1.0 Bidder must provide an execution plan for the Work. The plan should provide sufficient detail to enable Company to assess Bidder's understanding of the Work, evaluate Bidder's approach, commitment and ability to execute the Work and demonstrate Bidder's ability to meet Company's schedule. Bidder shall provide an execution plan that outlines its proposed method for executing the Work including, at a minimum:

The joint venture of Aecon-Flatiron-Barnard JV ("AFB JV") is fully prepared to begin work on the complexities posed by the Muskrat Falls Project for Nalcor and is committed to its successful completion. In the months spent as a Team developing this approach to work and the bid submitted with this document, our Team has assessed and addressed every aspect of the multi-faceted Project. Our approach to the work is detailed in this Appendix A13. Much of what is reported herein has also been conveyed in Appendix A1 Technical Requirements.

Mobilization/Demobilization Plan

Mobilization

ABF JV realizes that winter weather sets in quickly in Goose Bay, producing very cold temperatures and large volumes of snow. Currently, Award of the Project is scheduled for July 31, 2013. Mobilization will need to occur immediately following Award, as it is critical to the Project's success to utilize the Goose Bay Port in the first season.

As this Project has numerous critical milestone dates, AFB JV will require an early Limited Notice to Proceed. The early Notice to Proceed will be essential to the Project's success as there are several long-lead items that will need to be purchased far in advance of construction. In addition to purchasing the long-lead items, work on the hoarding structures, and crushing and batch plants will have to start immediately following Award.

Due to the Project's remote location, logistics for materials and equipment mobilization will be challenging. The scale and complexity of the Muskrat Falls Project will require several months to procure the equipment and materials that will be needed early on. These materials must then be transported via over-the-highway trucks to various port facilities where they can be containerized and shipped via barge to the port at Goose Bay. The Goose Bay Port is only accessible from April through December because the navigable waters freeze during the winter months. AFB JV prefers to ship materials and equipment to Goose Bay via barge because it is the most cost-effective way to transport materials to the remote project location. One barge can transport up to 250 truckloads of material. Any delay in Project Award or Notice to Proceed would result in significant cost and schedule impacts to the Project as materials and equipment that would have been efficiently transported via barge in summer months would now have to make the journey to the job site via thousands of additional trips by over-the-road trucks during winter months.

Among the materials to be shipped are the temporary structures for the spillway and powerhouse. The Project's Critical Path depends on the installation of these temporary structures to allow the construction of permanent works to continue during Labrador's harsh winters. Any delay in shipping these structures could potentially cause a full year's delay in the Project.

Although the logistics associated with the mobilization and demobilization of materials and equipment present the highest degree of complexity, the effort associated with housing and transporting approximately 1,675 people who will form the core of the Project will be no small task. It will be critical for AFB JV, Nalcor and SNC-Lavalin to work closely to manage the large scale of manpower required for the construction of such a complex project. AFB JV will have personnel dedicated to human resources and logistics associated with the movement and rotation of crews. It will be critical to the Project's success that qualified personnel

are available for its construction. The quality and dedication of Project personnel are the controlling factors for Project success.

Demobilization

While the Project is scheduled to reach substantial completion on June 29, 2018, as components of the project become complete, such as the spillway, demobilization from these work areas will commence in 2016. Knowing that the Project's labour costs will be significant, AFB JV will look to aggressively downsize the number of crews on-site as work is completed. With substantial completion slated to fall in the summer months, AFB JV plans to utilize cost-effective barge transport to demobilize from the Project.

List of subcontractors and their respective scopes of work

AFB JV intends to subcontract the following scopes of work as they require unique expertise. We have pre-qualified the following subcontractors to perform the works associated with the Project. Final decisions on selected subcontractors will take place after the Project Award through cost-benefit analysis and the negotiation process to deliver cost-effective service to the Project.

Scope of Work	Prequalified Subcontractors
Supply and Install Rebar	AGF
Supply and Install Structural Steel	Supermetal
Manufacture and Supply of On-site Concrete	Capital Ready Mix or Labrador Ready Mix
Production of Coarse and Fine Aggregates	Capital Ready Mix or Labrador Ready Mix
Grouting	Geo-foundation
Architectural, Metal Cladding and Roofing	Markland McCarthy Asselin Industrial
Electrical	Cahill Pennecon
Mechanical	Black and MacDonald
Temporary Shelter	Canam
Miscellaneous Metals and Embeds	Supermetal

List and details of all equipment required and list of proposed stand-by equipment

AFB JV has carefully considered the equipment required to undertake the Project's scope of work. We have the in-house capacity as well as excellent relationships with equipment suppliers to deliver the required equipment in a timely fashion to the Project. Details regarding the mobilization, use and maintenance of this equipment have been included in Appendix A1 as well as in this Appendix A13.

Where any equipment make and model numbers are specified, these are shown for illustrative purposes only and subject to final selection on site.

Concrete will be delivered from the concrete plant to the site by ready-mix trucks with insulated drums of 8 to 11 m3. The concrete will be placed by different methods depending on the pour size and placement location. Most of the concrete in the powerhouse and intake will be pumped using a stationary concrete pump (Putzmeister BSA 2109) and poured through a placing boom (Putzmeister 28 m). The placing booms will be strategically located to provide sufficient coverage in the powerhouse and intake. The concrete in the spillway and transition dams will be placed using pump trucks (Putzmeister 47 or 56 m) and telebelt trucks (Putzmeister TB130). Concrete buckets (3 to 6 m3) will be available for special situations or as a backup plan when equipment breaks down.

Hoisting onsite will be undertaken using a variety of tower and crawler cranes. Inside the temporary structures, we will use overhead bridge cranes for hoisting. RT and hydraulic truck cranes will be used around the site for material handling.

Material transport on-site will be done using semi-trucks/trailers, pickup trucks/trailers, and boom trucks. A variety of forklifts and cranes will be used to load and offload.

Snow removal will be accomplished with dump trucks equipped with plows and sanders. Motor graders (14M) and loaders (966) will also assist with snow removal. During the summer months, this equipment will be used to maintain the access roads.

The following is a current listing of the equipment AFB JV plans to use to construct the Muskrat Falls Project. The equipment list provided includes back-up/stand-by equipment to ensure the construction progress will not be interrupted in case of equipment failure.

Equipment	Quantity	Capacity	Manufacturer	Model
Lifting and Handling Equipment				
Tower Crane	2	3-24 ton	KROLL	K-620
Overhead Crane	16	10 tons	Protech	PH-10
Harbour Crane - Mobile 100 tonne	1	100 tonne	Gottwald	H280E
All-terrain hydraulic	1	500 tns +	Terex-Demag	AC500
Truck - Hydraulic telescopic crane	2	45 tns	GROVE	TMS 745
RT Crane - Hydraulic telescopic	2	130 tons	TEREX	RT130
RT Crane - Hydraulic telescopic	2	80 tons	TEREX	RT780
Crawler - Lattice boom	1	400 tons	Liebherr	LR1400-2

Equipment	Quantity	Capacity	Manufacturer	Model
Telehandler - Hydraulic telescopic	9	5000kgs	SKYTRACK	100-54
Telehandler - Hydraulic telescopic	2	4500kgs	MERLO	ROTO 45.21 MCSS
Manlift - Hydraulic telescopic	3	150 feet	JLG	JLG 150HAX
Manlift - Hydraulic telescopic	5	80 feet	GENIE	S-80X
Manlift - Hydraulic telescopic	2	60 feet	GENIE	Z-60/34
Scissorlift	3	56 feet	SKYJACK	SJ9250
Forklift	1	80000lbs	Taylor	
Reach Stacker	1	99000lbs	Taylor	TS9972
Earthwork and Road Equipment				
Loader	3	2.5-9.2v³	CAT	950K
Loader	2	2.5-9.2v³	CAT	966K
Truck - articulated 30 ton	2	30 ton	CAT	730
Excavator	1	36 ton	CAT	336E
Excavator	1	14 ton	CAT	314E CR
Excavator	1	8 ton	CAT	308E2 CR
Excavator	1	3.5 ton	CAT	303.5E CR
Excavator	1	2.7 ton	CAT	302.7D CR
Excavator	1	1.7 ton	CAT	301.7D
Excavator	1	0.9 ton	CAT	300.9D
Bulldozer	1	VPAT	CAT	D6K2
Bulldozer	1	VPAT	CAT	D5K2
Bulldozer	1	VPAT	CAT	D4K2
Compactor	1		Other	CS-563
Drill	1		Other	2-4"
Backhoe-loader mini	3	0.3 m³	CAT	908
Backhoe-loader	1	54" forks	CAT	430F IT
Grader	2		CAT	14M
Snow Removal and Agricultural Equipment				
Tractor - Agricultural	1		Kubota	L5740
Tractor - Agricultural	1		Kubota	M108X
Tractor - Agricultural	1		Kubota	L3710
Trucks – On-Highway				
Truck- TA Snowplow/sander	2	46000lbs	International	
Truck- TA Snowplow/sander	1	46000lbs	International	2654
Truck - TA Tractor/wetline	1	46000lbs	Sterling	LT9000
Truck - TA Tractor/wetline	1	46000lbs	Kenworth	T800

Equipment	Quantity	Capacity	Manufacturer	Model
Truck - TA Ultralight Tractor	8	40000lbs	Mack	CXU-613
Truck - TA Fuel	2	20000 lts		
Truck - TA Lube/fuel	1	20000 lts		
Truck - TA Vacuum 5000 gallons	1	5000 gals	Peterbilt	379
Truck - TA water tanker/sprayer	2	4000 gal	International	Durastar
Truck - TA Dumper	2	15 ton	International	7600
Truck - TA COE tow/service truck	1	40000lbs	Freightliner	COE
Truck - SA Snowplow /sander	1	23000lbs	FORD	F800
Truck - SA mechanic/lube body	1		FORD	F750
Truck - SA mechanic body	2		International	
Truck - SA 21 foot box	1	20000lbs	Sterling	Acterra
Truck - SA 12 foot dumper	1	12' dumper	FORD	F750
Bus - SA 15 passenger Mini	1	15	Chevrolet	3500LT
Bus - SA 18 passenger Mini	3	18	Blue Bird	Diesel 2013
Bus - SA 48 passenger School	10	48	Blue Bird	Vision S2014
Truck - SA 65 foot Cherry picker	1	1 bucket	International	4700
Truck - SA Cube cutaway	2	16 feet	FORD	E350
Truck - SA COE box	2	16 feet	International	CF500/600
Truck - SA 14 foot stakebed	2		FORD	F550
Truck - SA 16 foot box	3		FORD	F550
Truck - SA flatdeck	2	12'bed	FORD	F550
Truck - SA cube 18'	4	18'	FORD	F550
Trailers				
Trailer - Container single	12		Max-Atlas	CC-3240-3S-00
Trailer - Triaxle flatbed	6		VARIOUS	48-53ft
Trailer - Dropdeck 2-axle	2	25 ton	Reitnouer	
Trailer - Kingpin triaxle singles	2	12 ton	Load-King	18+5 feet
Trailer - Tanker triaxle	1	50000 litres	RemTec	6 compartment
Trailer - Tanker triaxle 26 foot	2	30000litre	Hutchinson	3 compartment
Trailer - Tag-along 3 axle	2	30 ton	Big Iron	Tag-along
Trailer - Sliding lowbed 3-axle	1	50 ton	Big Iron	Sliding axle
Trailer - Lowboy 3+1	1	50 ton	Siebert	3+1
Tanks, Rolloff and Containers				
Truck - TA cab/chassis for Rolloff	2	46000lbs		Kenworth T440
Roll off system	2	24 feet	Roll Off	FT-60-24-12-B
Roll off platform	1	24 feet	LAURIN	
Roll off containers	6	40 yards	LAURIN	

Equipment	Quantity	Capacity	Manufacturer	Model
Roll off containers	4	20 yards	LAURIN	
Roll off - water tank	1	25000 lts	LAURIN	
Roll off - Vacuum tank	1	11000 lts	LAURIN	
Tank - Used oil	1	20000 lts	Granby	
Tank double with frame - Fuel	6	50000 lts	Granby	
Tank - Water	3	50000 lts	Granby	
Tank - Water	3	4500 lts	Granby	single wall
Tank - Fuel	3	4500 lts	Granby	double wall
Container ISO 20 foot for transport	300	20CSTD	Various	20 foot
Container ISO 40 foot for transport	200	40STD	Various	40 foot
Container ISO 53 foot for transport	50	53STD	Various	53 foot
Light Vehicles and Buses				
SUV - Large	5		FORD	Expedition
SUV - Mid size	10		FORD	Explorer
SUV - Small	35		FORD	Escape
Pickup Truck - regular cab	35	1/2 ton	FORD	F150 RC
Pickup Truck - extended cab	50	1/2 ton	FORD	F150 KC
Pickup Truck 4 door	10	1/2 ton	FORD	F150 CC
Pickup Truck 4 door	5	3/4 ton	FORD	F250 CC
Pickup Truck 4 door	2	1 ton	FORD	F350 CC
Pickup Services 4 doors 4x4	1	3/4 ton	FORD	F250
Pickup Services 2 doors 4x4	2	1/2 ton	FORD	F150
Truck - Services Van 2500/3500	2	1/2 ton	FORD	E150
Van	3	1 ton	FORD	E-350
ATV	3	side by side	KUBOTA	RTV1100
ATV	2	side by side	KUBOTA	RTV500
Concrete Equipment				
Truck - Telebelt	1	130 feet	Putzmeister	TB130
Pump - Concrete - Diesel	1	95 m^3/h	Putzmeister	BSA 2109 HD
Pump - Concrete - Electricity	2	85 m^3/h	Putzmeister	BSA 2109 HE
Pump truck - Concrete	1	31 meter	Putzmeister	BSF 31Z
Pump truck - Concrete	1	47 meter	Putzmeister	BSF 47Z
Pump truck - Concrete	1	56 meter	Putzmeister	M56 Z
Placing Boom	4	28 meter	Putzmeister	MXR/28Z-150
Placing Boom - 3m tower PIN	8	3 meters	Putzmeister	MXR system
Placing Boom - 6m tower PIN	4	6 meters	Putzmeister	MXR system
Placing Boom - work platform	4		Putzmeister	MXR system

Equipment	Quantity	Capacity	Manufacturer	Model
Foundation anchors -towers 24m	8		Putzmeister	MXR system
Concrete Buckets - Lot	1		Gar-Bro	
Screed units - Lot	1		Various	
Maxcrete 10 m³ w/ Elec/Hyd unit	2	REMIX	Maxon	
Excavator - mini w/ 6 inch vibrator	3	7.8 ton	CAT	307
Hydroblaster 30 gpm @ 10000psi	2		Gardner-Denver	
Dewatering Pumps				
Submersible/starter/pres.syst.	2	6"/50hp	GRUNDFOS	230S500-14
Submersible/starter/pres.syst.	2	6"/20 hp	GRUNDFOS	150s200-10
Submersible 2"	2	1.5 hp 120v	GORMANN-RUPP	830646
Submersible 3"	2	3 hp 220v	TSURUMI	NK2-22 Hi-head
Submersible 3"	2	3 hp 220v	TSURUMI	NK2-22L hi-vol
Submersible 3"/starter	3	5 hp 600v	GORMANN-RUPP	S3A1
Submersible 4"/starter	2	10 hp 600v	GORMANN-RUPP	S4C1-E10
Submersible 8"/starter	1	95 hp 600v	GORMANN-RUPP	S8A1
GAS PUMP 2"	4	5.5hp honda	TSURUMI	EPT3-50HA
GAS PUMP 3"	4	8.0hp honda	TSURUMI	EPT3-80HA
GAS PUMP 4"	4	11 hp honda	TSURUMI	EPT3-100HA
Diesel pump 4"	1		GORMANN-RUPP	T4A60S
Diesel pump 6"	1	TRASH	TSURUMI	EPT3-150YD
Compressed Air (Fuel included)				
Compressor/air dryers	3	200 HP	Ingersol Rand	HP915WCU-T3
Compressor/air dryers	2	100 HP	Ingersol Rand	IRR75I125A6NLZ
Compressor - diesel	2	375 CFM	SULLAIR	375JD
Compressor - diesel	4	185 CFM	SULLAIR	185DPQJD
Power and Light (Fuel included)				
Tower Light	20	6 kw	Magnum	MLT3060
Tower Light	2	20 kw	DOOSAN	L20
Generator set	11	500 kw	GAL	
Generator set	1	300 kw	GAL	
Generator set	1	100 kW	MQ Power	DCA125USI
Generator set	1	56 kW	MQ Power	DCA70USI
Generator set	2	36 kw	MQ Power	DCA45USI

Equipment	Quantity	Capacity	Manufacturer	Model
Generator set	2	25 kW	DOOSAN	DOG25WMI
Heating (Fuel included)				
Forced-air oil furnace	8	4M Mbtu	Pyro Air	
Forced-air oil furnace	8	2M Mbtu	Pyro Air	
Portable construction oil heater	20	350000 Btu	Cochon	
Ground heater	2	385000 Btu	Wacker-Neuson	E3000
Oil furnace w/Riello F5N0-85 burner	40	139000 Btu	CONFORTO	KHM-140

Figure 1: Proposed Project Equipment List

Construction execution philosophy including: a construction schedule with overview of powerhouse, spillway and transition dams including as a minimum the weekly concreting progress by structure with reference and alignment to Milestones and interfaces as presented in Appendix A9.

AFB JV has modeled several scheduling scenarios to achieve the optimum methodology and sequencing of work activities that would result in a challenging and realistic project schedule that we can execute on-time and on-budget. Our execution philosophy is based on working under a large heated hoarding structure at each of the spillway, intake and powerhouse sites to minimize impact from inclement/harsh weather and, thus, have better control of our workforce's productivity. This philosophy has allowed our Team to develop the schedule based on maximizing concurrent activities, minimizing the number of activities on the Critical Path, and utilizing the historical information and experience we developed on previous similar projects to estimate the duration of the Project activities. AFB JV utilized the temporary hoarding strategy for the spillway and powerhouse to optimize the time available to work at these sites during all seasons and 24-hours a day. The utilization of overhead cranes in the hoarding plan adds additional capacity and addresses what is usually the limiting factor on a project of this kind.

Based on the optimization of work activities, AFB JV commits to meeting all Milestones and Interface dates, as shown in the table below included in Appendix A13– Attachment 1 (Milestone Dates).

