

**GOVERNMENT OF MALAYSIA**

**THE RECLAMATION PROJECT OF EX-MINING LAND  
FOR  
HOUSING DEVELOPMENT AND OTHER PURPOSES**

**FEASIBILITY STUDY REPORT**

**Volume 2  
APPENDICES**

**OCTOBER, 1981**

**JAPAN INTERNATIONAL COOPERATION AGENCY**

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**Volume 2  
APPENDICES**

**OCTOBER, 1981**

**JAPAN INTERNATIONAL COOPERATION AGENCY**

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## LIST OF APPENDIX

<u>APPENDIX</u>	<u>Page</u>
A. Terms of Reference .....	A-1 ~ A-4
B. Scope of Work .....	B-1 ~ B-8
C. Inception Reports .....	C-1 ~ C-31
C.1 Inception Report, Phase I .....	C-1
C.2 Inception Report, Phase II .....	C-15
D. Minutes of Steering Committee Meetings ....	D-1 ~ D-28
D.1 1st Meeting (10th December, 1979) .....	D-1
D.2 2nd Meeting (25th March, 1980) .....	D-5
D.3 3rd Meeting (19th August, 1980) .....	D-13
D.4 4th Meeting (26th March, 1981) .....	D-21
E. Results of Field Ground Investigations ....	E-1 ~ E-157
E.1 Kampong Pandan .....	E-1
E.2 Sentul .....	E-29
E.3 Gombak .....	E-119
E.4 Setapak .....	E-129
E.5 Castlefield .....	E-143
F. Results of Laboratory Tests .....	F-1 ~ F-162
F.1 Kampong Pandan .....	F-1
F.2 Sentul .....	F-5
F.3 Setapak .....	F-119
F.4 Castlefield .....	F-143

APPENDIX

Page

G.	Detailed Description of Ground Improvement Methods .....	G-1 ~ G-38
G.1	Preloading .....	G-1
G.2	Preloading with Vertical Drain .....	G-7
G.3	Dewatering by Pumping .....	G-12
G.4	Mechanical Compaction .....	G-17
G.5	Chemical Stabilization .....	G-31
G.6	Excavation and Replacement .....	G-35
H.	Detailed Data for Cost Study .....	H-1 ~ H-31
H.1	Unit Cost of Ground Improvement for Soft Material .....	H-2
H.2	Unit Cost of Foundation + Soft Ground Improvement .....	H-12
I.	Detailed Output of Financial and Economic Study .....	I-1 ~ I-16



**APPENDIX A**

**TERMS OF REFERENCE**

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# TERMS OF REFERENCE

## TERMS OF REFERENCE

Feasibility studies on the use of Ex-Mining  
Land for Housing Development and other purposes

### 1. Introduction

1.1. As a result of extraction of tin from the soil, most of the ex-mining lands in Malaysia are worked to a depth depending upon :-

- (a) type of mining equipment and construction method employed;
- (b) the presence, depth and profile of bed rock encountered; Bed rocks are generally lime stone and mining operation is carried out around the lime stone pinnacle and cavities in order to extract tin deposits.

1.2. After the mining operation is over typical feature of the ex-mining land is in the numerous mining pond scattered around big area of sandy, silty or clayey ground. The breakdown of soil matrix, lowering of density and appreciable reduction in the proportion of fines in the soil content results in a significant change in the hydraulic and mechanical properties of the original soil and affects engineering design criteria such as among other things the bearing capacity, surface and subsoil drainage, stability and settlement characteristics of the soil. Further there is insufficient research data available in inter-relating the mined soil with various general soil classifications and in relation to indexing of engineering properties including identification of use.

### 2. OBJECTIVES

2.1. It is the objective to undertake a comprehensive integrated study and survey of ex-mining land in the country to:-

- (a) identify areas of potential economic viability for housing and industrial development
- (b) to determine the methodology for identification and mode of resolution of technical problems in arriving at objective (a).
- (c) To establish a data bank of literature pertaining to current research and design/construction techniques in relation to objective (b) and incorporating findings, design guides and recommendations based on the study.

2.2. In arriving at objectives 2.1, particular emphasis should be given to low cost technology especially in relation to housing without compromising on safety and life of the structural or infrastructural works. Low cost technology should include low initial construction cost and low maintenance cost and subject to the prevailing codes of practice, building by laws and other regulatory measures.

### 3. GUIDELINES

3.1. The study should identify and categorise engineering problems in massive reclamation process and to evolve solutions to these problems with particular reference to :-

- (a) "Conversion of slime, tin tailing and other silt deposit into useful and economic building materials or materials for other purposes".
- (b) Displacement or reconstitution of the potentially unstable or unsuitable silt deposit or tin tailings left at the bottom of the mining pools.
- (c) The use of locally available materials as backfill and the methods and procedure for carrying out the backfilling operation.
- (d) Long term stability and settlement of deepfill and the necessary time lapse between backfilling and construction.

3.2. The study should suggest types of buildings together with the foundation and construction methods, such as low rise (one to two storey), medium rise (three to five storey), or high rise (above 5 storey) structures. It should identify, investigate and provide viable engineering solutions on problems envisaged to be encountered in dealing with various aspects pertaining to housing estate development including :-

- (a) on site and off site drainage.
- (b) foundations of structures including footing, pile and raft foundations. Co-relation of subsoil exploration with identification of suitable foundation type.
- (c) stability of earth works especially in fillings, cuttings, excavations and possible effects on slopes and embankments

- (d) settlement both short term and long term including sudden subterranean cave-in.
- (e) erosion and remedial measures to contain erosion.
- (f) infrastructure design and construction particularly in relation to roads including cost comparison of various alternative techniques.
- (g) methods and system of construction pertaining to soil stabilization and use as raw material the soil in ex-mining areas.

3.3. The study should provide cost/benefit alternatives for the usage of ex-mining land viz-a-viz the reclamation works to be undertaken.

3.4. The study should propose measures to be adopted in the mining operation with the view of alleviating the problems of reclamation of ex-mining land for housing and industrial development.

3.5. Any other aspects deemed relevant to the objectives mentioned hither to.

#### 4. STUDY APPROACH AND SCOPE OF WORK

4.1. The study team shall prepare their own work plan/schedule, members of the study team and their inputs and submit the same to Ministry of Housing and Local Government for approval. The team could further make recommendations in their work plan on aspects not dealt with here to achieve the objectives of this study.

4.2. Feasibility engineering study studies shall primarily deal in detail with the following areas:-

- (a) ex-mining state land around Kampung Pandan, Kuala Lumpur as shown in appendix A.
- (b) ex-mining land in proposed township of Sontul, Kuala Lumpur as shown in appendix B.

4.3. Appendix A and B also indicate the acreage of the study area and the depth of mining. Appendix C provides plans of typical houses envisaged for construction in ex-mining land.

4.4. The study team is also expected to visit ex-mining land in other parts of the country to conduct preliminary exploratory survey to co-relate and establish relevance of their findings in study area under 4.2 with conditions prevailing in ex-mining land elsewhere in the country. Areas for preliminary exploratory will be discussed and decided during the submission and prior to the approval of the work plan.

5. OBIGATIONS OF GOVERNMENT AGENCIES

5.1. Government agencies shall provide the study team as far as possible upon request all available information, data etc related directly to the work of the study team under those terms of reference.

6. MANAGEMENT OF THE STUDY

6.1. A steering committee will be formed under the auspices of the Ministry of Housing and Local Government for the overall management of the study. The study team is expected to submit from time to time a progress report to the Ministry of Housing and Local Government. The local staff attached to the study team, either as counterpart staff or for training, will assist the study team in arranging for access to available data and in other respects.

Ministry of Housing and Local  
Government,  
45, Jalan Dungan,  
Bangsar Heights,  
Kuala Lumpur

th October, 1978.

R/AL/s

**APPENDIX B**

**SCOPE OF WORK**

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**SCOPE OF WORK**  
**ON**  
**THE RECLAMATION PROJECT OF EX-MINING LAND FOR**  
**HOUSING DEVELOPMENT AND OTHER PURPOSES**  
**IN**  
**MALAYSIA**

**MARCH, 1979**

**JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)**

## I. INTRODUCTION

In response to a request of the Government of Malaysia, the Government of Japan has decided to conduct a Feasibility Study on the Reclamation Project of Ex-Mining Land for Housing Development and other purposes in accordance with laws and regulations in force in Japan, and the Japan International Cooperation Agency (hereinafter referred to as JICA), the official agency responsible for the implementation of technical cooperation programs of the Government of Japan, will carry out the study in close cooperation with the Government of Malaysia and the authorities concerned.

## II. OBJECTIVE OF THE STUDY

The objective of the study is to conduct the Feasibility Study on the Reclamation Project of Ex-Mining Land for Housing Development and other purposes, with special emphasis on cost saving technology without compromising on safety and life of the structural or infrastructural works. Low cost technology should include low initial construction cost and low maintenance cost and subject to the prevailing codes of practices, building by laws and other regulatory measures.

## III. SCOPE OF THE STUDY

### 3-1) Study Area

The study will cover the following areas:-

- a) Ex-mining state land around Kampong Pardau, Kuala Lumpur
- b) Ex-mining land in proposed township of Sentul, Kuala Lumpur.

### 3-2) Study Items

The study will cover the following items:-

- (1) Reconnaissance survey and data collection
  - a) Conduct a reconnaissance survey of ex-mining land in the study areas and other relevant areas in Kuala Lumpur.
  - b) Data collection and interview with Malaysian Government departments, local authorities and relevant agencies concerned, on matter relating to the present state of land-use planning, housing development planning, socio-economic conditions, etc.
- (2) Soil investigation on the study areas in order to identify engineering properties of soil in ex-mining land such as bearing capacity, surface and subsoil drainage, stability and settlement characteristics.
- (3) Engineering study for massive reclamation process
  - a) Displacement or reconstruction of unstable silt deposit and tin tailings
  - b) Possibility of conversion of slime, tin tailing and other silt deposit into useful and economic materials as backfill
  - c) Site selection of gathering materials as backfill
  - d) Method and procedure for carrying out the backfill operation, including the use of chemical stabilization by using locally available material such as lime, cement etc to improve the bearing capacity of the soil.

e) Long term stability and settlement of deepfill and the estimation of necessary time lapes between backfill and construction.

(4) Engineering study for the foundation and construction methods considering types of building such as low rise (one to two story), medium rise (three to five story), high rise (above five story).

- a) Recommendation on the methods and equipments to determine the more exact profile of bed-rock formation and selection of foundation types including footing, pile and raft foundation, etc.
- b) Stability of earth works such as fillings, cuttings, excavation and possible effects on roadworks, slopes and embankments.
- c) Settlement both short term and long term including sudden subterranean cave-in.
- d) Erosion and remedial measures to contain erosion.
- e) On site and off site drainage.
- f) Method and system of construction pertaining to soil stabilization and use as raw material the soil in ex-mining areas.
- g) Cost estimation of foundation and reclamation works.
- h) Implementation program of reclamation project.

(5) Economic and financial study

- a) Cost/Benefit analysis for the reclamation works of ex-mining lands considering alternatives.
- b) Financial Evaluation such as cash flow, tariff rate of housing, staging plan of investment cost, etc.

IV. REPORTS

JICA will prepare and submit the following reports in English to the Government of Malaysia in the course of the Feasibility Study respectively.

(1) Inception Report (30 copies)

At the commencement of 1st stage field survey

(2) Progress Report (30 copies)

Within 2 months after the end of 1st stage field survey

(3) Interim Report (30 copies)

Within 5 months after the end of 1st stage field survey

Submission of comments made by the Malaysian Government within 1 month after submission of this Report

(4) Draft Final Report (30 copies)

Within 2 months after the 2nd stage field survey

(5) Final Report (50 copies)

Within 2 months after receipt of the Malaysian Government's comments on the Draft Final Report

V. CONTRIBUTION OF THE GOVERNMENT OF MALAYSIA

- (1) To provide the study team with relevant data, informations and materials necessary for the execution of the study and such survey connected with it.

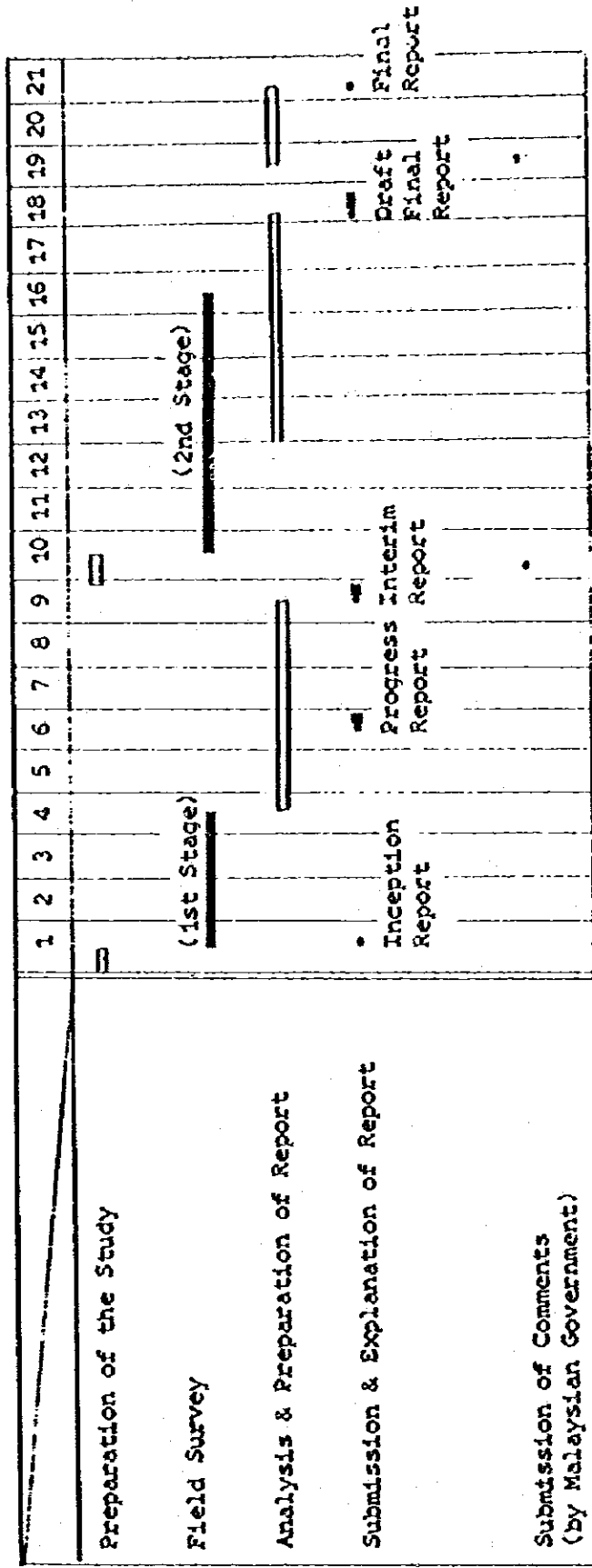
- (2) To exempt the study team from taxes and duties normally extended to Colombo Plan Experts for materials, equipment and personal effects brought into Malaysia for the purpose of the study.
- (3) To provide the study team with suitable office space, necessary office equipment and clerical service for the study.
- (4) To make arrangement for the study team to hire vehicles with drivers during the study period.
- (5) To assign the counterpart personnel to the study team during the study period.
- (6) To approve necessary field survey work upon request of the team.
- (7) To make necessary arrangements for the study team to bring out data and materials concerning the study to Japan subject to approval by the Government of Malaysia.
- (8) To make arrangement for the study team to obtain the permission for entry to land (Government/private) for the purpose of the study.
- (9) To exempt the study team members from income taxes and charges of any kind normally imposed on or connected with the living expenses remitted from abroad.

VI. CONTRIBUTION OF THE GOVERNMENT OF JAPAN

- (1) To provide a study team in relevant fields to undertake Feasibility study of the above project.

- (2) To bear necessary expenses for the execution of the study excluding expenses for the items mentioned in "V. CONTRIBUTION OF THE GOVERNMENT OF MALAYSIA".
- (3) To transfer the knowledge and technology of the project to the Malaysian personnels during the study period.

VII. TENTATIVE SCHEDULE



Work in Malaysia      Work in Japan



**APPENDIX C**

**INCEPTION REPORTS**

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**INCEPTION REPORT**  
**ON**  
**FEASIBILITY STUDY**  
**FOR**  
**THE RECLAMATION PROJECT OF EX-MINING LAND**  
**FOR**  
**HOUSING DEVELOPMENT AND OTHER PURPOSES**

**December, 1979**

**JAPAN INTERNATIONAL COOPERATION AGENCY**

FOREWORD

This report presents the proposed contents of the feasibility study for the reclamation project of ex-mining land for housing development and other purposes.

The phase 1 study will be carried out on the basis of this report and is scheduled to finish by March, 1980.

The contents of this Inception Report were approved by the JICA Supervisory Committee for this project.

December, 1979



Kakuichiro Adachi

Leader of the Japanese Study Team  
for the Reclamation Project of Ex-  
Mining Land for Housing Development  
and Other Purposes

TABLE OF CONTENTS

- 1 GENERAL DESCRIPTION
  - 2 PURPOSE OF STUDY
  - 3 CONTENTS OF STUDY
    - 3-1 SUBSURFACE GROUND INVESTIGATION
    - 3-2 SURVEY OF LOCAL PRACTICE OF FOUNDATION DESIGN
- 
- APPENDIX 1. WORK SCHEDULE
  2. ORGANIZATION CHART
  3. SCOPE OF WORK

## INCEPTION REPORT

### 1. GENERAL DESCRIPTION

The Government of Malaysia intends to construct large quantity of low cost houses in the suburbs of Kuala Lumpur in order to overcome the shortage of the houses at Kuala Lumpur. However, the areas with relatively good ground conditions have already been developed, and the ex-mining lands in the suburbs of Kuala Lumpur have to be used for the proposed housing developments. The ground condition of the ex-mining lands is generally poor and complex, and many foundation engineering problems are expected for the housing development at the ex-mining lands. Due to the problems expected at the sites, the progress of the construction of houses is behind schedule.

With the above background, the Government of Malaysia made a request to the Government of Japan to conduct a feasibility study for the use of ex-mining lands for the housing development and other purposes.

In response to the request of the Government of Malaysia, the preliminary survey mission visited Kuala Lumpur in March, 1979. Based on the advice given by the mission, it has been decided to perform the feasibility study for the reclamation project of ex-mining land for housing development and other purposes. Among many ex-mining lands in the suburbs of Kuala Lumpur, two typical sites have been selected for the study, i.e. Kampony Pandan and Sentul. The locations of the sites are shown in Fig. 1.

Sites for Housing Development

PETA PANDU  
KUALA LUMPUR

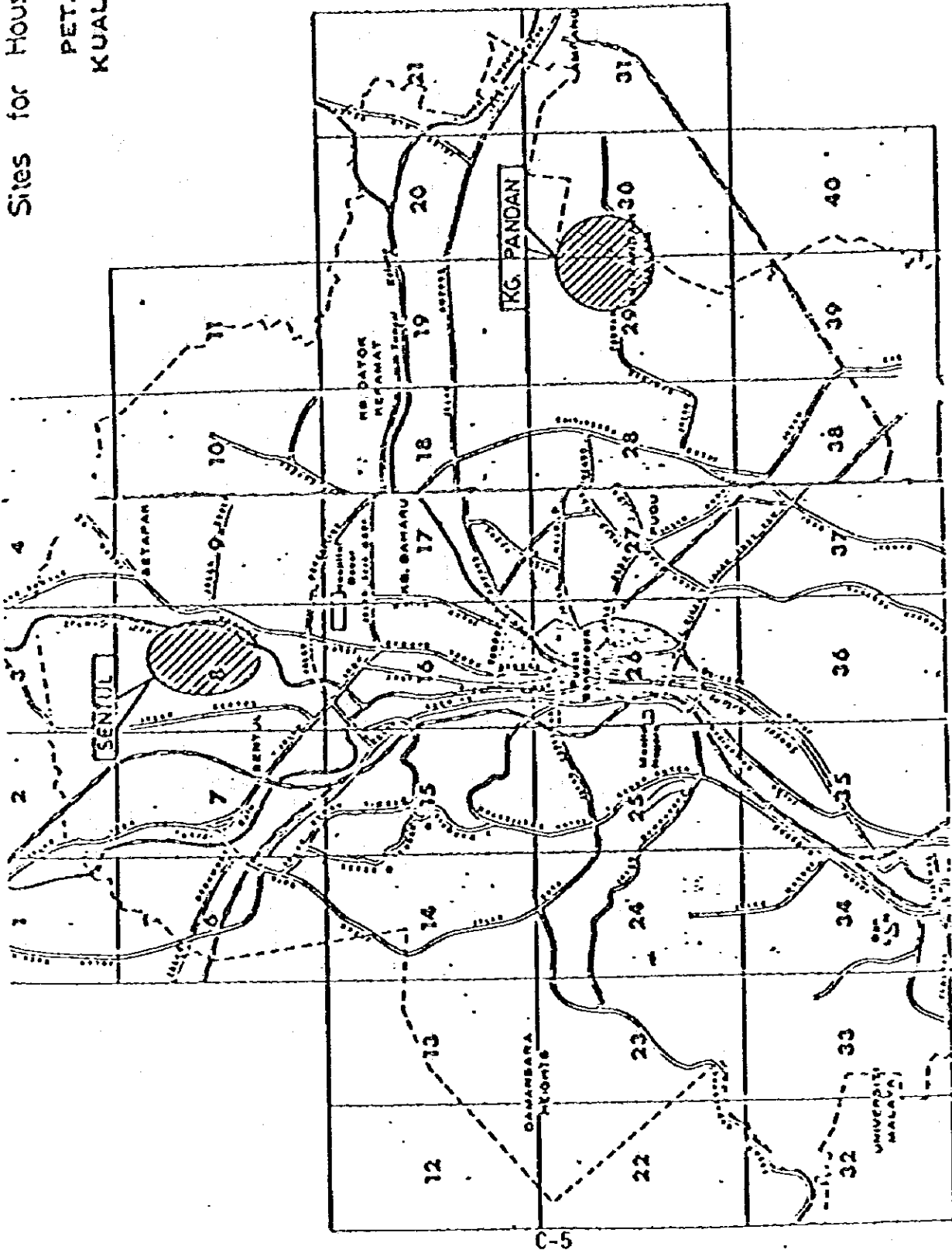


Fig 1. Guide Map of the Sites

Subsurface ground at the ex-mining land consists of thick, soft materials overlying limestone. The soft materials consist of clay and sand which were by-products of the tin mining operations. Properties of the soft materials are considered to be quite variable in both horizontal and vertical directions. The depth to the limestone is also expected to be changeable from location to location. Furthermore, it is also possible that there are caves in the body of the limestone. A sketch of the possible ground condition at the site is shown in Fig. 2 below.

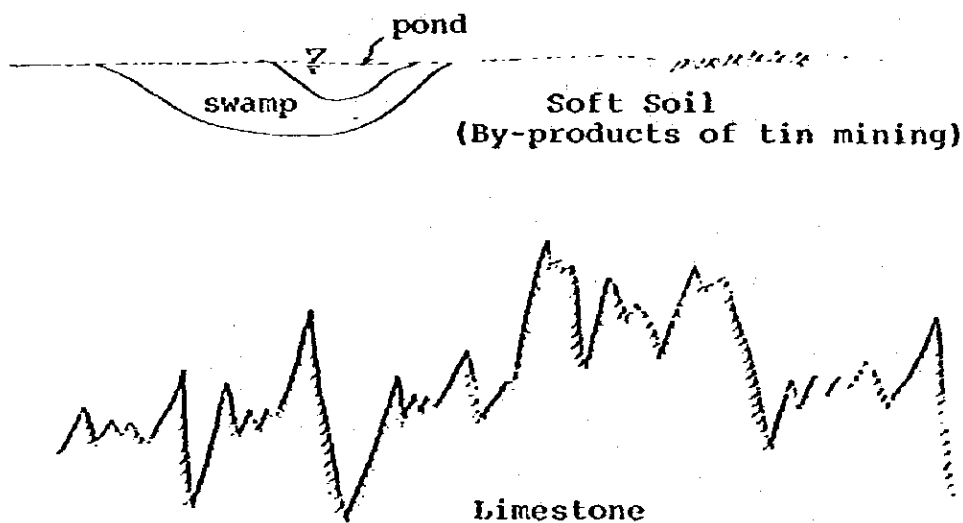


Fig. 2. A sketch of the possible ground condition at the site



## 2. PURPOSE OF STUDY

This feasibility study will be divided into two phases. The first phase of the study will be performed between December, 1979 and March, 1980, and the second phase will be conducted in 1980 to early 1981.

The primary purposes of the first phase are as follows:

- (1) To study the effectiveness of available field investigation methods such as geophysical survey, drillings, soundings and in-situ tests (At Pilot Test Area),
- (2) To obtain subsurface ground condition of the site for the study of the foundation problems (At Kampong Pandan and Sentul),
- (3) To survey the condition of the existing buildings and to study local construction practice in Malaysia, and
- (4) To establish the detailed study plan for the second phase.
- (5) To transfer the technology to the Government of Malaysia.

The primary purposes of the second phase are; to study ground improvement methods for the soft materials, and to study and recommend proper foundations for the proposed housings. However, final contents of the second phase will be discussed and fixed after the first phase study.

### 3. CONTENTS OF STUDY

Contents of the study programmed in the first phase are presented here. The study includes subsurface ground investigation and survey of the local practice of foundation design and construction. The results of the study will be reported to the Government of Malaysia as an interim report at the end of March, 1980.

#### 3-1 SUBSURFACE GROUND INVESTIGATION

Ground investigations will be carried out at 2 sites in Kuala Lumpur, i.e. ex-mining state land around Kampong Pandan and ex-mining land in proposed township of Sentul. Area of Kampong Pandan and Sentul are 134 acres and 243 acres, respectively. Prior to the ground investigation at both sites, a pilot ground investigation will be carried out in an area of 100m x 100m at Sentul.

##### A: Pilot Ground Investigation

In order to study the effectiveness of available ground investigation methods and also to study correlation of physical and mechanical properties of the sub-soils, the following ground investigation will be carried out at Pilot Test area in Sentul.

##### a) Geophysical Survey

\* Measurement of Electrical Resistivity of the Ground

- For obtaining the depth to the basic formation.

(to be performed at the grid points of

20m x 20m mesh)

\* Measurement of Micro-Gravity

- For obtaining the depth to the basic formation and checking the existence of caves in the basic formation. (at the grids of 10m x 10m mesh.)

b) Drilling and Sampling etc.

\* Drilling

- Drillings at 6 locations will be performed by percussive or rotary type drilling machines. Drillings will be terminated after the confirmation of 5m thickness of basic formation.

\* Standard Penetration Test

- Standard Penetration Tests will be carried out at 1m interval at 2 drilling holes to obtain relative density/consistency of the ground encountered.

\* Undisturbed Sampling

- Undisturbed Samples will be taken by either stationary piston samplers or Denison type samplers at 2 drilling holes. The sampling will be performed basically at 1m interval.

\* Pressuremeter Test

- In order to obtain the deformation and strength characteristics of the basic formation, pressuremeter tests will be performed at 1m interval at 2 drilling holes.

\* In-situ Vane Test

- In-situ vane test will be performed in the soft soils to obtain undrained shear strength.
- The tests will be performed at 1m interval at 2 drilling holes.

\* Rock Coring

- Rock coring will be performed in the basic formation at 2 drilling holes.

\* 10ton Dutch Cone --- at 2 locations

\* Dynamic Penetration Test --- at 2 locations

\* Pore Water Pressure Sounding --- at 2 locations

c) Laboratory Soil Test

About 60 undisturbed samples obtained from the site will be subjected to the following laboratory soil tests.

