

**SOUTHWEST RAPID TRANSIT CORRIDOR – STAGE 1
TRANSITWAY TUNNEL AT CN RIVERS SUBDIVISION
MILEAGE 1.38 & ASSOCIATED WORKS**

BID OPPORTUNITY #577-2009

BIDDERS' CONFERENCE NOTES

DILLON FILE NO.: 08-8813 & 09-1915

DATE: October 16, 2009

TIME: 9:30 a.m.

LOCATION: Caboto Center
1055 Wilkes Avenue

PRESENT:

Study Team:

Randy Fingas	City of Winnipeg – Project Manger, Transit Department
Dave Krahn	Dillon Consulting Limited - Project Manager
Kevin Willis	Dillon Consulting Limited - Structural Designer
Rick Pidsadny	Dillon Consulting Limited - Roads/Drainage Designer
Tracey Kucheravy	Dillon Consulting Limited - Structural/Specification
Faris Khalil	AECOM - Geotechnical Engineer
Fred Kemp	AECOM - Structural Shoring Engineer
Steve Wiecek	W.L. Gibbons & Associates – Senior Geologic Eng.
Shane McCartney	CN
Tim Saunders	CN

Contractors:

See attached listing of attendees.

Item

Discussion

BC.1 Introduction:

- Dave Krahn introduced himself as Project Manager for the Transitway Tunnel at CN Rivers Subdivision Mileage 1.38 & Associated Works - Bid Opportunity #577-2009.
- Dave indicated that the intent of this Bidders' Conference is to provide information as it relates to the design of the shoring and tunnel for this project. No information provided at this meeting or in the meeting notes are intended to change any provisions of the Bid Opportunity. Any required changes will be explicitly changed through addenda.

BC.2 Overall Scope of BRT Transitway:

- Dave Krahn gave a brief explanation of the overall project for Stage 1 of the Southwest Rapid Transit Corridor Project from Queen Elizabeth Way to Jubilee Avenue.

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BC.3 Geotechnical Presentation by Faris Khalil - AECOM

- Faris provided a summary of the geotechnical and shoring issues for this project.
- The presentation was made via PowerPoint and has been uploaded onto the City Purchasing Department website along with these notes. It should be noted that the presentation is for information purposes only and that the information provided was used in the design; however, the Contractor is responsible for the interpretation and assessment.
- Faris was asked why tie-backs or ground anchors were not considered as part of the shoring design. Faris's explanation was as follows:
 1. There is limited local experience in design, construction and performance of tie backs/ground anchors.
 2. Soil Anchors: The overburden consists of ~14 m thick of firm to soft clay, which is not expected to mobilize adequate bond/resistance at an acceptable safety factor considering the loading anticipated from 10 m deep excavation and Cooper E90 railway loading. Also, performance issues are expected for anchors in clay due to creep (the clay has high liquid limit and high plasticity index which indicate high creep potential).
 3. Till Anchors: None to limited thickness (< 2.5 m) of soft/loose till was encountered. No sufficient bond length will be available and anchors embedded in till are not expected to develop the required resistance.
 4. Considering 2 and 3 above, the anchors need to be installed into the bedrock. The following are the main concerns for anchor installation in the bedrock :
 - a. The bedrock is known to be weathered with low RQD (RQD of 42% was encountered in the site); this indicates that deep coring and/or extensive grouting will be required.
 - b. Drilling difficulties may be encountered and bore casing is likely required.
 - c. The bedrock is confirmed to be under artesian pressure. Groundwater pressure and flow within rock fractures and weathered zones is likely to impact grouting process and may wash the grout during the installation of the anchors.
 - d. A complicated and costly technique may be required to overcome the issue of groundwater flow, which will require drilling a large diameter core into the bedrock and grout with special product "consolidation grout or quick set grout" and after certain curing time to re-drill cores into the grout, install the anchor and re-grout. This process is still considered as an emerging technology and to our knowledge will be the first time to be tried locally.
 5. Anchors need to be installed at a certain angle. Small angles anchor will have large horizontal component but it will be long to catch the bedrock. Anchors installed at steep angle will be shorter but has small horizontal component and thus more anchors will be required. The vertical component of the anchors will exert vertical loads on the shoring walls (the steeper the anchor angle, the more vertical load). The

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	piles need to be driven “into the weathered rock” to mobilize adequate axial capacity to resist these vertical loads. Driving large number of piles at close interval may introduce seepage paths along the piles (short term and long term) for groundwater from the bedrock aquifer.
6.	Considering the above challenges, the selection of design parameters and the definition of construction requirements likely require pre-design and pre-production programs to address the uncertainty involved.
7.	Anchors are typically subjected to proof test for each individual anchor, which is expected to be costly and time consuming.
8.	Installation of anchors that extend under third party properties will require specific permits and easement agreement.

