

PHILIPPINE BIDDING DOCUMENTS

Procurement of INFRASTRUCTURE PROJECTS

Government of the Republic of the Philippines

**PROPOSED CONSTRUCTION OF BAESA COLUMBARIUM
WITH LAND DEVELOPMENT**

Project number:

21-00086

**Sixth Edition
July 2020**

Preface

These Philippine Bidding Documents (PBDs) for the procurement of Infrastructure Projects (hereinafter referred to also as the “Works”) through Competitive Bidding have been prepared by the Government of the Philippines for use by all branches, agencies, departments, bureaus, offices, or instrumentalities of the government, including government-owned and/or -controlled corporations, government financial institutions, state universities and colleges, local government units, and autonomous regional government. The procedures and practices presented in this document have been developed through broad experience, and are for mandatory use in projects that are financed in whole or in part by the Government of the Philippines or any foreign government/foreign or international financing institution in accordance with the provisions of the 2016 revised Implementing Rules and Regulations (IRR) of Republic Act (RA) No. 9184.

The PBDs are intended as a model for admeasurements (unit prices or unit rates in a bill of quantities) types of contract, which are the most common in Works contracting.

The Bidding Documents shall clearly and adequately define, among others: (i) the objectives, scope, and expected outputs and/or results of the proposed contract; (ii) the eligibility requirements of Bidders; (iii) the expected contract duration; and (iv) the obligations, duties, and/or functions of the winning Bidder.

Care should be taken to check the relevance of the provisions of the PBDs against the requirements of the specific Works to be procured. If duplication of a subject is inevitable in other sections of the document prepared by the Procuring Entity, care must be exercised to avoid contradictions between clauses dealing with the same matter.

Moreover, each section is prepared with notes intended only as information for the Procuring Entity or the person drafting the Bidding Documents. They shall not be included in the final documents. The following general directions should be observed when using the documents:

- a. All the documents listed in the Table of Contents are normally required for the procurement of Infrastructure Projects. However, they should be adapted as necessary to the circumstances of the particular Project.
- b. Specific details, such as the “*name of the Procuring Entity*” and “*address for bid submission*,” should be furnished in the Instructions to Bidders, Bid Data Sheet, and Special Conditions of Contract. The final documents should contain neither blank spaces nor options.
- c. This Preface and the footnotes or notes in italics included in the Invitation to Bid, BDS, General Conditions of Contract, Special Conditions of Contract, Specifications, Drawings, and Bill of Quantities are not part of the text of the final document, although they contain instructions that the Procuring Entity should strictly follow.
- d. The cover should be modified as required to identify the Bidding Documents as to the names of the Project, Contract, and Procuring Entity, in addition to date of issue.

- e. Modifications for specific Procurement Project details should be provided in the Special Conditions of Contract as amendments to the Conditions of Contract. For easy completion, whenever reference has to be made to specific clauses in the Bid Data Sheet or Special Conditions of Contract, these terms shall be printed in bold typeface on Sections I (Instructions to Bidders) and III (General Conditions of Contract), respectively.
- f. For guidelines on the use of Bidding Forms and the procurement of Foreign-Assisted Projects, these will be covered by a separate issuance of the Government Procurement Policy Board.

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Glossary of Terms, Abbreviations, and Acronyms

ABC – Approved Budget for the Contract.

ARCC – Allowable Range of Contract Cost.

BAC – Bids and Awards Committee.

Bid – A signed offer or proposal to undertake a contract submitted by a bidder in response to and in consonance with the requirements of the bidding documents. Also referred to as *Proposal* and *Tender*. (2016 revised IRR, Section 5[c])

Bidder – Refers to a contractor, manufacturer, supplier, distributor and/or consultant who submits a bid in response to the requirements of the Bidding Documents. (2016 revised IRR, Section 5[d])

Bidding Documents – The documents issued by the Procuring Entity as the bases for bids, furnishing all information necessary for a prospective bidder to prepare a bid for the Goods, Infrastructure Projects, and/or Consulting Services required by the Procuring Entity. (2016 revised IRR, Section 5[e])

BIR – Bureau of Internal Revenue.

BSP – Bangko Sentral ng Pilipinas.

CDA – Cooperative Development Authority.

Consulting Services – Refer to services for Infrastructure Projects and other types of projects or activities of the GOP requiring adequate external technical and professional expertise that are beyond the capability and/or capacity of the GOP to undertake such as, but not limited to: (i) advisory and review services; (ii) pre-investment or feasibility studies; (iii) design; (iv) construction supervision; (v) management and related services; and (vi) other technical services or special studies. (2016 revised IRR, Section 5[i])

Contract – Refers to the agreement entered into between the Procuring Entity and the Supplier or Manufacturer or Distributor or Service Provider for procurement of Goods and Services; Contractor for Procurement of Infrastructure Projects; or Consultant or Consulting Firm for Procurement of Consulting Services; as the case may be, as recorded in the Contract Form signed by the parties, including all attachments and appendices thereto and all documents incorporated by reference therein.

Contractor – is a natural or juridical entity whose proposal was accepted by the Procuring Entity and to whom the Contract to execute the Work was awarded. Contractor as used in these Bidding Documents may likewise refer to a supplier, distributor, manufacturer, or consultant.

CPI – Consumer Price Index.

DOLE – Department of Labor and Employment.

DTI – Department of Trade and Industry.

Foreign-funded Procurement or Foreign-Assisted Project – Refers to procurement whose funding source is from a foreign government, foreign or international financing institution as specified in the Treaty or International or Executive Agreement. (2016 revised IRR, Section 5[b]).

GFI – Government Financial Institution.

GOCC – Government-owned and/or –controlled corporation.

Goods – Refer to all items, supplies, materials and general support services, except Consulting Services and Infrastructure Projects, which may be needed in the transaction of public businesses or in the pursuit of any government undertaking, project or activity, whether in the nature of equipment, furniture, stationery, materials for construction, or personal property of any kind, including non-personal or contractual services such as the repair and maintenance of equipment and furniture, as well as trucking, hauling, janitorial, security, and related or analogous services, as well as procurement of materials and supplies provided by the Procuring Entity for such services. The term “related” or “analogous services” shall include, but is not limited to, lease or purchase of office space, media advertisements, health maintenance services, and other services essential to the operation of the Procuring Entity. (2016 revised IRR, Section 5[r])

GOP – Government of the Philippines.

Infrastructure Projects – Include the construction, improvement, rehabilitation, demolition, repair, restoration or maintenance of roads and bridges, railways, airports, seaports, communication facilities, civil works components of information technology projects, irrigation, flood control and drainage, water supply, sanitation, sewerage and solid waste management systems, shore protection, energy/power and electrification facilities, national buildings, school buildings, hospital buildings, and other related construction projects of the government. Also referred to as *civil works or works*. (2016 revised IRR, Section 5[u])

LGUs – Local Government Units.

NFCC – Net Financial Contracting Capacity.

NGA – National Government Agency.

PCAB – Philippine Contractors Accreditation Board.

PhilGEPS - Philippine Government Electronic Procurement System.

Procurement Project – refers to a specific or identified procurement covering goods, infrastructure project or consulting services. A Procurement Project shall be described, detailed, and scheduled in the Project Procurement Management Plan prepared by the agency which shall be consolidated in the procuring entity's Annual Procurement Plan. (GPPB Circular No. 06-2019 dated 17 July 2019)

PSA – Philippine Statistics Authority.

SEC – Securities and Exchange Commission.

SLCC – Single Largest Completed Contract.

UN – United Nations.

Section I. Invitation to Bid

Notes on the Invitation to Bid

The Invitation to Bid (IB) provides information that enables potential Bidders to decide whether to participate in the procurement at hand. The IB shall be posted in accordance with Section 21.2 of the 2016 revised IRR of RA No. 9184.

Apart from the essential items listed in the Bidding Documents, the IB should also indicate the following:

- a. The date of availability of the Bidding Documents, which shall be from the time the IB is first advertised/posted until the deadline for the submission and receipt of bids;
- b. The place where the Bidding Documents may be acquired or the website where it may be downloaded;
- c. The deadline for the submission and receipt of bids; and
- d. Any important bid evaluation criteria.

The IB should be incorporated into the Bidding Documents. The information contained in the IB must conform to the Bidding Documents and in particular to the relevant information in the Bid Data Sheet.



REPUBLIC OF THE PHILIPPINES
QUEZON CITY GOVERNMENT
BIDS AND AWARDS COMMITTEE FOR INFRASTRUCTURE &
CONSULTANCY



2nd floor, Finance Building, Procurement Department, Quezon City Hall Complex, Elliptical Road, Quezon City

June 21, 2021

Invitation to Bid

No	Project No.	Project Name	Location	Amount	Duration Cal. Days	Office	Source Fund
<u>Buildings – Small B</u>							
1	21-00078	Proposed Rehabilitation of Barangay Lourdes Hall	Lourdes	2,699,936.14	90	City Engineering Department	Engineering
2	21-00079	Proposed Rehabilitation of Sagip Batang Solvent Shelter	San Agustin	3,626,891.56	60	City Engineering Department	Engineering
3	21-00080	Proposed Improvement of District 1 Office Mini City Hall (at Barangay Katipunan)	Katipunan	7,103,222.41	120	City Engineering Department	Engineering
4	21-00081	Proposed Total Rehabilitation of Plumbing Utilities of the Legislative Building	Central	8,257,301.33	150	City Engineering Department	Engineering
5	21-00082	Proposed Improvement of District 1 Office Mini City Hall (at Barangay Bahay Toro)	Bahay Toro	11,216,538.26	120	City Engineering Department	Engineering
6	21-00041B	Proposed Construction of Vending Site at Mangga Street	Katipunan	2,077,798.42	60	City Engineering Department	Engineering
<u>Buildings – Medium A</u>							
7	21-00083	Proposed Improvement of Bahay Kalinga Building (Integrated Community Development Center and Calalay Training Center)	N.S. Amoranto	30,351,650.20	300	City Engineering Department	Engineering
8	21-00084	Proposed Construction of Roxas Health Center	Roxas	35,556,948.60	270	City Engineering Department	OCM-20% CDF
9	21-00085	Proposed Construction of Quezon City Jail Fence and Guard Tower	Bagong Silangan	39,848,424.84	300	City Engineering Department	Engineering
<u>Buildings – Medium B</u>							
10	21-00086	Proposed Construction of Baesa Columbarium with Land Development	Baesa	159,894,192.71	420	City Engineering Department	Engineering

<u>Parks – Small B</u>							
11	21-00087	Proposed Rehabilitation of of GSIS Village Parks and Playground including Basketball Court	Bahay Toro	12,864,305.13	120	City Engineering Department	Trust Fund
<u>Roads – Small B</u>							
12	21-00088	Proposed Rehabilitation of Road and Drainage at P. Castillo Street	Pansol	1,525,635.84	90	City Engineering Department	OCM-20% CDF
13	21-00089	Proposed Rehabilitation of Pathwalk / Sidewalk and Drainage System at Mangga and San Antonio Streets	Katipunan	1,851,260.51	90	City Engineering Department	OCM-20% CDF
14	21-00090	Proposed Rehabilitation of Road and Drainage at Fort Santiago and Ilocos Norte Streets	Alicia	4,105,674.56	90	City Engineering Department	OCM-20% CDF
15	21-00091	Proposed Rehabilitation of Road and Drainage at Santol Street (Palmera Homes)	Sta. Monica	9,767,772.89	180	City Engineering Department	Engineering

1. The **QUEZON CITY LOCAL GOVERNMENT**, through *funding source of various years* intends to apply the sum stated above being the Approved Budget for the Contract (ABC) to payments under the contract *for the above stated Projects*. Bids received in excess of the ABC shall be automatically rejected at bid opening.
2. The **QUEZON CITY LOCAL GOVERNMENT** now invites bids for the above Procurement Project. Completion of the Works is required *as stated above*. Bidders should have completed a contract similar to the Project. The description of an eligible bidder is contained in the Bidding Documents, particularly, in Section II (Instructions to Bidders).
3. Bidding will be conducted through open competitive bidding procedures using non-discretionary “*pass/fail*” criterion as specified in the 2016 revised Implementing Rules and Regulations (IRR) of Republic Act (RA) No. 9184.
4. Interested bidders may obtain further information from **QUEZON CITY LOCAL GOVERNMENT – BAC Secretariat** and inspect the Bidding Documents at the address given below *weekdays from 8:00 am. – 5:00 p.m.*
5. A complete set of Bidding Documents may be acquired by interested bidders on **22 June 2021 (Tuesday)** from given address and website/s below *and upon payment of a non-refundable fee for the Bidding Documents, pursuant to the latest Guidelines issued by the GPPB*. The Procuring Entity shall allow the bidder to present its proof of payment for the fees *presented in person*.

STANDARD RATES:

Approved Budget for the Contract	Maximum Cost of Bidding Documents (in Philippine Peso)
More than 1 Million up to 5 Million	5,000.00
More than 5 Million up to 10 Million	10,000.00
More than 10 Million up to 50 Million	25,000.00
More than 50 Million up to 500 Million	50,000.00
More than 500 Million	75,000.00

The following are the requirements for purchase of Bidding Documents;

1. PhilGEPS Registration Certificate (Platinum – 3 Pages)
2. Document Request List (DRL)
3. Authorization to purchase bidding documents
 - 3.1 Secretary's Certificate (for corporation)
 - 3.2 Special Power of Attorney (for sole proprietorship)
4. Notarized Joint Venture Agreement (if applicable)
5. Letter of Intent

It must be duly received by the BAC Secretariat at 2nd Floor, Procurement Department, Finance Building, Quezon City Hall Compound.

6. The ***QC- BAC- INFRASTRUCTURE & CONSULTANCY*** will hold a Pre-Bid Conference¹ on **June 30, 2021 at 10:00 AM at 2nd Floor, Procurement Department-Bidding Room, Finance Building, Quezon City Hall Compound** or we encourage the prospective bidders to join through our **Virtual Conference (ZOOM APP)** which shall be open to prospective bidders.

Virtual Conference (ZOOM APP)

Meeting ID: 854 9489 0133

Password: 273320

7. Bids must be duly received by the BAC Secretariat through manual submission at the office address as indicated below, on or before **July 12, 2021. – 9:00AM**. 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 16.
9. Bid opening shall be on **July 12, 2021 - 10:00 AM at 2nd Floor, Procurement Department-Bidding Room, Finance Building, Quezon City Hall Compound** and/or via Zoom. Bids will be opened in the presence of the bidders' representatives who choose to attend the activity.

Virtual Conference (ZOOM APP)

Meeting ID: 810 3646 5257

Password: 201522

10. The ***Quezon City Local Government*** 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 Implementing Rules and Regulations (IRR) of RA No. 9184, without thereby incurring any liability to the affected bidder or bidders.
11. For further information, please refer to:

ATTY. DOMINIC B. GARCIA

OIC, Procurement Department

2nd Floor, Procurement Department,

Finance Building, Quezon City Hall Compound

Elliptical Road, Barangay Central Diliman, Quezon City.

Tel. No. (02)8988-4242 loc. 8506/8710

Email Add: bacinfra.procurement@quezoncity.gov.ph

Website: www.quezoncity.gov.ph

¹ May be deleted in case the ABC is less than One Million Pesos (PhP1,000,000) where the Procuring Entity may not hold a pre-bid conference.

12. You may visit the following websites:

For downloading of Bidding Documents: <https://quezoncity.gov.ph/public-notices/procurement/>

By:


ATTY. MARK DALE DIAMOND P. PERRAL
Chairman, BAC-Infra and Consultancy

Section II. Instructions to Bidders

Notes on the Instructions to Bidders

This Section on the Instruction to Bidders (ITB) provides the information necessary for bidders to prepare responsive bids, in accordance with the requirements of the Procuring Entity. It also provides information on bid submission, eligibility check, opening and evaluation of bids, post-qualification, and on the award of contract.

1. Scope of Bid

The Procuring Entity, **Quezon City Government** invites Bids for the **PROPOSED CONSTRUCTION OF BAESA COLUMBARIUM WITH LAND DEVELOPMENT**, with Project Identification Number **21-00086**.

[Note: The Project Identification Number is assigned by the Procuring Entity based on its own coding scheme and is not the same as the PhilGEPS reference number, which is generated after the posting of the bid opportunity on the PhilGEPS website.]

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

2. Funding Information

2.1. The GOP through the source of funding as indicated below for **2021** in the amount of **One Hundred Fifty-Nine Million Eight Hundred Ninety-Four Thousand One Hundred Ninety-Two Pesos & 71/100 Cts. (P 159,894,192.71)**.

2.2. The source of funding is:

a. LGUs, the Annual or Supplemental Budget, as approved by the Sanggunian.

3. Bidding Requirements

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

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

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

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

The Procuring Entity, as well as the Bidders and Contractors, shall observe the highest standard of ethics during the procurement and execution of the contract. They or

through an agent shall not engage in corrupt, fraudulent, collusive, coercive, and obstructive practices defined under Annex “I” of the 2016 revised IRR of RA No. 9184 or other integrity violations in competing for the Project.

5. Eligible Bidders

- 5.1. Only Bids of Bidders found to be legally, technically, and financially capable will be evaluated.
- 5.2. The Bidder must have an experience of having completed a Single Largest Completed Contract (SLCC) that is similar to this Project, equivalent to at least fifty percent (50%) of the ABC adjusted, if necessary, by the Bidder to current prices using the PSA’s CPI, except under conditions provided for in Section 23.4.2.4 of the 2016 revised IRR of RA No. 9184.

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

- 5.3. For Foreign-funded Procurement, the Procuring Entity and the foreign government/foreign or international financing institution may agree on another track record requirement, as specified in the Bidding Document prepared for this purpose.
- 5.4. The Bidders shall comply with the eligibility criteria under Section 23.4.2 of the 2016 IRR of RA No. 9184.

6. Origin of Associated Goods

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

7. Subcontracts

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

The Procuring Entity has prescribed that:

a. Subcontracting is not allowed.

- 7.1. *[If Procuring Entity has determined that subcontracting is allowed during the bidding , state:]* The Bidder must submit together with its Bid the documentary requirements of the subcontractor(s) complying with the eligibility criterial stated in **ITB** Clause 5 in accordance with Section 23.4 of the 2016 revised IRR of RA No. 9184 pursuant to Section 23.1 thereof.
- 7.2. *[If subcontracting is allowed during the contract implementation stage, state:]* The Supplier may identify its subcontractor during the contract implementation stage. Subcontractors identified during the bidding may be changed during the

implementation of this Contract. Subcontractors must submit the documentary requirements under Section 23.1 of the 2016 revised IRR of RA No. 9184 and comply with the eligibility criteria specified in **ITB** Clause 5 to the implementing or end-user unit.

- 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 on **June 30, 2021, 10:00 A.M. at 2nd Floor, Procurement Department-Bidding Room, Finance Building, Quezon City Hall Compound** and/or we encourage the prospective bidders to join through our **Virtual Conference (ZOOM APP) Meeting ID: 854 9489 0133 Password: 273320**

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 **Section IX. Checklist of Technical and Financial Documents**.
- 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 **Section IX. Checklist of Technical and Financial Documents**.
- 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:*
 - a. 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 **in no case shall exceed One Hundred Twenty (120) calendar days from the date of opening of bids, unless duly extended by the bidder upon the request of the Head of the Procuring Entity (HoPE) of the Quezon City Local Government**. Any bid not accompanied by an acceptable bid security shall be rejected by the Procuring Entity as non-responsive.

16. Sealing and Marking of Bids

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

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

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

17. Deadline for Submission of Bids

The Bidders shall submit on the specified date and time and either at its physical address or through online submission as indicated in paragraph **5** 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

Notes on the Bid Data Sheet (BDS)

The Bid Data Sheet (BDS) consists of provisions that supplement, amend, or specify in detail, information, or requirements included in the ITB found in Section II, which are specific to each procurement.

This Section is intended to assist the Procuring Entity in providing the specific information in relation to corresponding clauses in the ITB and has to be prepared for each specific procurement.

The Procuring Entity should specify in the BDS information and requirements specific to the circumstances of the Procuring Entity, the processing of the procurement, and the bid evaluation criteria that will apply to the Bids. In preparing the BDS, the following aspects should be checked:

- a. Information that specifies and complements provisions of the ITB must be incorporated.
- b. Amendments and/or supplements, if any, to provisions of the ITB as necessitated by the circumstances of the specific procurement, must also be incorporated.

Bid Data Sheet

ITB Clause																																																	
5.2	For this purpose, similar contracts shall refer to contracts which have the same major categories of work.																																																
7.1	Subcontracting is not allowed.																																																
10.3	<i>No additional contractor license or permit is required</i> <i>In addition, eligible bidders shall qualify or comply with the following:</i> 1. Bidders with valid Philippine Contractors Accreditation Board (PCAB) Type Buildings – Medium B																																																
10.4	<table><tr><td colspan="4">The minimum work experience requirements for key personnel are the following:</td></tr><tr><td>Qty.</td><td>Key Personnel</td><td>General Experience</td><td>Relevant Experience</td></tr><tr><td>1</td><td>Project Manager</td><td>3 years</td><td>3 years</td></tr><tr><td>1</td><td>Project Engineer</td><td>3 years</td><td>3 years</td></tr><tr><td>1</td><td>DPWH duly accredited Materials Engineer</td><td>3 years</td><td>3 years</td></tr><tr><td>1</td><td>Safety Officer</td><td>3 years</td><td>3 years</td></tr><tr><td>1</td><td>Foreman</td><td>3 years</td><td>3 years</td></tr><tr><td>105</td><td>Skilled Worker</td><td>3 years</td><td>3 years</td></tr><tr><td>1</td><td>Driver</td><td>3 years</td><td>3 years</td></tr><tr><td>1</td><td>Heavy Equipment Operator</td><td>3 years</td><td>3 years</td></tr><tr><td>154</td><td>Laborer</td><td>1 year</td><td>3 months</td></tr><tr><td colspan="4"><i>In addition, the bidder must execute an affidavit of undertaking duly notarized stating that the foregoing personnel shall perform work exclusively for the project until its completion. Please see attached bid forms.</i></td></tr></table>	The minimum work experience requirements for key personnel are the following:				Qty.	Key Personnel	General Experience	Relevant Experience	1	Project Manager	3 years	3 years	1	Project Engineer	3 years	3 years	1	DPWH duly accredited Materials Engineer	3 years	3 years	1	Safety Officer	3 years	3 years	1	Foreman	3 years	3 years	105	Skilled Worker	3 years	3 years	1	Driver	3 years	3 years	1	Heavy Equipment Operator	3 years	3 years	154	Laborer	1 year	3 months	<i>In addition, the bidder must execute an affidavit of undertaking duly notarized stating that the foregoing personnel shall perform work exclusively for the project until its completion. Please see attached bid forms.</i>			
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	Plate Compactor 1 Welding Machine 1 Elf Truck 1 Minor Tools As needed Scaffolding (H-Frame) As needed Power Tools As needed <i>In addition, the bidder must execute an affidavit of undertaking duly notarized stating that the foregoing equipment shall be used exclusively for the project until its completion. Please see attached bid forms.</i>
12	<i>[Insert Value Engineering clause if allowed.]</i>
15.1	The bid security shall be in the form of a Bid Securing Declaration with project number, or any of the following forms and amounts: a) The amount of not less than Php 3,197,883.85 or equivalent to two percent (2%) of ABC if bid security is in cash, cashier's/manager's check, bank draft/guarantee or irrevocable letter of credit; or b) The amount of not less than Php 7,994,709.64 or equivalent to five percent (5%) of ABC if bid security is in Surety Bond.
19.2	Partial bid is not allowed. The infrastructure project is packaged in a single lot and the lot shall not be divided into sub-lots for the purpose of bidding, evaluation, and contract award.
20	No additional requirement.
21	Additional Contract Documents relevant to the Project as required: 1. Construction Schedule and S-curve, 2. Manpower Schedule, 3. Construction Methods, 4. Equipment Utilization Schedule, 5. PERT/CPM or other acceptable tools of project scheduling, shall be included in the submission of Technical Proposal.

Section IV. General Conditions of Contract

Notes on the General Conditions of Contract

The General Conditions of Contract (GCC) in this Section, read in conjunction with the Special Conditions of Contract in Section V and other documents listed therein, should be a complete document expressing all the rights and obligations of the parties.

Matters governing performance of the Contractor, payments under the contract, or matters affecting the risks, rights, and obligations of the parties under the contract are included in the GCC and Special Conditions of Contract.

Any complementary information, which may be needed, shall be introduced only through the Special 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

Notes on the Special Conditions of Contract

Similar to the BDS, the clauses in this Section are intended to assist the Procuring Entity in providing contract-specific information in relation to corresponding clauses in the GCC found in Section IV.

The Special Conditions of Contract (SCC) complement the GCC, specifying contractual requirements linked to the special circumstances of the Procuring Entity, the Procuring Entity's country, the sector, and the Works procured. In preparing this Section, the following aspects should be checked:

- a. Information that complements provisions of the GCC must be incorporated.
- b. Amendments and/or supplements to provisions of the GCC as necessitated by the circumstances of the specific purchase, must also be incorporated.

However, no special condition which defeats or negates the general intent and purpose of the provisions of the GCC should be incorporated herein.

Special Conditions of Contract

GCC Clause	
2	Completion of work shall be within 420 calendar days.
4.1	The Procuring Entity shall give possession of all parts of the Site to the Contractor upon receipt of the Notice to Proceed.
6	The site investigation reports are: <i>[list here the required site investigation reports.]</i>
7.2	<p><i>[Select one, delete the other.]</i></p> <p><i>[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:]</i> Fifteen (15) years.</p> <p><i>[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:]</i> Five (5) years.</p> <p><i>[In case of other structures, such as bailey and wooden bridges, shallow wells, spring developments, and other similar structures:]</i> Two (2) years.</p>
10	Dayworks are applicable at the rate shown in the Contractor's original Bid.
13	The amount of the advance payment is no more that fifteen percent (15%) of the Contract Price subject to approval by the HOPE and compliance with the conditions under RA 9184 and its IRR.
14	No further instructions.
15.1	<p>The date by which operating and maintenance manuals are required is <i>thirty (30) days</i></p> <p>The date by which "as built" drawings are required as part of final payment</p>
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 ten (10%) percent of the contract price.

Section VI. Specifications

Notes on Specifications

A set of precise and clear specifications is a prerequisite for Bidders to respond realistically and competitively to the requirements of the Procuring Entity without qualifying or conditioning their Bids. In the context of international competitive bidding, the specifications must be drafted to permit the widest possible competition and, at the same time, present a clear statement of the required standards of workmanship, materials, and performance of the goods and services to be procured. Only if this is done will the objectives of economy, efficiency, and fairness in procurement be realized, responsiveness of Bids be ensured, and the subsequent task of bid evaluation facilitated. The specifications should require that all goods and materials to be incorporated in the Works be new, unused, of the most recent or current models, and incorporate all recent improvements in design and materials unless provided otherwise in the Contract.

Samples of specifications from previous similar projects are useful in this respect. The use of metric units is mandatory. Most specifications are normally written specially by the Procuring Entity or its representative to suit the Works at hand. There is no standard set of Specifications for universal application in all sectors in all regions, but there are established principles and practices, which are reflected in these PBDs.

There are considerable advantages in standardizing General Specifications for repetitive Works in recognized public sectors, such as highways, ports, railways, urban housing, irrigation, and water supply, in the same country or region where similar conditions prevail. The General Specifications should cover all classes of workmanship, materials, and equipment commonly involved in construction, although not necessarily to be used in a particular Works Contract. Deletions or addenda should then adapt the General Specifications to the particular Works.

Care must be taken in drafting specifications to ensure that they are not restrictive. In the specification of standards for goods, materials, and workmanship, recognized international standards should be used as much as possible. Where other particular standards are used, whether national standards or other standards, the specifications should state that goods, materials, and workmanship that meet other authoritative standards, and which ensure substantially equal or higher quality than the standards mentioned, will also be acceptable. The following clause may be inserted in the SCC.

Sample Clause: Equivalency of Standards and Codes

Wherever reference is made in the Contract to specific standards and codes to be met by the goods and materials to be furnished, and work performed or tested, the provisions of the latest current edition or revision of the relevant standards and codes in effect shall apply, unless otherwise expressly stated in the Contract. Where such standards and codes are national, or relate to a particular country or region, other authoritative standards that ensure a substantially equal or higher quality than the standards and codes specified will be accepted

subject to the Procuring Entity's Representative's prior review and written consent. Differences between the standards specified and the proposed alternative standards shall be fully described in writing by the Contractor and submitted to the Procuring Entity's Representative at least twenty-eight (28) days prior to the date when the Contractor desires the Procuring Entity's Representative's consent. In the event the Procuring Entity's Representative determines that such proposed deviations do not ensure substantially equal or higher quality, the Contractor shall comply with the standards specified in the documents.

These notes are intended only as information for the Procuring Entity or the person drafting the Bidding Documents. They should not be included in the final Bidding Documents.



Republic of the Philippines
Quezon City
Office of the City Mayor
QUEZON CITY BIDS & AWARDS COMMITTEE
(QC-BAC-INFRA)



PROJECT : PROPOSED CONSTRUCTION OF BAESA COLUMBARIUM WITH LAND DEVELOPMENT (COLUMBARIUM)

LOCATION : Barangay Baesa, Quezon City

SUBJECT : GENERAL CONDITIONS AND TECHNICAL SPECIFICATIONS

I. GENERAL CONDITIONS

1.0 DEFINITIONS

- a. **OWNER :** LOCAL GOVERNMENT OF QUEZON CITY
- b. **CONTRACTOR :** Any individual, firm, corporation, partnership or association that enters into an agreement with the Owner for furnishing the materials and/or labor, tools, equipment, plant and other facilities required for the erection and completion of the project subject to the accompanying plans and working drawings.
- c. The Owner/Implementing Agency and the Contractor are treated through the contract documents as if each were of the regular number, masculine gender.

1.1 EXAMINATION OF MEMBER

The Contractor shall carefully examine the premises before submitting any bids to enable him to have full knowledge of conditions existing therein.

1.2 LOCATION

The Proposed Construction Of Baesa Columbarium with Land Development (Columbarium) be built along Barangay Baesa, Quezon City, refer to the approved Location Plan.

1.3 EXECUTION, CORRELATION & INTENT OF DOCUMENTS

- a. The Contract Documents are signed in sufficient number of copies by all parties concerned. In case anybody fails to sign copies of any item forming part of the set contract documents, the Implementing Agency's identification thereon shall suffice.
- b. The items, specifications and all other documents forming the contract documents are complementary. Anything shown on plans but not mentioned in the specifications or vice versa or anything not expressly set forth in either, but necessarily implied, shall be furnished or done as if specifically shown and mentioned in both, with no extra charge. Where dimensions are given in figures, follow them in preference to measurement by scale.
- c. Execute work as per agreement, making no changes or deviations whatsoever, without prior permission from the Implementing Agency.
- d. The Contractor shall verify and check all dimensions particularly those on the plans. He will be held directly responsible in case of any discrepancy that may be discovered during the progress of work.

1.4 DETAIL DRAWINGS AND INSTRUCTIONS

Plans furnished for use at the jobsite are whenever necessary, supplemented by detail drawings and instructions essential to the proper execution of the work. Such supplementary detail drawings and instructions shall be treated as of equal force as though originally issued.

1.5 PLANS AND PROJECT SITE

Keep at project site, in good order and condition, one (1) set of approved plans, specifications, supplementary detail drawings and instructions.

1.6 SHOP DRAWINGS

Shop drawings shall be provided by the Implementing Agency and/or Contractor during the progress of construction. The contractor should not place any item subject to shop drawings until the Implementing Agency shall have duly approved such drawings.

1.7 CHANGES

The Owner and the Implementing Agency reserve the right to make alterations or additions, including changes during the progress of work. The same shall be carried into effect without in any way deviating from or violating any agreement. Whatever amount shall necessarily be entailed in the cost of labor or materials or both shall be added to or deducted from the original contract price.

1.8 TIME OF COMPLETION AND SCHEDULE OF CONSTRUCTION

The Contractor shall, before actual commencement of the project operations, prepare and submit to the Implementing Agency for verification and approval, a complete and comprehensive work schedule covering the entire duration of construction. He shall also include therein, the estimated number of days within which the entire project shall be completed stage by stage by phase.

1.9 WORKMANSHIP

The project shall be executed with the use of first class workmanship to the full intent and meaning of the plans and specifications and to the complete approval and acceptance by the Implementing Agency.

1.10 MATERIALS

All materials to be used shall be the best of their respective types and kind. They shall be properly stored and protected from damage or injury.

1.11 SAMPLES

Submit samples as specified and proceed with the work with the use of materials procured based on the samples previously approved by the Implementing Agency.

1.12 INSPECTION OF WORK

The Contractor shall provide the facility for inspecting the work to the Implementing Agency, the Owner and other personnel having jurisdiction over the work.

1.13 DEFECTIVE OR IMPROPER WORK

All work or materials not acceptable to the Architect shall be removed immediately and replaced with appropriate work or materials without extra charge. All condemned materials shall be taken away from the premises without delay.

1.14 BUILDING LAWS AND REGULATIONS

The Contractor shall be held responsible for strict compliance with existing labor laws and regulations and shall free the Owner from any responsibility in connection therewith, he shall pay on time at his own expense, all taxes, fees and/or licenses due to the government, both national and local arising from his work on the project.

1.15 MANNER OF PAYMENT

Payments to the Contractor shall be based on the periodic work accomplishments subject to verification, approval and recommendation by the Implementing Agency.

1.16 RETENTION MONEY

Progress payments shall be subject to a ten percent (10%) deduction, referred to as retention money. All retained amounts shall be released upon satisfactory completion of the work and issuance of the Certificate of Final Completion and Acceptance.

1.17 TEMPORARY WATER, POWER AND TELEPHONE FACILITIES

The Contractor shall make the necessary arrangements with the local utility companies so as to provide temporary facilities for the supply of water, power and telephone for the duration of construction, and all expenses in connection therewith shall be borne by the Contractor.

1.18 PRIVY

The Contractor shall provide a temporary privy in a most inconspicuous and sanitary manner, and shall have it removed at the termination of the work.

1.19 CLEARING AND CLEANING

Upon its completion, the project and its premises shall be cleared and cleaned as directed by the Implementing Agency, and make ready for immediate occupancy.

1.20 TEMPORARY BARRICADES, SIGNAL LIGHTS, BILLBOARDS, ETC.

The Contractor shall provide all temporary barricades, signal lights, Architect and Contractor's billboards, the required official building billboard, etc., necessary for the protection of the public and for the proper prosecution of the work and display of construction requirements.

1.21 PERFORMANCE AND GUARANTEE BOND

To guarantee the faithful performance of the Contractor under the contract, he shall post a Performance Bond in the amount of thirty percent (30%) of the contract price in the form of cash, manager's check or surety bond, callable on demand.

1.22 QUESTIONS AND DISAGREEMENTS

All questions and disagreements between the Contractor and the Owner relative to the interpretation of the plans and specifications shall be referred to the Implementing Agency whose decision on the matter shall be final.

II. TECHNICAL SPECIFICATIONS

2.0 SITE WORK

WORK INCLUDED

- 2.0.0 Staking out and establishment of additional wall lines, grades and benchmarks.
- 2.0.1 All excavation works including all necessary shoring, bracing and drainage of storm water from the site.
- 2.0.2 All soil treatment, backfilling, filling, compaction and grading, removal of excess material from site.
- 2.0.3 Protection of property, work and structures, workmen and other people from damage and injury.
- 2.0.4 Soil Poisoning / Termite Proofing.
- 2.0.5 Gravel Bedding and Compaction (Ordinary Gravel).
- 2.0.6 Backfill and compaction

2.0.7 Hauling and disposal of excess materials

2.0.8 Demolition works

2.1 LINES, GRADES AND BENCHMARKS

2.1.0 Stake out accurately the lines of the building and/or the other structures included in the contract, and establish grades therefore, after which secure approval of the Project Manager before any excavation work is commenced.

2.1.0 Erect basic batter boards and basic reference marks at such places where they will not be disturbed during the construction of the foundation.

2.2 EXCAVATION

Structural Excavations: Excavations shall be to the depths indicated in the drawings where bearing value as indicated in the Soils Investigation Report provided as part of the Construction Documents shall be attained. Excavations for footings and foundations carried below required depths shall be filled with lean concrete and bottom of such shall be level. All structural excavations shall extend a sufficient distance from the walls and footings to allow for proper erection and dismantling of forms, for installation of service and for inspection.

All excavations shall be inspected and approved before pouring any concrete laying underground utility and auxiliary lines for placing select fill materials. The Contractor shall control the grading in the vicinity of all excavated areas to prevent surface drainage running into excavations. Water that accumulates in excavated areas shall be removed by pumping before fill is placed herein.

2.3 SOIL TREATMENT

Treat soil with 2% Chlordane or Andrex solution in water to provide an unbroken horizontal and vertical chemical barrier between the proposed structure and the possible termite colonies in the soil after excavation is completed and prior to pouring of concrete foundation and ground floor slabs. At the time the soil treatment is to be applied, the soil shall be in a friable condition with a sufficient low moisture content to allow uniform distribution of the treatment solution throughout the soil.

Do not apply pesticide during or immediately after heavy rains, or whenever climatic conditions are such that runoff will occur to create an environmental hazard. Cover treated areas with polyethylene or waterproof sheeting if concrete is not poured on the same day as the soil treatment. Take adequate precautions to prevent disturbance of the pesticide barrier. Re-treat the soil or fill is disturbed after the treatment and before the placement of structural components. Apply pesticide prior to placement of vapor barrier or waterproofing membrane.

2.4 SHORING

Excavation shall be shored and braced by members of suitable sizes where necessary to prevent danger to persons, injurious caving or erosions. Shoring bracing and sheathing shall be removed, as the excavations are backfilled, in a manner such as to prevent injurious caving. The contractor shall keep all excavations free from water while construction is in progress.

2.5 FILLING AND BACKFILLING

After forms have been removed and when concrete work is hard enough to resist pressure resulting from fill, backfilling may then be done. Materials excavated may be used for backfilling. All filling shall be placed in layers not exceeding six (6) inches in thickness, each layer being thoroughly compacted and rammed by wetting, tamping, rolling.

2.6 PLACING AND COMPACTING FILL

2.6.0 Common Fill: shall be approved imported/site-excavated material free from roots, stumps and other perishable or objectionable matter.

- 2.6.1 **Select Fill:** shall be placed where indicated and shall consist of crushed gravel, crushed rock or a combination thereof. The material shall be free from adobe, vegetable matters and shall be thoroughly tamped after lacing.
- 2.6.2 Before placing fill materials, the surface upon which it shall be placed shall be cleared of all brush roots, vegetable matter and debris, and thoroughly wetted to ensure good bonding between grounds.
- 2.6.3 **Compaction:** Fills shall be evenly spread in horizontal layers of not more than 200mm in thickness. Each layer shall be wetted and compacted by approved mechanical compaction machine, roller or portable to a density of at least 90% or its maximum density for non-cohesive soils as determined by ASTM Method D-1557 or AASHTO Method T-180.

2.7 FINISH GRADING

The contractor shall fill and grade the whole area to the indicated sub-grade elevations as directed by the Architect or Engineer. The contractor shall verify the finish grade elevations of the proposed pavements. Prior to grading operations, the areas shall be cleared of all heavy growth or vegetation stumps, roots, cables, wires, rocks and other debris. The finished sub-grade shall be reasonably smooth and compacted and ready to receive the base course for the proposed pavement.

2.8 DISPOSAL OF EXCESS MATERIALS

Any excess and demolished materials remaining after completion of the earthwork shall be disposed of by hauling and transported out of the premises at the contractor's own expense.

2.9 SUB-GRADE PREPARATION

2.9.0 SCOPE

The sub-grade preparation shall be that part of the work which is the preparation for the support of the bases for pavements and structures. It shall extend to the full width of pavements including shoulders and lay-bys as shown on the drawings or as specified herein. Unless otherwise agreed upon by the Engineer, sub-grade preparation or a section of the road shall not be commenced unless the contractor is able, after the completion and acceptance of the work, to commence immediately pavement construction.

2.9.1 PRODUCTS

All materials and equipment necessary for proper completion of this work shall be subject to the approval of the Engineer.

2.9.2 EXECUTION

2.9.2.0 Prior Works: Prior to commencing the preparation of the sub-grade, all culverts, cross drains, and other similar structures (including the fully compacted backfill) shall be completed. No work shall be started on the preparation of the sub-grade before the prior works herein approved by the Engineer.

2.9.2.1 Sub-grade Level Tolerance: The finish compacted surface of the sub-grade shall conform to AASHTO M-145.

2.9.2.2 Sub-grade in Cutting Common Material

- a. Unless otherwise specified, all materials below sub-grade level in earth cutting to a depth of 150mm or other depth shown on the drawings or directed by the Engineer shall be excavated. The material, if suitable, shall be placed to one side for re-use, or if unsuitable, shall be disposed of in accordance with the requirements of AASHTO M-145.
- b. Where material has been removed from below sub-grade level, the base of the resulting cutting shall be compacted to a depth of 150mm to the requirements of AASHTO M-145 Table 1. If necessary, the moisture content of the material shall be adjusted.

2.10 GRADED AGGREGATES AND BASE COURSE

2.10.0 SUBMITTALS

- a. Test Reports: Before delivery of materials, submit the following test reports:
 - 1. Gradation
 - 2. Bearing Ratio
 - 3. Attenberg Limits

2.10.1 DELIVERY AND STORAGE

Do not construct base course when rainfall or other weather conditions will detrimentally affect the quality of the finished course.

2.11 PRODUCTS

2.11.0 MATERIALS

- a. Aggregates: Consist of durable sound crushed gravel, crushed stone, free of lumps and balls of clay or other objectionable matter. Crushed stone shall be free from flat, soft or disintegrated pieces. Crushed gravel retained on a No. 4 sieve shall have at least ninety percent (90%) by weight with at least two fractured faces one hundred percent (100%) by weight with at least one fractured face.
- b. Base course materials samples shall have a Bearing Ratio of at least 100 as determined by laboratory tests on a 4-day soaked specimen in accordance with ASTM D 1883; compact specimen in accordance with ASTM D 1557, Method D. Determine grain size in accordance with ASTM C-117.
- c. Soil binder material, the surface of the layer by a combination of rolling and blading. Final surface shall be smooth and free from waves, irregularities and from ruts of soft yielding spots.

III CONCRETE

3.0 GENERAL

- 3.0.0 Unless otherwise specified herein, concrete work shall conform to the requirements of ACI Building Code. Full cooperation shall be given other trades to install embedded items. Provisions shall be made for setting items not placed in the forms. Before concrete is placed, embedded items shall have been inspected and tested for concrete aggregates and other materials shall have been done.

3.1 SUBMITTALS

- 3.1.0 Shop Drawings: Reproduction of contract drawings is unacceptable.
- 3.1.0 Shop Drawings for Reinforcing Steel: ACI 318. Indicate bending diagrams, assembly diagrams, splicing and lap 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 bars.
- 3.1.1 Contractor Mix Design: Thirty (30) days prior to concrete placement, submit a design for each strength and type of concrete. Furnish a complete list of materials including type, brand; source and amount of cement and admixtures;

applicable reference specifications and copies of test reports showing that the mix has been successfully tested to produce concrete with the properties specified and will be suitable for the job conditions. Provide fly ash and pozzolan test results performed within six (6) months of submittal date. Obtain approval before concrete placement.

3.1.2 Certificates of Compliance

- a. Aggregates
- b. Admixtures
- c. Reinforcement
- d. Cement

3.1.3 Catalogue Data

- a. Water stops
- b. Materials for Curing Concrete
- c. Joint Sealant
- d. Joint Filter
- e. Vapor Barrier
- f. Epoxy Bonding Agents

3.2 MATERIALS

3.2.0 Cement for concrete shall conform to the requirements of specifications for Portland cement (ASTM C-150).

3.2.1 Water used in mixing concrete shall be clean and free from other injurious amounts of oil, acids, alkaline, organic materials or other substances that may be deleterious to concrete or steel.

3.2.2 Fine Aggregates shall consist of hard, tough, durable uncoated particles. The shape of the particles shall be generally rounded or cubicle and reasonably free from flat or elongated particles. The stipulated percentages of fines in the sand shall be obtained either by processing sand or by the production of suitable graded manufactured sand.

3.2.3 Coarse Aggregates shall consist of gravel. Crushed gravel or rock. Or a combination of gravel and rock. Coarse aggregates shall consist of hard, tough, durable, clean and uncoated particles. The size of coarse aggregates top be used in the various parts of the Work shall be $\frac{3}{4}$ ".

3.2.4 Reinforcing bars shall conform to the requirements of ASTM Standard specifications for Billet Steel Bars for concrete reinforcement (A15-625) and to Specification for minimum requirements for the deformed steel bars for concrete reinforcement (A305-56). Tensile strength and grade for all reinforcing bars such as main horizontal (for beams), vertical (for columns), ties, stirrups and inserts shall be as follows:

No. 3 (3/8")	10 mm – fy	=	40,000 psi	Grade 40)
No. 4 (1/2")	12 mm – fy	=	40,000 psi	(Grade 40)
No. 5 (5/8")	16 mm – fy	=	60,000 psi	(Grade 60)
No. 6 (3/4")	20 mm – fy	=	60,000 psi	(Grade 60)
No. 8 (1")	25 mm – fy	=	60,000 psi	(Grade 60)

3.3 PROPORTIONING AND MIXING

3.3.0 Proportioning of all materials entering into the concrete mixture of 3,000 psi concrete shall be as follows:

<u>Class</u>	<u>Cement</u>	<u>Sand</u>	<u>Gravel</u>
A	1	2.0	4

3.3.1 Strength of Concrete: Concrete shall have 28-day cylinder strength of 3,000 psi shall be for slab on grade, site pavements and wall footings.

occurs. On the bottom of beams and slabs, where the congestion of steel near the forms makes placing difficult, a layer of mortar of the same cement-sand ratio as used in concrete shall be first deposited to cover the surface.

3.7 CURING

3.7.0 General: All concrete shall be moist-cured for a period not less than seven (7) consecutive days by an approved method or combination applicable to local conditions.

3.7.1 Moist curing: The surface of the concrete shall be kept continuously wet by covering with burlap, plastic or other approved materials thoroughly saturated with water and keeping the covering wet spraying or intermittent hosing.

3.8 FINISHING

3.8.0 Concrete surfaces shall not be plastered unless otherwise indicated. Exposed concrete surfaces shall be formed with smooth form material, and after removal of forms, the surfaces shall be smooth, true to line and shall present a finished appearance except for minor defects which can be easily repaired by patching with cement mortar, or can be ground to a smooth surface to remove all joint marks of the form work.

3.8.1 Concrete slabs on fill: The concrete slabs on fill laid on a prepared foundation consisting of sub-grade and granular fill with thickness equal to the thickness of overlaying slab except as indicated otherwise.

3.9 SURFACE FINISHES

3.9.0 Defects: Repair formed surfaces by removing minor honeycombs, pits greater than one square inch surface area or 0.25 inch maximum depth, or otherwise defective areas. Provide edges perpendicular to the surface and patch with non-shrink f=grout. Patch the holes and defects when the forms are removed.

3.9.1 Floor slabs, Pavements and Miscellaneous Construction: Unless otherwise specified, slab at the fountain area are straight to finish with waterproofing. Slope floors uniformly to drains where drains are provided. Depress the concrete base slab where Granite or Ceramic tiles are indicated.

3.9.2 Finish: Place, consolidate and immediately strike-off concrete to obtain proper contour, grade and elevation. A set sufficient for floating and supporting the weight of the finisher and equipment.

3.9.3 Pavements: Screed the concrete with a template advanced with a combined longitudinal and crosswise motion. Maintain a slight surplus of concrete ahead of the template. After screeding, float the concrete longitudinally and refloat as necessary. Obtain final finish by belting. Lay belt flat on the concrete surface and advance with a sawing motion; continue until a uniform but gritty non-slip surface is obtained. Round edges and joints with an edger having a radius of 1/8 inch.

3.9.4 Broomed: Provide for exterior walks, platforms, patios and ramps. Unless otherwise indicated, provide a floated finish, and then finish with a flexible bristle broom. Permit surface to harden sufficiently to retain the scoring or ridges. Broom traverse to traffic or at right angles to the slope of the slab.

3.9.5 Pits and Trenches: Place bottoms and walls monolithically or provide water stops and keys.

3.9.6 Curbs and Gutters: Provide contraction joints spaced at every 10 feet maximum unless otherwise indicated. Cut contraction joints ¼-inch deep with a jointing tool after the surface has been finished. Provide expansion joints ½-inch thick and spaced at every 100 feet maximum unless otherwise indicated. Provide a pavement finish.

3.10 MISCELLANEOUS

3.10.0 Construction Joints: Locate joints to least impair strength; continue reinforcement across joints unless otherwise indicated.

3.10.1 Expansion Joints and Contraction Joints: For slab on grade, provide at edges of interior floor slab, adjacent to walls as indicated. Completely fill joints exposed

- 3.3.2 Mixing: Concrete of 3,000 psi compressive strength shall be ready-mixed in transit from batching plant as scheduled order from qualified supplier, *accredited by Engineer*. The 3,000 psi concrete can be machine mixed on-site or also ready mixed in transit from batching plant. On-site mixing shall be within 30 minutes after the cement has been added to the aggregates.

3.4 FORMS

- 3.4.0 General: Forms shall be used whenever necessary to continue the concrete and shape it to the required lines, or to ensure the concrete contamination with materials caving from adjacent excavated surfaces. Forms shall have sufficient strength to withstand the pressure resulting from placement and vibration of the concrete, and shall be maintained rigidly in correct position. Forms shall be sufficiently tight to prevent loss of mortar from the concrete. Forms for exposed surfaces against which backfill is not to be placed shall be lined with a form grade plywood or metal panels.
- 3.4.1 Cleaning and Use of Forms: Before placing the concrete, the contact surfaces of the form shall be cleansed of encrustation of mortar, the grout or other foreign material, and shall be coated with commercial form oil that will prevent sticking and will not stain the concrete surfaces.
- 3.4.2 Removal of Forms: Forms shall be removed in a manner that will prevent damage to the concrete. Forms shall not be removed without approval. Any repairs of surface imperfections shall be performed at once and airing shall be started as soon as the surface is sufficiently hard to permit it without further damage.

3.5 PLACING REINFORCEMENT

General: Steel reinforcement shall be provided as indicated, together with all necessary gauge 16 G.I. wire ties, chairs, spacers, supports and other devices necessary to install and secure the reinforcement properly. All reinforcement, when placed, shall be free from loose, flaky rust and scale, oil grease, clay and other coating and foreign substances that would reduce or destroy its bond with concrete. Reinforcement shall be placed accurately and secured in place by use of metal or concrete supports, spacers and ties. Such supports shall be of sufficient strength to maintain the operation. The supports shall be used in such manner that they will not be exposed or contribute in any way, to the discoloration or deterioration of the concrete.

3.6 CONVEYING AND PLACING CONCRETE

- 3.6.0 Conveying: Concrete shall be conveyed from mixer to forms as rapidly as practicable, by methods that will prevent segregation, or loss of ingredients. There will be no vertical drop greater than 1.5 meters except where suitable equipment is provided to prevent segregation and where specifically authorized.
- 3.6.1 Placing: Concrete shall be worked readily into the corners and angles of forms and around all reinforcement and embedded items without permitting the material to segregate. Concrete shall be deposited as close as possible to its final position in the forms so that flow within the mass does not exceed two (2) meters and consequent segregation is reduced to a minimum near forms or embedded items, or elsewhere as directed. The discharge shall be so controlled that the concrete may be effectively compacted into horizontal layers not exceeding 30 centimeters in depth within the maximum lateral movement specified.
- 3.6.2 Time interval between mixing and placing: Concrete shall be placed before initial set has occurred and before it has contained its water content for more than 45 minutes.
- 3.6.3 Consolidation of concrete: Concrete shall be consolidated with the aid of mechanical vibrating equipment and supplemented by hand spading and tamping. Vibrators shall not be inserted into lower coursed that have commenced initial set and reinforcement embedded in concrete beginning to set or already set shall not be disturbed by vibrators. Consolidation around major embedded parts shall be by hand spading and tamping and vibrators shall not be used.
- 3.6.4 Placing concrete through reinforcement: In placing concrete through reinforcement, care shall be taken that no segregation of the coarse aggregate

to weather with joint filler material and joint sealant. Do not extend reinforcement or other embedded metal items bonded to the concrete through any expansion joints unless an expansion sleeve is used. Provide contraction joints, either formed or saw cut or cut with a jointing tool, to the indicated depth after the surface has been finished. Sawed joints shall be completed within 4 to 12 hours after concrete placement. Protect joints from intrusion of foreign matter.

IV METALS WORKS

4.0 DESCRIPTION

4.0.0 Metal works shall conform to the approved plans and to the Standard Specifications.

4.1 REFERENCE STANDARDS

4.1.0 Comply with the latest edition of the following as applicable, unless otherwise specified or modified.

4.1.0.0 AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), 1978: Specification for the Design, Fabrication and Erection of Structural Steel for Buildings. Code of Standard Practice for Steel Buildings and Bridges; Specification for Architecturally Exposed Structural Steel.

4.1.0.1 AMERICAN WELDING SOCIETY (AWS): Standard Welding Symbols A2.0-68; Standard Welding Code D1.1-1973 (Rev 1-73 & 2-74) (To govern if in conflict with AISC).

4.1.0.2 RESEARCH COUNCIL ON RIVETED AND BOLTED JOINTS OF THE ENGINEERING FOUNDATION (RCRBJ): Specification for Structural Joists using ASTM A-325-76s Bolts.

4.2.0.3 STRUCTURAL STEEL PAINTING COUNCIL (SSPC): Painting Manual, Vol. 1; Good Painting Practice, Painting Manual, Vol. 2; Systems and Specifications.

4.2 SOURCE QUALITY CONTROL

Errors of Shop Drawings, fabrication, correct fitting and alignment of the various metal items or component members shall be the responsibility of the Contractor. However, the Contractor shall permit the Architect or an independent inspection agency, if engaged by the Owner, to inspect work in progress in his shop. Such inspections shall not relieve the Contractor of his responsibility to furnish materials and workmanship in accordance with the Contract Documents.

4.3 PRODUCT DELIVERY, HANDLING AND STORAGE

Handle and store in such manner as to prevent damage or disfigurement. Store finished items or components above ground on platforms, pallets or other supports and protect from harmful elements.

4.4 PROTECTION

The Contractor shall protect any existing work subject to damage during the installation of the specified work and shall adequately protect specified work during installation.

4.5 FIELD QUALITY CONTROL

Facilities shall be provided by the Contractor as needed for the proper inspection of the specified work, including temporary platforms, hoists, protective devices, electric current, etc. Improper workmanship, as determined by the Architect shall be corrected and replaced, at no additional cost to the Owner.

4.6 MATERIALS

Products shall conform to the respective reference specifications and standards and to the requirements specified herein:

4.6.0 STEEL AND IRON: If not specified otherwise, use standard mill-finished structural steel shapes or bar iron in compliance with AISC Specifications for Design, Fabrication and Erection of Structural Steel for Buildings.

4.6.1 BOLTS, NUTS, STUDS AND RIVETS: ASTM A 325

4.6.2 SCREWS: Fed. Spec. FF-S-85, Fed. Spec. FF-S-92, and Fed. Spec. FF-S-111

4.7 FABRICATION

By mechanics skilled in the trade and in accordance with the manufacturer's directions, Metalwork shall be fabricated to allow for expansion and contraction of materials. Provide welding and bracing of adequate strength and durability, with tight, flush joints, dressed smooth and clean. Complete with bolts and nuts.

4.8 MEASUREMENTS

Before fabrication, provide necessary field measurements and verify all measurements.

4.9 METAL SURFACES

Shall be clean and free from all scale, flake, rust and rust pitting; well-formed and finished to shape and size, with sharp lines, angles and smooth surface. Shearing and punching shall leave clean true lines and surfaces. Weld or rivet permanent connections. Weld and flush rivets shall be used and finished flush smooth on surfaces that will be exposed after installation. Do not use screws or bolts where they can be avoided; when used, heads shall be countersunk, screwed up tight and threads nicked to prevent loosening.

4.10 CONSTRUCTION

Thickness of metals and details of assembly and supports shall give ample strength and stiffness for the minimum loads specified or indicated. Joints exposed to weather shall be formed to exclude water.

4.11 SHOP FABRICATION

Fabrication and assembly shall be done in the shop to the greatest extent possible.

4.12 SUBMITTALS

Shop Drawings: Submit along with catalogue, cuts, templates, and erection and installation details, indicating thickness, type, grade, class of metal and dimensions. Show construction details, reinforcement, anchorage, and installation with relation to the construction.

4.13 QUALIFICATION OF WELDERS

In accordance with AWS D1.1 using procedures, materials and equipment of the type required for the work.

4.14 DELIVERY AND STORAGE

Protect from corrosion, deformation and other types of damage. Store items in an enclosed area free from contact with soil and weather. Contractor shall replace and remove damaged items with new items.

4.15 WELDING

Use welding electrode E70xx and perform welding, welding inspection and corrective welding in accordance with AWS D1.1. Weld in a manner to prevent permanent distortion of the connected parts. Weld continuously along the entire area

of contact (except where tack welding is permitted. Do not tack weld exposed to connections.) Grind smooth visible weld in finished installation.

4.16 METAL PURLINS

Metal purlins shall be of high grade galvanized steel with minimum tensile strength of 275 MPa, 2mm in thickness manufactured by Philmetal or approved equal.

V MASONRY

5.0 MATERIALS

5.0.0 All materials and workmanship shall be in accordance with the applicable standard and specifications of the Structural Code of the Philippines and uniform Building Code.

5.0.1 Concrete Hollow Blocks (CHB) shall have a minimum face thickness of 1" (25mm). Nominal size shall be 4" x 8" x 16", minimum compressive strength shall be 500 psi for non-load bearing and 700-1000 psi for load bearing. All units shall be stored for a period not less than 28 days (including curing period) and shall not be delivered to the job site prior to that time unless the structure is equal or more than the specified.

5.0.2 Prior to commencing the preparation of the sub-grade, all culverts, cross drains, and other similar structures (including the fully compacted backfill) shall be completed. No work shall be started on the preparation of the sub-grade before the prior works herein approved by the Engineer.

5.0.3 Cement shall be standard Portland cement ASTM 270 - Type N.

5.0.4 Mortar: Mix mortar from 3 to 5 minutes in such quantities as needed for immediate use. Re-tempering will not be permitted if mortar stiffens because of premature setting. Discard such materials as well as those that have not been used within one hour after mixing. Proportioning shall be one (1) part Portland cement and two (2) parts and by volume, but not more than one (1) Portland cement and three (3) parts and by volume.

5.1 SUBMITTALS

5.1.0 Submit samples for approval two (2) samples each of each type of wall reinforcement and wall ties.

5.1.1 Certificates of Conformance: Submit certificate attesting that masonry cement, masonry units, aggregates and accessories meet the requirements specified.

5.2 ERECTION

5.2.0 All masonry shall be laid plumb, true to line, with level and accurately spaced courses, and with each course breaking joint with the source below. Bond shall be kept throughout corners and reveals shall be plumb and true. Units with greater than 12% absorption shall be wet before laying. Work required to be built in masonry; including anchors, wall plugs and accessories shall be built-in as the erection progresses.

5.2.1 Masonry Units: Each course shall be solidly bedded in Portland cement mortar. All units shall be damp when laid units shall be showed into place not laid, in a full bed of un-furrowed mortar. All horizontal and vertical points shall be completely filled with mortar when and as laid. Each course shall be bonded at corners and intersections. No cells shall be left open in face surfaces. All cells shall be filled up with mortar for exterior walls. Units terminating against beam or slab soffits shall be wedged tight with mortar. Do not lay cracked, broken or defaced block.

5.2.2 Plastering: Clean and evenly wet surfaces. Apply scratch coat with sufficient force to form good keys. Cross scratch coat upon its initial set; keep damp. Apply coat after each scratch coat has set at least 24 hours after scratch coat application. Lightly scratch brown coat; keep moist for two (2) days; allow drying out. Do not apply finish until brown coat has seasoned for seven (7) says. Just before

applying coat, wet brown coat again. Float finish coat to true even surface; trowel in manner that will force sand particles down into plaster, with final trowling, leave surfaces banished smooth free from rough areas, trowel marks, checks, other blemishes. Keep finish coat moist for at least two (2) days; thereafter protect against rapid drying until properly, thoroughly cured.

5.3 SCAFFOLDING

5.3.0 Provide safe wood or metal scaffolding required for masonry and other related work, including cleaning down on completion. Remove upon demobilization.

5.4 SURFACE PREPARATION

5.4.0 Lay floors without borders from centerline outward. Make adjustments at walls. Clean concrete sub-floor and moisten it without soaking. Sprinkle dry cement over surface. Spread setting bed mortar on concrete and tamp to assure good bond over the entire area then screed to smooth, level bed. Set average setting bed thickness at $\frac{3}{4}$ " but not less than $\frac{1}{2}$ ".

5.4.1 Wall: Scratch coat application as foundation coat shall be at most $\frac{1}{2}$ ". While still plastic, deeply score scratch coat or scratch and cross-scratch. Protect scratch coat and keep reasonably moist within seasoning period. Use mortar for scratch floor coats, within one hour after mixing. Re-tempering of partially hardened mortar is not permitted. Set scratch coat be cured for at least two (2) days before starting the setting.

5.5 CLEANING

5.5.0 Protection: Protect work which may be damaged, stained or discolored during cleaning operations.

5.5.1 Pointing: Upon completion of masonry work, cut out defective mortar joints and tuck joints and all holes solidly with mortar.

5.5.2 Cleaning: Clean exposed masonry surface with clear water and stiff fiber brushes and rinse with clean water. Where stains, mortar or other soil remain, continue cleaning as follows: Clean masonry surfaces by scrubbing with warm water and soap and rinsing thoroughly with clean water. Restore damaged, stained and discolored work to its original conditions or replace with new work.

VI ARCHITECTURAL

6.0 FLOOR AND WALL AND FINISHES

6.0.0 Exterior/Interior Walls & Floor finishes

- a. 300mm x 300mm Homogenous Porcelain Tiles w/ 300mm x 600mm Boarder Porcelain Tiles
- b. 600mm x 600mm Homogenous / Porcelain Polished. Floor tiles
- c. 300 x 600 Non Skid Ceramic Tiles w/ Grooves
- d. Plain cement epoxy paint finish
- e. Plain Cement Finish on Aqua Epoxy Painted Finish with Grooves
- f. 25mm concrete topping (for tiles)
- g. Urinal partition including stainless steel support and accessories.
- i. Toilet partition including stainless steel support and accessories..

6.1.7 HANDRAILS AND RAILINGS

Follow as per approved plan and specifications.

6.1.8 OTHER FINISHES

- a. 6mm thk facial mirror on 6mm thk marine plywood backing including all incidentals to complete.
- b. Main Stair Railing including Accessories, Painted Finish.
- c. PWD Comfort Room 50mmØ Stainless Steel Grab Bar
- d. Undercountertop Cabinet including accessories, Painted Finish (Pantry)
- e. Bathroom Accessories (Bidet, tissue and soap holder, towel hook)
- f. Countertop & Backsplash, 20mm thk. Granite Slab Finish (CDS)
- g. Ramp Railing including Accessories, Painted Finish
- h. Stainless Steel Cross with Pedestal
- i. Lobby, Precast Concrete Baluster Railing, Painted Granite Finish

6.1.9 CLEAN-UP

When the work is completed, the Contractor shall remove all temporary structures and surplus materials of every sort, restore what has been removed before, and leave the premises or site in as good condition as he had originally found them.

VII THERMAL CONTROL AND MOISTURE PROTECTION

7.0 WATERPROOFING

Use waterproofing cementitious powder, capillary type, flexible type-liquid applied waterproofing seamless membrane latex-modified rubber reinforced on slabs. Refer to manufacturer's recommendation on proper application of the product listed herein: Lanko manufactured by VSL.

7.1 VAPOR BARRIER

Use 8 mils thick, 6 feet wide roll plastic vapor barrier laid over compacted base course at ground floor slab with 300mm minimum overlap prior to setting up of steel reinforcing bars. Submit samples for approval.

7.2 WATERSTOPS

Use Rebstop Ultra Seal chemical grout water-stop specially formulated for construction joints to replace the use of conventional water-stop used for cold expansion joints on pipes, etc. manufactured by Rebtrade International Corporation or approved equal.

VIII FIRE PROTECTION

A. SPRINKLER SYSTEM, AUTOMATIC, WET-PIPE TYPE SPECIFICATIONS

8.0 GENERAL

Applicable provisions of the "General Conditions" govern work under this section.

6.1.1 CEILING FINISHES

- a. 10mm thk. Gypsum Board including framing and accessories.
- b. 12mm thk. Moisture Resistant Gypsum Board on lightweight aluminum frames.
- c. Rubbed Concrete

6.1.2 WINDOWS

Follow as per approved plan and specifications.

6.1.3 DOORS

Follow as per approved plan and specifications.

6.1.4 PAINTING

- a. All paints shall meet the required specifications and shall be delivered at the site in the original container. Use non Volatile Organic Compound (V.O.C.) paint or approved by the implementing agency and only accredited painters of the manufacturer shall execute the work to ensure the true origin and quality of paint and warranty of work.
- b. Concrete walls shall be treated with neutralizers. Exterior walls without wall veneer shall be applied with a primer before final coat. In general, rough surfaces of concrete, cabinets and woodworks surfaces shall be properly sandpapered and puffed before any application of paint.
- c. Latex Paint Finish (exterior masonry walls)
- d. Latex Paint Finish (interior masonry walls, stairs and Slab Soffit)
- e. Latex Paint Finish (ceiling)
- f. Painting of Doors and jambs
- g. Painting of Windows

6.1.5 WATERPROOFING AND DAMP-PROOFING

- a. Roof Decks : Terragum A – Torch applied membrane, UV protected.
- b. Toilets : Cementitious capillary type waterproofing.

6.1.6 HARDWARE

1. Provide all rough hardware required for the construction of works: nails, straps, lag screws, etc.
2. Butt Hinges : Use Toyo Butt Hinges, 4" x 4" with bearings for panel door
3. Locksets : For PVC plastic, wood and metal swing doors use ABLOY stainless mortise locksets with striker plate.
4. Door Stop : Locate position where no traffic could be obstructed. For restroom doors where tile finish abuts the door swing side, use IVES 65 6" above inside floor finish on door panel.
5. Door Closers : Posse/MBC Door closer for metal doors.
6. Exit Door Panic: Use Toyo Panic Exit Device, horizontal without key for Device single panel for fire exits.

8.1 QUALIFICATIONS OF CONTRACTORS

The Contractor for the fire protection installation shall be a qualified Fire Protection Contractor, regularly engaged in the installation of automatic fire sprinkler systems and other fire protection equipment, and must have at least one (1) sprinkler installation approved by the Philippine Insurance Rating Association (PIRA). Companies or corporations whose personnel have supervised an approved sprinkler plan and subsequently approved by PIRA or by the Fire Department are also qualified.

8.2 SCOPE OF WORK

8.2.0 This specification includes the furnishing of all labor, materials, equipment and services necessary or incidental to the complete installation, testing, adjusting and placing into service of the several systems of fire protection, all as shown on the drawings and as hereinafter specified. Drawings and specifications are considered as mutually explanatory and all works called for by one and not the other, shall be performed as though called for by both. In cases of conflicting information, the Architect and Engineer shall be notified at once in writing. Where incidental equipment or appurtenances are required and not listed as shown, same shall be furnished as required for a complete fire protection system.

8.2.1 Drawings are intended to show general arrangement and approximate physical sizes of equipment diagrammatically. Every bolt, nut, brace, strut, etc., is not necessarily indicated or specified; all such items as may be required, necessary or incidental to the proper and dependable operation of each system being a requirement of this contract, whether specifically referred to or not, must be supplied.

8.2.2 Work included in this specification shall consist of, but not limited to the following items:

1. Arrange for, obtain and bear the cost of necessary permits, bonds and fees for the automatic sprinkler work.
2. All fees, private or government shall be paid by the Contractor.
3. Furnish and install a sprinkler system to the entire building where shown on the drawings. System to include all pipes, hangers, sway braces, sprinkler heads, control valves, drains, alarms, water flow switches and control valve monitor switches, (the fire pumps, drives, jockey pumps and controllers, pumps standard accessories may be supplied by pump suppliers under separate bid package), to be installed by the Sprinkler Contractor.
4. Fire hose cabinets and fire hose accessories, including connection pipe and fittings to the sprinkler system.
5. Alarm check valves, complete with set of trimmings, retarding chamber, water motor alarm gong, alarm pressure switches, water flow switches and monitor switches. The Sprinkler Contractor shall coordinate and interface the required electrical wiring connections for the water flow and monitor switches to the building fire alarm system.
6. Furnish and install a system of dry standpipe complete with valves and fire department connection. Contractor to provide as shown in the plans, by-pass valve with pipe and fittings to connect the Wet Sprinkler pipe riser with the Dry Standpipe riser.
7. Furnish and install fire department connection for the sprinkler system.
8. Furnish and install inspector's test connection pipe, nozzles and valves on the farthest point of each floor, located where shown on the drawings.
9. Furnish and install water flow alarm switches, and monitor tamper switch to floor control valves. The Sprinkler Contractor shall furnish and install the Control Panel and the wiring in conduits for the connection of the water flow and monitor switches to the sprinkler supervisory panel. The supervisory control panel shall be interfaced to the building fire alarm system.
10. Do the testing of all piping works and necessary cleaning of the fire protection works. This includes also the testing of the fire department pipeline and drain pipe and water flow alarms.

11. Fire extinguishers as shown in the plans shall be supplied and installed by the Contractor. Over and above those specified, the owner of the building shall supply the requirements of the Fire Department.
12. All openings through which fire may spread from one floor to the other, such holes through floors or walls for the pipe shall be sealed with fire resistant materials.
13. Chipping and plastering works necessary for the area covered in the installation of automatic sprinkler system.
14. Furnish the shop drawings and certificates of inspection.
15. Periodically remove from the jobsite all rubbish and debris resulting from the fire protection work.
16. Furnish and install one (1) unit of 10 lbs. HCFC portable fire extinguishers for Electrical Rooms, Pump Room.
17. Miscellaneous items as hereinafter provided.

8.3 SITE CONDITIONS

The Contractor shall be deemed to have visited the site and acquaint himself with the existing site condition, means of access and take into account any feature that may affect his tender. No claim for his neglect to do so or not, out of a misunderstanding on his part in these conditions shall be entertained.

The Fire Protection Contractor shall be responsible for the proper coordination with other trade contractors.

8.4 STANDARDS, CODES AND REGULATIONS

The applicable current standards for the fire protection systems shall be the National Fire Protection Association (NFPA), NFPA-13, and Philippine Fire Code-PD 1185, the PSME Code and all other applicable local codes and ordinances.

8.5 SUBMITTAL (SHOP) DRAWINGS AND DATA

- 8.5.0 Before commencing any work or providing any materials at the jobsite for this project, the Fire Protection Contractor shall submit to the Engineer for approval, four (4) copies of catalogue cuts and descriptive matter regarding materials and equipment which he intends to furnish and install.

Shop drawings and data shall be submitted specifically for, but not limited to the following items: Sprinkler heads, calves, pipes, pipe hangers, hose valves and accessories, Fire Department connections, fire pumps and jockey pumps, controllers, fire hose cabinets, mechanical grooved coupling, flexible pipe connectors, pressure reducing valves, pipe riser support and sleeves, portable fire extinguishers and foam equipment.

- 8.5.1 The Fire Protection Contractor shall not proceed with the installation of the work until he has received the Engineer's approval on his shop drawings.

- 8.5.2 The Engineer's approval of shop drawings, catalogue cuts, etc. shall not relieve the Fire Protection Contractor of the responsibility for any errors or omissions which may exist in the items neither submitted nor shall relieve him from the responsibility for deviations from the contract drawings and specifications.

The stamped approval of the shop drawings, catalogue cuts, etc. shall not be construed as a complete check, but will indicate only that the general design and method of construction is satisfactory.

- 8.5.3 In the event inspection authorities require additional clarifying details, the details shall be prepared and approval of the same secured by the Fire Protection Contractor at his expense.

8.6 CONDUCT OF WORK

The Fire Protection Contractor shall employ on the job at all times a competent superintendent Licensed Mechanical Engineer who shall be responsible for the progress and execution of the work. Workmanship shall be of high quality, conforming to standard practice as stipulated by NFPA, ASTM and ASA and PSME recommendations by skilled workmen during regular working hours.

8.7 LOCAL AND IMPORTED MATERIALS

8.7.0 All materials and equipment furnished under this section shall be new, manufactured in the United States, and Non-UL/FM but conforming to NFPA Standards.

8.7.1 The proposal submitted shall include all materials and equipment as specified or

8.7.2 shown on the drawings.

8.8 AUTOMATIC SPRINKLER AND STANDPIPE SYSTEM

8.8.0 Pipe shall be new, designed for 175psi working pressure, conforming to ASTM specifications, manufactured in the United States or approved local pipes and have the manufacturer's name or brand along with the applicable ASTM standard marked on each length of the pipe. The locally manufactured pipe brand "Supreme" are acceptable brand with proper schedule and wall thickness.

8.8.1 Pipe shall be steel, schedule 40, black and in accordance with the specifications ASTM A120 or A53.

8.8.2 Schedule 40 black steel pipes shall be joined by screwed joints in accordance with specifications ANSIB2.1 up to 2½" and flanged, Victaulic type or screwed connections for 3" and up. Pipe fittings to be used with schedule 80 pipes shall be rated 300lbs. Class if there are any.

8.8.3 Sprinklers' piping that is exposed to the weather or used in a corrosive atmosphere shall be painted with protective coating. Sprinkler piping in the building shall be painted with two (2) coats of enamel primer and two (2) coats of Fire Red color enamel paint.

8.8.4 All ASTM A53 and ASTM A120 sprinkler pipe must be hydrostatic tested at the mill per ASTM standard.

8.8.5 Screwed fitting shall be malleable iron, 300 lbs. and 150 lbs. class, black and in accordance with ANSI B16.3. "Victaulic" brand mechanical tee and elbow UL/Fm fittings can also be used.

8.8.6 Flanged fittings shall be steel, short body, 150, black and in accordance with ANSI B16.1. Gaskets shall be full face of 1/8" minimum thickness red sheet rubber. Flange bolts shall be hexagon head machine bolts with semi-finished hexagon head nuts, cadmium-plated having dimension in accordance with ANSI B18.2.

8.8.7 Weld fittings shall be steel, standard weight, black and in accordance with ANSI B16.9, ANSI B16.25, ASTM A234, ANSI B16.5 or ANSI B16.11.

8.8.8 Outside screw and yoke gate valves shall be flanged, iron body, bronze mounted, 175 psi working pressure, with hand wheel turning counterclockwise to open. Valve shall be tested and listed by UL and/or FM.

8.8.9 Check valve shall be flanged, swing type, iron body bronze seat ring and disc ring, and 175 psi working pressure rating. Valve shall be tested and listed by UL and/or FM.

8.8.10 Check valve shall be butterfly wafer style, iron body, rubber seal 175 psi working pressure rating. Valve shall be tested and listed by UL and/or FM.

8.8.11 Fire Department connection shall be 4" x 2½" x 2½" Siamese connection, brass body, brass chain and plugs, and brass escutcheon letter "AUTOMATIC SPRINKLER" for sprinkler system, and/or "STANDPIPE" for standpipe system. Inlet threading shall be National Standard, same as municipal fire department connection shall be tested and listed by UL and/or FM and 175 psi rating.

8.8.12 Valve for main riser drain shall be angle type or globe type, bronze body, screwed, 175 psi working pressure rating, 2" size and a renewable composition soft disc.

- 8.8.13 Valve for auxiliary drain and inspector's test connection shall be globe type, bronze body, screwed, 175 psi working pressure rating, 1" size and a renewable composition disc.
- 8.8.14 At each location where called for on plans or where required by the fire department, provides an approved retard-type electric flow alarm switch. Provide alarm bell as required. Flow alarm switch shall have extra set of contacts for extension by others to central alarm panel.
- 8.8.15 Interior bell or horn shall be 24 VDC. Horn or bell shall be tested and listed by UL and/or FM. (Shall be supplied by the Electrical Contractor).
- 8.8.16 Flow switch shall be vane type, 24 DC. Flow switch shall be tested and listed by UL and/or FM.
- 8.8.17 Butterfly valve with tamper switch shall be tested and listed by UL and/or FM.
- 8.8.18 Valves for the fire hose stations shall be angle type, pressure restricting type 1½" female iron pipe threads, rough brass male NST threads, polished brass, chromium plated. Valve shall be tested and listed by UL and/or FM.
- 8.8.19 Cabinet for fire hose shall be recessed, 16-gauge body, aluminum door trim. Cabinet shall be designed for 100 feet hose pin rack and fire extinguisher. Door shall be full panel glass. Cabinet finish shall be baked white enamel inside with "Fire Red" coat inside. Cabinet may be locally made of approved quality.
- 8.8.20 Pin rack for the fire hose station cabinet shall be semi-automatic, baked red enamel finish, designed for 100 feet of 1½" hose, and furnished with 1½" chrome plated brass rack nipple.
- 8.8.21 Fire hose for fire hose station shall be 100 feet of 1½" cotton single jacket, rubber lined hose with wax and gum treatment. Hose couplings shall be 1½" chrome plated male-female National Standard hose threads. Fire hose and couplings shall be approved by UL and/or FM.
- 8.8.22 Nozzle for fire hose station shall be 1½" adjustable capable of complete shut-off, solid straight stream or any degree of solid conical fog with chrome plate. Threads shall be National Standard hose threads. Nozzle shall be approved by UL and/or FM.
- 8.8.23 Provide 1½" spanner to each FHC cabinet.
- 8.8.24 Furnish and install one (1) each – 10 lbs. capacity HCFC multi-purpose type portable fire extinguisher UL-listed and Factory Mutual approved to each fire hose cabinet.

8.9 IDENTIFICATION SIGNS

The drain, alarm test valves, etc. shall have standard identification signs, painted fire red with white lettering. The signs shall be attached to the valve in a conspicuous position.

8.10 SPRINKLER HEADS

- 8.10.0 Sprinkler heads shall be 1½" NPT, chrome finish, pendent, upright and horizontal sidewall. Sprinklers in the areas with suspended ceiling shall have escutcheon plates of the same finish as the textures of the ceiling boards. Sprinklers shall be tested and listed by UL and/or FM.
- 8.10.1 Furnish the Owner a steel enameled box housing for the space heads and a sprinkler wrench as shown in the plans.

8.11 FIRE PUMP

- 8.11.0 Fire Pump Assembly: Furnish and install fire pumps as shown on plans. One (1) Underwriters Laboratory Inc. approved fire service pump. The Fire pump at the Basement Floor shall be electric motor-driven with automatic controllers, and one (1) jockey pump complete with motors, motor starters, controls, fittings and other appurtenances necessary to complete the equipment installation in each respect.

8.11.1 Pumps shall be connected as shown in the drawings. Complete installation shall be in accordance with the requirements and meeting the approval of the NFPA 20, Philippine Insurance Rating Association (PIRA) and Fire Department.

8.11.2 The fire pumps to be installed at the Basement Floor level shall be as follows:

Fire Pump – One (1) unit Fire Pump shall be vertical turbine. Capacity and electrical supply shall be as per equipment schedule.

Pump shall be furnished with the following standard accessories:

- a) Main Relief Valve 3", flanged type, UL/FM listed for the 500 GPM pumps.
- b) 2" air release valve
- c) "GERAND" water flow meter, rated at 750GPM
- d) Discharge gauge (0-300psi), 3 1/2" face dial
- e) Enclosed waste cone with sight glass
- f) Discharge concentric reducer

The pump should deliver not less than 150% of rated capacity at a pressure not less than 65% of rated head. The shut-off pressure shall not exceed 140% of rated pressure

The pump shall be provided with suction bowls. Column, basket strainer, discharge head and an electric motor with hollow shaft with sufficient horsepower to drive the pump.

One (1) set fire ump controller with pressure recorder and shall reduce voltage primary resistor or Wye-Delta type starter, UL/FM listed.

8.11.3 Jockey Pump: One (1) unit jockey pump shall be centrifugal type, submersible. Capacity and electrical supply as per equipment schedule.

8.11.4 Drive: For the jockey pump, the motor horsepower rating shall be in accordance with the manufacturer's requirements. The motor shall be of such capacity that 115% of the full load ampere rating shall not exceed at any given condition of pump load.

8.11.5 The pump manufacturer shall provide the services of a qualified Engineer to advise the Contractor on the proper installation of equipment make necessary mechanical adjustments and align fire pump flexible couplings. Pump manufacturer shall pay the test fees, shall arrange and conduct final field acceptance test and provide all required test equipment.

8.11.6 One (1) set controller equipment: The fire ump control equipment shall be completely wired and tested at the factory and shall be specifically designed for fire pump purposes. Control equipment with all components shall be UL/FM listed and approved equipment, reduce voltage wye-delta type open transition or primary resistor type.

8.11.7 The Sprinkler Contractor shall provide and install the necessary electrical wiring in conduits. Controls from a power supply box to be provided inside the pump machine room to the fire pumps controller, to the equipment.

8.12 AUTOMATIC SPRINKLER AND STANDPIPE SYSTEM

8.12.0 The interior surfaces of all piping and equipment shall be clean and free of all dirt. Loose scale, rust and other foreign materials before installation.

8.12.1 Pipe ends shall be reamed to remove all burrs and pipe sections shall be cleaned inside to remove all chips and foreign materials prior to making up joints. Approved joint compound shall be applied to the threads of the pipe and not in the fitting when making up joints. Pipe shall not exceed into the waterway of the fitting.

8.12.2 Sprinkler heads installed where they may be exposed or subjected to mechanical damage shall be furnished complete with head guards.

- 8.12.3 When welding pipe on jobsite, the fire hazard of the welding process shall be with suitable safeguards. Weld in place of pipe and fittings shall not be allowed at the jobsite. Only shop weld fabrication will be permitted with factory made fittings. Mitered weld will not be permitted. Intersection of feed main and cross main pipe shall be provided with flanged or Victaulic type fittings.
- 8.12.4 Pipe passing through the building walls and floors above grade shall be provided with sleeves of standard weight galvanized steel pipe and shall be installed prior to concreting works of the Civil Contractor. The annular spaces between pipe and sleeves shall be packed tight with insulation fire resistant materials. Provide chrome plated escutcheon plates enough to cover the pipe sleeves. Sleeves shall be sized as follows:

1"	pipe-2"	ID Sleeve
1 ¼"	pipe-2"	ID Sleeve
1 ½"	pipe-2 1/2"	ID Sleeve
2"	pipe-3"	ID Sleeve
2 ½"	pipe-4"	ID Sleeve
3"	pipe-5"	ID Sleeve
4"	pipe-6"	ID Sleeve
6"	pipe-8"	ID Sleeve
8"	pipe-10"	ID Sleeve

8.13 PIPE SUPPORTS

- 8.13.0 All piping shall be supported by means of hangers of approved quality, capable of supporting load. Sizing, spacing and installation shall be in accordance with national Fire Protection Association Standard No. 13, "Sprinkler Systems", except as otherwise shown on drawings or specified herein.
- 8.13.1 The Fire Protection Contractor shall furnish and install the required sprinkler pipe seismic sway bracing for the risers, feed main pipe and cross main pipe all in accordance with tables and figures shown NFPA-13 requirements for the protection of the piping against breakage due to seismic earthquake movement.
- 8.13.2 No cutting, drilling, welding or burning of any structural steel member shall be allowed. Power driven studs and welding studs shall not be allowed.
- 8.13.3 All bolts and threaded rods shall be used with double nut and washer and lock washer wherever a single unsecured nut could work loose and allow either threaded rod or supported piping to drop.

8.14 TESTS AND INSPECTIONS

- 8.14.0 The Fire Protection Contractor shall conduct and bear the costs of all necessary tests of the fire protection work, furnishing all labor, power and equipment. All piping shall be tested with water and test witnessed by representatives of the Architect/Engineer and the Owner.
- 8.14.1 The fire protection piping shall be tested under a hydrostatic pressure of not less the 200lbs. PSIG, for a duration of not less than two (2) hours or at 50 lbs. psi in excess of the maximum static pressure when the maximum pressure is in excess of 150 lbs. psi.
- 8.14.2 The piping subjected to the hydrostatic test shall be filled with water and thoroughly checked for the elimination of all air. The control valves shall be closed during pressure testing. All joints shall be proven tight or acceptable by the test. Defective work or materials shall be corrected or replaced in approved manner. If necessary, piping shall be dismantled and re-assembled with the use of new pipe or fittings as

no caulking or makeshift method of temporary repair of defective work will be permitted. Test shall be repeated until the particular line or system receives the approval of the representatives of the Architect/Engineer.

- 8.14.3 Acceptance of the automatic sprinkler work shall be based upon the inspection and tests of the completed installation by representatives of the local fire department, Architect, Engineer, PIRA and the Owner.

IX AIR CONDITIONING AND VENTILATING SYSTEM

9.0 GENERAL REQUIREMENTS

9.0.0 Standards Compliance

- a. Philippine Society of Mechanical Engineers Code
- b. Philippine National Building Code
- c. Philippine Electrical Code
- d. Philippine Plumbing Code
- e. Fire Code of the Philippines
- f. American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
- g. Sheet Metal and Air Conditioning Contractors National Association (SMACNA)
- h. National Fire Protection Association
- h. American Society of Testing Materials (ASTM)
- i. Air Moving and Conditioning Association (AMCA)g
- j. American National Standard Institute (AMSI)
- k. National Electrical Manufacturing Association (NEMA)
- l. Underwriters Laboratory
- m. American Society of Mechanical Engineers (ASME)

9.0.1 Scope of Work

- a. Supply and Installation of Equipment and Materials. Complete.
- b. Supply and installation of pipes and fittings, valves and appurtenances, ducts, miscellaneous and consumables.
- c. Fabrication and installation pf hangers and supports.
- d. Supply and installation of control, wiring from Split-Type Air-conditioner to circuit breakers and others to complete the control system.
- e. Testing, adjusting, balancing and commissioning.
- f. Provide shop drawings and two (2) sets of "As-Built" plans
- g. Furnishing of written one (1) year warranty of ventilation and air-conditioning system

9.0.2 Submittals

- a. Within fifteen (15) days after award of contract, the mechanical contractor shall submit for engineer's approval, four (4) copies of all complete list of manufacturer's name of all materials he proposes to use.
- b. After approval of the above list and before purchase of any equipment or materials, the mechanical contractor shall submit to the engineer for approval,

four (4) complete sets of detailed information consisting of manufacturer's bulletins, shop drawings and partial list of materials to be provided under this contract.

- c. The mechanical contractor shall assume the loss of and the entire responsibility of any change in the work as shown in the contract drawings which may be occasioned by approval of materials other than those specified.

9.1 PRODUCTS

9.1.0 AIR COOLED CONDENSING U NITS

- 9.1.0.0 Units shall have capacity and configuration as shown on the drawings and as manufactured by a reputable manufacturer. All units shall be furnished factory assembled, tested and piped complete with compressors, fan, motors, integrally wired control panel, starters, spring type vibration isolators, steel base and refrigerant control accessories. Unit shall have gauge corrosion protected weatherproof casing.
- 9.1.0.1 Compressors for units with capabilities of up to 35160 watts and above shall be of semi-hermetic type and rated to operate at not more than 1750 RPM at full load. Compressors for units with capabilities of 26375 watts and below shall be of the hermetic type and rated to operate at not more than 3500 RPM at full load.
- 9.1.0.2 Condenser coils shall be seamless copper with mechanically bonded aluminum plate fins. Coil size, refrigerant circuiting and number of rows deep shall be compatible with the compressor displacement and capacity at the specified operating conditions with minimum refrigerant pressure drop.
- 9.1.0.3 Condenser fans shall be statically and dynamically balanced propeller-type fans directly driven by totally enclosed and inherently protected motors.
- 9.1.0.4 Motor starters, control components and power terminal shall be grouped in an accessible control box inside the unit casing. Electrical components shall be pre-wired and control circuits shall be independently protected with fuses or breakers. Compressor protection shall include automatic relays to prevent excessive compressor short cycling.
- 9.1.0.5 A complete charge of refrigerant 410A and compressor oil shall be furnished.

9.1.1 FAN COIL UNITS

- 9.1.1.0 Units shall either be of the floor-mounted or the ceiling-mounted, free blow type and/or ducted type as shown on the drawings.
- 9.1.1.1 Units shall have capacities at the operating conditions specified. They shall include an evaporator coil, expansion valve, centrifugal type air circulation blower, permanent type air filter, condensate drip pan and insulated decorative cabinet with discharge plenum, supply and return air grilles.
- 9.1.1.2 Fan motors shall be equipped with overload protection. They shall have fan switch and thermostat mounted on the unit.

9.1.2 CEILING-MOUNTED TYPE FANS

- 9.1.2.0 Units shall be ceiling-mounted type, direct driven and equipped with reverse flow prevention damper.
- 9.1.2.1 It shall have one-touch spring type louver for ease of cleaning and maintenance.
- 9.1.2.2 Fan casing shall be seam-welded and finished with corrosion resistant paint.
- 9.1.2.3 Fan shall have capacity and motor size as indicated in the plans.

9.1.3 PROPELLER EXHAUST FANS

9.1.3.0 Units shall be propeller type, suitable for wall mounting, direct-driven and equipped with gravity shutters.

9.1.3.1 It shall have wall mounting collar and fan guard.

9.1.3.2 Units shall have statically and dynamically balanced propeller set on a deep venture orifice. Unit shall be designed for continuous operation and shall be permanently lubricated. Inherent motor overload protection shall be provided.

9.1.3.3 Unit shall be epoxy-coated and finished with corrosion resistant paint.

9.1.3.4 Fans shall have capacity speed and motor size as indicated on the plans.

9.1.3.5 Fans shall be provided with a remote selector switch.

9.1.4 EXHAUST BLOWER

9.1.4.0 Furnish and install supply exhaust blowers as shown and as indicated on the drawings, complete with motors, belt sheaves vibration isolators.

9.2 BASIC MATERIALS AND METHODS

9.2.0 REFRIGERANT PIPING

9.2.0.0 Refrigerant piping shall be type L hard drawn seamless copper, suitable for a working pressure of 2,413 KPa. Fitting shall be wrought copper or brass designed for use with high temperature solder and suitable for a working pressure of not less than 2,413. Joints from soldered to threaded joints shall be made with standard adapter fittings using high temperature solder.

9.2.0.1 Pipes or tubings shall be cut accurately to measurements established at the building lines. All piping shall be laid straight and no pipe shall be laid against other metal without insulation. After cutting, the tubing shall be reamed, all burrs removed and the internal surfaces thoroughly cleaned. While soldering pipes and fittings together, a continuous flow of inert nitrogen gas must be applied to sweep the internal surface of the tubing to avoid the formation of oxide inside.

9.2.0.2 Condensate drain piping shall be of galvanized iron sh. 40 pipes and sized to liberally dispose of the condensate to the nearest floor drain. A P-trap without cleanout plugs shall be provided at the outlet for every drain.

9.2.0.3 Pipe supports and hangers shall be provided and fabricated in a workmanship manner out of steel angles, rods and flat bars. Metal to metal contact between pipes and hangers must be avoided by providing a 3mm thick rubber in between.

9.2.0.4 Supports on horizontal lines shall be spaced at not more than 1.80 meters on center. All piping must be properly anchored so that no stress is placed on equipment connection by expansion.

9.2.0.5 Pipe sleeves shall be of standard pipes with sufficient diameter to provide a minimum clearance of 6mm around the pipe and in case of insulated pipe, approximately 6mm around the insulation. Pipes should not be permitted to pass through the bearing walls, beams or columns.

9.2.0.6 Refrigerant pipes sizes shown on the drawings are for guide purposes only. Contractor is advised to confirm with the equipment supplier the required pipe sleeves for the units prior to installation at the jobsite.

9.3 AIR CONDITIONING CONTROL SYSTEM

9.3.0 Operation of the air conditioning system shall be fully automatic. They shall be capable of maintaining at full or partial loads inside conditions of 25 C.D.B. (plus or minus 1.11°C and 50% relative humidity (plus or minus 5% RH). Room thermostat shall control the operation of the compression through relays.

9.3.1 The controls shall be wired in such a way that whenever a condensing unit is in operation, the fan coil unit or air handling unit is also in operation.

- 9.3.2 The compressor crankcase heater must be of such capacity as to provide sufficient heat to the oil in the crankcase during the inoperative periods so that the serious oil foaming and slugging shall be prevented. The heater must be automatically energized whenever compressor operation stops and de-energized when the compressor starts.

9.4 REFRIGERANT VALVES AND ACCESSORIES

- 9.4.0 Refrigerant valves shall be installed in the suction and discharge lines adjacent to the compressor and on the liquid line discharge side of the condenser. The valves should be wrought copper or brass for use with R-410A and suitable for a working pressure of 2,413 KPa.
- 9.4.1 Thermostatic expansion valves of the proper capacity shall be installed in the refrigerant supply line to the evaporator. They shall be of the diaphragm type, externally equalized and must be of such optimum size as to maintain a full active evaporator under all conditions and yet reduce the possibility of flooding the refrigerant to the compressors during part load conditions.
- 9.4.2 Solenoid valves shall be installed on units with capacities of 26,375 watts and above and shall be designed for the operating pressure of the system. Valve capacities shall be based on a pressure drop across them not exceeding 20 KPa.
- 9.4.3 Dehydrators in combination with strainers shall be installed in the refrigerant line on the inlet side of the thermostatic expansion and solenoid valves. They shall have brass or copper bodies designed for a working pressure of 2,413 KPa.
- 9.4.4 Sight glasses shall be a combination of liquid and moisture indicators and shall be installed in the refrigerant to indicate whether or not the systems are properly charged and whether or not refrigerant in the system is dry.

9.5 REFRIGERANT PIPE INSULATION

- 9.5.0 Refrigerant piping insulation shall be applied on all refrigerant suction and condensate drain lines. Insulation material shall be flexible elastomeric pipe insulation 25mm thk. Joints shall be sealed with appropriate contact adhesive. Pipes installed outdoor shall be provided with Ga.26 aluminum cladding.

9.6 ELECTRICAL MATERIALS

9.6.0 ELECTRIC MOTORS

- 9.6.0.0 All motors shall operate at speed and electrical characteristics specified. They shall be guaranteed to operate at rated out-put with plus or minus ten (10) percent voltage variation at their terminals.
- 9.6.0.1 Motors 750 watts and above shall be 3-phase squirrel cage induction type, constant speed. Motors 560 watts and below shall be single-phase capacitor start induction run, or split type or shaded pole type as approved for the service.
- 9.6.0.2 Motor driving indoor equipment shall be of the open drip-proof construction. Motors driving outdoor equipment shall be of the totally enclosed fan cooled construction.
- 9.6.0.3 Motors driving equipment through pulleys and belts shall be provided with belt guards. The belt guards shall be made of heavy wire mesh or expanded metal set in a suitable frame covering the motor pulleys, belt and driving sheaves with access plates for tachometer reading.

9.6.1 MOTOR CONTROLLERS

- 9.6.1.0 All motor starters shall be of magnetic type complete with overload and relays manufactured in accordance with NEMA standards. Enclosures shall be a suitable for the application.
- 9.6.1.1 Starters for motor 3.73 kw and below shall be across the line type. Starters for motor above 3.73 Kw shall be of the reduced voltage type.

9.6.1.2 Circuit breakers shall operate on the thermal magnetic principle. Aside from serving as disconnecting means, they shall afford protection for motor against phasing circuits faults. They shall be provided with enclosures suitable for the application

9.6.1.3 All motors shall be provided with an over and under voltage protection device.

9.6.2 WIRING

9.6.2.0 All electrical power and control wiring necessary to be provided by the contractor shall be accomplished in accordance with the requirements of the electrical plans and specifications and shall conform to the Philippine Electrical Code. Wiring system including materials shall also comply with the specifications under the electrical division of the project

9.6.3 ELECTRICAL INTERLOCKS

9.6.3.0 For motors requiring electrical interlocks, remote control or sequence starting control features, starters shall be equipped with necessary auxiliary contacts or terminals to provide the control feature required. A separate set of terminal is required for each control circuit. Such starter shall be provided with "man-off-auto" selection switches. Other starters shall have a start-stop push buttons mounted in covers.

9.6.3.1 Except where otherwise specified, enclosure shall be sheet metal with hinged cover, NEMA type I for the general purpose indoor application. Starters shall be arranged for floor or wall mounting as shown or as indicated.

9.6.3.2 Pilot light shall be provided for all starters where the equipment is not visible from the starter and for all remote control stations.

9.6.3.3 Where possible, relays and switches that are not part of the automatic control system shall be mounted on the same panel as the corresponding motor starter. All supports for the stating equipment shall be furnished and installed by the A/C contractor.

9.6.3.4 This contractor shall furnish detailed wiring diagram to those installing the electrical wire and furnish all information necessary to assure the proper connection, operation and control of motorized equipment including interlocks, automatic and safety control auxiliary circuit

9.6.4 PAINTING AND FINISHING

9.6.4.0 Pipe hangers, duct hangers, uninsulated piping and other ferrous metal work that have not received factory painting shall be thoroughly cleaned and given two (2) coats of rust preventive paint.

