DAMOS SUPP. F MAY 1979

DAMOS

DISPOSAL AREA MONITORING SYSTEM

ANNUAL DATA REPORT - 1978

SUPPLEMENT F

NEW LONDON DISPOSAL SITE

Naval Underwater Systems Center

Newport, Rhode Island

WHOI
DOCUMENT
COLLECTION

New England Division
Corps of Engineers
Waltham, Massachusetts

May 1979

TC
187
.N45
1978
Suppl. F

DEMCO

DAMOS

DISPOSAL AREA MONITORING SYSTEM
ANNUAL DATA REPORT - 1978

SUPPLEMENT F
SITE REPORT - NEW LONDON

Naval Underwater Systems Center
Newport, Rhode Island

New England Division
Corps of Engineers
Waltham, Massachusetts

May 1979

MBL/WHOI
0 0301 0038842 7

DISPOSAL AREA MONITORING SYSTEM SITE LOCATIONS

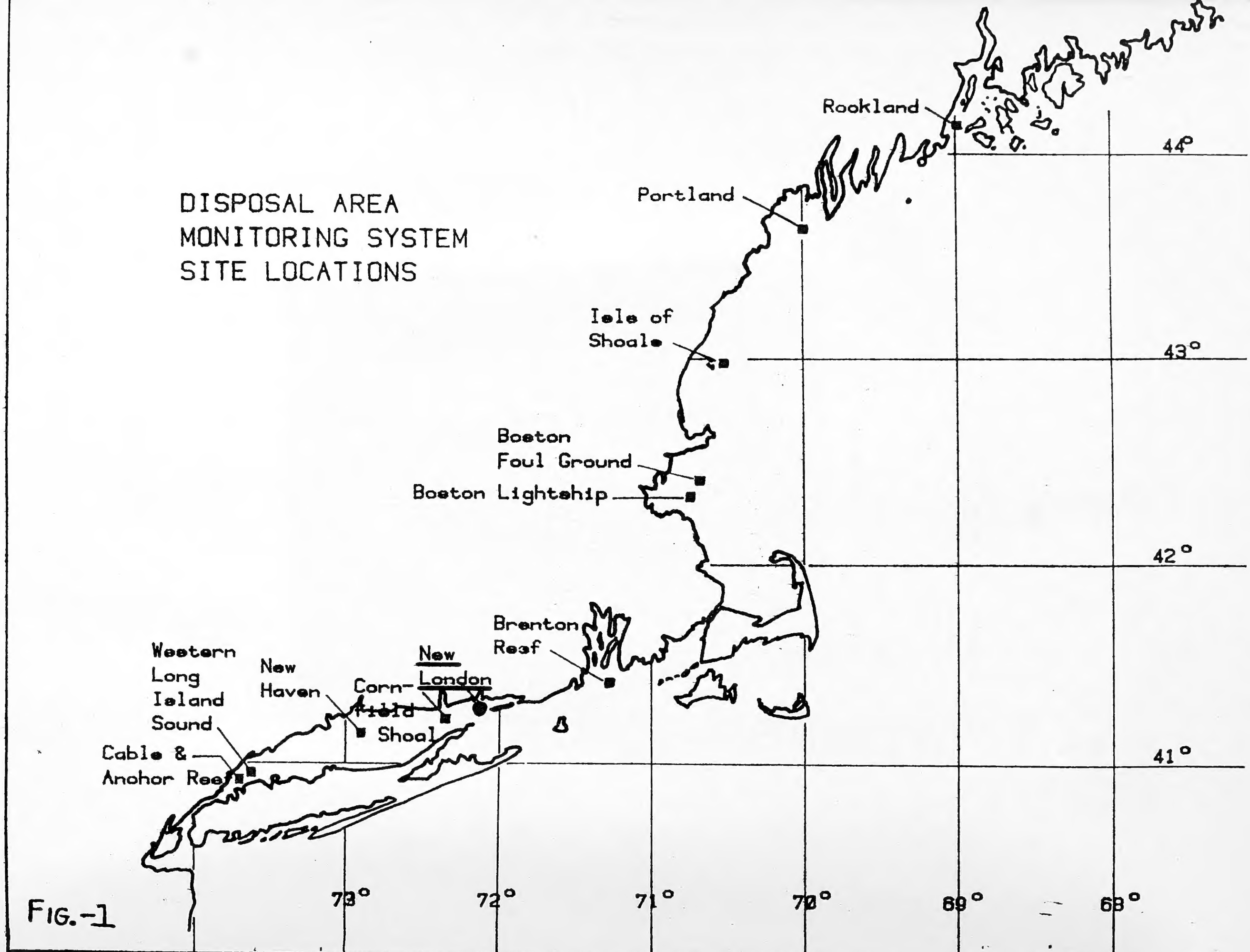


FIG.-1

DISPOSAL AREA MONITORING SYSTEM

This is one of a series of site specific data reports resulting from the DAMOS program, now two years in progress. DAMOS is the culmination of nearly a decade of prior study efforts, actually preceding NEPA, which have been directed towards the understanding of the effects of and the responsible management of the ocean disposal of dredged materials in New England waters as they fall under the authority of the New England Division of the Corps of Engineers. The individual site reports henceforth will be updated approximately on an annual bases as additional knowledge is gained, at least with respect to those sites where significant disposal activities will have occurred.

NEW LONDON DISPOSAL SITE

The New London Disposal Site (Fig. F-1) has been the most active disposal site in New England during the past several years. A major dredging project in the Thames River, sponsored by the U.S. Navy, has resulted in the disposal and subsequent monitoring of large quantities of spoils at this site. Although the first two years of monitoring effort were sponsored by the Navy, a summary of data is included here as subsequent studies will be conducted under the DAMOS program.

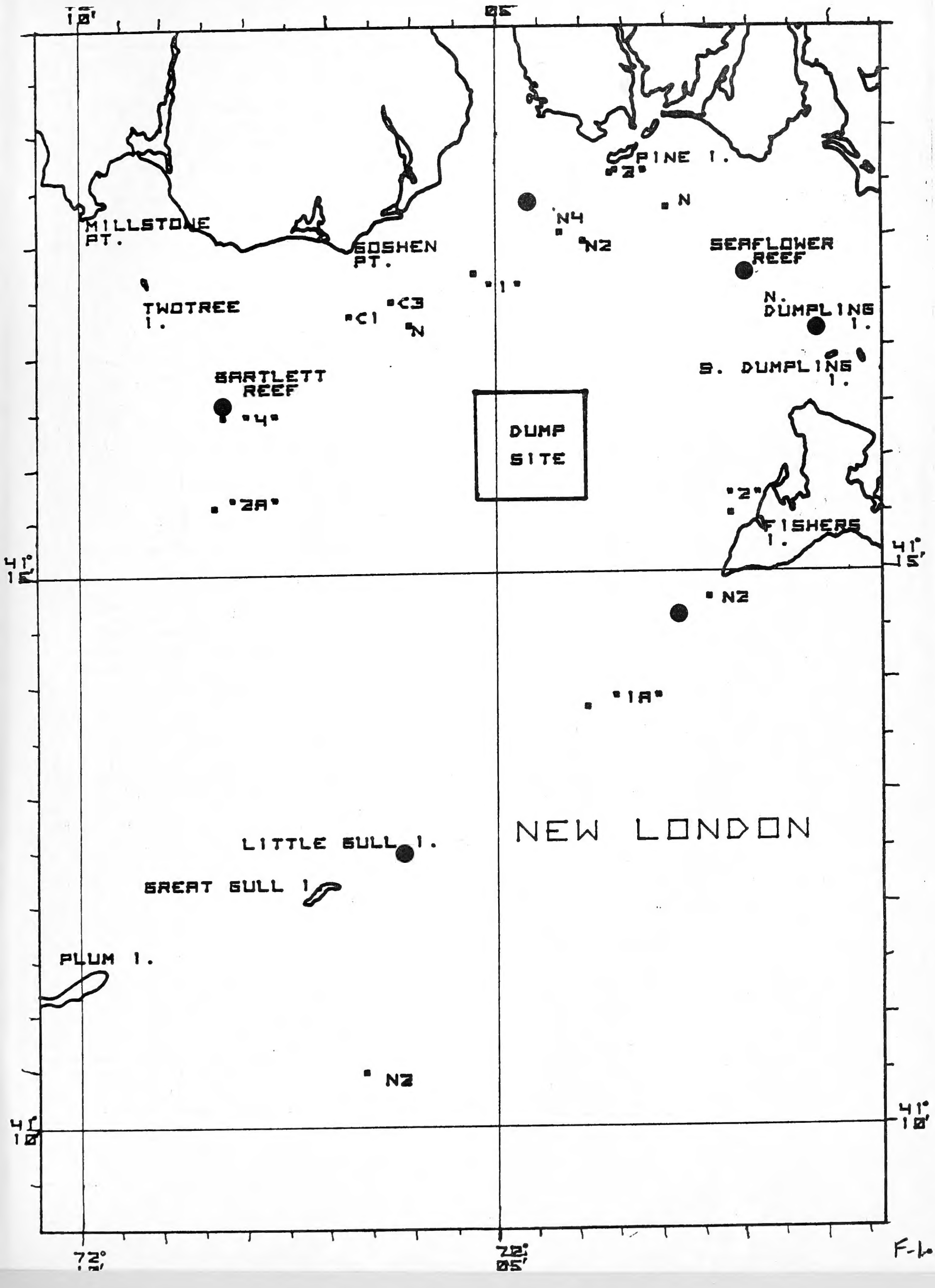
The site is located south of the Thames River and west of Fishers Island Sound in 20-24 meters of water. Sediments in the area are generally fine sand providing a good acoustic reflection. In the northern portion of the disposal site a "relict" disposal pile is present, formed from previous but unknown dredging operations.

Bathymetry

Navigation control for bathymetric surveys in the New London area is provided by shore stations at the New London Lighthouse and at Millstone Point. The navigation grid in this area has been used extensively during the past four years and has proven to be extremely stable and reliable.

Bathymetric surveys of the New London disposal site have been made almost semi-annually since 1974 in an effort to monitor the development and aerial extent of the spoil mound.

Following the end of Phase I dredging a survey was made on March 10, 1977 (Fig. F-2) prior to dredging or disposal of Phase II spoils. Consequently, this survey provides a baseline description of conditions existing at the site as a result of the Phase I dredging project. The spoil pile was an elliptical



MILLSTONE PT.
GOSHEN PT.
PINE I.
"3"
N
N4
N2
SEAFLOWER REEF
"1"
TWOTREE I.
C1
C3
N
N. DUMPLING I.
S. DUMPLING I.
BARTLETT REEF
"4"
DUMP SITE
"2A"
"2"
FISHERS I.
N2
"1A"
NEW LONDON
LITTLE GULL I.
GREAT GULL I
PLUM I.
N2
10'
05'
41° 15'
41° 10'
72° 10'
72° 05'

F-1

10 MARCH 1977

mound oriented slightly from northwest to southeast. The minimum depth in the northwest was 20 meters and in the southeast 18.5 meters. Because the first spoils to be dredged under the Phase II program were to be of the worst quality from the dock areas, it was decided to dispose of them just northeast of the southern portion of the mound, so that they would be covered by cleaner spoils. In order to accomplish this, a second buoy was positioned at the suggested disposal point.

The second survey (Fig. F-3) on September 12, 1977, indicated that this technique had been successful. There was a distinctive build-up of the mound northeast of 41°16'N, 72°4.8'W, the center of the southeast portion of the original mound.

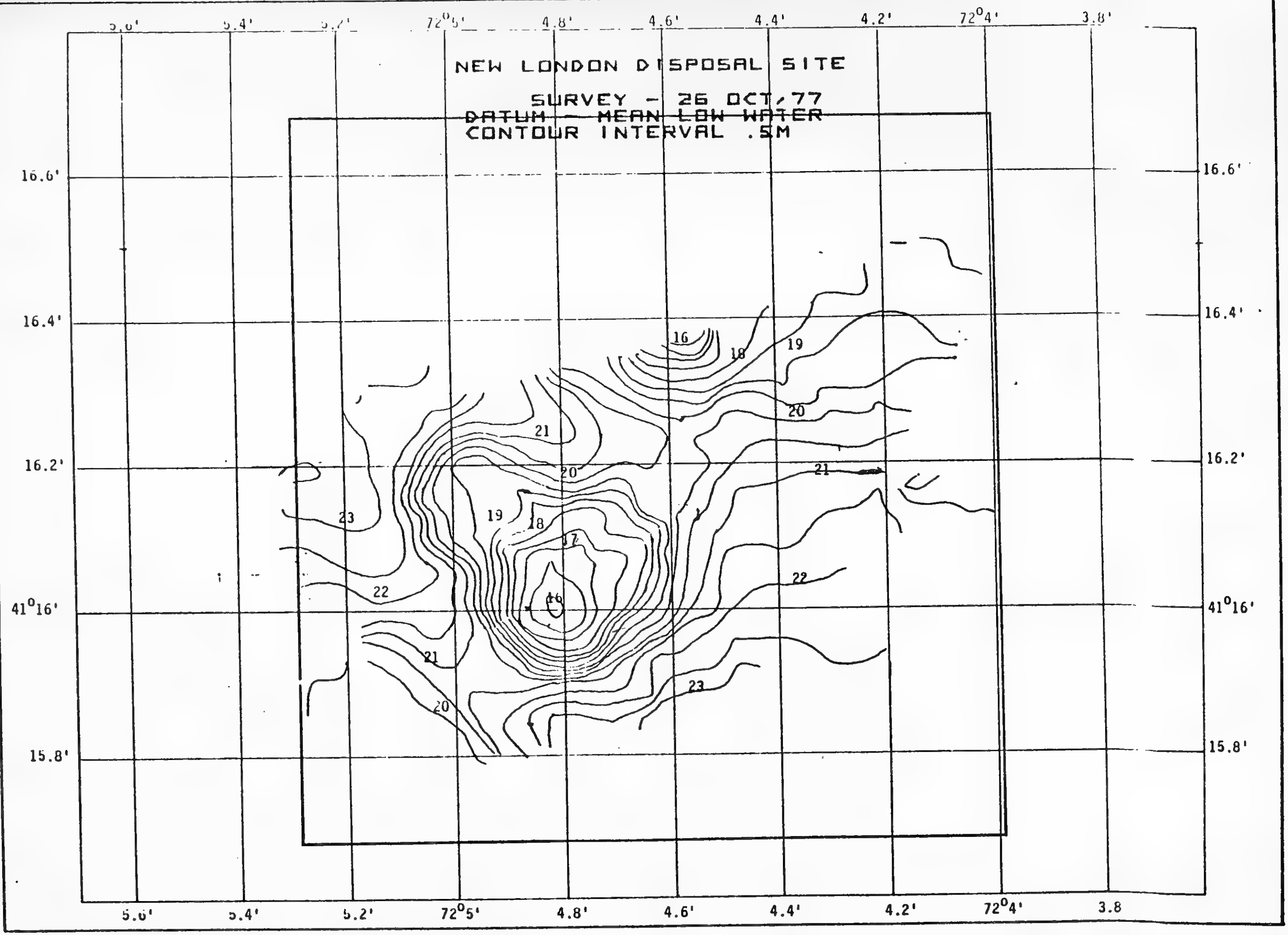
This build-up extended east to 72°4.6'W and north to 41°16.1'N. However, because of the concentrated disposal effort that began in June, 1977 the top of the mound had reached a minimum depth of 14 meters by September. Although this adequately covered the poor quality spoils, the minimum depth is above a safe limit relative to effects of wave action. Consequently, NUSC initiated movement of the disposal point northward and scheduled an additional survey on October 26, 1977, to investigate the effects of this action.

The resulting survey (Fig. F-4) indicated a corresponding northward shift of the spoil boundary in the affected area close to 16°2'N. The minimum depth increased to 16 meters, probably due to a combination of compaction and winnowing at the shallower depths.

