

Rupert diversion bay section			
Structures or works	Description	Excavated vol. (m³)	
		Overburden	Rock
Spillway	Concrete structure to the left of Rupert dam Two surface gates 12.2 m wide and one gated bottom opening 5 m wide by 7.1 m high Releases Rupert instream flow; discharges flow exceeding the 800 m³/s maximum diversion flow and the 3,470 m³/s PMF	90,000	650,000
Transfer tunnel	Located between the forebay and tailbay. Includes: – Intake canal (600 m long) – Concrete weir (90 m long) – Head pond (200 m long) – Tunnel (2,900 m long, 12.7 m wide and 18.6 m high) – Outlet canal (220 m long)	890,000	1,640,000
Instream flow release structure (C-R-22) at Lemare dam (C-R-21A)	Concrete structure built into the right abutment of dike C-R-22 Three bottom openings: two square with downstream gates, and one round, always open Releases substantially the mean annual flow of the Lemare (16.2 m³/s), approximating the river's mean natural hydrograph, with a maximum discharge of 88 m³/s Used as a temporary by-pass during construction of dike C-R-22	34,000	27,000
Instream flow release structures at Nemiscau-1 (C-76) and Nemiscau-2 (C-108) dams and Arques dike (C-104)	Three structures releasing substantially the mean annual flow of the Nemiscau (15.9 m³/s), approximating the river's mean natural hydrograph, with a maximum discharge of 86 m³/s <b>Nemiscau-1 structure:</b> – Two square bottom openings with downstream gates – Maximum flow 74 m³/s, mean annual flow 11.6 m³/s, maximum flow velocity 4.0 m/s – Structure allowing flow control – Used as a temporary by-pass during construction of Nemiscau-1 dam <b>Nemiscau-2 structure:</b> – Two round bottom openings, one with downstream gate – Maximum flow 6.0 m³/s, mean annual flow 2.0 m³/s, maximum flow velocity 5.4 m/s – Used as a temporary by-pass during construction of Nemiscau-2 dam <b>Arques structure:</b> – Two steel pipes, maximum flow 6.0 m³/s, mean annual flow 2.3 m³/s – At the end of its use as a temporary by-pass, the downstream end of one of the pipes will be modified to include two openings (one gated)	39,000	29,100
Relocation of three 735-kV transmission line segments	Relocation of 19 towers affected by impoundment of the Rupert tailbay (circuits 7059, 7069 and 7070), for a total of 8,300 m of transmission line	—	—

Increased-flow section			
Structures or works	Description	Excavated vol. (m³)	
		Overburden	Rock
Eastmain-1-A powerhouse	Located east of Eastmain-1 powerhouse. Includes: – Headrace canal (300 m long) – Intake with three openings – Three penstocks – Surface powerhouse (three vertical Francis units) – Tailrace canal (1,050 m long) – Switchyard to the west of the powerhouse, connected to Eastmain-1 substation by means of a 315-kV line 1 km long	707,000	2,200,000
Sarcelle powerhouse	Located east of the Sarcelle control structure. Includes: – Headrace canal (approx. 260 m long) – Intake with two openings – Surface powerhouse (three bulb-type units) – Tailrace canal (approx. 200 m long) – Switchyard located northeast of the powerhouse, connected to Eastmain-1 substation by means of a 315-kV line 102 km long	146,000	1,063,000
Weir at Sakami Lake outlet	Located on the left bank of the main stem of Sakami Lake outlet Concrete weir built across a canal Weir 125 m long with 185.2 m crest elevation	218,000	—

Rupert-Lemare-Nemiscau section (Waskaganish area)			
Rupert bank stabilization at Waskaganish	Left bank of the Rupert riprap-protected for about 200 m downstream and 100 m upstream of the water intake (if the work has not already been done)	—	—
Waskaganish drinking water plant	Construction of a new plant	—	—

