Invitation for Bids (IFB)

High Commission of India

Grant No.CoI/DC/228/07/2018

Grant Name: Design,Construction and Commissioning of 5,000MT Temperature Controlled Warehouse in Dambulla

Bid No.	Title	Contract Period	Required Grade
CoI/DC/228/07/2018	Proposed construction of 5000 MT capacity temperature controlled Storage facility at Dambulla	180 days	EM 1 (Electrical & Mechanical Services)

1. Government of India has approved a Grant for Design, Construction and Commissioning of 5000 MT Temperature Controlled Warehouse Facility in Dambulla under the Grant assistance Project in Sri Lanka.
2. The Government of India invites sealed bids from eligible and qualified bidders from Sri Lanka and India to Design and Construct of buildings including major items for cold storage chambers, including supplying and fixing of pre-fabricated insulation panels, supply and fixing suitable equipment, install and commission suitable temperature and humidity control and monitoring systems, design, supply and install pallet racking system. The Construction period is 180 calendar days.
3. Bidding will be conducted through Competitive Bidding Procedure – (Bidder has to submit Preliminary Information, Design/Technical Proposal and Financial Proposal in duplicate. The proposal will consist of two different sealed envelopes, where the first envelope will contain the Preliminary Information, Design/Technical Proposal and the second envelope will contain the Financial Proposal). Bid price of the technically qualified bidders will be red out at the time of opening of financial bid.
4. To be eligible for contract award, the successful bidder shall not have been blacklisted and shall meet the requirements of ICTAD (CIDA) registration as above. (Only for local bidders). Indian bidders must submit relevant document to prove the eligibility from Indian Authorities.
5. Qualification requirements are indicated in section 1 of the Bidding document. Additional details are provided in the Bidding Data (Section 11) & Contract Data (Section 1V).
6. Interested bidders may obtain further information from Development Cooperation Wing, High Commission of India, 36-38, Galle Road, Colombo-03 and bidding documents can be seen at mission's web site www.hcicolombo.org
7. A complete set of Bidding Documents in English language may be purchased by interested bidders from the Development Cooperation wing, High Commission of India, 36-38, Galle Road, Colombo-03 from 15 October 2018 to 06 November 2018 between 0930 hrs to 1600 hrs. upon payment of a non-refundable fee of Rs10,000.00 per document. The method of payment should be made by cash.

8. Bids should be sent to the address below at registered post or by hand in duplicate to the Counselor (Development Cooperation), High Commission of India, 36-38, Galle Road, Colombo-03 on or before 12 November 2018 at 1500 hrs. Late bids will not be accepted. Bids will be opened soon after closing in the presence of the bidders' representatives who choose to attend.
9. A site visit is arranged on 22 October 2018 at 1000 hrs in Dambulla. Prospective bidders are required to assemble at (near by Economic Center and close to the Economic center car park) Pre Bid meeting will be held at the High Commission of India, 36-38, Galle Road, Colombo-03 at 1500Hrs on 25 October 2018.
10. Each bidder shall provide the name and contact details of an individual to act as a point of contact during the tender process in Sri Lanka. That person may be asked to clarify the bid to provide additional information during the evaluation process.
11. The High Commission of India, Colombo shall issue a Corrigendum or Addendum addressing all issues clarified during the pre-bid meeting.
12. Only communications that are in writing from the High Commission of India, Colombo may be considered as properly authorized expressions on the Mission's behalf.
13. In submitting a bid to the Mission, the bidder will be deemed to have understood this bidding document, obtained all requisite information and verified the correctness of any information to be relied upon.
14. In submitting a bid to the Mission, the bidder will be deemed to be fully informed and to have accepted the terms and conditions outlined in this tender document.
15. The decision of High Commission of India in deciding the eligibility of the company to take part in the tender process is final.
16. The Mission reserves the right to accept or reject any or all Bid(s) or accept whole bid or part of the Bid and to annul the bidding process, at any time, thereby rejecting all bids, prior to any Contract being awarded.
17. The High Commission of India, Colombo reserves the right to clarify without restriction with bidders on any matter contained in the bids, without disclosing this to any other person.
18. The bidders should note that in the event of Contract having been awarded, the contractor will not assign in whole or in part its rights or obligations without the prior approval of the Mission.
19. The contract will also include provisions for the bidding company to adhere to all local laws applicable. The contract will also include provisions of *Force Majeure*, termination of contract, consequences of termination and re-tendering after termination of contract.
20. Any dispute or difference regarding the interpretation of the provisions of the Agreement/Contract shall be resolved amicably between the parties. If the dispute is not resolved through mutual consultations within a period of six months, either party may refer the dispute to arbitration in accordance with the Arbitration & Conciliation Act 1996 of India as amended from time to time. The number of arbitrators shall be one and that the place of arbitration shall be New Delhi, India. In such a situation the applicable law will be the law of India. The language of the Tribunal shall be English. The cost shall be borne by the parties equally unless otherwise determined by the Arbitral Tribunal.
21. All bids shall be accompanied by a Bid Security as in the Bidding Data.

Counsellor
Development Cooperation
High Commission of India
36-38, Galle Road,
Colombo-03

SECTION - I

Instructions to Bidders **ICTAD /SBD/04**

Instructions to Bidders shall be read in conjunction with the Bidding Data Matters relating to the performance of the Contractor, payments under the Contract, or matters affecting the risks, rights, and obligations of the parties under the contract are not included in this section, but are given in Section 111 - Conditions of Contract (Volume 1A) and the contract Data under Section 1V (Volume 1B).

Instructions to Bidders will not be a part of the Contract and will cease to have effect once the Contract is signed.

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SECTION – II

BIDDING DATA

This section shall be read in conjunction with Section I - Instructions to Bidders and is intended to provide specific information in relation to corresponding Clauses in Section I. Whenever there is an ambiguity, the provisions in Section II - Bidding Data Shall Supersede these provided in the section I – Instructions to Bidder

Bidding Data

Instructions to Bidders Sub-Clause

Item	Sub-Clause	Entry
Employer's name and address	1.1.& 9.1	**Employer's Name and Address** Name : The High Commission of India Address: 36-38, Galle Road, Colombo-03 **Employer's Representative** Name : Secretary, Ministry of National Policies and Economic Affairs Address: 1st Floor, "Miloda", Bristol Street, Colombo 01.
Scope of Works	1,1	The Works consists of Design and Construct of buildings including major items for cold storage chambers, including supplying and fixing of pre-fabricated insulation panels, supply and fixing suitable equipment, install and commission suitable temperature and humidity control and monitoring systems, design, supply and install pallet racking system. Located at Dambulla
Time for Completion	1.2	The Time for Completion for the whole of Works shall be 180 Days
Delay damages for the Works	1.2	The delay damages for the whole of the Works shall be 0.05% of the initial contract price per Day. The maximum amount of delay damages for the whole of the Works shall be10 percent of the Initial Contract Price.
Defects Notification Period	1.2	Defects Notification Period is: 365 Days from Employer's Taking over

Source of funds	2.1	The source of funds is from the Government of India
ICTAD registration required	3.1	The registration required Specialty Electrical & Mechanical Services Grade EM 1
Eligible bidders	3.4	Bidders shall submit a bid with following information. Failing to furnish such information may result the rejection of the bid by the Employer. (i) the name and address of the company (ii) the year of registration of the business of company; (iii) a certified copy of the audited accounts (for local agent(s)only) for any one of the two financial years immediately preceding the date of submission of Bids audited by an independent external auditor in accordance with Sri Lanka auditing standards together with the auditor's report confirming that the accounts were prepared in accordance with the Sri Lanka accounting standard; and (iv) all details of responsibilities, commissions or gratuities, if any, paid or to be paid to the local agent(s) connected with or relating to the Bid up to contract execution if the bidder is awarded the contract, including any success fees payable. Note: Indian bidders shall submit the bid with a local agent/representative. Local agent/representative required to submit the above 3.4 information.
Qualification Information	3.1, 3.2, 4.1	The following information shall be provided in Section VIII: • ICTAD registration* Registration number _____ Grade _____ Specialty _____ Expiry date _____ Indian companies shall submit it registration from Indian authorities proving equivalency of EM1 grade. • VAT registration number* _____ • Attach construction program • Attach legal status (Sole proprietor, Partnership, Company etc.) • Attach authentication for signatory • Total monetary value of construction work* performed for each of the last five years;

		• Experience in works of electrical and mechanical for each of the last five years;* • Construction equipment;* • Staffing;* • Attach Work plan and methods;
Average annual volume of construction work performed in last five years	4.3(a)	Average annual volume of construction work performed in last five years shall be at least Sri Lanka Rupees three hundred and sixty million (LKR 360) Audited financial statements for last five years should be submitted along with the bidding document. Contractor must have completed One similar work value not less than 80% of the project value or two similar work value not less than 50% of the project value or three similar work value not less than 40% of the project value
Liquid assets and/or credit facilities required	4.3(g)	The minimum amount of liquid assets and/or credit facilities net of other contractual commitments and exclusive of any advance payments which may be made under the contract shall be not less than Sri Lanka Rupees Hundred Twenty million. (LKR 120 million)
Bid price	13.3	VAT component shall not be included in the rates. The amount written in the Form of Bid shall be without VAT. However VAT component shall be shown separately at the end of the price schedule summary.
Contract is subjected to price adjustment for fluctuation of prices	13.4	The Contract is not subject to price adjustment in accordance with Clause 13.7 of the Conditions of Contract.
Currency of bid	14.1	Bidders Have to submit their offer in LKR only.
Bid validity period	15.1	The Bid shall be valid up to 120 days from the date of submission.
Amount of Bid security	16.1	The amount of Bid security shall be Sri Lanka Rupees six million (LKR 6,000,000.00)
Validity of Bid	16.2	The Bid security shall be valid up to 165 days from the

security		submission Bid Security which shall be; • An unconditional on demand guarantee. • In the form included in Section II in the Bidding document. • In favour of High Commission of India, Colombo The agencies acceptable to Employer are: • a commercial bank operating Sri Lanka approved by the Central Bank of Sri Lanka; or • a bank based in another country but the guarantee approved by the Central Bank of Sri Lanka.
Pre-Bid meeting	17.1	Pre Bid meeting will be held Venue: High Commission of India, Colombo Date: 25 October 2018 time:1500hrs
Sealing and marking of Bids	19.2	The following information also shall be included in the inner covers of envelope marked as "Envelope 1-Preliminary Information": (i) Schedule, "Annual turn-over Information"; (ii) Schedule "Adequacy of Working capital"; (iii) Schedule, " Construction experience in last five Years; (iv) Schedule, " Major items of construction equipment proposed"; (v) Schedule, " Team composition and Task assignment"; (vi) Curriculum vitae of key staff; (vii) Schedule, " Time Schedule for key staff"; (viii) Work program (Design related activities); (ix) Work program (Construction related activities);
	19.4	The following information also shall be included in the inner covers of envelope marked as "Envelope 2-Financial Proposal": 1. Bill of Quantity
	19.5 (a)	The Employer's address for the purpose of Bid submission is The High Commission of India, 36-38, Galle Road, Colombo-03

	19.5 (b)	Contract Name :Design, Construction and Commissioning of 5,000 MT capacity Temperature Controlled Warehouse facility at Dambulla Contract No. Col/DC/228/07/2018
Deadline for submission of Bids	20.1	The deadline for submission of Bids shall be 12 November 2018 Address for submission of Bids: High Commissioner of India, 36-38, Galle Road, Colombo-03,
Evaluation and comparison of Bids	27.0	Technical bid will be evaluated in two stages. Financial bids of the technically qualified bidders will be evaluated in stage two
Correction of errors	(28.1) c	The amount stated in the Bid will be adjusted by the Employer in accordance with the above procedure for the correction of errors and, with the concurrence of the bidder, shall be considered as binding upon the bidder. If the bidder does not accept the corrected amount of Bid, his Bid will be rejected, and the Bid Security may be forfeited in accordance with Sub-Clause 16.6(b)
Correction of errors	(28.1) d	deleted".
Amount of Performance Security	32.1	The **s**tandard form of performance security acceptable to the Employer shall be a bank guarantee issued by a commercial bank operating in Sri Lanka, approved by the Central Bank of Sri Lanka and acceptable to the Employer or a bank based in another country but the guarantee approved by the Central Bank of Sri Lanka. The amount of Performance Security is 5% of the Initial Contract Price.
Percentage of retention	34.1	The retention from each payment shall be10%percent. The limit of retention shall be5% percent of the Initial Contract Price.
Minimum amount of Interim Payment Certificates	34.2	Minimum amount of Interim Payment Certificates shall be: LKR 10,000,000/-

Adjudicator proposed by Employer	(35.1)	*Fees and types of reimbursable expenses to be paid to the Adjudicator shall be on a case to case basis and shall be shared equally by the Contractor and the Employer*:

SECTION – III

Conditions of Contract **ICTAD /SBD/04**

Conditions of Contract shall be read in conjunction with Contract Data

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SECTION – IV

CONTRACT DATA

This section shall be read in conjunction with Section III – Conditions of Contract, and is intended to provide specific information in relation to corresponding Clauses in section III – Whenever there is aambiguity, the provisions in Section IV – Contract Data shall supersede these provided in the section III – conditions of contract.

Contract Data

Conditions of Contract Clause Number/s	
1.1.2.2	**Employer is:** Name: The High Commission of India Address: 36-38, Galle Road, Colombo-03 **Employer's representative** Name: Secretary, Ministry of National Policies and Economic Affairs.
1.1.2.4	**Engineer is:** **Name:** Shall be Informed **Address: Shall be Informed** Will be intimated at the time of signing the contract
1.1.5.6	Not applicable
2.1	The right of access to, and possession is amended and shall be 14 Days from Letter of Acceptance.
3.1	**Engineer's Duties and Authority** The Engineer shall obtain the specific approval of the Employer before taking action under the following Sub-Clauses of these Conditions: (a) consenting to the subletting of any part of the Works under Sub-Clause 4.4 (b); (b) approving an extension of the Time for Completion, and/or any additional payment under Sub-Clause 19.1 *(Contractor's Claim)* issuing variation under Sub-Clause 13.1 *(Right to vary Employer's Requirement)*, except in an emergency situation, as reasonably determined by the Engineer.

Notwithstanding the obligation, as set out above, to obtain approval, if, in the opinion of the Engineer, an emergency occurs affecting the safety of life or of the Works or of adjoining property, he may, without relieving the Contractor of any of his duties and responsibilities under the Contract, instruct the Contractor to execute all such work or to do all such things as may, in the opinion of the Engineer, be necessary to abate or reduce the risk. The Contractor shall forthwith comply, despite the absence of approval of the Employer, with any such instruction of the Engineer. The Engineer shall determine an addition to the Contract Price, in respect of such instruction, in accordance with Clause 13.3 and shall notify the Contractor accordingly, with a copy to the Employer.

Key Personal

4.1

Design

1. **Structural Engineer** (Chartered Civil Engineer with more than 08 years of post-charterer experience)
2. **Electrical Engineer** (Chartered Engineer with more than 08 years of post-charterer experience)
3. **Mechanical Engineer** (Chartered Engineer with more than 08 years of post-charterer experience)
4. **Quantity Surveyor** (Chartered Quantity Surveyor with more than 8 years of experience in procurement work)

Contract Administration

1. **Resident Civil Engineer** (Chartered Civil Engineer with more than 08 years of post-charterer experience) – Full Time
2. **Electrical Engineer** (Chartered Engineer with more than 08 years of post-charterer experience) – Part Time
3. **Mechanical Engineer** (Chartered Engineer with more than 08 years of post-charterer experience) – Part Time
4. **Quantity Surveyor** (Chartered Quantity Surveyor with more than 8 years of experience in procurement work) – Part Time
5. **Technical Officer** (Electrical) – NVQ/IVQ level 6 with 5 years experience – Full Time

4.2 Performance Security

The Performance Security shall be 5 percent of the Initial Contract Price.

The Standard Form of Performance Security acceptable to the Employer shall be a Bank Guarantee issued by a commercial bank operating in Sri Lanka, approved by the Central Bank of Sri Lanka and acceptable to the Employer or a bank based in another country but the guarantee approved by the Central Bank of Sri Lanka.
Performance security shall valid 60 days beyond the defect liability period.

8.1 **Start Date:**
Commencement of Work
The Start Date is amended and shall be 14 Days from the issue of the Letter of Acceptance.

8.2 Time for Completion

The Time for Completion for the whole of Works shall be9 months

8.7 **Delay Damages**

The Delay Damages for the whole of the Works shall be 0.5% of Initial Cost per week.

The maximum amount of Delay Damages for the whole of the Works shall be10% percent of the Initial Contract Price.

11.1 **Defects Notification Period**

Defects Notification Period is: 365 Days from Taking-over Certificate.

13.7 **Adjustments for Changes in Cost**

Contract is not subjected to price adjustment for fluctuation of prices

14.1 **Contract Price**

The Sub-Clause 14.1 is modified as follows:
……..

14.3 (c) **Retention Money**

The retention from each payment shall be 10 percent of the Initial Contract Price (or Interim Payment Certificate).

The limit of retention shall be 5 percent of the Initial Contract Price.

14.4 Issue of Interim Payment Certificates

Minimum amount of Interim Payment Certificates shall be: 10 million.

18.2 Not applicable

18.4 Not applicable

19.2 & 19.4 **Failure to Agree Dispute Adjudicator**

Any dispute or difference regarding the interpretation of the provisions of the Agreement/Contract shall be resolved amicably between the parties. If the dispute is not resolved through mutual consultations within a period of six months, either party may refer the dispute to arbitration in accordance with the Arbitration & Conciliation Act 1996 of India as amended from time to time. The number of arbitrators shall be one and that the place of arbitration shall be New Delhi, India. In such a situation the applicable law will be the law of India. The language of the Tribunal shall be English. The cost shall be borne by the parties equally unless otherwise determined by the Arbitral Tribunal.

