REPUBLIC OF THE PHILIPPINES

NATIONAL POWER CORPORATION

(Pambansang Korporasyon sa Elektrisidad)

BID DOCUMENTS

Name of Project: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 x 120 M^3 FUEL OIL STORAGE TANK INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

Project Location: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MASBATE

Specification No. : LuzP24Z1685Sc

Contents :

Design and Development Department

DDD

SECTION I

INVITATION TO BID

National Power Corporation
INVITATION TO BID
PUBLIC BIDDING – BCS 2024-0590

1. The NATIONAL POWER CORPORATION (NPC), through its approved Corporate Budget of CY 2024 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-CLV24-001 / S1-CLV24-002 / S1-CLV24-003 / PB241001-DM Supply, Delivery, Installation and Test of 1 x 120 M^3 Fuel Oil Storage Tank Including Construction of Associated Facilities for Claveria DPP • PCAB License: License Category of at least **"Category D – General Building"** and registration classification of at least **"Small B – Building and Industrial Plant" OR "Small B – Mechanical Works"**	Construction of Fuel Oil Storage Tank or Water Storage Tank, Including its concrete foundation and associated works with capacity of not less 120 KL	19 September 2024 9:30 A.M.	01 October 2024 9:30 A.M.	₱ 8,688,020.00 / ₱ 10,000.00
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-CLV24-001 & 2 Others	Two Hundred Forty (240) Calendar Days	-

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

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

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

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

6. The National Power Corporation will hold a Pre-Bid Conference on the date, time and venue stated above. Interested bidder/s is/are allowed to join and participate in the Pre-Bid Conference at the Kañao Room or virtually. However, those attending virtually shall assume the risk of any internet connectivity issues. Further, interested bidders are hereby informed of the following:

    a. Only a maximum of two (2) representatives from each bidder / company shall be allowed to participate
    b. Wearing of Face Masks is recommended but not required in view of Proclamation No. 297 S.2023 lifting the State of Public Health Emergency Throughout the Philippines
    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 in the 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
    Gabriel Y. Itchon Building
    Senator Miriam P. Defensor-Santiago Ave. (formerly BIR Road)
    Cor. Quezon Ave., Diliman, Quezon City, 1100
    Tel Nos.: Tel Nos.: 8921-3541 local 5564/5713
    Email: bcsd@napocor.gov.ph /

12. You may visit the following websites:

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

ATTY. MELCHOR P. RIDULME
Sr. Vice President & COO and
Chairman, Bids and Awards Committee

SECTION II

INSTRUCTION TO BIDDERS

SECTION II - INSTRUCTIONS TO BIDDERS

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SECTION II - INSTRUCTIONS TO BIDDERS

1. Scope of Bid

NPC invites Bids for the **SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP**, with Project Identification Number **LuzP24Z1685Sc.**

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 2024 in the amount 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 completed an SLCC that is similar to the contract to be bid, and whose value, adjusted to current prices using the PSA consumer price indices, must be at least fifty percent (50%) of the ABC to be bid: Provided, however, That contractors under Small A and Small B categories without similar experience on the contract to be bid may be allowed to bid if the cost of such contract is not more than the Allowable Range of Contract Cost (ARCC) of their registration based on the guidelines as prescribed by the PCAB. For Foreign-funded Procurement, the GoP and the foreign government/foreign or international financing institution may agree on another track record requirement.

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.

7.2. 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.

7.3. 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 Two (2) copies of the first and second components of its Bid, marked **Original** and photocopy. Only the original copy will be read and considered for the bid.

Any misplaced document outside of the **Original** copy will not be considered. The photocopy is ONLY FOR REFERENCE.

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.

Bidders must also comply with the Disclaimer and Data Privacy Notice specified in the **BDS**.

17. Deadline for Submission of Bids

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

18. Opening and Preliminary Examination of Bids

18.1. The BAC shall open the Bids in public at the time, on the date, and at the place specified in paragraph 9 of the **IB**. The Bidders' representatives who are present shall sign a register evidencing their attendance. In case videoconferencing, webcasting or other similar technologies will be used, attendance of participants shall likewise be recorded by the BAC Secretariat. In case the Bids cannot be opened as scheduled due to justifiable reasons, the rescheduling requirements under Section 29 of the 2016 revised IRR of RA No. 9184 shall prevail.

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

19. Detailed Evaluation and Comparison of Bids

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

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

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

20. Post Qualification

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

21. Signing of the Contract

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

SECTION III

BID DATA SHEET

SECTION III - BID DATA SHEET

ITB Clause	
5.2	For this purpose, contracts similar to the Project refer to construction of Fuel Oil Storage Tank or Water Storage Tank, including its concrete foundation and associated works with capacity of not less 120 KL. 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 prospective bidder shall submit a valid and updated Certificate of PhilGEPs Registration under Platinum Membership (all pages including the Annex A of the said Certificate). **Non-compliance shall be a ground for disqualification.**
	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/signed Status Report as of the bidding date from Bureau of Construction containing relevant details of slippage, if any, for the declared on-going contracts with Department of Public Works and Highways (DPWH) 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. 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. NOTE: If the Bidder has no Single Largest Completed Contract (SLCC)/similar experience on the contract to be bid pursuant to ITB Clause 5.2, the SLCC Form (Form No. NPCSF-INFR-03) shall still be submitted and the Bidder shall indicate *"NONE – PCAB License Category D, Registration Classification – Small B"*

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" OR "SMALL B – MECHANICAL WORKS"**
10.4	The list of key personnel shall include the following minimum requirements: **a. One (1) Project Engineer** Registered Civil Engineer or Mechanical 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 at least 3 years professional experience as Civil/Mechanical Engineer on similar project **b. One (1) Materials Engineer** Registered Civil Engineer with valid accreditation from the Department of Public Works and Highways (DPWH) as Materials Engineer I **c. One (1) Safety Officer 2** Construction Safety Officer who has completed at least forty (40) hours of Construction Safety and Health Training (COSH) from Occupational Safety and Health Center (OSHC) or Safety Training Organizations (STOs) accredited by the Department of Labor and Employment (DOLE) 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 (at least 300 A min) - 2 units b. Bar cutter (at least 32mm ø capable) - 1 unit c. Concrete Mixer (at least 1 bagger) - 2 units d. Oxy-acetylene cutting outfit - 1 unit e. Water Truck (at least 500 Gal. capacity) - 1 unit f. Concrete Vibrator (at least 3.5HP) - 1 unit g. Vibratory Plate Compactor - 1 unit h. Cargo Truck - 1 unit
10.6	Bidders shall also submit the following requirements in their first envelope, Eligibility and Technical Component of their bid: 1. Duly signed and completely filled-out Technical Data Sheets for Mechanical Works, Section VI, Part II - Technical Data Sheets (MW) Manufacturer's brochures, manuals and other supporting documents of equipment, materials, hardware and tools proposed by the bidders must comply with the technical specifications of such equipment, materials, hardware and tools. It shall be a ground for disqualification if the submitted brochures, manuals and other supporting documents are determined not complying with the specifications during technical evaluation and post-qualification process.

	Equipment, materials, hardware and tools proposed by the winning bidder to be supplied, which were evaluated to be complying with the technical specifications, shall not be replaced and must be the same items to be delivered/installed/used during the contract implementation. Any proposed changes/replacement of said items may be allowed on meritorious reasons subject to validation and prior approval by NPC. 2. Complete eligibility documents of the proposed sub-contractor, if any
10.7	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.
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.
16.0	All bid submissions and related correspondences are confidential and for viewing only by the intended recipient/s. Any unauthorized access to review, reproduce, or disseminate the information contained therein is strictly prohibited. The National Power Corporation (NAPOCOR) does not guarantee the security of any information electronically transmitted. Bid submissions and related correspondences may contain personal and sensitive personal information, and are subject to the Data Privacy Act of 2012, its implementing rules, regulations and issuances of the National Privacy Commission of the Philippines ("Privacy Laws"). By viewing, using, storing, sharing and disposing (collectively "Processing"), such bids submissions and correspondences, you agree to comply with the Privacy Laws. By responding to correspondence, you consent to the Processing by NAPOCOR of the Personal Data contained in your submission/reply in accordance with NAPOCOR's Personal Data Privacy Policy which you can find at **http://www.napocor.gov.ph**. To report any privacy issue, contact the Data Privacy Officer at **dpo@napocor.gov.ph**. NAPOCOR is not liable for the proper and complete transmission of the information contained in bid submission/correspondences nor for any delay in its receipt.
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	Additional documents to be submitted during post-qualification: a. Class A – Eligibility Documents listed on the Annex A of Certificate of PhilGEPs Registration under Platinum Membership pursuant to Section 34.3 of the Revised IRR of R.A. 9184 b. 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) c. 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/signed Status Report as of the bidding date from Bureau of Construction containing relevant details of slippage, if any, for the declared on-going contracts with Department of Public Works and Highways (DPWH) d. Contract/Purchase Order for the contract stated in the Statement of the bidder's Single Largest Completed Contract (SLCC) similar to the contract to be bid (Form No. NPCSF-INFR-03) e. Certificate of Employment, Bio Data and valid PRC License of the (professional) personnel (NPCSF-INFR-10a, NPCSF-INFR-11) f. Certificate of Employment, Bio Data and Certificate of accreditation or ID card issued by DPWH for the Materials Engineer (NPCSF-INFR-10a, NPCSF-INFR-11) g. Certificate of Employment, Bio Data and Construction Safety and Construction Safety and Health Training Certificate from OSHC/STOs accredited by DOLE of the Safety Officer (NPCSF-INFR-10b, NPCSF-INFR-11) h. Proof of ownership and/or certificate of availability issued by Equipment Lessors for the submitted List of Contractor's Equipment (owned, leased or under purchase agreement) under form NPCSF-INFR-12 i. The licenses and permits relevant to the Project and the corresponding law requiring it as specified in the Technical Specifications, if any
21	The following documents shall form part of the contract: 1. Notice to Proceed 2. Construction schedule and S-curve 3. Manpower Schedule 4. Construction Methods 5. Equipment Utilization Schedule 6. Construction safety and health program of the contractor duly approved by the Bureau of Working Condition (BWC) of the Department of Labor and Employment (DOLE) or proof of submission to BWC 7. PERT/CPM.

SECTION IV

GENERAL CONDITIONS OF CONTRACT

SECTION IV – GENERAL CONDITIONS OF CONTRACT

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SECTION IV – GENERAL CONDITIONS OF CONTRACT

1. Scope of Contract

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

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

2. Sectional Completion of Works

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

3. Possession of Site

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

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

4. The Contractor's Obligations

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

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

5. Performance Security

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

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

6. Site Investigation Reports

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

7. Warranty

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

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

8. Liability of the Contractor

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

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

9. Termination for Other Causes

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

10. Dayworks

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

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

11. Program of Work

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

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

12. Instructions, Inspections and Audits

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

13. Advance Payment

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

14. Progress Payments

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

15. Operating and Maintenance Manuals

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

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

SECTION V

SPECIAL CONDITIONS OF CONTRACT

SECTION V – SPECIAL CONDITIONS OF CONTRACT

GCC Clause	
2	Sectional completion is not specified.
3.1	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.
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.
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.
8.0	**CORRECTION OF PUNCHLIST ITEMS:** After to the conduct of Test and Commissioning/Joint Final Inspection or upon the advice by the NPC, the Contractor/Supplier must correct any remaining works and work deficiencies identified in the punchlist issued for the project within one (1) month considering the approved remaining contract time. Failure to comply with this provision shall be grounds for non-issuance of Certificate of Satisfactory Performance which is a requirement for future bidding with the NPC. This, however, shall not preclude NPC's claim for liquidated damages, imposition of any other penalties and/or filing of blacklisting actions in accordance with the blacklisting guidelines issued by the Government Procurement Policy Board (GPPB).
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

(PART I – TECHNICAL SPECIFICATIONS)

GW – General Works

CW – Civil Works

MW – Mechanical Works

EW – Electrical Works

PART I

TECHNICAL SPECIFICATIONS

GW - GENERAL WORKS

PART 1 - TECHNICAL SPECIFICATIONS

GW – GENERAL WORKS

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PART I - TECHNICAL SPECIFICATIONS

GW – GENERAL WORKS

GW-1.0 GENERAL

GW-1.1 Project Description

This section covers the general technical requirements for furnishing of all supervision, equipment, labor, materials, supplies, tools and other incidentals in accordance with the specifications herein and shown on the accompanying drawings for the Supply, Delivery, Installation and Test, of 1 x 120 kL Fuel Oil Storage Tank and Auxiliary Equipment/Accessories including Construction of Associated Facilities for Claveria DPP.

The new Fuel Oil Storage Tanks (FOST) and associated auxiliaries and facilities shall serve as storage and transfer system of diesel oil and for use of the existing generating sets installed at Claveria DPP located at Masbate.

The work shall include all 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 FOST, Auxiliary Equipment/Accessories and Associated Facilities.

The work shall be performed and completed with high quality workmanship in accordance with all applicable codes, standards and generally accepted modern practice in the fabrication, installation and test of the Fuel Oil Storage Tank, Auxiliary Equipment/Accessories and Associated Facilities.

All necessary corrections and deviations from the specification of the equipment and materials arising either from error in the workmanship or design made by the manufacturer with the resulting extra expenses and related damages shall be solely charged to the account of the Contractor.

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

GW-1.2 Project Location

The FOST and auxiliary equipment/accessories to be fabricated and supplied by the Contractor shall be delivered, installed and tested at existing plant site in Claveria DPP, Sitio Kilapad, Poblacion 2, Claveria, Mabate.

EXISTING MODE OF TRANSPORT				
SITE	**1**	**2**	**3**	**4**
Claveria DPP	Port of Manila	Pio Duran Port L	Claveria Port S	Claveria DPP L
NOTES: L – Land Travel; S – Sea Travel; S-S – Special Trip Sea Travel				

GW-1.3 Project Duration

The work duration of the project is Two Hundred Forty (240) Calendar Days which shall become effective from receipt of Notice to Proceed. The total contract period is inclusive of twenty (20) rainy/unworkable days, considered unfavorable for the execution of works at site.

GW-1.4 Contractor's Classification

PCAB license category of at least **Category D – General Building** with inter-agency classification of at least **Small B – Building and Industrial Plant** *or* **Small B – Mechanical Works.**

GW-1.5 Minimum Required Key Personnel

a) One (1) Project/Site Engineer – Registered Civil or Mechanical Engineer who had supervised at least a project similar in nature as to the type of proposed project within the last 10 years. Must have 3 years professional as Civil or Mechanical Engineer on similar project.

b) One (1) Materials Engineer (as required by DPWH Department Order No. 111). Registered Civil Engineer with valid accreditation from the Department of Public Works and Highways (DPWH) as Materials Engineer I.

c) One (1) Safety Officer 2 – Construction Safety Officer who has completed at least forty (40) hours of Construction Safety and Health Training (COSH) from Occupational Safety and Health Center (OSHC) or safety Training Organizations (STOs) accredited by the Department of Labor and Employment (DOLE).

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-1.6 Minimum Required Construction Equipment

a) Welding Machine (300 Amp) - 2 units
b) Bar Cutter (32mm Ø capable) - 1 unit
c) Concrete Mixer (1-bagger) - 2 units
d) Oxy-acetylene Gas Cutter - 1 unit
e) Water Truck (500 gal. cap.) - 1 unit
f) Concrete Vibrator (3.5 hp) - 1 unit
g) Vibratory Plate Compactor - 1 unit
h) Cargo Truck - 1 unit

GW-1.7 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 Contractor shall submit blueprints of the project based on the issued bid documents/technical specifications. The Contractor shall be the signatory for the Blueprints/Drawings, Bill of Quantities, Technical Specifications and Design Analysis/Computation. 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

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

The Contractor shall also be responsible to assess and determine all and every work and service although not specifically detailed but are deemed required to fully complete the work and placing ready for the safe and reliable operation of the fuel oil storage tank and associated equipment. 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 discrepancies of the scope of work specified in this section with those specified in the relevant specific technical specifications (Mechanical, Architectural, Civil and Electrical Works), 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 work to be done under this section 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, which shall consist of but not limited to the following:

a) Mobilization/establishment of Contractor's complete construction camp and other facilities;

b) Site development/grading works, clearing, transfer/relocation of any obstruction, disposal of excavated and excess material from backfill/fill in the areas to be designated by NPC;

c) Supply, fabrication, erection/installation and test of one (1) set of fuel oil storage tank with a nominal capacity of 120 cu. meters, nominal diameter of 4.5 m and height of 7.2 m complete with valves, all tank appurtenances and accessories shown on the drawings and specified in this specification including tank calibration, testing (radiographic & hydrostatic), sandblasting and painting;

d) Supply, installation and test of one (1) set 18 m^3/hr at 30m head fuel oil transfer pump, 480V, 3-phase, 60hz, gear type complete with built-in relief valve, associated isolation valves, strainers, flow meter, electrical amenities, control & instrumentation and other accessories described in this specification including spare parts for one (1) year operation;

e) One (1) lot of Domestic Water Supply Piping System, including valves, pipe, fittings, pipe supports, excavation and backfilling of embedded pipes and other pipe accessories including interconnection to existing waterline and disinfection of the system;

f) Two (2) units of Inverter/Window type Air Conditioners, 16,000 kJ/h, minimum cooling capacity for bunkhouses, and two (2) units of Wall mounted Exhaust Fan for toilets, 100 m^3/h minimum capacity, propeller type, direct motor driven, 220V, 60 hz, 1-phase power supply for all air conditioning and ventilation units, all complete with mounting accessories and controls

g) Supply, installation and test of pump motor power supply including necessary control, monitoring and protective devices;

h) Supply, installation and test of power and lighting system;

i) Supply, laying and test of insulated copper conductors;

j) Supply and installation of conduit system;

k) Supply, Installation and Test of ground conductors, ground connectors, ground rods and other accessories required for the interfacing of all equipment to the existing grounding system;

l) Construction of new oil-water separator;

m) Construction of concrete foundation for FOST, concrete slab in tank farm, containment walls including drain pits and valve box;

n) Construction of fuel pump house complete with electrical amenities and concrete foundation for fuel oil transfer pump;

o) Construction of hazardous waste storage facility;

p) Supply and install of 2 x 20-footer containerized bunkhouse including construction of its concrete foundation

q) Supply, installation and test of one (1) lot waste oil/water drain pipes including the required excavation and backfilling works and necessary interconnection works to the existing FOST and its associated fuel oil piping, and drainage systems as applicable and shown on the drawings;

r) Supply, installation and test of one (1) lot fuel oil pipes, pipe fittings, pipe supports, associated valves and accessories, required excavation and backfilling works, interconnection works with existing fuel piping system and drainage systems as shown on the drawings;

s) Supply and installation of one (1) set of foam (AFFF/F3) wheeled type fire extinguisher complete with self-contained cylinder mounted on a frame with handle, floor stand and steel wheels, 125 L min. (33 gallons) capacity complete with associated valves, dial gauge indicator, nitrogen expellant tank for unit pressurization, appropriate size of discharge hose of 15 m long fitted with couplings and foam nozzle assembly and shall be in certified/approved by the certifying body specified in Section VI, Part I, MW-6.1;

t) Supply and installation of three (3) units of portable type fire extinguisher, clean agent (HCFC or Halotron I type), 7.1kg (15.5lbs), wall-hung type and shall be in certified/approved by the certifying body specified in Section VI, Part I, MW-6.1,

u) Supply of one (1) unit of 10 m long fuel oil sounding tape;

v) Tagging and marking for all supplied equipment including tank, valves and piping in accordance with the requirements of the relevant technical specifications;

w) Corrosion protection and painting;

x) Demobilization including clearing of site/demolition of Contractor's camp facilities; and

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

GW-3.0 MATERIALS AND EQUIPMENT

GW-3.1 General

All materials to be supplied under this contract shall be new and unused, free from defects and imperfections and best suited for the purpose intended. All materials shall comply with the latest revisions or editions of the specified standards for each equipment specification unless otherwise specified or permitted by NPC.

The names of manufacturers of equipment and articles contemplated for incorporation in the work together with performance capacities and other significant information pertaining to the equipment shall be furnished for approval. Equipment or articles installed or used without such approval shall be at the risk of subsequent rejections.

The equipment and materials to be furnished under this specification shall be essentially the current standard products of the respective manufacturer regularly engaged in the production of such equipment and materials. It shall be designed and manufactured for maximum safety and reliability in accordance with quality specifications.

Original brochures, catalogs and other related technical data sheets of materials and equipment to be supplied by the Contractor under this contract, in binder with cover, shall be submitted during the project implementation for NPC's review and approval prior to fabrication and/or 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.

GW-3.2 Codes and Standards

All materials, equipment, fabrication, construction, installation, inspection and testing furnished 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.

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 for Non-Destructive Testing
ASTM - American Society for Testing and Materials
AWS - American Welding Society
NFPA - National Fire Protection Association
OSHA - Occupational Safety and Health Administration Act of 1970

SSPC - Steel Structures Painting Council
UL - Underwriters Laboratory
FM - Factory Mutual

In the event of any conflict among the above listed codes or this Specification, Appendices and Attachments, Contractor shall refer the conflict to NPC for written resolution. The responsibility shall be on the Contractor to show the suitability of any alternative standards he may wish to use without NPC approval.

In addition to the above codes and standards, Contractor shall comply with all applicable State and local laws and regulations. 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 Contractor proposes to adopt must be attached to his Bid for acceptance. In every case, Contractors must list fully the standards they will conform to for this Contract.

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

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 Tropical Serviceability

GW-3.4.1 General

In choosing materials and their finishes, due regard shall be given to the humid tropical conditions under which the equipment is to work. Some relaxation of the following provisions may be permitted where equipment is hermetically sealed but it is preferred that tropical grade materials should be used wherever possible.

GW-3.4.2 Metals

Iron and steel are in general to be galvanized or painted, as appropriate or specified. Small iron and steel plate (other than SUS 316 stainless steel) of all instruments and devices, the metal parts or mechanisms are to be treated in an approved manner to prevent corrosion. Other components which are laminated, or which cannot be rustproofed, shall have all the expected parts thoroughly cleaned and heavily enameled, lacquered or compounded.

GW-3.5 Workmanship

Workmanship shall be of first class quality and in accordance with the best modern engineering practice for the manufacture, assembly, installation and test of equipment, notwithstanding any omissions from the specifications and drawings. To have quality workmanship, only technicians skilled in their respective trades shall be employed.

GW-4.0 DESIGN AND DUTY CONDITIONS

GW-4.1 Acknowledgement to Site Conditions

The Contractor shall be responsible for visiting the site to determine the nature, location and extent of work, the physical conditions, and the availability of materials and facilities needed to undertake the work. The Contractor shall thoroughly investigate and familiarize himself with all the conditions at the site, assessment of existing facilities/installations affected by the works under this contract, the surrounding area, means of communication and transportation, 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 sites shall be the responsibility of the Contractor and no additional payment thereof shall be made by NPC.

GW-4.2 Site Conditions

The conditions stated below may be applied unless otherwise specifically indicated in the relevant section of this specification.

Elevation above sea level	:	0 to 500 m
Ambient temperature	:	25 - 40°C
Barometric pressure	:	760 mm Hg
% Relative humidity	:	up to 100%
Design for seismic loads	:	Seismic zone factor 0.4
Max. wind velocity	:	250 km/hr and/or as specified in the latest edition of National Structural Code of the Philippines.

The prevailing atmospheric condition at site is generally warm and humid.

GW-4.3 Earthquake and Wind Design Requirements

The equipment and its associated structure may be subjected to both horizontal and vertical seismically induced acceleration of 0.40 g. or more depending on:

a) Natural period and mode of vibration;
b) Damping (inherent or specifically provided);
c) Manner of failure (ductile or brittle); and
d) Location (at ground level or at a higher level).

The equipment and its related structure required under this contract shall meet the seismic design requirement for earthquake conditions to conform with the latest edition of National Structural Code of the Philippines.

It is evident from the design response spectra that the degree of response varies markedly with the period of vibration. It is essential, therefore, that all equipment, or its supporting structure which has modes of vibration or components with modes of vibration with a natural period longer than 0.1 seconds be identified.

Provision shall be made for seismic movement by providing seismic movement joints between components that are interconnected and may have different vibratory characteristics. These joints shall be capable of withstanding the sum of the maximum deflection of each component resulting from a design earthquake.

The equipment and its related structure under this contract shall meet the requirements for a basic wind speed of not less than 250 km/hr gust and/or as specified in the latest edition of National Structural Code of the Philippines. The wind load shall be based on ANSI Standard A58.1 – 1972.

GW-4.4 Sound Control

The Contractor shall ensure that the sound levels of equipment and tools to be used during the performance of his works are within the permissible limits for personnel as defined in DOLE's Occupational Safety & Health Standards for Noise and contractual requirements for overall plant noise levels.

If the Contractor expects the maximum sound level of his equipment to exceed 90 dBA at a distance of 1 meter, Contractor shall use acoustical treatment features to achieve the sound control design objectives.

GW-5.0 EQUIPMENT MARKING, LABELING AND MISCELLANEOUS REQUIREMENTS

GW-5.1 Identification System

Tag Numbers or Standard Plant Identification Number (SPIN) for all supplied equipment and materials such as tank, pump, valves, strainers, instruments, panels and piping shall be provided by the Contractor. Tag Numbers/SPIN are designated with an alphanumeric code allowing clear identification of the equipment and materials which will 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 approved corrosion resistant metal.

Each equipment and auxiliaries shall be systematically marked both on the drawings and documents including cables, wires and terminals, as applicable.

Equipment codes or Tag Numbers/SPIN shall be indicated on all drawings and documents including bills of materials, lists of spare parts, etc. The codes will be used by respective NPC group for easy identification of stored equipment parts and materials and shall be suitable for use with a computer supported registration system.

Bid drawings are in most cases already marked with designated codes (Tag Numbers or SPIN); the system shall be expanded to include detailed diagrams, cable lists, spare parts list, etc., as approved by NPC.

GW-5.2 Nameplates and Labels

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 or label with clearly legible writing of approved size/thickness and pattern which shall be permanently attached to each assembled piece of equipment at an easily visible place subject to approval by NPC.

Nameplates generally contain all necessary information or brief technical description under which the equipment has been designed to operate and shall include the following: manufacturer's name, type of equipment, serial number, year of manufacture, Standard Plant Identification Number (SPIN), weight 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.

Equipment Nameplates which are manufacturer's standard and may not contain NPC's SPIN may be acceptable provided that Labels bearing the SPIN shall be attached to the equipment and accessories subject to NPC's approval.

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.

Nameplate shall be provided and securely fixed to the tank at location which is readily visible. The main inscriptions on the nameplate shall include Tank Tag Number/SPIN, Manufacturer/fabricator, Design Code, Nominal Capacity, Nominal Diameter, Nominal Height, Date of Manufacture and etc.

Labels contain only the Standard Plant Identification Number (SPIN) and/or description 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 valves and instruments shall be secured by screws or by flexible wires.

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 and subject for NPC's approval.

Labels or SPIN for piping and tank shall distinctly be printed on its external surfaces.

If it is not practical to include the SPIN or tag number on the equipment nameplate, a separate durable stainless steel tag with the identification number shall be securely attached to the equipment.

Each equipment wherever necessary, shall be provided with cautionary and warning plates and signs in accordance with the prescribed ANSI/IEEE or equivalent IEC Standards for the equipment.

Nameplates, labels and warning plates shall be in English.

GW-5.3 Erection Marks

All members comprising multi-part assemblies are to be marked with distinguishing numbers and/or letters corresponding to those of the approved drawings or material lists. These erection marks, if impressed before painting or galvanizing, shall be clearly readable.

Color banding of a code approved by NPC is to be employed to identify members of similar shape or type but of differing strengths or grades.

GW-5.4 Guards

Guards shall be provided for coupling, drive shafts, fans, etc. These shall comply with ANSI Standard B15.1, Safety Code for Mechanical Power Transmission Apparatus.

GW-5.5 Lifting Lugs

Lifting lugs or points where lifting lugs supplied can be attached to each item of equipment or component which requires to be removed for servicing and which weighs more than 20 kg shall be adequately provided.

GW-6.0 DRAWINGS

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. All works involving discrepancies shall not be started without NPC's formal approval.

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.

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.

Bid drawings may be used for planning the work but shall not be used for construction purposes or for furnishing materials, unless authorized or approved by NPC. Bid Drawings which show the work to be done as definitely and in as much detail as possible may be used as guide by the Contractor to proceed in the performance of his work.

Drawings which require changes or adjustments to suit with actual site conditions shall be prepared/submitted by the Contractor for NPC's review and approval.

GW-6.2 Drawings and Documents to be submitted with the Bid

The Contractor shall submit with his Bid the required copies of all the documents specified in Section VI – (Part II) Technical Data sheets under the Section "Annexes" including other documents specified in the relevant Clauses of the bid documents (Refer to Form No. NPCSF-INFRA-01-Checklist of Technical and Financial Envelope Requirements for Bidders, Section VIII-Bidding Forms).

Drawings and other data or information that the Bidders may deem useful in the evaluation of their bids may be submitted with the bid.

GW-6.3 Contractor/Manufacturer Drawings

GW-6.3.1 General

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

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

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

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.

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 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-6.3.2 Critical Path and Time Bar Diagram

Immediately upon effectivity of the Contract, NPC and the Contractor shall re-examine the Critical Path Network and Time Bar Diagram submitted with the Bid and determine by mutual agreement the "Agreed Critical Path Network" and "Agreed Time Bar Diagram". The "Agreed Critical Path Network" shall not be revised or modified without the prior approval of NPC or except where extension of the contract period is approved in accordance with relevant provisions of the specifications.

Every month thereafter, during the Contract period, the Contractor shall furnish NPC with the revised "Agreed Critical Path Network" and "Agreed Time Bar Diagram" and bring them up-to-date such that the "Agreed Critical Path Network" and "Agreed Time Bar Diagram" are still in effect. In all cases the "Agreed Critical Path Network" and "Agreed Time Bar Diagram" or subsequent approved revisions thereof, shall be prepared based only on the previous "Agreed Critical Path Network" and "Agreed Time Bar Diagram". If in the opinion of NPC, the Works is not being adequately or properly prosecuted in any respect, NPC shall require the Contractor to submit a new "Agreed Critical Path Network" and "Agreed Time Bar Diagram" providing for the proper and timely completion of the Works covered by this Contract.

The Contractor shall see to it that the "Agreed Critical Path Network" and "Agreed Time Bar Diagram" are followed as much as possible. No activity in the Network shall be started ahead of time at the expense of another unless it can be shown that the change in the sequence of operations is beneficial to the NPC, in which case, the prior approval of NPC shall be secured.

The percentage which will be the basis for judgment of the progress of the Works shall be computed in percent of progress in each different item of work and integrated on the "Agreed Critical Path Network" and "Agreed Time Bar Diagram" (with approved modification or revision, if any). The actual value or quantity of work done divided by the value or quantity of the total work, respectively, and multiplied by 100 shall be the Contactor's percentage of accomplishment. The percentage of accomplishment subtracted from anticipated percentage on the "Agreed Critical Path Network" and "Agreed Time Bar Diagram" is the percentage the Contractor is behind or ahead in his work.

None of the statements contained herein shall relieve the Contractor of the obligation to prosecute and complete the Works.

GW-6.3.3 General and Detailed Design Drawings for Civil Works

The drawings shall indicate, besides relative calculations and instructions, all data necessary for the design of supporting structures such as dimensions, weights, loads and stresses under operating conditions, dimensions and weights for installation, assembly and maintenance.

In addition, these drawings shall indicate all necessary details such as foundations, anchor, tie rods, trenches for cables and pipes, catwalks and supports and any other data used in the design of Civil Works.

The structures shall not substantially differ from those shown in the bid drawings.

GW-6.3.4 Working Plan

The Working Plan shall include the organization, working system, temporary yard installation, construction method, overall construction schedule, a list of Construction Equipment/Temporary Facilities to be used, etc.

GW-6.3.5 Progress Report

a) Monthly Reports

The Contractor shall submit to NPC on the seventh (7th) day of every month written detailed progress report, in an approved form, indicating the stage reached and anticipated completion dates for the design, ordering, procurement, manufacture, delivery and erection of the components. The report should be forwarded promptly so that on receipt by NPC the information is not unduly out of date.

From the commencement of manufacturing works, the Contractor shall provide color photographs of the Works which will be attached to the monthly progress reports. Each photographic print shall bear a printed description, a serial number and the date when taken.

Inscriptions shall be in English. Each photograph shall record or illustrate specific events.

b) Weekly Summary Report

The Contractor shall also prepare a weekly summary report covering all the site activities and submit it to NPC. This report shall include projected work activities for at least 2 weeks ahead of those being reported upon

GW-6.3.6 As-Built Drawings

The Contractor shall provide and keep up to date "As-Built" drawings of all structures constructed. These drawings shall show all changes or revisions from the original drawings and specifications, including the exact "as-built" locations, embedded piping, and other concealed items of Works.

The Contractor shall furnish prints of these drawings. They shall be kept in the Contractor's field office and shall be used only as a record set. At the end of every month, 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" drawings shall be submitted by the Contractor within thirty (30) calendar days from the completion of the contract or prior to the issuance of the certificate of completion, on four (4) prints and one (1) set of write-once recordable CD's. Such CD's shall be suitable for any optical drive of computer system.

Drawings and schedules shall be preferably submitted in standard A3 size.

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

GW-6.3.7 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; and
b) Factory Test/Site Test (Performance) Results

GW-6.4 Processing of Drawings

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

The Manager, Project Management Department
National Power Corporation Gabriel Y. Itchon Bldg. Sen. Miriam P. Defensor-Santiago Avenue (formerly BIR Road) corner Quezon Avenue, Diliman, Quezon City 1100

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

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". When prints of drawings are marked "Approved with Corrections Indicated" or "Returned for Corrections", the Contractor shall finalize the drawings and re-submit same in five (5) copies each for final approval. Every revision shall be shown by number, date and subject in a revision block.

Prints marked "Approved" or "Approved with Corrections Indicated" authorize the Contractor to proceed with construction or fabrication of the work shown on the drawings, with corrections, if any, indicated thereon.

If minor revisions are made after a drawing has been approved, the Contractor shall furnish two (2) additional prints, subsequent to each revision. 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.

Failure of the Supplier to submit the approved "As-Built" or "Final" Drawings to NPC on the respective dates specified in this section, NPC shall withhold Five percent (5%) of contract amount from payments due to the Supplier.

GW-6.3 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; and
b) Factory Test/Site Test (Performance) Results

GW-7.0 INSPECTION AND TESTS

GW-7.1 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.

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-7.2 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-7.3 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-7.4 Tests Failures

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

GW-7.5 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-8.0 QUALITY ASSURANCE REQUIREMENTS

GW-8.1 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-8.2 Quality Assurance Program

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

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

b) 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;

c) Arrange for the protection of the quality of the product and/or services to include delivery to the specified destination and/or performance of the required services, respectively; and

d) 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.

The Contractor shall ensure that all computer systems and software to be utilized on the project is qualified for the application under consideration and such qualification is documented.

GW-8.3 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 as 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-8.4 Records

The Contractor shall generate records as required by the quality assurance system and quality plans. The Contractor shall make available its records including audit reports for NPC's inspection.

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-8.5 Reporting and Corrective Action

The Contractor's quality assurance program shall provide established procedures for prompt detection and correction of all conditions adversely affecting quality, including failures, malfunctions, incidents, trends, deficiencies, deviations, non-conformances, and defective materials.

GW-9.0 DEMOLITION AND RELOCATION OF EXISTING EQUIPMENT AND STRUCTURES (AS APPLICABLE)

GW-9.1 General

The Contractor shall make full provision in his bid for the relocation, dismantling, assembly or demolition of existing equipment and associated structures and installations wherever this is required or prerequisite to the performance of the works. He shall furnish all necessary plant, equipment, tools and labor and execute the dismantling, assembly, relocation and demolition including disposal of debris and transportation, storage, reassembly and re-erection of dismantled equipment in accordance with the drawings or as directed by NPC.

GW-9.2 Dismantling of Existing Installations

Materials and equipment which are required to be reinstalled at new locations shall be handled with care at all times to prevent damage of any kind during dismantling and any such damage shall be made good by the contractor to the satisfaction of NPC.

Dismantling operations shall be executed in an orderly sequence, by suitably skilled personnel, in such a manner as to minimize the number and size of the resulting components.

GW-9.3 Storage, Transportation and Re-Erection

All dismantled materials and equipment shall be transported to the location where they are to be re-erected. If not immediately required at the location, they shall be carefully stored and maintained at such place and in such a manner as NPC may direct until such time as they are required at their new location.

Dismantled materials and equipment shall always be handled with care to prevent damage during transportation, storage and re-installation and any such damage shall be made good by the Contractor to the satisfaction to NPC.

The Contractor shall provide temporary shelter/cover such as tarpaulin or equivalent type of cover for protection of the equipment which requires protection from rain, dust or direct sunlight during the storage.

Re-erection and re-installation of all dismantled materials and equipment shall be carried out by skilled and qualified personnel with special training and experience in the appropriate trade.

GW-9.4 Demolition

The Contractor shall exercise due care and diligence during demolition structures, equipment, and installations, including the provision of screens and canopies to protect them from dust and debris. If any such damage should occur, the Contractor shall repair, replace or otherwise make good all damaged items to the approval of NPC.

All demolition operations shall be carried out in an orderly manner so as to cause minimum interference with other construction activities or the operation of the existing equipment and utilization of associated structures.

GW-9.5 Disposal of Demolished Materials

All debris and demolished materials shall be transported to a location designated by NPC and dumped or otherwise disposed of as directed by NPC.

If any demolished materials which are not required to be used elsewhere have a commercial value, he may direct the Contractor to set aside and salvage such materials, the proceeds of which shall be credited to NPC.

All salvable materials shall be carefully handled to avoid damage and shall be piled neatly at a location adjacent to the work or as directed by NPC. All salvable materials shall become the property of NPC and the Contractor shall be held responsible for all materials not accounted for. The salvable material shall not be used by the Contractor for any of his construction operations, unless otherwise authorized by NPC.

The Contractor shall clean the area of debris and hazardous materials resulting from the removal/dismantling of the equipment from the sites mentioned herein. The areas should be free from safety and environmental hazards during and after the dismantling activities.

GW-10.0 CORROSION PROTECTION AND PAINTING

GW-10.1 General

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 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 that is of equal or better-quality subject for the approval of NPC.

At least forty five (45) calendar days from the expected or planned completion of major construction and installation/erection activities 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 as specified in the relevant sections of this specification or as directed by NPC.

GW-10.2 Treatment for Shipping

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

The various items of materials and equipment which constitute the supply shall be thoroughly cleaned before shipment as to eliminate dirt, rust and grease and all welding slugs, 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.

All internal surfaces of tank shall be coated with an easily washable corrosion preventive compound.

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-10.3 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 metal blast

cleaned in accordance with Steel Structures Painting Council Standard. The various paints to be used shall be of high quality and type subject to approval of NPC.

No painting shall take place outdoor during the presence of rain, fog, dew or where the surfaces may be otherwise damp 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.

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 volume solids of 42% $\pm$ 2% high temperature paint shall be applied. For insulated surfaces exposed to high temperature one (1) primer coat of Aluminum modified silicone shall be applied prior to installation of insulation.

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 top coat 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 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.

All steel pipes laid underground shall be applied with two (2) coats of Coal Tar epoxy polyamide of 170 microns DFT each coat. Unless otherwise specified, asphalt jute or any approved equivalent shall be used for pipes laid underground.

Steel pipes installed underground may also be applied with tape wrapping with minimum finished thickness of 1 mm and shall be applied spirally with overlap of 50% in all parts of the pipe and fittings. Bitumen based primer shall be applied to pipe before applying the tape. The tape wrapping brochures shall be submitted for NPC approval prior to procurement and application. The wrapping shall extend for 300 mm beyond the buried portion.

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.

Final tests and inspection shall be carried out by 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 that 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-10.4 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 550 gm/m^2.

GW-11.0 PACKING, SHIPMENT AND STORAGE

GW-11.1 Preparation

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

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, as applicable, (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 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.

All electrical and delicate 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 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.

The Contractor shall employ methods that will warrant safe delivery of equipment and materials to its ultimate destination, with careful consideration given to the type of commodity, method of transportation, destination, storage time, and storage facilities at point of destination.

GW-11.2 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 sites and other areas on the route of delivery, including port facilities, inter-island shipping facilities, island transport, access roads, bridges, and to have acquainted themselves with all factors that will affect the cost of shipping and freight to Site.

Any damages to the roads, bridges, railways 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.

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 & its surfaces; and

c) Partial opening of the crates and plastic sheet protection of the plant auxiliary equipment 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 be responsible for the care and custody of the equipment from storage until erection.

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.

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

GW-11.3 Storage

If the supplied equipment and materials 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. The Contractor shall provide temporary shelter/cover such as tarpaulin or equivalent type of cover for protection of the equipment during the storage.

The Contractor shall be responsible for securing all his supplied equipment 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 outside property at the site, he may do so at his own expense and subject to the approval of NPC.

GW-12.0 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-13.0 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 Supplier's Service Personnel Services specified in Clause GW-14.0 as certified by the Plant Manager), NPC shall issue the Certificate of Final Acceptance.

GW-14.0 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-15.0 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 which include painting, equipment/pipe tagging and marking.

Failure of the Supplier to submit the approved "As-Built" or "Final" Drawings to NPC on the respective dates specified in this section, NPC shall withhold Five percent (5%) of contract amount from payments due to the Supplier.

PART I

TECHNICAL SPECIFICATIONS

AW - 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.

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

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

AW-1.4 Certification of Materials

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

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

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

NOTE: The above provisions are general for all types of buildings. The Contractor shall be guided accordingly by the applicable provisions in the specifications and what is shown in the drawings for each type.

AW-1.6 Measurement and Payment

Measurement for payment for different items in **Architectural Works** will be based on the areas, lengths, volumes and quantity placed and accepted by the NPC Representative.
Payments for each architectural item will be made at the corresponding contract unit price per square meter, linear meter, cubic meter and number of pieces/sets, for the pertinent items under Architectural Works in the Bill of quantities.

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

AW-2.0 PREFABRICATED CONTAINER HOUSE

AW-2.1 General

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

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

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

AW-2.2 Work Scope

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

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

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

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

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

Dimensions	:	6.0 meters length by 3.0 meters width by 2.7 meters height.
Steel Frame	:	Galvanized with painting
Walls	:	50 mm polystyrene insulation with double-sided 0.45mm pre-painted GI sheet.
Roof	:	Glasswool insulation with pre-painted GI sheet roof and interior ceiling.
Flooring	:	Magnesium board with linoleum finish.
Windows (4 sets – 1.0m x 1.0m)	:	4 sets aluminum frame sliding windows and 1 set PVC awning window.
Doors (1 set – 0.8m x 2.1m)	:	1 set steel door and 1 set PVC door.
Toilet & Bath	:	Complete with fixtures & fittings, including ceramic floor tiles, door, window and plumbing.

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

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

AW-2.3 Design Criteria for Prefabricated Container House

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

Wind load.

The wind load shall be based on basic wind speeds for occupancy category IV building and other structures where V=300 kph) and exposure D (Flat, unobstructed areas exposed to wind flowing over open water for a distance of at least 2 km) of NSCP volume I, 7th edition, 2015

AW-2.4 Measurement and Payment

Measurement and payment for **Prefabricated Container House** will be based on the corresponding contract unit price (1 lot) under Architectural Works in the Bill of quantities.

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

AW-3.0 CONCRETE MASONRY WORKS

AW-3.1 General

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

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

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

AW-3.2 Materials

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

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

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

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

b) Intersecting hollow blocks walls and partitions shall be bonded by overlapping units on alternative course or by the use of 6.3mm (1/4") diameter ties at 610mm (24") O. C. every second course (maximum) anchored in filled cells.

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

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

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

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

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

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

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

c) Water for mixing shall be clean and potable.

AW-3.3 Installation

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

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

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

AW-3.4 Concrete Lintel

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

AW-3.5 Testing of CHB

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

AW-3.6 Measurement and Payment

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

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

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

AW-4.0 PLASTERED PLAIN CEMENT FINISH

AW-4.1 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-4.2 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-4.3 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-4.4 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- 5.0 ROOFING AND SIDING SHEETS

AW- 5.1 General

The Contractor shall furnish all labor, materials, and operations including tools, other implements and accessories for the complete installation of roofing sheets wherever indicated in the drawings.

Installation shall be performed by skilled workmen in accordance with the construction and shop drawings and the manufacturer's standard.

Shop drawings and manufacturer's catalogue showing product standards and technical data will be provided by the Contractor to the NPC Representative for approval.

AW- 5.2 Materials

Material for roofing will be weather and chemical resistant. It shall be corrugated aluminum-zinc-silicon alloy coated metal sheet. Base metal shall be determined as specified in the drawing that shall range from 0.4 to 0.6mm thick. Bended sheets such as flat barge caps, flashings, ridge rolls, capping and moldings that serve as its accessory components shall have the same composition with the roofing and siding sheets of which minimum thickness base metal shall be 0.4mm. Gutters likewise shall have the same material composition with base metal thickness of 0.6mm unless otherwise specified in the drawing commonly as stainless.

AW- 5.3 Workmanship

Roofing and siding sheets shall be securely fastened on steel purlins and channels by hook or strove bolts or self-drilling screws or as required. Fasteners shall have a maximum distance of 0.30m O.C. along purlins.

Special care shall be given to the joints, lapping, bolting and setting of closers.

AW- 5.4 Measurement and Payment

Measurement and payment for **Roofing and Siding Sheet** will be based on the projected area inspected and accepted by the NPC Representative. No measurement & payment will be made on hidden areas covered by side & end overlaps, the cost for these being included in the projected area.

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

AW-6.0 DOWNSPOUTS AND ROOF DRAINS

AW-6.1 Scope of Works

a) Downspouts

Downspouts shall be 150 mm diameter unplasticized PVC, or as indicated in the drawings complete with fittings and accessories down to the catch basin and water storage tank.

b) Roof Drain

Roof drain shall be of high grade, strong, stainless. Casting shall be free from blowholes, porosity hard spots, excessive shrinkage, cracks, or other injurious defects shall be smooth and well cleaned both inside and outside and all fin sand roughness removed. Roof drains shall conform to the diameter of downspouts. Roof drains shall be provided at the upper end of all downspouts.

AW-6.2 Measurement and Payment

a) Downspouts

Measurement for payment will be based on the length installed and accepted.

b) Roof Drains

Measurement for payment for Roof Drain will be based on the number of sets installed and accepted.

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

AW-7.0 PAINTING AND VARNISHING

AW-7.1 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, moldings and others as specified by the NPC Representative shall be painted/varnished.

AW-7.2 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-7.3 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-7.4 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-7.5 Workmanship

All work shall be done by skilled painter 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-7.6 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-7.7 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-7.8 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.

AW-7.9 Measurement and Payment

Payment shall be based on what is called for in the Bill of quantities .

AW-8.0 CONCRETE FLOOR HARDENER

AW-8.1 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-8.2 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-8.3 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-9.0 SOIL TREATMENT

AW-9.1 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-9.2 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-9.3 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 everyone 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-9.4 Measurement and Payment

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

AW-10.0 PLUMBING FIXTURES AND FITTINGS

AW-10.1 General

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

AW-10.2 Make

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

AW-10.3 Trademarks

All plumbing fixtures and fittings must bear the trademarks of the manufacturer.
Maintenance Manual shall be submitted including complete instructions for replacing valve washers and strainers and give manufacturer's recommendations as to cleaning finish fixture surfaces.

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

AW-10.4 Fixtures

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

b) Lavatory – as shown in the drawings or as specified in the Bill of quantities

c) Urinal – as specified in the Bill of quantities

d) Kitchen Sink or Double Tub Sink – Stainless steel

e) Bibbs – Nickel Plated Copper or Brass Alloy

f) Shower Heads – Nickel Plated Copper

g) Plated clips and 19mm (3/4") caps on wall or as indicated on the drawings.

h) Floor Drain – Stainless or Brass Alloy

i) Clean-outs – Brass alloy

AW-10.5 Installation

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

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

All fixtures shall be provided with individual control stop so that each fixture may be separately controlled without affecting any other fixture.
All flush valves shall be equipped with vacuum breaking devices.

AW-10.6 Toilet Accessories

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

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

c) Urinal and Toilet Partition and Cubicle Doors- Hard wood laminate phenolic boards. Provide polyester coated extruded aluminium framing, non-rusting connection accessories, door hinges and lock sets, toilet paper holder, grab handle and accessory hook, signage.

d) Towel Holder-stainless

e) Liquid Soap Dispenser

AW-10.7 Measurement and Payment

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

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

PART I

TECHNICAL SPECIFICATIONS

CW - CIVIL WORKS

SECTION VI – TECHNICAL SPECIFICATIONS

CW – CIVIL WORKS

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TECHNICAL SPECIFICATIONS

CW – CIVIL WORKS

CW-1.0 GENERAL CONSTRUCTION FACILITIES

CW-1.1 Scope

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

CW-1.2 Moving-in

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

CW-1.3 Contractor's Camp Facilities

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

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

CW-1.4 Water Supply

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

CW-1.5 Sewerage Disposal and Sanitation

The Contractor shall, at his own expense, be responsible for the installation operation and maintenance of an adequate sewerage disposal and sanitation system and shall provide adequate toilet and wash-up facilities for his employees at his camp and in the areas where work is being carried out.

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

CW-1.6 Fire Protection

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

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

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

CW-1.7 Construction Power

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

CW-1.8 Camp Security

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

CW-1.9 Construction Material Storage

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

CW-1.10 Removal of Camp and Construction Facilities

After the completion of the work covered by the contract and prior to acceptance of the completed work, the entire camp facilities of the Contractor, including its water supply system, electric distribution system, quarters, warehouses, shops, dining halls, commissaries, temporary shed and other facilities therein shall be removed by the Contractor. The site shall be cleared and cleaned as directed by the NPC.

CW-1.11 Measurement and Payment

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

CW-2.0 CARE OF WATER DURING CONSTRUCTION

CW-2.1 Scope

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

CW-2.2 Drainage and Dewatering

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

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

CW-2.3 Measurement and Payment

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

CW-3.0 ENVIRONMENTAL REQUIREMENTS FOR CIVIL WORKS

CW-3.1 Scope

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

CW-3.2 General Conditions

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

CW-3.3 Measurement and Payment

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

CW-4.0 SITE GRADING

CW-4.1 Scope

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

CW-4.2 Clearing, Grubbing and Miscellaneous Work

CW-4.2.1 Clearing and Grubbing

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

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

CW-4.2.2 Miscellaneous Works

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

CW-4.3 Grading

CW-4.3.1 General

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

CW-4.3.2 Classification of Materials

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

CW-4.3.3 Stripping

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

CW-4.3.4 Excavation and Fill

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

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

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

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

In the event that construction of concrete footing or other concrete foundations is on fill, the fill shall be compacted efficiently and thoroughly so that when the fill is tested for compaction at the required foundation elevation for the structure, the required bearing capacity is attained but in no case less than 144 KPa. In no case shall filling and compaction work to be done without the presence of NPC's inspectors. The Contractor shall be held liable for any structural instability or damage that might result in consequence to non-compliance of this requirement. The Contractor shall institute corrective measures to bring the foundation base to a condition or state that will conform to the required bearing capacity; and also to repair and make good any damage on the structure to the satisfaction and at no cost to NPC.

CW-4.3.5 Slides

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

CW-4.3.6 Slip-Outs

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

CW-4.4 Disposal

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

CW-4.5 Sources of Fill Materials

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

CW-4.6 Environmental Requirements

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

CW-4.7 Measurement and Payment

CW-4.7.1 Clearing and Grubbing

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

CW-4.7.2 Miscellaneous Works

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

CW-4.7.3 Stripping

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

CW-4.7.4 Grading Excavation

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

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

CW-4.7.5 Grading Fill

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

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

CW-5.0 STRUCTURAL EXCAVATION, FILL AND BACKFILL

CW-5.1 Scope

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

CW-5.2 Materials

CW-5.2.1 Structural Excavation

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

CW-5.2.2 Structural Fill

a. Sand and Gravel Fill

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

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

b. Structural Earth Fill

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

CW-5.2.3 Special Foundation, if any

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

a. Lean Concrete

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

b. Selected Materials

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

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

CW-5.2.4 Structural Backfill

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

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

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

CW-5.3 Construction

CW-5.3.1 Excavation

a. General

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

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

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

b. Structural Excavation, Structure Other Than Pipes

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

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

c. Drainage and Sewerage Pipes and Cable Trench

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

d. Water Supply Pipes

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

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

CW-5.3.2 Structural Foundation Fill

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

by the NPC. No succeeding layer shall be placed until the previous layer has been tested and approved, as to compaction, by the NPC.

CW-5.3.3 Special Foundations

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

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

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

CW-5.3.4 Backfill

1. Structures, Other Than Pipes

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

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

2. Drainage and Sewerage Pipes

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

3. Water Supply Pipes

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

CW-5.4 Measurement and Payment

CW-5.4.1 Structural Excavation

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

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

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

CW-5.4.2 Structural Foundation Fill

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

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

CW-5.4.3 Special Foundations

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

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

CW-5.4.4 Structural Backfill

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

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

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

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

CW-6.0 CONCRETE

CW-6.1 Scope

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

CW-6.2 Class of Concrete

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

CW-6.3 Materials

CW-6.3.1 Cement

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

Unless otherwise specified, cement shall be ordinary Portland Cement. Type I for general construction which concrete is not in contact with soils or ground water and Type II for concrete in contact with soil or ground water. However, the use of Portland Pozzolan Cement Type IP meeting the AASHTO/ ASTM requirements may be allowed, provided that 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 Cement 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-6.3.2 Reinforcing Steel

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

CW-6.3.3 Water

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

CW-6.3.4 Aggregates

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

CW-6.3.5 Formwork

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

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

CW-6.4 Storage of Materials

CW-6.4.1 Cement and Aggregates

All cement shall be stored, immediately upon delivery at the Site, in weatherproof building that will protect the cement from dampness. The floor shall be adequately raised from the ground and in buildings placed in the locations approved by NPC. Provisions for storage shall be ample, and the shipments of cement as received shall be separately stored in such a manner that allows the earliest deliveries to be used first and to provide easy access for identification and inspection of each shipment. Storage buildings shall have capacity for storage of sufficient quantity of cement to allow sampling at least twelve (12) days before the cement is to be used. Bulk cement, if used, shall be transferred to elevated air tight and weatherproof bins. Stored cement shall

meet the test requirements at any time after storage when NPC orders retest. At the time of use, all cement shall be free flowing and free of lumps.