Rupert-Lemare-Nemiscau section (lower Rupert River)																
KP	Description	Crest dimensions			Permanent structures		Cofferdams and canals		Footprint (m²)						Dikes <sup>2</sup>	
		Elevation (m)	Length (m)	Height (m)	Fill (m³)	Excavated (m³)	Fill (m³)	Excavated (m³)	In water			On land			Length (m)	
									Permanent structures <sup>1</sup>	Cofferdams	Canals	Permanent structures	Cofferdams	Canals		
20.4	Rock blanket	14.0	200	4	57,000	0	0	0	0	50,000	0	0	0	0	0	0
33	Weir	52.7	177	3	54,000	17,000	25,000	4,000	17,000	13,000	0	8,000	1,000	0	590 - 90	
49	Weir	62	175	6	54,000	55,000	42,000	405,000	1,000	9,000	7,000	2,000	3,000	2,000	160 - 30	
85	Weir	168.3 and 166.7	60 and 100	2 and 3	0	23,000	66,000	0	1,000	29,000	0	5,000	1,000	0	0	
110.3	Weir	203.6	183	6	63,000	27,000	11,000	0	4,000	3,000 <sup>3</sup>	0	23,000	2,000	0	R: 85 m, L: 880 m	
170	Right weir	229.8	40	3	0	2,000	34,000	3,000	1,000	6,000	0	2,000	10,000	0	0	
170	Left weir	229.8	200	3	0	2,000	63,000	3,000	1,000	18,000	0	2,000	0	0	0	
223	Weir	246.3	130	4	1,000	6,000	35,000	3,000	1,000	10,000	5,000	400	2,000	0	0	
290	Right weir	253.0	69	3	7,000	2,000	13,000	1,000	8,000	7,000	0	0	1,000	0	0	
290	Centre weir	252.3	59	3	5,000	2,000	22,000	1,000	8,000	6,000	0	0	0	0	0	

1. The area of a dike built to close off a by-pass canal is considered to be in water.

2. The length of each dike is given separately.

3. The footprint includes 600 m² occupied by permanent structures.

General note: Overburden makes up a large portion of excavated materials. The overburden will have to be disposed of, whereas some of the rock will be used to build the structures.

**Notes:**

The plate reflects the design of structures at the scope-of-work stage. Structures will have the same function at the detailed engineering stage, but their arrangement may be adjusted in light of further field surveys and tests, as well as construction and seasonal constraints.

Structure data is given for information purposes only.

Eastmain-1-A Powerhouse and Rupert Diversion

Summary of Engineering Works

File: 6675\_cm\_124\_cp2-1\_051206.FH9

December 2005

Plate 2-1



Dams and dikes	Description	Crest		Crest length (m)	Height (m)	Dam/dike earthwork		Cofferdam earthwork		Footprint (m <sup>2</sup> )					
		Elevation (m)	Width (m)			Fill (m <sup>3</sup> )	Excavated (m <sup>3</sup> )	Fill (m <sup>3</sup> )	Excavated (m <sup>3</sup> )	In water			On land		
				Dams/dikes	Cofferdams					Canals	Dams/dikes	Cofferdams	Canals		
Rupert dam (C-1)	Rockfill structure in forebay at KP 314 of the Rupert	309.6	9.0	474	29	470,000	85,000	186,000	25,000	49,000	—	23,000	21,000	—	31,300
Lemare dam (C-R-21A)	Sand and gravel structure in forebay (KP 71 of the diversion), about 46 km upstream of where the Lemare joins the Rupert (KP 290 of the Rupert)	309.1	7.5	579	19	225,000	65,000	38,000	2,000	10,000	9,800	—	21,400	3,300	—
Nemiscau-1 dam (C-76) <sup>a</sup>	Sand and gravel structure in forebay on the right (north) branch of the Nemiscau, near KP 33 of the diversion	300.5	7.5	810	12.9	87,000	27,000	12,400	8,000	2,200	2,400	1,200	6,700	1,000	1,200
Nemiscau-2 dam (C-108)	Sand and gravel structure in forebay on the left (south) branch of the Nemiscau, near KP 49 of the diversion	301.5	7.5	230	9.4	76,000	53,000	19,100	7,000	5,200	6,900	700	2,700	3,500	2,900
Forebay dikes	31 dikes (homogeneous, sand and gravel, symmetrical, freeboard or road/dike)	309.6 to 309.1	6.0 or 7.5	22 to 1,994	1.0 to 20.0	2,315,000	742,000	132,000	8,000	35,760	16,100	400	363,700	23,400	14,500
Tailbay dikes	41 dikes (homogeneous, sand and gravel, freeboard or pervious embankment), including Arques dike	302.0 to 294.4	6.0 or 7.5	55 to 2,115	0.5 to 10.5	1,972,000	800,000	68,500	20,000	10,400	8,700	100	442,000	27,000	1,200

a. Including dike C-76A.

