

(3) 入札・施工管理計画

入札・施工管理業務は、BWDBとの契約の下でコンサルタントが行う。その業務の主な内容は次のとおりである。

- a) 入札図書の作成
- b) 入札業務の代行及び応札書の分析・評価
- c) パ国側と落札者との契約交渉での助言
- d) 復旧工事の施工管理
- e) 竣工検査
- f) 月例報告書の作成

上記業務に必要な要員とその主な業務は次のとおりである。

<u>要 員</u>	<u>主 な 業 務</u>
総 括	: プロジェクト全体の総括
土木技術者	: 常駐責任者、工事全体の技術・工程管理
地質・土質技術者	: 材料・品質管理試験の指導・監督、 工事の地質・土地に関する事項に対する助言
スペックライター	: 入札図書・技術仕様書の作成・入札業務の代行、 業者契約における助言、竣工検査

6-3-5 資機材調達計画

施工方針に従って建設に必要な資機材についてはできるだけ現地調達を行う。現地調達が不可能なもの或いは品質的に現地調達材では耐えられないもの、及び量及び価格の面で安定的供給が行われていないものについては我が国の製品を輸入することにする。現地調達材と輸入品の主なものは次のとおりである。

(1) 現地調達主要資材

セメント、鉄筋（丸形）、鉄筋（異形）、コンクリート用砂、コンクリート用砂利、ブリック、ブリックチップス、R.C.C パイプ、芝、土のう用麻袋、木杭

(2) 日本調達主要資機材

小型建設機械（タンバ、ミキサ、パイプレータ、エンジンポンプ等）、型枠用耐水合板及び型枠組立て用部品類（セパレータ、Pコン、フォームタイ等）、型枠用剝離材、釘、結束線、パイプサポート、水位検出装置部品類、測量機器類

6-4 実施スケジュール

(1) 実施設計

我が国とバングラデシュ両国政府による交換公文 (E/N) の調印後、BWDBはコンサルタントと実施設計業務と施工管理に関する契約を行う。コンサルタントは、本基本設計調査で立案された復旧計画案に基づいて、契約後直ちに実施設計に取りかかるとともに、その当初にBWDBと打合せを行い、設計内容等につき再確認する。実施設計には業務開始後完了までに2.5ヶ月が必要である。

(2) 業者選定

工事実施に関するE/Nが締結された後直ちにコンサルタントは、入札図書を作成し、BWDBの業務を代行して請負業者選定のための入札業務及び入札評価を行い落札者を決める。落札者はBWDBと契約交渉を経て契約を結ぶ。業者契約はE/N締結後3ヶ月以内に行う。そして工事は契約後1ヶ月以内に開始され、1990年3月末に完了する。

これらの実施スケジュールをバーチャートにすると図6-3-1のとおりとなる。

6-5 概算事業費

6-5-1 全体事業費

本計画に要する概算事業費は、概ね下記のとおりと見込まれる。

(1) 概算積算条件

- 1) 積算時点 : 1988年5月
- 2) 外国為替交換率 : 対米ドルに関しては東京銀行対顧客外国為替相場電信売(TTS)の、対タカに関してはロンドン市場におけるドル-タカの為替レートのそれぞれ1987年11月より1988年4月までの6ヶ月間の平均をとり、

1米ドル = 31.383 タカ

1米ドル = 129.76 円

1タカ = 4.13 円

とした。

(2) 全体事業費

本復旧計画に要する概算全体事業費は、約5億3千8百万円と見込まれる。

6-5-2 日本側負担事業費

我が国側負担の概算事業費総額は、上記全体事業費と同額となる。

6-5-3 バングラデシュ国側負担

6-3-5項の(2)に掲げた主要資機材を我が国からバ国へ輸入する際には輸入関税等バ国内の賦課の発生が予想されるが、これら輸入資機材に対する免税措置など必要な手続きはBWDBにより行われる。

第 7 章 維持管理計画

第7章 維持管理計画

7-1 維持管理体制

パ国における水資源開発プロジェクトは、その数 530件余（完成プロジェクト 409件、実施中 123件）に上るが、これらの完成施設はすべてBWDBによって維持管理されてきた。デモンストレーション・ユニットも例外ではなく、4-3-4項に示したとおりその完成以来BWDBの1機構であるNNDPのSub-Divisionによって維持管理されてきたし、本復旧工事完成後も同じ体制で維持管理される。維持管理体制については、N-N灌漑プロジェクト全体として計画されており、将来、隣接して建設予定のA-1地区が完成した暁には、総勢30名前後の人容で臨むことになっているが、同地区の整備完成は数年先となっているところから、当面はデモンストレーション・ユニットを中心に下表の人容で図4-3-1に示した組織・体制の下に維持管理がなされるであろう。

要 員	人 数	備 考
土木部門		
Sub-Divisional Engineer	1	
Sub-Assistant Engineer	2	
Work-Assistant	4	
Embankment Guard		
機械部門		
Sub-Divisional Engineer	1/2	他地区との兼任
Sub-Assistant Engineer	1/2	"
Foreman	1/2	"
Operator	5	当地区専任
Electrician	1	"
Mechanic	1	"
合 計	15.5 名	

7-2 維持管理計画

本復旧プロジェクトにより施設の復旧改善が実施された後は、前節の維持管理体制の下で復旧した施設の運用・点検・保守・監視・補修など維持管理上の必要な作業は、これらに付随して必要となる農民の組織化とか営農・栽培技術等に対する指導・啓蒙の活動とも併せ、BWDBによって行われる。

本基本設計調査では、我が国の無償資金協力案件として必要かつ最適な内容の復旧計画として、1987年の洪水で被災した輪中堤防の本格復旧（拡幅等による補強）並びに失われた灌漑用水供給機能を回復・向上させるために行う導水路、ポンプ機場及び幹線用水路堤の改善を実施することで合意したが、これらの他にBWDBが最優先させたいとしている2次・3次水路についても現況調査を行った。

これらの調査資料・情報をベースに国内解析を行った結果、調査団は、復旧した施設の安全が保たれるとともにそれらが期待通りに機能し加えて良好な状態に保つため、維持管理に際してBWDBが特に次の諸点を検討するよう勧告する。

(1) 輪中堤防の維持管理

輪中堤防の安全確保は、輪中プロジェクトの命題であり、プロジェクトの成否にかかっているとも言える。輪中堤防に係る本復旧案は、新たな土地収用は行わないという大前提に基づいて計画されたものであり、安全に対する配慮がなされているとはいえども、堤防の安全確保・安全維持に関しては、一層の努力が望まれるところであり、BWDBとの間で合意に達したミニッツにも調査団の勧告として付記した（付属資料1-4 参照）。

輪中堤防の維持管理に関しては、次の諸点が勧告される。

- 1) 輪中堤防の堤外地側に接した土地から土を掘り取らないように指導する。
更には、当該行為の禁止もしくは規制するような法的措置を検討する必要がある。
- 2) 乾期の地区外の農民によりポンプアップされている地区内幹線排水路(MDC)から地区外水田への堤防越しの給水を規制するか、さもなければ堤防を洗掘することのない適切な方法で行うよう当該農民を指導する。更には、もし堤防を損傷した場合、厳しく罰するような法的措置を検討する必要がある。
- 3) 洪水期にポンプの運転を制御することにより、MDCの水位を地区内の排水機能を損なわない範囲で極力高く保ち、堤外地との水位差をできるだけ小さくする。
- 4) 洪水期には堤体がゆるんでいるので、家畜（特に牛）を堤防斜面に放牧したり通行させたりしないよう農民を指導する。
- 5) 下記事項を実施するため農民組織を結成し、自主管理ができるよう指導する。
 - (a) 上記2)のような人為的破壊に対して堤防を定期的に監視し監督すること。
 - (b) いかなる理由による被害も早期に発見すること
 - (c) 動物穴をふさいだり、見つけた被害は見つけ次第手当又は修繕するようにし、損傷を受けたまま長期間放置しないこと。
- 6) 上記5)の農民組織とBWDBの間に緊急時の連絡体制を確立する。

(2) 導水路の維持管理

- 1) 導水路底にたまった土砂を排出して、水路を清掃する。
- 2) 排出すべき土砂は、水路の斜面上やすぐそばに放置しない。

(3) その他の灌漑排水施設

- 1) レンガ工場の進入路など幹線用水路と交差している道路等には、灌漑用水が自由に流下するのに必要かつ十分な通水断面積を有する管渠又は函渠を設けるものとし、用水の流下を阻害してはならない。
- 2) 幹線用水路並びに上記1)や分水工などの関連構造物は、灌漑用水の給水前に整備するとともに、灌漑期間中を通じて常に良好な状態に保つ。
- 3) これまで灌漑用水の供給が末端地域まで十分に行われていなかったこともあり、農民の灌漑農業に対する意欲や維持管理に対する意識が低下しているように見受けられるため、今後、BWDBは先に述べた農民組織を通じて、灌漑農業の技術指導や営農指導を行うとともに、施設の維持管理や水管理についても農民意識の改革を図ってゆく必要がある。

上に述べた勧告の中には、BWDBが直ぐにでも実行できるような事項もあれば、法令・規則の改定を必要とし時間のかかりそうな事項もある。いずれにしても、BWDBにはできるだけ多くの事項が一刻も早く実行するよう望まれるところである。

第 8 章 事業評価及び結論、提言

第8章 事業評価及び結論・提言

8-1 事業評価

昨年（1987年）8月14日の堤防決壊により、デモンストレーション・ユニット地区内の全域が湛水したため、昨年秋に収穫予定の稲作その他の作物収量は皆無となったが、本年（1988年）は、地区内でも洪水の被害が少なかった地域では、稲作が行われた。6月の雨期には応急復旧工事も完成して、地区内は従来どおり洪水と早魃から解放され、二期作の可能なこの地方では、年末には従来以上の収量が得られるものと期待されている。

本復旧プロジェクトが実施された場合、洪水から解放されるのは元より、導水路、ポンプ機場、幹線用水路といった灌漑施設の改善により、従来、最も灌漑用水を必要とする11～2月の灌漑期に十分に用水供給が出来ないでいた、という悩みから解放されると同時に、適正な用水の分配管理が行われれば、作付面積を増すことも可能となり、農業生産力の回復に加えてその増大にもつながるところとなる。

本デモンストレーション・ユニットの完成により、地域農業の発展と住民生活の安定が図られつつあり、バ国側からも高い評価を得ていた点は先にも述べてきたとおりである。このような優良プロジェクトを天災による被害により中断させることは、日・バ両国にとって大きな損失であり、本復旧計画により同地域の農業生産の増大と住民生活の安定・向上に資することの意義は極めて大であるといえる。

8-2 結論及び提言

本復旧プロジェクトを円滑に実施しそれを成功させるには、プロジェクトの実施に必要なバ国内の諸手続等自国の負担項目を実施スケジュール（図6-3-1 参照）に併せて時機よく実行することが不可欠であるが、それにも増して重要なのは、本復旧工事完成後、復旧された様々な施設を十分な維持管理の下に目的通りに機能させ、また、それらを良好な状態に保つことである。特に輪中プロジェクトにあっては、輪中堤防の安全を確保することが最大使命であり、プロジェクトを成功させるための不可欠な要件でもあるからである。

デモンストレーション・ユニットの灌漑プロジェクトを成功に導くため、BWDBは、7-2節に示した施設の維持管理に係る様々な事項を十分に検討し、実施可能な事項はできるだけ早く実現させ、時間を要する事項についても順次解決し、実現に向けての努力が肝要である。

付屬資料

付 属 資 料 1

- 1-1 調査団の構成
- 1-2 現地調査日程
- 1-3 面会者リスト
- 1-4 協議議事録
- 1-5 設計協議記録
- 1-6 先方政府負担工事に関する意見書
- 1-7 収集資料リスト

1-1 調査団の構成

担 当	氏 名	所 属
団 長 総 括	轟 登久夫	農林水産省関東農政局建設部開発課
計 画 管 理	野 田 亮 二	外務省経済協力無償資金協力課
灌 漑 計 画	嶋 内 逸 昌	日本技術開発株式会社
灌 漑 施 設 設 計	萩 原 昭	"
土 木 設 計	関 根 綾 藏	"
土 質 調 査	山 貝 廣 海	"

1-2 現地調査日程

曜日欄の () は通常の休日、[] は祝祭日を示す。

日順	月 日	曜 日	行 程	調 査 内 容
1	2. 15	月	東京 - (空路) → ハンコク	
2	16	火	ハンコク - (空路) → ダッカ	大使館、JICA事務所打合せ
3	17	水	ダッカ	灌漑・水資源開発・治水省表敬、調査計画
4	18	木	"	BWDB表敬、インベションレポート提出・協議、JICA事務所打合せ
5	19	(金)	"	輪中堤防、導水路、幹線・2次・3次用水路の現状調査、導水路の測量開始 資料・情報の整理・見直し
6	20	土	"	前日同様のサイト調査、ボーリング開始
7	21	(日)	"	資料・情報の整理・見直し
8	22	月	"	サイト調査、資料・情報整理の続き
9	23	火	"	BWDBカウンターパートとの打合せ
10	24	水	" 団長、野田： 東京 - (空路) → ハンコク	行カンダイル村・輪中堤防（終点寄り区間）の サイト調査
11	25	木	ダッカ 団長、野田： ハンコク - (空路) → ダッカ	BWDBカウンターパートとの打合せ、資料・情報整理 大使館、JICA事務所打合せ
12	26	(金)	ダッカ	導水路、ポンプ機場、幹線・2次・3次用水路 輪中堤防サイト調査、建設関連資料収集
13	27	土	"	ERD、灌漑治水省表敬、協議 BWDB協議（復旧内容）、団内討議
14	28	日	"	BWDBカウンターパート立会によるサイト調査 団内討議、Minutes(案)作成
15	29	月	"	BWDB・Chairman表敬、協議(Minutes) 大使館、JICA事務所、協議経過・結果報告

日順	月 日	曜 日	行 程	調 査 内 容
16	3. 1	火	ダッカ	Minutes 署名交換、カンファートとの打合せ
17	2	[水]	"	資料・情報の整理・見直し、復旧基本計画案の検討
18	3	[木]	" 団長、野田： ダッカ - (空路) → バンコク	団内討議 (調査結果、復旧内容、今後の作業) 復旧基本計画案検討
19	4	(金)	" 団長、野田： バンコク - (空路) → 東京	復旧基本計画案検討
20	5	土	"	BWDBへバ国負担堤防復旧工事に対する調査団の意見書提出、カンファートとの打合せ 幹線水路の測量開始、同現地作業監督、 復旧基本計画案作成
21	6	日	"	
22	7	月	"	BWDB設計協議 (復旧基本設計計画案) 上記協議記録作成、復旧計画案検討資料提供依頼状作成、JICA事務所の承認後、上記依頼状をBWDBへ提出(3/9) BWDBへ設計協議記録 (案) 提出・打合せ サイト調査、測量現地作業監督 サイト調査結果の整理・見直し・検討
25	10	木	ダッカ	
26	11	(金)	"	2次用水路の測量開始、同現地作業の指揮監督 BWDBによりチェック済みの設計協議(3/7)記録修正 ポンプ機場周辺の測量指揮・監督 復旧基本計画案策定、設計協議資料作成 幹線・2次・3次用水路調査 地質調査、地質調査結果整理、土質試験
33	18	(金)	ダッカ	
34	19	土	"	BWDB設計協議 (復旧基本設計計画 (案)) 測量図化作業指導・監督 設計協議(3/19)記録 (案) 作成
35	20	日	"	
36	21	月	"	BWDBへ設計協議(3/19)記録 (案) 提出
37	22	火	"	フィールド・レポート作成

日順	月 日	曜 日	行 程	調 査 内 容
38	3. 23	水	ダッカ	BWDB大使館、JICA事務所へフィールド・レポート（案）提出 Chairman 他BWDBスタッフの現場視察立会 設計協議（3/19）記録修正 基本設計（復旧計画図、概算数量）
39 40 41	24 25 26	木 金 〔土〕	“ “ ダッカ	設計協議（3/19）記録修正 基本設計（主として概算数量・工事費積算）
42	27	日	“	大使館、JICA事務所打合せ（調査結果） 基本設計（概算数量・工事費積算、フィールド・レポート作成）
43	28	月	“	BWDA設計協議（復旧内容の再確認、国内での解析・検討事項、技術仕様書記載事項等） 大使館、JICA事務所へ報告
44	29	火	ダッカ - （空路） → ボンゴ	BWDBへフィールド・レポート提出
45	30	水	ボンゴ - （空路） → 東京	

〔記事〕 ERD : External Resources Division、Ministry of Planning

BWDB: Bangladesh Water Development Board

2/21〔日〕: ベンガル語の公用語化記念の日

3/2〔水〕・3/3〔木〕: 国会議員選挙のための国民休日（当初、反大統領派勢力によるジェネストが予定されていたが、国民休日に振替えられた）

3/26〔土〕: バングラデシュ国独立記念の日

1-3 面会者リスト

(1) Bangladesh Government

1) Ministry of Planning

Mr. Md. Nasim Deputy Secretary
External Resources Division (ERD)

2) Ministry of Irrigation, Water Development and Flood Control

Dr. A.T.M. Shamsul Huda Joint Secretary

3) Bangladesh Water Development Board (BWBD)

Mr. Amjad Hossain Khan Chairman
Mr. G.H.A. Islam Jaigirdar Member (Implementation)
Mr. M.N. Huda Member (Operation & Maintenance)
Mr. Shamsur Rahman Member (Planning)
Mr. Abdul Khaleque Chief Engineer
Operation & Maintenance
Mr. Lutfur Rahman *1 Superintending Engineer
Dhaka O&M Circle
Mr. Anwar Hossain Bhuiyan Executive Engineer
*2 Design Circle-II
Mr. Yusuf Ali *3 Executive Engineer
Dhaka O&M Division-I
Mr. Nur Mohammad Khan *4 Sub-Divisional Engineer
NNDP Sub-Division

*1: Counterpart who coordinates overall work for the Study.

*2: Counterpart who assists the Team in design part of the Study.

*3: Counterpart who acts as a contact person.

*4: Counterpart who assists the Team in field work and supplying necessary data when the Team requires.

(2) 日本側関係者

1) 在バングラデシュ日本大使館

特命全権大使

田中 義具

一等書記官

中野 実

2) J I C A バングラデシュ事務所

所長

松沢 憲夫

所員

江川 敬三

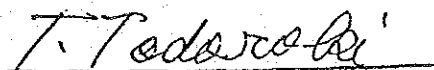
MINUTES OF DISCUSSION
ON
REHABILITATION OF DEMONSTRATION UNIT
IN
N-N IRRIGATION PROJECT

In response to the request of the Government of the People's Republic of Bangladesh (hereinafter referred to as "the Government of Bangladesh"), the Government of Japan decided to conduct a basic design study on rehabilitation of the Demonstration Unit in Narayanganj - Narsingdi (N-N) Irrigation Project Area (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (JICA). As a result of the Follow-up Study which was carried out last December, JICA has, therefore, despatched to Bangladesh the Basic Design Study Team headed by Mr. TOKUO TODOROKI, Deputy Director, Construction Department, Kanto Agricultural Administration Bureau, Ministry of Agriculture, Forestry and Fisheries (hereinafter referred to as "the Team") from February 15 to March 1, 1988. (Some members of the team will stay to complete the study by March 30, 1988.)


The Team had a series of discussions on the Project with the authorities concerned of the Government of Bangladesh and conducted a field survey at the Project site and other concerned areas.

As a result of the study, both parties agree to recommend to their respective Governments that the major points of understanding reached between them, attached herewith, should be examined towards the realization of the Project.

Dhaka, March 1, 1988



Tokuo Todoroki, Team Leader
Basic Design Study Team
JICA



Mr. M. N. Huda
Member (Operation & Maintenance)
BWBD, Dhaka

1. Objective of the Project

The objective of the Project is to rehabilitate the Demonstration Unit of N-N Irrigation Project which was seriously damaged by the flood in 1987.

2. Project Site

The site of the Project is as shown in Annex 1.

3. Implementing Body of the Project

Bangladesh Water Development Board (BWDB) is responsible for the implementation of the Project.

4. Contents of the Project

The final contents of the Project will be decided by the Government of Japan through future analization work in Japan by the Team. The final decision will be informed to Bangladesh side through JICA Office in Dhaka as soon as possible.

- 1) Reinforcement of Flood Embankment at full length
(refer to Annex 2-A as an example for rehabilitation)
- 2) Improvement of Intake Canal and Inlet of the Pumping Station
(refer to Annex 2-B and 2-C as an example for rehabilitation)
- 3) Improvement of Main Irrigation Canal Embankment only where new land acquisition by Bangladesh side is not needed.

5. Japan's Grant Aid System

Bangladesh side has understood Japan's Grant Aid System in general as explained by the Team.

6. Implementation Programme

A tentative Implementation Programme is shown in Annex 3.

J.J.

K. M. D.
1/31/88

7. Measures to be taken by Bangladesh Side

Measures to be taken by Bangladesh side are as follows:-

- a) to examine the embankment carefully in both dry and rainy seasons
- b) to maintain the embankment suitably as recommended in Annex 4.
- c) to complete the Resectioning work on the section 0.0 km - 4.0 km of the Flood Embankment by Bangladesh side within this dry season in 1988 so that a Japanese contractor can commence the Rehabilitation work from the beginning of the next dry season (October in 1988)
- d) Bangladesh side will take the best efforts for smooth implementation of the Project (to carry out domestic procedure quickly and timely in preparing and submitting Project Proforma (P.P.) etc.).