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

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

CW-6.4.2 Reinforcing Steel

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

CW-6.5 Concreting

CW-6.5.1 General

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

CW-6.5.2 Formwork Construction

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

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

Formwork for concrete placed underwater shall be watertight.

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

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

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

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

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

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

CW-6.5.3 Placing Reinforcement

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

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

CW-6.5.4 Mixing Concrete

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

CW-6.5.5 Placing Concrete

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

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

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

CW-6.5.6 Finishing Concrete

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

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

CW-6.5.7 Removal of Forms

Formwork shall not be removed without the permission of NPC; where such permission, however, shall not relieve the Contractor of its responsibility for the safety of the work. Blocks and bracing shall be removed at the time the forms are removed and in no case shall any portion of the wood forms be left in the concrete.
Falsework removal for continuous structures shall be as directed by NPC but in which case shall be temporarily supported such that the structure is gradually subjected to its working stresses. False work shall not be released in any span until the strength specified hereunder is attained.

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

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

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

CW-6.5.8 Curing and Protection

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

CW-6.5.9 Sampling and Testing of Concrete

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

The expense of making and curing all concrete specimens including the materials comprising the concrete specimens shall be borne by the Contractor. The cost of shipping and testing the concrete shall likewise be at the expense of the Contractor.
No concreting work on the project will be permitted to be done until NPC signifies in writing the approval of the use of all materials involved in making the concrete, following the satisfactory results of the necessary tests.

As work progresses, test cylinders shall be fabricated from the concrete samples and tested in accordance with ASTM C31 and ASTM C310. 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 strength level of a concrete mixture shall be acceptable if every average of any three consecutive strength tests equals exceeds f'c, provided no strength test falls below fc' by more than 500psi (3.5MPa) if fc' is 5000psi or less; or by more than 0.10fc' if fc' exceeds 5000psi.(35MPa)

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

CW-6.5.10 Tolerances and Repair for Concrete Construction

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

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

CW-6.5.11 Second Stage Concrete

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

CW-6.6 Measurement and Payment

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

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

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

CW-7.0 REINFORCING STEEL

CW-7.1 Description

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

CW-7.2 Material Requirement

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

CW-7.2.1 Bar Reinforcement

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

CW-7.2.2 Sampling

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

CW-7.3 Construction Requirement

CW-7.3.1 Order List for Bent Bars

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

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

CW-7.3.2 Fabrication

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

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

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

CW-7.3.3 Protection of Material

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

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

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

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

All steel reinforcement shall be accurately placed in position shown on the drawings or as required by the NPC and firmly held there during the placing and setting of the concrete. Bars shall be tied at all intersections except where

spacing is less than 30 mm in each direction, when alternate intersections shall be tied. Ties shall fasten on the inside.
Distance from the forms shall be maintained by means of stays, blocks, hangers or other approved supports. Blocks for holding reinforcement from contact with the forms shall be pre-cast mortar blocks of approved shape and dimensions or approved chairs. Layers of bars shall, be separated by pre-cast mortar blocks or by other equally suitable devices. The use of pebbles, pieces of broken stone or brick, metal pipe and wooden blocks or metal chairs shall not be permitted. Unless otherwise shown on the Drawings or required by the NPC, the minimum distance between bars shall be 40mm. Reinforcement in any member shall be placed and then inspected and approved by the NPC before the placing of concrete commences. Bundled bars shall be tied together at not more than 1.80 meters intervals.

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

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

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

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

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

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

shall be plumbed carefully and checked for location and elevation with an instrument, and shall be held in position rigidly to prevent displacement while concrete is being placed.

CW-7.3.5 Splicing

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

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

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

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

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

CW-7.4 Measurement and Payment

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

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

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

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

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

CW-8.0 STRUCTURAL STEEL

CW-8.1 General

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

CW-8.1.1 Submittals

Shop Drawings of all structural steel in five (5) copies for approval prior to fabrication of structural steel with complete information necessary for the fabrication and erection of the component parts of the structure including the

location, type and size of all bolts and welds, member sizes and lengths, camber & connector details, blocks, copes, and cuts. Include all welds by standard welding symbols.

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

Certificates of Conformance for the following:

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

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

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

CW-8.1.2 Delivery and Storage

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

CW-8.2 Materials

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

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

CW-8.2.1 Steel

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

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

CW-8.2.2 Bolts, Nuts and Washers:

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

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

CW-8.2.3 Accessories:

Welding electrodes and steel structural members shall use:

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

CW-8.3 Execution

CW-8.3.1 Fabrication

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

CW-8.3.2 Welding of Structural Steel Work:

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

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

CW-8.3.3 Shop Painting

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

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

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

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

CW-8.3.4 Erection

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

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

Provide safety belts and lines for workmen aloft on high structures unless safe working platforms or safety nets are provided.
When calibrated wrenches are used for tightening bolts, calibrate them at least one each working day using not less than three typical bolts of each diameter. Do not use impact torque wrenches to tighten anchor bolts set in concrete.

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

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

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

CW-8.3.5 Tests and Inspections

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

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

CW-8.4 Measurement and Payment

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

Payment will be made at the contract unit price for the item Structural Steel in the Schedule of Requirements, 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.

CW-9.0 DRAINAGE SYSTEM AND APPURTENANT STRUCTURES

CW-9.1 Scope

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

CW-9.2 Materials

CW-9.2.1 Non-Reinforced Concrete Drainage Pipes

Non-reinforced concrete drainage pipes shall meet the requirements of ASTM C14-20.

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

CW-9.2.2 Reinforced Concrete Drainage Pipes

Reinforced concrete drainage pipes shall meet the design and test requirements for Class II Reinforced Concrete Pipes in accordance with the latest revision of ASTM C76 and ASTM C497.

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

CW-9.2.3 PVC Pipes

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

CW-9.2.4 Concrete Covered Rectangular Ditch

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

CW-9.2.5 Bedding Material

A. For Stable Soil and Rock Foundation

Bedding material for sewerage and drainage pipes in stable soil and rock foundation, as determined by NPC, shall consist of sand or natural sandy soil in which all the materials passes a 10.5 mm (3/8") sieve but not more than 10% passes a 0.074 mm (No. 200) sieve.

B. For Unstable Foundation

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

C. Foundation under Roadways and Parking Areas

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

CW-9.3 Construction

CW-9.3.1 Trench Excavation and Backfill

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

CW-9.3.2 Concrete Canal

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

CW-9.3.3 Appurtenant Structures

Appurtenant structures like street inlet, street inlet-catch basin combination, manhole, catch basin for downspouts, catch basin for intersecting perforated PVC pipes, septic tank, drainage outlets, etc. shall be constructed at locations indicated on the plans or at the other convenient locations designated by the NPC. All appurtenant structures shall be of 20.70 MPa concrete unless otherwise shown on the drawings.

CW-9.4 Pipe Installation

CW-9.4.1 General

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

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

CW-9.4.2 Non-Reinforced and Reinforced Concrete Drainage Pipes

Whenever possible, concrete pipes shall be handled and installed with the aid of mechanical equipment and not just rolled or pushed into the trench from the bank. For small pipes, rope slings may be placed at both ends of the pipes and the rope slowly paved out until the pipe rests on the trench bed. proper and careful handling and laying should be observed at all times to prevent unnecessary structural damage to the pipe, especially at the pipe ends.
For pipes on sand bedding, before joining the next pipe length to the last pipe already laid, the bottom of the trench shall be excavated to the shape, size and location of the collar below the joint. The next pipe section shall then be securely attached to the previously laid pipe seeing to it the correct alignment and grade is always attained. Same procedures shall be observed for the remaining pipes.

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

CW-9.5 Measurement and Payment

CW-9.5.1 Concrete Rectangular Ditch

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

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

CW-9.5.2 Concrete Drainage Pipes and PVC Pipes

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

CW-9.5.3 Appurtenant Structures

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

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

CW-9.5.4 Bedding

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

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

CW-10.0 GROUTING

CW-10.1 Scope

This specification covers the requirements for the furnishing and installation of 2 component concrete epoxy grout unless shown otherwise on the design drawings.

CW-10.2 Physical Properties

The cured product shall have the following properties:
Tensile Strength = 27.65 MPa (4000 psi) minimum
Compressive Strength = 63.60 MPa (9200 psi) minimum.

CW-10.3 Submittals

The Contractor shall submit copies of brochures/specifications for NPC's approval.

CW-10.4 Measurement and Payment

Measurement for payment for Grouting will be based on the number of liters placed and accepted by NPC. Payment shall be made at the corresponding contract price for Grouting shown in the Bill of Quantities. Payment shall include all costs including supply of labor and materials and other incidentals necessary for the completion of the work.

CW-11.0 HIGH DENSITY POLYETHYLENE LINER

CW-11.1 Scope

This specification covers the requirements for the furnishing and installation of High Density Polyethylene Liner as shown on the design drawings.

CW-11.2 Physical Properties

The high density polyethylene liner shall be made from virgin homopolymer (petroleum product) with carbon black for UV protection and it should be resistant to most acids, chemicals and compounds.

CW-11.3 Submittals

The Contractor shall submit copies of brochures/specifications for NPC's approval.

CW-11.4 Measurement and Payment

Measurement for payment for High Density Polyethylene Liner will be based on the number of square meters placed and accepted by NPC. Payment shall be made at the corresponding contract price for High Density Polyethylene Liner as shown in the Bill of Quantities. Payment shall include all costs including supply of labor and materials and other incidentals necessary for the completion of the work.

CW-12.0 DRAIN PIPES

CW-12.1 Scope

This specification covers the requirements for the furnishing and installation of PVC Drain Pipes as shown on the design drawings.

CW-12.2 Physical Properties

The drain pipes shall be Polyvinyl Chloride and shall be unplasticized conforming to ISO 4435 or equivalent.

CW-12.3 Submittals

The Contractor shall submit copies of brochures/specifications for NPC's approval.

CW-12.4 Measurement and Payment

Measurement for payment for uPVC Drainpipes will be based on the number of linear meters placed and accepted by NPC. Payment shall be made at the corresponding contract price for uPVC Drainpipes as shown in the Bill of Quantities. Payment shall include all costs including supply of labor and materials and other incidentals necessary for the completion of the work.

CW-13.0 PVC WATERSTOP

CW-13.1 Scope

This specification covers the requirements for the furnishing and installation of PVC Waterstop as shown on the design drawings.

CW-13.2 Physical Properties

The PVC Waterstop shall have the following properties:
Tensile Strength = 13.82 MPa (2000 psi) minimum
Tear Resistance = 115.87 N/mm (300 lb/in) minimum

CW-13.3 Submittals

The Contractor shall submit copies of brochures/specifications for NPC's approval.

CW-13.4 Measurement and Payment

Measurement for payment for PVC Waterstop will be based on the number of linear meters placed and accepted. Payment shall be made at the corresponding contract price for PVC Waterstop as shown in the Bill of Quantities. Payment shall include all costs including supply of labor and materials and other incidentals necessary for the completion of the work.

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 specification shall include the furnishing of all labor, materials, equipment, tools and other incidentals required for all mechanical and associated works specified herein and shown on the accompanying drawings for the **Supply, Delivery, Installation and Test, of 1 x 120 kL Fuel Oil Storage Tank and Auxiliary Equipment/Accessories including Construction of Associated Facilities for Claveria Diesel Power Plant.**

All equipment and materials to be supplied by the Contractor shall be new and unused, of current manufacture, and of the highest Grade and the best of their respective kinds, and free from defects and imperfections. They shall be suitable for their intended purpose and shall comply with all applicable regulations, quality, and dimension standards.

The work shall be performed and completed in a high quality workmanship in accordance with all applicable codes, standards and generally accepted modern practice in the Supply, Fabrication, Installation and Test of the Fuel Oil Storage Tank, Auxiliary Equipment/Accessories and Associated Facilities. To have quality workmanship, only technicians skilled in their respective trades shall be employed.

The Contractor shall strictly observe the requirements specified in this Specific Technical Specification (Mechanical Works) in conjunction with the General Technical Specification (General Works), if applicable. The Specific Technical Specification shall take precedence over the General Technical Specifications in case of any inconsistency.

MW-2.0 SCOPE OF WORK

In accordance with the specifications contained in this section and as shown on the drawings, the scope of this Contract covers the supply, delivery, fabrication, installation/erection and test of all mechanical equipment and materials as required for the various facilities including all other works and services as required to complete the project, but not limited to the following:

a) One (1) set of 120 m^3 Diesel Fuel Oil Storage Tanks complete with associated valves and piping works, level gauge, spiral stairways and other tank appurtenances/accessories including tank calibration, testing, sandblasting and painting;

b) One (1) lot of piping materials complete with valves, fittings, supports and accessories, interconnection works with the existing FOST (fuel oil storage tanks' supply/filling), oil-waste piping to new oil-water separator and associated structural steel supports, including any required excavation and backfilling works; coating and painting;

c) One (1) lot of Fire Extinguishers complete with supports and necessary accessories; and

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

MW- 3.0 FUEL OIL STORAGE TANK (FOST)

MW-3.1 General

The design, fabrication, erection and testing of FOST shall conform to the requirements specified in this general specifications, applicable codes & standards and as shown on the accompanying drawings.

Upon completion of erection and testing, FOST shall be shot blasted internally and externally and painted with approved quality paint to withstand the anticipated service conditions.

FOST shall be provided with necessary nozzles for connections to all pipe works as shown on the drawings which include tapping points for instrumentation, manholes, vents, drains and other appurtenances such as stairways, caged ladder, hand railings, and etc.

The tank shall be provided with two hinged and jointed manhole doors (@ shell and roof) secured by bolts and winged nuts.

Prior to the purchase of materials, fabrication and erection/installation of the FOST, the Contractor shall submit for approval by NPC, brochures for tank materials, associated valves and piping materials, painting specifications, test procedures including necessary erection/installation details as required.

MW-3.2 Scope of Work

The work shall comprise all labor, tools, supply of appurtenant materials and other incidental for all works enumerated hereunder in accordance with the Specifications contained herein and as shown in the drawings or otherwise directed by the NPC.

The scope of the work shall consist of but not limited to the following:

a. Design, fabrication, delivery, installation/erection and testing of one (1) unit of FOST with a nominal capacity of 120 cu. m. with a diameter of 4.5 m and height of 7.2 m;

b. One (1) lot of fabrication/installation of spiral stairways, railings, manholes, roof vents, intake and discharge nozzles, air-foam chamber nozzles, drain and overflow nozzles, sounding gauge hatches, heat detector nozzles, level gauges and switches and other accessories shown on the bid drawings or specified herein including interconnection works with the existing piping systems (fuel oil storage tank's supply/filling) as shown in the drawings;

c. Three (3) units of 65 mm Ø gate valves for FOST inlet, outlet and spare nozzles;

d. One (1) unit of 50 mm Ø gate valve for drain line;

e. One (1) unit of 150mm Ø butterfly valve for tank farm drain outlets;

f. One (1) lot of sandblasting, painting and testing;

g. One (1) unit of 10 m long fuel oil sounding tape;

MW-3.3 Materials

All materials to be used for the FOST shall be new and unused and of the best grade and quality for the purpose. All manufactured items shall be standard commercial products of reputable manufacturers and in case where the materials shown in the drawing are not covered by the standards or specifications, the Supplier/Contractor shall furnish high quality materials which are acceptable to the applicable specifications and provisions of ASTM A-36 and AISC Standard Specifications or equivalent approved by NPC.

All materials used for pipes and fittings shall be carbon steel, Schedule 40, seamless, conforming to ASTM A53 Grade B, unless otherwise approved. Valves shall be cast or forged carbon steel body materials, flanged ends, with rising stem and generally be of gate valve type for size 65 mm in diameter, unless otherwise specified. Valves 50 mm Ø and below shall be of all bronze material, unless otherwise specified.

Plates shall be shaped at shop and edges be sheared, machined or chipped to suit the curvature of the tank and shall be marked before shipment to site.

Dimensions of tank plates shown on the accompanying drawings are in equivalent SI (metric) units converted from a standard size plates with US customary units. Plates of standard size with SI units may be used by the Supplier/Contractor subject to submission of relevant assembly/construction drawings for NPC's review and approval.

Certified mill test reports, covering all steel plate and structural shapes to be used in the work and as required by the governing codes and standards shall be furnished by the Supplier/Contractor for NPC's record. Copies of each mill test report shall be submitted to the NPC prior to fabrication of materials covered.

MW-3.4 Design and Construction

The FOST shall be of all welded construction designed, fabricated, constructed and erected in accordance with the requirement of API Standard 650 including Appendix E and shall be supplied complete with manholes, nozzles, level gauge, spiral stairways, caged ladder, railings, associated valves and piping works as shown on the drawings.

The FOST shall be vertical, cylindrical and with self-supporting conical roof.

The FOST shall be designed for erection on a concrete ring wall type foundation and shall conform to API standard requirements. The foundations shall be in accordance with the requirements shown on the relevant Civil Work drawings.

The fuel storage tank shall be designed and constructed with the following criteria:

MW-3.4.1 Shell

The shell plates of the tanks shall be constructed of not less than the thickness (corrosion allowance included) specified and shown on the drawings conforming to ASTM A 36 material.

The shell plates of the tanks shall be designed to have all courses truly vertical.

Shell vertical joints shall be by butt-weld with complete penetration and fusion as attained by double welding or by other means which obtain the same quality of deposited weld metal on the inside and the outside weld surface. Vertical joints in adjacent shell courses shall not be in alignment, but shall be offset from each other a minimum distance of five (5) times the thickness of the thicker course at the offset point.

Shell horizontal joints shall be by butt weld with complete penetration and fusion. Abutting shell plates shall have a common vertical centerline.

Top angles of A 36 material shall be attached to the shell either by butt joint which shall be of complete penetration and fusion or an alternative joint as shown on the drawing. Top angle size shall not be less than 75mm x 75mm x 6mm and the outstanding leg extends outside the tank.

Shell plates shall be of standard size conforming to 1,200mm (4ft.) wide, 2,440mm (8ft.) long and edges shall be properly squared and/or prepared for butt welding. Minimum thickness shall be 5mm or as shown on drawings.

Shell plates of standard size conforming to 1,830mm (6ft.) wide, 6,100mm (2ft.') long may be used if transportation to the specified plant site is accessible through land transportation direct from the source. Accordingly, detailed drawings showing arrangements of plates for shell, roof and bottom shall be submitted by the Contractor for NPC's review and approval.

MW-3.4.2 Bottom

Bottom plates shall have a minimum thickness of 8.0mm (5/16") (allowance for corrosion included) or as shown on the drawings with standard plate size similar the shell plates and conforming to A36 material. The plates shall be joined by lap welding, arranged as shown in the bid drawings. Three (3) plate laps in tank bottoms shall not be closer than 300mm (12") from each other and also from the tank shell. The bottom plates under the bottom shell ring shall have the outer ends of the joints fitted and lap-welded to form a smooth bearing for the shell plates.

Where butt-welded bottom plates are employed, the edges shall be prepared with either square or V-grooves. The butt welds shall be made by applying a backing strip 3mm (1/8") thick or heavier by tack welding to the underside of the plate. The bottom plates shall have a minimum slope of 1:120 upwards towards the center of the tank.

The attachment between the bottom edge of the lowest course shell plate and the bottom plates shall be a continuous fillet weld laid on each side of the shell plate.

MW-3.4.3 Roof

The roof of the 120 m^3 tanks shall be of self-supported-cone type provided with rafters. The roof and its supports shall be constructed in accordance with API 650, Standard for Construction of Welded Steel Tanks.

The slope self-supporting cone type roof shall be 15 degrees or as shown on the drawings. All roofs and supporting structures shall be designed to support dead load, plus a uniform live load of not less than 1.0 kPa (20 lbs/sq.ft.) of projected area. Roof plates shall have a minimum nominal thickness of 5mm (3/16") and its material shall be ASTM A36.

The roof plates shall be welded to each other on top side with a continuous full-fillet weld on all seams and shall not be attached to the supporting members. The roof plate circumference shall be attached to the top angle (not less than 75mm x 75mm x 5mm) of the tank with a continuous fillet weld on the top side only. Rafters supported on shell by means of rafter lugs are welded to the tank shell and connected to the collar plate or center column if required, as shown on the drawings. Where other construction is employed, detailed drawings shall be submitted by the Contractor for NPC's review and approval.

MW-3.4.4 Shell Attachments and Tank Appurtenances

The tanks shall be provided with the following appurtenances generally arranged in accordance with the bid drawings:

a) Spiral stairway and hand railings
b) Roof manhole
c) Shell manhole
d) Shell outlet nozzle
e) Shell inlet nozzle with riser pipe
f) Water draw off sump nozzle & piping
g) Roof vent
h) Overflow nozzle & piping
i) Sounding gauge hatch
j) Level gauge nozzles/hatch
k) Heat detector nozzle with blind flange/plug
l) Air-foam nozzle with blind flange/plug
m) Grounding pads
n) Nameplate
o) Sounding Tape

MW-3.4.4.1 Spiral Stairway and Handrails

Spiral stairways shall be provided with offset platform or landing platform on roof top and mid-rail sections of the tank. Platforms and stair treads shall be made of hot dipped galvanized steel gratings.

All parts shall be made of A 36 except otherwise specified. Stair width shall be a minimum of 600mm (24"). Tread shall be 200mm (8") wide made of hot dipped galvanized steel gratings and the rise of 200mm (8"). Top railing shall join platform handrail without offset and the height measured vertically from tread level at nose of tread shall be 864mm (34"). Maximum distance between railing posts along with the edge of the roof shall be 1500mm or as shown on the drawings. The stairway shall be completely supported on the shell of the tank and ends of the stringers shall be clear of the ground. The completed structure shall be capable of supporting a moving concentrated load of 454.4 kg (1000 lbs.) and the hand railing shall be capable of withstanding a load of 91 kg. (200 lbs.) applied in any direction at any point on the top rail.

Guard railings along the circumference of the roof shall be provided. Height of top railing above floor shall be 1000mm (40"). Toeboard of 75mm (3") height shall also be provided with midrail located approximately one-half the distance from top of the floor to top of railing.

MW-3.4.4.2 Manholes and Nozzles

Manholes and nozzles shall be provided and constructed in accordance with the bid drawings or with API 650. Reinforcing plates for these openings shall be made of one piece only. The minimum cross-section area of the reinforcement shall not be less than the product of the vertical diameter of the hole in the shell and gross plate thickness used. The necks, reinforcing plates and shell-plate openings which have either sheared or oxygen-cut surfaces shall have such surfaces uniformed and smoothen, with corners rounded, except where such surfaces are fully covered by attachment welds.

The tank atmospheric vent shall be fitted with a stainless filter of a replaceable type. Vent shall conform to the requirements of API Standard 2000.

Manholes and nozzles attached or fitted on the tank shall be of carbon steel, Schedule 40, seamless pipe conforming to ASTM A53 Grade B. Manholes may be fabricated using carbon steel plate or approved material subject however to radiographic test (RT) after fabrication.

Manholes on tank shall be furnished with hinged cover as shown on the drawings. Design of hinged components other than those shown on the drawings may be used provided that detailed drawings shall be submitted by the Contractor for NPC's review and approval.

MW-3.4.4.3 Grounding Pads & Rod

Each tank shall be provided with at least two (2) grounding pads equally spaced around the exterior of the tank for grounding protection.

Grounding pads shall be type 304 stainless steel or approved equivalent and shall be welded to the tank. Pads shall be at least 65mm by 75mm by 6mm thick and shall be drilled and tapped to the full thickness of the pad for hex head cap screws. Screw hole spacing and location shall match that of NEMA Standard hole terminals or as shown on the drawings.

Grounding rods to be used shall be of copper with minimum size of 20mm Ø and 3m long with connecting copper wire between grounding pad and rod or as required.

MW-3.4.4.4 Nameplate

Nameplate shall be provided and securely fixed to the tank at location which are readily visible. The main inscriptions on the nameplate shall include Tank Tag Number or SPIN (FO01TNK), Manufacturer/fabricator, Design Code, Nominal Capacity, Nominal Diameter, Nominal Height, Date of Manufacture and etc.

In addition to the nameplate, the lettering "NPC" and the NPC Logo with 1.0m diameter shall be painted on one side of the outside wall surfaces of the fuel oil storage tank facing the national road or main highway. 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 NPC. The color of the letters shall be luminous black. The color of NPC logo shall conform to its standard color.

MW-3.4.4.5 Holding Down Bolts

Holding down bolts shall be provided to protect the tank from skidding or overturning due to wind load or earthquake load. Number and size of bolts shall be provided as shown on drawings and equally spaced high strength bolts conforming to ASTM A 307 or approved equivalent.

MW-3.4.4.6 Piping, Valves and Fittings

Interconnecting piping to be installed shall be as shown on the drawings. Piping and fittings shall be of carbon steel, Schedule 40, seamless pipe conforming to ASTM A53 Grade B.

Inlet, outlet, water draw-off nozzles including spare nozzle shall be supplied with valves of sizes preferably similar to the nozzles unless otherwise specified or shown on the drawings. Air foam and heat detector nozzles for future use shall be provided with blind flanges or plug as applicable. Valves 65 mm and above shall be of rising stem, cast and forged carbon steel body, and with flange ends. Valves 50 mm and under shall be of bronze material, rising stem and with flanged or screwed ends. Gate valves shall generally be used, except for 150 mm Ø valve installed on waste oil drain to oil water separator, which is butterfly valve.

All valves that are directly connected to the tank nozzles shall have flanged ends.

MW-3.4.4.7 Gauges and Instrumentation

The tank shall be outfitted with all the proper instrumentation and/or gauge necessary for the accurate monitoring and control of the Diesel Fuel Oil.

The tank shall be provided with a ground receding level gauge. The level gauge shall be completed with welded hollow shell float, guide wires, tape, sheave elbows, tape conduit (pipe), support brackets, gauge head and level switches. The level gauge shall be constructed of the following materials:

a)	Gauge head	-	Aluminum
b)	Sheave elbows	-	Aluminum
c)	Sheaves	-	Stainless steel
d)	Float	-	Stainless steel
e)	Guide & gauge wires	-	Stainless steel
f)	Guide wires anchor	-	Stainless steel
g)	Support brackets	-	Carbon steel
h)	Gauge wire conduit pipe	-	ASTM 53 galvanized

The level gauge shall be so located that tank liquid level can be accurately indicated to a height equal to the straight side height of the tank.

All connection lugs or openings in the tank required for gauge equipment installation shall be furnished.

A calibration scale shall be printed on the tank and shall be large enough so it can easily be visible preferably from the powerhouse.

Wires and cables to be used and installed aboveground shall be enclosed in a rigid steel conduit (galvanized) except those laid on cable trays. Cables installed underground shall likewise be enclosed and pipe sleeve are coated with bituminous paint.

MW-3.4.4.8 Sounding Tape (10 m long)

The Contractor shall include the supply of one (1) set of 10-meter long sounding Tape. Tape body/frame shall be of aluminum alloy with stainless steel tape and brass dropper.

MW-3.5 Erection

The Contractor shall furnish all labor, tools, welding equipment and cables, falsework, scaffolding and other equipment necessary for the erection of the tank complete and ready for use. Lifting lugs attached to the tank for erection purposes shall be removed by the Contractor and any noticeable projection of weld metal shall be chipped-off.

Shell plates shall be shaped to suit the curvature of the tank at the shop prior to shipment to the project site.

Tank shell seams shall be so positioned that they do not pass through vessel connections. Inside seam shall be ground smooth for application of the internal's protective coating.

The tank and their structurals shall be welded by shielded metal-arc, the gas metal-arc, the flux-cored-arc, the electroslag or the electrogas process using suitable equipment. Welding may be performed manually, automatically or semi-automatically according to procedures described in ASME Section IX. Welding shall be performed in a manner to ensure complete fusion with the base metal. No welding of any kind shall be performed when the surfaces to be welded are wet, dirty nor during high winds unless the welder and the work are properly shielded. Each layer of weld metal or multi-layer shall be cleaned of slag and other deposits before applying the next layer.

The edges of all welds shall merge with the surface of the plate without a sharp angle. The maximum acceptable undercut shall be 0.4mm (1/64") of the base metal for vertical butt joints and 0.79mm (1/32") in depth for horizontal butt joints.

Tack weld, a weld made to hold parts of a weldment in proper alignment until final welds are made, shall not be considered as having any strength value in the finished structure.

The minimum size of fillet weld shall be as follows: plates 5mm (3/16") thick, not less than one-third the thickness of the thinner plate at the joint, with minimum of 5mm (3/16"). Single welded lap joints are permissible only on bottom plates and roof plates. Lap-welded joints, as tack-welded, shall be lapped not less than five (5) times the nominal thickness of the thinner joints, the lap need not exceed 50.8mm (2") and 25.4mm (1") for single welded lap joints. The reinforcement thickness of the welds on all butt joints on each side of the plate shall not exceed 2.4mm (3/32") and 3.2mm (1/8") for vertical and horizontal joints respectively. The reinforcement need not be removed except that it exceeds the maximum acceptable thickness. During the welding operation, plates shall be held close contact at all lap joints. Tack welds used in the assembly of vertical joints of the shell shall be removed when such joints are, welded manually. Tack welds, whether removed or left in place, shall be made using a fillet weld or butt weld procedure. Tack welds to be left in place shall be made by qualified welder and shall be examined visually for defects. Defective tack shall be removed.

Misalignment in completed vertical joints shall not exceed 10% of the plate thickness or 1.6mm (1/16"), whichever is larger. The upper plates in completed horizontal butt joints shall not project beyond the face of the lower plate at any point by more than 20% of the upper plate thickness, with a maximum projection of 3.2mm (1/8"), except that a projection of 1.6mm (1/16") is acceptable for upper plates less than 7.9mm (5/16") thick.

MW-3.6 Test and Inspection

Test and inspection of all materials and equipment shall be performed in accordance with the requirements of all applicable codes and standards, unless otherwise stated in this specification.

The Contractor shall establish test procedure in accordance with the requirements of this specification which will be used as guide in the performance of field test and inspection for all works furnished. The test procedure shall be submitted to NPC for review and approval.

Upon completion of works, the Contractor shall conduct and perform test and inspection for the system's equipment furnished which will be in accordance with the approved test procedure. The tests shall be performed in the presence of NPC representative. Prior to start of tests, the Contractor shall notify NPC of the date when such tests are to be performed.

Any defect found during the tests shall be rectified by the Contractor in the same manner described herein.

MW-3.6.1 Weld Inspection

a) Butt Welds

Complete penetration and fusion is required for welds joining shell plates to shell plates. Inspection for quality of welds shall be made by radiographic method. Where visual inspection by NPC inspector indicates unsatisfactory welds, acceptance or rejection shall be based on inspection of radiographs.

b) Fillet Welds

Fillet welds are welds of approximately triangular section joining two (2) surfaces approximately at right angle to each other as in lap joint, tee joint or corner joint.

Inspection of fillet welds shall be made by visual examination. Where visual inspection by the NPC inspector indicates unsatisfactory welds, acceptance or rejection shall be based on sectioning such areas by chipping with a mechanical round-nosed chipping tool.

c) Cost

All costs for making radiographs, liquid penetrant testing and any necessary repairs shall be borne by the Contractor. However, if the NPC inspector requires radiographs and/or liquid penetrant testing in excess to the number specified in this Section or requires chipouts of fillet welds in excess of one per 30m (100') of welds is disclosed, the cost of the additional inspection shall be borne by NPC.

MW-3.6.2 Methods of Inspecting Vertical and Horizontal Joints

Radiographic inspection is required for shell butt welds, annular plate butt welds and flush-type connection with butt welds. Inspection by radiographic methods shall not be required for roof plate or bottom plate welds nor for welds joining roof plates to the top angle, top angle to shell plate, shell plates to bottom plates or appurtenances to tanks.

a) Vertical Joints

Butt-welded joints in which the thinner shell plate is 10mm (3/8") or less shall have one (1) spot radiograph taken in the first 3m (10') of completed vertical joint of each type and thickness welded by each welder or welding operator. Thereafter, without regard to the number of welders or welding operators, one additional spot radiograph shall be taken in each additional 30m (100') and any remaining major fraction thereof, of vertical joint of the same type and thickness. At least 25% of the selected spots shall be at junctions of vertical and horizontal joints with a minimum of two (2) such intersections per tank. In addition, one random spot radiograph shall be taken in each vertical joint in the lowest course.

Butt-welded joints in which the thinner shell plate is over 10mm (3/8") up to 25.4mm (1") in thickness, spot radiographs shall be taken per above preceding paragraph. In addition, all junctions of the vertical and horizontal joints in plate of this thickness range shall be radiographed, with each film to show clearly not less than 50mm (2") of weld length on each side of the vertical intersection. In the lowest course, two (2) spot radiographs shall be taken in each vertical joint, one of which shall be as close to the bottom as practicable, the other taken at random.

b) Horizontal Joints

One spot radiograph shall be taken in the first 3m (10') of completed horizontal butt joint of the same type and thickness (based on the thickness of the thinner plate at the joint), without regard to the number of welders. Plate shall be considered of the same thickness when the difference in the specified or design thickness does not exceed 0.76mm (0.03"). Thereafter, one radiograph shall be taken in each additional 61m (200'), and any remaining major fraction of horizontal joint of the same type and thickness, not including the junctions with vertical joints as required in Item a) above. As welding progresses, radiographs shall be taken as soon as practicable. Each radiograph shall clearly show a minimum of 76mm (3") of weld length.

Bottom annular plate radial joints shall have complete penetration and fusion. For double butt-welded joints, one spot radiograph shall be taken on 10% of the radial joints. Single welded joints using back-bar shall be radiographed one spot on 50% of the radial joints. Locations shall be at the outer edge where shell plate joint joins the annular plate. Radiographs shall have a minimum length of 150mm (6").

c) Determination of Limits of Defective Welding

When a section of weld is unacceptable as shown by radiographs, or the limits of the deficient welding are not defined by such radiograph, two (2) adjacent spots shall be examined by radiography. However, if the original radiograph shows at least 76mm (3") of acceptable weld between the defect and any one edge

of the film, an additional radiograph need not be taken on that side of defect. If the weld at either of the two adjacent sections fails to comply with the requirements of radiographic standard in ASME Boiler and Pressure Vessel Code Section VIII, Div. 1, additional nearby spot shall be examined until the limits of unacceptable welding are determined or the Contractor may replace all the welding performed by the welder on that joint.

MW-3.6.3 Tank Testing

a) Testing Tank Bottom Welds

Upon completion of welding the tank bottom, all joints shall be tested by vacuum using a soap film solution.

b) Testing Tank Shell

Upon completion of the entire tank and the performance of weld inspection specified in Section MW-3.6.1, the tank shell shall be tested by one of the following:

b.1 If water is available, the tank shall be filled with water and inspected frequently during the filling operation. Filling of water shall be 50mm (2") above the top leg of the top angle;

b.2 If water is not sufficient to fill the tank, the test shall be made by one of the following:

b.2.1 Painting all joints on the inside with a highly penetrating oil and carefully examining the outside of the joint for leakage.

b.2.2 Applying vacuum to either side of the joints or applying internal air pressure as specified in Item c) of this Section and carefully examining the joints for leak.

c) Testing Tank Roof

Upon completion, the tank roof shall be tested by applying internal air pressure or external vacuum to the seams with a soap film solution. The internal pressure shall not exceed the weight of the roof plates.

MW-3.6.4 Repairs

a) Repair of Welds

All defects found shall be called to the attention of the NPC inspector and his approval shall be obtained before they are repaired. Pinhole leaks or porosity in tank bottom joints may be repaired by applying an additional weld bead over the defective area. Other defects or cracks in tank bottom joint or leaks in shell joints or in the shell-to-bottom joints shall be required by chipping or melting out the defects from one or both sides of the joint, as required, and rewelding. Only sufficient cutting out the defective

joints is required as is necessary to correct the defects. Isolated pinhole leaks in roof joints may be caulked mechanically. Considerable porosity in the roof joints or of cracking shall be added with bead of weld metal laid over the affected portion. Mechanical caulking is not permitted for any other repairs. Repairs of defect discovered after the tank has been subjected to hydrostatic test shall be made with the water level at least 300 mm (1') below the point being repaired or with the tank empty if repair is on or near the tank bottom.

All repaired welds shall be checked by repeating the original inspection procedure and by repeating one of the testing methods.

MW-3.7 Tank Calibration

The tank shall be calibrated for accurate measurement of Diesel Fuel Oil. Five (5) copies of calibration table shall be furnished by the Contractor to NPC.

The Contractor shall include the supply of one (1) set of 10 meter long Fuel Oil Tank Sounding Tape per plant site. Tape body/frame shall be of aluminum alloy with stainless steel tape and brass dropper.

MW-3.8 Painting Requirements

MW-3.8.1 General

The tank and other 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.

MW-3.8.2 Surface Preparation

Prior to painting all weld spatter, mill scale, burrs, rust, loose particles, and flux shall be removed. Grinding and deburring shall be performed with a wheel that will assure a clearly cut surface.

Blast cleaning with iron-free sand or grit shall be used. The grit shall be new and unused. Surface preparation of external surface of tank 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-3.8.3 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.

The tank external surfaces, appurtenances and other surfaces shall be painted to conform with the following:

a)	Primer Coat (75 microns DFT)	:	Zinc rich epoxy polyamide primer
b)	Intermediate Coat (100 microns DFT)	:	Epoxy polyamide
c)	Final Coat (50 microns DFT)	:	Polyurethane enamel

The tank inside surfaces including structural shall be painted to conform with the following:

a)	Primer Coat (50 microns DFT)	:	Zinc rich epoxy polyamide primer
b)	Intermediate Coat (100 microns DFT)	:	Polyamide amine cured epoxy coating
c)	Final Coat (100 microns DFT)	:	Polyamide amine cured epoxy coating

The underside of the tank bottom shall be coated with coal tar epoxy, 400 microns DFT.

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.

Final color of paint on external surfaces of the tank shall be silver or as directed by NPC. Final color of associated piping and equipment shall be similar to the existing facilities unless otherwise directed by NPC.

MW-4.0 FUEL OIL TRANSFER PUMP

MW-4.1 General

The fuel oil transfer pump shall be used for unloading/transferring of diesel oil from a tanker/lorry or 210-liter drum to FOST; and from FOST drums.

The pumps shall be installed inside the substation's fuel oil pump house complete with concrete foundation, anchor bolts and electrical amenities and shall conform to the requirements of relevant Civil and Electrical Works Specifications.

MW-4.2 Scope of Works

The Contractor shall supply, deliver, install and test of one (1) set of Fuel Oil Transfer Pumps with capacity of not less than 18 m^3/hr at a discharge head of 30m. The pumps shall be complete with flanges, bolts, nuts and other accessories necessary for the safe and reliable operation of the pumps including spare parts for one (1) year operation. The work shall include but not limited to the following:

a) Eleven (11) units of 65 mm Ø gate valve;
b) Three (3) units of 65 mm Ø swing type check valve @ F.O. transfer pump outlet, pump's bypass line and in the existing FOST;
c) Two (2) units of 65 mm Ø simplex strainer (40 mesh size);
d) Two (2) units of 100 mm Ø dial size pressure gauge @ F.O. transfer pump inlet and outlet;
e) One (1) unit of 18 m^3/hr rated flow Ø flow meter, 65 mm @ downstream of F.O. Transfer Pump;
f) One (1) unit of 50 mm Ø gate valve @ fuel supply line to existing day tanks (interconnection point)
g) One (1) unit 150 mm Ø butterfly valve @ tank's drain/overflow line
h) One (1) lot of piping materials, pipe fittings, pipe supports, pipe coating and other accessories including any required excavation and backfilling works; and
i) One (1) lot of spare parts for the fuel transfer pump as specified in the Clause MW-4.4.

MW-4.3 Design and Construction

The pump shall be horizontal gear type with a capacity of not less than 18 m^3/hr at a discharge head of 30m. Pump casing shall be made of cast iron material capable of withstanding a hydrostatic pressure of 150% of the maximum pumping pressure under which the pump could operate at design speed.

The fuel oil transfer pump shall conform, as minimum, to the following requirements:

a)	Casing	:	Cast Iron
b)	Gear	:	Ductile Iron
c)	Shaft	:	High Strength Carbon Steel
d)	Bushing	:	Bronze (Graphited)

Gland shall be made of cast iron stuff with graphite gland packing. Oil pan shall be provided at the gland section to catch possible oil leaks.

Pump shall be equipped with adjustable safety valve or relief valve to protect the unit from overpressure. Safety valve box and cover shall be made of cast iron.

Lifting lugs and eyes and other special tackle shall be provided as necessary to permit easy handling of the pump and its components.

The pump shall be driven by a direct-coupled motor mounted on a common metal base ready for installation on concrete foundation. Concrete foundation and anchor bolts shall be included in the scope of work and shall conform to the general requirements of relevant Civil Works Specifications.

Pump Motor shall be selected so that the pump brake HP requirement throughout the entire capacity range shall be within the nameplate rating of the motor. Motors shall be capable of operating continuously at rated output within ±5% of rated frequency and at any voltage within ±10% of rated value.

Pump motor shall generally be of the squirrel cage rotor induction type and shall comply with ANSI Standards plus amendments. Standard frame sizes should be used.

Pump Motor shall be of the totally enclosed guarded fan cooled type, suitable for continuous operation and direct on line starting. Motors shall conform to the requirements specified in the electrical Works specifications.

The pump to be supplied shall be operated at 480 V/3Ø/60 hz. The pump shall be operated only from the local panel located in the pump house.

Local panel shall be provided at the fuel pump house and in the control powerhouse. Local Panel at the power house shall be located midway of the fuel day tanks' area. Local panel shall be provided with start and stop push buttons with respective status indicating lights. Local panel at the pump house shall be provided with local/remote selector switch which shall be utilized for preference of fuel pumps operation either from the powerhouse or fuel pump house. Provisions for monitoring of Start and Stop status for the pump in the control room panel shall also be provided.

All cables and conduits including ground wire of appropriate size required for the connection of the motor to the existing station panel board shall be provided by the Contractor in coordination with the plant management.

The Contractor shall furnish a UL/CSA listed moulded-case circuit breaker equipped with thermal magnetic trip current protection, rated 30 AT, 480V, 3-phase, 60 Hz in an enclosure to be installed in the pump house and another unit of circuit breaker shall be provided and installed at the power station to be tapped at the existing 480 V system for the power source supply.

The local control panel shall be provided with start and stop push buttons with status indicating lights.

All cables and conduits of appropriate size required for the connection of motor from the existing station's panelboard shall be provided by the Contractor. Cable size shall not be less than the requirements in the Electrical Works Technical Specifications.

The technical requirements of the associated valves, flowmeter, strainers, gauges, testing and spare parts shall conform to the requirements specified in this section.

MW-4.4 Spare Parts

The Contractor shall supply the manufacturer's recommended spare parts for one (1) year operation of pump to be supplied which shall include the following as minimum:

a) One (1) set of bearings for pump and motor; and
b) One (1) set of bushings, wearing rings, packing and gaskets for the pump.

MW-4.5 Pump House

The Contractor shall construct a pump house which will house the fuel oil transfer pump in accordance with the attached Civil Work drawings. The pump house shall be provided with lighting, drainage system and other amenities to conform with the requirements specified in this section and in the relevant Electrical and Civil Works Technical Specifications and drawings.

Lighting fixture to be used shall be of compact LED type, 9 watts, 230V, vapor tight and fitted with clear glass globe.

The Pump house shall be provided with the following:

a) Supply, installation and test of 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 conductors; and
d) Supply and installation of conduit system.

MW-4.6 Submittal

The Contractor shall submit for NPC evaluation and approval for the following:

a) Catalogues or brochures for pumps and associated electrical device technical data, outline drawings, including detailed drawings of pump's concrete foundation;

b) Test procedures prior to test; and

c) Test and inspection reports

MW-4.7 Pump Testing

The pump and motor shall be subjected to factory tests to determine its conformance with the design and operating characteristics and shall be performed in accordance with the approved test procedures and applicable codes and standards which shall include the following:

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

b) Report of the characteristic curve of at least one (1) pump of each type such as Height vs. Flow, Power absorbed against Flow, Efficiency against Flow;

c) Test of uninterrupted operation to full flow and maximum height of each pump motor set for one (1) hour; and

d) Test of uninterrupted operation without load for each pump motor set for one (1) hour.

MW-4.8 Painting

Pump's associated valves and other accessories are generally delivered with final paint applied at the manufacturer's shop. Any part of the final paint that will be damaged during transport and installation shall be re-painted or touched-up after installation and testing. Final color shall be per manufacturer's standard unless otherwise directed by NPC.

MW-5.0 FUEL OIL TRANSFER AND WASTE OIL/WATER PIPING SYSTEM

MW-5.1 Scope of Works

The Contractor shall supply, install and test a complete fuel oil transfer and waste oil/water piping system including pipe supports, fittings, necessary accessories, all required excavation and backfill of pipe trenches, painting and other necessary accessories as required and shown on the attached drawings.

The F. O. transfer piping system shall consist of piping interconnections to the existing fuel oil supply line to existing 35 kL tank.

Waste oil/water shall consist of piping interconnections from the fuel oil tank's drain pit to oil-water separator and waste water from oil-water separator to drainage system or to a discharge area.

The works shall include the supply and installation of piping materials, valves, asphalt tape/jute of embedded fuel oil piping and other accessories to complete and make ready for the safe and reliable operation of the fuel oil transfer system but not limited to those shown on the attached drawings.

MW-5.2 Piping

Fuel oil piping shall be constructed from ASTM A53 Gr. B, seamless pipe and Schedule 40. All piping 65mm and larger shall be constructed with flanged joints or butt-welded joints and fittings. Piping 50mm and below shall be constructed with flanged joints or socket welded joints and fittings.

Fuel oil piping shall generally be installed above ground. In case fuel oil piping shall be installed underground, steel pipes shall be applied with tape wrapping with minimum thickness of 1 mm applied spirally with overlap of 50% in all parts of the pipe and fittings or approved equivalent. The tape wrapping brochures shall be submitted for NPC approval prior to procurement and application. The wrapping shall extend for 300 mm beyond the buried portion.

Waste oil/water piping shall be constructed of Unplasticized Polyvinyl Chloride (*uPVC)* pipe, Schedule 80 or Class 150, conforming to ASTM D-1784 or approved equivalent.

Unplasticized PVC pipe connection joints 80 mm (3") Ø and above shall be joined by rubber ring or solvent cement type connection. Smaller sizes shall be of solvent cement type connection. Flanged connections shall be used for connecting to flanged surfaces or to flanged-ends valve and shall be of the same material with the connected pipe with a rating of Class 150 or ANSI 150.

The waste oil/water piping system 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 compatible soil taken from trench excavation and approved by NPC.

All pipes that crosses 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 pipes in open areas shall be laid not less than 300mm from the ground surface to the bottom of pipe.

PVC pipe installed aboveground or with associated isolation valve 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-5.3 Valves

All gate or globe valves to be supplied shall be of the outside screw and yoke design or with rising stems. Valves body material shall be of cast iron for sizes more than 50mm diameter and cast bronze or stainless steel for 50mm and smaller. All valves shall have flanged ends with a rating of not less than 150 lb. The use of screwed ends may be applied to 50 mm diameter subject to the approval of NPC. Check valves shall be of swing type.

MW-5.4 Strainers

Strainers shall be of basket type or approved equivalent with body cast iron material and flanged ends. Body drain and vent connections shall be included. Drain plugs shall be threaded. Screen elements shall be of stainless steel construction with minimum 40-mesh size or as shown on the drawings. Magnets shall be included to trap small iron and steel particles for use in fuel oil lines.

MW-5.5 Pressure Gauges

Pressure gauges for fuel oil system shall be provided with dampener. Each pressure gauge shall be provided with isolation valve. Pressure gauge shall be of bourdon tube type with solid front case, and minimum size of dial gauge shall be of 100mm Ø.

MW-5.6 Flowmeters

Flowmeter shall be provided at fuel oil system. Accuracy of flow meters shall be $\pm$ 0.5% of total flow with 0.2% repeatability. Flowmeters shall be of LCD display and capable of monitoring the Total/Accumulated Flow, resettable total flow and instantaneous flow rate. Flowmeter shall be selected so that the designed flow in the fuel supply and return line shall be between 50% to 75% design regions, of the flow meter. Simplex strainer with minimum 40 mesh size and stainless steel filter element shall be provided upstream of the flowmeter. The flowmeter shall be made of aluminum or approved equivalent with flanged ends and shall utilize an internal battery that can last up to at least 5 years. The flowmeter shall be equipped with pulse generator or 4-20mA current output and ready for future interconnections.

MW-5.7 Testing

The piping system shall be hydrostatically tested at a pressure of 1.5 times the operating pressure of the system.

The assembled fuel oil piping system may be tested using a compressed air at a pressure of 1.25 times the operating pressure of the system and maintaining it for a minimum of 10 minutes, subject to the approval of NPC. Examination for leakage detected by soap bubble or equivalent method shall be made of all joints and connections. The piping system shall show no evidence of leaking.

During initial pipe filling and trial operation of the fuel oil piping system, piping fittings and joints shall be visually inspected against leak.

Waste oil/water may be applied to sections or the entire system. The test shall be made between valves and sections of not more than 305 m (1000 ft.) in accordance with the American Water Works Association (AWWA). There shall be no leakage whatsoever from the pipes, fittings and connections for each section tested while the system is under test pressure for the period of not less than thirty (30) minutes or the total time to inspect all portions of the waterline under test, whichever is longer. During the test, valves shall be opened and closed. Any leakage or any defect disclosed by the tests prior to the acceptance shall be corrected and repaired by the Contractor at his own expense 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-5.8 Painting

All 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.

All steel pipes laid underground shall be applied with two (2) coats of Coal Tar epoxy polyamide of 170 microns DFT each coat and finally wrapped with 6mm thickness asphalt jute.

Painting for waste oil/water PVC piping is not required.

Final color for fuel oil piping and associated valves installed above ground shall conform to Munsell No. 7.5R 3/12 and/or similar to the existing facilities or as directed by NPC.

MW-6.0 FIRE FIGHTING SYSTEM

MW-6.1 General

This section provides the essential information for the design, manufacture, fabrication, supply, installation, delivery to site and test of the specified fire fighting system.

All equipment and materials necessary for the complete installation shall be furnished complete, even though not necessarily mentioned in this specification but are necessary for the safe and reliable operation of the Fire Fighting System.

All the fire fighting equipment shall be supplied by the Contractor complete with their corresponding technical brochures written in English that would aid in the installation, operation and maintenance of the equipment.

Fire extinguishers shall be designed, installed and tested in accordance with International Organization for Standardization (ISO) norms and/or internationally accepted standards and/or listings or certifications based on Section 10.5.3.2 of the Revised Implementing Rules and Regulation (RIRR) of RA 9514 – The Fire Code of the Philippines, which are any of the following:

CERTIFYING BODY	CERTIFICATION/ COMPLIANCE MARKINGS
National Fire Protection Association (NFPA)	
Underwriters Laboratories (UL)	
Factory Mutual (FM)	
American National Standards Institute (ANSI/UL 8)	

Loss prevention Certification Board (LPC or LPCB)	
European Committee for Standardization (CE marked or EN 1866-1:2007)	
Australia Standards Association (ASA or AS2444)	
Japan Industrial Standard Committee (JIS or JISC)	
Korea Fire Industry Technology Institute (KFI)	
British Standards Institution (Kitemark EN3 or BS EN3)	

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

Painting of fire fighting equipment and applicable piping shall be in accordance with Manufacturer's standard or as directed by NPC. Equipment with final painting have already been applied at the shop but have been damaged during transport and/or installation works, shall require touch-up painting.

The Contractor shall design, furnish, install and test all the equipment specified below.

MW-6.2 Portable Fire Extinguishers

MW-6.2.1 Scope of work

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

a Three (3) units of portable type fire extinguisher, clean agent (HCFC or Halotron I Type), 7.1 kg. (15.5 lbs), wall-hung type, and shall be in certified/ approved by the certifying body specified in MW-6.1;

MW-6.2.2 Technical Requirements

Each fire extinguisher cylinder shall be complete with release valve, dial gauge indicator, appropriate length of hose with nozzle and locking pin.

The 7.1 kg (15.5 lbs.) capacity wall-hung type fire extinguishers shall be complete with carrying handle and wall-mounting bracket. Portable fire extinguishers shall be suitable for the protection against class ABC fires using Clean Agent (HydroChloroFluoroCarbon or Halotron I Type) that is environmentally safe and leaves no residue.

MW-6.3 Wheeled-Type Fire Extinguishers

MW-6.3.1 Scope of Work

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

a. One (1) set of Foam (AFFF/F3) wheeled type fire extinguisher complete with self-contained cylinder mounted on a frame with handle, floorstand and steel wheels, 125 L (33 gallons) capacity complete with associated valves, dial gauge indicator, nitrogen expellant tank for unit pressurization, appropriate size of discharge hose of 15 m long fitted with couplings and foam nozzle assembly and shall be in certified/ approved by the certifying body specified in MW-6.1;

MW-6.3.2 Technical Requirements

The fire extinguisher cylinder shall be complete with release valve, dial gauge indicator, appropriate length of hose with nozzle and locking pin.

