

## **Appendices**

- 1. Member List of the Survey Team**
- 2. Survey Schedule**
- 3. List of Party Concerned in the Recipient Country**
- 4. Minutes of Discussion**
- 5. Other Relevant Data (Geological Investigation)**



**Appendices :**

**1. Member List of the Survey Team**

**1-1. For the study**

Mr. Mikio NAKAMURA	Leader	Grant Aid Project Management Department, JICA
Mr. Hidenori NAKAMURA	Project Coordinator	Grant Aid Project Study Department, JICA
Mr. Kazuo YANAGIDA	Chief Consultant / Road Traffic Planner	Oriental Consultants Co., Ltd.
Mr. Yukio YOKOMIZO	Bridge Designer	Oriental Consultants Co., Ltd.
Mr. Nobuyuki OKABE	Natural Conditions Surveyor	Oriental Consultants Co., Ltd.
Mr. Keigo KONNO	Construction Planner / Cost Estimator	Oriental Consultants Co., Ltd.

**1-2. For Explanation Draft Final Report**

Mr. Yoshiaki KANO	Leader	Sri Lanka Office, JICA
Mr. Kazuo YANAGIDA	Chief Consultant / Road Traffic Planner	Oriental Consultants Co., Ltd.
Mr. Yukio YOKOMIZO	Bridge Designer	Oriental Consultants Co., Ltd.
Mr. Keigo KONNO	Construction Planner / Cost Estimator	Oriental Consultants Co., Ltd.

## Appendices :

### 2. Survey Schedule

#### 2-1. Schedule for the Survey

No	Date	Day	Stay	1 & 2	3,4 & 5	6
1	3/8	Sun.	Colombo	1135 Tokyo—1745 Singapore (JL719) 2100 Singapore—2240 Colombo (SQ402)		
2	9	Mon.	Colombo	Courtesy Call to JICA Office, Embassy of Japan, Min. of Transport & Highways, Dept. of External Resources, Dept. of National Planning and Road Development Authority		
3	10	Tue.	Colombo	Site survey (Bridges No.32 & 70)		
4	11	Wed.	Colombo	Site Survey (Bridges No.33 & 38)		
5	12	Thr.	Colombo	Site Survey (Bridges No.33), Discussion with RDA Officials		
6	13	Fri.	Colombo	Discussion with RDA Officials		
7	14	Sat.	Colombo	Team Meeting		
8	15	Sun.	Colombo	Team Meeting		
9	16	Mon.	Colombo	Discussion on the Minutes		
10	17	Tue.	Colombo	Signing of the Minutes, Report to JICA Office and Embassy of Japan 2355 Colombo—		
11	18	Wed.	Colombo	0550 Singapore (SQ401) 0825 Singapore—1545 Tokyo (JL712)	Site Survey	
12 ~ 26					Site Survey	
27	4/3	Fri.			2355 Colombo— (SQ401)	Site Survey
28	4	Sat			0815 Singapore—1600 Tokyo (JL712)	Site Survey
29 ~ 33						Site Survey
34	10	Fri				2355 Colombo—
35	11	Sat				0550 Singapore (SQ401) 0815 Singapore—1600 Tokyo (JL712)

1 Mikio NAKAMURA

2 Hidenori NAKAMURA

3 Kazuro YANAGIDA

4 Yukio YOKOMIZO

5 Nobuyuki OKABE

6 Keigo KONNO

## 2-2. Schedule for Explanation of Draft Report

No	Date	Day	Stay	1	2,3 & 4
1	98 <sup>+</sup> 6/1	Mon.	Colombo		1135 Tokyo—1745 Singapore (JL719) 2100 Singapore—2240 Colombo (SQ402)
2	2	Tue.	Colombo	Courtesy Call to JICA Office, Embassy of Japan, Min. of Transport & Highways, Dept. of External Resources, Dept. of National Planing and Road Development Authority	
3	3	Wed.	Colombo	Explanation of Draft Report at RDA	
4	4	Thr.	Colombo	Explanation of Draft Report at RDA Minutes of Discussion	
5	5	Fri.	Colombo	Signing of Minutes of Discussion Courtesy Call to Embassy of Japan 2355 Colombo—(SQ401)	
6	6	Sat.	Colombo		0815 Singapore—1600 Tokyo (JL712)

1 Yoshiaki KANO

3 Yukio YOKOMIZO

2 Kazuro YANAGIDA

4 Keigo KONNO

## **Appendices :**

### **3. List of Party Concerned in the Recipient Country**

#### **◆ Ministry of Finance & Planning**

- |                           |   |
|---------------------------|---|
| 1. Mr. J.H.J. Jayamaha    | Director, Japan Division, Department of External Resources                  |
| 2. Mr. K. Jegarajasingham | Director, Economic Infrastructure division, department of National Planning |

#### **◆ Ministry of Transport & Highways**

- |                        |                      |
|------------------------|----------------------|
| 3. Mr. G. Hewagama     | Secretary,           |
| 4. Mr. W.A. Jayasinghe | Additional Secretary |

#### **◆ Road Development Authority**

- |                                |   |
|--------------------------------|---|
| 5. Mr. M. B. S. Fernando       | Chairman  |
| 6. Dr. G. L. Asoka J. de Silva | Director, Engineering Services Division                   |
| 7. Mrs. H. Y. Fernando         | Deputy Director, Engineering Services Division (ESD)      |
| 8. Mr. H. M. K. G. C. Bandara  | Chief Engineer(Plannning), Traffic & Planning Office, ESD |
| 9. Mr. W. E. S. K. Fernando    | Senior Engineer, Bridge Design Office (BDO), ESD          |
| 10. Mr. D. K. Rphitha Swarna   | Senior Engineer, BDO, ESD                                 |
| 11. Mr. M. J. G. Munasinghe    | Design Engineer, BDO, ESD                                 |
| 12. Mr. B. P. K. Amarasekara   | Design Engineer, BDO, ESD                                 |

Minutes of Discussions  
The Basic Design Study  
on  
the Project for Reconstruction of Bridges.  
In  
the Democratic Socialist Republic of Sri Lanka  
(Consultation on Draft Report)

In March 1998, the Japan International Cooperation Agency (JICA) dispatched a Basic Design Study Team on the Project for Reconstruction of Bridges (hereinafter referred to as "the Project") to the Democratic Socialist Republic of Sri Lanka, and through discussions, field survey, and technical examination of the results in Japan, has prepared the draft report of the study.

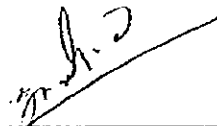
In order to explain the draft and to consultant the Government of Sri Lanka, JICA sent to Sri Lanka a study team (hereinafter referred to as "the Team"), which is headed by Mr. Yoshiaki KANO, Resident Representative, JICA Sri Lanka Office, and is scheduled to stay in the country from June 1 to 6, 1998.