Nalcor Schedule		Milestones with LD's	Addendum 8		
		Late Activities	Addendum 12		ABF JV
Milestones	Interface	Activity Name	Start	Finish	Finish
		505573.CH0007.2 INTERFACE AND MILESTONE SCHEDULE			
		505573.CH0007.2.1 General			
M0		M0 - Tender submission		09-Apr-13*	
M1		M1 - Contract Award	31-Jul-13*		
M2		M2 - Substantial Completion of the Work		30-Jun-18*	
		505573.CH0007.2.2 Spillway, North transition Dam, Separation Wall and Center Transition Dam			
	I1	I1 - Spillway Site Ready for Start of Works	11-Nov-13*		
M4		M4 -Spillway and Related Works required for Diversion, R. for SoW for CH0032 (hydro-mechanical) *		15-Feb-15	
		North Transition Dam			16-Dec-14
		Spillway Bridge			15-Feb-15
		Spillway Platform			24-Aug-14
		Centre transition Dam - 1			24-Nov-14
		Separation Wall - 1			01-Jun-14
		Separation Wall - 2			14-Feb-15
	I2	I2 - Bay No.1 Available for Start of Rollway Construction	04-Oct-16*		
M12		M12 - Bay No.1 Rollway Construction Completed and R. for SoW for CH0032		13-Mar-17*	13/Nov/16
	I3	I3 - Bay No. 2 & 4 Available for Start of Rollway Construction.	06-Nov-17*		
M13		M13 - Bay No.2 & 4 Rollway Construction Completed and R. for SoW for CH0032		17-Mar-18*	26/Feb/18
	I4	I4 - Bay No. 3 & 5 Available for Start of Rollway Construction.	31-May-17*		
M14		M14 - Bay No.3 & 5 Rollway Construction Complete and R. for SoW CH0032		19-Sep-17*	11/Aug/17
M16A		M16A - Completion of Phase 2 of Spillway Discharge Channel Lining.		29-Sep-18*	29/Sep/18
		505573.CH0007.2.3 Powerhouse			
	I7	I7 - Powerhouse Site Ready for Start of Works	04-Nov-13*		
M18		M18 - South Service Bay Enclosed and High Bay Lighting Installed and R. for SoW by Company Other Contractors.		30-Apr-15	28/Mar/15
M22		M22 - Unit 1 - Ready for installation of Draft Tube Cone by CH0030		28-Mar-16	16/Oct/15
	I8	I8 - Unit 1 - Installation of Draft Tube Cone, Completed by CH0030	23-Apr-16*		
M23		M23 - Unit 1 - Ready for installation of Stay Ring & Upper Pit liner by CH0030		22-May-16	10/May/16
	I9	I9 - Unit 1 - Installation of Stay Ring & Upper Pit liner, Completed by CH0030	22-Jul-16*		
M24		M24 - Unit 1 - Generator Floor Completed, including Pit Free for Unit 1.		30-Nov-16	9/Nov/16
M26		M26 - Unit 1 - Building Enclosed, R. for SoW by Others		30-Sep-15	27/Sep/15
M28		M28 - Unit 1 - Intake Structure Completed and R. for SoW by CH0032		31-Mar-16	30/Mar/16
M30		M30 - Unit 2 - Ready for installation of Draft Tube Cone by CH0030		4-May-16	19/Jan/16
	I10	I10 - Unit 2 - Installation of Draft Tube Cone, Completed by CH0030	30-May-16*		
M31		M31 - Unit 2 - Ready for installation of Stay Ring & Upper Pit liner by CH0030		27-Jun-16	14/Jun/16
	I11	I11 - Unit 2 - Installation of Stay Ring & Upper Pit liner, Completed by CH0030	31-Aug-16*		
M32		M32 - Unit 2 - Generator Floor Completed		11-Jan-17	9/Dec/16
M34		M34 - Unit 2 - Building Enclosed and High bay Lighting installed, R. for SoW by Other Contractors		11-Nov-15	10/Nov/15
M36		M36 - Unit 2 - Intake Structure Completed and R. for SoW of hydro-mechanical by Other contractor (CH0032)		29-Jun-16	16/Jun/16
M38		M38 - Unit 3 - Ready for installation of Draft Tube Cone by CH0030		10-Jun-16	23/Feb/16
	I12	I12- Unit 3 - Installation of Draft Tube Cone, Completed by CH0030	06-Jul-16*		
M39		M39 - Unit 3 - Ready for installation of Stay Ring & Upper Pit liner by CH0030		3-Aug-16	24/Jul/16
	I13	I13 - Unit 3 - Installation of Stay Ring & Upper Pit liner, Completed by CH0030	09-Oct-16*	09-Oct-16*	
M40		M40 - Unit 3 – Generator Floor Completed, including Pit Free for Unit 3		5-Mar-17	4/Mar/17
M42		M42 - Unit 3 - Building Enclosed, R. for SoW by Others		20-Jan-16	18/Jan/16
M44		M44 - Unit 3 - Intake Structure Completed and R. for SoW by CH0032		27-Sep-16	20/Jul/16
M46		M46 - Unit 4 - Ready for installation of Draft Tube Cone by CH0030		19-Jul-16	2/Jun/16
	I14	I14 - Unit 4 - Installation of Draft Tube Cone, Completed by CH0030	14-Aug-16*		
M47		M47 - Unit 4 - Ready for installation of Stay Ring & Upper Pit liner by CH0030		10-Sep-16	9/Sep/16
	I15	I15 - Unit 4 - Installation of Stay Ring & Upper Pit liner, Completed by CH0030	08-Nov-16*		
M48		M48 - Unit 4 - Generator Floor Completed		27-Apr-17	5/Apr/17
M50		M50 - Unit 4 - Building Enclosed, R. for SoW by Others		2-Mar-16	27/Feb/16
M52		M52 - Unit 4 - Intake Structure Completed and R. for SoW by CH0032		23-Feb-16	23/Feb/16
M53		M53 - North Service bay Building Enclosed and R. for SoW by Others		9-Apr-16	15/Mar/16
M54		M54 - Center Transition Dam Trashrack Cleaner rails Completed		13-Aug-16*	14/Jul/16
		505573.CH0007.2.4 South Transition Dam			
M55		M55 - South Transition Dam Completed		12-Dec-15	16/Oct/15
		505573.CH0007.2.5 Interface Dates for Supply of 3rd Party Material			

Figure 2: Milestone Dates

An overview of the construction schedule is provided below:

Spillway Structure and Discharge Channel, and North Transition Dam
Construction of the spillway and the north transition dam will include the following activities, as detailed in the Project schedule provided under Appendix A9, subsequent to the erection of the temporary hoarding structures for winter protection, which must occur no later than Nov. 11, 2013:

- **Civil Works:** The works include excavation of existing sand fill, scaling and water/air jet cleaning of rock foundation, overbreak concrete, placing pre-slabs, and placing and grouting rock dowels.
- **Concrete Works:** The works include concreting three base slabs, six pier structures, and the south retaining wall.
- **Spillway Discharge Channel – Phases 1, 2 and 3**
- **Spillway Bridges:** The works include the upstream and downstream bridges.
- **Platform of Spillway Electrical Building:** The works include rock cleaning, concrete footings, columns, slab and curbs, as well as steel structure and steel deck.
- **Construction of Rollways:** The works include construction of five rollways and interface with other contractors.

Based on the proposed schedule, AFB JV anticipates that the average monthly concrete production for the spillway and north transition dam will be 6,665 m^3 and 2,265 m^3, respectively as shown in the graphs below.

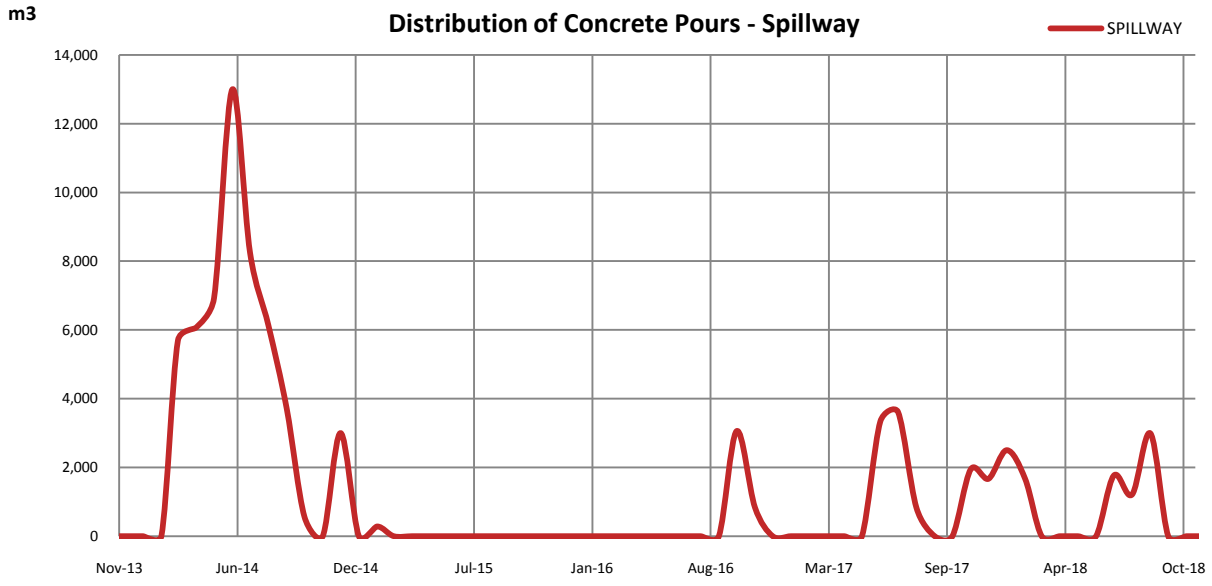

Figure 3: Distribution of Concrete Pours-Spillway

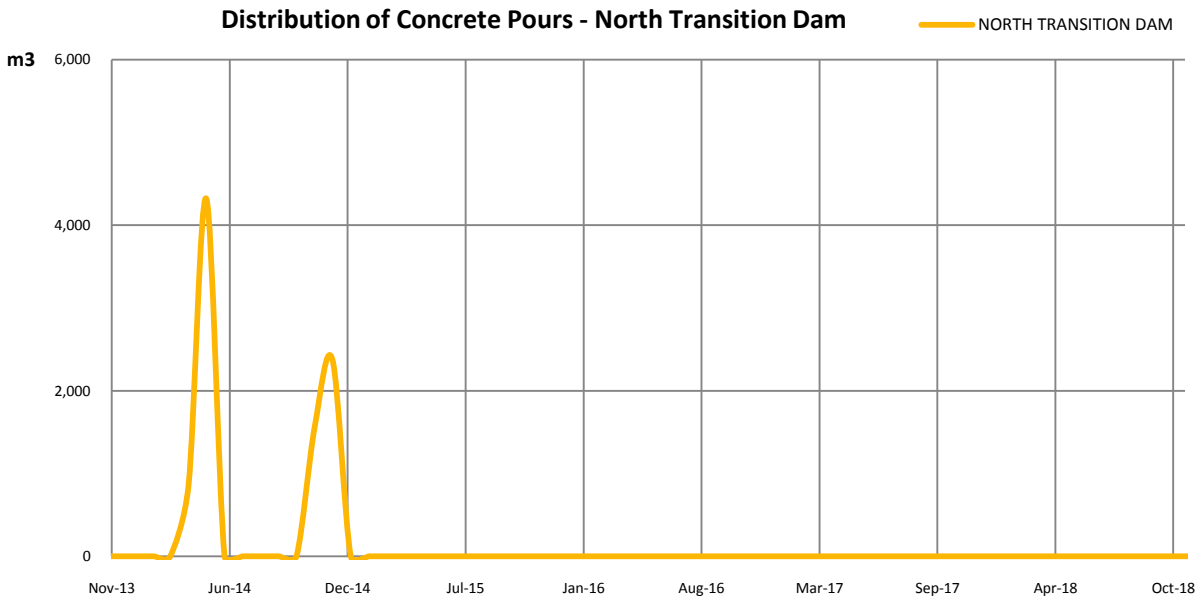

Figure 4: Distribution of Concrete Pours-North Transition Dam

Center Transition Dam

A small portion of the center transition dam will be covered with the spillway's shelter structure to allow work on the south wall of the spillway. Construction of the center transition dam will include the following activities, as detailed in the Project Schedule provided under Appendix A9:

- **Civil Works:** The works include fill excavation, dental excavation, scaling and water/air jet cleaning of bedrock, drilling and pressure grouting, drainage, dental concrete, etc.
- **Concrete Works:** The works include formwork, reinforcement, anchors and dowels, waterstops, grouting, and overbreak concrete, etc.

Based on the proposed schedule, AFB JV anticipates that the average monthly concrete production for the center transition dam will be 2,200 m^3, as shown in the graph below.

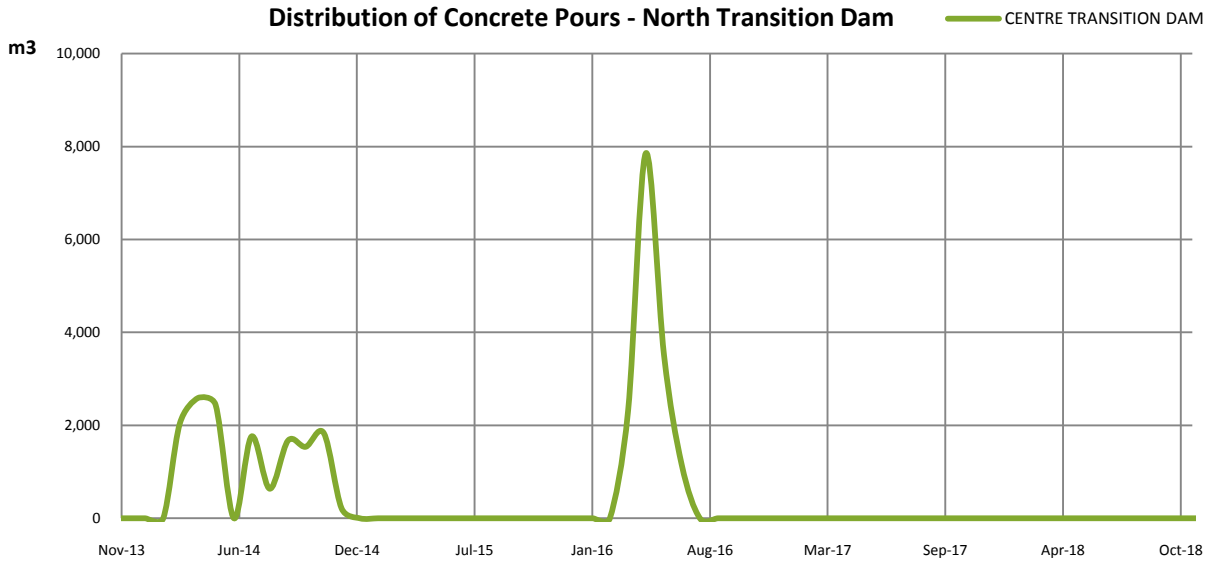

Figure 5: Distribution of Concrete Pours-North Transition Dam

Intake Structure

Construction of the intake structure will include the following activities, as detailed in the Project Schedule provided under Appendix A9:

- Erection of temporary hoarding structure for winter protection. Installation of the shelter commences on Nov. 4, 2013.
- **Civil Works:** The works include drilling and pressure grouting, scaling and water/air jet cleaning of rock foundation, and overbreak concrete.
- **Concrete Works:** The works include formwork, reinforcement, anchors and dowels, waterstops, grouting, and overbreak concrete, etc. The bench mark dates for commencing the concreting work on the intake – unit 1 is detailed below, and the works on units 2, 3 and 4 follow immediately, as detailed in the Project Schedule.
  - Intake Phase 1, Unit 1, concrete commences mid-March 2014.
  - Intake Phase 2, Unit 1, concrete commences mid-January 2015.
  - Intake Phases 3 & 4, Unit 1, concrete commences mid-August 2015.

Based on the proposed schedule, AFB JV anticipates the monthly concrete production for the intake will be 5,400 m^3, as shown in the graph below.

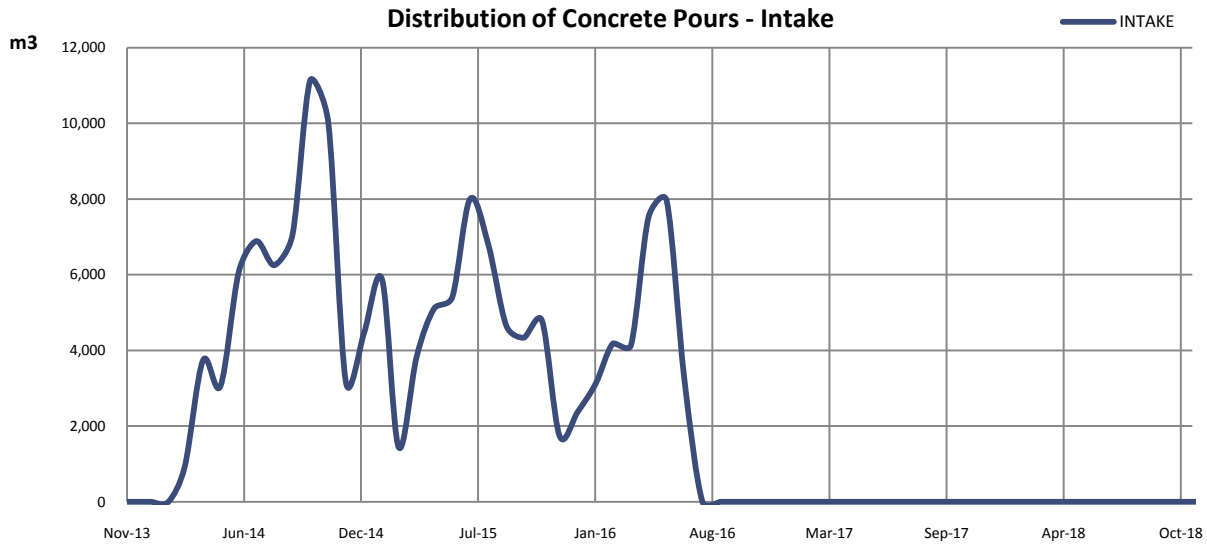

Figure 6: Distribution of Concrete Pours-Intake

Powerhouse Structure

Construction of the powerhouse structure will include the following activities, as detailed in the Project Schedule provided under Appendix A9:

- Erection of temporary hoarding structures for winter protection. Installation of the shelter commences on Nov. 4, 2013
- **Civil Works:** The works include drilling and pressure grouting, drainage, scaling and water/air jet cleaning of rock foundation, trench for interconnection cables and pipes.
- **Concrete Works:** The works include formwork, reinforcement, anchors and dowels, waterstops, grouting, and overbreak concrete, etc. The benchmark dates for commencing the concreting work on the powerhouse – unit 1 are detailed below, and the works on units 2, 3 and 4 follow immediately, as detailed in the Project Schedule.
  - Powerhouse Phase 1, Unit 1 – concrete commences no later than Mar. 1, 2014.
  - Powerhouse Phase 1, expected average production 4,000 m^3/month.
  - Powerhouse Phase 2, Unit 1 – concrete commences no later than Jan. 24, 2015.
  - Powerhouse Phase 2, expected average production 2,300 m^3/month.
  - South Service Bay starts the second week of January 2014.
  - South Service Bay, expected average production 1,275 m^3/month.
  - North Service Bay work starts on Nov. 15, 2015.
  - North Service Bay, expected average production 385 m^3/month.

