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(ACE 60/94)  
for information

Summary Report (January 94 - March 94)

**Environmental Monitoring Programme  
East of Sha Chau - Phase 2  
(Agreement CE 35/93)**

**Summary Report for January 1994**

**1 INTRODUCTION**

**1.1 Purpose of Report**

This report summarises the work carried out during January 1994 at the Contained Disposal Facility (CDF), East of Sha Chau. The purpose of the report is to appraise CED of any significant findings. If the monitoring results indicate any adverse trends, or if site investigation reveals any procedure likely to result in environmental damage, then suitable mitigation measures will be recommended and discussed with CED.

As far as possible, any results and information presented are correct at the time of reporting, but caution is advised in their interpretation. Further information is reported in the monthly progress reports and in quarterly synopsis of findings, as well as in the final report.

**2 FIELDWORK AND LABORATORY WORK UNDERTAKEN DURING THE MONTH**

A summary of fieldwork carried out during the month of January 1994 is presented in the attached Figure.

**2.1 Cumulative Impact Monitoring**

During the month, water quality was monitored weekly at the control station and sediment was collected from the 37 regional stations. Suspended solids were not scheduled for collection this month. Trawl samples were collected from six stations and benthic grab samples were collected from ten stations. Samples of tissue have been dissected and homogenised and shall be sent for analysis of body loading of metals.

**2.2 Pit-Specific Monitoring**

Water quality was monitored at four stations for a 24 hour period each week. Measurement of current speed and direction and water column profiling was carried out at five stations at the same time. Source material was not collected because of the low level and unpredictability of dredging activity. Additional representative samples will be taken in future months. Sediment samples were collected on one occasion for compliance purposes around the active pits (CMP11 b,c,d) and additional capping

## 2.4 Investigation and Mitigation

A site visit was made on 1 February 1994 to view operations at the disposal area, including operation of the silt curtain. EPD licensing have agreed to provide documentation on source material characteristics for each new licensing. A database will be compiled of all information, which will help in the review of material classification and the approach to disposal.

A further site visit was made on 17 February to inspect dredging works in the Brothers area as part of the assessment of the effects of adjacent works.

## 2.5 Laboratory Work

Sediment samples were sent to Laucks Testing laboratories in Seattle, Washington, USA at the beginning of February. The quality control procedures adopted by the laboratory for these samples has been studied and meets the requirements of the consultant. Sample analysis is in accordance with the requirements of CED and EPD as stated in the Project Brief.

The methods are not identical to those adopted during the period from April 1993 to December 1993 by TNO in the Netherlands. The methods used in the current study were adopted following discussion with EPD regarding currently accepted methods used in Hong Kong, in particular those methods currently used by EPD.

## 3 RESULTS AND SIGNIFICANT TRENDS

### 3.1 Water Quality

The monitoring programme did not reveal any adverse effects which could have been attributable to the influence of dumping activity. All results were within the range of natural variation experienced at the site. Peaks in suspended solid concentrations were not related to dump events.

The overall suspended solids concentrations recorded were lower relative to December monitoring, although higher levels were encountered during high current speeds. Water temperature ranged from 16 to 19 °C. Dissolved oxygen concentrations were high (up to about 8 mg l<sup>-1</sup>) and were not influenced by the dumping activity.

### 3.2 Sediment Quality

Sediment samples have been sent for analysis to Laucks Testing Laboratories in Seattle, Washington, USA. Results have not yet been received.

### 3.3 Biota

Analysis of the species abundance of trawl and benthic grab samples has been completed and has revealed no unusual features. Samples appear similar in species composition to samples previously collected from the area.

4 **POTENTIAL IMPACTS ARISING FROM DISPOSAL OPERATIONS**

The monitoring programme undertaken during January 1994 has not revealed any significant adverse trends or potential impacts.

5 **MITIGATION MEASURES AND OTHER RECOMMENDED ACTION**

In the absence of any potentially detrimental trends in the monitoring data, no mitigation measures are considered to be necessary. Details of CED Port Works, ADCP surveys have been requested. A further survey was expected on 1 February. Monitoring during February will continue as planned and according to the programme.

6 **OTHER EVENTS DURING THE MONTH**

The consultants have established a site office at Tuen Mun. A van has also been purchased and a driver hired.

The consultants have prepared an Inception report for this study and have supplied twenty-five (25) copies to CED within one month of the commencement of the project.

There have been no staff changes or alterations to the project management structure on this project.

