REPUBLIC OF THE PHILIPPINES

NATIONAL POWER CORPORATION

(Pambansang Korporasyon sa Elektrisidad)

BID DOCUMENTS

Name of Project : **CONSTRUCTION OF 10 KL RAIN WATER COLLECTOR AND OFFICE/STAFF HOUSE AT MANGSEE SPP**

Project Location : **MANGSEE, BALABAC, PALAWAN**

Specs No. : **LuzP21Z1271Sc**

PR Number : S1-MGP22-003

Contents:

Design and Development Department

DD

SECTION I

INVITATION TO BID

National Power Corporation
INVITATION TO BID
PUBLIC BIDDING – BCS 2022-0604

1. The NATIONAL POWER CORPORATION (NPC), through its approved Corporate Budget of CY 2022 intends to apply the sum of **(Please see schedule below)** being the Approved Budget for the Contract (ABC) to payments under the contract. Bids received in excess of the ABC shall be automatically rejected at Bid opening.

PR Nos./PB Ref No. & Description	Similar Contracts	Pre-bid Conference	Bid Submission / Opening	ABC/ Amt. of Bid Docs
S1-NPS22-019 / PB220725-AD00373 (PB2) Construction of Office and Staff House at Roxas Substation (NPSSTL), Roxas, Palawan • PCAB License: License Category of at least **"Category D – General Building"** and registration classification of at least **"Small A – Building and Industrial Plant**	Construction of Office, Staffhouse, or Residential Building	13 September 2022 9:30 AM	26 September 2022 9:30 AM	₱ 2,800,000.00 / ₱ 5,000.00
S1-MGP22-003 / PB220707-AD00239 (PB2) Construction of 10KL Rainwater Collector and Office/Staff House at Mangsee DPP, Mangsee, Balabac, Palawan • PCAB License: License Category of at least **"Category D – General Building"** and registration classification of at least **"Small B – Building and Industrial Plant"**	Construction of Industrial Building, Office, Residential, Storage or Commercial Building	13 September 2022 9:30 AM	26 September 2022 9:30 AM	₱ 1,403,000.00 / ₱ 5,000.00
Venue: Kañao Function Room, NPC Bldg. Diliman, Quezon City				

2. The NPC now invites bids for Items listed above. Delivery of the Goods is required **(see table below)** specified in the Technical Specifications. Bidders should have completed, within **(see table below)** from the date of submission and receipt of bids, a contract similar to the Project. The description of an eligible bidder is contained in the Bidding Documents, particularly, in Section II. (Instruction to Bidders).

PR No/s. / PB Ref No/s.	Delivery Period / Contract Duration	Relevant Period of SLCC reckoned from the date of submission & receipt of bids
S1-NPS22-019	Seventy-Five (75) Calendar Days	-
S1-MGP22-003	Ninety (90) Calendar Days	-

3. Bidding will be conducted through open competitive bidding procedures using a non-discretionary "*pass/fail*" criterion as specified in the 2016 revised Implementing Rules and Regulations (IRR) of Republic Act (RA) No. 9184.

   Bidding is restricted to Filipino citizens/sole proprietorships, partnerships, or organizations with at least sixty percent (60%) interest or outstanding capital stock belonging to citizens of the Philippines, and to citizens or organizations of a country the laws or regulations of which grant similar rights or privileges to Filipino citizens, pursuant to RA 5183.

4. Prospective Bidders may obtain further information from National Power Corporation, Bids and Contracts Services Division and inspect the Bidding Documents at the address given below during office hours (8:00AM to 5:00PM), Monday to Friday.

5. A complete set of Bidding Documents may be acquired by interested Bidders from the given address and website(s) and upon payment of the applicable fee for the Bidding Documents, pursuant to the latest Guidelines issued by the GPPB. *Bidding fee may be refunded in accordance with the guidelines based on the grounds provided under Section 41 of R.A. 9184 and its Revised IRR.*

6. The National Power Corporation will hold Pre-Bid Conference **(see table above)** and/or through video conferencing or webcasting which shall be open to prospective bidders.

   Only registered bidder/s shall be allowed to participate for the conduct of virtual pre-bid conference. **Unregistered bidders** may attend the Pre-Bid Conference at the Kañao Room, NPC subject to the following:

   a. Only a maximum of two (2) representatives from each bidder / company shall be allowed to participate during the virtual pre-bid conference.
   b. A "No Face mask / No Entry" policy shall be implemented in the NPC premises. Face mask shall be 3-ply surgical or KN95 mask type.
   c. The requirements herein stated including the medium of submission shall be subject to GPPB Resolution No. 09-2020 dated 07 May 2020
   d. The Guidelines on the Implementation of Early Procurement Activities (EPA) shall be subject to GPPB Circular No. 06-2019 dated 17 July 2019

7. Bids must be duly received by the BAC Secretariat through (i) manual submission at the office address indicated below; (ii) online or electronic submission before the specified time stated in the table above for opening of bids. Late bids shall not be accepted.

8. All Bids must be accompanied by a bid security in any of the acceptable forms and in the amount stated in **ITB** Clause 14.

9. Bid opening shall be on Kañao Function Room, NPC Head Office, Diliman, Quezon City and/or via online platform to be announced by NPC. Bids will be opened in the presence of the bidders' representatives who choose to attend the activity.

10. The National Power Corporation reserves the right to reject any and all bids, declare a failure of bidding, or not award the contract at any time prior to contract award in accordance with Sections 35.6 and 41 of the 2016 revised IRR of R.A. No. 9184, without thereby incurring any liability to the affected bidder or bidders.

11. For further information, please refer to:

Bids and Contracts Services Division,
Logistics Department

BIR Road cor. Quezon Avenue
Diliman, Quezon City
Tel Nos.: 8924-5211 and 8921-3541 local 5611/5504
Fax No.: 8922-1622
Email: bcsd@napocor.gov.ph / bcsd_napocor@yahoo.com

12. You may visit the following websites:

For downloading of Bidding Documents: https://www.napocor.gov.ph/bcsd/bids.php

RENE B. BARRUELA
Vice President, Corporate Affairs Group and
Chairman, Bids and Awards Committee

SECTION II

INSTRUCTIONS TO BIDDERS

SECTION II - INSTRUCTIONS TO BIDDERS

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SECTION II - INSTRUCTIONS TO BIDDERS

1. Scope of Bid

NPC invites Bids for the **CONSTRUCTION OF 10 KL RAIN WATER COLLECTOR AND OFFICE/STAFF HOUSE AT MANGSEE DPP** , with Project Identification Number **LuzP21Z1271Sc.**

The Procurement Project (referred to herein as "Project") is for the construction of Works, as described in Section VI (Specifications).

2. Funding Information

The GOP through the source of funding as indicated below for CY 2021 in the amount of **ONE MILLION FOUR HUNDRED THREE THOUSAND PESOS (₱ 1,403,000.00).** The source of funding is the proposed Corporate Operating Budget of the National Power Corporation (NPC).

3. Bidding Requirements

The Bidding for the Project shall be governed by all the provisions of RA No. 9184 and its 2016 revised IRR, including its Generic Procurement Manual and associated policies, rules and regulations as the primary source thereof, while the herein clauses shall serve as the secondary source thereof.

Any amendments made to the IRR and other GPPB issuances shall be applicable only to the ongoing posting, advertisement, or invitation to bid by the BAC through the issuance of a supplemental or bid bulletin.

The Bidder, by the act of submitting its Bid, shall be deemed to have inspected the site, determined the general characteristics of the contracted Works and the conditions for this Project, such as the location and the nature of the work; (b) climatic conditions; (c) transportation facilities; (c) nature and condition of the terrain, geological conditions at the site communication facilities, requirements, location and availability of construction aggregates and other materials, labor, water, electric power and access roads; and (d) other factors that may affect the cost, duration and execution or implementation of the contract, project, or work and examine all instructions, forms, terms, and project requirements in the Bidding Documents.

4. Corrupt, Fraudulent, Collusive, Coercive, and Obstructive Practices

The Procuring Entity, as well as the Bidders and Contractors, shall observe the highest standard of ethics during the procurement and execution of the contract. They or through an agent shall not engage in corrupt, fraudulent, collusive, coercive, and obstructive practices defined under Annex "I" of the 2016 revised IRR of RA No. 9184 or other integrity violations in competing for the Project.

5. Eligible Bidders

5.1. Only Bids of Bidders found to be legally, technically, and financially capable will be evaluated.

5.2. The Bidder must have an experience of having completed a Single Largest Completed Contract (SLCC) that is similar to this Project, equivalent to at least fifty percent (50%) of the ABC adjusted, if necessary, by the Bidder to

current prices using the PSA's CPI, except under conditions provided for in Section 23.4.2.4 of the 2016 revised IRR of RA No. 9184.

A contract is considered to be "similar" to the contract to be bid if it has the major categories of work stated in the **BDS**.

5.3. For Foreign-funded Procurement, the Procuring Entity and the foreign government/foreign or international financing institution may agree on another track record requirement, as specified in the Bidding Document prepared for this purpose.

5.4. The Bidders shall comply with the eligibility criteria under Section 23.4.2 of the 2016 IRR of RA No. 9184.

6. Origin of Associated Goods

There is no restriction on the origin of Goods other than those prohibited by a decision of the UN Security Council taken under Chapter VII of the Charter of the UN.

7. Subcontracts

7.1. The Bidder may subcontract portions of the Project to the extent allowed by the Procuring Entity as stated herein, but in no case more than fifty percent (50%) of the Project.

7.1. The Bidder must submit together with its Bid the documentary requirements of the subcontractor(s) complying with the eligibility criterial stated in **ITB** Clause 5 in accordance with Section 23.4 of the 2016 revised IRR of RA No. 9184 pursuant to Section 23.1 thereof.

7.2. Subcontracting of any portion of the Project does not relieve the Contractor of any liability or obligation under the Contract. The Supplier will be responsible for the acts, defaults, and negligence of any subcontractor, its agents, servants, or workmen as fully as if these were the Contractor's own acts, defaults, or negligence, or those of its agents, servants, or workmen.

8. Pre-Bid Conference

The Procuring Entity will hold a pre-bid conference for this Project on the specified date and time and either at its physical address and/or through videoconferencing/webcasting} as indicated in paragraph 6 of the **IB.**

9. Clarification and Amendment of Bidding Documents

Prospective bidders may request for clarification on and/or interpretation of any part of the Bidding Documents. Such requests must be in writing and received by the Procuring Entity, either at its given address or through electronic mail indicated in the **IB**, at least ten (10) calendar days before the deadline set for the submission and receipt of Bids.

10. Documents Comprising the Bid: Eligibility and Technical Components

10.1. The first envelope shall contain the eligibility and technical documents of the Bid as specified in **Form NPCSF-INFR-01 - Checklist of Technical and Financial Documents, Section VIII - Bidding Forms.**

10.2. If the eligibility requirements or statements, the bids, and all other documents for submission to the BAC are in foreign language other than English, it must be accompanied by a translation in English, which shall be authenticated by the appropriate Philippine foreign service establishment, post, or the equivalent office having jurisdiction over the foreign bidder's affairs in the Philippines. For Contracting Parties to the Apostille Convention, only the translated documents shall be authenticated through an apostille pursuant to GPPB Resolution No. 13-2019 dated 23 May 2019. The English translation shall govern, for purposes of interpretation of the bid.

10.3. A valid PCAB License is required, and in case of joint ventures, a valid special PCAB License, and registration for the type and cost of the contract for this Project. Any additional type of Contractor license or permit shall be indicated in the **BDS**.

10.4. A List of Contractor's key personnel (e.g., Project Manager, Project Engineers, Materials Engineers, and Foremen) assigned to the contract to be bid, with their complete qualification and experience data shall be provided. These key personnel must meet the required minimum years of experience set in the **BDS**.

10.5. A List of Contractor's major equipment units, which are owned, leased, and/or under purchase agreements, supported by proof of ownership, certification of availability of equipment from the equipment lessor/vendor for the duration of the project, as the case may be, must meet the minimum requirements for the contract set in the **BDS**.

11. Documents Comprising the Bid: Financial Component

11.1. The second bid envelope shall contain the financial documents for the Bid as specified in **Form NPCSF-INFR-01 - Checklist of Technical and Financial Documents, Section VIII - Bidding Forms.**

11.2. Any bid exceeding the ABC indicated in paragraph 1 of the **IB** shall not be accepted.

11.3. For Foreign-funded procurement, a ceiling may be applied to bid prices provided the conditions are met under Section 31.2 of the 2016 revised IRR of RA No. 9184.

12. Alternative Bids

Bidders shall submit offers that comply with the requirements of the Bidding Documents, including the basic technical design as indicated in the drawings and specifications. Unless there is a value engineering clause in the **BDS**, alternative Bids shall not be accepted.

13. Bid Prices

All bid prices for the given scope of work in the Project as awarded shall be considered as fixed prices, and therefore not subject to price escalation during contract implementation, except under extraordinary circumstances as determined by the NEDA and approved by the GPPB pursuant to the revised Guidelines for Contract Price Escalation guidelines.

14. Bid and Payment Currencies

14.1. Bid prices may be quoted in the local currency or tradeable currency accepted by the BSP at the discretion of the Bidder. However, for purposes of bid evaluation, Bids denominated in foreign currencies shall be converted to Philippine currency based on the exchange rate as published in the BSP reference rate bulletin on the day of the bid opening.

14.2. Payment of the contract price shall be made in Philippine Pesos.

15. Bid Security

15.1. The Bidder shall submit a Bid Securing Declaration or any form of Bid Security in the amount indicated in the **BDS**, which shall be not less than the percentage of the ABC in accordance with the schedule in the **BDS.**

15.2. The Bid and bid security shall be valid until **One Hundred Twenty (120) calendar days** from the date of opening of bids. Any bid not accompanied by an acceptable bid security shall be rejected by the Procuring Entity as non-responsive.

16. Sealing and Marking of Bids

Each Bidder shall submit one copy of the first and second components of its Bid.

The Procuring Entity may request additional hard copies and/or electronic copies of the Bid. However, failure of the Bidders to comply with the said request shall not be a ground for disqualification.

If the Procuring Entity allows the submission of bids through online submission to the given website or any other electronic means, the Bidder shall submit an electronic copy of its Bid, which must be digitally signed. An electronic copy that cannot be opened or is corrupted shall be considered non-responsive and, thus, automatically disqualified.

17. Deadline for Submission of Bids

The Bidders shall submit on the specified date and time and either at its physical address or through online submission as indicated in paragraph 7 of the **IB.**

18. Opening and Preliminary Examination of Bids

18.1. The BAC shall open the Bids in public at the time, on the date, and at the place specified in paragraph 9 of the **IB**. The Bidders' representatives who are present shall sign a register evidencing their attendance. In case videoconferencing, webcasting or other similar technologies will be used, attendance of participants shall likewise be recorded by the BAC Secretariat.

In case the Bids cannot be opened as scheduled due to justifiable reasons, the rescheduling requirements under Section 29 of the 2016 revised IRR of RA No. 9184 shall prevail.

18.2. The preliminary examination of Bids shall be governed by Section 30 of the 2016 revised IRR of RA No. 9184.

19. Detailed Evaluation and Comparison of Bids

19.1. The Procuring Entity's BAC shall immediately conduct a detailed evaluation of all Bids rated "*passed*" using non-discretionary pass/fail criteria. The BAC shall consider the conditions in the evaluation of Bids under Section 32.2 of 2016 revised IRR of RA No. 9184.

19.2. If the Project allows partial bids, all Bids and combinations of Bids as indicated in the **BDS** shall be received by the same deadline and opened and evaluated simultaneously so as to determine the Bid or combination of Bids offering the lowest calculated cost to the Procuring Entity. Bid Security as required by **ITB** Clause 15 shall be submitted for each contract (lot) separately.

19.3. In all cases, the NFCC computation pursuant to Section 23.4.2.6 of the 2016 revised IRR of RA No. 9184 must be sufficient for the total of the ABCs for all the lots participated in by the prospective Bidder.

20. Post Qualification

Within a non-extendible period of five (5) calendar days from receipt by the Bidder of the notice from the BAC that it submitted the Lowest Calculated Bid, the Bidder shall submit its latest income and business tax returns filed and paid through the BIR Electronic Filing and Payment System (eFPS), and other appropriate licenses and permits required by law and stated in the **BDS**.

21. Signing of the Contract

The documents required in Section 37.2 of the 2016 revised IRR of RA No. 9184 shall form part of the Contract. Additional Contract documents are indicated in the **BDS**.

SECTION III

BID DATA SHEET

SECTION III - BID DATA SHEET

ITB Clause	
5.2	For this purpose, contracts similar to the Project refer to contracts which have the same major categories of work, which shall be projects involving construction of industrial building, office, residential, storage or commercial building. The Single Largest Completed Contract (SLCC) as declared by the bidder shall be verified and validated to ascertain such completed contract. Hence, bidders must ensure access to sites of such projects/equipment to NPC representatives for verification and validation purposes during post-qualification process. It shall be a ground for disqualification, if verification and validation cannot be conducted for reasons attributable to the Bidder.
7.1	Only a maximum of fifty percent (50%) of the Works may be subcontracted. All Subcontractors must be approved by NPC.
10.1	The list of on-going contracts (Form No. NPCSF-INFR-02) shall be supported by the following documents for each on-going contract to be submitted during Post-Qualification: 1. Contract/Purchase Order and/or Notice of Award 2. Certification coming from the project owner/client that the performance is satisfactory as of the bidding date. The bidder shall declare in this form all his on-going government and private contracts including contracts where the bidder (either as individual or as a Joint Venture) is a partner in a Joint Venture agreement other than his current joint venture where he is a partner. Non declaration will be a ground for disqualification of bid.
	The Statement of the bidder's Single Largest Completed Contract (SLCC) similar to the contract to be bid (Form No. NPCSF-INFR-03) shall be supported by the following documents to be submitted during Bid Opening: 1. Contract/Purchase Order 2. Owner's Certificate of Final Acceptance issued by the project owner other than the contractor or a final rating of at least Satisfactory in the Constructors Performance Evaluation System (CPES). In case of contracts with the private sector, an equivalent document (Ex. Official Receipt or Sales Invoice) shall be submitted.
10.3	The required License issued by the Philippine Contractors Accreditation Board (PCAB): License Category of at least **"CATEGORY D – GENERAL BUILDING"** and registration classification of at least **"SMALL B – BUILDING & INDUSTRIAL PLANT"**

10.4	The list of key personnel shall include the following minimum requirements: **a. One (1) Project Engineer** Registered Civil Engineer who had supervised at least a project similar in nature as to the type and cost of the proposed project within the last 10 years. Must have at least 3 years professional experience as Civil Engineer on similar project. **b. One (1) Materials Engineer** Registered Civil Engineer with valid accreditation from the Department of Public Works and Highways (DPWH) as Materials Engineer I **c. One (1) Safety Officer 2** Construction Safety Officer who has completed at least forty (40) hours of Construction Safety and Health Training (COSH) from Occupational Safety and Health Center (OSHC) or Safety Training Organizations (STOs) accredited by the Department of Labor and Employment (DOLE) Valid Professional Regulations Commission (PRC) license for professional personnel, Construction Safety and Health Training Certificate from OSHC/STOs accredited by DOLE for the Safety Officer, certificate of accreditation including ID card issued by DPWH for Materials Engineer, shall be submitted and included as an attachment in the Standard Form NPCSF-INFR-09: List of Key Personnel Proposed to be Assign to the Contract. The above key personnel must either be employed by the Bidder or contracted by the Bidder to be employed for the contract to be bid.
10.5	The list of construction equipment (owned or leased) shall include the following minimum requirements: a. Bar cutter (20mmØ capable) - 1 unit b. Concrete Vibrator - 1 unit c. Concrete Mixer (at least 1 bagger) - 1 unit
10.6	Bidders shall also submit the following requirements in their first envelope, Eligibility and Technical Component of their bid: 1. Complete eligibility documents of the proposed sub-contractor, if any
10.7	The prospective bidders shall declare its Joint Venture partner during the purchase of bid/tender documents. Any single bidder/s who already procured/secured the bidding documents but want to avail the Joint Venture Agreement (JVA) shall inform the BAC in writing prior to the bid opening for records and documentation purposes. Failure to do so shall be a ground for disqualification/non-acceptance of its bid.
12	No further instructions
15.1	The bid security shall be in the form of a Bid Securing Declaration or any of the following forms and amounts: 1. The amount of not less than *2% of ABC*, if bid security is in cash, cashier's/manager's check, bank draft/guarantee or irrevocable letter of credit;

	2. The amount of not less than *5% of ABC* if bid security is in Surety Bond.
19.2	Partial Bid is not allowed
20	a. Contract/Purchase Order and/or Notice of Award for the contracts stated in the List of all Ongoing Government & Private Contracts Including Contracts Awarded but not yet Started (NPCSF-INFR-02); b. Certification coming from the project owner/client that the performance is satisfactory as of the bidding date for all ongoing contracts stated in form NPCSF-INFR-02. c. The licenses and permits relevant to the Project and the corresponding law requiring it as specified in the Technical Specifications, if any.
21	The following documents shall form part of the contract: 1. Notice to Proceed 2. Construction schedule and S-curve 3. Manpower Schedule 4. Construction Methods 5. Equipment Utilization Schedule 6. Construction safety and health program of the contractor duly approved by the Bureau of Working Condition (BWC) of the Department of Labor and Employment (DOLE) or proof of submission to BWC 7. PERT/CPM.

SECTION IV

GENERAL CONDITIONS OF CONTRACT

SECTION IV – GENERAL CONDITIONS OF CONTRACT

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SECTION IV – GENERAL CONDITIONS OF CONTRACT

1. Scope of Contract

This Contract shall include all such items, although not specifically mentioned, that can be reasonably inferred as being required for its completion as if such items were expressly mentioned herein. All the provisions of RA No. 9184 and its 2016 revised IRR, including the Generic Procurement Manual, and associated issuances, constitute the primary source for the terms and conditions of the Contract, and thus, applicable in contract implementation. Herein clauses shall serve as the secondary source for the terms and conditions of the Contract.

This is without prejudice to Sections 74.1 and 74.2 of the 2016 revised IRR of RA No. 9184 allowing the GPPB to amend the IRR, which shall be applied to all procurement activities, the advertisement, posting, or invitation of which were issued after the effectivity of the said amendment.

2. Sectional Completion of Works

If sectional completion is specified in the **Special Conditions of Contract (SCC)**, references in the Conditions of Contract to the Works, the Completion Date, and the Intended Completion Date shall apply to any Section of the Works (other than references to the Completion Date and Intended Completion Date for the whole of the Works).

3. Possession of Site

3.1 The Procuring Entity shall give possession of all or parts of the Site to the Contractor based on the schedule of delivery indicated in the **SCC,** which corresponds to the execution of the Works. If the Contractor suffers delay or incurs cost from failure on the part of the Procuring Entity to give possession in accordance with the terms of this clause, the Procuring Entity's Representative shall give the Contractor a Contract Time Extension and certify such sum as fair to cover the cost incurred, which sum shall be paid by Procuring Entity.

3.2 If possession of a portion is not given by the above date, the Procuring Entity will be deemed to have delayed the start of the relevant activities. The resulting adjustments in contract time to address such delay may be addressed through contract extension provided under Annex "E" of the 2016 revised IRR of RA No. 9184.

4. The Contractor's Obligations

The Contractor shall employ the key personnel named in the Schedule of Key Personnel indicating their designation, in accordance with **ITB** Clause 10.3 and specified in the **BDS**, to carry out the supervision of the Works.

The Procuring Entity will approve any proposed replacement of key personnel only if their relevant qualifications and abilities are equal to or better than those of the personnel listed in the Schedule.

5. Performance Security

5.1. Within ten (10) calendar days from receipt of the Notice of Award from the Procuring Entity but in no case later than the signing of the contract by both parties, the successful Bidder shall furnish the performance security in any of the forms prescribed in Section 39 of the 2016 revised IRR.

5.2. The Contractor, by entering into the Contract with the Procuring Entity, acknowledges the right of the Procuring Entity to institute action pursuant to RA No. 3688 against any subcontractor be they an individual, firm, partnership, corporation, or association supplying the Contractor with labor, materials and/or equipment for the performance of this Contract.

6. Site Investigation Reports

The Contractor, in preparing the Bid, shall rely on any Site Investigation Reports referred to in the **SCC** supplemented by any information obtained by the Contractor.

7. Warranty

7.1. In case the Contractor fails to undertake the repair works under Section 62.2.2 of the 2016 revised IRR, the Procuring Entity shall forfeit its performance security, subject its property(ies) to attachment or garnishment proceedings, and perpetually disqualify it from participating in any public bidding. All payables of the GOP in his favor shall be offset to recover the costs.

7.2. The warranty against Structural Defects/Failures, except that occasioned-on force majeure, shall cover the period from the date of issuance of the Certificate of Final Acceptance by the Procuring Entity. Specific duration of the warranty is found in the **SCC**.

8. Liability of the Contractor

Subject to additional provisions, if any, set forth in the **SCC**, the Contractor's liability under this Contract shall be as provided by the laws of the Republic of the Philippines.

If the Contractor is a joint venture, all partners to the joint venture shall be jointly and severally liable to the Procuring Entity.

9. Termination for Other Causes

Contract termination shall be initiated in case it is determined *prima facie* by the Procuring Entity that the Contractor has engaged, before, or during the implementation of the contract, in unlawful deeds and behaviors relative to contract acquisition and implementation, such as, but not limited to corrupt, fraudulent, collusive, coercive, and obstructive practices as stated in **ITB** Clause 4.

10. Dayworks

Subject to the guidelines on Variation Order in Annex "E" of the 2016 revised IRR of RA No. 9184, and if applicable as indicated in the **SCC**, the Dayworks rates in the Contractor's Bid shall be used for small additional amounts of work only when the

Procuring Entity's Representative has given written instructions in advance for additional work to be paid for in that way.

11. Program of Work

11.1. The Contractor shall submit to the Procuring Entity's Representative for approval the said Program of Work showing the general methods, arrangements, order, and timing for all the activities in the Works. The submissions of the Program of Work are indicated in the **SCC.**

11.2. The Contractor shall submit to the Procuring Entity's Representative for approval an updated Program of Work at intervals no longer than the period stated in the **SCC.** If the Contractor does not submit an updated Program of Work within this period, the Procuring Entity's Representative may withhold the amount stated in the **SCC** from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue Program of Work has been submitted.

12. Instructions, Inspections and Audits

The Contractor shall permit the GOP or the Procuring Entity to inspect the Contractor's accounts and records relating to the performance of the Contractor and to have them audited by auditors of the GOP or the Procuring Entity, as may be required.

13. Advance Payment

The Procuring Entity shall, upon a written request of the Contractor which shall be submitted as a Contract document, make an advance payment to the Contractor in an amount not exceeding fifteen percent (15%) of the total contract price, to be made in lump sum, or at the most two installments according to a schedule specified in the **SCC**, subject to the requirements in Annex "E" of the 2016 revised IRR of RA No. 9184.

14. Progress Payments

The Contractor may submit a request for payment for Work accomplished. Such requests for payment shall be verified and certified by the Procuring Entity's Representative/Project Engineer. Except as otherwise stipulated in the **SCC**, materials and equipment delivered on the site but not completely put in place shall not be included for payment.

15. Operating and Maintenance Manuals

15.1. If required, the Contractor will provide "as built" Drawings and/or operating and maintenance manuals as specified in the **SCC.**

15.2. If the Contractor does not provide the Drawings and/or manuals by the dates stated above, or they do not receive the Procuring Entity's Representative's approval, the Procuring Entity's Representative may withhold the amount stated in the **SCC** from payments due to the Contractor.

SECTION V

SPECIAL CONDITIONS OF CONTRACT

SECTION V – SPECIAL CONDITIONS OF CONTRACT

GCC Clause	
2	Sectional completion is not specified.
4	It shall also be the obligation and responsibility of the Contractor to carry out the Works properly and in accordance with this Contract, including but not limited to the following conditions: a. The Contractor shall conduct the Works with due regard to safety and health in accordance with its Construction Safety and Health Program (CSHP) duly approved by the Department of Labor & Employment (DOLE) and in compliance with the DOLE Department Order No. 13 – The Guidelines Governing Occupational Safety and Health in the Construction Industry. Failure to comply with the approved CSHP will be considered as non-compliance with the Contract and shall result to the imposition of Section 19, Violation and Penalties of the DOLE Department Order No. 13 and any appropriate sanctions such as, but not limited to: 1. Suspend the work until the Contractor complies with the approved CSHP with the condition that the work resumption will not incur additional cost to the Corporation; 2. Suspend payment of the portion of work under question; 3. Correct the situation by employing 3rd party and charge all expenses incurred to the Contractor's collectibles/securities; and 4. Report the condition to the Bureau of Working Conditions of the DOLE for their appropriate action. b. The Contractor shall be responsible for the strict compliance with the provision of the Philippine Laws affecting labor and operation of Work under the contract and shall be responsible for the payment of all indemnities arising out of any labor accident which may occur in the execution of the Works and for which he may be responsible under Republic Act 3428, as amended, known as the Workmen's Compensation Law. c. The Contractor is obliged to exercise due care so as not to endanger life and property in the vicinity of the Works where he operates in connection with this Contract. He shall be liable for all damages incurred in any manner by acts of negligence of his own, or his agents, employees, or workmen. d. It is the responsibility of the Contractor for the strict compliance with the requirements of the Philippine Clean Air Act of 1999 (R.A. 8749) and Philippine Clean Water Act of 2004 (R.A. 9275). The Contractor shall be liable for any damages/destructions to the environment including penalties that will be imposed by the Department of Environment and Natural Resources (DENR) arising from non-compliance of the requirements thereof. e. The Contractor shall be responsible for the strict compliance with the requirements of the Environmental Compliance Certificate (ECC) issued for this project (if any) and DENR Administrative Order No. 26. He shall be liable for any damages/destructions to the environment including penalties that will be imposed by the DENR arising from

	non-compliance thereof, in any manner by his acts or negligence, or by his agents, employees, or workmen in the execution of the Works. The Contractor may employ a Pollution Control Officer accredited with the DENR for the duration of the project, if so required by the DENR Administrative Order No. 26 f. It shall be the Contractor's responsibility for the correctness, accuracy and quality of works. NPC's approval does not relieve his contractual obligation and responsibility under this contract. g. Payment of all forms of taxes, such as value added tax (VAT) including municipal licenses and permits, and others that may be imposed by the Philippine Government or any of its agencies and political subdivisions in connection with the Contract shall be for the account of the Contractor. h. In general, the Contractor is totally responsible for the execution of the Works and therefore, takes upon himself all the technical, legal and economic risks and all obligations which could arise therefrom or connected therewith. The overall responsibility of the Contractor includes the responsibility for actions or omissions of his own personnel as well as the personnel of the sub-contractors.
4.1	NPC shall give access to the Site for the Contractor to commence and proceed with the works on the start date. The access to the site referred herein shall not be exclusive to the Contractor but only to enable him to execute the Work.
5	1. The following must be indicated in the performance bond to be posted by the Contractor: i. Company Name ii. Correct amount of the Bond iii. Contract/Purchase Order Reference Number iv. Purpose of the Bond: "To guarantee the faithful performance of the Principal's obligation to undertake *(Contract/Purchase Order Description)* in accordance with the terms and conditions of *(Contract No. & Schedule/Purchase Order No.)* entered into by the parties." 2. The bond shall remain valid and effective until the duration of the contract *(should be specific date reckoned from the contract effectivity)* plus sixty (60) days after NPC's acceptance of the last delivery/final acceptance of the project. 3. In case of surety bond, any extension of the contract duration or delivery period granted to the CONTRACTOR shall be considered as given, and any modification of the contract shall be considered as authorized, as if with the expressed consent of the surety, provided that such extension or modifications falls within the effective period of the said surety bond. However, in the event that the extension of the contract duration or delivery schedule would be beyond the effective period of the surety bond first posted, it shall be the sole obligation of the CONTRACTOR to post an acceptable Performance Security within ten (10) calendar days after the contract duration/delivery period extension has been granted by NPC. 4. Other required conditions in addition to the standard policy terms issued by the Bonding Company:

	i. The bond is a penal bond, callable on demand and the entire amount thereof shall be forfeited in favor of the Obligee upon default of the Principal without the need to prove or to show grounds or reasons for demand for the sum specified therein; ii. The amount claimed by the Obligee under this bond shall be paid in full and shall never be subject to any adjustment by the Surety; iii. In case of claim, the Surety shall pay such claim within sixty (60) days from receipt by the Surety of the Obligee's notice of claim/demand letter notwithstanding any objection thereto by the Principal.
6	No site investigation report.
7.2	In case of permanent structures, such as buildings of types 4 and 5 as classified under the National Building Code of the Philippines and other structures made of steel, iron, or concrete which comply with relevant structural codes (e.g., DPWH Standard Specifications), such as, but not limited to, steel/concrete bridges, flyovers, aircraft movement areas, ports, dams, tunnels, filtration and treatment plants, sewerage systems, power plants, transmission and communication towers, railway system, and other similar permanent structures: Fifteen (15) years. In case of semi-permanent structures, such as buildings of types 1, 2, and 3 as classified under the National Building Code of the Philippines, concrete/asphalt roads, concrete river control, drainage, irrigation lined canals, river landing, deep wells, rock causeway, pedestrian overpass, and other similar semi-permanent structures: Five (5) years. In case of other structures, such as Bailey and wooden bridges, shallow wells, spring developments, and other similar structures: Two (2) years.
10	No dayworks are applicable to the contract.
11.1	The Contractor shall submit the Program of Work to the Procuring Entity's Representative within Ten (10) calendar days of delivery of the Notice of Award/Letter of Acceptance.
11.2	The period between Program of Work updates is Thirty (30) calendar days. The amount to be withheld for late submission of an updated Program of Work is One percent (1%) of contract amount.
12	During contract implementation, the Procuring Entity shall conduct Constructors Performance Evaluation in accordance with Section 12, Annex E of the Revised Implementing Rules and Regulation of R.A. 9184 using the NPC Constructors Performance Evaluation System (CPES) Guidelines. CPES ratings shall be used for the following purposes: a) eligibility screening/post-qualification; b) awarding of contracts; c) project monitoring & control; d) issuance of Certificate of Completion; and in adopting measures to further improve performance of contractors in the prosecution of government projects. Qualified Constructors Performance Evaluators (CPE) shall conduct project evaluation as follows:

	(a) During Construction - Except for those projects with a duration of 90 calendar days and below which may be subjected to at least one (1) visit, all projects shall be subjected to a minimum of two (2) evaluations to be performed by the CPE. The number of evaluations beyond the prescribed minimum shall be determined by the CPES-Implementing Unit based on the size, nature and complexity of the project and shall be subject to approval by the proper authorities within the agency. The first evaluation shall be performed when the project is at least thirty percent (30%) physically complete or as maybe required by the CPES-IU using the S-curve or other appropriate means to determine whether there is substantial work completed for evaluation. (b) Upon Completion - only one evaluation shall be performed by the CPE right after the Project Implementation Group reports one hundred percent (100%) completion of the project.
13	The maximum amount of advance payment is fifteen percent (15%) of the Contract Price and paid in lump sum.
14	No further instructions.
15.1	The date by which "as built" drawings and operating and maintenance manuals are required is within thirty (30) calendar days after completion of contract.
15.2	The amount to be withheld for failing to produce "as built" drawings and/or operating and maintenance manuals by the date required is Five percent (5%) of contract amount.

SECTION VI

TECHNICAL SPECIFICATIONS

SECTION VI

TECHNICAL SPECIFICATIONS

PROJECT HIGHLIGHTS

SECTION VI - TECHNICAL SPECIFICATIONS

PH – PROJECT HIGHLIGHTS

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PART 1 - TECHNICAL SPECIFICATIONS

PH – PROJECT HIGHLIGHTS

PH-1.0 PROJECT HIGHLIGHTS

PH-1.1 General

This section covers the general technical requirements for furnishing all supervision, labor, materials, supplies, tools and equipment in accordance with specifications contained herein and as shown on the accompanying drawings to complete the **CONSTRUCTION OF 10 KL RAIN WATER COLLECTOR AND OFFICE/STAFF HOUSE AT MANGSEE DPP.**

The Contractor shall accept full responsibility for its work in the performance qualifications, specifications, documentation, reports, fabrication, corrosion protection, cleaning, shop testing, preparation for shipment, field testing, warranty provisions and compliance with the applicable codes and standards and the requirements of this specification.