SECTION –V

Standard Forms (Contract)

- Form of Bid Security
- Letter of Acceptance
- Form of Agreement
- Form of Performance Security
- Form of Mobilization Advance Security

FORM OF BID SECURITY

Whereas, ---------- [n*ame of bidder*] (hereinafter called and referred to as "the Bidder") has submitted its Bid dated ----------……[*date*] for the Design and Construction of ---------- [*name of Contract*] (hereinafter called and referred to as "the Bid.").

KNOW ALL PEOPLE by these presents that WE ----------[n*ame of organization*] having our registered office at ---------- (hereinafter called and referred to as "the Guarantor"), are bound unto ---------- [*name of Employer*] (hereinafter called and referred to as "the Employer") in the sum of Sri Lanka Rupees ---------- for which payment well and truly to be made to the said Employer. The Guarantor binds itself, its successors, and assignees by these presents.

SEALED with the Common Seal of the said Guarantor this ----------day of ------ 20------.

THE CONDITIONS of this obligation are:

1. If the Bidder withdraws its Bid during the period of bid validity specified in the bidding documents; or

2. If the Bidder refuses to accept the correction of errors in its Bid; or

3. If the Bidder, having been notified of the acceptance of its Bid by the Employer, during the period of bid validity, fails or refuses to:

   (a) execute the Form of Contract Agreement; or

   (b) furnish the Performance Security, in accordance with the Instruction to Bidders

We undertake to pay the Employer up to the above amount upon receipt of its first written demand, without the Employer having to substantiate its demand, provided that in its demand the Employer will note that the amount claimed by it is due to it, owing to the occurrence of one or more of the above conditions, specifying the occurred condition or conditions.

This Guarantee will remain in force up to and including Forty five (45) days after the period of bid validity, and any demand in respect thereof should be received by us no later than the above date.

DATE ---------- SIGNATURE OF THE GUARANTOR ----------

WITNESS ---------- SEAL

(Signature, Name, and Address)

Notes on Form of Letter of Acceptance

The Letter of Acceptance will be the basis for formation of the Contract as described in Clause 31 of the Instructions to Bidders. This Form of Letter of Acceptance should be filled in and sent to the successful bidder only after evaluation of Bids and after obtaining approval from the relevant authority.

FORM OF LETTER OF ACCEPTANCE

[letter head paper of the Employer]

[date]

To: *[name of the Contractor]*

[address of the Contractor]

This is to notify you that your Bid dated for design, construction and remedying defects of the _____ *[name of the Contract and identification number, as given in the Contract Data]* for the Contract price of Rupees n*[amount in numbers and words]* as corrected in accordance with Instructions to Bidders and/ or modified by a Memorandum of Understanding(if any), is hereby accepted.

The adjudicator shall be / shall be appointed by appointing authority**.**

You are hereby instructed to proceed with the execution of the said Works in accordance with the Contract documents.

The Start Date shall be:_____ *(fill as per Clause 8.1 of Conditions of Contract).*

The amount of Performance Security is *:* _____ *(fill as per Clause 4.2 of Conditions of Contract).*

The deadline for submission of Performance Security is _____ *(fill as per Clause 4.2 of Conditions of Contract).*

Authorized Signature :

Name and title of Signatory :

Name of Agency :

FORM OF CONTRACT AGRREMENT

This Agreement made the ---------- *[day*] of ---------- *[month*] 200 ----- [*year],* between ---------- ----------*[name and address of Employer]* (hereinafter called and referred to as "the Employer"), of the one part, and ---------- ---------- *[name and address of Contractor*] (hereinafter called and referred to as "the Contractor"), of the other part:

Whereas the Employer desires that the Contractor design and execute ---------- ---------- *[name and identification no of Contract](hereinafter called and referred to as "the Works")* and the Employer has accepted the Bid by the Contractor for the design, execution and completion of such Works and remedying of any defects therein.

The Employer and the Contractor agree as follows::

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Contract hereinafter referred to.

2. In consideration of the payments to be made by the Employer to the Contractor as indicated in this Agreement, the Contractor hereby covenants with the Employer to design, execute and complete the Works and remedy any defects therein in conformity in all respects with the provisions of the Contract.

3. The Employer hereby covenants to pay the Contractor in consideration of the design, execute and complete the Works and remedy any defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

In Witness whereof the parties hereto have caused this Agreement to be executed the day and year first before written in accordance with their respective laws.

---------- ----------**Authorised signature of Contractor** **Authorised signature of Employer**

SEAL SEAL

In the presence of:
Witnesses :

1. Name and NIC No. ----------
   Signature ----------
   Address ----------

2. Name and NIC No. ----------
   Signature ----------
   Address ----------

FORM OF PERFORMANCESECURITY
(Unconditional)

NUMBER : ..... DATE : .....

SUM GUARANTEED : .....

To: .....*[name of Employer*] (hereinafter called and referred to as "the Employer")
.....…… *[address of Employer]*

Whereas .....*[name and address of Contractor*] (hereinafter called and referred to as "the Contractor) has undertaken, in pursuance of contract No. ..... dated ..... to execute .....… *[name of Contract*] (hereinafter called and referred to as "the Contract");

AND WHEREAS it has been stipulated by the Employer in the said Contract that the Contractor shall furnish the Employer with a Guarantee issued by a recognized organization for the sum specified therein as security for compliance with its obligations in accordance with the Contract;

AND WHEREAS we have agreed to give the Contractor such a Guarantee;

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, up to a total of Rupees.....……..... *[amount of guarantee]* .....…… *[amount in words],* such sum being payable in the type and proportions of currencies in which the Contract Price is payable, and we undertake to pay the Employer, upon the Employer's first written demand and without cavil or objection, any sum or sums within the said amount as aforesaid without the Employer's needing to prove or to show grounds or reasons for the Employer's demand for the sum specified therein.

We hereby waive the necessity of the Employer's demanding the said debt from the contractor before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the Contract or of the Works to be performed there under or of any of the Contract documents which may be made between the Employer and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice or any such change, addition or modification.

This guarantee shall be valid until the date of issue of the Performance Certificate.

Signature and the Seal of the Guarantor : .....

Name of the Bank : .....

Address : .....

Date: .....

Witness : .....

FORM OF SECURITY FOR MOBILISATION ADVANCE PAYMENT

NUMBER : .....…….. DATE : .....

SUM GUARANTEED : .....

To : .....…… *[name of Employer*] (hereinafter called and referred to as "the Employer") ..... *[address of Employer]*

Name of the Contract .....

In accordance with the provisions of the Conditions of Contract, of the above mentioned contract …….. *[name and address of Contractor]* (hereinafter called and referred to as "the Contractor") shall deposit with the Employer a bank guarantee to guarantee his proper and faithful performance under the said Contract in and amount of ..... *[amount of guarantee*] ..... *[amount in words]*

We, the .....*[name and address of the organization*], as instructed by the contractor, agree unconditionally and irrevocably to guarantee as primary obligator and not as surety merely, the payment to the Employer on his first demand without whatsoever right of cavil and objection on our part and without the Employer's needing to prove or to show grounds or reason for the Employer's demand for the sums specified therein and without his first claim to the Contractor, in the amount not exceeding Rupees ..... *[amount of guarantee*]……*[amount in words]* such amount to be reduced periodically by the amounts recovered by the Employer from the proceeds of the contract.

We further agree that no change or addition to or other modification of the terms of the Contract or of the Works to be performed there under or of any of the Contract document which may be made between the Employer and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice or any such change, addition or modification.

No drawings may be made by the Employer under this guarantee until we have received notice in writing from the Employer that an advance payment of the amount listed above has been paid to the Contractor pursuant to the Contract.

This guarantee shall remain valid and in full effect from the date of the advance payment received by the Contractor under the Contract until the Employer receives full repayment of the same amount from the Contractor.

Signature and the Seal of the Guarantor : .....

Name of the Bank : .....

Address.....

Date : .....

Witness : .....

Format for Submission of Quotations

SECTION - VI

- Employer’s Requirement

PART I-EMPLOYER'S REQUIREMENT -GENERAL SPECIFICATIONS

1. General

1.1. Introduction

This specification covers the general aspects of Works and the Requirement of Bids and Contracts, viz., submittal requirements for Design and Drawings, Management Plans, Project Planning and Progress Monitoring, Site Management, Drawings Standards, and Contractor's Obligations for Safety and Health, etc., for design, construction, commissioning, operation and maintenance during defects liability period of 5,000 metric tons capacity Temperature & Humidity Controlled Warehouse Facility at Dambulla.

This work involves Civil, Architectural, Electrical, Mechanical, and Information Technology Works, including the supply of the necessary maintenance equipment and spare parts, testing and commissioning operational equipments, training of operators and on-going maintenance package. This General Specifications shall be read in conjunction with the Detailed Specifications, Drawings and other legal requirements govern by the local authority.

1.2. Overview of the Project

The key purpose of this project is to receive, handle, store and issue fruits and vegetables at the precise climatic control condition in-order to minimize waste and there by minimize the fluctuation of prices in the market place for these fruits and vegetables.

The proposed project land is located in Dambulla within the Matale District, Central Province of Sri Lanka. Employer will provide the land for construction of the buildings (the details of the land will be specified below within this technical specification). Construction of Main and Support Buildings, supply of equipment, preparation of the detailed drawings and approvals from relevant local authorities, internal works related to the distribution of Electricity, Water Supply, Data Communications and Connections, etc. within the facility, have tobe undertaken by the Contractor.

The scope of work includes, but not limited to site surveying, preparation for receiving support services, clearances from relevant local and national authorities, approval from the Employer’s nominated representative, design and construction of all civil works, supply and implementing the electro-mechanical systems, supply and installing the racking system, monitoring and security system, warehouse management information system, and landscaping areas external to the warehouse, etc.

2. The Coordination and Integration of Electrical and Mechanical Equipment

The Contractor shall fully co-ordinate the special requirements for all items of electrical and mechanical equipments and shall ensure that these requirements are fully accommodated within the structural and architectural design.

The Contractor shall ensure that all systems and subsystems are both physically and functionally compatible with each other, and will work together to meet the requirements of the Technical Specifications. All the mechanical systems shall be designed with the relevant standards available and approvals shall be taken from the Employer or his nominated representative.

The Contractor shall provide relevant technical literature, samples and other technical documents to prove the suitability of the system or equipments. The Employer or his representative may request for additional technical information, samples to be satisfied with the suitability of the system or equipment.

3. Environmental Conditions and Environmental Management Plan (EMP)

The design of equipments shall take account of the local climatic conditions and operating conditions as specified in this General Specifications and the Technical Specifications as appropriate. All equipments shall be designed to perform in a satisfactory manner in the environment in which it is installed and to withstand the effects of rains, high winds, temperature, humidity, vibration, noise, air, water quality and electrical power fluctuations. The general environmental conditions in the Dambulla area have to be obtained from Department of Meteorology.

The Contractor and his designers must ensure that the following objectives are pursued

in order to minimize the adverse environmental effects of the scheme,

- Efficient Space and Land Utilization
- Minimize Energy Consumption
- Minimize Co^2 emissions
- Improve thermal performance of building envelope over and above Building Regulation requirements.
- Provide low energy lighting systems
- Maximum usage of renewable energy and re-use of waste energy.
- Easy Movement of Vehicles
- Provide cycle storage
- Minimize Pollution
- Ensure no ozone depleting substances are used in the Construction.
- Specify boilers with low Nox emitting burners.

- Ensure use of sustainably managed timber for both basic building and finishing elements.
- Provide facilities for storage of recyclable waste both internal and external.

4. Health, Safety and Hygiene

The Employer places particular emphasis on high standards of health and safety and the purpose of this section is to provide information on the requirements that will apply to the Contractor. The Contractor must comply with all health, safety and hygiene standards specified by the local and national authorities. ISO 45001 Occupational health and safety regulation need to be followed at the design, construction and installation of the work.

The Contractor shall be subject to penal and civil laws for all injuries of their personnel, as well as personnel of the Employer, Consultant and Third Parties, even when the Contractor has implemented the required health, safety and hygiene specifications imposed by the relevant local and national authorities.

The Contractor shall perform all Works in a healthy and safe manner and in accordance with Sri Lankan Laws, Labour Rules, Police and Other Regulations and directions of the Employer or his employees.

If no relevant Sri Lankan Laws, Rules, Police and Other Regulations exist, then the relevant standards and codes of practice and current best practice of acknowledged international codes shall apply. The Contractor shall also comply at all times with any other mandatory requirements, local safety, security, and other regulations in force and to which the Works are subject, including any requirements specified by the Fire Department.

5. Technical Requirements Common to All Equipment

This section will discuss the general conditions associated with the electrical, mechanical and other equipment the Contractor is required to supply under this contract.

5.1. Standards

Where no particular National or International Standard is specifically stated in the documents, the Works shall comply with a relevant standard, code, or recommendation of the following organizations:

- The International Organization for Standardization (ISO);
- The International Electro Technical Commission (IEC);
- The European Committee for Standardization (CEN);

- British Standards Institution (BSI);
- Chartered Institute of Building Services Engineers, UK (CIBSE)
- National Fire Protection Association, USA (NFPA);
- Air Conditioning, Heating and Refrigeration Institute, USA (AHRI)
- German Standards Organization (DIN);
- Institute of Refrigeration, UK (IOR);
- American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE);
- American Society of Mechanical Engineers (ASME);

The standards of the above organizations referred herein represent the minimum requirements that shall be met by the Contractor.

The Contractor may adopt standards of the countries of source, but they shall confirm that such standards are equivalent to or better than those either referred to in these documents or listed above. The Contractor shall submit three copies of such standards in English language for the Employer's review, drawing attention to all differences. In the case that the Employer or his representative does not approve such standards, the Contractor agrees to adopt those standards specified by the Employer.

5.2. Units

The International System of Units (SI Units) shall be used for measurement and design criteria for equipment, drawings and materials supplied, installed and commissioned under this contract, unless otherwise approved in writing by the Employer's.

5.3. Suitability & Purposes

The E&M works shall be so designed, constructed, installed and commissioned (including training) to meet their particular purpose, by the Contractor. The design shall facilitate easy inspection, cleaning, lubrication, repairs and efficient operation in which continuity of service is a major consideration.

All materials used shall be of the highest quality and of the class most suitable for operating under the conditions specified and shall withstand the variations of environmental conditions without distortion, deterioration or undue stresses on any part, and also without affecting the strength and suitability of the various parts for the work for which it must perform.

No welding, filling or plugging of defective parts will be permitted without the written approval of the Employer. The design shall incorporate all necessary features to ensure the continuous operation and safety of all those concerned in the operation and maintenance of the Works.

IT Works shall include only the software system and shall be designed, developed and commissioned (including training) to meet the particular needs of the Employer in relation to the effective and efficient management of the warehouse and the protection of the produce stored therein. The system will be required to interact with multiple external entities, such as the farmers and banks.

6. Quality Assurance and Quality Control

All work and materials required in the Contract shall be executed and controlled by a Quality Assurance Management Scheme in accordance with the requirements of ISO 9001 or equivalent and as approved by the Employer or his representative. The Quality Assurance Scheme and Systems shall be submitted in advance in English language for its approval.

7. Testing and Commissioning of the Systems

The Contractor shall perform all necessary site testing and commissioning activities in order to ensure satisfactory operation of the completed system in compliance with the requirements of the Technical Specifications.

The Contractor shall inform the Employer of all such tests being undertaken in accordance with the Quality Assurance Management Plan and coordinate with the Employer with regards to the witnessing of such tests by the Employer and/or his representatives. All inspections, testing and commissioning shall be clearly identified in advance in the Quality Assurance Management Plan identifying the witness, inspection criteria and hold points as required by the Contractor, the Employer or both. The Quality Assurance Management Plan shall be submitted by the selected Contractor to the Employer for approval in accordance these General Specification Requirements.

All tests shall be carried out by the Contractor in the presence of those specified by the Employer with his representatives and in accordance with the agreed Quality Assurance Management Plan.

8. Operating and Maintenance Manuals, Record Drawings

No later than prior to commissioning, the Contractor shall submit to the Employer, for approval, six preliminary copies of operating instructions, maintenance instructions, maintenance drawings and illustrated parts lists for the whole of the Plant, in accordance with the requirements stated herein.

The instructions shall be in sufficient detail to enable the Employer or his employees to operate, maintain and repair each part of the Electrical and Mechanical Plant. The documentation will be accepted only upon approval of the Employer based on the recommendation of his authorized representative.

9. Training Employer's and End User's Staff

This section will discuss the training requirements, training objectives and the training methods the Contractor is required to comply in relation to this contract.

9.1. Training Requirement

The Contractor shall be required to train, or arrange training for operational and technical personnel nominated by the employer. These nominated personnel shall include any person or persons designated by the Employer, including the training instructors' who will require training in technical matters according to their intended function.

9.2. Training Objectives

The content, timing and duration of the training program shall be such that personnel trained by the Contractor will be able to operate and maintain the equipment/systems in the designed manner with maximum reliability and economy. Training objectives in terms of minimum standards to be achieved by each trainee shall be clearly defined by the Contractor in consultation with the Employer, for each trainee category, including the supervisors and instructors.

9.3. Training Methods

The training shall be planned and carried out in a manner suitable for the intended occupation and purpose, and shall consist of:

a) Formal off-the-job theory and practice.

b) Practical on-the-job follow-up experience.

10. Equipment Identification

All labels on any piece of equipment, cable, pipe, duct, etc., shall show the same identifications as shown on the approved drawings and or circuit diagrams. All equipments and materials supplied shall be indelibly labeled to show its identity, type, version, function, location, rating or limitation as appropriate. Removable modules such as relays, circuit breakers, etc., shall have the same indelible labeling on the fixture to which the module is attached. The label shall be adjacent to or on the module and shall not be obscured.