* Physical Properties Tests (Water Content, Specific Gravity, LL, PL, Grading Analysis)	30Nos.
* Consolidation Test	30Nos.
* Triaxial Compression Test (U-U Condition)	30Nos.
* Triaxial Compression Test (C-U Condition)	5Nos.
* Unconfined Compression Test 3Nos. x 30Sets.	90Nos.
* Unconfined Compression Test on Rock Samples	10Nos.
* Chemical Analysis on Soil Samples	5Sets

d) Engineering Study

On the basis of the results of ground investigation at pilot test area, the following engineering study will be performed.

- \* Evaluation on the effectiveness of the available ground investigation methods.
- \* Ground Condition of the site.
- \* Correlation of physical and mechanical properties of the soils.
- \* Correlation of the results of laboratory soil tests and soundings.

**B: Ground Investigation for the Whole Site**

The following ground investigation will be performed to study the subsurface ground condition for the whole site.

**a) Field Investigation**

**a-1) On Land**

**\* Drilling**

- Drillings with standard penetration tests will be performed at 12 locations (1 drilling per 350m x 350m)

**\* 10 ton Dutch Cone Penetration Test**

- Dutch cone penetration tests will be performed at 26 locations (1 test per 350m x 175m)

**a-2) At Pond**

**\* Dynamic Penetration Test**

- Dynamic penetration tests at 5 locations per pond will be performed.

**\* Sampling**

- Deposits at the bottom of the ponds will be taken by special samplers.

b) Laboratory Soil Test

b-1) On Land

A total of 100Nos. physical properties tests will be performed on the disturbed samples obtained from the drillings.

b-2) At Pond

A total of 10Nos. physical properties tests will be performed on the disturbed samples obtained from the ponds.

c) Engineering Study

The following engineering studies will be carried out based on the results of the ground investigation.

- \* Ground Conditions of the Sites
- \* Possibility of using the soft soil as the construction material (e.g. fill material)
- \* Analysis and recommendations on the foundations for the proposed structures.
- \* Recommendation on the contents of additional ground investigation.

3-2 SURVEY OF LOCAL PRACTICE OF FOUNDATION DESIGN

The following survey will be carried out by an experienced structural engineer in order to study the design practice, codes and construction method in Malaysia.

a) For buildings which yielded deformation and cracks

- \* Levelling of the building
- \* Sketch of the existing cracks

b) Design Practice

\* Meeting with Structural Engineers of Malaysia






\* Study on the Design Practice




c) Study on the Current Construction Method in Malaysia

The results of the study will be summarized and compiled in the report together with some comments.

The quantities of the ground investigations which mentioned above may be modified according to the actual ground condition of the site and others.

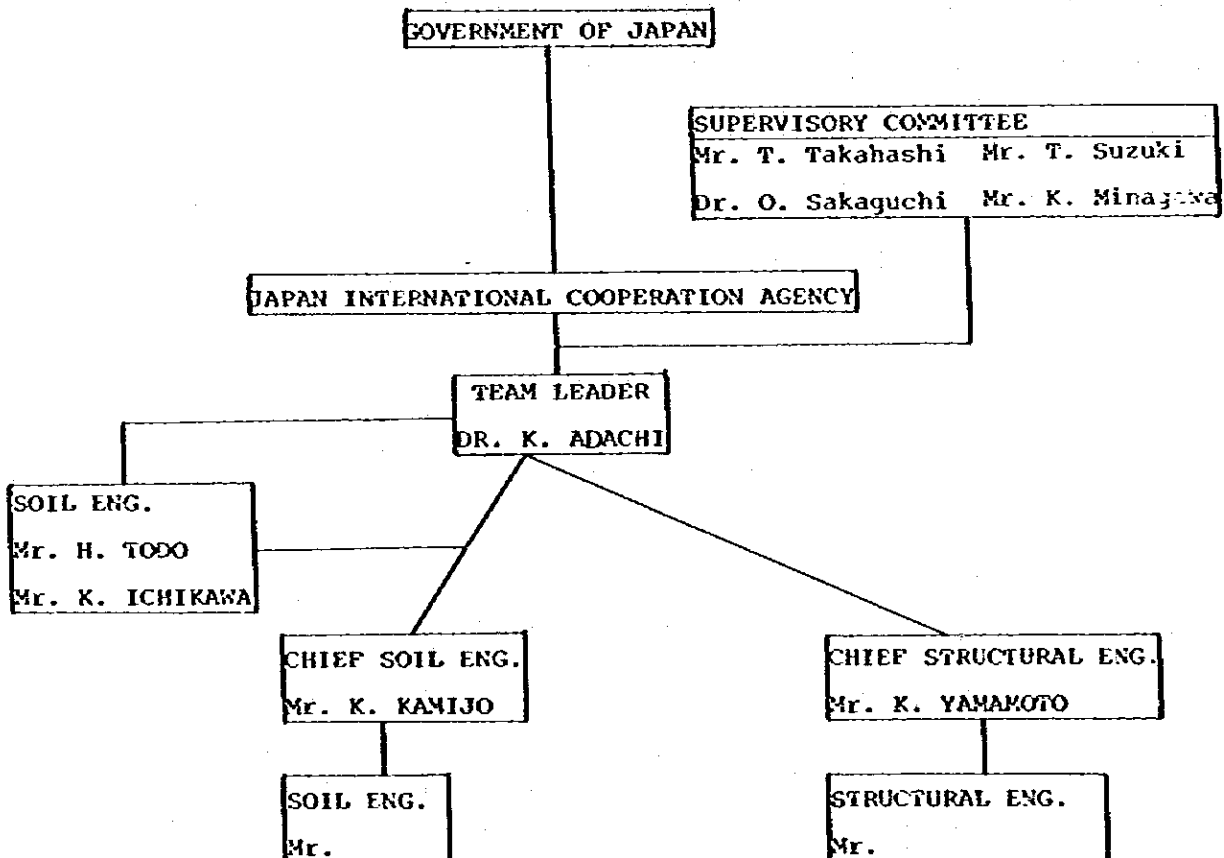
WORK SCHEDULE

ITEM	1979	1980		
	Dec.	Jan.	Feb.	March
Preparation				
Ground Investigation				
Survey of Local Practice of Foundation Design				
Laboratory Soil Test				
Engineering Study and Reports				

 in Japan  
 in Malaysia  
 in Singapore

APPENDIX 2

ORGANIZATION CHART





**INCEPTION REPORT**  
**ON**  
**FEASIBILITY STUDY (Phase II)**  
**FOR**  
**THE RECLAMATION PROJECT OF EX-MINING LAND**  
**FOR**  
**HOUSING DEVELOPMENT AND OTHER PURPOSES**

**August, 1980**

**JAPAN INTERNATIONAL COOPERATION AGENCY**

## Table of Contents

### 1. Introduction

### 2. Proposed Contents of Phase II Study

2-1 Study on Ground Improvement Methods for Soft Material

2-2 Study on the Foundations for the Proposed Housings

2-3 Engineering Study for Massive Reclamation Process and Other Earthworks

2-4 Supplemental Subsurface Ground Investigation and Laboratory Test

2-5 Summarization and Compilation of the Results of Items 2-1 to 2-4

2-6 Preliminary Survey of Other Ex-mining Areas Ex-mining Areas

2-7 Study on Tin Mining Operation

2-8 Economic and Financial Study

### 3. Reports

### 4. Contribution of the Government of Malaysia

Appendix 1 Organization Chart

Appendix 2 Member List

Appendix 3 Work Schedule

Appendix 4 Personal Schedule

## Section 1

### INTRODUCTION

The Government of Malaysia intends to construct large quantity of low cost houses in the suburbs of Kuala Lumpur in order to overcome the shortage of the houses at Kuala Lumpur. However, the areas with relatively good ground conditions have already been developed, and the ex-mining lands in the suburbs of Kuala Lumpur have to be used for the proposed housing developments. The ground condition of the ex-mining lands is generally poor and complex, and many foundation engineering problems are expected for the housing development at the ex-mining lands.

Based on the advice given in the report of the pre-feasibility study (May, 1979), it was decided to perform a feasibility study for the reclamation project of ex-mining land for housing development and other purposes. Among many ex-mining lands in the suburbs of Kuala Lumpur, two typical sites have been selected for the feasibility study, i.e. Kampong Pandan and Sentul.

The feasibility study was divided into two phases. Phase I study was performed between December, 1979 and March, 1980, and Phase II study will be conducted between August, 1980 and March, 1981.

The primary purposes of Phase I study are as follows:

- (1) To study the effectiveness of available field investigation methods such as geophysical survey, drillings, soundings and in-situ tests (at Pilot Test Area),
- (2) To obtain subsurface ground condition of the site for the study of the foundation problems (at Kampong Pandan and Sentul),
- (3) To survey the condition of the existing buildings and to study local construction practice in Malaysia, and
- (4) To establish the detailed study plan for the second phase.
- (5) To transfer the technology to the Government of Malaysia.

The results obtained in Phase I study were compiled into "Interim Report on Feasibility Study for the Reclamation Project of Ex-mining Land for Housing Development and Other Purposes" and submitted to the Government of Malaysia in March, 1980.

After the results of the pre-feasibility study and Phase I study, suggested contents of Phase II study are presented in the report of Phase I study. In the steering committee meeting held on 25th March, 1980, the proposed contents of Phase II study were discussed and were agreed upon in general.

Referring to the comments and suggestions presented at the steering committee meeting and also to remarks given by Japanese Governmental Organizations related to this feasibility study, detailed contents of Phase II study are prepared. The proposed contents of Phase II study are given in the next section.

## Section 2

### PROPOSED CONTENTS OF PHASE II STUDY

Proposed contents of Phase II study are presented here.

#### 2-1 Study on Ground Improvement Methods for Soft Material

This subject will include studies on:-

(1) Technical feasibility of possible ground improvement methods such as:-

- \* Preloadings,
- \* Vertical drains with preloadings,
- \* Sand compaction piles,
- \* Dynamic consolidations,
- \* Chemical soil stabilizations, and
- \* Others.

(2) Practical applicability, cost aspects, time required for the operation, etc.

(3) Experimental field study

In order to study the actual behavior of soft ground under embankments, a test embankment will be constructed at the pilot test area in Sentul.

Size of the test embankment will be 20m x 50m and the height will be 2.5m. Sand drains will be installed under the embankment in the area of 20m x 20m as shown in Fig. 1.

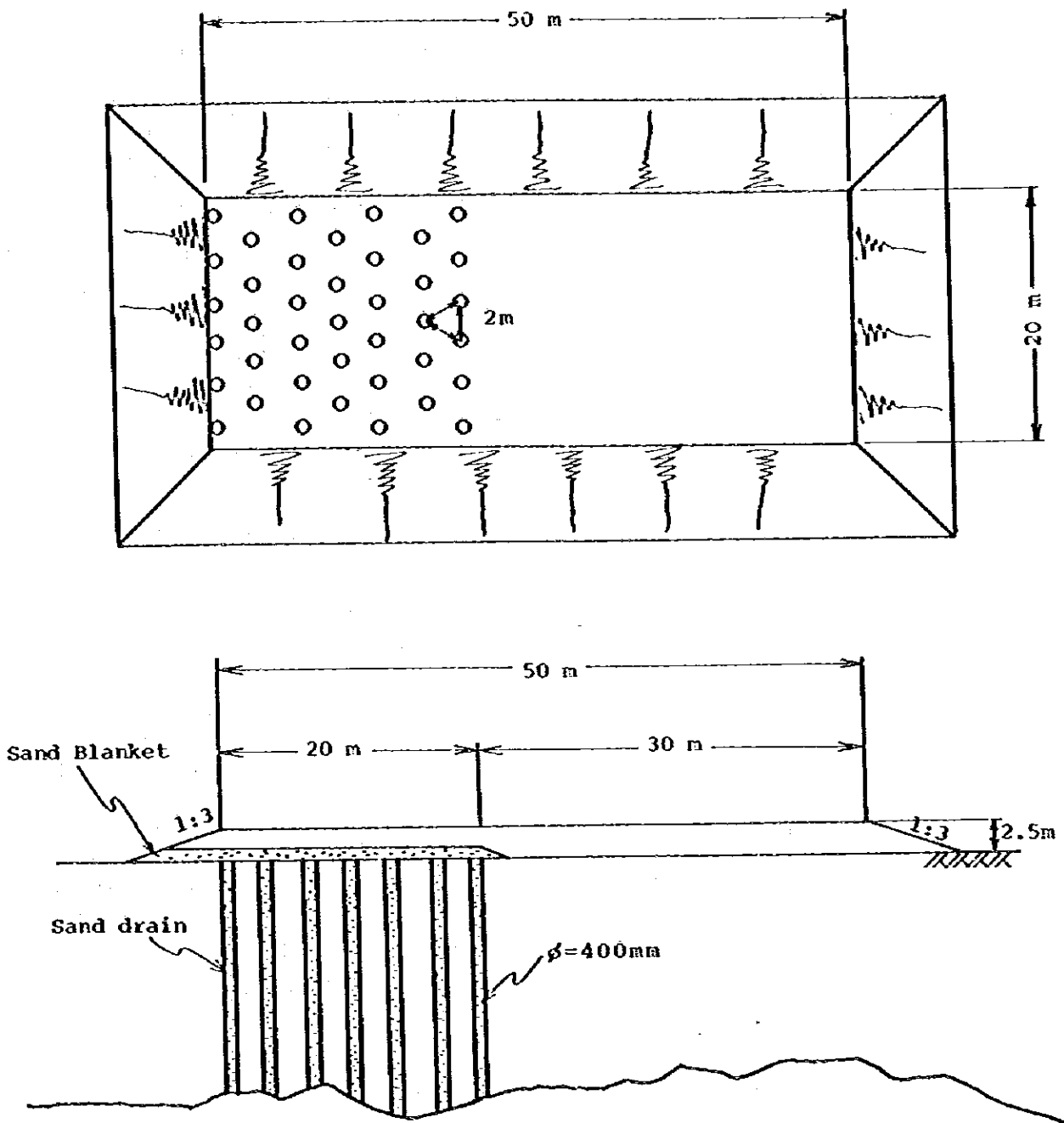


Fig. 1 Test Embankment

Settlement of the embankment will be observed using settlement plates.

Check borings and laboratory soil tests will be carried out to confirm the improvement of the soft ground. The investigation will be performed at two times; before the construction of the test embankment and after the improvement of soft ground.

2-2 Study on the Foundations for the Proposed Housings

Following subjects will be studied:-

- \* Pile foundations,
- \* Footings,
- \* Raft foundations,
- \* Structural components related to the foundations such as ground beams, and
- \* Others.

Results of pile driving and loading tests (to be performed by the Government of Malaysia with the co-operation of the study team) are also analysed and referred in this study.

2-3 Engineering Study for Massive Reclamation Process and Other Earthworks

This subject will include studies on following items:-

- \* Properties of soft layers,



- \* Consolidation settlement,
- \* Stability (fillings, cuttings, excavations),
- \* Erosion and drainage, and
- \* Others.

2-4 Supplemental Subsurface Ground Investigation and Laboratory Test

Subsurface ground investigation and laboratory soil tests will be carried out in Sentul in conjunction with the test embankment.

2-5 Summarization and Compilation of the Results of Item 2-1 to 2-4

Results of the study in items 2-1 to 2-4 will be summarized and compiled to guide the future investigation and design for the foundation of the housings in ex-mining lands.

2-6 Preliminary Survey of Other Ex-mining Areas

In addition to the selected 2 ex-mining areas (Kampong Pandan and Sentul), preliminary survey will be conducted at other ex-mining areas in and around Kuala Lumpur. The preliminary survey will mainly consist of reconnaissance survey by the experts of the study team. Exploratory drillings & laboratory tests may also be performed

when they are deemed to be necessary by the study team. The results of the survey will be analyzed and the summary will be in the form of indicating:

- (1) areas of potential economic viability for the housing development and other purposes.
- (2) degree of easiness or difficulty of foundation works for the housing development.
- (3) guide lines on the types of houses to be developed (low, medium, and high rise structures) with respect to the subsurface ground condition.

#### 2-7 Study on Tin Mining Operation

Study on possible measures to be adopted in the tin mining operation with the view of alleviating the problems of reclamation of ex-mining land for housing development and other purposes will be carried out.

#### 2-8 Economic and Financial Study

This subject will include the following aspects:-

- (1) Cost estimation of foundation and reclamation works.
- (2) Cost/benefit analysis for the land formation and foundation works for housing development and other purposes. This study will be made with respect to the houses to be built (low,

medium, and high rise) versus subsurface ground condition.

- (3) Financial consideration/evaluation such as cash flow, tariff rate of housing, staging plan of investment cost, etc.

Section 3

REPORTS

The following reports will be submitted.

- 1) Inception Report (Phase II)-----30 copies  
At the time of the steering committee meeting  
in August, 1980.
- 2) Draft Final Report-----30 copies  
Within 2 months after completion of the field  
works of Phase II study.
- 3) Final Report-----50 copies  
Within 2 months after receipt of the Malaysian  
Government's comments on the Draft Final Report.

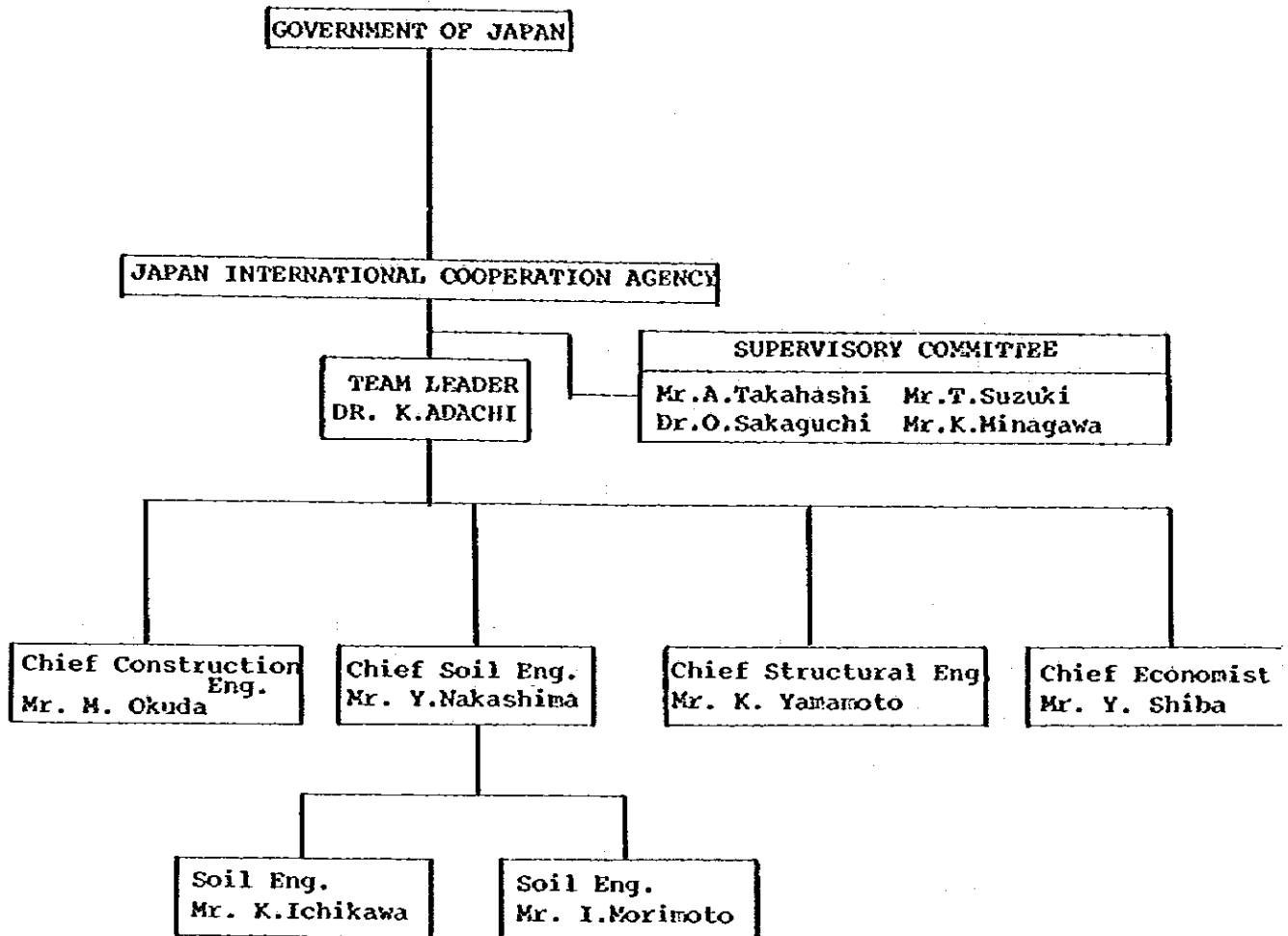
#### Section 4

#### CONTRIBUTIONS OF THE GOVERNMENT OF MALAYSIA

In addition to the contributions already agreed upon, the following contributions of the Government of Malaysia are essential in Phase II study.

- (1) Provide the necessary amount of earth required for the test embankment and approach road.
- (2) Perform pile driving and loading tests on concrete piles. The tests will be performed in conjunction with the projects of City Hall. The detailed contents of the tests will be discussed between related organizations of Malaysia and the Japanese Study Team.
- (3) Provide 3 (three) counterpart engineers during the period of field works. The counterpart engineers will co-operate and work together with the members of the study team.

APPENDIX 1  
ORGANIZATION CHART



APPENDIX 2

MEMBER LIST

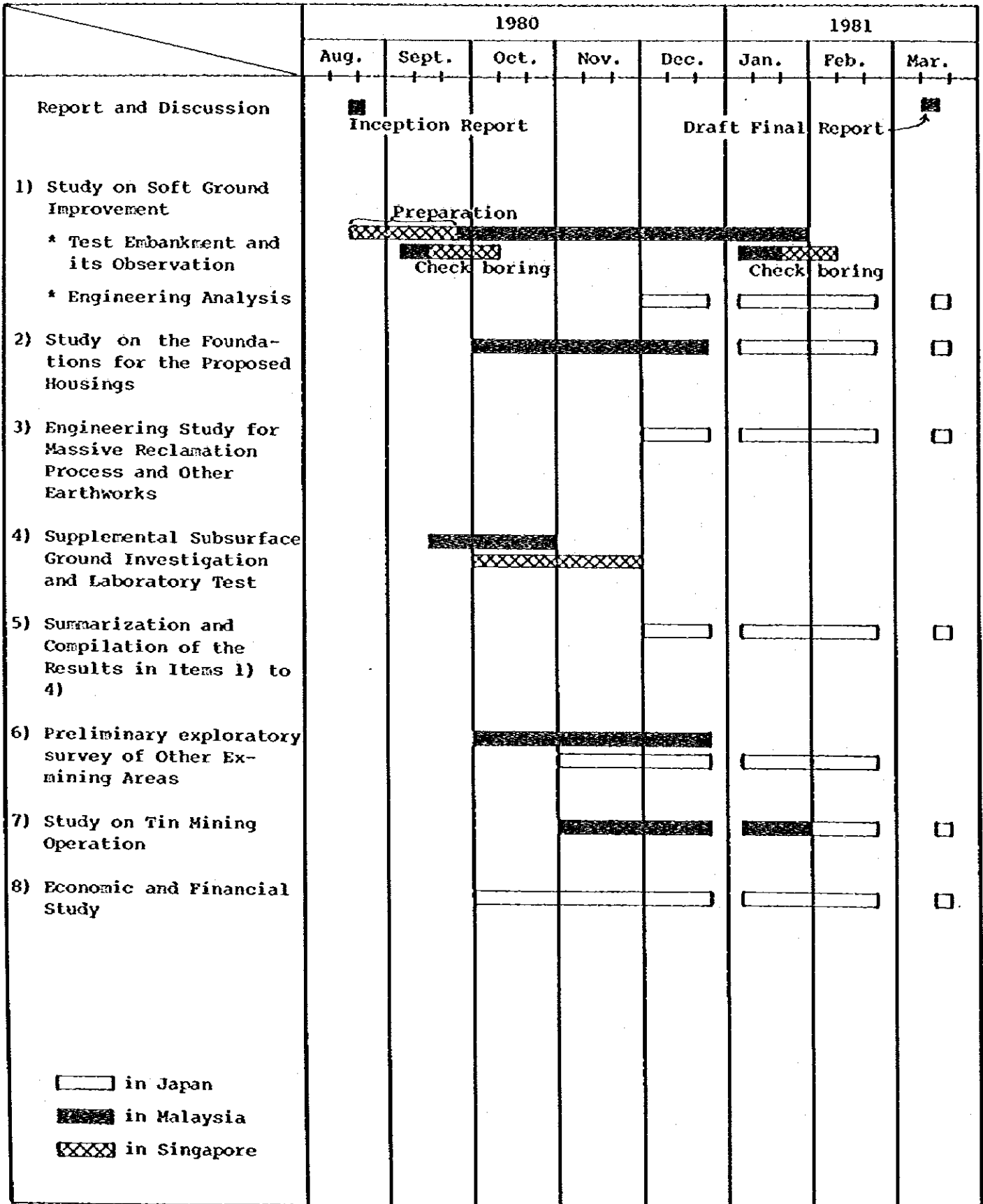
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Name	Team Position / Company Affiliation
Dr. K. Adachi	Team Leader Chief Engineer of the Overseas Department, Kiso-Jiban Consultants Co., Ltd.
Mr. M. Okuda	Chief Construction Engineer Overseas Department, Kiso-Jiban Consultants Co., Ltd.
Mr. Y. Nakashima	Chief Soil Engineer Overseas Department, Kiso-Jiban Consultants Co., Ltd.
Mr. K. Yamamoto	Chief Structural Engineer Chief Engineer of Orimoto-Takumi-Kozo Sekkei Kenkyujo
Mr. Y. Shiba	Chief Economist Chief Economist/City Planner of General City Planning Office
Mr. K. Ichikawa	Soil Engineer Singapore Branch, Kiso-Jiban Consultants Co., Ltd.
Mr. I. Morimoto	Soil Engineer Research Centre, Kiso-Jiban Consultants Co., Ltd.

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APPENDIX 3

WORK SCHEDULE





APPENDIX 4

PERSONAL SCHEDULE

Name	1980					1981		
	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar
1) Dr. K. Adachi (Team Leader)	■			■		□		■
2) Mr. M. Okuda (Chief Construction Engineer)	■	■	■	■	■	□		□
3) Mr. Y. Nakashima (Chief Soil Engineer)	□	■	■	■	■	■		□
4) Mr. K. Ichikawa (Soil Engineer)	■							
5) Mr. I. Morimoto (Soil Engineer)						□		
6) Mr. K. Yamamoto (Chief Structural Engineer)				■	□		□	□
7) Mr. Y. Shiba (Chief Economist)				□			□	□

□ in Japan  
 ■ in Malaysia or Singapore



**APPENDIX D**

**MINUTES OF STEERING COMMITTEE MEETINGS**

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1. The first part of the document is a list of names and titles.

2. The second part is a list of dates and times.

3. The third part is a list of locations and addresses.

Notes of the first Steering Committee  
Meeting for the Reclamation Project of  
Ex-Mining Land For Housing Development  
and Other Purposes.

---

Date : 10th December, 1979.

Time : 2.30 p.m.

Venue : Conference Room,  
Ministry Of Federal Territory.

Present:

Encik Zainol b. Mahmood,  
Secretary-General,  
Ministry of Federal Territory. - Chairman

Puan Halimah Esa,  
Economic Planning Unit,  
Prime Minister's Department.

Encik Low Poh Fee,  
Encik Kat Zin Ismail,  
Ministry of Housing and Local Government.

Encik Yeakop b. Rantau,  
Ministry of Land and Regional Development.

Encik Taha Ismail,  
Lands and Mines Department,  
(Federal Territory).

Encik Yeong Ken Choong,  
Mines Department,  
(Federal Territory)

Encik Khuzairah b. Hj Yusof,  
Housing Department,  
City Hall.