The Contractor shall strictly observe the general requirements of this specification in conjunction with the specific requirements specified in the relevant specifications.

PH-1.2 Project Location

The project is located at Mangsee, Balabac, Palawan.

PH-1.3 Scope of Work

The works and services to be performed under this Contract shall essentially consist of, but not limited to the following:

Architectural Works

a) Supply and Installation of complete one (1) unit twenty (20) feet Prefabricated Container House;
b) All masonry and plumbing works; and
c) All other works and services including those not specifically detailed herein but are required to fully complete the project.

Civil Works

a) Moving-in including furnishing, superintendence, construction, operation and maintenance of general construction facilities and moving-out thereof after completion and acceptance;
b) Complete construction of prefabricated container house foundations;
c) Complete construction of 10 KL rain water collector;
d) Complete construction of pumphouse; and
e) All other works and services including those not specifically detailed herein but are required to fully complete the project.

Electrical Works

a) Supply, Installation and Test of complete Lighting and Power System of the New Office/Staff House;
b) Supply, Installation and Test of complete Lighting System of the New Pump House; and
c) All other works and services including those not specifically detailed herein but are required to fully complete the project

Mechanical Works

a. One (1) unit of booster pump, 2.27 m^3/hr (10 gpm) minimum rated capacity at 30 m discharge pressure complete with valves, strainers and other necessary accessories;

b) One (1) unit of pressure tank (bladder type) with a capacity of not less than 100 liters (27 gal) complete with valves, pressure switch, pressure gauges and other necessary accessories. Pressure tank shall be fitted with rubber inside the tank and shall be pre-charged with air at a pressure sufficient to deliver the required water rate at pressure set points of 28/14m (40/20psi);

c) One (1) lot of Domestic Water Piping materials, valves, pipe fittings, strainers, gaskets, flanges, bolts and nuts, pipe supports including the required excavation and backfilling of embedded pipes and other incidentals to complete the domestic water supply piping system;

d) One (1) unit of Inverter-Window Type Air Conditioner of 11,500 kJ/h minimum cooling capacity for Office, complete with its mounting accessories and controls located at Operator's Quarter area;

e) One (1) unit Wall Mounted Exhaust Fan, 100 m^3/hr capacity for Restroom, complete with its mounting accessories and control;

f) Two (2) units of Portable Type Fire Extinguisher, Clean Agent (HCFC or Halotron I Type), 7.1 kg. (15.5 lbs), non-expiry, multi-shots, wall-hung type and PS/ICC and/or BFP approved;

g) All other works and services required to complete the project.

PH-1.4 Contract Period

The Supplier shall complete the works as herein specified within ninety (90) calendar days. The contract period is inclusive of five (5) unworkable days considered unfavorable for the execution of the works. The total contract duration shall be reckoned from the date of contract effectivity as specified in the **Notice to Proceed**.

PH-1.5 Contractor's Classification

The Contractor must have a valid Philippine Contractors Accreditation Board (PCAB) license with Registration Particulars of at least **"CATEGORY D – GENERAL BUILDING" and registration classification of at least "SMALL B – BUILDING OR INDUSTRIAL PLANT".**

Contractors under Small B must have completed similar contracts involving construction of industrial building, office, residential, storage or commercial building.

PH-1.6 Minimum Required Personnel

1. One (1) Project Engineer

   Registered Civil Engineer who had supervised at least a project similar in nature as to the type. Must have at least 3 years professional experience as Civil Engineer on similar project.

2. One (1) Materials Engineer

   Registered Civil Engineer with valid accreditation from the Department of Public Works and Highways (DPWH) as Materials Engineer I.

3. One (1) Safety Officer 2

   Construction Safety Officer who has completed at least forty (40) hours of Construction Safety and Health Training (COSH) from Occupational Safety and Health Center (OSHC) or Safety Training Organizations (STOs) accredited by the Department of Labor and Employment (DOLE).

Valid Professional Regulations Commission (PRC) license for professional personnel. Construction Safety and Health Training Certificate from OSHC/STOs accredited by DOLE for the Safety Officer, certificate of accreditation including ID card issued by DPWH Materials Engineer, shall be submitted and included as an attachment in the Standard Form NPCSF-INFR-09 List of Key Personnel Proposed to be Assign to the Contract.

The above key personnel must either be employed by the Bidder or contracted by the Bidder to be employed for the contract to be bid.

PH-1.7 Minimum Required Construction Equipment

The list of construction equipment (owned or leased) shall include the following:

a. Bar cutter (20 mm Φ capable) - 1 unit
b. Concrete Vibrator - 1 unit
c. Concrete Mixer - 1 unit

SECTION VI

TECHNICAL SPECIFICATIONS FOR ARCHITECTURAL WORKS

SECTION VI – TECHNICAL SPECIFICATIONS

AW – ARCHITECTURAL WORKS

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TECHNICAL SPECIFICATIONS

AW – ARCHITECTURAL WORKS

AW-1.0 GENERAL ARCHITECTURAL REQUIREMENTS

AW-1.1 General

The work to be done under this section shall include the furnishing of all labor, materials, equipment, tools, storage and stockyards of the pertinent materials and structural components and other incidentals for all architectural works enumerated hereunder, as shown on the accompanying drawings or as otherwise directed.

The work shall be performed and completed with high quality workmanship, in accordance with generally accepted modern practice in carpentry fenestrations, tinsmithing, plumbing, painting, landscaping and masonry work, etc. notwithstanding any omission from these Specifications or drawings.

Materials and structural parts that the Contractor shall supply and install, and which will be incorporated in the structure shall be new and unused. They shall be suitable for their intended purpose and appropriately matched to each other complying with all applicable regulations, quality and dimensions standards. Defective work is not acceptable.

AW-1.2 Submission of Samples

At least one (1) month before the start of any installation or application of materials, the Contractor shall submit samples of materials for all sections for evaluation and approval. No work shall be done until after samples are approved by the NPC Representative in writing. All work must strictly conform to approved samples as to quality, texture, color and finish.

Failure of the Contractor to comply with the preceding stipulation shall not entitle them of any extension of time nor any claim whatsoever for any delay in the work after rectification due to disapproval of work.

To avoid unnecessary delay, it is suggested that the orders and/or purchase of imported or local materials shall be made within sufficient period in order that adequate supply is available at any time when needed.

AW-1.3 Substitution of Materials

The Contractor shall submit a written request for substitution of materials in lieu of those specified when deemed very necessary and urgent. Such request shall indicate the reasons for substitution. No substitute material shall be used without written authorization from the NPC Representative.

In case of approved substitution of an inferior kind of material, a reduction in the contract price equal to the difference in cost of the two kinds of materials shall be made. Market prices at the provincial capital or at a commercial center agreed upon by the NPC Representative and the Contractor on the

date upon which authority for substitution is granted shall be the basis of said price reduction. Price differentials shall be determined and agreed upon immediately by both parties and incorporated in the approved letter of substitution.

The Contractor shall submit written request for substitution at least one (1) month before such materials are actually needed. Such request shall be accompanied by samples to be substituted and corresponding certification.

No price increase will be allowed for a better kind of material.

AW-1.4 Certification of Materials

The Contractor shall submit to the NPC Representative signed certificates from manufacturer or sole distributor of equipment and materials to be furnished and installed by the Contractor, certifying as to the kind, quality, rated capacity, quantity, performance and other descriptions of the equipment and materials delivered under a receipt number and date. No equipment or materials shall be erected, installed or applied such as electrical fixtures and accessories, concrete reinforcing steel, cement, G.I. and C.I. pipes, valves and fittings, plumbing and sanitary fixtures, building materials and finishes, paint and waterproofing, etc., without the required certificates.

AW-1.5 Other works which even if not specifically mentioned in the Section and Bill of Quantities shall be included:

- The measurements for the execution and payment of the Works, including provisions of the measuring equipment and the engagement of labor
- Connecting up of water, gas and electricity from the mains of the site indicated by the NPC Representative to the points of use
- Provision of small equipment and tools
- Safeguarding the Works against surface water, which shall normally be reckoned with, and its possible necessary removal
- Protecting the Works from heat, wind and rain
- Protection and safety measures required
- Protecting the executed works and the items handed over the execution of same from damage and theft up to the time of acceptance
- Supplying of the operational materials
- Supplying of consumable stores
- Supplying of fitting dowels
- Supplying of simple type pipe covering, e.g., in the shape of pipe sheathings with corrugated cardboard and the like
- Supplying and fitting of pipe fastening elements, e.g., pipe clips, hangers, etc.
- installing and dismantling as well as providing all framework and scaffolds
- Making blackouts on concrete
- Chemical preservation of timber
- Instructing the operating and maintenance personnel

NOTE: The above provisions are general for all types of buildings. The Contractor shall be guided accordingly by the applicable

provisions in the specifications and what is shown in the drawings for each type.

AW-1.6 Measurement and Payment

Measurement for payment for different items in **Architectural Works** will be based on the areas, lengths, volumes and quantity placed and accepted by the NPC Representative.

Payments for each architectural item will be made at the corresponding contract unit price per square meter, linear meter, cubic meter and number of pieces/sets, for the pertinent items under Architectural Works in the Bill of Quantities.

Payment shall constitute full compensation for all labor, materials, equipment, tools and incidentals necessary for the completion of each work.

AW-2.0 PREFABRICATED CONTAINER HOUSE

AW-2.1 General

The specification covers the features and technical requirements for the supply, delivery and erection/installation of one (1) unit, 20ft. Prefabricated Container House. Other parts and accessories which are note specifically mentioned herein but are necessary for the proper assembly and erection of the control room shall be included to be furnished.

All materials to be used and incorporated into the control house shall be new and unused. They shall be suitable for the intended purpose and shall comply with all applicable regulations, quality, and standards.

The Supplier shall accept full responsibility for his work including design, performance qualifications, specifications, documentation, reports, fabrication, assembly, corrosion protection, shop testing, preparation for shipment, field testing, warranty provisions and compliance with the applicable codes and standards and the requirements of this Specification.

AW-2.2 Work Scope

The works and services to be performed by the successful bidder shall cover the supply, delivery and complete erection/installation of one (1) unit, 20ft. Prefabricated Container House which shall essentially consist of but not limited to the following:

a) Moving-in including furnishing, installation, construction, operation and maintenance of general construction facilities.

b) Clearing and grading of the project site and disposal of all excess materials to designated areas.

c) Construction of reinforced concrete foundation including all required structural excavation, backfill and proper disposal of all excess excavated materials as per detailed drawings.

d) Supply and installation of one (1) unit twenty (20) feet Prefabricated Container House with the following specifications and fixtures:

Dimensions	:	6.0 meters length by 2.4 meters width by 2.6 meters height.
Container Frame	:	Square tubing, 4 mm base metal thickness, pre-painted.
Walls	:	50 mm polystyrene insulation with double-sided 0.45mm pre-painted GI sheet.
Roof	:	Glasswool insulation with pre-painted GI sheet roof and interior ceiling.
Flooring	:	Magnesium board with linoleum finish.
Windows	:	4 sets aluminum frame sliding window (1.00m x 1.00m) and 1 set aluminum frame awning window (0.50m x 0.50m)
Doors	:	1 set steel door (0.80m x 2.10m) and 1 set pvc door (0.60m x 2.10m)
Toilet & Bath (1 set – 1.20m x 1.20m)	:	Complete with fixtures & fittings, including ceramic floor tiles and plumbing

e) Application of touch up paint for scratch during installation.

f) Removal/clearing of all debris and waste/excess materials prior to demobilization.

AW-2.3 Design Criteria for Prefabricated Container House

The prefabricated container house shall be designed for the erection on the concrete foundation. All materials under these specifications shall be designed, constructed and erected in accordance with the requirement of the specification and codes of AISC, ASTM and other such regular published and accepted codes except were modified or supplemented by these specifications.

Wind load

The wind load shall be based on the latest edition of NSCP.

AW-2.4 Measurement and Payment

Measurement and payment for **Prefabricated Container House** will be based on the corresponding contract unit price (set) under the architectural work's Bill of Quantities.

Payment will be made at the corresponding contract unit price, which payment shall cover costs of furnishing all materials and labor including equipment and tools required to complete the work and all associated costs for site grading, foundation/slab construction including transport to site.

AW-3.0 CONCRETE MASONRY WORKS

AW-3.1 General

The work to be done under this section shall include the furnishing of all labor, materials, equipment, tools and other incidentals to complete the work.

Concrete masonry units of the type and thickness indicated shall be provided and shall be properly coordinated with the work of other trades. The source of supply for material which will affect the appearance of the finished work shall not be changed after the work has started.

Masonry units shall be handled with care to prevent chipping and breakage. Storage piles shall be so located as to avoid being damaged by construction operations and traffic. Cement and lime shall be stored off the ground under watertight cover until ready for use. Damaged materials shall be rejected.

AW-3.2 Materials

Concrete Hollow Blocks shall be of standard manufacture, machine-vibrated, fine and even textured and well-defined edges.

Unless otherwise shown on the drawings, concrete hollow blocks to be used shall conform to the requirements of ASTM Specification C-129-39 Minimum Compressive Strength of not less than 4.48MPa average of the fine specimens.

Mortar Proportions:
Cement mortar for laying concrete hollow blocks shall consist of one (1) part Portland cement, one-fourth (1/4) part lime and three (3) parts sand. Only sufficient water to make a workable mix will be permitted.

a) Masonry grout for filling cells of concrete blocks shall consist of one (1) Portland cement, one-fourth (1/4) part lime, three (3) parts sand to which three (3) pea gravel is added by volume. Mortar materials shall be accurately measured by volume and thoroughly mixed until evenly distributed throughout the batch mechanical mix. The actual mixing time shall not be less than two minutes.

b) Intersecting hollow blocks walls and partitions shall be bonded by overlapping units on alternative course or by the use of 6.3mm (1/4")

diameter ties at 610mm (24") O. C. every second course (maximum) anchored in filled cells.

Concrete lintel beams shall extend 305mm (12") beyond both sides of the opening and reinforced with four 12.7mm (1/2") bars placed over and below window openings.

a) Concrete studs, reinforced with one 12.7mm (1/2") diameter bar, shall be placed at both sides of all window and door openings.

b) All horizontal reinforcement shall be tied to vertical reinforcement.

c) Reinforcement shall be as specified in Section "Structural Steel".

Cement shall be Portland cement of approved brand conforming to ASTM Specifications C150, Type I.

a) Lime shall be made with pulverized and quicklime or with hydrated lime.

b) Sand shall be clean, washed and free from deleterious substances.

c) Water for mixing shall be clean and potable.

AW-3.3 Installation

Laying of all masonry units shall be plumbed, leveled and accurately spaced. All units shall be wetted before laying. The block should be laid on full mortar bedding and in such a way that no cracks are formed between the blocks and the mortar at the time the blocks are placed. All joints should be filled with mortar at the time it is laid. Any horizontal and vertical CHB wall reinforcements shall be anchored to concrete works by means of 10mm (3/8") by 609mm (24") long dowels. Embedding of anchor bolts, expansion shields, conduits, etc. shall be done as the erection progresses.

Cutting and patching of masonry required to accommodate the work of other trades shall be performed by masonry mechanics.

Finishing of all hollow block wall surfaces to be applied with cement plaster will be cleaned and evenly wet slashed with a wash of neat cement and sand followed by 1:2 cement mortar mix 10mm (3/8") thick which shall be applied with a wooden float.

AW-3.4 Concrete Lintel

Unless otherwise indicated, provide concrete lintels over all openings in concrete unit masonry walls. Lintels shall be cast-in-place and reinforced with longitudinal bars at the bottom, and of sizes as indicated on the plans. Concrete works shall conform to Concrete Works of these Specifications.

AW-4.4 Fixtures

a) Water Closet – as shown in the drawings or as specified in the Bill of Quantities

b) Kitchen Sink or Double Tub Sink – Stainless steel

c) Bibbs – Nickel Plated Copper or Brass Alloy

d) Floor Drain – Stainless or Brass Alloy

e) Clean-outs – Brass alloy

AW-4.5 Installation

Plumbing fixtures shall be installed free and open in a manner to afford access for cleaning. All brackets, cleat, plates and anchors required to support the fixtures shall be furnished in a rigidly manner. Water closets shall be sat on Boll-Wax.

Installed plumbing fixtures shall be kept clean and in working order for adequate protection so as not be used by anybody until issuance of Certificate of Completion.

All fixtures shall be provided with individual control stop so that each fixture may be separately controlled without affecting any other fixture.

All flush valves shall be equipped with vacuum breaking devices.

AW-4.6 Toilet Accessories

a) Soap Holders – white, vitreous China to match fixtures quality, brand and wainscoting color.

b) Tissue/Toilet Paper Holder - colored, to follow Water Closet brand and quality. Provide and fit, ready for use, on most convenient side of wall inside each water closet compartment, 750mm (30") above the finish floor.

c) Liquid Soap Dispenser

AW-4.7 Measurement and Payment

Measurement and payment for **Plumbing Fixtures** will be based on the number of sets/pieces installed and accepted by the NPC Representative.

Payment will be made at the corresponding contract unit price per set/piece for the pertinent item under Architectural Works in the Bill of Quantities.
Payment shall constitute full compensation for all labor, materials, equipment, tools and incidentals necessary for the completion of this work.

AW-3.5 Testing of CHB

Test samples from every 500 units shall be taken at random from the CHB to be used before installation. The testing shall be performed by a laboratory approved by the NPC Representative and the cost thereof shall be charged to the account of the Contractor. Concrete hollow blocks represented by such samples, failing to meet the requirements under the latest edition ASTM 6129-70 shall be rejected.

AW-3.6 Measurement and Payment

Measurement and payment for **Concrete Hollow Blocks** including its reinforcing bars will be based on the area in place and accepted by the NPC Representative.

Payment will be made at the corresponding contract unit price per square meter for the pertinent items under Architectural Works in the Bill of Quantities.

Payment shall constitute full compensation for all labor, materials, equipment, tools and incidentals necessary for the completion of this work.

AW-4.0 PLUMBING FIXTURES AND FITTINGS

AW-4.1 General

The work covered by this section of the Specifications consists in furnishing all plant, labor, equipment and tools, articles, appliances and materials and in performing all operations in connections with the installation of all plumbing fixtures, fittings and accessories, complete, in strict accord with this section of the Specifications or indicated on the drawings, are included in this work.

AW-4.2 Make

The model numbers herein given are intended to illustrate the quality and design of fixtures that will be required. American standard fixtures specified herein, and any substitution made to any item of fixtures specified must first be approved by the NPC Representative.

AW-4.3 Trademarks

All plumbing fixtures and fittings must bear the trademarks of the manufacturer.

Maintenance Manual shall be submitted including complete instructions for replacing valve washers and strainers and give manufacturer's recommendations as to cleaning finish fixture surfaces.

Submit samples of valves, faucets, trims and others for approval of the NPC Representative.

AW-4.4 Fixtures

a) Water Closet – as shown in the drawings or as specified in the Bill of Quantities

b) Kitchen Sink or Double Tub Sink – Stainless steel

c) Bibbs – Nickel Plated Copper or Brass Alloy

d) Floor Drain – Stainless or Brass Alloy

e) Clean-outs – Brass alloy

AW-4.5 Installation

Plumbing fixtures shall be installed free and open in a manner to afford access for cleaning. All brackets, cleat, plates and anchors required to support the fixtures shall be furnished in a rigidly manner. Water closets shall be sat on Boll-Wax.

Installed plumbing fixtures shall be kept clean and in working order for adequate protection so as not be used by anybody until issuance of Certificate of Completion.

All fixtures shall be provided with individual control stop so that each fixture may be separately controlled without affecting any other fixture.

All flush valves shall be equipped with vacuum breaking devices.

AW-4.6 Toilet Accessories

a) Soap Holders – white, vitreous China to match fixtures quality, brand and wainscoting color.

b) Tissue/Toilet Paper Holder - colored, to follow Water Closet brand and quality. Provide and fit, ready for use, on most convenient side of wall inside each water closet compartment, 750mm (30") above the finish floor.

c) Liquid Soap Dispenser

AW-4.7 Measurement and Payment

Measurement and payment for **Plumbing Fixtures** will be based on the number of sets/pieces installed and accepted by the NPC Representative.

Payment will be made at the corresponding contract unit price per set/piece for the pertinent item under Architectural Works in the Bill of Quantities.
Payment shall constitute full compensation for all labor, materials, equipment, tools and incidentals necessary for the completion of this work.

SECTION VI

TECHNICAL SPECIFICATIONS

FOR

CIVIL WORKS

SECTION VI – TECHNICAL SPECIFICATIONS

CW – CIVIL WORKS

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SECTION VI - TECHNICAL SPECIFICATIONS

CW – CIVIL WORKS

CW-1.0 GENERAL CONSTRUCTION FACILITIES

CW-1.1 Scope

This section covers the construction and/or maintenance of access roads, drainage system and other appurtenant structures, moving-in of the Contractor's construction equipment, setting up of the Contractor's camp and the disposition of the Contractor's various facilities at the end of the Contract.

CW-1.2 Moving-in

The Contractor shall bring to the site all his necessary construction equipment and plant and install all stationary construction equipment and plant at location and in the manner approved by the NPC. The Contractor shall submit sufficient detailed plans showing the proposed location of such stationary equipment and plant and other pertinent data. No installation of such stationary equipment shall be undertaken unless the corresponding plans have been approved by the NPC.

CW-1.3 Contractor's Camp Facilities

The Contractor shall provide and grade his camp site, construct his camp, employee housing, warehouse, machine and repair shops, fuel storage tanks and provide such related facilities and sanitary conveniences that the Contractor deems necessary for maintaining health, peace and order in the camp and work areas. The areas that may be used by the Contractor within the plant site shall be designated by the NPC.

The Contractor shall provide, maintain and operate, under competent direction, such camps and facilities as are necessary for the housing, feeding and accommodation of his employees.

CW-1.4 Water Supply

The Contractor shall, at his own expense, be responsible for the supply, installation, operation and maintenance of a safe and adequate supply of drinking and domestic water. Whenever there is a possibility of contamination of the water supply for drinking and domestic purposes, chlorination or some other approved methods of sterilization shall be carried out. The installation and maintenance of these services shall be subject to the approval of the NPC.

CW-1.5 Sewerage Disposal and Sanitation

The Contractor shall, at his own expense, be responsible for the installation operation and maintenance of an adequate sewerage disposal and sanitation

system and shall provide adequate toilet and wash-up facilities for his employees at his camp and in the areas where work is being carried out.

The Contractor shall execute the work with due regard to adequate sanitary provisions and applicable codes and shall take all necessary steps to prevent the pollution of water in any spring, river, or other sources of water supply. All toilets or wash-up facilities shall be subject to the prior and continuing approval of the NPC.

CW-1.6 Fire Protection

The Contractor shall observe all necessary precautions against fire, shall provide and maintain at his own expense, portable fire-fighting equipment he may deem necessary, and shall comply with all applicable laws of the Philippines relating thereto.

In the event of an uncontrollable fire occurring in the area of the Contractor's operation, the Contractor shall have to extinguish the fire immediately at his own expense, to the full extent of the manpower and equipment employed under the contract at the time of the fire.

The Contractor shall indemnify NPC against all liabilities, claims, damages and/or lawsuits arising thereto.

CW-1.7 Construction Power

The Contractor shall be responsible for providing his own electric power supply required for construction and erection/installation. If power is available from NPC and should the Contractor elect to utilize the NPC's power supply, he shall make an arrangement with NPC concerned group as to the billing rates and other requirements needed for direct connection to NPC.

CW-1.8 Camp Security

The Contractor shall provide his own security force to the extent that he deems necessary for maintaining peace and order in the camp and work areas and to safeguard materials and equipment. Nothing under the provisions of this paragraph shall relieve the Contractor from full responsibility for the maintenance of peace and order and protection of life and property in all areas where he operates.

CW-1.9 Construction Material Storage

The Contractor is required to put up warehouse(s) with capacities sufficient to store the construction materials required in the work. The warehouse(s) shall be specifically for this contract, notwithstanding his other facilities in the site that may serve the purpose.

CW-1.10 Removal of Camp and Construction Facilities

After the completion of the work covered by the contract and prior to acceptance of the completed work, the entire camp facilities of the Contractor, including its water supply system, electric distribution system, quarters,

warehouses, shops, dining halls, commissaries, temporary shed and other facilities therein shall be removed by the Contractor. The site shall be cleared and cleaned as directed by the NPC.

CW-1.11 Measurement and Payment

No separate measurement and payment will be made for the Contractor's Construction Facilities. The entire cost thereof shall be included in the various pay items in the Bill of Quantities.

CW-2.0 CARE OF WATER DURING CONSTRUCTION

CW-2.1 Scope

In accordance with the specifications contained in this section or otherwise directed, the Contractor shall construct and maintain all necessary temporary drainage ditches and other temporary protective works and he shall also furnish, install, maintain and operate necessary pumping equipment and other devices to protect construction operations free from water coming from any source, including rain.

CW-2.2 Drainage and Dewatering

The Contractor shall be responsible for dewatering foundation areas so that work can be carried out on a suitably dry condition. The Contractor shall construct drainage ditches, holes, culverts, furnish, maintain and operate at his own expense all necessary pumps and other dewatering devices to keep all work areas free from water.

After the work is completed and before it is accepted by the NPC, the Contractor shall remove all pumping equipment and shall remove, fill or plug all temporary drainage structures as directed, all at his expense.

CW-2.3 Measurement and Payment

No separate measurement and payment will be made for the Care of Water During Construction operations. The cost of furnishing, constructing, maintaining, operating and removing of temporary drainage structures, pumping system and other dewatering devices necessary to keep construction operations free from water, shall be included in the various pay items in the Bill of Quantities for structures where such care of water is required.

CW-3.0 ENVIRONMENTAL REQUIREMENTS FOR CIVIL WORKS

CW-3.1 Scope

This section pertains to the environmental and safety provisions, requirements and conditions that shall govern during the execution of all civil works under this project.

CW-3.2 General Conditions

The Contractor shall ensure compliance with the applicable environmental and safety regulations, as well as ECC conditions, during installation/construction of this project through the implementation of measures that include, but not limited to, the following:

a) Designate a Safety Officer and a Pollution Control Officer who shall respectively handle all safety and environmental concerns of the project.

b) Prepare and submit Construction Safety and Health Plan (CSHP).

c) Properly manage debris and various waste generated during installation/construction, such as the following:

- Dispose of demolition and construction debris in a designated or NPC approved disposal area(s);
- Stockpile (and cover if possible) or haul to the designated and/or pre-developed dump sites (spoil disposal areas) that shall be provided with suitable drainage – equipped with sediment traps, stripped top soil, spoils from quarry/borrow sites and excavated materials;
- Segregate solid wastes, such as empty cement sacks, scraps of tin or wood, used wires and other domestic garbage, for recycling or storage in NPC-approved temporary storage areas and further disposal to LGU-designated disposal sites.
- Properly handle, store and dispose-off, through DENR-accredited transporter/treater, hazardous wastes i.e. used oils, paints, thinner, etc.

d) Limit construction activities that generate excessive noise to daytime works only to prevent nuisance to nearby residents during rest hours.

e) As far as practicable, undertake site stripping, grading and excavations during dry weather.

f) Construction/Installation shall be carried-out in a manner where landslides and erosions are minimized.

g) Avoid unnecessary opening/clearing of areas outside construction sites or destruction of vegetative cover, especially cutting of existing trees; and to re-vegetate disturbed areas.

h) Implement biological control measures such as maintenance of vegetation buffers (i.e. sodding of grass, planting of creeping vines, herbs, shrubs and trees) to shield streams/rivers from sedimentation; planting of vegetative cover over erodible surfaces; and planting of exposed sloping areas with shallow-rooted species like grasses, herbs or creepers.

i) Locate fill slopes and spoil heaps away from drainage routes and properly remove/dispose the same as soon as practicable.

j) Preserve or replace, if practicable, natural drainage patterns (when disturbed by civil works) with appropriate drainage channels.

k) Convey oil-contaminated wastewater from workshops, garages, or gas filling stations through an oil trap (i.e. improvised oil-water separator) prior to discharge.

l) Spray water, wherever and whenever necessary, to minimize dust generation.

m) Provide PPEs and other safety provisions required by DOLE, for its project/site works.

n) Take all necessary steps to prevent the pollution of groundwater and/or water bodies in the vicinity of the project site.

CW-3.3 Measurement and Payment

No separate measurement and payment will be made for the Contractor's compliance to the foregoing. The entire cost thereof shall be included in the various pay items in the Bill of Quantities.

CW-4.0 SITE GRADING

CW-4.1 Scope

In accordance with the specifications contained herein and in conformance with the lines, slopes, grades and extent shown on the plans or otherwise directed by the NPC, the Contractor shall furnish all equipment, labor and materials and shall perform the required grading work.

CW-4.2 Clearing, Grubbing and Miscellaneous Work

CW-4.2.1 Clearing and Grubbing

The Contractor shall perform clearing and grubbing on the project site. The site shall be cleared and grubbed of all trees and brush except particular trees, which may be retained by the NPC for preservation. Particular trees to be left in place shall be protected from scarring and/or other injuries during clearing and grubbing work and other construction operations.

All stumps, roots and brush shall be removed to a depth of thirty (30) cm below original ground surface and disposed of in a place designated by the NPC. Downed timber, which may be ordered saved by the NPC for future use, shall be cut into logs as directed and neatly piled in a place designated by the NPC, otherwise they shall be disposed of same as above.

CW-4.2.2 Miscellaneous Works

Where shown on the drawings or if not shown but directed by the NPC, the Contractor shall perform miscellaneous work like demolition, removal, chipping, replacement or transfer of existing structures and other miscellaneous work. All demolished structures shall be disposed of as directed by NPC.

CW-4.3 Grading

CW-4.3.1 General

The word "grading" as defined herein means bringing to required grades all areas in accordance with the lines, slopes, elevations and grades shown on the drawings or as directed by the NPC.

CW-4.3.2 Classification of Materials

All materials in grading work shall be unclassified regardless of the nature of materials encountered during grading excavation and of materials used in grading fill. It is on the basis of unclassified material that Contractor shall determine his unit bid price for grading excavation and grading fill.

CW-4.3.3 Stripping

Fill areas to be brought to grade shall first be stripped of their top soil as directed but in no case less than twenty (20) centimeters in depth and disposed of properly in spoil areas designated by the NPC. Only materials from grading excavation and intended to be used for filling or backfilling purposes shall be stripped of top soil in the same manner as above.

CW-4.3.4 Excavation and Fill

Areas required to be brought to grade shall be excavated or filled as the case may be. Grading work shall be carried out in such a manner that the free drainage is maintained at all times and nowhere shall pondage be found in any part of the work.

The NPC may require the modification of slopes and grades according to the conditions actually encountered during excavation, but such change or modification shall not be construed to mean by the Contractor as a basis for additional compensation over and above the contract unit prices.
Any over-excavation performed by the Contractor for any purpose or reason, except as may be ordered by the NPC, shall be at the Contractor's expense and any excess of excavation shall be refilled, where required, with approved materials that shall be furnished, place and properly compacted at the expense of the Contractor.

Unsuitable materials, as determined by the NPC, which may be encountered below established grade, shall be removed to a depth as directed and accordingly replaced with suitable materials approved by the NPC. The removal and proper disposal of such unsuitable materials shall be paid for at the contract unit price for the item, Grading Excavation, and payment for

placing and compacting suitable material be made at the contract unit price for the item, Grading Fill, in the Bill of Quantities.

Fill work shall not be started until the area has been inspected and approved by the NPC after stripping. Grading fill shall be spread and compacted in layers of 15 cm. loose volume and compacted with approved roller weighing not less than 10 tons. Each layer shall be moistened or dried as directed for maximum compaction. No succeeding layer shall be placed thereon unless the preceding layer has been tested for compaction and approved by the NPC.

In the event that construction of concrete footing or other concrete foundations is on fill, the fill shall be compacted efficiently and thoroughly so that when the fill is tested for compaction at the required foundation elevation for the structure, the required bearing capacity is attained but in no case less than 17.24MPa. In no case shall filling and compaction work to be done without the presence of NPC's inspectors. The Contractor shall be held liable for any structural instability or damage that might result in consequence to non-compliance of this requirement. The Contractor shall institute corrective measures to bring the foundation base to a condition or state that will conform to the required bearing capacity; and also to repair and make good any damage on the structure to the satisfaction and at no cost to NPC.

CW-4.3.5 Slides

In the event that slides occur along excavated slopes during grading operations or after completion of grading but prior to acceptance of the work, the Contractor shall remove and dispose the slide materials and also to trim the slopes as directed to leave the slopes in a safe and neat condition all at no additional cost to NPC, unless occurrence of such slides is occasioned by causes beyond control of the Contractor. In such event, payment for the satisfactory removal and proper disposal of slide material and finishing and rounding of slopes will be paid for at the equivalent of thirty percent (30%) of the contract unit price per cubic meter for the item Grading Excavation.

CW-4.3.6 Slip-Outs

In the event of slip-outs in any part of the grading fill prior to final acceptance of the work, the Contractor shall rebuild such portion of the fill. In the case it is determined that the slip-outs was caused through the fault of the Contractor, the rebuilding of the fill shall be performed by the Contractor at no extra cost to NPC; otherwise, the reconstruction of the fill will be paid for thirty percent (30%) of the contract unit for the item, Grading Fill.

CW-4.4 Disposal

All excess materials from grading work (including excess materials in structural excavation and miscellaneous work) shall be disposed of the by the Contractor. The acquisition of the right-of-way for the area of disposal including the access thereto, permits, and other requirements, shall be the responsibility of the Contractor at no cost to NPC. The Contractor shall be held solely liable for any claim by third parties that may arise from improper transport and disposal of excess materials. The cost of acquisition of the

above-mentioned right-of-way shall be included in the unit bid price for excavation.

CW-4.5 Sources of Fill Materials

When suitable materials from grading excavation are deficient to meet the quantity required for grading fill, additional fill materials shall be obtained from other sources proposed by the Contractor and approved by the NPC. Cost of excavating, hauling, placing and compacting additional materials from borrow sources shall be included in the unit price bid for the item, Grading Fill. Acquisition of right-of-way to these sources shall be the responsibility and account of the Contractor.

CW-4.6 Environmental Requirements

All construction activities to be performed by the Contractor shall be in accordance with the restrictions stated in the approved Environmental Clearance Certificate (ECC) and the conditions set forth in Clause 3.0 – Environmental Requirements for Civil Works.

CW-4.7 Measurement and Payment

CW-4.7.1 Clearing and Grubbing

Unless otherwise specified in the Bill of Quantities, no separate measurement and payment will be made for Clearing and Grubbing. Corresponding cost hereof shall be included in the unit bid price of relevant item(s) in the Bill of Quantities.

CW-4.7.2 Miscellaneous Works

Measurement for payment for miscellaneous work such as demolition, restoration, etc., shall be made on a lot basis unless otherwise specified in the Bill of Quantities. Payment will be made at the contract unit price for the item Miscellaneous Works, which payment shall cover all cost for furnishing labor, equipment and incidentals necessary for demolition and restoration, disposal, and other related works required to complete the item.

CW-4.7.3 Stripping

Unless otherwise specified in the Bill of Quantities, no separate measurement and payment will be made for Stripping. Corresponding cost hereof shall be included in the unit bid price of relevant item(s) in the Bill of Quantities.

CW-4.7.4 Grading Excavation

Measurement for payment for Grading Excavation shall be based on the number of cubic meters excavated and properly disposed. Volume shall be computed by the average end area method which shall be the volume between the original ground (as determined by survey to be made by representatives of both NPC and the Contractor) and graded surface on the drawings or as established by NPC. To this volume shall be added, for purpose of payment, all authorized excavations below grade.

Payment will be made at the contract unit price for the item Grading Excavation in the Bill of Quantities, which payment shall constitute full compensation for furnishing of all labor, construction equipment and incidentals necessary excavate, dispose and other related work required to complete the work item.

CW-4.7.5 Grading Fill

Measurement for payment for Grading Fill shall be based on the number of cubic meters of the materials placed, graded, compacted and accepted. Volume shall be computed by the average end area method which shall be the volume between the ground surface after stripping and the finished grade surfaces on the drawings or as established by NPC.

Payment will be made at the contract unit price for the item Grading Fill in the Bill of Quantities, which payment shall constitute full compensation for furnishing of all materials, labor, construction equipment and incidentals necessary to complete the work item.

CW-5.0 STRUCTURAL EXCAVATION, FILL AND BACKFILL

CW-5.1 Scope

In accordance with the specifications contained herein and as shown on the drawings and otherwise directed, the Contractor shall perform all the required structural excavation, fill and backfill for the entire project, including the proper disposal of excess excavated materials.

