

3.4.2 Ultimate Use Plan

(1) Law and regulations

The following law and act prohibit the construction of buildings on completed landfill sites until the site has become innocuous;

- Uniform Building By-law (1984) Part 6
- Street, Drainage and Building Act (1974)

(2) Possible Ultimate Use

As for the ultimate use of the completed site, the land used immediately after reclamation is in the form of a car park, golf links, farmland, park, playground and so forth. On the reclaimed land many years later, one-storey rambling-type buildings can be constructed. From a standpoint of plant growth, tall trees which spread roots soon after completion of reclamation work are hard to grow due to gasses such as methane and sulfureted hydrogen contained under the reclaimed land and changes in temperature; on the other hand an underbrush like turf grows fast. It is essential to sufficiently study the thickness of the final covering material, following the objective for ultimate use of the completed site.

a. Ultimate use as farmland

A number of ultimate use cases for the completed site are intended for farmlands by reclaiming swamp and mountainous area (valley) to a levelled ground suitable to farmland through landfilling wastes. In order to use the land as a farmland, it is required, in most cases, to select a final covering material suitable to farming, and to make the thickness of the material approximately 1 - 2m. Additionally, in order to prevent crops from being affected by generated gas, it is essential to install a gas removal facility. Periodical inspection and maintenance are necessary because of distortion and impairment of gas removal pipes and rain water drains due to settlement of the foundation. And especially, because of the clogging of the pipe which causes the spread of generated gas over the farmland and wither crops to death. In order to obviate negative effects caused by gas, a periodical examination of conditions of generated gas should be conducted, and, thereby, a necessary measure should be worked out.

b. Ultimate use as sporting facilities and parks

A number of disposal sites are used ultimately as a soccer grounds, sports facilities and a park. In order to use the site for these facilities, it is easy and simple to decide the nature and thickness of covering materials, as compared to that for farmland.

Considering that a number of people including children and the elderly use these facilities more often than they would farmland, it is a prerequisite to pay attention to the handling and location of generated gas. The generated gas is treated by diffusing it into air and burning it, but, if the releasing height of gas diffusion and exhaust gas by burning is low, those gases remain in the utilized facilities, depending on climatological conditions such as wind direction, which in turn displeases people by the production of offensive odor. It is necessary to take the aesthetic aspects into account.

c. Ultimate use as car park

As for the ultimate use of the completed site as a car park, although there still remain the problems of the handling of rust produced on cars by gas, the improvement work for this use is easy compared with that for farmlands and parks. Inspection of gas removal facilities and generated gas should be conducted in the same manner as that in other uses, however there still arise a small number of problems such as settlement, in comparison with other methods of ultimate use.

(3) Recommendations on ultimate use

Due to settling and gas problems, construction of buildings on completed landfills site is not recommended for at least up to a certain amount of years (over 15 years). Thus, the following ultimate uses are recommended.

- a. For the PADS, a park for the surrounding inhabitants is recommended.

The reasons are

- b. For the PADS

A park is

- a great contribution to the surrounding residents,
- in harmony with the existing landscape,
- compatible with the surrounding land use,
- one of the least expensive methods of land use.

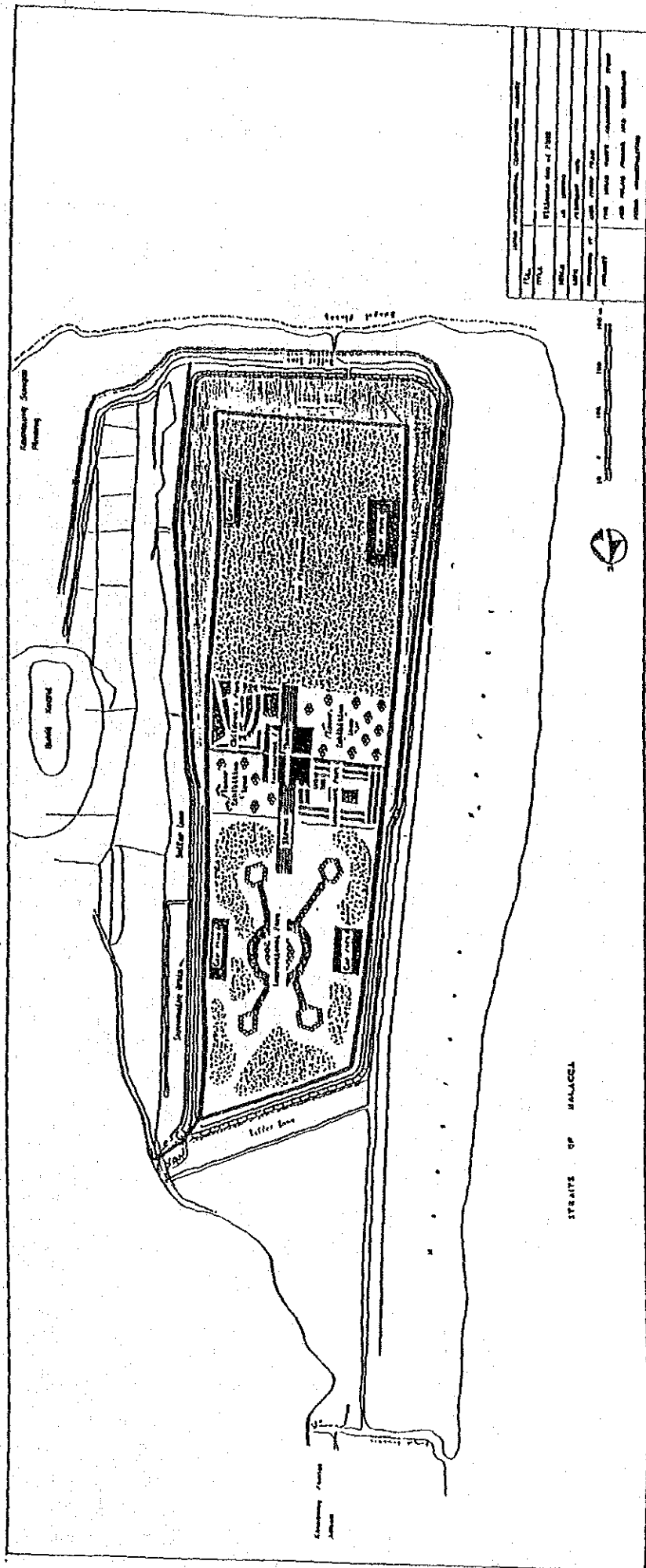


Fig. 3.4-1 Ultimate use plan for PADS

3.5 Cost Estimation

PADS first phase site development project cost is estimated and tabulated in Table 3.5-1. Operation and maintenance cost are estimated and tabulated in Table 3.5-2

Table 3.5-1 PADS First Phase Site Development Project Cost

I T E M S	Unit	Unit Price (N\$)	P A D S		R E M A R K S
			Quantity	Amount (1000)	
A. Site Development Works				3578	
1. Clearing	Ha	15000	33	495	
2. Main Facilities				2270	
a. Enclosing Structure				1886	
i. Enclosing Bund	m	720	2600	1872	
ii. Divider	m	30	450	14	
b. Drainage System				141	
i. Surrounding Drain	LS	-	1	112	
ii. On-Site Drain (Surface)	LS	-	1	29	
iii. On-Site Drain (Underground)	m	-	-	-	
iv. Drain for Reclaimed Area	m	-	-	-	
c. Access				243	
i. Approach Road	m	360	200	72	
ii. On-Site Road	m	210	100	21	
iii. Improvement of Bridge	LS	-	1	150	
3. Environment Protection Facilities				383	
i. Buffer Zone	m	-	-	-	
ii. Litter Control Facilities	m	32	2000	64	
iii. Gas Removal Facilities	LS	-	1	10	
iv. Leachate Collection Facilities	LS	-	1	76	
v. Leachate Cycling Facilities	LS	-	1	146	
vi. Leachate Effluent Facility	LS	-	1	77	
vii. Monitoring Facilities	LS	-	1	10	
4. Building and Accessories				430	
i. Site Office	No.	70000	1	70	
ii. Weighbridge	No.	150000	2	300	
iii. Storage Building	No.	25000	1	25	
iv. Safety Facilities	LS	-	-	15	Gate, Fence, Lights & etc.
v. Fire Prevention Facilities	LS	-	-	10	
vi. Utility	LS	-	-	10	Electricity, Telephone & Water
B. Equipment				1503	
a. Landfill Equipment				1368	
i. Bulldozer	No.	366000	3	1098	
ii. Hydraulic Excavator	No.	270000	1	270	
b. Environmental Equipment				135	
i. Water Truck	No.	100000	1	100	
ii. Inspection Vehicle	No.	35000	1	35	