Encik Leong Cheo Wah,  
Special Projects Department,  
City Hall.

Encik Sulaiman Samat,  
Coordination and Development Department,  
City Hall.

Mr. I. Ozana,  
Embassy of Japan,  
Malaysia.

Dr. K. Adachi,  
Dr. H. Tode,  
Japanese Survey Team.

Dr. T. Hirota,  
SICA, Tokyo.

Mr. H. Abe,  
JICA, Kuala Lumpur.

Mr. K. Yatzuda,  
JICA Kuala Lumpur.

Mr. K. Minogusa,  
Supervisory Committee Member.

Mr. T. Ai,  
Coordinator of Japanese Loan.

Encik Zainal Dahlan,  
Ministry of Federal Territory.

Encik Loi Hui Kong,  
Puan Fatimah bt. Hashim,  
Ministry of Federal Territory

- Secretary

1. Introduction.

- 1.1 The Chairman welcomed the members of the Japanese Mission and also the members of the Meeting.
- 1.2 The Chairman explained that the Steering Committee was formed to guide and steer the Japanese Study Team to the direction relevant to Malaysia's development needs. The study was first initiated by the Economic Planning Unit and the Ministry of Housing and Local Government. The Ministry of Federal Territory was brought into the picture because it is responsible for the development of Kuala Lumpur, the national capital. One of the main tasks of the Ministry of Federal Territory is to reclaim and develop the ex-mining lands for housing purposes for future development due to the shortage of available lands.

2. The Inception Report On Feasibility Study for The Reclamation Project of Ex-Mining Land.

- 2.1 The JICA representative, Mr. Takao Hirota, informed the meeting that the JICA recommended to the Government of Malaysia to initiate the project. The Draft Scope of Work was prepared and had been agreed in principle by the JICA and the Malaysian Government. Two sites had been chosen i.e. Karpong Pandan (134 acres) and Sentul (234 acres).
- 2.2 The Head of the Study Team, Dr. K. Adachi briefed the meeting about the Inception Report. The feasibility study will be divided into two phases. The first phase will be between October 1979 and March 1980, and will be mainly:-
- a. to study the effectiveness of available field investigation methods such as geophysical survey, drilling, soundings and in-situ test (at Pilot Test Area),
  - b. to obtain subsurface ground condition of the site for the study of the foundation problems (at Karpong Pandan and Sentul),

- c. to survey the condition of the existing buildings and to study local construction practice in Malaysia,
- d. to establish the detailed study plan for the second phase; and
- e. to transfer the technology to the Government of Malaysia.

2.3 The second phase will be conducted in 1980 to early 1981. The primary purposes of the second phase are:-

- a. to study ground improvement methods for the soft materials; and
- b. to study and recommend proper foundations for the proposed housings.

However, the final contents of the second phase will be discussed and fixed after the first phase study. The economical and financial aspects will be discussed in the second phase.

2.4 Prior to the ground investigation at Kempong Pandan and Sentul, a pilot ground investigation will be carried out in an area of 100m x 100m at Sentul.

2.5 The results of the study will be summarized and compiled in the report together with some comments.

### 3. Other Related Issues.

3.1 The Chairman informed the meeting that the timing of the study is appropriate, as it will enable the Ministry to make available the land for housing projects in 1980 for the Fourth Malaysia Plan.

3.2 The Chairman hoped that all the related agencies would give their cooperation to the Study Team to enable the study to be carried out smoothly and efficiently. An officer from the special Projects Department, City Hall will work closely with the Study Team.

3.3 The Study Team was requested to include the methods of improving the soil during mining time so that some of the good land will be saved. The team was also requested to study the type of construction and structure to be adopted in such areas so that cracks will not occur and thus will reduce the maintenance costs of low-cost houses.

3.4 The Mining Department was requested to supply the team with the data on the actual excavation depth of the mines. However, the representative informed the meeting that presently there are no records for Sentul. He also informed the meeting that the Land EXCO has suggested Setapak as an alternative to Kempong Pandan, but there was no follow-up.

3.5 The meeting appointed the following members:-

- |                             |   |  |
|-----------------------------|---|--|
| i. Coordinator              | 1 | Encik Loi Hul Kong<br>Ministry of Federal Territory. |
| ii. Technical Counterpart   | 1 | Encik Ban Kheng Thian<br>City Hall.                  |
| iii. Mining Department      | 1 | Encik Abu Bakar Mohd Nurul.                          |
| iv. Housing Department      | 1 | Encik Shafiq Ahmad<br>City Hall.                     |
| v. Transport and facilities | 1 | Encik Suleiman Samat<br>City Hall.                   |

3.6 The meeting was informed that 2 types of technical counterpart are needed by the Study Team:

- a. Soil and Foundation engineer
- b. Structural engineer.

3.7 The meeting was informed that the equipment for the study will arrive in mid-December. The EPU was requested to make arrangements for the Customs' clearance for these equipment.

3.8 The Special Projects Implementation Department, City Hall was requested to arrange for the set up of the office spaces for the Japanese study team. failing which, the alternative office-space will be provided by the Ministry Of Federal Territory. The team was requested to inform the Ministry of Federal Territory on the number of clerical staff required so as to enable the Ministry to make the necessary arrangements.

3.9 The representative from the Japanese Embassy informed the meeting that there is an allocation for 2 persons to make a study tour to Japan, under the Colombo Plan Training. PSD and EPU had been informed and EPU will take action upon PSD's directive to do so.

4. The Chairman thanked the members and the meeting was adjourned at 4.10 p.m.

Ministry of Federal Territory,  
5th Floor, Wisma PKNS,  
Jalan Raja Laut,  
Kuala Lumpur.

15th December 1979.

FH/ja..



Minutes Of The Second Meeting Of The  
Steering Committee On The Feasibility  
Study For The Reclamation Of Ex-Mining  
Land For Housing Development and Other  
Purposes

Date : 25th March, 1980  
Day : Tuesday  
Time : 9.30 a.m.  
Venue : Operation Room  
Ministry Of Federal  
Territory.

Present:

Encik Anuar Bin Hj. Abdul Latif  
Deputy Secretary-General,  
Ministry Of Federal Territory. - Chairman

Puan Halipah Bt. Esa  
Economic Planning Unit  
Prime Minister's Department.

Encik Muhammad bin Mohd Nor  
Encik Ch'ng Ming Chan  
Encik Goh Saw Lan  
Ministry Of Housing and Local Government.

Encik Mohd Nazir Che Ibrahim  
Ministry of Land and Regional Development.

Encik Yeong Ken Chong  
Department of Mines, Federal Territory.

Encik Ban Keng Thian  
Special Projects Implementation Department  
City Hall, Kuala Lumpur.

Encik Ayoub bin Hussin,  
Housing Management Department  
City Hall, Kuala Lumpur.

Mr. K. Takada,  
Second Secretary  
Embassy of Japan  
Malaysia.

Dr. O Sakaguchi  
Supervisory Committee Member

Dr. Kakuichiro Adachi  
Kiso-Jiban Consultant Co. Ltd.

Mr. Toshio Ai  
Japan International Cooperation Agency  
Tokyo, Japan.

Mr. K. Yatsuda  
Japan International Cooperation Agency  
Kuala Lumpur.  
Malaysia.

Encik Zainal bin Dahlan  
Ministry of Federal Territory.

Encik Loi Hui Kong  
Ministry of Federal Territory.

- Secretary

Absent:

Encik Sulaiman bin Saad,  
Development Coordination Unit,  
City Hall, Kuala Lumpur. (with apologies)

Encik Taha bin Ismail,  
Land Department, Federal Territory.

1. Introduction

- 1.1. The Chairman welcomed the members of the Steering Committee, and members from both the Japanese and Malaysian teams were formally introduced.

2. Confirmation of Minutes

The Minutes of the First Steering Committee meeting, held on 10th December 1979 was passed without any amendments.

2.1. Matters Arising

Mr. Toshio Ai, on behalf of J.I.C.A. officially extended his thanks and gratitude to the Malaysian Government, The Japanese embassy in Malaysia Kiso Jiban Consultants and others who have contributed towards the successful execution of the first phase feasibility study.

3. Major Contents of the Interim Report

Dr. K. Adachi explained that the primary purpose of the Phase 1 were :-

- a) to study the effectiveness of available subsurface investigation methods;
- b) to comprehend subsurface ground condition of the site in relation to foundation problems;
- c) to survey the condition of existing building and to study local construction practices;
- d) to establish the detailed study plan for Phase II, and
- e) To effect the transfer of technology to the Government of Malaysia.

### 3.1. Study Period

Dr. K. Adachi was of the opinion that the time allowed for the study was not too sufficient for the satisfactory completion of the interim report. The field work for this feasibility study commenced in late December and ended in late February 1930, after which laboratory on the soil samples were conducted; and the engineering study and report preparations were done in late February and March 1930. The interim Report is done in 3 volumes:

- a. Volume 1 : Main text, containing the major results of the study
- b. Volume 2 : Data on the actual investigation and information of the investigation methods and
- c. Volume 3 : Drawings, on plans and other details.

### 3.2. Findings

Dr. K. Adachi summarised and explained the major findings of the feasibility study, inter-alia:-

- a) 2 methods of mining are practiced in the Federal Territory i.e. gravel pumping and dredging.
- b) The bedrocks of the study areas, i.e. Kg. Pandan and Sentul are limestone. In both areas, excavations depths are irregular;
- c) Generally, Kg. Pandan offers better potential for housing settlement than Sentul, based on the reading and soundings performed on the land surface.

- d) ground improvement methods were also studied, including preloading, vertical drains with preloading dynamic consolidation etc, and these methods will be further tested in the 2nd phase study.

#### 4. Technical Significance and Difficulty of the Study

Dr. O. Sakaguchi, one of the members of the Supervisory committee in Japan, gave an informative and comprehensive briefing both on the technical significance of this study and also the technical difficulties to be encountered in the construction of buildings on ex-mining land. His briefing was given in Japanese and translated by Dr. K. Adachi. Dr. O. Sakaguchi explained that the subsoil of the ex-mining lands is complicated, the clay material present is soft and the sandy material is loose. In both the Sentul and Kg. Pandan areas, the bedrock is limestone, and sometimes cavities can be found.

##### 4.1. Technical Problems

On technical problems which might be encountered in housing development on ex-mining land, Dr. O. Sakaguchi mentioned that 7 categories of sub-surface ground condition may be cited.

Case 1 : Where the soft layer lies immediately on the ground surface, e.g. Sentul :

On these ground conditions a thick fill of more than 15m thick is required for housing construction, to prevent any occurrence of sliding. The construction of buildings on these ground conditions might bring about differential settlement of the soil giving rise to cracks and other damages. The suggested ground improvement method is to fill some portion of the ground in advance so as to enable the acceleration of the ground settlement process. Sand drains may also be used. Elaborate designs and control of field operations are essential and must be performed properly. Field experimentation on this will be carried out in the phase 2 study.

Case 2 : Where the soft clay is sandwiched in between the soil strata at some depths, not immediately below the subsurface.

As in Case 1, low rise buildings are suggested for housing construction as cracks and uneven settlement of houses will occur due to the weight of the building being transmitted onto the intermediate layers. Counter measures suggested includes preloading and a combination of drains.

Case 3 : Where the soft clay layer lies at the ground and mid-depth levels of the sub-surface. The loading of the weight of the building on the ground produces negative friction

and the greater the magnitude of the negative friction the greater the damage to housing structures.

Case 4 : Where there is relatively loose sand over the foundation layer, e.g. Kg. Pandan. The thickness of the sandy material varies from location to location. Soil improvement methods to intensify and accelerate settlement of the soil will have to include dynamic consolidation and compaction piles. Field investigations on this category of sub-surface condition might be carried out in phase 2 study, pending the approval of the Budget by the Japanese Government.

Case 5 : Where there is a dense sandy layer at mid-depths with relatively soft material underlying it.

The denser sandy layer may act as a "false bedrock" and piles driven down may penetrate until this layer only and this poses as a danger to the building structure. However, with the settlement of the soil, the sandy layer might become compacted and penetration of the piles through this layer might be difficult at a later stage.

Case 6 : Where there is irregular configuration of bedrock. Due to the irregularity of the bedrock, the piles may be damaged or bent upon contact with the irregular surfaces of the bedrock. The damage is not detected at the ground surface and there is the resultant unreliable bearing capacity of the piles. Probably through sliding, considerable damage to building structure also happens. Counter measures would include avoiding construction of high rise buildings. Investigation on this aspect will be done in the Phase I study pending budgetary constraints.

#### 4.2. Construction Costs

Dr. O. Sakaguchi also pointed out that in Japan, foundation piles support structures where the site foundation is irregular or where the subsurface foundation is poor. However, the cost for the remedial measures is about 50% - 100% of the total cost of construction.

#### 4.3. Long-term Cooperation

In conclusion, Dr. O. Sakaguchi stressed that long-term cooperation between the Malaysian and Japanese experts is essential to ensure the gradual and effective transfer of Japanese technology to Malaysia.

5. Housing in the Federal Territory

The Chairman informed the meeting that 30,000 units of Public houses will be built in the Federal Territory in the Fourth Malaysia Plan (1981-1985) and 1,300 acres per year is needed for housing purposes alone. To solve the shortage of land, the government is turning to the ex-mining lands as possible locations for low cost public housing schemes. The Chairman reiterated that the findings of this feasibility study will be of importance to this Ministry in the provision of housing for the people. He also stressed that the conclusive recommendations in the Phase II study will indeed be valuable to the Ministry.

6. Phase II Study

Dr. K. Adachi informed the meeting that the Primary purposes of the Phase II Study will include:-

- a) to study ground improvement methods for soft materials.
- b) to study and recommend proper foundations for the proposed housing.
- c) Engineering study for massive reclamation process and other earthwork.
- d) Supplementary subsurface ground investigation
- e) study on possible measures to be adopted in the tin mining operations with the view of alleviating the problems of future reclamation.
- f) Economic and financial study.

7. Cost Consideration

Mr. Ban Keng Thiam suggested that the high cost of the feasibility study can be minimised if the Japanese study team could join their Malaysian counterparts at the appropriate time, for instance, information on sub-soil material could be derived from drilling of on-going City Hall projects instead of conducting independent drillings.

8. Specialist/Consultant to the Ministry

The Chairman put forward the proposal for a Japanese technical specialist/consultant to be attached to the Ministry of Federal Territory to advise on matters pertaining to the reclamation of ex-mining land for housing development and other purposes. The meeting endorsed his suggestion.

8.1. Formal Application

The Ministry of Federal Territory will formally request the J.I.C.A. through the Economic Planning Unit (Malaysia) and the Japanese Embassy in Malaysia as regards the attachment of a specialist/consultant to the Ministry for the 1981/82 fiscal year.

Action: Ministry of Federal Territory.

9. Field Investigations in Phase II study

Dr. K. Adachi stressed the need to have 2 types of field investigations in the Phase II study, i.e. a test piling and loading and other combination of selective measures to accelerate the rate of settlement.

However, he mentioned that the 2 aspects might not be studied because of the substantial budgetary requirement involved, the amount required being in the region of M \$300,000 - M \$500,000.

9.1. Assurance of Assistance

The Chairman assured the Japanese members of the Steering Committee that the Malaysian government would provide assistance in whatever way possible to ensure the success of this feasibility study.

9.2.1. Counterpart from the Ministry of Housing & Local Government.

Mr. Mohammad bin Mohd Noor from the Ministry of Housing and Local Government expressed his support for the idea and indicated that his Ministry would be able to assign a full-time technical counterpart for the Phase II study.

9.2.2. Technical Counterpart from City Hall, Kuala Lumpur.

Mr. Ban Keng Thian informed the meeting that 2 counterparts from City Hall would be assigned for Phase II Study.

10. Comments on the Interim Report

Dr. K. Adachi informed the meeting that any constructive comments on the Interim Report by the Malaysian members would be welcomed and these comments will be reflected in the Phase II Study.

- 10.1. Mr. Ban Keng Thiam expressed his congratulations and commendations to the Japanese Study Team upon the completion of the difficult task of producing the concise and useful Interim Report within a short space of time.
- 10.2. Mr. Ban Keng Thiam with reference to the Interim Report stressed that particular emphasis should be given to low-cost technology, and low initial and maintenance cost in the reclamation of these ex-mining lands for housing purposes. He added that since the economic viability will determine the physical feasibility of the project, special emphasis needs to be placed on cost-benefit analysis. These emphases should be highlighted in the Phase II Study.

10.3. Uniformity in Policy

He also called for a uniform policy between relevant government agencies with regards the comparison and compilation of related information of mining and ex-mining land. This step, he added, would greatly facilitate ease of planning for housing development, especially in the Federal Territory and also help to reduce cost in terms of soil investigation.

11. Conclusion

The meeting was adjourned at 11.45 a.m. after the chairman, on behalf of the Malaysian Government and the steering committee members expressed his thanks and gratitude to the Japanese Government and members of the Study Team who had tirelessly and dedicatedly completed the useful report according to schedule.



**MINUTES OF THE THIRD MEETING OF THE STEERING COMMITTEE  
FOR THE FEASIBILITY STUDY FOR THE RECLAMATION OF  
EX-MINING LAND FOR HOUSING DEVELOPMENT AND OTHER PURPOSES**

Date : 19th August, 1980  
Day : Tuesday  
Time : 2.30 p.m.  
Venue : Conference Room,  
Ministry of Federal Territory

**Present:**

Encik Zainol bin Mahmood  
Secretary-General,  
Ministry of Federal Territory - Chairman

Encik Anuar bin Hj. Abdul Latif  
Deputy Secretary-General,  
Ministry of Federal Territory

Puan Halipah bt. Esa,  
Cik Nooraini bt. Md. Ali,  
Economic Planning Unit,  
Prime Minister's Department

Encik Choong Tet Foon,  
Department of Mines,  
Federal Territory.

Encik Ban Keng Thiam,  
Special Projects Implementation Department,  
City Hall, Kuala Lumpur.

Encik Ch'ng Ming Chan  
Cik Goh Saw Lan,  
Ministry of Housing & Local Government,  
Malaysia.

Encik Mohd. Nasir Che Ibrahim,  
Ministry of Land and Regional Development,  
Malaysia.

Encik Ayoub b. Hussin,  
Housing Management Department,  
City Hall, Kuala Lumpur

Mr. Kunihiko Takada,  
First Secretary,  
Embassy of Japan,  
Malaysia.

Mr. Terumi Iijima,  
Japan International Cooperation Agency,  
Tokyo,  
Japan.

Dr. Osamu Sakaguchi,  
Ministry of Construction,  
Tokyo,  
Japan.

Dr. Kakuichiro Adachi,  
Kiso-Jiban Co. Ltd.,  
Tokyo,  
Japan.

Mr. Nobuji Abe,  
Japan International Cooperation Agency,  
Kuala Lumpur.

Mr. Yuji Okazaki,  
Japan International Cooperation Agency,  
Tokyo,  
Japan.

Mr. Katsuumi Ichikawa,  
Kiso-Jiban Co. Ltd.,  
Singapore.

Encik Zainal bin Dahlan,  
Ministry of Federal Territory.

Encik Loi Hui Kong,  
Ministry of Federal Territory.

- Secretary

**Also Present:**

Encik Quah Kean Yeang  
Project Manager,  
Bt. Kiara Development Project,  
Ministry of Federal Territory.

**Absent (with apologies)**

Encik Sulaiman b. Samat,  
Development Coordination Unit,  
City Hall Kuala Lumpur

Encik Taha b. Ismail  
Land Office,  
Federal Territory.

**1. Introduction**

The Chairman welcomed the members of the Japanese Supervisory Committee of this project and all the members of the meeting were formally introduced.

**1.1. Inception Report, Phase II**

The Chairman explained that the main topic of discussion will be the Inception Report of the Phase II Study.

**2. Confirmation of the Minutes of Previous Meeting**

The minutes of the 2nd Steering Committee meeting was confirmed with 2 minor amendments. i.e.

- a. Page 4, Item 4.1. Technical problems,  
Case I, 4th line:-

"of more than 15 m thick" to be deleted

The sentence should now be read as:

On these ground conditions, a thick fill  
is required for housing construction ...

- b. Page 5, Item 4.1, case 6, second last line:

"in the Phase I study pending budgetary  
constraints" should read:

"in the Phase II study pending budgetary  
constraints"

### 3. (Inception Report, Phase II) Sand Drains

With reference to section 4 (page 11) of the Inception Report for Phase II, the meeting was informed that about 4000 cubic metres of earth (or approximately 1000 lorries carrying 4 cubic metre of earth) would be required for the construction of sand drains. Mr. Ban Keng Thiam from the Special Project Department, City Hall informed that provision of the earth required can be arranged, but his department would not be able to bear the cost of transportation. He added that the cost of transportation would vary according to the distance of the source of the earth (construction site) to the study site.

#### 3.1. Financial provision

Dr. K. Adachi, on behalf of the Japanese Supervisory Committee informed the meeting the financial provision for transportation will be met from allocation of the Japanese grant. He also added that the construction of the sand embankments and the sand drains would facilitate ease of accessibility to the site and more important, to accelerate the improvement of soft-ground conditions.

#### 3.2. Bukit Kiara Development Project

The Project Manager of the Bukit Kiara Development Project of the Ministry of Federal Territory informed the meeting that the earth required for the sand drains can be provided from his project area at Damansara.

Action: Mr. Quah Kean Yeang

### 4. Piling Tests

Mr. Ban Keng Thiam of City Hall stated that presently two projects by City Hall are using concrete piles but these two projects are not on ex-mining land. Nevertheless, he added that he will arrange for the Japanese study team to conduct test loading by concrete piles in either one or both these two projects areas, to facilitate evaluation of such a method.

#### 4.1. Test-loading

The Japanese Supervisory Committee agreed to the proposal whereby the study group would conduct the test-loading by concrete piles in about 2 months time in conjunction with City Hall's construction schedule.

Action: Mr. Ban Keng Thiam  
Special Projects Development  
Department City Hall.

#### 5. Technical Counterparts

The Chairman emphasised that the land available for development in the Federal Territory at the present and the future would be the mining & ex-mining land. To properly and to optimally utilise this scarce land, senior Malaysian engineers should be assigned to be the technical counterparts to the Japanese study team so that the transfer of knowledge could be more effective.

Action: Special Projects Implementation Department  
City Hall & Ministry of  
Housing & Local Government.

#### 5.1. Counterpart from the Ministry of Housing & Local Government

The representative from the Ministry of Housing and Local Government informed the meeting that the Ministry would assign a full-time engineer to the technical counterpart for the duration of the study period.

Action: Ministry of Housing &  
Local Government.

#### 5.2. Counterpart from City Hall

Mr. Ban Keng Thiam, Special Projects Implementation Department, City Hall stated that two engineers from City Hall would be assigned as full-time technical counterparts for this study.

Action: Special Project Implementation Department, City Hall.

#### 6. Key Points

Dr. K. Adachi expressed his sincere thanks & gratitude to personalities and organizations, both in Japan and Malaysia for the smooth progress of the Phase I study and also for the initiation of the Phase II study. He briefed the meeting on the key points for the Phase II study, which would include:

1. Study of General Improvement Methods for Soft Material.
2. Study on the Conditions for the Proposed Housing Projects.
3. Engineering Study for Massive Reclamation Process and other Earthwork.

4. Supplemental subsurface Ground Investigations and Laboratory Test.
5. Summarization and Compilation of the above items.
6. Preliminary Survey of other Ex-Mining Areas.
7. Study on Tin Mining Operations
8. Economic & Financial Study, and
9. Financial consideration & Evaluation of the project.

In addition, Dr. K. Adachi reiterated that the study team could not ascertain whether the Kg. Pandan and Sentul sites are representative of soil conditions of ex-mining lands, and in this respect, reconnaissance studies will be conducted in other mining areas.

#### 6.1. Guidelines on Mining Methods

Mr. Choong Tet Poong, Mines Department Federal Territory was of the opinion that the "Study on Tin Mining Operations" will be of assistance to his department in providing certain guidelines on the present mining operation methods. He hoped that guidelines would alleviate much of the problems of reclamation of ex-mining lands for development.

#### 6.2. Study on the Guidelines

The Chairman stressed that the Mines Department, Federal Territory should study these guidelines and procedures that will be forwarded by the Study Team, so that proper and relevant methods of tin mining can be enforced later.

#### 6.3. Close Cooperation

Dr. Adachi expressed his hope that close cooperation between related departments in the study would be forthcoming to ensure the smooth and efficient running of the Phase II Study.

Action: All Departments.

#### 7. Time Schedule

The meeting was informed by Dr. K. Adachi that the draft final report of this feasibility study will be submitted in early March 1981 for comments from the Government of Malaysia. The Official final report will be presented two months after the date of submission of official comments from the Malaysian Government.

#### 7.1. Fourth Malaysia Plan

The Chairman opined that the schedule for the completion of this feasibility study is timely and opportune as it would be assistance, in so far as the scarcity of available land is concerned, in the implementation of Fourth Malaysia Plan in the Federal Territory.

## 8. Technical Aspects of the Study

Dr. O. Sakaguchi, speaking in Japanese and translated by Dr. K. Adachi brought out the major pertinent technical aspects of this feasibility study. He mentioned that the difficulty in the reclamation of ex-mining land arises from two major factors, namely:-

- (a) these ex-mining lands possess different features from those of the natural landscape due to the intervention of human technology.
- (b) the bottom foundation bedrock is often irregular after the tin-mining operations.

The complicated configuration on the bedrock of these ex-mining lands makes piling difficult and many piles, whether concrete or steel, are expected to be damaged during pile driving.

### 8.1. Low Rise Buildings

Dr. O. Sakaguchi added that the soft-ground improvement of these areas will be more applicable for low-rise buildings. For high rise construction it would be necessary to improve the soft-ground conditions in addition to piling work.

### 8.2. Economic Aspects

The use of timber piles would be studied, especially for middle-rise buildings (4-5 storeys), in view of the economic consideration that has to be taken into account. However, for high-rise buildings (11 storeys and above), pile foundation will be the most feasible, as the cost incurred would be less than that of soft-ground improvement. Nevertheless, more investigation is required, for even in ex-mining lands, a variety of subsurface ground conditions exist. From the initial analysis, the subsurface ground conditions of Kg. Pandan is better than that of Sentul.

In the Phase II study, recommendations on procedures and measures for the investigation of subsurface ground conditions will also be forwarded.

### 8.3. Piling System

Mr. Ban Keng Thian, Special Projects Implementation Department, City Hall said that his department has encountered problems in the implementation of housing projects, as regards the structural stress on the piles being more than the designed stress. In this connection, other methods and/or procedures in piling would be of use and importance. In this respect, he felt that the terms of reference of the interim report are insufficient.

9. Slime Conditions

As regards the methods to eliminate the slime from ex-mining lands, Dr. K. Adachi informed that 2 ways are possible, namely:-

- (a) improvement of ground conditions at the site, and,
- (b) to separate the slime within the limited area of the ex-mining confine and to convert the slime area for park facilities.

10. Cost factor

The Chairman emphasised the importance of the cost factor in the reclamation project and reiterated the fact that the housing projects on ex-mining lands will be mainly low-cost housing, with heavily-subsidised rentals by the Malaysian Government. As such the cost factor should be kept in mind during the course of the study. The cost of soft ground improvement could possibly be more than cost incurred through reclamation and this has also to be considered. He also stressed that the housing projects in these ex-mining areas would be to house thousands of residents, and playgrounds, recreational facilities and parkland should be considered too.

11. Cost Estimation

Dr. K. Adachi informed the meeting that the cost estimation of as many types of foundation as possible will be given, and that the detail cost estimation will be dependent on the height of the building. The study team, however, will recommend four or five types of foundations based on the cost and feasibility.