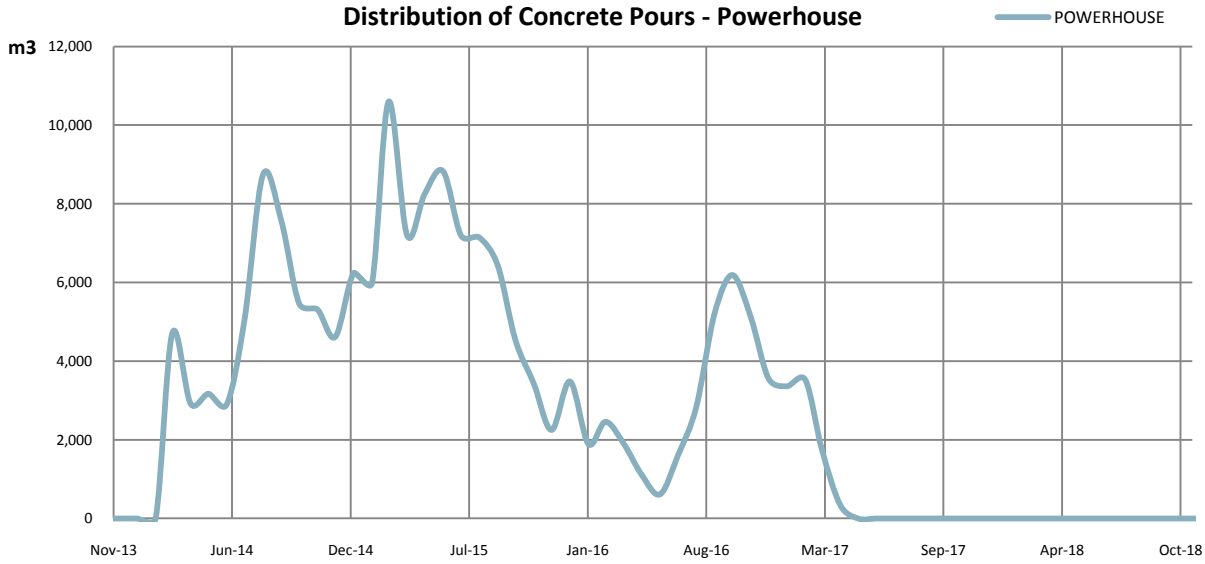

Figure 7: Distribution of Concrete Pours-Powerhouse

Concrete batch plant and concrete product details including supply of materials (i.e., water, aggregates, cement) and details of testing program.

AFB JV is presenting herein our plan to self-perform the concrete production by our JV forces. We reserve the right to subcontract this critical work to a qualified subcontractor at our discretion.

AFB JV is proposing to supply and install two new, or equivalent, state-of-the-art Liebherr Mobilmix Model 2.5 batching plants at the contractor's proposed laydown area, as shown in Drawing 02-F, to meet the demand of supplying concrete, grout and mortar for the Project. Each concrete batch plant has a maximum production capacity of 110 m^3/hr. The Mobilmix 2.5 batching plants are identical, fully automated, and winterized, and can be operated separately or as a twin plant with central control system and having an output rate of approximately 220 m^3/hr. The concrete batch plants will also produce the grout and mortar materials required for the Project. Layout of the Liebherr Mobilmix Model 2.5 batch plants are provided in Appendix A13- Attachment 2.

Figure 8: Liebherr Mobilmix Batching Plant

A Sauter central thermal plant model "Booster 1500" with a 7,000 litre hot water tank will be used for hot air

heating of the aggregate and sand bins, steam injection to de-ice the aggregates and for heating the water used for concrete production. A minimum of six separate bins will be provided for storing coarse and fine aggregates. The aggregates will be stored in these six heated and covered bins with a holding capacity of 250 tonnes each. A steam-heated pad will be available for additional aggregate storage of up to 1,000 tonnes. This pad will be set up near each batch plant. There will be 10,000 tonne above-ground storage for coarse aggregate and sand. For hot water, water will be drawn from the river and heated by a 6 MMBtu heating system and stored in a 10,000 litre insulated tank.

During warm weather, a water chiller plant with chilled water storage of 10,000 litres at 4 °C temperature will be set up at the plant site. The aggregates will be maintained in a wet state by using an automated sprinkler system. Additionally an ice plant and an ice storage facility will be provided to hold at least two days of production. A KTI flip unit will be used to provide flake ice production of 50 tonnes/day, a water chiller, a 50-tonne refrigerated storage tank and an ice distribution system for concrete production.

The main plant is fed by a 1000mm-wide belt which draws the aggregate materials from six (6) separate bins. The conveyor belt system is fully operated and controlled by using automated computer-controlled system inside the batch control area. The plant will use intelligent scales for automatic batch weighing and recording. Each plant will be equipped with temperature sensors for temperature control of both concrete and raw materials. The batch plants are also equipped with moisture sensors for fine and coarse aggregates.

Each plant has its own cement silos for Type LH-M and Type GU cements. The combined storage for the two plants allows for full production for a minimum of 20 days. Individual storage silos for supplementary materials (i.e., fly ash, silica fumes, natural pozzolan, and blast furnace slag) will also be provided dependent on approved mix designs. Three separate cement silos with 450 tonne total capacity will be located at each batch plant. The plant controls will be located in a large office trailer, equipped with computers, individual screens and keyboards for control of both plants. The computer-controlled batching will be done by a Liebherr automatic batch control system, Litrontic-MPS-III system. AFB JV will also provide a concrete truck wash out and equipment washing facility complete with containment ponds and decanting facilities.

The main components of the Mobilmix 2.5 are housed in strongly constructed containers. The mixing plant is designed for exceptional ease of assembly. All modules are ready to plug in, so that the complete plant can be ready to operate in just a few days (e.g., approximately one week). Complex foundations are not needed as the container modules can be supported on steel foundations. Templates in different colours are supplied to align the steel foundations quickly and accurately. Once the container-mounted system has been erected, the container modules form a complete weather-protecting housing. Additional insulation can be specified for extremely severe climatic conditions. All sections of the plant are easily accessible from stairs and gangways.

Concrete placement methodology including placing, consolidating, finishing (screeding system), curing and cold and hot weather protection measures.

Taking into consideration the significant amount of work and large concrete pours involved in the construction of the Project, AFB JV recognizes it is essential that proper pre-concrete planning be in place prior to concrete placement. Special attention will be given to logistical and technical considerations, such as concrete supply, casting sequence, prevention of cold joints being introduced during concrete placing, and temperature differential control.

- **Planning:** A pre-concreting meeting will be held internally to finalize the proposed concreting procedure. An initial pre-concreting meeting will be held between AFB JV, the Engineer (SNC-Lavalin) and Nalcor's representatives.
- **Access:** Designated site access routes for concrete supply will be prepared and traffic control measures implemented. The proper access must be organized to enable a continuous transportation of the concrete during the entire period of pouring so that the required temperature of concrete pour

will be maintained.

- **Supply:** Concrete batch plant capacity and the number of delivery trucks required for each pour will be planned to maintain a continuous supply of concrete and, therefore, prevent cold joint development and minimize temperature differentials from occurring within the concrete mass during the pour.
- **Concrete Delivery:** Since the concrete temperature increases with the passage of time from the initial mixing, the period between mixing and delivery will be kept to an absolute minimum. Attention will be given to coordinating and dispatching the mixing trucks with the rate of placement to avoid delays in delivery.
- **Pouring:** Concrete will be placed in a predetermined layering sequence to avoid any possibility of cold joint formation within the structures. We will minimize the approximate time spent in each poured layer (i.e., not to exceed 60 minutes).
- **Plant and Labour:** A detailed equipment and manpower resources schedule will be prepared to ensure we have a sufficient workforce for each pour.
- **Quality Control:** Sufficient quality control measures will be set in place for checking concrete supply and deliveries throughout the duration of the pour.
- **Contingency Measures:** Large pours cannot readily be stopped due to failure of concrete supply or plant breakdown. For this reason, adequate back-up and standby facilities in all aspects will be provided (i.e., back-up batch plant, placing equipment, etc.).

Concrete Placement

Pre-pour inspection of form panels, rebar, embedded items, rock surfaces and construction joints will be carried out before concrete pouring. A concrete Placement Authorization Request will be completed and submitted to the Engineer 24 hours prior to each placement, giving all relevant information concerning the placement as detailed in the Cast-in-Place Concrete Specifications.

Concrete placement methods and equipment shall be such that the concrete is conveyed and deposited without segregation and without changing or adversely affecting the specified qualities. Concrete will be placed through utilizing different concrete pumps depending on the location, size of the pour and complexity. A standby pump and other placing equipment will be available, in case of breakout. Concrete will be placed as close as possible to its final position in the structure. Concrete will not be dropped for a vertical height of more than 1.5 m. Hoppers with flexible chutes will be used to funnel the concrete down into tall, narrow forms. Workers may be stationed inside the forms to move the chutes around to ensure an even distribution of the concrete. The hoppers are required to be supported by the formwork (i.e., may not rest on the reinforcing steel).

Concrete placement operations will continue in a non-stop manner, during which concrete will be deposited in layers of no more than 500 mm (i.e., layer thickness ranges from 150 mm to 500 mm for regular reinforced members, and from 375 mm to 500 mm for mass concrete layers) and each successive layer will be placed before the preceding layer has commenced its initial set. The concrete placing rate should not exceed the limit specified for the formworks.

This AFB JV submission includes construction methodology drawings that show the planned locations of concrete pumps and associated equipment (i.e., placing arms, etc.), as described below:

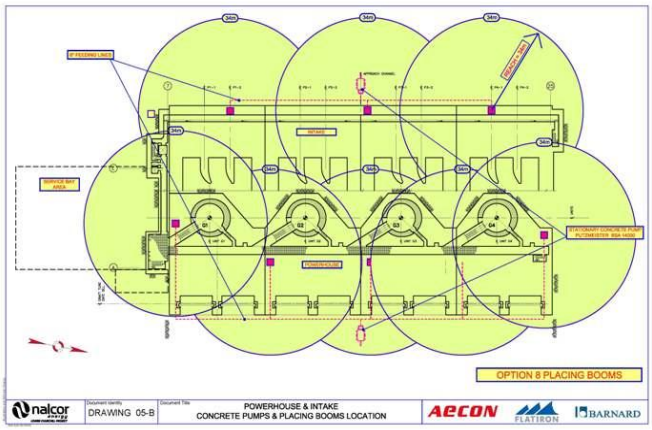

Figure 9: Powerhouse & Intake- Concrete Pumps & Placing Booms Location

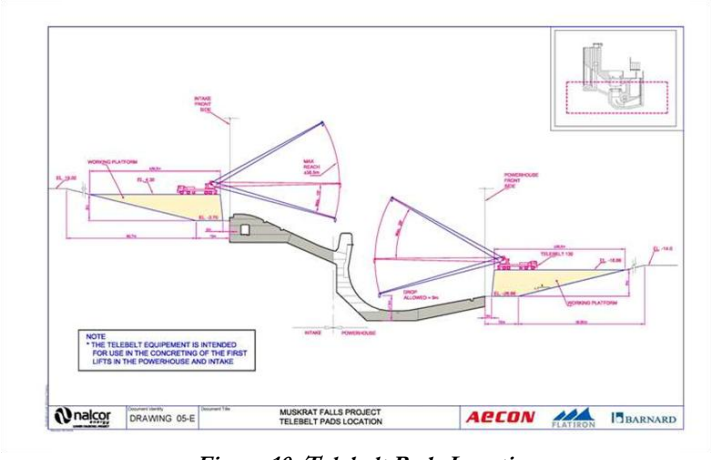

Figure 10: Telebelt Pads Location

Powerhouse Structure: Concrete will be placed through a stationary pump (Putzmeister BSA 2109) and five stationary towers located at strategic locations to facilitate the concrete placement, as detailed in Drawing 05-B. The concrete will be fed from the stationary pump to the stationary tower and placing arms through 150mm feeding lines. A Telebelt TB-130 will be used for concreting the first lifts at the draft tube in the powerhouse, as shown in Drawing 05-E.

Intake Structure: Concrete will be placed through a stationary pump (Putzmeister BSA 2109) and three stationary towers located at strategic locations to facilitate the concrete placement, as detailed in Drawing 05-B. The concrete will be fed from the stationary pump to the stationary towers and placing arms through 150mm feeding lines. A Telebelt TB-130 will be used for concreting the first lifts of the intake, as shown in Drawing 05-E.

Spillway Structure: Concrete will be placed by different concrete placing equipment including Telebelt TB-130 and mobile concrete pumps, as shown in Drawings 06-A, B, C & D and in the figure below.

Transition Dams and Other Structures: Concrete will be placed by mobile concrete pumps (i.e., 56Z+ OSS or other size).

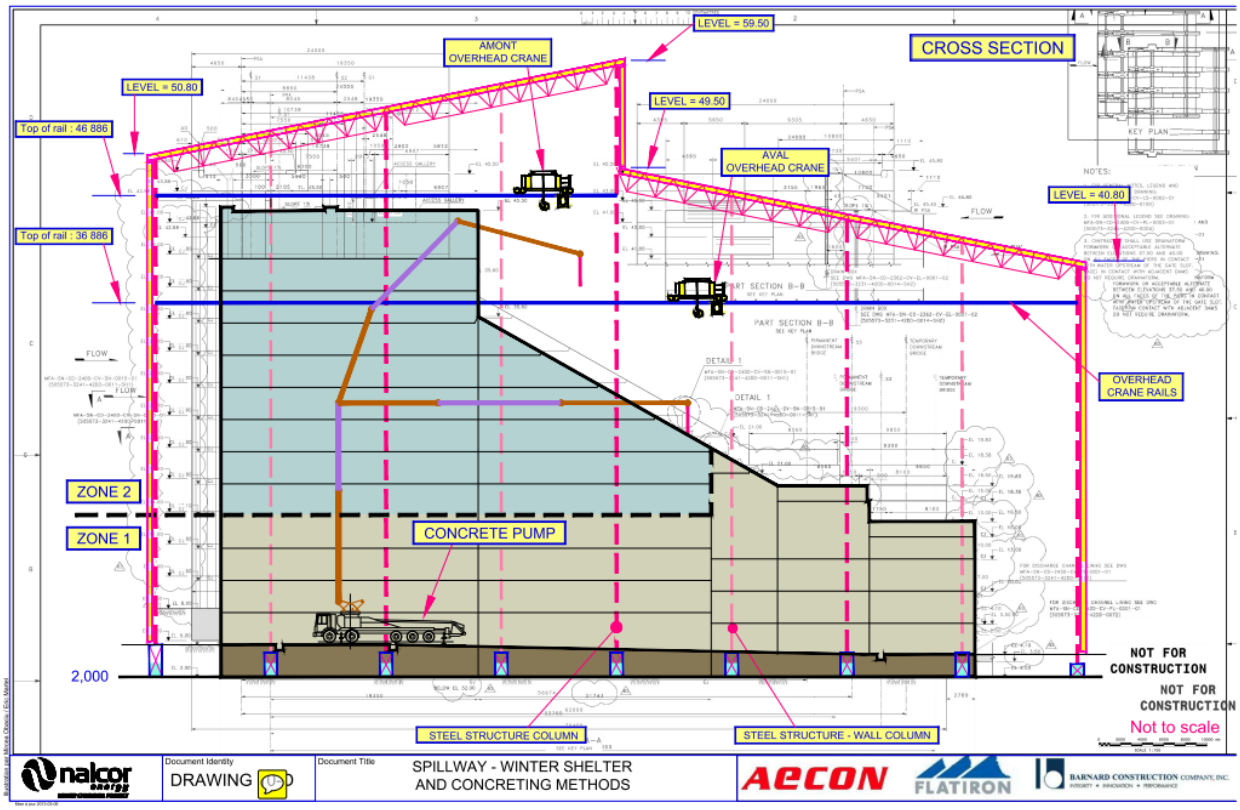

Figure 11: Spillway- Winter Shelter & Concreting Methods

Concrete Consolidation

AFB JV will consolidate the concrete being placed in accordance with CAN/CSA A23.1. Concrete consolidation will be performed thoroughly and uniformly by means of hand-tamping tools, vibrators, or finishing machines to obtain a dense, homogeneous structure, free of cold joints, fill planes, voids, and honeycombing. Proper consolidation will result in concrete that has a smooth surface (i.e., formed surface), free from air and water pockets, and in full contact with reinforcement, hardware anchors, waterstops, and other embedded parts to ensure a good bond.

The most common method of consolidating concrete is by vibrating the concrete with a portable spud-type vibrator. Depending on the size of the vibrator's head, the effective radius of vibration ranges between 75 and 350 mm (e.g., radius of vibration ranges between 75 and 150 mm for 20- to 40-mm diameter vibrators, and between 175 and 350 mm for 50 to 75 mm diameter vibrators).

The following best practices will be applied and taken into consideration while vibrating the concrete:

- Vibrating will be done immediately as the concrete is placed.
- Vibrators shall be applied systematically and at such spacing intervals so that the zones of influence overlap.
- Vibrators will be inserted and withdrawn slowly in a vertical direction to facilitate the removal of entrapped air bubbles. Vibrators should not be dragged through the concrete.
- Vibrators shall be applied, at any one position, until the concrete is consolidated, but not to the extent that segregation of the concrete will occur. Over-vibrating forces the finer aggregates to the top and drives the larger aggregates toward the bottom.
- When concrete is poured in layers, the head of the vibrator will penetrate through the top layer and partially through the layer underneath by its own mass and vibration.

- The workers are required to avoid contacting the reinforcing steel with the vibrator so that the bond between the steel and the concrete is not broken.
- The workers are required to avoid contacting the form walls with the vibrator as that may loosen the forms and may also cause honeycombing of the concrete surface.
- The workers will carry backup vibrator(s) in case of equipment problems.
- External vibrators shall have a minimum frequency of 3,600 vibrations per minute.

