DRAFT – FOR DISCUSSION PURPOSES ONLY

massDOT
Massachusetts Department of Transportation

Massachusetts Department of Transportation (MassDOT)

Red Line / Blue Line Connector

P3 Project Suitability Assessment Report

September 11, 2013

Deval L. Patrick, Governor
Timothy P. Murray, Lt. Governor
Richard A. Davey, Secretary & CEO

KPMG

Contents

Proposed Project Description

Physical Project Description

- The proposed Red Line / Blue Line Connector will link the only two lines that do not currently intersect within MBTA's rapid transit system
- The project will extend the Blue Line along two tracks from the Bowdoin station for approximately 1,500 feet to connect with the Charles/MGH station on the Red Line
- The estimated capital cost of the project is $750 million, according to the DEIR published in May 2010
- The project will consist of two parallel tunnels extending the Blue Line under Cambridge Street with a tunnel boring machine (TBM), twin tail tracks for train storage, a new subsurface platform / station for the Blue Line, rolling stock fleet procurement and pedestrian connections to the elevated platforms of the existing Charles/MGH station headhouse
- The Preferred Alternative selected eliminates Bowdoin Station from the Blue Line route

Source: MassDOT

DRAFT – FOR DISCUSSION PURPOSES ONLY

Project Background and Status

This report is part of the high-level screening process used to assess the suitability of delivering a project under a Public-Private Partnership:

Project Background	
Project Name:	Red Line / Blue Line Connector Project
Sponsoring Agency:	Massachusetts Department of Transportation
Preliminary Schedule	▪ Feasibility Study and Final Report – 1986 ▪ Expanded Environmental Notification Form – 2007 ▪ SIP Commitment – 2008 ▪ MEPA Draft Environmental Impact Report (DEIR) issued – March 2010 ▪ MEPA DEIR approved – May 2010 ▪ High level & detailed level P3 assessment – Fall 2013 (anticipated) ▪ MEPA Final Environmental Impact Report Initiation – TBD ▪ NEPA document initiation – TBD

DRAFT – FOR DISCUSSION PURPOSES ONLY

Commonwealth's Considerations

massDOT
Massachusetts Department of Transportation

Project-specific considerations:

- Link East Boston and North Shore residents with jobs, services, and educational opportunities in Boston's West End, Cambridge and Somerville
- Enhance regional access to Mass General Hospital, Mass Eye and Ear Infirmary, and surrounding medical facilities
- Relieve congestion pressure at other stations in Downtown Boston
- Improve access from Cambridge, Somerville, and northwestern suburbs to jobs, services, and attractions in Downtown Boston, East Boston, the North Shore and at Logan International Airport

Indicative drivers for P3 delivery :

- Accelerate project delivery and construction schedule
- Transfer risks related to construction, finance and maintenance

Transportation Need and Benefit Statement

Transportation Need and Benefit Statement	
To provide a link between East Boston and the North Shore to West Boston while enhancing regional access and relieving congestion.	**Description of surrounding area:** ▪ The project site is located in downtown Boston along Cambridge Street beginning near Sudbury Street in front of the John F. Kennedy Federal Building and terminating at Charles Circle with the construction staging area tentatively located in a portion of Massachusetts Ear and Eye Infirmary (MEEI) **What is the existing transportation need?** ▪ The Red and Blue Lines are the only two of Boston's rapid transit lines that do not intersect with one another ▪ Current transit riders traveling from points along the Blue Line to the Red Line, which connects to Massachusetts General Hospital (MGH) and surrounding medical facilities, must transfer using the MBTA's Green or Orange lines ▪ The Green and Orange lines are highly congested along this transfer segment **How will the project address the existing transportation need?** ▪ The completion of the project will enhance transit access, connectivity and regional mobility in East Boston, the North Shore and Cambridge ▪ The project will enhance access and connectivity to government facilities, MGH and other area medical facilities ▪ The project is predicted to have 22,390 daily boardings at the Charles / MGH station in 2030, which represents 12,000 additional daily boards over a no-build alternative, and would also include 5,610 transfers between the Red and Blue Lines at Charles/MGH reducing congestion at other subway stations ▪ Project completion will cause an overall reduction in weekday vehicle miles travelled by approximately 5,250 in 2030 leading to a significant improvement in regional air quality and automobile travel time in downtown Boston

