PHILIPPINE BIDDING DOCUMENTS

Procurement of INFRASTRUCTURE PROJECTS

Government of the Republic of the Philippines

CONSTRUCTION OF SCHOOL BUILDING COMPONENT FOR THE INCREASE IN CARRYING CAPACITY OF THE COLLEGE OF MEDICINE (REBID)

(ABC: Php 4,942,956.87)

PhilGeps Reference No: 11783721
PR 24-11-575 INF (Rebid)

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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 conformance 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 basis 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[k])

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[o])

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
WESTERN MINDANAO STATE UNIVERSITY
BIDS AND AWARDS COMMITTEE FOR INFRASTRUCTURE

Invitation to Bid for *PR 24-11-575 INF (Rebid) Construction of School Building Component for the Increase in Carrying Capacity of The College of Medicine (Rebid)*

1. The *Western Mindanao State University*, through the *GAA* intends to apply the sum of *Four Million Nine Hundred Forty-Two Thousand Nine Hundred Fifty-Six Pesos and Eighty-Seven Centavos (Php 4,942,956.87)* being the Approved Budget for the Contract (ABC) to payments under the contract for *Construction of School Building Component for the Increase in Carrying Capacity of the College of Medicine (Rebid)*. Bids received in excess of the ABC shall be automatically rejected at bid opening.

2. The *Western Mindanao State University* now invites bids for the above Procurement Project. Completion of the Works is required *within One Hundred Eighty (180) Calendar Days*. 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 *Western Mindanao State University* and inspect the Bidding Documents at the address given below from *8:00 AM - 5:00 PM Monday to Friday*.

5. A complete set of Bidding Documents may be acquired by interested bidders on *March 7, 2025 – April 3, 2025* from given address and website/s below and upon payment of the applicable fee for the Bidding Documents, pursuant to the latest Guidelines issued by the GPPB, in the amount of *Five Thousand (5,000.00) Pesos*.

6. The *Western Mindanao State University* will hold a Pre-Bid Conference[1] on *March 17, 2025 1:30 PM at BAC Office, Ground Floor Executive Building, Western Mindanao State University, Baliwasan, Zamboanga City*, which shall be open to prospective bidders.

7. Bids must be duly received by the BAC Secretariat through manual submission at the office address as indicated below on or before *1:00 PM April 3, 2025*. Late bids shall not be accepted.

8. All bids must be accompanied by a bid security of at least two percent (2%) of the Approved Budget for the Contract (ABC) in the form of Cash, Cashier's Check or Manager's Check, or Bid Securing Declaration. Bids without Bid Security will not be considered.

9. Bid opening shall be on *April 3, 2025, 1:00 PM* at the given address below *BAC Office, Ground Floor Executive Building, Western Mindanao State University, Baliwasan,*

[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.

Zamboanga City. Bids will be opened in the presence of the bidders' representatives who choose to attend the activity.

10. The *Western Mindanao State University* 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:

Mr. Joel C. Manalang
Head Secretariat
Executive Building, BAC Office
Western Mindanao State University
Normal Road, Baliwasan
Zamboanga City
Tel. No. (062)991-1771 loc. 100)
Email: bacsecretariat@wmsu.edu.ph

12. You may visit the following websites:

For downloading of Bidding Documents: www.wmsu.edu.ph *or PhilGeps website*

March 7, 2025

FREDELINO M. SAN JUAN, Ph.D.
BAC Chairperson

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, *Western Mindanao State University* invites Bids for the *PR 24-11-575 INF (Rebid) Construction of School Building Component for the Increase in Carrying Capacity of the College of Medicine (Rebid)*.

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 *CAA* in the amount of *Four Million Nine Hundred Forty-Two Thousand Nine Hundred Fifty-Six Pesos and Eighty-Seven Centavos (Php 4,942,956.87)*.

2.2. The source of funding is:

a. NGA, the General Appropriations Act or Special Appropriations.

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.

a. Subcontracting is not allowed.

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 *March 17, 2025 1:30 PM at BAC Office, Ground Floor Executive Building, Western Mindanao State University, Zamboanga City* and/or through video conferencing/webcasting) as indicated in paragraph 6 of the IB.

9. Clarification and Amendment of Bidding Documents

Prospective bidders may request for clarification on and/or interpretation of any part of this 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 tradable 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 shall be valid *at least 120 calendar days from the Opening of Bids*. Any bid not accompanied by an acceptable bid security shall be rejected by the Procuring Entity as non-responsive.

16. Sealing and Marking of Bids

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

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

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

17. Deadline for Submission of Bids

The Bidders shall submit on or before *April 3, 2025, 1:00 PM* at its physical address at the *BAC Office Ground Floor Executive Building, Western Mindanao State University, Baliwasan, Zamboanga City*.

