TORONTO TRANSIT COMMISSION
REPORT NO.

MEETING DATE: January 21, 2013

SUBJECT: PROJECT DELIVERY PROCESS ON SIGNIFICANT CONSTRUCTION PROJECTS

INFORMATION ITEM

RECOMMENDATION

It is recommended that the Commission receive this report for information.

BACKGROUND

At its meeting of April 30, 2012, the TTC Audit Committee moved:

a) That staff report back in six months on the status of the Construction Department's response to the June 2011 Internal Audit Report and further, that the report include a review and analysis of the City of Toronto Auditor's 2009 report, with options on how to maximize in-house knowledge and expertise, and recommendation on the appropriate mix of in-house vs. consultant staffing levels, and;

b) That the audit report be forwarded to the TTC Chief Executive Officer requesting a report be brought forward to the Commission on reviewing the procurement process and the project management approach for significant construction projects.

Response report for item a) was submitted to the TTC Audit Committee on October 26, 2012 and this report responds to the item b).

DISCUSSION

Since 2005, the core Capital Program budget has significantly increased from around $70M to over $300M annually. To meet the increased project demands, additional resources were added. In addition, the American Public Transportation Association (APTA) was requested to conduct a peer review with the focus on staffing level and utilization of in-house and external consultants complementing TTC staff in delivering the increased project work.

The APTA Peer Review panel recommended increasing the TTC staff level consistent with long term capital funding of $150M - $300M per year augmented by consultant staff for their special expertise and flexibility to support peak resource demands. As the capital budget changes from year to year due to change in priorities and identification of new

project requirements, the need to utilize consultant staff for their special expertise and flexibility to support peak resource demands will continue. Therefore, an annual review is undertaken to assess appropriate resource requirements and the staffing level is adjusted accordingly.

Furthermore, as a result of transferring project management responsibility to Metrolinx for the Light Rail Transit projects, the Transit Expansion Department and the Engineering and Construction Branch was reorganized to become the Engineering, Construction and Expansion (ECE) Group. The reorganization is expected to result in annual savings of approximately $4M.

PROJECT DELIVERY

Staff have previously reported to the Commission in May, 2012 on project delivery options for the Light Rail Transit (LRT) projects in Toronto and in March 2008 and January 2009 for the Toronto York Spadina Subway Extension (TYSSE) project.

The reports reviewed different project delivery approaches including Design Bid Build (DBB), Design Build (DB), and variation of Alternative Finance and Procurement (AFP), such as Design Build Finance (DBF) and Design Build Finance and Maintain (DBFM) project delivery approaches. In summary, the highlights of each of the project delivery approaches are:

DBB - This is the TTC's traditional approach to project delivery. TTC undertakes the design or retains a qualified consultant to design. It is then competitively tendered for the construction. DBB is used where technical complexity, significant interface with an operating facility, requirement for utility relocations, or impacts to communities require a high level of control by TTC.

DB – TTC completes a preliminary design and establishes performance standards. Through a competitive tender, a contractor is retained to complete the design and construction. It provides less control for TTC, particularly where significant interface with an operating facility is required. TTC utilized DB for the Bus Rapid Transit – Spadina Subway to York University project because of minimal impact to the community and interface with TTC operations to construct a dedicated bus roadway between Downsview Station and York University along the hydro corridor.

AFP/DBF/DBFM – This involves the development of the preliminary design and performance standards by the owner. Several contractors are then selected to participate in the request for proposals with a successful contractor financing, completing the design and construction and maintaining the project for an extended period of time.

The TYSSE project undertook an extensive review of project delivery strategies and reported its findings to the Commission in March 2008 (Appendix A) and January 2009 (Appendix B) as attached. The project delivery strategy review included a review of other transit infrastructure projects, consulting engineering workshops, interviews with construction industry and attending various workshops, conferences and presentations to conclude that the construction of the stations and tunnels will be best delivered using the DBB approach.

Similarly for the LRT project, APTA was invited to convene an expert peer review panel to review the project implementation plan for the LRT project in May 2012 and its findings were reported to the Commission in May 2012 (Appendix C) as attached. The APTA peer review concluded that the use of DBB is advantageous for aspects of the project in which transit agency control is critically important, such as phasing of the construction schedule to address community impacts and operational constraints at key interchange stations with existing system.

Staff review and evaluate projects on a case by case basis to select the most appropriate project delivery approach as noted in this report. As an example, Bus Rapid Transit – Spadina Subway to York University project was delivered through DB project delivery approach. Since the project entailed constructing a dedicated bus roadway, largely along the hydro corridor to provide rapid bus service from the Downsview subway station to the York University with limited interface with existing system and very little impact to the community, it was a suitable for non-traditional project delivery approach.

However, a vast majority of projects are state of good repair projects where it entails replacement, rehabilitation or modification of existing equipment, system or facilities with significant interface with operations and/or the public. To ensure that critical interface with operations and impact to the public are managed effectively and safely, DBB is the traditional project delivery approach used by TTC.

SUMMARY

Staff will continue to assess which project delivery approach is appropriate, taking into consideration complexity, interface with operations and community impact, among other things on a case by case basis to select the appropriate project delivery approach, noting that the DBB project delivery approach provides maximum control over the design and construction interface with operations to ensure that the finished project can be operated and maintained safely and effectively by TTC over the life cycle of the asset.

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Attachments: Appendices A – C

TORONTO TRANSIT COMMISSION
REPORT NO. 8(c)

APPENDIX A

MEETING DATE: March 26, 2008

SUBJECT: TORONTO-YORK SPADINA SUBWAY EXTENSION
PROJECT DELIVERY STRATEGY PROCESS

ACTION ITEM: x **INFORMATION ITEM:**

RECOMMENDATION

It is recommended that the Commission:

1. Approve the Project Delivery Strategy (PDS) process as outlined in this report noting that the PDS process was previously approved by the Toronto-York Spadina Subway Extension Executive Task Force at its meeting of February 19, 2008, and further noting that staff will report back on the findings and conclusions of the PDS process with recommendations for the Commission to consider.

2. Forward this report to the Toronto-York Spadina Subway Extension Executive Task Force and the Move Ontario Trust for information.

FUNDING

Sufficient funds for this expenditure are included in the Toronto-York Spadina Subway Extension Project, as set out on pages 1521 to 1526 of the TTC 2008-2012 Capital Program (category Expansion), which was approved by City Council on December 11, 2007.

BACKGROUND

The overall scope of the Project comprises an 8.6 kilometre extension of the TTC's Yonge-University-Spadina Subway, from its existing terminus at Downsview Station to a new terminus at Vaughan Corporate Centre. The Project includes six new stations, of which three are in the City, two are in the Region and one, Steeles West Station, straddles the City/Region boundary.

The estimated cost of the Project, unescalated (July $ 2006), is $2.090 billion. When considering costs at year of occurrence the estimated final cost in 2015 is $2.633 billion.

In early 2006, the Province of Ontario (Province) announced Provincial approval and a funding contribution of $670 million for the TYSSE Project.

In late 2006, the Region and the City in separate reports to their respective Councils approved the Project and combined funding for one-third of the final cost with an apportionment of 59.96% (City) and 40.04% (Region).

On March 6, 2007, the Federal Government announced that it would contribute an amount capped at $697 million for the Project.

In January 2008, the Province announced a further contribution of $200 million ($ 2008). This contribution along with the previous contributions from the City, Region and the Federal government provides full Project funding.

In March and April 2007 separate Environmental Assessments undertaken by the TTC/City and Region were approved by the Province's Ministry of the Environment.

Based on a preliminary scheduling analysis, it will take from seven to eight years to deliver the Project and commence revenue service to all stations.

At the time of writing, the approvals, agreements and initiatives that have not yet been finalized but are well advanced include:

- Federal Environmental Assessment
- Memorandum of Understanding – Operating
- Capital Cost Apportionment Agreement
- Building Canada Fund (BCF) Business Case Report
- Contribution Agreement

To manage the contributions from the funding partners and other financial aspects of the Project, the Province set up the Move Ontario Trust with one member each from the City, Region and Province.

In October 2007 the TYSSE Executive Task Force, consisting of three members each from the City and the Region began meeting regularly. The purpose of the ETF is to oversee the Project progress and deal with issues of inter-regional interest on the Project.

From the outset of the Project, there have been discussions, investigations and analysis with regard to adopting the best strategy to contractually deliver the Project.

There was also a requirement from the Federal Government in its guidelines for the Building Canada Fund (BCF) Business Case that Public Private Partnership (P3) options be screened for this purpose. The P3 analysis was carried out in late 2007. It recommended the elimination of a number of options as not viable considering the circumstances of the

TYSSE Project. Detailed analysis and adoption of the preferred options(s) was left to the Project Manager to pursue.

In the course of Project development, TYSSE staff undertook a number of initiatives to assist in the identification of the preferred PDS. These included various workshops, investigations, surveys and research. They are noted further in the following part of this report.

DISCUSSION

All parties have agreed that the TTC will construct, own, operate and maintain the sub-surface subway extension and integral surface elements of the subway including entrance structures, emergency exit buildings, power sub-stations and ventilation shafts.

The Region will be responsible for other surface facilities including passenger pick-ups and drop-offs (PPUDOs), bus platforms and parking lots within the Region.

Criteria

The Project is proceeding on the basis that the following criteria for contracting the subway extension has been accepted:

a) The TTC is the Project Manager and the design and construction of the subway extension will be in accordance with TTC's standards, procurement policies, practices and procedures.

b) A Toronto-York Spadina Subway Extension Department is organized as a Department within the TTC's Engineering & Construction Branch for the purpose of managing the Project.

c) The design and construction of the Project work will be largely (over 90%) undertaken by private sector firms procured by the TTC for the purpose.

d) Where required, subject matter expertise for technical issues and staff for construction to undertake custom TTC work will be provided by the TTC.

Objectives

The intended objective of the PDS is to adopt a process whereby the following objectives are met.

a) Achieves cost effectiveness, constructability and facilitates scope containment expectations.

b) The schedule is optimized and schedule co-ordination is efficient.

c) The construction meets a high level of performance, quality, structural integrity and efficiency.

d) The Project meets life cycle, maintainability and operating performance requirements.

e) Fulfils expectations for a high level of involvement in the Project by the private sector in management, design, construction and product supply.

Options

The PDS is expected to arrive at conclusions and recommendations on the type of contracts that will be used to procure construction services for the Project. It may also identify other efficiencies and benefits with regard to design features. These will be employed by TYSSE staff to define the structure of the contracts. A list of contracting options is attached as Appendix 1.

TTC's mandate includes the design, construction, ownership, operation and maintenance of the subway extension. The options involving assignment or transfer of these responsibilities to the private sector are not being considered. These include:

- Operation and Maintenance Contracts
- Design-Build Contracts to include any of: operate, own, maintain
- Lease Purchase Contracts

While they may ultimately prove impractical, the following options are being retained for further consideration for now:

- Design Bid Build (DBB)
- Design Build (DB)
- Construction Management (CM)
- Design Build Finance (DBF)
- Design Bid Build Finance (DBBF)

Observations/Conclusions from Previous Investigations

In Appendix 2 and Appendix 3, the findings and listing of representative projects with regard to contracting strategy are listed.

Appendix 2 itemized a number of findings from investigations, workshops and surveys that TYSSE staff and others undertook in the development of a PDSe The TYSSE staff

assessment of these findings is included.

PDS Process

TYSSE will proceed to complete the PDS as follows:

1. TYSSE will employ the services of an external Value Analyst (VA) with the requisite expertise for the purpose of analyzing the retained options for contracting the work, in accordance with the accepted criteria.

   The VA will convene workshops and undertake further investigations and analysis. For the purpose of efficiency, the contracting packages will be formed into the elements outlined in Appendix 4. The VA will recruit the necessary subject matter expertise to enable these exercises.

   The VA will recommend a preferred contracting approach for the following elements individually or in combination.

   - Sheppard West Station
   - Finch West Station
   - York University Station
   - Steeles West Station
   - Highway 407/Transitway Station
   - Vaughan Corporate Centre Station
   - Tunnel
   - Cut and Cover Running Structures
   - Wilson Yard Structure Modifications

   The preferred contracting and construction approval for the systems work and the remaining Project elements will be analyzed collaboratively by the VA, TTC and TYSSE staff and recommendations made accordingly. These include:

   - Signals
   - Trackwork
   - Communications
   - Traction Power

2. The VA will organize a forum likely in the form of a workshop for presentation of views by local contractors. The proceedings from this forum will be documented, analyzed and considered in arriving at the conclusions and recommendations of the PDS.

3. Under the guidance of the VA, the Project will be provided with conclusions and level of risk expected for the individual contract packages and the TYSSE overall contracted work to be expected for:

- Value-for-money
- Cost certainty
- Scope containment
- Schedule compliance
- Operational and maintenance integrity
- Product quality
- Litigation, safety, third party

4. Provide recommendations with regard to due diligence and technical exercises to mitigate risks for inclusion in contract documents. For example:

- Convening of Underground Construction Peer Review Board
- Mediation/Arbitration in contract documents
- Inclusion of Dispute Review Board
- Partnering provisions in contracts
- Application of Liquidated Damages
- Practical level of milestone identification
- Level of geotechnical information provided (Geotechnical Baseline Report)
- Third-party involvement in Project
- Allocation of risk in contract documents to the party best able to manage the risk
- Securing Escrow Documents on major contracts

5. Concurrent with or immediately following the above, TYSSE Project Management will undertake further investigations possibly in concert with the VA to optimize the most efficient contract packaging. It will look at and assess processes, contract features and technologies specified in those contracts that have been successful in other jurisdictions.

6. Following the conclusion of the above exercises, TYSSE staff will be in a position to commence procuring contracts in a manner consistent with TTC policies and procedures.

7. The VA will be a consulting engineering firm who has staff specializing in this field, likely certified by the Canadian Society of Value Analysts. This assignment may also include value engineering as a following option. Subject to satisfactory performance on the PDS, and availability of resource skill, the VA firm will be retained to co-ordinate value engineering for the design of the stations, tunnels and possibly other major elements. Value Engineering will be a discreetly separate technical exercise subsequent to the PDS recommendations.

The VA may also require external and TTC expertise such as financial experts, scheduling, estimating and constructability specialists to assist in the PDS exercise.

8. As it is expected that in both DB and DBB options, preliminary design needs to progress by TYSSE to the about 20%-30% stage, designers will be retained, design advanced prior to the conclusions and recommendations of the PDS being finalized. Initial design information will also be helpful in the PDS exercise. The following designs are expected to be initiated:

   - Comprehensive geotechnical investigation and preparation of a Geotechnical Baseline Report
   - Design of six stations and running structures
   - Design of the tunnels
   - Alignment design
   - Other technical and design exercises as required

Schedule Going Forward

Subject to the approval of the PDS process by the ETF and Commission, the following will be mandated:

- A Request for Proposal to retain a VA will be drafted and issued following Commission approval.
- A VA consultant will be retained.
- If the ETF and TTC approval timetable is maintained, conclusions and recommendations from the PDS are expected to be available by October 2008.
- The ETF will be informed of the recommendations and conclusions of the PDS and TYSSE's contracting schedule.
- In the event that the PDS conclusions and recommendations are not consistent with TTC policy and procedures, the further report to the TTC will indicate the inconsistency and recommend a course of action for the Commission's recommendation. Likewise, this will be reported to the ETF.
- A significant delay in adopting contract procurement options(s) will impact the overall Project schedule.