## Rupert forebay

Dikes									
Structures	Type	Crest (m)	Number of structures	Footprint in water (m <sup>2</sup> )			Footprint on land (m <sup>2</sup> )		
				Dikes	Cofferdams	Canals	Dikes	Cofferdams	Canals
Dike C-P-06	Homogeneous	309.6	1	4,000			19,000	2,500	
Dike C-R-1-2-3	Homogeneous	309.6	1	1,300	400		112,400	3,900	
Dike C-R-4	Homogeneous	309.6	1				700		
Dike C-R-5	Homogeneous	309.6	1				2,500		
Dike C-R-6	Homogeneous	309.6	1				4,600		
Dikes C-R-7 and C-R-8	Homogeneous and freeboard	309.5	2	4,300	200		40,100	6,000	1,500
Dike C-R-9	Freeboard	309.4	1				900		
Dike C-R-10	Homogeneous	309.3	2	13,400	9,400		21,800	4,800	
Dike C-R-11	Homogeneous	309.2	2				9,800		
Dike C-R-12	Homogeneous	309.2	1	60	200		12,900	1,300	
Dike C-R-13	Homogeneous	309.2	1				10,100		
Dike C-R-14	Homogeneous	309.1	2				8,000		
Dike C-R-15	Sand and gravel	309.1	1				10,700	1,500	
Dike C-R-16	Sand and gravel	309.1	1				3,700	1,500	
Dike C-R-17	Homogeneous	309.1	1	7,500			8,800		
Dike C-R-18	Freeboard	309.1	2				57,200		
Dike C-R-19	Homogeneous and freeboard	309.1	3	300	430		3,800	100	
Dike C-R-22	Sand and gravel	309.1	1	4,900	5,200	400	4,200	800	13,000
Dike C-R-23	Homogeneous and symmetrical	309.1	2		300		15,700	1,000	
Dike C-R-23B	Road/dike	309.1	1				7,200		
Dike C-P-16-19	Freeboard	309.1	1				1,300		
Dike C-P-17A	Homogeneous	309.1	2				8,300		

Canals							
Structures	Length <sup>a</sup> (m)	Width (m)	Invert elev. (m)	Excavated vol. (m <sup>3</sup> )		Area (m <sup>2</sup> )	
				Overburden	Rock	Water	Land
Canal S73-1	780	170	300.0	1,260,000	230,000	60,000	337,000
Canal S73-3	1 600	100	295.0				
Canal S73-4	280	125	298.0				
Canal S73-4A	180	120	301.5				
Canal S73-4B	180	120	301.5				

a. Including converging and diverging sections.

b. Including tunnel outlet canal.

## Rupert tailbay

Dikes									
Structures	Type	Crest (m)	Number of structures	Footprint in water (m <sup>2</sup> )			Footprint on land (m <sup>2</sup> )		
				Dikes	Cofferdams	Canals	Dikes	Cofferdams	Canals
Dike C-101	Sand and gravel	302.0	2	3,600			24,100		
Dike C-102	Homogeneous and freeboard	302.0	2				5,700		
Dike C-51D	Homogeneous	302.0	1				3,000		
Dike C-103	Homogeneous and freeboard	302.0	2				32,100		
Arques dike C-104	Sand and gravel	302.0	1	1,200	900	100	16,600	3,300	1,200
Dike C-105	Sand and gravel	302.0	2	2,700	4,900		29,500	6,400	
Dike C-106	Sand, gravel and freeboard	302.0	4				11,000		
Dike C-106D-2	Road/dike	301.5	1				1,400		
Dike C-107	Homogeneous	301.5	1				5,900		
Dike C-108A	Homogeneous	301.5	2				27,900	2,800	
Dike C-68	Homogeneous	301.3	1				6,100		
Dike C-69	Sand and gravel	301.3	2				14,500		
Dike C-70	Homogeneous and freeboard	301.3	3				20,400		
Dike C-71-74	Homogeneous and freeboard	301.0	6				98,000	4,700	
Dike C-75-78	Homogeneous and freeboard	300.5	3		2,900		25,800	7,600	
Dike C-76A	Sand and gravel	300.6	1				17,800	2,200	
Dike C-79-80	Freeboard	298.7	4				15,200		
Dike PV-1	Pervious embankment	298.1	1	1,200			22,400		
Dike PV-2	Pervious embankment	298.9	1	200			49,200		
Dike PV-3	Pervious embankment	299.7	1	1,500			15,400		