Source: MassDOT, http://www.eot.state.ma.us/redblue/downloads/DEIR/RBLC_DEIR_Executive_Summary.pdf

Assessment Criteria

High-Level Screening Criteria –Commonwealth Considerations				
Addresses Commonwealth's Considerations	Yes	No	TBD	Supporting Info
	X			The project addresses considerations such as: ▪ Providing a link between East Boston, the North Shore and West Boston ▪ Enhancing regional access to surrounding medical facilities ▪ Relieving congestion on other transit lines and other downtown transit stations ▪ Improving air quality and regional access to support economic growth
Satisfies Public Transportation Need	Yes	No	TBD	Supporting Info
	X			▪ This project is part of the Central Artery Mitigation Measures originally associated with the Big Dig project. The project satisfies the need to provide better connectivity and mobility between East Boston, the North Shore area, West Boston and surrounding areas ▪ The project will allow commuters to make transfers more effectively between the Blue and Red Lines, reducing congestion in other stations in downtown Boston, increasing ridership and improving transit options within the region overall
Addresses Priorities Identified in State, Regional and / or Local Transportation Plan	Yes	No	TBD	Supporting Info
			X	▪ Until 2009 the design portion of the project was included in the MBTA Capital Investment Program, the State Implementation Plan (SIP), and the Boston Metropolitan Planning Organization (MPO) Regional Transportation Plan (RTP). The construction phase of the project, however, has not been included in any state, regional or local plans ▪ In July 2011 MassDOT submitted a request to MassDEP to remove the final project design from the Transit System Improvements Regulation and the SIP

Assessment Criteria (Continued)

High-Level Screening Criteria - Opportunity for Acceleration, Innovation and Efficiencies				
Opportunity for Private Sector Innovation	Yes	No	TBD	Supporting Info
			X	▪ The project may offer an opportunity for private sector innovation in terms of enabling efficiencies in design and construction and possibly major maintenance ▪ Whole life costing may be introduced through the combination of design, construction and maintenance, but level of efficiencies is yet to be determined, especially considering the interface with the existing system ▪ Opportunities for innovation primarily in operating the project may be limited due to the size project (less than 1/3 of a mile), and interface with the existing subway system
Ability to Transfer Risk	Yes	No	TBD	Supporting Info
			X	▪ Risk transfer may include design, construction and potentially maintenance ▪ Transfer of other risks such as operations, ridership/revenue, and possibly maintenance may face challenges due to the limited physical size of the project and interface with the existing system
Accelerated Project Development	Yes	No	TBD	Supporting Info
	X			▪ P3 delivery could accelerate project development through coordination of design and construction by a single concessionaire ▪ Private financing of capital investment could reduce the up-front funding need by spreading out large costs over time

Assessment Criteria (Continued)

High-Level Screening Criteria – Funding/Financing				
	Yes	No	TBD	Supporting Info
Ability to Raise Capital			X	▪ There may be an ability to finance the project using milestone payments and /or availability payments. Financing will require reliable cash flows, which have not yet been identified ▪ The size of recent transactions indicates that there is depth in the market to finance the capital expenditure; however the ability to finance the project is subject to market conditions, public funding sources and risk allocation
	Yes	No	TBD	Supporting Info
Potential to Generate Revenue and Funding Requirement			X	▪ There is opportunity for additional fare revenue generation through increased ridership; however the impact of the connector on ridership may be difficult to isolate ▪ A ridership analysis performed predicted that by 2030 the connection between the Red and Blue Line would allow for 12,000 more commuters boarding at the Charles/MGH station on a daily basis as compared to a no-build alternative
	Yes	No	TBD	Supporting Info
Market Precedent			X	There is limited market precedent for similar projects: ▪ DBFM: Liefkenshoek Railway Connection (Belgium)) ▪ DBF: Route 460 63-20 (Virginia) ▪ DB: DFW Connector – Highway (Texas)

Assessment Criteria (Continued)