Table 3.5-2 PADS First Phase Operation and Maintenance Cost

I T E M S	Unit	Unit Price (N\$)	P A D S		R E M A R K S
			Quantity	Amount (1000)	
C. Operation				802	
1. Personnel			14	146	
Manager	No.	21700	1	22	
Technician	No.	15400	2	31	
Accountant	No.	11300	1	11	
Overseer	No.	11300	2	23	
Operator	No.	8300	4	33	
Laborer	No.	6500	4	26	
2. Landfill				625	
Divider	LS	-	1	23	
Drain for Reclaimed Area	m	18	2000	36	
Site Ditch	m	34	520	18	
On-Site Road	LS	-	1	35	
Gas Removal Facilities	LS	-	1	18	
Leachate Collection Facilities	LS	-	1	110	
Cover Materials	1000m ³	5000	77	385	
3. Utility				32	
Water	1000m ³	520	NIL	0	
Electricity	Mwh	210	50	11	
Fuel	1000l	488	46	22	
D. Maintenance				174	
1. Civil Works	LS	-	1	54	
2. Equipment	LS	-	1	120	

4. Immediate Improvement Plan and Interim Measure

4.1 Immediate Improvement Plan

4.1.1 Presentation of Immediate Improvement Plan

The present problems on the final disposal system both in MPPP and MPSP are identified.

In response to the present problems, the immediate improvement plan without large investment on final disposal system both in MPPP and MPSP is discussed and prepared as follows.

Fig. 4.1-1 shows an immediate improvement plan for the BSDS (Bakau Street Disposal Site)

(1) Environmental Protection Measures at the BSDS

a. Construction of buffer zone

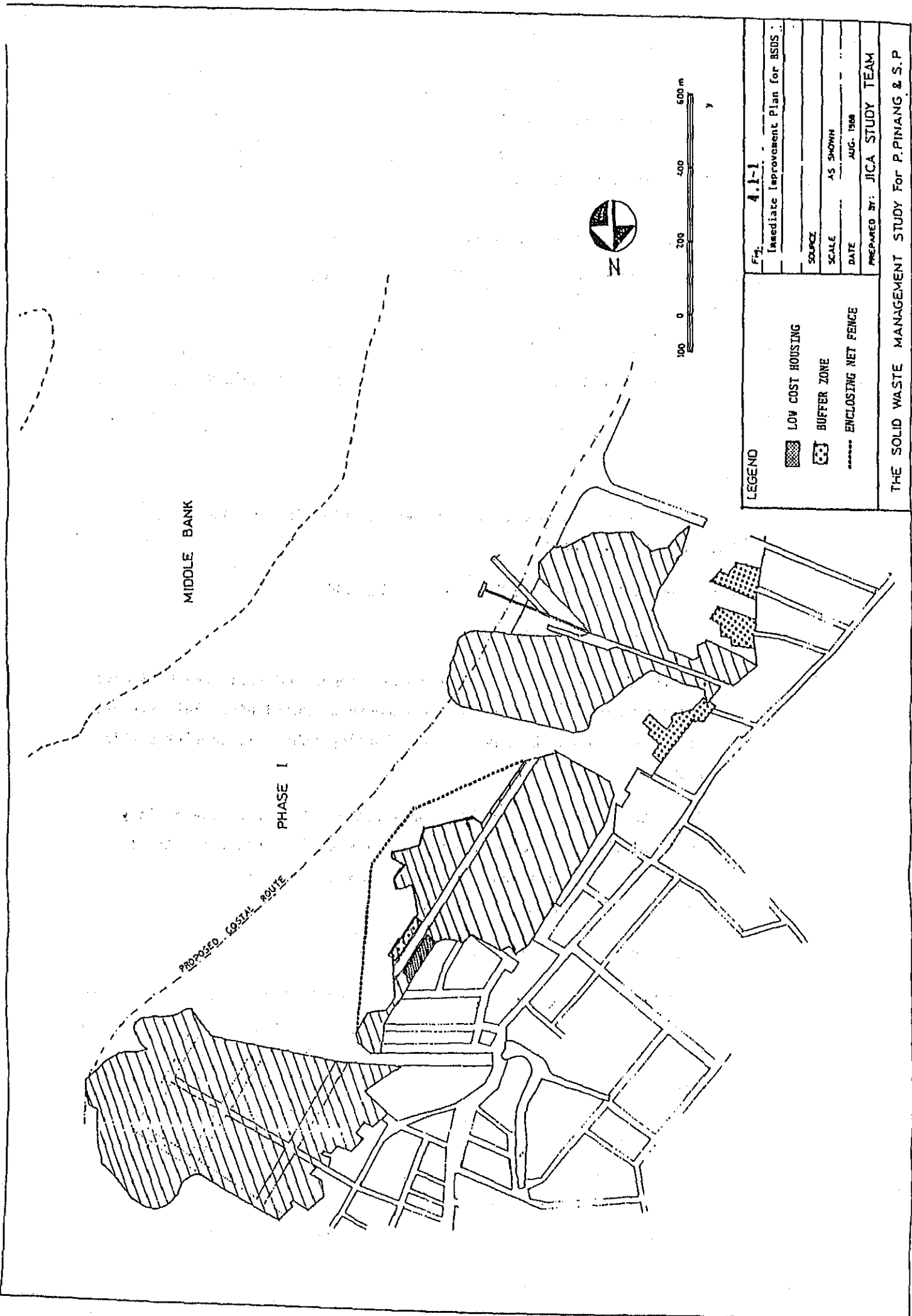
Due to close proximity of the densely populated area, the BSDS have had many complaints from the neighbourhood residents. This situation will worsen when the new low cost housing scheme is completed this year.

It is therefore, required to construct a buffer zone immediately in front of the new low cost housing. The buffer zone consists of a final cover, vegetation and a gas removal facility.

(Refer to Fig. 4.1-2)

b. Construction of an enclosing net fence

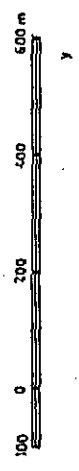
Although the earth bund has been provided in the sea at the BSDS, it is not an enclosing embankment. Due to inefficiency of the bund, the bund cannot completely protect the wastes from being washed away by the tides. The present bund has, therefore, only a limited advantage. Instead of wasting money on such a redundant measure, it is recommended that an enclosing net fence be installed when MPPP has obtained consensus for it, in its budget. The outline of the net fence is illustrated in Fig. 4.1-3. As shown in the figure, floats on the net can be detached and are able to use continuously.



