Field Information on Area # 3

This area is located 5 miles upstream from Coal Creek on the Missinaibi River. It lies immediately adjacent to the Precambrian rocks. Previous work had indicated a Cretaceous fireclay deposit in this vicinity. Information regarding the extent of this deposit was inadequate and accordingly 2 - 3 field days were scheduled to obtain more data.

Although the area was visited in late August when the water level was approximately 10 ft. higher than that of mid-July, 800 ft. of exposed clay were still to be noted along the river shore line. The nature of the clay is essentially the same throughout. However, two widely separated locations exhibited clays of different colour. The first exposure consists of a very dense, highly plastic blue grey clay. The second is a reddish coloured clay which is also quite plastic and dense. Both exposures were sampled.

The shoreline bluff immediately behind the clay deposit is composed of a highly weathered outcrop of Precambrian rock. The rock type is predominantly a coarse granite pegmatite with sizeable masses of quartz and feldspar minerals. Intruding dikes of a dark fine-grained rock are present in a few locations.

The quartz-feldspar pegmatite is a very easily broken rock type with a highly weathered and decomposed surface. The feldspar minerals show much alteration to a grey-green material which is very soft and powder-like. In several places, immediately overlying this rock type, are deposits of a clay-like material. This is a grey to blue-grey colour, moist, loosely compact and of low plasticity. A sample through two feet was taken. This is sample MRC 1. Thickness appears to vary.

The exposure of clay is over 800 feet in length but does not extend back of the east shore of the Missinaibi for any more than 25 ft. However, the clays do extend out into the river and underlie the river bed. Investigation of the western shore line did not reveal clays since deposition of river silts, till and sand could not be penetrated by the tools employed.

This may be an "in situ" clay deposit of limited extent rather than a secondarily transported deposit which would be expected to have a considerable areal extent. However, the finding of seams of lignite associated with the clays exposed along the shoreline lends more support to the latter.

Elevation Determination

A series of elevation determinations were made at selected locations in the silica sand area. The purpose was to 1. establish elevations of characteristic outcrops which would enable correlation of like exposures over a considerable extent; 2. provide information as to the exposed thickness of the Cretaceous material; 3. provide information as to the depth of overburden.

For the survey, an anaeroid barometer type altimeter made by Casella was employed. When used on a clear day, with little wind, it was hoped that the elevation readings would give ± 5 ft. accuracy.

The traverse began at Station 15+00E at water level. This was taken as being 0.0 ft. elevation. Tie-in checks were made every 30 minutes at different points along the river shore which drops very little over the mile extent which was traversed.

1500' East	-	River shore (0+00)	=	0' elevation
	-	Top of sands on river bank 1+00S	=	25'
	-	Top of bluff 2+00S	=	70'
	-	Top of hill 6+00S	=	110'
1200' East	-	Top of samples GMA # 15A, 15B, 15C 2+00S	=	30'
800' East	-	Red clay outcrop on shore line bluff 0+50S	=	25'
	-	Top of till	=	120'
400' East	-	Top of till	=	125'
	-	Red-grey clay exposure on river bank - 50'S GMA #13A - 13B	=	30'
0+00	-	River level (relative to 15 East)	=	5'
	-	Base of 0+00 picket	=	10'
	-	Top of silica sands at 1+00S GMA #12	=	25'
	-	Top of silica sands at 3S GMA # 9 & 10	=	75'

0+00 (contd.)	-	Top of the till bluff above the sands at 3 South	=	100'
	-	Top of the hill 6S	=	115'
	-	Clay bed GMA #16	=	80'
5+00W	-	River level (relative 15E)	=	5'
	-	Top of river bank	=	20'
	-	Top of hill # 3W	=	120'
15+00W	-	Creek level at 4+00S	=	35'
	-	Top of clay sample GMA # 2	=	70'
	-	Top of sands	=	80'
	-	Top of hill # 4	=	145'
	-	Sands at 9+00S	=	85'
25+00W	-	Top of hill # 5	=	140'
30+00W	-	Top of hill # 6	=	145'
35+00W	-	Top of sands exposed in cut at 18+00S	=	75'
	-	25 S red clay of GMA # 7	=	85'
	-	28S silica sand GMA # 8	=	100'
	-	Top of till of hill # 7E	=	155'

The above elevations are corrected for a tie-in difference of 20 feet.