High-Level Screening Criteria - Readiness				
Consistent with Federal Requirements	Yes	No	TBD	Supporting Info
			X	▪ TBD
Readiness	Yes	No	TBD	Supporting Info
			X	▪ The DEIR was approved by the Massachusetts Environmental Policy Act Office in May 2010 ▪ MassDOT has not commenced work on the Final Environmental Impact Report ▪ Existing documentation, cost estimates and studies would likely need to be refreshed ▪ Right-of-way (ROW) would need to be acquired from the City of Boston prior to being able to move forward with construction
Can Be Structured as a P3	Yes	No	TBD	
			X	▪ There is limited market precedent of similar projects delivered as a P3 with private financing. If the Commonwealth is interested in transferring maintenance risk and accelerate delivery through private financing, a DBFM structure may be further assessed. A DB approach remains an option

Potential Delivery Structures

Potential Delivery Model	Features
Option 1: DBFM	**Risk transfer:** A developer will be responsible for the delivery of the project under a fixed-price, date-certain design-build contract and will be responsible for maintenance during the contract life (up to a about 35 year contract term). Ridership/revenue risk, operations risk, fare policy and collection are retained by the Commonwealth **Payment mechanism:** The Commonwealth makes an annual availability payment to the developer which is also subject to performance deductions. The Commonwealth may fund payments though state funds and fare revenue **Private investment:** Typically, under this delivery model, projects are funded with a combination of debt and equity at a ratio between 85/15 – 90/10%
Option 2: DBF	**Risk transfer :** A developer will be responsible for the delivery of the project under a fixed price date certain design build contract and will be responsible for raising financing for the project. The Commonwealth will provide O&M and retain ridership and revenue risk, fare policy and fare collection **Payment mechanism:** Commonwealth collects the fare revenue and makes milestone, construction completion or annual payments to developer (not subject to availability or performance) for the repayment of the capital investment. The Commonwealth may fund payments though state funds and fare revenue **Private investment:** Typically, under this delivery model, projects are funded with 100% debt (e.g. bank debt or tax-exempt debt utilizing a 63-20 structure)
Option 3: DB	**Risk transfer:** A developer will be responsible for the delivery of the project under a fixed-price, date-certain design-build contract. The Commonwealth will retain all other major risks **Payment mechanism:** Commonwealth pays for design and construction during construction on a regular basis (e.g. monthly) so the contractor is not required to finance construction **Private investment:** There is no private investment under this delivery model, but there is risk transfer (design/construction)

***Please note that these are illustrative examples. Other options or variations on these themes may exist.**

Key Findings Summary

High Level P3 Suitability Assessment	
Addresses Considerations	**Yes.** This project addresses considerations such as enhancing regional access and mobility between East Boston, the North Shore, West Boston and surrounding communities to more jobs, services and opportunities, as well as to MGH and to Logan International Airport, while relieving congestion at other stations in downtown Boston
Opportunity for Acceleration, Innovation and Efficiencies	**TBD.** This project has the potential for private sector acceleration by transferring construction risk to the private sector
Funding/Financing:	**TBD.** Funding from the Commonwealth is still under evaluation as it is not clear how much public funding will be available
Readiness:	**TBD.** The DEIR has been issued and approved. MassDOT has not begun the Final Environmental Impact Report which will need to be completed before procurement of the project can begin. Existing documentation, cost estimates and studies would likely need to be refreshed. Further, ROW would need to be acquired from the City of Boston prior to being able to move forward with construction

Can the project be structured as a P3?	**TBD**
Move to the next phase for further analysis?	**[TBD by the Commission]**

DRAFT – FOR DISCUSSION PURPOSES ONLY

Considerations and Challenges

- Potential for only limited private sector value add due to narrow scope of the project
- System integration and interfacing with existing subway lines may limit opportunities for innovation
- MassDOT initiated a process to amend the SIP to permanently remove the obligation to perform final design of the project due to high costs
- Significant technical challenges surrounding the construction of the project include underground utilities and tunneling with using a TBM
- Construction management challenges include maintaining operation of current service during construction and limiting the impact of disruption to the area
- Use of federal funds, such as New Starts

Potential Next Steps

- Perform Benefit/Cost analysis
- Update revenue and ridership study
- Update preliminary capital and O&M cost estimates
- Assess efficiencies that could be generated through transfer of long term maintenance risk
- Perform high-level financial analysis
- Identify potential federal, state, and local funding and financing alternatives
- Analyze project affordability and impact to MassDOT and/or MBTA finances
- Conduct market sounding inquiries