MONITORING/FIELDWORK SCHEDULE  
EAST SHA CHAU PHASE 2

MONTH: January 1994

ACTUAL PROGRAMME

TASK	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
<i>Cumulative impact</i>																																
WATER QUALITY - 24 hour				X	X						X	X						X	X							X	X					
WATER QUALITY - Profiling																																
SEDIMENT - Cumulative						X	X			X			X																			
SUSPENDED SOLIDS																																
TRAWLING												X																				
BENTHIC GRABS														X																		
BIOMONITORING																																
<i>Pit-specific</i>																																
WATER QUALITY - 24 hour				X	X						X	X						X	X							X	X					
WATER QUALITY - Profiling					X							X							X	X							X	X				
SEDIMENT - compliance														X																		
SEDIMENT - capping										(X)															(X)							
SOURCE MATERIAL																																
NOTES: Items marked in parentheses for CMP1 - samples on 10th co-incide with cumulative impact samples																																

Post-typhoon monitoring is indicated by '\*'. Normal monitoring is 'X'

**Environmental Monitoring Programme  
East of Sha Chau - Phase 2  
(Agreement CE 35/93)**

**Summary Report for February 1994**

**1 INTRODUCTION**

**1.1 Purpose of Report**

This report summarises the work carried out during February 1994 at the Contained Disposal Facility (CDF), East of Sha Chau. The purpose of the report is to appraise CED of any significant findings. If the monitoring results indicate any adverse trends, or if site investigation reveals any procedure likely to result in environmental damage, then suitable mitigation measures will be recommended and discussed with CED.

As far as possible, any results and information presented are correct at the time of reporting, but caution is advised in their interpretation. Further information is reported in the monthly progress reports and in quarterly synopsis of findings, as well as in the final report.

**2 FIELDWORK AND LABORATORY WORK UNDERTAKEN DURING THE MONTH**

A summary of fieldwork carried out during the month of February 1994 is presented in the attached Figure.

**2.1 Cumulative Impact Monitoring**

During the month, water quality was monitored weekly at the control station. Trawl samples were collected from six stations and benthic grab samples were collected from ten stations. Samples of tissue have been dissected and homogenised and shall be sent for analysis of body loading of metals.

Suspended solids samples and sediment samples from cumulative impact stations were not scheduled for collection this month. Biomonitoring was not programmed for this month.

**2.2 Pit-Specific Monitoring**

Water quality was monitored at four stations for a 24 hour period each week. Measurement of current speed and direction and water column profiling was carried out at five stations at the same time. Source material was not collected because of the low level and unpredictability of dredging activity. Additional representative samples will be taken in future months. Sediment samples were collected on one occasion for compliance purposes around the active pits (CMPII b,c,d) and additional capping phase samples were collected around CMPI on one occasion. Three additional trawls were carried out at CMPIIc following dredging of this pit (pre-dumping). One trawl was taken inside the pit, one trawl immediately upstream and one trawl immediately downstream of the dredged pit.

### 2.3 Other Monitoring Work

No other monitoring work was conducted during the month of February.

### 2.4 Investigation and Mitigation

A site visit was made on 1 February 1994 to view operations at the disposal area, including operation of the silt curtain. EPD licensing have agreed to provide documentation on source material characteristics for each new licensing. A database will be compiled of all information, which will help in the review of material classification and the approach to disposal.

A further site visit was made on 17 February to inspect dredging works in the Brothers area as part of the assessment of the effects of adjacent works.

### 2.5 Laboratory Work

Sediment samples were sent to Laucks Testing laboratories in Seattle, Washington, USA at the beginning of February and again on 23 February. The quality control procedures adopted by the laboratory for these samples have been studied and meet the requirements of the consultant. Sample analysis is in accordance with the requirements of CED and EPD as stated in the Project Brief.

## 3 RESULTS AND SIGNIFICANT TRENDS

### 3.1 Water Quality

No adverse conditions were recorded during the water quality monitoring in February. The monitoring results showed that variations of the water environment were not particularly affected by dumping activities.

In general, suspended solids concentrations recorded at the compliance stations were low. Fluctuation of the suspended solids concentrations were still encountered during high current speeds. Minor decreases of dissolved oxygen concentrations were observed during the monitoring, however, this might not be related to dump activities. Throughout the month of February, water temperature was below 19 °C and the pH level was sometimes as high as 9 (slightly more alkaline than usual).