As a result of discussions, both parties have confirmed the main items of the Project as described on the attached sheets.


Colombo, June 5, 1998



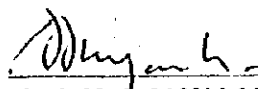
Mr. Yoshiaki KANO  
Leader  
Basic Design Study Team  
Japan International Cooperation Agency



Mr. G. Hewagama  
Secretary  
Ministry of Transport & Highways



Mr. W. A. Jayasinghe  
Chairman  
Road Development Authority



Mr. J. H. J. JAYAMAHA  
Director, Japan Division  
Department of External Resources  
Ministry of Finance & Planning

## ATTACHMENT

### 1. COMPONENTS OF THE DRAFT REPORT

The Government of Sri Lanka has agreed to and accepted in principle the components of the Draft Report proposed by the Team.

### 2. JAPAN'S GRANT AID SYSTEM

- (1) The Government of Sri Lanka has understood the system of Japan's Grant Aid explained by the Team as described in Annex-1.
- (2) The Government of Sri Lanka will take the necessary measures described in Annex-2 for smooth implementation of the Project on condition that the Grant Aid assistance by the Government of Japan is extended to the Project.

### 3. FUTURE SCHEDULE

The Team will make the Final Report in accordance with the confirmed items and send it to the Government of Sri Lanka by the end of August, 1998.

### 4. CLARIFICATION OF LAND ACQUISITION AT THE PROJECT SITE

According to the clarification of land acquisition by the Team, the Government of Sri Lanka shall commence a procedure for land acquisition at the Project Site and shall completely acquire the land before the beginning of November, 1998 for five bridges, which are Moda Ela, Bolawatta, Narthupana, Gilimale and Kospalana Bridges.

The Government of Sri Lanka has also confirmed that relocation of the habitants in the Project Site shall be implemented soon after the Exchange of Notes and at latest before the commencement of construction works on condition that the Grant Aid assistance by the Government of Japan is extended to the Project.

### 5. REMOVAL OF EXISTING NARTHUPANA AND GILIMALE BRIDGES

The safety after the completion of the new Gilimale Bridge will be affected by the existing Narthupana and Gilimale bridges due to possible washout or collapse. Hence, the Government of Sri Lanka should completely remove the existing Narthupana and Gilimale bridges including the piers immediately after the completion of the new bridge with Sri Lanka own expense.

### 6. SHIFT AND SET UP OF PUBLIC FACILITIES ON EXISTING KOSPALANA BRIDGE

There are public facilities, which are four water supply pipes, two telecom pipes and so on, on existing Kospalana bridge. Those all facilities will be shifted and set up by the government of Sri Lanka during constructing and after completed new Kosparana bridge.



## JAPAN'S GRANT AID SCHEME

## 1. Grand Aid Procedures

1) Japan's Grant Aid Program is executed through the following procedures.

- Application (Request made by the recipient country)
- Study (Basic Design Study conducted by JICA)
- Appraisal & Approval (Appraisal by the Government of Japan and Approval by the Cabinet)
- Determination of Implementation (The note exchanged between the Government of Japan and the recipient country)

2) Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA (Japan International Cooperation Agency) to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design Study) using (a) Japanese consulting firms(s).

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Program, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes signed by the Governments of Japan and the recipient country.

Finally, for the implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

## 2. Basic Design Study

## 1) Contents of the study

The aim of the Basic Design Study (hereinafter referred to as "the Study") conducted by JICA on a requested project (hereinafter referred to as "the Project") is to provide a basic document necessary for the appraisal of the Project by the Government of Japan. The contents of the Study are as follows:

- a) Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation.
- b) Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, social and economic point of view.
- c) Confirmation of items agreed on by both parties concerning the basic concept of the Project.
- d) Preparation of a basic design of the Project.

e) Estimation of costs of the project.

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of the Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

2) Selection of Consultants

For smooth implementation of the Study, JICA uses (a) registered consultant firm (s). JICA selects (a) firm(s) based on proposals submitted by interested firms. The selected firm(s) carry(ies) out a Basic Design Study and write(s) a report, based upon terms of reference set by JICA. The consultant firm(s) used for the Study is (are) recommended by JICA to the recipient country to also work on the Project's implementation after the Exchange of Notes, in order to maintain technical consistency and also to avoid undue any delay in implementation should the selection process be repeated.

3. Japan's Grant Aid Scheme

1) What is Grant Aid?

The Grant Aid Program provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. Grant Aid is not supplied through the donation of materials as such.

2) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the Project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

3) "The period of the Grant Aid" means the one fiscal year which the Cabinet approves the Project for. Within the fiscal year, all procedures such as exchanging of Note, concluding contracts with (a) consultant firm(s) and (a) contractor(s) and final payment to them must be completed. However, in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

4) Under the Grant Aid, in principle, Japanese products and services including transport of those of the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.

However, the prime contractors, namely, consulting constructing and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

5) Necessity of "Verification"

The Government of recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

6) Undertakings required of the Government of the Recipient Country

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as the following:

- (1) To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction.
- (2) To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the sites.
- (3) To secure buildings prior to the procurement in case the installation of the equipment.
- (4) To ensure all the expenses and prompt excursion for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid.
- (5) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts.

7) "Proper Use"

The recipient country is required to maintain and use the facilities constructed and the equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

8) "Re-export"

The products purchased under the Grant Aid should not be re-exported from the recipient country.

9) Banking Arrangements (B/A)

- a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in an authorized foreign exchange bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.
- b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an authorization to pay issued by the Government of the recipient country or its designated authority.

## NECESSARY MEASURES TO BE TAKEN BY THE GOVERNMENT OF SRI LANKA

The following necessary measures should be taken by the Government of Sri Lanka on condition that the Grant Aid by the Government of Japan is extended to the Project:

1. To provide data and information necessary for the Project.
2. To secure land necessary for the execution of the Project, such as temporary offices, working areas, storage yards and others.
3. To clear the sites prior to the commencement of the construction, including relocation of water supply pipes / telephone lines and removal of residents.
4. To bear commissions to the Japanese foreign exchange bank for its banking services based upon the Banking Arrangement.
5. To ensure prompt unloading, tax exemption, customs clearance at the port of disembarkation in Sri Lanka and prompt internal transportation of the materials and equipment for the Project purchased under the Grant Aid.
6. To exempt Japanese nationals engaged in the Project from customs duties, internal taxes and other fiscal levies which may be imposed in Sri Lanka with respect to the supply of the products and services under the verified contracts.
7. To accord Japanese Nationals whose services may be required in connection with the supply of products and the services under the verified contract, such facilities as may be necessary for their entry into Sri Lanka and stay therein for the performance of their work.
8. To provide necessary permissions, licenses and other authorizations for implementing the Project, if necessary.
9. To maintain and use properly and effectively the facilities constructed under the Project.
10. To bear all the expenses, other than those to be borne by the Japan's Grant Aid within the scope of the project.
11. To assign exclusive counterpart engineers and technicians for the Project.
12. To coordinate and solve any issues related to the Project which may be raised from third parties or inhabitants and the Project area during implementation of the Project.