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 preparing 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, contracts similar to the Project refer to contracts which have the same major categories of work, which shall be: *Note – As provided for in Section 21.4.2.4*
7.1	*Not Applicable*
10.3	*[Specify if another Contractor license or permit is required.]*
10.4	The key personnel must meet the required minimum years of experience set below: **Key Personnel** — **General Experience** — **Relevant Experience** *Licensed Civil Engineer* — *5 years* — *5 years* *Materials Engineer* — *5 years* — *5 years* *Construction Foreman* — *5 years* — *5 years* *Carpenter* — *5 years* — *5 years* *Steelman* — *5 years* — *5 years* *Tinsmith* — *5 years* — *5 years* *Mason* — *5 years* — *5 years* *Plumber* — *5 years* — *5 years* *Electrician* — *5 years* — *5 years* *Safety Officer* — *Certification issued by the Department of Labor and Employment (DOLE).*
10.5	The minimum major equipment requirements are the following: **Equipment's** — **Quantity** Dump Truck — 1 Batcher Mixer — 1 Concrete Vibrator — 2 Bar Cutter — 2 Bar Bender — 2
12	*No Further Instructions*
15.1	The bid security shall be in the form of a Bid Securing Declaration or any of the following forms and amounts: a. The amount of not less than two *percent (2%) of ABC* if bid security is in cash, cashier's/manager's check, bank draft/guarantee or irrevocable letter of credit;
19.2	Partial bid is not allowed. 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	***PCAB Licensie (Size Range: Small B, License Category: C & D)*** *All licenses and permits relevant to the Project and the corresponding law requiring it, e.g., Environmental Compliance Certificate, Certification that the project site is not within a geohazard zone, etc.*
21	Additional contract documents relevant to the Project that may be required by existing laws and/or the Procuring Entity, such as construction schedule and S-curve, manpower schedule, construction methods, equipment utilization schedule, construction safety and health program approved by the DOLE, and other acceptable tools of project scheduling.

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 62.1.2 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 "F" 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	*No further instructions*
4.1	**The Procuring Entity** shall give possession of all parts of the Site to the **Contractor Ono (1) day after receipt of Notice to Proceed and Commence Work.**
6	The site investigation reports are: *[list here the required site investigation reports.]*.
7.2	*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 navigation areas, ports, dams, tunnels, filtration and treatment plants, sewerage systems, power plants, transmission and communication towers, railway system, and other similar permanent structures:* **Fifteen (15) years.**
10	a. Dayworks are applicable at the rate shown in the Contractor's original Bid.
11.1	The Contractor shall submit the Program of Work to the Procuring Entity's Representative within *Ten (10)* days of delivery of the Notice of Award.
11.2	The amount to be withheld for late submission of an updated Program of Work is *Ten Percent (10%).*
13	The amount of the advance payment is *15% upon request subject to submission to and acceptance by the PE of a Performance Security*
14	*No Further Instructions*
15.1	The date by which operating and maintenance manuals are required is *within 10 (Ten) days after the Notice to Proceed and Commence Work* The date by which "as built" drawings are required is *at least Thirty (30) calendar days from the receipt of Completion and Turn-Over)*
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 percent (10 %).*

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.

TECHNICAL SPECIFICATIONS

(ADOPTED FROM DPWH – STANDARD SPECIFICATIONS FOR PUBLIC WORK STRUCTURES)

ITEM B.3 – PERMITS AND CLEARANCE

B.3.1 General Requirements

The contractor shall be responsible for securing all necessary permits and clearances related to the project which shall include but not limited to Hydrogeological assessment permit, excavation permit, clearances and locational compliance certificate, etc. Completion of the excavation and Fiscal – Form 1600A and Taxpayer's Compensation Insurance (CMTI), and other necessary requirements by the Local Government and BIR's among other, including payment of assessed fees, as may be required by the LGU's such as Occupancy Permit and before the turnover/date of the project.

The [redacted] – Physical Plant and Engineering Services are required to review, and bid specifications in accordance with the provisions of PNS Standards for application for Building Permits pursuant to Section I and II of the Implementing Rules and Regulations of the National Building Code, shall be authority to issue and conditions and posting and submittal of the building site. Public buildings and institutional projects funded wholly or exempt from payment of building permit fees.

ITEM B.4 – PROJECT SIGN BOARD / SIGNBOARD

B.4.1 General Requirements

The Contractor shall furnish (1) Project Information Signs and one for beginning and the end of the project or upon the direction of the Engineer.

The signs are considered necessary by the Physical Plant and Engineering Services the government information projects to inform the public of the implementation of the project and to advertise their name of the ongoing construction.

The sign billboard (single sided, dimensions and lettering type, as shown hereof) shall be erected on a permanent billboard measuring 1.220 mm x 2.440 mm using 12.00 mm thick marine plywood or fabrication of the same size painted on 2 coats marine plywood. The said billboard project fee billboard shall be installed at each of the project site. For each multi-simultaneous ongoing project, two billboards shall be installed, one (1) at the beginning and one (1) at the end of the project.

For road projects with a length of 10 linear meter, additional billboards shall also be installed at every five (5) kilometer. Exact(s) and/or location(s) of any additional signs shall be subject to the Engineer.

The other billboards shall be allowed to be installed with an information title as shall be [redacted] purposes and to eliminate the [redacted] limits or other [redacted] rights, [redacted] construction shall not be allowed as other [redacted] of [redacted] any [redacted] on their assignment.

The Contractor shall also install one (1) billboard as per [redacted] Sec. 2010.004, (Memorandum and Subsidy on Programs/Projects/Activities of Government Agencies.