JUSTIFICATION

Approval of this process will conclude in adoption of a Project Delivery that will optimize schedule, cost, operating efficiencies and other benefits for the Spadina Subway Extension Project.

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Appendix 1 – Procurement Options for TYSSE Contracts
Appendix 2 – Findings from Investigations of Procurement and Project Delivery for Transit Infrastructure Projects
Appendix 3 – Procurement Strategies Summary Report (August 2006)
Appendix 4 – Project Elements and Projected Costs

APPENDIX 1

Procurement Options for TYSSE Contracts

1. Design Build (DB)

Contract whereby a private sector contractor both designs and builds the infrastructure.

- *Design Build Operate Maintain (DBOM)*

  A variation of DB whereby a private sector contractor designs, builds and subsequently operates and maintains the infrastructure.

- *Design Build Operate (DBO)*

  A variation of DB whereby a private sector contractor designs, builds and subsequently operates the infrastructure.

- *Design Build Finance Operate (DBFO)*

  A variation of DB whereby a private sector contractor designs, builds, finances the construction and subsequently operates the infrastructure.

- *Design Build Finance (DBF)*

  A variation of DB whereby a private sector contractor designs, builds and finances the building of the infrastructure.

2. Design Bid Build (DBB)

A contract whereby the transit owner designs (or retains an engineering firm to design) and tenders the construction which is built by a private sector contractor.

- *Design Bid Build Operate Maintain (DBBOM)*

  A variation of DBB whereby a private sector contractor also operates and maintains the infrastructure.

- *Design Bid Build Operate (DBBO)*

  A variation of DBB whereby a private sector contractor also operates the infrastructure.

- *Design Bid Build Finance (DBBF)*

  A variation of DBB whereby a private sector contractor also finances the building of the infrastructure.

3. Alliance

A negotiated contract whereby the transit owner and a private sector contractor negotiate a contract to deliver a transit project such that the two parties share the risk and benefits.

4. Construction Management (CM)

A contract whereby a private sector contractor manages sub-contracts for the building of the transit infrastructure for a fee.

- *Construction Management at Risk (CM at Risk)*

  A variation of CM whereby the private sector contractor assumes all or part of the cost risk for cost overruns.

5. Other

There are also a number of other contract procurement options, as follows:

- Build Own Operate
- Buy Build Operate
- Build Own Transfer
- Lease Purchase

The titles are largely self-explanatory and are not defined further herein.

APPENDIX 2

Findings from Investigations of Procurement and Project Delivery for Transit Infrastructure Projects

1. Sheppard Subway (1995-2002)

In 2002 the TTC successfully completed the construction of the 6.4 km Sheppard Subway essentially on budget and on schedule. This subway was constructed almost exclusively applying the design/bid/build procurement and contracting approach. This method has been the established and preferred method for the TTC to deliver its major transit projects.

Staff Assessment

While the TTC has on occasion adopted other approaches such as Design Build it has found success with Design Bid Build and considers it a proven and viable method of delivering major transit infrastructure.

2. Ontario Power Generation (OPG) Niagara Tunnel Project

The site was visited by TTC Engineering and Construction staff on July 21, 2006 and presentations from OPG project staff were received. This is basically a large diameter tunnelling contract. It was contracted to an overseas firm as a design/build contract where the basic elements of the project were identified by the owner (OPG) and the contractor designed the tunnel, purchased and assembled the tunnel boring machine and undertook construction.

Risk appears to have been allocated based on the principle of allocation to the party (OPG or contractor) best able to manage the risk.

Staff Assessment

The contracting method used has not been used by the TTC for tunnelling in the recent past. While the primary purpose of the site investigation was to observe the technology, the project delivery method to the extent that information was obtained appeared to merit further consideration for TYSSE.

TYSSE staff have been monitoring the progress of this project.

3. Consulting Engineering Workshop

On July 26, 2006 TTC staff conducted a workshop with senior representatives of three large engineering firms with extensive experience in constructing major civil, systems, transit and railway infrastructure.

The purpose was to assess the merits of various procurement strategies. In particular those that appeared to need consideration for the TYSSE were:

- Design Bid Build (DBB) - conventional TTC project delivery method
- Design Build (DB) - often used in other transit projects
- Construction Management (CM)
- Design Build Operate and Maintain (DBOM) – has been used on some transit projects
- Hybrid or combinations of the above

Given the specific circumstances of the TYSSE Project, the panel excluded DBOM as a viable option and it was sceptical as to the viability of Construction Management for the entire Project.

The TYSSE is an 8.6 km extension of a larger system. Conveying ownership and maintenance of this section to another operator and at the same time integrating the extension into the existing system in a seamless manner was viewed as risky.

Documentation from this workshop has been retained in the TTC TYSSE Project files.

Staff Assessment

Staff concluded that the senior engineering representatives did not see merit in DBOM or versions of DBOM for procurement and delivery whereby the operation and maintenance of the extension becomes the responsibility of another party.

In general, the workshop concluded that DBB or DB were candidates for further consideration.

4. Canada Line

TTC staff visited the site, received presentations and held discussions with senior staff from the Canada Line Project, the Sea to Sky Highway Project and the Independent Engineer for the Canada Line on August 2-3, 2006.

The Canada Line is a stand-alone Light Rapid Transit (LRT) line constructed with contribution from various levels of government and the private sector using the DBFOM

project delivery approach. A private contractor/concessionaire will build, operate and maintain the line and provide approximately 35% of the $1.9 billion financing for the project. The private firm will receive compensation in the form of revenue earned through a 35 year concession to operate the line and also from government subsidy on an ongoing basis.

The overall procurement was an extensive process requiring a significant length of time to finalize.

Staff Assessment

The TTC staff concluded that as a stand alone project the procurement philosophy and financing, maintenance and operation approach adopted by the Canada Line was viable. However, the circumstances of the TYSSE are quite unlike those of the Canada Line and using the DBFOM method for the TYSSE was not appropriate.

There were direct elements to the Canada Line project delivery methodology such as the use of an Independent Engineer, utility and property agreements that merit further consideration for application on TYSSE.

5. Construction Industry Interviews

On August 1 and 8, 2006, TYSSE/TTC staff interviewed three senior representatives of local construction firms known to have the resources to carry out contracts in excess of $200 million.

The intent was to obtain their views on contracting out a large subway infrastructure project using DB or DBB. There was no discussion with regard to other contracting strategies.

While there were minor differences in views, these representatives had no major objections to either method. All indicated a slight preference for DB provided that:

- The contract package was large ($100 million or more).
- The risks are properly allocated.
- The system work and integration would be the responsibility of the owner.
- Significant preliminary design is undertaken by the TTC due to custom subway technology.

All accepted DBB as viable on all size contracts and preferred if:

- Contract packages were small (less than $100 million)
- There were multiple contractors at the same location

- TTC or other public sector agency employees were involved in construction on the same site
- Extensive custom or specialized design was required

Documentation from the interviews are retained in the TTC TYSSE Project files.

Staff Assessment

It seemed to staff that large DB contract was looked on favourably by large contractors for the construction of the "shell", i.e., tunnels and station boxes with station fit-outs, custom features, systems left to the owner.

6. Other Transit Projects

Staff reviewed available information on many major transit or similar projects that were active in August 2006 and could provide some information.

A list of those projects reviewed is listed in Attachment 3. This was done using anecdotal and web site information. No follow up investigations were carried out on most of the projects to confirm the accuracy of the information.

The following seems to have been occurring on the 21 projects.

- 9 DBB
- 7 DB
- 3 Mix of DBB and DB
- 1 Design/Build/Finance/Operate/Maintain (DBFOM)
- 1 DBOM

In the above there seems to have been no example of an existing subway line being extended by any other method than DBB.

While the success of 19 project delivery strategies was not investigated further, other than in a hearsay manner, the information obtained suggests that various methods to finance, design, construct, own, operate and maintain transit projects are being used. The favoured methods in North America appear to be either DBB or DB with responsibility for the financing, ownership, operation and maintenance being retained by the transit agency.

7. Various Workshops, Conferences, Presentations

- Infrastructure Ontario – Knowledge Workshop and Presentation (Toronto, November 2006)
- Canadian Urban Transit Association Conference (Toronto, November 2006)
- American Public Transit Association Conference (Toronto, June 2007)
- Rapid Excavation Tunnelling Conference (Toronto, June 2007)
- Various presentations, enquires, submissions from consulting engineers, suppliers and contractors

TYSSE/TTC staff attended a number of events at the above venues with regard to the delivery of transit projects.

Information from these exercises have been retained and were considered at the time as to their applicability for the TYSSE.

Staff Assessment

There were interesting notions introduced at some of these sessions that have potential for TTC infrastructure projects. There were also some specific technologies or processes that have been initiated that could have some application on the TYSSE Project.

Considering the particular circumstances on the TYSSE with regard to financing, ownership, operation and maintenance, staff concluded that these sessions confirmed that the viable options for project delivery of the TYSSE were likely DB or DBB or variation(s) of the two.

8. TTC Pilot Design/Build Project – York University Busway

As part of reconsidering its project contracting strategy on the numerous projects ite manages, TTC identified the York University Busway as a good candidate for DB.e

For the procurement exercise TTC reviewed its standard contract documents, retainede the services of outside expert legal counsel and DB contract specialists, and undertooke a thorough and extensive re-development of the standard contract documents to bee used on DB contract work. These documents are now in place.e

Staff Assessment

While it is too early to confirm the success of this approach, this contract will be revisited before major contracts for the TYSSE are tendered, particularly if DB is chosen.

9. Direct Investigations of Major Transit

A preliminary in-office investigation of a number of transit agencies was carried out to gather information, specifically to assist in the development of a Project Delivery Strategy for the TYSSE Project.

The transit agencies with ongoing activity that were considered of most interest and potentially provide valuable technical, contractual and other information were the following:

- New York City (MTA)
- Seattle (Sound Transit)
- San Juan (Tren Urbano)
- San Jose (VTA)
- Denver (RTD)
- Chicago (CTA)

Because of constraints with time, stage of projects, etc., the following were chosen for investigation:

a) Denver T-Rex (RTD)
b) Seattle Link Rail (Sound Transit)

This was for the purpose of investigating performance of ongoing contract procurement/project delivery options. Also, pending development of the Project Delivery Strategy, a further investigation is proposed for the purpose of investigating contract packaging for adoption on the Project. This will occur following ratification of the Project Delivery Strategy.

a) Denver Regional Transit District (RTD)

Denver RTD was chosen as reports received, information on records, and discussions indicated that it recently completed a large transit project (T-Rex) successfully using almost exclusively DB as its contracting strategy. Also, RTD was now embarking on an extensive expansion (FasTracks) of its system at a cost of somewhere between $4.8 billion US (approved) and $6.2 billion US (projected final cost).

RTD staff arranged for a series of meetings and presentations during the investigation. The RTD staff and consultants that were made available for discussion, volunteered documents and offered whatever information they had. This information has been retained.

The Denver T-Rex Project included a $1.2 billion DB contact consisting of a highway portion and LRT portion approximately equal in value. By all accounts the project was successfully delivered using DB.

The LRT required some adoption of LRT technology already in operation at RTD but was generally a stand alone initiative with little integration with the existing system. There was no tunnelling or major sub-surface work. Both the LRT and the highway were turned over to the respective public agencies on schedule.

Staff Assessment

The T-Rex project confirmed that a large full scope and stand-alone transit infrastructure project including systems work can be successfully prosecuted by DB.

b) Seattle Sound Transit

Seattle was chosen as it had a previous attempt in the late 1990's to construct an LRT line employing DB contracting. This was halted due to problems with DB. Specifically, this was for work including extensive tunnelling for which the tendered contract bids far exceeded the estimated cost and budget. The DB approach was abandoned largely because of this issue.

After a lengthy postponement, Sound Transit is again proceeding with the LRT expansion plan including extensive tunnelling. The contracting approach of this project is DBB. The total estimated cost for the three approved segments is $3.87 billion US, including $2.07 billion US for the Initial Segment where construction work is proceeding.

Sound Transit arranged for a series of meetings and presentations during the investigation. Information from the investigation has been retained.

The setback suffered by Sound Transit in the late 1990's was the consequence of a LRT contract estimated at around $450 million using DB. The contract, which consisted largely of tunnelling and sub-surface work, was bid at over $800 million by three bidders.

Following investigations, the project was postponed and Sound Transit reorganized. It undertook a thorough due diligence exercise of its contracting strategy. Following a six to seven year postponement, work has now restarted.

The current project work is being carried out solely using DBB. This is a requirement of the Washington State Department of Transportation and direction from the Sound Transit Board of Directors.

There has been a significant amount of design completed and construction is ongoing. As best as could be determined, work is proceeding well.

Staff Assessment

Based on what information that could be obtained, Sound Transit's reasons for choosing DB and the specifics of the DB contract in the mid 1990's were flawed and caused a significant delay in introducing improved transit in Seattle and area.

The ongoing work using DBB seems to be proceeding satisfactorily.

10. Screening of Private Public Partnership (P3) – Procurement Options for Building Canada Fund Business Case

As part of the Federal Government requirements for inclusion in the Building Canada Fund (BCF) Business Case Report for the Project, P3 Procurement Options were required to be screened.

Federal Government P3 screening guidelines were used.

The private consulting firm of PricewaterhouseCoopers (PWC) was retained and undertook an analysis over a compressed period in late 2007. Input was provided by the City, Region, TTC, Province and TTC's technical advisors.

A number of high level comparisons and analysis were carried out to eliminate impractical options and consider technical practicality, value-for-money, risk allocation, etc.

As a consequence of the evaluation undertaken by PWC, the viable options to be retained for further consideration are DB, DBB and DBF. While the analysis indicated some marginal cost differences, this high level analysis concluded that there was no significant difference in the options at this stage.

Staff Assessment

Staff believe that the PWC reaffirms that both DB and DBB are viable options for delivering the Project. It also introduces DBF as a viable option which has not been previously investigated by TYSSE staff.

11. Additional Information

TYSSE and other TTC staff have met and spoken with a number of external parties involved in the contract delivery of projects. These include:

- Tunnel Boring Machine Suppliers
- Tunnelling Experts
- Tunnelling Contractors
- Transit Consultants

Staff Assessment

Staff impressions from these discussions are considered in the context that the views of the participants may have been influenced by business interests. The following views seem to prevail.

- Both DB and DBB were viable:
  - Large contractors favour DB
  - Small contractors favour DBB
- Consultants generally favour DBB
- There was concern that one large and complex contract of roughly $1.5 billion was not viable in the Toronto area for local contractors.
- DB contracts should be between $100 million and $300 million to be attractive to local contractors.