MIDDLE BANK

PHASE I

PROPOSED ROAD ROUTE



LEGEND




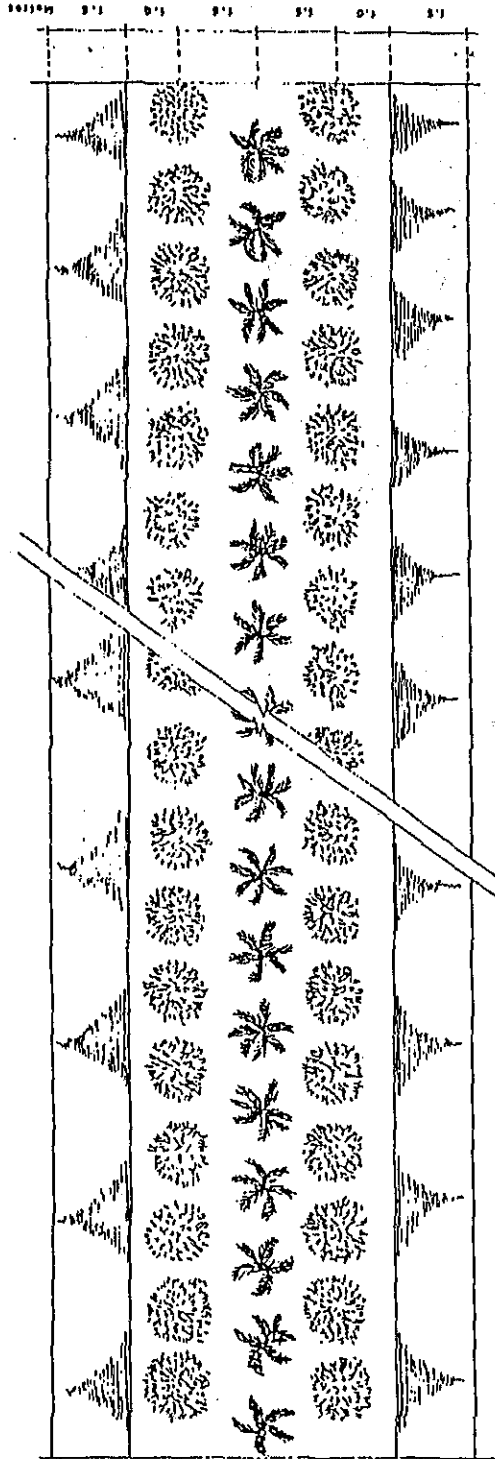
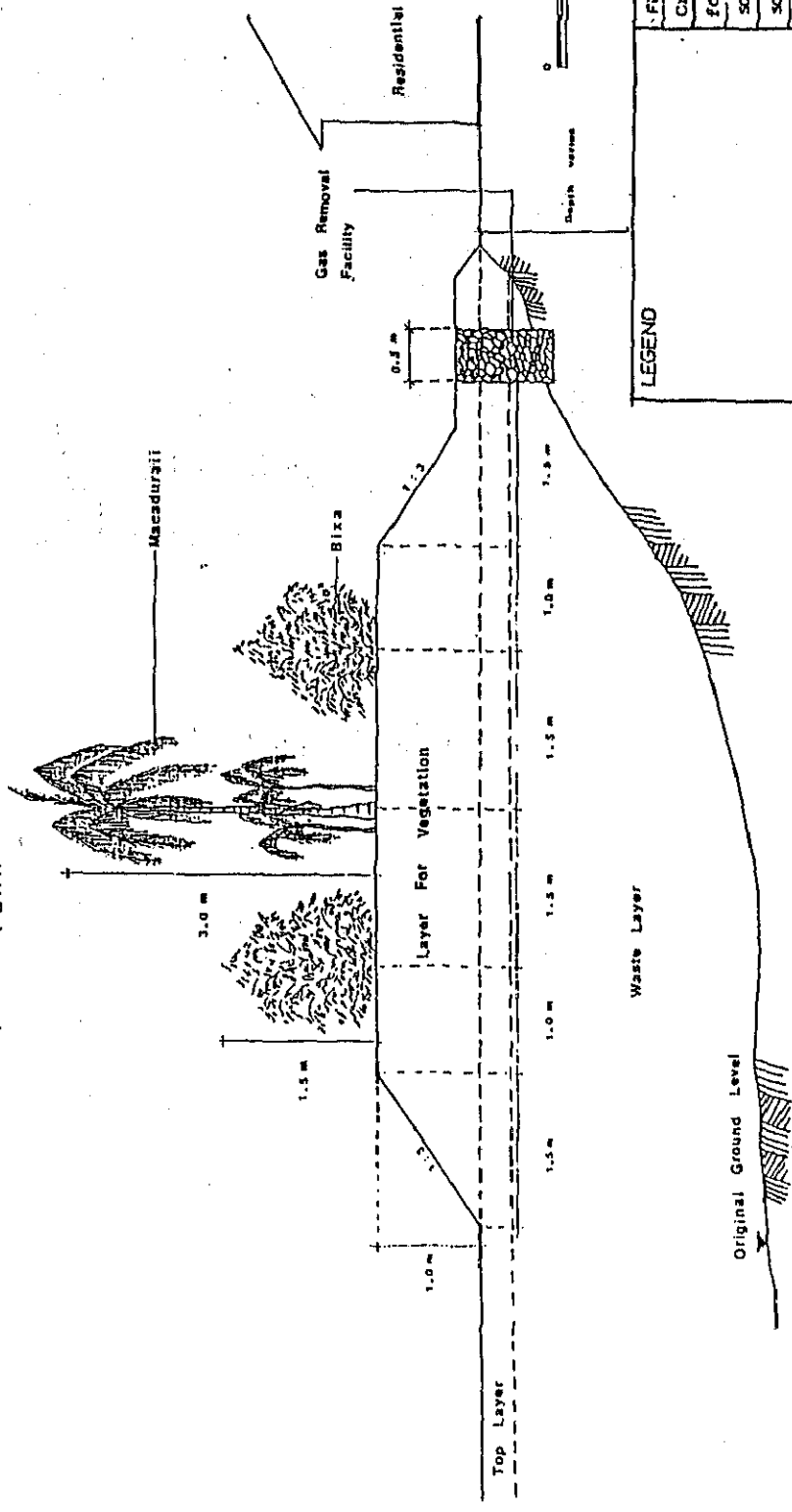
-  LOW COST HOUSING
-  BUFFER ZONE
-  ENCLOSING NET FENCE

Fig. 4.1-1	Immediate Improvement Plan for BSDS
SOURCE	
SCALE	AS SHOWN
DATE	AUG. 1988
PREPARED BY:	JICA STUDY TEAM

THE SOLID WASTE MANAGEMENT STUDY FOR P. PINIANG & S. P.