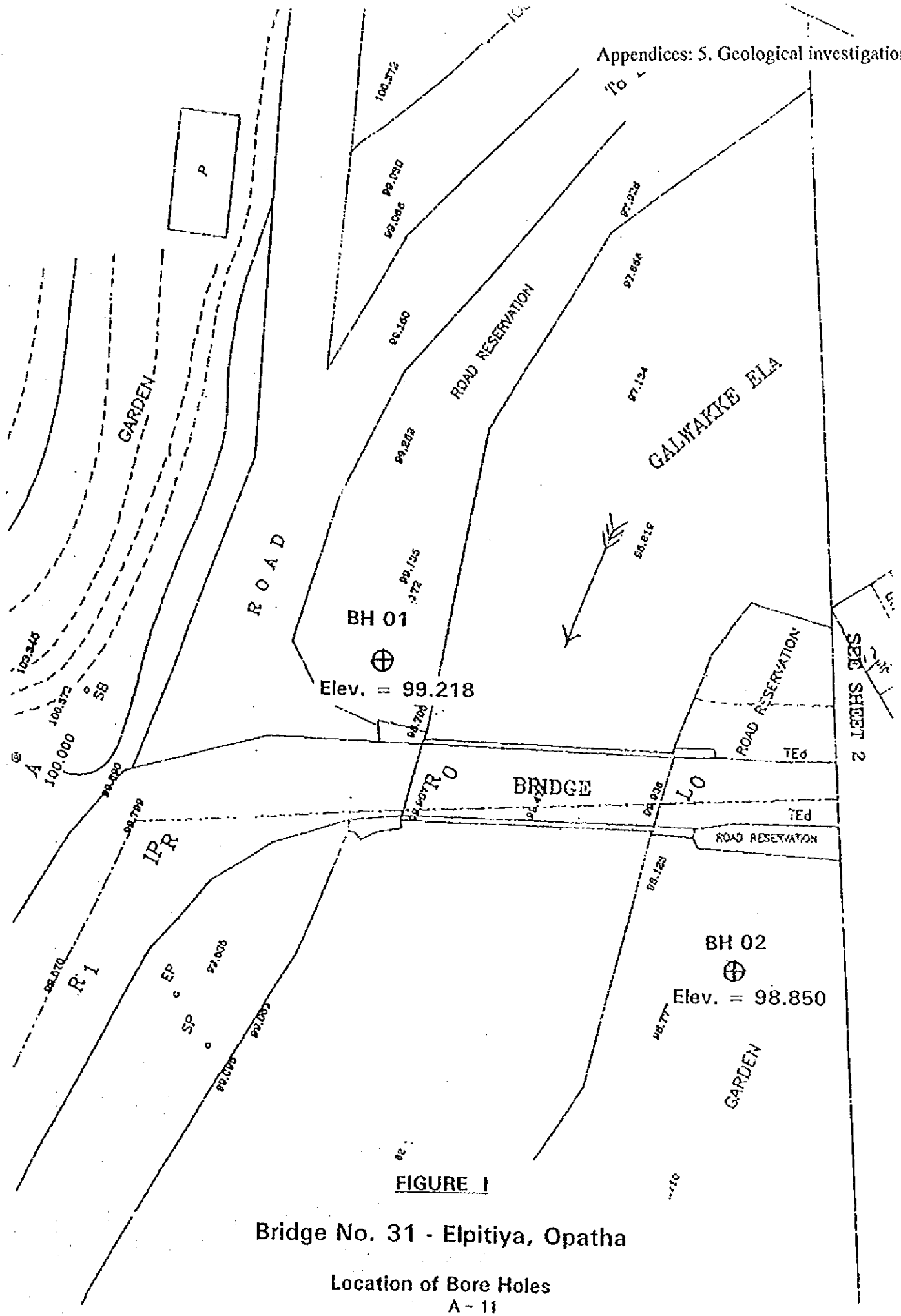


FIGURE 1

Bridge No. 31 - Elpitiya, Opatha

Location of Bore Holes

GEOLOGICAL RECORD OF BORING						HOLE No. BH - 01	
PROJECT Basic Design Study of Five Bridge			LOCATION No. 31 (Opatha - Elpitiya)				
GROUND ELEVATION		DEPTH OF HOLE 7.6 m		ANGLE FROM VERTICAL 0			
DIAMETER OF HOLE 100 mm		MACHINE Nenzl		DATE OF DRILLING 19th March 1998			
CORE RECOVERY		DEPTH TO GROUND WATER LEVEL IN HOLE		Not Encountered			
DRILLED BY S.K.P. Jayasundara				LOGGED BY S.K. Jayawardana			

ELEVATION (m)	DEPTH (m)	THICKNESS (m)	FIELD OBSERVATION				CORE RECOVERY % cm	STANDARD PENETRATION TEST							
			COLUMN SECTION	SOIL OR ROCK CLASSIFICATION	COLOUR	DESCRIPTION		DEPTH (m)	NUMBER OF BLOWS N						
	0.40	0.40			Dark Brown	HUMUS TOP SOIL									
	0.85	0.45		ML	Reddish Brown	MODERATELY DENSE SANDY CLAYEY SILT									
				SM	Dark Grey	VERY LOOSE SANDY SILT		1.0	08						
	1.90	1.05													
				ML	Yellow Brown	VERY SOFT SAND SANDY SILTY CLAY		2.0	01						
	4.00	2.10													
	4.40	0.40		ML	Greyish Brown	EXTREMELY DENSE CLAYEY SILT DECOMPOSED ROCK									
	4.72	0.32		Charnockitic Gneiss	Grey	Core Recovery = 100% R.O.D. = 100%									
				Charnockitic Gneiss		FRESH SLIGHTLY WEATHERED Core Recovery = 95% R.O.D. = 83%									
						Angle of Dip = 60°-70°									
	7.60	2.88													
						BORE HOLE TERMINATED AT 7.60 m BELOW GROUND LEVEL IN THE FRESH BED ROCK (GRADE 1)									
						SW=Slightly Weathered									
						Note : Undisturbed sample has been obtained from 2.50 m - 3.0 m depth									