The maximum height of the Cretaceous deposit is close to 80 or 85 ft. The majority of this thickness is silica sands. There are two clay layers at elevations of 30' and 75' above the Missinaibi River respectively. Finally it was noted that the maximum depth of overburden lies between 95 and 100 ft. However, in certain locations such as in the vicinity of 0+00 the depth of overburden is in the range of 35'. Moreover the depth of overburden in the vicinity of the several feeder streams cutting into the deposit is minimal, ranging between 1' - 15'.

Laboratory Test Results: Area No. 1

Clay recovered by washing varied from 3.3% to 16.2% and averaged 6.9%. Tests conducted show it to be kaolin suitable either as paper coating clay or high quality ceramic material.

Analyses of silica sands after clay removal were performed by a Toronto commercial firm but subsequent checks by the Department of Mines, Ottawa revealed gross inaccuracies.

Analysis results, by the Department of Mines, Ottawa on washed and scrubbed sands, showed iron content of 0.014% to 0.061% and 0.010% to 0.055% respectively and indicated that scrubbing will reduce iron content. Alumina content is variable but has been brought down by scrubbing to a range of 0.165% to 0.662%. Mica was found to contribute to this and tabling tests are in progress at Ottawa to determine whether mica removal is possible.

For comparison, trade specifications are:

Optical Glass, First Quality:	Fe_2O_3	0.02%	Max allowable.
	Al_2O_3	0.10%	Max allowable.
Flint Glass, Second Quality:	Fe_2O_3	0.035	" " .
	Al_2O_3	0.50	" " .

The tests therefore indicate a good quality material. Details appear in Appendix A.

Area No. 2

From test results completed this clay is classified as stoneware or very low duty fireclay.

Area No. 3

Laboratory tests show that the clay is common clay suitable only for building brick or similar products.

FRANC R. JOUBIN & ASSOCIATES
MINING GEOLOGISTS LIMITED
Norman D. Ursel

TABLE 1

Average Physical Properties of the Clay Samples

CLAY NO.	UNFIRED CHARACTERISTICS	P.C.E.	FIRED CHARACTERISTICS					REMARKS
			Cone No.	Fired Shrinkage %	Absorption %	Colour	Hardness	
1305 GMA-2	Yellow, non-calcareous sandy clay, good workability and plasticity, water of plasticity 24.5%, safe drying at 185°F, drying shrinkage 4.6%.	Cone 23-26 approx between 2921-2950	02 (2014°F)	0.3	18.1	Light salmon	Very soft	Suitable for low-duty, sandy fire-brick, very difficult to vitrify because of its sandy nature.
			5 (2151°F)	1.7	15.9	Light salmon	Very soft	
			10 (2345°F)	2.0	13.9	Pale pinkish buff	Soft	
			15 (2595°F)	3.2	12.1	Light brown (speckled)	Fairly soft	
1310 GMA-7	Brownish red, non-calcareous clay, good workability and plasticity (greasy), water of plasticity 27.8%, safe drying, drying shrinkage 5.6%.	Cone 27 approx 2937°F	02	1.5	16.9	Pink	Soft	Slight vanadium scum, suitable for low-duty fire-brick drying shrinkage slightly above normal.
			5	4.0	14.2	Pale pink	Fairly hard	
			10	5.6	10.9	Pale buff	Hard	
			15	6.5	6.5	Speckled brown	Very hard	
1315 GMA-16	Light red, non-calcareous clay, good workability and plasticity, water of plasticity 27.6%, safe drying, drying shrinkage 4.9%.	Cone 27½ approx. 2946°F	02	1.9	19.0	Salmon	Soft	Slight vanadium scum, suitable for low-duty fire-brick, fairly difficult to vitrify.
			5	4.5	12.5	Dark salmon	Fairly soft	
			10	6.0	9.4	Pinkish tan	Fairly hard	
			15	7.4	7.4	Speckled brown	Hard	
1317 GMA-19A	Yellow buff, non-calcareous clay, good workability, fairly plastic (greasy), water of plasticity 28.9%, safe drying, drying shrinkage 3.9%	Cone 29½ approx 2966°F	02	2.0	22.3	Pale salmon	Very soft	Vanadium scum, suitable for medium duty fire-brick, rather difficult to vitrify.
			5	4.0	17.9	Pale salmon	Fairly soft	
			10	6.0	14.2	Dark cream	Fairly hard	
			15	6.7	9.0	Speckled light brown	Hard to very hard	

