

第一次事前調査団派遣時作成M/Mレポート
(1995年12月)

THE HISTORY OF THE

REPUBLIC OF THE UNITED STATES

OF AMERICA

FROM 1776 TO 1863

BY

W. H. CHAPMAN

NEW YORK

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REPORT OF THE
MEETING OF THE FOUR NATIONS
JOINT RE-SURVEY OF CRITICAL AREAS AND
INVESTIGATION OF DANGEROUS/UNCONFIRMED
SHOALS AND WRECKS
IN THE STRAITS OF MALACCA AND SINGAPORE

BETWEEN

THE GOVERNMENTS OF INDONESIA, MALAYSIA, SINGAPORE

AND

THE GOVERNMENT OF JAPAN

11 - 13 DECEMBER, 1995
SEREMBAN, MALAYSIA

LETTER OF TRANSMITTAL

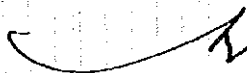
LETTER OF TRANSMITTAL
MEETING OF THE FOUR NATIONS
JOINT RE-SURVEY OF CRITICAL AREAS AND
INVESTIGATION OF DANGEROUS/UNCONFIRMED SHOALS AND WRECKS
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AND
THE GOVERNMENT OF JAPAN

The Meeting of The Four Nations Joint Re-survey of Critical Areas and Investigation of Dangerous/Unconfirmed Shoals and Wrecks in The Straits of Malacca and Singapore Between The Governments of Indonesia, Malaysia, Singapore and The Government of Japan hereby submits its Report as attached.

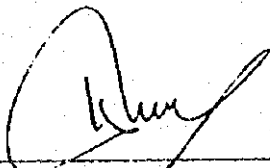
Dated this 13th day of December 1995



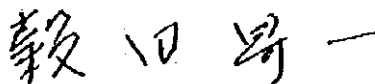
MR. MOHD RASIP HASSAN
Head Of The Malaysian Delegation



CAPT. SYAHWIN HAMID
Head Of The Indonesian Delegation



CAPT. WILSON CHUA
Head Of The Singaporean Delegation



MR. SHOICHI KOKUTA
Head Of The Japanese Delegation

**MEETING OF THE FOUR NATIONS
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**11 - 13 DECEMBER, 1995
SEREMBAN, MALAYSIA**

CONTENTS

1. Report of the Meeting of the Four Nations Joint Re-survey of Critical Areas and Investigation of Dangerous/Unconfirmed Shoals and Wrecks in The Straits of Malacca and Singapore Between The Governments of Indonesia, Malaysia, Singapore and The Government of Japan, 11-13 December 1995, Seremban, Malaysia.
2. Annexes
 - A : List of Delegates
 - B : Agenda
 - C : Draft Scope of Work Submitted by the Government of Japan
 - D : Revised Scope of Work
 - E : Revision to Survey Areas and Points
 - F : Proposed Implementation Schedule of The Revised Routeing System In The Straits Of Malacca and Singapore

**REPORT OF THE
MEETING OF THE FOUR NATIONS
JOINT RE-SURVEY OF CRITICAL AREAS AND
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**11 - 13 DECEMBER, 1995
SEREMBAN, MALAYSIA**

ANNEX A

LIST OF DELEGATES

INDONESIA

1. **CAPT. SYAHWIN HAMID**
Director of Navigation,
Directorate General of Sea Communication,
Ministry of Communications.
2. **MR. SURYANTO SH**
Communication Attache,
Embassy of The Republic of Indonesia,
Kuala Lumpur.
3. **MR. NURDIN SILA**
Hydro Oceanographic Service,
4. **MR. WAGIONO**
Head,
District of Navigation,
DGSC, MINCOM
5. **CAPT. NISFAN**
Head,
District of Navigation,
Tanjung Pinang Office,
DGSC, MINCOM.
6. **MR. SUSETYO**
Hydro Oceanographic Service,
7. **IR. A. TONNY BUDIONO**
Chief,
Navigational Survey Section,
Directorate of Navigation,
DGSC, MINCON.

MALAYSIA

1. **MR. MOHD RASIP HASSAN**
Hydrography Directorate.
2. **CAPT. ABDUL RAHIM AKOB**
Director of Marine,
Sarawak Marine Department.
3. **CAPT. AHMAD OTHMAN**
Acting Director ,
Safety of Navigation Division,
Marine Department Peninsular Malaysia.
4. **MR. ABDULLAH YUSUFF BASIRON**
Principal Assistant Secretary,
Marine Division,
Ministry of Transport.
5. **MR. HUSAINI ABDULLAH**
Hydrography Directorate.
6. **MR. AZIMBAZRI ABDUL SHUKOR**
Manager,
Light Dues Board,
Peninsular Malaysia.
7. **MR. ABD. RAZAK ABU HASSAN**
Hydrography Directorate.
8. **MR. ROSLAN AHMAD**
Hydrography Directorate.
9. **CAPT. HJ. ABD. RAHIM AZIZ**
General Manager (Supervisory)
Klang Port Authority.

SINGAPORE

1. **CAPT. WILSON CHUA**
Hydrographer,
Port of Singapore Authority.
2. **CAPT. CHNG LOY TEOH**
Dy Controller,
Port Operations Control,
Port of Singapore Authority.
3. **MR. CHEW CHEE MUN**
Dy Hydrographer,
Port of Singapore Authority.
4. **MRS. PEGGY KOH**
Cartographer,
Port of Singapore Authority.

JAPAN

1. **MR. SHOICHI KOKUTA**
Senior Coastal Survey Officer,
Coastal Survey and Cartographics Division,
Hydrographic Department,
Maritime Safety Agency.
2. **MR. MASARU TAGA**
Coastal Survey Officer,
Coastal Survey and Cartographics Division,
Hydrographic Department,
Maritime Safety Agency.
3. **MR. AKINORI SAITO**
Hydrographic Planning Officer,
Planning Division,
Hydrographic Department,
Maritime Safety Agency.
4. **MR. MASAYOSHI HIRAO**
Deputy Director,
Research and Development Division,
Japan Hydrographic Association.
5. **MR. NAOFUMI YAMAMURA**
First Development Study Division,
Social Development Study Division,
JICA HQ Office.
6. **MR. KOJI KAMBARA**
1st. Secretary,
Embassy of Japan,
Kuala Lumpur.

**REPORT OF THE MEETING OF
THE FOUR NATIONS JOINT RE-SURVEY OF CRITICAL AREAS AND
INVESTIGATION OF DANGEROUS/UNCONFIRMED SHOALS AND WRECKS
IN THE STRAITS OF MALACCA AND SINGAPORE BETWEEN THE
GOVERNMENTS OF INDONESIA, MALAYSIA, SINGAPORE AND THE
GOVERNMENT OF JAPAN**

11 - 13 DECEMBER, 1995

INTRODUCTION

1. A meeting of the Four Nations Joint Re-Survey of Critical Areas and Investigation of Dangerous/Unconfirmed Shoals and Wrecks in the Straits of Malacca and Singapore between the Governments of Indonesia, Malaysia, Singapore and the Government of Japan was held in Seremban, Malaysia, on 11 - 13 December 1995.
2. The Meeting was attended by delegates from Indonesia, Malaysia, Singapore and Japan. The list of delegates appears as Annex A.

WELCOME REMARKS

3. The Head of the Malaysian delegation welcomed the delegates from Indonesia, Singapore and Japan to Seremban.

ELECTION OF CHAIRMAN AND VICE-CHAIRMAN

4. Mr. Mohd. Rasip Hassan, Head of the Malaysian delegation was unanimously elected Chairman of the Meeting.
5. Captain Syahwin Hamid, Head of the Indonesian delegation was unanimously elected Vice-Chairman of the Meeting.

ADOPTION OF AGENDA

6. The Meeting adopted the Agenda which appears as Annex B.

BUSINESS ARRANGEMENTS

7. The Meeting discussed all agenda items in Plenary.

SCOPE OF WORK

8. The Meeting discussed the Draft Scope of Work submitted by Japan which appears as Annex C. The revised Scope of Work incorporating the decisions of the Meeting appears as Annex D.

8.1 Title of Project

- i. The Meeting agreed to revise the title of the Project to " The Four Nations Joint Re-Survey of Critical Areas and Investigation of Dangerous/Unconfirmed Shoals and Wrecks in the Straits of Malacca and Singapore".

8.2 Signatories to the Scope of Work

- i. The delegations of Indonesia, Malaysia and Singapore were of the view that in keeping with the title of the Project, and to be consistent with the signatories for the Littoral States, the Government of Japan should be the signatory to the Scope of Work rather than Japan International Cooperation Agency (JICA).
- ii. The delegation of Japan informed the Meeting that JICA could sign for the Government of Japan but would refer the matter to their Government and would inform the Littoral States accordingly.

8.3 Survey Areas and Points

- i. The Meeting having taken into account comments received at the 41st Sub-Committee on Safety of Navigation of the International Maritime Organisation on the proposal of the Littoral States to review the Routeing System in the Straits of Malacca and Singapore as well as the decision of the Meeting of the Review Group of the Routeing System in the Straits of Malacca and Singapore held in Penang in November 1995, agreed to revise the Study Areas by:
 - a. including three new survey points for investigation of three dangerous/unconfirmed wrecks;
 - b. removing point (h) because it is outside the proposed new Traffic Separation Scheme (TSS);
 - c. removing point (j) because it is in survey Area G;
 - d. correcting the co-ordinates of survey points (b) and (c); and
 - e. expanding survey Area A to include a check survey within the coverage of the original area proposed by the three Littoral States. This would take care the concerns expressed by the International Hydrographic Organisation with regards to the reliability of existing survey data.
- ii. The details of the revision appear as Annex E.

8.4 Allotment of Survey Groups

- i. The Meeting agreed on the allotment of Group Areas to the respective Littoral States for study as follows:

- a. Group Areas 2 and 4 to Malaysia;
 - b. Group Areas 1, 3 and Sub-Areas E & F of Group Area 5 to Indonesia; and
 - c. The remaining Sub-Areas of Group Area 5 and Group Area 6 to Singapore.
- ii. The Meeting agreed that Group Areas 2 and 4 be surveyed as soon as possible because the realignment of the proposed Routeing System is dependant on the result of the resurvey. This would meet the schedule for the implementation of the Routeing System in the Straits of Malacca and Singapore which was revised in the Meeting held in Penang in November 1995. The revised schedule appears as Annex F.

8.5 Specifications of Survey

8.5.1 Establishment of Global Positioning System Reference Stations

- i. The Meeting agreed that the main global positioning system reference station will be at Batam but others may be established at other locations including, if necessary :-
 - a. One Fathom Bank;
 - b. Cape Rachado; and
 - c. Bukit Jugra.

8.5.2 Location of Temporary Tidal Stations

- i. The Meeting endorsed the locations of temporary tidal stations as per paragraph 5 Appendix IV of Annex D.

8.5.3 Chart Datum Level

- i. The Meeting agreed that the chart datum level in Appendix IV will be the Lowest Astronomical Tide (LAT).

8.5.4 Standard Hydrographic of Survey

- i. The Meeting also agreed that the minimum standard for the survey shall be Second Order of the IHO Specification SP44.

8.6 Authorisation of Final Data

- i. The Meeting agreed that the final data will have to be authorised jointly and the following new paragraph 12 will be inserted into the Scope of Work:-

"Considering that the final results and data obtained under the Study will be adopted for production of and/or updating official nautical charts published by the hydrographic offices concerned and from the viewpoint of ensuring the safety of navigation using these nautical charts in the Straits, the result and data of hydrographic surveys carried out under the Study shall be verified and authorised by the relevant Japanese authority and the authorities of the three Littoral States in accordance with the IHO Specifications for Hydrographic Survey SP44".

