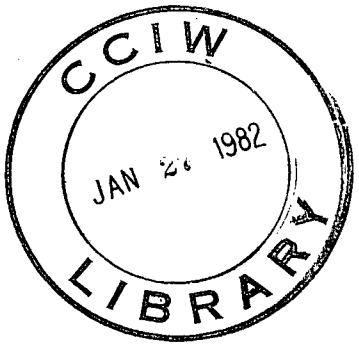

HYDRAULICS DIVISION
TECHNICAL NOTE

DATE: January 1982 REPORT NO: 82-01

TITLE: Particle Size Data Report 82-01

AUTHOR: G. A. Duncan

REASON FOR REPORT: This report responds to a request for particle size data from Dr. P. G. Manning, AED.

CORRESPONDENCE FILE NO:
5690 (Study No. 2302)

1.0 INTRODUCTION

This report provides the results of particle size analysis on sediments from a Lake Ontario core.

P. G. Manning, Nutrient Pathways Section, AED, submitted five subsamples from a core, requesting sand, silt and clay percentages.

The samples were analysed by K. Salisbury and the results checked by G. Duncan.

2.0 PROCEDURE

The Sieve and Sedigraph Method which provides sand, silt and clay percentages was used to analyse the samples (Duncan & LaHaie 1979).

Briefly the procedure consists of:

1. Splitting the sample to 2g.
2. Removing particles large enough to block Sedigraph Suction Tube (0.088 mm).
3. Dispersing sample in a Calgon suspension.
4. Automatic analysis with the Sedigraph.
5. Processing the results with SIZDIST: a FOTRAN IV computer program (Sandilands and Duncan, 1980).

3.0 RESULTS

For the Sieve and Sedigraph Method, the output consists of:

1. A histogram of the frequency distribution.

2. The percentage and cumulative percentages of the material occurring within each PHI unit.
3. Moment measures (Krumbein and Pettijohn, 1938) and graphic (Folk and Ward, 1957) statistics.
4. Percentiles.
5. Percent gravel, sand, silt and clay.
6. Ratios used to plot Folk's Ternary Classification.
7. Shepard (1954) and Folk (1974) Ternary Classifications.

REFERENCES

Duncan, G. A. and LaHaie, G. G., 1979. "Size Analysis Procedures Used in the Sedimentology Laboratory, NWRI". NWRI, CCIW, Hydraulics Division Manual, September 1979.

Folk, R. L., 1968. "Petrology of Sedimentary Rocks". Hemphill Publishing Co., Austin, Texas 182 p.

Folk, R. L. and Ward, W. C., 1957. "Brazos River Bar: A Study in the Significance of Grain Size Parameters". Jour. Sed. Petrology, V. 27, pp. 3-26.

Krumbein, W. C. and Pettijohn, F. J., 1938. "Manual of Sedimentary Petrography". Appleton-Century-Crofts, New York, 549 p.

Sandilands, R. G. and Duncan, G. A., 1980. "SIZDIST - A Computer Program for Size Analysis". NWRI, CCIW, Hydraulics Division Technical Note, Report No. 80-08.

Shepard, F. P., 1954. "Nomenclature Based on Sand-Silt Ratios". Jour. Sed. Petrology, V. 24, pp. 151-158.

APPENDIX 1
SIZDIST OUTPUT

0-1 CM 120182 SEDIGRAPH ANALYSIS

01/12/82

PHI	PCT.	CUMPCT.	
3.50			ASSUMED UPPER LIMIT
4.00	1.03	1.03	*
4.50	0.00	1.03	
5.00	1.03	2.06	*
5.50	1.03	3.09	*
6.00	9.28	12.37	*********
6.50	10.31	22.68	**********
7.00	13.40	36.08	*************
7.50	12.37	48.45	************
8.00	12.37	60.82	************
8.50	6.19	67.01	******
9.00	6.70	73.71	*******
9.50	4.64	78.35	*****
10.00	3.09	81.44	***
10.50	2.06	83.51	**
11.00	2.06	85.57	**
11.50	2.06	87.63	**
12.00	1.03	88.66	*
*****	11.34	100.00	***********

