

4 Minutes of Discussions

Minutes of Discussions
on
the Basic Design Study on the Project for Reconstruction
of Thaajuddeen School, Republic of Maldives

In response to a request from the Government of the Republic of Maldives, the Government of Japan has decided to conduct a Basic Design on the Project for Reconstruction of Thaajuddeen School (hereinafter referred as "the Project"), and entrusted the study to Japan International Cooperation Agency (JICA).

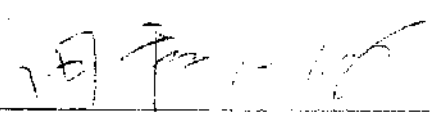
JICA sent to the Maldives the Basic Design Study Team headed by Mr. Masahiro TAWA, Deputy Director, Project Monitoring and Coordination Division, Grant Aid Management Department, JICA, and is scheduled to stay in the country from November 3 to November 22, 2001.

The team held a series of discussion on the Project with the concerned officials of the Government of Maldives and conducted a field survey at Male'.

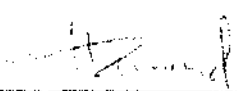
As a result of discussions and field survey, both parties confirmed the main items described on the attached sheets.

The team will proceed to further work and prepare the Basic Design Study Report.

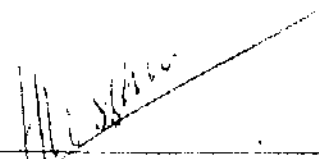
Male', November 8, 2001



Masahiro TAWA
Leader
Basic Design Study Team
Japan International Cooperation Agency
Japan



Abdul Hameed Zakariyya
Director, International Affairs
On behalf of the Department of
External Resources
Ministry of Foreign Affairs
Republic of Maldives



Hussain Mohamed
Director General
School Construction Section
Ministry of Education
Republic of Maldives

ATTACHMENT

1. Objectives of the Project

The objective of the Project is to improve the educational environment of Thaajuddeen School by reconstructing the school for primary education, and thus to contribute to the development of human resources in the Maldives.

2. Executing and implementing Organization

The executing agency of the Project is the Department of External Resources of the Ministry of Foreign Affairs. The implementing agency of the Project is the Ministry of Education (MOE). After implementation, the MOE will be responsible for the use and maintenance of the school granted under the Japan's Grant Aid.

3. Site of the Project

The site for the reconstruction of Thaajuddeen School has been confirmed as Block No. 399, Kan'ba Aishaarani Higun, Maafannu, Male', as shown in Annex-1. The site will be surveyed for the Project.

4. Components of the Project

- (1) After discussions with the Japanese side, the Maldives side finally requested the components described in Annex-2.
- (2) Both sides have agreed that the buildings will be designed in accordance with the criteria attached as Annex-3.
- (3) The final contents of the Project will be decided based on the further analysis in Japan.

5. Japan's Grant Aid Scheme

The Government of the Maldives (GOM) understood the Japan's Grant Aid Scheme explained by the team, as described in Annex-4.

6. Necessary Measures to be taken by the GOM

- (1) On condition that the Grant Aid Scheme by the Government of Japan is extended to the Project, the GOM will take the necessary measures, described in Appendix-1 of Annex-4 for the smooth implementation of the Project on condition that the Japan's grant aid is extended to the Project.
- (2) To secure the safety of the existing Thaajuddeen School buildings, the GOM shall repair and reinforce them and carry out periodical inspections in accordance with an action plan, which will be provided by the Japanese mission for the explanation of the draft report in the middle of February, 2002.
- (3) The existing Thaajuddeen School buildings shall be demolished by the GOM soon after the new school buildings are turned over.

7. Further Schedule of the Study

- (1) JICA will prepare a draft report of the Study, and dispatch a mission for the explanation of the contents to the GOM around the middle of February, 2002.

- (2) In case that the contents of the report are accepted in principle by the GOM, JICA will complete the final report of the Study and will send it to the GOM around April, 2002.

8. Other Relevant Issues

- (1) The Japanese side required the Maldives side to submit the detailed plan on teacher allocation with the budget estimation for the new employment as well as the transfer of staff already employed by November 22, 2001, and the Maldives side agreed on it.
- (2) Both sides agreed to change the name of the project from "Reconstruction of Thaajuddeen School" to "Reconstruction of the Third Primary School in Male".

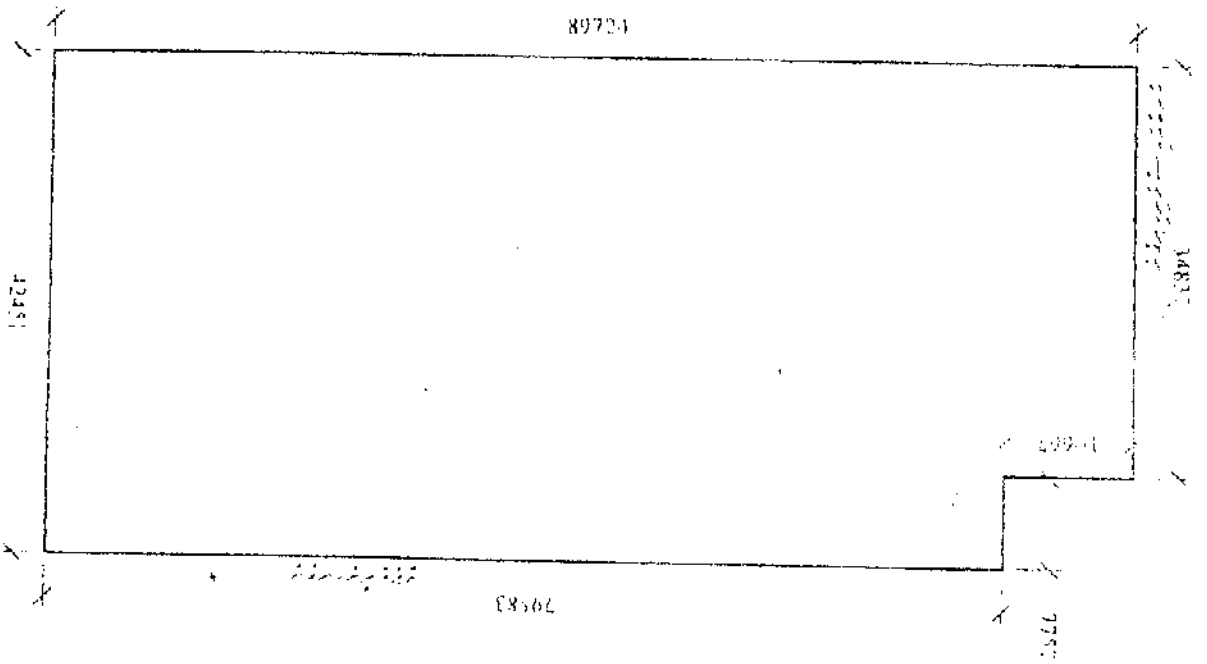
Annex-1: Site of the Project

Annex-2: Components Requested by the GOM

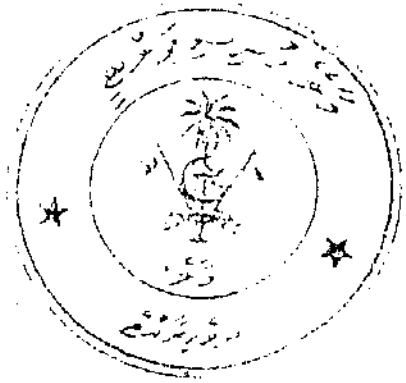
Annex-3: Criteria for the Building Design

Annex-4: Japan's Grant Aid Scheme

Annex-1: Site of the Project



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Annex-2: Components Requested by the GOM

General Teaching Area

1. 35 Classrooms
2. Art & Craft Room + Prep. Room
3. Music Room + Store Room
4. Computer Room + Prep. Room
5. Science Room + Prep. Room
6. A/V Room + Prep. Room
7. Library
8. School Hall/ Sports Hall with toilets
9. Store

Administrative and Staff Space

1. Lobby
2. General Office
3. Administrator Room
4. Principal Room Attached toilet
5. Secretary Room
6. 2 Asst. Principal Rooms
7. Print Room
8. Staff Meeting Room
9. Staff Room
10. Resource Room / Teaching Aids
11. Supervisors Room
12. Prayer Room
13. Pantry

Other Service Spaces

1. First Aid Room
2. Counseling Room
3. Sports Storage
4. Staff Toilets
5. Student Toilets
6. Machine Room
7. Electric Room
8. Stairs and Corridors
9. Storage Space
10. School Yard

Annex-3: Criteria for the Building Design

- (1) The components of facilities should satisfy the minimum functions required by the curriculum for primary education at present and near future.
- (2) The number and the scale of normal classrooms, other rooms and facilities should accommodate the minimum requirements taking into consideration the present and future needs of the educational system and school age population.
- (3) Buildings should secure enough durability against the climate and predictable natural disasters.
- (4) Materials for construction should be procured in Male' or imported easily and cost-effectively.

Annex-4: Japan's Grant Aid Scheme

(1) Grant Aid Procedure

- 1) Japan's Grant Aid Program is executed through the following procedures.
 - Application: (Request made by a recipient country)
 - Study (Basic Design Study conducted by JICA)
 - Appraisal & Approval
(Appraisal by the Government of Japan and Approval by Cabinet)
 - Determination of Implementation
(The Notes exchanged between the Governments 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 (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 to conduct a study on the request. If necessary, JICA send a Preliminary Study Mission to the recipient country to confirm the contents of the request.

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

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Programme, 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 the technical, social and economic points 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; and
- 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 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 the smooth implementation of the Study, JICA uses a consulting firm selected through its own procedure (competitive proposal). The selected firm participates in the Study and prepares for a report based upon the terms of reference set by JICA.

At the beginning of implementation after the Exchange of Notes, for the services of the Detailed Design and Construction Supervision of the Project, JICA recommends the same consulting firm which participated in the Study to the recipient country in order to maintain the technical consistency between the Basic Design and Detailed Design.

(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" means the one fiscal year which the Cabinet approves the project for. Within the fiscal year, all procedure such as exchanging of the Notes, concluding contracts with consulting firms and contractors 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, in principle, Japanese products and services including transport or 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, contracting 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 the 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 of Japanese taxpayers.

6) Undertakings required to the Government of the recipient country

- a) to secure a lot of land necessary for the construction of the Project and to clear the site;
- b) to provide facilities for distribution of electricity, water supply and drainage and other incidental facilities outside the site;
- c) to ensure prompt unloading and customs clearance at ports of disembarkation in the recipient country and internal transportation therein of the products purchased under the Grant Aid;
- d) to exempt Japanese nationals from customs duties, internal taxes and fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contracts;
- e) to accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contracts such as facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work;
- f) to ensure that the facilities constructed and products purchased under the Grant Aid be maintained and used properly and effectively for the Project; and
- g) to bear all the expenses, other than those covered by the Grant Aid, necessary for the Project.

7) "Proper Use"

The recipient country is required to maintain and use the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign the necessary staff for operation and maintenance of them 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 shall not be re-exported from the recipient country.

9) Banking Arrangement (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 a 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 (A/P) issued by the Government of recipient country or its designated authority.
- c) Commission of payment will be arranged and covered by the Government of the recipient country.

Minutes of Discussions
on
the Basic Design Study on the Project for Reconstruction
of the Third Primary School in Male'
in the Republic of Maldives
(Consultation on the draft Basic Design Report)

In November 2001 the Japan International Cooperation Agency (JICA) dispatched the Basic Design Study Team on the Project for Reconstruction of the Third Primary School in Male' (hereinafter referred to as "the Project") to the Maldives, and through discussions, field survey, and technical examination of the result in Japan, JICA has prepared the draft Basic Design Report of the Project.

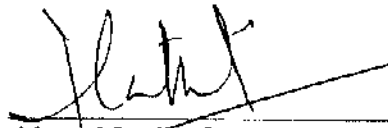
In order to explain and consult the Government of Maldives (GOM) on the components of the draft Report, JICA sent a Study Team, which is headed by Mr. Seiji Kaiho, and is scheduled to stay in the Maldives from 14th to 21st February 2002.

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

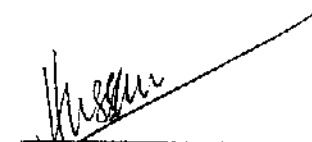
Male', 20th February 2002



Seiji Kaiho
Leader
Basic Design Study Team
Japan International Cooperation Agency
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Ahmed Latheef
Director-General of External Resources
Department of External Resources
Ministry of Foreign Affairs
Republic of Maldives



Hussain Mohamed
Director General
School Construction Section
Ministry of Education
Republic of Maldives

ATTACHMENT

1. Draft Basic Design Report

The Government of Maldives (GOM) has agreed and accepted the draft Basic Design Report proposed by the Team.

2. Executing and implementing Organization

The executing agency of the Project is the Department of External Resources of the Ministry of Foreign Affairs. The implementing agency of the Project is the Ministry of Education (MOE). After implementation, the MOE will be responsible for the use and maintenance of the newly constructed Third Primary School (hereinafter referred to as "the School").

3. Components of the Project

Both sides have confirmed the items, as shown in Annex-1, which will be constructed under the Japan's Grant Aid.

4. Japan's Grant Aid Scheme

The GOM understood the Japan's Grant Aid Scheme and the necessary measures to be taken by the GOM as explained by the team and described in Annex-2.

5. Further Schedule of the Study

JICA will complete the final Basic Design Report and will send it to the GOM around May 2002.

6. Other Relevant Issues

(1) Allocation of budget for the Works

The team requested the GOM to allocate necessary budgets timely for the Works as specified in Appendices 2 (AP-10) of the draft Basic Design Report (Annex-3).

The GOM agreed on it.

(2) Allocation of budget for proper operation and maintenance of the School

The team requested the GOM to allocate necessary budgets timely for proper operation and maintenance of the School.

The GOM agreed on it.

(3) Construction permit for the Project

The team confirmed that the construction permit for the Project should be obtained by the GOM within five (5) months after the signing of Exchange of Notes for the Project between the governments, subject to the necessary drawings and documents being provided by the Japanese side.

(4) Allocation of Teaching Staff

The team requested the MOE to allocate necessary teaching staff timely for the proper operation of the School.

The MOE agreed on it.



(5) Allocation of Pupils

The team requested the MOE to allocate pupils timely and appropriately for the School to make the best use of its expanded capacity.

The MOE agreed on it.

(6) Existing Thaajuddeen School buildings

The team requested the GOM to repair and reinforce the existing Thaajuddeen School buildings and carry out periodical inspections in accordance with the Action Plan, prepared by the Team. Also, the Team confirmed that the existing School buildings should be demolished by the GOM soon after the new School buildings are handed over to the GOM.

The GOM agreed on them.

(7) Lightening Rods

The GOM requested to install the lightening rods for the School.

Both sides agreed that the final decision would be made based on the further analysis in Japan.

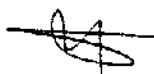
(8) Confidentiality of the draft and final Basic Design Reports

Both sides agreed that the contents of the draft and final Basic Design Reports are confidential and these Reports should not be duplicated or released to any outside parties.