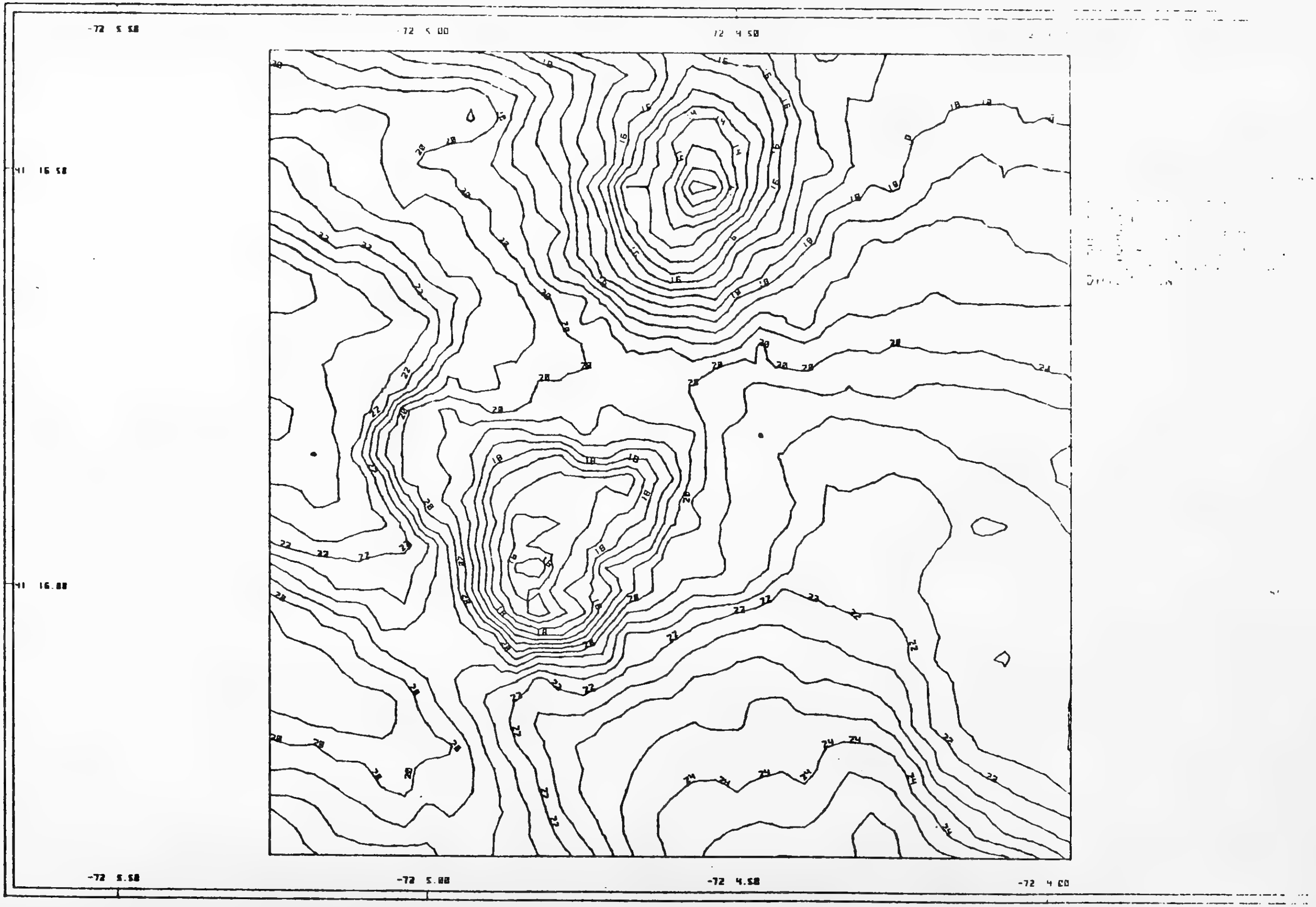
Following the October survey dumping continued at the new disposal point until a fourth survey was made on March 8, 1978 (Fig. F-5(a-k)). This was the first New London Survey to make use of the updated BDAS system. Although the rate of disposal was less during this period, the build-up at the designated point was readily apparent. The mound changed to a triangular shaped pile with

41°16.600'
41°16.400'
41°16.200'
41°16.000'
41°15.900'
41°15.500'
-72°5.500'
-72°5.400'
-72°5.200'
-72°4.500'
-72°4.400'
-72°4.200'
-72°4.000'
-72°3.900'
-72°3.500'
13
14
19
20
21
22
23
24

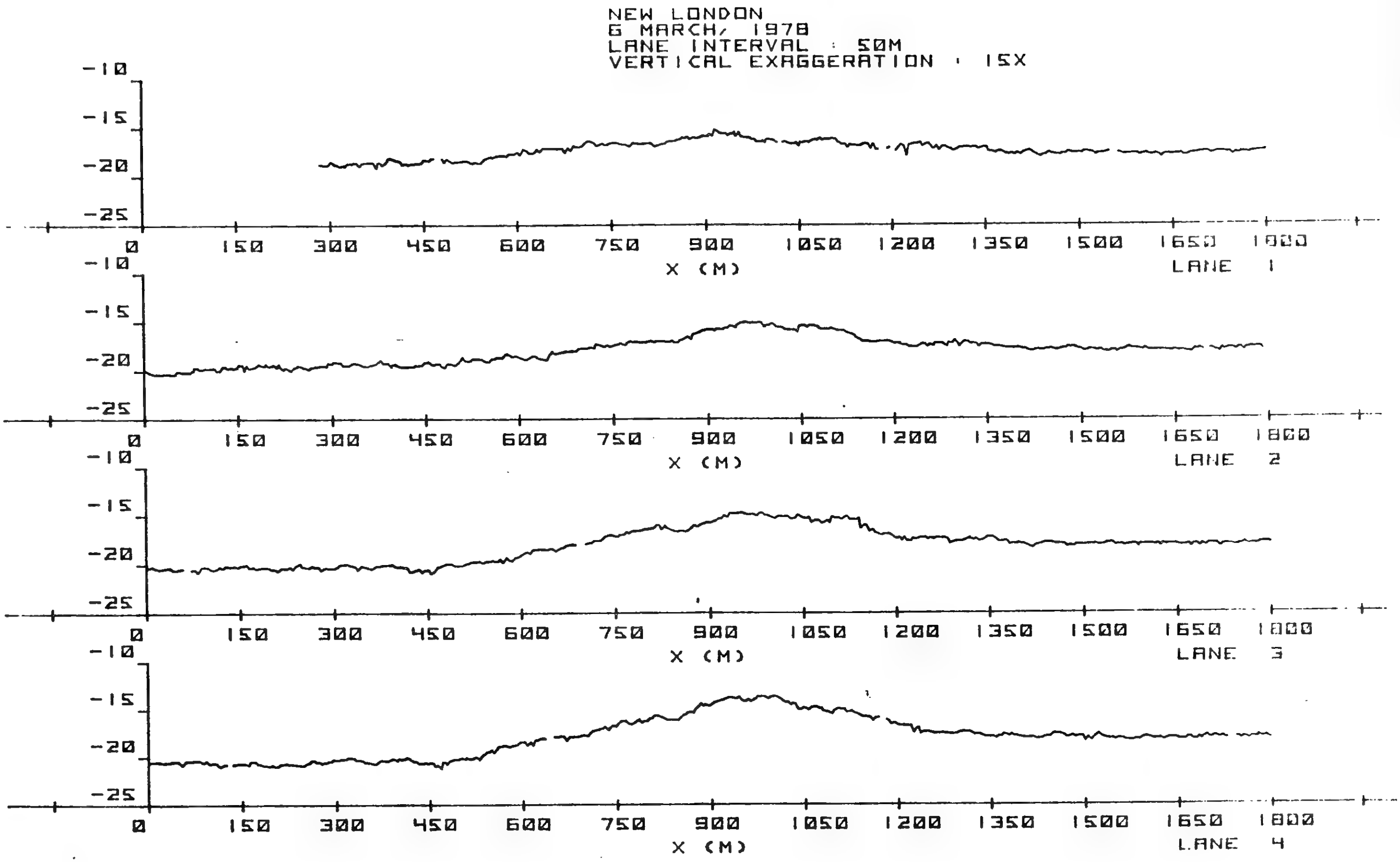
F-3


NEW LONDON DISPOSAL SITE
SURVEY - 26 OCT, 77
DATUM - MEAN LOW WATER
CONTOUR INTERVAL .5M
5.6'
5.4'
5.2'
72°5'
4.8'
4.6'
4.4'
4.2'
72°4'
3.8
16.6'
16.4'
16.2'
41°16'
15.8'
16
17
18
19
20
21
22
23

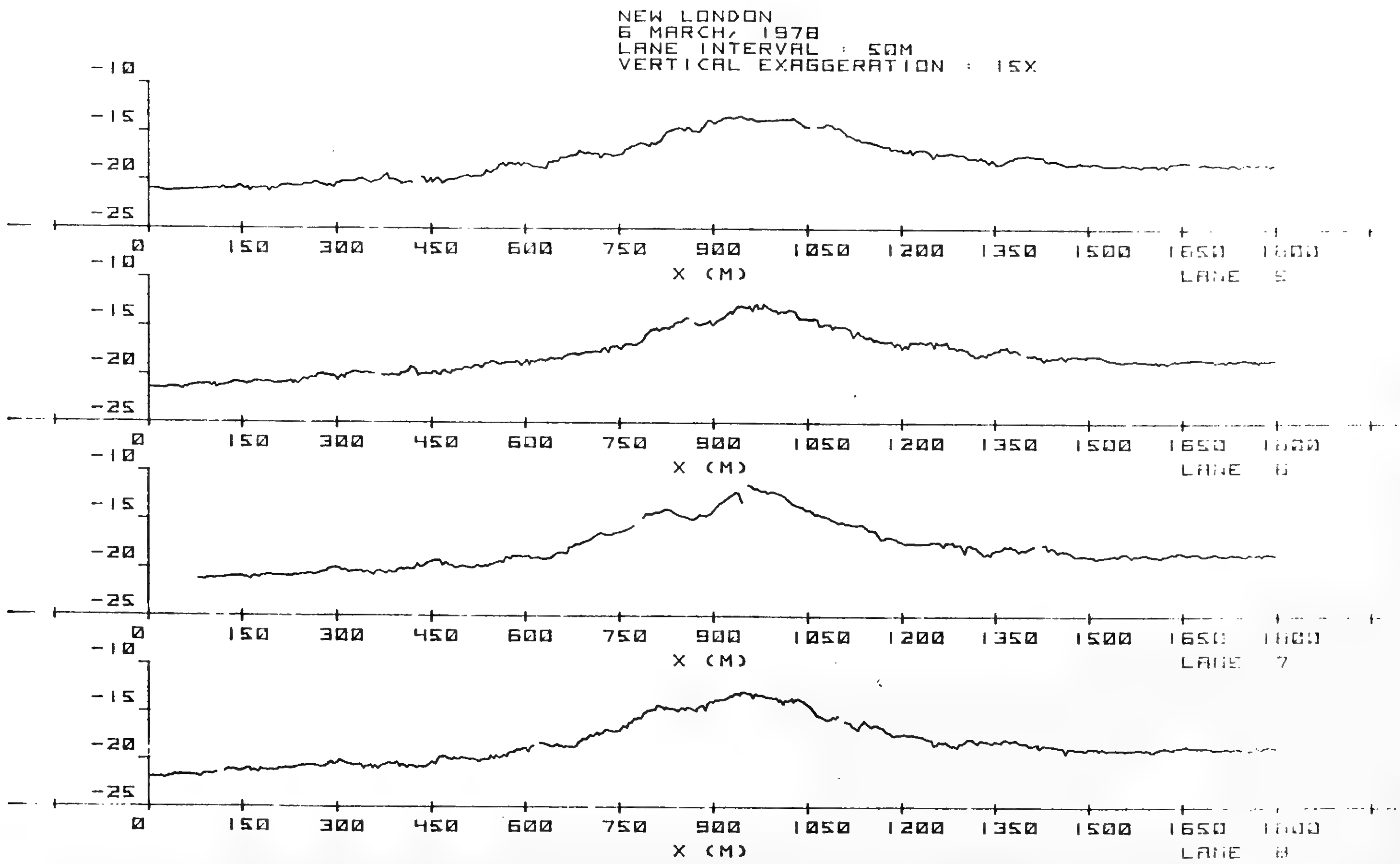
F. 4



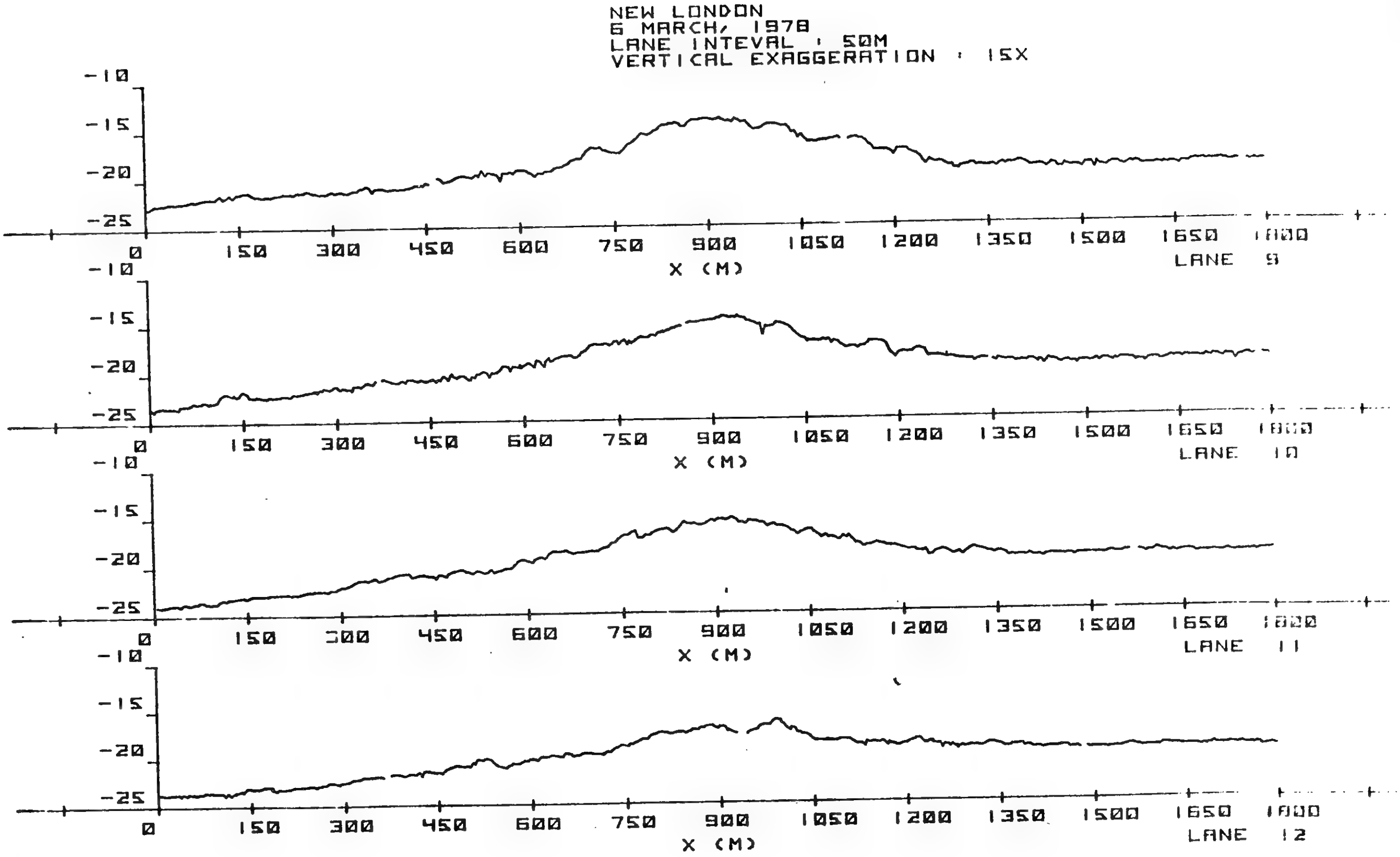
F-5A


NEW LONDON
6 MARCH, 1978
LANE INTERVAL : 50M
VERTICAL EXAGGERATION : 15X
-10
-15
-20
-25
0
150
300
450
600
750
900
1050
1200
1350
1500
1650
1800
X (M)
LANE 1
LANE 2
LANE 3
LANE 4