CW-5.2 Materials

CW-5.2.1 Structural Excavation

No classification will be made on the materials excavated. The Contractor shall determine his/her unit bid price for structural excavation based on unclassified material regardless of the nature of the materials actually encountered and excavated.

CW-5.2.2 Structural Fill

a. Sand and Gravel Fill

The material shall be of the same classification as the sand and gravel base consisting of river sand and gravel as approved by the NPC. The composite material shall be free from vegetable matter and lumps or balls of clay, and shall be uniformly graded from coarse to fine in accordance with the grading requirements shown below:

Sieve Designation (Square Mesh Sieves)	Percentage by Weight Passing
50.0 mm (2")	100
25.4 mm (1")	55-85
9.5 mm (3/8")	35-60
4.76 mm (No. 4)	25-50
2.08 mm (No. 10)	20-40
0.42 mm (No. 40)	8-20
0.074 mm (No. 200)	2-8

b. Structural Earth Fill

Structural earth fill shall consist of filling with suitable materials obtained from grading excavation or from borrow areas approved by the NPC.

CW-5.2.3 Special Foundation, if any

The NPC shall have the option to use one or both of the following materials for special foundations, whether or not shown on the drawings:

a. Lean Concrete

The strength of lean concrete shall be 13.79MPa or as designated by the NPC.

b. Selected Materials

Selected materials shall consist of compactable material which, when compacted, shall attain the required bearing capacity. The material could be a combination of earth and rock particles not greater than 8 cm including sandy clay, gravelly clay, or shale, all approved by the NPC.

Bed materials for water pipes and/or drainage culverts shall use sand fills.

CW-5.2.4 Structural Backfill

Backfill for Structures Other Than Pipes – Material for backfill shall consist of compactable and approved material taken from grading and structural excavations. Any additional material needed shall be obtained from borrow areas proposed by the Contractor and approved by the NPC.

Backfill for Sewerage and Drainage Pipes – The layer of backfill materials immediately above, up to 60 cm. from the top of pipe, and on the sides of the pipe shall consist of selected material consisting of clay soil and/or other fine materials that are free from stone particles, roots, debris. The upper layer shall consist of compactable materials taken from pipe trench and other structural excavation.

Backfill for Water Supply Pipes – Backfill for water supply pipes shall consist of compactable materials taken from trench excavation and approved by the NPC.

CW-5.3 Construction

CW-5.3.1 Excavation

a. General

The Contractor shall notify the NPC sufficiently in advance before the beginning of any excavation so that a joint survey for baseline data and cross-sectional measurements can be undertaken on the undisturbed/natural ground surface. All excavation shall be carried out according to the lines, slopes and grades shown on the drawings. In case an increase or decrease in quantities occur as a result of changes made by the NPC to such lines, slopes, and grades, the provisions on Variation Orders under the General Conditions of Contract (GCC) shall apply.

After each excavation is completed or where replacement of unsuitable material below required foundation grade has been undertaken, the Contractor shall notify the NPC so that proper inspection and confirmatory test on the bearing capacity of the foundation material can be made. In no case that concrete, sewer, drainage or water supply pipe can be placed unless a written approval has been issued by the NPC.

Over-excavation performed by the Contractor due to his carelessness shall be filled and properly compacted with the suitable material approved by NPC, at no additional cost to NPC.

b. Structural Excavation, Structure Other Than Pipes

The Contractor shall excavate the foundations to the specified side slopes and depths shown on the drawings, after which the NPC will conduct tests on the underlying material below foundation grade to determine the actual bearing capacity at such depth. If the required bearing capacity is not attained, the NPC shall instruct the Contractor to excavate further down until, in the opinion of the NPC, the bearing capacity is adequate to sustain the applied load on the foundation.

Compliance to such instruction shall not entitle the Contractor for additional compensation over and above the unit prices for excavation regardless of the nature of material excavated. For purposes of measurement, the applicable paylines for the excavation under this condition or situation shall be as shown on the drawings that show the paylines for excavation and special foundation materials.

c. Drainage and Sewerage Pipes and Cable Trench

The width of trench excavation for drainage and sewerage pipes and cable trench shall be as indicated on the drawings. All trench bottoms shall be excavated to the foundation grade indicated, regardless of the foundation material classification.

d. Water Supply Pipes

Trenches for main or feeder lines shall be excavated to the depth of no less than 0.25 meter on open ground and 0.60 meter under roadways and parking areas, both depths measured from the finished grade surface.

Service pipes shall be buried to a depth of at least 0.15 meter below grade line.

CW-5.3.2 Structural Foundation Fill

No fill materials shall be placed in any part of the fill foundation unless the foundations have been inspected and approved by the NPC. Fill materials shall be placed and spread in layer covering the entire length and breadth of the section under construction, each layer not to exceed 15 cm. in loose volume thickness and compacted thoroughly to the desired compaction as determined by the NPC. No succeeding layer shall be placed until the previous layer has been tested and approved, as to compaction, by the NPC.

CW-5.3.3 Special Foundations

If unsuitable material is encountered or if the foundation material is unsuitable such that the required bearing capacity of the foundation cannot be attained at the required elevation, further excavation shall be performed by the Contractor as stated in CW-5.3.1b.

Excavated materials below foundation grade shall be replaced at the direction of the NPC, either by lean concrete or by selected materials as mentioned in CW-5.2.3.

Selected materials shall be placed in 15-cm layers and compacted until the required bearing capacity is attained.

CW-5.3.4 Backfill

1. Structures, Other Than Pipes

Excavated areas around structures for backfilling shall be backfilled with approved materials in horizontal layers, each not exceeding 15cm. (6") in loose volume thickness. Each layer shall either be moistened or dried as directed and thoroughly tamped with tampers having no less than 160 $cm^2$of tamping area and weighing not less than 20 kg. The last layer shall be neatly brought up to the level of the adjoining finished grade surface.

In no case shall backfill be placed around concrete structures until after fourteen (14) days from placement of the concrete.

2. Drainage and Sewerage Pipes

After the pipes have been installed and grouted joints sufficiently cured, but in no case less than seven (7) days allowed for curing as specified in NSCP and the whole pipeline inspected, backfill materials specified herein shall be placed in layers as directed, each layer either dried or moistened as directed and thoroughly tamped. The backfill shall be brought up evenly on both sides

of the pipe up to the top of the pipe and finally up to the finished grade surface.

3. Water Supply Pipes

After the pipeline has been installed and tested it shall be backfilled in layers as directed and compacted to the satisfaction of the NPC.

CW-5.4 Measurement and Payment

CW-5.4.1 Structural Excavation

Measurement for payment for structural excavation performed by the Contractor for structures (except drainage, sewerage and water supply pipes, and appurtenances of which cost of excavation and backfill is included in the cost of installed pipe and constructed appurtenances) will be based on the number of cubic meters of materials excavated.

For purpose of payment, all authorized excavation below foundation grade (like in the case of unsuitable materials encountered) shall be included in the measurement.

Payment will be made at the contract unit price for Structural Excavation in the Bill of Quantities, which payment shall constitute full compensation for furnishing all labor and equipment necessary for excavation work and proper disposal of excess material excavated.

CW-5.4.2 Structural Foundation Fill

Measurement for payment for Structural Foundation Fill will be based on the number of cubic meters of fill materials placed within the neat lines as shown on the drawings.

Payment will be made at the contract unit price for the item, Sand and Gravel Fill/Base, in the Bill of Quantities, which payment shall constitute full compensation for furnishing, placing and compacting fill materials; labor which include spreading, compacting, etc., equipment and other incidentals necessary to complete the item.

CW-5.4.3 Special Foundations

Measurement for payment for lean concrete and/or selected materials placed within the pay lines for excavation will be based on the number of cubic meters in-place and accepted.

Payment will be made at the contract unit price for the corresponding item shown in the Bill of Quantities, which payment shall cover all costs for furnishing all labor, materials, equipment and tools necessary to complete the item.

CW-5.4.4 Structural Backfill

Measurement for payment for Structural Backfill (except backfill for drainage and sewerage pipes, appurtenances and other structures of which cost of backfill is included in the cost of installed pipes and appurtenances) will be based on the number of cubic meters of approved materials, backfilled, satisfactorily compacted and accepted. Any backfill material placed outside the pay lines for excavation to replace slides or over-excavation will not be paid.

Payment will be made at the contract unit price for the item, Structural Backfill, in the Bill of Quantities, which payment shall constitute full compensation for furnishing all labor, materials and equipment necessary for backfilling work.

CW-5.4.5 Trench Excavation and Backfill for Sewerage, Drainage and Water Supply Pipes and Cable Trench

No separate measurement and payment will be made for trench excavation and backfill for all sewerage, drainage and water supply pipes. Payment for trench excavation and backfill for pipes shall be included in the payment pertaining to pipes as shown in the Bill of Quantities.

CW-6.0 CONCRETE

CW-6.1 Scope

In accordance with the specifications contained in this section, the Contractor shall furnish all materials, labor, equipment and tools and perform all concreting works in accordance with the drawings, or as otherwise directed.

CW-6.2 Class of Concrete

Class of concrete or strength shall be as indicated on the drawings, which shall conform to the minimum requirement for compressive strength indicated on the provision of NSCP for Concrete and, in no case, shall not be less than 20.7 MPa.

CW-6.3 Materials

CW-6.3.1 Cement

Cement for concrete works shall be furnished by the Contractor and shall conform to the requirements of the latest edition of the Standard Specifications for Portland Cement (ASTMC150).

Unless otherwise specified, cement shall be ordinary Portland Cement. Type I for general construction which concrete is not in contact with soils or ground water and Type II for concrete in contact with soil or ground water.

Changing of brand or type of cement within the same structure will not be permitted unless with prior permission and approval obtained from the NPC.

CW-6.3.2 Reinforcing Steel

The Contractor shall furnish all reinforcing steel of the sizes shown on the drawings and in accordance with the herein specifications for reinforcing steel.

CW-6.3.3 Water

Water for use in concrete shall be subject to the approval of the NPC. It shall not be salty and shall be reasonably clear and free from oil, acid, injurious alkali or vegetable matter.

CW-6.3.4 Aggregates

All coarse and fine aggregates shall consist of hard, tough, durable and clean, uncoated particles. All foreign materials and dust shall be removed by processing. Aggregates shall generally be rounded and reasonably free from thin, flat and elongated particles in all sizes and well graded from coarse to fine.

CW-6.3.5 Formwork

Timber, lumber and plywood to be used for falsework and formwork shall be sound and shall comply with the requirements of this specifications. Use forms where a smooth form finish is required. Lumber shall be square-edged or tongue-and-groove boards, free or raised grain, knotholes and the other surfaces defects. Steel when used shall conform to the requirements of the ASTM A36. Steel form surfaces shall not contain irregularities, dents, or sags.

Forms shall be wood, plywood, or steel. Wood forms for surfaces exposed to view in the finished structure and requiring a smooth form finish, shall be plywood. For unexposed surfaces, undressed square-edge lumber may be used. Forms for surfaces requiring special finishes shall be plywood, or shall be lined with plywood, a non-absorptive, hard-pressed fiberboard, absorptive-type lining or other suitable material. Plywood, other than for lining, shall be concrete-form plywood free of raised grain, torn surfaces, worn edges, patches, or other surface defects, which would impair the texture of the concrete surface. Surfaces of steel forms shall be free from irregularities, dents, and sags.

CW-6.4 Storage of Materials

CW-6.4.1 Cement and Aggregates

All cement shall be stored, immediately upon delivery at the Site, in weatherproof building that will protect the cement from dampness. The floor shall be adequately raised from the ground and in buildings placed in the locations approved by NPC. Provisions for storage shall be ample, and the shipments of cement as received shall be separately stored in such a manner that allows the earliest deliveries to be used first and to provide easy access for identification and inspection of each shipment. Storage buildings shall have capacity for storage of sufficient quantity of cement to allow sampling at

least twelve (12) days before the cement is to be used. Bulk cement, if used, shall be transferred to elevated air tight and weatherproof bins. Stored cement shall meet the test requirements at any time after storage when NPC orders retest. At the time of use, all cement shall be free flowing and free of lumps.

Handling and storing of concrete aggregates shall be such that segregation or inclusion of foreign materials is sufficiently prevented. NPC may require that aggregates be stored on separate platforms at satisfactory locations.

In order to secure greater uniformity of concrete mix, NPC may require that the coarse aggregate be separated into two or more sizes. Different sizes of aggregates shall be stored in separate bins or in separate stockpiles and relatively away from each other to prevent the material at the edges of the piles from intermixing.

CW-6.4.2 Reinforcing Steel

Reinforcing steel shall be stored in accordance with the specifications for reinforcing steel.

CW-6.5 Concreting

CW-6.5.1 General

The written approval of the NPC shall be secured prior to any concreting work. All concrete shall be poured on dry and cleaned surfaces.

CW-6.5.2 Formwork Construction

Forms shall be installed mortar and watertight, true to the dimensions, lines and grades of the structure and with the sufficient strength, rigidity, shape and surface smoothness as to leave the finished works true to the dimensions shown on the drawings or required by NPC and with the surface finish as specified.

The inside surfaces of forms shall be cleaned of all dirt, mortar and foreign material. Forms, which will subsequently be removed, shall be thoroughly coated with a release agent or coating prior to its use. The release agent shall be commercial quality form oil or other approved coating which will permit the ready release of the forms and will not discolor the concrete.

Formwork for concrete placed underwater shall be watertight.

Forms shall be constructed so that the form surface of the concrete does not undulate excessively in any direction. Undulations exceeding either 2 mm or 1/270 of the center distance between studs, joints, form stiffeners, form fasteners, or wales will be considered to be excessive. Should any form of the forming system, even though previously approved for the use, produce a concrete surface with excessive undulations, its use shall be discontinued until modifications, satisfactory to NPC's Representative, have been made.

Portions of concrete structures with surface undulations in excess of the limits herein stated may be rejected by the NPC.

Form fasteners consisting of bolts, clamps or other devices shall be used as necessary to prevent spreading of the forms during concrete placement. The use of ties consisting of twisted wire loops to hold the forms in position will not be permitted.

All formworks shall be provided with adequate clean-out openings to permit inspection and easy cleaning after all reinforcement has been placed. Where forms for continuous surfaces are placed in successive units, the forms shall be fitted over the completed surface to obtain accurate alignment of the surface and to prevent leakage of mortar. Panel forms shall be constructed so that they can be removed without damaging the concrete. All exposed joints, edges, and external corners shall be chamfered a minimum of 20 mm unless specified otherwise herein. Forms for heavy girders and similar members shall be constructed with a proper camber.

Coating: Before placing the concrete, the contact surface of forms shall be coated with a non-staining mineral oil or suitable non-staining form coating compound or shall be given two coats of nitrocellulose lacquer, except as specified otherwise. Mineral oil shall not be used on forms for surfaces, which are to be painted. For surfaces not exposed to view in the finished structure, sheathing may be wetted thoroughly with clean water. All excess coating shall be removed by wiping with cloths. Reused forms shall have the contact surfaces cleaned thoroughly. Those that have been coated shall be given an additional application of the coating. Plaster waste molds shall be layered with two coats of the thin shellac or lacquer and coated with soft or thinned non-staining grease.

Tolerance and Variations: The Contractor shall set and maintain concrete forms to ensure that, after removal of the forms and prior to patching and finishing, no portion of the concrete work will exceed any of the tolerances specified. Variations in floor levels shall be measured before removal of supporting shores. The Contractor shall make the necessary corrective measures for the variations resulting from deflection, or when the latter affects concrete quality or curing. The tolerances specified shall not exceed by any portion of the concrete surfaces; the specified variation for one element of the structure shall be considered unacceptable when it permits another element of the structure to exceed its allowable variations. Except as otherwise specified herein, tolerances shall conform to ACI 347.

CW-6.5.3 Placing Reinforcement

Reinforcing steel and embedded items shall be properly and securely installed prior to the placing of concrete.

In no case shall concreting start without prior inspection and approval by the NPC of the placed reinforcement and other embedded items.

CW-6.5.4 Mixing Concrete

Mixing of concrete shall conform to the requirements of ACI Code for Concrete Construction.

CW-6.5.5 Placing Concrete

Concrete shall be conveyed from mixers to the forms or to the place of deposit as rapidly as possible and by methods that will prevent segregation or loss of ingredients. There shall be no vertical drop greater than 1.5 meters except where suitable equipment like metal pipe or tremie is used. The pipe or tremie shall be kept full of concrete and its end shall be kept buried in the newly placed concrete. Chutes through which concrete is delivered to the structure in a thin, continuously exposed flow will not be permitted except for very limited or isolated sections of the work.

Earth surfaces, upon which concrete shall be placed, shall be cleaned, dry and thoroughly compacted before placing the concrete.

Rock surface, upon which concrete shall be placed, shall be thoroughly cleaned of loose or semi-detached or unsound rock particles. Before placing concrete, all surfaces shall be wetted thoroughly to keep them in a completely moist condition, after which leveling mortar of the same cement ratio as the concrete mix complete contact between concrete and the leveled surface.

CW-6.5.6 Finishing Concrete

After the concrete has been deposited, distributed and vibrated, the concrete shall be struck off and screened by mechanical means approved by the NPC. The finishing machine shall be of the screening and troweling type designed and operated both to strike off and to consolidate. Hand finishing may be employed when suitable finishing machines are not available. Finishing of concrete shall be done, as directed, to the satisfaction of the NPC.

All finished surfaces shall be tested with 3 meters straight edge and any variation of the surface from the desired crown or cross section shall be properly corrected.

CW-6.5.7 Removal of Forms

Formwork shall not be removed without the permission of NPC; where such permission, however, shall not relieve the Contractor of its responsibility for the safety of the work. Blocks and bracing shall be removed at the time the forms are removed and in no case shall any portion of the wood forms be left in the concrete.

Falsework removal for continuous structures shall be as directed by NPC but in which case shall be temporarily supported such that the structure is gradually subjected to its working stresses. False work shall not be released in any span until the strength specified hereunder is attained.

When concrete strength tests are to be used as basis for the removal of forms and supports, the compressive strength of concrete must meet the following minimum requirements:

	Min. Time	Min.% Strength
Centering under girders and beams	14 days	80%
Sides of beams and all vertical surfaces	1 day	70%
Floor Slabs	14 days	80%

The site shall be cleared of all debris and refuse resulting from work.

CW-6.5.8 Curing and Protection

Concrete shall be cured for a period of not less than fourteen (14) consecutive days by keeping the surfaces of concrete continuously (not periodically) wet. Where tongue and groove forms were used and left in place of curing, they shall be kept wet at all times prevent opening at the joints and drying out of the concrete.

CW-6.5.9 Sampling and Testing of Concrete

The Contractor shall furnish all materials, either separately or mixed, as required by NPC. Selection of materials and the making of test specimens shall be made under the supervision of NPC and delivered to NPC laboratory or any NPC-accredited testing agency at the Contractor's expense.

The expense of making and curing all concrete specimens including the materials comprising the concrete specimens shall be borne by the Contractor. The cost of shipping and testing the concrete shall likewise be at the expense of the Contractor.

No concreting work on the project will be permitted to be done until NPC signifies in writing that, following the performance of the necessary tests, he gives his approval to the use of all materials involve in making the concrete.

As work progresses, test cylinders shall be fabricated from the concrete samples and tested in accordance with ASTM C31 and ASTM C39. At least one set of four (4) cylinders shall be made from each 10 cu.m of the concrete placed of each class. Also at least one set shall be made per day for each class of concrete placed each day.

Two (2) cylinders shall be tested at 28 days for specification compliance and one shall be tested at 7 and 14 days respectively for information. The acceptance test result shall be the average of the strength of the two cylinders tested at 28 days.

The compressive strength of the concrete shall be deemed acceptable if the averages of the three consecutive strength test results is equal to or exceeds the specified strength and no individual test falls below the specified strength by more than 3.50 MPa.

Concrete deemed to be not acceptable using the above criteria maybe rejected unless the Contractor can provide evidence, by means of core tests, that the quality of concrete represented by the failed test result is acceptable in place. Three (3) cores shall be taken in accordance with ASTM C42 and soaked for 24 hours prior to testing. Concrete in the area represented by the cores will be deemed acceptable if the average strength of the cores is equal to at least 85% of and no single core is less than 75% of the specified strength.

CW-6.5.10 Tolerances and Repair for Concrete Construction

Concrete structures shall be constructed to the lines shown on the drawings or where so required to suit actual field requirements. Any structure that does not conform to such lines shall be repaired or removed and made anew by the Contractor at no additional cost to the Corporation.

Repairs shall be made at surface imperfections due to faulty placing of concrete and cuts on the structures due to the removal of excess concrete on the lines shown on the drawings. Such repairs shall be made immediately after early stripping of the forms, after the imperfections have been identified and the methods of repair appropriately established.

CW-6.5.11 Second Stage Concrete

The second stage of concrete finishing shall be done only after the final installation of all pertinent equipment, anchorages, pipings, conduits and other embedded items as may be required for all electromechanical works.

CW-6.6 Measurement and Payment

Measurement for payment for Concrete, except concreting works that are associated to various construction and/or installation/erection works (i.e. equipment foundation and pedestals, perimeter wall footing and posts, etc.) included in the Bill of Quantities under separate pay item, will be based on the volume of concrete placed and accepted within the neat lines of the structure as shown on the drawings or in accordance with the manner of measurement set forth in the various sections of the Technical Provisions. No deduction will be made for rounded or beveled edges or space occupied by the metal items 10 sq. cm. or less in cross section, embedded in concrete.

Payment will be made at the corresponding contract unit price for the various items of concrete shown in the Bill of Quantities. Payment shall cover all costs for furnishing all labor, materials, including equipment and tools required for concreting work. Payment shall also include non-shrink cementitious grout and epoxy grout inside foundation block out and above engine base plate and care of water.

No separate measurement for payment will be made for formworks of which the cost shall be included in concreting works.

CW-7.0 REINFORCING STEEL

CW-7.1 Description

This work shall consist of furnishing, fabricating, and placing of steel reinforcement of the type, size, shape and grade required in accordance with these specifications and in conformity with the requirements shown on the Drawings or as directed by the NPC.

CW-7.2 Material Requirement

All material shall conform to the requirements hereinafter given. Certified test reports (mill test or other) shall be submitted to the NPC for all reinforcement steel used. These tests shall show the results of all chemical and physical tests made.

CW-7.2.1 Bar Reinforcement

Reinforcement bars for concrete shall be hot-rolled, weld able, deformed billet-steel bars conforming to the requirements specified in ASTM A615 and PNS 49 unless shown on the Drawings or as required by the NPC. The use of the cold twisted bars is not permitted. Bar reinforcement shall be shipped in standard bundles, tagged and marked in accordance with the Code of Standard Practice of the Concrete Reinforcement Steel Institute.

CW-7.2.2 Sampling

The NPC's Representative will sample reinforcement bars at the source of supply or at the point of distribution, and the Contractor shall notify the NPC in sufficient time in advance to permit sampling and testing before shipment is made. Three (3) samples from each size shall be taken at random representing five (5) tons or fraction thereof of each size.

CW-7.3 Construction Requirement

CW-7.3.1 Order List for Bent Bars

Before materials are ordered, the Contractor shall furnish all order lists and bending diagrams for the approval of the NPC. The approval of order lists and bending diagrams by the NPC shall in no way relieve the Contractor of responsibility for the correctness of such lists and such lists and diagrams. Any expenses incident to the revisions of materials furnished in accordance with such lists and diagrams to make them comply with the drawings shall be borne by the Contractor.

Shop Drawings for Reinforcing Steel (ACI 315): Indicate bending diagrams, assembly diagrams, splicing and laps of bars, shapes, dimensions and details of bar reinforcing, accessories and concrete cover. Do not scale dimensions from structural drawings to determine lengths of reinforcing steel.

CW-7.3.2 Fabrication

Bent bar reinforcement shall be cold bent as shown on the drawings or as required by the NPC. Bars shall be bent around circular pin having the following diameters (D) in relation to the diameter of the bar (d):

Bars 6mmΦ to 20mmΦ inclusive	D=6d
Bars 25mmΦ and 28mmΦ	D=8d
Bars 32mmΦ and greater	D=10d

Bends and hooks in stirrups and lateral ties may be bent to the diameter of the principal bar enclosed therein.

CW-7.3.3 Protection of Material

Steel reinforcement shall be protected at all times from injury. When placed in the work, it shall be free from dirt, detrimental scale, paint, oil or other foreign matter. However, when steel has on its surface easily removable and detrimental rust, loose scale or dust, it shall be cleaned by a satisfactory method, approved by the NPC.

Store reinforcement of the different sizes in racks raised above the ground with accurate identification. Protect reinforcing steel from contaminants such as grease, oil and dirt.

CW-7.3.4 Placing and Fastening Reinforcement & Miscellaneous Material (ACI-301)

All reinforcement bars, stirrups, hanger bars, wire fabric, spirals and other reinforcing materials shall be provided as indicated in the drawing or required by the specification, together with all necessary wire ties, chairs, screws, supports, and other devices necessary to install and secure the reinforcement properly. All reinforcement, when placed, shall be free from rust, scale, oil, grease, clay, and other coatings, and foreign substances that would reduce or destroy the bond. Rusting of reinforcement shall not reduce the effective cross sectional area of the reinforcement to the extent that the strength is reduced beyond specified values. Heavy, thick rust or loose, flaky rust shall be removed by rubbing with burlap or other approved method, prior to placing. Reinforcement that has bends not shown on the project drawings or on approved shop drawings, or is reduced in section by rusting such that its weight is not within permissible ASTM tolerances, shall not be used. All reinforcement shall be supported and wired together to prevent displacement by construction loads or by the placing of concrete. Unless directed otherwise by the NPC, reinforcement shall not be bent after being partially embedded in hardened concrete. Detailing of reinforcing shall conform to ACI 315. Where cover over reinforcing steel is not specified or indicated, it shall be in accordance with ACI 318.

All steel reinforcement shall be accurately placed in position shown on the drawings or as required by the NPC and firmly held there during the placing and setting of the concrete. Bars shall be tied at all intersections except where spacing is less than 30 mm in each direction, when alternate intersections shall be tied. Ties shall fasten on the inside.

Distance from the forms shall be maintained by means of stays, blocks, hangers or other approved supports. Blocks for holding reinforcement from contact with the forms shall be pre-cast mortar blocks of approved shape and dimensions or approved chairs. Layers of bars shall, be separated by pre-cast mortar blocks or by other equally suitable devices. The use of pebbles, pieces of broken stone or brick, metal pipe and wooden blocks or metal chairs shall not be permitted. Unless otherwise shown on the Drawings or required by the NPC, the minimum distance between bars shall be 40mm. Reinforcement in any member shall be placed and then inspected and approved by the NPC before the placing of concrete commences. Bundled bars shall be tied together at not more than 1.80 meters intervals.

Reinforcement shall be placed accurately and secured. It shall be supported by suitable chairs and spaces or by metal hangers. On the ground, and where otherwise subject to corrosion, concrete or other suitable non-corrodible material shall be used for supporting reinforcement. Where the concrete surface will be exposed to the weather in the finished structure or where rust would impair the appearance or finish of the structure, all reinforcement supports, within specified concrete cover, shall be galvanized or made of a suitable non-corrodible material.

All placement or movement of reinforcing steel after placement, to positions other than indicated or specified, shall be subject to the approval of the NPC.

Concrete protection for reinforcement shall be as indicated, or if not indicated, in accordance with ACI 318.

The minimum concrete cover for reinforcement specified in the bid documents shall takes precedence over all permissible reinforcement placement variations; nothing in the variations listed below is to be constructed as permitting violation or compromise thereof:

a.	Height of bottom bars	±6mm above form
b.	Lengthwise positioning	±50mm of bars
c.	Spacing bars in walls and solid slabs	±25mm
d.	Spacing bars in beams and footings	±6mm
e.	Height of top bars	±6mm
f.	Stirrup spacing:	
	(1) For any one stirrup	±25mm
	(2) For over-all group	±25mm of stirrup

Anchors and bolts; including but not limited to those for the machine and equipment bases: frames or edgings, hangers and inserts, door bucks, pipe supports, pipe sleeves, pipe passing through walls, metal ties, conduits, flashing reflects, drains and all other materials in connection with the concrete construction shall, where practicable be placed and secured in position when the concrete is placed. Anchor bolts for machines shall be set to templates, shall be plumbed carefully and checked for location and elevation with an

instrument, and shall be held in position rigidly to prevent displacement while concrete is being placed.

CW-7.3.5 Splicing

Splicing of reinforcement shall be in accordance with ACI 318, except as indicated otherwise or modified herein. Where splices in addition to those indicated on the drawings are necessary, they shall be approved by the NPC prior to their use. Splices shall not be made in beams, girders, and slabs at points of maximum stress. Butt Splicing shall preferably be used over lapping for bar sizes larger than 32 mmΦ. Splices to be welded shall conform to AWS D1.4; certification of weld ability of the reinforcement by the manufacturer, shall be submitted to the NPC. If the Contractor elects to use butt splicing of reinforcing, he shall submit complete details of the process to be used by the NPC. If the butt splices are used the Contractor shall ensure that the splice meets the requirements specified herein by performing at least three splices which shall be submitted for tests to a testing laboratory that has been approved for such testing by the NPC. The cost of these shall be borne by the Contractor.

All reinforcement shall be furnished in the full lengths indicated on the Drawings. Splicing of bars, except where shown on the Drawings will not be permitted without the written approval of the NPC. When allowed, splices shall be staggered as far as possible and with a minimum separation of not less than 40 bar diameters. Not more than one-third of the bars may be spliced in the same cross section, except where shown on the Drawings.

Unless otherwise shown on the Drawings, bars shall be lapped a minimum distance of:

Splice Type	Grade 40 Min.Lap	But Not Less Than
Tension	24d	300mm
Compression	20d	300mm

Where d is the diameter of the bar. In lapped splices, the bars shall be placed in contact and wired together. Lapped splices will not be permitted at locations where the concrete section is insufficient to provide a minimum clear distance of one and one-third the maximum size of coarse aggregate between the splice and the nearest adjacent bar. Welding of reinforcing steel shall only be done if detailed on the Drawings or if authorized by the NPC in writing. Spiral reinforcement shall be spliced by lapping at least one and half (11/2) turns or by butt-welding unless otherwise shown on the drawings.

CW-7.4 Measurement and Payment

The quantity to be paid for shall be the calculated theoretical number of kilograms of reinforcement steel bars as determined from the net length of the steel shown on the drawings, incorporated in the concrete and accepted.
The weight of deformed bars will be computed from the theoretical weight of the same nominal size as shown in the following tabulation:

Designation	Size (mm)	Weight (kg/m)
#2	6	0.222
#3	10	0.616
#4	12	0.888
#5	16	1.579
#6	20	2.468
#8	25	3.854
#9	28	4.833
#10	32	6.313
#11	36	7.991

Clips, ties, separators and other and related materials used for positioning and fastening the reinforcement in place as required by the NPC shall not be included in the weight-calculated payment under this item. If bars are substituted upon the Contractor's request and as a result, more steel is used than specified – only the amount specified shall be included.

When laps are made for splices, other than those shown on the drawings or required by the NPC and for the convenience of the Contractor, the extra steel shall not be measured nor paid for.

The accepted quantity shall be paid at the corresponding unit price for the item, Reinforcing Steel as shown in the Bill of Quantities which price and payment shall be made in full compensation for furnishing materials, labor, equipment and incidentals necessary to complete this item.

CW-8.0 STRUCTURAL STEEL

CW-8.1 General

This section covers the fabrication, erection, and shop painting of structural steel in accordance with the AISC "Manual of Steel Construction" referred to herein. In the AISC "Manual of Steel Construction" referred to herein, the Specification for Design, Fabrication, and Erection of Structural Steel for Buildings," and "Structural Joints using A325 or A490 Bolts" shall be considered a part thereto.

CW-8.1.1 Submittals

Shop Drawings of all structural steel in five (5) copies for approval prior to fabrication of structural steel with complete information necessary for the fabrication and erection of the component parts of the structure including the location, type and size of all bolts and welds, member sizes and lengths, camber & connector details, blocks, copes, and cuts. Include all welds by standard welding symbols.

Erection Plan consists of descriptive data to illustrate the structure steel erection procedure including the sequence of erection and temporary shoring and bracing, and written description of the detailed sequence of all welding, including each welding procedure to be performed.

Certificates of Conformance for the following:

- Bolts, Nuts and Washers
- Welding Electrodes and Rods
- Paint
- Steel
- Certified Test Reports

Chemical Analysis and Tensile Strength Test of structural steel in accordance to ASTM A53.

For high strength bolts and nuts, the Contractor shall also submit chemical analysis, including tensile strength and hardness tests as required by ASTM A325.

CW-8.1.2 Delivery and Storage

All materials shall be handled, shipped and stored in a manner that will prevent distortion or other damages. Materials shall be stored in a clean and properly drained location and out of contact with the ground. Damaged materials shall be replaced or, when permitted by NPC, may be repaired in an approved manner at no additional cost to NPC.

CW-8.2 Materials

All the materials shall be of the best quality of their kind, well graded and within the allowable distortions. They shall be free from flakes, corrosion, scale of fragments that could reduce the resistance and durability or injure the external appearance.

Except as modified herein, blast clean surfaces in accordance with SSPC SP6. Wash clean surfaces that become contaminated with rust, dirt, oil, grease or other contaminants with solvents until thoroughly clean. Ensure that steel to be embedded in concrete and surfaces when assembled, are free from rust, grease, dirt and other foreign matter.

CW-8.2.1 Steel

Materials shall conform to the respective specifications specified herein. Materials not otherwise specified herein shall conform to the AISC "Manual of Steel Construction".

Structural Steel:	ASTM A36
Steel Pipe:	ASTM A53, Type E or S, Grade B, ASTM A501
Steel W-Shape Piles (Soldier Piles):	ASTM A328

CW-8.2.2 Bolts, Nuts and Washers:

All bolts, nuts and washers shall be of hot-dip galvanized steel, in accordance with the following:

Bolts:	ASTM A307, Grade C or ASTM A36 for Anchor Bolts; ASTM A325 for Fastening Bolts
Nuts:	ASTM A563, Grade A, heavy hex style, except nuts less than 38mm may be provided in hex style
Washers:	ANSI B18.22.1, Type B

CW-8.2.3 Accessories:

Welding electrodes and steel structural members shall use:

Rods	E70XX electrodes
Non-shrink Grout	ASTM C827, non-metallic

CW-8.3 Execution

CW-8.3.1 Fabrication

Structural steel fabrication shall be in accordance with the applicable provisions of the Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings as set forth in the AISC "Manual of Steel Construction".

CW-8.3.2 Welding of Structural Steel Work:

All welding works shall be as indicated in the drawings and shall conform to AWS D1.1 - 77 "Structural Welding Code". Unless specified on the drawings, fillet welds shall be a minimum of 5 mm (3/16") and welding electrodes shall be with a tensile strength of 485 MPa.

All welding works shall be executed by the AWS D1.1 qualified welders, welding operators and trackers, whose workmanship shall be subject to the approval of NPC.

CW-8.3.3 Shop Painting

Except as otherwise specified, shop prime surfaces of all structural steel, except steel to be embedded in concrete or mortar. Surfaces to be welded shall not be coated within 12 mm from the specified top of the weld prior to welding. Insure that the surfaces are thoroughly dry and clean when the paint is applied. Do not paint on wet weather except under cover. Do not apply paint to steel, which is at a temperature that will cause blistering or porosity, or will otherwise be detrimental to the life of the paint. Apply paint with high quality workmanship, and coat all joints and crevices thoroughly. Prior to

assembly, paint all surfaces that will be concealed or inaccessible after assembly.

Shop prime coat surfaces as soon as possible after cleaning. Apply one coat of inorganic zinc to a minimum dry film thickness of 100 microns.

- Field painting: When the erection work is complete, the heads of field bolts, all welds and any surface from which the shop coat of paint has become worn off or has otherwise become defective, shall be cleaned and thoroughly covered with one coat of shop coat paint. When the paint applied for touching up bolt heads and abraded surfaces has become thoroughly dry, apply two field coats of marine epoxy paint subject to the approval of NPC.

- Marking: Prior to erection, members shall be provided with a painted erection mark. In addition, connecting parts assembled in the shop for remaining holes in field connections shall be matched marked with scratch and notch marks. Do not locate erection markings on areas to be welded. Do not locate erection markings in areas that will decrease member strength or cause stress concentrations.