The Foam (AFFF/F3) wheeled type fire extinguisher units shall consist of a completely self-contained cylinder mounted on a frame with handle, floorstand and steel or rubberized wheels, 125 L (33 gallons) capacity complete with associated valves, dial gauge indicator, nitrogen expellant tank for unit pressurization, appropriate size of discharge hose of 15 m long fitted complete with couplings and foam nozzle assembly.

MW-6.4 Submittals

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

MW-7.0 DOMESTIC WATER SUPPLY SYSTEM

MW-7.1 General

This section provides the essential information for the design, supply, installation, test and commissioning of the complete Domestic Water Supply System to provide the water requirement of the plant including the required excavation and backfilling of pipe trenches.

MW-7.2 Piping, Valves and Fittings

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

Gate valves, shall be made of bronze or stainless steel, rising stem, union bonnet, inside screw, solid wedge or plug type disc, with screwed or flanged ends. Check valves shall be of swing type, cast bronze and with screwed ends.

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

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

MW-7.3 Testing of Domestic Water Supply Piping System

After installation of the equipment, the Supplier 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 Supplier.

The piping system shall be hydrostatically tested at a pressure of 1.5 times the operating pressure of the system.

Tests may be applied to sections or the entire system. The test shall be made between valves and sections of not more than 305m (1000 ft) in accordance with the American Water Works Association (AWWA). There shall be no leakage whatsoever from the pipes, fittings and connections for each section tested while the system is under the test pressure for the period of not less than thirty (30) minutes of the total time to inspect all portions of the waterline under test, whichever is longer. During the test, valves shall be opened and closed. Any leakage or any defect disclosed by the tests prior to the acceptance shall be corrected and repaired by the Supplier at his own expense to the satisfaction of NPC.

Before any test is made, the Supplier 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 Supplier.

MW-7.4 Disinfecting of Water Storage Tank and Domestic Water Piping System

The water storage tank and domestic water piping system shall be disinfected after testing and before being put into use. Before disinfections, the 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 Supplier may use any of the methods of disinfections as recommended by the American Water Works Association (AWWA) or any of the following kinds of treatment:

a) Chlorine Gas-Water Mixture;

b) Calcium-Hypochlorite or equal; or

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

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

MW-8.0 AIR CONDITIONING AND VENTILATION SYSTEM

MW-8.1 General

This section provides the general technical requirements and other essential information for the Air Conditioning and Ventilation System equipment to be supplied, installed and tested by the Supplier.

The Air Conditioning and Ventilation Systems shall be provided in the containerized/pre-fabricated control house which houses the generator control and protection panels (GCPP), associated electrical equipment and devices. The Supplier shall be responsible for determining the respective sizes/ratings of the Air Conditioning and Ventilations system in consideration to the various electrical equipment and devices installed in the control house and subject to review and approval of NPC.

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

Power supply for the ventilation and air-conditioning equipment shall be 220V, single phase, 60 hz.

Refrigerant to be used shall be environmental friendly.

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

MW-8.2 Design Conditions

a) Outdoor Conditions:

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

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

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

c) Area to be air-conditioned shall be:

c.1 Bunkhouse (as indicated in the Schedule of Equipment and as shown in the Bid Drawings)

d) Area to be ventilated shall be:

d.1 Comfort Room (Bunkhouse): - 10 air changes per hour

MW-8.3 Schedule of Equipment

1. Air-Conditioning Unit

Location	Quantity	Cooling Load	Type
1) Bunkhouse 1	One (1) unit	16,000 kJ/hr	Window/ Inverter Type, Wall Mounted
2) Bunkhouse 2	One (1) unit	16,000 kJ/hr	

2. Ventilation Unit

Location	Quantity	Rating	Type
1) Bunkhouse 1 & 2's CR	Two (2) units	100 m^3/hr	Wall Mounted Exhaust Fan

MW-8.4 Air Conditioning System

MW-8.4.1 Scope of Work

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

All installation works shall include provision of opening for the air conditioning unit/s including its mounting brackets.

All electrical materials such as circuit breakers, automatic controls, including all power and control wires, supervision, electrical outlets, fittings and conduits for interlocking the operation of the indoor units and outdoor units shall be included and provided by the Supplier including complete system of automatic temperature controls.

The type and quantity of air conditioning equipment to be supplied shall be as specified in Clause 8.3 (Schedule of Equipment) or shown on the drawings.

The air conditioning unit to be supplied and installed shall have the following features/accessories but not limited to:

- With remote controller and holder
- With automatic and manual swing louver control
- With control switch
- Cool Mode
- Fan Mode
- Automatic Mode

MW-8.4.2 Window Type Air-conditioning

The Window Type Air Conditioning Unit to be supplied and installed for the control room/house is as specified in the schedule of equipment or shown on the drawings.

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

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

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

The work shall also include the provision of wall opening for installation of the window type air conditioning units.

MW-8.5 Ventilation Unit

MW-8.5.1 Scope of Work

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

MW-8.5.2 Wall-Mounted Exhaust Fan

Thru-the-wall propeller fan shall be provided at the Toilet.

The exhaust fan shall be installed/mounted on the wall and shall directly discharge exhaust air outside. It shall be of the direct-driven type and corrosion resistant. The fan shall be provided with an automatic shutter and shall operate on a 220 V, single phase, 60 Hz power supply.

MW-8.6 Installation and Painting

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

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

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

MW-8.7 Spare Parts

The Supplier shall supply the standard spare parts for one (1) year operation or as recommended by the manufacturer. Any replacement spare parts required during the warranty period shall be supplied by the Supplier at no cost to NPC.

MW-8.8 Acceptance Test

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

MW-8.9 Submittal

The Supplier shall submit the type and model of the air conditioning and ventilation units for the approval of NPC prior to purchase.

MW-9.0 EQUIPMENT MARKING AND LABELING

All equipment and devices to be supplied by the Contractor under this contract shall be provided with a corrosion-resistant nameplate with clearly legible writing of approved size and pattern and shall be permanently attached at an easily visible place. It shall provide all necessary information or brief technical description under which the equipment has been designed to operate and shall include the following: manufacturer's name; type of equipment; serial number; year of manufacture; weight and other relevant information in compliance with applicable standards.

All labels and nameplates shall be of engraved stainless steel or equivalent non-corrodible material.

Tag Numbers for instruments and other devices shall also be provided as necessary and practicable.

Appropriate labels shall also be provided for equipment and devices mounted on control boards, relay cabinets, desks, and other places as required for proper identification, as well as for operational, functional, and safety reasons.

The labeling, size of label plates, and their location shall be subject to approval by NPC. A sample label-plate (with indication of material used) with lettering shall be submitted for this purpose. The inscription shall be

printed or stenciled but in any case, water-proof, oil-proof and wear-resistant.

Each equipment, wherever necessary, shall be provided with cautionary and warning plates and signs.

Nameplates, labels, and warning plates shall be in English.

The nameplates and labels shall be protected during erection especially during painting. Damaged or illegible labels or nameplates shall be replaced by new ones.

No separate payment shall be made by NPC for nameplates and labels. Corresponding costs thereof shall be included by the Contractor in the bid price for each equipment to be furnished under the Contract.

MW-10.0 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.

MW-11.0 MEASUREMENT OF PAYMENT

Measurement of payment for all Mechanical Works shall be based on the bid price of each item in the Bill of Quantities. The cost shall cover all works required and described in the pertinent provisions of the specifications.

PART I

TECHNICAL SPECIFICATIONS

EW - ELECTRICAL WORKS

PART I - TECHNICAL SPECIFICATION

EW-ELECTRICAL WORKS

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EW - ELECTRICAL WORKS

EW-1.0 GENERAL

The works to be done under these specifications consist of Lighting and Power System for **Supply, Delivery, Installation and Test of 1 x 120 kL Fuel Oil Storage Tank (FOST) including Construction of Associated Facilities for Claveria 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 Fuel 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.

4. Supply and Installation of Conduit System.

5. Supply, Installation and Test of ground conductors, ground connectors, ground rods and other accessories required for the interfacing of all equipment to the existing grounding system.

In addition to the abovementioned scope, 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 (indoor and emergency), 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. Round Ceiling Luminaire

Round Ceiling Lamp shall be 230V, 60Hz, IP20 rated, 350mm diameter, white steel base, opal glass diffuser and complete with 18W LED lamp.

b. Compact Light Emitting Diode Bulb

Compact Light Emitting Diode Bulb 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.

c. Vapor Tight Fixture

Vapor tight fixture made of cast aluminum construction fitted with clear glass globe and guard suitable for self-contained, E27 base, compact led bulb, 9w.

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 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 following are the minimum requirements for the operator interface with the Fuel Oil Storage Tank Pump Motor. It shall include but not limited to Control Selection, Motor Control (Start/Stop), Motor Protection (Relays, Contactors and Circuit Breaker) and Motor Status Display (Indicating Lights)

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.

The combination starter unit shall have a symmetrical interrupting rating which exceeds the available short circuit current not less than 10,000 amperes.

Starter overload relay contacts, contactor operating coils, and starter auxiliary contacts shall be wired to marked unit terminal blocks.

Starters shall reliably operate with 85% of rated bus voltage applied and shall not drop out at voltage lesser than 75 % of rated bus voltage.

EW-5.1.2.1 Circuit Breaker

The combination motor starter unit shall include one miniature circuit breaker or molded case circuit breaker with symmetrical interrupting of at least 10,000 amperes or greater as determined by the Contractor. All breakers shall be manually operated with quick-make, trip-free mechanism of the toggle type.

The breakers shall be equipped with suitable arc quenching devices. Main current carrying contacts shall be silver plated and shall be capable of carrying their rated current without exceeding the Underwriters'

Laboratories specified temperature rise. All circuit breakers shall be of the same manufacturer.

EW-5.1.2.1 Starter Contactors

The rated continuous current carrying capacity of each starter contactor to be used shall be as listed in NEMA or IEC Standard. Contactors shall be applied in accordance with their kW rating only. The interrupting capacity of each starter contactor shall be not less than 10 times the rated continuous current carrying capacity.

The electrical life, without maintenance, of each starter contactor to be used shall be not less than 500,000 operations with each opening or closing of the load contacts to constitute one complete operation. The mechanical life of each starter contactor shall be not less than 5,000,000 operations.

Combination starter units which require line voltage to energize the main contactor operating coils or those for which main contactor coil inrush exceeds 600VA shall be equipped with auxiliary contactors (interposing relays) for use in the operating coil circuit.

EW-5.1.2.2 Overload Relays

All starters shall be equipped with overload relays and shall operate within a range of plus or minus 5 percent of the overload relay trip setting. Assemblies which do not meet this requirement both when field tested and when in actual operation shall be replaced by the Contractor.

Alternative proposal shall be considered based on furnishing bimetallic type temperature compensated overload relays or electric alloy type overload relays, provided that such proposals are accompanied by manufacturing information clearly indicating details of construction and experience records of the overload relay proposed.

EW-5.1.2.3 Mechanically Operated Auxiliary Contacts (As applicable, to be determined by the Contractor)

Each single-speed non-reversing starter shall be furnished with a total of six (6) mechanically operated auxiliary contacts, three (3) normally open and three (3) normally closed, mounted in the main contactor.

If required, each two-speed non-reversing starter shall be furnished with a total of ten (10) mechanically operated auxiliary contacts, three (3) normally open and two (2) normally closed, mounted on each main contactor.

Auxiliary contacts shall be operated by the contactor, not by the operating handle or its mechanism. Contacts shall be wired out to terminal blocks. One (1) NC contact shall be for motor space heater use and shall be rated for 10 amperes or larger.
The use of auxiliary relays to furnish the specified quantities of auxiliary contacts will not be acceptable.

EW-5.1.2.4 Indicating Lights

Each starter shall be furnished with two (2) indicating lights on the door to indicate when the motor is stopped or running.

EW-5.1.3 Nameplate

The panel shall be provided with adequately sized nameplate made of black surface exposing the white core. In addition, each piece of equipment mounted on or inside the panel shall also be provided with nameplate for easy and convenient identification.

EW-5.1.4 Equipment Grounding

The motor control, protection and monitoring panels including the pump motor, pipes, and Fuel Oil Storage Tank (FOST) shall be properly grounded in accordance with the latest electrical and electronics industry standards.

EW-6.0 Kilowatt-Hour Demand Meter

This specification covers the technical and associated requirements for the kilowatt-hour meter for use to measure the power consumption of the pump.

EW-6.1 Technical Characteristics and Requirements

The following shall be the minimum requirements for the kilowatt-hour meter:

Accuracy Class	Class 0.5 or better
Number of Phase	3
Wire	4
Voltage, V	120 - 480
Current Range	Class 200
Frequency, Hz	60
Register Type	LCD
LCD Display	Programmable

EW-7.0 DATA AND DOCUMENTATION REQUIREMENTS

Contractor-furnished data and information shall be guaranteed performance data, predicted performance, interface requirements and construction features of all Contractor's furnished equipment. The accuracy of such information and its compatibility with overall performance requirements specified by NPC are the sole responsibility of the Contractor.

All information submitted as part of Proposal Data would become part of contract data for successful bidder. Any deviation from such data requires NPC's approval.

EW-8.0 MEASUREMENT OF PAYMENT

Measurement of payment for all electrical works shall be based on the bid price of each item as shown in the Bill of Quantities – Electrical Works, Section VII of the Bid Document. The cost of each item shall cover all works required and described in the pertinent provisions of the specifications.

SECTION VI

(PART II - TECHNICAL DATA SHEETS)

MW – MECHANICAL WORKS

PART II – TECHNICAL DATA SHEETS

MW – MECHANICAL WORKS

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NOTES:

1. The Bidder shall fill-in all the data as required. The Bidder shall use continuation sheets as necessary for any other additional information keeping to the format shown herein or by reproducing the same.

2. NPC reserves the right to reject Bids without proper data/information as required herein.

3. The data required are technical features and characteristics of equipment and structures to be supplied by the Bidder. Bidder's proposal shall at least be equal or superior than the requirements specified by NPC.

M-1.0 FUEL OIL STORAGE TANK

ITEM	DESCRIPTION	UNITS	NPC REQUIREMENT	CONTRACTOR's DATA
M-1.1	Capacity (Nominal)	m^3	120	
M-1.2	Design Code		API 650 or Approved Equivalent	
M-1.3	Quantity	set	1	
M-1.4	Empty Weight	kg	By Contractor	
M-1.5	Operating Weight	kg	By Contractor	
M-1.6	Size (dia. X height)	m x m	4.5 x 7.2	
M-1.7	Materials of Construction:			
	Plate	ASTM	A 36	
	Structurals	ASTM	A 36	
M-1.8	Shell Plate Thickness:			
	1st Course	mm	6 min.	
	2nd Course to 3rd Course	mm	5 min.	
M-1.9	Bottom Plate Thickness	mm	8 min.	
M-1.10	Bottom Plate Slope		1:120 upwards towards the center of the tank	
M-1.11	Roof Plate Thickness	mm	5 min.	
M-1.12	Roof Plate Slope	degree	15	
M-1.13	Paint Specifications:			
	Shell Exterior		Per Specification	
	Shell Interior		Per Specification	
	Bottom Underside		Per Specification	
	Structurals		Per Specification	
M-1.14	Weld Examinations:			
	Shell	ASTM	Per Specification	
	Bottom Underside	ASTM	Per Specification	
	Roof	ASTM	Per Specification	
	Nozzles	ASTM	Per Specification	
M-1.15	Sounding Tape	m	10	
M-1.16	Level Switch		Included	

Name of Firm | Name & Signature of Representative | Designation

M-2.0 FUEL UNLOADING/TRANSFER PUMP

ITEM	DESCRIPTION	UNITS	NPC REQUIREMENT	CONTRACTOR's DATA
M-2.1.1	**Pump**			
M-2.1a	Manufacturer		By Contractor	
M-2.1b	Place of Manufacture		By Contractor	
M-2.1c	Quantity	set	1	
M-2.1d	Type		Gear	
M-2.1e	Capacity	m^3/h	18	
M-2.1f	Total Head	m	30	
M-2.1g	Speed	rpm	By Contractor	
M-2.1h	Efficiency	%	By Contractor	
M-2.1i	Power Required	kW	≤ 5.6 (7.5 HP)	
M-2.1j	Material:			
	Casing		Cast Iron	
	Gear		Ductile Iron	
	Shaft		H.Gr. Carbon Steel	
M-2.1k	Weight	kg	By Contractor	
M-12.2	**Motor**			
M-2.2a	Manufacturer		By Contractor	
M-2.2b	Place of Manufacture		By Contractor	
M-2.2c	Type & Protection		NEMA Standards	
M-2.2d	Insulation Class		Class F	
M-2.2e	Rating			
	Voltage	V	480	
	Power Output	kW	≤ 5.6 (7.5 HP)	
	Phase		3	
	Frequency	Hz	60	
M-2.2f	Current at Rated Voltage:			
	Full Load	A	By Contractor	
	Locked Rotor	A	By Contractor	
M-2.2g	Speed	RPM	By Contractor	
M-2.2h	Weight	kg	By Contractor	

Name of Firm | Name & Signature of Representative | Designation

M-3.0 FIRE EXTINGUISHERS

ITEM	DESCRIPTION	UNITS	NPC REQUIREMENT	CONTRACTOR's DATA
M-3.1	**Foam Wheeled Fire Extinguishers**			
M-3.1.1	Manufacturer		By Contractor	
M-3.1.2	Type		AFFF/F3, Wheeled	
M-3.1.3	Quantity (with container of foam additive)	set	One (1)	
M-3.1.4	Capacity	Liter	125	
M-3.1.5	Filled Weight	kg	By Contractor	
M-3.1.6	Height	mm	By Contractor	
M-3.1.7	Width	mm	By Contractor	
M-3.1.8	Depth	mm	By Contractor	
M-3.1.9	Discharge Flow	L/min.	By Contractor	
M-3.1.10	Working Pressure	kPa	By Contractor	
M-3.1.11	Foam discharge hose diameter	mm	25 min.	
M-3.1.12	Foam discharge hose length	m	15	
M-3.1.13	Volume of Nitrogen Tank	m^3	By Contractor	
M-3.1.14	Approving Authority		*Refer to Section VI, Part I, MW-6.1*	
M-3.2	**Portable Fire Extinguishers**			
M-3.2.1	Manufacturer		By Contractor	
M-3.2.2	Type		HCFC or Halotron I, Wall Hung	
M-3.2.3	Quantity	sets	Three (3)	
M-3.2.4	Capacity	kg	7.1	
M-3.2.5	Approving Authority		*Refer to Section VI, Part I, MW-6.1*	

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SECTION VII

BILL OF QUANTITIES

BILL OF QUANTITIES

SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DIESEL POWER PLANT

ITEM NO.	PARTICULARS	TOTAL AMOUNT (In Words)	TOTAL AMOUNT (In Figures)
A	CLAVERIA DIESEL POWER PLANT		
1.0	Architectural Works		₱ _____
2.0	Civil Works		₱ _____
3.0	Mechanical Works		₱ _____
4.0	Electrical Works		₱ _____
	TOTAL	_____	₱ _____

NOTE: ***1. Final delivery site of all equipment/materials shall be at the plant site***

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ARCHITECTURAL WORKS

Item No.	Description of Work or Materials	Work to Be Done	Ref	Unit	Estimated Quantity	Unit Price in Pesos (Words and Figures)	Total Amount (In Figures)
1.0	**PREFAB CONTAINER HOUSE (BUNKHOUSE)** • Dimensions: 6m length x 3.0m width x 2.7m height. • Flooring: MGO board with linoleum tiles. • Walls: 50mm polystyrene insulation with double-sided .45mm pre-painted GI sheet • Roofing: Glasswool insulation with pre-painted GI sheet roof and interior ceiling • Windows: 4 pcs aluminum frame sliding windows (1.0m x 1.0m), 1pc aluminmum frame awning window (0.5m x 0.5m) • Door: 1pc steel door (0.80m x 2.1m), 1pc pvc door (0.6m x 2.1m) • Additional: toilet (1.2x1.2) including fixtures & plumbing	furnish & install	Refer to NPC TS & Drawing	set/s	2	_____ _____(P_____)	_____(P_____)
2.0	**Hazardous Waste & Solid Waste Storage Area**						
2.1	**Wall Finishes**						
	a. 100mm thick CHB wall including reinforcements	furnish & lay	Refer to NPC TS & Drawing	sq.m.	18	_____ _____(P_____)	_____(P_____)
	b. Plain cement plaster finish.	furnish & spread	Refer to NPC TS & Drawing	sq.m.	9	_____ _____(P_____)	_____(P_____)
2.2	**Floor Finishes**						
	a. Plain cement plaster floor finish	furnish & apply	Refer to NPC TS & Drawing	sq.m.	28	_____ _____(P_____)	_____(P_____)

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Note: The total amount shall be inclusive of Mark-up (OCM and Profit) and VAT

ARCHITECTURAL WORKS

Item No.	Description of Work or Materials	Work to Be Done	Ref	Unit	Estimated Quantity	Unit Price in Pesos (Words and Figures)	Total Amount (In Figures)
2.3	**Roofing and Building Blankets**						
	a. Gutter: 0.60mm thk. G.I. sheet gutter	furnish & install	Refer to NPC TS & Drawing	li.m.	**9**	_____ _____(P_____)	_____(P_____)
	b. Roofings: 0.50mm thk. G.I. sheet long span corrugated roofings	furnish & install	Refer to NPC TS & Drawing	sq.m.	**55**	_____ _____(P_____)	_____(P_____)
	c. Barge Cap Flashing: 0.50mm thk. G.I.sheet Barge Cap Flashing including fasteners, sealants, hardware and accessories	furnish & install	Refer to NPC TS & Drawing	li.m.	**20**	_____ _____(P_____)	_____(P_____)
	d. Facia Board: 1/2" x 12" x 12' fiber cement facia board	furnish & install	Refer to NPC TS & Drawing	li.m.	**29**	_____ _____(P_____)	_____(P_____)
	e. Downspout: 3' (75mm) uPVC pipe series 1000 downspout including joint fittings, solvent and fasteners	furnish & install	Refer to NPC TS & Drawing	li.m.	**12**	_____ _____(P_____)	_____(P_____)
	f. Sidings: 0.50mm thk. G.I. sheet long span corrugated sheets	furnish & install	Refer to NPC TS & Drawing	sq.m.	**25**	_____ _____(P_____)	_____(P_____)
	g. Wire mesh enclosure sidings: 50mm x 50mm gage #10 wire mesh heavy galvanized on 1.5" dia steel pipe frame schedule 40, accessories and paintings. (pipe frame at CW BOQ)	furnish & install	Refer to NPC TS & Drawing	sq.m.	**51**	_____ _____(P_____)	_____(P_____)
	h. Roof Drain: Removable stainless wire basket strainer.	furnish & install	Refer to NPC TS & Drawing	pcs.	**3**	_____ _____(P_____)	_____(P_____)

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ARCHITECTURAL WORKS

Item No.	Description of Work or Materials	Work to Be Done	Ref	Unit	Estimated Quantity	Unit Price in Pesos (Words and Figures)	Total Amount (In Figures)
2.4	**Fenestration**						
	a. D1- Wire Mesh Door: (1.3m x 2.10m) 50mm x 50mm gage #10 wire mesh heavy galvanized on 1.5" dia steel pipe frame schedule 40, including lockset, accessories and painting.	furnish & install	Refer to NPC TS & Drawing	set	1	_____ _____(P_____)	_____(P_____)
	a. D2- Wire Mesh Door: (0.9m x 2.10m) 50mm x 50mm gage #10 wire mesh heavy galvanized on 1.5" dia steel pipe frame schedule 40, including lockset, accessories and painting.	furnish & install	Refer to NPC TS & Drawing	set	1	_____ _____(P_____)	_____(P_____)
3.0	**PUMPHOUSE**						
3.1	**Wall Finishes**						
	a. 150mm thick CHB wall including reinforcements	furnish & lay	Refer to NPC TS & Drawing	sq.m.	12	_____ _____(P_____)	_____(P_____)
	b. Pre-cast Concrete Louvers (300x300)	furnish & lay	Refer to NPC TS & Drawing	pcs	20	_____ _____(P_____)	_____(P_____)
	c. Plain cement plaster finish	furnish & apply	Refer to NPC TS & Drawing	sq.m.	10	_____ _____(P_____)	_____(P_____)
3.2	**Floor Finishes**						
	a. Plain concrete floor finish	furnish & apply	Refer to NPC TS & Drawing	sq.m.	2.0	_____ _____(P_____)	_____(P_____)

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Note: The total amount shall be inclusive of Mark-up (OCM and Profit) and VAT

ARCHITECTURAL WORKS

Item No.	Description of Work or Materials	Work to Be Done	Ref	Unit	Estimated Quantity	Unit Price in Pesos (Words and Figures)	Total Amount (In Figures)
3.3	**Painting**						
	a. All concrete surfaces	furnish & apply	Refer to NPC TS & Drawing	sq.m.	14	_____ _____(P_____)	_____(P_____)
3.4	**Fenestration**						
	a. Flush Door Type Marine Plywood: (0.90m x 2.10m) with Door Jamb, including lockset, accessories and painting.	furnish & install	Refer to NPC TS & Drawing	set	1	_____ _____(P_____)	_____(P_____)
	SUB-TOTAL AMOUNT OF BID					_____ _____(P_____)	_____(P_____)

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Note: The total amount shall be inclusive of Mark-up (OCM and Profit) and VAT

CIVIL WORKS

Item No.	Description of Work or Materials	Work to Be Done	Ref	Unit	Estimated Quantity	Unit Price in Pesos (Words and Figures)	Total Amount (In Figures)
1.0	**STRUCTURES AND FACILITIES**						
1.1	**Prefabricated Container House Foundation for 2 sets**						
	a. Structural Excavation	excavate & reuse	Refer to NPC TS & Drawing	cu.m.	**10.00**	_____ _____(P_____)	_____(P_____)
	b. Structural Backfill	spread, level & compact	Refer to NPC TS & Drawing	cu.m.	**4.00**	_____ _____(P_____)	_____(P_____)
	c. Sand and Gravel Bedding	furnish, place level & compact	Refer to NPC TS & Drawing	cu.m.	**1.00**	_____ _____(P_____)	_____(P_____)
	d. Concrete (20.7 Mpa)	furnish & place	Refer to NPC TS & Drawing	cu.m.	**4.00**	_____ _____(P_____)	_____(P_____)
	e. Reinforcing Steel Bars (Grade 275)	furnish, cut, bend schedule & install	Refer to NPC TS & Drawing	kgs.	**280.00**	_____ _____(P_____)	_____(P_____)
	f. Anchor bolts including base plate (for structural connections)	furnish and install	Refer to NPC TS & Drawing	pcs.	**48.00**	_____ _____(P_____)	_____(P_____)
1.2	**Hazardous Waste & Solid Waste Storage Area**						
	a. Structural Excavation	excavate,stockpile & reuse	Refer to NPC TS & Drawing	cu.m.	**12.00**	_____ _____(P_____)	_____(P_____)
	b. Structural Backfill	spread, level & compact	Refer to NPC TS & Drawing	cu.m.	**4.00**	_____ _____(P_____)	_____(P_____)

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Note: The total amount shall be inclusive of Mark-up (OCM and Profit) and VAT

CIVIL WORKS

Item No.	Description of Work or Materials	Work to Be Done	Ref	Unit	Estimated Quantity	Unit Price in Pesos (Words and Figures)	Total Amount (In Figures)
	c. Sand and Gravel Bedding	furnish, place level & compact	Refer to NPC TS & Drawing	cu.m.	**2.00**	_____ _____(P_____)	_____(P_____)
	d. Concrete (20.7 Mpa)	furnish & place	Refer to NPC TS & Drawing	cu.m.	**6.00**	_____ _____(P_____)	_____(P_____)
	e. Reinforcing Steel Bars (Grade 275)	furnish, cut, bend schedule & install	Refer to NPC TS & Drawing	kgs.	**300.00**	_____ _____(P_____)	_____(P_____)
	f. Structural Steel (A36), G.I. Pipes, Purlins, and Anchor bolts	furnish, fabricate assemble & install	Refer to NPC TS & Drawing	kgs.	**1,500.00**	_____ _____(P_____)	_____(P_____)
1.3	**Pumphouse**						
	a. Structural Excavation	excavate,stockpile & dispose	Refer to NPC TS & Drawing	cu.m.	**3.80**	_____ _____(P_____)	_____(P_____)
	b. Structural Backfill	spread, level & compact	Refer to NPC TS & Drawing	cu.m.	**2.20**	_____ _____(P_____)	_____(P_____)
	c. Sand and Gravel Bedding	furnish, place level & compact	Refer to NPC TS & Drawing	cu.m.	**0.30**	_____ _____(P_____)	_____(P_____)
	d. Concrete (20.7 MPa)	furnish, place & vibrate	Refer to NPC TS & Drawing	cu.m.	**3.60**	_____ _____(P_____)	_____(P_____)
	e. Reinforcing Steel Bars (Grade 275)	furnish, cut, bend schedule & install	Refer to NPC TS & Drawing	kgs.	**360.00**	_____ _____(P_____)	_____(P_____)

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CIVIL WORKS

Item No.	Description of Work or Materials	Work to Be Done	Ref	Unit	Estimated Quantity	Unit Price in Pesos (Words and Figures)	Total Amount (In Figures)
1.4	**120 KL FOST Foundation & Containment Wall**						
	a. Structural Excavation	excavate,stockpile & dispose	Refer to NPC TS & Drawing	cu.m.	**59.00**	_____ _____(P_____)	_____(P_____)
	b. Structural Backfilling	spread, level & compact	Refer to NPC TS & Drawing	cu.m.	**15.00**	_____ _____(P_____)	_____(P_____)
	c. Sand Cushion	furnish, place, spread & compact	Refer to NPC TS & Drawing	cu.m.	**3.70**	_____ _____(P_____)	_____(P_____)
	d. Well Compacted Crushed Stone	furnish, place, spread & compact	Refer to NPC TS & Drawing	cu.m.	**5.50**	_____ _____(P_____)	_____(P_____)
	e. 100mm thk. Sand and Gravel Bedding at Containment Wall, Slab and Ring Foundation	furnish, place level & compact	Refer to NPC TS & Drawing	cu.m.	**13.20**	_____ _____(P_____)	_____(P_____)
	f. Concrete (20.7 MPa at 28days) (for containment wall, slab & ring foundation)	furnish & place	Refer to NPC TS & Drawing	cu.m.	**58.00**	_____ _____(P_____)	_____(P_____)
	g. Reinforcing Steel Bars (Grade 275)	furnish, cut, bend schedule & install	Refer to NPC TS & Drawing	kgs.	**4640.00**	_____ _____(P_____)	_____(P_____)
	h. Concrete Epoxy Grout (2-component)	furnish & place	Refer to NPC TS & Drawing	lit	**78.00**	_____ _____(P_____)	_____(P_____)
	i. 50mm uPVC Pipe Drain	furnish & install	Refer to NPC TS & Drawing	l.m	**10.00**	_____ _____(P_____)	_____(P_____)

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Note: The total amount shall be inclusive of Mark-up (OCM and Profit) and VAT

CIVIL WORKS

Item No.	Description of Work or Materials	Work to Be Done	Ref	Unit	Estimated Quantity	Unit Price in Pesos (Words and Figures)	Total Amount (In Figures)
	j. PVC Waterstop (6" x 3/16" Plain Dumbell Type)	furnish & install	Refer to NPC TS & Drawing	l.m	**44.00**	_____ _____(P_____)	_____(P_____)
	k. High Density Polyethylene Liner 1mm (40mils) thk.	funish & install	Refer to NPC TS & Drawing	sq.m	**64.00**	_____ _____(P_____)	_____(P_____)
	l. Drain Pit (DP) at F.O.S.T.	furnish & construct	Refer to NPC TS & Drawing	pc.	**1.00**	_____ _____(P_____)	_____(P_____)
	m. Valve Box (VB) at F.O.S.T.	furnish & construct	Refer to NPC TS & Drawing	pc.	**1.00**	_____ _____(P_____)	_____(P_____)
	n. Oil-Water Separator (OWS) at F.O.S.T.	furnish & construct	Refer to NPC TS & Drawing	pc.	**1.00**	_____ _____(P_____)	_____(P_____)
1.5	**Drainage System and Appurtenances**						
	a. Septic Tank	furnish & construct	Refer to NPC TS & Drawing	pc.	1	_____ _____(P_____)	_____(P_____)
	b. 0.10m Ø uPVC Pipes	furnish & install	Refer to NPC TS & Drawing	li.m.	**60**	_____ _____(P_____)	_____(P_____)
1.6	**Containment Wall, Drain Pit & Valve Box (for existing 16KL FOST)**						
	a. Structural Excavation	excavate,stockpile & dispose	Refer to NPC TS & Drawing	cu.m.	**11.00**	_____ _____(P_____)	_____(P_____)

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CIVIL WORKS

Item No.	Description of Work or Materials	Work to Be Done	Ref	Unit	Estimated Quantity	Unit Price in Pesos (Words and Figures)	Total Amount (In Figures)
	b. Structural Backfilling	spread, level & compact	Refer to NPC TS & Drawing	cu.m.	**5.00**	_____ _____(P_____)	_____(P_____)
	c. 100mm thk. Sand and Gravel Bedding at Containment Wall and Slab on Grade	furnish, place level & compact	Refer to NPC TS & Drawing	cu.m.	**3.50**	_____ _____(P_____)	_____(P_____)
	d. Concrete (20.7 MPa at 28days) (for containment wall and slab on grade)	furnish & place	Refer to NPC TS & Drawing	cu.m.	**5.50**	_____ _____(P_____)	_____(P_____)
	e. Reinforcing Steel Bars (Grade 275)	furnish, cut, bend schedule & install	Refer to NPC TS & Drawing	kgs.	**440.00**	_____ _____(P_____)	_____(P_____)
	f. PVC Waterstop (6" x 3/16" Plain Dumbell Type)	furnish & install	Refer to NPC TS & Drawing	l.m	**20.00**	_____ _____(P_____)	_____(P_____)
	g. Drain Pit (DP) at F.O.S.T.	furnish & construct	Refer to NPC TS & Drawing	pc.	**1.00**	_____ _____(P_____)	_____(P_____)
	h. Valve Box (VB) at F.O.S.T.	furnish & construct	Refer to NPC TS & Drawing	pc.	**1.00**	_____ _____(P_____)	_____(P_____)
	SUB-TOTAL AMOUNT OF BID (CIVIL WORKS)					_____ _____(P_____)	_____(P_____)

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Note: The total amount shall be inclusive of Mark-up (OCM and Profit) and VAT

BILL OF QUANTITIES

1 X 120 KL FUEL OIL STORAGE TANK FOR CLAVERIA DIESEL POWER PLANT
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
MW	**MECHANICAL WORKS**						
MW-1.0	**FUEL OIL STORAGE TANK**		**MW-3.0 & Drawings**				
MW-1.1	Fuel Oil Storage Tank (120 cu. m.), 4.5m Nominal Diameter x 7.2m Height, complete with tank appurtenances, spiral stairways, hand railings, anchor bolts, level gauge, nozzles, associated piping & other tank appurtenances and accessories such as UL listed lightning rod, cables, grounding rod, etc. as described in the technical specifications and shown on bid drawing.	Supply, Fabrication Erection and Test		set	1	_____ (₱ _____)	₱ _____
MW-1.2	Tank Inspection/Testing, radiographic and hydrotesting	Conduct/Perform Testing		lot	1	_____ (₱ _____)	₱ _____
MW-1.3	Tank sandblasting and painting	Supply, Apply and Test		lot	1	_____ (₱ _____)	₱ _____
MW-1.4	Tank Calibration	Conduct/Perform Calibration		lot	1	_____ (₱ _____)	₱ _____
MW-1.5	Fuel oil tank sounding tape, 10m long, aluminum alloy frame, stainless steel tape with brass dropper	Supply and Test		set	1	_____ (₱ _____)	₱ _____
MW-1.6	Gate Valve, 65mm Ø, cast iron, flanged ends, OSY or rising stem, Class 150	Supply, Install and Test		sets	5	_____ (₱ _____)	₱ _____
MW-1.7	Check Valve, 65mm Ø, swing type, cast iron, flanged ends, Class 150	Supply, Install and Test		set	1	_____ (₱ _____)	₱ _____
MW-1.8	Gate Valve, 50mm Ø, cast bronze, flanged ends, Class 150	Supply, Install and Test		sets	2	_____ (₱ _____)	₱ _____
MW-1.9	Butterfly Valve, 150mm Ø, wafer type, cast iron body, stainless steel shaft-sleeve and disc, Class 150	Supply, Install and Test		set	1	_____ (₱ _____)	₱ _____
MW-1.10	Level Switch, stainless steel chamber and float, 2 level setpoints field adjustable, designed for top tank mounting	Supply, Install and Test		set	1	_____ (₱ _____)	₱ _____

Note: The total amount shall be inclusive of Mark-Up (OCM and Profit) and VAT)

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BILL OF QUANTITIES

1 X 120 KL FUEL OIL STORAGE TANK FOR CLAVERIA DIESEL POWER PLANT
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
MW-2.0	**FUEL/WASTE OIL TRANSFER SYSTEM**		**MW-4.0, 5.0 & Drawings**				
MW-2.1	Fuel transfer pump, 18m^3/hr @ 30m head, 480V, 3-phase, 60 hertz, gear type, horizontal, complete with built-in relief valve, anchor bolts, control panel, equipped with circuit breaker and controls, monitoring and protection, cables safely laid in a conduit from the pumphouse to the power supply source and other accessories described in the technical specifications	Supply, Erection and Test		set	1	_____ (₱ _____)	₱ _____
MW-2.2	Fuel transfer pipe, 80mm Ø, ASTM A 53 Gr. B, seamless, schedule 40 and its associated fittings, pipe supports, gaskets, supports, flanges, bolts and other accessories	Supply, Install and Test		lm	12	_____ (₱ _____)	₱ _____
MW-2.3	Fuel transfer pipe, 65mm Ø, ASTM A 53 Gr. B, seamless, schedule 40 and its associated fittings, pipe supports, gaskets, supports, flanges, bolts and other accessories	Supply, Install and Test		lm	114	_____ (₱ _____)	₱ _____
MW-2.4	Fuel transfer pipe, 50mm Ø, ASTM A 53 Gr. B, seamless, schedule 40 and its associated fittings, pipe supports, gaskets, supports, flanges, bolts and other accessories	Supply, Install and Test		lm	42	_____ (₱ _____)	₱ _____
MW-2.5	Waste Oil Pipe, 160mm O.D. (150mm DN), unplasticized PVC, Sch 80 or class 150, conforming to ASTM D-1784, and its associated fittings, pipe supports and other accessories and shall be in certified/ approved by the as described in the technical specifications or drawings.	Supply, Excavate, Install, Test, & Backfill		lm	6	_____ (₱ _____)	₱ _____
MW-2.6	Gate Valve, 65mm Ø, OSY or rising stem, cast iron, flanged ends, Class 150	Supply, Install and Test		sets	6	_____ (₱ _____)	₱ _____
MW-2.7	Gate Valve, 50mm Ø, OSY or rising stem, cast bronze or stainless steel, flanged ends, Class 150	Supply, Install and Test		sets	1	_____ (₱ _____)	₱ _____
MW-2.8	Check Valve, 65mm Ø, swing type, cast iron, flanged ends, Class 150	Supply, Install and Test		sets	2	_____ (₱ _____)	₱ _____
MW-2.9	Simplex strainer, 65mm Ø, basket type, cast iron body, stainless steel element with magnet, flanged ends, 40 mesh minimum	Supply, Install and Test		sets	2	_____ (₱ _____)	₱ _____

Note: The total amount shall be inclusive of Mark-Up (OCM and Profit) and VAT)

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BILL OF QUANTITIES

1 X 120 KL FUEL OIL STORAGE TANK FOR CLAVERIA DIESEL POWER PLANT
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
MW-2.0	**FUEL/WASTE OIL TRANSFER SYSTEM (continuation)**		**MW-5.0 & Drawings**				
MW-2.10	Flowmeter, 18m³/hr rated flow, aluminum body, flanged ends, with LCD display, internal battery to last at least 5 years, ±0.5% accuracy, 0.2% repeatability, monitors accumulated total flow, resettable total flow and instantaneous flow, equipped with pulse generator or 4-20mA current output	Supply, Install and Test		set	1	_____ (₱ _____)	₱ _____
MW-2.11	Pressure gauge, 65 mm Ø dial gauge, buordon tube type, with dampener and isolation valve	Supply, Install and Test		sets	2	_____ (₱ _____)	₱ _____
MW-2.12	Spare parts for fuel oil transfer unloading pump for one (1) year operation per Manufacturer's recommendation and as specified in the technical specifications to include the following: a) One (1) set of bearings for pump and motor b) One (1) set of bushings, wearing rings, packing and gaskets for the pump	Supply and Delivery		lot	1	_____ (₱ _____)	₱ _____
MW-3.0	**FIRE EXTINGUISHERS**		**MW-6.0**				
MW-3.1	Wheeled Type Fire Extinguisher (Foam-AFFF/F3) complete with self-contained cylinder mounted on frame with handle, floorstand and steel or rubberized wheels, 125 liters (33 gallons) capacity, associated valves, dial gauge indicator, nitrogen expellant tank for unit pressurization, 15 m long discharge hose of appropriate size fitted with couplings and foam nozzle assembly, shall be in certified/ approved by the certifying body specified in Section VI, Part I, MW-6.1	Supply, Install Test		set	1	_____ (₱ _____)	₱ _____
MW-3.2	Supply and installation of one (1) unit of portable type fire extinguisher, clean agent (HCFC or Halotron I type), 7.1kg (15.5lbs), wall-hung type and shall be in certified/approved by the certifying body specified in Section VI, Part I, MW-6.1	Supply, Install Test		sets	3	_____ (₱ _____)	₱ _____

Note: The total amount shall be inclusive of Mark-Up (OCM and Profit) and VAT)

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BILL OF QUANTITIES

1 X 120 KL FUEL OIL STORAGE TANK FOR CLAVERIA DIESEL POWER PLANT
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
MW-4.0	**DOMESTIC WATER SYSTEM**		**MW-7.0**				
MW-4.1	Gate Valve, 25mm Ø, rising stem, cast bronze, flanged or screwed ends, Class 150	Supply, Install Test		set	1	_____ (₱ _____)	₱ _____
MW-4.2	Gate Valve, 15mm Ø, rising stem, cast bronze, flanged or screwed ends, Class 150	Supply, Install Test		sets	4	_____ (₱ _____)	₱ _____
MW-4.3	Hose Bibb, 20mm Ø, bronze body, screwed ends, Class 150.	Supply, Install Test		set	1	_____ (₱ _____)	₱ _____
MW-4.4	Water Pipe, 32 mm O.D. (25 mm N.D.), uPVC pipe, sch 80 or Class 150, and its associated fittings, pipe supports and other accessories	Supply, Install Test		m	24	_____ (₱ _____)	₱ _____
MW-4.5	Water Pipe, 20 mm O.D. (15 mm N.D.), uPVC pipe, sch 80 or Class 150, and its associated fittings, pipe supports and other accessories	Supply, Install Test		m	6	_____ (₱ _____)	₱ _____
MW-5.0	**AIR CONDITIONING & VENTILATION SYSTEM**		**MW-8.0**				
MW-5.1	**Air-conditioning System**						
MW-5.1a	Air-conditioning unit for bunkhouse 1 & 2, window inverter type, 16,000 kJ/hr cooling capacity complete with controls (infrared remote) and other necessary accessories as described in the technical specifications.	Supply, Install Test	**MW-8.4**	sets	2	_____ (₱ _____)	₱ _____
MW-5.2	**Ventilation System**						
MW-5.2a	Exhaust fan for comfort room (bunkhouse), 100 m3/h ceiling mounted, propeller type, direct driven,complete with grills/louvers, mounted, flexible hose or ducts, mounting accessories and controls	Supply, Install Test	**MW-8.5**	sets	2	_____ (₱ _____)	₱ _____

Note: The total amount shall be inclusive of Mark-Up (OCM and Profit) and VAT)

Name of Firm

Name and Signature of Authorized Representative

Designation

BILL OF QUANTITIES

1 X 120 KL FUEL OIL STORAGE TANK FOR CLAVERIA DIESEL POWER PLANT
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
MW-6.0	**MISCELLANEOUS**						
MW-6.1	Tagging or Labels for Equipment, Valve, Piping, Instruments and its fixing accessories as described in the bid documents	Supply, Install Test	**GW-5.0**	lot	1	_____ _____ _____	_____
MW-6.2	Painting for Fuel Oil Piping & Equipment, its associated valves, fittings, supports and other accessories including touch-up for supports and other accessories	Supply, Install Test	**GW-10.0**	lot	1	_____ _____ (₱ _____)	₱ _____
	TOTAL MECHANICAL WORKS					_____ (₱ _____)	₱ _____

Note: The total amount shall be inclusive of Mark-Up (OCM and Profit) and VAT)

Name of Firm

Name and Signature of Authorized Representative

Designation

SECTION VII - BILL OF QUANTITIES
1 X 120 KL FUEL OIL STORAGE TANK FOR CLAVERIA DIESEL POWER PLANT
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	**PUMP MOTOR LOCAL CONTROL AND PROTECTION PANEL INCLUDING NEMA-1 CLASS COMBINATION MOTOR STARTER WITH 50AF/30AT MCCB, 3-PHASE, INDICATING LIGHTS, ETC.**	Furnish, Install and Test	EW-TS & BD	set(s)	1	_____ (₱ _____)	₱ _____
2.0	**LIGHTING AND POWER PANELBOARD**						
	a. 100AF/50AT, 2-Pole Main MCB with branch circuits of: 2 - 30AT, 2-Pole MCB 1 - 20AT, 2-Pole MCB 1 - 15AT, 2-Pole MCB	Furnish, Install and Test	EW-TS & BD	set(s)	2	_____ (₱ _____)	₱ _____
3.0	**LIGHTING FIXTURES**						
	a. Fixture Type A Round ceiling luminaire, 350mm dia., white steel base, white opal diffuser and complete with 18W LED COB light	Furnish, Install and Test	EW-TS & BD	set(s)	4	_____ (₱ _____)	₱ _____
	b. Fixture Type B 1x9W Compact LED Lighting Fixture	Furnish, Install and Test	EW-TS & BD	set(s)	3	_____ (₱ _____)	₱ _____
	c. Fixture Type C Vapor Tight Lighting Fixture with 12W Compact LED Bulb, E27 Base	Furnish, Install and Test	EW-TS & BD	set(s)	2	_____ (₱ _____)	₱ _____

Note: The total amount shall be inclusive of Mark-Up (OCM and Profit) and VAT

_____ Name of Firm

_____ Name and Signature of Authorized Representative

_____ Designation

SECTION VII - BILL OF QUANTITIES
1 X 120 KL FUEL OIL STORAGE TANK FOR CLAVERIA DIESEL POWER PLANT
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	**OUTLETS AND SWITCHES INCLUDING PLATE COVER, FLUSH-MOUNTED, GROUNDING TYPE**						
a.	Convenience Outlet Duplex, with grounding 16A, 230V, 1-phase	Furnish, Install and Test	EW-TS & BD	set(s)	11	_____ (₱ _____)	₱ _____
b.	Exhaust Fan Convenience Outlet 16A, 230V, 1-phase	Furnish, Install and Test	EW-TS & BD	set(s)	2	_____ (₱ _____)	₱ _____
c.	Single Pole Wall Switch, 10A, 230V-	Furnish, Install and Test	EW-TS & BD	set(s)	7	_____ (₱ _____)	₱ _____
d.	50AF/30AT, 3-Pole, MCCB, Enclosed Circuit Breaker (NEMA 1 Enclosure)	Furnish, Install and Test	EW-TS & BD	set(s)	1	_____ (₱ _____)	₱ _____
e.	50AF/20AT, 2-Pole, MCB, Enclosed Circuit Breaker (NEMA 1 Enclosure)	Furnish, Install and Test	EW-TS & BD	set(s)	1	_____ (₱ _____)	₱ _____
f.	50AF/30AT, 2-Pole, Safety Breaker with Built-in Convenience Outlet	Furnish, Install and Test	EW-TS & BD	set(s)	1	_____ (₱ _____)	₱ _____
5.0	**INSULATED COPPER CONDUCTORS INCLUDING TERMINAL LUGS, CABLE TIES, IDENTIFICATION TAGS, ETC.**	Furnish, Lay and Test	EW-TS & BD	lot	1	_____ (₱ _____)	₱ _____
a.	8.0 mm², 600 V, Heat Resistant Thermoplastic, (THHN/THWN-2), Copper Conductor						

Note: The total amount shall be inclusive of Mark-Up (OCM and Profit) and VAT

_____ Name of Firm

_____ Name and Signature of Authorized Representative

_____ Designation

SECTION VII - BILL OF QUANTITIES
1 X 120 KL FUEL OIL STORAGE TANK FOR CLAVERIA DIESEL POWER PLANT
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
	b. 5.5 mm², 600 V, Heat Resistant Thermoplastic, (THHN/THWN-2), Copper Conductor	Furnish, Lay and Test	EW-TS & BD	li.m.	110	_____ (₱ _____)	₱ _____
	c. 3.5 mm², 600 V, Heat Resistant Thermoplastic, (THHN/THWN-2), Copper Conductor	Furnish, Lay and Test	EW-TS & BD	li.m.	100	_____ (₱ _____)	₱ _____
5.0	**EMBEDDED AND/OR NON-EMBEDDED CONDUITS INCLUDING BOXES, LOCKNUTS, ELBOWS, BOLTS AND OTHER FITTINGS**						
	a. 20 mmØ uPVC	Furnish and Install	EW-TS & BD	li.m.	51	_____ (₱ _____)	₱ _____
	b. 25 mmØ uPVC	Furnish and Install	EW-TS & BD	li.m.	57	_____ (₱ _____)	₱ _____
	c. Boxes, Locknuts, Elbows and Other Fittings	Furnish and Install	EW-TS & BD	lot	1	_____ (₱ _____)	₱ _____
6.0	**EQUIPMENT GROUNDING**						
	a. 22 mm², soft drawn copper conductor with PVC insulation	Furnish, install and Test	EW-TS & BD	li.m.	5	_____ (₱ _____)	₱ _____
	b. Weld Metal Powder for Powder Connection including Molder and Holder, Etc.	Furnish and install	EW-TS & BD	lot	1	_____ (₱ _____)	₱ _____

Note: The total amount shall be inclusive of Mark-Up (OCM and Profit) and VAT

_____ Name of Firm

_____ Name and Signature of Authorized Representative

_____ Designation

SECTION VII - BILL OF QUANTITIES
1 X 120 KL FUEL OIL STORAGE TANK FOR CLAVERIA DIESEL POWER PLANT
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
	c. Grounding Rod (3m x 19mm dia.) Copper Bonded	Furnish and install	EW-TS & BD	pcs	3	_____ (₱ _____)	₱ _____
	d. Grounding Accessories such as Cable Lugs, Etc.	Furnish and install	EW-TS & BD	lot	1	_____ (₱ _____)	₱ _____

Note: The total amount shall be inclusive of Mark-Up (OCM and Profit) and VAT

TOTAL ELECTRICAL 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)

- PhilGEPs Certificate of Registration and Membership under Platinum Category (all pages) in accordance with Section 8.5.2 of the Revised IRR of RA. 9184;

  Note: The failure by the prospective bidder to update its Certificate with the current and updated Class "A" eligibility documents shall result in the automatic suspension of the validity of its Certificate until such time that all of the expired Class "A" eligibility documents has been updated

- Special PCAB License in case of Joint Ventures; and registration for the type and cost of the contract to be bid

- 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:

  - 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

  NOTE: If the Bidder has no Single Largest Completed Contract (SLCC)/similar experience on the contract to be bid pursuant to ITB Clause 5.2, the SLCC Form (Form No. NPCSF-INFR-03) shall still be submitted and the Bidder shall indicate *"NONE – PCAB License Category D, Registration Classification – Small B"*

  (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.)