9.7 EXECUTION

9.7.0 EQUIPMENT

9.7.0.0 Install all equipment as indicated and in accordance with the manufacturer's instructions. Provide clearance for inspection, repair, replacement and service. Provide conduits for wirings. Equip motors with unfused safety switches and overload protection in the operating disconnects switches and magnetic starters. Schedule and administer specified test

9.7.1 PIPING SYSTEM

9.7.1.0 Install piping and piping components to ensure proper and efficient operation of the equipment and controls. Proper supports for the mounting of vibration isolators, stands, guides, anchors, clamps and brackets shall be provided. Piping connections to equipment shall; be arranged so that removal or equipment can be accomplished with the least amount of disassembly or removal of the piping system. Allow sufficient pitch to ensure adequate drainage and venting. Hydrotest the piping system and conduct testing, adjusting and balancing of water flow to ensure efficient system performance

9.8 GUARANTEE AND SERVICE

- 9.8.0 The air conditioning and ventilating system equipment and accessories furnished and installed under this part of the specifications shall be guaranteed for a period of one (1) year from the date of acceptance thereof, and materials and equipment furnished shall be free from any defects in the materials, workmanship and design.
- 9.8.1 At any time within one year after the acceptance and upon proper notice, the contractor shall rectify any and all deficiencies including replacements of parts or the entire units without additional cost of the owner, if such deficiencies have been caused directly or indirectly by inferior materials, faulty workmanship and/or defective design or parts.
- 9.8.2 Expendable items such as oil, refrigerant, belts, filters, etc. are included in this one-year guarantee. During the guarantee period, the contractor shall perform free monthly inspection and service and make adjustments if necessary for the proper and efficient operation of the system

X PLUMBING

GENERAL

10.0 DESCRIPTION

10.0.0 Applicable provisions of General Conditions govern work under this section.

- 10.0.0.0 All fittings, connections and piping embedded in concrete shall be subject to inspection by the Architect and/or his representative before covering and/or completion.
- 10.0.0.1 The contractor shall provide all items, articles, materials, operations of methods listed, mentioned or scheduled on the drawings and/or herein, including labor, materials and incidentals necessary and required for their completion.
- 10.0.0.2 The contract drawings and specifications are complementary to each other, and any labor or materials called for by either, whether or not called for by both, if necessary, for the successful operation of any of the particular type of equipment furnished and installed will be without additional cost to the owner.
- 10.0.0.3 Intent: It is not intended that the drawings shall show every pipe fitting. All such items, whether specifically mentioned or not, or indicated in the drawings shall be furnished and installed, if necessary to complete the system in accordance with the best practice of the plumbing trade and to the satisfaction of the engineer and the owner.
- 10.0.0.4 The plumbing contractor is required to refer to all architectural, structural and electrical plans and specifications and shall investigate all possible interferences and conditions affecting his work.

10.1 SCOPE OF WORK

Work included under this section of this specification consists of furnishing all labor, tools and equipment, appliances and materials necessary for complete installation, testing and operation of the storm drainage system in accordance with the contract.

- a. Arrange for, obtain and bear the cost of necessary permits, bonds and fees, private or government shall be paid by the contractor.
- b. Supply and installation of Sanitary lines of the Building.

- c. Supply and Installation of waterlines of the Building.
- d. Storm drainage system and connection to the nearest storm drainage outlets.
- e. Supply and installation of Transfer pumps and Overhead Tanks.
- f. Supply and Installation of Plumbing fixtures.
- g. The contractor shall provide all necessary shop drawings and two (2) sets of As-Built Plans.
- h. Excavation and backfilling in connection with the work shall be included.
- i. Furnishing of written one (1) year warranty of the plumbing system

10.2 SUBMITTALS

- 10.2.0 Within fifteen (15) days after award of contract, the contractor shall submit for engineer's approval, four (4) copies of all complete list of manufacturer's name of all materials he proposes to use.
- 10.2.1 After approval of the above list and before purchase of any materials, the contractor shall submit to the engineer for approval, four (4) complete sets of detailed information consisting of manufacturer's bulletins, shop drawings and partial list of materials to be provided under this contract.
- 10.2.2 The contractor shall assume the loss of and the entire responsibility of any change in the work as shown in the contract drawings, which may be occasioned by approval of materials other than those specified.

10.3 APPLICABLE CODE AND STANDARD

- 10.3.0 All Storm Drainage works to be done and the sizes of pipes to be used shall be in accordance with the National Plumbing Code and the Plumbing Code of the Philippines.
- 10.3.1 The plumbing contractor shall verify the above paragraphs with each section of the specifications and coordinate his work so that the general contractor will understand clearly the intent of the work to be done.

10.4 PRODUCTS

10.4.0 Description of Materials

All materials to be used shall conform to the standards specified. Use of materials shall be governed by other requirements imposed on other section of these specifications. Materials shall be subject to tests necessary to ascertain their fitness if the engineer so requires.

10.4.1 Alternate Materials

Use of any material not specified in these specifications may be allowed, provided such alternate has been approved by the engineer, and provided further, that a test is required, shall be done by an approved agency in accordance with generally accepted standards.

10.4.2 Identification of Materials

Each length of pipe, fittings, traps, fixtures and devices used in the storm drainage system shall have case, stamped or indelibly marked on it the manufacturer's trademark or name, type and classes of products when so required by the standards mentioned. All materials and equipment mentioned in these specifications, including all incidental items not specifically indicated, but required to complete the contract shall be new and free from defects. If damaged during the course of construction, it shall be repaired or replaced as directed by the Project Manager at no additional cost for the owner.

10.4.3 Pipes and Fittings Schedule

- 10.4.3.0 Drain, Waste and Vent – shall be unplasticized polyvinyl chloride (uPVC) conforming to ASTM D1784, Crown Pipes or approved equivalent.

10.4.3.1 Storm Drainage Lines – Pipe sizes 250mmØ and above shall be reinforced concrete pipe. Pipe sizes 200mmØ and below shall be non-reinforced concrete pipe.

10.4.3.2 Water lines shall be UPVC pipe, blue sch. 40, push on or solvent type.

10.4.4 Drains

10.4.4.0 Floor drain for genset room shall be ASA 40-9F, pipe size 100mmØ by ASA Metals or approved equal.

10.4.4.1 Area Drain/Catch Basin shall be 140kg/sq. cm. (2000psi) reinforced concrete with GI cutting cover.

10.4.4.2 Site storm drain shall be reinforced concrete for 250mmØ and above, 200mmØ and below shall be concrete pipe.

10.4.5 Valves and Appurtenances

10.4.5.0 Ball valve shall be screwed, bronze, class 150 psi, kitz or approved equal.

10.4.5.1 Check valve shall be screwed, bronze, class 150 psi, kitz or approved equal

10.4.5.2 Pumps (Please refer specifications on plans)

10.4.6 Pipe Sleeves

10.4.6.0 Pipe sleeves shall be installed and properly secured in place at all points where pipes pass through masonry or concrete, except unframed floors on earth.

10.5 EXECUTION

10.5.0 Piping Installation

Piping shall be installed as shown on the drawings, as recommended by the manufacturer and as directed during installation, straight and direct as possible, forming right angles or parallel lines with building walls and other pipes and neatly spaced. Erect pipe risers plumb and true, parallel with walls and other pipes neatly spaced. All piping shall be supported or suspended on stands, clamps, hangers or equivalent or approved design. Supports shall be installed in such a manner to permit pipe free expansion and contraction while minimizing vibration.

10.5.1 Plumbing System Test

The entire system of drains shall be tested. Water test shall be in accordance with the plumbing Code. Every portion of the system shall be tested to a hydrostatic pressure equivalent to at least 10-foot head water for a period of ½ hour before covering. Defects disclosed by the test shall be repaired with new materials at the expense of the contractor.

XI ELECTRICAL WORKS

11.0 WORK INCLUDED

11.0.0 The work to be done under this Division comprises the furnishing of all tools, labor, equipment, fixtures and materials, unless otherwise herein specified, required to complete and leave ready for use the electrical system of the Proposed Construction of Baesa Columbarium, Barangay Baesa, Quezon City in accordance with this specification and accompanying drawings of materials and finishes.

11.0.0 The electrical contractor shall coordinate his work so that the general contractor and all other subcontractors will understand clearly the work to be done. The electrical contractor shall finish all electrical facilities and provision necessary for the installations and operations of other trades such as mechanical, air-conditioning, plumbing, sanitary and others.

- 11.0.1 All contractors and all companies or persons providing labor, materials or both for this project, are specifically referred to the General Conditions of the specifications, to the general contract plans, to all Divisions of specifications and to the various other contract documents, which may affect the completion of the contract work.

11.1 CODES, INSPECTIONS, PERMITS AND FEES

- 11.1.0 The work under this contract shall be done according to the requirements of the latest edition of the Philippine Electrical Code, the rules and regulations of the Local Government Authorities of Quezon City and the requirements of Manila Electric Company. Nothing contained in this specification or shown on the drawings shall be construed as conflict with national and local ordinances or laws governing the installation of Electrical Works, and all such laws and ordinances are hereby made part of these specifications. The contractor is required to meet the requirements hereof.

- 11.1.1 All permits and electrical fees required for this work shall be obtained at the expense of the Contractor. The Contractor shall furnish the Architect or the Owner or the same maybe, a final certificate of electrical inspection and approval from the proper government authorities after completion of the work.

11.2 TEST

- 11.2.0 The electrical contractor shall apply such test, replace or remedy all defective work and adjust such system as needed or as the Architect or the owner shall direct. He shall also instruct the proper use of the system and equipments to persons designated by the owner

11.3 MEASUREMENTS

- 11.3.0 The Electrical Contractor shall procure from the Architect detailed drawings of those parts of the work not fully shown on the plans and he shall compare and verify with the Owner. Any lack of agreement shall be submitted at once to the Architect for adjustments.

11.4 SLEEVES AND FORMS FOR OPENINGS

- 11.4.0 The Electrical Contractor shall provide and places all sleeves, for piping penetrating floors, walls, partitions, etc. He shall locate all necessary slots and openings for his work and it shall be done at such time as not to delay the general contractor of the project.

11.5 LOCATION OF OUTLETS

- 11.5.1 All Outlets shall be truly centered in panels and spaces provided thereof. Any discrepancy in the outlet location between the electrical plan and architectural plans shall be submitted to the Architect at once, to be verified before outlets are installed.

11.6 GROUNDINGS

- 11.6.0 If metallic conduits, supports, cabinets and equipment shall be properly grounded and bonded by means of copper straps. The conduits of such system shall be grounded by connecting to the grounding rod.
- 11.6.0 All ground connections shall have clean outlet surfaces and shall be tinned and sealed while bolting. Unless otherwise specified, ground wire shall be installed in exposed conduits and connections made readily accessible for inspection. Connection shall not be made underground or concealed in floors or walls.

11.7 WIRING METHODS

- 11.7.0 All wiring shall in general be installed inside standard conduits. All conduits shall run embedded in concrete, underground but in concrete envelope, embedded in hollow blocks partition, concrete slab, walls and roof above, between double wall wooden partitions if any, where the installation of concealed and/or embedded conduit wiring may be used, but only upon approval of the Owner's authorities concerned. Exposed conduits shall be Intermediate Metal Conduits unless otherwise specified.

11.8 GUARANTEE

11.8.0 The Electrical Contractor shall guarantee his work for a period of one (1) year from the date of final acceptance by the owner except for particulars items specifically mentioned in these specifications.

11.8.1 The Electrical Contractor shall, without additional compensation for the period specified, replace any work materials or equipment furnished and installed by him under this contract, which develop defects except from ordinary wear and tear.

11.9 MATERIALS

11.9.0 All materials shall be new and shall conform to the standards directed of Designer Engineer/Architect.

11.9.0 All materials on all systems shall comply with the following specifications unless specified and all materials not specified shall be of the best of their respective kind.

11.9.1 Materials sample shall be submitted for approval as required by the Architect and Electrical Engineer.

11.10 WIRES

11.10.0 All wires shall be copper, soft drawn and annealed, shall be 98% conductivity or better, shall be smooth and true of a cylindrical form and shall be within the actual size called for.

11.10.1 All wires and cables shall comply with the requirements of the *Underwriter's Laboratories Inc.*, the ASTM and the IPCEA as to their particular usage.

11.10.2 Wires and cables for outdoor and indoor lighting and power system shall be moisture and Heat Resistant Thermoplastic insulated for 600volts working pressure type THHN unless otherwise noted on the plans or specified.

11.10.3 For lighting and power system, no wire smaller than 3.5mm² shall be used except for control leads/ grounding wire.

11.10.4 All wires and cables shall be manufactured by manufacturing company acceptable to the Electrical Engineer of the owner.

11.11 CONDUITS

11.11.0 The conduit system shall consist of the following

Intermediate Metal Conduit (IMC) & Electrical Metallic Tubing (EMT)

They shall be of standard sizes and weight, mild steel hot dipped galvanized with inside enamel or epoxy coating, acceptable to the Electrical Engineer of the Owner.

Polyvinyl Chloride Conduit (PVC)

They shall be of standard size and weight, made of polyvinyl chloride, extruded, heavy wall, rated for 90-degree centigrade cable, schedule 40.

Limitations of use shall be as follows:

- a. As per requirement of the latest edition of PEC and/or NEC.
- b. Not permitted where subject to mechanical damage.

11.11.1 All conduits shall be of true cylindrical form and shall be within the actual size called for.

11.11.2 No conduits shall be used in any system smaller than 15-mm electrical trade size, not shall have more than four 90 degrees bend in any one run, and where necessary, hand hole and pull boxes shall be provided.

11.11.3 No wires shall be pulled in any conduit until the conduit system is complete in all details, In case of underground work, until concrete envelope or masonry has

been completed in every detail. In case of concealed work, until rough plastering has been completed.

- 11.11.4 The ends of all conduits shall be tightly plugged to exclude plaster dust sand and soil including moisture while the renovation of the perimeter is in the process.

11.12 OUTLET BOXES AND FITTINGS

- 11.12.0 At all outlets of every kind, for all systems, there shall be provided a suitable fittings which shall be either a box or other device especially designed to receive the type of fitting to be mounted thereon.
- 11.12.1 The Contractor shall consult with the Electrical Engineer as to the nature of various fittings to be used before installing his outlet fittings and shall conform strictly in the use of fittings so that the work when completed will be finished design.
- 11.12.2 In case of lamp post, the outlet of fittings shall be provided with suitable fixtures supports or a support of a size and a kind required by the fixture to be erected.

11.13 SWITCHES

- 11.13.0 Local lighting switches shall be flush type, heavy duty, 15- ampere size 250 volts, bakelite case, quick connect terminal. Outdoor lights shall be automatically operated by means of photo switch and manual selection. Or it might be a manual switch by means of breaker switch inside the lighting panel.

11.14 RECEPTACLES

- 11.14.0 Standard receptacles shall be 15- ampere size 250volts, parallel slots, duplex, flush mounted composition case, side wired with the insulated mounting yoke. If weatherproof wall plate is required, standard factory made metal waterproof plate.

11.15 PLATES

- 11.15.0 All switches and receptacles plates shall be bakelite plastic, ivory-colored or as directed by the Architect.

11.16 SWITCH GEAR, PANEL BOARDS AND CABINETS

- 11.16.0 Panel boards for outdoor lightings shall conform as indicated in the drawings with respect to supply characteristics, rating of main lug or main circuit breaker, main magnetic contactor, number and sizes of branch circuit breakers. All should have factory-wired control wirings with terminal block connection for external leads.
- 11.16.1 Lighting and power panel board either wall mounted or free standing shall consist of a factory complete dead front assembly of back plan, main busses, overcurrent and switching units, sheet metal cabinet and trim. Cabinet shall be fabricated from code gauge galvanized sheet metal with cover capped and fastened.
- 11.16.2 Panel boards and trim shall be suitable for the type of mounting shown on the drawings. The inside and outside of the panel boards cabinet and trim shall be factory painted and having two (2) coats of rust proof prime coat and one finish shop of gray enamel paint.
- 11.16.3 All cabinets and enclosure shall be general purpose, NEMA type 1 for indoor installation. Except where specifically noted on plans for outdoor use shall be rain tight and dust type NEMA 4X type enclosure.
- 11.16.4 All circuit breakers with frame size above 100AT shall have minimum interrupting capacity of 22 KAIC at 230 volts and frame size 100AT and below shall have minimum interrupting capacity of 18 KAIC at 230 volts. All circuit breakers shall be molded case, bolt on type with thermal magnetic trip elements. Number of poles, trip coil rating and frame size shall be as indicated on plans. All circuit breakers.

- 11.16.5 Switchgear main circuit breaker shall be stationary type, programmable trip device, an electronic relay that employs microprocessors-based technology. Functions to overload protection, short circuit protection, with selectivity, instantaneous short circuit protection with adjustment and ground fault protection.
- 11.16.6 Cardholder on inside of door with clear plastic cover and complete typewritten schedule of panel branch circuit shall be provided. Leave spare circuit blank.
- 11.16.7 Local panel boards and switchgear.
- 11.16.8 Submit samples and or product description of panel board to be used for approval prior to ordering and installation.

11.17 ELECTRIC SERVICE

- 11.17.0 The electric service shall be three (3)-phase, 4 wire, 230volts, 60 hertz. The sizes of service entrance conductor and conduit are shown in the plans.
- 11.17.1 The electrical contractor shall inspect the site, consult with *MERALCO* and check the orientation of the proposed service entrance before commencing work to avoid field problems.

11.18 LIGHTING SYSTEM

- 11.18.0 The lighting system shall be complete in every respect as indicated on the electrical plans or as specified in the Architectural plans. Exact fixture location shall be determined.
- 11.18.1 All wiring shall be installed in conduits, and in general shall be concealed. Buried underground in concrete encasement and/or embedded in concrete.
- 11.18.2 Mounting height of devices shall be as indicated in the plans and/or subject to Architect's approval prior to installations as follows
 - Local switches - 1.4 above finish floor line
 - Receptacles - 0.3 above finish floor line

11.19 DISTRIBUTION FEEDERS

- 11.19.0 Distribution voltage shall be 230volts, three (3)-phase, 4 wire. Feeder conductors and raceway shall be installed as shown on drawings and no change in size shall be made without the written consent of the Architect. Feeder conductors shall be continuous, and without splices between terminals. When feeders are run in multiple, they shall be exactly of the same length to avoid unbalanced division of the current.

11.20 CONNECTORS AND INSULATION

- 11.20.0 Use solderless mechanical pressure type lugs, copper connectors for splicing wires greater than no 8mm.sq. All splices shall be properly insulated using #M brand rubber tape and plastic electrical tape. Application of tapes shall be equivalent to the insulation of wire concerned, edges to provide smooth surfaces before taping.

11.21 BRANCH CIRCUITS

- 11.21.0 The drawings indicate the general methods of installation of all circuit wirings and the power lighting outlets which are to be supplied from this circuit. Branch circuit raceways shall be run from outlets to panel boards as direct as the ground and level condition will allow. Circuit allocations shall be as indicated on the drawings. Where it becomes necessary to connect any outlet to the circuit other than the one shown on the drawings, this shall be done without extra charge and only upon written consent of the Architect. No wire smaller than 3.5mm sq. shall be used for any lighting or power branch circuit. All lighting outlet shall be supplied from 2-wire single phase circuits. Number of wires for other outlets shall be as indicated on the drawings.

11.22 MOTOR CONNECTIONS

- 11.22.0 Connect the motor starting devices for all motors, except where otherwise specifically provided for under other contracts. Furnish all necessary connections between controllers and motors in conduit, and leave motor ready to start. The power supply leads to the motor from the controller shall be the same as the feeder indicated on the drawings, except for six terminal lead motor where wye-delta starting method is being applied.
- 11.22.1 Other trades, i.e. mechanical contractor, except as otherwise noted or specified will supply and deliver all controllers and shall erect and connect up safe complete.
- 11.22.2 The Electrical Contractor or trade people shall be held responsible as far as power supply to the controller is concerned. He shall ascertain the exact location of the motor controller and motors from other trades before installing the circuit work.

11.23 RECORD DRAWINGS AND AS BUILT PLANS

- 11.23.0 The Electrical Contractor shall keep an active record of the actual installation works during the progress job. The shall become the reference for the preparation of the As-Built Plans which shall include all pertinent information, complete in all aspects of the actual installations, all new information not originally shown in the contract drawings. The As-Built Plans shall be prepared by the Electrical Contractor at his expense and shall be submitted to the Architect and the Engineer for approval upon the completion of the work. The approval of the As-Built drawings shall be a pre-requisite for the final acceptance of the electrical works.
- 11.23.1 Two (2) copies of the As-Built drawings, signed and sealed by the Electrical Contractor's Professional Electrical Engineer, shall be submitted to the Architect and Engineer consultants. Original tracing/ reproducible copy shall also be submitted.

Note: *In contrast between these Technical Specifications and the approved Plans issued to the Contractor, the approved Plans shall prevail. See also the approved program of works. In case of doubt, for clearer outlooks consult the assigned Architect/Engineer.*

Prepared by:

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Republic of the Philippines
Quezon City
Office of the City Mayor
QUEZON CITY BIDS & AWARDS COMMITTEE
(QC-BAC-INFRA)



PROJECT : PROPOSED CONSTRUCTION OF BAESA COLUMBARIUM WITH LAND DEVELOPMENT (MORGUE)
LOCATION : Barangay Baesa, Quezon City
SUBJECT : GENERAL CONDITIONS AND TECHNICAL SPECIFICATIONS

I. GENERAL CONDITIONS

1.0 DEFINITIONS

- a. OWNER :** LOCAL GOVERNMENT OF QUEZON CITY
- b. CONTRACTOR :** Any individual, firm, corporation, partnership or association that enters into an agreement with the Owner for furnishing the materials and/or labor, tools, equipment, plant and other facilities required for the erection and completion of the project subject to the accompanying plans and working drawings.
- c.** The Owner/Implementing Agency and the Contractor are treated through the contract documents as if each were of the regular number, masculine gender.

1.1 EXAMINATION OF MEMBER

The Contractor shall carefully examine the premises before submitting any bids to enable him to have full knowledge of conditions existing therein.

1.2 LOCATION

The Proposed Construction Of Baesa Columbarium with Land Development (Morgue) be built along Barangay Baesa, Quezon City, refer to the approved Location Plan.

1.3 EXECUTION, CORRELATION & INTENT OF DOCUMENTS

- a.** The Contract Documents are signed in sufficient number of copies by all parties concerned. In case anybody fails to sign copies of any item forming part of the set contract documents, the Implementing Agency's identification thereon shall suffice.
- b.** The items, specifications and all other documents forming the contract documents are complementary. Anything shown on plans but not mentioned in the specifications or vice versa or anything not expressly set forth in either, but necessarily implied, shall be furnished or done as if specifically shown and mentioned in both, with no extra charge. Where dimensions are given in figures, follow them in preference to measurement by scale.
- c.** Execute work as per agreement, making no changes or deviations whatsoever, without prior permission from the Implementing Agency.
- d.** The Contractor shall verify and check all dimensions particularly those on the plans. He will be held directly responsible in case of any discrepancy that may be discovered during the progress of work.

1.4 DETAIL DRAWINGS AND INSTRUCTIONS

Plans furnished for use at the jobsite are whenever necessary, supplemented by detail drawings and instructions essential to the proper execution of the work. Such supplementary detail drawings and instructions shall be treated as of equal force as though originally issued.

1.5 PLANS AND PROJECT SITE

Keep at project site, in good order and condition, one (1) set of approved plans, specifications, supplementary detail drawings and instructions.

1.6 SHOP DRAWINGS

Shop drawings shall be provided by the Implementing Agency and/or Contractor during the progress of construction. The contractor should not place any item subject to shop drawings until the Implementing Agency shall have duly approved such drawings.

1.7 CHANGES

The Owner and the Implementing Agency reserve the right to make alterations or additions, including changes during the progress of work. The same shall be carried into effect without in any way deviating from or violating any agreement. Whatever amount shall necessarily be entailed in the cost of labor or materials or both shall be added to or deducted from the original contract price.

1.8 TIME OF COMPLETION AND SCHEDULE OF CONSTRUCTION

The Contractor shall, before actual commencement of the project operations, prepare and submit to the Implementing Agency for verification and approval, a complete and comprehensive work schedule covering the entire duration of construction. He shall also include therein, the estimated number of days within which the entire project shall be completed stage by stage by phase.

1.9 WORKMANSHIP

The project shall be executed with the use of first class workmanship to the full intent and meaning of the plans and specifications and to the complete approval and acceptance by the Implementing Agency.

1.10 MATERIALS

All materials to be used shall be the best of their respective types and kind. They shall be properly stored and protected from damage or injury.

1.11 SAMPLES

Submit samples as specified and proceed with the work with the use of materials procured based on the samples previously approved by the Implementing Agency.

1.12 INSPECTION OF WORK

The Contractor shall provide the facility for inspecting the work to the Implementing Agency, the Owner and other personnel having jurisdiction over the work.

1.13 DEFECTIVE OR IMPROPER WORK

All work or materials not acceptable to the Architect shall be removed immediately and replaced with appropriate work or materials without extra charge. All condemned materials shall be taken away from the premises without delay.

1.14 BUILDING LAWS AND REGULATIONS

The Contractor shall be held responsible for strict compliance with existing labor laws and regulations and shall free the Owner from any responsibility in connection therewith, he shall pay on time at his own expense, all taxes, fees and/or licenses due to the government, both national and local arising from his work on the project.

1.15 MANNER OF PAYMENT

Payments to the Contractor shall be based on the periodic work accomplishments subject to verification, approval and recommendation by the Implementing Agency.

1.16 RETENTION MONEY

Progress payments shall be subject to a ten percent (10%) deduction, referred to as retention money. All retained amounts shall be released upon satisfactory completion of the work and issuance of the Certificate of Final Completion and Acceptance.

1.17 TEMPORARY WATER, POWER AND TELEPHONE FACILITIES

The Contractor shall make the necessary arrangements with the local utility companies so as to provide temporary facilities for the supply of water, power and telephone for the duration of construction, and all expenses in connection therewith shall be borne by the Contractor.

1.18 PRIVY

The Contractor shall provide a temporary privy in a most inconspicuous and sanitary manner, and shall have it removed at the termination of the work.

1.19 CLEARING AND CLEANING

Upon its completion, the project and its premises shall be cleared and cleaned as directed by the Implementing Agency, and make ready for immediate occupancy.

1.20 TEMPORARY BARRICADES, SIGNAL LIGHTS, BILLBOARDS, ETC.

The Contractor shall provide all temporary barricades, signal lights, Architect and Contractor's billboards, the required official building billboard, etc., necessary for the protection of the public and for the proper prosecution of the work and display of construction requirements.

1.21 PERFORMANCE AND GUARANTEE BOND

To guarantee the faithful performance of the Contractor under the contract, he shall post a Performance Bond in the amount of thirty percent (30%) of the contract price in the form of cash, manager's check or surety bond, callable on demand.

1.22 QUESTIONS AND DISAGREEMENTS

All questions and disagreements between the Contractor and the Owner relative to the interpretation of the plans and specifications shall be referred to the Implementing Agency whose decision on the matter shall be final.

II. TECHNICAL SPECIFICATIONS

2.0 SITE WORK

WORK INCLUDED

- 2.0.0 Staking out and establishment of additional wall lines, grades and benchmarks.
- 2.0.1 All excavation works including all necessary shoring, bracing and drainage of storm water from the site.
- 2.0.2 All soil treatment, backfilling, filling, compaction and grading, removal of excess material from site.
- 2.0.3 Protection of property, work and structures, workmen and other people from damage and injury.
- 2.0.4 Soil Poisoning / Termite Proofing.
- 2.0.5 Gravel Bedding and Compaction (Ordinary Gravel).
- 2.0.6 Backfill and compaction

2.0.7 Hauling and disposal of excess materials

2.0.8 Demolition works

2.1 LINES, GRADES AND BENCHMARKS

2.1.0 Stake out accurately the lines of the building and/or the other structures included in the contract, and establish grades therefore, after which secure approval of the Project Manager before any excavation work is commenced.

2.1.0 Erect basic batter boards and basic reference marks at such places where they will not be disturbed during the construction of the foundation.

2.2 EXCAVATION

Structural Excavations: Excavations shall be to the depths indicated in the drawings where bearing value as indicated in the Soils Investigation Report provided as part of the Construction Documents shall be attained. Excavations for footings and foundations carried below required depths shall be filled with lean concrete and bottom of such shall be level. All structural excavations shall extend a sufficient distance from the walls and footings to allow for proper erection and dismantling of forms, for installation of service and for inspection.

All excavations shall be inspected and approved before pouring any concrete laying underground utility and auxiliary lines for placing select fill materials. The Contractor shall control the grading in the vicinity of all excavated areas to prevent surface drainage running into excavations. Water that accumulates in excavated areas shall be removed by pumping before fill is placed herein.

2.3 SOIL TREATMENT

Treat soil with 2% Chlordane or Andrex solution in water to provide an unbroken horizontal and vertical chemical barrier between the proposed structure and the possible termite colonies in the soil after excavation is completed and prior to pouring of concrete foundation and ground floor slabs. At the time the soil treatment is to be applied, the soil shall be in a friable condition with a sufficient low moisture content to allow uniform distribution of the treatment solution throughout the soil.

Do not apply pesticide during or immediately after heavy rains, or whenever climatic conditions are such that runoff will occur to create an environmental hazard. Cover treated areas with polyethylene or waterproof sheeting if concrete is not poured on the same day as the soil treatment. Take adequate precautions to prevent disturbance of the pesticide barrier. Re-treat the soil or fill is disturbed after the treatment and before the placement of structural components. Apply pesticide prior to placement of vapor barrier or waterproofing membrane.

2.4 SHORING

Excavation shall be shored and braced by members of suitable sizes where necessary to prevent danger to persons, injurious caving or erosions. Shoring bracing and sheathing shall be removed, as the excavations are backfilled, in a manner such as to prevent injurious caving. The contractor shall keep all excavations free from water while construction is in progress.

2.5 FILLING AND BACKFILLING

After forms have been removed and when concrete work is hard enough to resist pressure resulting from fill, backfilling may then be done. Materials excavated may be used for backfilling. All filling shall be placed in layers not exceeding six (6) inches in thickness, each layer being thoroughly compacted and rammed by wetting, tamping, rolling.

2.6 PLACING AND COMPACTING FILL

2.6.0 Common Fill: shall be approved imported/site-excavated material free from roots, stumps and other perishable or objectionable matter.

- 2.6.1 Select Fill: shall be placed where indicated and shall consist of crushed gravel, crushed rock or a combination thereof. The material shall be free from adobe, vegetable matters and shall be thoroughly tamped after lacing.
- 2.6.2 Before placing fill materials, the surface upon which it shall be placed shall be cleared of all brush roots, vegetable matter and debris, and thoroughly wetted to ensure good bonding between grounds.
- 2.6.3 Compaction: Fills shall be evenly spread in horizontal layers of not more than 200mm in thickness. Each layer shall be wetted and compacted by approved mechanical compaction machine, roller or portable to a density of at least 90% or its maximum density for non-cohesive soils as determined by ASTM Method D-1557 or AASHTO Method T-130.

2.7 FINISH GRADING

The contractor shall fill and grade the whole area to the indicated sub-grade elevations as directed by the Architect or Engineer. The contractor shall verify the finish grade elevations of the proposed pavements. Prior to grading operations, the areas shall be cleared of all heavy growth or vegetation stumps, roots, cables, wires, rocks and other debris. The finished sub-grade shall be reasonably smooth and compacted and ready to receive the base course for the proposed pavement.

2.8 DISPOSAL OF EXCESS MATERIALS

Any excess and demolished materials remaining after completion of the earthwork shall be disposed of by hauling and transported out of the premises at the contractor's own expense.

2.9 SUB-GRADE PREPARATION

2.9.0 SCOPE

The sub-grade preparation shall be that part of the work which is the preparation for the support of the bases for pavements and structures. It shall extend to the full width of pavements including shoulders and lay-bys as shown on the drawings or as specified herein. Unless otherwise agreed upon by the Engineer, sub-grade preparation or a section of the road shall not be commenced unless the contractor is able, after the completion and acceptance of the work, to commence immediately pavement construction.

2.9.1 PRODUCTS

All materials and equipment necessary for proper completion of this work shall be subject to the approval of the Engineer.

2.9.2 EXECUTION

2.9.2.0 Prior Works: Prior to commencing the preparation of the sub-grade, all culverts, cross drains, and other similar structures (including the fully compacted backfill) shall be completed. No work shall be started on the preparation of the sub-grade before the prior works herein approved by the Engineer.

2.9.2.1 Sub-grade Level Tolerance: The finish compacted surface of the sub-grade shall conform to AASHTO M-145.

2.9.2.2 Sub-grade in Cutting Common Material

- a. Unless otherwise specified, all materials below sub-grade level in earth cutting to a depth of 150mm or other depth shown on the drawings or directed by the Engineer shall be excavated. The material, if suitable, shall be placed to one side for re-use, or if unsuitable, shall be disposed of in accordance with the requirements of AASHTO M-145.
- b. Where material has been removed from below sub-grade level, the base of the resulting cutting shall be compacted to a depth of 150mm to the requirements of AASHTO M-145 Table 1. If necessary, the moisture content of the material shall be adjusted.

2.10 GRADED AGGREGATES AND BASE COURSE

2.10.0 SUBMITTALS

- a. Test Reports: Before delivery of materials, submit the following test reports:
 - 1. Gradation
 - 2. Bearing Ratio
 - 3. Attenberg Limits

2.10.1 DELIVERY AND STORAGE

Do not construct base course when rainfall or other weather conditions will detrimentally affect the quality of the finished course.

2.11 PRODUCTS

2.11.0 MATERIALS

- a. Aggregates: Consist of durable sound crushed gravel, crushed stone, free of lumps and balls of clay or other objectionable matter. Crushed stone shall be free from flat, soft or disintegrated pieces. Crushed gravel retained on a No. 4 sieve shall have at least ninety percent (90%) by weight with at least two fractured faces one hundred percent (100%) by weight with at least one fractured face.
- b. Base course materials samples shall have a Bearing Ratio of at least 100 as determined by laboratory tests on a 4-day soaked specimen in accordance with ASTM D 1883; compact specimen in accordance with ASTM D 1557, Method D. Determine grain size in accordance with ASTM C-117.
- c. Soil binder material, the surface of the layer by a combination of rolling and blading. Final surface shall be smooth and free from waves, irregularities and from ruts of soft yielding spots.

III CONCRETE

3.0 GENERAL

- 3.0.0 Unless otherwise specified herein, concrete work shall conform to the requirements of ACI Building Code. Full cooperation shall be given other trades to install embedded items. Provisions shall be made for setting items not placed in the forms. Before concrete is placed, embedded items shall have been inspected and tested for concrete aggregates and other materials shall have been done.

3.1 SUBMITTALS

- 3.1.0 Shop Drawings: Reproduction of contract drawings is unacceptable.
- 3.1.0 Shop Drawings for Reinforcing Steel: ACI 318. Indicate bending diagrams, assembly diagrams, splicing and lap 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 bars.
- 3.1.1 Contractor Mix Design: Thirty (30) days prior to concrete placement, submit a design for each strength and type of concrete. Furnish a complete list of materials including type, brand; source and amount of cement and admixtures;

applicable reference specifications and copies of test reports showing that the mix has been successfully tested to produce concrete with the properties specified and will be suitable for the job conditions. Provide fly ash and pozzolan test results performed within six (6) months of submittal date. Obtain approval before concrete placement.

3.1.2 Certificates of Compliance

- a. Aggregates
- b. Admixtures
- c. Reinforcement
- d. Cement

3.1.3 Catalogue Data

- a. Water stops
- b. Materials for Curing Concrete
- c. Joint Sealant
- d. Joint Filter
- e. Vapor Barrier
- f. Epoxy Bonding Agents

3.2 MATERIALS

3.2.0 Cement for concrete shall conform to the requirements of specifications for Portland cement (ASTM C-150).

3.2.1 Water used in mixing concrete shall be clean and free from other injurious amounts of oil, acids, alkaline, organic materials or other substances that may be deleterious to concrete or steel.

3.2.2 Fine Aggregates shall consist of hard, tough, durable uncoated particles. The shape of the particles shall be generally rounded or cubicle and reasonably free from flat or elongated particles. The stipulated percentages of fines in the sand shall be obtained either by processing sand or by the production of suitable graded manufactured sand.

3.2.3 Coarse Aggregates shall consist of gravel. Crushed gravel or rock. Or a combination of gravel and rock. Coarse aggregates shall consist of hard, tough, durable, clean and uncoated particles. The size of coarse aggregates top be used in the various parts of the Work shall be ¾".

3.2.4 Reinforcing bars shall conform to the requirements of ASTM Standard specifications for Billet Steel Bars for concrete reinforcement (A15-625) and to Specification for minimum requirements for the deformed steel bars for concrete reinforcement (A305-56). Tensile strength and grade for all reinforcing bars such as main horizontal (for beams), vertical (for columns), ties, stirrups and inserts shall be as follows:

No. 3 (3/8")	10 mm – fy	=	40,000 psi Grade 40
No. 4 (1/2")	12 mm – fy	=	40,000 psi (Grade 40)
No. 5 (5/8")	16 mm – fy	=	60,000 psi (Grade 60)
No. 6 (3/4")	20 mm – fy	=	60,000 psi (Grade 60)
No. 8 (1")	25 mm – fy	=	60,000 psi (Grade 60)

3.3 PROPORTIONING AND MIXING

3.3.0 Proportioning of all materials entering into the concrete mixture of 3,000 psi concrete shall be as follows:

<u>Class</u>	<u>Cement</u>	<u>Sand</u>	<u>Gravel</u>
A	1	2.0	4

3.3.1 Strength of Concrete: Concrete shall have 28-day cylinder strength of 3,000 psi shall be for slab on grade, site pavements and wall footings.

- 3.3.2 Mixing: Concrete of 3,000 psi compressive strength shall be ready-mixed in transit from batching plant as scheduled order from qualified supplier, *accredited by Engineer*. The 3,000 psi concrete can be machine mixed on-site or also ready mixed in transit from batching plant. On-site mixing shall be within 30 minutes after the cement has been added to the aggregates.

3.4 FORMS

- 3.4.0 General: Forms shall be used whenever necessary to continue the concrete and shape it to the required lines, or to ensure the concrete contamination with materials caving from adjacent excavated surfaces. Forms shall have sufficient strength to withstand the pressure resulting from placement and vibration of the concrete, and shall be maintained rigidly in correct position. Forms shall be sufficiently tight to prevent loss of mortar from the concrete. Forms for exposed surfaces against which backfill is not to be placed shall be lined with a form grade plywood or metal panels.
- 3.4.1 Cleaning and Use of Forms: Before placing the concrete, the contact surfaces of the form shall be cleansed of encrustation of mortar, the grout or other foreign material, and shall be coated with commercial form oil that will prevent sticking and will not stain the concrete surfaces.
- 3.4.2 Removal of Forms: Forms shall be removed in a manner that will prevent damage to the concrete. Forms shall not be removed without approval. Any repairs of surface imperfections shall be performed at once and airing shall be started as soon as the surface is sufficiently hard to permit it without further damage.

3.5 PLACING REINFORCEMENT

General: Steel reinforcement shall be provided as indicated, together with all necessary gauge 16 G.I. wire ties, chairs, spacers, supports and other devices necessary to install and secure the reinforcement properly. All reinforcement, when placed, shall be free from loose, flaky rust and scale, oil grease, clay and other coating and foreign substances that would reduce or destroy its bond with concrete. Reinforcement shall be placed accurately and secured in place by use of metal or concrete supports, spacers and ties. Such supports shall be of sufficient strength to maintain the operation. The supports shall be used in such manner that they will not be exposed or contribute in any way, to the discoloration or deterioration of the concrete.

3.6 CONVEYING AND PLACING CONCRETE

- 3.6.0 Conveying: Concrete shall be conveyed from mixer to forms as rapidly as practicable, by methods that will prevent segregation, or loss of ingredients. There will be no vertical drop greater than 1.5 meters except where suitable equipment is provided to prevent segregation and where specifically authorized.
- 3.6.1 Placing: Concrete shall be worked readily into the corners and angles of forms and around all reinforcement and embedded items without permitting the material to segregate. Concrete shall be deposited as close as possible to its final position in the forms so that flow within the mass does not exceed two (2) meters and consequent segregation is reduced to a minimum near forms or embedded items, or elsewhere as directed. The discharge shall be so controlled that the concrete may be effectively compacted into horizontal layers not exceeding 30 centimeters in depth within the maximum lateral movement specified.
- 3.6.2 Time interval between mixing and placing: Concrete shall be placed before initial set has occurred and before it has contained its water content for more than 45 minutes.
- 3.6.3 Consolidation of concrete: Concrete shall be consolidated with the aid of mechanical vibrating equipment and supplemented by hand spading and tamping. Vibrators shall not be inserted into lower coursed that have commenced initial set and reinforcement embedded in concrete beginning to set or already set shall not be disturbed by vibrators. Consolidation around major embedded parts shall be by hand spading and tamping and vibrators shall not be used.
- 3.6.4 Placing concrete through reinforcement: In placing concrete through reinforcement, care shall be taken that no segregation of the coarse aggregate

occurs. On the bottom of beams and slabs, where the congestion of steel near the forms makes placing difficult, a layer of mortar of the same cement-sand ratio as used in concrete shall be first deposited to cover the surface.

3.7 CURING

3.7.0 General: All concrete shall be moist-cured for a period not less than seven (7) consecutive days by an approved method or combination applicable to local conditions.

3.7.1 Moist curing: The surface of the concrete shall be kept continuously wet by covering with burlap, plastic or other approved materials thoroughly saturated with water and keeping the covering wet spraying or intermittent hosing.

3.8 FINISHING

3.8.0 Concrete surfaces shall not be plastered unless otherwise indicated. Exposed concrete surfaces shall be formed with smooth form material, and after removal of forms, the surfaces shall be smooth, true to line and shall present a finished appearance except for minor defects which can be easily repaired by patching with cement mortar, or can be ground to a smooth surface to remove all joint marks of the form work.

3.8.1 Concrete slabs on fill: The concrete slabs on fill laid on a prepared foundation consisting of sub-grade and granular fill with thickness equal to the thickness of overlaying slab except as indicated otherwise.

3.9 SURFACE FINISHES

3.9.0 Defects: Repair formed surfaces by removing minor honeycombs, pits greater than one square inch surface area or 0.25 inch maximum depth, or otherwise defective areas. Provide edges perpendicular to the surface and patch with non-shrink f=grout. Patch the holes and defects when the forms are removed.

3.9.1 Floor slabs, Pavements and Miscellaneous Construction: Unless otherwise specified, slab at the fountain area are straight to finish with waterproofing. Slope floors uniformly to drains where drains are provided. Depress the concrete base slab where Granite or Ceramic tiles are indicated.

3.9.2 Finish: Place, consolidate and immediately strike-off concrete to obtain proper contour, grade and elevation. A set sufficient for floating and supporting the weight of the finisher and equipment.

3.9.3 Pavements: Screed the concrete with a template advanced with a combined longitudinal and crosswise motion. Maintain a slight surplus of concrete ahead of the template. After screeding, float the concrete longitudinally and refloat as necessary. Obtain final finish by belting. Lay belt flat on the concrete surface and advance with a sawing motion; continue until a uniform but gritty non-slip surface is obtained. Round edges and joints with an edger having a radius of 1/8 inch.

3.9.4 Broomed: Provide for exterior walks, platforms, patios and ramps. Unless otherwise indicated, provide a floated finish, and then finish with a flexible bristle broom. Permit surface to harden sufficiently to retain the scoring or ridges. Broom traverse to traffic or at right angles to the slope of the slab.

3.9.5 Pits and Trenches: Place bottoms and walls monolithically or provide water stops and keys.

3.9.6 Curbs and Gutters: Provide contraction joints spaced at every 10 feet maximum unless otherwise indicated. Cut contraction joints 3/4-inch deep with a jointing tool after the surface has been finished. Provide expansion joints 1/2-inch thick and spaced at every 100 feet maximum unless otherwise indicated. Provide a pavement finish.

3.10 MISCELLANEOUS

3.10.0 Construction Joints: Locate joints to least impair strength; continue reinforcement across joints unless otherwise indicated.

- 3.10.1 Expansion Joints and Contraction Joints: For slab on grade, provide at edges of interior floor slab, adjacent to walls as indicated. Completely fill joints exposed to weather with joint filler material and joint sealant. Do not extend reinforcement or other embedded metal items bonded to the concrete through any expansion joints unless an expansion sleeve is used. Provide contraction joints, either formed or saw cut or cut with a jointing tool, to the indicated depth after the surface has been finished. Sawed joints shall be completed within 4 to 12 hours after concrete placement. Protect joints from intrusion of foreign matter.

IV METALS WORKS

4.0 DESCRIPTION

4.0.0 Metal works shall conform to the approved plans and to the Standard Specifications.

4.1 REFERENCE STANDARDS

4.1.0 Comply with the latest edition of the following as applicable, unless otherwise specified or modified.

4.1.0.0 AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), 1978: Specification for the Design, Fabrication and Erection of Structural Steel for Buildings. Code of Standard Practice for Steel Buildings and Bridges; Specification for Architecturally Exposed Structural Steel.

4.1.0.1 AMERICAN WELDING SOCIETY (AWS): Standard Welding Symbols A2.0-68; Standard Welding Code D1.1-1973 (Rev 1-73 & 2-74) (To govern if in conflict with AISC).

4.1.0.2 RESEARCH COUNCIL ON RIVETED AND BOLTED JOINTS OF THE ENGINEERING FOUNDATION (RCRBJ): Specification for Structural Joists using ASTM A-325-76s Bolts.

4.2.0.3 STRUCTURAL STEEL PAINTING COUNCIL (SSPC): Painting Manual, Vol. 1; Good Painting Practice, Painting Manual, Vol. 2; Systems and Specifications.

4.2 SOURCE QUALITY CONTROL

Errors of Shop Drawings, fabrication, correct fitting and alignment of the various metal items or component members shall be the responsibility of the Contractor. However, the Contractor shall permit the Architect or an independent inspection agency, if engaged by the Owner, to inspect work in progress in his shop. Such inspections shall not relieve the Contractor of his responsibility to furnish materials and workmanship in accordance with the Contract Documents.

4.3 PRODUCT DELIVERY, HANDLING AND STORAGE

Handle and store in such manner as to prevent damage or disfigurement. Store finished items or components above ground on platforms, pallets or other supports and protect from harmful elements.

4.4 PROTECTION

The Contractor shall protect any existing work subject to damage during the installation of the specified work and shall adequately protect specified work during installation.

4.5 FIELD QUALITY CONTROL

Facilities shall be provided by the Contractor as needed for the proper inspection of the specified work, including temporary platforms, hoists, protective devices, electric current, etc. Improper workmanship, as determined by the Architect shall be corrected and replaced, at no additional cost to the Owner.

4.6 MATERIALS

Products shall conform to the respective reference specifications and standards and to the requirements specified herein:

4.6.0 STEEL AND IRON: If not specified otherwise, use standard mill-finished structural steel shapes or bar iron in compliance with AISC Specifications for Design, Fabrication and Erection of Structural Steel for Buildings.

4.6.1 BOLTS, NUTS, STUDS AND RIVETS: ASTM A 325

4.6.2 SCREWS: Fed. Spec. FF-S-85, Fed. Spec. FF-S-92, and Fed. Spec. FF-S-111

4.7 FABRICATION

By mechanics skilled in the trade and in accordance with the manufacturer's directions, Metalwork shall be fabricated to allow for expansion and contraction of materials. Provide welding and bracing of adequate strength and durability, with tight, flush joints, dressed smooth and clean. Complete with bolts and nuts.

4.8 MEASUREMENTS

Before fabrication, provide necessary field measurements and verify all measurements.

4.9 METAL SURFACES

Shall be clean and free from all scale, flake, rust and rust pitting; well-formed and finished to shape and size, with sharp lines, angles and smooth surface. Shearing and punching shall leave clean true lines and surfaces. Weld or rivet permanent connections. Weld and flush rivets shall be used and finished flush smooth on surfaces that will be exposed after installation. Do not use screws or bolts where they can be avoided; when used, heads shall be countersunk, screwed up tight and threads nicked to prevent loosening.

4.10 CONSTRUCTION

Thickness of metals and details of assembly and supports shall give ample strength and stiffness for the minimum loads specified or indicated. Joints exposed to weather shall be formed to exclude water.

4.11 SHOP FABRICATION

Fabrication and assembly shall be done in the shop to the greatest extent possible.

4.12 SUBMITTALS

Shop Drawings: Submit along with catalogue, cuts, templates, and erection and installation details, indicating thickness, type, grade, class of metal and dimensions. Show construction details, reinforcement, anchorage, and installation with relation to the construction.

4.13 QUALIFICATION OF WELDERS

In accordance with AWS D1.1 using procedures, materials and equipment of the type required for the work.

4.14 DELIVERY AND STORAGE

Protect from corrosion, deformation and other types of damage. Store items in an enclosed area free from contact with soil and weather. Contractor shall replace and remove damaged items with new items.

4.15 WELDING

Use welding electrode E70xx and perform welding, welding inspection and corrective welding in accordance with AWS D1.1. Weld in a manner to prevent

permanent distortion of the connected parts. Weld continuously along the entire area of contact (except where tack welding is permitted. Do not tack weld exposed to connections.) Grind smooth visible weld in finished installation.

4.16 METAL PURLINS

Metal purlins shall be of high grade galvanized steel with minimum tensile strength of 275 MPa, 2mm in thickness manufactured by Philmetal or approved equal.

V MASONRY

5.0 MATERIALS

5.0.0 All materials and workmanship shall be in accordance with the applicable standard and specifications of the Structural Code of the Philippines and uniform Building Code.

5.0.1 Concrete Hollow Blocks (CHB) shall have a minimum face thickness of 1" (25mm). Nominal size shall be 4" x 8" x 16", minimum compressive strength shall be 500 psi for non-load bearing and 700-1000 psi for load bearing. All units shall be stored for a period not less than 28 days (including curing period) and shall not be delivered to the job site prior to that time unless the structure is equal or more than the specified.

5.0.2 Prior to commencing the preparation of the sub-grade, all culverts, cross drains, and other similar structures (including the fully compacted backfill) shall be completed. No work shall be started on the preparation of the sub-grade before the prior works herein approved by the Engineer.

5.0.3 Cement shall be standard Portland cement ASTM 270 - Type N.

5.0.4 Mortar: Mix mortar from 3 to 5 minutes in such quantities as needed for immediate use. Re-tempering will not be permitted if mortar stiffens because of premature setting. Discard such materials as well as those that have not been used within one hour after mixing. Proportioning shall be one (1) part Portland cement and two (2) parts and by volume, but not more than one (1) Portland cement and three (3) parts and by volume.

5.1 SUBMITTALS

5.1.0 Submit samples for approval two (2) samples each of each type of wall reinforcement and wall ties.

5.1.1 Certificates of Conformance: Submit certificate attesting that masonry cement, masonry units, aggregates and accessories meet the requirements specified.

5.2 ERECTION

5.2.0 All masonry shall be laid plumb, true to line, with level and accurately spaced courses, and with each course breaking joint with the source below. Bond shall be kept throughout corners and reveals shall be plumb and true. Units with greater than 12% absorption shall be wet before laying. Work required to be built in masonry; including anchors, wall plugs and accessories shall be built-in as the erection progresses.

5.2.1 Masonry Units: Each course shall be solidly bedded in Portland cement mortar. All units shall be damp when laid units shall be showed into place not laid, in a full bed of un-furrowed mortar. All horizontal and vertical points shall be completely filled with mortar when and as laid. Each course shall be bonded at corners and intersections. No cells shall be left open in face surfaces. All cells shall be filled up with mortar for exterior walls. Units terminating against beam or slab soffits shall be wedged tight with mortar. Do not lay cracked, broken or defaced block.

5.2.2 Plastering: Clean and evenly wet surfaces. Apply scratch coat with sufficient force to form good keys. Cross scratch coat upon its initial set; keep damp. Apply coat after each scratch coat has set at least 24 hours after scratch coat application. Lightly scratch brown coat; keep moist for two (2) days; allow drying out. Do not

apply finish until brown coat has seasoned for seven (7) days. Just before applying coat, wet brown coat again. Float finish coat to true even surface; trowel in manner that will force sand particles down into plaster, with final trawling, leave surfaces banished smooth free from rough areas, trowel marks, checks, other blemishes. Keep finish coat moist for at least two (2) days; thereafter protect against rapid drying until properly, thoroughly cured.

5.3 SCAFFOLDING

5.3.0 Provide safe wood or metal scaffolding required for masonry and other related work, including cleaning down on completion. Remove upon demobilization.

5.4 SURFACE PREPARATION

5.4.0 Lay floors without borders from centerline outward. Make adjustments at walls. Clean concrete sub-floor and moisten it without soaking. Sprinkle dry cement over surface. Spread setting bed mortar on concrete and tamp to assure good bond over the entire area then screed to smooth, level bed. Set average setting bed thickness at $\frac{3}{4}$ " but not less than $\frac{1}{2}$ ".

5.4.1 Wall: Scratch coat application as foundation coat shall be at most $\frac{1}{2}$ ". While still plastic, deeply score scratch coat or scratch and cross-scratch. Protect scratch coat and keep reasonably moist within seasoning period. Use mortar for scratch floor coats, within one hour after mixing. Re-tempering of partially hardened mortar is not permitted. Set scratch coat be cured for at least two (2) days before starting the setting.

5.5 CLEANING

5.5.0 Protection: Protect work which may be damaged, stained or discolored during cleaning operations.

5.5.1 Pointing: Upon completion of masonry work, cut out defective mortar joints and tuck joints and all holes solidly with mortar.

5.5.2 Cleaning: Clean exposed masonry surface with clear water and stiff fiber brushes and rinse with clean water. Where stains, mortar or other soil remain, continue cleaning as follows: Clean masonry surfaces by scrubbing with warm water and soap and rinsing thoroughly with clean water. Restore damaged, stained and discolored work to its original conditions or replace with new work.

VI ARCHITECTURAL

6.0 FLOOR AND WALL AND FINISHES

6.0.0 Exterior/Interior Walls & Floor finishes

- a. 300mm x 300mm Homogenous Porcelain Tiles w/ 300mm x 600mm Boarder Porcelain Tiles
- b. 600mm x 600mm Homogenous / Porcelain Polished. Floor tiles
- c. 600 x 600 Porcelain Tiles
- d. 30 x 600 Ceramic Tiles
- e. Plain cement epoxy paint finish
- f. Plain Cement Finish on Aqua Epoxy Painted Finish with Grooves
- g. 25mm concrete topping (for tiles) ..
- j. 300mm x 600mm Ceramic /wall Tiles

6.1.1 CEILING FINISHES

- a. 12mm thk. Gypsum Board including framing and accessories.
- b. 12mm thk. Moisture Resistant Gypsum Board on lightweight aluminum frames.
- c. Rubbed Concrete
- d. 600 X 600 Acoustic Ceiling w/ T-Runners

6.1.2 WINDOWS

Follow as per approved plan and specifications.

6.1.3 DOORS

Follow as per approved plan and specifications.

6.1.4 PAINTING

- a. All paints shall meet the required specifications and shall be delivered at the site in the original container. Use non Volatile Organic Compound (V.O.C.) paint or approved by the implementing agency and only accredited painters of the manufacturer shall execute the work to ensure the true origin and quality of paint and warranty of work.
- b. Concrete walls shall be treated with neutralizers. Exterior walls without wall veneer shall be applied with a primer before final coat. In general, rough surfaces of concrete, cabinets and woodworks surfaces shall be properly sandpapered and puffed before any application of paint.
- c. Latex Paint Finish (exterior masonry walls)
- d. Latex Paint Finish (interior masonry walls, stairs and Slab Soffit)
- e. Latex Paint Finish (ceiling)
- f. Painting of Doors and jambs
- g. Painting of Windows

6.1.5 WATERPROOFING AND DAMP-PROOFING

- a. Roof Decks : Terragum A – Torch applied membrane, UV protected.
- b. Toilets : Cementitious capillary type waterproofing.

6.1.6 HARDWARE

- 1. Provide all rough hardware required for the construction of works: nails, straps, lag screws, etc.
- 2. Butt Hinges : Use Toyo Butt Hinges, 4" x 4" with bearings for panel door
- 3. Locksets : For PVC plastic, wood and metal swing doors use ABLOY stainless mortise locksets with striker plate.
- 4. Door Stop : Locate position where no traffic could be obstructed. For restroom doors where tile finish abuts the door swing side, use IVES 65 6" above inside floor finish on door panel.
- 5. Door Closers : Posse/MBC Door closer for metal doors.
- 6. Exit Door Panic: Use Toyo Panic Exit Device, horizontal without key for

Device single panel for fire exits.

6.1.7 HANDRAILS AND RAILINGS

Follow as per approved plan and specifications.

6.1.8 OTHER FINISHES

a. 6mm thk facial mirror on 6mm thk marine plywood backing including all incidentals to complete.

b. PWD Comfort Room 50mmØ Stainless Steel Grab Bar

c. Bathroom Accessories (Bidet, tissue and soap holder, towel hook)

d. Cadaver

e. Countertop & Backsplash, 20mm thk. Granite Slab Finish (CDS)

6.1.9 CLEAN-UP

When the work is completed, the Contractor shall remove all temporary structures and surplus materials of every sort, restore what has been removed before, and leave the premises or site in as good condition as he had originally found them.

VII THERMAL CONTROL AND MOISTURE PROTECTION

7.0 WATERPROOFING

Use waterproofing cementitious powder, capillary type, flexible type-liquid applied waterproofing seamless membrane latex-modified rubber reinforced on slabs. Refer to manufacturer's recommendation on proper application of the product listed herein: Lanko manufactured by VSL.

7.1 VAPOR BARRIER

Use 8 mils thick, 6 feet wide roll plastic vapor barrier laid over compacted base course at ground floor slab with 300mm minimum overlap prior to setting up of steel reinforcing bars. Submit samples for approval.

7.2 WATERSTOPS

Use Rebstop Ultra Seal chemical grout water-stop specially formulated for construction joints to replace the use of conventional water-stop used for cold expansion joints on pipes, etc. manufactured by Rebtrade International Corporation or approved equal.

VIII FIRE PROTECTION

A. SPRINKLER SYSTEM, AUTOMATIC, WET-PIPE TYPE SPECIFICATIONS

8.0 GENERAL

Applicable provisions of the "General Conditions" govern work under this section.

8.1 QUALIFICATIONS OF CONTRACTORS

The Contractor for the fire protection installation shall be a qualified Fire Protection Contractor, regularly engaged in the installation of automatic fire sprinkler systems and other fire protection equipment, and must have at least one (1) sprinkler installation approved by the Philippine Insurance Rating Association (PIRA). Companies or corporations whose

personnel have supervised an approved sprinkler plan and subsequently approved by PIRA or by the Fire Department are also qualified.

8.2 SCOPE OF WORK

8.2.0 This specification includes the furnishing of all labor, materials, equipment and services necessary or incidental to the complete installation, testing, adjusting and placing into service of the several systems of fire protection, all as shown on the drawings and as hereinafter specified. Drawings and specifications are considered as mutually explanatory and all works called for by one and not the other, shall be performed as though called for by both. In cases of conflicting information, the Architect and Engineer shall be notified at once in writing. Where incidental equipment or appurtenances are required and not listed as shown, same shall be furnished as required for a complete fire protection system.

8.2.1 Drawings are intended to show general arrangement and approximate physical sizes of equipment diagrammatically. Every bolt, nut, brace, strut, etc., is not necessarily indicated or specified; all such items as may be required, necessary or incidental to the proper and dependable operation of each system being a requirement of this contract, whether specifically referred to or not, must be supplied.

8.2.2 Work included in this specification shall consist of, but not limited to the following items:

1. Arrange for, obtain and bear the cost of necessary permits, bonds and fees for the automatic sprinkler work.
2. All fees, private or government shall be paid by the Contractor.
3. Furnish and install a sprinkler system to the entire building where shown on the drawings. System to include all pipes, hangers, sway braces, sprinkler heads, control valves, drains, alarms, water flow switches and control valve monitor switches, (the fire pumps, drives, jockey pumps and controllers, pumps standard accessories may be supplied by pump suppliers under separate bid package), to be installed by the Sprinkler Contractor.
4. Fire hose cabinets and fire hose accessories, including connection pipe and fittings to the sprinkler system.
5. Alarm check valves, complete with set of trimmings, retarding chamber, water motor alarm gong, alarm pressure switches, water flow switches and monitor switches. The Sprinkler Contractor shall coordinate and interface the required electrical wiring connections for the water flow and monitor switches to the building fire alarm system.
6. Furnish and install a system of dry standpipe complete with valves and fire department connection. Contractor to provide as shown in the plans, by-pass valve with pipe and fittings to connect the Wet Sprinkler pipe riser with the Dry Standpipe riser.
7. Furnish and install fire department connection for the sprinkler system.
8. Furnish and install inspector's test connection pipe, nozzles and valves on the farthest point of each floor, located where shown on the drawings.
9. Furnish and install water flow alarm switches, and monitor tamper switch to floor control valves. The Sprinkler Contractor shall furnish and install the Control Panel and the wiring in conduits for the connection of the water flow and monitor switches to the sprinkler supervisory panel. The supervisory control panel shall be interfaced to the building fire alarm system.
10. Do the testing of all piping works and necessary cleaning of the fire protection works. This includes also the testing of the fire department pipeline and drain pipe and water flow alarms.
11. Fire extinguishers as shown in the plans shall be supplied and installed by the Contractor. Over and above those specified, the owner of the building shall supply the requirements of the Fire Department.

12. All openings through which fire may spread from one floor to the other, such holes through floors or walls for the pipe shall be sealed with fire resistant materials.
13. Chipping and plastering works necessary for the area covered in the installation of automatic sprinkler system.
14. Furnish the shop drawings and certificates of inspection.
15. Periodically remove from the jobsite all rubbish and debris resulting from the fire protection work.
16. Furnish and install one (1) unit of 10 lbs. HCFC portable fire extinguishers for Electrical Rooms, Pump Room.
17. Miscellaneous items as hereinafter provided.

8.3 SITE CONDITIONS

The Contractor shall be deemed to have visited the site and acquaint himself with the existing site condition, means of access and take into account any feature that may affect his tender. No claim for his neglect to do so or not, out of a misunderstanding on his part in these conditions shall be entertained.

The Fire Protection Contractor shall be responsible for the proper coordination with other trade contractors.

8.4 STANDARDS, CODES AND REGULATIONS

The applicable current standards for the fire protection systems shall be the National Fire Protection Association (NFPA), NFPA-13, and Philippine Fire Code-PD 1185, the PSME Code and all other applicable local codes and ordinances.

8.5 SUBMITTAL (SHOP) DRAWINGS AND DATA

- 8.5.0 Before commencing any work or providing any materials at the jobsite for this project, the Fire Protection Contractor shall submit to the Engineer for approval, four (4) copies of catalogue cuts and descriptive matter regarding materials and equipment which he intends to furnish and install.

Shop drawings and data shall be submitted specifically for, but not limited to the following items: Sprinkler heads, calves, pipes, pipe hangers, hose valves and accessories, Fire Department connections, fire pumps and jockey pumps, controllers, fire hose cabinets, mechanical grooved coupling, flexible pipe connectors, pressure reducing valves, pipe riser support and sleeves, portable fire extinguishers and foam equipment.

- 8.5.1 The Fire Protection Contractor shall not proceed with the installation of the work until he has received the Engineer's approval on his shop drawings.

- 8.5.2 The Engineer's approval of shop drawings, catalogue cuts, etc. shall not relieve the Fire Protection Contractor of the responsibility for any errors or omissions which may exist in the items neither submitted nor shall relieve him from the responsibility for deviations from the contract drawings and specifications.

The stamped approval of the shop drawings, catalogue cuts, etc. shall not be construed as a complete check, but will indicate only that the general design and method of construction is satisfactory.

- 8.5.3 In the event inspection authorities require additional clarifying details, the details shall be prepared and approval of the same secured by the Fire Protection Contractor at his expense.

8.6 CONDUCT OF WORK

The Fire Protection Contractor shall employ on the job at all times a competent superintendent Licensed Mechanical Engineer who shall be responsible for the progress and execution of the work. Workmanship shall be of high quality, conforming to standard practice as stipulated by NFPA, ASTM and ASA and PSME recommendations by skilled workmen during regular working hours.

8.7 LOCAL AND IMPORTED MATERIALS

- 8.7.0 All materials and equipment furnished under this section shall be new, manufactured in the United States, and Non-UL/FM but conforming to NFPA Standards.
- 8.7.1 The proposal submitted shall include all materials and equipment as specified or
- 8.7.2 shown on the drawings.

8.8 AUTOMATIC SPRINKLER AND STANDPIPE SYSTEM

- 8.8.0 Pipe shall be new, designed for 175psi working pressure, conforming to ASTM specifications, manufactured in the United States or approved local pipes and have the manufacturer's name or brand along with the applicable ASTM standard marked on each length of the pipe. The locally manufactured pipe brand "Supreme" are acceptable brand with proper schedule and wall thickness.
- 8.8.1 Pipe shall be steel, schedule 40, black and in accordance with the specifications ASTM A120 or A53.
- 8.8.2 Schedule 40 black steel pipes shall be joined by screwed joints in accordance with specifications ANSIB2.1 up to 2½" and flanged, Victaulic type or screwed connections for 3" and up. Pipe fittings to be used with schedule 80 pipes shall be rated 300lbs. Class if there are any.
- 8.8.3 Sprinklers' piping that is exposed to the weather or used in a corrosive atmosphere shall be painted with protective coating. Sprinkler piping in the building shall be painted with two (2) coats of enamel primer and two (2) coats of Fire Red color enamel paint.
- 8.8.4 All ASTM A53 and ASTM A120 sprinkler pipe must be hydrostatic tested at the mill per ASTM standard.
- 8.8.5 Screwed fitting shall be malleable iron, 300 lbs. and 150 lbs. class, black and in accordance with ANSI B16.3. "Victaulic" brand mechanical tee and elbow UL/Fm fittings can also be used.
- 8.8.6 Flanged fittings shall be steel, short body, 150, black and in accordance with ANSI B16.1. Gaskets shall be full face of 1/8" minimum thickness red sheet rubber. Flange bolts shall be hexagon head machine bolts with semi-finished hexagon head nuts, cadmium-plated having dimension in accordance with ANSI B18.2.
- 8.8.7 Weld fittings shall be steel, standard weight, black and in accordance with ANSI B16.9, ANSI B16.25, ASTM A234, ANSI B16.5 or ANSI B16.11.
- 8.8.8 Outside screw and yoke gate valves shall be flanged, iron body, bronze mounted, 175 psi working pressure, with hand wheel turning counterclockwise to open. Valve shall be tested and listed by UL and/or FM.
- 8.8.9 Check valve shall be flanged, swing type, iron body bronze seat ring and disc ring, and 175 psi working pressure rating. Valve shall be tested and listed by UL and/or FM.
- 8.8.10 Check valve shall be butterfly wafer style, iron body, rubber seal 175 psi working pressure rating. Valve shall be tested and listed by UL and/or FM.
- 8.8.11 Fire Department connection shall be 4" x 2½" x 2½" Siamese connection, brass body, brass chain and plugs, and brass escutcheon letter "AUTOMATIC SPRINKLER" for sprinkler system, and/or "STANDPIPE" for standpipe system. Inlet threading shall be National Standard, same as municipal fire department connection shall be tested and listed by UL and/or FM and 175 psi rating.
- 8.8.12 Valve for main riser drain shall be angle type or globe type, bronze body, screwed, 175 psi working pressure rating, 2" size and a renewable composition soft disc.
- 8.8.13 Valve for auxiliary drain and inspector's test connection shall be globe type, bronze body, screwed, 175 psi working pressure rating, 1" size and a renewable composition disc.

- 8.8.14 At each location where called for on plans or where required by the fire department, provides an approved retard-type electric flow alarm switch. Provide alarm bell as required. Flow alarm switch shall have extra set of contacts for extension by others to central alarm panel.
- 8.8.15 Interior bell or horn shall be 24 VDC. Horn or bell shall be tested and listed by UL and/or FM. (Shall be supplied by the Electrical Contractor).
- 8.8.16 Flow switch shall be vane type, 24 DC. Flow switch shall be tested and listed by UL and/or FM.
- 8.8.17 Butterfly valve with tamper switch shall be tested and listed by UL and/or FM.
- 8.8.18 Valves for the fire hose stations shall be angle type, pressure restricting type 1½" female iron pipe threads, rough brass male NST threads, polished brass, chromium plated. Valve shall be tested and listed by UL and/or FM.
- 8.8.19 Cabinet for fire hose shall be recessed, 16-gauge body, aluminum door trim. Cabinet shall be designed for 100 feet hose pin rack and fire extinguisher. Door shall be full panel glass. Cabinet finish shall be baked white enamel inside with "Fire Red" coat inside. Cabinet may be locally made of approved quality.
- 8.8.20 Pin rack for the fire hose station cabinet shall be semi-automatic, baked red enamel finish, designed for 100 feet of 1½" hose, and furnished with 1½" chrome plated brass rack nipple.
- 8.8.21 Fire hose for fire hose station shall be 100 feet of 1½" cotton single jacket, rubber lined hose with wax and gum treatment. Hose couplings shall be 1½" chrome plated male-female National Standard hose threads. Fire hose and couplings shall be approved by UL and/or FM.
- 8.8.22 Nozzle for fire hose station shall be 1½" adjustable capable of complete shut-off, solid straight stream or any degree of solid conical fog with chrome plate. Threads shall be National Standard hose threads. Nozzle shall be approved by UL and/or FM.
- 8.8.23 Provide 1½" spanner to each FHC cabinet.
- 8.8.24 Furnish and install one (1) each – 10 lbs. capacity HCFC multi-purpose type portable fire extinguisher UL-listed and Factory Mutual approved to each fire hose cabinet.

8.9 IDENTIFICATION SIGNS

The drain, alarm test valves, etc. shall have standard identification signs, painted fire red with white lettering. The signs shall be attached to the valve in a conspicuous position.

8.10 SPRINKLER HEADS

- 8.10.0 Sprinkler heads shall be 1½" NPT, chrome finish, pendent, upright and horizontal sidewall. Sprinklers in the areas with suspended ceiling shall have escutcheon plates of the same finish as the textures of the ceiling boards. Sprinklers shall be tested and listed by UL and/or FM.
- 8.10.1 Furnish the Owner a steel enameled box housing for the space heads and a sprinkler wrench as shown in the plans.

8.11 FIRE PUMP

- 8.11.0 Fire Pump Assembly: Furnish and install fire pumps as shown on plans. One (1) Underwriters Laboratory Inc. approved fire service pump. The Fire pump at the Basement Floor shall be electric motor-driven with automatic controllers, and one (1) jockey pump complete with motors, motor starters, controls, fittings and other appurtenances necessary to complete the equipment installation in each respect.
- 8.11.1 Pumps shall be connected as shown in the drawings. Complete installation shall be in accordance with the requirements and meeting the approval of the NFPA 20, Philippine Insurance Rating Association (PIRA) and Fire Department.
- 8.11.2 The fire pumps to be installed at the Basement Floor level shall be as follows:

Fire Pump – One (1) unit Fire Pump shall be vertical turbine. Capacity and electrical supply shall be as per equipment schedule.

Pump shall be furnished with the following standard accessories:

- a) Main Relief Valve 3", flanged type, UL/FM listed for the 500 GPM pumps.
- b) 2" air release valve
- c) "GERAND" water flow meter, rated at 750GPM
- d) Discharge gauge (0-300psi), 3 1/2" face dial
- e) Enclosed waste cone with sight glass
- f) Discharge concentric reducer

The pump should deliver not less than 150% of rated capacity at a pressure not less than 65% of rated head. The shut-off pressure shall not exceed 140% of rated pressure

The pump shall be provided with suction bowls. Column, basket strainer, discharge head and an electric motor with hollow shaft with sufficient horsepower to drive the pump.

One (1) set fire ump controller with pressure recorder and shall reduce voltage primary resistor or Wye-Delta type starter, UL/FM listed.

- 8.11.3 Jockey Pump: One (1) unit jockey pump shall be centrifugal type, submersible. Capacity and electrical supply as per equipment schedule.
- 8.11.4 Drive: For the jockey pump, the motor horsepower rating shall be in accordance with the manufacturer's requirements. The motor shall be of such capacity that 115% of the full load ampere rating shall not exceed at any given condition of pump load.
- 8.11.5 The pump manufacturer shall provide the services of a qualified Engineer to advise the Contractor on the proper installation of equipment make necessary mechanical adjustments and align fire pump flexible couplings. Pump manufacturer shall pay the test fees, shall arrange and conduct final field acceptance test and provide all required test equipment.
- 8.11.6 One (1) set controller equipment: The fire ump control equipment shall be completely wired and tested at the factory and shall be specifically designed for fire pump purposes. Control equipment with all components shall be UL/FM listed and approved equipment, reduce voltage wye-delta type open transition or primary resistor type.
- 8.11.7 The Sprinkler Contractor shall provide and install the necessary electrical wiring in conduits. Controls from a power supply box to be provided inside the pump machine room to the fire pumps controller, to the equipment.

8.12 AUTOMATIC SPRINKLER AND STANDPIPE SYSTEM

- 8.12.0 The interior surfaces of all piping and equipment shall be clean and free of all dirt. Loose scale, rust and other foreign materials before installation.
- 8.12.1 Pipe ends shall be reamed to remove all burrs and pipe sections shall be cleaned inside to remove all chips and foreign materials prior to making up joints. Approved joint compound shall be applied to the threads of the pipe and not in the fitting when making up joints. Pipe shall not exceed into the waterway of the fitting.
- 8.12.2 Sprinkler heads installed where they may be exposed or subjected to mechanical damage shall be furnished complete with head guards.
- 8.12.3 When welding pipe on jobsite, the fire hazard of the welding process shall be with suitable safeguards. Weld in place of pipe and fittings shall not be allowed at the jobsite. Only shop weld fabrication will be permitted with factory made fittings. Mitered weld will not be permitted. Intersection of feed main and cross main pipe shall be provided with flanged or Victaulic type fittings.

- 8.12.4 Pipe passing through the building walls and floors above grade shall be provided with sleeves of standard weight galvanized steel pipe and shall be installed prior to concreting works of the Civil Contractor. The annular spaces between pipe and sleeves shall be packed tight with insulation fire resistant materials. Provide chrome plated escutcheon plates enough to cover the pipe sleeves. Sleeves shall be sized as follows:

1"	pipe-2"	ID Sleeve
1 ¼"	pipe-2"	ID Sleeve
1 ½"	pipe-2 1/2"	ID Sleeve
2"	pipe-3"	ID Sleeve
2 ½"	pipe-4"	ID Sleeve
3"	pipe-5"	ID Sleeve
4"	pipe-6"	ID Sleeve
6"	pipe-8"	ID Sleeve
8"	pipe-10"	ID Sleeve

8.13 PIPE SUPPORTS

- 8.13.0 All piping shall be supported by means of hangers of approved quality, capable of supporting load. Sizing, spacing and installation shall be in accordance with national Fire Protection Association Standard No. 13, "Sprinkler Systems", except as otherwise shown on drawings or specified herein.
- 8.13.1 The Fire Protection Contractor shall furnish and install the required sprinkler pipe seismic sway bracing for the risers, feed main pipe and cross main pipe all in accordance with tables and figures shown NFPA-13 requirements for the protection of the piping against breakage due to seismic earthquake movement.
- 8.13.2 No cutting, drilling, welding or burning of any structural steel member shall be allowed. Power driven studs and welding studs shall not be allowed.
- 8.13.3 All bolts and threaded rods shall be used with double nut and washer and lock washer wherever a single unsecured nut could work loose and allow either threaded rod or supported piping to drop.

8.14 TESTS AND INSPECTIONS

- 8.14.0 The Fire Protection Contractor shall conduct and bear the costs of all necessary tests of the fire protection work, furnishing all labor, power and equipment. All piping shall be tested with water and test witnessed by representatives of the Architect/Engineer and the Owner.
- 8.14.1 The fire protection piping shall be tested under a hydrostatic pressure of not less the 200lbs. PSIG, for a duration of not less than two (2) hours or at 50 lbs. psi in excess of the maximum static pressure when the maximum pressure is in excess of 150 lbs. psi.
- 8.14.2 The piping subjected to the hydrostatic test shall be filled with water and thoroughly checked for the elimination of all air. The control valves shall be closed during pressure testing. All joints shall be proven tight or acceptable by the test. Defective work or materials shall be corrected or replaced in approved manner. If necessary, piping shall be dismantled and re-assembled with the use of new pipe or fittings as no caulking or makeshift method of temporary repair of defective work will be permitted. Test shall be repeated until the particular line or system receives the approval of the representatives of the Architect/Engineer.

- 8.14.3 Acceptance of the automatic sprinkler work shall be based upon the inspection and tests of the completed installation by representatives of the local fire department, Architect, Engineer, PIRA and the Owner.

IX AIR CONDITIONING AND VENTILATING SYSTEM

9.0 GENERAL REQUIREMENTS

9.0.0 Standards Compliance

- a. Philippine Society of Mechanical Engineers Code
- b. Philippine National Building Code
- c. Philippine Electrical Code
- d. Philippine Plumbing Code
- e. Fire Code of the Philippines
- f. American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
- g. Sheet Metal and Air Conditioning Contractors National Association (SMACNA)
- h. National Fire Protection Association
- h. American Society of Testing Materials (ASTM)
- i. Air Moving and Conditioning Association (AMCA)g
- j. American National Standard Institute (AMSI)
- k. National Electrical Manufacturing Association (NEMA)
- l. Underwriters Laboratory
- m. American Society of Mechanical Engineers (ASME)

9.0.1 Scope of Work

- a. Supply and Installation of Equipment and Materials. Complete.
- b. Supply and installation of pipes and fittings, valves and appurtenances, ducts, miscellaneous and consumables.
- c. Fabrication and installation pf hangers and supports.
- d. Supply and installation of control, wiring from Split-Type Air-conditioner to circuit breakers and others to complete the control system.
- e. Testing, adjusting, balancing and commissioning.
- f. Provide shop drawings and two (2) sets of "As-Built" plans
- g. Furnishing of written one (1) year warranty of ventilation and air-conditioning system

9.0.2 Submittals

- a. Within fifteen (15) days after award of contract, the mechanical contractor shall submit for engineer's approval, four (4) copies of all complete list of manufacturer's name of all materials he proposes to use.
- b. After approval of the above list and before purchase of any equipment or materials, the mechanical contractor shall submit to the engineer for approval, four (4) complete sets of detailed information consisting of manufacturer's bulletins, shop drawings and partial list of materials to be provided under this contract.

- c. The mechanical contractor shall assume the loss of and the entire responsibility of any change in the work as shown in the contract drawings which may be occasioned by approval of materials other than those specified.

9.1 PRODUCTS

9.1.0 AIR COOLED CONDENSING U NITS

- 9.1.0.0 Units shall have capacity and configuration as shown on the drawings and as manufactured by a reputable manufacturer. All units shall be furnished factory assembled, tested and piped complete with compressors, fan, motors, integrally wired control panel, starters, spring type vibration isolators, steel base and refrigerant control accessories. Unit shall have gauge corrosion protected weatherproof casing.
- 9.1.0.1 Compressors for units with capabilities of up to 35160 watts and above shall be of semi-hermetic type and rated to operate at not more than 1750 RPM at full load. Compressors for units with capabilities of 26375 watts and below shall be of the hermetic type and rated to operate at not more than 3500 RPM at full load.
- 9.1.0.2 Condenser coils shall be seamless copper with mechanically bonded aluminum plate fins. Coil size, refrigerant circuiting and number of rows deep shall be compatible with the compressor displacement and capacity at the specified operating conditions with minimum refrigerant pressure drop.
- 9.1.0.3 Condenser fans shall be statically and dynamically balanced propeller-type fans directly driven by totally enclosed and inherently protected motors.
- 9.1.0.4 Motor starters, control components and power terminal shall be grouped in an accessible control box inside the unit casing. Electrical components shall be pre-wired and control circuits shall be independently protected with fuses or breakers. Compressor protection shall include automatic relays to prevent excessive compressor short cycling.
- 9.1.0.5 A complete charge of refrigerant 410A and compressor oil shall be furnished.

9.1.1 FAN COIL UNITS

- 9.1.1.0 Units shall either be of the floor-mounted or the ceiling-mounted, free blow type and/or ducted type as shown on the drawings.
- 9.1.1.1 Units shall have capacities at the operating conditions specified. They shall include an evaporator coil, expansion valve, centrifugal type air circulation blower, permanent type air filter, condensate drip pan and insulated decorative cabinet with discharge plenum, supply and return air grilles.
- 9.1.1.2 Fan motors shall be equipped with overload protection. They shall have fan switch and thermostat mounted on the unit.

9.1.2 CEILING-MOUNTED TYPE FANS

- 9.1.2.0 Units shall be ceiling-mounted type, direct driven and equipped with reverse flow prevention damper.
- 9.1.2.1 It shall have one-touch spring type louver for ease of cleaning and maintenance.
- 9.1.2.2 Fan casing shall be seam-welded and finished with corrosion resistant paint.
- 9.1.2.3 Fan shall have capacity and motor size as indicated in the plans.

9.1.3 PROPELLER EXHAUST FANS

- 9.1.3.0 Units shall be propeller type, suitable for wall mounting, direct-driven and equipped with gravity shutters.
- 9.1.3.1 It shall have wall mounting collar and fan guard.

- 9.1.3.2 Units shall have statically and dynamically balanced propeller set on a deep venture orifice. Unit shall be designed for continuous operation and shall be permanently lubricated. Inherent motor overload protection shall be provided.
- 9.1.3.3 Unit shall be epoxy-coated and finished with corrosion resistant paint.
- 9.1.3.4 Fans shall have capacity speed and motor size as indicated on the plans.
- 9.1.3.5 Fans shall be provided with a remote selector switch.

9.1.4 EXHAUST BLOWER

- 9.1.4.0 Furnish and install supply exhaust blowers as shown and as indicated on the drawings, complete with motors, belt sheaves vibration isolators.

9.2 BASIC MATERIALS AND METHODS

9.2.0 REFRIGERANT PIPING

- 9.2.0.0 Refrigerant piping shall be type L hard drawn seamless copper, suitable for a working pressure of 2,413 KPa. Fitting shall be wrought copper or brass designed for use with high temperature solder and suitable for a working pressure of not less than 2,413. Joints from soldered to threaded joints shall be made with standard adapter fittings using high temperature solder.
- 9.2.0.1 Pipes or tubings shall be cut accurately to measurements established at the building lines. All piping shall be laid straight and no pipe shall be laid against other metal without insulation. After cutting, the tubing shall be reamed, all burrs removed and the internal surfaces thoroughly cleaned. While soldering pipes and fittings together, a continuous flow of inert nitrogen gas must be applied to sweep the internal surface of the tubing to avoid the formation of oxide inside.
- 9.2.0.2 Condensate drain piping shall be of galvanized iron sh. 40 pipes and sized to liberally dispose of the condensate to the nearest floor drain. A P-trap without cleanout plugs shall be provided at the outlet for every drain.
- 9.2.0.3 Pipe supports and hangers shall be provided and fabricated in a workmanship manner out of steel angles, rods and flat bars. Metal to metal contact between pipes and hangers must be avoided by providing a 3mm thick rubber in between.
- 9.2.0.4 Supports on horizontal lines shall be spaced at not more than 1.80 meters on center. All piping must be properly anchored so that no stress is placed on equipment connection by expansion.
- 9.2.0.5 Pipe sleeves shall be of standard pipes with sufficient diameter to provide a minimum clearance of 6mm around the pipe and in case of insulated pipe, approximately 6mm around the insulation. Pipes should not be permitted to pass through the bearing walls, beams or columns.
- 9.2.0.6 Refrigerant pipes sizes shown on the drawings are for guide purposes only. Contractor is advised to confirm with the equipment supplier the required pipe sleeves for the units prior to installation at the jobsite.

9.3 AIR CONDITIONING CONTROL SYSTEM

- 9.3.0 Operation of the air conditioning system shall be fully automatic. They shall be capable of maintaining at full or partial loads inside conditions of 25 C.D.B. (plus or minus 1.11°C) and 50% relative humidity (plus or minus 5% RH). Room thermostat shall control the operation of the compression through relays.
- 9.3.1 The controls shall be wired in such a way that whenever a condensing unit is in operation, the fan coil unit or air handling unit is also in operation.
- 9.3.2 The compressor crankcase heater must be of such capacity as to provide sufficient heat to the oil in the crankcase during the inoperative periods so that the serious oil foaming and slugging shall be prevented. The heater must be automatically

energized whenever compressor operation stops and de-energized when the compressor starts.

9.4 REFRIGERANT VALVES AND ACCESSORIES

- 9.4.0 Refrigerant valves shall be installed in the suction and discharge lines adjacent to the compressor and on the liquid line discharge side of the condenser. The valves should be wrought copper or brass for use with R-410A and suitable for a working pressure of 2,413 KPa.
- 9.4.1 Thermostatic expansion valves of the proper capacity shall be installed in the refrigerant supply line to the evaporator. They shall be of the diaphragm type, externally equalized and must be of such optimum size as to maintain a full active evaporator under all conditions and yet reduce the possibility of flooding the refrigerant to the compressors during part load conditions.
- 9.4.2 Solenoid valves shall be installed on units with capacities of 26,375 watts and above and shall be designed for the operating pressure of the system. Valve capacities shall be based on a pressure drop across them not exceeding 20 KPa.
- 9.4.3 Dehydrators in combination with strainers shall be installed in the refrigerant line on the inlet side of the thermostatic expansion and solenoid valves. They shall have brass or copper bodies designed for a working pressure of 2,413 KPa.
- 9.4.4 Sight glasses shall be a combination of liquid and moisture indicators and shall be installed in the refrigerant to indicate whether or not the systems are properly charged and whether or not refrigerant in the system is dry.

9.5 REFRIGERANT PIPE INSULATION

- 9.5.0 Refrigerant piping insulation shall be applied on all refrigerant suction and condensate drain lines. Insulation material shall be flexible elastomeric pipe insulation 25mm thk. Joints shall be sealed with appropriate contact adhesive. Pipes installed outdoor shall be provided with Ga.26 aluminum cladding.

9.6 ELECTRICAL MATERIALS

9.6.0 ELECTRIC MOTORS

- 9.6.0.0 All motors shall operate at speed and electrical characteristics specified. They shall be guaranteed to operate at rated out-put with plus or minus ten (10) percent voltage variation at their terminals.
- 9.6.0.1 Motors 750 watts and above shall be 3-phase squirrel cage induction type, constant speed. Motors 560 watts and below shall be single-phase capacitor start induction run, or split type or shaded pole type as approved for the service.
- 9.6.0.2 Motor driving indoor equipment shall be of the open drip-proof construction. Motors driving outdoor equipment shall be of the totally enclosed fan cooled construction.
- 9.6.0.3 Motors driving equipment through pulleys and belts shall be provided with belt guards. The belt guards shall be made of heavy wire mesh or expanded metal set in a suitable frame covering the motor pulleys, belt and driving sheaves with access plates for tachometer reading.

9.6.1 MOTOR CONTROLLERS

- 9.6.1.0 All motors starters shall be of magnetic type complete with overload and relays manufactured in accordance with NEMA standards. Enclosures shall be a suitable for the application
- 9.6.1.1 Starters for motor 3.73 kw and below shall be across the line type. Starters for motor above 3.73 Kw shall be of the reduced voltage type
- 9.6.1.2 Circuit breakers shall operate on the thermal magnetic principle. Aside from serving as disconnecting means, they shall afford protection for motor against phasing circuits faults. They shall be provided with enclosures suitable for the application

- 9.6.1.3 All motors shall be provided with an over and under voltage protection device.

9.6.2 WIRING

- 9.6.2.0 All electrical power and control wiring necessary to be provided by the contractor shall be accomplished in accordance with the requirements of the electrical plans and specifications and shall conform to the Philippine Electrical Code. Wiring system including materials shall also comply with the specifications under the electrical division of the project

9.6.3 ELECTRICAL INTERLOCKS

- 9.6.3.0 For motors requiring electrical interlocks, remote control or sequence starting control features, starters shall be equipped with necessary auxiliary contacts or terminals to provide the control feature required. A separate set of terminal is required for each control circuit. Such starter shall be provided with "man-off-auto" selection switches. Other starters shall have a start-stop push buttons mounted in covers.
- 9.6.3.1 Except where otherwise specified, enclosure shall be sheet metal with hinged cover, NEMA type I for the general purpose indoor application. Starters shall be arranged for floor or wall mounting as shown or as indicated.
- 9.6.3.2 Pilot light shall be provided for all starters where the equipment is not visible from the starter and for all remote control stations.
- 9.6.3.3 Where possible, relays and switches that are not part of the automatic control system shall be mounted on the same panel as the corresponding motor starter. All supports for the stating equipment shall be furnished and installed by the A/C contractor.
- 9.6.3.4 This contractor shall furnish detailed wiring diagram to those installing the electrical wire and furnish all information necessary to assure the proper connection, operation and control of motorized equipment including interlocks, automatic and safety control auxiliary circuit

9.6.4 PAINTING AND FINISHING

- 9.6.4.0 Pipe hangers, duct hangers, uninsulated piping and other ferrous metal work that have not received factory painting shall be thoroughly cleaned and given two (2) coats of rust preventive paint.

9.7 EXECUTION

9.7.0 EQUIPMENT

- 9.7.0.0 Install all equipment as indicated and in accordance with the manufacturer's instructions. Provide clearance for inspection, repair, replacement and service. Provide conduits for wirings. Equip motors with unfused safety switches and overload protection in the operating disconnects switches and magnetic starters. Schedule and administer specified test

9.7.1 PIPING SYSTEM

- 9.7.1.0 Install piping and piping components to ensure proper and efficient operation of the equipment and controls. Proper supports for the mounting of vibration isolators, stands, guides, anchors, clamps and brackets shall be provided. Piping connections to equipment shall be arranged so that removal or equipment can be accomplished with the least amount of disassembly or removal of the piping system. Allow sufficient pitch to ensure adequate drainage and venting. Hydrotest the piping system and conduct testing, adjusting and balancing of water flow to ensure efficient system performance

9.8 GUARANTEE AND SERVICE

- 9.8.0 The air conditioning and ventilating system equipment and accessories furnished and installed under this part of the specifications shall be guaranteed for a period of

one (1) year from the date of acceptance thereof, and materials and equipment furnished shall be free from any defects in the materials, workmanship and design.

- 9.8.1 At any time within one year after the acceptance and upon proper notice, the contractor shall rectify any and all deficiencies including replacements of parts or the entire units without additional cost of the owner, if such deficiencies have been caused directly or indirectly by inferior materials, faulty workmanship and/or defective design or parts.
- 9.8.2 Expendable items such as oil, refrigerant, belts, filters, etc. are included in this one-year guarantee. During the guarantee period, the contractor shall perform free monthly inspection and service and make adjustments if necessary for the proper and efficient operation of the system

X PLUMBING

GENERAL

10.0 DESCRIPTION

10.0.0 Applicable provisions of General Conditions govern work under this section.

- 10.0.0.0 All fittings, connections and piping embedded in concrete shall be subject to inspection by the Architect and/or his representative before covering and/or completion.
- 10.0.0.1 The contractor shall provide all items, articles, materials, operations of methods listed, mentioned or scheduled on the drawings and/or herein, including labor, materials and incidentals necessary and required for their completion.
- 10.0.0.2 The contract drawings and specifications are complementary to each other, and any labor or materials called for by either, whether or not called for by both, if necessary, for the successful operation of any of the particular type of equipment furnished and installed will be without additional cost to the owner.
- 10.0.0.3 Intent: It is not intended that the drawings shall show every pipe fitting. All such items, whether specifically mentioned or not, or indicated in the drawings shall be furnished and installed, if necessary to complete the system in accordance with the best practice of the plumbing trade and to the satisfaction of the engineer and the owner.
- 10.0.0.4 The plumbing contractor is required to refer to all architectural, structural and electrical plans and specifications and shall investigate all possible interferences and conditions affecting his work.

10.1 SCOPE OF WORK

Work included under this section of this specification consists of furnishing all labor, tools and equipment, appliances and materials necessary for complete installation, testing and operation of the storm drainage system in accordance with the contract.

- a. Arrange for, obtain and bear the cost of necessary permits, bonds and fees, private or government shall be paid by the contractor.
- b. Supply and installation of Sanitary lines of the Building.
- c. Supply and Installation of waterlines of the Building.
- d. Storm drainage system and connection to the nearest storm drainage outlets.
- e. Supply and installation of Transfer pumps and Overhead Tanks.

- f. Supply and Installation of Plumbing fixtures.
- g. The contractor shall provide all necessary shop drawings and two (2) sets of As-Built Plans.
- h. Excavation and backfilling in connection with the work shall be included.
- i. Furnishing of written one (1) year warranty of the plumbing system

10.2 SUBMITTALS

- 10.2.0 Within fifteen (15) days after award of contract, the contractor shall submit for engineer's approval, four (4) copies of all complete list of manufacturer's name of all materials he proposes to use.
- 10.2.1 After approval of the above list and before purchase of any materials, the contractor shall submit to the engineer for approval, four (4) complete sets of detailed information consisting of manufacturer's bulletins, shop drawings and partial list of materials to be provided under this contract.
- 10.2.2 The contractor shall assume the loss of and the entire responsibility of any change in the work as shown in the contract drawings, which may be occasioned by approval of materials other than those specified.

10.3 APPLICABLE CODE AND STANDARD

- 10.3.0 All Storm Drainage works to be done and the sizes of pipes to be used shall be in accordance with the National Plumbing Code and the Plumbing Code of the Philippines.
- 10.3.1 The plumbing contractor shall verify the above paragraphs with each section of the specifications and coordinate his work so that the general contractor will understand clearly the intent of the work to be done.

10.4 PRODUCTS

10.4.0 Description of Materials

All materials to be used shall conform to the standards specified. Use of materials shall be governed by other requirements imposed on other section of these specifications. Materials shall be subject to tests necessary to ascertain their fitness if the engineer so requires.

10.4.1 Alternate Materials

Use of any material not specified in these specifications may be allowed, provided such alternate has been approved by the engineer, and provided further, that a test is required, shall be done by an approved agency in accordance with generally accepted standards.

10.4.2 Identification of Materials

Each length of pipe, fittings, traps, fixtures and devices used in the storm drainage system shall have case, stamped or indelibly marked on it the manufacturer's trademark or name, type and classes of products when so required by the standards mentioned. All materials and equipment mentioned in these specifications, including all incidental items not specifically indicated, but required to complete the contract shall be new and free from defects. If damaged during the course of construction, it shall be repaired or replaced as directed by the Project Manager at no additional cost for the owner.

10.4.3 Pipes and Fittings Schedule

10.4.3.0 Drain, Waste and Vent – shall be unplasticized polyvinyl chloride (uPVC) conforming to ASTM D1784, Crown Pipes or approved equivalent.

10.4.3.1 Storm Drainage Lines – Pipe sizes 250mmØ and above shall be reinforced concrete pipe. Pipe sizes 200mmØ and below shall be non-reinforced concrete pipe.

10.4.3.2 Water lines shall be UPVC pipe, blue sch. 40, push on or solvent type.

10.4.4 Drains

10.4.4.0 Floor drain for genset room shall be ASA 40-9F, pipe size 100mmØ by ASA Metals or approved equal.

10.4.4.1 Area Drain/Catch Basin shall be 140kg/sq. cm. (2000psi) reinforced concrete with GI cutting cover.

10.4.4.2 Site storm drain shall be reinforced concrete for 250mmØ and above, 200mmØ and below shall be concrete pipe.

10.4.5 Valves and Appurtenances

10.4.5.0 Ball valve shall be screwed, bronze, class 150 psi, kitz or approved equal.

10.4.5.1 Check valve shall be screwed, bronze, class 150 psi, kitz or approved equal

10.4.5.2 Pumps (Please refer specifications on plans)

10.4.6 Pipe Sleeves

10.4.6.0 Pipe sleeves shall be installed and properly secured in place at all points where pipes pass through masonry or concrete, except unframed floors on earth.

10.5 EXECUTION

10.5.0 Piping Installation

Piping shall be installed as shown on the drawings, as recommended by the manufacturer and as directed during installation, straight and direct as possible, forming right angles or parallel lines with building walls and other pipes and neatly spaced. Erect pipe risers plumb and true, parallel with walls and other pipes neatly spaced. All piping shall be supported or suspended on stands, clamps, hangers or equivalent or approved design. Supports shall be installed in such a manner to permit pipe free expansion and contraction while minimizing vibration.

10.5.1 Plumbing System Test

The entire system of drains shall be tested. Water test shall be in accordance with the plumbing Code. Every portion of the system shall be tested to a hydrostatic pressure equivalent to at least 10-foot head water for a period of ½ hour before covering. Defects disclosed by the test shall be repaired with new materials at the expense of the contractor.

XI ELECTRICAL WORKS

11.0 WORK INCLUDED

11.0.0 The work to be done under this Division comprises the furnishing of all tools, labor, equipment, fixtures and materials, unless otherwise herein specified, required to complete and leave ready for use the electrical system of the Proposed Construction of Baesa Columbarium, Barangay Baesa, Quezon City in accordance with this specification and accompanying drawings of materials and finishes.

11.0.0 The electrical contractor shall coordinate his work so that the general contractor and all other subcontractors will understand clearly the work to be done. The electrical contractor shall finish all electrical facilities and provision necessary for the installations and operations of other trades such as mechanical, air-conditioning, plumbing, sanitary and others.

11.0.1 All contractors and all companies or persons providing labor, materials or both for this project, are specifically referred to the General Conditions of the specifications, to the general contract plans, to all Divisions of specifications and to the various other contract documents, which may affect the completion of the contract work.

11.1 CODES, INSPECTIONS, PERMITS AND FEES

11.1.0 The work under this contract shall be done according to the requirements of the latest edition of the Philippine Electrical Code, the rules and regulations of the Local Government Authorities of Quezon City and the requirements of Manila Electric Company. Nothing contained in this specification or shown on the drawings shall be construed as conflict with national and local ordinances or laws governing the installation of Electrical Works, and all such laws and ordinances are hereby made part of these specifications. The contractor is required to meet the requirements hereof.