List of References

Specific information in this report came from the following sources:
MassDOT, Draft Environmental Impact Study, March 2010
MassDOT, http://www.eot.state.ma.us/redblue/downloads/FactSheet2_050310.pdf, May 2010
Interview with Charles Planck, Senior Director – Strategic Initiatives and Performance. on August 7, 2013

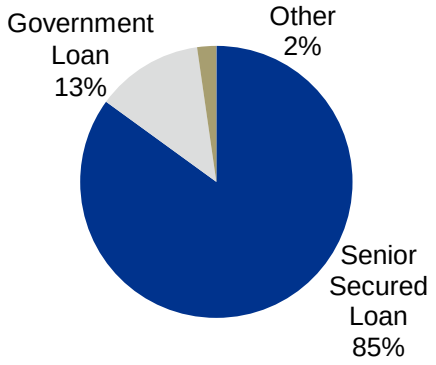
Appendix: Market precedents

Liefkenshoek Rail Tunnel (Belgium)

Characteristic	Project Detail
Project Type	Greenfield
Sector	Transportation – Rail
Description	▪ The Liefkenshoek Rail project involves the construction and maintenance of the civil infrastructure for a new 16.2 km freight-only railway linking the western docks and eastern docks of Antwerp. ▪ The freight-only railway line will directly connect the eastern and western docks of the Escaut river and link Bundel Zuid with the Antwerp North marshalling yard. It will run under the water bodies of Kanaal dock, Schelde river and Waasland canal. ▪ Construction of the project was started in November 2008 and is scheduled for completion by mid-2013. It will be followed by the laying of the railway tracks, overhead wiring and signaling infrastructure by Infrabel.
Public sponsor	Infrabel
Private sector partner	BAM PPP / Vinci Concessions / CFE
Status	Financial Close – November 2008
Term	38 years (post construction)
Project size	€840 million
Delivery model	DBFM
Payment mechanism	Availability Payment

Funding Details: € 840 million

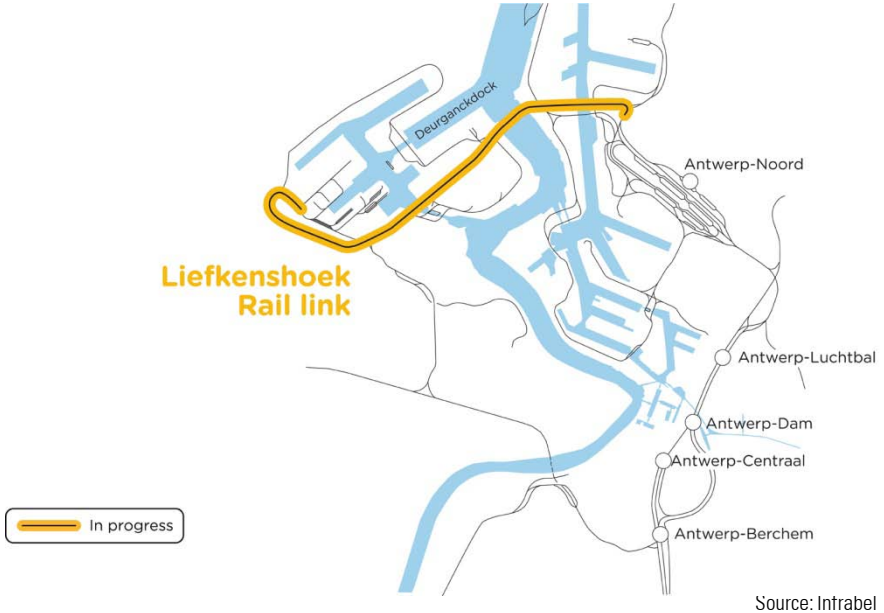
- € 714 Senior Secured Loan
- €107 million Government Loan
- €19 million Other



Liefkenshoek Rail Tunnel (Belgium)

Procurement Schedule	
April – 2006	RFQ (equivalent) issued
June – 2006	Bidder Responses Due
March – 2007	Shortlisted Proponents Announced
September – 2008	Preferred Proponent Selected
November – 2008	Financial Close