12. Practical Mining Methods

Mr. Choong Tet Foong, Department of Mines, Federal Territory urged the study team to keep in mind the practicality of the economic recommendations on mining methods during the course of the study. To this effect, the Japanese team will have discussions not only the Mining Department but also with the contractors regarding the cost requirements of the mining operations. Dr. K. Adachi, in reply, stated that the study team will recommend practical economic measures of mining with the view of alleviating future problems of reclamation.

12.1. Malaysian Context

Mr. Ban Keng Thiam also urged the Japanese study team to take into account the economic consideration of reclamation in the Malaysian context and not in the Japanese context as the cost of land in both countries are very different, for instance.

13. Any other Business

13.1. "Thank-you" Ceremony

The Chairman expressed his sincere hope that a "Thank-you" ceremony would be held as a mark of appreciation and thanks to the Japanese Government and the Japanese study team during the handing-over of the Final Report in mid-1981.

Action: Ministry of Federal Territory.

14. Special Consultant

Dr. K. Adachi, with reference to the suggestion by the Ministry of Federal Territory regarding the attachment of a specialist/consultant to the Ministry, hoped that a formal request from the Malaysian Government be made through the Economic Planning Unit (Malaysia) and the Japanese Embassy in Kuala Lumpur. This will facilitate the Japanese Embassy in expediting the process.

Action: Ministry of Federal Territory.

15. Conclusion

The meeting was adjourned at 4.15 p.m. after the Chairman expressed his thanks and appreciation to the Japanese Government and the study team and assured them that the Malaysian Government would extend her fullest cooperation to ensure the success of this feasibility study.



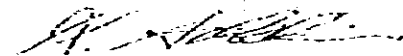
MINUTES OF THE FOURTH STEERING COMMITTEE MEETING ON  
THE FEASIBILITY STUDY FOR THE RECLAYATION PROJECT OF  
EX-MINING LAND FOR HOUSING AND OTHER PURPOSES

---

The Japanese Study Team organized by the Japan International Cooperation Agency and headed by Dr. Kakuichiro ADACHI, and the Ministry of Federal Territory (on behalf of the Government of Malaysia) headed by the Deputy Secretary-General, Encik ISMAIL BIN YUSOF held the fourth Steering Committee Meeting on the 26th March 1981 to discuss the Draft Final Report.

Constructive opinions and comments were exchanged between both parties, and the Final Report will be a reflection of this exchange of views in this Meeting.

The minutes of this Fourth Steering Committee Meeting is attached for reference and further action by the Governments of Japan and Malaysia.



.....  
DR. KAKUICHIRO ADACHI,  
LEADER OF THE JAPANESE  
STUDY TEAM



.....  
ENCIK ISMAIL BIN YUSOF,  
DEPUTY SECRETARY-GENERAL,  
MINISTRY OF FEDERAL TERRITORY,  
MALAYSIA

Minutes of the Fourth Meeting of the Steering  
Committee on the Feasibility Study on the Rec-  
lamation of Ex-Mining Land for Housing and  
Other Purposes.

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Date : 26th March 1981 (Thursday)  
Time : 9.30 a.m.  
Venue : Operations Room,  
Ministry of Federal Territory.

Present :-

Encik Ismail bin Yusof,  
Deputy Secretary General,  
Ministry of Federal Territory. - Chairman

Mr. Kunihiko Takada,  
First Secretary,  
Embassy of Japan,  
Kuala Lumpur.

Mr. Nobuji Abe,  
Japan International Cooperation Agency,  
Kuala Lumpur,  
Malaysia.

Dr. Osamu Sakaguchi,  
Supervisory Committee Member,  
Ministry of Construction,  
Japan.

Mr. Toshio Suzuki,  
Supervisory Committee Member,  
Ministry of Construction,  
Japan.

Dr. Kakuichiro Adachi,  
Study Team Head,  
Kiso-Jiban Consultant Co. Ltd.

Mr. Takashi Yoshida,  
Project Coordinator,  
Japan International Cooperation Agency,  
Tokyo, Japan.

Encik Chan Chiang Heng,  
Selangor Water Work Department,  
Malaysia.

Encik Ch'ng Ming Chan,  
Ministry of Housing and Local Government,  
Malaysia.

Encik Yunus bin Karim,  
Department of Mines,  
Federal Territory, Malaysia.

Dr. Ooi Teik Aun,  
Ministry of Public Work and Utilities,  
Malaysia.

Cik Noraini binti Md. Ali,  
Economic Planning Unit,  
Prime Minister Department,  
Malaysia.

Encik Mohd Nasir bin Che Ibrahim,  
Ministry of Land and Regional Development,  
Malaysia.

Cik Sharifah Azizah binti Syed Ibrahim,  
Encik Patrick Tan,  
Ministry of Science, Technology and Environment,  
Malaysia.

Encik Ban Kheng Thiam,  
Encik Leong Chee Wah,  
Special Projects Implementation Department,  
City Hall Kuala Lumpur,  
Malaysia.

Encik Ismail bin Dolah Harun,  
Land Office Federal Territory,  
Malaysia.

Encik Suleiman bin Abdul Samat,  
Development Coordination Unit,  
City Hall Kuala Lumpur,  
Malaysia.

Encik Zainal bin Dahalan,  
Ministry of Federal Territory.

Encik Loi Hui Kong,  
Ministry of Federal Territory.

- Secretary

...3/-

1. Introduction.

The Chairman in his opening remarks welcomed the Japanese delegates, and all the members of the Steering were formally introduced.

2. Confirmation of Minutes.

The minutes of the third meeting of the Steering Committee held on the 19th August 1980 was passed with one amendment on pg 6, Item 8.3, 4th line which would now read as:

..... encountered problems in the implementation of housing projects, particularly in piling works carried out in ex-mining area where limestone pinnacles are found.

The sentence which was written as:

'..... projects, as regards the structural stress on the piles being more than the designed stress' should be deleted and be replaced by the above-mentioned.

3. Matters Arising.

3.1 Full-time technical counterpart.

The meeting was informed that three full-time Malaysian technical counterparts were assigned to the Japanese Study-Team during the duration of the Phase II Feasibility Study. They are Mr. Ch'ng King Chan (Ministry of Housing and Local Government), Mr. Leong Chee Wah and Mr. Wong (Special Projects Implementation Department, City Hall Kuala Lumpur).

4. Phase II Study.

Dr. K. Adachi, the head of the Study Team, briefed the meeting on the methodology, findings and recommendations of the Feasibility Study. He mentioned that the Final Report will be based on the comments and suggestions on the Draft Final Report by the Malaysian Government.

#### 4.1 Study Site.

The Feasibility Study was conducted in two major study sites, i.e. Sentul and Kampung Pandan. In addition, investigations on the soil condition of six other areas in the Federal Territory were also conducted. He also highlighted the fact that various measures to counter subsidence in areas of soft subsurface were also conducted and the effectiveness of examining reclamation is visibly evident in the experimentation at the Sentul Study site.

#### 4.2 Classification of Ex-Mining Land.

The Draft Report classified the ex-mining land into 5 categories based on their soil profile and the soil properties. Recommendations for suitable low-rise, medium-rise or high-rise in each of the classification is based on the inherent soil mechanical properties. The use of slime and mining by-products as ceramics and other purposes is also proposed, so are the financial aspects of undertaking the recommended alternatives.

#### 5. Foundation and engineering aspects.

Dr. G. Sakauchi, further explained to the meeting the detailed aspects of technical foundation and engineering of this Feasibility Study. His explanation which was conducted in Japanese, was translated by Dr. K. Adachi.

#### 6. Future inter-government cooperation.

Mr. T. Suzuki stressed that areas of future cooperation between the Japanese and Malaysian as regards the continuance of this study could possibly be based on a comprehensive classification of ex-mining land, and also the use of mined by products,

This suggestion was well-received by the Chairman and the necessary action for further cooperation will be initiated by the Malaysian Government accordingly.

Action: Ministry of F.T.

...5/-

7. Comments.

7.1 Dry-strip mining.

The representative from the Federal Territory Department of Mines informed the meeting that dry-excitation is also practiced in the Federal Territory. As regards this dry-excitation methods, the applicability of the Feasibility Study recommendations would still hold good as water is still used at a later stage.

7.2 Type E Land.

The Chairman in an overtone of far-sighted planning, sounded out the possibility of reclaiming Type E Ex-mining land, in a manner which must be economically viable and technically feasible. The response from the Japanese was that this has also been incorporated in the report.

7.3 Government Control.

The technical counterpart from the Ministry of Housing and Local Government was of the opinion that strict governmental control of mining operations could facilitate advance planning of housing development.

7.4 Suspended Floor System.

Dr. Ooi Teik Aun from the Ministry of Public Works and Utilities suggested that the suspended floor system could be employed in place of preloading in ex-mining areas. The use of the suspended floor system would obviate the necessity of performing ground treatment; moreover this system could be more economical, if a cost comparison between the two methods could be done. The Japanese Study Team has already considered such a system but cautioned that without preloading, the settlement of the surrounding ground will create structural difficulties.

7.5 High rise on Type B ground.

Dr. Ooi Teik Aun also felt the construction of high rise on type B ground may be technically feasible as opposed to the view suggested in the Draft Report. The Japanese Study Team

counter-opined that from experience in Japan, even deep foundation for high rise structures on similar type of ground conditions tends to suffer structural problems. It would, therefore, be preferable to construct medium rise structures with soft ground treatment on such areas. In specific cases, however, necessity may dictate the construction of high rise structures on such type of ground conditions; and a minor amendment will be made to Table 8.3 as regards this comment.

#### 7.6 Cost benefit aspect.

Mr. Ban Kheng Thiam of the Special Projects Implementation Department, City Hall Kuala Lumpur, was of the view that the cost benefit aspect should be given more emphasis in the Final Report. The costs incurred in the adoption of each type of recommendation as regards the type of classified ex-mining land should be compared.

be This aspect will be included in the Final Report.

#### 7.7 Other Ex-Mining areas.

The meeting was informed that the findings of this Feasibility Study could be applied to the other ex-mining areas in M'sia, as they are less complex than those samples of ex-mining land which have been studied.

#### 7.8 Plan Sections.

The Final Report would also include the plan section drawings of the Sentul and Kampung Pandan study sites for ease of technical reference, as detailed investigations have been done in those areas.

#### 8. Submission of Comments.

The Chairman informed the Malaysian members of the Steering Committee that any proposed comments and possible amendments to the Draft Final Report should be submitted to the Ministry of Federal Territory by the 26th April 1981, so that after compilation they could be forwarded

by mid May 1981 to the Japanese Government through the Japanese Embassy in Kuala Lumpur.

9. Malaysian-Japan relations.

The Chairman recorded his thanks to the Japanese delegates and also to the Malaysian members of the Steering Committee. He indicated that this technical assistance from the Japanese Government augurs well for Malaysian-Japan relations.

The meeting adjourned at 12.30 p.m.

Ministry of Federal Territory,  
Kuala Lumpur.

27th March 1981

LHK/jem



**APPENDIX E**

**RESULTS OF FIELD GROUND INVESTIGATIONS**

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**APPENDIX E**  
**RESULTS OF FIELD GROUND INVESTIGATIONS**

	<u>Page</u>
E.1 Kampong Pandan .....	E-1
E.2 Sentul .....	E-29
E.3 Gombak .....	E-119
E.4 Setapak .....	E-129
E.5 Castlefield .....	E-143

**E.1 Results of Field Ground Investigation**  
**- Kampong Pandan -**

	<u>Page</u>
1. Details of Field Ground Investigation Performed .....	E-2
2. Mackintosh Probe Test .....	E-3
3. Dutch Cone Penetrometer Test .....	E-19
4. Precussion Boring .....	E-24

Details of Field Ground Investigation Performed

— Kampong Pandan —

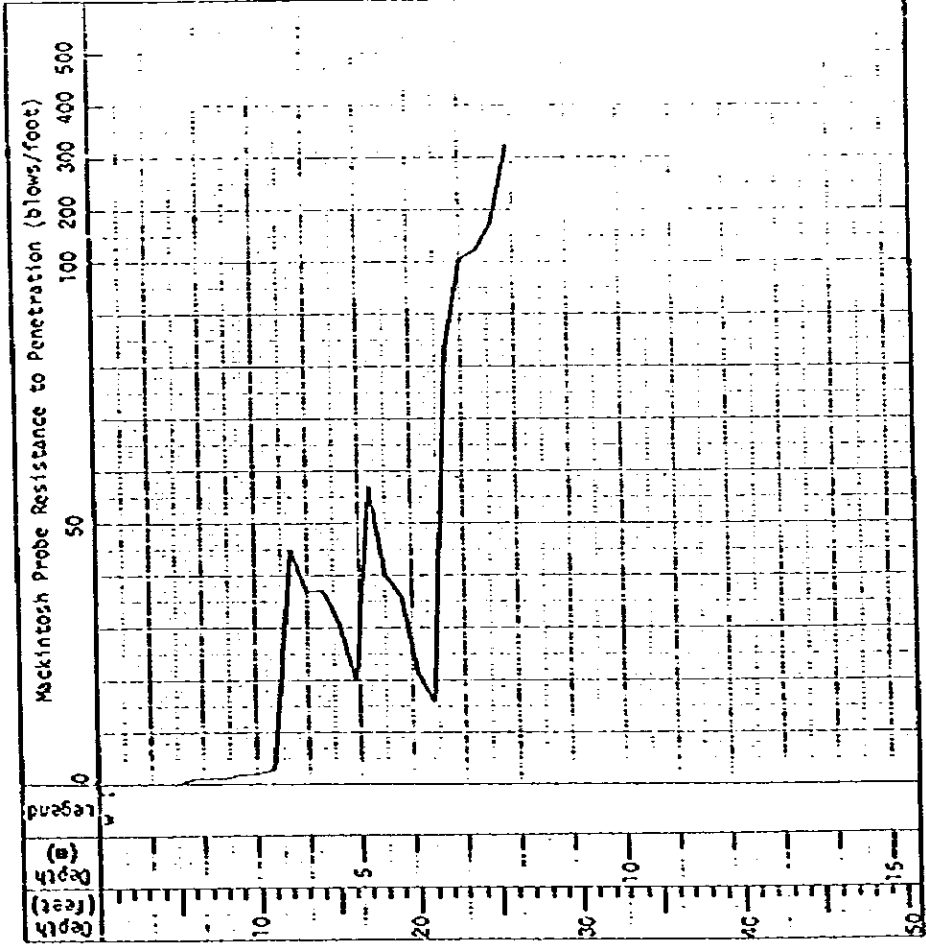
On Land					In Pond				
Percussion Boring			Dutch Cone	Penetro- meter Test	Mackintosh Probe Sounding			Disturbed Soil Sampling*	
Boring No.	Boring Depth (m)	Standard Penetration Test (Nos.)	Test No.	Sounding Depth (m)	Pond	Location No.	Sounding Depth (m)	(Nos.)	
PB-1	21.80	22	PD-1	22.6	P-1	MP-1	7.6	3	
PB-2	7.25	7	PD-2	18.4		MP-2	9.1	3	
PB-3	14.75	15	PD-3	20.8		MP-3	9.4	3	
PB-4	11.55	11	PD-4	13.8		MP-4	10.0	3	
PB-5	15.10	15	PD-5	6.0		MP-5	10.6	2	
			PD-6	16.8	P-2	MP-6	7.5	5	
			PD-7	16.6		MP-7	9.7	5	
			PD-8	6.0		MP-8	10.9	6	
			PD-9	18.2		MP-9	10.1	5	
					P-3	MP-10	10.0	4	
						MP-11	7.9	5	
						MP-12	9.4	3	
						MP-13	8.5	6	
						MP-14	8.8	4	
						MP-15A	11.5	5	
					P-4	MP-15	8.5	6	
						MP-16	7.9	4	
						MP-17	9.3	4	
						MP-18	8.1	3	
						MP-19	9.4	3	
					P-5	MP-20	7.5	2	
						MP-21	9.4	3	
						MP-22	4.8	4	
						MP-23	6.6	3	
						MP-24	4.9	3	
					P-6	MP-25	6.6	3	
						MP-26	5.4	3	
						MP-27	11.6	2	
						MP-28	8.2	2	
						MP-29	9.1	4	
						MP-30	11.9	3	
	loc. :	locations							
<b>Total</b>	5 loc.	70.45m	70 Nos.	9 loc.	139.2 m	6 ponds	31 locations	320.8 m	138 Nos.

\* Disturbed soil samplings were performed at the location of Mackintosh probe test using a peat sampler.

### MACKINTOSH PROBE TEST

Project: Feasibility Study for the Reclamation Project of Ex-mining Land for Housing Development and Other Purposes - Phase I

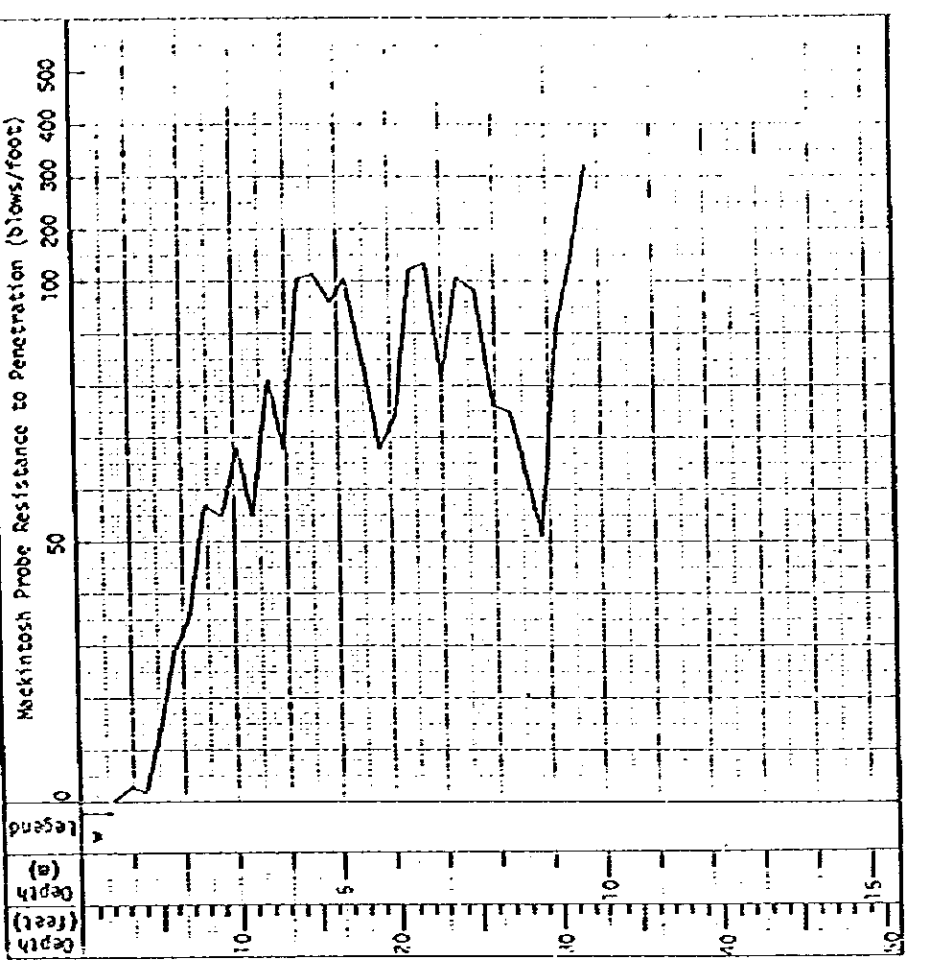
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 Elevation: -



### MACKINTOSH PROBE TEST

Project: Feasibility Study for the Reclamation Project of Ex-mining Land for Housing Development and Other Purposes - Phase I

Location: Kampong Pandan - MZ/003/80/ MP-2(P-1)  
 Date: 4-2-1980 Test No.: MP-2(P-1)  
 Depth of Test: 0'0"-32'0" Water Depth: 0'0"-2'0"  
 Elevation: -



Details of Field Ground Investigation Performed

— Kampong Pandan —

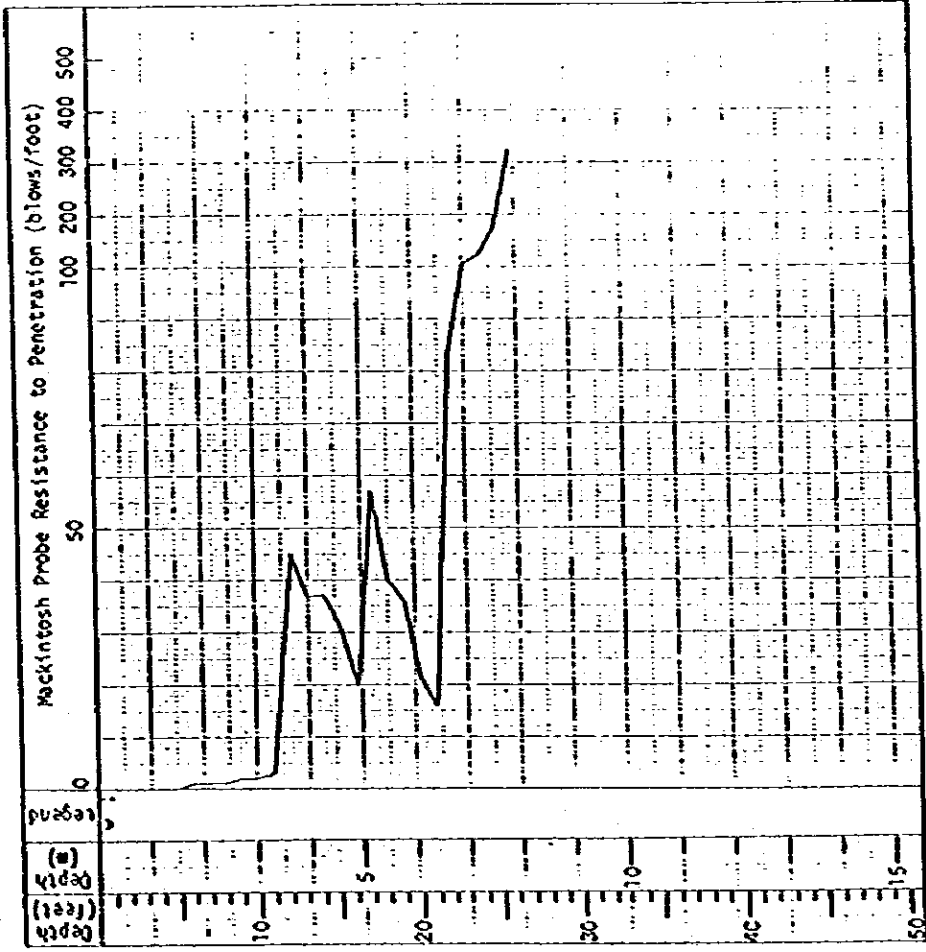
On Land					In Pond			
Percussion Boring			Dutch Cone	Penetro- meter Test	Mackintosh Probe Sounding			Disturbed Soil Sampling*
Boring No.	Boring Depth (m)	Standard Penetration Test (Nos.)	Test No.	Sounding Depth (m)	Pond	Location No.	Sounding Depth (m)	(Nos.)
PB-1	21.80	22	PD-1	22.6	P-1	MP-1	7.6	3
PB-2	7.25	7	PD-2	18.4		MP-2	9.1	3
PB-3	14.75	15	PD-3	20.8		MP-3	9.4	3
PB-4	11.55	11	PD-4	13.8		MP-4	10.0	3
PB-5	15.10	15	PD-5	6.0		MP-5	10.6	2
			PD-6	16.8	P-2	MP-6	7.5	5
			PD-7	16.6		MP-7	9.7	5
			PD-8	6.0		MP-8	10.9	6
			PD-9	18.2		MP-9	10.1	5
					P-3	MP-10	10.0	4
						MP-11	7.9	5
						MP-12	9.4	3
						MP-13	8.5	6
						MP-14	8.8	4
						MP-15A	11.5	5
					P-4	MP-15	8.5	6
						MP-16	7.9	4
						MP-17	9.3	4
						MP-18	8.1	3
						MP-19	9.4	3
					P-5	MP-20	7.5	2
						MP-21	9.4	3
						MP-22	4.8	4
						MP-23	6.6	3
						MP-24	4.9	3
						MP-25	6.6	3
					P-6	MP-26	5.4	3
						MP-27	11.6	2
						MP-28	8.2	2
						MP-29	9.1	4
						MP-30	11.9	3
	loc. : locations							
5 loc.	70.45m	70 Nos.	9 loc.	139.2 m	6 ponds	31 locations	320.8 m	138 Nos.

\* Disturbed soil samplings were performed at the location of Mackintosh probe test using a peat sampler.

