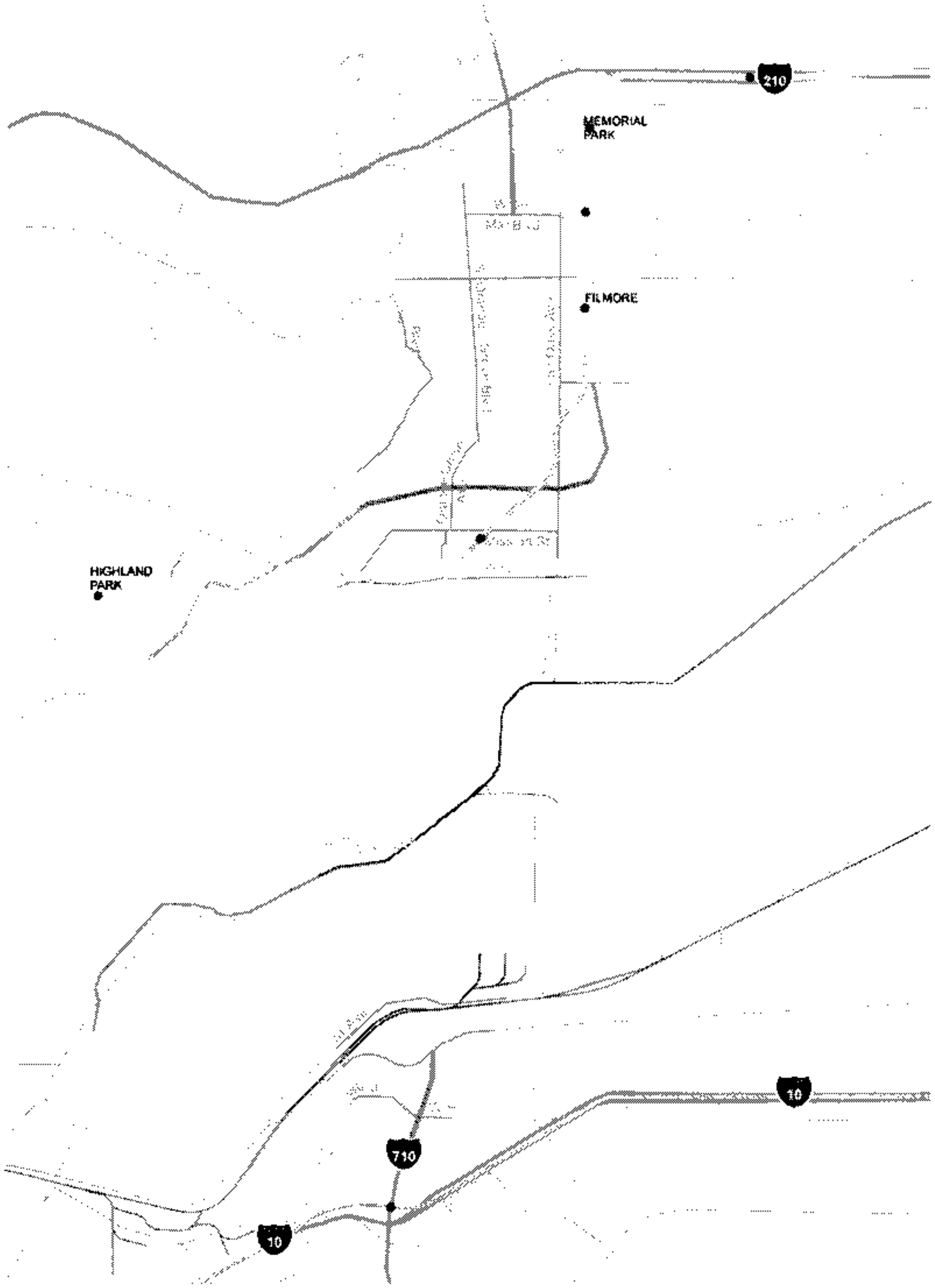
Scenario 1: SR 710 North – Public Option

The public option assumes a design-bid-build approach. The scope includes the design, environmental clearance, land acquisition, construction, operations, routine maintenance and capital maintenance responsibilities over a 50 year period for the SR-710 North Project. This scenario does not include any revenue from tolling, or any costs associated with constructing or maintaining tolling facilities.

The public option analyzed here includes delivery of the full scope and does not include tolling for this Project. The analysis period is from 2016 to 2063.

Annual operations costs are projected to be $38.2 million YOE in the opening year and increase to $110.7 million YOE over the analysis period, with an average annual cost of $68.3 million YOE.

Figure 10: SR 710 North Project Location



Additional costs not included in the tables below would be added to the total project cost (refer to Tables 23 and 24):

- Pre-construction costs of $375 million YOE ($288 million in 2010 present value dollars) between 2010 and 2016; and

- Right of way costs of $16 million YOE ($14 million in 2010 present value dollars).

Table 23: SR 710 North – Public Option. Sources and Uses during the Construction Period (2016-2026)

Sources of Funds During Construction ($m)		
Source	**YOE**	**PV (7%)**
Measure R	875	516
Other public capital funding	4,086	1,533
Other public operating funding	-	-
Total sources	**4,961**	**2,049**

Uses of Funds During Construction ($m)		
Use	**YOE**	**PV (7%)**
Construction costs	(4,961)	(2,049)
Total uses	**(4,961)**	**(2,049)**

Table 24: SR 710 North – Public Option. Sources and Uses during the Analysis Period (2016-2063)

Sources of Funds During Analysis Period ($m)		
Source	**YOE**	**PV (7%)**
Measure R	875	516
Other public capital funding	4,086	1,533
Other public operating funding	3,516	293
Total sources	**8,477**	**2,342**

Uses of Funds During Analysis Period ($m)		
Use	**YOE**	**PV (7%)**
Construction costs	(4,961)	(2,049)
O&M costs	(2,528)	(229)
Capital maintenance	(988)	(64)
Total Uses	**(8,477)**	**(2,342)**

Scenario 2: SR 710 North – P3 Option

The P3 option for the Project assumes a design-build-finance-operate-maintain approach to delivery. The Project scope includes the construction, operations, routine maintenance and capital maintenance responsibilities for the SR 710 North Project, as well as the full transfer of tolling, operations, major maintenance, and construction for the facility over a 50 year contract period, commencing at the contract start date of 2014.

Figure 11: SR 710 North – P3 Option

	Design, Build, Finance, Operate & Maintain
Design Risk	✓
Construction Risk	✓
Maintenance Risk	✓
Operations Risk	✓
Finance Risk	✓
Demand Risk	✓

Under the P3 option the construction schedule has been accelerated to take into account potential timing benefits that a P3 option may offer. This results in an earlier operations start date in 2023.

The construction cost for the P3 option is approximately $3.06 billion YOE, including additional costs to be met by Metro:

Pre-construction costs of $144 million YOE ($127 million in 2010 present value dollars)
Right-of-way costs of $14 million YOE ($11 million in 2010 present value dollars); and
Construction management costs of $85 million YOE ($46 million in 2010 present value dollars).

Annual operations costs, including tolling, are projected to be $26.6 million YOE in the opening year and increase to $87.0 million YOE over the analysis period, with an average annual cost of $51.1 million YOE.

Measure R funds of $875 million YOE are committed to the Project.

Tables 25 and 26 summarize the sources and uses of funds for the Project during the construction and operations periods. As shown, the P3 Project construction costs require approximately $1.29 billion YOE in public funding with the Project projected to attract $2.53 billion YOE in private capital. No public funding is required during operations, as the tolls are estimated to be sufficient to cover all project costs.

Table 25: SR 710 North – P3 Option. Sources and Uses during the Construction Period (2016-2022)

Sources of Funds During Construction ($m)		
Source	**YOE**	**PV (7%)**
Private financing	2,525	1,479
Measure R	875	516
Other public capital funding	411	243
Other public operating funding	-	-
Total sources	**3,811**	**2,238**

Uses of Funds During Construction ($m)		
Use	**YOE**	**PV (7%)**
Construction costs	(3,059)	(1,815)
Net transfers to reserve	(3)	(2)
Financing costs	(749)	(421)
Total uses	**(3,811)**	**(2,238)**

Table 26: SR 710 North – P3 Option. Sources and Uses during the Analysis Period (2014-2063)

Sources of Funds During Analysis Period ($m)		
Source	**YOE**	**PV (7%)**
Revenue	36,854	3,425
Interest income	16	1
Measure R	875	516
Other public capital funding	411	243
Other public operating funding	-	-
Private financing	2,525	1,479
Total sources	**40,681**	**5,664**

Uses of Funds During Analysis Period ($m)		
Use	**YOE**	**PV (7%)**
Construction costs	(3,059)	(1,815)
Capital maintenance	(939)	(79)
O&M costs	(2,096)	(233)
Taxes	(10,316)	(699)
Reserves	(0)	(18)
Debt service and returns to equity	(24,271)	(2,820)
Total Uses	**(40,681)**	**(5,664)**

Potential Benefits of a P3 Approach for the SR-710 North

The P3 Project Indicates Value for Money

As shown in Table 27, based on the Team's indicative financial analysis to date, the P3 option demonstrates a potential VfM benefit over the public option. The total cost to the public of delivering each option has been compared in 2010 present value dollars assuming the following:

- Public funding before construction represents costs that will not be transferred to a private party and include the cost of right of way, pre-construction costs and construction management costs;
- Public funding during construction represents the additional public funding requirement identified in each scenario to cover the cost of construction not met by public or private financing; and
- Costs have been shown in 2010 present value dollars using a 7% discount factor.

The key findings from the comparative analysis of the public and P3 options are:

- Revenues from tolling of the SR 710 North fill a significant funding gap for the Project;
- Under the P3 option, the 2010 present value of the public funding required for the Project drops by two-thirds, from $2.64 billion for the public option to $943 million for the P3 option, for a difference of $1.7 billion; and
- Under the P3 option, the capital costs of the Project may be lower by 15%, decreasing from $2.35 billion to $2.0 billion.

Table 27: SR 710 North – Public and P3 Options. Delivery Cost Comparison

SR-710 North (PRESENT VALUE 2010 @ 7%)			
Years of Operation		2027-2063	2023-2063
		Public	**P3**
Capital cost	Pre-construction	288	127
	ROW	10	11
	Constr. management	Incl. in. constr.cost	46
	Subtotal	298	184
	Construction cost	2,049	1,815
	Total capital cost	**2,347**	**1,999**
Additional costs	O&M (excluding tolling)	229	233
	Toll operations	N/A	Incl. above
	Capital maintenance (excluding tolling)	64	70
	Toll capital maintenance	N/A	9
	Total additional costs	**293**	**312**
Total project costs		**2,640**	**2,311**
Public funding required	Pre-construction + ROW + CS	298	184
	Measure R	516	516
	Other public funding req. -construction	1,533	243
	Subtotal - public funding req. - construction period only	**2,347**	**943**
	Other public funding req. -operations	293	
Total public funding required		**2,640**	**943**
	Net P3 revenues[1]	N/A	1,368
Total funding required		**2,640**	**2,311**

[1] represents toll revenues net of P3 financing costs and taxes

4.3.3. I-710 South

Project Description

The I-710 South Project (see Figure 12) runs north-south near downtown Los Angeles to the Port of Long Beach. The Project scope includes the development of a freight corridor (FC) to carry truck traffic, taking part of the truck traffic from the existing general purpose (GP) lanes, as well as the provision of more general purpose lane capacity.

The estimated cost of delivering the total Project is approximately $8.35 billion in YOE dollars.

A Record of Decision is expected at the end of 2011. The construction schedule includes predevelopment activities commencing in 2011, right of way acquisition starting in 2016 and construction starting in 2020. The completion of construction is planned for 2029 under the public option; under the P3 option, construction completion is planned for 2021 for the Freight Corridor and 2023 for the general purpose lanes.

Measure R funding for this Project is approximately $591 million YOE, with the bulk of it not available until after 2030. No other public funding sources have been committed.

Scenario 1: I-710 South – Public Option

The public option for the Project delivery assumes a design-bid-build approach. The Project scope includes the design, environmental clearance, land acquisition, construction, operations and routine maintenance and capital maintenance responsibilities over a 50 year period for the entire I-710 South Project, which includes the freight corridor, expansion of the general purpose lanes, and interchange improvements.

This scenario does not include any revenue from tolling, or any costs associated with constructing or maintaining tolling facilities. Construction and operational costs for the Project assume the completion and operation of the facility by Metro using traditional delivery methods.

The Project cash flows have been analyzed over a comparable time period to the P3 option. This includes predevelopment from 2011 to 2017, construction between 2018 and 2029, and operations starting in 2030.

As shown in Tables 28 and 29, the total construction cost is approximately $8.35 billion YOE, excluding the following additional costs:

- Right-of-way $850 million YOE ($478 million in 2010 present value dollars);
- Predevelopment costs of $1.42 billion YOE ($967 million in 2010 present value dollars).

The Project as a whole will require $7.76 billion YOE in public funds in addition to Measure R to complete construction. Throughout the analysis period, public funding in the amount of $3.69 billion YOE will be required for the operations, routine maintenance ($1.90 billion YOE), and capital maintenance for the facility ($1.79 billion YOE).

Annual operations costs are projected to be $30.7 million YOE in the opening year and increase to $84.0 million YOE over the analysis period, with an average annual cost of $53.1 million YOE.

Figure 12: I-710 South Project Location

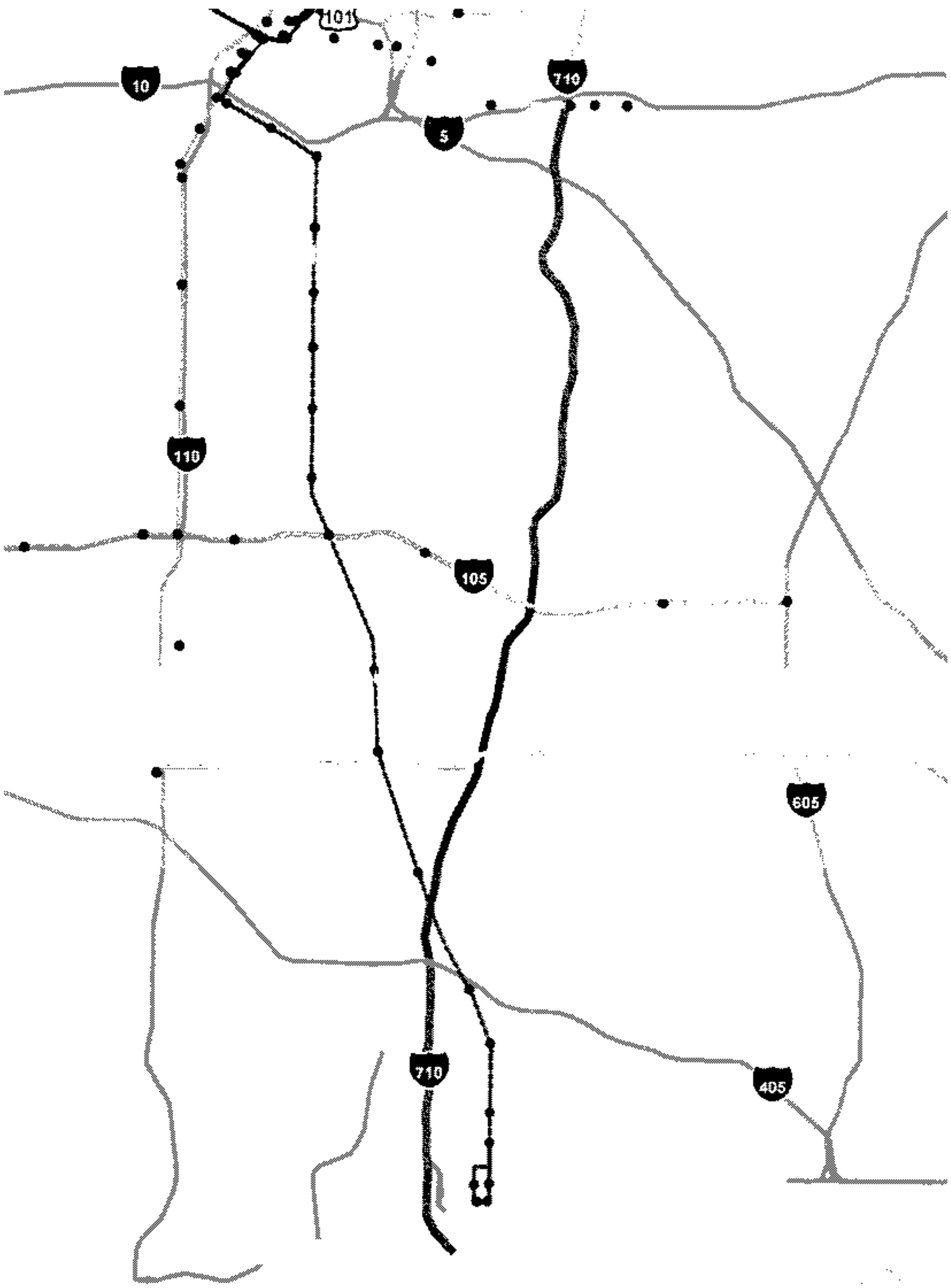


Table 28: I-710 South – Public Option. Sources and Uses during the Construction Period (2018-2029)

Sources of Funds During Construction ($m)		
Source	**YOE**	**PV (7%)**
Measure R	591	208
Other public capital funding	7,756	2,820
Other public operating funding	-	-
Total sources	**8,347**	**3,028**

Uses of Funds During Construction ($m)		
Use	**YOE**	**PV (7%)**
Construction costs	(8,347)	(3,028)
Total uses	**(8,347)**	**(3,028)**

Table 29: I-710 South – Public Option. Sources and Uses during the Analysis Period (2018-2064)

Sources of Funds During Analysis Period ($m)		
Source	**YOE**	**PV (7%)**
Measure R	591	208
Other public capital funding	7,756	2,820
Other public operating funding	3,671	251
Total sources	**12,018**	**3,279**

Uses of Funds During Analysis Period ($m)		
Use	**YOE**	**PV (7%)**
Construction costs	(8,347)	(3,028)
O&M costs	(1,859)	(146)
Capital maintenance	(1,812)	(105)
Total Uses	**(12,018)**	**(3,279)**

Scenario 2: I-710 South - P3 Option - Freight Corridor Only

The Project scope for the P3 option includes the tolling, financing, construction, operations and routine maintenance and capital maintenance responsibilities for the Freight Corridor (FC) section of the I-710 South Project to be delivered by a P3 concessionaire. The development and operations of the additional general purpose lanes expansion and interchanges will be retained by Metro but could be contracted to the P3 concessionaire under a design-build contract.

Figure 13: I-710 South – P3 Option

	Design, Build, Finance, Operate & Maintain
Design Risk	✓
Construction Risk	✓
Maintenance Risk	✓
Operations Risk	✓
Finance Risk	✓
Demand Risk	✓

Construction on the FC section of the Project would commence in 2015 and be completed in 2020 with the first year of operations starting 2021. The delivery of the remaining elements would be continued by Metro on the original schedule contemplated for this Project and be completed in 2029.

As shown in Tables 30 and 31, the total construction cost of the FC section is estimated at $2.32 billion YOE. The following additional costs retained by Metro are added back in Table 32 for comparison to the public option:

- Right-of-way costs of $782 million YOE ($552 million in 2010 present value dollars);
- Predevelopment costs of $1.0 billion YOE ($790 million in 2010 present value dollars);
- General purpose lanes and interchange construction costs of$4.27 billion YOE ($1.66 billion in 2010 present value dollars);
- General purpose and interchange operations and routine maintenance (O&M) costs of $1.31 billion YOE ($111 million in 2010 present value dollars); and
- Capital maintenance costs of $986 million YOE ($62 million in 2010 present value dollars).[5]

Annual operations costs for the Freight Corridor only, including tolling, are projected to be $8.7 million YOE in the opening year and increase to $30.9 million YOE over the analysis period, with an average annual cost of $17.6 million YOE .

Measure R funding is assumed at the same level as for the entire Public Project. Public capital is only required during the construction period, in the amount of $1.06 billion YOE.

[5] The costs associated with the general purpose lanes and interchanges are enumerated here in both YOE and 2010 present value dollars for indicative purposes only. Table 32 below shows these cost elements in 2010 present value dollars only in conjunction with the Value for Money analysis.

Toll revenues are projected to total $16.51 billion YOE over the 2021 – 2064 operating period.

Table 30: I-710 South – P3 Option. Sources and Uses during the Construction Period (2015-2020)

Sources of Funds During Construction ($m)		
Source	**YOE**	**PV (7%)**
Private financing	799	480
Measure R	591	208
Other public capital funding	1,064	777
Other public operating funding	-	-
Total sources	**2,454**	**1,465**

Uses of Funds During Construction ($m)		
Use	**YOE**	**PV (7%)**
Construction costs	(2,319)	(1,386)
Net transfers to reserve acct.	(5)	(3)
Financing costs	(130)	(76)
Total uses	**(2,454)**	**(1,465)**

Table 31: I-710 South – P3 Option. Sources and Uses during the Analysis Period (2015-2064)

Sources of Funds During Analysis Period ($m)		
Source	**YOE**	**PV (7%)**
Revenue	16,513	1,490
Interest income	17	2
Private financing	799	480
Measure R	591	208
Other public capital funding	1,064	777
Other public operating funding	-	-
Total sources	**18,984**	**2,957**

Uses of Funds During Analysis Period ($m)		
Use	**YOE**	**PV (7%)**
Construction costs	(2,319)	(1,386)
Capital maintenance	(973)	(92)
O&M costs	(776)	(90)
Taxes	(4,718)	(334)
Reserves	(0)	(21)
Debt service and returns to equity	(10,198)	(1,034)
Total Uses	**(18,984)**	**(2,958)**

Potential Benefits of a P3 Approach for the SR-710 South

The P3 Project Indicates Value for Money

As shown in Table 32, based on the Team's indicative financial analysis to date, the P3 option illustrates a potential VfM benefit to Metro. The total cost to the public of delivering each option has been compared in 2010 present value dollars assuming the following:

- Public funding will be used for pre-construction costs, including right of way, conceptual design and other pre-construction costs;
- Public funding during construction represents the additional public funding requirement identified in each scenario to cover the cost of construction not covered by identified sources of public funds or private financing; and
- Costs have been shown in 2010 present value dollars using a 7% discount factor.

The key findings from the comparative analysis of the public and P3 options are:

- Revenues from tolling of the I-710 South fill a significant funding gap for the Project and allow for early construction and operation of the Freight Corridor;
- Under the P3 option, the level of public funding required for the entire I-710 South Project may decrease up to 11% from $4.72 billion (2010 present value dollars) for the public option to $4.24 billion (2010 present value dollars) for the P3 option, for a difference of $480 million. The public revenue made available as a result of the tolled P3 option could potentially be used to advance the enhancement of the I-710 South general purpose lane capacity and interchanges;
- Based on the inputs and assumptions as provided for this analysis, the tolling option indicates potential VfM benefits to Metro in the P3 option;
- Including the costs of the general purpose lane capacity enhancement and interchange improvements, the capital costs of the I-710 South Project is comparable under both the public and P3 options; and
- Other business case options will include applying industry-norm reductions to operations, routine maintenance and capital maintenance costs and optimizing the tax treatment of the concession; these adjustments may provide additional VfM for the P3 approach.

Table 32: I-710 South – Public and P3 Options. Delivery Cost Comparison

I-710 South (PRESENT VALUE 2010 @ 7%)					
Years of Operation		2030-2064	2021-2064		
		Public	**P3**		
		Total	Total	*P3 FC*	*GP+IC*
Capital cost	Pre-construction	967	790	298	492
	ROW	478	552	443	109
	Constr. supervision (CS)	Incl. in const. cost	84	84	Incl in const. cost
	Subtotal	1,445	1,426	825	601
	Construction cost	3,028	3,043	1,386	1,657
	Total capital cost	**4,473**	**4,469**	**2,211**	**2,258**
Additional costs	O&M (excl. tolling)	146	178	67	111
	Toll operations	N/A	23	23	N/A
	Capital maintenance (excl. tolling)	105	137	75	62
	Toll capital maintenance	N/A	17	17	N/A
	Total additional costs	**251**	**355**	**182**	**173**
Total project costs		**4,724**	**4,824**	**2,393**	**2,431**
Public funding required	Pre-construction + ROW + CS	1,445	1,426	825	601
	Measure R	208	294	208	86
	Other public funding req. - construction	2,820	2,348	777	1,571
	Subtotal - public funding req. - construction period only	**4,473**	**4,068**	**1,810**	**2,258**
	Other public funding req. - operations	251	173	-	173
Total public funding required		**4,724**	**4,241**	1,810	2,431
	Net P3 revenues[1]	N/A	583	583	N/A
Total funding required		**4,724**	**4,824**	**2,393**	**2,431**

[1] represents toll revenues net of P3 financing costs and taxes

5.0 NEXT STEPS

This Section describes the activities to be undertaken in Task 4 to develop Business Cases for each project.

5.1. Develop the Business Case Methodologies

Task 4 will involve laying the groundwork for projects to proceed into procurement, assuming that Metro makes timely decisions regarding the project delivery method for each of the six initial projects. For some projects, this procurement process potentially could occur in the first half of 2011 while other projects will follow in 2012 and 2013. Completion of the business cases should be scheduled such that business cases will be completed first for those projects that are deemed likely to be procurement-ready first – as these projects will set the precedent for future procurements.

There are a number of factors that should be taken into account in developing the schedule for completion of the business cases:

- Environmental process – the six candidate P3 projects are currently moving through the environmental process on different timelines. Records of Decision (ROD) are due for Westside, Crenshaw/LAX, Regional Connector and I-710 South in 2011 and early 2012 while the RODs for High Desert Corridor and SR-710 North are a minimum of 24-36 months away;
- FTA New Starts process - two of the three transit projects – Regional Connector and Westside – are moving forward so as to qualify for FTA New Starts funding. The New Starts process has specific milestone requirements, whereby FTA must approve the advancement of a project from conceptual design, to preliminary and final engineering, and construction. Completion of the business cases for the proposed FTA New Starts projects should be fully coordinated with these approval milestones so that procurement options can remain open to both public and P3 project delivery;
- Right of way acquisition – with the exception of the SR-710 North (for which the current estimate for right of way is less than $20 million YOE) the acquisition of right of way presents a potentially constraining factor on the project delivery schedule due to both timing and availability of funds. For those projects such as the I-710 South, Crenshaw/LAX, Regional Connector and Westside Subway Extension for which the planned alignments face physical constraints, the uncertainty of when ROW will actually be available for construction can serve to add time to the project schedules; and
- Availability of data – as highlighted in Section 1, for all projects there remain gaps in the data needed to complete the financial analysis required for the business case. This issue is more pronounced in early-stage projects like High Desert Corridor and SR-710 North, where the data currently available lacks the necessary detail to perform thorough financial analysis upon which reliable conclusions and decisions can be made.

Based upon the factors affecting the individual project timelines, there are four projects that can progress to the pre-procurement detailed business case stage and be ready to "go to market" in the next 6-12 months: Crenshaw/LAX, Westside, Regional Connector and I –710 South. The I-710 North and High Desert Corridor require additional data development as well as completion of environmental work before they will be market ready. For all projects, ensuring that ongoing analysis includes a P3 option is essential to keeping this option viable.

5.2. Establish Greater Clarity on Project Options

In order to fully evaluate the potential benefits of the P3 options for each project, the scope of each needs to be more fully developed and refined to balance its financial attractiveness to a private partner with the public goals and needs. Consideration must be given to the following:

- Establishing a clear understanding of the relationships between infrastructure (civil work and systems), rolling stock and operations. This will inform the scope and responsibility of the P3 developer and its contractors.
- Gaining greater clarity on the market capacity and appetite, from a contracting, funding and insurance perspective, for taking the risks inherent in green field projects of this scale and complexity. This can only be achieved by direct and focused dialogue with the full spectrum of potential private sector partners, including developers, contractors, equipment suppliers, equity investors and lenders.

Clarity on these issues will help confirm procurement options to be evaluated against criteria such as speed of delivery, retention of competitive tension, private sector innovation and cost.

To best accomplish this, the Team will conduct workshops with Metro staff, its project consultants and selected stakeholders to identify the key objectives and constraints that would impact the available options and ultimately drive the preferred business cases for each project. The workshops will also be used to solicit detailed feedback from the private sector on the potential technical, commercial and financial options for each project. The feedback derived will serve as input to a formal market sounding on the key risk issues with potential private sector developers. This work should be conducted early in Task 4 so that it can inform the selection of a preferred option.

5.3. Define the P3 Projects and Procurement Approaches

Focusing on the development of a final scope and procurement plan will allow Metro and its advisors to refine the current assumptions for each project to reflect deliverable P3 outcomes. This will allow the Team to finalize the VfM analysis based on the preferred option for each project:

- Metro and the InfraConsult Team should adopt a consistent and comprehensive approach to quantification of risk for both transit and highway projects. To date risk analysis has been focused on technical risk and has not considered commercial and financial issues nor have operations, maintenance and lifecycle risk been quantified. The process should involve the identification and allocation of key risks and recommendations regarding risk allocation across the full range of technical, commercial and financial risk;

- Phasing and segmental development needs full consideration. It will be important to analyze the cost of different phasing options and present these to Metro for consideration;
- For those highway projects to be tolled, further traffic and revenue forecasting needs to be completed, and certain fundamental toll policy decisions will need to be analyzed and presented to the Metro Board; and
- The underlying technical assumptions for each project will be reviewed and amended to reflect the delivery options available under a P3. Examples include review of design and construction periods and the overlap with pre-development work, phasing and segmental options, traffic and revenue forecasting from an equity perspective and incorporation of property and ROW costs.

5.4. Lay out the Procurement Approaches

While the preferred option will be identified early in the business case process, selecting the best procurement method to accomplish it is equally as important. For those projects in early stages of development, the Team will explore options including a pre-development agreement, or PDA, that allow early-stage input from a potential private developer in a meaningful and at-risk way. For projects closer to procurement, we will analyze in-depth what additional work needs to be accomplished by Metro pre-procurement, and what can be transferred under a P3 approach. It is likely that converting the procurements to a P3 track will result in changing the staff resource allocation during the development period away from hard engineering to performance specification and contract preparation.

5.5. Finalize the VfM and the Business Cases

The business cases developed in Task 4 serve as the public faces of the projects to the market and to stakeholders alike, and as such the embedded decisions about project elements, risk transfer and contractual points need to be reflective of what will be included in the actual procurement documents. Where applicable, the business cases should reflect and/or include the following:

Policy assumptions regarding:

- Rolling stock procurement to be included with project or outside project procurement;
- Possible opportunities for private transit operations;
- The role of other governmental agencies in the P3 approval process;
- Concession term length;
- Long term contract oversight;
- Toll structures and frameworks; and
- Backing for availability payment structures.

Confirmation of the project scope:

- Confirm project scope and limits;
- Confirm rolling stock technology assumptions;
- Confirm rolling stock procurement assumptions (noted above);
- Confirm operations responsibility assumptions (noted above); and
- Confirm the project delivery schedule and phasing assumptions for the public option.

Perspectives from the private market sounding to confirm best approaches to:

- Construction risks (including tunneling) and acceptance of design risk;
- Opportunity for operations cost savings;
- Technology and systems integration;
- Interface risks and mitigation;
- Performance and Payment Bond capacity;
- Rolling stock procurement with project integration;
- Maintenance assumptions;
- Performance standards;
- Credit risk; and
- Delivery methods.

More refined cost estimates including:

- Revised construction cost estimate including updated delivery schedule and cost curves;
- Development of a bottom- up approach to routine maintenance and operations (if applicable) cost development; and
- Updated whole-life costing approach to develop capital maintenance cost profile.

Updated ridership forecasts and identification of third party revenue sources: This update should be consistent with any recommended schedule or project accelerations.

Risk workshop building on the existing risk work completed in Task 3 to provide:

Revised risk matrices for both the public sector and P3 approaches;

- Revised risk adjusted public sector cost inputs for all cost items to develop the Public Sector Comparator for each delivery option analyzed; and
- Revised shadow bid cost input development including: revised construction and replacement costs, O&M costs, accelerated delivery schedule (where appropriate) for each identified delivery method.

Refined tax and accounting inputs

- Finance/Operating lease treatment of assets;
- Agreed-upon rate of return *(CTC, FTA, etc.)*
- State and federal tax assumptions; and
- Tax Depreciation (Straight line, AMT, MACRS).

Refined project-specific financing terms for:

- Taxable and tax-exempt financing options;
- Equity;
- New and existing federal funding sources; and
- Use of Measure R.

Identification of any required legislative changes.

5.6. Identify Optimum Metro P3 program structure

- Project development
- Procurement
- Project delivery management
- Long term contract oversight
- PPP program management

Appendix A Risk and Efficiency Adjustment Methodology

This appendix discusses the determination and application of a risk and efficiency adjustment methodology in P3-delivered projects compared to Public-delivered projects for Task 3.

To demonstrate the potential benefits that can be achieved through alternative P3 delivery models at this planning level of analysis, the InfraConsult Team ("the Team") reviewed several data sources (shown in Table A-1).

The Team utilized the Allen Consulting Group's, "Performance of PPPs and Traditional Procurement in Australia (2007)" ("The Allen Study") as the basis of risk and efficiency adjustments in P3 project delivery. The Allen Study was deemed to be the most relevant reference because the empirical study provided actual cost data points of P3 and Traditional/Public delivery costs. The Allen Study surmised that a risk adjustment "delta" of -30% (i.e. savings) is an appropriate adjustment to apply to public sector cost estimates during comparable early planning level stage of project analysis.

Based on the Allen Study, the financial model input adjustments reflected a recommended 30% cost savings delta in the construction capital costs for the P3 costs compared to the Public costs.

Although certain routine operations and maintenance ("O&M") and lifecycle costs may benefit from possible cost savings and efficiencies in P3 agreements, no additional risk adjustments were made in the financial models for operations and routine maintenance (O&M) costs or capital construction and capital maintenance (lifecycle) costs at this stage.

During Task 4, detailed project-specific risk analyses, construction, operations and routine maintenance (O&M), and capital construction and capital maintenance (lifecycle) risk adjustments are expected to be incorporated into the VfM analysis. This topic is discussed in more detail in the subsequent section "Potential P3 Savings in Operations and Maintenance."

Application of Risk and Efficiency Adjustments in Task 3D

The assessment of risk transfer, as discussed above, and the possible project schedule acceleration during the design and construction phase of each project were reflected in the financial models developed for Task 3D. The financial models prepared in Task 3D accounted for the following adjustments to the public project capital cost estimates as described below:

Capital Cost Risk Adjustments

As a result of the review of various empirical data sources, a 30% cost reduction (including cost overruns and other construction related risks) was applied as a capital cost risk adjustment to arrive at the P3 capital cost estimates. The applied 30% cost reduction was deemed appropriate when comparing cost efficiency for P3s over traditional public procurements when measured from project inception to the final project capital cost price. ROW and other pre-development costs were not adjusted.

Schedule Acceleration

Another benefit of P3 project delivery contemplated by the Team at this level of analysis included opportunities for possible schedule acceleration under a P3 project delivery model. These differences vary by project depending on the private sector's ability to achieve service commencement earlier and with an overall higher degree of project delivery certainty.

Operations & Maintenance – Potential P3 Savings

Public-private partnerships consider the addition of responsibility for operations and maintenance to a contract that already includes design and construction. There are also several examples of agencies contracting out operations and/ or maintenance of existing facilities without significant new construction.

Numerous public agencies have contracted out some or all maintenance activities, on both transit and highway systems. Private participation has increased significantly in highway systems in USA, notably the states of Virginia, Florida, Texas, Massachusetts and the District of Colombia. A multi-billion dollar transit P3 is underway in Denver, Colorado.

Public agencies have implemented these contracting methods to improve service and efficiency, increase risk transfer (cost certainty) and to achieve lower overall lifecycle costs:

- Improve effectiveness – combining operations and maintenance with design and construction insures that operational issues are considered from the outset.
- Increase efficiency – providing incentives for one company to influence cost factors between construction and long term operations can result in delivering the project at lower lifecycle cost.
- Improve accountability via risk transfer – making the private sector responsible for performance through conditions of a contract that protects public interest.
- Increase innovation –the private sector involvement will likely increase innovation in methodology and operational approach.

An analysis of publicly available studies and reports that compare the cost of public sector delivery with outsourcing operations and maintenance services was conducted (Table A-2). In summary, these studies have shown that:

- A range of savings of between 12% and 21% have been reported on US highway systems (see table below for a summary of sources);
- Studies undertaken to estimate projected savings on specific projects and transit systems report a range of 12% to 25%; and
- International data is relatively consistent with the findings above showing a range of between 11% and 25%.

Sources of Value

In addition to variations in the cost of labor, many of the studies and reports cite the following reasons for achieving savings when contracting out operations and maintenance activities:

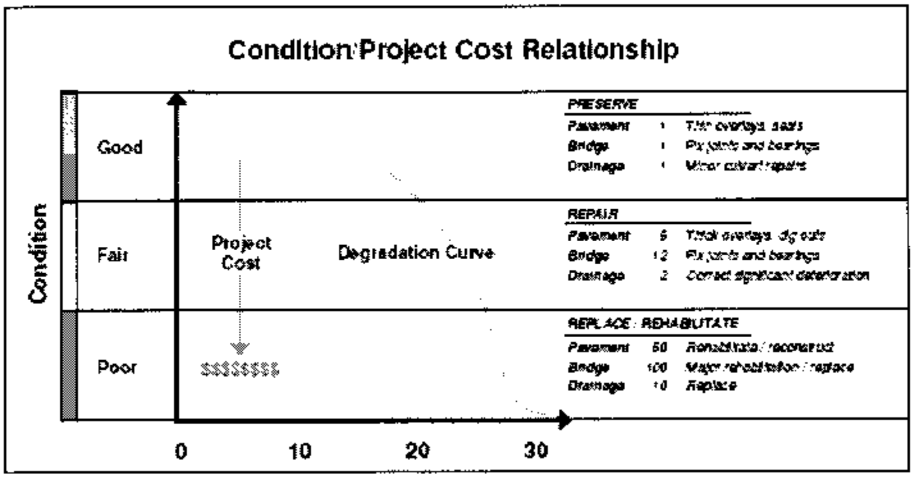
Adopting a Lifecycle Approach, also Referred to as Asset Management

Under public sector delivery, maintenance is "budget driven" meaning that agencies can only do the work they can afford, which is becoming less and less as needs outstrip available funds. However, when O&M is contracted out the standard of performance (i.e. asset condition) is fixed by the contract for the duration of the O&M period. The standard of performance is typically equal to the standard required on publicly operated and maintained highways. This performance-based criterion is often linked to a service payment, which also contains deduction clauses if the required level of performance is not achieved. This also serves to incentivize the contractor to be pro-active and efficient in the operation. Private sector participation has resulted, in some cases, in the adoption of innovative techniques that have improved levels of service at no additional cost.

Caltrans carries out routine, preventative and major maintenance on the State highway system using a combination of State forces and contracted services and recognizes the importance of a lifecycle approach to maintenance. According to a Caltrans report[6] "for every $1 invested in preserving pavement, bridge, or drainage systems, the State saves $5, $12, or $2 respectively. It costs many times that amount to allow a facility to degrade and repair it later. Keeping an asset in good health costs less than restoring it; good roads actually cost less." The figure below (from the same report) demonstrates the increasing cost of maintenance activities if condition is allowed to deteriorate. Metro similarly has a policy of asset maintenance and develops a State of Good Repair Study regularly. However, due to budgetary constraints, often Caltrans and Metro are unable to address all maintenance issues to the ideal level for lifecycle maintenance. Sadly, maintenance funding is often the first to be cut by outside agency forces, and agencies must creatively apply the remaining funds on an as-needed basis. If the necessary maintenance cannot be funded, the facility will not remain in good health.

A P3 contract allows a lifecycle / asset management approach to be taken whereas such an approach is less likely for the budget-driven public sector approach.

[6] Caltrans Five-Year Maintenance Plan (January 2009)



Use of Performance Standards (Performance-Based Contracting)

Most public sector maintenance is defined by "means and methods" in a manual which is updated periodically to reflect good practice. This prescriptive approach is designed to provide consistent results across a system, but in practice often results in less than optimal allocation of resources leading to overall declines in system condition. In particular, in times when budgets are constrained and funding for routine maintenance reduced, such an approach can prove unwieldy and unworkable, as it does not allow prioritization of efforts to achieve the highest level of performance possible within those budgetary constraints. A recent report by the ASCE concluded that 66 percent of California's highways and major roads were in poor condition, undoubtedly due in no small measure to the fact that the state underspent on its maintenance by more than $2 billion annually.

In a P3 model however, maintenance requirements are typically defined in the Agreement by performance standards, which define a level of result required but not the definition of what means must be used to achieve it. So, for example, rather than stating that a bridge structure must be painted every certain numbers of years with a paint of a specific type (and often color as well!), a performance standard would require that all exposed metal surfaces should be adequately protected from weather and sunlight so that they show no visible signs of oxidation, leaving it up to the contractor how best to achieve that result.

Provided the performance standards are appropriately defined, the performance based approach is more efficient, as it encourages the contractor to innovate and implement efficiencies to achieve the performance levels. In addition, efficiencies may be achieved because work only needs to be done when the standard drops, rather than scheduling work at specified intervals that may not be necessary.

Maintenance performance is enforced under the Agreement terms typically through provisions that financially assess the contractor for lack of facility availability and failure to meet milestone goals and long-term hand back requirements.

Fixed Prices and Competition

Under a competitive P3 procurement, prices submitted by bidders include the cost of both routine and capital maintenance for the entire term of the Agreement. This has the effect of providing a fixed price maintenance guarantee, subject only to agreed-upon inflation adjustments based on a third-party index. Agencies benefit from being able to budget such expenses for the life of the contract, and to smooth the curve of expenditures into annual escalating payments rather than the spikes of periodic major expenditures. And, as this amount is part of the overall contract payment structure, its funding is assured, either by being part of the Availability Payments committed under the contract, or by being paid by the contractor from project or other revenues. This benefit is absent from public maintenance where the annual budgets are the subject of fierce debate and often go unfunded, and where long-term costs are at best unpredictable due to the volatility of labor agreements and equipment and material cost swings.

In transferring the maintenance obligations to the private sector, the P3 structure also encourages the contractor to use its technical expertise and quality construction methods to seek ways to reduce its future maintenance costs. As the initial award will go to the bidder who has designed an asset to achieve the best overall lifecycle cost, the P3 process inherently encourages greater consideration of maintenance costs over the term of the contract because these costs are a significant part of its competitive price. Throughout the contract, the contractor has a powerful incentive to maintain the project properly since its compensation depends on meeting applicable standards and its profit depends on its ability to complete the required work for the same or lower price than initially projected. And, in a fully competitive procurement, the procuring agency also benefits in the form of lower competitive prices for both initial construction and long-term maintenance.

Table A-1. Review of Empirical Cost and Risk Savings between Traditional Procurement and Alternatives

Ref	Source Document	Key Finding(s)	Comments
1	Arup / PB "Analysis of Delivery Options for the Presidio Parkway Project" (2010)	Construction: DBB: 29% estimated risk exposure (sum of public and private risks, 80th percentile) DBF: 21% estimated risk exposure DBFOM: 14% estimated risk exposure DBB Capital Cost Risk Adjustments quoted: 32% (Bent Flyvbjerg database, 80th percentile) 39% (Caltrans database of large projects, 80th percentile) 55% (US Government, GAO, 80th percentile) 6-66% (UK Government, HM Treasury) Operations & Maintenance: DBB: 20% DBF: 20% DBFOM: 5%	Values used in business case: DBF: 8% difference in capital costs DBFOM: 15% difference in capital costs Analysis based on project specific issues and detailed QRA (not published) Values used in business case: DBF: 0% difference in O&M costs DBFOM: 15% difference in O&M costs
2	Florida Department of Transportation, "Port of Miami Tunnel Value for Money Analysis" (2010)	Construction: PUBLIC(DBB): 20% cost overrun P3 (DBFOM): 7.5% risk contingency Operations & Maintenance: PUBLIC(DBB): 20% cost overrun + 10% risk contingency + 10% contract renewal overrun P3 (DBFOM): 10% cost overrun + 7.5% risk contingency added to base cost estimate	12.5% difference in capital costs 22.5% difference in O&M costs
3	Florida Department of Transportation, "I-595 Corridor Improvements Value for Money Analysis" (2009)	Construction Engineering & Inspection (CEI): DBB: 12-15% P3 (DBF): 12% (same as DBB) P3 (DBFOM): 5% Construction: DBB: 10-20% cost overrun (assume 20%) P3 (DBF): 5% cost overrun + 10% risk contingency added to base cost estimate P3 (DBFOM): 5% cost overrun + 5% risk contingency added to base cost estimate Operations & Maintenance: DBB: 20% cost overrun (assume + 10% risk contingency + 10% contract renewal overrun) P3 (DBF): 20% cost overrun + 10% risk	Public not calculated so some data unavailable. DBF: 0-3% difference in CEI costs DBFOM: 7-10% difference in CEI costs DBF: 5% difference in capital costs DBFOM: 0% difference in

Ref	Source Document	Key Finding(s)	Comments
		contingency + 10% contract renewal overrun P3 (DBFOM): 10% cost overrun + 5% risk contingency added to base cost estimate	capital costs DBF: 0% difference in O&M costs DBFOM: 25% difference in O&M costs
4	US-DOT, "Report to Congress on Public-Private Partnerships" (2004)	Performance-based contracting (a form of P3) can result in cost savings ranging from 6 to 40% (based on study by Battelle & Koch Industries). Traditional low-bid contracts on average had 12.4% cost overruns. Nontraditional contracts had only a 3.6% cost overrun (based on study by Florida Department of Transportation).	
5	US-DOT, "Report to Congress on the Costs, Benefits, and Efficiencies of Public-Private Partnerships for Fixed Guideway Capital Projects" (2007)	Cost savings from P3 range between $1m and $38m compared to DBB. Percentage savings not provided, unable to calculate from this source.	7 large transit projects reviewed. 5 delivery methods were DB, 1 DBOM, 1 planned as DBFOM (since cancelled).
6	GAO-03-764T, "Federal-Aid Highways, Cost and Oversight of Major Highway and Bridge Projects – Issues and Options" (2003)	23 out of 30 projects experienced cost increases of between 2 and 211% 15 out of 30 projects increased by 25% or more	Study sample of 30 major highway and bridge projects
7	GAO/RCED-97-47, "Managing the Cost of Large Dollar Highway Projects" (1997)	Average cost overrun of large dollar (>$100m) highway projects is 41%. At the 80% confidence level the cost overrun was reported at 55%	Data interpreted by Arup/PB JV and included in Presidio Parkway Business Case Report (2010)
8	Flyvbjerg, Holm and Buhl, "Underestimating Costs in Public Works Projects: Error or Lie?" (2002)	Costs for highway projects are on average 20% higher than the cost estimate at the time the decision is made to invest	Statistical analysis of 167 large-scale US and international projects delivered by design-bid-build
9	Fitch Ratings, Global Infrastructure and Project Finance, "Global Toll Road	Construction cost overrun factors for base case "simple" projects taken as between 0% and 5%. For "complex" projects this is increased to between 0% and 10%. Stress case increases the ranges to 5-10% cost	Private sector's view of risk on US tolled concessions (highways)

Ref	Source Document	Key Finding(s)	Comments
	Rating Guidelines" (2007)	overrun for simple project and 10-20% cost overrun for complex projects. O&M taken as equal to historical average in base case (+1% in stress case) once established. During start-up base case is initial year cost plus 0-10% (+1% in stress case). Inflation is increased by 1-2% in start-up.	
10	Texas Department of Transportation, "Project Delivery Methods and Contracting Approaches Available for Implementation" (2001)	DB unit costs 6.1% less than DBB Cost growth 5.2% less	Data used was from building projects, not transportation
11	Legislative Analyst's Office, "Counties and Design-Build" (2010)	Of 5 projects: two were 5% and 16% less than estimated cost;) two were approximately the same and one was 5% higher	That this is a comparison with estimated costs rather than comparison with DBB
12	Allen Consulting Group, "Performance of P3s and Traditional Procurement in Australia (2007)	P3 demonstrate clearly superior cost efficiency over traditional procurement ranging from 30.8% (measured from project inception) to 11.4% (measured from contractual commitment to final outcome).	Broad ranging study of 21 P3 and 33 Traditional projects across Australia including transportation, schools, hospitals, water and sports stadiums.
13	Eagle P3-FastTracks: General Manager's Recommendation to RTD Board for Award of Concession Agreement, Special Board Meeting, June 15, 2010	Private bid of $2.085 billion in capital cost came in $300m lower than RTD estimate of $2.385 billion. In addition, total value of the 46-year concession proposed by selected concessionaire ($7.14 billion, or $1.12 billion in present value) was $2.70 billion below RTD estimate ($9.83 billion, or $1.48 billion in present value).	Capital costs and concession costs per concessionaire bid. Concession value reflects progress payments during construction and service payments. Capital costs reflect a 12.5% cost saving from engineer's estimate.