MEAN	ST.DEV.	SKEWNESS	KURTOSIS	
7.55	1.54	.28	.22	KRUMBEIN + PETTIJOHN (1938) MOMENT MEASURES FOR SIZE RANGE 4.0 TO 12.0 PHI

> 5 PERCENT OF THE FINES ARE NOT RESOLVED, OBTAIN FOLK STATS. GRAPHICALLY

PERCENTILES MEDIAN 7.56 5TH 5.60 16TH 6.18 25TH 6.59
75TH 9.14 84TH 10.62 95TH******

PCT. GRAVEL .00 SAND 1.03 SILT (PIPETTE) 0.00 CLAY (PIPETTE) 0.00
(SEDIGRAPH) 59.79 (SEDIGRAPH) 39.18

GRAVEL+SAND 1.03 SILT/(SILT+CLAY) 60.42PCT.GRAV+SAND/SILT+CLAY .01

LABELS SHEPARD -CLAYEY SILT FOLK(GMS)-MUD (SCS)-MUD

1-2 CM 1220182 SEDIGRAPH ANALYSIS

01/12/82

PHI	PCT.	CUMPCT.	
3.50	0.00		
4.00	0.00	0.00	
4.50	0.00	0.00	
5.00	1.00	1.00	*
5.50	1.00	2.00	*
6.00	3.00	5.00	***
6.50	8.00	13.00	********
7.00	8.00	21.00	********
7.50	12.00	33.00	************
8.00	10.00	43.00	**********
8.50	10.00	53.00	**********
9.00	8.00	61.00	********
9.50	7.00	68.00	*******
10.00	5.00	73.00	*****
10.50	5.00	78.00	*****
11.00	2.00	80.00	**
11.50	3.00	83.00	***
12.00	2.00	85.00	**
*****	15.00	100.00	***************

MEAN	ST.DEV.	SKEWNESS	KURTOSIS	
8.14	1.56	.17	-.44	KRUMBEIN & PETTIJOHN (1938) MOMENT MEASURES FOR SIZE RANGE 4.0 TO 12.0 PHI

> 5 PERCENT OF THE FINES ARE NOT RESOLVED, OBTAIN FOLK STATS. GRAPHICALLY

PERCENTILES	MEDIAN	8.35	5TH	6.00	16TH	6.69	25TH 7.17
			75TH	10.20	84TH	11.75	95TH******

PCT.	GRAVEL	.00	SAND	0.00	SILT (PIPETTE)	0.00	CLAY (PIPETTE) 0.00
					(SEDIGRAPH)	43.00	(SEDIGRAPH) 57.00
GRAVEL+SAND		.00	SILT/(SILT+CLAY)		43.00	PCT.GRAV+SAND/SILT+CLAY	.00

LABELS SHEPARD -SILTY CLAY FOLK(GM3)-MUD (SCS)-MUD

2-3 CM 120182 SEDIGRAPH ANALYSIS

PHI	PCT.	CUMPCT.	01/12/82
3.50			
	0.00		
4.00		0.00	
	1.02		*
4.50		1.02	
	0.00		
5.00		1.02	
	3.06		***
5.50		4.08	
	4.08		****
6.00		8.16	
	6.12		******
6.50		14.29	
	5.10		*****
7.00		19.39	
	11.22		**********
7.50		30.61	
	8.16		********
8.00		38.78	
	9.18		*********
8.50		47.96	
	10.20		**********
9.00		58.16	
	6.12		******
9.50		64.29	
	5.10		*****
10.00		69.39	
	4.08		****
10.50		73.47	
	3.06		***
11.00		76.53	
	3.06		***
11.50		79.59	
	2.04		**
12.00		81.63	
	18.37		******************
*****		100.00	

MEAN	ST.DEV.	SKEWNESS	KURTOSIS	
8.16	1.66	.06	-.47	KRUMBEIN + PETTIJOHN (1938) MOMENT MEASURES FOR SIZE RANGE 4.0 TO 12.0 PHI