- 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 and completely filled-out List of Contractor's Key Personnel (based on the minimum key personnel) *(NPCSF-INFR-09)*

➢ Duly Signed List of Contractor's Equipment (owned, leased or under purchase agreement (*NPCSF-INFR-12)*

➢ Duly signed and completely filled-out Technical Data Sheets for Mechanical Works, Section VI, Part II - Technical Data Sheets (MW)

➢ 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 Two (2) copies of the first and second components of its Bid, marked Original and photocopy. Only the original copy will be read and considered for the bid. Any misplaced document outside of the Original copy will not be considered. The photocopy is ONLY FOR REFERENCE. 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/signed Status Report as of the bidding date from Bureau of Construction containing relevant details of slippage, if any, for the declared on-going contracts with Department of Public Works and Highways (DPWH)

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 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.
3. If the Bidder has no Single Largest Completed Contract (SLCC)/similar experience on the contract to be bid pursuant to ITB Clause 5.2, the SLCC Form (Form No. NPCSF-INFR-03) shall still be submitted and the Bidder shall indicate *"NONE – PCAB License Category D, Registration Classification – Small B"*

Submitted by _____
(Printed Name & Signature)

Designation : _____
Date : _____

Standard Form Number: NPCSF-INFR-04

NET FINANCIAL CONTRACTING CAPACITY (NFCC)

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

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

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

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

NFCC = P _____

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

Submitted by:

_____
Name of Bidder/Contractor

_____
Signature of Authorized Representative

Date : _____

Standard Form Number: NPCSF-INFR-05

JOINT VENTURE AGREEMENT

KNOW ALL MEN BY THESE PRESENTS:

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

- and –

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

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

NAME OF PROJECT	**CONTRACT AMOUNT**
_____	_____

That the capital contribution of each member firm:

NAME OF FIRM	CAPITAL CONTRIBUTION
1.	₱
2.	₱

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

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

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

_____
Name & Signature of Authorized Representative

_____
Official Designation

_____
Name of Firm

_____
Name & Signature of Authorized Representative

_____
Official Designation

_____
Name of Firm

Witnesses

1. _____ 2. _____

[Jurat]

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

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

Standard Form Number: NPCSF-INFR-06a

FORM OF BID SECURITY (BANK GUARANTEE)

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

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

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

THE CONDITIONS of this obligation are that:

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

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

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

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

   a) fails or refuses to execute the Contract; or

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

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

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

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

DATE _____ SIGNATURE OF THE BANK _____

WITNESS _____ SEAL _____

_____

(Signature, Name and Address)

Standard Form Number: NPCSF-INFR-06b

FORM OF BID SECURITY (SURETY BOND)

BOND NO.: _____ DATE BOND EXECUTED: _____

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

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

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

NOW, THEREFORE, the conditions of this obligation are:

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

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

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

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

   d) fails or refuses to execute the Contract; or

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

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

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

PROVIDED HOWEVER, that the Surety shall not be:

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

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

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

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

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

Standard Form No: NPCSF-INFR-06c

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

BID-SECURING DECLARATION

SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LuzP24Z1685Sc

To: **National Power Corporation**
Gabriel Y. Itchon Building
Sen. Miriam P. Defensor-Santiago Blvd.
(formerly BIR Road) corner Quezon Avenue
Diliman, Quezon City, Philippines 1100

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, which shall be submitted during post-qualification.*
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: _____

_____

Particulars	Project Manager *(if applicable)*	Project Engineer	Materials Engineer *(if applicable)*	Safety Officer *(if applicable)*	
1 Name					
2 Address					
3 Date of Birth					
4 Education					
5 License/Qualification Details:					
a. Profession/Specialization					
b. Registration Number					
c. Registration Date					
d. Valid Until					
6 Experience Data:					
a. Years employed by the Bidder					
b. General Experience (yrs.)					
c. Professional Experience on similar project (yrs.)					

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.

Standard Form Number: NPCSF-INFR-10a

NOTE: THIS FORM SHALL BE SUBMITTED DURING POST-QUALIFICATION

KEY PERSONNEL'S CERTIFICATE OF EMPLOYMENT
(PROFESSIONAL PERSONNEL)

_____
Issuance Date

THE PRESIDENT
National Power Corporation
Gabriel Y. Itchon Building
Sen. Miriam P. Defensor-Santiago Blvd.
(formerly BIR Road) corner Quezon Avenue
Diliman, Quezon City, Philippines 1100

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 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

NOTE: THIS FORM SHALL BE SUBMITTED DURING POST-QUALIFICATION

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

_____
Issuance Date

THE PRESIDENT
National Power Corporation
Gabriel Y. Itchon Building
Sen. Miriam P. Defensor-Santiago Blvd.
(formerly BIR Road) corner Quezon Avenue
Diliman, Quezon City, Philippines 1100

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 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

NOTE: THIS FORM SHALL BE SUBMITTED DURING POST-QUALIFICATION

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 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
Page 2 of 2

1. Name : _____

2. Name and Address of Owner : _____

3. Name and Address of the Owner's Engineer (Consultant) : _____

4. Indicate the Features of Project (particulars of the project components and any other particular interest connected with the project): _____

5. Contract Amount Expressed in Philippine Currency : _____

6. Position : _____

7. Structures for which the employee was responsible : _____

8. Assignment Period : from _____ (months) _____ (years)
: to _____ (months) _____ (years)

_____
Name and Signature of Employee

It is hereby certified that the above personnel can be assigned to this project, if the contract is awarded to our company.

_____ _____
(Place and Date) (The Authorized Representative)

One of the requirements from the bidder 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 documents, which are owned, leased, and/or under purchase agreements.
This shall be supported by proof of ownership and/or certification of availability of equipment from the equipment lessor for the duration of the project, to be submitted during post-qualification.

Standard Form No. : NPCSF-INFR-13

BID LETTER

Date: _____

To: **THE PRESIDENT**
National Power Corporation
Gabriel Y. Itchon Building
Sen. Miriam P. Defensor-Santiago Blvd.
(formerly BIR Road) corner Quezon Avenue
Diliman, Quezon City, Philippines 1100

We, the undersigned, declare that:

(a) We have examined and have no reservation to the Bidding Documents, including Addenda, for the Contract **SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP (LuzP24Z1685Sc).**

(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 **SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP (LuzP24Z1685Sc)** 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	Qty.	Unit of Measure	Direct Cost (DC)				Mark-Up (MU)		VAT	Unit Cost	Total Price
				Materials	Labor	Equipment	Transport	OCM	Profit			
		(A)		(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)
								[(B)+(C)+ (D)+(E)] x % OCM	[(B)+(C)+ (D)+(E)] x % PROFIT	[(B)+(C)+ (D)+(E) + (F) + (G)] x % VAT	[(B)+(C)+ (D)+(E) + (F) + (G) + (H)] / (A)	(A) x (I)
											TOTAL	

NOTES:

1. The Bidder must provide all the information required above.
2. All pay items in the Bill of Quantities must be included the detailed cost estimate.
3. Unit Price and Total price in this form must be the same with the Bill of Quantities and Bid Letter.

_____ 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 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.

SECTION IX

BID DRAWINGS

BID DRAWINGS

ARCHITECTURAL DRAWINGS

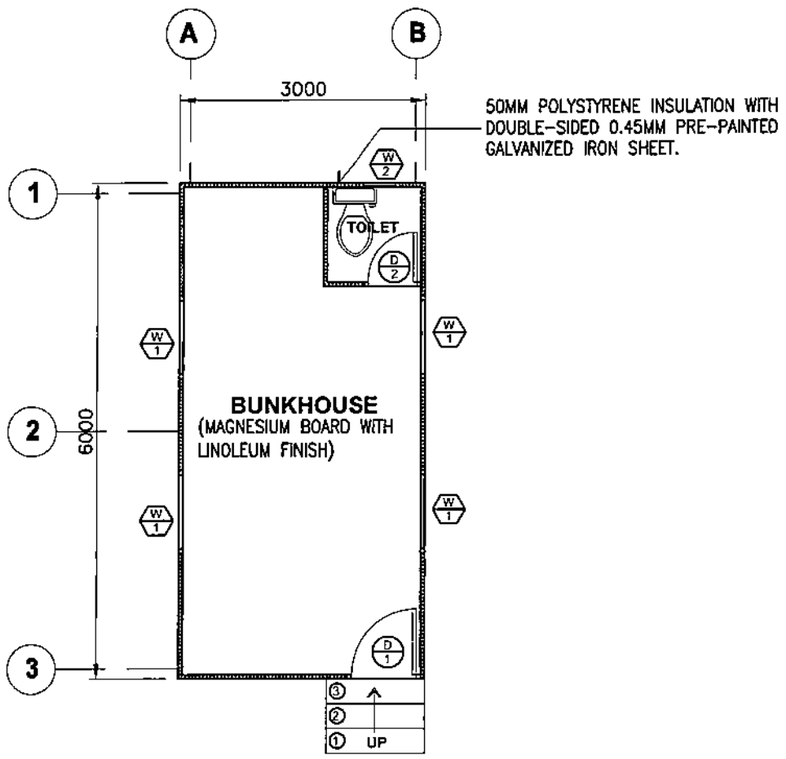
SECTION IX - BID DRAWINGS

AW - ARCHITECTURAL WORKS

DRAWING NO.	TITLE
CDPP-BDA-17.001	TYPICAL BUNKHOUSE (Floor Plan & Plumbing Layout)
CDPP-BDA-17.002	TYPICAL BUNKHOUSE (Elevations)
CDPP-BDA-17.003	TYPICAL BUNKHOUSE (Schedule of Doors & Windows)
CDPP-BDA-17.004	TYPICAL HAZARDOUS WASTE AND SOLID WASTE STORAGE (Floor Plan & Roof Plan)
CDPP-BDA-17.005	TYPICAL HAZARDOUS WASTE AND SOLID WASTE STORAGE (Front Elevation & Rear Elevation)
CDPP-BDA-17.006	TYPICAL HAZARDOUS WASTE AND SOLID WASTE STORAGE (Right Side & Left Side Elevation; Sec. "A")
CDPP-BDA-17.007	PUMPHOUSE (Plan and Elevation)

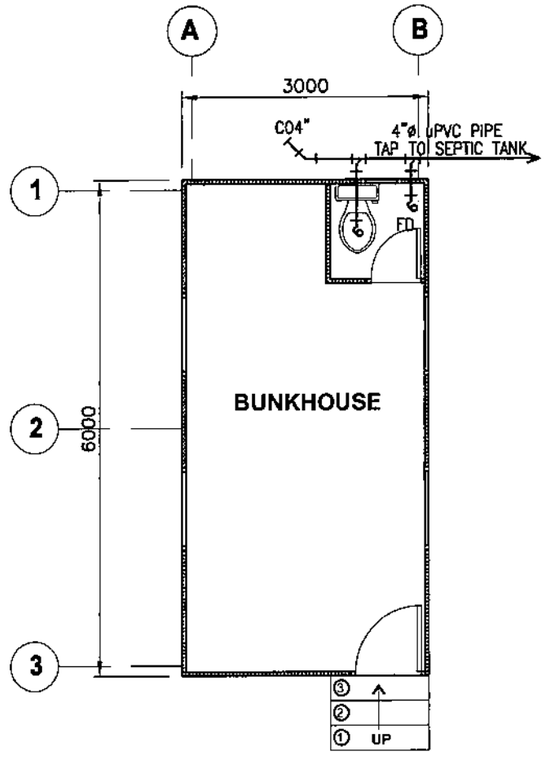
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
2. WORK THIS DRAWING WITH RELATED CIVIL, MECHANICAL AND ELECTRICAL DRAWINGS.
3. REFER TO SITE DEVELOPMENT PLAN FOR THE FINAL ORIENTATION OF CONTROL HOUSE.



FLOOR PLAN

SCALE 1:75



PLUMBING LAYOUT (BUNKHOUSE)

SCALE 1:75

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

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MASBATE

TITLE: **TYPICAL BUNKHOUSE (FLOOR PLAN & PLUMBING LAYOUT)**

	BY	CHKD	DATE
DESIGNED			
DRAWN			
REVIEWED	PRINCIPAL ENGR. / ARCH'T.		
CIVIL/ARCH'T			
ELEC.			
MECH.			

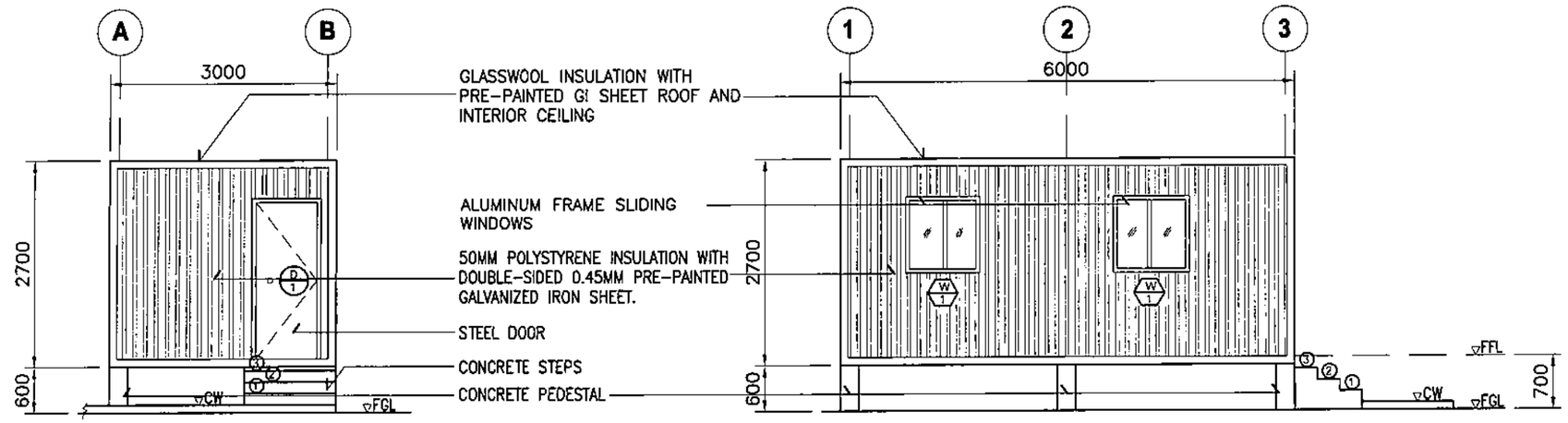
SUBMITTED: R. R. R. VILLANUEVA, Principal Architect A, CEAD
RECOMMENDED: A. C. ESPIRITU, Manager, CEAD
APPROVED: G. B. MAGPOC, JR., Manager, DDD

DWG. NO. CDPP-BDA-17.001 SPECS. NO. LuzP24Z1685Sc

SCALE: 1:75 **BID DRAWING** REV. 0

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
2. WORK THIS DRAWING WITH RELATED CIVIL, MECHANICAL AND ELECTRICAL DRAWINGS.
3. REFER TO SITE DEVELOPMENT PLAN FOR THE FINAL ORIENTATION OF CONTROL HOUSE.

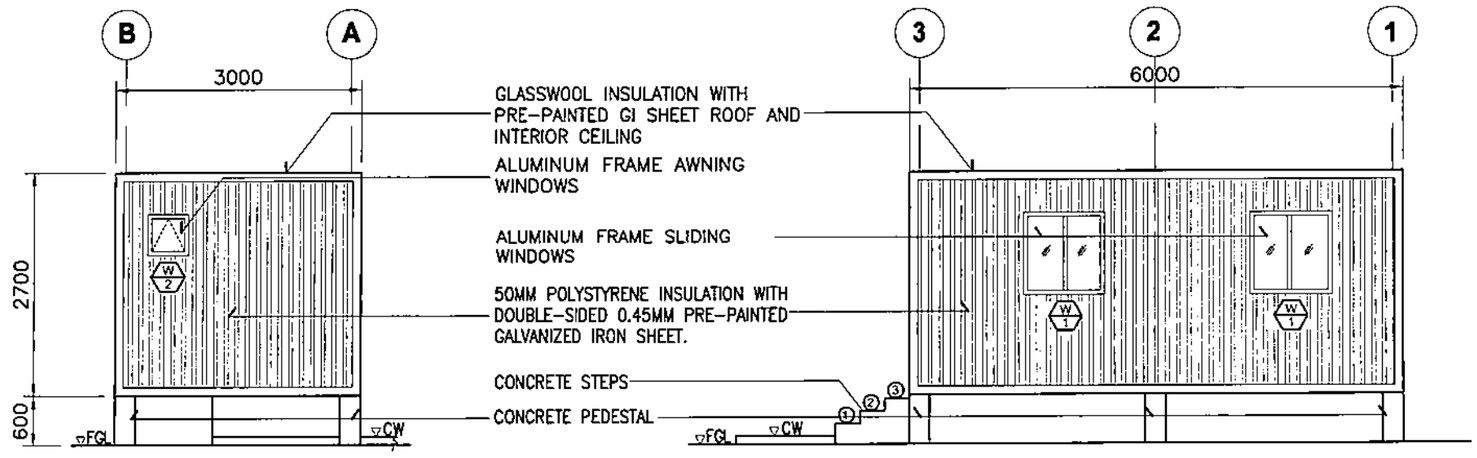


FRONT ELEVATION

SCALE 1:75

LEFT SIDE ELEVATION

SCALE 1:75



REAR ELEVATION

SCALE 1:75

RIGHT SIDE ELEVATION

SCALE 1:75

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

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MASBATE

TITLE: **TYPICAL BUNKHOUSE (ELEVATIONS)**

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

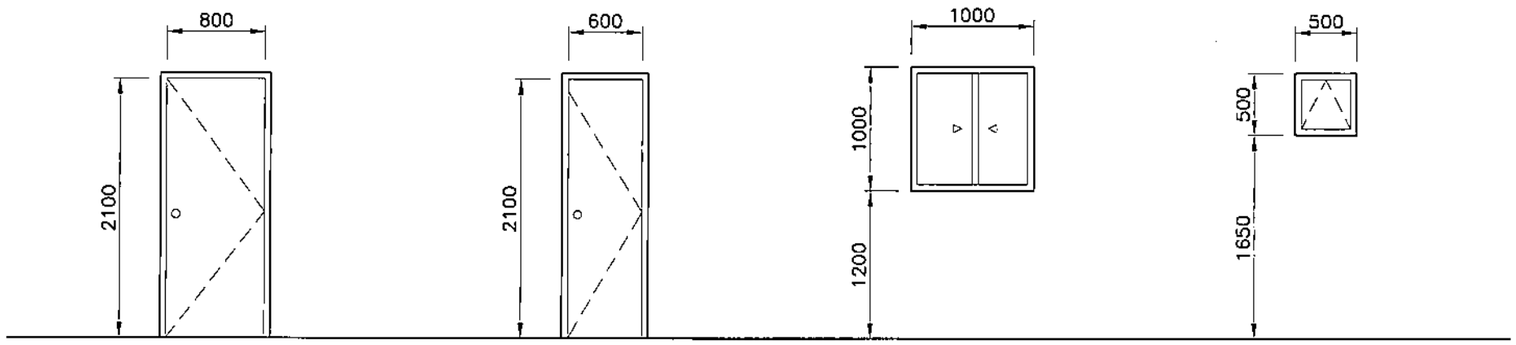
SUBMITTED: R. R. R. VILLANUEVA, Principal Architect A, CEAD
RECOMMENDED: A. C. ESPIRITU, Manager, CEAD
APPROVED: G. B. MAGPOC, JR., Manager, DDD

DWG. NO. CDPP-BDA-17.002 SPECS. NO. LuzP24Z1685Sc

SCALE: 1:75 **BID DRAWING** REV. 0

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
2. WORK THIS DRAWING WITH RELATED CIVIL, MECHANICAL AND ELECTRICAL DRAWINGS.



D/1 : FLUSH TYPE STEEL DOOR

D/2 : FLUSH TYPE PVC DOOR

W/1 : GLASS AND ALUM. SLIDING WINDOW
: 6 MM THICK CLEAR GLASS ALUMINUM FRAME

W/2 : GLASS AND ALUM. AWNING WINDOW
: 6 MM THICK CLEAR GLASS ALUMINUM FRAME

SCHEDULE OF DOORS AND WINDOWS

SCALE 1:50

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

OWNER: NATIONAL POWER CORPORATION
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MASBATE

TITLE: **TYPICAL BUNKHOUSE**
(SCHEDULE OF DOORS & WINDOWS)

	BY	CHKD	DATE
DESIGNED			
DRAWN			
REVIEWED	PRINCIPAL ENGR. / ARCHT.		
CIVIL/ARCH'T			
ELEC.			
MECH.			

SUBMITTED: R. R. R. VILLANUEVA
Principal Architect A, CEAD

RECOMMENDED: A. C. ESPIRITU
Manager, CEAD

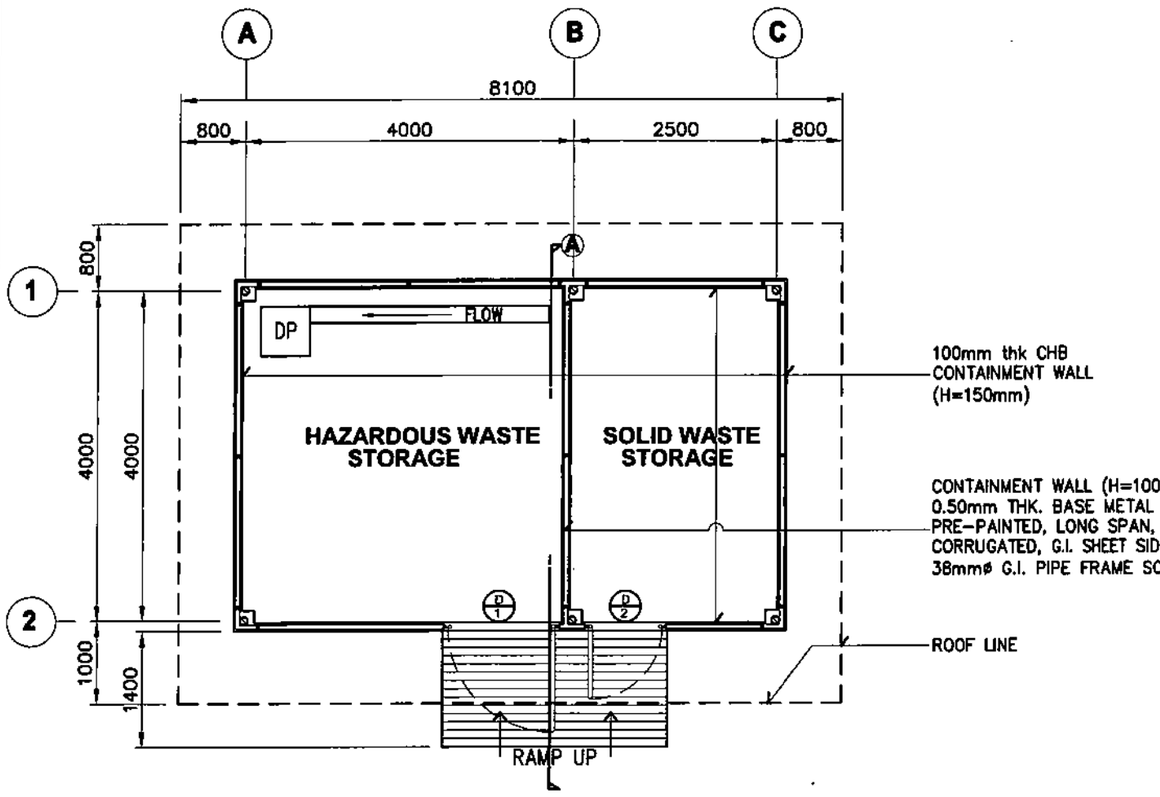
APPROVED: G. B. MAGPOC, JR.
Manager, DDD

DWG. NO. CDPP-BDA-17.003 SPECS. NO. LuzP24Z1685Sc

SCALE: 1:50 BID DRAWING REV. 0

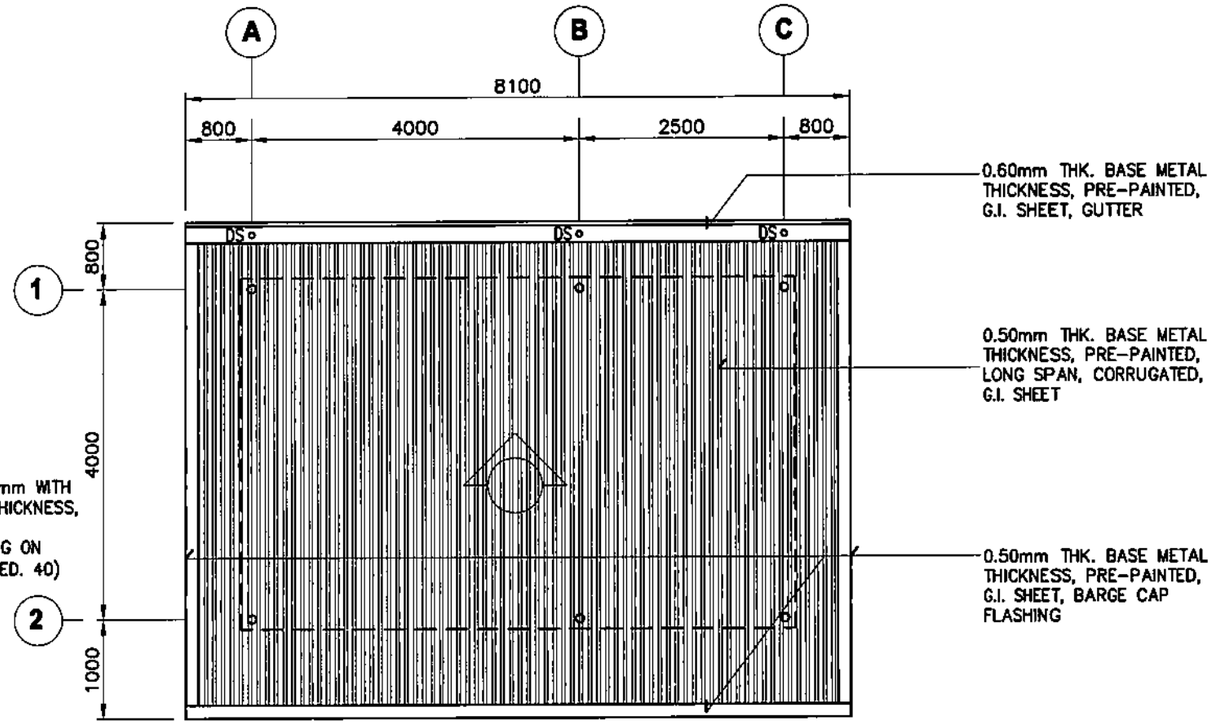
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. WORK THIS DRAWING WITH RELATED CIVIL AND ELECTRICAL DRAWINGS.



FLOOR PLAN

SCALE 1:75



ROOF PLAN

SCALE 1:75

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

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MASBATE

TITLE: **TYPICAL HAZARDOUS WASTE AND SOLID WASTE STORAGE (FLOOR PLAN AND ROOF PLAN)**

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

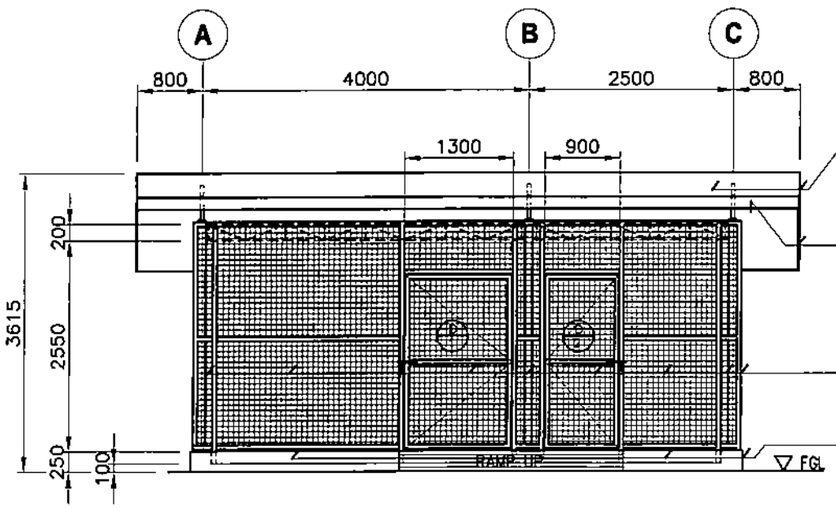
SUBMITTED: R. R. R. VILLANUEVA, Principal Architect A, CEAD
RECOMMENDED: A. C. ESPIRITU, Manager, CEAD
APPROVED: G. B. MAGPOC, JR., Manager, DDD

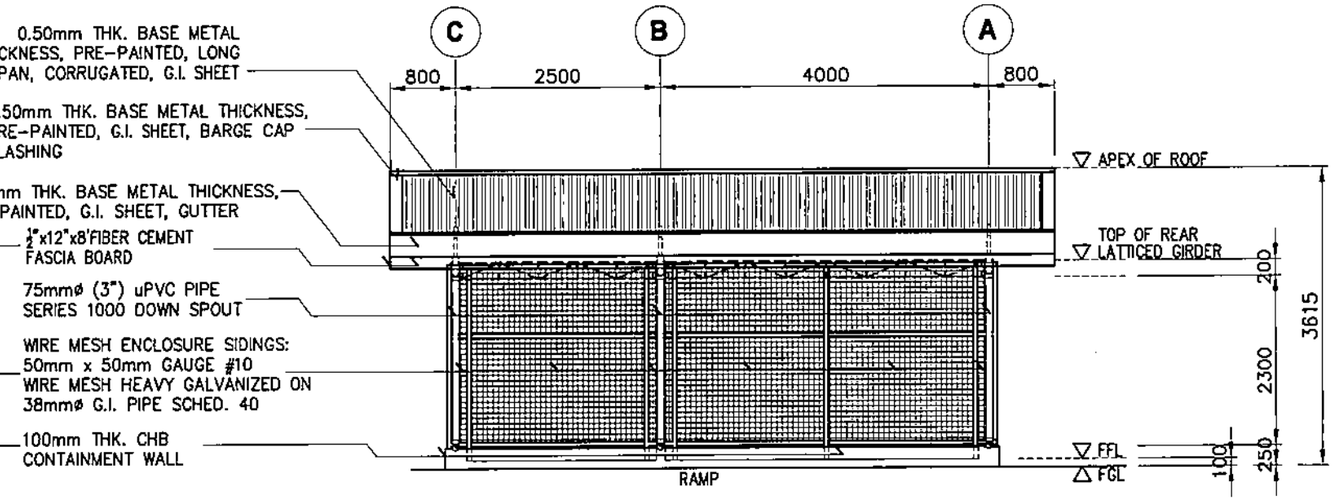
DWG. NO. CDPP-BDA-17.004 | SPECS. NO. LuzP24Z1685Sc

SCALE: 1:75 | **BID DRAWING** | REV. 0

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. WORK THIS DRAWING WITH RELATED CIVIL AND ELECTRICAL DRAWINGS.





FRONT ELEVATION
SCALE 1:75

REAR ELEVATION
SCALE 1:75

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

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MASBATE

TITLE: **TYPICAL HAZARDOUS WASTE AND SOLID WASTE STORAGE (FRONT ELEVATION AND REAR ELEVATION)**

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

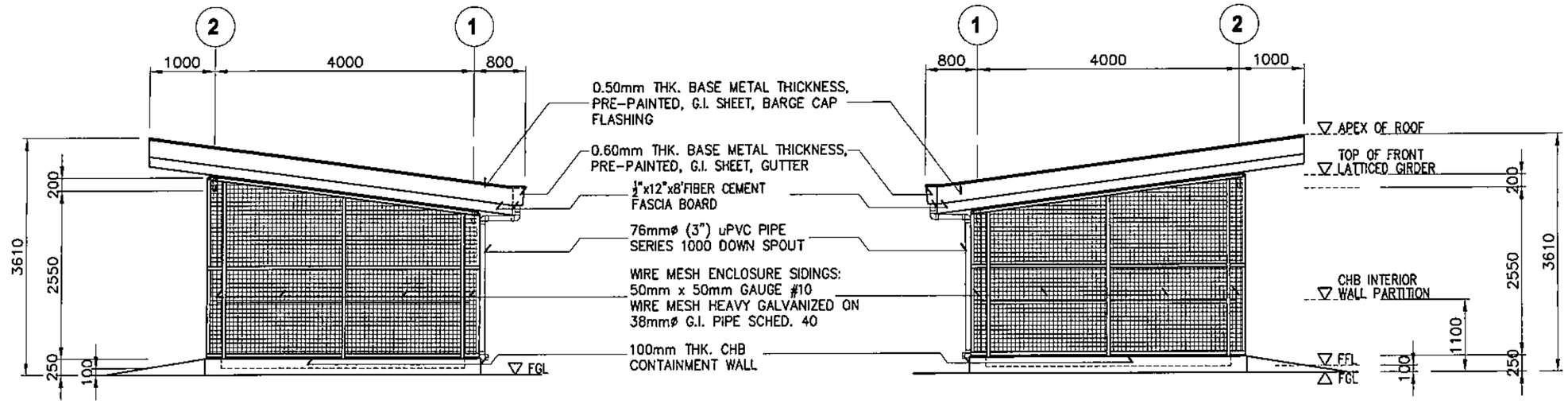
SUBMITTED: R. R. R. VILLANUEVA, Principal Architect-A, CEAD
RECOMMENDED: A. C. ESPIRITU, Manager, CEAD
APPROVED: G. B. MAGPOC, JR., Manager, DDD

DWG. NO. CDPP-BDA-17.005 | SPECS. NO. LuzP24Z1685Sc

SCALE: 1:75 | **BID DRAWING** | REV. 0

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. WORK THIS DRAWING WITH RELATED CIVIL AND ELECTRICAL DRAWINGS.

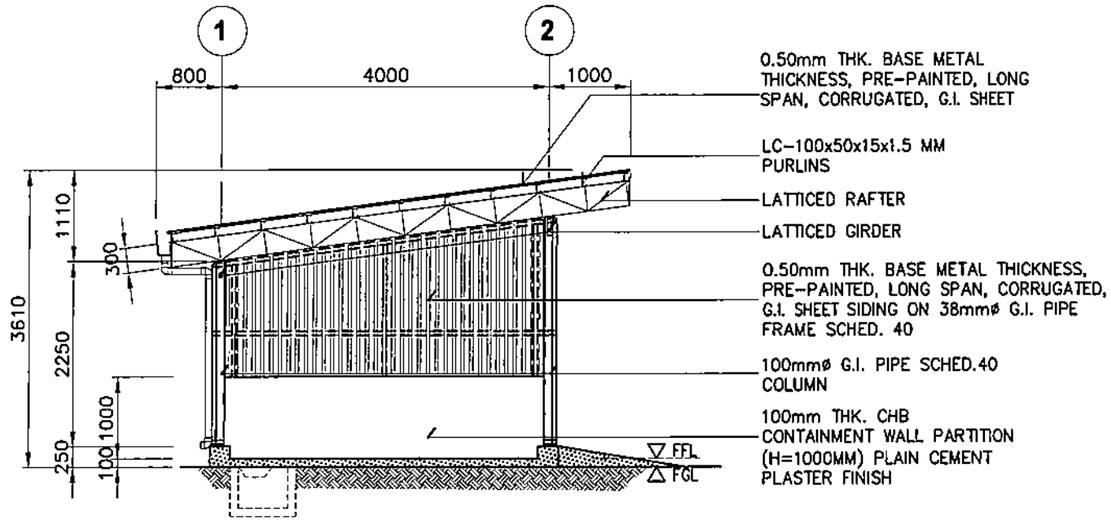


RIGHT SIDE ELEVATION

SCALE 1:75

LEFT SIDE ELEVATION

SCALE 1:75



SECTION 'A'

SCALE 1:75

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

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE. DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MASBATE

TITLE: **TYPICAL HAZARDOUS WASTE AND SOLID WASTE STORAGE (RIGHT SIDE AND LEFT SIDE ELEVATION; SECTION 'A')**

	BY	CHKD	DATE
DESIGNED			
DRAWN			
REVIEWED	PRINCIPAL ENG'R. / ARCHT.		
CIVIL/ARCHT			
ELEC.			
MECH.			

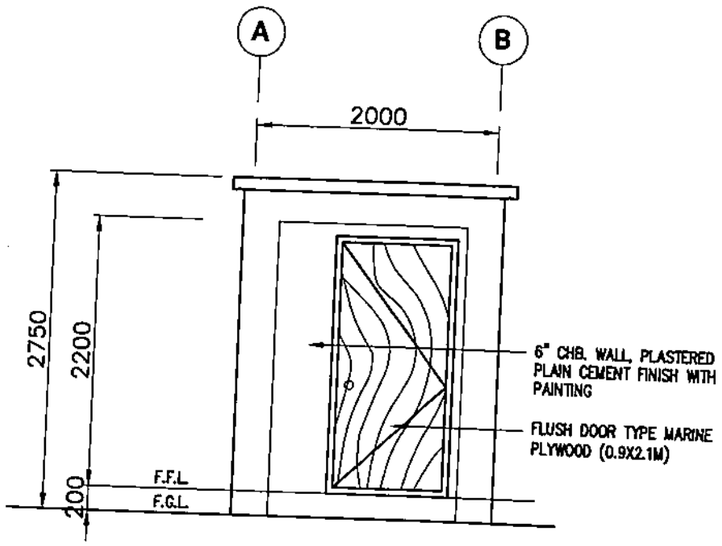
SUBMITTED: R. R. R. VILLANUEVA, Principal Architect A, CEAD
RECOMMENDED: A.C. ESPIRITU, Manager, CEAD
APPROVED: G. B. MAGPOC, JR., Manager, DDD

DWG. NO. CDPP-BDA-17.006 | SPECS. NO. LuzP24Z1685Sc

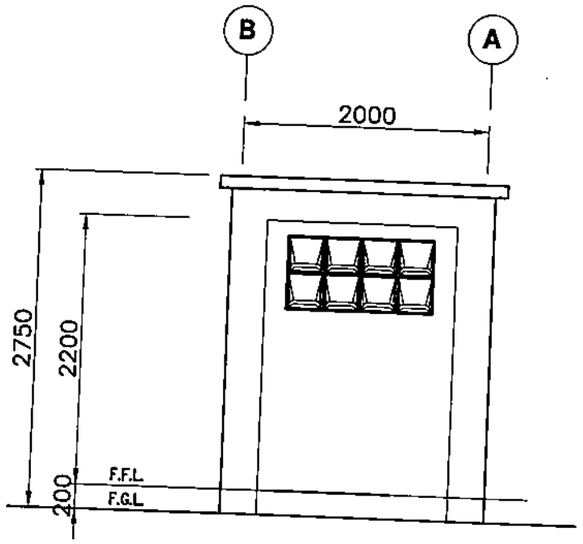
SCALE: 1:75 | **BID DRAWING** | REV. 0

NOTES:

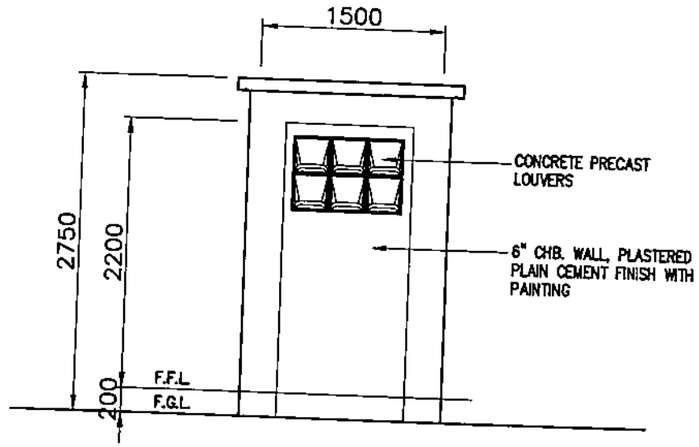
1. WORK THIS DRAWING WITH MECHANICAL DRAWINGS.



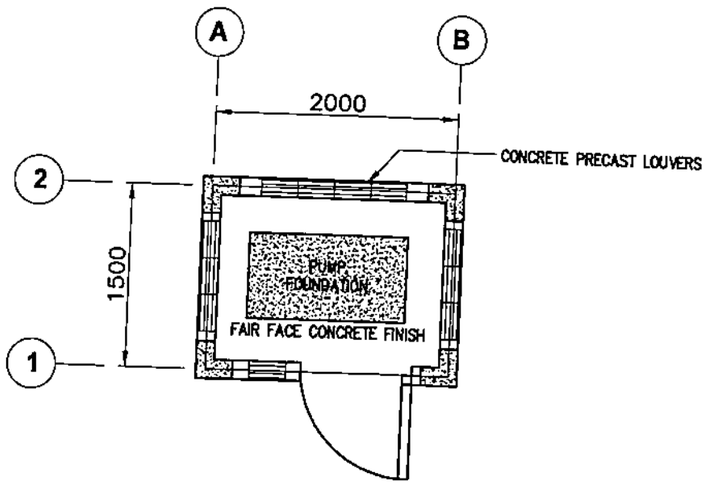
FRONT ELEVATION
SCALE 1:50



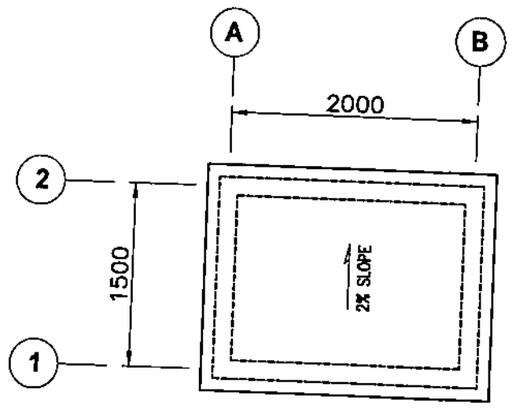
REAR ELEVATION
SCALE 1:50



SIDE ELEVATION
SCALE 1:50



FLOOR PLAN
SCALE 1:50



ROOF PLAN
SCALE 1:50

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

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MASBATE

TITLE: **PUMP HOUSE**
(PLAN & ELEVATION)

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

SUBMITTED: R. R. R. VILLANUEVA
Principal Architect A, CEAD

RECOMMENDED: A. C. ESPIRITU
Manager, CEAD

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

DWG. NO. CDPP-BDA-17.007 | SPECS. NO. LuzP24Z1685Sc

SCALE: 1:50 | BID DRAWING | REV. 0

BID DRAWINGS

CIVIL DRAWINGS

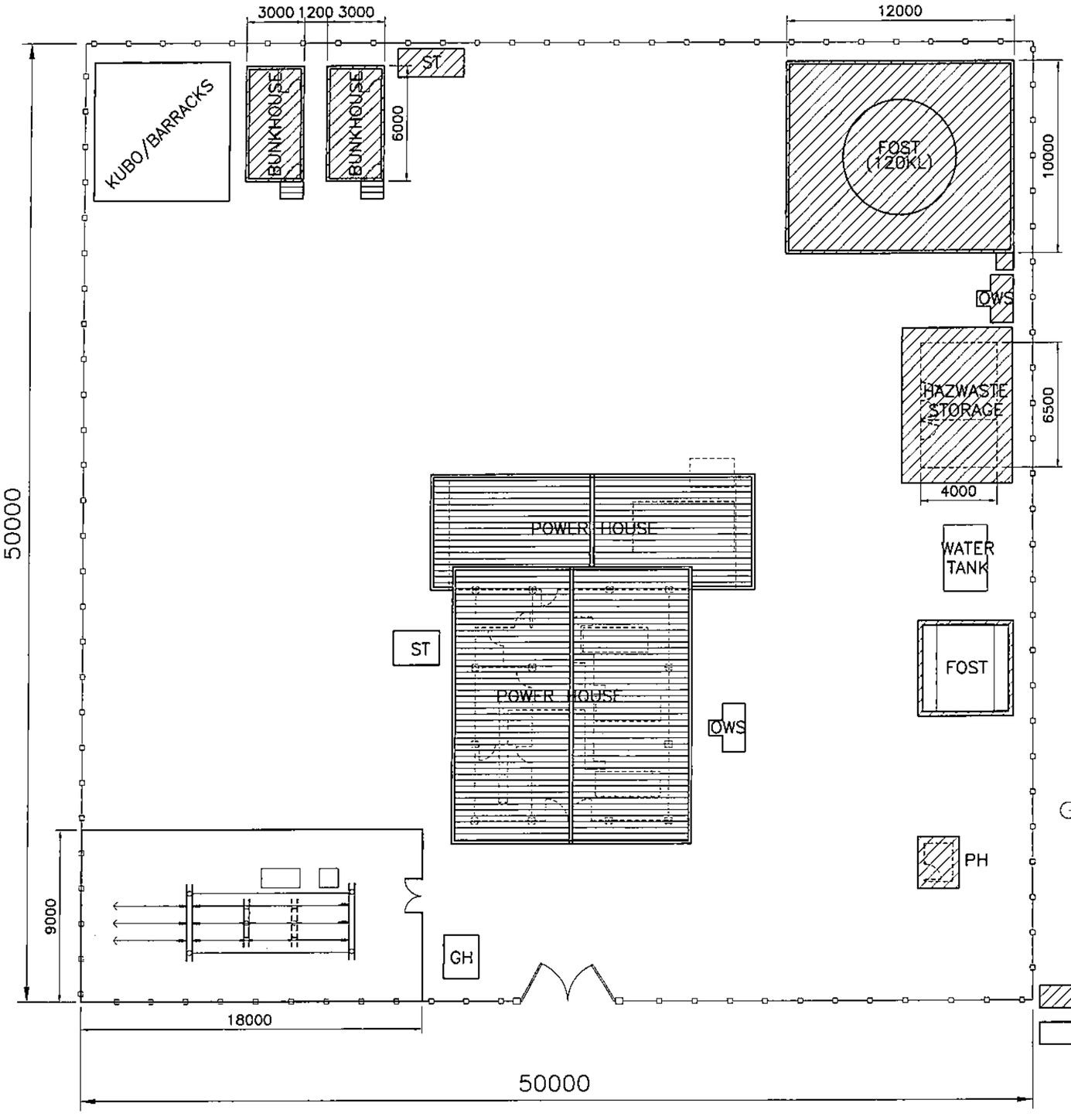
SECTION IX - BID DRAWINGS

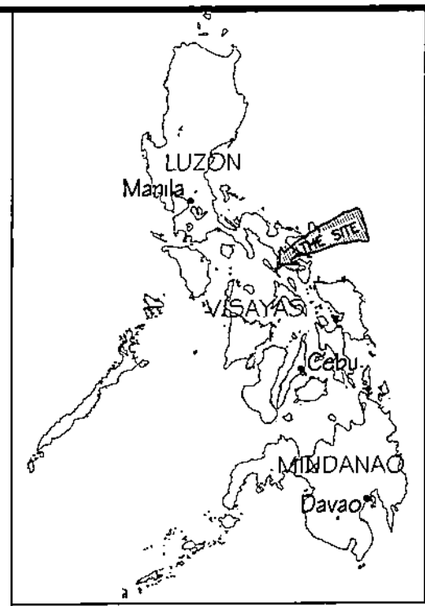
CW - CIVIL WORKS

DRAWING NO.	TITLE
CDPP -BDC-17.001	SITE DEVELOPMENT PLAN (Claveria DPP)
CDPP -BDC-17.002	TYPICAL PREFAB CONTAINER HOUSE (Foundation Plan, Pedestal, Concrete Step and Walk Details)
CDPP -BDC-17.003	TYPICAL HAZARDOUS WASTE AND SOLID WASTE STORAGE (Frame Elevations)
CDPP -BDC-17.004	TYPICAL HAZARDOUS WASTE AND SOLID WASTE STORAGE (Foundation & Roof Framing Plan)
CDPP -BDC-17.005	TYPICAL HAZARDOUS WASTE AND SOLID WASTE STORAGE (Pedestal Footing & RC Containment Wall)
CDPP -BDC-17.006	TYPICAL PUMPHOUSE (Foundation Plan, Section, Elevation & Det.)
CDPP -BDC-17.007	TYPICAL PUMPHOUSE (Roof Slab, Beam Section & Details)
CDPP -BDC-17.008	120 KL FUEL OIL STORAGE TANK (Sections)
CDPP -BDC-17.009	FOST FOUNDATION AND CONTAINMENT WALL (Reinforcement, Drain & Blockout Details)
CDPP -BDC-17.010	DRAIN PIT AND VALVE BOX (Plans, Sections & Details)
CDPP -BDC-17.011	OIL-WATER SEPARATOR (Plans, Sections & Details)
CDPP -BDC-17.012	16KL EXISTING FUEL OIL STORAGE TANK (Containment Wall)

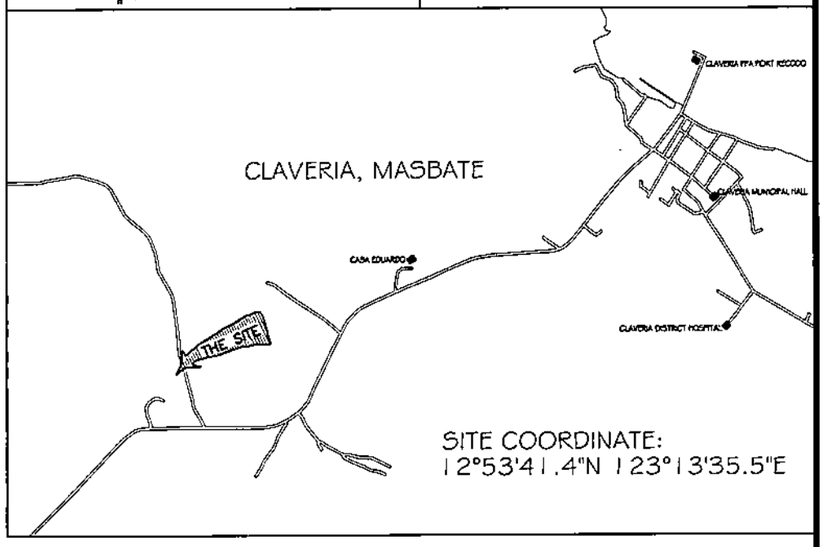
CDPP -BDC-17.013

SEPTIC TANK
(Plan, Section & Details)





SITE COORDINATE:
12°53'41.4"N 123°13'35.5"E



SITE COORDINATE:
12°53'41.4"N 123°13'35.5"E

LEGEND:

	–	PROPOSED IMPROVEMENTS
	–	EXISTING FACILITIES/STRUCTURES
FOST	–	FUEL OIL STORAGE TANK
OWS	–	OIL–WATER SEPARATOR
PH	–	PUMP HOUSE
VB	–	VALVE BOX
ST	–	SEPTIC TANK

SITE DEVELOPMENT PLAN

SCALE 1:250

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MASBATE

TITLE: **SITE DEVELOPMENT PLAN (CLAVERIA DPP)**

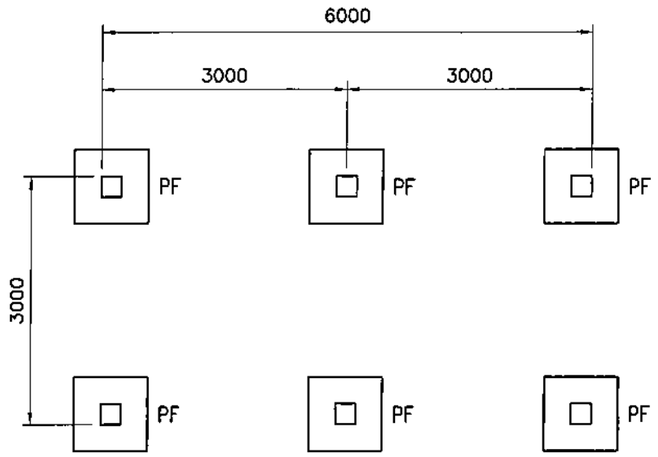
	BY	CHKD	DATE
DESIGNED			
DRAWN			
REVIEWED	PRINCIPAL ENGR. / ARCH'T.		
CIVIL/ARCH'T			
ELEC.			
MECH.			

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

DWG. NO. CDPP-BDC-17.001 SPECS. NO. LuzP24Z1685Sc

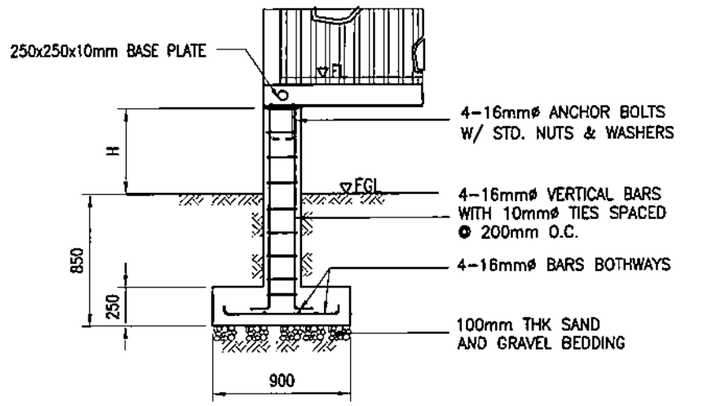
SCALE: 1:250 **BID DRAWING** REV. 0

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

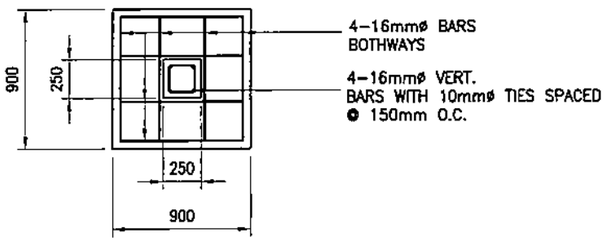


TYPICAL FOUNDATION PLAN

SCALE 1:75



SECTION



PLAN

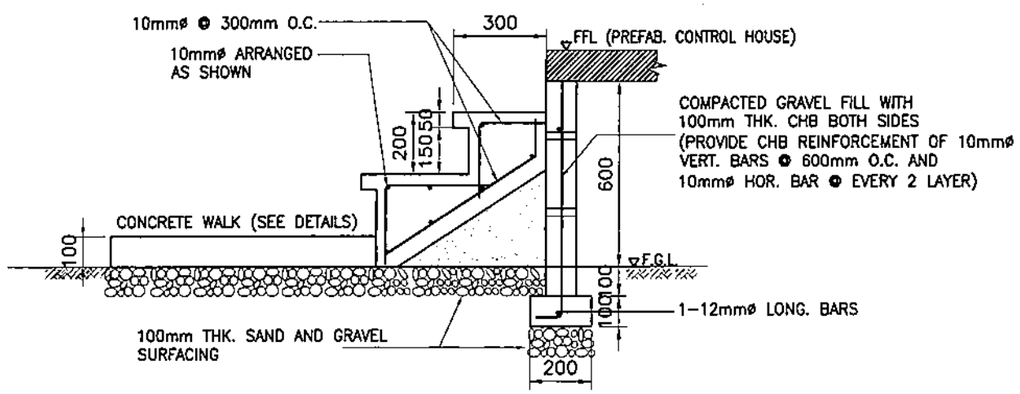
PEDESTAL FOOTING (PF)

SCALE 1:40

NOTES:

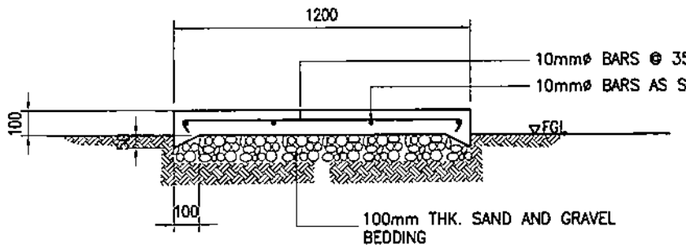
1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. FOOTING DESIGN BASED ON ALLOWABLE SOIL PRESSURE OF 144KPa AND TO BE VERIFY BASED ON ACTUAL SOIL CONDITION.
3. THE MINIMUM 28 DAY CYLINDER COMPRESSIVE STRENGTH OF CONCRETE SHALL BE 20.7MPa FOR PEDESTAL.
4. THE MINIMUM YIELD STRENGTH OF REINFORCEMENT TO BE USED SHALL BE GRADE 40 (276MPa).
5. ALL REINFORCING STEEL SHALL BE DETAILED AND PLACED IN CONFORMANCE WITH ACI-318.
6. THE HEIGHT OF PEDESTAL SHALL BE REFERRED TO THE TABLE BELOW.
7. WORK THIS WITH ARCHITECTURAL DRAWINGS.