Ref	Source Document	Key Finding(s)	Comments
14	Mott MacDonald (for HM Treasury), "Review of Large Public Procurement in the UK" (2002)	<u>Construction</u>: Optimism bias for traditional procurement = 47% (average of all types of infrastructure) Optimism bias for P3/PFI procurement = 1% (average of all types of infrastructure) Non-standard civil engineering optimism bias = 6-66% range. <u>Operations & Maintenance</u>: Optimism bias for traditional procurement = 41% (average of all types of infrastructure) Optimism bias for P3/PFI procurement, not applicable Non-standard civil engineering optimism bias for O&M not provided but outsourcing range is 0-41%.	Report notes: Do not use (this data) for calculating the optimism bias levels for current projects. Guidance indicates use of upper bound (66%) and lower bound (6%) for capital costs on non-standard civil engineering projects as a starting point for calculations at outline business case stage. Does not separate traditional from P3/PFI for non-standard civil engineering projects and does not have much data on P3/PFI.
15	University of Melbourne Engineering Research Unit – Report on the performance of P3 projects in Australia when compared with a representative sample of traditionally procured infrastructure projects (2008)	Over all time periods considered in this study, P3s delivered projects for a price that is far closer to the expected cost than if the project was procured in the Traditional manner. Based on the inter-quartile percentage for the period from initial project announcement to the actual final cost, P3s were 31.5% better than traditional projects. P3 contracts had an average cost escalation of 4.3% post contract execution compared to Traditional projects that had an average cost escalation of 18.0% for the same period. P3 projects provide far greater cost certainty than Traditional contracts and there is little variation in cost of a P3 project after the contract is signed.	<u>Source data includes</u>: • 32 social infrastructure projects • 23 Transport projects • 8 Sustainability (water, energy & waste) projects • 4 Information Technology (IT) projects Good summary table referring to other studies referenced in this table – see below. Report does not provide summary data for just transportation projects. P3 saving over Traditional = 13.7%

Ref	Source Document	Key Finding(s)	Comments
16	UK National Audit Office, "Performance of PFI Construction" (2009)	Compares P3/PFI results to contract price, not to traditional procurement. 65% of the projects surveyed were completed to the price as set out in the contract. The remaining 35% of projects were delivered for a price higher than that set out in the original contract.	Corroborates point made by others that there is still a risk of overruns on P3 form of delivery.
17	UK National Audit Office, "Performance of PFI Construction" (2003)	Compares P3/PFI results to contract price, not to traditional procurement. 78% of the projects surveyed were completed to the price as set out in the contract.	Corroborates point made by others that there is still a risk of overruns on P3 form of delivery.
18	HM Treasury – "The Green Book, Appraisal and Evaluation in Central Government"	Lots of guidance but actual figures are as per the Mott MacDonald study referenced above (14)	See 14 above
19	British Department for Transport, "Procedures with Dealing with Optimism Bias in Transport Planning" (2004)	Recommends optimism bias added to public project capital costs by mode: Roads = 15% at 50^{th} percentile, 32% at 80^{th} percentile Rail = 40% at 50^{th} percentile, 57% at 80^{th} percentile	Guidance refers to Mott MacDonald study and repeats the 6-66% used but recommends replacing that with these specific values for road and rail. Does not mention comparison of public procurement to P3

Table A-2. Review of O&M Cost Savings Potential between Traditional Procurement and Alternatives

Source Document	Key Finding(s)	Comments
Massachusetts DOT, "Competitive Contracting for Highway Maintenance: Lessons Learned from National Experience" by E. Montague and G. F. Segal (2004)	21% savings generated through maintenance contracting program	The cost savings studies were conducted by Kennedy School of Government at Harvard and the Coopers & Lybrand accounting firm.
Florida Department of Transportation, "Performance Based Contracting: The US versus the World" (2009)	FDOT has reported that is achieved 15.7% in cost savings through performance maintenance contracts	The study was submitted to TRB in 2009. Also referenced in Competitive Contracting for Highway Maintenance: Lessons Learned from National Experience by E. Montague and G. F. Segal (2004)
Virginia Department of Transportation, "Outsourcing Versus In-house Highway Maintenance: Cost Comparison and Decision Factors" (2006)	Analysis by Virginia Tech showed a savings of 12% as a result of contracting out maintenance	Study was conducted for South Carolina DOT
Texas Department of Transportation, "Open More Roadway Maintenance to Competition" (2001)	No specific percentage savings quoted but states that bid estimates came in lower than TxDOT estimates on pilot projects in Waco and Dallas	Reviews successes from Virginia and recommends continuation of outsourcing pilot program plus new pilot to include "all aspects of highway maintenance"
6th Annual Inter-University Symposium on Infrastructure Management, "Literature Review on Alternative Highway Maintenance Procurement Strategies" (2010)	Includes two case studies from Texas ("cost savings were realized and higher service levels were reported") and Florida ("12% cost savings as well as an increase in service levels")	Reviews a paper from Purdue University that performance contracts increase savings by 5.8%
Washington State Department of Transportation, "Synopsis of WSDOT's Review of Highway Maintenance Outsourcing Experience" (2006)	Describes the difficulty of comparing before and after apples-to-apples costs and recommend caution when reviewing claims of savings	Reviews outsourcing of highway O&M in Virginia, Florida, Oklahoma, Texas and British Colombia
Eagle P3-FastTracks: General Manager's Recommendation to RTD Board for Award of Concession Agreement, Special Board Meeting, June 15, 2010	Total value of the 46-year concession proposed by selected concessionaire ($7.14 billion, or $1.12 billion in present value) was $2.70 billion below RTD estimate ($9.83 billion, or $1.48 billion in	Concession costs and capital costs per concessionaire bid. Concession value reflects progress payments during construction and service payments. Capital costs

Source Document	Key Finding(s)	Comments
	present value). In addition, private bid of $2.085 billion in capital cost came in $300m lower than RTD estimate of $2.385 billion.	reflect a 12.5% cost saving from engineer's estimate.
"RTD: Partnerships in Transit," Presentation by Cal Marsella, General Manager of Denver RTD, June 2008, National Council on Public-Private Partnerships	2007 hourly cost for RTD contracted bus service averaged $63 in comparison to $92 in hourly costs for RTD-operated service, or approximately a 30% hourly cost saving.	Based on 2007 data compiled by Denver RTD.
Booz Allen Hamilton and Robert Kuo Consulting, "NCTD Transit Service Delivery Assessment Update" (2009)	12-18% savings in operations expenditure predicted by moving from full in house service to partial or complete outsourcing.	Study applies to California bus, paratransit, commuter rail and light rail
Florida Department of Transportation, "I-595 Corridor Improvements Value for Money Analysis" (2009)	DBFOM model assumed a 25% saving in O&M costs over DBB	Projected savings for a P3 toll road in Florida that has reached financial close
Florida Department of Transportation, "Port of Miami Tunnel Value for Money Analysis" (2010)	DBFOM model assumed a 22.5% saving in O&M costs over DBB	Projected savings for a complex P3 project involving a major tunnel in Florida that has reached financial close
Arup / PB, "Analysis of Delivery Options for the Presidio Parkway Project" (2010)	DBFOM model assumed a 15% saving in O&M costs over DBB	Projected savings for a current California P3 highway project
New Zealand Transport Agency, "Performance Based Contracting: The US versus the World" (2009)	NZTA recorded cost savings in the range of 25% using a hybrid performance based contract	Study was submitted to the Transportation Research Board in 2009
Swedish Transport Administration (STA), "Contract Maintenance – the Swedish Way" (2010)	Up to 20% cost savings in Operations and Maintenance by moving to complete outsourcing – based on performance based contracting	Study applies to Swedish highways
Transport Scotland, "Performance Audit Group's Annual Report" (2009-10)	11% efficiency savings delivered by maintenance contractor for 2009/10	Audit report prepared for the Transport Scotland 3rd Generation Operation Contracts

Appendix B Glossary and Abbreviations

A

Alternatives Analysis (AA): An analysis of the engineering and financial feasibility of alternatives under consideration for a rail extension or other major transit construction project; required before federal monies can be allocated to a project.

Analysis Period: The period, over which the costs and revenues of each project are analyzed for the sake of comparing the financial performance of different delivery options, typically reflecting a 35 to 50-year concession term starting with the development and construction phases of a project and continuing through operations and/or maintenance.

Asset: Any item of economic value, either physical in nature (such as land) or a right to ownership, expressed in cost or some other value, which an individual or entity owns.

C

California Environmental Quality Act (CEQA): The state law which requires state and local agencies to identify and analyze the significant environmental impacts of proposed development projects, to identify and analyze feasible mitigation measures and alternatives that may avoid or substantially reduce the adverse environmental impacts of proposed projects, and to consider the analysis and adopt feasible mitigation measures to reduce significant adverse effects before approving proposed projects.

California Department of Transportation (Caltrans): The state agency that operates California's highway systems and administers FHWA and state funding of transportation projects.

California Transportation Commission (CTC): A state-level commission, consisting of nine members appointed by the governor, which establishes priorities and allocates funds for highway, passenger rail and transit investments throughout California. The CTC adopts the State Transportation Improvement Program, or STIP, and implements state transportation policy. The CTC is also responsible for approving P3 projects developed under California Streets and Highways Code Section 143.

Capacity: Capacity refers to a rate of vehicular or person flow that can be expected to traverse a point or uniform section of a lane or roadway during a specific period, which is most often a peak 15-minute period, and which is not the maximum volume that can be accommodated during an hour, under prevailing roadway, traffic, and control conditions. Capacity and Level of Service (LOS) are analyzed separately and are not simply related to each other; both must be fully considered to evaluate the overall operation of a facility. Capacity analysis may be used in the computation of Volume-to-Capacity (V/C) ratios. In some cases, the V/C ratio is used to define LOS.

Capital Cost: Costs related to the design and construction of the project (excluding the cost of acquiring rolling stock).

Appendix B Glossary and Abbreviations

Capital Maintenance: Replenishment and replacement of capital facilities and equipment (with the exception of rolling stock).

Concession Benefits: Concession benefits are rights to receive revenues or other benefits for a fixed period of time.

Contingencies: Existing conditions, situations, or circumstances which involve uncertainty and which could result in gains or losses. For example, guaranteed loans represent contingent liabilities which, in the event of default by the borrowers, the federal government would be liable to cover the losses of the guarantors, and thereby sustain the loss itself.

D

Debt Service: The amount of debt interest and the principal repayments.

Design-Build (DB): A procurement or project delivery arrangement whereby a single entity (a contractor with subcontractors, or team of contractors and engineers, often with subcontractors) is entrusted with both design and construction of a project. This contrasts with traditional procurement where one contract is awarded for the design phase and then a second contract is bid for the construction phase of the project.

Design-Build-Finance (DBF): Based on DB, above. Under these arrangements, the agency may retain ownership of the public facility or system, but the private party generally invests its own capital to design and develop the properties. Typically, each partner shares in income resulting from the partnership.

Design-Build-Finance-Operate (DBFO): Based on DBF, above. A contract whereby one company undertakes a contract to perform these services for the length of the concession, often 30-50 years.

Design-Build-Finance-Operate-Maintain (DBFOM): Based on DBFO, above. A contract whereby one company undertakes a contract to perform these services for the length of the concession, often 30-50 years.

Discount Rate: The interest rate used in calculating the net present value (NPV) of expected future cash flows.

E

Environmental Assessment (EA): An environmental document that is required under NEPA to assess an action that is not a categorical exclusion and does not clearly require the preparation of an environmental impact statement (EIS), or where the Federal Highway Administration believes an environmental assessment would assist in determining the need for an EIS.

Environmental Impact Report (EIR): An analysis under CEQA of the environmental impacts of proposed land development and transportation projects. A draft EIR (DEIS) is circulated to the public and agencies with approval authority for comment. A DEIR grows up to be a certified FEIR that contains responses to public comments and ways to mitigate adverse impacts.

Environmental Impact Statement (EIS): An environmental review and assessment document required under NEPA when a proposed project or action will significantly affect the environment. A draft Environmental Impact Statement (DEIS) is a federally-required environmental document that is prepared when it is initially determined that the action/project may cause significant impacts to the environment, when environmental studies and early coordination indicate significant impacts, or when review of the environmental assessment indicates that the impacts anticipated to result from the project may be significant. The DEIS compares all reasonable alternatives to the proposed project and summarizes the studies, reviews, consultations, and coordination required by legislation and Executive Orders to the extent appropriate at the draft stage in the environmental process. This document lists all entities from which comments are being requested._A final Environmental Impact Statement (FEIS) is an environmental document that is prepared following the DEIS, which includes the results of the public involvement process and agency input on the DEIS. This document summarizes the substantive comments on social, economic, environmental, and engineering issues made as a result of the public involvement process, and documents compliance with requirements of all applicable environmental laws, Executive Orders, and other related requirements.

Environmental Protection Agency (EPA): A Federal agency charged with protecting the natural resources of the nation.

Equity: Commitment of money from public or private sources for project finance, with a designated rate of return target.

F

Feasibility Study: A study of a project's feasibility typically addressing issues such as the project's benefits, costs, effectiveness, and alternatives considered analysis of alternative selection, environmental effects, public opinions, and other factors. The feasibility study for major projects involving Federal funds was replaced under the Intermodal Surface Transportation Efficiency Act by the Major Investment Study.

Federal Highway Administration (FHWA): The federal agency responsible for the administration of federal highway funds. The agency is part of the US Department of Transportation.

Federal Transit Administration (FTA): The FTA was formerly known as the Urban Mass Transportation Administration. It operates under the authority of the Federal Transit Act and is part of the US Department of Transportation. It administers all federal programs related to mass transit.

H

Heavy Rail Transit (HRT): An electric railway with the capacity for a "heavy volume" of traffic and characterized by exclusive rights-of-way, multi-car trains, high speed and rapid acceleration, sophisticated signaling and high platform loading. Also known as "rapid rail," "subway," "elevated (railway)" or "metropolitan railway (metro)". The Metro Red and Purple Lines are heavy rail systems.

High Occupancy Vehicle (HOV): Vehicles having more than one occupant. Examples include carpools, vanpools, buses, and mini-buses. Transportation systems may encourage HOV use by having designated HOV lanes.

High Occupancy Vehicle (HOV) Lane: Exclusive road or traffic lane limited to buses, vanpools, carpools, emergency vehicles, and in some cases, single occupant motorcycles. HOV lanes typically have higher operating speeds and lower traffic volumes than adjacent general purpose lanes.

High Occupancy Toll (HOT) Lanes: Lanes reserved for high-occupancy vehicles or single-occupancy vehicles which pay a higher toll.

I

Interest: A periodic payment assessed for the use of capital. Financing interest is the charge assessed as a cost of extending credit as distinguished from additional interest which is the charge assessed on delinquent debts.

Intermodal Surface Transportation Efficiency Act (ISTEA): A Transportation Bill passed by Congress in 1991 that provided six year authorization for development of a National Intermodal Transportation System which consists of all forms of transportation in a unified, interconnected manner. Under ISTEA, the statewide planning process must incorporate some new goals: to reduce congestion and improve air quality; to consider national and international commerce; to consider energy conservation; to create an integrated system of several modes; and to concentrate on the most efficient way to move goods and people, not just people. The three major components of ISTEA are the National Highway System, the Surface Transportation Program, and the Congestion Mitigation and Air Quality Improvement Program. This bill was subsequently reauthorized by TEA-21 and SAFETEA-LU and is overdue for another authorization program in 2011.

L

Leverage: A financial mechanism used to increase available funds usually by issuing debt (typically bonds) or by guaranteeing or otherwise assuming liability for others' debt in an amount greater than cash balances.

Light Rail Transit (LRT): A railway with a "light volume" traffic capacity compared to "heavy rail." Light rail may use shared or exclusive rights of way, high or low platform loading, and multi-car trains or single cars traveling on fixed rails. LRT uses lightweight, streetcar type passenger vehicles operated on city streets that are typically not separated from other traffic. LRT is also known as light rail, streetcar, trolley car, and tramway. Metro Gold, Blue, and Green lines are LRT systems.

Loan: Legally binding agreement whereby funds are loaned by one party to another. The amount of funds disbursed is to be repaid (with or without interest and late fees) in accordance with the terms of a promissory note and/or repayment schedule.

Locally Preferred Alternative (LPA): The alternative selected by the appropriate state and local agencies and official boards through a public process; must be selected by project sponsors from among the evaluated alternative strategies and formally adopted and included in the Metropolitan Planning Organization's financially constrained long-range regional transportation plan.

Long Range Transportation Plan (LRTP): Metro's plan to meet Los Angeles County residents' transportation needs over the next 30 years. The 2009 LRTP reflects changes that have occurred since the 2001 LRTP, including growth patterns, the latest technical assumptions, climate change issues and Measure R projects. It recommends transportation projects that can be implemented through 2040, and other projects that could be funded if new revenue sources become available.

Los Angeles County Metropolitan Transportation Authority (LACMTA or Metro)

N

National Environmental Policy Act (NEPA): The federal law which provides the framework for the federal environmental review process for development projects that require permits, approvals or other major actions from federal agencies.

Net Present Value (NPV): The discounted value of a series of future costs, benefits or payments, i.e. the value of future cash flows in today's money.

New Starts: Federal funding granted under Section 3(i) of the Federal Transit Act (formerly known as the Urban Mass Transportation Act). These discretionary funds are made available for construction of a new fixed guideway system or extension of any existing fixed guideway system, based on cost-effectiveness, alternatives analysis results and the degree of local financial commitment.

Nominal Value or Amount: An unadjusted rate, value or change in value. In this case, it refers to values expressed in year of expenditure (YOE).

Non-Federal Match: The commitment of state or other non-federal funds required to receive federal contributions. For example, the U.S. SIB program requires a non-federal match for capitalization funds, which is 25 percent of the amount of federal funds. The match may be lower in states which have a sliding scale rate based on the percentage of federal land in the state.

Notice Of Intent (NOI): A notice that is prepared to inform the public that an Environmental Impact Statement will be prepared for a project. A notice of intent (NOI) is published in the Federal Register advising that an environmental document will be prepared in accordance with NEPA. The NOI will include a brief description of the proposed action and possible alternatives, and contact information for obtaining further information about the project and preparation of the document.

O

Operations & Maintenance (O&M): Of or relating to the direct operation of transportation service including salaries and benefits of operators, fare or toll collectors and mechanics and the routine maintenance of capital facilities such as buildings, grounds, revenue equipment, structures, tunnels, stations, roadways, track, communication systems and electric power facilities.

Original Discount Rate: Discount rate originally used to calculate the present value of direct loans or loan guarantee liabilities, when the direct or guaranteed loans were disbursed.

P

Performance Measures: Indicators of how well the transportation system or specific transportation projects will improve transportation conditions.

Proposition 42: A state constitutional amendment passed by California voters in March 2002 that permanently dedicates 100 percent of the state sales tax on gasoline for transportation investments, with the Legislature able to suspend these provisions in times of fiscal crisis.

Pre-Development Agreement (PDA): A legal agreement prior to the final design and construction phases whereby a private entity agrees to some or all of the following activities for a public-private project: development, design, and financial assessment. Depending on the outcome of the analysis, the public entity may choose to enter into negotiations for a concession agreement with the private partner to design, build, finance, operate, and/or maintain the project. The private partner may also assist the public entity with some or all of the following: environmental, engineering and design studies, including capital cost estimates, environmental mitigation, regulatory approvals, right of way and utility impact assessments, construction planning, toll operational strategies and/or toll market research.

Present Value (PV): The value of future cash flows discounted to the present at certain interest rate (such as the entity's cost of capital or funds), assuming compounded interest. The GAO definition of present values is as follows: The worth of a future stream of returns or costs in terms of money paid immediately (or at some designated date). A dollar available at some date in the future is worth less than a dollar available today because the latter could be invested and earn interest in the interim. In calculating the net present value, prevailing interest rates provide the basis for converting future amounts into their "money now" equivalents. Under credit reform, the subsidy cost of direct loans and loan guarantees are to be computed on a present value basis and included as budget outlays at the time the direct or guaranteed loans are disbursed.

Principal: Amount loaned to the borrower and owed to the federal government which excludes interest, penalties, administrative costs, loan fees, and prepaid charges.

Project Approval & Environmental Documentation (PA&ED)

Project Revenues: All rates, rents, fees, assessments, charges, and other receipts derived by a project sponsor from a project.

Public Private Partnership: Under a public-private partnership, sometimes referred to as a public-private venture, a contractual arrangement is formed between public and private sector entities to renovate, construct, operate, maintain, and/or manage a facility or system, in whole or in part, that provides a public service.

R

Record of Decision (ROD): A formal decision granted by the federal lead agency that provides a written record of the agency's decision on a Final Environmental Impact Statement (FEIS). The ROD documents any conditions or mitigation measures committed to in the FEIS.

Request for Proposals (RFP): An RFP is an announcement, often by the government agency, of a willingness to consider proposals for the performance of a specified project or program component.

Request for Qualifications (RFQ): An RFQ is a procurement tool routinely used by state and local governments and the private sector to select partners in major projects or systems acquisitions. This approach differs from the traditional request for proposals approach in that it asks only for qualifications of the potential contractor--his or her track record—and does not ask for pricing information.

Ridership: The number of rides taken by people using a public transportation system in a given time period.

Right-of-Way (ROW): The linear parcels of land acquired for or devoted to transportation purposes. For example, highway ROW and railroad ROW.

Risk Transfer: The passing of risk under contract from one party to another.

Routine Maintenance: Maintenance (not replacement or refurbishment) of capital facilities such as buildings, grounds, and equipment; structures, tunnels, and subways; fare collection equipment; stations; roadways and track; communication systems; and electric power facilities.

S

SAFETEA-LU: Safe, Accountable, Flexible, And Efficient Transportation Equity Act: A Legacy for Users, the federal transportation authorization that succeeded ISTEA and TEA-21.

Senate Bill 4 (SB 4 X2): The enabling legislation in the State of California allowing transportation agencies to use design-build procurements for highway projects.

Service Life: Projected life remaining (in years) of an existing structure or structural component under normal loading and environmental conditions before replacement or major rehabilitation is expected.

Southern California Association of Governments (SCAG): A six-county planning and coordinating agency that deals with transportation, water quality, housing and land use and also reviews and comments on applications for a variety of federal and state assistance programs.

State Infrastructure Bank: A state or multi-state revolving fund that provides loans, credit enhancement, and other forms of financial assistance to surface transportation projects.

State Transportation Improvement Program (STIP): A short-term transportation planning document covering at least a three-year period and updated at least every two years. The STIP includes a priority list of projects to be carried out in each of the three years. Projects included in the STIP must be consistent with the long-term transportation plan, must conform to regional air quality implementation plans, and must be financially constrained (achievable within existing or reasonably anticipated funding sources).

State Transportation Plan: The transportation plan covers a 20-year period and includes both short- and long-term actions that develop and maintain an integrated, intermodal transportation system. The plan must conform to regional air quality implementation plans and be financially constrained.

Subsidy Cost: The estimated long-term cost to the federal government of providing credit assistance (e.g., direct loans or loan guarantees), calculated on a net present value basis at the time of disbursement and excluding administrative costs.

T

TE-045 Innovative Finance Initiative: A research program begun by the Federal Highway Administration in 1994 in response to Executive Order 12893. This finance initiative is designed to increase investment, accelerate projects, promote the use of existing innovative finance provisions, and establish the basis for future initiatives by waiving selected federal policies and procedures, thus allowing specific transportation projects to be advanced through the use of non-traditional finance mechanisms.

Transportation Equity Act for the 21st Century (TEA-21): Passed by Congress in May 1998, this federal transportation legislation retained and expanded many of the programs created in 1991 under the Intermodal Surface Transportation Efficiency Act (ISTEA).

Reauthorized federal surface transportation programs for six years (1998–2003) and significantly increased overall funding for transportation.

TIFIA Credit Program: As part of its 1998 enactment of the Transportation Equity Act for the 21st Century (TEA 21), Congress established a Federal credit program for large transportation projects. Sections 1501 to 1504 of TEA 21, collectively the Transportation Infrastructure Finance and Innovation Act of 1998 (TIFIA), authorize the Department of Transportation (DOT) to provide three forms of credit assistance - secured (direct) loans, loan guarantees and standby lines of credit - to surface transportation projects of national or regional significance. A specific goal of TIFIA is to leverage private co-investment. Because the program offers credit assistance, rather than grant funding, potential projects must be capable of generating revenue streams via user charges or other dedicated funding sources. In general, a project's eligible costs must be reasonably anticipated to total at least $100 million. Credit assistance is available to highway, transit, passenger rail and multi-modal projects. Other types of eligible projects include intercity passenger rail or bus projects, publicly owned intermodal facilities on or adjacent to the National Highway System, projects that provide ground access to airports or seaports, and surface transportation projects principally involving the installation of Intelligent Transportation Systems (ITS), for which the cost threshold is $30 million. The TIFIA credit assistance is limited to 33 percent of eligible project costs. For more information, visit the TIFIA website at http://tifia.fhwa.dot.gov/.

TIGER Grant: Administered by the U.S. Department of Transportation, the Transportation Investment Generating Economic Recovery (TIGER) program was established with funds from the America Reinvestment and Recovery Act passed in February 2009. To date, it has awarded over $1.5 billion in discretionary grants to states and municipalities to construct and improve roads, bridges, rail, ports, transit and intermodal facilities through two competitive funding rounds, dubbed TIGER I and TIGER II.

Title 23 of the United States Code: Portion of the U.S. Code that includes many of the laws governing the federal-aid highway program. The title embodies substantive provisions of law that Congress considers permanent and need not be reenacted in each new highway authorization act.

Title 49 of the United States Code: Portion of the U.S. Code that includes laws governing various transportation-related programs and agencies, including the Department of Transportation, general and intermodal programs, interstate commerce, rail and motor vehicle programs, aviation programs, pipelines, and commercial space transportation.

V

Value For Money (VfM): An economic assessment the attempts to measure whether a stated project delivery method produces a higher value for money than the one it is compared to; the optimum combination of cost and quality to provide the required service.

Value Pricing: The concept of assessing higher prices for using certain transportation facilities during the most congested times of the day. Also known as congestion pricing and peak-period pricing. Examples of this concept include higher bridge tolls during peak periods or charging single-occupant vehicles to use HOV lanes.

Y

Year of Expenditure (YOE): the representation of costs and revenues inflated to the year in which they are scheduled to be received or paid, using a stated rate of inflation.

ATTACHMENT D

LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION AUTHORITY

Public-Private Partnership Program

Crenshaw/LAX Transit Corridor Business Plan

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FINAL
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EXECUTIVE SUMMARY

Objective

The Crenshaw/Los Angeles World Airport (LAX) Transit Corridor Project is a proposed 8.5-mile light rail transit (LRT) line that will connect the Exposition Line to the north and the Metro Green Line (MGL) to the south, with continuous direct rides onto the MGL (south or east). The Crenshaw/LAX Transit Corridor will serve the Cities of Los Angeles, Inglewood, Hawthorne, and El Segundo and portions of unincorporated Los Angeles County, and will provide direct service between the Crenshaw Corridor and downtown Los Angeles, the Westside, and the South Bay. The Project extends from the intersection of Exposition and Crenshaw Boulevards to the MGL Aviation/LAX Station, and will be operated in conjunction with the existing MGL to accommodate demand for travel in north-south and east-west directions.

The alignment is a combination of at-grade and below-grade along the Crenshaw Boulevard portion of the line. Along the Harbor Subdivision of the Burlington Northern Santa Fe Railroad (BNSF), the alignment is off-street in a dedicated right of way (ROW) used infrequently by freight trains. In addition to use by the Crenshaw/LAX LRT, Metro is also studying use of the railroad ROW for a new transit line.

As shown in Figure 1, the northern terminus of the alignment begins at the intersection of Exposition and Crenshaw Boulevards and continues southward along Crenshaw Boulevard to the Harbor Subdivision railroad ROW owned by Metro. The project continues along the railroad ROW parallel to Florence Avenue and Aviation Boulevard, runs adjacent to the ends of the south runways at LAX, and connects to the MGL at Aviation Boulevard. The project has six stations in the approved plan and two optional stations that are not included in the base project definition. The below grade segments include tunneling and cut-and-cover construction approaches that are proposed to minimize environmental impacts to the community.

The total Project capital cost is approximately $1.749 billion in year of expenditure dollars, including the cost of rolling stock. The majority of project funding ($1.201.5 billion) is proposed from Measure R, in the form of Transportation Infrastructure Finance and Innovation Act (TIFIA) loan proceeds and cash. Other funding sources include Propositions A and C, State Bond Proposition 1B, Congestion Management Air Quality (CMAQ), Regional Surface Transportation Funds (RSTP), and Federal Transit Administration (FTA) Section 5309 Bus and Bus Related Facilities funding.

The project faces several risks in its delivery. Among the significant risks are cost overruns on scope definition (e.g.: number of stations, number of grade separations , interface with Los Angeles World Airport), construction (e.g. utility relocation, type of grade separation and the complexity of constructing in a dense urban environment), inflation due to commodity price changes and impacts on the labor market of delivering the Measure R program.

Purpose of this Business Plan

This business plan provides a qualitative assessment of selected Project delivery options originally discussed with Metro during Task 3 and throughout Task 4.

The analysis assesses three options, of which two focus on Design-Build (DB) and one focuses on Design-Build-Finance-Maintain (DBFM). The two DB options consider alternate packaging of proposed contracts, with the DB contract packaging initially under consideration by Metro serving as the base option. The DBFM option considers one integral DB contract supplemented with private financing and long-term maintenance. Each option has been assessed based on its ability to achieve Metro's goals for the P3 program. These goals are:

- Optimize risk transfer;
- Achieve a cost effective use of public funds;
- Guarantee timely project completion / accelerate project delivery;
- Ensure asset quality throughout the lifecycle; and
- Provide the highest quality of service for the traveling public.

It should be noted that this analysis was conducted prior to Metro entering into an agreement with BNSF to abandon freight service in the Harbor Subdivision segment of the Crenshaw/LAX Transit Corridor and prior to Metro's decision to procure the Project as a single DB contract covering stations, systems, and civil works, with a separate DB contract for the maintenance facility.

Delivery Options Considered

Task 3 quantified the potential cost savings of a Design-Build-Finance-Operate-Maintain (DBFOM) concession structure in which a private entity would assume responsibility for design and construction of the Project as well as operations and non-vehicle maintenance upon completion. Upon further analysis, it was determined that the Crenshaw/LAX Transit Corridor could not be feasibly operated as a stand-alone project due to its connectivity with the existing Metro Green Line (MGL) and the proposed interlining of service on the two transit corridors. The location of the Southwestern Maintenance Yard, which was finalized by Board action subsequent to the submittal of Task 3, also posed a challenge to an effectively "ring-fenced" DBFOM project, as both MGL and future Green Line extensions would require Metro-operated trains to run in parallel with privately-operated trains on a system maintained by the P3 operator.

The Consultant team then proceeded to analyze a range of alternative delivery options that excluded operation of transit service and included only non-vehicle maintenance for the civil components.

The key characteristics of the three delivery options considered in this report are as follows:

Base DB (Option 1)	Alternate DB (Option 2)	DBFM (Option 3)
Structured as three Design-Build contracts based on geography: Contract No. 1 would include responsibility for track work, cut-and-cover trenches, aerial structures, and stations within the Harbor Subdivision segment. Contract No. 2 would include responsibility for cut-and-cover trenches, tunnels, the design and delivery of the TBM following Metro performance specifications, and stations within the Crenshaw Boulevard segment (including box excavation), as well as systems and systems integration along the entire alignment. Contract No. 3 would include responsibility for construction of the Southwestern Maintenance Yard facility at Arbor Vitae.	Structured as two Design-Build contracts based on function: Contract No. 1 would include responsibility for up to 8 stations, systems and system integration; Contract No. 2 would include responsibility for all civil works components, including tunnels, cut-and-cover trenches, and track work, as well as construction of the Southwestern Maintenance Yard facility at Arbor Vitae.	A single Design-Build-Finance-Maintain (DBFM) contract for design and construction of up to 8 stations, track, portals, systems, systems integration, design and delivery of TBM following Metro performance specifications. The routine and capital maintenance components would be limited to non-vehicle components, including tunnels, stations and stations fixtures, escalators, elevators and all civil components for the Crenshaw/LAX Transit Corridor.
Funding and financing for the project would be as planned in the America Fast Forward iteration of the Metro Countywide Financial Forecasting Model (August 2010).	Same as Option 1.	The private developer would finance a portion of the capital costs to be repaid over the term of the contract within an annual availability payment structure. The private developer would be reimbursed through a combination of milestone payments made during the construction period and availability payments utilizing funds available to the project including Measure R programmed funds. Financing would likely be a combination of tax-exempt and taxable financing discussed in further detail in Section 6.0 of this business plan.

Base DB (Option 1)	Alternate DB (Option 2)	DBFM (Option 3)
Metro would perform: ▪ Environmental impact statement and obtaining approvals ▪ Initial design activities (minimum 30% PE work) ▪ Develop performance specifications for the Tunnel Boring Machine (TBM) ▪ Acquisition of right of way (ROW) ▪ Utility relocations ▪ Vehicle procurement ▪ Rail operations and maintenance (both vehicle and non-vehicle) ▪ Routine and capital maintenance	Same as Option 1.	Metro would perform: ▪ Environmental impact statement and obtaining approvals ▪ Initial design activities (minimum 30% PE work) ▪ Acquisition of right of way (ROW) ▪ Utility relocations ▪ Vehicle procurement ▪ Rail operations and vehicle maintenance

Conclusions of the Business Plan

This analysis identified several possible opportunities and challenges in delivering the Crenshaw / LAX Transit Corridor Project using DB and DBFM options relative to achievement of Metro's P3 program goals.

Based on this analysis and input from Metro staff, the Team recommends the Alternate DB approach (Option 2) for delivery of the Project. The function-based contract packaging associated with this approach reflects an optimal risk management strategy for Metro, in light of the December 2011 Board decision to approvean agreement with BNSF to abandonfreight operations along the Harbor Subdivision segment of the Project. Metro's geography-based DB approach (Option 1) was originally proposed in response to the perceived need to secure the specialized expertise required for working in an active railroad ROW.

Elimination of freight operations will effectively mitigate key construction and operational risks associated with a shared ROW scenario, including technical, liability and insurance risks surrounding the design and construction of elements such as grade separations, intrusion fences, grade crossings, and drainage facilities. Additionally, curtailment of active freight operation will remove FRA requirements otherwise applicable to a shared-use corridor.

With the elimination of freight service, the right of way characteristics along the Harbor Subdivision and the northern segment of the Corridor become more similar. The design and construction risks associated with the Harbor Subdivision are accordingly reduced. As a result, corridor-wide responsibility for the completion of trackwork and systems can be more easily assigned to a single DB contractor, as proposed under Option 2.

This logic extends to other project elements as well. The ability to bundle similar construction activities and sitework in Option 2 has the potential to yield additional efficiencies and economies of scale compared to the Base DB option. For example, construction of civil works, such as tunnels and trenches, can be bundled into one contract, rather than having these same construction activities performed under both major DB contracts, as was originally proposed under the Base DB approach (Option 1). Similarly, the coordination of station design and construction under one contractor may result not only in greater bulk purchasing power for materials, but in a more consistent visual identity for the corridor, while still allowing for local neighborhood character to be reflected in individual station design.

It should be noted that any cost efficiencies yielded by an alternate DB contract packaging strategy are likely to be more limited in overall percentage terms than those already achieved by Metro's change in procurement approach from DBB to DB. The key benefits of the Alternate DB option lie primarily in reducing the number of contracts managed by Metro from three to two and offering a greater opportunity for each contractor to innovate in the delivery of Project elements across the corridor. Such innovation may result in greater cost containment if not a lower overall cost for Metro.

The implementation schedule for the Crenshaw/LAX Transit Corridor calls for the maintenance facility to be procured separately nearly a year later than the major DB contract work. This is due primarily to unanticipated delays experienced in the environmental review process for the maintenance facility and consequently its readiness to be put out to bid. That said, both the major DB contract work and the maintenance facility are anticipated to start construction at approximately the same time, in mid-2013. The recommendation of Option 2 assumes that Metro is able to align the procurement schedules and include the maintenance facility in a larger DB package comprised of the civil works components.

While a DBFM concession (Option 3) also ranks highly in this analysis and has potential to satisfy some of Metro's P3 program goals and criteria, the advantages do not merit recommendation of this procurement approach, for the following reasons:

- **Potential for cost savings and schedule certainty already captured by the change from Design-Bid-Build to a Design-Build procurement approach**. Metro has availed itself of these benefits by selecting Design-Build (DB) as its procurement approach.
- **Non-vehicle maintenance component too limited to result in major efficiencies.** Any additional cost savings to be achieved through the transfer of risk associated with a DBFM concession are likely to be limited, as the non-vehicle maintenance costs included in the concession would comprise less than 10% of total O&M costs for the Project, based on Metro's experience with its existing LRT

services as reported to the National Transit Database. The transfer of limited maintenance responsibilities to the private sector provides similarly limited opportunities for efficiencies and economies of scale.

- **Suboptimal risk transfer achievable under Design-Build-Finance-Maintain based on existing project definition and characteristics:**
  - **Project components insufficiently "ringfenced" from rest of Metro rail system.** Risk transfer is generally best achieved under a P3 procurement when all of the project components placed under the responsibility of the Private Partner are physically separate from those operated and maintained by the public entity, a concept known as "ringfencing." The current operating scenarios propose to split service at the Aviation interlocking with operation of Metro vehicles on what would be privately maintained track along the Crenshaw/LAX Transit Corridor. Shared use of the Crenshaw Corridor by the existing MGL makes it more difficult for Metro to "ringfence" a privately-maintained asset and monitor performance by the Private Partner. The outcome may be potential ongoing disputes over the party responsible for allegeddisruptions inservice quality. This will be further exacerbated upon extension of the Green Line to South Bay and LAX Airport, as these other lines will traverse the Crenshaw/LAX Transit Corridor to access the Southwestern Maintenance Yard and would likely be operated as through-routed service.
  - **Difficult to tie availability payment to performance monitoring due to lack of ringfencing.** Without a more comprehensive degree of control over the system, including operations and maintenance of rolling stock components, Metro may find it more difficult to shift risk to the private sector and a potential Private Partnermay be less willing to accept the risk associated with a long term availability payment-based contract.
- **Private financing unlikely to further enhance project funding profile.** The Crenshaw/LAX Transit Corridor benefits from a strong local contribution in the form of Measure R, and the timing of those funds is already well matched to the construction cost curve. There is thus limited potential for private financing to mitigate the funding risk associated with the project. Metro currently has access to lower-cost financing through the TIFIA program.

Consideration of a Comprehensive DBFOM Option

Building upon the findings of the options analysis, the Consultant Team continues to view a comprehensive DBFOM option as having high potential for cost savings to Metro over the long term assuming the Project scope were broadened to include the operation of service and the rolling stock and non-vehicle maintenance components of both the existing MGL as well as the Crenshaw/LAX Transit Corridor.

The broader Project scope would address some of the deficiencies associated with a DBFM approach (Option 3) identified above, specifically the "ringfencing" issues and the scale of risk transfer achievable for Metro. Indeed, a more comprehensive transfer of maintenance and lifecycle responsibilities under a comprehensive DBFOM approach would allow for any fixed and managerial costs incurred by the Private Partner during the ramp-up phase of operations to be spread out over a larger system and length of track. As such, it may offer greater opportunity and incentives for the Private Partner to realize efficiencies and economies of scale, leading to measurable long-term cost savings for Metro compared to the Base or Alternate DB approaches (Options 1 and 2).

Compared to Option 3, a comprehensive DBFOM including the existing MGL presents an optimal scenario with respect to the monitoring of asset performance, as many of the system interfaces between Metro and the Private Partner are eliminated or otherwise mitigated. It would create one continuous system to maintain, with greater ease of oversight for Metro in terms of contract management and the ability to expand the concession scope over time as new Green Line extensions to LAX Airport and the South Bay are added. It would also provide the opportunity to upgrade the MGL, including communications and track improvements.

If Metro were to consider a comprehensive DBFOM at this stage of project development, potential impacts on the current procurement schedule would need to be taken into account. Development of performance specifications for the Project and for the existing MGL, re-negotiation of existing labor contracts and changes to Metro's current practices for procurement and service delivery would be required. Such actions would likely lengthen the time needed to procure the Project beyond the timeline associated with the current two-step RFQ/RFP process, in which Metro plans to award the two main DB contracts by late 2012.

On this basis, the timeline associated with implementation of a comprehensive DBFOM option for the Crenshaw/LAX Transit Corridor and existing MGL may be inconsistent with Metro's goal of Project acceleration under the "America Fast Forward" initiative. The special status of the Project as the first to be built under this initiative lends greater weight in this analysis to schedule considerations over the potential long-term cost savings and risk transfer under a comprehensive DBFOM concession. Such trade-offs support the Team's recommendation to modify Metro's proposed packaging strategy within the parameters of a DB procurement approach, so as to maximize potential cost efficiencies without adversely affecting the Project schedule.

1.0 PROJECT DEFINITION

1.1. Base Project Scope

As shown in Figure 1, the proposed Crenshaw/LAX Transit Corridor Project alignment extends approximately 8.5 miles, from the Exposition LRT line at the intersection of Crenshaw and Exposition Boulevards to the Metro Green Line (MGL) Aviation/LAX Station. The alignment is comprised of a double-tracked right-of-way (ROW) consisting of at-grade, aerial, and below-grade guideway sections.

The proposed Crenshaw/LAX Corridor alignment's northern terminus is located at the planned Crenshaw/Exposition Station. This station will provide a pedestrian link to the Exposition Line, which is currently under construction. From the Crenshaw/Exposition Station, the alignment extends south along Crenshaw Boulevard for 3.25 miles to the Harbor Subdivision, in the process of abandonment per an agreement between Metro and the Burlington Northern Santa Fe (BNSF) Railroad. At this point, the alignment turns to the southwest and continues along the Harbor Subdivision for approximately 3.15 miles to Aviation Boulevard. From this point, the alignment continues south on the Harbor Subdivision alongside Aviation Boulevard for 2.15 miles to a connection to the MGL near the Aviation/LAX Station. The Crenshaw/LAX Transit Corridor Project as described was adopted as the Locally Preferred Alternative (LPA) by the Metro Board of Directors on December 10, 2009.

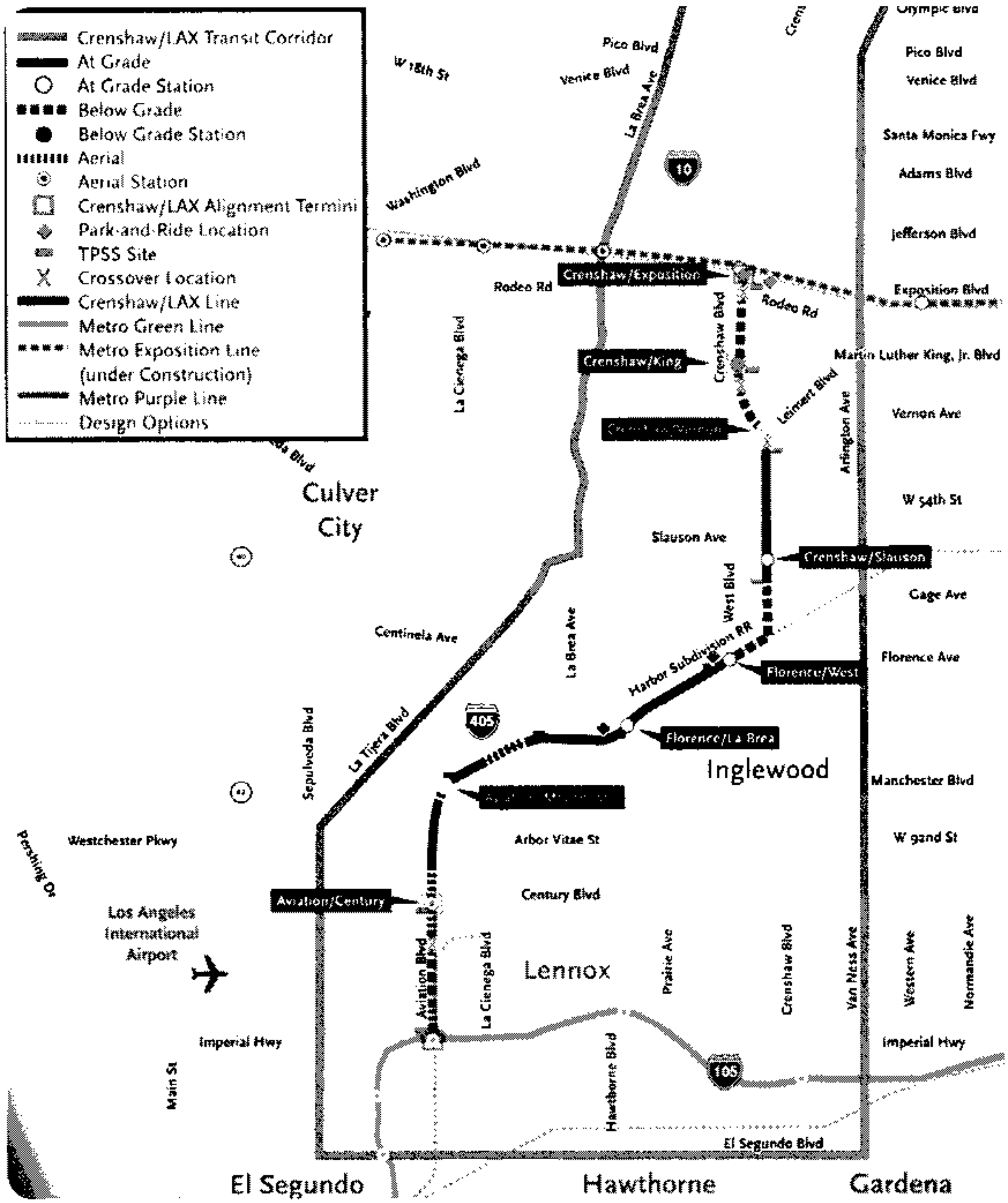
Eight stations are to be constructed at the following locations: Crenshaw/Exposition, Crenshaw/Martin Luther King Jr., Crenshaw/Vernon (optional), Crenshaw/Slauson, Florence/West, Florence/La Brea, Aviation/Manchester (optional), and Aviation/Century.

The stop at Aviation/Century will have a connection to Los Angeles International Airport (LAX) via a planned Automated People Mover. Connection to the LAX People Mover (a project currently proposed by the Los Angeles World Airports) has not been included in this scope.

The LRT alignment features crossings at a number of heavily trafficked roadways and highways, and is in proximity to the south runways of LAX. To avoid traffic delays, grade separations are being implemented at some key roadway crossings and locations: across Century Boulevard adjacent to the LAX south runways, across Manchester Avenue, across La Cienega Boulevard/I-405, across La Brea Avenue, between Victoria Avenue and 60th Street and between 48th and 39th Streets.