8.7 Undertakings of the Government of the Littoral States

- i. The Singapore delegation sought clarification from the Japanese delegation on paragraph 9 (b) under the sub-heading "UNDERTAKING OF THE GOVERNMENT OF SINGAPORE". The Japanese delegation explained that it was a standard clause

contained in all agreements made between JICA and countries requesting for technical assistance.

ii. The Indonesian delegation proposed two amendments to paragraph 8 of the Scope of Work as follows:

a. to delete paragraph 8 (a) (ii); and

b. to replace entire paragraph 8 (b) with:

"The Government of Indonesia shall indemnify any member of the Study Team in respect of damages arising from any legal action against the member in relation to any act performed or omissions made in undertaking the Study except when the two Governments agree that such a member is guilty of gross negligence or wilful misconduct."

iii. The Singapore delegation proposed the followings:

a. to replace paragraph 9 (d) (vii) with "logistic requirements within Singapore"; and

b. to replace 10 (a) (ix) with "to secure permission to use telecommunication facilities introduced from Japan for the execution of the field survey" to make it similar with provision of the other two countries.

iv. The Japanese delegation agreed to consider both the Indonesian and Singaporean proposals.

MODUS OPERANDI OF SURVEY

9. The Meeting taking note that an earlier completion of the Project would expedite the adoption process of the Littoral States' proposal for the new Routeing System in the Straits of Malacca and Singapore by the International Maritime Organisation, agreed that the duration of the Project will be within a period of two years.
10. The Meeting was informed by the Japanese delegation of the budgetary and procedural constraints on the part of JICA with regard to the participation of representatives from the Littoral States in Japan for the final data processing. The Japanese delegation proposed that the final data processing be held in the three Littoral States.
11. The Meeting having deliberated on the issue, agreed that the final data processing will be conducted in each of the Littoral States together with the Japanese team following the completion of survey works. The Meeting further agreed that :
 - i. During the Joint Re-Survey by each of the Littoral States which is expected to take about three months, possibly five Japanese team members and one representative each from the other two Littoral States will be present. The representatives from the other two Littoral States will be rotated on a monthly basis;
 - ii. In addition to the Japanese team, three representatives from each of the other two Littoral States will be present during the final data processing conducted in any of the Littoral States which will take about one month ;
 - iii. Due to the international importance of the Project, the final meeting and signing ceremony on the completion and acceptance of the Project will be held for two days in Japan at the request of the Littoral States which is to be attended by two representatives each from the Littoral States; and
 - iv. All costs involved in the participation of the representatives from the Littoral States in the Joint Re-Survey and Final Data Processing, the final meeting and

signing ceremony will be borne by the Project.

PREPARATORY STUDY - PHASE II

12. The Meeting was informed of the dates of the Preparatory Study - Phase II and the Second Joint Meeting to be held in Malaysia from 29 - 31 January, 1996. The Meeting took note that the Joint Meeting will end with a signing ceremony of the Scope of Work and Records of the Meeting.
13. The delegations of the three Littoral States requested the Japanese delegation to circulate the final version of the Scope of Work incorporating the decisions taken at this Meeting to enable the three countries to vet the document. The Japanese delegation agreed to the request and will circulate the document as soon as possible before the Second Joint Meeting in January, 1996.

OTHER MATTERS

14. Counterpart Training
 - 14.1 Resulting from the discussion on the usage of survey equipment and as part of transfer of technology, the delegations of the three Littoral States requested that a counterpart training for the following fields be conducted in Japan:
 - i. Electronic Navigational Charting; and
 - ii. Global Positioning System technology relating to hydrographic survey.
 - 14.2 The Japanese delegation agreed to submit the request to the relevant authority in Japan for consideration.
15. Development of Electronic Navigational Charts

15.1 The Meeting acknowledged the need for electronic navigational charts covering the Straits of Malacca and Singapore and agreed to cooperate towards the development of an electronic navigational chart database.

16. Survey Equipment

16.1 The Meeting agreed that the following survey equipment is essential for the Re-Survey Project :-

- i. 3 DGPS;
- ii. 3 four beam echo sounders;
- iii. 3 side scan sonars;
- iv. 3 automated data loggers including software; and
- v. 3 tide gauges.

16.2 The Meeting further agreed that the Japanese Consultant look into the need for heave compensators for the survey operations.

16.3 The delegations of the three Littoral States were of the opinion that after the completion of the survey the above equipment should be left in the Littoral States for future use in ensuring the safety of navigation. The Japanese delegation agreed to submit the request to the relevant authority in Japan for consideration.

17. Archiving of Data

17.1 The Meeting agreed that the raw data including echograms, side scan sonar records and tidal observations shall be kept by the respective Littoral States after the completion of final data processing. However any Littoral States may request for the raw data of any area relevant to each State.

ADOPTION OF REPORT

18. The Meeting considered and adopted the Report.

ACKNOWLEDGEMENT

19. The delegations from Indonesia, Singapore and Japan expressed their sincere appreciation to the host country for the hospitality extended to them and the excellent arrangements made for the Meeting.

20. The Meeting was held in the traditional spirit of goodwill and mutual understanding.



ANNEX B

AGENDA

AGENDA

**MEETING OF THE FOUR NATIONS
JOINT RE-SURVEY OF CRITICAL AREAS AND
INVESTIGATION OF DANGEROUS/UNCONFIRMED SHOALS AND WRECKS
IN THE STRAITS OF MALACCA AND SINGAPORE
BETWEEN
THE GOVERNMENTS OF INDONESIA, MALAYSIA, SINGAPORE
AND
THE GOVERNMENT OF JAPAN**

11 - 13 DECEMBER, 1995

SEREMBAN, MALAYSIA

1. Opening Remarks
2. Election of Chairman and Vice-Chairman
3. Adoption of Agenda
4. Business Arrangements
5. Scope of Work
6. Modus Operandi of Survey
7. Preparatory Study - Phase II
8. Other Matters
9. Consideration and Adoption of Report

ANNEX C

SCOPE OF WORK
(DRAFT)
FOR
THE RE-SURVEY OF CRITICAL AREAS
AND
INVESTIGATION OF DANGEROUS/UNCONFIRMED
SHOALS AND WRECKS
IN
THE STRAITS OF MALACCA AND SINGAPORE
AGREED UPON BETWEEN
THE GOVERNMENT OF THE REPUBLIC OF INDONESIA
THE GOVERNMENT OF MALAYSIA
THE GOVERNMENT OF THE REPUBLIC OF SINGAPORE
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

KUALA LUMPUR, January, 1996

Leader,
Preparatory Study Team
Japan International
Cooperation Agency

Director of Navigation
Directorate General of
Sea Communication
Government of Indonesia

Maritime Division
Ministry of Transport
Government of Malaysia

Hydrographic Department
Port of Singapore
Authority
Government of Singapore

1. Introduction

In response to the request of the Government of the Republic of Indonesia, (hereinafter referred to as "the Government of Indonesia"), The Government of Malaysia and the Government of the Republic of Singapore (hereinafter referred to as "the Government of Singapore"), the Government of Japan has decided to conduct the Re-survey of critical areas in the Straits of Malacca and Singapore including the investigation of dangerous/unconfirmed shoals and wrecks (hereinafter referred to as "the Study") in accordance with the relevant laws and regulations in force in Japan.

Accordingly, Japan International Cooperation Agency (hereinafter referred to as "JICA", the official agency responsible for the implementation of the technical cooperation programmes of the Government of Japan, will undertake the Study in close relation with the authorities concerned of the Governments of Indonesia, Malaysia and Singapore.

The present document sets forth the scope of work with regard to the Study.

2. Objective of the Study

The objective of the Study is to conduct hydrographic survey of critical areas including the investigation of dangerous/unconfirmed shoals and wrecks for the promotion of maritime safety in the Straits of Malacca and Singapore.

3. Study Areas

The Study will cover 24 areas in the Straits of Malacca and Singapore, details of which are indicated in the attached list (Appendix 1) and the map (Appendix 11). Total areas will be approximately 780 square kilometers.

4. Scope of the Study

In order to achieve the objective mentioned above, the Study shall cover the following items:-

a) **Horizontal Control Survey**

Based on the existing control points available for the Study, new points necessary for sounding operation shall be determined by Global Positioning System (GPS) observation.

b) **Tidal observation**

In order to determine the chart datum level and ^{for} make tidal reduction of soundings, tide stations and temporary tide poles shall be established in appropriate locations.

c) **Sounding (Search)**

Sounding (Search) operations shall be carried out by using precise four-beam echo sounders with side scan sonars. The standard interval between lines of sounding is 200m. However for the investigation of shoals and wrecks the sounding interval shall be closer.

d) **Position fixing**

Positioning of soundings shall be determined by Differential Global Positioning (DGPS).

e) **Data Processing**

Preliminary data processing of survey data shall be carried out in the field. Any shoals or wrecks detected shall be promulgated to all vessels by radio broadcast as soon as possible and subsequently by Notices to Mariners. Final data processing of survey data shall be carried out in Japan.

f) **Preparation of smooth sheets**

Based on the result of surveys, smooth sheets shall be prepared on plastic films. The scale of the smooth sheets shall be 1:20,000. Digital data equivalent to smooth sheets shall be distributed to each of the four countries.

g) **Details of the Study**

The details of the Study is listed in Appendix III.

5. **Study Schedule**

The Study shall be conducted in accordance with the attached tentative schedule. (Appendix IV).

6. **Reports and final results**

JICA shall prepare and submit the following reports containing the final results in English to the Governments of Indonesia, Malaysia and Singapore. The date of submission of each report may change according to the Study schedule.

a) **Reports**

i) **Plan of Operation**

Eighty (80) copies in English to be prepared at the commencement of the Study. Twenty (20) copies are to be submitted to each Government.

ii) **Progress Report**

Eighty (80) copies to be prepared every fiscal year. Twenty (20) copies are to be submitted to each Government.

iii) **Final Report**

Eighty (80) copies to be prepared upon completion of the Study. Twenty (20) copies are to be submitted to each Government).

- b) **Smooth Sheets**
Four (4) sets for each area to be prepared. One set for each Government.
- c) **Digital data**
Four (4) sets for each area. One set for each Government.
- d) **Other survey and observation data results prepared throughout the Study.**

7. **UNDERTAKINGS OF THE GOVERNMENT OF MALAYSIA**

- a) To facilitate smooth conduct of the Study, the government of Malaysia shall take necessary measures:
 - i) to inform the members of the Study team any existing risk in the Study area and to take any measures deemed necessary to secure the safety of the Study team,
 - ii) to ensure the necessary entry permits for the Study team to conduct field surveys in Malaysia and exempt them from consular fees,
 - iii) to exempt the members of the Study team from taxes and duties, as normally accorded under the provision of Malaysian General Circular No. 1 of 1979, on equipment, machinery and other materials brought into and out of Malaysia for the conduct of the Study,

- iv) to exempt the members of the Study team from income tax on their official emoluments in respect of their period of assignment in Malaysia in connection with the conduct of the Study, but the Government of Malaysia shall retain the right to take such emoluments into account for the purpose of assessing the amount to be applied to income from other sources,
- v) to provide necessary facilities to the Japanese study team for remittance as well as utilization of the funds introduced into Malaysia from Japan in connection with the implementation of the Study,
- vi) to secure permission for entry into private properties or restricted area for the implementation of the Study,
- vii) to make arrangements for the Study team to take back to Japan the data, maps and materials connected with the Study, subject to the approval of the Government of Malaysia, in order to prepare the reports,
- viii) to provide the Study team with medical services when needed but the expenses will be chargeable to the members of the Study Team,
- ix) to secure permission to use telecommunication facilities introduced from Japan for the execution of the field survey.