APPENDIX 3

Spadina Subway Extension
Procurement Strategies Summary Report
August 2006

Representative Projects

Project	Value	Procurement Method	Cited Reasons for Procurement Method
Sheppard Subway	$969 Million CDN	D/B/B	Complex, integrated with existing system. Business Loss & Property Issues.
2nd Avenue Subway	$17 Billion US	Six separate contracts for Phase 1 of 4 phases, delivered conventionally (TBM tunnel, 3 new stations, 1 existing station modifications/ renovations, and an overarching systems contract).	Different types of construction, size of contracts, bidding periods, and cash flow considerations.
YRTP (P3)	$80 Million CDN	D/B	P3 Quickstart
VIVA 1			
Canada Line **(formerly known as the RAV Line)**	$2 Billion (CDN)	D/B Finance Operate	A government test project in the 3P procurement method, supported strongly by the Province.
Cairo Subway **Phase 1 - 1987**		D/B/B	
Niagara River	$900 Million CDN	D/B	Assessable risks Knowledgeable contractors available to bid Tight schedule Knowledgeable client
Sea-to-Sky Highway	$600 Million CDN	DBOM	Schedule Experienced Contractors
Denver - TREX Light Rail portion of project included 19 miles of new double track line. Power is provided through cantanary/OCS. 13 new LRT stations along corridor. 6000 new parking spaces provided at surface parking lots and 3 new multilevel parking structures.	Full Project valued at $1.7 Billion US. D/B portion valued at $1.3 Billion US.	D/B was method for major portion of project including the light rail construction and highway reconstruction.	D/B procurement method was chosen for the corridor for a number of reasons - primary was to reduce the schedule for construction as well as to have one contracting entity throughout corridor.
		D/B/B was method for the design and construction of the LRV maintenance facility.	D/B/Build was chosen for LRV maintenance facility to allow the transit agency greater control over the design development of the facility.
		Direct contract procurement was method for obtaining the new LRV's and ticket vending equipment.	Direct contract procurement was chosen for the LRV's to allow choice of vehicles compatible with existing fleet.
Western Beaches CSO	$60M CDN	D/B	Assessable risks Knowledgeable contractors available to bid Schedule Funding restriction New procurement method for City
Sound Transit Project	$2.0 Billion US	D/B/B	Owner control and Board policy decision
Millennium Line Project	$1.12 Billion CDN	D/B Elevated Guideway	Project was schedule driven. Needed fast start on guideway to meet deliverables.
20.5 Km. Guideway - 17.5 Km elevated, 0.6 Km tunnel and 2.4 Km atgrade		D/B Vehicles and Systems	Negotiated Procurement. Proprietory vehicles and system.
12 Elevated Stations, 60 Mkll Vehicles and ATC		D/B/B Stations	Needed to allow for community input. Stations not on critical path.
Duration of 2 years & 10 months		Shared Risk Utilities	Owner responsible for major utilities/D/B Contractor responsible for minor.

APPENDIX 3

Spadina Subway Extension
Procurement Strategies Summary Report
August 2006

Representative Projects

Project	Value	Procurement Method	Cited Reasons for Procurement Method
Amtrak Folsom Project Sacramento Regional Transit Authority	$280 Million US	D/B/B	More control by owner.
Evergreen LRT Project **(Coquitlam, BC)**	$830 Million CDN	D/B guideway	Procurement method is still under review and hasn't been confirmed yet.
		D/B/B Stations	
		D/B/B tunnel	
		D/B Systems	
		D/B/B Maintenance Facility	
BART San Francisco Airport Extension	$1.2 Billion US	D/B	A Federal Transit Administration "Turnkey Demonstration Project" nomination dictated procurement type.
LA Metro Gold Line - Eastside Extension	$898.8 Million US	D/B	
South Boston Piers Transitway	$480 Million US	traditional design/bid/build	Environmental Issues to be resolved.
Boston's Silver Line Subway Phase III Tunnel	$1.1 billion US	Still in planning . Prel engineering stage could start in Fall '06 - delivery method- Likely traditional D/B/B	
North Shore Connector LRT System Extension	$435 Million US	traditional D/B/B	14 various construction contracts ranging from heavy civil/structural/underground to station finishes and transit and fire life systems.
Silicon Valley Rapid Transit	$5.5 Billion US	assessed design-build approaches and decided to use D/B/B	Risk, schedule and sophistication of client.
Tren Urbano		multiple large D/B packages	FTA demonstration project for use of design-build for transit construction.
Baltimore Metro System Section C	$350 Million US	D/B/B Invitation for Bid	Per MTA procurement method.

APPENDIX 4

Project Elements and Projected Costs

($ 2006)

1	Sheppard West Station		$52,221,136
2	Finch West Station		80,792,624
3	York University		72,627,126
4	Steeles West Station		100,192,532
5	Highway 407/Transitway Station		80,278,726
6	Vaughan Corporate Centre Station		78,964,512
7	Running Structure (tunnelling & Cut/Cover)		484,206,187
8	Utilities (excludes stations)		19,834,813
9	Trackwork		64,345,820
10	Power (including DC Traction Power)		30,371,682
11	Train Control (Signals)		33,206,910
12	Supervisory Control		24,451,412
13	Wilson Yard Modifications (structures, track, signals)		84,280,000
14	Project Engineering, Management, Geotechnical, Permits, Insurance, etc.		301,443,370
15	Contingency (26%)		399,412,465
16	Property & Miscellaneous		99,737,000
17	GST Rebate		(117,248,793)
18	Revenue Vehicles (56 Subway Cars)		201,712,000
		Total	$2,090,829,522
		Say	$2,090 Billion

STAFF SUMMARY SHEET

ENGINEERING AND CONSTRUCTION BRANCH — **11139 CR**

PREPARED BY: Andy Bertolo	**DEPARTMENT HEAD** – Andy Bertolo
EXTENSION: 6762	**DEPUTY GENERAL MANAGER** – N/A
EMAIL: andy.bertolo@ttc.ca	**GENERAL MANAGER** – John Sepulis

#8.-)

COMMISSION REPORT: TORONTO-YORK SPADINA SUBWAY EXTENSION
PROJECT DELIVERY STRATEGY PROCESS

#	ROUTING	CONCUR	NON-CONCUR	DATE	ATTACHMENT(S)
2	GM - ENG & CONST			March 6/08	Commission Report
4	GM - EXECUTIVE			10/03	Appendices 1, 2, 3, 4
	GM - OPERATIONS				
	DEPUTY GM - RAIL				
	DEPUTY GM - BUS				**ACTION REQUIRED BY CHIEF GENERAL MANAGER**
	GENERAL COUNSEL				
3	CHIEF FINANCIAL OFFICER			Mar 10/08	☐ SIGN AGREEMENT ☐ RECEIVE FOR INFORMATION ☐ APPROVE ☒ APPROVE FOR SUBMISSION TO COMMISSION ☐ APPROVE FOR SUBMISSION TO CHAIR
	EXECUTIVE DIRECTOR - HR				
	MANAGER - M&P				
1	CPM SPADINA SUBWAY EXT			MAR 5/08	

SIGNATURE — DATE: Mar 14/08

Form Revised: July 2007
1121397

TORONTO TRANSIT COMMISSION
REPORT NO. 13

APPENDIX B

MEETING DATE: January 21, 2009

SUBJECT: TORONTO-YORK SPADINA SUBWAY EXTENSION
PROJECT DELIVERY STRATEGY

INFORMATION ITEM

RECOMMENDATION

It is recommended that the Commission receive this report for information noting that the Design Bid Build (DBB) format will be used for contracting out the stations and tunnels for the Toronto-York Spadina Subway Extension Project (TYSSE).

FUNDING

Sufficient funds for this expenditure are included in the Toronto-York Spadina Subway Extension Project, as set out on pages 1479 to 1482 of the TTC 2009-2013 Capital Program (Category - Expansion) which was approved by City Council on December 9, 2008.

BACKGROUND

At its meeting on March 26, 2008, the Commission approved the Project Delivery Strategy (PDS) process. The objective of the PDS process was to determine the optimal type of contracting format to be used to deliver the construction contracts for the TYSSE Project.

A number of exercises have now been concluded including workshops, analyses and investigations. Based on the findings from the various initiatives, it was concluded that the construction of the stations and tunnels will be best delivered using the DBB contracting format. This was the contracting format used to successfully deliver the Sheppard Subway Project.

DISCUSSION

On January 13, 2009, Spadina Subway Extension Department staff recommended the DBB contracting format to the Toronto-York Executive Task Force (ETF). The ETF approved this recommendation of staff.

The Project is currently advancing with the expectation that the stations and tunnels will be designed, contracted and constructed using the DBB approach. The current contract "packaging" that has been determined to be the most efficient is a six-contract approach (DBB-6) as follows:

Contract

1 Tunnels from Downsview to Finch West, plus Sheppard West Station
2 Finch West Station
3 Tunnels from Finch West to Vaughan Corporate Centre, plus Highway 407 Station
4 York University Station
5 Steeles West Station
6 Vaughan Corporate Centre Station

While analysis to date has determined this DBB-6 contracting approach to be the most favourable, review will continue to confirm or amend the packaging prior to tendering the contracts for the stations and tunnels. These contracts will, for the most part, be proceeding concurrently.

The ETF's Independent Engineer concurs with the contract format being DBB and with this contract packaging approach.

The approximate total value of these contracts is $1.2 billion out of a total estimated final project cost of $2.6 billion.

JUSTIFICATION

This contract format will allow project staff to continue with the Commission's preferred contacting approach for the delivery of the TYSSE project.

January 14, 2009
70-2-1e
2501010

STAFF SUMMARY SHEET

ENGINEERING AND CONSTRUCTION BRANCH

12118 CF

#13

EPARED BY: Andy Bertolo

DEPARTMENT HEAD – Andy Bertolo

EXTENSION: 6762

DEPUTY GENERAL MANAGER – N/A

EMAIL: andy.bertolo@ttc.ca

GENERAL MANAGER – John Sepulis

COMMISSION REPORT: TORONTO-YORK SPADINA SUBWAY EXTENSION
PROJECT DELIVERY STRATEGY

#	ROUTING	CONCUR	NON-CONCUR	DATE
2	GM - ENG & CONST			Jan 15/09
5	GM - EXECUTIVE			Jan 14/09
4	GM - OPERATIONS			Jan 16/09
	DEPUTY GM - BUS			
	DEPUTY GM - RAIL			
	GENERAL COUNSEL			
3	CHIEF FINANCIAL OFFICER			Jan 16/09
	MANAGER - M&P			
	EXECUTIVE DIRECTOR - HR			
6	DIR. - COMMUNICATIONS			Jan 16/09
	CPM SPADINA SUBWAY EXT	AGB		JAN 15/09

ATTACHMENT(S)

ACTION REQUIRED BY CHIEF GENERAL MANAGER

- ☐ SIGN AGREEMENT
- ☐ RECEIVE FOR INFORMATION
- ☐ APPROVE
- ☒ APPROVE FOR SUBMISSION TO COMMISSION
- ☐ APPROVE FOR SUBMISSION TO CHAIR

GWebster — SIGNATURE

Jan 18/09 — DATE

Form Revised: April 2008
2501011

APPENDIX C

TORONTO TRANSIT COMMISSION
REPORT NO. 12

MEETING DATE: MAY 30, 2012

SUBJECT: LRT PROJECTS IN TORONTO – PROJECT DELIVERY

ACTION ITEM

RECOMMENDATION

It is recommended that the Commission:

1. Note that TTC has been program managing the delivery of the Light Rail Transit (LRT) program in Toronto since 2008 and that:
   a. The Transit Expansion Department is established as an integrated organization of TTC staff, consultants and Metrolinx and Infrastructure Ontario staff dedicated to the design and delivery of the LRT program;
   b. TTC has made extensive progress on the implementation of the LRT program specifically the Eglinton Crosstown LRT tunnels and stations;
   c. TTC's program for communications and community relations has developed strong relationships with local councilors, the public, business improvement associations, and community groups and has conducted extensive public consultation for the Eglinton Crosstown LRT, and prior to October 2010 for the Sheppard East LRT;
   d. TTC has developed a detailed project implementation plan for the Eglinton Crosstown LRT with the technical support of leading international consultants incorporating innovations and best practices from major transit agencies; and

2. Note that the Province of Ontario has indicated that it intends to change project delivery from TTC program management to a model using Alternative Finance and Delivery (AFP) Design Build Finance and Maintain. To further note that TTC has some concerns about the use of such a model as outlined in this paper and;

3. Request Metrolinx/Infrastructure Ontario to respond to the issues and concerns around project finance, cost, schedule and delivery model raised in this paper and;

4. Inform Metrolinx that the Province of Ontario decision to implement LRT by AFP and Infrastructure Ontario will require the transfer of program management functions, project design, construction and community relations from the TTC Transit Expansion Program to Metrolinx to be completed by October 31, 2012;

5. Direct the Chief Executive Officer (CEO) to commence the reallocation of TTC staff, to the extent possible, from the LRT program to TTC's on-going state of good repair construction and rehabilitation program and to the Spadina Subway Extension; and

6. Forward this report to the Toronto City Manager, Metrolinx and the Minister of Transportation and Infrastructure.

FUNDING

The recommendations of this report do not have any direct funding implications for the TTC as the Eglinton Crosstown LRT, Scarborough RT conversion to LRT and extension, Finch West LRT and Sheppard East LRT are fully funded by the Province of Ontario with a commitment of $8.4 Billion.

BACKGROUND

At its meeting on January 31, 2012 the Commission considered the staff report *"Eglinton Scarborough Crosstown Project Update"* that provided an overview of the TTC role as program manager responsible for LRT project planning, design, community consultation and outreach, construction, commissioning and operations and the change to AFP being contemplated by the Province of Ontario and Infrastructure Ontario for entirety of the Eglinton Scarborough Crosstown Project. The report noted TTC concerns with the approach the Metrolinx proposal for project delivery. The Commission directed the CEO to report back to the Commission on the Crosstown project delivery, project governance, and the role of the TTC in design, construction, maintenance and operations.

At its meeting on May 1, 2012, the Commission considered the staff report *"LRT Projects in Toronto Status Update".* This report provided an update on the status of all four LRT projects in Toronto given the decisions of Toronto City Council on February 8, 2012 and March 22, 2012, to support the implementation of the Eglinton Crosstown LRT, Sheppard East LRT, Scarborough LRT and Finch West LRT.

On April 25, 2012 the Metrolinx Board authorized, subject to approval by the Province, proceeding with implementation of the Eglinton Crosstown LRT, Sheppard East LRT, Scarborough LRT and Finch West LRT and confirmed the $8.4 Billion funding commitment for the program. The Metrolinx Board also resolved, subject to approval by Treasury Board, to use Infrastructure Ontario for AFP delivery of the LRT projects.

DISCUSSION

The *Metrolinx Act 2006* and the Provincial direction to Metrolinx, provides that the regional transit projects funded by the Province of Ontario will be owned and controlled by Metrolinx. As such Metrolinx is responsible for approval of project scope and budget,

overseeing project planning, procurement and implementation and approval of terms and conditions for constructing, operating and maintaining the transit projects. The Provincial direction also included involvement by Infrastructure Ontario in project management and AFP for the LRT program.

In 2009, the Province of Ontario announced committed funding for Eglinton Crosstown LRT, Sheppard East LRT, Scarborough LRT and Finch West LRT projects.

As the TTC had initiated the planning and implementation of the LRT projects, Metrolinx determined that TTC would continue to deliver the LRT projects on its behalf. TTC and Metrolinx established a governance structure that:

- respects and adheres to Metrolinx's role as owner and responsibility to control the projects;
- provides TTC with responsibility for the overall program management and implementation utilizing TTC expertise on transit project delivery and operations; and
- supports a separate organization within the TTC dedicated to the LRT program with an integrated team of TTC, Metrolinx and Infrastructure Ontario staff and consultants led by the Program Manager acceptable to both Metrolinx and the TTC.