This Project will also require the development of a Maintenance Facility. Of the four sites considered in an Environmental Assessment/Revised Draft Environmental Impact Report (EA/Revised Draft EIR), the Arbor Vitae/Bellanca site was selected by the Metro Board at its April 28th, 2011 meeting. The Maintenance Facility will be known as "Southwestern Maintenance Yard" and shared with the existing Metro Green Line, the future South Bay Metro Green Line Extension and the Metro Green Line to LAX project.

Figure1. Crenshaw/LAX Transit Corridor Alignment

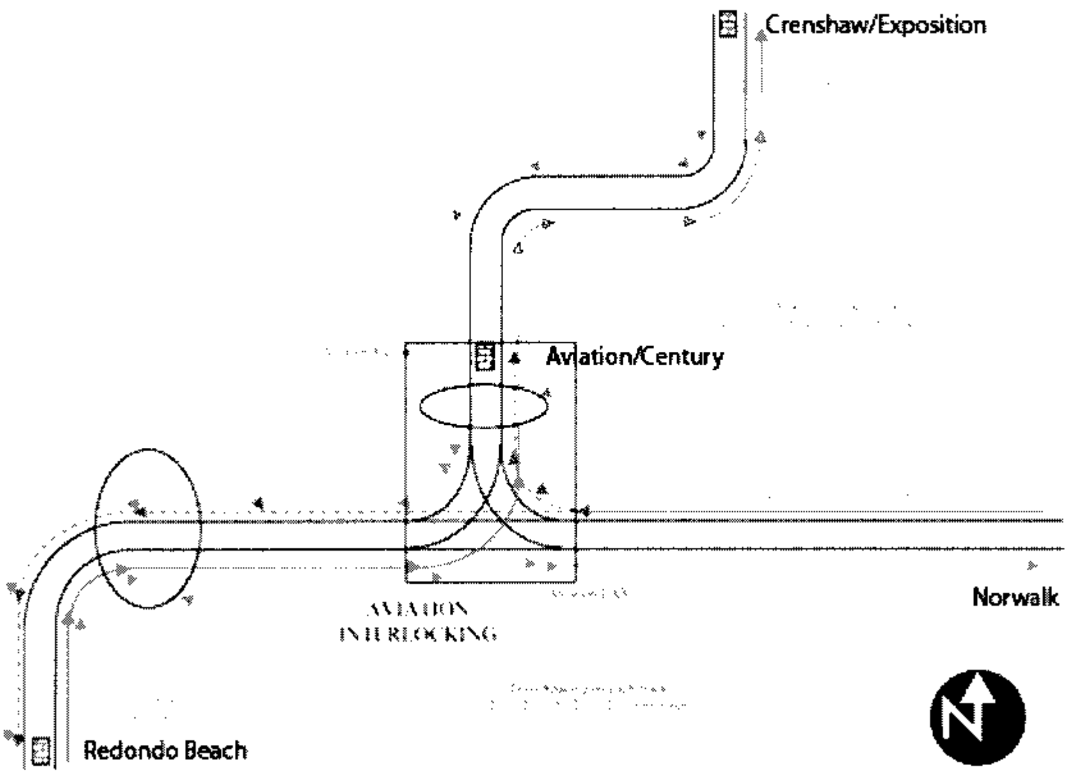


1.2. Operating Scenarios

The Crenshaw/LAX Transit Corridor Line will be operated in conjunction with the existing MGL to accommodate demand for travel in north-south and east-west directions. As shown in Figure 2, the system will be designed and built to support the following three possible service patterns:

- Crenshaw/Exposition to Redondo Beach. Crenshaw trains will depart Crenshaw/Exposition Station. At the Aviation interlocking, where the Crenshaw/LAX Transit Corridor merges with the MGL, the Crenshaw train will merge into the westbound track of the MGL towards Redondo Beach Station. The train will then turn around and go back to Crenshaw/Exposition.
- Redondo Beach to Norwalk. MGL trains departing from Redondo Beach Station will split at the Aviation interlocking, with every other train merging into the eastbound track towards Aviation/LAX Station and continuing to the Norwalk Station.
- Norwalk to Aviation/Century. MGL trains departing from Norwalk Station will split at Aviation/LAX, with every other train merging into the northbound track on the Crenshaw/LAX Transit Corridor and terminating at Aviation/Century, where connecting service to LAX Airport will be provided via a future Green Line extension currently being planned.

Figure 2. Crenshaw/LAX Transit Corridor Operating Scenario



1.3. Capital Costs

As summarized in Table 1, the estimated capital cost of the Project is $1,749.0 million YOE. This cost is $34.4 million higher than the $1,715.0 million YOE baseline Life-of-Project budget adopted in Metro's 2009 Long Range Transportation Plan. The higher estimate reflects the revised Life-of-Project budget adopted by Metro in October 2011 and includes design modifications developed as part of the project Preliminary Engineering work, vehicle procurement, and a contingency of 24% (both allocated and unallocated). It does not include the financing costs associated with the Project.

Table 1. Project Construction Costs Based on Preliminary Engineering

Cost Category	YOE $ (millions)
Construction	$1,133.6
Right-of-Way	$69.2
Vehicles	$87.8
Professional Services	$257.6
Unallocated Contingency	$174.8
Planning and Environmental	$26.0
Total Project Costs	$1,749.0

Consistent with its Final Unified Cost Management Process and Policy, Metro conducted a value engineering workshop in July 2011 to identify potential savings, including cost reduction strategies, design refinements, and contracting strategies to align costs before adopting the revised Life-of-Project budget. Potential savings/scope changes are still under consideration.

1.4. Public Funding

For the capital costs of the project, Metro has committed a total of $1,715.0 million YOE in public funding from a variety of local, State, and federal sources. In addition to these revenues, Metro proposes to reallocate $34.4 million in unexpended funding from another project to the Crenshaw/LAX Transit Corridor for a total of $1,749.0 million. The sources and levels of funding for the Project are summarized in Tables 2. Other than the level of Measure R funds which are voter-approved, the specific mix of funds is subject to change.

The construction period is scheduled to begin in FY 2012 and end in FY 2018, with revenue service anticipated to begin in October 2018. Annual capital revenue assumptions are shown in Table 3.

Table 2. Summary of Project Funding Sources

Source	Funding Level	Percent of Total Funds
Local		
Proposition A 35%	$4.8	0.3%
Local Agencies	$52.4	3.0%
Proposition C 25%	$154.4	8.8%
Measure R TIFIA	$545.9	31.2%
Measure R Cash	$655.6	37.5%
State		
Proposition 1B PTMISEA account	$201.2	11.5%
Regional Improvement Program	$36.7	2.1%
Federal		
FTA Section 5309 Bus and Bus Related Facilities	$8.6	0.5%
Congestion Management and Air Quality (CMAQ)	$68.2	3.9%
Regional Surface Transportation Program (RSTP)	$20.0	1.1%
Federal Other	$1.2	0.1%
TOTAL	**$1,749.0**	**100.0%**

Table3. Crenshaw/LAX Transit Corridor Annual Revenue Assumptions

Sources	Prior	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	Total $	Total %
Local												
Prop A 35%	$4.8										$4.8	0.3%
Local Agencies						$51.4		$1.0			$52.4	3.0%
Prop C 25%	$4.1			$14.7	$102.6			$26.6	$6.4		$154.4	8.8%
Measure R TIFIA						$139.9	$309.1	$96.6	$0.3		$545.9	31.2%
Measure R Cash	$545.9			$246.3	$234.8	$142.8			$11.0	$3.6	$655.6	37.5%
State												
Prop 1B PTMISEA		$39.1	$131.8	$30.3							$201.2	11.5%
RIP	$2.3				$34.4						$36.7	2.1%
Federal												
FTA Sec 5309 Bus	$8.6										$8.6	0.5%
CMAQ					$14.2	$54.0					$68.2	3.9%
RSTP						$20.0					$20.0	1.1%
Fed Other	$1.2										$1.2	0.1%
TOTAL	$38.1	$39.1	$131.8	$291.3	$386.0	$408.0	$309.1	$124.2	$17.7	$3.6	$1,749.0	100.0

The majority of funding comes from local sources (80.8 percent), including Proposition A, Proposition C, local, and Measure R. The latter provides the largest share of the total, in the form of $655.6 million in Measure R cash and $545.9 million for repayment of Transportation Infrastructure Finance and Innovation Act (TIFIA) loan proceeds, for a total of $1,201.5 million (68.7%).

1.5. Implementation Schedule

The following table summarizes Metro's planned federal (and State) environmental clearance, procurement and implementation schedule.

Table4. Crenshaw/LAX Transit Corridor Implementation Schedule

Date	Event
August 2011	FEIR/FEIS completed Industry review
September 22, 2011	Board adoption of FEIR/FEIS
December 23, 2011	RFQ Step 1 released
December 30, 2011	ROD issued by FTA
January 2012	Completion of BNSF agreement to abandon Harbor Subdivision
March 2012	Preliminary design completed RFP Step 2 - technical/price proposals submitted
July 31,2012	TIFIA loan closing
September 2012	Groundbreaking on advance utility work
~November 15, 2012	Contract(s) awarded Issue Notice to Proceed
June – August 2013	Start of major construction
October 2017	Substantialcompletion of construction
November 2017 – February 2018	Testing and revenue operations

The Final Environmental Impact Report/Final Environmental Impact Statement (FEIR/FEIS) was delivered on schedule on August 31, 2011 with Metro Board adoption scheduled at the September 2011 meeting. The Record of Decision (ROD) was issued by the Federal Transit Administration (FTA) on December 30, 2011.

The Project is currently anticipated to be procured over a twelve-month period through onemajor Design-Build contract under a two-step Request for Qualifications/Request for Proposal (RFQ/RFP). In the first step, procurement documents with pre-qualifications were released in late December 2011in conjunction with issuance of the ROD; in the second, the technical/price proposals are to be submitted in March2012. Based on this schedule, the major DB contract work would be awarded November 2012, with start of major construction in Summer 2013. A separate Design-Build contract for the shared maintenance facility is to be procured on a parallel schedule, with a contract award anticipated in early 2013 and start of construction in mid-2013.

Construction contracts would be substantially completed by October 2017, with revenue service scheduled to begin in early2018.

1.6. Status of Environmental Documents

Concurrent with theadoption of the FEIR/FEIS, a design option for an additional underground station to be located at an intermediate location between the planned Martin Luther King Jr. and Crenshaw/Slauson stations was requested and added by the Metro Board. The option for an additional underground station at Crenshaw/Vernon or an at-grade station at Crenshaw/48th Street to serve the Leimert Park neighborhood was not included in the original project scope analyzed by the EIR/EIS and would require supplemental analysis. While the potential impacts of an additional station at Leimert Park have yet to be environmentally cleared, the parcels that Metro would need to acquire in order to accommodate the additional station have already been cleared as potential takings in the current FEIR/FEIS, thereby allowing Metro to preserve the additional station as a bid option in the RFP to be released in March 2012.

2.0 EVALUATION APPROACH

This section describes Metro's goals for the Public-Private Partnership (P3) program and provides details of the methodology used to develop and assess the delivery options for the Project.

2.1. Objectives of the Business Plan

Under this Task 4 of the P3 Program, the InfraConsult Team has been requested to develop a business plan, including a review and analysis of potential delivery options for the Project, one of six (6) Measure R program projects selected by Metro, following an initial screening completed in Tasks 1 & 2, and an initial quantitative analysis completed in Task 3. The objective of this business plan is to provide a qualitative assessment of possible delivery options for the proposed Project.

Throughout its engagement on the P3 Program, the Team has followed an iterative process in its analysis of each individual Project, refining the range of possible delivery options in response to additional findings and changes in Metro's base procurement approach. In the case of the Crenshaw/LAX Transit Corridor, two such refinements have occurred since the submittal of the Task 3 report to Metro in January 2011:

- The Metro Board passed a motion in March 2011 authorizing Metro staff to utilize Design-Build (DB) as its base procurement method, citing a variety of potential advantages including "certain private sector efficiencies in the integration of design, project work and components of the Crenshaw/LAX Transit Corridor Project...a reduction in the number of changes and claims from multiple prime contractors, additional efficiencies in project management, administration and coordination, and design features not achievable through the DBB process."These advantages were similarly highlighted by the Consultant Team in its Task 3 report.

  Metro's adoption of DB as the preferred delivery approach resulted in a need for the Consultant Team to update the risk transfer assumptions that formed the basis of the cost savings comparison between Design-Bid-Build (DBB) and Design-Build-Finance-Operate-Maintain (DBFOM) in Task 3. As Metro is already taking advantage of the value engineering potential of a DB approach, one of the major value drivers achieved by a P3 approach, namely the risk adjustment applied to the construction cost in comparison to the DBB approach, is no longer operative. Indeed, in the Crenshaw/LAX Transit Corridor capital cost estimate developed by Metro (see Section 1.3), the cost savings associated with DB are already reflected in the percentage of the project budget devoted to "soft" costs and professional services.[1]

[1] "Soft" costs (SCC 80) as a percentage of "hard" costs (SCC 10-50) for Crenshaw/LAX Transit Corridor is 26.5%, compared to ~33% for Westside Subway Extension, which is anticipated to be procured as a Design-Bid-Build project. This reduction accounts for the efficiencies achieved under the Design-Build approach.

- As part of the Task 3 report submitted to Metro in January 2011, the Team performed an initial analysis comparing a DBB and DBFOMdelivery approach for the Project, in which a private developer would take the responsibility for design, construction, financing, operations and maintenance under one P3 contract. The results of this analysis indicated that as compared to a DBB delivery approach, a DBFOM approach may present a lower project cost in today's dollars on a present value basis.

  Upon further examination, it was determined that the inclusion of transit operations under a DBFOM would only be feasible if the Crenshaw/LAX Transit Corridor and existing MGL were to be combined into a single entity. As outlined in Section 1.2, the operating scenarios for the Transit Corridor call for split service at Aviation/Century, with some MGL trains proposed to share use of the Crenshaw/LAX Transit Corridor ROW and vice versa.If the system was not combined into a single entity, Metro would retain operations and maintenance responsibilities on the MGL and a Private Partner would be responsible for operations and maintenance on the Crenshaw/LAX Transit Corridor. Such an operating scenario presented potential issues associated with both public and private operators providing service on a common corridor, coupled with the difficulty of keeping the two operations distinct and sufficiently "ringfenced" for performance monitoring purposes. Therefore, the DBFOM option was not carried forward in the Task 4 analysis and transit operations were removed from further consideration as a potential element of the alternative procurement approaches.

Based on these findings and changes in approach, the range of delivery options available for selection in Task 4 falls between the following two delivery options, each representing one end of a spectrum of risk transfer:

- Design-Build (DB) - under which a private entity would take the responsibility for design and constructionwhile Metro would retain the responsibility for operations, maintenance and finance with limited risk and responsibility transferred to a private entity; and
- Design-Build-Finance-Maintain (DBFM) - under which a private entity would take the responsibility for design, construction, financing and maintenance (non-vehicle) under one P3 contract.

Lastly, a third potential delivery option is a Design-Build-Finance (DBF) approach under which Metro would transfer the responsibility for project financing, in addition to design and construction. An assessment of this option has not been included at this time for the following reasons:

- DBF is typically used where the profile of project expenditures does not match the timing of expected funding or if access to additional funding could accelerate project delivery. In such cases, potentially higher costs associated with private financing could be offset by cost savings from reduced inflation impacts. In the case of Crenshaw / LAX, Metro's existing plans match costs and revenues.

- DBF is typically applied to relatively smaller projects (recent US projects have been under $500 million) and used on a short term basis (less than 10 yrs). The Crenshaw / LAX Project is greater than $1 billion.

2.2. Approach for Evaluation of Alternative Delivery Options

As part of its P3 Program, Metro identified five major goals and example evaluation criteria for delivery of its Measure R program. The criteria were used to assess the relative ability of various project delivery approaches to achieve these goals, including cost certainty, cost savings, schedule certainty, project delivery acceleration, risk transfer optimization, lifecycle cost savings, and service quality. These goals are to:

- **Optimize risk transfer.** As the project sponsor, Metro typically retains responsibility for all risks related to right-of-way acquisition, permitting, environmental clearance, and public acceptability. Under a P3 procurement, a developer shares certain risks related to project delivery and/or performance that Metro would otherwise manage. A project's risk profile can be "optimized" by allocating a given risk to the party best able to manage it. The benefits of this approach include enhanced certainty of project price and delivery schedule. The potential cost of the risk transferred will be included in the developer's bid price.
- **Achieve the most cost-effective use of public funds.** Metro has identified cost containment as a major policy consideration in the implementation of its Measure R program. By exploring alternative delivery options, Metro may be able to leverage public sector funds and resources, achieve price certainty and enhance value for money.
- **Guarantee timely project completion and/or accelerate project delivery.** In its policy statements, Metro has emphasized the importance of schedule certainty, both for financial and public acceptability reasons. The delivery of projects on-time enhances credibility with the public and allows for better budget management and planning. Metro desires to accelerate transit project delivery as the region's highways face capacity constraints.
- **Ensure asset quality throughout project lifecycle.** Metro's objectives for the P3 program include ensuring that the ongoing quality of assets included in the project scope is maintained to a high standard throughout the proposed analysis/contract period.
- **Provide highest-quality service for the traveling public.** Regardless of project delivery model, Metro has identified a key objective to be that the quality of service should match the same high performance standards that Metro already offers.

As shown in Table 5, example evaluation criteria were developed to guide the assessment of each project delivery option's potential to fulfill the goals of Metro's P3 Program.

Table 5. Metro P3 Program Goals and Example Evaluation Criteria

Goals	Example Evaluation Criteria
Optimize risk transfer	Transparency/availability of information for private sector to price risks and submit "fixed price" bid
	Ease of modifications required to adapt existing service contracts
	Flexibility of the proposed project to enable private-sector innovation
	Compatibility of procurement method with regulatory requirements (Buy America/labor law/local hire/alternative fuel/green construction policies, etc.)
	Ability of private sector to comply with insurance requirements (potential capacity issue)
Achieve a cost-effective use of public funds	Price certainty to Metro
	Certainty and quantum of project funding streams, both short and long term
	Maximum leveraging of public funds
	Ability of option to provide greater access to alternative sources of finance
	Metro control over fare setting and revenue sharing with private sector partner
Guarantee timely completion-Accelerate project delivery	Ability to guarantee schedule certainty
	Potential to accelerate project delivery
Ensure asset quality throughout lifecycle	Ability to measure/monitor contractor performance/output on lifecycle
Provide highest-quality service for the traveling public	Ability to achieve operational performance/quality and safety for the traveling public

2.2.1. Analysis

The analysis of alternative delivery options has been completed in two stages. The first stage is to identify and summarize risks identified to date for the Crenshaw/LAX Transit Corridor Project and documented by the Metro Project team. Risks have been categorized as follows:

- Construction risks;
- Operational and maintenance risks; and
- Funding and financial risks.

Following the identification of the major risks associated with the project in Section 3.0, the analysis then seeks to explore the degree to which potential delivery options fulfill Metro's P3 Program goals through the management and mitigation of project risks identified.

Section 4.0 describes in greater detail the contract packaging strategy and overall scope of each project delivery option. The analysis of those options against Metro's goals is subsequently documented in Section 5.0.

3.0 PROJECT RISKS

This section presents a qualitative summary of the technical, financial and economic risks that Metro may encounter in delivering the Crenshaw / LAX Transit Corridor Project, prior to any consideration of an adopted procurement approach. The focus is mainly on technical risks related to meeting the project objectives with respect to cost, schedule and quality. The analysis is split into three sections representing the main areas of project delivery risk:

- Design and construction risks affecting cost and schedule;
- Long-term asset maintenance, rehabilitation and replacement (i.e. lifecycle) risks; and
- Funding, financial, and economic risks.

Metro has carried out several analyses on the construction cost and schedule risks associated with the delivery of the Project. The information in this section has been extracted and summarized from three main sources:

- Crenshaw / LAX Transit Corridor Risk Assessment Report dated May 31, 2011
- Crenshaw / LAX Transit Corridor Risk Workshop Handbook dated March 2011
- Crenshaw Transit Corridor Final EIS/EIR Chapter 8 – Financial Analysis and Comparison of Alternatives

In addition to these Metro sources, the discussion below also incorporates risk analysis carried out by the Consultant team as part of its Task 3 Strategic Assessment report. Several key project risks have been identified during the Project risk analysis work. These are summarized as below.

- Inflation of the Project capital costs (described further below), which can be driven by both demand and supply at global and regional levels. A major impact can occur when actual cost inflation exceeds the estimated / forecast rate of inflation included in the financial forecast.
- Right-of-way costs correlated to property values. In recent years both national and regional property values have declined following many years of growth, often above historic averages. Uncertainty exists regarding the potential recovery of the property market, both in terms of timing and forecast annual growth figures. Combined with specific site conditions, this will greatly influence the uncertainty of ROW costs.
- Concurrent implementation of multiple large infrastructure projects within Los Angeles County. This has the potential to limit the availability of qualified labor. If there is insufficient qualified labor, capital cost escalation can occur through unit cost increases over and above those forecast in the project budget. Qualified labor includes design and project management professionals as well as construction workers.

- Schedule delays will lead to overall cost delays, both in cost escalation and increased professional service costs. Schedule delays are often caused by a change in scopes of work, delays to local permitting and approval processes, stakeholder negotiations and agreements, ROW acquisition, utility relocations, procurement and authorization delays, together with general construction delays.
- Scope change and design risk arising from unexpected utility relocations as well as ground, geological, and environmental conditions can have a significant impact on the project budget.
- Delays associated with the availability of project funding. As the first of the major transit corridors in the Measure R program to be implemented, the Crenshaw / LAX Transit Corridor Project is funded at a cost not to exceed $1.715 billion (YOE $). Delays in receipt of funding and financing and potential changes in scope could potentially affect Metro's ability to deliver the project within budget.

3.1. Construction Risks

Construction phase risks arise from uncertainties such as project scope, physical constraints, stakeholder needs, contractor performance and the occurrence of unforeseen events that ultimately act to increase or decrease the final cost of the Project and accelerate or delay its completion date. As design progresses many of these uncertainties will be resolved, for example, uncertainty in ground conditions will be reduced following more extensive geotechnical investigations. Until the issues are resolved, these risks will be allowed for in the cost and schedule of project in the form of contingencies.

The following list summarizes the main risk issues that may impact Project delivery during the planned construction phase of the Project.

- Uncertainty over the final scope of work, including the amount of tunneling required as compared to an at-grade alignment and additional stations;
- Complexities of constructing the new transit alignment in a busy urban developed corridor, with an existing LRT route, including the interface with existing traffic flows, pedestrians, traffic management systems;
- Interface with LAX and Federal Aviation Administration for design and approvals;
- Expansion of the Metro Operations Center may not be completed in time for the Crenshaw/LAX Transit Corridor project, and/or additional shares of cost will be attributed to the Crenshaw/LAX Transit Corridor project as other America Fast Forward planned projects are delayed;
- Uncertainty over the depth of the existing utilities, particularly at intersections in the cut and cover sections of the project. This can lead to an increase in complexity of the utility relocations and subsequent increase in overall cost and schedule; and
- Complexity of the utility locations and relocations may delay construction.

3.1.1. Contractor Performance Risk

A performance bond is a promise by the contractor that the contractor will complete the work, and a promise by the surety that it will take one of the following actions if the contractor fails to perform: (a) step in to finish the work, (b) find another contractor to finish it, or (c) pay damages to the owner, up to the limits stated in the bond. In the event of a contractor default, the bond covers the risk of cost overruns over and above the contract price.

Prior to the construction phase, as a qualification for submitting a bid during the procurement process, potential contractors must have sufficient financial capacity to obtain performance bonds, in some cases equal to the monetary amount of the individual contract packages.

Limits on the amount of performance bonding available to individual contractors vary, with limits for a small pool of larger contractors in the neighborhood of $250 million per contract. For projects with performance bond requirements exceeding that amount, the larger contractors may form joint ventures to enable the bonding requirements to be met. The ability of the contractor(s) to obtain performance bonds for very large contracts represents a procurement risk.

Under the Transit Design-Build (DB) Law (Public Contract Code section 20209.5 et seq.), Metro has discretion to determine the amount of the performance bond, within the parameters of a statutory requirement that the amount must be sufficient to cover the design-builder's services. Since the projects will be federally funded or financed, FTA policy must also be taken into account. FTA requires grantees to obtain performance bonds from their construction contractors in an amount equal to 100 percent of the contract price unless a lower amount or alternative security is justified. For large transit projects such as Metro's, FTA is generally willing to approve a reduced bond amount, recognizing that a 100 percent bond is not necessary to cover the risk and that a requirement to obtain a 100 percent bond would severely impact competition. Other transportation agencies with federally-funded projects have used a range of performance security requirements for their projects.[2]

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[2] The FTA recently approved a 50 percent performance bond for the Santa Clara Valley Transportation Authority's Silicon Valley Berryessa Extension Project, expected to cost $800 million. For the Denver Regional Transit District's (RTD) Eagle P3 concession agreement, awarded in 2010, FTA approved an alternative approach to performance security for the project, allowing the Private Partner to provide either a payment/performance bond or letter of credit. The amount of the security for the Eagle project is set annually, equal to 50 percent of the total earned value of the design-build work for the upcoming year plus 5 percent of the value of future work. Given the six-year completion schedule, the required security is significantly less than 100 percent of the value of the design-build work. The Denver RTD request for approval relied heavily on the fact that the Private Partner would be providing financing.

It should be noted that reducing the amount of a performance bond does not directly result in a premium reduction, because the premium is determined based on the level of risk associated with the project. Even though the surety's potential total exposure is reduced when the bond amount goes down, the surety's primary risk is for the "first dollars" out, and the likelihood that the surety will be called upon to pay cost overruns does not change just because the bond amount is lower. For this reason, it is not uncommon for

Under the procurement approaches analyzed as part of the business plan, the consolidation of multiple contracts into a single contract is cited as a potential advantage for Metro, as it reduces the number of interfaces that must be managed by the agency in its oversight of a project. At the same time, Metro's approach to contract packaging must consider its duty to ensure that performance security will be sufficient to cover the project risks. Metro should also consider the impact of larger contract packages on the ability of smaller contractors to participate as principals, and on the number of teams able to propose, with the resulting impact on level of competition and predictable increase in Metro's costs.

In determining an appropriate performance bond amount, Metro should take into account the project risks to be covered by the bond, conditions in the surety markets, limitations affecting formation of teams, and the maximum amount that potential teams would be able to bond.

3.2. Operations Phase Risks

Maintenance costs can be highly uncertain during the preliminary engineering of projects due to unknown final scope, unknown mechanical and electrical equipment, unknown operating procedures, the complex interaction between preventive maintenance and replacement cycles and unknown economic factors such as inflation that have significant impact on the cost of activities that are many years away.

The following list summarizes the main risk issues that may impact the cost of long term asset maintenance, rehabilitation and replacement:

- Uncertainty in using past cost data to predict future costs;
- Uncertainty in real growth of maintenance costs over an extended time period (note that the Project operations and maintenance estimate only provides the cost in a single horizon year, 2035);
- Materials, utilities, labor, and equipment cost inflation;
- Unexpected soil conditions may reduce the life of the subsurface structures, for example corrosion of tunnel lining and tunnel / station steel reinforcement from acidic soil;
- Deferred or poorly performed routine maintenance that can accelerate the deterioration of assets resulting in reduced life and higher costs of major rehabilitation or replacement;
- Obsolescence of system components such as communications, signals and other systems;

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project owners (such as the Denver RTD) to accept letters of credit or other alternative performance security for P3 projects, since the premiums to obtain a letter of credit are based on the value of the letter of credit rather than on the cost of the project.

- Excessive wear and tear due to change in conditions that exceed design specifications, e.g. higher than expected volume of passengers using elevators and escalators;
- Uncertainty in cost of equipment replacement, not only of the equipment itself but the soft costs of installation e.g. due to restricted working hours, working at night etc.;
- Poorly installed equipment / low quality components / poor quality construction that may result in increased maintenance costs and an unexpected need for replacement outside of warranty period; and
- Change in maintenance standards, procedures and safety standards such as working hours.

3.3. Funding, Financial, Commercial and Economic Risks

There are a number of funding, financial, commercial, and economic risks to be considered. These include the ability to accurately forecast year of expenditure amounts, the risk of increasing project costs or delay due to Project scope changes or external impacts to schedule, the ability to execute planned financing strategies or the availability of financing within the market. The key Project risks are discussed as follows.

3.3.1. Funding Risks

Recent developments at the State and federal level have increased the risk that the sources of non-local funding assumed for the Crenshaw/LAX Transit Corridor may not be available as scheduled.

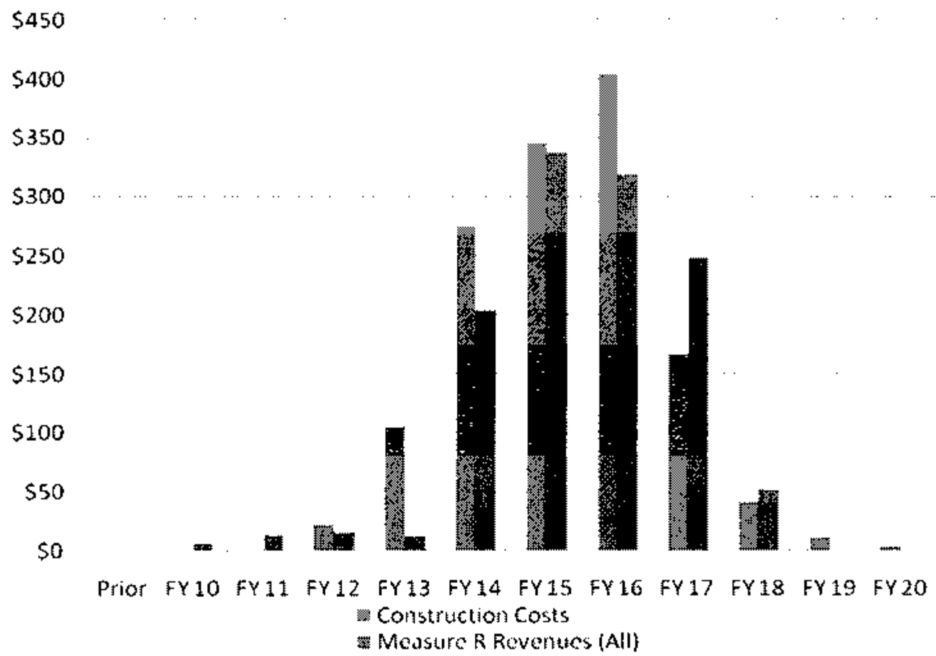
Future reductions in formula-based federal programs for transit, for example, such as the Congestion Management and Air Quality Improvement (CMAQ) program, could impact the level of funding available for the project, which is to receive a total of $68.2 million of CMAQ funds in FY 2015 and FY 2016.

Potentially most at risk are $201 million in State Proposition 1B funds committed to the project. These are scheduled to be available starting in FY 2012 and continuing through FY 2015, during the most capital-intensive phase of the six-year construction period. The availability of these bond proceeds depends on the financial rating of the State of California and its capacity to accommodate additional debt service. In March 2011, the State chose to delay a $2.3 billion Proposition 1B bond sale in order to save $250 million in debt service amid the ongoing budget crisis. By law, the remaining balance of Proposition 1B bond funds must be issued by the end of 2012. Failure to do so could jeopardize the timely completion of numerous State transportation projects, including this one.

That said, implementation of the Project relies primarily on local sources, namely Measure R. In contrast to other transit projects comprising Metro's broader "America Fast Forward" initiative, such as the Westside Subway Extension or the Regional Connector, the Crenshaw/LAX Transit Corridor is not a recipient of FTA New Starts funding and its exposure to future changes in federal funding levels remains fairly limited.

Furthermore, Metro has programmed Measure R revenues for the project in the first decade of the 30-year sales tax measure, in a manner generally congruent with the construction cost curve[3] of the project from FY 2012 through FY 2018, as shown in Figure 3. By ensuring the availability of revenues that are locally generated, controlled, and sufficient to cover the majority of costs during the construction phase, Metro's programmed schedule of Measure R cash flows reduces the funding risks associated with the Project's implementation.

Figure3. Crenshaw/LAX Transit Corridor Measure R Revenues vs. Construction Cost Curve (in millions)



The schedule of Measure R cash flows also broadens the range of potential options with regard to private finance. Section 6.0 explores the potential for a private developer to replace Measure R revenues during the FY 2012 to FY 2018 construction period with private equity or debt financing. This approach could increase Metro's flexibility in funding other "America Fast Forward"/Measure R-dependent transit projects also scheduled to begin construction in the first decade.

It should be noted that the availability of private financing for the Project could help supplement the proposed sources of capital and thereby mitigate risks associated with the timing of these public funding streams; however, the appropriate level of public funding would still be required over the term of the concession to service availability payments.

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[3]Construction cost includes standard cost categories (SCC) 10, 20, 30, 40, 50, and 80.

3.3.2. *Financing Risks*

Potential risks associated with financing the Crenshaw/LAX Project are described in this section. The ability to secure financing will be impacted by a number of potential issues, including:

- Metro's experience in raising debt from municipal tax exempt sources or private financing delivery options will impact the success and timing of the potential financing;
- The timing of the proposed financing may influence the schedule and the Project cost due to unanticipated higher costs of debt at the time of agreed pricing;
- Uncertainty surrounding the future market appetite for municipal tax exempt or private financing structures will impact the cost and timing of debt issuance and repayment; and
- The expected liquidity of the financial markets may be influenced by economic factors such as a lack of sustained economic recovery or capacity constraints caused by an over-demand of projects.

Through its "America Fast Forward" initiative, Metro intends to use a range of federal financing mechanisms, both existing and proposed, to advance and accelerate its delivery of key projects by leveraging Measure R revenues as a source of repayment for federally-subsidized loans. The centerpiece of this initiative is a proposed new class of qualified tax credit bonds, Qualified Transportation Improvement Bonds ("QTIBs"). QTIBs are taxable bonds issued by state, local or other eligible issuers where the Federal government subsidizes most or all of the interest cost through granting investors annual tax credits in lieu of interest. Metro is also utilizing federally subsidized loans available through the TIFIA program, as further described in Section 6.1.3.

QTIBs and TIFIA loan proceeds are projected to lower the overall cost of project financing for Metro's program of transit projects, compared to traditional tax-exempt bond financing; however, it is important to note that the Crenshaw/LAX Transit Corridor does not depend on these leveraging mechanisms to ensure the availability of sufficient Measure R revenues to meet the capital costs of the project during the construction period. This project would likely proceed as scheduled in the adopted 2009 Long Range Transportation Plan even without the creation of QTIBs, as other financing tools remain available. For these same reasons, private financing is unlikely to further enhance the funding profile of the Project.

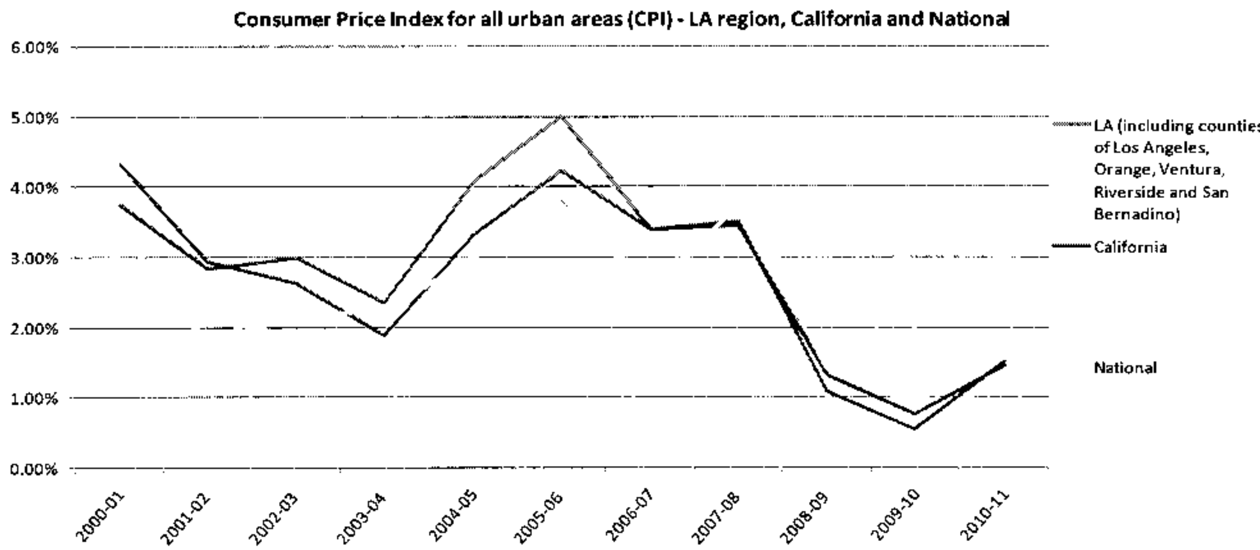
3.3.3. *Economic Risks*

A key economic risk is the uncertainty surrounding the ability to forecast inflation of costs and revenues over the expected construction timing and operations life of the asset. The cost of inflation is impacted by the timing of the cost and the demand of the underlying commodities and labor associated with the cost component. Therefore, the ability to deliver the Project within the funding plan will be impacted by:

- Any delay to the Project schedule having a direct impact on the construction cost and future cost of operations; as well as
- The broader impact of increases in demand on labor and commodities prices for the region, which may result from a recovering economy and Metro's Measure R program to deliver approximately $40 billion in projects.

The current forecast construction cost inflation for the Project is 2% for 2011 and 3% from 2012 to 2020.[4] Evidence of the variability of forecasts has been provided below, where data indicate that annual consumer price inflation has ranged between 4.99% and 0.54%[5] within the last 10 fiscal years.

Figure 4. CPI Index for LA Region, CA and National (source: California Department of Finance)



Overall, the Project faces the risk that an economic recovery combined with the total program demands on commodities and labor will lead to construction and operational costs growing at a faster rate than currently planned by Metro.

[4]Source: Administrative FEIS/FEIR May 2011
[5]California Department of Finance data website

4.0 PROJECT DELIVERY OPTIONS

Reflecting the change in the base project delivery option for the Crenshaw / LAX Transit Corridor Project to Design-Build and the elimination of operations from the range of functions under consideration for provision by the private sector, three project delivery options were evaluated based on then-current information available from Metro at the time of the Consultant Team's analysis for Task 4. As summarized in Table 6, the options reflect the following:

Table 6. Comparison of Contract Packaging Strategy for Project Delivery Options

	OPTION 1. BASE DB			**OPTION 2.** ALT. DB			**OPTION 3.** DBFM		
CONTRACT	1	2	3	1	2	3	1	2	3
CONSTRUCTION PERIOD									
Civil works	◆	◆			◆		◆		
Deep bore tunnel		◇			◇		◇		
Cut-and-cover	◇	◇			◇		◇		
Aerial structures	◇				◇		◇		
Systems		◆		◆			◆		
Stations	◆	◆		◆			◆		
Maintenance Yard			◆		◆		◆		
OPERATING PERIOD									
Non-vehicle maintenance		Metro			Metro		◆		

◆ = responsibility for this element/function included in the contract package

◇ = construction types included in civil works for this contract

X = contract eliminated/consolidated

- Option 1 - Base Project Delivery Approach: two major Design-Build contracts divide up the alignment based on geography into the Harbor Subdivision Segment (Contract No. 1) and the Crenshaw Boulevard Segment (Contract No. 2). They both include civil works components and stations. The Crenshaw Boulevard Segment also includes systems for the entire project. The third contract is for the maintenance yard (Contract No. 3). Metro will provide routine and capital maintenance for all project components upon completion by the DB contractor(s).
- Option 2 - Alternative Design Build: Contract No. 1 includes construction of all stations along the alignment and communication systems; Contract No. 2 includes all civil works components and the maintenance yard. Metro will

provide routine and capital maintenance for all project components upon completion by the DB contractor(s).

- Option 3 - Design Build Finance Maintain: a single contract for the design, construction, and routine/capital maintenance of all project components over a 35-year period except rolling stock. The Private Partner would also be responsible for providing financing for a portion of the design and construction costs.

4.1. Option 1: Design-Build

The Consultant Team's completion of Task 4 analysis occurred prior to Metro's decision to procure the Project as a single DB contract covering systems, stations, and civil works, with the maintenance facility as a separate DB contract. As originally proposed, the Crenshaw/LAX Transit Corridor Project was to be implemented through three major DB contracts, the first two of which divide up the alignment based on geography into the Harbor Subdivision Segment (Contract No. 1) and the Crenshaw Boulevard Segment (Contract No. 2), as shown in Figure 7 below. They both include civil works components and stations. The Crenshaw Boulevard Segment also includes systems for the entire project. The third contract includes the maintenance yard (Contract No. 3).

Metro intends touse a two-step procurement process to pre-qualify contractors for each of the contracts based on their experience in heavy civil construction, tunneling, track work, systems installation, and construction of yards and shops.

In addition to the DB contracts, Metro will issue other contracts for advance utility relocations and light rail vehicles (LRV).

Metro will also provide routine and capital maintenance for all project components upon completion by the DB contractor(s). These are to be maintained and replaced according to the schedules established by the agency's State of Good Repair (SOGR) capital asset inventory.

The following paragraphs provide a description of the originally-envisionedthree DB contracts in greater detail.

Contract No. 1 Harbor Subdivision DB Segment: Includes the work required for the Project's segment that extends from the existing MGL along the Metro's owned Harbor Subdivision to just east of Brynhurst Avenue (a distance of 5.0 miles). The alignment has the following characteristics:

- Aerial guideway from the MGL connection to 111th Street.
- Cut and cover underground configuration from north of 111th Street to north of 104th Street.
- Aerial guideway and station over Century Boulevard.
- At-grade from north of Century Boulevard to south of Manchester Avenue.
- LRT grade separation over Manchester Avenue.
- At-grade from Isis Avenue to east of Hindry Avenue.

- LRT grade separation over La Cienega Boulevard and Interstate 405.
- At-grade from west of N. Oaks Street to west of La Brea Avenue
- LRT underpass at La Brea Avenue.
- At-grade from Market Street to east of Brynhurst Avenue (end of Harbor Subdivision Segment).

In this segment, light rail stations are included in the scope at the following locations: Aviation/Century (aerial station), Florence/La Brea (at-grade station) and Florence/West Boulevard (at-grade station). Surface parking lots are included at the Florence/La Brea Station and the Florence/West Station.

The contract also includes cut and cover construction, BNSF track relocation or removal, light rail trackwork, special trackwork, station platforms, station finishes, demolition, grading, drainage, street modifications, grade crossings, catenary pole foundations and systemwideductbanks.

Contract No. 2Crenshaw Boulevard DB Segment: Includes the work required for the Project's segment that extends from east of Brynhurst Avenue in the Harbor Subdivision and turns onto Crenshaw Boulevard to the Exposition LRT Line (a distance of 3.5 miles). The alignment has the following characteristics:

- Cut and cover tunnel box from Victoria Avenue to south of 59th Street.
- At-grade from 59th Street to 48th Street.
- Below-grade cut and cover approach and twin bore tunnels on Crenshaw Boulevard from 48th Street to Exposition Boulevard (end of Crenshaw Boulevard segment).

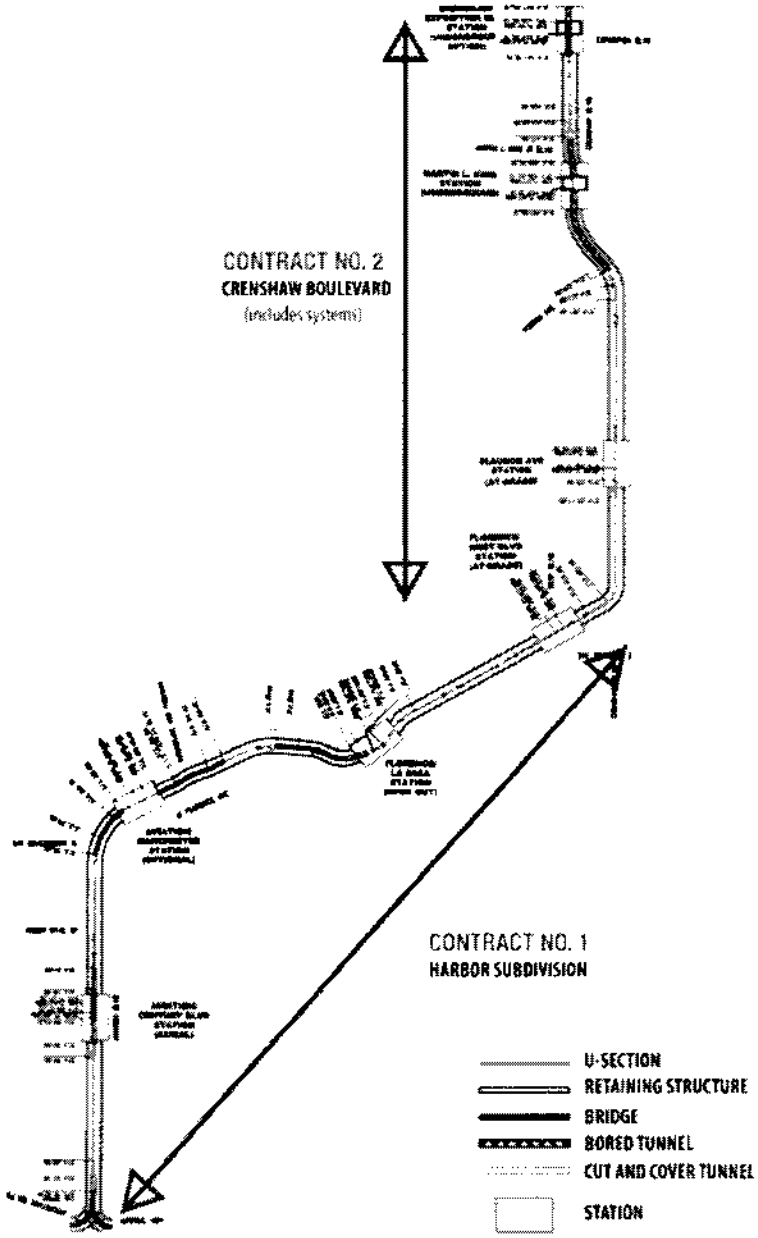
This contract's scope of work includes LRT stations at the following locations: Crenshaw/Slauson (at-grade station), Crenshaw/Martin Luther King (below-grade station), and Crenshaw/Exposition (below-grade station). A surface parking lot is included at the Crenshaw/Exposition Station.

The contract also includes cut and cover construction, twin bore tunnels, light rail trackwork, special trackwork, station platforms, station finishes, demolition, grading, drainage, street modifications, grade crossings, catenary pole foundations, systemwide duct banks, tie-ins to the existing Metro Green Line, and all system installations (for both Harbor Subdivision and Crenshaw Boulevard segments).

Contract No. 3. Maintenance & Storage Facility DB Contract: Includes a full service maintenance and storage facility with heavy repair, service and inspection, wheel truing, car wash, interior cleaning, store inventories, maintenance of way, yard tracks, demolition, grading, drainage, catenary pole foundations, ductbanks and systems installations.

This facility will be used by the existing Metro Green Line, Crenshaw/LAX Transit Corridor, and the planned South Bay Metro Green Line Extension, and Metro Green Line to LAX Extension. The cost of the facility is planned to be shared among the four rail lines.

Figure 5. Crenshaw/LAX Transit Corridor Revised Base Project Delivery Approach



4.2. Option 2. Alternate Design-Build (Alt DB)

Option 2 utilizes Design-Build procurement, but packages the contracts based on function rather than geography, as currently proposed by Metro. This "line of route" approach thus packages construction of all stations along the alignment and communication systems into one contract. All civil works components and the maintenance facility are packaged into a second contract. As under Option 1, Metro intends to provide routine and capital maintenance for all project components upon completion by the DB contractor(s).