11.1.1 All permits and electrical fees required for this work shall be obtained at the expense of the Contractor. The Contractor shall furnish the Architect or the Owner or the same maybe, a final certificate of electrical inspection and approval from the proper government authorities after completion of the work.

11.2 TEST

11.2.0 The electrical contractor shall apply such test, replace or remedy all defective work and adjust such system as needed or as the Architect or the owner shall direct. He shall also instruct the proper use of the system and equipments to persons designated by the owner

11.3 MEASUREMENTS

11.3.0 The Electrical Contractor shall procure from the Architect detailed drawings of those parts of the work not fully shown on the plans and he shall compare and verify with the Owner. Any lack of agreement shall be submitted at once to the Architect for adjustments.

11.4 SLEEVES AND FORMS FOR OPENINGS

11.4.0 The Electrical Contractor shall provide and places all sleeves, for piping penetrating floors, walls, partitions, etc. He shall locate all necessary slots and openings for his work and it shall be done at such time as not to delay the general contractor of the project.

11.5 LOCATION OF OUTLETS

11.5.1 All Outlets shall be truly centered in panels and spaces provided thereof. Any discrepancy in the outlet location between the electrical plan and architectural plans shall be submitted to the Architect at once, to be verified before outlets are installed.

11.6 GROUNDINGS

11.6.0 If metallic conduits, supports, cabinets and equipment shall be properly grounded and bonded by means of copper straps. The conduits of such system shall be grounded by connecting to the grounding rod.

11.6.0 All ground connections shall have clean outlet surfaces and shall be tinned and sealed while bolting. Unless otherwise specified, ground wire shall be installed in exposed conduits and connections made readily accessible for inspection. Connection shall not be made underground or concealed in floors or walls.

11.7 WIRING METHODS

11.7.0 All wiring shall in general be installed inside standard conduits. All conduits shall run embedded in concrete, underground but in concrete envelope, embedded in hollow blocks partition, concrete slab, walls and roof above, between double wall wooden partitions if any, where the installation of concealed and/or embedded conduit wiring may be used, but only upon approval of the Owner's authorities concerned. Exposed conduits shall be Intermediate Metal Conduits unless otherwise specified.

11.8 GUARANTEE

11.8.0 The Electrical Contractor shall guarantee his work for a period of one (1) year from the date of final acceptance by the owner except for particulars items specifically mentioned in these specifications.

- 11.8.1 The Electrical Contractor shall, without additional compensation for the period specified, replace any work materials or equipment furnished and installed by him under this contract, which develop defects except from ordinary wear and tear.

11.9 MATERIALS

- 11.9.0 All materials shall be new and shall conform to the standards directed of Designer Engineer/Architect.
- 11.9.0 All materials on all systems shall comply with the following specifications unless specified and all materials not specified shall be of the best of their respective kind.
- 11.9.1 Materials sample shall be submitted for approval as required by the Architect and Electrical Engineer.

11.10 WIRES

- 11.10.0 All wires shall be copper, soft drawn and annealed, shall be 98% conductivity or better, shall be smooth and true of a cylindrical form and shall be within the actual size called for.
- 11.10.1 All wires and cables shall comply with the requirements of the *Underwriter's Laboratories Inc.*, the ASTM and the IPCEA as to their particular usage.
- 11.10.2 Wires and cables for outdoor and indoor lighting and power system shall be moisture and Heat Resistant Thermoplastic insulated for 600volts working pressure type THHN unless otherwise noted on the plans or specified.
- 11.10.3 For lighting and power system, no wire smaller than 3.5mm² shall be used except for control leads/ grounding wire.
- 11.10.4 All wires and cables shall be manufactured by manufacturing company acceptable to the Electrical Engineer of the owner.

11.11 CONDUITS

- 11.11.0 The conduit system shall consist of the following

Intermediate Metal Conduit (IMC) & Electrical Metallic Tubing (EMT)

They shall be of standard sizes and weight, mild steel hot dipped galvanized with inside enamel or epoxy coating, acceptable to the Electrical Engineer of the Owner.

Polyvinyl Chloride Conduit (PVC)

They shall be of standard size and weight, made of polyvinyl chloride, extruded, heavy wall, rated for 90-degree centigrade cable, schedule 40.

Limitations of use shall be as follows:

- a. As per requirement of the latest edition of PEC and/or NEC.
 - b. Not permitted where subject to mechanical damage.
- 11.11.1 All conduits shall be of true cylindrical form and shall be within the actual size called for.
- 11.11.2 No conduits shall be used in any system smaller than 15-mm electrical trade size, not shall have more than four 90 degrees bend in any one run, and where necessary, hand hole and pull boxes shall be provided.
- 11.11.3 No wires shall be pulled in any conduit until the conduit system is complete in all details, In case of underground work, until concrete envelope or masonry has been completed in every detail. In case of concealed work, until rough plastering has been completed.

- 11.11.4 The ends of all conduits shall be tightly plugged to exclude plaster dust sand and soil including moisture while the renovation of the perimeter is in the process.

11.12 OUTLET BOXES AND FITTINGS

- 11.12.0 At all outlets of every kind, for all systems, there shall be provided a suitable fittings which shall be either a box or other device especially designed to receive the type of fitting to be mounted thereon.
- 11.12.1 The Contractor shall consult with the Electrical Engineer as to the nature of various fittings to be used before installing his outlet fittings and shall conform strictly in the use of fittings so that the work when completed will be finished design.
- 11.12.2 In case of lamp post, the outlet of fittings shall be provided with suitable fixtures supports or a support of a size and a kind required by the fixture to be erected.

11.13 SWITCHES

- 11.13.0 Local lighting switches shall be flush type, heavy duty, 15- ampere size 250 volts, bakelite case, quick connect terminal. Outdoor lights shall be automatically operated by means of photo switch and manual selection. Or it might be a manual switch by means of breaker switch inside the lighting panel.

11.14 RECEPTACLES

- 11.14.0 Standard receptacles shall be 15- ampere size 250volts, parallel slots, duplex, flush mounted composition case, side wired with the insulated mounting yoke. If weatherproof wall plate is required, standard factory made metal waterproof plate.

11.15 PLATES

- 11.15.0 All switches and receptacles plates shall be bakelite plastic, ivory-colored or as directed by the Architect.

11.16 SWITCH GEAR, PANEL BOARDS AND CABINETS

- 11.16.0 Panel boards for outdoor lightings shall conform as indicated in the drawings with respect to supply characteristics, rating of main lug or main circuit breaker, main magnetic contactor, number and sizes of branch circuit breakers. All should have factory-wired control wirings with terminal block connection for external leads.
- 11.16.1 Lighting and power panel board either wall mounted or free standing shall consist of a factory complete dead front assembly of back plan, main busses, overcurrent and switching units, sheet metal cabinet and trim. Cabinet shall be fabricated from code gauge galvanized sheet metal with cover capped and fastened.
- 11.16.2 Panel boards and trim shall be suitable for the type of mounting shown on the drawings. The inside and outside of the panel boards cabinet and trim shall be factory painted and having two (2) coats of rust proof prime coat and one finish shop of gray enamel paint.
- 11.16.3 All cabinets and enclosure shall be general purpose, NEMA type 1 for indoor installation. Except where specifically noted on plans for outdoor use shall be rain tight and dust type NEMA 4X type enclosure.
- 11.16.4 All circuit breakers with frame size above 100AT shall have minimum interrupting capacity of 22 KAIC at 230 volts and frame size 100AT and below shall have minimum interrupting capacity of 18 KAIC at 230 volts. All circuit breakers shall be molded case, bolt on type with thermal magnetic trip elements. Number of poles, trip coil rating and frame size shall be as indicated on plans. All circuit breakers.
- 11.16.5 Switchgear main circuit breaker shall be stationary type, programmable trip device, an electronic relay that employs microprocessors-based technology. Functions to overload protection, short circuit protection, with selectivity,

instantaneous short circuit protection with adjustment and ground fault protection.

- 11.16.6 Cardholder on inside of door with clear plastic cover and complete typewritten schedule of panel branch circuit shall be provided. Leave spare circuit blank.
- 11.16.7 Local panel boards and switchgear.
- 11.16.8 Submit samples and or product description of panel board to be used for approval prior to ordering and installation.

11.17 ELECTRIC SERVICE

- 11.17.0 The electric service shall be three (3)-phase, 4 wire, 230volts, 60 hertz. The sizes of service entrance conductor and conduit are shown in the plans.
- 11.17.1 The electrical contractor shall inspect the site, consult with *MERALCO* and check the orientation of the proposed service entrance before commencing work to avoid field problems.

11.18 LIGHTING SYSTEM

- 11.18.0 The lighting system shall be complete in every respect as indicated on the electrical plans or as specified in the Architectural plans. Exact fixture location shall be determined.
- 11.18.1 All wiring shall be installed in conduits, and in general shall be concealed. Buried underground in concrete encasement and/or embedded in concrete.
- 11.18.2 Mounting height of devices shall be as indicated in the plans and/or subject to Architect's approval prior to installations as follows
 - Local switches - 1.4 above finish floor line
 - Receptacles - 0.3 above finish floor line

11.19 DISTRIBUTION FEEDERS

- 11.19.0 Distribution voltage shall be 230volts, three (3)-phase, 4 wire. Feeder conductors and raceway shall be installed as shown on drawings and no change in size shall be made without the written consent of the Architect. Feeder conductors shall be continuous, and without splices between terminals. When feeders are run in multiple, they shall be exactly of the same length to avoid unbalanced division of the current.

11.20 CONNECTORS AND INSULATION

- 11.20.0 Use solderless mechanical pressure type lugs, copper connectors for splicing wires greater than no 8mm.sq. All splices shall be properly insulated using #M brand rubber tape and plastic electrical tape. Application of tapes shall be equivalent to the insulation of wire concerned, edges to provide smooth surfaces before taping.

11.21 BRANCH CIRCUITS

- 11.21.0 The drawings indicate the general methods of installation of all circuit wirings and the power lighting outlets which are to be supplied from this circuit. Branch circuit raceways shall be run from outlets to panel boards as direct as the ground and level condition will allow. Circuit allocations shall be as indicated on the drawings. Where it becomes necessary to connect any outlet to the circuit other than the one shown on the drawings, this shall be done without extra charge and only upon written consent of the Architect. No wire smaller than 3.5mm sq. shall be used for any lighting or power branch circuit. All lighting outlet shall be supplied from 2-wire single phase circuits. Number of wires for other outlets shall be as indicated on the drawings.

11.22 MOTOR CONNECTIONS

- 11.22.0 Connect the motor starting devices for all motors, except where otherwise specifically provided for under other contracts. Furnish all necessary connections between controllers and motors in conduit, and leave motor ready to start. The power supply leads to the motor from the controller shall be the same as the feeder indicated on the drawings, except for six terminal lead motor where wye-delta starting method is being applied.
- 11.22.1 Other trades, i.e. mechanical contractor, except as otherwise noted or specified will supply and deliver all controllers and shall erect and connect up safe complete.
- 11.22.2 The Electrical Contractor or trade people shall be held responsible as far as power supply to the controller is concerned. He shall ascertain the exact location of the motor controller and motors from other trades before installing the circuit work.

11.23 RECORD DRAWINGS AND AS BUILT PLANS

- 11.23.0 The Electrical Contractor shall keep an active record of the actual installation works during the progress job. The shall become the reference for the preparation of the As-Built Plans which shall include all pertinent information, complete in all aspects of the actual installations, all new information not originally shown in the contract drawings. The As-Built Plans shall be prepared by the Electrical Contractor at his expense and shall be submitted to the Architect and the Engineer for approval upon the completion of the work. The approval of the As-Built drawings shall be a pre-requisite for the final acceptance of the electrical works.
- 11.23.1 Two (2) copies of the As-Built drawings, signed and sealed by the Electrical Contractor's Professional Electrical Engineer, shall be submitted to the Architect and Engineer consultants. Original tracing/ reproducible copy shall also be submitted.

Note: *In contrast between these Technical Specifications and the approved Plans issued to the Contractor, the approved Plans shall prevail. See also the approved program of works. In case of doubt, for clearer outlooks consult the assigned Architect/Engineer.*

Prepared by:

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Republic of the Philippines
Quezon City
Office of the City Mayor
QUEZON CITY BIDS & AWARDS COMMITTEE
(QC-BAC-INFRA)



PROJECT : PROPOSED CONSTRUCTION OF BAESA COLUMBARIUM WITH LAND DEVELOPMENT (ADMIN BUILDING)

LOCATION : Barangay Baesa, Quezon City

SUBJECT : GENERAL CONDITIONS AND TECHNICAL SPECIFICATIONS

I. GENERAL CONDITIONS

1.0 DEFINITIONS

- a. OWNER :** LOCAL GOVERNMENT OF QUEZON CITY
- b. CONTRACTOR :** Any individual, firm, corporation, partnership or association that enters into an agreement with the Owner for furnishing the materials and/or labor, tools, equipment, plant and other facilities required for the erection and completion of the project subject to the accompanying plans and working drawings.
- c.** The Owner/Implementing Agency and the Contractor are treated through the contract documents as if each were of the regular number, masculine gender.

1.1 EXAMINATION OF MEMBER

The Contractor shall carefully examine the premises before submitting any bids to enable him to have full knowledge of conditions existing therein.

1.2 LOCATION

Proposed Construction Of Baesa Columbarium with Land Development (Admin Building) be built along Barangay Baesa, Quezon City, refer to the approved Location Plan.

1.3 EXECUTION, CORRELATION & INTENT OF DOCUMENTS

- a.** The Contract Documents are signed in sufficient number of copies by all parties concerned. In case anybody fails to sign copies of any item forming part of the set contract documents, the Implementing Agency's identification thereon shall suffice.
- b.** The items, specifications and all other documents forming the contract documents are complementary. Anything shown on plans but not mentioned in the specifications or vice versa or anything not expressly set forth in either, but necessarily implied, shall be furnished or done as if specifically shown and mentioned in both, with no extra charge. Where dimensions are given in figures, follow them in preference to measurement by scale.
- c.** Execute work as per agreement, making no changes or deviations whatsoever, without prior permission from the Implementing Agency.
- d.** The Contractor shall verify and check all dimensions particularly those on the plans. He will be held directly responsible in case of any discrepancy that may be discovered during the progress of work.

1.4 DETAIL DRAWINGS AND INSTRUCTIONS

Plans furnished for use at the jobsite are whenever necessary, supplemented by detail drawings and instructions essential to the proper execution of the work. Such supplementary detail drawings and instructions shall be treated as of equal force as though originally issued.

1.5 PLANS AND PROJECT SITE

Keep at project site, in good order and condition, one (1) set of approved plans, specifications, supplementary detail drawings and instructions.

1.6 SHOP DRAWINGS

Shop drawings shall be provided by the Implementing Agency and/or Contractor during the progress of construction. The contractor should not place any item subject to shop drawings until the Implementing Agency shall have duly approved such drawings.

1.7 CHANGES

The Owner and the Implementing Agency reserve the right to make alterations or additions, including changes during the progress of work. The same shall be carried into effect without in any way deviating from or violating any agreement. Whatever amount shall necessarily be entailed in the cost of labor or materials or both shall be added to or deducted from the original contract price.

1.8 TIME OF COMPLETION AND SCHEDULE OF CONSTRUCTION

The Contractor shall, before actual commencement of the project operations, prepare and submit to the Implementing Agency for verification and approval, a complete and comprehensive work schedule covering the entire duration of construction. He shall also include therein, the estimated number of days within which the entire project shall be completed stage by stage by phase.

1.9 WORKMANSHIP

The project shall be executed with the use of first class workmanship to the full intent and meaning of the plans and specifications and to the complete approval and acceptance by the Implementing Agency.

1.10 MATERIALS

All materials to be used shall be the best of their respective types and kind. They shall be properly stored and protected from damage or injury.

1.11 SAMPLES

Submit samples as specified and proceed with the work with the use of materials procured based on the samples previously approved by the Implementing Agency.

1.12 INSPECTION OF WORK

The Contractor shall provide the facility for inspecting the work to the Implementing Agency, the Owner and other personnel having jurisdiction over the work.

1.13 DEFECTIVE OR IMPROPER WORK

All work or materials not acceptable to the Architect shall be removed immediately and replaced with appropriate work or materials without extra charge. All condemned materials shall be taken away from the premises without delay.

1.14 BUILDING LAWS AND REGULATIONS

The Contractor shall be held responsible for strict compliance with existing labor laws and regulations and shall free the Owner from any responsibility in connection therewith, he shall pay on time at his own expense, all taxes, fees and/or licenses due to the government, both national and local arising from his work on the project.

1.15 MANNER OF PAYMENT

Payments to the Contractor shall be based on the periodic work accomplishments subject to verification, approval and recommendation by the Implementing Agency.

1.16 RETENTION MONEY

Progress payments shall be subject to a ten percent (10%) deduction, referred to as retention money. All retained amounts shall be released upon satisfactory completion of the work and issuance of the Certificate of Final Completion and Acceptance.

1.17 TEMPORARY WATER, POWER AND TELEPHONE FACILITIES

The Contractor shall make the necessary arrangements with the local utility companies so as to provide temporary facilities for the supply of water, power and telephone for the duration of construction, and all expenses in connection therewith shall be borne by the Contractor.

1.18 PRIVY

The Contractor shall provide a temporary privy in a most inconspicuous and sanitary manner, and shall have it removed at the termination of the work.

1.19 CLEARING AND CLEANING

Upon its completion, the project and its premises shall be cleared and cleaned as directed by the Implementing Agency, and make ready for immediate occupancy.

1.20 TEMPORARY BARRICADES, SIGNAL LIGHTS, BILLBOARDS, ETC.

The Contractor shall provide all temporary barricades, signal lights, Architect and Contractor's billboards, the required official building billboard, etc., necessary for the protection of the public and for the proper prosecution of the work and display of construction requirements.

1.21 PERFORMANCE AND GUARANTEE BOND

To guarantee the faithful performance of the Contractor under the contract, he shall post a Performance Bond in the amount of thirty percent (30%) of the contract price in the form of cash, manager's check or surety bond, callable on demand.

1.22 QUESTIONS AND DISAGREEMENTS

All questions and disagreements between the Contractor and the Owner relative to the interpretation of the plans and specifications shall be referred to the Implementing Agency whose decision on the matter shall be final.

II. TECHNICAL SPECIFICATIONS

2.0 SITE WORK

WORK INCLUDED

- 2.0.0 Staking out and establishment of additional wall lines, grades and benchmarks.
- 2.0.1 All excavation works including all necessary shoring, bracing and drainage of storm water from the site.
- 2.0.2 All soil treatment, backfilling, filling, compaction and grading, removal of excess material from site.
- 2.0.3 Protection of property, work and structures, workmen and other people from damage and injury.
- 2.0.4 Soil Poisoning / Termite Proofing.
- 2.0.5 Gravel Bedding and Compaction (Ordinary Gravel).
- 2.0.6 Backfill and compaction

2.0.7 Hauling and disposal of excess materials

2.0.8 Demolition works

2.1 LINES, GRADES AND BENCHMARKS

2.1.0 Stake out accurately the lines of the building and/or the other structures included in the contract, and establish grades therefore, after which secure approval of the Project Manager before any excavation work is commenced.

2.1.0 Erect basic batter boards and basic reference marks at such places where they will not be disturbed during the construction of the foundation.

2.2 EXCAVATION

Structural Excavations: Excavations shall be to the depths indicated in the drawings where bearing value as indicated in the Soils Investigation Report provided as part of the Construction Documents shall be attained. Excavations for footings and foundations carried below required depths shall be filled with lean concrete and bottom of such shall be level. All structural excavations shall extend a sufficient distance from the walls and footings to allow for proper erection and dismantling of forms, for installation of service and for inspection.

All excavations shall be inspected and approved before pouring any concrete laying underground utility and auxiliary lines for placing select fill materials. The Contractor shall control the grading in the vicinity of all excavated areas to prevent surface drainage running into excavations. Water that accumulates in excavated areas shall be removed by pumping before fill is placed herein.

2.3 SOIL TREATMENT

Treat soil with 2% Chlordane or Andrex solution in water to provide an unbroken horizontal and vertical chemical barrier between the proposed structure and the possible termite colonies in the soil after excavation is completed and prior to pouring of concrete foundation and ground floor slabs. At the time the soil treatment is to be applied, the soil shall be in a friable condition with a sufficient low moisture content to allow uniform distribution of the treatment solution throughout the soil.

Do not apply pesticide during or immediately after heavy rains, or whenever climatic conditions are such that runoff will occur to create an environmental hazard. Cover treated areas with polyethylene or waterproof sheeting if concrete is not poured on the same day as the soil treatment. Take adequate precautions to prevent disturbance of the pesticide barrier. Re-treat the soil or fill is disturbed after the treatment and before the placement of structural components. Apply pesticide prior to placement of vapor barrier or waterproofing membrane.

2.4 SHORING

Excavation shall be shored and braced by members of suitable sizes where necessary to prevent danger to persons, injurious caving or erosions. Shoring bracing and sheathing shall be removed, as the excavations are backfilled, in a manner such as to prevent injurious caving. The contractor shall keep all excavations free from water while construction is in progress.

2.5 FILLING AND BACKFILLING

After forms have been removed and when concrete work is hard enough to resist pressure resulting from fill, backfilling may then be done. Materials excavated may be used for backfilling. All filling shall be placed in layers not exceeding six (6) inches in thickness, each layer being thoroughly compacted and rammed by wetting, tamping, rolling.

2.6 PLACING AND COMPACTING FILL

2.6.0 Common Fill: shall be approved imported/site-excavated material free from roots, stumps and other perishable or objectionable matter.

- 2.6.1 **Select Fill:** shall be placed where indicated and shall consist of crushed gravel, crushed rock or a combination thereof. The material shall be free from adobe, vegetable matters and shall be thoroughly tamped after lacing.
- 2.6.2 Before placing fill materials, the surface upon which it shall be placed shall be cleared of all brush roots, vegetable matter and debris, and thoroughly wetted to ensure good bonding between grounds.
- 2.6.3 **Compaction:** Fills shall be evenly spread in horizontal layers of not more than 200mm in thickness. Each layer shall be wetted and compacted by approved mechanical compaction machine, roller or portable to a density of at least 90% or its maximum density for non-cohesive soils as determined by ASTM Method D-1557 or AASHTO Method T-180.

2.7 FINISH GRADING

The contractor shall fill and grade the whole area to the indicated sub-grade elevations as directed by the Architect or Engineer. The contractor shall verify the finish grade elevations of the proposed pavements. Prior to grading operations, the areas shall be cleared of all heavy growth or vegetation stumps, roots, cables, wires, rocks and other debris. The finished sub-grade shall be reasonably smooth and compacted and ready to receive the base course for the proposed pavement.

2.8 DISPOSAL OF EXCESS MATERIALS

Any excess and demolished materials remaining after completion of the earthwork shall be disposed of by hauling and transported out of the premises at the contractor's own expense.

2.9 SUB-GRADE PREPARATION

2.9.0 SCOPE

The sub-grade preparation shall be that part of the work which is the preparation for the support of the bases for pavements and structures. It shall extend to the full width of pavements including shoulders and lay-bys as shown on the drawings or as specified herein. Unless otherwise agreed upon by the Engineer, sub-grade preparation or a section of the road shall not be commenced unless the contractor is able, after the completion and acceptance of the work, to commence immediately pavement construction.

2.9.1 PRODUCTS

All materials and equipment necessary for proper completion of this work shall be subject to the approval of the Engineer.

2.9.2 EXECUTION

2.9.2.0 Prior Works: Prior to commencing the preparation of the sub-grade, all culverts, cross drains, and other similar structures (including the fully compacted backfill) shall be completed. No work shall be started on the preparation of the sub-grade before the prior works herein approved by the Engineer.

2.9.2.1 Sub-grade Level Tolerance: The finish compacted surface of the sub-grade shall conform to AASHTO M-145.

2.9.2.2 Sub-grade in Cutting Common Material

- a. Unless otherwise specified, all materials below sub-grade level in earth cutting to a depth of 150mm or other depth shown on the drawings or directed by the Engineer shall be excavated. The material, if suitable, shall be placed to one side for re-use, or if unsuitable, shall be disposed of in accordance with the requirements of AASHTO M-145.
- b. Where material has been removed from below sub-grade level, the base of the resulting cutting shall be compacted to a depth of 150mm to the requirements of AASHTO M-145 Table 1. If necessary, the moisture content of the material shall be adjusted.

2.10 GRADED AGGREGATES AND BASE COURSE

2.10.0 SUBMITTALS

- a. **Test Reports:** Before delivery of materials, submit the following test reports:
 - 1. Gradation
 - 2. Bearing Ratio
 - 3. Attenberg Limits

2.10.1 DELIVERY AND STORAGE

Do not construct base course when rainfall or other weather conditions will detrimentally affect the quality of the finished course.

2.11 PRODUCTS

2.11.0 MATERIALS

- a. **Aggregates:** Consist of durable sound crushed gravel, crushed stone, free of lumps and balls of clay or other objectionable matter. Crushed stone shall be free from flat, soft or disintegrated pieces. Crushed gravel retained on a No. 4 sieve shall have at least ninety percent (90%) by weight with at least two fractured faces one hundred percent (100%) by weight with at least one fractured face.
- b. Base course materials samples shall have a Bearing Ratio of at least 100 as determined by laboratory tests on a 4-day soaked specimen in accordance with ASTM D 1883; compact specimen in accordance with ASTM D 1557, Method D. Determine grain size in accordance with ASTM C-117.
- c. Soil binder material, the surface of the layer by a combination of rolling and blading. Final surface shall be smooth and free from waves, irregularities and from ruts of soft yielding spots.

III CONCRETE

3.0 GENERAL

- 3.0.0 Unless otherwise specified herein, concrete work shall conform to the requirements of ACI Building Code. Full cooperation shall be given other trades to install embedded items. Provisions shall be made for setting items not placed in the forms. Before concrete is placed, embedded items shall have been inspected and tested for concrete aggregates and other materials shall have been done.

3.1 SUBMITTALS

- 3.1.0 **Shop Drawings:** Reproduction of contract drawings is unacceptable.
- 3.1.0 **Shop Drawings for Reinforcing Steel:** ACI 318. Indicate bending diagrams, assembly diagrams, splicing and lap 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 bars.
- 3.1.1 **Contractor Mix Design:** Thirty (30) days prior to concrete placement, submit a design for each strength and type of concrete. Furnish a complete list of

materials including type, brand; source and amount of cement and admixtures; applicable reference specifications and copies of test reports showing that the mix has been successfully tested to produce concrete with the properties specified and will be suitable for the job conditions. Provide fly ash and pozzolan test results performed within six (6) months of submittal date. Obtain approval before concrete placement.

3.1.2 Certificates of Compliance

- a. Aggregates
- b. Admixtures
- c. Reinforcement
- d. Cement

3.1.3 Catalogue Data

- a. Water stops
- b. Materials for Curing Concrete
- c. Joint Sealant
- d. Joint Filter
- e. Vapor Barrier
- f. Epoxy Bonding Agents

3.2 MATERIALS

3.2.0 Cement for concrete shall conform to the requirements of specifications for Portland cement (ASTM C-150).

3.2.1 Water used in mixing concrete shall be clean and free from other injurious amounts of oil, acids, alkaline, organic materials or other substances that may be deleterious to concrete or steel.

3.2.2 Fine Aggregates shall consist of hard, tough, durable uncoated particles. The shape of the particles shall be generally rounded or cubicle and reasonably free from flat or elongated particles. The stipulated percentages of fines in the sand shall be obtained either by processing sand or by the production of suitable graded manufactured sand.

3.2.3 Coarse Aggregates shall consist of gravel. Crushed gravel or rock. Or a combination of gravel and rock. Coarse aggregates shall consist of hard, tough, durable, clean and uncoated particles. The size of coarse aggregates top be used in the various parts of the Work shall be ¾".

3.2.4 Reinforcing bars shall conform to the requirements of ASTM Standard specifications for Billet Steel Bars for concrete reinforcement (A15-625) and to Specification for minimum requirements for the deformed steel bars for concrete reinforcement (A305-56). Tensile strength and grade for all reinforcing bars such as main horizontal (for beams), vertical (for columns), ties, stirrups and inserts shall be as follows:

No. 3 (3/8")	10 mm – fy	=	40,000 psi Grade 40)
No. 4 (1/2")	12 mm – fy	=	40,000 psi (Grade 40)
No. 5 (5/8")	16 mm – fy	=	60,000 psi (Grade 60)
No. 6 (3/4")	20 mm – fy	=	60,000 psi (Grade 60)
No. 8 (1")	25 mm – fy	=	60,000 psi (Grade 60)

3.3 PROPORTIONING AND MIXING

3.3.0 Proportioning of all materials entering into the concrete mixture of 3,000 psi concrete shall be as follows:

<u>Class</u>	<u>Cement</u>	<u>Sand</u>	<u>Gravel</u>
A	1	2.0	4

3.3.1 Strength of Concrete: Concrete shall have 28-day cylinder strength of 3,000 psi shall be for slab on grade, site pavements and wall footings.

- 3.3.2 **Mixing:** Concrete of 3,000 psi compressive strength shall be ready-mixed in transit from batching plant as scheduled order from qualified supplier, *accredited by Engineer*. The 3,000 psi concrete can be machine mixed on-site or also ready mixed in transit from batching plant. On-site mixing shall be within 30 minutes after the cement has been added to the aggregates.

3.4 FORMS

- 3.4.0 **General:** Forms shall be used whenever necessary to continue the concrete and shape it to the required lines, or to ensure the concrete contamination with materials caving from adjacent excavated surfaces. Forms shall have sufficient strength to withstand the pressure resulting from placement and vibration of the concrete, and shall be maintained rigidly in correct position. Forms shall be sufficiently tight to prevent loss of mortar from the concrete. Forms for exposed surfaces against which backfill is not to be placed shall be lined with a form grade plywood or metal panels.
- 3.4.1 **Cleaning and Use of Forms:** Before placing the concrete, the contact surfaces of the form shall be cleansed of encrustation of mortar, the grout or other foreign material, and shall be coated with commercial form oil that will prevent sticking and will not stain the concrete surfaces.
- 3.4.2 **Removal of Forms:** Forms shall be removed in a manner that will prevent damage to the concrete. Forms shall not be removed without approval. Any repairs of surface imperfections shall be performed at once and airing shall be started as soon as the surface is sufficiently hard to permit it without further damage.

3.5 PLACING REINFORCEMENT

General: Steel reinforcement shall be provided as indicated, together with all necessary gauge 16 G.I. wire ties, chairs, spacers, supports and other devices necessary to install and secure the reinforcement properly. All reinforcement, when placed, shall be free from loose, flaky rust and scale, oil grease, clay and other coating and foreign substances that would reduce or destroy its bond with concrete. Reinforcement shall be placed accurately and secured in place by use of metal or concrete supports, spacers and ties. Such supports shall be of sufficient strength to maintain the operation. The supports shall be used in such manner that they will not be exposed or contribute in any way, to the discoloration or deterioration of the concrete.

3.6 CONVEYING AND PLACING CONCRETE

- 3.6.0 **Conveying:** Concrete shall be conveyed from mixer to forms as rapidly as practicable, by methods that will prevent segregation, or loss of ingredients. There will be no vertical drop greater than 1.5 meters except where suitable equipment is provided to prevent segregation and where specifically authorized.
- 3.6.1 **Placing:** Concrete shall be worked readily into the corners and angles of forms and around all reinforcement and embedded items without permitting the material to segregate. Concrete shall be deposited as close as possible to its final position in the forms so that flow within the mass does not exceed two (2) meters and consequent segregation is reduced to a minimum near forms or embedded items, or elsewhere as directed. The discharge shall be so controlled that the concrete may be effectively compacted into horizontal layers not exceeding 30 centimeters in depth within the maximum lateral movement specified.
- 3.6.2 **Time interval between mixing and placing:** Concrete shall be placed before initial set has occurred and before it has contained its water content for more than 45 minutes.
- 3.6.3 **Consolidation of concrete:** Concrete shall be consolidated with the aid of mechanical vibrating equipment and supplemented by hand spading and tamping. Vibrators shall not be inserted into lower coursed that have commenced initial set and reinforcement embedded in concrete beginning to set or already set shall not be disturbed by vibrators. Consolidation around major embedded parts shall be by hand spading and tamping and vibrators shall not be used.

- 3.6.4 Placing concrete through reinforcement: In placing concrete through reinforcement, care shall be taken that no segregation of the coarse aggregate occurs. On the bottom of beams and slabs, where the congestion of steel near the forms makes placing difficult, a layer of mortar of the same cement-sand ratio as used in concrete shall be first deposited to cover the surface.

3.7 CURING

- 3.7.0 General: All concrete shall be moist-cured for a period not less than seven (7) consecutive days by an approved method or combination applicable to local conditions.
- 3.7.1 Moist curing: The surface of the concrete shall be kept continuously wet by covering with burlap, plastic or other approved materials thoroughly saturated with water and keeping the covering wet spraying or intermittent hosing.

3.8 FINISHING

- 3.8.0 Concrete surfaces shall not be plastered unless otherwise indicated. Exposed concrete surfaces shall be formed with smooth form material, and after removal of forms, the surfaces shall be smooth, true to line and shall present a finished appearance except for minor defects which can be easily repaired by patching with cement mortar, or can be ground to a smooth surface to remove all joint marks of the form work.
- 3.8.1 Concrete slabs on fill: The concrete slabs on fill laid on a prepared foundation consisting of sub-grade and granular fill with thickness equal to the thickness of overlaying slab except as indicated otherwise.

3.9 SURFACE FINISHES

- 3.9.0 Defects: Repair formed surfaces by removing minor honeycombs, pits greater than one square inch surface area or 0.25 inch maximum depth, or otherwise defective areas. Provide edges perpendicular to the surface and patch with non-shrink f=grout. Patch the holes and defects when the forms are removed.
- 3.9.1 Floor slabs, Pavements and Miscellaneous Construction: Unless otherwise specified, slab at the fountain area are straight to finish with waterproofing. Slope floors uniformly to drains where drains are provided. Depress the concrete base slab where Granite or Ceramic tiles are indicated.
- 3.9.2 Finish: Place, consolidate and immediately strike-off concrete to obtain proper contour, grade and elevation. A set sufficient for floating and supporting the weight of the finisher and equipment.
- 3.9.3 Pavements: Screed the concrete with a template advanced with a combined longitudinal and crosswise motion. Maintain a slight surplus of concrete ahead of the template. After screeding, float the concrete longitudinally and refloat as necessary. Obtain final finish by belting. Lay belt flat on the concrete surface and advance with a sawing motion; continue until a uniform but gritty non-slip surface is obtained. Round edges and joints with an edger having a radius of 1/8 inch.
- 3.9.4 Broomed: Provide for exterior walks, platforms, patios and ramps. Unless otherwise indicated, provide a floated finish, and then finish with a flexible bristle broom. Permit surface to harden sufficiently to retain the scoring or ridges. Broom traverse to traffic or at right angles to the slope of the slab.
- 3.9.5 Pits and Trenches: Place bottoms and walls monolithically or provide water stops and keys.
- 3.9.6 Curbs and Gutters: Provide contraction joints spaced at every 10 feet maximum unless otherwise indicated. Cut contraction joints 3/4-inch deep with a jointing tool after the surface has been finished. Provide expansion joints 1/2-inch thick and spaced at every 100 feet maximum unless otherwise indicated. Provide a pavement finish.

3.10 MISCELLANEOUS

- 3.10.0 Construction Joints: Locate joints to least impair strength; continue reinforcement across joints unless otherwise indicated.

- 3.10.1 Expansion Joints and Contraction Joints: For slab on grade, provide at edges of interior floor slab, adjacent to walls as indicated. Completely fill joints exposed to weather with joint filler material and joint sealant. Do not extend reinforcement or other embedded metal items bonded to the concrete through any expansion joints unless an expansion sleeve is used. Provide contraction joints, either formed or saw cut or cut with a jointing tool, to the indicated depth after the surface has been finished. Sawed joints shall be completed within 4 to 12 hours after concrete placement. Protect joints from intrusion of foreign matter.

IV METALS WORKS

4.0 DESCRIPTION

4.0.0 Metal works shall conform to the approved plans and to the Standard Specifications.

4.1 REFERENCE STANDARDS

4.1.0 Comply with the latest edition of the following as applicable, unless otherwise specified or modified.

- 4.1.0.0 AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), 1978: Specification for the Design, Fabrication and Erection of Structural Steel for Buildings. Code of Standard Practice for Steel Buildings and Bridges; Specification for Architecturally Exposed Structural Steel.
- 4.1.0.1 AMERICAN WELDING SOCIETY (AWS): Standard Welding Symbols A2.0-68; Standard Welding Code D1.1-1973 (Rev 1-73 & 2-74) (To govern if in conflict with AISC).
- 4.1.0.2 RESEARCH COUNCIL ON RIVETED AND BOLTED JOINTS OF THE ENGINEERING FOUNDATION (RCRBJ): Specification for Structural Joists using ASTM A-325-76s Bolts.
- 4.2.0.3 STRUCTURAL STEEL PAINTING COUNCIL (SSPC): Painting Manual, Vol. 1; Good Painting Practice, Painting Manual, Vol. 2; Systems and Specifications.

4.2 SOURCE QUALITY CONTROL

Errors of Shop Drawings, fabrication, correct fitting and alignment of the various metal items or component members shall be the responsibility of the Contractor. However, the Contractor shall permit the Architect or an independent inspection agency, if engaged by the Owner, to inspect work in progress in his shop. Such inspections shall not relieve the Contractor of his responsibility to furnish materials and workmanship in accordance with the Contract Documents.

4.3 PRODUCT DELIVERY, HANDLING AND STORAGE

Handle and store in such manner as to prevent damage or disfigurement. Store finished items or components above ground on platforms, pallets or other supports and protect from harmful elements.

4.4 PROTECTION

The Contractor shall protect any existing work subject to damage during the installation of the specified work and shall adequately protect specified work during installation.

4.5 FIELD QUALITY CONTROL

Facilities shall be provided by the Contractor as needed for the proper inspection of the specified work, including temporary platforms, hoists, protective devices, electric current, etc. Improper workmanship, as determined by the Architect shall be corrected and replaced, at no additional cost to the Owner.

4.6 MATERIALS

Products shall conform to the respective reference specifications and standards and to the requirements specified herein:

4.6.0 STEEL AND IRON: If not specified otherwise, use standard mill-finished structural steel shapes or bar iron in compliance with AISC Specifications for Design, Fabrication and Erection of Structural Steel for Buildings.

4.6.1 BOLTS, NUTS, STUDS AND RIVETS: ASTM A 325

4.6.2 SCREWS: Fed. Spec FF-S-85, Fed. Spec. FF-S-92, and Fed. Spec. FF-S-111

4.7 FABRICATION

By mechanics skilled in the trade and in accordance with the manufacturer's directions, Metalwork shall be fabricated to allow for expansion and contraction of materials. Provide welding and bracing of adequate strength and durability, with tight, flush joints, dressed smooth and clean. Complete with bolts and nuts.

4.8 MEASUREMENTS

Before fabrication, provide necessary field measurements and verify all measurements.

4.9 METAL SURFACES

Shall be clean and free from all scale, flake, rust and rust pitting; well-formed and finished to shape and size, with sharp lines, angles and smooth surface. Shearing and punching shall leave clean true lines and surfaces. Weld or rivet permanent connections. Weld and flush rivets shall be used and finished flush smooth on surfaces that will be exposed after installation. Do not use screws or bolts where they can be avoided; when used, heads shall be countersunk, screwed up tight and threads nicked to prevent loosening.

4.10 CONSTRUCTION

Thickness of metals and details of assembly and supports shall give ample strength and stiffness for the minimum loads specified or indicated. Joints exposed to weather shall be formed to exclude water.

4.11 SHOP FABRICATION

Fabrication and assembly shall be done in the shop to the greatest extent possible.

4.12 SUBMITTALS

Shop Drawings: Submit along with catalogue, cuts, templates, and erection and installation details, indicating thickness, type, grade, class of metal and dimensions. Show construction details, reinforcement, anchorage, and installation with relation to the construction.

4.13 QUALIFICATION OF WELDERS

In accordance with AWS D1.1 using procedures, materials and equipment of the type required for the work.

4.14 DELIVERY AND STORAGE

Protect from corrosion, deformation and other types of damage. Store items in an enclosed area free from contact with soil and weather. Contractor shall replace and remove damaged items with new items.

4.15 WELDING

Use welding electrode E70xx and perform welding, welding inspection and corrective welding in accordance with AWS D1.1. Weld in a manner to prevent permanent distortion of the connected parts. Weld continuously along the entire area of contact (except where tack welding is permitted. Do not tack weld exposed to connections.) Grind smooth visible weld in finished installation.

4.16 METAL PURLINS

Metal purlins shall be of high grade galvanized steel with minimum tensile strength of 275 MPa, 2mm in thickness manufactured by Philmetal or approved equal.

V MASONRY

5.0 MATERIALS

5.0.0 All materials and workmanship shall be in accordance with the applicable standard and specifications of the Structural Code of the Philippines and uniform Building Code.

5.0.1 Concrete Hollow Blocks (CHB) shall have a minimum face thickness of 1" (25mm). Nominal size shall be 4" x 8" x 16", minimum compressive strength shall be 500 psi for non-load bearing and 700-1000 psi for load bearing. All units shall be stored for a period not less than 28 days (including curing period) and shall not be delivered to the job site prior to that time unless the structure is equal or more than the specified.

5.0.2 Prior to commencing the preparation of the sub-grade, all culverts, cross drains, and other similar structures (including the fully compacted backfill) shall be completed. No work shall be started on the preparation of the sub-grade before the prior works herein approved by the Engineer.

5.0.3 Cement shall be standard Portland cement ASTM 270 - Type N.

5.0.4 Mortar: Mix mortar from 3 to 5 minutes in such quantities as needed for immediate use. Re-tempering will not be permitted if mortar stiffens because of premature setting. Discard such materials as well as those that have not been used within one hour after mixing. Proportioning shall be one (1) part Portland cement and two (2) parts and by volume, but not more than one (1) Portland cement and three (3) parts and by volume.

5.1 SUBMITTALS

5.1.0 Submit samples for approval two (2) samples each of each type of wall reinforcement and wall ties.

5.1.1 Certificates of Conformance: Submit certificate attesting that masonry cement, masonry units, aggregates and accessories meet the requirements specified.

5.2 ERECTION

5.2.0 All masonry shall be laid plumb, true to line, with level and accurately spaced courses, and with each course breaking joint with the source below. Bond shall be kept throughout corners and reveals shall be plumb and true. Units with greater than 12% absorption shall be wet before laying. Work required to be built in masonry; including anchors, wall plugs and accessories shall be built-in as the erection progresses.

5.2.1 Masonry Units: Each course shall be solidly bedded in Portland cement mortar. All units shall be damp when laid units shall be showed into place not laid, in a full bed of un-furrowed mortar. All horizontal and vertical points shall be completely filled with mortar when and as laid. Each course shall be bonded at corners and intersections. No cells shall be left open in face surfaces. All cells shall be filled up with mortar for exterior walls. Units terminating against beam or slab soffits shall be wedged tight with mortar. Do not lay cracked, broken or defaced block.

5.2.2 Plastering: Clean and evenly wet surfaces. Apply scratch coat with sufficient force to form good keys. Cross scratch coat upon its initial set; keep damp. Apply coat

after each scratch coat has set at least 24 hours after scratch coat application. Lightly scratch brown coat; keep moist for two (2) days; allow drying out. Do not apply finish until brown coat has seasoned for seven (7) days. Just before applying coat, wet brown coat again. Float finish coat to true even surface; trowel in manner that will force sand particles down into plaster, with final trowling, leave surfaces banished smooth free from rough areas, trowel marks, checks, other blemishes. Keep finish coat moist for at least two (2) days; thereafter protect against rapid drying until properly, thoroughly cured.

5.3 SCAFFOLDING

5.3.0 Provide safe wood or metal scaffolding required for masonry and other related work, including cleaning down on completion. Remove upon demobilization.

5.4 SURFACE PREPARATION

5.4.0 Lay floors without borders from centerline outward. Make adjustments at walls. Clean concrete sub-floor and moisten it without soaking. Sprinkle dry cement over surface. Spread setting bed mortar on concrete and tamp to assure good bond over the entire area then screed to smooth, level bed. Set average setting bed thickness at $\frac{3}{4}$ " but not less than $\frac{1}{2}$ ".

5.4.1 Wall: Scratch coat application as foundation coat shall be at most $\frac{1}{2}$ ". While still plastic, deeply score scratch coat or scratch and cross-scratch. Protect scratch coat and keep reasonably moist within seasoning period. Use mortar for scratch floor coats, within one hour after mixing. Re-tempering of partially hardened mortar is not permitted. Set scratch coat be cured for at least two (2) days before starting the setting.

5.5 CLEANING

5.5.0 Protection: Protect work which may be damaged, stained or discolored during cleaning operations.

5.5.1 Pointing: Upon completion of masonry work, cut out defective mortar joints and tuck joints and all holes solidly with mortar.

5.5.2 Cleaning: Clean exposed masonry surface with clear water and stiff fiber brushes and rinse with clean water. Where stains, mortar or other soil remain, continue cleaning as follows: Clean masonry surfaces by scrubbing with warm water and soap and rinsing thoroughly with clean water. Restore damaged, stained and discolored work to its original conditions or replace with new work.

VI ARCHITECTURAL

6.0 FLOOR AND WALL AND FINISHES

6.0.0 Exterior/Interior Walls & Floor finishes

- a. 600mm x 600mm Homogenous / Porcelain Non-Skid.
Floor tiles
- b. 300mm x 600mm Ceramic Floor Tiles
- c. 300mm x 600mm Homogenous Porcelain Tiles
- d. Plain cement epoxy paint finish
- e. 25mm concrete topping (for tiles)
- f. 300 x 600mm Ceramic Wall Tiles.

6.1.1 CEILING FINISHES

- a. 12mm thk. Gypsum Board including framing and accessories.

Proposed Construction Of Baesa Columbarium with Land Development
(Admin Building)

b. 12mm thk. Moisture Resistant Gypsum Board on lightweight aluminum frames.

c. 600 x 600mm Acoustic Ceiling w/ T-Runners

6.1.2 WINDOWS

Follow as per approved plan and specifications.

6.1.3 DOORS

Follow as per approved plan and specifications.

6.1.4 PAINTING

- a. All paints shall meet the required specifications and shall be delivered at the site in the original container. Use non Volatile Organic Compound (V.O.C.) paint or approved by the implementing agency and only accredited painters of the manufacturer shall execute the work to ensure the true origin and quality of paint and warranty of work.
- b. Concrete walls shall be treated with neutralizers. Exterior walls without wall veneer shall be applied with a primer before final coat. In general, rough surfaces of concrete, cabinets and woodworks surfaces shall be properly sandpapered and puffed before any application of paint.
- c. Latex Paint Finish (exterior masonry walls)
- d. Latex Paint Finish (interior masonry walls, stairs and Slab Soffit)
- e. Latex Paint Finish (ceiling)
- f. Painting of Doors and jambs
- g. Painting of Windows

6.1.5 WATERPROOFING AND DAMP-PROOFING

- a. Roof Decks : Terragum A – Torch applied membrane, UV protected.
- b. Toilets : Cementitious capillary type waterproofing.

6.1.6 HARDWARE

1. Provide all rough hardware required for the construction of works: nails, straps, lag screws, etc.
2. Butt Hinges : Use Toyo Butt Hinges, 4" x 4" with bearings for panel door
3. Locksets : For PVC plastic, wood and metal swing doors use ABLOY stainless mortise locksets with striker plate.
4. Door Stop : Locate position where no traffic could be obstructed. For restroom doors where tile finish abuts the door swing side, use IVES 65 6" above inside floor finish on door panel.
5. Door Closers : Posse/MBC Door closer for metal doors.
6. Exit Door Panic: Use Toyo Panic Exit Device, horizontal without key for Device single panel for fire exits.

6.1.7 HANDRAILS AND RAILINGS

Follow as per approved plan and specifications.

6.1.8 OTHER FINISHES

- a. 6mm thk facial mirror on 6mm thk marine plywood backing including all incidentals to complete.
- b. Main Stair Railing including Accessories, Painted Finish.
- c. Undercountertop Cabinet including accessories, Painted Finish (Pantry)
- d. Bathroom Accessories (Bidet, tissue and soap holder, towel hook)

6.1.9 CLEAN-UP

When the work is completed, the Contractor shall remove all temporary structures and surplus materials of every sort, restore what has been removed before, and leave the premises or site in as good condition as he had originally found them.

VII THERMAL CONTROL AND MOISTURE PROTECTION

7.0 WATERPROOFING

Use waterproofing cementitious powder, capillary type, flexible type-liquid applied waterproofing seamless membrane latex-modified rubber reinforced on slabs. Refer to manufacturer's recommendation on proper application of the product listed herein: Lanko manufactured by VSL.

7.1 VAPOR BARRIER

Use 8 mils thick, 6 feet wide roll plastic vapor barrier laid over compacted base course at ground floor slab with 300mm minimum overlap prior to setting up of steel reinforcing bars. Submit samples for approval.

7.2 WATERSTOPS

Use Rebstop Ultra Seal chemical grout water-stop specially formulated for construction joints to replace the use of conventional water-stop used for cold expansion joints on pipes, etc. manufactured by Rebtrade International Corporation or approved equal.

VIII FIRE PROTECTION

A. SPRINKLER SYSTEM, AUTOMATIC, WET-PIPE TYPE SPECIFICATIONS

8.0 GENERAL

Applicable provisions of the "General Conditions" govern work under this section.

8.1 QUALIFICATIONS OF CONTRACTORS

The Contractor for the fire protection installation shall be a qualified Fire Protection Contractor, regularly engaged in the installation of automatic fire sprinkler systems and other fire protection equipment, and must have at least one (1) sprinkler installation approved by the Philippine Insurance Rating Association (PIRA). Companies or corporations whose personnel have supervised an approved sprinkler plan and subsequently approved by PIRA or by the Fire Department are also qualified.

8.2 SCOPE OF WORK

8.2.0 This specification includes the furnishing of all labor, materials, equipment and services necessary or incidental to the complete installation, testing, adjusting and placing into service of the several systems of fire protection, all as shown on the drawings and as hereinafter specified. Drawings and specifications are considered as mutually explanatory and all works called for by one and not the other, shall be performed as though called for by both. In cases of conflicting information, the

Architect and Engineer shall be notified at once in writing. Where incidental equipment or appurtenances are required and not listed as shown, same shall be furnished as required for a complete fire protection system.

- 8.2.1 Drawings are intended to show general arrangement and approximate physical sizes of equipment diagrammatically. Every bolt, nut, brace, strut, etc., is not necessarily indicated or specified; all such items as may be required, necessary or incidental to the proper and dependable operation of each system being a requirement of this contract, whether specifically referred to or not, must be supplied.
- 8.2.2 Work included in this specification shall consist of, but not limited to the following items:
1. Arrange for, obtain and bear the cost of necessary permits, bonds and fees for the automatic sprinkler work.
 2. All fees, private or government shall be paid by the Contractor.
 3. Furnish and install a sprinkler system to the entire building where shown on the drawings. System to include all pipes, hangers, sway braces, sprinkler heads, control valves, drains, alarms, water flow switches and control valve monitor switches, (the fire pumps, drives, jockey pumps and controllers, pumps standard accessories may be supplied by pump suppliers under separate bid package), to be installed by the Sprinkler Contractor.
 4. Fire hose cabinets and fire hose accessories, including connection pipe and fittings to the sprinkler system.
 5. Alarm check valves, complete with set of trimmings, retarding chamber, water motor alarm gong, alarm pressure switches, water flow switches and monitor switches. The Sprinkler Contractor shall coordinate and interface the required electrical wiring connections for the water flow and monitor switches to the building fire alarm system.
 6. Furnish and install a system of dry standpipe complete with valves and fire department connection. Contractor to provide as shown in the plans, by-pass valve with pipe and fittings to connect the Wet Sprinkler pipe riser with the Dry Standpipe riser.
 7. Furnish and install fire department connection for the sprinkler system.
 8. Furnish and install inspector's test connection pipe, nozzles and valves on the farthest point of each floor, located where shown on the drawings.
 9. Furnish and install water flow alarm switches, and monitor tamper switch to floor control valves. The Sprinkler Contractor shall furnish and install the Control Panel and the wiring in conduits for the connection of the water flow and monitor switches to the sprinkler supervisory panel. The supervisory control panel shall be interfaced to the building fire alarm system.
 10. Do the testing of all piping works and necessary cleaning of the fire protection works. This includes also the testing of the fire department pipeline and drain pipe and water flow alarms.
 11. Fire extinguishers as shown in the plans shall be supplied and installed by the Contractor. Over and above those specified, the owner of the building shall supply the requirements of the Fire Department.
 12. All openings through which fire may spread from one floor to the other, such holes through floors or walls for the pipe shall be sealed with fire resistant materials.
 13. Chipping and plastering works necessary for the area covered in the installation of automatic sprinkler system.
 14. Furnish the shop drawings and certificates of inspection.
 15. Periodically remove from the jobsite all rubbish and debris resulting from the fire protection work.

16. Furnish and install one (1) unit of 10 lbs. HCFC portable fire extinguishers for Electrical Rooms, Pump Room.

17. Miscellaneous items as hereinafter provided.

8.3 SITE CONDITIONS

The Contractor shall be deemed to have visited the site and acquaint himself with the existing site condition, means of access and take into account any feature that may affect his tender. No claim for his neglect to do so or not, out of a misunderstanding on his part in these conditions shall be entertained.

The Fire Protection Contractor shall be responsible for the proper coordination with other trade contractors.

8.4 STANDARDS, CODES AND REGULATIONS

The applicable current standards for the fire protection systems shall be the National Fire Protection Association (NFPA), NFPA-13, and Philippine Fire Code-PD 1185, the PSME Code and all other applicable local codes and ordinances.

8.5 SUBMITTAL (SHOP) DRAWINGS AND DATA

8.5.0 Before commencing any work or providing any materials at the jobsite for this project, the Fire Protection Contractor shall submit to the Engineer for approval, four (4) copies of catalogue cuts and descriptive matter regarding materials and equipment which he intends to furnish and install.

Shop drawings and data shall be submitted specifically for, but not limited to the following items: Sprinkler heads, calves, pipes, pipe hangers, hose valves and accessories, Fire Department connections, fire pumps and jockey pumps, controllers, fire hose cabinets, mechanical grooved coupling, flexible pipe connectors, pressure reducing valves, pipe riser support and sleeves, portable fire extinguishers and foam equipment.

8.5.1 The Fire Protection Contractor shall not proceed with the installation of the work until he has received the Engineer's approval on his shop drawings.

8.5.2 The Engineer's approval of shop drawings, catalogue cuts, etc. shall not relieve the Fire Protection Contractor of the responsibility for any errors or omissions which may exist in the items neither submitted nor shall relieve him from the responsibility for deviations from the contract drawings and specifications.

The stamped approval of the shop drawings, catalogue cuts, etc. shall not be construed as a complete check, but will indicate only that the general design and method of construction is satisfactory.

8.5.3 In the event inspection authorities require additional clarifying details, the details shall be prepared and approval of the same secured by the Fire Protection Contractor at his expense.

8.6 CONDUCT OF WORK

The Fire Protection Contractor shall employ on the job at all times a competent superintendent Licensed Mechanical Engineer who shall be responsible for the progress and execution of the work. Workmanship shall be of high quality, conforming to standard practice as stipulated by NFPA, ASTM and ASA and PSME recommendations by skilled workmen during regular working hours.

8.7 LOCAL AND IMPORTED MATERIALS

8.7.0 All materials and equipment furnished under this section shall be new, manufactured in the United States, and Non-UL/FM but conforming to NFPA Standards.

8.7.1 The proposal submitted shall include all materials and equipment as specified or

8.7.2 shown on the drawings.

8.8 AUTOMATIC SPRINKLER AND STANDPIPE SYSTEM

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- 8.8.0 Pipe shall be new, designed for 175psi working pressure, conforming to ASTM specifications, manufactured in the United States or approved local pipes and have the manufacturer's name or brand along with the applicable ASTM standard marked on each length of the pipe. The locally manufactured pipe brand "Supreme" are acceptable brand with proper schedule and wall thickness.
- 8.8.1 Pipe shall be steel, schedule 40, black and in accordance with the specifications ASTM A120 or A53.
- 8.8.2 Schedule 40 black steel pipes shall be joined by screwed joints in accordance with specifications ANSIB2.1 up to 2½" and flanged, Victaulic type or screwed connections for 3" and up. Pipe fittings to be used with schedule 80 pipes shall be rated 300lbs. Class if there are any.
- 8.8.3 Sprinklers' piping that is exposed to the weather or used in a corrosive atmosphere shall be painted with protective coating. Sprinkler piping in the building shall be painted with two (2) coats of enamel primer and two (2) coats of Fire Red color enamel paint.
- 8.8.4 All ASTM A53 and ASTM A120 sprinkler pipe must be hydrostatic tested at the mill per ASTM standard.
- 8.8.5 Screwed fitting shall be malleable iron, 300 lbs. and 150 lbs. class, black and in accordance with ANSI B16.3. "Victaulic" brand mechanical tee and elbow UL/Fm fittings can also be used.
- 8.8.6 Flanged fittings shall be steel, short body, 150, black and in accordance with ANSI B16.1. Gaskets shall be full face of 1/8" minimum thickness red sheet rubber. Flange bolts shall be hexagon head machine bolts with semi-finished hexagon head nuts, cadmium-plated having dimension in accordance with ANSI B18.2.
- 8.8.7 Weld fittings shall be steel, standard weight, black and in accordance with ANSI B16.9, ANSI B16.25, ASTM A234, ANSI B16.5 or ANSI B16.11.
- 8.8.8 Outside screw and yoke gate valves shall be flanged, iron body, bronze mounted, 175 psi working pressure, with hand wheel turning counterclockwise to open. Valve shall be tested and listed by UL and/or FM.
- 8.8.9 Check valve shall be flanged, swing type, iron body bronze seat ring and disc ring, and 175 psi working pressure rating. Valve shall be tested and listed by UL and/or FM.
- 8.8.10 Check valve shall be butterfly wafer style, iron body, rubber seal 175 psi working pressure rating. Valve shall be tested and listed by UL and/or FM.
- 8.8.11 Fire Department connection shall be 4" x 2½" x 2½" Siamese connection, brass body, brass chain and plugs, and brass escutcheon letter "AUTOMATIC SPRINKLER" for sprinkler system, and/or "STANDPIPE" for standpipe system. Inlet threading shall be National Standard, same as municipal fire department connection shall be tested and listed by UL and/or FM and 175 psi rating.
- 8.8.12 Valve for main riser drain shall be angle type or globe type, bronze body, screwed, 175 psi working pressure rating, 2" size and a renewable composition soft disc.
- 8.8.13 Valve for auxiliary drain and inspector's test connection shall be globe type, bronze body, screwed, 175 psi working pressure rating, 1" size and a renewable composition disc.
- 8.8.14 At each location where called for on plans or where required by the fire department, provides an approved retard-type electric flow alarm switch. Provide alarm bell as required. Flow alarm switch shall have extra set of contacts for extension by others to central alarm panel.
- 8.8.15 Interior bell or horn shall be 24 VDC. Horn or bell shall be tested and listed by UL and/or FM. (Shall be supplied by the Electrical Contractor).
- 8.8.16 Flow switch shall be vane type, 24 DC. Flow switch shall be tested and listed by UL and/or FM.
- 8.8.17 Butterfly valve with tamper switch shall be tested and listed by UL and/or FM.

- 8.8.18 Valves for the fire hose stations shall be angle type, pressure restricting type 1½" female iron pipe threads, rough brass male NST threads, polished brass, chromium plated. Valve shall be tested and listed by UL and/or FM.
- 8.8.19 Cabinet for fire hose shall be recessed, 16-gauge body, aluminum door trim. Cabinet shall be designed for 100 feet hose pin rack and fire extinguisher. Door shall be full panel glass. Cabinet finish shall be baked white enamel inside with "Fire Red" coat inside. Cabinet may be locally made of approved quality.
- 8.8.20 Pin rack for the fire hose station cabinet shall be semi-automatic, baked red enamel finish, designed for 100 feet of 1½" hose, and furnished with 1½" chrome plated brass rack nipple.
- 8.8.21 Fire hose for fire hose station shall be 100 feet of 1½" cotton single jacket, rubber lined hose with wax and gum treatment. Hose couplings shall be 1½" chrome plated male-female National Standard hose threads. Fire hose and couplings shall be approved by UL and/or FM.
- 8.8.22 Nozzle for fire hose station shall be 1½" adjustable capable of complete shut-off, solid straight stream or any degree of solid conical fog with chrome plate. Threads shall be National Standard hose threads. Nozzle shall be approved by UL and/or FM.
- 8.8.23 Provide 1½" spanner to each FHC cabinet.
- 8.8.24 Furnish and install one (1) each – 10 lbs. capacity HCFC multi-purpose type portable fire extinguisher UL-listed and Factory Mutual approved to each fire hose cabinet.

8.9 IDENTIFICATION SIGNS

The drain, alarm test valves, etc. shall have standard identification signs, painted fire red with white lettering. The signs shall be attached to the valve in a conspicuous position.

8.10 SPRINKLER HEADS

- 8.10.0 Sprinkler heads shall be 1½" NPT, chrome finish, pendent, upright and horizontal sidewall. Sprinklers in the areas with suspended ceiling shall have escutcheon plates of the same finish as the textures of the ceiling boards. Sprinklers shall be tested and listed by UL and/or FM.
- 8.10.1 Furnish the Owner a steel enameled box housing for the space heads and a sprinkler wrench as shown in the plans.

8.11 FIRE PUMP

- 8.11.0 Fire Pump Assembly: Furnish and install fire pumps as shown on plans. One (1) Underwriters Laboratory Inc. approved fire service pump. The Fire pump at the Basement Floor shall be electric motor-driven with automatic controllers, and one (1) jockey pump complete with motors, motor starters, controls, fittings and other appurtenances necessary to complete the equipment installation in each respect.
- 8.11.1 Pumps shall be connected as shown in the drawings. Complete installation shall be in accordance with the requirements and meeting the approval of the NFPA 20, Philippine Insurance Rating Association (PIRA) and Fire Department.
- 8.11.2 The fire pumps to be installed at the Basement Floor level shall be as follows:

Fire Pump – One (1) unit Fire Pump shall be vertical turbine. Capacity and electrical supply shall be as per equipment schedule.

Pump shall be furnished with the following standard accessories:

- a) Main Relief Valve 3", flanged type, UL/FM listed for the 500 GPM pumps.
- b) 2" air release valve
- c) "GERAND" water flow meter, rated at 750GPM

- d) Discharge gauge (0-300psi), 3 1/2" face dial
- e) Enclosed waste cone with sight glass
- f) Discharge concentric reducer

The pump should deliver not less than 150% of rated capacity at a pressure not less than 65% of rated head. The shut-off pressure shall not exceed 140% of rated pressure

The pump shall be provided with suction bowls. Column, basket strainer, discharge head and an electric motor with hollow shaft with sufficient horsepower to drive the pump.

One (1) set fire ump controller with pressure recorder and shall reduce voltage primary resistor or Wye-Delta type starter, UL/FM listed.

- 8.11.3 Jockey Pump: One (1) unit jockey pump shall be centrifugal type, submersible. Capacity and electrical supply as per equipment schedule.
- 8.11.4 Drive: For the jockey pump, the motor horsepower rating shall be in accordance with the manufacturer's requirements. The motor shall be of such capacity that 115% of the full load ampere rating shall not exceed at any given condition of pump load.
- 8.11.5 The pump manufacturer shall provide the services of a qualified Engineer to advice the Contractor on the proper installation of equipment make necessary mechanical adjustments and align fire pump flexible couplings. Pump manufacturer shall pay the test fees, shall arrange and conduct final field acceptance test and provide all required test equipment.
- 8.11.6 One (1) set controller equipment: The fire ump control equipment shall be completely wired and tested at the factory and shall be specifically designed for fire pump purposes. Control equipment with all components shall be UL/FM listed and approved equipment, reduce voltage wye-delta type open transition or primary resistor type.
- 8.11.7 The Sprinkler Contractor shall provide and install the necessary electrical wiring in conduits. Controls from a power supply box to be provided inside the pump machine room to the fire pumps controller, to the equipment.

8.12 AUTOMATIC SPRINKLER AND STANDPIPE SYSTEM

- 8.12.0 The interior surfaces of all piping and equipment shall be clean and free of all dirt. Loose scale, rust and other foreign materials before installation.
- 8.12.1 Pipe ends shall be reamed to remove all burrs and pipe sections shall be cleaned inside to remove all chips and foreign materials prior to making up joints. Approved joint compound shall be applied to the threads of the pipe and not in the fitting when making up joints. Pipe shall not exceed into the waterway of the fitting.
- 8.12.2 Sprinkler heads installed where they may be exposed or subjected to mechanical damage shall be furnished complete with head guards.
- 8.12.3 When welding pipe on jobsite, the fire hazard of the welding process shall be with suitable safeguards. Weld in place of pipe and fittings shall not be allowed at the jobsite. Only shop weld fabrication will be permitted with factory made fittings. Mitered weld will not be permitted. Intersection of feed main and cross main pipe shall be provided with flanged or Victaulic type fittings.
- 8.12.4 Pipe passing through the building walls and floors above grade shall be provided with sleeves of standard weight galvanized steel pipe and shall be installed prior to concreting works of the Civil Contractor. The annular spaces between pipe and sleeves shall be packed tight with insulation fire resistant materials. Provide chrome plated escutcheon plates enough to cover the pipe sleeves. Sleeves shall be sized as follows:

1" pipe-2" ID Sleeve

1 ¼"	pipe-2"	ID Sleeve
1 ½"	pipe-2 1/2"	ID Sleeve
2"	pipe-3"	ID Sleeve
2 ½"	pipe-4"	ID Sleeve
3"	pipe-5"	ID Sleeve
4"	pipe-6"	ID Sleeve
6"	pipe-8"	ID Sleeve
8"	pipe-10"	ID Sleeve

8.13 PIPE SUPPORTS

- 8.13.0 All piping shall be supported by means of hangers of approved quality, capable of supporting load. Sizing, spacing and installation shall be in accordance with national Fire Protection Association Standard No. 13, "Sprinkler Systems", except as otherwise shown on drawings or specified herein.
- 8.13.1 The Fire Protection Contractor shall furnish and install the required sprinkler pipe seismic sway bracing for the risers, feed main pipe and cross main pipe all in accordance with tables and figures shown NFPA-13 requirements for the protection of the piping against breakage due to seismic earthquake movement.
- 8.13.2 No cutting, drilling, welding or burning of any structural steel member shall be allowed. Power driven studs and welding studs shall not be allowed.
- 8.13.3 All bolts and threaded rods shall be used with double nut and washer and lock washer wherever a single unsecured nut could work loose and allow either threaded rod or supported piping to drop.

8.14 TESTS AND INSPECTIONS

- 8.14.0 The Fire Protection Contractor shall conduct and bear the costs of all necessary tests of the fire protection work, furnishing all labor, power and equipment. All piping shall be tested with water and test witnessed by representatives of the Architect/Engineer and the Owner.
- 8.14.1 The fire protection piping shall be tested under a hydrostatic pressure of not less the 200lbs. PSIG, for a duration of not less than two (2) hours or at 50 lbs. psi in excess of the maximum static pressure when the maximum pressure is in excess of 150 lbs. psi.
- 8.14.2 The piping subjected to the hydrostatic test shall be filled with water and thoroughly checked for the elimination of all air. The control valves shall be closed during pressure testing. All joints shall be proven tight or acceptable by the test. Defective work or materials shall be corrected or replaced in approved manner. If necessary, piping shall be dismantled and re-assembled with the use of new pipe or fittings as no caulking or makeshift method of temporary repair of defective work will be permitted. Test shall be repeated until the particular line or system receives the approval of the representatives of the Architect/Engineer.
- 8.14.3 Acceptance of the automatic sprinkler work shall be based upon the inspection and tests of the completed installation by representatives of the local fire department, Architect, Engineer, PIRA and the Owner.

IX AIR CONDITIONING AND VENTILATING SYSTEM

9.0 GENERAL REQUIREMENTS

9.0.0 Standards Compliance

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- a. Philippine Society of Mechanical Engineers Code
- b. Philippine National Building Code
- c. Philippine Electrical Code
- d. Philippine Plumbing Code
- e. Fire Code of the Philippines
- f. American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
- g. Sheet Metal and Air Conditioning Contractors National Association (SMACNA)
- h. National Fire Protection Association
- g. American Society of Testing Materials (ASTM)
- h. Air Moving and Conditioning Association (AMCA)g
- i. American National Standard Institute (ANSI)
- j. National Electrical Manufacturing Association (NEMA)
- k. Underwriters Laboratory
- l. American Society of Mechanical Engineers (ASME)

9.0.1 Scope of Work

- a. Supply and Installation of Equipment and Materials. Complete.
- b. Supply and installation of pipes and fittings, valves and appurtenances, ducts, miscellaneous and consumables.
- c. Fabrication and installation of hangers and supports.
- d. Supply and installation of control, wiring from Split-Type Air-conditioner to circuit breakers and others to complete the control system.
- e. Testing, adjusting, balancing and commissioning.
- f. Provide shop drawings and two (2) sets of "As-Built" plans
- g. Furnishing of written one (1) year warranty of ventilation and air-conditioning system

9.0.2 Submittals

- a. Within fifteen (15) days after award of contract, the mechanical contractor shall submit for engineer's approval, four (4) copies of all complete list of manufacturer's name of all materials he proposes to use.
- b. After approval of the above list and before purchase of any equipment or materials, the mechanical contractor shall submit to the engineer for approval, four (4) complete sets of detailed information consisting of manufacturer's bulletins, shop drawings and partial list of materials to be provided under this contract.
- c. The mechanical contractor shall assume the loss of and the entire responsibility of any change in the work as shown in the contract drawings which may be occasioned by approval of materials other than those specified.

9.1 PRODUCTS

9.1.0 AIR COOLED CONDENSING U NITS

9.1.0.0 Units shall have capacity and configuration as shown on the drawings and as manufactured by a reputable manufacturer. All units shall be furnished factory assembled, tested and piped complete with compressors, fan, motors, integrally wired control panel, starters, spring type vibration isolators, steel base and refrigerant control accessories. Unit shall have gauge corrosion protected weatherproof casing.

9.1.0.1 Compressors for units with capabilities of up to 35160 watts and above shall be of semi-hermetic type and rated to operate at not more than 1750 RPM at full load. Compressors for units with capabilities of 26375 watts and below shall be of the hermetic type and rated to operate at not more than 3500 RPM at full load.

9.1.0.2 Condenser coils shall be seamless copper with mechanically bonded aluminum plate fins. Coil size, refrigerant circuiting and number of rows deep shall be compatible with the compressor displacement and capacity at the specified operating conditions with minimum refrigerant pressure drop.

9.1.0.3 Condenser fans shall be statically and dynamically balanced propeller-type fans directly driven by totally enclosed and inherently protected motors.

9.1.0.4 Motor starters, control components and power terminal shall be grouped in an accessible control box inside the unit casing. Electrical components shall be pre-wired and control circuits shall be independently protected with fuses or breakers. Compressor protection shall include automatic relays to prevent excessive compressor short cycling.

9.1.0.5 A complete charge of refrigerant 410A and compressor oil shall be furnished.

9.1.1 FAN COIL UNITS

9.1.1.0 Units shall either be of the floor-mounted or the ceiling-mounted, free blow type and/or ducted type as shown on the drawings.

9.1.1.1 Units shall have capacities at the operating conditions specified. They shall include an evaporator coil, expansion valve, centrifugal type air circulation blower, permanent type air filter, condensate drip pan and insulated decorative cabinet with discharge plenum, supply and return air grilles.

9.1.1.2 Fan motors shall be equipped with overload protection. They shall have fan switch and thermostat mounted on the unit.

9.1.2 CEILING-MOUNTED TYPE FANS

9.1.2.0 Units shall be ceiling-mounted type, direct driven and equipped with reverse flow prevention damper.

9.1.2.1 It shall have one-touch spring type louver for ease of cleaning and maintenance.

9.1.2.2 Fan casing shall be seam-welded and finished with corrosion resistant paint.

9.1.2.3 Fan shall have capacity and motor size as indicated in the plans.

9.1.3 PROPELLER EXHAUST FANS

9.1.3.0 Units shall be propeller type, suitable for wall mounting, direct-driven and equipped with gravity shutters.

9.1.3.1 It shall have wall mounting collar and fan guard.

9.1.3.2 Units shall have statically and dynamically balanced propeller set on a deep venture orifice. Unit shall be designed for continuous operation and shall be permanently lubricated. Inherent motor overload protection shall be provided.

9.1.3.3 Unit shall be epoxy-coated and finished with corrosion resistant paint.

9.1.3.4 Fans shall have capacity speed and motor size as indicated on the plans.

9.1.3.5 Fans shall be provided with a remote selector switch.

9.1.4 EXHAUST BLOWER

9.1.4.0 Furnish and install supply exhaust blowers as shown and as indicated on the drawings, complete with motors, belt sheaves vibration isolators.

9.2 BASIC MATERIALS AND METHODS

9.2.0 REFRIGERANT PIPING

9.2.0.0 Refrigerant piping shall be type L hard drawn seamless copper, suitable for a working pressure of 2,413 KPa. Fitting shall be wrought copper or brass designed for use with high temperature solder and suitable for a working pressure of not less than 2,413. Joints from soldered to threaded joints shall be made with standard adapter fittings using high temperature solder.

9.2.0.1 Pipes or tubings shall be cut accurately to measurements established at the building lines. All piping shall be laid straight and no pipe shall be laid against other metal without insulation. After cutting, the tubing shall be reamed, all burrs removed and the internal surfaces thoroughly cleaned. While soldering pipes and fittings together, a continuous flow of inert nitrogen gas must be applied to sweep the internal surface of the tubing to avoid the formation of oxide inside.

9.2.0.2 Condensate drain piping shall be of galvanized iron sh. 40 pipes and sized to liberally dispose of the condensate to the nearest floor drain. A P-trap without cleanout plugs shall be provided at the outlet for every drain.

9.2.0.3 Pipe supports and hangers shall be provided and fabricated in a workmanship manner out of steel angles, rods and flat bars. Metal to metal contact between pipes and hangers must be avoided by providing a 3mm thick rubber in between.

9.2.0.4 Supports on horizontal lines shall be spaced at not more than 1.80 meters on center. All piping must be properly anchored so that no stress is placed on equipment connection by expansion.

9.2.0.5 Pipe sleeves shall be of standard pipes with sufficient diameter to provide a minimum clearance of 6mm around the pipe and in case of insulated pipe, approximately 6mm around the insulation. Pipes should not be permitted to pass through the bearing walls, beams or columns.

9.2.0.6 Refrigerant pipes sizes shown on the drawings are for guide purposes only. Contractor is advised to confirm with the equipment supplier the required pipe sleeves for the units prior to installation at the jobsite.

9.3 AIR CONDITIONING CONTROL SYSTEM

9.3.0 Operation of the air conditioning system shall be fully automatic. They shall be capable of maintaining at full or partial loads inside conditions of 25 C.D.B. (plus or minus 1.11°C) and 50% relative humidity (plus or minus 5% RH). Room thermostat shall control the operation of the compression through relays.

9.3.1 The controls shall be wired in such a way that whenever a condensing unit is in operation, the fan coil unit or air handling unit is also in operation.

9.3.2 The compressor crankcase heater must be of such capacity as to provide sufficient heat to the oil in the crankcase during the inoperative periods so that the serious oil foaming and slugging shall be prevented. The heater must be automatically energized whenever compressor operation stops and de-energized when the compressor starts.

9.4 REFRIGERANT VALVES AND ACCESSORIES

- 9.4.0 Refrigerant valves shall be installed in the suction and discharge lines adjacent to the compressor and on the liquid line discharge side of the condenser. The valves should be wrought copper or brass for use with R-410A and suitable for a working pressure of 2,413 KPa.
- 9.4.1 Thermostatic expansion valves of the proper capacity shall be installed in the refrigerant supply line to the evaporator. They shall be of the diaphragm type, externally equalized and must be of such optimum size as to maintain a full active evaporator under all conditions and yet reduce the possibility of flooding the refrigerant to the compressors during part load conditions.
- 9.4.2 Solenoid valves shall be installed on units with capacities of 26,375 watts and above and shall be designed for the operating pressure of the system. Valve capacities shall be based on a pressure drop across them not exceeding 20 KPa.
- 9.4.3 Dehydrators in combination with strainers shall be installed in the refrigerant line on the inlet side of the thermostatic expansion and solenoid valves. They shall have brass or copper bodies designed for a working pressure of 2,413 KPa.
- 9.4.4 Sight glasses shall be a combination of liquid and moisture indicators and shall be installed in the refrigerant to indicate whether or not the systems are properly charged and whether or not refrigerant in the system is dry.

9.5 REFRIGERANT PIPE INSULATION

- 9.5.0 Refrigerant piping insulation shall be applied on all refrigerant suction and condensate drain lines. Insulation material shall be flexible elastomeric pipe insulation 25mm thk. Joints shall be sealed with appropriate contact adhesive. Pipes installed outdoor shall be provided with Ga.26 aluminum cladding.

9.6 ELECTRICAL MATERIALS

9.6.0 ELECTRIC MOTORS

- 9.6.0.0 All motors shall operate at speed and electrical characteristics specified. They shall be guaranteed to operate at rated out-put with plus or minus ten (10) percent voltage variation at their terminals.
- 9.6.0.1 Motors 750 watts and above shall be 3-phase squirrel cage induction type, constant speed. Motors 560 watts and below shall be single-phase capacitor start induction run, or split type or shaded pole type as approved for the service.
- 9.6.0.2 Motor driving indoor equipment shall be of the open drip-proof construction. Motors driving outdoor equipment shall be of the totally enclosed fan cooled construction.
- 9.6.0.3 Motors driving equipment through pulleys and belts shall be provided with belt guards. The belt guards shall be made of heavy wire mesh or expanded metal set in a suitable frame covering the motor pulleys, belt and driving sheaves with access plates for tachometer reading.

9.6.1 MOTOR CONTROLLERS

- 9.6.1.0 All motor starters shall be of magnetic type complete with overload and relays manufactured in accordance with NEMA standards. Enclosures shall be a suitable for the application
- 9.6.1.1 Starters for motor 3.73 kw and below shall be across the line type. Starters for motor above 3.73 Kw shall be of the reduced voltage type
- 9.6.1.2 Circuit breakers shall operate on the thermal magnetic principle. Aside from serving as disconnecting means, they shall afford protection for motor against phasing circuits faults. They shall be provided with enclosures suitable for the application
- 9.6.1.3 All motors shall be provided with an over and under voltage protection device.

9.6.2 WIRING

- 9.6.2.0 All electrical power and control wiring necessary to be provided by the contractor shall be accomplished in accordance with the requirements of the electrical plans and specifications and shall conform to the Philippine Electrical Code. Wiring system including materials shall also comply with the specifications under the electrical division of the project

9.6.3 ELECTRICAL INTERLOCKS

- 9.6.3.0 For motors requiring electrical interlocks, remote control or sequence starting control features, starters shall be equipped with necessary auxiliary contacts or terminals to provide the control feature required. A separate set of terminal is required for each control circuit. Such starter shall be provided with "man-off-auto" selection switches. Other starters shall have a start-stop push buttons mounted in covers.
- 9.6.3.1 Except where otherwise specified, enclosure shall be sheet metal with hinged cover, NEMA type 1 for the general purpose indoor application. Starters shall be arranged for floor or wall mounting as shown or as indicated.
- 9.6.3.2 Pilot light shall be provided for all starters where the equipment is not visible from the starter and for all remote control stations.
- 9.6.3.3 Where possible, relays and switches that are not part of the automatic control system shall be mounted on the same panel as the corresponding motor starter. All supports for the stating equipment shall be furnished and installed by the A/C contractor.
- 9.6.3.4 This contractor shall furnish detailed wiring diagram to those installing the electrical wire and furnish all information necessary to assure the proper connection, operation and control of motorized equipment including interlocks, automatic and safety control auxiliary circuit

9.6.4 PAINTING AND FINISHING

- 9.6.4.0 Pipe hangers, duct hangers, uninsulated piping and other ferrous metal work that have not received factory painting shall be thoroughly cleaned and given two (2) coats of rust preventive paint.

9.7 EXECUTION

9.7.0 EQUIPMENT

- 9.7.0.0 Install all equipment as indicated and in accordance with the manufacturer's instructions. Provide clearance for inspection, repair, replacement and service. Provide conduits for wirings. Equip motors with unfused safety switches and overload protection in the operating disconnects switches and magnetic starters. Schedule and administer specified test

9.7.1 PIPING SYSTEM

- 9.7.1.0 Install piping and piping components to ensure proper and efficient operation of the equipment and controls. Proper supports for the mounting of vibration isolators, stands, guides, anchors, clamps and brackets shall be provided. Piping connections to equipment shall; be arranged so that removal or equipment can be accomplished with the least amount of disassembly or removal of the piping system. Allow sufficient pitch to ensure adequate drainage and venting. Hydrotest the piping system and conduct testing, adjusting and balancing of water flow to ensure efficient system performance

9.8 GUARANTEE AND SERVICE

- 9.8.0 The air conditioning and ventilating system equipment and accessories furnished and installed under this part of the specifications shall be guaranteed for a period of one (1) year from the date of acceptance thereof, and materials and equipment furnished shall be free from any defects in the materials, workmanship and design.

- 9.8.1 At any time within one year after the acceptance and upon proper notice, the contractor shall rectify any and all deficiencies including replacements of parts or the entire units without additional cost of the owner, if such deficiencies have been caused directly or indirectly by inferior materials, faulty workmanship and/or defective design or parts.
- 9.8.2 Expendable items such as oil, refrigerant, belts, filters, etc. are included in this one-year guarantee. During the guarantee period, the contractor shall perform free monthly inspection and service and make adjustments if necessary for the proper and efficient operation of the system

X PLUMBING

GENERAL

10.0 DESCRIPTION

10.0.0 Applicable provisions of General Conditions govern work under this section.

- 10.0.0.0 All fittings, connections and piping embedded in concrete shall be subject to inspection by the Architect and/or his representative before covering and/or completion.
- 10.0.0.1 The contractor shall provide all items, articles, materials, operations or methods listed, mentioned or scheduled on the drawings and/or herein, including labor, materials and incidentals necessary and required for their completion.
- 10.0.0.2 The contract drawings and specifications are complementary to each other, and any labor or materials called for by either, whether or not called for by both, if necessary, for the successful operation of any of the particular type of equipment furnished and installed will be without additional cost to the owner.
- 10.0.0.3 *Intent: It is not intended that the drawings shall show every pipe fitting. All such items, whether specifically mentioned or not, or indicated in the drawings shall be furnished and installed, if necessary to complete the system in accordance with the best practice of the plumbing trade and to the satisfaction of the engineer and the owner.*
- 10.0.0.4 The plumbing contractor is required to refer to all architectural, structural and electrical plans and specifications and shall investigate all possible interferences and conditions affecting his work.

10.1 SCOPE OF WORK

Work included under this section of this specification consists of furnishing all labor, tools and equipment, appliances and materials necessary for complete installation, testing and operation of the storm drainage system in accordance with the contract.

- a. Arrange for, obtain and bear the cost of necessary permits, bonds and fees, private or government shall be paid by the contractor.
- b. Supply and installation of Sanitary lines of the Building.
- c. Supply and Installation of waterlines of the Building.
- d. Storm drainage system and connection to the nearest storm drainage outlets.
- e. Supply and installation of Transfer pumps and Overhead Tanks.
- f. Supply and Installation of Plumbing fixtures.

- g. The contractor shall provide all necessary shop drawings and two (2) sets of As-Built Plans.
- h. Excavation and backfilling in connection with the work shall be included.
- i. Furnishing of written one (1) year warranty of the plumbing system

10.2 SUBMITTALS

- 10.2.0 Within fifteen (15) days after award of contract, the contractor shall submit for engineer's approval, four (4) copies of all complete list of manufacturer's name of all materials he proposes to use.
- 10.2.1 After approval of the above list and before purchase of any materials, the contractor shall submit to the engineer for approval, four (4) complete sets of detailed information consisting of manufacturer's bulletins, shop drawings and partial list of materials to be provided under this contract.
- 10.2.2 The contractor shall assume the loss of and the entire responsibility of any change in the work as shown in the contract drawings, which may be occasioned by approval of materials other than those specified.

10.3 APPLICABLE CODE AND STANDARD

- 10.3.0 All Storm Drainage works to be done and the sizes of pipes to be used shall be in accordance with the National Plumbing Code and the Plumbing Code of the Philippines.
- 10.3.1 The plumbing contractor shall verify the above paragraphs with each section of the specifications and coordinate his work so that the general contractor will understand clearly the intent of the work to be done.

10.4 PRODUCTS

10.4.0 Description of Materials

All materials to be used shall conform to the standards specified. Use of materials shall be governed by other requirements imposed on other section of these specifications. Materials shall be subject to tests necessary to ascertain their fitness if the engineer so requires.

10.4.1 Alternate Materials

Use of any material not specified in these specifications may be allowed, provided such alternate has been approved by the engineer, and provided further, that a test is required, shall be done by an approved agency in accordance with generally accepted standards.

10.4.2 Identification of Materials

Each length of pipe, fittings, traps, fixtures and devices used in the storm drainage system shall have case, stamped or indelibly marked on it the manufacturer's trademark or name, type and classes of products when so required by the standards mentioned. All materials and equipment mentioned in these specifications, including all incidental items not specifically indicated, but required to complete the contract shall be new and free from defects. If damaged during the course of construction, it shall be repaired or replaced as directed by the Project Manager at no additional cost for the owner.

10.4.3 Pipes and Fittings Schedule

10.4.3.0 Drain, Waste and Vent – shall be unplasticized polyvinyl chloride (uPVC) conforming to ASTM D1784, Crown Pipes or approved equivalent.

10.4.3.1 Storm Drainage Lines – Pipe sizes 250mmØ and above shall be reinforced concrete pipe. Pipe sizes 200mmØ and below shall be non-reinforced concrete pipe.

10.4.3.2 Water lines shall be UPVC pipe, blue sch. 40, push on or solvent type.

10.4.4 Drains

10.4.4.0 Floor drain for genset room shall be ASA 40-9F, pipe size 100mmØ by ASA Metals or approved equal.

10.4.4.1 Area Drain/Catch Basin shall be 140kg/sq. cm. (2000psi) reinforced concrete with GI cutting cover.

10.4.4.2 Site storm drain shall be reinforced concrete for 250mmØ and above, 200mmØ and below shall be concrete pipe.

10.4.5 Valves and Appurtenances

10.4.5.0 Ball valve shall be screwed, bronze, class 150 psi, kitz or approved equal.

10.4.5.1 Check valve shall be screwed, bronze, class 150 psi, kitz or approved equal

10.4.5.2 Pumps (Please refer specifications on plans)

10.4.6 Pipe Sleeves

10.4.6.0 Pipe sleeves shall be installed and properly secured in place at all points where pipes pass through masonry or concrete, except unframed floors on earth.

10.5 EXECUTION

10.5.0 Piping Installation

Piping shall be installed as shown on the drawings, as recommended by the manufacturer and as directed during installation, straight and direct as possible, forming right angles or parallel lines with building walls and other pipes and neatly spaced. Erect pipe risers plumb and true, parallel with walls and other pipes neatly spaced. All piping shall be supported or suspended on stands, clamps, hangers or equivalent or approved design. Supports shall be installed in such a manner to permit pipe free expansion and contraction while minimizing vibration.

10.5.1 Plumbing System Test

The entire system of drains shall be tested. Water test shall be in accordance with the plumbing Code. Every portion of the system shall be tested to a hydrostatic pressure equivalent to at least 10-foot head water for a period of ½ hour before covering. Defects disclosed by the test shall be repaired with new materials at the expense of the contractor.

XI ELECTRICAL WORKS

11.0 WORK INCLUDED

11.0.0 The work to be done under this Division comprises the furnishing of all tools, labor, equipment, fixtures and materials, unless otherwise herein specified, required to complete and leave ready for use the electrical system of the Proposed Construction of Baesa Columbarium, Barangay Baesa, Quezon City in accordance with this specification and accompanying drawings of materials and finishes.

11.0.0 The electrical contractor shall coordinate his work so that the general contractor and all other subcontractors will understand clearly the work to be done. The electrical contractor shall finish all electrical facilities and provision necessary for the installations and operations of other trades such as mechanical, air-conditioning, plumbing, sanitary and others.

11.0.1 All contractors and all companies or persons providing labor, materials or both for this project, are specifically referred to the General Conditions of the specifications, to the general contract plans, to all Divisions of specifications and to the various other contract documents, which may affect the completion of the contract work.

11.1 CODES, INSPECTIONS, PERMITS AND FEES

11.1.0 The work under this contract shall be done according to the requirements of the latest edition of the Philippine Electrical Code, the rules and regulations of the Local Government Authorities of Quezon City and the requirements of Manila Electric Company. Nothing contained in this specification or shown on the drawings shall be construed as conflict with national and local ordinances or laws governing the installation of Electrical Works, and all such laws and ordinances are hereby made part of these specifications. The contractor is required to meet the requirements hereof.

11.1.1 All permits and electrical fees required for this work shall be obtained at the expense of the Contractor. The Contractor shall furnish the Architect or the Owner or the same maybe, a final certificate of electrical inspection and approval from the proper government authorities after completion of the work.

11.2 TEST

11.2.0 The electrical contractor shall apply such test, replace or remedy all defective work and adjust such system as needed or as the Architect or the owner shall direct. He shall also instruct the proper use of the system and equipments to persons designated by the owner

11.3 MEASUREMENTS

11.3.0 The Electrical Contractor shall procure from the Architect detailed drawings of those parts of the work not fully shown on the plans and he shall compare and verify with the Owner. Any lack of agreement shall be submitted at once to the Architect for adjustments.

11.4 SLEEVES AND FORMS FOR OPENINGS

11.4.0 The Electrical Contractor shall provide and places all sleeves, for piping penetrating floors, walls, partitions, etc. He shall locate all necessary slots and openings for his work and it shall be done at such time as not to delay the general contractor of the project.

11.5 LOCATION OF OUTLETS

11.5.1 All Outlets shall be truly centered in panels and spaces provided thereof. Any discrepancy in the outlet location between the electrical plan and architectural plans shall be submitted to the Architect at once, to be verified before outlets are installed.

11.6 GROUNDINGS

11.6.0 If metallic conduits, supports, cabinets and equipment shall be properly grounded and bonded by means of copper straps. The conduits of such system shall be grounded by connecting to the grounding rod.

11.6.0 All ground connections shall have clean outlet surfaces and shall be tinned and sealed while bolting. Unless otherwise specified, ground wire shall be installed in exposed conduits and connections made readily accessible for inspection. Connection shall not be made underground or concealed in floors or walls.

11.7 WIRING METHODS

11.7.0 All wiring shall in general be installed inside standard conduits. All conduits shall run embedded in concrete, underground but in concrete envelope, embedded in hollow blocks partition, concrete slab, walls and roof above, between double wall wooden partitions if any, where the installation of concealed and/or embedded conduit wiring may be used, but only upon approval of the Owner's authorities concerned. Exposed conduits shall be Intermediate Metal Conduits unless otherwise specified.

11.8 GUARANTEE

11.8.0 The Electrical Contractor shall guarantee his work for a period of one (1) year from the date of final acceptance by the owner except for particulars items specifically mentioned in these specifications.

- 11.8.1 The Electrical Contractor shall, without additional compensation for the period specified, replace any work materials or equipment furnished and installed by him under this contract, which develop defects except from ordinary wear and tear.

11.9 MATERIALS

- 11.9.0 All materials shall be new and shall conform to the standards directed of Designer Engineer/Architect.
- 11.9.0 All materials on all systems shall comply with the following specifications unless specified and all materials not specified shall be of the best of their respective kind.
- 11.9.1 Materials sample shall be submitted for approval as required by the Architect and Electrical Engineer.

11.10 WIRES

- 11.10.0 All wires shall be copper, soft drawn and annealed, shall be 98% conductivity or better, shall be smooth and true of a cylindrical form and shall be within the actual size called for.
- 11.10.1 All wires and cables shall comply with the requirements of the *Underwriter's Laboratories Inc.*, the ASTM and the IPCEA as to their particular usage.
- 11.10.2 Wires and cables for outdoor and indoor lighting and power system shall be moisture and Heat Resistant Thermoplastic insulated for 600volts working pressure type THHN unless otherwise noted on the plans or specified.
- 11.10.3 For lighting and power system, no wire smaller than 3.5mm² shall be used except for control leads/ grounding wire.
- 11.10.4 All wires and cables shall be manufactured by manufacturing company acceptable to the Electrical Engineer of the owner.

11.11 CONDUITS

- 11.11.0 The conduit system shall consist of the following

Intermediate Metal Conduit (IMC) & Electrical Metallic Tubing (EMT)

They shall be of standard sizes and weight, mild steel hot dipped galvanized with inside enamel or epoxy coating, acceptable to the Electrical Engineer of the Owner.

Polyvinyl Chloride Conduit (PVC)

They shall be of standard size and weight, made of polyvinyl chloride, extruded, heavy wall, rated for 90-degree centigrade cable, schedule 40.

Limitations of use shall be as follows:

- a. As per requirement of the latest edition of PEC and/or NEC.
 - b. Not permitted where subject to mechanical damage.
- 11.11.1 All conduits shall be of true cylindrical form and shall be within the actual size called for.
- 11.11.2 No conduits shall be used in any system smaller than 15-mm electrical trade size, not shall have more than four 90 degrees bend in any one run, and where necessary, hand hole and pull boxes shall be provided.
- 11.11.3 No wires shall be pulled in any conduit until the conduit system is complete in all details, in case of underground work, until concrete envelope or masonry has been completed in every detail. In case of concealed work, until rough plastering has been completed.

- 11.11.4 The ends of all conduits shall be tightly plugged to exclude plaster dust sand and soil including moisture while the renovation of the perimeter is in the process.

11.12 OUTLET BOXES AND FITTINGS

- 11.12.0 At all outlets of every kind, for all systems, there shall be provided a suitable fittings which shall be either a box or other device especially designed to receive the type of fitting to be mounted thereon.
- 11.12.1 The Contractor shall consult with the Electrical Engineer as to the nature of various fittings to be used before installing his outlet fittings and shall conform strictly in the use of fittings so that the work when completed will be finished design.
- 11.12.2 In case of lamp post, the outlet of fittings shall be provided with suitable fixtures supports or a support of a size and a kind required by the fixture to be erected.

11.13 SWITCHES

- 11.13.0 Local lighting switches shall be flush type, heavy duty, 15- ampere size 250 volts, bakelite case, quick connect terminal. Outdoor lights shall be automatically operated by means of photo switch and manual selection. Or it might be a manual switch by means of breaker switch inside the lighting panel.

11.14 RECEPTACLES

- 11.14.0 Standard receptacles shall be 15- ampere size 250volts, parallel slots, duplex, flush mounted composition case, side wired with the insulated mounting yoke. If weatherproof wall plate is required, standard factory made metal waterproof plate.

11.15 PLATES

- 11.15.0 All switches and receptacles plates shall be bakelite plastic, ivory-colored or as directed by the Architect.

11.16 SWITCH GEAR, PANEL BOARDS AND CABINETS

- 11.16.0 Panel boards for outdoor lightings shall conform as indicated in the drawings with respect to supply characteristics, rating of main lug or main circuit breaker, main magnetic contactor, number and sizes of branch circuit breakers. All should have factory-wired control wirings with terminal block connection for external leads.
- 11.16.1 Lighting and power panel board either wall mounted or free standing shall consist of a factory complete dead front assembly of back plan, main busses, overcurrent and switching units, sheet metal cabinet and trim. Cabinet shall be fabricated from code gauge galvanized sheet metal with cover capped and fastened.
- 11.16.2 Panel boards and trim shall be suitable for the type of mounting shown on the drawings. The inside and outside of the panel boards cabinet and trim shall be factory painted and having two (2) coats of rust proof prime coat and one finish shop of gray enamel paint.
- 11.16.3 All cabinets and enclosure shall be general purpose, NEMA type 1 for indoor installation. Except where specifically noted on plans for outdoor use shall be rain tight and dust type NEMA 4X type enclosure.
- 11.16.4 All circuit breakers with frame size above 100AT shall have minimum interrupting capacity of 22 KAIC at 230 volts and frame size 100AT and below shall have minimum interrupting capacity of 18 KAIC at 230 volts. All circuit breakers shall be molded case, bolt on type with thermal magnetic trip elements. Number of poles, trip coil rating and frame size shall be as indicated on plans. All circuit breakers.
- 11.16.5 Switchgear main circuit breaker shall be stationary type, programmable trip device, an electronic relay that employs microprocessors-based technology. Functions to overload protection, short circuit protection, with selectivity,

Instantaneous short circuit protection with adjustment and ground fault protection.

- 11.16.6 Cardholder on inside of door with clear plastic cover and complete typewritten schedule of panel branch circuit shall be provided. Leave spare circuit blank.
- 11.16.7 Local panel boards and switchgear.
- 11.16.8 Submit samples and or product description of panel board to be used for approval prior to ordering and installation.

11.17 ELECTRIC SERVICE

- 11.17.0 The electric service shall be three (3)-phase, 4 wire, 230volts, 60 hertz. The sizes of service entrance conductor and conduit are shown in the plans.
- 11.17.1 The electrical contractor shall inspect the site, consult with *MERALCO* and check the orientation of the proposed service entrance before commencing work to avoid field problems.