Annex-1: Components of the Project

Annex-2: Japan's Grant Aid Scheme

Annex-3: List of Works to be Undertaken by the GOM



Annex-1: Components of the Project

General Teaching Area


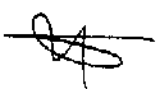
1. 35 Classrooms
2. Music Room + Store Room
3. Science Room + Preparation. Room
4. Audio-visual Room + Store Room
5. Multipurpose Room + Store Room
6. Library + Teaching Aids
7. School Hall + Stage + Store Room + Sports Store

Administrative and Staff Space

1. General Office
2. Administrator Room
3. Print Room
4. Meeting Room
5. Principal Room
6. Toilet for Principal
7. Assistant Principal Room
8. Supervisors Room
9. Staff Room
10. Prayer Room
11. Pantry

Service Spaces

1. First-aid Room
2. Store Rooms
3. Staff Toilets
4. Student Toilets
5. Toilets for School Hall
6. Universal Toilet
7. Machine Room
8. Electric Room
9. Corridors etc.



Annex-2: Japan's Grant Aid Scheme

(1) Grant Aid Procedure

- 1) Japan's Grant Aid Program is executed through the following procedures.
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 - Study (Basic Design Study conducted by JICA)
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Secondly, JICA conducts the study (Basic Design Study), using Japanese consulting firms.

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Programme, 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 the technical, social and economic points of view;
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- 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 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 the smooth implementation of the Study, JICA uses a consulting firm selected through its own procedure (competitive proposal). The selected firm participates in the Study and prepares for a report based upon the terms of reference set by JICA.

At the beginning of implementation after the Exchange of Notes, for the services of the Detailed Design and Construction Supervision of the Project, JICA recommends the same consulting firm which participated in the Study to the recipient country in order to maintain the technical consistency between the Basic Design and Detailed Design.

(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" means the one fiscal year which the Cabinet approves the project for. Within the fiscal year, all procedure such as exchanging of the Notes, concluding contracts with consulting firms and contractors 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, in principle, Japanese products and services including transport or 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, contracting 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 the 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 of Japanese taxpayers.

6) Undertakings required to the Government of the recipient country

- a) to secure a lot of land necessary for the construction of the Project and to clear the site;
- b) to provide facilities for distribution of electricity, water supply and drainage and other incidental facilities outside the site;
- c) to ensure prompt unloading and customs clearance at ports of disembarkation in the recipient country and internal transportation therein of the products purchased under the Grant Aid;
- d) to exempt Japanese nationals from customs duties, internal taxes and fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contracts;
- e) to accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contracts such as facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work;
- f) to ensure that the facilities constructed and products purchased under the Grant Aid be maintained and used properly and effectively for the Project; and
- g) to bear all the expenses, other than those covered by the Grant Aid, necessary for the Project.

7) "Proper Use"

The recipient country is required to maintain and use the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign the necessary staff for operation and maintenance of them 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 shall not be re-exported from the recipient country.

9) Banking Arrangement (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 a 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 (A/P) issued by the Government of recipient country or its designated authority.
- c) Commission of payment will be arranged and covered by the Government of the recipient country.

2. Necessary measures undertakings by each government

Major undertakings to be taken by each government is shown in the Appendix-1.

Appendix-1 Necessary measures undertakings by each government

No	Items	To be covered by Grant Aid	To be covered by Recipient side
1	To secure land		●
2	To clear, level and reclaim the site when needed		●
3	To construct gates and fences in and around the site		●
4	To construct roads		
	1) Within the site	●	
	2) Outside the site		●
5	To construct the building	●	
6	To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities		
	1) Electricity		
	a. The distributing line to the site		●
	b. The drop wiring and internal wiring within the site	●	
	c. The main circuit breaker and transformer	●	
	2) Water Supply		
	a. The city water distribution main to the site		●
	b. The supply system within the site (receiving and/or elevated tanks)	●	
	3) Drainage		
	a. The city drainage main (for storm, sewer and others) to the site		●
	b. The drainage system (for toilet sewer, ordinary waste, storm drainage and others) within the site	●	
	4) Telephone System		
	a. The telephone trunk line to the main distribution frame panel (MDF) of the building		●
	b. The MDF and the extension after the frame panel	●	
	5) Furniture and Equipment		
a. General furniture		●	
b. Project equipment	●		
7	To bear the following commissions to a bank of Japan for the banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
8	To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country		
	1) Marine(Air) transportation of the products from Japan to the recipient country	●	
	2) Tax exemption and customs clearance of the products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	●	
9	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●
10	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contracts		●
11	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant		●
12	To bear all the expenses, other than those to be borne by the Grant, necessary for construction of the facilities as well as for transportation and installation of the equipment		●


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Annex-3: List of Works to be Undertaken by the GOM

	Work Items
1	Repair Works of Existing Buildings
2	Demolition of Existing Buildings
3	Backfilling and Site Leveling
4	Installation of Infrastructure Electricity Water Supply Telephone Sewer System
5	Boundary wall
6	Procurement of Furniture Students' Chair Students' Desk Students' Cabinet Teachers' Desk Teachers' Chair Teachers' Cabinet Student Table for Science Room Stool for Science Room Demonstration Table for Science Room Chemical Refrigerator Chair for School Hall
7	Drilling Well
8	Installation of Fire Alarm System



5 Cost Estimation Borne by the Recipient Country

Work Item	Cost (Rf)
1.Repair and Reinforcement Works of Existing School Buildings	120,000
2.Removal of Existing School Buildings	1,200,000
3.Landfill	187,500
4.Installation of Infrastructure	24,900
5.Outdoor Work	208,000
6.Furniture and Equipment	683,000
7.Well Drilling	48,000
8Automatic Fire Alarm Equipment	1,100,000
Total	3,571,400

6 References

No.	Title	Media	Original/Copy	Publisher	Year
1	Statistical Yearbook Of Maldives	Book	Original/CD-R	Ministry of Planning and National Development	2001
2	Population and Housing Census of Maldives 2000	CD-R	CD-R	Ministry of Planning and National Development	2000
3	Support for Under-served Schools – A Strategy Document	Booklet	Copy	Unknown (From UNICEF)	2001
4	The National Syllabus for Primary and Middle School	Book	Original	Educational Development Centre	Unknown
5	English Syllabus Grades I –VII	Book	Original	Educational Development Centre	Unknown
6	Mathematics Syllabus Grades I –VII	Book	Original	Educational Development Centre	Unknown
7	National Environmental Studies Syllabus Grade 1-5	Book	Original	Educational Development Centre	Unknown
8	Social Studies Syllabus Grade six and seven	Book	Original	Educational Development Centre	Unknown
9	General Science Grades VI –VII	Book	Original	Educational Development Centre	Unknown
10	Physical Education Syllabus Grades 1-7	Book	Original	Educational Development Centre	Unknown
11	National Practical Arts Syllabus 1-7	Book	Original	Educational Development Centre	Unknown
12	Educational Statistics 2000	Book	Original	Ministry of Education	2000
13	Educational Master Plan (1996-2005) Part 1-3	Book	Original	Ministry of Education	1995
14	Building Construction Cost Data 59th Annual Edition	Book	Original	RS Means	2001
15	PWD Cost Information Quarterly	Book	Original	PWD Consultants Pte Ltd	2001

7 Geological Survey and Testing

**GEOLOGICAL SURVEY AND TESTING
FOR
THE PROJECT FOR RECONSTRUCTION OF
THE THIRD PRIMARY SHOOOL IN MALE'
IN
THE REPUBLIC OF MALDIVES**

January 2002

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**DRAFT REPORT ON GEOLOGICAL SURVEY AND TESTING FOR
BASIC DESIGN STUDY ON THE PROJECT FOR
RECONSTRUCTION OF THAAJUDDEEN SCHOOL, MALE,
REPUBLIC OF MALDIVES**

1.0 ORIGIN

The Ministry of Education of the Republic of Maldives (MoE) has envisaged a Project to reconstruct the Thaajuddeen School of Male and Messes Mohri Architect and Associates Inc. (MAAI) of 2-4-13, Chuo-ku, Tokyo, Japan has been appointed as the Consulting Engineers for the Project. The MAAI has required to investigate the sub soil conditions of the Site earmarked for the Project in order to evaluate the parameters involved with designing the foundation system of the new buildings. Under the above circumstances Messes Ground Engineering Consultants (Pvt) Ltd. of No. 24, Station Road, Wattala, Sri Lanka, (GECL) has been entrusted by MAAI with the sub soil investigation after accepting their Financial Proposal of 21st November 2001.

2.0 SCOPE

The scope of work was to drill four bore holes, one up to a depth of 20.0m, and three up to a depth of 10m in the proposed foundation area in order to facilitate the necessary soil investigations. The four bore holes were to be drilled while carrying out Standard Penetration Tests at every 1.0m intervals. However, the bore holes were to be terminated if a bearing layer having SPT N value more than 50 for consecutive 3m before reaching the above stipulated depths.

Disturbed and undisturbed soil samples were to be obtained from every cohesive soil layer.

Following laboratory tests were to be conducted on the soil samples obtained.

1. Specific gravity of soil granule.
2. Weight per unit volume.
3. Grading test.
4. Water content.
5. Liquid limit.
6. Plastic limit.
7. Unconfined compression test.
8. Triaxial compression test.
9. Consolidation test.
10. Horizontal soil bearing test.

The Report should include the location plan of the bore holes, soil profiles, bore hole log data, results of the laboratory tests carried out and suggestions of supporting layer and building foundation.

3.0 LOCATION

The proposed site is located adjacent to the existing school building at Kabaa – Aisha Rani Higur, Block 399, Maafanu 20-01, Male in Republic of Maldives.

The Site location and the bore hole locations are shown in Figure 1A in Annexure A to the Report. All the four locations of the bore holes were pre-decided by MAAI and those were located on the ground physically and shown to the Representative of the MAAI.

4.0 WORK CARRIED OUT

4.1 GENERAL

A YBM 05 Light Weight rotary type drilling machine along with a drilling team has been mobilized for this work on the 17th December 2001 and the fieldwork was completed on 24th December 2001.

The first bore hole was to be drilled was BH 01. A coral bed rock having SPT N value more than 50 for a depth of three consecutive meters was met at 11.65m. Therefore the bore hole was terminated at 14.65m without drilling up to a depth of 20m. The second bore hole was drilled at BH 02 and it was penetrated to a depth of 10m. The third and fourth bore holes was drilled at BH 03 and BH 04 and those were penetrated beyond 10m depth in order to find out the coral bed encountered in the BH 01 on the request of the Consultant's Representative. The depth of the third and fourth bore holes were 11.45m and 11.55m respectively.

Standard Penetration Tests were conducted and disturbed soil samples have been obtained from every 1.0 / 1.5 metre intervals through out the full drilled depth.

No undisturbed soil samples could be collected as there were no cohesive soil layers encountered in any of the bore holes.

Disturbed soil samples were obtained from every SPT location and whenever the soil type changed. All the samples were put in transparent containers and sealed in such a way that moisture from the samples will not get released to the atmosphere.

The depth to the ground water table is measured in every bore after 24 hours of termination of the same so that there is sufficient period of time for the water table to be stabilised.

The Work was continuously supervised by the Representative of the MAAI.

The soil samples were airlifted to the GECL laboratory in Sri Lanka for subjecting to the necessary laboratory tests.

The ground water sample for the same tests were obtained from the bore hole No BH 04 which has been drilled through the worst fill area where the water could be contaminated mostly.

4.2 STANDARD PENETRATION TEST (SPT)

Standard Penetration Tests (SPT) were conducted inside the bore holes in accordance with ASTM-D 1586 at every 1.0 interval throughout the total depth.

4.3 SAMPLING AND CLASSIFICATION

The sub soil strata were recovered using a split spoon sampler, by other dry blocking methods. Disturbed samples, what ever that could be recovered have been collected continuously at 1.0m intervals and when ever the soil type changes.

The soil samples were examined visually using a 10 x 1 magnifying glass and classified according to the Unified Soil Classification System at site. The classification was verified in the laboratory under the microscope. The soil classification of each stratum is given in the vertical soil profiles attached under the Annexure B to the Report.

4.4 WATER TABLE

The water levels of the ground water table with respect to the existing ground level at the bore hole locations have been observed and are reported in the vertical soil profiles under Annexure B to this Report.

The depth to the water level measured form the existing ground surface is given below.

BH 01 :	0.76m below the existing ground level.
BH 02 :	0.84m above the existing ground level.
BH 03 :	0.63m above the existing ground level.
BH 03 :	0.65m above the existing ground level.

No considerable variation in the ground water level is observed with the variation of the tide levels in the surrounding sea.

4.5 LABORATORY TESTING

The soil samples which were to be subjected for the following laboratory tests were selected with the approval of the MAAI in such a way that all the soil strata will be represented.

1.	Specific gravity of soil granule.	(SG)
2.	Grading test.	(GT)
3.	Water content.	(WC)
4.	Sulphate content of soil	(S-SO4)
5.	Chloride content of soil	(S-Cl)
6.	Sulphate content of ground water	(W-SO4)
7.	Chloride content of ground water	(W-Cl)

The soil sample for Sulphate and Chloride contents tests is selected at the depth of 3.0m where the foundation will be placed most possibly. The schedule of the laboratory tests is given in the Table No 01.

4.6 SOIL PROFILE

The vertical soil profiles are reported under Annexure B.

TABLE No. 01

Sample No	Bore Hole No	Depth (m)	SG	GT	WC	S-SO4	S-Cl	W-SO4	W-Cl
01	BH 01	1.00-1.45	*	*	*				
02	BH 01	3.00-3.45		*	*				
03	BH 01	4.00-4.45		*	*				
04	BH 01	11.00-11.45		*	*				
05	BH 01	7.00-7.45		*	*				
06	BH 01	9.00-9.45		*	*				
07	BH 01	10.00-10.45		*	*				
08	BH 01	1.00-1.45	*		*				
09	BH 02	1.00-1.45	*		*				
10	BH 02	5.00-5.45	*		*				
11	BH 02	7.00-7.45	*		*				
12	BH 02	9.00-9.45	*		*				
13	BH 02	9.00-9.45		*	*				
14	BH 02	10.00-10.45		*	*				
15	BH 04	9.00-9.45		*	*				
16	BH 04	10.00-10.45		*	*				
17	BH 03	3.00-3.45				*	*		
18	BH 04	Water						*	*

5.0 DISCUSSION

The total sub soil system of the site is comprised of an imported fill, thick prism of depositional soils and sedimentary basement rock.

A vertical cross section through the bore holes have been constructed and given under the Annexure C to the Report as Figure II A and Figure II B. The ground surface of the Site is assumed as nearly horizontal and plane for the purpose of construction of the vertical cross sections.

The Site appears to be partly reclaimed land formed by filling imported material.

The top most soil stratum is a 0.10m (BH 03) to 0.30m (BH 04) thick grayish brown coloured Top soil layer which contains partially decayed parts of vegetation, which is common all over the Site.