Concrete Finishing

AFB JV will finish all concrete surfaces that are exposed after concrete consolidation. The extent of such finishing will depend on the concrete component under construction (i.e., formed or non-formed surface) and the type of work. Finishing of the concrete surface will be done while it is sufficiently plastic to achieve the desired grades, elevations, and texture. We will pay special attention so that excessive fines and water are not drawn to the surface. The finished surface will be smooth, free from open texturing, undulations, projections, and ridges as well as will be struck off true to grade and cross-section profile.

AFB JV recognizes that there will be several different types of concrete finishes depending on the concrete component and whether the concrete surface is formed or non-formed. These different types, along with the JV's techniques, are detailed below:

Non-Formed Concrete Surface Finishes

Class U1 Finish: It serves as the first phase for U2 and U3 finishes, or for concrete surfaces that will never be exposed. It is the initial finishing that will be completed before any bleeding or free water is present on the surface of the concrete.

The concrete will be levelled and screeded to the specified lines and grades using a properly designed screed or straightedge. The screeding will be done immediately after placing, spreading and vibrating the concrete. Then, the concrete will be worked with a bull float or darby to remove high spots and ridges and to fill voids and hollows left in the surface by screeding.

Class U2 Finish: It is the final finish for exposed surfaces, or a second phase for U3 finish. After edging and grooving, the concrete surface will be smoothed using a wooden or steel float, or a mechanical float to provide a uniform surface meeting the specified tolerances.

This will commence after the bleed water has disappeared and when the concrete has stiffened sufficiently to prevent the movement of excess mortar to the surface.

Class U3 Finish: It is used for concrete surfaces where a smooth and hard finish is required. The concrete surface will be smoothed using a wooden or steel trowel, or a mechanical trowel, to provide a uniform surface meeting the specified tolerances.

One or more passes of the trowel will be made at suitable time intervals to obtain a dense, hard, smooth surface free of trowel marks. As the surface hardens, the trowel size shall diminish while increasing progressively (applicable also to mechanical trowel) the tool angle and the pressure applied on it. In case, where the first trowelling is mechanical, at least one more pass will be executed manually to eliminate the small defects. When the concrete surface is exposed to water current, the last trowelling will be made with a wooden trowel.

For formed concrete surfaces, AFB JV will verify the concrete surface using 1.5m straightedge or a 1.5m template for curved surfaces. The surface tolerance shall be in compliance with Table 7 of the Technical Specifications of Cast-in-Place Concrete.

Formed Concrete Surfaces Finishes
The following types of concrete surface finishes will be attained by utilizing different formwork classifications:

- **Finishes for Backfilled or Non-Exposed Concrete Surface:** Formwork of Class F1 will be utilized to create surfaces that will backfilled or will never be exposed.
- **Finishes for Exposed Surfaces:** Formwork of Class F2 will be used to create exposed surfaces other than those described in other classes. Formwork will be made in a way that will result in a concrete surface with uniform texture and appearance. The same material for all form wall of this class will be used.
- **Finishes for Hydraulic Flow Surfaces**: Formwork of Class F3 will be used to create hydraulic flow surfaces where uniformity and alignment accuracy are required. Wooden formwork for straight and curved surfaces will be made of sound wood free of knots and irregularities that can be cut and cambered with precision to the profiles required without splitting or twisting and will keep the shape it is given.
- **Finishes for Secondary Concrete:** Formwork of Class F4 will be used for secondary concrete formed surfaces. Class F4 has the same characteristics as Class F3 but with more stringent tolerances.

For non-formed concrete surfaces, the JV will verify the concrete surface using a 3.0 m straightedge or a 3.0 m template for curved surfaces. The surface tolerance shall be in compliance with Table 8 of the Technical Specifications of Cast-in-Place Concrete.

The concrete surfaces will be finished immediately following the removal of any forms. The cavities made by the cones used at the ends of metal ties will be filled and finished after removal on the plastic cones.

Scarification
All concrete surfaces that are to be covered with concrete will be scarified after the concrete has set or after the forms are removed, using a jet of pressurized water, pressurized abrasive, water and air, or any other means approved by the Engineer, to remove laitance, expose coarse aggregate and obtain a roughness of at least 5mm.

- Non-formed surfaces to be scarified will be wet with a surface retarder immediately after concreting to facilitate the scarification operation.
- Formed surfaces to be scarified may be wetted with a surface retarder prior to concreting to facilitate the scarification operation. Scarification will be carried out immediately after the forms are removed. The jet pressure will be adjusted based on the concrete age hardness.

Floor Topping
Where bonder or monolithic type topping is required, it will be executed as per the requirements of CAN/CSA A23.1 Section 7.6. The mix formula, slump and water/cement ratio will conform to the concrete specifications.

Floor Hardener
Floor hardener will be applied, where indicated on the drawings, as per the manufacturer's specifications.

Concrete Curing
Once the concrete is in place, the concrete will be cured for a certain amount of time to achieve the full strength. During the curing period, the concrete will not be placed under stress. The typical curing period of the concrete is 7 consecutive days for GU cement concrete and 10 consecutive days for LH-M cement concrete.

AFB JV will use two methods of curing concrete:

- The first method requires covering the surfaces to be cured with canvas, straw, burlap, or other approved material and keeping the concrete wet with water throughout the curing period. The water prevents the concrete from drying out too quickly. For surfaces that require a rubbing finish, the protective covering will be temporarily removed to allow the rubbing to continue and the covering will be restored as soon as possible.
- The other curing method requires the use of an approved curing compound such as the following:
    - Resin and wax-based products, which may be used in areas that are sheltered from inclement weather.
    - Chlorinated rubber-based products, which may be used in areas exposed to inclement weather.

The curing compound will be applied after the concrete surface has received the specified finishing treatment. Up until then, the concrete will be protected by the protective covering method or, in the case of vertical surfaces, simply by leaving the forms in place.

Cold Weather Curing

When the air temperature is at or below 5 °C, or when there is a probability of the temperature falling below 5 °C within 24 hours of placing, the concrete will be cured and protected according to cold weather procedures. We will monitor the conditions and modify the protection system as required to protect freshly placed concrete against dry-out, rain, cold or heat in compliance with CAN/CSA A23.1 Section 7.4.

AFB JV will design a protection system for the worst conditions that can be reasonably anticipated from local weather records, forecasts, site conditions, and past experience for the time period during which the protection is required. We will utilize the following protection methods:

- Heated enclosures at the spillway structure as shown in Drawings 06-B &D, as well as, at the intake and powerhouse structures, as shown in Drawings 07-A through 07-G. We have provided detailed description of the heated enclosures under Appendix A1, Question 5.1.13.

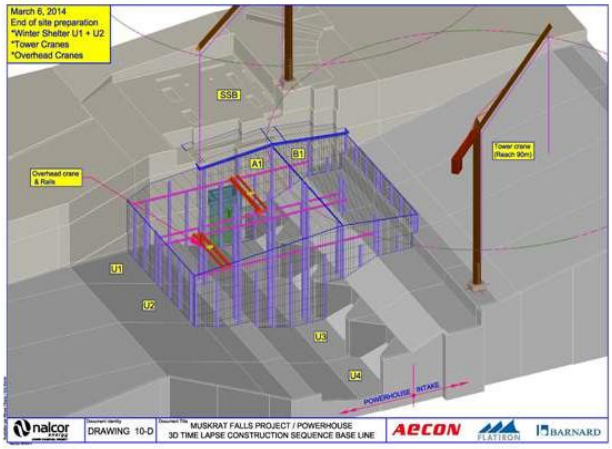

Figure 12: 3D Time Lapse Construction Sequence Base Line

Figure 13: 3D Time Lapse Construction Sequence Base Line

- Protective covers and insulations (i.e., insulated blankets, forms, etc.) will be used as detailed in Appendix A1, Question 5.1.13.
- During the curing period, we will monitor and record the concrete temperature regularly to conform to the concrete specifications, including:
    - Maintaining the concrete surface temperature above 5 °C for the duration of the curing period, and ensuring concrete temperature will never fall below the freezing point until the concrete has reached a minimum strength of 10Mpa.

- Limiting the internal and external concrete temperature differential for mass concrete elements to within 20 °C to minimize cracking. Monitoring and recording concrete and ambient air temperature will be undertaken to determine if the maximum 20 °C temperature differential is being met and verify compliance with the requirement of table 21 of CAN/CSA A123.1-09.

Hot Weather Curing

When the ambient air temperature is at or above 27 °C, or when there is a probability of the temperature rising to 27 °C during the placing period, curing and other protection measures shall be provided to protect the concrete in place from the effects of hot and/or drying weather conditions. Curing during the basic curing period will be accomplished by water spray or by using saturated burlap (absorptive fabric) to achieve cooling by evaporation.

The temperature of the concrete as placed shall be as low as practicable and in no case greater than the limits stipulated in CAN/CSA A23.1 Table 14. Concrete temperature may be cooled down by using ice and cold/chilled water in the concrete mix and continuously spraying the concrete aggregates with cold/chilled water.

Monitoring and Control of Concrete Temperature

Concrete temperature will be determined by using thermocouples installed near the surface, at 50mm from it, and also in the middle inside for mass concrete. Thermocouple and other data acquisition wires shall be inserted in conduits and end in a surface data acquisition box. The concrete surface temperature may be verified by using surface thermometer or infrared after the formwork has been removed.

The concrete temperature will be collected, graphed and submitted to the Engineer for each concrete pour subject to cold or hot weather conditions.

Survey Control Methodology

AFB JV will self-perform the day-to-day layout for the construction crews. In addition to surveying resources, AFB JV will utilize a specialized subcontractor to establish survey control on the Project and routine quality assurance.

All three AFB JV partners have extensive experience of self-performing surveys on numerous jobs of similar complexity. As part of the QA/QC program, the JV will look to an outside specialized survey contractor to perform regular checks on control points and other critical works. AFB JV believes that the extensive in-house surveying expertise provided by the partners, combined with the utilization of an outside specialized survey contractor, is the best way to optimize the survey cost associated with this project.

We will utilize state-of-the-art surveying equipment like the latest version of the robotic total station units, Trimble S6. These instruments rely on fixed monuments and provide a high degree of accuracy. Robotic instruments like the S6 do not require an additional surveyor to operate the instrument, which helps control the labour risk. The unit is controlled via the data collector that also functions as a remote control for the instrument. The use of the robotic total station will allow AFB JV to reduce the size of the survey team, which will increase efficiency and reduce cost. While the use of robotic total stations like the S6 is by no means new to the market, these units have been highly refined and have proven to be extremely effective tools. AFB JV believes that by utilizing the most qualified survey personnel and the correct tools for the job at hand, the job will be done right the first time.

Structural steel and rebar pre-fabrication details

AFB JV has carefully considered the structural steel and rebar pre-fabrication details for the Project. On a Project of this magnitude in such a remote location, it is imperative that all details are properly planed out to ensure the most efficient construction methodology. We are presenting below our structural steel and rebar pre-fabrication details for the Project.

Structural Steel Details

The structural steel anticipated for this Project is expected to be subcontracted to a qualified eastern Canadian subcontractor. Multiple fabricators and erectors from Quebec and Nova Scotia have expressed interest during the bidding process. Currently, the subcontractor AFB JV anticipates using for the Project is Supermetal Structures Inc. (SSI) of St-Romuald, Quebec. SSI's powerhouse experience includes structural steel fabricated and erected for Manitoba Hydro's Wuskwatim Project and currently SSI is working on a multi-stage hydro project with Ontario Power Generation on the Lower Mattagami River.

SSI has production capacities of up to 60,000 tons per year from its North American plants. The steel fabrication will be out of one or more SSI's East Coast plants (St-Romuald, Quebec; Sherbrooke, Quebec; or Rock Hill, South Carolina). Detailing will be completed out of one or more of SSI's detailing locations in Canada. Rail car shipments may be used directly from South Carolina to Quebec when the Rock Hill Plant is utilized. The structural steel delivery to the jobsite will typically be by truck. Laydown areas near the site will be utilized to accept and sort incoming shipments. SSI has the capability of utilizing its large storage facilities at its manufacturing plant locations

Rebar Pre-fabrication Details

The spillway walls are the part of the Project where rebar pre-fabrication will be the most efficient. AFB JV's subcontractor will assemble wall sections of about 12m x 8m on the ground. The space needed on the ground is about 14m x 10m. This space should be available between two sets of walls. The crane needed for the operation should lift 5,500 kg (4,500 kg of rebar and 1,000 kg for the lifting beam). No particular set-up is required to maintain the walls in place. This pre-fabrication will significantly improve the schedule of work.

Construction power monthly load requirements

AFB JV has performed a detailed analysis of the electrical requirements needed to support the construction operation and temporary facilities outlined in our proposal. Our analysis took into consideration the information provided in Exhibit 12 of the RFP Document. We have included in Appendix A13– Attachment 3 the forecasted monthly power load required at each area, including the contractor's laydown area, contractor's administration office, company's laydown area, the powerhouse and the spillway. We have also included in the Drawing Package detailed electrical drawings that demonstrate the electrical single line diagram for each area at the Project site.

Based on our analysis and the details provided in this section, we have determined that the temporary electrical load of 2,925 kVA available for our usage will not be sufficient to support the construction operation, and our JV will supply additional electrical power by utilizing several diesel generators. The graph below summarizes the monthly total power load requirement to execute the Project.

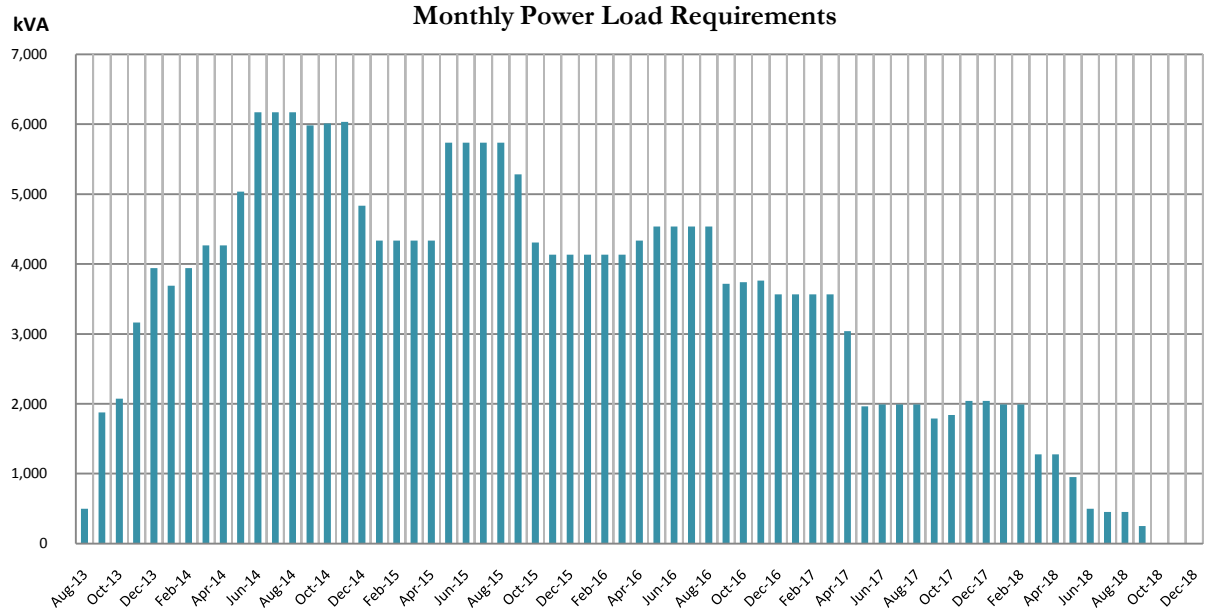

Figure 14: Monthly Power Load Requirements

It is relevant to note that we have assumed, based on no information being provided by Nalcor/SNC-Lavalin regarding the existing dewatering facility, that AFB JV may require 500 kVA to manage the dewatering facilities. It is expected that the additional power will be supplied by Nalcor in addition to the power capacity provided to the Contractor as detailed in Exhibit 12.

AFB JV has allowed sufficient electrical infrastructure and capacity for the full load of construction power required. This can be provided by increasing the capacity supply from Nalcor, which AFB JV assumes can be provided. In addition, AFB JV has provided diesel generators capable of providing the prime power if Nalcor can not increase the capacity of the power line. A clarification is provided in Appendix A17 confirming AFB JV has provided a $16 million credit to Nalcor for fuel if this power supply is increased to suit the temporary construction power requirements.

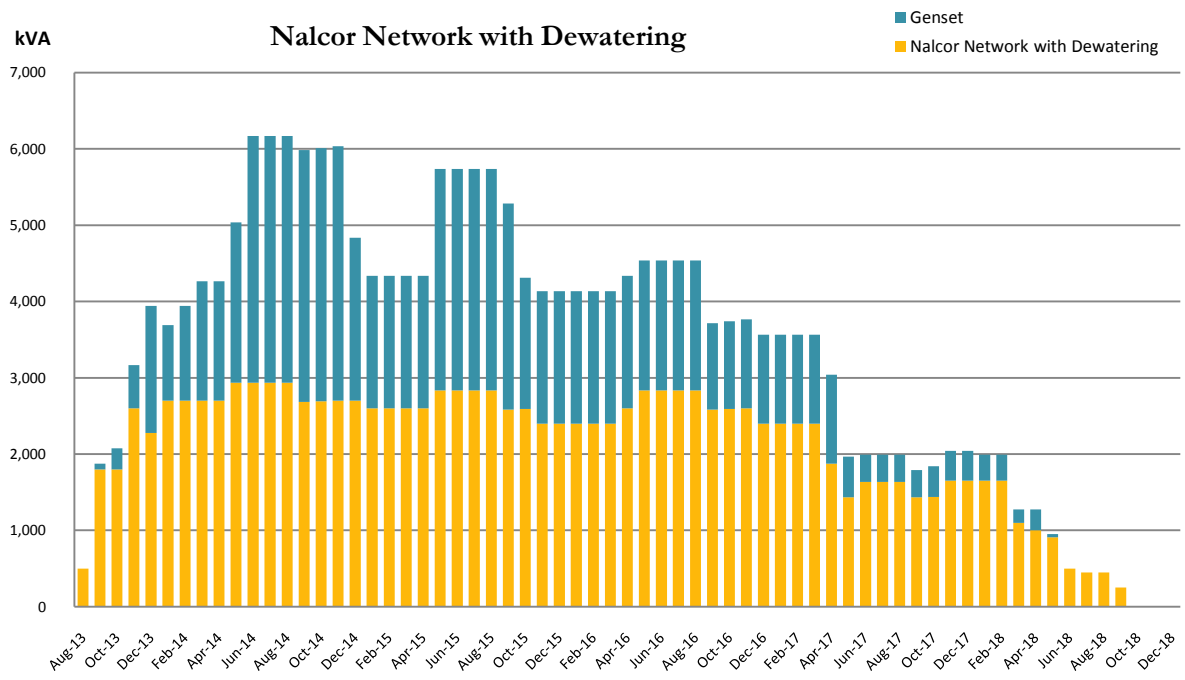

Figure 15: Nalcor Network with Dewatering

The following sections describe the power load supplied by Nalcor versus that required by AFB JV's operation at each area of the Project site, and our strategy to manage the excess power requirement.