11.18 LIGHTING SYSTEM

- 11.18.0 The lighting system shall be complete in every respect as indicated on the electrical plans or as specified in the Architectural plans. Exact fixture location shall be determined.
- 11.18.1 All wiring shall be installed in conduits, and in general shall be concealed. Buried underground in concrete encasement and/or embedded in concrete.
- 11.18.2 Mounting height of devices shall be as indicated in the plans and/or subject to Architect's approval prior to installations as follows
 - Local switches - 1.4 above finish floor line
 - Receptacles - 0.3 above finish floor line

11.19 DISTRIBUTION FEEDERS

- 11.19.0 Distribution voltage shall be 230volts, three (3)-phase, 4 wire. Feeder conductors and raceway shall be installed as shown on drawings and no change in size shall be made without the written consent of the Architect. Feeder conductors shall be continuous, and without splices between terminals. When feeders are run in multiple, they shall be exactly of the same length to avoid unbalanced division of the current.


11.20 CONNECTORS AND INSULATION

- 11.20.0 Use solderless mechanical pressure type lugs, copper connectors for splicing wires greater than no 8mm.sq. All splices shall be properly insulated using #M brand rubber tape and plastic electrical tape. Application of tapes shall be equivalent to the insulation of wire concerned, edges to provide smooth surfaces before taping.

11.21 BRANCH CIRCUITS

- 11.21.0 The drawings indicate the general methods of installation of all circuit wirings and the power lighting outlets which are to be supplied from this circuit. Branch circuit raceways shall be run from outlets to panel boards as direct as the ground and level condition will allow. Circuit allocations shall be as indicated on the drawings. Where it becomes necessary to connect any outlet to the circuit other than the one shown on the drawings, this shall be done without extra charge and only upon written consent of the Architect. No wire smaller than 3.5mm sq. shall be used for any lighting or power branch circuit. All lighting outlet shall be supplied from 2-wire single phase circuits. Number of wires for other outlets shall be as indicated on the drawings.

11.22 MOTOR CONNECTIONS

- 11.22.0 Connect the motor starting devices for  motors, except where otherwise specifically provided for under other contracts. Furnish all necessary connections between controllers and motors in conduit, and leave motor ready to start. The power supply leads to the motor from the controller shall be the same as the feeder indicated on the drawings, except for six terminal lead motor where wye-delta starting method is being applied.
- 11.22.1 Other trades, i.e. mechanical contractor, except as otherwise noted or specified will supply and deliver all controllers and shall erect and connect up safe complete.
- 11.22.2 The Electrical Contractor or trade people shall be held responsible as far as power supply to the controller is concerned. He shall ascertain the exact location of the motor controller and motors from other trades before installing the circuit work.

11.23 RECORD DRAWINGS AND AS BUILT PLANS

- 11.23.0 The Electrical Contractor shall keep an active record of the actual installation works during the progress job. The shall become the reference for the preparation of the As-Built Plans which shall include all pertinent information, complete in all aspects of the actual installations, all new information not originally shown in the contract drawings. The As-Built Plans shall be prepared by the Electrical Contractor at his expense and shall be submitted to the Architect and the Engineer for approval upon the completion of the work. The approval of the As-Built drawings shall be a pre-requisite for the final acceptance of the electrical works.
- 11.23.1 Two (2) copies of the As-Built drawings, signed and sealed by the Electrical Contractor's Professional Electrical Engineer, shall be submitted to the Architect and Engineer consultants. Original tracing/ reproducible copy shall also be submitted.

Note: *In contrast between these Technical Specifications and the approved Plans issued to the Contractor, the approved Plans shall prevail. See also the approved program of works. In case of doubt, for clearer outlooks consult the assigned Architect/Engineer.*

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Republic of the Philippines
Quezon City
Office of the City Mayor
QUEZON CITY BIDS & AWARDS COMMITTEE
(QC-BAC-INFRA)



PROJECT : PROPOSED CONSTRUCTION OF BAESA COLUMBARIUM WITH LAND DEVELOPMENT (PUBLIC TOILET WITH PUMP HOUSE)

LOCATION : Barangay Baesa, Quezon City

SUBJECT : GENERAL CONDITIONS AND TECHNICAL SPECIFICATIONS

I. GENERAL CONDITIONS

1.01 DEFINITIONS

- a. **OWNER :** LOCAL GOVERNMENT OF QUEZON CITY
- b. **CONTRACTOR :** Any individual, firm, corporation, partnership or association that enters into an agreement with the Owner for furnishing the materials and/or labor, tools, equipment, plant and other facilities required for the erection and completion of the project subject to the accompanying plans and working drawings.
- c. The Owner/Implementing Agency and the Contractor are treated through the contract documents as if each were of the regular number, masculine gender.

1.02 EXAMINATION OF MEMBER

The Contractor shall carefully examine the premises before submitting any bids to enable him to have full knowledge of conditions existing therein.

1.03 LOCATION

The Proposed Construction of Baesa Columbarium with Land Development (Public Toilet with pump house) is to be constructed at Barangay Baesa, Quezon City.

1.04 EXECUTION, CORRELATION & INTENT OF DOCUMENTS

- 1. The Contract Documents are signed in sufficient number of copies by all parties concerned. In case anybody fails to sign copies of any item forming part of the set contract documents, the Implementing Agency's identification thereon shall suffice.
- 2. The items, specifications and all other documents forming the contract documents are complementary. Anything shown on plans but not mentioned in the specifications or vice versa or anything not expressly set forth in either, but necessarily implied, shall be furnished or done as if specifically shown and mentioned in both, with no extra charge. Where dimensions are given in figures, follow them in preference to measurement by scale.
- 3. Execute work as per agreement, making no changes or deviations whatsoever, without prior permission from the Implementing Agency.

4. The Contractor shall verify and check all dimensions particularly those on the plans. He will be held directly responsible in case of any discrepancy that may be discovered during the progress of work.

1.05 DETAIL DRAWINGS AND INSTRUCTIONS

Plans furnished for use at the jobsite are whenever necessary, supplemented by detail drawings and instructions essential to the proper execution of the work. Such supplementary detail drawings and instructions shall be treated as of equal force as though originally issued.

1.06 PLANS AND PROJECT SITE

Keep at project site, in good order and condition, one (1) set of approved plans, specifications, supplementary detail drawings and instructions.

1.07 SHOP DRAWINGS

Shop drawings shall be provided by the Implementing Agency and/or Contractor during the progress of construction. The contractor should not place any item subject to shop drawings until the Implementing Agency shall have duly approved such drawings.

1.08 CHANGES

The Owner and the Implementing Agency reserve the right to make alterations or additions, including changes during the progress of work. The same shall be carried into effect without in any way deviating from or violating any agreement. Whatever amount shall necessarily be entailed in the cost of labor or materials or both shall be added to or deducted from the original contract price.

1.09 TIME OF COMPLETION AND SCHEDULE OF CONSTRUCTION

The Contractor shall, before actual commencement of the project operations, prepare and submit to the Implementing Agency for verification and approval, a complete and comprehensive work schedule covering the entire duration of construction. He shall also include therein, the estimated number of days within which the entire project shall be completed stage by stage by phase.

1.10 WORKMANSHIP

The project shall be executed with the use of first class workmanship to the full intent and meaning of the plans and specifications and to the complete approval and acceptance by the Implementing Agency.

1.11 MATERIALS

All materials to be used shall be the best of their respective types and kind. They shall be properly stored and protected from damage or injury.

1.12 SAMPLES

Submit samples as specified and proceed with the work with the use of materials procured based on the samples previously approved by the Implementing Agency.

1.13 INSPECTION OF WORK

The Contractor shall provide the facility for inspecting the work to the Implementing Agency, the Owner and other personnel having jurisdiction over the work.

1.14 DEFECTIVE OR IMPROPER WORK

All work or materials not acceptable to the Architect shall be removed immediately and replaced with appropriate work or materials without extra charge. All condemned materials shall be taken away from the premises without delay.

1.15 BUILDING LAWS AND REGULATIONS

The Contractor shall be held responsible for strict compliance with existing labor laws and regulations and shall free the Owner from any responsibility in connection therewith, he shall pay on time at his own expense, all taxes, fees and/or licenses due to the government, both national and local arising from his work on the project.

1.16 MANNER OF PAYMENT

Payments to the Contractor shall be based on the periodic work accomplishments subject to verification, approval and recommendation by the Implementing Agency.

1.17 RETENTION MONEY

Progress payments shall be subject to a ten percent (10%) deduction, referred to as retention money. All retained amounts shall be released upon satisfactory completion of the work and issuance of the Certificate of Final Completion and Acceptance.

1.18 TEMPORARY WATER, POWER AND TELEPHONE FACILITIES

The Contractor shall make the necessary arrangements with the local utility companies so as to provide temporary facilities for the supply of water, power and telephone for the duration of construction, and all expenses in connection therewith shall be borne by the Contractor.

1.19 PRIVY

The Contractor shall provide a temporary privy in a most inconspicuous and sanitary manner, and shall have it removed at the termination of the work.

1.20 CLEARING AND CLEANING

Upon its completion, the project and its premises shall be cleared and cleaned as directed by the Implementing Agency, and make ready for immediate occupancy.

1.21 TEMPORARY BARRICADES, SIGNAL LIGHTS, BILLBOARDS, ETC.

The Contractor shall provide all temporary barricades, signal lights, Architect and Contractor's billboards, the required official building billboard, etc., necessary for the protection of the public and for the proper prosecution of the work and display of construction requirements.

1.22 PERFORMANCE AND GUARANTEE BOND

To guarantee the faithful performance of the Contractor under the contract, he shall post a Performance Bond in the amount of thirty percent (30%) of the contract price in the form of cash, manager's check or surety bond, callable on demand.

1.23 QUESTIONS AND DISAGREEMENTS

All questions and disagreements between the Contractor and the Owner relative to the interpretation of the plans and specifications shall be referred to the Implementing Agency whose decision on the matter shall be final.

II. TECHNICAL SPECIFICATIONS

2.0 SITE WORK

WORK INCLUDED

- 2.0.0 All excavation works including all necessary shoring, bracing and drainage of storm water from the site.
- 2.0.1 All soil treatment, backfilling, filling, compaction and grading, removal of excess material from site.
- 2.0.2 Protection of property, work and structures, workmen and other people from damage and injury.
- 2.0.3 Demolition of existing road pavement as indicated in the drawings.
- 2.0.4 Laying of utility/auxiliary lines as indicated in the drawings.
- 2.0.5 Survey and Stake-out works

2.1 LINES, GRADES AND BENCHMARKS

- 2.1.0 Stake out accurately the lines of the building and/or the other structures included in the contract, and establish grades therefore, after which secure approval of the Project Manager before any excavation work is commenced.
- 2.1.1 Erect basic batter boards and basic reference marks at such places where they will not be disturbed during the construction of the foundation.

2.2 EXCAVATION

Structural Excavations: Excavations shall be to the depths indicated in the drawings where bearing value as indicated in the Soils Investigation Report provided as part of the Construction Documents shall be attained. Excavations for footings and foundations carried below required depths shall be filled with lean concrete and bottom of such shall be level. All structural excavations shall extend a sufficient distance from the walls and footings to allow for proper erection and dismantling of forms, for installation of service and for inspection.

All excavations shall be inspected and approved before pouring any concrete laying underground utility and auxiliary lines for placing select fill materials. The Contractor shall control the grading in the vicinity of all excavated areas to prevent surface drainage running into excavations. Water that accumulates in excavated areas shall be removed by pumping before fill is placed herein.

2.3 SOIL TREATMENT

Treat soil with 2% Chlordane or Andrex solution in water to provide an unbroken horizontal and vertical chemical barrier between the proposed structure and the possible termite colonies in the soil after excavation is completed and prior to pouring of concrete

foundation and ground floor slabs. At the time the soil treatment is to be applied, the soil shall be in a friable condition with a sufficient low moisture content to allow uniform distribution of the treatment solution throughout the soil.

Do not apply pesticide during or immediately after heavy rains, or whenever climatic conditions are such that runoff will occur to create an environmental hazard. Cover treated areas with polyethylene or waterproof sheeting if concrete is not poured on the same day as the soil treatment. Take adequate precautions to prevent disturbance of the pesticide barrier. Re-treat the soil or fill is disturbed after the treatment and before the placement of structural components. Apply pesticide prior to placement of vapor barrier or waterproofing membrane.

2.4 SHORING

Excavation shall be shored and braced by members of suitable sizes where necessary to prevent danger to persons, injurious caving or erosions. Shoring bracing and sheathing shall be removed, as the excavations are backfilled, in a manner such as to prevent injurious caving. The contractor shall keep all excavations free from water while construction is in progress.

2.5 FILLING AND BACKFILLING

After forms have been removed and when concrete work is hard enough to resist pressure resulting from fill, backfilling may then be done. Materials excavated may be used for backfilling. All filling shall be placed in layers not exceeding six (6) inches in thickness, each layer being thoroughly compacted and rammed by wetting, tamping, rolling.

2.6 PLACING AND COMPACTING FILL

2.6.0 Common Fill: shall be approved imported/site-excavated material free from roots, stumps and other perishable or objectionable matter.

2.6.1 Select Fill: shall be placed where indicated and shall consist of crushed gravel, crushed rock or a combination thereof. The material shall be free from adobe, vegetable matters and shall be thoroughly tamped after lacing.

2.6.2 Before placing fill materials, the surface upon which it shall be placed shall be cleared of all brush roots, vegetable matter and debris, and thoroughly wetted to ensure good bonding between grounds.

2.6.3 Compaction: Fills shall be evenly spread in horizontal layers of not more than 200mm in thickness. Each layer shall be wetted and compacted by approved mechanical compaction machine, roller or portable to a density of at least 90% or its maximum density for non-cohesive soils as determined by ASTM Method D-1557 or AASHTO Method T-180.

2.7 FINISH GRADING

The contractor shall fill and grade the whole area to the indicated sub-grade elevations as directed by the Architect or Engineer. The contractor shall verify the finish grade elevations of the proposed pavements. Prior to grading operations, the areas shall be cleared of all heavy growth or vegetation stumps, roots, cables, wires, rocks and other debris. The finished sub-grade shall be reasonably smooth and compacted and ready to receive the base course for the proposed pavement.

2.8 DISPOSAL OF EXCESS MATERIALS

Any excess and demolished materials remaining after completion of the earthwork shall be disposed of by hauling and transported out of the premises at the contractor's own expense.

2.9 SUB-GRADE PREPARATION

2.9.0 SCOPE

The sub-grade preparation shall be that part of the work which is the preparation for the support of the bases for pavements and structures. It shall extend to the full width of pavements including shoulders and lay-bys as shown on the drawings or as specified herein. Unless otherwise agreed upon by the Engineer, sub-grade preparation on a section of the road shall not be commenced unless the contractor is able, after the completion and acceptance of the work, to commence immediately pavement construction.

2.9.1 PRODUCTS

All materials and equipment necessary for proper completion of this work shall be subject to the approval of the Engineer.

2.9.2 EXECUTION

2.9.2.0 Prior Works: Prior to commencing the preparation of the sub-grade, all culverts, cross drains, and other similar structures (including the fully compacted backfill) shall be completed. No work shall be started on the preparation of the sub-grade before the prior works herein approved by the Engineer.

2.9.2.1 Sub-grade Level Tolerance: The finish compacted surface of the sub-grade shall conform to AASHTO M-145.

2.9.2.2 Sub-grade in Cutting Common Material

- a. Unless otherwise specified, all materials below sub-grade level in earth cutting to a depth of 150mm or other depth shown on the drawings or directed by the Engineer shall be excavated. The material, if suitable, shall be placed to one side for re-use, or if unsuitable, shall be disposed of in accordance with the requirements of AASHTO M-145.
- b. Where material has been removed from below sub-grade level, the base of the resulting cutting shall be compacted to a depth of 150mm to the requirements of AASHTO M-145 Table 1. If necessary, the moisture content of the material shall be adjusted.

2.10 GRADED AGGREGATES AND BASE COURSE

2.10.0 SUBMITTALS

- a. Test Reports: Before delivery of materials, submit the following test reports:
 1. Gradation
 2. Bearing Ratio
 3. Attenberg Limits

2.10.1 DELIVERY AND STORAGE

Do not construct base course when rainfall or other weather conditions will detrimentally affect the quality of the finished course.

2.11 PRODUCTS

2.11.0 MATERIALS

- a. Aggregates: Consist of durable sound crushed gravel, crushed stone, free of lumps and balls of clay or other objectionable matter. Crushed stone shall be free from flat, soft or disintegrated pieces. Crushed gravel retained on a No. 4 sieve shall have at least ninety percent (90%) by weight with at least two fractured faces one hundred percent (100%) by weight with at least one fractured face.
- b. Base course materials samples shall have a Bearing Ratio of at least 100 as determined by laboratory tests on a 4-day soaked specimen in accordance with ASTM D 1883; compact specimen in accordance with ASTM D 1557, Method D. Determine grain size in accordance with ASTM C-117.
- c. Soil binder material, the surface of the layer by a combination of rolling and blading. Final surface shall be smooth and free from waves, irregularities and from ruts of soft yielding spots.

CONCRETE

3.0 GENERAL

3.0.0 Unless otherwise specified herein, concrete work shall conform to the requirements of ACI Building Code. Full cooperation shall be given other trades to install embedded items. Provisions shall be made for setting items not placed in the forms. Before concrete is placed, embedded items shall have been inspected and tested for concrete aggregates and other materials shall have been done.

3.1 SUBMITTALS

3.1.0 Shop Drawings: Reproduction of contract drawings is unacceptable.

3.1.1 Shop Drawings for Reinforcing Steel: ACI 315. Indicate bending diagrams, assembly diagrams, splicing and lap 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 bars.

3.1.2 Contractor Mix Design: Thirty (30) days prior to concrete placement, submit a design for each strength and type of concrete. Furnish a complete list of materials including type, brand; source and amount of cement and admixtures; applicable reference specifications and copies of test reports showing that the mix has been successfully tested to produce concrete with the properties specified and will be suitable for the job conditions. Provide fly ash and pozzolan test results performed within six (6) months of submittal date. Obtain approval before concrete placement.

3.1.3 Certificates of Compliance

- a. Aggregates

- b. Admixtures
- c. Reinforcement
- d. Cement

3.1.4 Catalogue Data

- a. Water stops
- b. Materials for Curing Concrete
- c. Joint Sealant
- d. Joint Filter
- e. Vapor Barrier
- f. Epoxy Bonding Agents

3.2 MATERIALS

- 3.2.0 Cement for concrete shall conform to the requirements of specifications for Portland cement (ASTM C-150).
- 3.2.1 Water used in mixing concrete shall be clean and free from other injurious amounts of oil, acids, alkaline, organic materials or other substances that may be deleterious to concrete or steel.
- 3.2.2 Fine Aggregates shall consist of hard, tough, durable uncoated particles. The shape of the particles shall be generally rounded or cubicle and reasonably free from flat or elongated particles. The stipulated percentages of fines in the sand shall be obtained either by processing sand or by the production of suitable graded manufactured sand.
- 3.2.3 Coarse Aggregates shall consist of gravel. Crushed gravel or rock. Or a combination of gravel and rock. Coarse aggregates shall consist of hard, tough, durable, clean and uncoated particles. The size of coarse aggregates top be used in the various parts of the Work shall be ¾".
- 3.2.4 Reinforcing bars shall conform to the requirements of PNS-49 Standard specifications for Billet Steel Bars for concrete reinforcement (A15-625). Tensile strength and grade for all reinforcing bars such as main horizontal (for beams), vertical (for columns), ties, stirrups and inserts shall be as follows:

SCHEDULE OF REINFORCING BARS (PNS-49)

DIAMETER OF BARS	GRADE (fy)	
12mmØ & smaller	230 MPA	Grade 33
16mmØ to 25mmØ	275 MPA	Grade 40

3.3 PROPORTIONING AND MIXING

- 3.3.0 Proportioning of all materials entering into the concrete mixture of 3,000 psi concrete shall be as follows:

<u>Class</u>	<u>Cement</u>	<u>Sand</u>	<u>Gravel</u>
A	1	2.0	4

- 3.3.1 Strength of Concrete: Concrete shall have a 28-day cylinder strength of 3,000 psi for all structures.
- 3.3.2 Mixing: The 3,000 psi concrete can be machine mixed on-site. On-site mixing shall be within 30 minutes after the cement has been added to the aggregates.

3.4 FORMS

3.4.0 General: Forms shall be used whenever necessary to continue the concrete and shape it to the required lines, or to ensure the concrete contamination with materials caving from adjacent excavated surfaces. Forms shall have sufficient strength to withstand the pressure resulting from placement and vibration of the concrete, and shall be maintained rigidly in correct position. Forms shall be sufficiently tight to prevent loss of mortar from the concrete. Forms for exposed surfaces against which backfill is not to be placed shall be lined with a form grade plywood or metal panels.

3.4.1 Cleaning and Use of Forms: Before placing the concrete, the contact surfaces of the form shall be cleansed of encrustation of mortar, the grout or other foreign material, and shall be coated with commercial form oil that will prevent sticking and will not stain the concrete surfaces.

3.4.2 Removal of Forms: Forms shall be removed in a manner that will prevent damage to the concrete. Forms shall not be removed without approval. Any repairs of surface imperfections shall be performed at once and airing shall be started as soon as the surface is sufficiently hard to permit it without further damage.

3.5 PLACING REINFORCEMENT

General: Steel reinforcement shall be provided as indicated, together with all necessary gauge 16 G.I. wire ties, chairs, spacers, supports and other devices necessary to install and secure the reinforcement properly. All reinforcement, when placed, shall be free from loose, flaky rust and scale, oil grease, clay and other coating and foreign substances that would reduce or destroy its bond with concrete. Reinforcement shall be placed accurately and secured in place by use of metal or concrete supports, spacers and ties. Such supports shall be of sufficient strength to maintain the operation. The supports shall be used in such manner that they will not be exposed or contribute in any way, to the discoloration or deterioration of the concrete.

3.6 CONVEYING AND PLACING CONCRETE

3.6.0 Conveying: Concrete shall be conveyed from mixer to forms as rapidly as practicable, by methods that will prevent segregation, or loss of ingredients. There will be no vertical drop greater than 1.5 meters except where suitable equipment is provided to prevent segregation and where specifically authorized.

3.6.1 Placing: Concrete shall be worked readily into the corners and angles of forms and around all reinforcement and embedded items without permitting the material to segregate. Concrete shall be deposited as close as possible to its final position in the forms so that flow within the mass does not exceed two (2) meters and consequent segregation is reduced to a minimum near forms or embedded items, or elsewhere as directed. The discharge shall be so controlled that the concrete may be effectively compacted into horizontal layers not exceeding 30 centimeters in depth within the maximum lateral movement specified...

3.6.2 Time interval between mixing and placing: Concrete shall be placed before initial set has occurred and before it has contained its water content for more than 45 minutes.

3.6.3 Consolidation of concrete: Concrete shall be consolidated with the aid of mechanical vibrating equipment and supplemented by hand spading and tamping. Vibrators shall not be inserted into lower coursed that have

commenced initial set and reinforcement embedded in concrete beginning to set or already set shall not be disturbed by vibrators. Consolidation around major embedded parts shall be by hand spading and tamping and vibrators shall not be used.

- 3.6.4 Placing concrete through reinforcement: In placing concrete through reinforcement, care shall be taken that no segregation of the coarse aggregate occurs. On the bottom of beams and slabs, where the congestion of steel near the forms makes placing difficult, a layer of mortar of the same cement-sand ratio as used in concrete shall be first deposited to cover the surface.

3.7 CURING

- 3.7.0 General: All concrete shall be moist-cured for a period not less than seven (7) consecutive days by an approved method or combination applicable to local conditions.
- 3.7.1 Moist curing: The surface of the concrete shall be kept continuously wet by covering with burlap, plastic or other approved materials thoroughly saturated with water and keeping the covering wet spraying or intermittent hosing.

3.8 FINISHING

- 3.8.0 Concrete surfaces shall not be plastered unless otherwise indicated. Exposed concrete surfaces shall be formed with smooth form material, and after removal of forms, the surfaces shall be smooth, true to line and shall present a finished appearance except for minor defects which can be easily repaired by patching with cement mortar, or can be ground to a smooth surface to remove all joint marks of the form work.
- 3.8.1 Concrete slabs on fill: The concrete slabs on fill laid on a prepared foundation consisting of sub-grade and granular fill with thickness equal to the thickness of overlaying slab except as indicated otherwise.

3.9 SURFACE FINISHES

- 3.9.0 Defects: Repair formed surfaces by removing minor honeycombs, pits greater than one square inch surface area or 0.25 inch maximum depth, or otherwise defective areas. Provide edges perpendicular to the surface and patch with non-shrink f=grout. Patch the holes and defects when the forms are removed.
- 3.9.1 Floor slabs, Pavements and Miscellaneous Construction: Unless otherwise specified, slab at the fountain area are straight to finish with waterproofing. Slope floors uniformly to drains where drains are provided. Depress the concrete base slab where Bomanite, Granite or Ceramic tiles are indicated.
- 3.9.2 Finish: Place, consolidate and immediately strike-off concrete to obtain proper contour, grade and elevation. A set sufficient for floating and supporting the weight of the finisher and equipment.
- 3.9.3 Pavements: Screed the concrete with a template advanced with a combined longitudinal and crosswise motion. Maintain a slight surplus of concrete ahead of the template. After screeding, float the concrete longitudinally and refloat as necessary. Obtain final finish by belting. Lay belt flat on the concrete surface and advance with a sawing motion; continue until a uniform but gritty non-slip surface is obtained. Round edges and joints with an edger having a radius of 1/8 inch.

- 3.9.4 Broomed: Provide for exterior walks, platforms, patios and ramps. Unless otherwise indicated, provide a floated finish, and then finish with a flexible bristle broom. Permit surface to harden sufficiently to retain the scoring or ridges. Broom traverse to traffic or at right angles to the slope of the slab.
- 3.9.5 Pits and Trenches: Place bottoms and walls monolithically or provide water stops and keys.
- 3.9.6 Curbs and Gutters: Provide contraction joints spaced at every 10 feet maximum unless otherwise indicated. Cut contraction joints $\frac{3}{4}$ -inch deep with a jointing tool after the surface has been finished. Provide expansion joints $\frac{1}{2}$ -inch thick and spaced at every 100 feet maximum unless otherwise indicated. Provide a pavement finish.

3.10 MISCELLANEOUS

- 3.10.0 Construction Joints: Locate joints to least impair strength; continue reinforcement across joints unless otherwise indicated.
- 3.10.1 Expansion Joints and Contraction Joints: For slab on grade, provide at edges of interior floor slab, adjacent to walls as indicated. Completely fill joints exposed to weather with joint filler material and joint sealant. Do not extend reinforcement or other embedded metal items bonded to the concrete through any expansion joints unless an expansion sleeve is used. Provide contraction joints, either formed or saw cut or cut with a jointing tool, to the indicated depth after the surface has been finished. Sawed joints shall be completed within 4 to 12 hours after concrete placement. Protect joints from intrusion of foreign matter.

MASONRY

4.0 MATERIALS

- 4.0.0 Concrete Hollow Blocks (CHB) shall have a minimum face thickness of 1" (25mm). Nominal size shall be 8" x 8" x 16", minimum compressive strength shall be 500 psi for non-load bearing and 700-1000 psi for load bearing. All units shall be stored for a period not less than 28 days (including curing period) and shall not be delivered to the job site prior to that time unless the structure is equal or more than the specified.
- 4.0.1 Prior to commencing the preparation of the sub-grade, all culverts, cross drains, and other similar structures (including the fully compacted backfill) shall be completed. No work shall be started on the preparation of the sub-grade before the prior works herein approved by the Engineer.
- 4.0.2 Cement shall be standard Portland cement ASTM C-150-68 Type 1.
- 4.0.3 Mortar: Mix mortar from 3 to 5 minutes in such quantities as needed for immediate use. Re-tempering will not be permitted if mortar stiffens because of premature setting. Discard such materials as well as those that have not been used within one hour after mixing. Proportioning shall be one (1) part Portland cement and two (2) parts and by volume, but not more than one (1) Portland cement and three (3) parts and by volume.

4.1 SUBMITTALS

- 4.1.0 Submit samples for approval two (2) samples each of each type of wall reinforcement and wall ties.

- 4.1.1 **Certificates of Conformance:** Submit certificate attesting that masonry cement, masonry units, aggregates and accessories meet the requirements specified.

4.2 ERECTION

- 4.2.0 All masonry shall be laid plumb, true to line, with level and accurately spaced courses, and with each course breaking joint with the source below. Bond shall be kept throughout corners and reveals shall be plumb and true. Units with greater than 12% absorption shall be wet before laying. Work required to be built in masonry; including anchors, wall plugs and accessories shall be built-in as the erection progresses.
- 4.2.1 **Masonry Units:** Each course shall be solidly bedded in Portland cement mortar. All units shall be damp when laid units shall be showed into place not laid, in a full bed of un-furrowed mortar. All horizontal and vertical points shall be completely filled with mortar when and as laid. Each course shall be bonded at corners and intersections. No cells shall be left open in face surfaces. All cells shall be filled up with mortar for exterior walls. Units terminating against beam or slab soffits shall be wedged tight with mortar. Do not lay cracked, broken or defaced block.
- 4.2.2 **Lintels** shall be of concrete and reinforced as required. Lintels shall have a minimum depth of 0.20 (8") and shall extend to at least 0.20 (8") on each side of opening and reinforced with 2-12mmØ re-bars and 10mmØ lateral ties @ 200mm o.k.
- 4.2.3 **Plastering:** Clean and evenly wet surfaces. Apply scratch coat with sufficient force to form good keys. Cross scratch coat upon its initial set; keep damp. Apply coat after each scratch coat has set at least 24 hours after scratch coat application. Lightly scratch brown coat; keep moist for two (2) days; allow drying out. Do not apply finish until brown coat has seasoned for seven (7) says. Just before applying coat, wet brown coat again. Float finish coat to true even surface; trowel in manner that will force sand particles down into plaster, with final trawling, leave surfaces banished smooth free from rough areas, trowel marks, checks, other blemishes. Keep finish coat moist for at least two (2) days; thereafter protect against rapid drying until properly, thoroughly cured.

4.3 SCAFFOLDING

- 4.3.0 Provide safe wood or metal scaffolding required for masonry and other related work, including cleaning down on completion. Remove upon demobilization.

4.4 SURFACE PREPARATION

- 4.4.0 **Vitrified Floor Tile Installation:** Do not stat floor tiling occurring in space where both floor and wall tile setting has been completed. Before spreading setting bed, establish borderline center wires in both directions to permit laying pattern with minimum of cut tiles. Lay floors without borders from centerline outward. Make adjustments at walls. Clean concrete sub-floor and moisten it without soaking. Sprinkle dry cement over surface. Spread setting bed mortar on concrete and tamp to assure good bond over the entire area then screed to smooth, level bed. Set average setting bed thickness at ¾" but not less than ½".
- 4.4.1 **Wall:** Scratch coat application as foundation coat shall be at most ½". While still plastic, deeply score scratch coat or scratch and cross-scratch. Protect scratch coat and keep reasonably moist within seasoning period. Use mortar for scratch floor coats, within one hour after mixing. Re-tempering of partially hardened

mortar is not permitted. Set scratch coat be cured for at least two (2) days before starting the setting.

4.5 CLEANING

- 4.5.0 Protection: Protect work which may be damaged, stained or discolored during cleaning operations.
- 4.5.1 Pointing: Upon completion of masonry work, cut out defective mortar joints and tuck joints and all holes solidly with mortar.
- 4.5.2 Cleaning: Clean exposed masonry surface with clear water and stiff fiber brushes and rinse with clean water. Where stains, mortar or other soil remain, continue cleaning as follows: Clean masonry surfaces by scrubbing with warm water and soap and rinsing thoroughly with clean water. Restore damaged, stained and discolored work to its original conditions or replace with new work.

V STRUCTURAL STEEL

GENERAL

5.0 SCOPE OF WORK

The work includes the fabrication, erection and painting of structural steel. All structural steel work shall be in accordance with the AISC latest "Specifications for the Design, Fabrication and Erection of Steel for Buildings". The contractor shall furnish plates, clip angles connections and other miscellaneous work required for the completion of the structure.

5.1 SUBMITTALS

- 5.1.0 Shop Drawings: Submit shop drawings of all structural steel for approval prior to fabrication. Include complete information necessary for the fabrication and erection of the structure's components, including location, type and size of bolts, welds, member sizes and lengths, connection details, blocks, copes and cuts. Use AWS standard welding symbols.
- 5.1.1 Erection Plan. Submit for record purposes. Indicate the sequence of erection, temporary shoring and bracing and a detailed sequence of welding including each welding procedure.
- 5.1.2 Manufacturer's Certificates of Conformance.
 - a. Structural Steel
 - b. Bolts, nuts and washers
 - c. Shop painting materials
 - d. Welding electrodes and rods
 - e. Non-shrink grout
- 5.1.3 Welding: Submit descriptive data to illustrate the sequence of welding and each welding procedure to be used. Perform welding with qualified welders. The qualification of welders and the duration of qualification period shall be in accordance with the requirements of AWS. Any welder found to be producing unsatisfactory work even if he has passed qualification tests shall be immediately re-certified or replaced with a qualified welder.

5.2 REFERENCE STANDARDS

5.2.0 Comply with the latest edition of the following as applicable, unless otherwise specified or modified.

- a. AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), 1978: Specification for the Design, Fabrication and Erection of Structural Steel for Buildings. Code of Standard Practice for Steel Buildings and Bridges; Specification for Architecturally Exposed Structural Steel.
- b. AMERICAN WELDING SOCIETY (AWS): Standard Welding Symbols A2.0-68; Standard Welding Code D1.1-1973 (Rev 1-73 & 2-74) (To govern if in conflict with AISC).
- c. RESEARCH COUNCIL ON RIVETED AND BOLTED JOINTS OF THE ENGINEERING FOUNDATION (RCRBJ): Specification for Structural Joists using ASTM A-325-76s Bolts.
- d. STRUCTURAL STEEL PAINTING COUNCIL (SSPC): Painting Manual, Vol. 1; Good Painting Practice, Painting Manual, Vol. 2; Systems and Specifications.
- e. STEEL JOIST INSTITUTE-AMERICAN INSTITUTE OF STEEL CONSTRUCTION (SJI-AISC): "Standard Specifications for Open Web Steel Joists", and "Standard Specifications for Long Span Steel Joists", 1978 Editions.
- f. AMERICAN IRON AND STEEL INSTITUTE (AISI): "Specifications for the Design of Cold-Formed Steel Structure Members, 1974".

5.3 PRODUCTS

5.3.0 Steel: Structural Steel ASTM A-440 with minimum yield strength, $f_y=290$ mPa

5.3.1 BOLTS, NUTS AND WASHERS. Provide the following, unless otherwise indicated:

- a. Structural Steel
- b. Bolts: ASTM A325, Galvanized 78mmØ and below. A-490 1" Ø and above.
- c. Nuts: ASTM A325, Galvanized 78mmØ and below. A-490 1" Ø and above
- d. Washers: ANSI B 18.22.1, Type B

5.3.2 SHOP PAINTING

- a. Pre-treatment: Fed. Spec. TT-C-490, Type I, II or IV
- b. Primer Paint: Fed. Spec. TT-P-645

5.3.3 GALVANIZING

- a. Galvanizing Repair Paint: Mill Spec. DOD-P-21035

5.3.4 STRUCTURAL STEEL ACCESSORIES

- a. Welding Electrodes and Rods: AWS Code D1-1. E7018 Non-Shrink with minimum yield strength, $f_y=290$ mPa

- b. Non-Shrink Grout: With no ASTM C827

5.4 EXECUTION

5.4.0 FABRICATION

5.4.0.0 Markings: Prior to erection, members shall be provided with a painted erection mark. In addition, connection parts assembled in the shop for reaming holes in field connections shall be match-marked with scratch and notch marks. Do not locate erection markings on areas to be welded or on surfaces of weathering steels that will be exposed to the completed structure. Do not locate match-markings in areas that will decrease member strength or cause stress concentrations.

5.4.0.1 Shop Painting: Shop paint structural steel except as modified herein. Do not paint steel surfaces embedded in concrete, galvanized surfaces, bearing surfaces, or surface within ½ inch of the toe of the welds prior to welding. Prior to assembly, paint surfaces that will be concealed or inaccessible after assembly. Do not apply paint in foggy or rainy weather when paint may be exposed to temperature below 40 degrees F within 48 hours after application, unless approved otherwise.

- a. Cleaning: SSPC SP6, except as modified herein, SSPC SP3 or SP6 for steel surfaces exposed in spaces above ceilings, attic spaces, crawl spaces and chases. In addition, maintain steel surfaces free from rust, dirt, oil, grease and other contaminants through final assembly.
- b. Pre-Treatment: Immediately after cleaning, provide the metal surfaces with one coat of MIL. Spec. DOD-P-15328 pre-treatment to dry film thickness of 0.3 to 0.5 mil. Fed. Spec. TT-C-490, pre-treatment may be applied to SSPC DP6 cleaned surfaces in accordance with Fed. Spec. TT-C-490.
- c. Priming: Immediately after the pre-treatment coating has dried, apply primer to a minimum dry film thickness of 2.0 mil. Primer paint shall be zinc chromate conforming to Fed. Spec. TT-P-645. Repair damaged prime surfaces with an additional coat of primer.

5.4.0.2 Galvanizing: Provide as indicated or specified. Galvanize after fabrication where practicable.

- a. Galvanizing Repair: ASTM A780, using galvanizing repair paint for galvanizing damaged by handling, transporting, cutting, welding or bolting. Do not heat surfaces that repair paint has been applied to.

5.4.0.3 Bearing Surfaces and Friction Type Joints: In the shop, coat with a temporary rust preventive. Remove coating, as recommended by the coating manufacturer, immediately prior to field erection.

5.4.0.4 Surface Finishes: ANSI B46.1 maximum surface roughness of 125 pin, pinholes and sliding bearing, unless indicated otherwise.

5.4.0.5 Erection. Except when load indicator bolts are used, calibration wrenches shall be calibrated every two (2) working days on a minimum of three (3) typical bolts of each diameter. Provide for drainage in structural steel.

- a. Base Plates and Bearing Plates; after final positioning of members, provide full bearing under plates using non-shrink grout. Place non-shrink grout in accordance with the manufacturer's instructions.
- b. Field Painting: After erection, the field bolt heads and nuts, field welds, and any abrasions in the shop coat shall be cleaned and primed with paint of the same quality as that used for the shop priming.

5.4.1 SOURCE QUALITY CONTROL

Errors of Shop Drawing, Fabrication, correct fitting and alignment of the various metal items or component members shall be the responsibility of the contractor. However, the contractor shall permit the Architect or an independent inspection agency, if engaged by the Owner, to inspect work in progress in his shop. Such inspections shall not relieve the contractor of his responsibility to furnish materials and workmanship in accordance with the Contract Documents.

5.4.2 PRODUCT DELIVERY, HANDLING AND STORAGE

Handle and store in such manner as to prevent damage or disfigurement. Store finished items or components above ground on platforms, pallets or other supports and protect from harmful elements.

5.5 PROTECTION

The Contractor shall protect any existing work subject to damage during the installation of specified work and shall adequately protect specified work during installation. Finished work that is readily subject to damage by subsequent work or environmental conditions shall be protected by the Contractor immediately following the installation thereof.

5.6 FIELD MEASUREMENTS

Contractor shall make measurements in field to verify or supplement dimensions indicated and be responsible for accurate fit of specified work.

5.7 FIELD QUALITY CONTROL

Facilities shall be provided by the Contractor as needed for the proper inspection of the specified work, including temporary platforms, hoists, protective devices, electric current, etc. Improper workmanship, as determined by the Architect shall be corrected and replaced, at no additional cost to the Owner.

5.8 CONNECTIONS

Connections and not detailed shall be designed in accordance with AISC "Manual of Steel Construction". Build connections into existing work. Do not tighten anchor bolts set in concrete with impact torque wrenches. Punch, sub punch and ream or drill bolt and pin holes.

5.9 WELDING: Provide AWS D1.1 qualified welders, welding operators and tacklers.

5.10.1 Removal of temporary welds, run-off plates and backing strips, remove only from finished areas

5.10 TESTS AND INSPECTIONS: Perform field tests, and provide labor, equipment and incidentals required for testing.

Welds:

5.10.0 Visual Inspection: AWS D1.1 Section 6: Provide AWS certified welding inspectors for fabrication/erection inspections and testing and verification inspection. Welding inspectors shall visually inspect and mark welds, including fillet weld end returns.

5.10.1 Non-Destructive Testing: AWS D1.1. Test locations shall be selected by the Engineer if more than 20 percent (20%) of welds made by a welder contain defects identified by testing, and then all welds made shall be tested by radiographs or ultrasonic testing, as approved by the Engineer. When all welds made by an individual welder are required to be tested, magnetic particle testing shall be used in areas inaccessible to either radiographic or ultrasonic testing. Retest defective areas after repair.

VI ARCHITECTURAL

6.0 FINISHES

6.0.1 INTERIOR WALLS

- a. For areas exposed to moisture, use CHB with cement plaster finish painted.
- b. Plastering of doors and windows opening.

6.0.2 FLOOR FINISHES

- a. 300 x 300 Ceramic Tiles
- b. 25mm Concrete Topping (For Tiles)
- c. Plain Cement Finish w/ grooves

6.0.3 CEILING FINISHES

- a. 12mm Thk. MR Gypsum board including framing and accessories.

6.0.4 WINDOWS

Follow as per approved plan.

6.0.5 DOORS

Follow as per approved plan.

6.0.6 PAINTING

- a. All paints shall meet the required specifications and shall be delivered at the site in the original container. Use non Volatile Organic Compound (V.O.C.) paint or approved by the implementing agency and only accredited painters of the manufacturer shall execute the work to ensure the true origin and quality of paint and warranty of work.

- b. Concrete walls shall be treated with neutralizers. Exterior walls without wall veneer shall be applied with a primer before final coat. In general, rough surfaces of concrete, cabinets and woodworks surfaces shall be properly sandpapered and puffed before any application of paint.
- c. Latex Paint Finish (exterior masonry walls)
- d. Latex paint Finish (interior masonry walls/hardiflex)
- e. Latex Paint Finish (Ceiling)

6.0.7 HARDWARE

- 1. Provide all rough hardware required for the construction of works: nails, straps, lag screws, etc.
- 2. Butt Hinges : Use Toyo Butt Hinges, 4" x 4" with bearings for panel door.
- 3. Locksets : For PVC plastic, wood and metal swing doors use ABLOY stainless mortise locksets with striker plate.

6.0.8 OTHER FINISHES

- a. Countertop including Tiles.
- b. Stainless Steel Signage with Neon Backlight "MEDICINE DISPENSING ROOM" including accessories.
- c. Plastering Guide / Grooves
- d. Wood Ledge 0.25m x 2.4m including accessories, painted finish.

6.0.9 CLEAN-UP

When the work is completed, the Contractor shall remove all temporary structures and surplus materials of every sort, restore what has been removed before, and leave the premises or site in as good condition as he had originally found them.

VII THERMAL CONTROL AND MOISTURE PROTECTION

7.0 WATERPROOFING

Use waterproofing cementitious powder, capillary type, applied waterproofing seamless membrane latex-modified rubber reinforced on slabs. Refer to manufacturer's recommendation on proper application of the product listed herein: Lanko manufactured by VSL.

7.1 VAPOR BARRIER

Use 8 mils thick, 6 feet wide roll plastic vapor barrier laid over compacted base course at ground floor slab with 300mm minimum overlap prior to setting up of steel reinforcing bars. Submit samples for approval.

7.2 WATERSTOPS

Use **Rebstop Ultra Seal** chemical grout water-stop specially formulated for construction joints to replace the use of conventional water-stop used for cold expansion joints on pipes, etc. manufactured by **Rebtrade International Corporation** or approved equal.

IX PLUMBING

GENERAL

9.0 DESCRIPTION

- 9.0.0 Applicable provisions of General Conditions govern work under this section.
- 9.0.1 All fittings, connections and piping embedded in concrete shall be subject to inspection by the Architect and/or his representative before covering and/or completion.
- 9.0.2 The contractor shall provide all items, articles, materials, operations of methods listed, mentioned or scheduled on the drawings and/or herein, including labor, materials and incidentals necessary and required for their completion.
- 9.0.3 The contract drawings and specifications are complementary to each other, and any labor or materials called for by either, whether or not called for by both, if necessary, for the successful operation of any of the particular type of equipment furnished and installed will be without additional cost to the owner.
- 9.0.4 Intent: It is not intended that the drawings shall show every pipe fitting.
- 9.0.5 All such items, whether specifically mentioned or not, or indicated in the drawings shall be furnished and installed, if necessary to complete the system in accordance with the best practice of the plumbing trade and to the satisfaction of the engineer and the owner.
- 9.0.6 The plumbing contractor is required to refer to all architectural, structural and electrical plans and specifications and shall investigate all possible interferences and conditions affecting his work.

9.1 SCOPE OF WORK

- 9.1.2 Work included under this section of this specification consists of furnishing all labor, tools and equipment, appliances and materials necessary for complete installation, testing and operation of the plumbing and storm drainage system in accordance with the contract.
 - a. Arrange for, obtain and bear the cost of necessary permits, bonds and fees, private or government shall be paid by the contractor.
 - b. Soil, waste and vent pipe system within the building.
 - c. Sanitary drainage system of the building and its connection to the nearest existing sewer line or drainage line.
 - d. Cold-water distribution system and supply pipes to fixtures, hose bibs, inclusive of all valves, fittings and other accessories to complete the system.
 - e. Supply of all plumbing fixtures, trims and accessories.
 - f. Supply and installation of transfer pumps including valves and accessories under the supervision of the pump supplier.

- g. The contractor shall provide all necessary shop drawings and two (2) sets of As-Built Plans.
- h. Testing for leakage of all water supply and distribution system, drains, waste and venting system plus pressure testing for two (2) hours and disinfection of water distribution system.
- i. Water meter and MWSI connection as shown on plans and to be verified at the jobsite.
- j. Excavation and backfilling in connection with the work shall be included.
- k. Furnishing of written one (1) year warranty of the plumbing system

9.2 SUBMITTALS

- 9.2.0 Within fifteen (15) days after award of contract, the plumbing contractor shall submit for engineer's approval, four (4) copies of all complete list of manufacturer's name of all materials he proposes to use.
- 9.2.1 After approval of the above list and before purchase of any materials, the plumbing contractor shall submit to the engineer for approval, four (4) complete sets of detailed information consisting of manufacturer's bulletins, shop drawings and partial list of materials to be provided under this contract.
- 9.2.2 The plumbing contractor shall assume the loss of and the entire responsibility of any change in the work as shown in the contract drawings, which may be occasioned by approval of materials other than those specified.

9.3 APPLICABLE CODE AND STANDARD

- 9.3.0 All plumbing works to be done and the sizes of pipes to be used shall be in accordance with the National Plumbing Code and the Plumbing Code of the Philippines.
- 9.3.1 The plumbing contractor shall verify the above paragraphs with each section of the specifications and coordinate his work so that the general contractor will understand clearly the intent of the work to be done.

9.4 PRODUCTS

9.4.0 Description of Materials

All materials to be used shall conform to the standards specified. Use of materials shall be governed by other requirements imposed on other section of these specifications. Materials shall be subject to tests necessary to ascertain their fitness if the engineer so requires.

9.4.1 Alternate Materials

Use of any material not specified in these specifications may be allowed, provided such alternate has been approved by the engineer, and provided further, that a test if required shall be done by an approved agency in accordance with generally accepted standards.

9.4.2 Identification of Materials

Each length of pipe, fittings, traps, fixtures and devices used in the storm drainage system shall have case, stamped or indelibly marked on it the manufacturer's trademark or name, type and classes of products when so required by the standards mentioned. All materials and equipment mentioned in these specifications, including all incidental items not specifically indicated, but required to complete the contract shall be new and free from defects. If damaged during the course of construction, it shall be repaired or replaced as directed by the Project Manager at no additional cost for the owner.

9.4.3 Pipes and Fittings Schedule

9.4.3.0 Cold Water Lines – Shall be PP-R, pipes DIN 8077, non-corrosive, Leak proof, taste and odour neutral, jointing method is socket fusion.

9.4.3.1 Drain, Waste and Vent – shall be unplasticized polyvinyl chloride (uPVC) conforming to ASTM D1784.

9.4.4 Flanges, Bolting and Gaskets and Union

9.4.4.0 Provide flanges at flange connection to equipment and valves, slip-on or threaded as required.

Flanges shall conform to Class 300 black forged steel welding flanges 1/16" in raised faced to ASTM A-181 Grade 1. Bolts to ASTM A-193 regular hexagonal head unfinished, heavy semi-hexagonal nuts to ASTM A-194.

9.4.4.1 Provide union at each threaded connection to equipment, and valves for pipe sizes up to two (2) inches in diameter. It shall be galvanized steel pipe Class 300 screwed galvanized malleable iron, ground joint, brass to iron seat.

9.4.5 Valves

Valves up to and including two (2) inches shall be threaded ends, rough bodies and finished trimmings. Valves 2 ½ inches diameter and larger shall have iron [bodies, brass mounted and shall have either screws or flange ends.

9.4.5.0 Water meter shall be positive displacement type or any brand approved by MWSI or LWUA.

9.4.5.1 Hose Bibb shall made of male inlet threads, hexagon shoulder and three quarter inch hose connections. Provide one (1) extra gate valve on the vertical before the hose bib.

9.4.6 Drains

9.4.6.0 Floor drains at toilets shall be gauge no. 22 with round strainer and plastic bucket.

9.4.6.1 Deck drain shall be ASA 10-12, pipe size 75mmØ.

9.4.6.2 Floor drain for genset room shall be ASA 40-9F.

9.4.6.3 Grating cover (to be supplied by civil contractor).

9.4.7 Pipe Sleeves

- 9.4.7.0 Pipe sleeves shall be installed and properly secured in place at all points where pipes pass through masonry or concrete, except unframed floors on earth.
- 9.4.7.1 Pipe sleeves shall be of sufficient diameter to provide approximately one-quarter inch clearance around the pipe.
- 9.4.7.2 Pipe sleeve in walls and partitions shall be of wrought iron or steel pipe schedule 40. The pipe sleeves in concrete beams of concrete fireproofing shall be steel pipe schedule 40.
- 9.4.7.3 Pipe sleeves through floors shall be galvanized steel pipe schedule 40. Sleeve in pipe floor shall extend not less than one (1) inch and not more than two (2) inches above and the space around the pipe shall be packed with fiberglass insulation.
- 9.4.7.4 Pipe sleeves in footings shall be steel pipe and shall be not less than four (4) inches larger in diameter than the pipe to be installed.

9.4.8 Hangers and Supports

Vertical run of pipe shall be supported by brace. Horizontal runs of pipe shall be supported by loop 4-sway hanger.

9.4.9 Pumps Specifications

9.4.9.0 Plumbing Fixtures and Accessories

9.4.9.1 Water closet shall be Tank type.

9.4.9.2 Lavatory Countertop.

9.4.9.3 Urinal shall be wall-hung.

9.4.10 EXECUTION

9.4.10.0 Piping Installation

Piping shall be installed as shown on the drawings, as recommended by the manufacturer and as directed during installation, straight and direct as possible, forming right angles or parallel lines with building walls and other pipes and neatly spaced. Erect pipe risers plumb and true, parallel with walls and other pipes neatly spaced. All piping shall be supported or suspended on stands, clamps, hangers or equivalent or approved design. Supports shall be installed in such a manner to permit pipe free expansion and contraction while minimizing vibration.

9.4.10.1 Plumbing System Test

The entire system of drains, waste and vent shall be tested. Water test shall be in accordance with the plumbing Code. Every portion of the system shall be tested to a hydrostatic pressure equivalent to at least 10-foot head water for a period of ½ hour before covering. All cold water lines shall be tested at 150 psi for a period of

two (2) hours before covering. Defects disclosed by the test shall be repaired with new materials at the expense of the contractor.

9.4.11 Fixture Installation

Support all fixtures securely in a neat workman-like manner on approved carriers and supports. The method of support for each fixture shall be approved type manufacturer's standard, except where fixture designations on the drawings indicate modifications. Install all fixtures level and flush with finish floors and partitions. All fixtures shall be provided with individual shut-off valve and equipped with a trap.

X ELECTRICAL WORKS

10.0 WORK INCLUDED

10.0.0 The work to be done under this Division comprises the furnishing of all tools, labor, equipment, fixtures and materials, unless otherwise herein specified, required to complete and leave ready for use the electrical system of the above mentioned project in accordance with this specification and accompanying drawings of materials and finishes.

10.0.0 The electrical contractor shall coordinate his work so that the general contractor and all other subcontractors will understand clearly the work to be done. The electrical contractor shall finish all electrical facilities and provision necessary for the installations and operations of other trades such as mechanical, air-conditioning, plumbing, sanitary and others.

10.0.1 All contractors and all companies or persons providing labor, materials or both for this project, are specifically referred to the General Conditions of the specifications, to the general contract plans, to all Divisions of specifications and to the various other contract documents, which may affect the completion of the contract work.

10.1 CODES, INSPECTIONS, PERMITS AND FEES

10.1.0 The work under this contract shall be done according to the requirements of the latest edition of the Philippine Electrical Code, the rules and regulations of the Local Government Authorities of Quezon City and the requirements of Manila Electric Company. Nothing contained in this specification or shown on the drawings shall be construed as conflict with national and local ordinances or laws governing the installation of Electrical Works, and all such laws and ordinances are hereby made part of these specifications. The contractor is required to meet the requirements hereof.

10.1.1 All permits and electrical fees required for this work shall be obtained at the expense of the Contractor. The Contractor shall furnish the Architect or the Owner or the same maybe, a final certificate of electrical inspection and approval from the proper government authorities after completion of the work.

10.2 TEST

10.2.0 The electrical contractor shall apply such test, replace or remedy all defective work and adjust such system as needed or as the Architect or the owner shall direct. He shall also instruct the proper use of the system and equipments to persons designated by the owner. Submit copies of test data and results, including test reports on instrument to the engineer.

10.3 MEASUREMENTS

10.3.0 The Electrical Contractor shall procure from the Architect detailed drawings of those parts of the work not fully shown on the plans and he shall compare and verify with the Owner. Any lack of agreement shall be submitted at once to the Architect for adjustments.

10.4 SLEEVES AND FORMS FOR OPENINGS

10.4.0 The Electrical Contractor shall provide and place all sleeves, for piping penetrating floors, walls, partitions, etc. He shall locate all necessary slots and openings for his work and it shall be done at such time as not to delay the general contractor of the project.

10.5 LOCATION OF OUTLETS

10.5.0 All Outlets shall be truly centered in panels and spaces provided thereof. Any discrepancy outlet location between the electrical plan and architectural plans shall be submitted to the Architect at once and verified before outlets are installed.

10.6 GROUNDINGS

10.6.0 All metallic conduits, supports, cabinets and equipments shall be properly grounded and bonded by means of copper straps. The conduits of such system shall be grounded by connecting to the grounding rod.

10.6.1 All ground connection shall have clean outlet surfaces and shall be tinned and sealed while bolting. Unless otherwise specified, ground wire shall be installed in exposed conduits and connections made readily accessible for inspection. Connection shall not be made underground or concealed in floors or walls.

10.7 WIRING METHODS

10.7.0 All wiring shall in general be installed inside standard conduits. All conduits shall be run embedded in concrete, underground but in concrete envelope, embedded in hollow blocks partition, concrete slab, walls and roof above, between double wall wooden partitions if any, where the installation of concealed and/or embedded conduit wiring may be used, but only upon approval of the Owner's authorities concerned. Exposed conduits shall be rigid steel conduits unless otherwise specified.

10.8 GUARANTEE

10.8.0 The Electrical Contractor shall guarantee his work for a period of one (1) year from the date of final acceptance by the owner except for particulars items specifically mentioned in these specifications.

10.8.1 The Electrical Contractor shall, without additional compensation for the period specified, replace any work materials or equipment furnished and installed by him under this contract, which develop defects except from ordinary wear and tear.

10.9 MATERIALS

10.9.0 All materials shall be new and shall conform to the standards of **Underwriter's Laboratories, Inc.** In every case where such a standard has been established for the particular type of materials in question.

10.9.1 All materials on all system shall comply with the following specifications unless specified and all materials where not specified shall be of the best of their respective kind.

10.9.2 Samples on any materials shall be submitted for approval as required by the Architect.

10.10 WIRES

10.10.0 All wires shall be copper, soft drawn and annealed, shall be 98% conductivity, shall be smooth and true of a cylindrical form and shall be within the actual size called for.

10.10.1 All wires and cables shall comply with the requirements of the **Underwriter's laboratories**, the **ASTM** and the **IPCEA** as to their particular usage.

10.10.2 Wires and cables for outdoor and indoor lighting and power system shall be moisture and Heat Resistant Thermoplastic with nylon insulated for 600volts working pressure type THHN unless otherwise noted on the plans or specified.

10.10.3 For lighting and power system, no wire smaller than 3.5mm² shall be used except for control leads.

10.10.4 All wires and cables shall be manufactured by a reliable manufacturing company acceptable to the Electrical Engineer of the owner.

10.11 CONDUITS

10.11.0 The conduit system shall consist of the following

1. Intermediate Metal Conduit (IMC):

They shall be of standard sizes and weight, mild steel hot dipped galvanized with inside enamel or epoxy coating, acceptable to the Electrical Engineer of the Owner.

2. Polyvinyl chloride conduit (PVC):

They shall be of standard size and weight, made of polyvinyl chloride, extruded, heavy wall, rated for 90-degree centigrade cable, schedule 40.

3. Limitations of use shall be as follows:

- a. As per requirement of the latest edition of **PEC** and/or **NEC**.
- b. Not permitted where subject to mechanical damage.

10.11.1 All conduits shall be of true cylindrical form and shall be within the actual size called for.

10.11.2 No conduits shall be used in any system smaller than 15-mm electrical trade size, not shall have more than four 90 degrees bend in any one run, and where necessary, hand hole and pull boxes shall be provided.

10.11.3 No wires shall be pulled in any conduit until the conduit system is complete in all details. In case of underground work, until concrete envelope or masonry has been completed in every detail,. In case of concealed work, until rough plastering has been completed.

10.11.4 The ends of all conduits shall be tightly plugged to exclude plaster dust sand and soil including moisture while the renovation of the perimeter is in the process.

10.12 OUTLET BOXES AND FITTINGS

10.12.0 At all outlets of every kind, for all systems, there shall be provided a suitable fittings which shall be either a box or other device especially designed to receive the type of fitting to be mounted thereon.

10.12.1 The Contractor shall consult with the Architect as to the nature of various fittings to be used before installing his outlet fittings and shall conform strictly in the use of fittings so that the work when completed will be finished design.

10.13 SWITCHES

10.13.0 Local lighting switches shall be flush type, heavy duty, 15 ampere size 250 volts, bakelite case, quick connect terminal. Outdoor lights shall be automatically operated by means of photo switch and manual selection. Manually switch by means of breaker switch inside the lighting panel.

10.14 RECEPTACLES

10.14.0 Standard receptacles shall be 10-ampere size 250volts, parallel slots, duplex, flush mounted composition case, side wired with the insulated mounting yoke, If weatherproof wall plate are required, standard factory made metal waterproof plate shall be provided.

10.15 PLATES

10.15.0 All switches and receptacles plates shall be bakelite plastic, ivory-colored or as directed by the Architect

10.16 LIGHTING SYSTEM

10.16.0 The lighting system shall be complete in every respect all indicated on the plans or as indicated and specified in the Architectural plans. Exact fixture location shall be determined.

10.16.1 All wiring shall be installed in conduits, and in general shall be concealed. Buried underground in concrete encasement and/or embedded in concrete.

10.16.2 Mounting Height of devices shall be as indicated in the plans and/or subject to Architect's approval prior to installations as follows:

Local switches	-	1.4 above finish floor line
Receptacles	-	0.3 above finish floor line

10.17 DISTRIBUTIONS FEEDERS

- 10.17.0 Distribution voltage shall be 220volts, Single-phase, 3 wire. Feeder conductor and raceway shall be installed as shown on drawings and no change in size shall be made without written consent of the Architect. Feeder conductors shall be continuous, and without splices between terminals, when feeders are run in multiple, they shall be exactly of the same length to avoid **unbalanced division of the current**.

10.18 CONNECTORS AND INSULATION

- 10.18.0 Use solderless mechanical pressure type lugs, copper connectors for splicing wires greater than no 8mm.sq. All splices shall be properly insulated using #M brand rubber tape and plastic electrical tape. Application of two tapes shall be equivalent to the insulation of wire concerned, edges to provide smooth surfaces before taping.

10.19 BRANCH CIRCUITS

- 10.19.0 The drawings indicate the general methods of installation of all circuit wirings and the power lighting outlets which are to be supplied from this circuit. Branch circuit raceways shall be run from outlets to panel boards as direct as the ground and level condition will allow. Circuit allocations shall be as indicated on the drawings. Where it becomes necessary to connect any outlet to the circuit other than the one shown on the drawings, this shall be done without extra charge and only upon written consent of the Architect. No wire smaller than 3.5mm sq. shall be used for any lighting or power branch circuit. All lighting outlet shall be supplied from 2-wire single phase circuits. Number of wires for other outlets shall be as indicated on the drawings.

10.20 MOTOR CONNECTIONS

- 10.20.0 Connect the motor starting devices for all motors, except where otherwise specifically provided for under other contracts. Furnish all necessary connections between controllers and motors in conduit, and leave motor ready to start. The power supply leads to the motor from the controller shall be the same as the feeder indicated on the drawings, except for six terminal lead motor where wye-delta starting method is being applied.
- 10.20.1 Other trades, i.e. mechanical contractor, except as otherwise noted or specified will supply and deliver all controllers and shall erect and connect up safe complete.
- 10.20.2 The Electrical Contractor or trade people shall be held responsible as far as power supply to the controller is concerned. He shall ascertain the exact location of the motor controller and motors from other trades before installing the circuit work.

10.21 RECORD DRAWINGS AND AS BUILT PLANS

- 10.21.0 The Electrical Contractor shall keep an active record of the actual installation works during the progress job. The shall become the reference for the preparation of the As-Built Plans which shall include all pertinent information, complete in all aspects of the actual installations, all new information not originally shown in the contract drawings.
- 10.21.1 The As-Built Plans shall be prepared by the Electrical Contractor at his expense and shall be submitted to the Architect and the Engineer for approval upon the completion of the work. The approval of the As-Built drawings shall be a pre-requisite for the final acceptance of the electrical works.

10.21.2 Two (2) copies of the As-Built drawings, signed and sealed by the **Electrical Contractor's Professional Electrical Engineer**, shall be submitted to the Architect and Engineer consultants. Original tracing/ reproducible copy shall also be submitted.

Note: In contrast between these Technical Specifications and the approved Plans issued to the Contractor, the approved Plans shall prevail. See also the approved program of works. In case of doubt, for clearer outlooks consult the assigned Architect/Engineer.

Prepared by:

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Republic of the Philippines
Quezon City
Office of the City Mayor
QUEZON CITY BIDS & AWARDS COMMITTEE
(QC-BAC-INFRA)



PROJECT : PROPOSED CONSTRUCTION OF BAESA COLUMBARIUM WITH LAND DEVELOPMENT (PUBLIC TOILET)

LOCATION : Barangay Baesa, Quezon City

SUBJECT : GENERAL CONDITIONS AND TECHNICAL SPECIFICATIONS

I. GENERAL CONDITIONS

1.01 DEFINITIONS

- a. **OWNER :** LOCAL GOVERNMENT OF QUEZON CITY
- b. **CONTRACTOR :** Any individual, firm, corporation, partnership or association that enters into an agreement with the Owner for furnishing the materials and/or labor, tools, equipment, plant and other facilities required for the erection and completion of the project subject to the accompanying plans and working drawings.
- c. The Owner/Implementing Agency and the Contractor are treated through the contract documents as if each were of the regular number, masculine gender.

1.02 EXAMINATION OF MEMBER

The Contractor shall carefully examine the premises before submitting any bids to enable him to have full knowledge of conditions existing therein.

1.03 LOCATION

The Proposed Construction of Baesa Columbarium with Land Development (Public Toilet) is to be constructed at Barangay Baesa, Quezon City.

1.04 EXECUTION, CORRELATION & INTENT OF DOCUMENTS

1. The Contract Documents are signed in sufficient number of copies by all parties concerned. In case anybody fails to sign copies of any item forming part of the set contract documents, the Implementing Agency's identification thereon shall suffice.
2. The items, specifications and all other documents forming the contract documents are complementary. Anything shown on plans but not mentioned in the specifications or vice versa or anything not expressly set forth in either, but necessarily implied, shall be furnished or done as if specifically shown and mentioned in both, with no extra charge. Where dimensions are given in figures, follow them in preference to measurement by scale.
3. Execute work as per agreement, making no changes or deviations whatsoever, without prior permission from the Implementing Agency.

4. The Contractor shall verify and check all dimensions particularly those on the plans. He will be held directly responsible in case of any discrepancy that may be discovered during the progress of work.

1.05 DETAIL DRAWINGS AND INSTRUCTIONS

Plans furnished for use at the jobsite are whenever necessary, supplemented by detail drawings and instructions essential to the proper execution of the work. Such supplementary detail drawings and instructions shall be treated as of equal force as though originally issued.

1.06 PLANS AND PROJECT SITE

Keep at project site, in good order and condition, one (1) set of approved plans, specifications, supplementary detail drawings and instructions.

1.07 SHOP DRAWINGS

Shop drawings shall be provided by the Implementing Agency and/or Contractor during the progress of construction. The contractor should not place any item subject to shop drawings until the Implementing Agency shall have duly approved such drawings.

1.08 CHANGES

The Owner and the Implementing Agency reserve the right to make alterations or additions, including changes during the progress of work. The same shall be carried into effect without in any way deviating from or violating any agreement. Whatever amount shall necessarily be entailed in the cost of labor or materials or both shall be added to or deducted from the original contract price.

1.09 TIME OF COMPLETION AND SCHEDULE OF CONSTRUCTION

The Contractor shall, before actual commencement of the project operations, prepare and submit to the Implementing Agency for verification and approval, a complete and comprehensive work schedule covering the entire duration of construction. He shall also include therein, the estimated number of days within which the entire project shall be completed stage by stage by phase.

1.10 WORKMANSHIP

The project shall be executed with the use of first class workmanship to the full intent and meaning of the plans and specifications and to the complete approval and acceptance by the Implementing Agency.

1.11 MATERIALS

All materials to be used shall be the best of their respective types and kind. They shall be properly stored and protected from damage or injury.

1.12 SAMPLES

Submit samples as specified and proceed with the work with the use of materials procured based on the samples previously approved by the Implementing Agency.

1.13 INSPECTION OF WORK

The Contractor shall provide the facility for inspecting the work to the Implementing Agency, the Owner and other personnel having jurisdiction over the work.

1.14 DEFECTIVE OR IMPROPER WORK

All work or materials not acceptable to the Architect shall be removed immediately and replaced with appropriate work or materials without extra charge. All condemned materials shall be taken away from the premises without delay.

1.15 BUILDING LAWS AND REGULATIONS

The Contractor shall be held responsible for strict compliance with existing labor laws and regulations and shall free the Owner from any responsibility in connection therewith, he shall pay on time at his own expense, all taxes, fees and/or licenses due to the government, both national and local arising from his work on the project.

1.16 MANNER OF PAYMENT

Payments to the Contractor shall be based on the periodic work accomplishments subject to verification, approval and recommendation by the Implementing Agency.

1.17 RETENTION MONEY

Progress payments shall be subject to a ten percent (10%) deduction, referred to as retention money. All retained amounts shall be released upon satisfactory completion of the work and issuance of the Certificate of Final Completion and Acceptance.

1.18 TEMPORARY WATER, POWER AND TELEPHONE FACILITIES

The Contractor shall make the necessary arrangements with the local utility companies so as to provide temporary facilities for the supply of water, power and telephone for the duration of construction, and all expenses in connection therewith shall be borne by the Contractor.

1.19 PRIVY

The Contractor shall provide a temporary privy in a most inconspicuous and sanitary manner, and shall have it removed at the termination of the work.

1.20 CLEARING AND CLEANING

Upon its completion, the project and its premises shall be cleared and cleaned as directed by the Implementing Agency, and make ready for immediate occupancy.

1.21 TEMPORARY BARRICADES, SIGNAL LIGHTS, BILLBOARDS, ETC.

The Contractor shall provide all temporary barricades, signal lights, Architect and Contractor's billboards, the required official building billboard, etc., necessary for the protection of the public and for the proper prosecution of the work and display of construction requirements.

1.22 PERFORMANCE AND GUARANTEE BOND

To guarantee the faithful performance of the Contractor under the contract, he shall post a Performance Bond in the amount of thirty percent (30%) of the contract price in the form of cash, manager's check or surety bond, callable on demand.

1.23 QUESTIONS AND DISAGREEMENTS

All questions and disagreements between the Contractor and the Owner relative to the interpretation of the plans and specifications shall be referred to the Implementing Agency whose decision on the matter shall be final.

II. TECHNICAL SPECIFICATIONS

2.0 SITE WORK

WORK INCLUDED

- 2.0.0 All excavation works including all necessary shoring, bracing and drainage of storm water from the site.
- 2.0.1 All soil treatment, backfilling, filling, compaction and grading, removal of excess material from site.
- 2.0.2 Protection of property, work and structures, workmen and other people from damage and injury.
- 2.0.3 Demolition of existing road pavement as indicated in the drawings.
- 2.0.4 Laying of utility/auxiliary lines as indicated in the drawings.
- 2.0.5 Survey and Stake-out works

2.1 LINES, GRADES AND BENCHMARKS

- 2.1.0 Stake out accurately the lines of the building and/or the other structures included in the contract, and establish grades therefore, after which secure approval of the Project Manager before any excavation work is commenced.
- 2.1.1 Erect basic batter boards and basic reference marks at such places where they will not be disturbed during the construction of the foundation.

2.2 EXCAVATION

Structural Excavations: Excavations shall be to the depths indicated in the drawings where bearing value as indicated in the Soils Investigation Report provided as part of the Construction Documents shall be attained. Excavations for footings and foundations carried below required depths shall be filled with lean concrete and bottom of such shall be level. All structural excavations shall extend a sufficient distance from the walls and footings to allow for proper erection and dismantling of forms, for installation of service and for inspection.

All excavations shall be inspected and approved before pouring any concrete laying underground utility and auxiliary lines for placing select fill materials. The Contractor shall control the grading in the vicinity of all excavated areas to prevent surface drainage running into excavations. Water that accumulates in excavated areas shall be removed by pumping before fill is placed herein.

2.3 SOIL TREATMENT

Treat soil with 2% Chlordane or Andrex solution in water to provide an unbroken horizontal and vertical chemical barrier between the proposed structure and the possible termite colonies in the soil after excavation is completed and prior to pouring of concrete

foundation and ground floor slabs. At the time the soil treatment is to be applied, the soil shall be in a friable condition with a sufficient low moisture content to allow uniform distribution of the treatment solution throughout the soil.

Do not apply pesticide during or immediately after heavy rains, or whenever climatic conditions are such that runoff will occur to create an environmental hazard. Cover treated areas with polyethylene or waterproof sheeting if concrete is not poured on the same day as the soil treatment. Take adequate precautions to prevent disturbance of the pesticide barrier. Re-treat the soil or fill is disturbed after the treatment and before the placement of structural components. Apply pesticide prior to placement of vapor barrier or waterproofing membrane.

2.4 SHORING

Excavation shall be shored and braced by members of suitable sizes where necessary to prevent danger to persons, injurious caving or erosions. Shoring bracing and sheathing shall be removed, as the excavations are backfilled, in a manner such as to prevent injurious caving. The contractor shall keep all excavations free from water while construction is in progress.

2.5 FILLING AND BACKFILLING

After forms have been removed and when concrete work is hard enough to resist pressure resulting from fill, backfilling may then be done. Materials excavated may be used for backfilling. All filling shall be placed in layers not exceeding six (6) inches in thickness, each layer being thoroughly compacted and rammed by wetting, tamping, rolling.

2.6 PLACING AND COMPACTING FILL

2.6.0 Common Fill: shall be approved imported/site-excavated material free from roots, stumps and other perishable or objectionable matter.

2.6.1 Select Fill: shall be placed where indicated and shall consist of crushed gravel, crushed rock or a combination thereof. The material shall be free from adobe, vegetable matters and shall be thoroughly tamped after lacing.

2.6.2 Before placing fill materials, the surface upon which it shall be placed shall be cleared of all brush roots, vegetable matter and debris, and thoroughly wetted to ensure good bonding between grounds.

2.6.3 Compaction: Fills shall be evenly spread in horizontal layers of not more than 200mm in thickness. Each layer shall be wetted and compacted by approved mechanical compaction machine, roller or portable to a density of at least 90% or its maximum density for non-cohesive soils as determined by ASTM Method D-1557 or AASHTO Method T-180.

2.7 FINISH GRADING

The contractor shall fill and grade the whole area to the indicated sub-grade elevations as directed by the Architect or Engineer. The contractor shall verify the finish grade elevations of the proposed pavements. Prior to grading operations, the areas shall be cleared of all heavy growth or vegetation stumps, roots, cables, wires, rocks and other debris. The finished sub-grade shall be reasonably smooth and compacted and ready to receive the base course for the proposed pavement.

2.8 DISPOSAL OF EXCESS MATERIALS

Any excess and demolished materials remaining after completion of the earthwork shall be disposed of by hauling and transported out of the premises at the contractor's own expense.

2.9 SUB-GRADE PREPARATION

2.9.0 SCOPE

The sub-grade preparation shall be that part of the work which is the preparation for the support of the bases for pavements and structures. It shall extend to the full width of pavements including shoulders and lay-bys as shown on the drawings or as specified herein. Unless otherwise agreed upon by the Engineer, sub-grade preparation on a section of the road shall not be commenced unless the contractor is able, after the completion and acceptance of the work, to commence immediately pavement construction.

2.9.1 PRODUCTS

All materials and equipment necessary for proper completion of this work shall be subject to the approval of the Engineer.

2.9.2 EXECUTION

2.9.2.0 Prior Works: Prior to commencing the preparation of the sub-grade, all culverts, cross drains, and other similar structures (including the fully compacted backfill) shall be completed. No work shall be started on the preparation of the sub-grade before the prior works herein approved by the Engineer.

2.9.2.1 Sub-grade Level Tolerance: The finish compacted surface of the sub-grade shall conform to AASHTO M-145.

2.9.2.2 Sub-grade in Cutting Common Material

- a. Unless otherwise specified, all materials below sub-grade level in earth cutting to a depth of 150mm or other depth shown on the drawings or directed by the Engineer shall be excavated. The material, if suitable, shall be placed to one side for re-use, or if unsuitable, shall be disposed of in accordance with the requirements of AASHTO M-145.
- b. Where material has been removed from below sub-grade level, the base of the resulting cutting shall be compacted to a depth of 150mm to the requirements of AASHTO M-145 Table 1. If necessary, the moisture content of the material shall be adjusted.

2.10 GRADED AGGREGATES AND BASE COURSE

2.10.0 SUBMITTALS

- a. Test Reports: Before delivery of materials, submit the following test reports:
 1. Gradation
 2. Bearing Ratio
 3. Attenberg Limits

2.10.1 DELIVERY AND STORAGE

Do not construct base course when rainfall or other weather conditions will detrimentally affect the quality of the finished course.

2.11 PRODUCTS

2.11.0 MATERIALS

- a. Aggregates: Consist of durable sound crushed gravel, crushed stone, free of lumps and balls of clay or other objectionable matter. Crushed stone shall be free from flat, soft or disintegrated pieces. Crushed gravel retained on a No. 4 sieve shall have at least ninety percent (90%) by weight with at least two fractured faces one hundred percent (100%) by weight with at least one fractured face.
- b. Base course materials samples shall have a Bearing Ratio of at least 100 as determined by laboratory tests on a 4-day soaked specimen in accordance with ASTM D 1883; compact specimen in accordance with ASTM D 1557, Method D. Determine grain size in accordance with ASTM C-117.
- c. Soil binder material, the surface of the layer by a combination of rolling and blading. Final surface shall be smooth and free from waves, irregularities and from ruts of soft yielding spots.

CONCRETE

3.0 GENERAL

3.0.0 Unless otherwise specified herein, concrete work shall conform to the requirements of ACI Building Code. Full cooperation shall be given other trades to install embedded items. Provisions shall be made for setting items not placed in the forms. Before concrete is placed, embedded items shall have been inspected and tested for concrete aggregates and other materials shall have been done.

3.1 SUBMITTALS

3.1.0 Shop Drawings: Reproduction of contract drawings is unacceptable.

3.1.1 Shop Drawings for Reinforcing Steel: ACI 315. Indicate bending diagrams, assembly diagrams, splicing and lap 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 bars.

3.1.2 Contractor Mix Design: Thirty (30) days prior to concrete placement, submit a design for each strength and type of concrete. Furnish a complete list of materials including type, brand; source and amount of cement and admixtures; applicable reference specifications and copies of test reports showing that the mix has been successfully tested to produce concrete with the properties specified and will be suitable for the job conditions. Provide fly ash and pozzolan test results performed within six (6) months of submittal date. Obtain approval before concrete placement.

3.1.3 Certificates of Compliance

- a. Aggregates

- b. Admixtures
- c. Reinforcement
- d. Cement

3.1.4 Catalogue Data

- a. Water stops
- b. Materials for Curing Concrete
- c. Joint Sealant
- d. Joint Filter
- e. Vapor Barrier
- f. Epoxy Bonding Agents

3.2 MATERIALS

- 3.2.0 Cement for concrete shall conform to the requirements of specifications for Portland cement (ASTM C-150).
- 3.2.1 Water used in mixing concrete shall be clean and free from other injurious amounts of oil, acids, alkaline, organic materials or other substances that may be deleterious to concrete or steel.
- 3.2.2 Fine Aggregates shall consist of hard, tough, durable uncoated particles. The shape of the particles shall be generally rounded or cubicle and reasonably free from flat or elongated particles. The stipulated percentages of fines in the sand shall be obtained either by processing sand or by the production of suitable graded manufactured sand.
- 3.2.3 Coarse Aggregates shall consist of gravel. Crushed gravel or rock. Or a combination of gravel and rock. Coarse aggregates shall consist of hard, tough, durable, clean and uncoated particles. The size of coarse aggregates top be used in the various parts of the Work shall be ¾".
- 3.2.4 Reinforcing bars shall conform to the requirements of PNS-49 Standard specifications for Billet Steel Bars for concrete reinforcement (A15-625). Tensile strength and grade for all reinforcing bars such as main horizontal (for beams), vertical (for columns), ties, stirrups and inserts shall be as follows:

SCHEDULE OF REINFORCING BARS (PNS-49)

DIAMETER OF BARS	GRADE (fy)	
12mmØ & smaller	230 MPA	Grade 33
16mmØ to 25mmØ	275 MPA	Grade 40

3.3 PROPORTIONING AND MIXING

- 3.3.0 Proportioning of all materials entering into the concrete mixture of 3,000 psi concrete shall be as follows:

<u>Class</u>	<u>Cement</u>	<u>Sand</u>	<u>Gravel</u>
A	1	2.0	4

- 3.3.1 Strength of Concrete: Concrete shall have a 28-day cylinder strength of 3,000 psi for all structures.
- 3.3.2 Mixing: The 3,000 psi concrete can be machine mixed on-site. On-site mixing shall be within 30 minutes after the cement has been added to the aggregates.

3.4 FORMS

3.4.0 General: Forms shall be used whenever necessary to continue the concrete and shape it to the required lines, or to ensure the concrete contamination with materials caving from adjacent excavated surfaces. Forms shall have sufficient strength to withstand the pressure resulting from placement and vibration of the concrete, and shall be maintained rigidly in correct position. Forms shall be sufficiently tight to prevent loss of mortar from the concrete. Forms for exposed surfaces against which backfill is not to be placed shall be lined with a form grade plywood or metal panels.

3.4.1 Cleaning and Use of Forms: Before placing the concrete, the contact surfaces of the form shall be cleansed of encrustation of mortar, the grout or other foreign material, and shall be coated with commercial form oil that will prevent sticking and will not stain the concrete surfaces.

3.4.2 Removal of Forms: Forms shall be removed in a manner that will prevent damage to the concrete. Forms shall not be removed without approval. Any repairs of surface imperfections shall be performed at once and airing shall be started as soon as the surface is sufficiently hard to permit it without further damage.

3.5 PLACING REINFORCEMENT

General: Steel reinforcement shall be provided as indicated, together with all necessary gauge 16 G.I. wire ties, chairs, spacers, supports and other devices necessary to install and secure the reinforcement properly. All reinforcement, when placed, shall be free from loose, flaky rust and scale, oil grease, clay and other coating and foreign substances that would reduce or destroy its bond with concrete. Reinforcement shall be placed accurately and secured in place by use of metal or concrete supports, spacers and ties. Such supports shall be of sufficient strength to maintain the operation. The supports shall be used in such manner that they will not be exposed or contribute in any way, to the discoloration or deterioration of the concrete.

3.6 CONVEYING AND PLACING CONCRETE

3.6.0 Conveying: Concrete shall be conveyed from mixer to forms as rapidly as practicable, by methods that will prevent segregation, or loss of ingredients. There will be no vertical drop greater than 1.5 meters except where suitable equipment is provided to prevent segregation and where specifically authorized.

3.6.1 Placing: Concrete shall be worked readily into the corners and angles of forms and around all reinforcement and embedded items without permitting the material to segregate. Concrete shall be deposited as close as possible to its final position in the forms so that flow within the mass does not exceed two (2) meters and consequent segregation is reduced to a minimum near forms or embedded items, or elsewhere as directed. The discharge shall be so controlled that the concrete may be effectively compacted into horizontal layers not exceeding 30 centimeters in depth within the maximum lateral movement specified...

3.6.2 Time interval between mixing and placing: Concrete shall be placed before initial set has occurred and before it has contained its water content for more than 45 minutes.

3.6.3 Consolidation of concrete: Concrete shall be consolidated with the aid of mechanical vibrating equipment and supplemented by hand spading and tamping. Vibrators shall not be inserted into lower coursed that have

commenced initial set and reinforcement embedded in concrete beginning to set or already set shall not be disturbed by vibrators. Consolidation around major embedded parts shall be by hand spading and tamping and vibrators shall not be used.

- 3.6.4 Placing concrete through reinforcement: In placing concrete through reinforcement, care shall be taken that no segregation of the coarse aggregate occurs. On the bottom of beams and slabs, where the congestion of steel near the forms makes placing difficult, a layer of mortar of the same cement-sand ratio as used in concrete shall be first deposited to cover the surface.

3.7 CURING

- 3.7.0 General: All concrete shall be moist-cured for a period not less than seven (7) consecutive days by an approved method or combination applicable to local conditions.

- 3.7.1 Moist curing: The surface of the concrete shall be kept continuously wet by covering with burlap, plastic or other approved materials thoroughly saturated with water and keeping the covering wet spraying or intermittent hosing.

3.8 FINISHING

- 3.8.0 Concrete surfaces shall not be plastered unless otherwise indicated. Exposed concrete surfaces shall be formed with smooth form material, and after removal of forms, the surfaces shall be smooth, true to line and shall present a finished appearance except for minor defects which can be easily repaired by patching with cement mortar, or can be ground to a smooth surface to remove all joint marks of the form work.

- 3.8.1 Concrete slabs on fill: The concrete slabs on fill laid on a prepared foundation consisting of sub-grade and granular fill with thickness equal to the thickness of overlaying slab except as indicated otherwise.

3.9 SURFACE FINISHES

- 3.9.0 Defects: Repair formed surfaces by removing minor honeycombs, pits greater than one square inch surface area or 0.25 inch maximum depth, or otherwise defective areas. Provide edges perpendicular to the surface and patch with non-shrink f=grout. Patch the holes and defects when the forms are removed.

- 3.9.1 Floor slabs, Pavements and Miscellaneous Construction: Unless otherwise specified, slab at the fountain area are straight to finish with waterproofing. Slope floors uniformly to drains where drains are provided. Depress the concrete base slab where Bomanite, Granite or Ceramic tiles are indicated.

- 3.9.2 Finish: Place, consolidate and immediately strike-off concrete to obtain proper contour, grade and elevation. A set sufficient for floating and supporting the weight of the finisher and equipment.

- 3.9.3 Pavements: Screed the concrete with a template advanced with a combined longitudinal and crosswise motion. Maintain a slight surplus of concrete ahead of the template. After screeding, float the concrete longitudinally and refloat as necessary. Obtain final finish by belting. Lay belt flat on the concrete surface and advance with a sawing motion; continue until a uniform but gritty non-slip surface is obtained. Round edges and joints with an edger having a radius of 1/8 inch.

- 3.9.4 Broomed: Provide for exterior walks, platforms, patios and ramps. Unless otherwise indicated, provide a floated finish, and then finish with a flexible bristle broom. Permit surface to harden sufficiently to retain the scoring or ridges. Broom traverse to traffic or at right angles to the slope of the slab.
- 3.9.5 Pits and Trenches: Place bottoms and walls monolithically or provide water stops and keys.
- 3.9.6 Curbs and Gutters: Provide contraction joints spaced at every 10 feet maximum unless otherwise indicated. Cut contraction joints $\frac{3}{4}$ -inch deep with a jointing tool after the surface has been finished. Provide expansion joints $\frac{1}{2}$ -inch thick and spaced at every 100 feet maximum unless otherwise indicated. Provide a pavement finish.

3.10 MISCELLANEOUS

- 3.10.0 Construction Joints: Locate joints to least impair strength; continue reinforcement across joints unless otherwise indicated.
- 3.10.1 Expansion Joints and Contraction Joints: For slab on grade, provide at edges of interior floor slab, adjacent to walls as indicated. Completely fill joints exposed to weather with joint filler material and joint sealant. Do not extend reinforcement or other embedded metal items bonded to the concrete through any expansion joints unless an expansion sleeve is used. Provide contraction joints, either formed or saw cut or cut with a jointing tool, to the indicated depth after the surface has been finished. Sawed joints shall be completed within 4 to 12 hours after concrete placement. Protect joints from intrusion of foreign matter.

MASONRY

4.0 MATERIALS

- 4.0.0 Concrete Hollow Blocks (CHB) shall have a minimum face thickness of 1" (25mm). Nominal size shall be 8" x 8" x 16", minimum compressive strength shall be 500 psi for non-load bearing and 700-1000 psi for load bearing. All units shall be stored for a period not less than 28 days (including curing period) and shall not be delivered to the job site prior to that time unless the structure is equal or more than the specified.
- 4.0.1 Prior to commencing the preparation of the sub-grade, all culverts, cross drains, and other similar structures (including the fully compacted backfill) shall be completed. No work shall be started on the preparation of the sub-grade before the prior works herein approved by the Engineer.
- 4.0.2 Cement shall be standard Portland cement ASTM C-150-68 Type 1.
- 4.0.3 Mortar: Mix mortar from 3 to 5 minutes in such quantities as needed for immediate use. Re-tempering will not be permitted if mortar stiffens because of premature setting. Discard such materials as well as those that have not been used within one hour after mixing. Proportioning shall be one (1) part Portland cement and two (2) parts sand by volume, but not more than one (1) part Portland cement and three (3) parts sand by volume.

4.1 SUBMITTALS

- 4.1.0 Submit samples for approval two (2) samples each of each type of wall reinforcement and wall ties.

- 4.1.1 **Certificates of Conformance:** Submit certificate attesting that masonry cement, masonry units, aggregates and accessories meet the requirements specified.

4.2 ERECTION

- 4.2.0 All masonry shall be laid plumb, true to line, with level and accurately spaced courses, and with each course breaking joint with the source below. Bond shall be kept throughout corners and reveals shall be plumb and true. Units with greater than 12% absorption shall be wet before laying. Work required to be built in masonry; including anchors, wall plugs and accessories shall be built-in as the erection progresses.
- 4.2.1 **Masonry Units:** Each course shall be solidly bedded in Portland cement mortar. All units shall be damp when laid units shall be showed into place not laid, in a full bed of un-furrowed mortar. All horizontal and vertical points shall be completely filled with mortar when and as laid. Each course shall be bonded at corners and intersections. No cells shall be left open in face surfaces. All cells shall be filled up with mortar for exterior walls. Units terminating against beam or slab soffits shall be wedged tight with mortar. Do not lay cracked, broken or defaced block.
- 4.2.2 **Lintels** shall be of concrete and reinforced as required. Lintels shall have a minimum depth of 0.20 (8") and shall extend to at least 0.20 (8") on each side of opening and reinforced with 2-12mmØ re-bars and 10mmØ lateral ties @ 200mm o.k.
- 4.2.3 **Plastering:** Clean and evenly wet surfaces. Apply scratch coat with sufficient force to form good keys. Cross scratch coat upon its initial set; keep damp. Apply coat after each scratch coat has set at least 24 hours after scratch coat application. Lightly scratch brown coat; keep moist for two (2) days; allow drying out. Do not apply finish until brown coat has seasoned for seven (7) says. Just before applying coat, wet brown coat again. Float finish coat to true even surface; trowel in manner that will force sand particles down into plaster, with final trawling, leave surfaces banished smooth free from rough areas, trowel marks, checks, other blemishes. Keep finish coat moist for at least two (2) days; thereafter protect against rapid drying until properly, thoroughly cured.

4.3 SCAFFOLDING

- 4.3.0 Provide safe wood or metal scaffolding required for masonry and other related work, including cleaning down on completion. Remove upon demobilization.

4.4 SURFACE PREPARATION

- 4.4.0 **Vitrified Floor Tile Installation:** Do not stat floor tiling occurring in space where both floor and wall tile setting has been completed. Before spreading setting bed, establish borderline center wires in both directions to permit laying pattern with minimum of cut tiles. Lay floors without borders from centerline outward. Make adjustments at walls. Clean concrete sub-floor and moisten it without soaking. Sprinkle dry cement over surface. Spread setting bed mortar on concrete and tamp to assure good bond over the entire area then screed to smooth, level bed. Set average setting bed thickness at ¾" but not less than ½".
- 4.4.1 **Wall:** Scratch coat application as foundation coat shall be at most ½". While still plastic, deeply score scratch coat or scratch and cross-scratch. Protect scratch coat and keep reasonably moist within seasoning period. Use mortar for scratch floor coats, within one hour after mixing. Re-tempering of partially hardened

mortar is not permitted. Set scratch coat be cured for at least two (2) days before starting the setting.

4.5 CLEANING

- 4.5.0 Protection: Protect work which may be damaged, stained or discolored during cleaning operations.
- 4.5.1 Pointing: Upon completion of masonry work, cut out defective mortar joints and tuck joints and all holes solidly with mortar.
- 4.5.2 Cleaning: Clean exposed masonry surface with clear water and stiff fiber brushes and rinse with clean water. Where stains, mortar or other soil remain, continue cleaning as follows: Clean masonry surfaces by scrubbing with warm water and soap and rinsing thoroughly with clean water. Restore damaged, stained and discolored work to its original conditions or replace with new work.

V STRUCTURAL STEEL

GENERAL

5.0 SCOPE OF WORK

The work includes the fabrication, erection and painting of structural steel. All structural steel work shall be in accordance with the AISC latest "Specifications for the Design, Fabrication and Erection of Steel for Buildings". The contractor shall furnish plates, clip angles connections and other miscellaneous work required for the completion of the structure.

5.1 SUBMITTALS

- 5.1.0 Shop Drawings: Submit shop drawings of all structural steel for approval prior to fabrication. Include complete information necessary for the fabrication and erection of the structure's components, including location, type and size of bolts, welds, member sizes and lengths, connection details, blocks, copes and cuts. Use AWS standard welding symbols.
- 5.1.1 Erection Plan. Submit for record purposes. Indicate the sequence of erection, temporary shoring and bracing and a detailed sequence of welding including each welding procedure.
- 5.1.2 Manufacturer's Certificates of Conformance.
 - a. Structural Steel
 - b. Bolts, nuts and washers
 - c. Shop painting materials
 - d. Welding electrodes and rods
 - e. Non-shrink grout
- 5.1.3 Welding: Submit descriptive data to illustrate the sequence of welding and each welding procedure to be used. Perform welding with qualified welders. The qualification of welders and the duration of qualification period shall be in accordance with the requirements of AWS. Any welder found to be producing unsatisfactory work even if he has passed qualification tests shall be immediately re-certified or replaced with a qualified welder.

5.2 REFERENCE STANDARDS

5.2.0 Comply with the latest edition of the following as applicable, unless otherwise specified or modified.

- a. AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), 1978: Specification for the Design, Fabrication and Erection of Structural Steel for Buildings. Code of Standard Practice for Steel Buildings and Bridges; Specification for Architecturally Exposed Structural Steel.
- b. AMERICAN WELDING SOCIETY (AWS): Standard Welding Symbols A2.0-68; Standard Welding Code D1.1-1973 (Rev 1-73 & 2-74) (To govern if in conflict with AISC).
- c. RESEARCH COUNCIL ON RIVETED AND BOLTED JOINTS OF THE ENGINEERING FOUNDATION (RCRBJ): Specification for Structural Joists using ASTM A-325-76s Bolts.
- d. STRUCTURAL STEEL PAINTING COUNCIL (SSPC): Painting Manual, Vol. 1; Good Painting Practice, Painting Manual, Vol. 2; Systems and Specifications.
- e. STEEL JOIST INSTITUTE-AMERICAN INSTITUTE OF STEEL CONSTRUCTION (SJI-AISC): "Standard Specifications for Open Web Steel Joists", and "Standard Specifications for Long Span Steel Joists", 1978 Editions.
- f. AMERICAN IRON AND STEEL INSTITUTE (AISI): "Specifications for the Design of Cold-Formed Steel Structure Members, 1974".

5.3 PRODUCTS

5.3.0 Steel: Structural Steel ASTM A-440 with minimum yield strength, $f_y=290$ mPa

5.3.1 BOLTS, NUTS AND WASHERS. Provide the following, unless otherwise indicated:

- a. Structural Steel
- b. Bolts: ASTM A325, Galvanized 78mmØ and below. A-490 1" Ø and above.
- c. Nuts: ASTM A325, Galvanized 78mmØ and below. A-490 1" Ø and above
- d. Washers: ANSI B 18.22.1, Type B

5.3.2 SHOP PAINTING

- a. Pre-treatment: Fed. Spec. TT-C-490, Type I, II or IV
- b. Primer Paint: Fed. Spec. TT-P-645

5.3.3 GALVANIZING

- a. Galvanizing Repair Paint: Mill Spec. DOD-P-21035

5.3.4 STRUCTURAL STEEL ACCESSORIES

- a. Welding Electrodes and Rods: AWS Code D1-1. E7018 Non-Shrink with minimum yield strength, $f_y=290$ mPa

- b. Non-Shrink Grout: With no ASTM C827

5.4 EXECUTION

5.4.0 FABRICATION

5.4.0.0 Markings: Prior to erection, members shall be provided with a painted erection mark. In addition, connection parts assembled in the shop for reaming holes in field connections shall be match-marked with scratch and notch marks. Do not locate erection markings on areas to be welded or on surfaces of weathering steels that will be exposed to the completed structure. Do not locate match-markings in areas that will decrease member strength or cause stress concentrations.

5.4.0.1 Shop Painting: Shop paint structural steel except as modified herein. Do not paint steel surfaces embedded in concrete, galvanized surfaces, bearing surfaces, or surface within $\frac{1}{2}$ inch of the toe of the welds prior to welding. Prior to assembly, paint surfaces that will be concealed or inaccessible after assembly. Do not apply paint in foggy or rainy weather when paint may be exposed to temperature below 40 degrees F within 48 hours after application, unless approved otherwise.

- a. Cleaning: SSPC SP6, except as modified herein, SSPC SP3 or SP6 for steel surfaces exposed in spaces above ceilings, attic spaces, crawl spaces and chases. In addition, maintain steel surfaces free from rust, dirt, oil, grease and other contaminants through final assembly.
- b. Pre-Treatment: Immediately after cleaning, provide the metal surfaces with one coat of Mil. Spec. DOD-P-15328 pre-treatment to dry film thickness of 0.3 to 0.5 mil. Fed. Spec. TT-C-490, pre-treatment may be applied to SSPC DP6 cleaned surfaces in accordance with Fed. Spec. TT-C-490.
- c. Priming: Immediately after the pre-treatment coating has dried, apply primer to a minimum dry film thickness of 2.0 mil. Primer paint shall be zinc chromate conforming to Fed. Spec. TT-P-645. Repair damaged prime surfaces with an additional coat of primer.

5.4.0.2 Galvanizing: Provide as indicated or specified. Galvanize after fabrication where practicable.

- a. Galvanizing Repair: ASTM A780, using galvanizing repair paint for galvanizing damaged by handling, transporting, cutting, welding or bolting. Do not heat surfaces that repair paint has been applied to.

5.4.0.3 Bearing Surfaces and Friction Type Joints: In the shop, coat with a temporary rust preventive. Remove coating, as recommended by the coating manufacturer, immediately prior to field erection.

5.4.0.4 Surface Finishes: ANSI B46.1 maximum surface roughness of 125 pin, pinholes and sliding bearing, unless indicated otherwise.

5.4.0.5 Erection. Except when load indicator bolts are used, calibration wrenches shall be calibrated every two (2) working days on a minimum of three (3) typical bolts of each diameter. Provide for drainage in structural steel.

- a. Base Plates and Bearing Plates; after final positioning of members, provide full bearing under plates using non-shrink grout. Place non-shrink grout in accordance with the manufacturer's instructions.
- b. Field Painting: After erection, the field bolt heads and nuts, field welds, and any abrasions in the shop coat shall be cleaned and primed with paint of the same quality as that used for the shop priming.

5.4.1 SOURCE QUALITY CONTROL

Errors of Shop Drawing, Fabrication, correct fitting and alignment of the various metal items or component members shall be the responsibility of the contractor. However, the contractor shall permit the Architect or an independent inspection agency, if engaged by the Owner, to inspect work in progress in his shop. Such inspections shall not relieve the contractor of his responsibility to furnish materials and workmanship in accordance with the Contract Documents.

5.4.2 PRODUCT DELIVERY, HANDLING AND STORAGE

Handle and store in such manner as to prevent damage or disfigurement. Store finished items or components above ground on platforms, pallets or other supports and protect from harmful elements.