### 3.2 Sediment Quality

Results of sample analysis are anticipated and should be reported in the next progress report.

### 3.3 Biota

Analysis of the species abundance of trawl samples has been completed and has revealed no unusual features. Samples appear similar in species composition to samples previously collected from the area. Benthic animals occurred in slightly lower numbers than in January, although an increase in the number of species was found. An unusually higher number of Amphipoda was found compared to previous months' results, and specimens have been sent to China for identification.

#### 4 POTENTIAL IMPACTS ARISING FROM DISPOSAL OPERATIONS

The only results so far from the monitoring programme undertaken during February 1994 are from the water quality programme, which has not revealed any adverse trends or potential impacts attributable to the disposal operation. Other results are awaited.

#### 5 MITIGATION MEASURES AND OTHER RECOMMENDED ACTION

In the absence of any potentially detrimental trends in the data revealed by the water quality monitoring, no mitigation measures are considered to be necessary. The need for mitigation will have to be considered fully when data on sediment quality and biota body loading become available

The performance of the siltscreen was discussed with CED and EPD on 28 February. Details of the ADCP work around the pits carried out by CED are awaited, prior to a review of possible further fieldwork to check the effectiveness of the siltscreen. CED have provided a photographic reconnaissance, undertaken at 30 minute intervals on 1 and 2 March, of the swept shape of the siltscreen. Over a 7 hour period some 50% to 67% of the curtain was observed to lie on the sea surface.

#### 6 OTHER EVENTS DURING THE MONTH

There have been no staff changes or alterations to the project management structure on this project. Monitoring during March will continue as planned and according to the programme.

MONITORING/FIELDWORK SCHEDULE  
EAST SHA CHAU PHASE 2

MONTH: February 1994

ACTUAL PROGRAMME

TASK	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
<i>Cumulative impact</i>																												
WATER QUALITY - 24 hour		X	X				X	X								X	X					X	X					
WATER QUALITY - Profiling			X					X									X						X					
SEDIMENT - Cumulative																												
SUSPENDED SOLIDS																												
TRAWLING		X																										
BENTHIC GRABS														X														
BIOMONITORING																												
<i>Pit-specific</i>																												
WATER QUALITY - 24 hour		X	X				X	X								X	X						X	X				
WATER QUALITY - Profiling			X					X									X						X					
SEDIMENT - Compliance	X																											
SEDIMENT - Capping														X														
TRAWLING		X																										
SOURCE MATERIAL																												
NOTES																												

Post-typhoon monitoring is indicated by '\*' Normal monitoring is 'X'

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**Environmental Monitoring Programme  
East of Sha Chau - Phase 2  
(Agreement CE 35/93)**

**Summary Report for March 1994**

**1 INTRODUCTION**

**1.1 Purpose of Report**

This report summarises the work carried out during March 1994 at the Contained Disposal Facility (CDF), East of Sha Chau. The purpose of the report is to appraise CED of any significant findings. If the monitoring results indicate any adverse trends, or if site investigation reveals any procedure likely to result in environmental damage, then suitable mitigation measures will be recommended and discussed with CED.

As far as possible, any results and information presented are correct at the time of reporting, but caution is advised in their interpretation. Further information is reported in the monthly progress reports and in quarterly synopsis of findings, as well as in the final report.

**2 FIELDWORK AND LABORATORY WORK UNDERTAKEN DURING THE MONTH**

A summary of fieldwork carried out during the month of March 1994 is presented in the attached Figure.

**2.1 Cumulative Impact Monitoring**

During the month, water quality was monitored weekly at the control station. Trawl samples were collected from the usual six stations and in addition from three stations in and around CMPIIc (pre-dump trawl samples). Benthic grab samples were collected from ten stations. No problems were encountered during the surveys. Samples of tissue have been dissected and homogenised and shall be sent for analysis of body loading of metals.

Collection of samples for sediment chemistry and grain size took place on 4,7 and 8 March. Grain size samples were delivered to Materialab on March 8, while samples for chemical analysis were dispatched overnight by courier to Laucks Testing Laboratories (USA) on March 9. These samples presently are being analysed.

Biomonitoring was not programmed for this month.

