REPUBLIC OF THE PHILIPPINES

NATIONAL POWER CORPORATION

(Pambansang Korporasyon sa Elektrisidad)

BID DOCUMENTS

Name of Project : **REHABILITATION ELEVATED WATER TANK AND CISTERN INCLUDING INCLUDING PUMP AND ASSOCIATED PIPING AT CASIGURAN DPP**

Location : **BRGY. ESTEVES, CASIGURAN, AURORA**

Specs No. : **LuzP21Z1216Sr** / 61-CAS22-006 (PB2)

Contents:

Design and Development Department

DD

SECTION I

INVITATION TO BID

National Power Corporation
INVITATION TO BID
PUBLIC BIDDING – BCS 2022-0247

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-KAB22-001 / PB220525-JC Supply and Delivery of Mechanical Spare Parts for 1 x 260kW Dale Perkins Model 2006-TAG and 1 x 163kW Dale Perkins Model 2006-TG1 of Kabugao DPP	Supply and Delivery of Diesel Generating Sets or Mechanical and/or Electrical Parts / Components / Equipment for Diesel Generating Sets	13 May 2022 9:30 A.M	25 May 2022 9:30 A.M	₱ 3,164,200.00 / ₱ 5,000.00
S1-CAS22-006 / PB220425-JD00122 (PB2) Rehabilitation of Elevated Water Tank and Cistern Including Pump and Associated Piping at Casiguran DPP, Casiguran, Aurora • PCAB License: License Category of at least **"Category D – General Building"** and registration classification of at least **"Small B – Building and Industrial Plant"**	Water supply / piping projects	13 May 2022 9:30 A.M	25 May 2022 9:30 A.M	₱ 1,423,000.00 / ₱ 5,000.00
S1-B0622-004 / PB220425-JD00123 (PB2) Rehabilitation of Mooring Facility for Power Barge 106 at Romblon, Romblon • PCAB License: License Category of at least **"Category D – General Engineering"** and registration classification of at least **"Small B – Port, Harbor or Offshore Engineering"**	Construction / rehabilitation of mooring facilities, port, terminal or loading / unloading jetty	13 May 2022 9:30 A.M	25 May 2022 9:30 A.M	₱ 4,744,000.00 / ₱ 5,000.00

S1-CTL22-001 / PB220118-JD00124 (PB2) Supply and Delivery of Various Steel Poles & Line Hardware at Catanduanes 69kV T/L & S/S	Supply and Delivery of Transmission Line Hardware's and Substation Equipment	13 May 2022 9:30 A.M	25 May 2022 9:30 A.M	₱ 1,843,000.00 / ₱ 5,000.00
S1-CUY22-001 / PB220427-NA (PB2) Lease of 1.5 MW Modular Diesel Gensets for Cuyo DPP, Brgy. Suba, Cuyo, Palawan	Lease of Modular Diesel Generating Sets or Operation and Maintenance (O & M) of Diesel Generating Sets	13 May 2022 9:30 A.M	25 May 2022 9:30 A.M	₱ 28,374,500.00 / ₱ 25,000.00
S3-DIN22-008 / PB220525-NA Lease of 3.5 MW Modular Diesel Gensets for Dinagat DPP, Dinagat Island, Surigao Del Norte	Lease of Modular Diesel Generating Sets or Operation and Maintenance (O & M) of Diesel Generating Sets	13 May 2022 9:30 A.M	25 May 2022 9:30 A.M	₱ 47,140,000.00 / ₱ 25,000.00
HO-PMD22-005 / PB220427-NA00076 (PB2) Supply, Delivery, Installation and Testing of Nationwide Intensification of Household Electrification for Samar Areas (Ilijan DPP, Takut DPP and Llbucan DPP)	Supply, delivery, installation and testing of household connection / electrification materials	13 May 2022 9:30 A.M	25May 2022 9:30 A.M	₱ 3,072,000.00 / ₱ 5,000.00
S4-PIC22-036 / PB220427-HG00077 (PB2) Supply, Delivery, Installation, Test and Commissioning of Four (4) Units of Modular Diesel Gensets, Associated Electrical Equipment and Balance of Plant for Saluping and Bubuan DPP under the Electrification of New Areas in Bangsamoro-Basilan	Supply, Delivery, Installation, Test and Commissioning or Construction of Power Facilities, Installation, Test and Commissioning of Diesel Generating Set/s with at least one-unit capacity of 40kW Prime or Continuous Power with Power Transformer/s of at least 50kVA rating	13 May 2022 9:30 A.M	26 May 2022 9:30 A.M	₱ 39,809,300.00 / ₱ 25,000.00

HO-PIB22-006 / PB220427-HG00079 (PB2) Supply, Delivery, Installation, Test and Commissioning of 2 x 100kW (for Guinawayan DPP) and 2 x 80kW (for Nabuctot DPP) Diesel Gensets and Associated Electrical Equipment under Package 14-A	Supply, Delivery, Installation, Test and Commissioning or Construction of Power Facilities, Installation, Test and Commissioning of Diesel Generating Set/s with at least one-unit capacity of 80kW Prime or Continuous Power with Power Transformer/s of at least 112.5kVA rating	13 May 2022 9:30 A.M	26 May 2022 9:30 A.M	₱ 21,342,040.00 / ₱ 25,000.00
SO-OPD22-010 / PB220427-HG00080 (PB2) Supply, Delivery, Installation, Test & Commissioning of 2 x 100 kW (for Costa Rica DPP) and 1 x 60 kW (for Lunang DPP) Modular Diesel Gensets and Associated Electrical Equipment under Package 20-A	Supply, Delivery, Installation, Test and Commissioning or Construction of Power Facilities, Installation, Test and Commissioning of Diesel Generating Set/s with at least one-unit capacity of 60kW Prime or Continuous Power with Power Transformer/s of at least 75kVA rating	13 May 2022 9:30 A.M	26 May 2022 9:30 A.M	₱ 17,729,200.00 / ₱ 25,000.00
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-KAB22-001	Ninety (90) Calendar Days	Ten (10) Years
S1-CAS22-006	One Hundred Twenty (120) Calendar Days	-
S1-B0622-004	Sixty (60) Calendar Days	-
S1-CTL22-001	Sixty (60) Calendar Days	Ten (10) Years
S1-CUY22-001	Twelve (12) Months – Maximum Six (6) Months – Minimum	Ten (10) Years
S3-DIN22-008	Twelve (12) Months – Maximum Six (6) Months – Minimum	Ten (10) Years

HO-PMD22-005	Sixty (60) Calendar Days	-
S4-PIC22-036	Three (300) Calendar Days	Fifteen (15) Years
HO-PIB22-006	Two Hundred Forty (240) Calendar Days	Fifteen (15) Years
SO-OPD22-010	Two Hundred Forty (240) Calendar Days	Fifteen (15) Years

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 / 5361
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

ATTY. ROGEL T. TEVES
Vice President, Power Engineering Services and
Chairman, Bids and Awards Committee

SECTION II - INSTRUCTIONS TO BIDDERS

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SECTION II - INSTRUCTIONS TO BIDDERS

1. Scope of Bid

NPC invites Bids for the **REHABILITATION OF ELEVATED WATER TANK AND CISTERN INCLUDING PUMP AND ASSOCIATED PIPING AT CASIGURAN DPP,** with Project Identification Number **LuzP21Z1216Sr.**

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 2022 in the amount of specified in the Invitation to Bid. 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

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 contracts/projects involving water supply/piping projects 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 AND INDUSTRIAL PLANT"**

10.4	The list of key personnel shall include the following minimum requirements: **a. One (1) Project/Site Engineer** Registered Civil Engineer who had supervised at least a project similar in nature as to the type of the proposed project within the last 10 years. Must have 3 years professional as Civil Engineer on similar project **b. 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, 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. Welding Machine (300 A min) - 1 unit b. Oxy-acetylene cutting outfit - 1 unit c. Service Vehicle - 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. The project is grouped in a single lot and the lot shall not be divided into sub-lots for the purpose of bidding, evaluation, and contract award.
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

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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

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

GENERAL WORKS

PART I – TECHNICAL SPECIFICATIONS

GW – GENERAL WORKS

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PART I – TECHNICAL SPECIFICATIONS

GW - GENERAL WORKS

GW-1.0 GENERAL

This section covers the general technical requirements for furnishing all supervision, labor, materials, supplies, tools, equipment and other incidentals required in accordance with specifications contained herein and as shown on the accompanying drawings for the Rehabilitation of Elevated Water Tank and Cistern including Pump and Associated Piping at Casiguran DPP.

All materials, equipment, devices and accessories to be supplied under this contract shall be new and unused, free from defects and imperfections and best suited for the purpose intended.

It is not the intent to specify completely herein all details of design and construction of the Works. However, the Works shall conform in all respects to high standards of engineering, design and workmanship.

The Contractor shall accept full responsibility for its work including design, supplied equipment drawings, detailed drawings and calculations as required, performance qualifications, specifications, documentation, reports, fabrication, assembly, corrosion protection, cleaning, shop testing, preparation for shipment, field testing and compliance with the applicable codes and standards, and the requirements of this specification.

Workmanship shall be of first class quality and in accordance with the best modern engineering practice for fabrication, assembly, dismantling, hauling, loading/unloading, construction (civil works), re-assembly, installation and test of all equipment and materials, notwithstanding any omissions from the specifications and drawings. To have quality workmanship, only technicians skilled in their respective trades shall be employed.

The work shall include all materials, parts and every work and service although not specifically detailed herein but are required to fully complete and placing ready for the safe and reliable operation of the Water Supply Systems and Associated Facilities.

All necessary corrections and deviations from the requirement of this specification or drawings and all errors in or resulting from the workmanship of the Contractor including all costs, expenses and other damages resulting from any such deviations or errors, as well as freight charges, taxes and duties, will be solely for the account of the Contractor.

The Contractorshall strictly observe the general requirements of this specification (General Works) in conjunction with the specific requirements specified in the relevant specifications (Architectural, Civil, Mechanical and Electrical Works). The specific technical specifications shall take precedence over the general requirements (General Works) in case of any inconsistency.

GW-1.1 Project Description

The work shall consist mainly ofsupply, installation of submersible pump including construction of pumphouse, distribution pipes and interconnection to existing elevated water storage tank which shall be repaired/rehabilitated as shown on the drawings including isolation valves, required test, excavation and backfilling works and other necessary accessories.

The new water supply pipes shall serve as replacement of the existing main water supply lines which supply the water requirements of the plant.

The new water supply pipes shall generally be constructed from Unplasticized Polyvinyl Chloride (uPVC) including its associated fittings and necessary accessories. Flanged-type fittings shall be used for interconnections with the steel pipes and valves with diameter of 65mm and above.

GW-1.2 Contract Period and Location

The Contractor shall complete the works as specified within **One Hundred Twenty(120) Calendar Days**which shall become effective from receipt of the Notice to Proceed.The total contract period is inclusive of twenty (20) rainy/unworkable days, considered unfavorable for the execution of works at site.

The project is located at Casiguran DPP, Brgy. Esteves, Casiguran, Aurora.

GW-1.3 Contractor's Classification

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

The Contractor must have undertaken similar contracts/projects involving water supply/piping projects.

GW-1.4 Minimum Required Personnel

For the duration of the contract, the Contractor shall have the following minimum required personnel assigned to the project:

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) 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, 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.

GW-1.5 Building/Occupancy Permit and other Licenses and Permits imposed for the Contract

All forms of taxes, such as value added tax (VAT) including Local Government Unit (LGU) licenses and permits, and others that may be imposed by the Philippine Government or any of its agencies and political subdivisions in connection with Contract shall be for the account of the Contractor. NPC shall provide assistance to the Contractor in securing the needed documents for the permits/licenses or approvals.

Whenever Building/Occupancy Permit is required at the place where the subject building/structure is located or to be erected, the Contractor shall apply, process, submit and bear all costs and charges to the corresponding fees/incidental services of the required documents in securing a building permit.

For Building/Occupancy Permit purposes, the assigned Project Manager or designated representative of NPC shall be the signatory for the Owner's Representative/Procuring Entity and Full-time Inspector and Supervisor for the Construction Works. The Manager of the DDD or designated representative of NPC shall be the signatory of the Project Specifications and the drawings and design analysis/computation of Architectural, Structural, Electrical, Mechanical & Plumbing. While the Contractor will be the signatory for the Bill of Quantities/Cost Estimates. NPC may opt to require the contractor to provide the professional/eligible personnel to sign the permits especially but not limited to project with construct and design contract. The Contractor at his own expense shall bear all the costs and charges needed to comply with the said documents. The Contractor shall not be relieved on its responsibility with regards to the reliability and integrity of the project concern.

GW-2.0 SCOPE OF WORK

GW-2.1 General

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 Contractorshall be responsible for visiting the project site and thoroughly investigate and familiarize himself with all the conditions at site, the surrounding area and take particular reference to its accessibility, means of communication and transportation, determine possible sources of materials and equipment to be supplied/utilized during the project execution, verify the actual scope of works and relative costs, and all other factors that could hamper the smooth execution of the contract.

Any and/or all expenses arising through the lack of knowledge or understanding regarding the existing conditions of the site shall be the responsibility of the Contractorand no additional payment thereof shall be made by NPC.

Any discrepancies of the scope of work specified in this section with those specified in the relevant specific technical specifications (Architectural, Civil, Mechanical and ElectricalWorks), the specific technical specifications shall govern. However, anything mentioned in the specific technical specifications and not shown on the drawings, or shown in the drawings but not mentioned in the specifications but which are obviously necessary to make a complete installation shall be considered under the Contractor's Scope of Works.

The Contractor shall submit brochures/catalogues, necessary detailed drawings, calculations as required and other related technical data for all equipment and materials to be supplied under this contract for NPC review and approval.

The work to be done shall comprise the furnishing of all labor, tools, equipment, supply of appurtenant materials and other incidentals to complete and make ready all the works enumerated hereunder in accordance with the Specifications contained herein and as shown in the drawings or otherwise directed by the NPC, and shall consist mainly of but not limited to the following:

GW-2.1.1 Architectural Works

a) Repainting of all surface of elevated water tank support structure including surface preparation and grinding/cup brushing to sound metal of corroded parts of WF column, tension rod, turn buckles and gusset plates;

b) Painting of all surface for newly installed horizontal struts and tension rod including turn buckles; and

c) Repainting of fixed ladder with ladder cage and balcony including support, steel grating flooring and railings including surface preparation and grinding/cup brushing to sound metal of corroded parts of all surface areas.

d) Wall and floor system finishes, painting to all concrete surfaces and installation of door for the pumphouse to be constructed.

e) All other miscellaneous works required to complete the pumphouse including application of waterproofing membrane and soil poisoning.

GW-2.1.2 Civil Works

a) Removal and replacement of all horizontal strut support;

b) Removal and replacement of one (1) pc. 25mm Ø tension rod including turn buckles; and

c) Draining, cleaning and scrubbing of existing cistern including application of epoxy grout to cracks;

d) Installation of truss and cover for the existing cistern.

e) All civil works required to complete the construction of 1.5m x 2.0m pumphouse.

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

GW-2.1.3 Mechanical Works

a) One (1) set of centrifugal pump with motors, complete with controls and other accessories including spare parts for one (1) year operation;

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

c) One (1) lot of Painting Works to conform with the requirements of MW-4.5 and MW-5.0;

d) Disinfection of water supply line from cistern to distribution systems; and

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

GW-2.1.4 Electrical Works

a) Supply, Installation and Test of Centrifugal Pump Motor Power Supply including necessary control, monitoring and protective devices;

b) Supply, Installation and Test of Power and Lighting System;

c) Supply, Laying and Test of Insulated Copper Conductor;

d) Supply and Installation of Conduit System; and

e) All other works and services including those not specifically detailed herein but are required to fully complete the project.

GW-3.0 MATERIALS AND EQUIPMENT

GW-3.1 General

All materials, equipment, devices and accessories to be supplied under this contract shall be new and unused, free from 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 materials shall comply with the latest revisions or editions of the specified standards for each material specification unless otherwise specified or permitted by NPC.The materials selected shall be appropriately matched toother items complying with all applicable regulations, quality and dimension standards.

All materials or components used shall be tested in conformance with the applicable specifications and purchased with certified mechanical and chemical properties.

The materials and equipment shall essentially be the standard products of the manufacturer as best meets the conditions of sound engineering economy of manufacture and procurement.
Certified mill test reports as required in the relevant sections of this specification and the governing codes and standards shall be furnished by the Contractor for NPC's record. Copies of each mill test report shall be submitted to NPC prior to fabrication of materials covered.

The Contractor shall submit equipment specifications, brochures, catalogs and other related technical data and/or detailed drawings of all equipment and materials to be supplied by the Contractor under this contract for NPC's review and approval prior to procurement.

GW-3.2 Applicable Codes and Standards

The supply of equipment and materials shall conform to the latest specifications and provisions of the following engineering societies or other internationally accepted standards. Other standards which ensure equal or higher quality than the standards mentioned below will be accepted provided they meet the requirements of existing laws and regulations of the Government of the Republic of the Philippines.

The codes and standards specified herein set forth the minimum requirements, which may be exceeded by Contractor if, in Contractor's judgment and with Purchaser's acceptance, superior or more economical designs or materials are available for the intended use.

The whole of the work and materials supplied under the contract shall comply with all relevant statutory regulations and standards, as follows:

ACI - American Concrete Institute
AISC - American Institute of Steel Construction
ANSI - American National Standard Institute

API	-	American Petroleum Institute
ASME	-	American Society of Mechanical Engineers
ASNT	-	American Society of Non-Destructive Testing
ASTM	-	American Society of Testing Materials
AWS	-	American Welding Society
ISO	-	International Standards Organization
NPFA	-	National Fire Protection Association
OSHA	-	Occupational Safety Health Act of 1970
PEC	-	Philippine Electrical Code
SSPC	-	Steel Structures Painting Council
AWWA	-	American Water Works Association

In the event of any conflict among the above listed codes or this Specification, Appendices and Attachments, the bidder shall refer the conflict to NPC for written resolution. In addition to the above codes and standards, the bidder shall comply with all applicable state and local laws and regulations.

In addition to the above codes and standards, the Contractor shall comply with all applicable national and local laws, codes, regulations, statutes and ordinances. The latest edition of each standard shall mean the latest edition available at the date of contract signing.

Other internationally recognized national standards may be accepted, if in the opinion of NPC, such will guarantee a quality not inferior to that guaranteed by the above standards. The list of these alternative standards which the bidder proposes to adopt must be attached to his Bid for acceptance. In every case, bidders must list fully the standards they will conform to for this Contract.

All units, dimensions and calculations as required, shall be in metric system. Other units used shall be provided with equivalent metric units.

GW-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 test or trials shall be made in the presence of NPC or his duly authorized representative.

GW-3.4 Site Inspection

The Contractor shall be responsible for visiting the project site to check and verify the proposed location/layout shown on the drawings and determine the required quantity of materials and components to be supplied and installed, and verify the actual scope of works and its corresponding cost.

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 placing ready for the safe and reliable operation of the Potable Water Supply System. 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.

Any and/or all expenses arising through the lack of knowledge or understanding regarding the existing conditions of the site shall be the responsibility of the Contractor and no additional payment thereof shall be made by NPC.

GW-4.0 EQUIPMENT MARKING, LABELING& MISCELLANEOUS REQUIREMENTS

GW-4.1 Nameplates

All equipment and auxiliaries to be supplied by the Contractor under this contract shall be provided with 1 mm thick of stainless steel or approved equivalent corrosion-resistant nameplate with clearly legible writing of approved size and pattern which shall be permanently attached to each assembled piece of equipment at an easily visible location subject to approval by NPC.

Nameplates generally contain the brief technical specifications or characteristics of each component or equipment has been designed to operate and shall include the following: manufacturer's name, type of equipment, serial number, year of manufacture, weight, Standard Plant Identification Number (SPIN) if assigned/designated by NPC or indicated on drawings and other relevant information in compliance with applicable standards. Any special instructions shall also be shown and suitably attached, as much as practicable, to the equipment or other visible location near the subject equipment.

For other major components, i.e. pumps, motors, etc., the following shall be added: rated horsepower, speed, total head, capacity, direction of rotation and any other pertinent information.

Nameplates for panels, boards, etc. shall be made of laminated black and white plastic. The lettering shall be bold-engraved through the black layer so that the letters appear white.

Nameplates shall be attached by screws, the use of glue is only permitted for fixing labels on inside of a panel where screws are not applicable due to physical size of equipment.

Nameplates, labels and warning plates shall be in English.

GW-4.2 Labels

Labels contain only the Standard Plant Identification Number (SPIN) of each component or equipment for maintenance management and record purposes. In case SPIN is already factory fixed in the nameplate, labels are no longer required.

Labels for pumps shall be securely attached or installed adjacent to the equipment or as directed by NPC. For large equipment, i.e. tanks, piping, etc, the labels may be printed directly on the equipment's external surface which shall be fixed at readily visible locations.

In addition to labels, a direction of flow for pipelines shall also be identified by arrows painted with color different from the pipe base color. Size of labels varies with the size of the equipment.

All valves shall be provided with suitable labels attached to the valve handwheel and engraved in it the valve number or SPIN and other inscriptions as applicable. Valve body mounted shall be applied where handwheel top mounted labels are not applicable.

Labels shall be provided on both front and rear sides of MCC's, boards, panels, etc.