PLAN



ELEVATION

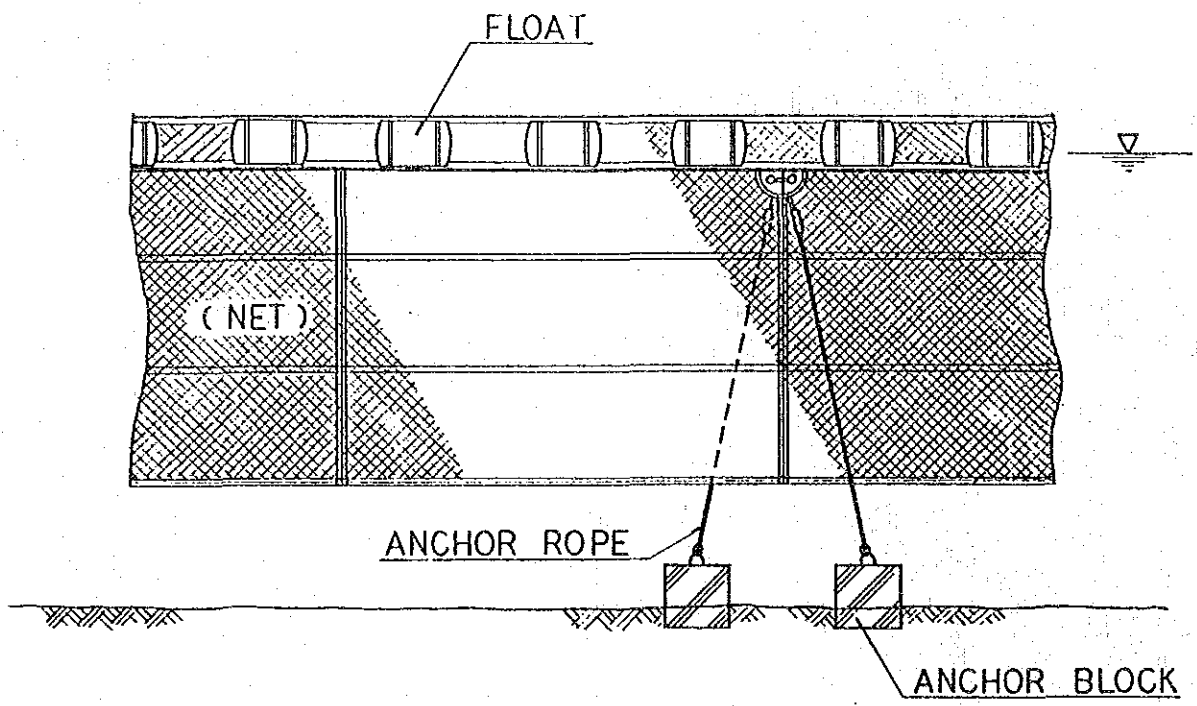
LEGEND

Fig.	A.1-2
Cross-section of Buffer Zone for Immediate Improvement of BSDS	
SOURCE	
SCALE	AS SHOWN
DATE	AUG. 1988
PREPARED BY: JICA STUDY TEAM	

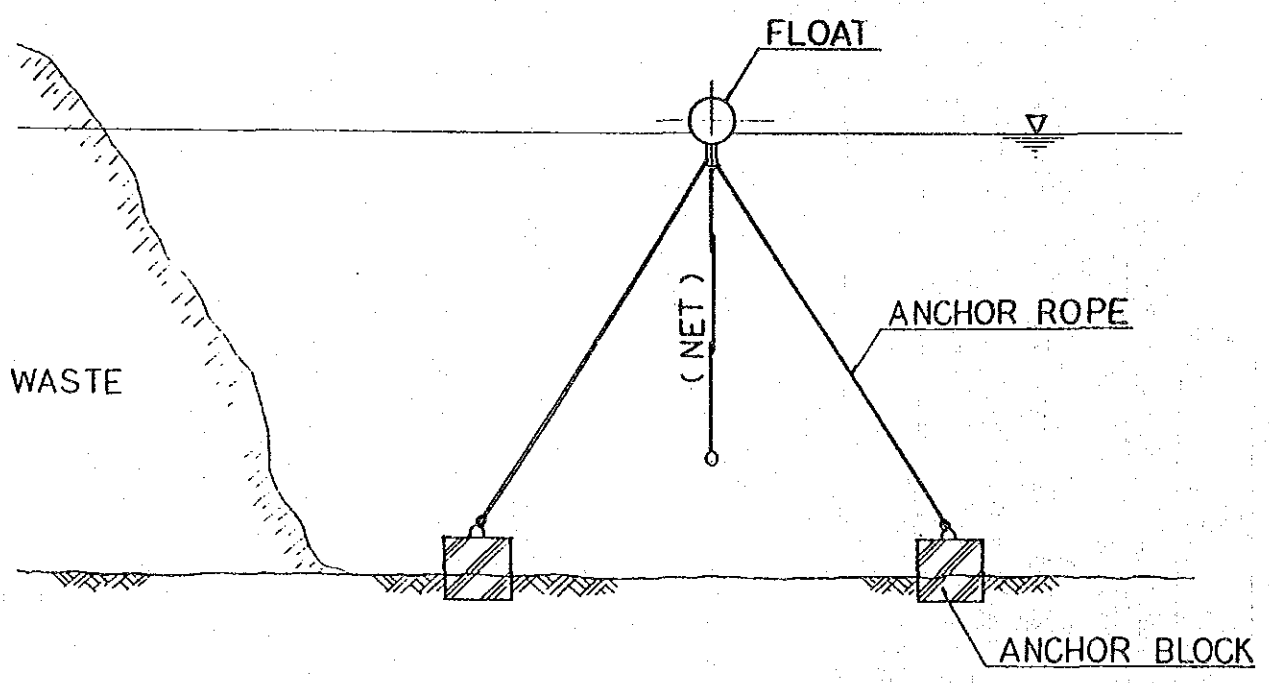
THE SOLID WASTE MANAGEMENT STUDY FOR P. PINANG & S. P.

Fig. 4.1-3

ENCLOSING NET FENCE



CROSS SECTION



(2) Operation

a. Operational Control

Although the waste disposed of at the BSDS is daily covered with enough soil and instructions for daily disposal operation are given by an overseer, it may not be sound enough due to the heavy usage of (*1) soil (300 m³/day according to the statistics from January 1st to July 30th 1988) and frequent exposure of the wastes disposed.

Therefore, it needs consideration of the following aspects.

(*1: Soil is used for the construction material of bund and also as cover material)

- i. Calculation of daily requirement of cover soil and control of its usage.
- ii. Preparation of weekly and monthly operation plan which shown stockyards of cover soil, working faces, vehicle flow, etc.

b. Execution of regular topographic surveys

The incoming-material data and the topographic surveys can be used to determine the amount of compaction, efficiency, land use, operation efficiency, and estimation on the degree of decomposition and eventual settlement.

c. Preparation of an ultimate plan of usage for the completed landfill so as to decide the final ground elevations.

(3) Others

a. Disposal fee

The present disposal fee is a uniform rate of \$60 per month for each applicant for the use of the BSDS. This system should be reconsidered.

b. Close cooperation with other departments

The present final disposal system is managed by Health and Engineering Departments of MPPP. The State Secretariat co-ordinates with other relevant authorities concerned for acquisition of new disposal sites. Although collaborations between departments and sections at present seems to be established, lack of communications is observed and described as follows;

- i. No participation from the Engineering Department in the Site Selection Committee
- ii. Improvement in disposal-fee system
- iii. Less attention by the council administrators and councilors on the complexity of disposal operations.

c. Recognition on the importance of sanitary landfill for final disposal and consensus for the increase in final disposal cost.

Disposal is the final functional element in the solid waste management system and is the ultimate fate of all solid waste. Even after the introduction of an incinerator, a disposal site, for ash and residues of the incinerator and incombustible wastes, is necessary.

The council administrators and councilors, are requested to consider these issues, because the operational side presently is suffering over a lot of complaints from the residents nearby, shipbuilders and fishermen.

There is a possibility that, in the near future, MPPP will have no disposal site arising from these objections and consequently wastes generated in the urban area will be left in the streets or dumped into drains.

In case MPPP uses the BSDS continuously, the possible methods of landfill are as follows;

- i. Extension of landfill work north-wards up to the Penang River estuary. There is a shipbuilder who is objecting to the operation.
- ii. Extension of landfill work to the sea.
- iii. Mounting up of waste on the reclaimed area. There is a possibility that many complaints may come from the neighbourhood.

(4) Project Cost

Project cost is calculated and tabulated in Table 4.1-1

Table 4.1-1 Project Cost

Item	Unit	Unit Price	Quantity	Amount	Remarks
Buffer Zone	m	150	200	30,000	
Enclosing Net Fence	m	490	1,000	490,000 <hr/> 520,000	Including vegetation and gas removal facilities

4.1.2 Progress of Immediate Improvement Plan

The present problems on the final disposal system in MPPP are identified.