**2.2 Pit-Specific Monitoring**

Water quality monitoring for CMPIIb, c, d at Stations M0, M2, M3 and M9 was carried out satisfactorily. In addition, on 29 March 94 a further four more stations, namely M5, M6, M7 and M8 around CMPIIa, were included in the continuous monitoring. This was because of the commencement of capping at this pit. For the first 24-hour period, two vessels were deployed for continuous monitoring at eight sampling stations. After this period one vessel remained on-site for vertical profiling at Stations

P15, P16, P17, P18 and P19 across CMPIIb, c, d followed by continuous monitoring at Control Station S22 for another 24 hours.

Sediment samples were collected for compliance purposes at CMPIIa on March 14 (post-operation and pre-capping phase) and again on March 28 (capping phase), while operational phase compliance samples were collected at CMPIIb, c, d on March 18.

Source material samples (sediments) for solid phase and elutriate testing were collected from a barge in Tolo Harbour on March 23. The dredged sediment in the barge had come from a depth of 7.6 metres below the sediment surface in an area classified as having contaminated sediments based on pre-dredging testing. These sediments were scheduled for disposal at East Sha Chau.

Three additional trawls were carried out at CMPIIc following dredging of this pit (pre-dumping). One trawl was taken inside the pit, one trawl immediately upstream and one trawl immediately downstream of the dredged pit. Post-capping benthic monitoring at CMPII was not carried out this month, but replicate samples at two stations will be collected in April.

### 2.3 Other Monitoring Work

Suspended solids samples were scheduled for collection during March, but there was no dumping on the day of sampling so this has been re-scheduled for April. Samples will be filtered, dried, weighed and analysed for the content of ten metals (elemental fingerprinting)

### 2.4 Investigation and Mitigation

No site visits were undertaken by the Engineering team in March to review pit operations. Details of EPD licencing of disposal operations are received on a regular basis, however to date no documentation on source material characteristics has been received.

The team have contacted both the PAA and the Fill Management section of CED to gather a composite view of the possible effects of adjacent works. The latter are in direct contact with the Airport Platform Consortium and are best placed with a regular update on dredging, rehandling, borrowing and backfilling operations in the immediate vicinity of ESC.

In order to overview the loss/accretion characteristics for each of the backfilled and capped pits, the team have formally requested CED to supply electronic data for the bathymetry for each stage of excavation, backfilling and capping of each pit.

### 2.5 Laboratory Work

Sediment samples from the cumulative impact monitoring in early March were sent to Laucks Testing laboratories and are currently being analysed. Results for all sediment samples collected in January and February have been received from Laucks and are presently being interpreted for inclusion in the March progress report.

### 3.5 Integrity of Pit I Capping Layer Pit I

The integrity of the capping layer of Pit I will be investigated by Fill Management Committee. Cored samples will be taken from the capping layer and sent for contamination testing.

### 4. OTHER EVENTS DURING THE MONTH

There have been no staff changes or alterations to the project management structure on this project. Monitoring during March will continue as planned and according to the programme.

### **3. RESULTS AND SIGNIFICANT TRENDS**

#### **3.1 Water Quality**

The overall monitoring results indicate a typical estuarine environment in the study area. Variations of salinity and pH occur when sea water mixes with a large amount of fresh water from the Pearl River. During the month of March, the sea water temperature was still relatively low with an average between 19 to 20°C.

No significant fluctuations of the dissolved oxygen and suspended solids concentrations were observed in March. However, high suspended solids concentrations were still recorded during strong tidal currents.

#### **3.2 Sediment Quality**

Locally elevated metal levels in zinc, lead and copper were found adjacent to east of Pit I in March 1994 but the monitoring results so far have not identified any obvious increasing trend in the contamination of sediment around the contaminated mud pits. The likely cause of such isolated incidence of sediment contamination is not known.

#### **3.3 Biota**

Analysis of the species abundance of trawl samples has been completed and generally has revealed no unusual features. Significantly fewer species, however, and lower diversity and evenness were observed inside CMPIIc, compared to the control stations. Although no data from pre-dump trawl surveys in other pits are available for comparison, the low numbers inside the pit are not surprising given that the area has recently been subjected to major disturbance from dredging activity. Benthic samples collected in March have been sorted and are currently being identified. No unusually large numbers of individual phyla have been observed to date.

#### **3.4 Ecotoxicology**

The results revealed that the concentrations of most metals in muscle tissue of selected species of commercial value caught at the disposal area were generally low. However, for the samples analyzed till March 1994, the majority of them showed chromium concentrations above the Food Adulteration Regulations (FAR) Limit. In addition, mercury concentrations of these samples appeared to have increased but it should be noted that these mercury concentrations were well below the FAR limit. Proposal will be prepared to find out the possible causes of the high metal levels in the aquatic biota.