### MACKINTOSH PROBE TEST

Project: Feasibility Study for the Reclamation Project of Ex-mining Land for Housing Development and Other Purposes - Phase I

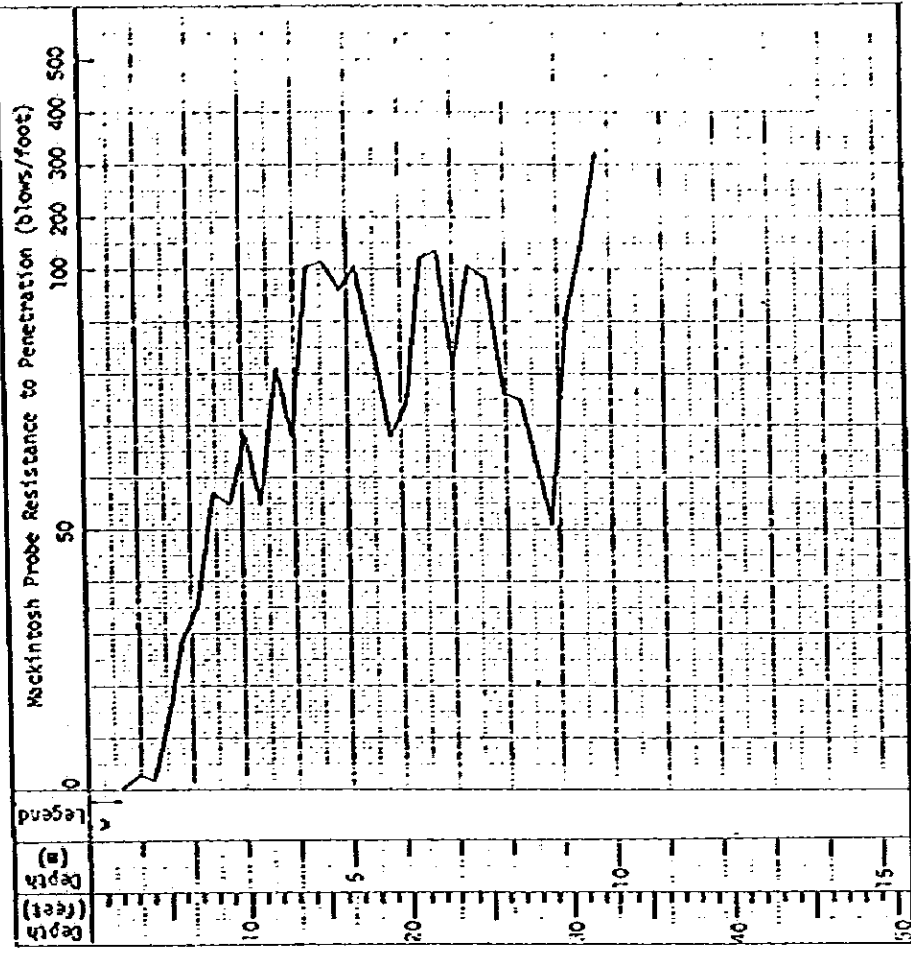
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 Elevation: \_\_\_\_\_



### MACKINTOSH PROBE TEST

Project: Feasibility Study for the Reclamation Project of Ex-mining Land for Housing Development and Other Purposes - Phase I

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 Elevation: \_\_\_\_\_



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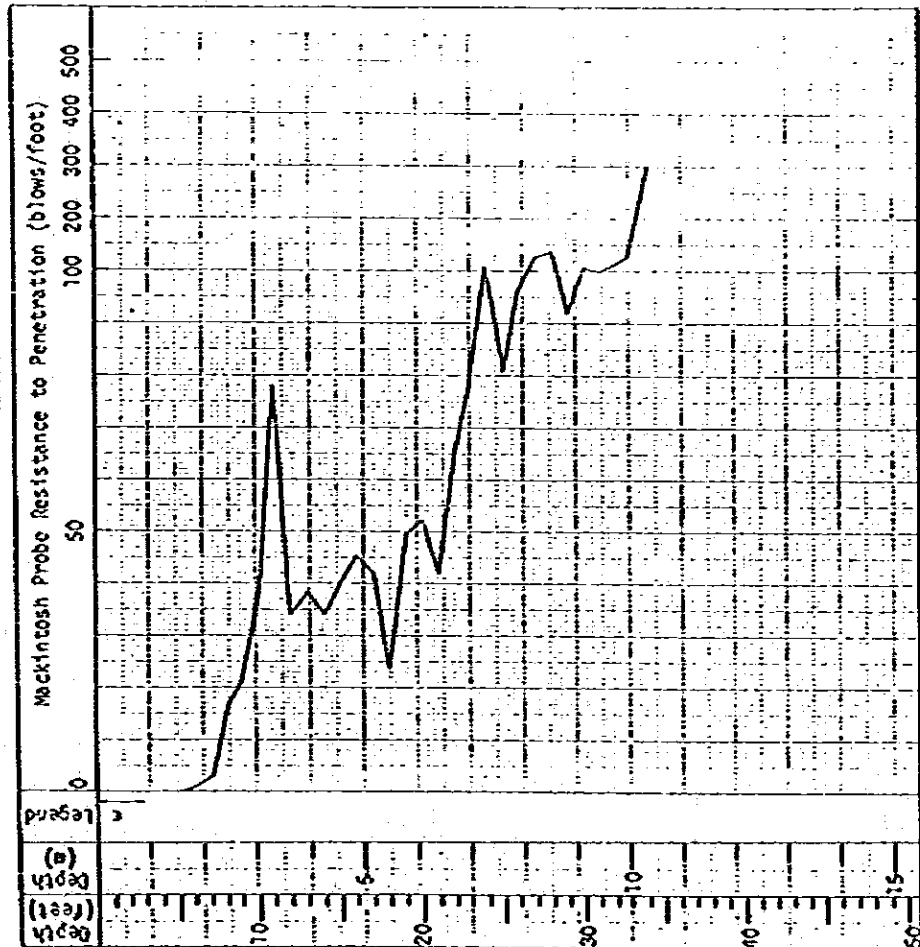
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Depth of Test: 0'0"-34'0"

Elevation: -



### MACKINTOSH PROBE TEST

Project: Feasibility Study for the Reclamation Project of Ex-mining Land for Housing Development and Other Purposes - Phase I

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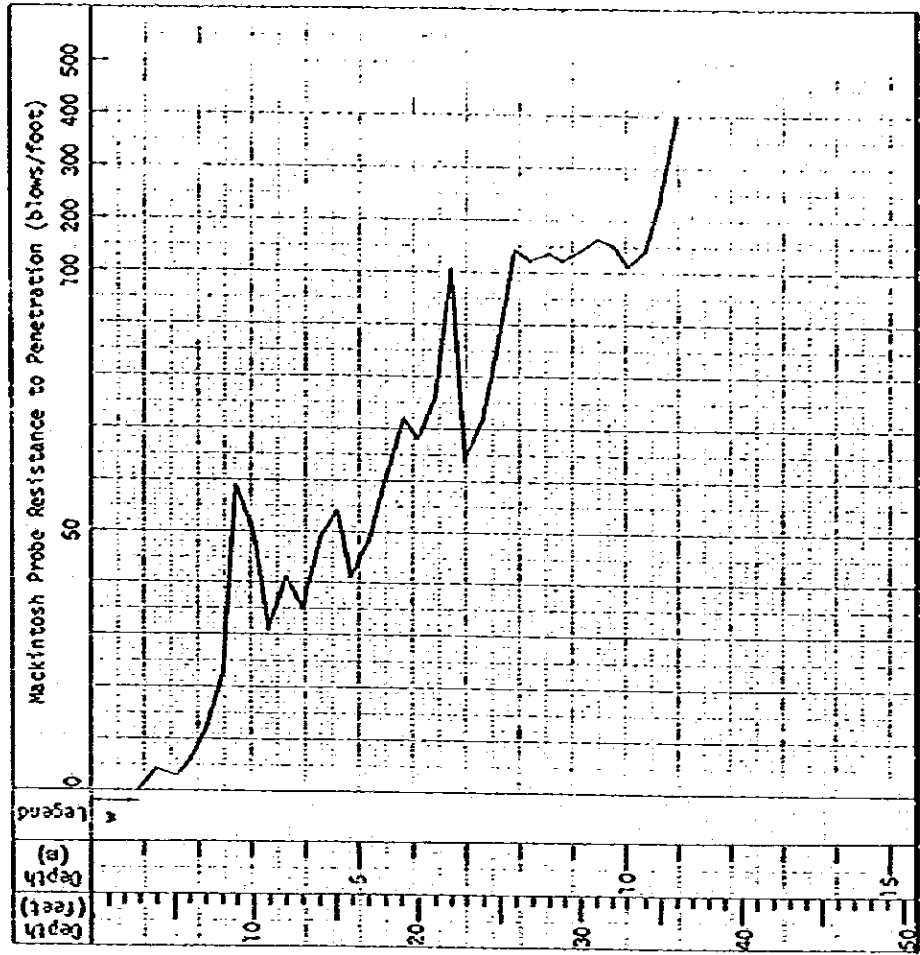
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Date: 4-2-1980

Water Depth: 0'0"-3'0"

Depth of Test: 0'0"-34'0"

Elevation: -





### MACKINTOSH PROBE TEST

Project: Feasibility Study for the Reclamation Project of Examining Land for Housing Development and Other Purposes - Phase I

Location: Kampong Pandan - N2/003/80/

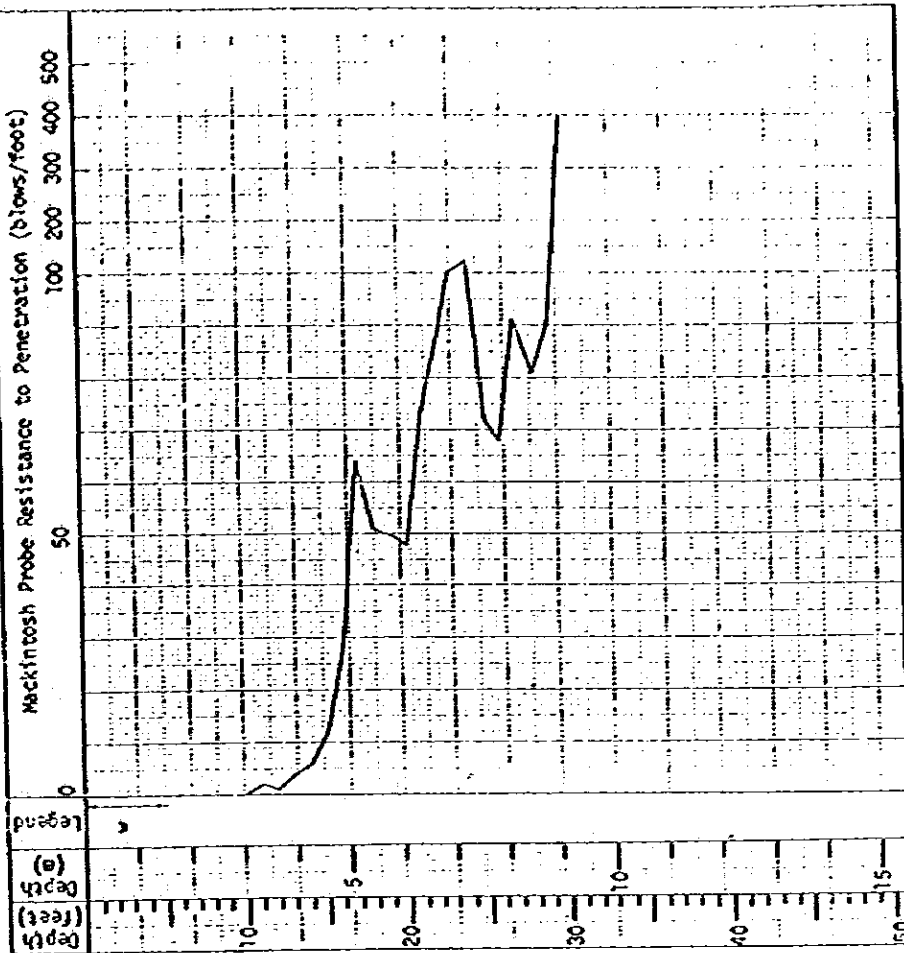
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Date: 2-2-1980

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Depth of Test: 0'0"-30'0"

Elevation: -



### MACKINTOSH PROBE TEST

Project: Feasibility Study for the Reclamation Project of Examining Land for Housing Development and Other Purposes - Phase I

Location: Kampong Pandan - N2/003/80/

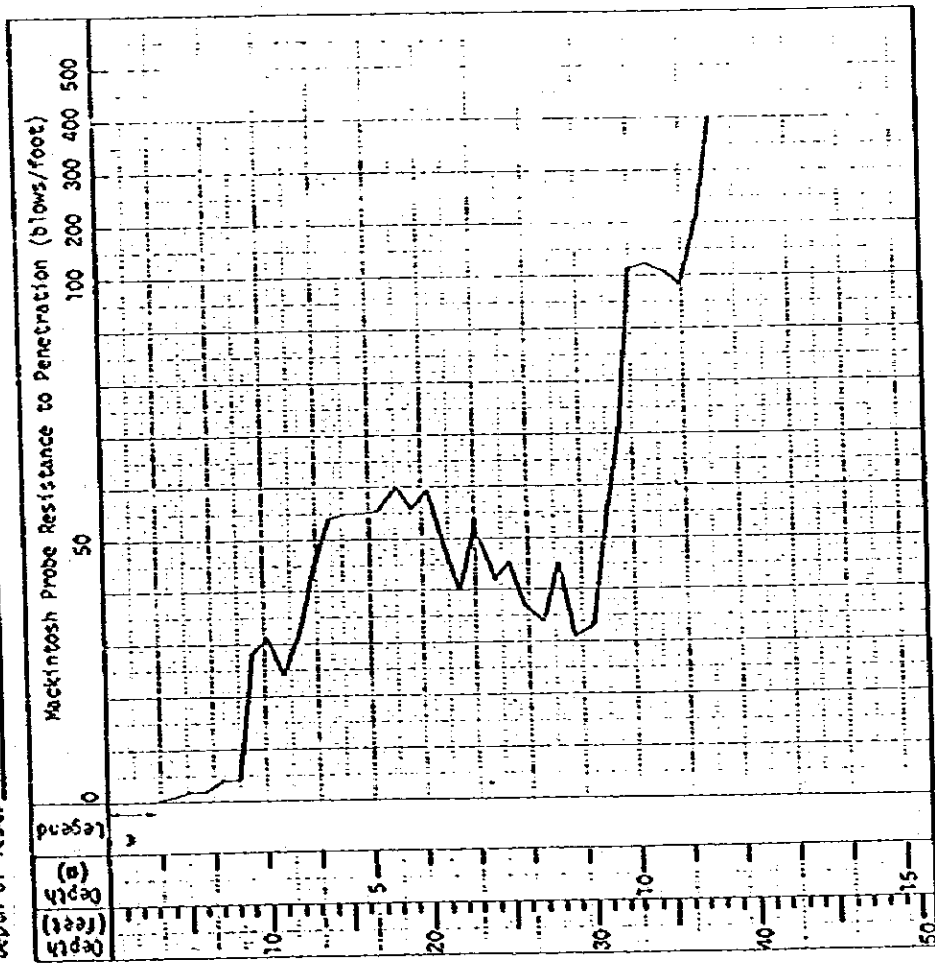
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Date: 4-2-1980

Water Depth: 0'0"-3'0"

Depth of Test: 0'0"-30'0"

Elevation: -



### MACKINTOSH PROBE TEST

Project: Feasibility Study for the Reclamation Project of Ex-mining Land for Housing Development and Other Purposes - Phase 1

Location: Kampong Pandan = M3/003/80/

Date: 2-2-1980

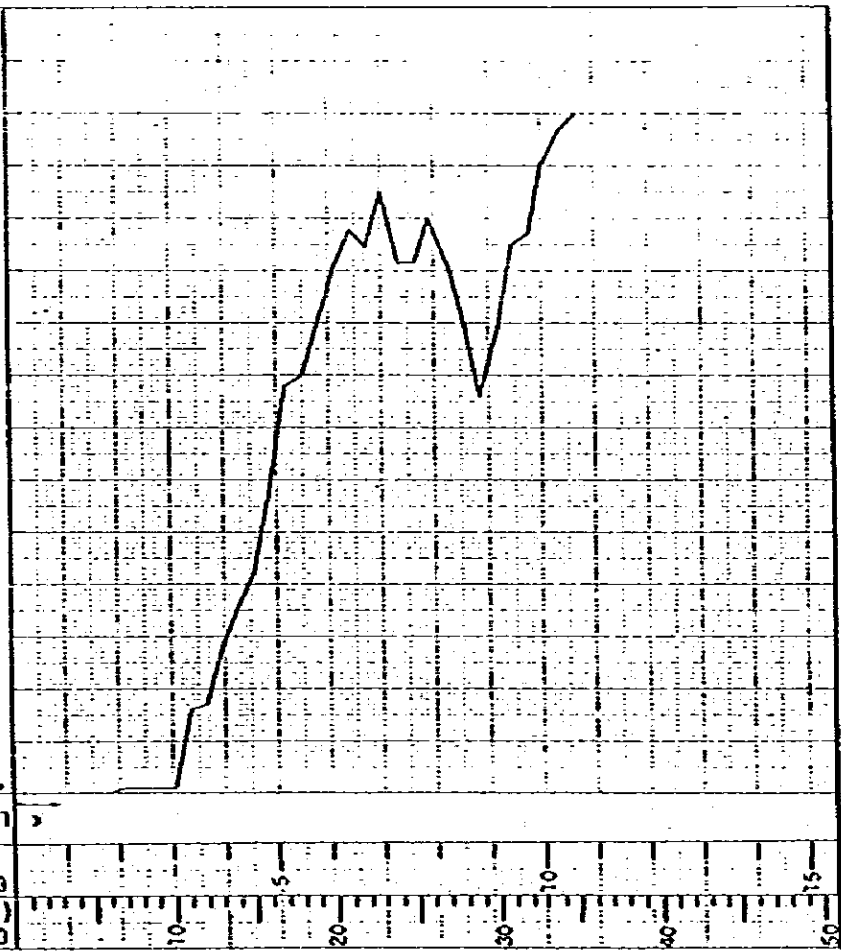
Depth of Test: 0'0"-35'0"

Elevation: \_\_\_\_\_

Test No.: MP-7(P-2)

Water Depth: 0'0"-3'0"

Mackintosh Probe Resistance to Penetration (blows/foot)



### MACKINTOSH PROBE TEST

Project: Feasibility Study for the Reclamation Project of Ex-mining Land for Housing Development and Other Purposes - Phase 1

Location: Kampong Pandan = M3/003/80/

Date: 2-2-1980

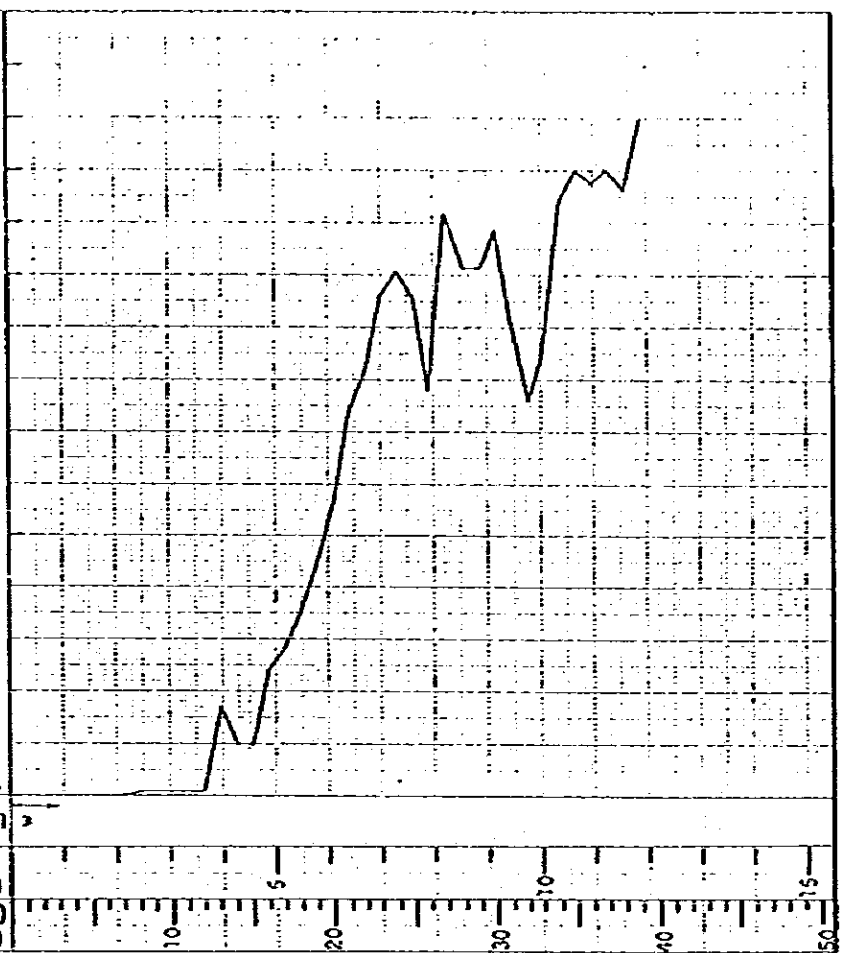
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Water Depth: 0'0"-3'0"

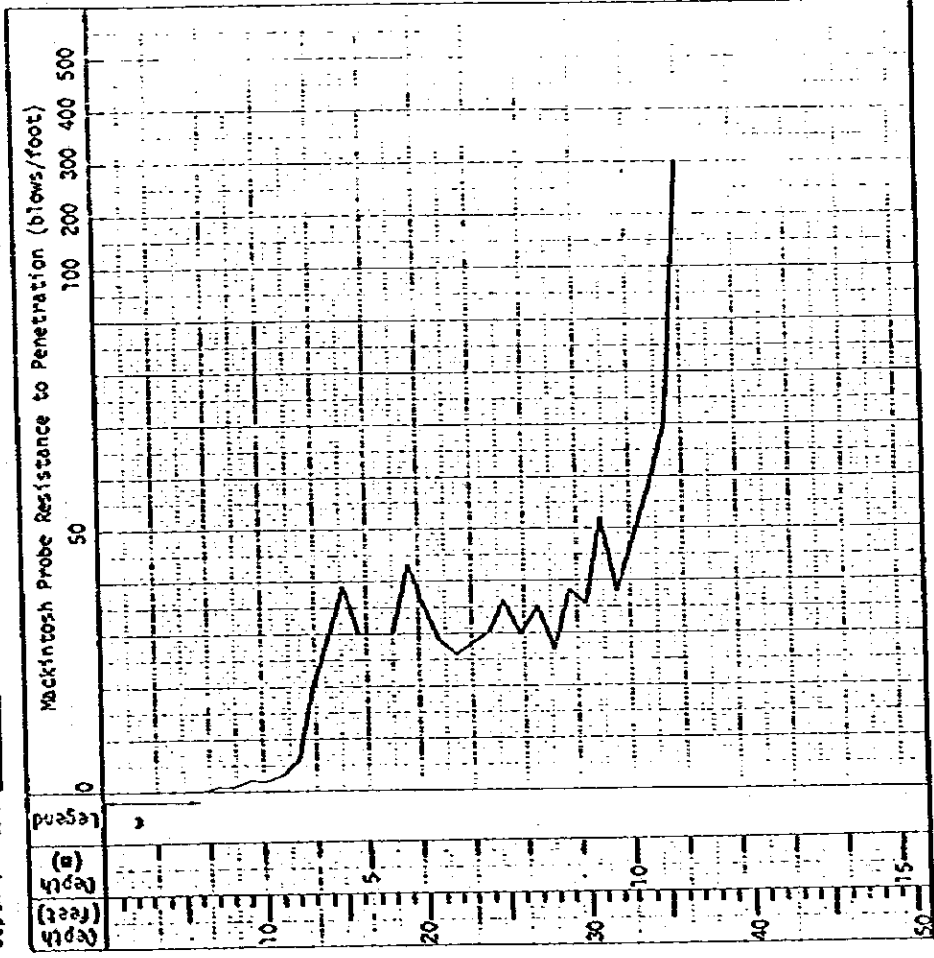
Mackintosh Probe Resistance to Penetration (blows/foot)



### MACKINTOSH PROBE TEST

Project: Feasibility Study for the Reclamation Project of Ex-mining Land for Housing Development and Other Purposes - Phase I

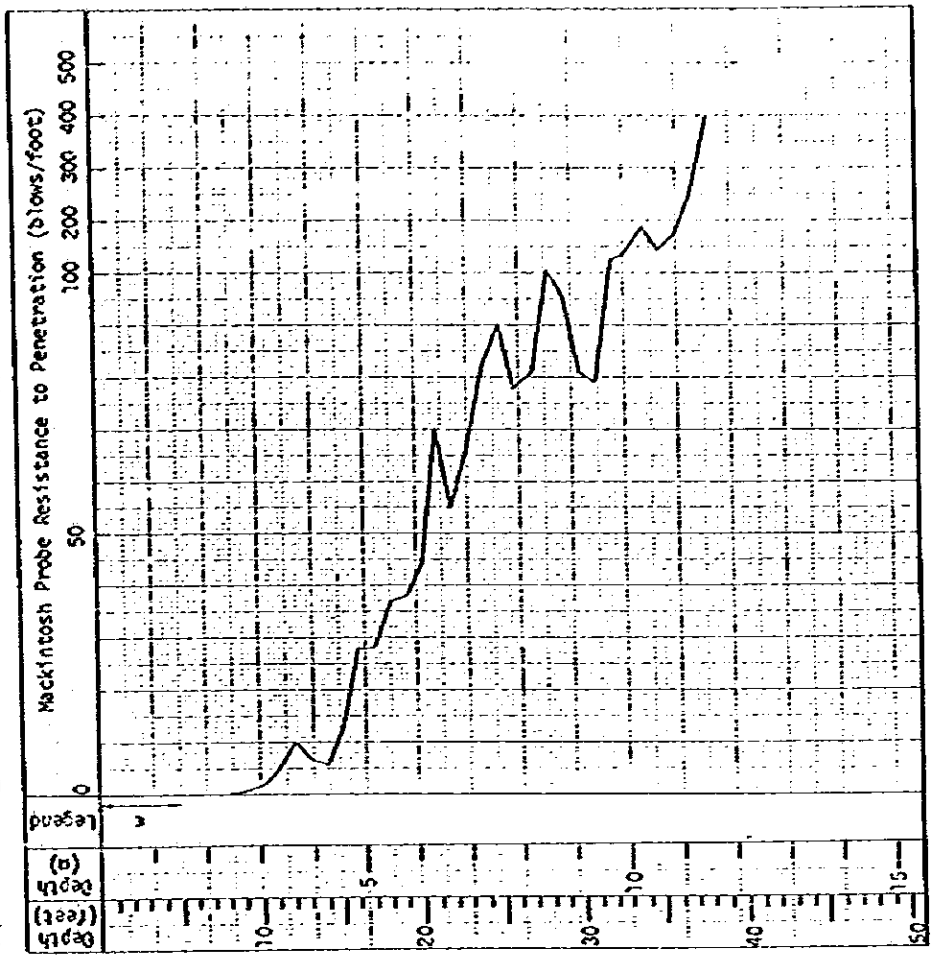
Location: Kampong Pandan = N2/003/80/ MP-9(P-2)  
 Date: 2-2-1980 Water Depth: 0'0"-6'0"  
 Depth of Test: 0'0"-36'0" Elevation: -



### MACKINTOSH PROBE TEST

Project: Feasibility Study for the Reclamation Project of Ex-mining Land for Housing Development and Other Purposes - Phase I

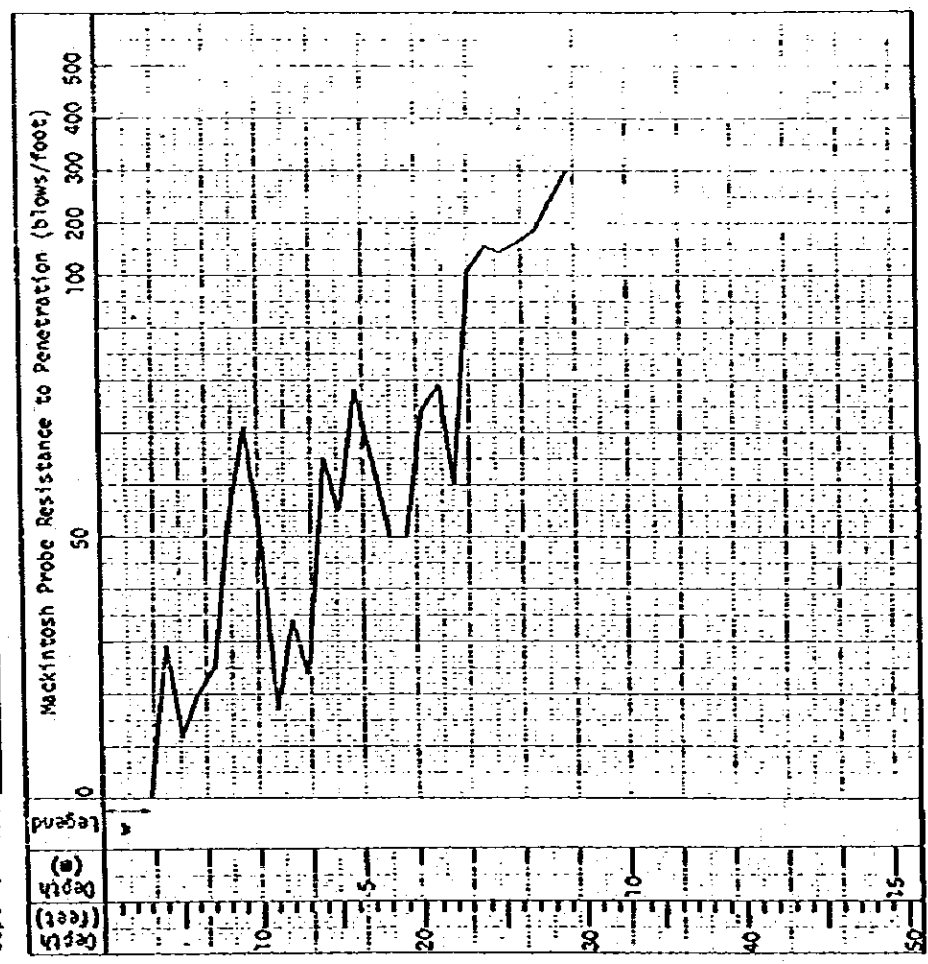
Location: Kampong Pandan = N2/003/80/ MP-10(P-2)  
 Date: 2-2-1980 Water Depth: 0'0"-5'0"  
 Depth of Test: 0'0"-38'0" Elevation: -



### MACKINTOSH PROBE TEST

Project: Feasibility Study for the Reclamation Project of Examining Land for Housing Development and Other Purposes - Phase I