In response to the present problems, the immediate improvement plan without large investment on final disposal system in MPPP is discussed and proposed by the Study Team.

In this section, the present status of the proposed items are described below.

Fig. 4.1-4 shows an immediate improvement plan for the BSDS (Bakau Street Disposal Site)

(1) Environmental Protection Measures at the BSDS

a. Construction of buffer zone

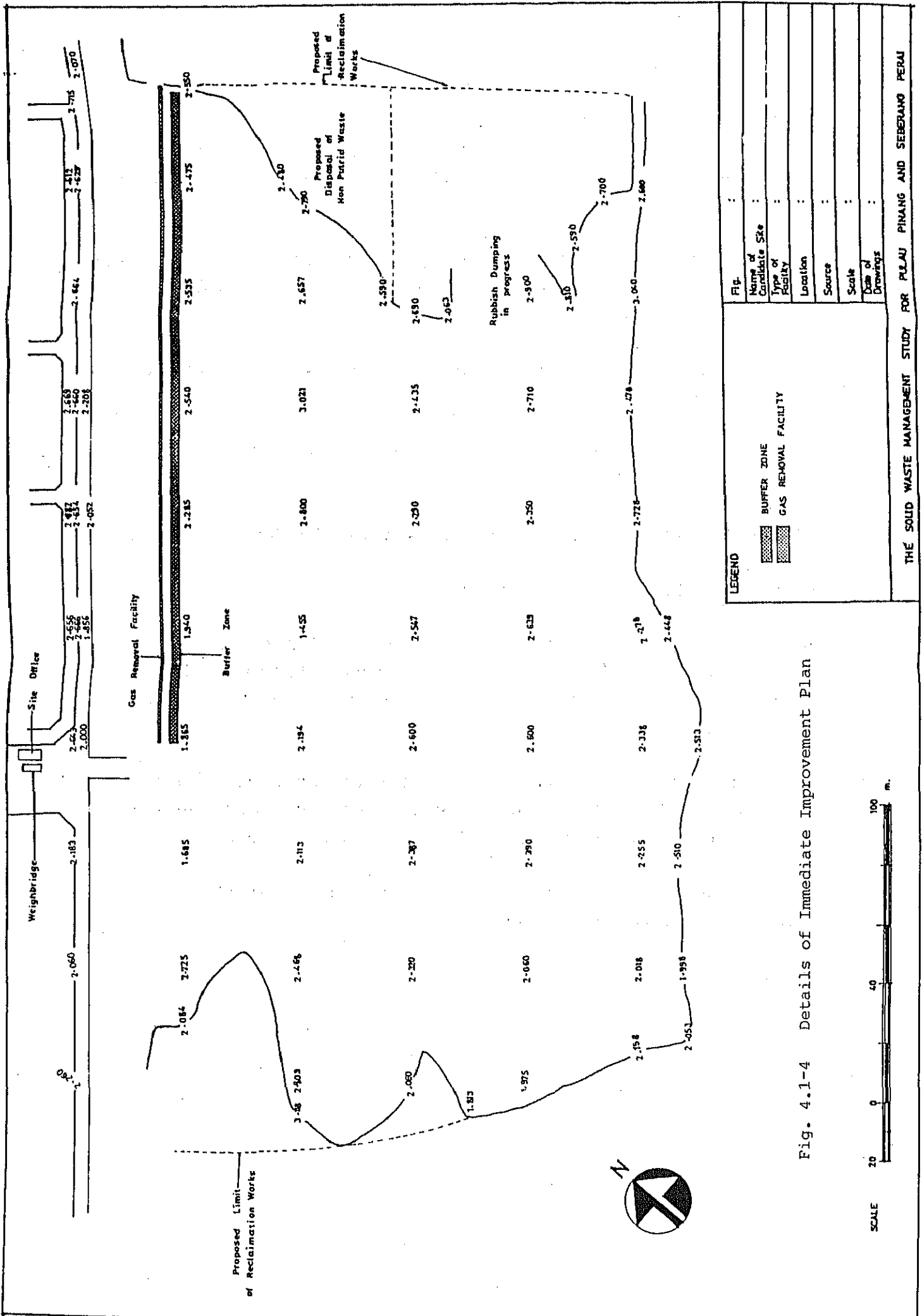
MPPP Engineering Department will proceed with the construction of the buffer zone. However, the proposal forwarded by the JICA Study Team on the buffer zone has been modified by Engineering Department.

The modified buffer zone is basically the construction of a bund with imported earth and planting of trees in which the MPPP Engineering Department managed to obtain for free.

The estimated cost by Engineering Department for the construction of this buffer zone is \$4,000.

b. Construction of an enclosing net

Owing to the short term use of the BSDS and estimated construction cost, MPPP does not intend to construct the enclosing net.



LEGEND	
	BUFFER ZONE
	GAS REMOVAL FACILITY
Fig. :	
Name of Candidate Site :	
Type of Facility :	
Location :	
Source :	
Scale :	
Date of Drawings :	

Fig. 4.1-4 Details of Immediate Improvement Plan

However, the Director of Engineering Department will study the proposed enclosing net fence plan and brochure forwarded by the JICA Study Team. If at all the system is considered, materials to be used shall be obtained locally and a more precise proposal on an other version of the fence is required for prevention of displacement of the net fence either inwards or towards the sea.

(2) Operation

a. Operational Control

Presently provision for all covering materials are being contracted out to suppliers and as such there are always inconsistent supply of the earth especially during rainy season.

Basically, covering material requirement is 30% of the actual tonnage of the daily disposed waste, but as far as BSDS is concerned the covering material requirement is 40%. This is mainly due to the construction of the outer bund which contribute to the extra 10% increase.

Stockpiling, theoretically is possible but it is not implemented due to the following reasons :-

- i) Stock piling requires doubling handling and MPPP does not provide allocations for the provision of extra lorry on BSDS.
- ii) During rainy days, covering materials will be washed away and this contributes to wastage of funds.
- iii) Present method is more applicable as far as the BSDS is concerned considering the limited period of usage of BSDS. The single handling of covering material requires only limited existing work force as well as minimisation of wastage.
- iv) All responsibility of providing covering earth lies upon the suppliers.

However, preparation of weekly and monthly operation plan will be done by Engineering Department in order to operate the BSDS more efficiently.

b. Execution of regular topographic survey

Presently, topographic survey on BSDS is done at a 3-4 months interval. Director of Engineering Department has requested for the survey to be executed at a shorter time interval.

c. Preparation of an ultimate use plan

No ultimate plan of usage for the completed BSDS as yet, because the reclaimed land belongs to the State.

(3) Others

a. Disposal fee

The new system of disposal fee as well as operation hours of the disposal site are made and shall be implemented as from January 1st, 1989.

i) Disposal fee and permit

Present:

- \$60/month - Unlimited number of entries.
- The registration number is stated in the permit.

New system:

- 1). \$5.00/day - Unlimited number of entries.
 - Registration number is stated in the permit.
- 2). \$80.00/month - Unlimited number of entries.
 - Registration number is stated in the permit.

ii) Method of Payment

Present:

When application is approved at the workshop, payment is made at KOMTAR. The permit is given out when receipt of payment is shown.

New system:

When the application is approved at the workshop, payment is made at the Vehicles Department/Office situated at the workshop area. Applicant may collect the permit after producing receipt of payment made.

iii) Work hours:

Present hours:-

7:00 AM - 1:30 PM (except Sunday and public holidays)

New system:

8:00 AM - 6:00 PM (Daily)

The work hours is changed to begin at 8:00 AM because between 6:30 AM to 8:00 AM, the contractors will be busy disposing their first load of waste. Starting work at 8:00 AM would reduce the vehicle congestion at the disposal site.

b. Close cooperation with other departments

MPPP is taking necessary actions on this subject, especially on the following two aspects are being achieved.