> 5 PERCENT OF THE FINES ARE NOT RESOLVED, OBTAIN FOLK STATS. GRAPHICALLY

PERCENTILES	MEDIAN	8.60	5TH	5.61	16TH	6.67	25TH 7.25
			75TH	10.75	84TH******		95TH******
PCT. GRAVEL	.00	SAND	0.00	SILT (PIPETTE)	0.00	CLAY (PIPETTE)	0.00
				(SEDIGRAPH)	38.78	(SEDIGRAPH)	61.22
GRAVEL+SAND	.00	SILT/(SILT+CLAY)	38.78	PCT.GRAV+SAND/SILT+CLAY		.00	
LABELS SHEPARD -SILTY CLAY		FOLK(GMS)-MUD				(SCS)-MUD	

5 1/2 CM 120182 SEDIGRAPH ANALYSIS

01/12/82

PHI	PCT.	CUMPCT.	
3.50	0.00		
4.00	0.00	0.00	
4.50	0.00	0.00	
5.00	2.44	2.44	**
5.50	2.44	4.88	**
6.00	2.44	7.32	**
6.50	4.88	12.20	*****
7.00	9.76	21.95	**********
7.50	7.32	29.27	*******
8.00	7.32	36.59	*******
8.50	9.76	46.34	**********
9.00	4.88	51.22	*****
9.50	7.32	58.54	*******
10.00	2.44	60.98	**
10.50	4.88	65.85	*****
11.00	2.44	68.29	**
11.50	2.44	70.73	**
12.00	29.27	100.00	**********
*****			

MEAN	ST.DEV.	SKEWNESS	KURTOSIS	
8.46	1.61	.06	-.60	KRUMBEIN + PETTIJOHN (1938) MOMENT MEASURES FOR SIZE RANGE 4.0 TO 12.0 PHI

> 5 PERCENT OF THE FINES ARE NOT RESOLVED, OBTAIN FOLK STATS. GRAPHICALLY

PERCENTILES MEDIAN 9.38 5TH 6.03 16TH 7.20 25TH 7.71
75TH****** 84TH****** 95TH******

PCT. GRAVEL .00 SAND 0.00 SILT (PIPETTE) 0.00 CLAY (PIPETTE) 0.0
(SEDIGRAPH) 29.27 (SEDIGRAPH) 70.7

GRAVEL+SAND .00 SILT/(SILT+CLAY) 29.27PCT.GRAV+SAND/SILT+CLAY .00

LABELS SHEPARD -SILTY CLAY FOLK(GMS)-MUD (SCS)-CLAY

2370

9-10 CM 120182 SEDIGRAPH ANALYSIS

PHI	PCT.	CUMPCT.	
3.50			
	0.00		
4.00		0.00	
	1.00		*
4.50		1.00	
	0.00		
5.00		1.00	
	1.00		*
5.50		2.00	
	4.00		****
6.00		6.00	
	4.00		****
6.50		10.00	
	5.00		*****
7.00		15.00	
	9.00		*********
7.50		24.00	
	9.00		*********
8.00		33.00	
	7.00		*******
8.50		40.00	
	10.00		**********
9.00		50.00	
	9.00		*********
9.50		59.00	
	6.00		******
10.00		65.00	
	6.00		******
10.50		71.00	
	4.00		****
11.00		75.00	
	3.00		***
11.50		78.00	
	3.00		***
12.00		81.00	
	19.00		*******************
*****		100.00	

MEAN	ST.DEV.	SKEWNESS	KURTOSIS	
8.48	1.66	-.02	-.50	KRUMBEIN + PETTIJOHN (1938) MOMENT MEASURES FOR SIZE RANGE 4.0 TO 12.0 PHI

> 5 PERCENT OF THE FINES ARE NOT RESOLVED, OBTAIN FOLK STATS. GRAPHICALLY

PERCENTILES MEDIAN 9.00 5TH 5.88 16TH 7.06 25TH 7.56
75TH 11.00 84TH****** 95TH******

PCT. GRAVEL .00 SAND 0.00 SILT (PIPETTE) 0.00 CLAY (PIPETTE) 0.00
(SEDIGRAPH) 33.00 (SEDIGRAPH) 67.00

GRAVEL+SAND .00 SILT/(SILT+CLAY) 33.00 PCT.GRAV+SAND/SILT+CLAY .00

LABELS SHEPARD -SILTY CLAY FOLK(GMS)-MUD (SCS)-CLAY