The reclaimed portion is restricted to the area of BH 01 and BH 04. The reclamation has been done by using waste material mixed with sea sand. The thickness of the filled layer varies from 1.85m in BH 01 to 2.95m in BH 04. In BH 01 the filled material is dominantly sea sand with little waste material and in BH 04 it vise versa. The inorganic portion of the filled material could be classified as loose, fine to coarse sand with some gravel.

The top soil stratum of BH 02 and BH 03 area is a 1.85m (BH 02) to 4.90m (BH 03) thick loose to dense, fine to coarse sand with some gravel and cobbles. This stratum continues into the BH 01 and BH 04 area underneath the filled layer.

The above sand layer is followed by a layer of loose to dense, very fine to coarse sand layer whose thickness varies from 3.15m (BH 03) to 5.90m (BH 02).

Subsequent to the above stratum a very loose to extremely dense / very stiff very fine sand / silt layer has been encountered. The particle size of this silty sand layer becomes very fine towards silt in the BH 04 area. A 1.05m cavity has been encountered on the top of this silty sand layer in the BH 04. No water losses have been encountered while penetrating this cavity. The lateral extension of the cavity can not be quantified with the available data.

Again another loose to dense very fine to coarse sand layer has been come across below the silty stratum in BH 01 and BH 04. This layer has not been found in BH 03.

The final soil stratum found in the area is a very thin, extremely dense, slightly plastic clayey sand layer deposited on the highly weathered coral bed rock. This was found only in the BH 01.

Almost all the sands encountered in the bore holes could be categorised, in general, as coral sands.

The highly weathered to slightly weathered coral rock bed has been encountered at the depth of 11.65m in BH 01 and at the depth of 11.10m in BH 04. But according to our experience in the Male Island this coral bed is again followed by depositional soils in many of the places. Since the thickness of the coral bed is not known consideration of pile foundations is not advisable. If pile foundations are considered further investigations should be carried out in order to establish the thickness of the coral bed and the compressive strength of the rock.

No highly compressible, cohesive, clay layers have been encountered in any of the bore holes.

The filled depth of BH 01 and BH 04 contains a mixture of sand, pieces of clothes, pieces of timber and other waste materials decomposed to a certain degree that the material of those can not be identified clearly. The filled material in BH 04 area is very much inferior than those of BH 01 area as far as the strength and settlement characteristics are concerned. Also, the worse fill area (BH 04) is more close to the sea than the less worse (BH 01) fill area, and therefore the effect of sea level changes will be more in the BH 04 area. However, it is not advisable to place heavy foundations in the filled zone, within the depth of fill. It is not possible to demarcate the boundary of the filled area by the data obtained from the bore holes. A thorough knowledge of the lateral boundary between the filled zone and the original ground is very important when the locations of building foundations are decided. Also, special care should be taken to ensure that the foundations are located in such a way that those are placed either on the original ground or on filled zone (ie; one foundation will not share both filled zone and original ground as its base). Such arrangement would reduce the problems caused by differential settlement between the filled zone and the original ground. This could be achieved by controlling the length of buildings to be constructed.

The ground water table has been identified at the depth between 0.65m (BH 04) and 0.84m (BH 02). The variation of the water table during the period of investigation was negligible and therefore it could be mentioned that the variation of the ground water table in the Site area due to the variation of the sea level changes is minimal. Also, it should be mentioned that the tidal variation during the period of investigation was not at the peak.

6.0 RECOMMENDATIONS

1. Allowable bearing capacities that could be recommended for different depths in soil overburden at the bore hole locations for shallow foundations are given in Table No1.

TABLE NO. 1

Depth (m) from the existing ground level	Allowable maximum bearing Capacity (kN./m ²)			
	Filled Zone		Original Ground	
	BH 01	BH 04	BH 02	BH 03
1.0	40	40	75	75
2.0	50	50	75	75
3.0	150	75	125	100
4.0	150	100	150	225
5.0	200	200	200	250

The anticipated settlements due to the above-recommended bearing pressures is around 30mm, which is well within the tolerable limits.

The water table is assumed to be at the existing ground level for the evaluation of above allowable bearing capacities.

Shallow individual footings, strip foundations or raft foundations could be considered for the proposed structures.

Also, it is advisable that the foundations should not be placed in the region of ground water table fluctuation.

The allowable bearing capacity has been calculated using the following equation proposed by Brinch Hensen.

$$b = (0.5 * Y' * B' * N_y * d_y * s_y) + (q' * N_q * d_q * s_q)$$

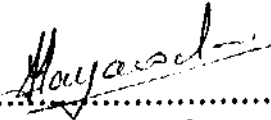
Where b = Bearing capacity of the soil at given depth
 Y' = Effective density of soil
 B' = Half of the breadth of the foundation
 N_y = Bearing capacity factor
 N_q = Bearing capacity factor
 Q' = Effective stress at the depth of the foundation
 d_y, s_y, d_q, s_q are depth and shape factors whose values are 1 in case of the strip foundations.

The anticipated settlement has been calculated using the following equation proposed by Mayerhoff.

$$S = \frac{1.9 * b'}{N}$$

Where S = Anticipated total settlement in mm
b' = Allowable bearing capacity
N = Average of the SPT N value of the affected depth.

2. The lateral extension of the filled zone should be established in order to decide the locations of the proposed structures.
3. If pile foundations are considered a more detail investigation should be conducted.


.....
S. K. Jayawardana
BSc.(Hons), MSc, CEng.(Lond), MIMM(Lond).

.....
15.01.2002
Date

ANNEXURE A

Location Plans of the Site and the Bore Holes

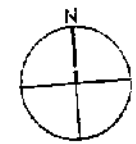
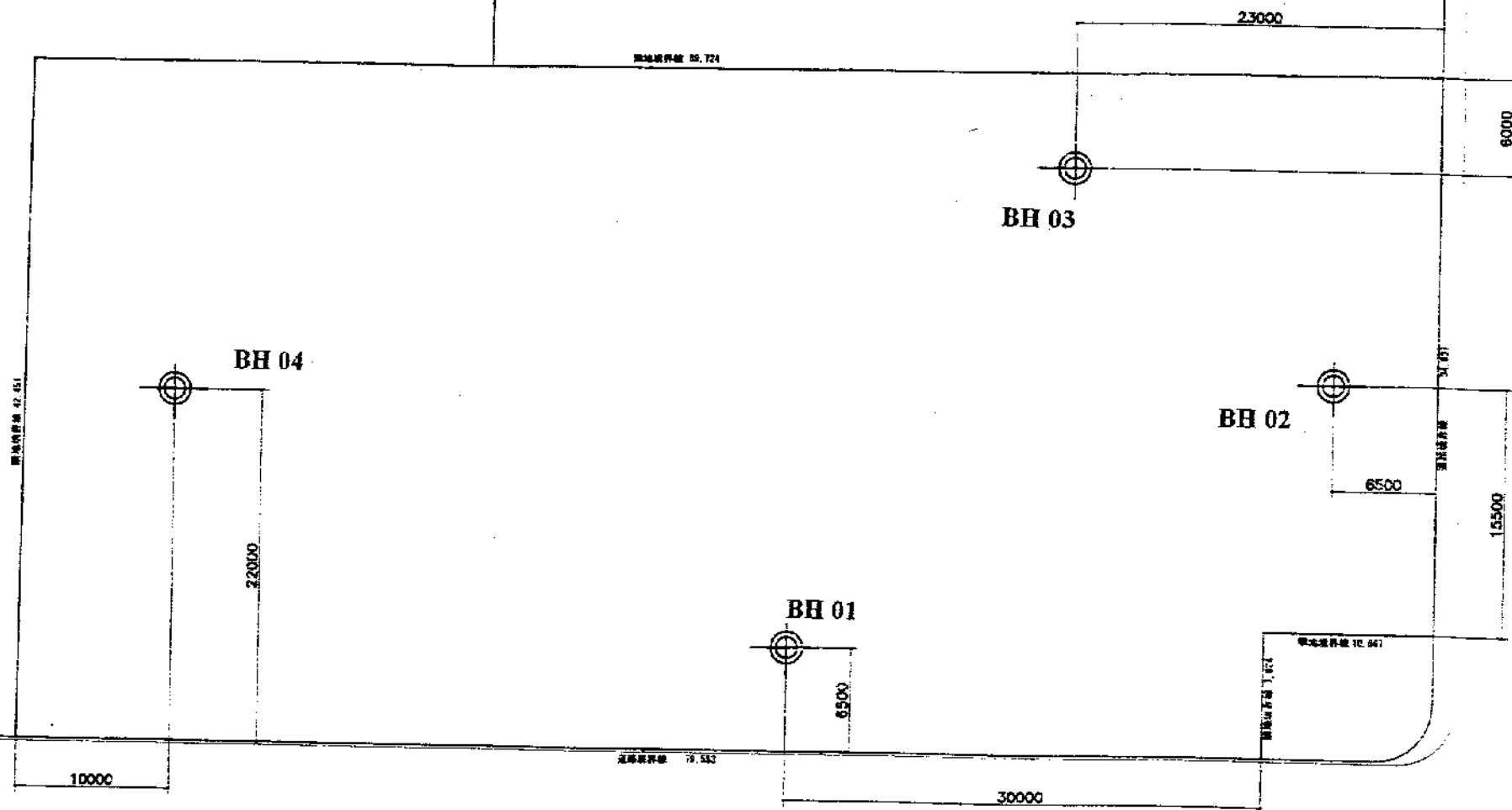


Figure I

Location Plan of the Bore Holes
(not to scale)

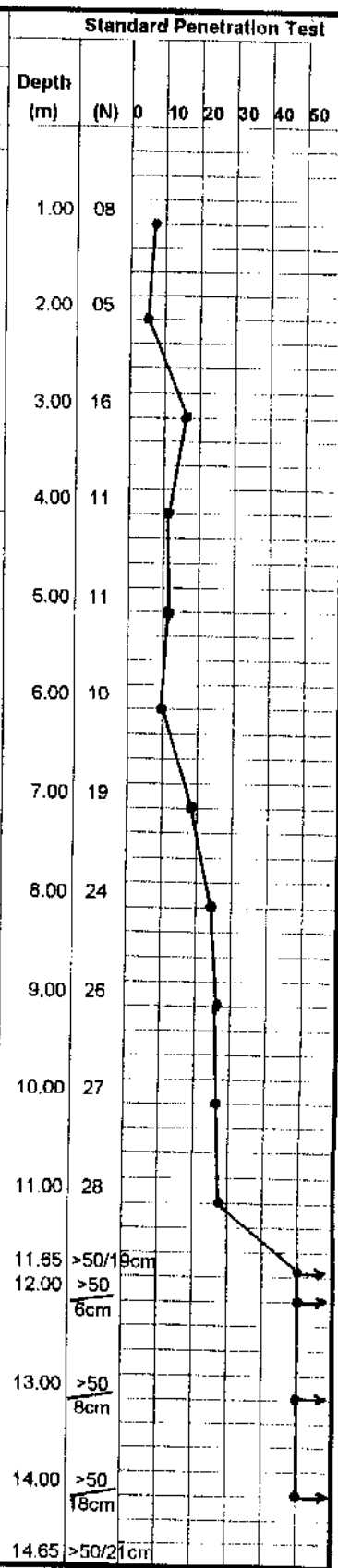
ANNEXURE B

Vertical Soil Profiles

GEOLOGICAL RECORD OF BORING

Project : Reconstruction of Thajudeen Sch **Date of Drilling:** 19/12/2001- 20/12/2001
Client : Mohri Architects **Angle from the vertical:** 0
Bore Hole Number : BH 0.1 **Depth of Hole (m):** 14.65
Ground Elevation : Assumed as 0.00 **Depth to the ground water level:** 0.76m from the EGL
Dia. of the hole (mm) : 100 **Logged By:** BSY

Elevation (m)	Depth (m)	Thickness (m)	Field Observations				Standard Penetration Test												
			Column Section	Soil / Rock Classifn.	Colour	Description	Depth (m)	(N)	0	10	20	30	40	50					
0.00																			
0.25	0.25	0.25		SW	Gr. Br.	Top soil with vegetable matter.													
0.50						FILL													
0.75																			
1.00																			
1.25																			
1.50																			
1.75																			
2.00	2.10	1.85																	
2.25																			
2.50																			
2.75																			
3.00																			
3.25																			
3.50																			
3.75																			
4.00	4.00	2.00																	
4.25																			
4.50																			
4.75																			
5.00	4.95	0.95																	
5.25																			
5.50																			
5.75																			
6.00																			
6.25																			
6.50																			
6.75																			
7.00																			
7.25																			
7.50																			
7.75																			
8.00	7.90	2.95																	
8.25																			
8.50																			
8.75																			
9.00																			
9.25																			
9.50																			
9.75																			
10.00	10.00	2.10																	
10.25																			
10.50																			
10.75																			
11.00																			
11.25	11.25	1.25																	
11.50																			
11.75	11.65	0.40																	
12.00																			
12.25																			
12.50																			
12.75																			
13.00																			
13.25																			
13.50																			
13.75																			
14.00																			
14.25																			
14.50																			
14.75	14.65	3.00																	



GEOLOGICAL RECORD OF BORING

Project	: Reconstruction of Thajudeen Sch	Date of Drilling:	21/12/2001
Client	: Mohri Architects	Angle from the vertical:	0
Bore Hole Number	: BH 02	Depth of Hole (m):	10.45
Ground Elevation	: Assumed as 0.00	Depth to the ground water level:	0.84m from the EGL
Dia. of the hole (mm)	: 100	Logged By:	BSY

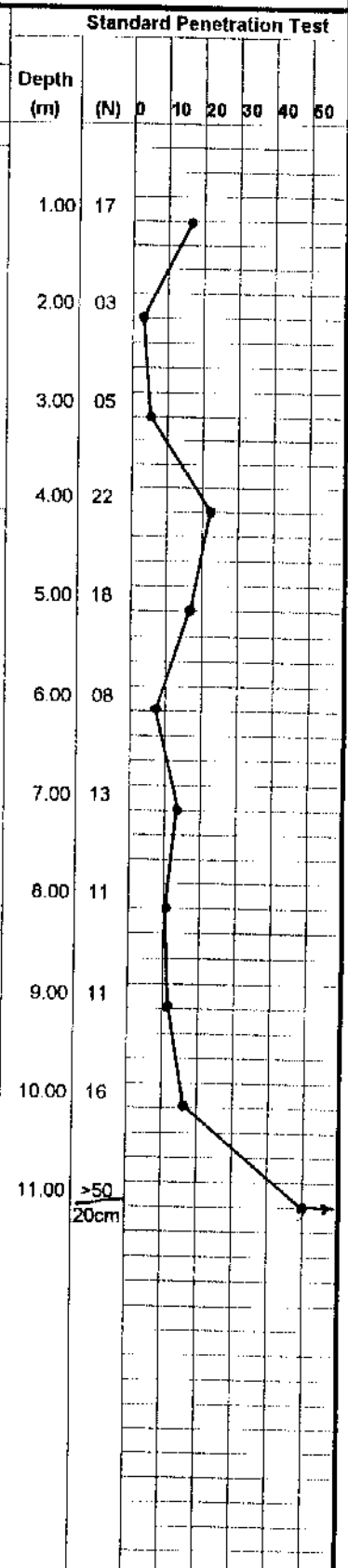
Elevation (m)	Depth (m)	Thickness (m)	Field Observations				Standard Penetration Test													
			Column Section	Soil / Rock Classifn.	Colour	Description	Depth (m)	(N)	0	10	20	30	40	50						
0.00																				
0.25	0.25	0.25		SW	Gr. Br.	Top soil with vegetable matter.														
0.50																				
0.75																				
1.00	1.00	0.75		SW	Grayish and brownish white	Medium, fine to coarse sand and gravels with some cobbles.														
1.25																				
1.50																				
1.75																				
2.00	2.10	1.10		SW / GW	Grayish and brownish white	Medium, fine to coarse sand and gravels with some cobbles.														
2.25																				
2.50																				
2.75																				
3.00																				
3.25	3.20	1.10																		
3.50																				
3.75																				
4.00																				
4.25																				
4.50																				
4.75																				
5.00																				
5.25																				
5.50																				
5.75																				
6.00																				
6.25																				
6.50																				
6.75																				
7.00																				
7.25																				
7.50																				
7.75																				
8.00	8.00	4.80																		
8.25																				
8.50																				
8.75																				
9.00	9.08	1.08		ML	Brownish white	Medium, very fine to coarse but dominantly fine sand mixed with cobbles, pieces of corals and sea shells.														
9.25																				
9.50																				
9.75																				
10.00																				
10.25																				
10.50	10.45	1.37																		
10.75																				
11.00																				
11.25																				
11.50																				
11.75																				
12.00																				
12.25																				
12.50																				
12.75																				
13.00																				
13.25																				
13.50																				
13.75																				
14.00																				
14.25																				
14.50																				
14.75																				

Bore hole terminated at 10.45m below the existing ground level in depositional soils.