MONITORING/FIELDWORK SCHEDULE  
EAST SHA CHAU PHASE 2

MONTH: March 1994

ACTUAL PROGRAMME

TASK	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
<i>Cumulative impact</i>																																
WATER QUALITY - 24 hour		X	X																													
WATER QUALITY - Profiling		X	X						X	X					X	X																
SEDIMENT - cumulative									X	X					X	X							X	X					X	X	X	
SUSPENDED SOLIDS				X			X	X															X	X					X	X	X	
TRAWLING (2)	X																															
BENTHIC CRABS																												X				
BIOMONITORING																																
<i>Pit-specific</i>																																
WATER QUALITY - 24 hour		X	X																													
WATER QUALITY - Profiling		X	X						X	X					X	X								X	X				X	X	X	
SEDIMENT - Compliance (1)									X	X					X	X							X	X				X	X	X		
SEDIMENT - Capping (CMP2a)																		X														
SOURCE MATERIAL														X																		
NOTES:																																
1. CMP2b,c,d																							X									
2. Includes 3 pre-dump trawls (CMP2c)																																

Post-typhoon monitoring is indicated by '\*' Normal monitoring is '.'

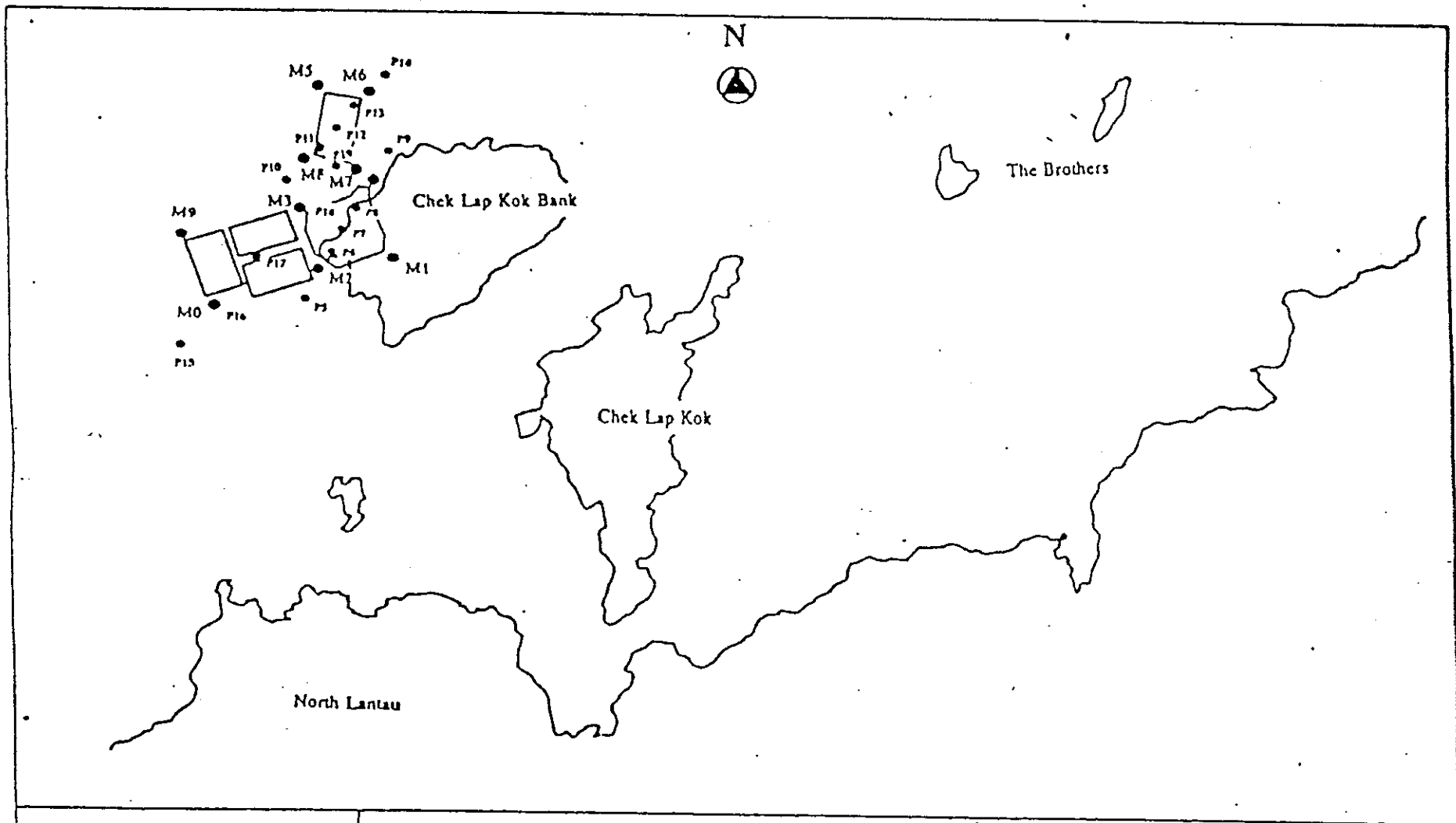
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Prosecution Statistics - January to March 1994