Electrical Requirements at the Contractor's Laydown Area

In accordance with Exhibit 12 of the RFP document, Nalcor will provide electrical power supply at the Contractor's laydown area with total capacity of 1,600 kVA. This area will house the temporary construction facilities including concrete batch plant as well as the crushing and processing facilities of aggregate/sand, which will require a total power capacity of 2,325 kVA at peak times, as detailed in Drawings 03 & 03A.

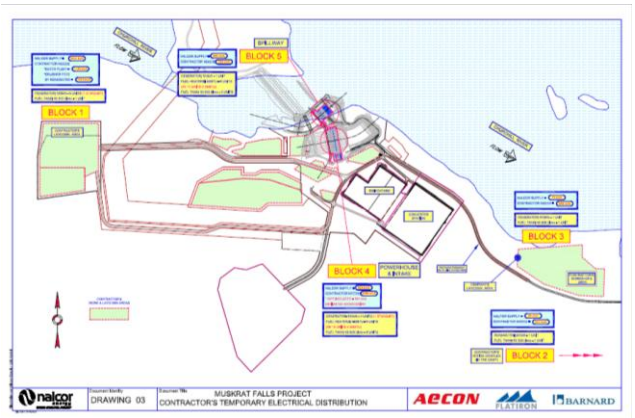

Figure 16: Contractor's Temporary Electrical Distribution

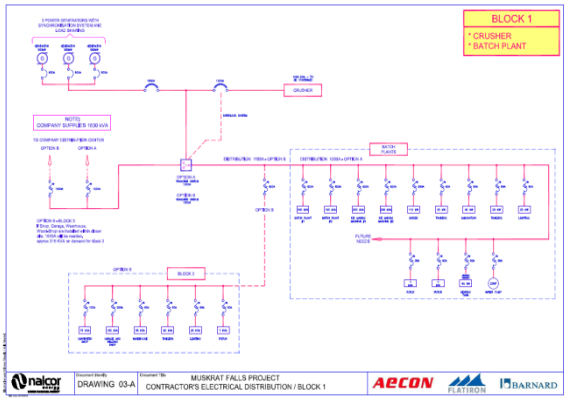

Figure 17: Contractor's Electrical Distribution/ Block 1

The table below summarizes our overall strategy to meet the power demand of the construction operation at this area.

Temporary Construction Facility	Power Required (kVA)	Power Supply Strategy
Concrete batch plant	1,125	From Nalcor's power (1600 kVA)
Crushing and processing facilities	1,200	Use of three - 500 kVA diesel generators (i.e., total 1,500 kVA)
Total power demand	2,325	3,100 kVA

Based on our electrical analysis, the graph below demonstrates our forecast for the power load required each month at this area. We are planning to utilize the three-500 kVA generators (total 1,500 kVA) provided at the crushing facility as an emergency power supply to ensure that the batch plants can remain operational at any time in case of power supply interruption. During this time, our crushing operation will be on hold until the power interruption is resolved by Nalcor.

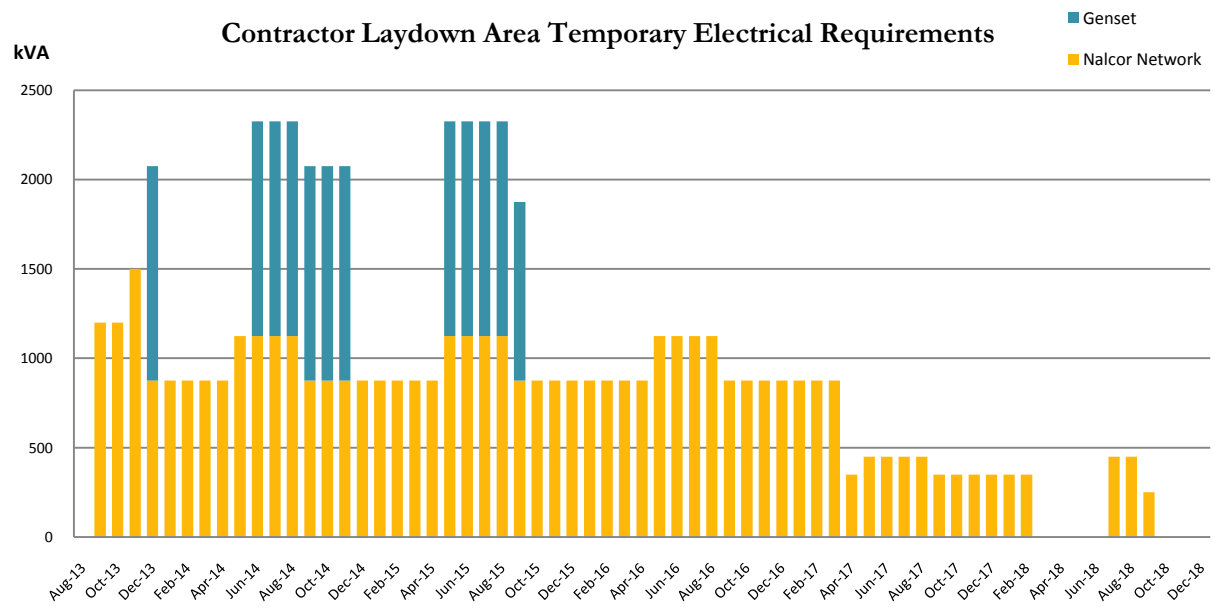

Figure 18: Contractor's Laydown Area Temporary Electrical Requirements

Electrical Requirements at the Contractor's Office Complex

Nalcor will provide 25 kVA as temporary electrical power supply to the Contractor's administration office, located at the accommodation complex. Based on our analysis, the contractor's administration office will require a total power capacity of 300 kVA at peak times as detailed in Drawing 03 (above) & 03-B, which exceed the temporary power provided by Nalcor.

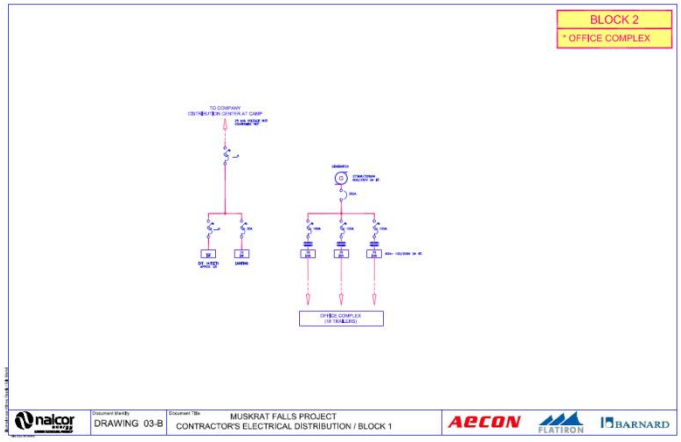

Figure 19: Contractor's Electrical Distribution/ Block 1

Our strategy to meet the power demand at this area is to utilize the power supplied by Nalcor and provide one additional 300 kVA generator. Based on our electrical analysis, the graph below demonstrates our forecast for the power load required each month at this area.

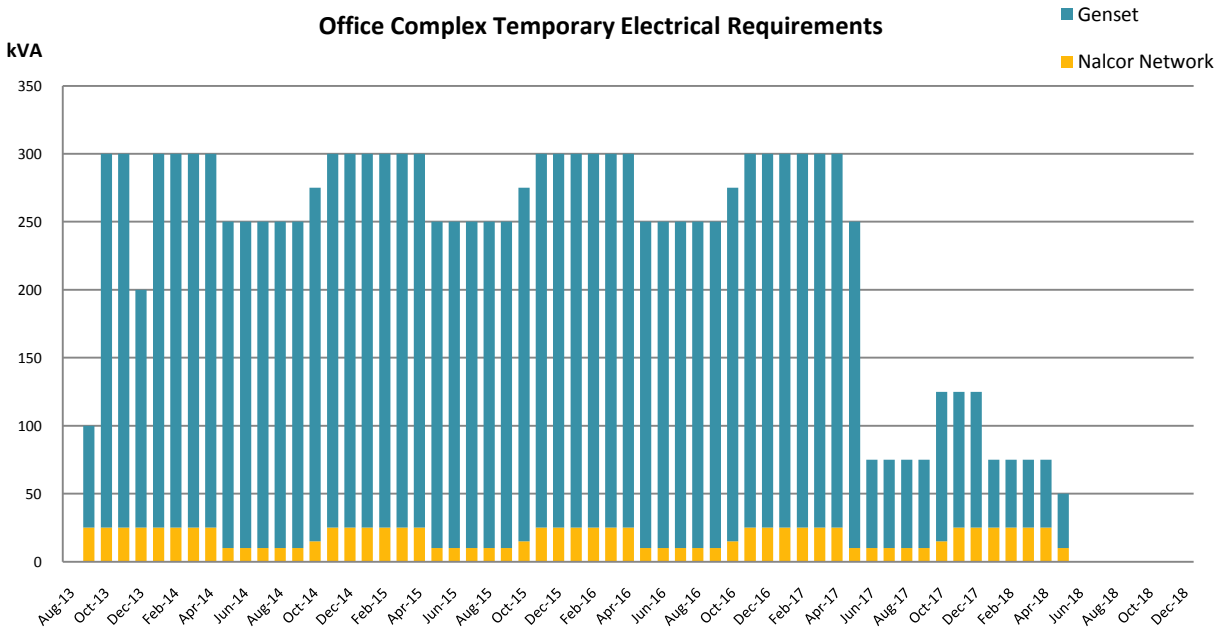

Figure 20: Office Complex Temporary Electrical Requirements

Electrical Requirements at the Company's Laydown Area

Nalcor will provide electrical power supply in close proximity to the Company's laydown area with total capacity of 75 kVA. This area will house AFB JV's fabrication shops, including carpenter shop, electrical shop, warehouse, welding and fabrication shops, etc., which will require a total power capacity of 365 kVA, as detailed in Drawings 03, 03-A & 03-C.

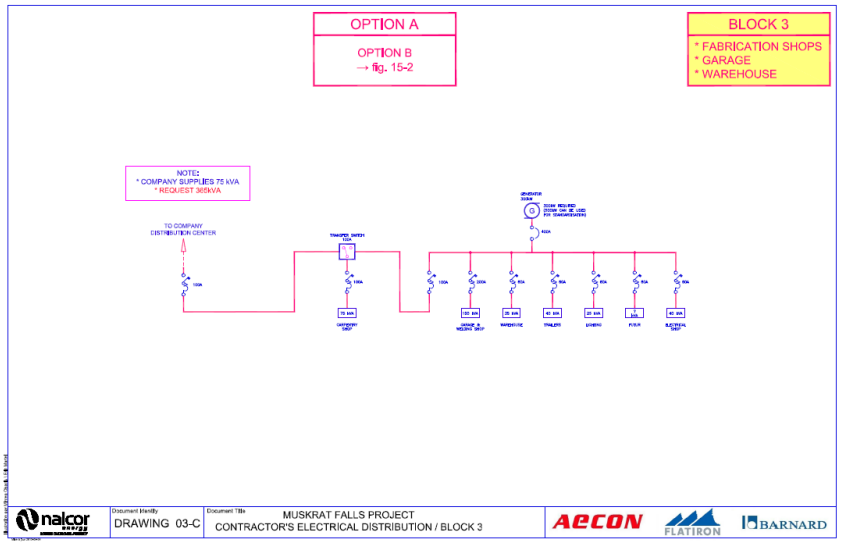

Figure 21: Contractor's Electrical Distribution/ Block 3

Our strategy to meet the power demand of the construction operation is to utilize the power supplied by Nalcor and provide one additional 500 kVA generator. Based on our electrical analysis included, the graph below demonstrates our forecast for the power load required each month at this area.

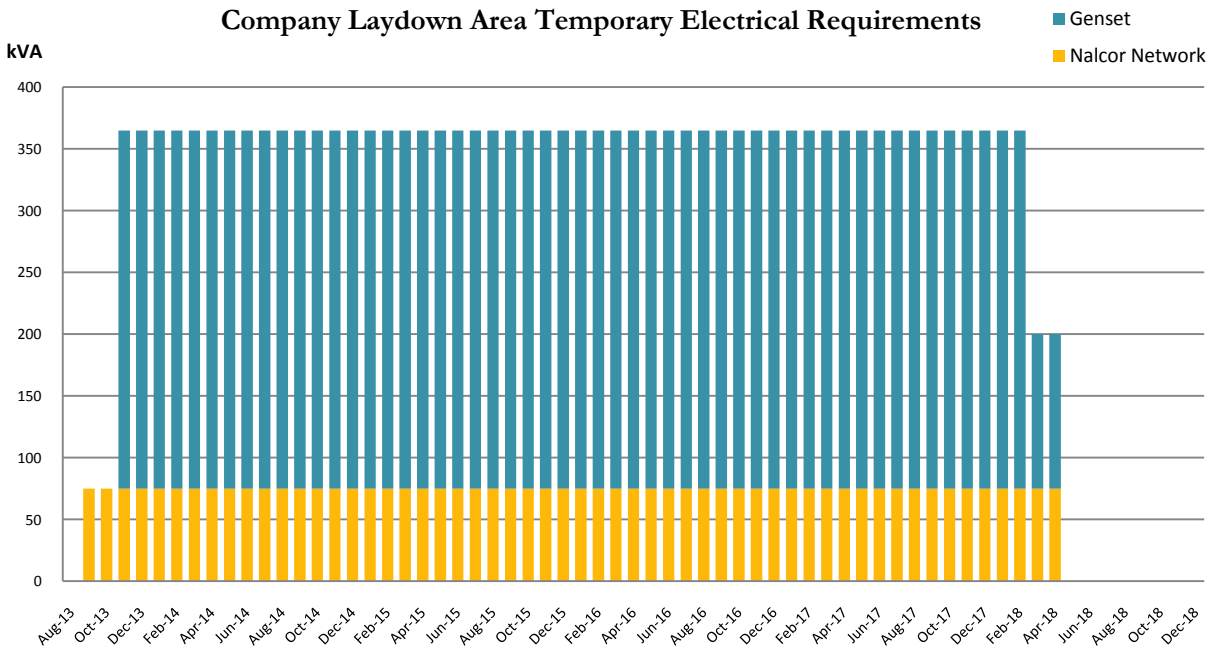

Figure 22: Company Laydown Area Temporary Electrical Requirements

Electrical Requirements at the Intake and Powerhouse

Nalcor will provide electrical power supply at the Powerhouse area with a total capacity of 925 kVA. The electrical power will be utilized to support the operation of the tower cranes, overhead cranes, concrete pumps, water and sump pumps, heating furnaces' fans inside the winter shelter, placing formworks and

concrete, as well as welding and servicing, which will require a total power capacity of 2095 kVA, as detailed in Drawings 03 & 03-D, -E & -F.

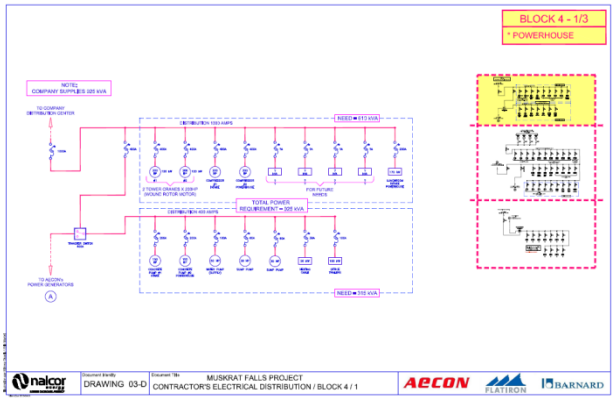

Figure 23: Contractor's Electrical Distribution/ Block 4/1

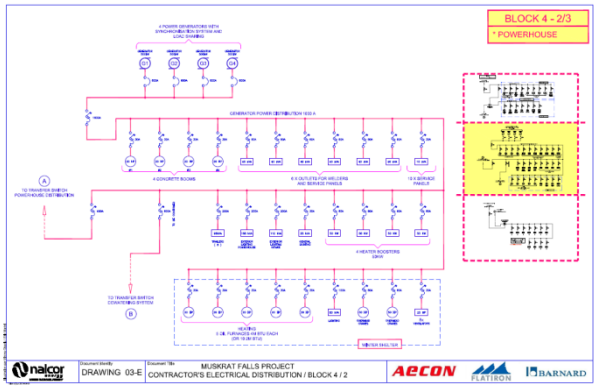

Figure 24: Contractor's Electrical Distribution/ Block 4/2

Our strategy to meet the power demand of the construction operation is to utilize the power supplied by Nalcor and provide four additional 500 kVA generators. One generator will be utilized as an emergency power supply to ensure that the dewatering system and concrete placing operation at the powerhouse would not be interrupted in case of power supply interruption. During this time, some of the other operations will be on hold until the power interruption is resolved by Nalcor.

Based on our electrical analysis, the graph below demonstrates our forecast for the power load required each month at this area.