11. Language

All information provided to the Employer in relation to the Contractor's proposal and all other subsequent correspondence, technical specifications, manuals, usage instructions, etc. must at all times be in **English**.

12. Conditions of Contract

This contract will be governed by the specified clauses of CIDA/SBD/04, Standard Bidding Document – Procurement of Works – Design and Build Contracts published by Construction Industry Development Authority (CIDA, former ICTAD).

PART II- EMPLOYER'S REQUIREMENT- TECHNICAL SPECIFICATIONS

A: PRELIMINARIES

1. Standards

The Contractor shall comply with the standards and design criteria given in the Employer's Requirements Section of General Specifications and in this Technical Specifications.

The Standards and Guide lines adopted in this project shall be a consistent set of standards that specifically apply to the manufacture, construction and testing of Temperature Controlled Warehouse Civil Works, Temperature and Humidity Controlled Storage Systems, Racking System, Stacking Equipments, Buildings, Structures, E &M, IT, Maintenance Equipments and other ancillary services building and equipments.

The standards and guide lines adopted shall be British Standard, American Standard, Sri Lankan Standard or any internationally recognized Standards, Guide Lines or accredited Code of Practice, which are equivalent with corresponding international standards and/or standards specified in the Employer's Requirements Section - General Specification or within this Technical Specification.

If any contradiction or misinformation between any standard, guild lines, code of practice or any specification, the Contractor must agree to comply with the recommendation or opinion, which shall be specified by the Employer's or his Representative in consultation with the Contractor.

2. Design Criteria and Concepts

Stored Product	Fresh Vegetables (including Onions) and Fruits
Stored Condition	Independent Mechanically Controlled Temperature and Relative Humidity Conditioned in Each Chamber within Specified Variable Storage Parameter
Total Capacity	5,000 MT (5,000,000 kg) using Onions as the reference product
Stored Method	Double Deep Pallet Racking System with Plastic Crates
Size of the Pallet	1,200mm x l,000mm (Length x Depth) the Contractor must agree to comply with the foundation specifications, in a manner suitable for the proposed Pallet Racks and both Hand Pallet Trucks / Electric Reach Trucks as well as racking.
Size of the Crate	600mm x 400mm x 300-320mm (LxWxH). The crates should be both stackable and nestable.
Maximum Weight (net weight)	1,050kg per pallet and 30kgs per crate (produce only)
Total Pallet Positions	5,000 pallet positions
Racking Type	Steel Powder Coated - Double Deep Pallet Racking

Highest Racking Position	Should not exceed 10m
Space between Racks	Should be sufficient for un- interrupted movements of Pallet Reach Trucks but should not exceed 3.2m
Total No. of Temperature & Humidity Controlled Chambers	Six (6)
Estimated Usage of Land Area	75m x 75m
Storage Temperature Conditions inside each chamber (4States - Adjustable)	a.(0-5°C),b.(6-I0°C), c.(10-15°C),d.(15°C-21°C)
Relative Humidity (within the chamber - adjustable)	35 – 95% *[Humidifying & De-humidifying Both Functions to be included]*
Required Temperature Conditions inside Ante Room (adjustable)	(0~20°C)
Required Relative Humidity inside the Ante Room (adjustable)	35 – 95% *[Humidifying & De-humidifying Both Functions to be included]*
Maximum Storage Period	Approximately 6 months
Average Storage Period	Approximately 3 months
Pallet Storage Mechanism	Electric Battery Powered Reach Trucks / Electrically Driven Forklifts
Pallet Stacking Mechanism	The Contractor should propose a method for stacking on the pallet with the crates, considering human capability.
Crates filling Mechanism	Manual by Labour
Refrigeration System	As specified in the specifications
Reach Truck Equipment	Should be capable of operating within the specified isle space and reach a double deep racking position at a maximum 10m high rack with a weight of 1050 kgs of produce (excluding weight of pallet and crates).

Additional Criteria: The Contractor's overall design shall take into consideration the following design criteria.

a) The convenient receiving, issuing and movement of the pallets within the warehouse,

b) Effective utilization of the land area,

c) Ability to utilize the mezzanine floor for office and executive rest areas,

3. Site Surveying, Boundary Demarcation and Physical Layout

The Scope of Works shall include, but shall not be limited to the following,

- Providing qualified survey crews to demarcate physical boundaries as per the approved survey plan for the building and support the Employer in verifying same,
- Undertake the boundary demarcation as per the approved physical boundaries,
- Undertaking "As Built Survey Plans" of the completed Works,
- Undertaking all construction and related surveys to the layout of the Works to control lines, levels and grades and to record the amount of Works performed; and monitor the existing infrastructures, adjacent structures and utilities, for settlement and movement etc,

4. Geological Investigation

The results of the geological site investigations and recommendations for the foundation will be provided by the Employer. The Contractor must determine the specific type of foundation is to be adopted and confirm the detailed specifications of the proposed foundation and provide adequate proof that the proposed foundation will meet the requirements of the purpose the warehouse is being constructed. Notwithstanding specifications provided by the Contractor, the Contractor must agree to comply with the foundation specifications, which will be specified by the Employer or his representative in consultation with the Contractor.

Prior to commencement of the work, the contractor must check for all obstacles and public utilities and provide a presentation of all field data in a Report. In the event that the Contractor adjudges that existing soil investigation results are not enough as provided by the Employer within the Bid Documents, exploratory drilling shall be carried out to verify the details of supporting soil strata at specific locations by the Contractor. The Contractor shall ensure safety of any excavation works, and to conduct tests in order to verify the design of spread foundation, pile foundation and any temporary supports.

B: COLD STORAGE

1. General Layout

The Contractor is called upon to design and present the most optimal Temperature Controlled Warehouse layout. The Contractor should explain in detail for the choices being made for the specific design. A general design for the layout of the storage and supportive services area is attached to this document (Annexure- I) as a basic guide line. The overall warehouse should comprise of Six (6) Cold Storage chambers where the temperature and relative humidity of each chamber could be independently controlled as per the specified values.

The overall warehouse shall require an Ante Room and an elevated receiving and issuing bay area. The Ante Room is a pre-condition room, which is used to handle the goods to prevent the cold rooms interacting with the outside. An area for the preparation of the pallet (loading/unloading) should be provided adjacent to the receiving/issuing bay. It is assumed that the produce will be received and issued in crates at the receiving/issuing bay. A separate area (not connected with the temperature-controlled warehouse) will be provided for sorting, grading and packing of inbound produce into crates and the re-packing of outbound produce from the crates into any other packing.

Other ancillary services such as Worker (Male/Female)Facilities (Changing Rooms, Rest Rooms, Toilets, etc.) should be provided to be complying for HACCP certification, Sorting and Crate/Pallet filling building for incoming products (from Farmers), Security Systems, Waste Management, Pump Room, Generator Room are to be located at the convenient place, and easy access. Office Area and Other facilities for office staff could be provided within the warehouse space (these facilities could be provided within a mezzanine area).

2. Cold Storage Chamber

The section will specify the design criteria and insulation and other criteria related to the temperature and humidity-controlled chambers to be constructed by the Contractor.

2.1. Design Criteria

The temperature and humidity-controlled chambers shall be suitable for storing fruits and vegetables. Each storage chamber will be maintained at a temperature and relative humidity within the ranges specified, and the temperature and humidity-controlled chambers should be suitable for a continuous24 hour, 365 days operation and temperature and humidity consistent measured at any part inside.

In full load condition the storing capacity within each temperature and humidity-controlled chamber would be approximately 850,000kg.

The uniformity of the Temperature and Relative Humidity within each chamber should be $\pm 1^{o}C$ and ±1% from the set-point respectively. Each temperature and humidity-controlled chamber shall have the capability to change inside temperature and relative humidity independently from 0°C to20°C and 35% to 95% respectively.

In the event of complete power failure, the cold room temperature must remain at $\pm 1^{o}C$of the specified set temperature, or below at the maximum ambient operating temperature, for at least 8 hours.

In case an emergency, when the inside temperature of any cold room chamber is outside the specified limits of the set temperature, an alarming device shall be activated to notify to the operators. In addition to that it shall have a capability to send short massage to a give minimum 5 numbers of given mobile phones, to indicate the mal-functions of the rooms. Also, it shall provide warning email to given 5 numbers of email address through a system of internet/web base.

It shall be provided, refrigeration units, sized to give 100% standby capacity under worst case condition, with automatic switching function for the time period of 12 hours. Each cold room shall have two (2) independent refrigerant circuits with identical capacity for duty and stand by operations. The operation of 2 units shall be interchanged for every 12hr period of time. However, in case of one unit breaking down, the remaining unit shall come into the operation immediately.

2.2. Wall, Ceiling and Insulation Floor Construction

The wall and roof panels shall be constructed using composite panels such that the temperature loss from the cold room will be minimal (the Contractor must specify the heat transfer from the wall and roof at various ambient temperatures). The design and materials proposed by the Contractor for the walls and roof, must ensure is capable of coping with the daily ambient temperature fluctuations and harsh weather patterns of sun, rain and wind experienced in the Dambulla area.

The Contractor may suggest the panel thickness to meet the above conditions but shall be not less than100mm and insulated by self-extinguishing formed in placed polyurethane foam by injecting between the claddings at an average density of 40 kg/m3.

Overall heat transfer coefficient of the composite panels used for insulating the temperature controlled air shall not be more 0.3W/m2K.

The Contractor in consultation with the Employer should ensure attractiveness of the internal environment within the warehouse.

The elements of construction of warehouse floor shall have, but not limited to the following key components.

1. Sub Base
2. Base Slab
3. Vapor Seal
4. Insulation
5. Wearing Floor

The maximum allowable leveling of the finished floor shall be 0.5mm/m and contractor shall pay special attention to the construction of even floor inside the warehouse and should be painted with

appropriate paint to demarcate the different areas within the warehouse. The paint should be of a quality to withstand the operations of the warehouse.

The door construction shall be identical to the wall panels having minimum thickness of l00mm and shall be top hung sliding door having clear opening 3.0m (width) x 2.lm (height) (Note: the opening should be adequate for the free movement of the equipment). There shall be minimum of 2 doors per cold storage (where anybody/ equipment at any point in the chamber could access both doors with their equipment). The doors shall be of top hung sliding type. The door perimeter, jamb and threshold shall be color band steel with double gasketing on three sides and wiper gasket on bottom. The frame is to include that easily replaceable heater wire to prevent condensation and frost formation.

The Contractor must undertake the termite treatment and obtain a certificate confirming the details of the treatment undertaken.

All the installation of the temperature and humidity controlled chamber shall be in lined with the specifications given by varies section of this specifications as well as guidance given by AHRI, ASHRAE, IOR, ASME etc.

2.3. Refrigeration System

The Contractor may select either option for selecting the refrigeration system to be supplied. However, the selected option should be clearly stated and justified by the Contractor and the components to be supplied clearly identified within the proposal.

All the Cold Room Refrigeration equipment shall be provided from a single source of manufacture and factory assembled. In the event this is not possible – the Contractor must prove the compatibility of the proposed components.

The refrigeration system should operate 24 hrs for 365 days per year. Machines having valves, gauges, thermometers or any parts which shall be operated or inspected regularly and which cannot be reached readily, should have platforms, ladders etc., with adequate handrails installed. Materials used in the construction of the machine shall be suitable for the purpose intended and those coming in contact with the refrigerant shall be highly resistant to corrosion by the refrigerant.

The split type refrigeration system shall consist of equal capacity two independent systems; One for duty and the other for standby. Also a digital control system should be provided with timer to switch between the two systems every 12 hours.

However, it should be possible to adjust the 12-hour period according to the requirements of the client. Arrangements shall be provided for automatic operation of a backup unit with an alarm, in case of failure of the unit, which is in operation. It shall be of a direct expansion split type system consisting of an evaporator, condensing unit, refrigerant piping, controls etc., and designed to operate continuously.

The semi hermetic refrigeration compressors shall be of high efficiency low noise reciprocating type or scroll equipped with suitable vibration isolators. The manufacturer of the compressor shall be Bitzer, Danfoss, Copeland or equivalent USA, EU or Japanese make. Compressor shall be equipped with over current and over/under voltage protection devices, thermal over load protection, high/low pressure cut outs, motor overload protectors, electrical fuses and voltage stabilizers.

Refrigeration circuit shall have a high capacity dryer in the system to remove moisture and dirt. It is compulsory to quote for environmentally friendly CFC free refrigerant used refrigeration system with the requirements of Montreal Protocol.

The refrigerant used in the refrigeration and air conditioners shall be R134a, R407C, R410a, R32, R290, R404A/R507A or equivalent. The casing of each refrigeration unit should be permanently marked with the standard 'CFC Free' symbol.

2.4. Humidifiers / Dehumidifiers

Each temperature controlled chamber shall have a device to control the relative humidity inside the room, with specified limits through programmable logic control, stipulated in tender documents. This function shall be achieved by incorporating a combined humidifier and dehumidifier system. It shall provide an automatic, continuous duty type desiccant dehumidifier system to remove or moisture as required to control and continuously monitor the specified humidity level.

It shall include water sprayed type humidifier to increase and control the humidity level inside the cold room. Contractor may also use water collecting inside the drain pan for water spraying system. Desiccant reactivation exhaust air flows shall be controlled with a self-contained volume dampening system and is capable of maintaining the low CFM flow rates independent of the building system static pressure fluctuation.

2.5. Alternate Refrigeration System Solution

It is proposed 2 numbers (one - duty and one - standby) of brine water solution chillers with water cooled condensers for producing refrigeration to all Cold Rooms and Ante Room. The manufacturer of the compressor shall be Bitzer, Danfoss, Copeland or equivalent USA, EU or Japan make. The

chillers shall be delivered factory assembled complete with all accessories and equipment such as water and refrigerant piping, valves, gauges, thermometers etc. required for convenient operation, testing and maintenance.

The refrigeration system should operate 24 hrs for 365 days per year. Machines having valves, gauges, thermometers or any parts which shall be operated or inspected regularly and which cannot be reached readily, should have platforms, ladders etc., with adequate handrails installed. Materials used in this construction shall be suitable for the purpose intended and those coming in contact with the refrigerant shall be highly resistant to corrosion by the refrigerant.

The chiller shall be of the vapor-compression refrigeration type with evaporative condenser. The refrigerant of the Chiller shall be Ammonia. The unit shall be completely factory enclosed with rotary screw compressor, unit mounted compressor motor starter, cooler, compressor and condenser. It shall incorporate a microcomputer control center for utilization of economizer cycles for efficiency and energy saving. The chiller shall be factory assembled, charged and tested with a full operating refrigerant and oil charge.

12 hours period of duty and stand-by rotation cycle shall be adjustable according to the requirements of the client. Arrangements shall be provided for automatic operation of backup unit with an alarm, in case of failure of the unit in operation. It shall be of a direct expansion split type system consisting of an evaporator, condensing unit, refrigerant piping, controls, etc., and designed to operate continuously. The minimum COP of each Chiller shall be 5.5 and IPLV shall be greater than 6.0.

The refrigerant Ammonia shall be confined to the chiller while chilled brine or chilled water through a heat exchanger shall be supplied to the cooler units at each cold rooms based on temperature and humidity requirements.

2.6. Data Monitoring System

All cold room chambers and temperature-controlled areas (e.g., Anti Room, temporary storage, packing and staging areas) must be equipped with continuous temperature and/or humidity monitoring equipment as described in the companion supplement. Temperature and humidity monitoring systems need to be connected to the operation and monitoring room and captured digitally into a monitoring system in pre-defined time periods.

In addition, all these areas should be qualified and temperature-mapped - see companion supplements: Qualification of temperature-controlled storage areas and Temperature mapping of storage areas. Initial mapping should be carried out in both the hot and cold seasons. It should be

repeated at regular intervals and after any significant modification to the building, the stock layout, or the heating or cooling system.

This unit shall provide the continuous record of the temperature inside the chambers and temperature-controlled areas. Wall mounted digital electronic data logger should be installed adjacent to the thermostat.

A minimum 7 days records should be maintained and the ability to integrate the data with a comprehensive Warehouse Management System.

2.7. Chiller Management System

This scope shall include, supply and installation of direct digital controller and controller panel (DDC) which integrates with chiller control panel. DDC should consist within built LCD display.

Panel should be located in Chiller plant room to control and monitor chillers, pumps and cooling towers. Panels shall have indication and monitoring for operation and equipment scheduling facilities, power, equipment status, fault conditions and alarm signal which shall be wired to Control and Monitoring Panels. This unit should be capable of controlling all regulating type motorized valves, etc. as indicated in schematic diagram.

The Visual LCD display at control room located inside the Chiller plant room area should be provided with data storage, retrieval and printing facilities should be available. In addition, it should be possible to integrate the data with a Warehouse Management System.

The controlling unit shall be modular in hardware architecture complete with CPU Module(s) having built-in communication capability, Power Supply Module(s),I/O Module(s), Mounting Hardware, Data Cables, and with all the other accessories as per manufacturer's recommended installation and practices to cater required point capacity for proper controlling as per specification and point schedule.

3. Sorting & Re-packing Area

In the event the incoming produce (vegetables and fruits) are not sorted and filled in to plastic crates specified by the warehouse, a Sorting and Crate Filling Area of approximately 40m x 6m should be provided. This area should have an overhead cover and should be protected from rain. The produce will be filled into the plastic crates manually and the crates are stacked on the pallets manually. The Contractor must provide for platforms that would assist the convenient stacking of the creates on the pallet. This same area will be used to re-pack the produced into separate packing at the point of issue.

The filled pallet needs to be transferred between the Produce Receiving/Issuing Area in the Temperature Controlled Warehouse and the Sorting and Re-packing Area.

When pre-sorted produce is received in the specified crates (envisage such a situation to be the norm in the future), the crates will be stacked on to the pallets manually at the receiving/issuing bay. The receiving/issuing bay should be equipped with a mechanical device to support the convenient stacking of crates onto the pallet. Electrically operated forklifts are used to deliver pallet from the receiving/issuing area to the Temperature Controlled Chambers.