CW-8.3.4 Erection

Except as modified herein, erect steel in accordance with the AISC "Manual of Steel Construction". Where parts cannot be assembled or fitted properly as a result of errors in fabrication or of deformation due to handling or transportation, report such condition immediately to the NPC's Representative and obtain approval there from for the methods of correction for straightening, including members of steel conforming to ASTM A514.

Drain Steel work properly; fill pockets in structures exposed to the weather with an approved waterproof material.

Provide safety belts and lines for workmen aloft on high structures unless safe working platforms or safety nets are provided.

When calibrated wrenches are used for tightening bolts, calibrate them at least one each working day using not less than three typical bolts of each diameter. Do not use impact torque wrenches to tighten anchor bolts set in concrete.

Connections: Connections shall be executed as shown on drawing. In case, connections are not detailed, it shall be designed in accordance with AISC "Manual of Steel Construction". Build connections into the existing work. Punch, sub-punch and ream, or drill bolt holes.

Tolerances: Structural steel shall be furnished and installed to the lines and levels as shown on the drawings.

Any structure that does not conform shall be repaired, removed and/or erected anew by the Contractor at no additional cost to NPC.
Tolerances on structural steel shall be in accordance with the "Code of Standard Practice" of the AISC "Manual of Steel Construction".

CW-8.3.5 Tests and Inspections

Visual Inspection of Welding: After the welding is completed, hand or power wires brush welds, thoroughly clean them before the inspector makes the check inspection. Inspect welds with magnifiers under strong, adequate light for surface cracking, porosity, and slag inclusions; excessive roughness; unfilled craters; gas pockets; undercuts; overlaps; size and insufficient throat and concavity. Inspect the preparation of groove welds for adequate throat opening and for snug positioning of backup bars.

Non-Destructive Testing[1]: In accordance with AWS D1.1 Twenty-five percent (25%) of the total number of joints, as selected by the NPC, shall be tested. If more than 20 percent of welds contain defects identified by testing, then all welds shall be tested by radiographic or ultrasonic testing, and to be approved by the NPC. When all welds made are required to be tested, magnetic particle testing shall be used only in areas inaccessible to either radiographic or ultrasonic testing. Retest defective areas after repair.

CW-8.4 Measurement and Payment

Measurement for payment for structural steel shall be based on the total kilogram of structural steel placed and accepted.

Payment will be made at the contract unit price for the item Structural Steel in the Bill of Quantities, which payment shall constitute full compensation for furnishing all labor, materials and equipment necessary to complete the item.

CW-9.0 DRAINAGE SYSTEM AND APPURTENANT STRUCTURES

CW-9.1 Scope

In accordance with the specifications contained herein, the Contractor shall furnish all materials, labor, equipment and tools, perform all required excavation and backfill, install all pipes and construct canals and ditches, as the case may be, where indicated on the drawings or where directed conforming with the lines and grades as established in the field by the NPC. The Contractor shall also construct or install, where required, appurtenant structures like street inlet, street inlet-catch basin combination, manhole, catch basin for downspouts, drainage outlets, drain pits, etc. as well as joints and connections as may be required to complete the system.

CW-9.2 Materials

CW-9.2.1 Non-Reinforced Concrete Drainage Pipes

Non-reinforced concrete drainage pipes shall meet the requirements of ASTM C14-68.

One pipe length shall be taken at random representing a group of fifty (50) pipes or fraction thereof of the same size and shall be submitted for test. Any

[1] Not applicable on non-critical structures/joints and as directed/required by NPC Design Engineer.

group represented by corresponding test specimens that do not meet the strength and other test requirements shall not be used in the work.

CW-9.2.2 Reinforced Concrete Drainage Pipes

Reinforced concrete drainage pipes shall meet the design and test requirements for Class II Reinforced Concrete Pipes in accordance with ASTM C76-68 and ASTM C497-67.

One (1) pipe length shall be taken at random representing a group of fifty (50) pipes or fraction thereof of the same size and shall be submitted for test. Any group represented by corresponding test specimens that do not meet the strength and other requirements shall not be used in the work.

CW-9.2.3 PVC Pipes

Polyvinyl Chloride (PVC) Pipes shall be unplasticized conforming to ISO4435 or equivalent. Details/scheme of perforation shall be as indicated in the bid drawing or as directed by NPC.

CW-9.2.4 Concrete Covered Rectangular Ditch

Cement, reinforcing steel, aggregate and water to be used for the construction of concrete covered rectangular ditch and open rectangular canal shall conform to the requirements set forth in Section CW-6.0 – Concrete. Foundation base material for concrete canal shall be sand and gravel as described in Section CW-5.0.

CW-9.2.5 Bedding Material

A. For Stable Soil and Rock Foundation

Bedding material for sewerage and drainage pipes in stable soil and rock foundation, as determined by NPC, shall consist of sand or natural sandy soil in which all the materials passes a 9.5 mm (3/8") sieve but not more than 10% passes a 0.074 mm (No. 200) sieve.

B. For Unstable Foundation

Bedding for sewerage and drainage pipes in soft and unstable foundation as determined by the NPC, shall consist of 13.79MPa concrete cradle in conformity with the dimensions shown on the drawings, or as determined by the NPC.

C. Foundation under Roadways and Parking Areas

Bedding for sewerage and drainage pipes crossing under roadways and parking areas with pipe cover (excluding concrete or asphalt pavement) of 60.9 cm (2 ft.) or less shall consist of 13.79MPa concrete cradle in conformity with the dimensions shown on the drawings, or as determined by the NPC.

CW-9.3 Construction

CW-9.3.1 Trench Excavation and Backfill

Trench excavation and backfill work shall be done in accordance with the pertinent provisions of Section CW-5.0.

CW-9.3.2 Concrete Canal

Concrete canal, open or covered, shall be constructed in accordance with the lines and grades shown on the drawings. Class of concrete shall be as indicated on the drawings or directed by the NPC.

CW-9.3.3 Appurtenant Structures

Appurtenant structures like street inlet, street inlet-catch basin combination, manhole, catch basin for downspouts, catch basin for intersecting perforated PVC pipes, septic tank, drainage outlets, drain pits, etc. shall be constructed at locations indicated on the plans or at the other convenient locations designated by the NPC. All appurtenant structures shall be of 17.30 MPa concrete unless otherwise shown on the drawings.

CW-9.4 Pipe Installation

CW-9.4.1 General

Before any drain pipe is installed, the sand or concrete bedding shall have been prepared and approved in accordance with the grade, shape, and dimensions shown on the drawings, or as directed by the NPC. No pipe over 45.7 cm (18") in diameter shall be laid on concrete bedding until seven (7) days have been elapsed after placing the concrete bedding. Pipes under 45.7 cm (18") in diameter may be laid after five (5) days elapsed after placing the concrete bedding.

All drain pipes shall be laid carefully, hubs upgraded, ends fully and closely jointed, and true to the lines and grades given. Succeeding pipe shall be jointed to the previously laid pipe, correct in alignment and grade. Any pipe, which has been damaged during installation or before acceptance of the work, shall be replaced and laid by the Contractor at his expense.

CW-9.4.2 Non-Reinforced and Reinforced Concrete Drainage Pipes

Whenever possible, concrete pipes shall be handled and installed with the aid of mechanical equipment and not just rolled or pushed into the trench from the bank. For small pipes, rope slings may be placed at both ends of the pipes and the rope slowly paved out until the pipe rests on the trench bed. proper and careful handling and laying should be observed at all times to prevent unnecessary structural damage to the pipe, especially at the pipe ends.

For pipes on sand bedding, before joining the next pipe length to the last pipe already laid, the bottom of the trench shall be excavated to the shape, size and location of the collar below the joint. The next pipe section shall then be

securely attached to the previously laid pipe seeing to it the correct alignment and grade is always attained. Same procedures shall be observed for the remaining pipes.

All pipe joints shall be filled with stiff mortar composed of one (1) part cement and two (2) parts clean sand and enough water. The inside part of the joint shall be plastered properly to bring the inside surfaces of jointed pipe ends flush even. Sufficient mortar shall be placed on the outside surface of joint to form a bead around the joint. Plastering work shall be as directed and approved by the NPC. After initial set, the mortar on the outside surface shall be protected from air and sunlight with a cover thoroughly wetted earth or burlap. Curing of the joint shall be done for a period of at least seven (7) days within which no backfill shall be placed on the installed pipeline.

CW-9.5 Measurement and Payment

CW-9.5.1 Concrete Rectangular Ditch

Measurement for payment for rectangular ditch and other channels will be based on the number of linear meters of canal constructed and accepted.

Payment will be made at the corresponding contract unit price per linear meter of the pertinent items shown in the Bill of Quantities. Payment shall constitute full compensation for furnishing all labor, materials, equipment and tools necessary for the construction of the concrete canal including attendant excavation and backfill.

CW-9.5.2 Concrete Drainage Pipes and PVC Pipes

Non-reinforced and reinforced concrete drain pipes, and PVC pipes in place and accepted will be measured by the linear meter along the centerline of the pipeline.

The quantities measured as provided above, completely installed and accepted, will be paid at the contract unit price for each size and kind of pipe shown in the Bill of Quantities. Payment shall constitute full compensation for furnishing all labor, material, equipment and tools for fabricating, hauling, installing and jointing of pipes. Payment shall also include the cost of attendant excavation, bedding and backfilling.

CW-9.5.3 Appurtenant Structures

Measurement for payment of appurtenant structures like street inlet, street inlet-catch basin combination, manhole, catch basin for downspouts, septic tank, drainage outlets, drain pits, etc. will be based on the number of structures constructed/installed and accepted.

The Contractor will be paid at the contract unit price for the pertinent item for each appurtenant structure shown in the Bill of Quantities. Such payment shall cover all costs for furnishing all equipment, labor, materials and tools necessary to complete the construction of the aforementioned appurtenant structures. Payment also includes the cost of attendant excavation and

backfill, furnishing, scheduling, cutting, bending and placing of reinforcing steel.

CW-9.5.4 Bedding

Measurement for payment for sand or natural sandy soil bedding and concrete cradle will be based on the number of cubic meters of materials placed and accepted.

Payment will be made at the corresponding contract unit price for the item. Sand Bedding for Pipes, and item, Concrete Cradle for Pipes, in the Bill of Quantities, which payment shall constitute full compensation for furnishing all labor, materials, equipment and tools necessary to complete the items.

SECTION VI

TECHNICAL SPECIFICATIONS FOR ELECTRICAL WORKS

SECTION VI - TECHNICAL SPECIFICATION

EW - ELECTRICAL WORKS

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EW - ELECTRICAL WORKS

EW-1.0 GENERAL

This section covers the technical and associated requirements for the complete lighting and power system for the Construction of Office/Staff House at Mangsee DPP.

All electrical equipment shall be installed in accordance with the relevant sections of this specification. The Supplier shall submit all related drawings and document deemed necessary, prior to the execution of the work, subject to the approval of NPC.

The works shall be performed and completed in a satisfactory manner in accordance with generally accepted modern engineering practice.

EW-2.0 SCOPE OF WORK

The scope of electrical work covers the furnishing of all labor, materials, equipment, tools and other necessary incidentals required which shall essentially consist of all electrical equipment and materials for the complete lighting and power system of the new office/staff house and pump house.

The scope of electrical work covers the furnishing of all labor, materials, equipment, tools and other necessary incidentals required which shall essentially consist of all electrical equipment and materials enumerated herein:

1. Supply, Installation and Test of complete Lighting and Power System of the New Office/Staff House;
2. Supply, Installation and Test of complete Lighting System of the New Pump House; and
3. All other works and services including those not specifically detailed herein but are required to fully complete the project.

EW-3.0 STANDARD OF MATERIALS

All materials to be used in the work shall be new, of high quality, free from all defects and of proven acceptability for the purpose of intended. Unless otherwise specified, materials shall conform to the latest applicable standard issued by the following authorities:

1. American National Standards Institute (ANSI)
2. Institute of Electrical and Electronic Engineers (IEEE)
3. Underwriter's Laboratory (UL)
4. National Electrical Manufacturer's Association (NEMA)
5. National Electrical Code (NEC)
6. Philippine Electrical Code (PEC)

Other recognized national standards maybe accepted if, in the opinion of NPC representatives, such will guarantee a quality not inferior to that guaranteed by the above standards.

In case of conflicting requirements between authorities cited above and those specified, such disagreement shall be resolved by representative of which his decision shall be final.

EW-4.0 LIGHTING AND POWER SYSTEM

The lighting and power system covered by this specification includes luminaires, outlets, switches and associated conduits, conductors, fittings, etc.

The devices/materials furnished shall be in accordance with, but not limited to, the latest issues of the Applicable Codes and Standards, including all addenda, in effect at time of purchase order unless otherwise stated in this specification.

All materials and parts which are not specifically mentioned herein but are necessary for the proper installation and safe operation of the lighting system shall be identified by the Supplier and shall be furnished at no additional cost to NPC.

EW-4.1 Technical Requirements and Characteristics

Circuits shall be wired separately for lighting and outlets. Lighting fixtures shall be controlled and switched locally approximately as shown on the drawings.

Replacement of fixture bulbs or tubes shall be possible without disconnecting any part of the power supply and risk of touching live parts of the installation.

EW-4.2 Lighting and Power Panelboard

The lighting and power panelboard shall be flush mounted and properly grounded.

The main and branch circuit breakers of the lighting and power panelboard for the office/staff house shall be quick-make quick break, thermal magnetic trip with rating as required by the connected load.

Nameplate shall be black plastic with engraved white letter.

EW-4.3 Luminaires (Lighting Fixtures) and Accessories

All luminaires when installed shall be free of leaks, warps, dents and other irregularities.

The hangers and brackets of all kinds for safety and proper installation of lighting fixtures shall be furnished and installed by the Supplier at his own expense.

The housings shall be fabricated of steel sheet, corrosion resistant, good ventilation and easy installation.

Samples and catalogues of all luminaires to be supplied shall be submitted for NPC's review and approval prior to the order. No luminaire shall be installed without approval of NPC.

Luminaires shall be wired with approved fixture wire, 90°C insulation. Each fixture shall be wired to a single point with an adequate slack for proper connection. All luminaires shall be protected from damage during installation. Any broken luminaire, receptacles, stems and the like, shall be replaced with new parts, at no cost to NPC.

Types of luminaires to be supplied, installed and tested are as follows:

1. Surface Mounted Type

    a. IP20 Ceiling Mounted Luminaire with Mirror Finish Aluminum Reflector, 1200mm x 600mm Zinc Phosphate Steel Sheet Housing and 2 x 16 Watts, Cool White, LED Linear Tube

    b. IP44 Wall Mounted Luminaire, 230V, 60Hz, Steel Base, White Satin Glass Diffuser and complete with 12 Watts LED Lamp

    c. IP20 Ceiling Mounted 12 Watts, Cool White Classic Globe Shape Frosted Finish LED Bulb with E27 Base

2. Emergency Lighting

    a. Portable Emergency Lighting Fixture, 2 X 2 Watts LED Warm White with Built-In Sealed Lead Acid Battery; Charging Time < 20 Hours; Usage Time >= 4 Hours

EW-4.4 Conductors

Conductors shall be stranded annealed copper conductor suitable for continuous temperature of 90°C when used in wet or dry location and 75°C when exposed to oil or coolant. The minimum size of conductor to be used shall be 3.5mm^2.

Insulation shall be suitable for wet and dry location, fungi resistant and ultra violet stable.

All conductors shall be moisture and heat resistant, flame retardant polyvinyl chloride insulation, chemical and abrasion resistant nylon sheath.

The conductor specification shall meet ASTM specification, PNS 35, UL standard 83 and requirements of PEC.

The Supplier shall submit catalogues and/or brochures showing details of insulation and ampacity ratings of all types of conductors to be supplied for approval of NPC.

EW-4.4.1 Conductor Installation

Conductors pulled through conduits shall be supported in an approved manner so as to avoid damage to the insulation. Grease or oily substances shall not be used to facilitate the passage of the conductor in conduits.

The pull shall be applied only by means of approved grips and the end portion, which has been marked or deformed by the grip, shall be cut-off by the Supplier.

All cable runs shall be continuous and all termination shall be at the terminal boards, equipment, etc. No splices are allowed in conduit or cable tray.

Prior to installation of conductors, conduits and cable trays shall be thoroughly cleaned to prevent damage to conductors during installation. After conductors have been installed, it shall be tested for continuity and insulation resistance and shall be tagged with respective conductor number.

EW-4.5 Conduit

All embedded and concealed in ceiling conduits, boxes and fitting required for the power and control conductors including all necessary hardware and accessories such as screws, bolts, concrete inserts, clamps, locknuts, couplings shall be furnished by the Supplier. The required quantities of various items of conduits and associated materials shall be furnished in accordance with the installation requirements.

During installation, due precaution shall be taken to protect the conduit and threads from mechanical injury. The ends of the conduit shall be sealed in an approved manner. Conduit runs shall be sealed by the use of caps and discs or plugs. The seals shall be maintained, except during inspection and tests, until the conductor is pulled in. Conduit shall be check to be free from obstructions by pulling a wooden mandrel of appropriate size through the conduit.

Conduits running in floors and terminating at equipment mounted on concrete bases shall be brought up to the equipment within the concrete bases, wherever possible.

All joints between lengths of conduits and threaded connection to boxes, fittings and equipment enclosures shall be made watertight.

Conduits installed outdoors running underground shall be buried to a minimum of 0.6 m.

Non-Metallic Conduits

Non-metallic conduit shall be made of un-plasticized polyvinyl chloride (uPVC) smooth walled inside and outside, colored red-orange, schedule 40.

The uPVC conduits shall be non-corrosive and weatherproof, resistant to the attacks of acids and alkalis and must have a self-extinguishing property hence shall not support combustion. It shall resist corrosion, rust and scale.

Metallic Conduits

Metallic conduit shall be made of Electrical Metallic Tubing (EMT), galvanized on the outside for corrosion protection and shall have an approved corrosion-resistant organic coating on the inside. EMT shall be installed by the use of set-screw or compression-type couplings and connectors.

EW-4.6 Junction / Utility and Pull Boxes

Junction / Utility Boxes

All junction/utility boxes for concealed work shall be of hot dip galvanized steel or un-plasticized polyvinyl Chloride. All wall boxes on exposed work shall be of aluminum blasted cast iron.

Utility boxes shall be firmly anchored in place and where required provided with fixture supports. The Supplier shall provide special supports for recessed lighting fixtures, etc. Suitable expansion screws shall be used for securing boxes to solid masonry and approved type toggles for securing to hallow masonry units.

Pull Boxes

Pull boxes shall be installed at all necessary points, to prevent damage to the insulation or other damage that might result from pulling resistance or for other reasons related to improper installation. All pull boxes shall be made of galvanized sheet steel not less than 2mm or un-plasticized polyvinyl chloride. Where pull boxes are used in connection with exposed conduits, plain covers attached to the pull box with a suitable number of countersunk flathead machine screws may be used.

EW-5.0 MEASUREMENT OF PAYMENT

Measurement of payment for all electrical works shall be based on the bid price of each item as shown in the Schedule of Requirements – Electrical Works, Section VII of the Tender Documents. The cost of each item shall cover all works required and described in the pertinent provisions of the specifications and bid drawings.

SECTION VI

TECHNICAL SPECIFICATIONS FOR MECHANICAL WORKS

PART 1 - TECHNICAL SPECIFICATIONS

MW - MECHANICAL WORKS

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MW - MECHANICAL WORKS

MW-1.0 GENERAL

The Work to be done under this section shall include the furnishing of all labor, materials, equipment, tools and other incidentals for all mechanical works enumerated hereunder or as shown on the accompanying drawings and installation manuals or as otherwise directed by NPC.

The work shall be performed and completed with high quality workmanship, in accordance with generally accepted modern practice in installation/erection works of Mechanical Equipment for the 10 KL Rain Water Collector and Office/Staff House at Mangsee DPP.

All equipment and materials which the Contractor shall supply and install shall be new and unused. They shall be suitable for their intended purpose and shall comply with all applicable regulations, quality and dimension standards.

The Contractor shall closely coordinate with other disciplines to avoid interference with other works specified in the relevant sections of this specification.

MW-2.0 SCOPE OF WORK

It is not the intent of this specification to specify all technical requirements or to set forth those requirements covered by applicable codes and standards. The Contractor shall furnish high quality work, materials and equipment meeting the requirements of this specification and industry standards.

The Contractor shall also be responsible to assess and determine all and every work and service although not specifically detailed but are deemed required to fully complete the work and smooth execution of the project. Relative costs of any additional works or materials which the Contractor deemed required or necessary to complete the works shall be included in the bid proposal.

The work to be done under this section shall comprise the furnishing of all labor, tools, equipment, supply of appurtenant materials and other incidentals including installation/erection and test of all mechanical works enumerated hereunder in accordance with the Specifications contained herein and as shown in the drawings or otherwise directed by the NPC, which shall consist of but not limited to the following:

a) One (1) unit of booster pump, 2.27 m^3/hr (10 gpm) minimum rated capacity at 30 m discharge pressure complete with valves, strainers and other necessary accessories;

b) One (1) unit of pressure tank (bladder type) with a capacity of not less than 100 liters (27 gal) complete with valves, pressure switch, pressure gauges and other necessary accessories. Pressure tank shall be fitted

with rubber inside the tank and shall be pre-charged with air at a pressure sufficient to deliver the required water rate at pressure set points of 28/14m (40/20psi);

c) One (1) lot of Domestic Water Piping materials, valves, pipe fittings, strainers, gaskets, flanges, bolts and nuts, pipe supports including the required excavation and backfilling of embedded pipes and other incidentals to complete the domestic water supply piping system;

d) One (1) unit of Inverter-Window Type Air Conditioner of 11,500 kJ/h minimum cooling capacity for Office, complete with its mounting accessories and controls located at Operator's Quarter area;

e) One (1) unit Wall Mounted Exhaust Fan, 100 m^3/hr capacity for Restroom, complete with its mounting accessories and control;

f) Two (2) units of Portable Type Fire Extinguisher, Clean Agent (HCFC or Halotron I Type), 7.1 kg. (15.5 lbs), non-expiry, multi-shots, wall-hung type and PS/ICC and/or BFP approved;

g) All other works and services required to complete the project.

MW-3.0 MATERIALS AND EQUIPMENT

MW-3.1 General

All materials, equipment, devices and accessories shall be new and unused, free from all defects and imperfections, and best suited for the purpose intended. Materials used in the manufacture and installation of all equipment to be furnished shall be of the required quality used in commercial products of reputable manufacturers. All equipment or substitute materials to be used shall conform to the latest specifications and provisions of approved standards of engineering societies or other equivalent standards approved by NPC.

All materials, parts and assemblies to be used shall be tested conforming to the latest specifications and provisions of approved Standards of Testing Materials. Results of the test shall be made to provide means of determining compliance with the applicable specifications. When requested, all tests or trials shall be made in the presence of NPC's duly authorized representative.

If the equipment fails to meet the guaranteed performance as determined by the test, the Supplier shall promptly make the necessary modifications at no cost to NPC.

Brochures, catalogs and other related technical data of materials and equipment to be supplied by the Supplier under this contract shall be submitted by the Supplier for NPC's review and approval prior to fabrication. Equipment or articles installed or used without such approval shall be at the Supplier's risk of subsequent rejections.

MW-3.2 Applicable Codes and Standards

The design, materials, equipment, manufacturing, construction, installation, and testing of all works under this contract shall be in strict accordance with the latest edition of all applicable codes and standards, national and local laws, codes and regulations, statutes and ordinances.

The latest edition of each standard shall mean the latest edition available at the date of contract signing.

All units, dimensions and calculations shall be in metric system.

MW-3.3 Test of Materials

All materials, parts and assemblies to be used shall be tested conforming to the latest specifications and provisions of approved Standards of Testing Materials. Results of the test shall be made to provide means of determining compliance with the applicable specifications. When requested, all tests or trials shall be made in the presence of NPC's duly authorized representative.

If the equipment fails to meet the guaranteed performance as determined by the test, the Contractor shall promptly make the necessary modifications at no cost to NPC.

MW-3.4 Submittals

The Contractor shall submit the technical specifications/data and brochures/catalogs of all equipment and materials to be supplied for NPC's review and approval prior to purchase and/or implementation including other necessary documents as required or specified in the relevant sections of this specification. Equipment or materials installed or used without such approval shall be at the Contractor's risk of subsequent rejections.

MW-4.0 DOMESTIC WATER SUPPLY SYSTEM

MW-4.1 General

This section provides the essential information for the design, supply, installation, construction and test of the Domestic Water Supply System to provide the water requirements of the proposed office/staff house for Mangsee DPP including all required excavation and backfilling works for the piping system.

The work shall include the provision of a hydro-pneumatic unit which shall consist of a booster pump and a pressure tank which automatically operates and actuated by a pressure switch at 40/20 psi water line pressure.

The hydro-pneumatic unit shall be provided with a pumphouse complete with amenities as shown on the relevant Civil Works and Electrical Works drawings and specifications.

The work shall include, but not limited to the following:

a) One (1) unit of booster pump, 2.27 m^3/hr (10 gpm) minimum rated capacity at 30 m discharge pressure;

b) One (1) unit of pressure tank (bladder type) with a capacity of not less than 100 liters (27 gal). Pressure tank shall be fitted with rubber inside the tank and shall be precharged with air at a pressure sufficient to deliver the required water rate at pressure set points of 28/14m (40/20psi);

c) One (1) unit of 32mm Ø Gate Valve @ booster pump's suction;

d) One (1) unit of 32 mm Y or basket type strainer fitted with stainless steel filter element and mesh size not less than 50;

e) Three (3) units of 25mm Ø Gate Valve @ booster pump's discharge, pressure tank outlet and distribution lines;

f) One (1) unit of 25mm Ø Check Valve @ booster pump's discharge;

g) Two (2) sets of Pressure Gauge @ booster pump's discharge and pressure tank;

h) One (1) set of Pressure Switch @ pressure tank;

i) Three (3) units of 20mm Ø Garden Hose Valve or Hose Bibb @ different locations;

j) One (1) lot of Spare Parts (as specified and/or per manufacturer's recommendation) for the Booster Pump for one (1) year operation; and

k) One (1) lot of piping, fittings and necessary accessories including the required excavation and backfill for the domestic water supply piping system.

MW-4.2 Hydro-pneumatic Unit

MW-4.2.1 Scope of Work

The scope of work covers the supply, installation and test of one (1) set of hydro-pneumatic unit with rated capacity of 2.27 m3/hr (10 gpm), preferably skid mounted or as shown on the drawing, complete with associated valves, piping works, anchor bolts, instrumentation and control, special tools for operation and maintenance, spare parts for one (1) year operation from the date of completion, pump house and other required accessories.

MW-4.2.2 Materials and Construction

The Hydro-pneumatic unit shall be designed to have continuous flow rate of not less than 2.27 m3/hr (10 gpm) at discharge pressure of not less than 30m.

The booster pump and pressure tank shall preferably be mounted in one skid made of structural steel and to be installed inside the pump house as shown on the drawing. The hydro-pneumatic unit shall preferably be assembled at factory complete with pipe works, associated valves, instruments and controls ready for installation and connection at site.

The booster pump shall have sufficient capacity and discharge pressure as required by the system. The pump shall be able to deliver a peak flow of at least 5% of the rated flow at required discharge pressure. The booster pump shall be self-priming, centrifugal type, made of bronze or stainless steel impeller, stainless steel shaft and cast iron body. The pump shall preferably be of the horizontal shaft type.
The pump shall be mounted with its driving motor on a common bedplate of rigid construction. The bed plate shall be complete with drip tray fitted with a conveniently located drain plug.

Pump shall be directly coupled to the electric motor which complies with the latest NEMA standards.

The motor shall be operated on 220V, single phase, 60 Hz suitable for continuous operation. The motor shall be equipped with built-in overload protection and automatic reset to assure safe motor operation under normal field conditions.

The pressure tank shall have a sufficient capacity to accommodate the required rated flow but not less than 100 liters (27 gal). The pressure tank shall be fitted with rubber inside the tank and shall be pre-charged with air at a pressure sufficient to deliver required water rate at pressure set points of 28/14m (40/20psi). A pressure switch shall be fitted on the tank to actuate the automatic stop and start of the pump preferably at 28m and 14m set points, respectively. The pressure tank shall be made of mild steel or approved equivalent, cylindrical, vertically mounted with sufficient shell thickness to withstand the maximum working pressure of not less than 7 ksc (100 psi). The tank shall be fitted with air inlet nozzle for initial charging or pressure build-up, relief valve to relieve pressure in excess of working pressure and other necessary accessories.

MW-4.2.3 Control System

The hydro-pneumatic unit shall be provided with control panel to be installed on the equipment skid/convenient area and all operations shall be carried-out from this panel. Control panel shall be installed adjacent the pump or as directed by NPC.

The booster pump shall be provided with a controller to operate automatically by the pressure switches mounted on the pressure tank. Manual on/off operation of the pressure pump shall also be provided through an "Auto-Manual-Stop Control switch mounted on the local control panel of the hydro-pneumatic unit.

MW-4.2.4 Spare Parts

The Contractor shall supply recommended spare parts for one (1) year operation of the unit including the following:

a) One (1) set of bearing of 1 pump
b) One (1) set of gland packing of 1 pump
c) One (1) set of special gaskets of 1 pump
d) One (1) set of wearing ring of 1 pump

MW-4.2.5 Pump House

The Contractor shall construct the Pump House which will house the Booster Pump and Pressure Tank in accordance with the attached Civil Work drawings. The pump house shall be provided with lighting and other amenities to conform to the requirements specified in the relevant Electrical and Civil Works Technical Specifications and drawings.

MW-4.3 Domestic Water Supply Piping System

MW-4.3.1 Scope of Work

The Contractor shall supply, install and test the Domestic Water Supply and Distribution Piping System including piping supports, fittings and all the necessary excavation and backfill works of pipe trenches.

The work shall include the installation of valves, valve boxes if necessary, gauges and other accessories as specified herein and shown on the drawings to complete and make ready for the safe and reliable operation of the system.

MW-4.3.2 Pipe, Fittings and Accessories

Domestic water piping shall generally be constructed from Unplasticized Polyvinyl Chloride (*uPVC*) pipe schedule 80 or class 150, conforming to ASTM D-1784 or approved equivalent.

Unplasticized PVC pipe connection joints 80 mm (3") Ø and above shall be joined by rubber ring or solvent cement type connection. Smaller sizes shall be of solvent cement type connection.

Flanged connections may be used for connecting to flanged surfaces and shall be of the same material with the connected pipe with a rating of class 150 or ANSI 150. Flanged joints may use flat gaskets with serrated flange faces or 0-rings with corresponding grooves. Gaskets and 0-rings shall not be fabricated from plasticized PVC.

Stainless steel conforming to type 304, not less than schedule 20 shall be used from rainwater collector up to discharge of pressure tank as shown on the drawings.

Union joints shall not be used with pipe diameters of more than 63 mm O.D. (2"). Joints between metal pipes and PVC pipes should be flanged type using a PVC flange on the PVC pipe and full face gasket.

Flange bolts shall be hexagonal head machine bolts with heavy semi-finished head nuts having dimensions in accordance with ANSI B18.2.

PVC pipe installed aboveground shall be properly supported to avoid pipe sagging. Pipe covering made of steel or metal shall be provided in case there is high risk of damaging the pipe during normal operation and maintenance.

All trench excavation and backfill works shall be done in accordance with pertinent provisions specified in the Civil Works Specifications.

MW-4.3.3 Valves and Accessories

All gate and globe valves, 65mm and over shall be of OS & Y with rising stem, solid wedge type disc for gate valves and plug type disc for globe valves, bolted, bonnet, bolted gland and have flanged ends with the following materials of components:

a)	Body & bonnet	-	Cast iron
b)	Stem	-	Bronze or brass
c)	Seat ring & seat	-	Bronze or bronze faced
d)	Wedge or disc	-	Bronze or bronze faced

Gate and globe valves, 50mm and smaller shall be made of bronze material, rising stem, union bonnet, inside screw, solid wedge or plug type disc, and screwed ends. Valves installed in valve boxes shall have flanged ends for easy replacement or if valves with screwed ends are used, appropriate unions shall be installed. Check valves shall be of cast bronze, swing type and screwed ends.

Valves of all sizes shall have a rating of not less than Class 150.

Garden hose connection valves or hose bibbs shall be of bronze material, 20mm size and outfitted with male thread hose connections.

Strainers shall be of Y-type or basket type with cast iron body material and flanged or screwed ends, fitted with threaded drain plugs. Screen elements shall be of replaceable type stainless steel construction with minimum of 50-mesh size.

Pressure gauges shall be of bourdon tube type with solid front case, minimum size of dial gauge shall be of 100 mm Ø. Gauge range should be chosen so that the working pressure is not more than 65% of the maximum scale value for fluctuating pressures or 75% for steady pressures.

Pressure switch shall be provided at the pressure tank to actuate the automatic operation of the pump. Design of the system shall take into consideration that a minimum pressure shall be maintained in the main pipeline at all times to enable the whole system reliable and dependable.

MW-4.4 Installation

The Contractor shall install the piping system in a thorough manner and with good workmanship in accordance with the construction drawings and specification or as directed by NPC. No installation work for underground pipe shall commence unless trench excavation has been approved by NPC.

All pipes, fittings, valves and appurtenances shall be free from dirt or other foreign matters before laying. In the installation of the pipes, care shall be taken to prevent the pipes from becoming clogged during the progress of the work. Should any pipe become either partially or wholly clogged before final completion of the work, it shall be cleaned out by the Contractor in a manner satisfactory to NPC or shall be replaced by and at the expense of the Contractor. Open ends shall be temporarily plugged, otherwise suitably closed when necessary.

Special care shall be taken in carrying out the installation of joints, branches, valves and other fittings.

All piping works shall be coordinated with any other work at site and with existing installation so that interference between piping and other structural features will be avoided. In case interferences occur, NPC will decide which work is to be relocated.

Where pipeline are laid, the trench shall be provided with a cushion pad of at least 100 mm sand and sandy soil bedding materials.

Embedded water supply pipes in open areas shall be laid not less than 300mm from the ground surface to the bottom of pipe.

All pipeline excavation shall be backfilled up to the level of the finished grade surface in layers of 150 mm and thoroughly compacted. Backfill materials shall be compactable soil taken from trench excavation and approved by NPC. Trench excavation and backfilling works shall be done in accordance with the pertinent provisions of the Civil Works Technical Specifications.

PVC pipe installed aboveground shall be properly supported to avoid pipe sagging. Pipe covering made of steel or metal shall be provided in case there is high risk of damaging the pipe during normal operation and maintenance.

All existing facilities affected and damaged during the installation of piping shall be replaced and/or restored to its original appearance by the Contractor at his own expense.

Transportation, storage and erection shall be in strict accordance with manufacturer's recommendations. Erection shall be such as to prevent stress in the piping.

All trench excavation and backfill works shall be done in accordance with pertinent provisions specified in the Civil Works Specifications.

MW-4.5 Testing and Cleaning

MW-4.5.1 Testing

The piping system shall be hydrostatically tested at a pressure 1.5 times the design pressure or maximum working pressure of the system for a period of not less than 30 minutes. Test may be applied to whole assembly of the entire piping system. During the test, valves shall be opened and closed.

Before starting the test procedure, the piping shall be flushed and cleaned thoroughly. When filling the line with water, all air shall be removed.

There shall be no leakage or whatsoever from the piping, fittings and connections for each assembly tested while the system is under test pressure for a period of not less than the specified time or the total time to inspect all portions of the water line under test, whichever is longer.

Any leakage or defect disclosed by the test prior to the acceptance shall be corrected and repaired by the Contractor at his own expense and to the satisfaction of NPC.

Before any tests are made, the Contractor shall notify NPC so that such test may be witnessed by NPC or his duly authorized representative. All expenses incurred during the test shall be borne by the Contractor.

If applicable, test shall also include visual check on welded parts of the modified tapping points during actual operation of each system to ensure that no leakage is observed on the welded joints.

The hydro-pneumatic unit including its associated equipment shall be subjected to factory tests to determine its conformance with the approved test procedure to be submitted by the supplier and applicable codes and standards which shall include the following:

a) Hydrostatic test of tanks to be 1.5 times the maximum operating pressure and to be maintained for 30 minutes or longer if required by applicable standards;

b) Report of the characteristic curves such as Head versus Flow and Efficiency versus Flow, etc. for pump; and

c) Functional tests of the control system of the assembly, sub-assembly or parts of the equipment.