ITEM 8.7 – OCCUPATIONAL SAFETY AND HEALTH

8.7.1 Description

This item covers the implementation of construction safety in all stages of project construction through provision, installation and maintenance of equipment, provisions, and activities to the satisfaction of the Engineer.

8.7.1.1 Construction Safety and Health Program (CSHP)

Every construction project shall have a suitable and approved Construction Safety and Health Program (CSHP) as required in all contracts regardless of amount, funding source and mode of implementation which shall comply with the minimum safety and health requirements as specified in the Occupational Safety and Health Standards.

The approved CSHP shall include but not be limited to the following:

1. Composition of the Safety and Health personnel responsible for the proper implementation of CSHP
2. Specific safety policies which shall be undertaken in the construction site, including frequency of and persons responsible for conducting toolbox and gang meetings.
3. Penalties and sanctions for violations of the CSHP.
4. Frequency, contents and persons responsible for preparing, submitting and keeping all reports to the office regarding the CSHP within the contract.
5. The manner of disposing of waste arising from the construction.

8.7.2 Construction Safety and Health personnel

At the start of the project, the Contractor shall establish Construction safety and health personnel composed of the following personnel:

1. Project Manager/Project Engineer

   The Contractor shall provide for a full time Project Manager/Project Engineer, who is tasked to observe, monitor and supervise the enforcement of CSHP man being followed strictly and correctly.

2. General Safety Engineer/Officer

   The General Contractor and/or subcontractors, as the case may be, shall provide for a full-time Officer, who shall be assigned as the CSHP to oversee and enforce full time the overall management of the CSHP. Furthermore, deployment of part-time or full-time safety men depending on the number of workers shall be provided in accordance with Rule 1030 of the Occupational Safety and Health Standards (OSHS) and applicable provisions under Section 2.6, Safety Personnel of Department of Labor and Employment (DOLE) Department Order (D.O.) 13, Series of 1998.

3. Health Personnel

   The Contractor's health personnel may be full time or part time certified first aider, registered nurse, physician and dentist depending on the total number of workers conforming to Section 2.8 Emergency Occupational Health Personnel and Facilities of DOLE D.O. 13, Series of 1998.

- Safety Practitioner

The Contractor must provide a full time or part time Safety Practitioner, who must [illegible] safety and health training [illegible]

[illegible]	[illegible]
[illegible]	
[illegible]	One (1) [illegible]
[illegible]	One (1) [illegible]
[illegible]	One (1) [illegible]
[illegible]	
[illegible]	One (1) [illegible]
[illegible]	One (1) [illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	One (1) [illegible]
[illegible]	One (1) [illegible] One (1) [illegible] [illegible] [illegible]
[illegible]	One (1) [illegible] One (1) [illegible] One (1) [illegible] [illegible]

8.7.2 Supervision, Control and Monitoring

[illegible] supervision, [illegible] and monitoring of the implementation of [illegible] for projects [illegible] shall be under the Implementing Office.

8.7.3 Construction Safety and Health Training

The Construction Safety and Health Training [illegible] shall be a [illegible] safety course [illegible] the DOLE [illegible] [illegible] in construction [illegible] [illegible] training course.

The Contractor shall provide [illegible] construction safety and health training to all [illegible] [illegible] training shall be a minimum of [illegible] per year for every [illegible] safety personnel.

8.7.4 Construction Safety and Health Reports

The Contractor shall be required to submit a monthly construction safety and health report to the DOLE Regional Office concerned. The report shall include a monthly summary of all safety and health [illegible] [illegible], a summary of all [illegible] [illegible] with the [illegible] for each [illegible].

In case of any [illegible] [illegible] the concerned [illegible] shall [illegible] notify the DOLE Regional Office within 24 [illegible]. After the [illegible] of investigation [illegible] the [illegible] shall report all [illegible] to DOLE Regional Office [illegible] of the month following the date of [illegible] of [illegible] using the DOLE [illegible] Report.

[illegible] Personal Protective Equipment (PPE) and Devices

[illegible] Contractor shall furnish his workers with protective equipment such as eyes, face, hands and feet, lifeline, safety harness/belts, protective shields and [illegible] whenever necessary by nature of the hazardous work process or environment, chemical or radiological or other mechanical or [illegible] hazards capable of causing injury or impairment in the function or any part of the body through absorption, [illegible] in addition to standard issue.

All PPE and Devices shall be in accordance with the requirements of the OSHS and should bear the [illegible] marking like the Occupational Safety and Health Center (OSHC).

For Hazardous Communicable Work, [illegible] basis, PPE's for all workers shall be safety helmet, safety gloves and safety shoes. Specialty PPE's shall be provided to workers in addition to or in lieu of the corresponding basic PPE as the work or activity requires. Workers with [illegible] shall be provided with goggles even the wearing of PPE. Moreover, all other persons who are not [illegible] shall be allowed to the site or work activities but must also wear appropriate PPE's.

Construction workers who are working from unguarded surfaces 2 m or more above ground, [illegible] or passageways from platforms, scaffolds or where they are exposed to the possibilities of falls [illegible] to life or limb, must be provided with safety harnesses and lifelines.