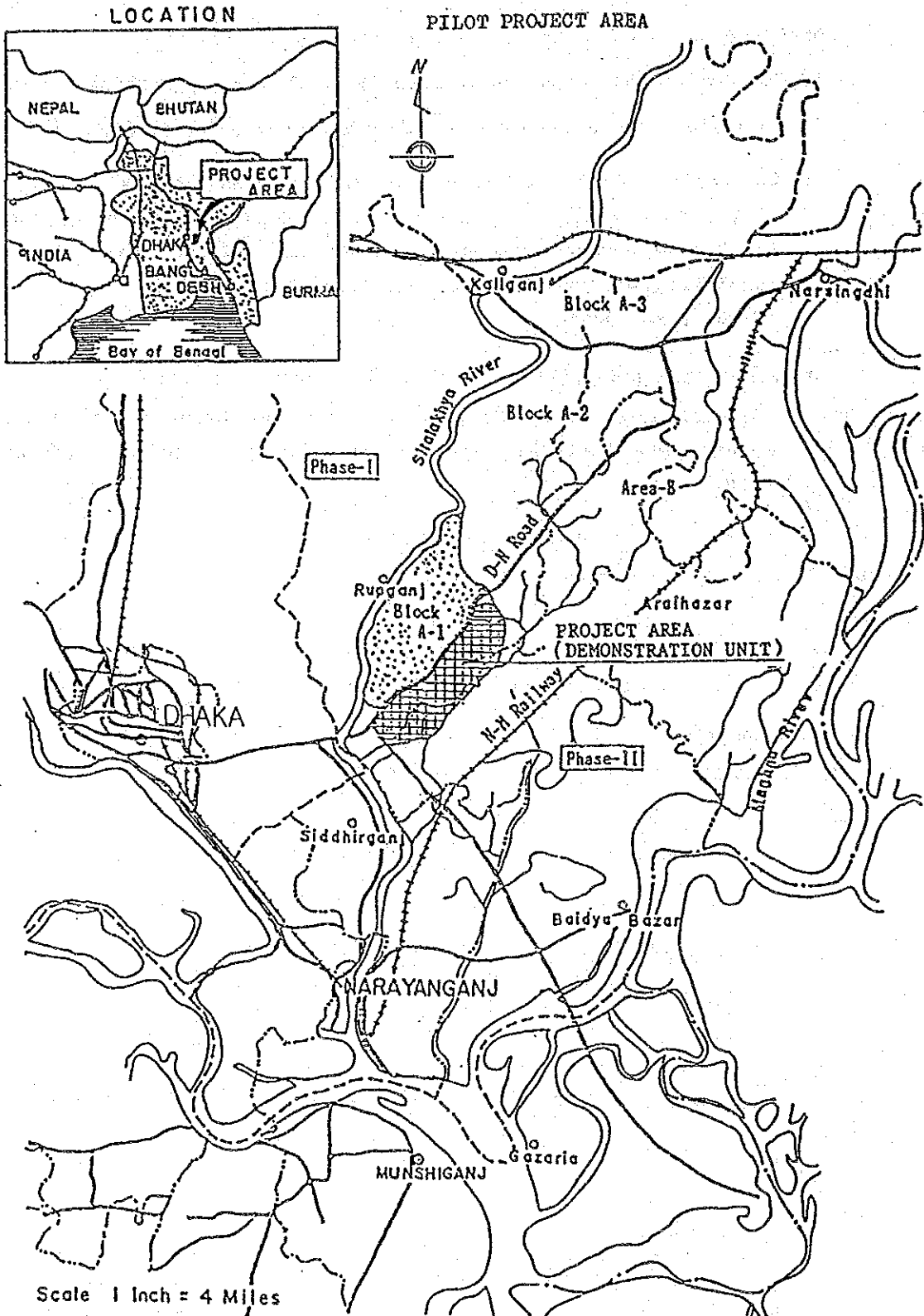
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LOCATION MAP

FOR

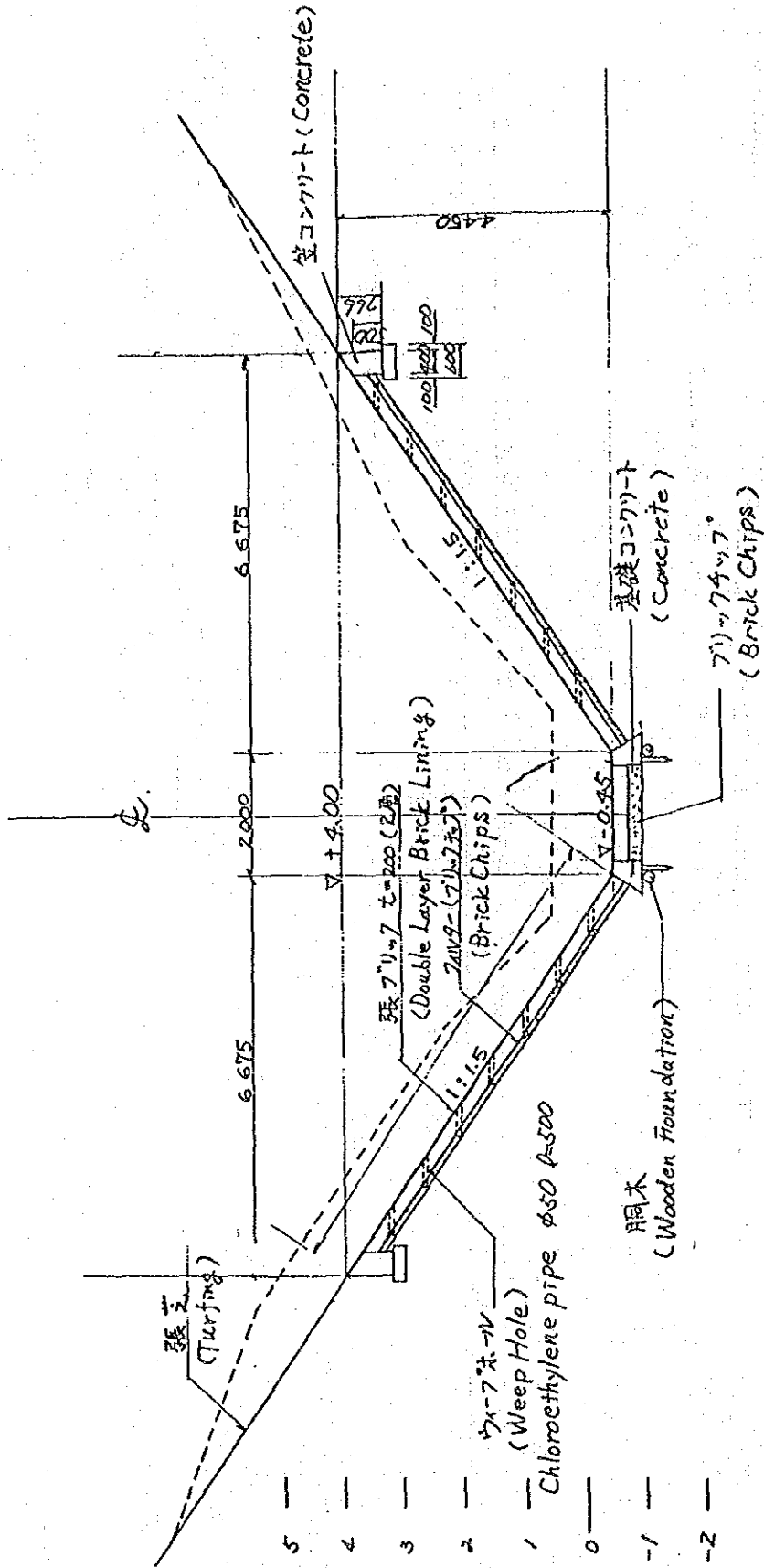
PILOT PROJECT AREA



J.S.

1/11/88

TYPICAL CROSS SECTION OF INTAKE CANAL SCALE: 1/100



J.P.

1/3/88

Implementation Programme

▬ : Home Work

▬ : Field Work

Year	1988												1989												1990			
	Month	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	
Item																												
Basic Design Study on Rehabilitation of D.U	▬	▬																										
Approval for Implementation by cabinet					∇																							
Exchange of Note						∇																						
Consultant Contract							∇																					
Detailed Design							▬																					
Tender & Tender Evaluation									▬																			
Construction Contract																												
Construction																												

G.S.

Handwritten signature and date: 88/11/11

RECOMMENDATION FOR MAINTENANCE

Recommended to take the following measures beyond BWDB's Maintenance Team to protect the Flood Embankment and to avoid its destruction which may jeopardize inhabitants' lives and their fortune inside.

- 1) to organize farmers' communities as far as possible for
 - a) watching and supervising periodically the embankment against artificial destruction
 - b) finding timely the damaged parts caused by any reasons
 - c) fulfilling up the animal holes and caring damages on the embankment suitably
 - d) cleaning and reexcavating silt periodically the Drainage Channels

- 2) to organize Emergency Communication System between the above mentioned farmers' communities and BWDB.

J. J.
1/31/88

J. J.

1-5 設計協議記錄

RECORD OF DISCUSSION FOR DESIGN DETAILS (1ST)

ON

REHABILITATION OF REMONSTRATION UNITS

IN

N-N IRRIGATION PROJECT

- 4. Executive Engineer, Design Circle-II, EMDB
- 5. Executive Engineer, Dhaka O&M Division-I, EMDB
- 6. Sub-Divisional Engineer, WNDP Sub-Division, EMDB
- 7. Mr. M. Nakano
First Secretary, Embassy of Japan
- 8. Mr. N. Matsuzawa
Resident Representative, JICA, Dhaka
- 9. Mr. H. Takada
Resident Engineer, JEC, Dhaka

The first discussion captioned above was held between the Japanese Basic Design Study Team (called as "the Team") and EMDB's counterpart who are assigned to the above-mentioned project (called as "the Counterpart") as follows:-

Date: March 7, 1988
 Place: Office Room of EMDB (Operation & Maintenance)
 Attendance: - From EMDB
 Mr. Anwar Hossain Bhuiyan E.K. Design Circle-II, Dhaka
 Mr. Nur Mohammad Khan S.D.E. WNDP-Division, Dhaka
 - From the Team (JEC)
 Mr. Toshiaki Shimauchi Irr. Planning & Management
 Mr. Akiro Hagiwara Irrigation Facilities Design
 Mr. Ayazo Sekine Civil Work Design
 Mr. Hiromi Yamaguchi Geological Investigation
 Dr. S.M. Parvez Mohit Interpreter
 (Local Staff of JEC, Dhaka.)

The items discussed are shown in attachment herewith.

T. Shimauchi
 (Toshiaki Shimauchi)
 From the Team

C.C. FOR INFORMATION TO:

- 1. Member (Operation & Maintenance), EMDB
- 2. Chief Engineer, North-Eastern Zone, EMDB
- 3. Superintending Engineer, Dhaka O&M Circle

Contd.....(2).....

ATTACHMENT

1. Items of Discussion

The both parties discussed about the following items, based on the Clause 4. (Contents of the Project) in the Minutes of Discussion signed between the Team and EMB on March 1, 1988.

- 1) A basic design plan proposed by the Team on Reinforcement of Flood Embankment at full length
- 2) A basic design plan proposed by the Team on Improvement of Intake Canal and Inlet of the Pumping Station
- 3) Improvement of Main Irrigation Canal Embankment only where new land acquisition by Bangladesh side is not needed

2. Contents of Discussion

2.1 Reinforcement of Flood Embankment

In respect of the captioned item, the Team proposed the widening method as shown in Figure-1 and explained its design policy.

According to the basic design plan on Reinforcement of Flood Embankment proposed, reinforcing plan is considered within the existing acquired land and the following are mainly pointed out.

- 1) Widening of crest: 4.0 m (3.0 m after Emergency Repair Work)
- 2) Making slope gentle: 1 : 2.0 (1 : 1.8 - ditto -)
- 3) Width of berm step: 3.0 m (as same as original width)

As a result of the above, the Main Drainage Channel should be reduced.

- 4) Side core facing outside slope at full length
- 5) Toe drain inside slope at full length

The above 2 of 4) and 5) are designed to take the remaining water-line down as lower as possible.

On the above basic design plan proposed by the Team, the Counterpart pointed out the following views.

- (a) Study on causes of failure of Flood Embankment and relationship to the basic design plan
- (b) Study for an assessment on stability and/or sand boiling of the existing embankment body and comparison with the basic design plan

(c) Toe drain:

EMB has no experience at any embankment with the toe drain at full length

Void of chipped brick will be filled with soil and may not work well in the future

This will involve huge maintenance cost which is not desirable

(d) Core-wall:
Core-wall facing outside slope may require regular maintenance due to slope failure. Accordingly the Counterpart requested a study for the feasibility of a center core in place of the side core proposed by the Team.

Regarding Toe Drain and Side Core, the Team will continuously study to make EMB's maintenance work as more less as possible.

2.2 Improvement of Inlet of the Pumping Station and Intake Canal

- 1) The Team explained that as the existing pumping station has been built 55 cm higher than the exact design level, this caused difficulty on water supply in the irrigation season. The Team thereby proposed that difficulty relating to pumping station might be almost cleared away by removing the river side inlet (apron) which makes an obstacle at the inflow of the water, 50 cm down from its existing level. The Team, therefore, proposed the method shown in Annex 2-C in the Minutes of Meeting for a basic design plan of improvement of Inlet of the Pumping Station. The counterpart mentioned that the existing pumping equipment is systematized automatically to stop the pumping operation at the water level of + 0.80 m. (actually this level corresponds to 1.35 m). As an improvement to the present difficulty on water supply, the Team further proposed that the resetting the float switch down to a lower position will make it possible to operate the pump much longer than before.

- 2) The counterpart opined that since the project is under operation since 1984, the difficulty as mentioned by the Team needs to be identified on the basis of actual data. For doing so water level record both in the river side and project side, pumping record (discharge), water level at automatic pump stoppage and its period and any other related data during irrigation season for all the years after completion of pump station are required to be officially collected and consulted. The both parties confirmed that the submergence depth according to original design were 1.75 m (difference between level of pump suction inlet - 0.95 m and LML + 0.80) and 1.45 m (difference between -0.95 m and LML of 0.50 m) considering design LML & LML of intake canal. The Counterpart also mentioned that due to the rise of the suction floor by 0.55 m, the submergence depth to pump suction inlet now also

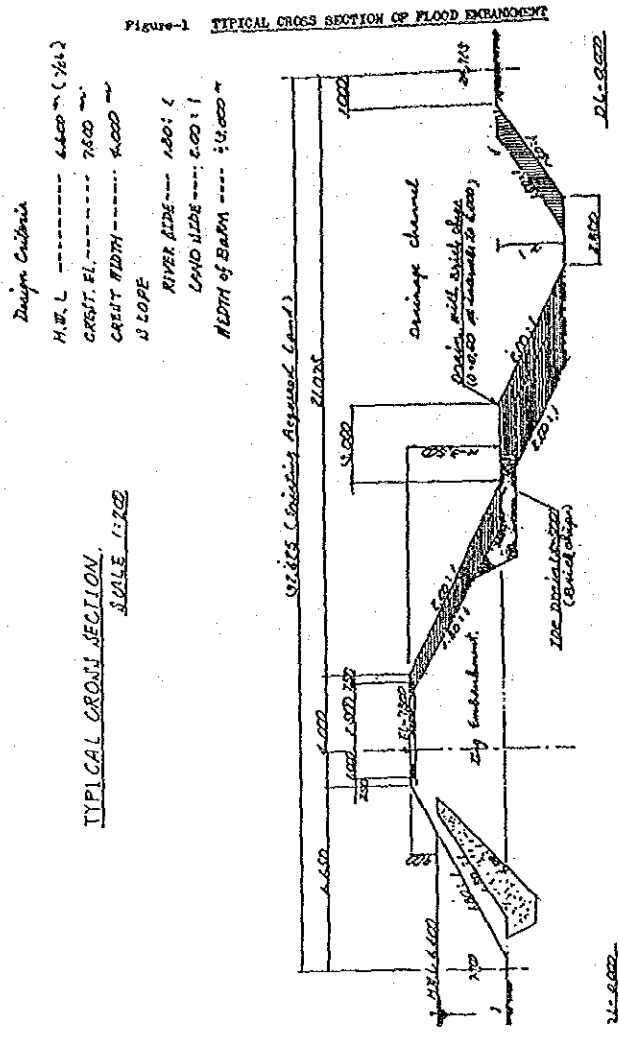
reduces to that amount i.e. available submergence depth considering design LML & LLML are now 1.20 m and 0.90 m respectively. The Counterpart accordingly considered that by implementing the proposed plan of lowering the inlet apron only will not improve the present pump submergence depth. Moreover proposal of lowering the float to lower pump stoppage level will reduce this existing depth also. Under this condition, the pump might be subjected to cavitation problem. The Counterpart, therefore, requested the Team to consult the pump maker and to try to solve the problem of cavitation, if required, by model tests. However, before proposing any further design plan, problem identification based on the actual data as mentioned are necessary. The Team also agreed on these proposals.

2.3 Improvement of Main Irrigation Canal (NIC) Embankment

In respect of the above-captioned item, the Team is carrying out levelling survey which is under field work at present. Therefore a basic design plan on this item will be proposed by the Team to MIBB after completion of the survey.

- OVER -

Figure-1 TYPICAL CROSS SECTION OF FLOOD EMBANKMENT



RECORD OF DISCUSSION FOR DESIGN DETAILS (2ND)

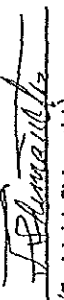
ON
REHABILITATION OF IRRIGATION UNIT
IN
N-3 IRRIGATION PROJECT

The second discussion captioned above was held between the Japanese Basic Design Study Team (called as "the Team") and EWDB's counterpart who are assigned to the above-mentioned project (called as "the Counterpart") as follows:-

- Date : March 19, 1988
- Place: Office Room of EWDB (Operation & Maintenance)
- Attendance:
 - the Counterpart from EWDB -
 - Mr. Lutfur Rahman S.E. Dhaka O&M Circle, Dhaka
 - Mr. Anwar Hossain Emilyat E.E. Design Circle-II, Dhaka
 - Mr. Yusuf Ali E.E. Dhaka O&M Division-I
 - Mr. Nur Mohammad Khan S.D.E. NNDP-Division, Dhaka
 - members from the Team -
 - Mr. Toshiaki Shimauchi Irr. Planning & Management
 - Mr. Akira Nagiware Irrigation Facilities Design
 - Mr. Ayazo Sekine Civil Works Design
 - Mr. Hiroshi Yamagai Geological Investigation

The discussion was advanced in accordance with the reference paper prepared by the Team, of which contents were discussed between the both parties with explanation by the Team. The items and contents discussed are recorded as attached herewith.

Dhaka, March 19, 1988 recorded by:


 (Toshiaki Shimauchi)
 On behalf of the Attendance
 Contd.....(2).....

ENCLOSURES:

1. Attachment as above.
2. Items of Discussion for Design Details (2nd) (refer to Annex-1).
3. Reference of Discussion for Design Details (2nd) (refer to Annex-2).
4. Geological Profile (refer to Annex-3).

C.C. FOR INFORMATION TO:

1. Member (Operation & Maintenance), EWDB, Dhaka.
2. Chief Engineer, North-Eastern Zone, EWDB, Dhaka.
3. Superintending Engineer, Dhaka O&M Circle, EWDB, Dhaka.
4. Executive Engineer, Design Circle-II, EWDB, Dhaka.
5. Executive Engineer, Dhaka O&M Division-I, EWDB, Dhaka.
6. Sub-Divisional Engineer, NNDP Sub-Division, EWDB, Dhaka.
7. Mr. K. Nakano
First Secretary, Embassy of Japan, Dhaka.
8. Mr. N. Matsuzawa
Resident Representative, JICA, Dhaka.
9. Mr. H. Takada
Resident Engineer, JEC, Dhaka.

ATTACHMENT

1. Items of Discussion

The both parties discussed about various items for design details as shown in Annex 1.

2. Contents of Discussion

Introduction

At the beginning of discussion, the both parties confirmed the record of the last discussion and found out that a part of items had dropped from the item 2.2. Therefore, the both parties decided to record it hereinafter as the item 3) of 2.2.

3) Regarding Improvement of Intako Canal, the Team proposed the slope protection method by brick lining shown in Annex 2b of the Minutes of Discussion for a basic design plan.

On this plan, the Counterpart explained that maintenance of broken brick lining will be a costly affairs to EMB if stability of the slope is not assured by this means. Accordingly the Counterpart requested the Team to study and identify cause of slope failure and justify the necessity of lining other than probable alternative solution.

The Team will do these and check stability of the slope, based on the results of boring and soil tests."

2.1 Basic Design Condition / Criteria

No special discussion was made on this matter.

2.2 Basic design plans to be adopted on the Project

2.2.1 Reinforcement of Flood Embankment

- 1) Widening of Embankment
(refer to item (a) of 2.1 in Annex 2)

Nothing special was discussed on this item.

- 2) Core Wall and Toe Drain
(refer to item (b) and (c) of 2.1 in Annex 2)

To a question from the Counterpart what are the purposes or rea-

sons proposing core-wall and toe-drain, the Team pointed out that the main reasons of those above were mentioned in lower half of page 2 to upper part of page 3 in the Reference of Discussion prepared by the Team (refer to Annex 2).

The Counterpart explained that the shape of this flood embankment with the crest width of 4.00 m and the slope gradient of 2 : 2.0, was not so different from many other embankments which had been, mostly without those measures, constructed by EMB in accordance with the Bangladesh Standard and which had stood against many floods came every year. Accordingly, the Counterpart mentioned that EMB hesitated to adopt those measures only for this flood embankment. To the opinion of the Counterpart, the Team explained, with the Geological Profile (refer to Annex 3), that materials on the embankment body in the section after 3.40 km point from Pumping Station was not so different from those at the breached portion where the emergency repair work was constructed with core and toe-drain. In addition to the above explanation, the Team further more explained about the following points.

- If the embankment was constructed without toe-drain, even if it was shaped any figure, seepage water may ooze out of the surface of slope.

In point of view to the long range, this may connect with a failure.

- It is supposed that the seepage line may actually rise up more than the expected line because of animal holes and other affective factors inside of the embankment body.

Regarding the measures for prevention of seepage, EMB's decision was pending. The final decision of EMB will be informed to the Team on the next discussion after the review by the Counterpart on the proposal by the Team.

In addition to the opinion before, the Counterpart suggested the following two (2) points.

- (1) If core-wall and toe-drain would be adopted as the measures

for reinforcement of the embankment, a monitoring survey should be carried out against the embankment repaired by the emergency work as a model in the flood season after completion of the work.

- (2) At the last flood, many seriously damaged portions were seen besides the breached portion. It is supposed that many collapses must have happened anywhere along the embankment if the flooded water did not become same level at both of the river side and the land side of the flood embankment. In view of the above situation, if the measures for seepage water would be executed for reinforcement of the flood embankment, those should be provided for full length of the embankment.

- 3) Consideration on Slope Protection of Main Drainage Channel (MDC) (refer to item (d) of 2.1 in Annex 2)

In respect of the captioned items, the Team explained that it would be provided only for the sections of the 3 existing bridges and for the curve sections of the channel to which part the drainage water rushed against its slope.

In connection with the above bridges, the Counterpart requested newly to build another 5 numbers at least of foot-bridges (5 feet grade in width by concrete) to benefit for the land owner who lived outside to cross over the drainage channel for their farming.

On this matter, the Team replied that it was very difficult to realize the request because the request was not suitable to the objectives of this Project, however, the Team would convey to their government that it was strongly requested by EMB.

In respect of the location of bridges to be required to build, EMB will give data through Sub-Divisional Engineer (SDE).

- 4) Other Considerations (refer to item (e) of 2.1 in Annex 2)

No special discussion was had on this item.

5) Other Items

(1) Brick Pavement

- Regarding the brick pavement on crest proposed by the Team on Figure - 1 in Annex 2, the Counterpart suggested that the brick pavement would make repairing work to animal holes taken by EMB every year as a maintenance work for the embankment difficult.
- The decision of EMB if the brick pavement on crest should be adopted on this project, or not, was pending. That will be informed to the Team later after review by EMB. The both parties confirmed that the brick pavement was unproprio to core-wall and/or toe-drain mentioned before.

(2) Specification of Construction

In request of some items to be specified in the specification of construction, the Counterpart suggested the Team to mention the following matters in it at the preparation of it.