4. Pre – Cooling Chamber:

Pre-cooling chamber to be provided adjoin to Ante Room to remove field heat, after sorting and before storing inside the cold storage chambers. The method of pre-cooling shall be either Force Cooling or Hydro Cooling to suit the type of vegetables, fruits and onions to be stored inside the cooling chambers.

5. Pallet Racking:

Since this use a Pallet Racking System. There are minimum 5 numbers of Pallets stack positions is high rise temperature-controlled warehouse solution, it is recommended to vertically. Each stacking position will be two rows (or two pallet positions) deep. The vertical distance between racking positions should be a minimum of 2.5 meters, in order to increase the loading capacity of the Cold Chamber. Each racking position should be capable of carrying a weight of 1,050kgs of produce, excluding weight of pallets and crates.

As with temperature-controlled stores, it is important to avoid temperature stratification and to ensure that the air circulation system maintains uneven temperature throughout the space.

6. Loading/Unloading Docks

The loading/unloading dock floor shall be elevated to a height that could cater to different type of vehicles (including containers) that would be involved in transporting the produce. The loading/unloading dock should be able to accommodate a minimum 20 Container size vehicles along the loading/unloading dock simultaneously.

Provision for loading/unloading of produce from refrigerated vehicles should also be given consideration. In order to minimize heat loss or heat gain through the dock area, vehicles should preferably be coupled to the building by a dock seal; it must also be possible to close off the opening

when no vehicle is in place. This arrangement is essential where vehicles are coupled to a temperature-controlled loading bay. It shall be an insulated, inflatable dock seal suitable for all type of vehicle application. The Contractor should also propose a dock levelling mechanism to handle vehicles of varied height.

C: ARCHITECTURAL WORKS & FINISHES

1. General

It is expected that the complete Temperature Controlled Warehouse and the specified service areas will be constructed within an approximately 75m x 75m area and 12.5m minimum high clear dimensions steel structure and roof with steel roof trusses covered with composite roofing sheets with insulation rendered. The external surfaces of the warehouse shall shield the warehouse and the insulation from the external elements. All the internal insulation partitioning works are to be done using composite insulation wall panels, of appropriate thickness to minimize the temperature loss and minimize the construction time period and saving of the cost.

2. Sorting and Re-packing Area

Construction of other support building to be used for sorting shall be of walls with appropriate material to protect the inner area from rain and concert slab over it for roof. Crate Filling and Pallet Stacking Building (this is the area apart from the loading and unloading bay). This area is intended to be used for sorting the produce, filling the crates, and stacking the pallets, which come directly from the farmers un-sorted. This area will also be used for re-packing the issued produce from crates to other form of packing. This area should be equipped with water taps and a drainage system to facilitate the washing of the produce, when required. The sorting and re-packing area should be 40m x 6m (area of 240 m^2).

3. Services Areas

In addition to the Temperature Controlled Chambers and Ante Room, the following areas are required within the temperature-controlled warehouse for the proper operation of the process.

I. Operation & Monitoring Area (min area of 10 m^2)
II. Office Area (min area of 150 m^2)
III. Quality Control, Lab (min area of 50m^2)
IV. Loading, Unloading and Handling (min area of 200m^2) of elevated area
V. Client meeting and conference room (min area of 15m^2)
VI. Area for Accommodation of the Staff (min area of 200m^2)
VII. Worker Toilets, Bathing Area and Changing Rooms (Male and Female)
VIII. Worker Canteen, Dining and Rest Area (min area 150m^2)

IX. Store for Pallet and Crates (min area of $50m^2$)

X. First Aid Station to accommodate two beds and other medical equipment (min area $10m^2$)

Items I,II, IV, V and VI are to have an air-conditioned environment and appropriate lighting, electricity socket outlets and service provisions.

Staff Accommodation and Worker Canteen shall include a Kitchen shall comprise of a piped LP gas system, kitchen hood ventilation system, Sinks, Water supply and discharge plumbing with work tops and tiled up stands around work tops, exhaust fan and electrical points, etc. Staff Accommodation shall also include staff toilets for both mail and female as well as shower and changing rooms.

Separate facilities shall be provided for both males and females toilets. Each set of facilities shall be accessed by one main entrance for security reasons. Alternative exits will be controlled and used only in case of emergency. The room is expected to be heavily used at certain peak periods such as change of shift and so the space standards must be adequate. Circulation must be direct and must facilitate the easy movement of staff in, around and out. The number of washrooms shall be decided by the requirements of local regulations.

The design shall facilitate cleaning and the finishes are to be durable, impermeable and easily cleaned. There are to be no sharp corners or edges. The services installation shall provide a clean, fresh, odor-free environment with adequate ventilation and exhaust fans. The general appearance is to be bright and cheerful.

This Facility shall include medical room with the size of approx.10sq.m and shall provide two (2) beds separated with other space with curtain, chairs and desk for simple first aid activity and first aid kit, telephone for emergency call, air-conditioned environment and appropriate lighting, socket outlets and service provisions.

4. Gate House including Entrance Gate

The Warehouse shall be provided with approximately 4m x 5m size gate house which adjoins the entrance gate. Gate house shall be suitable to accommodate 2 persons with all necessary services and provisions including toilet and lockers facilities.

The gatehouse shall be equipped with facilities to operate the Security Camera System. This shall comprise of video display monitors and PTZ control facilities for the selection and display of camera images. The gatehouse shall be equipped with security cameras and barrier for car inspection.

5. Waste Material Storage

The warehouse complex shall be provided with approximately 3m x 15m internal dimension of waste material storage and waste disposal facilities for temporary storage of waste materials to account for all waste generated from the operation, including:

- From Vehicle internal cleaning.
- Domestic waste from working areas including rejected produce.
- Domestic waste from offices and personnel amenities.
- From cleaning of roadways and walkways.
- Swarf from Sorting Area, Filling Area and Pallet loading area.
- From the Waste Water Treatment Plant.
- Workers waste including foods, paper, plastic and polythene etc.

5. Pump Room and Sump for Water Tank

The Storage shall provide approximately 6m x 8m internal dimension of pump room to accommodate the water tank. The minimum capacity of the water sump shall be 100,000 liters which will be used for Fire Water Requirement and Drinking and Operational Water Requirement. It is preferable to have the sump just below the Pump room area. This room shall be adequately water proofed to the height of 150 mm. The make of pump shall be in reputed brands such as MASDAF, KSB, Grundfos or equivalent.

6. Electricity Generator /Automatic Transfer Switch

The Contractor shall provide a 400VAC rated Diesel engine generator with suitable capacity for the Warehouse Premises. The Contractor will compute for the final KVA load essential to the 100% continuous operation that would determine the appropriate KVA rating of the generator.

The generator is a complete stand-alone generating set. The alternator and engine should be in the same skid base. The generator and the electrical components are fully enclosed in weather-proof canopy. The make of the Generator shall be Caterpillar, Cummins, FG Wilson or equivalent reputed brand.

The generator should be sound proof canopy type, self-ventilated, drip-proof, synchronous alternator designed for minimum reactance, low voltage-waveform distortion and maximum efficiency.

7. Electrical Panel Room

The Building shall provide an approximately 15m x 10m dimension low voltage switch room. The low voltage switch room shall be adequately ventilated by appropriately sized heat extract fan/s. The maximum ambient room temperature shall not exceed 30°C.

The LV switchgear's ventilation fan/s shall operate to extract heat inside the LV switchboard panel, in particular incoming air circuit breaker section and busbar compartment once the room ambient temperature had reached 35°C. The room layout shall include front and rear access clearance of 2000 mm and 2100 mm respectively to facilitate routine test that shall include front and rear access.

8. Locker Room/ Toilet /Showers / Lunch Room and Canteen

The Storage Facility shall include appropriate numbers of lockers room, WC showers, lunch room and canteen in accordance with the local regulations and complaint for obtaining HACCP certification. Locker rooms shall provide toilet, washing, shower, changing and locker facilities for workers on all shifts.

Locker rooms shall be conveniently located relative to the main areas which they serve. Separate facilities shall be provided for each gender. Each set of facilities shall be accessed by one main entrance for security reasons. Alternative exits will be controlled and used only in case of emergency. The room is expected to be heavily used at certain peak periods such as change of shift and so the space standards must be adequate.

Due consideration should be given to the flooring and other finishers of these staff welfare areas. Circulation must be direct and must facilitate the easy movement of staff in, around and out of the warehouse. The design shall facilitate easy cleaning and the finishes are to be durable, impermeable and easily cleaned. There are to be no sharp comers or edges. The services installation shall provide a clean, fresh, odor-free environment. The general appearance is to be bright and cheerful.

D: OTHER SERVICES

1. Electrical and Power Wiring

The Contractor shall supply and install electrical distribution and control panels, switchgears including circuit breakers, other electrical equipment and wiring necessary for the operation of the Fire Protection, Detection and Communication System as specified below.

This work shall be carried out by a Contractor who is specialized in this type of work and shall meet the requirements of the 17th edition of lEE (ICT) regulations' latest amendments such as BS 7671, local supply authorities' requirements and conform to best trade practices.

The controls will have the same specifications as set out in the electrical specifications. All equipment used shall be from a single manufacturer to ease future maintenance.

All cable entrances to the main control panel and all other panels will be fitted with standard cable bushing to render the transition of the cable into the panel both dust and water proof.

2. Road and Pavement Works

The main access road shall begin at the Main Entrance and feed all major facilities. A secondary road network including perimeter and feeder roads shall be included to provide access to all functional parts of the Depot. These shall be sized to permit access to emergency services vehicles including large fire fighting equipment. The width of any road shall be not less than 3.0m.

All the road construction shall be made of asphalt and aggregate paving mixture. The area on which the road will be laid shall be cleared of all vegetation, trees, shrubs and bushes. Once the process is completed, shaping, mounting and grading the surface to be done.

Once the soil has been leveled, an aggregate base of soil, concrete and limestone shall be used to stabilize the roadway. During this phase, curbs, gutters and drains are also constructed as required.

During this final phase, the asphalt shall be poured and laid. Depending on the estimated traffic volumes and regional climate conditions, the asphalt paving layers thickness and the number of layers have to be decided by the contractor. All the road signs, warnings and other safety features have to include to the scope of Roads and Paving.

Surface strong water system shall be interrelated with the road network system. Suitable drainage system, pipe network and gully system shall be designed and installed to suit the proper discharge of rain water.

3. Hedges, Trees & Existing Vegetation

The attention of the Contractor is drawn to the conditions of BS 5837 - "Code of practice for trees in relation to construction", with regard to the protection of existing vegetation. Existing trees, shrubs and other plants that are identified to be retained shall not be removed without specific instruction from the Employer. The Contractor shall take all precautions necessary to protect existing vegetation from malicious or accidental damage.

The Contractor's attention is drawn to the Planning Permission and to the protection of, and works to, existing trees, hedges and vegetation and shall have allowed all costs in connection. Should any plant material be disfigured, damaged or destroyed due to the Contractor's negligence, then it shall be liable to payment of compensation for the damage done, and to plant suitable and equivalent replacements at his own expense.

4. Water Supply System

The water supply system for the facility shall include water source identification and requirement (construct suitable well if local water supply not available or not sufficient, take water from a tank with suitable purifications etc.), water supply equipments, water distribution, waste water disposal, vehicle, crates, pallets washing, fire fighting water, floor washing and cleaning, sanitary flushing, etc. Domestic Water System has been designed to perform the following functions:

- To provide sufficient water storage volume to ensure continuous Depot water supply;
- To provide adequate quality of domestic water with sufficient volume to satisfy Operation demands;
- To conserve the use of fresh water while maintaining proper performance and cleansing of equipment and fixtures;
- To ensure water supply facilities shall not contaminate water supply sources;

Pipe Materials shall be High Density Polyethylene Pipe (HDPE) Type and Exposed Piping shall be colour painted for approval of the Engineer.

The water supply source to the Storage Building may come from the city water mains from the Dambulla Municipal Council. However if the water supply is not adequate or supply is not available, it is required to find any alternative permanent method for supply of water by the contractor. It shall

be either make a deep well, ground well or getting water from a suitable water source such as tank, river or any other means.

It is contractor's responsibility to construct a water treatment plant, if such method is used to get the water for the operation. Water taking form the bowsers or any other temporary means of water supply not accepted.

All the effluent from the process, human body waster and any other form shall be treated before discharge to the ground. All the sewer shall be treated through suitable septic tank system and soakage pit/leaching field system. The formation of water treatment plant and operation, maintenance is under this scope of work.

5. Rain Water Collection and Drainage

All ·the rain water needs to be collected and treated for secondary use of the building. Relevant capacity rain water storage tanks with pipe networks shall be installed at the suitable location of the land premises in order to minimize the use of fresh water and minimize the water waste. The rain water intensity has to be taken by department of meteorology. Minimum storage capacity shall be not less than 2 months average rainfalls. The cost for this system must be provided as a separate item within the price quotation.

6. CCTV Surveillance System

The surveillance system shall consist of IP CCTV cameras combination of fixed and equipped with Pan/Tilt/Zoom Lens System (PTZ) located in such a way that it covers all indoor and outdoor area.

CCTV monitors and remote-control units shall be located at the Security Room. The number of cameras has to be decided such a way that, it shall cover all indoor and outdoor locations except, washrooms, changing rooms, dormitory and toilets.

The make of CCTV equipments and accessories shall be from one single source of suppliers and having reputed brands such as Sony, Bosch, Hikvision, Panasonic or equivalent.

A master controller shall be provided wherein a CCTV video monitor and video tape recorder shall be connected to record the display of a preselected camera view. Video inputs to the multiplexer and sequential switcher shall come from the video outputs of CCTV cameras.

The master controller shall function as a bridging auto alarming switch. Minimum output locations shall be 5 and those locations shall have LED display units, size not less than 60 inches.

7. Fire Protection, Detection and Alarm System

The work to be done, in accordance with the Fire Regulation of Sri Lanka includes design, supply of materials, installation, commissioning, parameterization, testing, and supervision, including all labour and equipment necessary for the proper completion and execution of the Fire Detection Alarm and Control Works.

Fire Protection System of the building shall consist of a Fire Hydrant System with Pillar Hydrants, Breeching Inlets, Hose Reels etc, and Portable Fire Extinguishers. For the Fire Hydrant System, the pumping set for the system shall be installed in the Ground floor pump house, located in a suitable place as shown in the layout drawing. Water for the wetriser and fire ring main for pillar hydrants, shall be fed from the underground water sump through the respective pump set. All the fire pumps and equipments shall be UL Listed.

Fire Detection System includes the supply, installation, testing and commissioning of the addressable type fire detection and alarm notification required to form a complete, operative, coordinated system for the building. Fire detection and alarm system shall include, Fire Alarm Control Panel, Detections, Alarming Devices, and Control Wiring etc.

At least one emergency exit shall be provided for each compartment. A trapped man alarm shall be equipped with each cold room and ante room. clear illumination instructions on the method of escape shall be marked on the emergency exits.

The requirement, capacities and other specifications of Fire Protection, Detection and Alarm system shall be designed and installed CIDA Fire Regulation (CIDA/DEV/14) and Specifications (CIDA/SCA/08 and CIDA/SCA/09).

If any debatable or any misinformation shall refer relevant British Standards, NFPA Standard or any other suitable standard as approved by the Engineer.

8. Electricity, Telephone and Data System

The Contractor shall provide the necessary ducting to carry the wiring for electricity, telephone and data across the different parts of the warehouse.

9. Electricity, Telephone, Network and Data Management System

A warehouse data and information management system shall be equipped to the proper communication and operation information recording. It shall include Central Server System, Internet Connection, Wired and Wireless connection to the different location with Computer sand relevant software application, designed to support and optimize the warehouse functionality and storage management.

These systems facilitate management in their daily planning, organizing, staffing, directing, and controlling the utilization of available resources, to receive, move store and issue produce into, and out of a warehouse, while supporting staff in the performance of material movement and storage in and around a warehouse.

A private automatic branch exchange (PABX), automatic telephone switching system shall be equipped within the premises. The minimum number of direct dialing telephone lines shall be 10 numbers and extensions shall be not less than 100. High speed ADSL wireline telephone connection shall be provided to the office building and distribution shall be thereof. In addition to that minimum 2 numbers of wireless high speed 4G LTE connections shall be provided to the operation building, as directed by the Engineer. Wifi enable routers and other distribution system shall be provided by the contractor. The price quotation should identify and cost each of the components described above separately.

10. Racking & Store Configuration

A wide aisle racking system capable for retrieving pallets and to allow normal reach truck maneuverability is required. The racking system shall double-deep. All components of the Rack System (including the safety guards) shall be powder coated. The rack levels should be adjustable. The racks should be able to carry a minimum weight of 1,500kgs (excluding the safety factor). The lowest pallet would be placed on the floor. The racking system should be suitable for temperature-controlled warehouse operations.

11. Industrial Scales

The industrial type scales shall be floor mounting digital type scales having minimum weighing capacity of 3000kg. There shall be minimum six numbers of scales, which are digital and the minimum reading of not more than 100g. It should be possible to connect the reading from the scales to the warehouse management system.

12. Warehouse Management System (WMS)

A warehouse management system (WMS) shall be a software application and hardware system which shall need to control and manage the day-to-day operations as well as inventory control of the Onion logistics in the Cold Storage. WMS software shall guide the inventory receiving and storing, optimizes picking and shipping of orders and advises on inventory replenishment. The WMS shall keep track of the temperatures and permit the clients (those storing the produce) to monitor the temperature on a dynamic basis. The WMS should also permit the effective implementation of the 'Warehouse Receipt' mechanism. The WMS shall be a standalone application which shall include all input devices, data processing and storage devices, output devices, software and network monitoring systems etc.