5.5 PROTECTION

The Contractor shall protect any existing work subject to damage during the installation of specified work and shall adequately protect specified work during installation. Finished work that is readily subject to damage by subsequent work or environmental conditions shall be protected by the Contractor immediately following the installation thereof.

5.6 FIELD MEASUREMENTS

Contractor shall make measurements in field to verify or supplement dimensions indicated and be responsible for accurate fit of specified work.

5.7 FIELD QUALITY CONTROL

Facilities shall be provided by the Contractor as needed for the proper inspection of the specified work, including temporary platforms, hoists, protective devices, electric current, etc. Improper workmanship, as determined by the Architect shall be corrected and replaced, at no additional cost to the Owner.

5.8 CONNECTIONS

Connections and not detailed shall be designed in accordance with AISC "Manual of Steel Construction". Build connections into existing work. Do not tighten anchor bolts set in concrete with impact torque wrenches. Punch, sub punch and ream or drill bolt and pin holes.

5.9 WELDING: Provide AWS D1.1 qualified welders, welding operators and tacklers.

5.10.1 Removal of temporary welds, run-off plates and backing strips, remove only from finished areas

- 5.10 TESTS AND INSPECTIONS:** Perform field tests, and provide labor, equipment and incidentals required for testing.

Welds:

- 5.10.0 Visual Inspection: AWS D1.1 Section 6: Provide AWS certified welding inspectors for fabrication/erection inspections and testing and verification inspection. Welding inspectors shall visually inspect and mark welds, including fillet weld end returns.
- 5.10.1 Non-Destructive Testing: AWS D1.1. Test locations shall be selected by the Engineer if more than 20 percent (20%) of welds made by a welder contain defects identified by testing, and then all welds made shall be tested by radiographs or ultrasonic testing, as approved by the Engineer. When all welds made by an individual welder are required to be tested, magnetic particle testing shall be used in areas inaccessible to either radiographic or ultrasonic testing. Retest defective areas after repair.

VI ARCHITECTURAL

6.0 FINISHES

6.0.1 INTERIOR WALLS

- a. For areas exposed to moisture, use CHB with cement plaster finish painted.
- b. Plastering of doors and windows opening.

6.0.2 FLOOR FINISHES

- a. 300 x 300 Ceramic Tiles
- b. 25mm Concrete Topping (For Tiles)
- c. Plain Cement Finish w/ grooves

6.0.3 CEILING FINISHES

- a. 12mm Thk. MR Gypsum board including framing and accessories.

6.0.4 WINDOWS

Follow as per approved plan.

6.0.5 DOORS

Follow as per approved plan.

6.0.6 PAINTING

- a. All paints shall meet the required specifications and shall be delivered at the site in the original container. Use non Volatile Organic Compound (V.O.C.) paint or approved by the implementing agency and only accredited painters of the manufacturer shall execute the work to ensure the true origin and quality of paint and warranty of work.

- b. Concrete walls shall be treated with neutralizers. Exterior walls without wall veneer shall be applied with a primer before final coat. In general, rough surfaces of concrete, cabinets and woodworks surfaces shall be properly sandpapered and puffed before any application of paint.
- c. Latex Paint Finish (exterior masonry walls)
- d. Latex paint Finish (interior masonry walls/hardiflex)
- e. Latex Paint Finish (Ceiling)

6.0.7 HARDWARE

- 1. Provide all rough hardware required for the construction of works: nails, straps, lag screws, etc.
- 2. Butt Hinges : Use Toyo Butt Hinges, 4" x 4" with bearings for panel door.
- 3. Locksets : For PVC plastic, wood and metal swing doors use ABLOY stainless mortise locksets with striker plate.

6.0.8 OTHER FINISHES

- a. Countertop including Tiles.
- b. Stainless Steel Signage with Neon Backlight "MEDICINE DISPENSING ROOM" including accessories.
- c. Plastering Guide / Grooves
- d. Wood Ledge 0.25m x 2.4m including accessories, painted finish.

6.0.9 CLEAN-UP

When the work is completed, the Contractor shall remove all temporary structures and surplus materials of every sort, restore what has been removed before, and leave the premises or site in as good condition as he had originally found them.

VII THERMAL CONTROL AND MOISTURE PROTECTION

7.0 WATERPROOFING

Use waterproofing cementitious powder, capillary type, applied waterproofing seamless membrane latex-modified rubber reinforced on slabs. Refer to manufacturer's recommendation on proper application of the product listed herein: Lanko manufactured by VSL.

7.1 VAPOR BARRIER

Use 8 mils thick, 6 feet wide roll plastic vapor barrier laid over compacted base course at ground floor slab with 300mm minimum overlap prior to setting up of steel reinforcing bars. Submit samples for approval.

7.2 WATERSTOPS

Use **Rebstop Ultra Seal** chemical grout water-stop specially formulated for construction joints to replace the use of conventional water-stop used for cold expansion joints on pipes, etc. manufactured by ***Rebtrade International Corporation*** or approved equal.

IX PLUMBING

GENERAL

9.0 DESCRIPTION

- 9.0.0 Applicable provisions of General Conditions govern work under this section.
- 9.0.1 All fittings, connections and piping embedded in concrete shall be subject to inspection by the Architect and/or his representative before covering and/or completion.
- 9.0.2 The contractor shall provide all items, articles, materials, operations of methods listed, mentioned or scheduled on the drawings and/or herein, including labor, materials and incidentals necessary and required for their completion.
- 9.0.3 The contract drawings and specifications are complementary to each other, and any labor or materials called for by either, whether or not called for by both, if necessary, for the successful operation of any of the particular type of equipment furnished and installed will be without additional cost to the owner.
- 9.0.4 Intent: It is not intended that the drawings shall show every pipe fitting.
- 9.0.5 All such items, whether specifically mentioned or not, or indicated in the drawings shall be furnished and installed, if necessary to complete the system in accordance with the best practice of the plumbing trade and to the satisfaction of the engineer and the owner.
- 9.0.6 The plumbing contractor is required to refer to all architectural, structural and electrical plans and specifications and shall investigate all possible interferences and conditions affecting his work.

9.1 SCOPE OF WORK

- 9.1.2 Work included under this section of this specification consists of furnishing all labor, tools and equipment, appliances and materials necessary for complete installation, testing and operation of the plumbing and storm drainage system in accordance with the contract.
 - a. Arrange for, obtain and bear the cost of necessary permits, bonds and fees, private or government shall be paid by the contractor.
 - b. Soil, waste and vent pipe system within the building.
 - c. Sanitary drainage system of the building and its connection to the nearest existing sewer line or drainage line.
 - d. Cold-water distribution system and supply pipes to fixtures, hose bibs, inclusive of all valves, fittings and other accessories to complete the system.
 - e. Supply of all plumbing fixtures, trims and accessories.

- f. Supply and installation of transfer pumps including valves and accessories under the supervision of the pump supplier.
- g. The contractor shall provide all necessary shop drawings and two (2) sets of As-Built Plans.
- h. Testing for leakage of all water supply and distribution system, drains, waste and venting system plus pressure testing for two (2) hours and disinfection of water distribution system.
- i. Water meter and MWSI connection as shown on plans and to be verified at the jobsite.
- j. Excavation and backfilling in connection with the work shall be included.
- k. Furnishing of written one (1) year warranty of the plumbing system

9.2 SUBMITTALS

- 9.2.0 Within fifteen (15) days after award of contract, the plumbing contractor shall submit for engineer's approval, four (4) copies of all complete list of manufacturer's name of all materials he proposes to use.
- 9.2.1 After approval of the above list and before purchase of any materials, the plumbing contractor shall submit to the engineer for approval, four (4) complete sets of detailed information consisting of manufacturer's bulletins, shop drawings and partial list of materials to be provided under this contract.
- 9.2.2 The plumbing contractor shall assume the loss of and the entire responsibility of any change in the work as shown in the contract drawings, which may be occasioned by approval of materials other than those specified.

9.3 APPLICABLE CODE AND STANDARD

- 9.3.0 All plumbing works to be done and the sizes of pipes to be used shall be in accordance with the National Plumbing Code and the Plumbing Code of the Philippines.
- 9.3.1 The plumbing contractor shall verify the above paragraphs with each section of the specifications and coordinate his work so that the general contractor will understand clearly the intent of the work to be done.

9.4 PRODUCTS

9.4.0 Description of Materials

All materials to be used shall conform to the standards specified. Use of materials shall be governed by other requirements imposed on other section of these specifications. Materials shall be subject to tests necessary to ascertain their fitness if the engineer so requires.

9.4.1 Alternate Materials

Use of any material not specified in these specifications may be allowed, provided such alternate has been approved by the engineer, and provided further, that a test if required shall be done by an approved agency in accordance with generally accepted standards.

9.4.2 Identification of Materials

Each length of pipe, fittings, traps, fixtures and devices used in the storm drainage system shall have case, stamped or indelibly marked on it the manufacturer's trademark or name, type and classes of products when so required by the standards mentioned. All materials and equipment mentioned in these specifications, including all incidental items not specifically indicated, but required to complete the contract shall be new and free from defects. If damaged during the course of construction, it shall be repaired or replaced as directed by the Project Manager at no additional cost for the owner.

9.4.3 Pipes and Fittings Schedule

9.4.3.0 Cold Water Lines – Shall be PP-R, pipes DIN 8077, non-corrosive, Leak proof, taste and odour neutral, jointing method is socket fusion.

9.4.3.1 Drain, Waste and Vent – shall be unplasticized polyvinyl chloride (uPVC) conforming to ASTM D1784.

9.4.4 Flanges, Bolting and Gaskets and Union

9.4.4.0 Provide flanges at flange connection to equipment and valves, slip-on or threaded as required.

Flanges shall conform to Class 300 black forged steel welding flanges 1/16" in raised faced to ASTM A-181 Grade 1. Bolts to ASTM A-193 regular hexagonal head unfinished, heavy semi-hexagonal nuts to ASTM A-194.

9.4.4.1 Provide union at each threaded connection to equipment, and valves for pipe sizes up to two (2) inches in diameter. It shall be galvanized steel pipe Class 300 screwed galvanized malleable iron, ground joint, brass to iron seat.

9.4.5 Valves

Valves up to and including two (2) inches shall be threaded ends, rough bodies and finished trimmings. Valves 2 ½ inches diameter and larger shall have iron [bodies, brass mounted and shall have either screws or flange ends.

9.4.5.0 Water meter shall be positive displacement type or any brand approved by MWSI or LWUA.

9.4.5.1 Hose Bibb shall made of male inlet threads, hexagon shoulder and three quarter inch hose connections. Provide one (1) extra gate valve on the vertical before the hose bib.

9.4.6 Drains

9.4.6.0 Floor drains at toilets shall be gauge no. 22 with round strainer and plastic bucket.

9.4.6.1 Deck drain shall be ASA 10-12, pipe size 75mmØ.

9.4.6.2 Floor drain for genset room shall be ASA 40-9F.

9.4.6.3 Grating cover (to be supplied by civil contractor).

9.4.7 Pipe Sleeves

- 9.4.7.0** Pipe sleeves shall be installed and properly secured in place at all points where pipes pass through masonry or concrete, except unframed floors on earth.
- 9.4.7.1** Pipe sleeves shall be of sufficient diameter to provide approximately one-quarter inch clearance around the pipe.
- 9.4.7.2** Pipe sleeve in walls and partitions shall be of wrought iron or steel pipe schedule 40. The pipe sleeves in concrete beams of concrete fireproofing shall be steel pipe schedule 40.
- 9.4.7.3** Pipe sleeves through floors shall be galvanized steel pipe schedule 40. Sleeve in pipe floor shall extend not less than one (1) inch and not more than two (2) inches above and the space around the pipe shall be packed with fiberglass insulation.
- 9.4.7.4** Pipe sleeves in footings shall be steel pipe and shall be not less than four (4) inches larger in diameter than the pipe to be installed.

9.4.8 Hangers and Supports

Vertical run of pipe shall be supported by brace. Horizontal runs of pipe shall be supported by loop 4-sway hanger.

9.4.9 Pumps Specifications

- 9.4.9.0** Plumbing Fixtures and Accessories
- 9.4.9.1** Water closet shall be Tank type.
- 9.4.9.2** Lavatory Countertop.
- 9.4.9.3** Urinal shall be wall-hung.

9.4.10 EXECUTION

9.4.10.0 Piping Installation

Piping shall be installed as shown on the drawings, as recommended by the manufacturer and as directed during installation, straight and direct as possible, forming right angles or parallel lines with building walls and other pipes and neatly spaced. Erect pipe risers plumb and true, parallel with walls and other pipes neatly spaced. All piping shall be supported or suspended on stands, clamps, hangers or equivalent or approved design. Supports shall be installed in such a manner to permit pipe free expansion and contraction while minimizing vibration.

9.4.10.1 Plumbing System Test

The entire system of drains, waste and vent shall be tested. Water test shall be in accordance with the plumbing Code. Every portion of the system shall be tested to a hydrostatic pressure

equivalent to at least 10-foot head water for a period of ½ hour before covering. All cold water lines shall be tested at 150 psi for a period of two (2) hours before covering. Defects disclosed by the test shall be repaired with new materials at the expense of the contractor.

9.4.11 Fixture Installation

Support all fixtures securely in a neat workman-like manner on approved carriers and supports. The method of support for each fixture shall be approved type manufacturer's standard, except where fixture designations on the drawings indicate modifications. Install all fixtures level and flush with finish floors and partitions. All fixtures shall be provided with individual shut-off valve and equipped with a trap.

X ELECTRICAL WORKS

10.0 WORK INCLUDED

10.0.0 The work to be done under this Division comprises the furnishing of all tools, labor, equipment, fixtures and materials, unless otherwise herein specified, required to complete and leave ready for use the electrical system of the above mentioned project in accordance with this specification and accompanying drawings of materials and finishes.

10.0.0 The electrical contractor shall coordinate his work so that the general contractor and all other subcontractors will understand clearly the work to be done. The electrical contractor shall finish all electrical facilities and provision necessary for the installations and operations of other trades such as mechanical, air-conditioning, plumbing, sanitary and others.

10.0.1 All contractors and all companies or persons providing labor, materials or both for this project, are specifically referred to the General Conditions of the specifications, to the general contract plans, to all Divisions of specifications and to the various other contract documents, which may affect the completion of the contract work.

10.1 CODES, INSPECTIONS, PERMITS AND FEES

10.1.0 The work under this contract shall be done according to the requirements of the latest edition of the Philippine Electrical Code, the rules and regulations of the Local Government Authorities of Quezon City and the requirements of Manila Electric Company. Nothing contained in this specification or shown on the drawings shall be construed as conflict with national and local ordinances or laws governing the installation of Electrical Works, and all such laws and ordinances are hereby made part of these specifications. The contractor is required to meet the requirements hereof.

10.1.1 All permits and electrical fees required for this work shall be obtained at the expense of the Contractor. The Contractor shall furnish the Architect or the Owner or the same maybe, a final certificate of electrical inspection and approval from the proper government authorities after completion of the work.

10.2 TEST

10.2.0 The electrical contractor shall apply such test, replace or remedy all defective work and adjust such system as needed or as the Architect or the owner shall direct. He shall also instruct the proper use of the system and equipments to

persons designated by the owner. Submit copies of test data and results, including test reports on instrument to the engineer.

10.3 MEASUREMENTS

10.3.0 The Electrical Contractor shall procure from the Architect detailed drawings of those parts of the work not fully shown on the plans and he shall compare and verify with the Owner. Any lack of agreement shall be submitted at once to the Architect for adjustments.

10.4 SLEEVES AND FORMS FOR OPENINGS

10.4.0 The Electrical Contractor shall provide and places all shelves, for piping penetrating floors, walls, partitions, etc. He shall locate all necessary slots and openings for his work and it shall be done at such time as not to delay the general contractor of the project.

10.5 LOCATION OF OUTLETS

10.5.0 All Outlets shall be truly centered in panels and spaces provided thereof. Any discrepancy outlet location between the electrical plan and architectural plans shall be submitted to the Architect at once and verified before outlets are installed.

10.6 GROUNDINGS

10.6.0 All metallic conduits, supports, cabinets and equipments shall be properly grounded and bonded by means of copper straps. The conduits of such system shall be grounded by connecting to the grounding rod.

10.6.1 All ground connection shall have clean outlet surfaces and shall be tinned and sealed while bolting. Unless otherwise specified, ground wire shall be installed in exposed conduits and connections made readily accessible for inspection. Connection shall not be made underground or concealed in floors or walls.

10.7 WIRING METHODS

10.7.0 All wiring shall in general be installed inside standard conduits. All conduits shall be run embedded in concrete, underground but in concrete envelope, embedded in hollow blocks partition, concrete slab, walls and roof above, between double wall wooden partitions if any, where the installation of concealed and/or embedded conduit wiring may be used, but only upon approval of the Owner's authorities concerned. Exposed conduits shall be rigid steel conduits unless otherwise specified.

10.8 GUARANTEE

10.8.0 The Electrical Contractor shall guarantee his work for a period of one (1) year from the date of final acceptance by the owner except for particulars items specifically mentioned in these specifications.

10.8.1 The Electrical Contractor shall, without additional compensation for the period specified, replace any work materials or equipment furnished and installed by him under this contract, which develop defects except from ordinary wear and tear.

10.9 MATERIALS

- 10.9.0 All materials shall be new and shall conform to the standards of **Underwriter's Laboratories, Inc.** In every case where such a standard has been established for the particular type of materials in question.
- 10.9.1 All materials on all system shall comply with the following specifications unless specified and all materials where not specified shall be of the best of their respective kind.
- 10.9.2 Samples on any materials shall be submitted for approval as required by the Architect.

10.10 WIRES

- 10.10.0 All wires shall be copper, soft drawn and annealed, shall be 98% conductivity, shall be smooth and true of a cylindrical form and shall be within the actual size called for.
- 10.10.1 All wires and cables shall comply with the requirements of the **Underwriter's laboratories**, the **ASTM** and the **IPCEA** as to their particular usage.
- 10.10.2 Wires and cables for outdoor and indoor lighting and power system shall be moisture and Heat Resistant Thermoplastic with nylon insulated for 600volts working pressure type THHN unless otherwise noted on the plans or specified.
- 10.10.3 For lighting and power system, no wire smaller than 3.5mm² shall be used except for control leads.
- 10.10.4 All wires and cables shall be manufactured by a reliable manufacturing company acceptable to the Electrical Engineer of the owner.

10.11 CONDUITS

- 10.11.0 The conduit system shall consist of the following

- 1. Intermediate Metal Conduit (IMC):

They shall be of standard sizes and weight, mild steel hot dipped galvanized with inside enamel or epoxy coating, acceptable to the Electrical Engineer of the Owner.

- 2. Polyvinyl chloride conduit (PVC):

They shall be of standard size and weight, made of polyvinyl chloride, extruded, heavy wall, rated for 90-degree centigrade cable, schedule 40.

- 3. Limitations of use shall be as follows:

- a. As per requirement of the latest edition of **PEC** and/or **NEC**.
- b. Not permitted where subject to mechanical damage.

- 10.11.1 All conduits shall be of true cylindrical form and shall be within the actual size called for.
- 10.11.2 No conduits shall be used in any system smaller than 15-mm electrical trade size, not shall have more than four 90 degrees bend in any one run, and where necessary, hand hole and pull boxes shall be provided.
- 10.11.3 No wires shall be pulled in any conduit until the conduit system is complete in all details, In case of underground work, until concrete envelope or masonry has been completed in every detail,. In case of concealed work, until rough plastering has been completed.
- 10.11.4 The ends of all conduits shall be tightly plugged to exclude plaster dust sand and soil including moisture while the renovation of the perimeter is in the process.

10.12 OUTLET BOXES AND FITTINGS

- 10.12.0 At all outlets of every kind, for all systems, there shall be provided a suitable fittings which shall be either a box or other device especially designed to receive the type of fitting to be mounted thereon.
- 10.12.1 The Contractor shall consult with the Architect as to the nature of various fittings to be used before installing his outlet fittings and shall conform strictly in the use of fittings so that the work when completed will be finished design.

10.13 SWITCHES

- 10.13.0 Local lighting switches shall be flush type, heavy duty, 15 ampere size 250 volts, bakelite case, quick connect terminal. Outdoor lights shall be automatically operated by means of photo switch and manual selection. Manually switch by means of breaker switch inside the lighting panel.

10.14 RECEPTACLES

- 10.14.0 Standard receptacles shall be 10-ampere size 250volts, parallel slots, duplex, flush mounted composition case, side wired with the insulated mounting yoke, If weatherproof wall plate are required, standard factory made metal waterproof plate shall be provided.

10.15 PLATES

- 10.15.0 All switches and receptacles plates shall be bakelite plastic, ivory-colored or as directed by the Architect

10.16 LIGHTING SYSTEM

- 10.16.0 The lighting system shall be complete in every respect all indicated on the plans or as indicated and specified in the Architectural plans. Exact fixture location shall be determined.
- 10.16.1 All wiring shall be installed in conduits, and in general shall be concealed. Buried underground in concrete encasement and/or embedded in concrete.
- 10.16.2 Mounting Height of devices shall be as indicated in the plans and/or subject to Architect's approval prior to installations as follows:

- Local switches - 1.4 above finish floor line
- Receptacles - 0.3 above finish floor line

10.17 DISTRIBUTIONS FEEDERS

- 10.17.0 Distribution voltage shall be 220volts, Single-phase, 3 wire. Feeder conductor and raceway shall be installed as shown on drawings and no change in size shall be made without written consent of the Architect. Feeder conductors shall be continuous, and without splices between terminals, when feeders are run in multiple, they shall be exactly of the same length to avoid **unbalanced division of the current**.

10.18 CONNECTORS AND INSULATION

- 10.18.0 Use solderless mechanical pressure type lugs, copper connectors for splicing wires greater than no 8mm.sq. All splices shall be properly insulated using #M brand rubber tape and plastic electrical tape. Application of two tapes shall be equivalent to the insulation of wire concerned, edges to provide smooth surfaces before taping.

10.19 BRANCH CIRCUITS

- 10.19.0 The drawings indicate the general methods of installation of all circuit wirings and the power lighting outlets which are to be supplied from this circuit. Branch circuit raceways shall be run from outlets to panel boards as direct as the ground and level condition will allow. Circuit allocations shall be as indicated on the drawings. Where it becomes necessary to connect any outlet to the circuit other than the one shown on the drawings, this shall be done without extra charge and only upon written consent of the Architect. No wire smaller than 3.5mm sq. shall be used for any lighting or power branch circuit. All lighting outlet shall be supplied from 2-wire single phase circuits. Number of wires for other outlets shall be as indicated on the drawings.

10.20 MOTOR CONNECTIONS

- 10.20.0 Connect the motor starting devices for all motors, except where otherwise specifically provided for under other contracts. Furnish all necessary connections between controllers and motors in conduit, and leave motor ready to start. The power supply leads to the motor from the controller shall be the same as the feeder indicated on the drawings, except for six terminal lead motor where wye-delta starting method is being applied.
- 10.20.1 Other trades, i.e. mechanical contractor, except as otherwise noted or specified will supply and deliver all controllers and shall erect and connect up safe complete.
- 10.20.2 The Electrical Contractor or trade people shall be held responsible as far as power supply to the controller is concerned. He shall ascertain the exact location of the motor controller and motors from other trades before installing the circuit work.

10.21 RECORD DRAWINGS AND AS BUILT PLANS

- 10.21.0 The Electrical Contractor shall keep an active record of the actual installation works during the progress job. The shall become the reference for the preparation of the As-Built Plans which shall include all pertinent information, complete in all aspects of the actual installations, all new information not originally shown in the contract drawings.

10.21.1 The As-Built Plans shall be prepared by the Electrical Contractor at his expense and shall be submitted to the Architect and the Engineer for approval upon the completion of the work. The approval of the As-Built drawings shall be a pre-requisite for the final acceptance of the electrical works.

10.21.2 Two (2) copies of the As-Built drawings, signed and sealed by the **Electrical Contractor's Professional Electrical Engineer**, shall be submitted to the Architect and Engineer consultants. Original tracing/ reproducible copy shall also be submitted.

Note: In contrast between these Technical Specifications and the approved Plans issued to the Contractor, the approved Plans shall prevail. See also the approved program of works. In case of doubt, for clearer outlooks consult the assigned Architect/Engineer.

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Republic of the Philippines
Quezon City
Office of the City Mayor
QUEZON CITY BIDS & AWARDS COMMITTEE
(QC-BAC-INFRA)



PROJECT : PROPOSED CONSTRUCTION OF BAESA COLUMBARIUM WITH LAND DEVELOPMENT (MRF)

LOCATION : Barangay Baesa, Quezon City

SUBJECT : GENERAL CONDITIONS AND TECHNICAL SPECIFICATIONS

I. GENERAL CONDITIONS

1.01 DEFINITIONS

- a. OWNER :** LOCAL GOVERNMENT OF QUEZON CITY
- b. CONTRACTOR :** Any individual, firm, corporation, partnership or association that enters into an agreement with the Owner for furnishing the materials and/or labor, tools, equipment, plant and other facilities required for the erection and completion of the project subject to the accompanying plans and working drawings.
- c.** The Owner/Implementing Agency and the Contractor are treated through the contract documents as if each were of the regular number, masculine gender.

1.02 EXAMINATION OF MEMBER

The Contractor shall carefully examine the premises before submitting any bids to enable him to have full knowledge of conditions existing therein.

1.03 LOCATION

The Proposed Construction of Baesa Columbarium with Land Development (MRF) is to be constructed at Barangay Baesa, Quezon City.

1.04 EXECUTION, CORRELATION & INTENT OF DOCUMENTS

- 1. The Contract Documents are signed in sufficient number of copies by all parties concerned. In case anybody fails to sign copies of any item forming part of the set contract documents, the Implementing Agency's identification thereon shall suffice.
- 2. The items, specifications and all other documents forming the contract documents are complementary. Anything shown on plans but not mentioned in the specifications or vice versa or anything not expressly set forth in either, but necessarily implied, shall be furnished or done as if specifically shown and mentioned in both, with no extra charge. Where dimensions are given in figures, follow them in preference to measurement by scale.
- 3. Execute work as per agreement, making no changes or deviations whatsoever, without prior permission from the Implementing Agency.

4. The Contractor shall verify and check all dimensions particularly those on the plans. He will be held directly responsible in case of any discrepancy that may be discovered during the progress of work.

1.05 DETAIL DRAWINGS AND INSTRUCTIONS

Plans furnished for use at the jobsite are whenever necessary, supplemented by detail drawings and instructions essential to the proper execution of the work. Such supplementary detail drawings and instructions shall be treated as of equal force as though originally issued.

1.06 PLANS AND PROJECT SITE

Keep at project site, in good order and condition, one (1) set of approved plans, specifications, supplementary detail drawings and instructions.

1.07 SHOP DRAWINGS

Shop drawings shall be provided by the Implementing Agency and/or Contractor during the progress of construction. The contractor should not place any item subject to shop drawings until the Implementing Agency shall have duly approved such drawings.

1.08 CHANGES

The Owner and the Implementing Agency reserve the right to make alterations or additions, including changes during the progress of work. The same shall be carried into effect without in any way deviating from or violating any agreement. Whatever amount shall necessarily be entailed in the cost of labor or materials or both shall be added to or deducted from the original contract price.

1.09 TIME OF COMPLETION AND SCHEDULE OF CONSTRUCTION

The Contractor shall, before actual commencement of the project operations, prepare and submit to the Implementing Agency for verification and approval, a complete and comprehensive work schedule covering the entire duration of construction. He shall also include therein, the estimated number of days within which the entire project shall be completed stage by stage by phase.

1.10 WORKMANSHIP

The project shall be executed with the use of first class workmanship to the full intent and meaning of the plans and specifications and to the complete approval and acceptance by the Implementing Agency.

1.11 MATERIALS

All materials to be used shall be the best of their respective types and kind. They shall be properly stored and protected from damage or injury.

1.12 SAMPLES

Submit samples as specified and proceed with the work with the use of materials procured based on the samples previously approved by the Implementing Agency.

1.13 INSPECTION OF WORK

The Contractor shall provide the facility for inspecting the work to the Implementing Agency, the Owner and other personnel having jurisdiction over the work.

1.14 DEFECTIVE OR IMPROPER WORK

All work or materials not acceptable to the Architect shall be removed immediately and replaced with appropriate work or materials without extra charge. All condemned materials shall be taken away from the premises without delay.

1.15 BUILDING LAWS AND REGULATIONS

The Contractor shall be held responsible for strict compliance with existing labor laws and regulations and shall free the Owner from any responsibility in connection therewith, he shall pay on time at his own expense, all taxes, fees and/or licenses due to the government, both national and local arising from his work on the project.

1.16 MANNER OF PAYMENT

Payments to the Contractor shall be based on the periodic work accomplishments subject to verification, approval and recommendation by the Implementing Agency.

1.17 RETENTION MONEY

Progress payments shall be subject to a ten percent (10%) deduction, referred to as retention money. All retained amounts shall be released upon satisfactory completion of the work and issuance of the Certificate of Final Completion and Acceptance.

1.18 TEMPORARY WATER, POWER AND TELEPHONE FACILITIES

The Contractor shall make the necessary arrangements with the local utility companies so as to provide temporary facilities for the supply of water, power and telephone for the duration of construction, and all expenses in connection therewith shall be borne by the Contractor.

1.19 PRIVY

The Contractor shall provide a temporary privy in a most inconspicuous and sanitary manner, and shall have it removed at the termination of the work.

1.20 CLEARING AND CLEANING

Upon its completion, the project and its premises shall be cleared and cleaned as directed by the Implementing Agency, and make ready for immediate occupancy.

1.21 TEMPORARY BARRICADES, SIGNAL LIGHTS, BILLBOARDS, ETC.

The Contractor shall provide all temporary barricades, signal lights, Architect and Contractor's billboards, the required official building billboard, etc., necessary for the protection of the public and for the proper prosecution of the work and display of construction requirements.

1.22 PERFORMANCE AND GUARANTEE BOND

To guarantee the faithful performance of the Contractor under the contract, he shall post a Performance Bond in the amount of thirty percent (30%) of the contract price in the form of cash, manager's check or surety bond, callable on demand.

1.23 QUESTIONS AND DISAGREEMENTS

All questions and disagreements between the Contractor and the Owner relative to the interpretation of the plans and specifications shall be referred to the Implementing Agency whose decision on the matter shall be final.

II. TECHNICAL SPECIFICATIONS

2.0 SITE WORK

WORK INCLUDED

- 2.0.0 All excavation works including all necessary shoring, bracing and drainage of storm water from the site.
- 2.0.1 All soil treatment, backfilling, filling, compaction and grading, removal of excess material from site.
- 2.0.2 Protection of property, work and structures, workmen and other people from damage and injury.
- 2.0.3 Demolition of existing road pavement as indicated in the drawings.
- 2.0.4 Laying of utility/auxiliary lines as indicated in the drawings.
- 2.0.5 Survey and Stake-out works

2.1 LINES, GRADES AND BENCHMARKS

- 2.1.0 Stake out accurately the lines of the building and/or the other structures included in the contract, and establish grades therefore, after which secure approval of the Project Manager before any excavation work is commenced.
- 2.1.1 Erect basic batter boards and basic reference marks at such places where they will not be disturbed during the construction of the foundation.

2.2 EXCAVATION

Structural Excavations: Excavations shall be to the depths indicated in the drawings where bearing value as indicated in the Soils Investigation Report provided as part of the Construction Documents shall be attained. Excavations for footings and foundations carried below required depths shall be filled with lean concrete and bottom of such shall be level. All structural excavations shall extend a sufficient distance from the walls and footings to allow for proper erection and dismantling of forms, for installation of service and for inspection.

All excavations shall be inspected and approved before pouring any concrete laying underground utility and auxiliary lines for placing select fill materials. The Contractor shall control the grading in the vicinity of all excavated areas to prevent surface drainage running into excavations. Water that accumulates in excavated areas shall be removed by pumping before fill is placed herein.

2.3 SOIL TREATMENT

Treat soil with 2% Chlordane or Andrex solution in water to provide an unbroken horizontal and vertical chemical barrier between the proposed structure and the possible termite colonies in the soil after excavation is completed and prior to pouring of concrete

foundation and ground floor slabs. At the time the soil treatment is to be applied, the soil shall be in a friable condition with a sufficient low moisture content to allow uniform distribution of the treatment solution throughout the soil.

Do not apply pesticide during or immediately after heavy rains, or whenever climatic conditions are such that runoff will occur to create an environmental hazard. Cover treated areas with polyethylene or waterproof sheeting if concrete is not poured on the same day as the soil treatment. Take adequate precautions to prevent disturbance of the pesticide barrier. Re-treat the soil or fill is disturbed after the treatment and before the placement of structural components. Apply pesticide prior to placement of vapor barrier or waterproofing membrane.

2.4 SHORING

Excavation shall be shored and braced by members of suitable sizes where necessary to prevent danger to persons, injurious caving or erosions. Shoring bracing and sheathing shall be removed, as the excavations are backfilled, in a manner such as to prevent injurious caving. The contractor shall keep all excavations free from water while construction is in progress.

2.5 FILLING AND BACKFILLING

After forms have been removed and when concrete work is hard enough to resist pressure resulting from fill, backfilling may then be done. Materials excavated may be used for backfilling. All filling shall be placed in layers not exceeding six (6) inches in thickness, each layer being thoroughly compacted and rammed by wetting, tamping, rolling.

2.6 PLACING AND COMPACTING FILL

2.6.0 Common Fill: shall be approved imported/site-excavated material free from roots, stumps and other perishable or objectionable matter.

2.6.1 Select Fill: shall be placed where indicated and shall consist of crushed gravel, crushed rock or a combination thereof. The material shall be free from adobe, vegetable matters and shall be thoroughly tamped after lacing.

2.6.2 Before placing fill materials, the surface upon which it shall be placed shall be cleared of all brush roots, vegetable matter and debris, and thoroughly wetted to ensure good bonding between grounds.

2.6.3 Compaction: Fills shall be evenly spread in horizontal layers of not more than 200mm in thickness. Each layer shall be wetted and compacted by approved mechanical compaction machine, roller or portable to a density of at least 90% or its maximum density for non-cohesive soils as determined by ASTM Method D-1557 or AASHTO Method T-180.

2.7 FINISH GRADING

The contractor shall fill and grade the whole area to the indicated sub-grade elevations as directed by the Architect or Engineer. The contractor shall verify the finish grade elevations of the proposed pavements. Prior to grading operations, the areas shall be cleared of all heavy growth or vegetation stumps, roots, cables, wires, rocks and other debris. The finished sub-grade shall be reasonably smooth and compacted and ready to receive the base course for the proposed pavement.

2.8 DISPOSAL OF EXCESS MATERIALS

Any excess and demolished materials remaining after completion of the earthwork shall be disposed of by hauling and transported out of the premises at the contractor's own expense.

2.9 SUB-GRADE PREPARATION

2.9.0 SCOPE

The sub-grade preparation shall be that part of the work which is the preparation for the support of the bases for pavements and structures. It shall extend to the full width of pavements including shoulders and lay-bys as shown on the drawings or as specified herein. Unless otherwise agreed upon by the Engineer, sub-grade preparation on a section of the road shall not be commenced unless the contractor is able, after the completion and acceptance of the work, to commence immediately pavement construction.

2.9.1 PRODUCTS

All materials and equipment necessary for proper completion of this work shall be subject to the approval of the Engineer.

2.9.2 EXECUTION

2.9.2.0 Prior Works: Prior to commencing the preparation of the sub-grade, all culverts, cross drains, and other similar structures (including the fully compacted backfill) shall be completed. No work shall be started on the preparation of the sub-grade before the prior works herein approved by the Engineer.

2.9.2.1 Sub-grade Level Tolerance: The finish compacted surface of the sub-grade shall conform to AASHTO M-145.

2.9.2.2 Sub-grade in Cutting Common Material

- a. Unless otherwise specified, all materials below sub-grade level in earth cutting to a depth of 150mm or other depth shown on the drawings or directed by the Engineer shall be excavated. The material, if suitable, shall be placed to one side for re-use, or if unsuitable, shall be disposed of in accordance with the requirements of AASHTO M-145.
- b. Where material has been removed from below sub-grade level, the base of the resulting cutting shall be compacted to a depth of 150mm to the requirements of AASHTO M-145 Table 1. If necessary, the moisture content of the material shall be adjusted.

2.10 GRADED AGGREGATES AND BASE COURSE

2.10.0 SUBMITTALS

- a. **Test Reports:** Before delivery of materials, submit the following test reports:
 1. Gradation
 2. Bearing Ratio
 3. Attenberg Limits

2.10.1 DELIVERY AND STORAGE

Do not construct base course when rainfall or other weather conditions will detrimentally affect the quality of the finished course.

2.11 PRODUCTS

2.11.0 MATERIALS

- a. Aggregates: Consist of durable sound crushed gravel, crushed stone, free of lumps and balls of clay or other objectionable matter. Crushed stone shall be free from flat, soft or disintegrated pieces. Crushed gravel retained on a No. 4 sieve shall have at least ninety percent (90%) by weight with at least two fractured faces one hundred percent (100%) by weight with at least one fractured face.
- b. Base course materials samples shall have a Bearing Ratio of at least 100 as determined by laboratory tests on a 4-day soaked specimen in accordance with ASTM D 1883; compact specimen in accordance with ASTM D 1557, Method D. Determine grain size in accordance with ASTM C-117.
- c. Soil binder material, the surface of the layer by a combination of rolling and blading. Final surface shall be smooth and free from waves, irregularities and from ruts of soft yielding spots.

CONCRETE

3.0 GENERAL

- 3.0.0 Unless otherwise specified herein, concrete work shall conform to the requirements of ACI Building Code. Full cooperation shall be given other trades to install embedded items. Provisions shall be made for setting items not placed in the forms. Before concrete is placed, embedded items shall have been inspected and tested for concrete aggregates and other materials shall have been done.

3.1 SUBMITTALS

- 3.1.0 Shop Drawings: Reproduction of contract drawings is unacceptable.
- 3.1.1 Shop Drawings for Reinforcing Steel: ACI 315. Indicate bending diagrams, assembly diagrams, splicing and lap 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 bars.
- 3.1.2 Contractor Mix Design: Thirty (30) days prior to concrete placement, submit a design for each strength and type of concrete. Furnish a complete list of materials including type, brand; source and amount of cement and admixtures; applicable reference specifications and copies of test reports showing that the mix has been successfully tested to produce concrete with the properties specified and will be suitable for the job conditions. Provide fly ash and pozzolan test results performed within six (6) months of submittal date. Obtain approval before concrete placement.
- 3.1.3 Certificates of Compliance
 - a. Aggregates

- b. Admixtures
- c. Reinforcement
- d. Cement

3.1.4 Catalogue Data

- a. Water stops
- b. Materials for Curing Concrete
- c. Joint Sealant
- d. Joint Filter
- e. Vapor Barrier
- f. Epoxy Bonding Agents

3.2 MATERIALS

- 3.2.0 Cement for concrete shall conform to the requirements of specifications for Portland cement (ASTM C-150).
- 3.2.1 Water used in mixing concrete shall be clean and free from other injurious amounts of oil, acids, alkaline, organic materials or other substances that may be deleterious to concrete or steel.
- 3.2.2 Fine Aggregates shall consist of hard, tough, durable uncoated particles. The shape of the particles shall be generally rounded or cubicle and reasonably free from flat or elongated particles. The stipulated percentages of fines in the sand shall be obtained either by processing sand or by the production of suitable graded manufactured sand.
- 3.2.3 Coarse Aggregates shall consist of gravel. Crushed gravel or rock. Or a combination of gravel and rock. Coarse aggregates shall consist of hard, tough, durable, clean and uncoated particles. The size of coarse aggregates top be used in the various parts of the Work shall be ¾".
- 3.2.4 Reinforcing bars shall conform to the requirements of PNS-49 Standard specifications for Billet Steel Bars for concrete reinforcement (A15-625). Tensile strength and grade for all reinforcing bars such as main horizontal (for beams), vertical (for columns), ties, stirrups and inserts shall be as follows:

SCHEDULE OF REINFORCING BARS (PNS-49)

DIAMETER OF BARS	GRADE (fy)	
12mmØ & smaller	230 MPA	Grade 33
16mmØ to 25mmØ	275 MPA	Grade 40

3.3 PROPORTIONING AND MIXING

- 3.3.0 Proportioning of all materials entering into the concrete mixture of 3,000 psi concrete shall be as follows:

<u>Class</u>	<u>Cement</u>	<u>Sand</u>	<u>Gravel</u>
A	1	2.0	4

- 3.3.1 Strength of Concrete: Concrete shall have a 28-day cylinder strength of 3,000 psi for all structures.
- 3.3.2 Mixing: The 3,000 psi concrete can be machine mixed on-site. On-site mixing shall be within 30 minutes after the cement has been added to the aggregates.

3.4 FORMS

- 3.4.0 General: Forms shall be used whenever necessary to continue the concrete and shape it to the required lines, or to ensure the concrete contamination with materials caving from adjacent excavated surfaces. Forms shall have sufficient strength to withstand the pressure resulting from placement and vibration of the concrete, and shall be maintained rigidly in correct position. Forms shall be sufficiently tight to prevent loss of mortar from the concrete. Forms for exposed surfaces against which backfill is not to be placed shall be lined with a form grade plywood or metal panels.
- 3.4.1 Cleaning and Use of Forms: Before placing the concrete, the contact surfaces of the form shall be cleansed of encrustation of mortar, the grout or other foreign material, and shall be coated with commercial form oil that will prevent sticking and will not stain the concrete surfaces.
- 3.4.2 Removal of Forms: Forms shall be removed in a manner that will prevent damage to the concrete. Forms shall not be removed without approval. Any repairs of surface imperfections shall be performed at once and airing shall be started as soon as the surface is sufficiently hard to permit it without further damage.

3.5 PLACING REINFORCEMENT

General: Steel reinforcement shall be provided as indicated, together with all necessary gauge 16 G.I. wire ties, chairs, spacers, supports and other devices necessary to install and secure the reinforcement properly. All reinforcement, when placed, shall be free from loose, flaky rust and scale, oil grease, clay and other coating and foreign substances that would reduce or destroy its bond with concrete. Reinforcement shall be placed accurately and secured in place by use of metal or concrete supports, spacers and ties. Such supports shall be of sufficient strength to maintain the operation. The supports shall be used in such manner that they will not be exposed or contribute in any way, to the discoloration or deterioration of the concrete.

3.6 CONVEYING AND PLACING CONCRETE

- 3.6.0 Conveying: Concrete shall be conveyed from mixer to forms as rapidly as practicable, by methods that will prevent segregation, or loss of ingredients. There will be no vertical drop greater than 1.5 meters except where suitable equipment is provided to prevent segregation and where specifically authorized.
- 3.6.1 Placing: Concrete shall be worked readily into the corners and angles of forms and around all reinforcement and embedded items without permitting the material to segregate. Concrete shall be deposited as close as possible to its final position in the forms so that flow within the mass does not exceed two (2) meters and consequent segregation is reduced to a minimum near forms or embedded items, or elsewhere as directed. The discharge shall be so controlled that the concrete may be effectively compacted into horizontal layers not exceeding 30 centimeters in depth within the maximum lateral movement specified...
- 3.6.2 Time interval between mixing and placing: Concrete shall be placed before initial set has occurred and before it has contained its water content for more than 45 minutes.
- 3.6.3 Consolidation of concrete: Concrete shall be consolidated with the aid of mechanical vibrating equipment and supplemented by hand spading and tamping. Vibrators shall not be inserted into lower coursed that have

commenced initial set and reinforcement embedded in concrete beginning to set or already set shall not be disturbed by vibrators. Consolidation around major embedded parts shall be by hand spading and tamping and vibrators shall not be used.

- 3.6.4 Placing concrete through reinforcement: In placing concrete through reinforcement, care shall be taken that no segregation of the coarse aggregate occurs. On the bottom of beams and slabs, where the congestion of steel near the forms makes placing difficult, a layer of mortar of the same cement-sand ratio as used in concrete shall be first deposited to cover the surface.

3.7 CURING

- 3.7.0 General: All concrete shall be moist-cured for a period not less than seven (7) consecutive days by an approved method or combination applicable to local conditions.
- 3.7.1 Moist curing: The surface of the concrete shall be kept continuously wet by covering with burlap, plastic or other approved materials thoroughly saturated with water and keeping the covering wet spraying or intermittent hosing.

3.8 FINISHING

- 3.8.0 Concrete surfaces shall not be plastered unless otherwise indicated. Exposed concrete surfaces shall be formed with smooth form material, and after removal of forms, the surfaces shall be smooth, true to line and shall present a finished appearance except for minor defects which can be easily repaired by patching with cement mortar, or can be ground to a smooth surface to remove all joint marks of the form work.
- 3.8.1 Concrete slabs on fill: The concrete slabs on fill laid on a prepared foundation consisting of sub-grade and granular fill with thickness equal to the thickness of overlaying slab except as indicated otherwise.

3.9 SURFACE FINISHES

- 3.9.0 Defects: Repair formed surfaces by removing minor honeycombs, pits greater than one square inch surface area or 0.25 inch maximum depth, or otherwise defective areas. Provide edges perpendicular to the surface and patch with non-shrink f=grout. Patch the holes and defects when the forms are removed.
- 3.9.1 Floor slabs, Pavements and Miscellaneous Construction: Unless otherwise specified, slab at the fountain area are straight to finish with waterproofing. Slope floors uniformly to drains where drains are provided. Depress the concrete base slab where Bomanite, Granite or Ceramic tiles are indicated.
- 3.9.2 Finish: Place, consolidate and immediately strike-off concrete to obtain proper contour, grade and elevation. A set sufficient for floating and supporting the weight of the finisher and equipment.
- 3.9.3 Pavements: Screed the concrete with a template advanced with a combined longitudinal and crosswise motion. Maintain a slight surplus of concrete ahead of the template. After screeding, float the concrete longitudinally and refloat as necessary. Obtain final finish by belting. Lay belt flat on the concrete surface and advance with a sawing motion; continue until a uniform but gritty non-slip surface is obtained. Round edges and joints with an edger having a radius of 1/8 inch.

- 3.9.4 Broomed: Provide for exterior walks, platforms, patios and ramps. Unless otherwise indicated, provide a floated finish, and then finish with a flexible bristle broom. Permit surface to harden sufficiently to retain the scoring or ridges. Broom traverse to traffic or at right angles to the slope of the slab.
- 3.9.5 Pits and Trenches: Place bottoms and walls monolithically or provide water stops and keys.
- 3.9.6 Curbs and Gutters: Provide contraction joints spaced at every 10 feet maximum unless otherwise indicated. Cut contraction joints $\frac{3}{4}$ -inch deep with a jointing tool after the surface has been finished. Provide expansion joints $\frac{1}{2}$ -inch thick and spaced at every 100 feet maximum unless otherwise indicated. Provide a pavement finish.

3.10 MISCELLANEOUS

- 3.10.0 Construction Joints: Locate joints to least impair strength; continue reinforcement across joints unless otherwise indicated.
- 3.10.1 Expansion Joints and Contraction Joints: For slab on grade, provide at edges of interior floor slab, adjacent to walls as indicated. Completely fill joints exposed to weather with joint filler material and joint sealant. Do not extend reinforcement or other embedded metal items bonded to the concrete through any expansion joints unless an expansion sleeve is used. Provide contraction joints, either formed or saw cut or cut with a jointing tool, to the indicated depth after the surface has been finished. Sawed joints shall be completed within 4 to 12 hours after concrete placement. Protect joints from intrusion of foreign matter.

MASONRY

4.0 MATERIALS

- 4.0.0 Concrete Hollow Blocks (CHB) shall have a minimum face thickness of 1" (25mm). Nominal size shall be 8" x 8" x 16", minimum compressive strength shall be 500 psi for non-load bearing and 700-1000 psi for load bearing. All units shall be stored for a period not less than 28 days (including curing period) and shall not be delivered to the job site prior to that time unless the structure is equal or more than the specified.
- 4.0.1 Prior to commencing the preparation of the sub-grade, all culverts, cross drains, and other similar structures (including the fully compacted backfill) shall be completed. No work shall be started on the preparation of the sub-grade before the prior works herein approved by the Engineer.
- 4.0.2 Cement shall be standard Portland cement ASTM C-150-68 Type 1.
- 4.0.3 Mortar: Mix mortar from 3 to 5 minutes in such quantities as needed for immediate use. Re-tempering will not be permitted if mortar stiffens because of premature setting. Discard such materials as well as those that have not been used within one hour after mixing. Proportioning shall be one (1) part Portland cement and two (2) parts and by volume, but not more than one (1) Portland cement and three (3) parts and by volume.

4.1 SUBMITTALS

- 4.1.0 Submit samples for approval two (2) samples each of each type of wall reinforcement and wall ties.

- 4.1.1 **Certificates of Conformance:** Submit certificate attesting that masonry cement, masonry units, aggregates and accessories meet the requirements specified.

4.2 ERECTION

- 4.2.0 All masonry shall be laid plumb, true to line, with level and accurately spaced courses, and with each course breaking joint with the source below. Bond shall be kept throughout corners and reveals shall be plumb and true. Units with greater than 12% absorption shall be wet before laying. Work required to be built in masonry; including anchors, wall plugs and accessories shall be built-in as the erection progresses.
- 4.2.1 **Masonry Units:** Each course shall be solidly bedded in Portland cement mortar. All units shall be damp when laid units shall be showed into place not laid, in a full bed of un-furrowed mortar. All horizontal and vertical points shall be completely filled with mortar when and as laid. Each course shall be bonded at corners and intersections. No cells shall be left open in face surfaces. All cells shall be filled up with mortar for exterior walls. Units terminating against beam or slab soffits shall be wedged tight with mortar. Do not lay cracked, broken or defaced block.
- 4.2.2 **Lintels** shall be of concrete and reinforced as required. Lintels shall have a minimum depth of 0.20 (8") and shall extend to at least 0.20 (8") on each side of opening and reinforced with 2-12mmØ re-bars and 10mmØ lateral ties @ 200mm o.k.
- 4.2.3 **Plastering:** Clean and evenly wet surfaces. Apply scratch coat with sufficient force to form good keys. Cross scratch coat upon its initial set; keep damp. Apply coat after each scratch coat has set at least 24 hours after scratch coat application. Lightly scratch brown coat; keep moist for two (2) days; allow drying out. Do not apply finish until brown coat has seasoned for seven (7) says. Just before applying coat, wet brown coat again. Float finish coat to true even surface; trowel in manner that will force sand particles down into plaster, with final trawling, leave surfaces banished smooth free from rough areas, trowel marks, checks, other blemishes. Keep finish coat moist for at least two (2) days; thereafter protect against rapid drying until properly, thoroughly cured.

4.3 SCAFFOLDING

- 4.3.0 Provide safe wood or metal scaffolding required for masonry and other related work, including cleaning down on completion. Remove upon demobilization.

4.4 SURFACE PREPARATION

- 4.4.0 **Vitrified Floor Tile Installation:** Do not stat floor tiling occurring in space where both floor and wall tile setting has been completed. Before spreading setting bed, establish borderline center wires in both directions to permit laying pattern with minimum of cut tiles. Lay floors without borders from centerline outward. Make adjustments at walls. Clean concrete sub-floor and moisten it without soaking. Sprinkle dry cement over surface. Spread setting bed mortar on concrete and tamp to assure good bond over the entire area then screed to smooth, level bed. Set average setting bed thickness at $\frac{3}{4}$ " but not less than $\frac{1}{2}$ ".
- 4.4.1 **Wall:** Scratch coat application as foundation coat shall be at most $\frac{1}{2}$ ". While still plastic, deeply score scratch coat or scratch and cross-scratch. Protect scratch coat and keep reasonably moist within seasoning period. Use mortar for scratch floor coats, within one hour after mixing. Re-tempering of partially hardened

mortar is not permitted. Set scratch coat be cured for at least two (2) days before starting the setting.

4.5 CLEANING

- 4.5.0 Protection: Protect work which may be damaged, stained or discolored during cleaning operations.
- 4.5.1 Pointing: Upon completion of masonry work, cut out defective mortar joints and tuck joints and all holes solidly with mortar.
- 4.5.2 Cleaning: Clean exposed masonry surface with clear water and stiff fiber brushes and rinse with clean water. Where stains, mortar or other soil remain, continue cleaning as follows: Clean masonry surfaces by scrubbing with warm water and soap and rinsing thoroughly with clean water. Restore damaged, stained and discolored work to its original conditions or replace with new work.

V STRUCTURAL STEEL

GENERAL

5.0 SCOPE OF WORK

The work includes the fabrication, erection and painting of structural steel. All structural steel work shall be in accordance with the AISC latest "Specifications for the Design, Fabrication and Erection of Steel for Buildings". The contractor shall furnish plates, clip angles connections and other miscellaneous work required for the completion of the structure.

5.1 SUBMITTALS

- 5.1.0 Shop Drawings: Submit shop drawings of all structural steel for approval prior to fabrication. Include complete information necessary for the fabrication and erection of the structure's components, including location, type and size of bolts, welds, member sizes and lengths, connection details, blocks, copes and cuts. Use AWS standard welding symbols.
- 5.1.1 Erection Plan. Submit for record purposes. Indicate the sequence of erection, temporary shoring and bracing and a detailed sequence of welding including each welding procedure.
- 5.1.2 Manufacturer's Certificates of Conformance.
 - a. Structural Steel
 - b. Bolts, nuts and washers
 - c. Shop painting materials
 - d. Welding electrodes and rods
 - e. Non-shrink grout
- 5.1.3 Welding: Submit descriptive data to illustrate the sequence of welding and each welding procedure to be used. Perform welding with qualified welders. The qualification of welders and the duration of qualification period shall be in accordance with the requirements of AWS. Any welder found to be producing unsatisfactory work even if he has passed qualification tests shall be immediately re-certified or replaced with a qualified welder.

5.2 REFERENCE STANDARDS

5.2.0 Comply with the latest edition of the following as applicable, unless otherwise specified or modified.

- a. AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), 1978: Specification for the Design, Fabrication and Erection of Structural Steel for Buildings. Code of Standard Practice for Steel Buildings and Bridges; Specification for Architecturally Exposed Structural Steel.
- b. AMERICAN WELDING SOCIETY (AWS): Standard Welding Symbols A2.0-68; Standard Welding Code D1.1-1973 (Rev 1-73 & 2-74) (To govern if in conflict with AISC).
- c. RESEARCH COUNCIL ON RIVETED AND BOLTED JOINTS OF THE ENGINEERING FOUNDATION (RCRBJ): Specification for Structural Joists using ASTM A-325-76s Bolts.
- d. STRUCTURAL STEEL PAINTING COUNCIL (SSPC): Painting Manual, Vol. 1; Good Painting Practice, Painting Manual, Vol. 2; Systems and Specifications.
- e. STEEL JOIST INSTITUTE-AMERICAN INSTITUTE OF STEEL CONSTRUCTION (SJI-AISC): "Standard Specifications for Open Web Steel Joists", and "Standard Specifications for Long Span Steel Joists", 1978 Editions.
- f. AMERICAN IRON AND STEEL INSTITUTE (AISI): "Specifications for the Design of Cold-Formed Steel Structure Members, 1974".

5.3 PRODUCTS

5.3.0 Steel: Structural Steel ASTM A-440 with minimum yield strength, $f_y=290$ mPa

5.3.1 BOLTS, NUTS AND WASHERS. Provide the following, unless otherwise indicated:

- a. Structural Steel
- b. Bolts: ASTM A325, Galvanized 78mmØ and below. A-490 1" Ø and above.
- c. Nuts: ASTM A325, Galvanized 78mmØ and below. A-490 1" Ø and above
- d. Washers: ANSI B 18.22.1, Type B

5.3.2 SHOP PAINTING

- a. Pre-treatment: Fed. Spec. TT-C-490, Type I, II or IV
- b. Primer Paint: Fed. Spec. TT-P-645

5.3.3 GALVANIZING

- a. Galvanizing Repair Paint: Mill Spec. DOD-P-21035

5.3.4 STRUCTURAL STEEL ACCESSORIES

- a. Welding Electrodes and Rods: AWS Code D1-1. E7018 Non-Shrink with minimum yield strength, $f_y=290$ mPa

- b. Non-Shrink Grout: With no ASTM C827

5.4 EXECUTION

5.4.0 FABRICATION

5.4.0.0 Markings: Prior to erection, members shall be provided with a painted erection mark. In addition, connection parts assembled in the shop for reaming holes in field connections shall be match-marked with scratch and notch marks. Do not locate erection markings on areas to be welded or on surfaces of weathering steels that will be exposed to the completed structure. Do not locate match-markings in areas that will decrease member strength or cause stress concentrations.

5.4.0.1 Shop Painting: Shop paint structural steel except as modified herein. Do not paint steel surfaces embedded in concrete, galvanized surfaces, bearing surfaces, or surface within 1/2 inch of the toe of the welds prior to welding. Prior to assembly, paint surfaces that will be concealed or inaccessible after assembly. Do not apply paint in foggy or rainy weather when paint may be exposed to temperature below 40 degrees F within 48 hours after application, unless approved otherwise.

- a. Cleaning: SSPC SP6, except as modified herein, SSPC SP3 or SP6 for steel surfaces exposed in spaces above ceilings, attic spaces, crawl spaces and chases. In addition, maintain steel surfaces free from rust, dirt, oil, grease and other contaminants through final assembly.
- b. Pre-Treatment: Immediately after cleaning, provide the metal surfaces with one coat of MIL. Spec. DOD-P-15328 pre-treatment to dry film thickness of 0.3 to 0.5 mil. Fed. Spec. TT-C-490, pre-treatment may be applied to SSPC DP6 cleaned surfaces in accordance with Fed. Spec. TT-C-490.
- c. Priming: Immediately after the pre-treatment coating has dried, apply primer to a minimum dry film thickness of 2.0 mil. Primer paint shall be zinc chromate conforming to Fed. Spec. TT-P-645. Repair damaged prime surfaces with an additional coat of primer.

5.4.0.2 Galvanizing: Provide as indicated or specified. Galvanize after fabrication where practicable.

- a. Galvanizing Repair: ASTM A780, using galvanizing repair paint for galvanizing damaged by handling, transporting, cutting, welding or bolting. Do not heat surfaces that repair paint has been applied to.

5.4.0.3 Bearing Surfaces and Friction Type Joints: In the shop, coat with a temporary rust preventive. Remove coating, as recommended by the coating manufacturer, immediately prior to field erection.

5.4.0.4 Surface Finishes: ANSI B46.1 maximum surface roughness of 125 pin, pinholes and sliding bearing, unless indicated otherwise.

5.4.0.5 Erection. Except when load indicator bolts are used, calibration wrenches shall be calibrated every two (2) working days on a minimum of three (3) typical bolts of each diameter. Provide for drainage in structural steel.

- a. Base Plates and Bearing Plates; after final positioning of members, provide full bearing under plates using non-shrink grout. Place non-shrink grout in accordance with the manufacturer's instructions.
- b. Field Painting: After erection, the field bolt heads and nuts, field welds, and any abrasions in the shop coat shall be cleaned and primed with paint of the same quality as that used for the shop priming.

5.4.1 SOURCE QUALITY CONTROL

Errors of Shop Drawing, Fabrication, correct fitting and alignment of the various metal items or component members shall be the responsibility of the contractor. However, the contractor shall permit the Architect or an independent inspection agency, if engaged by the Owner, to inspect work in progress in his shop. Such inspections shall not relieve the contractor of his responsibility to furnish materials and workmanship in accordance with the Contract Documents.

5.4.2 PRODUCT DELIVERY, HANDLING AND STORAGE

Handle and store in such manner as to prevent damage or disfigurement. Store finished items or components above ground on platforms, pallets or other supports and protect from harmful elements.

5.5 PROTECTION

The Contractor shall protect any existing work subject to damage during the installation of specified work and shall adequately protect specified work during installation. Finished work that is readily subject to damage by subsequent work or environmental conditions shall be protected by the Contractor immediately following the installation thereof.

5.6 FIELD MEASUREMENTS

Contractor shall make measurements in field to verify or supplement dimensions indicated and be responsible for accurate fit of specified work.

5.7 FIELD QUALITY CONTROL

Facilities shall be provided by the Contractor as needed for the proper inspection of the specified work, including temporary platforms, hoists, protective devices, electric current, etc. Improper workmanship, as determined by the Architect shall be corrected and replaced, at no additional cost to the Owner.

5.8 CONNECTIONS

Connections and not detailed shall be designed in accordance with AISC "Manual of Steel Construction". Build connections into existing work. Do not tighten anchor bolts set in concrete with impact torque wrenches. Punch, sub punch and ream or drill bolt and pin holes.

5.9 WELDING: Provide AWS D1.1 qualified welders, welding operators and tacklers.

5.10.1 Removal of temporary welds, run-off plates and backing strips, remove only from finished areas

- 5.10 TESTS AND INSPECTIONS:** Perform field tests, and provide labor, equipment and incidentals required for testing.

Welds:

- 5.10.0 Visual Inspection: AWS D1.1 Section 6: Provide AWS certified welding inspectors for fabrication/erection inspections and testing and verification inspection. Welding inspectors shall visually inspect and mark welds, including fillet weld end returns.
- 5.10.1 Non-Destructive Testing: AWS D1.1. Test locations shall be selected by the Engineer if more than 20 percent (20%) of welds made by a welder contain defects identified by testing, and then all welds made shall be tested by radiographs or ultrasonic testing, as approved by the Engineer. When all welds made by an individual welder are required to be tested, magnetic particle testing shall be used in areas inaccessible to either radiographic or ultrasonic testing. Retest defective areas after repair.

VI ARCHITECTURAL

6.0 FINISHES

6.0.1 INTERIOR WALLS

- a. For areas exposed to moisture, use CHB with cement plaster finish painted.

6.0.2 FLOOR FINISHES

- a. Plain Cement Finish

6.0.3 CEILING FINISHES

- a. Rubbed Concrete

6.0.4 WINDOWS

Follow as per approved plan.

6.0.5 DOORS

Follow as per approved plan.

6.0.6 PAINTING

- a. All paints shall meet the required specifications and shall be delivered at the site in the original container. Use non Volatile Organic Compound (V.O.C.) paint or approved by the implementing agency and only accredited painters of the manufacturer shall execute the work to ensure the true origin and quality of paint and warranty of work.
- b. Concrete walls shall be treated with neutralizers. Exterior walls without wall veneer shall be applied with a primer before final coat. In general, rough surfaces of concrete, cabinets and woodworks surfaces shall be properly sandpapered and puffed before any application of paint.
- c. Latex Paint Finish (exterior masonry walls)

- d. Latex paint Finish (interior masonry walls/hardiflex)
- e. Latex Paint Finish (Ceiling)

6.0.7 HARDWARE

1. Provide all rough hardware required for the construction of works: nails, straps, lag screws, etc.
2. Butt Hinges : Use Toyo Butt Hinges, 4" x 4" with bearings for panel door.
3. Locksets : For PVC plastic, wood and metal swing doors use ABLOY stainless mortise locksets with striker plate.

6.0.8 OTHER FINISHES

- a. Countertop including Tiles.
- b. Stainless Steel Signage with Neon Backlight "MEDICINE DISPENSING ROOM" including accessories.
- c. Plastering Guide / Grooves
- d. Wood Ledge 0.25m x 2.4m including accessories, painted finish.

6.0.9 CLEAN-UP

When the work is completed, the Contractor shall remove all temporary structures and surplus materials of every sort, restore what has been removed before, and leave the premises or site in as good condition as he had originally found them.

VII THERMAL CONTROL AND MOISTURE PROTECTION

7.0 WATERPROOFING

Use waterproofing cementitious powder, capillary type, applied waterproofing seamless membrane latex-modified rubber reinforced on slabs. Refer to manufacturer's recommendation on proper application of the product listed herein: Lanko manufactured by VSL.

7.1 VAPOR BARRIER

Use 8 mils thick, 6 feet wide roll plastic vapor barrier laid over compacted base course at ground floor slab with 300mm minimum overlap prior to setting up of steel reinforcing bars. Submit samples for approval.

7.2 WATERSTOPS

Use Rebstop Ultra Seal chemical grout water-stop specially formulated for construction joints to replace the use of conventional water-stop used for cold expansion joints on pipes, etc. manufactured by Rebtrade International Corporation or approved equal.

IX PLUMBING

GENERAL

9.0 DESCRIPTION

- 9.0.0 Applicable provisions of General Conditions govern work under this section.
- 9.0.1 All fittings, connections and piping embedded in concrete shall be subject to inspection by the Architect and/or his representative before covering and/or completion.
- 9.0.2 The contractor shall provide all items, articles, materials, operations of methods listed, mentioned or scheduled on the drawings and/or herein, including labor, materials and incidentals necessary and required for their completion.
- 9.0.3 The contract drawings and specifications are complementary to each other, and any labor or materials called for by either, whether or not called for by both, if necessary, for the successful operation of any of the particular type of equipment furnished and installed will be without additional cost to the owner.
- 9.0.4 Intent: It is not intended that the drawings shall show every pipe fitting.
- 9.0.5 All such items, whether specifically mentioned or not, or indicated in the drawings shall be furnished and installed, if necessary to complete the system in accordance with the best practice of the plumbing trade and to the satisfaction of the engineer and the owner.
- 9.0.6 The plumbing contractor is required to refer to all architectural, structural and electrical plans and specifications and shall investigate all possible interferences and conditions affecting his work.

9.1 SCOPE OF WORK

- 9.1.2 Work included under this section of this specification consists of furnishing all labor, tools and equipment, appliances and materials necessary for complete installation, testing and operation of the plumbing and storm drainage system in accordance with the contract.
 - a. Arrange for, obtain and bear the cost of necessary permits, bonds and fees, private or government shall be paid by the contractor.
 - b. Soil, waste and vent pipe system within the building.
 - c. Sanitary drainage system of the building and its connection to the nearest existing sewer line or drainage line.
 - d. Supply of all plumbing fixtures, trims and accessories.
 - e. Supply and installation of transfer pumps including valves and accessories under the supervision of the pump supplier.
 - f. The contractor shall provide all necessary shop drawings and two (2) sets of As-Built Plans.
 - g. Testing for leakage of all water supply and distribution system, drains, waste and venting system plus pressure testing for two (2) hours and disinfection of water distribution system.

- h. Water meter and MWSI connection as shown on plans and to be verified at the jobsite.
- i. Excavation and backfilling in connection with the work shall be included.
- j. Furnishing of written one (1) year warranty of the plumbing system

9.2 SUBMITTALS

- 9.2.0 Within fifteen (15) days after award of contract, the plumbing contractor shall submit for engineer's approval, four (4) copies of all complete list of manufacturer's name of all materials he proposes to use.
- 9.2.1 After approval of the above list and before purchase of any materials, the plumbing contractor shall submit to the engineer for approval, four (4) complete sets of detailed information consisting of manufacturer's bulletins, shop drawings and partial list of materials to be provided under this contract.
- 9.2.2 The plumbing contractor shall assume the loss of and the entire responsibility of any change in the work as shown in the contract drawings, which may be occasioned by approval of materials other than those specified.

9.3 APPLICABLE CODE AND STANDARD

- 9.3.0 All plumbing works to be done and the sizes of pipes to be used shall be in accordance with the National Plumbing Code and the Plumbing Code of the Philippines.
- 9.3.1 The plumbing contractor shall verify the above paragraphs with each section of the specifications and coordinate his work so that the general contractor will understand clearly the intent of the work to be done.

9.4 PRODUCTS

9.4.0 Description of Materials

All materials to be used shall conform to the standards specified. Use of materials shall be governed by other requirements imposed on other section of these specifications. Materials shall be subject to tests necessary to ascertain their fitness if the engineer so requires.

9.4.1 Alternate Materials

Use of any material not specified in these specifications may be allowed, provided such alternate has been approved by the engineer, and provided further, that a test if required shall be done by an approved agency in accordance with generally accepted standards.

9.4.2 Identification of Materials

Each length of pipe, fittings, traps, fixtures and devices used in the storm drainage system shall have case, stamped or indelibly marked on it the manufacturer's trademark or name, type and classes of products when so required by the standards mentioned. All materials and equipment mentioned in these specifications, including all incidental items not specifically indicated, but required to complete the contract shall be new and free from defects. If

damaged during the course of construction, it shall be repaired or replaced as directed by the Project Manager at no additional cost for the owner.

9.4.3 Pipes and Fittings Schedule

9.4.3.0 Cold Water Lines – Shall be PP-R, pipes DIN 8077, non-corrosive, Leak proof, taste and odour neutral, jointing method is socket fusion.

9.4.3.1 Drain, Waste and Vent – shall be unplasticized polyvinyl chloride (uPVC) conforming to ASTM D1784.

9.4.4 Flanges, Bolting and Gaskets and Union

9.4.4.0 Provide flanges at flange connection to equipment and valves, slip-on or threaded as required.

Flanges shall conform to Class 300 black forged steel welding flanges 1/16" in raised faced to ASTM A-181 Grade 1. Bolts to ASTM A-193 regular hexagonal head unfinished, heavy semi-hexagonal nuts to ASTM A-194.

9.4.4.1 Provide union at each threaded connection to equipment, and valves for pipe sizes up to two (2) inches in diameter. It shall be galvanized steel pipe Class 300 screwed galvanized malleable iron, ground joint, brass to iron seat.

9.4.5 Valves

Valves up to and including two (2) inches shall be threaded ends, rough bodies and finished trimmings. Valves 2 ½ inches diameter and larger shall have iron [bodies, brass mounted and shall have either screws or flange ends.

9.4.5.0 Water meter shall be positive displacement type or any brand approved by MWSI or LWUA.

9.4.5.1 Hose Bibb shall made of male inlet threads, hexagon shoulder and three quarter inch hose connections. Provide one (1) extra gate valve on the vertical before the hose bib.

9.4.6 Drains

9.4.6.0 Floor drains at toilets shall be gauge no. 22 with round strainer and plastic bucket.

9.4.6.1 Deck drain shall be ASA 10-12, pipe size 75mmØ.

9.4.6.2 Floor drain for genset room shall be ASA 40-9F.

9.4.6.3 Grating cover (to be supplied by civil contractor).

9.4.7 Pipe Sleeves

9.4.7.0 Pipe sleeves shall be installed and properly secured in place at all points where pipes pass through masonry or concrete, except unframed floors on earth.

- 9.4.7.1 Pipe sleeves shall be of sufficient diameter to provide approximately one-quarter inch clearance around the pipe.
- 9.4.7.2 Pipe sleeve in walls and partitions shall be of wrought iron or steel pipe schedule 40. The pipe sleeves in concrete beams of concrete fireproofing shall be steel pipe schedule 40.
- 9.4.7.3 Pipe sleeves through floors shall be galvanized steel pipe schedule 40. Sleeve in pipe floor shall extend not less than one (1) inch and not more than two (2) inches above and the space around the pipe shall be packed with fiberglass insulation.
- 9.4.7.4 Pipe sleeves in footings shall be steel pipe and shall be not less than four (4) inches larger in diameter than the pipe to be installed.

9.4.8 Hangers and Supports

Vertical run of pipe shall be supported by brace. Horizontal runs of pipe shall be supported by loop 4-sway hanger.

9.4.9 Pumps Specifications

9.4.9.0 Plumbing Fixtures and Accessories

9.4.9.1 Water closet shall be Tank type.

9.4.9.2 Lavatory Countertop.

9.4.9.3 Urinal shall be wall-hung.

9.4.10 EXECUTION

9.4.10.0 Piping Installation

Piping shall be installed as shown on the drawings, as recommended by the manufacturer and as directed during installation, straight and direct as possible, forming right angles or parallel lines with building walls and other pipes and neatly spaced. Erect pipe risers plumb and true, parallel with walls and other pipes neatly spaced. All piping shall be supported or suspended on stands, clamps, hangers or equivalent or approved design. Supports shall be installed in such a manner to permit pipe free expansion and contraction while minimizing vibration.

9.4.10.1 Plumbing System Test

The entire system of drains, waste and vent shall be tested. Water test shall be in accordance with the plumbing Code. Every portion of the system shall be tested to a hydrostatic pressure equivalent to at least 10-foot head water for a period of ½ hour before covering. All cold water lines shall be tested at 150 psi for a period of two (2) hours before covering. Defects disclosed by the test shall be repaired with new materials at the expense of the contractor.

9.4.11 Fixture Installation

Support all fixtures securely in a neat workman-like manner on approved carriers and supports. The method of support for each fixture shall be approved type manufacturer's standard, except where fixture designations on the drawings indicate modifications. Install all fixtures level and flush with finish floors and partitions. All fixtures shall be provided with individual shut-off valve and equipped with a trap.

X ELECTRICAL WORKS

10.0 WORK INCLUDED

10.0.0 The work to be done under this Division comprises the furnishing of all tools, labor, equipment, fixtures and materials, unless otherwise herein specified, required to complete and leave ready for use the electrical system of the above mentioned project in accordance with this specification and accompanying drawings of materials and finishes.

10.0.0 The electrical contractor shall coordinate his work so that the general contractor and all other subcontractors will understand clearly the work to be done. The electrical contractor shall finish all electrical facilities and provision necessary for the installations and operations of other trades such as mechanical, air-conditioning, plumbing, sanitary and others.

10.0.1 All contractors and all companies or persons providing labor, materials or both for this project, are specifically referred to the General Conditions of the specifications, to the general contract plans, to all Divisions of specifications and to the various other contract documents, which may affect the completion of the contract work.

10.1 CODES, INSPECTIONS, PERMITS AND FEES

10.1.0 The work under this contract shall be done according to the requirements of the latest edition of the Philippine Electrical Code, the rules and regulations of the Local Government Authorities of Quezon City and the requirements of Manila Electric Company. Nothing contained in this specification or shown on the drawings shall be construed as conflict with national and local ordinances or laws governing the installation of Electrical Works, and all such laws and ordinances are hereby made part of these specifications. The contractor is required to meet the requirements hereof.

10.1.1 All permits and electrical fees required for this work shall be obtained at the expense of the Contractor. The Contractor shall furnish the Architect or the Owner or the same maybe, a final certificate of electrical inspection and approval from the proper government authorities after completion of the work.

10.2 TEST

10.2.0 The electrical contractor shall apply such test, replace or remedy all defective work and adjust such system as needed or as the Architect or the owner shall direct. He shall also instruct the proper use of the system and equipments to persons designated by the owner. Submit copies of test data and results, including test reports on instrument to the engineer.

10.3 MEASUREMENTS

10.3.0 The Electrical Contractor shall procure from the Architect detailed drawings of those parts of the work not fully shown on the plans and he shall compare and verify with the Owner. Any lack of agreement shall be submitted at once to the Architect for adjustments.

10.4 SLEEVES AND FORMS FOR OPENINGS

10.4.0 The Electrical Contractor shall provide and places all shelves, for piping penetrating floors, walls, partitions, etc. He shall locate all necessary slots and openings for his work and it shall be done at such time as not to delay the general contractor of the project.

10.5 LOCATION OF OUTLETS

10.5.0 All Outlets shall be truly centered in panels and spaces provided thereof. Any discrepancy outlet location between the electrical plan and architectural plans shall be submitted to the Architect at once and verified before outlets are installed.

10.6 GROUNDINGS

10.6.0 All metallic conduits, supports, cabinets and equipments shall be properly grounded and bonded by means of copper straps. The conduits of such system shall be grounded by connecting to the grounding rod.

10.6.1 All ground connection shall have clean outlet surfaces and shall be tinned and sealed while bolting. Unless otherwise specified, ground wire shall be installed in exposed conduits and connections made readily accessible for inspection. Connection shall not be made underground or concealed in floors or walls.

10.7 WIRING METHODS

10.7.0 All wiring shall in general be installed inside standard conduits. All conduits shall be run embedded in concrete, underground but in concrete envelope, embedded in hollow blocks partition, concrete slab, walls and roof above, between double wall wooden partitions if any, where the installation of concealed and/or embedded conduit wiring may be used, but only upon approval of the Owner's authorities concerned. Exposed conduits shall be rigid steel conduits unless otherwise specified.

10.8 GUARANTEE

10.8.0 The Electrical Contractor shall guarantee his work for a period of one (1) year from the date of final acceptance by the owner except for particulars items specifically mentioned in these specifications.

10.8.1 The Electrical Contractor shall, without additional compensation for the period specified, replace any work materials or equipment furnished and installed by him under this contract, which develop defects except from ordinary wear and tear.

10.9 MATERIALS

10.9.0 All materials shall be new and shall conform to the standards of **Underwriter's Laboratories, Inc.** In every case where such a standard has been established for the particular type of materials in question.

10.9.1 All materials on all system shall comply with the following specifications unless specified and all materials where not specified shall be of the best of their respective kind.

10.9.2 Samples on any materials shall be submitted for approval as required by the Architect.

10.10 WIRES

10.10.0 All wires shall be copper, soft drawn and annealed, shall be 98% conductivity, shall be smooth and true of a cylindrical form and shall be within the actual size called for.

10.10.1 All wires and cables shall comply with the requirements of the **Underwriter's laboratories**, the **ASTM** and the **IPCEA** as to their particular usage.

10.10.2 Wires and cables for outdoor and indoor lighting and power system shall be moisture and Heat Resistant Thermoplastic with nylon insulated for 600volts working pressure type THHN unless otherwise noted on the plans or specified.

10.10.3 For lighting and power system, no wire smaller than 3.5mm² shall be used except for control leads.

10.10.4 All wires and cables shall be manufactured by a reliable manufacturing company acceptable to the Electrical Engineer of the owner.

10.11 CONDUITS

10.11.0 The conduit system shall consist of the following

1. Intermediate Metal Conduit (IMC):

They shall be of standard sizes and weight, mild steel hot dipped galvanized with inside enamel or epoxy coating, acceptable to the Electrical Engineer of the Owner.

2. Polyvinyl chloride conduit (PVC):

They shall be of standard size and weight, made of polyvinyl chloride, extruded, heavy wall, rated for 90-degree centigrade cable, schedule 40.

3. Limitations of use shall be as follows:

a. As per requirement of the latest edition of **PEC** and/or **NEC**.

b. Not permitted where subject to mechanical damage.

10.11.1 All conduits shall be of true cylindrical form and shall be within the actual size called for.

10.11.2 No conduits shall be used in any system smaller than 15-mm electrical trade size, not shall have more than four 90 degrees bend in any one run, and where necessary, hand hole and pull boxes shall be provided.

10.11.3 No wires shall be pulled in any conduit until the conduit system is complete in all details, In case of underground work, until concrete envelope or masonry has been completed in every detail,. In case of concealed work, until rough plastering has been completed.

10.11.4 The ends of all conduits shall be tightly plugged to exclude plaster dust sand and soil including moisture while the renovation of the perimeter is in the process.

10.12 OUTLET BOXES AND FITTINGS

10.12.0 At all outlets of every kind, for all systems, there shall be provided a suitable fittings which shall be either a box or other device especially designed to receive the type of fitting to be mounted thereon.

10.12.1 The Contractor shall consult with the Architect as to the nature of various fittings to be used before installing his outlet fittings and shall conform strictly in the use of fittings so that the work when completed will be finished design.

10.13 SWITCHES

10.13.0 Local lighting switches shall be flush type, heavy duty, 15 ampere size 250 volts, bakelite case, quick connect terminal. Outdoor lights shall be automatically operated by means of photo switch and manual selection. Manually switch by means of breaker switch inside the lighting panel.

10.14 RECEPTACLES

10.14.0 Standard receptacles shall be 10-ampere size 250volts, parallel slots, duplex, flush mounted composition case, side wired with the insulated mounting yoke, If weatherproof wall plate are required, standard factory made metal waterproof plate shall be provided.

10.15 PLATES

10.15.0 All switches and receptacles plates shall be bakelite plastic, ivory-colored or as directed by the Architect

10.16 LIGHTING SYSTEM

10.16.0 The lighting system shall be complete in every respect all indicated on the plans or as indicated and specified in the Architectural plans. Exact fixture location shall be determined.

10.16.1 All wiring shall be installed in conduits, and in general shall be concealed. Buried underground in concrete encasement and/or embedded in concrete.

10.16.2 Mounting Height of devices shall be as indicated in the plans and/or subject to Architect's approval prior to installations as follows:

Local switches	-	1.4 above finish floor line
Receptacles	-	0.3 above finish floor line

10.17 DISTRIBUTIONS FEEDERS

- 10.17.0 Distribution voltage shall be 220volts, Single-phase, 3 wire. Feeder conductor and raceway shall be installed as shown on drawings and no change in size shall be made without written consent of the Architect. Feeder conductors shall be continuous, and without splices between terminals, when feeders are run in multiple, they shall be exactly of the same length to avoid **unbalanced division of the current**.

10.18 CONNECTORS AND INSULATION

- 10.18.0 Use solderless mechanical pressure type lugs, copper connectors for splicing wires greater than no 8mm.sq. All splices shall be properly insulated using #M brand rubber tape and plastic electrical tape. Application of two tapes shall be equivalent to the insulation of wire concerned, edges to provide smooth surfaces before taping.

10.19 BRANCH CIRCUITS

- 10.19.0 The drawings indicate the general methods of installation of all circuit wirings and the power lighting outlets which are to be supplied from this circuit. Branch circuit raceways shall be run from outlets to panel boards as direct as the ground and level condition will allow. Circuit allocations shall be as indicated on the drawings. Where it becomes necessary to connect any outlet to the circuit other than the one shown on the drawings, this shall be done without extra charge and only upon written consent of the Architect. No wire smaller than 3.5mm sq. shall be used for any lighting or power branch circuit. All lighting outlet shall be supplied from 2-wire single phase circuits. Number of wires for other outlets shall be as indicated on the drawings.

10.20 MOTOR CONNECTIONS

- 10.20.0 Connect the motor starting devices for all motors, except where otherwise specifically provided for under other contracts. Furnish all necessary connections between controllers and motors in conduit, and leave motor ready to start. The power supply leads to the motor from the controller shall be the same as the feeder indicated on the drawings, except for six terminal lead motor where wye-delta starting method is being applied.
- 10.20.1 Other trades, i.e. mechanical contractor, except as otherwise noted or specified will supply and deliver all controllers and shall erect and connect up safe complete.
- 10.20.2 The Electrical Contractor or trade people shall be held responsible as far as power supply to the controller is concerned. He shall ascertain the exact location of the motor controller and motors from other trades before installing the circuit work.

10.21 RECORD DRAWINGS AND AS BUILT PLANS

- 10.21.0 The Electrical Contractor shall keep an active record of the actual installation works during the progress job. The shall become the reference for the preparation of the As-Built Plans which shall include all pertinent information, complete in all aspects of the actual installations, all new information not originally shown in the contract drawings.
- 10.21.1 The As-Built Plans shall be prepared by the Electrical Contractor at his expense and shall be submitted to the Architect and the Engineer for approval upon the completion of the work. The approval of the As-Built drawings shall be a pre-requisite for the final acceptance of the electrical works.

10.21.2 Two (2) copies of the As-Built drawings, signed and sealed by the **Electrical Contractor's Professional Electrical Engineer**, shall be submitted to the Architect and Engineer consultants. Original tracing/ reproducible copy shall also be submitted.

Note: In contrast between these Technical Specifications and the approved Plans issued to the Contractor, the approved Plans shall prevail. See also the approved program of works. In case of doubt, for clearer outlooks consult the assigned Architect/Engineer.

Prepared by:

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Republic of the Philippines
Quezon City
Office of the City Mayor
QUEZON CITY BIDS & AWARDS COMMITTEE
(QC-BAC-INFRA)



PROJECT : PROPOSED CONSTRUCTION OF BAESA COLUMBARIUM WITH LAND DEVELOPMENT (DIESEL STORAGE)

LOCATION : Barangay Baesa, Quezon City

SUBJECT : GENERAL CONDITIONS AND TECHNICAL SPECIFICATIONS

I. GENERAL CONDITIONS

1.01 DEFINITIONS

- a. **OWNER :** LOCAL GOVERNMENT OF QUEZON CITY
- b. **CONTRACTOR :** Any individual, firm, corporation, partnership or association that enters into an agreement with the Owner for furnishing the materials and/or labor, tools, equipment, plant and other facilities required for the erection and completion of the project subject to the accompanying plans and working drawings.
- c. The Owner/Implementing Agency and the Contractor are treated through the contract documents as if each were of the regular number, masculine gender.

1.02 EXAMINATION OF MEMBER

The Contractor shall carefully examine the premises before submitting any bids to enable him to have full knowledge of conditions existing therein.

1.03 LOCATION

The Proposed Construction of Baesa Columbarium with Land Development (Diesel Storage) is to be constructed at Barangay Baesa, Quezon City.

1.04 EXECUTION, CORRELATION & INTENT OF DOCUMENTS

1. The Contract Documents are signed in sufficient number of copies by all parties concerned. In case anybody fails to sign copies of any item forming part of the set contract documents, the Implementing Agency's identification thereon shall suffice.
2. The items, specifications and all other documents forming the contract documents are complementary. Anything shown on plans but not mentioned in the specifications or vice versa or anything not expressly set forth in either, but necessarily implied, shall be furnished or done as if specifically shown and mentioned in both, with no extra charge. Where dimensions are given in figures, follow them in preference to measurement by scale.
3. Execute work as per agreement, making no changes or deviations whatsoever, without prior permission from the Implementing Agency.

4. The Contractor shall verify and check all dimensions particularly those on the plans. He will be held directly responsible in case of any discrepancy that may be discovered during the progress of work.

1.05 DETAIL DRAWINGS AND INSTRUCTIONS

Plans furnished for use at the jobsite are whenever necessary, supplemented by detail drawings and instructions essential to the proper execution of the work. Such supplementary detail drawings and instructions shall be treated as of equal force as though originally issued.

1.06 PLANS AND PROJECT SITE

Keep at project site, in good order and condition, one (1) set of approved plans, specifications, supplementary detail drawings and instructions.

1.07 SHOP DRAWINGS

Shop drawings shall be provided by the Implementing Agency and/or Contractor during the progress of construction. The contractor should not place any item subject to shop drawings until the Implementing Agency shall have duly approved such drawings.

1.08 CHANGES

The Owner and the Implementing Agency reserve the right to make alterations or additions, including changes during the progress of work. The same shall be carried into effect without in any way deviating from or violating any agreement. Whatever amount shall necessarily be entailed in the cost of labor or materials or both shall be added to or deducted from the original contract price.

1.09 TIME OF COMPLETION AND SCHEDULE OF CONSTRUCTION

The Contractor shall, before actual commencement of the project operations, prepare and submit to the Implementing Agency for verification and approval, a complete and comprehensive work schedule covering the entire duration of construction. He shall also include therein, the estimated number of days within which the entire project shall be completed stage by stage by phase.

1.10 WORKMANSHIP

The project shall be executed with the use of first class workmanship to the full intent and meaning of the plans and specifications and to the complete approval and acceptance by the Implementing Agency.

1.11 MATERIALS

All materials to be used shall be the best of their respective types and kind. They shall be properly stored and protected from damage or injury.

1.12 SAMPLES

Submit samples as specified and proceed with the work with the use of materials procured based on the samples previously approved by the Implementing Agency.

1.13 INSPECTION OF WORK

The Contractor shall provide the facility for inspecting the work to the Implementing Agency, the Owner and other personnel having jurisdiction over the work.

1.14 DEFECTIVE OR IMPROPER WORK

All work or materials not acceptable to the Architect shall be removed immediately and replaced with appropriate work or materials without extra charge. All condemned materials shall be taken away from the premises without delay.

1.15 BUILDING LAWS AND REGULATIONS

The Contractor shall be held responsible for strict compliance with existing labor laws and regulations and shall free the Owner from any responsibility in connection therewith, he shall pay on time at his own expense, all taxes, fees and/or licenses due to the government, both national and local arising from his work on the project.

1.16 MANNER OF PAYMENT

Payments to the Contractor shall be based on the periodic work accomplishments subject to verification, approval and recommendation by the Implementing Agency.

1.17 RETENTION MONEY

Progress payments shall be subject to a ten percent (10%) deduction, referred to as retention money. All retained amounts shall be released upon satisfactory completion of the work and issuance of the Certificate of Final Completion and Acceptance.

1.18 TEMPORARY WATER, POWER AND TELEPHONE FACILITIES

The Contractor shall make the necessary arrangements with the local utility companies so as to provide temporary facilities for the supply of water, power and telephone for the duration of construction, and all expenses in connection therewith shall be borne by the Contractor.

1.19 PRIVY

The Contractor shall provide a temporary privy in a most inconspicuous and sanitary manner, and shall have it removed at the termination of the work.

1.20 CLEARING AND CLEANING

Upon its completion, the project and its premises shall be cleared and cleaned as directed by the Implementing Agency, and make ready for immediate occupancy.

1.21 TEMPORARY BARRICADES, SIGNAL LIGHTS, BILLBOARDS, ETC.

The Contractor shall provide all temporary barricades, signal lights, Architect and Contractor's billboards, the required official building billboard, etc., necessary for the protection of the public and for the proper prosecution of the work and display of construction requirements.

1.22 PERFORMANCE AND GUARANTEE BOND

To guarantee the faithful performance of the Contractor under the contract, he shall post a Performance Bond in the amount of thirty percent (30%) of the contract price in the form of cash, manager's check or surety bond, callable on demand.

1.23 QUESTIONS AND DISAGREEMENTS

All questions and disagreements between the Contractor and the Owner relative to the interpretation of the plans and specifications shall be referred to the Implementing Agency whose decision on the matter shall be final.

II. TECHNICAL SPECIFICATIONS

2.0 SITE WORK

WORK INCLUDED

- 2.0.0 All excavation works including all necessary shoring, bracing and drainage of storm water from the site.
- 2.0.1 All soil treatment, backfilling, filling, compaction and grading, removal of excess material from site.
- 2.0.2 Protection of property, work and structures, workmen and other people from damage and injury.
- 2.0.3 Demolition of existing road pavement as indicated in the drawings.
- 2.0.4 Laying of utility/auxiliary lines as indicated in the drawings.
- 2.0.5 Survey and Stake-out works

2.1 LINES, GRADES AND BENCHMARKS

- 2.1.0 Stake out accurately the lines of the building and/or the other structures included in the contract, and establish grades therefore, after which secure approval of the Project Manager before any excavation work is commenced.
- 2.1.1 Erect basic batter boards and basic reference marks at such places where they will not be disturbed during the construction of the foundation.

2.2 EXCAVATION

Structural Excavations: Excavations shall be to the depths indicated in the drawings where bearing value as indicated in the Soils Investigation Report provided as part of the Construction Documents shall be attained. Excavations for footings and foundations carried below required depths shall be filled with lean concrete and bottom of such shall be level. All structural excavations shall extend a sufficient distance from the walls and footings to allow for proper erection and dismantling of forms, for installation of service and for inspection.

All excavations shall be inspected and approved before pouring any concrete laying underground utility and auxiliary lines for placing select fill materials. The Contractor shall control the grading in the vicinity of all excavated areas to prevent surface drainage running into excavations. Water that accumulates in excavated areas shall be removed by pumping before fill is placed herein.

2.3 SOIL TREATMENT

Treat soil with 2% Chlordane or Andrex solution in water to provide an unbroken horizontal and vertical chemical barrier between the proposed structure and the possible termite colonies in the soil after excavation is completed and prior to pouring of concrete

foundation and ground floor slabs. At the time the soil treatment is to be applied, the soil shall be in a friable condition with a sufficient low moisture content to allow uniform distribution of the treatment solution throughout the soil.

Do not apply pesticide during or immediately after heavy rains, or whenever climatic conditions are such that runoff will occur to create an environmental hazard. Cover treated areas with polyethylene or waterproof sheeting if concrete is not poured on the same day as the soil treatment. Take adequate precautions to prevent disturbance of the pesticide barrier. Re-treat the soil or fill is disturbed after the treatment and before the placement of structural components. Apply pesticide prior to placement of vapor barrier or waterproofing membrane.

2.4 SHORING

Excavation shall be shored and braced by members of suitable sizes where necessary to prevent danger to persons, injurious caving or erosions. Shoring bracing and sheathing shall be removed, as the excavations are backfilled, in a manner such as to prevent injurious caving. The contractor shall keep all excavations free from water while construction is in progress.

2.5 FILLING AND BACKFILLING

After forms have been removed and when concrete work is hard enough to resist pressure resulting from fill, backfilling may then be done. Materials excavated may be used for backfilling. All filling shall be placed in layers not exceeding six (6) inches in thickness, each layer being thoroughly compacted and rammed by wetting, tamping, rolling.

2.6 PLACING AND COMPACTING FILL

2.6.0 Common Fill: shall be approved imported/site-excavated material free from roots, stumps and other perishable or objectionable matter.

2.6.1 Select Fill: shall be placed where indicated and shall consist of crushed gravel, crushed rock or a combination thereof. The material shall be free from adobe, vegetable matters and shall be thoroughly tamped after lacing.

2.6.2 Before placing fill materials, the surface upon which it shall be placed shall be cleared of all brush roots, vegetable matter and debris, and thoroughly wetted to ensure good bonding between grounds.

2.6.3 Compaction: Fills shall be evenly spread in horizontal layers of not more than 200mm in thickness. Each layer shall be wetted and compacted by approved mechanical compaction machine, roller or portable to a density of at least 90% or its maximum density for non-cohesive soils as determined by ASTM Method D-1557 or AASHTO Method T-180.

2.7 FINISH GRADING

The contractor shall fill and grade the whole area to the indicated sub-grade elevations as directed by the Architect or Engineer. The contractor shall verify the finish grade elevations of the proposed pavements. Prior to grading operations, the areas shall be cleared of all heavy growth or vegetation stumps, roots, cables, wires, rocks and other debris. The finished sub-grade shall be reasonably smooth and compacted and ready to receive the base course for the proposed pavement.

2.8 DISPOSAL OF EXCESS MATERIALS

Any excess and demolished materials remaining after completion of the earthwork shall be disposed of by hauling and transported out of the premises at the contractor's own expense.

2.9 SUB-GRADE PREPARATION

2.9.0 SCOPE

The sub-grade preparation shall be that part of the work which is the preparation for the support of the bases for pavements and structures. It shall extend to the full width of pavements including shoulders and lay-bys as shown on the drawings or as specified herein. Unless otherwise agreed upon by the Engineer, sub-grade preparation on a section of the road shall not be commenced unless the contractor is able, after the completion and acceptance of the work, to commence immediately pavement construction.

2.9.1 PRODUCTS

All materials and equipment necessary for proper completion of this work shall be subject to the approval of the Engineer.

2.9.2 EXECUTION

2.9.2.0 Prior Works: Prior to commencing the preparation of the sub-grade, all culverts, cross drains, and other similar structures (including the fully compacted backfill) shall be completed. No work shall be started on the preparation of the sub-grade before the prior works herein approved by the Engineer.

2.9.2.1 Sub-grade Level Tolerance: The finish compacted surface of the sub-grade shall conform to AASHTO M-145.

2.9.2.2 Sub-grade in Cutting Common Material

- a. Unless otherwise specified, all materials below sub-grade level in earth cutting to a depth of 150mm or other depth shown on the drawings or directed by the Engineer shall be excavated. The material, if suitable, shall be placed to one side for re-use, or if unsuitable, shall be disposed of in accordance with the requirements of AASHTO M-145.
- b. Where material has been removed from below sub-grade level, the base of the resulting cutting shall be compacted to a depth of 150mm to the requirements of AASHTO M-145 Table 1. If necessary, the moisture content of the material shall be adjusted.

2.10 GRADED AGGREGATES AND BASE COURSE

2.10.0 SUBMITTALS

- a. **Test Reports:** Before delivery of materials, submit the following test reports:
 1. Gradation
 2. Bearing Ratio
 3. Attenberg Limits

2.10.1 DELIVERY AND STORAGE

Do not construct base course when rainfall or other weather conditions will detrimentally affect the quality of the finished course.

2.11 PRODUCTS

2.11.0 MATERIALS

- a. Aggregates: Consist of durable sound crushed gravel, crushed stone, free of lumps and balls of clay or other objectionable matter. Crushed stone shall be free from flat, soft or disintegrated pieces. Crushed gravel retained on a No. 4 sieve shall have at least ninety percent (90%) by weight with at least two fractured faces one hundred percent (100%) by weight with at least one fractured face.
- b. Base course materials samples shall have a Bearing Ratio of at least 100 as determined by laboratory tests on a 4-day soaked specimen in accordance with ASTM D 1883; compact specimen in accordance with ASTM D 1557, Method D. Determine grain size in accordance with ASTM C-117.
- c. Soil binder material, the surface of the layer by a combination of rolling and blading. Final surface shall be smooth and free from waves, irregularities and from ruts of soft yielding spots.

CONCRETE

3.0 GENERAL

3.0.0 Unless otherwise specified herein, concrete work shall conform to the requirements of ACI Building Code. Full cooperation shall be given other trades to install embedded items. Provisions shall be made for setting items not placed in the forms. Before concrete is placed, embedded items shall have been inspected and tested for concrete aggregates and other materials shall have been done.

3.1 SUBMITTALS

3.1.0 Shop Drawings: Reproduction of contract drawings is unacceptable.

3.1.1 Shop Drawings for Reinforcing Steel: ACI 315. Indicate bending diagrams, assembly diagrams, splicing and lap 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 bars.

3.1.2 Contractor Mix Design: Thirty (30) days prior to concrete placement, submit a design for each strength and type of concrete. Furnish a complete list of materials including type, brand; source and amount of cement and admixtures; applicable reference specifications and copies of test reports showing that the mix has been successfully tested to produce concrete with the properties specified and will be suitable for the job conditions. Provide fly ash and pozzolan test results performed within six (6) months of submittal date. Obtain approval before concrete placement.