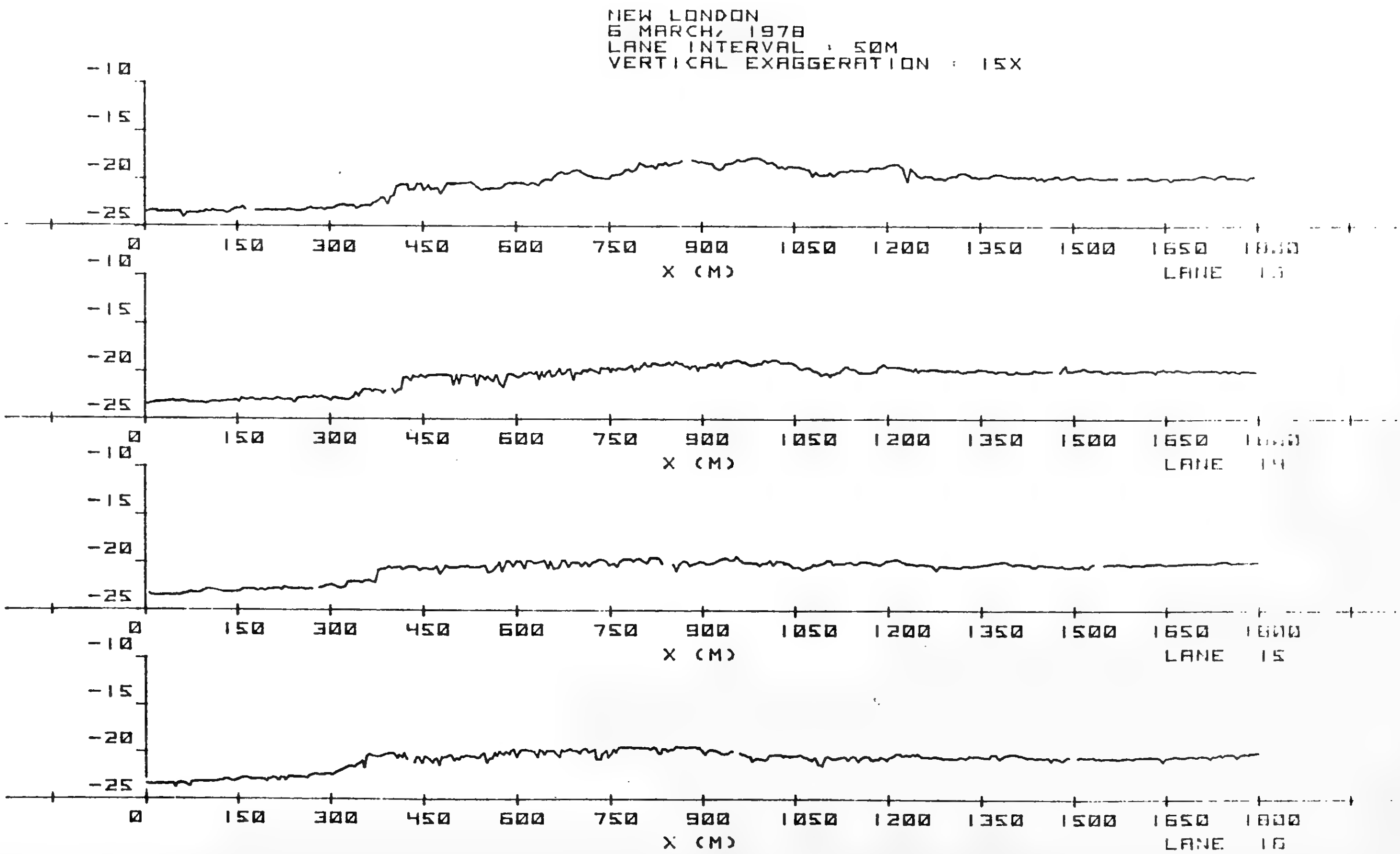
F 5b


NEW LONDON
6 MARCH, 1978
LANE INTERVAL : 50M
VERTICAL EXAGGERATION : 15X
-10
-15
-20
-25
0
150
300
450
600
750
900
1050
1200
1350
1500
1650
1800
X (M)
LANE 5
LANE 6
LANE 7
LANE 8

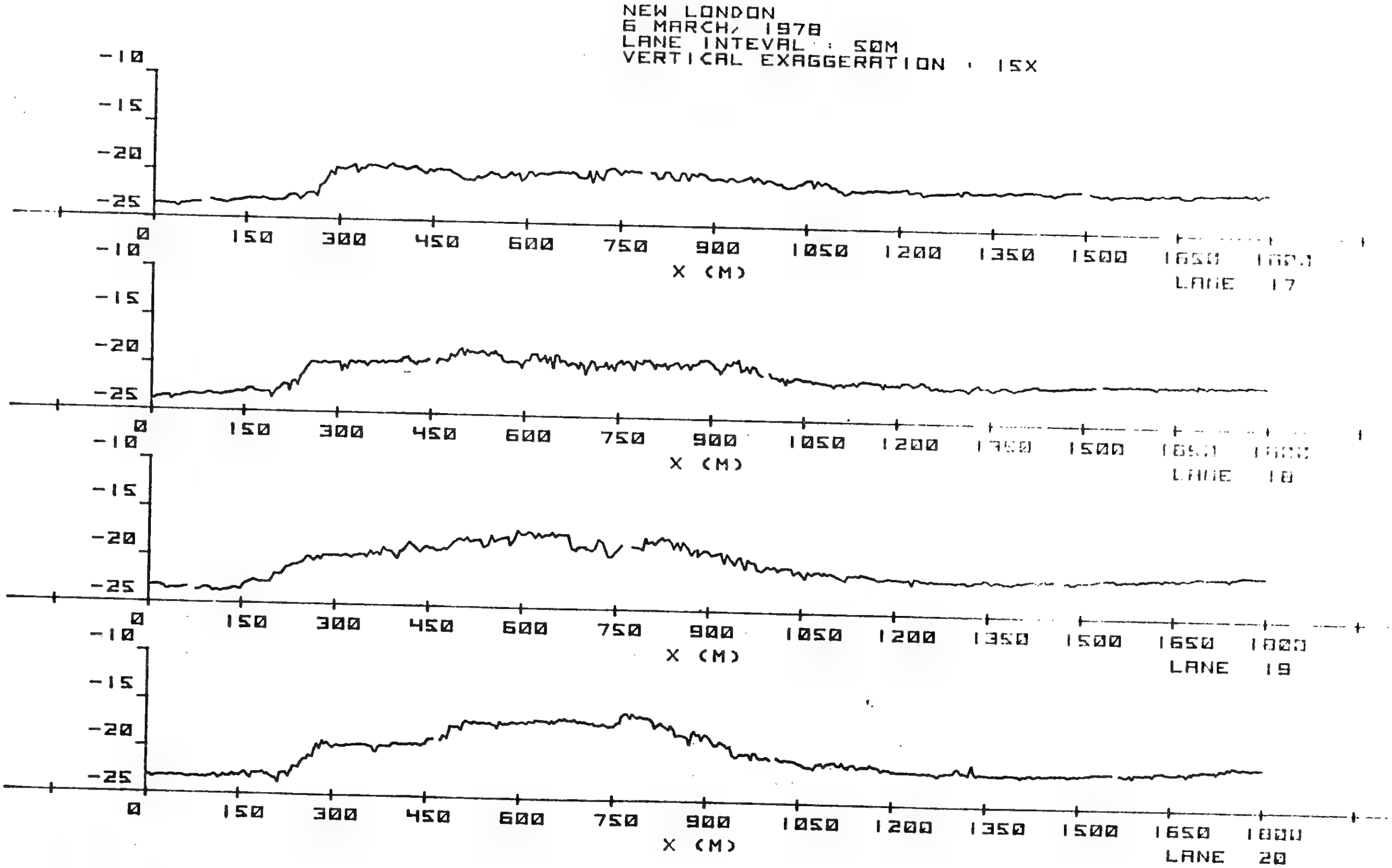
F 5c


NEW LONDON
6 MARCH, 1978
LANE INTEVAL : 50M
VERTICAL EXAGGERATION : 15X
-10
-15
-20
-25
0
150
300
450
600
750
900
1050
1200
1350
1500
1650
1800
X (M)
LANE 9
LANE 10
LANE 11
LANE 12

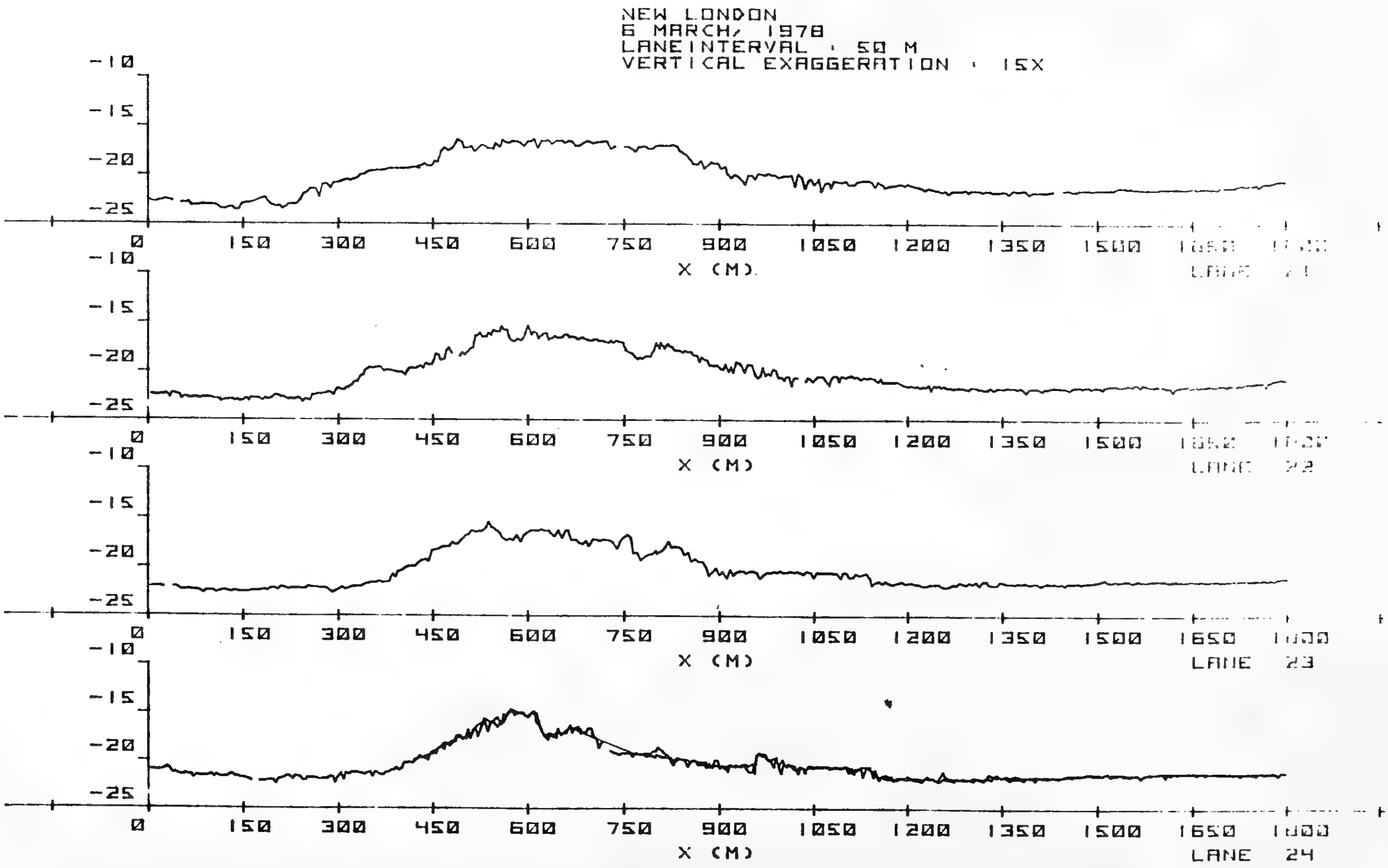
F-5a


NEW LONDON
6 MARCH, 1978
LANE INTERVAL : 50M
VERTICAL EXAGGERATION : 15X
-10
-15
-20
-25
0
150
300
450
600
750
900
1050
1200
1350
1500
1650
1800
X (M)
LANE
LANE 15
LANE 16

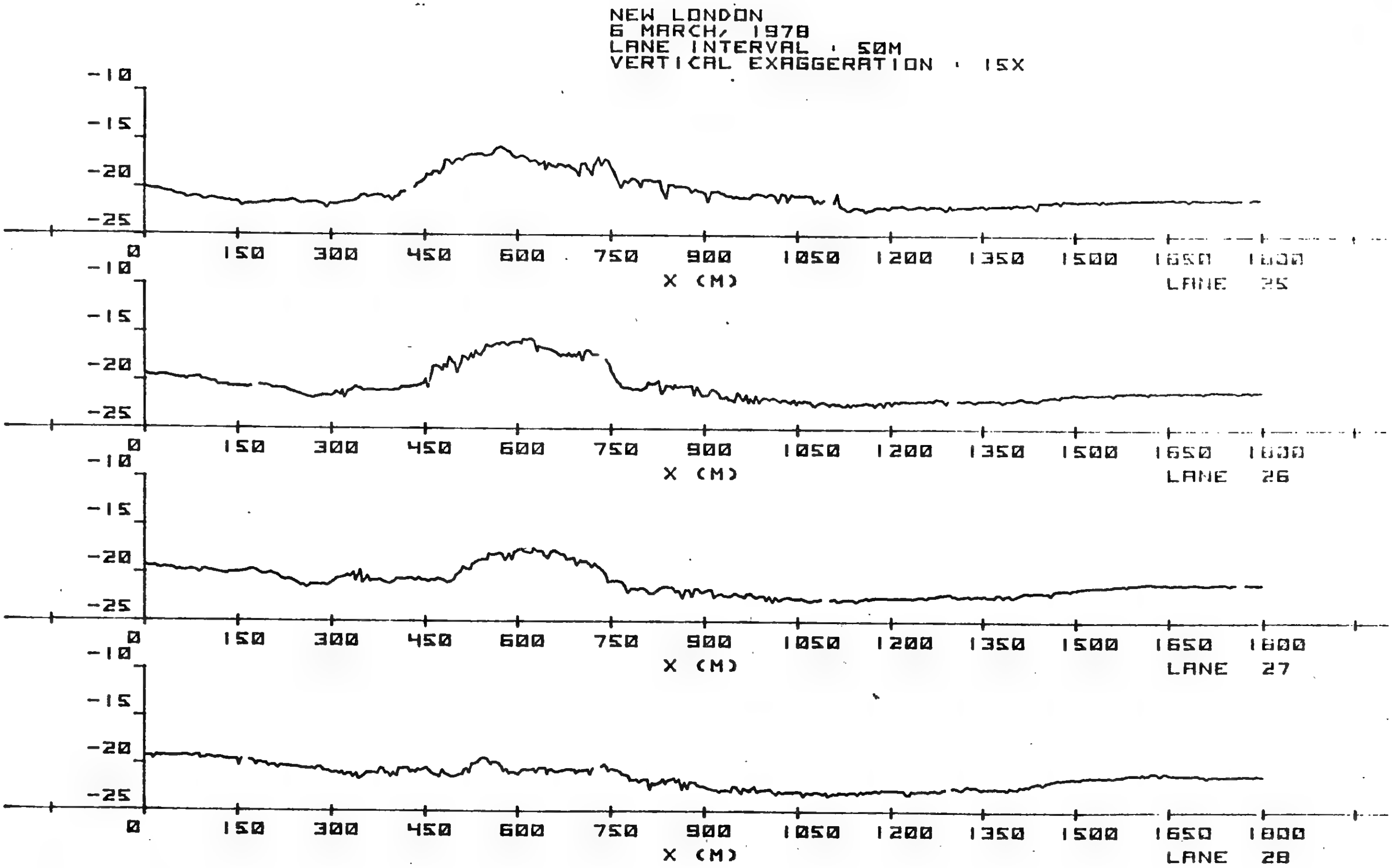
F 5e


NEW LONDON
6 MARCH, 1978
LANE INTEVAL : 50M
VERTICAL EXAGGERATION : 15X
-10
-15
-20
-25
0
150
300
450
600
750
900
1050
1200
1350
1500
1650
X (M)
LANE 17
LANE 18
LANE 19
LANE 20

F 5f


NEW LONDON
6 MARCH, 1978
LANEINTERVAL : 50 M
VERTICAL EXAGGERATION : 15X
X (M)
LANE 23
LANE 24

F. 5g


NEW LONDON
6 MARCH, 1978
LANE INTERVAL : 50M
VERTICAL EXAGGERATION : 15X
-10
-15
-20
-25
0
150
300
450
600
750
900
1050
1200
1350
1500
1650
1800
X (M)
LANE 25
LANE 26
LANE 27
LANE 28