GEOLOGICAL RECORD OF BORING						HOLE No. BH - 02	
PROJECT Basic Design Study of Five Bridge			LOCATION Bridge No. 31 (Elpitiya - Opatha)				
GROUND ELEVATION		DEPTH OF HOLE 6.85 m		ANGLE FROM VERTICAL 0			
DIAMETER OF HOLE 100 mm		MACHINE Nenzl		DATE OF DRILLING 21st March 1998			
CORE RECOVERY		DEPTH TO GROUND WATER LEVEL IN HOLE 1.80 m below ground level					
DRILLED BY S.K.P. Jayasundara				LOGGED BY S.K. Jayawardana			

ELEVATION (m)	DEPTH (m)	THICK- NESS (m)	FIELD OBSERVATION				CORE		STANDARD PENETRATION TEST																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
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GEOLOGICAL RECORD OF BORING						HOLE No. 8H - 01	
PROJECT	Basic Design Study for Five Bridge			LOCATION	No. 32 (Bola-watta - Dankotawa)		
GROUND ELEVATION			DEPTH OF HOLE	17.82 m		ANGLE FROM VERTICAL	0
DIAMETER OF HOLE	100 mm		MACHINE	NENZI		DATE OF DRILLING	21st March 1998
CORE RECOVERY			DEPTH TO GROUND WATER LEVEL IN HOLE		1.24 m below ground level		
			DRILLED BY H.K. Weerasingha			LOGGED BY B.S. Yapa	

ELEVATION (m)	DEPTH (m)	THICKNESS (m)	FIELD OBSERVATION				CORE		STANDARD PENETRATION TEST								
			COLUMN SECTION	SOIL OR ROCK CLASSIFICATION	COLOUR	DESCRIPTION	RECOVERY %	cm	DEPTH (m)	NUMBER OF BLOWS N							
										(N) 0	10	20	30	40	50	60	
	0.48	0.48		CL	Brown	MODERATELY PLASTIC CLAY MIXED WITH SOME SANDS											
	0.97	0.49		CL	Brown	MODERATELY PLASTIC CLAY											
	1.15	0.18		BOULDER													
	2.50	1.35		CL	Brown	SOFT MODERATELY PLASTIC CLAY											
				SP	Greyish Brown	LOOSE COARSE TO FINE SAND											
	3.31	0.81		SP	Greyish Brown	MODERATELY DENSE COARSE TO FINE SANDS WITH SOME FINES			2.5	07							
	3.95	0.64		CL	Dark Grey	MODERATELY SOFT MODERATELY PLASTIC CLAY			3.5	10							
	4.25	0.30		SP	Dark Grey	COARSE TO FINE SAND			4.0	05							
	4.45	0.20		SP/SC	Dark Grey	COARSE TO FINE SAND WITH SOME FINES											
	5.00	0.55		SP/SC	Greyish Brown	LOOSE COARSE TO FINE SANDS MIXED WITH SOME PLASTIC FINES			5.0	05							
	6.00	1.00		CL	Dark Greyish Brown	VERY SOFT MODERATELY PLASTIC CLAY MIXED WITH PARTIALLY DECAYED ORG. MATTER AND SAND			6.0	01							
	7.50	1.50		CL/PL	Blackish Brown	VERY SOFT MODERATELY PLASTIC SLIGHTLY ORGANIC SQUEEZY CLAY MIXED WITH SOME DECAYED ORGANIC MATTER			7.5	02							
	8.95	1.45		PL	Brown	SOFT PARTIALLY DECAYED ORGANIC MATTER			8.5	02							
	9.60	0.65		SC	Grey	VERY DENSE GRAVELLY COARSE TO FINE SAND WITH SOME PLASTIC FINES			9.5	32							
	10.50	0.90		CL	Greyish Brown	SOFT MODERATELY PLASTIC CLAY MIXED WITH SOME SAND			10.5	04							
	10.95	0.45		CL	Yellowish Brown	SOFT MODERATELY PLASTIC CLAY MIXED WITH SOME SAND			11.5	04							
	11.50	0.55		CL/ML	Yellowish Brown	MODERATELY STIFF MODERATELY PLASTIC CLAY MIXED WITH SOME SILTS			12.5	15							
	12.50	1.00		CL/ML	Yellowish Brown	STIFF MODERATELY PLASTIC CLAY MIXED WITH SOME SANDS AND SILTS			13.5	27							
	13.50	1.00		ML	Yellowish Brown	VERY DENSE SLIGHTLY PLASTIC CLAYEY SILTS MIXED WITH MICACEOUS MATERIAL			14.5	50							
	14.82	0.09															

GEOLOGICAL RECORD OF BORING						HOLE No. BH 01 (Contd .....)	
PROJECT			Basic Design Study for Five Bridge.		LOCATION		No. 32 - Bolawetta - Dankotawa
GROUND ELEVATION				DEPTH OF HOLE		17.82 m	
DIAMETER OF HOLE		100 mm		MACHINE		YBM	
CORE RECOVERY				DATE OF DRILLING		21st March 1998	
		DEPTH TO GROUND WATER LEVEL IN HOLE		1.24 m below ground level			
		DRILLED BY				H.M. Weerasinghe	
		LOGGED BY				S.S. Yapa	

ELEVATION (m)	DEPTH (m)	THICK- NESS (m)	FIELD OBSERVATION				CORE RECOVERY		STANDARD PENETRATION TEST																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
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	17.82	3.00		Charnockit-ic Biotite Gneiss	Gray	GRADE 1 ROCK WITH SLIGHTLY WEATHERED 150 mm THICK TOP LAYER CORE RECOVERY=100% R.Q.D. = 48%																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							

GEOLOGICAL RECORD OF BORING					HOLE No. BH - 02 (Contd ....)	
PROJECT	Basic Design Study for Five Bridge			LOCATION	No.32 - Bolawatta - Dankolawa	
GROUND ELEVATION		DEPTH OF HOLE	17.60 m		ANGLE FROM VERTICAL	0
DIAMETER OF HOLE	100 mm	MACHINE	YBM - 05		DATE OF DRILLING	26th March 1998
CORE RECOVERY		DEPTH TO GROUND WATER LEVEL IN HOLE			0.60 m below ground level	
		DRILLED BY H.M. Weerasinghe			LOGGED BY S.S. Yapa	