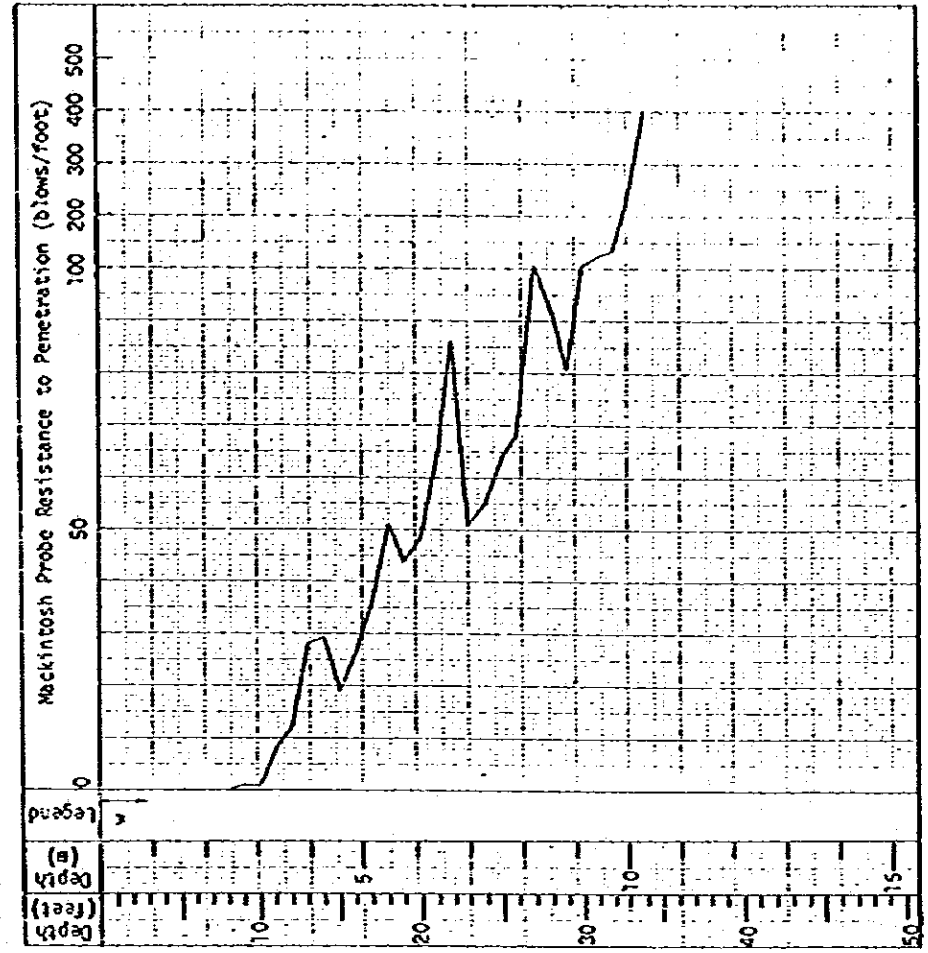
Location: Kampong Pandan - M7/003/80/ Test No.: MP-11(P-3)  
 Date: 2-2-1980 Water Depth: 0'0"-3'0"  
 Depth of Test: 0'0"-29'0" Elevation: -



### MACKINTOSH PROBE TEST

Project: Feasibility Study for the Reclamation Project of Examining Land for Housing Development and Other Purposes - Phase I

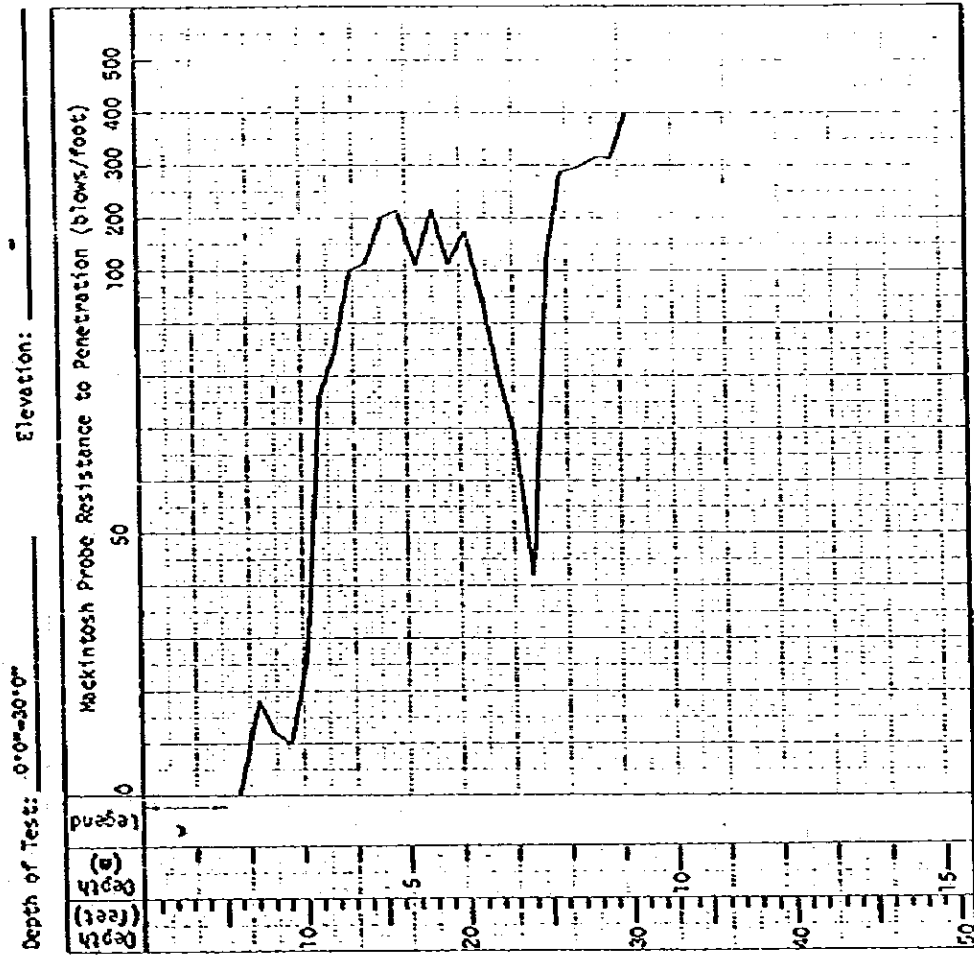
Location: Kampong Pandan - M7/003/80/ Test No.: MP-12(P-3)  
 Date: 2-2-1980 Water Depth: 0'0"-3'0"  
 Depth of Test: 0'0"-34'0" Elevation: -



### MACKINTOSH PROBE TEST

Project: Feasibility Study for the Reclamation Project of Ex-mining Land for Housing Development and Other Purposes - Phase I

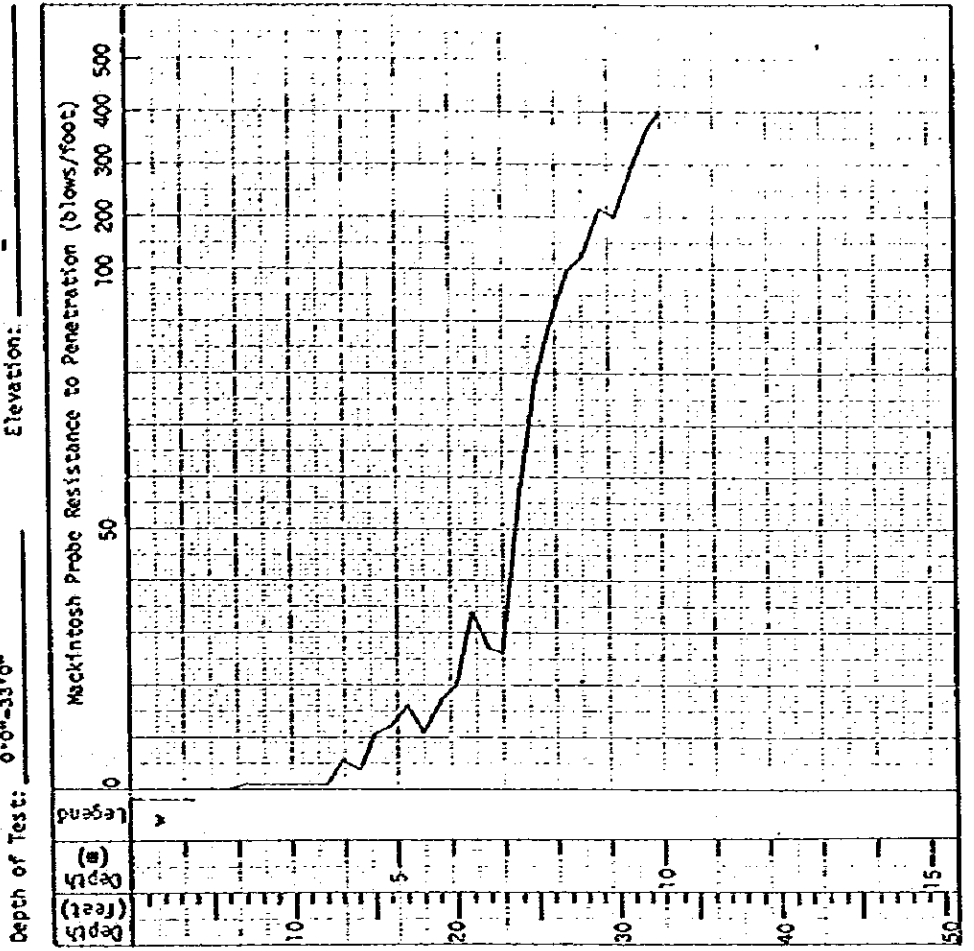
Location: Kampong Pandan - N2/003/80/ MP-13(P-3)  
 Date: 1-2-1980 Test No.:  
 Water Depth: 0'0"-5'0" Elevation: -



### MACKINTOSH PROBE TEST

Project: Feasibility Study for the Reclamation Project of Ex-mining Land for Housing Development and Other Purposes - Phase I

Location: Kampong Pandan - N2/003/80/ MP-14(P-3)  
 Date: 1-2-1980 Test No.:  
 Water Depth: 0'0"-4'0" Elevation: -



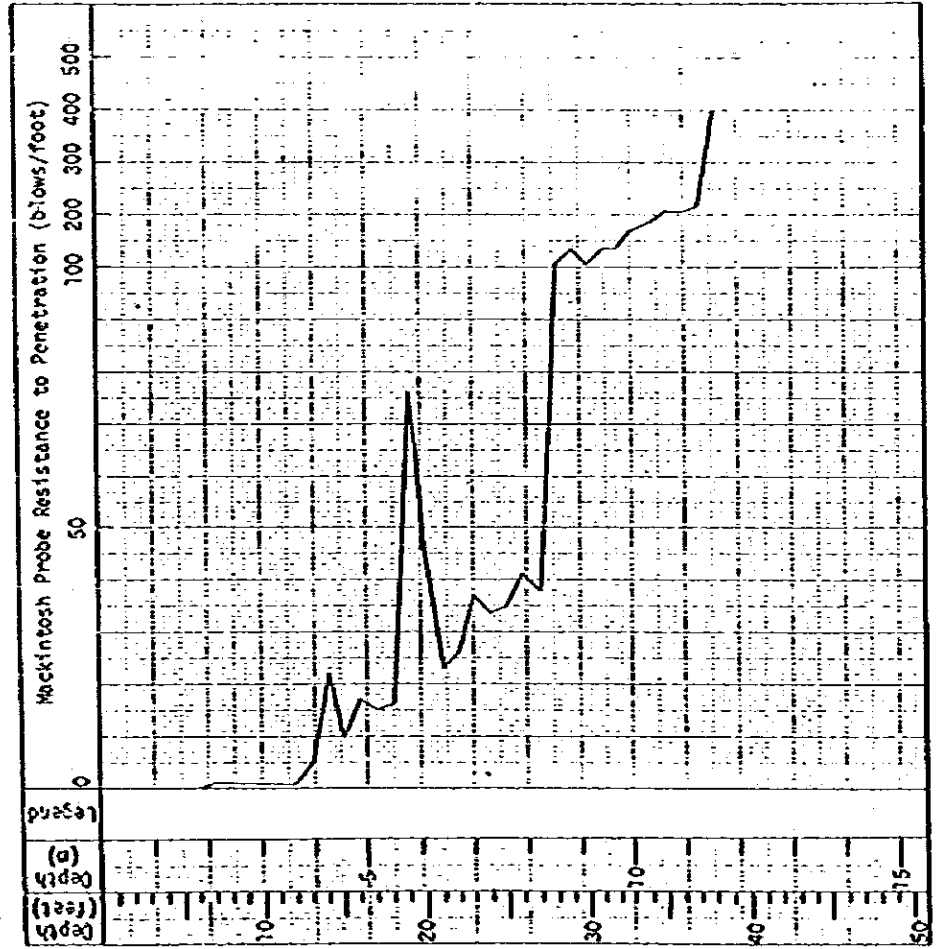
### MACKINTOSH PROBE TEST

Project: Feasibility Study for the Reclamation Project of Ex-mining Land for Housing Development and Other Purposes - Phase I

Location: Kampong Pandan - N3/003/80/ Test No.: MP-15A(P-3)

Date: 1-2-1980 Water Depth: \_\_\_\_\_

Depth of Test: 0'0"-38'0" Elevation: \_\_\_\_\_



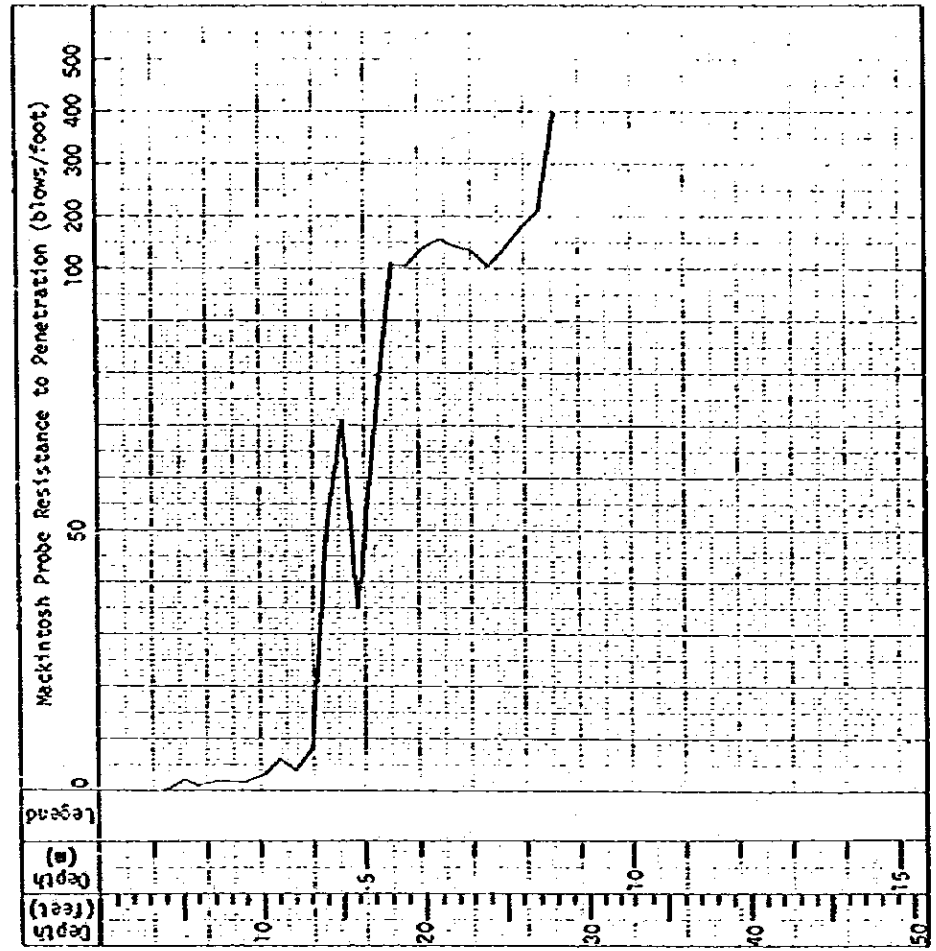
### MACKINTOSH PROBE TEST

Project: Feasibility Study for the Reclamation Project of Ex-mining Land for Housing Development and Other Purposes - Phase I

Location: Kampong Pandan - N3/003/80/ Test No.: MP-15(P-3)

Date: 1-2-1980 Water Depth: \_\_\_\_\_

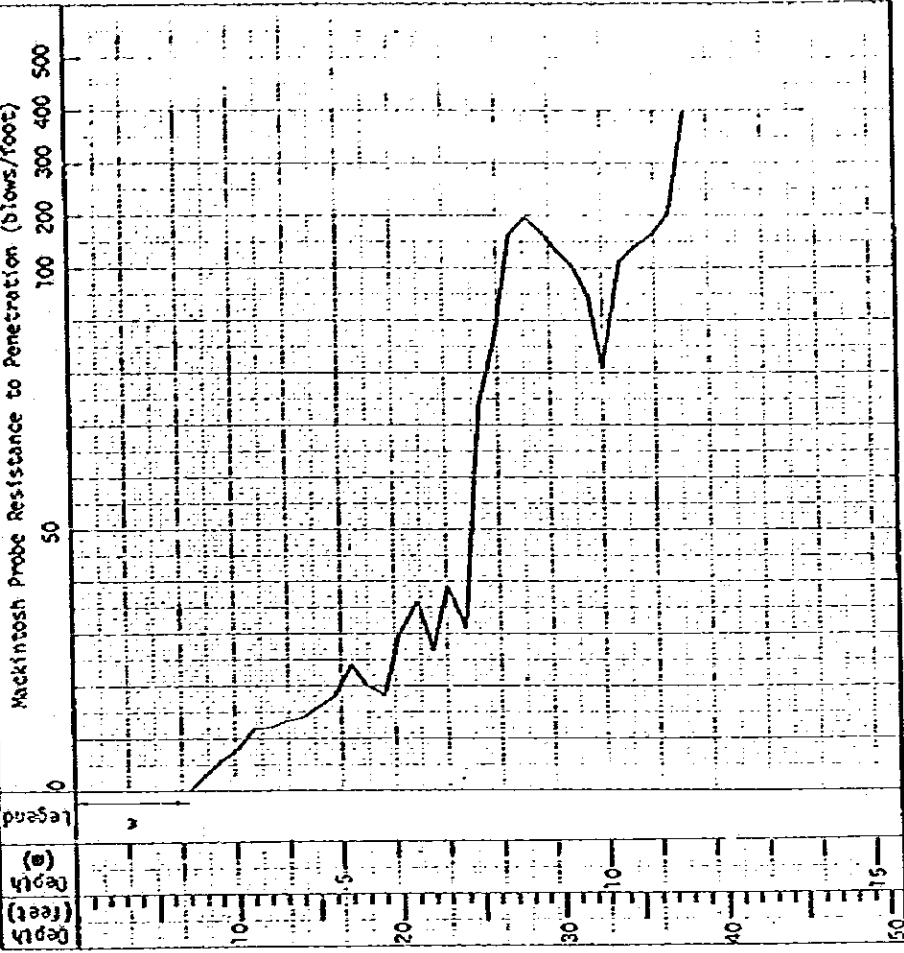
Depth of Test: 0'0"-28'0" Elevation: \_\_\_\_\_



### MACKINTOSH PROBE TEST

Project: Feasibility Study for the Reclamation Project of Ex-mining Land for Housing Development and Other Purposes - Phase I

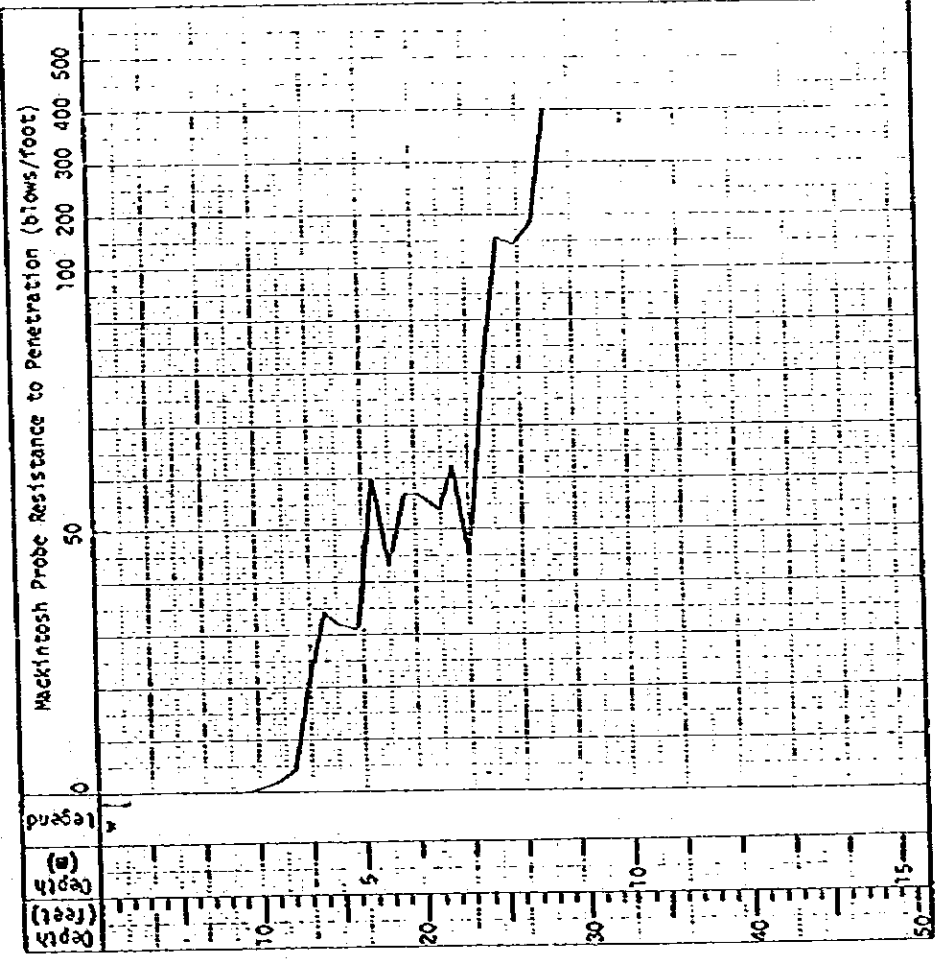
Location: Kampong Pandan - N3/003/80  
 Date: 29-1-1980  
 Test No.: MP-17(P-4)  
 Water Depth: 0'0"=7'0"  
 Depth of Test: 0'0"=38'0" Elevation: -



### MACKINTOSH PROBE TEST

Project: Feasibility Study for the Reclamation Project of Ex-mining Land for Housing Development and Other Purposes - Phase I

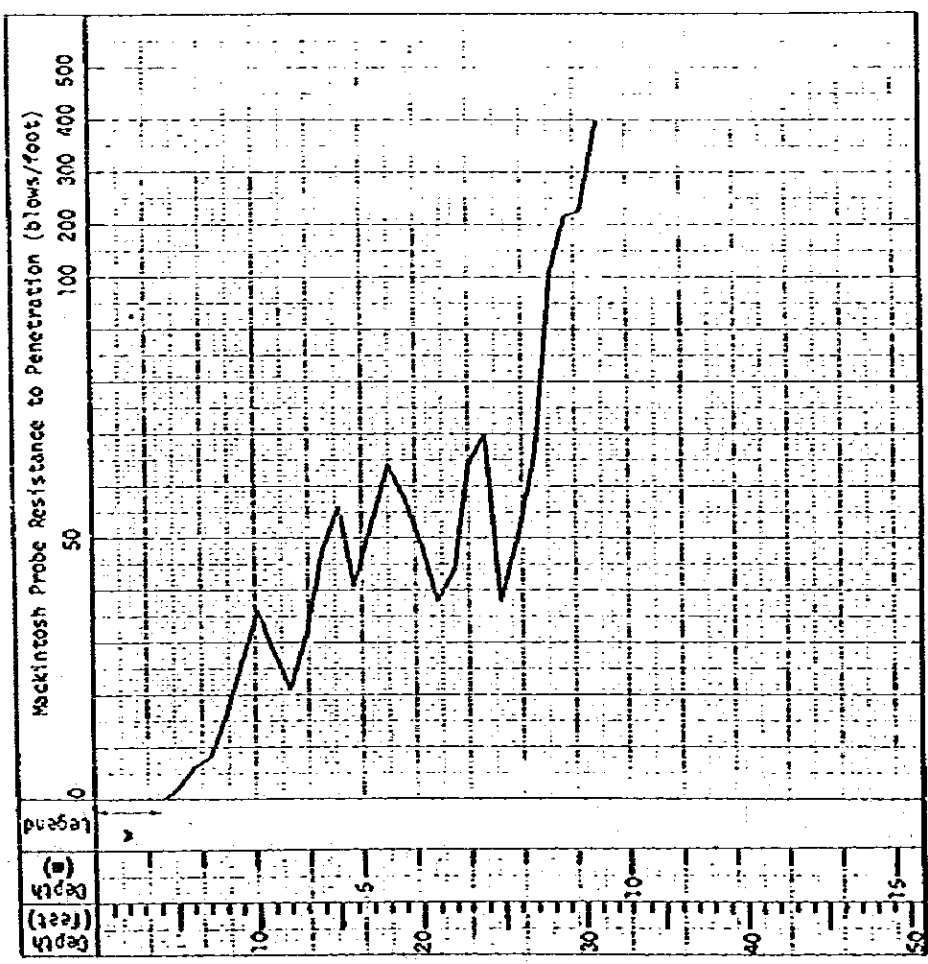
Location: Kampong Pandan - N3/003/80  
 Date: 1-2-1980  
 Test No.: MP-16(P-3)  
 Water Depth: 0'0"=2'0"  
 Depth of Test: 0'0"=28'0" Elevation: -



### MACKINTOSH PROBE TEST

Project: Feasibility Study for the Reclamation Project of Ex-mining Land for Housing Development and Other Purposes - Phase I

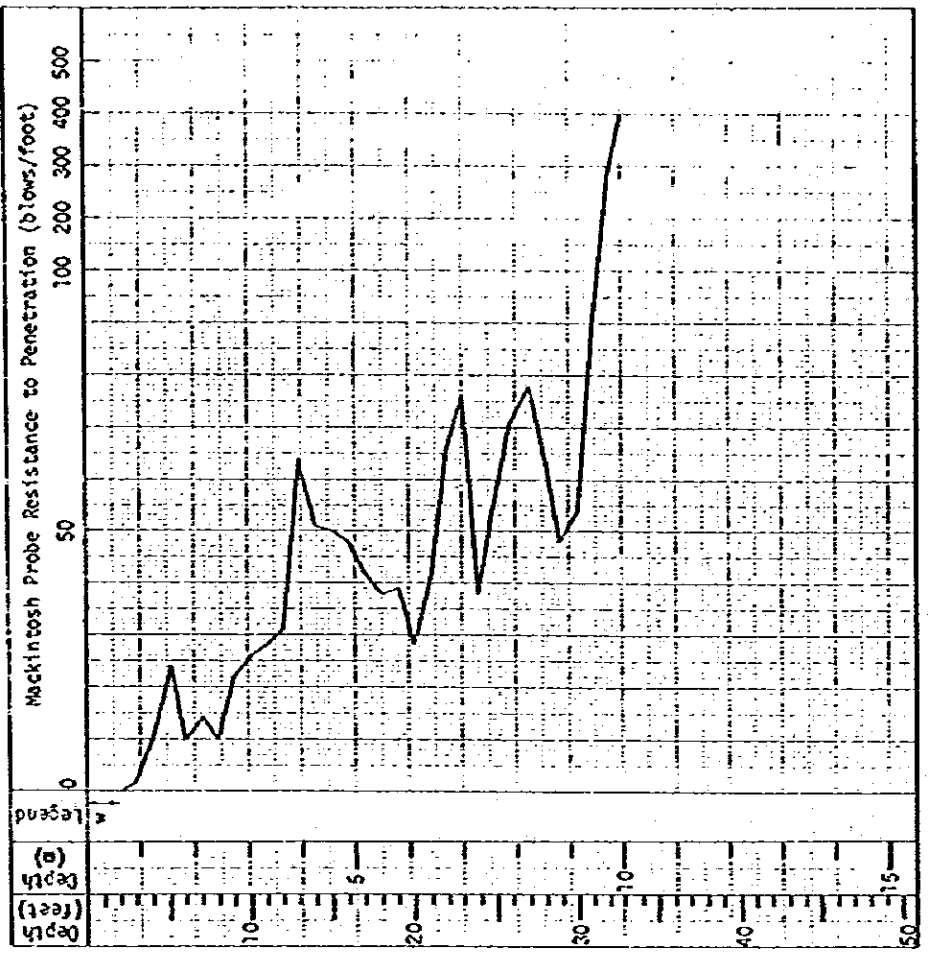
Location: Kampong Pandan - M7/003/80  
 Date: 29-1-1980  
 Test No.: MP-18(P-4)  
 Water Depth: 0'0"-4'0"  
 Depth of Test: 0'0"-31'0" Elevation: -