Standard Plant Identification Number (SPIN) for instruments and other devices shall also be provided and inscribed in the label or nameplate as applicable.

Labels shall be secured by screws or by flexible wires if screws are not applicable such as for valves, instruments, etc.

GW-4.3 Tag Numbers/Standard Plant Identification Number (SPIN)

Tag Numbers or SPIN for all supplied equipment and materials shall be provided by the Contractor.
Tag Numbers/SPIN are designation codes which shall be used to achieve uniformity and standardization in identifying each component and equipment for installation, maintenance, documentation and record purposes. The Tag Numbers/SPIN shall be clearly inscribed in a stainless steel or equivalent corrosion resistant metal in accordance with the NPC Standard Specifications.

Tag Numbers/SPIN are generally specified or indicated on the Bid drawings. In case of supplied equipment, valves, instruments or devices are not designated with tag numbers or SPIN, the Contractor shall assign a number subject to the approval of NPC.

GW-5.0 QUALITY ASSURANCE REQUIREMENTS

GW-5.1 General

The Contractor shall have a well-organized Quality Management System which is relevant for the Works covered under the contract to assure that items and services, including subcontracted items and services, will comply with this specification.

Within thirty (30) days of the Effective Date of Contract, the Contractor shall submit five (5) copies of his complete quality control and assurance procedures, and manuals for review and approval by NPC. The manual shall include pro-forma checklists for all requirements of the Contractor's quality control and assurance program and those called for in this Specification.

GW-5.2 Quality Assurance Program

The Contractor shall, for all work covered by the Contract:

1. Establish procedures for adequate planning and resourcing of all quality related activities including the preparation of quality plans;

2. Establish measures for the identification and control of items throughout all stages of the Contract. This shall include measures to maintain traceability as identified in agreed quality plans;

3. Arrange for the protection of the quality of the product to include delivery to the specified destination; and

4. Control their measuring and test equipment in accordance with the established procedures for measurements and calibration systems and ensure that such equipment that may be used by subcontractors to verify work is similarly controlled.

Where any site installation and/or test and commissioning work is involved, the Contractor shall prepare contract-specific quality assurance procedures in agreement with NPC prior to commencement of such works.

GW-5.3 Quality Plan

The Contractor shall establish and implement quality plans detailing the specific activities, design reviews, operations, control procedures, inspections, testing, approvals and certification requirements applicable. All procedures, which support the quality plan shall be referenced and distributed to NPC together with the quality plan. Quality plans shall be submitted to NPC for review and approval.

GW-5.4 Records

The Contractor shall generate records as required by the quality assurance system and quality plans. Records, including audit reports shall be made available for inspection by NPC.

All records shall be concisely compiled, indexed and cross-referenced to the project contract number and the relevant subcontract numbers. They shall be clearly identifiable to the individual parts and assemblies to which they refer.

All records generated during the course of the Contract, including those generated as evidence of effective implementation of the quality assurance program of the Contractor and his subcontractors, shall be retained by the Contractor for a minimum period of five (5) years from the date of contract completion. These records shall be made available to NPC on request during the retention period.

GW-5.5 Reporting and Corrective Action

The Contractor's quality assurance program shall provide for prompt detection and correction of all conditions adversely affecting quality, including failures,

malfunctions, incidents, trends, deficiencies, deviations, non-conformances, and defective materials.

GW-6.0 DRAWINGS AND INSTRUCTION MANUALS

GW-6.1 Drawings Contained in the Tender Document

The drawings called for in this section shall be the Bid Drawings attached to the Tender Document. Discrepancies between the drawings and actual field conditions or between drawings and specifications shall immediately be brought to the attention of NPC for proper resolution. These drawings maybe superseded by subsequent revision or corresponding issuance of detailed drawings or specifications.

Anything mentioned in these specifications and not shown on the drawings, or shown in the drawings but not mentioned in the specifications but which are obviously necessary to make a complete installation shall be considered and included as if they are both mentioned and shown. In case of discrepancy between the drawings and the specification, the requirements stipulated in the relevant technical specifications shall govern, except as otherwise directed by NPC. All works involving discrepancies shall not be started without NPC's formal approval.

The drawings and the specifications are complimentary to each other and what is called for in one shall be as binding as if called for both.

The Bid Drawings show the work to be done as definitely and in as much detail as possible. Bid drawings may be used for planning the work, but shall not be used for construction purposes or for furnishing materials, unless otherwise authorized by the NPC.

GW-6.2 Contractor's Drawings/ Manufacturer Drawings

GW-6.2.1 General

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 this section and relevant specifications.

Brochures and catalogues for equipment and devices to be supplied by the Contractor or as specified in the relevant sections of this specifications shall be submitted for NPC's review and approval prior to procurement and installation.

Before submitting any detailed drawing for review, the Contractor shall obtain approval of a list of detail drawings he proposes to submit. Only selected drawings in the list, or any drawings as NPC deemed necessary, shall be submitted for approval. The sequence of submission shall be such that information is available for checking each drawing when it is received.

Any 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.

All approved drawings shall form part of the Contract. Approval of the Contractor's drawings shall not be construed to mean relieving the Contractor of any of his responsibility for the correctness of his calculations and drawings nor for the strict compliance with the Contract.

All drawings submitted by the Contractor or by any Sub-Contractor shall contain in the lower right-hand corner, in addition to the Contractor's name, the date, drawing scale, drawing title and number, and contract number as given in the Specification. NPC Standard Specifications for Title Blocks shall be provided to the Contractor during the contract implementation.

GW-6.2.2 As-Built Drawings or Final Drawings

The Contractor shall provide and keep an up-to-date "As-Built" or "Final" drawings of all structures constructed and all equipment and accessories and miscellaneous works installed. These drawings shall show all changes and revisions from the original drawings and specifications, including the exact "as-built" locations, sizes and kinds of equipment and accessories, miscellaneous metalworks, embedded piping and electrical systems and other concealed items of work.

These drawings shall be kept in the Contractor's field office but shall be made available at all times for review of NPC. At the end of every work, all entries, changes or revisions made in the drawings by the Contractor shall be checked and approved by NPC.

The complete and duly checked and approved "As-Built" or "Final" drawings shall be submitted by the Contractor within thirty (30) calendar days from the completion of the contract in five (5) prints and one (1) set of electronic copy on CD/DVD. Such CD/DVD shall be suitable for any optical drive of computer system.

Drawings and schedules shall preferably submitted in standard A3 size.

No separate payment will be made for furnished "As Built" or "Final drawings. Contractor shall include al cost thereof in the unit and lump sum bid prices in the Bidding Form.

GW-6.3 Processing of Drawings/Documents

All drawings and documents to be prepared by the Contractor for NPC's review and approval shall be on A4 size or A3 size folded to A4 and submitted to, except otherwise mutually agreed during the implementation stage:

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

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 within fourteen (14) calendar days for NPC's review and approval.

Five (5) prints with dark lines on a white background shall be furnished to NPC for each drawing submitted for approval. Two (2) copies will be returned to the Contractor either marked "Approved", "Approved with Corrections Indicated", or Returned for Corrections". Prints marked "Approved" or "Approved with Corrections Indicated" authorize the Contractor to proceed with the procurement/fabrication, assembly and construction of the works 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 it in five (5) copies each for final approval. Every revision shall be shown by number, date and subject in a revision block.

If minor revisions are made after a drawing has been approved, the Contractor shall incorporate the corrections on the as-built drawings to be submitted by the Contractor. No major revision affecting the design shall be made after a drawing has been marked "Approved" without re-submitting the drawing for formal approval of said revision.

Drawings and documents marked "Noted" without comments are deemed approved. If comments/corrections are indicated thereon, the Contractor shall finalize the drawings/documents and resubmit for NPC review and reference.

During project implementation, the Contractor shall address all communications pertaining to Contractor's Drawings to, except otherwise mutually agreed:

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. All drawings are preferred in a computer-aided format. However, if unable to comply with this requirement, manual drafted drawings will be acceptable. All CAD produced drawings are to be submitted in Autocad formats. All other computer-generated documents are to conform to Microsoft Office.

GW-6.4 Instruction Manuals

The Contractor shall furnish five (5) copies of the draft instruction Manuals/Operation & Maintenance Manuals for all his supplied equipment under this Contract, at least one (1) month prior to the conduct of site testing for NPC review and approval. Upon approval, the Contractor shall resubmit five (5) copies in final form.

Instruction Manuals shall be furnished by the Contractor and assembled on standard metric A4 sheets. Covers and binders to be used for the manuals shall be robust and oil-resistant.

Manuals shall contain data relevant to the equipment or system design and its installation, start-up, operation, lay-up, preventive maintenance, troubleshooting, testing and repair. Drawings which are to be bound into the manual, shall also be A4 or A3 folded to A4.

Instruction Manuals shall include copies of NPC approved "Final Drawings" or "As-built Drawings" of all plans and drawings, brochures and catalogues, workshop or service manuals, including standard/special tools list and spare parts list.

No separate payment will be made for furnished "As Built" drawings and Instruction Manuals/O & M Manuals. Contractor shall include all cost thereof in the unit and lump sum bid prices as specified in the Bidding Form.

GW-6.5 Documents for NPC's Records

The Contractor shall furnish five (5) copies of the following documents for NPC's records:

a) Material Data, Material Certifications and Test Reports required by governing Codes and Standards;

b) Factory Test/Site Test (Performance) Results;

c) Progress Reports; and

d) Other documents as may be required.

GW-7.0 CORROSION PROTECTION AND PAINTING

GW-7.1 General

The Contractor shall apply corrosion protection and painting to all equipment and materials to be furnished in accordance with the minimum requirements specified in this section.

An adequate supply of touch-up paint shall be supplied by the Manufacturer/Contractor which shall be used for painting surfaces that will be damaged during transport and installation works including surfaces that show signs of corrosion. Color of Final painting shall be per Manufacturer's standard, unless otherwise specified in the pertinent provisions of the specifications.

The Contractor shall be responsible for the adoption of preparation procedures and protective coating systems which are suitable for the environment experienced by the various components/elements of the Plant.

Where a specific coating system is mentioned elsewhere in the specification, the Contractor shall accept responsibility for the suitability for such system. The Contractor has the option to nominate an alternative coating system for the approval of NPC.

Within sixty (60) calendar days from the award of the Contract, the Contractor shall submit for the approval of NPC, a full schedule of coating systems including the following information:

a) Plant item name;
b) Protective coating systems including number and thickness of coats;
c) Short list of protective coating manufacturers and applicators;
d) Surface preparation;
e) Workshop action; and
f) Final color schedule which NPC will provide during the Contract stage or as specified in the relevant sections of this specification.

GW-7.2 Treatment for Shipping

The various items which do not fall under the paintings or lining specifications in the documents shall be surface treated for shipping.

The various items to be shipped shall be thoroughly cleaned before shipment so as to eliminate dirt, rust and grease, all welding slugs and spatters, and loose metals.

All metallic machined surfaces shall be covered with a protective coating. This coating shall be effective against salty air and shall be easily removable at site.

All iron or steel external surfaces shall be covered with two (2) coats of protective anti-rust paint.

Piping, valves and other parts that have undergone hydraulic tests and which cannot be completely dried should be treated with water-absorbing corrosion inhibitor before the application of protective coating.

GW-7.3 Application of Paint

Before any painting is made, all surfaces must be prepared properly by removing all rusts, scales, welding slugs and spatters, grease and encrustation of any nature. Steel surfaces shall be white blasted in accordance with Steel Structures Painting Council Standard. The various paints to be used shall be of approved quality and type.

No painting shall take place outdoor during the presence of rain, fog, dew or where the surfaces may be otherwise damp; in particular and no application of

paint should be made on plaster surfaces that are not completely dry. No coating shall be applied unless the surface is at minimum of 3°C above dew point.

For successive coats, first coat shall be dried hard before the second coat. The color of successive coats must be sufficiently different to allow easy identification of the sequence of painting of surfaces for control purposes.

Paint shall not be applied to machined surfaces, corrosion resistant materials or linings, unless otherwise specified in the relevant sections of the specifications.

All contact surfaces of field-welded connections shall be masked at a distance of 100 mm back from the weld joint and shall be suitably protected against corrosion.

For non-insulated surfaces exposed to high temperature two (2) coats of aluminum modified silicone with a volume solids of 42% ± 2% high temperature paint shall be applied.

For internal surfaces for the receipt of oil, three (3) coats of paint having a phenolic-base or equivalent shall be applied. As minimum, first coat shall be applied with 80 microns DFT of zinc rich polyamide epoxy primer. Second and final coat shall be applied with 100 microns DFT polyamide epoxy for each coat. External surfaces shall be painted with 80 microns DFT of zinc rich polyamide epoxy primer on first coat. On second coat, 160 microns FTF of intermediate chlorinated rubber shall be applied and 80 microns DFT chlorinated rubber topcoat as final coat.
All other equipment and piping shall be prime coated with 80 microns DFT zinc rich epoxy paint and 80 microns DFT of chlorinated rubber for each intermediate and top coat.

Exposed fabrication, erection, or shipping marks shall be cleaned off and the areas touched-up shall be painted to match the adjacent surfaces.

For surfaces where blast cleaning and a wash primer are specified, touch-up painting shall include application of the wash primer before the touch-up coats.

Equipment and auxiliaries which are shop-fabricated/assembled and have already been provided with final painting shall no longer require painting at the site except for painted surfaces which have been damaged during transport and/or installation works, shall require touch-up painting. Color of final painting shall be as designated and approved by NPC.

Final tests and inspection shall be carried out by the Contractor to ascertain the correspondence of the paintwork to the prescribed color and treatment. These tests will indicate whether or not the paintwork is correctly applied and is free from wrinkles or roughness which might affect the adhesion of the protective coating.

Should the measured dry film thickness result to less than the specified one, the Contractor shall apply additional paint to the coat inspected or shall increase

the thickness of succeeding coat, as applicable, to assure the specified total dry film thickness.

GW-7.4 Hot Dip Galvanizing

The zinc protective coat shall be adherent, smooth and free from discontinuity and imperfections such as bubble, porosity, cracks, or other irregularities of the protective layer.

The thickness of applied layer shall correspond to a minimum rate of 600 gm/m^2or as approved by NPC.

GW-8.0 PACKING, SHIPMENT AND STORAGE

GW-8.1 Preparation

The Contractor shall prepare materials and equipment for shipment to protect it from damage during shipment/transport and subsequent storage.

All dismantled equipment, accessories and associated structures shall be properly and carefully packed/crated, as applicable, including any equipment and materials to be supplied by the Contractor.

Equipment shall be completely drained of all water and thoroughly dry prior to shipment. When such draining requires removal of plugs, drain valves, etc., the Contractor shall make sure that these parts are re-inserted or reassembled prior to shipment. Other fluids (coolant, fuel oil, lube oil, etc.) shall be drained only if the Contractor deems it necessary and subject to the approval of NPC. All openings and machined surfaces shall be provided with protection to prevent damage, corrosion and entrance of foreign matter during shipment and storage.

Flanged connections shall be protected by a ½ inch (15 mm) or thicker plywood disc, or suitable alternate, bolted to the face of the flange.

Threaded or socket weld connections shall be protected with screwed or snap on type and securely held plastic protectors. Cast-iron plugs are not acceptable for protection unless part of the permanent assembly.

Butt weld connections shall be protected by wooden disks that cover the entire weld end area and shall be secured by metal straps and fasteners.

Covers, straps or fasteners shall not be welded to equipment.

Equipment shall be adequately supported for shipment. All loose parts shall be crated or boxed for shipment and appropriately identified. Where shipment is braced internally, it shall be marked conspicuously, "Remove internal braces before testing and operating".

All large and heavy shipping units shall have suitable skids for moving. Crating shall also be adequate for lifting with slings. If location of slings is critical, these locations shall be marked accordingly.

As the shipment or transported equipment/materials may be left in open temporary storage at the designated place, the Contractor shall ensure that the delivered items have appropriate protection from water and other elements such as temporary shelter/cover/tarpaulin or equivalent type of cover for protection.

All delicate electrical and mechanical parts susceptible to damage from moisture shall be packed in hermetically sealed container or other approved containers within their packing cases, with all machined surfaces coated with a rust preventive compound. All sealed packages shall include bags of silica or equally moisture absorbing chemical. When electric space heaters are provided for that purpose, these should be wired to the outside of the equipment so that energization immediately upon receipt is possible without disassembly of crates, etc. This also requires that no combustible material will be left in the inside of the equipment.

All equipment belonging to the same system/skid shall be properly marked and packed in the same crate, where practicable. The Contractor shall not mix equipment and parts of one system with another to avoid confusion during re-assembly.

Valves, including its bolts, nuts, and washers, shall be segregately packed and properly marked according to plant system, size, and number of pieces.

All temperature gauges, pressure gauges, switches, transmitters, and other instruments shall be properly marked and carefully packed so as not to break the associated glass and undue damage to the threaded portion.

All spare parts shall be packed in a sealed container including special and standard tools in their separate sealed toolboxes.

All packages, crate boxes, drums, bags, bundles, or other containers or any loose pieces shall carry the following identification marks on the two (2) sides in black with a stencil-proof ink or paint by means of block letters not less than 30 mm high; i.e.

NATIONAL POWER CORPORATION

CONTRACT No. : _____
ITEM NO. : _____
PORT OF DISCHARGE : _____
DESCRIPTION OF CONTENT : _____
NET WEIGHT : _____ kgs
GROSS WEIGHT : _____ kgs
DIMENSION : _____ m^3
CRATE NO. : _____

All packages shall be forwarded with a copy of packing list placed inside the package and another copy thereof contained in a waterproof envelope placed outside the package. The packing list shall give all information on the package such as package no., packing appearance, net weight, gross weight, dimension, measurement, and description of the equipment including storage and handling instructions with descriptions for periodic inspection and/or storage maintenance to ascertain that no deterioration will occur during storage.

Prior to shipment/transport, the Contractor shall furnish advance copies of all packing lists and other pertinent documents.

GW-8.2 Shipment/Transport

The Contractor shall be responsible for the sea and land transportation of the plant equipment, materials and supplies required under this Specification and shall ensure that they are safely and timely delivered to the specified site.Contractor shall be deemed to have visited the site and other areas on the route of delivery, including port facilities, inter-island shipping facilities, island transport, access roads, bridges,railways and to have acquainted themselves with all factors that will affect the cost of shipping and freight to the site.

Any damages to the roads, bridges, railways,ports if any, etc. arising out of neglect of Contractor shall be the responsibility of the Contractor. Likewise, any additional claim attributable to Contractor's lack of knowledge or understanding on existing conditions of the site shall not be given due credence.

The Contractor shall ship the materials and equipment on clear commercial bill of lading and the cost of all freight, insurance, shipping, handling and road transport charges shall be included in the Bid Price.

Upon arrival of equipment and materials at site, NPC and the Contractor or their authorized representatives shall jointly verify the plant equipment to be stored at site following the steps below:

a) Inspection and verification of the packing list;

b) Visual inspection of the condition of the packing and its surfaces; and

c) Partial opening of the crates and plastic sheet protection of the plant auxiliary equipment and diesel generating sets to verify the content and its physical condition and to check pilferage or damage during shipment and storage.

A record shall be prepared carefully noting all eventual shortage, defects or damages, signed by the Contractor and concurred by NPC. All shortages and damages noted shall be immediately replaced by the Contractor at his own cost and shall ensure the timely delivery of replacement without affecting the agreed overall project implementation schedule.

The Contractor shall keep a proper store ledger carefully noting all movements of materials within the project site. NPC has the right of access to the ledger, which shall be kept by the Contractor on site at all times.

GW-8.3 Storage

The Contractor shall be responsible for securing all his supplied equipment and materials at a place designated by NPC until the completion of the erection/installation, and test. Any loss and/or damage of said equipment at said storage area shall be the responsibility of the Contractor.

If the Contractor desires to use any storage area other than those designatedby NPC atthe respective sites, he may do so at his own expense and subject to the approval of NPC.

If the dismantled equipment and materials including those to be supplied by the Contractor will not be immediately required for installation at the site, the materials and equipment shall be carefully stored and maintained at such place and in such a manner as NPC may direct until such time as they are ready for installation/erection.

GW-9.0 INSPECTION AND TESTS

GW-9.1 General

The Contractor shall perform at his own expense all tests required to ensure adequacy of material, workmanship and conformance of equipment to the requirements of the specifications and standards.
The Contractor shall submit to NPC for approval, a complete test program for all his supplied materials/equipment and workmanship covered by the contract. Likewise, five (5) copies of test procedures shall be submitted for approval at least forty five (45) days prior to the conduct of actual test.

NPC and/or his duly authorized representatives shall witness all applicable tests detailed in the relevant sections. NPC shall be notified by the Contractor thirty (30) days in advance about any tests to be conducted requiring the presence of NPC.

Tests not requiring the presence of NPC shall be, in any case, notified in advance. In such case, the Contractor shall then proceed with the tests and shall submit test reports in five (5) copies to NPC. NPC's acceptance of the work by waiving the inspection of tests and receipt of the Contractor's Certified Test Reports and Inspection and Testing Certificate shall in no way relieve the Contractor of his responsibility in accordance with the requirement of the Specifications.

For inspected or tested goods that fail to conform with the Specification, the Contractor shall either replace or make any alterations necessary to meet the requirements of the Specifications at no costs to NPC.