Construction Work / Activity	Construction PPE	Remarks
1. Any kind of [illegible] construction or [illegible] activities, for instance: a. Building scaffolds; b. Building formwork	1. Safety shoes 2. Safety helmet 3. Safety harness/belts 4. Safety goggles 5. Face shield 6. Gloves	Must be worn especially if the [illegible] and employees working [illegible]
2. Working/working around [illegible] such as but not limited to the following: a. [illegible] b. Working [illegible] with [illegible]	1. Safety shoes/boots 2. Safety helmet 3. Gloves 4. Safety goggles 5. Face shield 6. Safety harness/belts	If welder/welding [illegible] shall be provided If welder/welding [illegible] shall be provided
3. Working/working [illegible]	1. Safety shoes/boots 2. Safety helmet 3. Gloves 4. Safety goggles 5. Face shield 6. Safety harness/belts	If welder/welding [illegible] shall be provided If welder/welding [illegible] shall be provided
4. Working [illegible]	1. Safety shoes/boots 2. Safety helmet 3. Gloves 4. Safety goggles 5. Face shield 6. Safety harness/belts	If welder/welding [illegible] shall be provided If welder/welding [illegible] shall be provided
5. Working with steel [illegible]	1. Safety shoes/boots 2. Safety helmet 3. Gloves 4. Safety goggles 5. Face shield 6. Safety harness/belts	If welder/welding [illegible] shall be provided If welder/welding [illegible] shall be provided
6. [illegible]	1. Safety shoes/boots 2. Safety helmet 3. Gloves 4. Safety goggles 5. Face shield 6. Safety harness/belts	If welder/welding [illegible] shall be provided If welder/welding [illegible] shall be provided
7. Working on top of any [illegible]	1. Safety shoes/boots 2. Safety helmet 3. Gloves 4. Safety goggles 5. Face shield 6. Safety harness/belts	If welder/welding [illegible] shall be provided If welder/welding [illegible] shall be provided
8. Work [illegible]	1. Safety shoes/boots 2. Safety helmet 3. Gloves 4. Safety goggles 5. Face shield 6. Safety harness/belts	If welder/welding [illegible] shall be provided If welder/welding [illegible] shall be provided

		2. Heat resistant and [illegible] gloves	
		3. [illegible]	
		4. Heat resistant protective clothing	
		5. Light filtering [illegible]	For gas cutting [illegible]
9.	When working with live electricity above 50 volts AC or DC	1. Electricity insulated safety gloves	Electrical resistance must be suitable for the [illegible] voltage [illegible]
		2. Electricity insulated safety shoes	
10.	Work involving exposure to or handling of hot materials or work near open flame	1. Heat resistant and heat insulating gloves	For handling of hot [illegible]
		2. Heat insulating protective clothing	For working in hot working environments
		3. Heat resistant protective face shield	For working near open flame
11.	Work involving [illegible]	1. [illegible]	[illegible]
		2. Ear protection	
12.	Work involving exposure to [illegible] dust	1. Dust filtering respirators	[illegible]
13.	Work [illegible] oxygen	1. Self-contained or supplied air respirator	[illegible]
14.	Working with [illegible] chemicals	1. Chemical resistant gloves	[illegible]
		2. Chemical filtering respirator	[illegible]
		3. Chemical resistant face shield	[illegible]
		4. Chemical goggles	[illegible]
		5. Chemical protective [illegible]	[illegible]
15.	Working with atmosphere containing [illegible]	1. [illegible] filtering respirators	[illegible]
		2. [illegible]	[illegible]
		3. Self-contained or supplied air respirator	[illegible]
		4. Chemical suits	[illegible]
16.	Working at height [illegible]		
17.	Working near vehicular traffic	1. [illegible]	
		2. [illegible]	
18.	[illegible]	1. Self-contained or supplied [illegible] breathing apparatus	

	[illegible]	If any worker may be exposed to [illegible] and wet
8. Working in [illegible] lighting conditions	1. High visibility vest	

8.1.8 Signages and Barricades

Construction Safety Signages and Barricades shall be provided as appropriate and/or sufficient to protect the workers and the public of the hazards existing in the worksite. Signages shall be posted in prominent positions at strategic locations and as far as practicable, be in the language understandable to most of the workers employed. The cost of the same shall be in accordance with the DPWH Road Works Safety Manual.

8.1.9 Facilities

The Contractor shall provide the following welfare facilities in the proper hygienic working conditions:

1. Adequate supply of safe drinking water
2. Adequate sanitary and washing facilities
3. Suitable living accommodation for workers and as may be applicable for their families
4. Separate sanitary, washing and sleeping facilities for men and women workers. The provision of a full-time registered nurse, a full-time physician, a dentist and an infirmary or emergency hospital with one (1) bed capacity when the number of employees exceed 300. In addition, there should be one (1) bed capacity for every 100 employees in excess of three hundred (300).