Liefkenshoek Rail Tunnel Project Map



Source: Infrabel

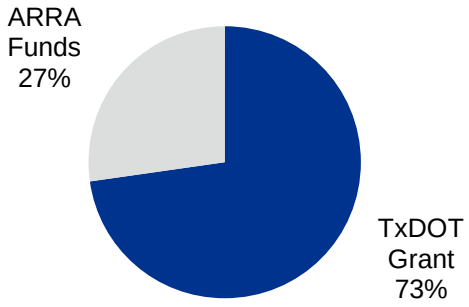
Lessons Learned		
P3 suitability ▪ The project is the largest infrastructure development PPP project in all of Belgium	Risk Transfer ▪ The awarded contractors are responsible for the maintenance of the railway infrastructure and the electromechanical installations	Other ▪ Restrictions relating to gradients for railway tracks had to be observed, which are considerably flatter than those for roads

DFW Connector (Texas)

Characteristic	Project Detail
Project Type	Greenfield
Sector	Transportation – Roads
Description	▪ Located in Texas's Dallas-Fort Worth Metroplex area, at the northern entrance of the Dallas-Fort Worth International airport, the DFW Connector expands 8.4 miles of SH 114 and SH 121 (Tarrant County Texas) in the currently funded configuration, and 14.4 miles in the final configuration. ▪ Included in the contract is the design and construction of toll-managed express lanes, which requires the reconstruction of five interchanges. ▪ Capital maintenance pricing was for three five year option periods commencing at substantial completion. TxDOT is to notify the contractor six months before the start of operations if they wish to exercise the first option. Maintenance options for years 5-10 and 11-15 can only be exercised if the preceding option is exercised.
Public sponsor	Texas Department of Transportation (TxDOT)
Private sector partner	Kiewit / Zachry Construction / Parsons Brinckerhoff / AECOM
Status	Financial Close – October 2009
Term	50 years
Project size	$917 million
Delivery model	DBM
Payment mechanism	Revenue / demand risk

Funding Details: $917 million

- $667 million TxDOT Grant
- $250 million ARRA Funds



DFW Connector (Texas)

Procurement Schedule	
December – 2006	Transaction Launch
March – 2008	Shortlisted Proponents Announced
March – 2009	Preferred Proponent Selected
October – 2009	Commercial Close
October – 2009	Financial Close

Lessons Learned

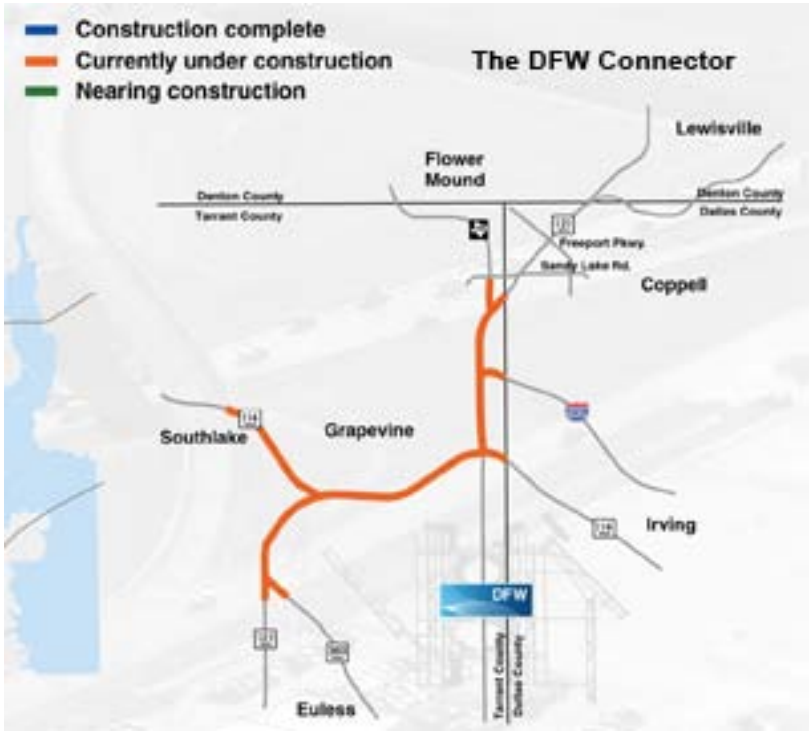
P3 suitability

- Used an alternative DB structure along with options to deliver maintenance as part of the project

Funding/financing

- To maximize funding TxDOT required the competing bidders to submit their bids for three different configurations of the project with and without the responsibilities for maintenance

DFW Connector Project Map



Source: North Central Texas Council of Governments