The Contractor shall provide the required consumables, if any, to be used during the test, unless otherwise specified in the relevant sections of the technical specifications.

During the test and upon written request of the Contractor, NPC may provide personnel to assist the Contractor in the performance of the test under the direction of the Contractor.

After installation of all equipment and devices supplied by the Contractor, the Contractor shall perform the required test in accordance with the approved test procedures submitted by the Contractor. All tests to be performed shall be closely coordinated with the manufacturer's representatives or commissioning personnel specifically designated by NPC for said equipment.

NPC or its designated representative shall be entitled to attend the tests and/or inspections conducted on the premises of the Contractor or its Contractor(s) provided that NPC shall bear all of its own costs and expenses incurred in connection with such attendance including, but not limited to, all traveling and board and lodging expenses. The Contractor, however, shall extend all reasonable facilities and assistance during the conduct of such test and/or inspection on its premises.

GW-9.2 Inspection/Tests at Contractor's Premises

NPC reserves the right to inspect all shop and assembly work associated with the Works, verify quantities consigned to stores and inspect quality control and assurance records as well as shop and purchase order records. When scheduled, and as often as NPC deems appropriate, progress will be monitored with respect to Key Dates in the Contract Schedule and the sequence of events and activities on the Contractor's Detailed Contract Schedule.

The Contractor shall carry out all tests in accordance with the requirements of the specifications and submitted test procedures duly approved by NPC.

Prior to shipment and final inspection, each equipment supplied by the Contractor shall be given the manufacturer's standard factory acceptance test and/or as required in the relevant sections of the technical specifications.

The Contractor shall carry out tests, as may be required by the specified Standards and the Quality Control and Assurance Program, as well as the entire test program approved by NPC.

If NPC opted not to witness the Factory Tests, NPC will issue a Certificate of Waiver of Tests Witnessing/Inspection for the equipment and materials. In such case, the Contractor shall proceed with the Factory Tests in accordance with the requirement of the specification and the manufacturer's test specification as approved by NPC.

Issuance of the Certificate of Waiver of Tests Witnessing/Inspection for equipment required to be witnessed by NPC or its authorized representative(s) however, shall in no way relieve the Contractor of his responsibility to conform with the approved test procedures and the requirements of the Specifications.

The factory test record and dispositions, and any other pertinent supporting data and documents shall form part of a test report to be submitted in accordance with the specification.

GW-9.3 Site Test

After installation of all Contractor's supplied equipment and materials, the Contractor shall provide the services of highly qualified personnel who shall be responsible in providing technical advice and overall supervision for the performance of site tests. He shall also closely coordinate with NPC personnel who will be witnessing the site tests.

All tests shall be carried-out in accordance with the approved procedures submitted by the Contractor for his supplied equipment or as directed/coordinated with NPC.

The Contractor shall be responsible in compiling, recording and submitting the test reports to NPC.

Measuring and testing instruments, tools, equipment and devices shall be supplied by the Contractor.

GW-9.4 Tests Failures

If any equipment or materials supplied by the Contractor fails to pass any test, NPC may, at its own judgment, direct the Contractor to make any necessary corrections or alterations for defects or order equipment/component replacement, as maybe deemed appropriate. Any and all expenses due to additional tests or retests made necessary by failure of Contractor's supplied equipment/component, e.i. failure to meet the acceptance criteria and other requirements of the specification, shall be borne by the Contractor.

GW-9.5 Test Reports/Certificates

Five (5) certified copies of the reports of all tests and other manufacturer standard tests shall be furnished to NPC within a maximum of fifteen (15) days following the completion of the tests.

Test certificates shall include, in addition to the test results, the following information:

a) Equipment data; and

b) NPC's tag number; and/or equipment serial number.

The Contractor shall bear the cost of furnishing these records and reports.

GW-10.0 CLEAN UP

When the Works are completed and before the issuance of the Certificate of Completion is made, the Contractor shall remove from the Site, without expense to NPC, all temporary structures, all materials and rubbish of every sort, shall fill and dress all holes and cavities made for his convenience, and shall leave the

whole area in good order and condition, all as required and directed by NPC.

Unless otherwise directed by NPC, all excess materials and components which form part of the supplied equipment or materials and identified to be no longer required for the construction and erection/installation, shall remain at site and properly turned over to the NPC

GW-11.0 MEASUREMENT OF PAYMENT

Measurement for payment for all works shall be based on the bid price of each item as shown in the Bill of Quantities or as described in the relevant sections of this specification. The cost shall cover all works required and described in the pertinent provisions of the specifications.

Measurement for payment for pipes and its associated fittings and accessories shall be based on the bid price indicated on the Bill of Quantities of the actual length of pipe installed. The cost shall cover all works required including excavation, sand bedding, backfilling, testing, repair/restoration of affected/damaged existing structures and other works and services described in the pertinent provisions of the specifications.

GW-12.0 CERTIFICATE OF COMPLETION AND ACCEPTANCE

When all the works and services have been satisfactorily completed as required in the Contract, the Contractor may give notice to this effect to NPC. Such notice shall be deemed to be the basis for NPC to issue a Certificate of Completion in respect of the Works within fifteen (15) days of receipt of such notice.

After the lapse of the warranty period, provided that there are no defects found and/or pending repair works (including completion of the required Contractor's Service Personnel Services specified in Clause GW-13.0 as certified by the Plant Manager), NPC shall issue the Certificate of Final Acceptance.

GW-13.0 GUARANTEE

The Contractor shall guarantee that he will repair, and/or replace, at his own expense, equipment and materials against defect in design, materials and workmanship for a period of twelve (12) months after the issuance of the Certificate of Completion. The Contractor guarantees that when the equipment and/or material are placed in operation and/or use, it will perform in the manner as set forth in the Contract.

GW-14.0 MEASUREMENT OF PAYMENT

Measurement for payment for all works shall be based on the bid price of each item as shown in the respective Bill of Quantities. The cost shall cover all works required and described in the pertinent provisions of the specifications and for the satisfactory completion of each work.
Failure of the Contractor to submit the approved "As-Built" or "Final" Drawings and "Operation and Maintenance' Manuals to NPC on the respective dates specified in Clauses GW-6.2.2 and GW-6.5, NPC shall withhold Five percent (5%) of contract amount from payments due to the Contractor.

SECTION VI

TECHNICAL SPECIFICATIONS FOR ARCHITECTURAL WORKS

SECTION VI – TECHNICAL SPECIFICATIONS

AW – ARCHITECTURAL WORKS

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SECTION VI - TECHNICAL SPECIFICATIONS

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 CONCRETE MASONRY WORKS

AW-2.1 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-2.2 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-2.3 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-2.4 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-2.5 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-2.6 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-3.0 PLASTERED PLAIN CEMENT FINISH

AW-3.1 General

The work to be done under this section includes furnishing of all labor, materials, equipment and other facilities and the satisfactory performance of all work necessary to complete all cement plaster finish.
Plaster mixture is applied in layers to masonry and reinforced concrete, surface to interior or exterior walls and ceilings.

AW-3.2 Materials

a) Portland cement conforming to the latest edition of ASTM Standards C-150.

Lime - Slaked quicklime or hydrated lime to make lime putty.

Sand - Natural sand, white or light grey, washed and cleaned, strong and free from injurious amount of dust and flaky particles.

Water - Clean and fresh contains no salt, potable and free from sulfur oil and other impurities that may cause discoloration of the finish.

b) Accessories for plaster work, includes nails, picture, moulds, casings, window stools, bases, etc.

AW-3.3 Application

The total thickness of masonry and plaster shall be 15mm (5/8"). For a three-coat plastering, the scratch coat and brown coat shall be at least 6.3mm (1/4") thick and the hard finish 3.2mm (1/8") thick with a minimum thickness of

1.6mm (1/16") at any point. For a two-coat work the base shall be 12.7mm (1/2") thick and the hard finish the same as for a three-coat work.

The lath for plastering shall be leveled, plumb and well secured to the backing material. The leveling elements installed would include grounds and screeds. For walls, a screed shall be installed at the base of the wall with its top about 102mm (4") above finish floor. The screed is run horizontally, leveled and set at the exact thickness of finished plaster. Around all openings and the intersection with the ceiling grounds are installed.

All anchorage for cabinets, furniture, stair, handrails, electrical outlets, etc., should be installed before plastering is started.

All internal corners should be reinforced by lapping wire lath.
Mixture for various coats should be checked to see that proportions are correct.

Manufacturer's directions for applying the various types of plaster should be followed scrupulously The NPC Representative should check whether they conform to end use of the plaster.

AW-3.4 Measurement and Payment

The measurement for payment for all **Plaster Plain Cement Finish** will be based on the area applied and accepted by the NPC Representative.

Payment will be made at the corresponding contract unit price per square meter for the pertinent item under architectural works in the Bill of Quantities.

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

AW-4.0 PAINTING AND VARNISHING

AW-4.1 General

The work to be executed under this section shall include the furnishing of all materials, labor, tools and ladders, scaffolding and other facilities necessary for the satisfactory performance of all work necessary to complete all painting and finishing of all surfaces throughout the interior and exterior of the building, except as otherwise specified.

The Contractors, providing the labor, materials or both for this project are specifically referred to the General Contract plans, to the General Conditions of the specifications, to all the Sections of the Specifications and to the various other sub-contract documents which may affect the completion of any sub- contract work. In the absence of a complete agreement between sub-contractors, supply dealers or others affected by the construction of this project, the General Contractor shall be held responsible for the co-ordination of all the work.

The Contractor shall examine all sections of this specification and perform all paintings called for therein.

All woodwork in ceiling, partitions, handrails, cabinet work, grill work, mouldings and others as specified by the NPC Representative shall be painted/varnished.

AW-4.2 Inspection of Surfaces

Before starting the work, the Contractor shall inspect all surfaces to be painted. If the surfaces cannot be put in proper condition to receive paint by customary cleaning methods or sanding or sparkling, the Contractor shall notify the NPC Representative in writing. The NPC Representative will cause these defects to be reminded. The commencing of the work by the Contractor indicates his acceptance of the surfaces to be painted and assumes responsibility for the rectification of any unsatisfactory finishing, resulting from his negligence.

AW-4.3 Materials

All paint materials shall meet the requirements of the Philippine National Standard Specifications for Paintings.
Paints shall be brought to the Site in tightly closable, convenient, original containers, if nothing to the contrary is stipulated in the Specifications. The containers shall be marked in a durable manner with the following particulars:

- Maker
- Paint and relevant thinner
- Gross and net weights
- Date of supply by the maker's factory

The openings of the containers shall leave enough room for a stirring appliance.

All containers shall be kept tightly closed until the contents are to be used. Immediately prior to use of the contents and before pouring into smaller containers for working purposes, any skin shall be removed and the contents stirred thoroughly, if necessary, with a stirring appliance.

Paints, thinners and filling cements which are not required for immediate use shall be protected against the action of frost and heat.
Only thinners supplied by the makers of the paint or those described by them as suitable shall be use for adjusting paints to working consistency. The instructions of the maker shall be followed in this respect.

Paint and filling cements shall be used in accordance with the maker's instructions.

The Contractor shall obtain from the manufacturer and shall submit to the NPC Representative a paint manufacturer's guarantee for the quality of each painting material and that each coat of paint is compatible with previous and subsequent coats.

Paints which do not have to be prepared by mixing several constituents just prior to use shall be brought to the Site in such a state of readiness that they need only be adjusted to brushing or spraying consistency to meet the relevant working conditions (e.g., temperature), by adding the particular thinners in accordance with the maker's instructions.
With the exceptions of ready-mixed materials in original containers, all mixing shall be done at the job site. No materials are to be reduced or changed except as specified by the Manufacturer of said materials.

The quality of the paints shall be such that they form no solid sediment and at most a slight skin in unopened original containers within 6 months - calculated from the marker's delivery date. A paint which has formed a solid sediment or more than just a slight skin in the unopened original containers by the time of use or which cannot be processed satisfactorily shall not be used. A sediment shall be regarded as solid if it cannot be dispelled quickly and completely by stirring.

The use of white zinc (lithophones) will not be allowed.

A place will be designated by the NPC Representative for the storage of paint materials and tools. Whenever it may be necessary to change the location of this storage place, the Contractor shall promptly move to the newly designated place. The storage space floor shall be adequately protected from damage and from paint. Paint shall be covered at all times, safeguards taken to prevent fire.

AW-4.4 Colors and Samples

All colors shall be subjected to the approval of the NPC Representative. Tinting of matching colors shall be done under the supervision of the NPC Representative. In all cases, a sample shall be applied on the job and the

NPC Representative must give his approval before work is commenced. If required, three panels, 200 mm x 250 mm (8" x 10") of each color and finish shall be prepared in advance, with the NPC Representative. "Of color selected" shall be understood as all coats specified herein.

AW-4.5 Workmanship

All work shall be done by skilled mechanics with high quality workmanship. All paints shall be evenly applied so as to be free from sags, runs, crawls or other defects. All painting materials shall be meet the requirements of stress and shall be in accordance with the relevant standards. All coatings shall be of proper consistency and well brushed out so as to show the minimum of brush marks, except varnish and enamel which shall be uniformly flowed on. All brushes shall be clean and in good condition, with heavy brushes preferred. Light brushes shall not be permitted.

Paint shall be thoroughly stirred so as to keep the pigment evenly in suspension when paint is being applied.

No painting shall be done under conditions that are unsuitable for the production of good results. No oil painting shall be done in damp weather.

Application of succeeding coats shall strictly follow the over-coating times specified by the paint manufacturer. If no specific data are available, all coats shall be thoroughly dry before painting shall be applied. At least twenty-four (24) hours shall be allowed between coats. Exterior painting under damp/wet conditions is not allowed.

Painting coat as specified are intended to cover the surfaces perfectly, if surfaces are not fully covered, further coat shall be applied to attain the desired evenness of the paint application.

All parts of moldings and ornament shall be left clean and true to details.

All finish shall be uniform as to sheen, color and texture, except when glazing is required.

AW-4.6 Protection

The Contractor shall protect the work of all other trades against damage or injury by his employees, or by his materials, tools or utensils used in connection with this contract. Any damage done by him shall be repaired at his own expense, without additional compensation beyond the contract price.

The Contractor shall note that some damage to paintwork during shipment, storage, and building-in and particularly during grouting of the steel lining is unavoidable and the application of all protective treatment shall be programmed accordingly. Care shall be taken to remove salt crystal liable to become deposited during the sea transport and/or storage at seaport by thorough washing with clean fresh water. Before any coat of paint is applied, the surface shall be prepared as hereunder described, so that it is clean and free from all deleterious matter and completely dry.

The Contractor shall be responsible for the complete shop and field coats. Shop coats shall be checked for good quality and where necessary, before proceeding with the painting or coating operations at Site, the Contractor shall clean and repair, including smooth trowel, all shop coats which are defective or damaged.

Protect all parts of the building from paint drops by using clean drop cloths and remove all paint inadvertently placed or dropped on exposed surfaces without damage to same. Close various spaces while painting and exclude dust until finish is dry.

Plumbing systems shall not be used to wash paint brushes or containers.

Temporary or permanent welding shall not be permitted on areas where the welding will damage paint or other protective coatings, unless the areas of coatings which would be damaged thereby are accessible for repairing and inspection. Materials which have been painted shall be handled with care and protected as necessary to preserve the coating in good conditions.

AW-4.7 Paint Application

Materials, which are subject to working instructions, shall be treated according to these instructions, unless stipulated differently by the relevant paint manufacturer:
Paint, gloss and coating may be worked manually or by machines, unless a particular execution has been stipulated in the Specifications.

Paint, gloss and coat shall be bond firmly and be of even surface without scars and strips.

The surface shall be smooth, if not otherwise stipulated in the Specifications, such as finely or coarsely granulated.

Any paint, gloss or coating shall be applied without filling to create a uniform surface or, when gloss is being applied, a flowing surface with the required materials according to instruction manuals, of white or light shade, unless otherwise stated in the Specifications.

Top finish shall be high gloss, unless otherwise stated in the Specifications.

If flat levels are to be formed, the prime coated surfaces shall be completely being covered with suitable undercoat filler ribbed and smoothed.

Primer protective coating shall be applied on woodwork according to manufacturer's instruction. If several coats are requested, the preceding coat shall need to be dried before applying the subsequent one. This does not apply for wet-on-wet techniques.

Drying periods prescribed by the manufacturer shall be observed, for open surfaces, as well as for edges or irregular surfaces. All edges at doors, windows, skirting, sockets, etc., shall be of sharp and straight line.

New concrete and masonry surfaces must be thoroughly naturalized either by brush or spray with a solution of 2 kg. of zinc sulfate to each gallon of water.

Surfaces so treated shall be tested to ascertain that alkalinity is removed; otherwise a second treatment with the same solution shall be applied. Within 24 hours after drying, all crystals on the surface must be brushed off applying the prime coat.

Metal works shall be kept clean and free from corrosion following installation. Abraded surfaces shall be retouched prior to finish painting, using the same type of paint as prime coat. Galvanized metals shall be weathered or pickled with the approved metal primer in accordance with printed instruction of the manufacturer.

Where components parts of steel or aluminum alloys meat, joints shall be sealed so that no moisture can penetrate between the contact surfaces.

Rivet and bolt heads, protruding corners, sharp section edges and places of difficult access shall be pre-treated.

The paint shall be applied in coats which are as uniform as possible.

The first priming coat shall be applied by brush. Further coats shall be applied by brush if nothing to the contrary is stipulated in the Specifications. Smaller and specially shaped brushes shall be used for rivet and bolt heads, protruding corners, sharp section edges and places of difficult access.

When applying paints by spray-gun, the object to be sprayed shall not be contaminated by water or oil in the compressed air.

In paint systems involving coats, the various coats of paints shall be distinguishable from each other by their shade.

All coats of print shall be applied only to clean, dry and non-greasy surfaces. In multi-coat paint systems, the coat last applied shall always be sufficient dry, free from any superficial moisture and from dust and dirt before applying the next text coat; only when using the moist oil type of paints may it be necessary for the previous coat to be hard dry.

The Contractor shall inform the NPC Representative in good time before starting to apply the next coat so that the NPC Representative shall have the opportunity of approving the previous coat.

Painting work shall not be carried out at a temperature below +5 °C and above 50 °C. In addition, painting work shall not be carried out on surface affected by the action of rain, fog and moisture or water of condensation; work started on such surfaces may not be continued until the surfaces to be painted are completely dry.

AW-4.8 Painting Systems

All surfaces which are required by the Finish Schedules or specifications to be painted, or otherwise finished, shall be given coats of paints or varnish as specified herein. Individual directions printed on the label of the approved paint and varnish shall be strictly followed. Paint thinner or linseed oil of the same brand as the paint to be thinned shall be used.

All materials, supplies and articles furnished shall be the standard products of superior quality. All constituent materials shall conform to the applicable provisions of the latest edition of ASTM Specifications.

The following list indicates painting materials of special compositions considered suitable for various parts of the works.

Concrete and Plastered Surface

Any concrete, cement plaster exposed to high humidity 3 coats of a highly weather-resistant synthetic resin-based paint. The first coat shall contain from 5% to 20% thinner as the surface requires.

All concrete (walls, foundations, etc.) backfilled with soil or submerged.

- 1 coat of coal-tar epoxy.

- 2 coats of a mineral-filled water-resistant coat-tar epoxy.

Concrete, cement plaster, etc. exposed to oil, surface shall be dry, if possible sandblasted, clean and slightly roughened.

- 1 coat with a plastic-modified hydraulic mortar.
- 2 coats of an oil-resistant synthetic resin-based paint.

Concrete exposed to Mechanical and Chemical attack.

- 1 coat of colorless 2- pack epoxy-based paint; this shall contain from 10% to 20% thinner as the surface requires.
- 2 coats of 2-pack epoxy-based paint.

Concrete flooring exposed to mechanical wear and oil.

- 3 coats of chlorinated rubber-based paint. The first coat shall contain 15% thinner.

Internal concrete, plastered walls exposed to abrasion.

- 3 coats of an oil-free, synthetic resin-based, dust-binding paint.

Concrete flooring subject to minor mechanical wall.

- 2 coats of an oil-free, synthetic resin-based, dust-binding paint.

Internal plastered ceilings and walls.

- 2 coats of a polyvinyl-acetate dispersion type, non-chalking paint. First coat shall contain up to 30% thinner of clean, fresh water as the surface requires.

Wooden Surfaces

a) Exterior Parts – N/A

b) Surface shall be smoothed down with adhesive; if machine sanding is involved, a sanding is involved, a sanding sealer to bind the fibres shall be applied; the surface shall also be dry and free from dust.

   - 1 coat of fungicide and bactericide ingredients after first coat.
   - 2 coats of synthetic resin-based lacquer with white active pigments.

c) Interior Parts - Application of varnish on wooden interior walls, partitions, T&G ceiling panelling and closets/cabinets.

   All materials, supplies and articles furnished shall be the standard products of a known manufacturer approved by the NPC Representative.

   1) First Coat. Fill open grained wood with natural wood paste fillers, as is, or mixed with oil-wood stain to obtain desired

shade. Apply along the grain within 30 minutes. Let dry overnight and sand lightly.

2) Second Coat. Apply any one (1) of the colors of oil-wood stain: oak, walnut, marble, and mahogany. Dry overnight and sand lightly.