ELEVATION (m)	DEPTH (m)	THICKNESS (m)	FIELD OBSERVATION				CORE RECOVERY		STANDARD PENETRATION TEST																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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GEOLOGICAL RECORD OF BORING				HOLE No. BH - 02 (Contd...)	
PROJECT	Basic Design Study for Five Bridge		LOCATION	No. 32 - Bolawatta - Dankotuwa	
GROUND ELEVATION		DEPTH OF HOLE	17.60 m	ANGLE FROM VERTICAL	0
DIAMETER OF HOLE	100 mm	MACHINE	VBH - 05	DATE OF DRILLING	26th March 1998
CORE RECOVERY		DEPTH TO GROUND WATER LEVEL IN HOLE	0.60 m below ground level		
			DRILLED BY	H.M. Weerasinghe	
			LOGGED BY	B.S. Yapa	

ELEVATION (m)	DEPTH (m)	THICKNESS (m)	FIELD OBSERVATION				CORE RECOVERY		STANDARD PENETRATION TEST							
			COLUMN SECTION	SOIL OR ROCK CLASSIFICATION	COLOUR	DESCRIPTION	%	cm	DEPTH (m)	NUMBER OF BLOWS N						
									(N)	0	10	20	30	40	50	60
	15.51	6.01														
	15.61	0.10		CHARNOCKITIC GNEISS	Yellowish Brown	DENSE CLAYEY SILTS WITH PIECES OF ROCK DECOMPOSED ROCK										
				CHARNOCKITIC GNEISS	Grey	SLIGHTLY WEATHERED TO MODERATELY WEATHERED ROCK CORE RECOVERY: 43% R.Q.D. 21%										
	17.60	1.99				BORE HOLE TERMINATED AT 17.60 m BELOW GROUND LEVEL IN BED ROCK GRADE II - III Notes : 1. Undisturbed Sample NO.1 is obtained from 2.71 m to 3.21 m below the ground level 2. Undisturbed Sample No. 2 is obtained from 5.00 m to 5.50 m below the ground level										