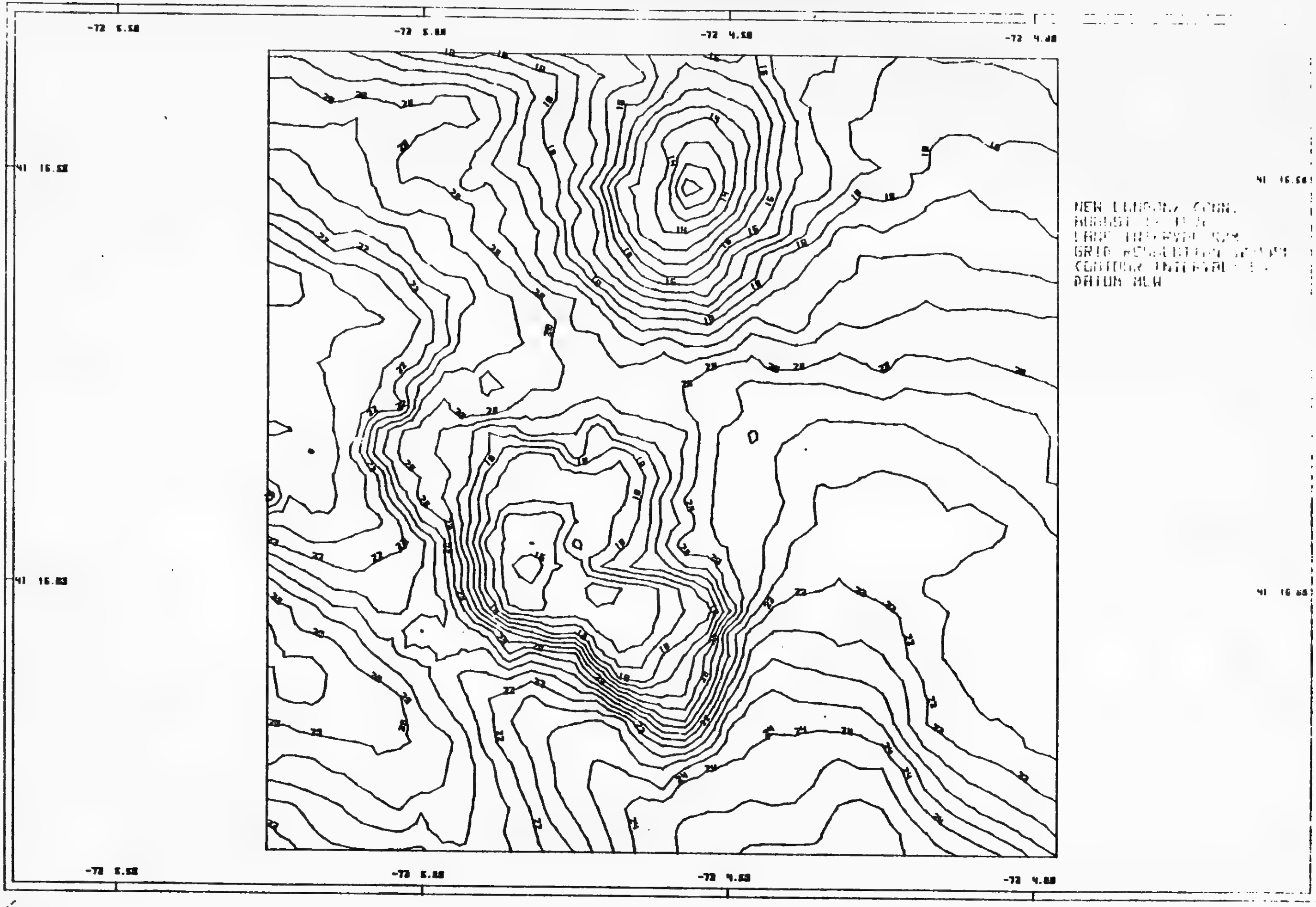
F. 5h

a fairly large lobe of sediment in the northeast corner. In general, the top of the spoil mound was not as flat as it appeared in past surveys, and the entire pile seemed more conical than before. The minimum depth had increased to 15.5 to 16 meters over most of the pile.

As a result of this survey another change in the position of the disposal point was initiated that moved the site southward. Disposal at this new position continued until completion of the dredging operation in June, 1978. A post disposal survey was then made on August 1, 1978 (Fig. F-6(a-k)) that showed the final mound had a general elliptical shape with a major axis from northwest to southeast. The minimum depth of 16 meters found in the October, 1977 survey has remained stable throughout this period.

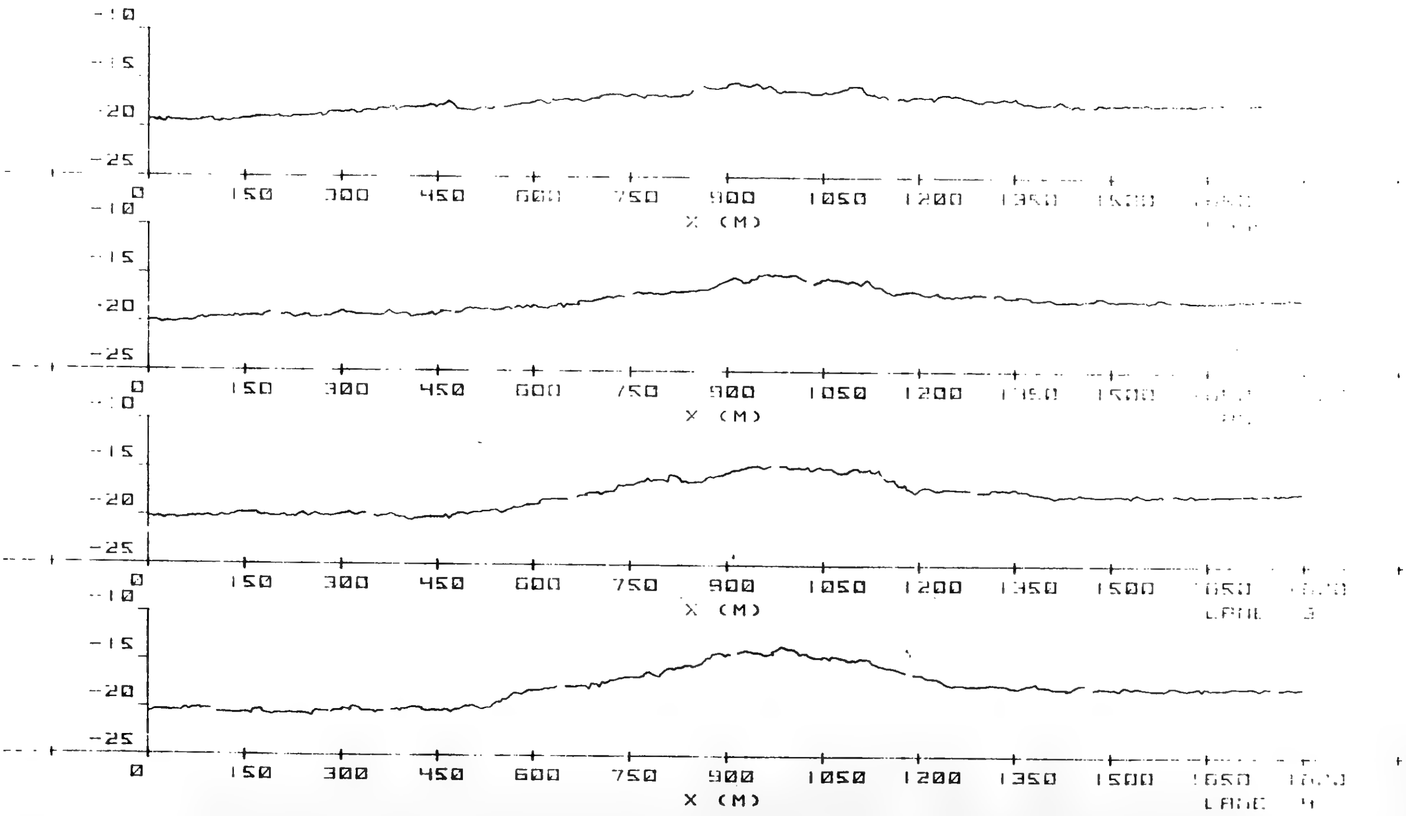
The BDAS system provides excellent precision in surveying and analysis of bathymetric data. This is shown in Figure F-7 where a series of transects are superimposed to evaluate changes in bottom topography. From these data, it is apparent that no major changes in topography are occurring at the New London site and even minor topographic features can be reproduced over a period of several months.

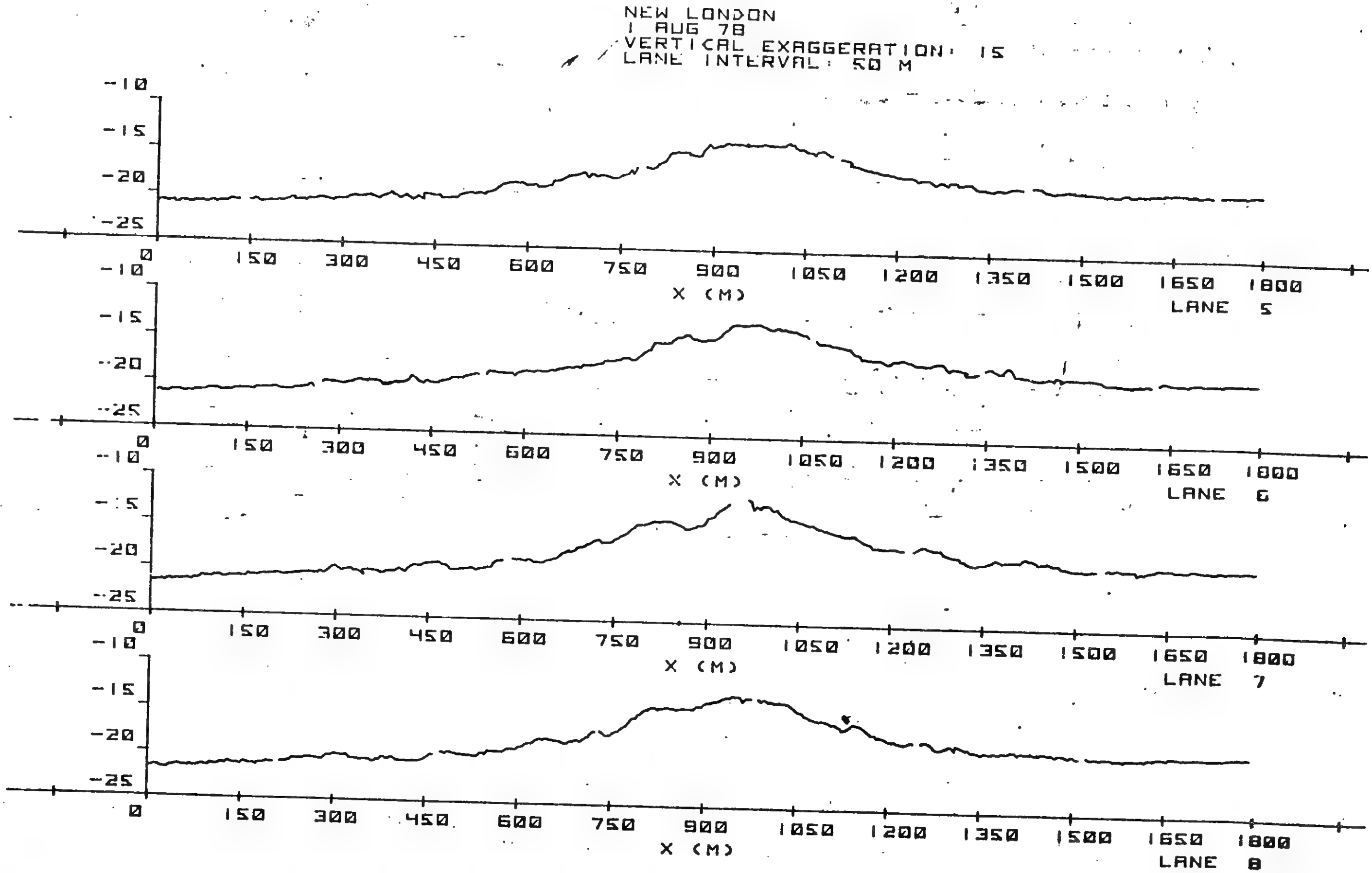
Although no major changes in topography have occurred at New London, there is evidence for change in the character of spoils following disposal. A cross-section across the spoil pile that was taken from east to west during the October 1977 survey is shown in Figure F-8. This profile was obtained using a Raytheon Dual Frequency Fathometer System that is used in conjunction with the EDO 4034-A. The lower frequency (7 kHz) allows penetration of the sediment for sub-bottom profiling while the higher frequency (200 kHz) provides an accurate measure of the sediment-water interface.


NEW LONDON, CONN.
DATUM MLW
-72 5.50
-72 5.00
-72 4.50
-72 4.00
41 16.50
41 16.00

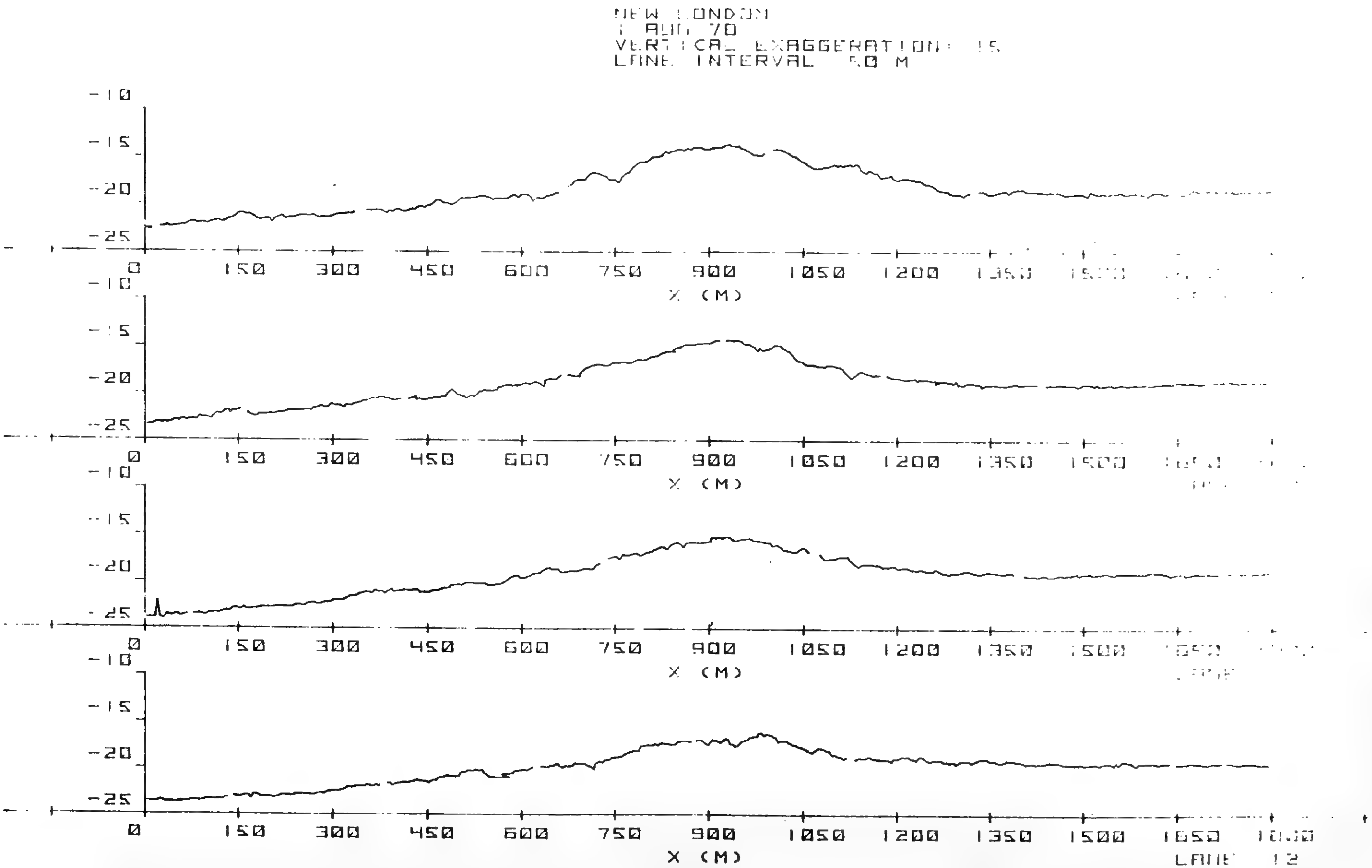
F-6a

NEW LONDON
1 AUG 78
VERTICAL EXAGGERATION: 15
LANE INTERVAL: 50 M



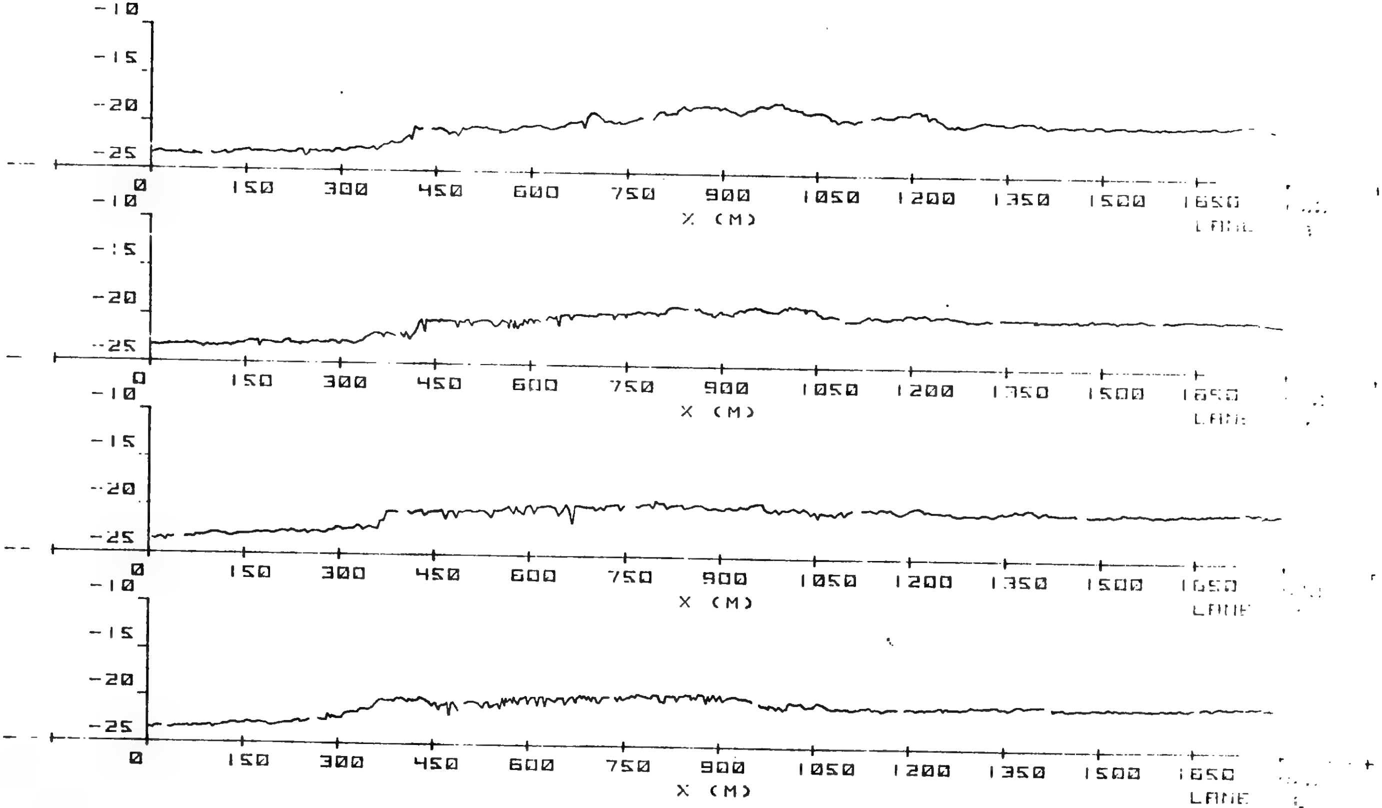

NEW LONDON
1 AUG 78
VERTICAL EXAGGERATION: 15
LANE INTERVAL: 50 M
-10
-15
-20
-25
0
150
300
450
600
750
900
1050
1200
1350
1500
1650
1800
X (M)
LANE 5
LANE 6
LANE 7
LANE 8