4.3. Option 3. Design-Build-Finance-Maintain (DBFM)

Option 3 includes a single contract for design, construction, and maintenance of all non-rolling stock components over a proposed 35-year period. The length of the concession term is based on recent market precedent for transit P3s in the United States; it is also calibrated to coincide with the maximum loan repayment term of 35 years under the TIFIA program, which would likely form an integral component of any P3 financing strategy. Under the DBFM option, the Private Partner would be responsible for providing financing at the appropriate time for a portion of the design and construction costs. As with both the Base and Alternate DB (Options 1 and 2), Metro would retain responsibility for funding ROW acquisition, advance utility relocations, and light-rail vehicle contracts.

The Private Partner would also be responsible for maintenance of all passenger stations, track, civil works, including tunnels, aerial structures, elevators/escalators, as well as communication systems. The maintenance of garage and shop buildings associated with the Crenshaw/LAX Transit Corridor and MGL known as "Southwestern Maintenance Yard" would not be included in a DBFM contract, as this facility would be shared with Metro employees. The general preference to avoid a potential interface between Metro employees and those hired by the Private Partner accordingly limits the types of non-vehicle maintenance activities that can be performed.

The level of service would be defined in the DBFM contract for preservation of civil works and systems in a state of good repair over the concession period and enforceable via contractually specified penalties and/or withholding of availability payments.

5.0 ANALYSIS OF THE DELIVERY OPTIONS

The delivery options have been analyzed against the key criteria associated with the P3 program goals as defined by Metro staff:

- Optimize risk transfer;
- Achieve a cost effective use of public funds;
- Guarantee timely completion - accelerate project delivery;
- Ensure asset quality throughout the lifecycle; and
- Provide highest quality of service to the traveling public.

5.1. Optimize Risk Transfer

This section explores the potential for each delivery option to optimize the transfer of different types of risk identified earlier in Section 3.0. These include design, construction, maintenance and lifecycle. Optimization of risk transfer supports the goals of Metro's P3 program to the extent that it enables the agency to achieve greater cost and schedule certainty.

5.1.1. Design and Construction Risks

The contract packaging strategy associated with each delivery option represents an important way to transfer and mitigate design and construction risk.

The geographically-based contract packaging strategy for the Base DB approach (Option 1) addresses the technical risks specific to the two different ROW types present in the Crenshaw/LAX Corridor - expected at that time to be an active freight railroad in the south along the Harbor Subdivision and an urban street environment in the north along Crenshaw Boulevard.Separate, geographically-based DB contracts could allow for teams with specific expertise in each segment type to handle the associated risks. (This strategy was proposed prior to the December 2011 Board approval of Metro entering into an agreement with BNSF to abandon freight operations in the Harbor Subdivision.)

For Options 2 and 3, the rationale is that the contract packaging can improve the ability of Metro to integrate components of the project with fewer contracts and with functional integration, particularly since freight operations in the Harbor Subdivision will be abandoned. Interfaces between tunnels, structures, stations and platforms can potentially be managed more efficiently. With fewer contracts Metro is also required to coordinate with fewer parties during the construction phase.

Compared to the Base DB approach (Option 1), the Alternate DB packaging strategy (Option 2) reduces the number of contracts from three to two, with the maintenance yard folded into a larger contract package comprising all civil works components, potentially leading to better risk management and innovation in the execution of the project by both Metro and the contractor. For Metro, the number of contractor interfaces it must manage is reduced from three to two. For the contractor, the function-based approach to contract packaging proposed in Option 2 allows for the more efficient bundling of similar sitework and construction activities.

For example, under the Alternate DB strategy (Option 2), all cut-and-cover trenching, tunnelling, and removal of the existing freight tracks would be performed under one contract. Together, these activities will create vast amounts of spoils that the contractor will need to transport out of the project area and dispose of. The packaging of all civil works components in one contract in Option 2 allows for the coordinated disposal of spoils created by a variety of construction activities. Particularly as the Crenshaw Boulevard segment and Harbor Subdivision segment have very different levels of access to freeway/rail corridors that could be used to remove spoils from the project area, a coordinated effort in this regard could translate into better risk management during the construction phase.

Given the likely performance bonding requirements to be established by Metro, the further consolidation of multiple contracts into a single contract under the DBFM approach (Option 3) would increase the dollar amount of the overall package and make the bonding requirements financially unsustainable for all but the largest contractors. The DB approaches (Options 1 and 2), by contrast, allow Metro to issue smaller contracts that are more consistent with market capacity for performance bonding. Option 1 carries the additional advantage of enabling Metro to increase local participation and work more closely with the community in individual station areas / segments of the alignment by dividing the project scope geographically between the two main contracts.

5.1.2. Maintenance and Lifecycle Risks

Metro intends to provide routine and capital maintenance under both DB approaches (Options 1 and 2); assets are to be maintained and replaced based on the schedules established by the agency's SOGR capital asset inventory. The risk for the Project under both DB delivery approaches (Options 1 and 2) is that insufficient funding for long-term routine and capital maintenance may not be allocated in some or all years, potentially reducing the quality of service and increasing lifecycle costs above the optimized level that would otherwise be achieved with consistent maintenance expenditures.

The DBFM approach (Option 3) includes responsibility for long-term asset maintenance of the Crenshaw/LAX Transit Corridor; therefore, the risk of performance during the operations phase is passed down to the Private Partner. Metro would be in the position to oversee the performance and to assess payment deductions for contract breaches for any documented performance below agreed-upon standards. In addition, by establishing long-term maintenance standards upfront and committing a portion of the annual availability payment to the future funding of both routine and capital maintenance during the 35-year concession term, the DBFM option establishes long-term budgetary certainty for Metro.

One key issue to explore is whether the limited scope of non-vehicle maintenance transferred to a Private Partner under the DBFM approach is likely to result in significant risk transfer (and thus yield measurable cost savings to Metro) based on the specific characteristics of the Crenshaw/LAX Transit Corridor. As noted in the project definition, the alignment is comprised of multiple types of construction, including at-grade, aerial and below-grade guideway sections. The associated maintenance activities are thus more specialized and the opportunities for optimizing staffing requirements across several activities by combining those with similar functional expertise more limited. The complexities of this Project would likely require the Private Partner to hire multiple staff positions for relatively short sections of each construction type.

Some savings could potentially be achieved by subcontracting these services to firms that already have a local presence, as opposed to the Private Partner incurring all the necessary start-up and fixed costs required to perform these functions.

However, Metro would still be required to maintain its own separate set of in-house staff specializing in these maintenance activities for its other rail projects, potentially creating some staffing redundancies compared to the Base or Alternate DB delivery (Options 1 and 2). Maintenance activities also include highly specialized skill sets, such as for electric traction power and catenary wiring systems. There is unlikely to be a significant cost differential between Metro and the Private Partner for such highly specialized labor.

Based on the analysis performed to date, it is not known to what extent any savings from reduced labor costs and increased worker productivity under the DBFM option would be offset by other factors, such as start-up costs and management fees. In general, the greater the scale of maintenance responsibilities transferred to the Private Partner, the greater potential there may be for efficiencies of sufficient magnitude to result in overall cost savings to the project sponsor. As discussed further in Section 7.0, a more comprehensive delivery approach inclusive of long-term maintenance responsibilities for the existing MGL may offer the greatest potential to achieve such efficiencies, notwithstanding the other legal and institutional challenges associated with the implementation approach.

5.2. Achieve Cost-Effective Use of Public Funds

Metro has identified cost containment and the cost-effective use of public funds as a major policy consideration in the implementation of its Measure R program. Alternative delivery options may enable Metro to achieve a cost-effective use of public funds by offering greater price certainty over the long term and/or providing opportunities to leverage public funding with private finance options (as outlined further in Section 6.0).

Under the base and Alternate DB approach (Options 1 and 2), Metro is already pursuing a cost-effective project by leveraging Measure R revenues committed to the Crenshaw/LAX Transit Corridor through the federal TIFIA loan program. The flexible loan terms afforded by the TIFIA program allow Metro to draw down the loan proceeds beginning in FY 2016, with the repayment schedule deferred until FY 2021 (after the project's completion).

A DBFM option would enhance the certainty that adequate funding will be available at the appropriate time for design and construction by transferring the risk of financing to the Private Partner.

For financing, a Private Partner could not only utilize the TIFIA program, but increase the leveraging potential of the Project's other funding sources by providing access to additional sources of private finance, such as Private Activity Bonds, bank debt, and equity. These sources would not ordinarily be considered under a wholly publicly-funded project.

The inclusion of private bank debt or equity, while generally available at a higher cost than traditional public financing sources, may on balance lead to a more cost-effective project, as the participation of risk-averse lenders represents an additional layer of managerial oversight who can apply pressure on the contractor to contain costs and deliver a project within budget.

5.3. Guarantee Timely Completion – Accelerate Project Delivery

A key goal of the P3 Program and Metro's "America Fast Forward" initiative is to accelerate delivery of Measure R transit projects. The priority given to the goal of project acceleration is particularly critical for the Crenshaw/LAX Transit Corridor, given its status as the first project to be delivered under "America Fast Forward."

Assuming that these timing-related issues could be resolved, the DBFM approach (Option 3) presents potential project delivery advantages compared to the Base and Alternate DB options insofar as an availability payment-based DBFM concession creates a stronger incentive for the contractor to complete the construction on schedule, both as a result of payments being deferred to the end of construction and the investment of private equity in the project or "skin in the game." From this standpoint, DBFM could be conducive to Metro's goal of timely project completion.

5.4. Ensure Asset Quality Throughout Lifecycle

Neither DB approach (Options 1 and 2) includes a lifecycle component in the contractual scope. Responsibility for maintaining and monitoring asset performance would be retained by Metro upon completion of the project by the contractor. All assets would be maintained under Metro's State of Good Repair initiative in collaboration with FTA to track the condition and project future replacement dates for the entire capital asset inventory. Funding for this purpose is programmed separately based on available sources at the time of replacement.

Under a DBFM approach, asset performance becomes the responsibility of the Private Partner, and a portion of the availability payment is typically reserved for routine maintenance and lifecycle needs. The Private Partner is generally evaluated based on the performance of the asset, rather than adherence to a specific replacement schedule. Performance must therefore be measurable in order for Metro to enforce the terms of the contract. The separation or "ringfencing" of any privately-maintained functions from the Metro's existing systems is advisable for performance monitoring purposes.

The DBFM option (Option 3) creates a number of interfaces with Metro's existing systems along the alignment that may make performance monitoring more challenging. One key concern pertains to existing Metro rail facilities and whether there is sufficient space to isolate any privately-maintained signaling and communications equipment such that the Project is adequately separate from the rest of Metro rail system.

5.5. Provide Highest Quality of Service for the Traveling Public

Metro is to retain responsibility for transit operations on the Crenshaw/LAX Transit Corridor under all three options, and for maintenance under the Base and Alternate DB approaches (Options 1 and 2).

Over the long term, the proper maintenance of assets in a state of good repair is essential to providing high-quality service for the traveling public. To the extent that funding is identified and committed for this purpose via the availability payment structure under a DBFM contract, this option may provide for more consistent expenditures on maintenance and thus a more consistent quality of service.

Conversely, service quality may be negatively impacted if risks associated with ongoing and capital maintenance under a DBFM concession (Option 3) are not thoroughly addressed in the contract between Metro and the Private Partner. For example, a poorly defined performance regime may result in ongoing disputes over responsibility for system repairs. The proper "ringfencing" of the asset is again critical to ensure that any deviation in service quality from agreed-upon performance standards can be properly attributed to the responsible party.

5.6. Summary of Options Analysis Results

Table 7 below summarizes the results of the delivery options analysis above using a "dot" system to indicate on a qualitative basis whether a given option would be suboptimal (●), neutral(O) or optimal (◉) in satisfying a particular evaluation criterion. The ratings for each option have also been combined into an overall score.

This qualitative exercise allowed for an overall comparison of the delivery options and assisted the Team in assessing whether a particular project delivery option would provide greater potential to meet Metro's goals.

Based on the P3 program goals articulated by Metro and the technical assessment performed by the Consultant Team, both DB approaches (Options 1 and 2) and the DBFM approach (Option 3) present unique advantages that make each of them viable delivery option for the Crenshaw/LAX Transit Corridor:

- With its geography-based contract packaging approach, the Base DB option (Option 1), which assumed continuation of active freight rail service in the Harbor Subdivision, attempts to reduce construction risk associated with the different ROW characteristics in the Crenshaw/LAX Corridor by assigning responsibility for each segment type to the team specializing in the management of those risks;
- With its concentration of all systems work and all civil work into two functionally-based contracts, the Alternate DB option (Option 2) provides opportunities for

better logistical coordination of similar construction activities, potentially resulting in greater efficiencies;

Table 7. Comparison of Project Delivery Options Relative to Metro Goals

Goals	Evaluation Criteria	Base Option 1: DB	Option 2: Alt DB	Option 3: DBFM
Optimize risk transfer	Transparency/availability of information for private sector to price risks and submit "fixed price" bid	○	○	●
	Flexibility of the proposed project to enable innovation	●	○	◉
	Compatibility of procurement method with regulatory requirements (Buy America/labor law/local hire/alternative fuel/green construction policies, etc.)	◉	◉	○
	Ability of private sector to comply with insurance requirements (potential capacity issue)	◉	◉	○
Achieve a cost-effective use of public funds	Price certainty to Metro	○	◉	◉
	Certainty and quantum of project funding streams, both short and long term	○	○	○
	Maximum leveraging of public funds through greater access to alternative sources of finance	○	○	◉
Timing - Accelerate project delivery	Ability to guarantee schedule certainty	◉	◉	◉
	Potential to accelerate project delivery	○	○	●
Ensure asset quality throughout lifecycle	Ability to measure/monitor contractor performance/output on lifecycle	○	○	◉
Provide highest-quality service for the traveling public	Ability to achieve operational performance/quality and safety for the traveling public	○	○	○
LEGEND	suboptimal <<< neutral >>> optimal			
	●○◉			

- The elements to be maintained under the DBFM option (Option 3) share an interface with the existing Metro Green Line. For Metro to succeed in securing a private entity willing to accept the associated risk, this interface would have to be sufficiently "ringfenced" for performance monitoring purposes. Assuming this could be accomplished, the availability payment-based structure of the DBFM option could provide financial incentives for the Private Partner to maintain quality service performance over the long term;
- The contract packages for both DB options are sized consistent with market capacity for performance bonding requirements;
- Compared to DB Options 1 and 2, a single DBFM contract associated with Option 3 would further reduce Metro's interfaces with multiple contractors, while the larger size of this contract would likely still be accommodated by the surety markets;
- A DBFM option could allow Metro to tap private sources of financing, mitigating the risks of any near- or medium-term challenges associated with specific project funding sources. Offsetting this conceptual advantage of DBFM is that with either DB option, Metro has access to Measure R funding within the first ten years and will be leveraging Measure R revenues through the TIFIA program. In addition, Metro may have access to other innovative financing mechanisms, depending on the outcome of pending legislation at the federal level; and
- In terms of schedule, lenders could apply additional pressure on the Private Partner to deliver the project on time, while the development of detailed performance specifications may at the same time lengthen Metro's existing procurement process.

Section 6.0 describes some of the private finance options that could be used in a DBFM concession.

6.0 POTENTIAL P3 FINANCING STRATEGY

If Metro were to adopt a delivery option such as DBFM that included financing responsibilities, several sources of private finance could potentially be available, including bank loans, Private Activity Bonds, TIFIA, and private equity. These are discussed below:

6.1. Options for Private Financing

6.1.1. Bank Debt

Due to the dominance of tax-exempt financing in the US, the use of bank debt in US P3 transportation projects has been limited. In December 2010, the Long Beach Court Building, a social infrastructure P3 deal, reached financial close using a short term bank loan and a year prior to that Port of Miami Tunnel reached financial close using a bank facility of $342 million combined with TIFIA finance of $341 million. Currently, shorter tenors on bank debt mean that this form of capital carries a greater refinancing risk than a bond. However, it does have the advantages that proceeds are drawn periodically, as required, avoiding "negative carry" interest costs, and the process for reaching financial close is simpler and can be done concurrently with commercial close. But it is important to note that bank debt may be limited in its availability in the short term due in part to the European debt crisis which could restrict the amount of finance that could be raised for a project of this scale.

6.1.2. Private Activity Bonds (PABs)

PABs are tax-exempt bonds issued through a conduit established by a state or local government agency for the purpose of funding eligible expenditures, the proceeds of which may be used by one or more private entities for a qualified project. At this time the United States Department of Transportation (USDOT) is reporting issued and/or approved PAB allocations of $8.0 billion, out of legal maximum of $15 billion. Recently, Presidio Parkway in Northern California received an allocation of $592 million (financial close expected in Spring2012) and the Eagle P3 transit project in Denver, Colorado reached financial close on $397 million in PABs debt in August 2010. PABs offer an all-in cost of bond debt that can be less expensive than bank debt, as well as a long-dated solution that removes refinancing risk for the private developer. The use of a PAB issue does include several constraints including: the requirement to meet federal standards; expenditure of 95% of funds within 5 years; restriction on use of PABs proceeds to fund existing assets; and the need to comply with arbitrage rules on invested funds.

6.1.3. Transportation Infrastructure Financing Innovation Act (TIFIA)

As part of the FY 2010 Transportation Investment Generating Economic Recovery (TIGER) II program funded by the American Reinvestment and Recovery Act (ARRA), the Crenshaw / LAX Transit Corridor Project was awarded a $20 million USDOT grant that will subsidize a $545.9 million TIFIA loan to Metro in support of the Project's capital costs. As described below, TIFIA can also be utilized in coordination with private financing.

The TIFIA program is designed to fill market gaps and leverage substantial private and other non-federal co-investment by providing supplemental and subordinate capital to projects. The TIFIA program offers project sponsors the following advantages:

- Long-term loans at the comparable U.S. Treasury yield (State and Local Government Series (SLGS) rate plus one basis point) – 3.14% for a 35 year loan as of January 26 , 2012;
- Ability to lock in the interest rate several years in advance of a drawdown, without any additional cost;
- Right to prepay loan draw downs in whole or in part at any time, without penalty;
- Potential willingness of USDOT to accept more flexible terms, such as back-loading debt service to reflect anticipated growth in the pledged revenue stream, and thinner debt service coverage margins than otherwise required to obtain an investment-grade rating in the capital markets;
- Diversified source of debt capital (U.S. Treasury as lender), reducing market saturation; and
- Lower transaction costs.

The USDOT awards credit assistance for transportation projects to eligible applicants, which include state departments of transportation, transit operators, special authorities, local governments and private entities. The challenges associated with TIFIA assistance are summarized below:

- Demand exceeds funding supply, therefore applications are on a competitive basis;
- Availability of funds are subject to Congressional appropriation and may therefore impact project schedule;
- Funds permitted are limited to 33% of eligible project costs;
- An investment grade rating is required for facilities senior to the TIFIA loan; and
- The TIFIA office requires the loan to carry a 'springing' lien in the event of bankruptcy such that TIFIA debt ranks paripassu with senior.

6.1.4. Private Equity

Sources of private equity include financial institutions, pension funds, private developers and infrastructure funds. Equity providers typically provide the smaller share of funding, as compared to debt, for example the Eagle P3 equity component was $54 million, against $397 million in debt (or a 14% debt to equity ratio). Equity providers are paid a return after project costs, debt service and any taxation costs have been paid. As a result, returns to equity providers are varied and due to this increased risk of repayment, providers of equity require a higher cost of funds.

6.2. Potential Availability Payment Structure

If the Crenshaw / LAX Transit Corridor Project were delivered utilizing an alternate procurement approach that includes either long-term maintenance responsibilities or the use of private finance, such as DBFM (Option 3), the Consultant team assumed that the Private Partner would be compensated under an availability payment model, with all fare revenues continuing to accrue to Metro.

Under such a model, Metro would make periodic payments to the P3 partner, the base amount of which would be bid during the procurement phase. These availability payments are typically structured to repay the cost of debt, to provide a return on invested capital, and to cover the projected cost of contractually required maintenance, lifecycle maintenance, and any included operating costs over a specified contractual period. In some cases, payments may begin during the construction period to cover part of the capital costs as well. Generally, the part of the availability payment related to financing is fixed, and the portion covering maintenance and operation (if applicable) is subject to escalation based on an agreed-upon index.

Payments received by the Private Partner would include:

- A milestone payment at substantial completion of the work planned to be completed once the facility is available for revenue service; and
- Availability payments over a 35-year maintenance period, subject to performance.

In its Task 3 report, the Consultant Team proposed a potential availability payment structure for the Crenshaw/LAX Transit Corridor,with Measure R funding assumed to meet 70% of construction costs based on similar levels of public funding support for transit projects in the US. The other 30% consisted of private bank debt and an equity contribution by the Private Partner to be repaid over a 35-year period via annual availability payments using the remainder of Measure R and other funding sources not expended during the construction period.

This financing structure ensures that the Private Partner's equity stake has a long-term exposure through the maintenance period. This exposure in turn helps to maintain rigorous standards of performance, with the equity investor penalized in the form of reduced availability payments if performance falls below contractually agreed-upon standards.

The equity investor would also have exposure through life-cycle expenditure if increased capital replacement programs are required earlier in the asset life due to lack of routine maintenance or poor construction quality.

6.3. Constraints on Metro Funding Sources Comprising an Availability Payment

The revenue streams currently available to fund a long-term availability payment on the Crenshaw/LAX Transit Corridor are limited to a mix of one-time and ongoing federal, state, and local funding sources, most notably Measure R, which is scheduled to sunset in FY 2039. The 35-year DBFM concession considered in this business plan would end in FY 2047, and thus exceeds by eight years the expiration date of Measure R. Hence, Metro's ability to accommodate a long-term financial commitment to a Private Partner may be constrained in part by the sunsetting of this important revenue source unless there is an extension to the expiration date or other revenue sources are identified.

The Consultant team analyzed the potential long-term availability payment funding options for the Crenshaw/LAX Transit Corridor in collaboration with the staff of Metro's Capital Planning and Finance Departments. In contrast to Measure R, Proposition A and Proposition C do not sunset and could be theoretically used to fund the portion of the availability payment attributable to the cost of maintaining the non-underground segments of the project without running afoul of the use restrictions imposed on Proposition A and C funds by the Metro Reform and Accountability Act of 1998.

Assuming that this restriction remains unchanged, approximately 20% of the 8.5-mile project consisting of tunnels or cut-and-cover trenches would be ineligible for Proposition A and C funds. This portion of the project would need to be covered by other Metro revenue sources after FY 2039.

Other potential revenue sources, such as ground lease payments from future joint development agreements or advertising, are likely to be considered either highly speculative or insufficiently creditworthy by the financial markets to guarantee availability payments.

7.0 CONCLUSIONS AND RECOMMENDATIONS

This analysis identifies several possible opportunities and challenges associated with delivering the Crenshaw / LAX Transit Corridor Project using Design Build and Design Build Finance Maintain options relative to achievement of Metro's P3 program goals.Based on this analysisand input received from Metro staff, the Team recommends the Alternate DB approach (Option 2) for delivery of the Project. The function-based contract packaging associated with this approach reflects an optimal risk management strategy for Metro, withfreight operations by BNSF to beabandoned along the Harbor Subdivision, which comprises the southern segment of the Project. The geographically-based DB Option (Option 1) was proposed by Metro as an approach to address unique design and operational issues associated with LRT operation in what was then expected to be an active freight corridor.

While the decision to abandon freight service on the Harbor Subdivision is a consideration in selection of a project delivery approach, abandonment also serves to mitigate key construction and operational risks associated with a shared ROW scenario, including technical, liability and insurance risks surrounding the design and construction of elements such as grade separations, intrusion fences, grade crossings, and drainage facilities. In addition, curtailment of active freight operation removes FRA requirements otherwise applicable to a shared use corridor.

With negotiations between Metro and BNSF now resulting in the abandonment of freight rail operations, the right-of-way characteristics along the Harbor Subdivision and the northern segment of the Corridor become more similar. The design and construction risks associated with the Harbor Subdivision are reduced. As a result, corridor-wide responsibility for the completion of trackwork and systems can be more easily assigned to a single DB contractor, as proposed under Option 2.

The potential for efficiencies extends to other project elements as well. The ability to bundle similar construction activities and sitework in Option 2 has the potential to yield additional economies of scale compared to the Base DB option. For example, construction of civil works, such as tunnels and trenches, can be bundled into one contract, rather than having these same construction activities performed under themajor DB contract work, as was originally proposed under the Base DB approach (Option 1). Similarly, the coordination of station design and construction under one contractor may result not only in greater bulk purchasing power for materials, but in a more consistent visual identity for the corridor, while still allowing for local neighborhood character to be reflected in individual station design.

While an alternate DB contract packaging strategy as proposed in Option 2 can yield cost efficiencies, such efficiencies are likely to be more limited in overall percentage terms than those already achieved by Metro's change in procurement approach from DBB to DB. The key benefits of Option 2 lie primarily in reducing the number of contracts managed by Metro from three to two and offering a greater opportunity for each contractor to innovate in the delivery of Project elements across the corridor. Such innovation may result in greater cost containment if not a lower overall cost for Metro.

With respect to the Southwestern Maintenance Yard, the implementation schedule for the Crenshaw/LAX Transit Corridor calls for the maintenance facility to be procured separately nearly a year later than the alignment contracts (Contracts No. 1 and No.2). This is due primarily to unanticipated delays experienced in the environmental review process for the maintenance facility and consequently its readiness to be put out to bid. That said, both the major DBcontract work and the maintenance facility are anticipated to start construction at approximately the same time, in mid-2013. The recommendation of Option 2 assumes that Metro is able to align the procurement schedules and include the maintenance facility in a larger DB package comprised of the civil works components.

In addition to the two DB options considered in this analysis, DBFM was also evaluated as a third potential option. While a DBFM concession (Option 3) also ranks highly in this analysis and has potential to satisfy some of Metro's P3 program goals and criteria, the advantages do not merit recommendation of this procurement approach, for the following reasons:

- **Cost savings already captured by the change from Design-Bid-Build to a Design-Build procurement approach.** As noted earlier, Metro has already taken advantage of a primary driver of cost savings during the design and construction phase of the Project by selecting Design-Build as its procurement approach.
- **Non-vehicle maintenance component too limited to result in major efficiencies.** Based on Metro's historical LRT O&M cost experience as reported to the National Transit Database, any additional cost savings to be achieved through the transfer of risk associated with a DBFM concession are likely to be limited, as the non-vehicle maintenance costs included in the concession would comprise less than 10% of total O&M costs for the Project. The transfer of limited maintenance responsibilities to the private sector provides similarly limited opportunities for efficiencies and economies of scale.
- **Suboptimal risk transfer achievable under Design-Build-Finance-Maintain based on existing project definition and characteristics**:
    - **Project components insufficiently "ringfenced" from rest of Metro rail system.** The current operating scenarios propose to split service at the Aviation interlocking with Metro vehicles proposed to operate on what would be privately maintained track along the Crenshaw/LAX Transit Corridor. This interface with the existing Metro Gold Line makes it more difficult for Metro to "ringfence" a privately-maintained asset and monitorthe Private Partner'sperformance. This will be further exacerbated upon extension of the Green Line to South Bay and LAX Airport, as these other lines will traverse the Crenshaw/LAX Transit Corridor to access the Southwestern Maintenance Yard and would likely be operated as through-routed service. The outcome of such lack of ringfencing may be ongoing disputes over responsibility for potentially diminished service quality.
    - **Difficult to tie availability payment to performance monitoring due to lack of ringfencing.** Without a more comprehensive degree of control over the system, including operations and maintenance of rolling stock components,

Metro may find it more difficult to shift risk to the private sector. In addition, a potential Private Partnermay be less willing to accept the risk associated with a long term availability payment-based contract.

- **Private financing unlikely to further enhance project funding profile.** In light of Metro's funding availability and schedule and its ability to access low-cost financing, there is limited potential for private financing to mitigate the funding risk associated with the Project. The Crenshaw/LAX Transit Corridor benefits from a strong local contribution in the form of Measure R, and the timing of those funds is already well matched to the construction cost curve. Metro currently has access to lower-cost financing through the TIFIA program and may also benefit from the use of interest-subsidized debt in the form of proposed Qualified Transportation Improvement Bonds.
- **Need to address challenges associated with sources of funding for availability payments.** With regard to funding and financing, there are challenges associated with the use of availability payments for the Crenshaw/LAX Transit Corridor and Metro transit projects in general that Metro would need to address prior to the implementation of a DBFM contract, including:
  - Limitations on Metro's ability to enter into long-term concession agreements due to the sunsetting of Measure R in FY 2039;
  - Restrictions on the use of Proposition A and Proposition C funds for transit projects with an underground component.

Consideration of a Comprehensive DBFOM Option

Building upon the findings of the assessment of alternative project delivery options, the Consultant Team continues to view a comprehensive DBFOM option as having high potential for cost savings to Metro over the long term. Such an option would require broadening the Project scope to include the rolling stock and non-vehicle maintenance components as well as operations of the existing MGL and Crenshaw/LAX Transit Corridor.

Expansion of the Project scope to include a broader spectrum of O&M as well as other related LRT lines would address some of the deficiencies associated with a DBFM approach (Option 3) identified above. Specifically, it would address the "ringfencing" issues and the scale of risk transfer achievable for Metro. Indeed, a more comprehensive transfer of maintenance and lifecycle responsibilities under a comprehensive DBFOM approach would allow for any fixed and managerial costs incurred by the Private Partner during the ramp-up phase of operations to be spread out over a larger system and length of track. As such, it may offer greater opportunity and incentives for the developer to realize efficiencies and economies of scale, leading to measurable long-term cost savings for Metro compared to the Base or Alternate DB approaches (Options 1 and 2).

In comparison to DBFM Option 3, a comprehensive DBFOM including the existing Metro Green Line presents an optimal scenario with respect to the monitoring of asset performance, as many of the system interfaces between Metro and the developer are eliminated or otherwise mitigated. Co-joining the lines would create one continuous system to maintain, with greater ease of oversight for Metro in terms of contract management. It would also allow for potential expansion of the concession scope over time as new Green Line extensions to LAX Airport and the South Bay are added.

Metro might also potentially benefit from equipment upgrades that the developer would elect to perform on the existing MGL sooner than they would otherwise be implemented under Metro's replacement schedule. Such upgrades could potentially result in improved service reliability for passengers and in lower lifecycle costs for Metro. Signaling technology, for example, has changed rapidly in the past ten to fifteen years since construction of the MGL, with solid state signaling systems now replaced by modern computer-based signaling. The developer might choose to re-signal the existing MGL with the newer technology to remove any operational interface or incompatibility with the Crenshaw/LAX Transit Corridor. This type of upgrade would provide for much more efficient operations and probably greater capacity on the network.

In its recent February 2010 State of Good Repair (SOGR) Assessment, for example, Metro inventoried the known capital maintenance needs for the MGL and identified a number of elements, including wayside systems, elevators, communications and signaling equipment that would need to be replaced over the proposed 35-year concession period. A more thorough SOGR assessment would need to be performed and made available during the procurement process in order for bidders to appropriately price in the costs of needed improvements and/or upgrades on the MGL.

If Metro were to consider a comprehensive DBFOM at this stage of project development, potential impacts on the current procurement schedule would need to be taken into account. Development of performance specifications for the Project and for the existing MGL as well the re-negotiation of existing labor contracts would both likely lengthen the amount of time needed to procure the project beyond the timeline associated with the current two-step RFQ/RFP process, in which Metro plans to award the two main DB contracts by early 2013.

In addition, the Consultant Team identified a number of additional technical, institutional and regulatory issues associated with the transfer of existing MGL operations to a Private Partner, including:

- Location of the Southwestern Maintenance Yard, which would require vehicles for future Green Line extensions to LAX Airport and the South Bay to operate on track maintained by the Private Partner, thereby potentially creating the issue of a shared interface, assuming that Metro were to operate and/or maintain those extensions;
- Potential effect on the competitive bidding environment for future Green Line extensions ifa Private Partnerhad been previously selected to operate and maintain the existing MGL and Crenshaw/LAX Transit Corridor;
- Lack of institutional precedent for utilizing the provisions of the Transit Design-Build Law (Public Contract Code 20209.5) to implement a comprehensive DBFOM; and

- Section 5333(b) of the Federal Transit law requiring that arrangements be made to protect certain rights of mass transit employees affected by grants of Federal funds for the acquisition, improvement, or operation of a transit system.

The resolution of these issues would further lengthen the procurement process. On this basis, the timeline associated with implementation of a comprehensive DBFOM option for the Crenshaw/LAX Transit Corridor and existing MGL may be inconsistent with Metro's goal of Project acceleration under the "America Fast Forward" initiative. The special status of the Project as the first to be built under this initiative lends greater weight in this analysis to schedule considerations over the potential long-term cost savings and risk transfer under a comprehensive DBFOM concession. Such trade-offs support the recommendation from this analysis to modify Metro's proposed packaging strategy within the parameters of a DB procurement approach, so as to maximize potential cost efficiencies without adversely affecting the Project schedule.

ATTACHMENT E

LOSANGELESCOUNTY
METROPOLITAN TRANSPORTATION AUTHORITY

Public-Private Partnership Program

Regional Connector Business Plan

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EXECUTIVE SUMMARY

Objective

The objective of this business plan is to develop and analyze a range of possible delivery options for the Regional Connector project (Project) and to determine what, if any, role there might be for private participation in the design, construction, financing, and/or maintenance of the Project or of particular project components.

Project Description

The Project will form a crucial link in Los Angeles County Metropolitan Transportation Authority's ("Metro") transit network comprising a 1.9 mile direct light rail link between the Metro Gold Line and the Metro Blue Line and Metro Expo Line terminus, located in downtown Los Angeles. The current plan, documented in the Administrative FEIR/FEIS (May 2011), includes the development of a double track tunnel and three stations along the alignment using a combination of tunnel boring and cut and cover techniques. It is expected that the operations and maintenance for the new section will be folded into existing Metro activities and included as subcomponents of its existing north-south and east-west routes.

The total Project capital cost is approximately $1.367 billion in year of expenditure dollars, including the cost of rolling stock. The planned funding for the project includes $160 million of Measure R funding and $819 million of FTA New Starts funding. It is expected that the majority of the remaining costs will be met from State funding sources, including proceeds from High Speed Rail Bonds and Proposition 1B dollars.

The Project is currently in the preliminary engineering and environmental approval stage of development. The Record of Decision is anticipated in Winter 2012. The administrative draft of the final environmental impact statement/report was submitted to the FTA on June 27, 2011.

This Project is included as one of the 12 designated by Metro and the City of Los Angeles as part of its 30/10 plan, which seeks to use innovative finance and delivery options to advance project delivery faster than would be achievable under conventional options. It was approved by the voters of Los Angeles County as eligible for receipt of Measure R funds authorized by the 2008 referendum.

The Project is one of 6 Measure R program projects selected by Metro following an initial screening completed in Tasks 1 & 2, and an initial quantitative analysis completed in Task 3.

Risk Assessment

The project faces several risks in its delivery. Among the most significant are cost overruns on construction, primarily due to geotechnical unknowns and the complexity of tunneling in an urban environment, inflation due to commodity price changes and impacts on the labor market of delivering the Measure R program, and delay in securing New Starts funding and other planned funding.

Risks such as those summarized above may act to increase the cost of the Project and/ or delay the date of completion. In addition, there are uncertainties in the cost of future maintenance, repair and replacement of tunnel infrastructure, station equipment, signals, track and systems. The risks identified above may be mitigated, transferred or shared by Metro's implementation strategy.

Delivery Options Considered

Two delivery options are considered in this business plan, a Design-Build ("DB") and a Design-Build-Finance-Maintain ("DBFM"), as shown below:

Table 1: Delivery Options Considered

DB option	DBFM option
Structured as either one or two Design-Build contracts covering: Tunnels (includes stations and structural box excavation), design and delivery of the TBM following Metro performance specifications; and other items including stations, track work, systems and systems integration testing.	A single Design-Build-Finance-Maintain (DBFM) contract for design and construction of 3 stations, track, portals, systems, systems integration, design and delivery of TBM following Metro performance specifications. The routine and capital maintenance components would be limited to the tunnel lining to underside of rail, stations and stations fixtures, escalators, elevators and other civil components.
Funding and financing for the project would be as planned in Metro's 30/10 forecast model. Legislation is pending to create a new class of tax credit bond, Qualified Transportation Bonds ("QTIBs") which would potentially lower the overall cost of project financing to Metro. The intent is to use Measure R funds to raise the necessary level of QTIBs to finance capital expenditure.	The private developer would finance a portion of the capital costs to be repaid over the term of the contract within an annual availability payment structure. The private developer would be reimbursed through a combination of milestone payments made during the construction period and availability payments utilizing funds available to the project including Measure R programmed funds. Financing would likely be a combination of tax-exempt and taxable financing discussed in further detail in Section 5 of this business plan.
Metro would perform: ▪ Environmental impact statement and obtaining approvals ▪ Initial design activities (minimum 30% PE work) ▪ Develop performance specifications for the Tunnel Boring Machine (TBM)	Metro would perform: ▪ Environmental impact statement and obtaining approvals ▪ Initial design activities (minimum 30% PE work) ▪ Develop performance specifications for the Tunnel Boring Machine (TBM)

DB option	DBFM option
▪ Acquisition of right of way (ROW) ▪ Utilities relocation ▪ Vehicle procurement ▪ Construction and operations of the Operations Center ▪ Rail operations and maintenance ▪ Routine and capital maintenance	▪ Acquisition of right of way (ROW) ▪ Utilities relocation ▪ Vehicle procurement ▪ Construction and operations of the Operations Center ▪ Rail operations and maintenance

Under a proposed DBFM approach a component of the project capital cost would be paid for by private finance, to be repaid over the life of the contract term (usually 20-35 years) in the form of an availability payment. The availability payment would be paid over time using allocated Metro funds (such as Measure R sales tax revenues).

Private finance sources may include bank debt, private activity bonds, federal credit assistance authorized by the Transportation Infrastructure Financing Innovation Act (TIFIA) and private equity.

Analysis and Results

This business plan seeks to provide a qualitative assessment of selected Project delivery options originally discussed with Metro during Task 3 and throughout this Task 4. The analysis assesses a Design-Build ("DB") option and a Design-Build-Finance-Maintain ("DBFM") option based on Metro's objectives for the Measure R program. These objectives have been summarized as:

- Achieve most cost effective use of public funds.
- Accelerate project delivery.
- Optimize risk transfer.
- Ensure asset quality throughout the lifecycle.
- Provide highest-quality service for the traveling public.

Based on the scope of the Project and Metro's objectives for the Measure R program, two key attributes have been identified which drive the analysis:

- The Project scale: The short length and relatively small amount of civil works construction of the Project make an associated maintenance contract relatively unattractive and costly, given the high amount of overhead such a small contract would have to bear. This "diseconomy" of scale does not appear to be balanced against other economies that could result from transferring maintenance to a private contractor.

- Interface risk: The interface risks for the maintenance of the Project would likely be increased under a private delivery option as the developer would have to interface with existing line components running north-south and east-west, putting not just the Project at risk but the entire central section of the Metro system if outages occurred or reliability issues surfaced.

Overall, based on the limited scope for the project and its crucial location, a Design-Build approach for the Project under which ongoing maintenance and operations are included within the future major line operations by Metro appears to be the most suitable approach. Under this approach, Metro can benefit from risk transfer afforded by combining design and construction into a single contract, minimizing interface risk and scheduling delays and allowing for increased innovation in construction means and methods. By retaining the operations and maintenance within Metro, Metro will achieve the benefits of system integration and economies of scale, given the function of the Project as a connector between two much larger lines and the small physical scale of the civil work.

Private financing options also appear to be infeasible given that one of the primary sources of repayment for any project investment, the FTA New Starts program, has not yet committed to either the amount or timing of the grants sought by Metro for the Project. The heavy reliance on New Starts fundingexposes the Project to significant risks in schedule and cost if funds are not received as they are currently programmed. This is a risk that a developer would not accept.

1.0 PROJECT DEFINITION

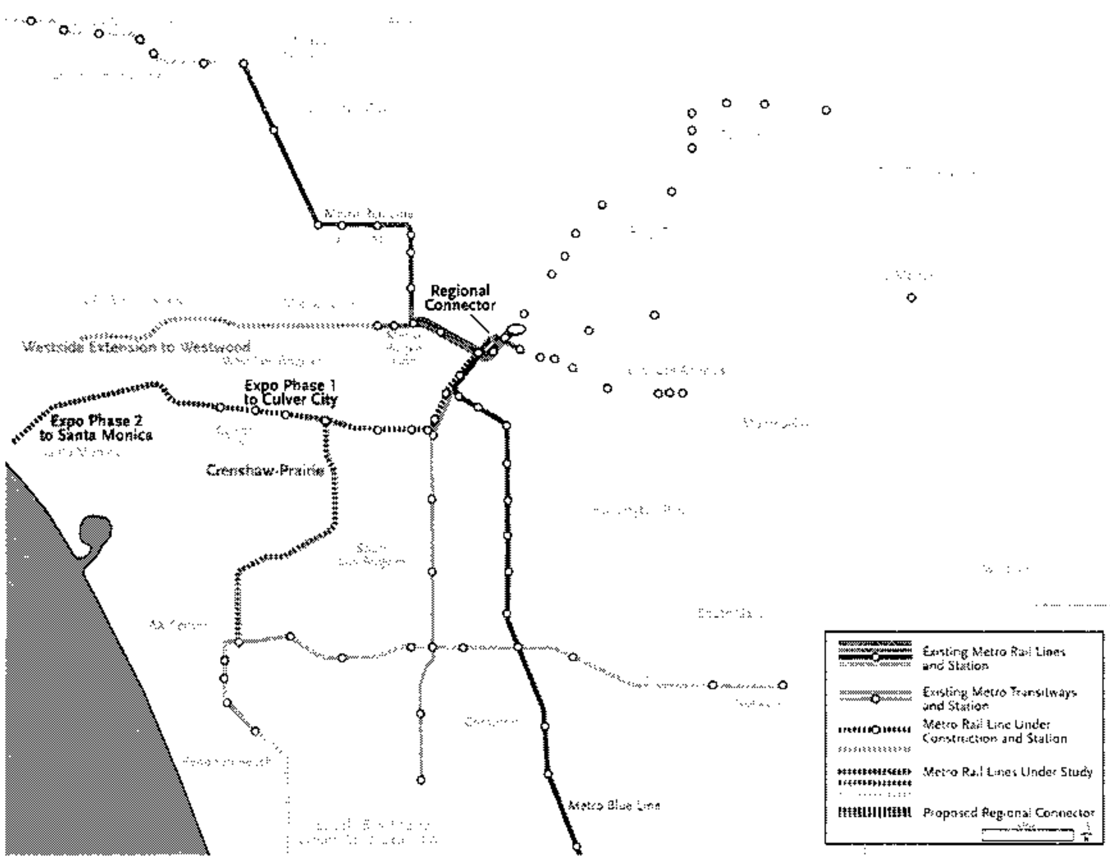
This section summarizes the Project scope as described in the latest Administrative Final Environmental Impact Statement/Report (Administrative FEIS/FEIR) dated May 2011.

1.1. Description of Project Scope

The Regional Connector Project will form a crucial link in Metro's transit network. The Project located in downtown Los Angeles incorporates a 1.9 mile direct light rail link between the Metro Gold Line at Little Tokyo/Arts District Station at 1st Street and Alameda Street and the Metro Blue Line (creating a continuous north-south route) and Metro Exposition Line terminus at the 7th Street and Figueroa Street (creating a continuous east-west route).

The Project is included in the Southern California Area of Governments (SCAG) Regional Transportation Plan for 2008 and Metro's 2009 Long Range Transportation Plan (LRTP). The proposed technology is light rail transit compatible with the current Metro Rail operations for the Metro Exposition Line and Gold and Blue Lines.

Figure 1: Regional Transportation Projects



Source: Administrative FEIS May 2011

The project is included as one of the 12 designated by Metro and the City of Los Angeles as part of its 30/10 plan, which seeks to use innovative finance and delivery options to advance project delivery faster than would be achievable under conventional options. It was approved by the voters of Los Angeles County as eligible for receipt of Measure R funds authorized by the 2008 referendum.

The Project includes double track that would run from the existing platform at the 7th Street Metro Center station and run up Flower Street, curving northeast to connect via two proposed portals with the surface line of the Metro Gold Line to Pasadena and the primarily surface line Metro Gold Line to East Los Angeles.

The Locally Preferred Alternative (documented in the Administrative FEIS/FEIR, May 2011) includes the scope and proposed construction methods described below:

- The design, specification and development of a Tunnel Boring Machine (TBM). The TBM will be inserted to the northeast of 1st and Alameda streets, boring will commence at Central Avenue south of 1st Street and continue excavating westward. Tunnel boring activities would allow tunneling to proceed down Flower Street to 4th Street.
- The tunnel section from 4th Street connecting to the existing 7th Street Metro Center is proposed to be developed using a cut and cover approach. In addition, along Flower Street from 4th to the 7th Street Metro Center, an enhanced pedestrian walkway is proposed, by reducing the number of street lanes.
- Stations are proposed along the alignment as follows:
  - An underground station just south of the intersection of 2nd Street and Hope Street (the 2nd/Hope Street station).
  - An underground station between Broadway and Spring Streets (2nd/Broadway station).
  - An underground station at the Little Tokyo/Arts District, 1st Street/Central Avenue station, partially located within Central Avenue and the northern half of the block bounded by 1st Street, Central Avenue, 2nd Street, and Alameda Street.
- In addition, the scope includes proposals for pocket tracks and crossovers located beneath Flower Street between 5th and 6th Streets, just east of 2nd/Broadway station, near 1st and Alameda Streets and in the tunnel just north of the 1st Street and Central Avenue station.
- Traction power substation (TPSS) facilities are proposed at along Flower Street between 5th and 4th Streets and underground in the 2nd/Broadway station.

The operations and maintenance functions of the Regional Connector are planned to be incorporated into the existing operation and maintenance of the Metro Gold Line, Exposition Line and Blue Line.

1.2. Summary of Project Construction Costs and Schedule

The total project cost included in the Administrative FEIS/FEIR is $1.367 billion in year of expenditure dollars. This estimate has been developed as part of the project Preliminary Engineering work and includes a 30% estimate for contingencies. With the exclusion of vehicles (to be procured separately) and finance charges (Metro allocated costs) the total capital cost of construction estimate for the Project is $1.346 billion.

