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Subject: CH009 Bid Schedule
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CH009 Bid Comments.docx



CH009 Bidder Comparison.xlsx

John asked me to have another look at the CH0009 bidders schedules, and do some analysis and notes.

Attached are what I have done this morning. Note that the Excel sheet was to try and cut through some of the complexity of the schedule layouts and to help with the review.

Tony

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CH0009 Dragados-O'Connolls (B3) vs Bernard-Pennecon (B2)**B2**

- Schedule generally done on a 6day per week calendar. This permits a 1d/wk buffer
- Includes a 4d per month weather allowance
- Schedule indicates working between beginning of May and end of October
- Intends to use a double lane bridge without pier
- Has a full cofferdam construction duration of 120d (including starter groins). Factoring for the days/week calendar this is a 20 week duration.
- Duration for cofferdam completion (post-starter groins) is 75d. Starts 10-Aug; finishes 24-Oct (note – period from 15Jul to 10-Aug is removal of cofferdams and watering-up of spillway)
- RCC Construction duration of 143d
- RCC construction using trucks

B3

- Schedule generally done on a 7day per week calendar
- No noted weather allowance
- Schedule indicates (generally) working between the period of beginning of May to Mid-December
- Intends to us a single land bridge with a pier
- Has to remove bridge pier post water-up
- Has a full cofferdam construction duration of 147d (including starter groins). Factoring for the days/week calendar this is a 21 week duration. Bidder notes that if volume reduction assumption is wrong, could add one week
- Duration for cofferdam completion (post-starter groins) is 98d. Starts 25-July; Finishes 31-Oct (Note, period between 15-July and 25-July is cofferdam removal. Schedule driver for 25-Jul is not immediately clear, but *appears* to be the ongoing removal of the cofferdam 1 (which is not fully removed prior to starting the cofferdam construction)
- RCC Construction duration of approx. 152d (to El 39m, excludes other portions of structure (CVC)
- Rcc placement using boom. Dam sectioned into two parts

Summary:

- B2 schedule is simpler
- B3 Schedule appears to more appropriately model some of the anticipated conditions as will occur (still removing cofferdams while starting main cofferdam). B2 Schedule has some opportunity for improvement in overlapping some of these activities
- B3 has a bridge pier to install and remove, and a single lane bridge (possibly a bottleneck).
- B2 using double lane bridge
- B2 has several potential buffers built in – scheduled on a 6d week, 4 weather day per month allowance, opportunity to overlap work that hasn't been planned that way, can extend working

season beyond end October. B3 has little potential buffer other than extending from 10h to 11 or 12h shifts. Other opportunities may be possible but are not apparent.

- B2 Schedule indicates not meeting milestone for completion of RCC dam. However, there are opportunities to adjust the critical dam works by: (Note that portions of the North Dam are required for the nominal impoundment timeline in late 2017, but other parts of the dam (ogee, flip bucket) could be completed after impoundment. Additionally, given the apparent schedule slippage within the CH0007 package, it is likely that impoundment by the end of 2017 will not be achieved
 - o Working foundation preparation through the winter using localized protection
 - o Overlapping dental concrete activity with foundation preparation activity
 - o Overlapping the start of RCC placement with levelling concrete activity (limited opportunity)
 - o Working slightly later into the Winter period

B2 schedule indicates non-compliance with milestones. However the milestone is likely unrealistic due to other project conditions. Unclear if B2 fully understood the modified milestones or not. B2 schedule indicates ability to meet critical portion of the North Dam completion milestone for impoundment with minor modifications.

B3 Schedule indicates ability to meet milestones, but has little apparent buffer (possibly built into activity durations and not transparent).

At face value, B2 schedule appears to have greater flexibility, even though it presents as non-compliant.