PURPOSE	H
CONTROL HOUSE	600mm
BUNKHOUSE WITH STORAGE ROOM	300mm



CONTROL HOUSE CONCRETE STEPS DETAILS

SCALE 1:20



CONCRETE WALK DETAILS

SCALE 1:25

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

OWNER: NATIONAL POWER CORPORATION
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MASBATE

TITLE: **TYPICAL PREFAB CONTAINER HOUSE**
(FOUNDATION PLAN, PEDESTAL, CONCRETE STEP AND WALK DETAILS)

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

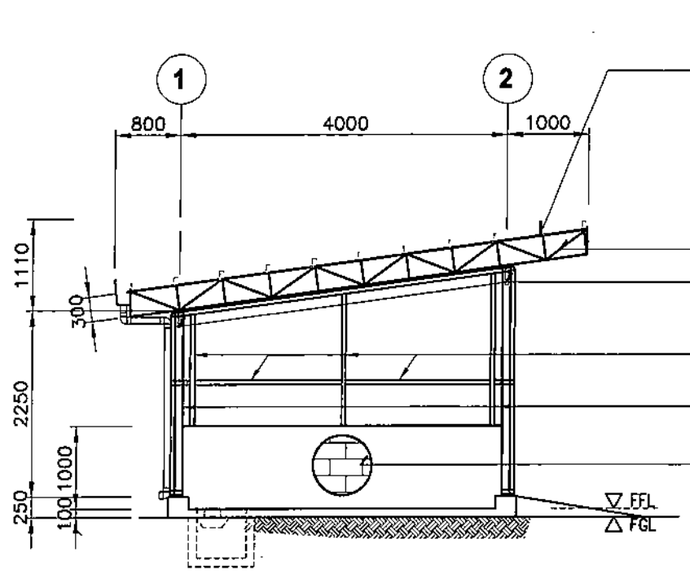
SUBMITTED: H. L. MENDOZA, Principal Engineer A, CEAD
RECOMMENDED: A. G. ESPIRITU, Manager, CEAD
APPROVED: G. B. MAGPOC, JR., Manager, DDD

DWG. NO. CDPP-BDC-17.002 SPECS. NO. LuzP24Z1685Sc

SCALE: AS SHOWN **BID DRAWING** REV. 0

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.



LC–100x50x15x1.5 MM PURLINS SPACED AS SHOWN W/ CLEATS L–40x40x3 MM

LATTICED RAFTER: TOP & BOTTOM CHORD: L50X50X5 WEB MEMBERS: L40X40X3

LATTICED GIRDER: TOP & BOTTOM CHORD: L50X50X5 WEB MEMBERS: L40X40X3

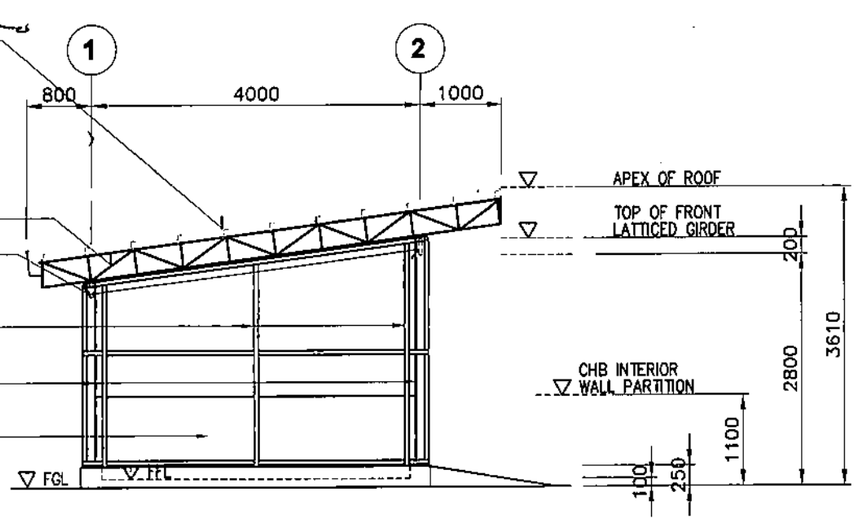
38mmø G.I. PIPE SCH. 40

100mmø G.I. PIPE SCHED.40 COLUMN

100mm THK. CHB CONTAINMENT WALL PARTITION (H=1000MM) PLAIN CEMENT PLASTER FINISH

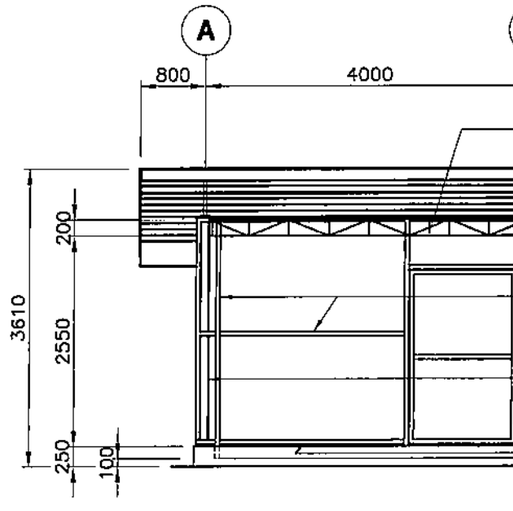
FRAME ELEVATION AT GRID B

SCALE 1:75



FRAME ELEVATION AT GRID A

SCALE 1:75



LATTICED RAFTER: TOP & BOTTOM CHORD: L50X50X5 WEB MEMBERS: L40X40X3

LC–100x50x15x1.5 MM PURLINS

38mmø G.I. PIPE SCH. 40

100mmø G.I. PIPE SCHED.40 COLUMN

100mm THK. CHB CONTAINMENT WALL

FRAME ELEVATION AT GRID 2

SCALE 1:75

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

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MASBATE

TITLE: **TYPICAL HAZARDOUS WASTE AND SOLID WASTE STORAGE**
(FRAME ELEVATIONS)

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

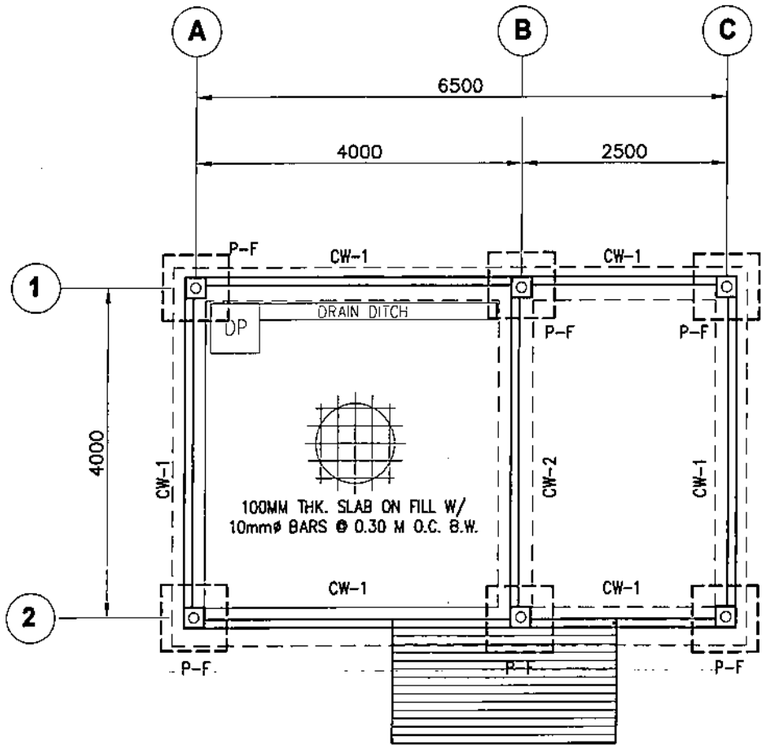
SUBMITTED: H. L. MENDOZA, Principal Engineer A, CEAD
RECOMMENDED: A. C. ESPIRITU, Manager, CEAD
APPROVED: G. B. MAGPOC, JR., Manager, DDD

DWG. NO. CDPP-BDC-17.003 SPECS. NO. LuzP24Z1685Sc

SCALE: 1:75 **BID DRAWING** REV. 0

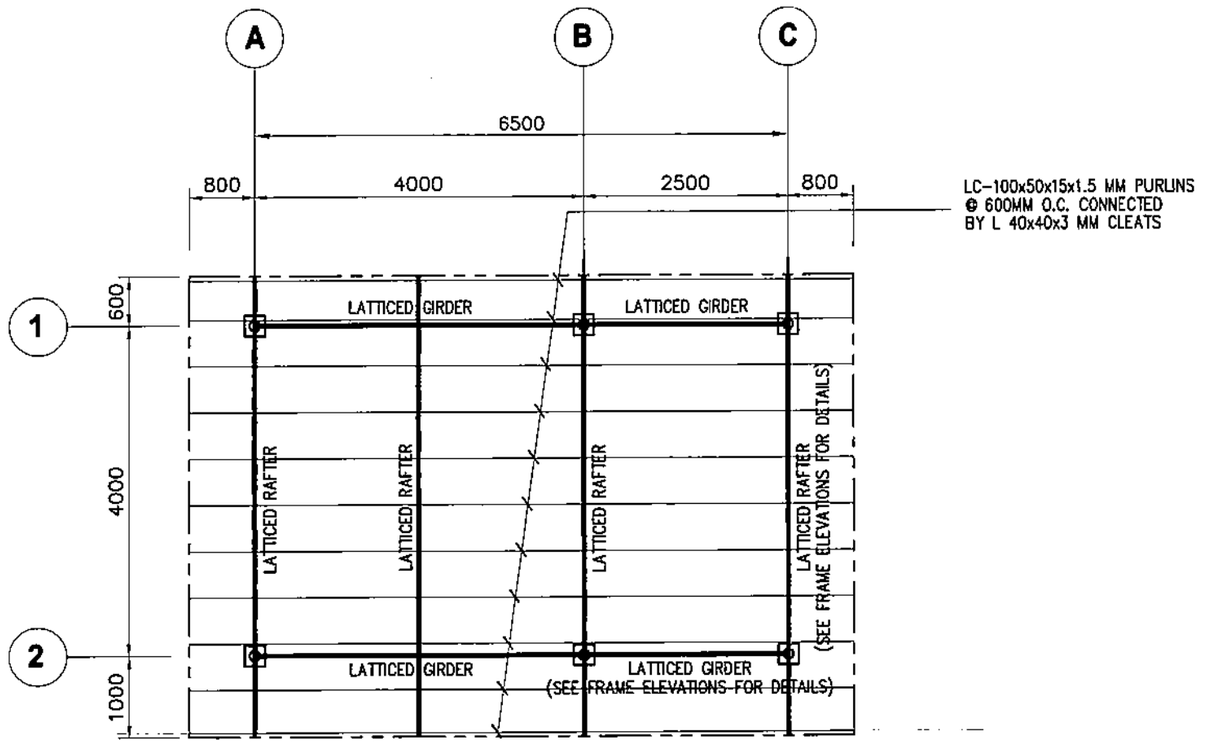
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. MINIMUM COMPRESSIVE STRENGTH OF CONCRETE SHALL BE f'c = 20.7 MPa AT 28 DAYS PERIOD.
3. ALL STRUCTURAL STEEL SHALL CONFORM TO SPECIFICATIONS FOR A36 STEEL WHILE ALL ANCHOR BOLTS TO A307 SPECIFICATIONS.
4. ALL JOINTS, SPLICES AND CONNECTIONS SHALL BE FULLY WELDED.
5. WORK THIS DRAWING WITH RELATED ARCHITECTURAL AND ELECTRICAL DRAWINGS.



FOUNDATION PLAN

SCALE 1:75



ROOF FRAMING PLAN

SCALE 1:75

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

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MASBATE

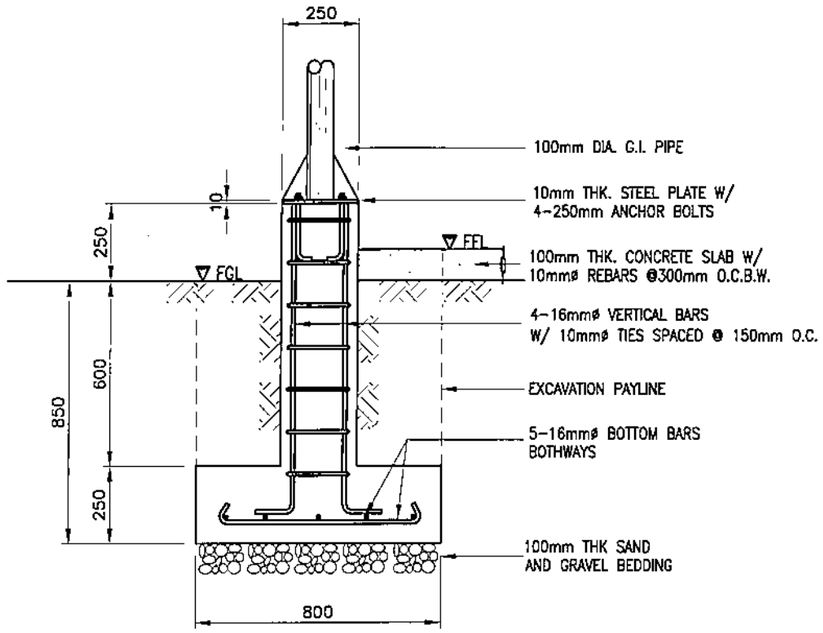
TITLE: **TYPICAL HAZARDOUS WASTE AND SOLID WASTE STORAGE**
(FOUNDATION AND ROOF FRAMING PLAN)

	BY	CHKD	DATE
DESIGNED			
DRAWN			
REVIEWED	PRINCIPAL ENGR. / ARCH'T.		
CIVIL/ARCH'T			
ELEC.			
MECH.			

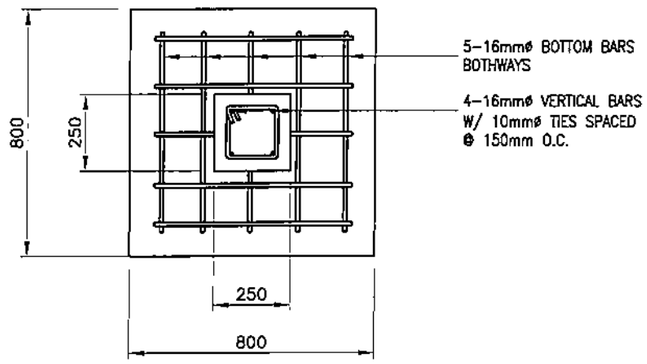
SUBMITTED: H. L. MENDOZA, Principal Engineer A, CEAD
RECOMMENDED: A.C. ESPIRITU, Manager, CEAD
APPROVED: G. B. MAGPOC, JR., Manager, DDO

DWG. NO. CDPP-BDC-17.004 | SPECS. NO. LuzP24Z1685Sc

SCALE: AS SHOWN | **BID DRAWING** | REV. 0



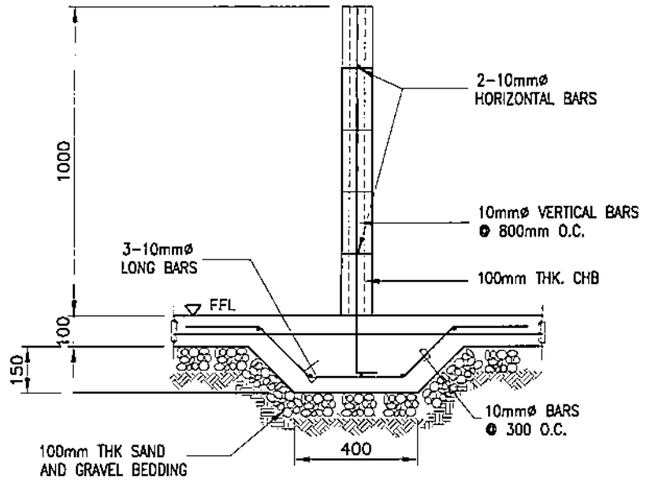
SECTION



PLAN

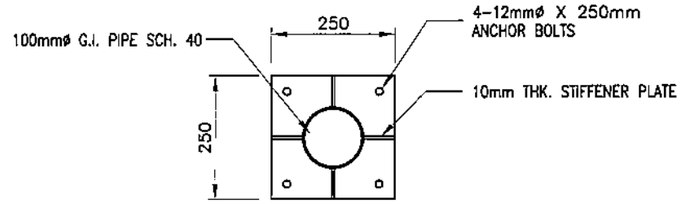
FOUNDATION DETAILS (CF)

SCALE 1:20



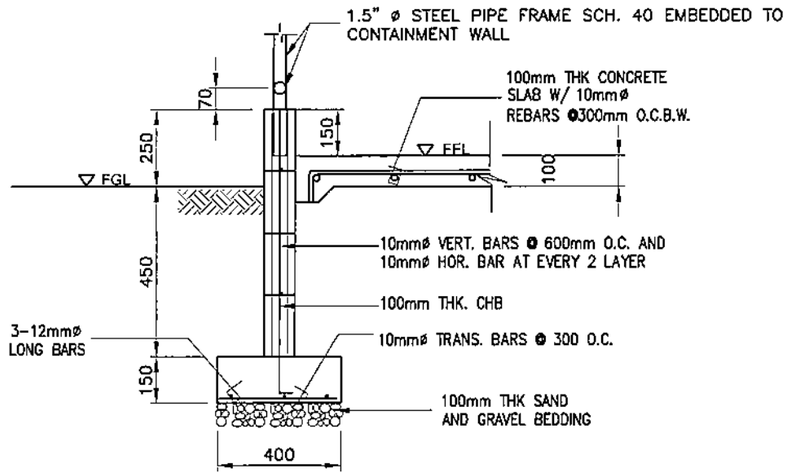
CONTAINMENT WALL (CW-2)

SCALE NTS



TYPICAL BASE PLATES DETAILS

SCALE NTS

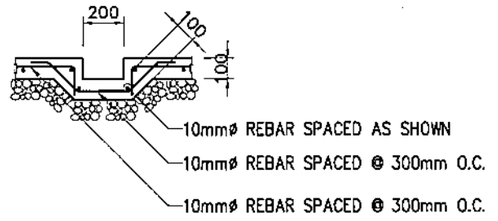


CONTAINMENT WALL (CW-1)

SCALE NTS

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. MINIMUM COMPRESSIVE STRENGTH OF CONCRETE SHALL BE fc = 20.7 MPa AT 28 DAYS PERIOD.
3. ALL STRUCTURAL STEEL SHALL CONFORM TO SPECIFICATIONS FOR A36 STEEL WHILE ALL ANCHOR BOLTS TO A325 SPECIFICATIONS
4. ALL CONNECTIONS SHALL BE WELDED IN ACCORDANCE WITH THE AMERICAN WELDING SOCIETY.
5. ALL JOINTS, SPLICES AND CONNECTIONS SHALL BE FULLY WELDED.
6. ALL METAL SHALL BE CLEANED FROM RUST AND PAINTED WITH PRIMER PAINT.
7. STEEL COLUMN CONNECTION TO CONCRETE FOUNDATION SHALL BE PROVIDED WITH BASE PLATE AND ANCHOR BOLTS.
8. WORK THIS DRAWING WITH RELATED CIVIL AND ELECTRICAL DRAWINGS.



DRAIN DITCH DETAILS

SCALE NTS

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

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MASBATE

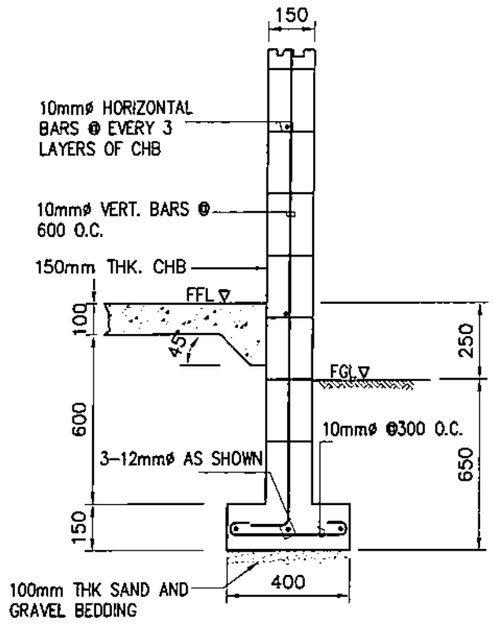
TITLE: **TYPICAL HAZARDOUS WASTE AND SOLID WASTE STORAGE**
(PEDESTAL FOOTING AND RC CONTAINMENT WALL)

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

SUBMITTED: H. L. MENDOZA, Principal Engineer A, CEAD
RECOMMENDED: A. C. ESPIRITU, Manager, CEAD
APPROVED: G. B. MAGPOC, JR., Manager, DDD

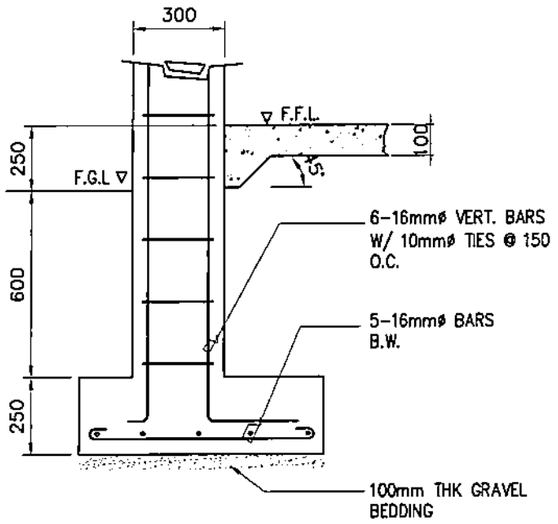
DWG. NO. CDPP-BDC-17.005 SPECS. NO. LuzP24Z1685Sc

SCALE: AS SHOWN BID DRAWING REV. 0



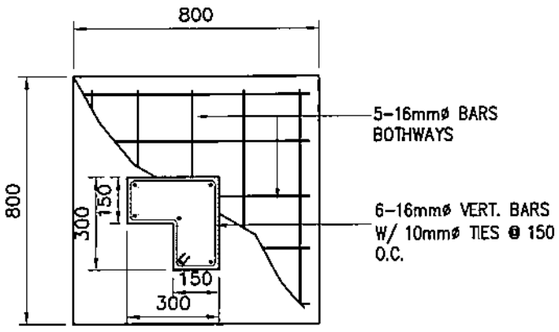
WALL FOOTING (WF)

SCALE 1:20



ELEVATION

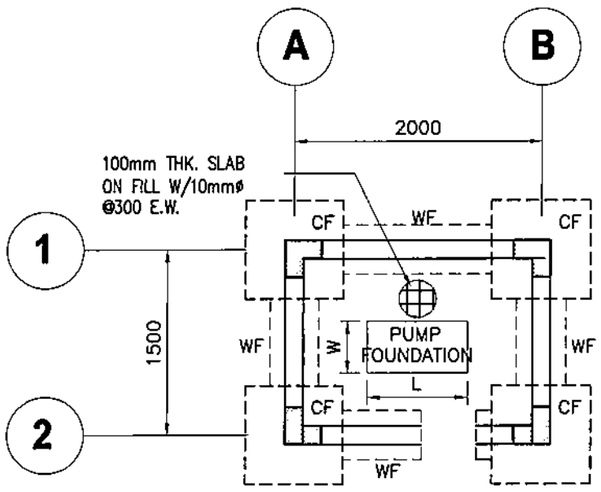
SCALE 1:20



PLAN

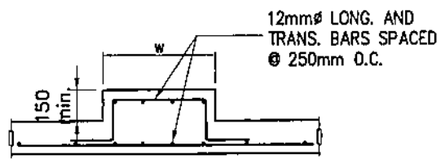
COLUMN-FOOTING DETAIL (CF)

SCALE 1:20



PUMPHOUSE FOUNDATION PLAN

SCALE 1:50



SECTION

PUMP FOUNDATION

SCALE NTS

NOTES:

1. MINIMUM COMPRESSIVE STRENGTH OF CONCRETE SHALL BE f'c = 20.70 MPa AT 28 DAYS PERIOD.
2. ALL REINFORCING BARS SHALL CONFORM TO THE LATEST REQUIREMENTS OF PHILIPPINE NATIONAL STANDARD FOR DSB GRADE 275.
3. ALL ASPECTS OF CONSTRUCTION AND DETAILING OF REINFORCEMENTS SHALL BE IN ACCORDANCE WITH THE LATEST PROVISIONS OF ACI CODE.
4. DIMENSION OF PUMP FOUNDATION WILL VARIES IN THE PUMP TO BE SUPPLIED.

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

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MASBATE

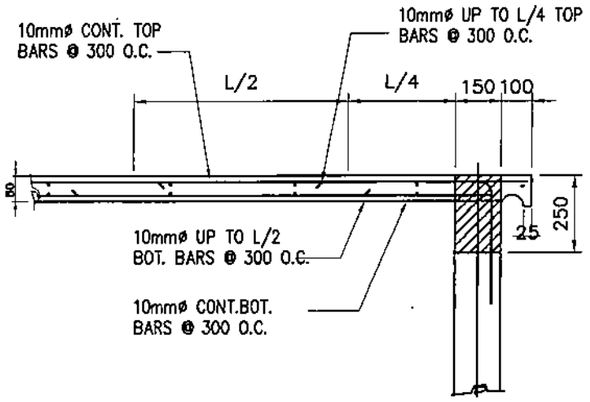
TITLE: **TYPICAL PUMPHOUSE (FOUNDATION PLAN, SECTION, ELEVATION & DETAILS)**

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

SUBMITTED: H. L. MENDOZA, Principal Engineer A, CEAD
RECOMMENDED: A. C. ESPIRITU, Manager, CEAD
APPROVED: G. B. MAGPOC, JR., Manager, DDD

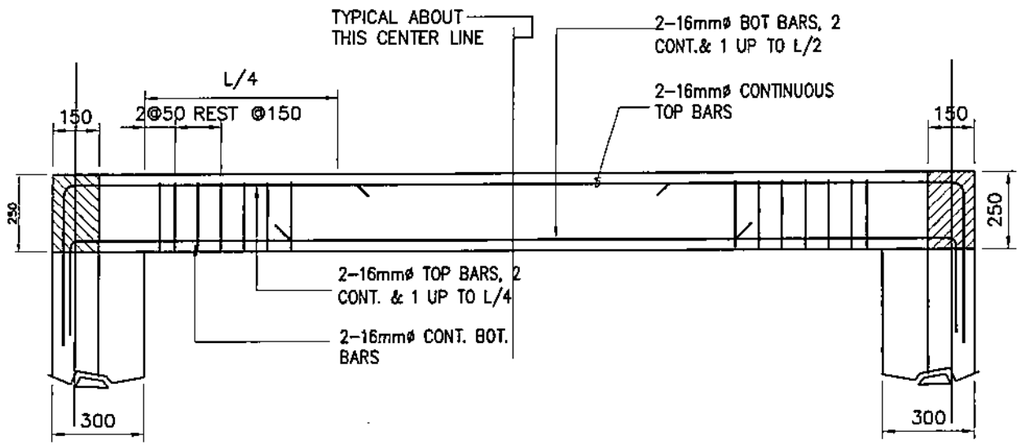
DWG. NO. CDPP-BDC-17.006 | SPECS. NO. LuzP24Z1685Sc

SCALE: AS SHOWN | **BID DRAWING** | REV. 0



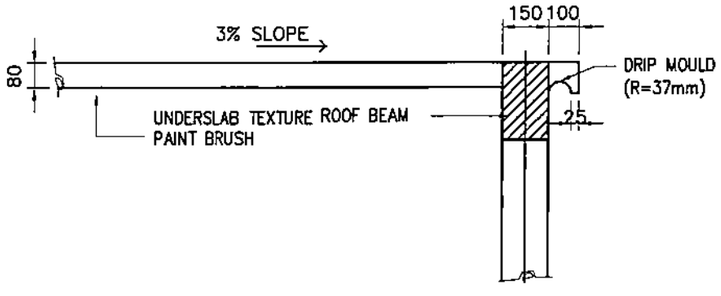
ROOF SLAB REINFORCEMENT

SCALE 1:20



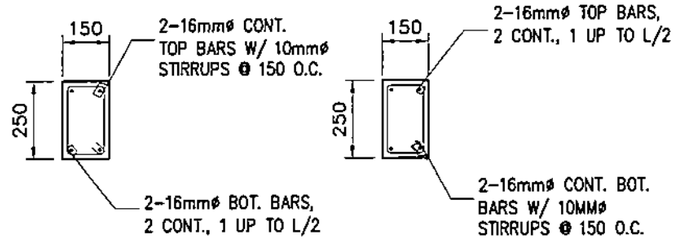
BEAM DETAIL

SCALE 1:20



ROOF SLAB DETAIL

SCALE 1:20



BEAM SECTION

SCALE 1:20

NOTES:

1. ALL DIMENSION ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. MINIMUM COMPRESSIVE STRENGTH OF CONCRETE SHALL BE f'c = 20.70 MPa AT 28-DAYS PERIOD.
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.

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

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MASBATE

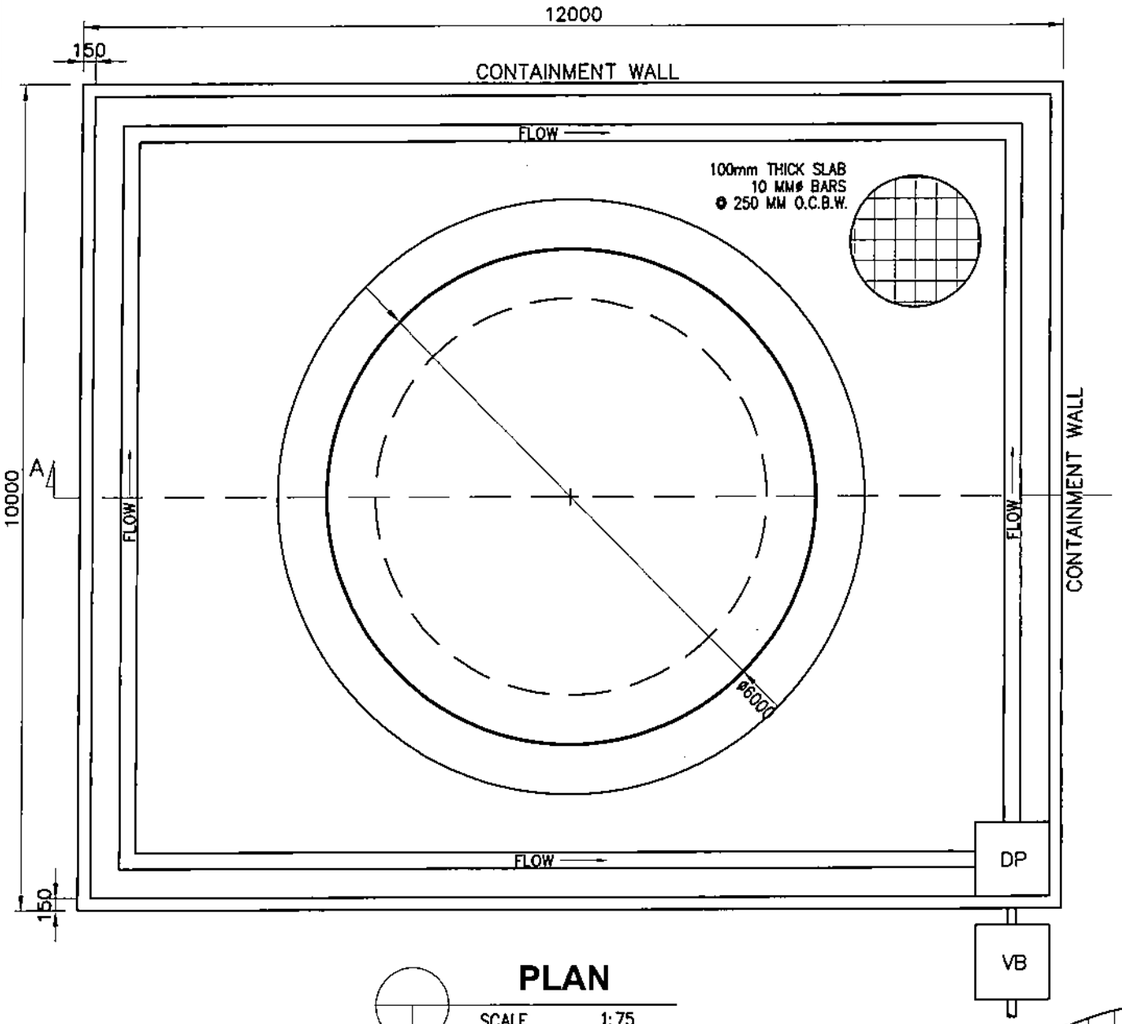
TITLE: **TYPICAL PUMPHOUSE (ROOF SLAB, BEAM SECTION AND DETAILS)**

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

SUBMITTED: H. L. MENDOZA, Principal Engineer A, CEAD
RECOMMENDED: A. O. ESPIRITU, Manager, CEAD
APPROVED: G. B. MAGPOC, JR., Manager, DOO

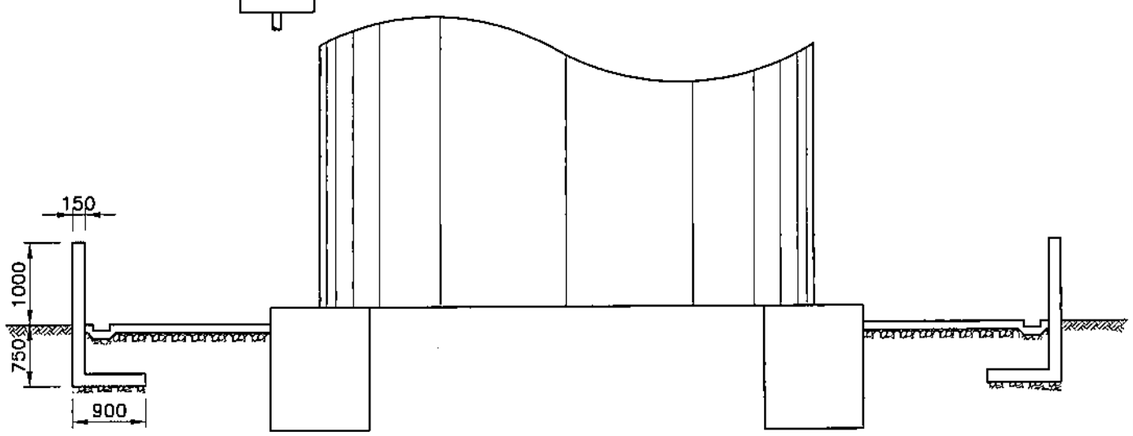
DWG. NO. CDPP-BDC-17.007 SPECS. NO. LuzP24Z1685Sc

SCALE: 1:20 **BID DRAWING** REV. 0



PLAN

SCALE 1:75



SECTION THRU A

SCALE 1:75

LEGEND:

DP – DRAIN PIT
VB – VALVE BOX

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. WORK THIS WITH MECHANICAL DRAWINGS.

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

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MASBATE

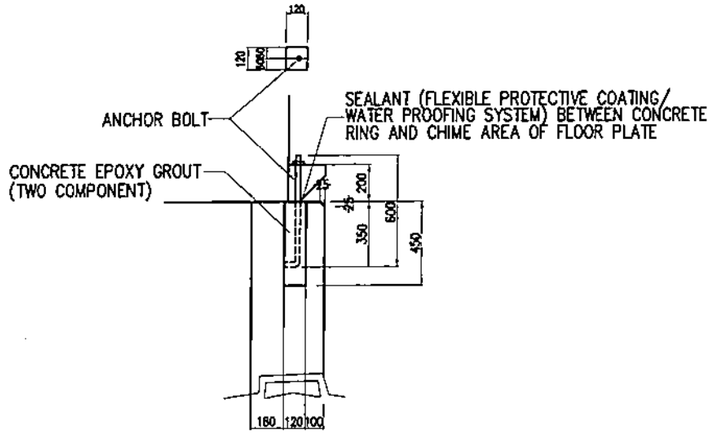
TITLE: **120 KL FUEL OIL STORAGE TANK (SECTIONS)**

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

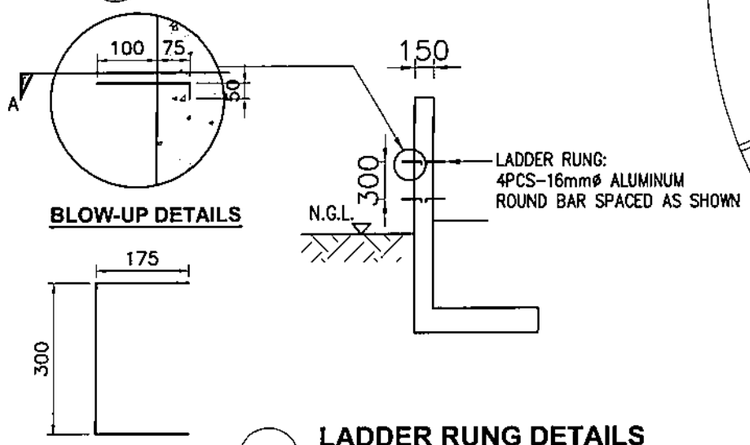
SUBMITTED: H. L. MENDOZA, Principal Engineer A, CEAD
RECOMMENDED: A. O. ESPIRITU, Manager, CEAD
APPROVED: G. B. MAGPOC, JR., Manager, DDO

DWG. NO. CDPP-BDC-17.008 | SPECS. NO. LuzP24Z1685Sc

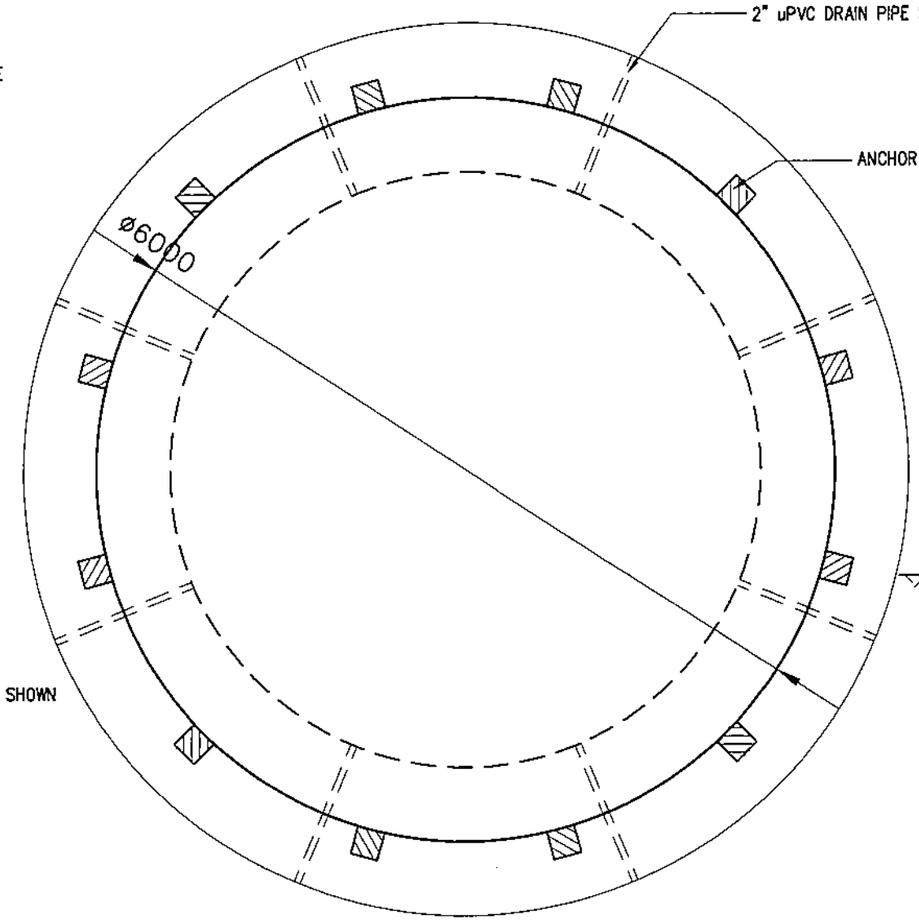
SCALE: AS SHOWN | **BID DRAWING** | REV. 0



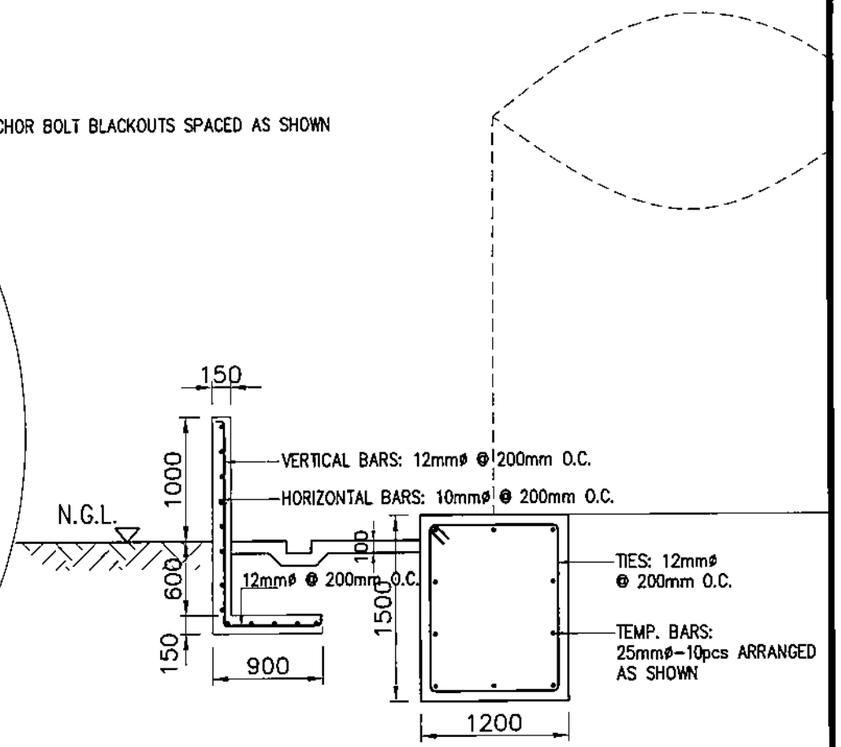
BLOCKOUT DETAILS
SCALE NTS



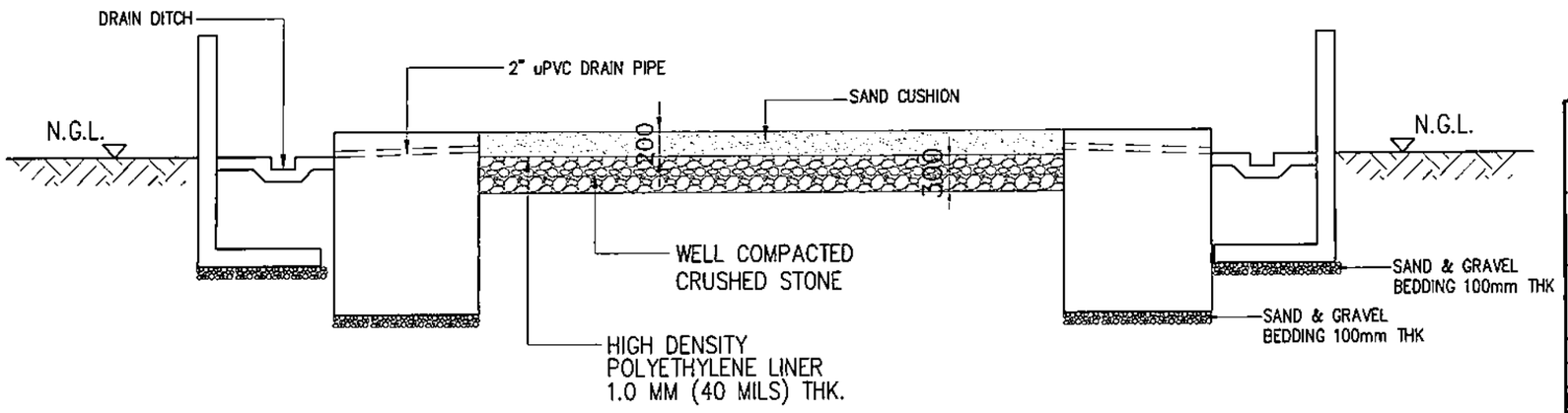
LADDER RUNG DETAILS
SCALE 1:50



DRAIN & BLOCKOUT PLAN
SCALE 1:50



REINFORCEMENT DETAILS
SCALE 1:50



SECTION DETAILS
SCALE NTS

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

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MASBATE

TITLE:
FOST FOUNDATION AND CONTAINMENT WALL
(REINFORCEMENT, DRAIN AND BLOCKOUT DETAILS)

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

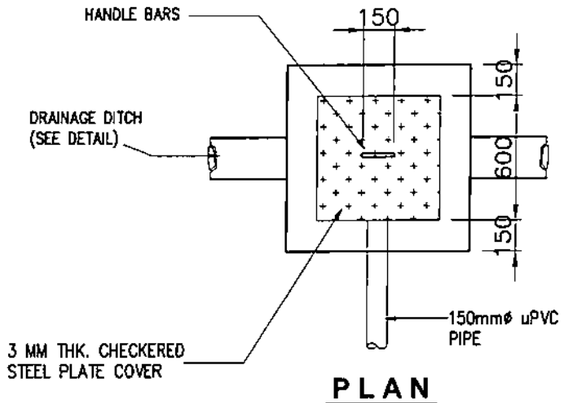
SUBMITTED: H. L. MENDOZA, Principal Engineer A, CEAD
RECOMMENDED: A. C. ESPIRITU, Manager, CEAD
APPROVED: G. B. MAGPOC, JR., Manager, DDD

DWG. NO. CDPP-BDC-17.009 | SPECS. NO. LuzP24Z1685Sc

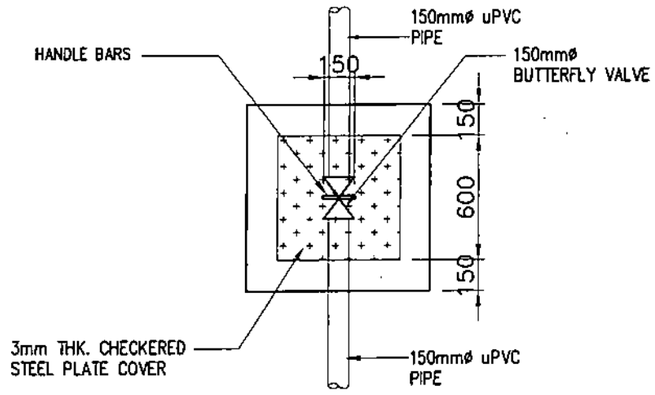
SCALE: AS SHOWN | **BID DRAWING** | REV. 0

NOTES:

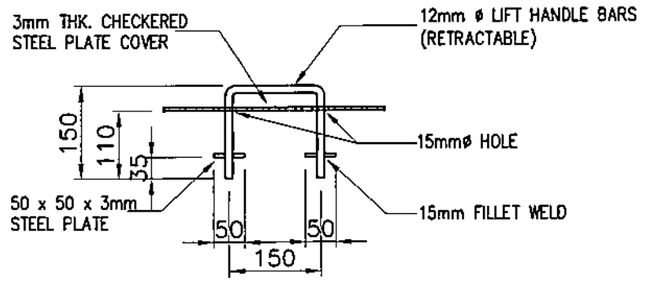
1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. MINIMUM COMPRESSIVE STRENGTH OF CONCRETE IS f'c = 20.70 MPa.
3. REINFORCING STEEL BARS SHALL CONFORM TO THE REQUIREMENTS OF THE PHILIPPINE NATIONAL STANDARD (LATEST EDITION) FOR DEFORMED BARS GRADE 275.
4. WORK THIS DRAWING WITH MECHANICAL DRAWINGS.



PLAN

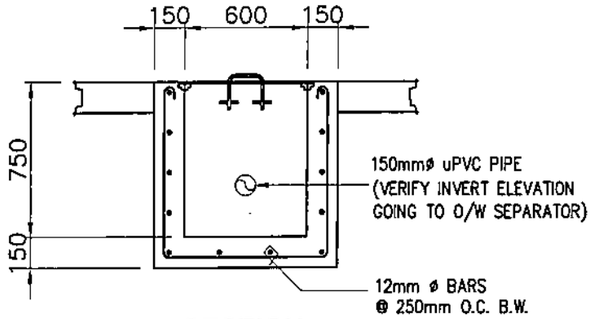


PLAN



HANDLE BAR DETAILS

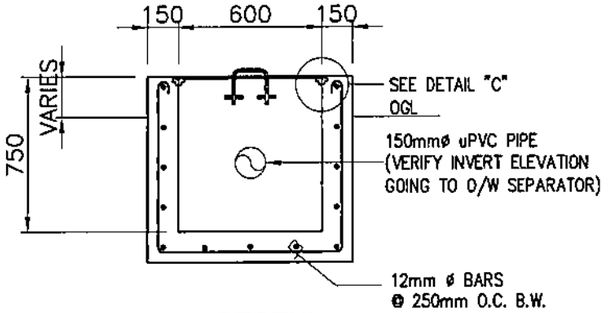
SCALE NTS



SECTION

DRAIN PIT

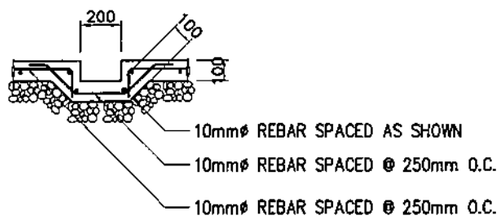
SCALE 1:30



SECTION

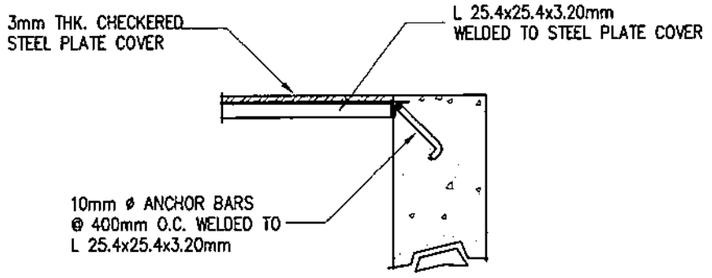
VALVE BOX

SCALE 1:30



DRAIN DITCH DETAILS

SCALE 1:30



DETAIL C

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

OWNER: NATIONAL POWER CORPORATION
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MASBATE

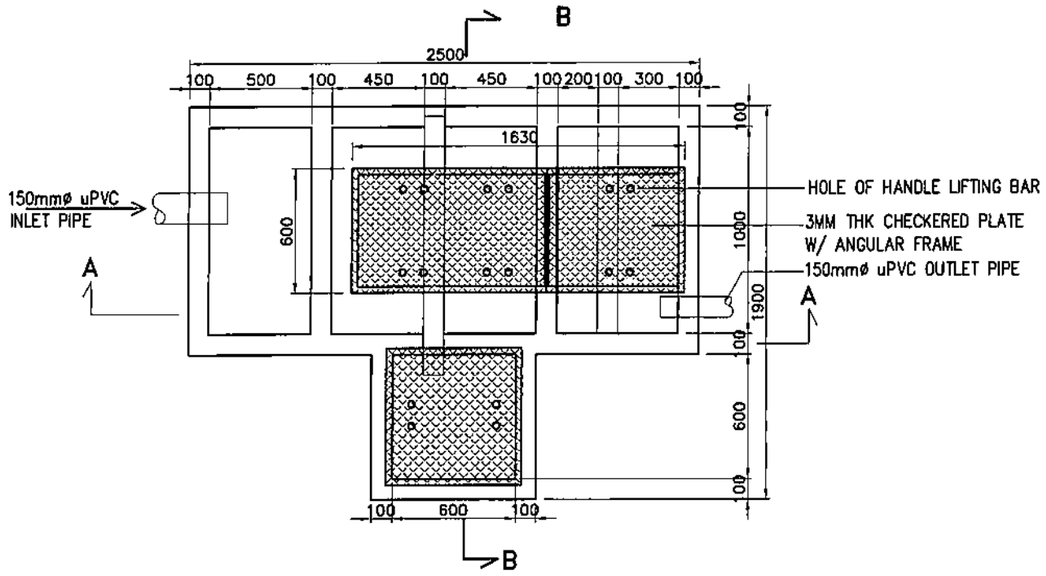
TITLE: DRAIN PIT AND VALVE BOX
(PLANS, SECTIONS & DETAILS)

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

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

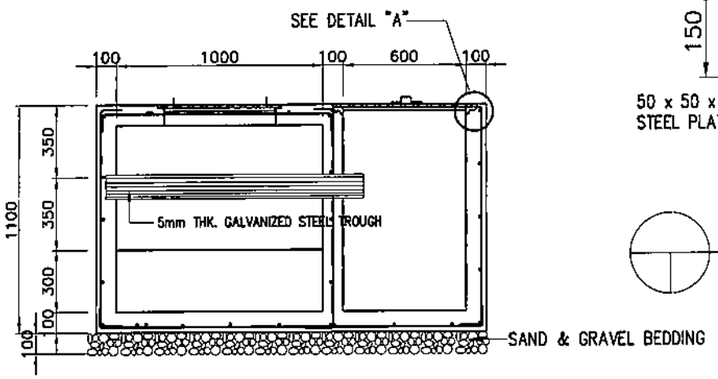
DWG. NO. CDPP-BDC-17.010 SPECS. NO. LuzP24Z1685Sc

SCALE: AS SHOWN BID DRAWING REV. 0



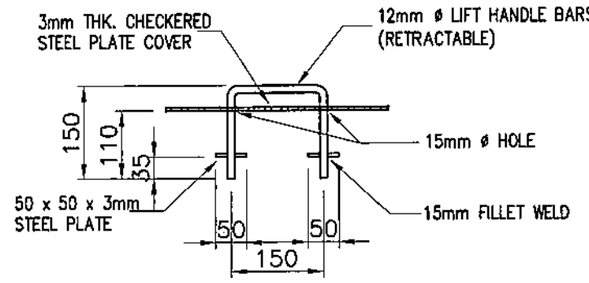
PLAN

SCALE 1:30



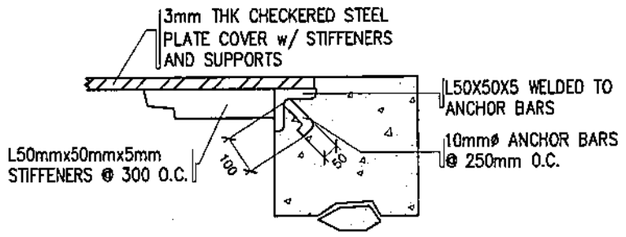
SECTION B-B

SCALE 1:30

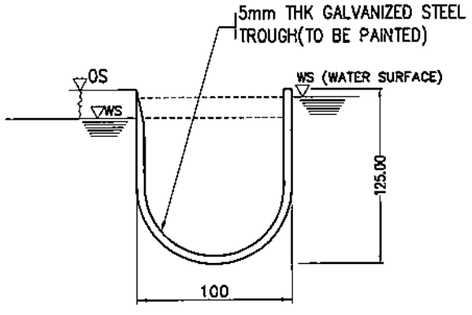


HANDLE BAR DETAILS

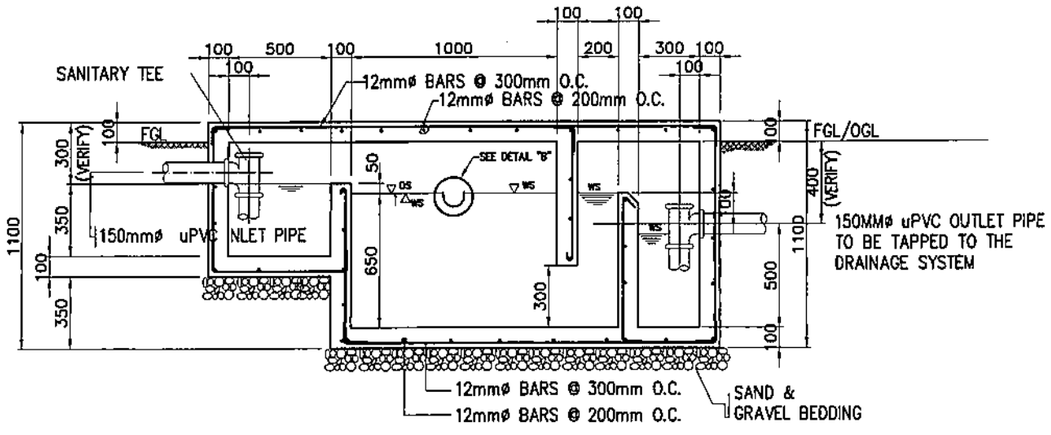
SCALE NTS



DETAIL 'A'



DETAIL 'B'



SECTION A-A

SCALE 1:30

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWSE INDICATED.
2. MINIMUM COMPRESSIVE STRENGTH OF CONCRETE SHALL BE f'c = 20.7 MPa AT 28 DAYS PERIOD.
3. ALL REINFORCING STEEL BARS SHALL CONFORM TO THE LATEST REQUIREMENTS OF PNS FOR DEFORMED STEEL LATEST PROVISIONS OF ACI-318 CODE.
4. ALL ASPECTS OF CONSTRUCTION AND DETAILING OF REINFORCEMENTS SHALL BE IN ACCORDANCE WITH THE LATEST PROVISIONS OF ACI-318 CODE.
5. BEFORE THE START OF THE CONSTRUCTION, VERIFY THE DRAINAGE STRUCTURES & ELEVATIONS CONNECTED TO THE OIL-WATER SEPARATOR.
6. AFTER THE COMPLETION OF THE CONSTRUCTION, THE OIL-WATER SEPARATOR MUST BE FILLED WITH WATER UP TO THE BOTTOM RIM OF THE STEEL TROUGH.