GEOLOGICAL RECORD OF BORING

Project : Reconstruction of Thajudeen Sch **Date of Drilling:** 22/12/2001
Client : Mohri Architects **Angle from the vertical:** 0
Bore Hole Number : BH 03 **Depth of Hole (m):** 11.45
Ground Elevation : Assumed as 0.00 **Depth to the ground water level:** 0.63m from the EGL
Dia. of the hole (mm) : 100 **Logged By:** BSY

Elevation (m)	Depth (m)	Thickness (m)	Field Observations			Standard Penetration Test														
			Column Section	Soil / Rock Classifn.	Colour	Description	Depth (m)	(N)	0	10	20	30	40	50						
0.00																				
0.25					Br. white	Top soil with some vegetable matter.														
0.50	0.10	0.10		SW																
0.75																				
1.00																				
1.25																				
1.50																				
1.75																				
2.00																				
2.25	2.30	2.20		SW / GW	Brownish white or whitish brown	Medium to very loose, fine to coarse sand and gravels with some cobbles.														
2.50																				
2.75																				
3.00																				
3.25																				
3.50																				
3.75																				
4.00	4.00	1.70																		
4.25																				
4.50																				
4.75																				
5.00	5.00	1.00																		
5.25																				
5.50																				
5.75																				
6.00	6.00	1.00		SW	Brownish white or whitish brown	Medium to loose, fine to coarse sand with some gravels and cobbles.														
6.25																				
6.50																				
6.75																				
7.00																				
7.25																				
7.50																				
7.75																				
8.00																				
8.25	8.15	2.15																		
8.50																				
8.75																				
9.00	9.00	0.85			- do -	Medium, very fine to coarse but dominantly fine sand mixed with pieces of sea shells.														
9.25																				
9.50																				
9.75																				
10.00	10.00	1.00		ML	- do -	Medium, very fine to coarse but dominantly fine sand mixed with small amount of gravels														
10.25																				
10.50																				
10.75																				
11.00	11.00	10.00			- do -	Medium, very fine to coarse but dominantly fine sand mixed with small amount of gravels and cobbles.														
11.25																				
11.50	11.35	0.35			- do -	Extremely dense, coarse to fine sand with pieces of corals.														
11.75																				
12.00																				
12.25																				
12.50																				
12.75																				
13.00																				
13.25																				
13.50																				
13.75																				
14.00																				
14.25																				
14.50																				
14.75																				



Bore hole terminated at 11.45m below the existing ground level on hard coral bed.

GEOLOGICAL RECORD OF BORING

Project : Reconstruction of Thajudeen Sch **Date of Drilling:** 23/12/2001
Client : Mohri Architects **Angle from the vertical:** 0
Bore Hole Number : BH 04 **Depth of Hole (m):** 11.45
Ground Elevation : Assumed as 0.00 **Depth to the ground water level:** 0.65m from the EGL
Dia. of the hole (mm) : 100 **Logged By:** BSY

Elevation (m)	Depth (m)	Thickness (m)	Field Observations			Standard Penetration Test													
			Column Section	Soil / Rock Classifn.	Colour	Description	Depth (m)	(N)	0	10	20	30	40	50					
0.00																			
0.25	0.30	0.30		SW	Gr. br.	Top soil with vegetable matter.													
0.50																			
0.75																			
1.00																			
1.25																			
1.50																			
1.75																			
2.00																			
2.25																			
2.50																			
2.75																			
3.00																			
3.25	3.25	2.95																	
3.50																			
3.75																			
4.00	4.00	0.75																	
4.25																			
4.50																			
4.75																			
5.00	5.00	1.00																	
5.25																			
5.50																			
5.75																			
6.00	6.00	1.00																	
6.25																			
6.50																			
6.75																			
7.00																			
7.25																			
7.50																			
7.75																			
8.00	8.05	2.05																	
8.25																			
8.50																			
8.75																			
9.00	9.10	1.05																	
9.25																			
9.50																			
9.75																			
10.00																			
10.25	10.15	1.05																	
10.50																			
10.75																			
11.00	11.10	0.95																	
11.25																			
11.50	11.55	0.45																	
11.75																			
12.00																			
12.25																			
12.50																			
12.75																			
13.00																			
13.25																			
13.50																			
13.75																			
14.00																			
14.25																			
14.50																			
14.75																			

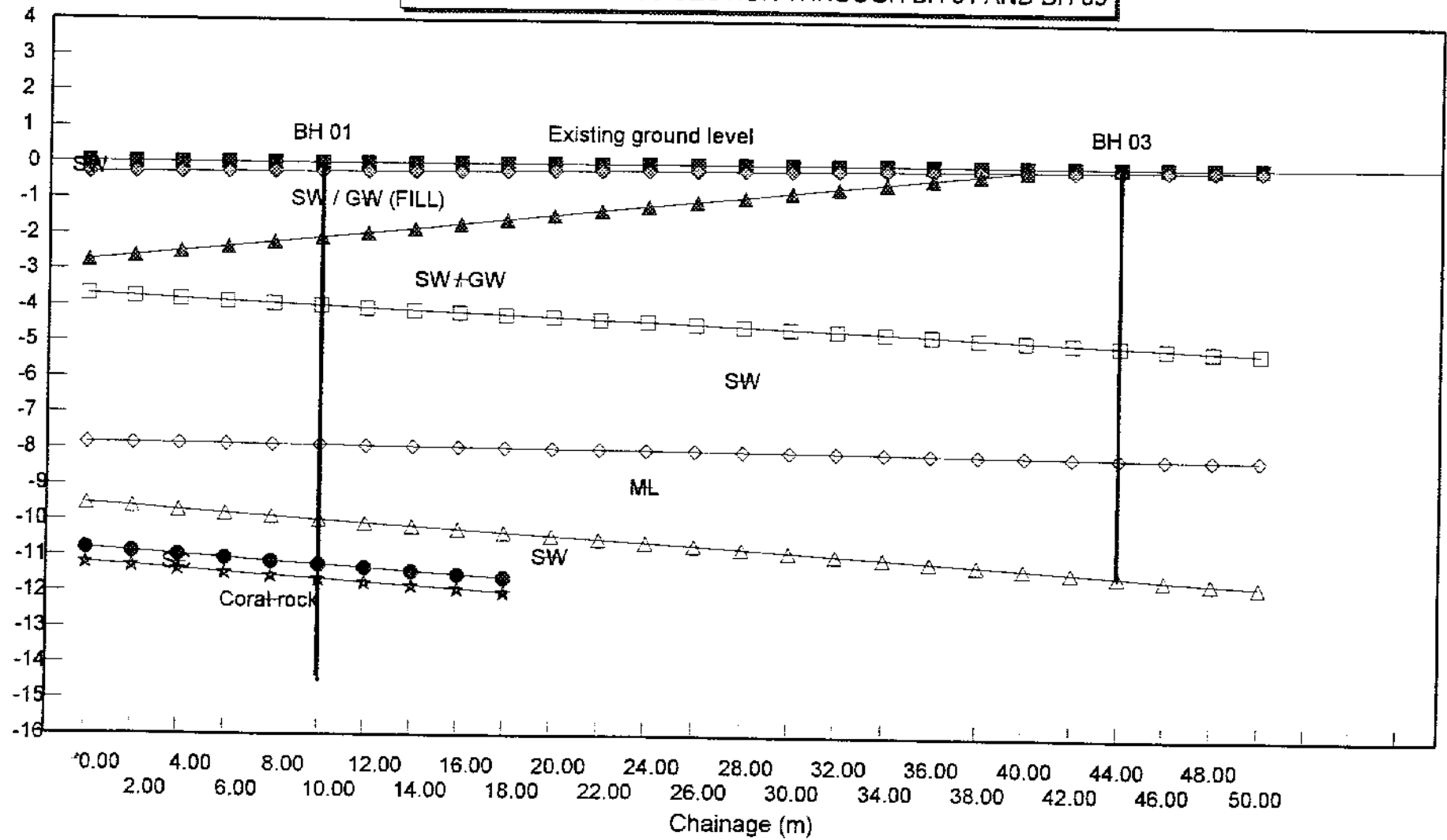
Bore hole terminated at 11.55m below the existing ground level in hard coral bed.

ANNEXURE C

Vertical Cross Section

FIGURE II - A

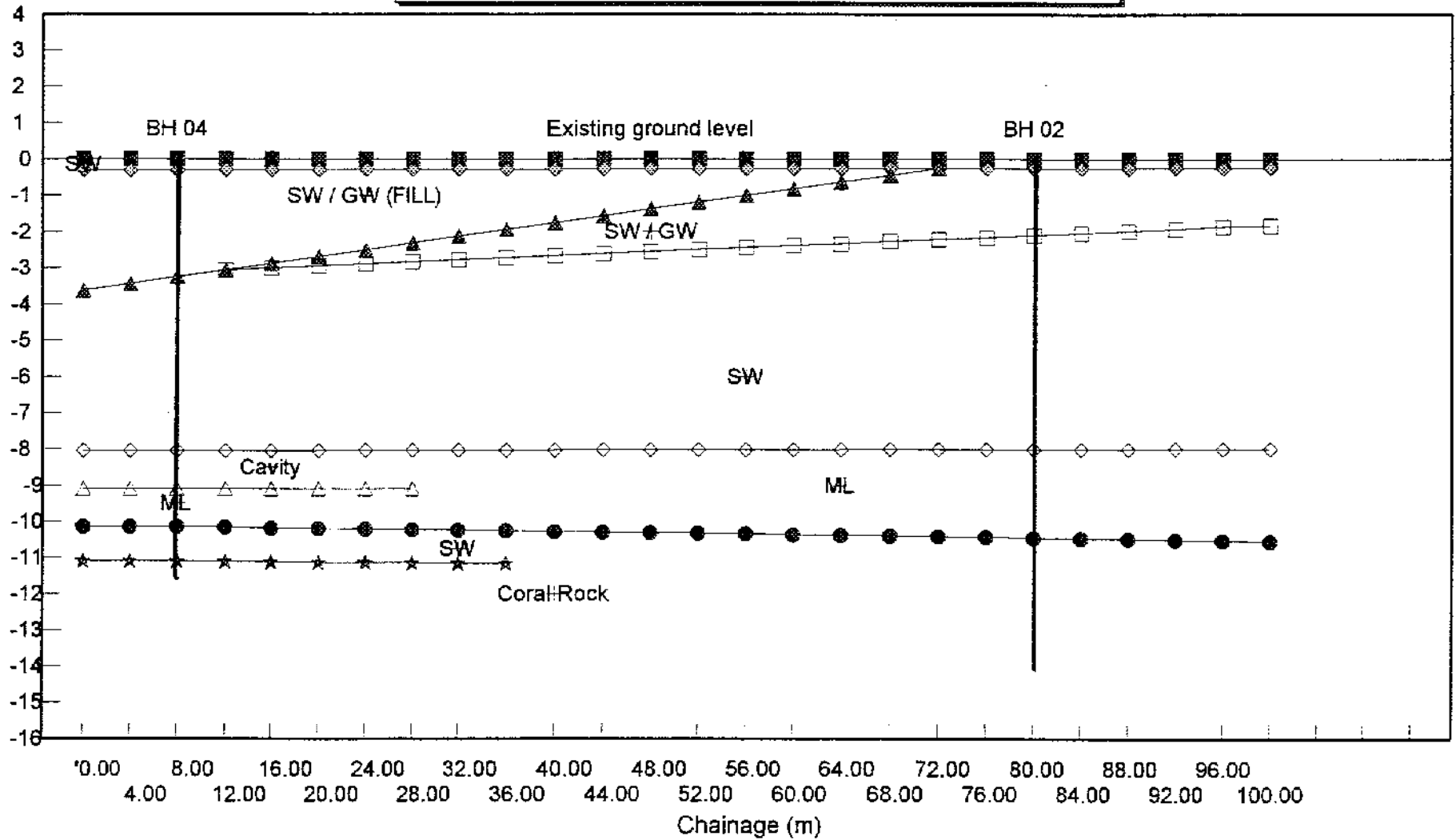
GENERALISED CROSS SECTION THROUGH BH 01 AND BH 03



- | | | | |
|--------------------------------|----------------------------------|---------------------------------|------------------------------|
| ■ Elev. of existing Ground | ◇ Elev. of bot. of first SW laye | ▲ Elev. of bot. of FILL layer | ◻ Elev. of bot. of SW/GW lay |
| ◊ Elev. of bot. of second SW I | △ Elev. of bot. of ML layer | ● Elev. of bot. of third SW lay | ★ Elev. of bot. of SC layer |

FIGURE II - B

GENERALISED CROSS SECTION THROUGH BH 04 AND BH 02



■ Elev. of existing Ground	◇ Elev. of bot. of first SW laye	▲ Elev. of bot. of FILL layer	□ Elev. of bot. of SW/GW lay
◊ Elev. of bot. of second SW I	△ Elev. of bot. of Cavity	● Elev. of bot. of ML layer	★ Elev. of bot. of third SW lay

ANNEXURE D

Results of the Laboratory Tests

GROUND ENGINEERING CONSULTANTS (PVT) LTD.