13. Palettes and Crates

Pallet shall be at least 2 - Way Entry (4 -Way Entry is preferable) and suitable for racking. Entry to the 2-way entry pallets should be from the longer side. It shall be heavy duty light weight plastic and suitable for double deep racking and handling by both hand pallet trucks and electric reaches trucks.

The minimum racking weight on the pallet shall be 1250kg (without safety factor) and size shall be 1,200mm x l,000mm (LxW). Pallets shall be suitable for operation in a temperature controlled environment storing vegetables and fruits, and washable and be able to stack each other with minimum space requirements.

Plastic crates shall have a size of 600mm x 400mm x 300mm-320mm (LxWxH). It shall be of heavydutylight weight plastic. The minimum loading capacity shall be 30kg (of big onions). It shall be ideal for vegetable storage and perforated for proper ventilation. Minimum 2 handles shall be available to carry the crates. The crates should be both nestable and stackable. Maximum stacking capacity shall be 7 crates high and crates shall be washable and nestable.

14. Pallet Trucks for Loading / Unloading / Pallet & Crates Filling Bay

Fleet of pallet trucks shall be used to lift and move pallets at the Loading/Unloading Bay. Partially of them shall be manually operated hand pallet trucks while rest of the pallet trucks shall be electrical pallet trucks. Electrical charging points need to be provided at a suitable location as shown in the drawing. The minimum handling capacity of a hand pallet truck shall be 1500 kg. The Contractor shall indicate the cost per item and the recommended number of items as a separate item within the price quotation.

15. Electric Pallet Reach Trucks

The electrical powered forklifts and reach trucks shall be used to lift and move crate filled pallets and materials from sorting area to the temperature-controlled storage chambers. The minimum capacity of a fork lift shall benot less than 2500kg. Necessary charging points shall be provided for energizing the equipment.

The electric powered reach truck shall be used to lift and store the crate filled pallets into the appropriate racking position within the double deep racking system. The minimum capacity for the reach truck should be not less than 1250kg at 10m while storing the pallet in the deeper position of the double deep racking system. When selecting the number of Fork Lifts/Reach Trucks, it needs to be considered the idling trucks, which are at the charging condition. The minimum capacity of a reach truck shall be 2000 kg.

The fully charged electric Reach Truck/Fork Lift shall operate continuously 6 hours or more. The specifications of the proposed reach trucks must ensure the required operational parameters have been satisfied by the proposed reach truck. The isles required between racks should be the minimum specified or meet the requirement of the racking solution specified above.

The Bidder shall identify these items separately and indicate the unit cost and the recommended number of units separately within the price quotation.

SECTION - VII

- Form of Bid
- Form of Design
- Technical Proposal
- Form of Price Proposal

FORM OF BID

NAME OF CONTRACT: Design, Construction, and Commissioning of 5000 MT Temperature Controlled Warehouse facility at Dambulla

To: **Councellor (Department of Cooperation), High Commission of India, 36-38, Galle Road, Colombo-03**

We have examined the Conditions of Contract, Employer's Requirements, Schedules and Addenda Nos. ……. for the execution of the above-named Works. We accordingly offer to design, execute and complete the said Works and remedy any defects fit for the purpose, in conformity with the Bidding Documents and the enclosed Proposal, at the lump sum stated in the Form of Price Proposal included in a separate envelope and submitted with this bid, or other such sums as may be determined in accordance with the terms and conditions of the Contract.

We confirm that our bid includes this General Information, Price Proposal, and Design/Technical Proposal sealed under three separate envelopes.

We agree to abide by this Bid until…… *[insert date]*, and it shall remain binding upon us and may be accepted at any time before that date.

We confirm that, we (including all members of a joint venture and subcontractors) are not associated, directly or indirectly, with the consultant or any other entity in preparation of the design, specifications, and other documents for the Contract.

If this offer is accepted, we will provide the specified Performance Security, commence the Works as soon as reasonably practicable after the Commencement Date, and complete the Works in accordance with the above-named documents within the Time for Completion. We will ensure that works will be done in conformity with the contract.

Unless and until a formal Agreement is prepared and executed this Bid, together with your written acceptance thereof, shall constitute a binding Contract between us.

We understand that you are not bound to accept the lowest offer or any other bid you may receive.

Signature of the persons duly authorized to sign documents for and on behalf of

Address:

Date:

FORM OF DESIGN/TECHNICAL PROPOSAL

NAME OF CONTRACT: Design, Construction, and Commissioning of 5000 MT Temperature Controlled Warehouse facility at Dambulla

To: **Councellor (Department of Cooperation), High Commission of India, 36-38, Galle Road, Colombo-03**

We have examined the Conditions of Contract, Employer's Requirements, Schedules, and Addenda Nos.---------- for the execution of the above-named Works.

We accordingly offer to design, execute and complete the said Works and remedy any defects, fit for purpose in conformity with these Bidding Documents and the enclosed proposal. We are hereby submitting our Bid, which includes this Design/Technical Proposal, General Information and a Financial Proposal sealed under a separate envelopes.

We understand that you are not bound to accept the lowest offer or any other bid you may receive.

Signature of the persons duly authorized to sign documents for and on behalf of

Address:

Date:

FORM OF PRICE PROPOSAL

NAME OF CONTRACT: Design, Construction, and Commissioning of 5000 MT Temperature Controlled Warehouse facility at Dambulla

To: **Councellor (Department of Cooperation), High Commission of India, 36-38, Galle Road, Colombo-03**

We have examined the Conditions of Contract, Employer's Requirements, Schedules and Addenda Nos. ---------- for the execution of the above-named Works. We accordingly offer to design, execute and complete the said Works and remedy any defects fit for the purpose, in conformity with the Bidding Documents and the enclosed Proposal, for the fix lump sum of ---------- ---------- or other such sums as may be determined in accordance with the terms and conditions of the Contract. The above amounts are in accordance with the Price Schedules herewith and are made part of this bid. We confirm that our bid includes this Price Proposal, Design/Technical Proposal, and General Information sealed under a separate envelopes.

We accept your suggestions for the appointment of the Adjudicator, as set out in Bidding Data.

We agree to abide by this Bid until …… *[insert date]*, and it shall remain binding upon us and may be accepted at any time before that date.

We confirm that, we (including all members of a joint venture and subcontractors) are not associated, directly or indirectly, with the consultant or any other entity in preparation of the design, specifications, and other documents for the Contract.

If this offer is accepted, we will provide the specified Performance Security, commence the Works as soon as reasonably practicable after the Commencement Date, and complete the Works in accordance with the above-named documents within the Time for Completion. We will ensure that works will be done in conformity with the contract.

Unless and until a formal Agreement is prepared and executed this Bid, together with your written acceptance thereof, shall constitute a binding Contract between us.

We understand that you are not bound to accept the lowest offer or any other bid you may receive.

Signature of the persons duly authorized to sign documents for and on behalf of

Address:

Date:

* If the Bidder does not accept, this paragraph it may be deleted and replaced with:

We do not accept your suggestion for the appointment of the Adjudicator. We have included our suggestion in the Bid, but this suggestion is not a condition of this offer. If this suggestion is not acceptable to you, we propose that the Adjudicator be jointly appointed in accordance with Sub-Clause 35 of the Instructions to Bidders.

SECTION - VIII

SECTION - IX

Schedules

Schedule A1 – Preliminary Information

For joint ventures, each joint venture partner shall furnish information separately.

ITB Clause reference	Description	Information *(to be filled by the Bidder)*	Remarks
4.1 (a)	**Legal Status**		*Provide certified copies of Registration*
	Written power of attorney of the signatory to the Bid	*Provide original or certified copy of the power of attorney attested by a Notary and label as attachment to Clause 4.1(a)*	
	If a Joint Venture, names and addresses of Joint Venture Partners	1. …… 2. ……... 3. ……	*Provide a draft copy of the Joint Venture Agreement or alternatively the memorandum of understanding*
	If a Joint Venture, name of Lead Partner		
	For joint ventures, each joint venture partner shall furnish Legal Status separately		
	Name (Lead partner)		*Provide certified copies and label as attachment to Clause 4.1(a)*
	Legal status		
	Place of registration		
	Principle place of business		
	Written power of attorney of the signatory to the Bid	*Provide original or certified copy of the power of attorney attested by a Notary and label as attachment to Clause 5.1*	
	VAT Registration Number		
	Name (Partner 2)		*Provide certified copies and label as attachment to Clause 4.1 (a)*
	Legal status		
	Place of registration		
	Principle place of business		

	Written power of attorney of the signatory to the Bid	*Provide original or certified copy of the power of attorney attested by a Notary and label as attachment to Clause 4.1 (a)*	
	VAT Registration Number		
	Name (Partner 3)		*Provide certified copies and label as attachment to Clause 4.1 (a)*
	Legal status		
	Place of registration		
	Principle place of business		
	Written power of attorney of the signatory to the Bid	*Provide original or certified copy of the power of attorney attested by a Notary and label as attachment to Clause 4.1 (a)*	
	VAT Registration Number		
4.2 (a)	***CIDA (ICTAD) Registration***		*Provide certified copies and label as attachment to Clause 4.2(a)*
	Registration number		
	Grade		
	Specialty		
	Expiry Date		

Schedule A2 – Annual Turn-over Information (Construction only – Last five years)

For joint ventures, each joint venture partner shall furnish information separately.

Year	Turn-over	Remarks
1		*Attach audited reports and label as attachment to Clause 4.2*
2		
3		
4		
5		

Schedule A3 – Adequacy of Working Capital

Source of credit line	Amount	Remarks
		Provide documentary evidence and label as attachment to Clause 4.2
Total		

Schedule A4 – Construction Experience in last five years

For joint ventures, each joint venture partner shall furnish information separately.

Year	Employer	Description of Works	Amount	Contractor's Responsibility (%)
		Total		

- *Provide documentary evidence and label as attachment to Clause 4.2*

Schedule A5 – Design Experience in last five years

For joint ventures, each joint venture partner shall furnish information separately.

Year	Employer	Description of Works	Amount	Responsibility (%)
		Total		

Provide documentary evidence and label as attachment to Clause 4.2

Schedule A6 – Major Items of Construction Equipment Proposed	
Type	**Capacity**

Schedule A7 – Comments and Suggestions on Employer's Requirements

(enclose this schedule in envelope marked,"Envelope1–Design and Technical Proposal")

Bidders may include observations made on Employer's Requirements and any suggestions for consideration.

Schedule A8 – Contractor's Proposal

(enclose in envelope marked, " Envelope 1 – Design and Technical Proposal")

This schedule should be competed considering all the requirements given in the Employer's Requirements, including design criteria, specifications and technical data. (use additional pages if necessary)

Schedule A9 – Curriculum Vitae of Key Staff

(enclose Curriculum Vitae in envelope marked, " Envelope 1 – Design and Technical Proposal")

Proposed Position:	
Name of Staff:	
Profession:	
Date of Birth:	
Membership in Professional Societies:	
Detailed Tasks Assigned:	
Key Qualifications:	Give an outline of staff member's experience most pertinent to tasks or assignment. Describe degree of responsibility held by staff member on relevant previous assignments and give dates and locations. Use about half a page.
Education:	
Employment Record:	
Certification:	*I, the undersigned, certify that to the best of my knowledge and belief,, the information is correct.*

Signature of staff member Date

Schedule A10 – Team Composition and Task Assignment

(enclose this schedule in envelope marked, " Envelope 1 – Design and Technical Proposal)

A. Design Staff

Name	Position	Task

B. Construction Management

Name	Position	Task

Schedule A11 – Time Schedule for Key Staff																		
			Months (in the form of a Bar Chart)															
Name	**Position**	**Activities**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**Number of Months**

Schedule A12 – Work Program (Design Related Activities)

(enclose in envelope marked, " Envelope 1 – Design and Technical Proposal)

	[1st, 2nd, etc. are months from the Start Date.]														
Design Activity	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th

Schedule A13 – Work Program (Construction Related Activities)

(enclose this schedule in envelope marked, " Envelope 1 – Design and Technical Proposal)

	[1st, 2nd, etc. are months from the Start Date.]														
Construction Activity	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th

Schedule C1 – Price Schedule

(enclose all price schedules in envelope marked, " Envelope 2 – Financial Proposal")

Activity 1: Preliminaries

Item No:	Sub-activity description	Amount
1.1	Performance Security	
1.2	Insurances	
1.3		
1.4		
1.5		
1.6		
1.7		
1.8		
1.9		
1.10		
1.11		
1.12		
1.13		
	Any other Sub-activity (bidder to include)	
1.A1		
1.A2		
1.A3		
1.A4		
Total for Activity 1 carried to summary		

Schedule C1 – Price Schedule

(enclose all price schedules in envelope marked, " Envelope 2 – Financial Proposal")

Activity 2: Design

Item No:	Sub-activity description	Amount
2.1	Survey and Investigation	
2.2	Design of …….	
2.3	Design of ……..	
2.4		
2.5		
2.6		
2.7		
2.8		
2.9		
2.10		
2.11		
2.12		
	Any other Sub-activity (bidder to include)	
2.A1		
2.A2		
2.A3		
2.A4		
Total for Activity 2 carried to summary		

Schedule C1 – Price Schedule

(enclose all price schedules in envelope marked, " Envelope 2 – Financial Proposal")

Activity 3: ……..

Item No:	Sub-activity description	Amount
3.1		
3.2		
3.3		
3.4		
3.5		
3.6		
3.7		
3.8		
3.9		
3.10		
3.11		
3.12		
3.13		
	Any other Sub-activity (bidder to include)	
3.A1		
3.A2		
3.A3		
Total for Activity 3 carried to summary		

Schedule C2 – Price Schedule

(enclose all price schedules in envelope marked, " Envelope 2 – Financial Proposal")

Major Components	Foreign Component (Ex. All Taxes) SLR	Local Component (Ex. VAT) SLR	Total Amount (Ex. VAT& Taxes) SLR
1. Site Mobilization, Clearing, Surveying, Ground Preparation, Soil Testing including the cost of Ground-Breaking Ceremony.			
2. Obtaining necessary clearance from local authorities including clearances for Council Drawings, Street Lines, Electrical System, Fire Detection and Protection System, Public Health Inspectors Certification, EIA from Environmental Authority, COC certificates.			
3. Design and Construction of Sub Structure including Foundation Works, and Piling (if necessary), Termite Treatment, Boundary Walls and Water Sumps			
4. Design and Construction of Super Structure of the main Storage Building, and specified service areas including insulated Walls, Roofs, Floor Finishes, Surface Finishes, Paints.			
5. Design and Construction of Super Structureandother Supportive Buildings including, Walls, Roofs, Floor Finishes, Surface Finishes, Paints. Each building identified separately			
6. Design, Supply, Delivery and installation of Electrical Systems including Generator, ATS, cable management systems, electrical wiring, main and sub distribution boards, sub meters, lighting fixtures, termination devices, switch gears, sensors, protective equipment, lightening protection systems.			
7. Design, Supply, Delivery and installation of Six (6)Insulated Cold ChambersCold Rooms*			
a) Supply and installation, chamber walls, ceiling and floor panels, Doors with fixtures, Floor preparations.			

	b) Supply and installation of Refrigeration Systems including Chillers, Heat Exchangers, Evaporative Coolers (Cooling Towers), Pumps, Chilled water, Condenser Water, Refrigerant Pipes lines, Insulation, supportive structures, Evaporators, Control Panels, Electrical Power and Control Wiring, Chiller Management Systems, Temperature and Humidity Data Monitoring and Management System.			
	c) Supply and installation of Humidifying, De-humidifying and Fresh Air System.			
	d) Supply and installation of Racking System			
	8. Design and construction of loading and unloading bays, dock levelers for varying vehicle heights, and equipment to facilitate the stacking of crates on the pallets, dock seals, for the loading/unloading bay etc.			
	9. Establishing of Crate Filling Mechanism, Scales adjacent to the loading/unloading bays.			
	10. Design, Supply, Delivery and installation of Fire Protection, Detection, Suppression and Alarm system including Fire Pumps, Hydrant pipes networks, pillar hydrants, landing valves, hose reels, control valves, manifold, control panels, automatic fire detection devices, manual fire initiation devices, control and power wiring, Fire Alarm Control Panels (FACP), Repeater Panels, Alarming Devices, Interface and Control Modules.			
	11. Supply, design, delivery and installation of CCTV and Temperature Monitoring sensors and related data capture, storage, sharing and monitoring systems. All equipment control modules, monitoring sensors and related monitoring systems.			
	12. Design and installation of TelephoneandDataNetwork ducting systems			

13. Construction of Roads and Pavement Works, Drainage systems, Landscaping, Plantation, Flowering, Rain Water Harvesting System, Security Systems, Gates etc.			
14. Onsite, Off site, Witness Tests, Commissioning and Handover of individual system as well as total completed system, inventory documentation, Defect Identification, Training, Customer awareness programs, Fire and Other Safety Drills, etc.			
15. Obtaining Certificate of Completion from the relevant local National, International Bodies which ever applicable.			
16. Comprehensively Service and maintenance of the individual and whole system for the period of Defect Liability from the date of handing over.			
TOTAL			
Other Equipment			
17. Supply of Pallets (each)**			
18. Supply of Creates (each) **			
19. Reach Truck (each) **			
20. Warehouse Management System (WMS) ***			

* In addition to the price provided above under 7(a-d) for 6 cold chambers the Bidder shall also provide the cost for constructing one (1) cold chamber.
** No detailed
*** Provide the scope and specifications of the proposed WMS

Major Component	Foreign Component (Ex. All Taxes) SLR	Local Component (Ex. VAT) SLR	Total Amount (Ex. VAT& Taxes) SLR
21. Design, Supply, Delivery and installation of One (1)Insulated Cold Chambers Cold Rooms			
a) Supply and installation, chamber walls, ceiling and floor panels, Doors with fixtures, Floor preparations.			

b) Supply and installation of Refrigeration Systems including Chillers, Heat Exchangers, Evaporative Coolers (Cooling Towers), Pumps, Chilled water, Condenser Water, Refrigerant Pipes lines, Insulation, supportive structures, Evaporators, Control Panels, Electrical Power and Control Wiring, Chiller Management Systems, Temperature and Humidity Data Monitoring and Management System.			
c) Supply and installation of Humidifying, De-humidifying and Fresh Air System.			
d) Supply and installation of Racking System			

In addition to the summary pricing stated for each 'Major Component' indicated above, the Bidder shall provide detailed costs of all activities and components associated with each 'Major Component' in the following format. Expand as required.