F 6c


NEW LONDON
1 AUG 70
VERTICAL EXAGGERATION: 15
LANE INTERVAL 5.0 M
-10
-15
-20
-25
0
150
300
450
600
750
900
1050
1200
1350
1500
1650
X (M)
LANE 12

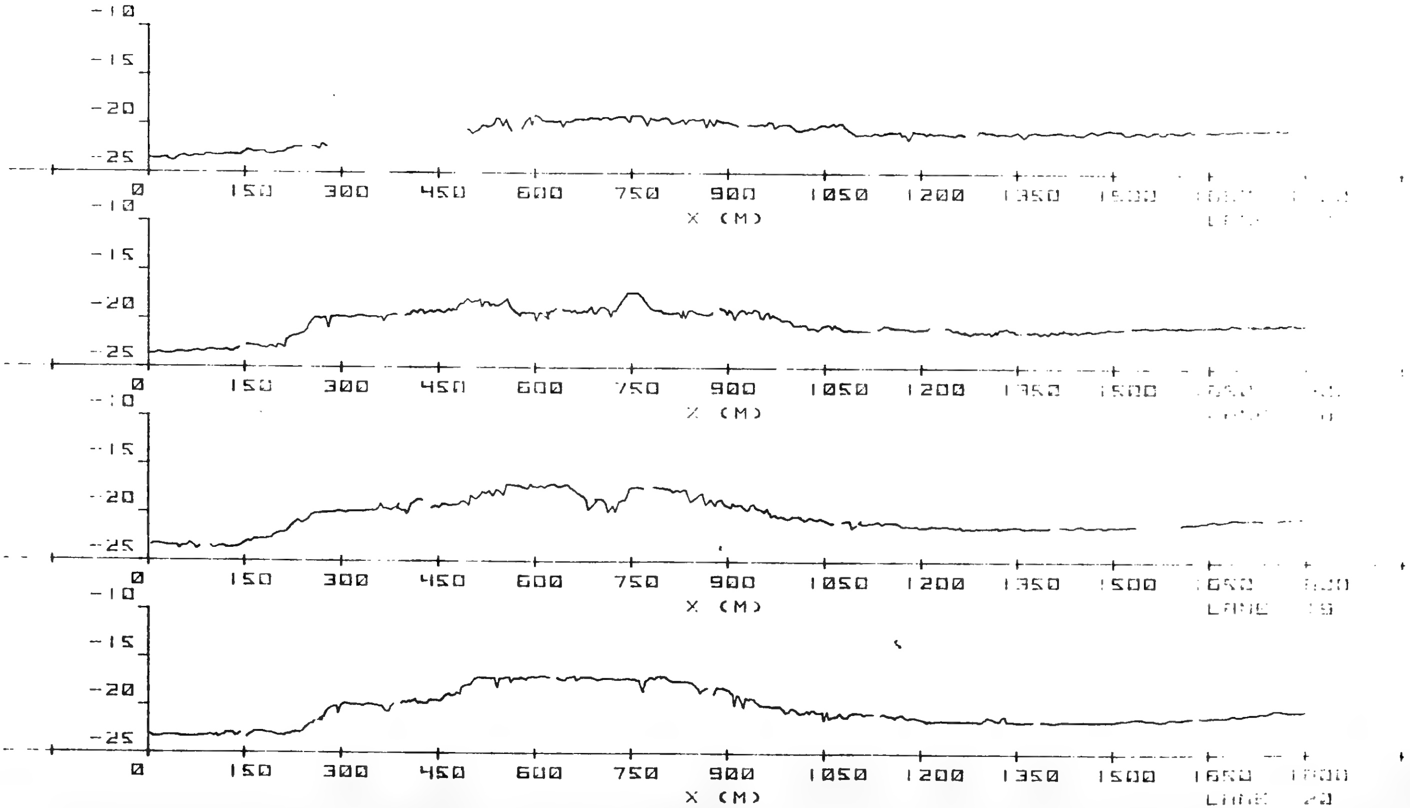
F 6-d

NEW LONDON
1 AUG 78
VERTICAL EXAGGERATION: 15
LANE INTERVAL: 50 M



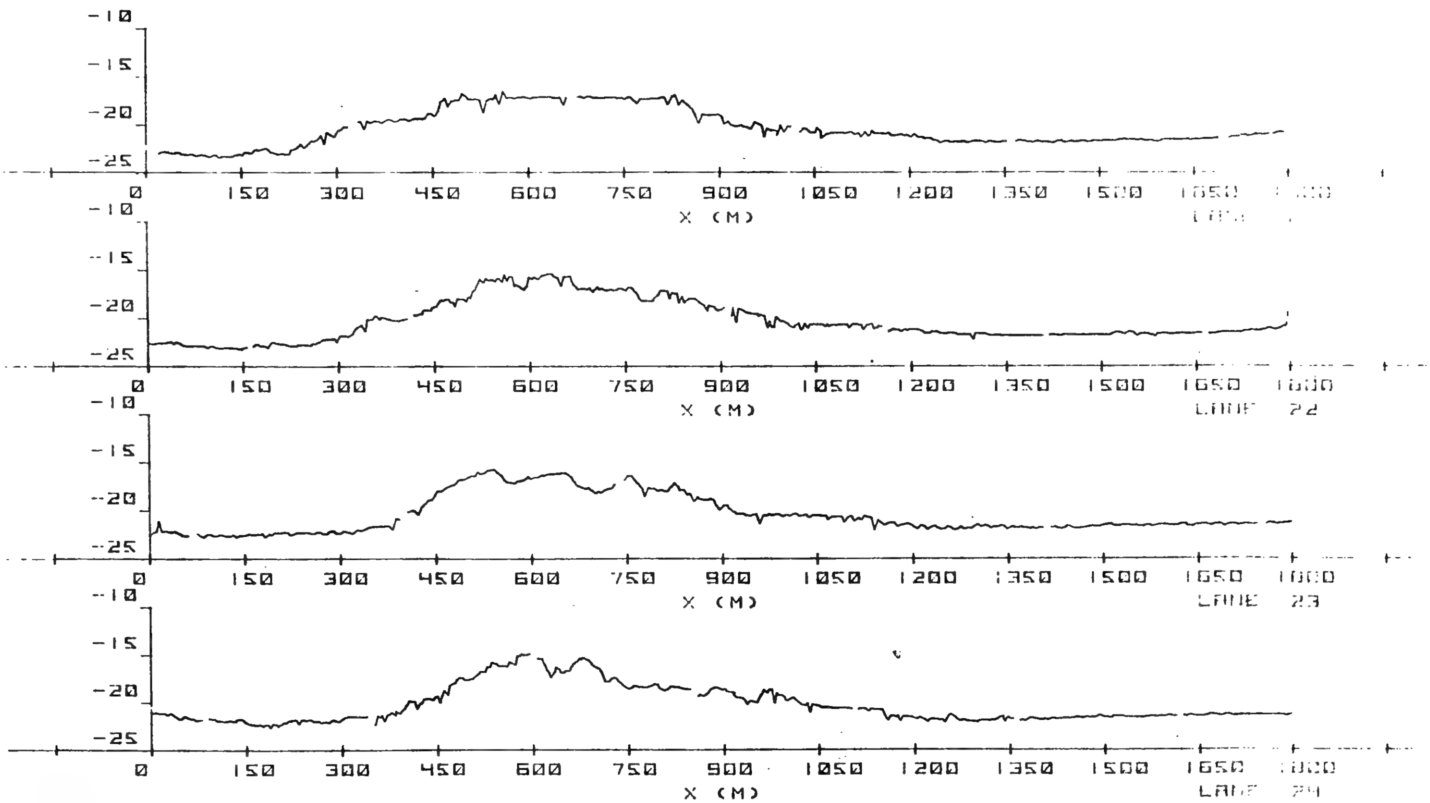
F-6-2

NEW LONDON
1 AUG 78
VERTICAL EXAGGERATION 15
LANE INTERVAL: 50 M

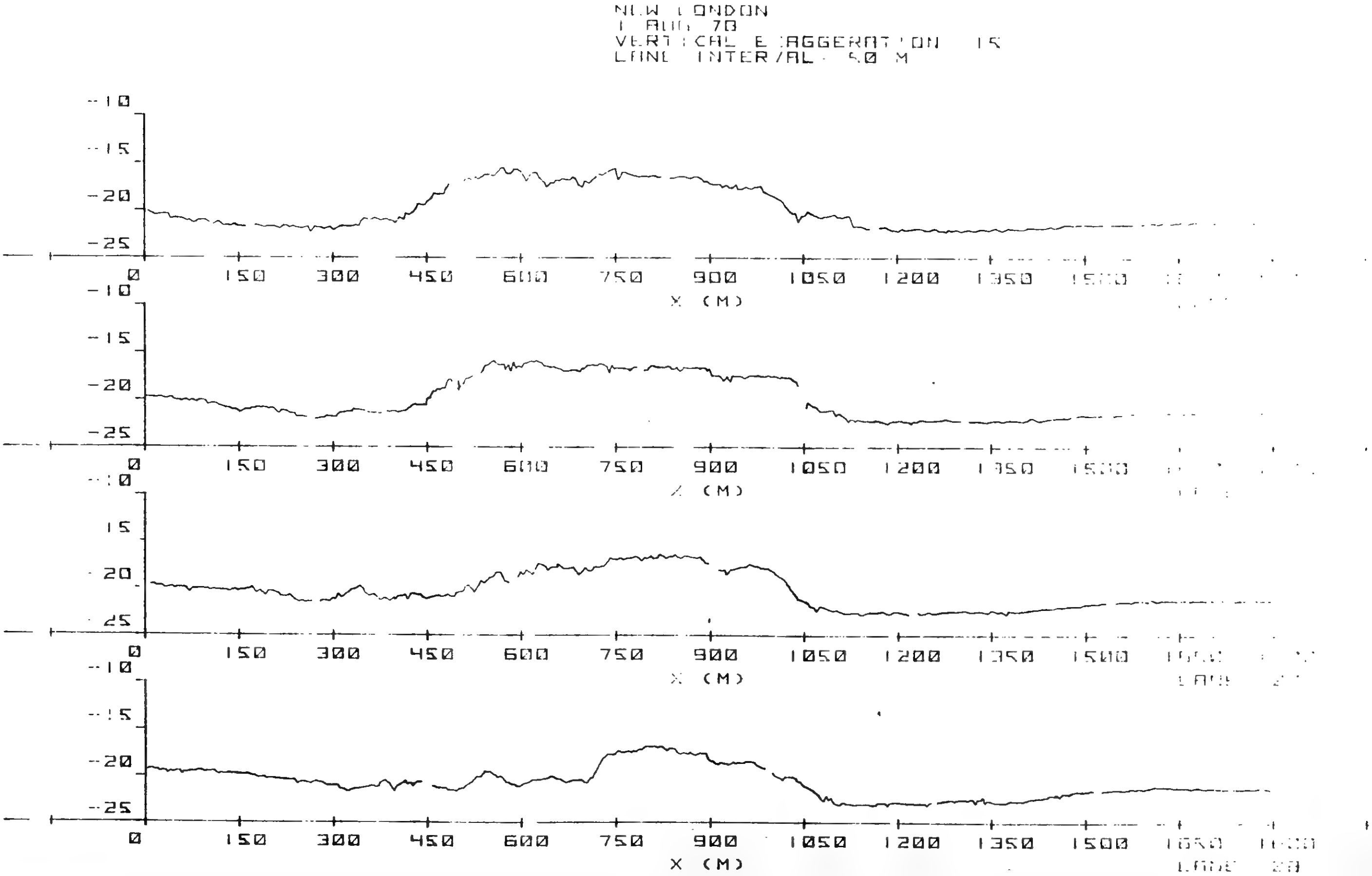


F6f

NEW LONDON
1 AUG 70
VERTICAL EXAGGERATION: 15
LANE INTERVAL: 50 M

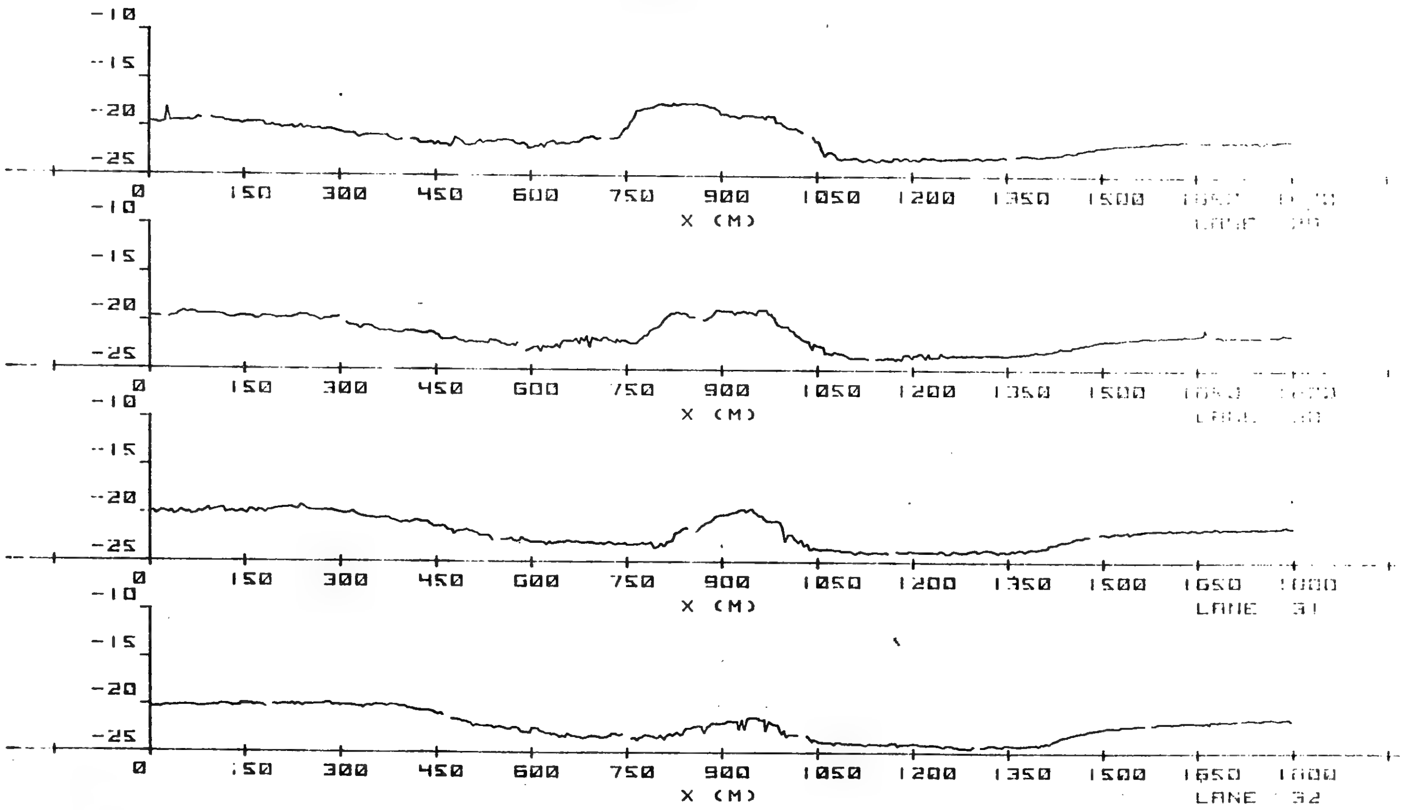


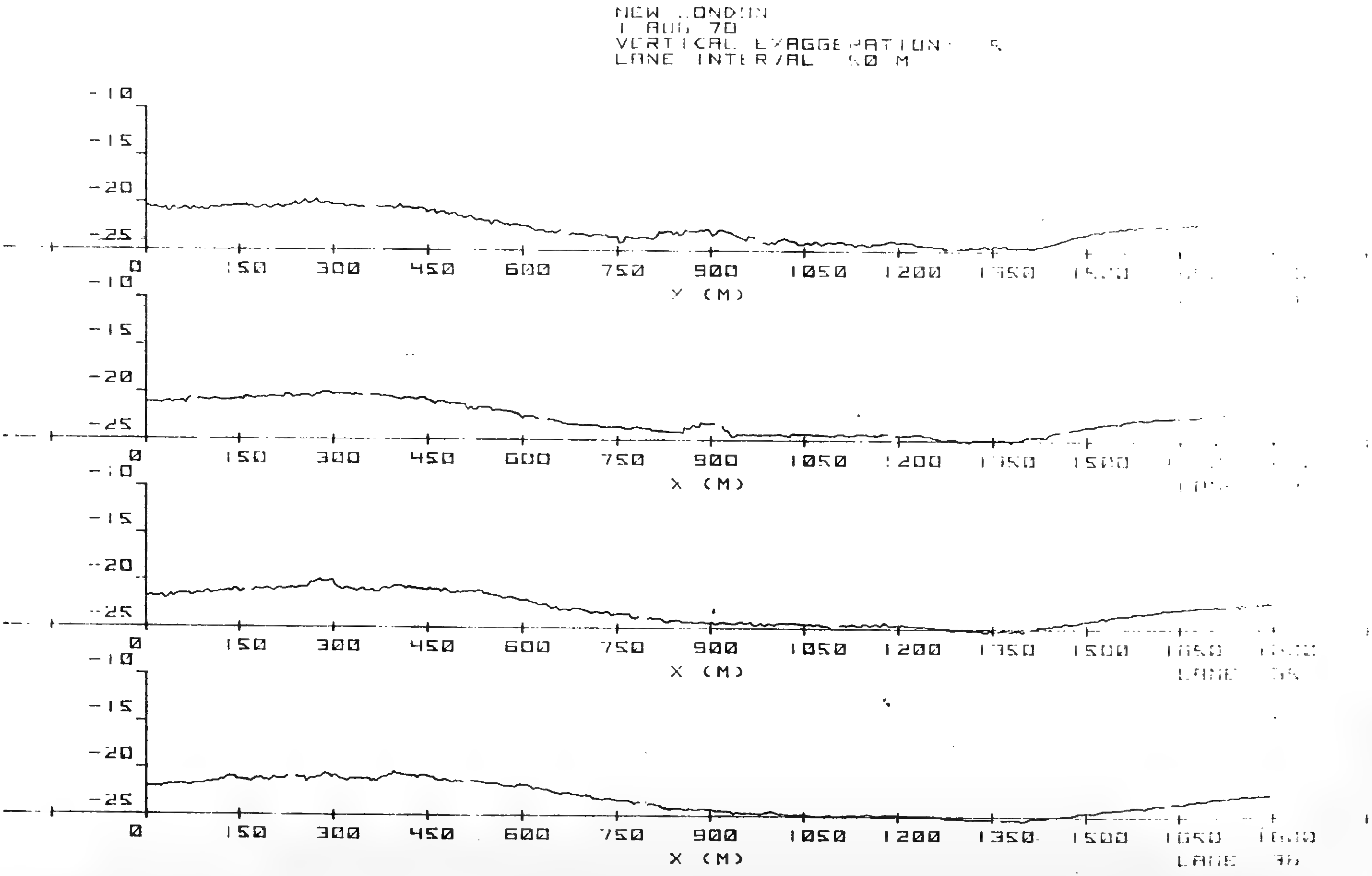
F 6g


NEW LONDON
1 AUG 78
VERTICAL EXAGGERATION 15
LANE INTERVAL 50 M
-10
-15
-20
-25
0
150
300
450
600
750
900
1050
1200
1350
1500
X (M)

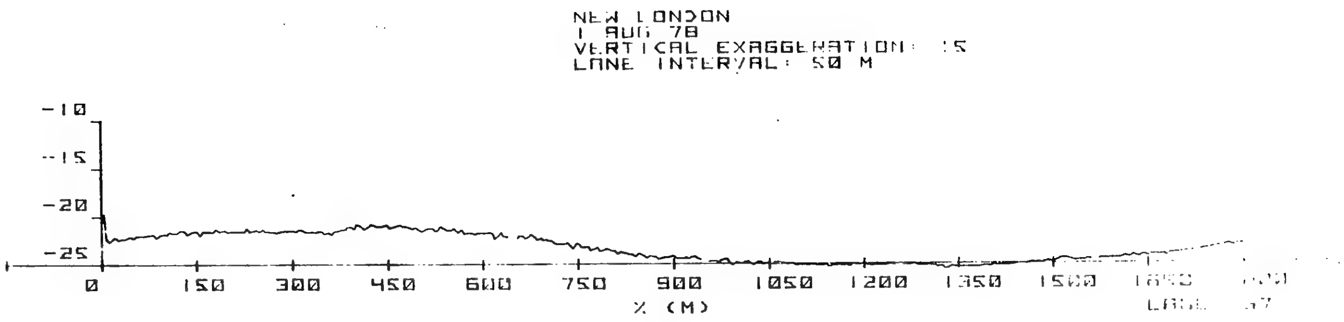
F 6A

NEW LONDON
1 AUG 70
VERTICAL EXAGGERATION: 15
LANE INTERVAL: 50 M




NEW LONDON
1 AUG 70
VERTICAL EXAGGERATION 5
LANE INTERVAL 50 M
-10
-15
-20
-25
0
150
300
450
600
750
900
1050
1200
1350
1500
X (M)

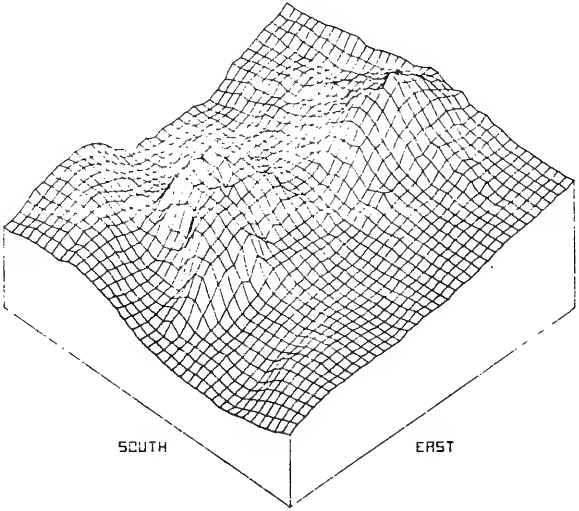
F 6-8

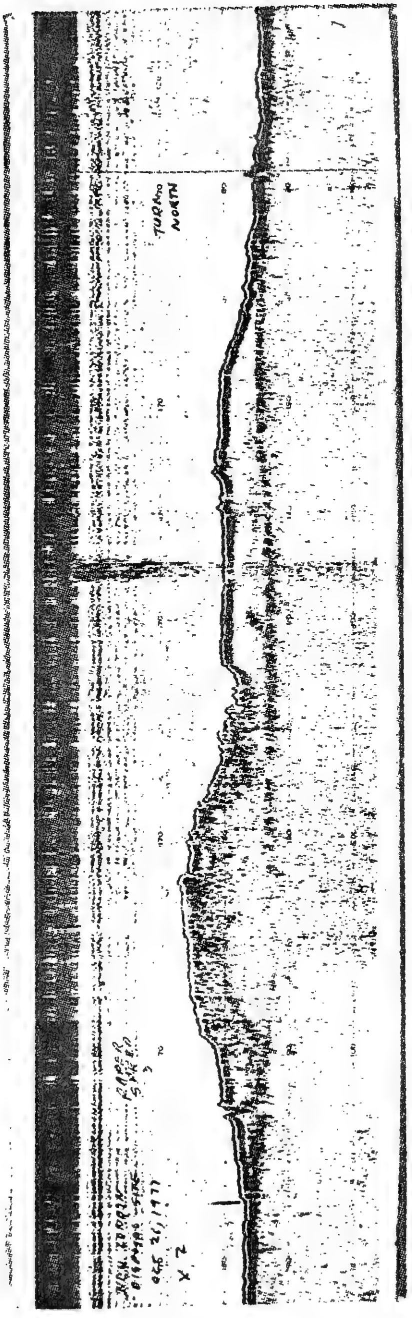


NEW LONDON
1 AUG 78
VERTICAL EXAGGERATION: 15
LANE INTERVAL: 50 M
-10
-15
-20
-25
0
150
300
450
600
750
900
1050
1200
1350
1500
X (M)

F 6k

NEW LONDON
1 AUG 78
VERTICAL EXAGGERATION: 60
VIEW ANGLE 45 DEG





TURN TO NORTH
PAPER SHIFTED
X 2