- Improvements in disposal-fee system
- Recognition by the Council administrators and councillors on the complexity of disposal operations.

However, it is regretted that an engineer from Engineering Department has neither participated in the Site Selection Committee nor at the Technical Committee.

c. Recognition on the importance of sanitary landfill for final disposal and consensus for the increase in final disposal cost

MPPP has paid favourable attention on the above subjects. Therefore, interim measures of final disposal until proposed PADS opening has been established smoothly. However, the consensus for the increase in final disposal cost has not been achieved yet.

4.1-3 Improvement and Results after the Execution of Immediate Improvement Plan

Most of proposed immediate improvement subjects have not been practised yet. Improvement and results after the execution of immediate improvement plans are thus not available for comments in this section.

In order to evaluate the improvement and results after the execution of immediate improvement plan, the aspects to be evaluated are tabulated in Table 4.1-2.

Table 4.1-2 Aspects for the Evaluation of Immediate Improvement Plan

Immediate Improvement Items	Aspects for the Evaluation
(1) Environmental Protection Measures at the BSDS	
a. Construction of Buffer Zones	- Complaints from surrounding residents
b. Construction of an Enclosing Net Fence	- Out of execution
(2) Operation	
a. Operational Control	- Saving of cover materials - Efficiency of landfill equipment
b. Execution of Regular Topographic Surveys	- Improvement of landfill operation by the preparation of proposed operational plan - Improvement of reclaimed land
c. Preparation of an Ultimate Use Plan	- Not determined

Immediate Improvement Items	Aspects for the Evaluation
(3) Others	
a. Disposal fee	<ul style="list-style-type: none"> - Total amount of disposal fee collected and number of applicants - Direct hauled waste amount disposed at the BSDS in terms number of factories and others - Numbers of illegal dumping noted
b. Close cooperation with other departments	<ul style="list-style-type: none"> - Comments required from various personnel and departments concerned in this subject.
c. Recognition on the importance of sanitary landfill for final disposal and concensus for the increase in final disposal cost.	<ul style="list-style-type: none"> - Ditto

4.2 Interim Measure

4.2.1 Proposed Sites

(1) Interim Period

Prior to the study on the interim measures, the interim period is defined as a preparatory period for the first phase project of the Master Plan. It is the period from now upto the opening of the proposed PADS (Pantai Acheh disposal site). The proposed opening date will be January 1992. It is a transitional period from the present system (i.e. control tipping) to the future system (i.e. sanitary landfill).

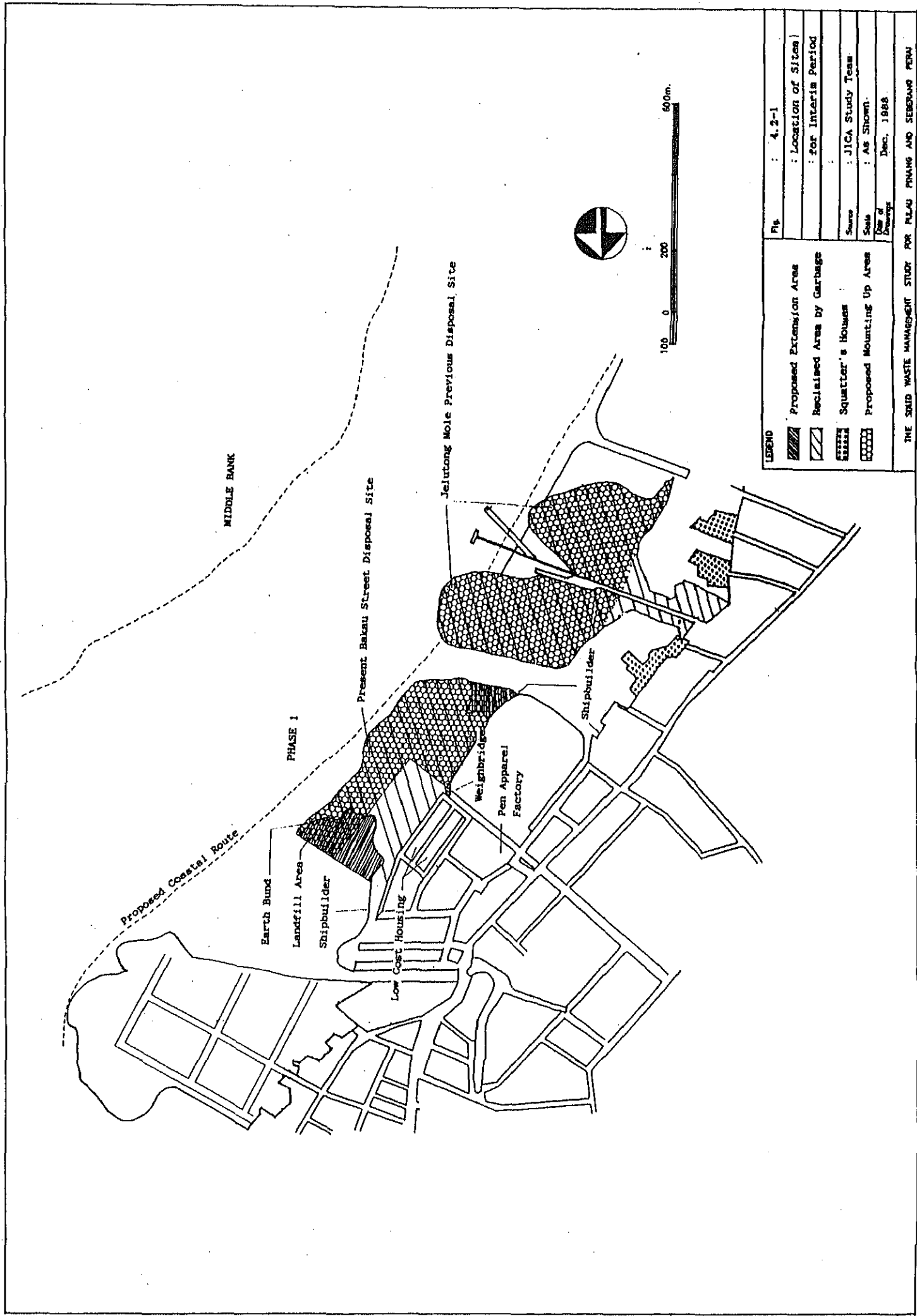
(2) Proposed Sites

In response to the request made by the Malaysian side at the Steering Committee meeting held on November 5, 1988, a study on the interim measures that need to be undertaken by MPPP prior to the implementation of the Master Plan was made through the close cooperation and discussion between the JICA Study Team and the Malaysian side.

As for the preparation of a final disposal plan, it is critical to identify the location and number of final disposal sites available. Through the discussions, the sites for the interim period are identified as follows:

a. Use of present BSDS (Bakau Street Disposal Site)

Extension of present BSDS towards north the is the given priority for the first 6 months, i.e. from December 1988 to May 1989. Location of proposed extension site is shown in Fig. 4.2-1.



LEGEND	Fig : 4.2-1
	: Location of Sites
	: for Interim Period
	Source : JICA Study Team
	Scale : As Shown
	Date of Preparation : Dec. 1988

THE SOLID WASTE MANAGEMENT STUDY FOR PULAU PINANG AND SEBERANG PERAI

b. Mounting up of the BSDS

After the extension of landfill work northwards over the six months, mounting up on the reclaimed area of BSDS is done. The heights of mounting up is 3m from present reclaimed level.

Location of proposed mounting up area is shown in Fig. 4.2-1.

c. Mounting up of JMPDS (Jelutong Mole Previous Disposal Site)

Next to the mounting up of BSDS, mounting-up of JMPDS is carried out. The height of mounting up is yet to be determined because it depends on the area of JMPDS and disposal amount.