In 2010 the draft Metrolinx-TTC-City of Toronto Master Agreement defined the roles and responsibilities of each of the parties and formalized the project governance based on TTC program management of the delivery of the LRT projects. TTC and Metrolinx agreed that this approach to project delivery would satisfy the Metrolinx role as owner while continuing the momentum and progress on project delivery achieved by TTC (attached).

Metrolinx and TTC also agreed on a project delivery plan that would respond to the Province of Ontario's intention to involve Infrastructure Ontario and the AFP project delivery process.

TTC, Metrolinx, and Infrastructure Ontario agreed on the following project delivery as the best approach to deliver value for money and continue the momentum:

- Design Bid Build (DBB) - TTC retains a qualified consultant. TTC's consultants design to 100% and construction is competitively tendered with detailed specifications. DBB is used where the technical complexity, requirement for utility relocations and impacts on communities and businesses require a high level of control by TTC.
    - Eglinton Crosstown LRT - Tunneled sections
    - Eglinton Crosstown LRT, Sheppard East LRT and Finch West LRT - at-grade sections
    - Eglinton Crosstown Interchange Stations (Eglinton West, Yonge Eglinton and Kennedy) - These stations involve a high level of complexity and risks due to their connections and structural interface with the existing stations and necessity to maintain existing transit operations throughout construction.

- Design Build (DB) -
    - Eglinton In-line Stations - TTC's consultant designs to about 30%. A contractor is competitively procured to complete design and construct packages of two to four stations.
    - Systems - TTC's usual practice is to procure systems (signalling, communications, etc.) to include design, supply and installation.

- AFP - Design Build Finance and Maintain (DBFM) - A contractor is procured for design and construction. DBFM is most effective where there is potential for the contractor to have control of the construction site, and there is minimal community impact.
    - Maintenance and Storage Facilities - Consultants provide the initial design parameters and Infrastructure Ontario procures a contractor to complete design, provide financing, construct the facility and maintain certain elements for a period of up to 30 years all under the TTC overall management. As MSFs are stand-alone facilities with limited utility and community impacts, they are good candidates for DBFM.
    - Scarborough RT Conversion to LRT - Structure and Stations (excluding Kennedy Station). As with the MSFs, the SRT conversion will have limited community and business impact and the characteristics of the project would provide opportunities for innovation.
    - The Sheppard MSF was tendered as an AFP in 2010 but the process was suspended with the change of the LRT plan.

In April 2011, Metrolinx advised TTC that two changes would be made to the previously agreed Master Agreement:

- Metrolinx's role would change from oversight to implementation; and
- Metrolinx funded projects would be delivered by Infrastructure Ontario AFP if supported by a value-for-money analysis and approved by the Treasury Board.

As a result, at its meeting on April 25, 2012, the Metrolinx Board directed that, subject to positive value-for-money analysis results and Treasury Board approval, Infrastructure Ontario will be used to deliver the entire LRT program.

This report provides TTC staff comments and concerns regarding AFP project delivery that have been discussed with Metrolinx and Infrastructure Ontario over the past 15 months and TTC's recommendations for project delivery.

American Public Transit Association Peer Review

In order to obtain an informed, objective and independent perspective on major transit project delivery, TTC invited the American Public Transit Association (APTA) to convene an expert peer review panel to review and critique the TTC's project implementation plan

for the LRT projects. The APTA Peer Review was conducted on May 13 to 17, 2012 in Toronto. The Panel was comprised of high level executive transit professionals with extensive project delivery experience from North America's largest transit agencies:

Mysore Nagaraja, P.E. – Partner & Co-Founder with Jim Simpson former U.S. FTA Administrator of Spartan Solutions, LLC

- Formerly:
  - President MTA Capital Construction
  - Head, MTA NYCT's Capital Program Management (1600 staff)
- Advanced $20 Billion plus expansion program from inception to construction in less than five years
- Transportation Leadership Award, 2004, 2002
- Person of the Year, CMAA, 2004
- Engineer of the Year, ASCE, 2003

Krishniah Murthy, P.E. - Executive Director Transit Project Delivery
Los Angeles County Metropolitan Transportation Authority

- Leading:
  - Eastside LRT Extension
  - Westwood Subway
  - Crenshaw Regional Connector
- Formerly:
  - Senior Vice President, Parsons Brinckerhoff
  - Principal, Valley Metro Rail, Mission Valley East Extension in San Diego, Trinity Commuter Rail

Robert L. Lund, Jr., P.E. - Senior Director Capital Construction, Southeastern Pennsylvania Transportation Authority (SEPTA), Rail and Transit Facilities

- Nationally recognized ARRA Program, 32 projects for power, track, controls, bridges, buildings, vehicles
- Deputy Director, SEPTA's Market Street Elevated Reconstruction Project
- Formerly: Resident Construction Manager, New York Power Authority

Anil Parikh, P.E. - Vice President and Deputy Program Executive, MTA (New York City) Capital Construction Company

- Leading:
  - 63rd Street Line Connection
  - Queens Brooklyn Line
  - Second Avenue Subway "Mega" Project – One of the largest projects in the history of MTA New York City Transit
- Education:
  - Master's Degree in Construction Management
  - Executive 21 Leadership Program for Sr. Construction Executives

The APTA Panel reviewed the decisions made to date about the scope of the LRT plan, TTC's detailed construction phasing plan, organization structure, project scope, project schedule and progress to date. The APTA panel also received presentations from Metrolinx and Infrastructure Ontario regarding AFP project delivery. Metrolinx and Infrastructure Ontario participated in the review throughout.

The concluding presentation and recommendations of the APTA panel are attached to this report and the complete report of the panel will be available in the next few weeks. The APTA Panel noted that mature transit agencies have been considering new approaches to project delivery such as DB, but not AFP, and variations of DBFOM, as an alternative to the traditional DBB approach, to meet financial and schedule challenges.

The APTA Peer Review Panel comments and recommendations are provided throughout this report.

Project Delivery Approaches

TTC's traditional approach to project delivery involves:

- TTC providing project management and the critically important interface with TTC operations, safety, service planning, facilities and systems.
- TTC procuring consultants to undertake:
    - preliminary planning and Environmental Assessments;
    - design of stations, tunnels, systems, vehicles;
    - development of project implementation plans to optimize schedule and provide the value for money analysis;
    - preparation of construction tender plans and documents.
- TTC procuring contractors competitively to undertake construction consistent with the design.

This project delivery, known as DBB, ensures that the finished project can be operated safely and effectively by the TTC, with the highest level of customer service and that it is cost effective to maintain and rehabilitate over the life cycle of the asset. TTC has retained the foremost international consultants in transit design and engineering for the LRT program. The vast majority of transit projects are delivered by major transit agencies with DBB.

The Infrastructure Ontario process for project implementation provides for a greater role for the private sector in managing the overall delivery of major infrastructure projects as well as for on-going maintenance and operations. The Province has used Infrastructure Ontario extensively since 2004 to deliver hospitals and other medical facilities, prisons, and courthouses. Although Infrastructure Ontario is involved in the Ottawa LRT project, Infrastructure Ontario has not yet delivered any transit projects utilizing this approach.

In 2010 TTC, Metrolinx and Infrastructure Ontario assessed the various delivery approaches for the LRT program and agreed on a delivery approach in which TTC provides the overall program management utilizing a hybrid contracting strategy consisting of the traditional TTC and the Infrastructure Ontario AFP approaches as follows:

Design Bid Build - The traditional approach by TTC in which TTC consultants complete 100% of design and the construction is tendered to a construction firm. DBB provides the maximum control by TTC and is recommended for the project components that must be carefully managed because they involve:

- extensive utility relocations;
- significant traffic, pedestrian, transit and cycling disruption;
- interface with existing subway stations with requirements to maintain TTC rider operations through construction; and
- impacts on communities and local businesses.

Design Build - TTC completes a preliminary design and performance standards. The contractor is responsible for completing the design and construction. This approach provides less control for TTC and was to be used for project components that are not high risk.

Design Build Finance Maintain - This AFP approach involves the development of the preliminary design and performance standards by the owner for the Infrastructure Ontario procurement process. Several contractors, usually three, are selected to participate in the Request for Proposals (RFP). The successful contractor completes the design, finances the work, constructs the project and maintains the project for an extended period after completion. This approach was to be used for project components that have very little community and business impact, and the contractor is in control of the site.

Metrolinx Project Delivery

The April 25, 2012 report approved by the Metrolinx Board set-out LRT project delivery as follows:

Eglinton Crosstown LRT:

- Continue with DBB tenders for tunnel construction starting in late summer of 2012.
- Proceed with Infrastructure Ontario delivery for the balance of the Eglinton project.
- Anticipate award of contract by mid 2014.
- Projected in-service date of 2020.

Sheppard East LRT:

- Proceed with Infrastructure Ontario delivery.
- Anticipate award of contract by late 2014.
- Projected in-service date 2018.

Scarborough RT:

- Proceed with Infrastructure Ontario delivery.
- Anticipate award of contract by late 2014.
- Existing system shut down for replacement after Pan/Parapan American Games in 2015.
- Projected in-service date of 2019.

Finch West LRT:

- Prepare design for Infrastructure Ontario procurement.
- Build underground access connections to Toronto-York-Spadina Subway extension (TYSSE) immediately.
- Anticipate award of contract by early 2015.
- Construction start in 2015 with projected in-service date of 2019.

Sheppard MSF:

- Continue with the Infrastructure Ontario DBFM selection process started last year.
- Anticipate award of contract by mid-2013.
- Projected in-service date of 2015 for Phase 1.

TTC Comment on the Metrolinx Project Delivery and Contract Staging

Metrolinx initially presented the option of AFP for the entire LRT project delivery to TTC staff in April 2011. In December 2011, the Province of Ontario determined that TTC would operate the completed the projects but indicated that Infrastructure Ontario would proceed with AFP for DBFM.

Metrolinx and Infrastructure Ontario have noted the following advantages and for the Province to use AFP:

- It defers costs as payments start at project completion.
- It provides one point of accountability for the project - the contractor.
- Risk can be transferred to the private sector.
- Budget and schedule are predictable.

A series of meetings between TTC, Metrolinx and Infrastructure Ontario, were conducted in an effort to come to agreement amongst the three agencies on project delivery, the impact on the project schedule and budget and the TTC role.

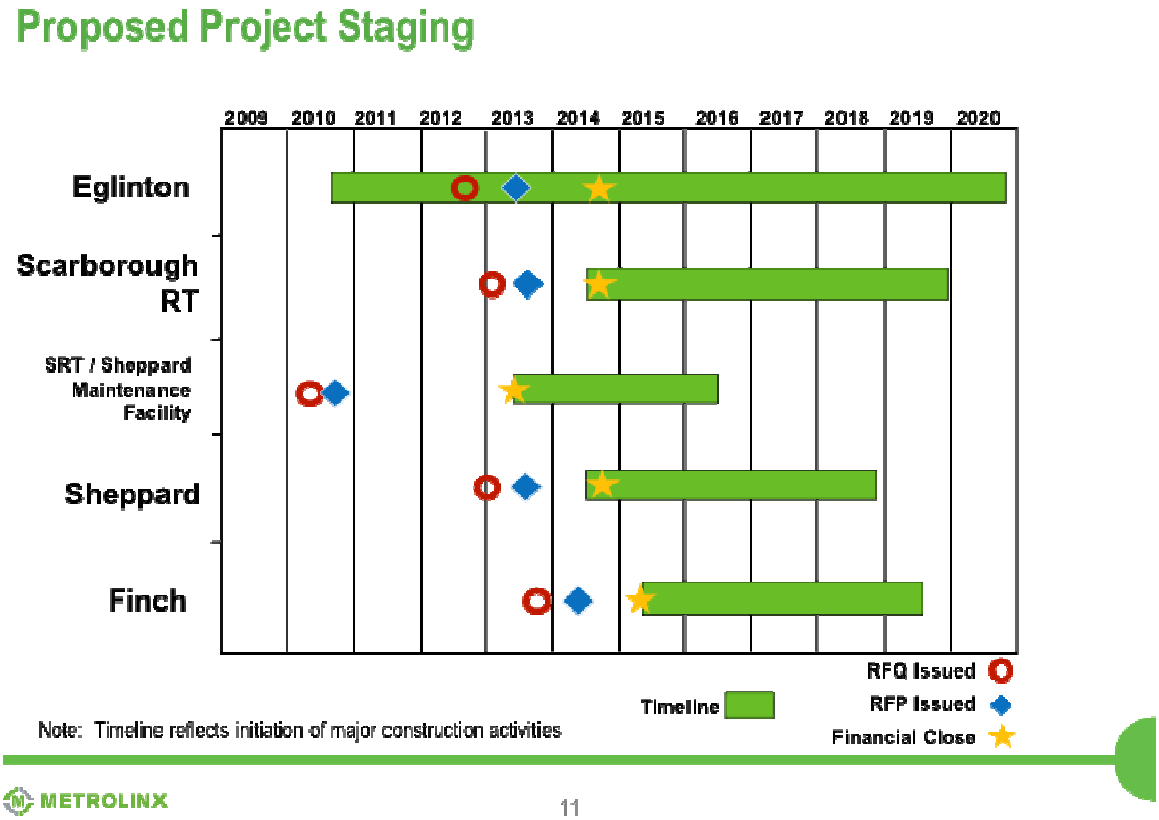
Metrolinx/Infrastructure Ontario cited the Canada Line in Vancouver as an example of a major transit project fully delivered by Design Build Fund Operate and Maintain (DBFOM). While the project was delivered three months ahead of schedule, well in time for the Winter Olympics, it is the TTC's understanding that it met budget by providing private sector financing for the cost overruns encountered at the close of the Request for Proposals (RFP) process.

TTC staff therefore recommend that Metrolinx be asked to comment further on their proposed method of project delivery.

Schedule

The Metrolinx schedule for the program shows award of contracts for all four projects in mid 2014 to early 2015. Extensive consultant and project management resources will be required to achieve 30% design for all four projects at the same time.

Metrolinx Schedule as of April 25, 2012



The Metrolinx schedule for Eglinton Crosstown LRT is considered by the TTC and the APTA Peer Review Panel to be extremely challenging and that by necessity it increases the risk of disproportionate disruption to communities.

Underground station construction is the most time intensive part of the project and, as it requires cut and cover construction, has the greatest disruption to the community. The station construction and the extensive utility relocations require about three-four years of

construction per in-line station and longer for interchange stations. Once completed one-two years are required for commissioning and testing the project before it can go into service. The Metrolinx schedule does not start final design of the stations until after the AFP contract is awarded in mid 2014. Completing all the station design and construction in four years for opening in 2020 is unrealistic in the opinion of the TTC and the APTA panel.

The Metrolinx schedule carries the risk of disproportionate community disruption. If all of the stations are designed and constructed in the same timeframe, there will inevitably be major disruption for the length of the underground section on Eglinton. In addition, there will be the cumulative impact across the city with Sheppard East LRT and Finch West LRT construction in the same time period.

AFP requires that the progress made to date on the time critical station designs, be suspended now at about 30% design and re-started once the contract is awarded in mid 2014 - a loss of about two years of progress that could be used to stagger station construction and mitigate disruption if the designs and construction were to proceed.

The Metrolinx schedule delays construction start of the Sheppard East LRT to 2014 to accommodate the timelines for the AFP process.