- b) The government of Malaysia shall indemnify any member of the Study team in respect of damages arising from any legal action against him in relation to any act performed or omissions made in undertaking the Study except when the two Governments agree that such a member is guilty of gross negligence or wilful misconduct.
- c) The government of Malaysia shall coordinate the three coastal countries in respect of the study.
- d) Ministry of Transport (hereinafter referred to as "MOT") shall act as counterpart agency to the Japanese study team and also as coordinating body in relation with other governmental and non-governmental organization concerned for the smooth implementation of the Study.
- e) MOT shall, at its own expense, provide the Japanese study team with the following, in cooperation with other organizations concerned:
 - i) available data and information related to the Study
 - ii) counterpart personnel
 - iii) mother vessel for survey with crew including fuel expense
 - iv) supervisor to the sounding survey
 - v) suitable office space with office equipment in Kuala Lumpur and the base of the mother vessel
 - vi) credentials or identification cards, and
 - vii) appropriate number of vehicles with drivers

8. UNDERTAKINGS OF THE GOVERNMENT OF INDONESIA

- a) To facilitate smooth conduct of the Study, the Government of Indonesia shall take necessary measures:
- i) to inform the members of the Study team any existing risk in the Study area and to take any measures deemed necessary to secure the safety of the Study team;
 - ii) to permit the members of the Japanese study team to enter, leave and sojourn in Indonesia for the duration of their assignment therein, and exempt them from foreign registration requirements and consular fees,
 - iii) to exempt the members of the Japanese study team from taxes, duties and other charges on equipment, machinery, vehicles and other materials brought into Indonesia for the conduct of the Study,
 - iv) to exempt the members of the Japanese study team from income tax and charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Japanese study team for their services in connection with the implementation of the Study,
 - v) to provide necessary facilities to the Japanese study team for remittance as well as utilization of the funds introduced into Indonesia from Japan in connection with the implementation of the Study,

- vi) to secure permission for entry into private properties or restricted area for the implementation of the Study,
 - vii) to secure permission for the Japanese study team to take all data and documents (including maps, photographs) related to the Study out of Indonesia to Japan, for the sole purpose of the Study,
 - viii) to provide medical services as needed. Its expenses will be chargeable on members of the Japanese study team.
 - ix) to secure permission to use telecommunication facilities introduced from Japan for the execution of the field survey.
- b) The government of Indonesia shall bear claims, if any arises, against the members of the Japanese study team resulting from occurring in the course of, or otherwise connected with, the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or wilful misconduct on the part of the members of the Japanese study team.
- c) Directorate General of Sea Communication (hereinafter referred to as "DGSC") shall act as counterpart agency to the Japanese study team and also as coordinating body in relation with other governmental and non-governmental organization concerned for the smooth implementation of the Study.

d) DGSC shall, at its own expense, provide the Japanese study team with the following, in cooperation with other organizations concerned:

- i) available data and information related to the Study,
- ii) counterpart personnel,
- iii) mother vessel for survey with crew including fuel expense
- iv) supervisor to the sounding survey
- v) Suitable office space with office equipment in Jakarta or at the base of mother vessel.
- vi) credentials or identification cards, and
- vii) appropriate number of vehicles with drivers

9. **UNDERTAKINGS OF THE GOVERNMENT OF SINGAPORE**

a) To facilitate smooth conduct of the Study, the Government of Singapore shall take necessary measures:

- i) to inform the members of the Study team of any existing risk in the Study areas and to take any measures deemed necessary to secure the safety of the Study team,
- ii) to permit the members of the Study team to enter, leave and stay in Singapore for the duration of their assignment therein, and exempt them from foreign registration requirements and consular fees,

- iii) to exempt the members of the Study team from taxes, duties and other charges on survey equipment and machinery, and other survey and drafting materials brought into Singapore for the conduct of the Study,
- iv) to exempt the members of the Study team from income tax and charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Japanese Study team for their services in connection with the implementation of the Study,
- v) to provide necessary facilities to the Japanese study team for remittance as well as utilization of the funds introduced into Singapore from Japan in connection with the implementation of the Study,
- vi) to secure permission for entry into private properties or restricted area for the implementation of the Study,
- vii) to secure permission for the Japanese study team to take all data and documents (including maps, photographs) related to the Study out of Singapore to Japan,
- viii) to provide medical services as needed. Its expenses will be chargeable to members of the Japanese study team,
- ix) to secure radio frequency for the Differential GPS data transfer and communication.

- b) The government of Singapore shall bear claims, if any arises, against the members of the Japanese study team resulting from, occurring in the course of, or otherwise connected with, the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or wilful misconduct on the part of the members of the Japanese study team.

- c) Port of Singapore Authority (hereinafter referred to as "PSA") shall act as counterpart agency to the Japanese study team and also as coordinating body in relation with other governmental and non-governmental organization concerned for the smooth implementation of the Study.

- d) PSA shall, at its own expense, provide the Japanese study team with the following, in cooperation with other organizations concerned:
 - i) available data and information related to the Study,
 - ii) counterpart personnel,
 - iii) mother vessel for survey with crew including fuel expense.
 - iv) Supervisor to the sounding survey
 - v) suitable office space with office equipment in Singapore.
 - vi) credentials or identification cards, and
 - vii) Logistics requirements.

10. UNDERTAKINGS OF JICA

- a) For the implementation of the STUDY, JICA shall take the following measures:
- i) to dispatch, at its own expense, study team to Indonesia, Malaysia and Singapore.
 - ii) to pursue technology transfer to the counterpart personnel in the course of study.
 - iii) to hire survey boat and vehicles for positioning at the expense of JICA.

11. CONSULTATION

JICA and Ministry of Transport (MOT) of Malaysia (Coordinator of three coastal states) shall consult with each other in respect of any matter that may arise from or in connection with the Study.

Appendix I

List of Resurvey Areas / Points

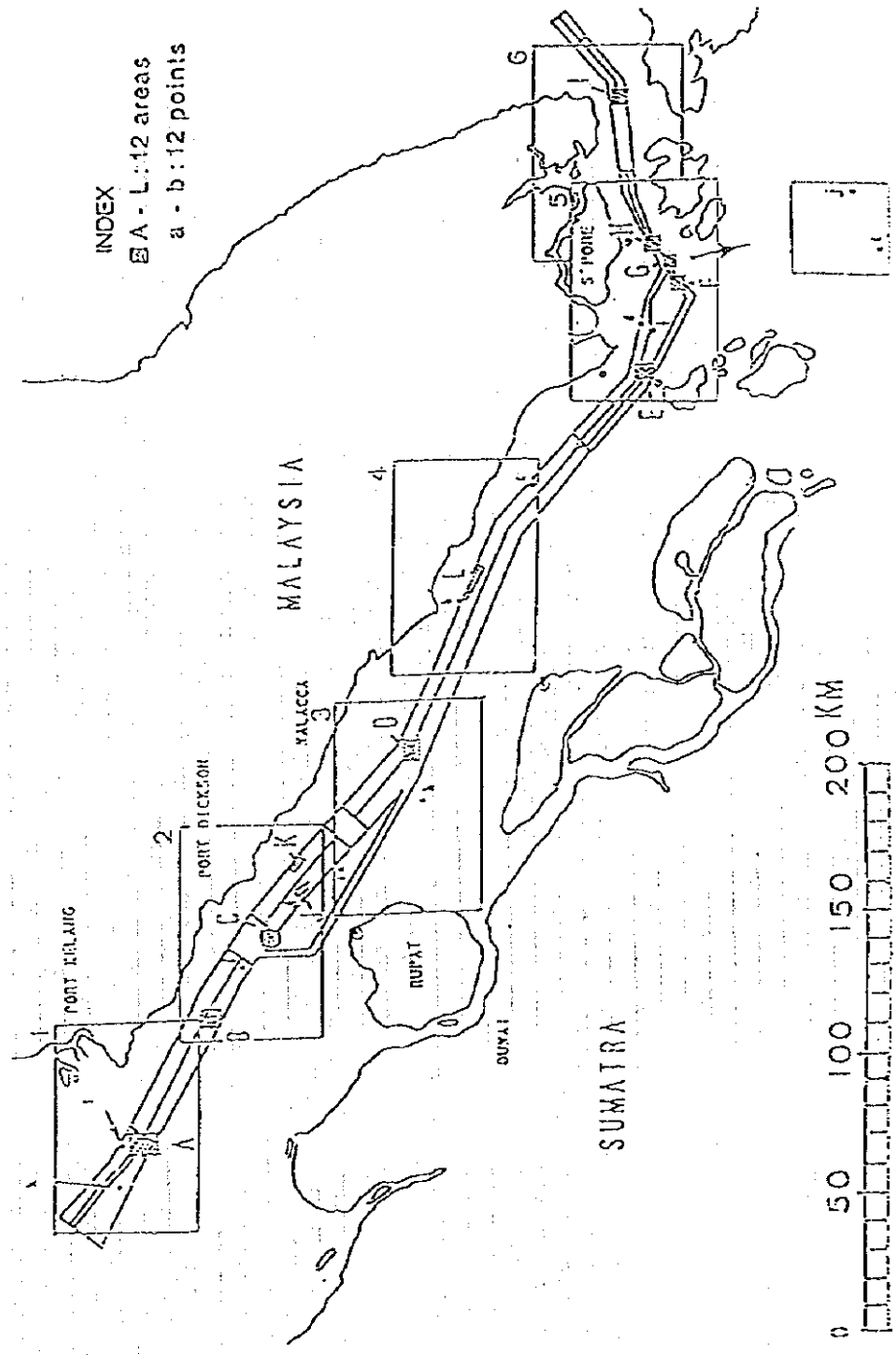
Areas / Points	Position	Subject	Remarks
A	(a) 02° 50.2' N 100° 59.3' E	Wreck & Shoal	(1) 02° 48.7' N 101° 00.8' E
	(b) 02° 50.2' N 101° 03.6' E		(2) 02° 47.0' N 101° 02.1' E
	(c) 02° 44.5' N 101° 03.6' E		(3) 02° 46.0' N 101° 02.1' E
	(d) 02° 44.5' N 100° 59.3' E		
B	(a) 02° 36.7' N 101° 24.4' E	Shoal	(4) 02° 35.2' N 101° 25.9' E
	(b) 02° 36.7' N 101° 27.5' E		(5) 02° 33.9' N 101° 26.0' E
	(c) 02° 32.4' N 101° 27.5' E		
	(d) 02° 32.4' N 101° 24.4' E		
C	(a) 02° 24.1' N 101° 39.1' E	Shoal	(6) 02° 22.6' N 101° 40.6' E
	(b) 02° 24.1' N 101° 42.1' E		
	(c) 02° 21.1' N 101° 42.1' E		
	(d) 02° 21.1' N 101° 39.1' E		
D	(a) 01° 57.6' N 102° 12.6' E	Wreck	(7) 01° 56.1' N 102° 14.1' E
	(b) 01° 57.6' N 102° 16.9' E		(8) 01° 55.5' N 102° 15.4' E
	(c) 01° 54.0' N 102° 16.9' E		
	(d) 01° 54.0' N 102° 12.6' E		
E	(a) 01° 13.3' N 103° 24.3' E	Wreck	(9) 01° 11.8' N 103° 25.9' E
	(b) 01° 13.3' N 103° 27.4' E		(10) 01° 10.8' N 103° 25.8' E
	(c) 01° 09.3' N 103° 27.4' E		
	(d) 01° 09.3' N 103° 24.3' E		
F	(a) 01° 06.7' N 103° 40.6' E	Wreck	(11) 01° 05.2' N 103° 42.1' E
	(b) 01° 06.7' N 103° 43.6' E		
	(c) 01° 03.7' N 103° 43.6' E		
	(d) 01° 03.7' N 103° 40.6' E		

Areas / Points	Position	Subject	Remarks
G	(a) 01° 09.1' N 103° 43.9' E (b) 01° 09.1' N 103° 46.9' E (c) 01° 06.1' N 103° 46.9' E (d) 01° 06.1' N 103° 43.9' E	Wreck	(12) 01° 07.6' N 103° 45.4' E
H	(a) 01° 12.0' N 103° 47.4' E (b) 01° 12.0' N 103° 50.4' E (c) 01° 09.0' N 103° 50.4' E (d) 01° 09.0' N 103° 47.4' E	Danger	(13) 01° 10.5' N 103° 48.9' E
I	(a) 01° 17.5' N 104° 13.5' E (b) 01° 17.5' N 104° 16.5' E (c) 01° 14.5' N 104° 16.5' E (d) 01° 14.5' N 104° 13.5' E	Wreck	(14) 01° 16.0' N 104° 15.0' E
J	① 02° 17.4' N 101° 49.0' E ② 02° 15.6' N 101° 49.6' E	Shoals	
K	02° 17.2' N 101° 54.2' E	Shoal	
L	(a) 01° 46.2' N 102° 42.8' E (b) 01° 42.6' N 102° 50.0' E (c) 01° 42.0' N 102° 49.8' E (d) 01° 45.8' N 102° 42.6' E	Shoal	
a	02° 10.2' N 101° 52.0' E	Shoal	
b	01° 46.4' N 102° 48.3' E	Wreck	
c	01° 84.0' N 103° 05.0' E	Wreck	
d	01° 12.2' N 103° 34.3' E	Wreck	
e	01° 07.4' N 103° 44.2' E	Wreck	
f	02° 28.0' N 101° 35.4' E	Wreck	

Areas / Points	Position	Subject	Remarks
g	02° 16.0' N 101° 47.7' E	Shoal	
h	01° 54.2' N 102° 04.8' E	Wreck	
i	01° 11.1' N 103° 33.0' E	Wreck	
j	01° 07.6' N 103° 45.4' E	Wreck	
k	02° 53.9' N 100° 52.0' E	Shoal	
l	01° 51.1' N 101° 00.0' E	Shoal	

Appendix II

Map of Resurvey Areas / Points



TECHNICAL DETAILS

1. HYDROGRAPHIC SURVEY STANDARDS

The International Hydrographic Organization (IHO) Standards for hydrographic Surveys : the fourth edition of SP-44 shall be applied to the hydrographic surveying to be carried out under the Study.