3) Third Coat. Spray required coats of lacquer sanding sealer. Let dry for 30 minutes and sand to smooth.

4) Choice of any of the following topcoats:

- Clear flat lacquer - for standard flat effect.
- Clear dead flat lacquer - for complete flat lacquer.
- Super dead flat lacquer - for complete flat lacquer.
- Clear gloss lacquer - for standard gloss effect.
- Water white gloss lacquer - for brilliant crystal-clear effect.
- Versatile spar varnish - for glossy thick coating also applicable for exterior wood surfaces.

When spraying under high humid conditions, add up to ten per cent (10%) by volume of lacquer thinner retarder to prevent blushing of lacquer products.

Steel Surfaces

Details are given General Technical Requirements.

AW-4.9 Measurement and Payment

Payment shall be based on what is called for in the Bidding Form.

AW-5.0 CONCRETE FLOOR HARDENER

AW-5.1 General

The work under this section shall be undertaken by skilled tradesmen experienced with this kind of work. The work to be done shall consist of furnishing all labor, materials and provision of tools and equipment necessary to complete the application of Floor Hardener.

AW-5.2 Materials

Floor hardener shall be non-metallic a mixture of especially graded mineral aggregates crushed and sieved to produce sharp granules. It should be extremely hard and must be highly resistant to abrasion, impact, chemical and acid, attack and will not oxidize under any circumstances. It should be non-metallic and must be a mixture of graded Silicon Carbide and Aluminum Oxide Aggregates.

AW-5.3 Measurement and Payment

Measurement and payment for **Concrete Floor Hardener** will be based on the area placed and accepted by the Owner.

Payment will be made at the corresponding contract unit price per square meter 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-6.0 SOIL TREATMENT

AW-6.1 General

The work to be done under this Section shall include all labor, materials, tools and equipment necessary for soil treatment.

The Contractor shall treat the soil under the building and immediate surroundings to make it impervious and toxic to subterranean termites, often referred to as white ants or "anay" by application of soil poison solutions.

AW-6.2 Material

Material to be used shall be a solution commonly used by licensed companies or entities engaged in pest control or pest eradication. Banned solutions must not be applied.

AW-6.3 Application

The application of solutions follows the sequence of construction and the following are the order treatment:

a) Thoroughly saturate every linear meter of excavation for footings and other cement work.

b) After grading and leveling the soil in the ground and layers of gravel laid preparatory to the pouring of concrete, flood or soak every square floor area.

c) As soon as the building is constructed, just prior to the landscaping of the lawn and garden, saturate every linear meter perimeter of the building, about three (3) meters wide, with the termite proofing solution.

d) Treat earth fills thoroughly as they may carry termite colonies. As soon as the fill is packed and leveled, saturate every one square meter area with 4 litters of the termite-proofing solution.

An ordinary watering can (sprinkling can) can be used to saturate or saturate areas with the termite-proofing solution. However, for convenience and thorough and faster application, use a power sprayer with 3 to 5 gallons per minute capacity.

AW-6.4 Measurement and Payment

Measurement for payment for Soil Treatment will be based on what is required on the Bill of Quantities.

AW-7.0 WATERPROOFING

AW-7.1 General

The work includes the laying/ installation of waterproofing membrane at the roof deck of the building.

Waterproofing materials shall be delivered to the site in their original sealed containers or packages bearing manufacturer's name and brand designation.

The work shall be performed by the manufacturer's certified applicators and only the best quality of materials and workmanship shall be used in strict accordance with the standard practice for this type of work.

AW-7.2 Materials

The waterproofing material shall be a complete system of bitumen layers supplied by a manufacturer of reputable corporate existence.
Waterproofing materials shall be heat resistant preformed reinforced bituminous membrane which has good elongation and recovery characteristic when subjected to expansion and contraction movements.

AW-7.3 Surface Preparation

All concrete or masonry surfaces shall be cured for minimum of seven (7) days. It must be wood-trawled, smooth, firm, dry, clean and free from rubbish, lose or foreign materials and imperfections.

Installation of metal fittings and similar works shall be completed before application of waterproofing is done.

Surfaces shall be properly graded to drain water freely into drain lines. Drainage connections shall be set up to permit free flow of water. There shall be provisions for mortar cants in the angle formed by the area. If required, reglets of about 40mm deep and 40mm wide at 250mm above floor finish shall be provided along walls or parapet walls for the waterproofing system.

AW-7.4 Execution of Work

The waterproofing membrane shall be installed according to the manufacturer's instruction. Apply material "patching compound" reinforced with "patching fabric" on cracks and other surface imperfections.
The membrane application shall be commenced from the lowest point when applied on a surface to fall line to ensure weathered overlaps.

After installation of membrane, careful inspection shall be made for accidental damage. Damaged area shall be cleaned and patched with fresh membrane waterproofing (minimum patching material of 152mm x 152mm).
Prior to acceptance of the job, all waterproofed surfaces shall be given a 48-hour flooding and the Contractor shall remedy at once any evidence of leakage. Flooding test shall be done by plugging all drains, building temporary dams at opening so that water will be 25.4mm (1") deep at high point of waterproofing.

Concrete topping to be used shall be 20.70MPa as per ACI specifications and 50mm (2") thick (minimum) excluding the finish and reinforced with welded steel wire fabric as per ASTM A185-73 specifications.

In particular, the Contractor shall verify conditions such as the following do not exist:

- extensive unevenness of the bed;
- too rough, too porous, too smooth surfaces;
- sharp edges of boarding and ridges;
- variation from the horizontal or fall stipulated in the Specifications or dictated by circumstances;
- incorrect level of the surface of the bed;
- non-rounded corners, edges and channeling;
- stress and settlement cracks, holes;
- too moist surface;
- non-sealing of voids (e.g. in concrete);
- inadequate firmness of the bed;
- oily surface;
- unsuitable type or portion of penetrating structural members; and
- lack of parts for connecting structural members which penetrate the waterproofing

AW-7.5 Guarantee

The Contractor shall guaranty that the work specified in this section will be free from defects of materials, workmanship and leakage for a period of five (5) years from the date of final acceptance. This obliges the Contractor to make good the defective work.

AW-7.6 Measurement and Payment

Measurement of payment for **Membrane Waterproofing** will be based on the area applied 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.

SECTION VI

TECHNICAL SPECIFICATIONS FOR CIVIL WORKS

SECTION VI – TECHNICAL SPECIFICATIONS

CW – CIVILWORKS

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SECTION VI - TECHNICAL SPECIFICATIONS

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 provice 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 STRUCTURAL EXCAVATION, FILL AND BACKFILL

CW-4.1 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-4.2 Materials

CW-4.2.1 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-4.2.2 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-4.2.3 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 13.79 MPa 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-4.2.4 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-4.3 Construction

CW-4.3.1 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-4.3.2 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-4.3.3 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-4.3.4 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-4.4 Measurement and Payment

CW-4.4.1 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-4.4.2 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., equiprnent and other incidentals necessary to complete the item.

CW-4.4.3 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-4.4.4 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-4.4.5 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-5.0 CONCRETE

CW-5.1 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-5.2 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-5.3 Materials

CW-5.3.1 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. However, the use of Portland Pozzolan Cement Type IP meeting the AASHTO/ASTM requirements may be allowed, provided that the trial mixes shall be done and that the mixes meeting the concrete strength requirements of the

AASHTO/ASTM provisions, pertaining the use of Portland Pozzolan Type IP, shall be adopted.

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-5.3.2 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-5.3.3 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-5.3.4 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-5.3.5 Formwork

Timber, lumber and plywood to be used for falsework and formwork shall be sound and shall comply with the requirements of this specification. 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-5.4 Storage of Materials

CW-5.4.1 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 airtight 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-5.4.2 Reinforcing Steel

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

CW-5.5 Concreting

CW-5.5.1 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-5.5.2 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 that will be considered 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-5.5.3 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-5.5.4 Mixing Concrete

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

CW-5.5.5 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-5.5.6 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-5.5.7 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-5.5.8 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-5.5.9 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-5.5.10 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-5.5.11 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-5.6 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-6.0 REINFORCING STEEL

CW-6.1 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-6.2 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-6.2.1 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-6.2.2 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-6.3 Construction Requirement

CW-6.3.1 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-6.3.2 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-6.3.3 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-6.3.4 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-6.3.5 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 Φ32 mm. 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 otherwise 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-6.4 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-7.0 STRUCTURAL STEEL

CW-7.1 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-7.1.1 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-7.1.2 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-7.2 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, and scale of fragments that could reduce the resistance and durability or injure the external appearance.

Except as modified herein, blast clean the 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-7.2.1 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-7.2.2 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-7.2.3 Accessories

Welding electrodes and steel structural members shall use:

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

CW-7.3 Execution

CW-7.3.1 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-7.3.2 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-7.3.3 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. Ensure 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 in a 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-7.3.4 Erection

Except as modified herein, erect the 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-7.3.5 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-7.4 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.

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

SECTION VI

TECHNICAL SPECIFICATIONS FOR MECHANICAL WORKS

PART I – 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 and Associated Piping at Casiguran 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 conduct actual inspection at site and thoroughly investigate and familiarize himself with all the conditions at site, make assessment on the physical conditions and configurations of the existing structure, equipment and piping, determine the required quantity of materials and equipment to be supplied/utilized during the project execution, determine possible sources of materials and equipment to be supplied/utilized, and verify the actual scope of works and relative costs. Any and/or all expenses arising through the lack of knowledge or understanding regarding the existing conditions of the site shall be the responsibility of the Contractor and no additional payment thereof shall be made by NPC.

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. 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.

In accordance with the specifications contained in this section and as shown on the drawings, the scope of this Contract covers the supply, installation/erection and test of all mechanical equipment and materials as required, but not limited to the following:

a) One (1) set of centrifugal pump with motor, complete with controls and other accessories including spare parts for one (1) year operation;

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

c) One (1) lot of Painting Works to conform with the requirements of this specification;

d) Disinfection of water supply line from cistern to distribution systems; and

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

MW-3.0 MATERIALS

MW-3.1 General

All materials, equipment, devices and accessories to be supplied under this contract 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 and materials shall conform to the latest specifications and provisions of approved standards of engineering societies or other equivalent standards approved by NPC.

The work shall be performed and completed in a high quality workmanship, in accordance with generally modern accepted practice in the fabrication, assembly, installation and test of all equipment and materials supplied by the Contractor, notwithstanding any omission from these Specifications or drawings.

Defect and damages to the equipment resulting from faulty installation works shall be repaired and/or replaced by the Contractor at no cost to the NPC.

MW-3.2 Code and Standards

The supply, installation and test of equipment and materials shall conform to the latest specifications and provisions of the following engineering societies or other internationally accepted standards. Other standards which ensure equal or higher quality than the standards mentioned below will be accepted provided they meet the requirements of existing laws and regulations of the Government of the Republic of the Philippines.

ANSI	-	American National Standard Institute
ASME	-	American Society of Mechanical Engineers
ASTM	-	American Society of Testing Materials
AWS	-	American Welding Society
FM	-	Factory Mutual Engineering
HIS	-	Hydraulic Institute Standards
NEC	-	National Electric Code
NEMA	-	National Electrical Manufacturer's Association
OSHA	-	Occupational Safety Health Act of 1970
PEC	-	Philippine Electric Code

In the event of any conflict among the above listed codes or this Specification, Appendices and Attachments, Bidder shall refer the conflict to NPC for written resolution. In addition to the above codes and standards, Bidder shall comply with all applicable State and local laws and regulations.

MW-3.3 Equipment Foundation

All equipment shall be installed in accordance with the manufacturer's recommendations and applicable codes and standards. Requirements for concrete foundations where the equipment are to be mounted shall be referred to the relevant Civil Works Specifications.

The Contractor shall be responsible for the correct positioning and leveling of the equipment and auxiliaries, and any checking made by the NPC during the course of the work shall not relieve the Contractor from his responsibility. During installation works, electro-mechanical equipment shall be carefully lifted or glided on the foundation by using only approved methods and equipment, and in a manner that will prevent damage to the equipment and foundation. The equipment shall be positioned on a location as shown on the drawings and shall be leveled and checked true to grade and alignment before final grouting. The Contractor shall strictly adhere to the installation procedures/manuals provided by Manufacturers of the equipment.

Prior to equipment mounting and grouting, the surface area and blackouts of concrete foundation shall be cleaned of all dirt by any approved means. Chipping of concrete surface to the required thickness shall be done by any approved methods without damaging the concrete structure as a whole.

The pouring of concrete to secure in place any equipment on its concrete foundation shall not be made until the NPC has verified the correct location of the foundation. Should incorrect positioning be ascertained after the concrete pouring, the Contractor shall make the correction at his own expense.

The concrete foundation surfaces shall be free of any loose materials, oil, water or any other contaminants that would prevent the grout from bonding. The concrete shall be chipped to expose a minimum aggregate so as to remove all laitance and provide a rough surface for bonding. The exposed surface shall be blown with compressed air free of oil to remove dust.

MW-3.4 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-3.5 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 articles 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 requirement of the plant including the required excavation and backfilling of pipe trenches.

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

a) One (1) set of centrifugal pump with motor, complete with controls and other accessories including spare parts for one (1) year operation;

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

c) Disinfection of water supply line from cistern to distribution systems.

MW-4.2 Centrifugal Pump

MW-4.2.1 Scope of Work

The scope of work shall cover the supply, delivery, installation and test of one (1) unit of centrifugal pump, single or multi-stage, horizontal shaft type with a capacity not less than 11.36 m^3/hr (50 gpm) at 20m head complete with all controls and necessary accessories, equipment foundation and anchor bolts including spare parts required during the 1 year warranty period as recommended by the pump manufacturer. The pump shall be installed between the cistern and water tank.

The supply shall include but not limited to the following:

a) One (1) unit of 32mm ∅ Gate Valve @ pump's suction;

b) One (1) unit of 32mm Ø Gate Valve @ pump's discharge;

c) One (1) unit of 32mm Ø Check Valve @ pump's discharge;

d) Two (2) units of Pressure Gauge, 100mm Ø dial gauge, bourbon tube type, 0 - 3 kg/cm2 scale range, equipped with isolation valve;

e) One (1) set of Strainer, Simplex Type with cast iron body material, 40-mesh size, stainless steel elements and flanged or screwed ends;

f) One (1) lot of Standard Spare Parts as recommended by the manufacturer for one (1) year operation and as specified in the technical specifications.

g) One (1) lot of Piping materials complete with pipe fittings, pipe supports and other accessories;

h) One (1) lot of Power, Control and Instrumentation Cables;

i) One (1) lot of Concrete Foundation for the Pump; and

j) Functional test of the Pump and control panel.

MW-4.2.2 Materials and Construction

a) Pump Assembly

The pump casing shall be made of heavy duty cast iron, bronze or stainless steel impeller, stainless steel shaft sleeve and mechanical seal arrangement. Shaft shall be of high-grade carbon steel or stainless steel designed for maximum load-carrying capability

The pump casing shall be split type for ease of maintenance such that the impeller and shaft are capable of being withdrawn without disturbing any of the main pipework and valves carrying the pumped fluid.

The horizontal 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 230V, 3-phase, 60 hz suitable for continuous and intermittent operation. The motor shall be equipped with built-in overload protection and automatic reset to assure safe motor operation under normal field conditions.

Motor shall be provided with suitable electrical control and complete protective devices. The control relays of the motor starter shall be contained in the steel metal enclosures or control panel installed under the building stair.

b) Power Cable

Power supply and control cables shall be included in the supply. Power supply shall be sourced from the Power Panel Board and terminated in the pump's local control panel installed in the pump house. The cables shall be sized suitably for the proper pump operation conforming to the requirements specified in the relevant Electrical Specifications.

c) Controls

Motor shall be provided with suitable electrical controls and complete protective devices. The control equipment shall be of switch actuated control type. The control relays shall be contained in the steel metal enclosures/control panel of the motor starter. The pump controls shall be designed such that it can be operated either automatically in conjunction with a level switch in the water storage tank or manually through a manual-local control push buttons provided at the pump's local control panel installed in the pump house.

Control switch to start and stop the pump shall be done in the local panel installed within the pumphouse. Sufficient status indications and alarm signal is initiated upon loss of pump operation. Pump operation shall be as follows:

a)	Water storage tank level high:	Pump stops
b)	Water storage tank level high high:	Annunciate high level alarm and simultaneously trips the running pump
c)	Water storage tank level low:	Pump starts
d)	Water storage tank level low low:	Annunciate low level alarm and simultaneously triggers the standby pump to start

The local control panel shall include pump starter, circuit breaker, motor overload protection, pump control relay, internal 230-240volt control transformer for supplying power to the instruments and control system, start/stop push buttons with indicating lights, power supply indicating light, level alarms, failure or trouble alarm and other components required for the proper operation of the pump. The change-over switch for AUTO-LOCAL operation shall be provided in the local control panel.

MW-4.2.3 Centrifugal Pump House

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

MW-4.2.4 Testing

The pump and motor shall be subjected to factory tests to determine its conformance with the requirements of the specifications and approved test procedures which shall include but not limited to the following:

a) Pressure hydrostatic proof of the casing to 1.5 times the maximum pressure for 30 minutes;

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

c) Other tests as required by applicable codes and standards.

MW-4.2.5 Submittal

The following documents shall be submitted by the Contractor for NPC's review and approval:

a) Technical data, specifications and catalogues;
b) Outline, assembly and installation drawings showing all the dimensions;
c) Operation and maintenance manuals; and
d) Complete test reports.

MW-4.2.6 Spare Parts

The Contractor shall supply and submit list of recommended spare parts for one (1) year operation with corresponding cost which shall include the following:

a) One (1) set of bearing metal for pump and motor; and
b) One (1) set of bushing, wearing rings, packing and gaskets

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, all required excavation and backfill of pipe trenches.

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

MW-4.3.2 Pipe, Fittings and Accessories

Steel Pipe: Piping installed within the area of the centrifugal pump shall be constructed from ASTM A53, Grade A, Schedule 40, seamless and hot-dip galvanized. All steel piping 65mm Ø and above shall be constructed with flanged joints or butt welded joints and fittings. Pipes 50mm Ø below shall be connected with threaded joints

PVC Pipe: The water supply and distribution piping shall be constructed of Unplasticized Polyvinyl Chloride (*uPVC)* pipe, Class 150, conforming to ASTM D-1784 or approved equivalent, except otherwise specified or shown on the drawing.

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.

The piping shall generally be laid underground. All trenches shall be provided with a cushion pad of at least 100mm sand and sandy soil bedding materials. All pipeline excavations shall be backfilled up to the level of the finished grade surface in layers of 150mm and each layer shall be thoroughly compacted. Backfill materials shall be compactable soil taken from trench excavation and approved by NPC.

All pipes that cross roadways shall be provided with pipe sleeve made of steel material or RCP pipe to protect the pipe from various loads imposed by vehicles and shall extend 600mm beyond shoulder of each pavement side. Embedded water supply pipes in open areas shall be laid not less than 300mm from the ground surface to the bottom of pipe.

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, 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, 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.

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.

Filter/Strainer shall be of Simplex type with cast iron body material and flanged or screwed ends. Screen elements shall be of stainless steel construction with minimum of 40-mesh size.

MW-4.3.4 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.

All pipes that cross roadways shall be provided with pipe sleeve of steel material or reinforced concrete pipe to protect the pipe from various loads imposed by vehicles and shall extend 600mm beyond shoulder of each pavement side.

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-4.4 Testing and Cleaning

MW-4.4.1 General

After installation of the equipment and piping system 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.

The Contractor shall submit the following for review and/or approval by NPC prior to the conduct of test for all equipment and system supplied by the Contractor:

a) Test procedures prior to test; and
b) Test and inspection reports.

All equipment and appurtenances necessary to carry out the tests and any repair, if required, shall be borne by the Contractor.

MW-4.4.2 Pump

The pump shall be subjected to site tests to determine its conformance with the design and operating characteristics and shall be performed in accordance with MW-4.2.2 and the approved test procedures and applicable codes and standards.

MW-4.4.3 Domestic Water Supply Piping System

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 test is made, the Contractor shall notify NPC in advance so that such test may be witnessed. All expenses that may be incurred during the tests shall be borne by the Contractor.

MW-4.5 Painting

The Contractor shall be responsible for the adoption of preparation procedures and protective coating systems that are suitable for the environment experienced by the various equipment and piping systems and conforming manufacturer's recommendation and applicable standards. Painting shall generally be applied to metallic surfaces unless otherwise specified.

Where a specific coating system is mentioned elsewhere in the specification, the Contractor shall accept responsibility for the suitability for such system. The Contractor has the option to nominate an alternative coating system that is of equal or better quality subject for the approval of NPC.

All other equipment and steel piping installed outdoors and indoors shall be prime coated with 80 microns DFT zinc rich epoxy paint and 80 microns DFT of chlorinated rubber for each intermediate and topcoat.

MW-4.6 Disinfection of Cistern, Elevated Water Storage Tank and Domestic Water Piping System

The cistern, water storage tank and domestic water piping system shall be disinfected after testing and before being put into use. Before disinfection, the cistern, tank and piping should be drained, flushed, re-drained and refilled. In refilling, care must be taken to avoid entraining or entrapping air in the tank. The Contractor may use any of the methods of disinfection 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.

MW-4.7 Submittal

The Contractor shall also submit the technical specifications/data and brochures/catalogs of the pump, level switches/gauges, piping materials, valves and other accessories for review and approval of NPC prior to purchase.