SPECIFIC GRAVITY TEST

PROJECT	: Reconstruction of Thaajuddeen School									DATE	: 29/12/2001
CLIENT	: Mohri Architect & Associates Inc.										
LOCATION	: Rep. of Maldives										
BORE HOLE NO.	No.	0 1		0 1		0 2		0 2			
SAMPLE NO.	No.										
DEPTH	(m)	1.00 - 1.45		11.00 - 11.45		1.00 - 1.45		5.00 - 5.45			
SOIL SPECIMEN NO.		0 8		0 4		0 9		1 0			
Mass of gas jar and plate (m1)	(g)	1191.0	1083.0	1180.0	1075.0	1186.0	1191.0	1083.0	1186.0		
Mass of gas jar, plate and soil (m2)	(g)	1591.0	1485.0	1394.0	1284.0	1589.0	1551.0	1483.0	1585.0		
Mass of gas jar, plate, soil and water (m3)	(g)	3845.0	3759.1	3723.5	3631.9	3857.3	3808.5	3751.7	3854.6		
Mass of gas jar, plate and water (m4)	(g)	3587.5	3498.0	3587.5	3498.0	3606.5	3587.5	3498.0	3606.5		
m2 - m1	(g)	400.00	402.00	214.00	209.00	403.00	360.00	400.00	399.00		
m4 - m1	(g)	2396.50	2415.00	2407.50	2423.00	2420.50	2396.50	2415.00	2420.50		
m3 - m2	(g)	2254.00	2274.10	2329.50	2347.90	2268.30	2257.50	2268.70	2269.60		
(M4 -M1)-(M3 -M2)	(ml)	142.50	140.90	78.00	75.10	152.20	139.00	146.30	150.90		
SG = $\frac{M2 - M1}{(M4 -M1)-(M3 -M2)}$		2.81	2.85	2.74	2.78	2.65	2.59	2.73	2.64		
Average Specific Gravity		2.83		2.76		2.62		2.69			
Remarks	:										
Tested by	:	B.S.Yapa									
Computed by	:	S.K.Jayawardana									

GROUND ENGINEERING CONSULTANTS (PVT) LTD.

SPECIFIC GRAVITY TEST

PROJECT	: Reconstruction of Thaaajuddeen School	DATE	: 31/12/2001
CLIENT	: Mohri Architect & Associates Inc.		
LOCATION	: Rep. of Maldives		
BORE HOLE NO.	No.	0 2	0 2
SAMPLE NO.	No.		
DEPTH	(m)	7.00 - 7.45	9.00 - 9.45
SOIL SPECIMEN NO.		1 1	1 2
Mass of gas jar and plate (m1)	(g)	1206.5	1191.0
Mass of gas jar, plate and soil (m2)	(g)	1607.0	1591.0
Mass of gas jar, plate, soil and water (m3)	(g)	3864.4	3840.0
Mass of gas jar, plate and water (m4)	(g)	3603.5	3587.5
m2 - m1	(g)	400.50	400.00
m4 - m1	(g)	2397.00	2396.50
m3 - m2	(g)	2257.40	2249.00
(M4 -M1)-(M3 -M2)	(ml)	139.60	147.50
SG = $\frac{M2 - M1}{(M4 -M1)-(M3 -M2)}$		2.87	2.71
Average Specific Gravity		2.79	2.71
Remarks	:		
Tested by	: B.S.Yapa		
Computed by	: S,K,Jayawardana		

GROUND ENGINEERING CONSULTANTS (PVT) LTD.

GRAIN SIZE DISTRIBUTION - SIEVE ANALYSIS

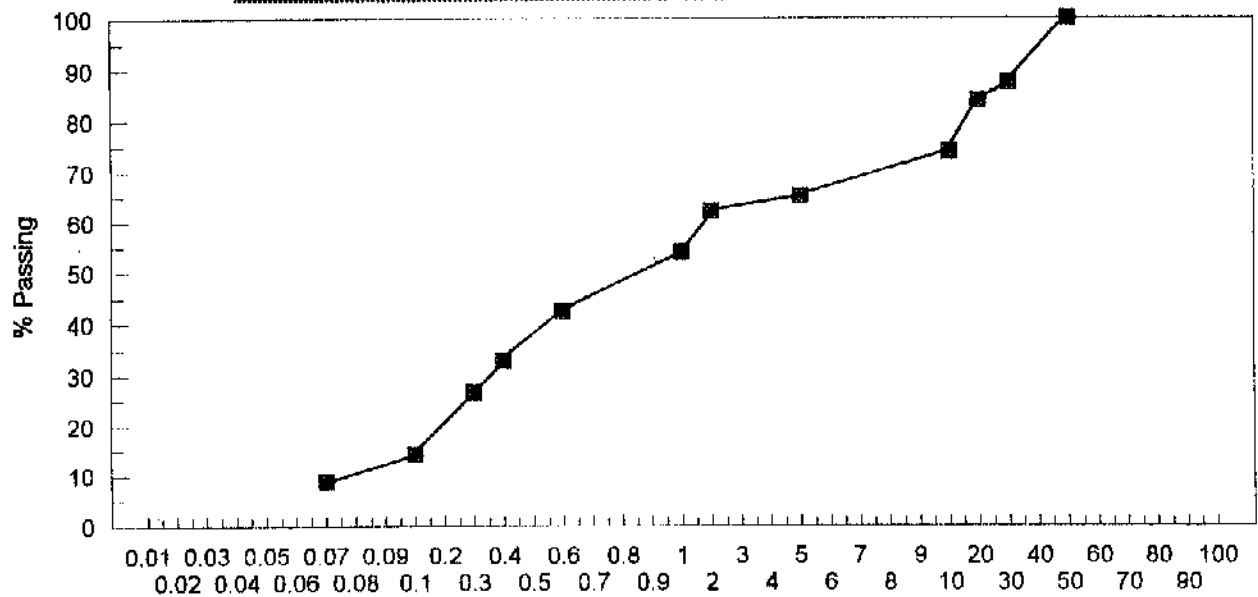
PROJECT Reconstruction of Thaajuddeen School
LOCATION Rep. of Maldives
BORE HOLE NO. 01
DEPTH (m) 1.00 - 1.45
SAMPLE NO. 01
Test Method BS 1377 75 No 2.7

Date : 29 Dec 2001

Weight of the soil + pan = 96.90 g
 Weight of the pan = 6.10 g
 Weight of the soil = 90.80 g

Sieve Size/ Partical Size mm	Weight g	Retained %	Cum. Retained %	% Passing %	Remarks
50.00		0.00	0.00	100.00	
28.00	11.20	12.33	12.33	87.67	
20.00	3.31	3.65	15.98	84.02	
14.00		0.00	15.98	84.02	
10.00	9.10	10.02	26.00	74.00	
5.00	7.90	8.70	34.70	65.30	
2.00	2.83	3.12	37.82	62.18	
1.18	7.33	8.07	45.89	54.11	
0.60	10.61	11.69	57.58	42.42	
0.425	8.61	9.48	67.06	32.94	
0.300	5.61	6.18	73.24	26.76	
0.150	11.30	12.44	85.68	14.32	
0.075	5.01	5.52	91.20	8.80	

PARTICLE SIZE DISTRIBUTION CURVE



GROUND ENGINEERING CONSULTANTS (PVT) LTD.

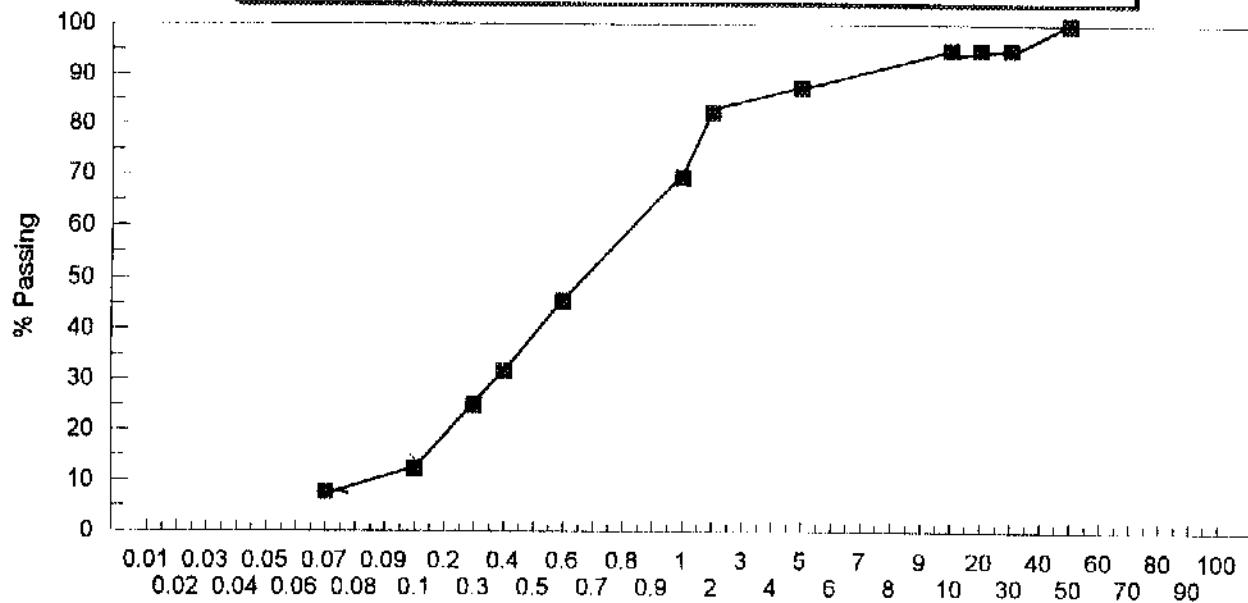
GRAIN SIZE DISTRIBUTION - SIEVE ANALYSIS

PROJECT Reconstruction of Thaaajuddeen School **Date** 29 Dec 2001
LOCATION Rep. of Maldives
BORE HOLE NO. 01
DEPTH (m) 3.00 - 3.45
SERIAL NO. 02
Test Method BS 1377 75 No 2.7

Weight of the soil + pan = 114.20 g
 Weight of the pan = 6.10 g
 Weight of the soil = 108.10 g

Sieve Size/ Partical Size mm	Weight g	Retained %	Cum. Retained %	% Passing %	Remarks
50.00		0.00	0.00	100.00	
28.00	5.41	5.00	5.00	95.00	
20.00		0.00	5.00	95.00	
14.00		0.00	5.00	95.00	
10.00		0.00	5.00	95.00	
5.00	8.21	7.59	12.60	87.40	
2.00	5.42	5.01	17.61	82.39	
1.18	14.01	12.96	30.57	69.43	
0.60	25.92	23.98	54.55	45.45	
0.425	14.90	13.78	68.33	31.67	
0.300	7.20	6.66	75.00	25.00	
0.150	13.91	12.87	87.86	12.14	
0.075	4.80	4.44	92.30	7.70	

PARTICLE SIZE DISTRIBUTION CURVE



GROUND ENGINEERING CONSULTANTS (PVT) LTD.

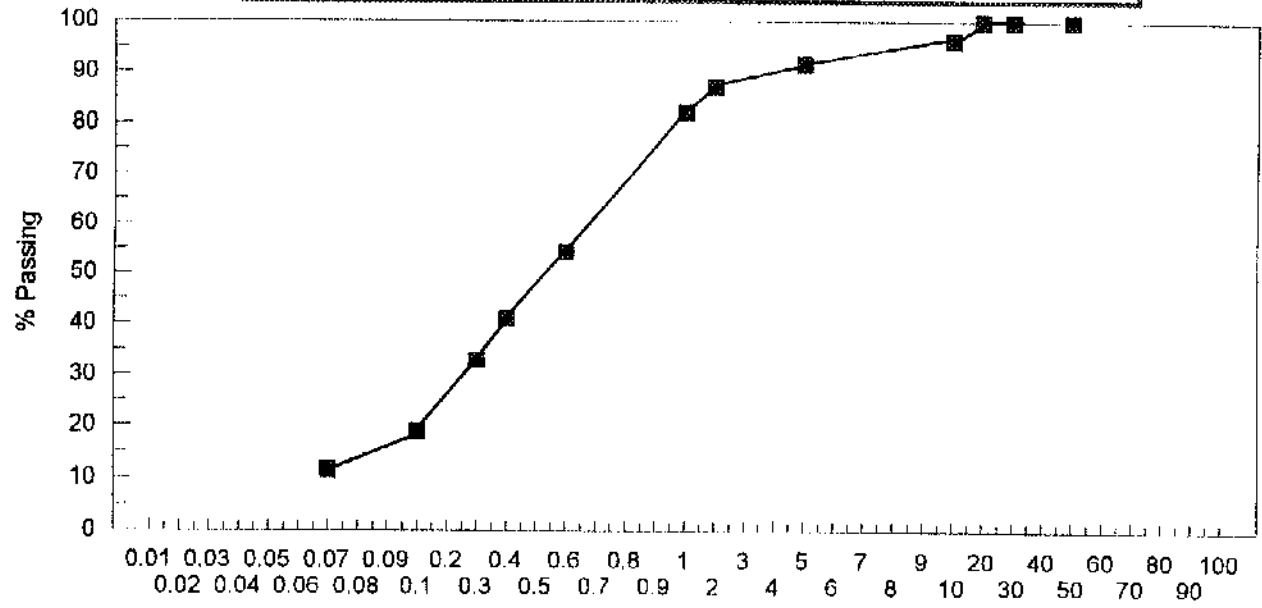
GRAIN SIZE DISTRIBUTION - SIEVE ANALYSIS

PROJECT Reconstruction of Thaajuddeen School **Date** 29 Dec 2001
LOCATION Rep. of Maldives
BORE HOLE NO. 01
DEPTH (m) 4.00 - 4.45
SERIAL NO. 03
Test Method BS 1377 75 No 2.7

Weight of the soil + pan = 100.01 g
 Weight of the pan = 6.10 g
 Weight of the soil = 93.91 g

Sieve Size/ Partical Size mm	Weight g	Retained %	Cum. Retained %	% Passing %	Remarks
50.00		0.00	0.00	100.00	
28.00		0.00	0.00	100.00	
20.00		0.00	0.00	100.00	
14.00	3.40	3.62	3.62	96.38	
10.00		0.00	3.62	96.38	
5.00	4.40	4.69	8.31	91.69	
2.00	4.31	4.59	12.90	87.10	
1.18	4.69	4.99	17.89	82.11	
0.60	26.10	27.79	45.68	54.32	
0.425	12.62	13.44	59.12	40.88	
0.300	7.61	8.10	67.22	32.78	
0.150	13.20	14.06	81.28	18.72	
0.075	6.83	7.27	88.55	11.45	

PARTICLE SIZE DISTRIBUTION CURVE



GROUND ENGINEERING CONSULTANTS (PVT) LTD.