PENNECON

Cofferdam Construction

	<u>Start</u>	<u>Finish</u>	<u>Duration</u>	<u>Notes</u>
Starter Groins	10-Oct-15	24-Nov-15	45	
Remaining Groins (El 17m)	10-Aug-16	13-Sep-16	34	
Fill Between Groins	27-Aug-16	24-Sep-16	28	
Time to close river after starter groins (El 17m)	10-Aug-16	24-Sep-16	45	Summary of rock + fill
Complete Cofferdam to El 25m	26-Sep-16	24-Oct-16	28	
Time to full Cofferdam after Starter Groins	10-Aug-16	24-Oct-16	75	Summary of everything after starter

Total Duration

120

Material Volume	568290	All Materials, Includes Starter Groins	ROUGH
Volume Per Day	4735.75		ROUGH

Bridge & Ramp

Award, Design, Fabricate & Deliver Bridge (70d)	15-Jul-15	5-Oct-15	82	Using 6 Day week in Schedule
Build Bridge Abutments (20d)	9-Nov-15	2-Dec-15	23	Partially depends upon Groins
Install Bridge (40d)	2-May-16	16-Jun-16	45	
Available Time to Build Ramp to groins (Not in sched	17-Jun-16	9-Aug-16	53	Could be "float"

RCC DAM

Foundation (Preliminary) (25d)	26-Sep-16	24-Oct-16	28	After diversion, before winter
Foundation (Final) (15d)	1-May-17	18-May-17	17	After Winter Could work through winter with localized protection
Foundation (Duration Summary)			45	
Levelling Concrete (25d)	18-May-17	16-Jun-17	29	Using RCC Trucks. 6d week. Could be partially overlapped with foundations Winter no work. 6d/wk calendar. 1 week in 2018 could be solved with use of different calendar or overlapping foundations and levelling concrete
RCC Placement (125d) to El 37m	16-Jun-17	9-May-18	327	
Duration w/o winter	16-Jun-17	31-Oct-17	143	

Execution Notes

Double Lane Bridge
 GENERALLY Scheduled using 6 day week
 Allowing 4 weather days per month
 Plans to stop work at End October, restart work 01-May (6months per year working)

O'Connell's

Cofferdam Construction

	<u>Start</u>	<u>Finish</u>	<u>Duration</u>	<u>Notes</u>
Starter Groins	14-Sep-15	2-Nov-15	49	
Remaining Groins (El 17m)	25-Jul-16	28-Aug-16	34	
Fill Between Groins	22-Aug-16	2-Oct-16	41	
Time to close river after starter groins (El 17m)	25-Jul-16	2-Oct-16	69	Summary of rock + fill
Complete Cofferdam to El 25m	3-Oct-16	31-Oct-16	28	
Time to full Cofferdam after Starter Groins	25-Jul-16	31-Oct-16	98	Summary of everything after starter

Total Duration

147

Material Volume	568290	All Materials, Includes Starter Groins	ROUGH
Volume Per Day	3865.918		ROUGH

Bridge & Pier

Tender (2w)	4-Aug-15	17-Aug-15	13	
Engineer Bridge & Pier (6w)	18-Aug-15	28-Sep-15	41	
Approve Bridge/Pier (3w)	29-Sep-15	19-Oct-15	20	
Fab/Deliver Pier (10w)	20-Oct-15	11-Jan-16	83	Includes Holidays
Fab/Deliver Bridge (20w)	20-Oct-15	21-Mar-16	153	Includes Holidays
Build Ramp (4w)	28-Mar-16	24-Apr-16	27	
Install Pier (6w)	28-Mar-16	8-May-16	41	
Install Bridge (8w)	25-Apr-16	19-Jun-16	55	
Time to Build Ramp from Bridge (NOT IN SCHEDULE	20-Jun-16	24-Jul-16	34	Could be "Float"

RCC DAM

Foundation Prep (6w)	19-Sep-16	30-Oct-16	41
Levelling Concrete (4w)	3-Oct-16	30-Oct-16	27
RCC Placement (mult activity)	2-May-17	1-Oct-17	152 To El 39m
RCC Volume	200738		
RCC Daily Placement Rate (to 39m)	1,321		

Execution Notes

Single Lane Bridge

Two hauling fleets planned

Assumed that qty of Class 2 rocks is 0.5x that in tender. If not the case need an extra week

Plan to haul across bridge in 40t articulated trucks or 35t Rigid trucks

Mitigation to extend 10h shifts to 11 or 12h shifts (Equipment downtime for maintenance & refueling?)

Plan to stockpile materials (rocks) along river. Initially 45,000m³. Currently "as much as possible", but indicates that no stockpiling is required

Scheduled using 7d week

Plans to start work end march, Stop Work in Dec (depends upon work) ~8 months/year working