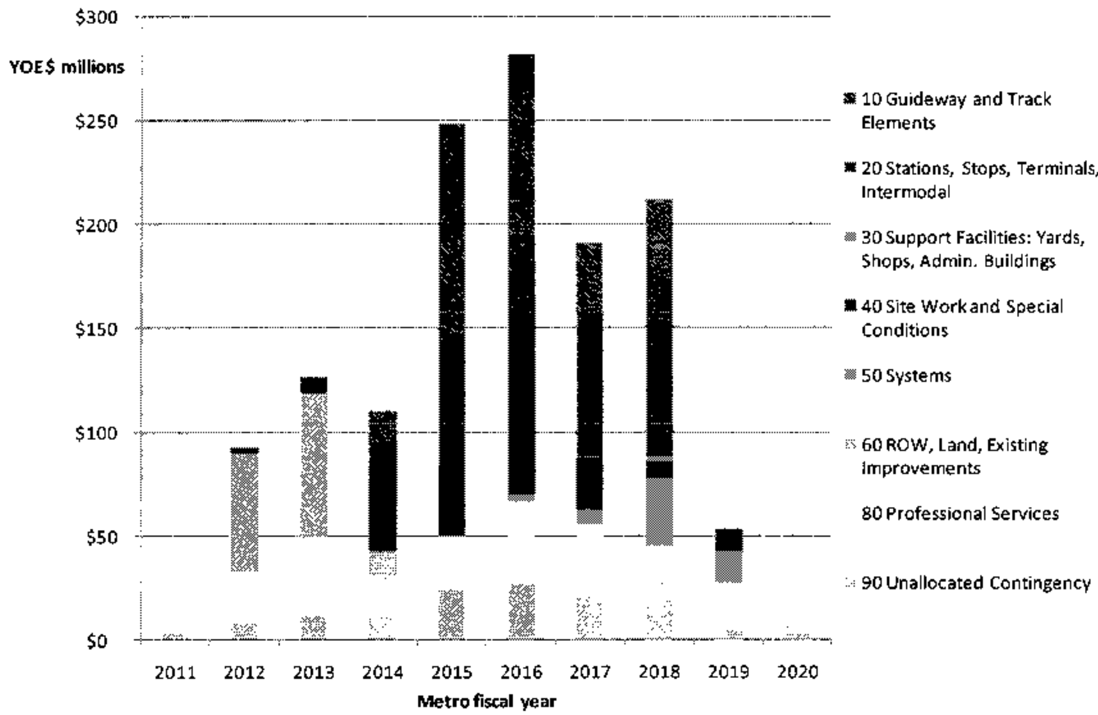
Table 2: Construction Cost Breakdown

FTA Standard Cost Categories $ millions	2010 $	YOE $
10 Guideway and Track Elements	$ 233	$ 275
20 Stations, Stops, Terminals, Intermodal.	$ 271	$ 326
30 Support Facilities: Yards, Stops, Admin. Buildings	$ 2	$ 3
40 Site Work and Special Conditions	$ 139	$ 161
50 Systems	$ 44	$ 56
60 ROW, Land, Existing Improvements	$ 127	$ 136
80 Professional Services	$ 228	$ 265
90 Unallocated Contingency	$ 106	$ 125
Sub total	***$ 1,151***	***$ 1,346***
70 Vehicles	$ 18	$ 20
100 Finance Charges	$ 1	$ 1
Total	***$ 1,170***	***$ 1,367***

Source: Admin FEIS/EIR May 2010

The Record of Decision is expected to be issued in Winter 2012, after which it is anticipated that procurement and securing of funding will be completed. Construction is scheduled to start in 2014, with 80% of total construction excluding vehicle purchase slated to be completed by 2018. The graphic below illustrates the capital expenditure profile for the Project between 2011 and 2020.

Figure 2: Construction Cost Profile, Excluding VehicleCosts



1.3. Summary of Operations and Maintenance Costs

The proposed project will result in the connection of the Metro Gold Line, Metro Exposition Line, and Metro Blue Line resulting in two continuous routes:

- North-South: connecting Claremont to Long Beach using the Metro Gold Line, Regional Connector, and Metro Blue Line tracks; and
- East-West: connecting Santa Monica to East Los Angeles using the Metro Expo Line, Regional Connector, and Metro Gold Line Eastside Extension tracks.

Light rail trains will operate on these routes at 5 minute intervals. The addition of the Project is expected to increase Metro's system wide operations and maintenance cost by approximately $14.6 million in 2035 (approximately $7.4 million in 2011 dollars[1]).

Metro has confirmed that the vehicle purchase, expansion of the Metro Operations Center, replacement and the operations of the trains and system components associated with the Project are to be delivered and operated outside the scope of this assessment. The remaining maintenance and lifecycle elements of the Project have been considered in this business plan. These include responsibility for the routine maintenance and lifecycle costs (capital maintenance costs) for the following Project scope components: tunnel lining to underside of rail, stations and station fittings, escalators, elevators and other civil components.

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[1]Source: Administrative FEIS/EIR May 2011, page 6-15 describes LRT only cost impacts

1.4. Summary of Implementation Schedule

The implementation schedule for the Project is subject to continuous change. For the purposes of this report, the schedule for implementation of the Project following the Record of Decision is as shown below.

Table 3: Project Timeline

Milestone	Timing
Final EIR/EIS	Summer 2011
FTA Record of Decision	Winter 2012
Final design	1 – 2 years
Construction	4 years
Revenue service begins	2019

Source: Administrative FEIS/FEIR May 2011

Assuming the Project is procured under a DB or DBFM, procurement would likely be initiated after ROD and the contract awarded concurrent with the completion of Preliminary Engineering activities. The developer would then be responsible for completion of final design as part of the DB or DBFM contract.

1.5. Summary of Project Funding Sources

Metro has allocated a total of $1.367 billion in public funding for the Project from a variety of local, state, and federal sources, as summarized below. This funding amount includes the procurement of vehicles and Metro's project financing costs.

Table 4: Metro Funding Plan

Metro funding plan	YOE $ millions	% of total funding
Federal sources		
Section 5309 - New Starts (60% of Costs)	$ 819.60	60%
State sources		
High-Speed Rail Bonds	$ 114.90	8%
Proposition 1B	$ 149.60	11%
Regional Improvements Program Funds	$ 2.00	0%
Local sources		
Measure R Sales Tax-backed QTIBS	$ 160.80	12%
Lease Revenue	$ 0.20	0%
LONP Reimbursement Fund 3562	$ 78.90	6%
Local Agency Funds (3% of Costs)	$ 40.90	3%
TOTAL SOURCES OF PLANNED CAPITAL FUNDING	***$ 1,366.90***	***100%***

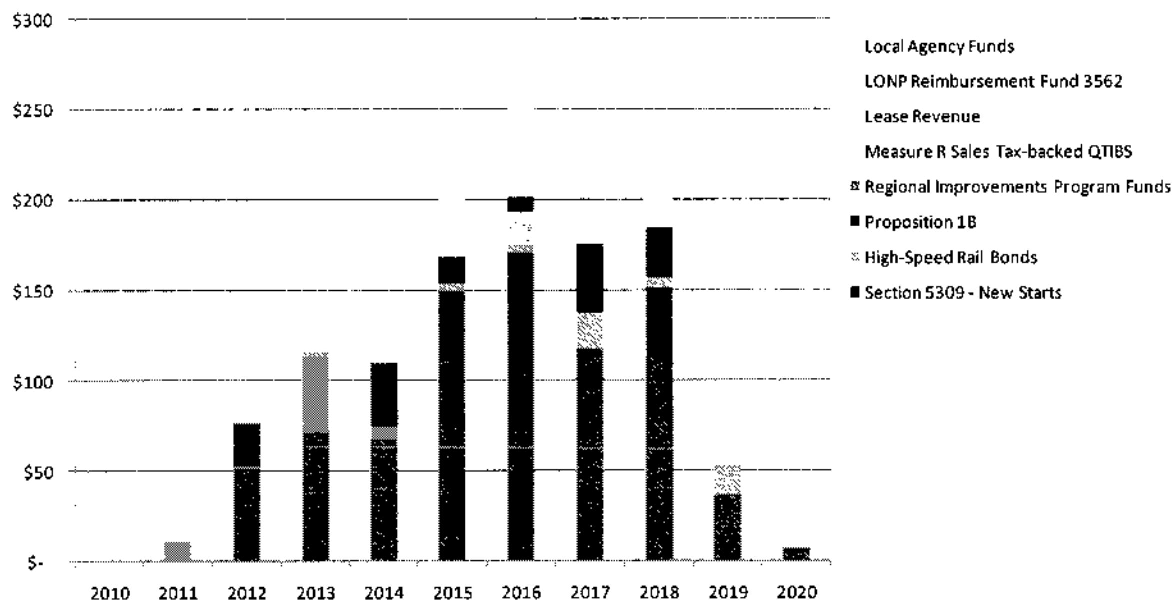
Source: Administrative FEIS/FEIR May 2011

The Project funding plan relies heavily on an FTA New Starts contribution of $819.6 million, or 60% of the total funding required. The funding plan shown (refer to Figure 3) includes FTA funds drawn in 2012, which assumes the securing of a Full Funding Grant Agreement (FFGA) following ROD expected in Winter 2012.

Other major planned funding sources include State transportation bonds, including High Speed Rail Proposition 1A and Proposition 1B funds, at $114.9 million and $149.6 million, respectively. High Speed Rail bonds are subject to approval by the State legislature.

Measure R sales tax revenues totaling $160.8 million have also been programmed for the project. Metro plans to issue a new form of sales tax revenue bonds dubbed "QTIBS" secured by these revenues. The accelerated project schedule presumes the availability of two federal programs to leverage Measure R dollars, the Transportation Infrastructure Finance Innovation Act (TIFIA) and Qualified Transit Improvement Bonds (QTIBs). As Measure R sunsets in 2040, this analysis presumes that all financings backed by Measure R mature by that date.

Figure 3: Metro Forecasting: Regional Connector (Aug 2010)



Source: Metro Blue Book funding profile

During the construction period starting in FY 2012, the "early" funding sources currently programmed to support the Project's capital costs include FTA New Starts, High Speed Rail Proposition 1A bonds and LONP Reimbursement Funds, with proceeds from Measure R-backed QTIBs scheduled to occur later, beginning in FY 2015. The Proposition 1B allocation of $149.6 million includes an initial expenditure of $24.9 million in FY 2012, with the majority of the allocation spent later in the construction phase from FY 2014 to FY 2018. Local agency contributions represent the last dollars in, along with the closeout of the FTA New Starts FFGA in FY 2019. The risks associated with the timing and quantum of funding from these various sources are discussed in Section 3.4.

1.6. Environmental Impact and Process

The Metro Board approved the Draft Environmental Impact Statement / Environmental Impact Report (EIR/EIS) and the Locally Approved Alternative in October 2010. The final EIS was published in the summer of 2011 and the Record of Decision for the Project is expected in Winter 2012.

2.0 EVALUATION APPROACH

This section describes Metro's goals for the P3 program and provides details of the methodology used to develop and assess the delivery options for the Project.

2.1. Objectives of the Business Plan

Under this Task4 of the P3 Program, the InfraConsult Team has been requested to develop a business plan, including a review and analysis of potential delivery options for the Project, one of 6 Measure R program projects selected by Metro following an initial screening completed in Tasks 1 & 2, and an initial quantitative analysis completed in Task 3. The objective of this business plan is to analyze a range of possible delivery options for the Project.

The objective of this business plan is to develop and analyze a range of possible delivery options for the proposed Project and to determine what, if any, role there might be for private participation in the design, construction, financing, and/or maintenance of the Project or of particular project components.

The business plan includes a summary description of the Project followed by an analysis of key Project information relevant to delivery options: scope, schedule, cost, funding and risk. This Project information is used to develop a short list of potential delivery options in accordance with the following assumptions:

- rolling stock will be procured separately by Metro;
- rolling stock maintenance will be performed by Metro; and
- vehicle operations will be retained responsibilities for Metro.

In addition, Metro has opted to utilize a Design-Build approach for the Project delivery.

Therefore, these considerations limit the range of potential delivery options to be analyzed to those along a spectrum of risk transfer alternatives beginning with Design-Build and moving through to Design-Build-Finance-Maintain. These are:

- Design-Build (DB) - under which Metro would transfer responsibility for final design and construction to a DB contractor and retain the responsibility for operations, maintenance and finance. This option will be used as a *"base case"* for the analysis;
- Design-Build-Finance (DBF)-under which a private developer would initially finance the construction as well as design and construct it;
- Design-Build-Finance-Maintain (DBFM)- under which a private developer would take the responsibility for design, construction, financing and maintenance (non-vehicle) under one P3 contract.

The DBF option,also sometimes called turnkey,was not included in the analysis as the Project does not fit the typical profile for successful DBFs, for the following reasons:

- DBF is typically attractive for smaller projects, usually less than $500 million - with repayment profiles matched to the tenor of available contractor financing, which today is less than 10 years. The Project is greater than $1 billion, and has access to longer term bond financings in the 30-40 year range.
- DBF is typically used where the profile of project expenditures does not match the timing of expected funding. Most commonly, it is used to pay for construction, with the contractor then being repaid immediately upon Project acceptance or within a few years afterward. Metro's Project funding plan is expected to provide funds necessary for construction when they are required, assuming that the assumptions on timing of grant funds within that plan are credible.
- The underlying financing costs for a DBF reflect the contractor's cost of money, and will generally be far higher than the cost of Metro's funds. In addition, the financings will be taxable, and, all else being equal, will carry an interest rate 30 to 40 percent higher than the tax-exempt rates accessible to Metro.

The conclusions of this business plan are based on the advantages and disadvantages of the selected delivery options and the extent to which the options meet Metro's evaluation criteria relative to the current delivery option that Metro is understood to be following for this Project. The analysis is qualitative in nature and does not attempt to calculate or compare the cost of each option.

2.2. Program Goals

As part of its Public-Private Partnership (P3) Program, Metro identified five major goals and related evaluation criteria for delivery of its Measure R program. The criteria were used to assess the relative ability of various project delivery approaches to achieve these goals, including cost certainty, cost savings, schedule certainty, project delivery acceleration, risk transfer optimization, lifecycle cost savings, and service quality. These goals are:

- **Optimize risk transfer.** By allocating risks to the party best able to manage them, an optimal risk profile may be achieved. The benefits of this approach include enhanced certainty of project price and delivery schedule.
- **Achieve the most cost-effective use of public funds.** Metro has identified cost containment as a major policy consideration in the implementation of its Measure R program. By exploring alternative delivery options, Metro may be able to leverage public sector funds and resources, achieve price certainty and enhance value for money.
- **Guarantee timely project completion and/or accelerate project delivery.**Schedule certainty is of great importance to Metro, both for financial and public acceptability reasons. The delivery of projects on-time enhances credibility with the public and allows for better budget management and planning. Metro has identified a desire to accelerate transit project delivery as the region's highways face increasing capacity constraints.

- **Ensure asset quality throughout project lifecycle.** Metro's objectives for the P3 program include ensuring that the ongoing quality of assets included in the project scope is maintained to a high standard throughout the proposed analysis/contract period.
- **Provide highest-quality service for the traveling public.** Regardless of project delivery model, Metro has identified a key objective to be that the quality of service should match the same high performance standards that Metro already offers.

As shown in Table 5 below, example evaluation criteria were developed to guide the assessment of each project delivery option's potential to fulfill the goals of Metro's P3 Program.

Table 5: Metro P3 Program Goals and Example Evaluation Criteria

Goals	Example Evaluation Criteria
Optimize risk transfer	Transparency/availability of information for private sector to price risks and submit "fixed price" bid. Ease of modifications required to adapt existing service contracts. Flexibility of the proposed project to enable private-sector innovation. Compatibility of procurement method with regulatory requirements (Buy America/labor law/local hire/alternative fuel/green construction policies, etc.). Ability of private sector to comply with insurance requirements (potential capacity issue)
Achieve a cost-effective use of public funds	Price certainty to LA Metro. Certainty and quantum of project funding streams, both short and long term. Maximum leveraging of public funds. Ability of option to provide greater access to alternative sources of finance. Metro control over fare setting and revenue sharing with private sector partner.
Guarantee timely completion-Accelerate project delivery	Ability to guarantee schedule certainty. Potential to accelerate project delivery.
Ensure asset quality throughout lifecycle	Ability to measure/monitor contractor performance/output on lifecycle.
Provide highest-quality service for the traveling public	Ability to achieve operational performance/quality and safety for the traveling public.

2.3. Approach for Evaluation of Alternative Delivery Options

The analysis of alternative delivery options has been completed in two stages. The first stage is to identify and summarize risks identified to date for the Project and documented by the Metro Project team. To do so, the team held a multi-day risk workshop, during which the Project was evaluated against various components of work expected to occur during its development, delivery, and operating phases. Each was then assessed as to what could affect a positive outcome, and the likelihood of each risk actually occurring was ranked. The resulting matrix, known as a risk register, became the foundation for the mitigation analysis phase of the assessment, which measured each of the potential project delivery mechanisms against each risk and ultimately, against Metro's goals.

The main categories of risks looked at were:

- Construction risks;
- Operational and maintenance risks; and
- Funding and financial risks.

This analysis is described in detail in Section 3 of the report.

3.0 PROJECT RISKS

This section presents a qualitative summary of the technical, financial and economic risks that Metro may encounter in delivering the Project, regardless of the adopted procurement approach. The focus is mainly on technical risks related to meeting the project objectives with respect to cost, schedule and quality.

The analysis is split into three sections representing the main areas of project delivery risk:

- Risks that may impact design and construction costs and completion date;
- Risks that may impact the cost of long term asset maintenance, rehabilitation and replacement; and
- Risks that may impact the project from a funding, financial and economic perspective.

Metro has carried out several analyses on the construction cost and schedule risks associated with the delivery of the Project. The information in this section has been extracted and summarized from three main sources:

1. Regional Connector Transit Corridor Risk Contingency Management Plan dated October 29th, 2010;
2. Regional Connector Transit Corridor Administrative Final EIS/EIR dated May 9th, 2011; and
3. Risk Management Monthly Progress Report dated June 2011.

In addition to these Metro sources, the discussion below also incorporates risk analysis carried out by the InfraConsult team as part of its Task 3 Strategic Assessment report.

3.1. Summary of Key Project Risks

Key project risks are summarized as below:

- **Increase in project capital costs due to inflation.** This can be driven by both demand and supply at global and regional levels. A major impact can occur when actual cost inflation exceeds the estimated / forecast rate of inflation included in the financial forecast. While inflation has been stable for many years, economic direction and inflation projections are currently subject to widespread conjecture and disagreement in the near term.
- **Difficulty in estimating right-of-way costs.** In recent years both national and regional property values have declined following many years of growth, often above historic averages. Uncertainty exists regarding the potential recovery of the property market, both in terms of timing and forecast annual growth figures. Combined with specific site conditions, this will greatly influence the uncertainty of right-of-way acquisitions for the Project.

- **Increase in capital costs due to concurrent implementation of multiple large infrastructure projects within Los AngelesCounty.** This has the potential to impact the availability of qualified labor causing labor price pressure. If there is insufficient qualified labor, capital cost escalation can occur through unit cost increases over and above those forecast in the project budget. Qualified labor includes design and project management professionals as well as construction workers.
- **Schedule delays which impact costs will lead to overall cost delays, both in cost escalation and increased professional service costs.** Schedule delays are often caused by a change in scopes of work, delays to local permitting and approval processes, stakeholder negotiations and agreements, right-of-way acquisition, utility relocation, procurement and authorization delays, and general construction delays.
- **Scope change and design risk can have a significant impact on the project budget.** Cost increases occur as a result of unexpected ground, geological and environmental conditions and unknown or unexpected utility relocations.
- **Delays associated with project funding.** The primary funding sources for theProject are not yet fully authorized. New Starts and High Speed Rail bond funds require approvals from the Federal Government and the State Legislature. Measure R revenue can fall below projections, effecting the timing of their availability for the Project expenditures. Delays in receipt of funding and financing and potential changes in scope that require additional funding amounts could potentially affect Metro's ability to deliver the project within budget.
- **Construction phase risks.** Construction phase risks arise from uncertainties such as project scope, physical constraints, stakeholder needs, contractor performance and the occurrence of unforeseen events that ultimately act to increase or decrease the final cost of the Project and accelerate or delay its completion date. As design progresses many of these uncertainties will be resolved; for example, uncertainty in ground conditions will be reduced following more extensive geotechnical investigations. Until the issues are resolved, these risks will be allowed for in the cost and schedule of the Project in the form of contingencies.

The following list summarizes the main risks that may impact the Project's schedule and cost during the construction phase:

Interoperability of other parts of the network: The Project will connect existing operating lines in downtown Los Angeles, inevitably creating challenges in operating the system network-wide:

- The expansion of the Metro Operations Center may not be completed in time for the Project, and/ or additional shared costs towards the expansion of this facility may be allocated to the Project if other 30/10 planned projects are cancelled.

- Design changes possibly required by the separately designed and procured systemwide train control system could increase the final cost of the current Project cost estimates include only preliminary estimates for these components.

Complex site conditions: There are a number of complex site condition issues related to delivery of this Project:

- Any delay in the relocation of the 75" storm drain at Alameda Street could delay construction.
- The potential presence of Volatile Organic Compound (VOC) contaminated soils, such as were encountered during the construction of the Red Line in the late 1980s and early 1990s. Current treatment facilities may not have sufficient capacity and therefore treatment of the contaminated soils could add to the Project cost by requiring construction of treatment facilities or long-distance shipping to distant facilities.
- Uncertainty over the depth of the existing utilities, particularly at intersections in the cut and cover sections of the project. This could lead to an increase in complexity of the utility relocations and subsequent increase in preliminary engineering work.
- Geotechnical properties associated with the Fernando formation, potentially indicating softer ground that the current characterization has indicated. Mixed ground and face conditions can often lead to delays in tunneling operations.

Complex construction and design issues associated with a project of this nature: Extensive tunneling and underground work will lead a number of technical challenges on the Project:

- Uncertainty over the fire life, ventilation and safety strategy and design. Computational fluid dynamics and simulations have not been carried out to determine the overall ventilation requirements. If the project is ultimately required to comply with NFPA 130 this could have significant impacts on the ventilation required and the current cost estimates associated with additional work.
- Complexities and methodologies of constructing the deep stations at 2nd and Broadway and 2nd and Hope Street. These stations are currently planned to be constructed using cut and cover but the depth, of up to 130 feet, may exceed the practical depths of using soldier piles. If it became necessary to change the construction methodology to mined excavation rather than cut and cover, the Project cost would likely increase significantly, and the schedule could well need to be extended.

3.2. Operations Phase Risks

Predicting maintenance costs while still in the preliminary engineering phase is quite problematic, due to the unknown final scope of the Project, as-yet unspecified mechanical and electrical equipment, uncertainties about actual operating procedures, the complex interaction between preventive maintenance and replacement cycles, and the difficulty of predicting economic factors such as inflation that have significant impact on the cost of future activities.

The following list summarizes the main risk issues that may impact the cost of long term asset maintenance, rehabilitation and replacement:

- Uncertainty in using past cost data to predict future costs.
- Uncertainty in real growth of maintenance costs over an extended time period (note that the Project operations and maintenance estimate only provides the cost in a single horizon year, 2035).
- Increases in the cost of materials, utilities, labor and equipment beyond that originally projected.
- Unexpected soil conditions that may reduce the life of the subsurface structures, for example corrosion of tunnel lining and tunnel / station steel reinforcement from acidic soil.
- Deferred or poorly performed routine maintenance which could accelerate the deterioration of assets resulting in reduced life and higher costs of major rehabilitation or replacement.
- Obsolescence of system components such as communications, signals and other systems.
- Excessive wear and tear due to change in conditions that exceed design specifications, e.g. higher than expected volume of passengers using elevators and escalators.
- Uncertainty in cost of equipment replacement, not only of the equipment itself but the soft costs of installation e.g. due to restricted working hours, working at night etc.
- Poorly installed equipment / low quality components / poor quality construction that might result in increased maintenance costs and an unexpected need for replacement outside of warranty period.
- Change in maintenance standards, procedures and safety standards such as working hours.

3.3. Funding Risks

This section summarizes the risks faced by Metro in delivering the Project within the planned funding approach, specifically risks associated with the following areas that may impact the Project delivery:

- Variations in the timing of planned and programmed funding availability;
- Changes in the amount of available Metro funds; and
- The ability to secure requested amounts of State and Federal funding.

The following is a discussion of the specific risks associated with the various funding sources that are currently planned for the Project.

3.3.1. FTA New Starts

Prior to award of the FFGA, the Project funding plan remains at risk of changes in both the quantum and timing of funds anticipated from the FTA News Starts program. In its FY 2011 budget, the U.S. House of Representatives has proposed a cut of 30% to the overall FTA New Starts program, and there is yet no agreement within Congress on a longer term authorization for the program.

Given the uncertainty surrounding a timeframe for a surface transportation reauthorization bill in Congress and the potential for a significantly reduced future budget for the New Starts program, there may be limits imposed on the amount of annual FTA funding that Metro can receive both for individual projects and collectively as an agency (i.e. for its other New Starts projects that are scheduled to be constructed during the same period). Should these limits materialize, it may be necessary to reduce the Project's reliance on New Starts funding to a level below the current 60%.

With such a large component of the Project costs being funded from one source, the uncertain level of federal funding available for the New Starts program presents a significant risk to the Project schedule and cost.

3.3.2. High-Speed Rail Bonds (Proposition 1A)

In November 2008, California voters approved Proposition 1A authorizing the issuance of up to $9.95 billion in general obligation bonds for the construction of a statewide high-speed rail system, including $950 million for local or regional feeder systems that would enhance ridership and patronage on the overall system. The Regional Connector is currently programmed to receive $114.9 million in High-Speed Rail (Proposition 1A) Bonds. The issuance of these bonds is contingent upon the approval of the State Legislature. Recently, Governor Brown exercised his line-item veto authority to reduce Proposition 1A funding for feeder systems from $154.3 million to $7.0 million for FY 2012, citing the lack of a "comprehensive statewide rail plan." Any delays in future legislative approval could jeopardize the timely completion of the project.

3.3.3. Proposition 1B

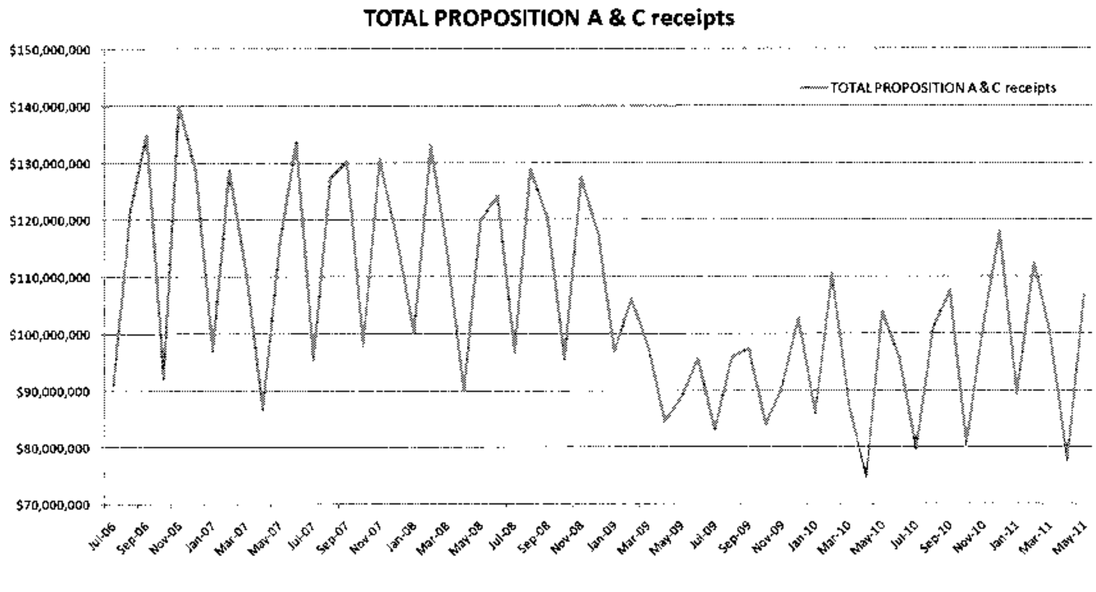
Proposition 1B funds are to be allocated to the Project from the Public Transportation Modernization, Improvement, and Service Enhancement Account (PTMISEA) subaccount. The project is part of the FY 2011/12 budget cycle allocation. Funds from this source must be encumbered and fully liquated by June 2017.

The recent delay of bond sales has already impacted the availability of PTMISEA funding for the both the FY 2008/09 and FY 2009/10 cycles. Any further deterioration of the State's fiscal health and/or credit rating could delay the availability of Proposition 1B funding for the Project, negatively impacting the schedule.

3.3.4. Measure R

Measure R funds totaling $160.8 million have been programmed for the Project. Measure R funds are dependent on the collection of the sales tax, driven by the local economy and as a result, reduced sales tax collections due to poor economic times may impact Metro's ability to deliver the entirety of its Measure R transit program including the Regional Connector. An indication of the recent volatility in sales tax revenues can be seen from the receipts for Proposition A and Proposition C for the past five years.

Figure 4: Sales Tax Receipts for Prop A and C



Source: LA Metro website

In contrast to other transit projects comprising its broader "30/10" or "America Fast Forward" initiative, such as the Westside Subway Extension, Metro has programmed all Measure R revenues for the Regional Connector in the first decade of the 30-year sales tax measure, in a manner generally congruent with the construction cost curve of the project from FY 2012 through FY 2019. However, it may choose, at its option, to leverage those funds through the issuance of bonds to allow other projects to proceed earlier.

Proposed amendments to section 54 of the Internal Revenue Code would create a new class of qualified tax credit bonds, Qualified Transportation Bonds ("QTIBs"). QTIBs are taxable bonds issued by state, local or other eligible issuers where the Federal government subsidizes most or all of the interest cost through granting investors annual tax credits in lieu of interest. These bonds are projected to lower the overall cost of project financing for Metro's entire program of transit projects, compared to traditional tax-exempt bond financing. The intent is to use Measure R funds to support the repayment of QTIBs issued to finance capital expenditure on the Project as well as on other projects in the LA Metro program. However, as noted in the previous paragraph, the Project does not require this leveraging mechanism to ensure the availability of sufficient Measure R revenues to meet the capital costs of the project during the construction period.

Therefore, the potential challenges associated with the amendments to section 54 and subsequent enactment of QTIBs legislation at the federal level represents a relatively minor risk to the project's financial viability in the context of the other funding risks discussed above, particularly reductions in FTA New Starts funding and cancelled/deferred transportation bond issuances for Prop 1A and Prop 1B at the State level.

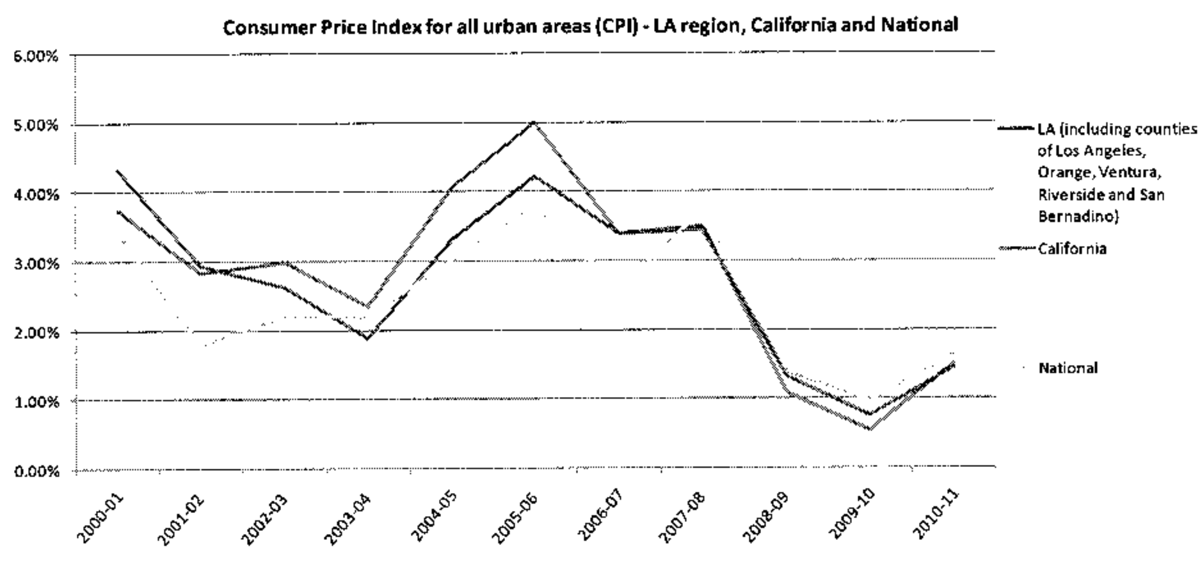
3.4. Economic Risks

The uncertainty surrounding the ability to forecast inflation of costs and revenues over the expected construction timing and operations life of the asset is a fundamental risk. The impact of inflation is influenced by the timing of the expenditures and the demand for the underlying commodities and labor associated with the Project costs. Therefore, the ability to deliver the Project within the funding plan will be impacted by:

- Any delay to the Project schedule, whether to the start of construction or its duration; and
- Higher than projected increases in labor costs and commodities prices which may result from the overheating of the labor market and the scarcity of certain types of building materials as construction demand ramps up after this recession.

The current forecast construction cost inflation for the Project is 2% for 2011 and 3% from 2012 to 2020.[2]Evidence of the variability of forecasts has been provided below, where data indicate that annual consumer price inflation has ranged between 4.99% and 0.54%[3] within the last 10 fiscal years.

Figure 5: CPI Index for LA Region, CA, and National



Source: California Department of Finance

[2]Source: Administrative FEIS/FEIR May 2011

[3]California Department of Finance data website

Overall, the Project faces the risk that an economic recovery combined with the total program demands on commodities and labor will lead to construction and operational costs growing at a faster rate than currently planned by Metro.

4.0 P3 PROCUREMENT OPTIONS ANALYSIS

This section summarizes the delivery options for the Project and describes the evaluation of each option against specific objectives defined by Metro staff.

4.1. Summary of the Design-Build Option

Metro is planning to procure the Project under either one or two Design-Build contracts, covering the delivery of the tunnels (including the stations and structural box excavation) and the design and delivery of the tunnel boring machine ("TBM"), and including the stations, track work, systems and systems integration testing. Metro plans to retain control over the performance specifications for the TBM and for executing necessary utility relocation work. In addition, Metro would retain the following activities outside of the Design-Build contract(s):

- Initial design activities (Preliminary Engineering ("PE") work) for the Project;
- Acquisition of right of way (ROW);
- Vehicle procurement (expected to be done under a system wide rolling stock procurement);
- Rail operations and maintenance, as well as routine and capital maintenance for the tunnel and civil structures. It is expected that these activities will be folded into existing operations on the Metro Gold Line, Metro Blue Line and Metro Exposition Line with the formation of continuous routes both north-south and east-west; and
- Expansion of the Metro Operations Center.

The Project construction costs are to be funded as described under Section 1.5.

4.2. Summary of the Design-Build-Finance-Maintain Option

A Design-Build-Finance-Maintain ("DBFM") approach has been identified in the earlier Task 3 analysis as an alternative that might suit the Project scope and Metro's desire to retain rail operations and rolling stock procurement. This option would be achieved by expanding the Design-Build concept to include components of the ongoing routine and capital maintenance activities, as described below, over a contract term that could be up to 35 years.[4] The DBFM developer would typically be compensated by a series of annual payments linked to the quality of service and availability of the asset for use by Metro.

[4]Denver RTD Eagle P3 – 35 year availability payment deal

4.3. Analysis of the Options

The delivery options have been analyzed against the following criteria, developed from program objectives as defined by Metro staff:

- Optimize risk transfer;
- Achieve a cost effective use of public funds;
- Ensure asset quality throughout the lifecycle;
- Accelerate project delivery; and
- Provide highest-quality service for the traveling public.

4.3.1. Optimize Risk Transfer

A key value driver in project delivery is the allocation of risks to the parties best able to manage them. By seeking an optimal allocation of risk, project best achieves its potential for delivering value for money to Metro. The ability of each project delivery option to transfer risk has been analyzed as follows:

- **Contract size and scope:** As noted above, Metro plans to use a Design-Build approach to procuring the Project, but has not yet decided whether to use one or two contracts. Reducing the number of contracts from two to one will have the positive effect of reducing the number of contractor interfaces; increasing the size and scope potentially allows a greater opportunity for innovation in delivery. Adding the maintenance component under the DBFM approach could lead to further reductions in the risk premium, depending on the size of the maintenance component, by creating a greater incentive on the part of a private developer to manage and mitigate risks by being responsible not only for design and construction but for the maintenance of the asset throughout its lifecycle.
- **Cost and pricing:** It is not expected that the degree to which Metro will be able to transfer construction and pricing risk would be different between the DBFM option and a DB option, as both are based on a design-build contracting approach for the Project construction. Under the DBFM delivery model, however, pricing and inflation risk for the future maintenance component is transferred to a private developer reducing the risk profile retained by Metro, including the following identified risks:
    - Uncertainty in forecasting future costs;
    - Deferred or poorly performed maintenance resulting in reduced asset life and higher replacement cost;
    - Obsolescence of components included under the DBFM contract; and
    - Uncertainty in the cost of equipment replacement.

  Even with those risks transferred, though, it is unlikely that the developer's base cost of maintenance will be lower than Metro's, as it will have to carry a very high overhead for such a small section of the infrastructure. The difficulty of working within a constrained site, in many places deep underground and without adjacent areas for thecontractor's material and equipment storage, and of scheduling crews over such a small Project base, will translate directly in higher costs than would be achievable if the logistical and overhead costs were spread over a wider base. This "diseconomy" of scale is a direct result of the relatively short (1.9 mile) length of the Project.

- **Metro retained risks:**Several items included in the Project scope create delivery risk for the Project that will likely not be fully transferable under either option and for which Metro will retain some shared risk. These include:
    - The construction of deep stations;
    - Geotechnical conditions of the Project right of way;
    - The presence of contaminated soils; and

  These are in addition to those risks that Metro has chosen to retain as its own, such as right of way acquisition and utility relocation.
- **Size of the maintenance component:**Under the DBFM option, maintenance responsibilities for some of the infrastructure are transferred to the DBFM contractor. Due to the small scale of the completed Project, and the likelihood that many of the installed components will need no significant maintenance for years, the size of the maintenance component of the overall contract will be very small. Therefore, it is highly unlikely that the addition of maintenance would cause a developer to be willing to shift risks or returns beyond the construction period, meaning that the Private Partner would expect to be repaid the bulk of construction funds shortly after completion and would not be willing to place them at risk over the life of the asset. (Note: the potential for risk transfer would be substantially increased if the maintenance responsibilities for the existing Metro Blue, Gold, and Expo Lines were included in the proposed DBFM.)
- **Maintenance Interface risk:**While the "DB" portion of the DBFM option may increase the potential for innovation in delivery by allowing for a greater construction scope to be delivered by a private developer, addition of the maintenance responsibility may offset some of those benefits. The location and functionality of the Project create unique interface risks to the entire system, given that it connects two rail lines that run to the north, south, and west of the Project. The areas of responsibility between the various operators, maintainers and contractors will be difficult to define and may well create an environment where disputes occur and prove difficult to resolve. The ability to establish and implement a risk and performance based contract, such as a DBFM, for a central section of the network situated within two existing lines presents a significant challenge and a risk to the Project.
- **Expansion of the Metro Operations Center timing:** The Project's operational start date is dependent on the timing of the delivery of other system wide components, including the Metro Operations Center and vehicle acquisition, which are outside the scope of either option analyzed herein. However, under a DBFM option, which includes an ongoing maintenance component, any delay

to the start of operations caused by Metro would likely result in a claim for developer compensation. This would not be a factor in the DB option.

- **Life cycle maintenance (replacement) risk:** This risk is transferred under the DBFM option for a period of approximately 35 years. The benefits of this risk transfer will have the largest impact on those assets with shorter replacement cycles such as systems and communications equipment, station mechanical, electrical and plumbing facilities, and elevators and escalators. Longer life assets, such as structures and track, have replacement cycles longer than the contract term, and therefore the DBFM contractor's activities will be limited to preventative maintenance for these elements.

4.3.2. Achieve a Cost Effective Use of Public Funds

Achieving a cost effective use of public funds depends on several factors in the Project delivery.

- **Construction pricing inflation:**The risk that project capital costs increase due to inflation and exceed available funding may be transferred to a private developer under both DB and DBFM approaches.
- **Maintenance price inflation:**The risk that the project maintenance costs increase over the term due to inflation and exceed available funding may be transferred to a private developer under the DBFM approach. However, the economy of scale that Metro may achieve using a system wide approach to maintenance may outweigh the benefits of transferring this risk to a private developer.
- **Schedule delays:** In the short term, developing and negotiating a DBFM contract may present a schedule risk to the Project potentially leading to cost overruns due to Metro's relative lack of experience in performance based contracting. In the long term, Metro would be able to manage schedule risk post-commercial close by agreeing to a fixed date delivery agreement under either a DB or DBFM. However, several risks remain with Metro under either delivery option:
    - Metro change orders;
    - Delays in right of way acquisition or property access due to delayed utility relocation;
    - Delays in environmental approvals;
    - Stakeholder negotiations; and
    - Securing federal, state and local funding on schedule.
- **Market capacity:**Maximizing the competitive tension of a procurement process under a DB or DBFM will require a number of sufficiently experienced market participants. The financial close of the $1.6 billion Eagle P3, between Denver RTD in Colorado and private consortium in August 2010 provides indication that there is capacity and interest in the current transit infrastructure market for a Project of this size ($1.3 billion). However, the relatively limited size of the maintenance component of this Project and the potential risks associated with managing only a small segment within a larger network may prove challenging for private

developers and investors and has the potential to limit the responses, and consequently competitive tension.

- **Use of private finance:**A DBFM would allow Metro to better leverage its available public funds, both by bringing private equity into the project and by using private finance to bridge initial funding gaps. By structuring the project as an availability payment over a defined term, Metro may be able to use Measure R funds to make payments to the private developer while not impacting its debt capacity. This would allow for a greater use of funds on hand in the near term and create budget certainty for the entire transit program.

4.3.3. Ensure Asset Quality Throughout the Asset Lifecycle

By combining whole-life maintenance components and replacement responsibilities with the construction of the Project, as under a DBFM agreement, a private developer is able to optimize risk management and increase value engineering opportunities. However, with regard to the Project, these benefits may be limited as discussed below.

- The integrated nature of the Project within the rail network would create difficulties in implementing a performance monitoring system that effectively makes the private developer accountable and incentivizes appropriate behavior.
- A DBFM approach typically incentivizes a private developer to manage the risk of construction and maintenance so as to result in a pre-defined level of service for the public, which if not achieved has a financial impact on the developer through lower payments. This approach relies on an ability to monitor and enforce a performance regime. Such a regime may be difficult to monitor for the Project tunnel components due to the short tunnel length of this Project, however, may be practical for the station elements. Separating out responsibility for the stations and key components such as elevators and escalators would be feasible, either combined with construction or simply as along-term maintenance contract, and is a recommended course of action.

4.3.4. Accelerate Project Delivery

Several risks have been noted that may impact the Project's implementation schedule and timing of operations start. These include:

- Schedule delays that may be caused through changes in scope, delays to permitting, protracted stakeholder negotiations, and delays in site access due to delayed right of way acquisitions or utility relocations, among other general construction delay issues;
- Delays caused through the inability to secure the amount of funding as scheduled to meet project needs; and
- Uncertainty in the completion timing of external components required for the Project operations start date, including the Operations Center and vehicle acquisition.

Both delivery options use a design-build approach to the construction phase, through which the schedule may be accelerated by value engineering opportunities enhanced by combining the responsibilities for design and build – for example, undertaking concurrently early works while design process is still underway. However, under both a DB and DBFM the project schedule will remain at risk of delay through those elements that Metro retains responsibility for both within the Project scope, such as the utilities and right of way components, and outside of the project scope such as delivery of the Operations Center.

Extending the pre-construction period to accommodate a lengthy document preparation and negotiating period for the DBFM could also create schedule delay.

But the largest potential delay arises from the risks associated with the security and commitment of funding sources. If the America Fast Forward plan is unsuccessful and the FTA New Starts Full Funding Grant application is unsuccessful or altered in terms of timing and amount, then a DBFM option based on leveraging Measure R would allow Metro the opportunity to continue with the Project delivery, although perhaps not at the lowest overall cost

4.3.5. Provide Highest-Quality Service for the Traveling Public

Several risks have been noted that may impact the service quality for the traveling public associated with the Project. These include:

- Delays during the construction period for almost any reason can put pressure on all parties to meet the operational start date at all costs. If those costs include short-cutting performance and acceptance testing protocols and schedules or opening for service without full acceptance, there can be a long-term impact on system quality under either a DB or DBFM approach.
- Failure by Metro to enforce the DB contract's construction standards, properly perform acceptance testing, and perform required warranty service could affect long-term system quality.
- Failure to properly manage and monitor the long-term maintenance obligation of the Private Partner under the DBFM may contribute to the risk of reduced service quality if performance of maintenance by the private developer is not clearly monitored through a proper regime and interface risk with Metro rail operations is not effectively managed. The ability to monitor the performance of maintenance services of a private developer within the small section of the line (excluding the station components) will be difficult due to the embedded nature of the project within the network.

4.4. Results of Options Analysis

The analysis has been summarized below.

Table 6: Results of Options Analysis

Objective	DB option	DBFM option
Optimize risk transfer: Construction Maintenance and Ops	A single DB contract may lead to greater innovation as the DB contractor is able to optimize the approach by having greater responsibility. Integration of the Project into the existing transit network is of critical importance. Metro is proposing to meet this risk by using existing operations and maintenance capacity on existing lines to cover the needs of the Project.	A single DB contract may lead to greater innovation as the DB contractor is able to optimize the approach by having greater responsibility. Combining construction and maintenance will lead to better lifecycle planning - Interface risks may occur due to connectivity to two separate lines at the North and South of the Project; - Setting a performance regime that optimizes the risk transfer may be difficult for a Project located within 2 existing lines.
Achieve most cost effective use of public funds	The DB option would include a fixed price DB contract to be funded mainly from New Starts ($819m) and Measure R ($160m).	The cost per mile (Project totals 1.9 miles) associated with adding the additional maintenance component under the DBFM option may not lead to value for money as compared to the DB option, when considering the risk transfer issues described above.
Ensure asset quality throughout the lifecycle	Responsibility for the Project over the life would be met under existing Metro's practices and guidelines.	The DBFM option would likely face challenges in the development and enforcement of a performance regime due to the integrated nature of the Project with respect of the Network.
Accelerate project delivery	Metro is proceeding toward an expected ROD in Winter 2012 for a DB delivery option. A major schedule risk to the Public option delivery is the Project reliance on 60% New Starts funding.	The DBFM option may potentially require a longer lead time due to the additional complexity of a negotiating a performance based contract including a maintenance component.
Provide highest-quality service for the traveling public	It is expected that operations and maintenance responsibilities for the Project will be incorporated within the network.	The Project size may limit the ability to monitor performance and may increase the risk of service quality reduction for non-station components by enhancing interface risk.

The options assessment appears to show that due to the size of the project and its critical importance to the network operations and connectivity, it is likely that the potential costs associated with transferring the responsibilities of any ongoing maintenance component to a private partner would most likely outweigh the benefits of risk transfer and private sector innovation.

However, the ability to leverage Measure R funding as an alternative to the existing funding plan is worthy of consideration.

Given that the Project relies extensively on as-yet approved federal funding from the New Starts program of the FTA, its start date and ultimate schedule are quite dependent on the timing and amount of such grant funding. Should the Project secure a Full Funding Grant Agreement, the amount will immediately be set, but the timing will still be at risk of Congressional budget appropriations and perhaps even re-authorization of the Surface Transportation Act. However, delay in the receipt of funds can in and of itself affect the project cost, as lack of funds when programmed can cause delays which then cause inflation to increase project cost.

5.0 P3 FINANCING OPTIONS

This section describes the components of private finance used in P3 projects and the current P3 financial market.

5.1. Summary of Sources for the Proposed P3 Option

Under the proposed DBFM, the Project capital cost would be fundedpartially by private finance, to be repaid over the life of the contract term (usually 20- 35 years) in the form of an availability payment. Unlike a user-fee based project, where revenues are paid by users and demand risk is transferred to the private developer, under an availability payment structure the contractual payments would be paid over time from Metro funds (such as Measure R sales tax revenues). The payments would be sized to repay debt, to provide a return on invested capital, and to cover the contractual annual maintenance fees.