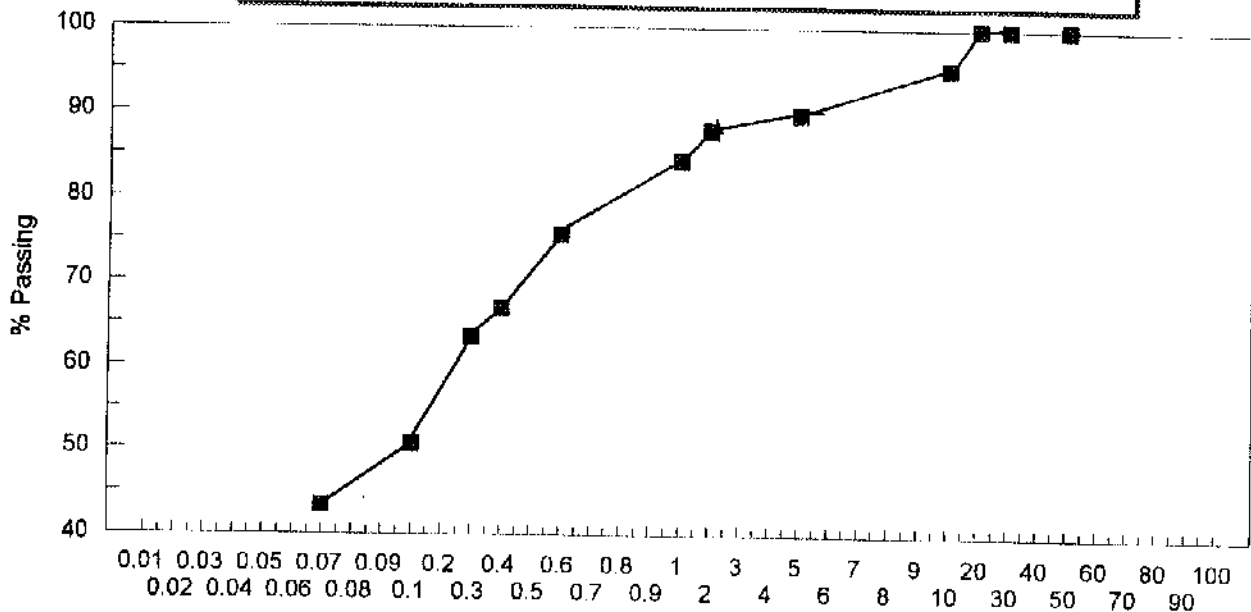
GRAIN SIZE DISTRIBUTION - SIEVE ANALYSIS

PROJECT Reconstruction of Thaajuddeen School **Date** 03 Jan 2002
LOCATION Rep. of Maldives
BORE HOLE NO. 01
DEPTH (m) 11.00 - 11.45
SERIAL NO. 04
Test Method BS 1377 75 No 2.7

Weight of the soil + pan = 65.71 g
 Weight of the pan = 6.20 g
 Weight of the soil = 59.51 g

Sieve Size/ Partical Size mm	Weight g	Retained %	Cum. Retained %	% Passing %	Remarks
50.00		0.00	0.00	100.00	
28.00		0.00	0.00	100.00	
20.00		0.00	0.00	100.00	
14.00		0.00	0.00	100.00	
10.00	2.81	4.72	4.72	95.28	
5.00	3.30	5.55	10.27	89.73	
2.00	1.11	1.87	12.13	87.87	
1.18	2.12	3.56	15.69	84.31	
0.60	5.20	8.74	24.43	75.57	
0.425	5.22	8.77	33.20	66.80	
0.300	2.01	3.38	36.58	63.42	
0.150	7.65	12.85	49.44	50.56	
0.075	4.33	7.28	56.71	43.29	

PARTICLE SIZE DISTRIBUTION CURVE



GROUND ENGINEERING CONSULTANTS (PVT) LTD.

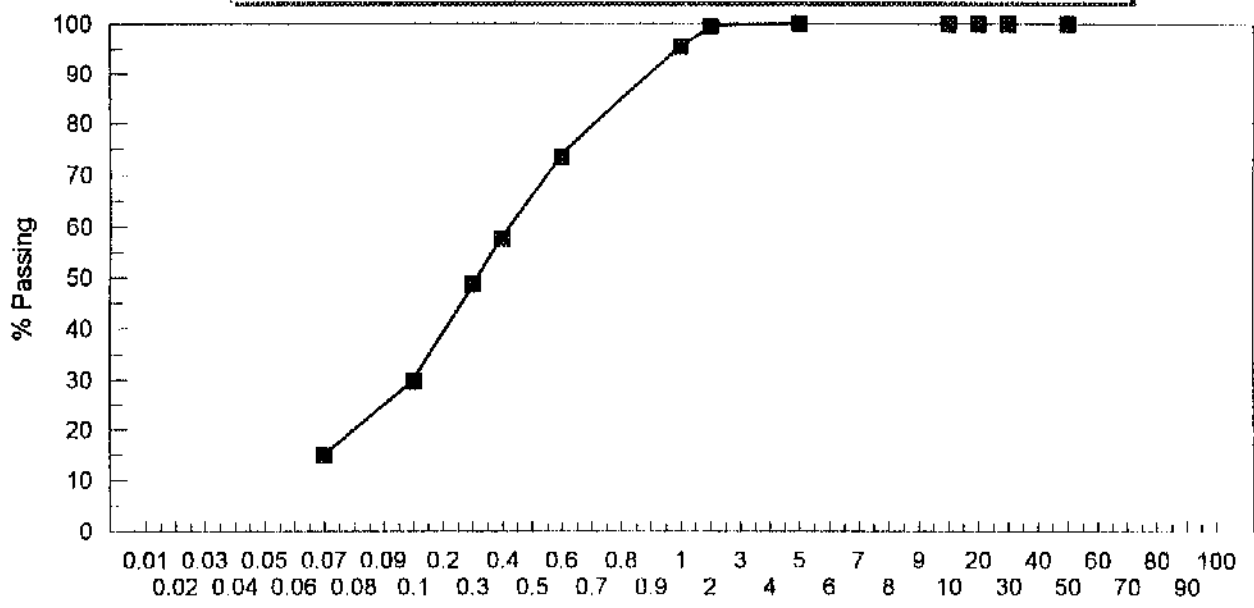
GRAIN SIZE DISTRIBUTION - SIEVE ANALYSIS

PROJECT Reconstruction of Thaajuddeen School **Date** 31 Dec 2001
LOCATION Rep. of Maldives
BORE HOLE NO. 01
DEPTH (m) 7.00 - 7.45
SERIAL NO. 05
Test Method BS 1377 75 No 2.7

Weight of the soil + pan = 158.40 g
 Weight of the pan = 8.88 g
 Weight of the soil = 149.52 g

Sieve Size/ Partical Size mm	Weight g	Retained %	Cum. Retained %	% Passing %	Remarks
50.00		0.00	0.00	100.00	
28.00		0.00	0.00	100.00	
20.00		0.00	0.00	100.00	
14.00		0.00	0.00	100.00	
10.00		0.00	0.00	100.00	
5.00		0.00	0.00	100.00	
2.00	0.82	0.55	0.55	99.45	
1.18	5.92	3.96	4.51	95.49	
0.60	33.02	22.08	26.59	73.41	
0.425	23.72	15.86	42.46	57.54	
0.300	13.22	8.84	51.30	48.70	
0.150	28.32	18.94	70.24	29.76	
0.075	22.22	14.86	85.10	14.90	

PARTICLE SIZE DISTRIBUTION CURVE



GROUND ENGINEERING CONSULTANTS (PVT) LTD.

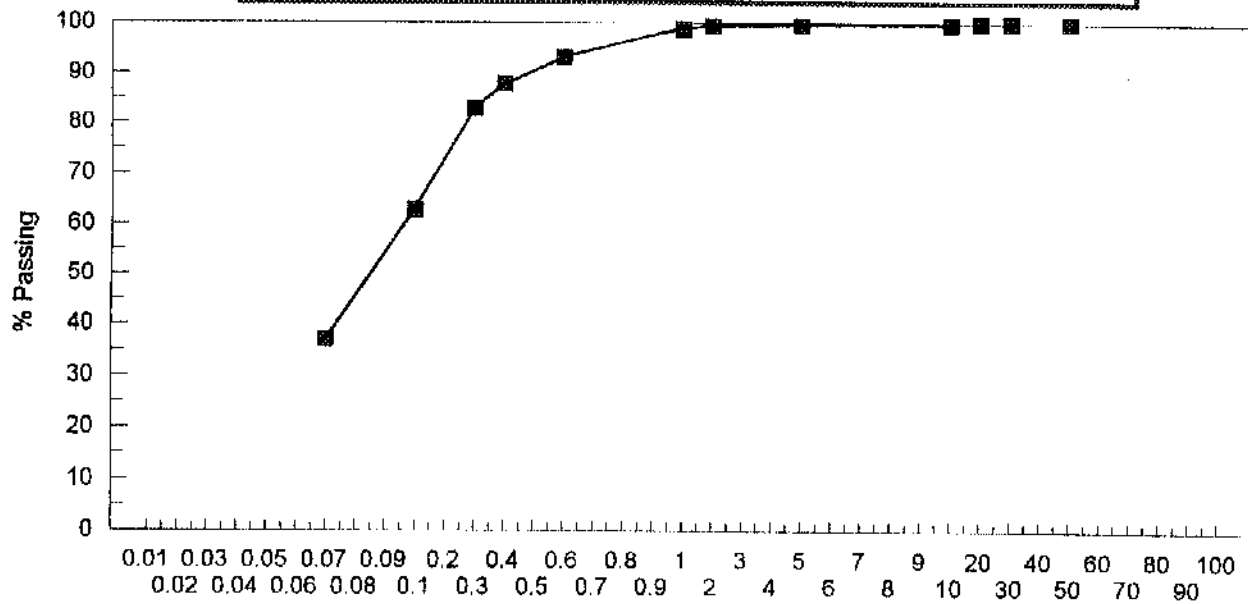
GRAIN SIZE DISTRIBUTION - SIEVE ANALYSIS

PROJECT Reconstruction of Thaajuddeen School **Date** 31 Dec 2001
LOCATION Rep. of Maldives
BORE HOLE NO. 01
DEPTH (m) 9.00 - 9.45
SERIAL NO. 06
Test Method BS 1377 75 No 2.7

Weight of the soil + pan = 184.31 g
 Weight of the pan = 6.20 g
 Weight of the soil = 178.11 g

Sieve Size/ Partical Size mm	Weight g	Retained %	Cum. Retained %	% Passing %	Remarks
50.00		0.00	0.00	100.00	
28.00		0.00	0.00	100.00	
20.00		0.00	0.00	100.00	
14.00		0.00	0.00	100.00	
10.00	0.61	0.34	0.34	99.66	
5.00	0.30	0.17	0.51	99.49	
2.00	0.21	0.12	0.63	99.37	
1.18	1.01	0.57	1.20	98.80	
0.60	9.90	5.56	6.75	93.25	
0.425	9.52	5.35	12.10	87.90	
0.300	9.11	5.11	17.21	82.79	
0.150	35.71	20.05	37.26	62.74	
0.075	45.91	25.78	63.04	36.96	

PARTICLE SIZE DISTRIBUTION CURVE



GROUND ENGINEERING CONSULTANTS (PVT) LTD.

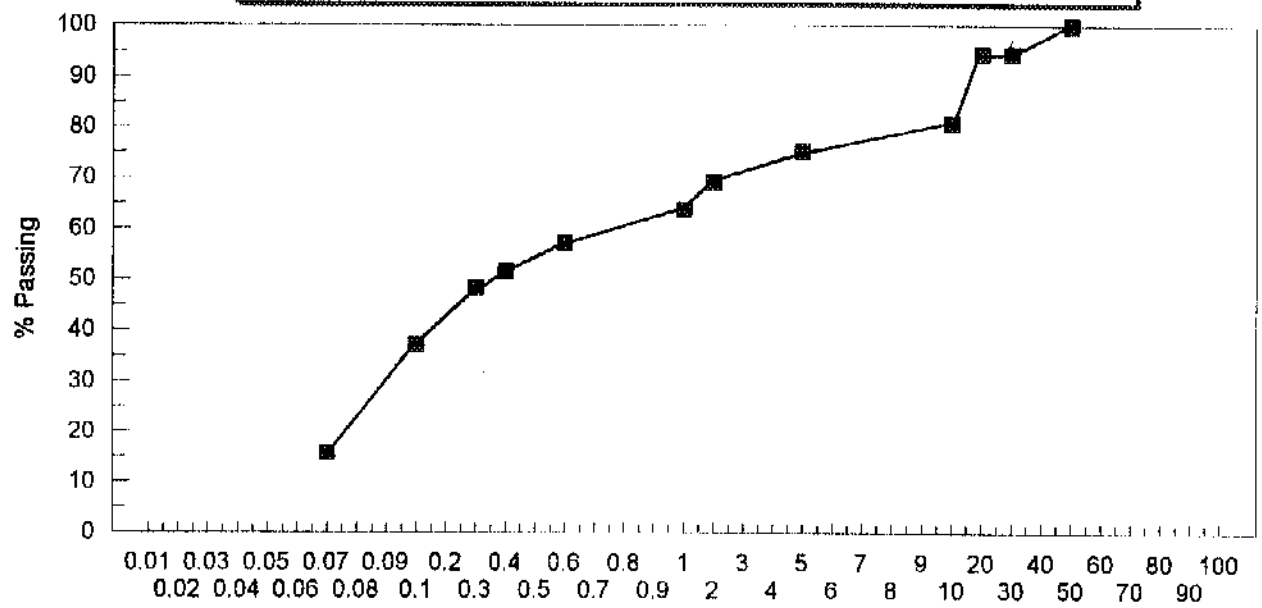
GRAIN SIZE DISTRIBUTION - SIEVE ANALYSIS

PROJECT Reconstruction of Thaajuddeen School **Date** 31 Dec 2001
LOCATION Rep. of Maldives
BORE HOLE NO. 01
DEPTH (m) 10.00 - 10.45
SERIAL NO. 07
Test Method BS 1377 75 No 2.7

Weight of the soil + pan = 210.70 g
 Weight of the pan = 10.90 g
 Weight of the soil = 199.80 g

Sieve Size/ Partical Size mm	Weight g	Retained %	Cum. Retained %	% Passing %	Remarks
50.00		0.00	0.00	100.00	
28.00	11.01	5.51	5.51	94.49	
20.00		0.00	5.51	94.49	
14.00		0.00	5.51	94.49	
10.00	27.10	13.56	19.07	80.93	
5.00	11.20	5.61	24.68	75.32	
2.00	12.11	6.06	30.74	69.26	
1.18	11.11	5.56	36.30	63.70	
0.60	13.10	6.56	42.86	57.14	
0.425	10.82	5.42	48.27	51.73	
0.300	6.90	3.45	51.73	48.27	
0.150	22.20	11.11	62.84	37.16	
0.075	43.00	21.52	84.36	15.64	

PARTICLE SIZE DISTRIBUTION CURVE



GROUND ENGINEERING CONSULTANTS (PVT) LTD.