The TTC, supported by the independent APTA Peer Review Panel, recommend:

- A realistic target in-service date of 2022-2023 for the Eglinton Crosstown LRT.
- Construction should be staged to address community impacts and operational constraints.
- Sufficient time for commissioning the line should be provided in the schedule.
- Continue to complete the Crosstown station designs and proceed immediately to DB to stagger the construction and major disruptions on Eglinton.
- Start construction of the Sheppard East LRT immediately.
- Start the Finch West LRT construction in 2015 consistent with Provincial cash flow requirements.
- Start the Scarborough RT construction in 2015 immediately after the Pan/Parapan American Games.

TTC staff recommend that Metrolinx be asked to comment on this alternative schedule, given the concerns expressed above and as noted by the APTA Peer Review Panel.

Financing and Costs

It is acknowledged that the TTC is not an expert on private funding models and that innovative approaches to major infrastructure projects should always be considered. That said, there is limited evidence of the use of private funding, more specifically AFP, to fund major transit projects.

The Canada Line is the only transit project on the continent to be completed with partial private financing. Cost overruns at the RFP stage required that the successful contractor provide 30% of the financing. The Eagle Line in Denver is also being built with partial private financing. In both cases the financing is required to cover funding shortfalls and not as a way to provide value-for-money.

The APTA Peer Review Panel concluded there is uncertainty with respect to:

- the advantage of private-sector vs. public-sector financing; and
- the ability and cost of the private sector to provide financing for very large long duration projects.

It is fully recognized that the Province is funding the entire cost of the project, and has sole responsibility for decisions related to cost, budget and financing. As such it is the Province's prerogative to ultimately determine these issues.

TTC staff recommend that Metrolinx be asked to comment further on their confidence around use of the AFP model to fund LRT projects in Toronto.

Competitiveness

The Metrolinx/Infrastructure Ontario AFP approach involves contracts for entire LRT projects with values of $1 Billion and up. For the Eglinton Crosstown LRT the value would be several billion dollars. One of the objectives of using the AFP approach is to increase competition.

However, the APTA Peer Review noted that although AFP promises increased competition with very large multi-billion contracts, there is a very real possibility that such large contracts may actually inhibit competition and may result in no competition. The contracts may be so large that very few, if any, contractors have the resources and can raise the financing to participate in the RFP process.

TTC staff recommend that Metrolinx be asked to comment further on this issue in order to address this concern.

Community Impact

TTC has made it clear to the public and local councilors that station construction and the activities at the tunnel launch shafts will be extensive and disruptive. Under the TTC project delivery approach, the public would be informed and consulted at each step of the design and construction process.

There are concerns that the elements of the project in development, such as station location and design, that have been subject to public consultation could change with the

AFP contract. The Canada Line in Vancouver offers some experience. The Canada Line was planned and received environmental approval as a bored tunnel for the underground sections. Through the RFP process, the successful consortium included changes to the construction method to cut and cover construction for an extensive section of the underground alignment through an active retail shopping area. As the procurement process was confidential the public was informed of this major change only after the contract was awarded and the decision made, and there was no opportunity for the community's concerns to inform or influence the contacts.

One of the important features of DBFM is the discipline it imposes on the project with respect to scope and schedule. All issues and considerations are to be determined up front and early in the RFP process so that once the contract is signed it provides for the contractor to proceed with no or minimal change. For this reason TTC recommends the DBFM be used for components of the projects that have limited community impact and where the construction area can be turned over to the contractor.

The Crosstown underground stations have extensive complexity as they involve construction in the middle of Eglinton Avenue, require numerous utilities to be moved, involve major traffic, pedestrian, transit and cycling disruptions and will have impact on local businesses and institutions. There will inevitably be situations in which unforeseen changes are required for technical reasons or the construction approach requires adjustment to respond to concerns and issues from the public and local councillors. The TTC project delivery can accommodate such changes with minimal cost and delay. However, under an AFP contract, although the change may be relatively small, the actual cost charged by the contractor could be very high if it causes a delay to the entire project and its financing.

TTC has also made commitments to the public that certain construction approaches will be used to mitigate disruption. For station construction, TTC has required that at least one lane of traffic will be maintained in each direction throughout the station construction. In addition the TTC approach for contracting packages of stations for construction would stagger the construction along Eglinton to reduce disruption and traffic restrictions.

The TTC will ultimately be responsible for signing off station designs from a safety and operability perspective. It has a complementary role of community engagement and consultation. Both responsibilities appear to be put at risk by the proposed project schedule so staff recommend that Metrolinx be asked to address this concern.

Project Delivery

The Metrolinx/Infrastructure Ontario project delivery proposal for AFP for the entire LRT program uses a one-size fits all approach.

TTC and the APTA Peer Review Panel recommendations are based on the appropriate project delivery taking into account the characteristics of the project elements.

The following is a summary of the TTC and APTA Peer Review Recommendations.

Project Component	TTC	APTA Peer Review
Eglinton - Tunnels	Design Bid Build	Design Bid Build
Eglinton Stations - In Line	Design Build - Groups of 2 to 3	Design Build - Groups of 2 to 3
Eglinton Stations -Interchange	Design Bid Build	Design Bid Build
Scarborough RT	AFP - Design Build Maintain	Design Build Maintain
Sheppard East LRT	Design Bid Build	Design Bid Build Or Design Build Maintain
Finch West LRT	Design Bid Build	Design Bid Build Or Design Build Maintain
Yards	AFP - Design Build Maintain	Design Build Maintain
Systems	Design Build	Design Build

Notwithstanding the Province's prerogative to ultimately determine the project delivery model, TTC staff believe that a mixed approach to program delivery as outlined above offers the best solution to delivery of this complex project while still respecting Metrolinx's role as owner and responsibility for oversight. It would still involve Infrastructure Ontario and the AFP process in significant components of the program.

TTC Role

Although TTC, Metrolinx and Infrastructure Ontario have been in discussion about AFP project delivery for over a year, the April 25, 2012 report to the Metrolinx Board makes it clear that that the Province of Ontario intends to deliver the LRT projects in Toronto by AFP.

TTC recognizes and respects the Province of Ontario and Metrolinx authority as owner and sole funder of the LRT projects to make decisions about project delivery. TTC was asked by Metrolinx and by the Commission to provide comment and advice on project delivery and has made its serious concerns known through a number of meetings and correspondence with Metrolinx.

Given that the Province and Metrolinx have indicated that they will proceed to implement the LRT projects through Infrastructure Ontario and AFP, the issue of the TTC's role in AFP project delivery needs to be addressed.

Metrolinx would prefer TTC to stay involved in order to build on TTC expertise and utilize the organization that TTC has in place to continue progress on the projects until the project contracts are awarded. Metrolinx would like TTC to continue to be responsible for utility relocation, property acquisition, community relations and communications for the projects.

TTC has dedicated significant resources and effort to planning and implementation of the LRT projects to-date and clearly has an interest in leading the projects through to implementation and operation. However, up to now, TTC has had clear responsibility for the project planning and construction on behalf of Metrolinx. The change to Infrastructure Ontario AFP will transfer the responsibility for project delivery to the contractor.

As the future operator, TTC will stay involved to provide the performance standards and design review and construction oversight to ensure that the completed project can be handed over to TTC.

Metrolinx would also like TTC to stay involved to provide advice and technical expertise and to continue with community relations through the development of the RFPs. However, if TTC does not have responsibility for or control over the construction of the projects, it cannot realistically conduct effective community relations. As the public agency responsible for the largest transit system in the country, TTC involvement would be understood by the public to be a position of accountability and responsibility for the projects. The accountability for the projects should rest clearly with the owner, Metrolinx, and the project delivery approach it uses.

If the Province proceeds as expected with AFP delivery, TTC staff recommend the following involvement in the LRT projects:

- As the future operator TTC provide standards and review of the operating system design to be included in the RFPs to ensure that the completed projects can be safely and efficiently operated. TTC recommends that Metrolinx adjust the timelines for the development of the RFP documents and for the project completion to ensure there is adequate time to include the requirements and to ensure effective commissioning of the final projects.

- As the operator of the existing system, TTC will require that the design of the interchange stations be developed to 90% to ensure that the safe and efficient operation for the existing subway system is not undermined or jeopardized through the design or construction of the new LRT stations and that operations will be maintained throughout the construction. TTC recommends that Metrolinx adjust the timelines for the development of the RFP documents to ensure adequate time is included for the full development of the interchange station designs and construction staging.

- As program manager on behalf of Metrolinx, TTC immediately transfer all responsibility for planning, design, construction and community relations to

Metrolinx. The DBFM will provide for the private-sector to project manage the projects including planning, design, and construction on behalf of Metrolinx, replacing TTC's role and responsibility. TTC staff have advised Metrolinx to establish an organization that can assume the responsibilities currently provided by TTC.

Impact on TTC Organization

The TTC Transit Expansion Department was established in 2008 to provide a dedicated team of TTC staff and in-house consultants to plan and deliver the LRT projects.

Staff recommend that TTC staff currently in the Transit Expansion Department be transitioned to the extent possible into other parts of the TTC organization to ensure their expertise is retained and is a resource for succession planning and to reduce the need for consultants on other TTC construction, state of good repair and expansion projects. In particular, the Transit Expansion Department has developed an effective approach to community relations for the LRT projects and specifically the Eglinton Crosstown that should be replicated and integrated into TTC construction activities consistent with TTC's focus on customer service.

Conclusion

The decisions of Toronto City Council and Metrolinx regarding the Eglinton Crosstown LRT, Sheppard East LRT, Scarborough LRT and Finch West LRT projects are important steps in implementing much needed improved transit in Toronto and provide for significant expansion of the rapid transit network.

TTC as the program manager for the LRT program on behalf of Metrolinx over the past three years, has made significant progress on the planning, design and delivery despite the controversy and delay resulting from decisions about the scope of the program. The APTA Peer Review has validated TTC's project implementation strategy for the LRT projects.

The Province of Ontario is expected to direct Metrolinx and Infrastructure Ontario to deliver the LRT program by AFP with the a private-sector contractor assuming responsibility for project management, design and construction with TTC remaining involved as the future operator. TTC has expressed concerns about the AFP delivery approach being implemented across the entire LRT program as outlined in this paper. Staff have recommended that Metrolinx be asked to comment further on these concerns.

If the Province confirms its decision to proceed with an AFP funded project delivered by Metrolinx/Infrastructure Ontario, the TTC will no longer be responsible for program management to deliver the LRT projects. Under this scenario, staff recommend that the

Transit Expansion Department, be dissolved and the TTC staff be transitioned into other positions within the TTC wherever possible. It is also recommended that the community relations approach developed for the LRT projects be incorporated into TTC construction and expansion projects.

As operator of the completed LRT projects, TTC will provide to Metrolinx its requirements and standards and develop a new working relationship to ensure these requirements are incorporated into the DBFM contracts. TTC will also provide requirements to Metrolinx for the design, review and construction of the interchange stations to ensure the continued safety and efficient operation for the existing subway system.

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May 30, 2012
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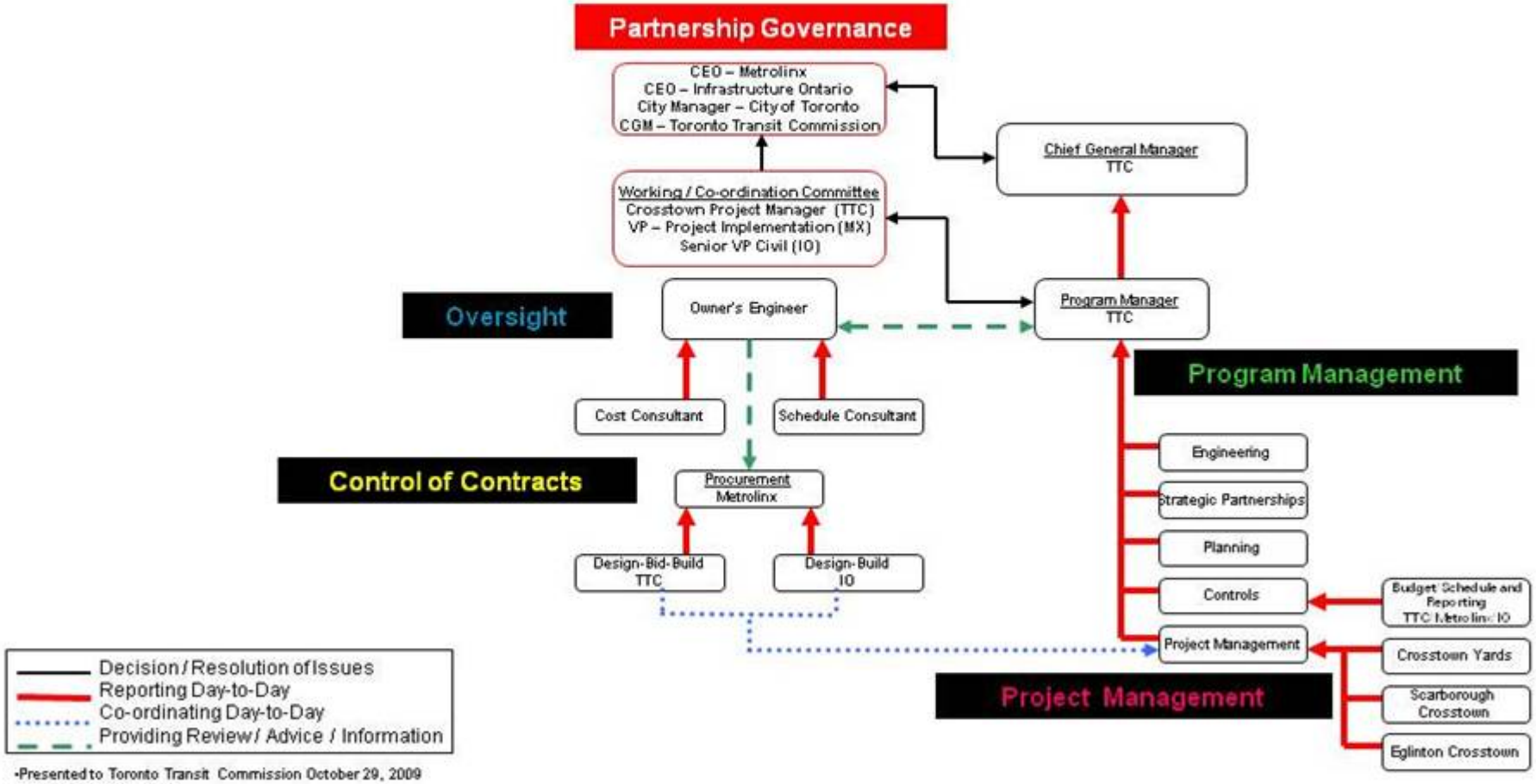
03-06-000075464

Attachment:

Appendix 1 - Metrolinx – TTC Transit Project Implementation
Appendix 2 - Metrolinx Report and Presentation
Appendix 3 - APTA Peer Review presentation and recommendations

Appendix 1

METROLINX – TTC TRANSIT PROJECT IMPLEMENTATION



•Presented to Toronto Transit Commission October 29, 2009
•Updated January 2012

Metrolinx to approve project scope, budget and major RFPs.