TABLE 1 (cont'd)

Average Physical Properties of the Clay Samples

CLAY NO.	UNFIRED CHARACTERISTICS	P.C.E.	FIRED CHARACTERISTICS Cone No.	Fired Shrinkage %	Absorption %	Colour	Hardness	REMARKS
1322 GMA-21C	Light cream, non-calcareous sandy clay, good workability, low plasticity, water of plasticity 20%, safe drying, drying shrinkage 4.0%.	Cone 28½ approx 2946°F	02	0.0	16.4	Nearly white	Very soft	will probably do washing Very slight vanadium scum, difficult to vitrify because of sandy nature, very close to being suitable for intermediate duty fire-brick.
			5	0.2	15.7	Nearly white	Very soft	
			10	1.0	14.0	Nearly white	Soft	
			15	1.3	13.5	Cream fine specks	Fairly soft	
1323 GMA-23	Salmon, non-calcareous clay, good workability and plasticity, (greasy), water of plasticity 29.4%, safe drying, drying shrinkage 5.4%.	Cone 30½ approx 3000°F	02	2.3	21.8	Light salmon	Very soft	Very slight vanadium scum, fire clay suitable for intermediate duty refractories.
			5	5.0	14.2	Very light salmon	Fairly hard	
			10	7.4	10.9	Light buff	Hard	
			15	9.0	5.6	Speckled brown	Very hard	
1324 GMB-1	Cream, non-calcareous clay, (some hard lumps) good workability, very plastic, water of plasticity 32%, cracks with rapid drying, drying shrinkage 4.2%.	Cone 16, approx 2651°F	02	1.7	20.6	Cream	Medium hard	Stoneware type clay or very low-duty fire clay
			5	5.8	12.3	Dark cream	Very hard	
			10	7.8	3.0	Mottled grey	Steel hard nearly vitrified	
1325 GMB-2	Brown, non-calcareous clay, (some hard greenish yellow lumps contain sand) good workability, very plastic, water of plasticity 27.5%, cracks with rapid drying, drying shrinkage 6.5%.	Cone 12½ approx 2397°F	06 (1816°F)	3.3	15.5	Light red	Fairly hard	Common, red-burning clay, some difficulty with drying.
			02	8.5	5.7	Red to dark red	Very hard	
			5	9.8	1.8	Dark red	Steel hard	

TABLE 1 (cont'd)

Average Physical Properties of the Clay Samples

CLAY NO.	UNFIRED CHARACTERISTICS	P.C.E.	FIRED CHARACTERISTICS					REMARKS
			Cone No.	Fired Shrinkage %	Absorption %	Colour	Hardness	
1326 GMB-3	Brown, non-calcareous clay, good workability and plasticity (greasy), water of plasticity 29.2%, tendency to crack with rapid drying, drying shrinkage 6.7%.	Cone 12½ approx 2404°F	06	3.7	12.5	Dark salmon	Hard	Same as comments as for GMB-2
			04 (1922°F)	6.3	7.2	Light red	Very hard	
			02	9.2	2.2	Red	Steel hard	
			6	7.7	0.4	Dark red	Vitrified (overfired)	
1327 GMB-5A	Yellow tuff, non-calcareous clay, good workability and plasticity (greasy), water of plasticity 27%, safe drying, drying shrinkage 4.2%.	Cone 15 approx 2595°F	04	2.0	19.1	Pale salmon	Fairly hard	Common clay.
			02	4.5	13.7	Salmon	Hard	
			5	9.7	3.3	Dark brownish red	Steel hard	
			10	8.7	0.7	Dark brown (specks)	Nearly vitrified (warped slightly)	