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

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

MW-5.0 PAINTING OF EXISTING ELEVATED WATER STORAGE TANK

MW-5.1 Requirements

MW-5.1.1 General

The scope covers the necessary works and materials, equipment, tools, services and incidentals to complete all work for the repainting and disinfection of the existing elevated water storage tank.

The Contractor shall provide forced air ventilation while work is being done inside the tank, after each coat is applied and continue after completion of painting works. Air shall be exhausted from the lowest portions of the tank with the top openings kept open and clear. Ventilation requirements will be in strict accordance with the manufacturer's recommendations and OSHA requirements as applicable.

The tank's inside and outside surfaces, steel pipe, structural supports and other appurtenant surfaces shall be painted in accordance with first class standard practices suitable for the purpose.

All paints and shop primer to be used shall be of standard types of a well-known manufacturer subject to the approval of NPC.

Prior to procurement of painting/coating materials, the Contractor shall submit brochures and catalogues for NPC's review and approval.

The Contractor shall provide forced air ventilation while work is being done inside the tank, after each coat is applied and continue after completion of painting works. Air shall be exhausted from the lowest portions of the tank with the top openings kept open and clear. Ventilation requirements will be in strict accordance with the manufacturer's recommendations and OSHA requirements as applicable.

MW-5.1.2 Surface Preparation

Before any painting is made, all surfaces must be prepared properly by removing all rusts, scales, welding slugs and spatters, existing paint, grease and encrustation of any nature. Steel surfaces shall be white blasted in accordance with Steel Structures Painting Council Standard. The various paints to be used shall be of approved quality and type.

Blast cleaning with iron-free sand or grit shall be used inside the tank. The grit shall be new and unused. Surface preparation of external surface of tank and other structural surfaces that will be carried-out at the site shall be done by power tool cleaning to avoid scattering of abrasives caused by blast cleaning.

All cleaned surfaces shall be primed within six (6) hours or before any rust bloom forms on the blasted surface.

MW-5.1.3 Painting Application

Application of painting shall be in accordance with the Manufacturer's recommendations and standard practices. No painting shall be applied on wet or damp surfaces.

No painting shall take place outdoor during the presence of rain, fog, dew or where the surfaces may be otherwise damp; in particular and no application of paint should be made on plaster surfaces that are not completely dry. No coating shall be applied unless the surface is at minimum of 3°C above dew point.

For successive coats, first coat shall be dried hard before the second coat. The color of successive coats must be sufficiently different to allow easy identification of the sequence of painting of surfaces for control purposes.

Paint shall not be applied to machined surfaces, corrosion resistant materials or linings, unless specified in relevant section of this specification.

Materials and equipment which are applied with primer coatings, it shall be capable of withstanding the wearing effect of handling during shipment and erection.

Any damages on the final coating of equipment and accessories which are applied at the manufacturer's shop shall be touched-up with the same color with the adjacent surfaces.

Outside surfaces of the elevated steel water storage tank including supporting tower structure for the elevated tank and piping shall be painted to conform with the following:

1. Primer Coat (75 microns DFT)	:	Zinc rich epoxy polyamide primer
2. Intermediate Coat (100 microns DFT)	:	Epoxy polyamide
3. Final Coat (50 microns DFT)	:	Polyurethane enamel

Final color of the tank and structures shall be silver or as directed by NPC.

Inside surfaces of the elevated steel water storage tank including structural shall be painted to conform with the following:

1. Primer Coat (150 microns DFT)	:	Odorless and tasteless epoxy based primer
2. Final Coat (100 microns DFT)	:	Odorless and tasteless epoxy polyamide based paint

MW-5.1.4 Testing of Coating

Final tests and inspection shall be carried out by Contractor to ascertain the conformance of the paintwork to the prescribed requirements and procedures. These tests will indicate whether or not the paintwork is correctly applied and is free from wrinkles or roughness that might affect the adhesion of the protective coating.

The Contractor shall provide test instruments used for testing dry film thickness.

Should the measured dry film thickness result to less than the specified one, the Contractor shall apply additional paint to the coat inspected or shall increase the thickness of succeeding coat, as applicable, to conform with the specified total dry film thickness (DFT).

MW-5.1.5 Tagging and Lettering

Tagging shall be provided and painted to the tank at location together with the "NPC" Name and NPC "Logo" which are readily visible and preferably below the NPC logo. Tag no. to be inscribed/painted shall be "PW01TNK".

In addition, lettering of "NPC" name with NPC "LOGO" shall be painted at least on two opposite sides of the outside wall surface of each of the elevated water tank and above the balcony railing, the exact location of which shall be as directed by NPC. Each letter shall have at least a height of 0.6 m and approximately 0.45 m. width, or as otherwise directed by the NPC. The color of the letters shall be luminous blue and red enamel paint on the inscribed lines or as directed by NPC.

MW-5.2 Disinfection and Leak Testing

Disinfection of the internal surfaces of the tank and associated piping shall be conducted in accordance with the requirements specified in Clause MW-4.7.

Newly installed pipe shall be tested by visual examination for leaks at joints during filling of water storage tank. Any leakage that is disclosed in the test shall be repaired by the Contractor to the satisfaction of NPC.

MW-6.0 MEASUREMENT OF PAYMENT

Measurement for payment for all works shall be based on the bid price of each item as shown in the Bill of Quantities. 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 Bill of Quantities. 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 VI

TECHNICAL SPECIFICATIONS FOR ELECTRICAL WORKS

PART I - TECHNICAL SPECIFICATION

EW-ELECTRICAL WORKS

TABLE OF CONTENTS

EW - ELECTRICAL WORKS

EW-1.0 GENERAL

The works to be done under these specifications consist of Lighting and Power System for **Rehabilitation of Elevated Water Tank and Cistern including Pump and Associated Piping at Casiguran DPP.**

EW-2.0 SCOPE OF WORK

In accordance with the specification contained in this section and as shown on the bid drawings, the scope of this contract shall include all engineering services such as furnishing, installation, testing and commissioning of electrical devices and materials.

The works required are as follows:

1. Supply, Installation and Test of Pump Motor Power Supply including necessary control, monitoring and protective devices;
2. Supply, Installation and Test of Power and Lighting System;
3. Supply, Laying and Test of Insulated Copper Conductors; and
4. Supply and Installation of Conduit System.

In addition, the following shall be provided by the Contractor:

1. Provision of services of a highly qualified and competent Electrical Engineer with experience in the implementation of electrical works to perform/direct supervision during installation and test of all supplied devices, including cabling works;
2. Conduct of inspection to verify and assess the extent of the related and incidental works needed to implement the project competently and efficiently; and

The Contractor shall bear full responsibility that the materials have been designed and fabricated in accordance with all codes, standards, and applicable governmental regulations and performs under the conditions and to the standards specified herein.

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 intended purpose. Unless otherwise specified, materials shall conform to the latest applicable standard issued by the following authorities:

1. American National Standards Institute (ANSI)
2. International Electrotechnical Commission (IEC)
3. Institute of Electrical and Electronic Engineers (IEEE)

4. Underwriter's Laboratory (UL)
5. National Electrical Manufacturer's Association (NEMA)
6. National Electrical Code (NEC)
7. Philippine Electrical Code (PEC)

Other recognized national standards may be 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 whose decision shall be final.

EW-4.0 LIGHTING AND POWER SYSTEM

The lighting and power system covered by this specification includes lighting and power outlets (convenience and power), switches, associated conduits and cables, lighting fixtures, fittings, transformer, fuse disconnect switch with lightning arrester combination, 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 Contractor and shall be furnished at no additional cost to NPC.

EW-4.1 Technical Requirements and Characteristics

Circuit shall be wired for lights and outlets. Lighting fixtures shall be controlled and switched locally approximately as shown on the bid drawings. Power source shall be as indicated on the bid 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 Fixtures, Luminaires and Accessories

EW-4.2.1 Lighting Fixtures

All lighting fixtures 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 Contractor at his own expense.

All lighting fixtures, samples and catalogues shall be submitted for NPC's review and approval prior to the order. No lighting fixtures shall be installed without approval of NPC.

Lighting fixtures 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 lighting fixtures shall be protected from damage during installation. Any broken lighting fixtures, receptacles, stems and the like, shall be replaced with new parts, at no cost to NPC.

EW-4.2.2 Luminaires

a. Compact Light Emitting Diode Lamp

Compact Light Emitting Diode Lamp shall be cool white frosted finish, rated 240V AC, 60 Hz operations. Lamp holders shall have E27 base.

When used in damp and wet locations, it shall have an explosion and corrosion proof body and sealed.

EW-4.3 Conductors

Conductor shall be stranded annealed copper conductor suitable for continuous temperature of 90°C. 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 cables shall be moisture and heat resistant thermoplastic or cross-linked synthetic polymer unless otherwise specified by NPC.

EW-4.3.1 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 to conductors only by means of approved grips and the end portion of the conductor, which has been marked or deformed by the grip, shall be cut-off by the Contractor.

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

EW-4.4 Conduit System

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 Contractor. 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.

EW-4.4.1 Non-Metallic Conduits

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

The RMC and 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.

EW-4.5 Junction / Utility and Pull Boxes

EW-4.5.1 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 Contractor 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.

EW-4.5.2 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 unplasticized 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 CONTROL, PROTECTION AND MONITORING PANELS OF MOTOR PUMP

The control, protection and monitoring panels covered by this specification shall primarily be comprised of the combination motor starter with breaker unit, measuring devices, indicating lights and other associated components. The panels, depending on the location where it shall be installed, shall provide one or more of the following functions: control, protection, monitoring and disconnecting means of the FOST Pump Motor to be installed inside the pump house.

EW-5.1 Technical Requirements and Characteristics

The protection relay system shall be designed to bring the unit to automatic opening of breaker for electrical fault according to calculated tripping parameters.

The protection scheme shall be provided with adequate number of input/output contacts of suitable rating to carry out the prescribed tripping functions for the initiation of automatic closing/tripping or switching control.

All DC and AC power supply required for control, monitoring and protection of the system shall be integrated in the panels. The power and voltage requirements will be determined by the manufacturer in accordance with the ratings and consumption of its equipment/device.

The Contractor may offer a motor control, protection and/or monitoring panel with proprietary standard design of the manufacturer containing the required functions suitable to the offered pump motor.

EW-5.1.1 Panel Construction

The panel shall be constructed from a minimum of 2.0 mm thickness steel sheet with edges formed into a rectangular pattern welded steel sheets so that each section is rigid, self-supporting and enclosed. It shall be adequately protected and suitable for indoor and outdoor application and all climate condition.

The panel shall be labeled with ISO symbols and comply with IP 65 for external environmental resistance and IP 44 and NEMA 12 for the resistance of the internal sealed modules.

EW-5.1.2 Combination Motor Starter and Breaker Unit

The combination magnetic full voltage starter unit shall include contactors with manual reset thermal overload relays; and operating coils. The smallest combination starter unit shall be NEMA Type 1 or equivalent to IEC standard.

SECTION VII

BILL OF QUANTITIES

SECTION VII

BILL OF QUANTITIES FOR ARCHITECTURAL WORKS

BILL OF QUANTITIES
ARCHITECTURAL WORKS

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)
I. REPAINTING OF ELEVATED WATER TANK SUPPORT STRUCTURE							
1.0	Painting of elevated water tank support structure (includes surface preparation and grinding/cup brushing to sound metal of corroded parts of WF column, tension rod, turn buckle and gusset plates)	clean, furnish & apply	Refer to NPC TS & Drawing	lot	1.0	_____ _____(P_____)	_____(P_____)
2.0	Painting of Horizontal Strut 2-80x80x6 thk Angle Bar						
3.0	Repainting of Fixed Ladder with Ladder Cage and Balcony including support, steel grating flooring and railings (includes surface preparation and grinding/cup brushing to sound metal of corroded parts of all surface areas)						
B. PUMPHOUSE							
1.0	**WALL SYSTEM AND FINISHES**						
	(a) 150mm thick (6") CHB Wall including mortars and reinforcing bars.	furnish and lay	Refer to NPC TS & Drawing	sq.m.	13	_____ _____(P_____)	_____(P_____)
	(b) Plastering - plain cement plaster wall finish	furnish and apply	Refer to NPC TS & Drawing	sq.m.	37	_____ _____(P_____)	_____(P_____)
	(c) Concrete Louvers	furnish and lay	Refer to NPC TS & Drawing	sq.m.	1	_____ _____(P_____)	_____(P_____)
2.0	**FLOOR FINISHES**						
	(a) Plain cement plaster Floor Finish	furnish and apply	Refer to NPC TS & Drawing	sq.m.	3.0	_____ _____(P_____)	_____(P_____)

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BILL OF QUANTITIES
ARCHITECTURAL WORKS

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)
3.0	**FENESTRATION**						
	(a) Door: D - 1 (2100mm x 900mm) Flush Type Wooden Door Marine Plywood both sides 2"x5" hard wood jamb, including heavy duty loose pin hinges, door knob/lockset weatherproof and painting	furnish and install	Refer to NPC TS & Drawing	set	1.0	_____ _____(P_____)	_____(P_____)
4.0	**PAINTING**						
	(a) All Concrete Surfaces	furnish and apply	Refer to NPC TS & Drawing	sq. m.	50	_____ _____(P_____)	_____(P_____)
5.0	**MISCELLANEOUS**						
5.a	Soil poisoning; authorized anti-termite liquid concentrate	1 furnish and apply	Refer to NPC TS & Drawing	lot	1.0	_____ _____(P_____)	_____(P_____)
5.b	Waterproofing membrane: 5 layers of bitumen with polyethelene reinforcement sheeting	furnish and apply	Refer to NPC TS & Drawing	lot	1.0	_____ _____(P_____)	_____(P_____)
	TOTAL AMOUNT OF BID (ARCHITECTURAL WORKS) CASIGURAN DPP					_____ _____(P_____)	_____(P_____)

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SECTION VII

BILL OF QUANTITIES FOR CIVIL WORKS

BILL OF QUANTITIES
CIVIL WORKS

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)
A. ELEVATED WATER TANK SUPPORT STRUCTURE							
1.0	Removal & replacement of all horizontal strut	dismantle furnish & replace	Refer to NPC TS & Drawing	kgs.	**1292**	_____ _____(P_____)	_____(P_____)
2.0	Removal & replacement of 25mm dia. Tension rod (including 25mm dia. turn buckle)	dismantle furnish & replace	Refer to NPC TS & Drawing	pc.	**1.0**	_____ _____(P_____)	_____(P_____)
B. CISTERN							
	Cover for cistern						
1.0	35 x 20 x 2mm Hot dipped galvanized rectangular tube	furnish & install	Refer to NPC TS & Drawing	l.m.	**43.0**	_____ _____(P_____)	_____(P_____)
2.0	20 x 20 x 2mm Hot dipped galvanized angle bar	furnish & install	Refer to NPC TS & Drawing	l.m.	**18.0**	_____ _____(P_____)	_____(P_____)
3.0	20 x 2mm Hot dipped galvanized flat bar	furnish & install	Refer to NPC TS & Drawing	l.m.	**92.0**	_____ _____(P_____)	_____(P_____)
4.0	Heavy duty uPVC Tarpaulin (including accessories for connection)	furnish & install	Refer to NPC TS & Drawing	sq.m.	**69.0**	_____ _____(P_____)	_____(P_____)
5.0	**Rehabilitation of existing cistern**						
	(a) Cleaning/Brushing with soap water and bleach (internal/external part)	drain, clean & scrub	Refer to NPC TS & Drawing	sq.m.	**115.0**	_____ _____(P_____)	_____(P_____)

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BILL OF QUANTITIES
CIVIL WORKS

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) Application of epoxy grout to existing cracks	furnish & apply	Refer to NPC TS & Drawing	lot	1.0	_____ _____(P_____)	_____(P_____)
C. PUMPHOUSE							
1.0	Construction of Pumphouse (including structural excavation / backfill, sand and gravel bedding, 20.7 MPa concrete, RSB G275 and application of concrete epoxy	furnish & construct	Refer to NPC TS & Drawing	lot	1.0	_____ _____(P_____)	_____(P_____)
	TOTAL AMOUNT OF BID (CIVIL WORKS) CASIGURAN DPP					_____ _____(P_____)	_____(P_____)

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SECTION VII

BILL OF QUANTITIES FOR ELECTRICAL WORKS

ELECTRICAL WORKS

Item No.	Description of Work or Materials	Work to be Done	Ref.	Unit	Total Quantity	Unit Price in Pesos (Words and Figures)	Total Amount
1.0	**CENTRIFUGAL PUMP**						
a.	Local Control and Protection Panel in NEMA-1 Class Enclosure including Combination Motor Starter with 50AF/25AT, 3-Pole, 230V MCB, Start/Stop Button, Indicating Lights, etc. as described in the Technical Specifications	Furnish, Install and Test		set	1	***Price already included in MW-Mechanical Works (Item 1.1.2)***	
2.0	**LIGHTING FIXTURES**						
	a. Fixture Type A (1x9 W Compact LED Lighting Fixture)	Furnish, Install and Test		set	1	_____ (₱ _____)	₱ _____
3.0	**BREAKERS, OUTLETS AND SWITCHES INCLUDING PLATE COVER, FLUSH-MOUNTED, GROUNDING TYPE**						
a.	Convenience Outlet Duplex, Weatherproof 16A, 230V, 1-phase	Furnish, Install and Test		set	1	_____ (₱ _____)	₱ _____
b.	50AF/25AT, 3-Pole, 230V, MCB in NEMA 1 Enclosure to be installed inside the control room	Furnish, Install and Test		set	1	_____ (₱ _____)	₱ _____
c.	50AF/20AT, 2-Pole, 230V, MCB in NEMA 1 Enclosure to be installed inside the pump house	Furnish, Install and Test		set	1	_____ (₱ _____)	₱ _____

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ELECTRICAL WORKS

Item No.	Description of Work or Materials	Work to be Done	Ref.	Unit	Total Quantity	Unit Price in Pesos (Words and Figures)	Total Amount
4.0	**INSULATED COPPER CONDUCTORS INCLUDING TERMINAL LUGS, CABLE TIES, IDENTIFICATION TAGS, ETC.**	Furnish, Lay and Test		lot	1	_____ (₱ _____)	₱ _____
	a. 5.5 mm², 600 V, Heat Resistant Thermoplastic, (THHN/THWN-2), Copper Conductor						
	b. 3.5 mm², 600 V, Heat Resistant Thermoplastic, (THHN/THWN-2), Copper Conductor						
5.0	**EMBEDDED AND/OR NON-EMBEDDED CONDUITS INCLUDING BOXES, LOCKNUTS, ELBOWS, BOLTS AND OTHER FITTINGS**	Furnish and Install		lot	1	_____ (₱ _____)	₱ _____
	a. 20 mmØ RMC						
	b. 20 mmØ uPVC						
	c. Boxes, Locknuts, Elbows and Other Fittings						

TOTAL ELECTRICAL WORKS _____ (₱ _____) ₱ _____

_____ Name of Firm

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SECTION VII

BILL OF QUANTITIES FOR MECHANICAL WORKS

MECHANICAL WORKS

Item No.	Description of Work or Materials	Work to be Done	Ref. Clause	Unit	Estimated Quantity	Unit Price in Pesos (Words and Figures)	Total Amount
1.0	**DOMESTIC WATER SUPPLY SYSTEM**		MW-4.0				
1.1	**Water Storage and Pumping System**						
1.1.1	Centrifugal Pump, 11.36 m³/hr (50 GPM) @ 20 meters minimum TDH, 230 V, 3-phase, 60 hz, with power cable, instruments & controls, control panel, and other accessories as described in the technical specifications	Supply, Install and Test		Set	1	_____ (₱ _____)	₱ _____
1.1.2	Gate Valve, 32mm ø, cast bronze, rising stem, screwed ends, Class 150	Supply, Install and Test		Sets	2	_____ (₱ _____)	₱ _____
1.1.3	Check Valve, 32mmø, Swing type, cast bronze, screwed ends, Class 150	Supply, Install and Test		Set	1	_____ (₱ _____)	₱ _____
1.1.4	Water Pipe, 40mm O.D. (1 1/4" N.D.), ASTM A 53, Gr. B, hot-dip galvanized, Sch. 40, and its associated fittings, pipe supports and other accessories as described in the technical specifications	Supply, Excavate, Install, Test, & Backfill		lm	12	_____ (₱ _____)	₱ _____
1.1.5	Pressure Gauge, 100mm ø dial gauge, bourbon tube type, 0 - 3 kg/cm² scale range, equipped with isolation valve	Supply, Install and Test		Sets	2	_____ (₱ _____)	₱ _____
1.1.6	Strainers, Simplex type with cast iron body material and flanged or screwed ends. Screen elements shall be of stainless steel construction with minimum of 40-mesh size.	Supply, Install and Test		Sets	1	_____ (₱ _____)	₱ _____
1.1.7	Spare Parts for Centrifugal Pump for one (1) year operation or during warranty period per Manufacturer's recommendation and as specified in the technical specifications	Supply & Delivery		Lot	1	_____ (₱ _____)	₱ _____

_____ Name of Firm

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MECHANICAL WORKS

Item No.	Description of Work or Materials	Work to be Done	Ref. Clause	Unit	Estimated Quantity	Unit Price in Pesos (Words and Figures)	Total Amount
1.2	**Domestic Water Supply Piping System**						
1.2.1	Gate Valve, 32mm Ø, cast bronze, rising stem, screwed ends, Class 150	Supply, Install and Test		Sets	3	_____ (₱ _____)	₱ _____
1.2.2	Gate Valve, 25mm Ø, cast bronze, rising stem, screwed ends, Class 150	Supply, Install and Test		Sets	2	_____ (₱ _____)	₱ _____
1.2.3	Hose Bibb, 20mm Ø, bronze body, screwed ends, Class 150	Supply & Install		Sets	8	_____ (₱ _____)	₱ _____
1.2.4	Water Pipe, 40mm O.D. (1 1/4" N.D.), unplasticized PVC, schedule 80 or class 150, associated fittings, pipe supports and other accessories as described in the technical specifications	Supply, Excavate, Install, Test, & Backfill		lm	120	_____ (₱ _____)	₱ _____
1.2.5	Water Pipe, 32mm O.D. (1" N.D.), unplasticized PVC, schedule 80 or class 150, associated fittings, pipe supports and other accessories as described in the technical specifications	Supply, Excavate, Install, Test, & Backfill		lm	120	_____ (₱ _____)	₱ _____
1.2.6	Water Pipe, 25mm O.D. (3/4" N.D.), unplasticized PVC, schedule 80 or class 150, associated fittings, pipe supports and other accessories as described in the technical specifications	Supply, Excavate, Install, Test, & Backfill		lm	84	_____ (₱ _____)	₱ _____
1.2.7	Water Pipe, 20mm O.D. (1/2" N.D.), unplasticized PVC, schedule 80 or class 150, associated fittings, pipe supports and other accessories as described in the technical specifications	Supply, Install, and Test		lm	90	_____ (₱ _____)	₱ _____
1.2.8	Disinfection of elevated tank and domestic water piping system	Supply, perform & Test		lot	1	_____ (₱ _____)	₱ _____

_____ Name of Firm

_____ Name and Signature of Authorized Representative

_____ Designation

MECHANICAL WORKS

Item No.	Description of Work or Materials	Work to be Done	Ref. Clause	Unit	Estimated Quantity	Unit Price in Pesos (Words and Figures)	Total Amount
2.0	**LABELS OR TAGGING**		GW-4.0				
2.1	Tagging or Labels for Equipment, Valves, Piping, Instruments and its fixing accessories	Supply & Installation		Lot	1	_____ (₱ _____)	₱ _____
3.0	**PAINTING**		MW-5.2				
3.1	Painting for elevated water tank, domestic water equipment & piping, its associated valves, fittings, piping supports and other accessories including touch-up for factory painted equipment and accessories	Supply & Apply		Lot	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.