2. COORDINATES AND DATUM LEVEL

The reference coordinates and ellipsoid, projection and chart datum level to be used for the Study will be as follows:

- a) Reference coordinates and ellipsoid : WGS-84 DATUM
- b) Projection : Transverse Mercator (TM) Projection
- c) Origin of coordinates : Center of each survey area
- d) Chart Datum : Indian Spring Low Water Level

3. HORIZONTAL CONTROL POINT SURVEY

3.1 Survey Method

Based on the existing horizontal control points available for the Study, new horizontal points necessary for sounding operations shall be determined by a static method using Differential Global Positioning System (DGPS).

3.2 Control Points

The number of new horizontal control points to be established for reference stations of DGPS are tentative points of which location are shown in Appendix 11.

The required horizontal accuracy of these points shall be within 1 part of 100,000.

4. SOUNDING AND SEARCH

4.1 Survey Method

The sounding and search operations will be carried out by using precise four-beam echo sounders and a side scan sonar. The standard interval between sounding lines is 200 meters.

Digital data of the hydrographic survey will also be acquired.

4.2 Correction of Sounding Data

The correction of sounding data will be made for the sound velocity in sea water by a bar-check method or sound speed correction table and for the tidal reduction by tidal heights observed.

4.3 Positioning System

The position of survey launches will be determined by a Real-Time Differential/Kinematic Global Positioning System.

5. TIDAL OBSERVATION

In order to determine the chart datum level and make the tidal reduction to sounding data, temporary tide stations using digital type tide gauges and/or tide poles will be set in appropriate places.

The relation between a temporary tide station and/or a tide pole and new bench marks will be determined by a direct levelling using the nearest existing bench mark.

The long-term mean sea level of a temporary tide station will be obtained by comparing its short-term mean sea level with the mean sea level of the same period at the standard tide station.

6. BOTTOM SAMPLING

The bottom sampling using a hand-lead and/or a tube dredge will be carried out at about 300m interval only near the shoals and patches in each sounding area for discrimination of its bottom characteristics.

7. DATA PROCESSING

7.1 Preliminary Data Processing

Initial data processing shall be carried out in the field by the following procedure:

- i) To store the positioning and sounding data with time/date in floppy disks magnetic tape on survey launches.
- ii) To develop preliminary track charts to confirm the coverage of the survey areas by a computer and a plotter on the survey vessel (mother vessel).
- iii) to interpret side scan sonar records to search and confirm shoals and wrecks.
- iv) To develop preliminary sounding charts to confirm the shapes and positions of shoals and wrecks by a computer and a plotter on the survey vessel.

- v) To choose detailed survey area to confirm the precise position and the shallowest depth on the survey vessel.

7.2 Final Data Processing

The final data processing such as the sound velocity correction and tidal reduction for sounding data will be carried out in Japan.

After that, final track charts and sounding charts will be developed by a computer and a flat-bed plotter.

Finally, smooth sheet for each survey area will be prepared on plastic film. Digital data equivalent to smooth sheets will also be prepared.

8. **FINAL RESULTS**

Main final survey results of the Study as a part of the Final Report will be as follows:

- a) **Control Point Survey**
 - i) List of Control Points
 - ii) Description of Control Points
 - iii) Location Map of Control Points

- b) **Sounding and Search**
 - i) Echograms
 - ii) Records of Side Scan Sonar
 - iii) Positioning Data of Survey Launches
 - iv) Track Charts (Scale 1:20,000)
 - v) Sounding Charts (Scale 1:20,000)

- c) **Tidal Observation**
 - i) Records of Tidal Observation
 - ii) Tidal Diagrams

- d) **Smooth Sheets**
 - i) Smooth Sheets (Scale 1:20,000)

- e) **Digital Data**
 - i) Floppy Disk of Digital Data

Appendix IV

TENTATIVE SCHEDULE

Month	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	32	33	34	35	36		
WORK IN FIELD																																						
WORK IN JAPAN																																						
REPORT																																						

ANNEX D

DRAFT
SCOPE OF WORK
FOR
THE FOUR NATIONS JOINT RE-SURVEY OF CRITICAL AREAS
AND
INVESTIGATION OF DANGEROUS/UNCONFIRMED
SHOALS AND WRECKS
IN
THE STRAITS OF MALACCA AND SINGAPORE
AGREED UPON BETWEEN
THE GOVERNMENT OF THE REPUBLIC OF INDONESIA
THE GOVERNMENT OF MALAYSIA
THE GOVERNMENT OF THE REPUBLIC OF SINGAPORE
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

KUALA LUMPUR, January, 1996

Director of Navigation
Directorate General of Sea Communication
Ministry of Communication
Government of Indonesia

Maritime Division
Ministry of Transport
Government of Malaysia

Hydrographic Department
Port of Singapore Authority
Government of Singapore

Leader
Preparatory Study Team
Japan International Cooperation Agency

1. Introduction

In response to the request of the Government of the Republic of Indonesia, (hereinafter referred to as "the Government of Indonesia"), The Government of Malaysia and the Government of the Republic of Singapore (hereinafter referred to as "the Government of Singapore"), the Government of Japan has decided to conduct the Four Nations Joint Re-Survey of Critical Areas and Investigation of Dangerous/Unconfirmed Shoals and Wrecks in the Straits of Malacca and Singapore (hereinafter referred to as "the Study") in accordance with the relevant laws and regulations in force in Japan.

Accordingly, Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programmes of the Government of Japan, will undertake the Study in close relation with the authorities concerned of the Governments of Indonesia, Malaysia and Singapore.

The present document sets forth the scope of work with regard to the Study.

2. Objective of the Study

The objective of the Study is to conduct hydrographic survey of critical areas including the investigation of dangerous/unconfirmed shoals and wrecks for the promotion of maritime safety in the Straits of Malacca and Singapore.

3. Study Areas

The Study shall cover 25 areas in the Straits of Malacca and Singapore, details of which are attached as Appendix I and the map attached as Appendix II. The total areas to be surveyed will be approximately 780 square kilometers.

The Study Areas are divided into 6 Group Areas shown in Appendix III. Each littoral Governments shall be designated Group Areas and undertake to take necessary measures to facilitate smooth conduct of the Study in connection with their designated Group Areas. The Group Areas designated to each littoral Governments and their order of implementation priority are as follows:

- a) Group Area 2 to the Government of Malaysia;
- b) Group Area 4 to the Government of Malaysia;
- c) Group Area 1 to the Government of Indonesia;
- d) Group Area 3 to the Government of Indonesia;
- e) Sub-Areas E and F in Group Area 5 to the Government of Indonesia;
- f) Remaining Sub-Areas in Group Area 5 to the Government of the Singapore;
- and
- g) Group Area 6 to the Government of Singapore.

4. Government Representative

In Group Area designated to a littoral Government, not more than five representatives from the Government of Japan and a representative from each of the other two littoral

Governments shall also be present throughout the Study. The representative from each of the other two littoral Governments shall be rotated on a monthly basis.

During final data processing conducted at a littoral state, three representatives from each of the other two littoral Governments shall also be present.

5. Scope of the Study

In order to achieve the objective mentioned above, the Study shall cover the following items :-

a) Horizontal Control Survey

Based on the existing control points available for the Study, new points necessary for sounding operation shall be determined by Global Positioning System (GPS) observation.

b) Tidal observation

In order to determine the chart datum level for tidal reduction of soundings, tide stations and temporary tide poles shall be established in appropriate locations.

c) Sounding (Search)

Sounding (Search) operations shall be carried out by using precise four-beam echo sounders with side scan sonars. The standard interval between lines of sounding is 200 metres. However for the investigation of shoals and wrecks the sounding interval shall be closer.

d) Position fixing

Positioning of soundings shall be determined by Differential Global Positioning System (DGPS).

e) Data Processing

Preliminary data processing of survey data shall be carried out in the field. Any dangerous shoals or wrecks detected shall be promulgated to all vessels by radio broadcast as soon as possible and subsequently by Notices to Mariners. Final data processing of survey data shall be carried out in each of the littoral Government following completion of the Study in their designated Group Areas.

f) Preparation of smooth sheets

Based on the result of surveys, smooth sheets shall be prepared on plastic films. The scale of the smooth sheets shall be 1:20,000. Digital data

equivalent to smooth sheets shall be distributed to each of the four countries.

g) Details of the Study

The details of the Study is listed in Appendix IV.

6. Study Schedule

The Study shall be conducted in accordance with the tentative Schedule attached as Appendix V.

7. Reports and final results

JICA shall prepare and submit the following reports containing the final results in English to the Governments of Indonesia, Malaysia and Singapore. The date of submission of each report may change according to the Study Schedule.

a) Reports

i) Plan of Operation

Eighty (80) copies in English to be prepared at the commencement of the Study. Twenty (20) copies are to be submitted to each Government.

ii) Progress Report

Eighty (80) copies to be prepared every fiscal year. Twenty (20) copies are to be submitted to each Government.

iii) Final Report

Eighty (80) copies to be prepared upon completion of the Study. Twenty (20) copies are to be submitted to each Government.

b) Smooth Sheets

Four (4) sets of each area to be prepared. One set for each Government.

c) Digital data

Four (4) sets for each area. One set for each Government.

d) Other survey and observation data results prepared throughout the Study.

8. UNDERTAKINGS OF THE GOVERNMENT OF MALAYSIA

a) To facilitate smooth conduct of the Study, the Government of Malaysia shall

take necessary measures :

- i) to inform the members of the Study team any existing risk in the Study area and to take any measures deemed necessary to secure the safety of the Study team,
 - ii) to ensure the necessary entry permits for the Study team to conduct field surveys in Malaysia and exempt them from consular fees,
 - iii) to exempt the members of the Study team from taxes and duties, as normally accorded under the provision of Malaysian General Circular No. 1 of 1979, on equipment, machinery and other materials brought into and out of Malaysia for the conduct of the Study,
 - iv) to exempt the members of the Study team from income tax on their official emoluments in respect of their period of assignment in Malaysia in connection with the conduct of the Study, but the Government of Malaysia shall retain the right to take such emoluments into account for the purpose of assessing the amount to be applied to income from other sources,
 - v) to provide necessary facilities to the Japanese study team for remittance as well as utilization of the funds introduced into Malaysia from Japan in connection with the implementation of the Study,
 - vi) to secure permission for entry into private properties or restricted area for the implementation of the Study,
 - vii) to make arrangements for the Study team to take back to Japan the data, maps and materials connected with the Study, subject to the approval of the Government of Malaysia, in order to prepare the reports,
 - viii) to provide the Study team with medical services when needed but the expenses will be chargeable to the members of the Study Team,
 - ix) to secure permission to use telecommunication facilities introduced from Japan for the execution of the field survey.
- b) The government of Malaysia shall indemnify any member of the Study team in respect of damages arising from any legal action against such a member in relation to any act performed or omissions made in undertaking the Study except when the two Governments agree that such a member is guilty of gross negligence or wilful misconduct.
- c) The government of Malaysia shall coordinate the three littoral countries in respect of the study.