TABLE 11

Properties of Clay Fractions Washed from Sands

CLAY NO.	UNFIRED CHARACTERISTICS	P.C.E.	FIRED CHARACTERISTICS Cone No.	Fired Shrinkage %	Absorption %	Colour	Hardness	REMARKS
1304 GMA-1	3.3% clay, drying shrinkage 4.5%	Cone 34+ approx 3205°F+	10 (2345°F)	11.0		Nearly white		
1306 GMA-3	6.6% clay, drying shrinkage 4.5%	Cone 34+	10	13.0		White		
1307 GMA-4	16.2% clay, drying shrinkage 4.0%	Cone 34+	10	13.0		Very slightly off white		
1308 GMA-6A	7.5% clay, drying shrinkage 4%	Cone 34+	10	15.0		Nearly white		
1309 GMA-6B	9.4% clay, drying shrinkage 4%	Cone 34+	10	12.0		White		
1311 GMA-8	3.5% clay, drying shrinkage 4.5% [illegible] ? or limonite or organic	Cone 32½ approx 3115°F	10	14.0		Light grey		
1312 GMA-9	4.0% clay, drying shrinkage 4.0%	Cone 34+	10	14.0		White		
1313 GMA-10	6.9% clay, drying shrinkage 5%	Cone 34+	10	12.0		White		
1314 GMA-11	5.2% clay, drying shrinkage 4.0% Rutile or ilmenite ?	Cone 32½ 3134°F	10	12.0		Yellowish white		
1316 GMA-18	4.0% clay, drying shrinkage 2.5%	Cone 34+ approx 3205°F+	10	13.0		Off white		White at the botto of briquette

TABLE 11 (cont'd)

Properties of Clay Fractions Washed from Sands

CLAY NO.	UNFIRED CHARACTERISTICS	P.C.E.	FIRED CHARACTERISTICS					REMARKS
			Cone No.	Fired Shrinkage %	Absorption %	Colour	Hardness	
1318 GMA-19B	7.2% clay, drying shrinkage 3.5%	Cone 32 3103°F	10	12.0		Whitish grey	pyrite or limonite?	
1319 GMA-20	12.8% clay, drying shrinkage 4.0%	Cone 34- approx 3195-	10	12.0	[illegible]	Slight off white		
1320 GMA-21A	4.1% clay, drying shrinkage 5.5%	Cone 34-	10	12.0		Light cream		White at the bottom
1321 GMA-21B	6.4% clay, drying shrinkage 7.0%	Cone 32½ 3134°F	10	13.0		Light grey	pyrite or limonite?	Warped in firing

83, 1-35

In June 1962 exploration licence of occupation No. 13440 covering parts of Burstall and McBrien Townships along the Missinaibi River was granted to Dr. Franc. R. Joubin. Subsequent investigation of clay and silica-kaolin deposits was conducted by Franc. R. Joubin & Associates.

Prior to field work surficial geologic interpretation of aerial photographs (Fig. 1) and a drainage map of the area (Fig. 2) and a topographic map (Fig. 3) were completed by Hunting Survey Corporation. Actual field work was conducted by Robert Galway, Geologist and Don MacLeod, Geologists Helper, under the supervision of N.H. Ursel, P. Eng.

Much of the laboratory test work was done at the Department of Mines and Technical Surveys at Ottawa. This was desirable because of previous experience with the material to be tested and because of the lack of capable commercial facilities.

Details of the geological mapping, sampling and laboratory analyses are given in the following report.