(1) Earth Work by using Machinery

The embankment should be constructed by using compacting machinery, such as soil compactor, engine tamper or small vibration roller, controlling density of the compacted soil to achieve the density in 90 % or more of maximum dry-density at earth work.

(2) Turfing

Turfing should be given on the following parts.

- both side slopes of the embankment
- both side shoulders of the crest of 2 feet (0.60 m) in each side width
- all width of the berm step
- upper part of embankment side of MDX slope down to its EML.

On this matter, the Team explained that the inlet apron separately built from the retaining walls and may not affect the sheet piles as a result of the study. However, the Team mentioned that the Team would review the original design and explain the results after the review in the study report.

In case of the modification of the lower limit water level of pump operation in dry season, it is necessary to obtain the guarantee against the functional disorder of the pump.

2.2.3 Improvement of MIC Embankment

1) General Section of MIC (refer to upper part of Figure - 7 on page 12 in Annex 2)

The both parties confirmed design conditions on the figure of Typical Cross Section of MIC proposed by the Team as follows:-

- a. Design H/L : EL 5.25 m (4.70 + 0.55 = 5.25 m)
- b. Free board : FB=0.60 m (Standard.)
- c. Elevation of crest : EL 5.85 m (5.25 + 0.60 = 5.85 m)
- d. Width of crest : W = 2.00 m
- e. Canal bank slope : Canal side: 1 : 2.0
Farm side : 1 : 1.5
- f. At improvement of the canal, it should be done to the canal side where land acquisition is not needed.

2) Part Section of MIC as Flood Embankment (refer to lower part of Figure - 7 on page 12 in Annex 2)

Regarding the part section of MIC in Barba area, the Counterpart suggest the Team to match the design elevation of crest to that of Flood Embankment.

On this matter, the Team explained logically that it is unnecessary to raise up the crest so high, pointing out some definite reasons or view points.

The Counterpart mentioned that the failure of this part of the embankment may cause failure to nearby the existing bridge on N-N Road which will result total disruption of communication also.

Accordingly, this part of the embankment needs to design as a flood embankment similar to the main flood embankment of the Project.

2.2.2 Improvement of Intake Canal and Inlet of Pumping Station

1) Intake Canal

(1) Present Conditions and Consideration of Slop Damages (refer to (a) and (b) of 2.2, 1) in Annex 2)

The Team explained the present conditions and their consideration of slop damages showing the photographs and the survey results.

(2) Measures for Improvement (refer to item (c) of 2.2, 1) in Annex 2)

The Counterpart put the following views on the proposed measures suggested by the Team.

- Brick blocks will be better to use for brick lining. The brick blocks may consist of several bricks joined with cement mortar, and be normally formed into the size of 15" x 15" x 6". It may be suitable to use a larger size one than the above normal one for the Project.
- Keep holes (drainage pipes) with PVC will be filled with soil due to siltation, therefore, it will be difficult to maintain its effect. Brick chips laid under the brick blocks and some gaps between the blocks will work as weep-holes instead of them.

The Team will review the above proposal.

The Counterpart asked to the Team that it is necessary to widen the section of the canal at the section from the confluence of the two streams where the drainage channel of the Project joins to the original stream (Nakhir Khal) to the Labiya River, because in which section, the water rises up by those above two flows.

On this matter, the Team answered to judge that it may not make problems because the proposed section of the canal will become wider than the existing one by cutting its slopes.

2) Pumping Station (refer to item 2) of 2.2 in Annex 2)

The Counterpart mentioned that BMDB agrees to lower down the inlet apron as proposed by the Team and put the view that the condition should be taken on the stability of the structures of Pumping Station while dismantling the inlet apron.

BASIC DESIGN STUDY
ON REHABILITATION OF DEMONSTRATION UNIT
IN N-N IRRIGATION PROJECT

ITEM OF DISCUSSION FOR DESIGN DETAILS (2ND)

Introduction.

- . Confirmation of the last discussion's record

1. Basic Design Conditions / Criteria

- . Confirmation of conditions and/or criteria (HML, EML, LML, LML, Quantities of irrigation water and drainage water and other conditions or criteria if necessary).

2. Basic Design Plans to be adopted on the Project (Proposal)

- . Reconfirmation of condition or criteria for each item
- . Explanation of basic design plans proposed by the Team (Cause of difficulties, design policy of the proposal, purposes or effects of the proposed work items and other explanation if necessary)
- . Discussion of the proposal

2.1 Reinforcement of Flood Embankment at full length

- (a) Widening method within the existing acquired land
- (b) Core-wall outside
- (c) Toe drain inside
- (d) Consideration for slope protection of Main Drainage Channel
- (e) Other consideration on seriously damaged portions

2.2 Improvement of Intake Canal and Inlet of the Pumping Station

- (a) Present conditions of facilities and equipments in their level
- (b) Portions or points to be improved
- (c) Proposal for improvement of Intake Canal
- (d) Proposal for improvement of Pumping Station
- (e) Other consideration if necessary

2.3 Improvement of Main Irrigation Canal Embankment

- only where new land acquisition by Bangladesh side is not needed
- (a) Present conditions in a view of survey results
- (b) Scope of rehabilitation works on MIC embankment under way by EMB under IDA finance.

3. Implementation Plan

- . Schedule after field survey (home office study / preparation of P.P.)

BASIC DESIGN STUDY
ON REHABILITATION OF DEMONSTRATION UNIT
IN N-N IRRIGATION PROJECT

1. Basic Design Condition / Criteria

1.1 Water Level

- a. HML : 6.60 m (1/25, quoted from the design of N-N Block A-1)
- b. LML : 0.80 m (1/10, quoted from the original Basic Design)
- c. LML: 0.50 m (- ditto -)

1.2 Quantity of Water

- a. Irrigation water: $Q = 2.20$ cu-m/sec
- b. Drainage water : $Q = 3.18$ cu-m/sec

(both figures are quoted from the original Basic Design)

1.3 Conditions for Flood Embankment

- a. Land acquisition: Necessary land for reinforcement will not acquired additionally any more, so that embankment shall be reinforced within the existing acquired land.
- b. Land use: In connection with the above, the land should be used as effectively as possible.
- c. Main Drainage Channel: This may be reduced by widening of embankment. However, the widening should be designed to keep necessary section area for drainage channel.
- d. Specification on part details
 - 1) Width of crest : 4.00 m or more
 - 2) Width of berm step: 3.00 m or more
 - 3) Free board : 0.90 m (quoted from the design of N-N Block A-1)
 - 4) Elevation of crest: 7.50 m (based on the above)
 - 5) Gradient of slope : 1 : 1.80 or more gentle
 - 6) Space on land use : may permit a less space.

2. Basic Design Plans (Proposal)

The paper prepared here is to explain the contents of basic design plans proposed by the study team for rehabilitation works to be implemented as a Japanese Grant Aid project.

The explanation of basic design plans will be developed below item by item of rehabilitation works.

REFERENCE OF DISCUSSION
FOR
DESIGN DETAILS (2ND)

MARCH, 1988

BASIC DESIGN STUDY TEAM, JICA

2.1 Reinforcement of Flood Embankment

A basic design plan proposed by the study team for reinforcement of Flood Embankment is as shown in Figure-1 (Typical Cross Section of Flood Embankment).

In the figure, the study team mainly proposes three (3) items of Widening Embankment, Core wall and Toe drain as a measure of reinforcement of Flood Embankment based on the following consideration.

- 1) Widening of Embankment
The Flood Embankment should be widened within the existing acquired land (W= 32.625 m). This means that the embankment must be widened to the land side.
- 2) Core wall
A core wall should be placed under the river side slope for a purpose to lower the level of water permeating into the embankment, especially at the section beyond some 3.40 km point from the Pumping Station.
- 3) Toe drain
A toe drain should be settled down to the toe of the land side slope at full length of the embankment for a purpose to prevent the water permeating through the embankment body from spouting at middle of the land side slope.

1) General Consideration

In respect of the above 2 items of 2) and 3), the study team further mentions a view of these items studied through the field survey as follows:-

(a) Geological Conditions

According to the results of geological investigation (boring on the flood embankment), the flood embankment consists of loose fine sand or soft clayey silt, which are not homogeneous. Especially in the section beyond some 3.40 km point from the Pumping Station, it is commonly found out that the existing (original) embankment was built with unsuitable materials, such as loose fine sand and silt with N-value of 2 - 4 and has many animal holes and some voids seem to be due to insufficiency of compaction in its body. These conditions are much similar to the brached portion. The above mention means that the embankment body in this section is much permeable more than the other section.

(b) Necessity of Core wall

Accordingly, in the section like this, it is very important to prevent the flood water coming directly into the embankment body. This is another reason why the study team proposes to place a core wall under the river side slope.

(c) Seepage Line and Toedrain

While, although the embankment is widened and made its slope more gentle than the original one, its slope may not become more gentle than the grade of 1 : 2.0 because of widening within the existing

acquired land. Accordingly, it can not be said that the embankment has enough length in its width to lower the seepage line down to under the toe of its slope (refer to Figure-2a). Figure-2b shows the seepage line in the case of placing core wall. These figures are drawn based on calculation, so it is supposed that the actual seepage line is presumably rising up more than the calculated one because of animal holes, less homogeneities of the embankment materials and other uncertain factors.

In considering to keep a long-period stability of the embankment with steep slope, it is much important to prevent the seepage water from spouting onto the surface of back slope. The seepage water must be drained out before it reaches the surface of slope. This is the reason why the study team proposes to settle a toe drain under the land side slope at full length.

2) Design Details

(1) Core wall

- a. The design details of core wall are as shown in Figure-1.
- b. The study team is carrying out site investigation, looking forward to find out less permeable materials along D-N Road. (Soil tests are under operation at present).
- c. Regarding the core wall, the study team was suggested by the counterpart of EIDB at the last meeting to place the core-wall in the center of the embankment (refer to Figure-3a). However, at a result of the office studies, the study team judged that the suggested core wall is unsuitable to lower the seepage line.

To expect the effect of core wall, it should be placed down to the bottom of the embankment as shown in Figure-3b. Even in this case, it is unadvisable because cutting volume of soil for settling core becomes large bulk (refer to Figure-3b).

(2) Toe drain

- a. The design details of toe drain are as shown in Figure-4.
- b. In this basic design, the study team considers to make the maintenance work of EIDB after completion as much easier or more less as possible.
- c. The study team considers to put jute mat on the toe drain to keep it working effectively from filling with soil.

(3) Slope protection of Main Drainage Channel

For the particular parts or portions, such as the parts of the existing bridges and curve section, the study team considers to design a slope protection with brick lining.

(4) Other considerations

- As one of other consideration, the study team consider to design large-size core wall at the sections where the Tektir Khal closes to the embankment.

Figure - 1 TYPICAL CROSS SECTION OF FLOOD EMBANKMENT

SCALE 1 : 100

Design Criteria

1. H.W.L ----- 6.600 m ----- (1/25)
2. Elevation of Crest ----- 7.500 m
3. Width of Crest ----- 4.000 m
4. Slope
 River Side ----- 2.00 : 1
 Land Side ----- 1.80 : 1
5. Width of Beam Stop ----- 0.000 m

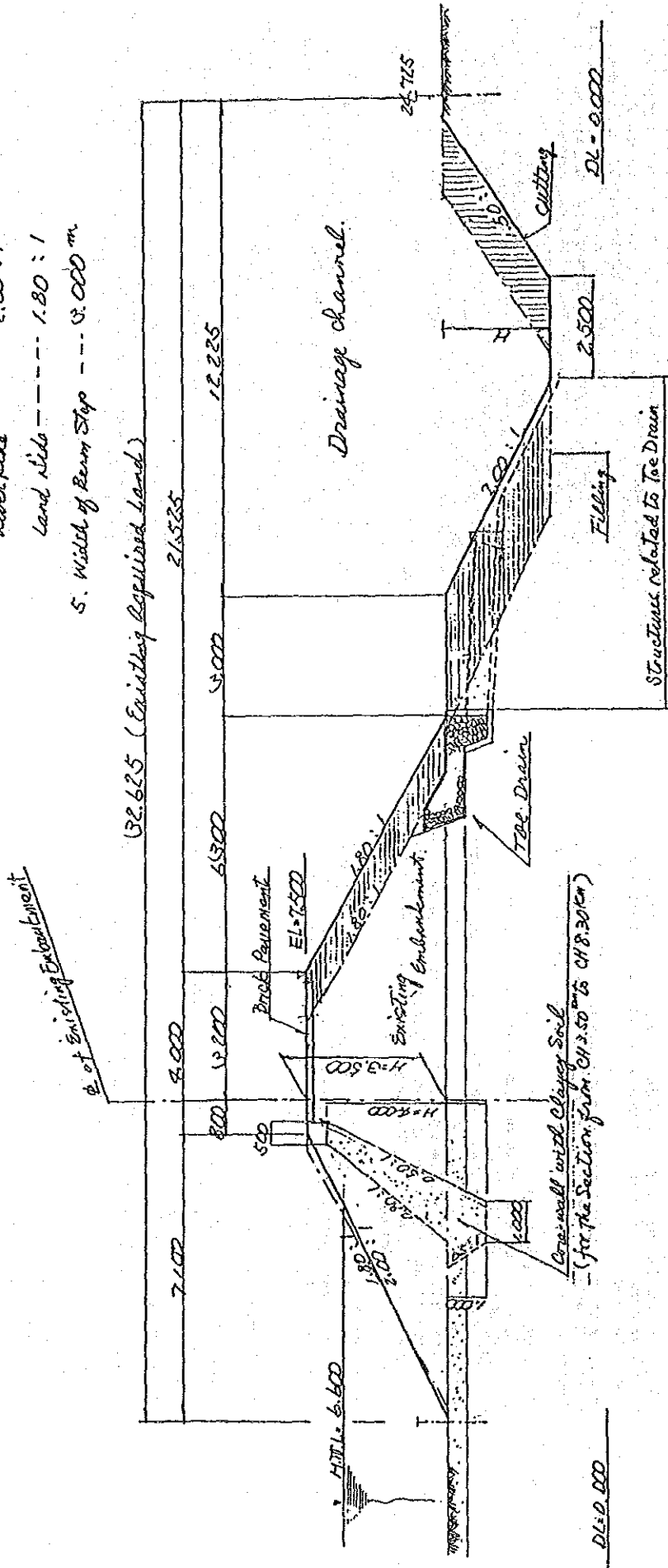


Figure - 2a SEEPAGE LINE IN THE EMBANKMENT (Without Core Wall)

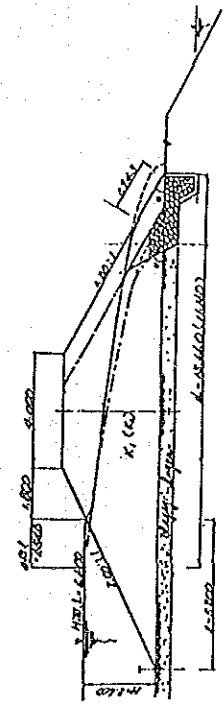


Figure - 2b SEEPAGE LINE IN THE EMBANKMENT (With Core Wall)

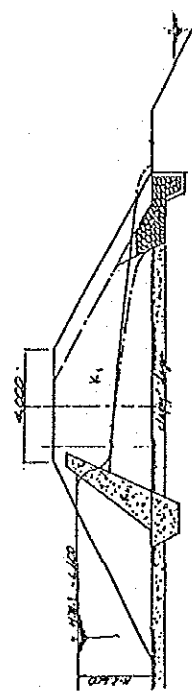


Figure - 3a CENTER CORE (suggested by E/DB)

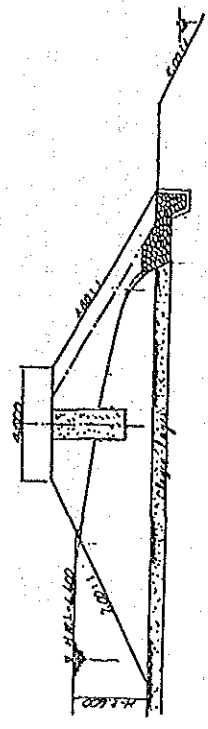


Figure - 3b EARTH WORK FOR CENTER CORE

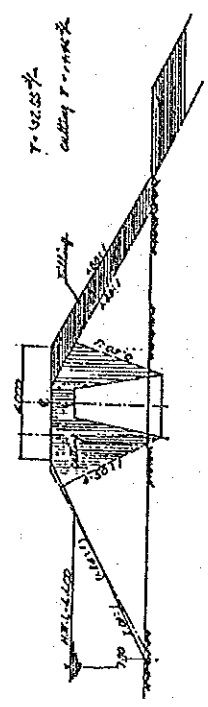
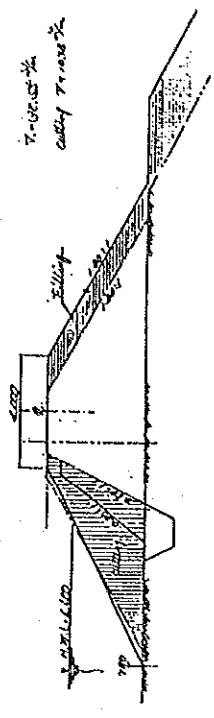


Figure - 3c EARTH WORK FOR PROPOSED CORE WALL



2.2 Improvement of Intake Canal and Pumping Station

This work item consists of improvement of Intake canal and improvement of Pumping Station. The study team explains each difficulty and its improving measure of the above as follows:-

1) Intake Canal

(a) Present Conditions

The intake canal is an earth waterway used for 2 purposes of irrigation and drainage. Accordingly, it works as an irrigation canal to send stream water from Lakhya River to the Pumping Station and as a drainage channel to let out the water from the Demonstration Project area to the river.

The canal is about 6 - 7 m high in its slope height, and many parts of slope eroded and portions partly collapsed are found out in its slopes.

(b) Consideration of Slope Damages

The study team judges that the slope damages of Intake Canal might be due to duplication of the following affective factors.

- Collapse or sliding of slope caused by repetition of water flow and up and down of water level by tide in dry season and by drainage water in rainy season
- Cutting waterway slope steeper than the upper slope at re-excavation of the canal bed on maintenance work
- Leaving the re-excavated soil with an unstable condition near by or in the slope of the canal.
- Erosion due to the natural drainage water from surrounding areas (lower parts of slope)
- Soft soil in geological factor. (related to water content)
- Erosion caused by cozing the under-ground water out of slope.

(c) Measures for Improvement

Considering the above-mentioned factors, the study team proposes a basic design plan for its improvement as shown in Figure-5.

In the plan, the study team proposes a slope protection by brick lining method as a measure for improvement of Intake Canal to keep it away from the above-mentioned factors as much as possible, based on the following considerations.

- Recutting the existing slope to remove the loose earth on it and to lower the level of canal bed
- Protecting the cut slope by brick lining with weep holes for the under ground water behind it to ooze out
- Placing a wooden beam foundation under the concrete bases because of soft ground on the bed.
- Stability of slope will be analyzed in home office work in Japan based on the results of geological and soil investigation

- According to the results of analyses, the study team might propose an alternative basic design plan on this item.

2) Pumping Station

(a) Present Conditions

Part elevations at the Pumping Station are as shown in Figure-6. These elevations shown in the figure are as confirmed by the both members of EADB and the study team at the last meeting.

The both members above have basically understood that a difficulty at operation of irrigation is caused by a fact that the entry part of the Pumping Station was built 0.55 m higher than the original design level.

(b) Improvement to be undertaken

In respect of improvement of Pumping Station, the study team proposes replacing of inlet apron as showing with hatch mark in Figure-6.

However, the study team was suggested by EADB side that the pump equipments are systematized automatically to stop its operation. On this matter, the study team is consulting details of the supplied equipments to the pump maker in Japan. But the study team has no reply yet at present, so continuously asking them.

2.3 Improvement of Main Irrigation Canal (MIC) Embankment

(a) Present Condition

Regarding the present condition, the study team carried out leveling for topographical survey by employing a local surveyors.

In this survey, profile levelling of MIC at full length (9.20 km) and cross section levelling with 47 sections were carried out along MIC Embankment.

The survey results will be effectively used on this basic design study and also on the subsequent detailed design.

(b) Improvement to be undertaken

A basic design plan to be proposed for improvement of MIC Embankment is as shown in Figure-7.

The design details are under examination at present. The study team will clarify the scope of work on this item, based on the survey results and rehabilitation work under way by EADB with INA finance.