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MASBATE

TITLE: **OIL-WATER SEPATOR**
(PLANS, SECTIONS & DETAILS)

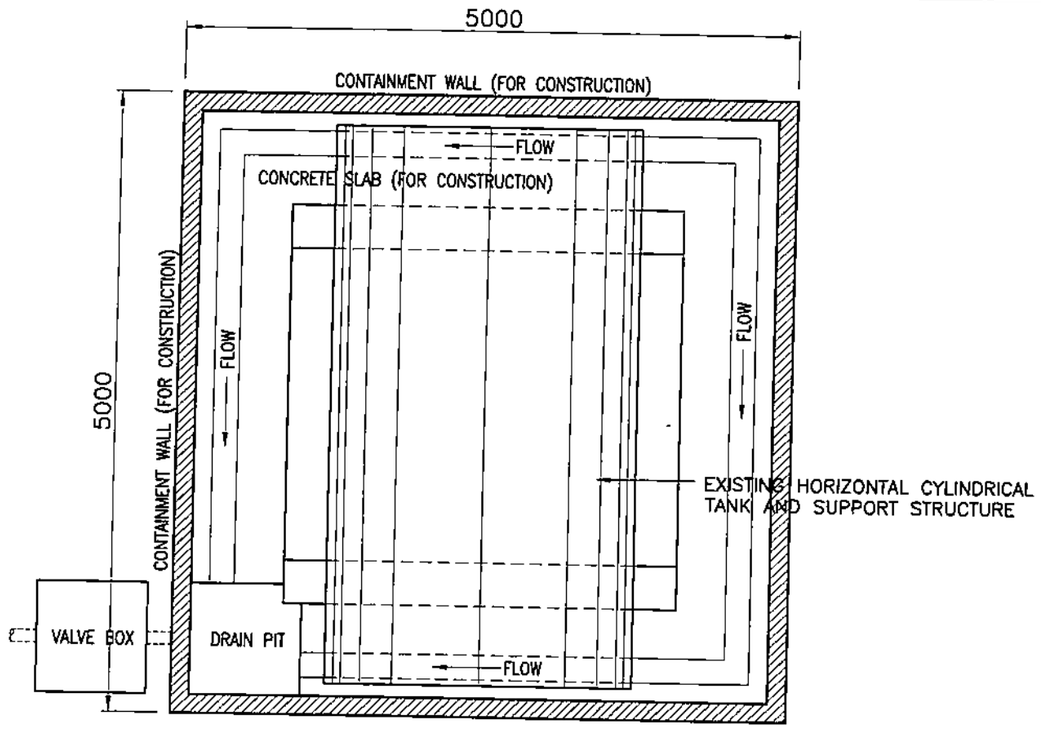
	BY	CHKD	DATE
DESIGNED			
DRAWN			
REVIEWED	PRINCIPAL ENGR. / ARCHT.		
CIVIL/ARCHT			
ELEC.			
MECH.			

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

DWG. NO. CDPP-BDC-17.011 SPECS. NO. LuzP24Z1685Sc

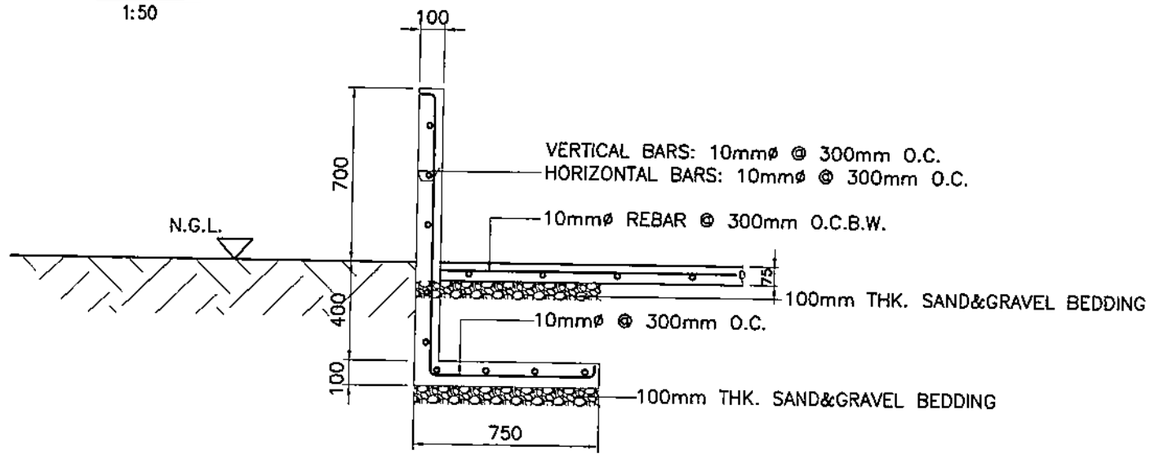
SCALE: AS SHOWN **BID DRAWING** REV. 0

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



CONTAINMENT WALL LAYOUT

SCALE 1:50



CONTAINMENT WALL DETAILS

SCALE 1:50

NOTES:

1. ALL DIMENSIONS & ELEVATIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
2. MINIMUM COMPRESSIVE STRENGTH OF CONCRETE SHALL BE f'c = 20.70 MPa AT 28 DAYS PERIOD.
3. ALL REINFORCING BARS SHALL CONFORM TO THE LATEST REQUIREMENTS OF PNS FOR DSB GRADE 275.
4. PROVIDE PVC WATERSTOP (6"x3/16" PLAIN DUMBBELL TYPE) AT CONSTRUCTION JOINT.
5. ALL ASPECTS OF CONSTRUCTION AND DETAILING OF REINFORCEMENTS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE ACI CODE.

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

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MASBATE

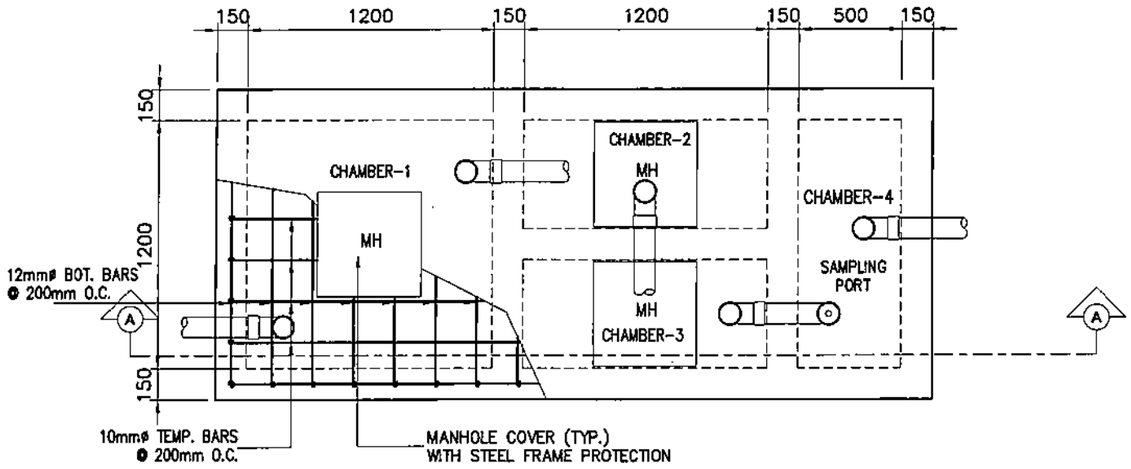
TITLE: **16KL EXISTING FUEL OIL STORAGE TANK (CONTAINMENT WALL)**

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

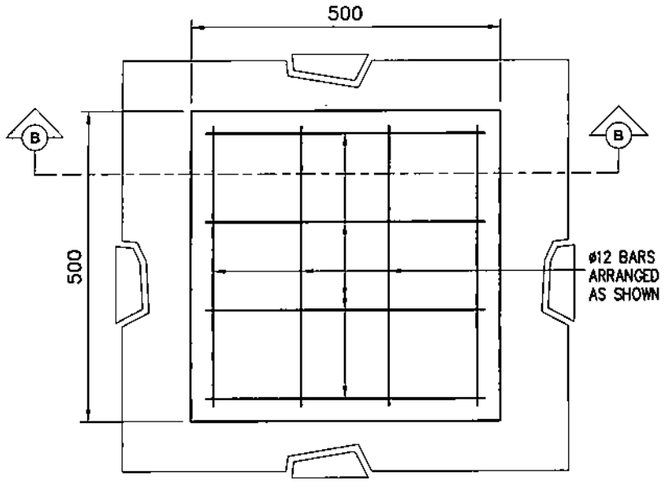
SUBMITTED: H. L. MENDOZA, Principal Engineer A, CEAD
RECOMMENDED: A. C. ESPIRITU, Manager, CEAD
APPROVED: G. B. MAGPOC, JR., Manager, DDO

DWG. NO. CDPP-BDC-17.012 SPECS. NO. LuzP24Z1685Sc

SCALE: AS SHOWN **BID DRAWING** REV. 0



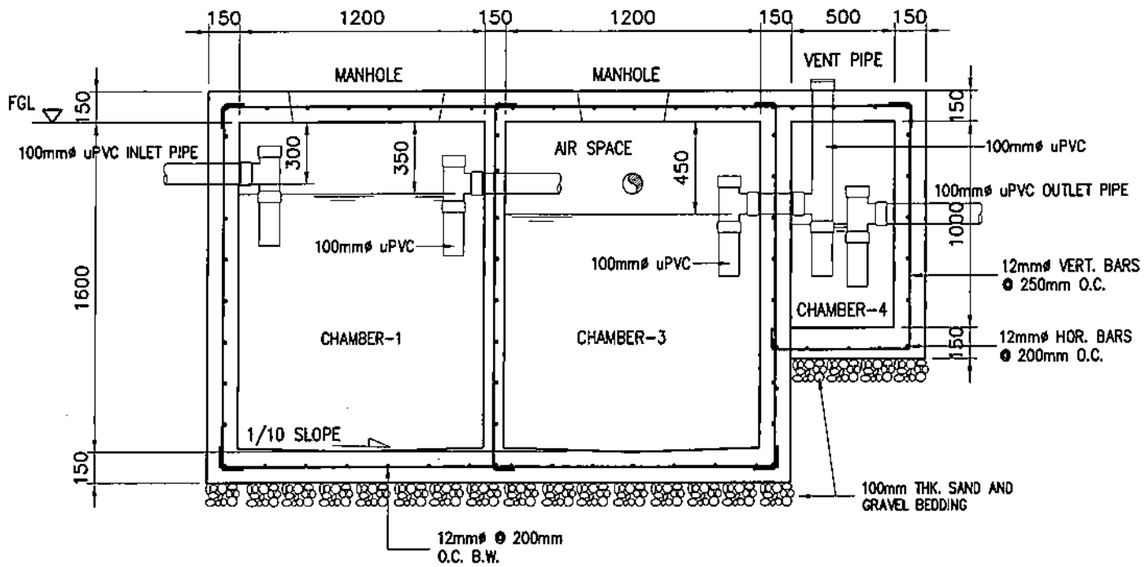
PLAN



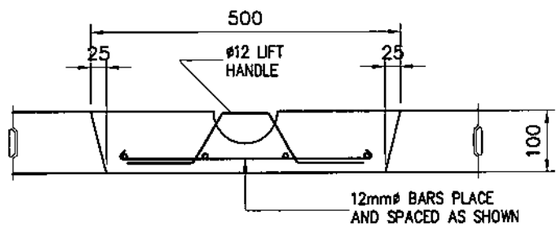
TYP. MANHOLE COVER

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
2. MINIMUM COMPRESSIVE STRENGTH OF CONCRETE SHALL BE 20.70 MPa FOR DRAINAGE APPURTENANT STRUCTURES.
3. ALL REINFORCING STEEL BARS SHALL CONFORM TO THE LATEST REQUIREMENTS OF PHILIPPINE NATIONAL STANDARD FOR DSB GRADE 275.
4. BEFORE INITIATING CONSTRUCTION, VERIFY THE LOCATION AND ELEVATION OF THE SEPTIC TANK, AS WELL AS THE LOCATION AND ELEVATION OF ITS TAPPING POINT, TO ENSURE PROPER FLOW.
5. WORK THIS DRAWING WITH THE MASTER PLAN, ELECTRICAL AND MECHANICAL DRAWINGS.



SECTION 'A'



SECTION 'B'

SEPTIC TANK

SCALE 1:30

REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPD.
1	07/23	*UPDATING OF BID DOCUMENTS AS REQUESTED BY END-USER*				

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MASBATE

TITLE: **SEPTIC TANK** (PLAN, SECTION & DETAILS)

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

SUBMITTED: H. L. MENDOZA, Principal Engineer A, CEAD
RECOMMENDED: A. C. ESPIRITU, Manager, CEAD
APPROVED: G. B. MAGPOC, JR., Manager, DDD

DWG. NO. CDPP-BDC-17.013 SPECS. NO. LuzP24Z1685Sc

SCALE: AS SHOWN **BID DRAWING** REV. 1

BID DRAWINGS

MECHANICAL DRAWINGS

SECTION IX - BID DRAWINGS

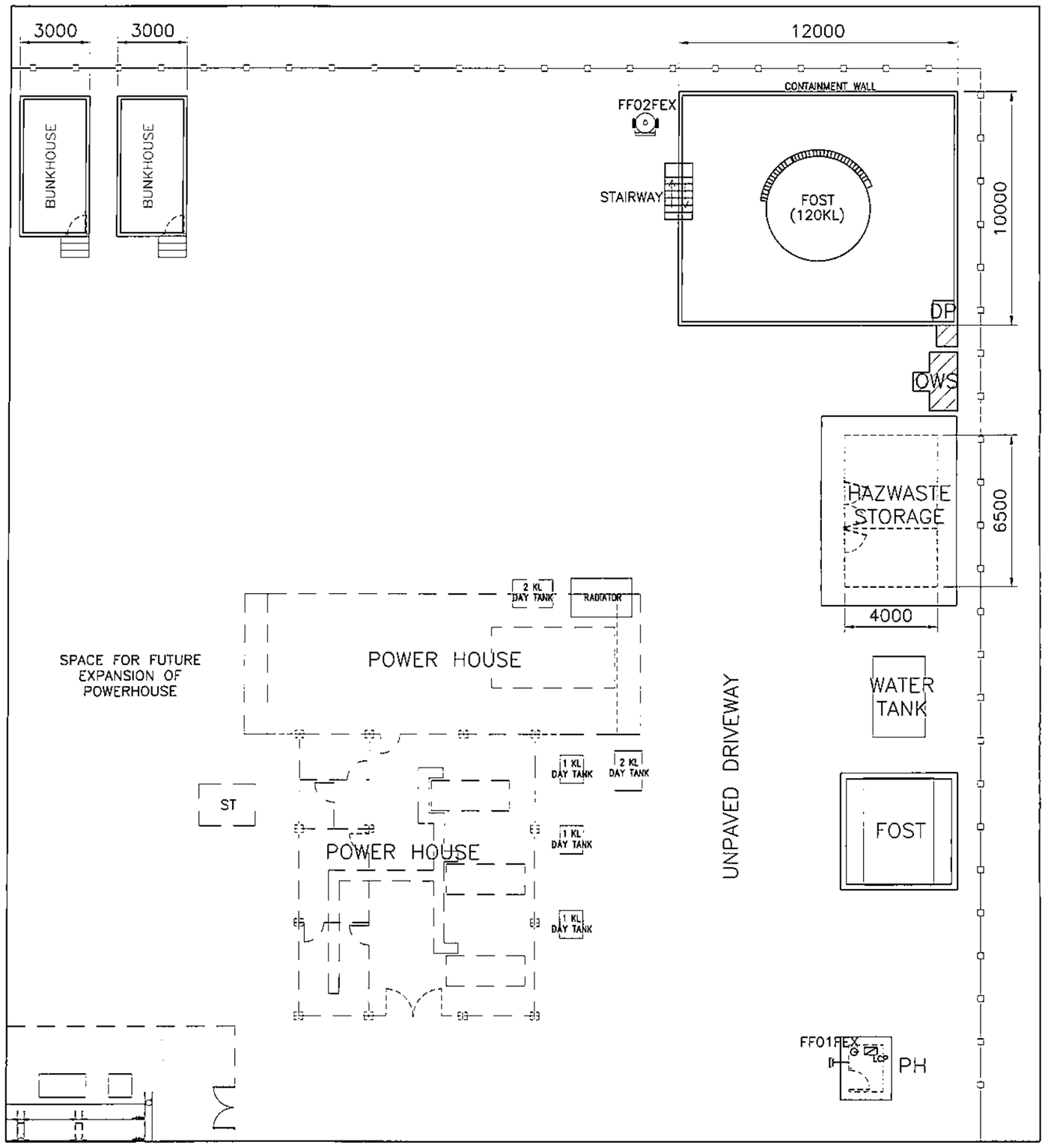
MW - MECHANICAL DRAWINGS

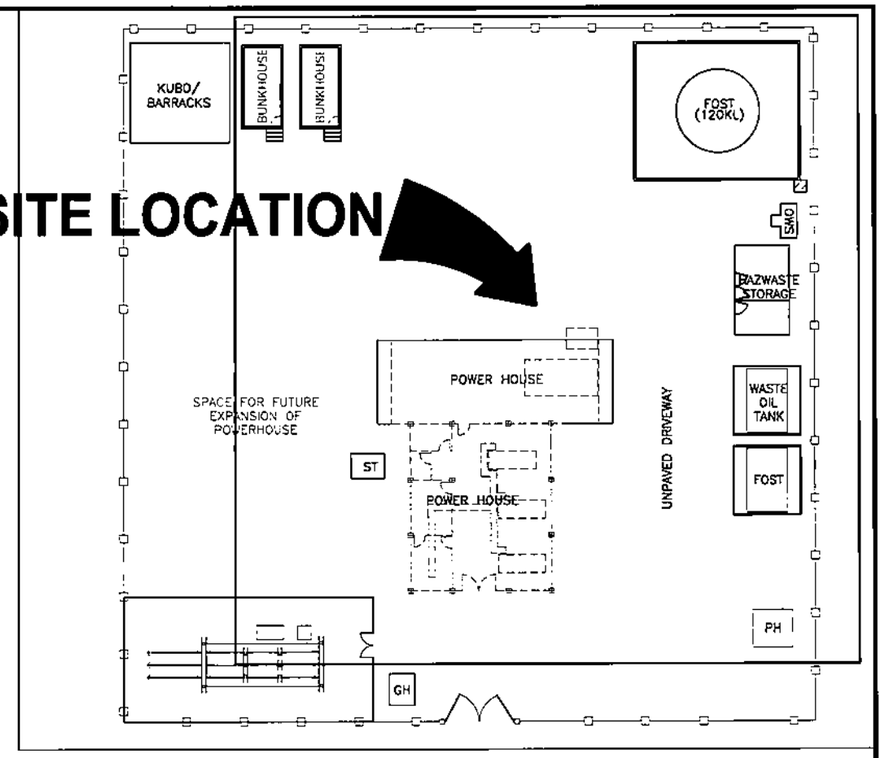
DRAWING NO.	TITLE
CDPP-BDM-17.001	PLANT LAYOUT
CDPP-BDM-17.002	DOMESTIC WATER SUPPLY PIPING LAYOUT
CDPP-BDM-17.003	FUEL OIL STORAGE AND PIPING LAYOUT
CDPP-BDM-17.004	FUEL OIL STORAGE AND PIPING LAYOUT (P & I Diagram)
CDPP-BDM-17.005	FUEL OIL STORAGE TANK (PLAN AND SECTION)
CDPP-BDM-17.006	PLATE ARRANGEMENT AND DETAILS
CDPP-BDM-17.007	TANK STAIR AND RAILING DETAILS
CDPP-BDM-17.008	NOZZLE DETAILS (SHEET 1 OF 2)
CDPP-BDM-17.009	NOZZLE ARRANGEMENT AND OTHER DETAILS (SHEET 2 OF 2)
CDPP-BDM-17.010	TANK NOZZLES AND PIPE
CDPP-BDM-17.011	HOLDING DOWN BOLTS DETAILS
CDPP-BDM-17.012	ROOF AND SHELL MANHOLE DETAILS
CDPP-BDM-17.013	LEVEL GAUGE INDICATOR DETAILS

SECTION IX - BID DRAWINGS

MW - MECHANICAL DRAWINGS

DRAWING NO.	TITLE
CDPP-BDM-17.014	RAFTER DETAILS





NOTES:

1. THIS DRAWING IS FOR BIDDING PURPOSES ONLY.
2. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
3. THE DIMENSION SHOWN MAY BE ADJUSTED BASED ON THE ACTUAL DIMENSION OF THE FACILITIES/EQUIPMENT TO BE SUPPLIED BY THE CONTRACTOR.
4. WORK THIS DRAWING WITH RELEVANT CIVIL AND ELECTRICAL DRAWINGS.

LEGEND:

DP — DRAIN PIT
FOST — FUEL OIL STORAGE TANK
OWS — OIL–WATER SEPARATOR
PH — PUMPHOUSE
VB — VALVE BOX

— PROPOSED FACILITIES/STRUCTURES
— EXISTING FACILITIES

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MABATE

TITLE: **PLANT LAYOUT**

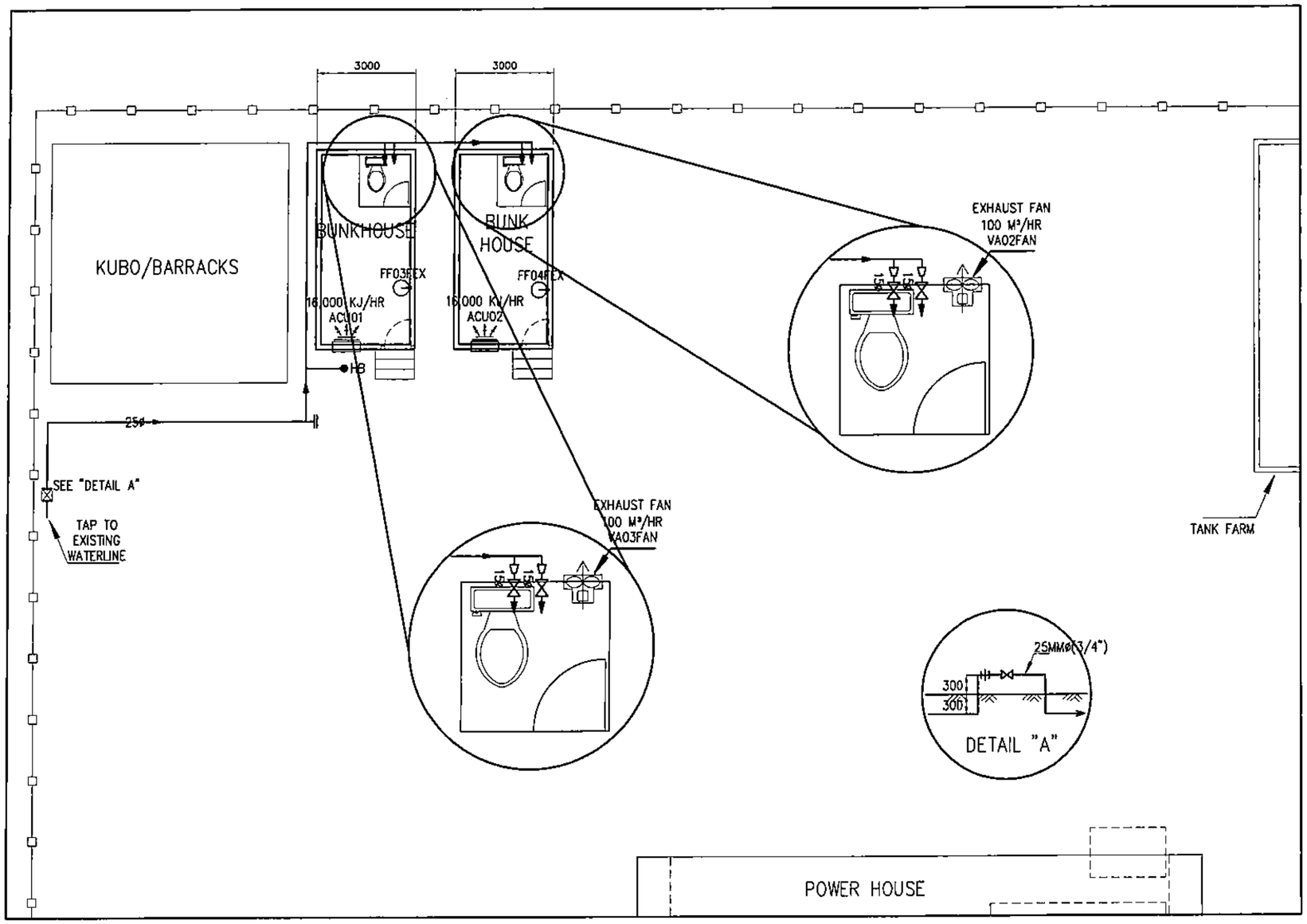
	BY	CHKD	DATE
DESIGNED			
DRAWN	JTC		
REVIEWED	PRINCIPAL ENG'R. / ARCH'T.		
CIVIL/ARCH'T			
ELEC.			
MECH.		JTC	

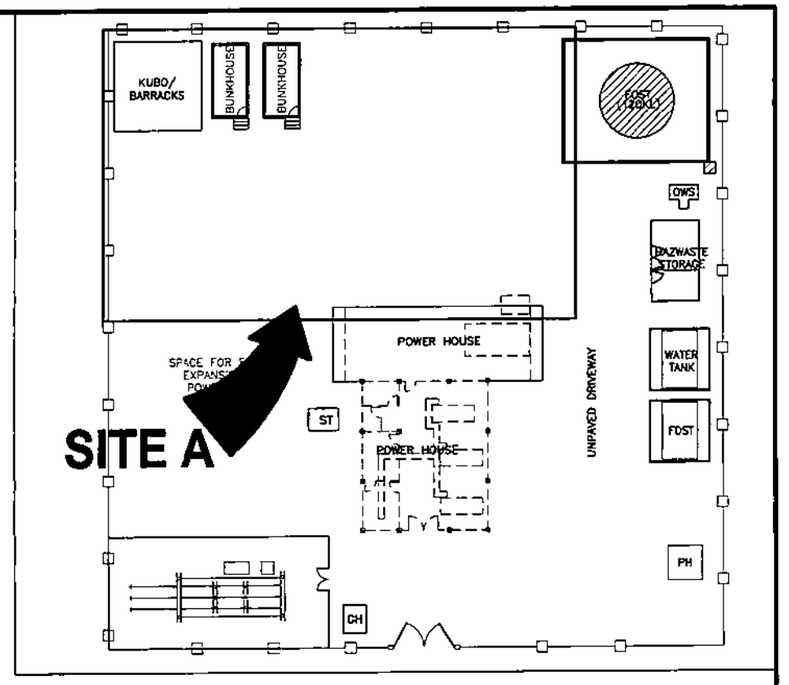
SUBMITTED: N. G. ESPAYOS, Principal Engineer A, MED
RECOMMENDED: J. A. TAPEL, JR., Manager, MED
APPROVED: G. B. MAGPOC, JR., Manager, DDO

DWG. NO. CDPP-BDM-17.001 | SPECS. NO. LuzP24Z1685Sc

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

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





NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. ALL PIPING, PIPE FITTINGS AND SUPPORTS, VALVES AND OTHER ACCESSORIES REQUIRED SHALL BE SUPPLIED, INSTALLED AND TESTED BY THE CONTRACTOR INCLUDING THE REQUIRED EXCAVATION AND BACKFILLING WORKS.
3. DOMESTIC WATER PIPING AND FITTINGS SHALL BE MADE OF UNPLASTICIZED POLYVINLY CHLORIDE(uPVC) SCHEDULE 80 OR CLASS 150 CONFORMING TO ASTM D-1784 OR APPROVED EQUIVALENT (EXCEPT OTHERWISE SHOWN).
4. WATER SYSTEM PIPE SHALL GENERALLY BE INSTALLED UNDERGROUND NO LESS THAN 300MM DEPTH.
5. ALL uPVC/PE PIPE DIMENSIONS SHOWN ARE IN NOMINAL DIAMETER (MM) WITH THE FOLLOWING EQUIVALENTS:
   - 25MM (1") = 32MM O.D.
   - 20MM (3/4") = 25MM O.D.
   - 15MM (1/2") = 20MM O.D.
6. THIS DRAWING IS FOR BIDDING PURPOSES ONLY.

- HOSE BIBB
- REDUCER
- GATE VALVE
- PORTABLE FIRE EXTINGUISHER (HCFC OR HALOTRON I)
- FF02FEX – WHEELED FIRE EXTINGUISHER (AFFF/F3)
- AIRCONDITIONING UNIT
- WALL MOUNTED EXHAUST FAN

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

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MABATE

TITLE: **DOMESTIC WATER SUPPLY PIPING LAYOUT**

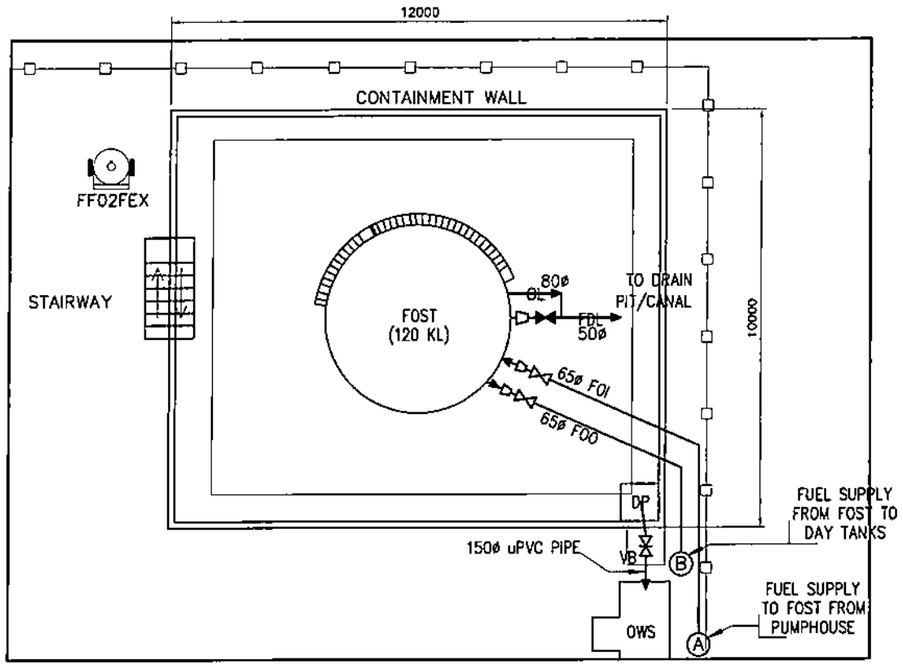
	BY	CHKD	DATE
DESIGNED			
DRAWN	JTC		
REVIEWED	PRINCIPAL ENG'R. / ARCH'T.		
CIVIL/ARCH'T			
ELEC.			
MECH.		JTC	

SUBMITTED: N. G. ESPAYOS, Principal Engineer A, MED
RECOMMENDED: J. A. PAPEL, JR., Manager, MED
APPROVED: G. B. MAGPOC, JR., Manager, DDD

DWG. NO. CDPP-BDM-17.002 | SPECS. NO. LuzP24Z1685Sc

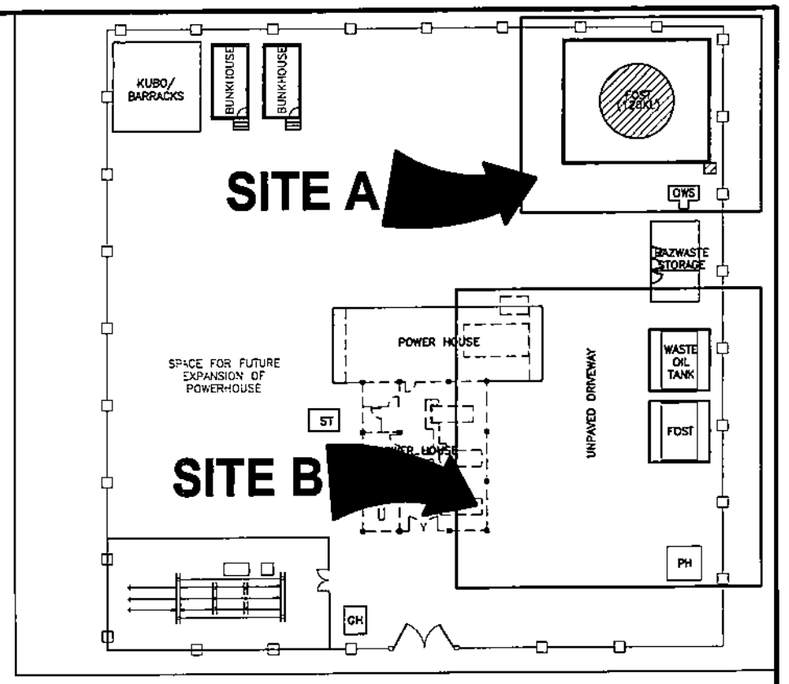
SCALE: 1:150 | **BID DRAWING** | REV. 0

SITE A

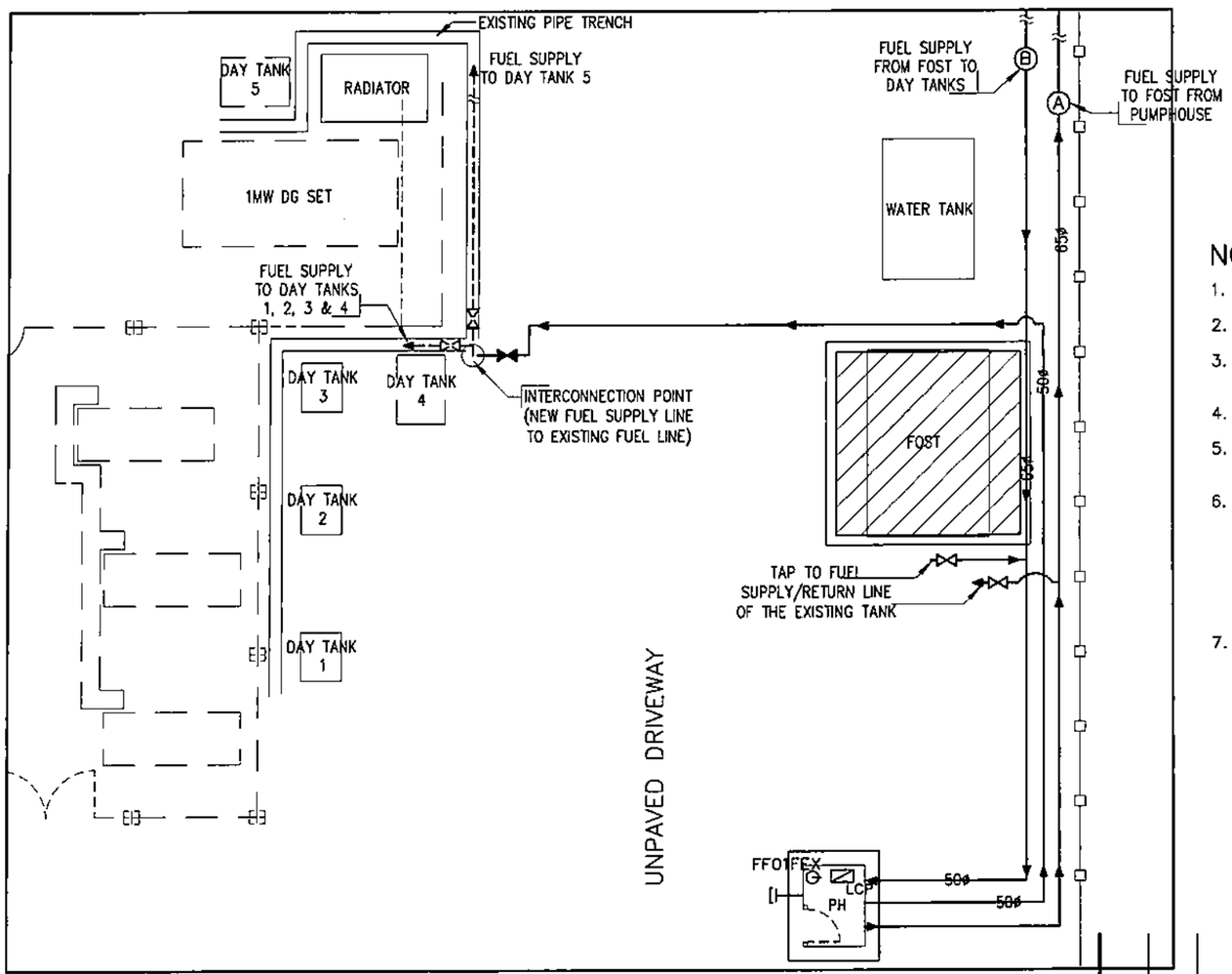


LEGEND:

- ⋈ – GATE VALVE (NORMALLY OPEN)
- ⋈ – GATE VALVE (NORMALLY CLOSED)
- ▷ – REDUCER
- ◎ – WHEELED-TYPE FIRE EXTINGUISHER
- ⊖ – PORTABLE FIRE EXTINGUISHER
- FOST – FUEL OIL STORAGE TANK
- FDL – FUEL DRAIN LINE
- FOI – FUEL OIL INLET
- FOO – FUEL OIL OUTLET
- DP – DRAIN PIT
- VB – VALVE BOX
- OWS – OIL-WATER SEPARATOR
- PH – PUMPHOUSE
- OL – OVERFLOW LINE
- ▭ – PROPOSED FACILITIES/STRUCTURES
- ▭ – EXISTING FACILITIES/STRUCTURES
- FF02FEX – WHEELED TYPE FIRE EXTINGUISHER
- ----- – EXISTING FUEL LINE



SITE B



NOTES:

1. THIS DRAWING IS FOR REFERENCE PURPOSES ONLY.
2. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
3. ALL EQUIPMENT SHOWN IN THIS DRAWING SHALL BE SUPPLIED CONSTRUCTED, TESTED AND COMMISSIONED BY THE CONTRACTOR.
4. EQUIPMENT AND PIPING ARRANGEMENT MAY BE ADJUSTED TO SUIT ACTUAL SITE CONDITIONS.
5. REFER TO CIVIL DRAWINGS FOR THE DETAILS OF CIVIL STRUCTURES FACILITIES INCLUDING EQUIPMENT FOUNDATION AND TRENCH.
6. FUEL PIPE SHALL BE GENERALLY INSTALLED ABOVEGROUND. WHERE INSTALLATION IS REQUIRED UNDERGROUND, MINIMUM DEPTH OF EMBEDDED PIPES SHALL BE NOT LESS THAN 300MM IN OPEN GROUNDS AND 400MM UNDER ROADWAYS. FOR PIPES THAT CROSSES ROADWAY, PIPE SLEEVE OF STEEL MATERIALS OR RSC SHALL BE PROVIDED.
7. LOCAL PANEL SHALL BE PROVIDED AT THE PUMPHOUSE AND CONTROL ROOM/POWERHOUSE (SEE ELECTRICAL DRAWINGS). EACH LOCAL PANEL SHALL BE PROVIDED WITH START AND STOP PUSH BUTTONS WITH RESPECTIVE STATUS INDICATING LIGHTS.

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

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MABATE

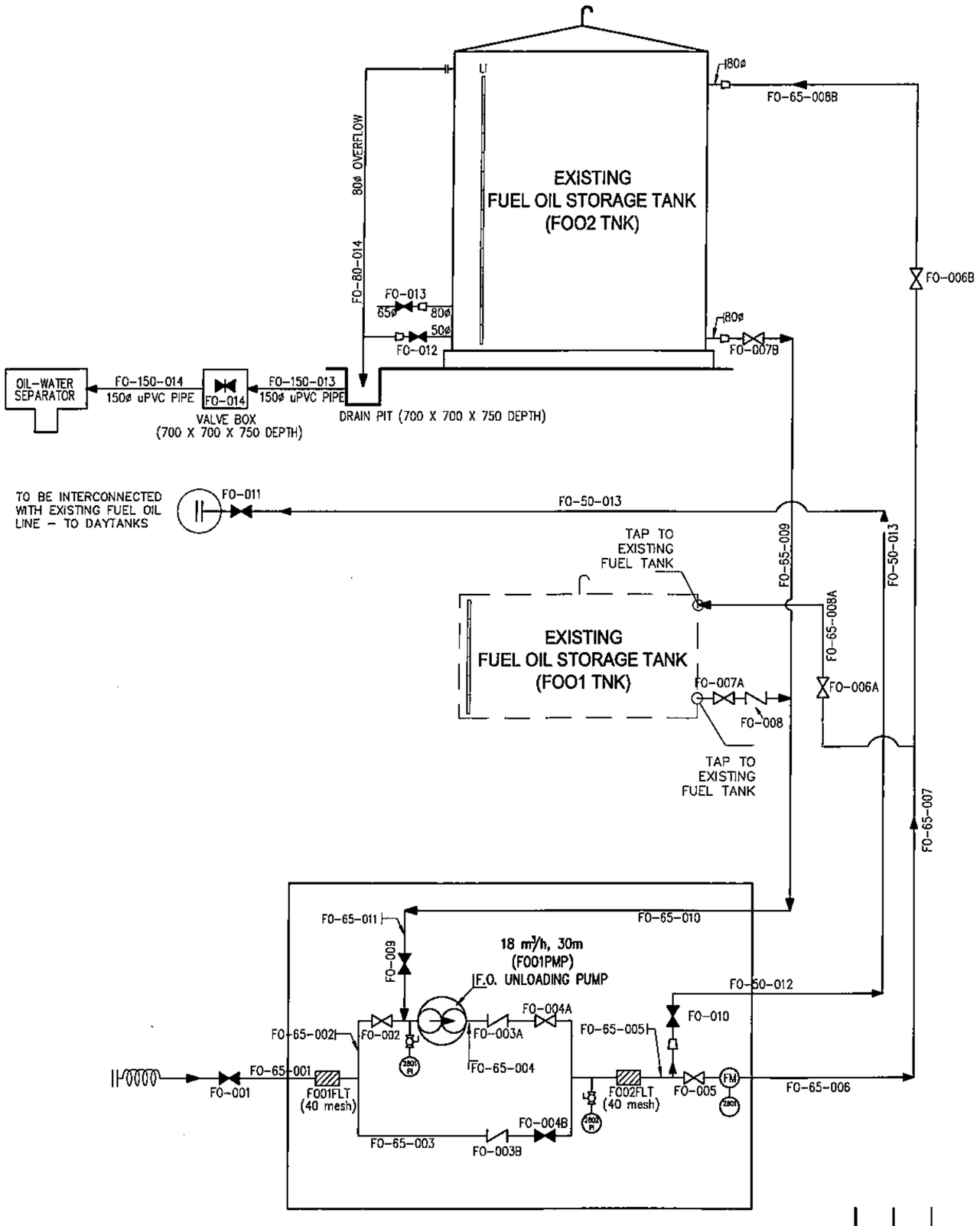
TITLE: **FUEL OIL STORAGE AND PIPING LAYOUT**

	BY	CHKD	DATE
DESIGNED			
DRAWN	JTC		
REVIEWED	PRINCIPAL ENG'R. / ARCH'T.		
CIVIL/ARCH'T			
ELEC.			
MECH.		JTC	

SUBMITTED: N/G. ESPAYOS, Principal Engineer A, MED
RECOMMENDED: J. A. TAREL, JR., Manager, MED
APPROVED: G. B. MAGPOC, JR., Manager, DOO

DWG. NO. CDPP-BDM-17.003 | SPECS. NO. LuzP24Z1685Sc

SCALE: 1:150 | BID DRAWING | REV. 0



NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. ALL PIPING, PIPE SUPPORTS AND FITTINGS, VALVES AND ACCESSORIES SHALL BE SUPPLIED, INSTALLED AND TESTED BY THE CONTRACTOR. PIPES ARE GENERALLY INSTALLED ABOVE GROUND UNLESS OTHERWISE SHOWN ON THE DRAWING. PIPES TO BE INSTALLED UNDERGROUND SHALL BE NOT LESS THAN 300 MM DEPTH.
3. FUEL OIL PIPES SHALL CONFORM TO ASTM A53 GR. B, SEAMLESS AND SCHEDULE 40. MATERIALS FOR VALVES 65MMø AND ABOVE SHALL BE CAST IRON AND CAST BRONZE FOR 50MMø AND BELOW.
4. REFER TO CIVIL DRAWINGS FOR THE DETAILED DRAWINGS OF TANK FOUNDATION/BUND WALL, DRAIN PIT AND VALVE BOX.
5. VALVE INSIDE DRAIN VALVE BOX SHALL BE PROPERLY SUPPORTED.
6. DRAIN PIPE FROM DRAIN PIT UP TO THE EXISTING DRAINAGE SYSTEM SHALL BE MADE OF uPVC, SCHEDULE 80 OR CLASS 150 CONFORMING TO ASTM D-1784 OR APPROVED EQUIVALENT.
7. F.O. STEEL PIPES WHICH ARE BURIED UNDERGROUND SHALL BE APPLIED WITH 6MM THICKNESS OF ASPHALT JUTE OR APPROVED EQUIVALENT. PRIOR TO APPLICATION OF ASPHALT JUTE, EXTERNAL SURFACES SHALL BE PRIMED WITH 2 COATS OF COAL TAR EPOXY POLYAMIDE OF 170 MICRONS DFT EACH COAT.
8. THE CONTRACTOR SHALL SUPPLY FLEXIBLE HOSE NOT LESS THAN 50MMø AND 3 METERS LONG FITTED WITH STEEL PIPE NOT LESS THAN 50MMø FOR HANDLING FUEL OIL FROM A 210L DRUM AND FLANGE CONNECTION AT F.O. TRANSFER PUMP SUCTION AT FUEL OIL AND DISCHARGE AREA. THE FLEXIBLE HOSE SHALL BE MADE OF SYNTHETIC RUBBER TUBE REINFORCED WITH SPIRAL-PLIED SYNTHETIC FABRIC WITH WIRE HELIX.

LEGEND:

- ⋈ – GATE VALVE (NORMALLY OPEN)
- ⋈ – GATE VALVE (NORMALLY CLOSED)
- – CHECK VALVE
- – BUTTERFLY VALVE
- – REDUCER
- – FUEL FILTER
- – FLANGE
- – EXISTING TANK
- FI – FLOW INDICATOR
- FM – FLOW METER
- PI – PRESSURE GAUGE
- – FLEXIBLE HOSE

PIPE DESIGNATION LEGEND:

FO-20-008
- FO – SYSTEM (FUEL OIL)
- 20 – NOMINAL PIPE SIZE (DIA.)
- 008 – SEQUENCE NO.