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

REHABILITATION OF ELEVATED WATER TANK AND CISTERN INCLUDING PUMP AND ASSOCIATED PIPING AT CASIGURAN DPP (LuzP21Z1216Sr)

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-07b

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*

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).

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).

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 **REHABILITATION OF ELEVATED WATER TANK AND CISTERN INCLUDING PUMP AND ASSOCIATED PIPING AT CASIGURAN DPP (LuzP21Z1216Sr).**

(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 **REHABILITATION OF ELEVATED WATER TANK AND CISTERN INCLUDING PUMP AND ASSOCIATED PIPING AT CASIGURAN DPP (LuzP21Z1216Sr)** 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

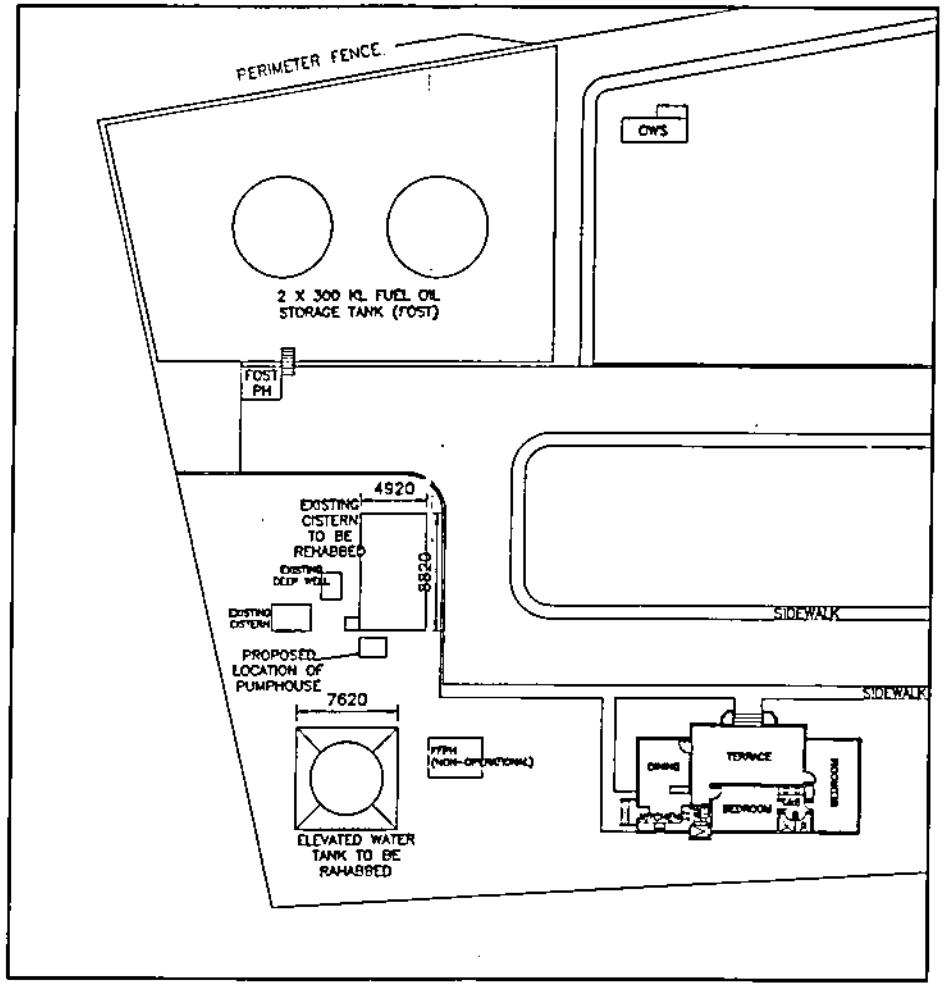
SECTION IX

BID DRAWINGS FOR CIVIL WORKS

SECTION IX – BID/REFERENCE DRAWINGS

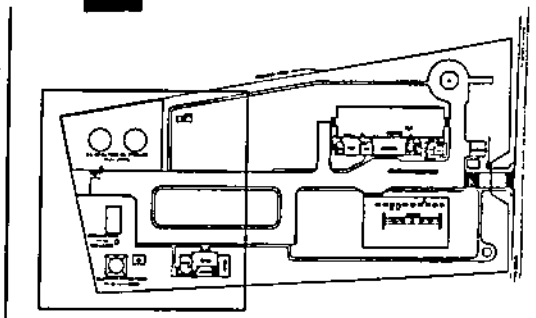
CW – CIVIL WORKS

DRAWING NO.	TITLE
CasDPP-BDC-13.001	CASIGURAN DPP (Site Development Plan)
CasDPP-BDC-13.002	ELEVATED WATER STORAGE TANK (Plan, Section, Elevation & Detail)
CasDPP-BDC-13.003	CISTERN & DETAIL OF COVER (Plan, Section & Detail)
CasDPP-BDC-13.004	PUMPHOUSE (Plan & Elevation)
CasDPP-BDC-13.005	PUMPHOUSE (Plan, Section & Elevation)
CasDPP-BDC-13.006	PUMPHOUSE BEAM & ROOF SLAB (Plan & Details)

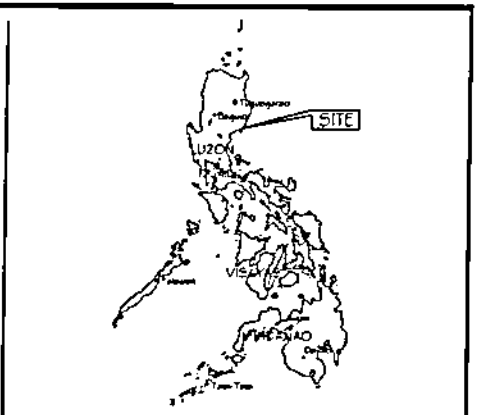


SITE DEVELOPMENT PLAN

CasDPP-BDC-15.001 SCALE 1:400



CASIGURAN DIESEL POWER PLANT



KEY MAP

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. THE CONTRACTOR SHALL VERIFY & CONFORM TO ALL ACTUAL DIMENSIONS IN UNDERTAKING THIS PROJECT. THE NPC SHALL BE NOTIFIED OF ANY DISCREPANCIES OR INCONSISTENCIES AND INCORPORATE WITH THE WORKSHOP DRAWINGS.

OWNER: NATIONAL POWER CORPORATION
AGHAM ROAD, DILIMAN, QUEZON CITY

PROJECT REHABILITATION OF ELEVATED WATER TANK AND CISTERN INCLUDING PUMP AND ASSOCIATED PIPING AT CASIGURAN DPP

LOCATION: BRGY. ESTEVES, CASIGURAN, AURORA

TITLE: SITE DEVELOPMENT PLAN (CASIGURAN DPP)

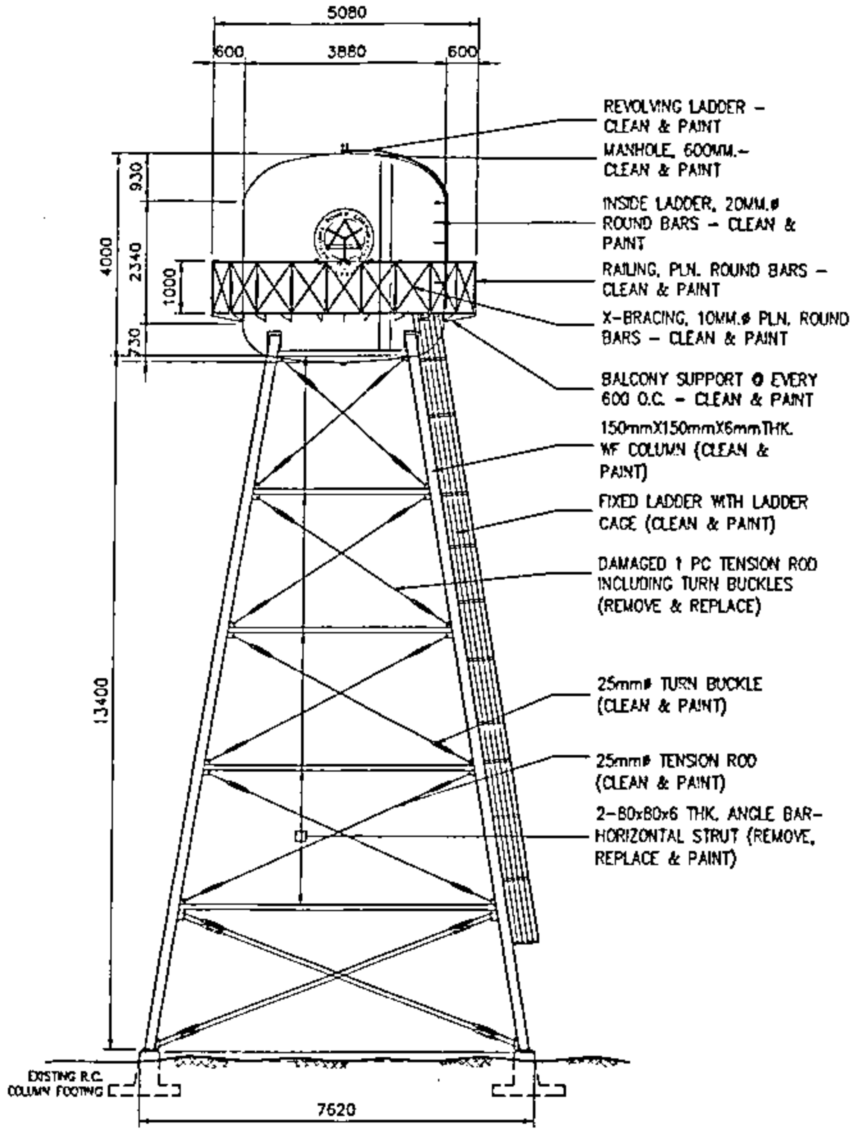
	BY	CHKD	DATE
DESIGNED			
DRAWN	FYST		
REVIEWED	PRINCIPAL ENGR. / ARCHT.		
CIVIL/ARCHT			
ELEC.			
MECH.			

SUBMITTED: H. L. MENDOZA, Principal Engineer A, CEAD
RECOMMENDED: V. JORVINA, Division Manager, CEAD
APPROVED: G. B. MAGPOC, JR., Manager, DDD

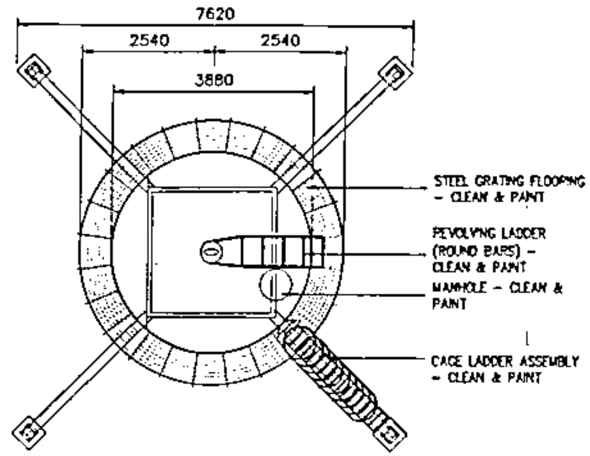
DWG NO CasDPP-BDC-13.001 SPECS NO LuzP21Z1216Sr

SCALE AS SHOWN BID DRAWING

REV.	DATE	NATURE OF REVISION	BY	CHKD	RECD	APPD



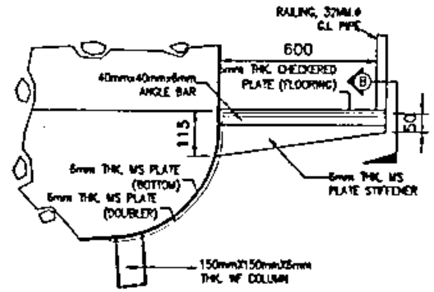
ELEVATION
SCALE 1:100



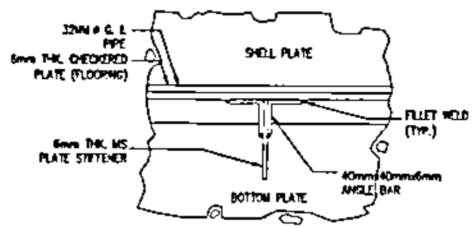
PLAN
SCALE 1:100

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. THE CONTRACTOR SHALL VERIFY & CONFORM TO ALL ACTUAL DIMENSIONS IN UNDERTAKING THIS PROJECT. THE NPC SHALL BE NOTIFIED OF ANY DISCREPANCIES OR INCONSISTENCIES AND INCORPORATE WITH THE WORKSHOP DRAWINGS.
3. STRUCTURAL STEEL TO BE USED FOR FABRICATION AND ERECTION OF THIS STRUCTURE SHALL COMPLY WITH ALL THE PERTINENT PROVISION OF AISC SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDING LATEST EDITION.
4. ALL STRUCTURAL STEEL SHAPES SHALL CONFORM TO ASTM A36 STRUCTURAL STEEL UNLESS OTHERWISE INDICATED.
5. ALL CONNECTION DETAILS SHOWN ARE CONCEPTUAL DESIGN AND OF CONNECTION DETAILS IS THE RESPONSIBILITY OF THE CONTRACTOR.
6. SUBMIT SHOP DRAWINGS FOR REVIEW AND APPROVAL PRIOR TO FABRICATION WORKS.
7. CLEANING AND PAINTING WORKS ARE REQUIRED ON ALL STEEL SURFACES INCLUDING THE INNER TANK SHELL.
8. WORK THIS DRAWING WITH THE MECHANICAL TECHNICAL SPECIFICATION.



BALCONY SUPPORT SECTIONAL DET.



SECTION THRU 'B'

OWNER: NATIONAL POWER CORPORATION
AGHAM ROAD, DILIMAN, QUEZON CITY

PROJECT: REHABILITATION OF ELEVATED WATER TANK AND CISTERN INCLUDING PUMP AND ASSOCIATED PIPING AT CASIGURAN DPP

LOCATION: BRGY. ESTEVES, CASIGURAN, AURORA

TITLE: ELEVATED WATER STORAGE TANK
(PLAN, SECTION, ELEVATION AND DETAIL)

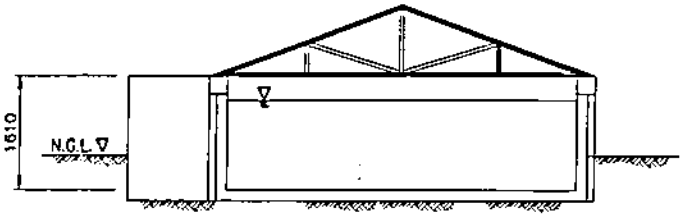
	BY	CHKD	DATE
DESIGNED			
DRAWN			
REVIEWED	PRINCIPAL ENGR./ARCHT.		
CIVIL/ARCHT.		GCP	
ELEC.			
MECH.			

SUBMITTED: M. L. MENDOZA
RECOMMENDED: J. J. JORVINA
APPROVED: G. B. MAGPOC, JR.

DWG NO CasDPP-BDC-13.002 SPECS NO LuzP21Z1216Sr

SCALE: AS SHOWN BID DRAWING

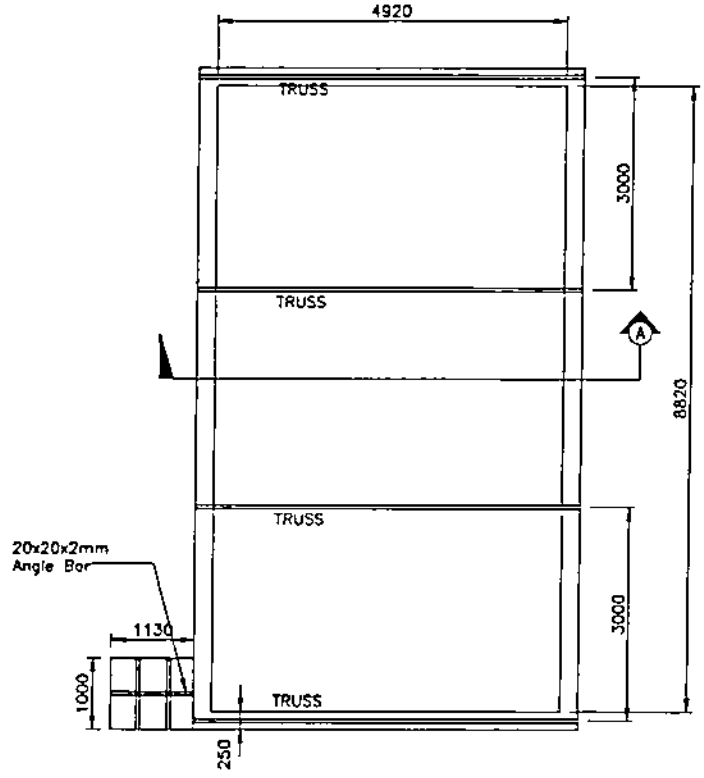
REV	DATE	NATURE OF REVISION	BY	CHKD	RECD.	APPD



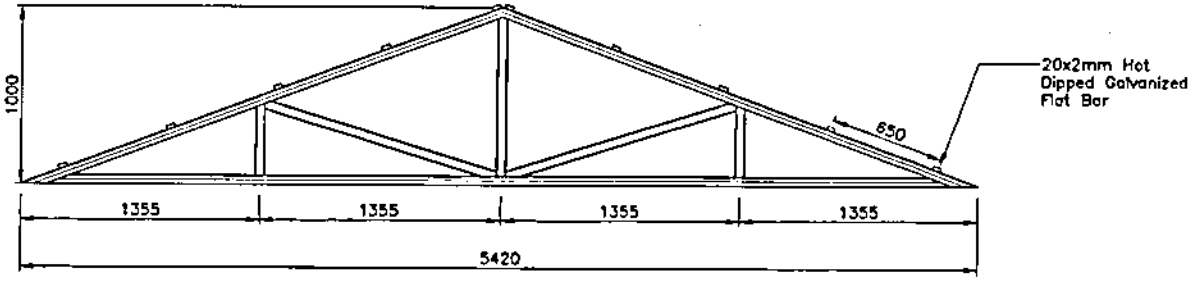
SECTION THRU 'A'

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. THE CONTRACTOR SHALL VERIFY & CONFORM TO ALL ACTUAL DIMENSIONS IN UNDERTAKING THIS PROJECT. THE NPC SHALL BE NOTIFIED OF ANY DISCREPANCIES OR INCONSISTENCIES AND INCORPORATE WITH THE WORKSHOP DRAWINGS.
3. ALL CONNECTION DETAILS SHOWN ARE CONCEPTUAL DESIGN AND OF CONNECTION DETAILS IS THE RESPONSIBILITY OF THE CONTRACTOR.
4. TARPAULIN COVER WILL BE ATTACHED TO D-RINGS AT EVERY 1.5 METERS AROUND THE CISTERN.
5. SIZE OF TARPAULIN TO BE USED SHALL BE LARGE ENOUGH TO COVER THE WHOLE AREA OF THE TRUSS.