8.1.10 Costing

The cost of the implementation of construction safety and health shall be integrated to the overall project cost under the prescribed pay item. In consideration of the cost involved of providing the necessary safety equipment and manpower for an effective implementation of safety in the workplace, the following shall be used as a guide:

1. Personal Protective Equipment (PPE)

   The PPEs shall be provided by the Contractor and its cost shall be duly quantified and made part of the overall cost of Item B.7 Occupational Safety and Health. The use of PPEs shall conform to Section 8.1.7 Personal Protective Equipment and Clothing.

2. Clinical Materials and Equipment

   Medical equipment as a component such as medicines, first aid items, other related necessities shall be at the account of the Contractor implementing the project and shall be in accordance with the Occupational Health Standard of DOLE.

3. Signages and Barricades

   The quantities and cost of signages and barricades necessary for a specific item of work shall be quantified and made part of that pay item of work. For general signages and barricades not related to specific pay item of work but necessary for promoting safety in and around the construction site, the quantities and cost shall be a separate pay item and included in the overall cost of Item B.7 - Occupational Safety and Health.

4. Facilities

Facilities such as portable toilets, waste disposal, sanitary and washing facilities, emergency dressings and clinic, adequate lighting, and other facilities needed in construction safety and health program in accordance with DOLE and previously approved guidelines of the Department and shall be quantified and the cost thereof be made a separate pay item under "Facilities for the Engineers and Other General Requirements" as required in the DPWH Standard Specifications.

6. Workers

Labor cost for the worker and safety personnel assigned in the field shall be included in the overall cost of Item 5.0 "Occupational Safety and Health Program" and shall be calculated based on the cost of labor or the [illegible]. Duration of employment shall be based on project duration [illegible].

8. Safety and Health Training

Cost associated for the provision of basic and continuing construction safety and health training of all safety and technical personnel shall be made part of the indirect/overhead cost of the project.

8.3.1) Safety in Construction during Heavy Equipment Operations

In relation to heavy equipment operation in all construction sites, the following are required in the different phases of the project:

I. Pre-Construction

The contractor must ensure that necessary certification is obtained from DOLE duly accredited organizations for the following:

a. All heavy equipment operators assigned at the project site must be tested and certified in accordance with a standard trade test prescribed by Technical Education and Skills Development Authority (TESDA) in coordination with its accredited organization.

b. All heavy equipment must be tested and certified in accordance with the standards prescribed by DOLE or its recognized organization prior to commissioning of said equipment.

II. During Construction

The Contractor must ensure that the following conditions be met and complied with:

a. For mobilization or transport of heavy equipment, road regulations, weight and width dimensions as imposed by Government for all roads and bridges to be utilized during transport. Operators with duly certified [illegible] are allowed to load and unload heavy equipment in [illegible].

b. During operation and use of heavy equipment, operating manuals must be updated. Standard checklist of usage and procedures must be observed. A list of [illegible] equipment, tools and materials must be available and properly utilized.

c. In the conduct of periodical inspections, duly certified mechanics and operators shall conduct [illegible] inspection of all heavy equipment [illegible] of the site in accordance with standards set by TESDA in coordination with the Association of Construction Equipment Lessors (ACEL), Inc. During [illegible] inspection all equipment which do not comply with the minimum safety standards for equipment certification shall be immediately removed from the work site for [illegible] or repair until they meet such standards or requirements. The Contractor and the equipment owner shall maintain a logbook [illegible] for [illegible] of maintenance reports. [illegible]

[illegible] for each heavy equipment. These equipment shall be used as a reference [illegible] during the conduct of equipment inspection.

3. Post Removal and Post Construction

The procedures for [illegible]

B.7.12 [illegible]

The Contractor [illegible]

ITEM B.9 - MOBILIZATION / DEMOBILIZATION

B.9.1 [illegible]

[illegible]

Mobilization and demobilization shall be treated as a separate pay item. [illegible]

ITEM B.10 - TEMPORARY FENCE

B.10.1 Description

[illegible]

B.10.2 Material Requirements

B.10.2.1 Barbed Wire

Barbed wire shall conform to the requirements of ASTM [illegible]

B.10.2.2 Chain Link Screen Fence

Chain link fence fabric shall be fabricated from the [illegible] conforming to [illegible], Chain Link Fence, and shall be of the type shown on the Plans. Before ordering the chain link fence fabric, the Contractor shall submit a sample of the material to the Engineer for testing and his approval.

[illegible].2.2 Concrete Post

Concrete posts shall be made of Class A concrete in accordance with Item [illegible], Structural Concrete. The posts shall be cast to a uniform section as shown on the Plans and shall have a smooth surface finish.

[illegible].2.3 Steel Post

Steel posts shall be of the sections and length as specified or as shown on the Plans. The posts shall be copper bearing open hearth steel conform to the requirements of ASTM A 702, Standard Specification for Steel Fence Posts, Hot Wrought, for the grade specified.

[illegible].2.4 Steel Reinforcement

Steel reinforcement for concrete posts shall be deformed steel bars conforming to the provisions of Item [illegible], Reinforcing Steel.

[illegible].2.5 Hardware

Nuts, bolts, washers and other ungalvanized hardware shall be galvanized after fabrication as specified in AASHTO [illegible], Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware.

[illegible].3 Construction Requirements

The Contractor shall perform such clearing and grubbing as may be necessary to construct the fence to the required grade and alignment.