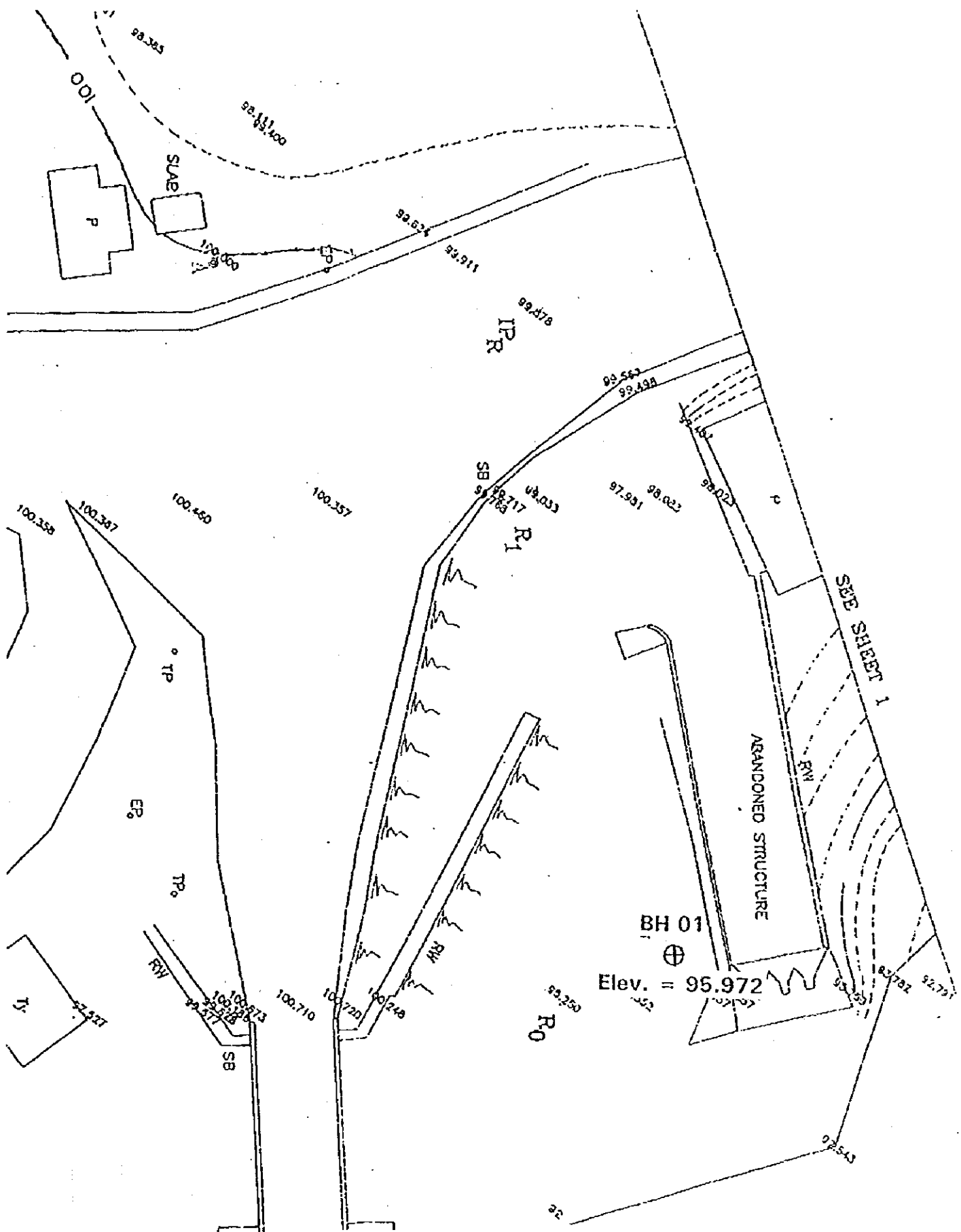


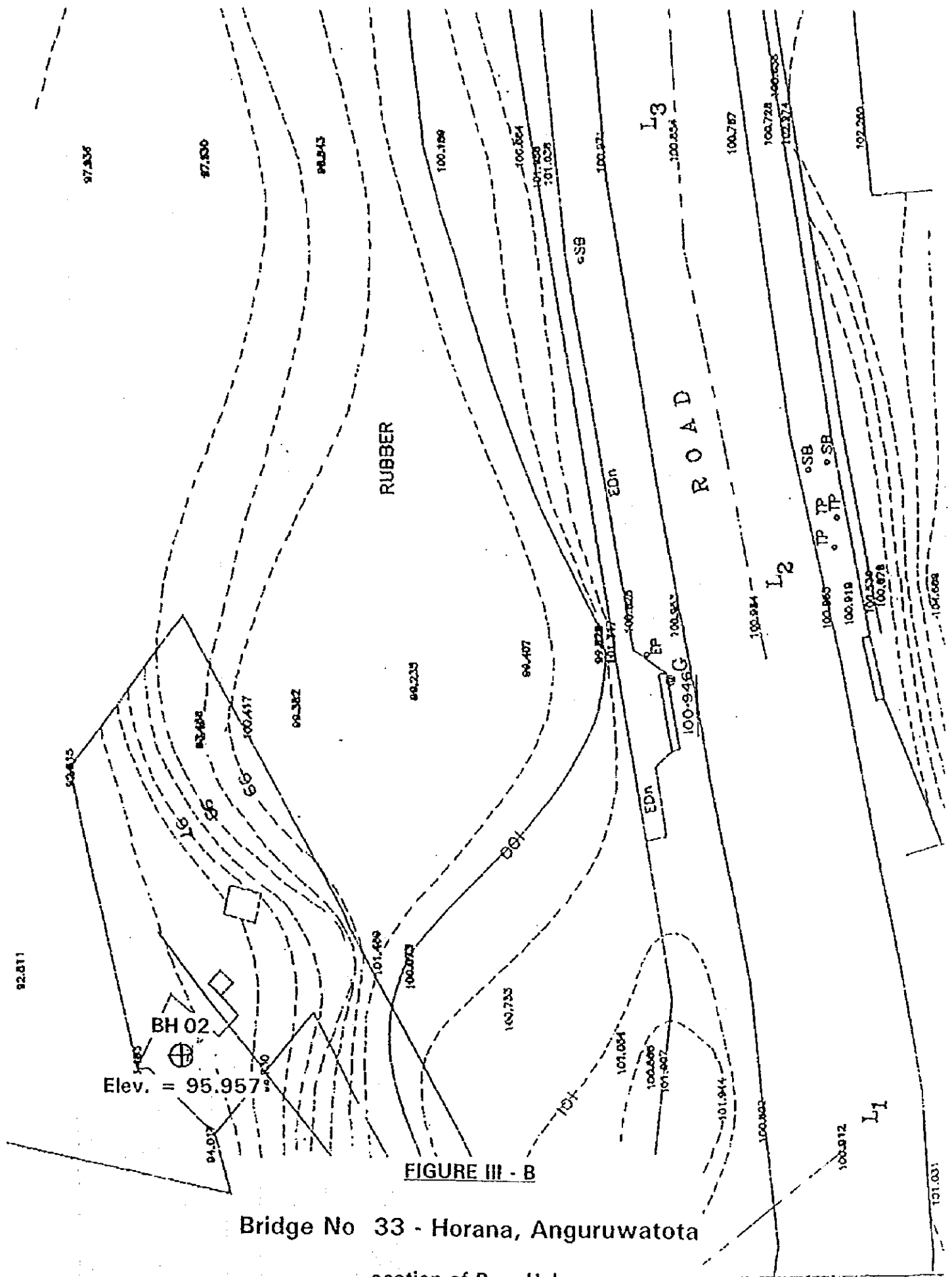
FIGURE III - A

Bridge No. 33 - Horana, Anguruwatota

Location of Bore Holes  
A - 19

GEOLOGICAL RECORD OF BORING						HOLE No. BH - 01	
PROJECT Basic Design Study of Five Bridge Site			LOCATION No. 33 (Horana - Angurwatota)				
GROUND ELEVATION		DEPTH OF HOLE 7.32 m		ANGLE FROM VERTICAL 0			
DIAMETER OF HOLE 100 mm		MACHINE Menzi		DATE OF DRILLING 17th March 1998			
CORE RECOVERY		DEPTH TO GROUND WATER LEVEL IN HOLE 2.40 m below ground level					
DRILLED BY S.K.P. Jayasundera				LOGGED BY S.K. Jayasundera			

ELEVATION (m)	DEPTH (m)	THICKNESS (m)	FIELD OBSERVATION				CORE RECOVERY		STANDARD PENETRATION TEST																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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GEOLOGICAL RECORD OF BORING					HOLE No. BH - 02		
PROJECT	Basic Design Study for Five Bridges			LOCATION	No. 33 - Hosana - Angurawalota		
GROUND ELEVATION			DEPTH OF HOLE	9.00 m		ANGLE FROM VERTICAL	0
DIAMETER OF HOLE	100 mm		MACHINE	YBH - 05	DATE OF DRILLING	20th March 1998	
CORE RECOVERY			DEPTH TO GROUND WATER LEVEL IN HOLE		1.70 m below ground level		
			DRILLED BY			R.O. Somapala	
			LOGGED BY			B.S. Yapa	

ELEVATION (m)	DEPTH (m)	THICKNESS (m)	FIELD OBSERVATION				CORE RECOVERY		STANDARD PENETRATION TEST										
			COLUMN SECTION	SOIL OR ROCK CLASSIFICATION	COLOUR	DESCRIPTION	RECOVERY		DEPTH (m)	NUMBER OF BLOWS N									
							%	cm		(N)	0	10	20	30	40	50	60		
	0.65	0.65		CL/SC	Brown	SLIGHTLY PLASTIC CLAY MIXED WITH SAND													
	1.30	0.65		CONCRETE	Grey	DETERIORATED TO SOME EXTENT CORE RECOVERY=66%													
				BOULDER	Grey	MODERATELY WEATHERED BOULDER CORE RECOVERY=22%													
	4.05	2.75																	
	4.40	0.35		BOULDER	Grey	MODERATELY WEATHERED CORE RECOVERY=57%													
	4.90	0.50		BOULDER	Grey	MODERATELY WEATHERED CORE RECOVERY=100%													
	5.25	0.35		BOULDER	Grey	MODERATELY WEATHERED CORE RECOVERY=97%													
	5.85	0.60		ML/SH	Brown	VERY FINE SAND MIXED WITH NON PLASTIC FINES													
	6.15	0.30		CHARNOCKITIC GNEISS	Brown/Gray	HIGHLY WEATHERED CORE RECOVERY=100%													
	6.95	0.70		CHARNOCKITIC GNEISS	Brown/Gray	R.O.O. = 20% MODERATELY WEATHERED CORE RECOVERY=93% R.O.O. = 47%													
	7.60	0.65		CHARNOCKITIC GNEISS	Grey	SLIGHTLY WEATHERED CORE RECOVERY= 94% R.O.O. = 88%													
	9.00	1.40		CHARNOCKITIC GNEISS	Greenish Grey	FRESH ROCK CORE RECOVERY=96% R.O.O. = 62%													
						BORE HOLE TERMINATED AT 9.00 m BELOW GROUND LEVEL IN THE GRADE I BCO. ROCK Note : 1. No undisturbed soil samples were taken 2. No SPT tests were carried out													