This difference impacts the financial structure as follows:

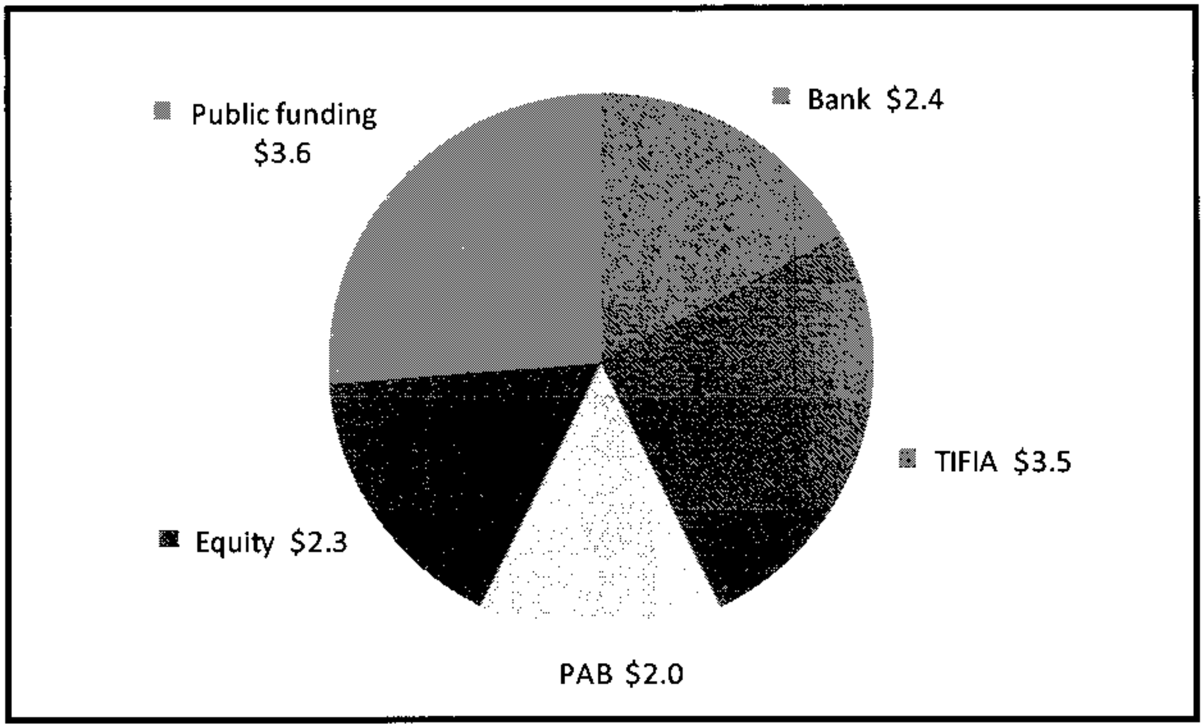
- Depending on the credit of the revenue source, higher levels of debt to equity may be achieved compared to user-fee based projects;
- The required returns for an equity provider may be comparatively lower (compared to user fee deals) due to the reduction in the risk profile; and
- Lenders may require comparatively lower debt coverage requirements and allow shorter 'tails' (a period of time at the end of a P3 contract during which there is no debt repayment, providing comfort to lenders that debt may be repaid).

For transit projects, whose revenues do not cover their operating costs let alone provide for any repayment of capital, availability based financings are the only choice. The cost of financing P3 projects will generally be higher on a pure financial basis than publicly funded transactions that can use long-tenor tax-exempt debt.

5.1.1. Options for Private Finance

Several sources of private finance are available for a project delivery and are discussed below. Debt options available include bank loans, Private Activity Bonds and TIFIA (for transport related projects).

Figure 6:Major Sources of Funds for Transportation P3 Deals 2007 – 2010 (shown in $ billions)



Source: Data sourced from InfraDeals

5.1.1.1 Bank Debt

Due to the dominance of tax-exempt financing in the US, the use of bank debt in US P3 transportation deals has been limited. In December 2010, the Long Beach Court Building, a social infrastructure P3 deal, reached financial close using a short term bank loan. A year prior to that, Port of Miami Tunnel reached financial close using a bank facility of $342 million combined with TIFIA finance of $341 million. Currently, shorter tenors on bank debt mean that this form of capital carries a greater refinancing risk - and potentially higher future cost - than a bond. However, it does have the advantage that proceeds are drawn periodically, as required, avoiding "negative carry" interest costs associated with bond financings. Banks often offer a shorter route to financial close than does the bond market, as the level of documentation and disclosure required is less burdensome and therefore often less expensive to prepare.

5.1.1.2 Private Activity Bonds (PABs)

PABs are tax-exempt bonds issued through a conduit established by a state or local government agency for the purpose of funding eligible expenditures, the proceeds of which may be used by one or more private entities for a qualified project. At this time USDOT is reporting approved PAB allocations of $5.1 billion, out of legal maximum of $15 billion. Recently, Presidio Parkway in Northern California received an allocation of $592 million - with financial close awaiting the resolution of outstanding litigation - and the Eagle P3 transit project in Denver, Colorado reached financial close on $397 million in

PABs in August 2010. PABs offer an all-in cost of debt that can be less expensive than bank debt, as well as a long-dated solution that removes refinancing risk from the table.

PABs include several constraints including

- An allocation must be received from USDOT prior to issuance;
- 95% of proceeds must be spent within 5 years;
- Funds cannot be used to acquire or improve existing assets; and
- Federal rules governing arbitrage on invested funds must be followed.

5.1.1.3 Transportation Infrastructure Financing Innovation Act (TIFIA)

The USDOT competitively awards credit assistance for transportation projects to eligible applicants, which include state departments of transportation, transit operators, special authorities, local governments and private entities. Although not truly "private finance", as the program is funded by the US Treasury, TIFIA is considered a tool that supports bringing private finance to projects.

There are several benefits and challenges associated with TIFIA assistance summarized below:

- A low cost of debt (SLGS rate plus one basis point) – 4.38% for a 35 year loan on July 7th, 2011[5];
- Repayment terms which include accrual of interest and principal to allow projects to overcome early cash flow constraints;
- Demand exceeds funding supply, therefore applications are on a competitive basis;
- Funds permitted are limited to 33% of eligible project costs;
- An investment grade rating is required for facilities senior to the TIFIA loan; and
- The TIFIA office requires the loan to carry a 'springing' lien in the event of bankruptcy such that TIFIA debt ranks paripassu with senior debt.

5.1.1.4 Private Equity

Sources of private equity include financial institutions, pension funds, private developers and infrastructure funds. Equity providers typically provide the smaller share of funding, as compared to debt. For example the Eagle P3 equity component was $54 million, against $397 million in debt (or a 14% debt to equity ratio). Equity providers are paid a return after all project costs, debt service and taxes have been paid. Equity return requirements vary widely based on the project's credit and risk profile, and range from

[5]Source: FHWA TIFIA website

the low teens for availability payment investments to the mid-20s for user fee transactions.

5.1.2. Recent Precedent P3 Transactions

A number of P3 transactions have been completed in the US despitethe financial market turmoil over the last few years. Over $12 billion in transportation infrastructure deals have reached financial close since fall 2007. Most recently, the transit P3 market has witnessed the successful financial close of Denver's $1.6 billion Eagle P3 project. The Denver RTD has transferred the design, build, finance, maintenance and operational responsibilities for the development of a total of approximately 35 miles of commuter light rail in and around Denver, adding connectivity between Denver International Airport and Denver Union station. The concession included responsibility for rolling stock procurement and maintenance anddevelopment of the required maintenance facility. RTD retained control over fares and service levels.

The project was awarded under an availability payment structure to a consortium including Balfour Beatty, Macquarie, Fluor, Uberior Fund and John Laing plc. The financial structure developed by the consortium included $54 million in equity (provided by Fluor, Uberior Fund and John Laing plc) and $397 million in Private Activity Bonds[6], along with $1.03 billion of FTA New Starts money under a Full Funding Grant Agreement.

The consortium will be reimbursed with construction payments of over $1 billion during the design-build period and then paid annual service payments (availability payments) during the operations period. The availability payments have been structured over a 35 year term[7] and are subject to deductions based on service and availability. The availability payment has been divided into two components – an operations and maintenance component which requires appropriation by the District, and a second component payable from and secured by a subordinate lien on the RTD sales tax revenues[8].

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[6]Source: InfraDeals

[7] Source: InfraDeals

[8]RTD PAB Offering Statement

6.0 CONCLUSIONS

This analysis has identified several possible challenges and opportunities in delivering this Project under a DBFM option. These were considered against the criteria developed from program objectives defined by Metro staff:

- Optimize risk transfer;
- Achieve a cost effective use of public funds;
- Ensure asset quality throughout the lifecycle;
- Accelerate project delivery; and
- Provide highest-quality service for the traveling public.

In terms of challenges, there aretwo factors that affect both the ability to optimize the transference of risk to a private developer long term and the ability to achieve effective use of public funds. As these factors are endemic to the Project definition and to its function within the Metro operating system, it is difficult to imagine any options at this point that would minimize the risks associated with each of these factors. The short length of the Project, and the relatively small package of civil works to be maintained after construction, coupled with the strategic importance of this 1.9 mile segment to the interconnectivity of the entire Metro system, together create a risk envelope for private development that is not likely to produce a positive value for money for a full-scale P3 option.

- **Project scale:**The cost benefit of transferring a relatively small maintenance component to a private developer under a DBFM may be minimal for this small segment (1.9 miles) that has strategic importance and interconnection to the network operated by Metro. Both the cost of performance itself and the cost and difficulty in administering such a contract are likely to result in a base cost for a private developer that would be higher than Metro's for doing the same work.
- **Interface:**The interface risks for the Project will likely be increased under a DBFM approach as the private developer would have to interface with the continuous north-south and east-west routes created by the Project. It would be difficult to define a clear demarcation of maintenance responsibilities, diluting the benefit of risk transfer to Metro. Opportunity for risk transfer to a private developer is far greater where the developer is responsible for end to end service of a discrete segment of rail track or line.

In terms of opportunities, private finance offers an opportunity to potentially deliver more projects earlier in the overall Metro program for the same level of funding, depending on the outcome of legislation efforts to amend Section 54 of the Internal Revenue Code, which would enable Metro to leverage Measure R.

The DBFM approach could allow an alternative approach of either raising QTIBs or tax-exempt revenue bonds to allow Metro to leverage public funding sources such as Measure R through availability payments.The downside of using private finance is that it comes typically at a higher cost of capital – this additional cost is outweighed if effective risk transfer to the private developer can be demonstrated in the long term. Given the challengesin this Project associated with interface risk and diseconomy of scale, effective risk transfer may prove difficult.

The reliance of the project funding plan on FTA New Starts funding is a significant risk to project schedule and cost regardless of which delivery option is selected. The project was approved into Preliminary Engineering in January 2011 at which time it is understood that the FTA noted several items of concern including the project cost estimate, the size of FTA New Starts funding included in the plan relative to other funding sources, and the implementation schedule proposed by Metro.

The analysis leads to the conclusion that, based on the limited scope of the project and its crucial location and function, a Design-Build approach for the Project under which ongoing maintenance and operations are retained by Metro appears to be the most suitable P3 approach. Under this approach Metro can benefit from risk transfer and economies of scale within the design and construction component, and Metro can maintain an economy of scale for the operations and maintenance.

An efficient variation would be to carve out non-transportation related critical elements such as elevators and escalators and perhaps even the stations themselves and procure them separately under DBM or even DBFM contracts, linking long-term performance of these easily measurable assets with compensation.

Given this recommendation, the next step would be to specifically identify those assets and their related components for which it would be best to link maintenance to construction and installation and begin developing separate performance standards for them in addition to completing preliminary engineering.

ATTACHMENT F

LOSANGELESCOUNTY
METROPOLITAN TRANSPORTATION AUTHORITY

Public-Private Partnership Program

Westside Subway Business Plan

Prepared by
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EXECUTIVE SUMMARY

Objective

The objective of this business plan is to develop and analyze a range of possible delivery options for the Westside Subway Extension project (Project) and to determine what, if any, role there might be for private participation in the design, construction, financing, and/or maintenance of the Project or of particular project components.

Historically, the Los Angeles County Metropolitan Transportation Authority (Metro) has delivered large infrastructure projects using traditional delivery methods such as Design-Bid-Build. Public Private Partnerships (P3) are innovative contractual arrangementsthat share the project costs, risks and returns between public and private entities to deliver projects more efficiently, quickly and cost-effectively.

Project Description

The Project is an 8.96 mile extension of the existing Metro Purple Line subway with seven stations west from its current terminus at the Wilshire/Western station through Mid-Wilshire to UCLA / Westwood. The proposed technology is heavy rail transit compatible to the current Metro Rail operations for the Metro Red and Purple Lines.

The estimated capital cost of the Project is between $4.17 and $4.49 billion (2010 dollars) or approximately $5.34 billionin Year of Expenditure dollars. Operations and maintenance costs are estimated to be $37.9 million (2010 dollars) in 2035. Funding sources have been identified including Measure R, local agency contributions,State LONP Reimbursement Fund and FTA New Starts – Section 5309.

The Project is currently in the preliminary engineering and environmental approval stage of development. Record of Decision is anticipated in March 2012. The administrative draft of the final environmental impact statement / report was submitted to the FTA on June 27, 2011.

The Project is one of six Measure R program projects selected by Metro for further analysis of P3 potential, following an initial screening completed in Tasks 1 & 2, and an initial quantitative analysis completed in Task 3.

This Project is included as one of the 12 designated by Metro and the City of Los Angeles as part of its 30/10 plan, which seeks to use innovative finance and delivery options to advance project delivery faster than would be achievable under conventional options. It was approved by the voters of Los Angeles County as eligible for receipt of Measure R funds authorized by the 2008 referendum.

Risk Assessment

To deliver the Project, Metro will need to mitigate, transfer or share a significant number of risks. This report builds on the work done by Metro and its consultants in identifying the following key risk areas:

- availability of land including easements and temporary construction access;
- difficult ground conditions including gaseous ground, watery soil, potential subsidence and numerous potential events related to tunneling;
- uncertainty in final scope with respect to final location and alignment of stations and track, provision of allowances for future expansions, environmental and archaeological mitigations (such as relocation and storage of fossils);and,
- uncertainty in the timing and availability of local, state and federal funds.

Risks such as those summarized above may act to increase the cost of the Project and/or delay the date of completion. In addition, there are uncertainties in the cost of future maintenance, repair and replacement of tunnel infrastructure, station equipment, signals, track and systems. The risks identified above may be mitigated, transferred or shared by Metro's implementation strategy.

Delivery Options Considered

Various P3 delivery options were developed as potential alternatives to the Design Build Build (DBB)approach currently being considered by Metro. P3s are contractual arrangements between a governmental agency or authority and a private entity for the primary purpose of developing, operating and/or maintaining public infrastructure normally in the domain of the governmental sector.A variety of P3 models have been utilized throughout the world, having the common objective of facilitating private sector participation in the provision of public works and thereby transferring to or sharing with the private partners some or all of the traditional public responsibility and risks for financing, designing, constructing, maintaining and/or operating various infrastructure projects. P3 options considered in this analysis include several combinations of DBB, Design Build (DB), and Design Build Finance Maintain (DBFM) and are summarized in the table below:

<table>
<tr><th>Alternative</th><th>Number and type of Construction Contracts</th><th>Systems Maintenance</th><th>Infrastructure Maintenance</th><th>Operations</th></tr>
<tr><td>Public Option</td><td>3 x DBB Tunnels
3 x DB Stations
1 x DB Track, Systems</td><td>By Metro</td><td>By Metro</td><td>By Metro</td></tr>
<tr><td>Enhanced Public Option</td><td>1 x DB Tunnels
1 x DB Stations
1 x DB Track, Systems</td><td>By Metro</td><td>By Metro</td><td>By Metro</td></tr>
<tr><td rowspan="2">P3 Alternative 1</td><td>1 x DB Tunnels</td><td>By Metro</td><td rowspan="2">By Metro</td><td rowspan="2">By Metro</td></tr>
<tr><td colspan="2">1 x DBFM Stations, Track and Systems</td></tr>
<tr><td>P3 Alternative 2</td><td colspan="3">1 x DBFM Tunnels, Stations, Track and Systems</td><td>By Metro</td></tr>
<tr><td>P3 Alternative 3</td><td colspan="3">1 x DBFM Tunnels, Rail Yard, Stations, Track and Systems
+ maintenance of existing Red / Purple Line</td><td>By Metro</td></tr>
</table>

The options shown above assume that operations and the procurement / maintenance of vehicles would be excluded. P3 Alternative 3 was developed as an exception to this rule for comparative purposes.

The P3 alternatives contemplate different combinations of DBFM contracts whereby a Private Partner is compensated with an annual payment to cover the maintenance of the facility, the repayment of debt and a return to the equity provider. In return, Metro pays a fixed price, only increased to reflect changes in general inflation and adjusted for poor service quality or lack of availability of the asset.

Under aproposed DBFM approacha portion of the project capital cost would be provided by private investors, to be repaid over the life of the contract term (usually 20-35 years) in the form of an availability payment. The availability payment would be paid over time using allocated Metro funds (such as Measure R sales tax revenues).

Private finance sources may include bank debt, private activity bonds, federal credit assistance authorized by the Transportation Infrastructure Financing Innovation Act (TIFIA) and private equity.

Each option was found to have advantages and disadvantages to Metro as summarized below, with the P3 Alternative 1 ranking the highest when measured against Metro's P3 programmatic goals. Notwithstanding that ranking, the P3 Alternative1 also presents risks in execution to Metro, which as an agency has no experience in procuring, negotiating, and overseeing such arrangements with Private Partners.

Public Option

One of the main advantages of the Public Option is thatthe DBB and DB procurement delivery approaches are familiar to Metro staff throughtheir recent experiences.This procurement structure entails the letting of smaller construction packages, which allow more (and smaller) firms to bid on the Project. Additionally, as is its usual practice, Metro wouldretain control over all maintenance interfaces and activities.

However, the Public Option has significant risks related to the timing and availability of funding that could affect the project's progress. It also has substantial interface risks between designers and contractors and between multiple contractors. Due to the advanced level of design that will have been completed by the time the contracts arebid, there is limited opportunity for contractor innovation in tunneling means and methods and lifecycle enhancements. Under this option, Metro retains the risk of cost and schedule uncertainty for the tunnels, as well as all maintenance, repair and replacement cost risks.

Enhanced Public Option

For the Enhanced Public Option,economies of scale could be achieved by combining contracts into larger DB packages. This also has the added benefit of increased opportunity for innovation in design and construction of tunnels by transferring all design responsibility and risk to the bidders, thus allowing constructability to be front and center during the design process. This option also transfers constructionschedule risk tothe DB contractor for tunnels and stations. And, because the bidders will have full design and construction responsibility, it may be possible to obtain long term warranties on certain construction elements, minimizing some of the post completion risk to Metro.

In the Enhanced Public Option, Metro retains the risks related to the timing and availability of funding, but reduces its exposure to the interface risk between contracts for tunnels, stations and track, which should allow for fewer change orders and price adjustments over the contract term.

As in the Public Option, Metro retains maintenance, repair and replacement cost risk.

P3 Alternative 1

Building on the Enhanced Public Option, P3 Alternative 1 achieves even greater economies of scale than the previous two options by letting significantly larger contracts, thereby also delivering an improvement in the management of interface risk between contracts. Intrinsic to the nature of P3 contracts is the transfer of completion risk to the Private Partner. This alternative allows for private finance to support public funds for part of the project. It also provides some certainty of long-term maintenance costs and a life-cycle approach to Asset Management by putting responsibility for maintenance onto the private partner.

A disadvantage could bepotential duplication of maintenance staff, communications and safety equipmentwith existing Metro operations

P3 Alternative 2

P3 Alternative 2 has similar advantages to P3 Alternative 1 with respect to economies of scale, opportunity for innovation by combining design, construction and maintenance activities, reduction in interface risks and opportunities for private finance. A further benefit of this option is the increased transfer of maintenance risks associated with the tunnel infrastructure.

This option introduces interface and performance measurement risk associated with work at the rail yard (which would need to be used by Metro and the P3 provider) and additional interface risk between the proposed extension and the existing Purple Line. There would also be a possible duplication of maintenance staffing which may erode efficiencies.

P3 Alternative 3

The final option would require a major organizational change program for Metro in order to hand over maintenance activities on the Red / Purple Line, for which there is no precedent in the United States. This option has similar advantages as P3 Alternatives 1 and 2 with respect to economies of scale, opportunity for innovation by combining design, construction and maintenance activities, reduction in construction interface risks and opportunities for private finance and similar disadvantages with respect to the size of contracts, limited competition, and need for specialist advice.

Importantly, this option eliminates potential interface issues between Metro and the Private Partner that might occur in P3 Alternatives 1 and 2. That would allow for clearer measurement of the Private Partner's performance and provide for innovation and cost reduction in Metro's current maintenance work on the Red / Purple Line. This option would deliver increased certainty of future costs of maintenance, repair and replacement.

Analysis and Results

The Enhanced Public Option and P3 Alternative 1 were carried forward for further analysis against Metro's program goals and the evaluation criteria. The Public Option was retained for comparison purposes.

The program goals and evaluation criteria are qualitative and include:

- Achieve most cost-effective use of public funds.
- Accelerate project delivery.
- Optimize risk transfer.
- Ensure asset quality throughout the life cycle.
- Provide highest-quality service for the traveling public.

The **Enhanced Public Option** was shown to perform better against the evaluation criteria than the Public Option. The primary advantage is the additional transfer of tunnel construction cost and schedule risks. The alternative may not accelerate project delivery over the Public Option, and there is likely to be minimal improvement on life cycle quality or service to the traveling public since neither option proposes any form of maintenance risk transfer. The procurement process for the Enhanced Public Option maintains the current schedule of the Public Option.

P3 Alternative 1 performed better against the evaluation criteria than both the Public Optionand the EnhancedPublic Option. It proposes a similar level of risk transfer for the construction elements of the project but advances this concept further into the maintenance of stations, track and systems. The procurement process for P3 Alternative 1 maintains the current schedule of the Public Option. Private sources of finance allow Metro more flexibility between up front funding requirements and funds that may be leveraged. The later availability of Measure R funds may make private sources of finance an attractive option for this Project. Private finance may also be an attractive option if the P3 availability payments do not count as public debt. The higher cost of capital can be outweighed bythe benefits of effective risk transfer to the Private Partner. P3 Alternative 1 provides Metro with increased certainty of maintenance, repair and replacement costs for stations, track and systems.

In conclusion, this analysis indicates that P3 Alternative 1 allows Metro to benefit from private sources of finance while offsetting the higher cost of capital against life cycle efficiencies gained from the bundling of design, construction and maintenance services.

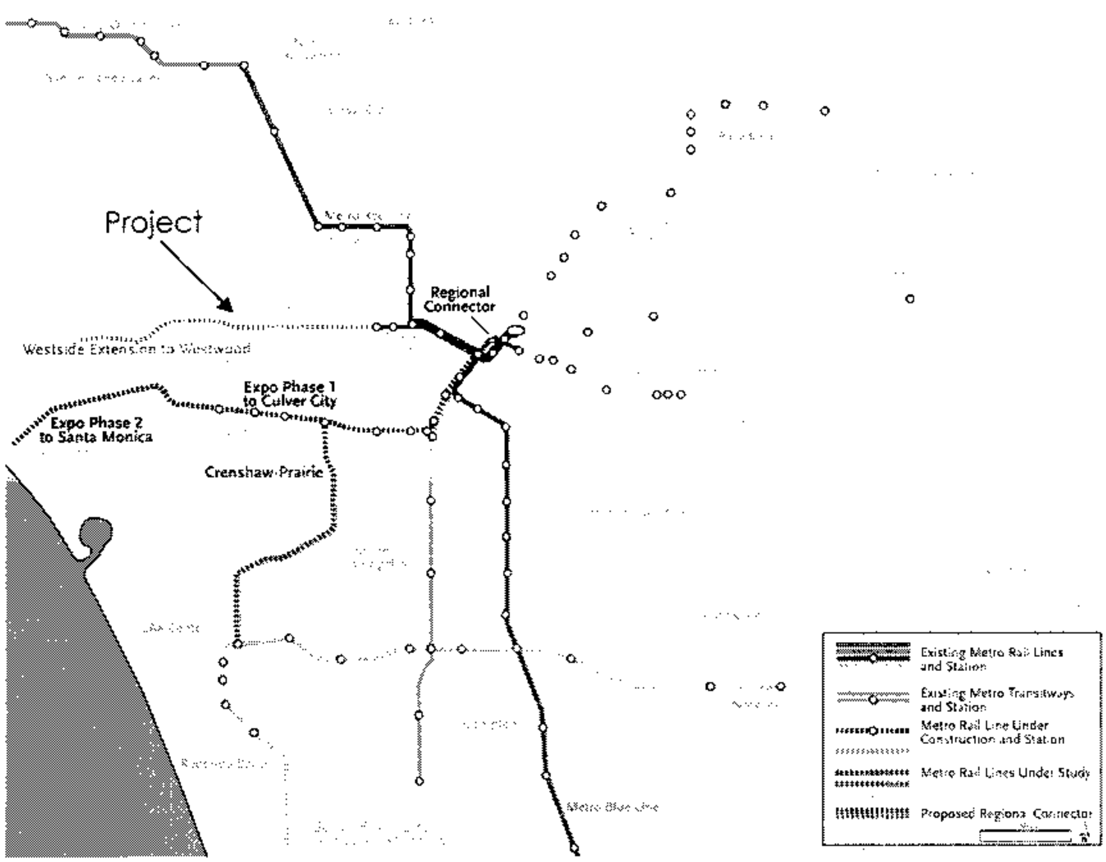
1.0 PROJECT DEFINITION

1.1. Description of Project Scope

The Locally Preferred Alternative (LPA) for the Westside Subway Extension project (Project) is an 8.96 mile extension of the existing Metro Purple Line subway with seven stations west from its current terminus at the Wilshire/Western station through Mid-Wilshire to UCLA / Westwood as shown in the graphic below.

The Project is included in the Southern California Area of Governments' Regional Transportation Plan for 2008 and Metro's 2009 Long Range Transportation Plan. The proposed technology is heavy rail transit compatible with the current Metro Rail operations for the Metro Red and Purple Lines.

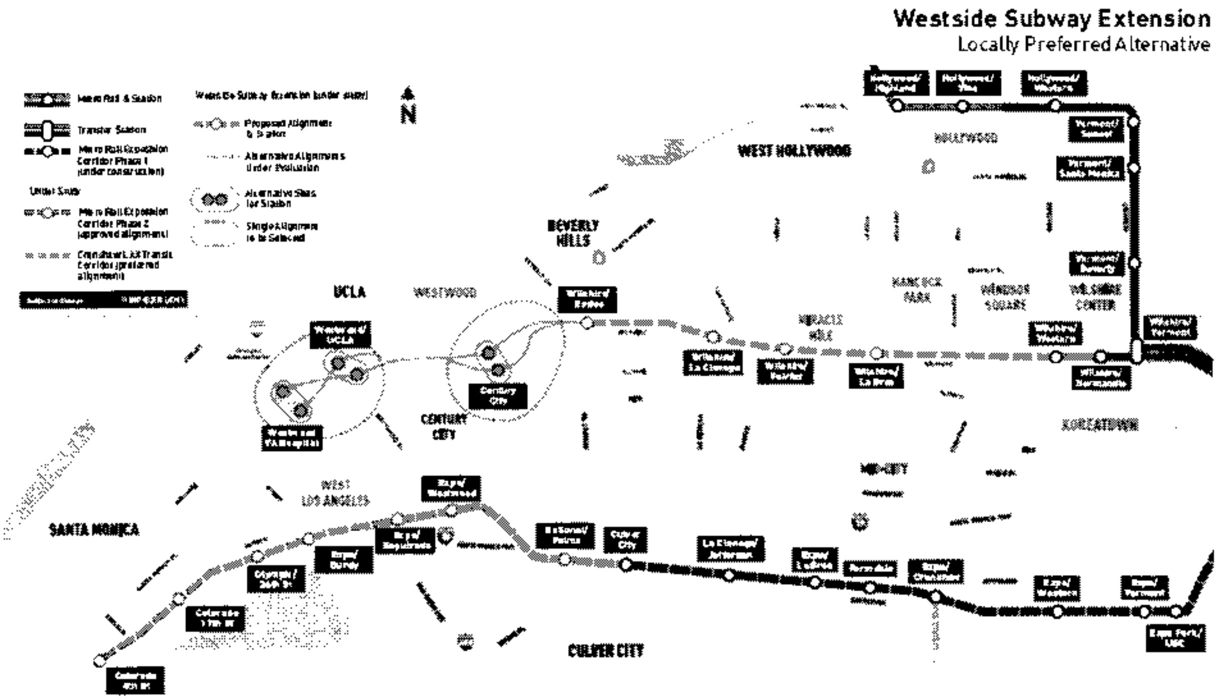
Figure 1: Regional Transportation Projects



Source: Draft EIS/EIR

This Project is included as one of the 12 designated by Metro and the City of Los Angeles as part of its 30/10 plan, which seeks to use innovative finance and delivery options to advance project delivery faster than would be achievable under conventional options. It was approved by the voters of Los Angeles County as eligible for receipt of Measure R funds authorized by the 2008 referendum.

Figure 2: Westside Subway Extension LPA



Metro

Source: Draft EIS/EIR

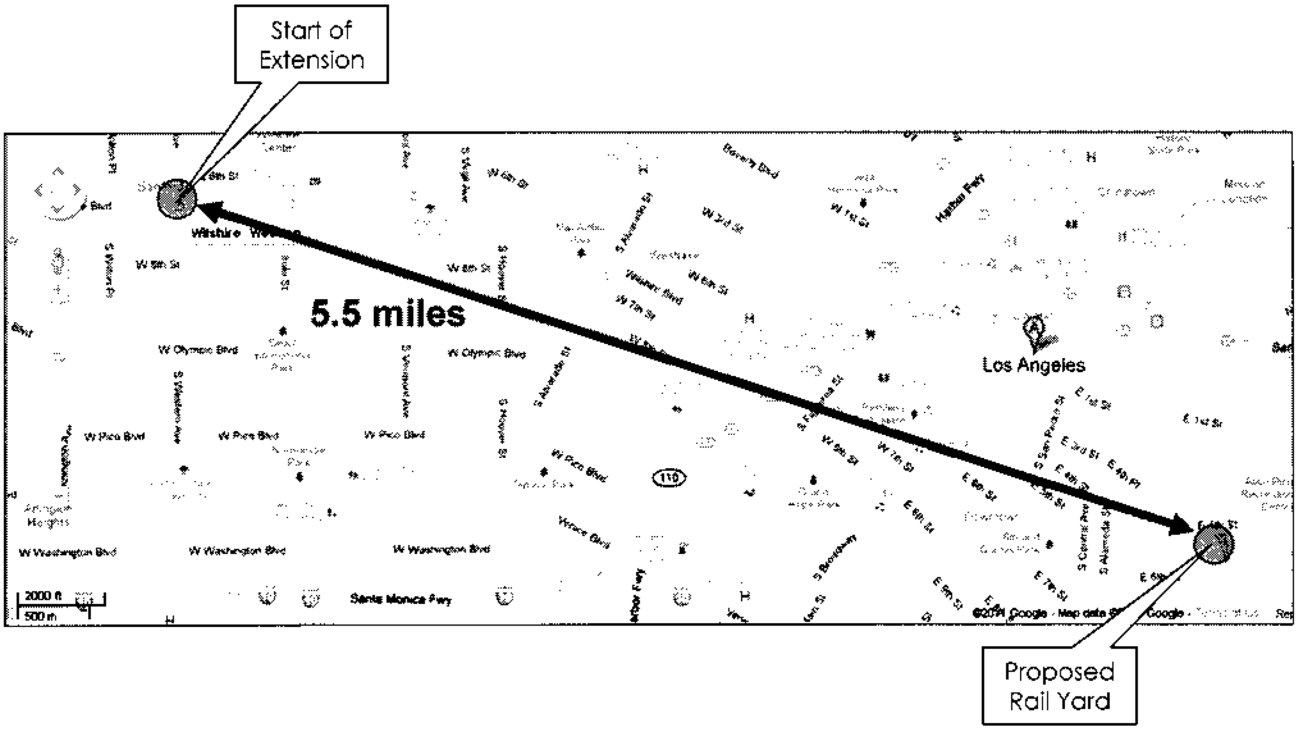
Figure 2 illustrates the LPA; the location of three of the seven stations has not yet been finalized.

The Project includes the construction of seven new stations west of the existing Wilshire/Western station:

- Station 1: Wilshire/La Brea;
- Station 2: Wilshire/Fairfax;
- Station 3: Wilshire/La Cienega;
- Station 4: Wilshire/Rodeo;
- Station 5: Century City;
- Station 6: Westwood/UCLA; and
- Station 7: Westwood/VA Hospital.

The Project also includes the expansion of the current Metro Red Line Division 20 Rail Yard and necessary ancillary facilities including special track work (tail tracks, pocket tracks, crossovers and double crossovers), traction power substations, emergency generators and vent shafts. The location of the rail yard in relation to the start of the Project is indicated in Figure 3.

Figure 3: Location of Proposed Rail Yard Expansion



For the purposes of this analysis, the Project scope excludes the Rail Operations Center and the purchase of 104 new heavy rail vehicles. It is assumed that these two items will be procured separately by Metro. The cost of these items has been retained in the overall estimate (see below) for consistency with the Draft EIS/EIR and potential later total project cost comparisons.

Heavy rail transit was selected for its attributes such as high passenger carrying capacity, high levels of service predictability, higher speeds and the ability to expand capacity with multiple units.

The stations will be below ground in a structural "box" that is accessed from street level via stairs, escalators and elevators. A mezzanine level will hold ticketing facilities. 450-foot platforms will be at a lower level and allow level boarding for full accessibility. Stations will include various shafts for air circulation and passenger facilities such as lighting, seating, signage, safety and security systems.

1.1.1. Scope Options

At the time of approval to enter Preliminary Engineering, the exact location of three stations was still to be determined:

- Option 4, Station 5: Century City (either at Santa Monica Blvd or Constellation Blvd);

- Option 5, Station 6: Westwood/UCLA (either on-street or off-street); and
- Option 6, Station 7: Westwood/VA Hospital (either north or south of Wilshire).

The decision on Option 4 (the location of the Century City stations) will impact the alignment of the Project between Beverley Hills and Century City.

1.1.2. *Phasing Options*

The Draft EIS/EIR evaluates two minimum operable segments (MOS) but no reference to these is included in the Board definition of the LPA:

- MOS 1 interim terminus at Wilshire/Fairfax (extension to include two new stations); and
- MOS 2 interim terminus at Century City (extension to include five new stations).

This report assumes that it is Metro's intention to build the entire project and not consider MOS alternatives unless forced to do so.

1.2. Summary of Project Construction Costs and Schedule

The table below summarizes the estimated capital costs for the LPA in 2010 dollars.

Table 1: Capital Costs

SCC Cost Categories		$ 000s
10.0	Guideways and Track Elements	$ 864,870
20.0	Stations, Stops, Terminals, Intermodal	$ 886,151
30.0	Support Facilities: Yards, Shops, Admin Buildings	$ 136,431
40.0	Sitework and Special Conditions	$ 298,108
50.0	Systems	$ 165,240
60.0	Right-of-Way, Land, Existing Improvements	$ 178,173
70.0	Vehicles	$ 528,528
80.0	Professional Services	$ 775,764
90.0	Project Contingency (Unallocated)	$ 383,327
100.0	Finance Charges	$ 161,270
Total Cost (2010) Dollars		**$ 4,377,862**

Source: Application to Enter Preliminary Engineering. June 2010

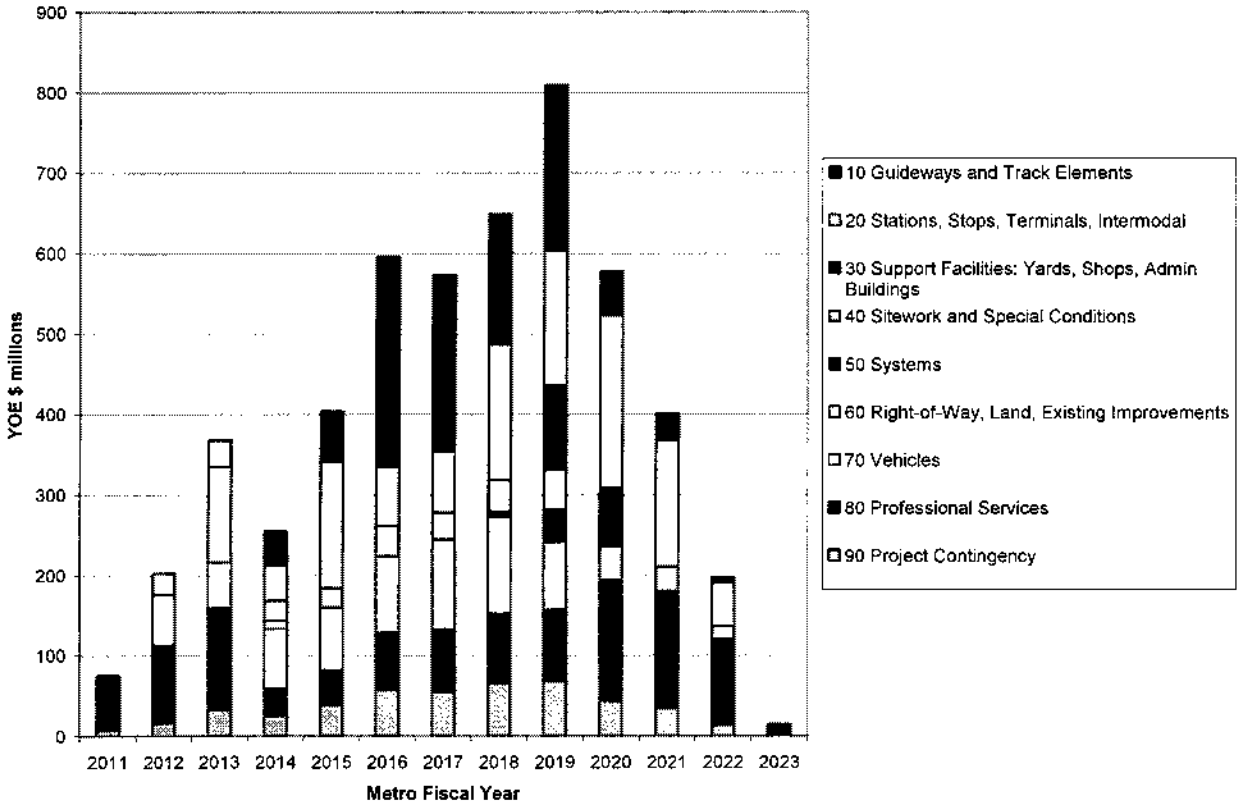
Note that vehicles and a contribution towards the expansion of the existing Rail Operations Center are excluded from the scope of the Project but these items have been included within the cost estimate above. This is for consistency and to enable direct comparison with the project estimate as per the Draft EIS/EIR and later updates. The business plan assumes that these costs need to be funded as part of the Project, even if the actual works are procured separately.

The Metro "Cost and Financial Analysis" Report dated August 2010 provides capital cost estimates for the options still under consideration. This gives a range of projects costs between $4.17 and $4.49 billion.

The capital cost of the Project in Year of Expenditure dollars is $5.34 billion including estimated finance charges.

Figure 4 illustrates the capital expenditure profile of the Project.

Figure 4: Capital Cost Expenditure Profile



1.3. Summary of Operations and Maintenance Costs

The operating and maintenance cost of the Project in horizon year 2035 is[1]:

- $37.9m in 2010 dollars, or
- $79.4m in Year of Expenditure dollars

The above operating and maintenance cost[2] is the total system cost to Metro for Alternative 2E (the Board-approved LPA). The cost includes operations, vehicle

[1]Metro Draft Operations and Maintenance Cost Report – Addendum (120G) dated October 12, 2010
[2]The Metro "Cost and Financial Analysis" Report dated August 2010 details that the Subway Extension Segments 1, 2 and 3 will incur $46.9 million YOE operating and maintenance costs in 2034/35.

maintenance, non-vehicle maintenance and general administration. Non-vehicle maintenance represents approximately 35% of the total.

1.4. Summary of Implementation Schedule

The implementation schedule for the Project is subject to continuous change. For the purposes of this report, the schedule for implementation of the Project following the Record of Decision is as shown below.

Table 2: Project Timeline

Milestone	Timing
FTA Record of Decision	March 20, 2012
FTA Approval to Enter Final Design	September 10, 2012
Final Design Contract Award	October 2012
Early System Work Agreement Approved by FTA	June 2012
Completion of Final Design	June2013
Invitation for Bids Advertised for Contracts 1, 2 and 3	June 2013
Full Funding Grant Agreement Awarded and Signed by FTA	September 2013
Notice to Proceed for Contracts 1, 2 and 3	February 2014
Completion of Property Acquisition	April 2014
Completion of Utility Works	April 2014
IFB Advertised for Contract 5 (or Contracts 5, 6, 7 and 8 if separate)	2015
NTP for Contract 5 (or Contracts 5, 6, 7 and 8 if separate)	2016
IFB Advertised for Contract 4	2016
NTP for Contract 4	2017
Substantial Completion	2022
Revenue Operations Date	2023

Source: Level 1 Management Schedule presented to FTA March, 2011

1.5. Summary of Project Funding Sources

Metro has allocated a total of $5,340.1 million in public funding for the Project from a variety of local, State, and federal sources, as summarized in Table 3 below. This funding amount includes environmental planning costs of approximately $35 million and financing costs of $216.1 million.

Table 3: Summary of Project Funding Sources

	Amount (millions, year of expenditure)	Percent of Total Funds
Local		
Measure R QTIBs	$2,097.9	39.3%
Measure R TIFIA	$640.8	12.0%
Measure R Cash	$311.1	5.8%
Local Agency Contributions	$153.4	2.9%
State		
State LONP Reimbursement Fund	$73.2	1.4%
Federal		
FTA New Starts – Section 5309	$2,063.7	38.6%
TOTAL	$5,340.1	100.0%

Source: FTA New Starts Financial Template, October 2010 update

The Project funding plan relies heavily on an FTA New Starts contribution of $2,063.7 million, or nearly 40% of the total funding required. At this time a Full Funding Grant Agreement (FFGA) is expected toward September 2013 following FTA award of a Record of Decision in March 2012.

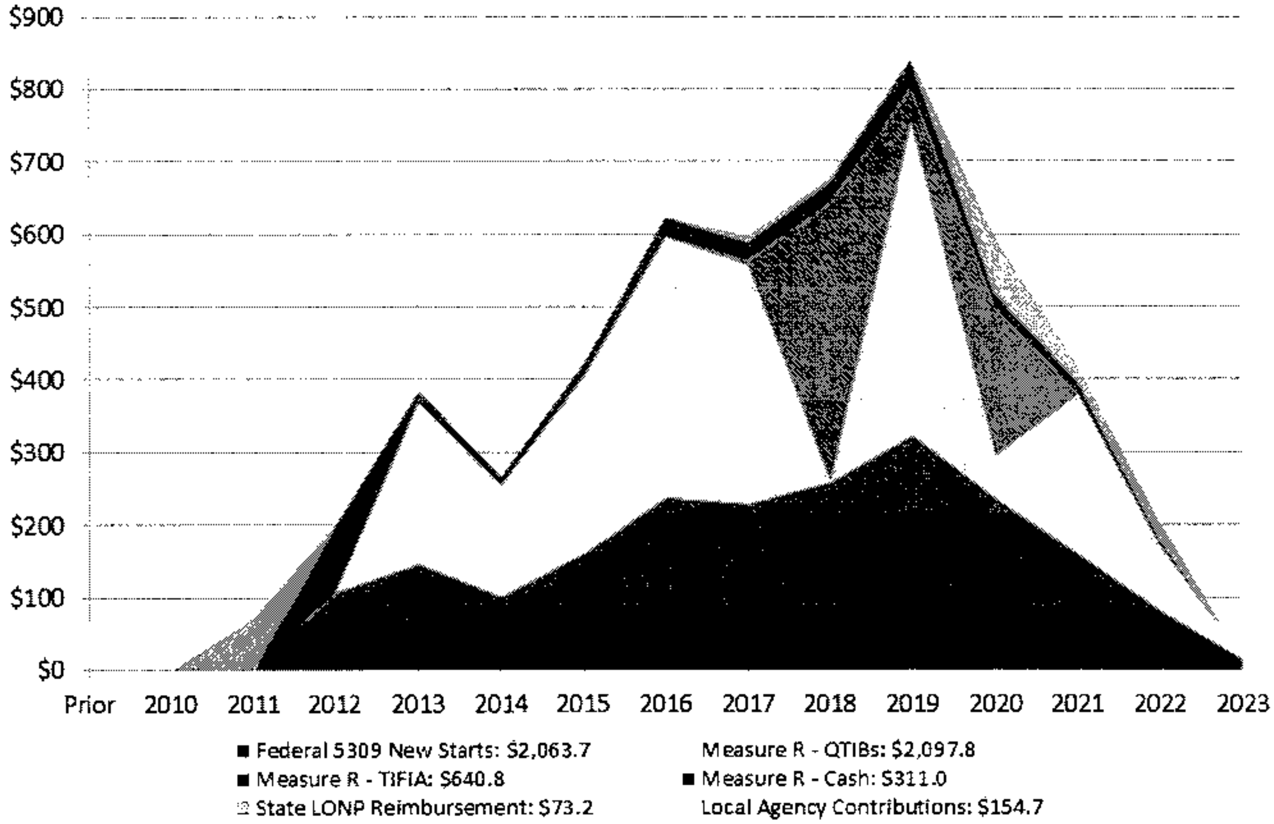
Measure R sales tax revenues totaling $3,049.8 million have also been programmed for the project accounting for 57.1% of the total project cost. The accelerated project schedule presumes the availability of two federal programs to leverage Measure R dollars, the Transportation Infrastructure Finance Innovation Act (TIFIA) and Qualified Transit Improvement Bonds (QTIBs). As Measure R sunsets in 2040, this analysis presumes that all financings backed by Measure R mature by that date.

In July 2011, USDOT selected the Project to receive the full $640.8 million TIFIA loan amount sought by Metro. The final application is pending, with issuance of the TIFIA loan contingent upon final approval in early 2012.

It is also proposed that the Project receive $2,097.9 million in proceeds from a new form of federally subsidized bonds called "QTIBs", which would be repaid from Measure R funds. As envisioned, the interest on QTIBs would be in the form of federal income tax credits equivalent to the yield on similarly rated debt instruments, and would therefore not need to be paid in cash by Metro, effectively representing a 100 percent federal subsidy of the interest. The $2,097.9 million in QTIB proceeds are assumed to be fixed-rate serial bonds with a 30-year amortization and level principal payments. Legislation authorizing $50 billion of such bonds was introduced in July 2011 and is pending within the Senate Finance Committee.

Other committed funding sources include Local Agency Contributions and State Letter of No Prejudice (LONP) Reimbursement funds.

Figure 5: Project Funding Profile



During the construction period starting in FY 2012, the "early" funding sources currently programmed to support the project's capital costs include State LONP funds, FTA New Starts and proceeds from Measure R-backed QTIBs. Local agency contributions are to be contributed later starting in FY 2017 through the closeout in FY 2023. The risks associated with the timing and quantum of funding from these various sources are discussed later in this report.

1.6. Environmental Impact and Process

1.6.1. Current Status of Environmental Approval

The Project is currently undergoing Preliminary Engineering (PE) and preparation of the Final Environmental Impact Statement / Environmental Impact Report (Final EIS/EIR) document. The Project received approval to enter PE by the Federal Transit Administration (FTA) in January 2011. This followed Metro Board approval of the Draft EIS/EIR and selection of Locally Preferred Alternative in October 2010.

Table 4: Milestones Achieved

Milestone	Date Achieved
Completion of Alternatives Analysis	January 22, 2009
Metro Board Approval of Draft EIS/EIR	October 28, 2010
Metro Board selection of LPA	October 28, 2010
FTA Approval to enter PE	January 5, 2011
Submission of Admin Draft FEIS/EIR to FTA	June 27, 2011
Completion of Preliminary Engineering	November 4, 2011

1.6.2. Timeframe for Environmental Approval

The schedule for project implementation assumes that the Record of Decision will be issued early in the spring of 2012, as outlined below.

Table 5: Milestones to be Achieved

Milestone	Date expected
Notice of Availability (NOA) of Final EIS/EIR	January 6, 2012
Metro Board Adopt the Project CEQA Notice of Determination (NOD)	February 23, 2012
FTA Record of Decision	March 20 2012

Source: Level 1 Management Schedule presented to FTA March, 2011, augmented by recent discussions with Metro staff

2.0 EVALUATION APPROACH

2.1. Objectives of Business Plan

Under this Task 4 of the P3 Program, the InfraConsult Team was requested to develop a business planfor the Westside Subway Extension project (Project) that includes a review and analysis of potential delivery options. The Project is one of six Measure R program projects selected by Metro, following an initial screening completed in Tasks 1 & 2, and an initial quantitative analysis completed in Task 3. Section 2.1 describes the transition from Task 3 to Task 4 in more detail.