The Contractor shall install the concrete posts in the concrete footing to the [illegible] dimensions. [illegible] In addition, if the [illegible] is encountered [illegible], it will [illegible] the Contractor to provide an additional [illegible] of the [illegible] to permit the installation of [illegible].

Line posts, corner and end posts [illegible] shall be installed in accordance with the Plans. Lengths of the posts and footings shall conform to the dimensions shown on the Plans.

At locations where breaks in a run of fencing are required, or at intersections with existing fences, appropriate adjustments in post spacing shall be made to conform to the requirements for the type of closure indicated.

When the Plans require that the posts, braces or anchors be embedded in concrete, the Contractor shall install temporary guys or braces [illegible] until such time as the concrete has set sufficiently to hold the posts. Unless otherwise permitted, no materials shall be installed on posts or braces placed in concrete until [illegible] days elapsed from the time of placing the concrete.

All posts shall be set vertically and to the required grade and alignment. Cutting off the tops of the posts will not be allowed only with the approval of the Engineer [illegible].

The fabric [illegible] shall be firmly attached to the posts and braces in the manner indicated. All wire shall be stretched taut and installed to the required elevations.

The fence shall generally follow the contour of the ground, with the bottom of fence fabric not less than [illegible] nor more than [illegible] from the ground surface. Grading shall be performed where necessary to

4. Power Shall

The Contractor shall construct, install before power at the time of test as indicated on the Plans, and to the satisfaction of the Engineer. Upon completion, these power shall become the property of the Contractor and shall be removed from the project site.

ITEM 900 (Refer to ITEM 105, ITEM 120) – CLEARING AND GRUBBING

900.1 Description

This item shall consist of clearing, grubbing, removing and disposing of vegetation and other objectionable materials within the right-of-way, borrow pits, and designated areas, and in preparation of the roadbed, slopes, and other areas to be occupied by the embankment or other structures or facilities within the limits of the project.

900.2 Construction Details

900.2.1 General

The Engineer will establish the limits of the work and designate all trees, shrubs, and other things to remain. The Contractor will be responsible for protecting those designated to remain. Any damage to such trees or shrubs selected for retention shall be repaired, replaced, or compensated for, as the Engineer may direct.

900.2.2 Clearing and Grubbing

All spoiling, stumps, and all trees, shrubs, roots and other protruding obstructions, not designated to remain, shall be removed, including undergrowth cleared, grubbed and removed from:

1. Roadbed or shoulders and slopes and roots and non-merchantable dead shrubs with a minimum of 300 mm. DBH having height not greater or equal of embankments will be required.
2. A minimum width of the existing right-of-way and within the limits, channels and waterways as may be required from different elevations of natural ground where the water level.
3. All areas to be covered by the toe of the fill slopes, except that all such shall be cut off flush with the surface of the final slope line.
4. Existing roads, channels, ditches and ditch work, trees to be left standing shall be trimmed to the lines, grades and cross sections as directed.

Except in the areas to be excavated, stump holes and other voids from which obstructions are removed shall be backfilled with suitable material and compacted to the satisfaction of the Engineer.

If combustible materials are burned, it shall be done under the constant care of competent watchmen at such times and in such a manner that the surrounding vegetation, other adjacent property, or anything designated to remain on the right-of-way will not be endangered. If permitted, burning shall be done in accordance with applicable laws, ordinances, and regulations.

The contractor shall use high intensity burning procedures (i.e. accelerants, high blowing or jet assisted burners) and have an adequate supply of all ignition sources before burning with the proper safety measures during the burning process. At the conclusion of each burning session, the fire shall be completely extinguished so that no smoldering debris remains. If the Contractor is delayed by the Engineer and or start burning operations or to suspend such operations because of hazardous weather conditions, ambient air temperature, wind velocity or subsequent construction operations shall be removed by the Contractor to temporary location

[illegible] of construction operations and later, if directed by the Engineer, shall be ... at a designated time and burned.

Perishable and debris which cannot be burned and nonperishable burned material may be disposed of by methods and in locations approved by the Engineer, on or off the project. If disposal is by burying, the debris shall be placed in layers with the material so disposed of in each layer shall be covered or mixed with earth material by the land-fill method to fill all voids. The top layer of material buried shall be covered with at least 300mm (12 inches) of earth or other approved material and shall be graded, shaped and compacted to present a pleasing appearance. If the disposal location is off the project, the Contractor shall make all necessary arrangements with property owners in writing for obtaining suitable disposal locations which are outside the limits of view from the project. The cost involved shall be included in the bid price. A copy of such agreement shall be furnished to the Engineer. The disposal area shall be seeded, fertilized and mulched at the contractor's expense.

Woody material may be disposed of by chipping. The wood chips may be used for mulch, slope erosion control or may be uniformly spread over selected areas as directed by the Engineer. Wood chips used as mulch for erosion control shall have a maximum thickness 12mm (1/2 inch) and not exceeding [illegible] square ([illegible] square inches) in any individual surface area. Wood chips not designated for use under other sections shall be spread over the designated areas in layers not to exceed 75 mm (3 inches) loose thickness. Diseased trees shall be buried or disposed of as directed by the Engineer.