PLAN
SCALE 1:75



TOP CHORD = 35x20x2mm HOT DIPPED GALVANIZED RECTANGULAR TUBE
BOTTOM CHORD = 35x20x2mm HOT DIPPED GALVANIZED RECTANGULAR TUBE
WEB MEMBERS = 20x20x2mm HOT DIPPED GALVANIZED ANGLE BARS

TRUSS DETAIL
SCALE NTS

OWNER: NATIONAL POWER CORPORATION
AGHAM ROAD, DILIMAN, QUEZON CITY

PROJECT: REHABILITATION OF ELEVATED WATER TANK AND CISTERN INCLUDING PUMP AND ASSOCIATED PIPING AT CASIGURAN DPP

LOCATION: BRGY. ESTEVES, CASIGURAN, AURORA

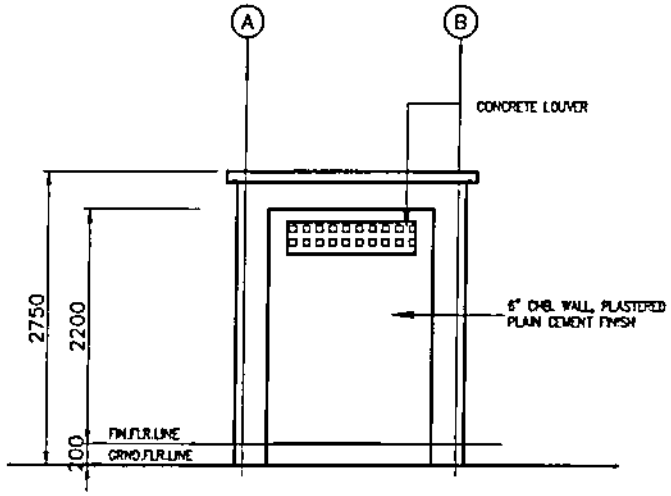
TITLE: CISTERN AND DETAIL OF COVER
(PLAN, SECTION AND DETAIL)

	BY	CHKD	DATE
DESIGNED			
DRAWN	FYST		
REVIEWED	PRINCIPAL ENGR / ARCHT		
CIVIL/ARCHT			
ELEC.			
MECH.			

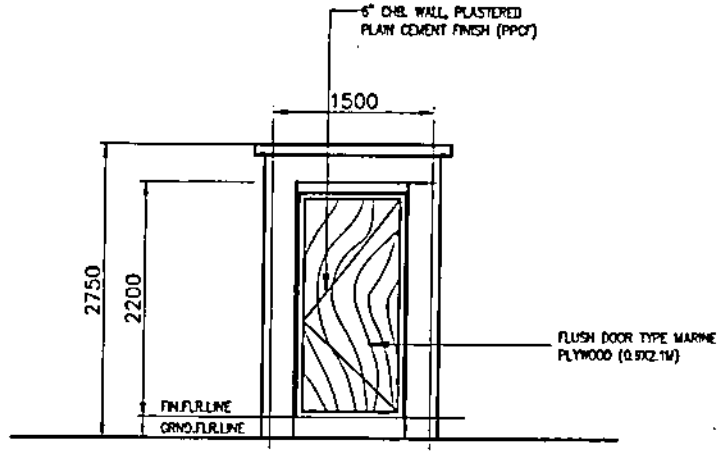
SUBMITTED: H. L. MENDOZA, Principal Engineer A, CEAD
RECOMMENDED: V.G. JORVINA, Division Manager, CEAD
APPROVED: G. B. MAGPOC, JR., Manager, CCD

DWG NO: CasDPP-BDC-13.003
SPECS NO: LuzP21Z1216Sr
SCALE: AS SHOWN
BID DRAWING

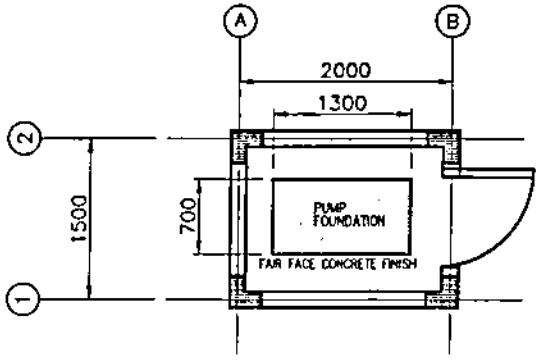
REV	DATE	NATURE OF REVISION	BY	CHKD	RECD	APPD



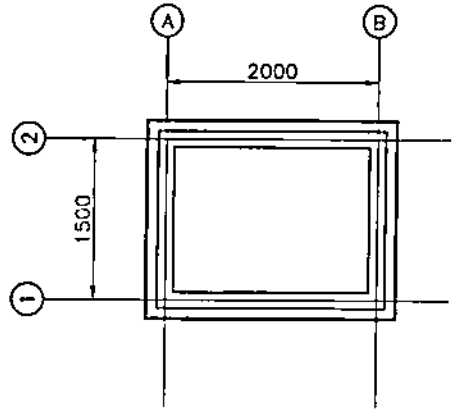
FRONT ELEVATIONS
CasDPP-BDC-13.004 SCALE 1:50



SIDE ELEVATIONS
CasDPP-BDC-13.004 SCALE 1:50



PLAN
CasDPP-BDC-13.004 SCALE 1:50



ROOF PLAN
CasDPP-BDC-13.004 SCALE 1:50

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.

OWNER: NATIONAL POWER CORPORATION
AGHAM ROAD, DILIMAN, QUEZON CITY

PROJECT: REHABILITATION OF ELEVATED WATER TANK AND CISTERN INCLUDING PUMP AND ASSOCIATED PIPING AT CASIGURAN DPP

LOCATION: BRGY ESTEVES, CASIGURAN, AURORA

TITLE: PUMPHOUSE (PLAN & ELEVATION)

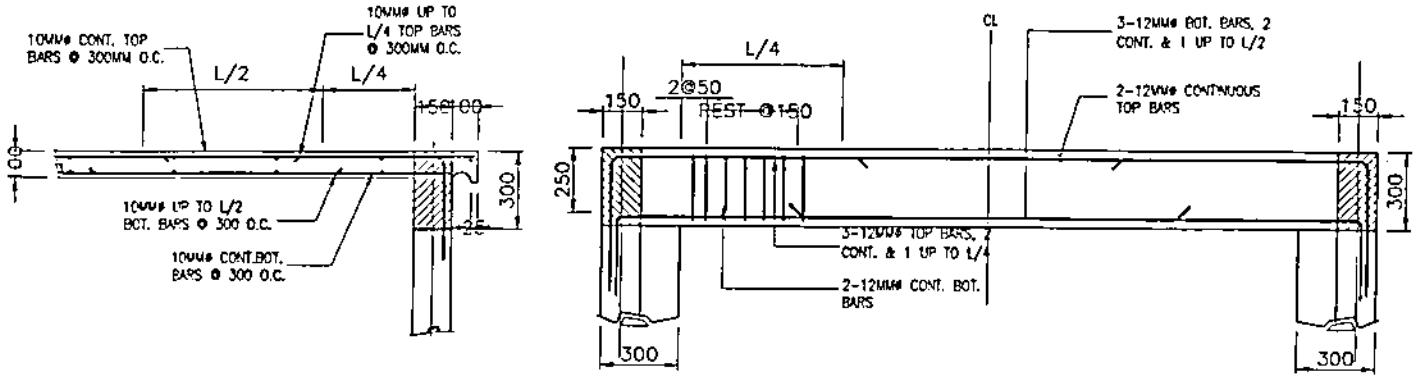
	BY	CHKD	DATE
DESIGNED			
DRAWN	FYST		
REVIEWED	PRINCIPAL ENGR. I ARCHT.		
CIVIL/ARCHT			
ELEC.			
MECH.			

SUBMITTED: H. L. MENDOZA, Principal Engineer A, CEAD
RECOMMENDED: V. C. JORVINA, Division Manager, CEAD
APPROVED: G. B. MAGPOC, JR., Manager, DDO

DWG NO: CasDPP-BDC-13.004 SPECS NO: LuzP21Z1216Sr

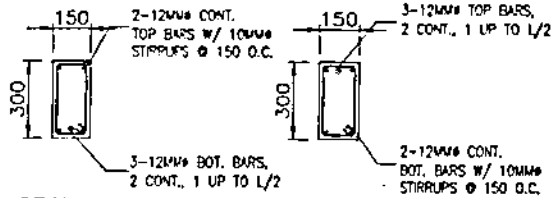
SCALE: AS SHOWN BID DRAWING REV. 0

REV	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPD.



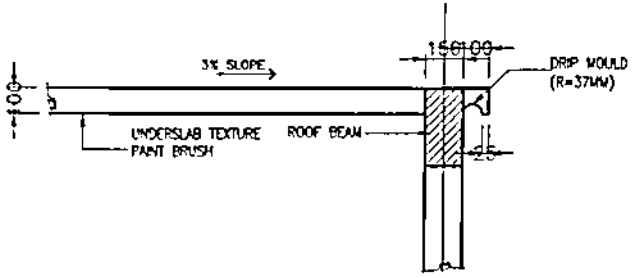
1 **ROOF SLAB REINFORCEMENT**

SCALE 1:20



2 **BEAM DETAIL**

SCALE 1:20



3 **ROOF SLAB DETAIL**

SCALE 1:20

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. MINIMUM COMPRESSIVE STRENGTH OF CONCRETE AT 28-DAY PERIOD SHALL BE 20.70 MPa (3000 PSI).
3. REINFORCING STEEL BARS SHALL CONFORM TO THE LATEST REQUIREMENTS OF PNS FOR DEFORMED STEEL BARS GRADE 275.
4. ALL ASPECTS OF CONSTRUCTION AND DETAILING OF REINFORCEMENTS SHALL BE IN ACCORDANCE WITH THE LATEST PROVISIONS OF ACI CODE.

OWNER: NATIONAL POWER CORPORATION
AGHAM ROAD, DILIMAN, QUEZON CITY

PROJECT: REHABILITATION OF ELEVATED WATER TANK AND CISTERN INCLUDING PUMP AND ASSOCIATED PIPING AT CASIGURAN DPP

LOCATION: BRGY. ESTEVES, CASIGURAN, AURORA

TITLE: PUMPHOUSE BEAM AND ROOF SLAB (PLAN & DETAILS)

	BY	CHKD	DATE
DESIGNED			
DRAWN	FYST		
REVIEWED	PRINCIPAL ENGR. / ARCHT.		
CIVIL/ARCHT			
ELEC.			
MECH			

SUBMITTED: [illegible] MENDOZA, Project Manager & CEAD

RECOMMENDED: J. JORVINA, Division CEAD

APPROVED: G. B. MAGPOC, JR., Manager, DDC

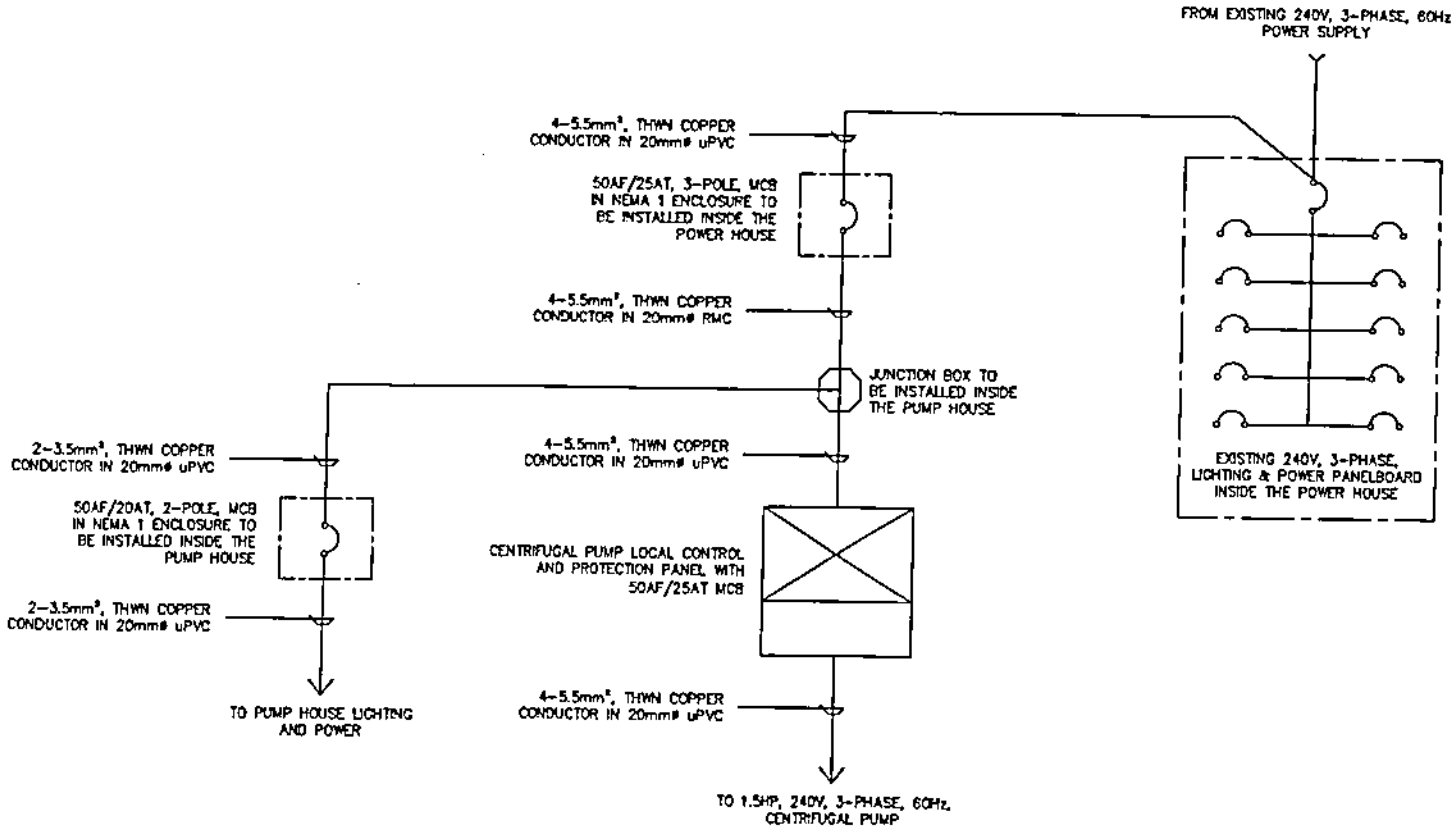
DWG NO: CasDPP-BDC-13.006 SPECS NO: LuzP21Z1216Sr

SCALE: AS SHOWN BID DRAWING REV. 0

REV	DATE	NATURE OF REVISION	BY	CHKD	RECD	APPD

SECTION IX

BID DRAWINGS FOR ELECTRICAL WORKS



SINGLE LINE DIAGRAM

NOTES:

1. THIS DRAWING IS FOR BIDDING PURPOSES ONLY.
2. THE CONTRACTOR SHALL SUBMIT THE ACTUAL ROUTE OF POWER SUPPLY FOR NPC APPROVAL.
3. LOCATIONS OF EQUIPMENT TO BE SUPPLIED INCLUDING ACCESSORIES AND APPURTENANCES SHALL BE CLOSELY COORDINATED WITH THE PLANT HEAD/PERSONNEL.
4. ALL EQUIPMENT TO BE SUPPLIED SHALL BE PROPERLY GROUNDED.

OWNER: NATIONAL POWER CORPORATION
AGHAM ROAD, DILIMAN, QUEZON CITY

PROJECT: REHABILITATION OF ELEVATED WATER TANK AND CISTERN INCLUDING PUMP AND ASSOCIATED PIPING AT CASIGURAN CPP

LOCATION: BRGY. ESTEVES, CASIGURAN, AURORA

TITLE: SINGLE LINE DIAGRAM

	BY	CHKD	DATE
DESIGNED			
DRAWN	MC		
REVIEWED	PRINCIPAL ENGR./ARCHT.		
CIVIL/ARCHT			
ELEC.			
MECH.			

SUBMITTED: B.P. AGUILA, Engineer A
RECOMMENDED: A. S. CANDELARIA III, Manager, MED
APPROVED: G. B. MAGPOC, JR., Manager, CDD

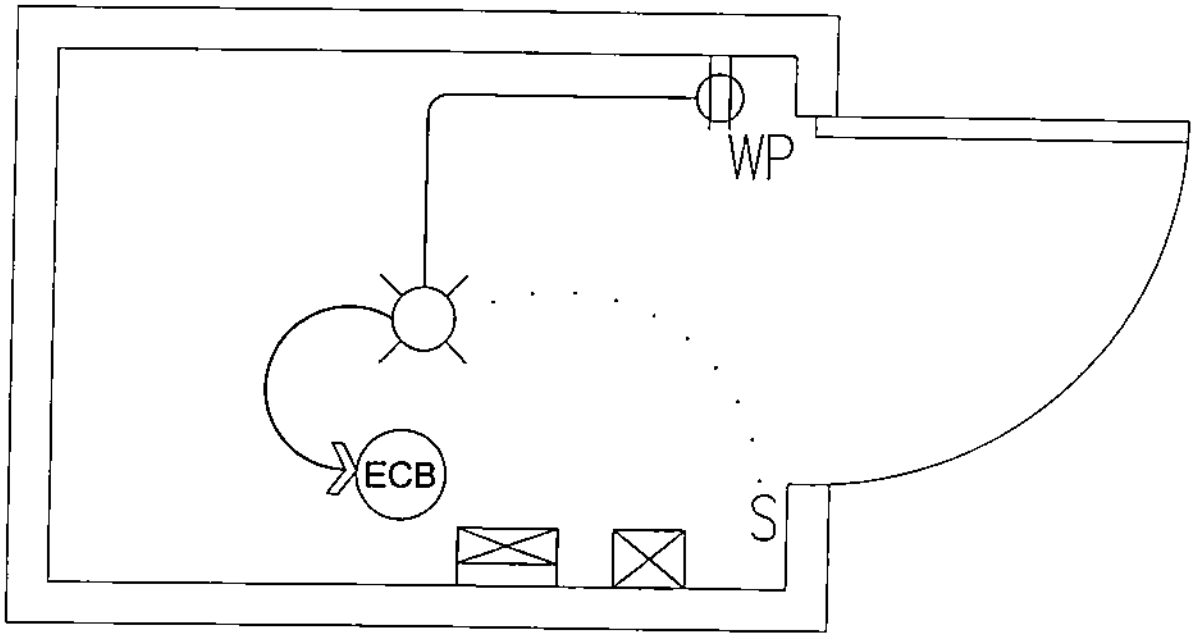
DWG. NO. CasDPP-BDE-13.001 | SPECS. NO. LuzP21Z1216Sr

SCALE: N.T.S. | BID DRAWING | REV. 0

REV.	DATE	NATURE OF REVISION	BY	CHKD	RECD	APPD

LEGEND:

- LOCAL CONTROL & PROTECTION PANEL WITH 50AFT/25AT, 3-POLE, MCB
- 50AF/20AT, 2-POLE ENCLOSED MCB
- CIRCUIT RUNNING ON CEILING AND THROUGH WALL
- CONTROL CIRCUIT
- Φ_{WP} - WEATHERPROOF CONVENIENCE OUTLET
- S - SINGLE POLE WALL SWITCH
- SINGLE POLE WALL SWITCH



(A)

IP20 1 x 9 WATTS COOL WHITE, CLASSIC GLOBE SHAPE, FROSTED FINISH, E27 BASE, COMPACT LED LAMP.

OWNER: NATIONAL POWER CORPORATION
AGHAM ROAD, DILIMAN, QUEZON CITY

PROJECT: REHABILITATION OF ELEVATED WATER TANK AND CISTERN INCLUDING PUMP AND ASSOCIATED PIPING AT CASIGURAN DPP

LOCATION: BRGY. ESTEVES, CASIGURAN, AURORA

TITLE: **LIGHTING AND POWER LAYOUT (PUMP HOUSE)**

	BY	CHKD	DATE
DESIGNED			
DRAWN	MC		
REVIEWED	PRINCIPAL ENGR./ARCHT.		
CIVIL/ARCHT			
ELEC.			
MECH.			

SUBMITTED: B. M. AGUILA, Engineer A
RECOMMENDED: A. S. DANDELARIA III, Engineer, MED
APPROVED: G. B. MAGPOC, JR., Manager, DCD

DWG NO. CasDPP-BDE-13.002 | SPECS NO. LuzP21Z1216Sr

SCALE: 1:200 | **BID DRAWING** | REV 0

REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPD.