3.1.3 Certificates of Compliance

- a. Aggregates

- b. Admixtures
- c. Reinforcement
- d. Cement

3.1.4 Catalogue Data

- a. Water stops
- b. Materials for Curing Concrete
- c. Joint Sealant
- d. Joint Filter
- e. Vapor Barrier
- f. Epoxy Bonding Agents

3.2 MATERIALS

- 3.2.0 Cement for concrete shall conform to the requirements of specifications for Portland cement (ASTM C-150).
- 3.2.1 Water used in mixing concrete shall be clean and free from other injurious amounts of oil, acids, alkaline, organic materials or other substances that may be deleterious to concrete or steel.
- 3.2.2 Fine Aggregates shall consist of hard, tough, durable uncoated particles. The shape of the particles shall be generally rounded or cubicle and reasonably free from flat or elongated particles. The stipulated percentages of fines in the sand shall be obtained either by processing sand or by the production of suitable graded manufactured sand.
- 3.2.3 Coarse Aggregates shall consist of gravel. Crushed gravel or rock. Or a combination of gravel and rock. Coarse aggregates shall consist of hard, tough, durable, clean and uncoated particles. The size of coarse aggregates top be used in the various parts of the Work shall be $\frac{3}{4}$ ".
- 3.2.4 Reinforcing bars shall conform to the requirements of PNS-49 Standard specifications for Billet Steel Bars for concrete reinforcement (A15-625). Tensile strength and grade for all reinforcing bars such as main horizontal (for beams), vertical (for columns), ties, stirrups and inserts shall be as follows:

SCHEDULE OF REINFORCING BARS (PNS-49)

DIAMETER OF BARS	GRADE (fy)	
12mmØ & smaller	230 MPA	Grade 33
16mmØ to 25mmØ	275 MPA	Grade 40

3.3 PROPORTIONING AND MIXING

- 3.3.0 Proportioning of all materials entering into the concrete mixture of 3,000 psi concrete shall be as follows:

<u>Class</u>	<u>Cement</u>	<u>Sand</u>	<u>Gravel</u>
A	1	2.0	4

- 3.3.1 Strength of Concrete: Concrete shall have a 28-day cylinder strength of 3,000 psi for all structures.
- 3.3.2 Mixing: The 3,000 psi concrete can be machine mixed on-site. On-site mixing shall be within 30 minutes after the cement has been added to the aggregates.

3.4 FORMS

3.4.0 General: Forms shall be used whenever necessary to continue the concrete and shape it to the required lines, or to ensure the concrete contamination with materials caving from adjacent excavated surfaces. Forms shall have sufficient strength to withstand the pressure resulting from placement and vibration of the concrete, and shall be maintained rigidly in correct position. Forms shall be sufficiently tight to prevent loss of mortar from the concrete. Forms for exposed surfaces against which backfill is not to be placed shall be lined with a form grade plywood or metal panels.

3.4.1 Cleaning and Use of Forms: Before placing the concrete, the contact surfaces of the form shall be cleansed of encrustation of mortar, the grout or other foreign material, and shall be coated with commercial form oil that will prevent sticking and will not stain the concrete surfaces.

3.4.2 Removal of Forms: Forms shall be removed in a manner that will prevent damage to the concrete. Forms shall not be removed without approval. Any repairs of surface imperfections shall be performed at once and airing shall be started as soon as the surface is sufficiently hard to permit it without further damage.

3.5 PLACING REINFORCEMENT

General: Steel reinforcement shall be provided as indicated, together with all necessary gauge 16 G.I. wire ties, chairs, spacers, supports and other devices necessary to install and secure the reinforcement properly. All reinforcement, when placed, shall be free from loose, flaky rust and scale, oil grease, clay and other coating and foreign substances that would reduce or destroy its bond with concrete. Reinforcement shall be placed accurately and secured in place by use of metal or concrete supports, spacers and ties. Such supports shall be of sufficient strength to maintain the operation. The supports shall be used in such manner that they will not be exposed or contribute in any way, to the discoloration or deterioration of the concrete.

3.6 CONVEYING AND PLACING CONCRETE

3.6.0 Conveying: Concrete shall be conveyed from mixer to forms as rapidly as practicable, by methods that will prevent segregation, or loss of ingredients. There will be no vertical drop greater than 1.5 meters except where suitable equipment is provided to prevent segregation and where specifically authorized.

3.6.1 Placing: Concrete shall be worked readily into the corners and angles of forms and around all reinforcement and embedded items without permitting the material to segregate. Concrete shall be deposited as close as possible to its final position in the forms so that flow within the mass does not exceed two (2) meters and consequent segregation is reduced to a minimum near forms or embedded items, or elsewhere as directed. The discharge shall be so controlled that the concrete may be effectively compacted into horizontal layers not exceeding 30 centimeters in depth within the maximum lateral movement specified...

3.6.2 Time interval between mixing and placing: Concrete shall be placed before initial set has occurred and before it has contained its water content for more than 45 minutes.

3.6.3 Consolidation of concrete: Concrete shall be consolidated with the aid of mechanical vibrating equipment and supplemented by hand spading and tamping. Vibrators shall not be inserted into lower coursed that have

commenced initial set and reinforcement embedded in concrete beginning to set or already set shall not be disturbed by vibrators. Consolidation around major embedded parts shall be by hand spading and tamping and vibrators shall not be used.

- 3.6.4 Placing concrete through reinforcement: In placing concrete through reinforcement, care shall be taken that no segregation of the coarse aggregate occurs. On the bottom of beams and slabs, where the congestion of steel near the forms makes placing difficult, a layer of mortar of the same cement-sand ratio as used in concrete shall be first deposited to cover the surface.

3.7 CURING

- 3.7.0 General: All concrete shall be moist-cured for a period not less than seven (7) consecutive days by an approved method or combination applicable to local conditions.
- 3.7.1 Moist curing: The surface of the concrete shall be kept continuously wet by covering with burlap, plastic or other approved materials thoroughly saturated with water and keeping the covering wet spraying or intermittent hosing.

3.8 FINISHING

- 3.8.0 Concrete surfaces shall not be plastered unless otherwise indicated. Exposed concrete surfaces shall be formed with smooth form material, and after removal of forms, the surfaces shall be smooth, true to line and shall present a finished appearance except for minor defects which can be easily repaired by patching with cement mortar, or can be ground to a smooth surface to remove all joint marks of the form work.
- 3.8.1 Concrete slabs on fill: The concrete slabs on fill laid on a prepared foundation consisting of sub-grade and granular fill with thickness equal to the thickness of overlaying slab except as indicated otherwise.

3.9 SURFACE FINISHES

- 3.9.0 Defects: Repair formed surfaces by removing minor honeycombs, pits greater than one square inch surface area or 0.25 inch maximum depth, or otherwise defective areas. Provide edges perpendicular to the surface and patch with non-shrink f=grout. Patch the holes and defects when the forms are removed.
- 3.9.1 Floor slabs, Pavements and Miscellaneous Construction: Unless otherwise specified, slab at the fountain area are straight to finish with waterproofing. Slope floors uniformly to drains where drains are provided. Depress the concrete base slab where Bomanite, Granite or Ceramic tiles are indicated.
- 3.9.2 Finish: Place, consolidate and immediately strike-off concrete to obtain proper contour, grade and elevation. A set sufficient for floating and supporting the weight of the finisher and equipment.
- 3.9.3 Pavements: Screed the concrete with a template advanced with a combined longitudinal and crosswise motion. Maintain a slight surplus of concrete ahead of the template. After screeding, float the concrete longitudinally and refloat as necessary. Obtain final finish by belting. Lay belt flat on the concrete surface and advance with a sawing motion; continue until a uniform but gritty non-slip surface is obtained. Round edges and joints with an edger having a radius of 1/8 inch.

- 3.9.4 Broomed: Provide for exterior walks, platforms, patios and ramps. Unless otherwise indicated, provide a floated finish, and then finish with a flexible bristle broom. Permit surface to harden sufficiently to retain the scoring or ridges. Broom traverse to traffic or at right angles to the slope of the slab.
- 3.9.5 Pits and Trenches: Place bottoms and walls monolithically or provide water stops and keys.
- 3.9.6 Curbs and Gutters: Provide contraction joints spaced at every 10 feet maximum unless otherwise indicated. Cut contraction joints $\frac{3}{4}$ -inch deep with a jointing tool after the surface has been finished. Provide expansion joints $\frac{1}{2}$ -inch thick and spaced at every 100 feet maximum unless otherwise indicated. Provide a pavement finish.

3.10 MISCELLANEOUS

- 3.10.0 Construction Joints: Locate joints to least impair strength; continue reinforcement across joints unless otherwise indicated.
- 3.10.1 Expansion Joints and Contraction Joints: For slab on grade, provide at edges of interior floor slab, adjacent to walls as indicated. Completely fill joints exposed to weather with joint filler material and joint sealant. Do not extend reinforcement or other embedded metal items bonded to the concrete through any expansion joints unless an expansion sleeve is used. Provide contraction joints, either formed or saw cut or cut with a jointing tool, to the indicated depth after the surface has been finished. Sawed joints shall be completed within 4 to 12 hours after concrete placement. Protect joints from intrusion of foreign matter.

MASONRY

4.0 MATERIALS

- 4.0.0 Concrete Hollow Blocks (CHB) shall have a minimum face thickness of 1" (25mm). Nominal size shall be 8" x 8" x 16", minimum compressive strength shall be 500 psi for non-load bearing and 700-1000 psi for load bearing. All units shall be stored for a period not less than 28 days (including curing period) and shall not be delivered to the job site prior to that time unless the structure is equal or more than the specified.
- 4.0.1 Prior to commencing the preparation of the sub-grade, all culverts, cross drains, and other similar structures (including the fully compacted backfill) shall be completed. No work shall be started on the preparation of the sub-grade before the prior works herein approved by the Engineer.
- 4.0.2 Cement shall be standard Portland cement ASTM C-150-68 Type 1.
- 4.0.3 Mortar: Mix mortar from 3 to 5 minutes in such quantities as needed for immediate use. Re-tempering will not be permitted if mortar stiffens because of premature setting. Discard such materials as well as those that have not been used within one hour after mixing. Proportioning shall be one (1) part Portland cement and two (2) parts and by volume, but not more than one (1) Portland cement and three (3) parts and by volume.

4.1 SUBMITTALS

- 4.1.0 Submit samples for approval two (2) samples each of each type of wall reinforcement and wall ties.

- 4.1.1 **Certificates of Conformance:** Submit certificate attesting that masonry cement, masonry units, aggregates and accessories meet the requirements specified.

4.2 ERECTION

- 4.2.0 All masonry shall be laid plumb, true to line, with level and accurately spaced courses, and with each course breaking joint with the source below. Bond shall be kept throughout corners and reveals shall be plumb and true. Units with greater than 12% absorption shall be wet before laying. Work required to be built in masonry; including anchors, wall plugs and accessories shall be built-in as the erection progresses.
- 4.2.1 **Masonry Units:** Each course shall be solidly bedded in Portland cement mortar. All units shall be damp when laid units shall be showed into place not laid, in a full bed of un-furrowed mortar. All horizontal and vertical points shall be completely filled with mortar when and as laid. Each course shall be bonded at corners and intersections. No cells shall be left open in face surfaces. All cells shall be filled up with mortar for exterior walls. Units terminating against beam or slab soffits shall be wedged tight with mortar. Do not lay cracked, broken or defaced block.
- 4.2.2 **Lintels** shall be of concrete and reinforced as required. Lintels shall have a minimum depth of 0.20 (8") and shall extend to at least 0.20 (8") on each side of opening and reinforced with 2-12mmØ re-bars and 10mmØ lateral ties @ 200mm o.k.
- 4.2.3 **Plastering:** Clean and evenly wet surfaces. Apply scratch coat with sufficient force to form good keys. Cross scratch coat upon its initial set; keep damp. Apply coat after each scratch coat has set at least 24 hours after scratch coat application. Lightly scratch brown coat; keep moist for two (2) days; allow drying out. Do not apply finish until brown coat has seasoned for seven (7) says. Just before applying coat, wet brown coat again. Float finish coat to true even surface; trowel in manner that will force sand particles down into plaster, with final trawling, leave surfaces banished smooth free from rough areas, trowel marks, checks, other blemishes. Keep finish coat moist for at least two (2) days; thereafter protect against rapid drying until properly, thoroughly cured.

4.3 SCAFFOLDING

- 4.3.0 Provide safe wood or metal scaffolding required for masonry and other related work, including cleaning down on completion. Remove upon demobilization.

4.4 SURFACE PREPARATION

- 4.4.0 **Vitrified Floor Tile Installation:** Do not stat floor tiling occurring in space where both floor and wall tile setting has been completed. Before spreading setting bed, establish borderline center wires in both directions to permit laying pattern with minimum of cut tiles. Lay floors without borders from centerline outward. Make adjustments at walls. Clean concrete sub-floor and moisten it without soaking. Sprinkle dry cement over surface. Spread setting bed mortar on concrete and tamp to assure good bond over the entire area then screed to smooth, level bed. Set average setting bed thickness at ¾" but not less than ½".
- 4.4.1 **Wall:** Scratch coat application as foundation coat shall be at most ½". While still plastic, deeply score scratch coat or scratch and cross-scratch. Protect scratch coat and keep reasonably moist within seasoning period. Use mortar for scratch floor coats, within one hour after mixing. Re-tempering of partially hardened

mortar is not permitted. Set scratch coat be cured for at least two (2) days before starting the setting.

4.5 CLEANING

- 4.5.0 Protection: Protect work which may be damaged, stained or discolored during cleaning operations.
- 4.5.1 Pointing: Upon completion of masonry work, cut out defective mortar joints and tuck joints and all holes solidly with mortar.
- 4.5.2 Cleaning: Clean exposed masonry surface with clear water and stiff fiber brushes and rinse with clean water. Where stains, mortar or other soil remain, continue cleaning as follows: Clean masonry surfaces by scrubbing with warm water and soap and rinsing thoroughly with clean water. Restore damaged, stained and discolored work to its original conditions or replace with new work.

V STRUCTURAL STEEL

GENERAL

5.0 SCOPE OF WORK

The work includes the fabrication, erection and painting of structural steel. All structural steel work shall be in accordance with the AISC latest "Specifications for the Design, Fabrication and Erection of Steel for Buildings". The contractor shall furnish plates, clip angles connections and other miscellaneous work required for the completion of the structure.

5.1 SUBMITTALS

- 5.1.0 Shop Drawings: Submit shop drawings of all structural steel for approval prior to fabrication. Include complete information necessary for the fabrication and erection of the structure's components, including location, type and size of bolts, welds, member sizes and lengths, connection details, blocks, copes and cuts. Use AWS standard welding symbols.
- 5.1.1 Erection Plan. Submit for record purposes. Indicate the sequence of erection, temporary shoring and bracing and a detailed sequence of welding including each welding procedure.
- 5.1.2 Manufacturer's Certificates of Conformance.
 - a. Structural Steel
 - b. Bolts, nuts and washers
 - c. Shop painting materials
 - d. Welding electrodes and rods
 - e. Non-shrink grout
- 5.1.3 Welding: Submit descriptive data to illustrate the sequence of welding and each welding procedure to be used. Perform welding with qualified welders. The qualification of welders and the duration of qualification period shall be in accordance with the requirements of AWS. Any welder found to be producing unsatisfactory work even if he has passed qualification rests shall be immediately re-certified or replaced with a qualified welder.

5.2 REFERENCE STANDARDS

5.2.0 Comply with the latest edition of the following as applicable, unless otherwise specified or modified.

- a. AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), 1978: Specification for the Design, Fabrication and Erection of Structural Steel for Buildings. Code of Standard Practice for Steel Buildings and Bridges; Specification for Architecturally Exposed Structural Steel.
- b. AMERICAN WELDING SOCIETY (AWS): Standard Welding Symbols A2.0-68; Standard Welding Code D1.1-1973 (Rev 1-73 & 2-74) (To govern if in conflict with AISC).
- c. RESEARCH COUNCIL ON RIVETED AND BOLTED JOINTS OF THE ENGINEERING FOUNDATION (RCRBJ): Specification for Structural Joists using ASTM A-325-76s Bolts.
- d. STRUCTURAL STEEL PAINTING COUNCIL (SSPC): Painting Manual, Vol. 1; Good Painting Practice, Painting Manual, Vol. 2; Systems and Specifications.
- e. STEEL JOIST INSTITUTE-AMERICAN INSTITUTE OF STEEL CONSTRUCTION (SJI-AISC): "Standard Specifications for Open Web Steel Joists", and "Standard Specifications for Long Span Steel Joists", 1978 Editions.
- f. AMERICAN IRON AND STEEL INSTITUTE (AISI): "Specifications for the Design of Cold-Formed Steel Structure Members, 1974".

5.3 PRODUCTS

5.3.0 Steel: Structural Steel ASTM A-440 with minimum yield strength, $f_y=290$ mPa

5.3.1 BOLTS, NUTS AND WASHERS. Provide the following, unless otherwise indicated:

- a. Structural Steel
- b. Bolts: ASTM A325, Galvanized 78mmØ and below. A-490 1" Ø and above.
- c. Nuts: ASTM A325, Galvanized 78mmØ and below. A-490 1" Ø and above
- d. Washers: ANSI B 18.22.1, Type B

5.3.2 SHOP PAINTING

- a. Pre-treatment: Fed. Spec. TT-C-490, Type I, II or IV
- b. Primer Paint: Fed. Spec. TT-P-645

5.3.3 GALVANIZING

- a. Galvanizing Repair Paint: Mill Spec. DOD-P-21035

5.3.4 STRUCTURAL STEEL ACCESSORIES

- a. Welding Electrodes and Rods: AWS Code D1-1. E7018 Non-Shrink with minimum yield strength, $f_y=290$ mPa

- b. Non-Shrink Grout: With no ASTM C827

5.4 EXECUTION

5.4.0 FABRICATION

5.4.0.0 Markings: Prior to erection, members shall be provided with a painted erection mark. In addition, connection parts assembled in the shop for reaming holes in field connections shall be match-marked with scratch and notch marks. Do not locate erection markings on areas to be welded or on surfaces of weathering steels that will be exposed to the completed structure. Do not locate match-markings in areas that will decrease member strength or cause stress concentrations.

5.4.0.1 Shop Painting: Shop paint structural steel except as modified herein. Do not paint steel surfaces embedded in concrete, galvanized surfaces, bearing surfaces, or surface within ½ inch of the toe of the welds prior to welding. Prior to assembly, paint surfaces that will be concealed or inaccessible after assembly. Do not apply paint in foggy or rainy weather when paint may be exposed to temperature below 40 degrees F within 48 hours after application, unless approved otherwise.

- a. Cleaning: SSPC SP6, except as modified herein, SSPC SP3 or SP6 for steel surfaces exposed in spaces above ceilings, attic spaces, crawl spaces and chases. In addition, maintain steel surfaces free from rust, dirt, oil, grease and other contaminants through final assembly.
- b. Pre-Treatment: Immediately after cleaning, provide the metal surfaces with one coat of MIL. Spec. DOD-P-15328 pre-treatment to dry film thickness of 0.3 to 0.5 mil. Fed. Spec. TT-C-490, pre-treatment may be applied to SSPC DP6 cleaned surfaces in accordance with Fed. Spec. TT-C-490.
- c. Priming: Immediately after the pre-treatment coating has dried, apply primer to a minimum dry film thickness of 2.0 mil. Primer paint shall be zinc chromate conforming to Fed. Spec. TT-P-645. Repair damaged prime surfaces with an additional coat of primer.

5.4.0.2 Galvanizing: Provide as indicated or specified. Galvanize after fabrication where practicable.

- a. Galvanizing Repair: ASTM A780, using galvanizing repair paint for galvanizing damaged by handling, transporting, cutting, welding or bolting. Do not heat surfaces that repair paint has been applied to.

5.4.0.3 Bearing Surfaces and Friction Type Joints: In the shop, coat with a temporary rust preventive. Remove coating, as recommended by the coating manufacturer, immediately prior to field erection.

5.4.0.4 Surface Finishes: ANSI B46.1 maximum surface roughness of 125 pin, pinholes and sliding bearing, unless indicated otherwise.

5.4.0.5 Erection. Except when load indicator bolts are used, calibration wrenches shall be calibrated every two (2) working days on a minimum of three (3) typical bolts of each diameter. Provide for drainage in structural steel.

- a. Base Plates and Bearing Plates; after final positioning of members, provide full bearing under plates using non-shrink grout. Place non-shrink grout in accordance with the manufacturer's instructions.
- b. Field Painting: After erection, the field bolt heads and nuts, field welds, and any abrasions in the shop coat shall be cleaned and primed with paint of the same quality as that used for the shop priming.

5.4.1 SOURCE QUALITY CONTROL

Errors of Shop Drawing, Fabrication, correct fitting and alignment of the various metal items or component members shall be the responsibility of the contractor. However, the contractor shall permit the Architect or an independent inspection agency, if engaged by the Owner, to inspect work in progress in his shop. Such inspections shall not relieve the contractor of his responsibility to furnish materials and workmanship in accordance with the Contract Documents.

5.4.2 PRODUCT DELIVERY, HANDLING AND STORAGE

Handle and store in such manner as to prevent damage or disfigurement. Store finished items or components above ground on platforms, pallets or other supports and protect from harmful elements.

5.5 PROTECTION

The Contractor shall protect any existing work subject to damage during the installation of specified work and shall adequately protect specified work during installation. Finished work that is readily subject to damage by subsequent work or environmental conditions shall be protected by the Contractor immediately following the installation thereof.

5.6 FIELD MEASUREMENTS

Contractor shall make measurements in field to verify or supplement dimensions indicated and be responsible for accurate fit of specified work.

5.7 FIELD QUALITY CONTROL

Facilities shall be provided by the Contractor as needed for the proper inspection of the specified work, including temporary platforms, hoists, protective devices, electric current, etc. Improper workmanship, as determined by the Architect shall be corrected and replaced, at no additional cost to the Owner.

5.8 CONNECTIONS

Connections and not detailed shall be designed in accordance with AISC "Manual of Steel Construction". Build connections into existing work. Do not tighten anchor bolts set in concrete with impact torque wrenches. Punch, sub punch and ream or drill bolt and pin holes.

5.9 WELDING: Provide AWS D1.1 qualified welders, welding operators and tacklers.

5.10.1 Removal of temporary welds, run-off plates and backing strips, remove only from finished areas

5.10 TESTS AND INSPECTIONS: Perform field tests, and provide labor, equipment and incidentals required for testing.

Welds:

5.10.0 Visual Inspection: AWS D1.1 Section 6: Provide AWS certified welding inspectors for fabrication/erection inspections and testing and verification inspection. Welding inspectors shall visually inspect and mark welds, including fillet weld end returns.

5.10.1 Non-Destructive Testing: AWS D1.1. Test locations shall be selected by the Engineer if more than 20 percent (20%) of welds made by a welder contain defects identified by testing, and then all welds made shall be tested by radiographs or ultrasonic testing, as approved by the Engineer. When all welds made by an individual welder are required to be tested, magnetic particle testing shall be used in areas inaccessible to either radiographic or ultrasonic testing. Retest defective areas after repair.

VI ARCHITECTURAL

6.0 FINISHES

6.0.1 INTERIOR WALLS

- a. For areas exposed to moisture, use CHB with cement plaster finish painted.
- b. Plastering of doors and windows opening.

6.0.2 FLOOR FINISHES

- a. Plain Cement Finish
- b. Plain Cement Finish on Aqua Epoxy Paint
- c. Plain Cement Finish w/ Grooves

6.0.3 CEILING FINISHES

- a. Rubbed Concrete

6.0.4 WINDOWS

Follow as per approved plan.

6.0.5 DOORS

Follow as per approved plan.

6.0.6 PAINTING

- a. All paints shall meet the required specifications and shall be delivered at the site in the original container. Use non Volatile Organic Compound (V.O.C.) paint or approved by the implementing agency and only accredited painters of the manufacturer shall execute the work to ensure the true origin and quality of paint and warranty of work.

- b. Concrete walls shall be treated with neutralizers. Exterior walls without wall veneer shall be applied with a primer before final coat. In general, rough surfaces of concrete, cabinets and woodworks surfaces shall be properly sandpapered and puffed before any application of paint.
- c. Latex Paint Finish (exterior masonry walls)
- d. Latex paint Finish (interior masonry walls/hardiflex)
- e. Latex Paint Finish (Ceiling)

6.0.7 HARDWARE

- 1. Provide all rough hardware required for the construction of works: nails, straps, lag screws, etc.
- 2. Butt Hinges : Use Toyo Butt Hinges, 4" x 4" with bearings for panel door.
- 3. Locksets : For PVC plastic, wood and metal swing doors use ABLOY stainless mortise locksets with striker plate.

6.0.8 CLEAN-UP

When the work is completed, the Contractor shall remove all temporary structures and surplus materials of every sort, restore what has been removed before, and leave the premises or site in as good condition as he had originally found them.

VII THERMAL CONTROL AND MOISTURE PROTECTION

7.0 WATERPROOFING

Use waterproofing cementitious powder, capillary type, applied waterproofing seamless membrane latex-modified rubber reinforced on slabs. Refer to manufacturer's recommendation on proper application of the product listed herein: Lanko manufactured by VSL.

7.1 VAPOR BARRIER

Use 8 mils thick, 6 feet wide roll plastic vapor barrier laid over compacted base course at ground floor slab with 300mm minimum overlap prior to setting up of steel reinforcing bars. Submit samples for approval.

7.2 WATERSTOPS

Use Rebstop Ultra Seal chemical grout water-stop specially formulated for construction joints to replace the use of conventional water-stop used for cold expansion joints on pipes, etc. manufactured by Rebtrade International Corporation or approved equal.

IX PLUMBING

GENERAL

9.0 DESCRIPTION

- 9.0.0 Applicable provisions of General Conditions govern work under this section.
- 9.0.1 All fittings, connections and piping embedded in concrete shall be subject to inspection by the Architect and/or his representative before covering and/or completion.
- 9.0.2 The contractor shall provide all items, articles, materials, operations of methods listed, mentioned or scheduled on the drawings and/or herein, including labor, materials and incidentals necessary and required for their completion.
- 9.0.3 The contract drawings and specifications are complementary to each other, and any labor or materials called for by either, whether or not called for by both, if necessary, for the successful operation of any of the particular type of equipment furnished and installed will be without additional cost to the owner.
- 9.0.4 Intent: It is not intended that the drawings shall show every pipe fitting.
- 9.0.5 All such items, whether specifically mentioned or not, or indicated in the drawings shall be furnished and installed, if necessary to complete the system in accordance with the best practice of the plumbing trade and to the satisfaction of the engineer and the owner.
- 9.0.6 The plumbing contractor is required to refer to all architectural, structural and electrical plans and specifications and shall investigate all possible interferences and conditions affecting his work.

9.1 SCOPE OF WORK

- 9.1.2 Work included under this section of this specification consists of furnishing all labor, tools and equipment, appliances and materials necessary for complete installation, testing and operation of the plumbing and storm drainage system in accordance with the contract.
 - a. Arrange for, obtain and bear the cost of necessary permits, bonds and fees, private or government shall be paid by the contractor.
 - b. Soil, waste and vent pipe system within the building.
 - c. Sanitary drainage system of the building and its connection to the nearest existing sewer line or drainage line.
 - d. Cold-water distribution system and supply pipes to fixtures, hose bibs, inclusive of all valves, fittings and other accessories to complete the system.
 - e. Supply of all plumbing fixtures, trims and accessories.
 - f. The contractor shall provide all necessary shop drawings and two (2) sets of As-Built Plans.
 - g. Testing for leakage of all water supply and distribution system, drains, waste and venting system plus pressure testing for two (2) hours and disinfection of water distribution system.

- h. Water meter and MWSI connection as shown on plans and to be verified at the jobsite.
- i. Excavation and backfilling in connection with the work shall be included.
- j. Furnishing of written one (1) year warranty of the plumbing system

9.2 SUBMITTALS

- 9.2.0 Within fifteen (15) days after award of contract, the plumbing contractor shall submit for engineer's approval, four (4) copies of all complete list of manufacturer's name of all materials he proposes to use.
- 9.2.1 After approval of the above list and before purchase of any materials, the plumbing contractor shall submit to the engineer for approval, four (4) complete sets of detailed information consisting of manufacturer's bulletins, shop drawings and partial list of materials to be provided under this contract.
- 9.2.2 The plumbing contractor shall assume the loss of and the entire responsibility of any change in the work as shown in the contract drawings, which may be occasioned by approval of materials other than those specified.

9.3 APPLICABLE CODE AND STANDARD

- 9.3.0 All plumbing works to be done and the sizes of pipes to be used shall be in accordance with the National Plumbing Code and the Plumbing Code of the Philippines.
- 9.3.1 The plumbing contractor shall verify the above paragraphs with each section of the specifications and coordinate his work so that the general contractor will understand clearly the intent of the work to be done.

9.4 PRODUCTS

9.4.0 Description of Materials

All materials to be used shall conform to the standards specified. Use of materials shall be governed by other requirements imposed on other section of these specifications. Materials shall be subject to tests necessary to ascertain their fitness if the engineer so requires.

9.4.1 Alternate Materials

Use of any material not specified in these specifications may be allowed, provided such alternate has been approved by the engineer, and provided further, that a test if required shall be done by an approved agency in accordance with generally accepted standards.

9.4.2 Identification of Materials

Each length of pipe, fittings, traps, fixtures and devices used in the storm drainage system shall have case, stamped or indelibly marked on it the manufacturer's trademark or name, type and classes of products when so required by the standards mentioned. All materials and equipment mentioned in these specifications, including all incidental items not specifically indicated, but required to complete the contract shall be new and free from defects. If

damaged during the course of construction, it shall be repaired or replaced as directed by the Project Manager at no additional cost for the owner.

9.4.3 Pipes and Fittings Schedule

9.4.3.0 Cold Water Lines – Shall be PP-R, pipes DIN 8077, non-corrosive, Leak proof, taste and odour neutral, jointing method is socket fusion.

9.4.3.1 Drain, Waste and Vent – shall be unplasticized polyvinyl chloride (uPVC) conforming to ASTM D1784.

9.4.4 Flanges, Bolting and Gaskets and Union

9.4.4.0 Provide flanges at flange connection to equipment and valves, slip-on or threaded as required.

Flanges shall conform to Class 300 black forged steel welding flanges 1/16" in raised faced to ASTM A-181 Grade 1. Bolts to ASTM A-193 regular hexagonal head unfinished, heavy semi-hexagonal nuts to ASTM A-194.

9.4.4.1 Provide union at each threaded connection to equipment, and valves for pipe sizes up to two (2) inches in diameter. It shall be galvanized steel pipe Class 300 screwed galvanized malleable iron, ground joint, brass to iron seat.

9.4.5 Valves

Valves up to and including two (2) inches shall be threaded ends, rough bodies and finished trimmings. Valves 2 ½ inches diameter and larger shall have iron [bodies, brass mounted and shall have either screws or flange ends.

9.4.5.0 Water meter shall be positive displacement type or any brand approved by MWSI or LWUA.

9.4.5.1 Hose Bibb shall made of male inlet threads, hexagon shoulder and three quarter inch hose connections. Provide one (1) extra gate valve on the vertical before the hose bib.

9.4.6 Drains

9.4.6.0 Floor drains at toilets shall be gauge no. 22 with round strainer and plastic bucket.

9.4.6.1 Deck drain shall be ASA 10-12, pipe size 75mmØ.

9.4.6.2 Floor drain for genset room shall be ASA 40-9F.

9.4.6.3 Grating cover (to be supplied by civil contractor).

9.4.7 Pipe Sleeves

9.4.7.0 Pipe sleeves shall be installed and properly secured in place at all points where pipes pass through masonry or concrete, except unframed floors on earth.

- 9.4.7.1 Pipe sleeves shall be of sufficient diameter to provide approximately one-quarter inch clearance around the pipe.
- 9.4.7.2 Pipe sleeve in walls and partitions shall be of wrought iron or steel pipe schedule 40. The pipe sleeves in concrete beams of concrete fireproofing shall be steel pipe schedule 40.
- 9.4.7.3 Pipe sleeves through floors shall be galvanized steel pipe schedule 40. Sleeve in pipe floor shall extend not less than one (1) inch and not more than two (2) inches above and the space around the pipe shall be packed with fiberglass insulation.
- 9.4.7.4 Pipe sleeves in footings shall be steel pipe and shall be not less than four (4) inches larger in diameter than the pipe to be installed.

9.4.8 Hangers and Supports

Vertical run of pipe shall be supported by brace. Horizontal runs of pipe shall be supported by loop 4-sway hanger.

9.4.9 EXECUTION

9.4.9.0 Piping Installation

Piping shall be installed as shown on the drawings, as recommended by the manufacturer and as directed during installation, straight and direct as possible, forming right angles or parallel lines with building walls and other pipes and neatly spaced. Erect pipe risers plumb and true, parallel with walls and other pipes neatly spaced. All piping shall be supported or suspended on stands, clamps, hangers or equivalent or approved design. Supports shall be installed in such a manner to permit pipe free expansion and contraction while minimizing vibration.

9.4.9.1 Plumbing System Test

The entire system of drains, waste and vent shall be tested. Water test shall be in accordance with the plumbing Code. Every portion of the system shall be tested to a hydrostatic pressure equivalent to at least 10-foot head water for a period of ½ hour before covering. All cold water lines shall be tested at 150 psi for a period of two (2) hours before covering. Defects disclosed by the test shall be repaired with new materials at the expense of the contractor.

X ELECTRICAL WORKS

10.0 WORK INCLUDED

- 10.0.0 The work to be done under this Division comprises the furnishing of all tools, labor, equipment, fixtures and materials, unless otherwise herein specified, required to complete and leave ready for use the electrical system in accordance with this specification and accompanying drawings of materials and finishes.

10.0.0 The electrical contractor shall coordinate his work so that the general contractor and all other subcontractors will understand clearly the work to be done. The electrical contractor shall finish all electrical facilities and provision necessary for the installations and operations of other trades such as mechanical, air-conditioning, plumbing, sanitary and others.

10.0.1 All contractors and all companies or persons providing labor, materials or both for this project, are specifically referred to the General Conditions of the specifications, to the general contract plans, to all Divisions of specifications and to the various other contract documents, which may affect the completion of the contract work.

10.1 CODES, INSPECTIONS, PERMITS AND FEES

10.1.0 The work under this contract shall be done according to the requirements of the latest edition of the Philippine Electrical Code, the rules and regulations of the Local Government Authorities of Quezon City and the requirements of Manila Electric Company. Nothing contained in this specification or shown on the drawings shall be construed as conflict with national and local ordinances or laws governing the installation of Electrical Works, and all such laws and ordinances are hereby made part of these specifications. The contractor is required to meet the requirements hereof.

10.1.1 All permits and electrical fees required for this work shall be obtained at the expense of the Contractor. The Contractor shall furnish the Architect or the Owner or the same maybe, a final certificate of electrical inspection and approval from the proper government authorities after completion of the work.

10.2 TEST

10.2.0 The electrical contractor shall apply such test, replace or remedy all defective work and adjust such system as needed or as the Architect or the owner shall direct. He shall also instruct the proper use of the system and equipments to persons designated by the owner. Submit copies of test data and results, including test reports on instrument to the engineer.

10.3 MEASUREMENTS

10.3.0 The Electrical Contractor shall procure from the Architect detailed drawings of those parts of the work not fully shown on the plans and he shall compare and verify with the Owner. Any lack of agreement shall be submitted at once to the Architect for adjustments.

10.4 SLEEVES AND FORMS FOR OPENINGS

10.4.0 The Electrical Contractor shall provide and places all shelves, for piping penetrating floors, walls, partitions, etc. He shall locate all necessary slots and openings for his work and it shall be done at such time as not to delay the general contractor of the project.

10.5 LOCATION OF OUTLETS

10.5.0 All Outlets shall be truly centered in panels and spaces provided thereof. Any discrepancy outlet location between the electrical plan and architectural plans shall be submitted to the Architect at once and verified before outlets are installed.

10.6 GROUNDINGS

10.6.0 All metallic conduits, supports, cabinets and equipments shall be properly grounded and bonded by means of copper straps. The conduits of such system shall be grounded by connecting to the grounding rod.

10.6.1 All ground connection shall have clean outlet surfaces and shall be tinned and sealed while bolting. Unless otherwise specified, ground wire shall be installed in exposed conduits and connections made readily accessible for inspection. Connection shall not be made underground or concealed in floors or walls.

10.7 WIRING METHODS

10.7.0 All wiring shall in general be installed inside standard conduits. All conduits shall be run embedded in concrete, underground but in concrete envelope, embedded in hollow blocks partition, concrete slab, walls and roof above, between double wall wooden partitions if any, where the installation of concealed and/or embedded conduit wiring may be used, but only upon approval of the Owner's authorities concerned. Exposed conduits shall be rigid steel conduits unless otherwise specified.

10.8 GUARANTEE

10.8.0 The Electrical Contractor shall guarantee his work for a period of one (1) year from the date of final acceptance by the owner except for particulars items specifically mentioned in these specifications.

10.8.1 The Electrical Contractor shall, without additional compensation for the period specified, replace any work materials or equipment furnished and installed by him under this contract, which develop defects except from ordinary wear and tear.

10.9 MATERIALS

10.9.0 All materials shall be new and shall conform to the standards of **Underwriter's Laboratories, Inc.** In every case where such a standard has been established for the particular type of materials in question.

10.9.1 All materials on all system shall comply with the following specifications unless specified and all materials where not specified shall be of the best of their respective kind.

10.9.2 Samples on any materials shall be submitted for approval as required by the Architect.

10.10 WIRES

10.10.0 All wires shall be copper, soft drawn and annealed, shall be 98% conductivity, shall be smooth and true of a cylindrical form and shall be within the actual size called for.

10.10.1 All wires and cables shall comply with the requirements of the **Underwriter's laboratories**, the **ASTM** and the **IPCEA** as to their particular usage.

- 10.10.2 Wires and cables for outdoor and indoor lighting and power system shall be moisture and Heat Resistant Thermoplastic with nylon insulated for 600volts working pressure type THHN unless otherwise noted on the plans or specified.
- 10.10.3 For lighting and power system, no wire smaller than 3.5mm² shall be used except for control leads.
- 10.10.4 All wires and cables shall be manufactured by a reliable manufacturing company acceptable to the Electrical Engineer of the owner.

10.11 CONDUITS

10.11.0 The conduit system shall consist of the following

1. Intermediate Metal Conduit (IMC):

They shall be of standard sizes and weight, mild steel hot dipped galvanized with inside enamel or epoxy coating, acceptable to the Electrical Engineer of the Owner.

2. Polyvinyl chloride conduit (PVC):

They shall be of standard size and weight, made of polyvinyl chloride, extruded, heavy wall, rated for 90-degree centigrade cable, schedule 40.

3. Limitations of use shall be as follows:

- a. As per requirement of the latest edition of **PEC** and/or **NEC**.
- b. Not permitted where subject to mechanical damage.

10.11.1 All conduits shall be of true cylindrical form and shall be within the actual size called for.

10.11.2 No conduits shall be used in any system smaller than 15-mm electrical trade size, not shall have more than four 90 degrees bend in any one run, and where necessary, hand hole and pull boxes shall be provided.

10.11.3 No wires shall be pulled in any conduit until the conduit system is complete in all details, In case of underground work, until concrete envelope or masonry has been completed in every detail,. In case of concealed work, until rough plastering has been completed.

10.11.4 The ends of all conduits shall be tightly plugged to exclude plaster dust sand and soil including moisture while the renovation of the perimeter is in the process.

10.12 OUTLET BOXES AND FITTINGS

10.12.0 At all outlets of every kind, for all systems, there shall be provided a suitable fittings which shall be either a box or other device especially designed to receive the type of fitting to be mounted thereon.

- 10.12.1 The Contractor shall consult with the Architect as to the nature of various fittings to be used before installing his outlet fittings and shall conform strictly in the use of fittings so that the work when completed will be finished design.

10.13 SWITCHES

- 10.13.0 Local lighting switches shall be flush type, heavy duty, 15 ampere size 250 volts, bakelite case, quick connect terminal. Outdoor lights shall be automatically operated by means of photo switch and manual selection. Manually switch by means of breaker switch inside the lighting panel.

10.14 RECEPTACLES

- 10.14.0 Standard receptacles shall be 10-ampere size 250volts, parallel slots, duplex, flush mounted composition case, side wired with the insulated mounting yoke, If weatherproof wall plate are required, standard factory made metal waterproof plate shall be provided.

10.15 PLATES

- 10.15.0 All switches and receptacles plates shall be bakelite plastic, ivory-colored or as directed by the Architect

10.16 LIGHTING SYSTEM

- 10.16.0 The lighting system shall be complete in every respect all indicated on the plans or as indicated and specified in the Architectural plans. Exact fixture location shall be determined.
- 10.16.1 All wiring shall be installed in conduits, and in general shall be concealed. Buried underground in concrete encasement and/or embedded in concrete.
- 10.16.2 Mounting Height of devices shall be as indicated in the plans and/or subject to Architect's approval prior to installations as follows:

Local switches	-	1.4 above finish floor line
Receptacles	-	0.3 above finish floor line

10.17 DISTRIBUTIONS FEEDERS

- 10.17.0 Distribution voltage shall be 220volts, Single-phase, 3 wire. Feeder conductor and raceway shall be installed as shown on drawings and no change in size shall be made without written consent of the Architect. Feeder conductors shall be continuous, and without splices between terminals, when feeders are run in multiple, they shall be exactly of the same length to avoid **unbalanced division of the current**.

10.18 CONNECTORS AND INSULATION

- 10.18.0 Use solderless mechanical pressure type lugs, copper connectors for splicing wires greater than no 8mm.sq. All splices shall be properly insulated using #M brand rubber tape and plastic electrical tape. Application of two tapes shall be equivalent to the insulation of wire concerned, edges to provide smooth surfaces before taping.

10.19 BRANCH CIRCUITS

- 10.19.0 The drawings indicate the general methods of installation of all circuit wirings and the power lighting outlets which are to be supplied from this circuit. Branch

circuit raceways shall be run from outlets to panel boards as direct as the ground and level condition will allow. Circuit allocations shall be as indicated on the drawings. Where it becomes necessary to connect any outlet to the circuit other than the one shown on the drawings, this shall be done without extra charge and only upon written consent of the Architect. No wire smaller than 3.5mm sq. shall be used for any lighting or power branch circuit. All lighting outlet shall be supplied from 2-wire single phase circuits. Number of wires for other outlets shall be as indicated on the drawings.

10.20 RECORD DRAWINGS AND AS BUILT PLANS

- 10.20.0 The Electrical Contractor shall keep an active record of the actual installation works during the progress job. The shall become the reference for the preparation of the As-Built Plans which shall include all pertinent information, complete in all aspects of the actual installations, all new information not originally shown in the contract drawings.
- 10.20.1 The As-Built Plans shall be prepared by the Electrical Contractor at his expense and shall be submitted to the Architect and the Engineer for approval upon the completion of the work. The approval of the As-Built drawings shall be a pre-requisite for the final acceptance of the electrical works.
- 10.20.2 Two (2) copies of the As-Built drawings, signed and sealed by the **Electrical Contractor's Professional Electrical Engineer**, shall be submitted to the Architect and Engineer consultants. Original tracing/ reproducible copy shall also be submitted.

Note: *In contrast between these Technical Specifications and the approved Plans issued to the Contractor, the approved Plans shall prevail. See also the approved program of works. In case of doubt, for clearer outlooks consult the assigned Architect/Engineer.*

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Republic of the Philippines
Quezon City
Office of the City Mayor
QUEZON CITY BIDS & AWARDS COMMITTEE
(QC-BAC-INFRA)



PROJECT : PROPOSED CONSTRUCTION OF BAESA COLUMBARIUM WITH LAND DEVELOPMENT (POWER HOUSE)

LOCATION : Barangay Baesa, Quezon City

SUBJECT : GENERAL CONDITIONS AND TECHNICAL SPECIFICATIONS

I. GENERAL CONDITIONS

1.01 DEFINITIONS

- a. **OWNER :** LOCAL GOVERNMENT OF QUEZON CITY
- b. **CONTRACTOR :** Any individual, firm, corporation, partnership or association that enters into an agreement with the Owner for furnishing the materials and/or labor, tools, equipment, plant and other facilities required for the erection and completion of the project subject to the accompanying plans and working drawings.
- c. The Owner/Implementing Agency and the Contractor are treated through the contract documents as if each were of the regular number, masculine gender.

1.02 EXAMINATION OF MEMBER

The Contractor shall carefully examine the premises before submitting any bids to enable him to have full knowledge of conditions existing therein.

1.03 LOCATION

The Proposed Construction of Baesa Columbarium with Land Development (Power House) is to be constructed at Barangay Baesa, Quezon City.

1.04 EXECUTION, CORRELATION & INTENT OF DOCUMENTS

- 1. The Contract Documents are signed in sufficient number of copies by all parties concerned. In case anybody fails to sign copies of any item forming part of the set contract documents, the Implementing Agency's identification thereon shall suffice.
- 2. The items, specifications and all other documents forming the contract documents are complementary. Anything shown on plans but not mentioned in the specifications or vice versa or anything not expressly set forth in either, but necessarily implied, shall be furnished or done as if specifically shown and mentioned in both, with no extra charge. Where dimensions are given in figures, follow them in preference to measurement by scale.
- 3. Execute work as per agreement, making no changes or deviations whatsoever, without prior permission from the Implementing Agency.

4. The Contractor shall verify and check all dimensions particularly those on the plans. He will be held directly responsible in case of any discrepancy that may be discovered during the progress of work.

1.05 DETAIL DRAWINGS AND INSTRUCTIONS

Plans furnished for use at the jobsite are whenever necessary, supplemented by detail drawings and instructions essential to the proper execution of the work. Such supplementary detail drawings and instructions shall be treated as of equal force as though originally issued.

1.06 PLANS AND PROJECT SITE

Keep at project site, in good order and condition, one (1) set of approved plans, specifications, supplementary detail drawings and instructions.

1.07 SHOP DRAWINGS

Shop drawings shall be provided by the Implementing Agency and/or Contractor during the progress of construction. The contractor should not place any item subject to shop drawings until the Implementing Agency shall have duly approved such drawings.

1.08 CHANGES

The Owner and the Implementing Agency reserve the right to make alterations or additions, including changes during the progress of work. The same shall be carried into effect without in any way deviating from or violating any agreement. Whatever amount shall necessarily be entailed in the cost of labor or materials or both shall be added to or deducted from the original contract price.

1.09 TIME OF COMPLETION AND SCHEDULE OF CONSTRUCTION

The Contractor shall, before actual commencement of the project operations, prepare and submit to the Implementing Agency for verification and approval, a complete and comprehensive work schedule covering the entire duration of construction. He shall also include therein, the estimated number of days within which the entire project shall be completed stage by stage by phase.

1.10 WORKMANSHIP

The project shall be executed with the use of first class workmanship to the full intent and meaning of the plans and specifications and to the complete approval and acceptance by the Implementing Agency.

1.11 MATERIALS

All materials to be used shall be the best of their respective types and kind. They shall be properly stored and protected from damage or injury.

1.12 SAMPLES

Submit samples as specified and proceed with the work with the use of materials procured based on the samples previously approved by the Implementing Agency.

1.13 INSPECTION OF WORK

The Contractor shall provide the facility for inspecting the work to the Implementing Agency, the Owner and other personnel having jurisdiction over the work.

1.14 DEFECTIVE OR IMPROPER WORK

All work or materials not acceptable to the Architect shall be removed immediately and replaced with appropriate work or materials without extra charge. All condemned materials shall be taken away from the premises without delay.

1.15 BUILDING LAWS AND REGULATIONS

The Contractor shall be held responsible for strict compliance with existing labor laws and regulations and shall free the Owner from any responsibility in connection therewith, he shall pay on time at his own expense, all taxes, fees and/or licenses due to the government, both national and local arising from his work on the project.

1.16 MANNER OF PAYMENT

Payments to the Contractor shall be based on the periodic work accomplishments subject to verification, approval and recommendation by the Implementing Agency.

1.17 RETENTION MONEY

Progress payments shall be subject to a ten percent (10%) deduction, referred to as retention money. All retained amounts shall be released upon satisfactory completion of the work and issuance of the Certificate of Final Completion and Acceptance.

1.18 TEMPORARY WATER, POWER AND TELEPHONE FACILITIES

The Contractor shall make the necessary arrangements with the local utility companies so as to provide temporary facilities for the supply of water, power and telephone for the duration of construction, and all expenses in connection therewith shall be borne by the Contractor.

1.19 PRIVY

The Contractor shall provide a temporary privy in a most inconspicuous and sanitary manner, and shall have it removed at the termination of the work.

1.20 CLEARING AND CLEANING

Upon its completion, the project and its premises shall be cleared and cleaned as directed by the Implementing Agency, and make ready for immediate occupancy.

1.21 TEMPORARY BARRICADES, SIGNAL LIGHTS, BILLBOARDS, ETC.

The Contractor shall provide all temporary barricades, signal lights, Architect and Contractor's billboards, the required official building billboard, etc., necessary for the protection of the public and for the proper prosecution of the work and display of construction requirements.

1.22 PERFORMANCE AND GUARANTEE BOND

To guarantee the faithful performance of the Contractor under the contract, he shall post a Performance Bond in the amount of thirty percent (30%) of the contract price in the form of cash, manager's check or surety bond, callable on demand.

1.23 QUESTIONS AND DISAGREEMENTS

All questions and disagreements between the Contractor and the Owner relative to the interpretation of the plans and specifications shall be referred to the Implementing Agency whose decision on the matter shall be final.

II. TECHNICAL SPECIFICATIONS

2.0 SITE WORK

WORK INCLUDED

- 2.0.0 All excavation works including all necessary shoring, bracing and drainage of storm water from the site.
- 2.0.1 All soil treatment, backfilling, filling, compaction and grading, removal of excess material from site.
- 2.0.2 Protection of property, work and structures, workmen and other people from damage and injury.
- 2.0.3 Demolition of existing road pavement as indicated in the drawings.
- 2.0.4 Laying of utility/auxiliary lines as indicated in the drawings.
- 2.0.5 Survey and Stake-out works

2.1 LINES, GRADES AND BENCHMARKS

- 2.1.0 Stake out accurately the lines of the building and/or the other structures included in the contract, and establish grades therefore, after which secure approval of the Project Manager before any excavation work is commenced.
- 2.1.1 Erect basic batter boards and basic reference marks at such places where they will not be disturbed during the construction of the foundation.

2.2 EXCAVATION

Structural Excavations: Excavations shall be to the depths indicated in the drawings where bearing value as indicated in the Soils Investigation Report provided as part of the Construction Documents shall be attained. Excavations for footings and foundations carried below required depths shall be filled with lean concrete and bottom of such shall be level. All structural excavations shall extend a sufficient distance from the walls and footings to allow for proper erection and dismantling of forms, for installation of service and for inspection.

All excavations shall be inspected and approved before pouring any concrete laying underground utility and auxiliary lines for placing select fill materials. The Contractor shall control the grading in the vicinity of all excavated areas to prevent surface drainage running into excavations. Water that accumulates in excavated areas shall be removed by pumping before fill is placed herein.

2.3 SOIL TREATMENT

Treat soil with 2% Chlordane or Andrex solution in water to provide an unbroken horizontal and vertical chemical barrier between the proposed structure and the possible termite colonies in the soil after excavation is completed and prior to pouring of concrete

foundation and ground floor slabs. At the time the soil treatment is to be applied, the soil shall be in a friable condition with a sufficient low moisture content to allow uniform distribution of the treatment solution throughout the soil.

Do not apply pesticide during or immediately after heavy rains, or whenever climatic conditions are such that runoff will occur to create an environmental hazard. Cover treated areas with polyethylene or waterproof sheeting if concrete is not poured on the same day as the soil treatment. Take adequate precautions to prevent disturbance of the pesticide barrier. Re-treat the soil or fill is disturbed after the treatment and before the placement of structural components. Apply pesticide prior to placement of vapor barrier or waterproofing membrane.

2.4 SHORING

Excavation shall be shored and braced by members of suitable sizes where necessary to prevent danger to persons, injurious caving or erosions. Shoring bracing and sheathing shall be removed, as the excavations are backfilled, in a manner such as to prevent injurious caving. The contractor shall keep all excavations free from water while construction is in progress.

2.5 FILLING AND BACKFILLING

After forms have been removed and when concrete work is hard enough to resist pressure resulting from fill, backfilling may then be done. Materials excavated may be used for backfilling. All filling shall be placed in layers not exceeding six (6) inches in thickness, each layer being thoroughly compacted and rammed by wetting, tamping, rolling.

2.6 PLACING AND COMPACTING FILL

2.6.0 Common Fill: shall be approved imported/site-excavated material free from roots, stumps and other perishable or objectionable matter.

2.6.1 Select Fill: shall be placed where indicated and shall consist of crushed gravel, crushed rock or a combination thereof. The material shall be free from adobe, vegetable matters and shall be thoroughly tamped after lacing.

2.6.2 Before placing fill materials, the surface upon which it shall be placed shall be cleared of all brush roots, vegetable matter and debris, and thoroughly wetted to ensure good bonding between grounds.

2.6.3 Compaction: Fills shall be evenly spread in horizontal layers of not more than 200mm in thickness. Each layer shall be wetted and compacted by approved mechanical compaction machine, roller or portable to a density of at least 90% or its maximum density for non-cohesive soils as determined by ASTM Method D-1557 or AASHTO Method T-180.

2.7 FINISH GRADING

The contractor shall fill and grade the whole area to the indicated sub-grade elevations as directed by the Architect or Engineer. The contractor shall verify the finish grade elevations of the proposed pavements. Prior to grading operations, the areas shall be cleared of all heavy growth or vegetation stumps, roots, cables, wires, rocks and other debris. The finished sub-grade shall be reasonably smooth and compacted and ready to receive the base course for the proposed pavement.

2.8 DISPOSAL OF EXCESS MATERIALS

Any excess and demolished materials remaining after completion of the earthwork shall be disposed of by hauling and transported out of the premises at the contractor's own expense.

2.9 SUB-GRADE PREPARATION

2.9.0 SCOPE

The sub-grade preparation shall be that part of the work which is the preparation for the support of the bases for pavements and structures. It shall extend to the full width of pavements including shoulders and lay-bys as shown on the drawings or as specified herein. Unless otherwise agreed upon by the Engineer, sub-grade preparation on a section of the road shall not be commenced unless the contractor is able, after the completion and acceptance of the work, to commence immediately pavement construction.

2.9.1 PRODUCTS

All materials and equipment necessary for proper completion of this work shall be subject to the approval of the Engineer.

2.9.2 EXECUTION

2.9.2.0 Prior Works: Prior to commencing the preparation of the sub-grade, all culverts, cross drains, and other similar structures (including the fully compacted backfill) shall be completed. No work shall be started on the preparation of the sub-grade before the prior works herein approved by the Engineer.

2.9.2.1 Sub-grade Level Tolerance: The finish compacted surface of the sub-grade shall conform to AASHTO M-145.

2.9.2.2 Sub-grade in Cutting Common Material

- a. Unless otherwise specified, all materials below sub-grade level in earth cutting to a depth of 150mm or other depth shown on the drawings or directed by the Engineer shall be excavated. The material, if suitable, shall be placed to one side for re-use, or if unsuitable, shall be disposed of in accordance with the requirements of AASHTO M-145.
- b. Where material has been removed from below sub-grade level, the base of the resulting cutting shall be compacted to a depth of 150mm to the requirements of AASHTO M-145 Table 1. If necessary, the moisture content of the material shall be adjusted.

2.10 GRADED AGGREGATES AND BASE COURSE

2.10.0 SUBMITTALS

- a. **Test Reports:** Before delivery of materials, submit the following test reports:
 1. Gradation
 2. Bearing Ratio
 3. Attenberg Limits

2.10.1 DELIVERY AND STORAGE

Do not construct base course when rainfall or other weather conditions will detrimentally affect the quality of the finished course.

2.11 PRODUCTS

2.11.0 MATERIALS

- a. Aggregates: Consist of durable sound crushed gravel, crushed stone, free of lumps and balls of clay or other objectionable matter. Crushed stone shall be free from flat, soft or disintegrated pieces. Crushed gravel retained on a No. 4 sieve shall have at least ninety percent (90%) by weight with at least two fractured faces one hundred percent (100%) by weight with at least one fractured face.
- b. Base course materials samples shall have a Bearing Ratio of at least 100 as determined by laboratory tests on a 4-day soaked specimen in accordance with ASTM D 1883; compact specimen in accordance with ASTM D 1557, Method D. Determine grain size in accordance with ASTM C-117.
- c. Soil binder material, the surface of the layer by a combination of rolling and blading. Final surface shall be smooth and free from waves, irregularities and from ruts of soft yielding spots.

CONCRETE

3.0 GENERAL

- 3.0.0 Unless otherwise specified herein, concrete work shall conform to the requirements of ACI Building Code. Full cooperation shall be given other trades to install embedded items. Provisions shall be made for setting items not placed in the forms. Before concrete is placed, embedded items shall have been inspected and tested for concrete aggregates and other materials shall have been done.

3.1 SUBMITTALS

- 3.1.0 Shop Drawings: Reproduction of contract drawings is unacceptable.
- 3.1.1 Shop Drawings for Reinforcing Steel: ACI 315. Indicate bending diagrams, assembly diagrams, splicing and lap 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 bars.
- 3.1.2 Contractor Mix Design: Thirty (30) days prior to concrete placement, submit a design for each strength and type of concrete. Furnish a complete list of materials including type, brand; source and amount of cement and admixtures; applicable reference specifications and copies of test reports showing that the mix has been successfully tested to produce concrete with the properties specified and will be suitable for the job conditions. Provide fly ash and pozzolan test results performed within six (6) months of submittal date. Obtain approval before concrete placement.
- 3.1.3 Certificates of Compliance
 - a. Aggregates

- b. Admixtures
- c. Reinforcement
- d. Cement

3.1.4 Catalogue Data

- a. Water stops
- b. Materials for Curing Concrete
- c. Joint Sealant
- d. Joint Filter
- e. Vapor Barrier
- f. Epoxy Bonding Agents

3.2 MATERIALS

- 3.2.0 Cement for concrete shall conform to the requirements of specifications for Portland cement (ASTM C-150).
- 3.2.1 Water used in mixing concrete shall be clean and free from other injurious amounts of oil, acids, alkaline, organic materials or other substances that may be deleterious to concrete or steel.
- 3.2.2 Fine Aggregates shall consist of hard, tough, durable uncoated particles. The shape of the particles shall be generally rounded or cubicle and reasonably free from flat or elongated particles. The stipulated percentages of fines in the sand shall be obtained either by processing sand or by the production of suitable graded manufactured sand.
- 3.2.3 Coarse Aggregates shall consist of gravel. Crushed gravel or rock. Or a combination of gravel and rock. Coarse aggregates shall consist of hard, tough, durable, clean and uncoated particles. The size of coarse aggregates top be used in the various parts of the Work shall be ¾".
- 3.2.4 Reinforcing bars shall conform to the requirements of PNS-49 Standard specifications for Billet Steel Bars for concrete reinforcement (A15-625). Tensile strength and grade for all reinforcing bars such as main horizontal (for beams), vertical (for columns), ties, stirrups and inserts shall be as follows:

SCHEDULE OF REINFORCING BARS (PNS-49)

DIAMETER OF BARS	GRADE (fy)	
12mmØ & smaller	230 MPA	Grade 33
16mmØ to 25mmØ	275 MPA	Grade 40

3.3 PROPORTIONING AND MIXING

- 3.3.0 Proportioning of all materials entering into the concrete mixture of 3,000 psi concrete shall be as follows:

<u>Class</u>	<u>Cement</u>	<u>Sand</u>	<u>Gravel</u>
A	1	2.0	4

- 3.3.1 Strength of Concrete: Concrete shall have a 28-day cylinder strength of 3,000 psi for all structures.
- 3.3.2 Mixing: The 3,000 psi concrete can be machine mixed on-site. On-site mixing shall be within 30 minutes after the cement has been added to the aggregates.

3.4 FORMS

- 3.4.0 General: Forms shall be used whenever necessary to continue the concrete and shape it to the required lines, or to ensure the concrete contamination with materials caving from adjacent excavated surfaces. Forms shall have sufficient strength to withstand the pressure resulting from placement and vibration of the concrete, and shall be maintained rigidly in correct position. Forms shall be sufficiently tight to prevent loss of mortar from the concrete. Forms for exposed surfaces against which backfill is not to be placed shall be lined with a form grade plywood or metal panels.
- 3.4.1 Cleaning and Use of Forms: Before placing the concrete, the contact surfaces of the form shall be cleansed of encrustation of mortar, the grout or other foreign material, and shall be coated with commercial form oil that will prevent sticking and will not stain the concrete surfaces.
- 3.4.2 Removal of Forms: Forms shall be removed in a manner that will prevent damage to the concrete. Forms shall not be removed without approval. Any repairs of surface imperfections shall be performed at once and airing shall be started as soon as the surface is sufficiently hard to permit it without further damage.

3.5 PLACING REINFORCEMENT

General: Steel reinforcement shall be provided as indicated, together with all necessary gauge 16 G.I. wire ties, chairs, spacers, supports and other devices necessary to install and secure the reinforcement properly. All reinforcement, when placed, shall be free from loose, flaky rust and scale, oil grease, clay and other coating and foreign substances that would reduce or destroy its bond with concrete. Reinforcement shall be placed accurately and secured in place by use of metal or concrete supports, spacers and ties. Such supports shall be of sufficient strength to maintain the operation. The supports shall be used in such manner that they will not be exposed or contribute in any way, to the discoloration or deterioration of the concrete.

3.6 CONVEYING AND PLACING CONCRETE

- 3.6.0 Conveying: Concrete shall be conveyed from mixer to forms as rapidly as practicable, by methods that will prevent segregation, or loss of ingredients. There will be no vertical drop greater than 1.5 meters except where suitable equipment is provided to prevent segregation and where specifically authorized.
- 3.6.1 Placing: Concrete shall be worked readily into the corners and angles of forms and around all reinforcement and embedded items without permitting the material to segregate. Concrete shall be deposited as close as possible to its final position in the forms so that flow within the mass does not exceed two (2) meters and consequent segregation is reduced to a minimum near forms or embedded items, or elsewhere as directed. The discharge shall be so controlled that the concrete may be effectively compacted into horizontal layers not exceeding 30 centimeters in depth within the maximum lateral movement specified...
- 3.6.2 Time interval between mixing and placing: Concrete shall be placed before initial set has occurred and before it has contained its water content for more than 45 minutes.
- 3.6.3 Consolidation of concrete: Concrete shall be consolidated with the aid of mechanical vibrating equipment and supplemented by hand spading and tamping. Vibrators shall not be inserted into lower coursed that have

commenced initial set and reinforcement embedded in concrete beginning to set or already set shall not be disturbed by vibrators. Consolidation around major embedded parts shall be by hand spading and tamping and vibrators shall not be used.

- 3.6.4 Placing concrete through reinforcement: In placing concrete through reinforcement, care shall be taken that no segregation of the coarse aggregate occurs. On the bottom of beams and slabs, where the congestion of steel near the forms makes placing difficult, a layer of mortar of the same cement-sand ratio as used in concrete shall be first deposited to cover the surface.

3.7 CURING

- 3.7.0 General: All concrete shall be moist-cured for a period not less than seven (7) consecutive days by an approved method or combination applicable to local conditions.
- 3.7.1 Moist curing: The surface of the concrete shall be kept continuously wet by covering with burlap, plastic or other approved materials thoroughly saturated with water and keeping the covering wet spraying or intermittent hosing.

3.8 FINISHING

- 3.8.0 Concrete surfaces shall not be plastered unless otherwise indicated. Exposed concrete surfaces shall be formed with smooth form material, and after removal of forms, the surfaces shall be smooth, true to line and shall present a finished appearance except for minor defects which can be easily repaired by patching with cement mortar, or can be ground to a smooth surface to remove all joint marks of the form work.
- 3.8.1 Concrete slabs on fill: The concrete slabs on fill laid on a prepared foundation consisting of sub-grade and granular fill with thickness equal to the thickness of overlaying slab except as indicated otherwise.

3.9 SURFACE FINISHES

- 3.9.0 Defects: Repair formed surfaces by removing minor honeycombs, pits greater than one square inch surface area or 0.25 inch maximum depth, or otherwise defective areas. Provide edges perpendicular to the surface and patch with non-shrink f=grout. Patch the holes and defects when the forms are removed.
- 3.9.1 Floor slabs, Pavements and Miscellaneous Construction: Unless otherwise specified, slab at the fountain area are straight to finish with waterproofing. Slope floors uniformly to drains where drains are provided. Depress the concrete base slab where Bomanite, Granite or Ceramic tiles are indicated.
- 3.9.2 Finish: Place, consolidate and immediately strike-off concrete to obtain proper contour, grade and elevation. A set sufficient for floating and supporting the weight of the finisher and equipment.
- 3.9.3 Pavements: Screed the concrete with a template advanced with a combined longitudinal and crosswise motion. Maintain a slight surplus of concrete ahead of the template. After screeding, float the concrete longitudinally and refloat as necessary. Obtain final finish by belting. Lay belt flat on the concrete surface and advance with a sawing motion; continue until a uniform but gritty non-slip surface is obtained. Round edges and joints with an edger having a radius of 1/8 inch.

- 3.9.4 Broomed: Provide for exterior walks, platforms, patios and ramps. Unless otherwise indicated, provide a floated finish, and then finish with a flexible bristle broom. Permit surface to harden sufficiently to retain the scoring or ridges. Broom traverse to traffic or at right angles to the slope of the slab.
- 3.9.5 Pits and Trenches: Place bottoms and walls monolithically or provide water stops and keys.
- 3.9.6 Curbs and Gutters: Provide contraction joints spaced at every 10 feet maximum unless otherwise indicated. Cut contraction joints 3/4-inch deep with a jointing tool after the surface has been finished. Provide expansion joints 1/2-inch thick and spaced at every 100 feet maximum unless otherwise indicated. Provide a pavement finish.

3.10 MISCELLANEOUS

- 3.10.0 Construction Joints: Locate joints to least impair strength; continue reinforcement across joints unless otherwise indicated.
- 3.10.1 Expansion Joints and Contraction Joints: For slab on grade, provide at edges of interior floor slab, adjacent to walls as indicated. Completely fill joints exposed to weather with joint filler material and joint sealant. Do not extend reinforcement or other embedded metal items bonded to the concrete through any expansion joints unless an expansion sleeve is used. Provide contraction joints, either formed or saw cut or cut with a jointing tool, to the indicated depth after the surface has been finished. Sawed joints shall be completed within 4 to 12 hours after concrete placement. Protect joints from intrusion of foreign matter.

MASONRY

4.0 MATERIALS

- 4.0.0 Concrete Hollow Blocks (CHB) shall have a minimum face thickness of 1" (25mm). Nominal size shall be 8" x 8" x 16", minimum compressive strength shall be 500 psi for non-load bearing and 700-1000 psi for load bearing. All units shall be stored for a period not less than 28 days (including curing period) and shall not be delivered to the job site prior to that time unless the structure is equal or more than the specified.
- 4.0.1 Prior to commencing the preparation of the sub-grade, all culverts, cross drains, and other similar structures (including the fully compacted backfill) shall be completed. No work shall be started on the preparation of the sub-grade before the prior works herein approved by the Engineer.
- 4.0.2 Cement shall be standard Portland cement ASTM C-150-68 Type 1.
- 4.0.3 Mortar: Mix mortar from 3 to 5 minutes in such quantities as needed for immediate use. Re-tempering will not be permitted if mortar stiffens because of premature setting. Discard such materials as well as those that have not been used within one hour after mixing. Proportioning shall be one (1) part Portland cement and two (2) parts and by volume, but not more than one (1) Portland cement and three (3) parts and by volume.

4.1 SUBMITTALS

- 4.1.0 Submit samples for approval two (2) samples each of each type of wall reinforcement and wall ties.

- 4.1.1 **Certificates of Conformance:** Submit certificate attesting that masonry cement, masonry units, aggregates and accessories meet the requirements specified.

4.2 ERECTION

- 4.2.0 All masonry shall be laid plumb, true to line, with level and accurately spaced courses, and with each course breaking joint with the source below. Bond shall be kept throughout corners and reveals shall be plumb and true. Units with greater than 12% absorption shall be wet before laying. Work required to be built in masonry; including anchors, wall plugs and accessories shall be built-in as the erection progresses.

- 4.2.1 **Masonry Units:** Each course shall be solidly bedded in Portland cement mortar. All units shall be damp when laid units shall be showed into place not laid, in a full bed of un-furrowed mortar. All horizontal and vertical points shall be completely filled with mortar when and as laid. Each course shall be bonded at corners and intersections. No cells shall be left open in face surfaces. All cells shall be filled up with mortar for exterior walls. Units terminating against beam or slab soffits shall be wedged tight with mortar. Do not lay cracked, broken or defaced block.

- 4.2.2 **Lintels** shall be of concrete and reinforced as required. Lintels shall have a minimum depth of 0.20 (8") and shall extend to at least 0.20 (8") on each side of opening and reinforced with 2-12mmØ re-bars and 10mmØ lateral ties @ 200mm o.k.

- 4.2.3 **Plastering:** Clean and evenly wet surfaces. Apply scratch coat with sufficient force to form good keys. Cross scratch coat upon its initial set; keep damp. Apply coat after each scratch coat has set at least 24 hours after scratch coat application. Lightly scratch brown coat; keep moist for two (2) days; allow drying out. Do not apply finish until brown coat has seasoned for seven (7) says. Just before applying coat, wet brown coat again. Float finish coat to true even surface; trowel in manner that will force sand particles down into plaster, with final trawling, leave surfaces banished smooth free from rough areas, trowel marks, checks, other blemishes. Keep finish coat moist for at least two (2) days; thereafter protect against rapid drying until properly, thoroughly cured.

4.3 SCAFFOLDING

- 4.3.0 Provide safe wood or metal scaffolding required for masonry and other related work, including cleaning down on completion. Remove upon demobilization.

4.4 SURFACE PREPARATION

- 4.4.0 **Vitrified Floor Tile Installation:** Do not stat floor tiling occurring in space where both floor and wall tile setting has been completed. Before spreading setting bed, establish borderline center wires in both directions to permit laying pattern with minimum of cut tiles. Lay floors without borders from centerline outward. Make adjustments at walls. Clean concrete sub-floor and moisten it without soaking. Sprinkle dry cement over surface. Spread setting bed mortar on concrete and tamp to assure good bond over the entire area then screed to smooth, level bed. Set average setting bed thickness at $\frac{3}{4}$ " but not less than $\frac{1}{2}$ ".
- 4.4.1 **Wall:** Scratch coat application as foundation coat shall be at most $\frac{1}{2}$ ". While still plastic, deeply score scratch coat or scratch and cross-scratch. Protect scratch coat and keep reasonably moist within seasoning period. Use mortar for scratch floor coats, within one hour after mixing. Re-tempering of partially hardened

mortar is not permitted. Set scratch coat be cured for at least two (2) days before starting the setting.

4.5 CLEANING

- 4.5.0 **Protection:** Protect work which may be damaged, stained or discolored during cleaning operations.
- 4.5.1 **Pointing:** Upon completion of masonry work, cut out defective mortar joints and tuck joints and all holes solidly with mortar.
- 4.5.2 **Cleaning:** Clean exposed masonry surface with clear water and stiff fiber brushes and rinse with clean water. Where stains, mortar or other soil remain, continue cleaning as follows: Clean masonry surfaces by scrubbing with warm water and soap and rinsing thoroughly with clean water. Restore damaged, stained and discolored work to its original conditions or replace with new work.

V STRUCTURAL STEEL

GENERAL

5.0 SCOPE OF WORK

The work includes the fabrication, erection and painting of structural steel. All structural steel work shall be in accordance with the AISC latest "Specifications for the Design, Fabrication and Erection of Steel for Buildings". The contractor shall furnish plates, clip angles connections and other miscellaneous work required for the completion of the structure.

5.1 SUBMITTALS

- 5.1.0 **Shop Drawings:** Submit shop drawings of all structural steel for approval prior to fabrication. Include complete information necessary for the fabrication and erection of the structure's components, including location, type and size of bolts, welds, member sizes and lengths, connection details, blocks, copes and cuts. Use AWS standard welding symbols.
- 5.1.1 **Erection Plan.** Submit for record purposes. Indicate the sequence of erection, temporary shoring and bracing and a detailed sequence of welding including each welding procedure.
- 5.1.2 **Manufacturer's Certificates of Conformance.**
 - a. Structural Steel
 - b. Bolts, nuts and washers
 - c. Shop painting materials
 - d. Welding electrodes and rods
 - e. Non-shrink grout
- 5.1.3 **Welding:** Submit descriptive data to illustrate the sequence of welding and each welding procedure to be used. Perform welding with qualified welders. The qualification of welders and the duration of qualification period shall be in accordance with the requirements of AWS. Any welder found to be producing unsatisfactory work even if he has passed qualification tests shall be immediately re-certified or replaced with a qualified welder.

5.2 REFERENCE STANDARDS

5.2.0 Comply with the latest edition of the following as applicable, unless otherwise specified or modified.

- a. AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), 1978: Specification for the Design, Fabrication and Erection of Structural Steel for Buildings. Code of Standard Practice for Steel Buildings and Bridges; Specification for Architecturally Exposed Structural Steel.
- b. AMERICAN WELDING SOCIETY (AWS): Standard Welding Symbols A2.0-68; Standard Welding Code D1.1-1973 (Rev 1-73 & 2-74) (To govern if in conflict with AISC).
- c. RESEARCH COUNCIL ON RIVETED AND BOLTED JOINTS OF THE ENGINEERING FOUNDATION (RCRBJ): Specification for Structural Joists using ASTM A-325-76s Bolts.
- d. STRUCTURAL STEEL PAINTING COUNCIL (SSPC): Painting Manual, Vol. 1; Good Painting Practice, Painting Manual, Vol. 2; Systems and Specifications.
- e. STEEL JOIST INSTITUTE-AMERICAN INSTITUTE OF STEEL CONSTRUCTION (SJI-AISC): "Standard Specifications for Open Web Steel Joists", and "Standard Specifications for Long Span Steel Joists", 1978 Editions.
- f. AMERICAN IRON AND STEEL INSTITUTE (AISI): "Specifications for the Design of Cold-Formed Steel Structure Members, 1974".

5.3 PRODUCTS

5.3.0 Steel: Structural Steel ASTM A-440 with minimum yield strength, $f_y=290$ mPa

5.3.1 BOLTS, NUTS AND WASHERS. Provide the following, unless otherwise indicated:

- a. Structural Steel
- b. Bolts: ASTM A325, Galvanized 78mmØ and below. A-490 1" Ø and above.
- c. Nuts: ASTM A325, Galvanized 78mmØ and below. A-490 1" Ø and above
- d. Washers: ANSI B 18.22.1, Type B

5.3.2 SHOP PAINTING

- a. Pre-treatment: Fed. Spec. TT-C-490, Type I, II or IV
- b. Primer Paint: Fed. Spec. TT-P-645

5.3.3 GALVANIZING

- a. Galvanizing Repair Paint: Mill Spec. DOD-P-21035

5.3.4 STRUCTURAL STEEL ACCESSORIES

- a. Welding Electrodes and Rods: AWS Code D1-1. E7018 Non-Shrink with minimum yield strength, $f_y=290$ mPa

- b. Non-Shrink Grout: With no ASTM C827

5.4 EXECUTION

5.4.0 FABRICATION

- 5.4.0.0 Markings: Prior to erection, members shall be provided with a painted erection mark. In addition, connection parts assembled in the shop for reaming holes in field connections shall be match-marked with scratch and notch marks. Do not locate erection markings on areas to be welded or on surfaces of weathering steels that will be exposed to the completed structure. Do not locate match-markings in areas that will decrease member strength or cause stress concentrations.
- 5.4.0.1 Shop Painting: Shop paint structural steel except as modified herein. Do not paint steel surfaces embedded in concrete, galvanized surfaces, bearing surfaces, or surface within ½ inch of the toe of the welds prior to welding. Prior to assembly, paint surfaces that will be concealed or inaccessible after assembly. Do not apply paint in foggy or rainy weather when paint may be exposed to temperature below 40 degrees F within 48 hours after application, unless approved otherwise.
- a. Cleaning: SSPC SP6, except as modified herein, SSPC SP3 or SP6 for steel surfaces exposed in spaces above ceilings, attic spaces, crawl spaces and chases. In addition, maintain steel surfaces free from rust, dirt, oil, grease and other contaminants through final assembly.
 - b. Pre-Treatment: Immediately after cleaning, provide the metal surfaces with one coat of Mil. Spec. DOD-P-15328 pre-treatment to dry film thickness of 0.3 to 0.5 mil. Fed. Spec. TT-C-490, pre-treatment may be applied to SSPC DP6 cleaned surfaces in accordance with Fed. Spec. TT-C-490.
 - c. Priming: Immediately after the pre-treatment coating has dried, apply primer to a minimum dry film thickness of 2.0 mil. Primer paint shall be zinc chromate conforming to Fed. Spec. TT-P-645. Repair damaged prime surfaces with an additional coat of primer.
- 5.4.0.2 Galvanizing: Provide as indicated or specified. Galvanize after fabrication where practicable.
- a. Galvanizing Repair: ASTM A780, using galvanizing repair paint for galvanizing damaged by handling, transporting, cutting, welding or bolting. Do not heat surfaces that repair paint has been applied to.
- 5.4.0.3 Bearing Surfaces and Friction Type Joints: In the shop, coat with a temporary rust preventive. Remove coating, as recommended by the coating manufacturer, immediately prior to field erection.
- 5.4.0.4 Surface Finishes: ANSI B46.1 maximum surface roughness of 125 pin, pinholes and sliding bearing, unless indicated otherwise.
- 5.4.0.5 Erection. Except when load indicator bolts are used, calibration wrenches shall be calibrated every two (2) working days on a minimum of three (3) typical bolts of each diameter. Provide for drainage in structural steel.

- a. Base Plates and Bearing Plates; after final positioning of members, provide full bearing under plates using non-shrink grout. Place non-shrink grout in accordance with the manufacturer's instructions.
- b. Field Painting: After erection, the field bolt heads and nuts, field welds, and any abrasions in the shop coat shall be cleaned and primed with paint of the same quality as that used for the shop priming.

5.4.1 SOURCE QUALITY CONTROL

Errors of Shop Drawing, Fabrication, correct fitting and alignment of the various metal items or component members shall be the responsibility of the contractor. However, the contractor shall permit the Architect or an independent inspection agency, if engaged by the Owner, to inspect work in progress in his shop. Such inspections shall not relieve the contractor of his responsibility to furnish materials and workmanship in accordance with the Contract Documents.

5.4.2 PRODUCT DELIVERY, HANDLING AND STORAGE

Handle and store in such manner as to prevent damage or disfigurement. Store finished items or components above ground on platforms, pallets or other supports and protect from harmful elements.

5.5 PROTECTION

The Contractor shall protect any existing work subject to damage during the installation of specified work and shall adequately protect specified work during installation. Finished work that is readily subject to damage by subsequent work or environmental conditions shall be protected by the Contractor immediately following the installation thereof.

5.6 FIELD MEASUREMENTS

Contractor shall make measurements in field to verify or supplement dimensions indicated and be responsible for accurate fit of specified work.

5.7 FIELD QUALITY CONTROL

Facilities shall be provided by the Contractor as needed for the proper inspection of the specified work, including temporary platforms, hoists, protective devices, electric current, etc. Improper workmanship, as determined by the Architect shall be corrected and replaced, at no additional cost to the Owner.

5.8 CONNECTIONS

Connections and not detailed shall be designed in accordance with AISC "Manual of Steel Construction". Build connections into existing work. Do not tighten anchor bolts set in concrete with impact torque wrenches. Punch, sub punch and ream or drill bolt and pin holes.

5.9 WELDING: Provide AWS D1.1 qualified welders, welding operators and tacklers.

5.10.1 Removal of temporary welds, run-off plates and backing strips, remove only from finished areas

5.10 TESTS AND INSPECTIONS: Perform field tests, and provide labor, equipment and incidentals required for testing.

Welds:

5.10.0 Visual Inspection: AWS D1.1 Section 6: Provide AWS certified welding inspectors for fabrication/erection inspections and testing and verification inspection. Welding inspectors shall visually inspect and mark welds, including fillet weld end returns.

5.10.1 Non-Destructive Testing: AWS D1.1. Test locations shall be selected by the Engineer if more than 20 percent (20%) of welds made by a welder contain defects identified by testing, and then all welds made shall be tested by radiographs or ultrasonic testing, as approved by the Engineer. When all welds made by an individual welder are required to be tested, magnetic particle testing shall be used in areas inaccessible to either radiographic or ultrasonic testing. Retest defective areas after repair.

VI ARCHITECTURAL

6.0 FINISHES

6.0.1 INTERIOR WALLS

- a. For areas exposed to moisture, use CHB with cement plaster finish painted.
- b. Plastering of doors and windows opening.

6.0.2 FLOOR FINISHES

- a. Plain Cement Finish
- b. Plain Cement Finish w/ Epoxy Paint
- c. 50mm Concrete Topping

6.0.3 CEILING FINISHES

- a. Rubbed Concrete

6.0.4 WINDOWS

Follow as per approved plan.

6.0.5 DOORS

Follow as per approved plan.

6.0.6 PAINTING

- a. All paints shall meet the required specifications and shall be delivered at the site in the original container. Use non Volatile Organic Compound (V.O.C.) paint or approved by the implementing agency and only accredited painters of the manufacturer shall execute the work to ensure the true origin and quality of paint and warranty of work.

- b. Concrete walls shall be treated with neutralizers. Exterior walls without wall veneer shall be applied with a primer before final coat. In general, rough surfaces of concrete, cabinets and woodworks surfaces shall be properly sandpapered and puffed before any application of paint.
- c. Latex Paint Finish (exterior masonry walls)
- d. Latex paint Finish (interior masonry walls/hardiflex)
- e. Latex Paint Finish (Ceiling)

6.0.7 HARDWARE

- 1. Provide all rough hardware required for the construction of works: nails, straps, lag screws, etc.
- 2. Butt Hinges : Use Toyo Butt Hinges, 4" x 4" with bearings for panel door.
- 3. Locksets : For PVC plastic, wood and metal swing doors use ABLOY stainless mortise locksets with striker plate.

6.0.8 OTHER FINISHES

- a. Countertop including Tiles.
- b. Stainless Steel Signage with Neon Backlight "MEDICINE DISPENSING ROOM" including accessories.
- c. Plastering Guide / Grooves
- d. Wood Ledge 0.25m x 2.4m including accessories, painted finish.

6.0.9 CLEAN-UP

When the work is completed, the Contractor shall remove all temporary structures and surplus materials of every sort, restore what has been removed before, and leave the premises or site in as good condition as he had originally found them.

VII THERMAL CONTROL AND MOISTURE PROTECTION

7.0 WATERPROOFING

Use waterproofing cementitious powder, capillary type, applied waterproofing seamless membrane latex-modified rubber reinforced on slabs. Refer to manufacturer's recommendation on proper application of the product listed herein: Lanko manufactured by VSL.

7.1 VAPOR BARRIER

Use 8 mils thick, 6 feet wide roll plastic vapor barrier laid over compacted base course at ground floor slab with 300mm minimum overlap prior to setting up of steel reinforcing bars. Submit samples for approval.

7.2 WATERSTOPS

Use Rebstop Ultra Seal chemical grout water-stop specially formulated for construction joints to replace the use of conventional water-stop used for cold expansion joints on pipes, etc. manufactured by Rebtrade International Corporation or approved equal.

IX PLUMBING

GENERAL

9.0 DESCRIPTION

- 9.0.0 Applicable provisions of General Conditions govern work under this section.
- 9.0.1 All fittings, connections and piping embedded in concrete shall be subject to inspection by the Architect and/or his representative before covering and/or completion.
- 9.0.2 The contractor shall provide all items, articles, materials, operations of methods listed, mentioned or scheduled on the drawings and/or herein, including labor, materials and incidentals necessary and required for their completion.
- 9.0.3 The contract drawings and specifications are complementary to each other, and any labor or materials called for by either, whether or not called for by both, if necessary, for the successful operation of any of the particular type of equipment furnished and installed will be without additional cost to the owner.
- 9.0.4 Intent: It is not intended that the drawings shall show every pipe fitting.
- 9.0.5 All such items, whether specifically mentioned or not, or indicated in the drawings shall be furnished and installed, if necessary to complete the system in accordance with the best practice of the plumbing trade and to the satisfaction of the engineer and the owner.
- 9.0.6 The plumbing contractor is required to refer to all architectural, structural and electrical plans and specifications and shall investigate all possible interferences and conditions affecting his work.

9.1 SCOPE OF WORK

- 9.1.2 Work included under this section of this specification consists of furnishing all labor, tools and equipment, appliances and materials necessary for complete installation, testing and operation of the plumbing and storm drainage system in accordance with the contract.
 - a. Arrange for, obtain and bear the cost of necessary permits, bonds and fees, private or government shall be paid by the contractor.
 - b. Soil, waste and vent pipe system within the building.
 - c. Sanitary drainage system of the building and its connection to the nearest existing sewer line or drainage line.
 - d. Cold-water distribution system and supply pipes to fixtures, hose bibs, inclusive of all valves, fittings and other accessories to complete the system.
 - e. Supply of all plumbing fixtures, trims and accessories.
 - f. Supply and installation of transfer pumps including valves and accessories under the supervision of the pump supplier.

- g. The contractor shall provide all necessary shop drawings and two (2) sets of As-Built Plans.
- h. Testing for leakage of all water supply and distribution system, drains, waste and venting system plus pressure testing for two (2) hours and disinfection of water distribution system.
- i. Water meter and MWSI connection as shown on plans and to be verified at the jobsite.
- j. Excavation and backfilling in connection with the work shall be included.
- k. Furnishing of written one (1) year warranty of the plumbing system

9.2 SUBMITTALS

- 9.2.0 Within fifteen (15) days after award of contract, the plumbing contractor shall submit for engineer's approval, four (4) copies of all complete list of manufacturer's name of all materials he proposes to use.
- 9.2.1 After approval of the above list and before purchase of any materials, the plumbing contractor shall submit to the engineer for approval, four (4) complete sets of detailed information consisting of manufacturer's bulletins, shop drawings and partial list of materials to be provided under this contract.
- 9.2.2 The plumbing contractor shall assume the loss of and the entire responsibility of any change in the work as shown in the contract drawings, which may be occasioned by approval of materials other than those specified.

9.3 APPLICABLE CODE AND STANDARD

- 9.3.0 All plumbing works to be done and the sizes of pipes to be used shall be in accordance with the National Plumbing Code and the Plumbing Code of the Philippines.
- 9.3.1 The plumbing contractor shall verify the above paragraphs with each section of the specifications and coordinate his work so that the general contractor will understand clearly the intent of the work to be done.

9.4 PRODUCTS

9.4.0 Description of Materials

All materials to be used shall conform to the standards specified. Use of materials shall be governed by other requirements imposed on other section of these specifications. Materials shall be subject to tests necessary to ascertain their fitness if the engineer so requires.

9.4.1 Alternate Materials

Use of any material not specified in these specifications may be allowed, provided such alternate has been approved by the engineer, and provided further, that a test if required shall be done by an approved agency in accordance with generally accepted standards.

9.4.2 Identification of Materials

Each length of pipe, fittings, traps, fixtures and devices used in the storm drainage system shall have case, stamped or indelibly marked on it the manufacturer's trademark or name, type and classes of products when so required by the standards mentioned. All materials and equipment mentioned in these specifications, including all incidental items not specifically indicated, but required to complete the contract shall be new and free from defects. If damaged during the course of construction, it shall be repaired or replaced as directed by the Project Manager at no additional cost for the owner.

9.4.3 Pipes and Fittings Schedule

9.4.3.0 Drain, Waste and Vent – shall be unplasticized polyvinyl chloride (uPVC) conforming to ASTM D1784.

9.4.4 Flanges, Bolting and Gaskets and Union

9.4.4.0 Provide flanges at flange connection to equipment and valves, slip-on or threaded as required.

Flanges shall conform to Class 300 black forged steel welding flanges 1/16" in raised faced to ASTM A-181 Grade 1. Bolts to ASTM A-193 regular hexagonal head unfinished, heavy semi-hexagonal nuts to ASTM A-194.

9.4.4.1 Provide union at each threaded connection to equipment, and valves for pipe sizes up to two (2) inches in diameter. It shall be galvanized steel pipe Class 300 screwed galvanized malleable iron, ground joint, brass to iron seat.

9.4.5 Valves

Valves up to and including two (2) inches shall be threaded ends, rough bodies and finished trimmings. Valves 2 ½ inches diameter and larger shall have iron [bodies, brass mounted and shall have either screws or flange ends.

9.4.5.0 Water meter shall be positive displacement type or any brand approved by MWSI or LWUA.

9.4.5.1 Hose Bibb shall made of male inlet threads, hexagon shoulder and three quarter inch hose connections. Provide one (1) extra gate valve on the vertical before the hose bib.

9.4.6 Drains

9.4.6.0 Floor drains at toilets shall be gauge no. 22 with round strainer and plastic bucket.

9.4.6.1 Deck drain shall be ASA 10-12, pipe size 75mmØ.

9.4.6.2 Floor drain for genset room shall be ASA 40-9F.

9.4.6.3 Grating cover (to be supplied by civil contractor).

9.4.7 Pipe Sleeves

- 9.4.7.0 Pipe sleeves shall be installed and properly secured in place at all points where pipes pass through masonry or concrete, except unframed floors on earth.
- 9.4.7.1 Pipe sleeves shall be of sufficient diameter to provide approximately one-quarter inch clearance around the pipe.
- 9.4.7.2 Pipe sleeve in walls and partitions shall be of wrought iron or steel pipe schedule 40. The pipe sleeves in concrete beams of concrete fireproofing shall be steel pipe schedule 40.
- 9.4.7.3 Pipe sleeves through floors shall be galvanized steel pipe schedule 40. Sleeve in pipe floor shall extend not less than one (1) inch and not more than two (2) inches above and the space around the pipe shall be packed with fiberglass insulation.
- 9.4.7.4 Pipe sleeves in footings shall be steel pipe and shall be not less than four (4) inches larger in diameter than the pipe to be installed.

9.4.8 Hangers and Supports

Vertical run of pipe shall be supported by brace. Horizontal runs of pipe shall be supported by loop 4-sway hanger.

9.4.9 EXECUTION

9.4.9.0 Piping Installation

Piping shall be installed as shown on the drawings, as recommended by the manufacturer and as directed during installation, straight and direct as possible, forming right angles or parallel lines with building walls and other pipes and neatly spaced. Erect pipe risers plumb and true, parallel with walls and other pipes neatly spaced. All piping shall be supported or suspended on stands, clamps, hangers or equivalent or approved design. Supports shall be installed in such a manner to permit pipe free expansion and contraction while minimizing vibration.

9.4.9.1 Plumbing System Test

The entire system of drains, waste and vent shall be tested. Water test shall be in accordance with the plumbing Code. Every portion of the system shall be tested to a hydrostatic pressure equivalent to at least 10-foot head water for a period of ½ hour before covering. All cold water lines shall be tested at 150 psi for a period of two (2) hours before covering. Defects disclosed by the test shall be repaired with new materials at the expense of the contractor.

9.4.10 Fixture Installation

Support all fixtures securely in a neat workman-like manner on approved carriers and supports. The method of support for each fixture shall be approved type manufacturer's standard, except where fixture designations on the drawings indicate modifications. Install all fixtures level and flush with finish floors and partitions. All fixtures shall be provided with individual shut-off valve and equipped with a trap.

X ELECTRICAL WORKS

10.0 WORK INCLUDED

- 10.0.0 The work to be done under this Division comprises the furnishing of all tools, labor, equipment, fixtures and materials, unless otherwise herein specified, required to complete and leave ready for use the electrical system of the Proposed Improvement of the above mentioned project in accordance with this specification and accompanying drawings of materials and finishes.
- 10.0.0 The electrical contractor shall coordinate his work so that the general contractor and all other subcontractors will understand clearly the work to be done. The electrical contractor shall finish all electrical facilities and provision necessary for the installations and operations of other trades such as mechanical, air-conditioning, plumbing, sanitary and others.
- 10.0.1 All contractors and all companies or persons providing labor, materials or both for this project, are specifically referred to the General Conditions of the specifications, to the general contract plans, to all Divisions of specifications and to the various other contract documents, which may affect the completion of the contract work.

10.1 CODES, INSPECTIONS, PERMITS AND FEES

- 10.1.0 The work under this contract shall be done according to the requirements of the latest edition of the Philippine Electrical Code, the rules and regulations of the Local Government Authorities of Quezon City and the requirements of Manila Electric Company. Nothing contained in this specification or shown on the drawings shall be construed as conflict with national and local ordinances or laws governing the installation of Electrical Works, and all such laws and ordinances are hereby made part of these specifications. The contractor is required to meet the requirements hereof.
- 10.1.1 All permits and electrical fees required for this work shall be obtained at the expense of the Contractor. The Contractor shall furnish the Architect or the Owner or the same maybe, a final certificate of electrical inspection and approval from the proper government authorities after completion of the work.

10.2 TEST

- 10.2.0 The electrical contractor shall apply such test, replace or remedy all defective work and adjust such system as needed or as the Architect or the owner shall direct. He shall also instruct the proper use of the system and equipments to persons designated by the owner. Submit copies of test data and results, including test reports on instrument to the engineer.

10.3 MEASUREMENTS

- 10.3.0 The Electrical Contractor shall procure from the Architect detailed drawings of those parts of the work not fully shown on the plans and he shall compare and verify with the Owner. Any lack of agreement shall be submitted at once to the Architect for adjustments.

10.4 SLEEVES AND FORMS FOR OPENINGS

10.4.0 The Electrical Contractor shall provide and places all shelves, for piping penetrating floors, walls, partitions, etc. He shall locate all necessary slots and openings for his work and it shall be done at such time as not to delay the general contractor of the project.

10.5 LOCATION OF OUTLETS

10.5.0 All Outlets shall be truly centered in panels and spaces provided thereof. Any discrepancy outlet location between the electrical plan and architectural plans shall be submitted to the Architect at once and verified before outlets are installed.

10.6 GROUNDINGS

10.6.0 All metallic conduits, supports, cabinets and equipments shall be properly grounded and bonded by means of copper straps. The conduits of such system shall be grounded by connecting to the grounding rod.

10.6.1 All ground connection shall have clean outlet surfaces and shall be tinned and sealed while bolting. Unless otherwise specified, ground wire shall be installed in exposed conduits and connections made readily accessible for inspection. Connection shall not be made underground or concealed in floors or walls.

10.7 WIRING METHODS

10.7.0 All wiring shall in general be installed inside standard conduits. All conduits shall be run embedded in concrete, underground but in concrete envelope, embedded in hollow blocks partition, concrete slab, walls and roof above, between double wall wooden partitions if any, where the installation of concealed and/or embedded conduit wiring may be used, but only upon approval of the Owner's authorities concerned. Exposed conduits shall be rigid steel conduits unless otherwise specified.

10.8 GUARANTEE

10.8.0 The Electrical Contractor shall guarantee his work for a period of one (1) year from the date of final acceptance by the owner except for particulars items specifically mentioned in these specifications.

10.8.1 The Electrical Contractor shall, without additional compensation for the period specified, replace any work materials or equipment furnished and installed by him under this contract, which develop defects except from ordinary wear and tear.

10.9 MATERIALS

10.9.0 All materials shall be new and shall conform to the standards of **Underwriter's Laboratories, Inc.** In every case where such a standard has been established for the particular type of materials in question.

10.9.1 All materials on all system shall comply with the following specifications unless specified and all materials where not specified shall be of the best of their respective kind.

10.9.2 Samples on any materials shall be submitted for approval as required by the Architect.

10.10 WIRES

10.10.0 All wires shall be copper, soft drawn and annealed, shall be 98% conductivity, shall be smooth and true of a cylindrical form and shall be within the actual size called for.

10.10.1 All wires and cables shall comply with the requirements of the **Underwriter's laboratories**, the **ASTM** and the **IPCEA** as to their particular usage.

10.10.2 Wires and cables for outdoor and indoor lighting and power system shall be moisture and Heat Resistant Thermoplastic with nylon insulated for 600volts working pressure type THHN unless otherwise noted on the plans or specified.

10.10.3 For lighting and power system, no wire smaller than 3.5mm² shall be used except for control leads.

10.10.4 All wires and cables shall be manufactured by a reliable manufacturing company acceptable to the Electrical Engineer of the owner.

10.11 CONDUITS

10.11.0 The conduit system shall consist of the following

1. Intermediate Metal Conduit (IMC):

They shall be of standard sizes and weight, mild steel hot dipped galvanized with inside enamel or epoxy coating, acceptable to the Electrical Engineer of the Owner.

2. Polyvinyl chloride conduit (PVC):

They shall be of standard size and weight, made of polyvinyl chloride, extruded, heavy wall, rated for 90-degree centigrade cable, schedule 40.

3. Limitations of use shall be as follows:

- a. As per requirement of the latest edition of **PEC** and/or **NEC**.
- b. Not permitted where subject to mechanical damage.

10.11.1 All conduits shall be of true cylindrical form and shall be within the actual size called for.

10.11.2 No conduits shall be used in any system smaller than 15-mm electrical trade size, not shall have more than four 90 degrees bend in any one run, and where necessary, hand hole and pull boxes shall be provided.

- 10.11.3 No wires shall be pulled in any conduit until the conduit system is complete in all details, In case of underground work, until concrete envelope or masonry has been completed in every detail,. In case of concealed work, until rough plastering has been completed.
- 10.11.4 The ends of all conduits shall be tightly plugged to exclude plaster dust sand and soil including moisture while the renovation of the perimeter is in the process.

10.12 OUTLET BOXES AND FITTINGS

- 10.12.0 At all outlets of every kind, for all systems, there shall be provided a suitable fittings which shall be either a box or other device especially designed to receive the type of fitting to be mounted thereon.
- 10.12.1 The Contractor shall consult with the Architect as to the nature of various fittings to be used before installing his outlet fittings and shall conform strictly in the use of fittings so that the work when completed will be finished design.