Major Component Reference Number: 1

Item Number	Activity/Component	Unit	No. of Units	Unit Price In SLR	Total Price In SLR
1.1					
1.2					
	Total				

Major Component Reference Number: 2

Item Number	Activity/Component	Unit	No. of Units	Unit Price In SLR	Total Price In SLR
2.1					
2.2					
	Total				

Major Component Reference Number: 21

Item Number	Activity/Component	Unit	No. of Units	Unit Price In SLR	Total Price In SLR
21.1					
21.2					
	Total				

The Bidder must provide the following certification with the Financial Proposal.

Schedule C3 – Percentage for Overheads and profits for Plant, Materials or services to be purchased by the Contractor (if any) under Provisional Sums, in accordance with Sub-Clause 13.4 of Conditions of Contract

(enclose this schedule in envelope marked, " Envelope 2 – Financial Proposal")

(Required to fill by the bidder, only if Provisional Sum items are included in the Price Schedules by the Employer)

Item Number ***(1)***	**Amount of Provisional Sum** *(to be filled by the Employer)* **(2)**	**Percentage** *(to be filled by the bidder)* **(3)**	**Amount of Overhead and Profit** *(to be filled by the bidder)* **(4) = (2) * (3)/100**
Total Overheads and Profits carried to summary			

Schedule C4 – Price Schedule

(enclose this schedule in envelope marked, " Envelope 2 – Financial Proposal")

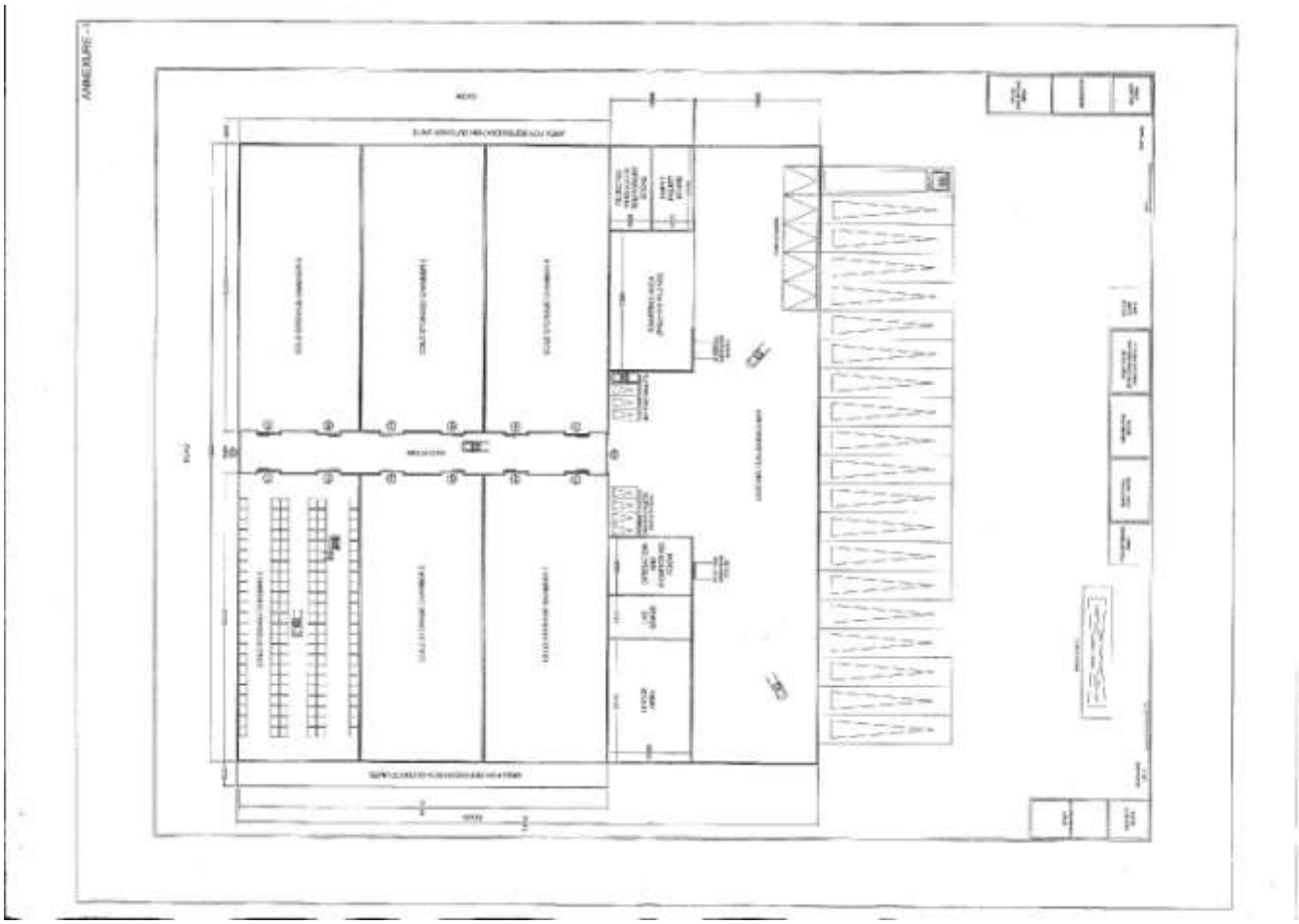
Sheet … of …..

Summary

Activity No:	Activity description	Amount
1	Preliminaries	
2	Design	
3		
4		
5		
6		
7		
8		
9		
	Any other activity (bidder to include)	
A		
B		
	Sub Total	
	Discounts	
	Add Day Work Schedule	
	Add overhead and Profits for Provisional Sums	
	Amount carried to Form of Bid	
	Add VAT	
Total		

Section IX

Drawings



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Geotechnical Investigation Report- Interpretation of Sub-Surface Conditions

for

Proposed Cold Warehouse for Dedicated Economic Center at Dabulla

on

15th October 2018

1.0 INTRODUCTION

This preliminary geotechnical report is prepared to recommend the geotechnical parameters require to design the foundations for proposed Warehouse for Dedicated Economic Center at Dabulla. The site for the proposed development is located near to the existing Economic Center at Dabulla. Fig. 1 shows the location of the proposed Building. It is learnt that the proposed building is in size of 75 m x 75m and basically use to storage facilities for vegetables. Any architectural drawing is not available at the time of preparation of this report. In order to examine the subsurface conditions, boring was carried out at selected locations.

Foundation and Waterwell Engineering (PVT) LTD was carried out subsurface exploration by carrying out five boreholes of the proposed development. This report is basically interpret the borehole logs . The variation of the subsurface material together with SPT values is presented.

The detailed report will be submitted with the availability of laboratory experimental results.

Fig. 1 Proposed Cold Warehouse for Dedicated Economic Center at Dabulla

2. SITE INSPECTION and SUBSURFACE EXPLORATION

The site is found to be comparatively level terrain surrounded by mountains. Initially, it was covered with vegetation. Rock outcrops was observed at some locations within the site of proposed development. Visual inspection reveals that the site consist of outcrops of mixed metamorphic rocks, the major rock type is identified as Biotote Gneiss. The field investigations reported herein is that of the borehole investigation.

2.1 Subsurface Exploration (Boreholes)

In order to examine the subsurface profile, five boreholes were conducted at the proposed development site. The locations of Boreholes are shown in Fig 2.

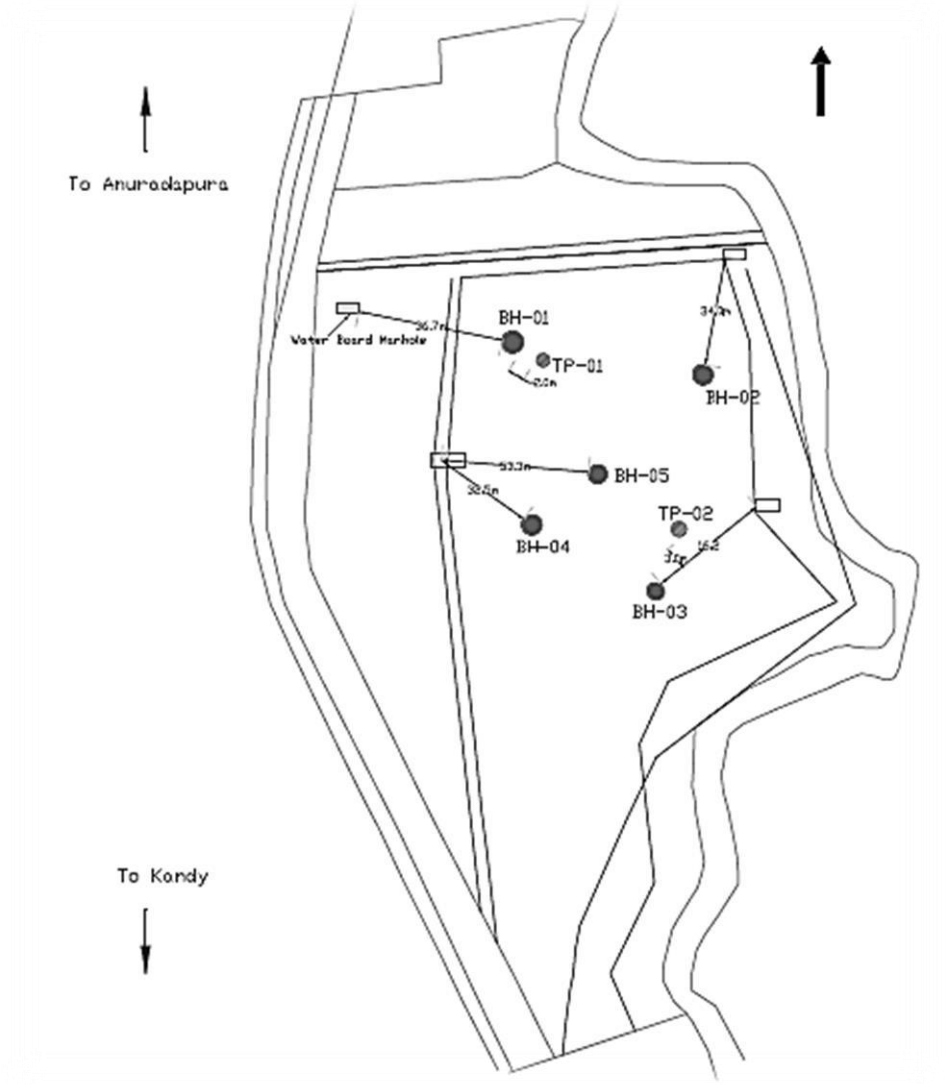


Fig. 2 Locations of the Boreholes

The borehole in the size of 75 mm in diameter was advanced through the overburden by rotary wash boring method. Cuttings were removed from the hole by the circulating water during drilling. Casing in the size of NX was used during the drilling process. All boreholes were initially advanced up to the hard rock level. Thereafter, they were further advanced to 1 m into the hard rock by coring the rock using a double tube core barrel. Fig. 2 shows the boring at designated locations and borehole samples.

(a) Borehole -01

(b) Borehole -02

(c) Borehole -03

(d) Borehole -04


(e) Bore hole -05

Fig. 3 Boring in Process at Designated Locations and Borehole Samples

Standard Penetration Tests (SPTs) were carried out at 1.0 m intervals up to the hard rock (N<50) to assess the relative densities of the ground materials. This was done by driving a standard split spoon sampler into undisturbed soil under the impact of 63.5 kg hammer falling through a height of 760 mm. The Standard Penetration Tests were performed in accordance with BS1377:1990: Part 9 and the test results are interpreted in the boring logs at the relevant test depths as shown in Annexure. Disturbed samples of soil were collected both from the SPT split spoon and the flushed water during drilling.

2.1 Summery of Boreholes

The details of the boreholes, together with the depth to GWT, depth to rock and the depth of the boreholes are given below. All depths are indicated with respect to a zero datum at top of each borehole. Table 1 summarize the borehole information. Ground water level (GWL) was determined as the depth at which the water level stabilized inside the borehole. Rock coring in boreholes had given following results for the Core Recovery (CR) and Rock Quality Designation (RQD) as in Table 2. The bed rock was found to be Biotite Gneiss.

Table 1 Borehole Information

Bore hole No.	BH-01	BH-02	BH-03	BH-04	BH-05
Coordinates	N 7° 51′ 52″ E 80° 39′ 10″	N 7° 51′ 51″ E 80° 39′ 12″	N 7° 51′ 50″ E 80° 39′ 12″	N 7° 51′ 50″ E 80° 39′ 11″	N 7° 51′ 52″ E 80° 39′ 09″
Depth to GWT/ m	3.90	2.90	3.90	3.90	3.90
Depth, SPT < 50 /m	4.00	6.00	6.00	5.00	7.50
Depth of Bore hole / m	5.00	11.30	10.00	10.00	8.50

Table 2 RQD and CR of Rock

Borehole No.	Depth Range / m	State of the Rock	CR/ %	RQD/ %
BH-01	4.00-5.00	Slightly Weathered Rock of GG	90	47
BH-02	8.30-10.00	Moderately Weathered Rock of BG	47	19
	10.00-10.50	Moderately Weathered Rock of BG	80	Nil
	10.50-11.30	Fresh Rock of BG	84	71
BH-03	7.50-9.00	Moderately Weathered Rock of BG	58	37
	9.00-10.00	Fresh Rock of BG	100	95
BH-04	7.50-9.50	Highly to Moderately Weathered Rock of BG	24	Nil
	9.50-10.00	Fresh Rock of BG	100	100
BH-05	7.50-8.50	Fresh Rock of BG	100	100

Note- BG- Biotite Gneiss; GG- Granitic Gneiss

2.2 Variation of Subsurface Conditions across the Site

Figs. 4 and 5 show the change of subsurface conditions across the site. It is observed that the subsurface consist of 0.3-0.5 m Sandy silty clay as at the top layer, and thereafter SAND with silt and clay mixed soil. Hard rock (SPT >50) layer is found to be below this layer. The borehole log details revealed that, hard rock layer consist of slightly to Fresh rock of Biotite

Gneiss except for BH-01. The rock encountered at BH-01 was found to be Granitic Gneiss of slightly weathered grade. The thickness of the overburden varies across the site unevenly.

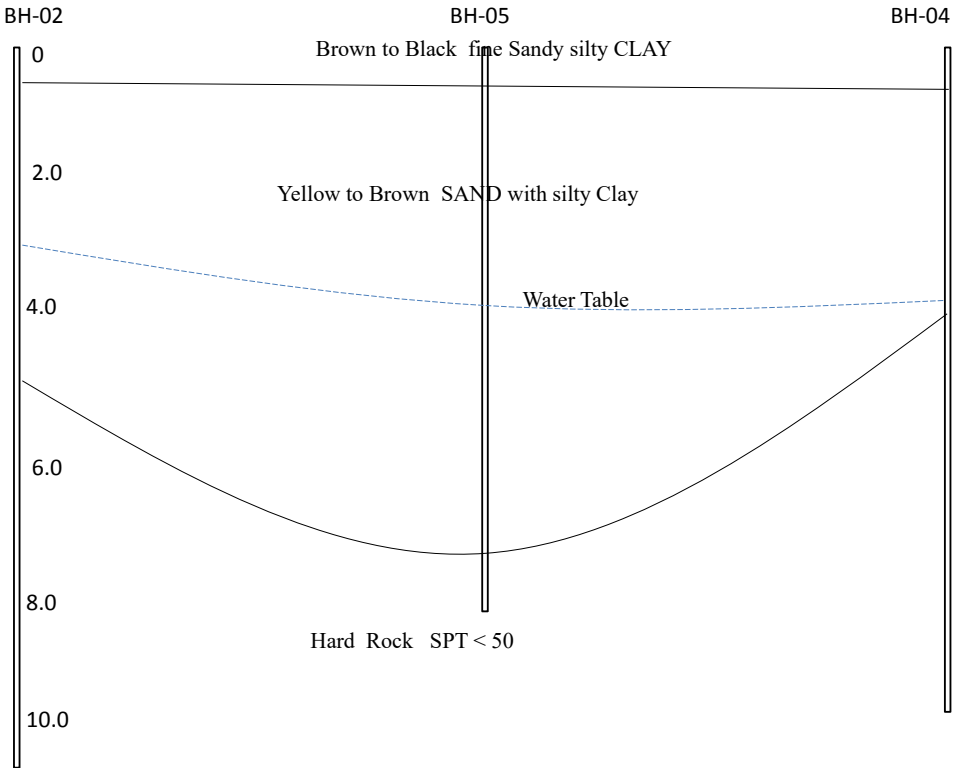


Fig. 4 Sub Soil Profile across BH-02, BH-05and BH-04

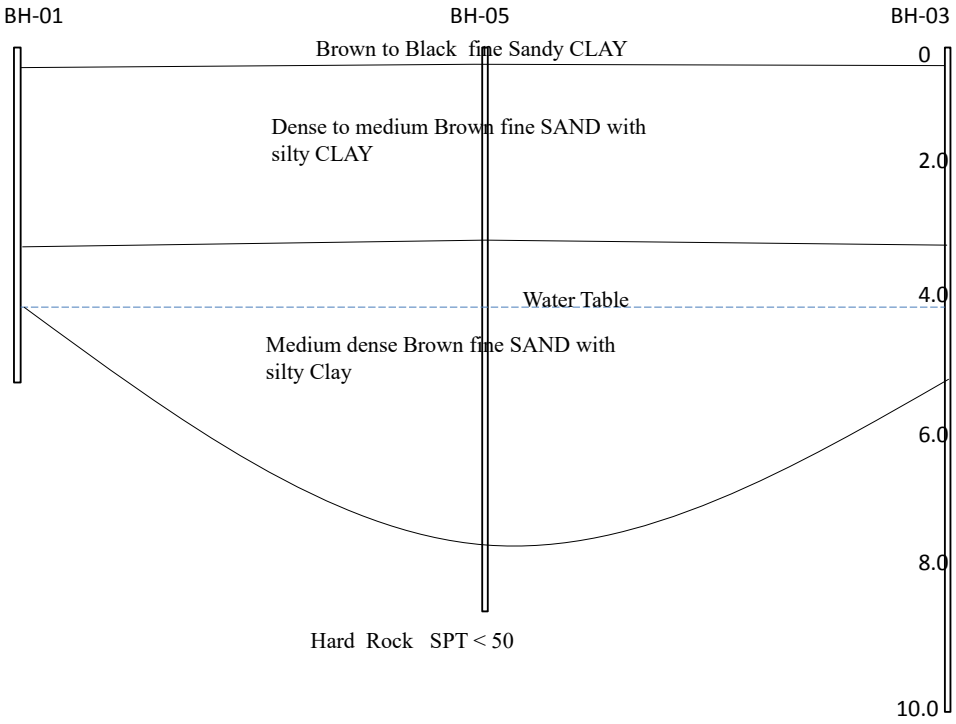


Fig. 5 Sub Soil Profile across BH-01, BH-05 and BH-03

3.0 VARIATIONS OF GEOTECHNICAL PROPERTIES ACROSS THE SITE

Tables 3, 4, 5, 6, and 7 summarize the corrected SPT values, Modulus of Elasticity (Modulus of Deformation), Friction Angle, and Ultimate Bearing Capacity of the layers for boreholes BH-01, BH-02, BH-03,BH-04, and BH-05, respectively. Corrections were made to the SPT values considering the effects overburden, and water table. Efficiency of the hammer was assumed as 70%.