- d) Ministry of Transport (hereinafter referred to as "MOT") shall act as counterpart agency to the Japanese study team and also as coordinating body in relation with other governmental and non-governmental organization concerned for the smooth implementation of the Study.
- e) MOT shall, at its own expense, provide the Japanese study team with the following, in cooperation with other organizations concerned :
 - i) available data and information related to the Study
 - ii) counterpart personnel
 - iii) mother vessel for survey with crew including fuel expense
 - iv) supervisor to the survey
 - v) suitable office space with office equipment in Kuala Lumpur and the base of the mother vessel
 - vi) credentials or identification cards, and
 - vii) appropriate number of vehicles with drivers

9. UNDERTAKINGS OF THE GOVERNMENT OF INDONESIA

- a) To facilitate smooth conduct of the Study, the Government of Indonesia shall take necessary measures :
 - i) to inform the members of the Study team any existing risk in the Study area and to take any measures deemed necessary to secure the safety of the Study team ;
 - ii) to permit the members of the Japanese study team to enter, leave and sojourn in Indonesia for the duration of their assignment therein, and exempt them from foreign registration requirements and consular fees,
 - iii) to exempt the members of the Japanese study team from taxes, duties and other charges on equipment, machinery, vehicles and other materials brought into Indonesia for the conduct of the Study,
 - iv) to exempt the members of the Japanese study team from income tax and charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Japanese study team for their services in connection with the implementation of the Study,
 - v) to provide necessary facilities to the Japanese study team for remittance as well as utilization of the funds introduced into

Indonesia from Japan in connection with the implementation of the Study,

- vi) to secure permission for entry into private properties or restricted area for the implementation of the Study,
 - vii) to provide medical services as needed. Its expenses will be chargeable on members of the Japanese study team.
 - viii) to secure permission to use telecommunication facilities introduced from Japan for the execution of the field survey.
- b) The government of Indonesia shall indemnify any member of the Study team in respect of damages arising from any legal action against such a member in relation to any act performed or omissions made in undertaking the Study except when the two Governments agree that such a member is guilty of gross negligence or wilful misconduct.
- c) Directorate General of Sea Communication (hereinafter referred to as "DGSC") shall act as counterpart agency to the Japanese study team and also as coordinating body in relation with other governmental and non-governmentation of the study.
- d) DGSC shall, at its own expense, provide the Japanese study team with the following, in cooperation with other organizations concerned :
- i) available data and information related to the Study,
 - ii) counterpart personnel,
 - iii) mother vessel for survey with crew including fuel expense
 - iv) supervisor to the survey
 - v) suitable office space with office equipment in Jakarta or at the base of mother vessel.
 - vi) credentials or identification cards, and
 - vii) appropriate number of vehicles with drivers.

10. UNDERTAKINGS OF THE GOVERNMENT OF SINGAPORE

- a) To facilitate smooth conduct of the Study, the Government of Singapore shall take necessary measures :
- i) to inform the members of the Study team of any existing risk in the Study area and to take any measures deemed necessary to secure the

safety of the Study team,

- ii) to permit the members of the Study team to enter, leave and stay in Singapore for the duration of their assignment therein, and exempt them from foreign registration requirements and consular fees,
 - iii) to exempt the members of the Study team from taxes, duties and other charges on survey equipment and machinery, and other survey and drafting materials brought into Singapore for the conduct of the Study,
 - iv) to exempt the members of the Study team from income tax and charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Japanese Study team for their services in connection with the implementation of the Study,
 - v) to provide necessary facilities to the Japanese study team for remittance as well as utilization of the funds introduced into Singapore from Japan in connection with the implementation of the Study,
 - vi) to secure permission for entry into private properties or restricted area for the implementation of the Study,
 - vii) to secure permission for the Japanese study team to take all data and documents (including maps, photographs) related to the Study out of Singapore to Japan,
 - viii) to provide medical services as needed. Its expenses will be chargeable to members of the Japanese study team,
 - ix) to secure permission to use telecommunication facilities introduced from Japan for the execution of the field survey.
- b) The government of Singapore shall bear claims, if any arises, against the members of the Japanese study team resulting from, occurring in the course of, or otherwise connected with, the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or wilful misconduct on the part of the members of the Japanese study team.
- c) Port of Singapore Authority (hereinafter referred to as "PSA") shall act as counterpart agency to the Japanese study team and also as coordinating body in relation with other governmental and non-governmental organization concerned for the smooth implementation of the Study.
- d) PSA shall, at its own expense, provide the Japanese study team with the following, in cooperation with other organizations concerned :
- i) available data and information related to the Study,

- ii) counterpart personnel,
- iii) mother vessel for survey with crew including fuel expense.
- iv) supervisor to the survey.
- v) suitable office space with office equipment in Singapore.
- vi) credentials or identification cards, and
- viii) logistics requirements within Singapore.

11. UNDERTAKINGS OF JICA

- a) For the implementation of the STUDY, JICA shall take the following measures :
 - i) to dispatch, at its own expense ,study team to Indonesia, Malaysia and Singapore.
 - ii) to pursue technology transfer to the counterpart personnel in the course of study.
 - iii) to hire survey boat and vehicles for positioning at the expense of JICA.
 - iv) to bear all the cost involved in bringing representatives from the littoral Governments to the Joint Re-Survey, final data processing venues as well as the final Study meeting and Study acceptance ceremony venue.

12. CONSULTATION

JICA and MOT Malaysia (Coordinator of the three littoral Governments) shall consult with each other in respect of any matter that may arise from or in connection with the Study.

13. AUTHORISATION

Considering that the final results and data obtained under the Study will be adopted for production of and/or updating official nautical charts published by the hydrographic offices concerned and from the viewpoints of ensuring the safety of navigation using these nautical charts in the Straits, the result and data of hydrographic surveys carried out under the Study shall be verified and authorised by the relevant Japanese authority and the authorities of the three littoral Governments in accordance with the IHO Specifications for Hydrographic Survey 'S44'.

APPENDIX I

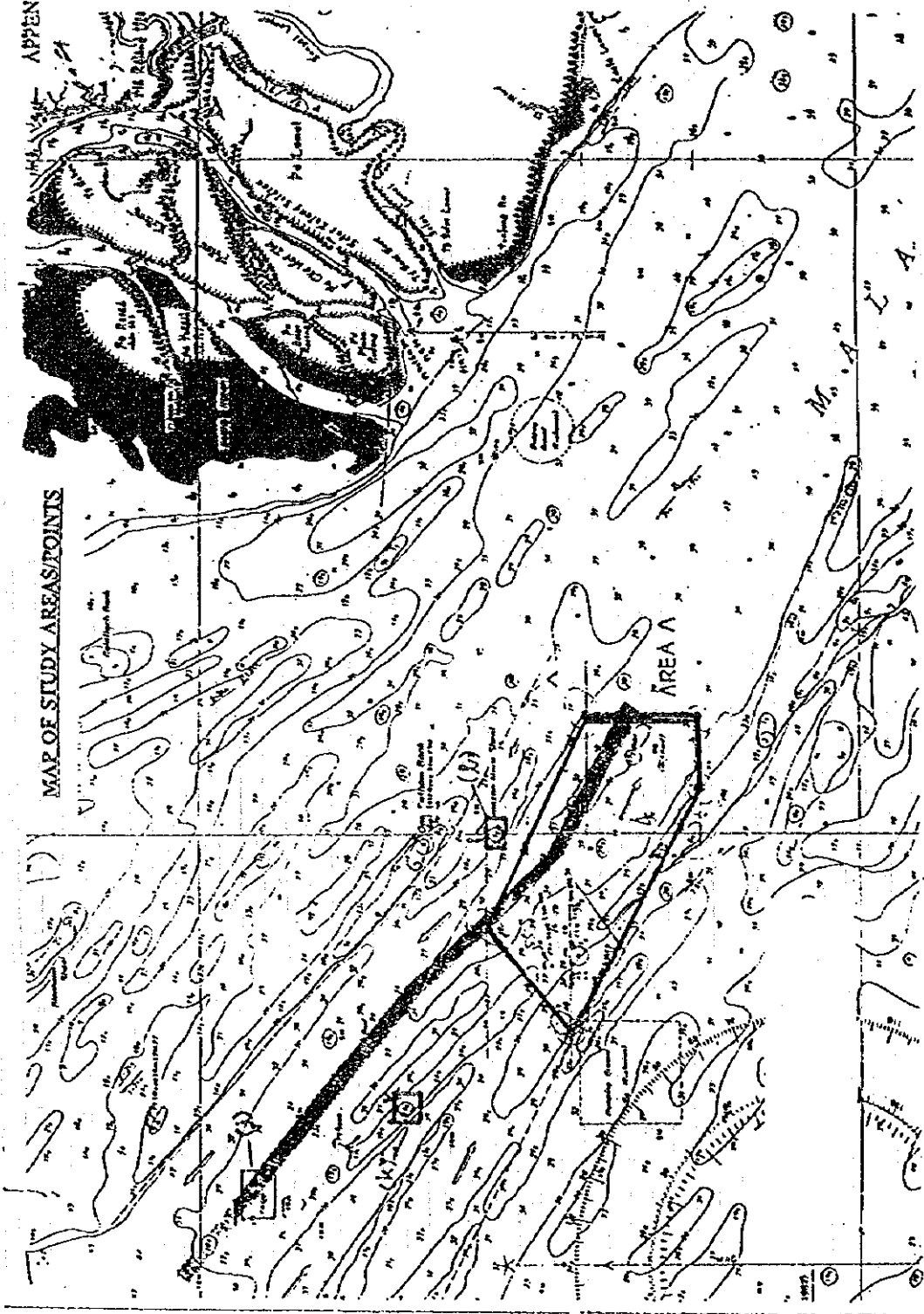
LIST OF STUDY AREAS/POINTS

Areas/Points	Position	Subject	Remarks
A	(a) 02° 51.'4 N 100° 57.'2 E (b) 02° 48.'3 N 101° 03.'4 E (c) 02° 45.'0 N 101° 03.'4 E (d) 02° 45.'0 N 101° 01.'3 E (e) 02° 48.'9 N 100° 54.'1 E	Wreck/shoal and sand wave areas	(1) 02° 48.'7 N 101° 00.'8 E (2) 02° 47.'0 N 101° 02.'1 E (3) 02° 46.'0 N 101° 02.'1 E
B	(a) 02° 36.'7 N 101° 24.'4 E (b) 02° 36.'7 N 101° 27.'5 E (c) 02° 32.'4 N 101° 27.'5 E (d) 02° 32.'4 N 101° 24.'4 E	Shoal	(4) 02° 35.'2 N 101° 25.'9 E (5) 02° 33.'9 N 101° 26.'0 E
C	(a) 02° 24.'1 N 101° 39.'1 E (b) 02° 24.'1 N 101° 42.'1 E (c) 02° 21.'1 N 101° 42.'1 E (d) 02° 21.'1 N 101° 39.'1 E	Shoal	(6) 02° 22.'6 N 101° 40.'6 E
D	(a) 01° 57.'6 N 102° 12.'6 E (b) 01° 57.'6 N 102° 16.'9 E (c) 01° 54.'0 N 102° 16.'9 E (d) 01° 54.'0 N 102° 12.'6 E	Wreck	(7) 01° 56.'1 N 102° 14.'1 E (8) 01° 55.'5 N 102° 15.'4 E