The objective of this business plan is to develop and analyze a range of possible delivery options for the proposed Project and to determine what, if any, role there might be for private participation in the design, construction, financing, and/or maintenance of the Project or of particular project components.

The business plan includesa summary description of the Project followed by an analysis of key Project information relevant to delivery options: scope, schedule, cost, funding and risk. This Project information is used to develop a short list of potential delivery options in accordance with the following assumptions:

- rolling stock will be procured separately by Metro;
- rolling stock maintenance will be performed by Metro; and
- vehicle operations will be retained responsibilities for Metro.

Based on these requirements the range of delivery options available for selection falls between the following two delivery options, each representing one end of a spectrum of risk transfer established by the scope limitations described above:

- Design-Bid-Build (DBB) - under which Metro would retain the responsibility for design, construction, operations, maintenance and finance with limited risk and responsibility transferred to a private entity; and
- Design-Build-Finance-Maintain (DBFM) - under which a Private Partner would take the responsibility for design, construction, financing and non-vehicle maintenance under one P3 contract.

The business plan describes several possible delivery options that fall within this range and analyzes selected options against Metro's stated evaluation criteria.

The conclusions of this business plan are based on the advantages and disadvantages of the selected delivery options and the extent to which the options meet Metro's evaluation criteria relative to the current delivery option that Metro is understood to be following for this Project. The analysis is qualitative in nature and does not attempt to calculate or compare the cost of each option.

2.1.1. Transition from Task 3

Since the conclusion of Task 3 in October 2010, the Metro Board approved the Westside Subway Extension project (Project) Draft Environmental Impact Statement / Environmental Impact Report (Draft EIS/EIR) and selected a Locally Preferred Alternative (LPA). The Federal Transit Administration (FTA) approved the Project's entry into Preliminary Engineering in January 2011. Work is now underway on Preliminary Engineering and the Final Environmental Impact Statement / Environmental Impact Report (Final EIS/EIR).

The LPA is very similar in scope to the Project Definition developed in Task3. That implementation timeframe assumed Record of Decision in 2011, construction work beginning in 2014 and completion of all segments occurring in 2023.

Further work has since been undertaken by the Metro project team on the evaluation of station locations, minor alignment options, engineering design, review of environmental impacts and preliminary approach to contract packaging. Although this work has resulted in updated data on cost, schedule and funding, there has been no substantial change to the Project from the scope that was assumed in Task 3.

The P3 option recommended in the Task 3 report assumed that the capital cost, non-vehicle maintenance, capital maintenance and financing responsibilities for the Project are assumed by a P3 partner and that transit operations are provided by Metro. In Task 3, a strategic assessment of the Westside Subway Extension project (Project) compared the Net Present Value cost of delivering the entire Project as a DBFM contract with the default public sector comparator mode of delivery, which was assumed to be DBB.

Task 3 indicated that the DBFMoption was considered worthy of further analysis in Task 4 to determine more specific P3 alternatives that could accelerate delivery, encourage private sector innovation, lower life cycle costs and increase certainty of cost and schedule.

2.2. Approach for Evaluation of Alternate Delivery Options

For this Task, the analysis of alternative delivery options was completed in two stages.

The first stage was to develop a short list of potential delivery options based on a more detailed understanding of the Project with respect to scope, schedule, cost, and funding. The analysis assessed the risks to project delivery regardless of how the project is to be procured. For example, this Project involves significant challenges with respect to tunneling through gassy ground under a dense urban environment with highly restricted access to construction staging areas. Such delivery risks will have to be managed regardless of whether the Project is delivered as a design-bid-build, design-build, a combination of both, or some other form of contractual arrangement.

Risks were analyzed in the following categories:

- construction cost and schedule risks;
- maintenance cost risks; and,

- funding risks.

Although the above apply to all delivery options, financing and other commercial risks depend on how the Project is procured. The next stage of the analysis was to summarize Metro's current preferred delivery option and analyze any associated financing risks.

The development of initial options was also constrained by the following assumptions:

- rolling stock will be procured separately by Metro;
- rolling stock maintenance will be performed by Metro; and
- vehicle operations will be retained by Metro.

This led to the development of a short list of P3 delivery options, which were then analyzed in detail using a "procurement options analysis" matrix (in Appendix A). The analysis reviewed the major risk areas and explained how each delivery option addressed those risks. The first stage concluded with the dismissal of options that were found to be sub-optimal and the selection of delivery options to be analyzed further.

The second stage of analysis explored the degree to which each delivery option carried forward met Metro's program goals (described in Section 2.3 below).

Metro's current preferred delivery option is included in the analysis to enable a comparison of the "public option" with the P3 alternatives. Each goal is addressed in turn with a narrative to explain how each of the options provided advantages or disadvantages.

The selection of delivery option is complex and likely to be based on multiple qualitative and quantitative factors, not all of which are addressed in this initial business plan. The business plan's conclusions therefore summarize the results of the analysis in terms of the key advantages and disadvantages of each option. Should Metro wish to examine one or more options in more detail, Section 7.0 of this plan recommends specific areas for further analysis to assist with the selection process.

2.3. Program Goals

As part of its P3 Program, Metro identified five major goals and related evaluation criteria for delivery of its Measure R program. The criteria were used to assess the relative ability of various project delivery approaches to achieve these goals, including cost certainty, cost savings, schedule certainty, project delivery acceleration, risk transfer optimization, lifecycle cost savings, and service quality. These goals are:

- Optimize risk transfer. By allocating risks to the party best suited to manage them, an optimal risk profile may be achieved. The benefits of this approach include enhanced certainty of project price and delivery schedule. Risk transfer does not necessarily result in savings to Metro, as the potential cost of the risk transferred will be included in the private sector's bid price.

- Achieve the most cost-effective use of public funds. Metro has identified cost containment as a major policy consideration in the implementation of its Measure R program. By exploring alternative delivery options, Metro may be able to leverage public sector funds and resources, achieve price certainty and enhance value for money.
- Guarantee timely project completion and/or accelerate project delivery. Schedule certainty is of great importance to Metro, both for financial and public acceptability reasons. The delivery of projects on-time enhances credibility with the public and allows for better budget management and planning. Metro has identified a desire to accelerate transportation project delivery as the regions' highways face capacity constraints.
- Ensure asset quality throughout project lifecycle. Metro's objectives for the P3 program include ensuring that the ongoing quality of assets included in the project scope is maintained to a high standard throughout the proposed analysis/contract period.
- Provide highest-quality service for the traveling public. Regardless of project delivery model, Metro has identified a key objective to be that the quality of service should match the same high performance standards that Metro already offers.

As shown in Table 6, example evaluation criteria were developed to guide the assessment of each project delivery option's potential to fulfill the goals of Metro's P3 Program.

Table 6: Metro P3 Program Goals and Example Evaluation Criteria

Goals	Example Evaluation Criteria
Optimize risk transfer	Transparency/availability of information for private sector to price risks and submit "fixed price" bid Ease of modifications required to adapt existing service contracts Flexibility of the proposed project to enable private-sector innovation Compatibility of procurement method with regulatory requirements (Buy America/labor law/local hire/alternative fuel/green construction policies, etc.) Ability of private sector to comply with insurance requirements (potential capacity issue)
Achieve a cost-effective use of public funds	Price certainty to Metro Certainty and quantum of project funding streams, both short and long term Maximum leveraging of public funds Ability of option to provide greater access to alternative sources of finance Metro control over fare setting and revenue sharing with private sector partner
Guarantee timely completion-Accelerate project delivery	Ability to guarantee schedule certainty Potential to accelerate project delivery
Ensure asset quality throughout lifecycle	Ability to measure/monitor contractor performance/output on lifecycle
Provide highest-quality service for the traveling public	Ability to achieve operational performance/quality and safety for the traveling public

3.0 PROJECT RISKS

This section presents a qualitative summary of the technical risks that Metro has in delivering the Project, regardless of the adopted procurement approach. The focus is mainly on technical risks related to meeting the project objectives with respect to cost, schedule and quality.

The analysis is split into two sections representing the main areas of project delivery risk:

- Risks that may impact design and construction costs and completion date; and
- Risks that may impact the cost of long term asset maintenance, rehabilitation and replacement.

A detailed discussion of how Metro's current intended procurement approach and a selected number of P3 alternatives address these risks is included in the following Section 4.0. That section describes how each procurement alternative affects Metro's ability to mitigate, transfer or accept risk.

3.1. Construction Cost and Schedule Risks

Construction phase risks arise from uncertainties such as project scope, physical constraints, stakeholder needs, contractor performance and the occurrence of unforeseen events that ultimately act to increase or decrease the final cost of the Project and accelerate or delay its completion date. As design progresses many of these uncertainties will be resolved, for example, uncertainty in ground conditions will be reduced following more extensive geotechnical investigations. Until the issues are resolved, these risks will be allowed for in the cost and schedule of project in the form of contingencies.

Metro has carried out several analyses on the construction cost and schedule risks associated with the delivery of the Project. The information in this section has been extracted and summarized from three main sources:

- Westside Subway Extension Risk Assessment Report (173B) dated August 2010;
- Westside Subway Extension Draft EIS/EIR Section 6.5 Risks and Uncertainties dated September 2010; and
- FTA Program Management Oversight Consultant risk matrix dated October 2010.

In addition to these Metro sources, the discussion below also incorporates PPP risk analysis carried out by the InfraConsult team as part of its Task 3 Strategic Assessment report.

Several source documents were reviewed, including:

- Westside Subway Extension Draft EIS/EIR – September 2010;
- Westside Subway Extension Risk Assessment Report (173B) – August 24, 2010; and
- LACMTA FTA Risk Matrix (extract) – October 18, 2010.

The review indicated that most of the Project construction risks relate to three key areas: (1) uncertainty over easements, land acquisition and temporary access for construction activity; (2) uncertainty over geotechnical conditions and their impact on tunneling and underground station box construction; and (3) uncertainty in the final scope of the Project.

3.1.1. Easements, Land Acquisition and Temporary Access

Due to the dense urban location of the project, there is uncertainty in the cost of property takes, and a risk that owners may litigate or refuse to give up the land. This risk was specifically identified at the proposed Rodeo Drive station, around UCLA and the VA hospital. Related to this risk area is the location of temporary and permanent disposal of excavated material that could be contaminated.

Several aspects of the Project require agreements with land owners and tenants. Delays in executing such agreements may impact Project cost and schedule. Specific areas that could be problematic are the location of cut and cover crossovers at the VA Hospital and UCLA; the potential provision of a track connection structure to allow a future connection to West Hollywood; a potential allowance for future expansion of the Westwood/VA Hospital station; the potential provision of replacement parking at VA Hospital station; and the location/number of exits at each station.

3.1.2. Geotechnical Conditions, Tunneling and Underground Station Box Construction

Geotechnical investigations were ongoing at the time of this report but several issues have been identified. Tunneling is expected to encounter tar sands, which may clog slurry machines and separation parts. Gaseous ground has been identified which may result in difficulties related to sealing the tunnel from gas, especially at cross passages and tunnel joints.

During construction, unexpected soil conditions such as watery soil may lead to face loss and sink holes. Unanticipated ground water may lead to a requirement for additional dewatering, but this may encourage the flow of gas. There is also a risk that tunneling in this area may encounter obstructions such as abandoned oil wells.

Tunnel boring machines are designed for these types of conditions but variable or unexpected conditions may result in additional costs of equipment repair and replacement due to excessive cutter wear. Tunneling operations that may increase cost and delay the advance rate also include loss of face, alignment problems and mixed face conditions. These risks have been specifically identified between the Wilshire/La Brea and Wilshire/Western stations.

Tunneling will be carefully planned to avoid settlement strain in surrounding infrastructure but there is always a risk that settlement may occur, particularly for the taller buildings at Westwood/Constellation.

3.1.3. Uncertain Scope

As with all major projects that are in the preliminary stages of design, there is uncertainty in the scope and cost of construction. Contingencies are included in the cost estimate but there is a risk that these may be exceeded in the final cost of the Project.

Ongoing discussion with stakeholders may result in scope changes that have to be accommodated during later stages of design, resulting in additional costs and possible delays. There is also risk that additional environmental mitigations beyond those required by the Record of Decision may be required that would add to the overall Project's costs; for example, should construction uncover fossils, the Project would have to be expanded to include the cost of the removal and protection of fossil remains.

Additionally, unexpected on-line utility relocations and off-line utility protections may be required following further utility surveys or utilities found during construction. Potential utility issues include the sewer drain at Westwood/UCLA and the confidentiality of plans associated with the federal General Services Administration (GSA) site.

While these risks are typical for an underground urban transit project, the size of this Project and the density of the urban area that it passes through make these risks especially significant. Known hazards such as gaseous soils, tar sands and the high probability of finding fossils can and are being mitigated in the current design process, but there will still be uncertainty over the size of the impact that these hazards could have on the overall cost construction schedule.

Schedule impacts are particularly difficult to estimate as risk events often have a consequential effect that can result in other costs/delays that would not have otherwise occurred. This difficulty is compounded when there are multiple contracts for construction.

3.1.4. Pricing Risk

One of the differences among the procurement options is the level of risk transfer. Under its traditional procurement structure, Metro retains the risks and associated costs of those risks. Under the proposed alternative arrangements, Metro transfers some or all of these risks to the contractor, with the contractors' price reflecting the amount of risk it is assuming. How that risk is priced will vary based on how well the contractor feels it is able to manage that risk, and how accurately it is able to predict the cost of assuming it. Generally, a contractor is prepared to accept a higher level of risk in a DBFMprocurement asit has much greater control of the design and delivery of the project than in a more traditional DBB approach. So, for those project elements with a high amount of unknowns during the bid stage, such as tunneling or environmental remediation, it is advisable for Metro to attempt to mitigate those costs by continuing with design, site and geotechnical investigation to a greater level of detail than would normally be expected in aDBFM procurement.

To mitigate the post completion risk of the tunnels, a long term warranty with liability to the DB contractor would need to be part of the contract documents.

3.1.5. Schedule Risk

The current schedule for the Public Optionshows an FTA Record of Decision in March 2012 and an award of final design contract in October 2012. Invitations for Bids advertisement for Contracts 1,2 and 3 is anticipated in June 2013.

Table 7 below provides details of recent examples of the duration of the procurement process for DB or DBFM contracts, showing an average of approximately 15 – 18 months.

Table 7: Recent Examples of DB / PPP Procurement Durations

Alaskan Way Viaduct	
Procurement team commenced preparation of documents	June 2009
Request for Qualifications issued	September 2009
Shortlist announced	December 2009
Request for Proposals issued	May 2010
Proposals Due	October 2010
Award of Contract	December 2010
Gold Line Foothills Extension	
Procurement team commenced preparation of documents	December 2009
Request for Qualifications issued	March 2010
Shortlist announced	April 2010
Request for Proposals issued	August 2010
Final Proposals Due	June 2011
Award of Contract	July 2011
Presidio Parkway	
Procurement team commenced preparation of documents	June 2009
Request for Qualifications issued	February 2010
Shortlist announced	April 2010
Presidio Parkway, cont.	
Request for Proposals issued	July 2010
Proposals Due	October 2010
Award of Contract	December 2010 (signed January 2011)

It would take 18 months for a Metro DBFM procurement process, so the earliest possible award date would be May 2013. This is in line with the examples detailed in Table 7 above and maintains the current schedule of the Public Option.

3.2. Contractor Performance Risk

A performance bond is a promise by the contractor that the contractor will complete the work, and a promise by the surety that it will take one of the following actions if the contractor fails to perform: (a) step in to finish the work, (b) find another contractor to finish it, or (c) pay damages to the owner, up to the limits stated in the bond. In the event of a contractor default, the bond covers the risk of cost overruns over and above the contract price up to the bond amount.

Potential contractors must have sufficient financial capacity to obtain performance bonds, in some cases equal to the monetary amount of the individual contract packages.

Limits on the amount of performance bonding available to individual contractors vary, with limits for a small pool of larger contractors in the neighborhood of $250 million per contract. For projects with performance bond requirements exceeding that amount, the larger contractors may form joint ventures to enable the bonding requirements to be met, or project phasing/packaging can be adjusted to meet market limits. The ability of the contractor(s) to obtain performance bonds for contracts of this size represents a procurement risk.

Under the Transit Design-Build (DB) Law (Public Contract Code section 20209.5 et seq.), Metro has discretion to determine the amount of the performance bond, within the parameters of a statutory requirement that the amount must be sufficient to cover the design-builder's services. Since the projects will be federally funded or financed, FTA policy must also be taken into account. FTA requires grantees to obtain performance bonds from their construction contractors in an amount equal to 100 percent of the contract price unless a lower amount or alternative security is justified. For large transit projects such as Metro's, FTA is generally willing to approve a reduced bond amount, recognizing that a 100 percent bond is not necessary to cover the risk and that a requirement to obtain a 100 percent bond would severely impact competition. Other transportation agencies with federally-funded projects have used a range of performance security requirements for their projects.[3]

[3] The FTA recently approved a 50 percent performance bond for the Santa Clara Valley Transportation Authority's Silicon Valley Berryessa Extension Project, expected to cost $800 million. For the Denver Regional Transit District's (RTD) Eagle P3 concession agreement, awarded in 2010, FTA approved an alternative approach to performance security for the project, allowing the concessionaire to provide either a payment/performance bond or letter of credit. The amount of the security for the Eagle project is set annually, equal to 50 percent of the total earned value of the design-build work for the upcoming year plus 5 percent of the value of future work. Given the six-year completion schedule, the required security is significantly less than 100 percent of the value of the design-build work. The Denver RTD request for approval relied heavily on the fact that the concessionaire would be providing financing.

Under the procurement approaches analyzed as part of the business plans, the consolidation of multiple contracts into a single contract is cited as a potential advantage for Metro, as it reduces the number of interfaces that must be managed by the agency in its oversight of a project. At the same time, Metro's approach to contract packaging must consider its duty to ensure that performance security will be sufficient to cover the project risks. Metro should also consider the impact of larger contract packages on the ability of smaller contractors to participate as principals, and on the number of teams able to propose, with the resulting impact on level of competition and predictable increase in Metro's costs.

In determining an appropriate performance bond amount, Metro should take into account the project risks to be covered by the bond, conditions in the surety markets, limitations affecting formation of teams, and the maximum amount that potential teams would be able to bond. The availability of bonds and the amounts available are determining factors in establishingmaximum contract sizes.

3.3. Maintenance Cost Risks

Predicting maintenance costs while still in the preliminary engineering phase is quite problematic, due to the unknown final scope of the Project, as-yet unspecified mechanical and electrical equipment, uncertainties about actual operating procedures, the complex interaction between preventive maintenance and replacement cycles, and the difficulty of predicting economic factors such as inflation that have significant impact on the cost of future activities.

This analysis does not refer to any formal risk assessment that Metro may have undertaken on future maintenance costs. The main risk issues presented below were developed specifically for this report. These are risks that may impact the cost of long term asset maintenance, rehabilitation and replacement:

1. Uncertainty in using past cost data to predict future costs;
2. Uncertainty in real growth of maintenance costs over an extended time period (note that Project operations and maintenance estimate only provides the cost in a single horizon year, 2035);
3. Materials, utilities, labor and equipment cost inflation;
4. Unexpected soil conditions may reduce the life of the subsurface structures, for example, corrosion of tunnel lining and tunnel/station steel reinforcement from acidic soil;

It should be noted that reducing the amount of a performance bond does not directly result in a premium reduction, because the premium is determined based on the level of risk associated with the project. Even though the surety's potential total exposure is reduced when the bond amount goes down, the surety's primary risk is for the "first dollars" out, and the likelihood that the surety will be called upon to pay cost overruns does not change just because the bond amount is lower. For this reason, it is not uncommon for project owners (such as the Denver RTD) to accept letters of credit or other alternative performance security for P3 projects, since the premiums to obtain a letter of credit are based on the value of the letter of credit rather than on the cost of the project.

5. Deferred or poorly performed routine maintenance that could accelerate the deterioration of assets resulting in reduced life and higher costs of major rehabilitation or replacement;

6. Obsolescence of system components such as communications, signals and other systems;

7. Excessive wear and tear due to change in conditions that exceed design specifications, for example, higher than expected volume of passengers using elevators and escalators;

8. Uncertainty in cost of equipment replacement, not only of the equipment itself but the soft costs of installation, for example, due to restricted working hours, working at night, etc.;

9. Poorly installed equipment/low quality components/poor quality construction that could result in increased maintenance costs and unexpected need for replacement outside of warranty period; and

10. Change in maintenance standards, procedures and safety standards such as working hours.

3.4. Funding Risks

This section summarizes the risks faced by Metro in delivering the project within the planned funding approach, specifically:

- Variations in the timing of planned and programmed funding availability;
- Changes in the amount of available Metro funds; and
- The ability to secure requested amounts of Federal funding.

The following is a discussion of the specific risks associated with the various funding sources that are currently planned for the Westside Subway Extension project.

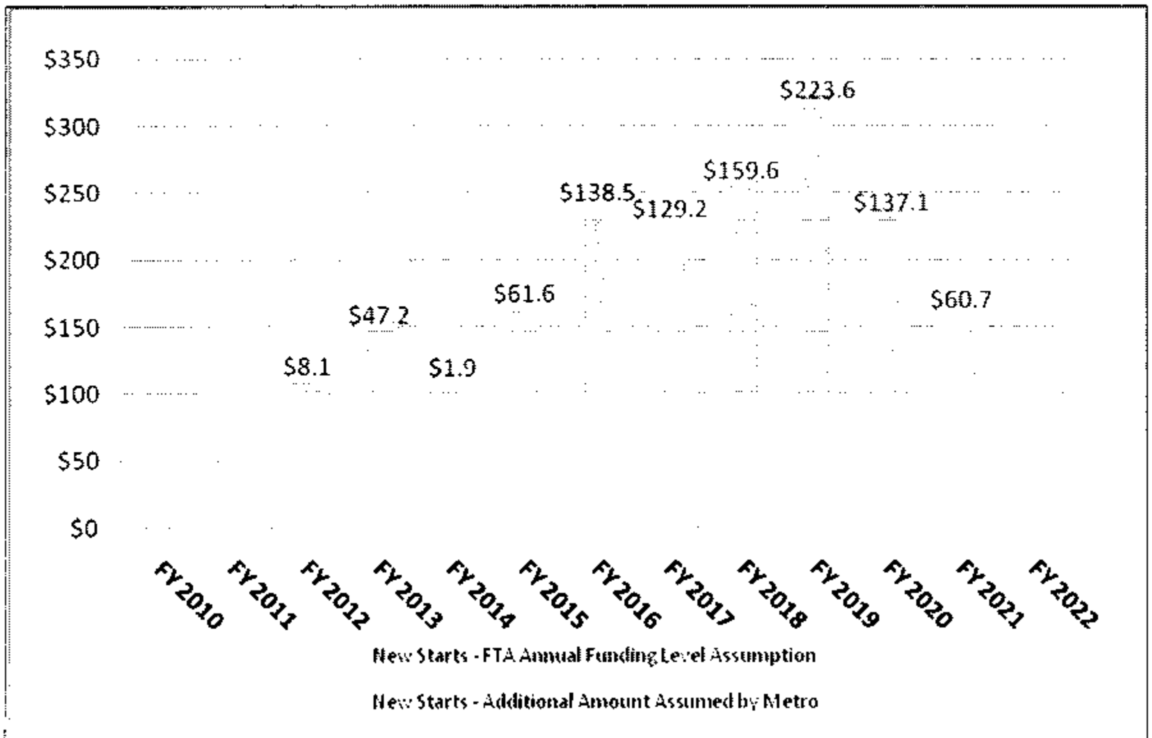
3.4.1. FTA New Starts

With such a large component of the Project costs being funded from the federal New Starts program, the status of that program and its overall funding levelpresent a significant risk to the Project schedule and cost.

Prior to award of the FFGA the Project funding plan remains at risk of changes in both the quantum and timing of agreed-upon funding amounts under the FTA News Starts program. In its FY 2012 Transportation Appropriations bill, the House and Senate increased funding to the New Starts program by $358 million for a total of $1.9 billion in 2012. Future funding levels remain unknown past FY 2012 at this time.

Given the current uncertainty surrounding a timeframe for a surface transportation reauthorization bill in Congress and the unknown future budget for the New Starts program, there may be limits imposed on the amount of annual FTA funding that Metro can receive both for individual projects and collectively as an agency for its other New Starts projects.

Figure 6:FTA New Starts Annual Funding Amounts Assumed in Financial Plan



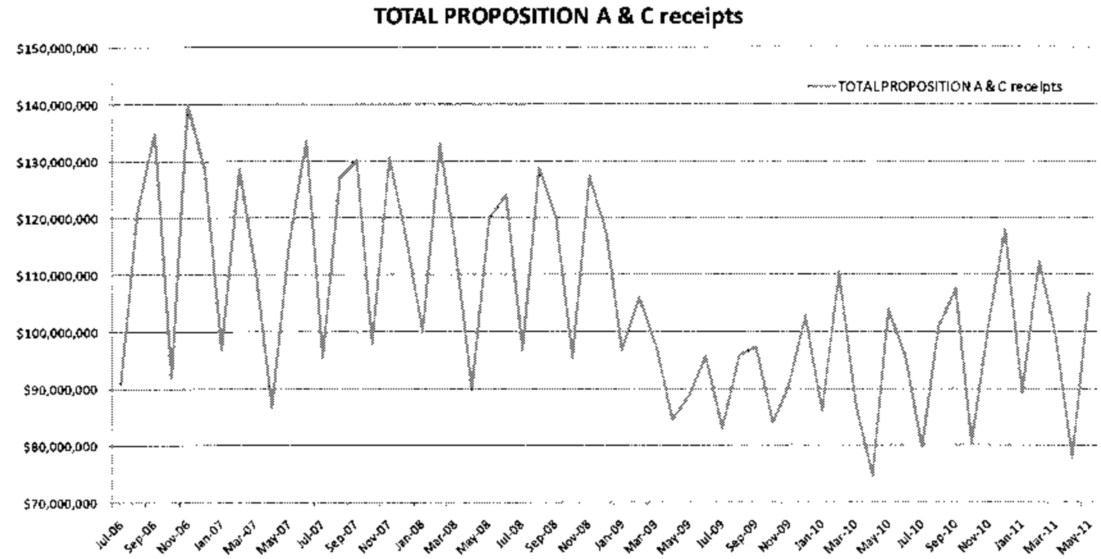
The FTA has also indicated to Metro that an assumption of receipt of greater than $100 million in New Starts funding in any one year may be overly optimistic. The financial plan assumes annual amounts exceeding $100 million in several years, ranging up to $323.6 million in FY 2019. Amounts in excess of $100 million per year total $967.5 million, as shown in Figure 6. To accommodate these annual limits, the total New Starts funding amount for the Project may need to be drawn down over a longer period or may need to be reduced below the current 38.6 percent share of total project costs.

3.4.2. *Measure R*

Measure R funds totaling $3,049.8 million have been programmed for the Project. Measure R funds are dependent on the collection of the sales tax, driven by the local economy. As a result, reduced sales tax receipts from a prolonged economic downturn may impact Metro's ability to deliver the entirety of its Measure R transit program. An indication of the recent volatility in sales tax revenues can be seen from the receipts for Proposition A and Proposition C over the past 5 years.[4]

[4] Refer to chart illustrating Proposition A and C, and Measure R sales tax receipts at http://www.metro.net/about/financebudget/taxes/. Accessed August 2011.

Figure 7: Sales Tax Receipts for Prop A and C



Source: LA Metro website

A large portion of the Measure R revenues are expected to be delivered early through loan programs such as TIFIA or the proposed QTIBs in which the federal government is anticipated to subsidize the cost of financing for the Project. The Project's accelerated schedule under the "30/10" initiative depends on the availability of these leveraging mechanisms. The first drawdown of QTIBs proceeds for the Westside Subway Extension is currently scheduled to occur in FY 2013, while TIFIA loan proceeds are contributed later beginning FY 2017. Without TIFIA or other proposed bond instruments, the schedule of Measure R revenues would revert back to the adopted 2009 Long Range Transportation Plan, which would deliver the project in three phases, with completion in FY 2036. Such a schedule would likely also affect the Project cost, due to inflation and longer term exposure to interest rate fluctuations.

The climate of fiscal austerity at the federal level and a reluctance to approve new programs without offsetting revenue or budgetary cuts creates a considerable risk that the QTIBs legislation either will not be enacted by Congress or that it may not offer a 100 percent interest rate subsidy sought by Metro. A bill has been introduced authorizing the issuance of $50 Billion in bonds whose holders would receive federal income tax credits rather than cash payments, but that legislation, the Transportation and Regional Infrastructure Bonds (TRIP) Act of 2011, has not been reported out of committee and its fate is uncertain. Under these circumstances there is a risk of project cost overrun or delay due to a potential requirement for reprogramming of project funds.

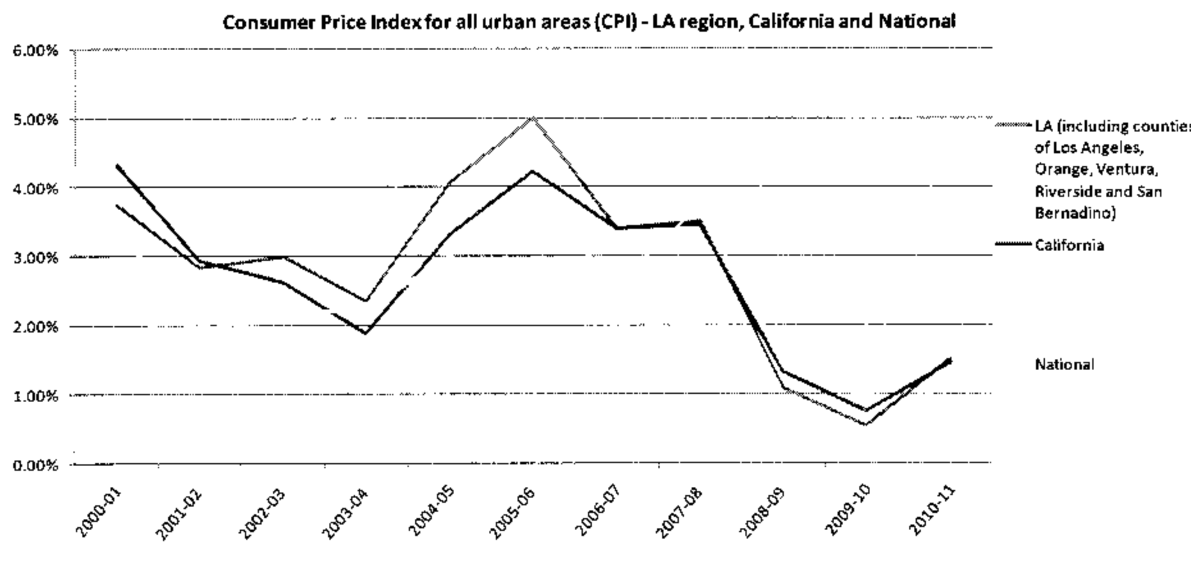
3.5. ECONOMIC RISKS

The uncertainty surrounding the ability to forecast inflation of costs and revenues over the expected construction timing and operations life of the asset is a fundamental risk. The impact of inflation is influenced by the timing of the expenditures and the demand for the underlying commodities and labor associated with the Project costs. Therefore, the ability to deliver the Project within the funding plan will be impacted by:

- Any delay to the Project schedule, whether to the start of construction or its duration; and
- Higher than projected increases in labor costs and commodities prices which may result from the overheating of the labor market and the scarcity of certain types of building materials as construction demand ramps up after this recession.

The current forecast construction cost inflation for the Project is 2% for 2011 and 3% from 2012 to 2020.[5] Evidence of the variability of forecasts has been provided below, where data indicate that annual consumer price inflation has ranged between 4.99% and 0.54%[6] within the last 10 fiscal years.

Figure 8: CPI Index for LA Region, CA, and National



Source: California Department of Finance

Overall, the Project faces the risk that an economic recovery combined with the total program demands on commodities and labor will lead to construction and operational costs growing at a faster rate than currently planned by Metro.

[5]Source: Administrative FEIS/FEIR May 2011
[6]California Department of Finance data website

4.0 P3 PROCUREMENT OPTIONS ANALYSIS

This section presents the results of the analysis to compare Metro's current intended procurement approach with several P3 alternative approaches using evaluation criteria established by Metro. The sections below define each procurement alternative and present the results of the analysis of each option with reference to a detailed matrix included in Appendix A.

The procurement alternatives were developed using the conclusions from Task 3, more recent project information and a detailed understanding of the project and its risks as presented above. It is acknowledged that there may be other possible alternatives that are variations of the alternatives presented below. The intention of this analysis was to develop a limited number of initial alternatives that were significantly different in order to illustrate the key advantages and disadvantages associated with them. Having "screened" these alternatives, two were analyzed in more detail.

As a comparison against the Public Option, four procurement alternatives were initially developed. The first was called the "Enhanced Public Option" as it represents an incremental change in the Public Option. The other three were called "P3 Alternatives" 1, 2 and 3.

A summary of the Public Option and alternatives is shown in Table 8.

Table 8: Summary of Procurement Alternatives

<table>
<tr><th>Alternative</th><th>Number and type of Construction Contracts</th><th>Systems Maintenance</th><th>Infrastructure Maintenance</th><th>Operations</th></tr>
<tr><td>Public Option</td><td>3 x DBB Tunnels
3 x DB Stations
1 x DB Track, Systems</td><td>By Metro</td><td>By Metro</td><td>By Metro</td></tr>
<tr><td>Enhanced Public Option</td><td>1 x DB Tunnels
1 x DB Stations
1 x DB Track, Systems</td><td>By Metro</td><td>By Metro</td><td>By Metro</td></tr>
<tr><td rowspan="2">P3 Alternative 1</td><td>1 x DB Tunnels</td><td>By Metro</td><td rowspan="2">By Metro</td><td rowspan="2">By Metro</td></tr>
<tr><td colspan="2">1 x DBFM Stations, Track and Systems</td></tr>
<tr><td>P3 Alternative 2</td><td colspan="3">1 x DBFM Tunnels, Stations, Track and Systems</td><td>By Metro</td></tr>
<tr><td>P3 Alternative 3</td><td colspan="3">1 x DBFM Tunnels, Rail Yard, Stations, Track and Systems
+ maintenance of existing Red / Purple Line</td><td>By Metro</td></tr>
</table>

The initial development of alternatives assumed that operations and the procurement/maintenance of vehicles would be excluded from all of the options. P3 Alternative 3 was developed as an exception to this rule for comparative purposes as the implications of including O&M may apply to other projects in the future.

Note that P3 Alternative 3 considers a broader scope than the other alternatives as it contemplates the transfer of all maintenance work for the existing Red / Purple Line as well as delivery and maintenance of the extension. For the Public Option and other alternatives, Metro would continue to maintain the existing system as per current arrangements.

Section 4.1 describes the Public Option. An analysis of the financial and economic risks associated with this option is presented in Section 4.2.

Section 4.3 presents four initial alternative options and a narrative that explains the reasons for selecting two of these alternatives for further analysis. Section 4.5 compares the Public Option with the selected alternatives using Metro's evaluation criteria.

4.1. Definition of Public Option

The "public option" is defined as Metro's intended procurement approach to delivering the Project:[7]

- The tunnels and station structural boxes are to be constructed under three separate construction contracts following final design by Metro (design-bid-build, DBB):
  - Contract 1: Wilshire/Western station to Wilshire/La Cienega tunnel (including vent shaft) approximate value $637m;
  - Contract 2: Wilshire/La Cienega station to Century City station approximate value $492m; and
  - Contract 3: Century City to end of line (including "mid line vent structure") approximate value $471m.
- Metro will design and procure the Tunnel Boring Machines and that there will be two for each contract, six in total.
- It is assumed that Metro will undertake preliminary utility relocation work under separate specialist contracts and negotiate with public and private utility owners.
- The Division 20 Rail Yard expansion will be procured as a separate design-bid-build (DBB) contract (Contract 4, approximate value $199m).
- Station finishes will be procured as three separate design-build (DB) contracts (Contracts 5, 6 and 7, approximate values $214m, $267m and $367m).
- Trackwork, systems and systems integration testing will be procured as one design-build (DB) contract (Contract 8, approximate value $319m).
- The Rail Operations Center and 104 new heavy rail vehicles will be procured separately by Metro.

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[7]Source: Potential Construction Contract Requirements, dated February 3, 2011

- A Program Management / Construction Management team will be procured separately by Metro.
- Metro will operate the trains, signals, ticketing and other services as per existing arrangements.
- Metro will carry out all routine and preventive maintenance and asset replacement of civil infrastructure, systems, signals and vehicles for the Project and the existing Red / Purple Line.

In addition to the project delivery (cost and schedule) risks identified in Section 3 above, the Public Option procurement approach introduces additional commercial and financial risks. On the positive side, however, the DBB option gives Metro full control over Project design and allows it to control the timing and structure of all associated financings.

4.2. Alternative Procurement Options

This section presents four initial alternative options followed by the reasons for selecting two of these alternatives for further analysis. The next section then compares the Public Option with the selected alternatives using Metro's evaluation criteria.

4.2.1. Enhanced Public Option

Description

The Enhanced Public Option proposes a single design-build (DB) contract for the design and construction of the extension tunnels and station boxes and a single design-build (DB) contract for the design and construction of all seven stations. Given the long lead times for the design and procurement of tunnel boring machines, this option assumes that Metro will continue to design the TBM to an advanced levels (>60%) and then convey the design to the bidders.

Other components of the Project will be procured as per Metro's current intended approach:

- One DB Contract for track, systems and systems integration;
- One DBB Contact for Rail Yard;
- Program Management Oversight team procured separately;
- Metro maintenance (all);
- Vehicles procured separately;
- Rail Operations Center developed separately; and
- Metro responsible for operations.

Advantages and Disadvantages

This alternative was developed to consider the potential advantages of combining the tunnel and station contracts in larger packages. The primary benefits are to achieve greater economies of scale and to minimize the interface risk between contractors, especially with respect to the construction of the tunnels in three segments. In order to achieve Metro's proposed schedule for project delivery under 30/10, this alternative maintains the three segment approach, utilizing three sets of Tunnel Boring Machines (TBMs).

The TBMs and tunnel lining could be designed to advanced levels by Metro's designers but the design would be finalized by the DB contractor. This arrangement allows Metro to continue with geotechnical investigations that minimize the level of risk associated with unknown ground conditions. Metro would provide its design and geotechnical information to bidders during the procurement of tunnel contractors, but the contractors would be responsible for finalizing the design and for all delays and cost overruns during construction itself. Metro undertaking this design and associated site and geotechnical investigation mitigates the potential cost to Metro of the tunneling risk transfer.

By allowing DB contractors to finalize design and construction methodology Metro would also be allowing bidders to develop innovative approaches to key risk areas such as site preparation, lay down areas, access points and public interfaces, as well as design and construction methods.

A disadvantage of this approach is that the substantial contract size may limit the field of competition, thereby having an upward effect on prices. The tunnel contract would be in excess of $1billion so joint ventures would have to be formed in order to achieve the likely assumed levels of performance securities. But this is normal for the market for large tunnels, and has the benefit that fewer contracts would be required to be procured, managed and coordinated

This consolidation will reduce some interface risks, but will not eliminate them entirely. For example, interface risk will still be present between the tunnel contractor and the station and track contractors. Additionally, this option does not mitigate the significant funding and financial risks that the Project faces.

A DB approach involves a departure from Metro's traditional DBB methodology for tunnel construction. To successfully transfer risk to the contractor, it is important that the bid specifications be open enough to encourage the contractor to employ innovation in both design and construction means and methods. Should Metro require too many specific design elements, the DB contractor will be unwilling to assume full design risk, and Metro may find itself with a sub-optimal risk transfer. The DB contractors will also resist accepting completion risk if they do not have the freedom to plan and execute the work in the manner they deem most appropriate and efficient. It is likely that Metro will require specialist support to develop the performance-based criteria and contract documents for this type of DB work.

A further benefit of the strong DB contract is that it will allow Metro to transfer post completion risk to the DB contractor, in the form of a long term warranty. Recent examples of this are included in Table 9 below.It is worth mentioning that the concessionaire for the Port of Miami tunnel project obtained an extended 10 year warranty in addition to the 2 year construction warranty.

Table 9: Warranty Provisionsin Various Design-BuildTunnel/Trench Contracts

Project	Year/Type of Project	Scope of Warranty	Duration	Warranty Bond
WSDOT Alaskan Way Viaduct	2010 Toll Tunnel	Standard design-build warranty.	Two year period for the tunnel structure, the tunnel approach structure and all systems, equipment, fixtures and other tunnel appurtenances. Warranty period for all other work is the later of (a) one year after physical completion or (b) final acceptance.	No warranty bonds, but performance bond covers warranty work
MAT concessionaire Port of Miami Tunnel Project[8]	2009 Underwater tunnel, bridge widening and roadway improvements	A. General obligation to correct all nonconforming or defective work B. Additional warranty (through expiration of extended ten year warranty period) that as of substantial completion, the tunnel and the other primary components of the Project will be safe and designed and constructed in accordance with the technical requirements of the concession agreement.	Two year warranty on all work Extended ten year warranty (commencing upon expiration of two year warranty) on: (a) defects or nonconforming work related to all Structural Elements;[9] and (b) that tunnel and other primary components of the Project will be safe and designed and constructed in accordance with concession agreement technical requirements.	Performance security (10% letter of credit) to remain in place through initial two year warranty period. Parent company guaranty secures design-builder obligations during extended warranty period.

[8] Pursuant to concession agreement with Florida DOT.

[9] Structural Elements are defined as "foundations, columns, walls, floors, beams, slabs, tunnel and bridge structures, tunnel lining, roof supporting structures, roofs, roads and other internal and external load-bearing structures essential to the stability or strength of the Project"

	Project			
Southern Nevada Water Authority Lake Mead Intake No. 3 Shafts and Tunnel	2007 Underwater tunnel	General warranty that work will comply with contract documents.	Two years.	Performance bond remains in effect through two year correction period, subject to Design-Builder's right to reduce the amount.
City of Reno ReTRAC Project	2002 Depressed railway	Standard design-build warranty. Warranties not applicable to railroad work.	Five year period for warranties regarding water tightness. One year warranty for all other elements of the Project	No warranty bonds, but performance bond covers warranty work
Alameda Corridor Transportation Authority Mid-Corridor Design-Build Project	1998 Street and rail	Standard design-build warranty For the bypass track/storage track design, warranty of fitness for use is not applicable and warranty against defects is limited to construction defects, and the period.	One year after the Final Acceptance Date or such longer term as may be required under an applicable City Agreement or Utility Agreement(s).	Performance bond to remain in place until one year after Final Acceptance
Alaska DOT Whittier Access Project, Tunnel Segment[10]	1998 Tunnel modification	Performance warranty for major systems. Design-builder was required to complete performance testing to validate design and performance criteria prior to opening the tunnel to traffic	Two years (contract provided for an extended warranty as well as a two year operation period).	No information available

[10]Project information based on SEP-14 evaluation report.

[illegible]	Project	[illegible]	[illegible]	[illegible]
Atlandia Design and Furnishings Atlantic City/ Brigantine Connector[11]	1997 Highway connector and tunnel	Standard design-build warranty.	Five years for the tunnel structure, the tunnel approach structure and all systems, equipment, fixtures and other tunnel structure appurtenances. One year warranty period for all other Work.	Performance Bond remains in effect through warranty period, subject to Contractor's right to provide replacement bonds reducing bond amount.

4.2.2. P3 Alternative 1

Description

P3 Alternative 1 proposes a single DB contract for the design and construction of the extension tunnels and station boxes and a separate, single DBFM contract for the design, construction and maintenance of stations, track, systems and systems integration.

The DBFM contract includes a single contract for design, construction, and maintenance of all non-rolling stock components over a proposed 30-year period. The length of the concession term is based on recent market precedent for transit P3s in the United States, calibrated to fall within the maximum loan repayment term of 35 years under the TIFIA program, which would likely form an integral component of any P3 financing strategy, but ultimately limited by the sunsetting of Measure R in 2040. Under the DBFM option, the Private Partner would be responsible for providing financing at the appropriate time for a portion of the design and construction costs. As with both the Public and the Enhanced Public Options, Metro would retain responsibility for funding ROW acquisition, advance utility relocations, and vehicle contracts.

The Private Partner would also be responsible for maintenance of all passenger stations, track, civil works, including tunnels, aerial structures, elevators/escalators, as well as communication systems.

The level of service would be defined in the DBFM contract for preservation of civil works and systems in a state of good repair over the concession period and enforceable via contractually specified penalties and/or withholding of availability payments.

[11] Pursuant to public-private partnership agreement with NJDOT, SJTA.

Other components of the Project would be procured similarly to Metro's current intended approach:

- One DBB Contact for Rail Yard;
- Program Management Oversight team procured separately;
- Metro maintenance of tunnels and vehicles;
- Vehicles procured separately;
- Rail Operations Center developed separately; and
- Metro responsible for operations.

Advantages and Disadvantages

This alternative is similar to the Enhanced Public Optionfor the delivery of the tunnels and station boxes so the advantages and disadvantages such as reduced interface risk, construction methodology, and use of land and easements for lay down areas are similar to those described above.

The introduction of DBFM for station fit-outs, track, systems and systems integration is a significant change from the Enhanced Public Option due to the transfer of maintenance responsibilities to the same entity that is responsible for its design and construction. The design and construction part of the contract would be similar to the Enhanced Public Option, which also combines these parts of the Project into one large contract package, thereby resulting in similar advantages and disadvantages to those described above.

The added scope of maintenance in this alternative is limited to activities that could mostly be performed from the stations during system closures. Direct access via stations instead of from the rail yard is an advantage because the rail yard is approximately six miles from the start of the Project and is mostly used for vehicle maintenance rather than infrastructure and systems maintenance. Additional market soundings would be required to determine if high-rail activities could be cost-effectively added to the maintenance scope.

The introduction of private finance allows Metro to change the way it funds the project and reduces some of the funding risks associated with the project. Instead of Metro providing all of the funds up-front, it could seek to enter into a contract with a Private Partner to finance that portion of the project not funded by grant money. Typically, Metro would pay the Private Partner a lump sum completion payment when the stations open and the system is operational, covering some or all of the capital cost of the construction, followed by annual payments over the remainder of the contract term covering any unpaid capital investment, maintenance expenses, debt service if any, and return on equity. Both types of payment would be closely linked to contractual performance requirements and deductions would be made if performance targets were not met.

This optionwould be designed and developed assuming life-cycle risk transfer meaning thatthe Private Partner has a strong incentive to design and construct the Project in a way that maximizes maintenance efficiencies and reduces costs. A significant advantage to Metro is that it has certainty of maintenance costs for the duration of the contract because they are part of the payment to the Private Partner and agreed during the procurement. Metro therefore transfers the risk of maintenance cost escalation and benefits from a contractually enforceable program of regular and periodic maintenance performedaccording to specifications.

One of the potential impediments to this approach is the potential lack of US market capacity, including the availability of performance and payment securities. As this is a new concept, the potential size of Metro's program including all of the Westside stations, track, systems and system integration, could well exceed the market capacity. A structured program of industry outreach if the best way to determine the market interest level. If this interest proved to be insufficient, the approach could be adjusted to separate the stations from the track, systems and systems integration (which should always be kept as one package). A further separation could package the stations into two or even three contracts but this would reduce the potential for economies of scale and bulk purchasing agreements. It would also introduce more interfaces between contractors and limit the ability of those Private Partners to make up for any schedule delays that may still occur. A single Private Partner has much more flexibility in making up for schedule delays on one part of a large Project by allocating its resources to another part until the cause of delay has been resolved.

To avoid potential duplication of maintenance staff and communications and safety equipment with Metro, a clear matrix of responsibilities would need to be developed and included in the contract documents. The general preference to avoid a potential interface between Metro employees and those hired by the Private Partner accordingly limits the types of non-vehicle maintenance activities that can be performed.