Table 3 Properties and Ultimate Bearing Capacity of the Layers of BH1

Depth Range /m	Depth of SPT test /m	Corrected N Value	Average Es/kPa	Friction Angle /˚	Ultimate Bearing Capacity/kPa
0.00-1.00	-	-	-	-	-
1.00-2.00	1.00	35	2,9000	38	750
2.00- 4.00	2.00, 3.00	20	23,000	30	420
4.00 -5.00	4.00	>50, HR	28,000	-	>3000

Table 4 Properties and Ultimate Bearing Capacity of the Layers of BH2

Depth Range /m	Depth of SPT test /m	Corrected N Value	Average Es/kPa	Friction Angle /˚	Ultimate Bearing Capacity/kPa
0.00-1.00	-	-	-	-	-
1.00-2.00	1.00	43	34,000	40	800
2.00-3.00	2.00	31	26,000	36	650
3.00 -4.00	3.00	14	26,000	28	350
4.00 -5.00	4.00	32	26,000	37	650
5.00 -6.00	5.00	18	26,000	31	450
6.00 -8.30	6.00, 7.50	>50	28,000	43	>1500
8.30 -11.00		HR	30,000		>3000

Table 5 Properties and Ultimate Bearing Capacity of the Layers of BH3

Depth Range /m	Depth of SPT test /m	Corrected N Value	Average Es/kPa	Friction Angle /˚	Ultimate Bearing Capacity/kPa
0.00-1.00	-	-	-	-	-
1.00-2.00	1.00	43	34,000	40	800
2.00-3.00	2.00	24	28,000	34	600
3.00 -4.00	3.00	28	27,000	35	630
4.00 -5.00	4.00	14	24,000	28	350
5.00 -7.50	5.00	>50	30,000	43	>1500
7.50 -10.00	7.50	>50, HR			>3000

Table 6 Properties and Ultimate Bearing Capacity of the Layers of BH4

Depth Range /m	Depth of SPT test /m	Corrected N Value	Average Es/kPa	Friction Angle /˚	Ultimate Bearing Capacity/kPa
0.00-1.00	-	-	-	-	-
1.00-2.00	1.00	41	33,000	40	800
2.00-3.00	2.00	49	36,000	42	800
3.00 -4.00	3.00	19	30,000	31	450
4.00 -5.00	4.00	24	28,000	34	600
5.00 -7.50	5.00	>50	30,000	43	>1500
7.50 -10.00	7.50	>50, HR			>3000

Table 7 Properties and Ultimate Bearing Capacity of the Layers of BH5

Depth Range /m	Depth of SPT test /m	Corrected N Value	Average Es/kPa	Friction Angle /˚	Ultimate Bearing Capacity/kPa
0.00-1.00	-	-	-	-	-
1.00-2.00	1.00	25	23,000	34	600
2.00-3.00	2.00	45	29,000	41	800
3.00 -4.00	3.00	28	28,000	35	600
4.00 -5.00	4.00	26	27,000	34	600
5.00 -6.00	5.00	25	26,000	34	600
6.00 -7.50	6.00	19	25,000	31	450
7.50 -8.50	7.5	>50, HR	28,000		>3000

Note – Es – Most conservative values;

HR-Hard Rock, (Slightly Weathered Rock, Fresh Rock)

3.1. Factors affecting the selection of foundations

Factors affecting the selection of the foundations are based on followings.

- **Loads and load effects** to be transferred from the structure to the subsurface layers; any structural drawing is not available at the time of preparation of this report. The economical design foundation requires the loads from the superstructure.

- **Subsurface conditions** as encountered at the site as detailed above and found to be consisted of comparatively strong layers with higher SPT values at most of the layers. However, comparatively low SPT values were observed at some locations below 3 m at BH-02, and BH-04; below 4 m at BH-03; below 2 m at BH-01. The compressibility characteristics need to be examined if the foundations are placed above these layers. These layers are underlain by a hard layer (Rock).

- Position of the **ground water table** which is encountered at approximately 3.9 m at most of the locations and 2.9 m at one location. This could be change with the weather conditions.

4.0 RECOMMENDATIONS for FOUNDATIONS

Based on the borehole log reports, following recommendations are drawn in general for the process of planning and designing of the foundation for the proposed facility.

a) Shallow foundation is recommended as the presence of comparatively strong layers with higher bearing capacity.

b) Isolated pad footing or raft foundation is recommended depending on the structural loads. The depth of the base of the isolated footing may vary with the subsurface conditions, and should be preferably after 3.5 m in most of the locations to avoid the expansive soil layers (if available) above the mentioned depth. Laboratory experiments are in progress to determine the swelling characteristics of soils. The depth to the footing has to be decided after completion of laboratory experiments. Else, if the footing places above this layer, the footing should be design to cater the swelling pressure. The ultimate bearing capacity values can be obtained from the Tables 3-7. Factor of safety 2.5 is suggested to determine the allowable bearing capacity of the layers.

c) If the raft foundation to be used, then it can be placed below any depth below 1.5 m. The requirement for bearing capacity and settlement need to be satisfied. The allowable settlement 50 mm is recommended.

d) Deep foundations can be adopted based on the structural loads of the superstructure. If any deep foundation to be adopted then those foundation should be socketed into hard rock (slightly weathered rock or Fresh rock). The socked length of the foundation should be designed according to the properties of the layer.

Note- It should be noted that the results and recommendations of this report are solely based on the site inspection, collected samples from the drilled boreholes and assuming that the subsurface conditions do not significantly deviate from those encountered. **The detailed report will be submitted upon the completion of Laboratory experiments.**

Dr. A.M.R.G. Athapaththu
Geotechnical Consultant
D.Eng MPhil (Eng.), BSc. (Eng.) (Hons) MSLGS, AMIESL(5310)
15th October 2018

FOUNDATION & WATERWELL ENGINEERING (PVT) LTD

THE GEOTECHNICAL SITE INVESTIGATION LOGS FOR THE PROPOSED COLD WAREHOUSE FOR DEDICATED ECONOMIC CENTRE AT DAMBULLA

CLIENT

THE COMISSIONER, FOOD DEPARTMENT

PROJECT CONSULTANT

ENGINEERING DESIGN CENTRE – UNIVERSITY OF PERADENIYA

FORWARDED BY

FOUNDATION & WATERWELL ENGINEERING [PVT] LTD

Professional Geotechnical Engineering Solutions for On and Off Shore Soil Investigations, Soil Nailing, Soil Stabilizing, Grouting and Ground Improvement

4th Cross Lane, Jaya Mawatha, Ratmalana, Sri Lanka
Tel: +94 115555008 | Fax : +94 112624582
Web: www.foundationandwaterwell.com | Email: fwweng@sol.lk

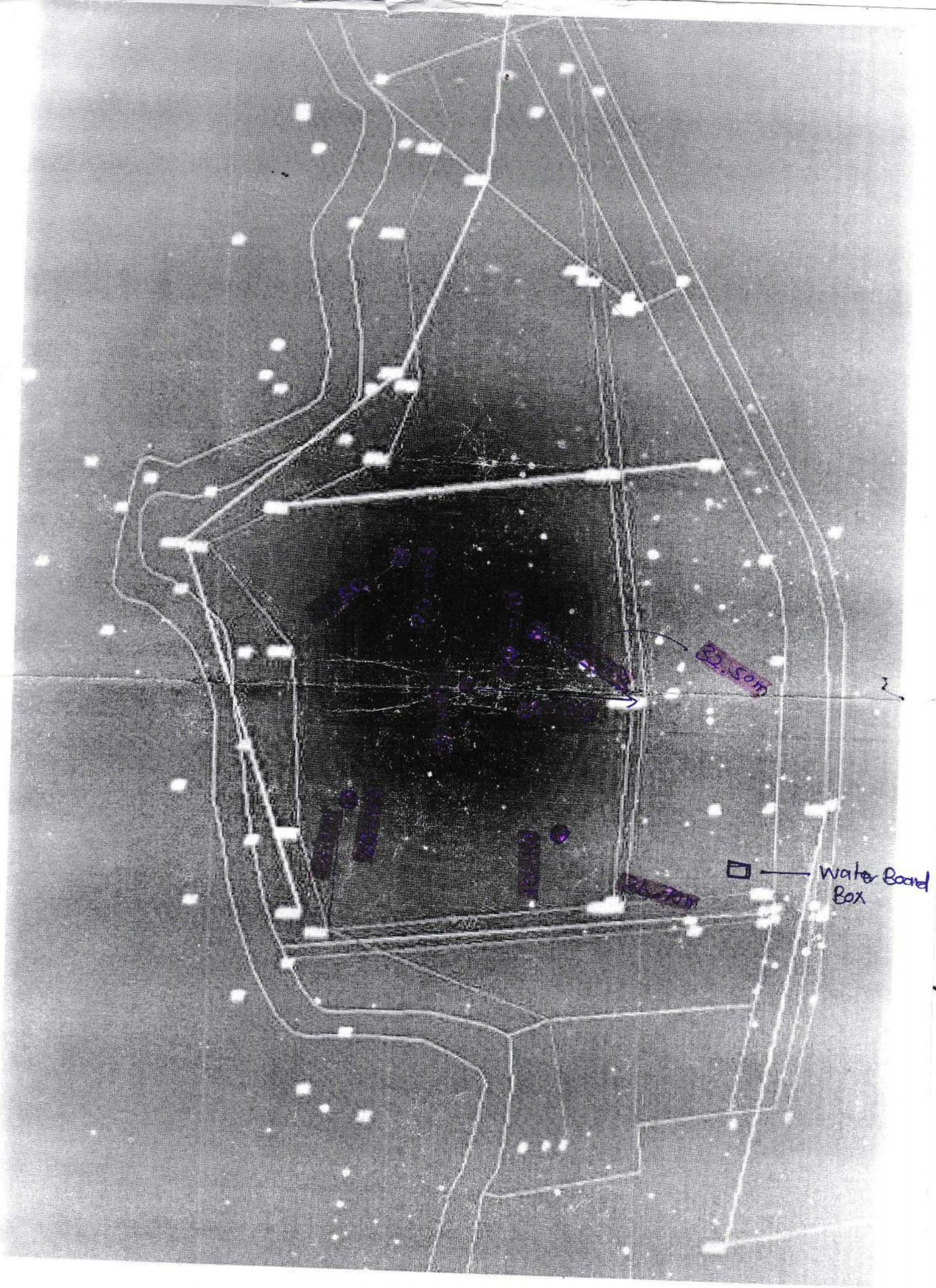
OCTOBER 2018

CONTENTS

ANNEXURE

Annex - A

(Borehole Location Plan)


Water Board Box

Annex - B

(Logs of Borehole)

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"Pioneers in Geotechnical/Soil Investigations & Ground Water Supply"
Tel/Fax: 011-2624582, 011-5555008

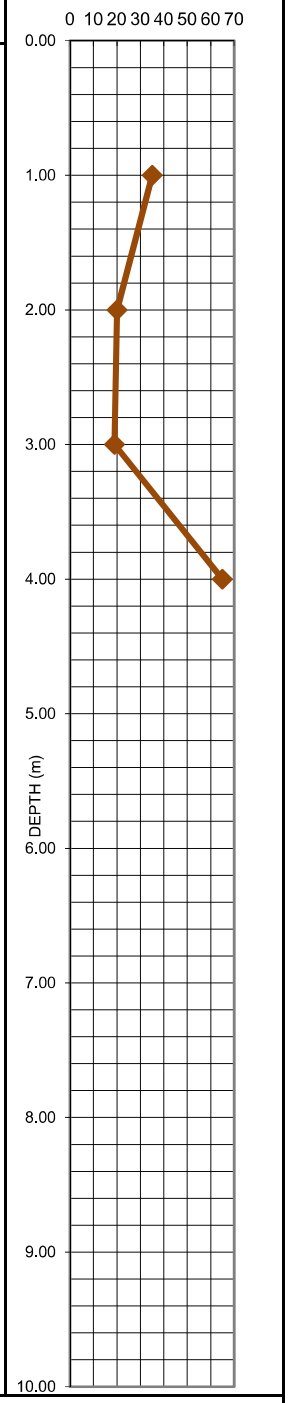
BORING NO: BH - 01 | Sheet 01 of 01

BOREHOLE LOG

COORDINATES
N: 7° 51′ 52″
E: 80° 39′ 10″

PROJECT:	Soil Investigation for Proposed Cold Warehouse For Dedicated Economic Centre At Dambulla		
CLIENT:	The Comissioner, Food Department		
PROJECT ARCHITECT / CONSULTANT:	Engineering Design Centre, University Of Peradeniya		
LOCATION:	Dambulla	**ELEVATION:**	Existing ground level as Zero
DRILLING METHOD & EQUIPMENT:	Rotary Hydraulic Drilling & Sampling, 63.5kg hammer at 76cm drop		
START: 25/09/2018	**END:** 25/09/2018	**LOGGER:**	Thilina

ELEVATION	DEPTH (m)	THICKNESS (m)	SOIL SAMPLE	SOIL SYMBOL	SOIL DESCRIPTION	SYMBOLIC LOG	STANDARDED PENETRATION TEST DEPTH (m)	SPT 'N'
	0.00	0.30		CL	Blackish brown, fine sandy CLAY			
	0.30							
	1.00	2.70	D/S (1)	SP	Dense to medium dense, brown, fine SAND with silty clay		**1.00**	**35**
							15-07	
							15-17	
							15-18	
	2.00		D/S (2)				**2.00**	**20**
							15-02	
							15-02	
							15-18	
	3.00	1.00	D/S (3)		Medium dense, yellowish brown fine to medium SAND with trace of clay & mica		**3.00**	**19**
							15-05	
							15-08	
							15-11	
	4.00				*(Bedrock level)*		**4.00**	**>50**
		1.00	D/S (4)	R	Slightly weathered, pink granitic GNEISS rock CR - 90% RQD - 47%		15-HB	
							15-	
	5.00				End of boring at 5.00m depth		15-	
	6.00							
	7.00							
	8.00							
	9.00							
	10.00							



KEY
- **HB - Hammer Rebounded(SPT)**
- **WOH - Weight of Hammer(SPT)**
- **WOR - Weight of Rods(SPT)**
- **U/S - Undisturbed Sample**
- **D/S - Disturbed Sample**

REMARKS:
01. Borehole was completed at 5.00m depth.
02. Ground water table was at 3.90m below existing ground level.
03. Borehole was terminated as per the instructions given by the Project Consultant.