Laid down
GA

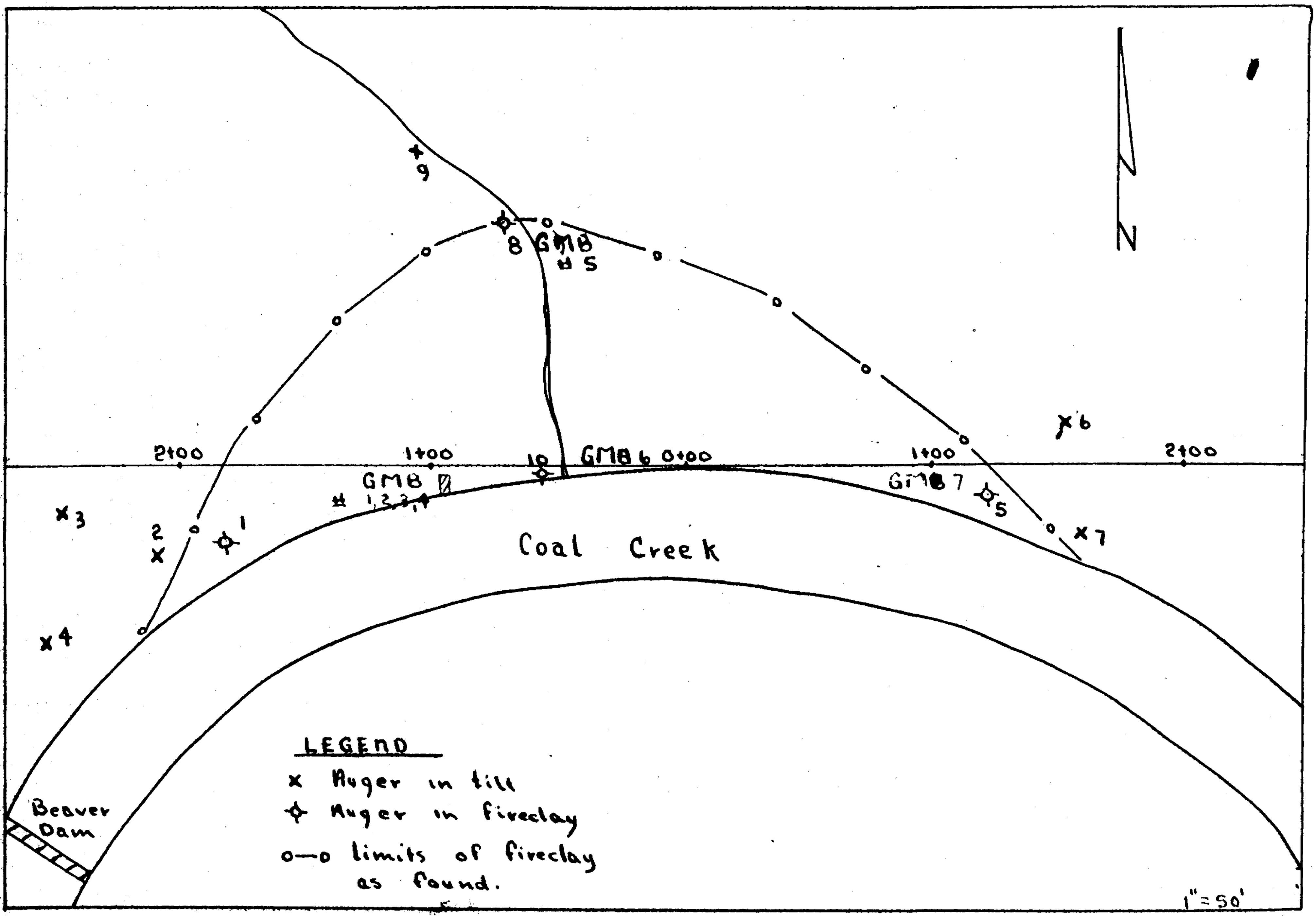