Canals							
Structures	Length <sup>a</sup> (m)	Width (m)	Invert elev. (m)	Excavated vol. (m <sup>3</sup> )		Area (m <sup>2</sup> )	
				Overburden	Rock	Water	Land
Canal 16	675	100	292.5	1,900,000	600,000	187,600 <sup>b</sup>	540,000 <sup>b</sup>
Canal 15	750	130	293.0				
Canal 4	1,300	110	292.0				
Canal 5	590	110	292.0				
Canal C	820	200	292.7				
Canal Z	1,240	170	291.0				

### Notes:

The plate reflects the design of structures at the scope-of-work stage. Structures will have the same function at the detailed engineering stage, but their arrangement may be adjusted in light of further field surveys and tests, as well as construction and seasonal constraints.

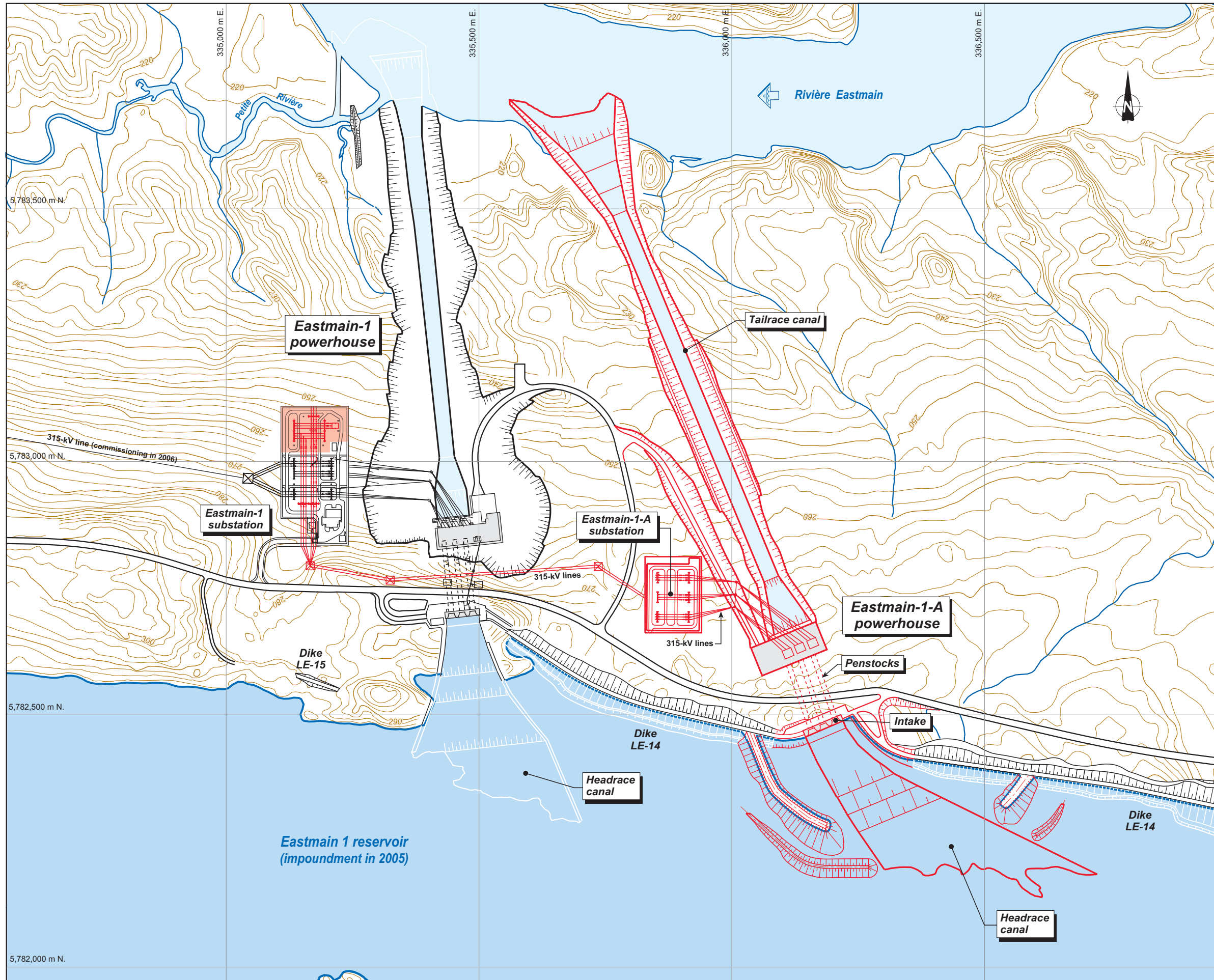
Structure data is given for information purposes only.