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MABATE

TITLE: **FUEL OIL STORAGE AND PIPING LAYOUT (P & i DIAGRAM)**

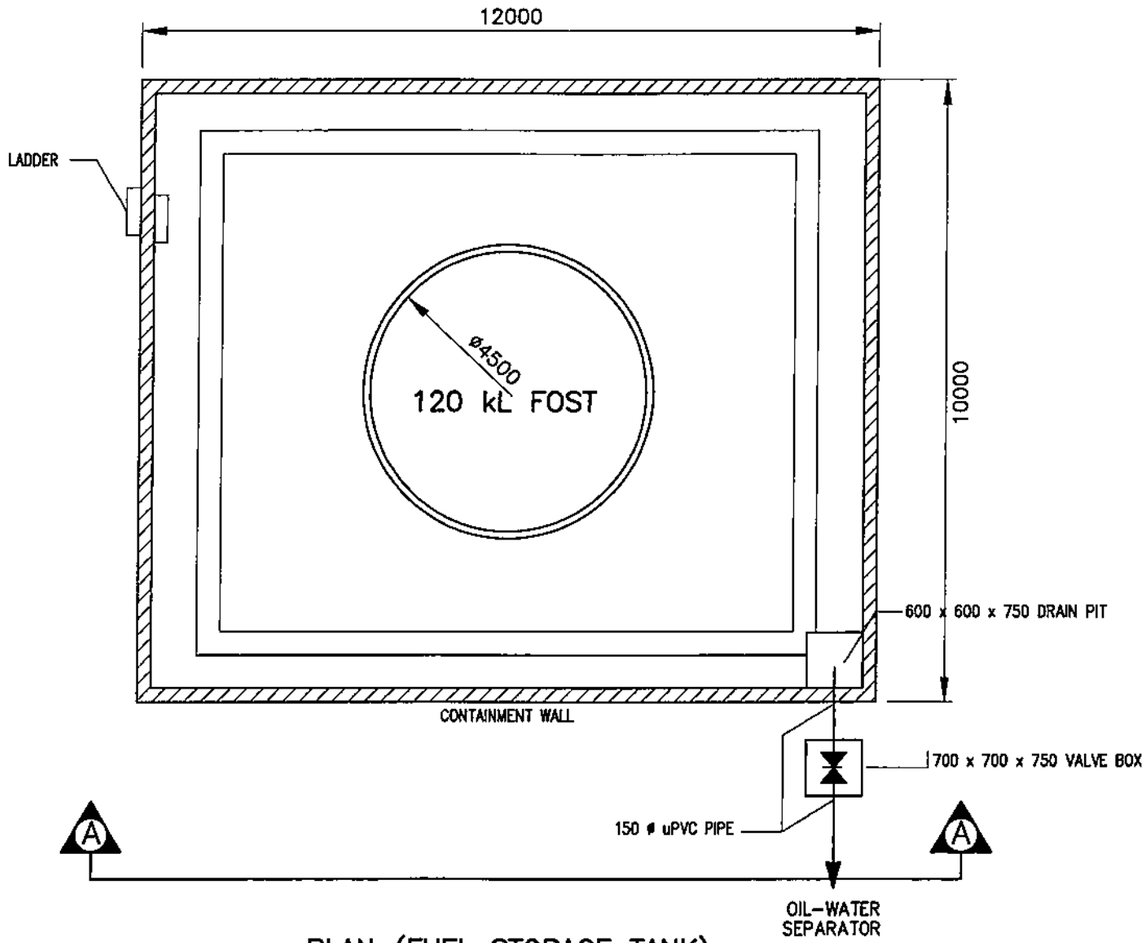
	BY	CHKD	DATE
DESIGNED			
DRAWN	JTC		
REVIEWED	PRINCIPAL ENG'R. / ARCH'T.		
CIVIL/ARCH'T			
ELEC.			
MECH.		JTC	

SUBMITTED: N. G. ESPAYOS, Principal Engineer A, MED
RECOMMENDED: J. A. TAPEL, JR., Manager, MED
APPROVED: G. B. MAGPOC, JR., Manager, DDO

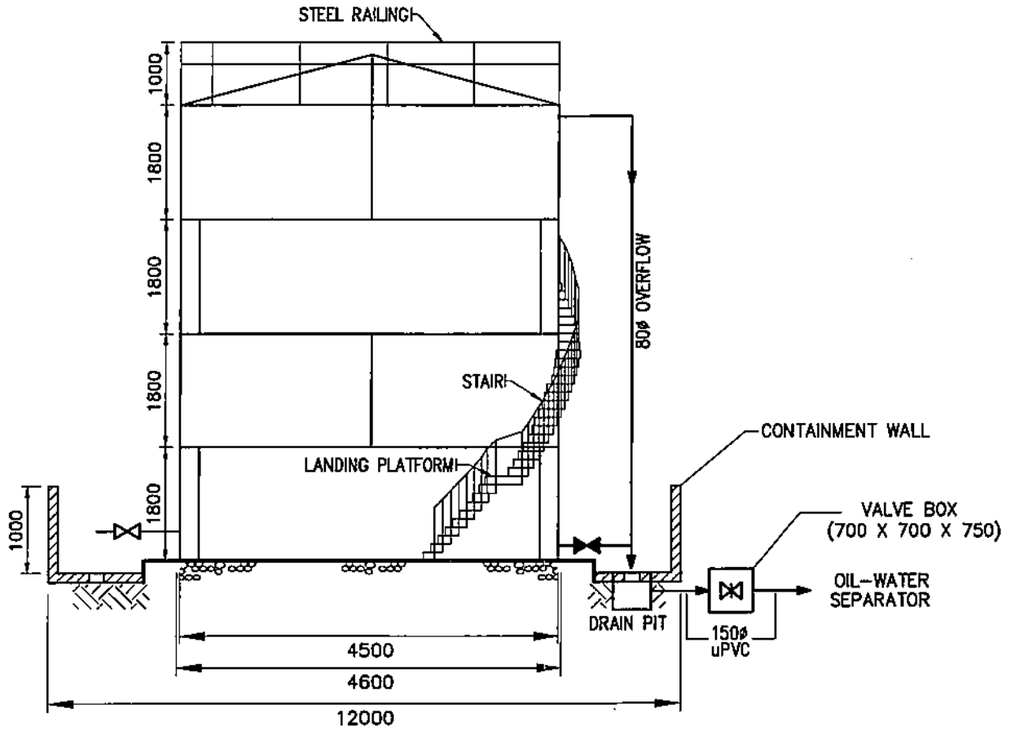
DWG. NO. CDPP-BDM-17.004 | SPECS. NO. LuzP24Z1685Sc

SCALE: NTS | **BID DRAWING** | REV. 0

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



PLAN (FUEL STORAGE TANK)



SECTION A

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. REFER TO CIVIL DRAWINGS FOR THE DETAILS OF TANK FOUNDATION, CONTAINMENT WALL, DRAIN PIT/DITCH, VALVE BOX, OIL–WATER SEPARATOR AND CONTAINMENT ACCESS LADDER.
3. REFER TO DRAWING NOS. CDPP–BDM–17–005 TO 014 FOR DETAILS OF TANK APPURTENANCES.

LEGEND:

⋈ – GATE VALVE (NORMALLY OPEN)
⧓ – GATE VALVE (NORMALLY CLOSED)
⋈ – BUTTERFLY VALVE

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

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MABATE

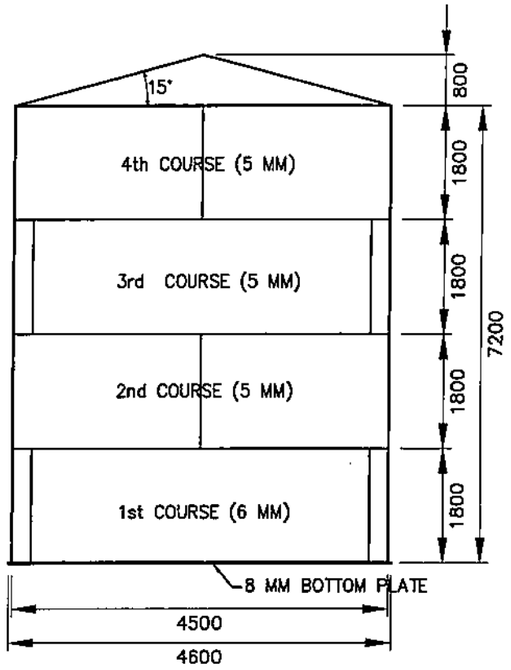
TITLE: **FUEL OIL STORAGE TANK (PLAN AND SECTION)**

	BY	CHKD	DATE
DESIGNED			
DRAWN	JTC		
REVIEWED	PRINCIPAL ENG'R. / ARCH'T.		
CIVIL/ARCH'T			
ELEC.			
MECH.		JTC	

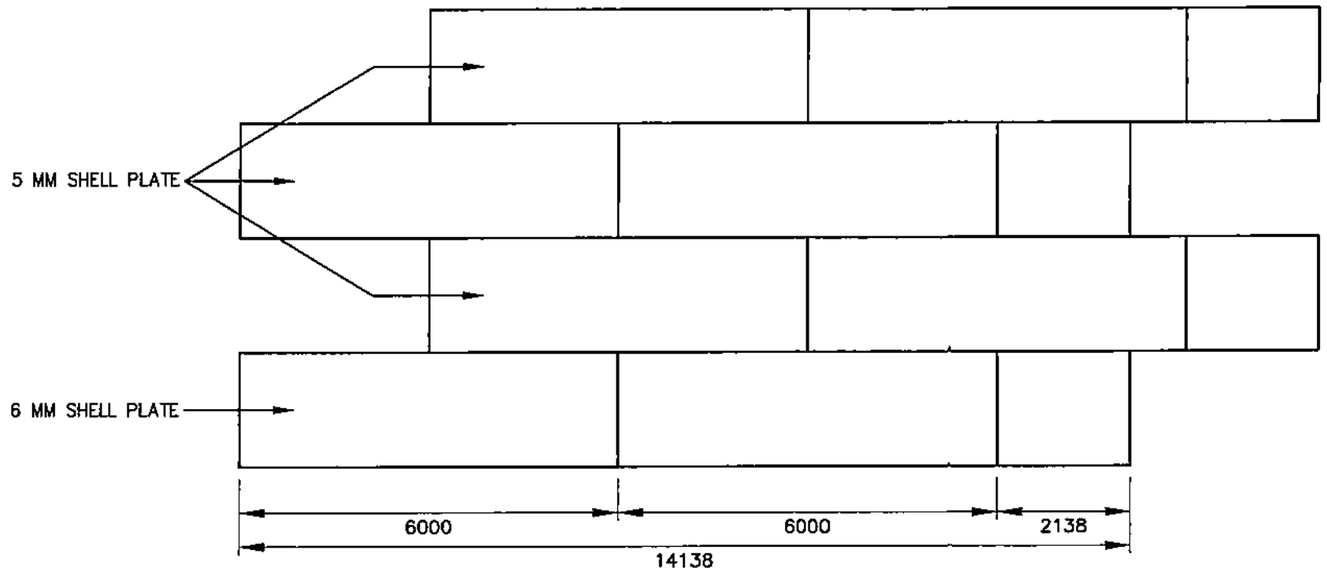
SUBMITTED: N. G. ESPAYOS, Principal Engineer A, MED
RECOMMENDED: J. A. TAPEL, JR., Manager, MED
APPROVED: G. B. MAGPOC, JR., Manager, DDD

DWG. NO. CDPP-BDM-17.005 | SPECS. NO. LuzP24Z1685Sc

SCALE: NTS | **BID DRAWING** | REV. 0



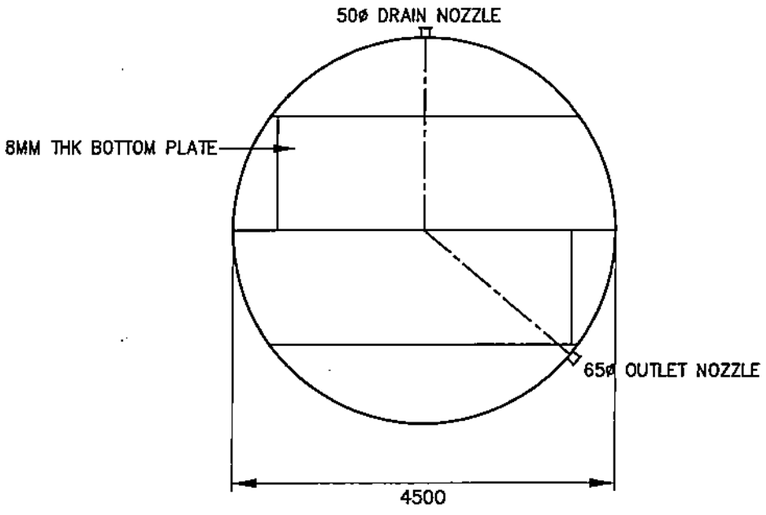
SIDE ELEVATION



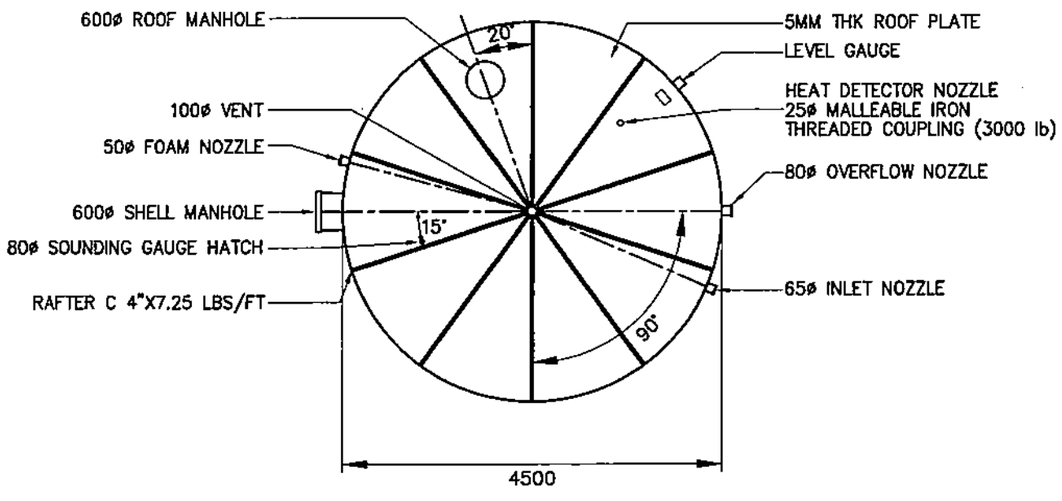
SHELL PLATE ARRANGEMENT

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. FUEL OIL STORAGE TANK SHALL BE CONSTRUCTED TO CONFORM WITH THE LATEST EDITION OF THE AMERICAN PETROLEUM INSTITUTE (API) 650 AND THE MINIMUM REQUIREMENTS SHOWN ON THIS DRAWING AND AS SPECIFIED IN THE TECHNICAL SPECIFICATIONS.
3. DETAILED DRAWINGS IF NECESSARY SHALL BE SUBMITTED BY THE CONTRACTOR FOR NPC REVIEW AND APPROVAL.
4. PLATES SHALL BE SHAPED TO SUIT THE CURVATURE OF THE TANK AND EDGES BE SHEARED, MACHINED OR CHIPPED AT SHOP AND SHALL BE MARKED BEFORE SHIPMENT TO SITE.
5. NOZZLES FOR HEAT DETECTOR AND FOAM NOZZLE SHALL BE SUPPLIED WITH THREADED CAP AND BLIND FLANGE, RESPECTIVELY.
6. ALL WELDING WORKS SHALL CONFORM TO THE REQUIREMENTS OF THE SPECIFICATION AND API 650.



BOTTOM PLATE ARRANGEMENT



ROOF PLATE ARRANGEMENT
& NOZZLE ORIENTATION

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

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MABATE

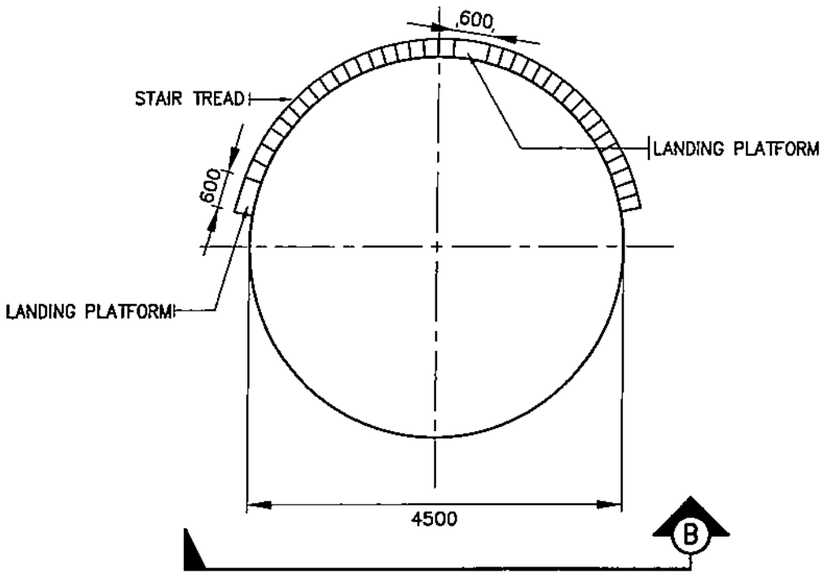
TITLE: **PLATE ARRANGEMENT AND DETAILS**

	BY	CHKD	DATE
DESIGNED			
DRAWN	JTC		
REVIEWED	PRINCIPAL ENG'R. / ARCH'T.		
CIVIL/ARCH'T			
ELEC.			
MECH.		JTC	

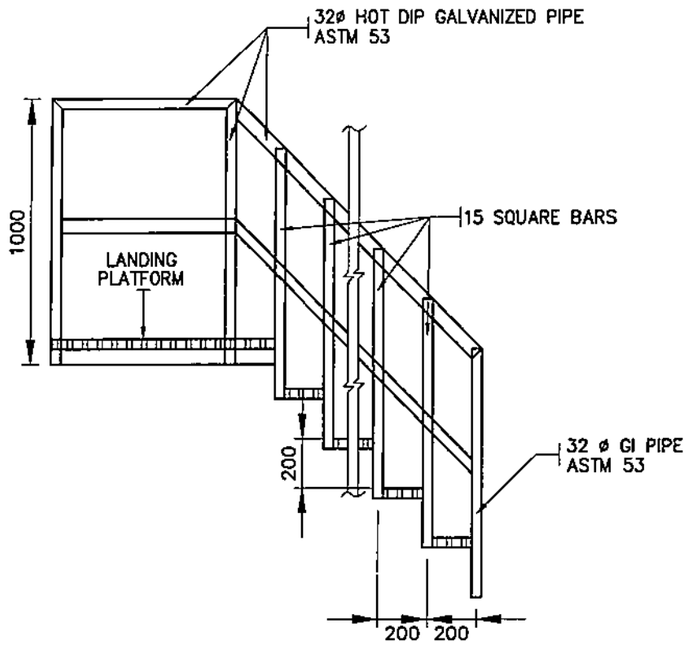
SUBMITTED: N. G. ESRAYOS, Principal Engineer A, MED
RECOMMENDED: J. A. TAPEL, JR., Manager, MED
APPROVED: G. B. MAGPOC, JR., Manager, DDD

DWG. NO. CDPP-BDM-17.006 | SPECS. NO. LuzP24Z1685Sc

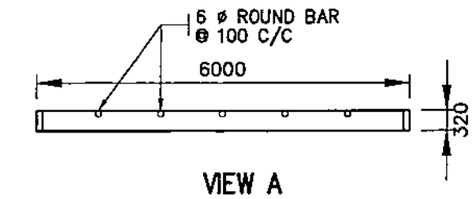
SCALE: NTS | **BID DRAWING** | REV. 0



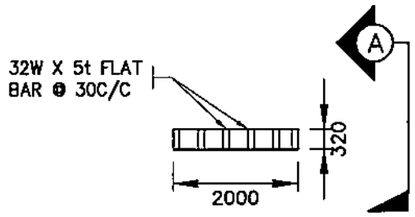
STAIR LAYOUT



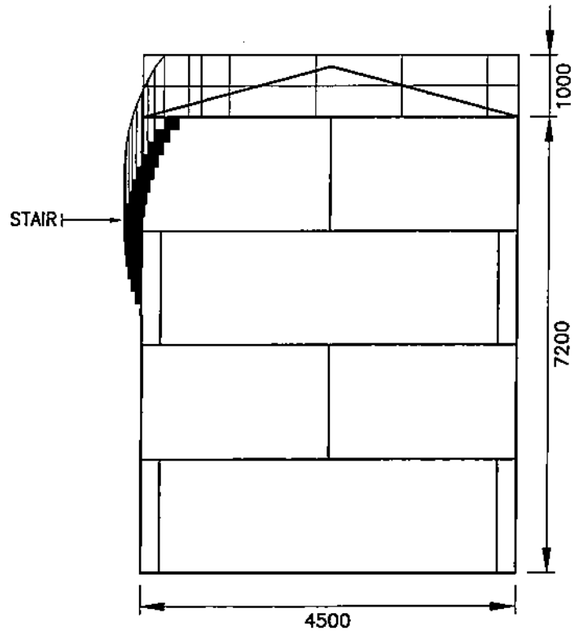
STAIRWAY W/LANDING PLATFORM (TYPICAL)



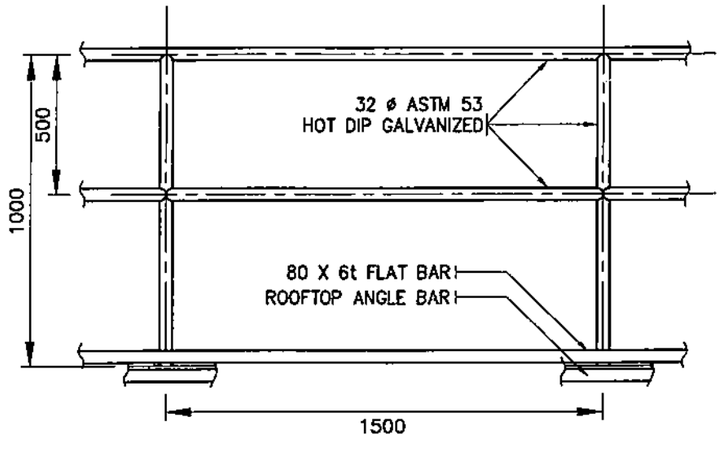
VIEW A



STAIR TREAD



VIEW B



TYPICAL ROOF HANDRAIL

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. FUEL OIL STORAGE TANK SHALL BE CONSTRUCTED TO CONFORM WITH THE LATEST EDITION OF THE AMERICAN PETROLEUM INSTITUTE (API) 650 AND THE MINIMUM REQUIREMENTS SHOWN ON THIS DRAWING AND AS SPECIFIED IN THE TECHNICAL SPECIFICATIONS.
3. DETAILED DRAWINGS IF NECESSARY SHALL BE SUBMITTED BY THE CONTRACTOR FOR NPC REVIEW AND APPROVAL.
4. ALL STAIR THREADS, HANDRAILING, POST (PIPE AND BARS), MID-RAILS AND TOEBOARDS SHALL BE HOT DIP GALVANIZED.
5. NOZZLE SIZES FOR HEAT DETECTOR, FOAM NOZZLE AND LEVEL GAUGE HATCH SHALL BE SUPPLIED WITH PLUGS/BLIND FLANGES.
6. NOZZLES FOR TANK SHALL BE INSTALLED BASED ON THE TANK ORIENTATION.

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

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MABATE

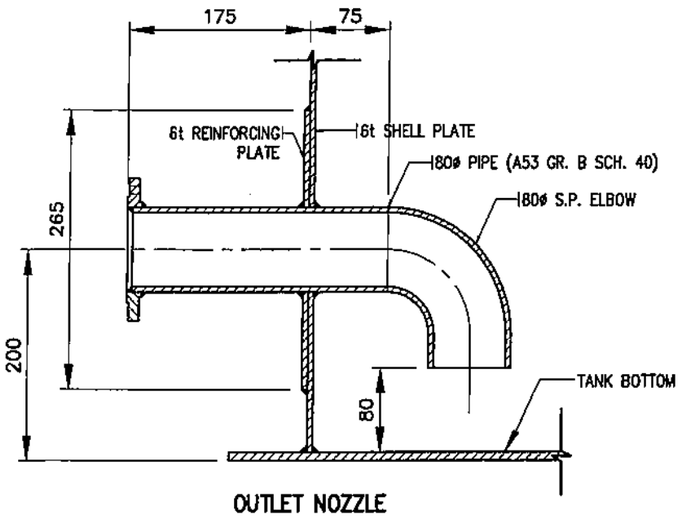
TITLE: **TANK STAIRS AND RAILING DETAILS**

	BY	CHKD	DATE
DESIGNED			
DRAWN	JTC		
REVIEWED	PRINCIPAL ENG'R. / ARCH'T.		
CIVIL/ARCH'T			
ELEC.			
MECH.		JTC	

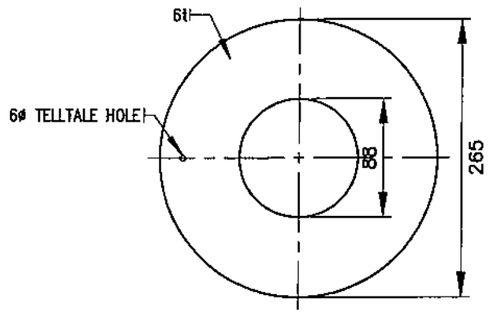
SUBMITTED: N. G. ESPAYOS, Principal Engineer A, MED
RECOMMENDED: J. A. TAPEL, JR., Manager, MED
APPROVED: G. B. MAGPOC, JR., Manager, DDD

DWG. NO. CDPP-BDM-17.007 | SPECS. NO. LuzP24Z1685Sc

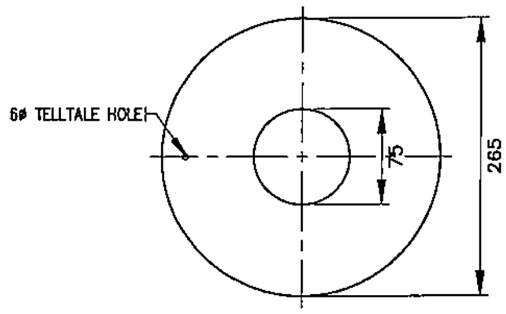
SCALE: NTS | **BID DRAWING** | REV. 0



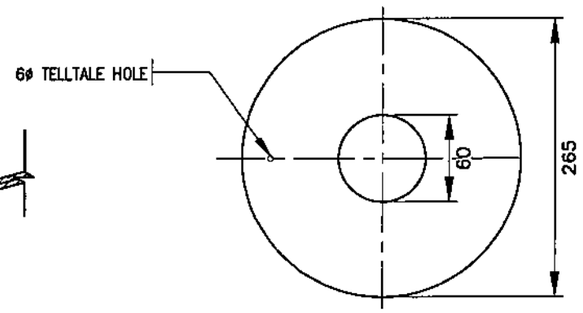
OUTLET NOZZLE



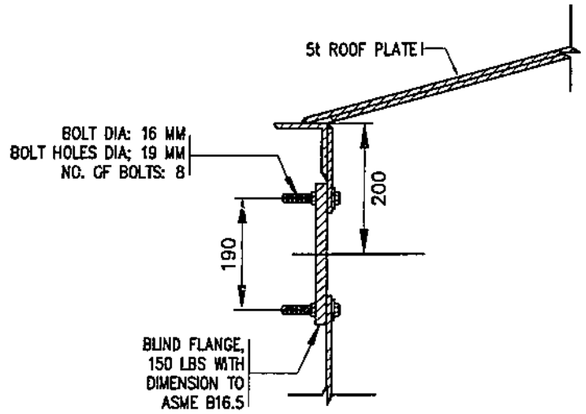
REINFORCING PLATE FOR 80ø NOZZLE



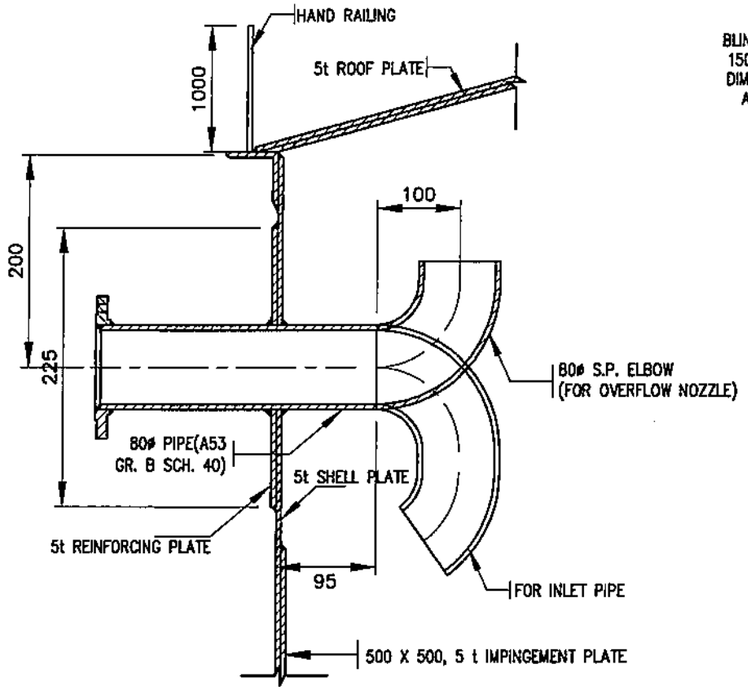
REINFORCING PLATE FOR 65ø NOZZLE



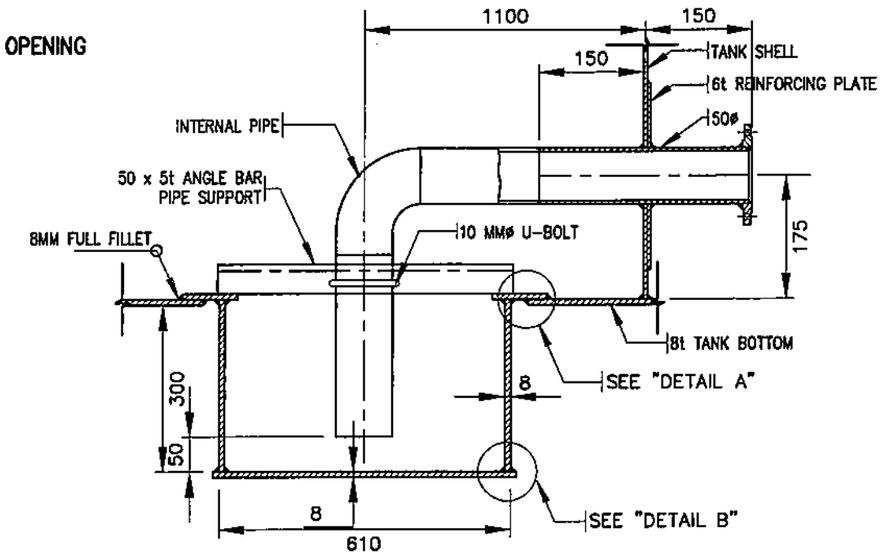
REINFORCING PLATE FOR 50ø NOZZLE



FOAM CHAMBER OPENING



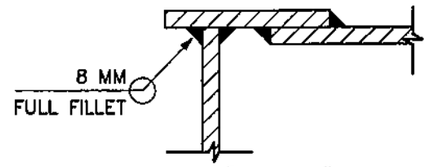
INLET/OVERFLOW NOZZLES (TYPICAL)



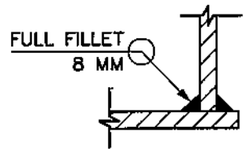
DRAWOFF SUMP

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. FUEL OIL STORAGE TANK SHALL BE CONSTRUCTED TO CONFORM WITH THE LATEST EDITION OF THE AMERICAN PETROLEUM INSTITUTE (API) 650 AND THE MINIMUM REQUIREMENTS SHOWN ON THIS DRAWING AND AS SPECIFIED IN THE TECHNICAL SPECIFICATIONS.
3. DETAILED DRAWINGS IF NECESSARY SHALL BE SUBMITTED BY THE CONTRACTOR FOR NPC REVIEW AND APPROVAL.
4. ALL WELDING WORKS SHALL CONFORM TO THE REQUIREMENTS OF THE SPECIFICATION AND (API) 650.
5. INLET AND OVERFLOW NOZZLES SHALL BE SEPARATELY LOCATED DEPENDING ON THE ORIENTATION OF THE TANK SHOWN ON PLANT'S LAYOUT.
6. THE ERECTION PROCEDURE FOR DRAW OFF NOZZLE SHALL INCLUDE THE FOLLOWING STEP PER API 650:
   A. A HOLE SHALL BE CUT IN THE BOTTOM PLATE OR A SUMP SHALL BE PLACED IN THE FOUNDATION BEFORE BOTTOM PLACEMENT;
   B. A NEAT EXCAVATION SHALL BE MADE TO CONFORM TO THE SHAPE OF THE DRAWOFF SUMP, THE SUMP SHALL BE PUT IN PLACE, AND THE FOUNDATION SHALL BE COMPACTED AROUND THE SUMP AFTER PLACEMENT; AND
   C. THE SUMP SHALL BE WELDED TO THE BOTTOM.



"DETAIL A"



"DETAIL B"

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

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MABATE

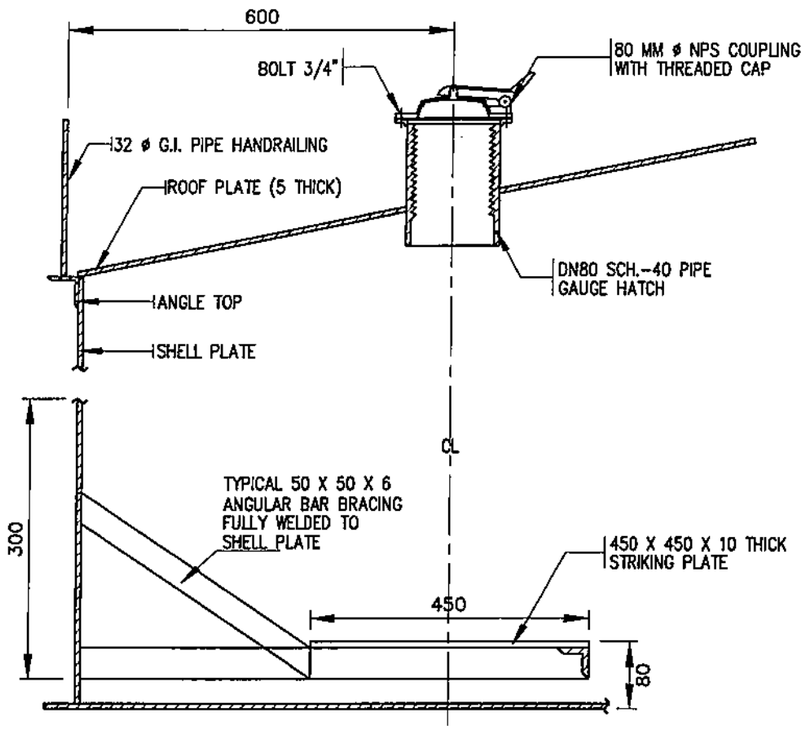
TITLE: **NOZZLE DETAILS (SHEET 1 OF 2)**

	BY	CHKD	DATE
DESIGNED			
DRAWN	JTC		
REVIEWED	PRINCIPAL ENG'R. / ARCH'T.		
CIVIL/ARCH'T			
ELEC.			
MECH.		JTC	

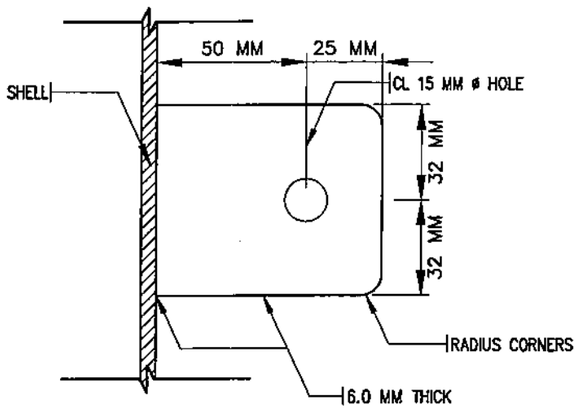
SUBMITTED: N. G. ESPAYOS, Principal Engineer A, MED
RECOMMENDED: J. A. TAMEL, JR., Manager, MED
APPROVED: G. B. MAGPOC, JR., Manager, DDD

DWG. NO. CDPP-BDM-17.008 | SPECS. NO. LuzP24Z1685Sc

SCALE: NTS | **BID DRAWING** | REV. 0



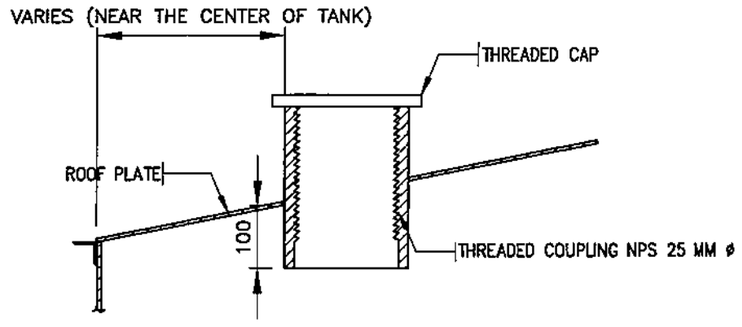
GAUGE HATCH NOZZLE AND STRIKING PLATE



GROUNDING LUG

NOTES FOR GROUNDING LUG:

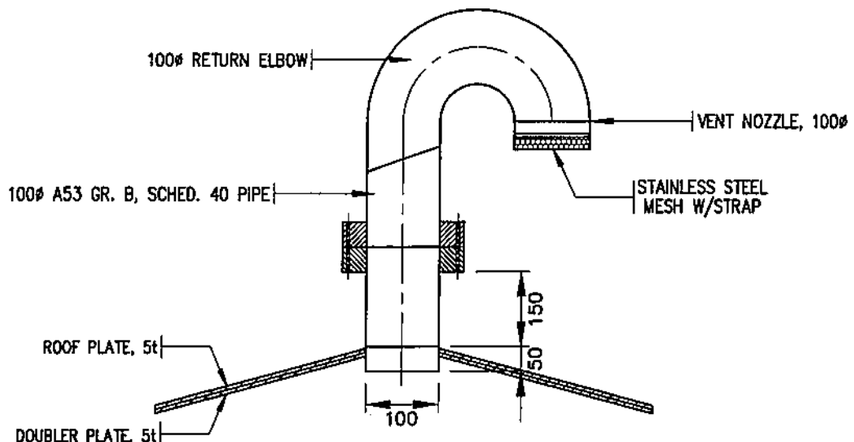
1. LUG MATERIAL SHALL BE AUSTENITIC STAINLESS STEEL WHEN ATTACHED TO CARBON OR LOW ALLOY STEEL PARTS.
2. TWO SETS INCLUDING 3 M LENGTH, 20 MM ø COPPER GROUNDING ROD ARE REQUIRED.



HEAT DETECTOR NOZZLE

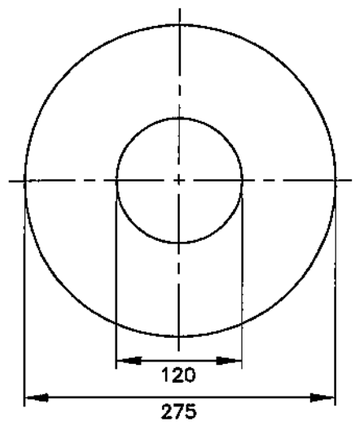
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. FUEL OIL STORAGE TANK SHALL BE CONSTRUCTED TO CONFORM WITH THE LATEST EDITION OF THE AMERICAN PETROLEUM INSTITUTE (API) 650 AND THE MINIMUM REQUIREMENTS SHOWN ON THIS DRAWING AND AS SPECIFIED IN THE TECHNICAL SPECIFICATIONS.
3. DETAILED DRAWINGS IF NECESSARY SHALL BE SUBMITTED BY THE CONTRACTOR FOR NPC REVIEW AND APPROVAL.
4. ALL WELDING WORKS SHALL CONFORM TO THE REQUIREMENTS OF THE SPECIFICATION AND API 650.



ROOF OPEN VENT

INSTALLED AT THE CENTER OF THE ROOF



REINFORCING PLATE FOR 100ø VENT NOZZLE

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

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MABATE

TITLE: **NOZZLE ARRANGEMENT AND OTHER DETAILS (SHEET 2 OF 2)**

	BY	CHKD	DATE
DESIGNED			
DRAWN	JTC		
REVIEWED	PRINCIPAL ENG'R. / ARCH'T.		
CIVIL/ARCH'T			
ELEC.			
MECH.		JTC	

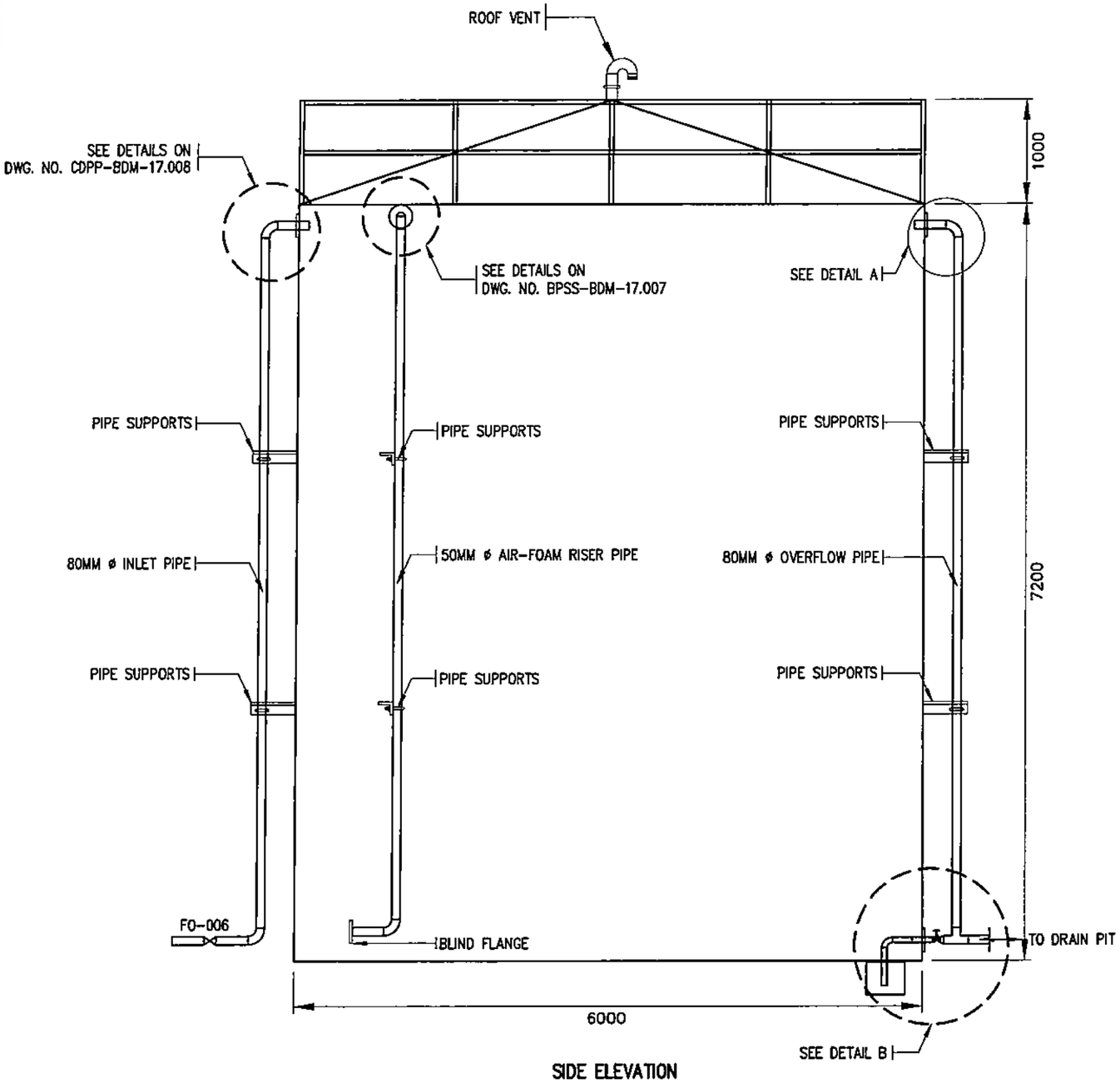
SUBMITTED: N. G. ESPAYOS, Principal Engineer A, MED

RECOMMENDED: J. A. TABEL, JR., Manager, MED

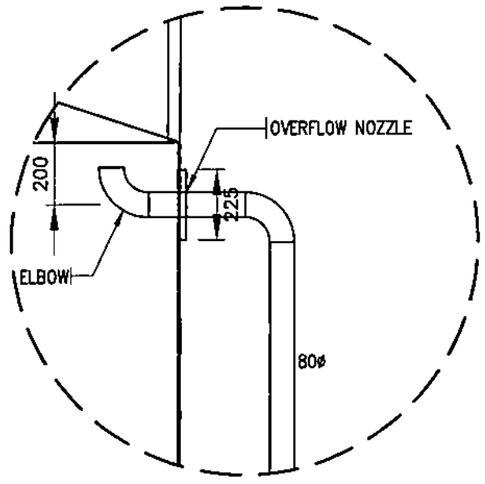
APPROVED: G. B. MAGPOC, JR., Manager, DDD

DWG. NO. **CDPP-BDM-17.009** SPECS. NO. **LuzP24Z1685Sc**

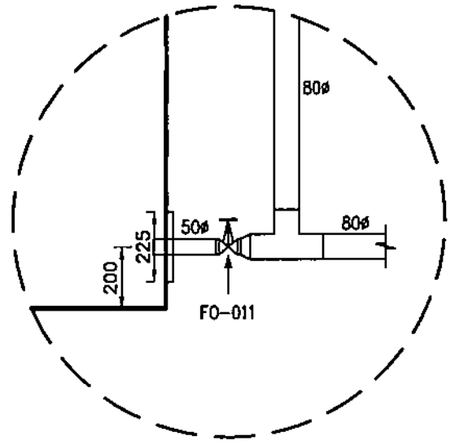
SCALE: NTS | **BID DRAWING** | REV. 0



SIDE ELEVATION



DETAIL A



DETAIL B

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. FUEL OIL STORAGE TANK SHALL BE CONSTRUCTED TO CONFORM WITH THE LATEST EDITION OF THE AMERICAN PETROLEUM INSTITUTE (API) 650 AND THE MINIMUM REQUIREMENTS SHOWN ON THIS DRAWING AND AS SPECIFIED IN THE TECHNICAL SPECIFICATIONS.
3. DETAILED DRAWINGS IF NECESSARY SHALL BE SUBMITTED BY THE CONTRACTOR FOR NPC REVIEW AND APPROVAL.
4. ALL WELDING WORKS SHALL CONFORM TO THE REQUIREMENTS OF THE SPECIFICATION AND API 650.
5. PIPE SHALL CONFORM TO ASTM A53 GRADE B, SCHEDULE 40 AND SEAMLESS PIPE.

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

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MABATE

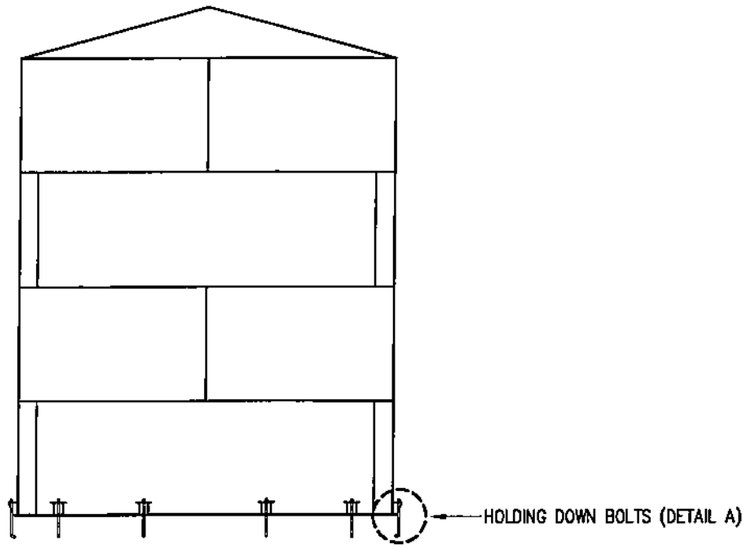
TITLE: **TANK NOZZLES AND PIPE**

	BY	CHKD	DATE
DESIGNED			
DRAWN	JTC		
REVIEWED	PRINCIPAL ENG'R. / ARCH'T.		
CIVIL/ARCH'T			
ELEC.			
MECH.		JTC	

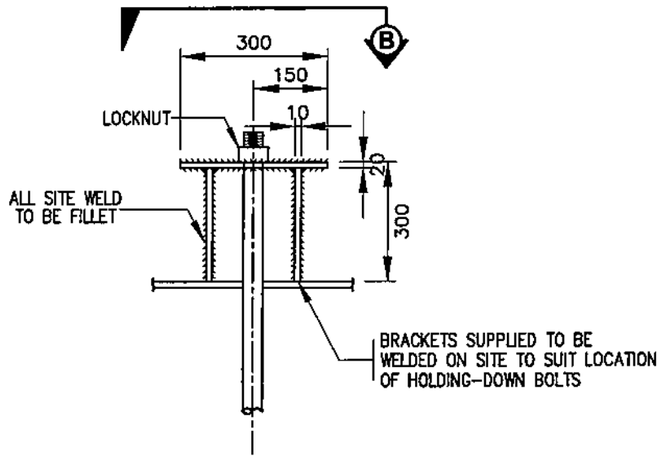
SUBMITTED: N. G. ESPAYOS, Principal Engineer A, MED
RECOMMENDED: J. A. TAPEL, JR., Manager, MED
APPROVED: G. B. MAGPOC, JR., Manager, DDD

DWG. NO. **CDPP-BDM-17.010** SPECS. NO. **LuzP24Z1685Sc**

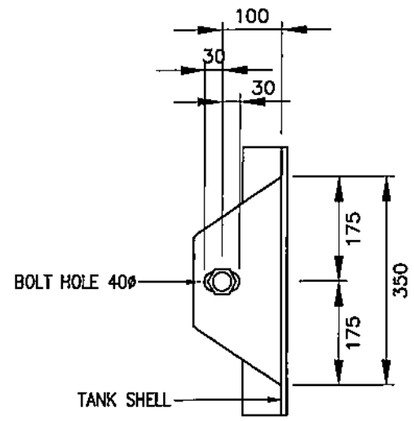
SCALE: NTS | **BID DRAWING** | REV. 0



SIDE ELEVATION

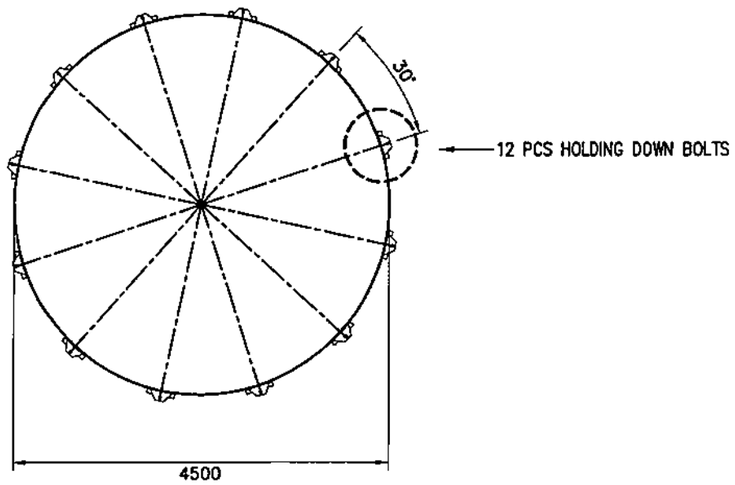


VIEW A

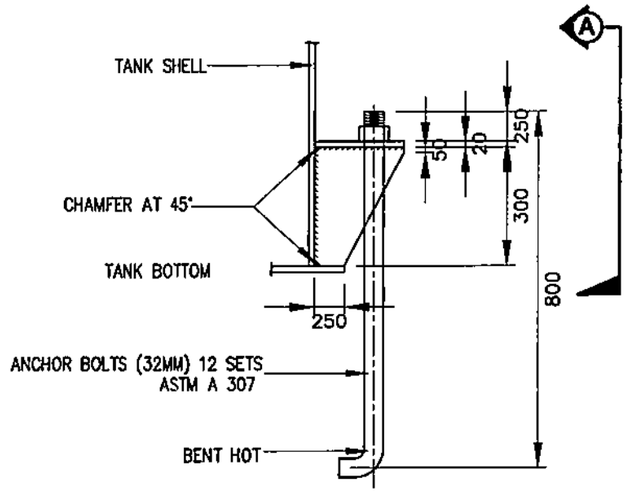


VIEW B

HOLDING DOWN BOLTS DETAILS



ANCHOR BOLTS DETAILS



DETAIL A

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. FUEL OIL STORAGE TANK SHALL BE CONSTRUCTED TO CONFORM WITH THE LATEST EDITION OF THE AMERICAN PETROLEUM INSTITUTE (API) 650 AND THE MINIMUM REQUIREMENTS SHOWN ON THIS DRAWING AND AS SPECIFIED IN THE TECHNICAL SPECIFICATIONS.
3. DETAILED DRAWINGS IF NECESSARY SHALL BE SUBMITTED BY THE CONTRACTOR FOR NPC REVIEW AND APPROVAL.
4. ALL WELDING WORKS SHALL CONFORM TO THE REQUIREMENTS OF THE SPECIFICATION AND API 650.
5. REFER TO RELEVANT CIVIL DRAWINGS FOR DETAILS OF FOUNDATION DRAWINGS.