4.2.2 Proposed Measures

(1) Required Area

Disposal sites for the interim period are identified as follows;

- Extension area of BSDS
- Mounting up area of BSDS
- Mounting up area of JMPDS

Based on the assumptions stated below, the extension and mounting up area required for the waste disposal during the interim period shall be

- 3.2 ha for the extended usage of BSDS
- 23.0 ha for the mounting up use of BSDS and JMPDS

Assumptions;

- i) Landfill volume is estimated, assuming that the depth of the extension area is 5m and the height of mounting-up area is 3m.
- ii) Daily amount of waste disposed in 1990 for MPPP is 450 ton/day. (165,000 ton/year).
- iii) Unit weight of landfill waste is 0.8 ton/m³.
- iv) Covering materials share 30% of total landfill volume.

(2) Proposed Measures

a. Extension area of BSDS

Extension area of BSDS shall be reclaimed as indicated by the dotted lines in Fig. 4.2-2. This line shall be the maximum limit of the reclamation works.

Present manner of landfill operation is applied to the reclamation of the extension area.

b. Mounting up area of BSDS

A 3.0 metres high bund shall be constructed at 3.0 metres away from the edge of the completed work faces and this bund shall be the maximum limit of the mounts.

A 6.0 metres wide road of compacted crusher run shall be constructed as the access to the three mounting up zones. Drains which run parallel to the access road shall discharge any access water directly into the sea.

c. Mounting up area of JMPDS

The mounting up level of JMPDS is yet to be determined. The MPPP Engineering Department shall undertake a topographic survey on JMPDS to ascertain the existing ground level.

Tentatively, mounting up of JMPDS shall be of the following sequence:-

Please refer to Fig. 4.2-4

- Area A shall be mounted-up first. The same division of zones, drainage, access road and gas removal facility shall apply as in BSDS.
- After completion of area A, the process of mounting up shall move to area B.

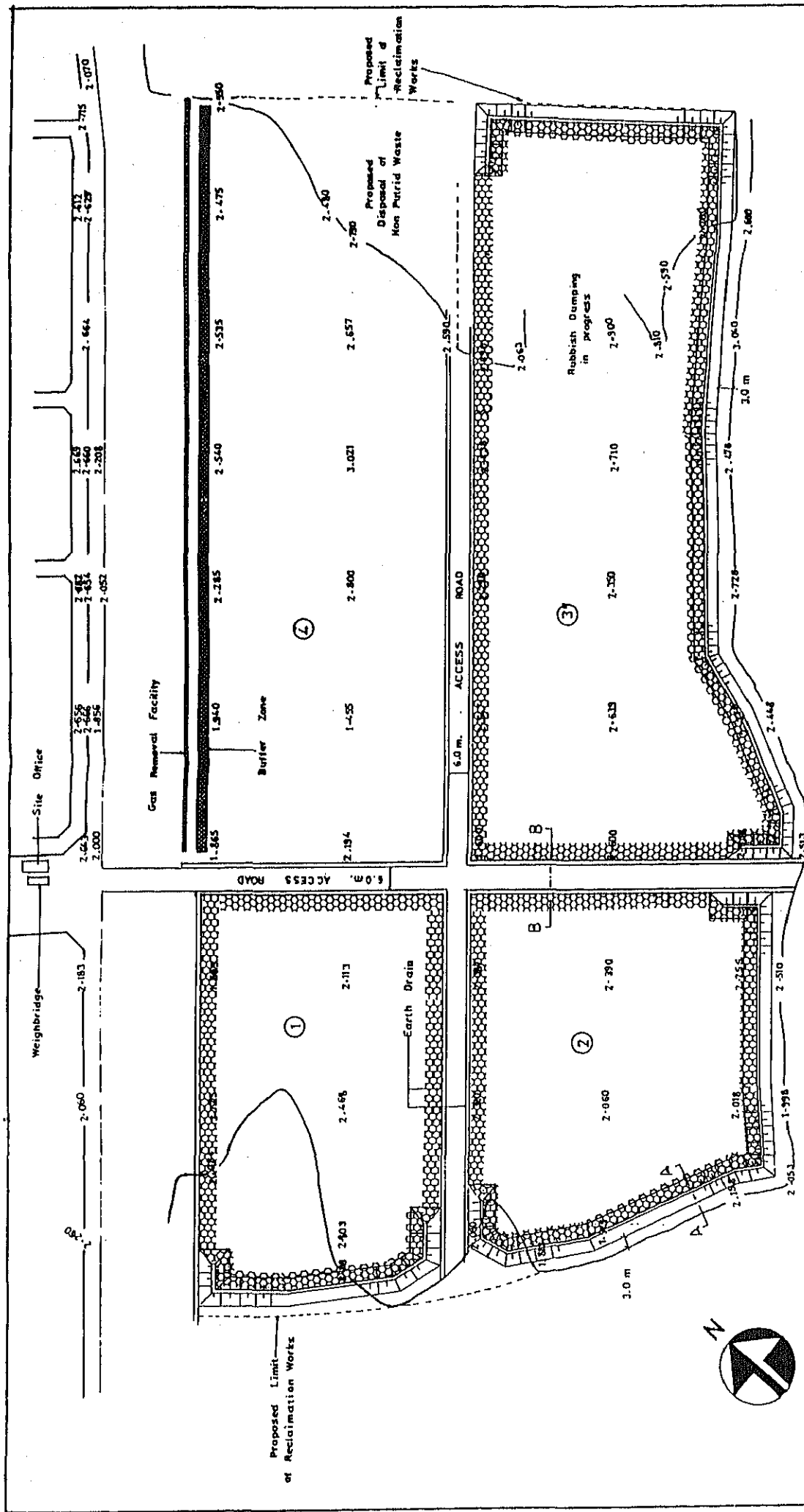


Fig.	: 4.2-2
Name of Candidate Site	: Interim Measure at
	: BSDS
Source	: JICA Study Team
Scale	: As Shown
Date of Drawings	: DEC. 1988

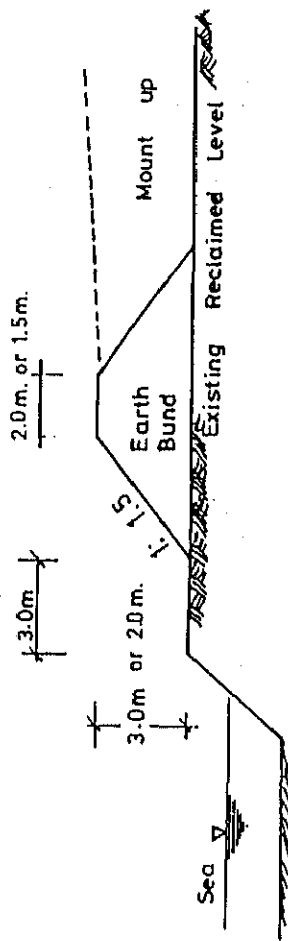
LEGEND

- BUFFER ZONE
- GAS REMOVAL FACILITY
- EARTH BUND
- MOUNTING UP AREA

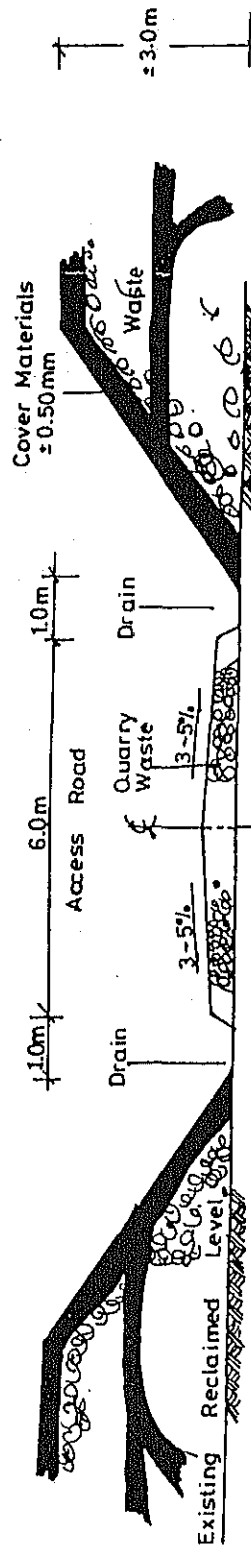
FIG. 1
Proposed Top-up Operation at BSDS
Note: Only cell ①, ② and ③ shall be utilised