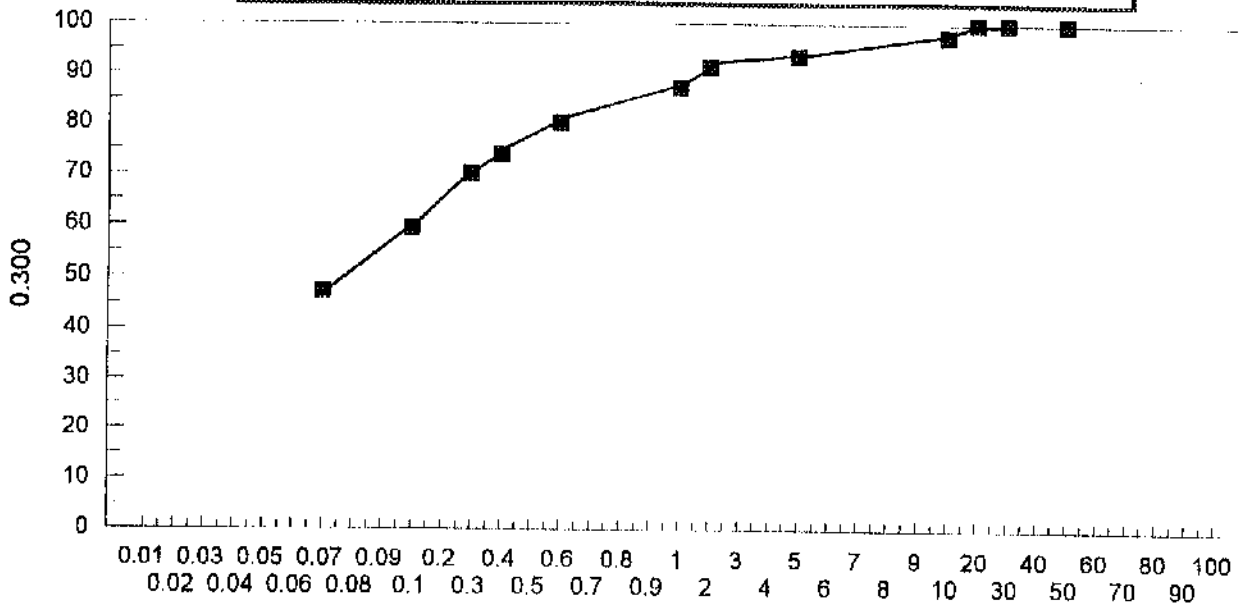
GRAIN SIZE DISTRIBUTION - SIEVE ANALYSIS

PROJECT Reconstruction of Thaajuddeen School **Date** 31 Dec 2001
LOCATION Rep. of Maldives
BORE HOLE NO. 02
DEPTH (m) 10.00 - 10.45
SERIAL NO. 14
Test Method BS 1377 75 No 2.7

Weight of the soil + pan = 211.90 g
 Weight of the pan = 6.10 g
 Weight of the soil = 205.80 g

Sieve Size/ Partical Size mm	Weight g	Retained %	Cum. Retained %	% Passing %	Remarks
50.00		0.00	0.00	100.00	
28.00		0.00	0.00	100.00	
20.00		0.00	0.00	100.00	
14.00		0.00	0.00	100.00	
10.00	5.11	2.48	2.48	97.52	
5.00	7.80	3.79	6.27	93.73	
2.00	4.71	2.29	8.56	91.44	
1.18	8.51	4.14	12.70	87.30	
0.60	14.42	7.01	19.70	80.30	
0.425	13.11	6.37	26.07	73.93	
0.300	7.82	3.80	29.87	70.13	
0.150	22.20	10.79	40.66	59.34	
0.075	24.51	11.91	52.57	47.43	

PARTICLE SIZE DISTRIBUTION CURVE



GROUND ENGINEERING CONSULTANTS (PVT) LTD.

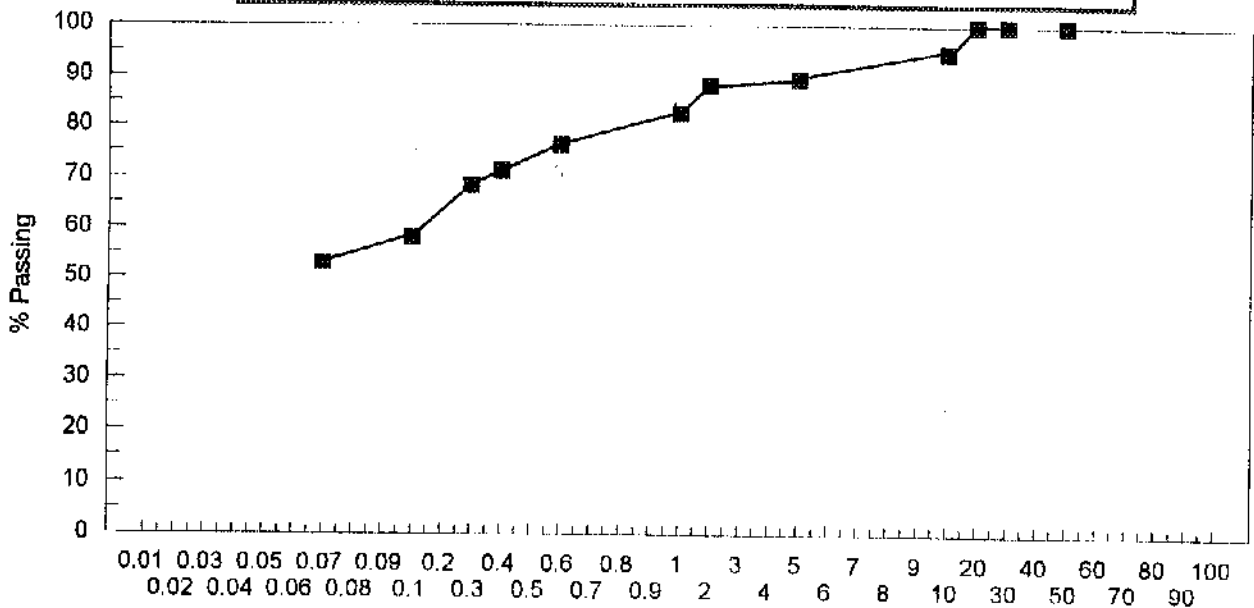
GRAIN SIZE DISTRIBUTION - SIEVE ANALYSIS

PROJECT Reconstruction of Thaaajuddeen School **Date** 31 Dec 2001
LOCATION Rep. of Maldives
BORE HOLE NO. 04
DEPTH (m) 9.00 - 9.45
SERIAL NO. 15
Test Method BS 1377 75 No 2.7

Weight of the soil + pan = 109.51 g
 Weight of the pan = 6.00 g
 Weight of the soil = 103.51 g

Sieve Size/ Partical Size mm	Weight g	Retained %	Cum. Retained %	% Passing %	Remarks
50.00		0.00	0.00	100.00	
28.00		0.00	0.00	100.00	
20.00		0.00	0.00	100.00	
14.00		0.00	0.00	100.00	
10.00	5.32	5.14	5.14	94.86	
5.00	5.52	5.33	10.47	89.53	
2.00	1.41	1.36	11.83	88.17	
1.18	5.71	5.52	17.35	82.65	
0.60	6.52	6.30	23.65	76.35	
0.425	5.31	5.13	28.78	71.22	
0.300	3.01	2.91	31.69	68.31	
0.150	10.63	10.27	41.96	58.04	
0.075	5.30	5.12	47.08	52.92	

PARTICLE SIZE DISTRIBUTION CURVE



GROUND ENGINEERING CONSULTANTS (PVT) LTD.

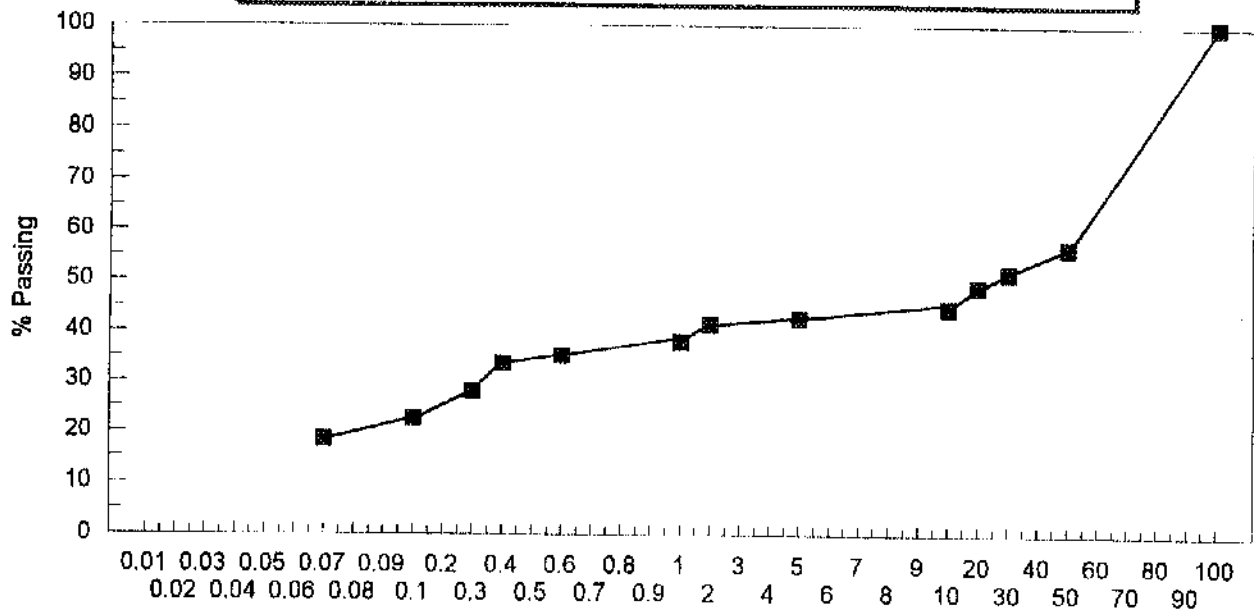
GRAIN SIZE DISTRIBUTION - SIEVE ANALYSIS

PROJECT Reconstruction of Thaaajuddeen School **Date** 31 Dec 2001
LOCATION Rep. of Maldives
BORE HOLE NO. 04
DEPTH (m) 10.00 - 10.45
SERIAL NO. 16
Test Method BS 1377 75 No 2.7

Weight of the soil +pan = 144.40 g
 Weight of the pan = 6.00 g
 Weight of the soil = 138.40 g

Sieve Size/ Partical Size mm	Weight g	Retained %	Cum. Retained %	% Passing %	Remarks
50.00	60.22	43.51	43.51	56.49	
28.00	6.71	4.85	48.36	51.64	
20.00	3.70	2.67	51.03	48.97	
14.00		0.00	51.03	48.97	
10.00	5.82	4.21	55.24	44.76	
5.00	2.81	2.03	57.27	42.73	
2.00	1.71	1.24	58.50	41.50	
1.18	4.83	3.49	61.99	38.01	
0.60	4.06	2.93	64.93	35.07	
0.425	2.11	1.52	66.45	33.55	
0.300	7.64	5.52	71.97	28.03	
0.150	7.62	5.51	77.48	22.52	
0.075	5.83	4.21	81.69	18.31	

PARTICLE SIZE DISTRIBUTION CURVE



GROUND ENGINEERING CONSULTANTS (PVT) LTD.

NATURAL MOISTURE CONTENT DETERMINATION

PROJECT : Reconstruction of Thaajuddeen School

DATE : 02/01/2002

CLIENT : Mohri Architect & Associates Inc.

LOCATION : Rep. of Maldives

CONTRACTOR

TEST METHOD : BS 1377 : 1975 2.2.1

Bore hole number		0 1		0 1		0 1	
Depth	m	1.00 - 1.45		3.00 - 3.45		4.00 - 4.45	
Sample number		0 1		0 2		0 3	
Weight of the can	g	10.54	10.60	10.40	10.60	10.70	10.50
Weight of the can + wet Soil	g	91.01	72.40	92.41	90.30	108.81	77.62
Weight of the can + dry soil	g	73.41	58.92	74.80	73.22	89.42	64.41
Moisture content	%	27.99	27.90	27.34	27.28	24.63	24.50
Average moisture content	%	27.95		27.31		24.57	

Bore hole number		0 1		0 1		0 1	
Depth	m	7.00 - 7.45		9.00 - 9.45		10.00 - 10.45	
Sample number		0 5		0 6		0 7	
Weight of the can	g	10.53	8.88	6.20	6.10	10.90	6.10
Weight of the can + wet Soil	g	85.80	71.57	124.92	109.70	152.22	99.33
Weight of the can + dry soil	g	70.81	59.26	105.61	93.30	128.38	83.72
Moisture content	%	24.87	24.43	19.42	18.81	20.29	20.11
Average moisture content	%	24.65		19.12		20.20	

Bore hole number		0 1		0 2		0 2	
Depth	m	11.00 - 11.45		1.00 - 1.45		5.00 - 5.45	
Sample number		0 4		0 9		1 0	
Weight of the can	g	10.54	10.50	8.40	10.50	8.72	8.20
Weight of the can + wet Soil	g	80.97	60.31	197.41	217.93	211.62	157.45
Weight of the can + dry soil	g	63.45	47.81	168.30	185.72	177.00	129.61
Moisture content	%	33.11	33.50	18.21	18.38	20.57	22.93
Average moisture content	%	33.31		18.29		21.75	

Tested by : B.S.Yapa

Checked by : S.K.Jayawardana

GROUND ENGINEERING CONSULTANTS (PVT) LTD.

NATURAL MOISTURE CONTENT DETERMINATION

PROJECT : Reconstruction of Thaaajuddeen School

DATE : 02/01/2002

CLIENT : Mohri Architect & Associates Inc.

LOCATION : Rep. of Maldives

CONTRACTOR

TEST METHOD : BS 1377 : 1975 2.2.1

Bore hole number		0 2	0 2	0 2
Depth	m	7.00 - 7.45	9.00 - 9.45	10.00 - 10.45
Sample number		1 1	1 2	1 4
Weight of the can	g	7.80 7.70	8.20 8.80	6.00 8.90
Weight of the can + wet Soil	g	153.31 158.20	150.72 107.73	152.71 89.15
Weight of the can + dry soil	g	122.31 125.40	130.85 94.30	130.24 76.58
Moisture content	%	27.07 27.87	16.20 15.71	18.09 18.57
Average moisture content	%	27.47	15.95	18.33

Bore hole number		0 3	0 4	0 4
Depth	m	3.00 - 3.45	5.00 - 5.45	9.00 - 9.45
Sample number		1 8	1 7	1 5
Weight of the can	g	10.60 10.54	10.50 10.40	10.40 10.60
Weight of the can + wet Soil	g	55.20 65.31	73.21 107.98	84.63 76.82
Weight of the can + dry soil	g	46.31 54.31	59.91 87.88	70.82 64.01
Moisture content	%	24.89 25.13	26.92 25.94	22.86 23.98
Average moisture content	%	25.01	26.43	23.42

Bore hole number		0 4		
Depth	m	10.00 - 10.45		
Sample number		1 6		
Weight of the can	g	6.00 6.00		
Weight of the can + wet Soil	g	91.30 109.33		
Weight of the can + dry soil	g	76.30 91.01		
Moisture content	%	21.34 21.55		
Average moisture content	%	21.44		

Tested by : B.S.Yapa

Checked by : S.K.Jayawardana



ANALYSIS OF A SPECIMEN OF SOIL

Report No. SS 38424

Client : Ground Engineering Consultants (Pvt.) Ltd.,
No. 24, Station Road,
Wattala.