Figure - 5 TYPICAL CROSS SECTION OF INTAKE CANAL
SCALE 1 : 100

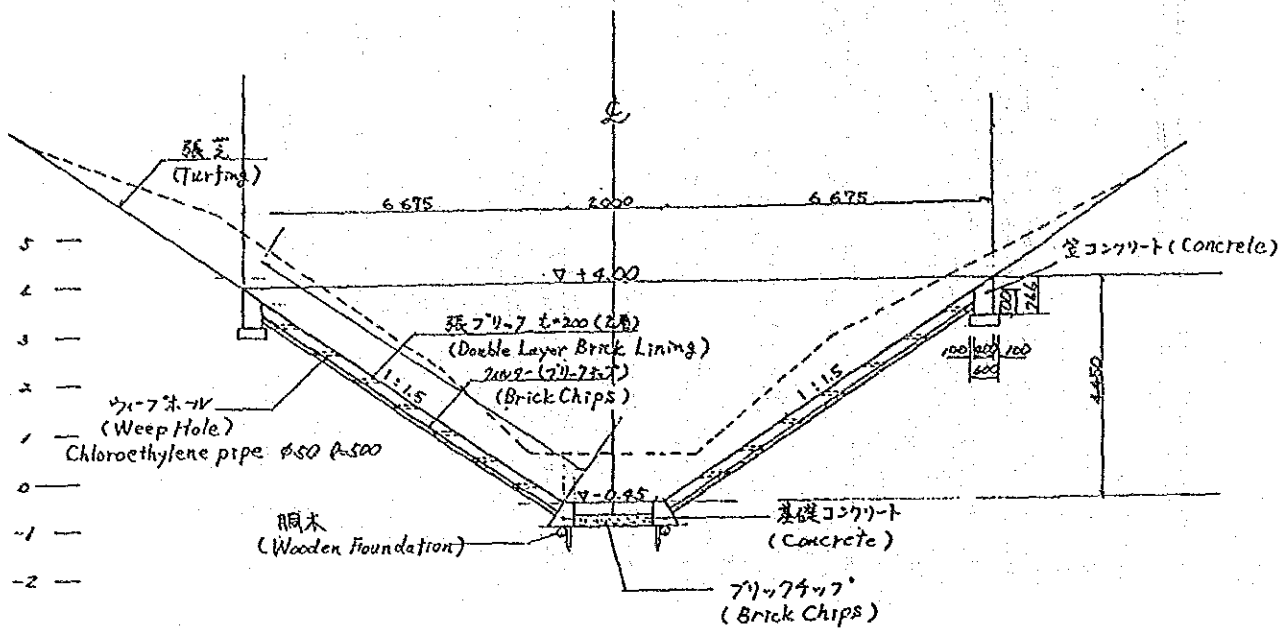
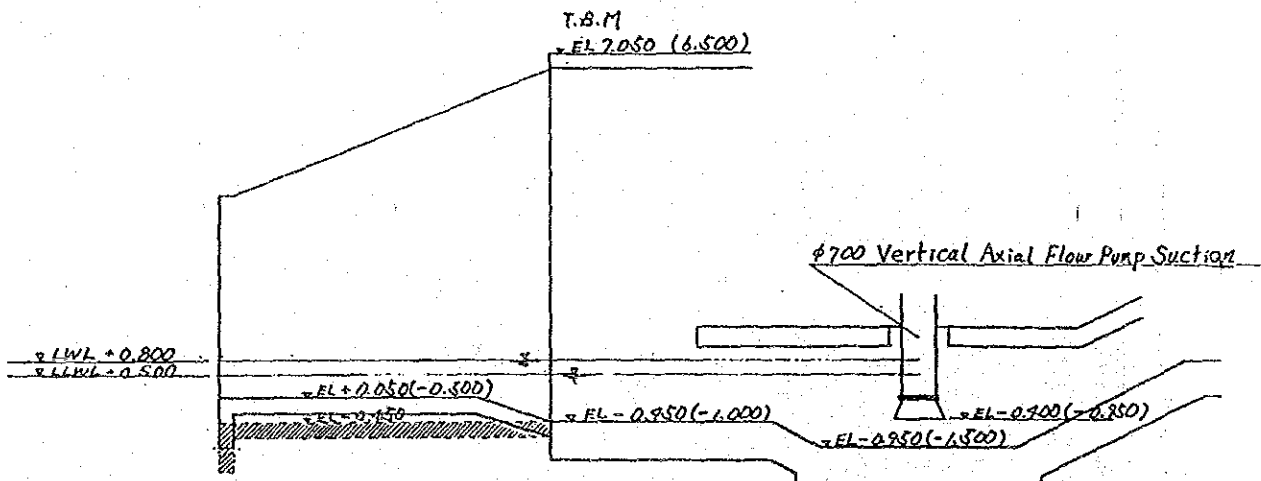


Figure - 6 PART ELEVATIONS AT PUMPING STATION




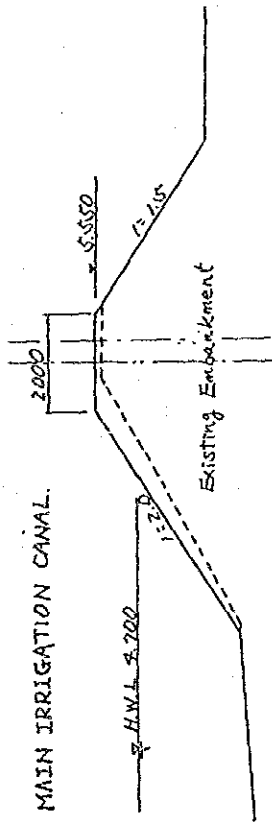
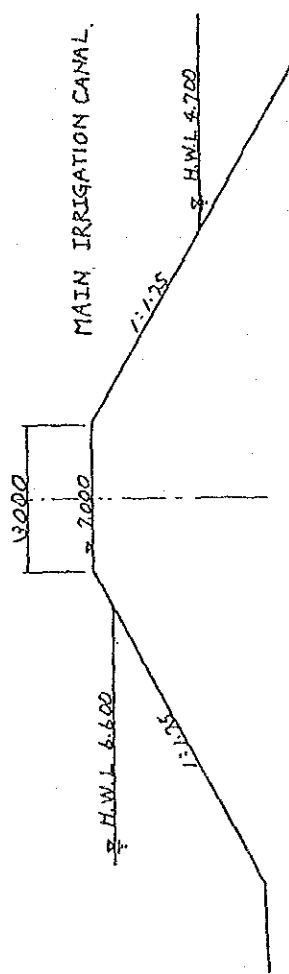
NOTES : Without () : Existing (As built)
 Within () : Original Design
 : Removal of Inlet

Figure - 7 TYPICAL CROSS SECTION OF
MAIN IRRIGATION CANAL EMBANKMENT
SCALE 1 : 100

TYPICAL CROSS SECTION



PORTION OF REINFORCEMENT OF FLOOD EMBANKMENT (IN BORPA)



* The Embankment under way by B.W.D.B.

JICA BANGLADESH OFFICE

(JAPAN INTERNATIONAL COOPERATION AGENCY)
DIT PLOT NO. 70, BLOCK-D
ROAD NO. 21, BANANE, DHAKA-13
BANGLADESH
PHONE: 604285, 600062.

JICA

Ref-No. BDS-Re/001
March 1, 1988

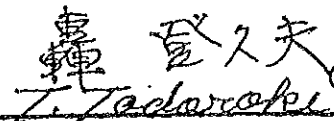
Mr. M. N. Huda
Member (Operation & Maintenance)
Bangladesh Water Development Board
Dhaka

Sub:- The View of the Japanese Basic Design Study Team on the
Construction Work of the Flood Embankment under way by BWDB

Dear Mr. Huda,

- 1) The rehabilitation work at full length of the flood embankment of the Demonstration Unit is expected to be commenced since the beginning of the next dry season (October in 1988) under Japanese Grant Aid.
- 2) In spite of the above-mentioned new rehabilitation work under Japanese Grant Aid, Bangladesh has to face the next monsoon season which may cause another destruction on the damaged flood embankment. Therefore the temporal rehabilitation (Emergency Repair Construction) for the half last part of the embankment (4.0 - 8.3 km) is under way by Japanese Grant Aid, and another half's rehabilitation (0.0 - 4.0km) is undertaken by Bangladesh side against the next monsoon season.
- 3) Through the field survey, our team has found several serious damages in the part of the embankment undertaken by Bangladesh side (above-mentioned 0.0 - 4.0 km) caused by animal holes and artificial reasons especially damages through pumping-up from the main drainage channel beyond the embankment by farmers outside of Demonstration Unit which make the crest width of the embankment less than 2.5 m.
- 4) In this point, our basic design study team would like to advise BWDB to concentrate Bangladesh side construction works on good caring those above-mentioned seriously damaged parts in this dry season.

Yours faithfully,


T. Todoroki

(Tokuo Todoroki)
Team Leader
Basic Design Study Team
JICA

Contd..... P/2.....

C.C. TO:

1. Mr. Amjad Hossain Khan
Chairman
Bangladesh Water Development Board
Dhaka
2. Dr. A.T.M. Shamsul Huda
Joint Secretary
Ministry of Irrigation, Water Development & Flood Control
Dhaka
3. Mr. Md. Nasim
Deputy Secretary
External Resources Division
Ministry of Planning
4. Mr. Minoru Nakano
First Secretary
Embassy of Japan
Dhaka
5. Mr. Norio Matsuzawa
Resident Representative
Japan International Cooperation Agency
Dhaka

1-7 収集資料リスト

	Title	Issue	Remarks
1.	Mouza Map alongthe aquired land for Secondary Irrigation Canal and Tertiary Irrigation Canal	Bangladesh Water Development Board (BWDB)	Copy
2	Data recorded on the Lakhya River at Demra in 1987	BWDB	Copy
3	Data of the Pumping Operation recorded from 1984 upto 1988	BWDB	Copy
4	Planning documents for Operation & Maintenance of Irrigation System	BWDB	Type(organization diagram)
5	Tender documents of rehabilita-tion work being carried out by BWDB	BWDB	Copy

付屬資料 2

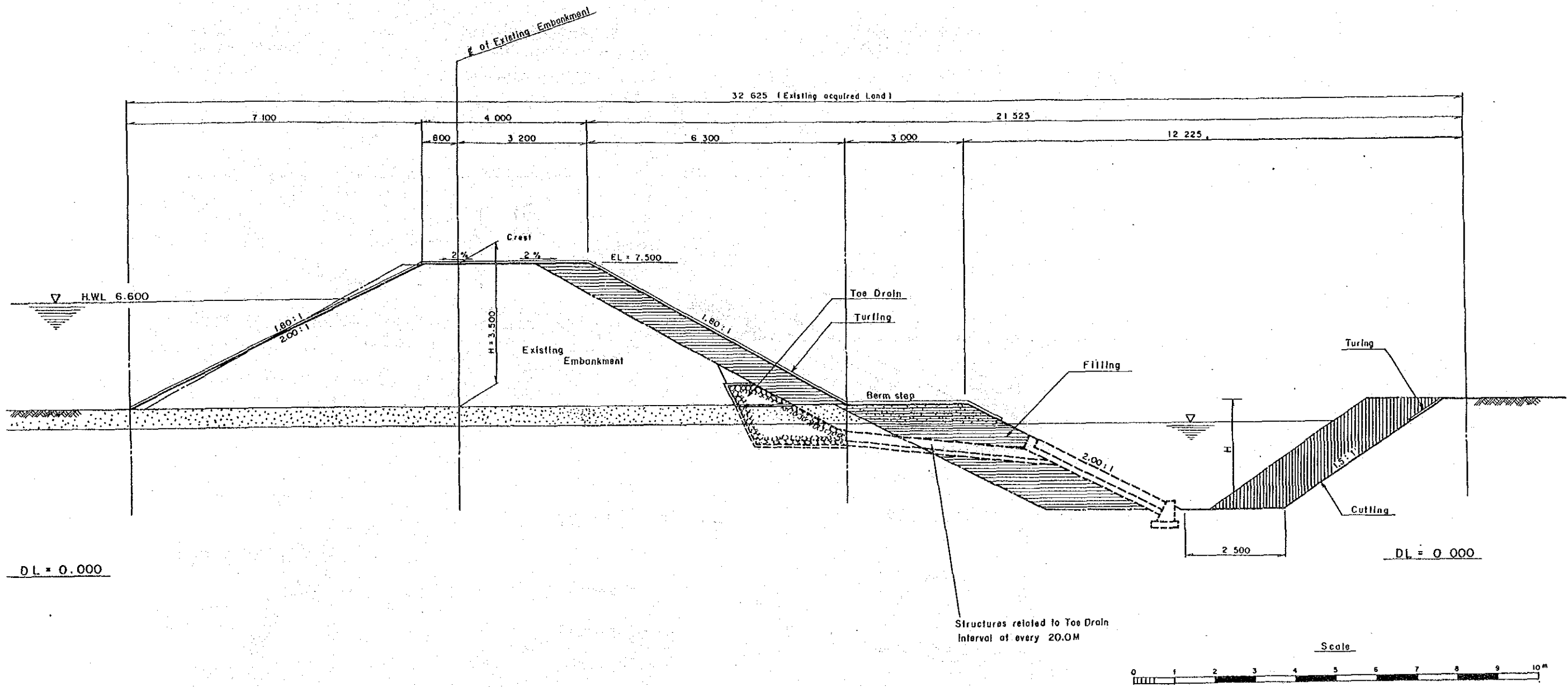
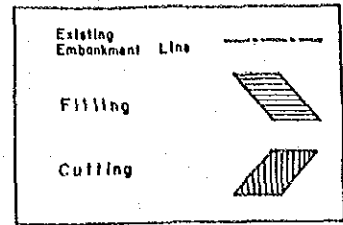
2-1 概略設計図

2-2 付図、付表

2 - 1 概略設計図

TYPICAL CROSS SECTION OF FLOOD EMBANKMENT

EXAMPLE



Structures related to Toe Drain
Interval at every 20.0M

NARAYANGANJ-NARSINGDI IRRIGATION PROJECT
REHABILITATION OF DEMONSTRATION UNIT
THE PEOPLE'S REPUBLIC OF BANGLADESH

TYPICAL CROSS SECTION
OF FLOOD EMBANKMENT

Date: May 1988 D.W.G NO.1

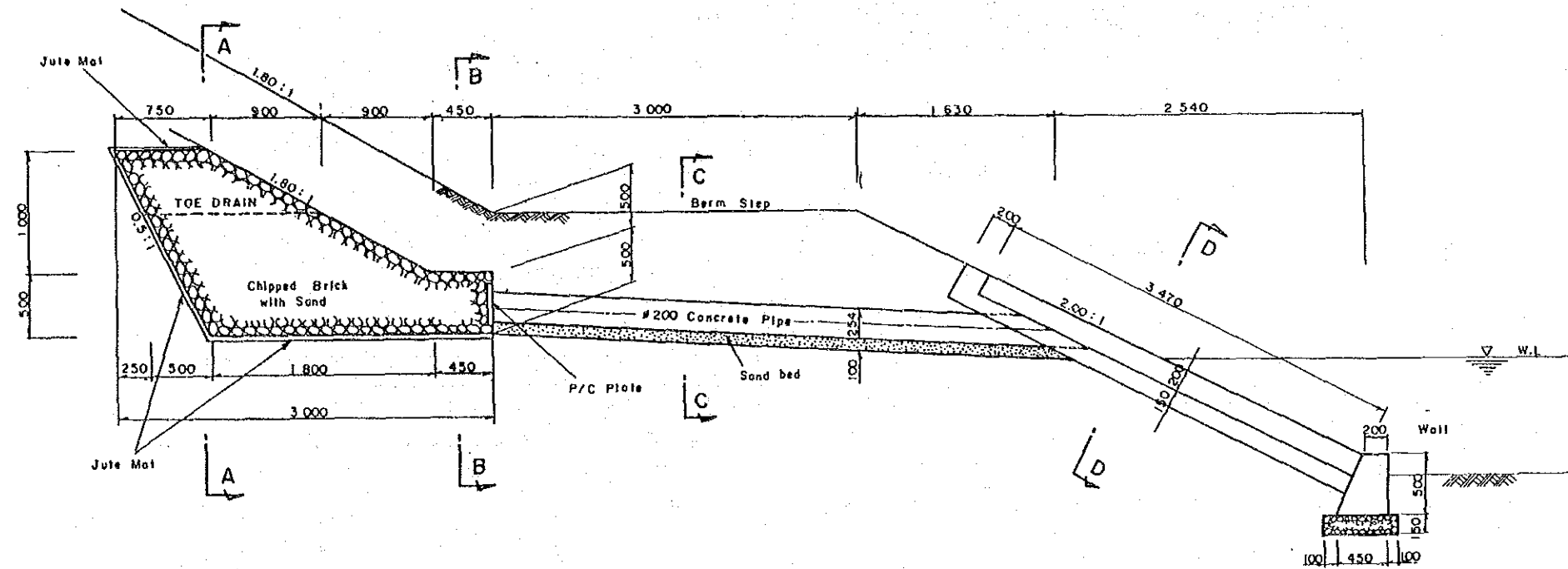
JAPAN INTERNATIONAL COOPERATION AGENCY

DETAILS OF TOE DRAIN AND RELATED STRUCTURE

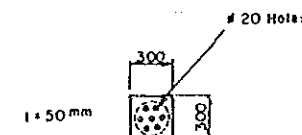
Toe Drain
(With Chipped Brick at full Length)

SECTIONAL DRAIN (1)
(ϕ 200 Concrete Culvert pipe at interval every 20.0M)

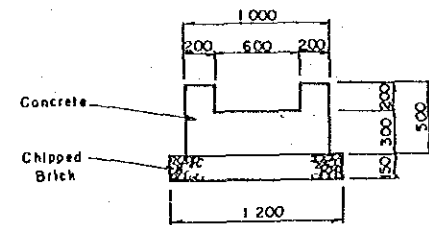
SECTIONAL DRAIN (2)
(Brick Wall 0.6 x 0.2 at interval every 20.0M)



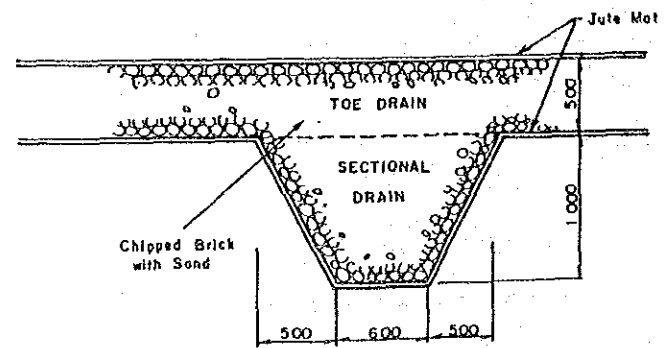
P/C PLATE



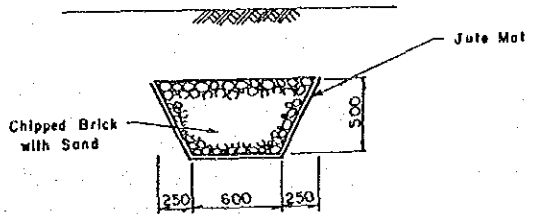
WALL



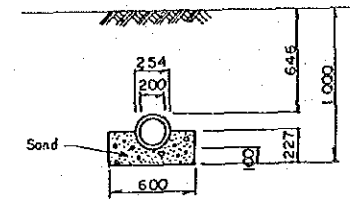
SECTION A-A



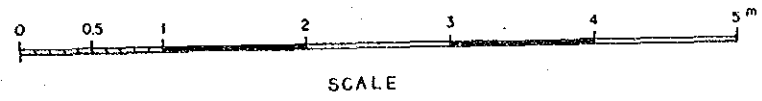
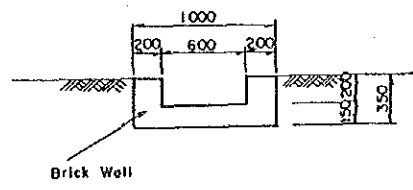
SECTION B-B



SECTION C-C



SECTION D-D

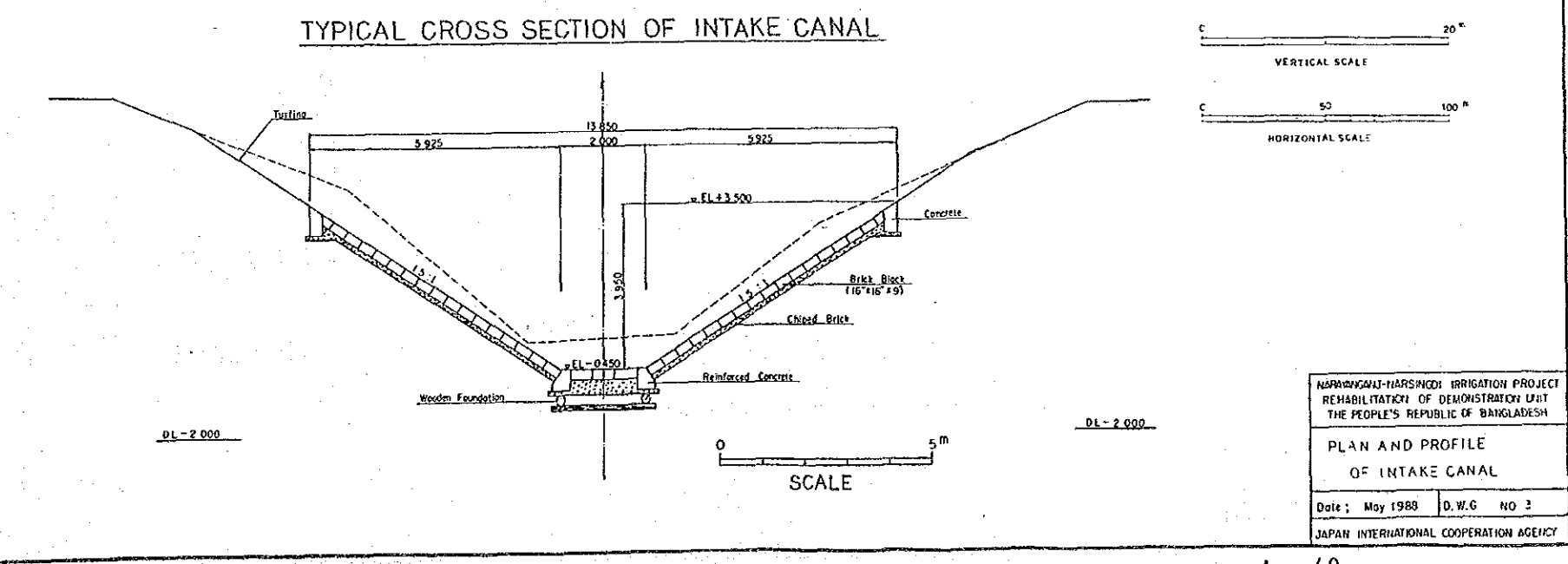
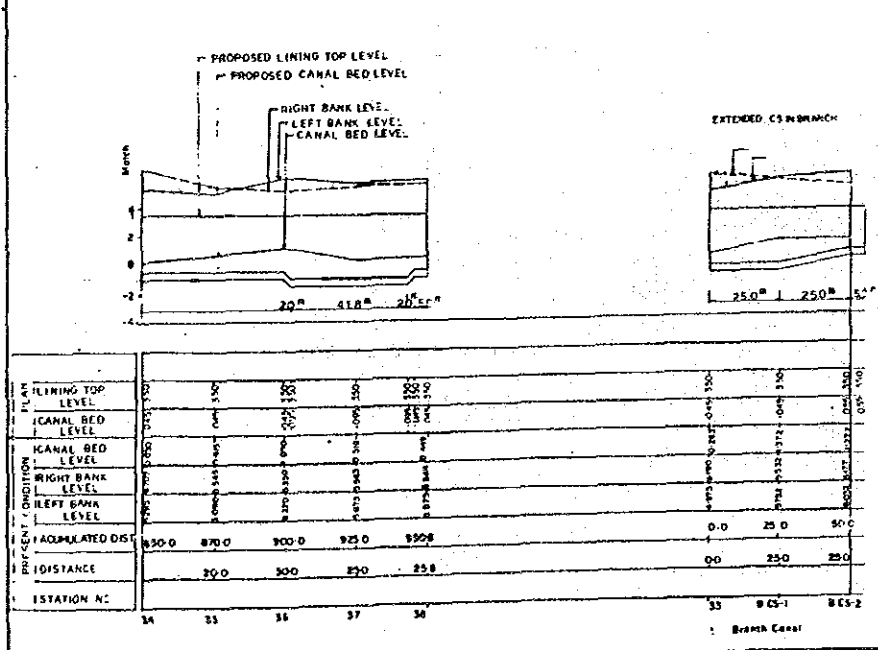
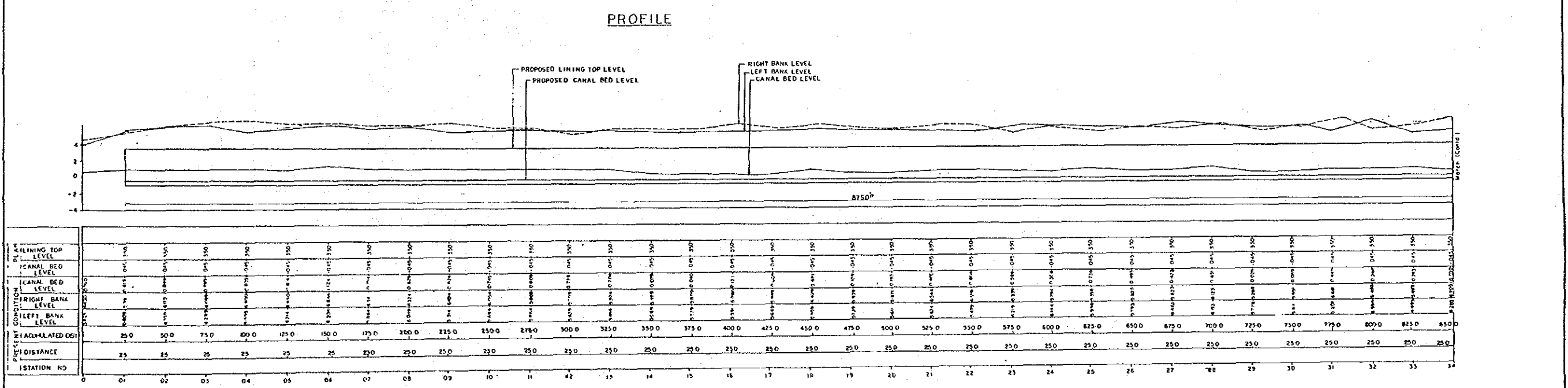
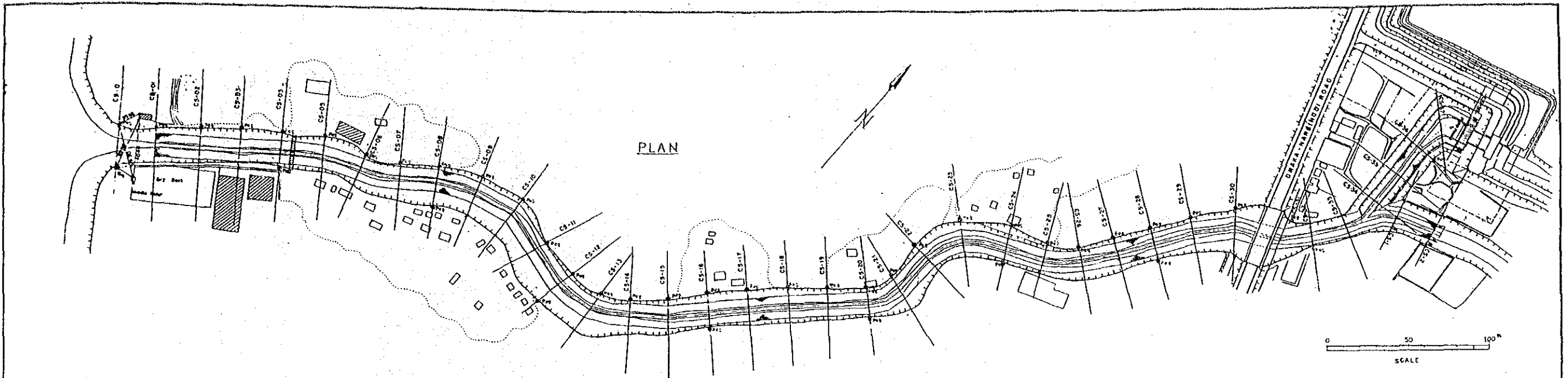