The profile shows a clear distinction between the flat-topped, transparent older Phase I pile and the rough, translucent Phase II pile. Future consolidation and setting of the Phase II pile may result in a similar profile to the older pile in the future.

Currents

One set of current meter data for the New London disposal site is presented in Table F-1 and Figure F-9 (a-c). These data are similar to records previously obtained at this site, as they are dominated by an east-west tidal flow that results in a net drift to the east.

An interesting feature resulting from the use of motion ellipses for analysis is the fact that major tidal flow is in a northwest southeast direction althoug the net drift is nearly due east. This condition further emphasizes the need to look at shorter time intervals to evaluate the effect of currents on the stability of dredge spoil. If net drift were the only criteria used to predict where effects of spoiling might be present, then one would be looking in the wrong location since all transport would be along the axis of motions.

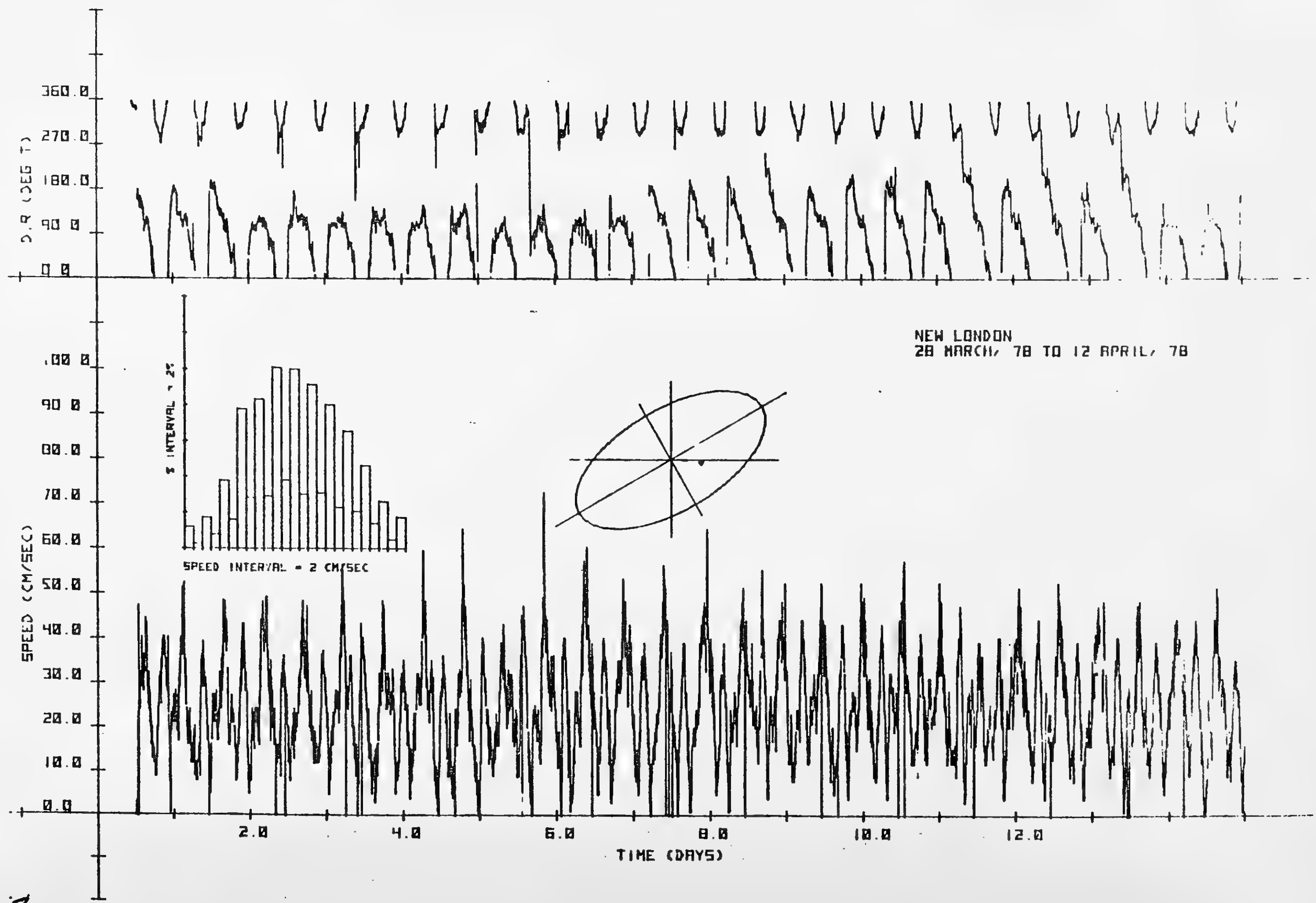
The New London Site is one of the most active sites in terms of water movement. The horizontal kinetic energy of 333 dynes/sec is made up of 80% tidal energy and is therefore continuous and predictable. This is evidenced by the fact that the highest 10% speed of 44 cm/sec is only slightly higher than the peak tidal speed of 42 cm/sec.