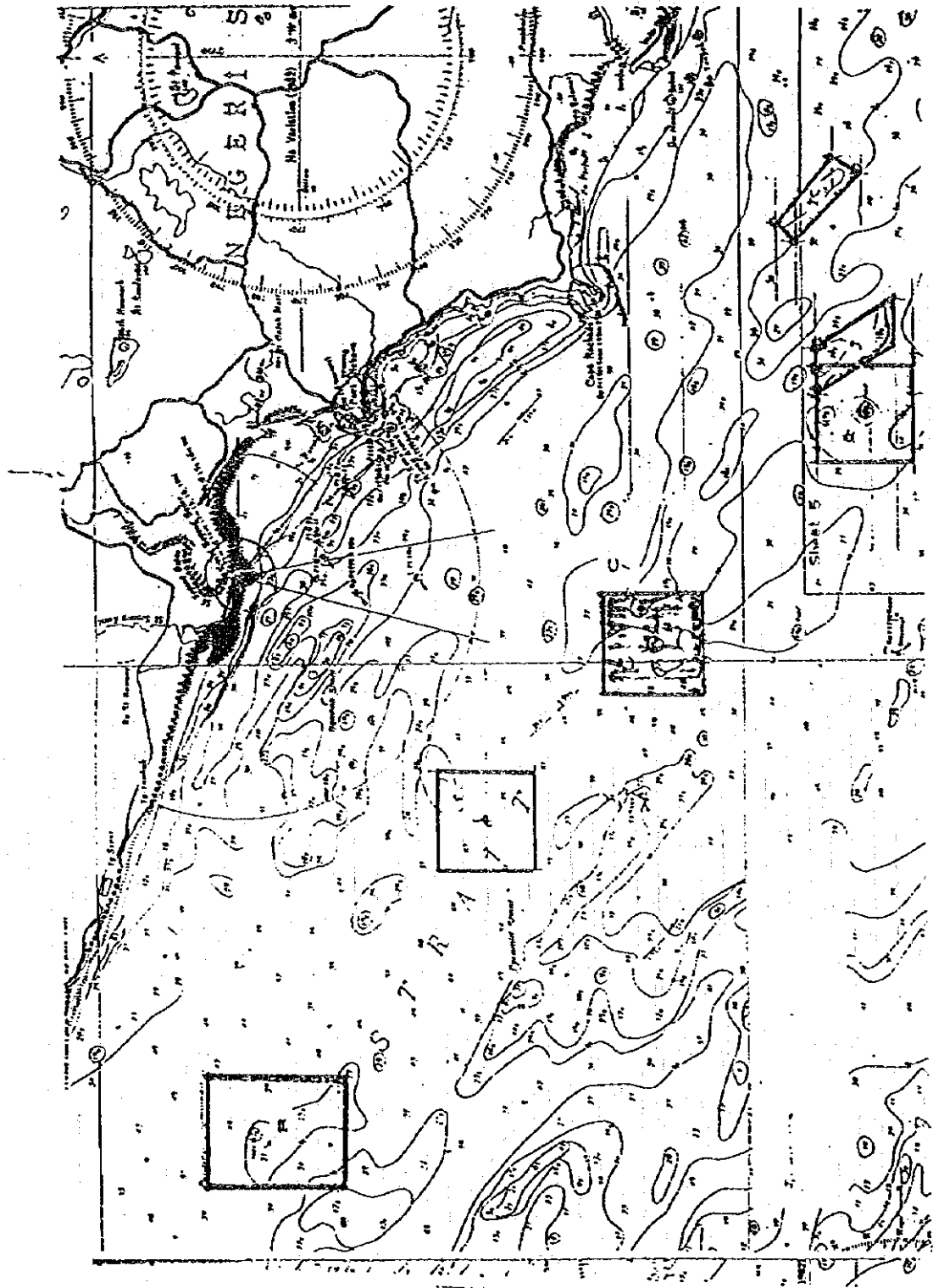
E	(a) 01° 13.'3 N 103° 24.'3 E (b) 01° 13.'3 N 103° 27.'4 E (c) 01° 09.'3 N 103° 27.'4 E (d) 01° 09.'3 N 103° 24.'3 E	Wreck	(9) 01° 11.'8 N 103° 25.'9 E (10) 01° 10.'8 N 103° 25.'8 E
F	(a) 01° 06.'7 N 103° 40.'6 E (b) 01° 06.'7 N 103° 43.'6 E (c) 01° 03.'7 N 103° 43.'6 E (d) 01° 03.'7 N 103° 40.'6 E	Wreck	(11) 01° 05.'2 N 103° 42.'1 E
G	(a) 01° 09.'1 N 103° 43.'9 E (b) 01° 09.'1 N 103° 46.'9 E (c) 01° 06.'1 N 103° 46.'9 E (d) 01° 06.'1 N 103° 43.'9 E	Wreck	(12) 01° 07.'6 N 103° 45.'4 E
H	(a) 01° 12.'0 N 103° 47.'4 E (b) 01° 12.'0 N 103° 50.'4 E (c) 01° 09.'0 N 103° 50.'4 E (d) 01° 09.'0 N 103° 47.'4 E	Danger	(13) 01° 10.'5 N 103° 48.'9 E
I	(a) 01° 17.'5 N 104° 13.'5 E (b) 01° 17.'5 N 104° 16.'5 E (c) 01° 14.'5 N 104° 16.'5 E (d) 01° 14.'5 N 104° 13.'5 E	Wreck	(14) 01° 16.'0 N 104° 15.'0 E
J	① 02° 17.'4 N 101° 49.'0 E ② 02° 15.'6 N 101° 49.'6 E	Shoals	
K	02° 17.'2 N 101° 54.'2 E	Shoal	

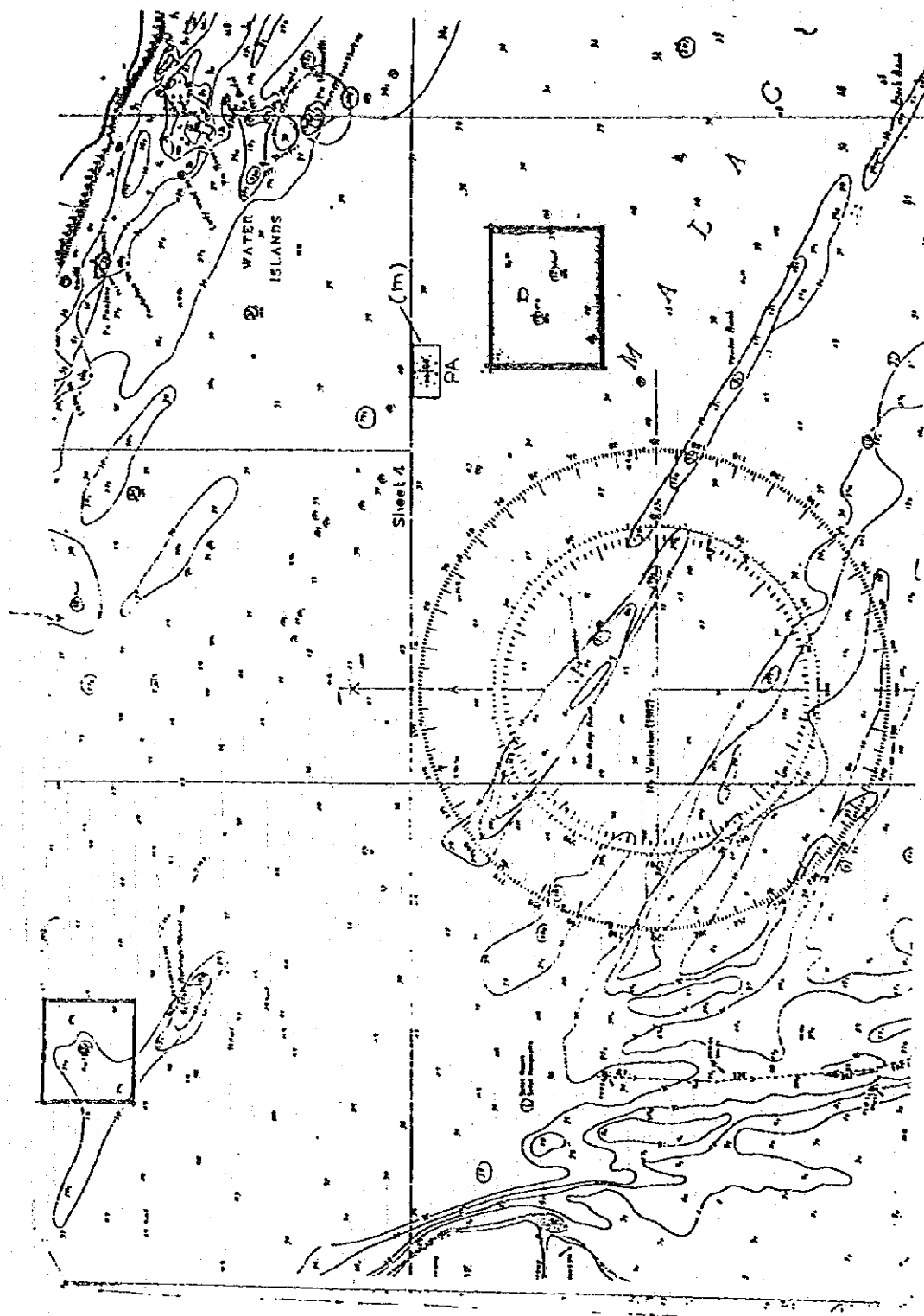
L	(a) 01° 46.'2 N 102° 42.'8 E (b) 01° 42.'6 N 102° 50.'0 E (c) 01° 42.'0 N 102° 49.'8 E (d) 01° 45.'8 N 102° 42.'6 E	Shoal	
a	02° 10.'2 N 101° 52.'0 E	Shoal	
b	01° 46.'4 N 102° 43.'3 E	Wreck	
c	01° 34.'0 N 103° 05.'0 E	Wreck	
d	01° 12.'2 N 103° 34.'3 E	Wreck	
e	01° 07.'4 N 103° 44.'2 E	Wreck	
f	02° 28.'0 N 101° 35.'4 E	Wreck	
g	02° 16.'0 N 101° 47.'7 E	Shoal	
h	01° 15.'8 N 103° 19.'8 E	Wreck	
i	01° 11.'1 N 103° 33.'0 E	Wreck	
j	02° 58.'2 N 100° 49.'5 E	Wreck	
k	02° 53.'9 N 100° 52.'0 E	Shoal	
l	01° 51.'1 N 101° 00.'0 E	Shoal	
m	01° 59.'3 N 102° 12.'4 E	Wreck	