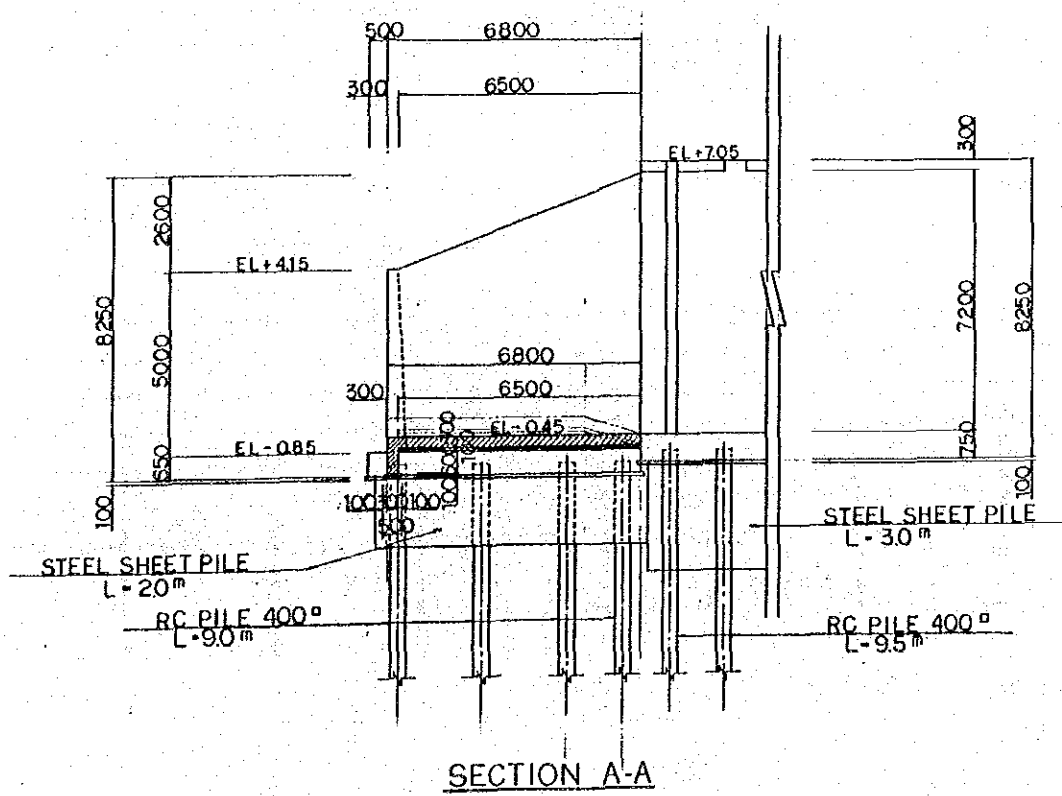
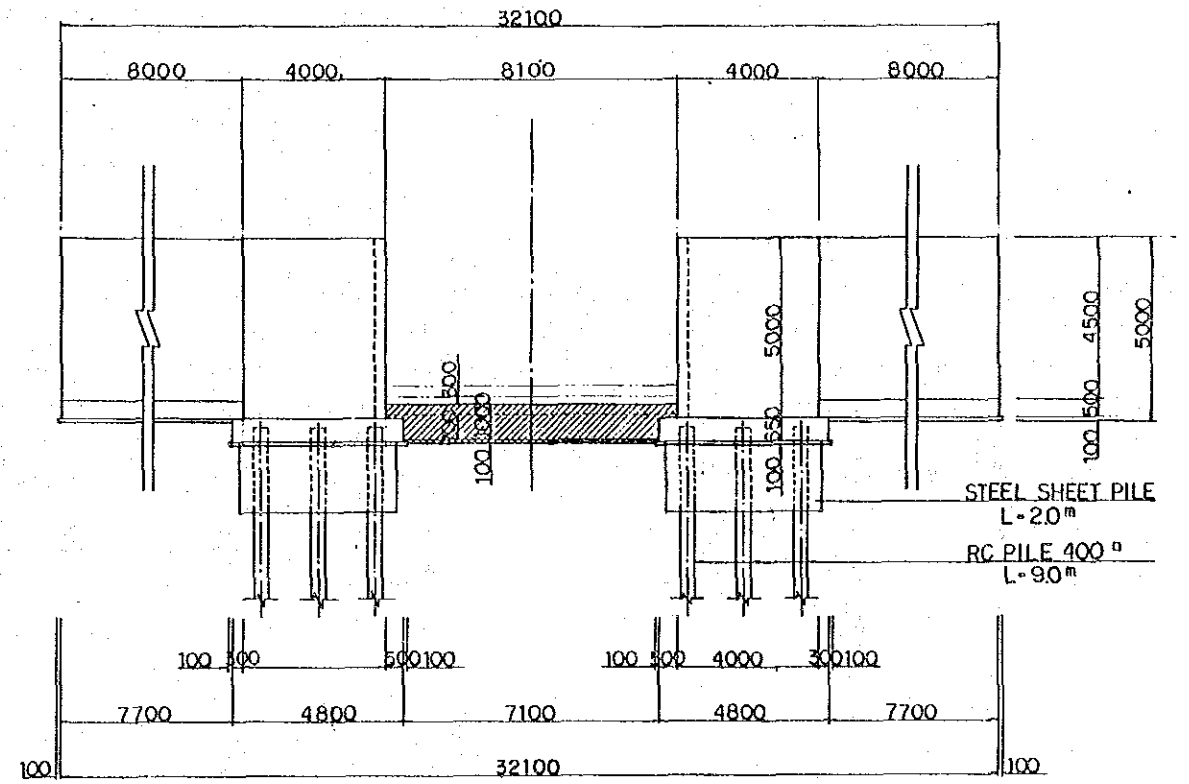
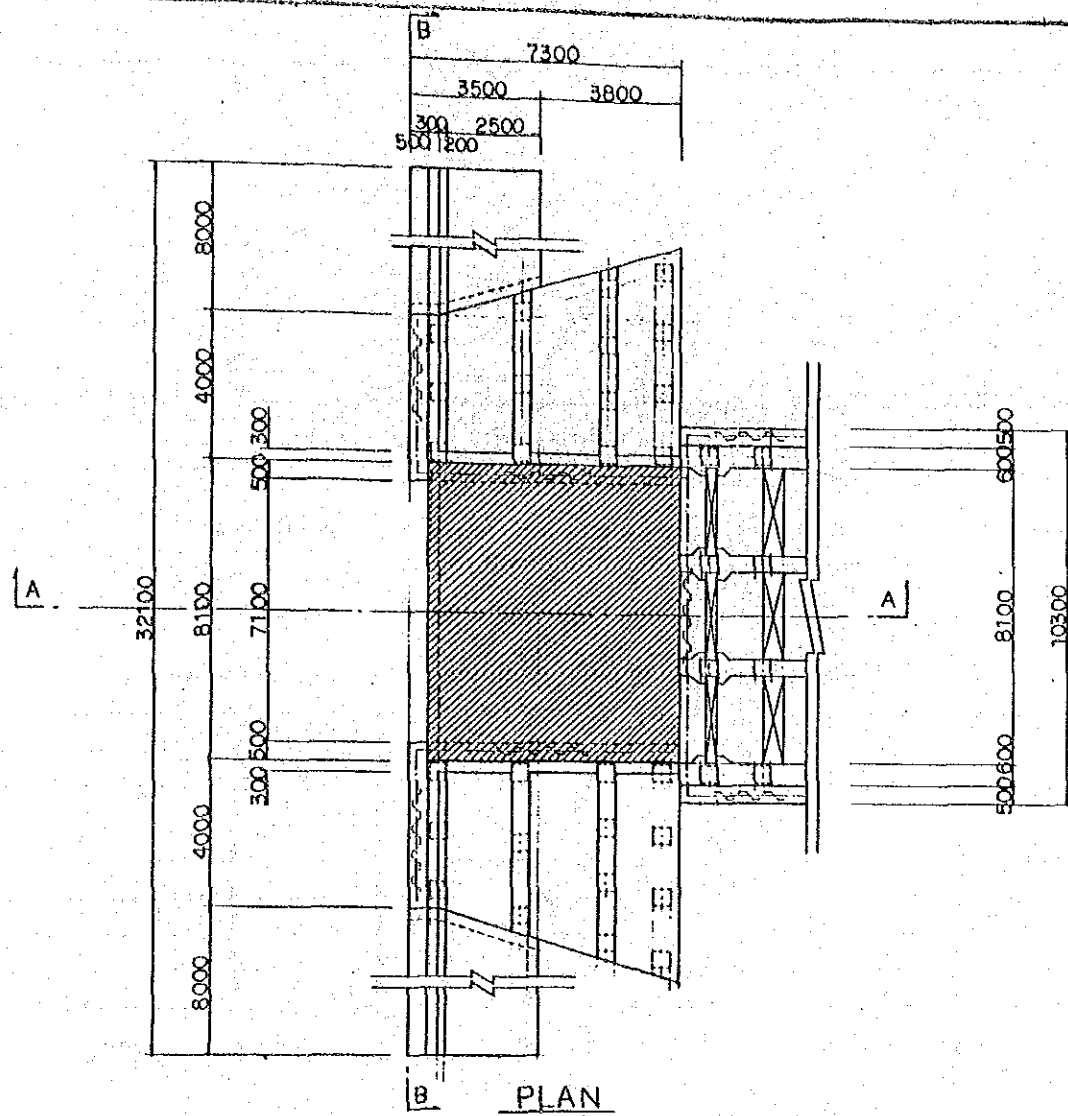
NARAYNGANJ-NARSINGDI IRRIGATION PROJECT
REHABILITATION OF DEMONSTRATION UNIT
THE PEOPLE'S REPUBLIC OF BANGLADESH

DETAILS OF TOE DRAIN AND
CRSS DRAINAGE STRUCTURES

Date: May 1988 D.W.G NO. 2

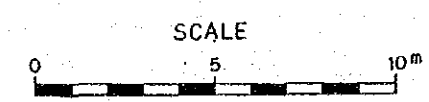
JAPAN INTERNATIONAL COOPERATION AGENCY





SECTION B-B

- NOTES :
- : A part of to be removed.
 - : A part of to be reconstructed.

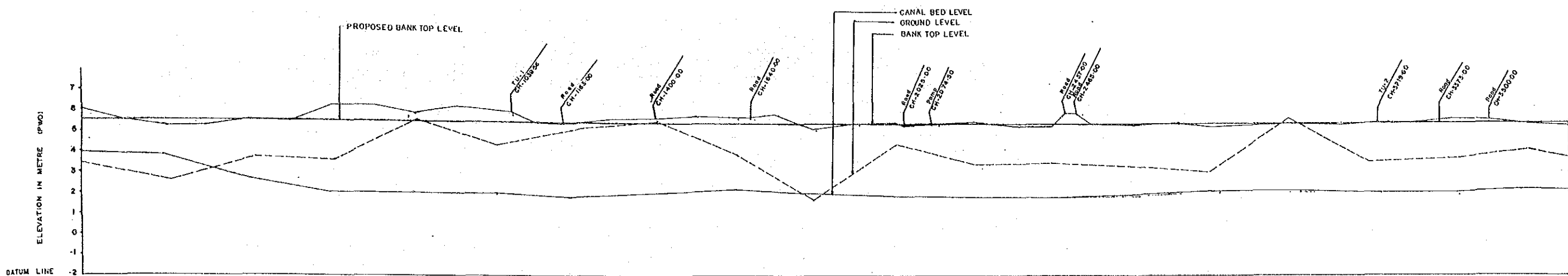


NARAYANGANJ-NARSINGDI IRRIGATION PROJECT
 REHABILITATION OF DEMONSTRATION UNIT
 THE PEOPLE'S REPUBLIC OF BANGLADESH

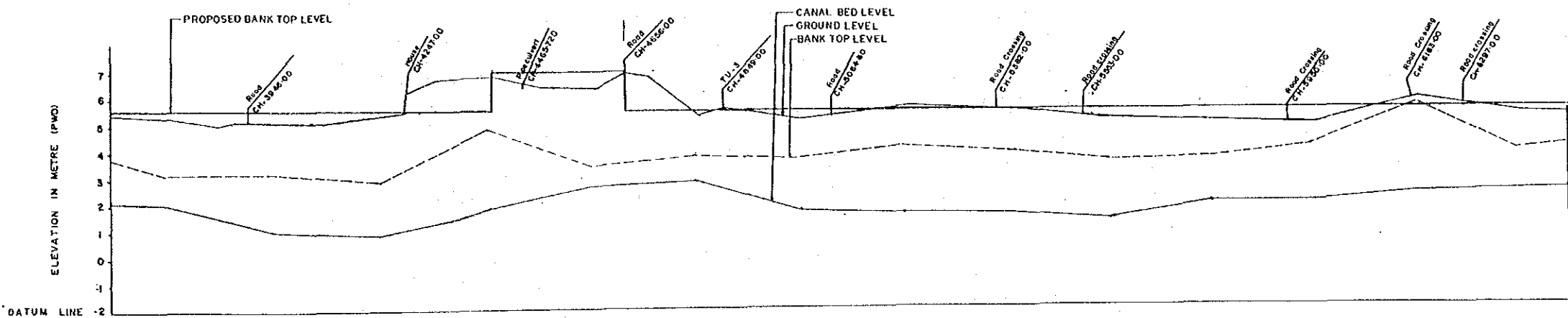
IMPROVEMENT OF INLET APRON

Date ; May 1988 | D.W.G NO. 4

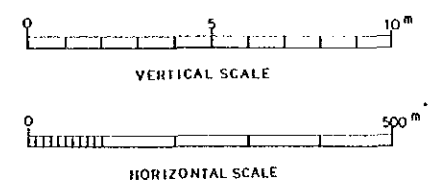
JAPAN INTERNATIONAL COOPERATION AGENCY



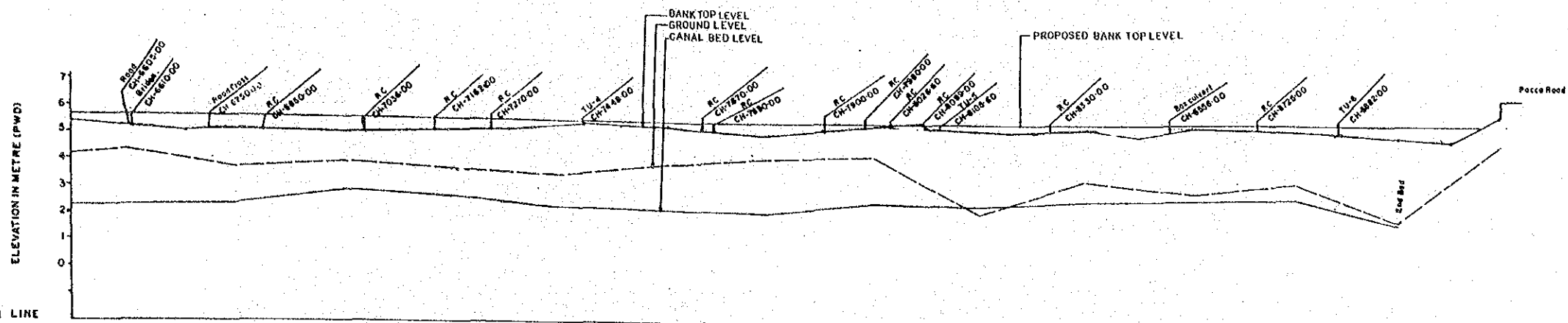
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04+00	100	100	4.01	3.51	3.51	3.51
05+00	200	200	4.02	3.52	3.52	3.52
06+00	300	300	4.03	3.53	3.53	3.53
07+00	400	400	4.04	3.54	3.54	3.54
08+00	500	500	4.05	3.55	3.55	3.55
09+00	600	600	4.06	3.56	3.56	3.56
10+00	700	700	4.07	3.57	3.57	3.57
11+00	800	800	4.08	3.58	3.58	3.58
12+00	900	900	4.09	3.59	3.59	3.59
13+00	1000	1000	4.10	3.60	3.60	3.60
14+00	1100	1100	4.11	3.61	3.61	3.61
15+00	1200	1200	4.12	3.62	3.62	3.62
16+00	1300	1300	4.13	3.63	3.63	3.63
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18+00	1500	1500	4.15	3.65	3.65	3.65



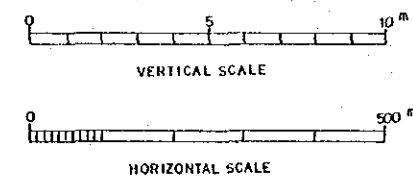
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21+00	1800	1800	4.18	3.68	3.68	3.68
22+00	1900	1900	4.19	3.69	3.69	3.69
23+00	2000	2000	4.20	3.70	3.70	3.70
24+00	2100	2100	4.21	3.71	3.71	3.71
25+00	2200	2200	4.22	3.72	3.72	3.72
26+00	2300	2300	4.23	3.73	3.73	3.73
27+00	2400	2400	4.24	3.74	3.74	3.74
28+00	2500	2500	4.25	3.75	3.75	3.75
29+00	2600	2600	4.26	3.76	3.76	3.76
30+00	2700	2700	4.27	3.77	3.77	3.77
31+00	2800	2800	4.28	3.78	3.78	3.78
32+00	2900	2900	4.29	3.79	3.79	3.79



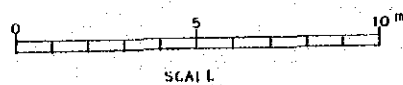
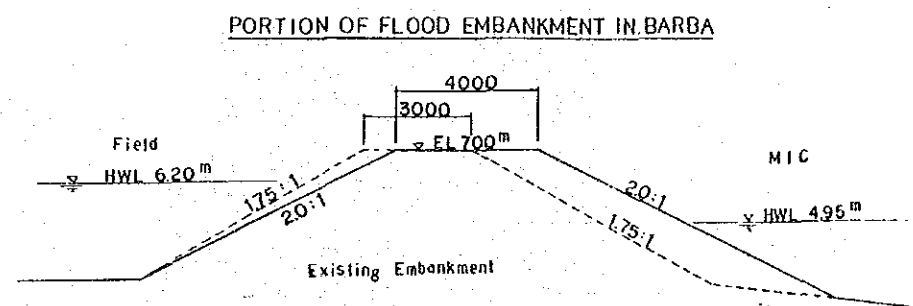
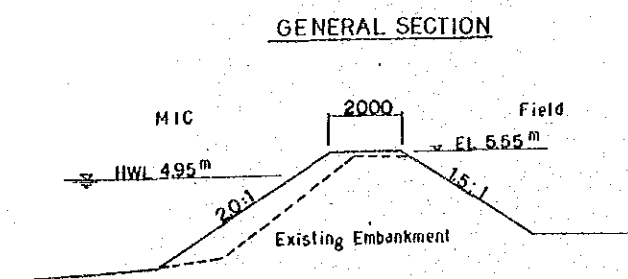
NAWANGANJ-NARSINGDI IRRIGATION PROJECT
 REHABILITATION OF DEMONSTRATION UNIT
 THE PEOPLE'S REPUBLIC OF BANGLADESH
 PROFILE OF MAIN IRRIGATION
 CANAL EMBANKMENT (1/2)
 Date; May 1988 D.W.G NO.5
 JAPAN INTERNATIONAL COOPERATION AGENCY