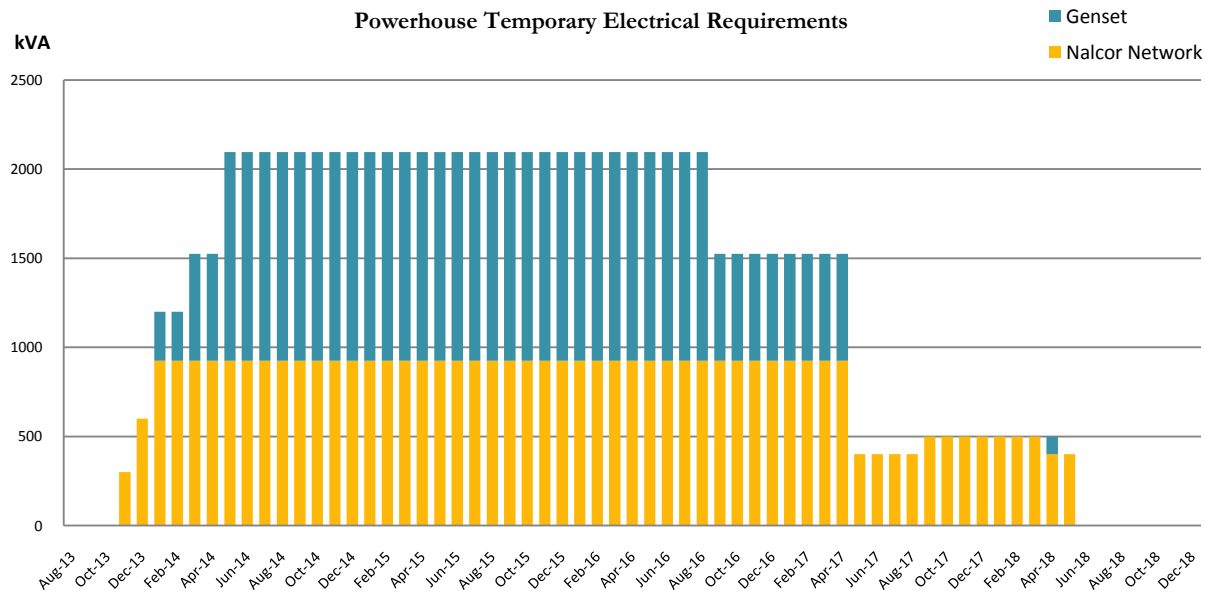

Figure 25: Powerhouse Temporary Electrical Requirements

Electrical Requirements at the Spillway

Nalcor will provide electrical power supply at the spillway with a total capacity of 300 kVA. The electrical

power will be utilized to support the operation of the overhead cranes, sump pumps, heating furnaces and fans inside the winter shelter, placing formworks and concrete, as well as welding and servicing, which will require a total power capacity of 700 kVA, as detailed in Drawings 03 & 03-G.

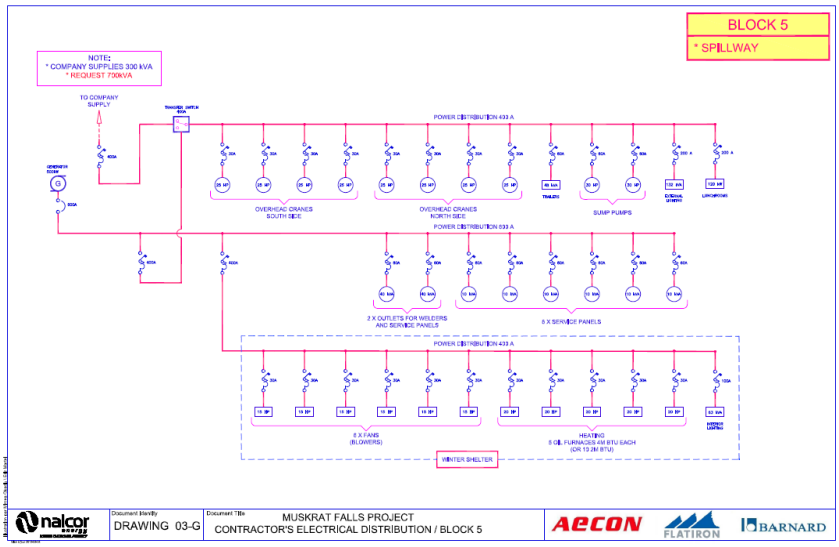

Figure 26: Contractor's Electrical Distribution/Block 5

Our strategy to meet the power demand of the construction operation is to utilize the power supplied by Nalcor and provide one additional 500 kVA generator. The generator will be utilized as an emergency power supply to ensure that the concrete placing operation at the spillway would not be interrupted in case of power supply interruption. During this time, some of the other operations will be on hold until the power interruption is resolved by Nalcor.

Based on our electrical analysis, the graph below demonstrates our forecast for the power load required each month at this area.

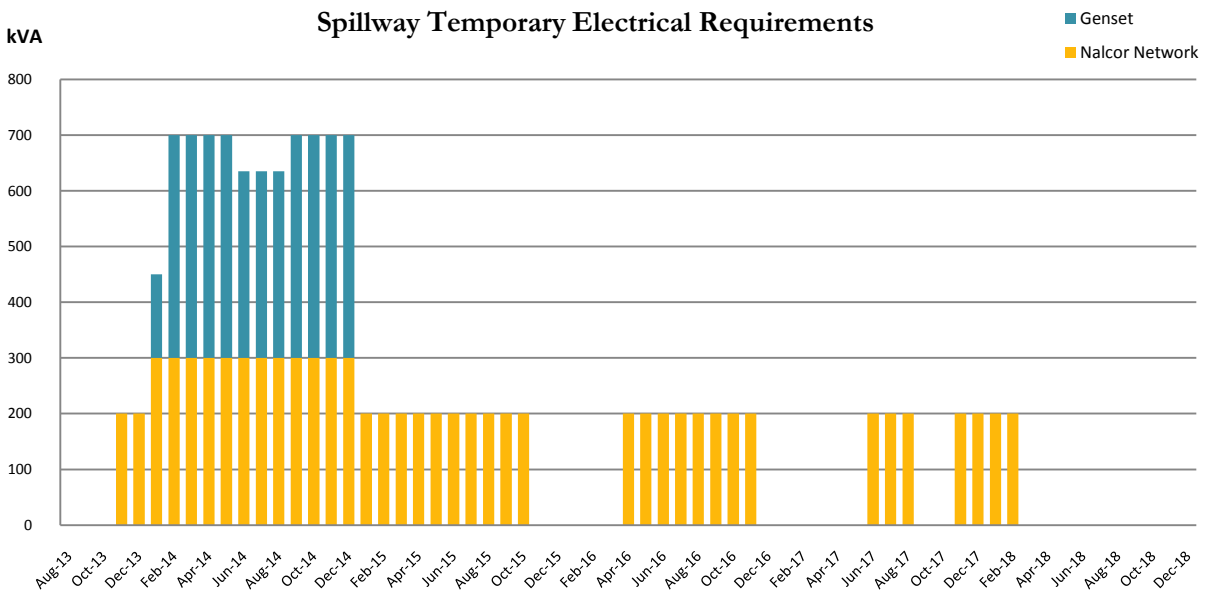

Figure 27: Spillway Temporary Electrical Requirements

In summary, AFB JV is aware of the restrictions on the temporary power provided by Nalcor, and we have accounted for adequate back-up measures to meet the required demand of temporary electrical power during the construction of the Project. AFB JV will work cooperatively with Nalcor/SNC-Lavalin to meet the demand of the temporary power supply throughout the Project at the most economic and efficient process for the Project.

Engineering and shop drawing production

Throughout the Project, AFB JV will utilize the following guide to manage the production of engineering and shop drawings.

Preparation of Shop Drawings:

- AFB JV will arrange for the preparation of clearly identified shop drawings as called for by the contract documents or as the Engineer (SNC-Lavalin) may reasonably request.
- Shop drawings will be prepared by AFB JV, its fabricators, suppliers, equipment manufacturers and subcontractors or by others retained by AFB JV.
- Shop drawings will be prepared following a review of the drawings, specifications and contract documents supplied by the Engineer, and the resolution of any inconsistencies or requested changes.
- When required, shop drawings will be sealed and signed by a qualified Professional Engineer registered in the Province of Newfoundland and Labrador.

Information to be included on Shop Drawings:

- Shop drawings will make reference to the appropriate design drawings produced by the Engineer by indicating drawing number(s) and revision number(s) and the appropriate section of the specification, as applicable.
- The design loads or quantities specified by the Engineer will be clearly shown on the shop drawings. The shop drawings will indicate the codes that have been used in the preparation of the shop drawings.
- Shop drawings will include the following information:

- Original date of issue
- Dates of all applicable revisions
- Project title
- Project address
- Project number
- Wherever applicable, the name(s) of the following:
  - contractor(s)
  - subcontractor(s)
  - supplier(s)
  - manufacturer(s)
  - separate detailer(s)
  - sequence number for each shop drawing
  - identifications of all products and materials
  - relation to adjacent structures or materials
  - clearly identified field dimensions
  - applicable standards – such as a Canadian Standards Association [CSA] or others

Submittal of Shop Drawings:

- Prior to submission to the Engineer, AFB JV will review and approve all shop drawings. By this review and approval, we represent that we have determined and verified all field measurements, field construction criteria, materials, and similar data, and that we have checked and coordinated each shop drawing with the requirements of the work and the contract documents. In compliance with our Quality Assurance, AFB JV will indicate our review and approval by including the date and the signature of a responsible person on each shop drawing. Based on our review, we will notify the Engineer in writing of any deviations in the shop drawings from the requirements of the contract documents.
- We require that shop drawings be accompanied by a transmittal letter showing date, project title, project number, project address, our address, and the sequence number of each shop drawing submitted. We request the Engineer's representatives to sign and return the transmittal indicating the date and name of person received the shop drawings.
- Shop drawings can be submitted in electronic format or as prints as the registered Engineer may direct. The format in which shop drawings are to be submitted may be established at the start of the Project. Similarly, the format in which shop drawings can be returned as having been reviewed or marked up may be established at the start of the Project.
- The Engineer will forward the shop drawings to the appropriate team member(s) for review. In performing his or her review, the Engineer will only review for conformity to the design concept and for general arrangement. The Engineer must seal the shop drawings and include appropriate wording to indicate the nature of the review, and that the shop drawings were reviewed for general conformance only to the design concept and for general arrangement.
- Unless the shop drawings have been approved by the Engineer, we will make all changes to the shop drawings that the Engineer may require to be consistent with the contract documents and resubmit the shop drawings. When resubmitting the shop drawings, we will notify the registered professional of record in writing of any revisions other than those requested by the Engineer.
- We recognize that such review and approval by the Engineer does not relieve AFB JV from its responsibility for any and all errors or omissions in the shop drawings or from its responsibility for meeting all the requirements contained in the contract documents.

Shop Drawings during Construction:

- The supply, fabrication or manufacture of components may not commence until the Engineer has

reviewed the shop drawings and returned them to AFB JV, which will provide authorization to proceed.

- A copy of the shop drawings must be available at all times at the location where the component is being made, at the site of the work, at AFB JV's office, and at the Engineer's office.

Shop Drawings after Construction:

- Upon completion of construction, a copy of all final approved shop drawings will be kept with the final design drawings and submitted to the Engineer as part of the turn-over documents.

Environmental and Dewatering Strategy

AFB JV has carefully considered the environmental protection and dewatering methodology required for the Muskrat Falls Project, in order to complete the Project successfully without any environmental incidents. Our environmental and dewatering strategy is described below:

Dewatering Strategy

The CH0007 Contract Specifications require that AFB JV operate and maintain the dewatering system installed by the CH0006 Contractor. Per the CH0006 Specifications, the dewatering system will have a capacity to pump 15m³/min, which is equivalent to 15,000 l/m. In addition to maintaining this mechanical dewatering system, AFB JV is required to operate and maintain existing ditches and sediment ponds left by the CH0006 Contractor, and design, construct, maintain and backfill any additional trenches and ditches, as necessary.

The sketch provided below depicts the pumping plan and discharge flows that were anticipated by one of AFB JV partners that submitted a proposal on the CH0006 Foundation Package. The system utilized heat-traced discharge piping to transfer the water from the pumps to the sediment basins. From the sediment basins, the water would free-flow through designed ditches to be discharged off-site. As the CH0007 Contract has not provided any details of the system that will be installed by the CH0006 Contractor, AFB JV has assumed that the CH0006 Foundation Contractor will have a similar or better system.

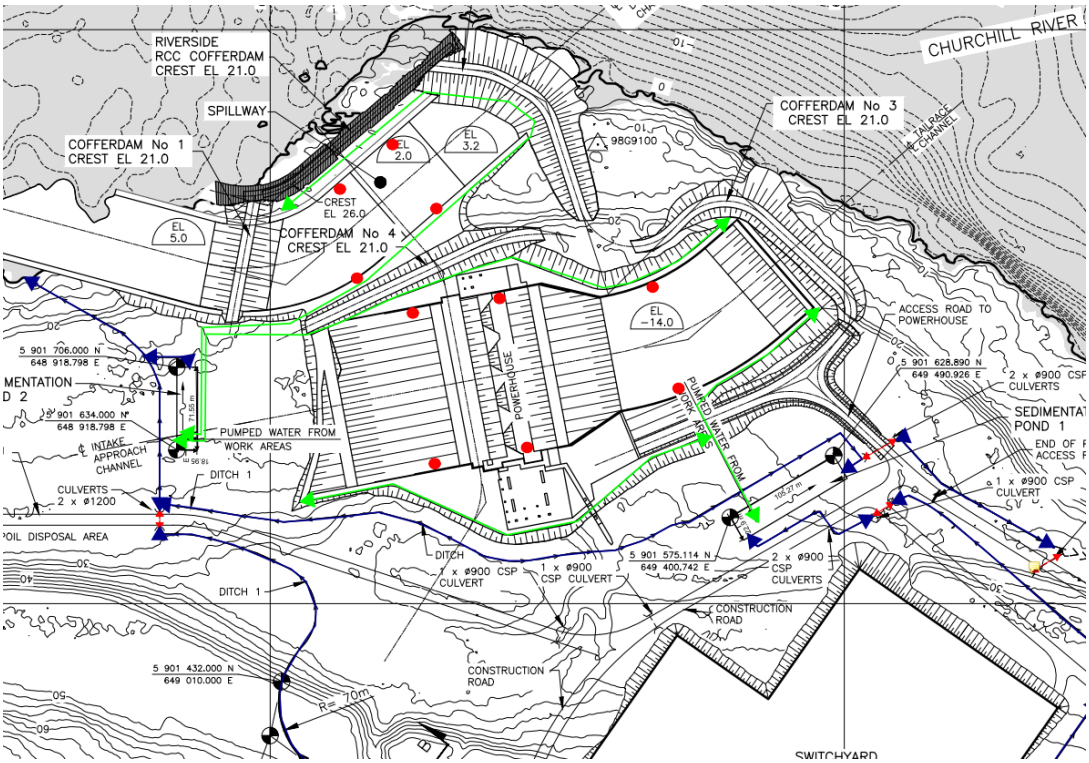

Figure 28:
The drawing above references potential sump locations (red dots) in the powerhouse and spillway cuts with discharge piping (green lines) running to the designed sedimentation ponds.

The dewatering system for the CH0007 Contract is directly contingent to the system that the CH0006 Foundation Contractor has installed. AFB JV has reasonably assumed that the dewatering system that the CH0006 Contractor has installed will be in good working order and will have sufficient capacity to meet the needs of AFB JV for the successful construction of the CH0007 Contract. In addition, AFB JV has been forced to assume that the existing dewatering system will function without further modifications to facilitate the large volume of concrete to be placed in the CH0007 Contract. In attempts to make allowances for modifications to the CH0006 dewatering system, AFB JV made several Requests for Information in an effort to thoroughly understand the system prior to submitting this proposal; however, this information has not been provided.

The CH0006 Foundation Contractor should have anticipated leakage under the cofferdams and constructed berms and ditches to keep sheet flows arising from rainstorms from running into the spillway and powerhouse areas. As these works are foreseen to be in place, AFB JV has made no allowance for their installation. In addition, no allowance has been made for any water treatment.

Environmental Strategy
AFB JV is committed to conducting its business activities in an environmentally responsible manner. In undertaking the construction of the Muskrat Falls Project, our JV Team will comply with all applicable federal, provincial and municipal regulations and By-Laws. We will implement environmental protection procedures as outlined in the P-WEPP and develop, implement, and maintain our own C-SEPP, as applicable. The environmental mitigation measures outlined in the C-SEPP will be consistent with the P-WEPP as well as the applicable standards, codes, acts and regulations and the conditions of Environmental Assessment ("EA") Release.

For details regarding AFB JV's environmental strategy for the Project, please refer to Appendix A8, Question 12.

General cold weather (hoarding) protection strategy

AFB JV's overall strategy for winter protection is to supply and erect large hoarding structures at the spillway and powerhouse structures, which will mitigate the impact of harsh winter and inclement weather on the work progress. Although our Team has a significant cost associated with constructing such a complicated structure, based on our cost-benefit analysis, we are confident that this option would play a significant role in facilitating our efforts to control the Project Schedule. Furthermore, the large enclosures will help our JV attract skilled trades eager for high-paying winter work, in a friendly environment.

Figure 29: 3D Time Lapse Construction Sequence Base Line

AFB JV is aware of the harsh winter conditions at the Project site where the air temperature ranges from -35 °C to 0 °C. Members have learned from similar northern projects such as:

- Churchill Falls Generating Station Project in Newfoundland
- Eastmain Hydroelectric Project in James Bay, Quebec
- Toulnustouc Hydroelectric Project north of Baie-Comeau, Quebec
- Long Spruce Generating Station in Manitoba
- Lower Mattagami Hydroelectric Complex in northern Ontario
- Laforge-1 (intake), Laforge-2 (powerhouse) and Brisay (powerhouse) projects in James Bay, Quebec, that utilize such shelter will significantly mitigate the risk on the Project Schedule.

The following sections describe our hoarding strategy for winter 2013/2014, 2014/2015 and 2015/2016 at

different areas on the Project site. Considering the significant amount of concrete to be placed at various components of the Project (i.e., spillway, intake, powerhouse, center/north and south transition dams, separation walls, approach channels, etc.) and the aggressive Project schedule, the JV will be adopting different strategies for protecting the concrete placed at different components and different times.

Hoarding Strategy for Spillway, Intake and Powerhouse

Due to the extensive amount of work required to complete the spillway, intake and powerhouse structures in a relatively aggressive timeframe, the JV will provide a fully enclosed frame shelter to cover the work areas at these locations so concrete placement and protection activities can be mainly undertaken in an enclosed and controlled environment. The closures strategy is summarized below and detailed in the hoarding drawings, Drawings 07 through 07-F, included in the Drawing Package of our RFP submission. Please refer to these in conjunction with the descriptions below.