After installation of the equipment the Contractor shall perform necessary tests at site to determine its compliance with the requirements of the specifications. All costs for testing shall be borne by the Contractor.

MW-4.5.2 Disinfection

The water piping system shall be disinfected after testing and before being put into use. Before disinfections, the piping should be drained, flushed, re-

drained and refilled. In refilling, care must be taken to avoid entraining or entrapping air in the piping. The Contractor may use any of the methods of disinfections as recommended by the American Water Works Association (AWWA) or any of the following kinds of treatment:

a) Chlorine Gas-Water Mixture;

b) Calcium-Hypochlorite or equal; or

c) Dry Calcium Hypochlorite or Chlorinated Lime and Water Mixture.

Retention period shall be at least 24 hours and shall produce not less than 10 ppm at extreme end of the lines at the end of the retention period. After flushing, residual chlorine must be reduced to less than 1 ppm.

The Contractor shall submit the following for review and/or approval by NPC:

a) Test procedures prior to test; and

b) Test and inspection reports.

MW-4.6 Submittal

The following documents shall be submitted by the Contractor for NPC's review and approval prior to procurement and installation.

a) Complete data, specifications and catalogues;
b) Outline and assembly drawings;
c) Assembly, installation and test procedures;
d) Complete shop and field test reports;
e) Operation and Maintenance Manuals; and
f) Wiring diagram of the electrical control and termination including arrangement and type of control boxes/panel.

MW-5.0 AIRCONDITIONING AND VENTILATION SYSTEM

MW-5.1 General

This section provides the essential information for the Air Conditioning and Ventilation System equipment to be supplied, installed and tested by the Contractor.

All air-conditioning equipment and Ventilation System shall preferably have one Brand name and shall be the standard product of a reputable A/C manufacturer. In case other brand of A/C and Ventilation equipment are to be used to meet with the specific requirements in the bid document, catalogues and other supporting documents shall be submitted for NPC's review and approval.

Power supply for the ventilation and air-conditioning equipment shall be 230V, single phase, 60 Hz.

Refrigerant to be used shall be environmental friendly.

All necessary transformers and electrical materials shall be included in the Contractor's supply if power ratings provided are other than the one's specified above.

MW-5.2 Design Conditions

a) Outdoor Conditions:

Dry Bulb Temperature	:	35°C
Wet Bulb Temperature	:	27°C
Relative Humidity	:	80% to 100%

b) Indoor Conditions (for air-conditioned areas):

Dry Bulb Temperature	:	24°C ± 3°C
Relative Humidity	:	50% ± 5%

c) Area to be air-conditioned shall be:

c.1) Office/Staff House

d) Area to be ventilated shall be:

d.1) Restroom - 10 changes per hour

MW-5.3 Schedule of Equipment

a) Air-Conditioning Unit

Location	Quantity	Cooling Load	Type
a.1) Office/Staff house	One (1) unit	11,500 kJ/H	Inverter Window Type

b) Ventilation Unit

Location	Quantity	Rating	Type
b.1) Restroom	One (1)	100 m^3/hr	Wall Mounted Exhaust Fan

MW-5.4 Air-Conditioning System

MW-5.4.1 Scope of Works

The Work called for in this specification includes the design, furnishing, delivering, installing and testing of window type air conditioners (inverter type) to provide a fully ventilated and air conditioned rooms. The work shall include other accessories even though not specifically mentioned in this specification but are necessary to obtain a complete set for the safe and reliable operation of the system as a whole.

All electrical materials such as circuit breakers, automatic controls, including all power and control wires, supervision, electrical outlets and fittings shall be included and provided by the Contractor including complete system of automatic temperature controls.

The type and quantity of air conditioning equipment to be supplied shall be as specified in clause MW-5.3 (Schedule of Equipment) or shown on the drawings.

All air conditioning units (window type) to be supplied and installed shall have the following features/accessories but not limited to:

- With Remote Controller and Holder
- With automatic and manual swing louver control
- With control switch
- Cool Mode
- Fan Mode
- Automatic Mode

MW-5.4.2 Window Type Air-Conditioning Systems

The Window Type Air Conditioning Units to be supplied and installed for specific areas in the building are as specified in the schedule of equipment or shown on the drawings.

The units shall be wall mounted room air conditioner and shall be provided with a room thermostat and sensing element which detect changes in room temperature and adjust it to desired cooling by automatic actuation of the compressor. Compressor shall be provided with thermal overload device that automatically shuts off the compressor during overheating.

Fan motor shall be permanently lubricated. The unit shall operate on a 230 V AC, single phase and 60 Hz power supply.

Mounting brackets which are properly fixed on the concrete wall or structure shall be provided to support the suspended portion of the air conditioner unit. Weather seals shall be provided on the area between the air conditioner and wall opening.

Provision of wall opening for the installation of the window type air conditioning units shall be closely coordinated with the civil works.

MW-5.5 Ventilation Units

MW-5.5.1 General

The Contractor shall furnish, deliver, install and test the ventilation system equipment complete with all the necessary appurtenances for its efficient operation. The scope of supply shall include all mounting supports and fixing materials required to complete the installation and ready for operation.

The unit shall be properly sized to conform to the required air changes per hour at free air for this particular application but in no case be less than those specified elsewhere in this specification. It shall be designed to continuously or intermittently operate on a 230 V, single phase, 60 Hz power supply, otherwise specified.

MW-5.5.2 Wall Mounted Exhaust Fans

Thru-the-wall propeller exhaust fans shall be provided at the area as specified in the schedule of equipment.

Each unit shall be properly sized to conform with the required air changes per hour at free air for this particular application but in no case be less than those specified elsewhere in this specification. Unit installed/mounted on the wall and directly discharges exhaust outside the building shall be provided with automatic shutter. It shall be of the direct driven type and corrosion resistant to operate on a 230 V, single phase, 60 Hz.

MW-5.6 Installation and Painting

The Air-Conditioning Unit and Wall Mounted Exhaust Fan shall be installed as indicated in the drawings or as directed by NPC. After installation, all exposed and unfinished surfaces shall be thoroughly cleaned and washed possibly by chemical of all rust, oil and other foreign matters and shall be repainted in accordance with the manufacturer's standard or as approved by NPC.

Likewise, all surfaces and supports shall be thoroughly cleaned of rust, oil and other foreign matters and shall be painted with epoxy primer and two (2) coats of finish paint.

Painted surfaces of all equipment which are damaged during transport and installation shall be repaired or touched-up as necessary to prevent rusting, corrosion, etc. until the final finish painting application is made.

MW-5.7 Spare Parts and Tools

The Contractor shall supply the standard spare parts for one (1) year operation as recommended by the equipment manufacturer. Spare parts

required during the warranty period shall be supplied by the Contractor at no Cost to NPC.

Special tools for normal operation and maintenance and are not usually available in a standard machine shop or retailing store shall also be provided as recommended by the manufacturer.

MW-5.8 Acceptance Test

Prior to acceptance of the Works, the equipment shall be tested in the presence of NPC to determine whether the requirements of the specifications have been met. Any defects found that are inherent in the equipment shall be remedied at the expense of the Contractor.

MW-5.9 Submittal

Prior to purchase and implementation of the works, the Contractor shall prepare and submit five (5) copies of the following drawings/documents for review/approval of NPC:

a) Dimensional layout drawings of mechanical equipment and associated devices.

b) Manufacturer's catalog sheets, marked as necessary, to indicate materials or equipment being furnished including instruments for control system;

c) Complete control schematic and wiring diagrams for all equipment to be furnished;

d) List of recommended Spare Parts and Special Tools; and

e) Operation and Maintenance Manuals.

MW-6.0 PORTABLE FIRE EXTINGUISHERS

MW-6.1 Scope of Work

The Contractor shall supply the specified number of UL/FM approved Portable Type Fire Extinguishers complete and ready for operation and shall be installed at their corresponding place of use as specified below and shown on the drawings.

a) Two (2) units of Portable Type Fire Extinguisher, Clean Agent (HCFC or Halotron I Type), 7.1 kg. (15.5 lbs), non-expiry, multi-shots, wall-hung type and PS/ICC and/or BFP approved;.

MW-6.2 Fire Extinguishers

Fire extinguisher shall be Philippine Standard/International Certificate of Competence and/or Bureau of Fire Protection Approved and of rechargeable

cylinder with five (5) years guarantee against leak. The fire extinguisher cylinder shall be complete with release valve, dial gauge indicator, appropriate length of hose with nozzle and locking pin.

The 7.1 kg (15.5 lbs.) capacity wall-hung type fire extinguisher shall be complete with carrying handle and wall-mounting bracket.

Portable fire extinguisher shall be suitable for the protection against class ABC fires using Clean Agent (HydroChloroFluoroCarbon or Halotron I Type) that is environmentally safe and leaves no residue.

The fire extinguisher shall be check-weighed at interval of six (6) months from the date of delivery for a period of one (1) year and if found to be undercharged (unless used by an NPC personnel) shall be filled and recharged by the Supplier at no expense to NPC.

MW-6.3 Submittal

The Contractor shall submit the type and model of the fire extinguishers for the approval of NPC prior to purchase.

MW-7.0 DRAWINGS

Prior to procurement of all materials, equipment and auxiliaries to be supplied by the Contractor under this contract, the Contractor shall submit for NPC's review, approval, and/or reference, five (5) copies of prints of technical specifications/data and/or brochures/catalogues. NPC shall review, comment or note corrections to be made and return two (2) copies to the Contractor within twenty (20) calendar days after receipt of the drawing. If corrections are required, the Contractor shall make all necessary corrections and re-submit such within fourteen (14) calendar days for NPC's review and approval.

Prints marked "Approved" or "Approved with Corrections Indicated" authorize the Contractor to proceed with the procurement of materials or equipment or construction/fabrication of the work shown on the drawings, with corrections, if any, indicated thereon. When prints of drawings are marked "Approved with Corrections Indicated" or "Returned for Corrections", the Contractor shall finalize the drawings and re-submit same in five (5) copies each for final approval. Every revision shall be shown by number, date and subject in a revision block.

Drawings approved by NPC shall in no way relieve the Contractor from entire responsibility for engineering, design, workmanship, material and all other liabilities under the Contract.

NPC reserves the right to reproduce any drawings or prints received from the Contractor as may be required despite any notice prohibiting the same appearing on the drawing or the print.

The Contractor shall submit construction and detailed drawings as may deemed necessary, as-built drawings and other documents for NPC's review, approval, information and reference as specified in the relevant specifications.

Any supply of materials/equipment or construction of any particular structure or portion thereof prior to the approval of drawings pertinent thereto shall be at the Contractor's risk. The Contractor shall be responsible for any extra cost that may arise in correcting the work already done to conform with the drawings as revised and approved.

Should an error be found in the Contractor's drawings during construction/erection, the correction including any field change considered necessary shall be noted on the drawings and shall be resubmitted for approval.

All data and information to be submitted shall be in the English language and all drawings shall be drawn using the metric system as unit of measurement.

The Contractor shall address all communications pertaining to Contractor's Drawings or otherwise agreed to:

The Manager, Design and Development Department
National Power Corporation
Agham Road corner Quezon Avenue,
Diliman, Quezon City 1100

All drawings and documents to be submitted by the Contractor for NPC's review and approval shall be on A4 size or A3 size folded to A4.

MW-8.0 GUARANTEE

The Contractor shall guarantee the replacement of the supplied equipment or components at his own expense against defect in design, workmanship and materials for a period of twelve (12) months after the equipment has been installed, tested and accepted. However, the warranty coverage for the compressor of the air-conditioning units shall be five (5) years. The Contractor guarantees that the equipment will perform in the manner as set forth in the equipment's manual and the Contract.

The Contractor shall submit a Warranty Certificate effective from the date of acceptance by NPC.

After the lapse of the warranty period, provided that there are no defects found and/or pending repair works, NPC shall release the warranty security/certificate.

MW-9.0 MEASUREMENT OF PAYMENT

Measurement for payment for all works shall be based on the bid price of each item as shown in the Schedule of Requirements (Bid Price Schedule). The cost shall cover all works required and described in the pertinent provisions of the specifications.

Measurement for payment for pipes shall be based on the bid price of actual length of pipe installed as shown in the Schedule of Requirements (Bid Price Schedule). The cost shall cover all works required including excavation, sand bedding, backfilling, testing, painting and other works and services described in the pertinent provisions of the specifications.

SECTION VII

BILL OF QUANTITIES

BILL OF QUANTITIES
ARCHITECTURAL WORKS
MANGSEE DPP

Item No.	Description of Work or Materials	Work to Be Done	Reference	Unit	Estimated Quantity	Unit Price in Pesos (Words and Figures)	Total Amount (In Figures)
1.0	**PREFAB CONTAINERIZED HOUSE**	furnish & install	Refer to NPC TS & Drawing	sets	**1.00**	_____ _____(P_____)	_____(P_____)
1.1	Dimensions: 6m length x 2.4m width x 2.6m height Flooring: MGO board with linoleum tiles Walls: 50mm polystyrene insulation with double-sided .45mm pre-painted GI sheet Roofing: Glasswool insulation with pre-painted GI sheet roof and interior ceiling Windows: 4 pcs aluminum frame sliding windows (1.0m x 1.0m), 1pc aluminmum frame awning window (0.5m x 0.5m) Door: 1pc steel door (0.80m x 2.1m), 1pc pvc door (0.6m x 2.1m) Additional: toilet(1.2x1.2) including fixtures & plumbing						
1.2	Plumbing System						
	a. 50mm dia. uPVC Pipes (including fittings)	furnish and install	Refer to NPC TS & Drawing	li.m.	**8.00**	_____ _____(P_____)	_____(P_____)
	b. 100mm dia. uPVC Pipes	furnish and	Refer to NPC TS & Drawing	li.m.	**8.00**	_____	
	c. Floor Drain, Stainless Steel	furnish and install	Refer to NPC TS & Drawing	pcs.	**1.00**	_____ _____(P_____)	_____(P_____)
2.0	**PUMPHOUSE**						
2.1	Wall System and Finishes						
	a.150mm thick (6") CHB wall including mortar grout and reinforcing bars.	furnish & lay	Refer to NPC TS & Drawing	sq.m.	**10.00**	_____ _____(P_____)	_____(P_____)

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Item No.	Description of Work or Materials	Work to Be Done	Reference	Unit	Estimated Quantity	Unit Price in Pesos (Words and Figures)	Total Amount (In Figures)
	b. Plain cement plaster wall finish.	furnish & apply	Refer to NPC TS & Drawing	sq.m.	**15.00**	_____ _____(P_____)	_____(P_____)
	c. Precast Concrete Louver (250mm x 250mm)	furnish & install	Refer to NPC TS & Drawing	pcs.	**7.00**	_____ _____(P_____)	_____(P_____)
2.2	Floor Finishes						
	a. Plain cement floor finish	furnish & apply	Refer to NPC TS & Drawing	sq.m.	**3.00**	_____ _____(P_____)	_____(P_____)
2.3	Fenestration						
	a. (900mm x 2100mm) Flush Type wooden door marine plywood both sides, 2"x 5" hard wood jamb , including heavy duty loose pin hinges, door knob/lockset weather proof and painting.	furnish & install	Refer to NPC TS & Drawing	set	**1.00**	_____ _____(P_____)	_____(P_____)
2.4	Painting						
	a. All concrete surfaces 1 coat of water based acrylic paint primer 2 coats of water based acrylic top coat including surface preparation	furnish & apply	Refer to NPC TS & Drawing	sq.m.	**15.00**	_____ _____(P_____)	_____(P_____)
	TOTAL AMOUNT OF ARCHITECTURAL WORKS MANGSEE DPP					_____ _____(P_____)	_____(P_____)

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BILL OF QUANTITIES
CIVIL WORKS
MANGSEE DPP

Item No.	Description of Work or Materials	Work to Be Done	Reference	Unit	Estimated Quantity	Unit Price in Pesos (Words and Figures)	Total Amount (In Figures)
1.0	**PREFAB CONTAINERERIZED HOUSE FOUNDATION**						
1.1	Structural Excavation	excavate & reuse	Refer to NPC TS & Drawing	cu.m.	**4.70**	_____ _____(P_____)	_____(P_____)
1.2	Structural Backfill	spread, level & compact	Refer to NPC TS & Drawing	cu.m.	**2.70**	_____ _____(P_____)	_____(P_____)
1.3	Sand and Gravel Bedding	furnish, place level & compact	Refer to NPC TS & Drawing	cu.m.	**0.50**	_____ _____(P_____)	_____(P_____)
1.4	Concrete (20.7 Mpa)	furnish & place	Refer to NPC TS & Drawing	cu.m.	**1.60**	_____ _____(P_____)	_____(P_____)
1.5	Reinforcing Steel Bars (Grade 275)	furnish, cut, bend schedule & install	Refer to NPC TS & Drawing	kgs.	**102.00**	_____ _____(P_____)	_____(P_____)
1.6	Structural Steel (A36) (inc. anchor bolts, nut and washers)	furnish, fabricate assemble & install	Refer to NPC TS & Drawing	kgs.	**87.00**	_____ _____(P_____)	_____(P_____)
2.0	**PUMPHOUSE**						
2.1	Structural Excavation	excavate & reuse	Refer to NPC TS & Drawing	cu.m.	**3.10**	_____ _____(P_____)	_____(P_____)
2.2	Structural Backfill	spread, level & compact	Refer to NPC TS & Drawing	cu.m.	**2.20**	_____ _____(P_____)	_____(P_____)

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CIVIL WORKS
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Item No.	Description of Work or Materials	Work to Be Done	Reference	Unit	Estimated Quantity	Unit Price in Pesos (Words and Figures)	Total Amount (In Figures)
2.3	Sand and Gravel Bedding	furnish, place level & compact	Refer to NPC TS & Drawing	cu.m.	**0.45**	_____ _____(P_____)	_____(P_____)
2.4	Concrete (20.7 Mpa)	furnish & place	Refer to NPC TS & Drawing	cu.m.	**2.35**	_____ _____(P_____)	_____(P_____)
2.5	Reinforcing Steel Bars (Grade 275)	furnish, cut, bend schedule & install	Refer to NPC TS & Drawing	kgs.	**224.00**	_____ _____(P_____)	_____(P_____)
3.0	**10 KL RAIN WATER COLLECTOR**						
3.1	Structural Excavation	excavate & reuse	Refer to NPC TS & Drawing	cu.m.	**5.31**	_____ _____(P_____)	_____(P_____)
3.2	Sand and Gravel Bedding	furnish, place level & compact	Refer to NPC TS & Drawing	cu.m.	**0.70**	_____ _____(P_____)	_____(P_____)
3.3	Concrete (20.7 Mpa) (including waterproofing)	furnish & place	Refer to NPC TS & Drawing	cu.m.	**7.46**	_____ _____(P_____)	_____(P_____)
3.4	Reinforcing Steel Bars (Grade 275)	furnish, cut, bend schedule & install	Refer to NPC TS & Drawing	kgs.	**341.00**	_____ _____(P_____)	_____(P_____)
3.5	Structural Steel (A36)	furnish, fabricate assemble & install	Refer to NPC TS & Drawing	kgs.	**24.00**	_____ _____(P_____)	_____(P_____)
	TOTAL AMOUNT OF CIVIL WORKS MANGSEE DPP					_____ _____(P_____)	_____(P_____)

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ELECTRICAL WORKS
MANGSEE DPP

Item No.	Description of Work or Materials	Work to Be Done	Ref.	Unit	Estimated Quantity	Unit Price in Pesos (Words and Figures)	Total Amount
1.0	**PANELBOARD AND CIRCUIT BREAKERS**						
	a. Lighting and Power Panelboard (LPP) 100AF/60AT, 2-Pole Main MCB with branch circuits of: 1 - 50AF/25AT, 2-Pole MCB 4 - 50AF/20AT, 2-Pole MCB 1 - 50AF/15AT, 2-Pole MCB	Furnish, Install and Test	EW-TS & BD	set	1	_____ (P_____) P_____	
	b. NEMA-1 Class Combination Motor Controller with 50AF/20AT, MCB, Enclosed Circuit Breaker	Furnish, Install and Test	EW-TS & BD	set	1	_____ (P_____) P_____	
	c. Existing Main Distribution Panelboard (MDP) (located in the Control Room)						
	c.1 1 - 100AF/60AT, 2-Pole MCB (for LPP in the Office/Staff House)	Furnish, Install and Test	EW-TS & BD	set	1	_____ (P_____) P_____	
2.0	**LUMINAIRES**						
	a. Luminaire Type A Ceiling Mounted, 2 x 16W LED Tube Lighting Fixture, with mirror finished aluminum reflector, 1200mm x 600mm zinc phosphate steel sheet housing	Furnish, Install and Test	EW-TS & BD	sets	3	_____ (P_____) P_____	
	b. Luminaire Type B Wall Mounted Luminaire Steel Base, White Satin Glass Diffuser, 12W Compact LED Lamp	Furnish, Install and Test	EW-TS & BD	sets	1	_____ (P_____) P_____	

ELECTRICAL WORKS
MANGSEE DPP

Item No.	Description of Work or Materials	Work to Be Done	Ref.	Unit	Estimated Quantity	Unit Price in Pesos (Words and Figures)	Total Amount
	c. Luminaire Type C 12W, Cool White, LED Bulb, Classic Globe Shape with E27 Base	Furnish, Install and Test	EW-TS & BD	sets	2	_____ (P_____)	P _____
	d. Luminaire Type D 2 x 2W LED Emergency Lighting Fixture with Built-in Sealed Lead Acid Battery	Furnish, Install and Test	EW-TS & BD	set	1	_____ (P_____)	P _____
3.0	**OUTLETS AND SWITCHES, INCLUDING PLATE COVER, FLUSH-MOUNTED**						
	a. Convenience Outlet, Universal, Grounding-Type, Duplex with Cover, 20 A, 230 V, 1-phase	Furnish, Install and Test	EW-TS & BD	sets	8	_____ (P_____)	P _____
	b. Outlet for ACU, Grounding-Type, Single Receptacle, 25 A, 230 V, 1-phase	Furnish, Install and Test	EW-TS & BD	set	1	_____ (P_____)	P _____
	c. Outlet for Exhaust Fan, Single Receptacle, 16 A, 230 V, 1-phase	Furnish, Install and Test	EW-TS & BD	set	1	_____ (P_____)	P _____
	d. Outlet for Emergency Light, Single Receptacle, 16 A, 230 V, 1-phase	Furnish, Install and Test	EW-TS & BD	set	1	_____ (P_____)	P _____
	e. Single Gang Wall Switch, 10A, 230 V	Furnish, Install and Test	EW-TS & BD	sets	2	_____ (P_____)	P _____

ELECTRICAL WORKS
MANGSEE DPP

Item No.	Description of Work or Materials	Work to Be Done	Ref.	Unit	Estimated Quantity	Unit Price in Pesos (Words and Figures)	Total Amount
	f. Double Gang Wall Switch, 10A, 230 V	Furnish, Install and Test	EW-TS & BD	sets	1	_____ (P_____)	P_____
	h. Boxes, Fittings, and Accessories	Furnish and Install	EW-TS	lot	1	_____ (P_____)	P_____
4.0	**INSULATED COPPER CONDUCTORS INCLUDING TERMINAL LUGS, CONNECTORS, CABLE TIES, IDENTIFICATION TAGS, ETC.**	Furnish, Lay and Test	EW-TS & BD	lot	1	_____ (P_____)	P_____
	a. 14 mm², 600 V, Heat Resistant Thermoplastic, (THHN/THWN-2), Copper Conductor						
	b. 8.0 mm², 600 V, Heat Resistant Thermoplastic, (THHN/THWN-2), Copper Conductor						
	c. 3.5 mm², 600 V, Heat Resistant Thermoplastic, (THHN/THWN-2), Copper Conductor						
	d. Terminal Lugs, Connectors, Cable Ties, Identification Tags, Etc.						

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Item No.	Description of Work or Materials	Work to Be Done	Ref.	Unit	Estimated Quantity	Unit Price in Pesos (Words and Figures)	Total Amount
5.0	**EMBEDDED AND/OR NON-EMBEDDED CONDUITS INCLUDING BOXES, LOCKNUTS, ELBOWS, BOLTS AND OTHER FITTINGS**	Furnish and Lay	EW-TS & BD	lot	1	_____ (P_____)	P _____
	a. 25 mmØ uPVC						
	b. 20 mmØ uPVC						
	c. Boxes, Locknuts, Elbows, Bolts and other fittings						
6.0	**GROUNDING MATERIALS**	Furnish and Install	EW-BD	set	1	_____ (P_____)	P _____
	a. Ground Rod, Copper Bonded, 16mmØ x 3m with Ground Clamp						
	b. Grounding Accessories such as Cable Lugs, etc.						

SUB-TOTAL AMOUNT OF BID (ELECTRICAL WORKS) _____ (P_____) P _____

BILL OF QUANTITIES
CONSTRUCTION OF 10 KL RAIN WATER COLLECTOR AND OFFICE/STAFF HOUSE FOR MANGSEE DPP
(MANGSEE DPP)
MECHANICAL WORKS

Item No.	Description of Work or Materials	Work to be Done	Ref.	Unit	Estimated Quantity	Unit Price in Pesos (Words and Figures)	Total Amount
MW-1.0	**DOMESTIC WATER SUPPLY SYSTEM**		MW-4.0				
MW-1.1	**Booster Pump & Pressure Tank**						
MW-1.1.1	Booster Pump, 2.27m^3/h (10 gpm) at at 30 meters discharge pressure, 230V, single phase, 60 Hz, complete with power cable, instruments & other accessories as described in the technical specifications	Supply, Install and Test		Set	1	_____ (₱ _____)	₱ _____
MW-1.1.2	Pressure tank, bladder type, 100 liters (27 gal.) rated capacity, precharged with air and designed for pressure settings of 28/14m (40/20 psi), fitted with relief valve and other requirements as described in the technical specifications	Supply, Install and Test		Set	1	_____ (₱ _____)	₱ _____
MW-1.1.3	Gate Valve at booster pump's suction, 32mm Ø, OSY or rising stem, cast bronze, screwed ends, Class 150	Supply & Install		Set	1	_____ (₱ _____)	₱ _____
MW-1.1.4	Y-Strainer or basket type at booster pump's suction, 50-mesh size replaceable stainless steel filter element, 32mm Ø, cast iron body,screwed ends, Class 150	Supply & Install		Set	1	_____ (₱ _____)	₱ _____
MW-1.1.5	Gate Valve at booster pump's discharge, 25mm Ø ,OSY or rising stem, cast bronze, screwed ends, Class 150	Supply & Install		Sets	2	_____ (₱ _____)	₱ _____
MW-1.1.6	Check Valve at booster pump's discharge, 25mm Ø Swing type, cast bronze, screwed ends, Class 150	Supply & Install		Set	1	_____ (₱ _____)	₱ _____
MW-1.1.7	Pressure gauge, 80mm Ø dial gage, bourbon type, with isolation valve	Supply & Install		Sets	2	_____ (₱ _____)	₱ _____
MW-1.1.8	Pressure switch at pressure tank, two set points, pump to start at 20 psi and stops at 40 psi	Supply & Install		Set	1	_____	₱ _____

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BILL OF QUANTITIES
CONSTRUCTION OF 10 KL RAIN WATER COLLECTOR AND OFFICE/STAFF HOUSE FOR MANGSEE DPP
(MANGSEE DPP)
MECHANICAL WORKS

Item No.	Description of Work or Materials	Work to be Done	Ref.	Unit	Estimated Quantity	Unit Price in Pesos (Words and Figures)	Total Amount
MW-1.1.9	Spare Parts for booster pump for one (1) year operation as recommended by manufacturer and as specified in the the technical specifications Clause MW-4.2.9	Supply & Delivery		lot	1	_____ (₱ _____)	₱ _____
MW-1.2	**Domestic Water Supply Piping**						
MW-1.2.1	Gate Valve, 25 mm Ø, rising stem, cast bronze, screwed ends, Class 150	Supply, Install and Test		sets	1	_____ (₱ _____)	₱ _____
MW-1.2.2	Hose Bibb, 20mm Ø, bronze body, screwed ends, Class 150	Supply, Install and Test		sets	3	_____ (₱ _____)	₱ _____
MW-1.2.3	Water Pipe, 32mm (N.D.), stainless steel type 304, sch. 20 and its associated fittings, pipe supports and other accessories as required in the technical specifications.	Supply, Excavate, Install, Test, & Backfill		lm	12	_____ (₱ _____)	₱ _____
MW-1.2.4	Water Pipe, 25mm (N.D.), stainless steel type 304, sch. 20 and its associated fittings, pipe supports and other accessories as required in the technical specifications.	Supply, Install & Test		lm	6	_____ (₱ _____)	₱ _____
MW-1.2.5	Water Pipe, 25 mm (N.D.), uPVC pipe, sch. 80 or class 150, and its associated fittings, pipe supports and other accessories	Supply, Excavate, Install, Backfill, Test & Disinfection		lm	12	_____ (₱ _____)	₱ _____
MW-1.2.6	Water Pipe, 20 mm (N.D.), uPVC pipe, sch. 80 or class 150, and its associated fittings, pipe supports and other accessories	Supply, Excavate, Install, Backfill, Test & Disinfection		lm	24	_____ (₱ _____)	₱ _____
MW-1.2.7	Water Pipe, 15 mm (N.D.), uPVC pipe, sch. 80 or class 150, and its associated fittings, pipe supports and other accessories	Supply, Excavate, Install, Backfill, Test & Disinfection		lm	6	_____ (₱ _____)	₱ _____

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CONSTRUCTION OF 10 KL RAIN WATER COLLECTOR AND OFFICE/STAFF HOUSE FOR MANGSEE DPP
(MANGSEE DPP)
MECHANICAL WORKS

Item No.	Description of Work or Materials	Work to be Done	Ref.	Unit	Estimated Quantity	Unit Price in Pesos (Words and Figures)	Total Amount
MW-2.0	**AIR CONDITIONING & VENTILATION SYSTEM**		MW-5.0				
MW-2.1	**Air-Conditioning System**						
MW-2.1.1	Air conditioning unit for Bedroom, 11,500 kJ/hr minimum cooling capacity, window-inverter type, complete with controls and accessories as described in the technical specifications	Supply, Install and Test		set	1	_____ (₱ _____)	₱ _____
MW-2.2	**Ventilation System**						
MW-2.2.1	Exhaust fan for Restroom, 100 m^3/h wall mounted, propeller type, direct driven, complete with automatic shutter, mounting accessories and controls	Supply, Install and Test		set	1	_____ (₱ _____)	₱ _____
MW-3.0	**PORTABLE FIRE EXTINGUISHERS**		MW-6.0				
MW-3.1	Portable Fire Extinguishers, HCFC or Halotron I, 7.1 kg. (15.5 lbs.), non-expiry, multi shots, wall hung type with bracket and mounting accessories, PS/ICC and/or BFP approved	Supply and Install		units	1	_____ (₱ _____)	₱ _____
	TOTAL MECHANICAL WORKS					_____ (₱ _____)	₱ _____

_____ Name of Firm

_____ Name and Signature of Authorized Representative

_____ Designation

SECTION VIII

BIDDING FORMS

SECTION VIII – BIDDING FORMS

TABLE OF CONTENTS

Standard Form No: NPCSF-INFR-01

Checklist of Technical & Financial Envelope Requirements for Bidders

A. THE 1ST ENVELOPE (TECHNICAL COMPONENT) SHALL CONTAIN THE FOLLOWING:

1. ELIGIBILITY DOCUMENTS

a. (CLASS A)

➢ Any of the following:

- PhilGEPS Certificate of Registration and Membership under Platinum Category in accordance with Section 8.5.2 of the IRR;

OR:

- The following updated and valid Class "A" eligibility documents enumerated under "Annex A" of the Platinum Membership:
  - Registration Certificate from the Securities and Exchange Commission (SEC) for corporations, Department of Trade and Industry (DTI) for sole proprietorship, or Cooperative Development Authority (CDA) for cooperatives;
  - Mayor's/Business permit issued by the city or municipality where the principal place of business of the prospective bidder is located, or the equivalent document for Exclusive Economic Zones or Areas.

    In cases of recently expired Mayor's/Business permits, it shall be accepted together with the official receipt as proof that the bidder has applied for renewal within the period prescribed by the concerned local government unit, provided that the renewed permit shall be submitted as a post qualification requirement in accordance with Section 34.2 of the Revised IRR of RA 9184.
  - The prospective bidder's audited financial statements, showing, among others, the prospective bidder's total and current assets and liabilities, stamped "received" by the BIR or its duly accredited and authorized institutions, for the preceding calendar year which should not be earlier than two (2) years from the date of bid submission.
  - Tax clearance per Executive Order 398, Series of 2005, as finally reviewed and approved by the BIR;
  - Valid Philippine Contractors Accreditation Board (PCAB) license and registration for the type and cost of the contract for this Project or Special PCAB License in case of Joint Ventures.

OR:

- A combination thereof.

➢ Statement of all its ongoing government and private contracts if any, whether similar or not similar in nature and complexity to the contract to be bid *(NPCSF-INFR-02)*

➢ The Statement of the bidder's Single Largest Completed Contract (SLCC) similar to the contract to be bid, and whose value, adjusted to current prices using the Philippine Statistics Authority (PSA) consumer price index, must be at least 50% of the ABC *(NPCSF-INFR-03)* complete with the following supporting documents:

- Contract
- Owner's Certificate of Final Acceptance issued by the project owner other than the contractor or a final rating of at least Satisfactory in the Constructors Performance Evaluation System (CPES). In case of contracts with the private sector, an equivalent document (Ex. Official Receipt or Sales Invoice) shall be submitted

(The Single Largest Completed Contract (SLCC) as declared by the bidder shall be verified and validated to ascertain such completed contract. Hence, bidders must ensure access to sites of such projects/equipment to NPC representatives for verification and validation purposes during post-qualification process.

It shall be a ground for disqualification, if verification and validation cannot be conducted due to inaccessibility of the site for whatever reason or fault of the bidder.)

- Special PCAB License in case of Joint Ventures
- Duly signed computation of its Net Financial Contracting Capacity (NFCC) at least equal to the ABC *(NPCSF-INFR-04)*;

b. (CLASS B)

- Valid Joint Venture Agreement, if applicable *(NPCSF-INFR-05)*

2. Technical Documents

- Bid Security, any one of the following:
  - Bid Securing Declaration (*NPCSF-INFR-06c*)

    OR
  - Cash or Cashier's/Manager's check issued by a Universal or Commercial Bank – 2% of ABC;

    OR
  - Bank draft/guarantee or irrevocable letter of credit issued by a Universal or Commercial Bank: *(NPCSF-INFR-06a) - 2% of ABC;*

    OR
  - Surety Bond callable upon demand issued by a reputable surety or insurance company *(NPCSF-INFR-06b) - 5% of ABC, with*
    - Certification from the Insurance Commission as authorized company to issue surety
- Duly signed, completely filled-out and notarized Omnibus Sworn statement (Revised) (NPCSF-INFR-07), complete with the following attachments:
  - For Sole Proprietorship:
    - Special Power of Attorney
  - For Partnership/Corporation/Cooperative/Joint Venture:
    - Document showing proof of authorization (e.g., duly notarized Secretary's Certificate, Board/Partnership Resolution, or Special Power of Attorney, whichever is applicable)
- Organization Chart for the project *(NPCSF-INFR-08)*
- Duly Signed List of Contractor's Key Personnel (based on the minimum key personnel) with complete supporting documents *(NPCSF-INFR-09,10a,10b & 11)*
- Duly Signed List of Contractor's Equipment (owned, leased or under purchase agreement (*NPCSF-INFR-12), with*
  - Proof of ownership and/or certificate of availability issued by Equipment Lessors
- Complete eligibility documents of proposed sub-contractor, if applicable

B. THE 2ND ENVELOPE (FINANCIAL COMPONENT) SHALL CONTAIN THE FOLLOWING:

- Duly signed Bid Letter indicating the total bid amount in accordance with the prescribed form (*NPCSF-INFR-13)*
- Duly signed and completely filled-out Bill of Quantities *(Section VII)* indicating the unit and total prices per item and the total amount in the prescribed Bill of Quantities form.
- Duly Signed Detailed Estimates for each items of work showing the computations in arriving at each item's unit prices used in coming up with the bid (*NPCSF-INFR-14)*
- Summary sheets indicating the direct unit prices of construction materials, labor rates and equipment rental rates used in coming up with the bid (*NPCSF-INFR-15)*

CONDITIONS:

1. *Each Bidder shall submit one copy of the first and second components of its Bid. NPC may request additional hard copies and/or electronic copies of the Bid. However, failure of the Bidders to comply with the said request shall not be a ground for disqualification.*
2. *A Bidder not submitting bid for reason that his cost estimate is higher than the ABC, is required to submit his letter of non-participation/regret supported by corresponding detailed estimates. Failure to submit the two (2) documents shall be understood as acts that tend to defeat the purpose of public bidding without valid reason as stated under Section 69.1.(i) of the revised IRR of R.A. 9184.*

Standard Form Number: NPCSF-INFR-02

List of All Ongoing Government and Private Contracts Including Contract Awarded But Not Yet Started

Business Name : _____
Business Address : _____

Name of Contract/Location/ Project Cost	a. Owner's Name b. Address c. Telephone Nos.	Nature of Work	Contractor's Role		a. Date Awarded b. Date Started c. Date of Completion or Estimated Completion Time	Value of Outstanding Works
			Description	%		
Government						
Private						
					Total Cost	

The bidder shall declare in this form all his on-going government and private contracts including contracts where the bidder (either as individual or as a Joint Venture) is a partner in a Joint Venture agreement other than his current joint venture where he is a partner. Non declaration will be a ground for disqualification of bid.