All merchantable timber in the clearing area which has not been removed from the right-of-way prior to the beginning of construction, shall become the property of the Contractor, unless otherwise provided.

Low hanging, unsound and unsightly branches on trees or shrubs designated to remain shall be trimmed as directed. Branches of trees extending over the roadbed shall be trimmed to give a clear height of 6 m (20 feet) above the roadbed surface. All trimming shall be done by skilled workmen and in accordance with good tree surgery practices.

Timber cut inside the area staked for clearing shall be felled within the area to be cleared.

100.2.3 Individual Removal of Trees or Stumps

Individual trees or stumps designated by the Engineer for removal and located in areas other than those established for clearing or grubbing and roadside clean up shall be removed and disposed of as specified under Subsection 100.2.1 except trees removed shall be cut as nearly flush with the ground as practicable without removing stumps.

ITEM 801 (Refer to ITEM 101) ITEM 101 – REMOVAL OF STRUCTURES AND OBSTRUCTIONS

101.1 Description

This Item shall consist of the removal wholly or in part, and satisfactory disposal of all buildings, fences, structures, old pavements, abandoned pipelines, and any other obstructions which are not designated or permitted to remain, except for the obstructions to be removed and disposed of under other items in the Contract. It shall also include the salvaging of designated materials and backfilling the resulting trenches, holes, and pits.

101.2 Construction Requirements

The Contractor shall perform the work described above, within and adjacent to the roadway, on Government-owned land or easement, as shown on the Plans or as directed by the Engineer. All designated salvable material shall be removed, without unnecessary damage, in sections or pieces which may be readily transported, and shall be stored by the Contractor at specified places on the project or as otherwise shown in

the Special Provisions. Pavement markings shall be installed as designated in Subsection 101.2.2 Unsuitable material may be disposed of outside the limits of view from the project with written permission of the property owner on whose property the material is placed. Copies of all agreements with property owners are to be furnished to the Engineer. Basements or cavities left by the structure removal shall be filled with acceptable material to the level of the surrounding ground and, if within the prism of construction, shall be compacted to the required density.

101.3.2 Removal of Existing Bridges, Culverts, and other Drainage Structures

All existing bridges, culverts and other drainage structures in use by traffic shall not be removed until satisfactory arrangements have been made to accommodate traffic. The removal of existing culverts within the embankment areas will be required only as necessary for the installation of new structures. Abandoned culverts shall be broken down, crushed and sealed or plugged. All culverts adapted for future use as determined by the Engineer shall be carefully removed and all precautions shall be employed to avoid breakage or structural damage to any of its part. All sections of structures removed which are not designated for stockpiling or re-laying shall become the property of the Contractor and be removed from the project or disposed off in a manner approved by the Engineer.

Unless otherwise directed, the substructures of existing structures shall be removed down to the natural stream bottom and those parts outside of the stream shall be removed down to at least 300 mm (12 inches) below natural ground surface. Where such portions of existing structures lie wholly or in part within the limits for a new structure, they shall be removed as necessary to accommodate the construction of the proposed structure.

Steel bridges and wood bridges when specified to be salvaged shall be carefully dismantled without damage. Steel members shall be match-marked unless such match marking is waived by the Engineer. All salvaged material shall be stored as specified in Subsection 101.2.1.

Structures designated to become the property of the Contractor shall be removed from the right-of-way.

Blasting or other operations necessary for the removal of an existing structure or obstruction, which may damage new construction, shall be completed prior to placing the new work, unless otherwise provided in the Special Provisions.

101.3.3 Removal of Pipes Other than Pipe Culverts

Unless otherwise provided, all pipes shall be carefully removed and every precaution taken to avoid breakage or damage. The pipes to be re-laid shall be removed and stored when necessary, so that there will be no loss or damage before re-laying. The Contractor shall replace sections lost from storage or damaged by negligence, at his own expense.

101.3.4 Removal of Existing Pavement, Sidewalks, Curbs, etc.

All concrete pavement, base course, sidewalks, curbs, gutters, etc., designated for removal, shall be:

a. Broken into pieces and used for riprap on the project, or
b. Broken into pieces, the size of which shall not exceed 300 mm (12 inches) in any dimension and stockpiled at designated locations on the project for use by the Government, or
c. Otherwise, broken-up and disposed-off as directed by the Engineer. When specified, bitumen, gravel, bituminous materials or other surfacing or pavement materials shall be removed and stockpiled as required in Subsection 101.3.1; otherwise such materials shall be disposed off as directed.

There will be no separate payment for excavating for removal of structures and obstructions or for backfilling and compacting the remaining cavity.

ITEM 903 – STRUCTURAL EXCAVATION

903.1 Description

This item shall consist of the necessary excavation for foundation of bridges, culverts, retaining walls and other structures not otherwise provided for in the specifications. Excavation shall include the removal of the backfilling of completed structures and the disposal of all materials excavated, and the preparation and finishing of the bottom of excavations to the lines and grades indicated in the Plans or as established by the Engineer.

The term shall include necessary shoring of the excavation, bailing, pumping, draining, cofferdamming and the necessary construction of coffer and cofferdams, but excluding the materials therefore, and the subsequent removal of same and refilling of the excavation as hereinafter provided.