### MACKINTOSH PROBE TEST

Project: Feasibility Study for the Reclamation Project of Ex-mining Land for Housing Development and Other Purposes - Phase I

Location: Kampong Pandan - M7/003/80  
 Date: 29-1-1980  
 Test No.: MP-19(P-4)  
 Water Depth: 0'0"-2'0"  
 Depth of Test: 0'0"-33'0" Elevation: -

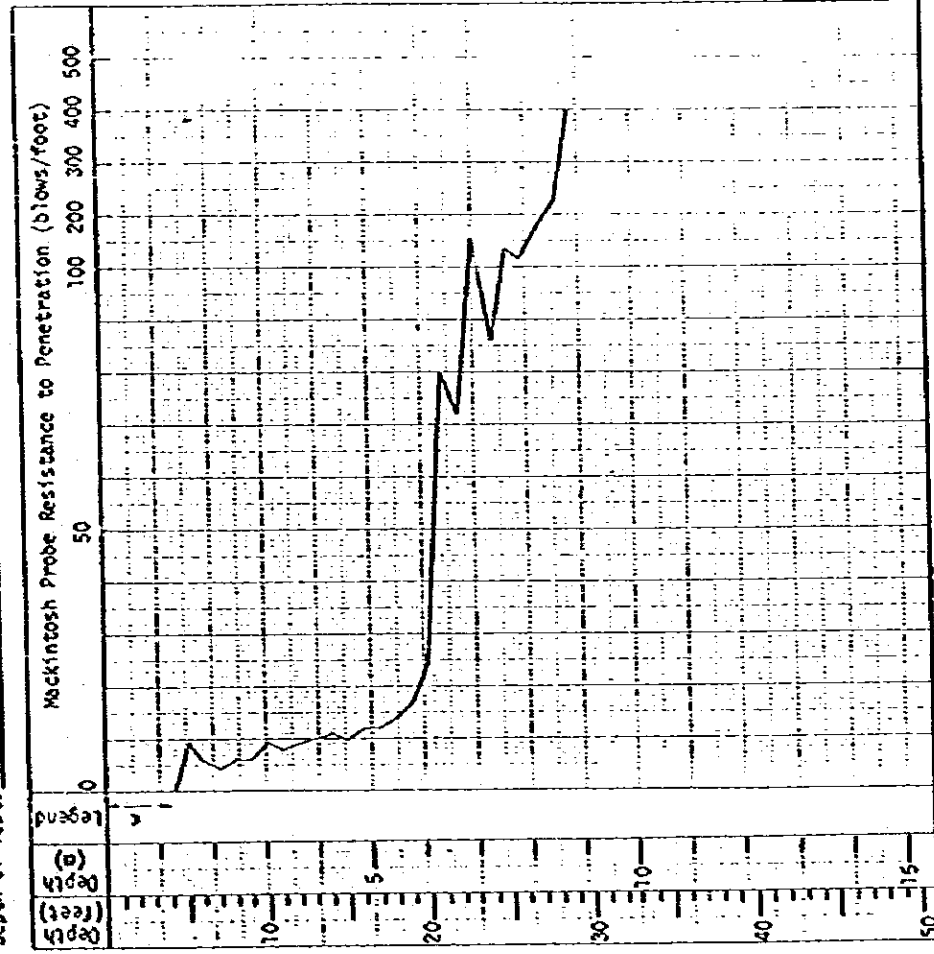




### MACKINTOSH PROBE TEST

Project: Feasibility Study for the Reclamation Project of Ex-mining Land for Housing Development and Other Purposes - Phase I

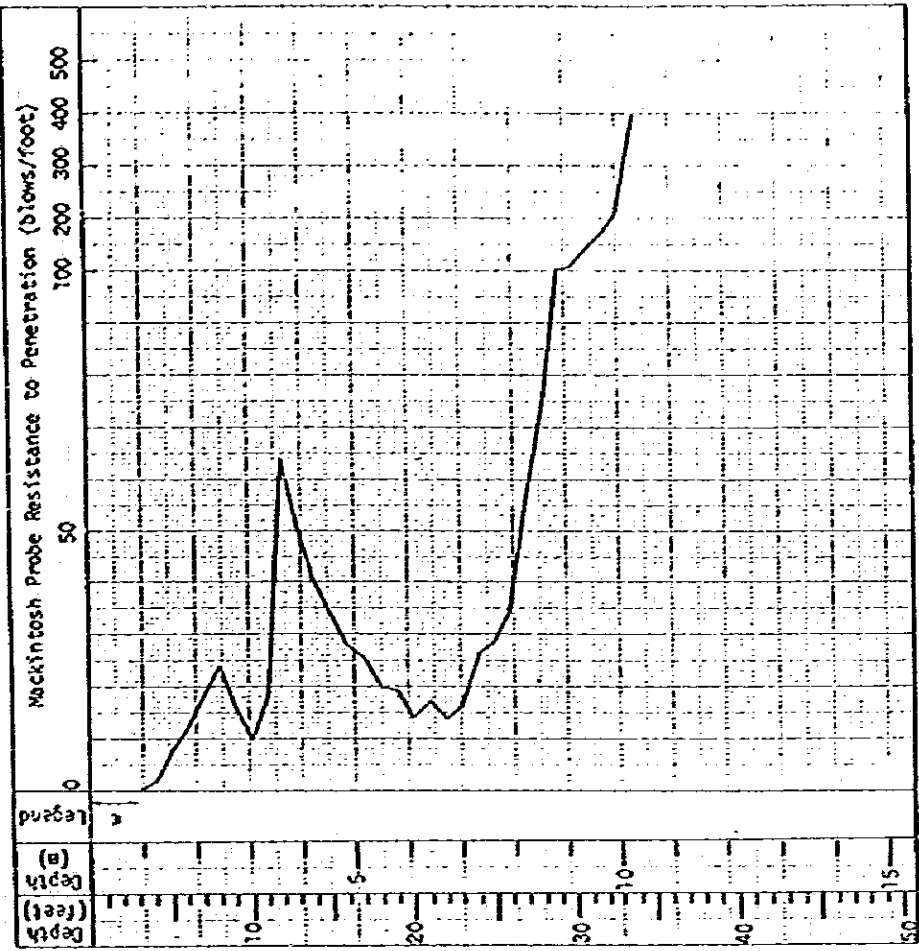
Location: Kampong Pandan - M3/003/80  
 Date: 29-1-1980  
 Test No.: MP-20(P-4)  
 Water Depth: 0'0"-4'0"  
 Depth of Test: 0'0"-29'0" Elevation: \_\_\_\_\_



### MACKINTOSH PROBE TEST

Project: Feasibility Study for the Reclamation Project of Ex-mining Land for Housing Development and Other Purposes - Phase I

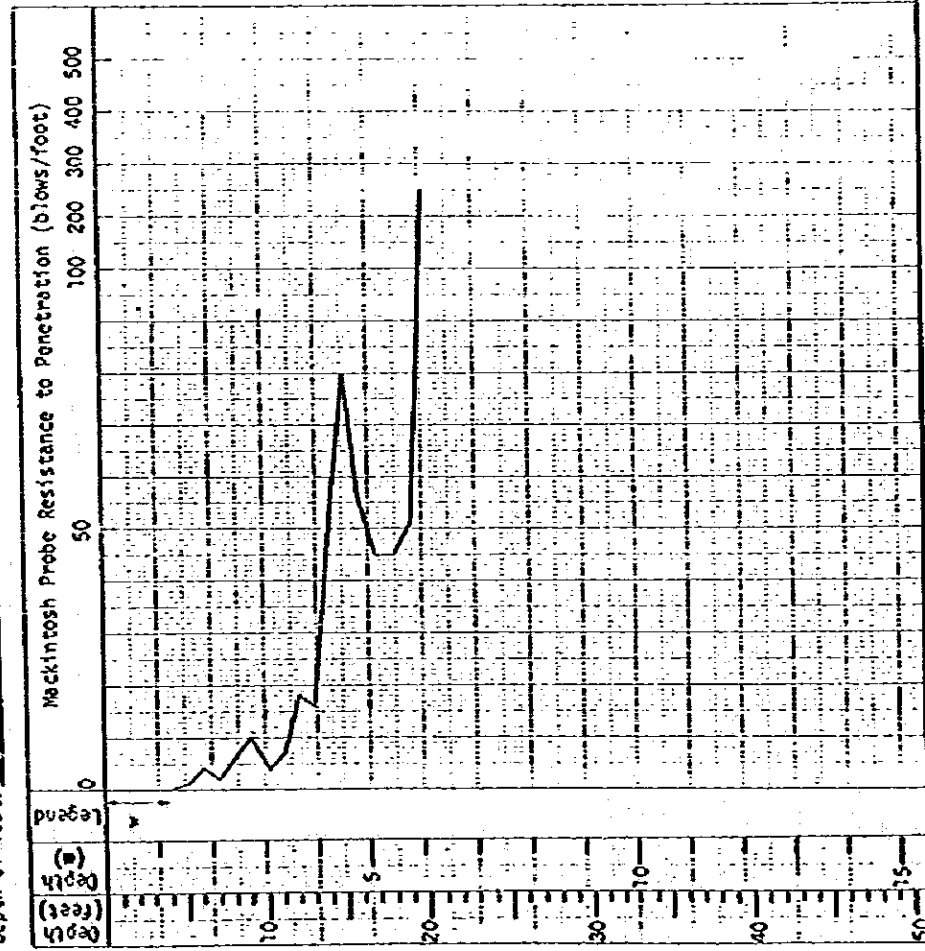
Location: Kampong Pandan - M3/003/80  
 Date: 29-1-1980  
 Test No.: MP-21(P-4)  
 Water Depth: 0'0"-3'0"  
 Depth of Test: 0'0"-34'0" Elevation: \_\_\_\_\_



### MACKINTOSH PROBE TEST

Project: Feasibility Study for the Reclamation Project of Ex-mining Land for Housing Development and Other Purposes - Phase I

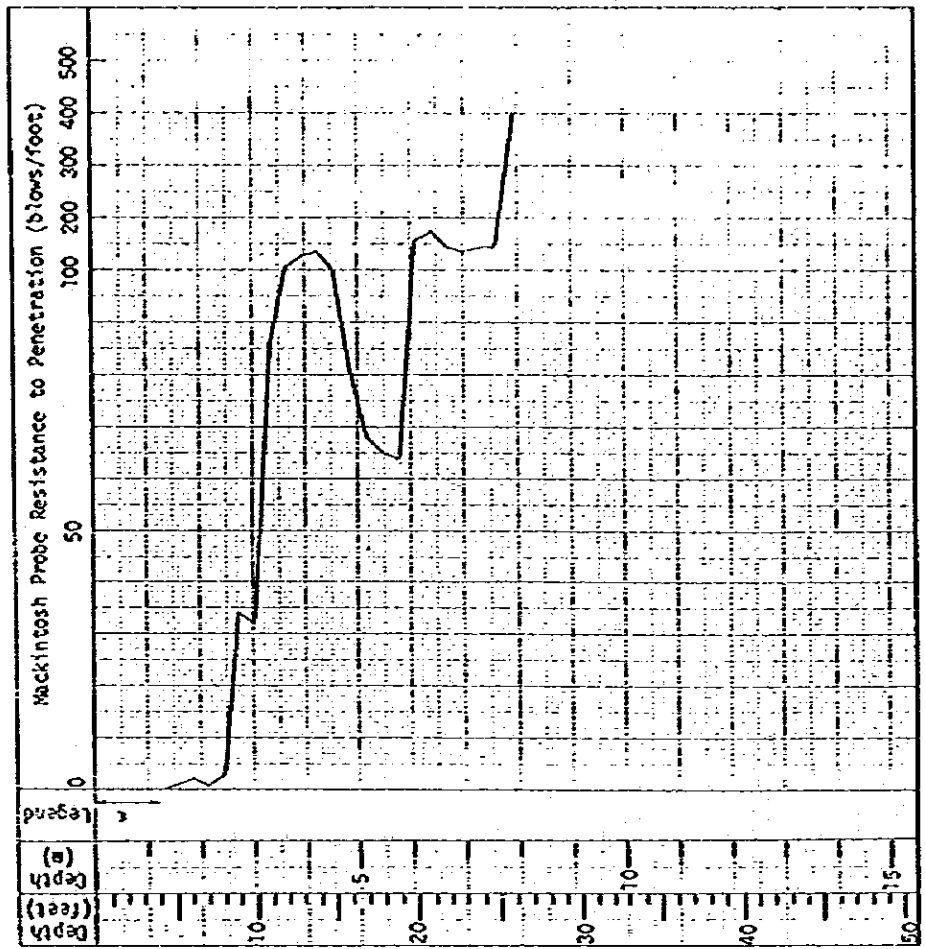
Location: Kampong Pandan - M3/003/80/ Test No.: MP-22(P-5)  
 Date: 5-2-1980 Water Depth: 0'0"-4'0"  
 Depth of Test: 0'0"-20'0" Elevation: -



### MACKINTOSH PROBE TEST

Project: Feasibility Study for the Reclamation Project of Ex-mining Land for Housing Development and Other Purposes - Phase I

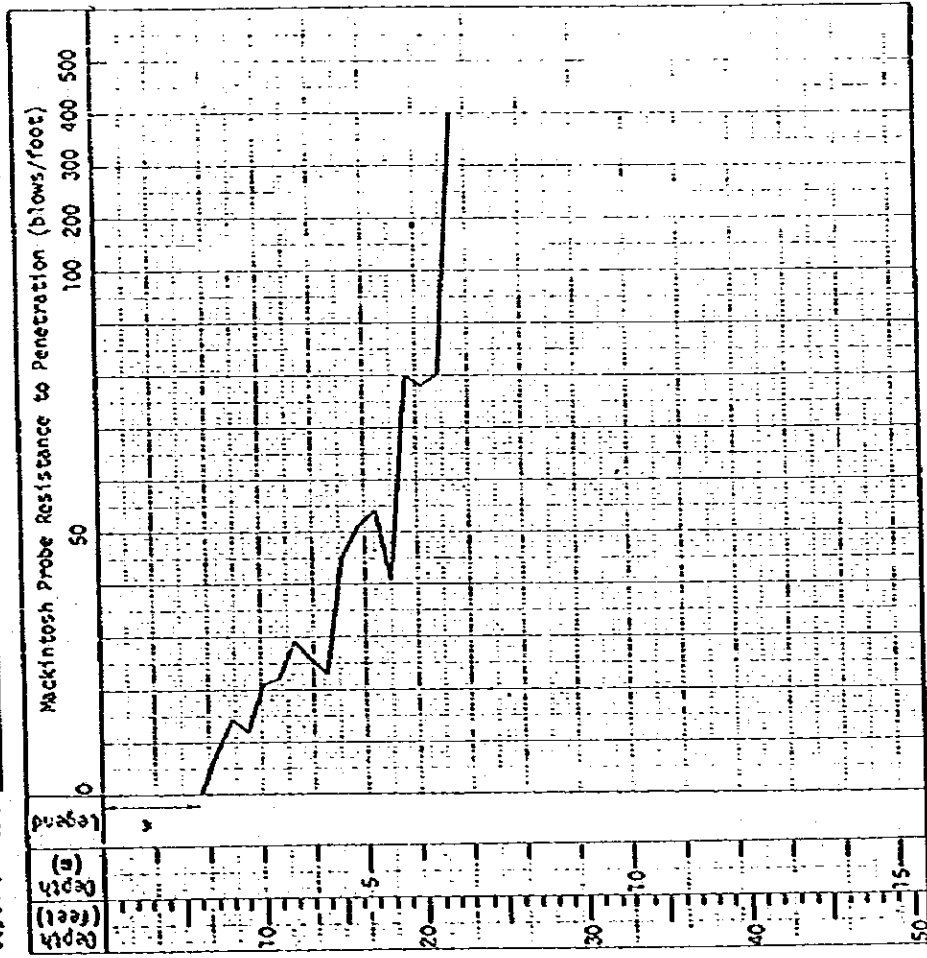
Location: Kampong Pandan - M3/003/80 Test No.: MP-23(P-5)  
 Date: 5-2-1980 Water Depth: 0'0"-4'0"  
 Depth of Test: 0'0"-26'0" Elevation: -



### MACKINTOSH PROBE TEST

Project: Feasibility Study for the Reclamation Project of Examining Land for Housing Development and Other Purposes - Phase 1

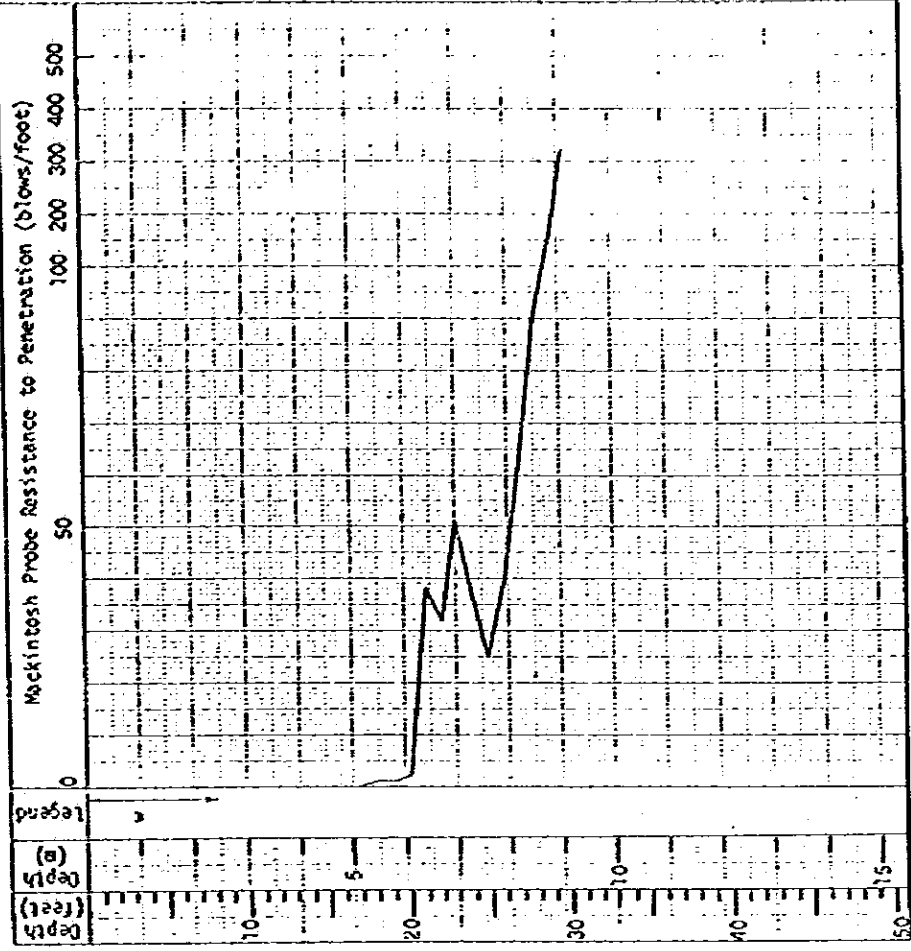
Location: Kampong Pandan - M2/003/80/ MP-24(P=5)  
 Date: 5-2-1990 Water Depth: 0'0"-6'0"  
 Depth of Test: 0'0"-22'0" Elevation: \_\_\_\_\_



### MACKINTOSH PROBE TEST

Project: Feasibility Study for the Reclamation Project of Examining Land for Housing Development and Other Purposes - Phase 1

Location: Kampong Pandan - M2/003/80/ MP-25(P=5)  
 Date: 5-2-1990 Water Depth: 0'0"-8'0"  
 Depth of Test: 0'0"-30'0" Elevation: \_\_\_\_\_



### MACKINTOSH PROBE TEST

Project: Feasibility Study for the Reclamation Project of Ex-mining Land for Housing Development and Other Purposes - Phase I

Location: Kampong Pandan = M3/003/80/

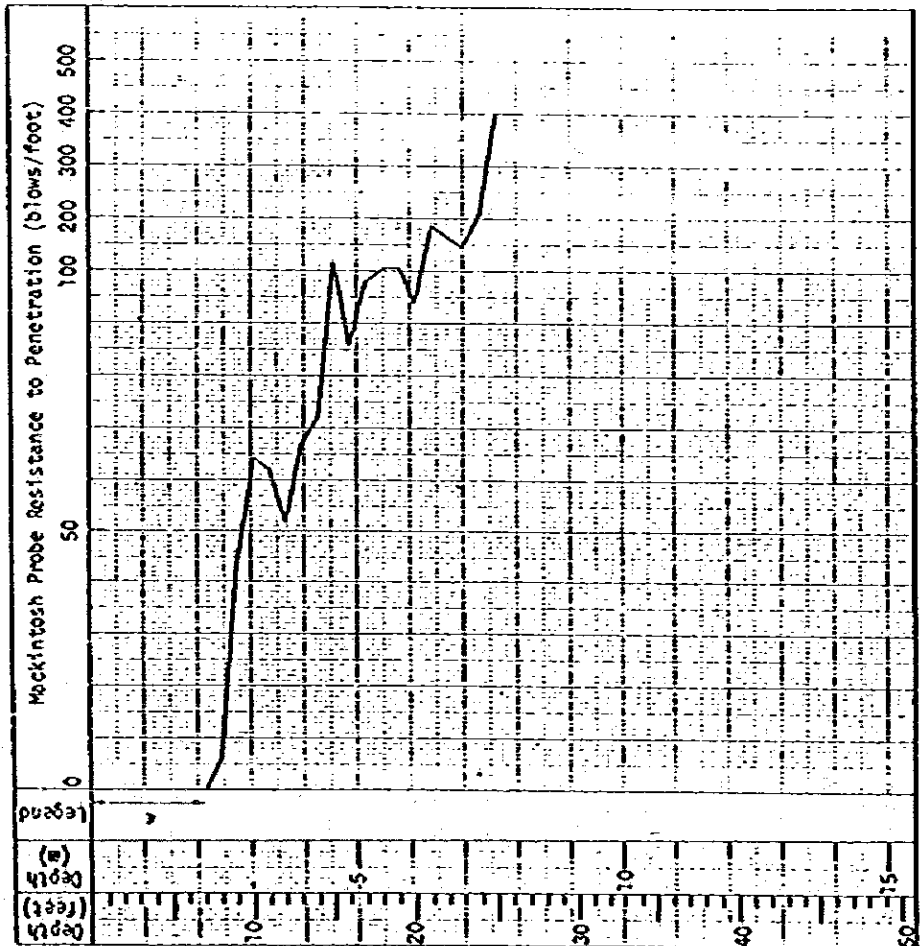
Test No.: MP-26(P-5)

Date: 5-2-1980

Water Depth: 0'0"-7'0"

Depth of Test: 0'0"-25'0"

Elevation: \_\_\_\_\_



### MACKINTOSH PROBE TEST

Project: Feasibility Study for the Reclamation Project of Ex-mining Land for Housing Development and Other Purposes - Phase I

Location: Kampong Pandan = M3/003/80

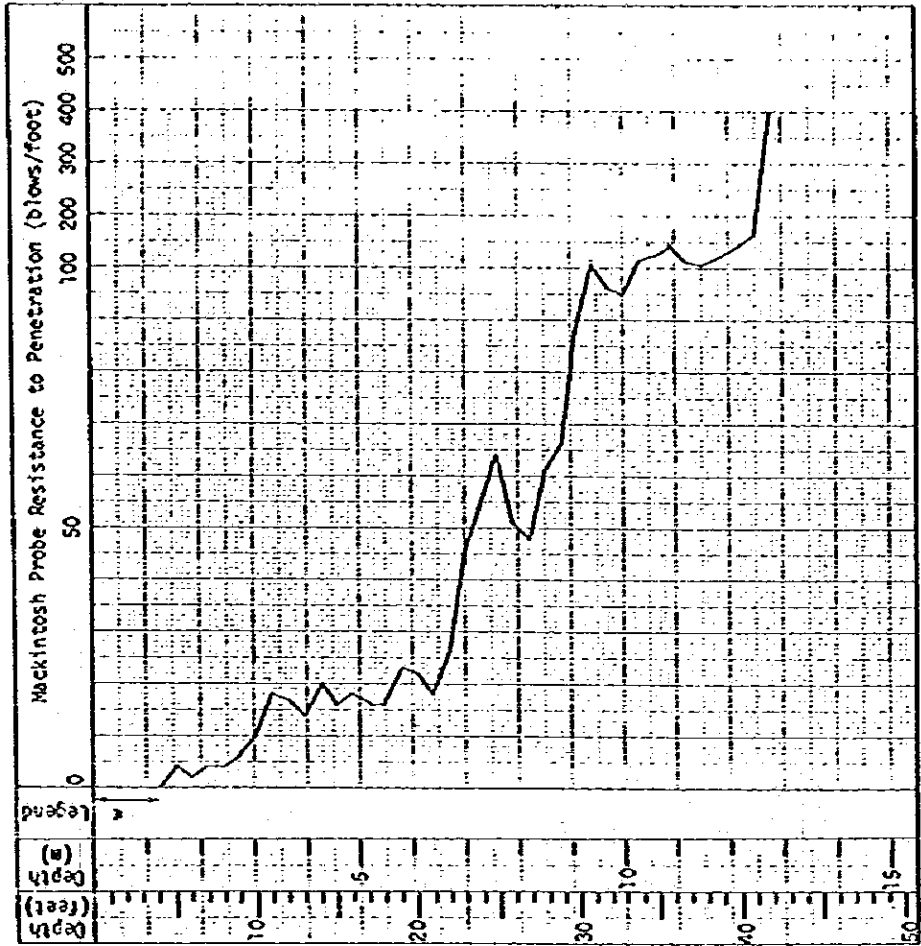
Test No.: MP-27(P-6)

Date: 6-2-1980

Water Depth: 0'0"-4'0"

Depth of Test: 0'0"-42'0"

Elevation: \_\_\_\_\_



### MACKINTOSH PROBE TEST

Project: Feasibility Study for the Reclamation Project of Ex-mining Land for Housing Development and Other Purposes - Phase I