N.B. No prosecution was undertaken in January to March 1994

Number of Cases of Illegal Dumping Observed - January to March 1994

	January	February	March
No. of Cases of Illegal Dumping Observed	2	2	0



BINNIE-CES  
JOINT VENTURE

Figure 1

East Sha Chau Environmental Monitoring Phase 2  
Location of Water Quality Monitoring and Profiling Stations

Drawn by: DS  
December 1993  
Not To Scale

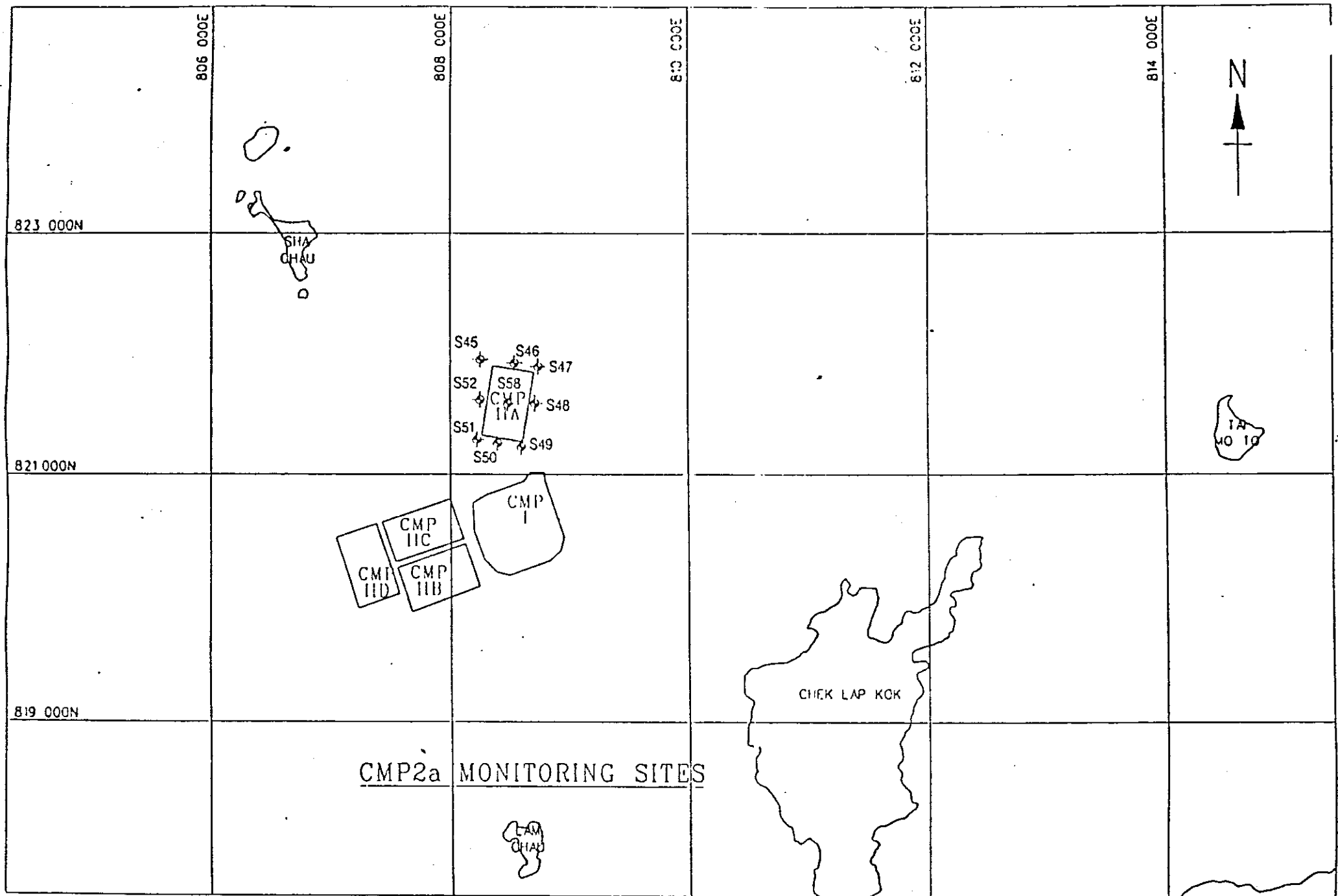


Figure 2 Location of Sediment Sampling Stations, Compliance Monitoring Programme Pit CMP2a



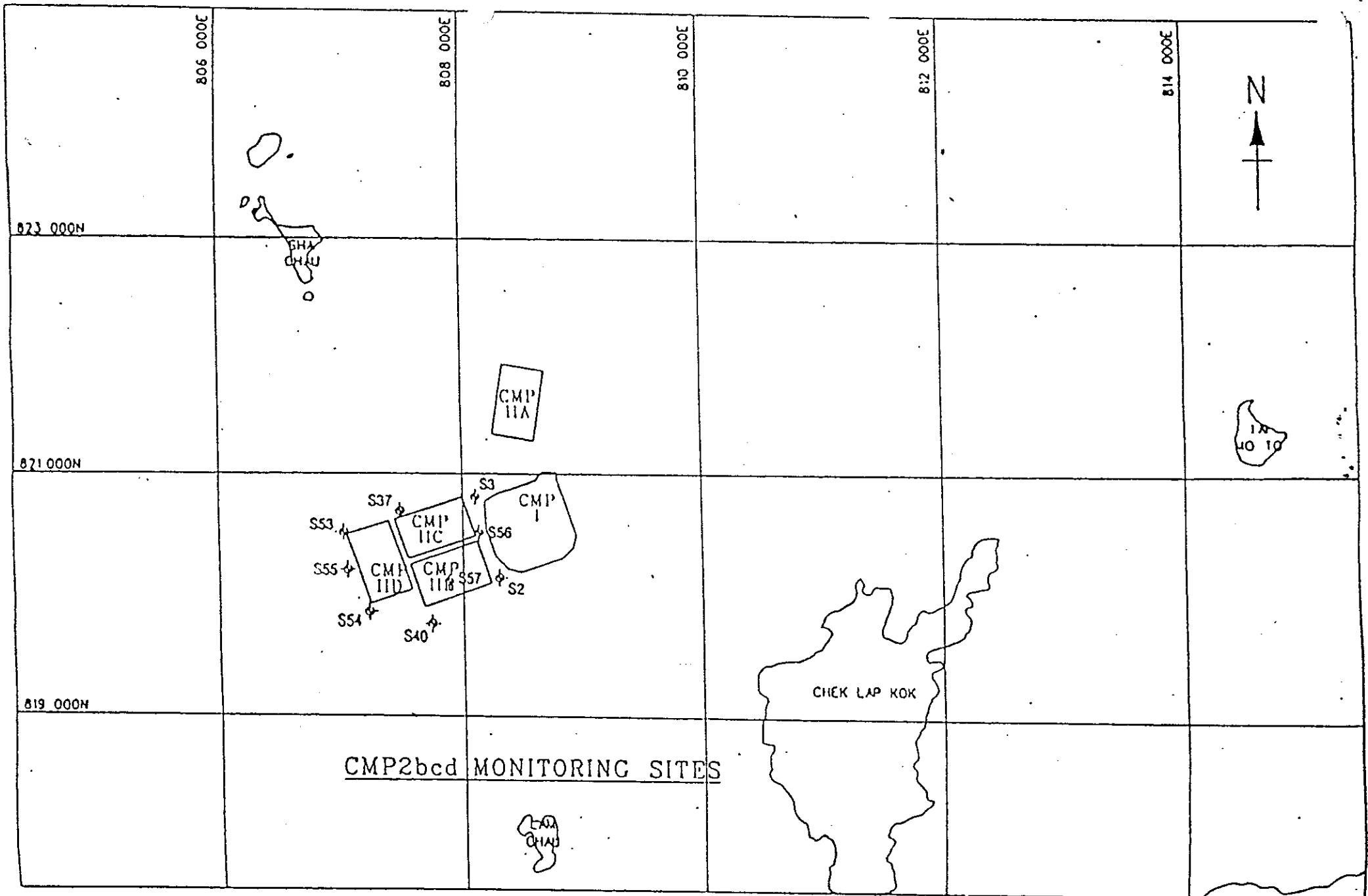


Figure 3 Location of Sediment Sampling Stations, Compliance Monitoring Programme Pit CMP2b