PRESENT CONDITION	PLAN																		
	BANK TOP LEVEL	CANAL BED LEVEL	GROUND LEVEL	BANK TOP LEVEL	ACCUMULATED DIST.	DISTANCE	STATION NO.												
	5.00	3.37	4.50	5.37	100	100	CS-33												
	4.00	2.00	3.00	4.00	400	400	34												
	3.00	1.50	2.50	3.00	400	800	35												
	2.00	1.00	2.00	2.00	400	1200	36												
	1.00	0.50	1.50	1.50	400	1600	37												
	0.50	0.25	1.00	1.00	400	2000	38												
	0.25	0.125	0.75	0.75	400	2400	39												
	0.125	0.0625	0.375	0.375	400	2800	40												
	0.0625	0.03125	0.1875	0.1875	400	3200	41												
	0.03125	0.015625	0.09375	0.09375	400	3600	42												
	0.015625	0.0078125	0.046875	0.046875	400	4000	43												
	0.0078125	0.00390625	0.0234375	0.0234375	400	4400	44												
	0.00390625	0.001953125	0.01171875	0.01171875	400	4800	45												
	0.001953125	0.0009765625	0.005859375	0.005859375	400	5200	46												



TYPICAL CROSS SECTIONS OF M.I.C EMBANKMENT



NAWANGANJ-NARSINGDI IRRIGATION PROJECT
REHABILITATION OF DEMONSTRATION UNIT
THE PEOPLE'S REPUBLIC OF BANGLADESH

PROFILE OF MAIN IRRIGATION
CANAL EMBANKMENT (2/2)

Date: May 1988 D.W.G NO.6

JAPAN INTERNATIONAL COOPERATION AGENCY

2 - 2 付図、附表

表 A2-2-1 ラキヤ川の平均高水位 (デムラ観測所)

(unit: m PWD)

	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>	<u>Average</u>
1974	-	-	-	2.18	3.08	3.81	5.50	6.30	5.76	4.57	2.99	2.14	
1975	1.77	1.67	1.69	2.09	2.62	3.33	4.52	5.24	5.06	4.29	2.92	2.12	3.11
1976	1.70	1.62	1.73	2.03	2.60	3.80	5.19	5.06	4.93	3.61	2.50	2.10	3.07
1977	1.65	1.52	1.68	2.41	3.18	4.35	4.99	5.48	5.26	4.29	2.73	2.10	3.30
1978	1.60	1.54	1.61	1.92	2.93	4.27	4.95	5.23	4.75	3.83	2.52	1.91	3.09
1979	1.61	1.38	1.59	-	-	-	-	5.10	4.98	4.22	2.57	2.13	
1980	1.68	1.63	1.77	2.14	3.03	3.86	4.73	5.69	5.42	4.21	2.81	2.10	3.26
1981	1.70	1.55	1.66	2.19	2.55	3.33	4.82	5.42	5.16	3.64	2.57	1.99	3.05
1982	1.57	1.51	1.48	2.14	2.51	3.44	4.70	5.05	4.88	3.40	2.22	1.87	2.90
1983	1.66	1.50	1.90	2.15	2.85	3.44	4/58	5.16	5.51	4.76	3.04	2.05	3.22
1984	1.75	1.49	1.68	2.16	3.03	4.37	5.20	5.46	5.48	4.43	2.54	1.95	3.30
1985	1.56	1.57	1.92	2.23	2.61	3.95	4.88	5.13	4.95	4.32	2.78	2.04	3.26
1986	1.65	1.50	1.61	2.06	2.49	2.70	4.40	4.76	4.83	4.57	3.02	1.94	2.96
Average	1.65	1.54	1.69	2.14	2.79	3.72	4.87	5.31	5.15	4.16	2.71	2.03	3.13

表 A 2-2-2 ラキヤ川の平均低水位 (ダム下観測所)

(unit: m PWD)

	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>	<u>Average</u>
1974	-	-	-	1.78	2.85	3.64	5.45	6.27	5.74	4.52	2.71	1.72	
1975	1.33	1.17	1.18	1.61	2.26	3.07	4.40	5.21	5.03	4.23	2.68	1.72	2.82
1976	1.26	1.12	1.24	1.57	2.21	3.65	5.14	5.03	4.91	3.41	2.15	1.68	2.78
1977	1.19	0.94	1.21	2.05	2.96	4.25	4.94	5.45	5.23	4.21	2.47	1.69	3.05
1978	1.15	1.03	1.06	1.39	2.35	3.93	4.92	5.20	4.74	3.70	2.17	1.54	2.77
1979	1.16	0.94	1.05	-	-	-	-	5.06	4.95	4.18	2.25	1.71	
1980	1.23	1.10	1.23	1.57	2.75	3.73	4.68	5.66	5.40	4.13	2.48	1.64	2.97
1981	1.23	1.07	1.14	1.75	2.12	3.08	4.74	5.40	5.13	3.50	2.21	1.62	2.75
1982	1.15	1.06	0.99	1.70	2.20	3.17	4.66	5.00	4.83	3.25	1.86	1.41	2.61
1983	1.16	0.95	1.36	1.69	2.56	3.25	4.51	5.10	5.48	4.69	2.76	1.62	2.93
1984	1.30	1.01	1.13	1.67	2.66	4.25	5.16	5.42	4.69	4.32	2.23	1.51	2.95
1985	1.12	1.06	1.41	1.75	2.20	3.78	4.82	5.08	4.90	4.19	2.47	1.66	2.87
1986	1.29	0.96	1.05	1.55	2.10	2.63	4.30	4.67	4.75	4.49	2.76	1.56	2.68
Average	1.21	1.04	1.16	1.67	2.44	3.54	4.81	5.27	5.06	4.06	2.40	1.62	2.83

表A 2-2-3 安定計算に用いた土質定数 (輪中堤防)

番号	湿潤重量 (t/m ³)	飽和重量 (t/m ³)	粘着力 (t/m ²)	内部摩擦角 (度)	
1	1.75	1.86	3.00	20.00	現況堤体
2	1.75	1.85	1.50	5.00	遮水壁
3	1.75	1.90	3.20	15.00	新規堤体
4	1.75	1.90	3.20	15.00	新規堤体
5	1.75	1.80	3.00	15.00	表土
6	1.75	1.80	3.00	15.00	表土
7	1.80	1.80	2.00	30.00	基礎地盤

表A 2-2-4 安定計算に用いた土質定数 (導水路)

番号	湿潤重量 (t/m ³)	飽和重量 (t/m ³)	粘着力 (t/m ²)	内部摩擦角 (度)	
1	1.60	1.70	2.50	10.00	上部層
2	1.60	1.70	2.50	10.00	上部層
3	1.60	1.60	2.00	3.00	中部層
4	1.70	1.70	4.00	3.00	下部層

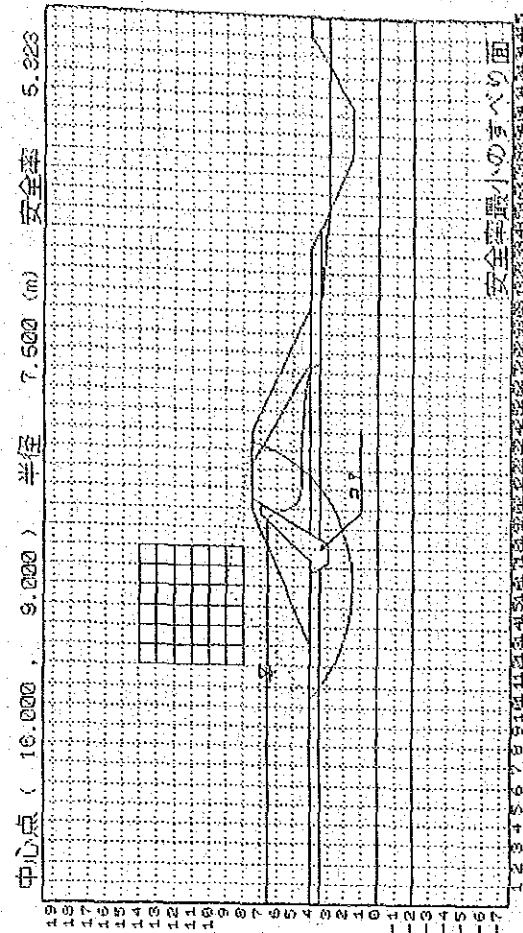
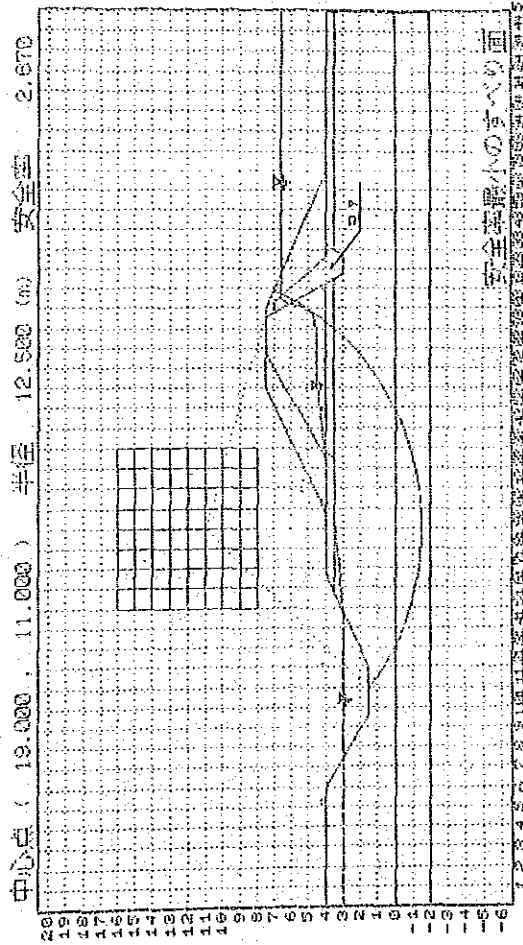
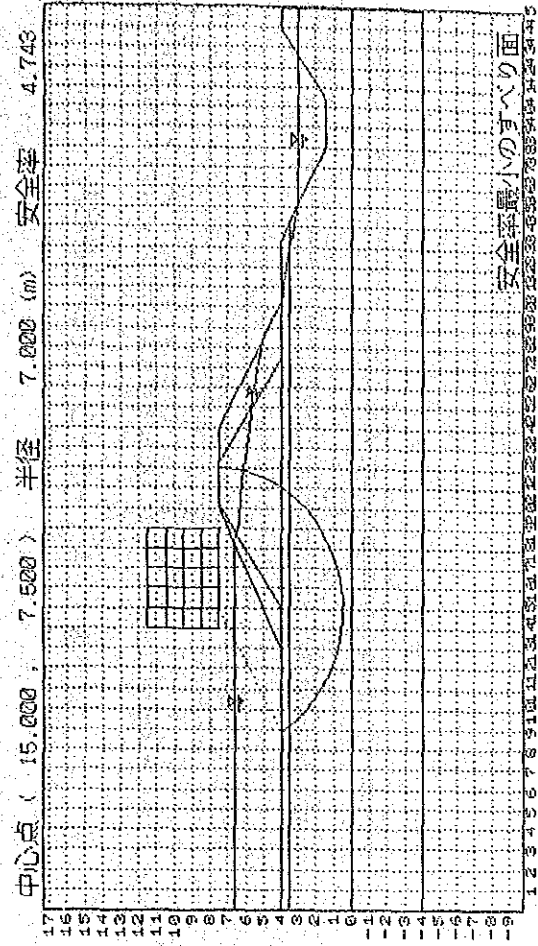
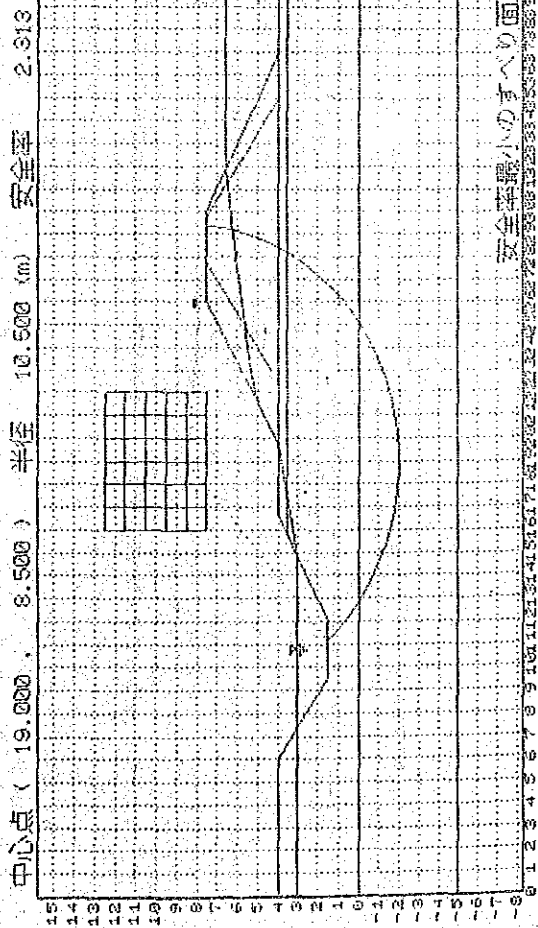


図 A 2 - 2 - 1 安定検討結果 (1)

計算結果

すべり円 1
 円弧の始点 X = 8.034 (m) Y = 4.000 (m)
 円弧の終点 X = 18.180 (m) Y = 3.020 (m)
 円弧の中心 X = 13.306 (m) Y = 5.568 (m)
 半径 R = 5.500 (m)
 中心角 = 135.840 (度)

直線部の長さ

4.468 (m)

すべり円 2
 円弧の始点 X = 20.250 (m) Y = 6.980 (m)
 円弧の終点 X = 20.364 (m) Y = 7.443 (m)
 円弧の中心 X = 19.364 (m) Y = 7.443 (m)
 半径 R = 1.000 (m)
 中心角 = 27.597 (度)

せん断力 T = 8.639 (t/m)
 せん断抵抗力 S = 51.421 (t/m)
 c によるもの 43.851 (t/m)
 φ によるもの 7.871 (t/m)

安全率 F = 5.952

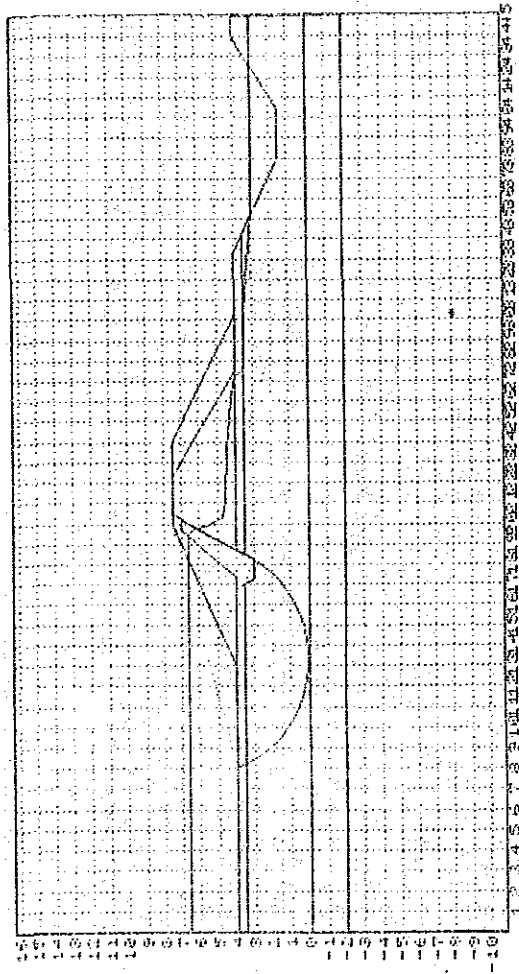
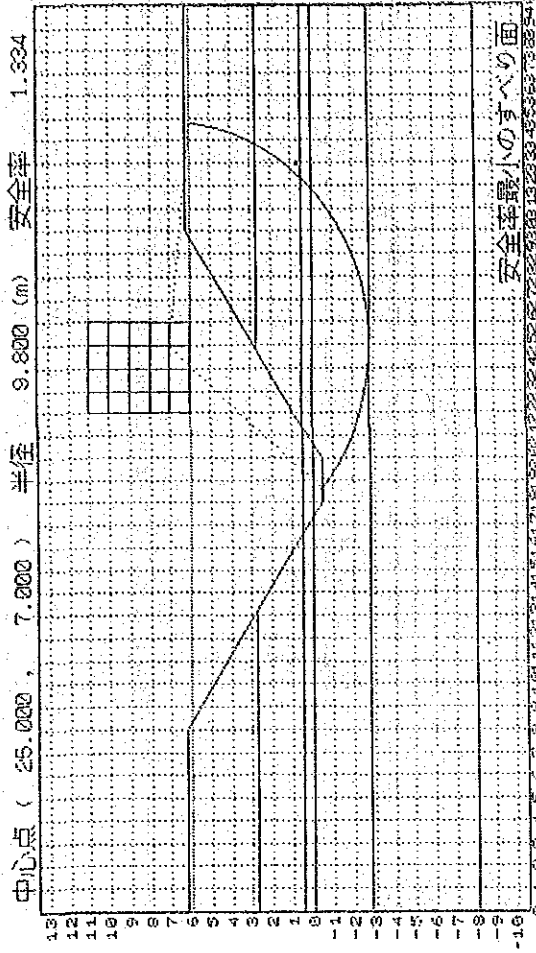
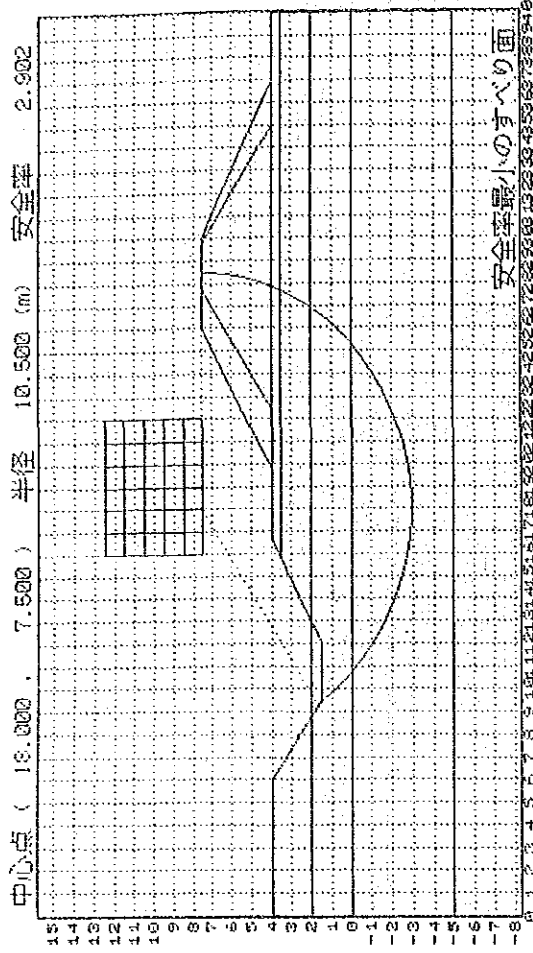


図 A2-2-2 安定検討結果 (2)

付 属 資 料 3

- 3-1 現況測量成果
- 3-2 地質、土質調査データ
- 3-3 カントリーデータ

3-1 現況測量成果

1) 測量内容

本基本設計調査で実施した測量は、表A3-1-1のとおりである。

表A3-1-1 測量の内容

Canals	Length of Profile km	Numbers of Cross Section nos	Remarks
Intake canal	0.95	41	Profile & Cross Section
MIC Embankment	9.20	47	- do -
SIC No.1	0.61	6	- do -
SIC No.2	1.35	9	- do -
SIC No.3	1.20	7	- do -
SIC No.4	1.51	9	- do -
SIC No.5	1.10	8	- do -
SIC No.6	0.54	4	- do -
SIC No.7	0.40	4	- do -
	16.86	135	

2) 分水工の測量結果

分水工 (MIC~SIC) 敷高の測量結果は、表A3-1-2のとおりである。

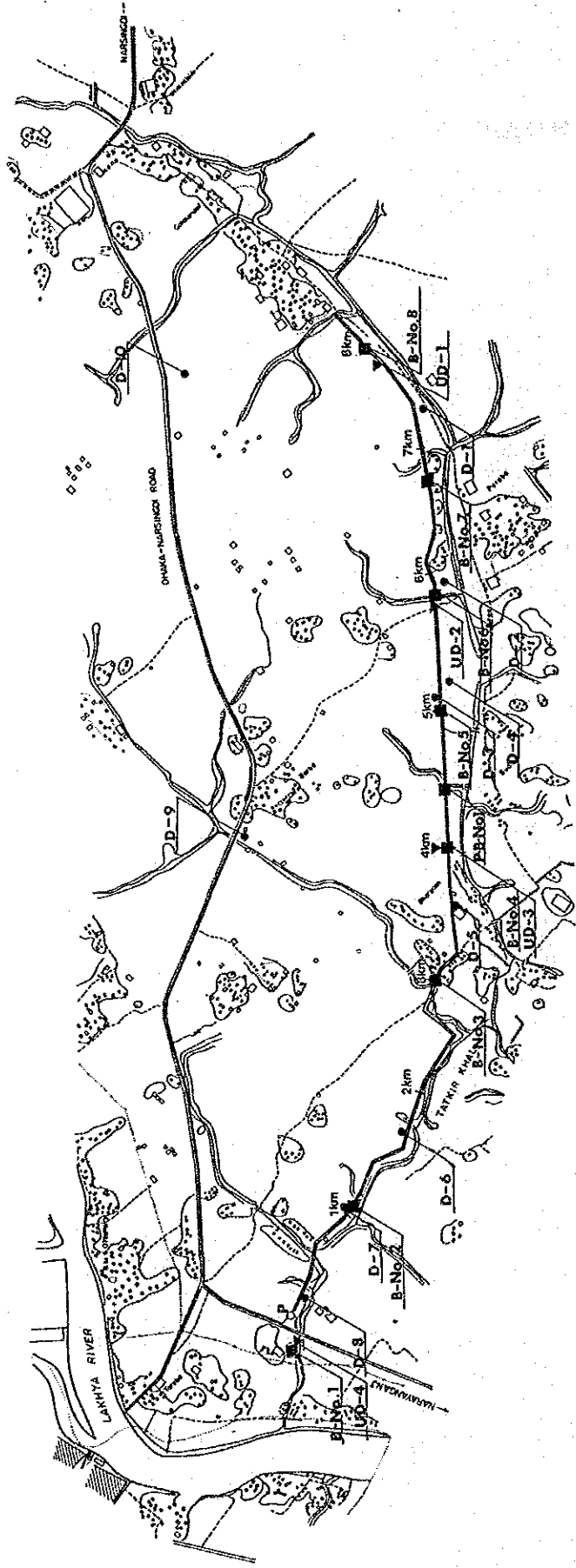
表A3-1-2 分水工敷高の測量結果

Turnouts	Location from Pump Station km	Elevation at the Bottom m	Remarks
Turnout No.1	1.040	EL 4.034	
Turnout No.2	3.220	EL 4.027	
Turnout No.3	4.849	EL 4.022	
Turnout No.4	7.448	EL 3.991	
Turnout No.5	8.106	EL 3.987	
Turnout No.6	8.882	EL 3.971	

Notes: MIC: Main Irrigation Canal
SIC: Secondary Irrigation Canal
EL : Elevation (m PWD)