TABLE F-1

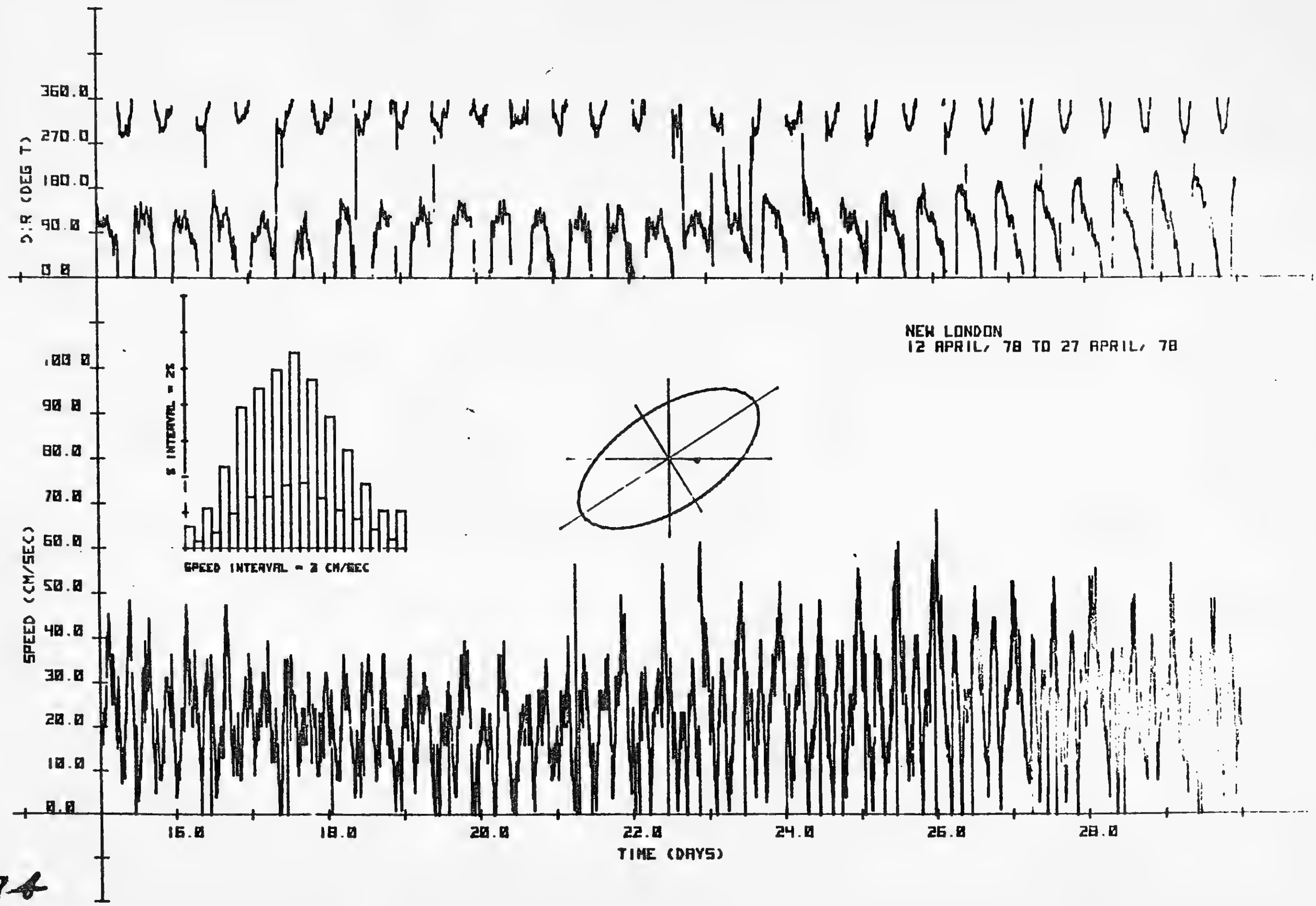
	Total OBS. Current	Tidal Current Inc. Mean	Residual Current	Mean Current
Semi-major axis (cm/sec)	23.2	21.68	10.03	-
Semi-minor axis (cm/sec)	11.3	7.50	8.85	-
Direction (oT)	058	060	074	-
Horizontal Kinetic energy (dynes/sec)	333.30	263.10	89.46	19.30
10% Highest speeds (cm/sec)	44.2 9.0%	-	-	-
Peak speed (cm/sec)	-	41.59	-	-
Average maximum speed (cm/sec)	-	32.44	-	-

Sediments

Heavy metal analyes of sediments from the area of the New London disposal site are presented in Table F-2. Those samples in the closest proximity of the dump site are generally quite different from all the other New London samples. The samples over one half mile from active dumping show no enrichment of metal and are among the cleanest in the whole region, comparing well with Brenton Reef and Cornfield Shoals. Since the effect of contamination from metals can not be identified in samples other than the three closest to the dump site, we may state that the effect of dumping metal containing spoil in New London is restricted to one half mile or less.

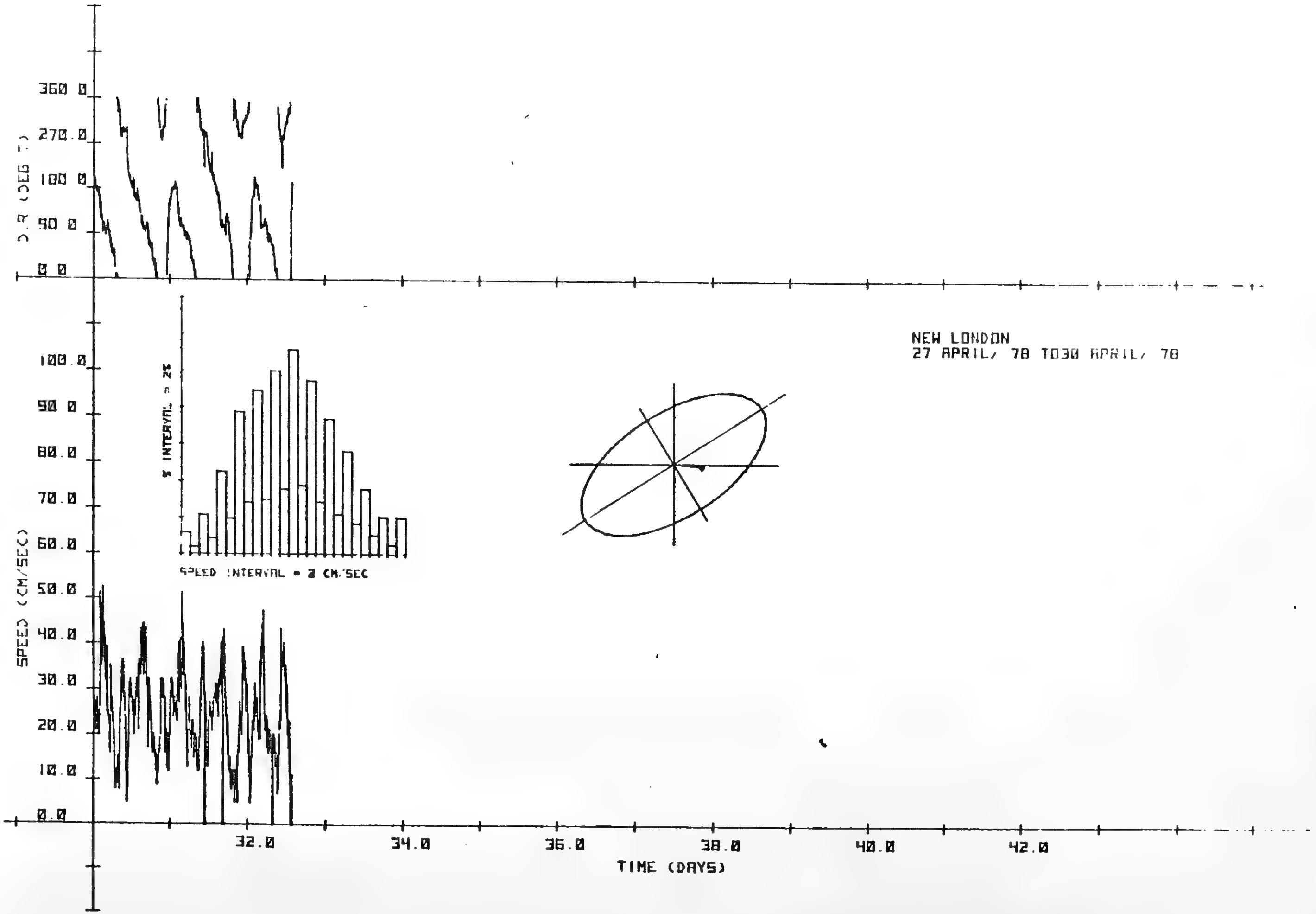

NEW LONDON
28 MARCH, 78 TO 12 APRIL, 78
D.R (DEG T)
360.0
270.0
180.0
90.0
0.0
SPEED (CM/SEC)
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
% INTERVAL = 2%
SPEED INTERVAL = 2 CM/SEC
2.0
4.0
6.0
8.0
10.0
12.0
TIME (DAYS)

F-9a



DIR (DEG T)
360.0
270.0
180.0
90.0
0.0
SPEED (CM/SEC)
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
% INTERVAL = 2%
SPEED INTERVAL = 2 CM/SEC
NEW LONDON
12 APRIL, 78 TO 27 APRIL, 78
16.0
18.0
20.0
22.0
24.0
26.0
28.0
TIME (DAYS)

F. 9b



360 0
270.0
100 0
90 0
0.0
D.R (DEG T)
100.0
90 0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
SPEED (CM/SEC)
% INTERVAL = 2%
SPEED INTERVAL = 2 CM/SEC
NEW LONDON
27 APRIL, 78 TO30 APRIL, 78
32.0
34.0
36.0
38.0
40.0
42.0
TIME (DAYS)

F 9c

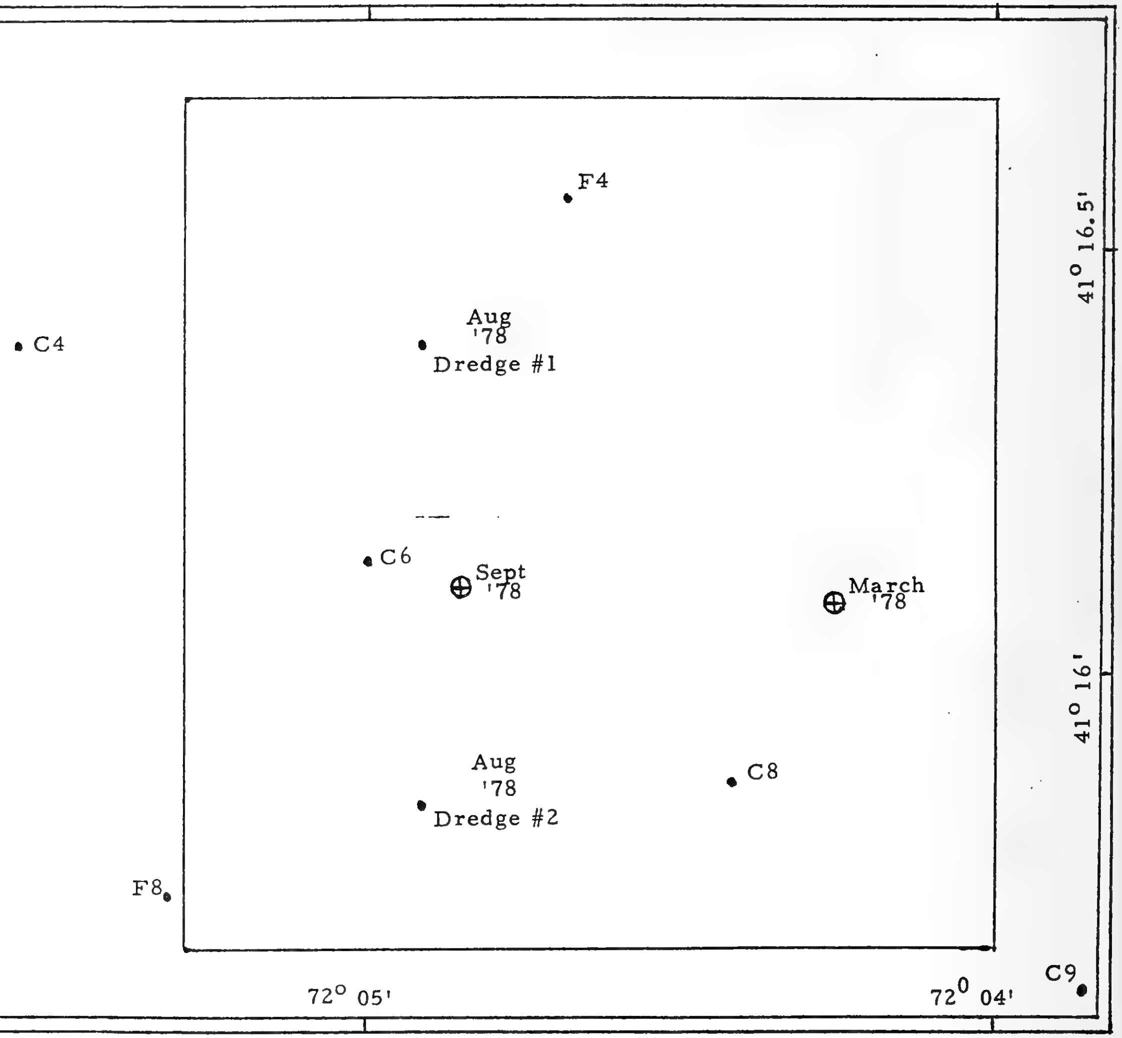
TABLE F-1a

SAMPLE LOCATIONS

SITE: New London

DATE	DISPOSAL SITE: CURRENT METER	MUSSELS	BENTHIC SAMPLES DREDGES	BENTHIC SAMPLES GRABS	REFERENCE SITE MUSSELS	BENTHIC SAMPLES DREDGES	BENTHIC SAMPLES GRABS
March/1978	41°16'04.8" 72°04'15.0"						
17/Apr/1978							
2/Aug/1978			41°16'23" 72°04'56"				
2/Aug/1978			41°15'51" 72°04'55"	~~Decca~~			
20/Sept/1978	G 5404 R 8122 BOLT 41°16'6.2" 72°04'50.7"			41°15'42" 72°05'19" (F8)			
20/Sept/1978				41°16'33.5" 72°04'40.5" (F4)			
20/Sept/1978				41°17'09" 72°07'17" (C1)			
20/Sept/1978				41°16'38" 72°06'08" (C3)			
20/Sept/1978				41°16'23" 72°05'33.5" (C4)			
20/Sept/1978				41°16'08" 72°05'00" (C6)			
20/Sept/1978				41°15'52.5" 72°04'25" (C8)			
20/Sept/1978				41°15'37.5" 72°03'51" (C9)			

New London



⊕ Current Meters

• Benthic Samples
All Sept. '78
Unless otherwise
labeled

F1b

TABLE F-2a

SURFACE SEDIMENTS, METAL ANALYSIS

New London Dump Site Stations

March 1977, September 1977, March 1978 and September 1978

Station Number	CADMIUM, PPM				COBALT, PPM				CHROMIUM, PPM			
	MAR 1977	SEP 1977	MAR 1978	SEP 1978	MAR 1977	SEP 1977	MAR 1978	SEP 1978	MAR 1977	SEP 1977	MAR 1978	SEP 1978
A-10-3	0.2	0.2	.12	.50			2.4	2.4	16	9.0	7.3	9.1
C-1	0.2	0.3	.37	.50			2.1	2.1	2.0	9.5	3.9	6.5
C-3	0.2	0.2	.25	.25			3.5	3.1	7.3	6.2	6.1	7.7
C-4	.35	0.3	.69	.25			4.4	5.5	14	9.2	10	19
C-6	.60	1.0	.35	.50			6.6	7.5	48	46	27	33
C-8	0.2	0.2	.59	.38			5.9	3.9	16		29	19
C-9	0.2	0.3	.25	.25			3.5	3.7	9.4	8.6	11	10
F-4	0.2	0.3	.25	.50			5.2	8.1	11	9.6	14	36
F-8	.35	1.1	.35	.37			6.1	7.4	16	23	17	24
ERROR % $\frac{S.D. \times 10^2}{mean}$	25				9				5			

TABLE F-2b

SURFACE SEDIMENTS, METAL ANALYSIS

New London Dump Site Stations

March 1977, September 1977, March 1978 and September 1978

Station Number	COPPER, PPM				IRON, x 10^4 PPM				MERCURY, PPM			
	MAR 1977	SEP 1977	MAR 1978	SEP 1978	MAR 1977	SEP 1977	MAR 1978	SEP 1978	MAR 1977	SEP 1977	MAR 1978	SEP 1978
A-10-3	5.5		5.0	3.6			.48	.41	.27	.48	.09	.02
C-1	.79	7.2	2.6	3.4			.29	.26	.05	.08	.01	.02
C-3	5.0	3.8	2.1	3.4			1.1	.86	.07	.05		.04
C-4	8.1	5.7	7.4	17			.56	.87	.24	.13	.03	.17
C-6	13	42	17	16			2.0	1.6	.29	.49	.12	.06
C-8	11		20	12			1.6	.69	.08		.28	.25
C-9	4.9	5.9	7.2	8.4			.64	.57	.11	.42	.07	.07
F-4	16	9.2	26	13			1.0	1.5	.21	.12	.22	.06
F-8	19	23	15	21			.94	1.0	.14	.62	.09	.44
ERROR $\frac{S.D. \times 10^2}{mean}$	7				3				14			

TABLE F-2c

SURFACE SEDIMENTS, METAL ANALYSIS

New London Dump Site Stations

March 1977, September 1977, March 1978 and September 1978

	NICKEL, PPM				LEAD, PPM				ZINC, PPM			
Station Number	MAR 1977	SEP 1977	MAR 1978	SEP 1978	MAR 1977	SEP 1977	MAR 1978	SEP 1978	MAR 1977	SEP 1977	MAR 1978	SEP 1978
A-10-3			10	3.9	33	13	10	9.7	35	30	33	38
C-1			13	5.9	4.0	16	8.3	9.0	6.3	32	16	19
C-3			14	6.5	18	14	12	15	45	28	43	55
C-4			53	16	23	16	21	31	37	37	30	76
C-6			38	20	16	60	21	15	61	123	61	53
C-8			33	11	14		34	18	34		61	47
C-9			17	8.6	17	14	15	19	34	31	41	49
F-4			33	18	19	16	23	11	53	36	79	50
F-8			47	18	21	43	29	41	43	81	58	91
ERROR $\frac{S.D. \times 10^2}{mean}$	5				13				15			

TABLE F-2d

SURFACE SEDIMENTS, OIL/GREASE AND VOLATILE SOLIDS

New London Dump Site Stations

March 1977, September 1977, March 1978 and September 1978

Station Number	OIL/GREASE, x 10^3 PPM MAR 1977	SEP 1977	MAR 1978	SEP 1978	% VOLATILE SOLIDS MAR 1977	SEP 1977	MAR 1978	SEP 1978
A-10-3				1.8	1.8	2.3	2.5	3.0
C-1				1.4	0.8	.95	1.9	3.8
C-3				1.2	2.9	1.3	1.3	2.0
C-4			.82	2.0	7.1	4.8	9.3	6.7
C-6			.12	1.2	6.2	6.3	6.6	7.0
C-8	NEGLIGABLE	NEGLIGABLE	.05	.53	3.5		5.6	5.4
C-9			5.2	1.8	3.1	3.6	2.4	1.3
F-4			.23	1.6	9.3	1.5	6.2	10
F-8			6.8	1.7	6.4	10	8.7	28
ERROR $\frac{S.D. \times 10^2}{mean}$			15			5		

Benthic Biochemistry

The study of Mytilus edulis at the New London site is an ongoing program sponsored by the Navy that has been reported elsewhere. An example of the results of this study is presented in Figure F-10. The data for Nickel were derived from Mytilus edulis monitoring stations at New London disposal site. During the predisposal period (March to August, 1977), the ratios of Ni were all within the 95% confidence limits of the baseline data, which are delineated by a set of broken lines. Elevated ratios (up to 12 times of the baseline data) coincided with periods of heightened disposal activities from September 1977 to February 1978. As the disposal activity subsided in March 1978, the ratios (except DI) quickly returned to within the 95% confidence limits. The observed rise and fall of the ratios which correleated with the dumping activity were also apparent in mussels from the reference area (North Dumping) which is located two miles east of the disposal area. However, the magnitude of the rise is much less than those stations located on or near the dumping area, attesting that M. edulis is a sensitive environmental monitor.