GEOLOGICAL RECORD OF BORING					HOLE No. BH - 01	
PROJECT	Basic Design Study of Five Bridge			LOCATION	No. 38 - Malwala - Siripagana	
GROUND ELEVATION		DEPTH OF HOLE	14.50 m	ANGLE FROM VERTICAL	0	
DIAMETER OF HOLE	100mm	MACHINE	NENZI	DATE OF DRILLING	23rd March 1998	
CORE RECOVERY		DEPTH TO GROUND WATER LEVEL IN HOLE	2.96-m below ground level			
DRILLED BY S.K.P. Jayasundera				LOGGED BY S.K. Jayawardena		

ELEVATION (m)	DEPTH (m)	THICKNESS (m)	FIELD OBSERVATION				CORE RECOVERY % cm	STANDARD PENETRATION TEST						
			COLUMN SECTION	SOIL OR ROCK CLASSIFICATION	COLOUR	DESCRIPTION		DEPTH (m)	NUMBER OF BLOWS N					
					Light Grey Brown Grey	Hueva Top Soil STIFF/MODERATELY DENSE SANDY SILTY CLAY / SANDY CLAYEY SILT								
	1.10	1.10		ML	Greyish Brown	VERY SOFT/VERY LOOSE SANDY SILTY CLAY/ SANDY CLAYEY SILT		1.0 06						
	1.95	0.85		SH/SC	Brown Reddish Brown	VERY LOOSE SILTY CLAYEY SAND		2.0 03						
	3.10	1.15		ML	Dark Grey	VERY SOFT SANDY SILTY CLAY		3.0 01						
	3.85	0.75												
	3.95	0.10		Boulder		HIGHLY WEATHERED		4.0 07						
	4.80	0.85		SH	Grey	LOOSE SILTY SAND								
	5.65	0.65		ML	Yellow Brown	MODERATELY STIFF SANDY SILTY CLAY		5.0 07						
	6.45	1.00		SC	Yellow Brown	LOOSE SILTY CLAYEY SAND		6.0 08						
	8.00	1.55		CL	Yellow Brown	STIFF SANDY SILTY CLAY		7.0 09						
	8.45	0.45		Boulder	Whitish Grey	HIGHLY WEATHERED ROCK		8.0 13						
	9.00	0.55		CL	Greyish Brown	VERY STIFF SANDY SILTY CLAY		9.0 19						
	9.85	0.85		GRANULITIC GNEISS (BED ROCK)	Grey / Brown	HIGHLY WEATHERED ROCK / COMPLETELY WEATHERED ROCK CORE RECOVERY=15% R.O.C. 50%								
	10.00	0.15		- do -	Grey / Brown	HIGHLY WEATHERED ROCK CORE RECOVERY=50% R.O.C. 50%		10.0 50						
	11.80	1.80		GRANULITIC GNEISS (BED ROCK)	Grey / Brown	COMPLETELY DECOMPOSED ROCK WITH SMALL ROCK PIECES		11.0 50						
	14.50	2.70		GRANULITIC GNEISS (BED ROCK)	Grey	MODERATELY WEATHERED - FRESH ROCK		12.0 50						
BOREHOLE TERMINATED AT 14.50 m BELOW IN THE GRADE 1 BED ROCK														

GEOLOGICAL RECORD OF BORING						HOLE No. BH - 02	
PROJECT	Basic Design Study for Five Bridge				LOCATION	No. 38 - Halwala - Sripegama	
GROUND ELEVATION			DEPTH OF HOLE	10.03 m		ANGLE FROM VERTICAL	0
DIAMETER OF HOLE	100 mm		MACHINE	Nantl		DATE OF DRILLING	27th March 1998
CORE RECOVERY			DEPTH TO GROUND WATER LEVEL IN HOLE			0.00 m	
			DRILLED BY S.K.P. Jayasundera			LOGGED BY B.S. Yapa	

ELEVATION (m)	DEPTH (m)	THICKNESS (m)	FIELD OBSERVATION				CORE		STANDARD PENETRATION TEST																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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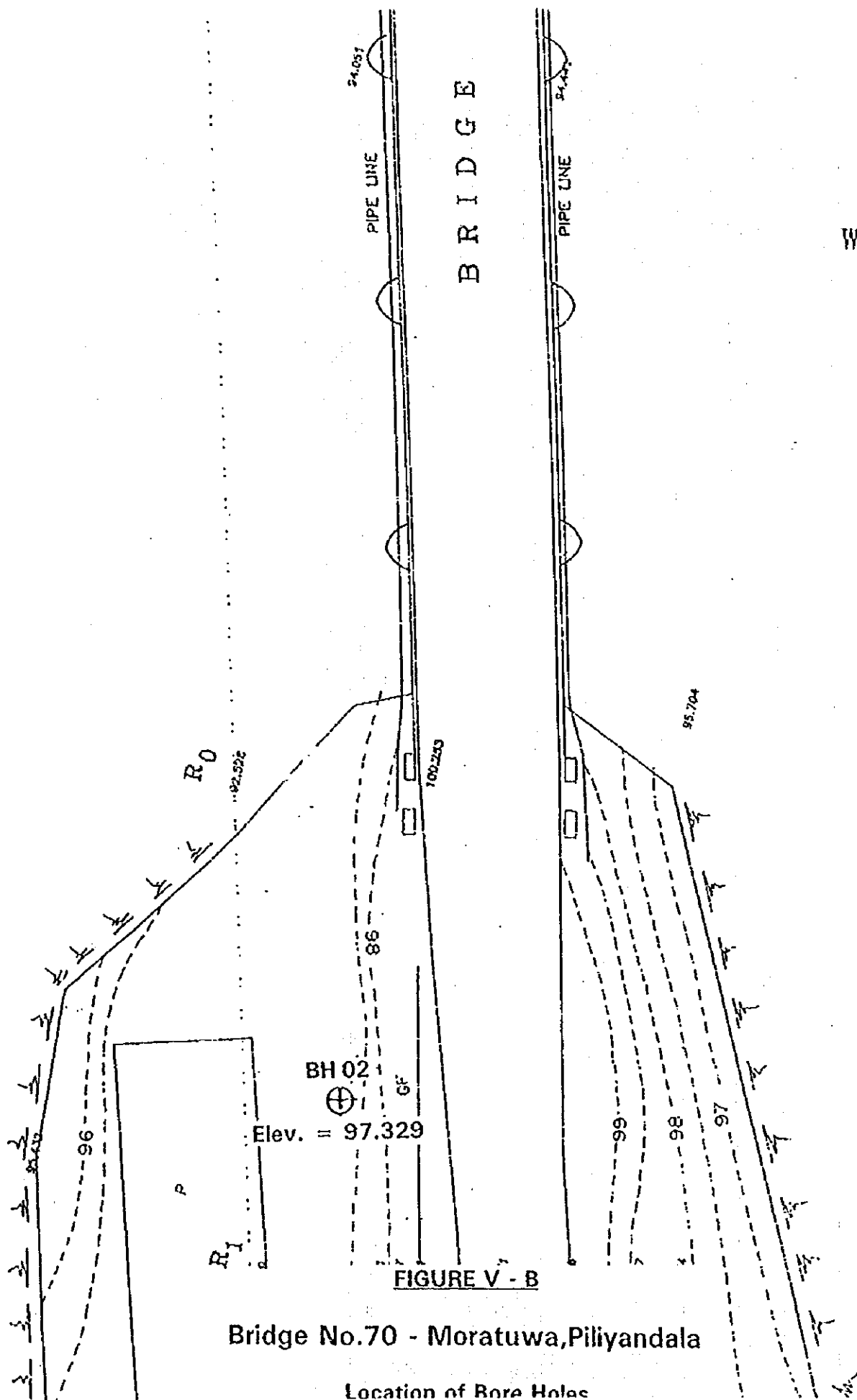