3-2 地質、土質調査データ

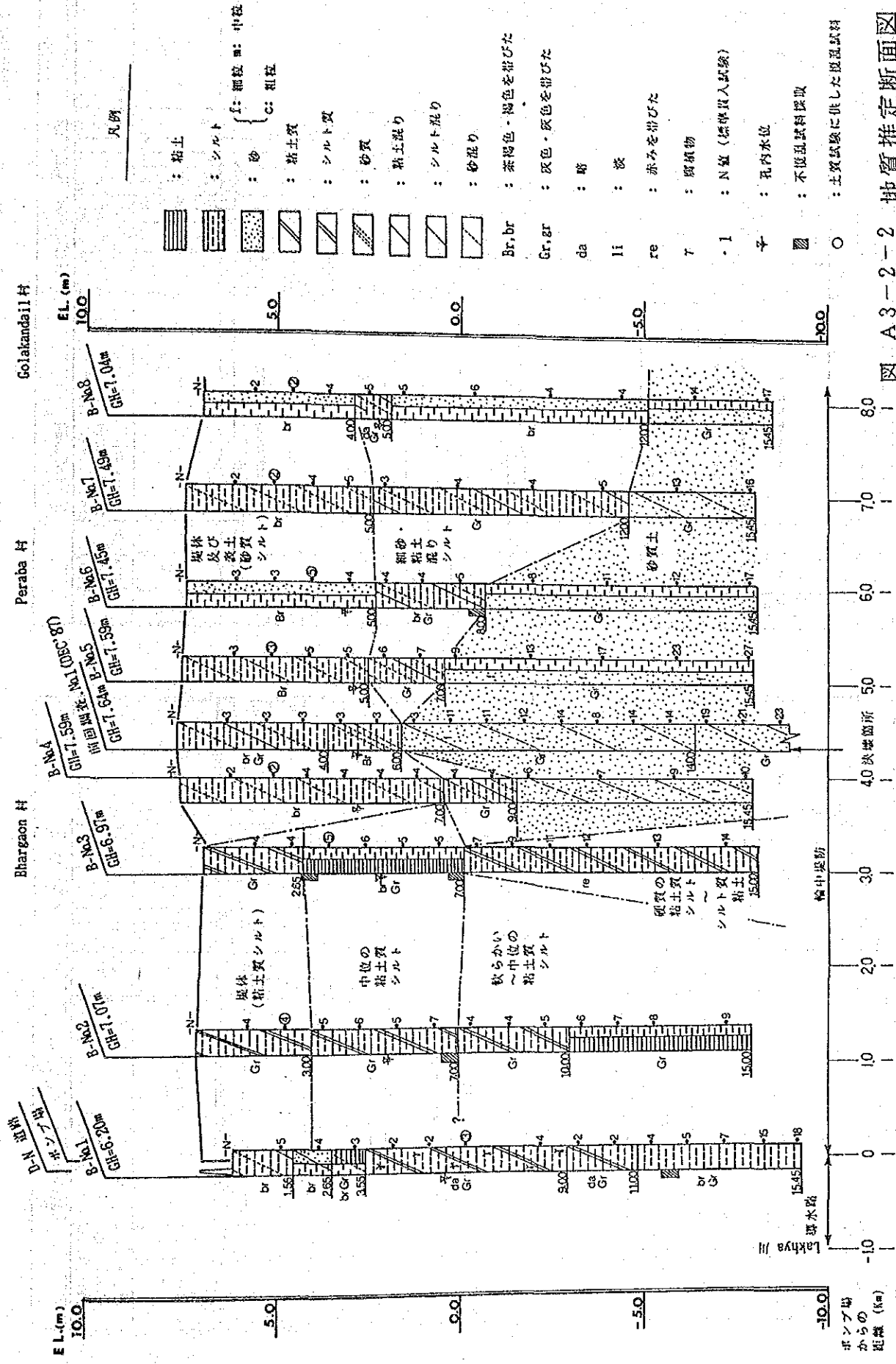
N-N DEMONSTRATION PROJECT MAP
 LOCATION MAP OF GEOLOGICAL INVESTIGATION



LEGEND

- B-No.1 : Boring (P-;Previous Study)
- ▼ UD-1 : Undisturbed Sampling
- D-1 : Disturbed Sampling
- : Flood Embankment
- - - : Intake Canal
- ⊕ : Pumping Station
- ⊙ : Village (High Land)

図 A3-2-1 土質調査位置図



Bore chart of boring No. 3 Elevation 6.97 m

Reduced elevation (m)	depth (m)	thickness	strata encountered	log	standard penetration tests blows/30cm	remarks soil samples
1						
2	2.65				4	
3	2.65	2.65	Gray soft clayey silt.		4	
4					5	
5					6	
6					5	
7	7.00	4.35	Brownish gray medium stiff clay and silt.		5	
8					7	
9					9	
10					11	
11					12	
12					13	
13					14	
14						
15	15.00	8.00	Reddish medium stiff to stiff silt with clay.			
disturbed sample <input type="checkbox"/> undisturbed sample <input checked="" type="checkbox"/>						

Bore chart of boring No. 4 Elevation 7.59m

Reduced elevation (m)	depth (m)	thickness (m)	strata encountered	log	standard penetration tests blows/30cm	remarks soil samples
1						
2					2	
3					2	
4					4	
5					4	
6					4	
7	7.00	7.00	Brownish very loose silt with fine sand trace clay		4	
8					4	
9	9.00	2.00	Gray soft silt with fine sand with clay.		4	
10					6	
11					7	
12					7	
13					9	
14						
15	15.45	6.45	Gray loose to medium dense fine sand with silt.		10	
disturbed sample <input type="checkbox"/> undisturbed sample <input checked="" type="checkbox"/>						

Bore chart of boring No. 5 Elevation 7.59 m

Reduction elevation (m)	Depth (m)	Strata encountered	Log	Standard penetration tests blows/30cm	Remarks soil samples
1				10 20 30 40 50 60 70 80 90	
2				3	
3				3	
4				5	
5	5.00	Brown very loose silt with fine sand.		5	
6				6	
7	7.00	Gray very loose silt with fine sand trace clay.		7	
8				9	
9				13	
10				17	
11				23	
12				27	
13					
14					
15	15.45	Gray medium dense fine sand and silt.			
	8.45				
<input type="checkbox"/> disturbed sample <input checked="" type="checkbox"/> undisturbed sample					

Bore chart of boring No. 6 Elevation 7.45 m

Reduction elevation (m)	Depth (m)	Strata encountered	Log	Standard penetration tests blows/30cm	Remarks soil samples
1				10 20 30 40 50 60 70 80 90	
2				3	
3				3	
4				5	
5	5.00	Brownish very loose silt and fine sand.		4	
6				4	
7				4	
8	8.00	Brownish gray soft silt with clay trace fine sand.		5	
9				8	
10				11	
11				12	
12					
13					
14					
15	15.45	Gray medium dense very fine sand and silt.		17	
	7.45				
<input type="checkbox"/> disturbed sample <input checked="" type="checkbox"/> undisturbed sample					

表 A 3 - 2 - 1 ボーリング調査数量表

Bore Hole No.	Distance from the Pumping Station (m)	Depth (m)	Standard Penetration Test (times)	Undisturbed Samples (pieces)
1	- 150	15	14	1
2	+1,100	15	13	1
3	+3,000	15	12	2*
4	+4,000	15	12	-
5	+5,000	15	11	-
6	+5,850	15	11	1
7	+6,800	15	10	-
8	+7,800	15	10	-
TOTAL		120	93	5

* One of them was collected from the existing embankment material and the others were obtained from the substrata under the embankment.

表 A 3 - 2 - 2 不攪乱試料採取位置

Sample No.	Location: Distance from the Pumping Station
UD - 1	on the flood embankment : 7,700 m
UD - 2	- ditto - : 5,800 m
UD - 3	- ditto - : 4,000 m
UD - 4	on the right side slope of the intake canal : - 150 m

表 A 3-2-3 土質試驗結果一覽表 (1/2)

(Intake Canal, Flood Embankment and its Foundation)

B/H No. or Sample No.	Distance from Pump St.	Object	Depth (m)	Particle Size Distribution (%)					Consistency Limit		SG	MC (%)	Unit Weight (g/cm ³)	Classi- fica- tion	UCS qu (kg/cm ²)	Triaxial Comp.		Remarks
				>2 mm	2-74 mm	74-5 mm	5- mm	5 > mm	LL (%)	PI						c (kg/cm ²)	φ (°)	
B-1	150 m	Intake Canal	6.00~6.45	0	4	54	42	42	85	36	2.688	58.12	—	—	—	—	LL: Liquid Limit	
UD-4			11.55~12.00	0	4	54	42	42	52	22	2.682	42.13	1.702	0.636	0.46	4		
d-1	500 m	Embankment	0.5 (slope)	0	7	52	41	69	33	2.650	70.29	1.593	0.590	0.30	5	PI: Plasticity Index		
B-2	1,100 m	Foundation	6.55~7.00	0	2	74	24	44	44	16	2.677	31.72	1.885	0.725	0.34	1	SG: Specific gravity	
d-2	1,500 m	Embankment	0.5	0	3	87	10	33	9	2.668	10.47	—	—	—	—	MC: Moisture content		
d-3	2,500 m	Foundation	2.00~2.45	0	4	78	18	44	16	2.659	30.08	—	—	—	—	UCS _{qu} : Unconfined compression strength		
B-3	3,000 m	Foundation	3.00~3.45	0	11	80	9	39	16	2.661	28.97	—	—	—	—	C: Cohesion		
d-4	3,500 m	Embankment	0.5	0	12	75	13	36	16	2.680	15.92	—	—	—	—	φ: Angle of internal friction		
B-4	4,000 m	Foundation	2.00~2.45	0	6	86	8	35	11	2.685	28.43	—	—	—	—			
UD-3	4,000 m	Foundation	0.5 (Slope)	0	12	78	10	33	7	2.671	25.82	1.787	0.772	0.39	22			
d-5	4,500 m	Foundation	0.5	0	8	71	21	33	15	2.671	14.28	—	—	—	—			
B-5	5,000 m	Foundation	2.00~2.45	0	4	87	9	34	11	2.654	27.72	—	—	—	—			
d-6	5,500 m	Foundation	0.5	0	16	45	39	N.P	N.P	2.670	6.00	—	—	—	—			
UD-2	5,800 m	Foundation	2.5	0	1	76	23	44	16	2.676	29.29	1.812	1.672	0.74	7			
B-6	5,850 m	Foundation	3.00~3.45	0	10	82	8	38	13	2.671	33.13	—	—	—	—			
d-7	6,400 m	Embankment	0.5	0	9	87	4	42	14	2.669	15.72	—	—	—	—			
B-7	6,800 m	Foundation	2.00~2.45	0	5	89	6	35	11	2.665	28.17	—	—	—	—			
d-8	7,500 m	Foundation	0.5	0	18	76	6	N.P	N.P	2.671	9.18	—	—	—	—			
UD-1	7,700 m	Foundation	0.5 (Slope)	0	3	78	19	42	14	2.675	27.29	1.660	—	0.34	28			
B-8	7,800 m	Foundation	2.00~2.45	0	14	84	2	39	11	2.671	33.06	—	—	—	—			

表 A 3 - 2 - 4 土質試驗結果一覽表 (2 / 2)

(Material for Embankment & its Core-wall)

Sample No.	Location (P.S.: Pumping Station)	Depth (m)	Particle Size Distribution (%)				Consistency Limit		SG	MC (%)	Classification	Compaction Test			Triaxial Comp.	Permeability K (cm/sec)	Remarks
			> 2 mm	2 ~ 74 μm	74 ~ 5 μm	5 > μm	LL (%)	PI				MDD (g/cm ³)	OMC (%)	c (kg/cm ²)			
D-1	7450 m from P.S. R/S. 50 m	0.5	0	5	65	30	46	20	2.675	23.67	ML	1.670	20.50	0.27	19		MDD: Maximum Dry Density OMC: Optimum Moisture Content
D-2	5900 m from P.S. R/S. 50 m	0.5	0	5	61	34	38	16	2.677	21.53	CL	1.651	20.05	0.31	13		
D-3	5100 m from P.S. on the MDC(L/S)	0.5	0	2	60	38	43	21	2.654	28.41	CL	1.603	20.50	0.44	13		
D-4	5200 m from P.S. R/S. 40 m	0.5	0	2	82	16	46	19	2.675	32.81	CL (ML)	1.610	20.56	0.22	21		
D-5	3500 m from P.S. R/S. 40 m	0.5	0	3	74	23	44	20	2.670	29.07	CL	1.618	20.00	0.24	20		
D-6	1700 m from P.S. on the MDC(L/S)	0.5	0	8	53	39	57	31	2.681	18.04	CH	1.602	21.50	0.37	12		
D-7	1000 m from P.S. on the MDC(L/S)	0.5	0	6	52	42	47	19	2.672	16.36	ML	1.586	20.25	0.31	17		
D-8	300 m from P.S. R/S. 50 m	0.5	0	4	65	31	48	23	2.677	19.71	CL	1.611	21.00	0.36	16		
D-9	Brick factory along D-N Road (4 km from P.S.)	4.0	0	1	60	39	60	30	2.670	52.83	CH	1.413	27.40			Impermeable	
D-10	— ditto — (8 km from P.S.)	1.5	0	4	77	19	41	16	2.678	27.14	CL	1.632	19.50			Impermeable	

3-3 カントリーデータ

3-3-1 カントリーデータ

1. 基礎指標

(1) 国名： バングラデシュ人民共和国

首都： ダッカ

独立年月日： 1972年 3月26日

(2) 国土・人口

面積： 14万3,988km²

人口： 1億0426万9,000人(1986年推定)

人口密度： 724人/km² (1986年確定)

人口増加率： 2.32%(1986年推定)

(3) 政体

75年、77年改正の憲法に基づく民族主義、民主主義、社会主義、イスラム主義を4原則とする立憲共和制の人民共和国である。

(4) 宗教

宗教は自由であるが77年改正憲法により指導原則はイスラム教としており、国民の大部分はイスラム教徒(約86.6%)で、残りはヒンズー教徒(12.1%)、キリスト教徒、仏教徒など1.3%である。

(5) 言語

ベンガル語を国語としているが82年の新教育政策でアラビア語、英語の義務教育化を図っている。

(6) 人種

ほとんどがベンガル人(98%)で、チベットのモンゴル系と南インドのドラビダ系の混血である。非ベンガル人は約2%を占めている。

(7) 教育

政府は国防に次ぎ教育部門の発展を促進している。初級学校（6～10万）は義務教育で44,200校、識字率は50%に計画中である。

(8) 通貨・レート

通貨単位はタカ (Taka)、1タカは100パイサ(Paisa)、1ドルは86年6月約30タカ、1タカ約5円

(9) 気候・地勢・緯度

1) 気候

典型的な亜熱帯モンスーン気候である。気候的特徴によって1年が、① ノースウエスタン期（夏季3～5月）、②モンスーン期（雨季6～10月）、③乾季（11～2月）の3期に区分される。気温は夏季の4月が最も高く、ダッカ地区における最高は34.4℃である。また最低は乾季の1月で11.6℃である。降雨量は雨季に集中していて、年間降雨量の約80%がこの時期に降っている。降雨量は、一般的に東部地区に多く西部地区の方が少ない。

2) 地勢

インド亜大陸の東端に位置し、国土の大部分はガンジス、ジャムナ、メグナの三大河川の下流河川部が占め、支流・分流が入り込む典型的なデルタ地帯の特徴を持っており、広大で低く殆んど平坦な沖積平野である。地質はシルト質の軟弱層である。

3) 緯度

バングラデシュ国は、北緯20°75'～25°75'、東経88°30'～92°75'の範囲にある。西はインドのウェストベンガル、北は同アッサム及びメハラヤ、東は同トリプラミゾラムの諸州に続き南東部チッタゴン地区山地においてビルマに接している。

2. 社会、経済指標

(1) 国内総生産

GDP: 160.54億ドル (1985年)

成長率: 4.9%

(2) 国民所得

一人当り国民所得：113ドル

(3) 産業構成 (表 A 3-3-1-1 参照)

(4) 主要輸出品目構成 (表 A 3-3-1-2 参照)

(5) 国際収支 (表 A 3-3-1-3 参照)

(6) 外資準備

86年12月31日現在 3.9457億ドル

(7) 対外債務

86年12月31日における債務は 65.69億ドルで、独立以来の借款、贈与は88,586億ドルである。

(8) 対日貿易

日本からの輸入：2億4,900万ドル(1984/85年)

日本への輸出：5,928万ドル(1984/85年)

(9) 財政収支 (表 A 3-3-1-4 参照)

表 A3-3-1-1 セクター別GDP構成比 (現在価格表示)

(Percentage)

Sectors	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86 (p)
1. Agriculture ...	46.7	45.9	47.1	48.4	50.1	51.6
i) Crops ...	35.9	35.8	36.2	37.1	36.9	37.8
ii) Forestry ...	2.5	2.4	3.0	3.4	3.3	3.4
iii) Livestock ...	5.3	4.8	5.1	4.8	6.4	6.8
iv) Fisheries ...	3.0	2.9	2.8	3.1	3.5	3.6
2. Mining and Quarrying ...	0.001	0.002	0.001	0.001	0.001	0.001
3. Industry ...	9.8	9.7	9.7	8.8	8.3	7.8
i) Large scale ...	5.7	5.6	5.4	4.9	4.6	4.4
ii) Small scale ...	4.1	4.1	4.3	3.9	3.7	3.4
4. Construction ...	5.6	6.0	5.2	5.2	5.4	5.5
5. Power, Gas, Water and Sanitary Services ...	0.3	0.4	0.6	0.6	0.6	0.5
6. Transport, Storage and Communication ...	7.9	8.6	8.7	7.4	6.5	6.0
7. Trade Services ...	8.9	8.3	8.0	8.1	8.4	7.9
8. Housing Services ...	7.6	7.4	6.8	7.1	6.7	6.4
9. Public Admn. and Defence ...	3.5	3.6	3.6	4.0	4.2	4.3
10. Banking and Insurance ...	1.8	1.6	1.5	1.5	1.6	1.6
11. Professional and Misc. Services ...	7.9	8.5	8.8	8.9	8.2	8.3
12. GDP at Market Prices ...	100.0	100.0	100.0	100.0	100.0	100.0

Note : (P)—Provisional.

Source: B.B.S.

セクター別GDP構成比 (固定価格表示)

(Percentage)

Sectors	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86 (p)
1. Agriculture ...	48.7	48.8	49.3	48.0	46.9	46.8
i) Crops ...	38.6	38.0	38.5	37.3	36.3	36.3
ii) Forestry ...	2.4	2.6	2.6	2.7	2.8	2.9
iii) Livestock ...	4.8	5.1	5.0	4.9	4.8	4.7
iv) Fisheries ...	2.9	3.1	3.2	3.1	3.0	2.9
2. Mining and Quarrying ...	0.001	0.002	0.001	0.001	0.001	0.001
3. Industry ...	10.6	10.7	10.1	10.1	10.0	9.8
i) Large Scale ...	6.1	6.1	5.6	5.6	5.6	5.5
ii) Small Scale ...	4.5	4.6	4.5	4.5	4.4	4.3
4. Construction ...	4.0	4.2	4.1	4.7	5.0	5.0
5. Power, Gas, Water and Sanitary Services ...	0.3	0.4	0.6	0.6	0.6	0.7
6. Transport, Storage & Communication ...	6.8	6.7	7.0	6.8	6.8	6.8
7. Trade Services ...	9.6	8.7	8.6	8.7	8.9	9.1
8. Housing Services ...	7.4	7.5	7.4	7.3	7.2	7.0
9. Public Admn. and Defence... ...	3.8	4.0	3.9	4.5	4.9	5.0
10. Banking and Insurance ...	1.9	1.8	1.6	1.7	1.9	1.9
11. Professional & Miscellaneous services ...	6.9	7.2	7.4	7.6	7.8	7.9
12. GDP at Constant Market price ...	100.0	100.0	100.0	100.0	100.0	100.0

Note : (p) provisional.

Source : B.B.S.

表 A3-3-1-2 主要輸出品

Commodity	(M. ton) (Million taka)									
	1980-81		1981-82		1982-83		1983-84		1984-85	
	Quan- tity	Value	Quan- tity	Value	Quan- tity	Value	Quan- tity	Value	Quan- tity	Value
Fish, Fresh and dried (excluding canned)	7818	602	9391	1004	14464	1673	20717	2031	27055	2333
Tea	32341	672	39063	812	31418	1100	33800	1700	26509	1568
Spices	546	5	95	1	351	6	363	11	236	8
Cotton, raw	257	5	726	15	403	15	221	8	348	15
Jute raw	353561	1875	352089	2000	457000	2580	387153	2730	266037	3900
Leather	13824	871	15594	1073	19919	1581	20710	2198	17365	1921
Paper newsprint and hardboard	14202	119	10472	105	5782	61	399	2	18137	220
Jute manufactured	558172	6532	552273	6282	569071	7920	574543	8991	543187	10886
Jute yarn	8518	109	18735	242	26289	395	38464	739	38880	936
Jute fabrics, woven	279693	3444	211420	2529	267432	3950	325898	4989	264849	5119
Rope and twine of Jute	4167	50	2801	32	2213	28	1587	26	1451	33
Jute bags and Sacks	265794	2929	319317	3479	273137	3547	208594	3237	238007	4798

Source: B. B. S.

主要輸入品

Commodity	(Thousand metric tons) (Million taka)									
	1980-81		1981-82		1982-83		1983-84		1984-85	
	Quan- tity	Value	Quan- tity	Value	Quan- tity	Value	Quan- tity	Value	Quan- tity	Value
Rice	79	303	264	1123	317	1668	169	955	690	3992
Wheat	812	1870	1574	3977	1515	4766	1872	5916	1905	6506
Petroleum and petroleum products	1831	7982	1184	6667	1550	10022	1801	9843	1676	10500
Vegetable Oils	132	1454	120	1424	149	1766	147	2494	244	4384
Chemicals, drugs and medicine etc.	—	3750	—	4564	—	4253	—	5572	—	7158
Iron and steel	—	2811	—	3527	—	1304	—	2394	—	4208
Machinery including belting for machinery	—	4674	—	4521	—	6094	—	5451	—	7092
Electrical goods and apparatus other than machinery	—	1191	—	846	—	1021	—	1303	—	1901
vehicles	—	3199	—	1780	—	2493	—	1757	—	2843

Source: B. B. S.