Eastmain-1-A Powerhouse and Rupert Diversion

## Characteristics of Dikes and Canals

File: 6675\_cm\_124\_sc2-2\_051206.FH9

December 2005



**Notes:**  
 The plate shows the design of structures at the scope-of-work stage. Structures will have the same function at the detailed engineering stage, but their arrangement may be adjusted in light of further field surveys and tests, as well as construction and seasonal constraints.

The configuration of temporary structures is given for information purposes only.

Eastmain-1-A Powerhouse and Rupert Diversion

**Eastmain-1-A Powerhouse  
 Plan View of Site**

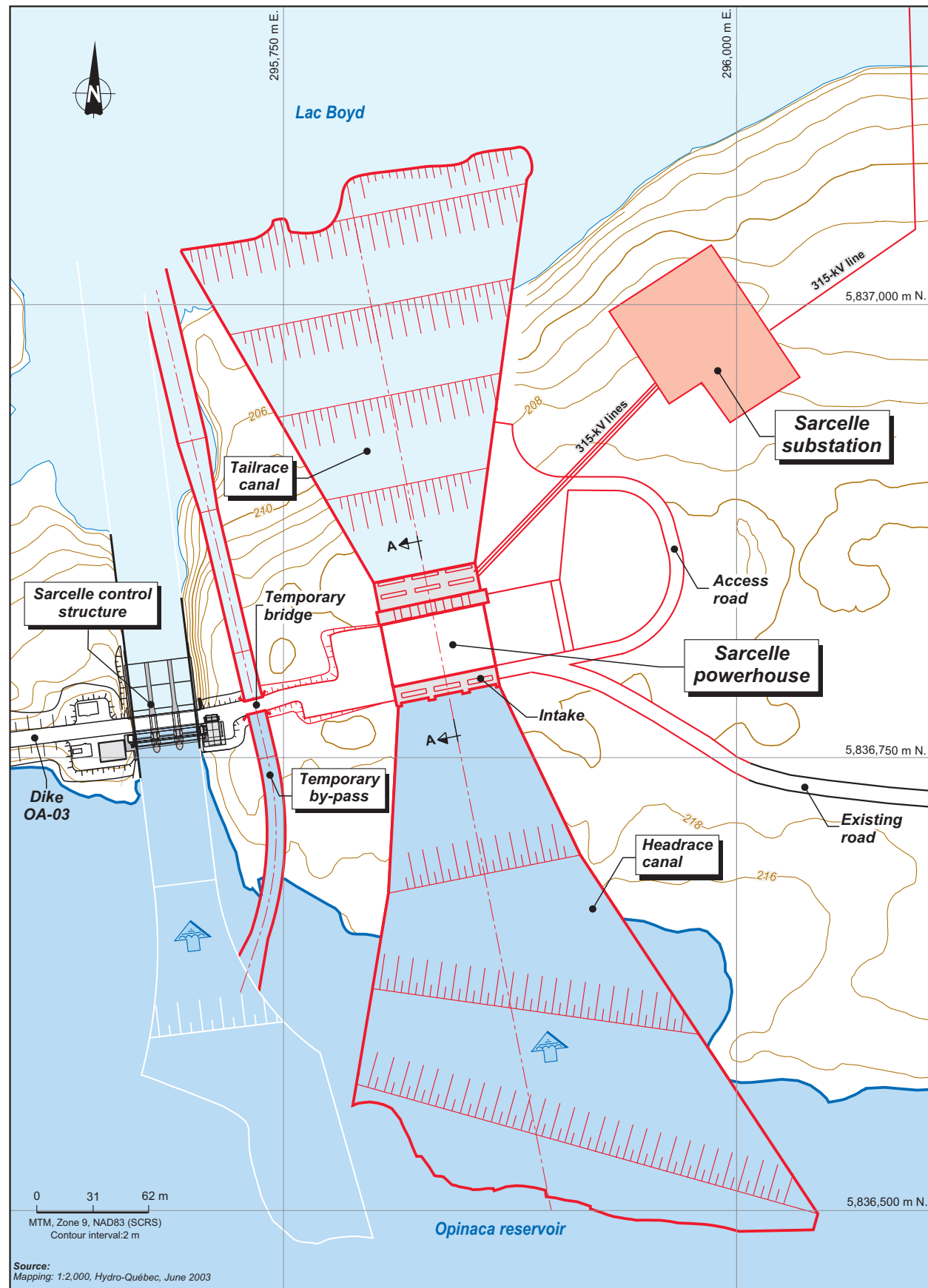
0 76 152 m  
 MTM, Zone 9, NAD27 (CSRS)  
 Contour interval: 2 m