Location: Kempong Pandan - M3/003/80

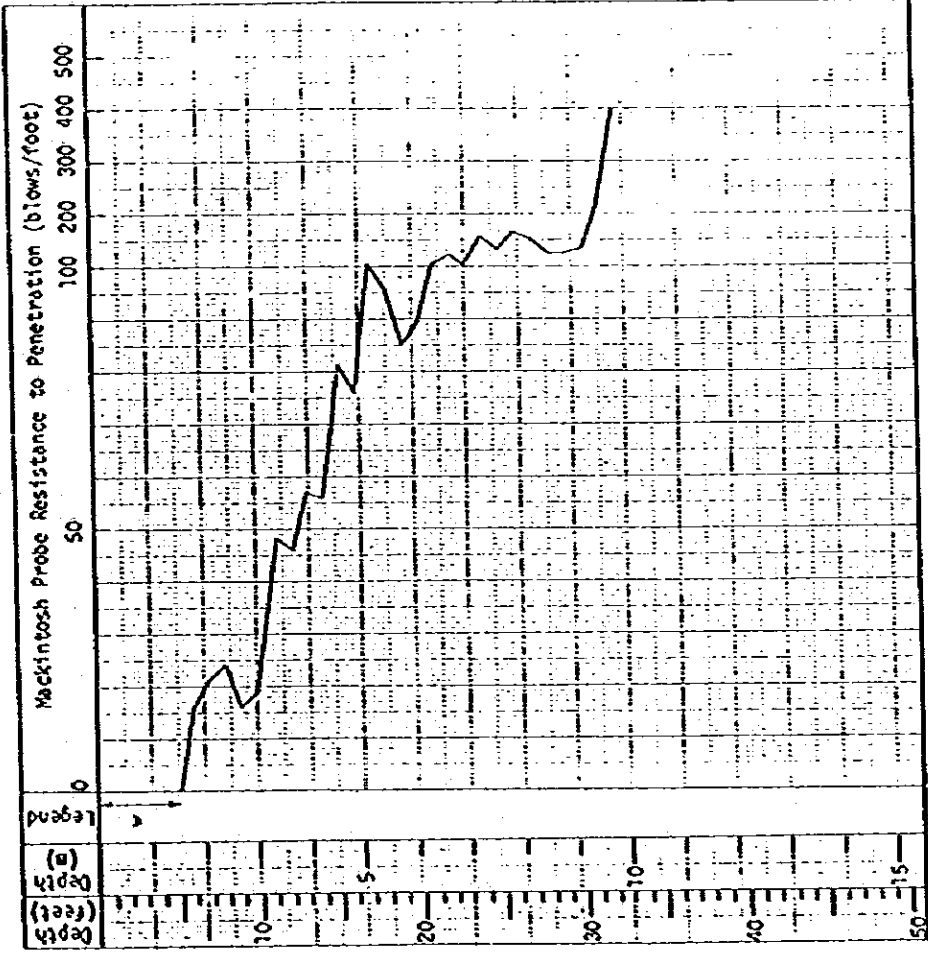
Test No.: MP-28(P-6)

Water Depth: 0'0"-5'0"

Date: 6-2-1980

Depth of Test: 0'0"-32'0"

Elevation: -



### MACKINTOSH PROBE TEST

Project: Feasibility Study for the Reclamation Project of Ex-mining Land for Housing Development and Other Purposes - Phase I

Location: Kempong Pandan - M3/003/80

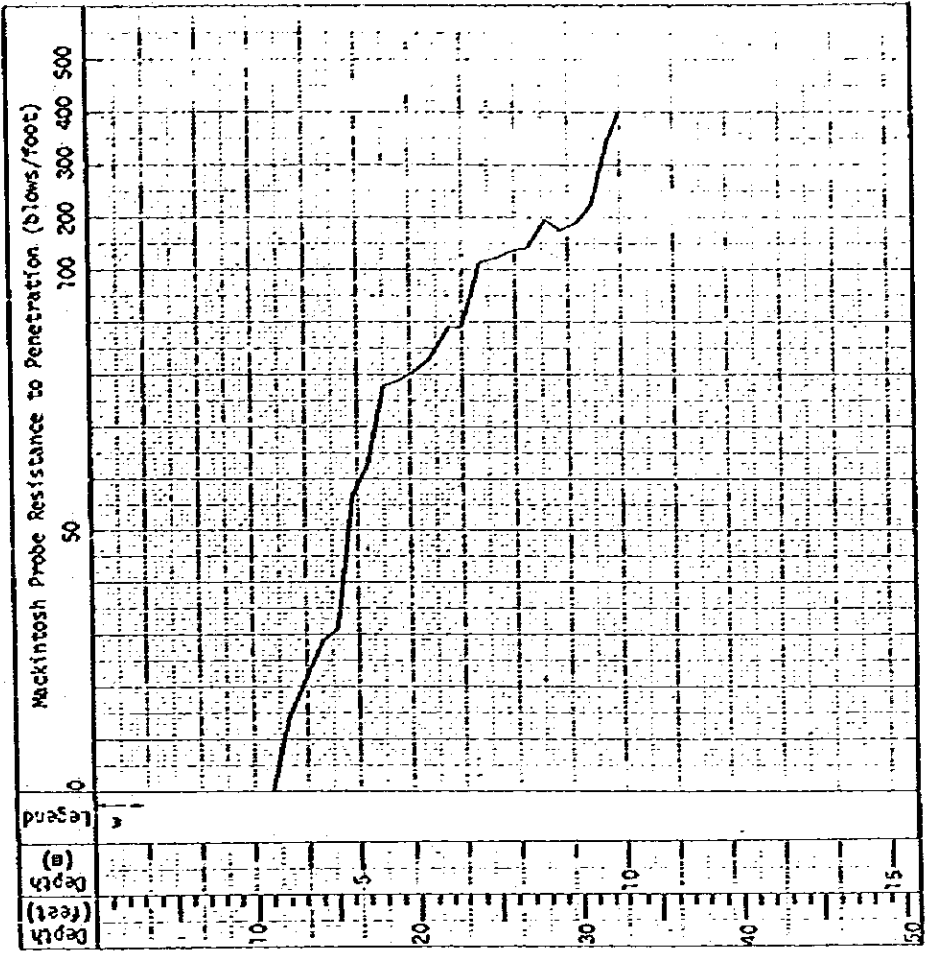
Test No.: MP-29(P-6)

Water Depth: 0'0"-3'0"

Date: 6-2-1980

Depth of Test: 0'0"-33'0"

Elevation: -



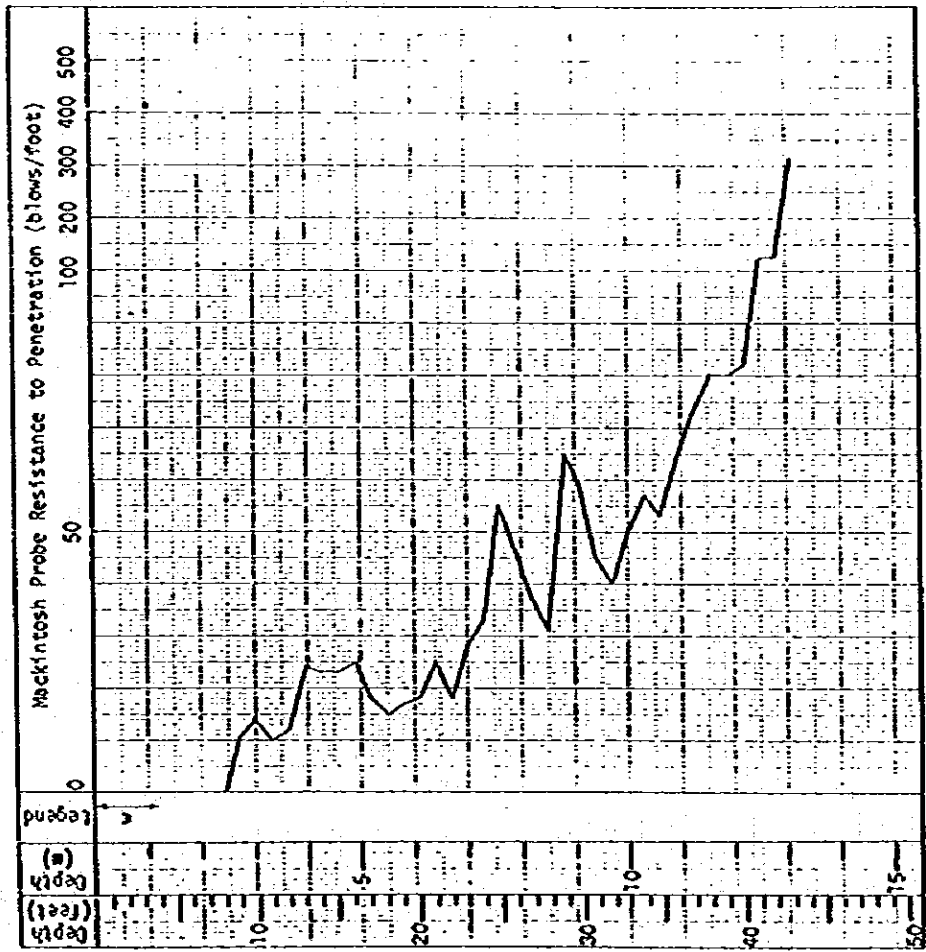
# MACKINTOSH PROBE TEST

Project: Feasibility Study for the Reclamation Project of Ex-mining Land for Housing Development and Other Purposes - Phase I

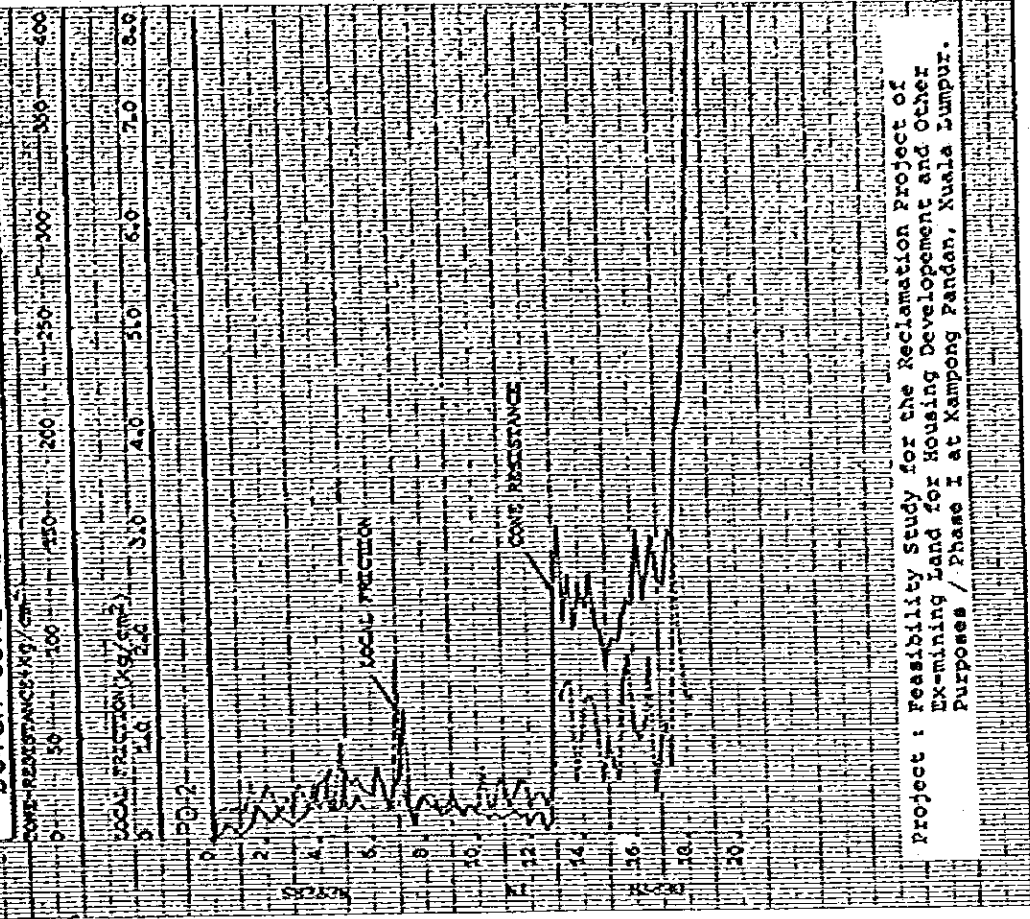
Location: Kampong Pandan - M7/003/80 Test No.: MP-30(P-6)

Date: 6-2-1988 Water Depth: 0'0"-4'0"

Depth of Test: 0'0"-43'0" Elevation: \_\_\_\_\_

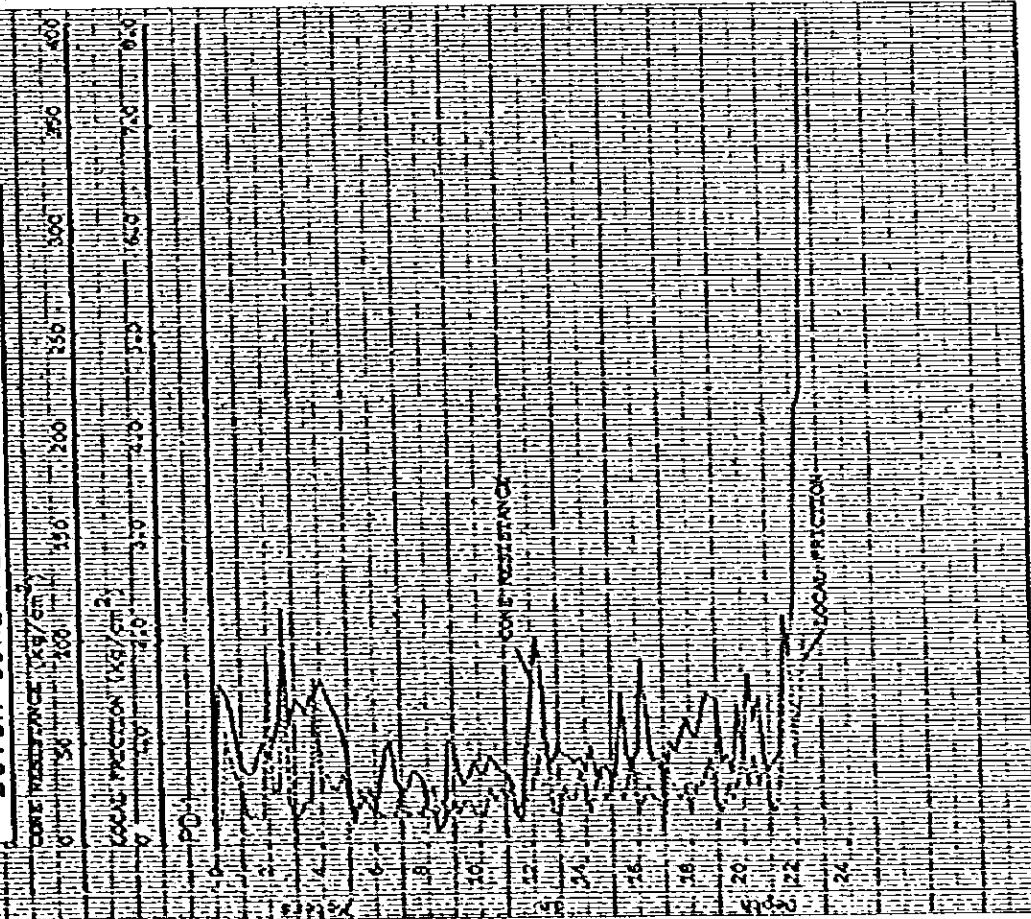


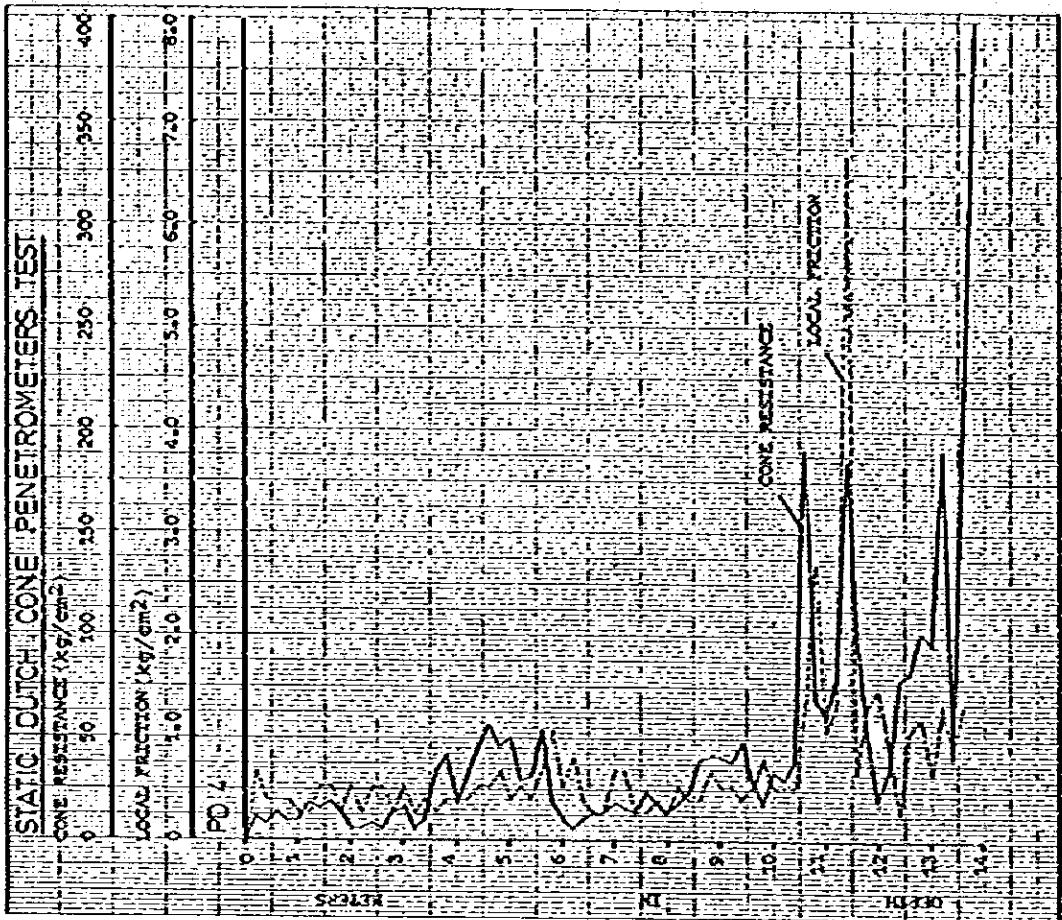
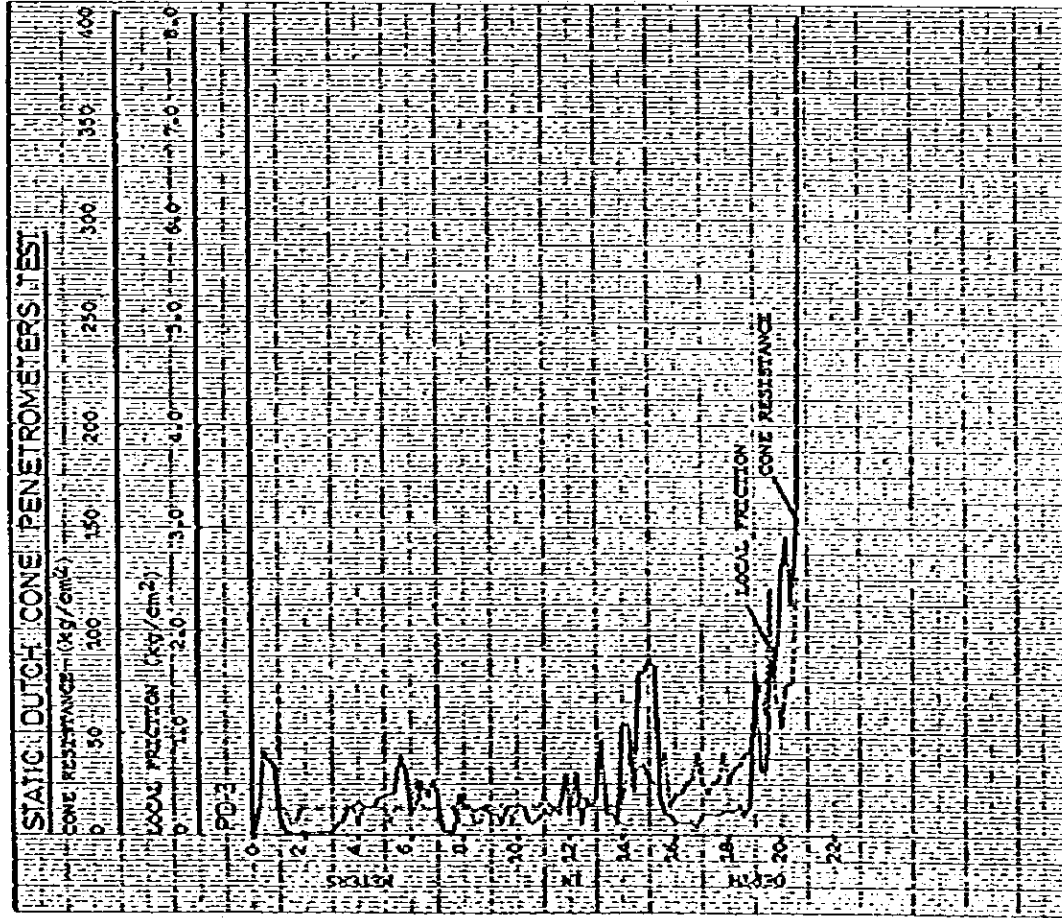
# DUTCH CONE PENETROMETER TEST



Project : Feasibility Study for the Reclamation Project of  
 Examining Land for Housing Development and Other  
 Purposes / Phase I at Kampong Pandan, Kuala Lumpur.

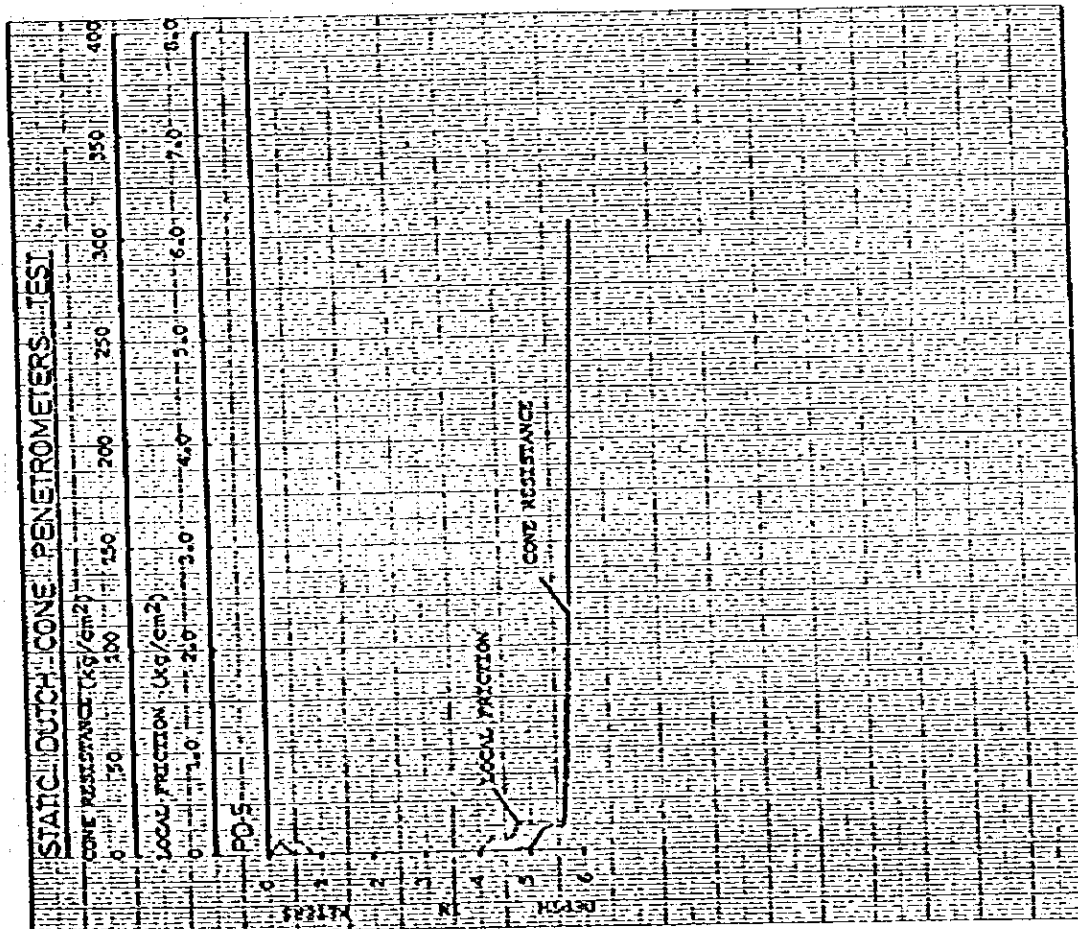
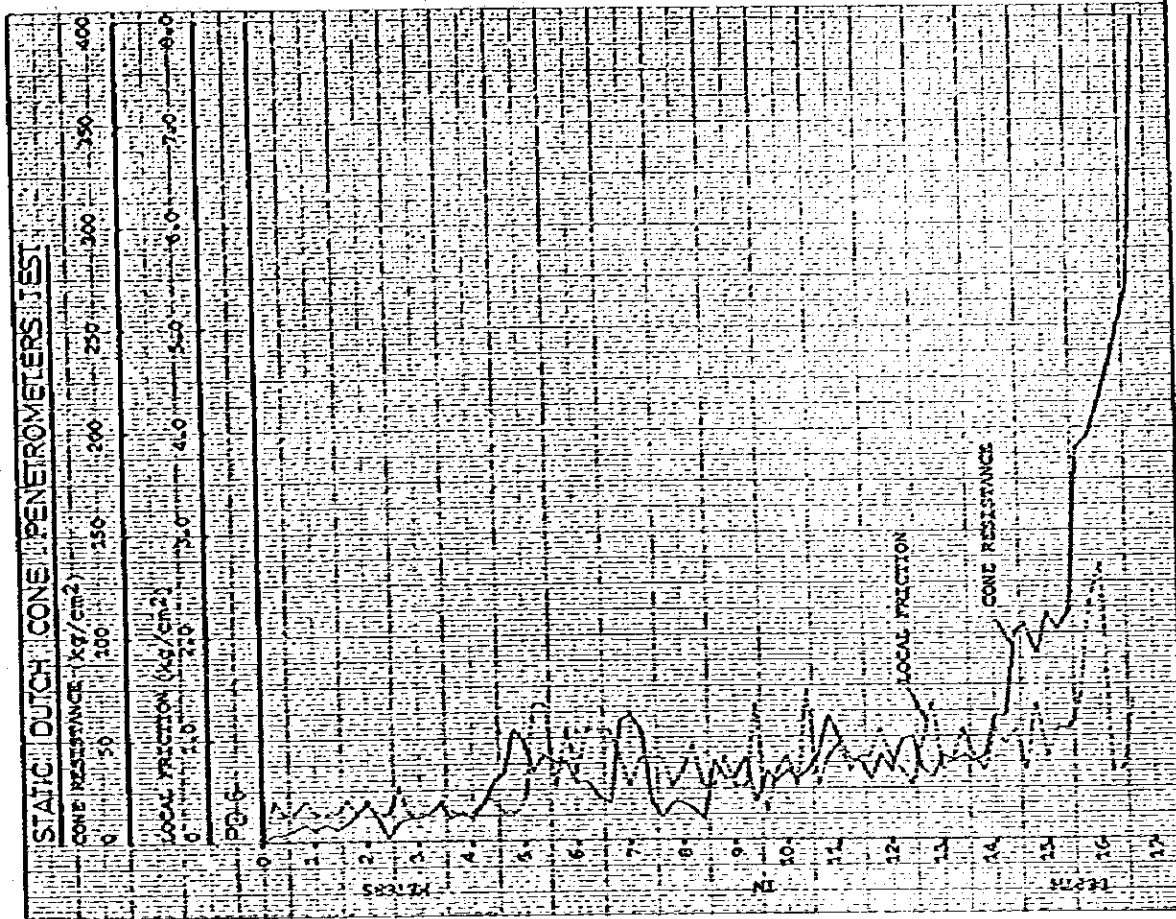
# DUTCH CONE PENETROMETER TEST





Project: Feasibility Study for the Reclamation Project of Ex-mining Land  
 for Housing Development and Other Purposes-Phase I at Nampeng  
 Pandan, Kuala Lumpur - MY/003/80/





Project: Feasibility Study for the Reclamation Project of Ex-mining Land  
for Housing Development and Other Purposes-Phase I at Kampong  
Pandau, Kuala Lumpur - M3/003/80/