GEOLOGICAL RECORD OF BORING						HOLE No. BH - 01		
PROJECT	BASIC DESIGN STUDY OF FIVE BRIDGE			LOCATION	No.70 (Moroluwa - Piliyandala)			
GROUND ELEVATION	At the road to level		DEPTH OF HOLE	14.45 m		ANGLE FROM VERTICAL	0	
DIAMETER OF HOLE	100 mm		MACHINE	YBM - 05		DATE OF DRILLING	11th March 1998	
CORE RECOVERY				DEPTH TO GROUND WATER LEVEL IN HOLE	3.07 m below ground level			
				DRILLED BY	R.D. Soanapala		LOGGED BY	S.K. Jayawardana

ELEVATION (m)	DEPTH (m)	THICKNESS (m)	FIELD OBSERVATION				CORE RECOVERY % cm	STANDARD PENETRATION TEST							
			COLUMN SECTION	SOIL OR ROCK CLASSIFICATION	COLOR	DESCRIPTION		DEPTH (m)	NUMBER OF BLOWS N						
						FILLED GROUND FOR THE ROAD EMBANKMENT									
	3.05	3.05						1.0	09						
	3.45	0.40		HL	Yellow Brown	SOFT SANDY SILTY CLAY		2.0	06						
				HL	Reddish Brown	SOFT SANDY SILTY CLAY		3.0	05						
	4.60	1.15						4.0	04						
	5.25	0.65		HL	Light Brown	VERY SOFT SANDY SILTY CLAY		5.0	01						
				SC	Brown	LOOSE TO MODERATELY DENSE SANDY CLAYEY SILT									
	6.80	1.55													
	7.50	0.70		SH	Grey	MODERATELY DENSE SILTY SAND		7.0	09						
	8.00	0.50		HL	Grey	MODERATELY DENSE SANDY CLAYEY SILT									
	8.40	0.40		SH	Dark Brown	MODERATELY DENSE SILTY SAND		8.0	11						
	8.90	0.50		HL	Dark Brown	SOFT SANDY SILTY CLAY									
	9.30	0.20		SH	Light Grey	LOOSE SANDY SILT		9.0	01						
	9.30	0.20		CL	Dark Grey	SOFT SILTY CLAY									
	9.75	0.45		HL	Light Grey	SOFT SANDY SILTY CLAY									
				HL	Dark Grey	CLAYEY SILT SOFT TO VERY SOFT		10.0	02						
								11.0	03						
								12.0	11						
	13.30	1.53						13.0	18						
	14.45	1.15		MH	Dark Grey	DENSE TO VERY DENSE MICACEOUS SILT (COMPLETELY DECOMPOSED ROCK)		14.0	50						
				Notes: UD Samples could not be obtained		BORE HOLE TERMINATED AT 14.45 m BELOW GROUND LEVEL IN WEATHERED ROCK (GRADE V - VI)									

92.940

W E R.



GEOLOGICAL RECORD OF BORING						HOLE No. BH - 02	
PROJECT	Basic Design Study of Five Bridge				LOCATION	No. 70 (Piliyandala - Moratuwa)	
GROUND ELEVATION		DEPTH OF HOLE		9.75 m	ANGLE FROM VERTICAL		0
DIAMETER OF HOLE		100 mm	MACHINE	NENZI	DATE OF DRILLING		13th March 1998
CORE RECOVERY		DEPTH TO GROUND WATER LEVEL IN HOLE			0.70 m below ground level		
DRILLED BY - S.K.P. Jayasundera					LOGGED BY S.K. Jayawardana		

ELEVATION (m)	DEPTH (m)	THICKNESS (m)	FIELD OBSERVATION				CORE RECOVERY		STANDARD PENETRATION TEST						
			COLUMN SECTION	SOIL OR ROCK CLASSIFICATION	COLOUR	DESCRIPTION	%	cm	DEPTH (m)	NUMBER OF BLOWS N					
				SH	Dark Brown	SANDY SILT AND SILTY SAND				(N) 0	10	20	30	40	50
	1.15	1.15							1.0 09						
				HL	Reddish Brown	VERY SOFT SANDY CLAY			2.0 01						
	3.30	2.15							3.0 01						
	3.50	0.20		HL	Dark Brown	VERY SOFT SANDY SILT									
	3.90	0.40		HL	Yellowish Brown	VERY SOFT SANDY SILTY CLAY									
	4.35	0.45		HL	Reddish Brown	VERY SOFT SANDY SILTY CLAY			4.0 01						
				HL	Dark Grey	VERY SOFT SILTY CLAY									
	5.56	1.21							5.2 02						
	5.90	0.34		HL	Dark Grey	VERY LOOSE SANDY CLAYEY SILT									
				SH	Light Grey	MODERATELY DENSE SILTY SAND			6.0 12						
	6.60	0.70													
	6.80	0.20		SH	Dark Grey	MODERATELY DENSE SANDY SILT									
				SH	Light Grey	MODERATELY DENSE SANDY SILT			7.0 09						
	8.20	1.40							8.0 15						
	8.70	0.50		HL	Light Grey	MODERATELY DENSE SANDY CLAYEY SILT									
	9.15	0.45		HL	Reddish Brown	SANDY SILTY CLAY									
						STIFF (HIGHLY WEATHERED ROCK)			9.0 50						
	9.75	0.60		Charnockite Gneiss	Grey	FRESH-SLIGHTLY WEATHERED ROCK									
BORE HOLE TERMINATED AT 9.75 M BELOW GROUND LEVEL GRADE 1 - 11															
Notes:															
1. UD Sample No. 1 From 4.50 m to 5.2 m depth															
2. UD Sample No. 2 From 6.50 m to 7.00 m depth															