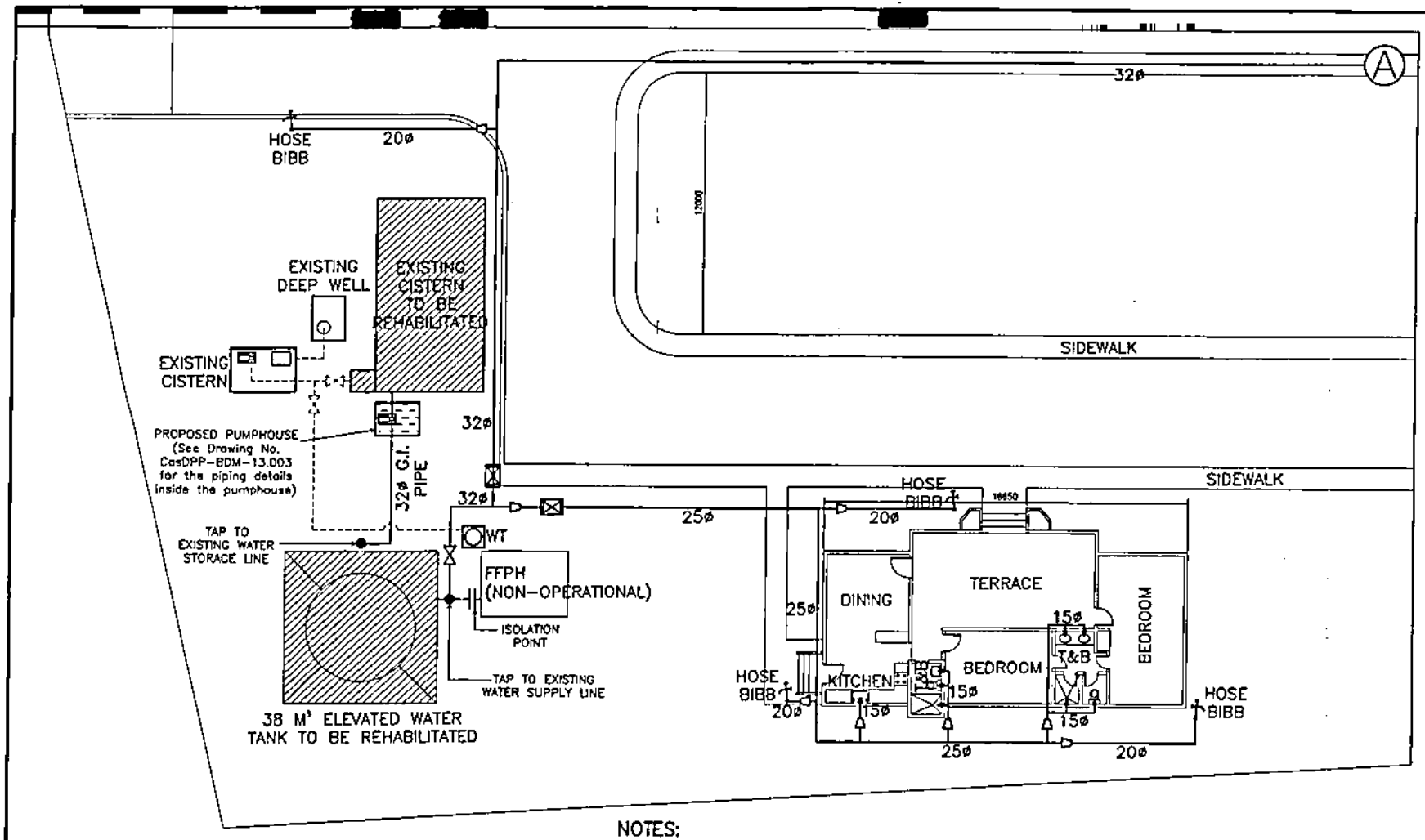
SECTION IX

BID DRAWINGS FOR MECHANICAL WORKS

SECTION IX - BID DRAWINGS

MW - MECHANICAL DRAWINGS

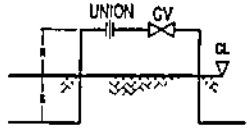
DRAWING NO.	TITLE
CasDPP-BDM-13.001	Piping Layout (1 of 2) (Area A)
CasDPP-BDM-13.002	Piping Layout (2 of 2) (Area B)
CasDPP-BDM-13.003	Pumphouse and Piping Layout



LEGEND:

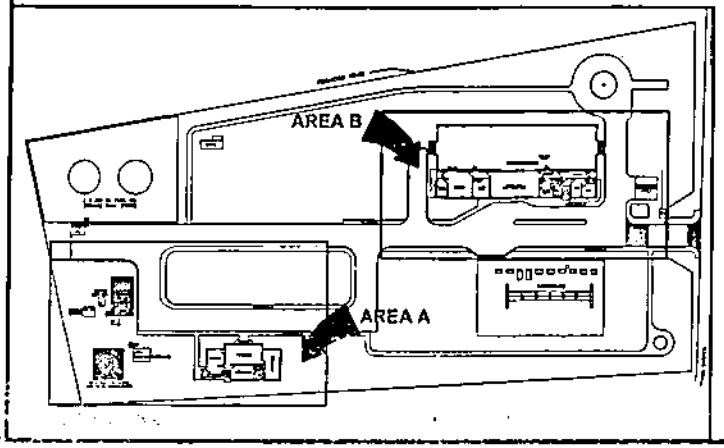
- EXISTING STRUCTURES
- TO BE RAHABILITATED
- TO BE CONSTRUCTED
- HOSE BIBB
- REDUCER
- GATE VALVE
- CHECK VALVE
- ISOLATION VALVE (SEE DETAIL A)

FFPH – FIRE FIGHTING PUMP HOUSE
PH – PUMP HOUSE
WT – WATER TANK



"ISOLATION VALVE" DETAIL "A"

AREA "A"



NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. ALL EQUIPMENT, PUMP, PIPING, SUPPORTS AND FITTINGS, VALVES, INSTRUMENTS AND OTHER ACCESSORIES SHALL BE SUPPLIED, INSTALLED AND TESTED BY THE CONTRACTOR INCLUDING THE REQUIRED EXCAVATION AND BACKFILLING WORKS AND INTERCONNECTION WITH THE PIPING SYSTEMS OF VARIOUS PLANT FACILITIES.
3. DOMESTIC WATER PIPE AND FITTINGS TO BE USED (FROM TANK TO VARIOUS FACILITIES) SHALL BE MADE OF UNPLASTICIZED POLYVINYL CHLORIDE (uPVC) PIPE, SCHEDULE 80 OR CLASS 150 CONFORMING TO ASTM D-1784 OR APPROVED EQUIVALENT.
4. MINIMUM DEPTH OF EMBEDDED PIPE IN OPEN GROUND SHALL BE 300 MM AND 400 MM UNDER ROADWAYS. FOR PIPES THAT CROSSES ROADWAYS, PIPE SLEEVE OF GALVANIZED STEEL MATERIALS OR RSC SHALL BE PROVIDED. EXCAVATION AND BACKFILLING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF RELEVANT CIVIL WORKS TECHNICAL SPECIFICATIONS.
5. BROCHURES/CATALOUGES OF ALL EQUIPMENT, PIPING, VALVES, ETC 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 uPVC 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.

REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPD.

OWNER: NATIONAL POWER CORPORATION
AGHAM ROAD, DILIMAN, QUEZON CITY

PROJECT: REHABILITATION OF ELEVATED WATER TANK AND CISTERN INCLUDING PUMP AND ASSOCIATED PIPING AT CASIGURAN DPP

LOCATION: BRGY. ESTEVES, CASIGURAN, AURORA

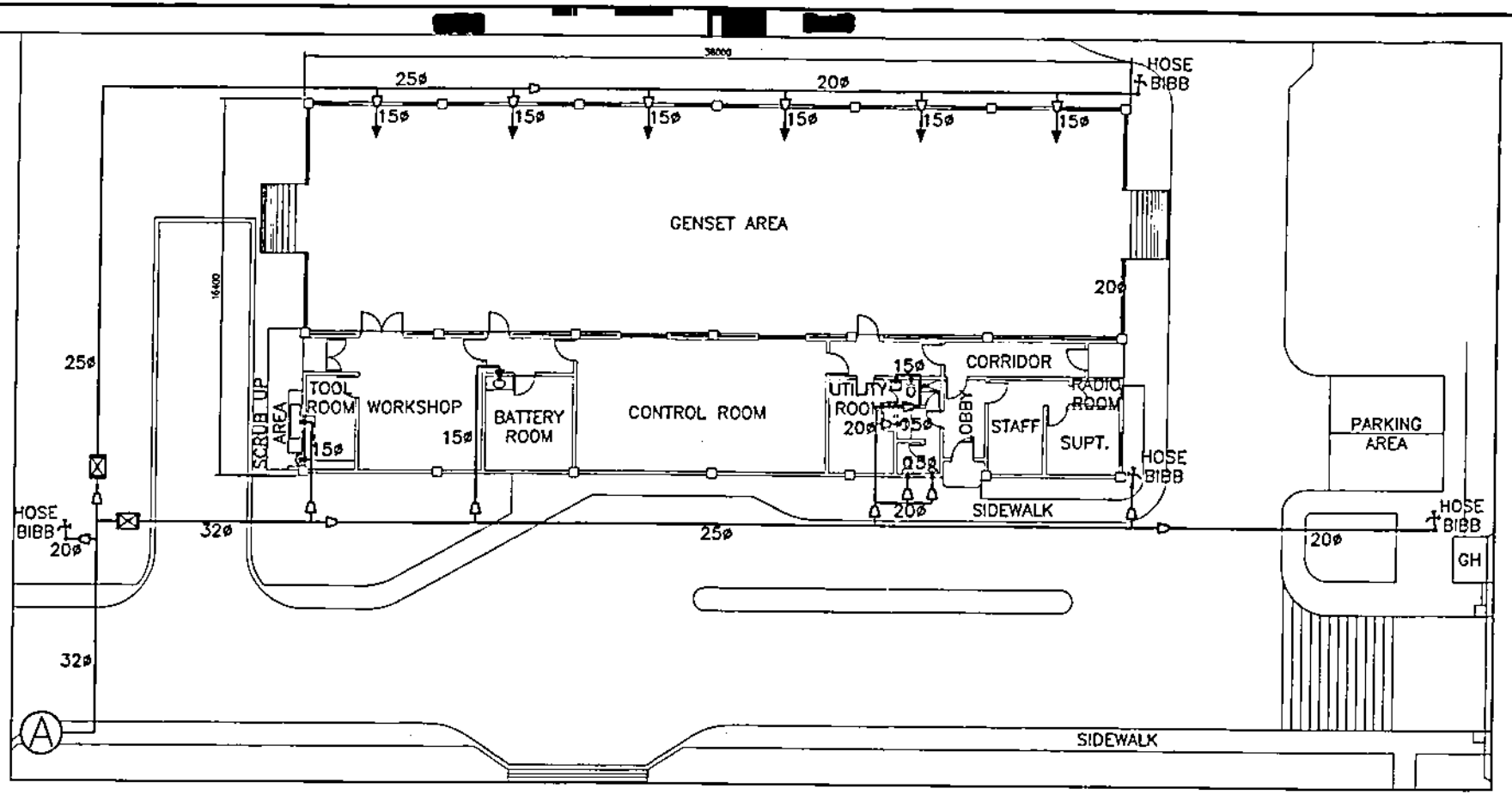
TITLE: **PIPING LAYOUT (1 OF 2)**
(AREA A)

	BY	CHKD	DATE
DESIGNED	LACR		
DRAWN	LACR		
REVIEWED	PRINCIPAL ENGR./ ARCHT.		
CIVIL/ARCHT			
ELEC.			
MECH.			

SUBMITTED: R. M. CABAWAN
RECOMMENDED: N. N. RODRIGUEZ, Manager, LSD
APPROVED: G. B. MAGPOC, JR., Manager, CSD

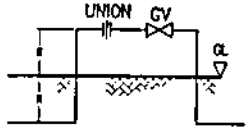
DWG NO. CasDPP-BDM-13.001 | SPECS NO. LuzP21Z1216Sr

SCALE: 1:200 | BID DRAWING | R.N. 0



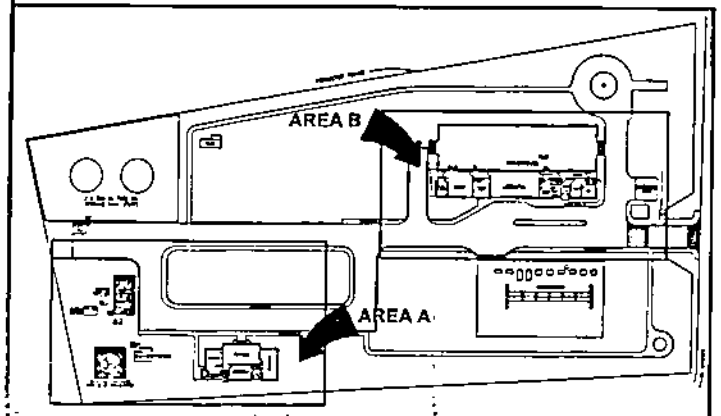
LEGEND:

- EXISTING STRUCTURES
- HOSE BIBB
- REDUCER
- ISOLATION VALVE (SEE DETAIL A)
- GH – GUARD HOUSE



"ISOLATION VALVE" DETAIL "A"

AREA "B"



NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. ALL EQUIPMENT, PUMP, PIPING, SUPPORTS AND FITTINGS, VALVES, INSTRUMENTS AND OTHER ACCESSORIES SHALL BE SUPPLIED, INSTALLED AND TESTED BY THE CONTRACTOR INCLUDING THE REQUIRED EXCAVATION AND BACKFILLING WORKS AND INTERCONNECTION WITH THE PIPING SYSTEMS OF VARIOUS PLANT FACILITIES.
3. DOMESTIC WATER PIPE AND FITTINGS TO BE USED (FROM TANK TO VARIOUS FACILITIES) SHALL BE MADE OF UNPLASTICIZED POLYVINYL CHLORIDE (uPVC) PIPE, SCHEDULE 80 OR CLASS 150 CONFORMING TO ASTM D-1784 OR APPROVED EQUIVALENT.
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5. BROCHURES/CATALOUGES OF ALL EQUIPVENT, PIPING, VALVES, ETC 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 uPVC 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.
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20MM (3/4") = 25MM O.D.
15MM (1/2") = 20MM O.D.

REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPD.

OWNER: NATIONAL POWER CORPORATION
AGHAM ROAD, DILIMAN, QUEZON CITY

PROJECT: REHABILITATION OF ELEVATED WATER TANK AND CISTERN INCLUDING PUMP AND ASSOCIATED PIPING AT CASIGURAN DPP

LOCATION: BRGY. ESTEVES, CASIGURAN, AURORA

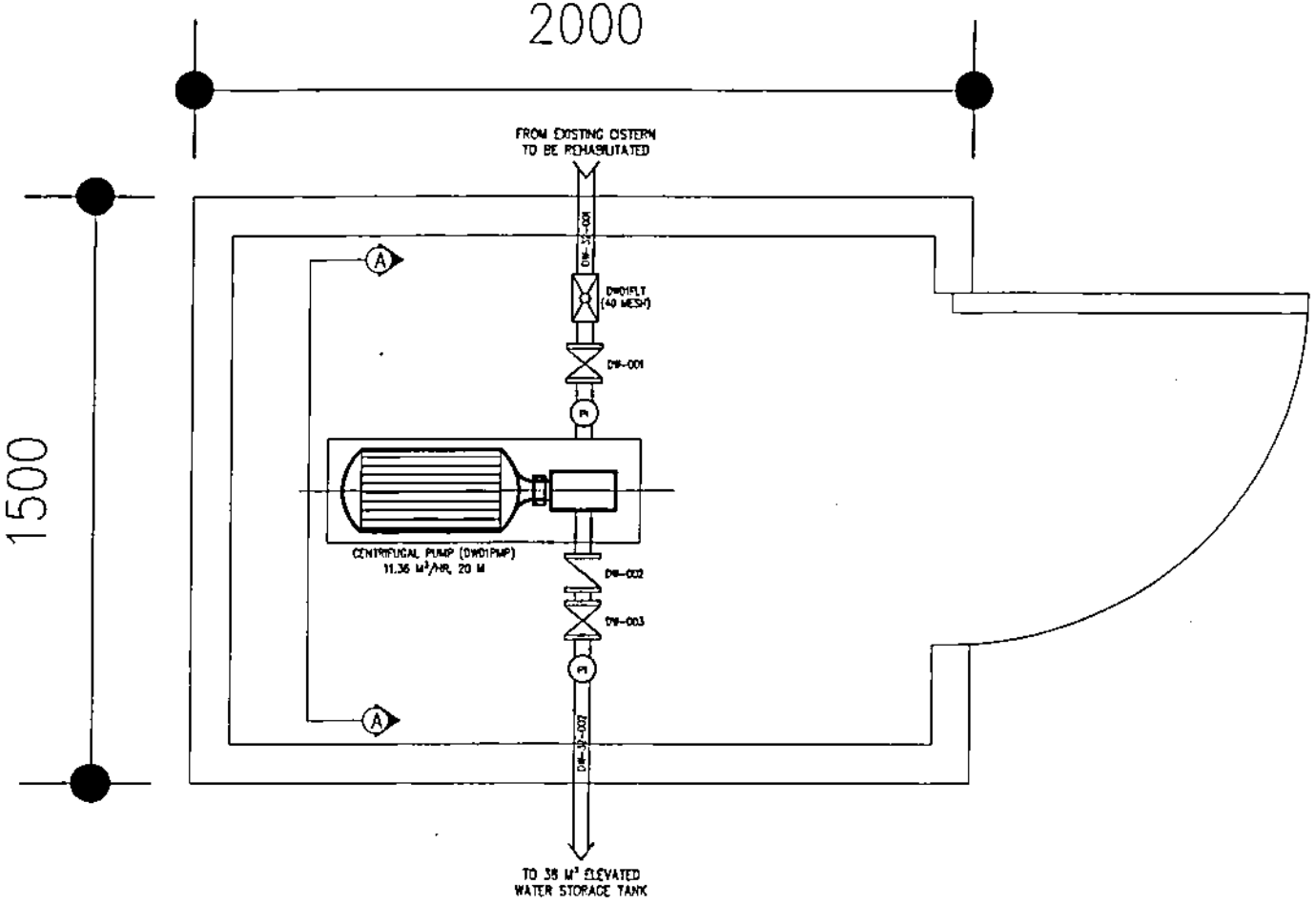
TITLE: **PIPING LAYOUT (2 OF 2)**
(AREA B)

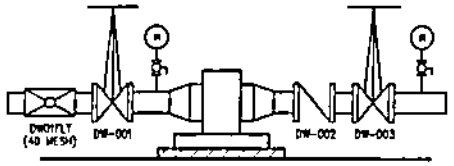
	BY	CHKD	DATE
DESIGNED	LACR		
DRAWN	LACR		
REVIEWED	PRINCIPAL ENGR. / ARCHT.		
CIVIL/ARCHT			
ELEC			
MECH			

SUBMITTED: R. M. CEBAWAN
RECOMMENDED: A.N. RODRIGUEZ
APPROVED: G. B. MAGPOC, JR.

DWG. NO. CasDPP-BDM-13.002 | SPECS. NO. LuzP21Z1216Sr

SCALE: 1:200 | BID DRAWING | REV. 0





CENTRIFUGAL PUMP (DW01PMP)
11.36 M³/HR, 20 M

SECTION A

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. PIPING MATERIALS SHALL CONFORM TO THE REQUIREMENTS OF THE TECHNICAL SPECIFICATIONS.
3. THE CONTRACTOR SHALL SUBMIT FINAL ARRANGEMENT AND DETAILS FOR NPC APPROVAL. THE ARRANGEMENT SHOWN IS FOR REFERENCE ONLY AND MAY BE MODIFIED BASED ON ACTUAL DIMENSIONS OF THE EQUIPMENT TO BE SUPPLIED BY THE CONTRACTOR.
4. THE CONTRACTOR SHALL FURNISH ALL CABLES REQUIRED FROM POWER SUPPLY SOURCE INSIDE THE POWER STATION TO THE PUMPHOUSE INCLUDING CIRCUIT BREAKER, CONDUITS AND OTHER NECESSARY ACCESSORIES IN ACCORDANCE WITH THE RELEVANT ELECTRICAL SPECIFICATION.
5. REFER TO CIVIL DRAWINGS FOR THE DETAILS OF PUMPHOUSE AND PIPE TERMINAL.

LEGEND:

- ⋈ – GATE VALVE
- ⋈ – GATE VALVE (NORMALLY CLOSED)
- ⩘ – CHECK VALVE
- ⊠ – STRAINER SIMPLEX TYPE (40 MESH)
- PI – PRESSURE GAUGE

REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD	APPD.

OWNER: **NATIONAL POWER CORPORATION**
AGHAM ROAD, DILIMAN, QUEZON CITY

PROJECT: REHABILITATION OF ELEVATED WATER TANK AND CISTERN INCLUDING PUMP AND ASSOCIATED PIPING AT CASIGURAN DPP

LOCATION: BRGY. ESTEVES, CASIGURAN, AURORA

TITLE: **PUMPHOUSE AND PIPING LAYOUT**

	BY	CHKD	DATE
DESIGNED	LACR		
DRAWN	LACR		
REVIEWED	PRINCIPAL ENGR. / ARCHT.		
CIVIL/ARCHT			
ELEC.			
MECH.			

SUBMITTED: R. M. CABAWAN
RECOMMENDED: A. N. RODRIGUEZ
APPROVED: G. B. MAGPOC, JR.

DWG NO. CasDPP-BDM-13.003 | SPECS NO. LuzP21Z1216Sr

SCALE: NTS | BID DRAWING | REV. 0