表 A3-3-1-3 國際收支

(Croro taka)

Items	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85
Current Account:							
Imports (f.o.b.)	2307.8	3257.2	3925.5	4834.9	5172.9	5408.0	6122
Exports (f.o.b.)	892.3	1150.8	1334.4	1454.5	1860.6	2051.5	2521
Freight and Insurance—							
(a) On import	279.1	434.1	443.1	556.0	586.4	610.7	708
(b) Earned	—	—	—	—	—	6.1	6
(c) Net	-279.1	-434.1	-443.1	-556.0	-586.4	-604.6	-701
Other goods and services-net	7.2	-16.7	61.3	54.5	-65.8	72.4	50
Balance	-1707.4	-2557.2	-2973.1	-3881.9	-3832.9	-3888.7	-4232
Investment income net	-33.5	22.0	-37.0	-194.8	-259.0	-160.8	-172
Transfer by Bangladesh nationals	217.7	325.0	619.6	772.5	1422.4	1376.2	1034
Grants, donations etc. cash or kind	988.0	1129.0	1099.9	1359.8	1859.5	1840.9	1828
Deficit/surplus current account	-515.2	-1081.2	-1290.6	-1944.4	-810.0	-832.4	-1562
Capital Account:							
Aid and loan net	681.6	803.7	931.8	1487.0	1107.6	1385.5	1209
a) Long-term net	714.3	828.5	916.2	1070.6	1440.7	1213.2	1269
b) Short-term net	-33.7	-24.8	15.6	416.4	-333.1	172.3	-61
Other capital transactions	-43.9	-252.8	287.7	294.3	-457.4	-463.3	363
Errors and omissions	52.0	52.1	77.1	163.1	159.8	89.8	-10
Surplus on capital budget	515.2	+1081.2	+1290.6	+1944.4	810.0	832.4	1562

Note : Trade data may differ from those compiled by B.B.S. and are shown in table 8.2 below.
Source: Bangladesh Bank.

貿易收支

(Croro taka)

Year	Export	Import	Balance
1975-76	555.2	1470.3	-915.1
1976-77	667.0	1399.3	-732.3
1977-78	717.8	1821.6	-1103.8
1978-79	963.2	2207.3	-1244.1
1979-80	1099.7	3052.5	-1952.8
1980-81	1148.4	3728.8	-2580.4
1981-82	1238.7	3872.9	-2634.2
1982-83	1801.6	4526.5	-2724.9
1983-84	2013.6	5087.4	-3073.8
1984-85	2622.5	6826.3	4203.8

Note : 1 crore=10 million.
Source: B.B.S.

表 A3-3-1-4 財政収支

		(Million taka)					
Heads		1979-80	1980-81	1981-82	1982-83	1983-84	1984-85 (R.E.)
1.	Revenue Receipts:	15333	17551	25725	28666	24288	34770
	(a) Tax	13251	13935	20405	23487	22025	28071
	(b) Non-Tax	2082	3616	5320	5179	2263	6699
2.	Development Receipts	15228	20800	22898	29910	36476	34104
	(a) Project	7621	8072	10143	13480	18624	17680
	(b) Food and Commodities	11114	10085	11717	16920	16210	15390
	(c) Internal Resources	(-) 3507	2643	1038	(-)490	1642	(-)1034
	Total Receipts:	30561	38351	48623	58576	60764	68874
1.	Revenue Expenditure:	11810	13959	17299	18358	20457	29977
	(a) Wages and Salaries	3998	5018	5186	6434	7073	10232
	(b) Commodities and Services	2853	3110	3849	4117	7013	9055
	(c) Transfer	4319	4861	6969	5209	5505	9840
	(d) Others	640	970	1275	2598	866	850
2.	Development Expenditure:	21726	24683	25529	24272	29739	38794
	(a) Agriculture, Flood Control, water resources and Rural Institutions.	8267	9811	11101	8733	11331	17330
	(b) Industry	2626	3071	2225	1963	2873	2555
	(c) Transport and Communication	4670	5111	4420	3881	3676	5338
	(d) Other Services	6163	6690	7783	9695	11859	13571
	Total Expenditure:	33536	38642	42828	42630	50196	68771
	Real Public Expenditure (deflated) ...	11368	11853	11669	11073	11180	13645
	Population of Mid Financial Year ...	87.7	89.9	91.5	93.6	95.7	99.2
	Per capita Expenditure :						
	(a) Constant Prices (deflated) ...	130	132	127	118	117	138
	(b) Current Prices	382	430	468	455	525	693
	Total Public Expenditure as % of GDP at current market price.	16.94	16.57	16.15	14.78	14.34	16.81

Notes : Real public expenditure has been obtained by deflating total expenditure in current prices by the implicit national income deflator; (with base 1972-73=100)

Per capita expenditure in current Prices has been obtained from the real Public Expenditures.

The present figures of development receipts shown in the table indicate revised budget estimates. As the actual data are not available the receipts and expenditures on development budget may differ.

Source : Compiled by B.B.S.

3-3-2 第3次5ヶ年計画

第3次5ヶ年計画は次に掲げる8つの目標を定めて、長期的展望にもとづいた総合的發展を見込んでいる。

1. 人口成長率の減少
2. 生産的雇用の拡大
3. 初等教育の普及と人的資源の開発
4. 長期的構造変化をもたらすための技術差益の奨励
5. 食糧自給
6. 国民のミニマム、ベーシック、ニーズの達成
7. 経済成長の加速
8. 自主自立の促進

(1) 総金額 3,860億タカ (127億USDドル)

(第2次5ヶ年計画比 22.7%増)

内 公共部門 2500億タカ (64.8%)

民間部門 1360億タカ (35.2%)

年間10%のインフレーションが現在のように緩くときは最終年度の総額見込みは5200億タカとなる。

第2次5ヶ年計画における実施総額は1509.5億タカで、これは目標額の88%であった。

(2) 成長率一貫終年度の1990年に年間成長率5.4%を達成することを目標とする。

第2次5ヶ年計画では、目標5.4%に対して3.8%の年間成長率であった。一方1978-80年の2ヶ年計画期間では目標5.6%に対して達成率は3.5%であった。

(3) 1984-85会計年度の国民総生産(GDP)は1653.8億であった。1989-90会計年度つまり第3次5ヶ年計画の最終年度のGDPは、1984-85年価格にして2005.2億タカに設定されている。

(4) 人口成長率: 1990年までに1億1千万人(第2次5ヶ年計画期間中の増加率は2.4%) (1990年までに増加率を1.8%まで下げることを目標とする。)

(5) 計画期間中の外国援助の占める割合: 2102.8億タカ(総額の54%)
過去外国援助の占める割合は以下の通りであった。

第1次5ヶ年計画(1973-78) 77%

2ヶ年計画(1978-80) 63%

第2次5ヶ年計画(1980-85) 58%

(6) 国内資源の動員: 1757.2億タカ

内 公共貯蓄 596億タカ

民間貯蓄 1161.2億タカ

(7) 部門別配分

1) 農業一括配分額 1146億タカ

内 公共 706億タカ

民間 440億タカ

農業部門の年間成長率の目標は4%で国民総生産に占める農業部門の割合は第2次5ヶ年計画の50.4%に対して46.9%と低めに設定されている。

2) 工業一括配分額 580億タカ

民間 320億タカ

公共 260億タカ

年間成長率の目標は10.1%で国民総生産に占める割合は第2次5ヶ年計画の9.5%に対し11.9%に設定されている。

3) エネルギー並びに天然資源: 617.5億タカ

年間成長率の目標は天然ガス 13.8%、電力 15%。電力は1984

-85年度の936MWから1989-90年度 1823MWに増加。

4) 通信・交通: 452.5億タカ

5) 基礎建設、住宅、水資源: 420億タカ

6) 教育、宗教関係: 137億タカ

公共 122億タカ

民間 15億タカ

7) 厚生関係: 60億タカ

8) 人口調整: 94億タカ

9) 社会基礎整備: 32.2億タカ

10) 科学、技術: 6億タカ

11) 人的資源、労働: 9.3億タカ

12) 地方自治: 6.5億タカ

13) 大口配分: 100億タカ

県(デストリクト)、郡(ウボジラ) 病院基礎整備

都(ウボジラ) 開発基金

都市 125億タカ

チタゴン丘陵地区開発 9.2億タカ

関係、物品関係 22.3億タカ

技術援助 12億タカ

その他 民間 25億タカ

6.5億タカ

- (8) 資本・産出高比率：— 4 (第2次5ヶ年計画では3.9)
- (9) 新築戸数：— 510万人、1990年には総人口を2440万人に引き上げる。
- (10) 食糧生産：— 2070万トン (第2次5ヶ年計画での年間生産高は1380万トン)
- (11) 漁獲高：— 100万トン (1984～85年度の漁獲高は、77.4万トンであった。)
- (12) 農村電化：— 1989～90年度には22100村 (現在は7900村が電化する)
- (13) 初等教育の普及：— 初等教育を受ける者の数 1160万人 (第2次5ヶ年計画最終年度で890万人であった。)
- (14) 病院ベッド数：— 4万ベッド (現在27600ベッド)
- (15) 国民所得：— 過去13年間に亘る開発計画により国民所得は第1次5ヶ年計画並びに2ヶ年計画期間中は年間5.3%、第2次5ヶ年計画では3.8%であった。
- (16) 460の郡(ウボジラ)に対する配分：— 225億タカ
- (17) その他：—
- 第3次5ヶ年計画期間中の国民総貯蓄額は第2次の4.2%から7%に上ることか期待され、また投資率は18.8%から20.4%に税金国民総生産比率は8.4%から10.3%に上昇する。
- 今次計画では国民総生産マトリックスを採用し発展の度合いをモニタリングできるようにした。マトリックスには社会経済要因10、農村地域要因8、都市要因2を含む。

第三次5カ年計画の採択

エルシャド大統領を議長とする国家経済評議会(NEC)は昨年12月3日第三次5カ年計画(85/86年度より5カ年)を採択した。同計画の概要は次の通り。

(1) 第三次5カ年計画の総投資額は3,860億タカ(148.5億ドル)で、第二次5カ年計画(80/81年度より5カ年)の実際の投資額と比較して22.7%の増加となっている。内訳は公共部門投資が2,500億タカ(64.8%)、民間部門投資が1,360億タカ(35.2%)、また資金源として外国よりの援助2,102.8億タカ(54.5%)、国内資金1,757.2億タカ(45.5%)を予定している。また計画期間中のGDP成長率は5.4%を目標としている。

(2) 同計画においてバングラデシュ政府は、民間経済活性化と共に、依然として深刻な貧困の緩和・解消、及び人口増加問題を重点課題としている。貧困については、現在国民の3/4以上が人間として維持すべき最低生活水準以下の生活を強いられ、その比率はむしろ拡大しつづつあるとさえ言われている。また人口については、バングラデシュの食糧生産が、72/73年度の1,000万トンから84/85年度の1,610万トンに増加したにもかかわらず、依然として高い人口増加のため、食糧不足問題が解消されず、外国からの食糧援助に依存せざるを得ない現状にある。第3次5カ年計画では、このような相関関係にある貧困、人口及び食糧の3問題を解決せずに効果的な経済・社会開発計画を推進することは困難であるとの結論を再確認したものであり、そのための具体策として下記の8項目が本件年次計画の達成目標として設定されている。

(イ) 人口増加率の低減

現在の人口増加率は年間2.4%であるが、89/90年度には右を1.8%にまで減少し、同年度における人口を1,105億人以下に抑える。

(ロ) 製造業における雇用機会の創設

製造業における510万人分の雇用機会を創設し、最終的な就業労働者人口を2,440万人とする。

(ハ) 初等教育の拡充及び人的資源の開発

初等教育における就学児童数を現在の890万人から1,160万人に拡大する。

(ニ) 長期的に構造改革をもたらすための技術的支援の開発

(ホ) 食糧の自給自足

84/85年度では1,610万トンであった穀物取引量を89/90年度には2,070万トンにまで引き上げ、また漁獲量についても77万トンから100万トンにまで引き上げる。

(ヘ) 人間としての最低生活条件の充足

現在2,76万床しかない病院のベッド数を89/90年度には、4,07万床とする。また現在までに電化された農村は全国で7,900村であるが、これを22,100村にまで上げる。

(ト) 経済成長の促進

インフレを年10%以内に抑えつつ、年間5.4%のGDP成長率を達成する。

表 A3-3-2-1 第3次5ヵ年計画におけるセクター別投資配分計画
(At 1984/85 Prices)

(Tk. in crore)

Sector	Public Sector	Private Sector	Total
1. Agriculture, Water Resources & Rural Development	7,060	4,400	11,460
2. Industries & Minerals	2,600	3,200	5,800
3. Energy & Natural Resources	5,675	500	6,175
4. Transport and Communication	3,025	1,500	4,525
(a) Transport	2,637	1,500	4,137
(b) Communication	388	..	388
5. Physical Planning, Housing & Water Supply	550	3,650	4,200
6. Education & Religious Affairs	1,220	150	1,370
7. Health	550	50	600
8. Population Control & Family Planning	870	70	940
9. SCYSWAM	307	15*	322
(a) Social Welfare	75	..	75
(b) Women's Affairs	50	..	50
(c) Youth Development	17	..	17
(d) Mass Media	50	..	50
(e) Cultural Development	51	..	51
(f) Development of Sports	64	..	64
10. Scientific and Technological Research (STR)	60	..	60
11. Manpower & Labour	93	..	93
12. Public Administration	65	..	65
13. Block Allocation	2,925	..	2,925
(a) Zila and Upazila Infrastructures	1,000	..	1,000
(b) Development Assistance to Upazila Parishads	1,250	..	1,250
(c) Development Assistance to Pourashava	92	..	92
(d) Special CHT Plan	213	..	213
(e) Customs Duty and Sales Tax (CDST)	120	..	120
(f) Annual Technical Assistance Programme (ATAP)	250	..	250
14. Other Sectors	65	65
Total	25,000	13,600	38,600

Note: The list of the projects of the TFYP alongwith expenditure incurred by the end of the SFYP, fund to be required during TFYP and other relevant information will be published as a separate document of the Plan entitled "Blue Book of the Third Five Year Plan."

*This is for all sub-sectors under SCYSWAM.

表 A3-3-2-2 第2次5ヵ年計画期間の公共投資のセクター別配分実績
(At current prices)

(Tk. in crore)

Sector	Allocation		Realization	
	Amount	Percentage of total	Amount	Percentage of total
1. Agriculture and Related Activities	5552	34.6	4149	29.8
(a) Agriculture	2149	13.4	1776	12.8
(b) Irrigation	2702	16.8	1911	13.7
(c) Rural Institutions and Development.	701	4.4	462	3.3
2. Industry	2042	12.7	1254	9.0
3. Power and Natural Resources	3021	18.8	3061	22.0
4. Physical Planning and Housing	820	5.1	746	5.3
5. Transport	1819	11.3	1774	12.7
6. Communication	341	2.1	308	2.2
7. Education and Religious Affairs	707	4.4	511	3.7
8. Health	413	2.6	371	2.7
9. Population Control and Family Planning	368	2.3	346	2.5
10. SCYSWAM	280	1.7	231	1.7
11. Manpower and Labour	88	0.6	90	0.6
12. Public Administration	55	0.3	48	0.3
13. STR	129	0.8	110	0.8
14. Upazila Infrastructure and Development Assistance and Others (CHT, Paurashava, etc.)	425	2.7	930	6.7
Total	16,060	100	13,929	100

表 A 3-3-2-3 セクター別目標値

Items	Units	1984/85 (Actual)	1989/90 (Target)
Agriculture			
1. Foodgrains	ml. metric tons	16.1	20.7
(a) Rice	Do	14.6	18.0
(b) Wheat	Do	1.5	2.6
(c) Others	Do	..	0.1
2. Jute	ml. bales	4.6	6.0
3. Tea	ml. lb	96.8	115.0
4. Sugar cane	lakh tons	70.0	82.0
5. Pulses	Do	2.0	3.0
6. Oil Seeds	Do	2.0	3.5
7. Potato	Do	13.0	17.0
8. Fish	'000' tons	774	1000
Industries			
1. Jute Textiles	'000' tons	561	650
2. Cotton Textiles :			
(a) Yarn	ml. kg.	59.4	95.0
(b) Cloth	ml. metro	771.0	1215.0
3. Fertilizer	'000' metric tons	806	2150
4. Paper and Newsprint	Do	90	105
5. Sugar	Do	88	225

6(a)

Items	Unit	1984/85 (Actual)	1989/90 (Target)
6. Cement	'000' metric tons	240	850
7. Basic Metals (Steel)	Do	101	230
Energy			
1. Electricity			
(a) Generation	GWH	4545	899
(b) Sales	GWH	2840	7146
2. Gas			
(a) Output	MMCFD	450	750
(b) Customers Connections	'000' numbers	240	400
(c) Development Wells	Numbers	21	38
Transport and Communication			
1. Paved Roads	KM	4830	6118
PPH			
1. Rural Drinking Water Supply	'000' of hand tubewells.*	618.8	792.8
Education			
1. Primary School Enrolment	lakh students	89.2	116
2. Secondary Education Enrolment	Do	24.8	27.5
3. College Education Enrolment	Do	4.3	4.4
4. University Education Enrolment	'000' students	35.0	38.6
5. Technical Education Enrolment	Do	20.4	22.0
6. Vocational Education Enrolment	Do	554	756
(including community schools)			
7. Madrasa Education Enrolment	Do	319	350
Health			
1. No. of Hospital beds	'000' numbers	27.6	40.7
2. No. of Doctors	Do	16.0	22.5
3. No. of Nurses	Do	6.5	10.2
Population Control			
1. Population Growth Rate	In %	2.4	1.8
2. Contraceptive Prevalence Rate (CPR)	Do	25	40

* This includes shallow, deep and deepset hand tubewells.

3-3-3 ウバジラ制度

西 5-44

部(ウバジラ)制度の概略
(在バングラデシュ大使館報告)

1982年3月エルシャド政権発足以来の懸案である民政移管への実現については、先般行われたエルシャド大統領の政策に係わる国民の信を問う国民投票に続き同民政移管政策の一環として来る5月16日及び20日の両日、郡(ウバジラ)議会議員選挙が実施される予定のところ、今般在バングラデシュ大使館より郡(ウバジラ)制度の概略につき報告越した。右報告はバングラデシュの地方行政組織を知るうえで有益な資料と思料されるので印刷の上御高覧に供することとした。

昭和60年 4 月
アジラ局 西アジラ課

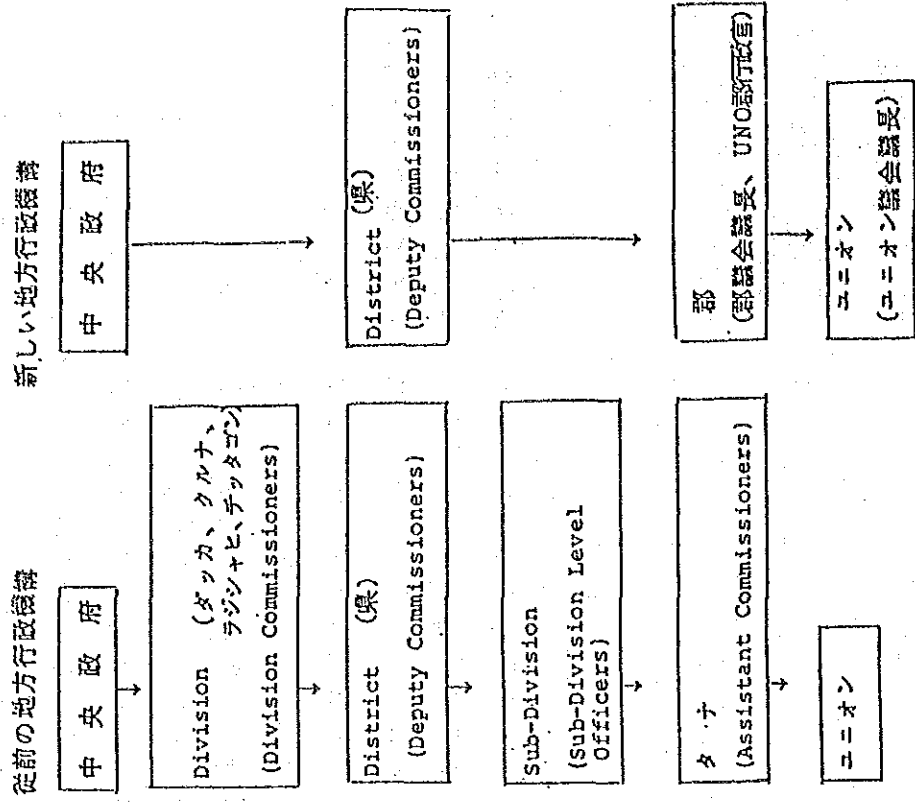
南西アジラ課長

エルシャド大統領は農村部の経済開発に不可欠であるとして行政の地方分権化を重点政策の一つとして掲げてきた。行政の地方分権化は従来中央政府と農村人口との間に地方行政機関が幾層にも重なり（下表参照）農村部の経済開発が必ずしも円滑に実施されていなかつたことを反省して、地方行政機関の簡素化と農村開発の核となるべき郡 (Upazilla) の機能強化を旨としたものである。

郡は郡議会（構成等は後述）を持ち、議長は直接選挙によつて選ばれる。エルシャド政権は84年3月に郡議会議長選の実施を予定していたが、右選挙が現政権の地方での差益作りに利用されるとの野党側の激しい反対にあり、中止を余儀なくされた。

しかし「エ」大統領は、本年3月の国民投票で自身の政策に国民の圧倒的支持が得られたとして、5月16、20日の両日に分け郡議会議長選を実施する予定である。なお同選挙は非政

党ベースで行われ立候補者の所属政党は明らかにされないのが建前である。



2 郡制度の概略

郡は全国で460(4月/2日現在)あり、地方によつて差はあるものの、面積約/25平方マイル人口約20万人程度が典型的な郡の大きさである。郡庁所在地には郡議会がおかれ、ウバシラ内の行政を執行する為に UNO (Upazilla Nirbahi Officer 郡行政官) を長としてその下に中央政府各省庁よりの出向者等からなる農業、教育、保健等各分野の担当官が配置される。これら出向の行政官の任免権は中央省庁にあるものの、職務の遂行に關し郡議会に責任を負うものとされる。

① 郡議会の構成

郡議会議長は、当該郡に住居を有する25才以上の者に被選挙権があり、直接選挙によつて選ばれる。任期は5年、俸給は月/250タカ。議長は中央省庁の Deputy Secretary (課長レベル) 又は陸海空軍の少佐と同等のランクとみなされる。郡議会は、議長の他、郡内のニオン議会議長(民選)女性3名、男性/名の政府指名議員、郡中央協同組合委員長、及び郡内

で政府が定める公職に就いている者を議員として、いるが、議長及びニオン議会議長のみが議決権を有する。

(2) 郡議会の機能

郡議会の果たす重要な役割としては、(1) Food for Work Program 等個々の郡限りの重要性を有する開発計画の策定及び実施、(2) 政府年次開発計画のうち広域に亘らず、分割し得る部分(食糧倉庫の建設、地域林業の振興等)の実施が挙げられる。

財源としては、郡議会は市場税、興行税、橋・フェリー使用税等の地方税を徴収することとができることになっているが8/82会計年度ですべての地方行政機関の地方税収入が646億タカ(84年世銀資料)に過ぎないことから、中央政府からの交付金(ノウバジラ当りの平均約500万タカが大部分を占めることとなる。

JICA