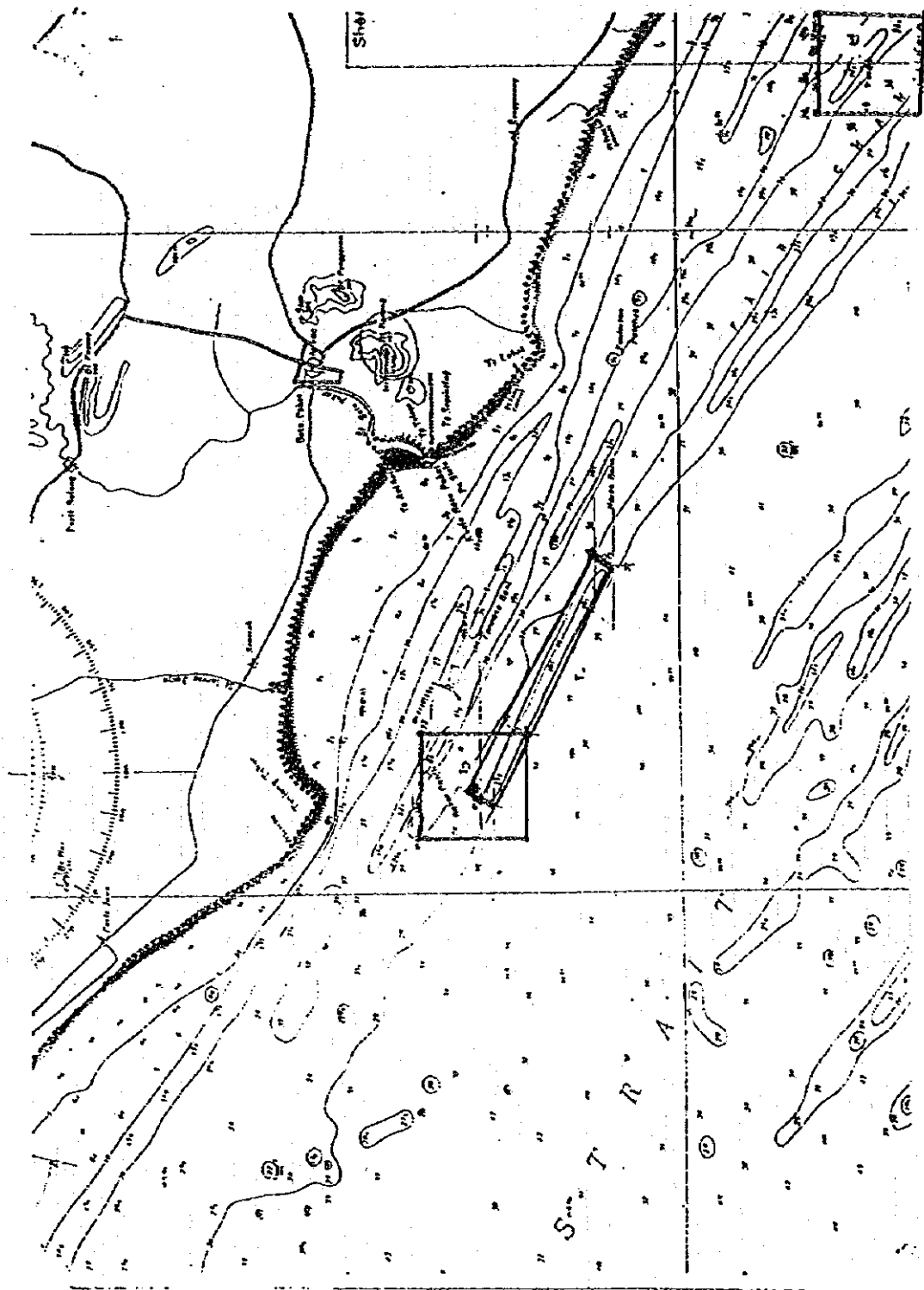
MAP OF STUDY AREAS/POINTS

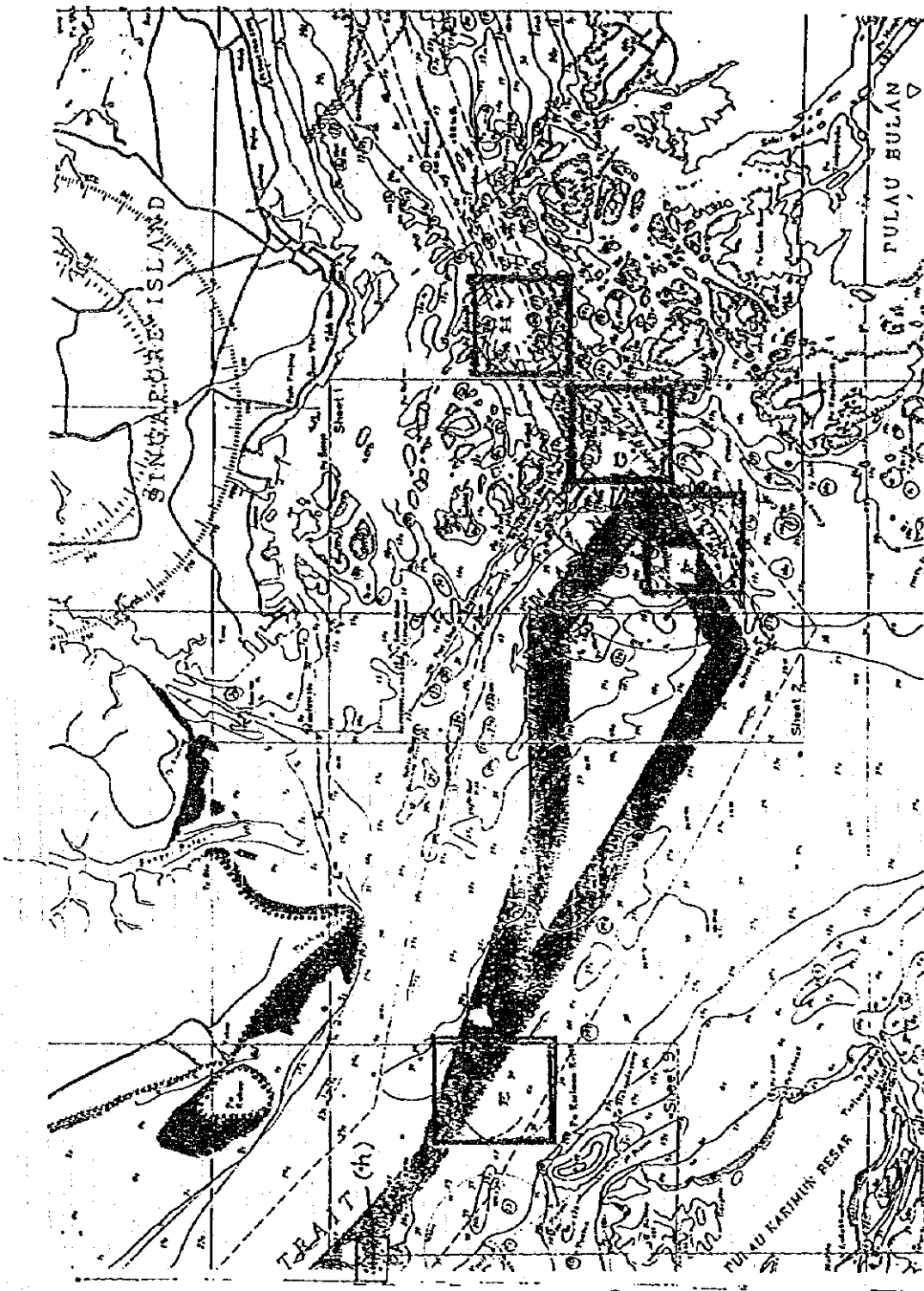


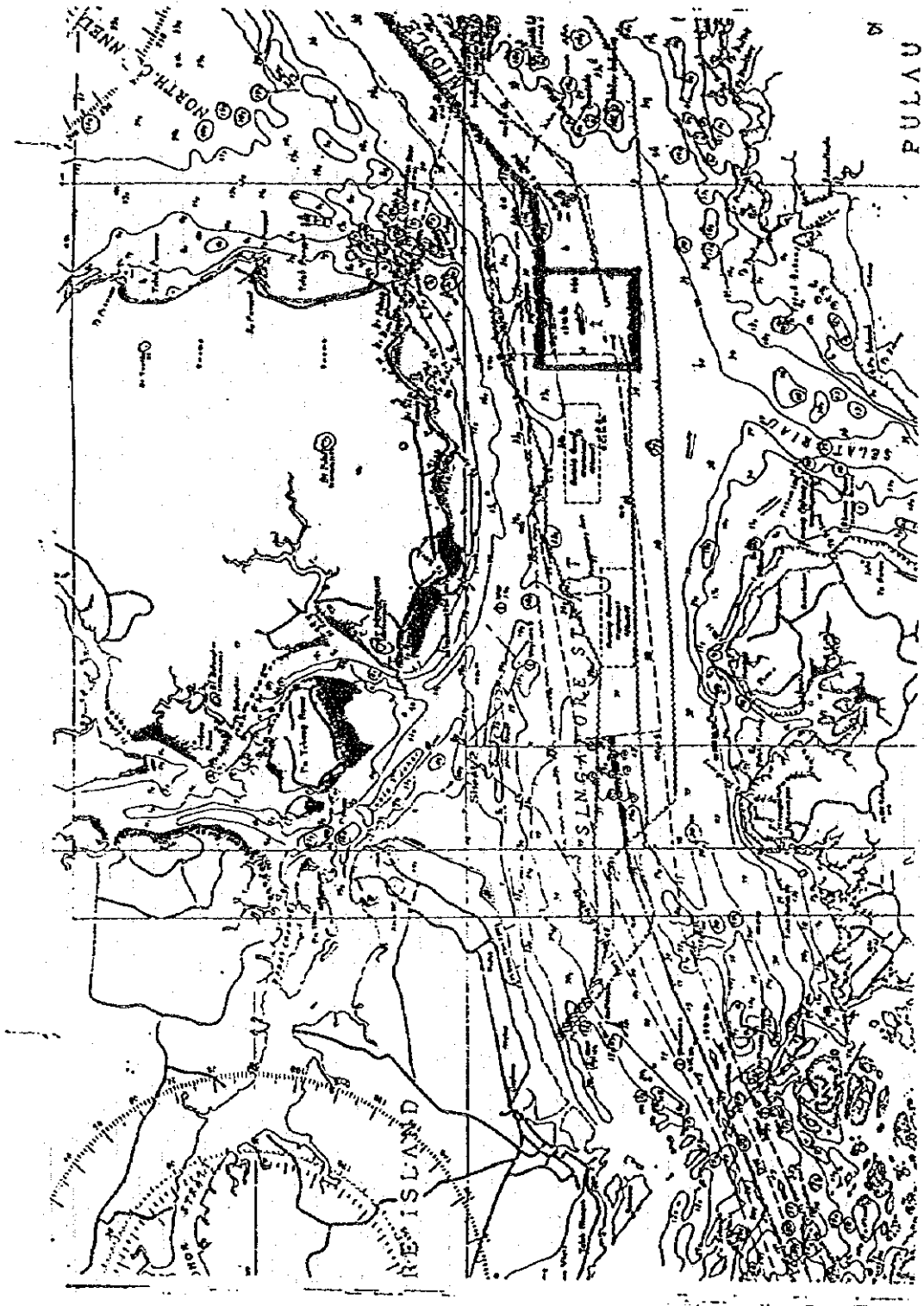
11-1

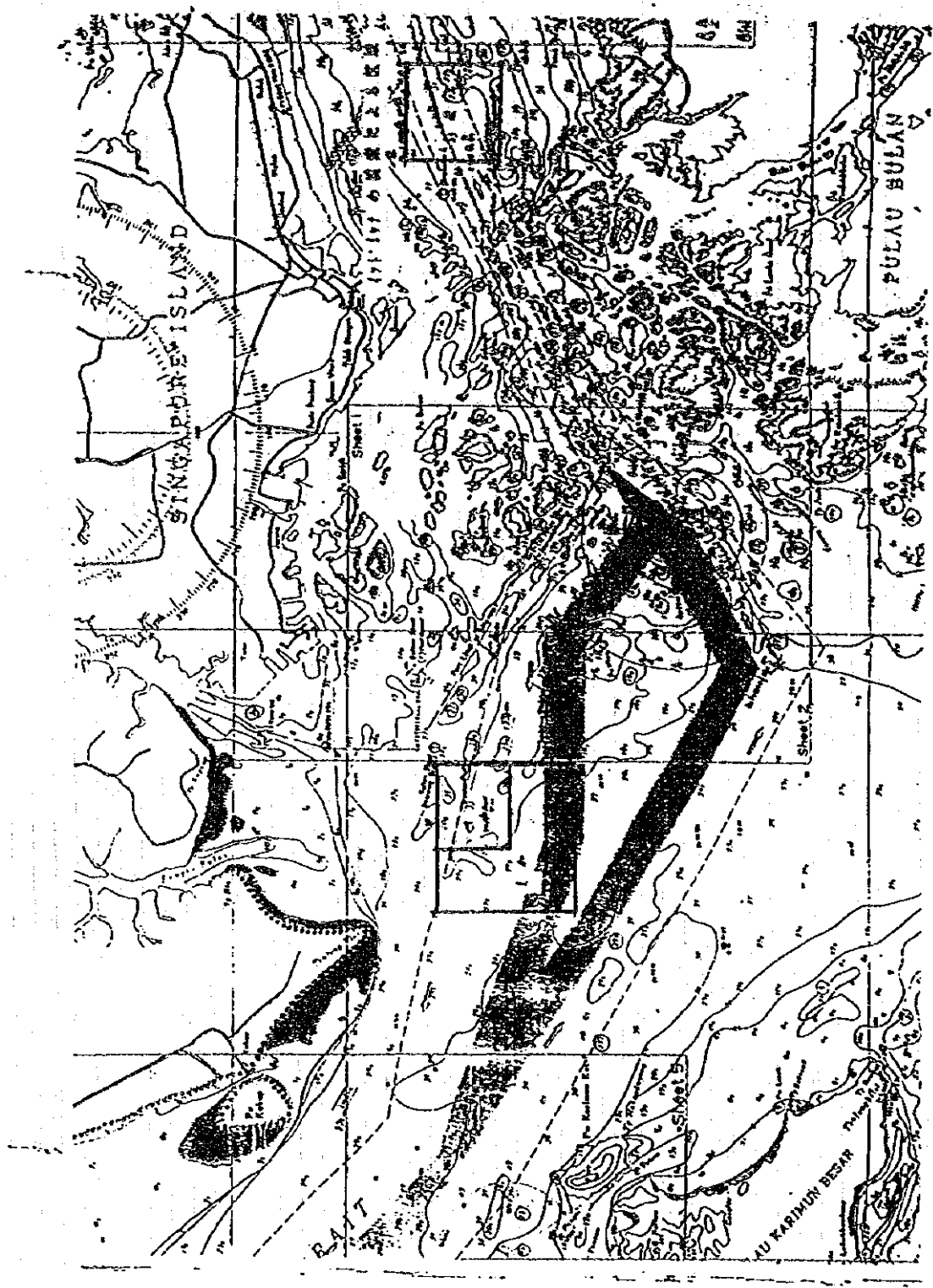




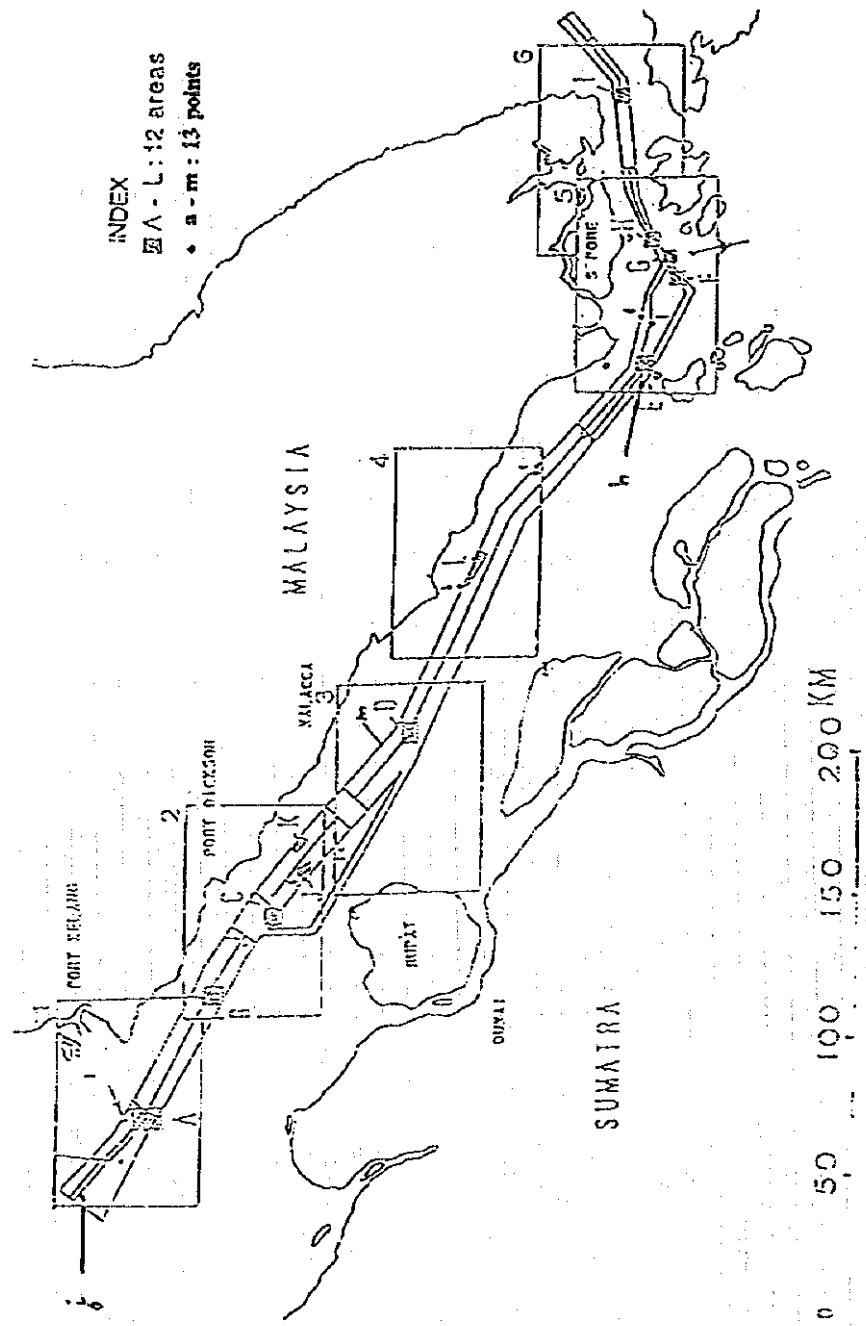








GROUP AREAS OF STUDY



TECHNICAL DETAILS

1. HYDROGRAPHIC SURVEY STANDARDS

The International Hydrographic Organization (IHO) Standards for Hydrographic Surveys : the Forth Edition of SP-44 shall be applied to the hydrographic surveying to be carried out under the Study. The minimum standard for the Study shall be of Second Order to the IHO Specification SP-44.

2. COORDINATES AND DATUM LEVEL

The reference coordinates and ellipsoid, projection and chart datum level to be used for the Study will be as follows :

- 2.1 Reference coordinates and ellipsoid : WGS - 84 DATUM
- 2.2 Projection : Transverse Mercator (TM) Projection
- 2.3 Origin of coordinates : Center of each survey area
- 2.4 Chart Datum Level : Lowest Astronomical Tide (LAT)

3. HORIZONTAL CONTROL POINT SURVEY

3.1 Survey Method

Based on the existing horizontal control points available for the Study, new horizontal points necessary for sounding operations shall be determined by a static method using Differential Global Positioning System (DGPS).

3.2 Control Points

New horizontal control points to be established for reference stations of DGPS at Bukit Jugra Lighthouse, Cape Rachado Lighthouse, One Fathom Bank Lighthouse and at other locations as necessary.

4. SOUNDING AND SEARCH

4.1 Survey Method

The sounding and search operations will be carried out by using precise four-beam echo sounder and a high definition side scan sonar. The standard interval between sounding lines is 200 meters. For detailed identification of shoals and wrecks, sounding lines will be intensified to ensure full ensonification of the features.

Digital data of the hydrographic survey will also be acquired.

4.2 Correction of Sounding Data

The correction of sounding data will be made for the sound velocity in sea water by a bar-check method or sound speed correction table and for the tidal reduction by tidal heights observed.

4.3 Positioning System

The position of survey launch will be determined by a Real-Time Differential/Kinematic Global Positioning System.

5. TIDAL OBSERVATION

In order to determine the chart datum level and make the tidal reduction to sounding data of the study areas, temporary tide stations using digital type tide gauges and/or tide poles will be set at the following locations :-

- | | | | |
|-----|----------------------|---|---------------------------------|
| 5.1 | One Fathom Bank | - | Area A, Points (j), (k) and (l) |
| 5.2 | Tanjung Gabang | - | Area B |
| 5.3 | Port Dickson | - | Area C and Point (f) |
| 5.4 | Cape Rachado | - | Areas J, K and Point (g) |
| 5.5 | Beting Medang Lt. Bn | - | Point (a) |
| 5.6 | Pulau Undan | - | Area D and Point (m) |

- 5.7 Tanjung Segenting - Area L, Points (b) and (c)
- 5.8 Pulau Kukup - Area E, Points (d), (h) and (i)
- 5.9 Raffles Island - Areas F, G, H and Point (e)
- 5.10 Tanjung Ayam - Area I

The relation between a temporary tide station and/or a tide pole and new bench marks will be determined by direct levelling using the nearest existing bench marks.

For determination of Chart Datum (D.L) in each survey area, tidal harmonic constants and other results obtained during the tidal study carried out jointly by Japan and three coastal countries in Malacca and Singapore Straits from 1977 to 1979 will be used. The sum of four main tidal components in tidal harmonic constants is Z_o . Therefore, $D.L = \text{Mean Sea Level} - Z_o$. The time difference for tide and height ratio in each survey area will also be calculated from the above results.

The long-term mean sea level of a temporary tide station will also be obtained by comparing its short-term mean sea level with the mean sea level of the same period at the standard tidal station.

6. BOTTOM SAMPLING

The bottom sampling using a hand-lead and/or a tube dredge will be carried out at about 300 metres interval only near the shoals and patches in each sounding area for discrimination of its bottom characteristic.

7. DATA PROCESSING

7.1 Preliminary Data Processing

Initial data processing shall be carried out in the field by the following procedures :

- i) To store the positioning and sounding data with time/date in floppy disks magnetic tape on the survey launch.
- ii) To develop preliminary track charts to confirm the coverage of the survey areas by a computer and a plotter on the survey vessel (mother vessel).

- iii) to interpret side scan sonar records to search and confirm shoals and wrecks.