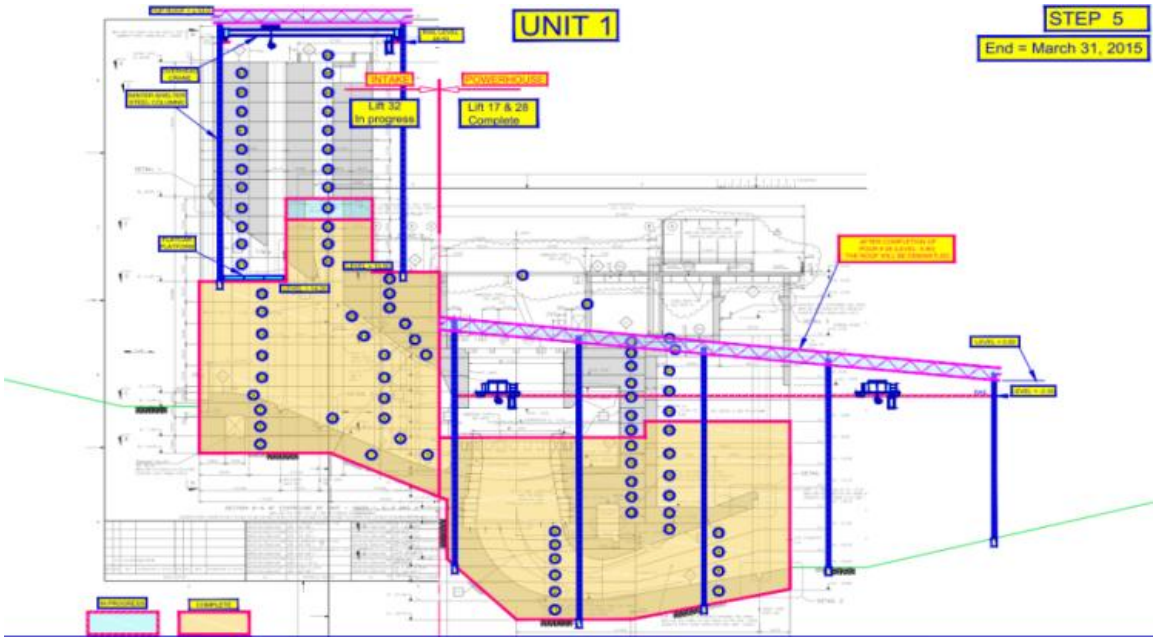

Figure 30: Hoarding Strategy

Winter 2013/2014
In winter 2013/2014, AFB JV will commence the work on the spillway, and north and center transition dams, as well as the powerhouse and intake units 1 and 2, as detailed below:

Spillway Structure

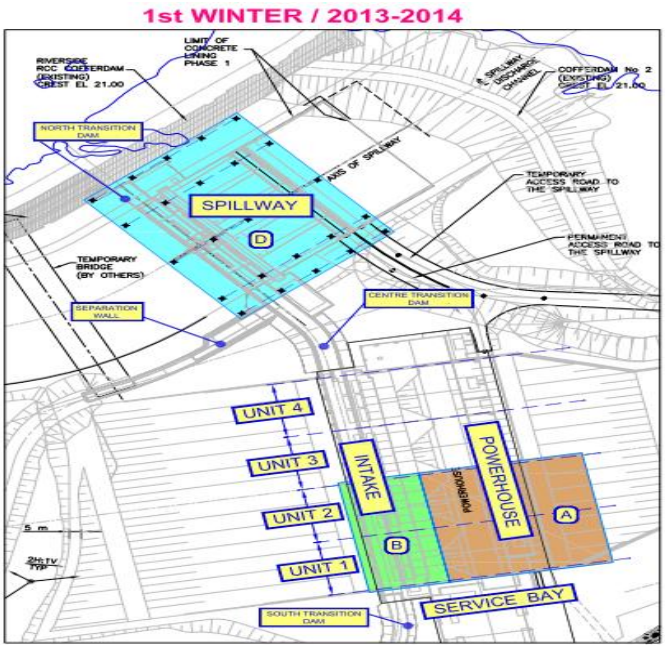

Figure 31: 1st Winter/ 2013-2014

Initially, areas requiring foundation preparation (rock cleaning and grouting) will be covered with small fabric buildings/tents and individually hoarded and heated (Type III & Type IV Protection). From Nov. 11, 2013, through Jan. 20, 2015, a full MUROX shelter steel building will be installed over the entire spillway, the north transition dam and a small part of the centre transition dam. The structure will be founded on the excavated spillway rock surface and extend to elevation ranges between 40.80 and 59.50, as shown on Drawings 06-B & -D. This building will be heated by self-contained diesel fuel heaters with burner capacities up to 4.2 million BTUs/hr. This structure will be removed in winter 2015.

North and Center Transition Dams

The north transition dam and portion of the center transition dam, including the electrical room, will be enclosed under the spillway MUROX shelter, detailed above.

Intake Units 1 and 2

Initially, areas requiring foundation preparation (rock cleaning and grouting) will be covered with small fabric buildings/tents and individually hoarded and heated (Type III & Type IV Protection). From early November 2013 through mid-August 2014, a full MUROX shelter steel building will be installed over the lower intake area of units 1and 2. The structure will be founded on the excavated intake rock surface and extend to elevation ranges between 3.5 and 7.06, as shown on Drawings 07-A & B. This building will be heated by self-contained diesel fuel heaters with burner capacities up to 4.2 million BTU/hr. This structure will be removed in the summer of 2014.

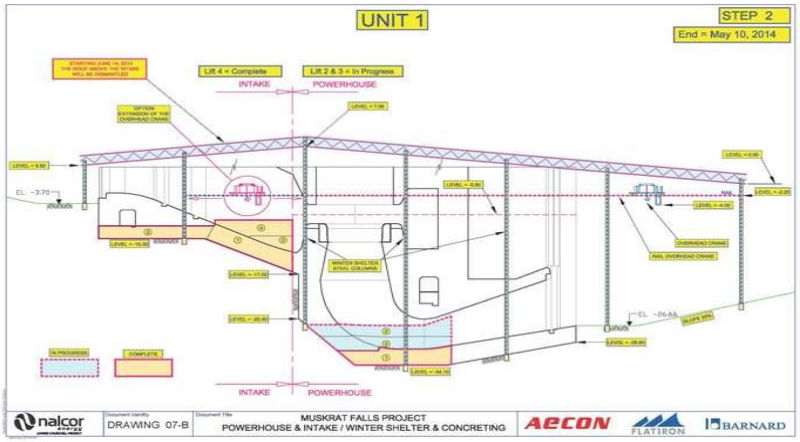

Figure 32: Powerhouse & Intake/ Winter Shelter & Concreting

Intake Unit 3

Areas requiring foundation preparation (rock cleaning and grouting) will be covered with small fabric buildings/tents and individually hoarded and heated (Type III & Type IV Protection). Only the invert will require protection from early November 2013 through early spring 2014. These areas will be heated by small diesel fuel-powered heaters. No shelter steel building will be installed over the intake area unit 3 in winter 2013/2014 as we defer the work to early spring 2014.

Powerhouse Units 1 and 2

Initially areas requiring foundation preparation (rock cleaning and grouting) will be covered with small fabric buildings/tents and individually hoarded and heated (Type III & Type IV Protection). In early November 2013 through spring/summer 2015, a full MUROX shelter steel building will be installed over the powerhouse area units 1 and 2. The structure will be founded on the excavated powerhouse rock surface and extend to elevations ranging between 0.00 and 7.06, as shown in Drawings 07-A through E. This building will be heated by self-contained diesel fuel heaters with burner capacities up to 4.2 million BTU/hr. The structure will be extended to cover units 3 and 4 in fall 2014, and then removed from unit 1 by April 2015 and unit 2 by July 2015.

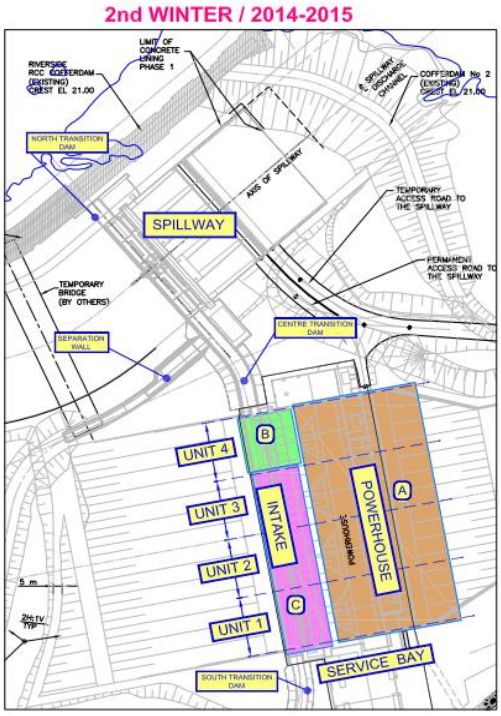

Figure 33: 2nd Winter/2014- 2015

Winter 2014/2015

During winter 2014/2015, AFB JV will continue working on intake and powerhouse units 1, 2, 3 and 4, as detailed below:

Intake Units 1, 2 and 3

From late November 2014, a full horseshoe shelter will be installed over the upper intake area of units 1, 2 and 3. Portions of this structure will be removed, as individual units are completed, between September 2015 and December 2015, respectively. The structures will be founded on previously poured intake structure at elevations 14.2 and 15.5, and extended to elevation 53, as shown on Drawings 07-E & 07-F. These building will be heated by self-contained diesel fuel heaters with burner capacities up to 4.2 million BTU/hr. The entire structure will be removed by December 2015.

Intake Unit 4:

From mid June 2014 through March 2015, a full MUROX shelter steel building will be installed over the lower intake area of units 4. The structure will be founded on the excavated intake/powerhouse rock surface and extend to elevation ranges between 3.5 and 7.06, as shown on Drawing 07-A & -B. This

building will be heated by self-contained diesel fuel heaters with burner capacities up to 4.2 million BTU/hr. This structure will be removed by end of spring 2015.

Powerhouse Structure

Powerhouse Units 1 and 2

The work on powerhouse units 1 and 2 will continue under the MUROX shelter erected in winter 2013/2014 as described above. The structure will be removed from unit 1 by April 2015 and unit 2 by July 2015.

Powerhouse Units 3 and 4

In September and October 2014, a full "MUROX" shelter steel building will be installed over the powerhouse area units 3 and 4. The structure will be founded on the excavated powerhouse rock surface and extend to an elevation that ranges between 0.00 and 7.06. This building will be heated by self-contained diesel fuel heaters with burner capacities up to 4.2 million BTU/hr. The structure will be removed in August 2015.

Winter 2015/2016

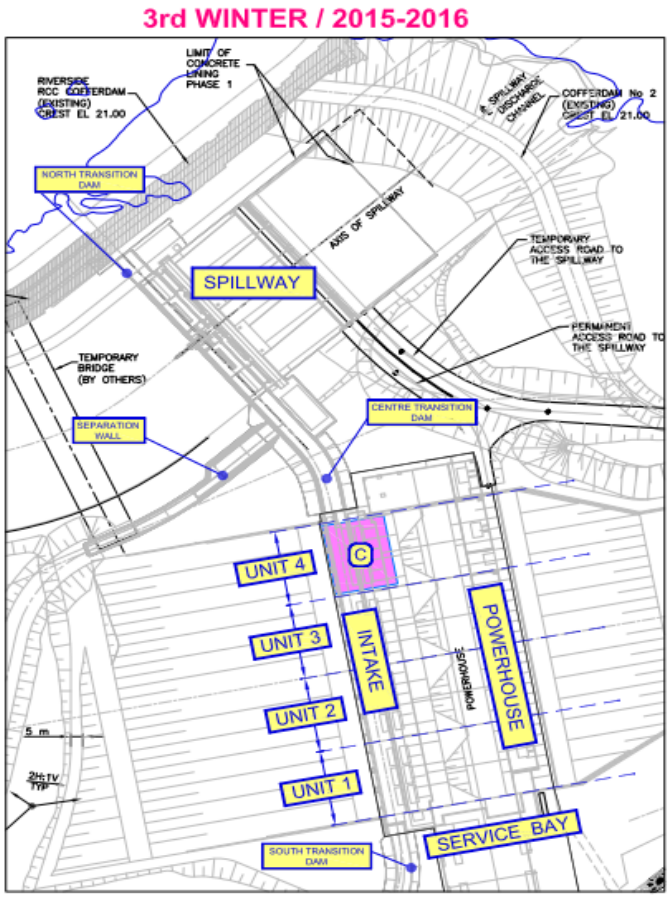

Figure 34: 3rd Winter/ 2015-2016

Intake Unit 4

From September 2015, a full Horseshoe shelter will be installed over the upper intake area of unit 4. The structures will be founded on previously poured intake structure at elevations 14.2 and 15.5, and extended to elevation 53, as shown on Drawings 07-E & 07-F. The building will be heated by self-contained diesel fuel heaters with burner capacities up to 4.2 million BTU/hr. The entire structure will be removed by mid March 2016

South Service Bay

In November 2015, a stand alone "MUROX" shelter steel building will be installed over the South Service Bay area. The structure will be founded on the excavated surface. This building will be heated by self-contained diesel fuel heaters with burner capacities up to 1.2 million BTU/hr. The temporary structure will then be removed in the spring of 2015.

At other areas of the Project such as the spillway approach channels and rollways, separation wall and south transition dam, AFB JV will implement local hoardings and protection measures to protect the concrete during winter in accordance with CSA A23.1. Throughout the Project, we will utilize the following guideline to ensure compliance with the Project specifications.

General Requirements
When the ambient temperature is at or below 5 °C, AFB JV will implement adequate protective measures to:

- Maintain the concrete surface temperature above 5 °C for the duration of the curing period, and ensure the concrete temperature will never fall below the freezing point until the concrete has reached a minimum strength of 10Mpa.
- Limit the internal and external concrete temperature differential for mass concrete elements to within 20 °C to minimize cracking. Monitoring and recording concrete and ambient air temperature will be undertaken to determine if the maximum 20 °C temperature differential is being met and verify compliance with the requirement of table 21 of CAN/CSA A123.1-09.

In general, concrete will be protected from overnight freezing by using 25 mm insulating blankets, insulated forms or a combination of both per Type 1 specifications. When temperatures are predicted to fall or remain below 0 °C but not exceeding -12 °C, temporary enclosures will be utilized along with circulated warm air and insulating blankets with a value of 75 mm or insulated forms as necessary to ensure formwork, steel reinforcement, and substrate surface temperatures are above 5 °C prior to placing concrete. Extra heaters, fuel and any other materials such as insulating blankets will be on hand for use if necessary.

Enclosures and framed shelters shall be constructed, maintained and monitored to ensure:

- Concrete exposure to the outside environment during placement is minimized.
- Ventilation is adequate so there is no build-up of excess carbon dioxide generated from heaters that comes in contact with the concrete during curing and cooling periods.
- Concrete will comply with the specification by maintaining the required surface temperature of 5 °C during the curing period, and ensuring the cool down rates, when removing the protection, do not exceed specification requirements to prevent cracking from thermal shock.

The concrete temperature at the time of placement shall comply with the limits specified in CSA A23.1 - Table 5. Concrete handling equipment, such as pump lines, buckets, etc., will be insulated to ensure concrete temperatures are maintained. For each pour, the JV will prepare a table and graph showing the temperature differentials between the ambient air temperature, the concrete surface temperature and concrete core temperature. The results will be available for review by SNC-Lavalin.

Pre-placement Activities
Sufficient enclosures will be constructed in advance of concrete placement to ensure formwork, reinforcing and substrate meet the specification-required temperatures. Just prior to concrete placement, formwork, reinforcing and substrate surface temperature will be checked by Quality Control to ensure they are above 5 °C and that there is no frozen material present that will come in contact with the fresh concrete. In the case of placing fresh concrete on previously placed concrete, the surfaces to come in contact with the fresh concrete will be protected from freezing (i.e., insulating blankets or circulating warm air) in such a manner as not to crack or damage the existing concrete. In all cases, use of a direct flame on reinforcing or existing concrete will not be allowed. In accordance with the specifications, a concrete Placement Authorization Request shall be completed prior to concrete being introduced in the forms signifying that all items are acceptable including temperature requirements. Thermocouples will be installed near the surface of the concrete, at 50 mm from it and if mass concrete in the centre of the pour to track the concrete temperatures at all times.

Crane strategy including site lay-out drawings

AFB JV has thoroughly considered the required lifting equipment, specifically overhead cranes, tower cranes, and mobile cranes that are required on the Project. AFB JV's crane strategy is as described below:

Overhead Crane Use in the Spillway, Intake and Powerhouse Structures

AFB JV's strategy is to supply 16-each 10-ton temporary overhead cranes on the Project (i.e., 8-OH cranes at the spillway and 8-each OH cranes at the powerhouse) to effectively undertake the works under the hoarding structures. These OH cranes will be installed on the shelter structure and run under the heated shelter, maximizing productivity and minimizing any safety issues associated with craning in cold weather

In general, the temporary OH cranes will be used to move construction materials (e.g., formwork, reinforcing steel, and miscellaneous materials), set and strip formwork and steel cages, as well as install upper and lower spiral case, etc. The temporary OH cranes in the powerhouse may be utilized by the Company's other contractors to facilitate the assembly and erection of the powerhouse's permanent OH crane, or other work as required by Nalcor/SNC-Lavalin.

Tower Cranes and Mobile Crane Use at the Spillway, Intake and Powerhouse Structures
Drawing 05-A shows the work area layout and the location of the proposed tower cranes. AFB JV will utilize two tower cranes to service the powerhouse, intake and center transition dams as shown in Drawing 05-A. We will also use different mobile cranes and boom trucks, as detailed in the table below, to aid in the construction process at different locations. Drawing 05A shows the proposed access roads and working platforms that will be used by the tower cranes and mobile cranes. Drawings 05-C & -D show the working platforms in front of the intake and powerhouse structures, which will be used to facilitate access of pumping equipment and mobile cranes.

Equipment	Quantity	Capacity	Manufacturer	Model	Year
Tower Crane	2	3-24 tonne	KROLL	K-620	2013
Overhead Crane	16	10 tons	Protech	PH-10	2013
Harbour Crane - Mobile	1	100 tonne	Gottwald	H280E	2007
All-Terrain Hydraulic	1	500 tonne	Terex-Demag	AC500	2005
Truck - Hydraulic telescopic crane	2	45 tonne	GROVE	TMS 745	2013
RT Crane - Hydraulic telescopic	2	130 tons	TEREX	RT130	2013
RT Crane - Hydraulic telescopic	2	80 tons	TEREX	RT780	2013
Crawler - Lattice boom	1	400 tons	Liebherr	LR1400-2	2006

Resources, including the manpower forecast per trade for the duration of the works as well as the monthly accommodation requirement at the camp.

Please refer to Appendix A12.

Details of labour attraction and retention strategy

AFB JV will develop a detailed staffing management plan, as part of the human resources plan that will describe when and how human resource requirements will be met. We recognize that attracting the required skilled workforce is the most significant risk on the Project, and therefore, we have developed the following strategies to mitigate the risk:

- Offering competitive compensation and benefit packages, financial incentive/premium and travel compensation to work on remote projects.