SCALE 20 40 100 m

A - A Section



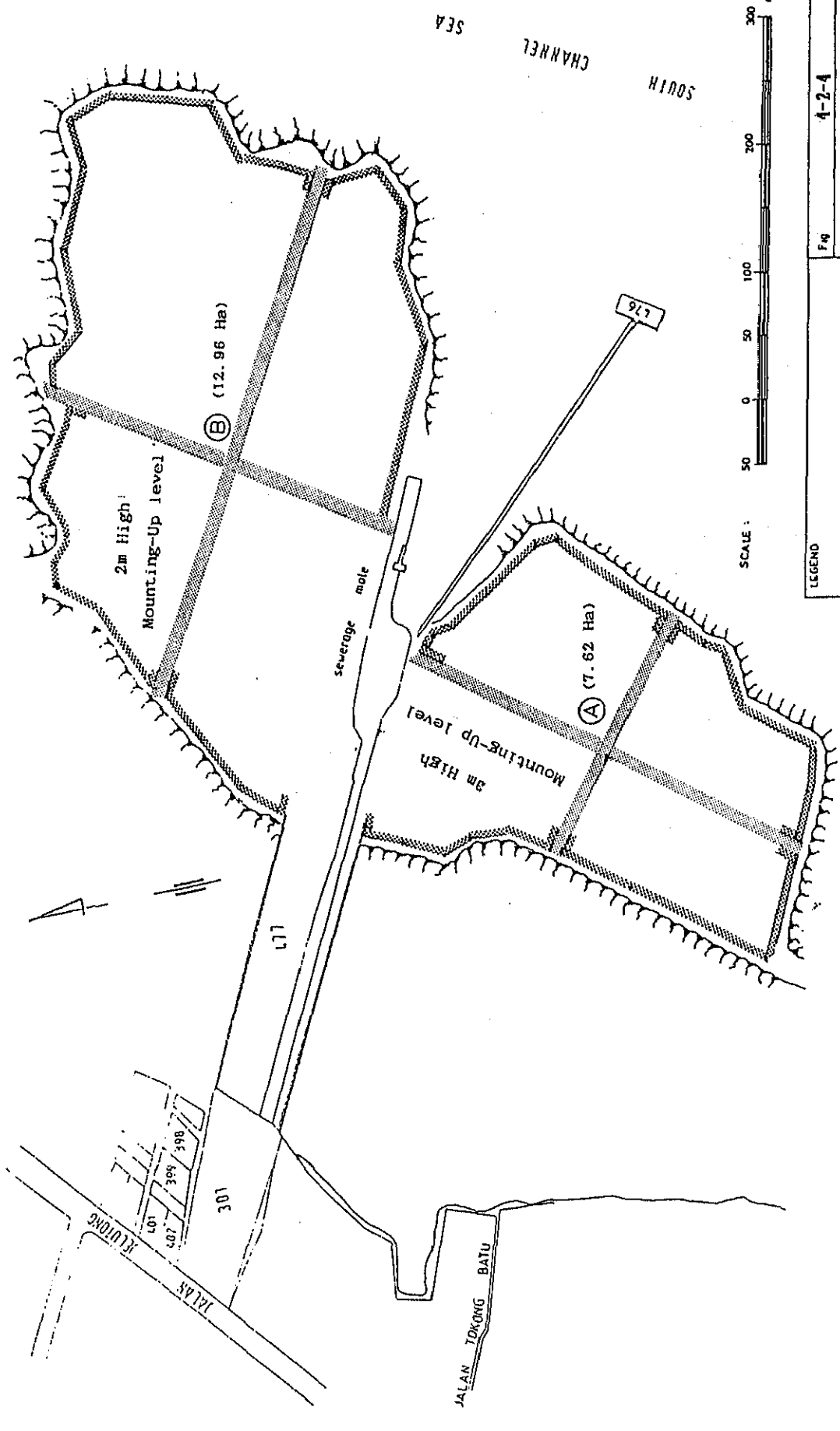
B - B Section



LEGEND

Fig.	: 4-2-3
Name of Candidate SKE	Cross Section of BSDS
Type of Facility	:
Location	:
Source	: JICA Study Team
Scale	: As Shown
Date of Drawings	: Dec. 1988

PROPOSED TOP-UP LEVEL OF JMDS



LEGEND		Bund
		On-site Road
Fig	4-2-4	
Interim Measure at	JMPDS	
Source	JICA Study Team	
Scale	AS SHOWN	
Date of Report	Dec. 1988	

THE SOLID WASTE MANAGEMENT STUDY FOR PULAU PINANG AND SEBERANG PERAI

4.2-3 Cost Estimation of Interim Measure for Final Disposal in MPPP

A preliminary design of the interim measures for final disposal in MPPP is carried out and estimation of cost needed during the interim period is made.

(1) Site Development Works

Cost of site development works is estimated as follows,

a. Bakau Street Disposal Site

- i) Cost estimation for the construction of the proposed gas removal facility and buffer zone are \$6,000.00 and \$4,000.00 respectively.

Both the before-mentioned costs will be obtained from the annual budget given to the MPPP Engineering Department by the State Government.

- ii) The construction of the enclosing bund during the mount-up stage is considered to be part of the disposal process. Therefore, the allocation of finance for the subject will also be obtained from the same annual budget.

b. Jelutong Mole Proposed Disposal Site

The height of mount at JMPDS is yet to be determined. The MPPP Engineering Department shall undertake a topographic survey on JMPDS to ascertain the existing ground level. A site development plan is tentatively made and the development cost is made based on this plan and tabulated in Table 1.

(2) Consultancy Service

Capital investment for the implementation of the Feasibility study phase 1 is estimated to be \$3,802,000.00 (Ringgit Three Million Eight Hundred and Two Thousand Only). Then, consultancy fees is expected to be 5% of the estimated cost of it i.e. \$190,000.00 (Ringgit One Hundred and Ninety Thousand Only).

This estimated cost includes the preparation of detailed design for the site development of proposed PADS, preparation of bill of quantity and all other related supervision works.

Summary of the related expenditure is specified and tabulated in Table 4.2-2

However, the cost shown in the Table 4.2-2 was estimated in December 1988 in order to ask budget allocation of the year 1989. The cost was estimated again and the revised cost is available in the Main Report Volume I Section 7.3.2.

Table 4.2-1 Site Development For Interim Measure in JMPDS

	<u>Unit</u>	<u>Unit Price</u>	<u>Quantity</u>	<u>Amount</u>
1. <u>Area A</u>				
i. Gravel for On-site road	m ³	\$27.00	1,800	\$48,600.00
ii. Bund	m ³	\$ 5.00	19,780	\$98,900.00
2. <u>Area B</u>				
i. Gravel for On-site road	m ³	\$27.00	2,380	\$62,910.00
ii. Bund	m ³	\$ 5.00	12,330	\$61,650.00
				\$272,060.00

Table 4.2-2 Summary of Cost Estimation

1. Site Development Cost For JMPDS	\$272,060.00
2. Consultancy Fees For Feasibility Study Phase I 5% x \$3,802,000.00	\$190,000.00
Total	\$462,060.00

JICA