Specimen : Received a specimen of soil from the client along with the client's
letter dated 31st of December, 2001. The specimen was labeled
as follows :

" B11 No. -03
(3.0 - 3-45)
Male
Sample No. -17

Service Required : 1. Sulphate Content
2. Chloride Content

Method of Testing : 1. Total sulphate content was determined according to the
methods given in BS 1377 : 1975, British Standard,
Methods of Test for Soils for Civil Engineering
purposes.
2. Total Chloride Content was determined according to the
method given in ASTM Standard - Volume 04.08, Soil
and Rock ; Building Stones.

<u>Results</u>	<u>Constituent</u>	<u>Specimen</u> (% by wt.)
	SO ₃	0.51
	Cl	N. D

S. T. C. O.

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Sath Jayatilaka
MANAGER / METALS & MINERALS GROUP,
MATERIALS TECHNOLOGY DIVISION.

Manjula
.....
Miss. Manjula Warshahennadi
TECHNICAL ASSISTANT

15th January, 2002



ANALYSIS OF A SPECIMEN OF WATER

Report No. SS 38464

Client : Ground Engineering Consultants (Pvt.) Ltd.,
No. 24, Station Road,
Wattala.

Specimen : Received a specimen of water from the client along with the
client's letter dated 31st of December, 2001. The specimen
was labeled as follows :

“ Sample No : 18
Bore Hole No. 04
Male “

Service Required : 1. Sulphate Content
2. Chloride Content

Method of Testing : Determination of Chloride Ion Content and sulphate content
were carried out according to the methods given in ASTM
Standard, Volume 11.01, Water (1).

<u>Results</u>	<u>Constituent</u>	<u>Specimen (mg/l)</u>
	SO ₃	290.35
	Cl	2343

SJ
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Sath Jayatileka
MANAGER / METALS & MINERALS GROUP,
MATERIALS TECHNOLOGY DIVISION.

Manjula
.....
Miss. Manjula Warshahemadi
TECHNICAL ASSISTANT

15th January, 2002.

ANNEXURE E

Drillers' Field Records

GROUND ENGINEERING CONSULTANTS (PVT) LTD.

Geotechnical Engineering consultants

DRILLERS DAILY RECORD

PROJECT : Reconstruction of Thaajuddeen School **DATE** : 19.12.2001
LOCATION : Play ground of Thaajuddeen School **DRILLER** : H.M. Weera
BH NO. : BH 01
TIME COMMENCED : 0630 Hrs **GWL** :

Depth (m)	Wash out	Description	Remarks	SPT				
				15 cm	10 cm	10 cm	10 cm	N
0.00 0.25		Top soil with vegetable matters. Dirty brownish gray silty sand.	Hand dugged					
1.00	Light brown, 100% recovery	Ligh to dark gray coloured silty sand with materials used for reclamation. Filling material contains domestic waste, building debris, and pieces of wood	Dry blocking was used for sampling Penetration rate is high	4	2	3	3	7
2.00	Grayish milky white, 100% recovery	The filled layer finished at 2.10m Dark gray silty sand.	Dry blocking was used for sampling Penetration rate is comparatively low	4	3	3	4	10
3.00	Brownish milky white 100% recovery	Light brown silty sand wit some fines	Dry blocking was used for sampling Penetration rate is comparatively low	7	8	4	4	16
4.00	Brownish milky white 100% recovery	Light brown silty sand wit some fines Layer changed at 4.00m	Dry blocking was used for sampling Penetration rate is comparatively high	5	4	4	3	11
5.00	Brownish milky white 100% recovery	Light brown silty sand with some fines	Dry blocking was used for sampling Penetration rate is same as earlier	3	3	4	4	11
6.00	- do -	- do -	- do -	4	4	3	3	10
7.00	- do -	- do - The fines content increases with the depth	Dry blocking was used for sampling Penetration rate is lower than earlier	7	7	6	6	19
8.00	- do -	The layer changed at 7.90m Light brown sandy silt	Dry blocking was used for sampling Penetration rate is lower than earlier	10	7	8	9	24

TIME STOPPED: 1900Hrs

WEATHRE : Cloudy and drizzling from time to time

GROUND ENGINEERING CONSULTANTS (PVT) LTD.

Geotechnical Engineering consultants

DRILLERS DAILY RECORD

PROJECT : Reconstruction of Thaajuddeen School **DATE** : 19.12.2001
LOCATION : Play ground of Thaajuddeen School **DRILLER** : H.M. Weera
BH NO. : BH 01
TIME COMMENCED : **GWL** : 0.76m below EGL

Depth (m)	Wash out	Description	Remarks	SPT				
				15 cm	10 cm	10 cm	10 cm	N
8.00	Brownish milky white 100% recovery	Light brown silty sand	Dry blocking was used for sampling Penetration rate is same as earlier					
9.00				11	8	9	9	26
10.00	- do -	- do -	Dry blocking was used for sampling Penetration rate is same as earlier	6	9	9	9	27
11.00	Grayish milky white 100% recover	Layer changed at 11.25m Blackish clayey sand	Dry blocking was used for sampling Penetration rate is same as earlier	6	8	10	10	28
11.65	Blackish brown 100% recovery	Blackish clayey sand Hard layer is encountered at 11.66m	Dry blocking was used for sampling Penetration rate is same as earlier	35	15 / 04 cm			> 50
12.00	Grayish milky white 100% recovery	Coral rock pieces	Diamond coring has been used for drilling No core has come out But wash out came with rock pieces	50 / 06 cm				> 50
13.00	- do -	- do -	- do -	50 / 08 cm				> 50
14.00	- do -	- do -	- do -	32	18 / 03 cm			> 50
14.65	- do -	- do -	- do - Bore hole terminated	28	22 / 06 cm			> 50

TIME STOPPED : 1930Hrs
WEATHRE : Cloudy and drizzling from time to time

GROUND ENGINEERING CONSULTANTS (PVT) LTD.

Geotechnical Engineering consultants

DRILLERS DAILY RECORD

PROJECT : Reconstruction of Thaajuddeen School **DATE** : 20.12.2001
LOCATION : Play ground of Thaajuddeen School **DRILLER** : H.M. Weera
BH NO. : BH 02
TIME COMMENCED : 0630 Hrs **GWL** :

Depth (m)	Wash out	Description	Remarks	SPT				
				15 cm	10 cm	10 cm	10 cm	N
0.00	NA	Brownish gray silty sand with vegetable matters	Hand dugged					
0.30		Top soil						
1.00	Grayish white 100% recovery	Gray gravelly sand with some cobbles	Dry blocking was used for sampling Penetration rate is considerably low	15	12	10	7	29
2.00	Brownish white 100% recovery	- do - Layer has changed at 2.10m Sand with pieces of some coral and sea shells	Dry blocking was used for sampling Penetration rate is comparatively high	4	3	3	4	10
3.00	- do -	Brownish white sand with pieces of some coral and sea shells	- do -	3	4	2	5	11
4.00	- do -	Brownish white sand with pieces of some coral and sea shells	- do -	5	4	4	3	11
5.00	- do -	Brownish white sand with pieces of some coral and sea shells	- do -	4	4	3	5	12
6.00	- do -	Brownish white sand with pieces of some coral and sea shells	- do -	4	4	3	4	11
7.00	- do -	Brownish white sand with pieces of some coral and sea shells	- do -	6	6	5	4	15
8.00	Whitish brown 100% recovery	Whitish brown sand with pieces of some coral and sea shells	- do -	6	3	3	3	09

TIME STOPPED: 1900Hrs

WEATHER : Sunny and Highly humid

GROUND ENGINEERING CONSULTANTS (PVT) LTD.

Geotechnical Engineering consultants

DRILLERS DAILY RECORD

PROJECT : Reconstruction of Thaajuddeen School **DATE** : 21.12.2001

LOCATION : Play ground of Thaajuddeen School **DRILLER** : H.M. Weera

BH NO. : BH 02

TIME COMMENCED : 0630 Hrs **GWL** : 0.84m below EGL

Depth (m)	Wash out	Description	Remarks	SPT				
				15 cm	10 cm	10 cm	10 cm	N
8.00	Milky white Color of washout changed to gray at 8.50m to 8.75m	Grayish milky white silty sand with pieces of coral.	Dry blocking was used for sampling Penetration rate is comparatively low					
9.00	100% recovery			6	3	3	5	11
10.00	Milky white 100% recovery	Grayish milky white sandy silt Very fine sand with considerable amount of silt	Dry blocking was used for sampling Penetration rate is comparatively low	6	5	4	5	14
10.45			Bore hole terminated					

TIME STOPPED: 1000Hrs

WEATHER : Sunny and Highly humid

GROUND ENGINEERING CONSULTANTS (PVT) LTD.

Geotechnical Engineering consultants

DRILLERS DAILY RECORD

PROJECT : Reconstruction of Thaajuddeen School **DATE** : 21.12.2001
LOCATION : Play ground of Thaajuddeen School **DRILLER** : H.M. Weera
BH NO. : BH 03
TIME COMMENCED : 1300 Hrs **GWL** :

Depth (m)	Wash out	Description	Remarks	SPT				
				15 cm	10 cm	10 cm	10 cm	N
0.00 0.10	NA	Brownish gray silty sand with vegetable matters Top soil	Hand dugged					
1.00	Grayish milky white 100% recovery	Grayish white coarse sand with some gravel and pebbles	Dry blocking was used for sampling Penetration rate is low	15	7	5	5	17
2.00	Grayish milky white 100% recovery	Grayish white coarse sand with some gravel and pebbles Layer changed at 2.30m	Dry blocking was used for sampling Penetration rate is extremely high	5	2	01 / 20 cm	-	03
3.00	Brownish milky white 100% recovery	Grayish white coarse sand with some gravel and pebbles	Dry blocking was used for sampling Penetration rate is same as earlier	2	1	2	2	05
4.00	Brownish milky white 100% recovery	Grayish white coarse sand with some gravel and pebbles	Dry blocking was used for sampling Penetration rate is comparatively low	20	12	7	3	22
5.00	Brownish milky white 100% recovery	Grayish white coarse sand with some gravel, and pebbles Layer changed at 5.00m	Dry blocking was used for sampling Penetration rate is same as earlier	7	8	6	4	18
6.00	Brownish milky white 100% recovery	Brownish white sand with pieces of coral rock	Dry blocking was used for sampling Penetration rate is comparatively high	12	3	2	3	08
7.00	Grayish milky white 100% recovery	- do -	Dry blocking was used for sampling Penetration rate is comparatively low	17	9	2	2	13

TIME STOPPED: 1500Hrs
WEATHER : Sunny and Highly humid

GROUND ENGINEERING CONSULTANTS (PVT) LTD.

Geotechnical Engineering consultants

DRILLERS DAILY RECORD

PROJECT : Reconstruction of Thaajuddeen School **DATE** : 21.12.2001
LOCATION : Play ground of Thaajuddeen School **DRILLER** : H.M. Weera
BH NO. : BH 03
TIME COMMENCED : 1500 Hrs **GWL** : 0.63m below EGL

Depth (m)	Wash out	Description	Remarks	SPT				
				15 cm	10 cm	10 cm	10 cm	N
7.00	Grayish milky white 100% recovery	Brownish white sand with pieces of coral rock	Dry blocking was used for sampling Penetration rate is same as earlier					
8.00		Layer changed at 8.15m Grayish white fine sand		5	3	3	5	11
9.00	Grayish milky white 100% recovery	Grayish white fine sand with pieces of sea shells	Dry blocking was used for sampling Penetration rate is same as earlier	10	4	3	4	11
10.00	- do -	- do -	- do -	11	5	6	5	16
11.00	- do -	- do -	- do -	13	23	27		> 50
11.25			Bore hole terminated					

TIME STOPPED: 1900Hrs
WEATHER : Sunny and Highly humid

GROUND ENGINEERING CONSULTANTS (PVT) LTD.

Geotechnical Engineering consultants

DRILLERS DAILY RECORD

PROJECT : Reconstruction of Thaajuddeen School **DATE** : 22.12.2001
LOCATION : Play ground of Thaajuddeen School **DRILLER** : H.M. Weera
BH NO. : BH 04
TIME COMMENCED : 0600 Hrs **GWL** :

Depth (m)	Wash out	Description	Remarks	SPT				
				15 cm	10 cm	10 cm	10 cm	N
0.00	NA	Dark gray silty sand with vegetable matters	Hand dugged					
0.30		Top soil						
1.00	Dark gray to black 100% recovery	Ligth to dark gray coloured silty sand with materials used for reclamation. Filling material contains domestic waste, building debris, pieces of wood and ashes of burnt material	Dry blocking was used for sampling Penetration rate is high	3	2	2	3	07
2.00	- do -	- do -	- do -	3	2	2	2	06
3.00	- do - Grayish white	- do - Layer changed at 3.25m Brownish gray sand with gravel and pieces of sea shells	- do -	4	2	2	1	05
4.00	Grayish milky white 100% recovery	Brownish gray sand with gravel and pieces of sea shells	Dry blocking was used for sampling Penetration rate is extremely high	7	2	1	1	03
5.00	Grayish milky white 100% recovery	Brownish gray sand with gravel and pieces of sea shells	Dry blocking was used for sampling Penetration rate is same as earlier up to 5.30m and there onward it was comparatively low	8	3	2	6	11
6.00	Brownish milky white 100% recovery	Brownish gray sand with gravel and pieces of sea shells	Dry blocking was used for sampling Penetration rate is comparatively low	15	10	9	9	28
7.00	- do -	- do -	Dry blocking was used for sampling Penetration rate is comparatively high	6	7	8	3	18

WEATHER : Sunny and Highly humid

GROUND ENGINEERING CONSULTANTS (PVT) LTD.

Geotechnical Engineering consultants

DRILLERS DAILY RECORD

PROJECT : Reconstruction of Thaajuddeen School **DATE** : 22.12.2001
LOCATION : Play ground of Thaajuddeen School **DRILLER** : H.M. Weera
BH NO. : BH 04
TIME COMMENCED : 0600 Hrs **GWL** : 0.65m below EEGL

Depth (m)	Wash out	Description	Remarks	SPT					
				15 cm	10 cm	10 cm	10 cm	N	
7.00	Brownish milky white 100% recovery	Brownish gray sand with gravel and pieces of sea shells There could be a cavity from 8.05m to 9.10m.	Dry blocking was used for sampling Penetration rate is extremely high SPT conducted at 8.00m, and it freely dropped to 8.62m. Again SPT was conducted at 8.62m and it freely dropped to 9.10.	1 / 62 cm					< 01
9.10		SPT conducted again		1	1	1 / 20 cm	-		02
10.00	Grayish milky white 100% recovery	Grayish sandy silt with gravel and pieces of sea shells	Dry blocking was used for sampling Penetration rate is comparatively high	9	3	1	2		06
11.00	Grayish milky white 100% recovery	Grayish sandy silt with gravel and pieces of sea shells Layer changed at 11.00 to coral rock	Dry blocking was used for sampling Penetration rate is extremely low	13	30	20 / 09 cm	-		> 50
11.55	Milky white 100% recovery	Highly weathered coral rock	Dry blocking was used for sampling Penetration rate is extremely low	> 50 / 0 cm					> 50
11.55			Bore hole terminated						

STOPPED AT : 1945 Hrs
WEATHER : Sunny and Highly humid