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

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD)CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MASBATE

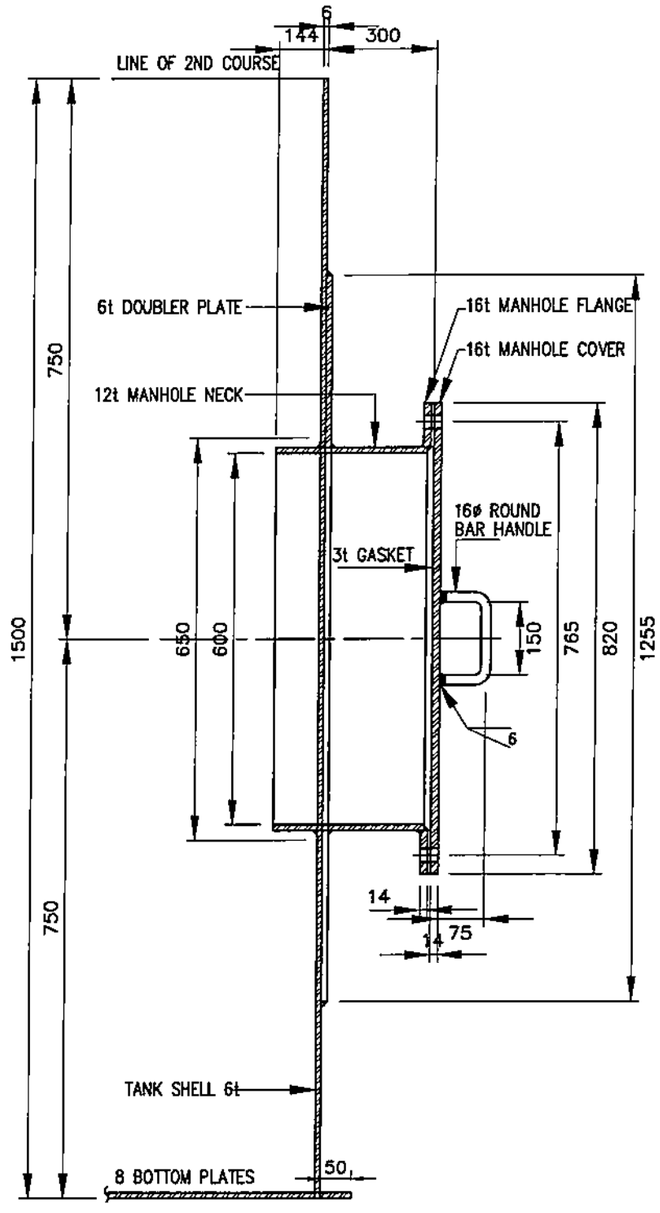
TITLE: **HOLDING DOWN BOLTS DETAILS**

	BY	CHKD	DATE
DESIGNED			
DRAWN	JTC		
REVIEWED	PRINCIPAL ENG'R. / ARCH'T.		
CIVIL/ARCH'T.			
ELEC.			
MECH.		JTC	

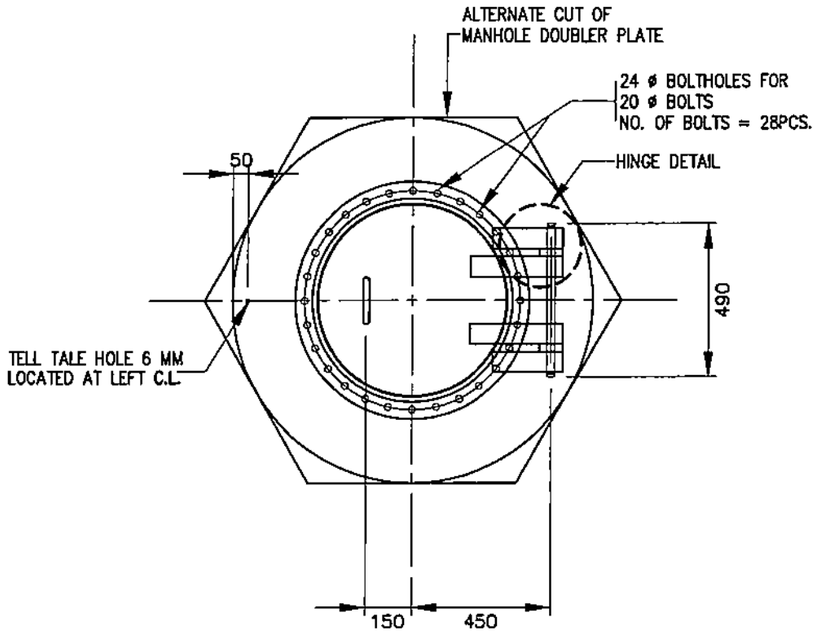
SUBMITTED: N.G. ESPAYOS, Principal Engineer A, MED
RECOMMENDED: J.A. TAPEL, JR., Manager, MED
APPROVED: G. B. MAGPOC, JR., Manager, DDD

DWG. NO. CDPP-BDM-17.011 | SPECS. NO. LuzP24Z1685Sc

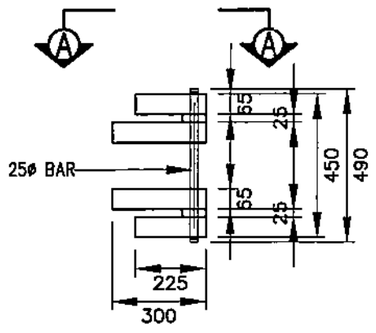
SCALE: NTS | BID DRAWING | REV. 0



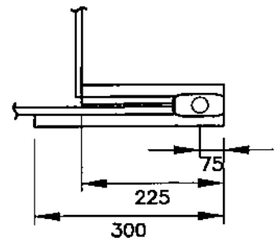
SHELL MANHOLE SECTION



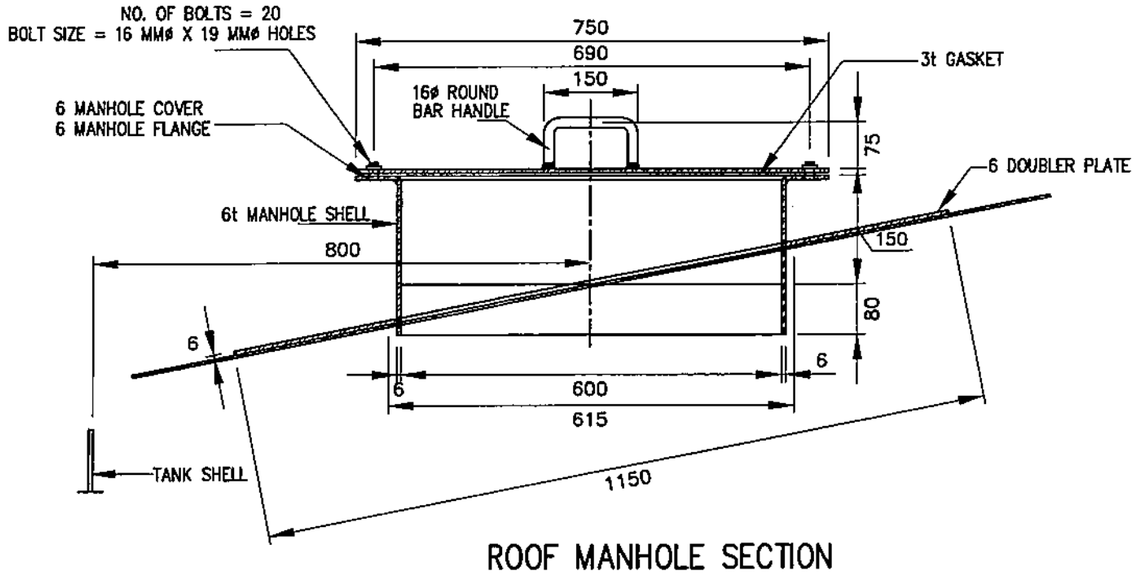
SHELL MANHOLE PLAN



HINGE DETAIL



SECTION A



ROOF MANHOLE SECTION

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. FUEL OIL STORAGE TANK SHALL BE CONSTRUCTED TO CONFORM WITH THE LATEST EDITION OF THE AMERICAN PETROLEUM INSTITUTE (API) 650 AND THE MINIMUM REQUIREMENTS SHOWN ON THIS DRAWING AND AS SPECIFIED IN THE TECHNICAL SPECIFICATIONS.
3. DETAILED DRAWINGS IF NECESSARY SHALL BE SUBMITTED BY THE CONTRACTOR FOR NPC REVIEW AND APPROVAL.
4. ALL WELDING WORKS SHALL CONFORM TO THE REQUIREMENTS OF THE SPECIFICATION AND API 650.

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MABATE

TITLE: **ROOF AND SHELL MANHOLE DETAILS**

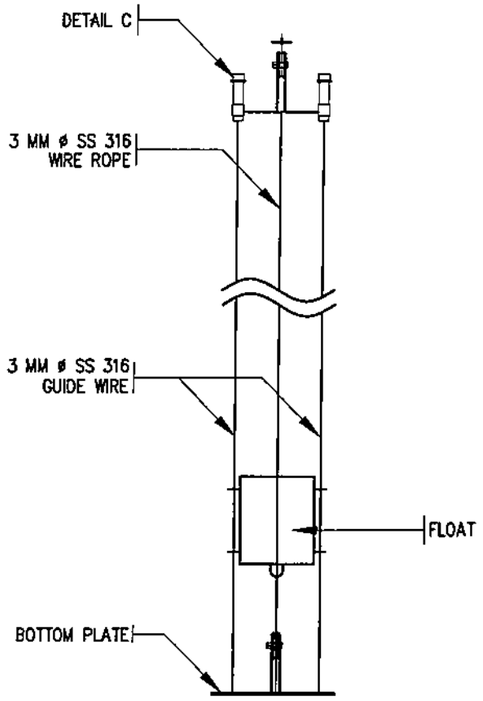
	BY	CHKD	DATE
DESIGNED			
DRAWN	JTC		
REVIEWED	PRINCIPAL ENG'R. / ARCH'T.		
CIVIL/ARCH'T			
ELEC.			
MECH.		JTC	

SUBMITTED: N. G. ESPAYOS, Principal Engineer A, MED.
RECOMMENDED: J. A. TAPEL, JR., Manager, MED
APPROVED: G. B. MAGPOC, JR., Manager, DDD

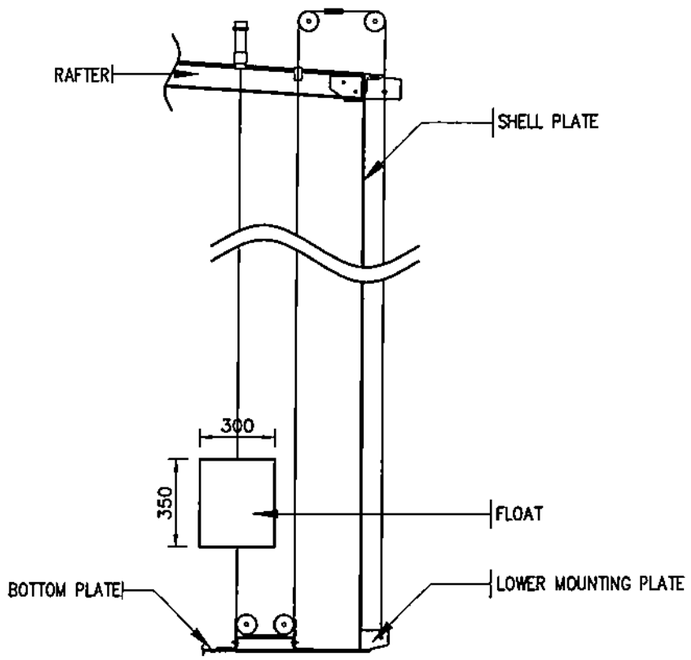
DWG. NO. CDPP-BDM-17.012 | SPECS. NO. LuzP24Z1685Sc

SCALE: NTS | **BID DRAWING** | REV. 0

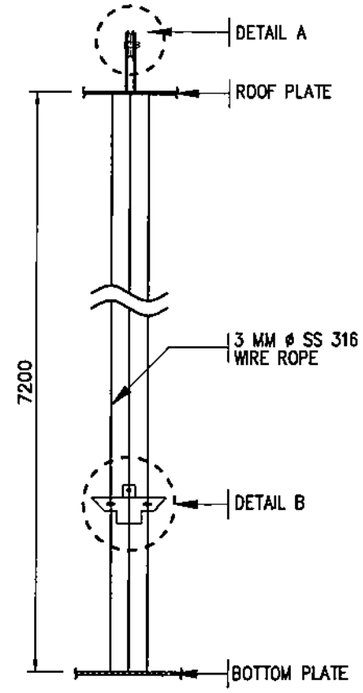
REV.	DATE	NATURE OF REVISION	BY	CHKD.	RECD.	APPD.



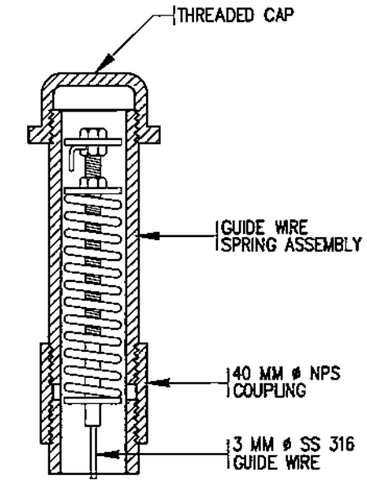
FRONT VIEW
SCALE 1:25 M



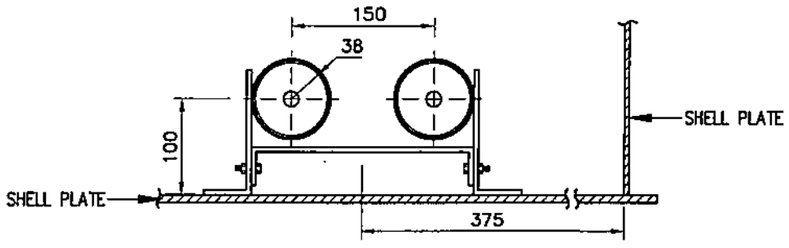
SECTIONAL VIEW
SCALE 1:25 M



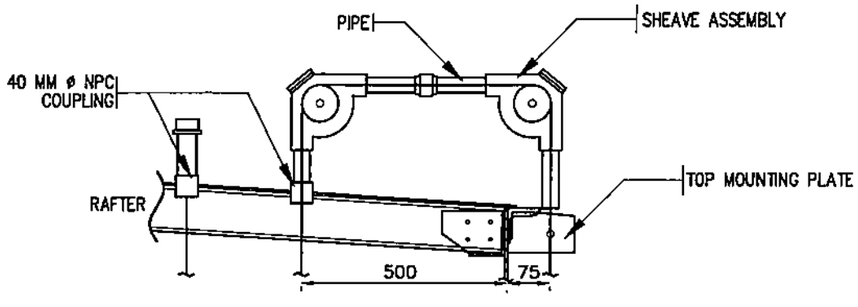
EXTERNAL VIEW
SCALE 1:25 M



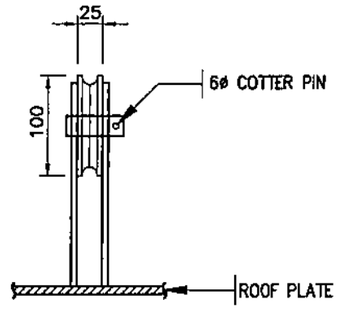
DETAIL "C"
SCALE NTS



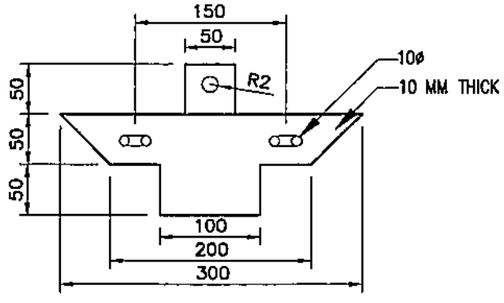
LOWER ROLLER ASSEMBLY
SCALE NTS



UPPER ROLLER ASSEMBLY
SCALE NTS



DETAIL A
SCALE 1:5M



DETAIL B
SCALE NTS

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. FUEL OIL STORAGE TANK SHALL BE CONSTRUCTED TO CONFORM WITH THE LATEST EDITION OF THE AMERICAN PETROLEUM INSTITUTE (API) 650 AND THE MINIMUM REQUIREMENTS SHOWN ON THIS DRAWING AND AS SPECIFIED IN THE TECHNICAL SPECIFICATIONS.
3. DETAILED DRAWINGS IF NECESSARY SHALL BE SUBMITTED BY THE CONTRACTOR FOR NPC REVIEW AND APPROVAL.
4. ALL WELDING WORKS SHALL CONFORM TO THE REQUIREMENTS OF THE SPECIFICATION API 650.
5. CALIBRATION SCALES SHALL BE PAINTED ON THE TANK AND SHALL BE LARGE ENOUGH SO IT CAN EASILY BE VISIBLE FROM THE CONTROL ROOM / POWERHOUSE.
6. SIZE AND DIMENSIONS OF FLOAT AND BOARD TANK GAUGE ASSEMBLY MAY BE MODIFIED IN COORDINATION WITH THE DEVICE SUPPLIER.

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

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MABATE

TITLE:

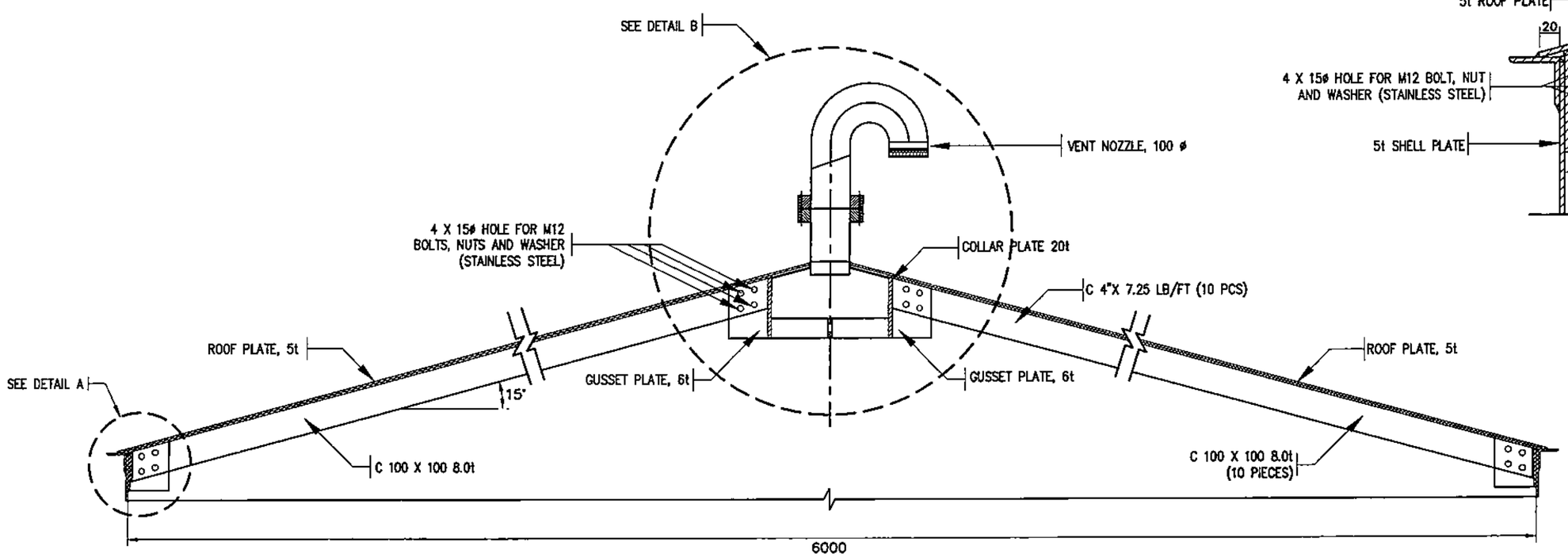
LEVEL GAUGE INDICATOR DETAILS

	BY	CHKD	DATE
DESIGNED			
DRAWN	JTC		
REVIEWED	PRINCIPAL ENG'R. / ARCH'T.		
CIVIL/ARCH'T			
ELEC.			
MECH.		JTC	

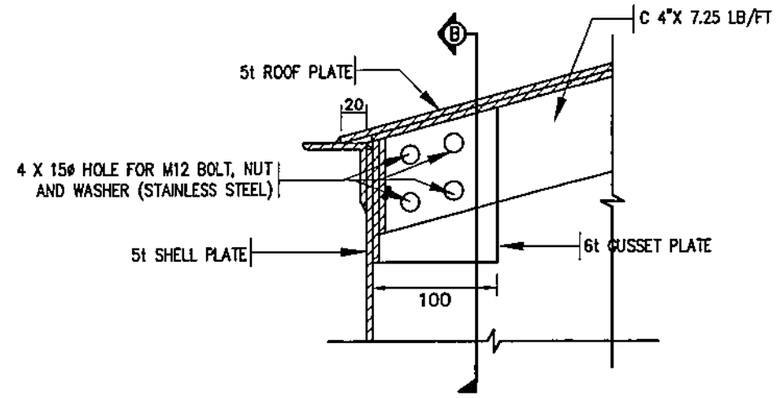
SUBMITTED: N. G. ESPAYOS, Principal Engineer A, MED
RECOMMENDED: J. A. TAPEL, JR., Manager, MED
APPROVED: G. B. MAGPOC, JR., Manager, DDD

DWG. NO. CDPP-BDM-17.013 | SPECS. NO. LuzP24Z1685Sc

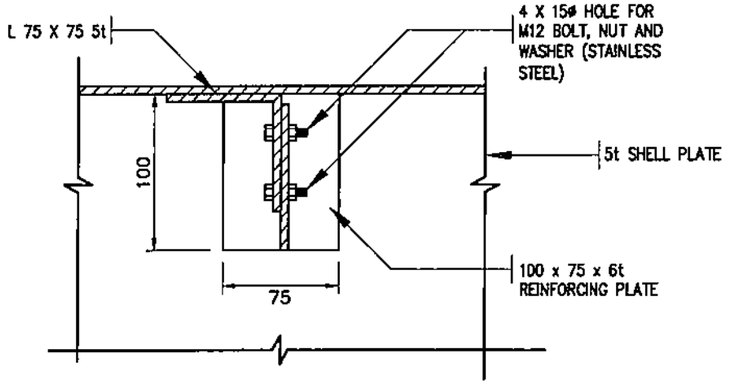
SCALE: NTS | **BID DRAWING** | REV. 0



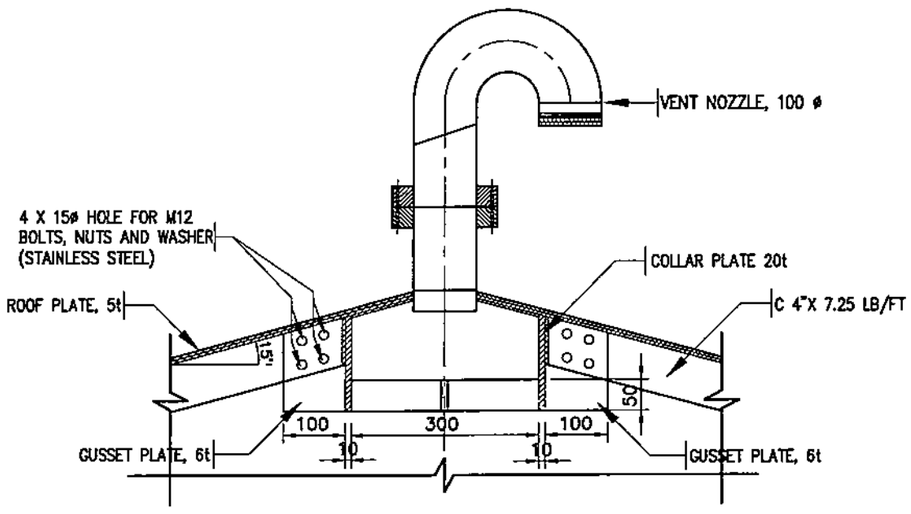
RAFTER DETAILS



DETAIL A



SECTION B



DETAIL B

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. FUEL OIL STORAGE TANK SHALL BE CONSTRUCTED TO CONFORM WITH THE LATEST EDITION OF THE AMERICAN PETROLEUM INSTITUTE (API) 650 AND THE MINIMUM REQUIREMENTS SHOWN ON THIS DRAWING AND AS SPECIFIED IN THE TECHNICAL SPECIFICATIONS.
3. DETAILED DRAWINGS IF NECESSARY SHALL BE SUBMITTED BY THE CONTRACTOR FOR NPC REVIEW AND APPROVAL.
4. ALL WELDING WORKS SHALL CONFORM TO THE REQUIREMENTS OF THE SPECIFICATION AND API 650.

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

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MABATE

TITLE: **RAFTER DETAILS**

	BY	CHKD	DATE
DESIGNED			
DRAWN	JTC		
REVIEWED	PRINCIPAL ENG'R. / ARCH'T.		
CIVIL/ARCH'T			
ELEC.			
MECH.		JTC	

SUBMITTED: N. G. ESPAYOS, Principal Engineer A, MED
RECOMMENDED: J. A. TAPEL, JR., Manager, MED
APPROVED: G. B. MAGPOC, JR., Manager, DDD

DWG. NO. CDPP-BDM-17.014 | SPECS. NO. LuzP24Z1685Sc

SCALE: NTS | **BID DRAWING** | REV. 0

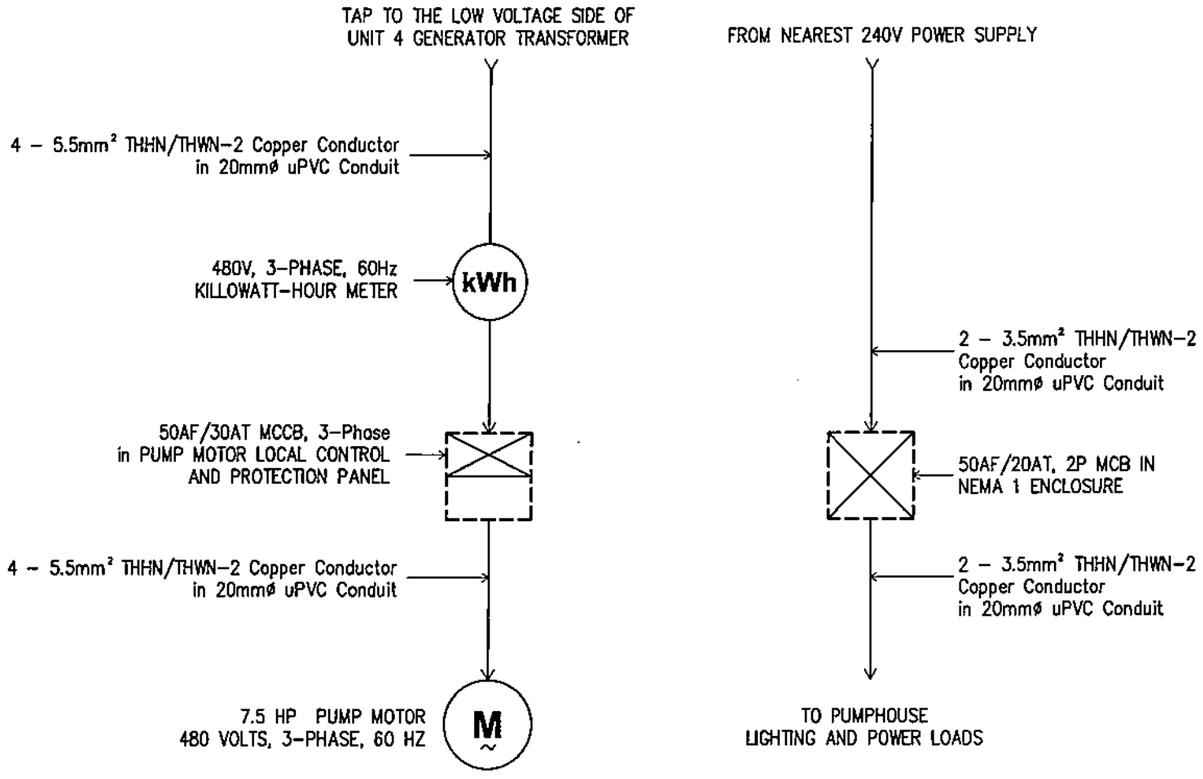
BID DRAWINGS

ELECTRICAL DRAWINGS

SECTION IX - BID DRAWINGS

EW - ELECTRICAL DRAWINGS

DRAWING NO.	TITLE
CDPP-BDE-17.001	SINGLE LINE DIAGRAM
CDPP-BDE-17.002	LOCAL CONTROL PANEL LAYOUT
CDPP-BDE-17.003	LIGHTING & POWER LAYOUT – PUMP HOUSE
CDPP-BDE-17.004	LIGHTING & POWER LAYOUT – HWS/SWS
CDPP-BDE-17.005	LIGHTING & POWER LAYOUT – BUNK HOUSE
CDPP-BDE-17.006	SCHEDULE OF LOADS & RISER DIAGRAM (BUNK HOUSE – LPP)
CDPP-BDE-17.007	GENERAL NOTES AND DETAILS OF LIGHTING FIXTURES



NOTES:

1. THE CONTRACTOR SHALL TEST AND INSTALL THE NEW 7.5 HP FUEL OIL PUMP MOTOR TO BE SUPPLIED.
2. THE CONTRACTOR SHALL PROVIDE LOCAL CONTROL & PROTECTION PANEL, COMPLETE WITH NECESSARY MONITORING PARAMETERS, RELAYS, CONTACTORS AND OVERCURRENT PROTECTIVE DEVICES FOR THE NEW PUMP MOTOR.
3. THE CONTRACTOR SHALL SUBMIT THE BROCHURES/ CATALOGUES OF THE PUMP MOTOR CONTROL AND MONITORING PANELS INCLUDING COMPONENTS FOR METERING, PROTECTION, CONTROL AND MONITORING PURPOSES FOR APPROVAL OF NPC.
4. KILOWATT–HOUR METER SHALL BE INSTALLED BESIDE THE LOCAL CONTROL AND PROTECTION PANEL OF THE PUMP.
5. THE LOCAL CONTROL AND PROTECTION PANEL INCLUDING THE 7.5HP FUEL OIL PUMP MOTOR, PIPES, AND FUEL OIL STORAGE TANK (FOST) SHALL BE PROPERLY GROUNDED IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS. IN CASE OF UNAVAILABILITY OF NEARBY GROUND GRID, COPPER BONDED GROUND ROD SHALL BE UTILIZED. PROVIDE 22mm² SOFT DRAWN, PVC–INSULATED, COPPER CONDUCTOR FOR GROUND CONNECTION.
6. THE CONTRACTOR SHALL PROVIDE SEPARATE 50AF/30AT, 3–PHASE MCCB IN NEMA 1 ENCLOSURE TO BE INSTALLED BESIDE THE EXISTING MAIN DISTRIBUTION PANELBOARD FOR THE POWER SUPPLY OF THE PROPOSED PUMP HOUSE.

SINGLE LINE DIAGRAM

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

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MABATE

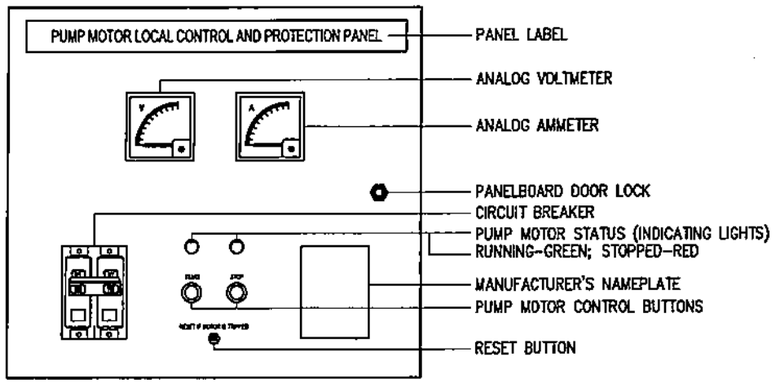
TITLE: **SINGLE LINE DIAGRAM**

	BY	CHKD	DATE
DESIGNED			
DRAWN	NIC		
REVIEWED	PRINCIPAL ENGR. / ARCH'T.		
CIVIL/ARCH'T			
ELEC.			
MECH.			

SUBMITTED: R. P. VERAR, Principal Engineer A, EEICD
RECOMMENDED: C. Z. C. LUGOD, JR., Manager, EEICD
APPROVED: G. B. MAGPOC, JR., Manager, DOD

DWG. NO. CDPP-BDE-17.001 | SPECS. NO. LuzP24Z1685Sc

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



TYPICAL PUMP MOTOR LOCAL CONTROL AND PROTECTION PANEL (LCPP)

NOTES:

1. PUMP MOTOR CONTROL, PROTECTION AND/OR MONITORING PANELS SHALL BE COLORED RAL 7032 AND ITS STEEL SHEET THICKNESS SHALL BE AT LEAST 2.0 MILLIMETERS.
2. THE CONTRACTOR SHALL DESIGN THE CABLE ENTRY FOR ALL THE POWER, CONTROL AND INSTRUMENTATION TO BE USE.
3. THE CONTRACTOR SHALL PROVIDE THE BROCHURES/ CATALOGUES OF THE PUMP MOTOR CONTROL AND MONITORING PANELS INCLUDING COMPONENTS FOR METERING, PROTECTION, CONTROL AND MONITORING PURPOSES FOR APPROVAL OF NPC.

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

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MABATE

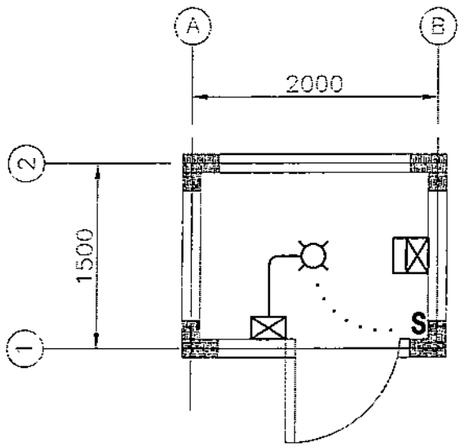
TITLE: **LOCAL CONTROL PANEL LAYOUT**

	BY	CHKD	DATE
DESIGNED			
DRAWN	NIC		
REVIEWED	PRINCIPAL ENG'R. / ARCHT.		
CIVIL/ARCH'T			
ELEC.			
MECH.			

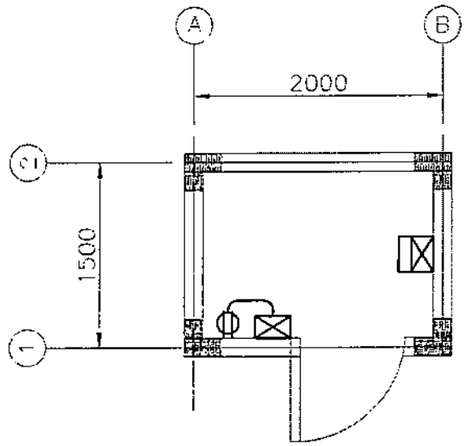
SUBMITTED: R. P. VERAR, Principal Engineer A-EEICD
RECOMMENDED: C.Z. C. LUGOD, JR., Manager, EEICD
APPROVED: G. B. MAGPOC, JR., Manager, DDD

DWG. NO. CDPP-BDE-17.002 | SPECS. NO. LuzP24Z1685Sc

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



LIGHTING LAYOUT
SCALE 1:50



POWER LAYOUT
SCALE 1:50

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER UNLESS OTHERWISE SPECIFIED.
2. POWER SUPPLY SHALL BE TAKEN FROM THE EXISTING 240V, SINGLE PHASE SOURCE TO BE PROVIDED BY THE END-USER.
3. FIXTURES AND OUTLETS SHALL BE PROPERLY TESTED BY THE CONTRACTOR.

LEGEND:

- – FIXTURE TYPE B
- S – SINGLE POLE WALL SWITCH
- – 200 VA DUPLEX CONVENIENCE OUTLET
- ..... – CONTROL CIRCUIT
- ——— – CIRCUIT RUNNING ON CEILING/ THROUGH WALL
- – 50AF/20AT ENCLOSED CIRCUIT BREAKER
- – PUMP MOTOR LOCAL CONTROL AND PROTECTION PANEL

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

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MABATE

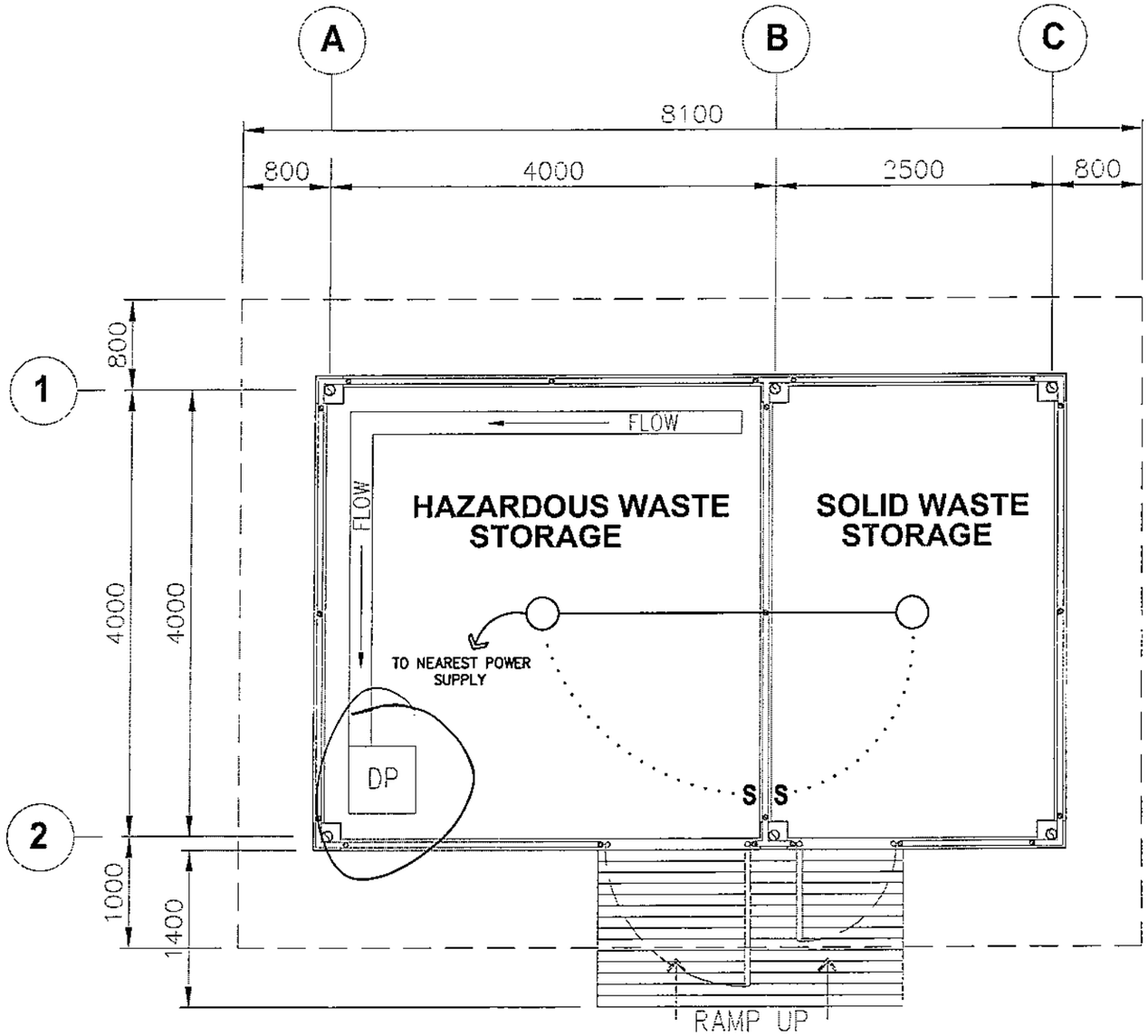
TITLE:
LIGHTING & POWER LAYOUT - PUMP HOUSE

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

SUBMITTED: R. P. VERAR, Principal Engineer A, EECD
RECOMMENDED: G. Z. C. LUGOD, JR., Manager, EECD
APPROVED: G. B. MAGPOC, JR., Manager, DDD

DWG. NO. CDPP-BDE-17.003 | SPECS. NO. LuzP24Z1685Sc

SCALE: AS SHOWN | **BID DRAWING** | REV. 0



LIGHTING LAYOUT

SCALE 1:50

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER UNLESS OTHERWISE SPECIFIED.
2. POWER SUPPLY SHALL BE TAKEN FROM THE EXISTING 240V, SINGLE PHASE SOURCE TO BE PROVIDED BY THE END-USER.
3. FIXTURES AND OUTLETS SHALL BE PROPERLY TESTED BY THE CONTRACTOR.

LEGEND:

- ○ – FIXTURE TYPE C
- S – SINGLE POLE WALL SWITCH
- ..... – CONTROL CIRCUIT
- ——— – CIRCUIT RUNNING ON CEILING

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MABATE

TITLE: **LIGHTING & POWER LAYOUT - HWS/SWS**

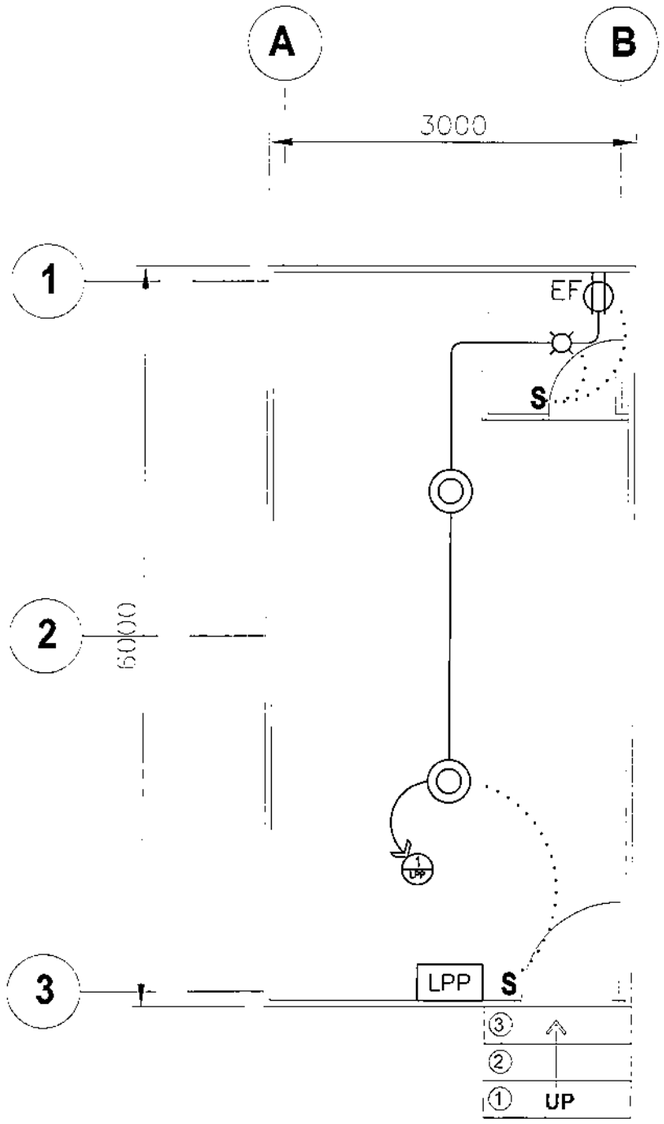
	BY	CHKD	DATE
DESIGNED			
DRAWN	NIC		
REVIEWED	PRINCIPAL ENGR. / ARCH'T.		
CIVIL/ARCH'T			
ELEC.			
MECH.			

SUBMITTED: B. P. VERAR, Principal Engineer A, EEICD
RECOMMENDED: C. Z. C. LUGOD, JR., Manager, EEICD
APPROVED: G. B. MAGPOC, JR., Manager, DDO

DWG. NO. CDPP-BDE-17.004 | SPECS. NO. LuzP24Z1685Sc

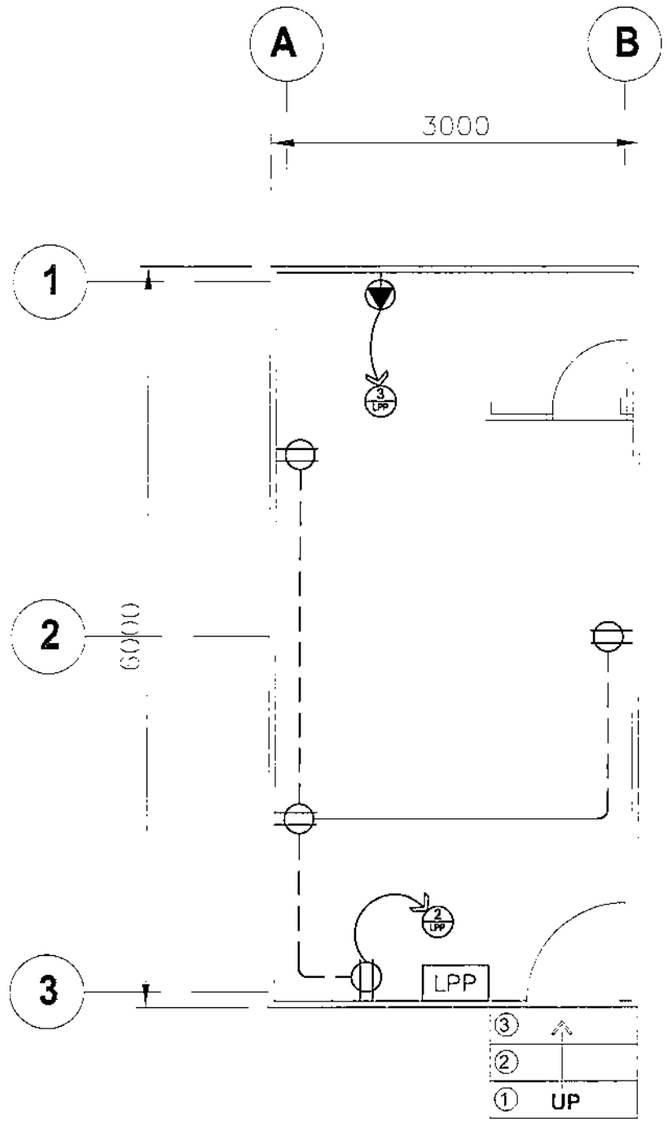
SCALE: AS SHOWN | **BID DRAWING** | REV. 0

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



LIGHTING LAYOUT

SCALE 1:50



POWER LAYOUT

SCALE 1:50

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER UNLESS OTHERWISE SPECIFIED.
2. POWER SUPPLY SHALL BE TAKEN FROM THE EXISTING 240V, SINGLE PHASE SOURCE TO BE PROVIDED BY THE END-USER.
3. FIXTURES AND OUTLETS SHALL BE PROPERLY TESTED BY THE CONTRACTOR.
4. THE LIGHTING AND POWER LAYOUT SHOWN SHALL BE THE REFERENCE FOR THE TWO (2) BUNK HOUSES.

LEGEND:

- ◎ – FIXTURE TYPE A
- ⌧ – FIXTURE TYPE B
- S – SINGLE POLE SWITCH
- EF – EXHAUST FAN OUTLET
- – DUPLEX CONVENIENCE OUTLET
- – SAFETY BREAKER WITH BUILT-IN C.O.
- LPP_ – LIGHTING & POWER PANELBOARD 1/2
- —— – CIRCUIT RUNNING ON CEILING/WALL
- — — – CIRCUIT RUNNING ON WALL
- · · · · – CONTROL CIRCUIT
- 1 LPP – CIRCUIT HOMERUN

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

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MABATE

TITLE: **LIGHTING & POWER LAYOUT - BUNK HOUSE**

	BY	CHKD	DATE
DESIGNED			
DRAWN	NIC		
REVIEWED	PRINCIPAL ENG'R. / ARCH'T.		
CIVIL/ARCHT			
ELEC.			
MECH.			

SUBMITTED: R. P. VERAR, Principal Engineer A, EEICD
RECOMMENDED: C. Z. C. LUGOD, JR., Manager, EEICD
APPROVED: G. B. MAGPOC, JR., Manager, DDD

DWG. NO. CDPP-BDE-17.005 | SPECS. NO. LuzP24Z1685Sc

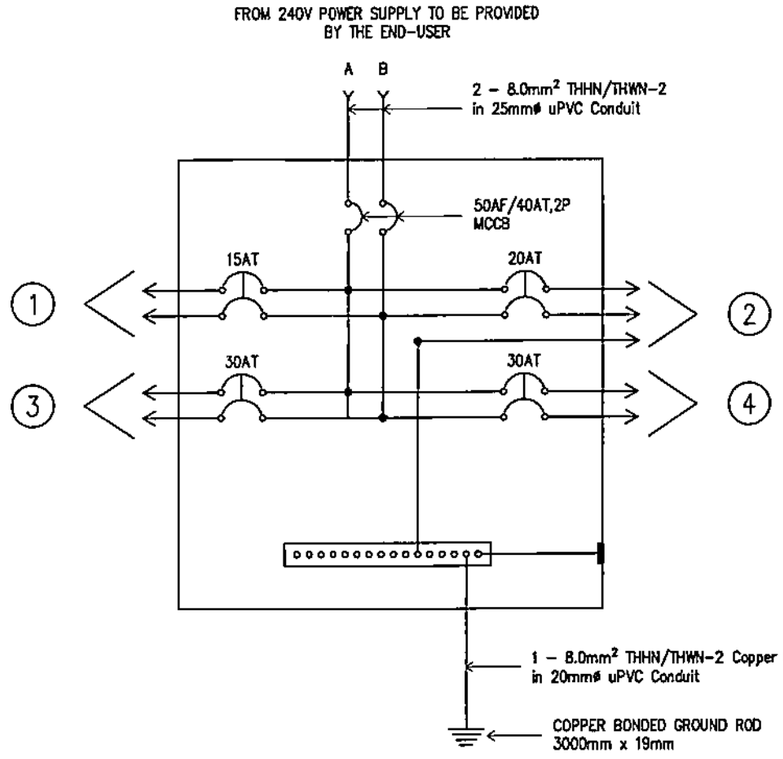
SCALE: AS SHOWN | **BID DRAWING** | REV. 0

SCHEDULE OF LOADS: TYPICAL LIGHTING AND POWER PANELBOARD FOR BUNK HOUSE 1 & 2

CKT NO.	DESCRIPTION	VA	V	AMPS	SIZES		
					BREAKER	WIRE	TRUNKING
1	2 – 18W FIXTURE TYPE A 1 – 9W FIXTURE TYPE B 1 – 100VA EXHAUST FAN OUTLET	150	230	0.65	15AT	2 – 3.5mm² THHN/THWN-2	16mmx10mm uPVC
2	5 – 180VA CONVENIENCE OUTLET	900	230	3.91	20AT	3 – 3.5mm² THHN/THWN-2	16mmx10mm uPVC
3	2HP AIR CONDITIONING UNIT (FUTURE)	2760	230	12.00	30AT	3 – 5.5mm² THHN/THWN-2	16mmx10mm uPVC
4	SPARE	2760	230	12.00	30AT		
	TOTAL	6570		28.57			

PROVIDE: 100AF/50AT, 2P, MCB
WITH BRANCH CIRCUIT OF:
1 – 15AT, 2P, MCB
1 – 20AT, 2P, MCB
2 – 30AT, 2P, MCB

PROVIDE: 2 – 8.0mm² THHN/THWN-2 Copper Conductor in 25mmø uPVC Conduit



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

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MABATE

TITLE: **SCHEDULE OF LOADS & RISER DIAGRAM (BUNK HOUSE - LPP)**

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

SUBMITTED: R. P. VERAR, Principal Engineer, EEICD
RECOMMENDED: C. Z. C. LUGOD, JR., Manager, EEICD
APPROVED: G. B. MAGPOC, JR., Manager, DDD

DWG. NO. CDPP-BDE-17.006 | SPECS. NO. LuzP24Z1685Sc

SCALE: AS SHOWN | **BID DRAWING** | REV. 0

GENERAL NOTES:

1. ALL WORKS SHALL BE DONE IN ACCORDANCE WITH THE LATEST PROVISIONS OF THE PHILIPPINE ELECTRICAL CODE, LAWS AND ORDINANCES OF THE LOCAL CODE ENFORCING AUTHORITIES.

2. METHOD OF WIRING SHALL BE IN uPVC WITH PROPER FITTINGS, DEVICES, BOXES AND SUPPORTS, WORK SHALL BE AS PER PLAN AND SPECIFICATIONS AS TO LOCATION, TYPE AND USE.

3. ALL SWITCHES AND CONVENIENCE OUTLETS SHALL BE FLUSH-MOUNTED 1.37 METERS AND 0.30 METER RESPECTIVELY ABOVE THE FINISHED FLOOR.

4. CONDUIT RUNS ARE INDICATIVE ONLY. THE ACTUAL RUNS SHALL BE DETERMINED IN THE FIELD.

5. WIRES, BOXES, ELECTRICAL AS WELL AS NON-ELECTRICAL MATERIALS NOT INCLUDED IN THE PLANS AND SPECIFICATION BUT NECESSARY TO COMPLETE THE JOB SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR.

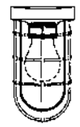
6. ALL ELECTRICAL MATERIALS TO BE USED IN THE INSTALLATION SHALL BE NEW, STANDARD AND APPROVED TYPE AS TO LOCATION, TYPES AND PURPOSE.

7. MINIMUM SIZE OF CONDUCTOR TO BE USED SHALL BE 3.5 mm^2 THHN/THWN-2 IN 20 mmø uPVC, SCH.40 CONDUIT UNLESS OTHERWISE SPECIFIED IN THE PLAN.

8. ELECTRICAL WORKS SHALL BE DONE UNDER THE DIRECT SUPERVISION OF A DULY LICENSED ELECTRICAL ENGINEER.

DETAILS OF LIGHTING FIXTURES

A	B
	
IP20 ROUND CEILING LUMINAIRE, SURFACE MOUNTED, 350mm DIAMETER, WHITE STEEL BASE, WHITE GLASS DIFFUSER AND COMPLETE WITH 18 WATTS LED COB LIGHT. (MIN. Lm = 1200Lm)	1 x 9 WATTS COOL WHITE, CLASSIC GLOBE SHAPE, FROSTED FINISH, E27 BASE, COMPACT LED LAMP (Min. Lm = 900Lm)

C

VAPOR TIGHT FIXTURE MADE OF CAST ALUMINUM CONSTRUCTION FITTED WITH CLEAR GLASS GLOBE AND GUARD SUITABLE FOR SELF-CONTAINED, E27 BASE, COMPACT LED BULB, 12W. (MIN. Lm = 900Lm)

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

OWNER: **NATIONAL POWER CORPORATION**
GABRIEL Y. ITCHON BLDG., SEN. MIRIAM P. DEFENSOR-SANTIAGO AVENUE (FORMERLY BIR ROAD) CORNER QUEZON AVENUE, DILIMAN 1100 QUEZON CITY, PHILIPPINES

PROJECT: SUPPLY, DELIVERY, INSTALLATION AND TEST OF 1 X 120 KL FUEL OIL STORAGE TANK (FOST) INCLUDING CONSTRUCTION OF ASSOCIATED FACILITIES FOR CLAVERIA DPP

LOCATION: CLAVERIA DPP, SITIO KILAPAD, POBLACION 2, CLAVERIA, MABATE

TITLE: **GENERAL NOTES AND DETAILS OF LIGHTING FIXTURES**

	BY	CHKD	DATE
DESIGNED			
DRAWN	NIC		
REVIEWED	PRINCIPAL ENGR. / ARCH'T.		
CIVIL/ARCH'T			
ELEC.			
MECH.			

SUBMITTED: R. P. VERAR, Principal Engineer A, EEICD
RECOMMENDED: C. Z. C. LUGOD, JR., Manager, EEICD
APPROVED: G. B. MAGPOC, JR., Manager, DDO

DWG. NO. CDPP-BDE-17.007 | SPECS. NO. LuzP24Z1685Sc

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