Future work at New London will be sponsored by the DAMOS program and should provide continuous data over long time periods.

Benthic Macrofauna

Although there have been extensive studies of benthic macrofauna conducted under the Navy monitoring program at the New London disposal site, a more general approach has been taken for the DAMOS program that is similar to sampling techniques used at other sites. Thus, a station on the disposal site and a reference station are compared. The results of the numeric density data are presented in Tables F-3 and F-4. These stations are quite different in that the reference station has higher diversity (H') and more total number of individuals although the disposal site station had a predominance of A. vadorum.

TABLE F-3

DAMOS BENTHOS - TABLE OF NUMERIC DENSITY DATA

NEW LONDON DUMP SITE - 17 APRIL 1978

	PREDOMINANT SPECIES	DREDGE NUMBER #1	#2	#3	TOTAL	MEAN	STANDARD DEVIATION	COEFF. OF DISPERSION	95 PERCENT CONF. LIMITS OF MEAN	NUMERIC RANK	% OF TOTAL	CUMUL: % OF TOTAL
1.	Ninoe nigrippes	7	13	20	40	13.3	6.5	3.2	0-29.4	1	18.3	18.3
2.	Unciola irrorata	0	6	16	22	7.3	8.1	9.0	0-27.4	2	10.1	28.4
3.	Potamilla reniformis	0	0	19	19	6.3	11.0	19.1	0-33.6	3	8.7	37.1
4.	Scalibregma inflatum	0	4	14	18	6.0	7.2	8.7	0-23.9	4	8.3	45.4
5.	Pitar morrhuana	1	1	6	8	2.7	2.9	3.1	0- 9.9	5	3.7	49.1
6.	Pherusa affinia	0	2	6	8	2.7	3.1	3.5	0-10.4	5	3.7	52.8
7.	Cyclocardia borealis	1	2	3	6	2.0	1.0	0.5	0- 4.5	6	2.8	55.6
8.	Nucula proxima	0	2	3	5	1.7	1.5	1.4	0- 5.4	7	2.3	57.9
9.	Ampharete acutifrons	0	1	4	5	1.7	2.1	2.5	0- 6.9	7	2.3	60.2
10.	Nephthys incisa	1	0	4	5	1.7	2.1	2.5	0- 6.9	7	2.3	62.5
11.	Cancer irroratus	0	2	3	5	1.7	1.5	1.4	0- 5.4	7	2.3	64.8
12.	Sylactis hooperi	0	2	2	4	1.3	1.2	1.0	0- 4.3	8	1.8	66.6
13.	Astarte (undata)	1	0	3	4	1.3	1.5	1.8	0- 5.0	8	1.8	68.4
14.	Ampelisca abdita	0	0	4	4	1.3	2.3	4.1	0- 7.0	8	1.8	70.2
15.	Photis dentata	0	0	4	4	1.3	2.3	4.1	0- 7.0	8	1.8	72.0
16.	Phoxocephalus holbolli	0	0	4	4	1.3	2.3	4.1	0- 7.0	8	1.8	73.8
17.	Pagurus longicarpus	1	1	2	4	1.3	0.6	0.3	0- 2.8	8	1.8	75.6
TOTAL		12	36	117	165	55.0	55.0	55.0	0-191.6			
TOTAL # OF SPP PER DREDGE		6	30	46	60	27.3	20.1		0- 77.2			
SPECIES DIVERSITY	(H')	1.35	2.40	1.12	4.87	1.62	0.68					
EQUITABILITY	(J')	0.75	0.75	0.29	1.79	0.60	0.27					

TOTAL # OF INDIVIDUALS THIS STATION = 218
(Corrected for 635 specimens of A. Vadorum)

TABLE F-4

DAMOS BENTHOS - TABLE OF NUMERIC DENSITY DATA

	PREDOMINANT SPECIES	DREDGE NUMBER #1	#2	#3	TOTAL	MEAN	STANDARD DEVIATION	COEFF. OF DISPERSION	95 PERCENT CONF. LIMITS OF MEAN	NUMERIC RANK	% OF TOTAL	CUMUL: % OF TOTAL
1.	Mytilis edulis	164	19	30	213	71.0	80.7	91.8	0-271.5	1	42.5	42.5
2.	Euclymene collaris	17	20	10	47	15.7	5.1	1.7	3.0-28.4	2	9.4	51.9
3.	Ninoe nigrippos	7	17	7	31	10.3	5.8	3.2	0- 24.7	3	6.2	58.1
4.	Ampelisca vadorum	10	9	0	19	6.3	5.5	4.8	0- 20.0	4	3.8	61.9
5.	Ampharete acutifrons	0	7	4	11	3.7	3.5	3.3	0- 12.4	5	2.2	64.1
6.	Pherusa affinis	3	2	5	10	3.3	1.5	0.7	0- 7.0	6	2.0	66.1
7.	Unciola irroratus	5	3	2	10	3.3	1.5	0.7	0- 7.0	6	2.0	68.1
8.	Nassarius tribittatus	5	4	0	9	3.0	2.6	2.3	0- 9.5	7	1.8	69.9
9.	Pitar morrhuana	2	5	2	9	3.0	1.7	1.0	0- 7.2	7	1.8	71.7
	TOTAL	213	86	60	359	119.7	81.9	56.0	0-323.2			
	TOTAL NO OF SPP PER DREDGE	45	40	34	75	39.7	5.5		26.0-53.4			
	SPECIES DIVERSITY (H')	2.07	3.06	2.73	7.86	2.62	0.50					
	EQUITABILITY (J')	0.54	0.83			0.71	0.15					

TOTAL NO. OF INDIVIDUALS THIS STATION = 501

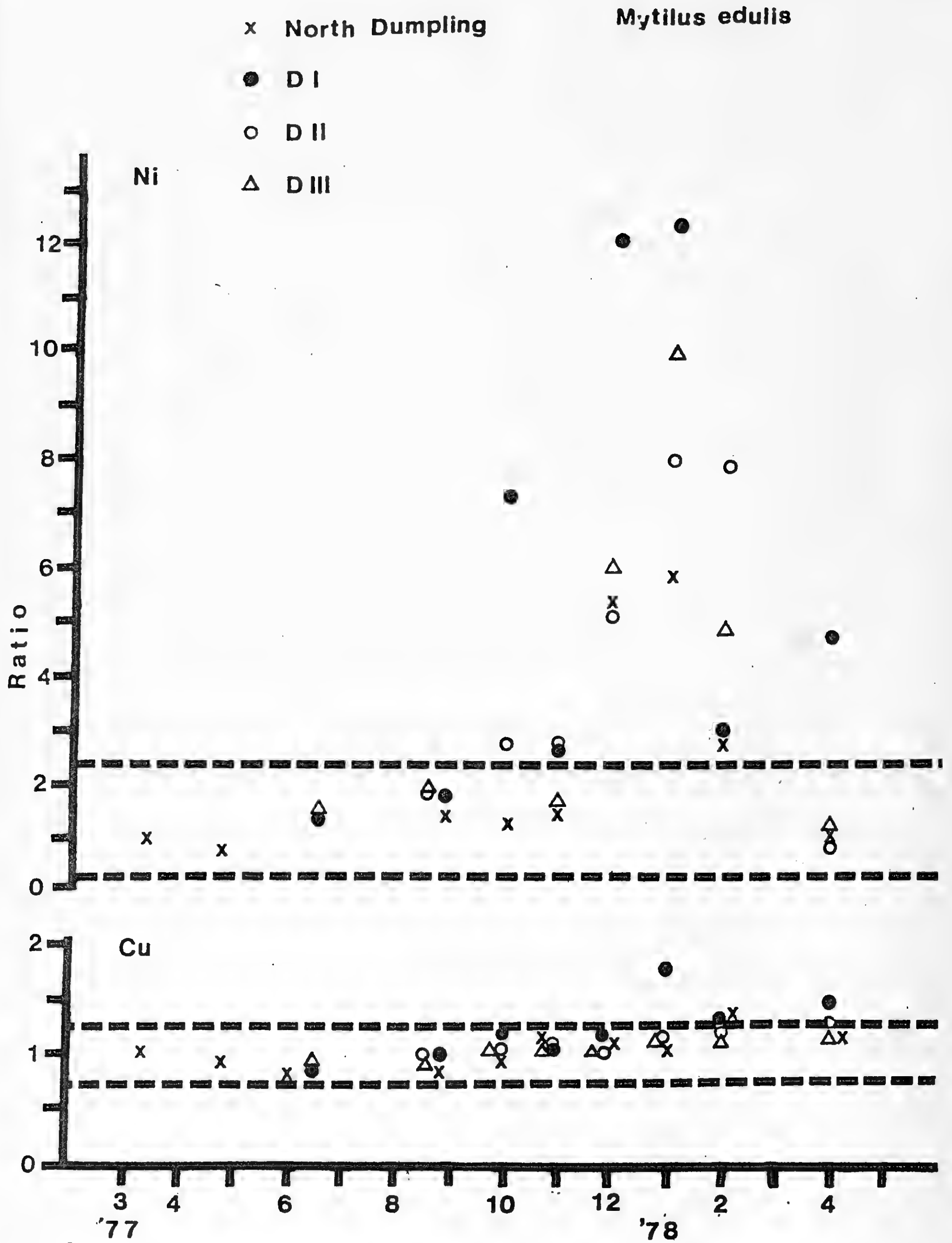


Figure 10. Temporal variation in the ratios of heavy metals in Mytilus edulis from New London monitoring sites: DI, DII and DIII, as well as North Dumpling, a reference site. Broken lines represent the 95% confidence limits of the baseline data.

Fisheries

This program is in the preliminary stages and results presented here are subject to expansion and more detail.

Lobsters. Dr. L. Stewart of the Conn. Marine Advisory Service has studied lobster distribution at the New London site by examining six locations (at the corners and center of the dumping area and at the dumping buoy) and counting lobsters seen in ½ hour. He concluded that lobster density was a third of that found in productive lobster grounds in the general area and that the monotonous sandy bottom was poor lobster habitat.

The seasonal pattern of the lobster fishery in this area varies with the size of vessels. Smaller boats may begin fishing very close to shore in April and work their way out to the Race and Plum Island by August. Larger boats will move from ledges along the Connecticut shore to deeper parts of the western Sound by June and into Block Island Sound by the end of summer. Lobsters are caught within hte Thames esturay in the spring. Waters around Fishers Island are reserved for residents. The greatest concentration of pots is in the Race where migrating lobsters are caught.

At any one time, commercial lobstermen will occupy a continuous area, frequently following a topographic feature. In the dump site area 2-3 pot trauls are usually used.

A fisherman who had pots just south of the disposal site in June, 1978, reported that fishing at the site was very good during its use for disposal of organic waste by a pharmacentical manufacturer, but had dropped off when Navy dredging began.

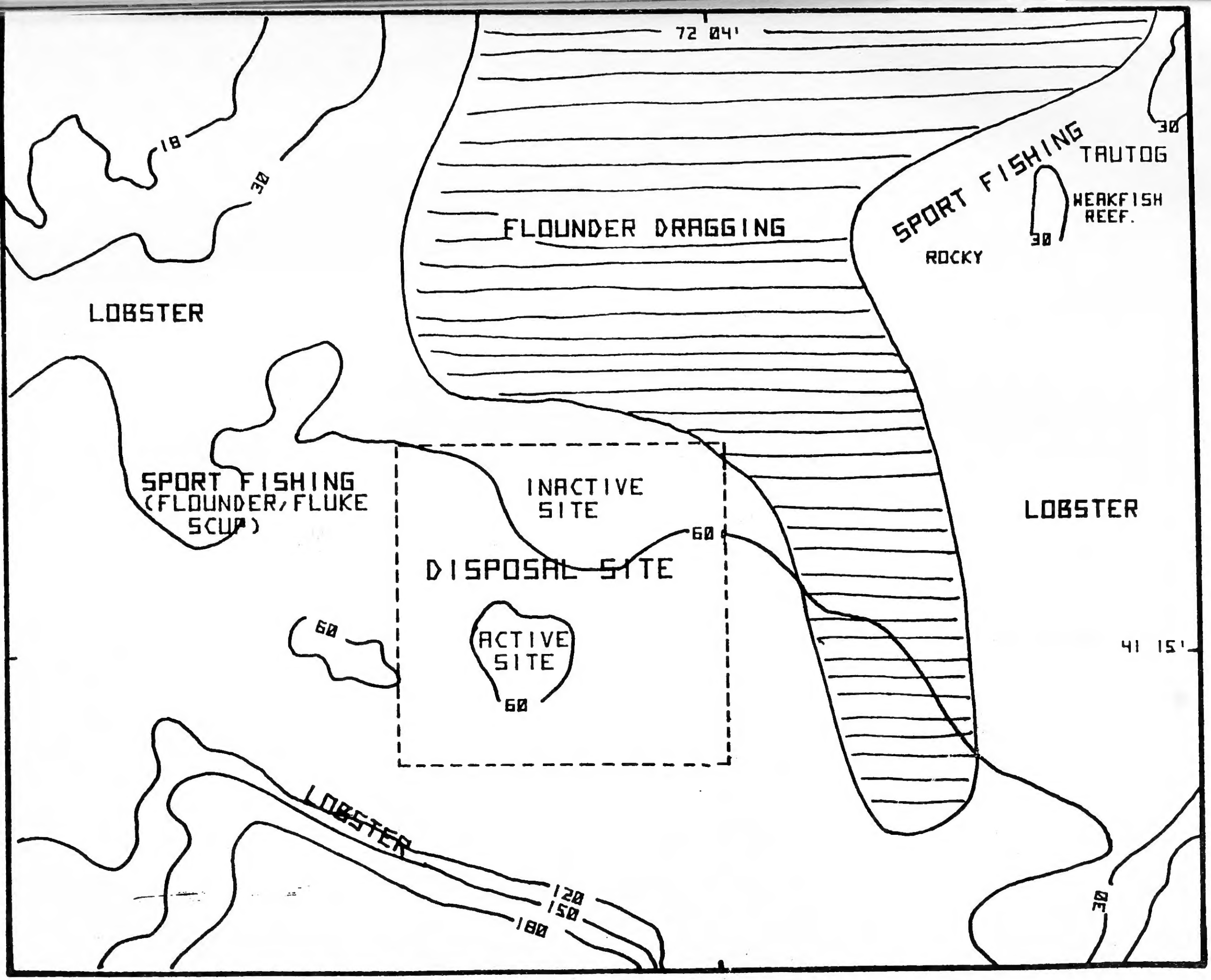
Finfish. The area inshore of the disposal site is used by a small number of draggers during the summer. The catch is predominant by winter and summer flounder although some scup is also caught. A total of 10 boats may fish in this area at one time or another, but only one or two are regular users, the others are lobster boats which occasionally drag.

Fishable ground is shown in Fig. F-11. One fisherman reported that he formerly crossed the old dump site, but stopped after catching construction stone in his net.

Blueback herring are caught in this area in the fall when they are present in the region (not 1977, 1978).

The most important sport fishing areas are near the Race. The target species (blue fish and stripped bass) are probably little effected by spoil disposal since they normally enter turbid estuaries.

The rocky extension of Seaflower Reef is a site of tautog fishing. Some bottom fishing for flounders is carried out a mile N.W. of the dump site by party boats. Recently a small boat sport fishery for summer flounder has developed around the perimeter of the spoil mound.



FISHERIES IN THE VICINITY OF
NEW LONDON DISPOSAL SITE