Metro would need specialist support for developing contract documents, in particular for the development of performance specifications for the maintenance work.

Finally, the separation of maintenance work for stations, track and systems within the 9 mile extension from the rest of the Red/Purple Line system creates an additional interface risk. Within the stations the risk is probably low as they are relatively isolated facilities, but the maintenance of signals and systems would have to be carefully planned and defined in the contract documents for this alternative to work.

4.2.3. P3 Alternative 2

Description

P3 Alternative 2 proposes a single DBFM contract for the design, construction and maintenance of the extension including tunnels, station boxes, stations, track, systems and systems integration. The DBFM contract will include responsibility for routine maintenance, preventive maintenance and replacement of wayside infrastructure (including tunnels, stations and track), signals and systems over a 30-year period. Its terms and general structure are described in the P3 Alternative 1, above.

Other components of the Project will be procured as per Metro's current intended approach:

- One DBB Contact for Rail Yard;
- Program Management Oversight team procured separately;
- Metro maintenance of vehicles;
- Vehicles procured separately;
- Rail Operations Center developed separately; and
- Metro responsible for operations.

Advantages and Disadvantages

P3 Alternative 2 is a significantly larger contract than P3 Alternative 1 and is likely to be in excess of current single-project capacity for performance surety. The alternative is therefore excluded from comparison with the Public Option and Enhanced Public Option.

The main advantages of this larger contract for the design, construction, financing and maintenance of the entire Project (except for the rail yard) include: increased economies of scale by combining the construction of stations with tunnels; increased opportunities for innovation in design and construction, in particular with respect to construction methodology such as optimum use of lay down areas and more opportunities for schedule acceleration; enhanced interface risk reduction by making one contractor team responsible for a larger amount of the project; significant transfer of completion risk due to a likely payment structure that includes strict performance based requirements and therefore additional oversight from lenders; increased certainty of future maintenance costs for more of the Project and ensuring a life cycle approach to design, construction and maintenance; and ability to reduce financing risks.

The alternative also has a number of disadvantages, including that theincreased scope of infrastructure maintenance would likely require access to the rail yard which is also (and predominantly) used by Metro for vehicle maintenance and the maintenance of the rest of the Red/Purple line. This creates an interface between Metro and the Private Partner that may make monitoring of compliance with performance measurement more difficult. A potentially increased level of duplication of staff, communications and safety equipment will be required for operations and maintenance. Metro will still have to provide staff and equipment for operations as this is retained, but the Private Partner would also need separate staff and equipment for maintenance, especially within the stations. Construction contract interface risk would be largely transferred but there would still be maintenance interface risks between the Project and the existing Red/Purple line at Wilshire/Western station location; this interface would need to be carefully defined in the contract documents.

4.2.4. P3 Alternative 3

Description

PPP Alternative 3 proposes a single design-build-finance-maintain (DBFM) contract for the design, construction and maintenance of the extension including tunnels, station boxes, stations, track, systems and systems integration as per Alternative 2 plus handing over responsibility for maintenance of the existing Red and Purple Line including tunnels, stations, track and systems for a 30-year period.

The contract would include the design, construction and maintenance of the Rail Yard expansion and handover of the entire facility to the Concessionaire. Vehicle maintenance would be included for existing and new vehicles. The contract would include responsibility for routine maintenance, preventive maintenance and replacement of all wayside infrastructure (including tunnels, stations and track), vehicles, signals and systems over a 30-year period.

Metro will continue to operate the trains, ticket machines and other direct customer services. A sub option proposes including the procurement of 104 new vehicles into the same contract. Other assumptions are:

- Program Management Oversight team procured separately.
- Rail Operations Center developed separately.

Advantages and Disadvantages

Alternative 3 is an even larger contract than Alternative 2 so it has also been excluded from the evaluation comparison in the next section. A brief discussion is included here to introduce the concept and address its main advantages and disadvantages.

Some of the advantages extend from the previously discussed alternatives such as increased economies of scale, reduced interfaces between contractors, ability to introduce innovation etc. The primary additional benefit to Alternative 3 is that it removes the maintenance interface between the Project and the rest of the Red / Purple line. This significantly reduces the risk of operational conflicts at the rail yard since the Private Partner would be entirely responsible for its operation, including the construction of the expansion. Metro may continue to have some access to the rail yard (such as for driver facilities or other operational needs) but the yard would otherwise be leased to the Private Partner for the duration of the DBFM contract.

Another significant difference is that by including vehicle maintenance in the scope of the contract the Private Partner would be better able to manage the wheel-rail interface risk that is critical to the maintenance of track and vehicles. Closer coordination between the maintenance of these two parts of the system should result in lower maintenance costs over the long term and may extend asset life as well.

The disadvantages are primarily due to contract size and the organizational impacts that this option would have within an agency that does not currently contract out any transit operations or significant levels of infrastructure / vehicle maintenance. There is no precedent for this structure in the US and there are clearly potential risks to whoever takes on the pioneering role. The transfer of existing operations and maintenance would require significant levels of due diligence in order to get a fixed price contract that does not include very high contingencies. The challenge of crafting and then enforcing performance standards for high-volume daily transit service would also require significant expertise and management time and attention, as well as stakeholder buy-in. Metro would have to work very closely with industry over an extended procurement period to develop a "bankable" project. Significant levels of advice and support may be required for this level of planning and development.

A further complication would be the need to renegotiate labor agreements for existing infrastructure and vehicle maintenance. Preliminary discussions with Metro have indicated that there may be flexibility with new systems but that it would be very difficult to negotiate existing work.However, it may be possible for a "Project Labor Agreement" (PLA) to be negotiated and to include job protection over the term of existing labor agreements whereby the Private Partner accommodates certain elements of the agreements and introduces new benefits such as increased levels of training.

4.3. Analysis of Selected Procurement Alternatives

Following the analysis presented in Section 4.2, it was determined that the Enhanced Public Option and P3 Alternative 1 would be taken forward for comparison against the Public Option. The table below summarizes the alternatives taken forward for evaluation.

Table10: Public Option and Selected Alternatives

<table>
<tr><th>Alternative</th><th>Number and type of Construction Contracts</th><th>Systems Maintenance</th><th>Infrastructure Maintenance</th><th>Operations</th></tr>
<tr><td>Public Option</td><td>3 x DBB Tunnels
3 x DB Stations
1 x DB Track, Systems</td><td>By Metro</td><td>By Metro</td><td>By Metro</td></tr>
<tr><td>Enhanced Public Option</td><td>1 x DB Tunnels
1 x DB Stations
1 x DB Track, Systems</td><td>By Metro</td><td>By Metro</td><td>By Metro</td></tr>
<tr><td rowspan="2">P3 Alternative 1</td><td>1 x DB Tunnels</td><td>By Metro</td><td rowspan="2">By Metro</td><td rowspan="2">By Metro</td></tr>
<tr><td colspan="2">1 x DBFM Stations, Track and Systems</td></tr>
</table>

The comparison below is based on Metro's established evaluation criteria.

In order to focus the analysis, the evaluation criteria have been applied primarily to: (1) the construction of the tunnels and station boxes; and, (2) system maintenance. These two aspects were selected following the identification of key risks in the previous sections.

4.3.1. Criteria 1: Achieve Most Cost-Effective Use of Public Funds

Price certainty:The Public Option allows Metro to gain a better understanding of the cost of tunnel construction as it will be undertaking 100% design before going out to bid, but history has shown that the bid prices are usually significantly less than the final construction cost due to scope changes and claims. The Enhanced Public Option transfers more completion risk to the contractor along with responsibility for final design and DB contracts are typically much more restrictive on allowable claims. With the Enhanced Public Option and P3 Alternative 1, fixed prices will be agreed when the contracts are signed. As long as the contracts transfer appropriate levels of risk, this transfer should not result in significant levels of contingency added to prices.

Economies of scale:The Enhanced Public Option and P3 Alternative 1 should achieve economies of scale due to the smaller number of contracts for the same scope of work. The difference between the Enhanced Public Option and P3 Alternative 1 is likely to be minimal since the only difference is the inclusion of track and systems with the station fit-out work and these involve different sorts of materials and equipment. There may be a diseconomy of scale in P3 Alternative 1 with respect to maintenance work as Metro has the advantage of maintaining the rest of the Red/Purple Line system. This means they already have equipment and labor in place so the addition of 9 miles may not result in a proportional increase in cost to Metro. The P3 Alternative 1 Private Partner would need to have its own equipment and labor.

Leveraging funds and access to alternatives:P3 Alternative 1 includes sources of private debt and equity that are repaid over the contract period. This additional financing mechanism may be a significant benefit to Metro although a determination of cost-effectiveness would need to be made based on a quantitative comparison between this and the Public Option. The Public Option and the Enhanced Public Option do not allow for private sources of finance.

4.3.2. Criteria 2: Accelerate Project Delivery

Schedule certainty:The use of DB contracts in the Enhanced Public Option and P3 Alternative 1 should provide more certainty to Metro that the construction phase of the Project will be completed on time compared to the DBB contracts envisaged in the Public Option. Fewer contracts in the Enhanced Public Option and the P3 Alternative 1 may result in fewer conflicts between contractors and allow the contractors that have a larger scope of work to adjust their work around difficulties and make up for lost time by advancing another part of the Project.

Acceleration:The Project is currently undergoing Preliminary Engineering so it is not too late to choose an alternative procurement option without delaying the schedule. The Enhanced Public Option will take longer to procure because performance specifications will have to be developed, but once this is done the construction schedule may be compressed if the contractor is able to start preliminary work while design is still under way. This, however, is limited by the long lead time and critical path nature of TBM design and manufacture. The P3 Alternative 1 may require additional time to develop P3 procurement documents and time for proposers to develop their technical and financial submissions. However, Metro would be able to leverage P3 procurement documentation and processes developed in both California and other jurisdictions to reduce this timescale.

4.3.3. Criteria 3: Optimize Risk Transfer

Availability of information to price risk: The Public Option will generate the most information prior to tunnel construction, because Metro and its engineers will complete final design. A similar level of technical data could be made available for the Enhanced Public Option and the P3 Alternative 1, but it would be left to the Private Partner to interpret the data in its design so as to transfer the risk of design away from Metro. Under the P3 Alternative 1, the Private Partner's ability to price the long-term cost of maintenance and thus transfer that risk away from Metro will depend heavily on how well the contract terms define and measure performance and allocate responsibility for consequential responses to actions of others, including Metro's service levels and its responsibility to maintain rolling stock.

Ability to measure performance: The Public Option and the Enhanced Public Option will result in similar levels of risk transfer, but the use of several contractors in the Public Option may make it more difficult to establish fault if a claim arises, particularly at the physical interfaces between contractors. The use of DBB in the Public Option may make it difficult to establish whether a problem on site is due to the design or to the construction methodology. The Enhanced Public Option and the P3 Alternative 1 combine these activities and transfer them to a single entity which eliminates the problem. The inclusion of some maintenance services in the P3 Alternative 1 will require clear definition of scope andaccess to and use of facilities in the contract documents. The relatively small level of maintenance proposed – compared to the other P3 Alternatives – should make it easier to isolate and measure performance because the Partner will not need to utilize the rail yard.

Ease of contract document development: The Public Optionwill be the most straight-forward contract to develop as Metro has extensive experience of DBB for tunnels. The Enhanced Public Option and the DB part of the P3 Alternative 1 may call on more recent experience from DB projects such as the Eastside Extension. Including private finance, a long term agreement and transfer of maintenance risk will make the P3 Alternative 1 a much more complex procurement option so will require significant amounts of new work in preparing the contract documents. Experience can be drawn from other Agencies that have implemented similar approaches such as Denver RTD, and from expert technical, business and financial advisers

Flexibility to enable innovation: The Public Option allows for some innovation in construction methodology but this will be limited at the time of bidding because 100% design plans will have already been prepared. The Enhanced Public Option and the P3 Alternative 1 allow potential Private Partners much more latitude in developing design and construction options during both the procurement and implementation phases and may result in lower cost to Metro. P3 Alternative 1 is the only option that provides incentives for a single entity to take a life cycle view of system components and to try and reduce the overall cost of the installation and maintenance over a long period.

Compatibility with regulations: The Enhanced Public Option and the P3 Alternative 1 propose much larger contracts than the Public Option and are likely to attract international competition, which may require a heightened scrutiny to ensure compliance with federal, state and local regulations and laws they may be less familiar with. However, as most international firms in this market have US subsidiaries and partner with US firms, this should not be a major concern. There should not be any major differences between the alternatives for environmental impacts, green construction policies, sustainability etc.

Availability of performance and payment securities: As discussed in Section 3.2, this presents a major challenge for all large contracts, and will particularly do so for the P3 Alternative 1 which contemplates only two contracts for the delivery of approximately $4bn of construction work. It will be the least difficult for the Public Option, as its contract packages are the smallest. As the tunnel contract in the Enhanced Public Option is likely to be larger than $1bn, this may also present insurance difficulties. Current surety market conditions indicate that bonding availability above $250 million per contract is highly limited. There are other performance options, such as joint ventures or acceptance of corporate guarantees or letters of credit in lieu of commercial sureties that can mitigate this issue.

4.3.4. Criteria 4: Ensure Asset Quality throughout Life Cycle

Extent of life cycle risk transfer: The Public Option and the Enhanced Public Option do not transfer any maintenance performance or cost risk away from Metro. P3 Alternative 1 transfers a limited amount of maintenance cost and replacement cost risk for track and system components as well as station equipment. The scope of this is largely mechanical and electrical equipment which typically has a life cycle (or obsolescence shelf life) of under 25 years. P3 Alternative 1, a proposed 30-year DBFM contract, would allow Metro to transfer the performance risk of the system elementsover the term of the contract, requiring the Private Partner to maintain, replace and even upgrade all component parts. If maintenance or replacement costs rise steeply in the next 30 years, Metro would have protection under the P3 Alternative 1 but not under thePublic Option or the Enhanced Public Option.

4.3.5. Criteria 5: Provide Highest-Quality Service for the Traveling Public

Ability to achieve and measure operational performance/quality: None of the alternatives contemplate any transfer of operations responsibility or risk away from Metro. However, P3 Alternative 1 would include some customer service aspects such as maintenance of station facilities like elevators and escalators. P3 Alternative 1 would include strict performance requirements that could be linked to payments so that if, for example, an escalator was out of service for a certain period of time, the contractor would not be paid its full amount until the escalator was back in operation. The contractor would therefore have a strong incentive to keep such equipment operational to meet customer service objectives. This level of accountability is not featured in alternatives the Public Option or the Enhanced Public Option.

5.0 P3 FINANCING OPTIONS

This section describes the components of private finance used in P3 projects and the current P3 financial market.

5.1. Summary of Sources for the Proposed P3 Option

Under theDBFM approach the Private Partner would be compensated with a contractually fixed annual payment for the maintenance of the project, the repayment of debt and a return to the equity provider. That payment would be increased annually to reflect changes in an agreed-upon inflation rate and could be decreased by adjustments for failure to meet contractual obligations regarding service quality or availability of the asset.

Under the P3 Alternative 1, a portion of the project capital cost would be paid for by the Private Partner, and repaid over the life of the contract term in the form of an availability payment. Unlike a user-fee based project, where revenues are paid by users and demand risk is transferred to the private developer, under an availability payment structures the payments would be paid over time from Metro funds (such as Measure R sales tax revenues).

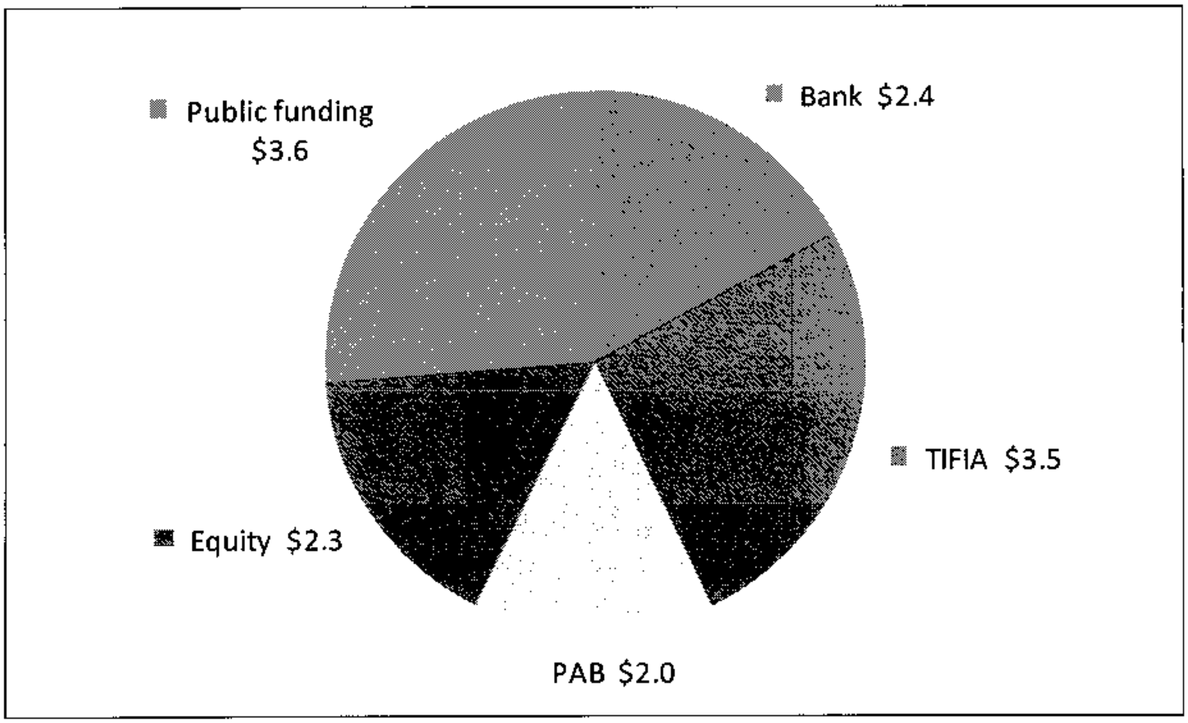
5.2. Options for Private Finance

Sources of available finance include bank loans, Private Activity Bonds and TIFIA (for transport related projects). These are discussed below.

5.2.1. Bank Debt

Due to the dominance of tax-exempt financing in the US, the use of bank debt in US P3 transportation deals has been limited. In December 2010, the Long Beach Court Building, a social infrastructure P3 deal, reached financial close using a short term bank loan and a year prior to that Port of Miami Tunnel reached financial close using a bank facility of $342 million combined with TIFIA finance of $341 million. Shorter tenors on bank debt mean that this form of capital carries a greater refinancing risk than a bond; however, it does have the advantages that proceeds are drawn periodically, as required, avoiding "negative carry" interest costs. Closing can also be a simpler task, and usually requires no third-party ratings. But it is important to note that bank debt may belimited in its availability in the short term due in part to the European debt crisis which could restrict the amount of finance that could be raised for a project of this scale.

Figure 9: Major Sources of Funds for Transportation P3 Deals 2007 – 2010 (shown in $ billions)



5.2.2. Private Activity Bonds (PABs)

PABs are tax-exempt bonds issued through a conduit established by a state or local government agency for the purpose of funding eligible expenditures, the proceeds of which may be used by one or more private entities for a qualified project. At this time USDOT is reporting approved PAB allocations of $5.9 billion, with $2.2 billion already issued, out of legal maximum of $15 billion. Recently, Presidio Parkway in Northern California received an allocation of $592 million and the Eagle P3 transit project in Denver, Colorado reached financial close on $397 million in PABs debt in August 2010. PABs offer an all-in cost of bond debt that can be less expensive than bank debt; as well as a long-dated solution that removes refinancing risk for the private developer. The use of a PAB issue includes several constraints includingthe requirement to meet federal standards, to spend 95% of funds within 5 years and the requirement to comply with arbitrage rules on invested funds. Funds can only be spent on new assets.

5.2.3. Transportation Infrastructure Financing Innovation Act (TIFIA)

The USDOT awards credit assistance for transportation projects to eligible applicants, which include state departments of transportation, transit operators, special authorities, local governments and private entities. There are several benefits and challenges associated with TIFIA assistance summarized below:

- A low cost of debt (SLGS rate plus one basis point) – 4.38% for a 35-year loan as at July 7th, 2011;[12]
- Repayment terms which include accrual of interest and principal to allow projects to overcome early operations phase cash flow constraints;
- Demand exceeds funding supply, therefore applications are on a competitive basis;
- Funds are available periodically and may therefore impact project schedule;
- Funds permitted are limited to 33% of eligible project costs;
- An investment grade rating is required for facilities senior to the TIFIA loan; and
- The TIFIA office requires the loan to carry a 'springing' lien in the event of bankruptcy such that TIFIA debt ranks paripassu with senior.

The two-year reauthorization bill recently reported out of committee (S. 1813, or MAP-21) contains numerous changes to TIFIA that would have the effect of making more funds available for more projects under a streamlined application process. That bill's passage is not certain, however.

5.2.4. Private Equity

In general, sources of private equityfor P3 transactions include financial institutions, pension funds, private developers and infrastructure funds. Equity providers typically provide the smaller share of funding, as compared to debt. For example, the Eagle P3 equity component was $54 million, against $397 million in debt (or a 14% debt to equity ratio). Equity providers are paid a return after project costs, debt service and any taxation costs have been paid. As a result, returns to equity providers are varied and due to this increased risk of repayment providers of equity require a higher cost of funds.

Under the P3 Alternative 1, the Private Partner will contribute a portion of the project costs as equity, and expect to achieve a return on it. That return is at risk for the life of the contract, as the Private Partner's equity stake has long-term exposure through the maintenance period. This helps to maintain rigorous standards of performance due to concession conditions penalizing the equity investor if the standards fall below predetermined levels. The loss of equity would be the result of deductions being made from the availability payment for non-compliance of performance standards.

The equity investor would also have exposure through life-cycle expenditure if increased capital replacement programs are required earlier in the asset life due to lack of routine maintenance or poor construction quality.

[12]Source: FHWA TIFIA website

5.3. Recent Precedent P3 Transactions

Several P3 transactions have been completed in the US despite financial market conditions over the last few years. Over $12 billion in transportation infrastructure deals have reached financial close since fall 2007. Most recently the transit P3 market has witnessed the successful financial close of Denver's $1.6 billion Eagle P3 project. The Denver RTD transferred the design, build, finance, maintenance and operational responsibilities for the development of a total of approximately 35 miles of commuter light rail in and around Denver, adding connectivity between Denver International Airport and Denver Union station and including rolling stock procurement and maintenance facility development.

The project was awarded as an availability deal by Denver RTD to a consortium including Balfour Beatty, Macquarie, Fluor, Uberior Fund and John Laing plc. The financial structure of developed by the consortium included $54 million in equity (provided by Fluor, Uberior Fund and John Laing plc) and $397 million in Private Activity Bonds.[13]More than $1 billion in construction funds came from a full funding grant from FTA.

For the completion of the DBFOM the consortium will be reimbursed with construction payments of over $1 billion during the design-build period and service payments (availability payments) during the operations period. The availability payments have been structured over a 35-year term[14] and are subject to deductions based on service and availability. The availability payment has been divided into two components – an operations and maintenance component which requires appropriation by the District, and a second component payable from and secured by a subordinate lien on the RTD sales tax revenues.[15]

[13]Source: InfraDeals
[14]Source: InfraDeals
[15]RTD PAB Offering Statement

6.0 CONCLUSIONS

The Westside Subway Extension project faces significant technical, commercial and funding risks as has already been well established by Metro, its environmental and design consultants and the Federal Transit Administration PMO consultants. This business plan summarizes key risk areas and develops several potential alternative delivery options that could help Metro to manage those risks in a cost effective way. As discussed in previous reports, *optimal* risk transfer will help Metro to deliver its projects more efficiently. A range of risk transfer options were considered in this report and analyzed against Metro's P3 Program goals and evaluation criteria.

Four initial alternatives were developed from an analysis of project delivery risks and a consideration of how those risks could best be managed. A wide variety of risk transfer options were consideredincluding: an increased use of design-build with larger construction packages to reduce interfaces; the transfer of different levels of maintenance responsibility combined with private finance and performance based availability payments; complete transfer of the new and existing Red and Purple Lines to a private sector maintenance company as part of a large package that is privately financed and repaid using Measure R and other funds.

The P3 Alternative 2 option to transfer significant levels of maintenance risk was eliminated from further analysis, primarily due to the difficulty of separating private maintenance from the maintenance of the rest of the facility when the rail yard is located so far from the Project. Infrastructure maintenance would require shared use of the rail yard and could result in performance measurement difficulties, making it difficult to clearly establish the necessary performance based payment mechanism.

The P3 Alternative 3 option to transfer the maintenance of the existing system was dropped from further analysis due to the magnitude of the organizational change that Metro would have to undertake to make it a success. Although there are potential risk transfer benefits to this approach, it would significantly delay the delivery of the extension and that is counter to Metro's desire to accelerate the Project.

Two remaining options include:

The **Enhanced Public Option** proposesa single DB contract for the design and construction of tunnels and station boxes and a single DB contract for the design and construction of all seven stations. Tunnel and tunnel boring machine design would be taken to advanced levels by Metro due to the long lead time for fabrication of the TBM. In addition to including larger packages than the Public Option, the Enhanced Public Option could include long term warranties with liability coverage which would be in accordance with best industry practice and minimize the post completion risk to Metro.

P3 Alternative 1includesa single DB contract for the design and construction of tunnels and station boxes and a separate, single DBFM contract for the design, construction and maintenance of stations, track, systems and systems integration. The DBFM contract would include responsibility for routine maintenance, preventive maintenance and replacement of signals and systems over a 30-year period.

These options were analyzed against the P3 Program goals andevaluation criteria developed by Metro:

- Achieve most cost-effective use of public funds.
- Accelerate project delivery.
- Optimize risk transfer.
- Ensure asset quality throughout the life cycle.
- Provide highest-quality service for the traveling public.

Each option was shown to have some merit but also potential challenges, but the P3 Alternative 1 performed best against Metro's stated goals.

The **Enhanced Public Option** was shown to perform better against the evaluation criteria than the Public Option, in particular with respect to the optimization of risk transfer. The Enhanced Public Option would allow additional transfer of critical risks such as ground conditions and general tunnel construction performance to the contractor, allowing Metro to gain cost and schedule certainty for the tunnel contract(s). It does not, however, accelerate project delivery over the Public Option, and there is likely to be minimal improvement on life cycle quality or service to the traveling public since neither option contains any maintenance risk transfer.

The Enhanced Public Option should allow Metro to achieve a more cost-effective use of public funds, since contingency amounts set aside for claims can be reduced due to the fixed price nature of the proposed DB contracts. Neither Public Option involves any form of private financing but the Enhanced Public Option may provide Metro with more assurance that its funding will match the profile of construction with less concern over delays and cost-overruns. The Enhanced Public Option maintains the current schedule presumed in the Public Option.

P3 Alternative 1 was shown to have significant benefits when analyzed against Metro's stated evaluation criteria. Its DB and DBFM contractsaccomplish a similar level of risk transfer for the construction elements of the project as do the two Public Options, but it advances this concept further into the maintenance of stations, track and systems. P3 Alternative 1 maintains the current schedule presumed by the Public Option.

P3 Alternative 1allows the introduction of private sources of finance for a substantial part of the project, allowing Metro more flexibility between up front funding requirements and funds that may be leveraged. The later availability of Measure R funds may make private sources of finance an attractive option for this Project. The downside of using private finance is that it comes typically at a higher cost of capital, which can be outweighed by effective risk transfer to the Private Partner in the long term.

An additional benefit of the P3 Alternative 1 is certainty of maintenance costs over thecontract period and added incentives for performance due to the potential for a performance based payment mechanism and the need by the Private Partner to achieve anticipated equity returns.

In **conclusion**, the objective analysis of delivery options against Metro's program goals indicates that P3 Alternative 1 is more likely to meet those goals than the Public Option or the Enhanced Public Option.

The primary reasons are:

- the introduction of private finance to accelerate the project by leveraging future revenues and allowing funding flexibility;
- optimal transfer of delivery risk for construction and long term maintenance of certain components; and,
- improved assurance of asset quality through the life cycle of those selected components.

P3 Alternative 1 allows Metro to benefit from private sources of finance while offsetting the higher cost of capital against life cycle efficiencies gained from the bundling of design, construction and maintenance services.

In order to mitigate the cost of the risk transfer, particularly for the tunnel design, it is recommended that Metro continue with design, site and geotechnical investigation to a greater level of detail than would normally be expected from a DBFM procurement.

Several issues need to be considered further to validate this conclusion. Metro's needs may change over time due to internal and external influences – for example, there may be further changes in the quantum and timing of public funding and Metro's ability to raise municipal debt finance that make P3 more or less attractive. Metro may undertake further analysis on the use of design-build contracts for tunneling work and the outsourcing of asset maintenance work – both of which are core requirements for P3 Alternative 1 to be implemented.

P3 Alternative 1 represents a step change in procurement policy as Metro has no prior experience of the design-build-finance-maintain approach. Although this analysis present several potential advantages of the approach, experience in other jurisdictions indicates that P3 benefits increase over time as more experience is gained. Metro may be able to work towards the full DBFM approach by implementing and learning from incremental changes.

7.0 NEXT STEPS

It is recommended that Metro consider the following steps to further establish the delivery options that are likely to best meet its program goals:

1. Approve selected option(s) for further analysis

2. Develop a more detailed definition of the delivery option based on latest technical information from Metro Planning and Construction

3. Carry out a quantitative analysis of construction costs, schedule, maintenance costs and funding / finance assumptions to establish project feasibility under the selected delivery option

4. Conduct targeted industry outreach through one-on-ones with selected developers and industry forums to establish market interest and capacity for the selected delivery option(s)

5. Use quantitative data and industry outreach feedback to further refine and improve the definition of the delivery option; activities may include a commercially focused risk workshop and the development of a formal Request for Interest

6. Prepare a comprehensive Business Case for the selected option that quantifies the costs and benefits to Metro of pursuing the selected delivery option compared with the most likely alternative

7. Present the Business Case for Board approval and (assuming approval is granted) issue a Request for Qualifications

Appendix A: Procurement Options Analysis

Option Title	Public Option	Enhanced Public Option	P3 Alternative 1	P3 Alternative 2	P3 Alternative 3
Description	Contract packages as defined by LA Metro in documentation available at the time of the analysis: • 3 No. DBB Contracts for tunnels and station box excavations • 3 No. DB Contracts for station fit outs • 1 No. DB Contract for track, systems and systems integration • 1 No. DBB Contact for Rail Yard • Program Management / Construction Management team procured separately • Vehicles procured separately • ROC developed separately • Metro maintenance (all) • Metro operations	As per PO but with one single DB contract for tunnel and station box excavations and one single DB contract for all seven station fit outs. Tunnel Boring Machines taken to advanced levels of design (>60%) by Metro due to long lead time for manufacture. Same packaging for other components: • 1 No. DB Contract for track, systems and systems integration • 1 No. DBB Contact for Rail Yard • Program Management Oversight team procured separately • Vehicles procured separately • ROC developed separately • Metro maintenance (all) • Metro operations	DB for the tunnels and station boxes (as per the Enhanced PO) with a single DBFM for design, construction and maintenance of the 7 stations, track, systems and systems integration. Includes maintenance of systems over a 30-year period. Same packaging for other components: • 1 No. DBB Contact for Rail Yard • Program Management Oversight team procured separately • Vehicles procured separately • ROC developed separately • Metro maintenance of tunnels and vehicles • Metro operations	Similar to P3 Alternative 1 but a single larger contract for design, construction and maintenance of the extension including tunnels, station boxes, stations, track, systems and systems integration. Includes maintenance of wayside and systems over a 30-year period. Same packaging for other components: • 1 No. DBB Contact for Rail Yard • Program Management Oversight team procured separately • Vehicles procured separately • ROC developed separately • Metro maintenance of vehicles • Metro operations	Single DBFM contract for the extension as per P3 Alternative 2 but with the Concessionaire then taking over the maintenance of the extension and the existing Red and Purple Line including tunnels, stations, track and systems for a 30-year period. The contract would also include the design, construction and maintenance of the Rail Yard expansion and handover of the entire facility to the Concessionaire. Vehicle maintenance would also be included but not operations – this would be retained by Metro. A sub-option would be to include the procurement of the vehicles in the contract. • Program Management Oversight team procured separately • ROC developed separately • Metro operations

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Approximate Contract Values Real Dollars (2010) Maintenance and replacement costs are for the Extension only and for Non Vehicle Maintenance only Not adjusted for risk or efficiency	Tunnel contract 1	$637m	Tunnels contract	$1,600m	Tunnels contract	$1,600m	Tunnels, Stations, Track, Systems, Integration + Maintenance		Tunnels, Stations, Track, Systems, Integration, Rail Yard + Maintenance of New and Existing System	
	Tunnel contract 2	$492m	Stations contract	$848m	Stations, Track, Systems, Integration + Maintenance					
	Tunnel contract 3	$471m	Track, Systems, Integration	$319m						
	Station contract 1	$283m	Rail Yard Expansion	$199m	Rail Yard Expansion	$199m	Rail Yard Expansion	$199m		
	Station contract 2	$283m	30 Years Maintenance		30 Years Maintenance		30 Years Maintenance			
	Station contract 3	$282m	30 Years Replacement		30 Years Replacement		30 Years Replacement			
	Track, Systems, Integration	$319m								
	Rail Yard Expansion	$199m								
	30 Years Maintenance									
	30 Years Replacement									
	Total (2010$)		Total (2010$)	TBD	Total (2010$)	TBD	Total (2010$)	TBD		

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Impact on operations and maintenance of existing Red / Purple Lines	• Extension to be operated and maintained in the same way as the existing lines using same systems • Minimal impact on existing	• No change from PO	• No significant change from PO • Interface at Wilshire / Western	• No significant change from PO • Interface at Wilshire / Western	• Significant change to maintenance of existing Red and Purple Lines and maintenance of vehicles due to inclusion in the DBFM contract • No change to operations
Economies of scale due to bundling of construction contracts	• Eight contracts (excluding ROC and vehicles) • Contract package size is limited by assumed limitations on the size of performance bonds	• Reduction in number of contracts from eight to four (excluding ROC and vehicles) • Economies of scale achievable from combining tunnel and station construction – reduces likelihood of overall delay as Contractors have more flexibility to work around any difficulties	• Reduction in number of contracts from eight to three (excluding ROC and vehicles) • Same as Enhanced PO	• Reduction in number of contracts from eight to two (excluding ROC and vehicles) • Additional economies of scale achievable due to combining tunnels and stations in one contract – allows Contractor to work around difficulties and make up lost time	• Reduction in number of contracts from eight to one (excluding ROC and vehicles) • Same as PPP Alternative 2 – marginal increase in size due to inclusion of Rail Yard but remote location from site so limited opportunities to achieve activity based economies of scale • Increased economies of scale for supply of track, materials and specialist parts
Impact on Train Control and Communications Room (located at Wilshire Western station)	• Existing facility has spare capacity for expansion	• No change from PO	• Existing facility has sufficient space for the isolation of signaling equipment for the extension such that it is separate from the rest of the system – allows for separate maintenance and performance measurement	• Same as P3 Alternative 2	• Isolation not required as Concessionaire would take over whole system • Opportunity for reconfiguration if this results in improved efficiencies and cost savings over time • Opportunity for installation of new equipment / upgrades that may extend useful life and reduce overall life cycle cost of the equipment
Staffing efficiencies for operations and maintenance	• Increase in staff commensurate with expansion of system from 17 miles to 26 miles • No significant addition to number of management or specialist roles	• No change from PO	• Stations, track and systems maintenance for extension may be more efficient due to private sector ability to train staff in more than one skill area • Some duplication of roles will be necessary for management and specialist roles	• Larger scope of maintenance allows increased efficiencies in staff being able to multi skill • Increased level of duplication in management and specialist roles	• No duplication of management and specialist roles as Concessionaire will be responsible for the whole systems and all maintenance • Much greater opportunities for efficiency across activities due to larger, multi-skilled workforce
Facilities efficiency for operations and maintenance	• Extension to be operated and maintained in the same way as the existing lines using same systems • Expansion of facilities required in proportion to scope of extension	• No change from PO	• Potential duplication of communications and safety equipment as DBFM contractor will need to install and utilize their own equipment	• Increased level of duplication of communications and safety equipment as DBFM contractor will need to install and utilize their own systems	• No duplication of equipment as Concessionaire will be responsible for communications and safety equipment across the whole system

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Potential for innovation in design and construction activities (innovation is defined as something that increases quality for same cost or provides same quality at reduced cost)	• Minimal for tunnels due to 100% design by Metro designers and in-house procurement of TBM • Potential for innovation in DB delivery of stations, track and systems	• Increased opportunity for innovation in design of TBMs and construction of tunnel and station boxes due to use of DB but limited by recommendation for Metro to undertake advanced levels of design and novate to the DB contractor • Single contractor for entire tunnel allows for innovation in the efficient disposal of contaminated spoil	• Same as Enhanced PO	• Same as Enhanced PO and P3 Alternative 1 but with additional potential for innovation for design and construction of interfaces between tunnel, station and platform construction	• Same as P3 Alternative 2 • Significant innovation possible in design of Rail Yard layout to suit efficient maintenance of wayside (and vehicles if included)
Potential for innovation in maintenance activities (innovation is defined as something that increases quality for same cost or provides same quality at reduced cost)	• Innovation dependent on internal Metro procedures for process improvement	• No change from PO	• Opportunity for innovation in the way that stations, track and systems maintenance is carried out	• Increased opportunity for innovation in the way that wayside and systems maintenance is carried out	• Significant innovation possible in the maintenance of the whole system (and vehicles if included)
Market capacity and competition	• Eight contracts (excluding ROC and vehicles) divides the work up into smaller contract packages that are more likely to be attractive to a higher number of bidders • Market capacity advantage is offset by the need for more bidders – may have same firms bidding on several packages	• Reduction in number of contracts from eight to four (excluding ROC and vehicles) – limits the number of bidders but fewer bidders are required • Larger contracts will attract more international expertise and increase competition to Metro's benefit • Traditional surety market limits may be too small for contract sizes	• Reduction in number of contracts from eight to three (excluding ROC and vehicles) – therefore similar to Enhanced PO • Addition of stations, track and systems maintenance may reduce the number of bidders unable to perform services but likelihood is that joint ventures and other teaming arrangements will allow this to work • Traditional surety market limits may be too small for contract sizes	• Reduction in number of contracts from eight to two (excluding ROC and vehicles) – very large contract for tunnels, stations, track and systems (including maintenance) will limit number of qualified bidders but teams will form and international teams will be attracted to the opportunity • Traditional surety market limits may be too small for contract sizes	• Reduction in number of contracts from eight to one (excluding ROC and vehicles) • Contract may be too large – bidders may be put off by high level of bid preparation required – can be offset by procurement policy (e.g. stipends) • Addition of Rail Yard from PPP Alternative 2 does not significantly increase the size of the design and construction work • Addition of vehicle procurement limits number of qualified bidders although suppliers may decide to be on more than one team • Inclusion of significant levels of maintenance will limit number of qualified bidders, especially if vehicles are included • Very large DBFM contract will attract international teams • (Ability to secure performance bonds is to be investigated further)

Option Title	Public Option	Enhanced Public Option	P3 Alternative 1	P3 Alternative 2	P3 Alternative 3
Risk transfer and pricing – organizational interface between construction contractors	• Eight contracts (excluding ROC and vehicles) results in high level of interface risk between contractors increasing the potential for conflicts, increased costs and delays • Contractors may include significant risk premium to cover expected interface issues	• Reduction in number of contracts from eight to four (excluding ROC and vehicles) – reduces number of interfaces and interface risk but interfaces still exist between the tunnel contractor, the stations contractor and the systems and track contractor • Increased ability of contractors to manage risks and control other parts of the project may result in reduction of risk premium	• Reduction in number of contracts from eight to three (excluding ROC and vehicles) • Same Enhanced PSC except for reduced interface risk between the station and track contractors (note: this is not a major interface compared to others)	• Reduction in number of contracts from eight to two (excluding ROC and vehicles) – significant reduction in contract interfaces for the bulk of construction including all interfaces between construction of tunnels, stations, track and systems • More challenging oversight required but experienced Concessionaire may be able to manage this risk without inclusion of significant risk premium	• Reduction in number of contracts from eight to one (excluding ROC and vehicles) • Same as PPP Alternative 2 • Addition of Rail Yard has marginal impact due to remote location from the extension
Risk transfer and pricing – design and construction of tunnels	• Tunnel design risk is retained by Metro • Risk of delays to TBM progress retained by Metro due to in-house design and purchase of TBMs – most technical difficulties due to ground conditions likely to result in claims	• Tunnel design is novated to DB contractor so risk is transferred – premium may be included depending on level of design performed and confidence in Metro's designers • Risk of TBM delays and difficulties transferred to a degree but likely to be shared risks on ground conditions to minimize cost of risk premium	• Similar to Enhanced PO but Private Partner is generally more willing to accept a higher level of risk in a DBFM than in a DB	• Same as P3 Alternative 1 with potential for even greater acceptance of risk without addition of significant risk premium due to increased scope of DBFM contract and inclusion of tunnel maintenance	• Same as PPP Alternative 2
Risk transfer and pricing – future maintenance and replacement costs	• Metro retains all risks associated with future cost of maintenance and replacement	• Same as PO	• Fixed price contract for stations, track and systems maintenance over Concession period transfers risk away from Metro for these components of the extension • Combination of design, installation and maintenance allows Concessionaire to manage this risk without adding a high risk premium	• Fixed price contract for wayside maintenance over Concession period transfers risk away from Metro for maintenance of the extension • Combination of design, construction and maintenance allows Concessionaire to manage this risk without adding a high risk premium	• Fixed price contract for maintenance of the whole system over Concession period transfers risk away from Metro & creates a greater degree of price certainty • Combination of design, construction and maintenance allows Concessionaire to manage this risk without adding a high risk premium for the extension • Inclusion of Rail Yard also allows transfer of vehicle maint. cost risk over 30-year concession period • Concessionaire may include a risk premium for maintenance costs associated with existing Red and Purple Lines depending on amount of detailed information provided by Metro on asset condition (available in State of Good Repair Report) • Risk premium may be included for maintenance of vehicles if vehicle purchase is not included in the DBFM contract

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Risk transfer and pricing – overall project constructability and integration	• Risk is retained by Metro • Mega project creates significant challenges in terms of program management • Metro ultimately liable for all cost and schedule overruns	• Fewer contracts improves the ability of Metro to integrate component parts of the project and coordinate with a fewer number of parties • Contractors have more ability to resolve their own difficulties without affecting other contractors	• Similar to Enhanced PO but inclusion of private finance involves risk averse lenders in oversight of project and pressure on the contractor to perform	• Overall project coordination and constructability risk is reduced even further by combining more of the project into a single DBFM contract • Significantly larger DBFM contract value increases level of oversight by private lenders	• Similar to P3 Alternative 2 as inclusion of Rail Yard does not significantly affect coordination due to its remote location • Very large DBFM contract value increases level of oversight by private lenders
Risk transfer and pricing – wheel to rail interface	• Metro responsible for procurement of vehicles	• Same as PO	• Same as PO	• Track maintenance for the extension is included in the DBFM contract but Metro is responsible for the purchase and maintenance of vehicles so this interface is harder to manage	• DBFM contract includes maintenance of vehicles so interface between wheel and track is easier to manage but only from an ongoing maintenance perspective, unless contract includes the purchase of vehicles as well in which case this interface can be managed very well
Risk transfer and pricing – interface between extension and Purple Line	• Metro responsible for maintenance of extension and Red / Purple Line so is able to manage this interface	• Same as PO	• Interface risk is created between the maintenance of stations, track and systems by the Private Partner and the maintenance of other tunnel assets by Metro – the impact of this risk may not be very high due to different types of work	• Non vehicle maintenance interface risk is removed for the extension but still exists between the extension and the Purple Line near to the Wilshire / Western station	• All maintenance interface risk is eliminated
Rail Yard	• DBB delivery • Design input from Metro operations and maintenance divisions • Metro management as an extension of existing procedures	• No change from PO	• No change from PO in terms of design and construction • DBFM for stations, track and systems only means that Private Partner does not need significant levels of access to the Rail Yard – allows isolation of operations and performance measures	• No change from PO in terms of design and construction • Private Partner is more likely to need to use the Rail Yard for maintenance activities e.g. storage of equipment, staff facilities etc. – difficult to isolate operations and performance measures, creates interface risk between public and private sector	• Inclusion in the DBFM contract has the advantage of allowing the Private Partner to design the facility in a way that suits O&M procedures • Private Partner has more freedom to operate the Rail Yard in a way that fits with asset management approach to maintenance and renewals • Advantage is stronger with inclusion of vehicle procurement as shop and equipment requirements can be integrated with vehicle specs • Complete isolation from Metro operations makes it easier to measure performance

Option Title	Public Option	Enhanced Public Option	P3 Alternative 1	P3 Alternative 2	P3 Alternative 3
Project delay due to availability and timing of funding	• Construction funding includes Federal and local sources that have yet to be finalized and programmed • There is a risk that New Starts funding (FFGA) will not be granted at the level that has been applied for • Metro fully liable for delays due to availability and timing of funding • Metro responsible for funding operations and maintenance of existing system and extension	• Same as PO	• DBFM contract transfers the risk of funds being available at the appropriate time for design, construction and maintenance but this is limited to the scope of the DBFM contract i.e. extension stations, track and systems • Metro responsible for funding the other contracts including tunnels, Rail Yard and vehicles • Metro responsible for funding milestone and service payments over the concession period • Metro responsible for funding operations and maintenance of existing system and extension except for extension stations, track and systems	• DBFM contract transfers the risk of funds being available at the appropriate time for design, construction and maintenance of most of the extension • Metro responsible for funding the other contracts including Rail Yard and vehicles • Metro responsible for funding milestone and service payments over the concession period	• DBFM contract transfers the risk of funds being available at the appropriate time for design, construction and maintenance of the extension and maintenance of the whole system • Metro responsible for funding the vehicle contract unless this is also included in the DBFM • Metro responsible for funding milestone and service payments over the concession period • Service payments will be higher due to maintenance of whole system
Certainty of service quality and accountability for performance	• Service quality and accountability for performance of extension and existing systems is implied in current Metro management procedures and oversight arrangements • Metro responsible for operational performance	• Same as PO	• Levels of service are defined in DBFM contract for extension stations, track and systems maintenance – results in certainty of quality over concession period for these assets via payment mechanism • Other components of the extension and existing systems are as per PO	• Levels of service are defined in DBFM contract for extension tunnel, stations, track and systems maintenance – increased certainty of quality over concession period for these assets via payment mechanism • Other components of the extension and existing systems are as per PO	• Levels of service are defined in DBFM contract for the maintenance of the whole system including infrastructure, systems and vehicles • High levels of certainty and accountability via payment mechanism • Metro responsible for operational performance
Specialist capability of LA Metro and cost of assistance	• Metro is very familiar with DBB so will not require significant specialist resources for the procurement phase • Specialist resources may be needed for development of DB contracts and procurement process • Significant levels of resources will be needed for Construction Management, inspection and overall program management	• Additional specialist resources will be needed for increased use of DB especially with respect to tunnels • Less resources will be needed for Program Management Oversight for DB contracts that include self-certification	• Specialist resources will be needed to assist Metro in the procurement documentation and process for a DBFM contract - advisors will include technical, legal and financial • Technical inputs will be required to develop performance based specifications – change of mindset can be challenging at first • Fewer resources will be needed for Program Management Oversight for DB and DBFM contracts that include self-certification	• Similar to P3 Alternative 1 but increased scope of DBFM contract will require additional specialist resources for development of contract documents and management of the procurement process	• Similar to P3 Alternatives 1 and 2 but additional specialist resources will be needed for DBFM contract that includes taking over responsibility for existing infrastructure • Due diligence will be required to provide bidders with information of the condition of the existing system • Increased specialist resources required if vehicle purchase is included in the DBFM contract