BC.4 Shoring Presentation by Fred Kemp - AECOM

- Fred provided a summary for the design of the shoring for this project.
- The presentation was made via PowerPoint and has been uploaded onto the City Purchasing Department website along with these notes. It should be noted that the presentation is for information purposes only and that the information provided was used in the design; however, the Contractor is responsible for the interpretation and assessment.
- The following comments and questions were raised after Fred’s presentation:
 1. CN has been involved in the design of the shoring and has approved the shoring design that has been presented. An alternative shoring approach may be considered after tenders close. The Bidders must submit bids based on the shoring scheme presented in the Contract Drawings. CN would also have to review and approve any alternative proposals.
 2. *How would you remove the bracing when you backfill to the top of structure?* Backfill up to 1st brace, remove brace, and continue to next brace, etc. Top brace would be removed after wall has reached sufficient strength and waterproofing is complete.
 3. *What type of compressive forces will there be when dismantling?* Substantial forces are to be expected. Backfilling will help dissipate forces. This was also taken into account where slip joints were not used, only column connections. It was also noted that shimming and blocking is used between the horizontal waler and the soldier piles, which will make “freeing” up the bracing for removal a little easier.
 4. *Would the Project Administrator be open to a different designed joint?* Yes, but if there is a significant change to the shoring design, CN will need to review design and approve it.
 5. *Has this shoring been used before?* Yes, similar to bridge cofferdam construction.
 6. *Why is the shoring galvanized?* Shoring is not galvanized; structural steel within tunnel structure is.

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7.	<i>Can the storm sewer be moved, as installing the sewer on a curve may be difficult?</i> There are some minor alignment changes that can be accommodated; however, the land drainage sewer alignment is to be located between the middle and outside shoring piles.
8.	<i>Have all of the construction easements been secured?</i> All but Quintex has been secured.
9.	<i>At the interface between Stage 1 & Stage 2 of the shoring works, is there an interior headwall?</i> At the top there is an upstand retaining wall on the tunnel roof to support backfill and lateral train loads. Below that the interface sheet pile wall does the job of retaining the fill until it is excavated during the stage 2 cofferdam work. The stage 1 internal bracing that is now locked into the concrete tunnel construction within the cofferdam supports this interface sheet pile wall. The section itself would be able to take the loads and to clarify all bracing and cross bracing needs to remain in structure.

BC.5 Tunnel Presentation by Kevin Willis – Dillon Consulting Limited

- Kevin provided a summary for the tunnel design for this project.
- The presentation was made using Contract Drawings and highlighting and clarifying various critical construction procedures.
- A copy of Kevin's summary notes, as well as the drawings shown at the presentation, has been uploaded onto the City Purchasing Department website along with these notes.
- The following comments and clarifications were noted after Kevin's presentation.
 1. Specify connections between Stage 1 and Stage 2: Some base slab and roof slab bars require mechanical couplers as shown on the drawings. Walls require only lap splices.
 2. *At the Tunnel, do the concrete pours have to be alternating?* No, tunnel segments can be poured sequentially. Retaining walls do have a requirement for alternating pours, however.
 3. Substitutions are possible but need approval by Contract Administrator.

BC.6 Depressurization Comments Provided by Steve Wiecek - W.L. Gibbons & Associates

- Steve provided the following comments regarding the groundwater depressurization:
 1. The Contractor will be required to install, operate and decommission a groundwater depressurization system to lower groundwater pressures in the bedrock aquifer to protect against hydraulic fracturing, improve stability, and prevent excessive seepage at the base of the excavation for the tunnel.
 2. The hydrogeologic characteristics of the bedrock aquifer at this site require that the groundwater depressurization wells be put in close proximity to the excavation to maximize the depressurization effect. In order to avoid interference with the Contractors' works, the installation of the groundwater depressurization wells by the

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	<p>Owner has been deferred until the contractor has completed sufficient site preparation to allow access for the drilling equipment and has laid out the proposed works. The location of the groundwater depressurization wells will be determined in consultation with the Contractor, who will be required to approve the locations relative to potential interference with his works. Tentatively, the area between the tunnel shoring and the crane pad is being considered as a location for the wells.</p> <ol style="list-style-type: none"><li data-bbox="358 554 1406 800">3. Up to eight (8) additional wells (combined for Stages 1 and 2) will be installed by the Owner. The wells will consist of nominal 125 mm diameter PVC casing installed to bedrock, followed by an open bedrock hole. Once the installation and testing of the wells is completed by the Owner, the wells will be turned over for use by the contractor for groundwater depressurization. Well capacities of 1.5 litres per second are expected, but capacities of up to 7.6 litres per second may be achieved on some wells.<li data-bbox="358 821 1406 919">4. The contractor will be required to provide access for the drill rig and service vehicle, remove the drill cuttings, and provide drainage for any water generated during the drilling and testing program.<li data-bbox="358 940 1406 1039">5. Discharge from the groundwater depressurization system will be to an approved location determined by the Contractor as part of his site Water Management Plan (Specification Section D.14).

BC.7 Additional Comments Regarding Schedule

- The 2 ½ months and 2 month window in the schedule for track relocation was questioned. These dates are based on the time required to relocate the tracks before freeze up and to relocate the remaining CN utilities. CN confirmed that the October dates are firm. Dillon to check whether there is any flexibility in these dates and get back to the Contractors if a tighter time frame is available. If no response is received, Contractors to assume that the tender time frames govern.
- A flagman will be supplied by the City of Winnipeg through CN and will be available ten hours a day, six days a week.
- If schedule supports an additional flagman, CN may accommodate but needs a minimum two months notice to bulletin for another position.

These notes were recorded by Tracey Kucheravy. Any errors or omissions should be reported to Dillon Consulting Limited immediately.

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Non-Mandatory Bidders' Conference
Caboto Centre, 1055 Wilkes Avenue
Friday, October 16th - 9:30 a.m.

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