METROLINX
An agency of the Government of Ont io
Une agence du gouvernement de l'Ont io

Board Report

To: Board of Directors

From: Jack J. Collins
Vice President, Rapid Transit Implementation

Date: April 25, 2012

Re: **Toronto Transit Projects**

EXECUTIVE SUMMARY

The Board of Directors is being asked to receive and endorse this staff report on moving forward with all four Toronto transit projects – Eglinton, Scarborough, Sheppard and Finch. In moving forward, Metrolinx will use Infrastructure Ontario on all projects, as directed by Treasury Board, to maximize value and increase certainty of on-time, on-budget delivery, subject to the completion of value-for-money analysis on each project. Staff is recommending that construction continue where it is already underway, such as the tunnel launch shaft for the Eglinton Crosstown LRT, and that we move to fulfill the original promise of delivering these projects by 2020.

RECOMMENDATION

RESOLVED:

1. *THAT*, subject to any approvals required from the Province of Ontario, Metrolinx is authorized to proceed with the implementation of the Toronto Transit Plan as originally approved by Metrolinx on May 19, 2010, consisting of the following projects, (the "Projects), with the following staging:

    - the Eglinton Crosstown LRT from the Jane Street / Black Creek area to Kennedy Station with an in-service date of 2020,
    - the Scarborough RT / Sheppard LRT maintenance and storage facility, with a construction start of 2013 and substantial completion in 2016,
    - the Scarborough RT replacement and extension to Sheppard Avenue, with a construction start of 2014 and an in-service date of 2019,
    - the Sheppard East LRT from Don Mills Station to east of Morningside Avenue, with a construction start of 2014 and an in-service date of 2018; and,
    - the Finch West LRT from the Toronto-York-Spadina Subway Extension (TYSSE) to Humber College, with a construction start date of 2015 and an in-service date of 2019.

2. *THAT*, Metrolinx staff is authorized to finalize and execute definitive legal agreements with the City and the TTC relating to the funding and implementation of the Projects at a capped contribution of $8.4 billion in 2010 dollars.

3. *THAT*, the principles outlined in Metrolinx's letter to the Chair of the Toronto Transit Commission dated January 31, 2012 attached as Appendix I to this report shall be reflected in the definitive legal agreements relating to the funding and implementation of the Projects.

4. *THAT*, subject to positive value-for-money analysis results and Treasury Board approval, Metrolinx will use Infrastructure Ontario for project delivery to the extent feasible in accordance with letter from Ontario Minister of Transportation to Metrolinx Chair dated April 19th, 2012 attached as Appendix II, in order to optimize the value for money to the Ontario taxpayer on these transit investments.

5. *THAT,* in conjunction with an IO project delivery approach, Metrolinx staff work with the federal government to seek additional P3 Canada Fund support for these projects.

6. *THAT,* after consultation with the TTC and Infrastructure Ontario, staff report back to the Board with opportunities for early works packages that can advance the projects without reducing overall value-for-money from the preferred delivery approach.

7. *THAT*, Metrolinx funding and implementation of the Projects is contingent on the PRESTO fare card being implemented by the TTC, and,

8. *THAT,* after consultation with the City of Toronto and the TTC, staff report back to the Board with details on the updated budget and scope for the Projects.

BACKGROUND

On March 21-22, 2012, the City Council completed its deliberations on Metrolinx Light Rail Transit Projects for Toronto (Appendix III). Council endorsed an approach which re-affirmed, in large measure, the projects contained in Metrolinx's original plan. The following is a chronology of key changes to the scope of the Projects.

On May 19, 2010, Metrolinx adopted the original plan that included four LRT projects in the City of Toronto including:

- the Eglinton Crosstown LRT from Jane Street to Kennedy Station.
- the Scarborough RT conversion to LRT from Kennedy Station to Sheppard Avenue.
- the Sheppard East LRT from Don Mills Station to east of Morningside Avenue.
- the Finch West LRT from the Toronto-York-Spadina Subway Extension (TYSSE) to Humber College.

On March 31, 2011, the Mayor of Toronto, Minister of Transportation and Chair of Metrolinx signed a MoU for a revised transit plan for Toronto. The MoU included the Eglinton-Scarborough Crosstown transit project, underground from Jane / Black Creek to Kennedy Station, continuing in the Scarborough RT (SRT) alignment to Scarborough City Centre as the responsibility of Metrolinx, and the Sheppard Subway extensions, west to Downsview Station and east to Scarborough City Centre and enhanced bus service on Finch Avenue as the responsibility of the City of Toronto, subject to receiving support from their respective organizations.

On January 31, 2012, the Metrolinx Chair sent a letter to Mayor Ford and TTC Chair Stintz encouraging Mayor Ford and Chair Stintz to confirm their position on a transit plan in Toronto at the earliest possible date. The letter also restates the five principles that guided the negotiations of the MoU between the Province, Mayor and Metrolinx, as they continue to reflect the provincial interest and the mandate given to Metrolinx (the letter is attached as Appendix I).

On February 8, 2012, Council affirmed its support for the Metrolinx original plan, approved by the Metrolinx Board at its meeting on May 19, 2010, with the one exception being Sheppard Avenue East, which was left for decision at a future date following advice from the expert panel.

On March 21-22, 2012, Council considered the report of the expert panel on Sheppard Avenue East. The expert panel recommended that Council proceed with LRT on Sheppard Avenue from Don Mills Station to east of Morningside Avenue. After debate, Council adopted the recommendation and forwarded it to Metrolinx and the Province for review.

On April 19, 2012, Metrolinx received a letter from the Minister of Transportation (Appendix II) reiterating the Provincial policy related to project delivery that is articulated in the Province's long-term infrastructure plan, *Building Together*. As part of this plan, the government adopted a policy of making greater use of AFP through Infrastructure Ontario (IO) to procure the province's infrastructure. The letter notes that all provincial infrastructure projects in excess of $50 million will be subject to recommendations by the Ministry of Infrastructure to government regarding project delivery and procurement method, and the need to consult with IO to determine whether and how they can assist with procurement. In the letter, the Minister advises that Metrolinx is to develop its revised implementation plan anticipating the use of AFP for project delivery in all cases, subject to the completion of value-for-money analysis on the individual projects and Treasury Board approval.

DISCUSSION

Previous Council Decision

On February 8, 2012, Council adopted a motion on the Metrolinx Transit Projects in Toronto with a 25-18 vote in favour of a plan that is similar to the original plan approved by the Metrolinx Board at its meeting on May 19, 2010. In summary, the Council motion supports:

- the Eglinton Crosstown LRT from Jane Street to Kennedy Station.
- the Scarborough RT conversion to LRT from Kennedy Station to Sheppard Avenue.
- the Finch West LRT from the Toronto-York-Spadina Subway Extension (TYSSE) to Humber College.

The one exception is transit on the Sheppard Avenue corridor, for which council directed the creation of an expert panel to advise Council, not later than March 21, 2012.

After completion of a detailed evaluation of options, the Panel concluded that LRT is the recommended mode of transit for Sheppard Avenue East. With the exception of Dr. Gordon Chong, a strong consensus existed among the Panel members that the LRT was superior to the subway options presented, across the range of assessment criteria under consideration. A summary of the Expert Panel Report is attached in Appendix IV.

After receipt and debate of the report, on March 22, 2012, Council recommended the LRT option as its preferred transit investment for Sheppard Avenue East.

Metrolinx Staff Comment

The recommended plan endorsed by City Council in large measure returns to the original Metrolinx plan endorsed by the Metrolinx Board on May 19, 2010. The Metrolinx approved plan included construction of four LRT projects and one York Region Viva BRT program in corridors identified as Top 15 priorities in the Metrolinx Regional Transportation Plan, The Big Move. As the largest single investment in public transit in Canadian history, the plan represented an aggressive, bold and doable program. The plan included proceeding with three projects immediately, Sheppard LRT, Eglinton LRT and York Viva, with Scarborough RT and Finch LRT commencing construction in 2015.

The plan endorsed by City Council represents a departure from the MoU that was negotiated with the Mayor of Toronto. The MoU provided that Metrolinx would deliver a fully grade separated LRT along the Eglinton-Scarborough RT alignment from the Jane/Black Creek area to McCowan in the Scarborough City Centre, while the City would deliver subway extensions in the Sheppard corridor, and enhanced bus service on the Finch corridor. However, the MoU obligated all parties to receive support from their respective organizations, which for the Mayor, meant that the plan needed endorsement from Council. This has not been achieved.

Metrolinx staff recommends that the Board support City Council's endorsement of the revised plan, which is reflective of the original plan endorsed by the Metrolinx Board of Directors. The revised transit plan for Toronto evaluated against Metrolinx stated principles achieves the following:

- ✓ consistent with regional needs identified in The Big Move:
  - o links regional urban growth centres
  - o provides new east west connections
  - o connects communities of social need
  - o locates transit to support future growth
  - o high level of readiness relative to other regional projects
  - o centres of population and employment served.
- ✓ each of the four Toronto light rail projects are identified as a Top 15 Priority.
- ✓ sound transit planning principles are met with previous Metrolinx studies and approved Environmental Assessments by City Council and Ministry of Environment for all four projects.
- ✓ meets $8.4 billion provincial funding and asset ownership and control criteria that allows for amortization of costs.
- ✓ minimizes penalties and avoids sunk costs.
- ✓ minimizes cost of delay to light rail vehicle contract, but actual cost impact still needs to be negotiated with vehicle supplier.
- ✓ impacts to traffic are limited:
  - o Scarborough fully separated from traffic
  - o Sheppard and Finch to be widened; some intersection adjustments required
  - o Along Eglinton, east of Leslie, all general use lanes to be maintained; HOV lanes will be removed to accommodate the LRT in median; some intersection adjustments required.

Budget and Scope

Eglinton Crosstown LRT

Over the past year, significant progress has been made on the implementation of the Eglinton Crosstown LRT. Major project delivery achievements to date include:

- initiated construction on the west tunnel launch site at Eglinton Avenue West and Black Creek Drive;
- completed design of the west tunnel from Black Creek drive to Yonge Street;
- initiated design for seven stations between Black Creek Drive and Yonge Street;
- held public consultations for Bathurst Station, Dufferin Station, Eglinton West (Allen) Station;
- purchased property for the proposed vehicle maintenance and storage facility on the former Kodak Lands;
- conducted extensive geotechnical testing and investigation work;
- ordered the tunnel liners;

- ordered the tunnel boring machines; and
- ordered the light rail vehicles.

The approved schedule for the Eglinton Crosstown LRT is 2010-2020. As noted above, construction and engineering are well underway for the project and it is expected to be completed on the 2020 timeline.

The project has a total length of 19 kilometres, of which approximately 11 kilometres will be located in a tunnel. The line has a forecasted 2031 ridership of 5,400 people per hour in the peak direction (PPHPD) in 2031. Forecasted passenger volumes are within the range of capacity for a LRT system.

The previous budget for Eglinton was estimated at $4.9 billion in 2010 dollars. These costs will need to be reviewed to reflect potential changes to scope, including a grade separation option through the Black Creek area. Metrolinx staff plan to report back to the Board of Directors at the June meeting on the proposed alignment in the Black Creek area and the western terminus for this phase of the project.

Scarborough RT

This project involves the replacement of the Scarborough RT with a LRT and its extension from McCowan to Sheppard. The total length of the project is 9.9 kilometres and it is forecasted to carry approximately 10,000 pphpd, within the capacity of a LRT.

Major project delivery milestones to date for the Scarborough RT include completion of design for the replacement of the SRT to 30 percent and completed design for Kennedy Station to 10 percent. Design for the extension component of the SRT, between McCowan and Sheppard will need to be restarted.

The previous plan included a construction schedule for the Scarborough RT of 2015-2020. The schedule allows for the SRT to be in service during the Pan Am/Parapan Games in the summer of 2015, after which the service would be shut down for construction. Planning, design and engineering work will be completed prior to construction in order to minimize down time.

The revised plan will move up SRT completion by one year from 2020 to 2019. This would be accomplished by starting work on the extension of the line between McCowan and Sheppard as a first phase, allowing the existing service to continue until after the Pan Am/Parapan Games are completed.

The budget for the SRT was estimated at $1.8 billion in 2010 dollars.

Sheppard East LRT

This project involves a new LRT line from the Don Mills station on the Sheppard subway line to Morningside, a distance of 12 kilometres. Forecasted ridership to 2031 is 3,000 pphpd, well within the capacity of a LRT.

Metrolinx and the TTC are currently completing construction of the Agincourt grade separation at Sheppard Avenue and the GO Stouffville rail line. The grade separation target completion date is June 2012. In addition, Metrolinx acquired property for a combined SRT and Sheppard East LRT maintenance and storage facility at Conlins Road. Site preparation work, including the relocation of underground utilities, has been completed. Finally, procurement for the maintenance facility, which was to be a design-build-finance-maintain project in collaboration with Infrastructure Ontario, is currently on hold and will need to be reactivated.

The original approved plan included a construction schedule for the Sheppard East LRT of 2010-2014. With the exception of work at the Agincourt grade separation and site grading of the Conlins yard property, no work has progressed on this project for more than a year.

The revised plan includes working with the IO delivery model, subject to a value-for-money analysis and Treasury Board approval, by 2018.

The budget for the project was estimated at $950 million in 2010 dollars, including a one-third contribution from the federal government.

Finch West LRT

The original approved plan called for implementation of the Finch West LRT project in the 2015-2020 period. This project involves a new LRT line from the Finch West station on the Toronto-York Spadina Subway extension to Humber College, a distance of 11 kilometres. Forecasted ridership to 2031 is 2,800 pphpd, well within the capacity of a LRT.

Metrolinx and the TTC will need to review the current status of all Finch West LRT work, evaluate and update the cost estimates and prepare an value for money analysis for an IO delivery model. The anticipated completion date will be in 2019.

Project Staging

Considerations

The Eglinton Crosstown LRT is currently under construction. Ensuring construction momentum is not lost on this critical project is an essential consideration. Time is required to bring additional project management, design and engineering resources on board. Maintaining schedule on Eglinton is a key consideration, other considerations include:

- Vehicle deliveries
    - the ability to receive and test vehicles will reduce delay and other costs associated with the vehicle contract
- Industry capacity in responding to multiple procurements
    - we must be mindful of industry capacity to respond to multiple concurrent opportunities
    - engineering may be a challenging area, although the size and scale of these offerings is expected to draw resources from around the world
- SRT replacement is a priority
    - The SRT has high, established ridership; it is near the end of its economic life and in need of replacement. Project acceleration has benefits and staging can be done to avoid any disruptions during the Pan Am / Parapan Games period
- Deliver all projects through Alternative Finance and Procurement (AFP)
    - Provincial policy requires making greater use of Alternative Financing and Procurement (AFP) through IO to procure the province's infrastructure, and in particular that provincial projects over $50 million be considered for AFP delivery, subject to value-for-money analysis and Treasury Board approval.

Staff Recommended Project Staging

It is recommended that the Projects be staged for construction in the following manner:

Eglinton Crosstown LRT:

- Continue with Design Bid Build tenders for tunnel construction starting in late summer of 2012
- Proceed with IO delivery for the balance of the Eglinton project
- Projected in-service date of 2020

Scarborough RT / Sheppard East LRT Yard:

- Continue with the Design-Build-Finance-Maintain (DBFM) selection process started last year
- Provides early storage and testing site for vehicles
- Minimizes delays to vehicle supplier
- Avoids break fees if procurement is cancelled
- Projected in-service date of 2015 (Phase 1 for vehicle deliveries), 2016 (substantial completion)

Sheppard East LRT:

- Proceed with IO delivery
- Projected in-service date of 2018

Scarborough RT:

- Proceed with IO delivery
- Separate early works as Design-Bid-Build (DBB)for track along Sheppard Avenue, from the yard to Progress Avenue for vehicle testing
- Initial construction would be on extension from McCowan to Sheppard Avenue
- Existing system shut down for replacement after Pan Am / Parapan Games
- Projected in-service date of 2019

Finch West LRT:

- Complete design work to 30% to facilitate AFP procurement
- Build underground access connections to Toronto-York-Spadina Subway extension (TYSSE) immediately
- Projected in-service date of 2019

Return to the Board

Considering the foregoing, staff recommends proceeding with the necessary work to implement the Projects, and that after further consultation with the City of Toronto, TTC and Infrastructure Ontario, reporting back to the Board with details on any updates to project budget and scope.