- iv) To develop preliminary sounding charts to confirm the shapes and positions of shoals and wrecks by a computer and a plotter on the survey vessel.
- v) To choose detailed survey area to confirm the precise position and the shallowest depth on the survey vessel.

7.2 Final Data Processing

The final data processing such as the sound velocity correction and tidal reduction for sounding data will be carried out in Japan.

After that, final track charts and sounding charts will be developed by a computer and a flat-bed plotter.

Finally, smooth sheet for each survey area will be prepared on plastic film.

Digital data equivalent to smooth sheets will also be prepared.

8. FINAL RESULTS

Main final survey results of the Study as a part of the Final Report will be as follows :

8.1 Control Point Survey

- i) List of Control Points
- ii) Description of Control Points
- iii) Location Map of Control Points

8.2 Sounding and Search

- i) Echograms
- ii) Records of Side Scan Sonar
- iii) Positioning Data of Survey Launch
- iv) Track Charts (Scale 1:20,000)
- v) Sounding Charts (Scale 1:20,000)

8.3 Tidal Observation

- i) Records of Tidal Observation
- ii) Tidal Diagrams

8.4 Smooth Sheets

- i) Smooth Sheets (Scale 1:20,000)

8.5 Digital Data

- i) Floppy Disk of Digital Data

STUDY SCHEDULE

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Work Preparation in Japan																									
Working in Field																									
Data Processing																									
Final Report																									

ANNEX E

REVISION TO SURVEY AREAS AND POINTS

1. New Survey points to be included :

- (1) $02^{\circ} 58'.2$ N $100^{\circ} 49'.5$ E (WK PA)
- (2) $01^{\circ} 15'.8$ N $103^{\circ} 19'.8$ E (WK PA)
- (3) $01^{\circ} 59'.3$ N $102^{\circ} 12'.4$ E (WK PA)

2. To remove the following survey points :

- (1) Point (h) $01^{\circ} 54'.2$ N $102^{\circ} 04'.8$ E
- (2) Point (j) $01^{\circ} 07'.6$ N $103^{\circ} 45'.4$ E

3. To correct the following survey point coordinates :-

- (1) Point (b) to read $01^{\circ} 46'.4$ N $102^{\circ} \underline{43'.3}$ E
- (2) Point (c) to read $01^{\circ} \underline{34'.0}$ N $103^{\circ} 05'.0$ E

4. To expand survey area (A) as follows :

- (a) $02^{\circ} 51'.4$ N $100^{\circ} 57'.2$ E
- (b) $02^{\circ} 48'.3$ N $101^{\circ} 03'.4$ E
- (c) $02^{\circ} 45'.0$ N $101^{\circ} 03'.4$ E
- (d) $02^{\circ} 45'.0$ N $101^{\circ} 01'.3$ E
- (e) $02^{\circ} 48'.9$ N $100^{\circ} 54'.1$ E

ANNEX F

PROPOSED IMPLEMENTATION SCHEDULE OF THE REVISED ROUTING SYSTEM
IN THE STRAITS OF MALACCA AND SINGAPORE

	1995			1996												1997						
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	
1 Meeting of Review Group Routing System																						
2 Straits of Malacca and Singapore Survey Resurvey Project Study																						
3 20th Meeting of TTEG (Tentative)																						
4 Straits of Malacca and Singapore Resurvey (Tentative)																						
5 Submission of Financial Implication of Revised Routing System to IMO																						
6 Financial Implication of Revised Routing System considered at MSC 63																						
7 Straits of Malacca and Singapore Resurvey Project Status Information To NAV 42																						
8 Dataline of Submission of Revised Routing System To IMO																						
9 Revised Routing System Considered at NAV 43																						
10 Adoption of Revised Routing System at MSC 66																						
11 Installation and Upgrading of Aids to Navigation																						
12 Promulgation of Adopted Routing System																						
13 Charting of Adopted Routing System																						
14 New Routing System Comes Into Force																						

	1997			1998																		
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec				
1 Meeting of Review Group of TSS																						
2 Straits of Malacca and Singapore Survey Resurvey Project Study Tour																						
3 20th Meeting of TTEG (Tentative)																						
4 Straits of Malacca and Singapore Resurvey (Tentative)																						
5 Submission of Financial Implication of Revised Routing System to IMO																						
6 Financial Implication of Revised Routing System considered at MSC 63																						
7 Straits of Malacca and Singapore Resurvey Project Status Information To NAV 42																						
8 Dataline of Submission of Revised Routing System To IMO																						
9 Revised Routing System Considered at NAV 43																						
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11 Installation and Upgrading of Aids to Navigation																						
12 Promulgation of Adopted Routing System																						
13 Charting of Adopted Routing System																						
14 New Routing System Comes Into Force																						