Note : This statement shall be supported with the following documents for all the contract(s) stated above which shall be submitted during Post-qualification:

1. Contract/Purchase Order and/or Notice of Award
2. Certification coming from the project owner/client that the performance is satisfactory as of the bidding date.

Submitted by : _____
(Printed Name & Signature)
Designation : _____
Date : _____

Standard Form Number: NPCSF-INFR-03

The Statement of the bidder's Single Largest Completed Contract (SLCC) similar to the contract to be bid

Business Name : _____
Business Address : _____

Name of Contract	a. Owner's Name b. Address c. Telephone Nos.	Nature of Work	Contractor's Role		a. Amount at Award b. Amount at Completion c. Duration	a. Date Awarded b. Contract Effectivity c. Date Completed
			Description	%		

Notes:
1. The bidder must state only one (1) Single Largest Completed Contract (SLCC) similar to the contract to be bid.
2. Supporting documents such as Contract/Purchase Order and any of the following: Owner's Certificate of Final Acceptance issued by the project owner other than the contractor; *or* A final rating of at least Satisfactory in the Constructors Performance Evaluation System (CPES); *or* Official Receipt (O.R); *or* Sales Invoice for the contract stated above shall be submitted during Bid Opening.

Submitted by _____
(Printed Name & Signature)

Designation : _____
Date : _____

Standard Form Number: NPCSF-INFR-04

NET FINANCIAL CONTRACTING CAPACITY (NFCC)

A. Summary of the Bidder's/Contractor's assets and liabilities on the basis of the income tax return and audited financial statement for the immediately preceding calendar year are:

		Year 20__
1.	Total Assets	
2.	Current Assets	
3.	Total Liabilities	
4.	Current Liabilities	
5.	Net Worth (1-3)	
6.	Net Working Capital (2-4)	

B. The Net Financial Contracting Capacity (NFCC) based on the above data is computed as follows:

NFCC = [(Current assets minus current liabilities) x 15] minus the value of all outstanding or uncompleted portions of the projects under ongoing contracts, including awarded contracts yet to be started coinciding with the contract for this Project.

NFCC = P _____

Herewith attached is certified true copy of the audited financial statement, stamped "RECEIVED" by the BIR or BIR authorized collecting agent for the immediately preceding calendar year.

Submitted by:

_____
Name of Bidder/Contractor

_____
Signature of Authorized Representative

Date : _____

Standard Form Number: NPCSF-INFR-05

JOINT VENTURE AGREEMENT

KNOW ALL MEN BY THESE PRESENTS:

That this JOINT VENTURE AGREEMENT is entered into by and between: _____, of legal age, *(civil status)* _____, authorized representative of _____ and a resident of _____.

- and –

_____, of legal age, *(civil status)* _____, authorized representative of _____ a resident of _____.

That both parties agree to join together their capital, manpower, equipment, and other resources and efforts to enable the Joint Venture to participate in the Bidding and Undertaking of the hereunder stated Contract of the **National Power Corporation.**

NAME OF PROJECT _____

CONTRACT AMOUNT _____

That the capital contribution of each member firm:

NAME OF FIRM	CAPITAL CONTRIBUTION
1.	₱
2.	₱

That both parties agree to be jointly and severally liable for their participation in the Bidding and Undertaking of the said contract.

That both parties agree that _____ and/or _____ shall be the Official Representative/s of the Joint Venture, and are granted full power and authority to do, execute and perform any and all acts necessary and/or to represent the Joint Venture in the Bidding and Undertaking of the said contract, as fully and effectively and the Joint Venture may do and if personally present with full power of substitution and revocation.

That this Joint Venture Agreement shall remain in effect only for the above stated Contract until terminated by both parties.

_____
Name & Signature of Authorized Representative

_____
Official Designation

_____
Name of Firm

_____
Name & Signature of Authorized Representative

_____
Official Designation

_____
Name of Firm

Witnesses

1. _____ 2. _____

[Jurat]

[Format shall be based on the latest Rules on Notarial Practice]

If the bidder is a joint venture, one of the requirements is the submission of a valid joint venture agreement.

Standard Form Number: NPCSF-INFR-06a

FORM OF BID SECURITY (BANK GUARANTEE)

WHEREAS, *(Name of Bidder)*_____ (hereinafter called "the Bidder") has submitted his bid dated *(Date)*_____ for the *[name of project]* (hereinafter called "the Bid").

KNOW ALL MEN by these presents that We *(Name of Bank)*_____ of *(Name of Country)*_____ having our registered office at _____ (hereinafter called "the Bank" are bound unto National Power Corporation (hereinafter called "the Entity") in the sum of *[amount in words & figures as prescribed in the bidding documents]* for which payment well and truly to be made to the said Entity the Bank binds himself, his successors and assigns by these presents.

SEALED with the Common Seal of the said Bank this _____ day of _____ 20___.

THE CONDITIONS of this obligation are that:

1) if the Bidder withdraws his Bid during the period of bid validity specified in the Bidding Documents; or

2) if the Bidder does not accept the correction of arithmetical errors of his bid price in accordance with the Instructions to Bidder; or

3) if the Bidder, having determined as the LCB, fails or refuses to submit the required tax clearance, latest income and business tax returns and PhilGEPs registration certificate within the prescribed period; or

4) if the Bidder having been notified of the acceptance of his bid and award of contract to him by the Entity during the period of bid validity:

   a) fails or refuses to execute the Contract; or

   b) fails or refuses to submit the required valid JVA, if applicable; or

   c) fails or refuses to furnish the Performance Security in accordance with the Instructions to Bidders;

we undertake to pay to the Entity up to the above amount upon receipt of his first written demand, without the Entity having to substantiate its demand, provided that in his demand the Entity will note that the amount claimed by it is due to the occurrence of any one or combination of the four (4) conditions stated above.

The Guarantee will remain in force up to 120 days after the opening of bids or as it may be extended by the Entity, notice of which extension(s) to the Bank is hereby waived. Any demand in respect of this Guarantee should reach the Bank not later than the above date.

DATE _____ SIGNATURE OF THE BANK _____

WITNESS _____ SEAL _____

_____
(Signature, Name and Address)

Standard Form Number: NPCSF-INFR-06b

FORM OF BID SECURITY (SURETY BOND)

BOND NO.: _____ DATE BOND EXECUTED: _____

By this bond, We *(Name of Bidder)* _____ (hereinafter called "the Principal") and *(Name of Surety)* _____ of *(Name of Country of Surety)* _____, authorized to transact business in the Philippines (hereinafter called "the Surety") are held and firmly bound unto National Power Corporation (hereinafter called "the Employer") as Obligee, in the sum of *(amount in words & figures as prescribed in the bidding documents)*, callable on demand, for the payment of which sum, well and truly to be made, we, the said Principal and Surety bind ourselves, our successors and assigns, jointly and severally, firmly by these presents.

SEALED with our seals and dated this _____ day of _____ 20 _____

WHEREAS, the Principal has submitted a written Bid to the Employer dated the _____ day of _____ 20 _____, for the _____ (hereinafter called "the Bid").

NOW, THEREFORE, the conditions of this obligation are:

1) if the Bidder withdraws his Bid during the period of bid validity specified in the Bidding Documents; or

2) if the Bidder does not accept the correction of arithmetical errors of his bid price in accordance with the Instructions to Bidder; or

3) if the Bidder, having determined as the LCB, fails or refuses to submit the required tax clearance, latest income and business tax returns and PhilGEPs registration certificate within the prescribed period; or

4) if the Bidder having been notified of the acceptance of his bid and award of contract to him by the Entity during the period of bid validity:

   d) fails or refuses to execute the Contract; or

   e) fails or refuses to submit the required valid JVA, if applicable; or

   f) fails or refuses to furnish the Performance Security in accordance with the Instructions to Bidders;

then this obligation shall remain in full force and effect, otherwise it shall be null and void.

PROVIDED HOWEVER, that the Surety shall not be:

a) liable for a greater sum than the specified penalty of this bond, nor

b) liable for a greater sum that the difference between the amount of the said Principal's Bid and the amount of the Bid that is accepted by the Employer.

Standard Form Number: NPCSF-INFR-06b
Page 2 of 2

This Surety executing this instrument hereby agrees that its obligation shall be valid for 120 calendar days after the deadline for submission of Bids as such deadline is stated in the Instructions to Bidders or as it may be extended by the Employer, notice of which extension(s) to the Surety is hereby waived.

PRINCIPAL _____	SURETY _____
SIGNATURE(S) _____	SIGNATURES(S) _____
NAME(S) AND TITLE(S) _____	NAME(S) _____
SEAL _____	SEAL _____

Standard Form No: NPCSF-INFR-06c

REPUBLIC OF THE PHILIPPINES)
CITY OF _____) S.S.

BID-SECURING DECLARATION
CONSTRUCTION OF 10 KL RAIN WATER COLLECTOR AND OFFICE/STAFF HOUSE AT MANGSEE DPP (LuzP21Z1271Sc)

To: **National Power Corporation**
BIR Road cor. Quezon Ave.
Diliman, Quezon City

I/We[1], the undersigned, declare that:

1. *I/We* understand that, according to your conditions, bids must be supported by a Bid Security, which may be in the form of a Bid-Securing Declaration.
2. *I/We* accept that: (a) *I/we* will be automatically disqualified from bidding for any contract with any procuring entity for a period of two (2) years upon receipt of your Blacklisting Order; and, (b) *I/we* will pay the applicable fine provided under Section 6 of the Guidelines on the Use of Bid Securing Declaration, within fifteen (15) days from receipt of the written demand by the Procuring Entity for the commission of acts resulting to the enforcement of the Bid Securing Declaration under Sections 23.1 (b), 34.2, 40.1 and 69.1, except 69.1 (f) of the IRR of R.A. 9184; without prejudice to other legal action the government may undertake.
3. *I/We* understand that this Bid-Securing Declaration shall cease to be valid on the following circumstances:
   (a) Upon expiration of the bid validity period, or any extension thereof pursuant to your request;
   (b) *I am/we are* declared ineligible or post-disqualified upon receipt of your notice to such effect, and (i) *I/we* failed to timely file a request for reconsideration or (ii) *I/we* filed a waiver to avail of said right;
   (c) *I am/we are* declared as the bidder with the Lowest Calculated and Responsive Bid, and *I/we* have furnished the performance security and signed the Contract.

IN WITNESS WHEREOF, *I/we* have hereunto set my hand this ____ day of ____ 20____ at _____, Philippines.

_____
[Name and Signature of Bidder's Representative/ Authorized Signatory] [Signatory's legal capacity]
Affiant

[Jurat]
[Format shall be based on the latest Rules on Notarial Practice]

---

[1] *Select one and delete the other. Adopt same instruction for similar terms throughout the document.*

Standard Form No: NPCSF-INFR-07

Omnibus Sworn Statement (Revised)

REPUBLIC OF THE PHILIPPINES)
CITY/MUNICIPALITY OF _____) S.S.

AFFIDAVIT

I, [Name of Affiant], of legal age, [Civil Status], [Nationality], and residing at [Address of Affiant], after having been duly sworn in accordance with law, do hereby depose and state that:

1. *[Select one, delete the other:]*

   [If a sole proprietorship:] I am the sole proprietor or authorized representative of [Name of Bidder] with office address at [address of Bidder];

   [If a partnership, corporation, cooperative, or joint venture:] I am the duly authorized and designated representative of [Name of Bidder] with office address at [address of Bidder];

2. *[Select one, delete the other:]*

   [If a sole proprietorship:] As the owner and sole proprietor, or authorized representative of [Name of Bidder], I have full power and authority to do, execute and perform any and all acts necessary to participate, submit the bid, and to sign and execute the ensuing contract for [Name of the Project] of the [Name of the Procuring Entity], as shown in the attached duly notarized Special Power of Attorney;

   [If a partnership, corporation, cooperative, or joint venture:] I am granted full power and authority to do, execute and perform any and all acts necessary to participate, submit the bid, and to sign and execute the ensuing contract for [Name of the Project] of the [Name of the Procuring Entity], as shown in the attached [state title of attached document showing proof of authorization (e.g., duly notarized Secretary's Certificate, Board/Partnership Resolution, or Special Power of Attorney, whichever is applicable;)];

3. [Name of Bidder] is not "blacklisted" or barred from bidding by the Government of the Philippines or any of its agencies, offices, corporations, or Local Government Units, foreign government/foreign or international financing institution whose blacklisting rules have been recognized by the Government Procurement Policy Board, by itself or by relation, membership, association, affiliation, or controlling interest with another blacklisted person or entity as defined and provided for in the Uniform Guidelines on Blacklisting;

4. Each of the documents submitted in satisfaction of the bidding requirements is an authentic copy of the original, complete, and all statements and information provided therein are true and correct;

5. [Name of Bidder] is authorizing the Head of the Procuring Entity or its duly authorized representative(s) to verify all the documents submitted;

6. *[Select one, delete the rest:]*

   [If a sole proprietorship:] The owner or sole proprietor is not related to the Head of the Procuring Entity, members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat, the head of the Project Management Office or the end-user unit, and the project consultants by consanguinity or affinity up to the third civil degree;

   [If a partnership or cooperative:] None of the officers and members of *[Name of Bidder]* is related to the Head of the Procuring Entity, members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat, the head of the Project

Management Office or the end-user unit, and the project consultants by consanguinity or affinity up to the third civil degree;

[If a corporation or joint venture:] None of the officers, directors, and controlling stockholders of *[Name of Bidder]* is related to the Head of the Procuring Entity, members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat, the head of the Project Management Office or the end-user unit, and the project consultants by consanguinity or affinity up to the third civil degree;

7. *[Name of Bidder]* complies with existing labor laws and standards; and

8. *[Name of Bidder]* is aware of and has undertaken the responsibilities as a Bidder in compliance with the Philippine Bidding Documents, which includes:

   a. Carefully examining all of the Bidding Documents;

   b. Acknowledging all conditions, local or otherwise, affecting the implementation of the Contract;

   c. Making an estimate of the facilities available and needed for the contract to be bid, if any; and

   d. Inquiring or securing Supplemental/Bid Bulletin(s) issued for the *[Name of the Project].*

9. *[Name of Bidder]* did not give or pay directly or indirectly, any commission, amount, fee, or any form of consideration, pecuniary or otherwise, to any person or official, personnel or representative of the government in relation to any procurement project or activity.

10. In case advance payment was made or given, failure to perform or deliver any of the obligations and undertakings in the contract shall be sufficient grounds to constitute criminal liability for Swindling (Estafa) or the commission of fraud with unfaithfulness or abuse of confidence through misappropriating or converting any payment received by a person or entity under an obligation involving the duty to deliver certain goods or services, to the prejudice of the public and the government of the Philippines pursuant to Article 315 of Act No. 3815 s. 1930, as amended, or the Revised Penal Code.

IN WITNESS WHEREOF, I have hereunto set my hand this __ day of ___, 20__ at _____, Philippines.

[Insert NAME OF BIDDER OR ITS AUTHORIZED REPRESENTATIVE]
[Insert signatory's legal capacity]
Affiant

[Jurat]
[Format shall be based on the latest Rules on Notarial Practice]

Standard Form Number: NPCSF-INFR-08

CONTRACTOR'S ORGANIZATIONAL CHART FOR THE CONTRACT

Submit Copy of the Organizational Chart that the Contractor intends to use to execute the Contract if awarded to him. Indicate in the chart the names of the Project Manager, Project Engineer, Foreman and other Key Engineering Personnel.

Attach the required Proposed Organizational Chart for the Contract as stated above

NOTES:

1. *This organization chart should represent the "Contractor's Organization" required for the Project, and not the organizational chart of the entire firm.*
2. *Each such nominated engineer/key personnel shall comply with and submit duly accomplished forms NPCSF-INFR-10a, NPCSF-INFR-10b and NPCSF-INFR-11.*
3. *All these are required to be in the Technical Envelope of the Bidder.*

Standard Form Number: NPCSF-INFR-09

LIST OF KEY PERSONNEL PROPOSED TO BE ASSIGNED TO THE CONTRACT

(Based on the Minimum Key Personnel Required in the Bidding Documents)

Business Name: _____

Business: _____

_____

		DESIGNATION				
1	Name					
2	Address					
3	Date of Birth					
4	Employed Since					
5	Experience					
6	Previous Employment					
7	Education					
8	PRC License					

Required Attachments:

1. *Certificate of Employment, Bio Data and Construction Safety and Health Training Certificate of the Safety Officer*
2. *Certificate of Employment, Bio Data and valid PRC License of the (professional) personnel*
3. *Certificate of Employment, Bio Data and accreditation from DPWH as Materials Engineer for the Materials Engineer*

Submitted by: _____

(Printed Name & Signature)

Designation: _____

Date: _____

One of the requirements from the bidder to be included in its Technical Envelope is a list of contractor's key personnel (based on the minimum key personnel required in the bidding documents) to be assigned to the contract to be bid, with their complete qualification and experience data (including the key personnel's signed written commitment to work for the project once awarded the contract).

Standard Form Number: NPCSF-INFR-10a

KEY PERSONNEL'S CERTIFICATE OF EMPLOYMENT
(PROFESSIONAL PERSONNEL)

_____
Issuance Date

THE PRESIDENT
National Power Corporation
BIR Road cor. Quezon Ave.
Diliman, Quezon City

Dear Sir:

I am *(Name of Nominee)*_____ a Licensed _____ Engineer with Professional License No. _____ issued on *(date of issuance)*_____ at *(place of issuance)*_____.

I hereby certify that *(Name of Bidder)*_____ has engaged my services as *(Designation)*_____ for the *(Name of Project)*_____, if awarded to it.

As *(Designation)*_____, I supervised the following completed projects similar to the contract under bidding:

NAME OF PROJECT	OWNER	COST	DATE COMPLETED

At present, I am supervising the following projects:

NAME OF PROJECT	OWNER	COST	DATE COMPLETED

In case of my separation for any reason whatsoever from the above-mentioned Contractor, I shall notify the National Power Corporation at least twenty one (21) days before the effective date of my separation.

As *(Designation)*_____, I know I will have to stay in the job site all the time to supervise and manage the Contract works to the best of my ability, and aware that I am authorized to handle only one (1) contract at a time.

I do not allow the use of my name for the purpose of enabling the above-mentioned Contractor to qualify for the Contract without any firm commitment on my part to assume the post of *(Designation)*_____ therefor, if the contract is awarded to him since I understand that to do so will be a sufficient ground for my disqualification as *(Designation)*_____ in any future National Power Corporation bidding or employment with any Contractor doing business with the National Power Corporation.

_____
(Name and Signature)
AFFIANT

[Jurat]
[Format shall be based on the latest Rules on Notarial Practice]

One of the requirements from the bidder to be included in its Technical Envelope is a list of contractor's key personnel (viz. Project Manager, Project Engineer, Construction Safety Officer, Foremen, etc), to be assigned to the contract to be bid, with their complete qualification and experience data (including the key personnel's signed written commitment to work for the project once awarded the contract).

Standard Form Number: NPCSF-INFR-10b

KEY PERSONNEL'S CERTIFICATE OF EMPLOYMENT
(CONSTRUCTION SAFETY AND HEALTH OFFICER)

_____
Issuance Date

THE PRESIDENT
National Power Corporation
BIR Road cor. Quezon Ave.
Diliman, Quezon City

Dear Sir:

I am *(Name of Nominee)* _____ an Construction Safety & Health Officer with Certificate No. _____ issued on *(date of Issuance)* _____ at *(place of Issuance)* _____.

I hereby certify that *(Name of Bidder)* _____ has engaged my services as Construction Safety & Health Officer for the *(Name of Project)* _____, if awarded to it.

I am the Construction Safety & Health Officer of the following completed projects similar to the contract under bidding:

NAME OF PROJECT	OWNER	COST	DATE COMPLETED

At present, I am the Construction Safety & Health Officer of the following projects:

NAME OF PROJECT	OWNER	COST	DATE COMPLETED

In case of my separation for any reason whatsoever from the above-mentioned Contractor, I shall notify the National Power Corporation at least twenty one (21) days before the effective date of my separation.

As Construction Safety & Health Officer, I know I will have to stay in the job site all the time and aware that I am authorized to handle only one (1) contract at a time.

I do not allow the use of my name for the purpose of enabling the above-mentioned Contractor to qualify for the Contract without any firm commitment on my part to assume the post of Construction Safety & Health Officer, if the contract is awarded to him since I understand that to do so will be a sufficient ground for my disqualification as Construction Safety & Health Officer in any future National Power Corporation bidding or employment with any Contractor doing business with the National Power Corporation.

_____
(Name and Signature)
AFFIANT

[Jurat]
[Format shall be based on the latest Rules on Notarial Practice]

One of the requirements from the bidder to be included in its Technical Envelope is a list of contractor's key personnel (viz. Project Manager, Project Engineer, Construction Safety Officer, Foremen, etc), to be assigned to the contract to be bid, with their complete qualification and experience data (including the key personnel's signed written commitment to work for the project once awarded the contract).

Standard Form Number: NPCSF-INFR-11

KEY PERSONNEL
(FORMAT OF BIO-DATA)

Give the detailed information of the following personnel who are scheduled to be assigned as full-time field staff for the project. Fill up a form for each person.

1. Name : _____
2. Date of Birth : _____
3. Nationality : _____
4. Education and Degrees : _____
5. Specialty : _____
6. Registration : _____
7. Length of Service with the Firm : _____ Year from ____ (months) _____ (year)
   To ____ (months) _____ (year)
8. Years of Experience : _____
9. If Item 7 is less than ten (10) years, give name and length of service with previous employers for a ten (10)-year period (attached additional sheet/s), if necessary:

Name and Address of Employer	Length of Service
_____	_____ year(s) from _____ to _____
_____	_____ year(s) from _____ to _____
_____	_____ year(s) from _____ to _____

10. Experience:

    This should cover the past ten (10) years of experience. (Attached as many pages as necessary to show involvement of personnel in projects using the format below).

Page 2 of 2

1. Name : _____
2. Name and Address of Owner : _____
3. Name and Address of the Owner's Engineer (Consultant) : _____
4. Indicate the Features of Project (particulars of the project components and any other particular interest connected with the project): _____
5. Contract Amount Expressed in Philippine Currency : _____
6. Position : _____
7. Structures for which the employee was responsible : _____
8. Assignment Period : from _____ (months) _____ (years)
   : to _____ (months) _____ (years)

_____
Name and Signature of Employee

It is hereby certified that the above personnel can be assigned to this project, if the contract is awarded to our company.

_____ _____
(Place and Date) (The Authorized Representative)

One of the requirements from the bidder to be included in its Technical Envelope is a list of contractor's key personnel (viz. Project Manager, Project Engineer, Construction Safety Officer, Foremen, etc), to be assigned to the contract to be bid, with their complete qualification and experience data (including the key personnel's signed written commitment to work for the project once awarded the contract).

Standard Form Number: NPCSF-INFR-12

LIST OF EQUIPMENT, OWNED OR LEASED AND/OR UNDER PURCHASE AGREEMENTS

(Based on the Minimum Equipment Required in the Bidding Documents)

Business Name: _____

Business: _____

_____

Description	Model/Year	Capacity / Performance / Size	Plate No.	Motor No. / Body No.	Location	Condition	Proof of Ownership / Lessor or Vendor
A. Owned							
i.							
ii.							
iii.							
iv.							
v.							
B. Leased							
i.							
ii.							
iii.							
iv.							
v.							
C. Under Purchase Agreements							
i.							
ii.							
iii.							
iv.							
v.							

Submitted by: _____

(Printed Name & Signature)

Designation: _____

Date: _____

One of the requirements from the bidder to be included in its Technical Envelope is the list of its equipment units pledged for the contract to be bid, based on minimum equipment required in the bidding docs. which are owned (supported by proof/s of ownership), leased, and/or under purchase agreements (with corresponding engine numbers, chassis numbers and/or serial numbers), supported by certification of availability of equipment from the equipment lessor/vendor for the duration of the project

Standard Form No. : NPCSF-INFR-13

BID LETTER

Date: _____

To: **THE PRESIDENT**
National Power Corporation
BIR Road cor. Quezon Ave.
Diliman, Quezon City

We, the undersigned, declare that:

(a) We have examined and have no reservation to the Bidding Documents, including Addenda, for the Contract **CONSTRUCTION OF 10 KL RAIN WATER COLLECTOR AND OFFICE/STAFF HOUSE AT MANGSEE DPP (LuzP21Z1271Sc).**

(b) We offer to execute the Works for this Contract in accordance with the Bid Documents, Technical Specifications, General and Special Conditions of Contract accompanying this Bid;

The total price of our Bid, excluding any discounts offered below is: *[insert information]* _____;

The discounts offered and the methodology for their application are: *[insert information]* _____;

(c) Our Bid shall be valid for a period of *[insert number]* _____ days from the date fixed for the Bid submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;

(d) If our Bid is accepted, we commit to obtain a Performance Security in the amount of *[insert percentage amount]* _____ percent of the Contract Price for the due performance of the Contract;

(e) Our firm, including any subcontractors or suppliers for any part of the Contract, have nationalities from the following eligible countries: *[insert information]* _____;

(f) We are not participating, as Bidders, in more than one Bid in this bidding process, other than alternative offers in accordance with the Bidding Documents;

(g) Our firm, its affiliates or subsidiaries, including any subcontractors or suppliers for any part of the Contract, has not been declared ineligible by the Funding Source;

(h) We understand that this Bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal Contract is prepared and executed; and

(i) We understand that you are not bound to accept the Lowest Calculated Bid or any other Bid that you may receive.

(j) We likewise certify/confirm that the undersigned, is the duly authorized representative of the bidder, and granted full power and authority to do, execute and perform any and all acts necessary to participate, submit the bid, and to sign and execute the ensuing contract for the **CONSTRUCTION OF 10 KL RAIN WATER COLLECTOR AND OFFICE/STAFF HOUSE AT MANGSEE DPP (LuzP21Z1271Sc)** of the National Power Corporation.

(k) We acknowledge that failure to sign each and every page of this Bid Letter, including the Bill of Quantities, shall be a ground for the rejection of our bid.

Name: _____

In the capacity of: _____

Signed: _____

Duly authorized to sign the Bid for and on behalf of: _____

Date: _____

Standard Form No. : NPCSF-INFR-14

DETAILED COST ESTIMATE FORM

Name of Bidder : _____

Item No.	Item Description	Unit of Measure	Direct Cost			Mark-Up		VAT	Unit Cost	Total Price
			Materials	Labor	Equipment	OCM	Profit			

_____
Name, Signature of Authorized Representative

_____
Designation

Standard Form No. : NPCSF-INFR-15

SUMMARY SHEETS OF MATERIALS PRICES, LABOR RATES AND EQUIPMENT RENTAL RATES

Name of Bidder : _____

I. Unit Prices of Materials

Materials Description	Unit	Unit Price
1.		
2.		
3.		
4.		
5.		
6.		
7.		

II. Manpower Hourly Rates

Designation	Rate/Hr.
1.	
2.	
3.	
4.	
5.	
6.	
7.	

III. Equipment Hourly Rental Rates

Equipment Description	Rental Rate/Hr.
1.	
2.	
3.	
4.	
5.	
6.	
7.	

Name, Signature of Authorized Representative

Designation

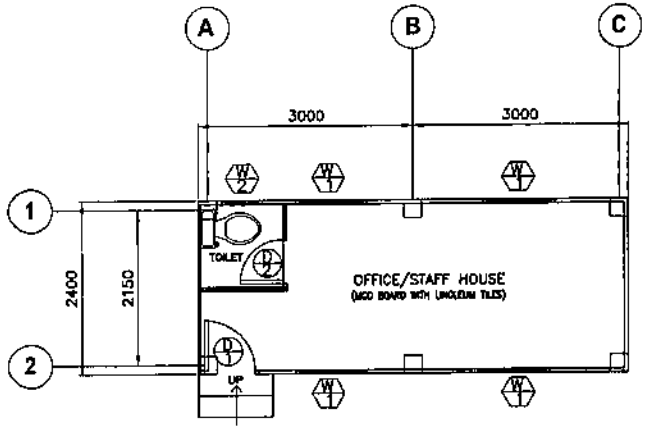
SECTION IX

BID DRAWINGS

SECTION IX – BID DRAWINGS

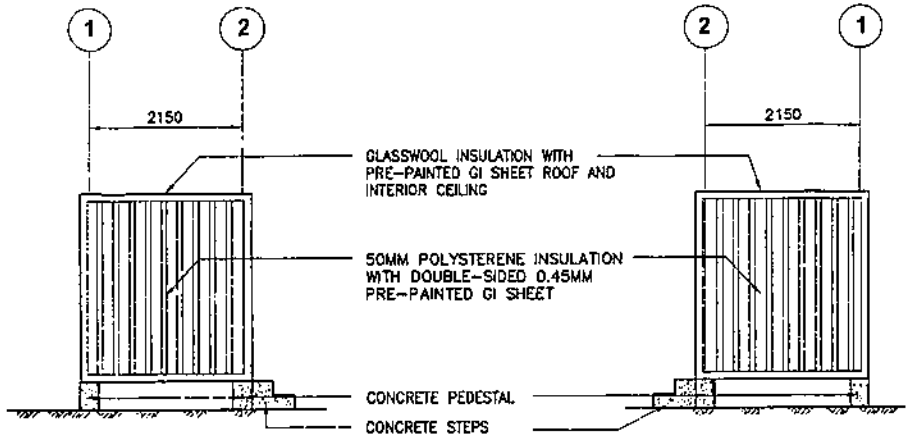
AW – ARCHITECTURAL WORKS

DRAWING NO.	TITLE
MgseeDPP-BDA-17.001	PREFABRICATED CONTAINER HOUSE (Floor and Roof Plan, Plumbing Layout and Elevations)
MgseeDPP-BDA-17.002	PREFABRICATED CONTAINER HOUSE (Elevation, Schedule of Doors and Windows)
MgseeDPP-BDA-17.003	PUMPHOUSE (Plan, Section and Schedule of Doors and Windows)



FLOOR PLAN

SCALE 1:75

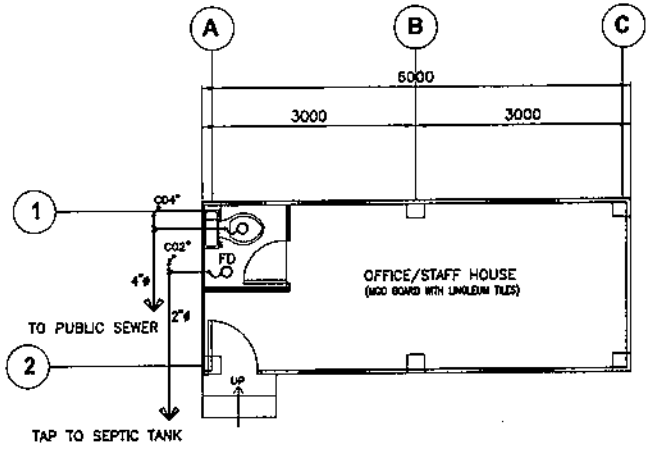


LEFT SIDE ELEVATION

SCALE 1:75

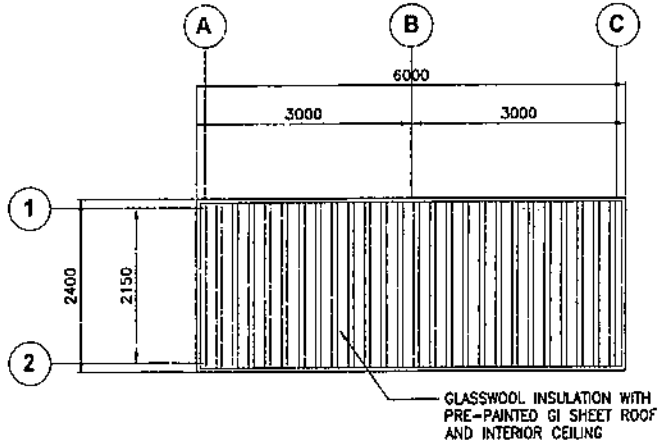
RIGHT SIDE ELEVATION

SCALE 1:75



PLUMBING LAYOUT

SCALE 1:75



ROOF PLAN

SCALE 1:75

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. LOCATION OF OFFICE/STAFF HOUSE SHALL BE VERIFIED AT SITE.

LEGEND:

FD – FLOOR DRAIN
CO – CLEAN OUT

OWNER: **NATIONAL POWER CORPORATION**
AGHAM ROAD, DILIMAN, QUEZON CITY

PROJECT: CONSTRUCTION OF 10 KL RAIN WATER COLLECTOR AND OFFICE/STAFF HOUSE AT MANGSEE DPP

LOCATION: MANGSEE, BALABAC, PALAWAN

TITLE: **PREFABRICATED CONTAINER HOUSE**
(FLOOR AND ROOF PLAN, PLUMBING LAYOUT, ELEVATIONS)

	BY	CHKD	DATE
DESIGNED			
DRAWN	M.BILLO		
REVIEWED	PRINCIPAL ENG'R. / ARCH'T.		
CIVIL/ARCH'T			
ELEC.			
MECH.			

SUBMITTED: ENGR. V. LLANUEVA
PRINCIPAL ARCHITECT A, CEAD

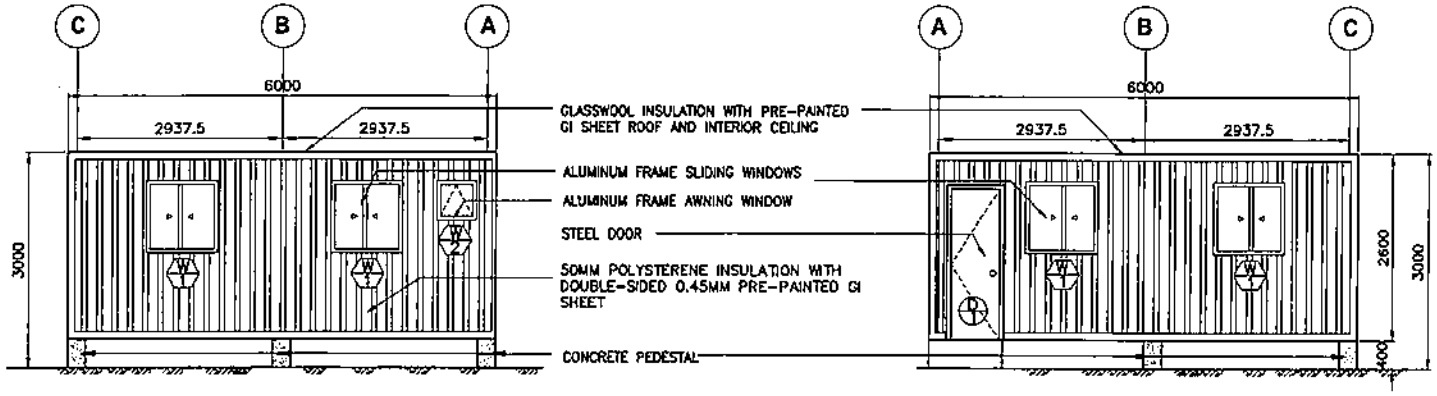
RECOMMENDED: A/C. ESPIRITU
Manager, CEAD

APPROVED: N. G. GUERRERRA
Manager, DDO

DWG. NO. MgseDPP-BDA-17.001 | SPECS. NO. LuzP21Z1271Sc

SCALE: AS SHOWN | **BID DRAWING** | REV. 0

REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPD.