In addition, after consultation with the TTC and Infrastructure Ontario, staff will report back to the Board with opportunities for early works packages that can advance the projects without reducing overall value-for-money from the preferred delivery approach.

PRESTO Implementation

The region-wide implementation of the PRESTO fare card is an important goal for Metrolinx. The electronic fare card is now in place on all GO Transit services and municipal operators throughout the GTHA. Good progress has been made on a Master Agreement for the implementation of PRESTO across the entire TTC system. Moving forward with the PRESTO fare card system should be a condition of any agreement with the City and the TTC.

Alternative Finance and Procurement

Infrastructure Ontario's alternative financing and procurement (AFP) model has a proven track record of successfully delivering large complex infrastructure projects, on time and on budget.

The IO model allows for the private sector to design and construct the facility, subject to strict parameters and required outcomes. In the end, the benefits of private sector innovation can be incorporated into a public works project that remains a public asset after construction completion. Given this strong record, IO is participating in the procurement of the Metrolinx Air Rail Link Spur project (design-build-finance), the Ottawa LRT project (design-build-finance-maintain) and the Waterloo LRT project (design-build-finance-operate-maintain). This is consistent with the province's long-term infrastructure plan, *Building Together*.

AFP projects are guided by five key principles including transparency, value-for-money, public ownership and public control, and that public interest is paramount. With projects as significant as these Toronto transit projects, Metrolinx must look at all delivery options in order to achieve the best value for taxpayer money.

Metrolinx is prepared to proceed with the IO delivery model, with the exception of some early contract packages on Eglinton Crosstown, such as tunnel boring machines, tunneling and early works contracts, pending the successful completion of value-for-money assessments for each of the projects and subject to approvals required by the Metrolinx Board and Province.

The delivery model will not affect the customer experience as each of the lines will be operated as seamless components of the TTC network.

BUDGET POSITION

Subject to Provincial Cabinet approval to reaffirm the Toronto Transit Plan as modified by more definitive agreements, the maximum budget authorized for the plan is $8.4 billion in 2010 dollars.

Respectfully submitted,

Jack J. Collins
Vice President, Rapid Transit Implementation
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Attachments

Appendix I – Metrolinx letter to TTC Chair (January 31, 2012)
Appendix II – Minister's Letter to Metrolinx Chair (April 19th, 2012)
Appendix III – City Council Resolutions (February 8 and March 21-22, 2012)
Appendix IV – Toronto City Council Sheppard Avenue Expert Panel Report Summary

Toronto Transit Projects

April 25, 2012

Jack Collins
Vice President, Rapid Transit Implementation

Outline

- Overall Direction
- Evaluation Principles
- City Council Motions
- Toronto Plan Evaluation against Principles
- Project Staging Considerations
- Metrolinx Staff Recommendation
- Proposed Board Resolutions
- Next Steps

Overall Direction

- Move forward with all four lines - Eglinton, Scarborough, Sheppard and Finch
- Use Infrastructure Ontario on all projects as directed by Treasury Board, to maximize value and increase certainty of on-time, on-budget delivery and a cooperative design process
- Continue construction where it is underway (e.g. Eglinton)
- Fulfill promise of delivering all projects by 2020

Evaluation Principles

1. Sound Regional Transit Planning:
   - Any projects to be paid for by the Province must achieve sound transportation objectives for the City and the region, and reflect the goals and principles of our regional transportation plan, The Big Move

2. Budget and Cost:
   - The maximum budget for the provincial contribution to the plan remains fixed at the original $8.4B (2010$). Any plan must be cost-effective and involve no cost increases to the Province over the original budget, in terms of the total provincial investment, the cash flow required in each year and the Province's ability to amortize its investment over the life of the assets. Any additional costs must be paid by the City or other partners

3. Penalties:
   - The Province is not prepared to pay any penalties related to contractual commitments or the loss of investments that result from changes sought by the City. These costs must be borne by the City

Evaluation Principles

4. Cost of Delay:
   - Delays in the delivery of results to residents are not acceptable. In the event that further delays occur in the delivery of projects, any delay costs must be assumed by the City

5. Traffic:
   - Any plan should minimize adverse impacts on traffic to the extent reasonably possible

February City Council Motion

- Council adopted motion on February 8, 2012 with a 25-18 vote in favour of a plan similar to original plan
- In summary, the City Council motion supports:
  - Eglinton Crosstown LRT from Jane to Kennedy Station in a tunnel and surface alignment
  - Finch West LRT from the future Finch West Station on the Toronto-York-Spadina-Subway-Extension (TYSSE) to Humber College
  - The Scarborough RT conversion to LRT from Kennedy station to Sheppard Avenue
  - Establish Expert Advisory Panel for transit on Sheppard and report back to Council on or before March 21, 2012

March City Council Motion on Sheppard Avenue

- City Council considered the Expert Advisory Panel's report and recommendations on March 21 and 22, 2012
- The Advisory Panel ranked three alternatives, LRT, Subway and a hybrid Subway/LRT option against the following criteria:
  - Funding and Economic Development
  - Transit Service
  - Sustainability and Social Impact
- LRT ranked highest at 87.3%, Hybrid at 59.5% and Subway at 59.3%
- City Council adopted a number of motions including the following for transit on Sheppard:

"1. City Council confirm that Light Rail Transit (LRT) is the preferred rapid transit mode for Sheppard Avenue East from Don Mills to Morningside, and confirm the Sheppard Avenue East LRT as a priority line within the approved Metrolinx "5 in 10" plan"

Plan Evaluation Against Principles

- ✓ Consistent with regional transportation needs identified in The Big Move; each of the four Toronto LRT projects are identified as a Top 15 Priority
- ✓ Meets $8.4 provincial funding and “asset ownership and control” criteria that allows amortization of capital costs
- ✓ Minimizes penalties and avoids sunk costs
- ✓ Minimizes cost of delay to Light Rail Vehicle contract, but actual cost impact still needs to be negotiated
- ✓ Impacts on traffic are limited:
  - ❑ Scarborough fully separated from traffic
  - ❑ Sheppard and Finch to be widened; some intersection adjustments required
  - ❑ Along Eglinton, east of Leslie, all general use lanes to be maintained; HOV lanes will be removed to accommodate the LRT; some intersection adjustments required

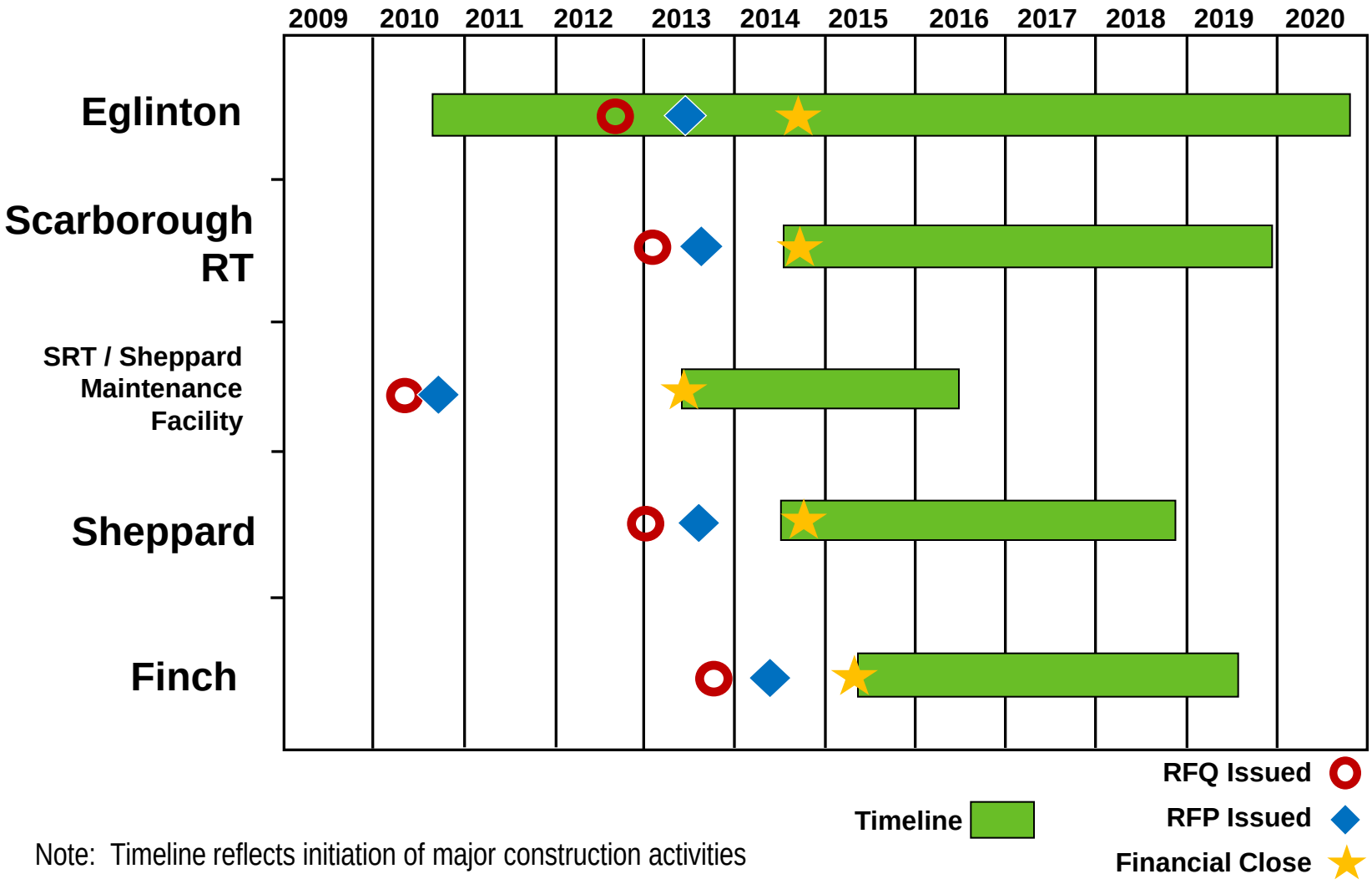
Consistency with Regional Transportation Needs

- Projects are priority elements of the GTHA system:
  - Linking regional urban growth centres
  - New east-west transit connections
  - Connecting communities of social need
  - Locating transit to support future growth
  - High level of readiness relative to other regional projects
  - Population and employment served

Project Staging Considerations

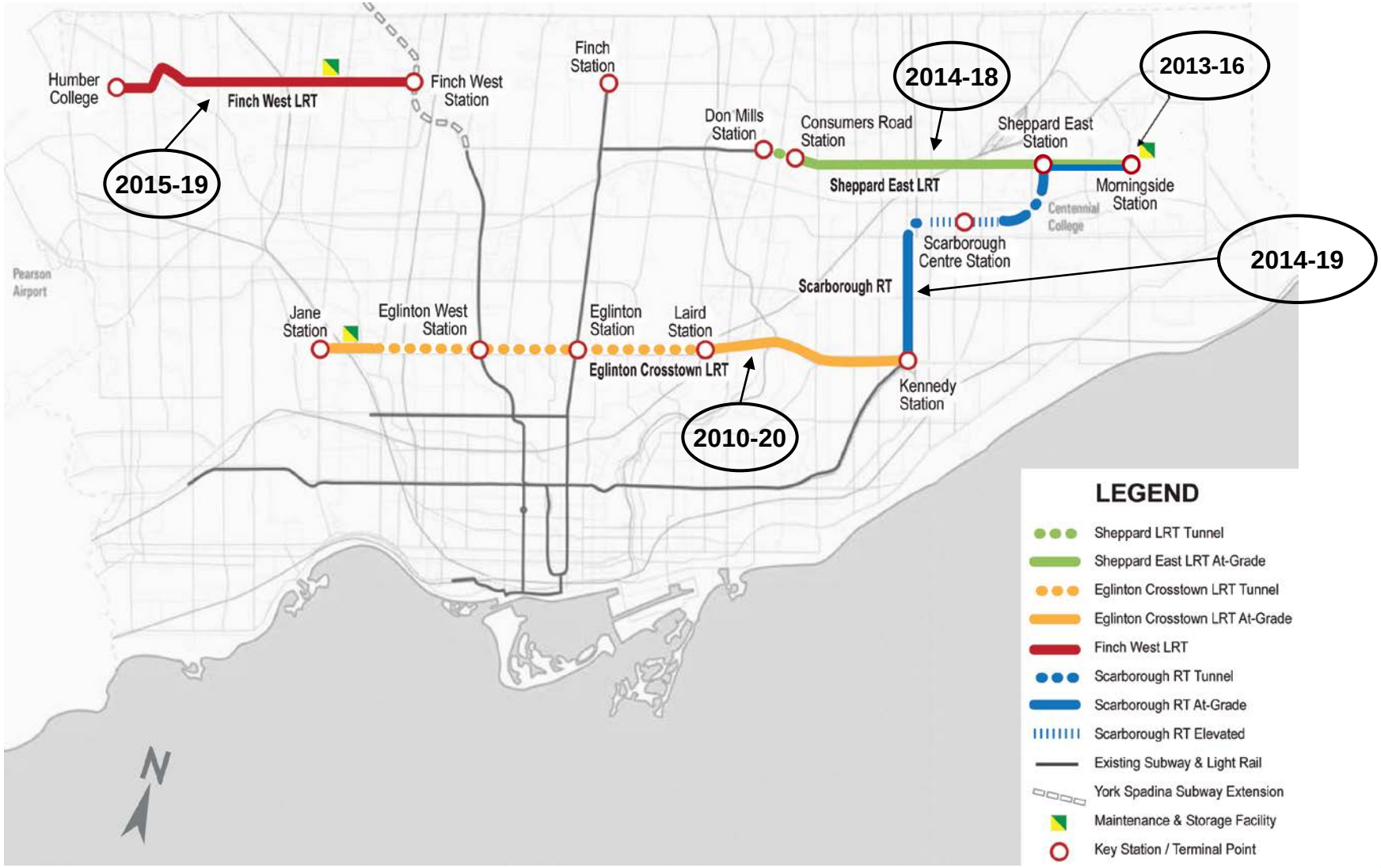
- Current construction progress
  - The tunnel segment of the Eglinton project is currently under construction, using a design-bid-build process, to complete project on schedule; discussions with TTC / IO underway on Alternative Financing and Procurement (AFP) delivery
- Vehicle deliveries
  - The ability to receive and test vehicles will reduce delay and other costs associated with the vehicle contract
- Industry capacity in responding to multiple procurements
  - We must be mindful of industry capacity to respond to multiple concurrent opportunities
  - Engineering may be the challenging area, although the size and scale of these offerings is expected to draw resources from around the world
- SRT replacement is a priority
  - The SRT has high, established ridership, it is near the end of its economic life and in need of replacement. Project acceleration has benefits and staging can be done to avoid any disruptions during the Pan Am/Parapan Games period
- Deliver all projects through AFP
  - Provincial policy now requires that all projects over $50 million be considered for AFP delivery, subject to value-for-money analysis