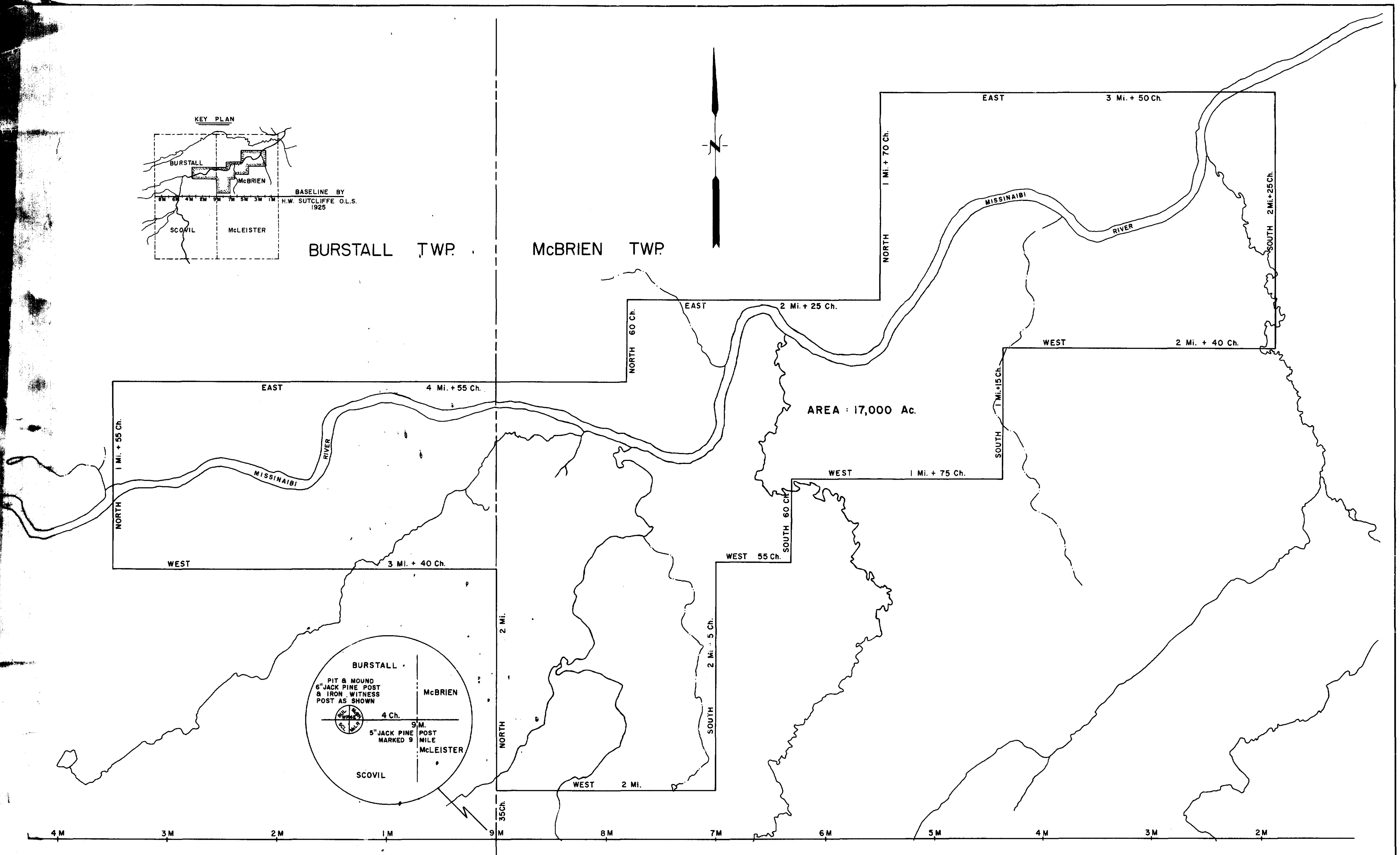