File:  
 6675\_no\_057\_sp2-3\_051102.fr10

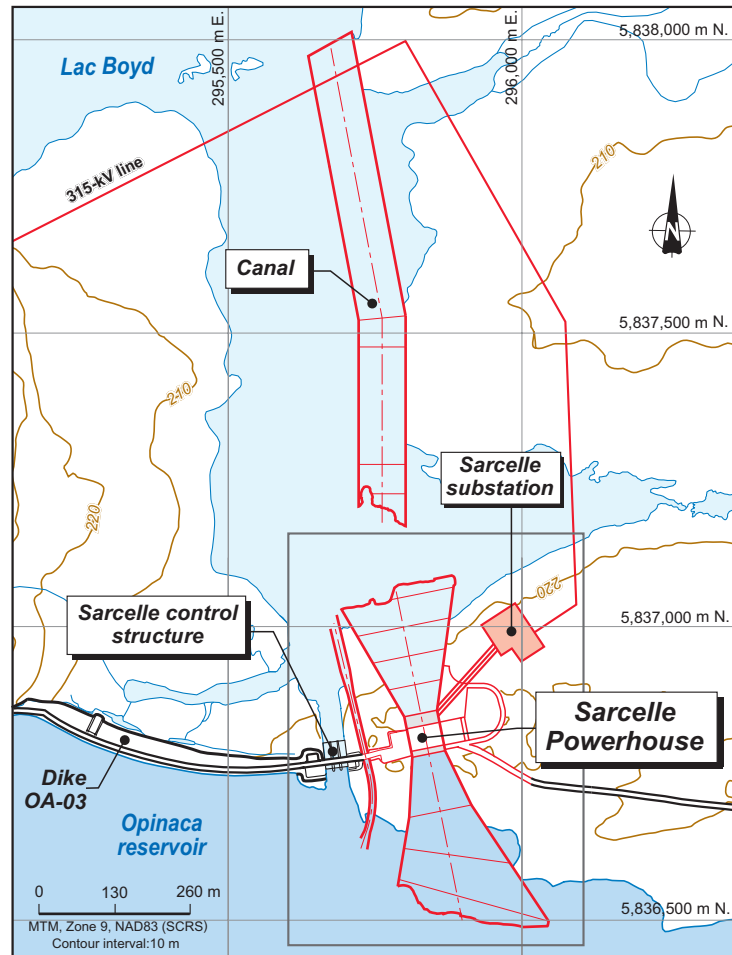
December 2005

Plate 2-3

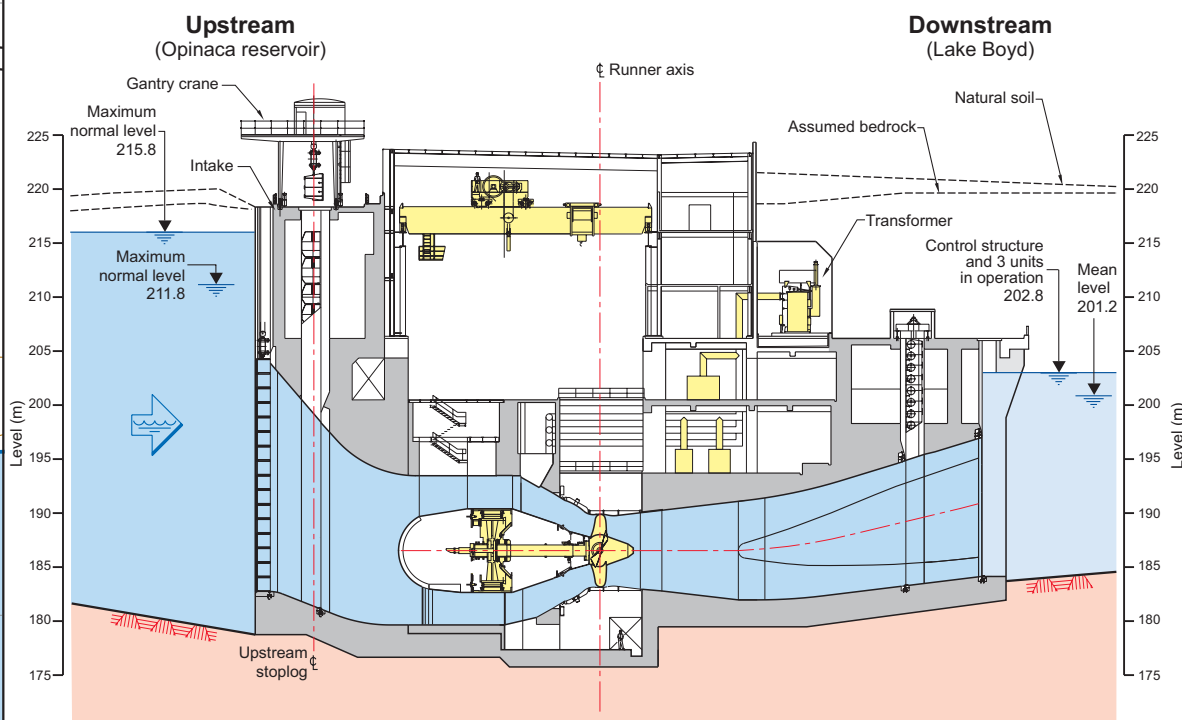




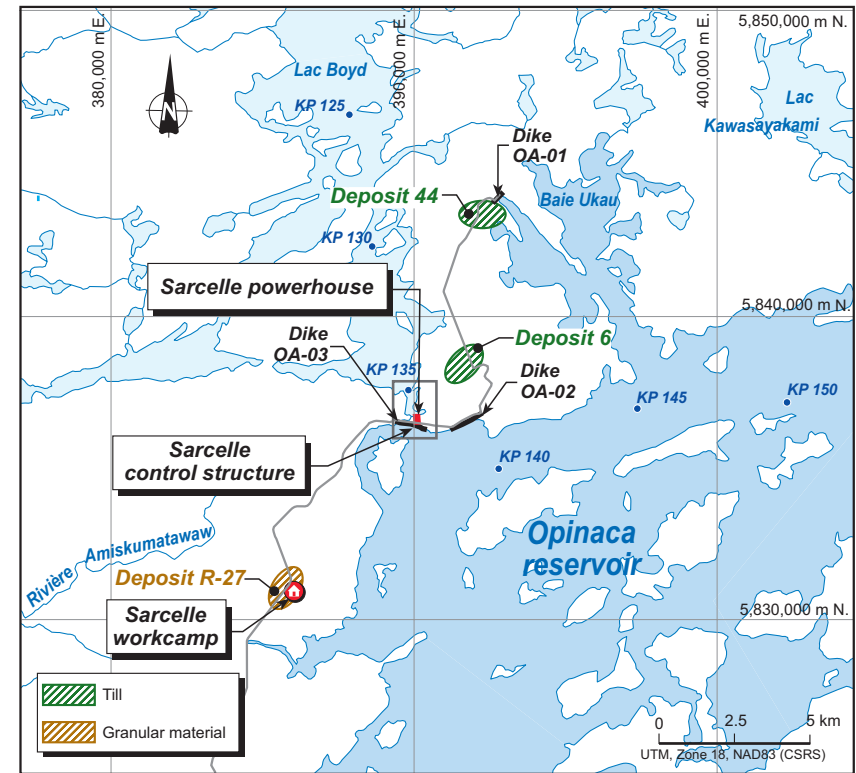
Sarcelle powerhouse and existing control structure  
Plan view



Site overview



Powerhouse profile  
Section A-A



Potential borrow pits  
(area and number not restrictive)

- Electrical and mechanical apparatus
- Concrete
- Bedrock

**Notes:**  
The plate shows the design of structures at the scope-of-work stage. Structures will have the same function at the detailed engineering stage, but their arrangement may be adjusted in light of further field surveys and tests, as well as construction and seasonal constraints.

The configuration of temporary structures is given for information purposes only.

Eastmain-1-A Powerhouse and Rupert Diversion

**Sarcelle Powerhouse and Local Borrow Pits  
Plan Views and Sections**

File:  
6675\_no\_059\_sp2-4\_051027.flr10

December 2005

Plate 2-4