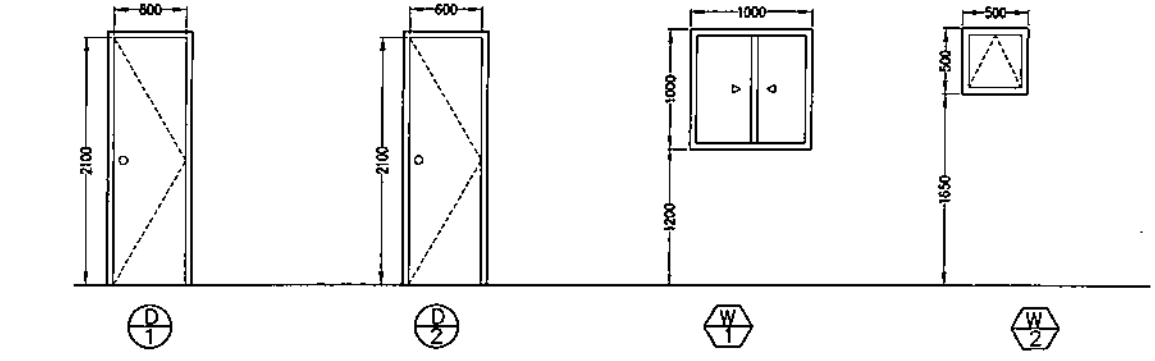


REAR ELEVATION

SCALE 1:75

FRONT ELEVATION

SCALE 1:75



: FLUSH TYPE STEEL DOOR
: DOOR KNOB, WEATHERPROOF
: ONE (1) SET

: FLUSH TYPE PVC DOOR
: DOOR KNOB
: ONE (1) SET

: GLASS AND ALUM. SLIDING WINDOW
: 6 MM THICK CLEAR GLASS
: ALUMINUM FRAME
: FOUR (4) SET

: GLASS AND ALUM. AWNING WINDOW
: ALUMINUM FRAME
: ONE (1) SET

SCHEDULE OF DOORS AND WINDOWS

SCALE 1:50

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. LOCATION OF OFFICE/STAFF HOUSE SHALL BE VERIFIED AT SITE.

OWNER: NATIONAL POWER CORPORATION
AGHAM ROAD, DILIMAN, QUEZON CITY

PROJECT: CONSTRUCTION OF 10 KL RAIN WATER COLLECTOR AND OFFICE/STAFF HOUSE AT MANGSEE DPP

LOCATION: MANGSEE, BALABAC, PALAWAN

TITLE: PREFABRICATED CONTAINER HOUSE
(ELEVATION, SCHEDULE OF DOORS AND WINDOWS)

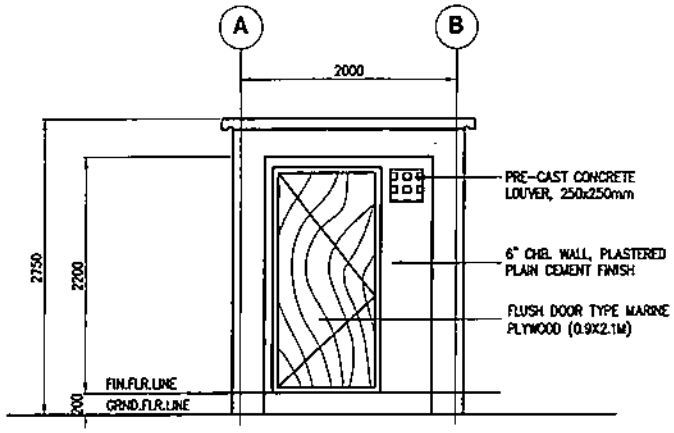
	BY	CHKD	DATE
DESIGNED			
DRAWN	MMEDO		
REVIEWED	PRINCIPAL ENGR. / ARCHT.		
CIVIL/ARCHT			
ELEC.			
MECH.			

SUBMITTED: R.R.R. VILLANUEVA, PRINCIPAL ARCHITECT A, CEAD
RECOMMENDED: A/C. B.SPIRITU, Manager, CEAD
APPROVED: N. G. SCHWENDIMANN, Manager, ODO

DWG. NO. MgseeDPP-BDA-17.002 | SPECS. NO. LuzP21Z1271Sc

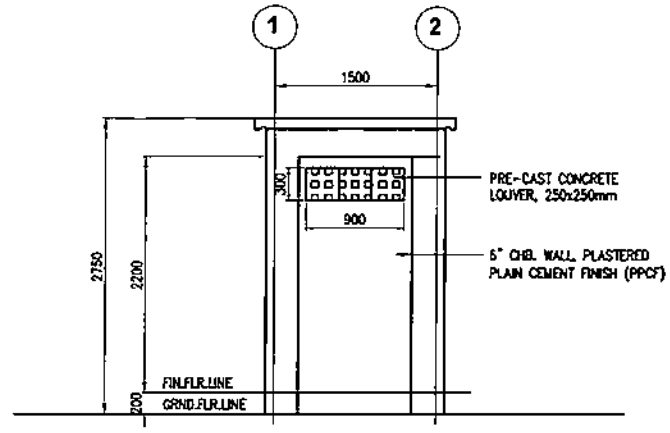
SCALE: AS SHOWN | BID DRAWING | REV. 0

REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPD.



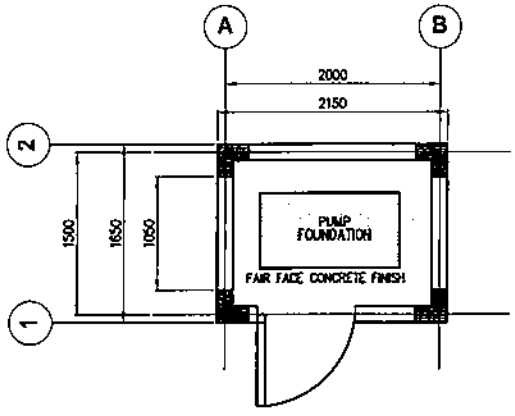
FRONT ELEVATIONS

SCALE 1:30



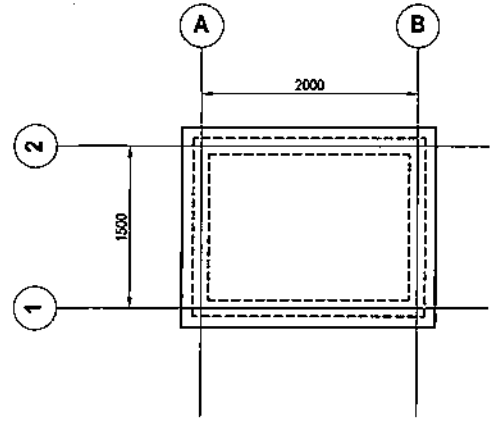
SIDE ELEVATIONS

SCALE 1:30



PLAN

SCALE 1:30



ROOF PLAN

SCALE 1:30

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.

REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPD.

OWNER: NATIONAL POWER CORPORATION
AGHAM ROAD, DILIMAN, QUEZON CITY

PROJECT: CONSTRUCTION OF 10 KL RAIN WATER COLLECTOR AND OFFICE/STAFF HOUSE AT MAINGSEE DPP

LOCATION: MAINGSEE, BALBALIC, PALAWAN

TITLE: **PUMPHOUSE**
(PLAN, SECTION AND SCHEDULE OF DOORS AND WINDOWS)

	BY	CHKD	DATE
DESIGNED			
DRAWN	MJRSCD		
REVIEWED	PRINCIPAL ENG'R. / ARCHT.		
CIVIL/ARCHT			
ELEC.			
MECH.			

SUBMITTED: R.R.R. VILLANUEVA, PRINCIPAL ARCHITECT A, CEAD

RECOMMENDED: A. C. BERRITU, Manager, CEAD

APPROVED: N. G. [illegible], Manager, OOD

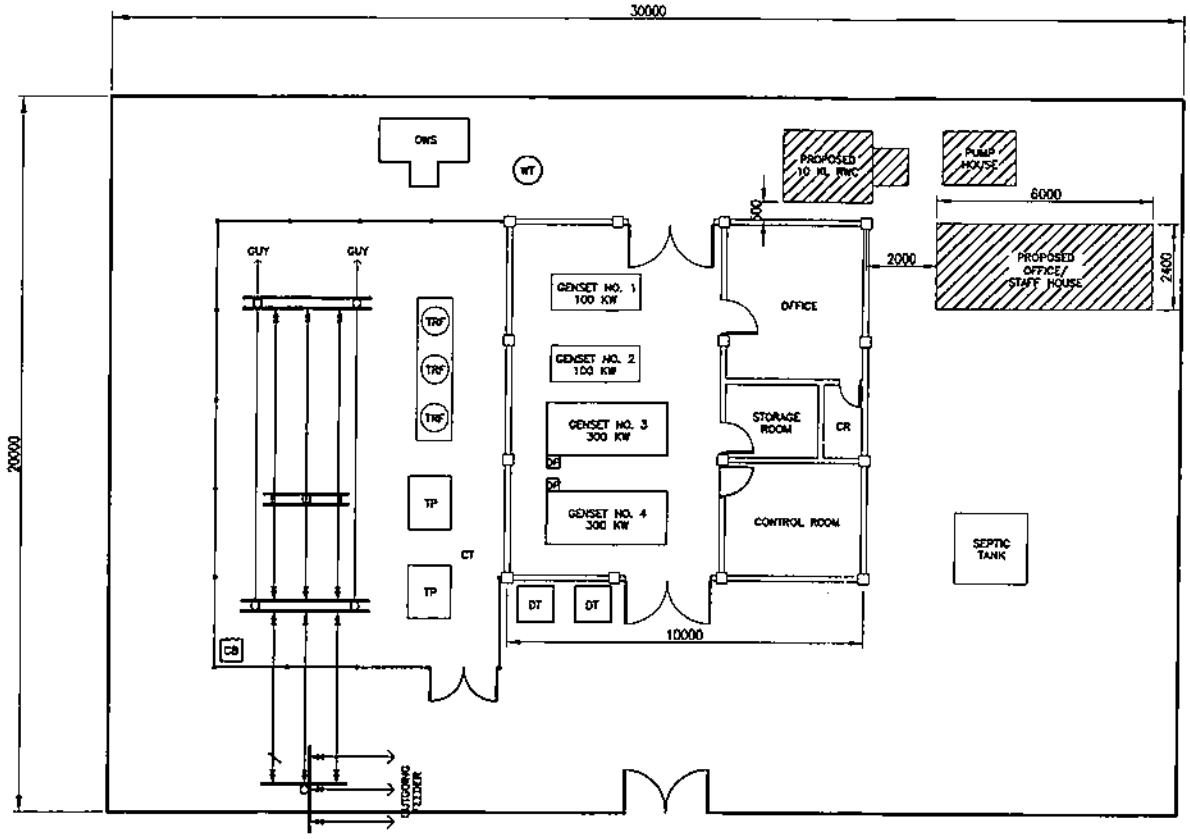
DWG. NO. MgseeDPP-BDA-17.003 SPECS. NO. LuzP21Z1271Sc

SCALE: AS SHOWN **BID DRAWING** REV. 0

SECTION IX – BID DRAWINGS

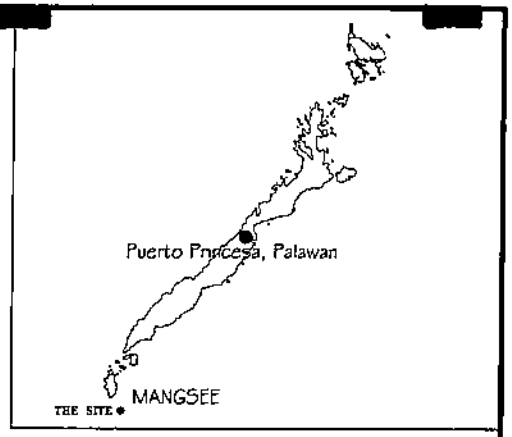
CW – CIVIL WORKS

DRAWING NO.	TITLE
MgseeDPP-BDC-17.001	SITE DEVELOPMENT PLAN (Mangsee Diesel Power Plant)
MgseeDPP-BDC-17.002	FOUNDATION PLAN, PEDESTAL, CONCRETE WALK AND STEPS DETAILS
MgseeDPP-BDC-17.003	10 KL RAIN WATER COLLECTOR (Plan, Section and Details)
MgseeDPP-BDC-17.004	PUMPHOUSE (Foundation Plan, Wall and Column Footing)
MgseeDPP-BDC-17.005	PUMPHOUSE (Roof Slab, Beam Section and Details)



SITE DEVELOPMENT PLAN

SCALE 1:150



LOCATION MAP

NOT TO SCALE

LEGEND:

- EXISTING PERIMETER FENCE
- SECLUSION FENCE
- EXISTING FACILITIES/STRUCTURES
- PROPOSED FACILITIES/STRUCTURES/EQUIPMENT
- DT – DAY TANK
- OWS – OIL WATER SEPARATOR
- TRF – TRANSFORMER
- DP – DRAIN PIT
- WT – WATER TANK
- TP – TRANSFROMER PAD
- RWC – RAIN WATER COLLECTOR

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. LOCATION OF OFFICE/STAFF HOUSE SHALL BE VERIFIED AT SITE.
3. ORIENTATION/LOCATION OF 10 KL RAIN WATER COLLECTOR SHALL BE VERIFIED AT SITE TO SUIT ACTUAL CONDITION.
4. WORK THIS WITH ELECTRICAL AND MECHANICAL DRAWINGS.

OWNER: NATIONAL POWER CORPORATION
AGHAM ROAD, DILIMAN QUEZON CITY

PROJECT: CONSTRUCTION OF 10 KL RAIN WATER COLLECTOR AND OFFICE/STAFF HOUSE AT MANGSEE DPP

LOCATION: MANGSEE, BALABAC, PALAWAN

TITLE: SITE DEVELOPMENT PLAN (MANGSEE DIESEL POWER PLANT)

	BY	CHKD	DATE
DESIGNED			
DRAWN	MBSILO		
REVIEWED	PRINCIPAL ENGR. / ARCHT.		
CIVIL/ARCHT			
ELEC.			
MECH.			

SUBMITTED: H. L. MENDOZA, Principal Engineer A, OIC/HEAD

RECOMMENDED: A. C. BISTRITU, Manager, OIC/HEAD

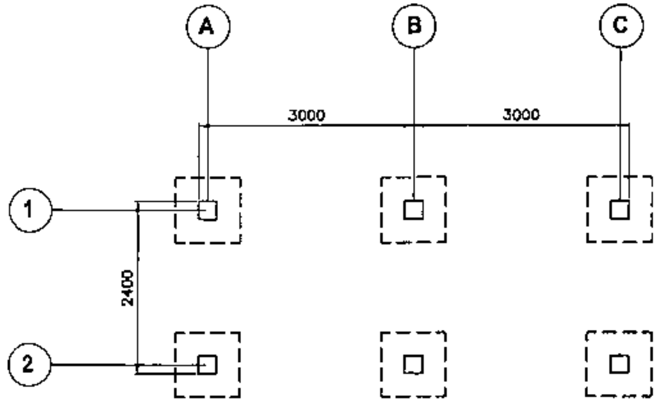
APPROVED: N. G. SOMBILLERA, Manager, OIC

DWG. NO. MgseeDPP-BDC-17.001 SPECS. NO. LuzP21Z1271Sc

REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPD.

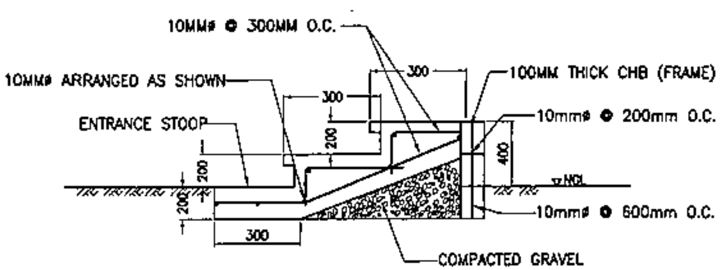
SCALE: AS SHOWN BID DRAWING REV. 0

[redacted] [redacted]



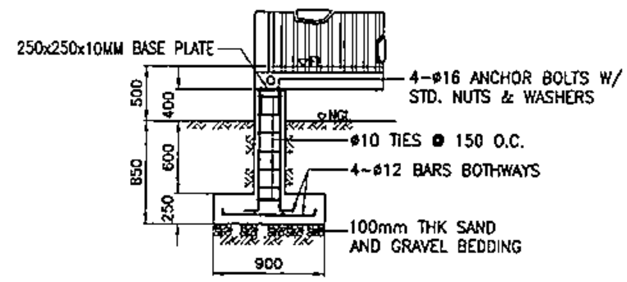
TYPICAL FOUNDATION PLAN

SCALE 1:60

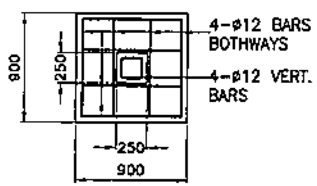


CONCRETE STEPS DETAIL

SCALE 1:60



SECTION



PLAN

DETAILS OF PEDESTAL FOOTING

SCALE 1:NTS

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. FOOTING DESIGN BASED ON ALLOWABLE SOIL PRESSURE OF 2,083 psf (100 KPa) AND TO BE VERIFY BASED ON ACTUAL SOIL CONDITION.
3. THE MINIMUM 28 DAY CYLINDER COMPRESSIVE STRENGTH OF CONCRETE SHALL BE 20.7MPa FOR PEDESTAL.
4. THE MINIMUM YIELD STRENGTH OF REINFORCEMENT TO BE USED SHALL BE GRADE 40 (276MPa).
5. ALL REINFORCING STEEL SHALL BE DETAILED AND PLACED IN CONFORMANCE WITH ACI-318.

OWNER: NATIONAL POWER CORPORATION
AGHAM ROAD, DILIMAN, QUEZON CITY

PROJECT: CONSTRUCTION OF 10 KL RAIN WATER COLLECTOR AND OFFICE/STAFF HOUSE AT MANGSEE DPP

LOCATION: MANGSEE, BALABAC, PALAWAN

TITLE: FOUNDATION PLAN, PEDESTAL, AND STEPS DETAILS

	BY	CHKD	DATE
DESIGNED			
DRAWN	MELLO		
REVIEWED	PRINCIPAL ENG'R. / ARCH'T.		
CIVIL/ARCH'T			
ELEC.			
MECH.			

SUBMITTED: H. L. MENDOZA, Principal Engineer A, CEAD

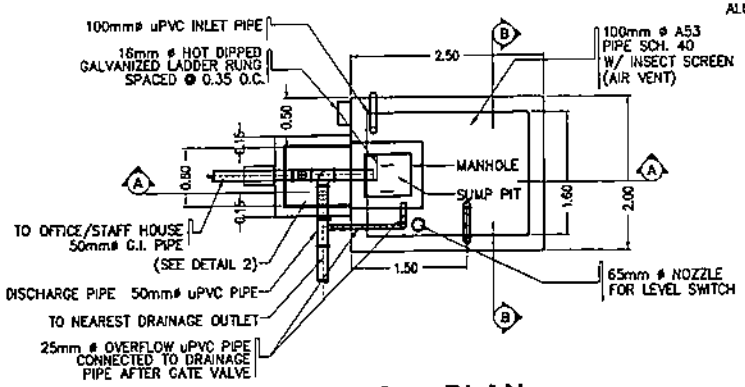
RECOMMENDED: A. C. SPIRITU, Manager, CEAD

APPROVED: N. G. SOMOSIERRA, Manager, DDD

DWG. NO. MgseeDPP-BDC-17.002 | SPECS. NO. LuzP21Z1271Sc

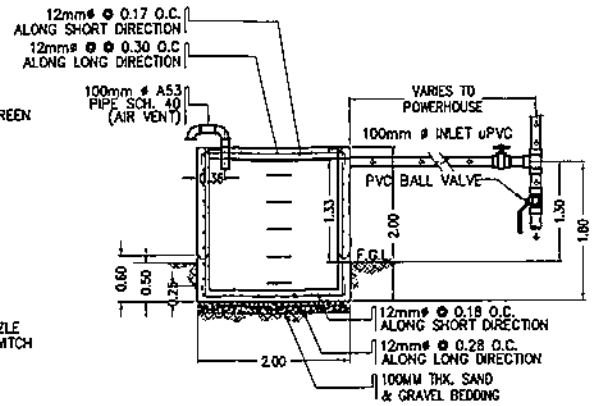
REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPD.

SCALE: AS SHOWN | BID DRAWING | REV. 0



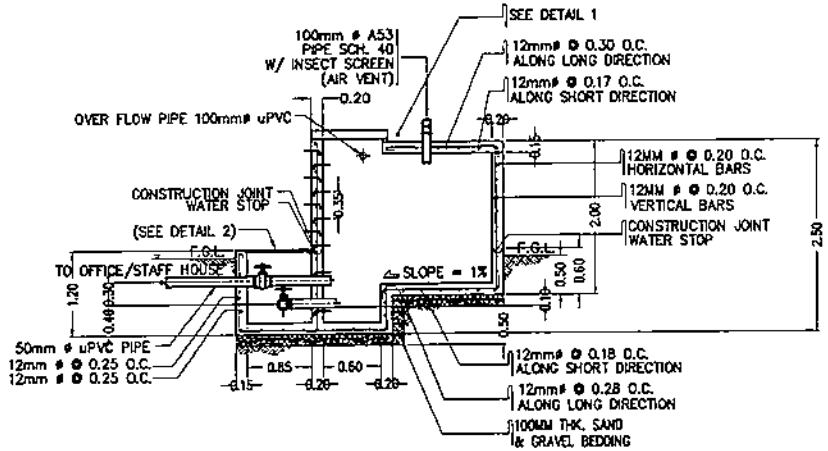
PLAN

SCALE 1:70



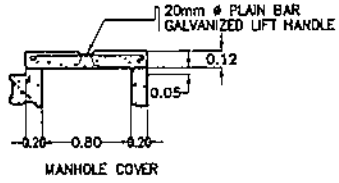
SECTION B-B

SCALE 1:70



SECTION A-A

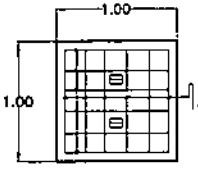
SCALE 1:70



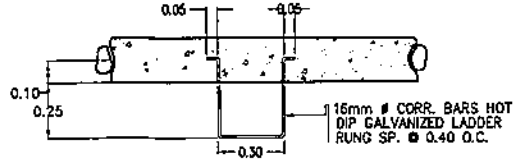
MANHOLE COVER

DETAIL 1

SCALE NTS



PLAN

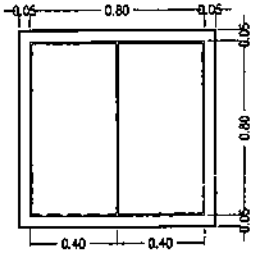


DETAIL OF LADDER RUNG

SCALE NTS

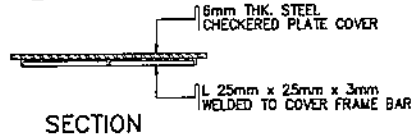
NOTES:

1. FLOORING, WALL AND ROOFING SHALL BE REINFORCED CONCRETE, FLOOR AND ROOF THICKNESS SHALL BE 150MM AND WALLS SHALL BE 200MM.
2. ALL DIMENSIONS, ELEVATIONS AND SPACING OF REBARS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
3. MINIMUM COMPRESSIVE STRENGTH OF CONCRETE SHALL BE f'c = 20.70 MPa AT 28 DAYS PERIOD.
4. REINFORCING BARS SHALL CONFORM TO THE LATEST REQUIREMENTS OF PNS FOR DSB GRADE 275.
5. ALLOWABLE BEARING CAPACITY OF SOIL SHALL NOT BE LESS THAN 144 kPa.
6. ALL ASPECTS OF CONSTRUCTION AND DETAILING OF REINFORCEMENTS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE ACI CODE.
7. INTEGRAL WATER PROOFING ADMIXTURES SHALL BE ADDED DURING CONCRETE BATCHING IN PROPORTIONS AS PER MANUFACTURERS RECOMMENDATION TO PREVENT WATER SEEPAGE.
8. FINAL LOCATION FOR RWC SHALL BE VERIFIED TO SUIT IN THE ACTUAL FIELD CONDITION



DETAIL 2

SCALE NTS



SECTION

OWNER: NATIONAL POWER CORPORATION
AGHAM ROAD, DILIMAN, QUEZON CITY

PROJECT: CONSTRUCTION OF 10 KL RAIN WATER COLLECTOR AND OFFICE/STAFF HOUSE AT MANGSEE DPP

LOCATION: MANGSEE, BALABAC, PALAWAN

TITLE: **10 KL RAIN WATER COLLECTOR**
(PLAN SECTION AND DETAILS)

	BY	CHKD	DATE
DESIGNED			
DRAWN	MGRELO		
REVIEWED	PRINCIPAL ENG'R. / ARCHT.		
CIVIL/ARCHT			
ELEC.			
MECH.			

SUBMITTED: H. L. MENDOZA, Principal Engineer / CEAD
RECOMMENDED: A. C. ESPIRITU, Manager, CEAD
APPROVED: N. G. SOMBILLERA, Manager, DDD

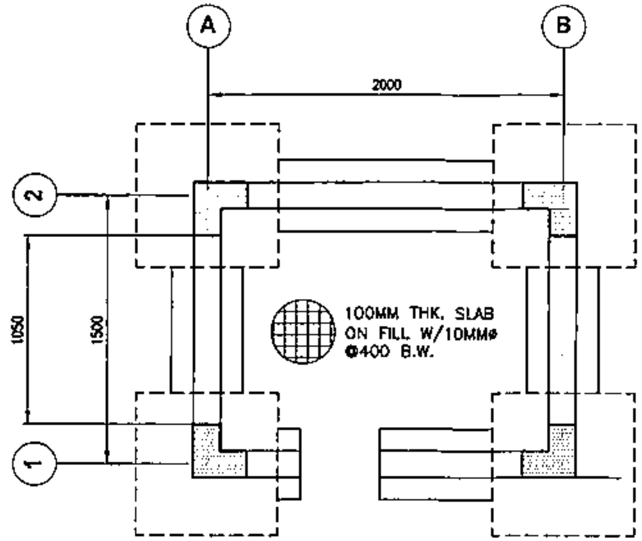
DWG. NO. NgseeDPP-BDC-17.003 SPECS. NO. LuzP21Z1271Sc

SCALE: AS SHOWN **BID DRAWING** REV. 0

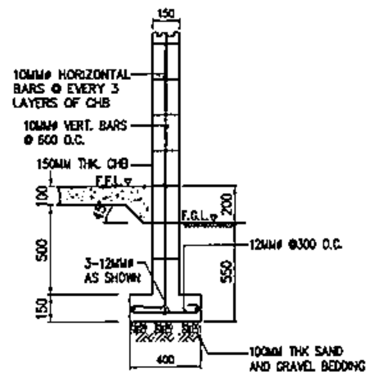
REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPD.

NOTES:

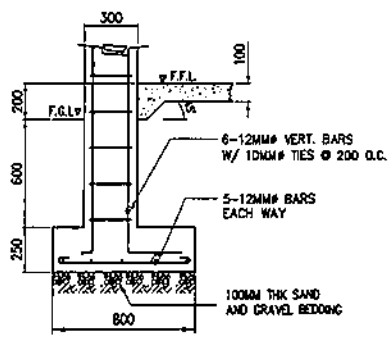
1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. MINIMUMM COMPRESSIVE STRENGTH OF CONCRETE SHALL BE F'C = 20.70 MPA @ 28 DAYS PERIOD.
3. REINFORCING BARS MUST CONFORM TO THE LATEST PNS FOR DSB GRADE 275.
4. ALL ASPECTS OF CONSTRUCTION AND DETAILING OF REINFORCEMENTS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE ACI CODE.



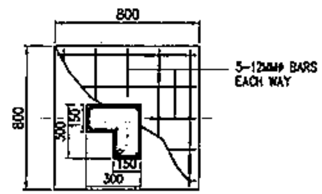
FOUNDATION PLAN
SCALE 1:30



WALL SECTION
SCALE 1:30



ELEVATION
SCALE 1:30



PLAN

COLUMN FOOTING
SCALE 1:30

REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPD.

OWNER: **NATIONAL POWER CORPORATION**
AGHAM ROAD, DILIMAN, QUEZON CITY

PROJECT: CONSTRUCTION OF 10 KL RAIN WATER COLLECTOR AND OFFICE/STAFF HOUSE AT MANGSEE DPP

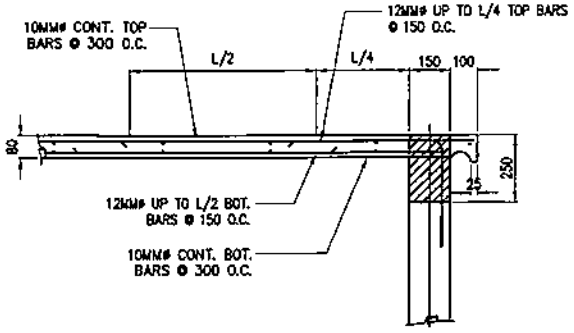
LOCATION: MANGSEE, BALABAC, PALAWAN

TITLE: **PUMPHOUSE**
(FOUNDATION PLAN, WALL AND COLUMN FOOTING)

	BY	CHKD	DATE
DESIGNED			
DRAWN	MURILLO		
REVIEWED	PRINCIPAL ENG'R. / ARCH'T.		
CIVIL/ARCH'T			
ELEC.			
MECH.			

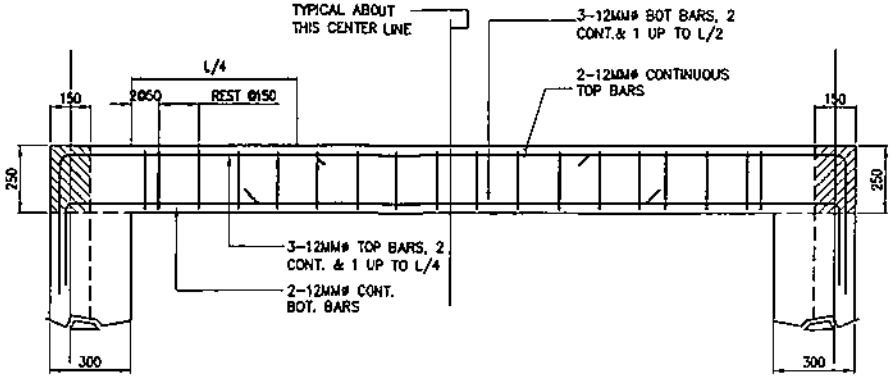
SUBMITTED: H. L. MENDOZA, Principal Engineer A, CEAD
RECOMMENDED: A. C. ESPIRITU, Manager, CEAD
APPROVED: N. C. [illegible], Manager, DOD

DWG. NO. MgseeDPP-BDC-17.004
SPECS. NO. LuzP21Z1271Sc
SCALE: AS SHOWN
BID DRAWING
REV. 0



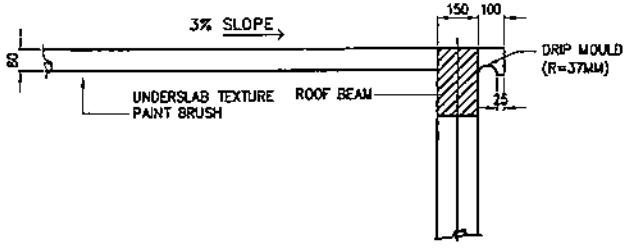
ROOF SLAB REINFORCEMENT

SCALE 1:20



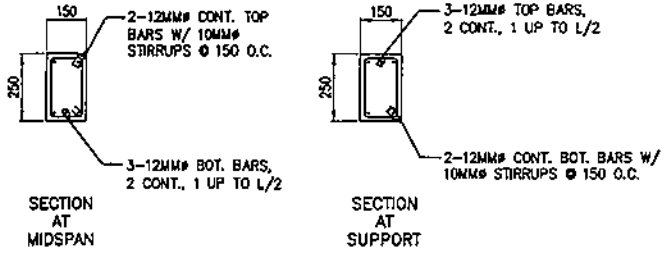
BEAM DETAIL

SCALE 1:20



ROOF SLAB DETAIL

SCALE 1:20



BEAM SECTION

SCALE 1:20

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. MINIMUM COMPRESSIVE STRENGTH OF CONCRETE SHALL BE F'C = 20.70 MPA @ 28 DAYS PERIOD.
3. REINFORCING BARS MUST CONFORM TO THE LATEST PNS FOR DSB GRADE 275.
4. ALL ASPECTS OF CONSTRUCTION AND DETAILING OF REINFORCEMENTS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE ACI CODE.

REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPD.

OWNER: NATIONAL POWER CORPORATION
AGHAM ROAD, DILIMAN, QUEZON CITY

PROJECT: CONSTRUCTION OF 10 KL RAIN WATER COLLECTOR AND OFFICE/STAFF HOUSE AT MANOSEE DPP

LOCATION: MANOSEE, BALABAC, PALAWAN

TITLE: **PUMPHOUSE**
(ROOF SLAB, BEAM SECTION AND DETAILS)

	BY	CHKD	DATE
DESIGNED			
DRAWN	MARILLO		
REVIEWED	PRINCIPAL ENG'R. / ARCH'T.		
CIVIL/ARCH'T			
ELEC.			
MECH.			

SUBMITTED: H. L. MENDOZA, Principal Engineer/A, CEAD
RECOMMENDED: A. C. ESPIRITU, Division Chief, CEAD
APPROVED: N. G. GONZALEZ, Manager, DDO

DWG. NO. MgseeDPP-BDC-17.005 SPECS. NO. LuzP21Z1271Sc

SCALE: AS SHOWN **BID DRAWING** REV. 0

SECTION IX - BID DRAWINGS

EW – ELECTRICAL WORKS

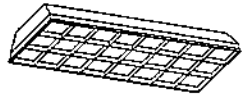
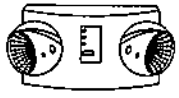
DRAWING NO.	TITLE
MgseeDPP-BDE-13.001	GENERAL NOTES, LEGEND AND DETAILS OF LUMINAIRES (PREFABRICATED CONTAINER HOUSE)
MgseeDPP-BDE-13.002	LIGHTING AND POWER LAYOUT (PREFABRICATED CONTAINER HOUSE)
MgseeDPP-BDE-13.003	SCHEDULE OF LOADS AND RISER DIAGRAM (PREFABRICATED CONTAINER HOUSE)

GENERAL NOTES:

1. ALL WORKS SHALL BE DONE IN ACCORDANCE WITH THE LATEST PROVISIONS OF THE PHILIPPINE ELECTRICAL CODE, LAWS AND ORDINANCES OF THE LOCAL CODE ENFORCING AUTHORITIES.
2. POWER SUPPLY SHALL BE SINGLE PHASE, 240 VOLTS, 60 HERTZ, TWO (2) WIRE SYSTEM TO BE PROVIDED BY THE END-USER.
3. ALL SWITCHES AND CONVENIENCE OUTLETS SHALL BE FLUSH-MOUNTED. SWITCHES SHALL BE 1.37 METERS ABOVE THE FINISHED FLOOR WHILE CONVENIENCE OUTLETS SHALL BE MOUNTED 0.30 METERS ABOVE THE FINISHED FLOOR AND 0.15 METERS ABOVE WORKING TABLE.
4. OUTLETS FOR EMERGENCY LIGHT AND EXHAUST FAN SHALL BE FLUSH-MOUNTED, 2.0 METERS ABOVE THE FINISHED FLOOR.
5. CONDUIT RUNS ARE INDICATIVE ONLY. THE ACTUAL RUNS SHALL BE DETERMINED IN THE FIELD.
6. MINIMUM SIZE OF CONDUCTOR TO BE USED FOR THE BRANCH CIRCUITS SHALL BE 3.5 mm^2 THHN/THWN-2 IN 20 mmø SCH.40 uPVC CONDUIT WITH PROPER FITTINGS, DEVICES, BOXES AND SUPPORTS UNLESS OTHERWISE SPECIFIED IN THE PLAN.
7. WIRES, BOXES, ELECTRICAL AS WELL AS NON-ELECTRICAL MATERIALS NOT INCLUDED IN THE PLANS AND SPECIFICATIONS BUT NECESSARY TO COMPLETE THE JOB SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR.
8. ALL EQUIPMENT SHALL BE PROPERLY GROUNDED.
9. ALL ELECTRICAL MATERIALS TO BE USED IN THE INSTALLATION SHALL BE NEW, STANDARD AND APPROVED TYPE AS TO LOCATION, TYPES AND PURPOSE. WORK SHALL BE AS PER PLAN AND SPECIFICATIONS AS TO LOCATION, TYPE AND USE.
10. ELECTRICAL WORKS SHALL BE DONE UNDER THE DIRECT SUPERVISION OF A DULY LICENSED ELECTRICAL ENGINEER.