FIG. 5 AREA # 2, Sketch Plan



SCOVIL TWP.

McLEISTER TWP.

PLAN SHOWING EXPLORATORY LICENCE

IN THE TWPS OF BURSTALL & McBRIEN

DISTRICT OF COCHRANE

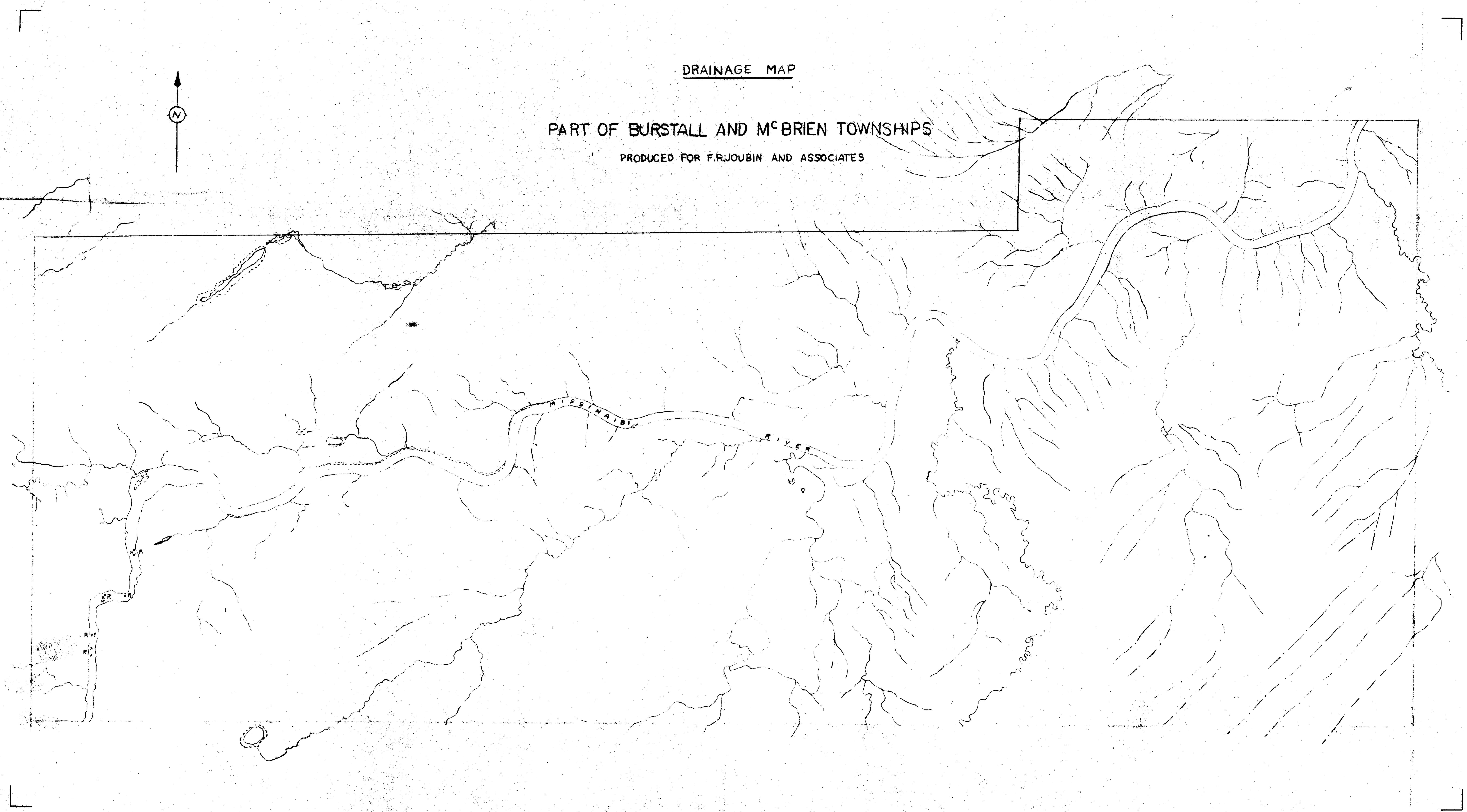
SCALE 1 Inch = 40 Ch.