- Providing world-class accommodations, including cafeteria and recreation facilities. It will be an advantage to the Project if the workforce can keep their rooms during the turnaround period.
- Building partnerships with local communities, Innu and First Nations (i.e., the Project will have an Innu peoples' human resources liaison to assist with communications, hiring and day-to-day work-related issues).
- Identifying and communicating Project labour needs at an early stage.
- Establishing recruitment initiatives (i.e., database for workers, suppliers and subcontractors; career seminars and workshops; career booklets and advertisements, etc.).
- Establishing a detailed training program (i.e., on-the-job training for craft workers) and working with government-sponsored training programs available for Innu communities.
- Selecting candidates early (e.g., conditional letters of intended employment, etc.) and providing specific training programs to certain Labrador candidates.
- Providing workplace attachment for both first- and second-year graduates of apprenticeship programs to the maximum extent possible.
- Providing a variety of work schedules to accommodate different groups of workers and to assist in meeting Nalcor's employment goals, particularly for Aboriginal employees and women.

Identification of required site layout of temporary facilities (include plan view) for proposed offices, warehouses, garages/workshops, storage yard needs, special equipment, lunch room

AFB JV has carefully considered the needs to facilitate construction requirements. On a Project of this magnitude in such remote location, it is imperative that all facilities are properly planed out to ensure the most efficient construction methodology. The drawings shown below provide an indication of the temporary facilities AFB JV will install to facilitate the works.

- Drawing 02-A shows the general layout of the Project site and identifies AFB JV's required utilization areas, at different location across the Project site, to accommodate the construction temporary facilities.

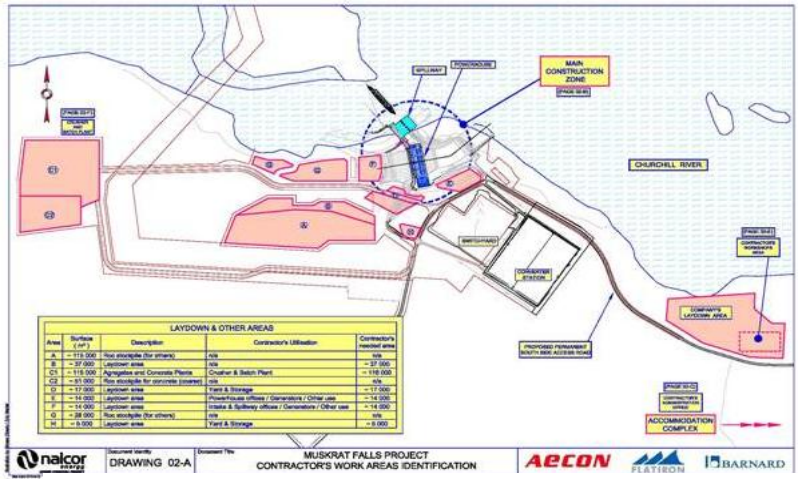

Figure 35: Contractor's Work Areas Identification

- Drawing 02-C shows the proposed layout for AFB JV Team's administration office within the accommodation complex. AFB JV has envisioned the need for approximately 4,500 m2 for administration office.

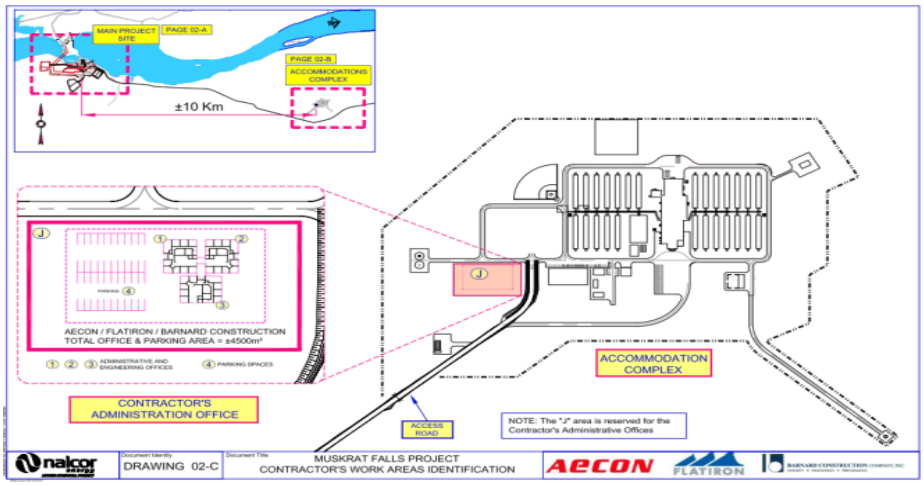

Figure 36: Contractor's Work Areas Identification

- Drawing 02-D shows the proposed layout of temporary facilities (e.g., site offices, C-cans, lunch rooms, generator, fuel tank, etc.) at the spillway, intake and powerhouse structures.

Figure 37: Main Construction Zone-Work Sites & Access Roads

- Drawing 02-E shows the proposed layout for AFB JV's fabrication shop, including carpenter shop, electrical shop, warehouse, welding and fabrication shops, garage, etc.). Based on our preliminary planning, we have envisioned the need for approximately 20,000 m2 to accommodate the required area for the fabrication shop.

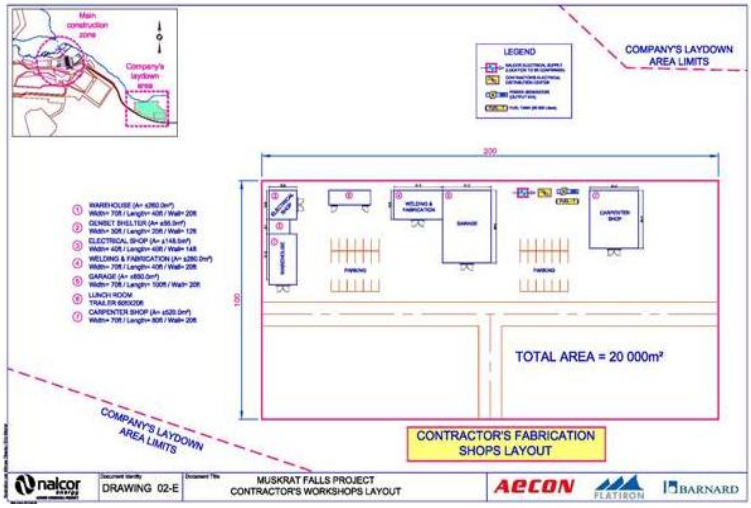

Figure 38: Contractor's Workshops Layout

- Drawing 02-F shows the proposed site layout of the concrete batch plant and crushing area. Based on the large volume of concrete and aggregates required on this Project, we need approximately 116,000 m2 to set up the temporary facilities required for concrete production and aggregate processing and stockpiling.

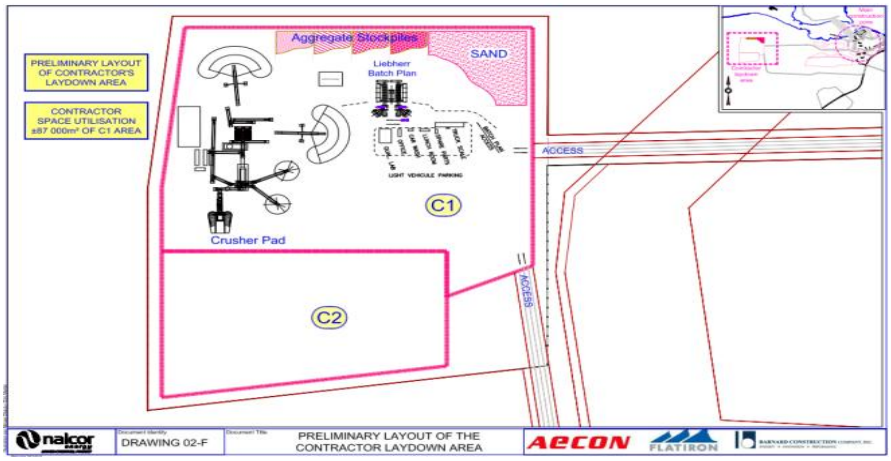

Figure 39: Preliminary Layout of the Contractor Laydown Area

Detail how use of latest electronic technology will be used in engineering/design/survey data and the coordination, planning and management of the work.

All partners of AFB JV continually explore the use of new technologies available to the construction industry. Our staffs continually undergo training to ensure that they are skilled and proficient at applying these advances to their work in the office as well as in the field. In every case, the Team members determine what technologies and software bring the best value to the specific project at hand. The following are some of the technologies AFB JV is contemplating using to improve upon the production and management for the Muskrat Falls Project.

Electronic Timecards: Current systems that our Team members utilize are often driven by liability issues; for example, timecards require a personnel authorization that the time is correct and a notation on whether or not that individual was injured during the day. The JV is currently reviewing the use of paperless timecards, while covering the bases on the liability side. One option is the use of wireless tablets with PINs issued to each crew member. This real-time field reporting system allows the foreman to code a crew member's hours to the correct cost code in the field and eliminates the need for office personnel to re-enter the information from a paper timecard into a cost-tracking system.

Daily Cost Tracking: Daily cost tracking is a powerful, yet simple tool, that allows for a glimpse into the day's production and cost. It empowers the field foremen to calculate their own progress and crew costs.

BIM/Civil 3D : Our Team has already broken up every concrete pour on the Project into an individual pour that calculates the form quantity, concrete volume, and surface prep. Should we be selected as the preferred contractor, AFB JV would add all embeds, piping, rebar, grounding, etc. to this model. We would be constructing the project in a digital version and be able to understand conflicts with a small office staff versus discovering them in the field with a much larger workforce. This saves money and time for all parties on this type of contract.

AFB JV can take BIM out of the office and onto the site via the use of computer tablets. Once a BIM model has been loaded onto a tablet that is oriented to the site either by GPS or Wi-Fi systems, individuals can use the tablet as a window that one can look though to see the final product in the midst of construction.

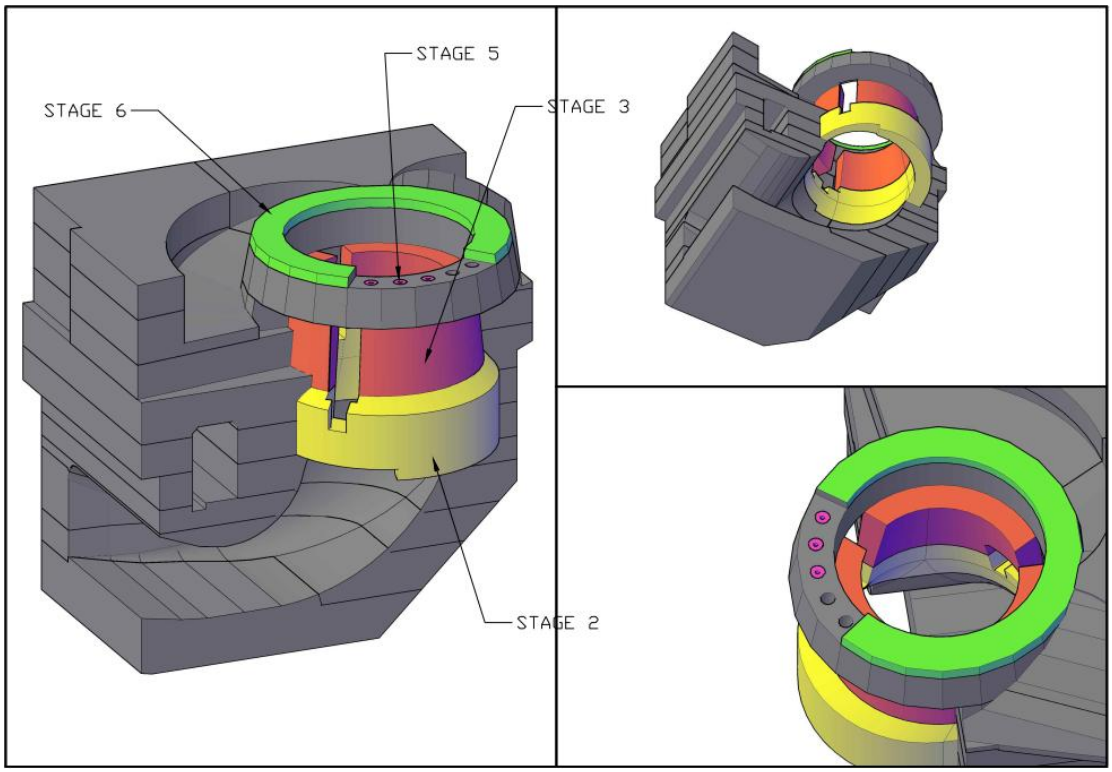

Figure 40: AFB JV 3D view developed during bid preparation

3D Printer Model of the Structures and Site – AFB JV already has enough information to print a model of the Project and its associated structures. We see the use of a couple models to be helpful for

Owner/Engineer coordination and Field Crew Coordination meetings. Each pour would be modeled to fit in the model. This allows crews to visually understand the direction of the Project, improving overall Project communication. The 3D model, expected to cost $30,000, would improve the overall labour productivity and has the ability to minimize any rework scenarios.

Figure 41: AFB JV 3D view developed during bid preparation

Production Analysis: The AFB JV Team has experience with production analysis and crew training that will be essential in our Team's ability to manage the Project labour component and ensure our target price is not exceeded. We refer to this analysis as Breakthrough Training. It benefits repeat activities and identifies a step-by-step time analysis of multiple cycles of an activity. The analysis involves videotaping and time breakdown of each step of multiple cycles. The Team times each step of the work and identifies delays that affect the work. The Team then works to eliminate those delays. We utilize this approach on our projects to minimize the labour cost and improve upon the project schedule. On this Project, Breakthrough Training can really have an effect on the overall project since it's an evaluation of people's tendencies. Crew productions can easily be compared and focused upon as necessary to maximize the project production. This tool was instrumental in the Saluda Dam Remediation Project, where a new chimney filter placement method was developed. It allowed for a more rapid placement of critical chimney filters. The end product contributed to finishing the project one year early and resulted in the project's high quality; it is now considered the preferred method of placement worldwide.

Software Applications

AFB JV uses a variety of integrated computer systems and software applications to gain full productivity out of our workforce.

Estimating Software: Our JV partners utilized various estimating programs, such as Hard Dollar, Sharpe, etc. to develop the cost estimate for this Project. This cost estimate will be considered the cost performance baseline of the Project. The estimating software will be available at the jobsite and utilized for pricing out additional scopes of work, if requested by the Owner/Engineer.

Scheduling Software: AFB JV utilizes Primavera P6 as its primary scheduling program to produce a resource-loaded Project schedule. The software can be integrated with Hard Dollar and other cost estimating software to calculate the Earned Value Measurements that will be used to monitor and control the Project progress. The Project Schedule will be updated regularly, based on daily input from the field. It will provide a real-time indication of Project progress compared to the baseline schedule. Look-ahead schedules will be used by the Project Team on a weekly basis to plan and execute the upcoming work.

Cost Controls: Aecon uses an Electronic Construction Management System (eCMS), which is an integrated production tracking and accounting system. The eCMS application is able to support Aecon's ongoing project management processes and procedures with functionality such as but not limited to, production tracking, cost

tracking, payroll processing, invoicing, subcontract management, and financial reporting. The eCMS system is operated remotely using the internet for project access.

Survey/Design Software: We use AutoCAD Civil 3D in a variety of applications, including quantity takeoff, design, and survey control.

Document Control: AFB JV Team members utilize different document control systems, including Contract Manager (Oracle), SharePoint 10, etc. to accurately manage and maintain up-to-date Project information. Through our various experiences, we have proven our abilities to adapt to any software or document control system Nalcor provides, if required.

All of these software programs are integrated by the user to model the job and gain a full understanding of cost, schedule and construction sequencing.

Fleet Management & Remote Diagnostics: With the advent of GPS-based remote diagnostics and fleet management software, preventative maintenance and repair drastically reduce the risk of failures that will impact productivity on site. Planned maintenance and repair allows for a structured approach to providing reliable support to the construction arm as well as increasing safety levels on site and diminishing potential environmental risks.

Laser Surveying: An additional new technology that AFB JV survey teams will utilize is a 3D laser scanner. 3D laser scanners, such as the Trimble CX, can generate extreme amounts of accurate data quickly. The 3D laser scanner's true strong point is its ability to generate as-builts of structures that would be difficult or impossible to accurately map with traditional survey equipment, such as the turbine tailraces and the rock walls of the excavation. AFB JV would utilize an inurement like the CX to initially scan and digitize the rock surface. The data from this scan will allow AFB JV to know if the rock has been under- or over-excavated and notify Nalcor/SNC-Lavalin of any forthcoming quantity and design issues. The data from this initial scan are easily transferred into AutoCAD where they can serve as the foundation for design changes and graphic models.

The utilization of the above technologies including BIM, wireless networks and systems like the 3D laser scanner will allow AFB JV to efficiently track and manage the work being performed at the Muskrat Falls Project.

2.0 Bidder shall submit organization charts for the management, control and execution of all phases of the Work. Organization charts shall at a minimum outline the position description, the incumbent in each position and identification of key Personnel. Examples of Key Personnel are as listed below:

- **Contractor's Representative/ Project Manager**
- **Engineering Manager**
- **Resident Engineer**
- **Construction Manager**
- **Construction Superintendents**
- **Equipment Manager**
- **Quality Manager**
- **Health and Safety Manager**
- **Environmental Manager**

- **Planning and Schedule Manager**
- **Risk Manager/ Coordinator**
- **Financial and Accounting Manager**

3.0 Resumes of key Personnel shall be included in the Proposal and should, at a minimum, include the following information:

- **Position**
- **Name**
- **Education**
- **Work Experience**
- **Clearly indicate hydro experience**
- **References**

Key Personnel provided in this Appendix will be included in Item 3.2 of Exhibit 3 of the Agreement (Part 2 of the RFP).

4.0 A list of hydro projects with Powerhouse and Spillway structures of similar complexity presently under construction by Contractor for future visit by Company's representatives during the evaluation process.

AFB JV has the following hydroelectric projects under construction. We have provided references for these projects in Appendix A1– Question 4.6.

- Waneta Expansion Project, British Columbia
- Lower Mattagami Hydroelectric Project, Kapuskasing, Northern Ontario
- Snoqualmie Falls Hydroelectric Redevelopment Project, Snoqualmie, Washington
- Saluda Dam Remediation Project, Columbia, South Carolina
- Ruskin Dam Powerhouse and Spillway Upgrade Project, Mission, British Columbia

Appendix A13 List of Attachments:

Attachment 1	Milestone Dates Table	1
Attachment 2	Layout of the Concrete Batch Plant	1
Attachment 3	Forecast of Monthly Electrical Requirements	1