LEGEND:

- (A) – LUMINAIRE TYPE A
- (B) – LUMINAIRE TYPE B
- (C) – LUMINAIRE TYPE C
- (D) – LUMINAIRE TYPE D
- $\bullet S$ – SINGLE GANG WALL SWITCH
- $\bullet S_{ab}$ – DOUBLE GANG WALL SWITCH (SUBSCRIPT DENOTES LAMP/S BEING CONTROLLED)
- Φ – 200 VA, DUPLEX CONVENIENCE OUTLET
- Φ – 200 VA, DUPLEX WEATHERPROOF CONVENIENCE OUTLET
- Φ_{EL} – EMERGENCY LIGHT OUTLET
- Φ_{EF} – EXHAUST FAN OUTLET
- BP – BOOSTER PUMP LOCAL CONTROL AND PROTECTION PANEL
- Φ_{ACU} – AIR CONDITIONING UNIT (ACU) OUTLET
- ——— – CIRCUIT RUNNING ON CEILING
- - - - - – CIRCUIT RUNNING ON WALL / UNDERGROUND
- . . . . . – CONTROL CIRCUIT
- →① – CIRCUIT HOMERUN
- LPP – LIGHTING AND POWER PANEL

(A)	(B)	(C)	(D)
			
IP20 SURFACE MOUNTED LUMINAIRE, 1200 mm IN LENGTH, WITH MIRROR FINISH ALUMINUM REFLECTOR AND 2 X 16 WATTS COOL WHITE LED LINEAR TUBE	IP44 WALL MOUNTED LUMINAIRE, STEEL BASE, WHITE SATINATED FLASS DIFFUSER WITH 1 x 12 WATTS COMPACT LED LAMP	IP20 LED BULB, 1 x 12 WATTS COOL WHITE, CLASSIC GLOBE SHAPE, FROSTED FINISH, E27 BASE	PORTABLE EMERGENCY LIGHT, 2 x 2 WATTS LED WARM WHITE WITH BUILT-IN SEALED LEAD ACID BATTERY CHARGING TIME < 20 HRS; USAGE TIME >= 4 HRS

DETAILS OF LUMINAIRES

SCALE NTS

REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECO.	APPD.

OWNER: NATIONAL POWER CORPORATION
AGHAM ROAD, DILIMAN, QUEZON CITY

PROJECT: CONSTRUCTION OF 10 KL RAIN WATER COLLECTOR AND OFFICE/STAFF HOUSE AT MANGSEE DPP

LOCATION: MANGSEE, BALABAC, PALAWAN

TITLE: GENERAL NOTES, LEGEND AND DETAILS OF LUMINAIRES

	BY	CHKD	DATE
DESIGNED	ACLS		
DRAWN	ACLS		
REVIEWED	PRINCIPAL ENGR./ARCHT.		
CIVIL/ARCHT			
ELEC.			
MECH.			

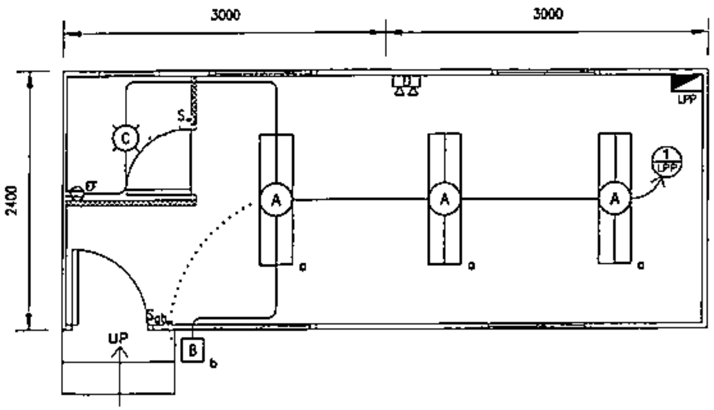
SUBMITTED: B. M. AGUILA, Project Engineer

RECOMMENDED: L. C. LUGOD, JR., Manager, LDDO

APPROVED: N. O. GO, Manager, DDO

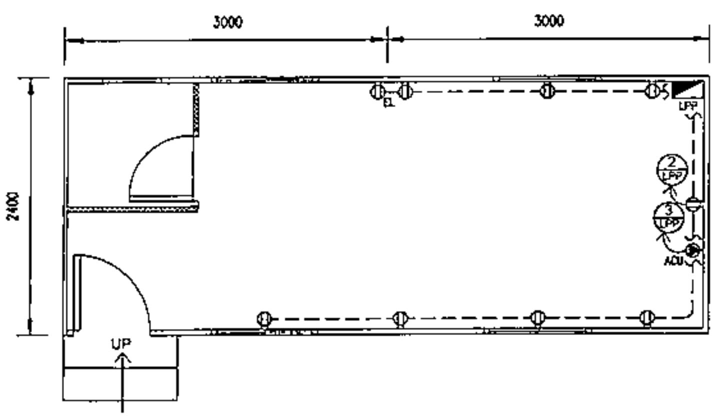
DWG. NO. MgseeDPP-BDE-17.001 SPECS. NO. LuzP21Z1271Sc

SCALE: AS SHOWN BID DRAWING REV. 0



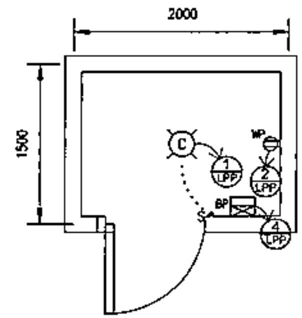
LIGHTING LAYOUT
(OFFICE/STAFF HOUSE)

SCALE 1:50



POWER LAYOUT
(OFFICE/STAFF HOUSE)

SCALE 1:50



POWER AND LIGHTING LAYOUT
(PUMP HOUSE)

SCALE 1:50

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. THIS DRAWING SHALL BE WORKED WITH CIVIL AND MECHANICAL BID DRAWINGS.

REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPD.

OWNER: NATIONAL POWER CORPORATION
AGHAM ROAD, DILIMAN, QUEZON CITY

PROJECT: CONSTRUCTION OF 10 KL RAIN WATER COLLECTOR AND OFFICE/STAFF HOUSE AT MANGSEE DPP

LOCATION: MANGSEE, BALABAC, PALAWAN

TITLE: LIGHTING AND POWER LAYOUT
(OFFICE/STAFF HOUSE AND PUMP HOUSE)

	BY	CHKD	DATE
DESIGNED	ACLB		
DRAWN	ACLB		
REVIEWED	PRINCIPAL ENGR. / ARCHT.		
CIVIL/ARCH'T			
ELEC.			
MECH.			

SUBMITTED: B. M. AGUILA, Principal Engineer A

RECOMMENDED: C. C. LUGOD, JR., Manager

APPROVED: N. G. SOMOSIERRA, Manager, DDD

DWG NO. MgseeDPP-BDE-17.002 | SPECS. NO. LuzP21Z1271Sc

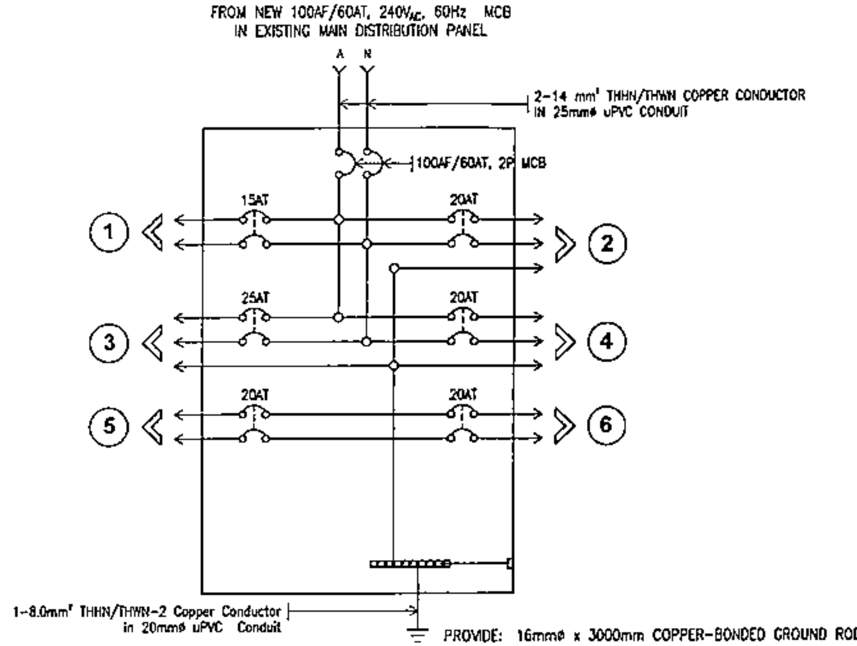
SCALE: AS SHOWN | BID DRAWING | REV. 0

SCHEDULE OF LOADS							
CKT NO.	DESCRIPTION	VA	V	A	SIZES		
					BREAKER	WIRE	CONDUIT
1	3 – 2 X 16W LED TUBE, TYPE A 1 – 12W LED LAMP, TYPE B 2 – 12W LED BULB, TYPE C 1 – 100VA OUTLET FOR EXHAUST FAN	265	230	1.15	50AF / 15AT	2 – 3.5mm² THHN/THWN–2	20mmØ uPVC
2	8 – 200VA CONVENIENCE OUTLET 1 – 200VA CONVENIENCE OUTLET (WEATHERPROOF) 1 – 100VA EMERGENCY LIGHT OUTLET	1900	230	8.26	50AF / 20AT	2 – 3.5mm² THHN/THWN–2 1 – 3.5mm² THHN/THWN–2	20mmØ uPVC
3	1 – 1.5HP AIR CONDITIONING UNIT	2300	230	10	50AF / 25AT	2 – 3.5mm² THHN/THWN–2 1 – 3.5mm² THHN/THWN–2	20mmØ uPVC
4	1 – 1.0HP BOOSTER PUMP	1840	230	8	50AF / 20AT	2 – 3.5mm² THHN/THWN–2 1 – 3.5mm² THHN/THWN–2	20mmØ uPVC
5	SPARE	1500	230	6.52	50AF / 20AT		
6	SPARE	1500	230	6.52	50AF / 20AT		
	TOTAL	9305	230	40.46			

PROVIDE: 100 AF / 60 AT, 2P MCB
WITH BRANCH CIRCUITS OF:
1 – 50AF/25AT, 2P, MCB
4 – 50AF/20AT, 2P, MCB
1 – 50AF/15AT, 2P, MCB

PROVIDE: 2 – 14 mm² THHN/THWN–2 Copper Conductor in 25mmø uPVC Conduit

SCHEDULE OF LOADS
(LIGHTING AND POWER PANEL)



RISER DIAGRAM
(LIGHTING AND POWER PANEL)
SCALE NTS

REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECO.	APPD.

OWNER: **NATIONAL POWER CORPORATION**
AGHAM ROAD, DILIMAN, QUEZON CITY

PROJECT: CONSTRUCTION OF 10 KL RAIN WATER COLLECTOR AND OFFICE/STAFF HOUSE AT MANGSEE DPP

LOCATION: MANGSEE, BALABAC, PALAWAN

TITLE: **SCHEDULE OF LOADS AND RISER DIAGRAM**
(OFFICE/STAFF HOUSE AND PUMP HOUSE)

	BY	CHKD	DATE
DESIGNED	ACLB		
DRAWN	ACLB		
REVIEWED	PRINCIPAL ENGR./ARCHT.		
CIVIL/ARCHT			
ELEC.			
MECH.			

SUBMITTED: B. M. AGUILA
Principal Engineer A

RECOMMENDED: G. Z. C. LUGOD, JR.
Manager, EGCD

APPROVED:
Manager, ODD

DWG. NO. MgseeDPP-BDE-17.003 | SPECS. NO. LuzP21Z1271Sc

SCALE: AS SHOWN | **BID DRAWING** | REV. 0

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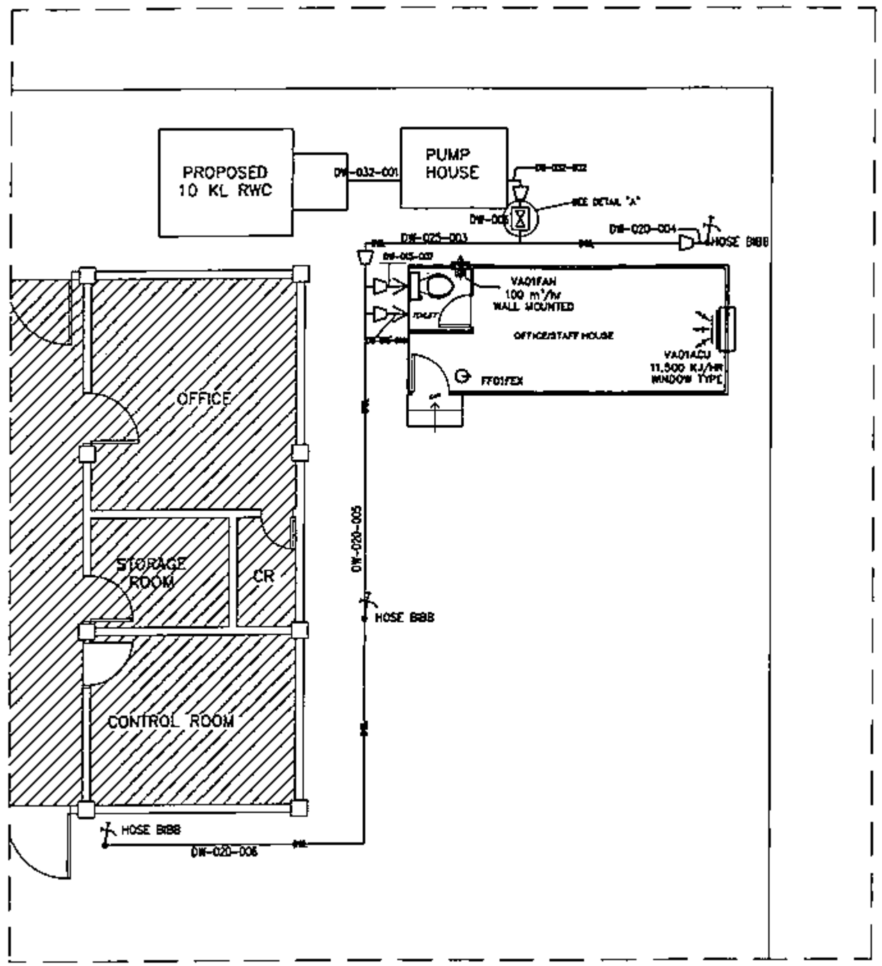
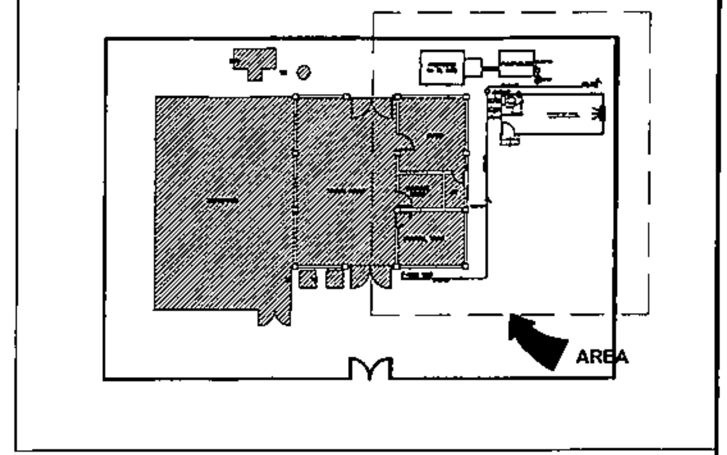
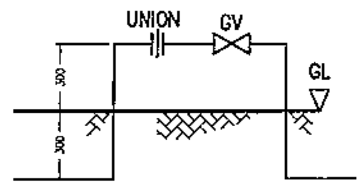






"ISOLATION VALVE"
DETAIL "A"

LEGEND:

- HOSE BIBB
- REDUCER
- GATE VALVE
- WINDOW TYPE AIR CONDITIONING UNIT (INVERTER)
- EXHAUST FAN (WALL MOUNTED)
- PORTABLE FIRE EXTINGUISHER (7.1KG HCFC OR HALOTRON)
- DWL - DOMESTIC WATER LINE
- GATE VALVE WITH VALVE BOX
- EXISTING FACILITIES

NOTES:

1. THIS DRAWING IS FOR BIDDING PURPOSES ONLY.
2. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
3. ALL WORKS SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF THE TECHNICAL SPECIFICATIONS.
4. PIPING SHALL BE EMBEDDED NOT LESS THAN 300MM FROM THE GROUND SURFACE TO THE BOTTOM OF PIPE.
5. FOR PIPES THAT CROSSES ROADWAYS, PIPE SLEEVE OF STEEL MATERIAL SHALL BE PROVIDED.
6. ALL PIPES, VALVES, VALVE BOXES, FITTINGS, AND PIPE SUPPORTS SHALL BE INSTALLED FOR THE EFFICIENT AND PROPER OPERATION OF THE SYSTEM.
5. ALL PIPES AND VALVES' BROCHURES/CATALOGUES SHALL BE SUBMITTED BY THE CONTRACTOR, FOR NPC'S REVIEW AND APPROVAL, PRIOR TO PROCUREMENT/INSTALLATION.
6. FINAL DETAILS AND ADJUSTMENT SHALL BE DONE IN THE FIELD BY THE CONTRACTOR DURING INSTALLATION TO SUIT ACTUAL SITE CONDITIONS. ALL WORKS SHALL BE EXECUTED IN CLOSE COORDINATION WITH ALL TRADES.
7. ALL PVC/PE PIPE DIMENSIONS SHOWN ARE IN NOMINAL DIAMETER (MM) WITH THE FOLLOWING EQUIVALENTS:
   - 40MM (1 1/2") = 50MM OUTSIDE DIAMETER (O.D.)
   - 32MM (1 1/4") = 40MM O.D.
   - 25MM (1") = 32MM O.D.
   - 20MM (3/4") = 25MM O.D.
   - 15MM (1/2") = 20MM O.D.
8. REFER TO KPSS-80M-22.002 FOR DETAILS OF DOMESTIC WATER PIPING.

REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPD.

OWNER: **NATIONAL POWER CORPORATION**
AGHAM ROAD, DILIMAN, QUEZON CITY

PROJECT: **CONSTRUCTION OF 10 KL RAIN WATER COLLECTOR AND OFFICE/STAFFHOUSE FOR MANGSEE DPP**

LOCATION: MANGSEE, BALABAC, PALAWAN

TITLE: **AIR CONDITIONING, VENTILATION, FIRE EXTINGUISHER AND DOMESTIC WATER SUPPLY SYSTEM**
(MANGSEE DPP)

	BY	CHKD	DATE
DESIGNED			
DRAWN	MAN		
REVIEWED	PRINCIPAL ENGR. / ARCHT.		
CIVIL/ARCHT			
ELEC.			
MECH.	JTC		

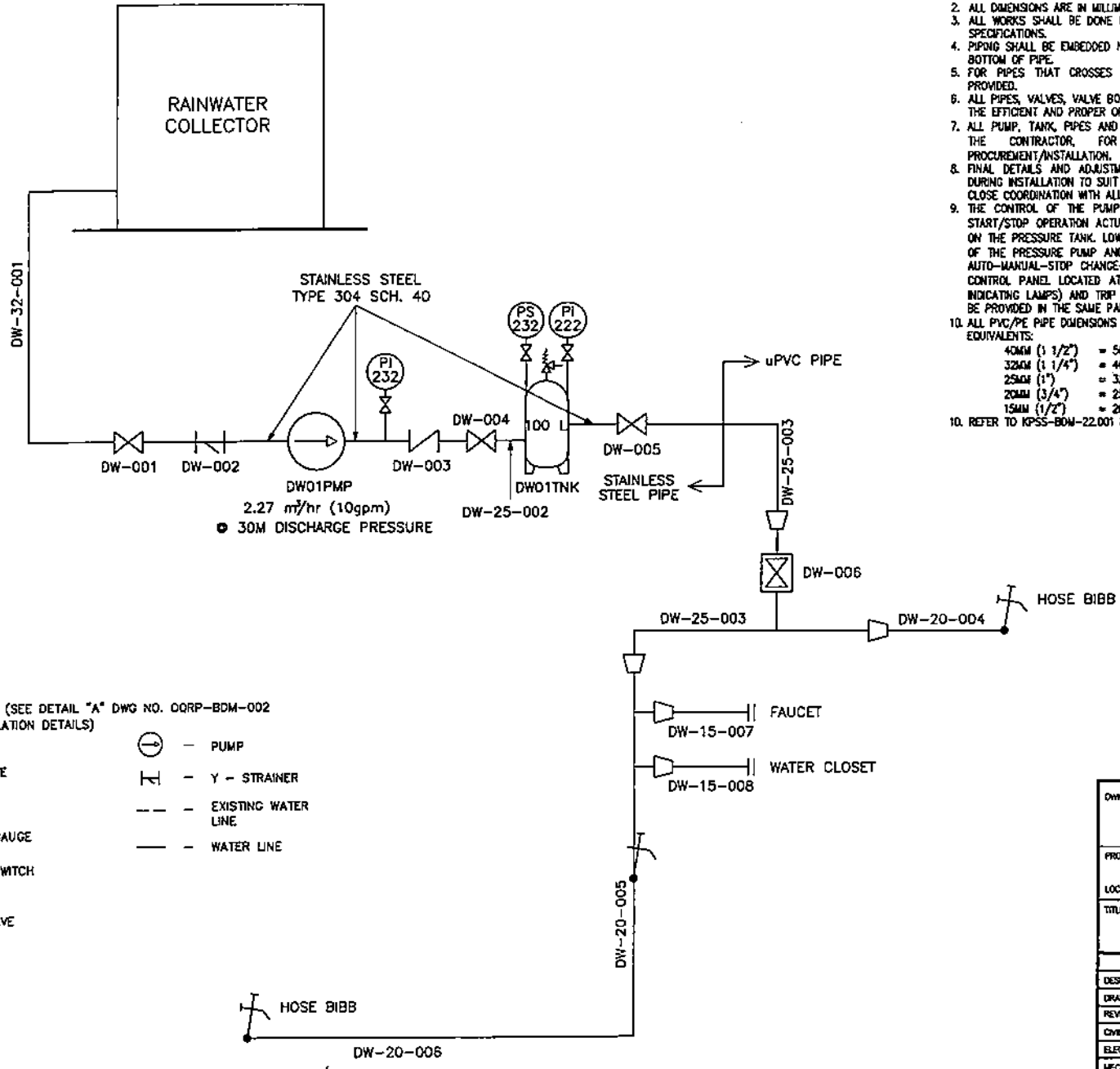
SUBMITTED: R. M. CADSAWAN, Principal Engineer A

RECOMMENDED: J. A. TAPEL, JR., Manager, MEU

APPROVED: N. C. [illegible], Manager, DDD

DWG. NO. MgseeDPP-BDM-17.001 | SPECS. NO. LuzP21Z1271Sc

SCALE: 1:100 | **BID DRAWING** | REV. 0



NOTES:

1. THIS DRAWING IS FOR BIDDING PURPOSES ONLY.
2. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
3. ALL WORKS SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF THE TECHNICAL SPECIFICATIONS.
4. PIPING SHALL BE EMBEDDED NOT LESS THAN 300MM FROM THE GROUND SURFACE TO THE BOTTOM OF PIPE.
5. FOR PIPES THAT CROSSES ROADWAYS, PIPE SLEEVE OF STEEL MATERIAL SHALL BE PROVIDED.
6. ALL PIPES, VALVES, VALVE BOXES, FITTINGS, AND PIPE SUPPORTS SHALL BE INSTALLED FOR THE EFFICIENT AND PROPER OPERATION OF THE SYSTEM.
7. ALL PUMP, TANK, PIPES AND VALVES' BROCHURES/CATALOGUES SHALL BE SUBMITTED BY THE CONTRACTOR, FOR NPC'S REVIEW AND APPROVAL, PRIOR TO PROCUREMENT/INSTALLATION.
8. FINAL DETAILS AND ADJUSTMENT SHALL BE DONE IN THE FIELD BY THE CONTRACTOR DURING INSTALLATION TO SUIT ACTUAL SITE CONDITIONS. ALL WORKS SHALL BE EXECUTED IN CLOSE COORDINATION WITH ALL TRADES.
9. THE CONTROL OF THE PUMP SHALL BE DESIGNED FOR EITHER MANUAL OR AUTOMATIC START/STOP OPERATION ACTUATED BY THE LOW AND HIGH PRESSURE SWITCHES MOUNTED ON THE PRESSURE TANK. LOW PRESSURE (20 PSI) SHALL ACTUATE THE START OPERATION OF THE PRESSURE PUMP AND AUTOMATICALLY STOPS AT HIGH PRESSURE (40 PSI). THE AUTO-MANUAL-STOP CHANGE-OVER-SWITCH OF THE PUMP SHALL BE PROVIDED IN THE CONTROL PANEL LOCATED AT THE PUMP HOUSE. START/STOP STATUS (RED & GREEN INDICATING LAMPS) AND TRIP ALARM/TROUBLE SIGNAL (ORANGE INDICATING LIGHTS) SHALL BE PROVIDED IN THE SAME PANEL.
10. ALL PVC/PE PIPE DIMENSIONS SHOWN ARE IN NOMINAL DIAMETER (MM) WITH THE FOLLOWING EQUIVALENTS:

40MM (1 1/2")	=	50MM OUTSIDE DIAMETER (O.D.)
32MM (1 1/4")	=	40MM O.D.
25MM (1")	=	32MM O.D.
20MM (3/4")	=	25MM O.D.
15MM (1/2")	=	20MM O.D.

10. REFER TO KPSS-BDM-22.001 FOR DETAILS OF DOMESTIC WATER PIPING.

LEGEND:

- GATE VALVE (SEE DETAIL "A" DWG NO. 00RP-BDM-002 FOR INSTALLATION DETAILS)
- GATE VALVE
- CHECK VALVE
- REDUCER
- PI – PRESSURE GAUGE
- PS – PRESSURE SWITCH
- RELIEF VALVE
- PUMP
- Y – STRAINER
- EXISTING WATER LINE
- WATER LINE

REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPD.

OWNER: **NATIONAL POWER CORPORATION**
AGHAM ROAD, DILIMAN, QUEZON CITY

PROJECT: CONSTRUCTION OF 10 KL RAIN WATER COLLECTOR AND OFFICE/STAFFHOUSE FOR MANGSEE DPP

LOCATION: MANGSEE, BALABAC, PALAWAN

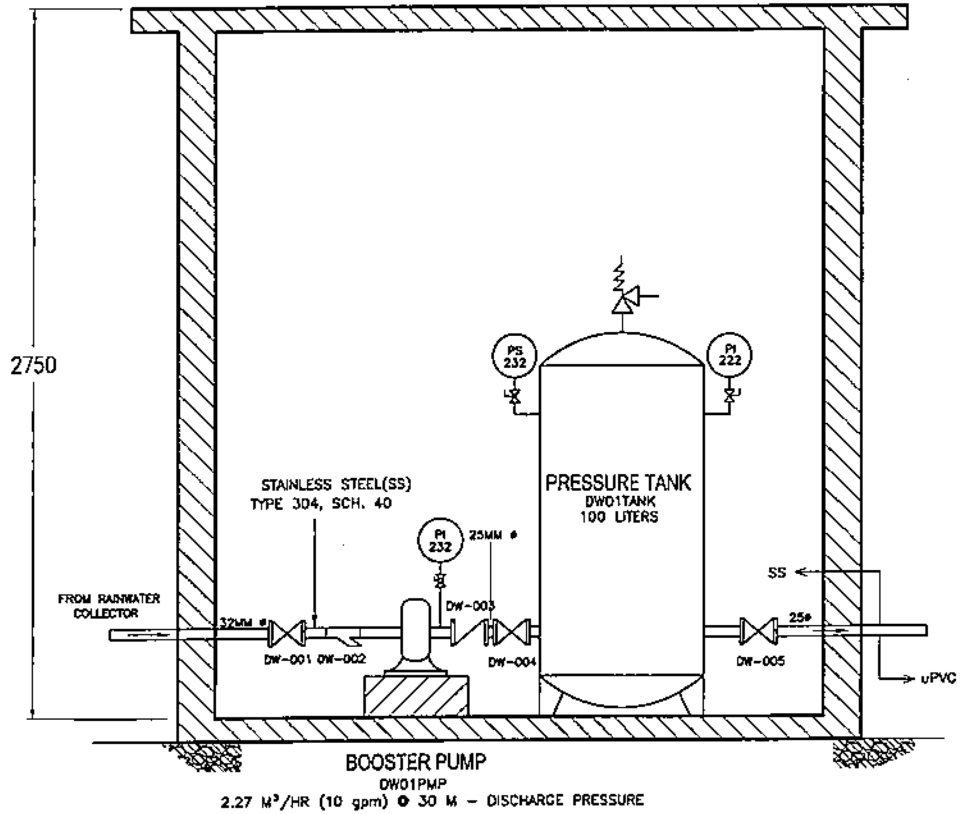
TITLE: **DOMESTIC WATER SUPPLY SYSTEM**
P & I DIAGRAM

	BY	CHKD	DATE
DESIGNED			
DRAWN	MAH		
REVIEWED	PRINCIPAL ENGR. / ARCHT.		
CIVIL/ARCHT			
ELEC.			
MECH.	JTC		

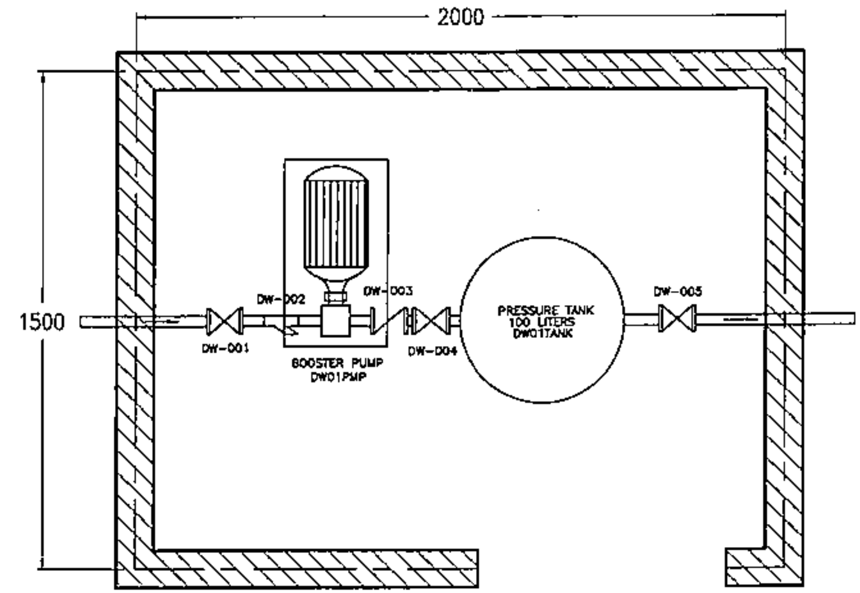
SUBMITTED: R. G. CAPSAWAN, Principal Engineer
RECOMMENDED: J. A. TAREL, JR., Manager, GDD
APPROVED: N. G. [illegible], Manager, GDD

DWG. NO. MgseeDPP-BDM-17.002 | SPECS. NO. LuzP21Z1271Sc

SCALE: NTS | **BID DRAWING** | REV. 0



BOOSTER PUMP
DW01PMP
2.27 M^3/HR (10 gpm) @ 30 M – DISCHARGE PRESSURE



WATER PUMP HOUSE

NOTES:

1. THIS DRAWING IS FOR BIDDING PURPOSES ONLY.
2. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
3. ALL WORKS SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF THE TECHNICAL SPECIFICATIONS.
4. PIPING SHALL BE EMBEDDED NOT LESS THAN 300MM FROM THE GROUND SURFACE TO THE BOTTOM OF PIPE.
5. FOR PIPES THAT CROSSES ROADWAYS, PIPE SLEEVE OF STEEL MATERIAL OR RSC SHALL BE PROVIDED.
6. ALL PIPES, VALVES, VALVE BOXES, FITTINGS, AND PIPE SUPPORTS SHALL BE INSTALLED FOR THE EFFICIENT AND PROPER OPERATION OF THE SYSTEM.
5. ALL PUMP, TANK, PIPES AND VALVES' BROCHURES/CATALOGUES SHALL BE SUBMITTED BY THE CONTRACTOR, FOR NPC'S REVIEW AND APPROVAL, PRIOR TO PROCUREMENT/INSTALLATION.
6. PIPE FROM RAINWATER STORAGE TANK UP TO PRESSURE TANK SHALL BE STAINLESS STEEL PIPE CONFORMING TO TYPE 304 SCHEDULE 40 WHILE uPVC SHALL BE USED FOR DISTRIBUTION PIPING..
7. DETAILED FOUNDATION DRAWINGS FOR PUMP AND TANK SHALL BE SUBMITTED BY THE SUPPLIER FOR NPC'S REVIEW AND APPROVAL.
8. FINAL DETAILS AND ADJUSTMENT SHALL BE DONE IN THE FIELD BY THE CONTRACTOR DURING INSTALLATION TO SUIT ACTUAL SITE CONDITIONS. ALL WORKS SHALL BE EXECUTED IN CLOSE COORDINATION WITH ALL TRADES.
9. THE CONTROL OF THE PUMP SHALL BE DESIGNED FOR EITHER MANUAL OR AUTOMATIC START/STOP OPERATION ACTUATED BY THE LOW AND HIGH PRESSURE SWITCHES MOUNTED ON THE PRESSURE TANK. LOW PRESSURE (20PSI) SHALL ACTUATE THE START OPERATION OF THE PRESSURE PUMP AND AUTOMATICALLY STOPS AT HIGH PRESSURE (40 PSI). THE AUTO-MANUAL-STOP CHANGE-OVER-SWITCH OF THE PUMP SHALL BE PROVIDED IN THE CONTROL PANEL LOCATED AT THE PUMP HOUSE. START/STOP STATUS (RED & GREEN INDICATING LAMPS) AND TRIP ALARM/TROUBLE SIGNAL (ORANGE INDICATING LIGHTS) SHALL PROVIDED IN THE SAME PANEL.
10. ALL PVC/PE PIPE DIMENSIONS SHOWN ARE IN NOMINAL DIAMETER (MM) WITH THE FOLLOWING EQUIVALENTS:
    - 40MM (1 1/2") = 50MM OUTSIDE DIAMETER (O.D.)
    - 32MM (1 1/4") = 40MM O.D.
    - 25MM (1") = 32MM O.D.
    - 20MM (3/4") = 25MM O.D.
    - 15MM (1/2") = 20MM O.D.
10. REFER TO RELEVANT CIVIL DRAWINGS FOR DETAILS PUMP HOUSE.

LEGEND:

- GATE VALVE
- COCK
- CHECK VALVE
- RELIEF VALVE
- (PI) – PRESSURE GAUGE
- (PS) – PRESSURE SWITCH
- Y – STRAINER

REV.	DATE	NATURE OF REVISION	BY	CHKD	RECD.	APPD.

OWNER: NATIONAL POWER CORPORATION
AGHAM ROAD, DILIMAN, QUEZON CITY

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LOCATION: MANGSEE, BALABAC, PALAWAN

TITLE: **BOOSTER PUMP AND PRESSURE TANK PUMPHOUSE**

	BY	CHKD	DATE
DESIGNED			
DRAWN	MAN		
REVIEWED	PRINCIPAL ENG'R. / ARCHT.		
CIVIL/ARCHT			
ELEC.			
MECH.	JTC		

SUBMITTED: R. M. CABSAWAN, Principal Engineer A

RECOMMENDED: J. A. TAPEL, JR., Manager, MED

APPROVED: N. G. SOMOSIERRA, Manager, DOD

DWG. NO. MgseeDPP-BDM-17.003 | SPECS. NO. LuzP21Z1271Sc

SCALE: NTS | **BID DRAWING** | REV 0