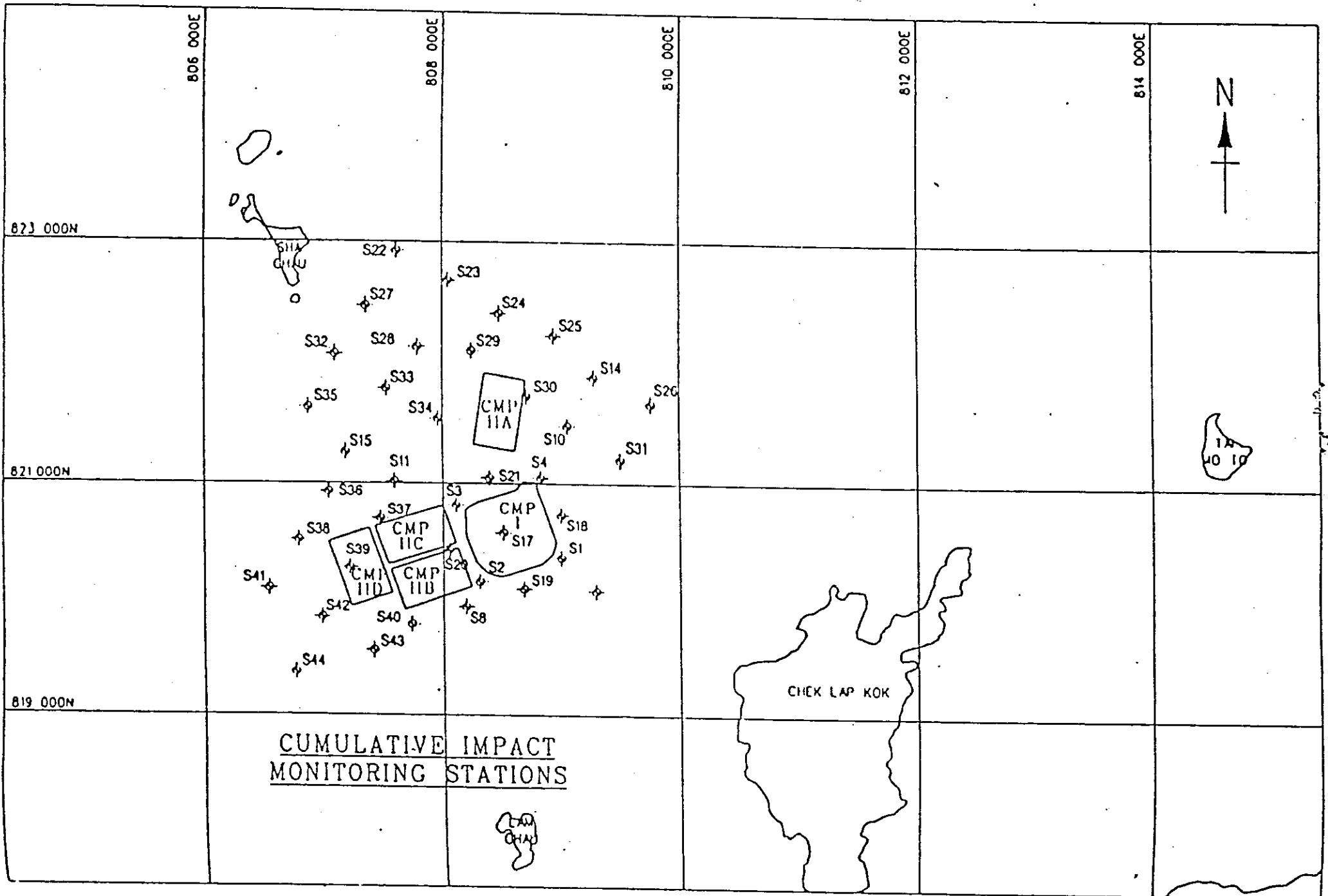


Figure 4 Location of sediment sampling stations, cumulative impact monitoring