PREPARED BY THE ONTARIO DEPARTMENT OF MINES

1962

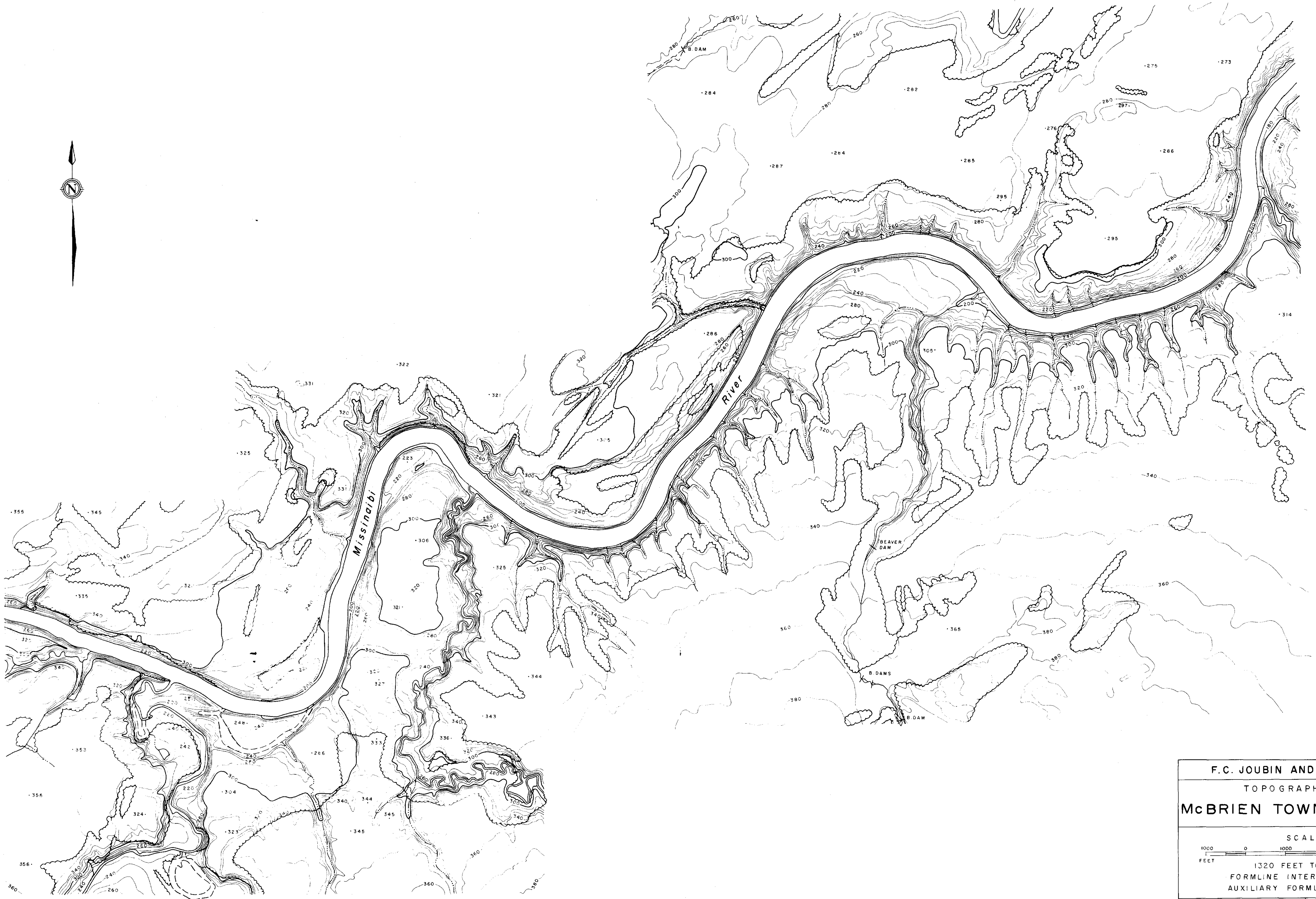
42A02NW0001 63.1-35 MCBRIEN

200



SCALE: 2640 FEET TO 1 INCH APPROXIMATELY

FIG. 2



F.C. JOUBIN AND ASSOCIATES

TOPOGRAPHIC MAP

McBRIEN TOWNSHIP AREA

SCALE

1000 FEET 0 1000 2000 3000 4000 FEET

1320 FEET TO 1 INCH
FORMLINE INTERVAL 20 FEET
AUXILIARY FORMLINES 10 FEET

AERIAL PHOTOGRAPHY BY	CONTROL BY
DEPT. OF LANDS AND FORESTS	CLIENT

A PRODUCT OF
HUNTING SURVEY CORPORATION LIMITED
1450 O'CONNOR DRIVE TORONTO, CANADA

DRAWN BY R. Gibbs CHECKED BY	DATE APRIL 1963	JOB NO. 2463

Fig. 3

42J02NW0001 63.1-35 MCBRIEN

220


Missinaibi River
Missinaibi River
N
10N.
8N.
6N.
4N
2N.
2S.
4S.
6S.
8S.
10S.
30+00 W
20+00 W.
10+00 W.
0+00
10+00 E.
20+00 E.
GMA 5, 6
GMA 7
GMA 8
GMA 1, 2, 3, 4
GMA 18
GMA 17
GMA 11
GMA 9, 10
GMA 16
GMA 13
GMA 19
GMA 20
GMA 15
GMA 21, 22, 23
LEGEND
Cretaceous limits
GMA Sample sites
Auger hole in Cretaceous
+ Auger hole (till only)
BURSTALL PROJECT
AREA # 1
31-8-62
1" : 200'

FIG. 4