Proposed Project Staging



Note: Timeline reflects initiation of major construction activities

Proposed Project Staging



Recommended Project Staging

- Continue with procurement for balance of Eglinton project
  - Must continue with procurement to maintain schedule
  - Projected in-service date of fall / winter 2020
- Re-activate procurement for the combined Scarborough RT / Sheppard East LRT yard
  - Provides early storage and testing site for vehicles
  - Minimizes delays to vehicle supplier
  - Avoids break fees if procurement is cancelled
  - Projected in-service date of 2015 (Phase 1 for vehicle deliveries), 2016 (substantial completion)
- Scarborough RT
  - Initial construction would be on the extension from McCowan to Sheppard Avenue
  - Existing system shut down for replacement after Pan Am / Parapan Games
  - Projected in-service date of 2019

Recommended Project Staging

- Finch West LRT
  - Complete design work to 30% to facilitate AFP procurement
  - Build underground access connections to Toronto-York-Spadina Subway Extension (TYSSE) immediately
  - Projected in-service date of 2019
- Sheppard East LRT
  - Utilizes previous design and engineering work
  - Projected in-service date of 2018
- Metrolinx will work with TTC and IO to identify opportunities for “early works”, provided value-for-money is demonstrated

Metrolinx Resolution

RESOLVED:

1. *THAT*, subject to any approvals required from the Province of Ontario, Metrolinx is authorized to proceed with the implementation of the plan as originally approved by Metrolinx on May 19, 2010, consisting of the following projects, with the following staging:
   - Eglinton Crosstown LRT from the Jane Street / Black Creek area to Kennedy Station, with an in-service date of 2020
   - Scarborough RT / Sheppard maintenance and storage facility, with a construction start of 2013 and substantial completion in 2016
   - Scarborough RT replacement and extension to Sheppard Avenue, with a construction start of 2014 and an in-service date of 2019
   - Sheppard East LRT from Don Mills Station to east of Morningside Avenue, with a construction start of 2014 and an in-service date of 2018; and
   - Finch West LRT from the Toronto-York-Spadina Subway Extension (TYSSE) to Humber College, with a construction start of 2015 and an in-service date of 2019

Metrolinx Resolution (continued)

2. *THAT*, Metrolinx staff is authorized to finalize and execute definitive legal agreements with the City and the TTC relating to the funding and implementation of the Projects and a capped contribution of $8.4 billion in 2010 dollars

3. *THAT,* the principles outlined in Metrolinx's letter to the Chair of the Toronto Transit Commission dated January 31, 2012 attached as Appendix I to this report shall be reflected in the definitive legal agreements relating to the funding and implementation of the Projects

4. *THAT*, subject to positive value-for-money analysis results and Treasury Board approval, Metrolinx will use Infrastructure Ontario for project delivery to the extent feasible in order to optimize the value to the Ontario taxpayer on these transit investments

5. *THAT*, in conjunction with an IO project delivery approach, Metrolinx staff work with the federal government to secure additional P3 Canada Fund support for these projects

Metrolinx Resolution (continued)

6. *THAT,* after consultation with the TTC and Infrastructure Ontario, staff report back to the Board with opportunities for early works packages that can advance the projects without reducing overall value-for-money from the preferred delivery approach

7. *THAT,* Metrolinx funding and implementation of the Projects is contingent on the PRESTO fare card being implemented by the TTC, and,

8. *THAT,* after consultation with the City of Toronto and the TTC, staff report back to the Board with details on the updated budget and scope for the Projects.

Next Steps

- Convey advice and recommendations from Metrolinx Board to the Province
- Metrolinx will continue:
  - Construction on the Eglinton Crosstown central tunnel
  - Design and engineering on the Eglinton Crosstown section west of Black Creek to Jane, including the west Maintenance and Storage Facility
  - Development of the Master Agreement with the City and TTC and draft more definitive legal agreements
  - Working with Infrastructure Ontario and the TTC on the development of the delivery models for the projects, including value-for-money analysis

Appendix 3

APTA Peer Review

Crosstown Extension Project Delivery Methods

for

Toronto Transit Commission

Mysore Nagaraja, P.E.
Krishniah Murthy, P.E.
Robert L. Lund, Jr., P.E.
Anil Parikh, P.E.
Martin Schroeder, P.E.

May 17, 2012

Presentation of Peer Review Panel

- Overview of the APTA Peer Review Program
- Objectives of this Peer Review
- Peer Review Findings and Recommendations
- Recommended Actions

The APTA Peer Review

- Provides Transit Agencies with an unbiased review of projects, organization structure, technical approach or design, policies and procedures, application of technology or any topic as part of an Transit Agency's business.
- Peer review panels are selected based on their experience, knowledge or problem solving ability. Panel members consist of transit agencies (some exceptions to accommodate specific requests of the host property)
- Panel meets at the host property for review
- Provided as a service by the American Public Transportation Association

Content of the Peer Review

- The observations and recommendations as provided through the APTA Peer Review process are provided in good faith and are based upon the experience and skills of the Review panelists. The APTA Peer Review does not, nor is it meant to, represent a full organizational review. The Peer Review is intended to be used as a resource that, in conjunction with other assessment tools, can assist the requesting organization to evaluate their particular needs and issues.

APTA Peer Review Deliverables

- Verbal Report on Last Day of Panel Meeting at Host Property
- Written Report – within 30 days of panel meeting
  - Issues (Findings and Recommendations)
  - Responses to Questions
  - Conclusions
  - Appendices
    - Statement of Work
    - Agenda
    - List of Reference Documents
    - Panel Qualifications

Panel Members

High level executive transit professionals with extensive project delivery experience from North America's largest transit agencies

Panel Member – Mysore Nagaraja, P.E.

- **Partner & Co-Founder with Jim Simpson former U.S. FTA Administrator**

  Spartan Solutions, LLC

  Formerly:

  President MTA Capital Construction

  Head, MTA NYCT's Capital Program Management (1600 hundred person staff)

  Advanced $20B plus expansion program from inception to construction in less than five years

  Transportation Leadership Award, 2004, 2002

  Person of the Year, CMAA, 2004

  Engineer of the Year, ASCE, 2003

Panel Member – Krishniah Murthy, P.E.

- **Executive Director Transit Project Delivery**

  Los Angeles County Metropolitan Transportation Authority

  Eastside LRT Extension

  Westwood Subway

  Crenshaw Regional Connector

  Formerly :

  Senior Vice President, Parsons Brinckerhoff

  Principal, Valley Metro Rail, Mission Valley East Extension in San Diego, Trinity Commuter Rail

Panel Member – Robert L. Lund, Jr., P.E.

- **Senior Director Capital Construction**

  Southeastern Pennsylvania Transportation Authority (SEPTA)

  Rail and Transit Facilities

  Nationally recognized ARRA Program, $191M, 32 projects for power, track, controls, bridges, buildings, vehicles

  Deputy Director, SEPTA's Market Street Elevated Reconstruction Project

  Formerly :

  Resident Construction Manager, New York Power Authority

Panel Member – Anil Parikh, P.E.

- **Vice President and Deputy Program Executive**

  MTA Capital Construction Company

  63rd Street Line Connection

  Queens Brooklyn Line

  Second Avenue Subway "Mega" Project – One of the largest projects in the history of MTA New York City Transit

  Education:

  Master's Degree in Construction Management

  Executive 21 Leadership Program for Sr. Construction Executives

Thank you

- Sameh Ghaly
- Andy Byford
- Jim Fraser
- Rick Thompson
- Peter Allibone
- Anna Pace
- Jack Collins
- Franca Di Giovanni
- Sarah Currie – extra special thanks!

What We Were Asked to Do - Objectives

- Review and comment on project delivery trends and applications in North America for multibillion dollar projects
- Review Project Implementation Plan and project delivery approach.
  - Community / business impact during construction
  - Level of market competitiveness and ability to deliver and finance
  - Estimated final cost and project schedule

Conduct of Peer Review

- Reviewed extensive collection of project documents and reports.
- Participated in discussions held at TTC
  - Evolution of light rail plan
  - Organizational structure related to provincial agencies and city
  - Project status
  - TTC project implementation plan
  - Public outreach
  - Reviewed P3 presentation of Metrolinx
- Corridor tour
- Overall impression / observations
- Addressed questions posed on the SOW and additional specific questions

Discussion Categories

- General Observations
- Overview of Project Delivery Approaches
- Industry Trends
- Review of Project Implementation Plan and Project Delivery Methods
- Organization
- Near-term Actions

General Observations

- Large complex challenging project
- Program Ownership and Stakeholders
- Operational Constraints
- Socioeconomic and Regional Implications
- Capabilities
- Governance and Risks

Overview of Project Delivery Approaches

- What is a Delivery Method?
- Why are there so many?
- What distinguishes these methods and where used?

Type of Delivery Methods

- Design Bid Build (DBB)
- Design Build (DB)
  - DBM
  - DBOM
  - DBFOM
  - DBFM
- Construction Manager (CM)
  - CMR
  - CMA
- Integrated Project Delivery (IPD)

Considerations When Selecting PDM

- Cost and Life Cycle Costs / Issues
- Schedule
- Finance
- Risk Allocation and Management
- Complexity and Size of Project
- Capabilities – staff, organization, operational, technical
- Availability of Contractors / Competition
- Labor Unions / Regulations and Laws
- Stakeholders and Third-Party Involvement
- Maintainability
- Technology and Innovation

DBB

- **Benefits**
  - Widely accepted method of Project delivery and significant industry experience
  - Owner has greater control of requirements
  - Close consideration of community needs and constraints
- **Draw Backs**
  - Generally has limited ability to compress schedule
  - Design and Implementation Risks
  - Change order risk

DB

- **Benefits**
  - Provides opportunity for only prequalified teams to bid
  - Design and construction activities can over lap
  - Increased opportunities for innovation in design and construction
  - Less resource demand for project management
  - DB team takes majority of the risk
- **Drawbacks**
  - Special contract management skills required
  - If design definitions and requirements are not clearly specified or scope changes, can be costly and litigious.
  - Less control and ability to make continuous changes.

Trending of Delivery Methods

- Years of experience and maturity of agencies coupled with financial and schedule challenges have promoted various combination of delivery strategies such as DB, DBOM, DBM, DBMO, DBOMF
- Mature transit agencies, in the past decade, have been considering these methods as serious options to DBB
- These agencies have established standards for their facilities, systems, operational characteristics', criteria, and project requirements.
- Additionally, the Integrated Project Delivery method has begun to appear with the advent of new technologies such as BIM and web-based Project Management embracing systems engineering concepts

Projects in North America

- Hawaii - $5B - $1.2B DB Arial Guideway and Maintenance Facilities
- San Francisco BART - $1.4B – Warm Springs Extension – DB
- Los Angeles - $1.2B DB Expo LRT, $890M LRT Foothills Extension – DB (was DBF)
- Los Angeles – Crenshaw LRT - $1.7B DB
- Los Angeles – Regional Connector LRT - $1.2B – DB
- Other Los Angeles projects such as Westside Extension are under review

Projects in North America

- Denver – Fastracks - $6.9B combination of PPP (DBFOM), DB and DBB
- UTA - $7.2B – DB and DBB
- Washington Dulles Airport - $3B – HRT – DB
- NYC – MTACC - $18B – DBB (many negotiated, 2-step process)
- PATH - $3.9B – CMA
- Port Authority of New York New Jersey – Goethals Bridge - $2B – DBFOM
- Canada Line - $1.75B - DBFOM

General Recommendations – Delivery TTC Expansion Projects

- One-size possible but not most effective
- Phasing of schedule needed to address community impact and operational constraints
- Establish multiple contracts for in-line stations to minimize risk and attract competition
- Design-Build contracts to incorporate RFQ, RFP and BAFO
- All construction contracts irrespective of delivery methods must include all TTC requirements
- Interoperability and inter-changability requirements should be included in systems contracts with TTC concurrence

Comment on Alternative Financing

- Stated Advantages
  - Reduced cost and long-term cost certainty
  - Schedule
  - Better performance
- Uncertainties from Review
  - Cost of private sector v. government financing
  - Ability of private sector to achieve financing for large and long duration projects in which payment is reserved
  - Competition promise
  - Schedule represented seems unrealistic

Rationale for Not Addressing AF

- Case not made given uncertainties as discussed
- Schedule appears overly aggressive when considering the need to stage construction and time needed for commissioning especially for Eglinton line

Specific Recommendations - Delivery

- Eglinton Line
  - Apply Multiple Methods
    - Kennedy, Eglinton and Eglinton West use DBB
    - Tunneling DBB
    - Systems – use DB or variant
    - Maintenance facilities – DBM
    - In-line station multiple package contract awards (2-3)

Specific Recommendations Delivery

- **SRT – DBM**

Specific Recommendations - Delivery

- **Sheppard East LRT**
  - **ROW and in-line stations – DBM or DBB**
  - **Interchange station - DBB**
  - **Maintenance – DBM**

Specific Recommendations - Delivery

- Finch West LRT
  - ROW and stations – DBM or DBB
  - Maintenance – DBM

General Recommendations - Organization

- Organization
  - FTA Technical Capacity Assessment
  - Separate Integrated and Dedicated Organization focused only on this program.
  - Authority relationships of stakeholders need to be carefully established.
  - MOU amongst stakeholder for successful completion with agreed upon common goals.
  - TTC to have major influencing role and authority within organization at high level
  - From the organization establish PDM

Recommended Near-term Actions

- Agree on a Master Agreement
- Create Organization
- Establish Roles, Responsibilities and Authorities
- Define and Implement Policy and Procedures
- Identify and Involve Stakeholders
- Agree on delivery methods
- Agree on General Schedule

Thank you.

For additional information contact

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STAFF SUMMARY SHEET

#12

ENGINEERING, CONSTRUCTION AND EXPANSION GROUP

15533 CR

PREPARED BY: Anna Pace

SECTION: Strategic Partnerships

EXTENSION: 8112

HEAD: N/A

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CHIEF: Sameh Ghaly

COMMISSION REPORT: LRT PROJECTS IN TORONTO – PROJECT DELIVERY

#	ROUTING	CONCUR	NON-CONCUR	DATE	ATTACHMENT(S)
	CHIEF OPERATING OFFICER				Appendix 1 – 3
1	CHIEF CAPITAL OFFICER	✓		24/05/12	
3	CHIEF CUSTOMER OFFICER	✓		24/05/12	
	CHIEF FINANCIAL & ADMIN OFFICER				
	DEPUTY CHIEF OPERATING OFFICER				ACTION REQUIRED BY CHIEF EXECUTIVE OFFICER
	HEAD OF FINANCE				
	HEAD OF HUMAN RESOURCES				☐ SIGN AGREEMENT ☐ RECEIVE FOR INFORMATION ☐ APPROVE ☑ APPROVE FOR SUBMISSION TO COMMISSION ☐ APPROVE FOR SUBMISSION TO CHAIR
	HEAD OF M&P				
	HEAD OF LEGAL				
2	EXEC DIR CORP COMMUNICATIONS	✓		May/25/12	

SIGNATURE

25 May 2012
DATE