10.13 SWITCHES

- 10.13.0 Local lighting switches shall be flush type, heavy duty, 15 ampere size 250 volts, bakelite case, quick connect terminal. Outdoor lights shall be automatically operated by means of photo switch and manual selection. Manually switch by means of breaker switch inside the lighting panel.

10.14 RECEPTACLES

- 10.14.0 Standard receptacles shall be 10-ampere size 250volts, parallel slots, duplex, flush mounted composition case, side wired with the insulated mounting yoke, If weatherproof wall plate are required, standard factory made metal waterproof plate shall be provided.

10.15 PLATES

- 10.15.0 All switches and receptacles plates shall be bakelite plastic, ivory-colored or as directed by the Architect

10.16 LIGHTING SYSTEM

- 10.16.0 The lighting system shall be complete in every respect all indicated on the plans or as indicated and specified in the Architectural plans. Exact fixture location shall be determined.
- 10.16.1 All wiring shall be installed in conduits, and in general shall be concealed. Buried underground in concrete encasement and/or embedded in concrete.
- 10.16.2 Mounting Height of devices shall be as indicated in the plans and/or subject to Architect's approval prior to installations as follows:
- | | | |
|----------------|---|-----------------------------|
| Local switches | - | 1.4 above finish floor line |
| Receptacles | - | 0.3 above finish floor line |

10.17 DISTRIBUTIONS FEEDERS

- 10.17.0 Distribution voltage shall be 220volts, Single-phase, 3 wire. Feeder conductor and raceway shall be installed as shown on drawings and no change in size

shall be made without written consent of the Architect. Feeder conductors shall be continuous, and without splices between terminals, when feeders are run in multiple, they shall be exactly of the same length to avoid **unbalanced division of the current**.

10.18 CONNECTORS AND INSULATION

- 10.18.0 Use solderless mechanical pressure type lugs, copper connectors for splicing wires greater than no 8mm.sq. All splices shall be properly insulated using #M brand rubber tape and plastic electrical tape. Application of two tapes shall be equivalent to the insulation of wire concerned, edges to provide smooth surfaces before taping.

10.19 BRANCH CIRCUITS

- 10.19.0 The drawings indicate the general methods of installation of all circuit wirings and the power lighting outlets which are to be supplied from this circuit. Branch circuit raceways shall be run from outlets to panel boards as direct as the ground and level condition will allow. Circuit allocations shall be as indicated on the drawings. Where it becomes necessary to connect any outlet to the circuit other than the one shown on the drawings, this shall be done without extra charge and only upon written consent of the Architect. No wire smaller than 3.5mm sq. shall be used for any lighting or power branch circuit. All lighting outlet shall be supplied from 2-wire single phase circuits. Number of wires for other outlets shall be as indicated on the drawings.

10.20 MOTOR CONNECTIONS

- 10.20.0 Connect the motor starting devices for all motors, except where otherwise specifically provided for under other contracts. Furnish all necessary connections between controllers and motors in conduit, and leave motor ready to start. The power supply leads to the motor from the controller shall be the same as the feeder indicated on the drawings, except for six terminal lead motor where wye-delta starting method is being applied.
- 10.20.1 Other trades, i.e. mechanical contractor, except as otherwise noted or specified will supply and deliver all controllers and shall erect and connect up safe complete.
- 10.20.2 The Electrical Contractor or trade people shall be held responsible as far as power supply to the controller is concerned. He shall ascertain the exact location of the motor controller and motors from other trades before installing the circuit work.

10.21 RECORD DRAWINGS AND AS BUILT PLANS

- 10.21.0 The Electrical Contractor shall keep an active record of the actual installation works during the progress job. The shall become the reference for the preparation of the As-Built Plans which shall include all pertinent information, complete in all aspects of the actual installations, all new information not originally shown in the contract drawings.
- 10.21.1 The As-Built Plans shall be prepared by the Electrical Contractor at his expense and shall be submitted to the Architect and the Engineer for approval upon the completion of the work. The approval of the As-Built drawings shall be a pre-requisite for the final acceptance of the electrical works.
- 10.21.2 Two (2) copies of the As-Built drawings, signed and sealed by the **Electrical Contractor's Professional Electrical Engineer**, shall be submitted to the

Architect and Engineer consultants. Original tracing/ reproducible copy shall also be submitted.

Note: In contrast between these Technical Specifications and the approved Plans issued to the Contractor, the approved Plans shall prevail. See also the approved program of works. In case of doubt, for clearer outlooks consult the assigned Architect/Engineer.

Prepared by:

PABLO S. CABUGAWAN JR.

Section VII. Drawings

[Insert here a list of Drawings. The actual Drawings, including site plans, should be attached to this section, or annexed in a separate folder.]

Section VIII. Bill of Quantities

Notes on the Bill of Quantities

Objectives

The objectives of the Bill of Quantities are:

- a. to provide sufficient information on the quantities of Works to be performed to enable Bids to be prepared efficiently and accurately; and
- b. when a Contract has been entered into, to provide a priced Bill of Quantities for use in the periodic valuation of Works executed.

In order to attain these objectives, Works should be itemized in the Bill of Quantities in sufficient detail to distinguish between the different classes of Works, or between Works of the same nature carried out in different locations or in other circumstances which may give rise to different considerations of cost. Consistent with these requirements, the layout and content of the Bill of Quantities should be as simple and brief as possible.

Daywork Schedule

A Daywork Schedule should be included only if the probability of unforeseen work, outside the items included in the Bill of Quantities, is high. To facilitate checking by the Entity of the realism of rates quoted by the Bidders, the Daywork Schedule should normally comprise the following:

- a. A list of the various classes of labor, materials, and Constructional Plant for which basic daywork rates or prices are to be inserted by the Bidder, together with a statement of the conditions under which the Contractor will be paid for work executed on a daywork basis.
- b. Nominal quantities for each item of Daywork, to be priced by each Bidder at Daywork rates as Bid. The rate to be entered by the Bidder against each basic Daywork item should include the Contractor's profit, overheads, supervision, and other charges.

Provisional Sums

A general provision for physical contingencies (quantity overruns) may be made by including a provisional sum in the Summary Bill of Quantities. Similarly, a contingency allowance for possible price increases should be provided as a provisional sum in the Summary Bill of Quantities. The inclusion of such provisional sums often facilitates budgetary approval by avoiding the need to request periodic supplementary approvals as the future need arises. Where such provisional sums or contingency allowances are used, the SCC should state the manner in which they will be used, and under whose authority (usually the Procuring Entity's Representative's).

The estimated cost of specialized work to be carried out, or of special goods to be supplied, by other contractors should be indicated in the relevant part of the Bill of Quantities as a particular provisional sum with an appropriate brief description. A separate procurement procedure is normally carried out by the Procuring Entity to select such specialized contractors. To provide an element of competition among the Bidders in respect of any facilities, amenities, attendance, etc., to be provided by the successful Bidder as prime Contractor for the use and convenience of the specialist contractors, each related provisional sum should be followed by an item in the Bill of Quantities inviting the Bidder to quote a sum for such amenities, facilities, attendance, etc.

Signature Box

A signature box shall be added at the bottom of each page of the Bill of Quantities where the authorized representative of the Bidder shall affix his signature. Failure of the authorized representative to sign each and every page of the Bill of Quantities shall be a cause for rejection of his bid.

These Notes for Preparing a Bill of Quantities are intended only as information for the Procuring Entity or the person drafting the Bidding Documents. They should not be included in the final documents.

PROJECT TITLE : PROPOSED CONSTRUCTION OF BAESA COLUMBARIUM WITH LAND DEVELOPMENT

LOCATION : BARANGAY BAESA, DISTRICT 6, QUEZON CITY

PROJECT NO. : 21 - 00086

DURATION : Four Hundred Twenty (420) Calendar Days

BREAKDOWN OF COST

ITEM NO	SCOPE OF WORKS & WORK DESCRIPTION	MATERIALS COST	LABOR COST	INDIRECT COST	AGGREGATE COST
I	GENERAL REQUIREMENTS				
II	CONSTRUCTION OF COLUMBARIUM BUILDING				
III	CONSTRUCTION OF MORGUE BUILDING				
IV	CONSTRUCTION OF ADMIN BUILDING				
V	CONSTRUCTION OF PUBLIC TOILET WITH PUMP HOUSE				
VI	CONSTRUCTION OF PUBLIC TOILET				
VII	CONSTRUCTION OF MATERIAL RECOVERY FACILITY				
VIII	CONSTRUCTION OF DIESEL STORAGE				
IX	CONSTRUCTION OF POWER HOUSE				
X	LAND DEVELOPMENT WORKS				

TOTAL COST P _____

LUMP SUM BID IN WORDS : _____

Contractor : _____

BILL OF QUANTITIES
(Building Construction/Rehabilitation Project)

PROJECT TITLE : PROPOSED CONSTRUCTION OF BAESA COLUMBARIUM WITH LAND DEVELOPMENT

LOCATION : BARANGAY BAESA, DISTRICT 6, QUEZON CITY

PROJECT NO. : 21 - 00086

DURATION : Four Hundred Twenty (420) Calendar Days

SCOPE OF WORKS:

I GENERAL REQUIREMENTS

General Requirements include Billboard, Clearing, Hauling and Disposal of Construction Materials and Debris, Construction Safety Health Equipment, Scaffolding, and Temporary Facilities and Utilities

II CONSTRUCTION OF COLUMBARIUM BUILDING

- 1 Site Works include Site Clearing, Layout and Staking and preparation of earthworks
- 2 Civil/Structural Works include concrete works, masonry works, thermal and moisture protection and metal works
- 3 Architectural Works include floor finishes, wall finishes and partitions, ceiling works, installation of doors, windows, jambs and accessories and painting works
- 4 Sanitary/Plumbing Works include roughing-ins installation of equipment, fixtures and accessories.
- 5 Electrical Works include roughing-ins, wiring, installation of devices, fixtures, panel board and accessories
- 6 Auxillary Works include Closed Circuit Television (CCTV) system and Fire Detection and Alarm System (FDAS)
- 7 Mechanical Works include installation of airconditioning system and ventilation
- 8 Fire Protection Works include fire sprinkler system
- 9 Utilities and Ancillary Works include installation of equipment and accessories

II CONSTRUCTION OF MORGUE BUILDING

- 1 Site Works include Site Clearing, Layout and Staking and preparation of earthworks
- 2 Civil/Structural Works include concrete works, masonry works, thermal and moisture protection and metal works
- 3 Architectural Works include floor finishes, wall finishes and partitions, ceiling works, installation of doors, windows, jambs and accessories and painting works
- 4 Sanitary/Plumbing Works include roughing-ins installation of equipment, fixtures and accessories.
- 5 Electrical Works include roughing-ins, wiring, installation of devices, fixtures, panel board and accessories
- 6 Auxillary Works include Telephone (Voice) Closed Circuit Television (CCTV) system and Fire Detection and Alarm System (FDAS)
- 7 Mechanical Works include installation of airconditioning system and ventilation

III CONSTRUCTION OF ADMIN BUILDING

- 1 Site Works include Site Clearing, Layout and Staking and preparation of earthworks
- 2 Civil/Structural Works include concrete works, masonry works, thermal and moisture protection and metal works
- 3 Architectural Works include floor finishes, wall finishes and partitions, ceiling works, installation of doors, windows, jambs and accessories and painting works
- 4 Sanitary/Plumbing Works include roughing-ins installation of equipment, fixtures and accessories.
- 5 Electrical Works include roughing-ins, wiring, installation of devices, fixtures, panel board and accessories
- 6 Auxillary Works include Closed Circuit Television (CCTV) system and Fire Detection and Alarm System (FDAS)
- 7 Mechanical Works include installation of airconditioning system and ventilation

IV CONSTRUCTION OF PUBLIC TOILET WITH PUMP HOUSE

- 1 Site Works include Site Clearing, Layout and Staking and preparation of earthworks
- 2 Civil/Structural Works include concrete works, masonry works and thermal and moisture protection

- 3 Architectural Works include floor finishes, wall finishes and partitions, ceiling works, installation of doors, windows, jambs and accessories and painting works
- 4 Sanitary/Plumbing Works include roughing-ins, installation of equipment, fixtures and accessories.
- 5 Electrical Works include roughing-ins, wiring, installation of devices, fixtures, panel board and accessories
- 6 Mechanical Works include installation of ventilation system

V CONSTRUCTION OF PUBLIC TOILET

- 1 Site Works include Site Clearing, Layout and Staking and preparation of earthworks
- 2 Civil/Structural Works include concrete works, masonry works and thermal and moisture protection
- 3 Architectural Works include floor finishes, wall finishes and partitions, ceiling works, installation of doors, windows, jambs and accessories and painting works
- 4 Sanitary/Plumbing Works include roughing-ins installation of equipment, fixtures and accessories.
- 5 Electrical Works include roughing-ins, wiring, installation of devices, fixtures, panel board and accessories
- 6 Mechanical Works include installation of ventilation system

VI CONSTRUCTION OF MATERIAL RECOVERY FACILITY

- 1 Site Works include Site Clearing, Layout and Staking and preparation of earthworks
- 2 Civil/Structural Works include concrete works, masonry works, thermal and moisture protection and metal works
- 3 Architectural Works include sink finishes, ceiling works and painting works
- 4 Sanitary/Plumbing Works include roughing-ins installation of equipment, fixtures and accessories.
- 5 Electrical Works include roughing-ins, wiring, installation of devices, fixtures, panel board and accessories
- 6 Mechanical Works include installation of equipment and accessories

VII CONSTRUCTION OF DIESEL STORAGE

- 1 Site Works include Site Clearing, Layout and Staking and preparation of earthworks
- 2 Civil/Structural Works include concrete works, masonry works and thermal and moisture protection
- 3 Architectural Works include sink finishes, installation doors, windows, jambs and accessories and painting works
- 4 Sanitary/Plumbing Works include roughing-ins installation of equipment, fixtures and accessories.
- 5 Electrical Works include roughing-ins, wiring, installation of devices, fixtures, panel board and accessories
- 6 Mechanical Works include installation of equipment and accessories

VIII CONSTRUCTION OF POWER HOUSE

- 1 Site Works include Site Clearing, Layout and Staking and preparation of earthworks
- 2 Civil/Structural Works include concrete works, masonry works and thermal and moisture protection
- 3 Architectural Works include installation doors, windows, jambs and accessories and painting works
- 4 Sanitary/Plumbing Works include roughing-ins installation of equipment, fixtures and accessories.
- 5 Electrical Works include roughing-ins, wiring, installation of devices, fixtures, panel board and accessories
- 6 Mechanical Works include installation of equipment and accessories

IX LAND DEVELOPMENT WORKS

- 1 Site Works include Site Clearing, Layout and Staking and Preparation of Earthworks, Removal of Existing Structures and Roadway Excavation
- 2 Civil/Structural Works include concrete works, masonry works, concreting of pavements, curbs & gutters, and sidewalks construction of concrete manholes and laying of concrete pipes
- 3 Architectural Works include installation doors, windows, jambs and accessories, logos and lettering and painting works
- 4 Sanitary/Plumbing Works include roughing-ins installation of equipment, fixtures and accessories.
- 5 Electrical Works include roughing-ins, wiring, installation of devices, fixtures, panel board and accessories

X All necessary testing of materials and commissioning works must be performed as per standard procedures

XI ITEMS NOT INCLUDED

- 1 Columbarium Vault door
- 2 Green area / grass, planting of trees, flower vase, and grave stone on land development works
- 3 Rehabilitation of existing niche
- 4 Sewage Treatment Plant

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
I	GENERAL REQUIREMENTS				
	Billboard	2	unit	P	P
	Clearing, Hauling and Disposal of Construction Materials and Debris	186	t.l.		
	Construction Safety and Health Equipment	1	unit		
	Scaffolding (Rental)				
	Columbarium Building	644	sq.m.		
	Morgue Building	360	sq.m.		
	Admin Building	350	sq.m.		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Public Toilet & Power House	192	sq.m.		
	Public Toilet	136	sq.m.		
	MRF	96	sq.m.		
	Diesel Storage	114	sq.m.		
	Power House	131	sq.m.		
	Gazebo, Perimeter Fence and Guard House	386	sq.m.		
	Temporary Electrical and Water Facilities	420	day		
	Temporary Facilities	1	unit		
	Temporary Enclosure around the Construction Area (H=2.4m)	669	l.m.		
				Direct Cost I	P 4,372,298.00
II	CONSTRUCTION OF COLUMBARIUM BUILDING				
A	SITE WORKS (COLUMBARIUM BUILDING)				
	Site Clearing and Preparation	596	sq.m.	P	P
	Layout and Staking	596	sq.m.		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Excavation for Structures				
	Footing	257	cu.m.		
	Wall Footing	58	cu.m.		
	Slab-on-Fill	57	cu.m.		
	Septic Tank	73	cu.m.		
	Cistern Tank	53	cu.m.		
				Subtotal	P
	Soil Treatment	539	sq.m.	P	P
	Gravel Bedding	46	cu.m.		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
	Backfill and Compaction	246	cu.m.	P	P
				Subtotal	P
				Materials Cost II A	P
				Labor Cost II A	
				Direct Cost II A	P
B	CIVIL WORKS / STRUCTURAL WORKS (COLUMBARIUM BUILDING)				
	Concrete Works				
	Ready Mix Concrete, 28MPa, 3/4" Gravel, 28days				
	Footing	44	cu.m.	P	P
	Wall Footing	21	cu.m.		
	Column	39	cu.m.		
	Beam	106	cu.m.		
	Suspended Slab	118	cu.m.		
	Ready Mix Concrete, 21MPa, 3/4" Gravel, 28days				
	Stairs	7	cu.m.		
	Ramp	6	cu.m.		
	Slab-on-Fill	57	cu.m.		
	Columbarium Vault	165	cu.m.		
	Septic Tank	14	cu.m.		
	Cistern Tank	22	cu.m.		
	Reinforcing Steel Bar				
	Grade 40 Reinforcing Steel Bar including G.I. Tie Wire Ga. 16				
	10mm Ø Reinforcing Steel Bar				
	Wall Footing	401	kg		
	Column (Ties)	3,316	kg		
	Slab on Fill	1,768	kg		
	Beam (Stirrups)	2,941	kg		
	Suspended Slab	12,055	kg		
	Stairs	171	kg		
	Ramp	831	kg		
	Columbarium Vault	9,372	kg		
	Septic Tank	322	kg		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Cistern Tank	508	kg		
	12mm Ø Reinforcing Steel Bar				
	Wall Footing	449	kg		
	Beam (CRB)	165	kg		
	Beam (Web Bars)	539	kg		
	Septic Tank	999	kg		
	Suspended Slab	16,780	kg		
	Stairs	817	kg		
	Stiffener Column	589	kg		
	Grade 60 Reinforcing Steel Bar including G.I. Tie Wire Ga. 16				
	16mm Ø Reinforcing Steel Bar				
	Footing	2,086	kg		
	Column	5,141	kg		
	Beam (Main Bars)	8,679	kg		
	Columbarium Vault	4,761	kg		
	Cistern Tank	1,534	kg		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	20mm Ø Reinforcing Steel Bar				
	Footing	2,972	kg		
	Column	1,556	kg		
	Beam (Main Bars)	1,872	kg		
	Cistern Tank	2,272	kg		
	Formworks				
	Footing	95	sq.m.		
	Column	284	sq.m.		
	Beam	348	sq.m.		
	Suspended Slab	391	sq.m.		
	Stairs, Ramp & Columbarium Vault	421	sq.m.		
	Scaffolding and Shoring				
	Column	541	l.m.		
	Beam	816	l.m.		
	Suspended Slab	391	sq.m.		
	Stairs, Ramp & Columbarium Vault	421	sq.m.		
	Masonry Works				
	100mm CHB Laying including Mortar, Reinforcement and Two-Face Plastering	501	sq.m.		
	150mm CHB Laying including Mortar, Reinforcement and Two-Face Plastering	1057	sq.m.		
	Plastering of Doors and Windows Opening	220	l.m.		
	Thermal and Moisture Protection				
	Vapor Barrier	539	sq.m.		
	Cementitious Flexible Type Waterproofing	591	sq.m.		
	Non-toxic Waterproofing Coating (2 coats)	88	sq.m.		
	Miscellaneous & Consumables				
	Epoxy Tank Lining	88	sq.m.		
	Epoxy Primer	88	sq.m.		
	Metal Works				
	6mm thick Base Plate	14	kg		
	12mm Ø Dyna Bolt	16	piece		
	Stainless Steel Cross				
	100mm Tubular Bar	13	kg		
	12mm Square Bar	4	kg		
	100mm Tubular Bar Stainless Pedestal	370	kg		
	Miscellaneous & Consumables				
	Acetylene Tank (Refill)	1	tank		
	Oxygen Tank (Refill)	1	tank		
	Welding Rod	1	box		
				Materials Cost II B	P
				Labor Cost II B	
				Direct Cost II B	P
C	ARCHITECTURAL WORKS (COLUMBARIUM BUILDING)				
	Floor Finishes				
	300mm x 300mm Non-Skid Homogenous Floor Tiles	9	sq.m.	P	P
	300mm x 300 mm Homogenous Porcelain Tiles	134	sq.m.		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	with 300mm x 600mm Border Porcelain Tiles				
	600mm x 600mm Homogenous Porcelain Tiles Polished	655	sq.m.		
	600mm x 600mm Non-skid Homogenous Tiles (Stair Tiles)	16	sq.m.		
	300mm x 600mm Homogenous Porcelain Tiles (Stair Tiles)	36	sq.m.		
	Rubber Nosing	72	l.m.		
	Floor Topping for Preparation of Tile Works	850	sq.m.		
	Wall Partitioning and Finishes				
	300mm x 600mm Matte Homogenous / Porcelain Wall Tiles	85	sq.m.		
	20mm thick Granite Slab Countertop	5	sq.m.		
	25mm thick Granite Cover	143	sq.m.		
	Ceiling Finishes				
	10mm thick Gypsum Board on Metal Framing	544	sq.m.		
	12mm thick Moisture Resistant Gypsum Board on Metal Framing	217	sq.m.		
	Rubbed Finishing Preparation for Slab Soffit	104	sq.m.		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Miscellaneous				
	50mm Ø Stainless Steel Grab Bar	4	l.m.		
	100mm Ø Stainless Steel Railing Hair Line Finish (Ramp)	61	l.m.		
	Marine Plywood Cabinet Door, Painted Finish	6	l.m.		
	Steel Hinges for Vault (metal door and stainless steel screw not included)	1,692	piece		
	Precast Baluster Granite Finish	144	piece		
	Precast Concrete Pier Granite Finish	12	piece		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
	Installation of Doors				
	Doors				
	D1 - 1.6m x 2.75m Double Leaf Glass Door with Fixed Glass Transom on Powder Coated (Light Color) Aluminum Frame with Complete Accessories	2	set	P	P
	D2 - 0.8m x 2.1m Single Leaf Glass Door on Powder Coated (Light Color) Aluminum Frame with Complete Accessories	2	set	14,280.00	28,560.00
	D3 - 1.6m x 2.1m Double Leaf Glass Door on Powder Coated (Light Color) Aluminum Frame with Complete Accessories	4	set		
	D4 - 0.8m x 2.1m Painted Wood Panel Door with Fixed Glass Panel	2	set		
	D5 - 0.8m x 2.1m Painted Wood Panel Door	3	set		
	D6 - 0.8m 2.1m Painted Wood Panel Door with Louvers	2	set		
	D7 - 1.0m x 2.1m Painted Wood Panel Door with Louvers	2	set		
	D8 - 0.9m x 2.1m Painted Metal Door with Louver Vents	1	set		
	Hardwares and Accessories				
	Door Jamb				
	D4 - 0.8m x 2.1m Wooden Door Jamb	2	set		
	D5 - 0.8m x 2.1m Wooden Door Jamb	3	set		
	D6 - 0.8m 2.1m Wooden Door Jamb	2	set		
	D7 - 1.0m x 2.1m Wooden Door Jamb	2	set		
	D8 - 0.9m x 2.1m Metal Door Jamb	1	set		
	Door Hinge, Heavy Duty	30	piece		
	Door Knob, Lever Type	10	piece		
	Installation of Windows				
	W1 - 1.2m x 2.4m Awning Window with Fixed Glass on Powder Coated (Light Color) Aluminum Frame with Complete Accessories	4	set		
	W2 - 1.2m x 3.0m Curtain Wall on Powder Coated (Light Color) Aluminum Frame with Complete Accessories	4	set		
	W3 - 3.0m x 4.05m Curtain Wall with Awning Windows on Powder Coated (Light Color) Aluminum Frame with Complete Accessories	1	set		
	W4 - 1.2m x 2.4m Curtain Wall on Powder Coated (Light Color) Aluminum Frame with Complete Accessories	2	set		
	W5 - 2.4m x 3.6m Curtain Wall with Awning Glass Window on	2	set		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Powder Coated (Light Color) Aluminum Frame with Complete Accessories				
	W6 - 1.2m x 0.6m Awning Glass Window on Powder Coated (Light Color) Aluminum Frame with Complete Accessories	4	set		
	W7 - 1.8m x 0.6m Awning Glass Window on Powder Coated (Light Color) Aluminum Frame with Complete Accessories	2	set		
	W8 - 1.2m x 1.8m Awning Glass Window with Fixed Glass on Powder Coated (Light Color) Aluminum Frame with Complete Accessories	5	set		
	W9 - 0.6m x 2.4m Awning Glass Window on Powder Coated (Light Color) Aluminum Frame with Complete Accessories	4	set		
	W10 - 1.2m x 3.0m Awning Glass Window with Fixed Glass on Powder Coated (Light Color) Aluminum Frame with Complete Accessories	2	set		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	W11- 0.742m x 2.4m Awning Glass Window on Powder Coated (Light Color) Aluminum Frame with Complete Accessories	4	set	P	
	W12- 1.43m x 2.4m Stained Glass Window	1	set		
	W13- 1.43m x 2.4m Stained Glass Window	1	set		
	W14- 1.2m x 2.4m Awning Glass Window with Fixed Glass on Powder Coated (Light Color) Aluminum Frame with Complete Accessories	19	set		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
	Painting Works				
	Textured Paint Finish (Exterior Walls)	704	sq.m.	P	P
	Flat Latex Paint				
	Interior Walls	1,682	sq.m.		
	Ceiling	647	sq.m.		
	Glossy Painted Finish	73	sq.m.		
	Plain Cement Paint Finish	556	sq.m.		
	Epoxy Primer (Electrical Works)	5	liter		
	Fire Red Paint Finish (Fire Protection Works)	200	sq.m.		
	Quick Dry Enamel (Electrical Works)	1	sq.m.		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
				Materials Cost II C	P
				Labor Cost II C	
				Direct Cost II C	P
D	SANITARY AND PLUMBING WORKS (COLUMBARIUM BUILDING)				
	Sewer Line System				
	50mm Ø PVC Standard Hub Pipe	28	piece	P	P
	75mm Ø PVC Standard Hub Pipe	5	piece		
	100mm Ø PVC Standard Hub Pipe	11	piece		
	100mm Ø x 50mm Ø PVC Wye	17	piece		
	100mm Ø x 75mm Ø PVC Wye	6	piece		
	50mm Ø x 50mm Ø PVC Tee	16	piece		
	75mm Ø x 75mm Ø PVC Tee	4	piece		
	100mm Ø x 100mm Ø PVC Tee	4	piece		
	50mm Ø x 50mm Ø PVC 1/4 Bend	8	piece		
	75mm Ø x 75mm Ø PVC 1/4 Bend	2	piece		
	100mm Ø x 100mm Ø PVC 1/4 Bend	4	piece		
	50mm Ø x 50mm Ø PVC 1/8 Bend	17	piece		
	75mm Ø x 75mm Ø PVC 1/8 Bend	6	piece		
	75mm Ø x 50mm Ø PVC Reducer	4	piece		
	100mm Ø PVC Cleanout	4	piece		
	50mm Ø PVC P-Trap	16	piece		
	50mm Ø PVC Coupling	9	piece		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	75mm Ø PVC Coupling	2	piece		
	100mm Ø PVC Coupling	4	piece		
	Storm Drainage System				
	75mm Ø PVC Standard Hub Pipe	24	piece		
	100mm Ø PVC Standard Hub Pipe	17	piece		
	75mm Ø x 75mm Ø PVC Wye	14	piece		
	75mm Ø x 75mm Ø PVC 1/4 Bend	4	piece		
	100mm Ø x 100mm Ø PVC 1/4 Bend	6	piece		
	75mm Ø x 75mm Ø PVC 1/8 Bend	14	piece		
	100mm Ø x 75mm Ø PVC Reducer	6	piece		
	75mm Ø PVC P-Trap	20	piece		
	75mm Ø PVC Coupling	8	piece		
	100mm Ø PVC Coupling	6	piece		
	Water Line System				
	20mm Ø PPR Pipe, PN 16	9	piece		
	25mm Ø PPR Pipe, PN 16	2	piece		
	32mm Ø PPR Pipe, PN 16	2	piece		
	40mm Ø PPR Pipe, PN 16	10	piece		
	20mm Ø x 20mm Ø PPR Tee Equal	6	piece		
	75mm Ø x 75mm Ø PPR Tee Equal	3	piece		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	40mm Ø x 20mm Ø PPR Tee Unequal	1	piece		
	25mm Ø x 20mm Ø PPR Reducer	2	piece		
	32mm Ø x 20mm Ø PPR Reducer	2	piece		
	40mm Ø x 32mm Ø PPR Reducer	1	piece		
	20mm Ø PPR 90° Elbow	7	piece		
	32mm Ø PPR 90° Elbow	1	piece		
	75mm Ø PPR 90° Elbow	8	piece		
	20mm Ø x 15mm Ø PPR Female Threaded Tee	13	piece		
	20mm Ø PPR End Cap	13	piece		
	20mm Ø PPR Union Patente	6	piece		
	20mm Ø PPR Coupling	5	piece		
	32mm Ø PPR Coupling	1	piece		
	40mm Ø PPR Coupling	5	piece		
	20mm Ø PPR Male Adaptor	12	piece		
	40mm Ø PPR Male Adaptor	2	piece		
	Water Pump Assembly				
	65mm Ø PPR Pipe, PN 16	3	piece		
	75mm Ø PPR Pipe, PN 16	13	piece		
	65mm Ø x 40mm Ø PPR Reducer	1	piece		
	75mm Ø x 65mm Ø PPR Reducer	2	piece		
	65mm Ø PPR Coupling	2	piece		
	75mm Ø PPR Coupling	7	piece		
	75mm Ø PPR Union Patente	5	piece		
	75mm Ø PPR Male Adaptor	12	piece		
	75mm Ø PPR Gate Valve	3	piece		
	75mm Ø Check Valve	3	piece		
	65mm Ø Water Meter	1	piece		
	Valves and Appurtenances				
	20mm Ø PPR Gate Valve	6	piece		
	40mm Ø PPR Gate Valve	1	piece		
	Fixtures				
	Bidet with Accessories, Stainless Steel	4	unit		
	Flexible Hose	10	unit		
	Grease Trap, 5gpm	2	set		
	Kitchen Sink Faucet, (Water Efficient)	2	unit		
	Kitchen Sink, Single Tub	2	set		
	Lavatory Faucet, Lever Type	4	unit		
	Lavatory, Wall Hung	4	set		
	Urinal, Flush Valve, (Water Efficient)	1	set		
	Water Closet, Tank Type, (Water Efficient)	4	set		
	Accessories				
	Angle Valve, Single-Way	6	unit		
	Angle Valve, Two-Way	4	unit		
	Deck Drain, 75mm Ø , Dome Type	20	unit		
	Floor Drain, 50mm x 50mm	9	unit		
	Facial Mirror	2	sq.m.		
	Soap Dispenser	4	unit		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Tissue Holder, Stainless	4	unit		
	Pipe Hangers and Supports				
	Support for horizontal pipes greater than 50mmØ, 1m interval	70	l.m.		
	Downspout Brackets	27	l.m.		
	Miscellaneous and Consumables				
	400cc Solvent Cement	50	can		
	1000cc All Around Sealant	3	can		
	Hacksaw Blade	20	piece		
	Teflon Tape	20	roll		
	Waste Cloth	20	kg		
				Materials Cost II D	P
				Labor Cost II D	
				Direct Cost II D	P

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
E	ELECTRICAL WORKS (COLUMBARIUM BUILDING)				
	Pipes and Fittings				
	20mm Ø PVC Pipe	580	piece	P	P
	25mm Ø PVC Pipe	35	piece		
	90mm Ø PVC Pipe	6	piece		
	32mm Ø IMC Pipe	6	piece		
	65mm Ø IMC Pipe	7	piece		
	20mm Ø PVC Adaptor	656	piece		
	20mm Ø PVC Locknut and Bushing	656	pair		
	20mm Ø PVC Elbow	100	piece		
	25mm Ø PVC Adaptor	4	piece		
	25mm Ø PVC Locknut and Bushing	4	pair		
	25mm Ø PVC Elbow	2	piece		
	90mm Ø PVC Adaptor	10	piece		
	90mm Ø PVC Locknut and Bushing	10	pair		
	32mm Ø IMC Locknut and Bushing	4	pair		
	32mm Ø IMC Coupling	2	piece		
	32mm Ø IMC Elbow	2	piece		
	65mm Ø IMC Locknut and Bushing	4	pair		
	65mm Ø IMC Coupling	2	piece		
	65mm Ø IMC Elbow	2	piece		
	16mm Ø x 3.0m Grounding Rod (Copper Clod) with Ground Clamp	6	piece		
	200mm Ø Ground Well/Pit with Stainless Steel Cover	1	piece		
	50mm x 100mm PVC Utility Box	77	piece		
	100mm x 100mm PVC Junction Box With Cover	251	piece		
	20mm Ø Metallic Conduit	335	l.m.		
	Wires and Cables				
	3.5mm² THHN Wire	31	roll		
	5.5mm² THHN Wire	30	l.m.		
	8.0mm² THHN Wire	350	l.m.		
	14.0mm² THHN Wire	180	l.m.		
	30.0mm² THHN Wire	40	l.m.		
	125.0mm² THHN Wire	40	l.m.		
	150.0mm² THHN Wire	54	l.m.		
	30.0mm² Bare Copper Wire	63	l.m.		
	2.0mm² TW Wire	14	roll		
	3.5mm² TW Wire	12	l.m.		
	5.5mm² TW Wire	260	l.m.		
	8.0mm² TW Wire	15	l.m.		
	30.0mm² THW Wire	15	l.m.		
	38.0mm² THW Wire	18	l.m.		
	Lighting Fixtures (Energy Efficient)				
	18W LED Tube Light, Dust Proof	2	piece		
	18W LED Tubet Light, Box Type (fixture only)	2	piece		
	T8, 10W LED Tube Light	4	piece		
	T8, 18W LED Tube Light	6	piece		
	600mm x 600mm Troffer Fixture,Double Recessed Type	2	piece		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	with Complete Accessories				
	1200mm x 300mm Troffer Fixture, Single Recessed Type with Complete Accessories	2	piece		
	Strip Light (Cove Light)	22	roll		
	40W , Pendant Lighting	6	piece		
	12W, LED Cylindrical Wall Light (Column)	8	piece		
	Step Light	20	piece		
	Spot Light (Dome)	8	piece		
	Chandelier	1	piece		
	100mm Ø Pinlight (case)	17	piece		
	10W LED Bulb	17	piece		
	100mm x 100mm Super Flat LED Pinlight	12	set		
	150mm x 150mm Super Flat LED Pinlight	26	set		
	200mm x 200mm Super Flat LED Pinlight	90	set		
	300mm x 300mm Super Flat LED Pinlight	16	set		
	9W , Emergency Light, Twinhead	12	piece		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Wiring Devices and Other Fixtures				
	Outlet with Grounding , One-gang, for Hand Dryer	4	piece		
	Outlet with Grounding , One-gang	12	piece		
	Outlet with Grounding , Two-gang	36	piece		
	Switch with Plate & Cover, One-gang	10	piece		
	Switch with Plate & Cover, Two-gang	24	piece		
	Switch with Plate & Cover, Three-gang	3	piece		
	Panel Board				
	MDP (Main Distribution Panel)				
	Main: 300AT/300AF 3P, 35KAIC @240V MCCB	1	assy		
	Branches:				
	1 - 250 AT, 3P, MCCB				
	1 - 100 AT, 3P, MCCB				
	2 - Space				
	Enclosure: NEMA 1 with Ground Terminals				
	LP (Lighting Panel)				
	Main: 100AT/100AF, 3P, 25KAIC @ 240V MCCB	1	assy		
	Branches:				
	14 - 20AT, 2P, Bolt On				
	2 - 30AT , 2P , Bolt On				
	Enclosure: NEMA 1 with Ground Terminals				
	PP (Power Panel)	1	assy		
	Main: 250AT/300AF 3P, 35KAIC @240V MCCB				
	Branches:				
	4 - 70AT, 2P, Bolt On				
	7 - 40AT, 2P, Bolt On				
	6 - 30AT, 2P, Bolt On				
	7 - 20AT, 2P, Bolt On				
	Enclosure: NEMA 1				
	ECB (Enclosed Circuit Breaker)				
	30AT, 2P, NEMA 3R	4	assy		
	40AT, 2P, NEMA 3R	7	assy		
	70AT, 2P, NEMA 3R	4	assy		
	Pipe Hangers and Supports				
	Horizontal Layout of Pipe	10	l.m.		
	Vertical Layout of Pipe	5	l.m.		
	Miscellaneous & Consumables				
	400cc Solvent Cement	5	can		
	1000cc All Around Sealant	3	can		
	Electrical Tape	27	roll		
	Hacksaw Blade	5	piece		
	Masking Tape	7	roll		
	Paint Thinner	5	liter		
	Pulling Lubricant	2	gal		
	Rubber Tape	7	roll		
	Tie Wire, Ga.16 (for cable pulling)	5	kg		
	Torch w/ Butane	2	set		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
				Materials Cost II E	P
				Labor Cost II E	
				Direct Cost II E	P
F	AUXILIARY WORKS (COLUMBARIUM BUILDING)				
	Closed Circuit Television (CCTV) System				
	Pipes and Fittings				
	20mm Ø PVC Pipe	56	piece	P	P
	20mm Ø PVC Adaptor	28	piece		
	20mm Ø PVC Locknut	20	piece		
	20mm Ø Flexible Metallic Conduit	13	l.m.		
	20mm Ø Straight Connector with Locknut	7	piece		
	100mm x 100mm Metal Junction Box with Cover	8	piece		
	118mm PVC Square Box	3	piece		
	325mm x 275mm x 275mm Pull Box	1	piece		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Wires and Cables				
	UTP Cat-6 Cable	2	roll		
	HDMI Cable	8	lm		
	Video Balun UTP Cat-6 Connector	13	pair		
	12V DC Male & Female Power Balun Connector	13	pair		
	Fixtures and Devices				
	HD Bullet Camera (Vandal Resistant), Outdoor type	4	unit		
	HD Dome Camera (Day/Night), Indoor Type	9	unit		
	HD Digital Video Recorder (DVR), 16-channel with DVD Burner	1	unit		
	DVD Security Lock Box, Low Profile	1	unit		
	Multi-Function Keyboard Controller	1	unit		
	32" LED Monitor	1	set		
	UPS, 1000VA ≥ 5mins "on-line"	1	set		
	12V DC Power Adapter	2	piece		
	12V DC 1 Female to 8 Male Power Splitter	2	piece		
	Pipe Hangers and Supports				
	Rigid Steel Strap	84	piece		
	Strut Clamp	84	piece		
	6mm Ø x 40mm Tox with Screw	1	box		
	25mm Ø x 40mm Tox with Screw	1	box		
	Miscellaneous and Consumables				
	400cc Solvent Cement	10	can		
	Electrical Tape	10	roll		
	G.I. Tie Wire (for Cable Pulling)	2	kg		
	Masking Tape	6	roll		
	Pulling Lubricant	3	can		
	Rubber Tape	5	roll		
				Materials Cost	P
				Labor Cost	
				Direct Cost	P
	Fire Detection and Alarm System (FDAS)				
	Pipes and Fittings				
	20mm Ø EMT Pipe	65	piece	P	P
	20mm Ø EMT Elbow	20	piece		
	20mm Ø EMT Coupling, Set Screw Type	33	piece		
	50mm x 100mm Metal Utility Box	38	piece		
	100mm x 100mm Metal Junction Box with Cover	34	piece		
	Wires and Cables				
	1.25mm² TF Wire	3	roll		
	Fixtures and Devices				
	Fire Alarm Bell with Strobe Light, 150mm Ø	3	unit		
	Fire Alarm Control Panel (4 Zones)	1	unit		
	Heat Detector	3	unit		
	Manual Pull Station	3	unit		
	Smoke Detector	28	unit		
	Pipe Hangers and Supports				
	Support for Horizontal Pipelines	195	lm		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Miscellaneous and Consumables				
	Electrical Tape	3	roll		
	G.I. Tie Wire (for Cable Pulling)	1	kg		
	Hacksaw Blade	3	piece		
	Masking Tape	2	roll		
	Masonry Drill Bit	2	piece		
	Metal Drill Bit	2	piece		
	Rubber Tape	2	roll		
				Materials Cost	P
				Labor Cost	
				Direct Cost	P
				Materials Cost II F	P
				Labor Cost II F	
				Direct Cost II F	P

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
G	MECHANICAL WORKS (COLUMBARIUM BUILDING)				
	Refrigerant Pipe System				
	6mm Ø Copper Coil Tubing	72	l.m.	P	P
	10mm Ø Copper Coil Tubing	66	l.m.		
	16mm Ø Copper Coil Tubing	123	l.m.		
	20mm Ø Copper Coil Tubing	15	l.m.		
	6mm Ø x 20mm thick Rubber Foam Insulation	72	l.m.		
	10mm Ø x 20mm thick Rubber Foam Insulation	66	l.m.		
	16mm Ø x 20mm thick Rubber Foam Insulation	123	l.m.		
	20mm Ø x 20mm thick Rubber Foam Insulation	15	l.m.		
	Condensate Water Drainage System				
	32mm Ø x 3m uPVC Pipe	37	piece		
	32mm Ø x 12mm thick Rubber Foam Insulation	110	l.m.		
	Ventilation System				
	150mm Ø PVC Pipe	9	piece		
	150mm Ø Air Vent Cap	6	piece		
	300mm x 300mm Rectangular Duct	10	l.m.		
	300mm x 300mm Transfer Air Grille	4	piece		
	300mm Ø Volume Control Damper	2	piece		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
	Equipment and Accessories				
	EF 1 - Ceiling Mounted Exhaust Fan, 150cmh, 230V / 1φ / 60Hz	4	unit	P	P
	EF 2 - Ceiling Mounted Exhaust Fan, 520cmh, 230V / 1φ / 60Hz	2	unit		
				Equipment Cost	P
				Labor Cost	
				Subtotal	P
	SAC 1 - Floor-mounted Air Conditioning Unit, 5.0TR (60,000BTUH), 9.52mm Ø Liquid, 19.05mm Ø Gas & 32mm Ø Drain Pipes 5.57kW, 230V / 3φ / 60Hz	1	unit	P	P
	SAC 2 - Ceiling-mounted Air Conditioning Unit, 3.0TR (36,000BTUH), 9.52mm Ø Liquid, 15.88mm Ø Gas & 32mm Ø Drain Pipes 3.2kW, 230V / 1φ / 60Hz	4	unit		
	SAC 3 - Wall-mounted Air Conditioning Unit, 2.0TR (24,000BTUH) 6.35mm Ø Liquid, 15.88mm Ø Gas & 32mm Ø Drain Pipes 2.1kW, 230V / 1φ / 60Hz	6	unit		
				Equipment Cost	P
	Labor Cost with Technical Supervision				
				Subtotal	P
	Pipe Hangers and Supports				
	Condensate Water Drainage System Support	111	l.m.	P	P
	Refrigerant Pipe System Support	138	l.m.		
	ACCU Support	11	unit		
	Vibration Isolator	44	piece		
	Miscellaneous & Consumables				

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	400cc Solvent Cement	10	can		
	25mm wide x 50m long Polyethylene Tape	30	roll		
	50mm x 10m Duct Tape	25	rolll		
	Brazing Rod (10pcs/box)	10	box		
	Waste Cloth	10	kg		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
				Materials Cost II G	P
				Labor Cost II G	
				Direct Cost II G	P

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
H	FIRE PROTECTION WORKS (COLUMBARIUM BUILDING)				
	Fire Sprinkler System				
	Pipes and Fittings				
	25mm Ø B.I. Pipe, Schedule 40	32	piece	P	P
	32mm Ø B.I. Pipe, Schedule 40	13	piece		
	40mm Ø B.I. Pipe, Schedule 40	11	piece		
	50mm Ø B.I. Pipe, Schedule 40	5	piece		
	65mm Ø B.I. Pipe, Schedule 40	5	piece		
	25mm Ø x 25mm Ø 90° B.I. Elbow, Threaded	92	piece		
	32mm Ø x 32mm Ø 90° B.I. Elbow, Threaded	2	piece		
	40mm Ø x 40mm Ø 90° B.I. Elbow, Threaded	7	piece		
	25mm Ø x 25mm Ø x 25mm Ø B.I. Tee, Threaded	42	piece		
	32mm Ø x 32mm Ø x 25mm Ø B.I. Tee, Threaded	26	piece		
	32mm Ø x 32mm Ø x 32mm Ø B.I. Tee, Threaded	4	piece		
	40mm Ø x 40mm Ø x 25mm Ø B.I. Tee, Threaded	8	piece		
	40mm Ø x 40mm Ø x 40mm Ø B.I. Tee, Threaded	13	piece		
	25mm Ø x 12mm Ø B.I. Reducer, Threaded	95	piece		
	32mm Ø x 25mm Ø B.I. Reducer, Threaded	21	piece		
	40mm Ø x 25mm Ø B.I. Reducer, Threaded	13	piece		
	40mm Ø x 32mm Ø B.I. Reducer, Threaded	14	piece		
	32mm Ø B.I. Threadolet, Threaded	3	piece		
	40mm Ø B.I. Threadolet, Threaded	13	piece		
	40mm Ø B.I. End Cap, Threaded	4	piece		
	13mm Ø B.I. Plug, Threaded	95	piece		
	Valves and Appurtenances				
	25mm Ø Inspector's Test Connection	2	piece		
	25mm Ø Globe Valve	2	piece		
	Fixtures & Accessories				
	Fire Extinguisher	1	unit		
	Fire Hose Cabinet	2	set		
	Fire Sprinkler Head				
	13mm Ø Pendent-type Fire Sprinkler Head, 68°C	75	piece		
	13mm Ø Pendent-type Fire Sprinkler Head, 93°C	4	piece		
	13mm Ø Sidewall-type Fire Sprinkler Head, 68°C	16	piece		
	Floor Control Assembly				
	Pipes and Fittings				
	25mm Ø B.I. Pipe, Schedule 40	2	piece		
	50mm Ø B.I. Pipe, Schedule 40	2	piece		
	65mm Ø B.I. Pipe, Schedule 40	2	piece		
	100mm Ø B.I. Pipe, Schedule 40	2	piece		
	50mm Ø B.I. Slip-on-Flange	4	piece		
	65mm Ø B.I. Slip-on-Flange	14	piece		
	100mm Ø B.I. Slip-on-Flange	2	piece		
	100mm Ø x 65mm Ø B.I. Tee, Weldable	2	piece		
	25mm Ø x 25mm Ø B.I. Tee, Threaded	4	piece		
	25mm Ø 90° B.I. Elbow, Threaded	4	piece		
	25mm Ø B.I. Threadolet, Threaded	4	piece		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	25mm Ø B.I. Union Patente, Threaded	2	piece		
	Valves and Appurtenances				
	25mm Ø Sight Glass	2	piece		
	25mm Ø Inspector Test Connection	2	piece		
	25mm Ø Globe Valve	2	piece		
	65mm Ø Flow Switch	2	piece		
	300psi Pressure Gauge	2	piece		
	100mm Ø Victaulic Coupling	2	piece		
	65mm Ø OS & Y Gate Valve	2	piece		
	Fire Pump Assembly				
	Pipes and Fittings				
	25mm Ø B.I. Pipe, Schedule 40	1	piece		
	40mm Ø B.I. Pipe, Schedule 40	1	piece		
	100mm Ø B.I. Pipe, Schedule 40	14	piece		
	100mm Ø x 100mm Ø B.I. Tee, Weldable	2	piece		
	100mm Ø B.I. 90° Elbow, Weldable	7	piece		
	100mm Ø B.I. Slip-on-Flange	12	piece		
	25mm Ø 90° B.I. Elbow, Threaded	7	piece		
	50mm Ø 90° B.I. Elbow, Threaded	2	piece		
	25mm Ø B.I. Thredolet, Threaded	2	piece		
	25mm Ø B.I. Union Patente, Threaded	1	piece		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Valves and Appurtenances				
	25mm Ø Inspector's Test Connection	1	piece		
	100mm Ø Check Valve	1	piece		
	100mm Ø Alarm Check Valve	1	piece		
	100mm Ø Flow Switch	1	piece		
	100mm Ø Victaulic Coupling	1	piece		
	100mm Ø OS & Y Gate Valve	2	piece		
	300psi Pressure Gauge	2	piece		
	750gpm Flow Meter	1	piece		
	Fixtures				
	Fire Department Connection	2	set		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
	Equipment and Accessories				
	FP 1 - Fire Pump, 500gpm, 85.0psi, 40.0hp, 230V / 3φ / 60Hz	1	unit	P	P
	JP 1 - Jockey Pump, 25gpm, 85.0psi, 5.0hp, 230V / 3φ / 60Hz	1	unit		
				Equipment Cost	P
	Labor Cost with Technical Supervision				
				Subtotal	P
	Pipe Hangers and Supports				
	Hangers for 25mm Ø B.I. Pipe	192	l.m.	P	P
	Hangers for 40mm Ø B.I. Pipe	144	l.m.		
	Hangers for 50mm Ø B.I. Pipe	30	l.m.		
	Hangers for 65mm Ø B.I. Pipe	42	l.m.		
	Hangers for 100mm Ø B.I. Pipe	34	l.m.		
	Support for Vertical Pipes	77	l.m.		
	Miscellaneous & Consumables				
	20mm Ø Metal Drill Bit	20	piece		
	Hacksaw Blade	30	piece		
	Rubber Gasket	4	lm		
	Special Purpose Sealant	10	tube		
	Teflon Tape	89	roll		
	Threading Oil	10	gal		
	Waste Cloth	15	kg		
	Welding Rod	10	box		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
				Materials Cost II H	P
				Labor Cost II H	
				Direct Cost II H	P
I	UTILITIES & ANCILLARY WORKS (COLUMBARIUM BUILDING)				
	Equipment and Accessories				
	Booster Pump, 5.0hp, 100ft Dynamic Head, 230V/3φ/60Hz	2	unit	P	P
	Pressure Tank, Stainless Steel, 500gal with Complete Accessories	1	unit		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
				Equipment Cost II I	P
	Labor Cost with Technical Supervision II I				
				Direct Cost II I	P
				Materials Cost II	P
				Labor Cost II	P
				Direct Cost II	P

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
III	CONSTRUCTION OF MORGUE BUILDING				
A	SITE WORKS (MORGUE BUILDING)				
	Site Clearing and Preparation	165	sq.m.	P	P
	Layout and Staking	165	sq.m.		
	Excavation for Structures				
	Footing	46	cu.m.		
	Wall Footing	26	cu.m.		
	Slab-on-Fill	19	cu.m.		
	Septic Tank	9	cu.m.		
	Soil Treatment	174	sq.m.	P	
	Gravel Bedding	17	cu.m.		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
	Backfill and Compaction	46	cu.m.	P 455.00	P
				Subtotal	P
				Materials Cost III A	P
				Labor Cost III A	
				Direct Cost III A	P
B	CIVIL WORKS / STRUCTURAL WORKS (MORGUE BUILDING)				
	Concrete Works				
	Ready Mix Concrete, 28MPa, 3/4" Gravel, 28days				
	Footing	14	cu.m.	P	P
	Column	10	cu.m.		
	Beam	29	cu.m.		
	Suspended Slab	24	cu.m.		
	Ready Mix Concrete, 21MPa, 3/4" Gravel, 28days				
	Wall Footing	10	cu.m.		
	Slab-on-Fill	19	cu.m.		
	Ramp	2	cu.m.		
	Septic Tank	4	cu.m.		
	Reinforcing Steel Bar				
	Grade 40 Reinforcing Steel Bar including G.I. Tie Wire Ga. 16				
	10mm Ø Reinforcing Steel Bar				
	Wall Footing	160	kg		
	Column (Ties)	928	kg		
	Slab on Fill	472	kg		
	Beam (Stirrups)	575	kg		
	Suspended Slab	4,471	kg		
	Ramp	242	kg		
	Septic Tank	126	kg		
	12mm Ø Reinforcing Steel Bar				
	Wall Footing	202	kg		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Column	197	kg		
	Septic Tank	377	kg		
	Suspended Slab	2,120	kg		
	Grade 60 Reinforcing Steel Bar including G.I. Tie Wire Ga. 16				
	16mm Ø Reinforcing Steel Bar				
	Footing	878	kg		
	Column	1,336	kg		
	Beam (Main Bars)	2,010	kg		
	Formworks				
	Footing	22	sq.m.		
	Wall Footing	59	sq.m.		
	Column	94	sq.m.		
	Beam	90	sq.m.		
	Suspended Slab	118	sq.m.		
	Ramp	14	sq.m.		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Scaffolding and Shoring				
	Column	160	l.m.		
	Beam	243	l.m.		
	Suspended Slab	152	sq.m.		
	Masonry Works				
	100mm CHB Laying including Mortar, Reinforcement and Two-Face Plastering	155	sq.m.		
	150mm CHB Laying including Mortar, Reinforcement and Two-Face Plastering	155	sq.m.		
	Plastering of Doors and Windows Opening	108	l.m.		
	Thermal and Moisture Protection				
	Vapor Barrier	174	sq.m.		
	Cementitious Flexible Type Waterproofing	255	sq.m.		
				Materials Cost III B	P
				Labor Cost III B	
				Direct Cost III B	P
C	ARCHITECTURAL WORKS (MORGUE BUILDING)				
	Floor Finishes				
	300mm x 300mm Homogenous Porcelain Tiles	55	sq.m.	P	P
	with 300mm x 600mm Border Porcelain Tiles				
	600mm x 600mm Homogenous Porcelain Tiles Polished	85	sq.m.		
	300mm x 600mm Non-Skid Homogenous Tiles with Grooves	15	sq.m.		
	Floor Topping for Preparation of Tile Works	155	sq.m.		
	Plain Cement Painted Finish (Slab)	559	sq.m.		
	12mm Groove Line (Ramp)	35	l.m.		
	Wall Partiioning and Finishes				
	300mm x 600mm Homogenous Wall Tiles	37	sq.m.		
	20mm thick Granite Slab Countertop	2	sq.m.		
	Marine Plywood Cabinet Door, Painted Finish	4	l.m.		
	Ceiling Finishes				
	10mm thick Gypsum Board on Metal Framing	66	sq.m.		
	12mm thick Moisture Resistant Gypsum Board on Metal Framing	15	sq.m.		
	600mm x 600mm Acoustic Panel Board on Metal Framing	20	sq.m.		
	Rubbed Finishing Preparation for Slab Soffit	72	sq.m.		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
	Installation of Doors				
	Doors				
	D1 - 1.7m x 2.738m Powder Coated (Light Color) Aluminum Frame Double Leaf Glass Door with Fixed Glass Transom with Complete Accessories	1	set	P	P
	D2 - 1.0m x 2.1m Painted Wood Panel Door with Louvers	1	set		
	D3 - 0.8m x 2.1m Painted Solid Wood Panel Doors with Fixed Glass Panel	2	set		
	D4 - 0.7m x 2.1m Painted Wood Panel Door with Louvers	1	set		
	D5 - 0.6m x 2.1m Painted Wood Panel Door with Louvers	1	set		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	D6 - 0.8m x 2.1m Painted Solid Wood Panel Door with Fixed Glass Panel	3	set		
	D7 - 1.0m x 2.1m Painted Solid Wood Panel Door with Fixed Glass Panel	1	set		
	D8 - 1.7m x 2.1m Painted Metal Door with Painted Metal Jambs	2	set		
	Hardware and Accessories				
	Door Jamb				
	D2 - 1.0m x 2.1m Wooden Door Jamb	1	set		
	D3 - 0.8m x 2.1m Wooden Door Jamb	2	set		
	D4 - 0.7m x 2.1m Wooden Door Jamb	1	set		
	D5 - 0.6m x 2.1m Wooden Door Jamb	1	set		
	D6 - 0.8m x 2.1m Wooden Door Jamb	3	set		
	D7 - 1.0m x 2.1m Wooden Door Jamb	1	set		
	D8 - 1.7m x 2.1m Metal Door Jamb	2	set		
	Door Hinge, Heavy Duty	27	piece		
	Door Knob , Lever Type	9	piece		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Installation of Windows				
	W1 - 1.0m x 1.9m Casement Glass Window on Powder Coated (Light Color) Aluminum Frame with 12mm Square Bar Grilles	3	set		
	W2 - 1.2 x 0.6m Casement Glass Window on Powder Coated (Light Color) Aluminum Frame with Complete Accessories	1	set		
	W3 - 1.8m x 0.6m Casement Glass Window on Powder Coated (Light Color) Aluminum Frame with Complete Accessories	2	set		
	W4 - 2.4m x 0.6m Casement Glass Window on Powder Coated (Light Color) Aluminum Frame with Complete Accessories	1	set		
	W5 - 2.4m x 0.6m Casement Glass Window on Powder Coated (Light Color) Aluminum Frame with Complete Accessories	1	set		
				Labor Cost	
				Subtotal	P
	Painting Works				
	Flat Latex Paint Finish (Ceiling)	81	sq.m.	P	P
	Flat Latex Paint Finish (Interior Walls)	412	sq.m.		
	Glossy Paint Finish	446	sq.m.		
	Red Epoxy Primer (Electrical Works)	10	sq.m.		
	Textured Paint Finish (Exterior Walls)	105	sq.m.		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
				Materials Cost III C	P
				Labor Cost III C	
				Direct Cost III C	P
D	SANITARY AND PLUMBING WORKS (MORGUE BUILDING)				
	Sewer Line System				
	50mm Ø PVC Standard Hub Pipe	17	piece	P	P
	75mm Ø PVC Standard Hub Pipe	1	piece		
	100mm Ø PVC Standard Hub Pipe	12	piece		
	100mm Ø x 50mm Ø PVC Wye	11	piece		
	100mm Ø x 75mm Ø PVC Wye	2	piece		
	100mm Ø x 100mm Ø PVC Wye	4	piece		
	50mm Ø x 50mm Ø PVC Tee	12	piece		
	75mm Ø x 75mm Ø PVC Tee	2	piece		
	100mm Ø x 100mm Ø PVC Tee	4	piece		
	50mm Ø x 50mm Ø PVC 1/4 Bend	3	piece		
	100mm Ø x 100mm Ø PVC 1/4 Bend	9	piece		
	50mm Ø x 50mm Ø PVC 1/8 Bend	11	piece		
	75mm Ø x 75mm Ø PVC 1/8 Bend	2	piece		
	100mm Ø x 100mm Ø PVC 1/8 Bend	4	piece		
	75mm Ø x 50mm Ø PVC Reducer	2	piece		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	100mm Ø PVC Cleanout	9	piece		
	50mm Ø PVC P-Trap	10	piece		
	50mm Ø PVC Coupling	6	piece		
	75mm Ø PVC Coupling	1	piece		
	100mm Ø PVC Coupling	4	piece		
	Storm Drainage System				
	75mm Ø PVC Standard Hub Pipe	19	piece		
	75mm Ø x 75mm Ø PVC Tee	4	piece		
	75mm Ø x 75mm Ø PVC Wye	7	piece		
	75mm Ø x 75mm Ø PVC 1/4 Bend	10	piece		
	75mm Ø x 75mm Ø PVC 1/8 Bend	127	piece		
	75mm Ø PVC P-Trap	8	piece		
	75mm Ø PVC Coupling	6	piece		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Water Line System				
	20mm Ø PPR Pipe, PN 16	6	piece		
	32mm Ø PPR Pipe, PN 16	1	piece		
	40mm Ø PPR Pipe, PN 16	2	piece		
	20mm Ø x 20mm Ø PPR Tee Equal	5	piece		
	40mm Ø x 20mm Ø PPR Tee Unequal	2	piece		
	32mm Ø x 20mm Ø PPR Reducer	1	piece		
	40mm Ø x 32mm Ø PPR Reducer	1	piece		
	20mm Ø PPR 90° Elbow	5	piece		
	32mm Ø PPR 90° Elbow	1	piece		
	20mm Ø x 15mm Ø PPR Female Threaded Tee	8	piece		
	20mm Ø PPR End Cap	8	piece		
	20mm Ø PPR Union Patente	4	piece		
	32mm Ø PPR Union Patente	1	piece		
	20mm Ø PPR Coupling	3	piece		
	32mm Ø PPR Coupling	1	piece		
	40mm Ø PPR Coupling	1	piece		
	20mm Ø PPR Male Adaptor	8	piece		
	32mm Ø PPR Male Adaptor	2	piece		
	Valves and Appurtenances				
	20mm Ø PPR Gate Valve	4	piece		
	32mm Ø PPR Gate Valve	1	piece		
	Fixtures				
	Bidet with Accessories, Stainless Steel	2	unit		
	Flexible Hose	7	unit		
	Grease Trap, 5gpm	3	set		
	Kitchen Sink Faucet, (Water Efficient)	3	unit		
	Kitchen Sink, Single Tub	3	set		
	Lavatory Faucet, Lever Type	2	unit		
	Lavatory, Wall Hung	2	set		
	Urinal, Flush Valve, (Water Efficient)	1	set		
	Water Closet, Tank Type , (Water Efficient)	2	set		
	Accessories				
	Angle Valve, Single-Way	5	unit		
	Angle Valve, Two-Way	2	unit		
	Floor Drain, 50mm x 50mm	5	unit		
	Deck Drain, 75mm Ø , Dome Type	8	unit		
	Facial Mirror	1	sq.m.		
	Soap Dispenser	2	unit		
	Tissue Holder, Stainless	2	unit		
	Pipe Hangers and Supports				
	For horizontal pipes greater than 50mm Ø, 1m interval	38	l.m.		
	Downspout Brackets	6	l.m.		
	Miscellaneous and Consumables				
	400cc Solvent Cement	19	can		
	1000cc All Around Sealant	2	can		
	Hacksaw Blade	19	piece		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Teflon Tape	19	roll		
	Waste Cloth	19	kg		
				Materials Cost III D	P
				Labor Cost III D	
				Direct Cost III D	P
E	ELECTRICAL WORKS (MORGUE BUILDING)				
	Pipes and Fittings				
	20mm Ø PVC Pipe	255	piece	P	P
	65mm Ø PVC Pipe	6	piece		
	20mm Ø PVC Adaptor	222	piece		
	20mm Ø PVC Locknut and Bushing	222	pair		
	20mm Ø PVC Elbow	100	piece		
	65mm Ø PVC Adaptor	2	piece		
	65mm Ø PVC Locknut and Bushing	12	pair		
	65mm Ø PVC Elbow	2	piece		
	16mm Ø x 3000mm Grounding Rod (Copper Clod) with Ground Clamp	1	piece		
	50mm x 100mm PVC Utility Box	31	piece		
	100mm x 100mm PVC Junction Box With Cover	80	piece		
	20mm Ø Metallic Conduit	51	l.m.		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Wires and Cables				
	3.5mm² THHN Wire	10	roll		
	5.5mm² THHN Wire	120	l.m.		
	8.0mm² THHN Wire	40	l.m.		
	80.0mm² THHN Wire	54	l.m.		
	2.0mm² TW Wire	5	roll		
	3.5mm² TW Wire	60	l.m.		
	5.5mm² TW Wire	20	l.m.		
	22.0mm² TW Wire	18	l.m.		
	Lighting Fixtures (Energy Efficient)				
	T8, 10W LED Tube Light	48	piece		
	600mm x 600mm Troffer Fixture Double Recessed Type with Complete Accessories	24	piece		
	40W , Pendant Light	3	piece		
	12W, LED Cylindrical Wall Light	16	piece		
	100mm x 100mm Super Flat LED Pinlight	1	piece		
	150mm x 150mm Super Flat LED Pinlight	34	piece		
	9W , Emergency Light, Twinhead	2	piece		
	Wiring Devices and Other Fixtures				
	Outlet with Grounding, One Gang, for Hand Dryer	3	piece		
	Outlet with Grounding, One-gang for ACU	2	piece		
	Outlet with Grounding, One-gang	2	piece		
	Outlet with Grounding, Two-gang	14	piece		
	Switch, with Plate & Cover , One-gang	7	piece		
	Switch, with Plate & Cover , Two-gang	2	piece		
	Switch, with Plate & Cover , Three-gang	1	piece		
	Panel Board				
	LPP B (Lighting and Power Panel B) Main: 200AT/200AF, 3P, 35KAIC @ 240V MCCB Branches: 3 - 40AT, 2P, Bolt-On 8 - 30AT, 2P, Bolt-On 7 - 20AT, 2P, Bolt-On Enclosure: NEMA 1 with Ground Terminals	1	assy		
	ECB (Enclosed Circuit Breaker)				
	30AT, 2P, NEMA 3R	7	assy		
	40AT, 2P, NEMA 3R	3	assy		
	Pipe Hangers and Supports				
	Horizontal Layout of Pipe	10	l.m.		
	Vertical Layout of Pipe	5	l.m.		
	Miscellaneous & Consumables				
	400cc Solvent Cement	2	can		
	1000cc All Around Sealant	1	can		
	Electrical Tape	15	roll		
	Hacksaw Blade	2	piece		
	Masking Tape	3	roll		
	Pulling Lubricant	1	gal		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Rubber Tape	5	roll		
	Tie Wire, Ga.16 (for cable pulling)	5	kg		
	Torch with Butane	2	set		
				Materials Cost III E	P
				Labor Cost III E	
				Direct Cost III E	P
F	AUXILIARY WORKS (MORGUE BUILDING)				
	Telephone (Voice) and Data System				
	Pipes and Fittings				
	20mm Ø PVC Pipe	28	piece		
	20mm Ø PVC Adaptor	14	piece		
	20mm Ø PVC Locknut	16	piece		
	50mm x 100mm PVC Utility Box	4	piece		
	100mm x 100mm PVC Octagonal Box with Cover	4	piece		
	118mm PVC Square Box	1	piece		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Wires and Cables				
	UTP Cat-6 Cable, 4 pairs	2	roll		
	1m UTP Cat-6 Patch Cord	4	piece		
	8.0mm² THW Wire (Grounding Wire)	10	lm		
	Fixtures and Devices				
	Universal LAN Outlet, Duplex (2-device)	4	piece		
	Pipe Hangers and Supports				
	Beam Clamp	16	piece		
	Rigid Steel Strap	18	piece		
	Strut Clamp	14	piece		
	3m Cable Trays and Metal Cabinets Ground Strap	2	piece		
	Telecom Backboard	1	piece		
	Miscellaneous and Consumables				
	400cc Solvent Cement	5	can		
	6mm Ø x 40mm Tox with Screw	1	box		
	25mm Ø x 40mm Tox with Screw	1	box		
	Electrical Tape	3	roll		
	G.I. Tie Wire (for Cable Pulling)	1	kg		
	Hacksaw Blade	3	piece		
	Masking Tape	3	roll		
	Pulling Lubricant	1	can		
	Rubber Tape	3	roll		
	Waste Cloth	2	kg		
				Materials Cost	P
				Labor Cost	
				Direct Cost	P
	Closed Circuit Television (CCTV) System				
	Pipes and Fittings				
	20mm Ø PVC Pipe	6	piece	P	P
	20mm Ø PVC Adaptor	3	piece		
	20mm Ø PVC Locknut	7	piece		
	20mm Ø Flexible Metallic Conduit	4	l.m.		
	20mm Ø Straight Connector with Locknut	2	piece		
	100mm x 100mm Metal Junction Box with Cover	3	piece		
	118mm PVC Square Box	1	piece		
	Wires and Cables				
	UTP Cat-6 Cable	1	roll		
	HDMI Cable	8	l.m.		
	Video Balun UTP Cat-6 Connector	4	pair		
	12V DC Male & Female Power Balun Connector	4	pair		
	Fixtures and Devices				
	HD Bullet Camera (Vandal Resistant), Outdoor type	3	unit		
	HD Dome Camera (Day/Night), Indoor Type	1	unit		
	HD Digital Video Recorder (DVR), 16-channel with DVD Burner	1	unit		
	DVD Security Lock Box, Low Profile	1	unit		
	Multi-Function Keyboard Controller	1	unit		
	32" LED Monitor	1	set		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	UPS, 1000VA ≥ 5mins "on-line"	1	set		
	12V DC Power Adapter	1	pc		
	12V DC 1 Female to 8 Male Power Splitter	1	pc		
	Pipe Hangers and Supports				
	Rigid Steel Strap	9	piece		
	Strut Clamp	9	piece		
	6mm Ø x 40mm Tox with Screw	1	box		
	25mm Ø x 40mm Tox with Screw	1	box		
	Miscellaneous and Consumables				
	400cc Solvent Cement	10	can		
	Electrical Tape	5	roll		
	G.I. Tie Wire (for Cable Pulling)	2	kg		
	Masking Tape	3	roll		
	Pulling Lubricant	2	can		
	Rubber Tape	3	roll		
				Materials Cost	P
				Labor Cost	
				Direct Cost	P

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Fire Detection and Alarm System (FDAS)				
	Pipes and Fittings				
	20mm Ø EMT Pipe	17	piece	P	P
	20mm Ø EMT Elbow	20	piece		
	20mm Ø EMT Coupling, Set Screw Type	9	piece		
	50mm x 100mm Metal Utility Box	6	piece		
	100mm x 100mm Metal Junction Box with Cover	10	piece		
	Wires and Cables				
	1.25mm² TF Wire	1	roll		
	Fixtures and Devices				
	Fire Alarm Bell with Strobe Light, 150mm Ø	3	unit		
	Fire Alarm Control Panel (4 Zones)	1	unit		
	Manual Pull Station	3	unit		
	Smoke Detector	7	unit		
	Pipe Hangers and Supports				
	Support for Horizontal Pipelines	51	l.m.		
	Miscellaneous and Consumables				
	Electrical Tape	3	roll		
	G.I. Tie Wire (for Cable Pulling)	1	kg		
	Hacksaw Blade	3	piece		
	Masking Tape	2	roll		
	Masonry Drill Bit	2	piece		
	Metal Drill Bit	2	piece		
	Rubber Tape	2	roll		
				Materials Cost	P
				Labor Cost	
				Direct Cost	P
				Materials Cost III F	P
				Labor Cost III F	
				Direct Cost III F	P
G	MECHANICAL WORKS (MORGUE BUILDING)				
	Refrigerant Pipe System				
	10mm Ø Copper Coil Tubing	8	l.m.	P	P
	16mm Ø Copper Coil Tubing	8	l.m.		
	10mm Ø x 20mm thick Rubber Foam Insulation	8	l.m.		
	16mm Ø x 20mm thick Rubber Foam Insulation	8	l.m.		
	Condensate Water Drainage System				
	32mm Ø x 3m uPVC Pipe	4	piece		
	32mm Ø x 12mm thick Rubber Foam Insulation	10	l.m.		
	Ventilation System				
	150mm Ø PVC Pipe	2	piece		
	150mm Ø Air Vent Cap	2	piece		
	300mm x 300mm Rectangular Duct	10	l.m.		
	300mm x 300mm Transfer Air Grille	2	piece		
	300mm Ø Volume Control Damper	1	piece		
				Materials Cost	P

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
				Labor Cost	
				Subtotal	P
	Equipment and Accessories				
	WAC 1 - 1.0hp, 928W, 230V / 1ϕ / 60Hz	2	unit		
	CF 1 - Ceiling Fan, 0.50cms, 100W, 230V / 1ϕ / 60Hz	1	unit		
	EF 1 - Ceiling Mounted Exhaust Fan, 150cmh, 230V / 1ϕ / 60Hz	2	unit		
				Equipment Cost	P
				Labor Cost	
				Subtotal	P
	SAC 2 - Ceiling Cassette Air Conditioning Unit, 3.0TR (36000BTUH), 9.52mm Ø Liquid, 15.88mm Ø Gas & 32mm Ø Drain Pipes 2.94kW, 230V / 1ϕ / 60Hz	1	unit	P	P
				Equipment Cost	P
	Labor Cost with Technical Supervision				
				Subtotal	P

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Pipe Hangers and Supports				
	Condensate Water Drainage System Support	10	l.m.	P	P
	Refrigerant Pipe System Support	8	l.m.		
	ACCU Support	1	unit		
	Vibration Isolator	4	piece		
	Miscellaneous & Consumables				
	400cc Solvent Cement	3	can		
	25mm wide x 50m long Polyethylene Tape	6	roll		
	50mm x 10m Duct Tape	5	roll		
	Brazing Rod (10pcs/box)	1	box		
	Fire Extinguisher	1	piece		
	Waste Cloth	3	kg		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
				Materials Cost III G	P
				Labor Cost III G	
				Direct Cost III G	P
				Materials Cost III	P
				Labor Cost III	P
				Direct Cost III	P
IV	CONSTRUCTION OF ADMIN BUILDING				
A	SITE WORKS (ADMIN BUILDING)				
	Site Clearing and Preparation	159	sq.m.	P	P
	Layout and Staking	159	sq.m.		
	Excavation for Structures				
	Footing	82	cu.m.		
	Wall Footing	30	cu.m.		
	Slab-on-Fill	16	cu.m.		
	Septic Tank	32	cu.m.		
				Subtotal	P
	Soil Treatment	157	sq.m.	P	P
	Gravel Bedding	18	cu.m.		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
	Backfill and Compaction	111	cu.m.	P	P
				Subtotal	P
				Materials Cost IV A	P
				Labor Cost IV A	
				Direct Cost IV A	P
B	CIVIL WORKS / STRUCTURAL WORKS (ADMIN BUILDING)				

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Concrete Works				
	Ready Mix Concrete, 28MPa, 3/4" Gravel, 28days				
	Footing	16	cu.m.	P	P
	Column	10	cu.m.		
	Beam	28	cu.m.		
	Suspended Slab	29	cu.m.		
	Ready Mix Concrete, 21MPa, 3/4" Gravel, 28days				
	Wall Footing	11	cu.m.		
	Stairs	3	cu.m.		
	Slab-on-Fill	16	cu.m.		
	Septic Tank	8	cu.m.		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Reinforcing Steel Bar				
	Grade 40 Reinforcing Steel Bar including G.I. Tie Wire Ga. 16				
	10mm Ø Reinforcing Steel Bar				
	Wall Footing	137	kg		
	Column (Ties)	829	kg		
	Slab on Fill	417	kg		
	Beam (Stirrups)	1,088	kg		
	Suspended Slab	3,751	kg		
	Stairs	66	kg		
	Septic Tank	150	kg		
	12mm Ø Reinforcing Steel Bar				
	Wall Footing	241	kg		
	Septic Tank	533	kg		
	Suspended Slab	4,909	kg		
	Stairs	381	kg		
	Grade 60 Reinforcing Steel Bar including G.I. Tie Wire Ga. 16				
	16mm Ø Reinforcing Steel Bar				
	Footing	948	kg		
	Column	1,455	kg		
	Beam (Main Bars)	2,229	kg		
	Formworks				
	Footing	119	sq.m.		
	Column	81	sq.m.		
	Beam	81	sq.m.		
	Suspended Slab	109	sq.m.		
	Stairs	19	sq.m.		
	Scaffolding and Shoring				
	Column	150	l.m.		
	Beam	212	l.m.		
	Suspended Slab	109	sq.m.		
	Stairs	17	sq.m.		
	Masonry Works				
	100mm CHB Laying including Mortar, Reinforcement and Two-Face Plastering	202	sq.m.		
	150mm CHB Laying including Mortar, Reinforcement and Two-Face Plastering	277	sq.m.		
	Plastering of Doors and Windows Opening	220	l.m.		
	Thermal and Moisture Protection				
	Vapor Barrier	230	sq.m.		
	Cementitious Flexible Type Waterproofing	128	sq.m.		
				Materials Cost IV B	P
				Labor Cost IV B	
				Direct Cost IV B	P
C	ARCHITECTURAL WORKS (ADMIN BUILDING)				
	Floor Finishes				
	300mm x300 mm Homogenous Porcelain Tiles with 300mm x 600mm Border Porcelain Tiles	25	sq.m.	P	P

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	300mm x 600mm Non-Skid Homogenous Tiles with Grooves	10	sq.m.		
	600mm x 600mm Homogenous Porcelain Tiles Polished	164	sq.m.		
	300mm x 600mm Homogenous Porcelain Tiles with Grooves	22	sq.m.		
	Rubber Nosing	29	sq.m.		
	Floor Topping for Preparation of Tile Works	268	sq.m.		
	Wall Partitioning and Finishes				
	300mm x 600mm Ceramic Wall Tiles	44	sq.m.		
	20mm thick Granite Slab Countertop	3	sq.m.		
	Ceiling Finishes				
	10mm thick Gypsum Board on Metal Framing	86	sq.m.		
	12mm thick Moisture Resistant Gypsum Board on Metal Framing	20	sq.m.		
	600mm x 600mm Acoustic Panel Board on Metal Framing	67	sq.m.		
				Materials Cost	P
				Labor Cost	
				Subtotal	P

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Installation of Doors				
	Doors				
	D1 - 1.6m x 2.75m Double Leaf Glass Door with Fixed Transom on Powder Coated (Light Color) Aluminum Frame with Complete Accessories	1	set	P	P
	D2 - 0.8m x 2.1m Painted Wood Panel Door	2	set		
	D3 - 0.8m x 2.1m Painted Wood Panel Door	4	set		
	D4 - 0.8m x 2.1m Painted Wood Panel Door with Louvers	1	set		
	D5 - 1.0m x 2.1m Painted Wood Panel Door with Louvers	1	set		
	D6 - 0.8m 2.1m Single Leaf Glass Door on Powder Coated (Light Color) Aluminum Frame with Complete Accessories	1	set		
	Hardwares and Accessories				
	Door Jamb				
	D2 - 0.8m x 2.1m Wooden Door Jamb	2	set		
	D3 - 0.8m x 2.1m Wooden Door Jamb	4	set		
	D4 - 0.8m x 2.1m Wooden Door Jamb	1	set		
	D5 - 1.0m x 2.1m Wooden Door Jamb	1	set		
	Door Hinge, Heavy Duty	24	piece		
	Door Knob , Lever Type	8	piece		
	Installation of Windows				
	W1 - 1.0m x 1.9m Casement Windows on Powder Coated (Light Color) Aluminum Frame with 12mm Square Bar Grilles	11	set		
	W2 - 1.0m x 1.5m Casement Window on Powder Coated (Light Color) Aluminum Frame with 12mm Square Bar Grilles	1	set		
	W3 - 1.8m x 0.6m Awning Glass Window on Powder Coated (Light Color) Aluminum Frame	3	set		
	W4 - 1.2m x 0.6m Awning Glass Window on Powder Coated (Light Color) Aluminum Frame	1	set		
	W5 - 2.4m x 0.6m Awning Glass Window on Powder Coated (Light Color) Aluminum Frame	1	set		
	W6 - 4.5m x 2.7m Fixed Glass Window on Powder Coated (Light Color) Aluminum Frame with 12mm Flat Bar Accent Grilles	1	set		
	W7 - 2.3m x 3.6m Awning Glass Window on Powder Coated (Light Color) Aluminum Frame	1	set		
	W8 - 1.26m x 1.5m Casement Glass Window on Powder Coated (Light Color) Aluminum Frame with 12mm Square Bar Grilles	4	set		
	W9 - 1.0m x 1.2m Casement Glass Window on Powder Coated (Light Color) Aluminum Frame with 12mm Square Bar Grilles	1	set		
	W10 - 0.725m x 1.5m Casement Glass Window on Powder Coated (Light Color) Aluminum Frame with 12mm Square Bar Grilles	1	set		
	W11 - 1.26m x 1.9m Casement Glass Window on Powder Coated (Light Color) Aluminum Frame with 12mm Square Bar Grilles	2	set		
	W12 - 0.725m x 0.6m Casement Glass Window on Powder Coated (Light Color) Aluminum Frame	1	set		
				Materials Cost	P
				Labor Cost	
				Subtotal	P

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Painting Works				
	Textured Paint Finish (Exterior Walls)	246	sq.m.	P	P
	Flat Latex Paint Finish (Roof Deck & Canopy)	76	sq.m.		
	Gloss Paint Finish (Dome)	159	sq.m.		
	Flat Latex Paint Finish (Interior Walls)	624	sq.m.		
	Flat latex Paint Finish (Ceiling)	106	sq.m.		
	Plain Cement Painted Finish	335	sq.m.		
	Red Epioxy Primer (Electrical Works)	10	sq.m.		
	Miscellaneous				
	Marine Plywood Cabinet Door, Painted Finish	3	l.m.		
	100mm Ø Stainless Steel Pipe (Railings)	11	l.m.		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
				Materials Cost IV C	P
				Labor Cost IV C	
				Direct Cost IV C	P

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
D	SANITARY AND PLUMBING WORKS (ADMIN BUILDING)				
	Sewer Line System				
	50mm Ø PVC Standard Hub Pipe	14	piece	P	P
	75mm Ø PVC Standard Hub Pipe	1	piece		
	100mm Ø PVC Standard Hub Pipe	10	piece		
	100mm Ø x 50mm Ø PVC Wye	8	piece		
	100mm Ø x 75mm Ø PVC Wye	2	piece		
	100mm Ø x 100mm Ø PVC Wye	3	piece		
	50mm Ø x 50mm Ø PVC Tee	8	piece		
	75mm Ø x 75mm Ø PVC Tee	2	piece		
	100mm Ø x 100mm Ø PVC Tee	5	piece		
	50mm Ø x 50mm Ø PVC 1/4 Bend	4	piece		
	100mm Ø x 100mm Ø PVC 1/4 Bend	3	piece		
	50mm Ø x 50mm Ø PVC 1/8 Bend	8	piece		
	75mm Ø x 75mm Ø PVC 1/8 Bend	2	piece		
	100mm Ø x 100mm Ø PVC 1/8 Bend	3	piece		
	75mm Ø x 50mm Ø PVC Reducer	2	piece		
	100mm Ø PVC Cleanout	8	piece		
	50mm Ø PVC P-Trap	7	piece		
	50mm Ø PVC Coupling	5	piece		
	75mm Ø PVC Coupling	1	piece		
	100mm Ø PVC Coupling	3	piece		
	Storm Drainage System				
	75mm Ø PVC Standard Hub Pipe	28	piece		
	75mm Ø x 75mm Ø PVC Wye	7	piece		
	75mm Ø x 75mm Ø PVC 1/4 Bend	7	piece		
	75mm Ø x 75mm Ø PVC 1/8 Bend	127	piece		
	75mm Ø PVC P-Trap	15	piece		
	75mm Ø PVC Coupling	9	piece		
	Water Line System				
	20mm Ø PPR Pipe, PN 16	6	piece		
	32mm Ø PPR Pipe, PN 16	5	piece		
	20mm Ø x 20mm Ø PPR Tee Equal	4	piece		
	32mm Ø x 32mm Ø PPR Tee Equal	1	piece		
	40mm Ø x 40mm Ø PPR Tee Equal	1	piece		
	32mm Ø x 20mm Ø PPR Tee Unequal	2	piece		
	32mm Ø x 20mm Ø PPR Reducer	1	piece		
	20mm Ø PPR 90° Elbow	6	piece		
	32mm Ø PPR 90° Elbow	1	piece		
	20mm Ø x 15mm Ø PPR Female Threaded Tee	6	piece		
	20mm Ø PPR End Cap	6	piece		
	20mm Ø PPR Union Patente	3	piece		
	32mm Ø PPR Union Patente	1	piece		
	20mm Ø PPR Coupling	3	piece		
	32mm Ø PPR Coupling	3	piece		
	20mm Ø PPR Male Adaptor	6	piece		
	32mm Ø PPR Male Adaptor	2	piece		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Valves and Appurtenances				
	20mm Ø PPR Gate Valve	3	piece		
	32mm Ø PPR Gate Valve	1	piece		
	Fixtures				
	Bidet with Accessories, Stainless Steel	2	unit		
	Flexible Hose	5	unit		
	Grease Trap, 5gpm	1	unit		
	Kitchen Sink Faucet, (Water Efficient)	1	unit		
	Kitchen Sink, Single Tub	1	set		
	Lavatory Faucet, Lever Type	2	unit		
	Lavatory, Wall Hung	2	set		
	Urinal, Flush Valve, (Water Efficient)	1	set		
	Water Closet, Tank Type, (Water Efficient)	2	set		
	Accessories				
	Angle Valve, Single-Way	3	unit		
	Angle Valve, Two-Way	2	unit		
	Floor Drain, 50mm x 50mm	4	unit		
	Deck Drain, 75mm Ø , Dome Type	15	unit		
	Facial Mirror	2	sq.m.		
	Soap Dispenser	2	unit		
	Tissue Holder, Stainless	2	unit		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Pipe Hangers and Supports				
	For horizontal pipes greater than 50mm Ø, 1m interval	49	l.m.		
	Downspout Brackets	34	l.m.		
	Miscellaneous and Consumables				
	400cc Solvent Cement	18	can		
	1000cc All Around Sealant	2	can		
	Hacksaw Blade	18	pc		
	Teflon Tape	18	roll		
	Waste Cloth	18	kg		
				Materials Cost IV D	P
				Labor Cost IV D	
				Direct Cost IV D	P
E	ELECTRICAL WORKS (ADMIN BUILDING)				
	Pipes and Fittings				
	20mm Ø PVC Pipe	312	piece	P	P
	25mm Ø PVC Pipe	6	piece		
	65mm Ø PVC Pipe	4	piece		
	20mmØ PVC Adaptor	240	piece		
	20mmØ PVC Locknut and Bushing	240	pair		
	20mmØ PVC Elbow	70	piece		
	25mm Ø PVC Adaptor	2	piece		
	25mm Ø PVC Locknut and Bushing	2	pair		
	25mm Ø PVC Elbow	2	piece		
	65mm Ø PVC Adaptor	8	piece		
	65mm Ø PVC Locknut and Bushing	8	pair		
	65mm Ø PVC Elbow	2	piece		
	16mm Ø x 3000mm Grounding Rod (Copper Clod) with Ground Clamp	1	piece		
	50mm x 100mm PVC Utility Box	39	piece		
	100mm x 100mm PVC Junction Box With Cover	81	piece		
	20mm Ø Metallic Conduit	115	l.m.		
	Wires and Cables				
	3.5mm² THHN Wire	15	roll		
	5.5mm² THHN Wire	75	l.m.		
	14.0mm² THHN Wire	30	l.m.		
	80.0mm² THHN Wire	36	l.m.		
	2.0mm² TW Wire	4	roll		
	3.5mm² TW Wire	40	l.m.		
	5.5mm² TW Wire	16	l.m.		
	22.0mm² TW Wire	12	l.m.		
	Lighting Fixtures (Energy Efficient)				
	T8, 10W LED Tube Light	34	piece		
	T8, 18W LED Tube Light	2	piece		
	600mm x 600mm, Troffer Fixture, Double Recessed Type with Complete Accessories	17	piece		
	1200mm x 300mm Troffer Fixture, Single Recessed Type with Complete Accessories	1	piece		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	100mm Ø LED Pinlight	2	piece		
	10W LED Bulb	2	piece		
	40W , Pendant Light	1	piece		
	12W , LED Cylindrical Wall Light (Column)	4	piece		
	100mm x 100mm Super Flat LED Pinlight	5	piece		
	150mm x 150mm Super Flat LED Pinlight	8	piece		
	200mm x 200mm Super Flat LED Pinlight	29	piece		
	9W, Emergency Light, Twinhead	4	piece		
	Wiring Devices and Other Fixtures				
	Outlet with Grounding, One-gang for Hand Dryer	3	piece		
	Outlet with Grounding, One-gang for ACU	2	piece		
	Outlet with Grounding, One-gang	4	piece		
	Outlet with Grounding, Two-gang	18	piece		
	Switch with Plate & Cover , One-gang	6	piece		
	Switch with Plate & Cover , Two-gang	7	piece		
	Switch with Plate & Cover , Three-gang	4	piece		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Panel Board				
	LPP A (Lighting and Power Panel A)				
	Main: 200AT/200AF 3P, 35KAIC @240V MCCB	1	assy		
	Branches:				
	1 - 70AT, 2P, Bolt-On				
	10 - 30AT, 2P, Bolt-On				
	9 - 20AT, 2P, Bolt-On				
	Enclosure: NEMA 1 with Ground Terminals				
	ECB (Enclosed Circuit Breaker)				
	30AT, 2P, NEMA 3R	8	assy		
	70AT, 2P, NEMA 3R	1	assy		
	Pipe Hangers and Supports				
	Horizontal Layout of Pipe	10	l.m		
	Vertical Layout of Pipe	5	l.m		
	Miscellaneous & Consumables				
	400cc Solvent Cement	2	can		
	1000cc All Around Sealant	1	can		
	Electrical Tape	20	roll		
	Hacksaw Blade	2	piece		
	Masking Tape	5	roll		
	Pulling Lubricant	1	gal		
	Rubber Tape	5	roll		
	Tie Wire, Ga.16 (for cable pulling)	5	kg		
	Torch with Butane	2	set		
				Materials Cost IV E	P
				Labor Cost IV E	
				Direct Cost IV E	P
F	AUXILIARY WORKS (ADMIN BUILDING)				
	Telephone (Voice) and Data System				
	Pipes and Fittings				
	20mm Ø PVC Pipe	12	piece	P	P
	20mm Ø PVC Adaptor	6	piece		
	20mm Ø PVC Locknut	18	piece		
	40mm Ø PVC Pipe	34	piece		
	40mm Ø PVC Adaptor	17	piece		
	40mm Ø PVC Locknut	4	piece		
	40mm Ø PVC Elbow	4	piece		
	40mm Ø PVC Entrance Cap	1	piece		
	50mm x 100mm PVC Utility Box	5	piece		
	100mm x 100mm PVC Octagonal Box with Cover	4	piece		
	118mm PVC Square Box	2	piece		
	Wires and Cables				
	UTP Cat-6 Cable, 4 pairs	1	roll		
	1m UTP Cat-6 Patch Cord	5	piece		
	8.0mm² THW Wire (Grounding Wire)	10	lm		
	Fixtures and Devices				
	Universal LAN Outlet, Simplex (1-device)	1	piece		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Universal LAN Outlet, Duplex (2-device)	4	piece		
	IP PBX with 20 Lines and 120 IP Extensions	1	piece		
	Distribution Frame (DF) 24U Data Rack (19") with Standard Framing and Paneling 1 - 8-port Rack-mounted Router (1U) 1 - 12-port Rack-mounted Preloaded Fiber Patch Panel (2U) 1 - 12-port Managed Fast Fiber Switch (2U) 1 - 24-port CAT6 Standard Density Feed-thru Patch Panel (2U) 1 - 48-port CAT6 Standard Density Feed-thru Patch Panel (3U) 1 - 20-port UTP + 4-port FTP Network Switch (2U) 1 - 48-port UTP Network Switch (3U) 1 - Rack-mounted UPS, 650VA ≥ 5mins "on-line" 2 - Small Form-factor Pluggable (SFP) Optical Transceiver with Cable Managers and UTP/FTP Converter with UTP Cross-connect Cables	1	assy		
	Pipe Hangers and Supports				
	Beam Clamp	16	piece		
	Rigid Steel Strap	18	piece		
	Strut Clamp	14	piece		
	3m Cable Trays and Metal Cabinets Ground Strap	2	piece		
	Telecom Backboard	1	piece		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Miscellaneous and Consumables				
	400cc Solvent Cement	10	can		
	6mm Ø x 40mm Tox with Screw	1	box		
	25mm Ø x 40mm Tox with Screw	1	box		
	Electrical Tape	5	roll		
	G.I. Tie Wire (for Cable Pulling)	1	kg		
	Hacksaw Blade	5	piece		
	Masking Tape	5	roll		
	Pulling Lubricant	1	can		
	Rubber Tape	3	roll		
	Waste Cloth	4	kg		
				Materials Cost	P
				Labor Cost	
				Direct Cost	P
	Closed Circuit Television (CCTV) System				
	Pipes and Fittings				
	20mm Ø PVC Pipe	20	piece	P	P
	20mm Ø PVC Adaptor	10	piece		
	20mm Ø PVC Locknut	12	piece		
	20mm Ø Flexible Metallic Conduit	5	lm		
	20mm Ø Straight Connector with Locknut	3	piece		
	100mm x 100mm Metal Junction Box with Cover	4	piece		
	118mm PVC Square Box	1	piece		
	Wires and Cables				
	UTP Cat-6 Cable	1	roll		
	HDMI Cable	8	lm		
	Video Balun UTP Cat-6 Connector	5	pair		
	12V DC Male & Female Power Balun Connector	5	pair		
	Fixtures and Devices				
	HD Bullet Camera (Vandal Resistant), Outdoor type	2	unit		
	HD Dome Camera (Day/Night), Indoor Type	3	unit		
	HD Digital Video Recorder (DVR), 16-channel with DVD Burner	1	unit		
	DVD Security Lock Box, Low Profile	1	unit		
	Multi-Function Keyboard Controller	1	unit		
	32" LED Monitor	1	set		
	UPS, 1000VA ≥ 5mins "on-line"	1	set		
	12V DC Power Adapter	1	unit		
	12V DC 1 Female to 8 Male Power Splitter	1	unit		
	Pipe Hangers and Supports				
	Rigid Steel Strap	30	piece		
	Strut Clamp	30	piece		
	6mm Ø x 40mm Tox with Screw	1	box		
	25mm Ø x 40mm Tox with Screw	1	box		
	Miscellaneous and Consumables				
	400cc Solvent Cement	5	can		
	Electrical Tape	10	roll		
	G.I. Tie Wire (for Cable Pulling)	2	kg		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Masking Tape	5	roll		
	Pulling Lubricant	2	can		
	Rubber Tape	5	roll		
				Materials Cost	P
				Labor Cost	
				Direct Cost	P
	Fire Detection and Alarm System (FDAS)				
	Pipes and Fittings				
	20mm Ø EMT Pipe	29	piece	P	P
	20mm Ø EMT Elbow	20	piece		
	20mm Ø EMT Coupling, Set Screw Type	15	piece		
	50mm x 100mm Metal Utility Box	18	piece		
	100mm x 100mm Metal Junction Box with Cover	14	piece		
	Wires and Cables				
	1.25mm² TF Wire	2	roll		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Fixtures and Devices				
	Fire Alarm Bell with Strobe Light, 150mm Ø	3	piece		
	Fire Alarm Control Panel (4 Zones)	1	unit		
	Heat Detector	1	piece		
	Manual Pull Station	3	piece		
	Smoke Detector	10	piece		
	Pipe Hangers and Supports				
	Support for Horizontal Pipelines	87	lm		
	Miscellaneous and Consumables				
	Electrical Tape	3	roll		
	G.I. Tie Wire (for Cable Pulling)	1	kg		
	Hacksaw Blade	3	piece		
	Masking Tape	2	roll		
	Masonry Drill Bit	2	piece		
	Metal Drill Bit	2	piece		
	Rubber Tape	2	roll		
				Materials Cost	P
				Labor Cost	
				Direct Cost	P
				Materials Cost IV F	P
				Labor Cost IV F	
				Direct Cost IV F	P
G	MECHANICAL WORKS (ADMIN BUILDING)				
	Refrigerant Pipe System				
	10mm Ø Copper Coil Tubing	12	l.m.	P	P
	16mm Ø Copper Coil Tubing	12	l.m.		
	10mm Ø x 20mm thick Rubber Foam Insulation	12	l.m.		
	16mm Ø x 20mm thick Rubber Foam Insulation	12	l.m.		
	Condensate Water Drainage System				
	32mm Ø x 3m uPVC Pipe	4	piece		
	32mm Ø x 12mm thick Rubber Foam Insulation	10	l.m.		
	Ventilation System				
	150mm Ø PVC Pipe	2	piece		
	150mm Ø Air Vent Cap	2	piece		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
	Equipment and Accessories				
	WAC 2 - 0.75hp, 645W, 230V / 1φ / 60Hz	2	unit	P	P
	CF 1 - Ceiling Fan, 0.50cms, 100W, 230V / 1φ / 60Hz	3	unit		
	EF 1 - Ceiling Mounted Exhaust Fan, 150cmh, 230V / 1φ / 60Hz	2	unit		
				Equipment Cost	P
				Labor Cost	
				Subtotal	P
	SAC 1 - Wall-mounted Air Conditioning Unit, 2.0TR (24000BTUH),	1	unit	P	P

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	9.52mm Ø Liquid, 15.88mm Ø Gas & 32mm Ø Drain Pipes 2.54kW, 230V / 3φ / 60Hz				
				Equipment Cost	P
	Labor Cost with Technical Supervision				
				Subtotal	P
	Pipe Hangers and Supports				
	Condensate Water Drainage System Support	10	l.m.	P	P
	Refrigerant Pipe System Support	12	l.m.		
	ACCU Support	1	unit		
	Vibration Isolator	4	piece		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Miscellaneous & Consumables				
	400cc Solvent Cement	3	can		
	25mm wide x 50m long Polyethylene Tape	6	roll		
	Brazing Rod (10pcs/box)	1	box		
	Fire Extinguisher	2	piece		
	Waste Cloth	3	kg		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
				Materials Cost IV G	P
				Labor Cost IV G	
				Direct Cost IV G	P
				Materials Cost IV	P
				Labor Cost IV	P
				Direct Cost IV	P
V	CONSTRUCTION OF PUBLIC TOILET WITH PUMP HOUSE				
A	SITE WORKS (PUBLIC TOILET WITH PUMP HOUSE)				
	Site Clearing and Preparation	123	sq.m.	P	P
	Layout and Staking	123	sq.m.		
	Excavation for Structures				
	Footing	26	cu.m.		
	Wall Footing	20	cu.m.		
	Slab-on-Fill	14	cu.m.		
	Soil Treatment	129	sq.m.		
	Gravel Bedding	12	cu.m.		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
	Backfill and Compaction	26	cu.m.	P	P
				Subtotal	P
				Materials Cost V A	P
				Labor Cost V A	
				Direct Cost V A	P
B	CIVIL WORKS / STRUCTURAL WORKS (PUBLIC TOILET WITH PUMP HOUSE)				
	Concrete Works				
	Ready Mix Concrete, 28MPa, 3/4" Gravel, 28days				
	Footing	8	cu.m.	P	P
	Column	7	cu.m.		
	Beam	17	cu.m.		
	Suspended Slab	13	cu.m.		
	Ready Mix Concrete, 21MPa, 3/4" Gravel, 28days				