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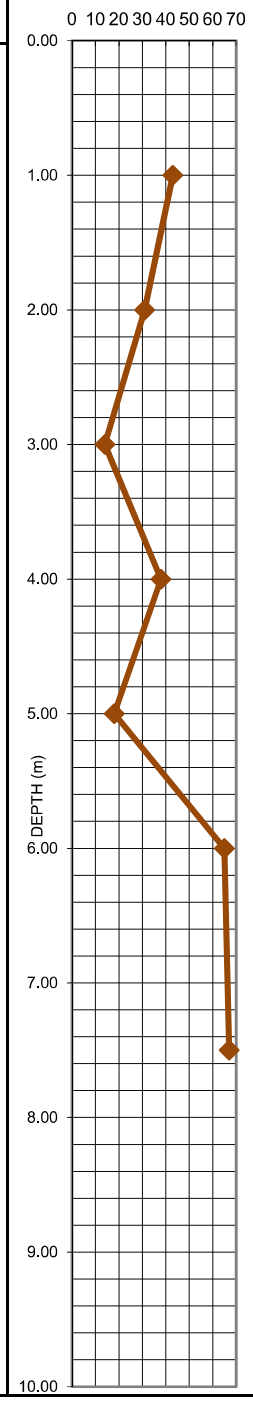
BORING NO: BH - 02 | Sheet 01 of 02

BOREHOLE LOG

COORDINATES
N: 7° 51′ 51′′
E: 80° 39′ 12′′

PROJECT:	Soil Investigation for Proposed Cold Warehouse For Dedicated Economic Centre At Dambulla		
CLIENT:	The Comissioner, Food Department		
PROJECT ARCHITECT / CONSULTANT:	Engineering Design Centre, University Of Peradeniya		
LOCATION:	Dambulla	**ELEVATION:**	Existing ground level as Zero
DRILLING METHOD & EQUIPMENT:	Rotary Hydraulic Drilling & Sampling, 63.5kg hammer at 76cm drop		
START: 26/09/2018	**END:** 27/09/2018	**LOGGER:**	Thilina

ELEVATION	DEPTH (m)	THICKNESS (m)	SOIL SAMPLE	SOIL SYMBOL	SOIL DESCRIPTION	SYMBOLIC LOG	STANDARDED PENETRATION TEST DEPTH (m)	SPT 'N'
	0.00	0.40		ML	Brownish black, fine sandy silty CLAY with organic matter (Surface layer)			
	0.40							
	1.00		D/S (1)				1.00	43
							15-15	
							15-19	
							15-24	
	2.00						2.00	31
		3.30	D/S (2)	SP	Medium dense to dense, light brownish yellow fine SAND with silty clay		15-07	
							15-13	
							15-18	
	3.00		D/S (3)				3.00	14
							15-04	
							15-05	
	3.70						15-09	
	4.00						4.00	38
			D/S (4)				15-10	
							15-18	
							15-20	
	5.00		D/S (5)				5.00	18
							15-06	
							15-07	
							15-11	
	6.00						6.00	>50
		4.60	D/S (6)	SP	Completely weathered rock, disintegrating to medium dense to very dense, light grey, fine to medium SAND with trace of clay & mica		15-11	
							15-12/HB	
							15-	
	7.00							
							7.50	>50
			D/S (7)				15-HB	
	8.00							
	8.30				*(Bedrock level)*			
	9.00							
		1.50	D/S (8)	R	Dark grey, moderately weathered, Biotite GNEISS rock CR - 47% RQD - 19%			
	9.80							
	10.00				See page 02 of 02			



KEY
- **HB - Hammer Rebounded(SPT)**
- **WOH - Weight of Hammer(SPT)**
- **WOR - Weight of Rods(SPT)**
- **U/S - Undisturbed Sample**
- **D/S - Disturbed Sample**

REMARKS:
01. Borehole was completed at 11.30m depth.
02. Ground water table was at 2.90m below existing ground level.
03. Borehole was terminated as per the instructions given by the Project Consultant.

FOUNDATION & WATERWELL ENGINEERING (PVT) LTD

"Pioneers in Geotechnical/Soil Investigations & Ground Water Supply"

Tel/Fax: 011-2624582, 011-5555008

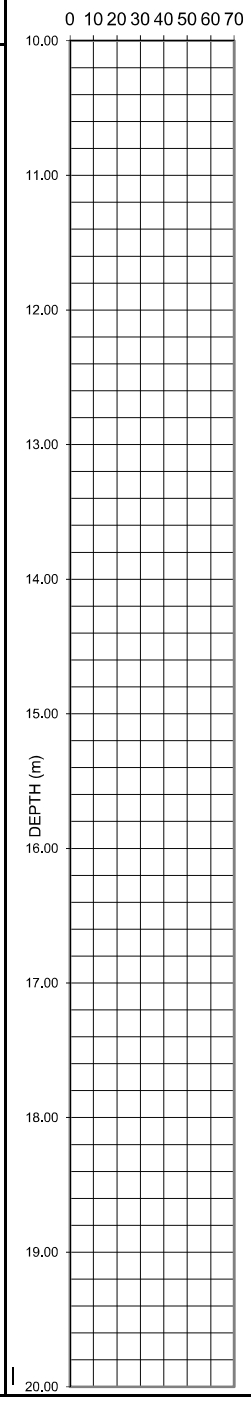
BORING NO: BH - 02 | Sheet 02 of 02

BOREHOLE LOG

COORDINATES
E: 7° 51′ 51′′
N: 80° 39′ 12′′

PROJECT:	Soil Investigation for Proposed Cold Warehouse For Dedicated Economic Centre At Dambulla		
CLIENT:	The Comissioner, Food Department		
PROJECT ARCHITECT / CONSULTANT:	Engineering Design Centre, University Of Peradeniya		
LOCATION:	Dambulla	**ELEVATION:**	Existing ground level as Zero
DRILLING METHOD & EQUIPMENT:	Rotary Hydraulic Drilling & Sampling, 63.5kg hammer at 76cm drop		
START: 26/09/2018	**END:** 27/09/2018	**LOGGER:**	Thilina

ELEVATION	DEPTH (m)	THICKNESS (m)	SOIL SAMPLE	SOIL SYMBOL	SOIL DESCRIPTION	SYMBOLIC LOG	STANDARDED PENETRATION TEST DEPTH (m)	STANDARDED PENETRATION TEST SPT 'N'
	10.00	0.50		R	Moderately weathered Biotite GNEISS rock CR - 80% RQD - Nil			
	10.30							
	11.00	1.00		R	Grey, fresh Biotite GNEISS rock CR - 84% RQD - 71%			
	11.30				End of boring at 11.30m depth			
	12.00							
	13.00							
	14.00							
	15.00							
	16.00							
	17.00							
	18.00							
	19.00							
	20.00							



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- **HB - Hammer Rebounded(SPT)**
- **WOH - Weight of Hammer(SPT)**
- **WOR - Weight of Rods(SPT)**
- **U/S - Undisturbed Sample**
- **D/S - Disturbed Sample**

REMARKS:

FOUNDATION & WATERWELL ENGINEERING (PVT) LTD

"Pioneers in Geotechnical/Soil Investigations & Ground Water Supply"
Tel/Fax: 011-2624582, 011-5555008

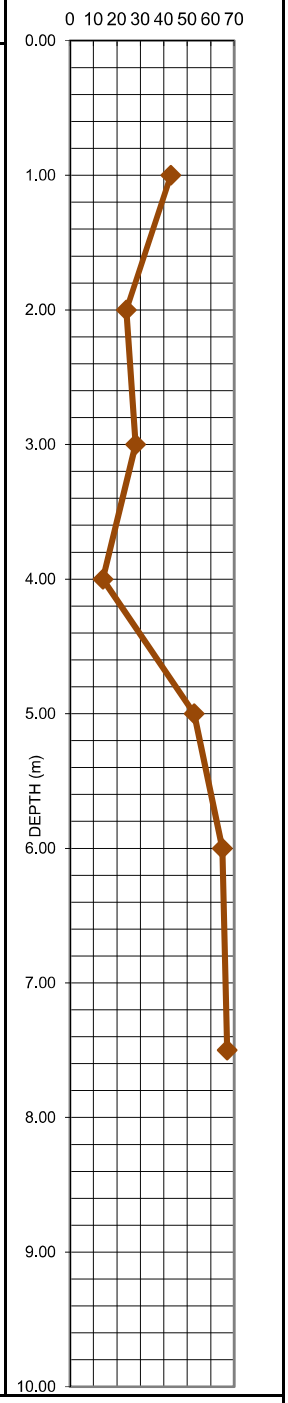
BORING NO: BH - 03 | Sheet 01 of 01

BOREHOLE LOG

COORDINATES
N: 7° 51′ 50″
E: 80° 39′ 12″

PROJECT:	Soil Investigation for Proposed Cold Warehouse For Dedicated Economic Centre At Dambulla		
CLIENT:	The Comissioner, Food Department		
PROJECT ARCHITECT / CONSULTANT:	Engineering Design Centre, University Of Peradeniya		
LOCATION:	Dambulla	**ELEVATION:**	Existing ground level as Zero
DRILLING METHOD & EQUIPMENT:	Rotary Hydraulic Drilling & Sampling, 63.5kg hammer at 76cm drop		
START: 27/09/2018	**END:** 28/09/2018	**LOGGER:**	M.Chandrakanth

ELEVATION	DEPTH (m)	THICKNESS (m)	SOIL SAMPLE	SOIL SYMBOL	SOIL DESCRIPTION	SYMBOLIC LOG	STANDARDED PENETRATION TEST DEPTH (m)	SPT 'N'
	0.00	0.30		CL	Brownish black, fine Sandy CLAY with organic matter			
	0.30							
	1.00	2.70	D/S (1)	SP	Dense, brown, fine SAND with clay		**1.00**	**43**
							15-10	
							15-19	
							15-24	
	2.00		D/S (2)				**2.00**	**24**
							15-02	
							15-07	
							15-17	
	3.00						**3.00**	**28**
		2.00	D/S (3)	ML	Stiff to very stiff, yellowish brown, fine to medium sandy SILTY CLAY		15-07	
							15-13	
							15-15	
	4.00		D/S (4)				**4.00**	**14**
							15-05	
							15-07	
							15-07	
	5.00						**5.00**	**53**
		2.50	D/S (5)	SC	Very dense, whitish grey, CLAYEY SAMD with mica, completely weathered rock		15-18	
							15-24	
							15-29	
	6.00		D/S (6)				**6.00**	**>50**
							15-HB	
							15-	
							15-	
	7.00							
	7.50				*(Bedrock level)*		**7.50**	**>50**
		1.50	D/S (7)	R	Grey, moderately weathered rock CR - 58% RQD - 37%		15-HB	
	8.00							
	9.00							
		1.00	D/S (8)	R	Whitish grey, fresh Biotite GNEISS rock CR - 100% RQD - 95%			
	10.00							



KEY
- **HB - Hammer Rebounded(SPT)**
- **WOH - Weight of Hammer(SPT)**
- **WOR - Weight of Rods(SPT)**
- **U/S - Undisturbed Sample**
- **D/S - Disturbed Sample**

REMARKS:
01. Borehole was completed at 10.00m depth.
02. Ground water table was at 3.90m below existing ground level.
03. Borehole was terminated as per the instructions given by the Project Consultant.

FOUNDATION & WATERWELL ENGINEERING (PVT) LTD

"Pioneers in Geotechnical/Soil Investigations & Ground Water Supply"

Tel/Fax: 011-2624582, 011-5555008

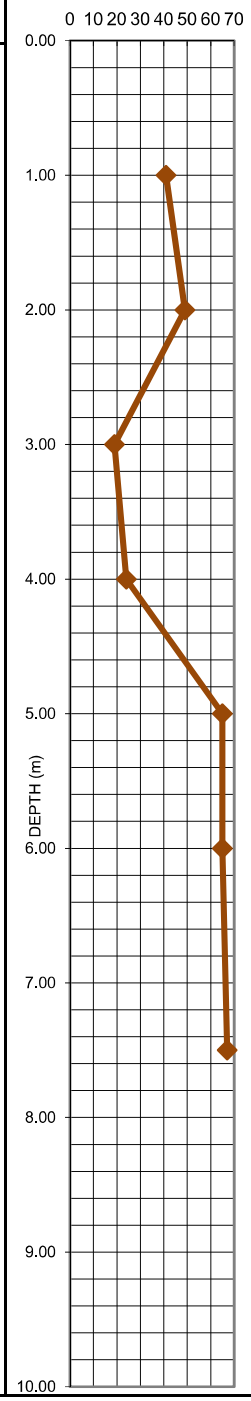
BORING NO: BH - 04 | Sheet 01 of 01

BOREHOLE LOG

COORDINATES
N: 7° 51′ 50″
E: 80° 39′ 11″

PROJECT:	Soil Investigation for Proposed Cold Warehouse For Dedicated Economic Centre At Dambulla		
CLIENT:	The Comissioner, Food Department		
PROJECT ARCHITECT / CONSULTANT:	Engineering Design Centre, University Of Peradeniya		
LOCATION:	Dambulla	**ELEVATION:**	Existing ground level as Zero
DRILLING METHOD & EQUIPMENT:	Rotary Hydraulic Drilling & Sampling, 63.5kg hammer at 76cm drop		
START: 10-01-18	**END:** 10-01-18	**LOGGER:**	M.Chandrakanth

ELEVATION	DEPTH (m)	THICKNESS (m)	SOIL SAMPLE	SOIL SYMBOL	SOIL DESCRIPTION	SYMBOLIC LOG	STANDARDED PENETRATION TEST DEPTH (m)	SPT 'N'
	0.00	0.60		ML	Yellowish brown, fine to medium sandy SILTY CLAY			
	0.60							
	1.00	2.40	D/S (1)	SP	Dense, yellowish brown, fine SAND with trace of clay		1.00	41
							15-06	
							15-20	
							15-21	
	2.00		D/S (2)				2.00	49
							15-09	
							15-23	
							15-26	
	3.00	1.00	D/S (3)	CL	Stiff, yellowish brown fine sandy CLAY		3.00	19
							15-04	
							15-08	
							15-11	
	4.00	3.50	D/S (4)	SC	Dense to very dense, yellowish brown to whitish grey CLAYEY SAND with mica, completely weathered rock		4.00	24
							15-05	
							15-10	
							15-14	
	5.00		D/S (5)				5.00	>50
							15-16/HB	
							15-	
							15-	
	6.00		D/S (6)				6.00	>50
							15-12/HB	
							15-	
							15-	
	7.00							
	7.50				*(Bedrock level)*		7.50	>50
							15-HB	
	8.00	2.00		R	Highly to moderately weathered Biotite GNEISS rock CR - 24% RQD - Nil			
	9.00							
	9.50							
	10.00	0.50		R	Fresh, Biotite GNEISS rock CR - 100% RQD - 100%			



KEY

HB - Hammer Rebounded(SPT)
WOH - Weight of Hammer(SPT)
WOR - Weight of Rods(SPT)
U/S - Undisturbed Sample
D/S - Disturbed Sample

REMARKS:

01. Borehole was completed at 10.00m depth.
02. Ground water table was at 3.90m below existing ground level.
03. Borehole was terminated as per the instructions given by the Project Consultant.

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Tel/Fax: 011-2624582, 011-5555008

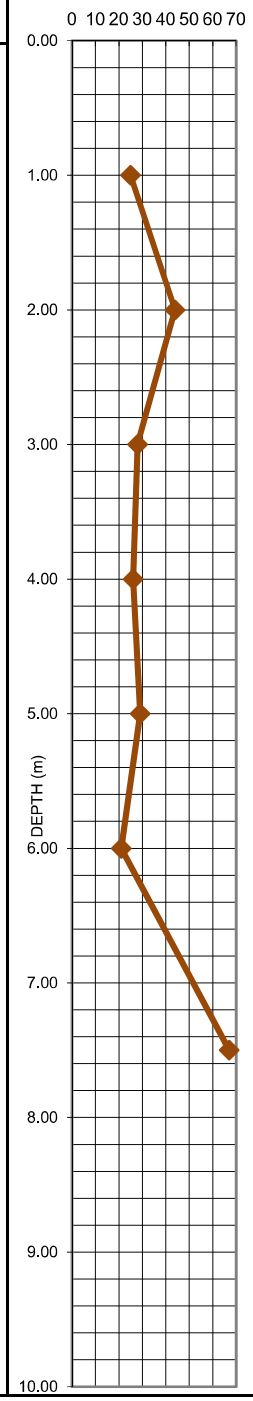
BORING NO: BH - 05 | Sheet 01 of 01

BOREHOLE LOG

COORDINATES
N: 7° 51′ 52″
E: 80° 39′ 09″

PROJECT:	Soil Investigation for Proposed Cold Warehouse For Dedicated Economic Centre At Dambulla		
CLIENT:	The Comissioner, Food Department		
PROJECT ARCHITECT / CONSULTANT:	Engineering Design Centre, University Of Peradeniya		
LOCATION:	Dambulla	**ELEVATION:**	Existing ground level as Zero
DRILLING METHOD & EQUIPMENT:	Rotary Hydraulic Drilling & Sampling, 63.5kg hammer at 76cm drop		
START: 29/09/2018	**END:** 30/09/2018	**LOGGER:**	M.Chandrakanth

ELEVATION	DEPTH (m)	THICKNESS (m)	SOIL SAMPLE	SOIL SYMBOL	SOIL DESCRIPTION	SYMBOLIC LOG	STANDARDED PENETRATION TEST DEPTH (m)	SPT 'N'
	0.00	0.50			Brown, fine to medium sandy CLAY with organic matter			
	0.50							
	1.00	2.30	D/S (1)	SP	Dense, brownish yellow, fine SAND with trace of clay		**1.00** 15-08 15-11 15-14 **2.00** 15-12 15-21 15-24 **3.00**	**25** **45** **28**
	2.00		D/S (2)					
	3.00	1.20	D/S (3)	SP	Dense, yellowish brown, fine to medium SAND with trace of clay		15-07 15-14 15-14 **4.00**	 **26**
	4.00	1.00	D/S (4)	CL	Very stiff, light greyish yellow, fine to medium sandy CLAY		15-06 15-12 15-14 **5.00**	 **29**
	5.00	2.50	D/S (5)	SC	Medium dense, yellowish grey, CLAYEY SAND with mica, completely weathered rock		15-07 15-14 15-15 **6.00** 15-06 15-08 15-13	 **21**
	6.00		D/S (6)					
	7.00				*(Bedrock level)*		**7.50** 15-HB	**>50**
	7.50	1.00	D/S (7)		Whitish grey, fresh Biotite GNEISS rock CR - 100% RQD - 100%			
	8.00							
	8.50				End of boring at 8.50m depth			
	9.00		D/S (8)					
	10.00							



KEY
- **HB - Hammer Rebounded(SPT)**
- **WOH - Weight of Hammer(SPT)**
- **WOR - Weight of Rods(SPT)**
- **U/S - Undisturbed Sample**
- **D/S - Disturbed Sample**

REMARKS:
01. Borehole was completed at 8.50m depth.
02. Ground water table was at 3.90m below existing ground level.
03. Borehole was terminated as per the instructions given by the Project Consultant.

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