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Wall Footing	7	cu.m.		
	Slab-on-Fill	14	cu.m.		
	Reinforcing Steel Bar				
	Grade 40 Reinforcing Steel Bar including G.I. Tie Wire Ga. 16				
	10mm Ø Reinforcing Steel Bar				
	Wall Footing	215	kg		
	Column (Ties)	481	kg		
	Slab on Fill	347	kg		
	Beam (Stirrups)	352	kg		
	Suspended Slab	3,478	kg		
	12mm Ø Reinforcing Steel Bar				
	Column	124	kg		
	Suspended Slab	590	kg		
	Grade 60 Reinforcing Steel Bar including G.I. Tie Wire Ga. 16				
	16mm Ø Reinforcing Steel Bar				
	Footing	489	kg		
	Column	708	kg		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Beam (Main Bars)	1,540	kg		
	Formworks				
	Footing	13	sq.m.		
	Wall Footing	13	sq.m.		
	Column	53	sq.m.		
	Beam	59	sq.m.		
	Suspended Slab	60	sq.m.		
	Scaffolding and Shoring				
	Column	96	l.m.		
	Beam	158	l.m.		
	Suspended Slab	78	sq.m.		
	Masonry Works				
	150mm CHB Laying including Mortar, Reinforcement and Two-Face Plastering	287	sq.m.		
	Plastering of Doors and Windows	65	l.m.		
	Thermal and Moisture Protection				
	Vapor Barrier	174	sq.m.		
	Cementitious Flexible Type Waterproofing	98	sq.m.		
				Materials Cost V B	P
				Labor Cost V B	
				Direct Cost V B	P
C	ARCHITECTURAL WORKS (PUBLIC TOILET WITH PUMP HOUSE)				
	Floor Finishes				
	300mm x 300mm Non-Skid Homogenous Floor Tiles	61	sq.m.	P	P
	Floor Topping for Preparation of Tile Works	61	sq.m.		
	12mm Groove Lines (Ramp)	49	l.m.		
	Wall Partiioning and Finishes				
	300mm x 600mm Porcelain Wall Tiles	128	sq.m.		
	20mm thick Granite Slab Countertop	5	sq.m.		
	2000mm x 150mm x 10mm thick High Pressure Phenolic Laminate Toilet Partition with Complete Accessories	30	sq.m.		
	1500mm x 450mm x 10mm thick High Pressure Phenolic Laminate Urinal Partition with Complete Accessories	8	sq.m.		
	Ceiling Finishes				
	12mm thick Moisture Resistant Gypsum Board on Metal Framing	61	sq.m.		
	Rubbed Finishing Preparation for Slab Soffit	27	sq.m.		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
	Installation of Doors				
	Doors				
	D1 - 0.8m x 2.1m Painted Wood Panel Door with Louvers with Complete Accessories	2	sets	P	P
	D2 - 1.0m x 2.1m Painted Wood Panel Door with Louvers with Complete Accessories	1	set		
	D3 - 3.6m x 2.4m Roll Up Aluminum Door	1	set		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Hardwares and Accessories				
	Door Jamb				
	D1 - 0.8m x 2.1m Wooden Jamb	2	set		
	D2 - 1.0m x 2.1m Wooden Jamb	1	set		
	Door Hinge, Heavy Duty	9	piece		
	Door Knob , Lever Type	3	piece		
	Installation of Windows				
	W1 - 3.6m x 0.6m Awning Glass Window on Powder Coated (Light Color) Aluminum Frame with Complete Accessories	2	set		
	W2 - 1.2m x 0.6m Awning Glass Window on Powder Coated (Light Color) Aluminum Frame with Complete Accessories	1	set		
	W3 - 3.6m x 1.0m Heavy Duty G.I. Louver Window	3	set		
				Materials Cost	P
				Labor Cost	
				Subtotal	P

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Painting Works				
	Textured Paint Finish (Exterior Walls)	148	sq.m.	P	P
	Gloss Paint Finish	161	sq.m.		
	Flat Latex Paint Finish (Interior Walls)	105	sq.m.		
	Plain Cement Painted Finish	275	sq.m.		
	Red Epoxy Primer (Electrical Works)	15	sq.m.		
	Miscellaneous Works				
	50mm Ø Stainless Steel Grab Bar	4	l.m.		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
				Materials Cost V C	P
				Labor Cost V C	
				Direct Cost V C	P
D	SANITARY AND PLUMBING WORKS (PUBLIC TOILET WITH PUMP HOUSE)				
	Sewer Line System				
	50mm Ø PVC Standard Hub Pipe	37	piece	P	P
	75mm Ø PVC Standard Hub Pipe	5	piece		
	100mm Ø PVC Standard Hub Pipe	20	piece		
	100mm Ø x 50mm Ø PVC Wye	30	piece		
	100mm Ø x 75mm Ø PVC Wye	10	piece		
	100mm Ø x 100mm Ø PVC Wye	2	piece		
	50mm Ø x 50mm Ø PVC Tee	32	piece		
	75mm Ø x 75mm Ø PVC Tee	10	piece		
	50mm Ø x 50mm Ø PVC 1/4 Bend	14	piece		
	100mm Ø x 100mm Ø PVC 1/4 Bend	3	piece		
	50mm Ø x 50mm Ø PVC 1/8 Bend	30	piece		
	75mm Ø x 75mm Ø PVC 1/8 Bend	10	piece		
	100mm Ø x 100mm Ø PVC 1/8 Bend	2	piece		
	75mm Ø x 50mm Ø PVC Reducer	10	piece		
	50mm Ø PVC Cleanout	2	piece		
	100mm Ø PVC Cleanout	3	piece		
	50mm Ø PVC P-Trap	21	piece		
	50mm Ø PVC Coupling	12	piece		
	75mm Ø PVC Coupling	2	piece		
	100mm Ø PVC Coupling	6	piece		
	Storm Drainage System				
	75mm Ø PVC Standard Hub Pipe	22	piece		
	75mm Ø x 75mm Ø PVC Wye	6	piece		
	75mm Ø x 75mm Ø PVC 1/4 Bend	11	piece		
	75mm Ø x 75mm Ø PVC 1/8 Bend	6	piece		
	75mm Ø PVC P-Trap	9	piece		
	75mm Ø PVC Coupling	7	piece		
	Water Line System				
	20mm Ø PPR Pipe, PN 16	14	piece		
	25mm Ø PPR Pipe, PN 16	2	piece		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	32mm Ø PPR Pipe, PN 16	6	piece		
	40mm Ø PPR Pipe, PN 16	4	piece		
	50mm Ø PPR Pipe, PN 16	1	piece		
	65mm Ø PPR Pipe, PN 16	2	piece		
	20mm Ø x 20mm Ø PPR Tee Equal	9	piece		
	25mm Ø x 20mm Ø PPR Tee Unequal	5	piece		
	32mm Ø x 20mm Ø PPR Tee Unequal	5	piece		
	32mm Ø x 25mm Ø PPR Tee Unequal	5	piece		
	40mm Ø x 20mm Ø PPR Tee Unequal	4	piece		
	40mm Ø x 25mm Ø PPR Tee Unequal	4	piece		
	50mm Ø x 32mm Ø PPR Tee Unequal	2	piece		
	65mm Ø x 40mm Ø PPR Tee Unequal	3	piece		
	25mm Ø x 20mm Ø PPR Reducer	28	piece		
	32mm Ø x 20mm Ø PPR Reducer	4	piece		
	32mm Ø x 25mm Ø PPR Reducer	15	piece		
	40mm Ø x 25mm Ø PPR Reducer	2	piece		
	40mm Ø x 32mm Ø PPR Reducer	9	piece		
	50mm Ø x 40mm Ø PPR Reducer	8	piece		
	65mm Ø x 20mm Ø PPR Reducer	5	piece		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	65mm Ø x 40mm Ø PPR Reducer	5	piece		
	65mm Ø x 50mm Ø PPR Reducer	9	piece		
	20mm Ø PPR 90° Elbow	284	piece		
	25mm Ø PPR 90° Elbow	48	piece		
	32mm Ø PPR 90° Elbow	55	piece		
	40mm Ø PPR 90° Elbow	6	piece		
	50mm Ø PPR 90° Elbow	52	piece		
	65mm Ø PPR 90° Elbow	60	piece		
	20mm Ø x 15mm Ø PPR Female Threaded Tee	119	piece		
	20mm Ø PPR End Cap	119	piece		
	20mm Ø PPR Union Patent	18	piece		
	32mm Ø PPR Union Patent	4	piece		
	65mm Ø PPR Union Patent	12	piece		
	20mm Ø PPR Coupling	131	piece		
	25mm Ø PPR Coupling	57	piece		
	32mm Ø PPR Coupling	22	piece		
	40mm Ø PPR Coupling	24	piece		
	50mm Ø PPR Coupling	48	piece		
	65mm Ø PPR Coupling	37	piece		
	20mm Ø PPR Male Adaptor	36	piece		
	32mm Ø PPR Male Adaptor	8	piece		
	65mm Ø PPR Male Adaptor	24	piece		
	Valves and Appurtenances				
	20mm Ø PPR Gate Valve	18	piece		
	32mm Ø PPR Gate Valve	4	piece		
	65mm Ø PPR Gate Valve	12	piece		
	Fixtures				
	Bidet with Accessories, Stainless Steel	10	unit		
	Flexible Hose	17	unit		
	Lavatory, Wall Hung	7	set		
	Lavatory Faucet, Lever Type	7	unit		
	Slop Sink Faucet	2	unit		
	Urinal, Flush Valve, (Water Efficient)	7	set		
	Water Closet, Tank Type, (Water Efficient)	10	set		
	Accessories				
	Angle Valve, Single-Way	7	unit		
	Angle Valve, Two-Way	10	unit		
	Deck Drain, 75mm Ø , Dome Type	9	unit		
	Floor Drain, 50mm x 50mm	14	unit		
	Facial Mirror	5	sq.m.		
	Soap Dispenser	3	unit		
	Tissue Holder, Stainless	3	unit		
	Pipe Hangers and Supports				
	For horizontal pipes greater than 50mm Ø, 1m interval	53	l.m.		
	Downspout Brackets	12	l.m.		
	Miscellaneous and Consumables				
	400cc Solvent Cement	20	can		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	1000cc All Around Sealant	10	can		
	Hacksaw Blade	10	piece		
	Teflon Tape	50	roll		
	Waste Cloth	10	kg		
	Welding Rod	2	box		
				Materials Cost V D	P
				Labor Cost V D	
				Direct Cost V D	P

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
E	ELECTRICAL WORKS (PUBLIC TOILET WITH PUMP HOUSE)				
	Pipes and Fittings				
	20mm Ø PVC Pipe	87	piece	P	P
	40mm Ø PVC Pipe	6	piece		
	110mm Ø PVC Pipe	6	piece		
	20mm Ø IMC Pipe	6	piece		
	25mm Ø IMC Pipe	5	piece		
	20mm Ø PVC Adaptor	120	piece		
	20mm Ø PVC Locknut and Bushing	120	pair		
	20mm Ø PVC Elbow	17	piece		
	40mm Ø PVC Adaptor	4	piece		
	40mm Ø PVC Locknut and Bushing	4	pair		
	40mm Ø PVC Elbow	1	piece		
	110mm Ø PVC Adaptor	4	piece		
	110mm Ø PVC Locknut and Bushing	4	pair		
	20mm Ø IMC Locknut & Bushing	4	pair		
	20mm Ø IMC Coupling	4	piece		
	20mm Ø IMC Elbow	4	piece		
	25mm Ø IMC Locknut & Bushing	4	pair		
	25mm Ø IMC Coupling	4	piece		
	25mm Ø IMC Elbow	4	piece		
	16mm Ø x 3000mm Grounding Rod (Copper Clod) with Ground Clamp	1	piece		
	50mm x 100mm PVC Utility Box	7	piece		
	100mm x 100mm PVC Junction Box With Cover	53	piece		
	20mm Ø Metallic Conduit	2	l.m.		
	Wires and Cables				
	3.5mm² THHN Wire	5	roll		
	3.5mm² THHN Wire	20	l.m.		
	8.0mm² THHN Wire	24	l.m.		
	14.0mm² THHN Wire	21	l.m.		
	30.0mm² THHN Wire	54	l.m.		
	250.0mm² THHN Wire	54	l.m.		
	2.0mm² TW Wire	2	roll		
	2.0mm² TW Wire	10	l.m.		
	3.5mm² TW Wire	15	l.m.		
	5.5mm² TW Wire	24	l.m.		
	8.0mm² TW Wire	18	l.m.		
	60.0mm² TW Wire	12	l.m.		
	Lighting Fixtures (Energy Efficient)				
	18W LED Tube Light, Box Type, (fixture only)	4	piece		
	18W LED Tube Light	4	piece		
	12W , LED Cylindrical Wall Light (Column)	4	piece		
	100mm x 100mm Super Flat LED Pinlight	7	piece		
	150mm x 150mm Super Flat LED Pinlight	18	piece		
	200mm x 200mm Super Flat LED Pinlight	8	piece		
	Wiring Devices and Other Fixtures				

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Switch with Plate & Cover, One-gang	3	piece		
	Switch with Plate & Cover, Two-gang	1	piece		
	Switch with Plate & Cover, Three-gang	3	piece		
	Panel Board				
	LPPC (Lighting and Power Panel C) Main: 100AT/100AF, 3P, 25KAIC @240V MCCB Branches: 1 - 70AT, 3P, Bolt-On 1 - 40AT, 3P, Bolt-On 2 - 30AT, 2P, Bolt-On 4 - 20AT, 2P, Bolt-On Enclosure: NEMA 1 with Ground Terminals	1	assy		
	ECB (Enclosed Circuit Breaker)				
	30AT, 2P, NEMA 3R	2	assy		
	40AT, 3P, NEMA 3R	1	assy		
	70AT, 3P, NEMA 3R	1	assy		
	400AT, 3P, NEMA 3R	1	assy		
	Pipe Hangers and Supports				
	Horizontal Layout of Pipe	20	l.m.		
	Vertical Layout of Pipe	10	l.m.		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Miscellaneous & Consumables				
	400cc Solvent Cement	3	can		
	1000ccAll Around Sealant	3	can		
	Electrical Tape	22	roll		
	Hacksaw Blade	4	piece		
	Masking Tape	22	roll		
	Pulling Lubricant	2	gal		
	Rubber Tape	17	roll		
	Tie Wire, Ga.16 (for cable pulling)	3	kg		
	Torch with Butane	3	set		
				Materials Cost V E	P
				Labor Cost V E	
				Direct Cost V E	P
F	MECHANICAL WORKS (PUBLIC TOILET WITH PUMP HOUSE)				
	Ventilation System				
	150mm Ø PVC Pipe	9	piece	P	P
	150mm Ø Air Vent Cap	9	piece		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
	Equipment and Accessories				
	EF 1 - Ceiling Mounted Exhaust Fan, 150cmh, 230V / 1φ / 60Hz	9	unit	P	P
	EF 2 - Wall Mounted Industrial Exhaust Fan, 1900cmh, 230V / 1φ / 60Hz	1	unit		
				Equipment Cost	P
				Labor Cost	
				Subtotal	P
	Miscellaneous & Consumables				
	400cc Solvent Cement	6	can	P	P
	Waste Cloth	3	kg		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
				Materials Cost V F	P
				Labor Cost V F	
				Direct Cost V F	P
				Materials Cost V	P
				Labor Cost V	P
				Direct Cost V	P
VI	CONSTRUCTION OF PUBLIC TOILET				
A	SITE WORKS (PUBLIC TOILET)				
	Site Clearing and Preparation	64	sq.m.	P	P
	Layout and Staking	64	sq.m.		
	Excavation for Structures				
	Footing	22	cu.m.		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Wall Footing	14	cu.m.		
	Slab-on-Fill	7	cu.m.		
				Subtotal	P
	Soil Treatment	68	sq.m.	P	P
	Gravel Bedding	9	cu.m.		
				Materials Cost	P
				Labor Cost	
				Subtotal	P

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Backfill and Compaction	21	cu.m.	P	P
				Subtotal	P
				Materials Cost VI A	P
				Labor Cost VI A	
				Direct Cost VI A	P
B	CIVIL WORKS / STRUCTURAL WORKS (PUBLIC TOILET)				
	Concrete Works				
	Ready Mix Concrete, 28MPa, 3/4" Gravel, 28days				
	Footing	7	cu.m.	P	P
	Column	6	cu.m.		
	Beam	12	cu.m.		
	Suspended Slab	10	cu.m.		
	Ready Mix Concrete, 21MPa, 3/4" Gravel, 28days				
	Wall Footing	5	cu.m.		
	Slab-on-Fill	7	cu.m.		
	Reinforcing Steel Bar				
	Grade 40 Reinforcing Steel Bar including G.I. Tie Wire Ga. 16				
	10mm Ø Reinforcing Steel Bar				
	Wall Footing	149	kg		
	Column (Ties)	403	kg		
	Slab on Fill	192	kg		
	Beam (Stirrups)	196	kg		
	Suspended Slab	1,774	kg		
	12mm Ø Reinforcing Steel Bar				
	Column	84	kg		
	Suspended Slab	276	kg		
	Grade 60 Reinforcing Steel Bar including G.I. Tie Wire Ga. 16				
	16mm Ø Reinforcing Steel Bar				
	Footing	420	kg		
	Column	658	kg		
	Beam (Main Bars)	870	kg		
	Formworks				
	Footing	11	sq.m.		
	Wall Footing	10	sq.m.		
	Column	47	sq.m.		
	Beam	35	sq.m.		
	Suspended Slab	43	sq.m.		
	Scaffolding and Shoring				
	Column	84	lm		
	Beam	90	lm		
	Suspended Slab	43	sq.m.		
	Masonry Works				
	150mm CHB Laying including Mortar, Reinforcement and Two-Face Plastering	157	sq.m.		
	Plastering of Doors and Windows	38	l.m.		
	Thermal and Moisture Protection				

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Vapor Barrier	68	sq.m.		
	Cementitious Flexible Type Waterproofing	44	sq.m.		
				Materials Cost VI B	P
				Labor Cost VI B	
				Direct Cost VI B	P
C	ARCHITECTURAL WORKS (PUBLIC TOILET)				
	Floor Finishes				
	300mm x 300mm Non-Skid Homogenous Floor Tiles	45	sq.m.	P	P
	Floor Topping for Preparation of Tile Works	45	sq.m.		
	Plain Cement Painted Finish	302	sq.m.		
	Wall Partitioning and Finishes				
	300mm x 600mm Homogenous Porcelain Wall Tiles	112	sq.m.		
	20mm thick Granite Slab Countertop	4	sq.m.		
	2000mm x 1500mm x 10mm thick High Pressure Phenolic Laminate Toilet Partition with Complete Accessories	20	sq.m.		
	1500mm x 450mm x 10mm thick High Pressure Phenolic Laminate Toilet Partition with Complete Accessories	5	sq.m.		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Ceiling Finishes				
	12mm thick Moisture Resistant Gypsum Board on Metal Framing	83	sq.m.		
	Rubbed Finishing Preparation for Slab Soffit	19	sq.m.		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
	Installation of Doors				
	Doors				
	D1 - 0.8m x 2.1m Painted Wood Panel Door with Louvers	2	set	P	P
	D2 - 1.0m x 2.1m Painted Wood Panel Door with Louvers	1	set		
	Hardwares and Accessories				
	Door Jamb				
	D1 - 0.8m x 2.1m Wooden Door Jamb	2	set		
	D2 - 1.0m x 2.1m Wooden Door Jamb	1	set		
	Door Hinge, Heavy Duty	9	piece		
	Door Knob, Lever Type	3	piece		
	Installation of Windows				
	W1- 3.6m x 0.6m Awning Window on Powder Coated (Light Color) Aluminum Frame with Complete Accessories	2	set		
	W2- 1.2m x 0.6m Awning Window on Powder Coated (Light Color) Aluminum Frame with Complete Accessories	1	set		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
	Painting Works				
	Elastomeric Paint Finish (Roof Deck & Dome)	71	sq.m.	P	P
	Flat Latex Paint Finish (Interior Walls)	14	sq.m.		
	Flat Latex Paint Finish (Ceiling)	83	sq.m.		
	Glossy Paint Finish	137	sq.m.		
	Red Epoxy Primer (Electrical Works)	10	sq.m.		
	Textured Paint Finish (Exterior Walls)	96	sq.m.		
	Miscellaneous Works				
	50mm Ø Stainless Steel Grab Bar	2	l.m.		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
				Materials Cost VI C	P
				Labor Cost VI C	
				Direct Cost VI C	P
D	SANITARY AND PLUMBING WORKS (PUBLIC TOILET)				
	Sewer Line System				
	50mm Ø PVC Standard Hub Pipe	32	piece	P	P
	75mm Ø PVC Standard Hub Pipe	4	piece		
	100mm Ø PVC Standard Hub Pipe	10	piece		
	100mm Ø x 50mm Ø PVC Wye	30	piece		
	100mm Ø x 75mm Ø PVC Wye	8	piece		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	100mm Ø x 100mm Ø PVC Wye	2	piece		
	50mm Ø x 50mm Ø PVC Tee	30	piece		
	75mm Ø x 75mm Ø PVC Tee	8	piece		
	50mm Ø x 50mm Ø PVC 1/4 Bend	13	piece		
	100mm Ø x 100mm Ø PVC 1/4 Bend	3	piece		
	50mm Ø x 50mm Ø PVC 1/8 Bend	28	piece		
	75mm Ø x 75mm Ø PVC 1/8 Bend	8	piece		
	100mm Ø x 100mm Ø PVC 1/8 Bend	2	piece		
	75mm Ø x 50mm Ø PVC Reducer	8	piece		
	50mm Ø PVC Cleanout	1	piece		
	100mm Ø PVC Cleanout	3	piece		
	50mm Ø PVC P-Trap	20	piece		
	50mm Ø PVC Coupling	10	piece		
	75mm Ø PVC Coupling	2	piece		
	100mm Ø PVC Coupling	3	piece		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Storm Drainage System				
	75mm Ø PVC Standard Hub Pipe	15	piece		
	75mm Ø x 75mm Ø PVC Wye	4	piece		
	75mm Ø x 75mm Ø PVC 1/4 Bend	8	piece		
	75mm Ø x 75mm Ø PVC 1/8 Bend	4	piece		
	75mm Ø PVC P-Trap	6	piece		
	75mm Ø PVC Coupling	5	piece		
	Water Line System				
	20mm Ø PPR Pipe, PN 16	14	piece		
	25mm Ø PPR Pipe, PN 16	2	piece		
	32mm Ø PPR Pipe, PN 16	6	piece		
	40mm Ø PPR Pipe, PN 16	4	piece		
	50mm Ø PPR Pipe, PN 16	1	piece		
	20mm Ø x 20mm Ø PPR Tee Equal	9	piece		
	25mm Ø x 20mm Ø PPR Tee Unequal	5	piece		
	32mm Ø x 20mm Ø PPR Tee Unequal	5	piece		
	32mm Ø x 25mm Ø PPR Tee Unequal	5	piece		
	40mm Ø x 20mm Ø PPR Tee Unequal	4	piece		
	40mm Ø x 25mm Ø PPR Tee Unequal	4	piece		
	50mm Ø x 32mm Ø PPR Tee Unequal	2	piece		
	65mm Ø x 40mm Ø PPR Tee Unequal	3	piece		
	32mm Ø x 25mm Ø PPR Reducer	3	piece		
	40mm Ø x 32mm Ø PPR Reducer	5	piece		
	50mm Ø x 40mm Ø PPR Reducer	2	piece		
	65mm Ø x 50mm Ø PPR Reducer	2	piece		
	20mm Ø PPR 90° Elbow	27	piece		
	25mm Ø PPR 90° Elbow	14	piece		
	32mm Ø PPR 90° Elbow	9	piece		
	40mm Ø PPR 90° Elbow	5	piece		
	20mm Ø x 15mm Ø PPR Female Threaded Tee	20	piece		
	25mm Ø x 20mm Ø PPR Female Threaded Tee	8	piece		
	20mm Ø PPR End Cap	20	piece		
	25mm Ø PPR End Cap	8	piece		
	32mm Ø PPR Union Patent	2	piece		
	40mm Ø PPR Union Patent	1	piece		
	20mm Ø PPR Coupling	13	piece		
	25mm Ø PPR Coupling	1	piece		
	32mm Ø PPR Coupling	5	piece		
	40mm Ø PPR Coupling	3	piece		
	32mm Ø PPR Male Adaptor	4	piece		
	40mm Ø PPR Male Adaptor	2	piece		
	Valves and Appurtenances				
	32mm Ø PPR Gate Valve	2	piece		
	40mm Ø PPR Gate Valve	1	piece		
	Fixtures				
	Bidet with Accessories, Stainless Steel	8	unit		
	Flexible Hose	14	unit		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Lavatory Faucet, Lever Type	6	unit		
	Lavatory, Wall Hung	6	set		
	Slop Sink Faucet	2	unit		
	Urinal, Flush Valve, (Water Efficient)	6	set		
	Water Closet, Tank Type, (Water Efficient)	8	set		
	Accessories				
	Angle Valve, Single-Way	6	unit		
	Angle Valve, Two-Way	8	unit		
	Deck Drain, 75mm Ø , Dome Type	6	unit		
	Floor Drain, 50mm x 50mm	14	unit		
	Facial Mirror	5	sq.m.		
	Soap Dispenser	3	unit		
	Tissue Holder, Stainless	3	unit		
	Pipe Hangers and Supports				
	For horizontal pipes greater than 50mm Ø, 1m interval	53	l.m.		
	Downspout Brackets	12	l.m.		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Miscellaneous and Consumables				
	400cc Solvent Cement	20	can		
	1000cc All Around Sealant	10	can		
	Hacksaw Blade	10	piece		
	Teflon Tape	50	roll		
	Waste Cloth	10	kg		
	Welding Rod	2	box		
				Materials Cost VI D	P
				Labor Cost VI D	
				Direct Cost VI D	P
E	ELECTRICAL WORKS (PUBLIC TOILET)				
	Pipes and Fittings				
	20mm Ø PVC Pipe	103	piece	P	P
	20mm Ø PVC Adaptor	64	piece		
	20mm Ø PVC Locknut and Bushing	64	pair		
	20mm Ø PVC Elbow	15	piece		
	50mm x 100mm PVC Utility Box	4	piece		
	100mm x 100mm PVC Junction Box With Cover	28	piece		
	20mm Ø Metallic Conduit	54	piece		
	Wires and Cables				
	3.5mm² THHN Wire	4	roll		
	5.5mm² THHN Wire	36	l.m.		
	2.0mm² TW Wire	2	roll		
	3.5mm² TW Wire	12	l.m.		
	Lighting Fixtures (Energy Efficient)				
	12W, Cylindrical Wall Light (Column)	4	piece		
	100mm x 100mm Super Flat LED Pinlight	5	piece		
	150mm x 150mm Super Flat LED Pinlight	12	piece		
	200mm x 200mm Super Flat LED Pinlight	6	piece		
	Wiring Devices and Other Fixtures				
	Switch, with Plate & Cover , One-gang	2	piece		
	Switch, with Plate & Cover , Two-gang	2	piece		
	Panel Board				
	LPP D (Lighting and Power Panel D) Main: 30AT/50AF, 3P, 18KAIC @ 240V MCCB Branches: 4 - 20AT, 2P, Bolt-On Enclosure: NEMA 1 with Ground Terminals	1	assy		
	Pipe Hangers and Supports				
	Horizontal Layout of Pipe	10	l.m.		
	Vertical Layout of Pipe	5	l.m.		
	Miscellaneous & Consumables				
	400cc Solvent Cement	2	can		
	1000cc All Around Sealant	2	can		
	Electrical Tape	10	roll		
	Hacksaw Blade	2	piece		
	Masking Tape	10	roll		
	Pulling Lubricant	1	gal		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Rubber Tape	10	roll		
	Tie Wire, Ga.16 (for cable pulling)	2	kg		
	Torch with Butane	2	set		
				Materials Cost VI E	P
				Labor Cost VI E	
				Direct Cost VI E	P
F	MECHANICAL WORKS (PUBLIC TOILET)				
	Ventilation System				
	150mm Ø PVC Pipe	7	piece	P	P
	150mm Ø Air Vent Cap	7	piece		
				Materials Cost	P
				Labor Cost	
				Subtotal	P

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Equipment and Accessories				
	EF 1 - Ceiling Mounted Exhaust Fan, 150cmh, 230V / 1 ϕ / 60Hz	7	unit	P	P
				Equipment Cost	P
				Labor Cost	
				Subtotal	P
	Miscellaneous & Consumables				
	400cc Solvent Cement	5	can	P	P
	Waste Cloth	2	kg		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
				Materials Cost VI F	P
				Labor Cost VI F	
				Direct Cost VI F	P
				Materials Cost VI	P
				Labor Cost VI	P
				Direct Cost VI	P
VII	CONSTRUCTION OF MATERIAL RECOVERY FACILITY				
A	SITE WORKS (MATERIAL RECOVERY FACILITY)				
	Site Clearing and Preparation	46	sq.m.	P	P
	Layout and Staking	46	sq.m.		
	Excavation for Structures				
	Footing	5	cu.m.		
	Wall Footing	5	cu.m.		
	Slab-on-Fill	5	cu.m.		
				Subtotal	P
	Soil Treatment	42	sq.m.	P	P
	Gravel Bedding	5	cu.m.		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
	Backfill and Compaction	5	cu.m.	P	P
				Subtotal	P
				Materials Cost VII A	P
				Labor Cost VII A	
				Direct Cost VII A	P
B	CIVIL WORKS / STRUCTURAL WORKS (MATERIAL RECOVERY FACILITY)				
	Concrete Works				
	On-Site Mix Concrete, 21MPa, 3/4" Gravel, 28days				
	Footing	2	cu.m.	P	P
	Wall Footing	2	cu.m.		
	Column	2	cu.m.		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Beam	2	cu.m.		
	Slab-on-Fill	5	cu.m.		
	Reinforcing Steel Bar				
	Grade 40 Reinforcing Steel Bar including G.I. Tie Wire Ga. 16				
	10mm Ø Reinforcing Steel Bar				
	Wall Footing	47	kg		
	Column (Ties)	94	kg		
	Slab on Fill	117	kg		
	Beam (Stirrups)	36	kg		
	12mm Ø Reinforcing Steel Bar (Column)	45	kg		
	Grade 60 Reinforcing Steel Bar including G.I. Tie Wire Ga. 16				
	16mm Ø Reinforcing Steel Bar				
	Footing	80	kg		
	Column	120	kg		
	Beam (Main Bars)	100	kg		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Formworks				
	Footing	3	sq.m.		
	Wall Footing	3	sq.m.		
	Column	15	sq.m.		
	Beam	5	sq.m.		
	Scaffolding and Shoring				
	Column	28	l.m.		
	Beam	13	l.m.		
	Masonry Works				
	150mm CHB Laying including Mortar, Reinforcement and Two-Face Plastering	61	sq.m.		
	Thermal and Moisture Protection				
	Vapor Barrier	42	sq.m.		
	Metal Works				
	Wall				
	100mm x 12mm Flat Bar	509	kg		
	100mm Ø G.I. Pipe	1,076	kg		
	100mm x 100mm Wire Mesh (6mm Ø)	364	kg		
	250mm x 250mm x 10mm Base Plate	47	kg		
	25mm Ø Anchor Bolt	36	piece		
	Roof Truss				
	100mm x 150mm x 6mm Channel	264	kg		
	50mm x 100mm x 1.4mm C Purlins	636	kg		
	12mm Ø Sagrod	9	kg		
	25mm Ø Dyna Bolt	8	piece		
	Roofing Works				
	12.55mm x 300mm , Fascia Board	13	l.m.		
	Pre Painted G.I. End Flashing	26	l.m.		
	Pre Painted G.I. Gutter	13	l.m.		
	Pre Painted Rib Type Roofing Sheet Ga. 20	38	sq.m.		
	Miscellaneous and Consumables				
	Rivets	40	piece		
	Silicon Sealant	4	tube		
	Tekscrew	177	piece		
				Materials Cost VII B	P
				Labor Cost VII B	
				Direct Cost VII B	P
C	ARCHITECTURAL WORKS (MATERIAL RECOVERY FACILITY)				
	Floor Finishes				
	Floor Topping and Finishing Preparations	1	sq.m.	P	P
	Plain Cement Paint Finish	107	sq.m.		
	Sink Finishes				
	300mm x 300mm Homogenous Porcelain Tiles	1	sq.m.		
	Ceiling Finishes				
	6mm thick Fiber Cement Board on Metal Framing	38	sq.m.		
	Painting Works				
	Textured Paint Finish (Exterior Walls)	46	sq.m.	P	

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Epoxy Enamel Paint Finish (Steel Surfaces)	38	sq.m.		
	Glossy Paint Finish (Roof Canopy & Dome)	73	sq.m.		
	Flat Latex Paint Finish (Interior Walls)	40	sq.m.		
	Flat Latex Paint Finish (Ceiling)	38	sq.m.		
				Materials Cost VII C	P
				Labor Cost VII C	
				Direct Cost VII C	P
D	SANITARY AND PLUMBING WORKS (MATERIAL RECOVERY FACILITY)				
	Sewer Line System				
	50mm Ø PVC Standard Hub Pipe	2	piece	P	P
	75mm Ø PVC Standard Hub Pipe	9	piece		
	75mm Ø x 50mm Ø PVC Wye	2	piece		
	50mm Ø x 50mm Ø PVC Tee	1	piece		
	50mm Ø x 50mm Ø PVC 1/8 Bend	2	piece		
	75mm Ø PVC Cleanout	1	piece		
	50mm Ø PVC P-Trap	1	piece		
	50mm Ø PVC Coupling	1	piece		
	75mm Ø PVC Coupling	3	piece		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Storm Drainage System				
	75mm Ø PVC Standard Hub Pipe	8	piece		
	75mm Ø x 75mm Ø PVC Wye	4	piece		
	75mm Ø x 75mm Ø PVC 1/4 Bend	6	piece		
	75mm Ø x 75mm Ø PVC 1/8 Bend	4	piece		
	75mm Ø PVC P-Trap	6	piece		
	75mm Ø PVC Coupling	3	piece		
	Water Line System				
	20mm Ø PPR Pipe, PN 16	2	piece		
	20mm Ø PPR 90° Elbow	3	piece		
	20mm Ø x 15mm Ø PPR Female Threaded Tee	1	piece		
	20mm Ø PPR End Cap	1	piece		
	20mm Ø PPR Union Patente	1	piece		
	20mm Ø PPR Coupling	1	piece		
	20mm Ø PPR Male Adaptor	2	piece		
	Valves and Appurtenances				
	20mm Ø PPR Gate Valve	1	piece		
	Fixtures				
	Flexible Hose	1	unit		
	Grease Trap, 5gpm	1	set		
	Kitchen Sink Faucet	1	unit		
	Kitchen Sink, Single Tub	1	set		
	Accessories				
	Angle Valve, Single-Way	1	unit		
	Floor Drain, 50mm x 50mm	1	unit		
	Deck Drain, 75mm Ø , Dome Type	6	unit		
	Pipe Hangers and Supports				
	For horizontal pipes greater than 50mm Ø, 1m interval	16	lm		
	Downspout Brackets	7	lm		
	Miscellaneous and Consumables				
	1000cc All Around Sealant	1	can		
	400cc Solvent Cement	4	can		
	Hacksaw Blade	4	piece		
	Teflon Tape	4	roll		
	Waste Cloth	4	kg		
				Materials Cost VII D	P
				Labor Cost VII D	
				Direct Cost VII D	P
E	ELECTRICAL WORKS (MATERIAL RECOVERY FACILITY)				
	Pipes and Fittings				
	20mm Ø PVC Pipe	6	piece	P	P
	20mmØ PVC Adaptor	10	piece		
	20mmØ PVC Locknut and Bushing	10	pair		
	20mmØ PVC Elbow	10	piece		
	50mm x 100mm PVC Utility Box	1	piece		
	100mm x 100mm PVC Junction Box With Cover	4	piece		
	20mm Ø Metallic Conduit	6	l.m.		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Wires and Cables				
	3.5mm² THHN Wire	36	l.m.		
	2.0mm² TW Wire	18	l.m.		
	Lighting Fixtures (Energy Efficient)				
	18W LED Tube Light, Box Type (Fixture Only)	3	piece		
	18W LED Tube Light	3	piece		
	Wiring Devices and Other Fixtures				
	Switch, with Plate & Cover , One-gang	1	piece		
	Pipe Hangers and Supports				
	Horizontal Layout of Pipe	10	l.m.		
	Vertical Layout of Pipe	5	l.m.		
	Miscellaneous & Consumables				
	400cc Solvent Cement	1	can		
	1000cc All Around Sealant	1	can		
	Electrical Tape	5	roll		
	Hacksaw Blade	1	piece		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Masking Tape	3	roll		
	Pulling Lubricant	1	gal		
	Rubber Tape	3	roll		
	Tie Wire, Ga.16 (for cable pulling)	1	kg		
	Torch with Butane	1	set		
				Materials Cost VII E	P
				Labor Cost VII E	
				Direct Cost VII E	P
F	MECHANICAL WORKS (MATERIAL RECOVERY FACILITY)				
	Equipment and Accessories				
	EF 2 - Wall Mounted Industrial Exhaust Fan, 1900cmh, 230V / 1 ϕ / 60Hz	1	unit	P	P
	Miscellaneous and Consumables				
	Fire Extinguisher	1	unit		
				Materials Cost VII F	P
				Labor Cost VII F	
				Direct Cost VII F	P
				Materials Cost VII	P
				Labor Cost VII	P
				Direct Cost VII	P
VIII	CONSTRUCTION OF DIESEL STORAGE				
A	SITE WORKS (DIESEL STORAGE)				
	Site Clearing and Preparation	46	sq.m.	P	P
	Layout and Staking	46	sq.m.		
	Excavation for Structures				
	Footing	10	cu.m.		
	Wall Footing	9	cu.m.		
	Slab-on-Fill	4	cu.m.		
				Subtotal	P
	Soil Treatment	38	sq.m.	P	P
	Gravel Bedding	4	cu.m.		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
	Backfill and Compaction	12	cu.m.	P	P
				Subtotal	P
				Materials Cost VIII A	P
				Labor Cost VIII A	
				Direct Cost VIII A	P
B	CIVIL WORKS / STRUCTURAL WORKS (DIESEL STORAGE)				
	Concrete Works				
	On-Site Mix Concrete, 21MPa, 3/4" Gravel, 28days				
	Footing	2	cu.m.	P	P

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Wall Footing	3	cu.m.		
	Column	3	cu.m.		
	Beam	5	cu.m.		
	Suspended Slab	6	cu.m.		
	Ramp	2	cu.m.		
	Slab-on-Fill	4	cu.m.		
	Reinforcing Steel Bar				
	Grade 40 Reinforcing Steel Bar including G.I. Tie Wire Ga. 16				
	10mm Ø Reinforcing Steel Bar				
	Wall Footing	86	kg		
	Column (Ties)	153	kg		
	Slab on Fill	102	kg		
	Beam (Stirrups)	91	kg		
	Suspended Slab	1,786	kg		
	Ramp	53	kg		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	12mm Ø Reinforcing Steel Bar (Column)	62	kg		
	Grade 60 Reinforcing Steel Bar including G.I. Tie Wire Ga. 16				
	16mm Ø Reinforcing Steel Bar				
	Footing	130	kg		
	Column	160	kg		
	Beam (Main Bars)	450	kg		
	Formworks				
	Footing	4	sq.m.		
	Wall Footing	6	sq.m.		
	Column	22	sq.m.		
	Beam	16	sq.m.		
	Suspended Slab	30	sq.m.		
	Scaffolding and Shoring				
	Column	40	l.m.		
	Beam	40	l.m.		
	Suspended Slab	30	sq.m.		
	Masonry Works				
	150mm CHB Laying including Mortar, Reinforcement and Two-Face Plastering	100	sq.m.		
	Plastering of Doors and Windows	39	l.m.		
	Thermal and Moisture Protection				
	Vapor Barrier	38	sq.m.		
	Cementitious Flexible Type Waterproofing	50	sq.m.		
				Materials Cost VIII B	P
				Labor Cost VIII B	
				Direct Cost VIII B	P
C	ARCHITECTURAL WORKS (DIESEL STORAGE)				
	Floor Finishes				
	Plain Cement Floor Finish	131	sq.m.	P	P
	Floor Topping for Preparation of Tile Works	4	sq.m.		
	Sink Finishes				
	300mm x 300mm Homogenous Porcelain Tiles	2	sq.m.		
	200mm x 200mm Homogenous Porcelain Tiles	2	sq.m.		
	Ceiling Finishes				
	Rubbed Finishing Preparation for Slab Soffit	50	sq.m.		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
	Installation of Door				
	D1 - 3.6m x 2.4m Roll Up Door	1	set	P	P
	Installation of Windows				
	W1- 3.6m x 0.8m Heavy Duty G.I. Louver Window	1	set		
	W2- 4.0m x 0.8m Heavy Duty G.I. Louver Window	2	set		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
	Painting Works				

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Elastomeric Paint Finish (Roof & Canopy)	50	sq.m.	P	P
	Flat Latex Paint Finish (Interior Walls)	96	sq.m.		
	Glossy Paint Finish	43	sq.m.		
	Red Epoxy Primer (Electrical Works)	5	sq.m.		
	Textured Paint Finish (Exterior Walls)	96	sq.m.		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
				Materials Cost VIII C	P
				Labor Cost VIII C	
				Direct Cost VIII C	P

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
D	SANITARY AND PLUMBING WORKS (DIESEL STORAGE)				
	Sewer Line System				
	50mm Ø PVC Standard Hub Pipe	2	piece	P	P
	75mm Ø PVC Standard Hub Pipe	10	piece		
	75mm Ø x 50mm Ø PVC Wye	2	piece		
	50mm Ø x 50mm Ø PVC Tee	1	piece		
	50mm Ø x 50mm Ø PVC 1/8 Bend	2	piece		
	75mm Ø PVC Cleanout	1	piece		
	50mm Ø PVC P-Trap	1	piece		
	50mm Ø PVC Coupling	1	piece		
	75mm Ø PVC Coupling	3	piece		
	Storm Drainage System				
	75mm Ø PVC Standard Hub Pipe	7	piece		
	75mm Ø x 75mm Ø PVC Wye	2	piece		
	75mm Ø x 75mm Ø PVC 1/4 Bend	6	piece		
	75mm Ø x 75mm Ø PVC 1/8 Bend	2	piece		
	75mm Ø PVC P-Trap	4	piece		
	75mm Ø PVC Coupling	3	piece		
	Water Line System				
	20mm Ø PPR Pipe, PN 16	2	piece		
	20mm Ø PPR 90° Elbow	3	piece		
	20mm Ø x 15mm Ø PPR Female Threaded Tee	1	piece		
	20mm Ø PPR End Cap	1	piece		
	20mm Ø PPR Union Patente	1	piece		
	20mm Ø PPR Coupling	1	piece		
	20mm Ø PPR Male Adaptor	2	piece		
	Valves and Appurtenances				
	20mm Ø PPR Gate Valve	1	piece		
	Fixtures				
	Flexible Hose	1	unit		
	Grease Trap, 5gpm	1	set		
	Kitchen Sink Faucet	1	unit		
	Kitchen Sink, Single Tub	1	set		
	Accessories				
	Angle Valve, Single-Way	1	unit		
	Deck Drain, 75mm Ø , Dome Type	4	unit		
	Floor Drain, 50mm x 50mm	1	unit		
	Pipe Hangers and Supports				
	For horizontal pipes greater than 50mm Ø, 1m interval	14	lm		
	Downspout Brackets	7	lm		
	Miscellaneous and Consumables				
	400cc Solvent Cement	3	can		
	1000cc All Around Sealant	1	can		
	Hacksaw Blade	3	piece		
	Teflon Tape	3	roll		
	Waste Cloth	3	kg		
				Materials Cost VIII D	P

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
				Labor Cost VIII D	
				Direct Cost VIII D	P
E	ELECTRICAL WORKS (DIESEL STORAGE)				
	Pipes and Fittings				
	20mm Ø PVC Pipe	33	piece	P	P
	20mmØ PVC Adaptor	16	piece		
	20mmØ PVC Locknut and Bushing	16	pair		
	20mmØ PVC Elbow	10	piece		
	50mm x 100mm PVC Utility Box	1	piece		
	100mm x 100mm PVC Junction Box With Cover	7	piece		
	20mm Ø Metallic Conduit	9	l.m.		
	Wires and Cables				
	3.5mm² THHN Wire	198	l.m.		
	2.0mm² TW Wire	99	l.m.		
	Lighting Fixtures (Energy Efficient)				
	18W LED Tube Light, Box Type (Fixture Only)	6	piece		
	18W LED Tube Light,	6	piece		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Wiring Devices and Other Fixtures				
	Switch, with Plate & Cover , One-gang	1	piece		
	Pipe Hangers and Supports				
	Horizontal Layout of Pipe	10	l.m.		
	Vertical Layout of Pipe	5	l.m.		
	Miscellaneous & Consumables				
	400cc Solvent Cement	1	can		
	1000cc All Around Sealant	1	can		
	Electrical Tape	5	roll		
	Hacksaw Blade	1	piece		
	Masking Tape	3	roll		
	Pulling Lubricant	1	gal		
	Rubber Tape	3	roll		
	Tie Wire, Ga.16 (for cable pulling)	1	kg		
	Torch with Butane	1	set		
				Materials Cost VIII E	P
				Labor Cost VIII E	
				Direct Cost VIII E	P
F	MECHANICAL WORKS (DIESEL STORAGE)				
	Equipment and Accessories				
	EF 2 - Wall Mounted Industrial Exhaust Fan, 1900cmh, 230V / 1 ϕ / 60Hz	1	unit	P	P
	Miscellaneous and Consumables				
	Fire Extinguisher	1	unit		
				Materials Cost VIII F	P
				Labor Cost VIII F	
				Direct Cost VIII F	P
				Materials Cost VIII	P
				Labor Cost VIII	P
				Direct Cost VIII	P
IX	CONSTRUCTION OF POWER HOUSE				
A	SITE WORKS (POWER HOUSE)				
	Site Clearing and Preparation	79	sq.m.	P	P
	Layout and Staking	79	sq.m.		
	Excavation for Structures				
	Footing	19	cu.m.		
	Wall Footing	14	cu.m.		
	Slab-on-Fill	7	cu.m.		
				Subtotal	P
	Soil Treatment	68	sq.m.	P	P
	Gravel Bedding	8	cu.m.		
				Materials Cost	P
				Labor Cost	
				Subtotal	P

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Backfill and Compaction	20	cu.m.	P	P
				Subtotal	P
				Materials Cost IX A	P
				Labor Cost IX A	
				Direct Cost IX A	P
B	CIVIL WORKS / STRUCTURAL WORKS (POWER HOUSE)				
	Concrete Works				
	Ready Mix Concrete, 21MPa, 3/4" Gravel, 28days				
	Slab-on-Fill	15	cu.m.	P	P
	On-Site Mix Concrete, 21MPa, 3/4" Gravel, 28days				
	Footing	4	cu.m.		
	Wall Footing	5	cu.m.		
	Column	5	cu.m.		
	Beam	6	cu.m.		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Suspended Slab	9	cu.m.		
	Reinforcing Steel Bar				
	Grade 40 Reinforcing Steel Bar including G.I. Tie Wire Ga. 16				
	10mm Ø Reinforcing Steel Bar				
	Wall Footing	149	kg		
	Column (Ties)	234	kg		
	Slab on Fill	222	kg		
	Beam (Stirrups)	95	kg		
	Suspended Slab	1786	kg		
	12mm Ø Reinforcing Steel Bar				
	Column	90	kg		
	Suspended Slab	248	kg		
	Grade 60 Reinforcing Steel Bar including G.I. Tie Wire Ga. 16				
	16mm Ø Reinforcing Steel Bar				
	Footing	220	kg		
	Column	498	kg		
	Beam (Main Bars)	410	kg		
	Formworks				
	Footing	11	sq.m.		
	Wall Footing	5	sq.m.		
	Column	37	sq.m.		
	Beam	23	sq.m.		
	Suspended Slab	47	sq.m.		
	Scaffolding and Shoring				
	Column	60	l.m.		
	Beam	40	l.m.		
	Suspended Slab	47	sq.m.		
	Masonry Works				
	150mm CHB Laying including Mortar, Reinforcement and Two-Face Plastering	74	sq.m.		
	Plastering of Doors and Windows Opening	35	l.m.		
	Thermal and Moisture Protection				
	Vapor Barrier	68	sq.m.		
	Cementitious Flexible Type Waterproofing	83	sq.m.		
				Materials Cost IX B	P
				Labor Cost IX B	
				Direct Cost IX B	P
C	ARCHITECTURAL WORKS (POWER HOUSE)				
	Floor Finishes				
	Plain Cement Paint Finish	224	sq.m.	P	P
	Ceiling Finishes				
	Rubbed Finishing Preparation for Slab Soffit	87	sq.m.		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
	Installation of Doors				
	D1 - 3.0m x 3.0m Double Outward Swing, Fully Louvered Steel Door	1	set	P	P

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	with Latches for Meralco Padlock and Danger Sign				
	D2 - 1.0m x 2.1m Double Outward Swing, Fully Louvered Steel Door with Latches for Meralco Padlock and Danger Sign	1	set		
	Installation of Window				
	W1- 8.0m x 2.0m Fixed Steel Louver	1	set		
				Materials Cost	P
				Labor Cost	
				Subtotal	P

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Painting Works				
	Textured Paint Finish (Exterior Walls)	104	sq.m	P	P
	Glossy Paint Finish	73	sq.m		
	Flat Latex Paint Finish (Interior Walls)	320	sq.m		
	Elastomeric Paint Finish (Roof and Canopy)	83	sq.m		
	Red Epoxy Primer (Electrical Works)	10	sq.m		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
				Materials Cost IX C	P
				Labor Cost IX C	
				Direct Cost IX C	P
D	SANITARY AND PLUMBING WORKS (POWER HOUSE)				
	Storm Drainage System				
	75mm Ø PVC Standard Hub Pipe	14	piece	P	P
	75mm Ø x 75mm Ø PVC Wye	4	piece		
	75mm Ø x 75mm Ø PVC 1/4 Bend	6	piece		
	75mm Ø x 75mm Ø PVC 1/8 Bend	4	piece		
	75mm Ø PVC P-Trap	8	piece		
	75mm Ø PVC Coupling	5	piece		
	Fixtures & Accessories				
	Deck Drain, 75mm Ø , Dome Type	8	unit		
	Pipe Hangers and Supports				
	For horizontal pipes greater than 50mm Ø, 1m interval	33	l.m.		
	Downspout Brackets	9	l.m.		
	Miscellaneous and Consumables				
	400cc Solvent Cement	3	can		
	Hacksaw Blade	2	piece		
	Waste Cloth	2	kg		
				Materials Cost IX D	P
				Labor Cost IX D	
				Direct Cost IX D	P
E	ELECTRICAL WORKS (POWER HOUSE)				
	Pipes and Fittings				
	20mm Ø PVC Pipe	45	piece	P	P
	65mm Ø PVC Pipe	6	piece		
	110mm Ø PVC Pipe	25	piece		
	20mmØ PVC Adaptor	42	piece		
	20mmØ PVC Locknut and Bushing	42	pair		
	20mmØ PVC Elbow	20	piece		
	65mmØ PVC Adaptor	40	piece		
	65mmØ PVC Locknut and Bushing	2	pair		
	65mmØ PVC Elbow	2	piece		
	110mmØ PVC Adaptor	20	piece		
	110mmØ PVC Locknut and Bushing	20	pair		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	50mm x 100mm PVC Utility Box	5	piece		
	100mm x 100mm PVC Junction Box With Cover	16	piece		
	20mm Ø Metallic Conduit	15	l.m.		
	Oval Eyebolt	1	piece		
	16mm Ø x 3000mm Grounding Rod (Copper Clod) with Ground Clamp	10	piece		
	Ground Well/Pit 8" Dia Depth with S/S Cover	1	piece		
	Wires and Cables				
	3.5mm² THHN Wire	2	roll		
	5.5mm² THHN Wire	70	l.m.		
	80.0mm² THHN Wire	42	l.m.		
	250.0mm² THHN Wire	225	l.m.		
	100.0mm² Bare Copper Wire	20	l.m.		
	2.0mm² TW Wire	90	l.m.		
	3.5mm² TW Wire	35	l.m.		
	22.0mm² TW Wire	15	l.m.		
	60.0mm² THW Wire	75	l.m.		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Lighting Fixtures (Energy Efficient)				
	18W LED Tube Light, Box Type, (Fixture Only)	7	piece		
	18W LED Tube Light	7	piece		
	12W, Cylindrical Wall Light (Column)	3	piece		
	Wiring Devices and Other Fixtures				
	Switch, with Plate & Cover , Three-gang	2	piece		
	Panel Board				
	LVSG (Low Voltage Switch Gear) Main: 1200AT/1200AF, 3P, 100KAIC @ 600V MCCB Branches: 1 - 300 AT, 3P , MCCB 4 - 200 AT, 3P , MCCB 3 - 100 AT, 3P , MCCB 1 - 30 AT, 3P , MCCB 1 - Space Enclosure: NEMA 1 with Ground Terminals	1	assy		
	LPP E (Lighting and Power Panel E) Main: 200AT/200AF, 3P, 35KAIC @ 240V MCCB Branches: 17 - 30 AT , 2P , Bolt-On 1 - 20 AT , 2P , Bolt-On Enclosure: NEMA 1 with Ground Terminals	1	assy		
	Automatic Transfer Switch (ATS) Main: 1200AT/1200AF, 3P, 220V , 60 Hz Enclosure: Weather Proof Type in NEMA 1 with Ground Terminals	1	assy		
	Miscellaneous & Consumables				
	400cc Solvent Cement	2	can		
	1000cc All Around Sealant	1	can		
	Electrical Tape	15	roll		
	Hacksaw Blade	4	piece		
	Masking Tape	2	roll		
	Pulling Lubricant	2	gal		
	Rubber Tape	10	roll		
	Tie Wire, Ga.16 (for cable pulling)	1	kg		
	Torch with Butane	2	set		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
	Stand By Generator Set 385KVA, 3P, 220V, 60Hz, 1800rpm with 0.8pf Diesel: Engine Driven Dimension : 4120mm x 1370 mm x 2000 mm	1	assy	P	P
				Subtotal	P
				Materials Cost IX E	P
				Labor Cost IX E	
				Direct Cost IX E	P

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
F	MECHANICAL WORKS (POWER HOUSE)				
	Equipment and Accessories				
	EF 2 - Wall Mounted Industrial Exhaust Fan, 1900cmh, 230V / 1ϕ / 60Hz	3	unit	P	P
	Miscellaneous and Consumables				
	Fire Extinguisher	1	piece		
				Materials Cost IX F	P
				Labor Cost IX F	
				Direct Cost IX F	P
				Materials Cost IX	P
				Labor Cost IX	
				Direct Cost IX	P

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
X	LAND DEVELOPMENT WORKS				
A	SITE WORKS (LAND DEVELOPMENT)				
	Roadway Excavation	102	cu.m.	P	P
	Removal of Existing Concrete Pavement	3,834	sq.m.		
	Layout and Staking	7,443	sq.m		
	Site Clearing and Preparation	7,443	sq.m		
	Excavation for Structures				
	Concrete Structures	598	cu.m		
	Sewer Line Pipes	230	cu.m.		
	Storm Drainage Pipes	2,780	cu.m.		
	Demolition of Existing Structure (Niche)	8,076	sq.m		
	Soil Poisoning/Termite Proofing	487	sq.m		
				Subtotal	P
	Gravel bedding	346	cu.m	P	P
				Materials Cost	P
				Labor Cost	
				Subtotal	P
	Backfill and Compaction	9,449	cu.m	P	P
				Subtotal	P
				Materials Cost X A	P
				Labor Cost X A	
				Direct Cost X A	P
B	CIVIL / STRUCTURAL WORKS (LAND DEVELOPMENT)				
1	Construction of Gazebo, Water Feature, Perimeter Fence & Stairs				
	Concrete Works				
	Ready Mix Concrete, 21MPa, 3/4" Gravel @ 28 days				
	Wall Footing	40	cu.m	P	P
	Slab on Fill	15	cu.m		
	Stairs	8	cu.m		
	Ready Mix Concrete, 28MPa, 3/4" Gravel @ 28 days				
	Retaining Wall (Footing)	54	cu.m		
	Column	30	cu.m		
	Beam	2	cu.m		
	Suspended Slab	2	cu.m		
	Retaining Wall (Stem Wall)	37	cu.m		
	Reinforcing Steel Bars				
	Grade 40 Reinforcing Steel Bar including G.I. Tie Wire # 16				
	10mm Ø Wall Footing	881	kg		
	10mm Ø Slab on Fill	190	kg		
	10mm Ø Column	1,129	kg		
	10mm Ø Beam	113	kg		
	10mm Ø Suspended Slab	65	kg		
	10mm Ø Stair	222	kg		
	Grade 60 Reinforcing Steel Bar including G.I. Tie Wire # 16				

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	16mm Ø Column	4,615	kg		
	16mm Ø Beam	282	kg		
	16mm Ø Retaining Wall	3,877	kg		
	16mm Ø Retaining Wall (Footing)	3,045	kg		
	Formworks				
	Wall Footing	286	sq.m		
	Retaining Wall (Footing)	184	sq.m		
	Column	414	sq.m		
	Beam	12	sq.m		
	Suspended Slab	6	sq.m		
	Scaffolding and Shoring				
	Column	15	l.m.		
	Beam	63	l.m.		
	Suspended Slab	35	sq.m		
	Masonry Works				
	100mm CHB Wall Laying, including mortar, reinforcement and two-face plastering	205	sq.m		
	150mm CHB Wall Laying, including mortar, reinforcement and two-face plastering	595	sq.m		
	Plastering of Doors and Windows Opening	8	l.m.		
	Metal Works				
	Trench Drain Steel Grating				
	6mm x 38mm Flat Bar	50	kg		
	5mm x 50mm Flat Bar	8	kg		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Perimeter Fence				
	25mm x 50mm x 9.5mm Tubular Bar	18,266	kg		
	25mm x 75mm x 9.5mm Tubular Bar	5,654	kg		
	100mm x 100mm x 9.5mm Tubular Bar	1,658	kg		
	Miscellaneous & Consumables				
	Acetylene Tank (Refill)	63	tank		
	Oxygen Tank (Refill)	32	tank		
	Welding Rod	16	box		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
2	Construction of Columbarium Gate & Guard House				
	Concrete Works				
	Ready Mix Concrete, 21MPa, 3/4" Gravel @ 28 days				
	Slab on Fill	6	cu.m	P	P
	Ready Mix Concrete, 28MPa, 3/4" Gravel @ 28 days				
	Column Footing	1	cu.m		
	Column	4	cu.m		
	Beam	4	cu.m		
	Reinforcing Steel Bars				
	Grade 40 Reinforcing Steel Bar including G.I. Tie Wire # 16				
	10mm Ø Slab on Fill	171	kg		
	10mm Ø Column	234	kg		
	10mm Ø Beam	252	kg		
	Grade 60 Reinforcing Steel Bar including G.I. Tie Wire # 16				
	16mm Ø Column	578	kg		
	16mm Ø Beam	465	kg		
	Formworks				
	Column	84	sq.m		
	Beam	80	sq.m		
	Suspended Slab	16	sq.m		
	Scaffolding and Shoring				
	Column	84	l.m.		
	Beam	66	l.m.		
	Masonry Works				
	150mm CHB Wall Laying, including mortar, reinforcement	204	sq.m.		
	Plastering of Doors and Windows Opening	23	l.m.		
	Metal Works				
	Steel Gate (2.15m x 4.50m) 2 Sets				
	25mm x 25mm x 1.5mm Tubular Bar	133	kg		
	50mm x 75mm x 2mm Tubular Bar	57	kg		
	50mm x 100mm x 2mm Tubular Bar	71	kg		
	150mm x 150mm x 6mm Tubular Bar	255	kg		
	1.20m x 2.40m x 2mm Mild Steel Plate	362	kg		
	Pillow Block	16	pc		
	Barrel Bolt	4	pc		
	Service Gate (1.30m x 2.05m) 2 Sets				

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	25mm x 25mm x 1.5mm Tubular Bar	48	kg		
	50mm x 75mm x 2mm Tubular Bar	38	kg		
	50mm x 100mm x 2mm Tubular Bar	71	kg		
	1.20m x 2.40m x 2mm Mild Steel Plate	181	kg		
	Pillow Block	8	piece		
	Barrel Bolt	2	piece		
	Miscellaneous & Consumables				
	Acetylene Tank (Refill)	1	tank		
	Assorted Metal Drill Bit	5	piece		
	Cut Off Blade	5	piece		
	Grinding Disc for Metal	5	piece		
	Oxygen Tank (Refill)	2	tank		
	Welding Rod	2	box		
				Materials Cost	P
				Labor Cost	
				Subtotal	P

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
3	Construction of Roads, Sidewalks, Curbs & Gutters				
	Concrete Works				
	316i P.C.C.P.,0.20m. thk., 550 F, 14 days	1,947	cu.m.	P	P
	502c Concrete Curb & Gutter (S-Type)	485	l.m.		
	503b Concrete Sidewalk.,0.10m. thk., 550 F, 14 days	188	sq.m.		
	503c Concrete Sidewalk.,0.10m. thk., 550 F, 14 days	3,766	sq.m.		
				Subtotal	P
				Materials Cost X B	P
				Labor Cost X B	
				Direct Cost X B	P
C	ARCHITECTURAL WORKS (LAND DEVELOPMENT)				
	Floor Finishes				
	600mm x 600mm Non-Skid Homogeneous Floor Tiles	30	sq.m.	P	P
	Stamped Concrete with 50mm Concrete Topping	565	sq.m.		
	Floor Topping for Preparation of Tile Works	50	sq.m.		
	600mm x 600mm Flamed Granite	129	sq.m.		
	Concrete Wheel Stopper	34	unit		
	Wall Finishes				
	Decorative Stone	509	sq.m.		
	Granite Wall	352	sq.m.		
	Groove Lines	327	l.m.		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
	Installation of Doors				
	D1 - 0.8m x 2.1m Metal Flush Door with Complete Lock Set	2	set	P	P
	Hardware and Accessories				
	Wooden Door Jamb				
	D1 - 0.8m x 2.1m Metal Flush Door with Complete Lock Set	2	set		
	Door Hinge, Heavy Duty	6	piece		
	Door Knob, Lever Type	2	piece		
	Installation of Windows				
	W1- 0.5m x 2.335m Aluminum Power Coated Awning Window with Fixed Glass	1	set		
	W2- 1.2m x 1.2m Aluminum Power Coated Aluminum Awning Window	1	set		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
	Painting Works				
	Elastomeric Paint Finish	148	sq.m.	P	P
	Epoxy Enamel Paint Finish (Steel Surfaces)	548	sq.m.		
	Fine Sand Blasted / Stucco Painted Finish	20	sq.m.		
	Plain Cement Plastered Painted Finish	803	sq.m.		
	Rubberized Paint Finish (Parking)	436	sq.m.		
	Logos and Letterings				
	400mm High Stainless Steel Signage with Neon Backlights "BAESA"	5	set		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	225mm High Stainless Steel Signage with Neon Backlight "Columbarium"	11	set		
	Stainless Steel Logo with 3mm Thk Stickers and Neon Backlight	1	set		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
				Materials Cost X C	P
				Labor Cost X C	
				Direct Cost X C	P

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
D	SANITARY AND PLUMBING WORKS (LAND DEVELOPMENT)				
	Sewer Line System				
	HDPE Pipe, SDR 13.6				
	150mm Ø HDPE Pipe, SDR 13.6	50	l.m.	P	P
	200mm Ø HDPE Pipe, SDR 13.6	10	l.m.		
	250mm Ø HDPE Pipe, SDR 13.6	145	l.m.		
	315mm Ø HDPE Pipe, SDR 13.6	25	l.m.		
	Sewer Manhole	9	unit		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
	Storm Drainage System				
	Reinforced Concrete Circular Pipe				
	460mm Ø R.C.C.P.	1,041	l.m.	P	P
	610mm Ø R.C.C.P.	754	l.m.		
	910mm Ø R.C.C.P.	194	l.m.		
	Concrete Manhole				
	C.M.H. for 460mm Ø R.C.P.	48	unit		
	C.M.H. for 610mm Ø R.C.P.	41	unit		
	C.M.H. for 910mm Ø R.C.P.	10	unit		
				Subtotal	P
	Water Line System				
	20mm Ø PPR Pipe, PN 16	29	piece	P	P
	40mm Ø PPR Pipe, PN 16	9	piece		
	50mm Ø PPR Pipe, PN 16	15	piece		
	65mm Ø PPR Pipe, PN 16	10	piece		
	75mm Ø PPR Pipe, PN 16	132	piece		
	90mm Ø PPR Pipe, PN 16	18	piece		
	20mm Ø x 20mm Ø PPR Tee Equal	13	piece		
	50mm Ø x 50mm Ø PPR Tee Equal	12	piece		
	75mm Ø x 40mm Ø PPR Tee Unequal	15	piece		
	40mm Ø x 20mm Ø PPR Reducer	13	piece		
	75mm Ø x 65mm Ø PPR Reducer	2	piece		
	90mm Ø x 75mm Ø PPR Reducer	2	piece		
	20mm Ø PPR 90° Elbow	13	piece		
	50mm Ø PPR 90° Elbow	8	piece		
	75mm Ø PPR 90° Elbow	13	piece		
	90mm Ø PPR 90° Elbow	7	piece		
	20mm Ø x 15mm Ø PPR Female Threaded Tee	13	piece		
	20mm Ø PPR End Cap	13	piece		
	50mm Ø PPR Union Patent	4	piece		
	20mm Ø PPR Coupling	29	piece		
	40mm Ø PPR Coupling	9	piece		
	50mm Ø PPR Coupling	15	piece		
	65mm Ø PPR Coupling	10	piece		
	75mm Ø PPR Coupling	132	piece		
	90mm Ø PPR Coupling	18	piece		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	20mm Ø PPR Male Adaptor	26	piece		
	50mm Ø PPR Male Adaptor	20	piece		
	65mm Ø PPR Male Adaptor	1	piece		
	90mm Ø PPR Male Adaptor	4	piece		
	Valves and Appurtenances				
	20mm Ø PPR Gate Valve	13	piece		
	50mm Ø PPR Gate Valve	4	piece		
	90mm Ø PPR Gate Valve	1	piece		
	50mm Ø Check Valve	6	piece		
	90mm Ø Check Valve	1	piece		
	65mm Ø Float Valve	1	piece		
	65mm Ø Water Meter	1	piece		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Fixtures				
	20mm Ø Vacuum Breaker	13	unit		
	Course Nozzle Bubbler	7	unit		
	Hose Bibb	13	unit		
				Materials Cost	P
				Labor Cost	
				Subtotal	P
				Materials Cost X D	P
				Labor Cost X D	
				Direct Cost X D	P
E	ELECTRICAL WORKS (LAND DEVELOPMENT)				
	Guard House				
	Pipes and Fittings				
	20mm Ø PVC Pipe	40	piece	P	P
	25mm Ø PVC Pipe	50	piece		
	40mm Ø PVC Pipe	8	piece		
	20mm Ø PVC Adaptor	12	piece		
	20mm Ø PVC Locknut and Bushing	12	pair		
	20mm Ø PVC Elbow	10	piece		
	25mm Ø PVC Adaptor	40	piece		
	25mm Ø PVC Locknut and Bushing	40	pair		
	25mm Ø PVC Elbow	10	piece		
	40mm Ø PVC Adaptor	6	piece		
	40mm Ø PVC Locknut and Bushing	6	pair		
	40mm Ø PVC Elbow	4	piece		
	100mm x 100mm PVC Junction Box with Cover	6	piece		
	20mm Ø Metallic Conduit	6	l.m.		
	Wires and Cables				
	3.5mm² THHN Wire	1	roll		
	5.5mm² THHN Wire	185	l.m.		
	8.0mm² THHN Wire	3	roll		
	30.0mm² THHN Wire	66	l.m.		
	2.0mm² TW Wire	60	l.m.		
	3.5mm² TW Wire	30	l.m.		
	5.5mm² TW Wire	150	l.m.		
	8.0mm² TW Wire	22	l.m.		
	Lighting Fixtures (Energy Efficient)				
	18W LED Tube Light, Box Type (Fixture Only)	1	piece		
	18W LED Tube Light	1	piece		
	40W , Pendant Light	2	piece		
	Wiring Devices and Other Fixtures				
	Outlet with Grounding , Two-gang	1	piece		
	Switch, with Plate & Cover , Three-gang	1	piece		
	Panel Board				
	LPP (Lighting and Power Panel)	1	assy		
	Main: 100AT/100AF, 3P, 25KAIC @240V MCCB				

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Branches: 1 -20 AT , 2P , Bolt-On 5 -30 AT , 2P , Bolt-On 4 -40 AT , 2P , Bolt-On 2 - Spare Enclosure: NEMA 1 with Ground Terminals				
	ENCLOSED CIRCUIT BREAKER (ECB)				
	30AT, 3P, NEMA 3R	3	assy		
	40AT, 3P, NEMA 3R	4	assy		
	Pipe Hangers and Supports				
	Vertical Layout of Pipe	5	l.m.		
	Miscellaneous & Consumables				
	400cc Solvent Cement	5	can		
	1000cc All Around Sealant	1	can		
	Electrical Tape	15	roll		
	Hacksaw Blade	5	pc		
	Masking Tape	5	roll		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Pulling Lubricant	1	gal		
	Rubber Tape	5	roll		
	Tie Wire, Ga.16 (for cable pulling)	10	kg		
	Torch with Butane	1	set		
				Materials Cost	P
				Labor Cost	
				Direct Cost	P
	Site Development				
	Pipes and Fittings				
	20mm Ø PVC Pipe	760	piece	P	P
	40mm Ø PVC Pipe	68	piece		
	65mm Ø PVC Pipe	120	piece		
	90mm Ø PVC Pipe	33	piece		
	110mm Ø PVC Pipe	120	piece		
	20mmØ PVC Adaptor	324	piece		
	20mmØ PVC Locknut and Bushing	324	pair		
	20mmØ PVC Elbow	135	piece		
	40mmØ PVC Adaptor	60	piece		
	40mmØ PVC Locknut and Bushing	60	pair		
	65mmØ PVC Adaptor	80	piece		
	65mmØ PVC Locknut and Bushing	80	pair		
	65mmØ PVC Elbow	60	piece		
	65mmØ PVC Coupling	60	piece		
	90mmØ PVC Adaptor	20	piece		
	90mmØ PVC Locknut and Bushing	20	pair		
	110mmØ PVC Adaptor	60	piece		
	110mmØ PVC Locknut and Bushing	60	pair		
	110mmØ Service Entrance Cap	3	piece		
	100mm x 100mm PVC Junction Box With Cover	153	piece		
	16mm Ø x 3000mm Grounding Rod (Copper Clod) with Ground Clamp	1	piece		
	Wires and Cables				
	5.5mm² THHN Wire	42	roll		
	30.0mm² THHN Wire	606	l.m.		
	80.0mm² THHN Wire	1,014	l.m.		
	150.0mm² THHN Wire	279	l.m.		
	250.0mm² THHN Wire	1,050	l.m.		
	3.5mm² TW Wire	22	roll		
	8.0mm² TW Wire	202	l.m.		
	22.0mm² TW Wire	338	l.m.		
	38.0mm² TW Wire	93	l.m.		
	60.0mm² THW Wire	350	l.m.		
	Lighting Fixtures (Energy Efficient)				
	30W LED Flood Light	14	piece		
	Chandelier	1	piece		
	Lamp Post	32	piece		
	Park Light	85	piece		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Panel Board				
	MCB (Main Circuit Breaker) Main: 1200AT/1200AF 3P, 100KAIC @600V MCCB Enclosure: NEMA 4X	1	assy		
	LPP (STP Room)				
	Main: 200AT/200AF 3P, 35KAIC @240V MCCB Branches: 4 - 30AT, 2P, Bolt-on 4 - 30AT, 3P, Bolt-on 2 - 20AT, 2P, Bolt-on Enclosure: NEMA 1 with Ground Terminals	1	assy		
	Pipe Hangers and Supports				
	Vertical Layout of Pipe	15	l.m.		
	Miscellaneous & Consumables				
	400cc Solvent Cement	10	can		
	1000cc All Around Sealant	5	can		
	Electrical Tape	30	roll		
	Hacksaw Blade	10	piece		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Masking Tape	10	roll		
	Pulling Lubricant	5	gal		
	Rubber Tape	10	roll		
	Tie Wire, Ga.16 (for cable pulling)	10	kg		
	Torch with Butane	5	set		
				Materials Cost	P
				Labor Cost	
				Direct Cost	P
				Materials Cost X E	P
				Labor Cost X E	
				Direct Cost X E	P
F	AUXILIARY WORKS (LAND DEVELOPMENT)				
	Closed Circuit Television (CCTV) System (Columbarium Building)				
	Pipes and Fittings				
	20mm Ø PVC Pipe	107	piece	P	P
	20mm Ø PVC Adaptor	54	piece		
	20mm Ø PVC Locknut	12	piece		
	20mm Ø Flexible Metallic Conduit	10	l.m.		
	20mm Ø Straight Connector with Locknut	5	piece		
	100mm x 100mm Metal Junction Box with Cover	6	piece		
	Wires and Cables				
	UTP Cat-6 Cable	4	roll		
	HDMI Cable	7	lm		
	Video Balun UTP Cat-6 Connector	10	pair		
	12V DC Male & Female Power Balun Connector	10	pair		
	Fixtures and Devices				
	HD Bullet Camera (Vandal Resistant), Outdoor type	10	unit		
	HD Dome Camera (Day/Night), Indoor Type	6	unit		
	HD Digital Video Recorder (DVR), 16-channel with DVD Burner	1	unit		
	32" LED Monitor	1	set		
	12V DC Power Adapter	1	unit		
	12V DC 1 Female to 8 Male Power Splitter	1	unit		
	Pipe Hangers and Supports				
	Rigid Steel Strap	84	piece		
	Strut Clamp	84	piece		
	6mm Ø x 40mm Tox with Screw	1	box		
	25mm Ø x 40mm Tox with Screw	1	box		
	Miscellaneous and Consumables				
	400cc Solvent Cement	10	can		
	Electrical Tape	10	roll		
	G.I. Tie Wire (for Cable Pulling)	2	kg		
	Masking Tape	6	roll		
	Pulling Lubricant	3	can		
	Rubber Tape	5	roll		
				Materials Cost	P
				Labor Cost	

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
				Direct Cost	P
	Closed Circuit Television (CCTV) System (Morgue Building)				
	Pipes and Fittings				
	20mm Ø PVC Pipe	22	piece		
	20mm Ø PVC Adaptor	11	piece		
	20mm Ø PVC Locknut	11	piece		
	20mm Ø Flexible Metallic Conduit	4	l.m.		
	20mm Ø Straight Connector with Locknut	2	piece		
	100mm x 100mm Metal Junction Box with Cover	11	piece		
	Wires and Cables				
	UTP Cat-6 Cable	1	roll		
	Video Balun UTP Cat-6 Connector	4	pair		
	12V DC Male & Female Power Balun Connector	4	pair		
	Fixtures and Devices				
	HD Bullet Camera (Vandal Resistant), Outdoor type	4	piece		

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Pipe Hangers and Supports				
	Rigid Steel Strap	5	piece		
	Strut Clamp	19	piece		
	6mm Ø x 40mm Tox with Screw	1	box		
	25mm Ø x 40mm Tox with Screw	1	box		
	Miscellaneous and Consumables				
	400cc Solvent Cement	10	can		
	Electrical Tape	5	roll		
	G.I. Tie Wire (for Cable Pulling)	2	kg		
	Masking Tape	3	roll		
	Pulling Lubricant	2	can		
	Rubber Tape	3	roll		
				Materials Cost	P
				Labor Cost	
				Direct Cost	P
	Closed Circuit Television (CCTV) System (Admin Building)				
	Pipes and Fittings				
	20mm Ø PVC Pipe	60	piece	P	P
	20mm Ø PVC Adaptor	30	piece		
	20mm Ø PVC Locknut	12	piece		
	20mm Ø Flexible Metallic Conduit	7	l.m.		
	20mm Ø Straight Connector with Locknut	3	piece		
	100mm x 100mm Metal Junction Box with Cover	4	piece		
	118mm PVC Square Box	1	piece		
	Wires and Cables				
	UTP Cat-6 Cable	48	roll		
	HDMI Cable	10	lm		
	Video Balun UTP Cat-6 Connector	7	pair		
	12V DC Male & Female Power Balun Connector	7	pair		
	Fixtures and Devices				
	HD Bullet Camera (Vandal Resistant), Outdoor type	7	piece		
	12V DC Power Adapter	1	piece		
	12V DC 1 Female to 8 Male Power Splitter	1	piece		
	Pipe Hangers and Supports				
	Rigid Steel Strap	30	piece		
	Strut Clamp	30	piece		
	6mm Ø x 40mm Tox with Screw	1	box		
	25mm Ø x 40mm Tox with Screw	1	box		
	Miscellaneous and Consumables				
	400cc Solvent Cement	10	can		
	Electrical Tape	10	roll		
	G.I. Tie Wire (for Cable Pulling)	2	kg		
	Masking Tape	5	roll		
	Pulling Lubricant	2	can		
	Rubber Tape	5	roll		
				Materials Cost	P
				Labor Cost	

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
				Direct Cost	P
				Materials Cost X F	P
				Labor Cost X F	
				Direct Cost X F	P
G	UTILITIES & ANCILLARY WORKS (LAND DEVELOPMENT)				
	Construction of Hand Hole				
	Concrete Encasement (0.70m Width)	273	l.m.	P	P
	Hand Hole (0.70m x 0.70m)	8	set		
	Hand Hole (0.70m x 1.20m)	2	set		
	Construction of Service Entrance				
	Concrete Service Entrance Post (0.40m x 0.40m x 5.0m)	1	unit		
	Electrical Earth Pit	1	unit		
				Subtotal	P

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	QTY	UNIT	UNIT COST	TOTAL COST
	Equipment and Accessories				
	Sewage Pump, 50gpm, 40ft TDH, 2.0hp, 230V/1φ/60Hz	8	unit	P	P
	Electric Blower, 3.5kW, 230cmh, 230V/3φ/60Hz	4	unit		
				Equipment Cost	P
	Labor Cost with Technical Supervision				
				Direct Cost	P
				Materials Cost X G	P
				Labor Cost X G	
				Direct Cost X G	P
				Materials Cost X	P
				Labor Cost X	
				Direct Cost X	P

SUMMARY

ITEM NO	WORK DESCRIPTION AND SCOPE OF WORKS	AMOUNT
I	GENERAL REQUIREMENTS	P
II	CONSTRUCTION OF COLUMBARIUM BUILDING	
III	CONSTRUCTION OF MORGUE BUILDING	
IV	CONSTRUCTION OF ADMIN BUILDING	
V	CONSTRUCTION OF PUBLIC TOILET WITH PUMP HOUSE	
VI	CONSTRUCTION OF PUBLIC TOILET	
VII	CONSTRUCTION OF MATERIAL RECOVERY FACILITY	
VIII	CONSTRUCTION OF DIESEL STORAGE	
IX	CONSTRUCTION OF POWER HOUSE	
X	LAND DEVELOPMENT WORKS	
TOTAL DIRECT COST		P
Strictly enforce health protocols relative to the latest applicable DPWH memorandum	Overhead, Contingencies and Miscellaneous Expenses (OCM)	
	Profit	
	VAT	
TOTAL ESTIMATED COST		P

Section IX. Checklist of Technical and Financial Documents

Notes on the Checklist of Technical and Financial Documents

The prescribed documents in the checklist are mandatory to be submitted in the Bid, but shall be subject to the following:

- a. GPPB Resolution No. 09-2020 on the efficient procurement measures during a State of Calamity or other similar issuances that shall allow the use of alternate documents in lieu of the mandated requirements; or
- b. any subsequent GPPB issuances adjusting the documentary requirements after the effectivity of the adoption of the PBDs.

The BAC shall be checking the submitted documents of each Bidder against this checklist to ascertain if they are all present, using a non-discretionary “pass/fail” criterion pursuant to Section 30 of the 2016 revised IRR of RA No. 9184.

Checklist of Technical and Financial Documents

I. TECHNICAL COMPONENT ENVELOPE

Class “A” Documents

Legal Documents

- ☐ (a) Valid PhilGEPS Registration Certificate (Platinum Membership) (all pages);
and
- ☐ (b) Registration certificate from Securities and Exchange Commission (SEC), Department of Trade and Industry (DTI) for sole proprietorship, or Cooperative Development Authority (CDA) for cooperatives or its equivalent document;
and
- ☐ (c) Mayor’s or Business permit issued by the city or municipality where the principal place of business of the prospective bidder is located, or the equivalent document for Exclusive Economic Zones or Areas;
and
- ☐ (e) Tax clearance per E.O. No. 398, s. 2005, as finally reviewed and approved by the Bureau of Internal Revenue (BIR).

Technical Documents

- ☐ (f) Statement of the prospective bidder of all its ongoing government and private contracts, including contracts awarded but not yet started, if any, whether similar or not similar in nature and complexity to the contract to be bid (*please see attached prescribed forms required by the QC – BAC for Infrastructure and Consultancy*); **and**
- ☐ (g) Statement of the bidder’s Single Largest Completed Contract (SLCC) similar to the contract to be bid, except under conditions provided under the rules with an attached Notice of Award, Notice to Proceed, Contract and Certificate of Acceptance (*please see attached prescribed form required by the QC – BAC for Infrastructure and Consultancy*); **and**
- ☐ (h) Philippine Contractors Accreditation Board (PCAB) License;
or
Special PCAB License in case of Joint Ventures;
and registration for the type and cost of the contract to be bid; **and**
- ☐ (i) Original copy of Bid Security. If in the form of a Surety Bond, submit also a certification issued by the Insurance Commission;
or
Original copy of Notarized Bid Securing Declaration; **and**
- ☐ (j) Project Requirements, which shall include the following:
 - ☐ a. Organizational chart for the contract to be bid;
 - ☐ b. List of contractor’s key personnel (*e.g.*, Project Manager, Project Engineers, Materials Engineers, and Foremen), to be assigned to the contract to be bid, with their complete qualification and experience data (*please see attached prescribed form required by the QC – BAC for Infrastructure and Consultancy*);
 - ☐ c. List of contractor’s major equipment units, which are owned, leased, and/or under purchase agreements, supported by proof of ownership or certification of availability of equipment from the equipment

lessor/vendor for the duration of the project, as the case may be (*please see attached prescribed form required by the QC – BAC for Infrastructure and Consultancy*); **and**

- ☐ (k) Original duly signed Omnibus Sworn Statement (OSS); **and** if applicable, Original Notarized Secretary's Certificate in case of a corporation, partnership, or cooperative; or Original Special Power of Attorney of all members of the joint venture giving full power and authority to its officer to sign the OSS and do acts to represent the Bidder.

Additional Technical Requirements:

- ☐ • Certificate of Site Inspection or Affidavit of Site Inspection as part of Omnibus Sworn Statement
- ☐ • Affidavit of Undertaking for Key Personnel and Equipment (*please see attached prescribed form required by the QC – BAC for Infrastructure and Consultancy*)
- ☐ • Equipment Utilization Schedule
- ☐ • Manpower Schedule
- ☐ • Construction Schedule and S-Curve
- ☐ • PERT-CMP
- ☐ • Construction Methods

Financial Documents

- ☐ (l) The prospective bidder's audited financial statements, showing, among others, the prospective bidder's total and current assets and liabilities, stamped "received" by the BIR or its duly accredited and authorized institutions, for the preceding calendar year which should not be earlier than two (2) years from the date of bid submission; **and**
- ☐ (m) The prospective bidder's computation of Net Financial Contracting Capacity (NFCC) (*please see attached prescribed form required by the QC – BAC for Infrastructure and Consultancy*).

Class "B" Documents

- ☐ (n) If applicable, duly signed joint venture agreement (JVA) in accordance with RA No. 4566 and its IRR in case the joint venture is already in existence; **or** duly notarized statements from all the potential joint venture partners stating that they will enter into and abide by the provisions of the JVA in the instance that the bid is successful.

II. FINANCIAL COMPONENT ENVELOPE

- ☐ (o) Original of duly signed and accomplished Financial Bid Form; **and**

Other documentary requirements under RA No. 9184

- ☐ (p) Original of duly signed Bid Prices in the Bill of Quantities; **and**
- ☐ (q) Duly accomplished Detailed Estimates Form, including a summary sheet indicating the unit prices of construction materials, labor rates, and equipment rentals used in coming up with the Bid; **and**
- ☐ (r) Cash Flow by Quarter.

Bid Form for the Procurement of Infrastructure Projects
[shall be submitted with the Bid]

BID FORM

Date : _____
Project Identification No. : _____

To: *[name and address of Procuring Entity]*

Having examined the Philippine Bidding Documents (PBDs) including the Supplemental or Bid Bulletin Numbers *[insert numbers]*, the receipt of which is hereby duly acknowledged, we, the undersigned, declare that:

- a. We have no reservation to the PBDs, including the Supplemental or Bid Bulletins, for the Procurement Project: *[insert name of contract]*;
- b. We offer to execute the Works for this Contract in accordance with the PBDs;
- c. The total price of our Bid in words and figures, excluding any discounts offered below is: *[insert information]*;
- d. The discounts offered and the methodology for their application are: *[insert information]*;
- e. The total bid price includes the cost of all taxes, such as, but not limited to: *[specify the applicable taxes, e.g. (i) value added tax (VAT), (ii) income tax, (iii) local taxes, and (iv) other fiscal levies and duties]*, which are itemized herein and reflected in the detailed estimates,
- f. Our Bid shall be valid within the a period stated in the PBDs, and it shall remain binding upon us at any time before the expiration of that period;
- g. 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, or a Performance Securing Declaration in lieu of the the allowable forms of Performance Security, subject to the terms and conditions of issued GPPB guidelines¹ for this purpose;
- h. 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;
- i. 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
- j. We understand that you are not bound to accept the Lowest Calculated Bid or any other Bid that you may receive.

¹ currently based on GPPB Resolution No. 09-2020

- k. 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 [Name of Project] of the [Name of the Procuring Entity].
- l. We acknowledge that failure to sign each and every page of this Bid Form, including the Bill of Quantities, shall be a ground for the rejection of our bid.

Name: _____

Legal Capacity: _____

Signature: _____

Duly authorized to sign the Bid for and behalf of: _____

Date: _____

Bid Securing Declaration Form

[shall be submitted with the Bid if bidder opts to provide this form of bid security]

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

BID SECURING DECLARATION **Project Identification No.: *[Insert number]***

To: *[Insert name and address of the Procuring Entity]*

I/We, 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 procurement 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 RA No. 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; and
 - c. I am/we are declared the bidder with the Lowest Calculated Responsive Bid, and I/we have furnished the performance security and signed the Contract.

IN WITNESS WHEREOF, I/We have hereunto set my/our hand/s this ____ day of *[month]* *[year]* at *[place of execution]*.

[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]

Contract Agreement Form for the Procurement of Infrastructure Projects (Revised)

[not required to be submitted with the Bid, but it shall be submitted within ten (10) days after receiving the Notice of Award]

CONTRACT AGREEMENT

THIS AGREEMENT, made this *[insert date]* day of *[insert month]*, *[insert year]* between *[name and address of PROCURING ENTITY]* (hereinafter called the "Entity") and *[name and address of Contractor]* (hereinafter called the "Contractor").

WHEREAS, the Entity is desirous that the Contractor execute *[name and identification number of contract]* (hereinafter called "the Works") and the Entity has accepted the Bid for *[contract price in words and figures in specified currency]* by the Contractor for the execution and completion of such Works and the remedying of any defects therein.

NOW THIS AGREEMENT WITNESSETH AS FOLLOWS:

1. In this Agreement, words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to.
2. The following documents as required by the 2016 revised Implementing Rules and Regulations of Republic Act No. 9184 shall be deemed to form and be read and construed as part of this Agreement, viz.:

- a. Philippine Bidding Documents (PBDs);
 - i. Drawings/Plans;
 - ii. Specifications;
 - iii. Bill of Quantities;
 - iv. General and Special Conditions of Contract;
 - v. Supplemental or Bid Bulletins, if any;
- b. Winning bidder's bid, including the Eligibility requirements, Technical and Financial Proposals, and all other documents or statements submitted;

Bid form, including all the documents/statements contained in the Bidder's bidding envelopes, as annexes, and all other documents submitted (e.g., Bidder's response to request for clarifications on the bid), including corrections to the bid, if any, resulting from the Procuring Entity's bid evaluation;

- c. Performance Security;
 - d. Notice of Award of Contract and the Bidder's conforme thereto; and
 - e. Other contract documents that may be required by existing laws and/or the Procuring Entity concerned in the PBDs. **Winning bidder agrees that additional contract documents or information prescribed by the GPPB that are subsequently required for submission after the contract execution, such as the Notice to Proceed, Variation Orders, and Warranty Security, shall likewise form part of the Contract.**
3. In consideration for the sum of *[total contract price in words and figures]* or such other sums as may be ascertained, *[Named of the bidder]* agrees to *[state the object of the contract]* in accordance with his/her/its Bid.

4. The *[Name of the procuring entity]* agrees to pay the above-mentioned sum in accordance with the terms of the Bidding.

IN WITNESS whereof the parties thereto have caused this Agreement to be executed the day and year first before written.

[Insert Name and Signature] [Insert Name and Signature]

[Insert Signatory's Legal Capacity] [Insert Signatory's Legal Capacity]

for: for:

[Insert Procuring Entity] [Insert Name of Supplier]

Acknowledgment

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

Omnibus Sworn Statement (Revised)

[shall be submitted with the Bid]

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]

Performance Securing Declaration (Revised)

[if used as an alternative performance security but it is not required to be submitted with the Bid, as it shall be submitted within ten (10) days after receiving the Notice of Award]

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

PERFORMANCE SECURING DECLARATION

Invitation to Bid: [Insert Reference Number indicated in the Bidding Documents] To:
[Insert name and address of the Procuring Entity]

I/We, the undersigned, declare that:

1. I/We understand that, according to your conditions, to guarantee the faithful performance by the supplier/distributor/manufacturer/contractor/consultant of its obligations under the Contract, I/we shall submit a Performance Securing Declaration within a maximum period of ten (10) calendar days from the receipt of the Notice of Award prior to the signing of the Contract.
2. I/We accept that: I/we will be automatically disqualified from bidding for any procurement contract with any procuring entity for a period of one (1) year for the first offense, or two (2) years for the second offense, upon receipt of your Blacklisting Order if I/We have violated my/our obligations under the Contract;
3. I/We understand that this Performance Securing Declaration shall cease to be valid upon:
 - a. issuance by the Procuring Entity of the Certificate of Final Acceptance, subject to the following conditions:
 - i. Procuring Entity has no claims filed against the contract awardee;
 - ii. It has no claims for labor and materials filed against the contractor; and
 - iii. Other terms of the contract; or
 - b. replacement by the winning bidder of the submitted PSD with a performance security in any of the prescribed forms under Section 39.2 of the 2016 revised IRR of RA No. 9184 as required by the end-user.

IN WITNESS WHEREOF, I/We have hereunto set my/our hand/s this ____ day of [month]
[year] at [place of execution].

*[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]

LIST OF ALL ON-GOING GOVERNMENT AND PRIVATE CONTRACTS

NAME OF CONTRACTOR: _____

PROJECT TITLE (Name of the Contract) & EXACT PROJECT LOCATION	DATE OF CONTRACT	CONTRACT DURATION	PROJECT OWNER & POSTAL ADDRESS	NATURE OF WORK	CONTRACTOR'S ROLE (SOLE CONTRACTOR, SUBCONTRACTOR, PARTNER IN A JV) and PERCENTAGE OF PARTICIPATION	TOTAL CONTRACT VALUE AT AWARD	DATE OF COMPLETION or ESTIMATED COMPLETION TIME	TOTAL CONTRACT VALUE AT COMPLETION IF APPLICABLE	PERCENTAGE		VALUE OF OUTSTANDING WORKS (IN PHP)
									ACTUAL ACCOMPLISHMENT	PLANNED ACCOMPLISHMENT	
									TOTAL AMOUNT (Php) OF OUTSTANDING WORKS		

PHOTOCOPY ADDITIONAL FORMS, IF NECESSARY

LIST OF ALL AWARDED BUT NOT YET STARTED GOVERNMENT AND PRIVATE CONTRACTS OF THE BIDDER

NAME OF CONTRACTOR: _____

PROJECT TITLE: _____

PROJECT TITLE & EXACT LOCATION	MAJOR SCOPE OF WORKS & DATE STARTED	NAME AND ADDRESS OF PROJECT OWNER	CONTRACT PRICE (PHP) AS AWARDED	DATE OF SCHEDULED COMPLETION	ROLE OF BIDDER <u>IN THE</u> <u>CONTRACT SOLE</u> <u>CONTRACTOR / SUB-</u> <u>CONTRACTOR/PARTNER IN A</u>
TOTAL AMOUNT OF CONTRACT (Php)					

SINGLE LARGEST COMPLETED CONTRACT SIMILAR TO THE CONTRACT TO BE BID

NAME OF CONTRACTOR: _____

PROJECT TITLE: _____

PROJECT TITLE (Name of the Contract) & EXACT PROJECT LOCATION	DATE OF CONTRACT	CONTRACT DURATION	PROJECT OWNER & POSTAL ADDRESS	NATURE OF WORK	CONTRACTOR'S ROLE (SOLE CONTRACTOR, SUBCONTRACTOR, PARTHNER IN A JV) and PERCENTAGE OF PARTICIPATION	TOTAL CONTRACT VALUE AT AWARD	DATE OF COMPLETION or ESTIMATED COMPLETION TIME	TOTAL CONTRACT VALUE AT COMPLETION IF APPLICABLE

LIST OF MAJOR EQUIPMENT TO BE USED FOR THE PROJECT

NAME OF CONTRACTOR: _____

PROJECT TITLE: _____

TYPE	DESCRIPTION / CAPACITY	SERIAL NO.	YEAR ACQUIRED	PRESENT LOCATION (SPECIFIC ADDRESS)	STATUS OF AVAILABILITY (OWNED/LEASED)

A. LIST OF KEY CONSTRUCTION PERSONNEL TO BE ASSIGNED TO THE PROJECT

NAME OF CONTRACTOR: _____

PROJECT TITLE: _____

NAME	POSITION	AGE	EDUCATIONAL ATTAINMENT	TYPE OF CONSTRUCTION EXPERIENCE	NO.OF YEARS WITH THE CONTRACTOR	PROFESSION	PRC NO.

COMPUTATION OF NET FINANCIAL CONTRACTING CAPACITY (NFCC)

NAME OF BIDDER: _____

CURRENT ASSETS*		PHP	_____
(LESS) CURRENT LIABILITIES*	(LESS)	PHP	_____
NETWORTH		PHP	_____
NETWORTH x 15	x 15	PHP	_____
(LESS) VALUE OF ALL OUTSTANDING ON-GOING CONTRACTS**	(LESS)	PHP	_____
(LESS) VALUE OF ALL AWARDED BUT NOT YET STARTED CONTRACTS AS OF DATE**	(LESS)	PHP	_____
NET FINANCIAL CONTRACTING CAPACITY		PHP	_____

NOTES: * CURRENT ASSETS AND LIABILITIES BASED ON AUDITED FINANCIAL STATEMENT FOR THE PRECEDING CALENDAR YEAR SUBMITTED TO B.I.R.

 ** BASED ON LIST OF ON-GOING AND AWRDED BUT NOT YEY STARTED CONTRACTS SUBMITTED

REPUBLIC OF THE PHILIPPINES)

_____) S.S.

AFFIDAVIT OF UNDERTAKING

I, _____, of legal age, Filipino, _____ **[OFFICER OR REPRESENTATIVE]** _____

with office address at _____ after having been duly sworn to in accordance with law, hereby voluntary depose and state:

That I am duly authorized representative of the **[Name of Bidder]** to execute this undertaking as evidenced by Secretary's Certificate and Board Resolution.

That **[Name of Bidder]** bidding for the (Name of Project)

That relative to the aforementioned Project, the **[Name of Bidder]** hereby undertake that the equipment to be use and the key personnel to be assign shall exclusively be used and will only perform to the said project until its completion.

That I am executing this affidavit to attest to the truth of the foregoing and in compliance with the submission of the technical requirements for the public bidding of the said project.

IN WITNESS HEREOF, I have hereunto signed my name below this _____ day of _____ at _____.

AFFIANT FURTHER SAYETH NAUGHT.

Affiant

SUBSCRIBED AND SWORN TO BEFORE ME this ____ day of _____
_____ in _____,

affiant exhibiting to me his/her _____ issued at
_____ on _____.

Doc. No. ;
Page No. ;
Book No. ;
Series of 2020

Notary Public