It also includes the furnishing and placing of approved foundation fill material to replace unsuitable material below the foundation elevation of structures. No allowance will be made for classification of different types of common excavation.

903.2 Construction Requirements

903.2.1 Clearing and Grubbing

The foundation excavation operations in any area of necessary clearing and grubbing in that area shall be performed in accordance with Item 111(1): Clearing & Grubbing.

Excavation

1. General. All excavation for the Contractor shall notify the Engineer sufficiently in advance of the beginning of any excavation so that cross sectional observations may be taken before construction begins. The natural ground adjacent to the structure shall not be disturbed without the permission of the Engineer. Trenches or foundation pits for structures or abutments or piers shall be excavated to the lines and grades or elevations shown on the Plans or as staked by the Engineer. They shall be of sufficient size to permit the placing of forms and the placing and inspection of the full width and length of the foundations. The elevations of the bottoms of footings, as shown on the Plans, shall be considered as approximate only and the Engineer may order, in writing, such changes in dimensions or elevations of footings as may be deemed necessary by the owner's authorized representative.

   Boulders, logs, and other objectionable materials encountered in excavation shall be removed.

   After each excavation is completed, the Contractor shall notify the Engineer so that cross-sectional observations, bailing, removal of objectionable material and the character of the foundation material.

2. Structures other than pipe culverts. All wood or other temporary supports shall be removed to such depth as may be directed by the Engineer. All timber, either round, squared, or sawed as directed by the Engineer. All timber or portions thereof extending into ground. All loose and disintegrated rock and other material shall be removed.

   When the footing is to rest on material other than rock, excavation to final grade shall not be made until just before the footing is to be placed. When

the foundation material is soft or mucky or otherwise unsuitable, as determined by the Engineer, the Contractor shall remove the unsuitable material and backfill with approved granular material. This foundation fill shall be placed and compacted in 150 mm (6 inches) layers up to the foundation elevation. When foundation piles are used, the excavation of each pit shall be completed before the piles are driven and any placing of foundation fill shall be done after the piles are driven. After the driving is completed, all loose and displaced materials shall be removed, leaving a smooth, solid bed to receive the footing.

2. Pipe Culverts. The width of the pipe trench shall be sufficient to permit satisfactory jointing of the pipe and thorough tamping of the bedding material under and around the pipe.

Where rock, hardpan, or other unyielding material is encountered, it shall be removed below the foundation grade for a depth of at least 300 mm or 4 mm for each 100 mm of fill over the top of pipe, whichever is greater, but not to exceed three-quarters of the vertical inside diameter of the pipe. The width of the excavation shall be at least 300 mm (12 inches) greater than the horizontal outside diameter of the pipe. The excavation below grade shall be backfilled with selected fine compressible material, such as silty clay or loam, and lightly compacted in layers not over 150 mm (6 inches) in uncompacted depth to form a uniform but yielding foundation.

Where a firm foundation is not encountered at the grade established, due to soft, spongy, or other unstable soil, such unstable soil under the pipe shall be removed to the depth directed by the Engineer and replaced with approved granular foundation fill material properly compacted to provide adequate support for the pipe, unless other special construction methods are called for on the Plans.

The foundation surface shall provide a firm foundation of uniform density throughout the length of the culvert and, if directed by the Engineer, shall be cambered in the direction parallel to the pipe centerline.

Where pipe culverts are to be placed in trenches excavated in embankments, the excavation of each trench shall be performed after the embankment has been constructed to a plane parallel to the proposed profile grade and to such height above the bottom of the pipe as shown on the Plans or directed by the Engineer.

103.3.3 Utilization of Excavated Materials

All excavated materials, so far as suitable, shall be utilized as backfill or embankment. The surplus materials shall be disposed off in such manner as not to obstruct the stream or otherwise impair the efficiency or appearance of the structure. No excavated materials shall be deposited at any time so as to endanger the partly finished structure.

103.3.4 Cofferdams

Suitable and practically watertight cofferdams shall be used wherever water-bearing strata are encountered above the elevation of the bottom of the excavation. If requested, the Contractor shall submit drawings showing his proposed method of cofferdam construction, as directed by the Engineer.

Cofferdams or cribs for foundation construction shall in general, be carried well below the bottoms of the footings and shall be well braced and as nearly watertight as practicable. In general, the interior dimensions

of cofferdams shall be such as to give sufficient clearance for the construction of forms and the inspection of their exteriors, and to permit pumping outside of the forms. Cofferdams or cribs which are tilted or moved laterally during the process of sinking shall be righted or enlarged to provide the necessary clearance.

When conditions are encountered which, as determined by the Engineer, render it impracticable to dewater the foundation before placing the footing, the Engineer may require the construction of a concrete foundation seal of such dimensions as he may consider necessary, and of such thickness as to resist any possible uplift. The concrete for such seal shall be placed as shown on the Plans or directed by the Engineer. The foundation shall then be dewatered and the footing placed. When weighted cribs are employed and the mass is utilized to overcome partially the hydrostatic pressure acting against the bottom of the foundation seal, special anchorage such as dowels or keys shall be provided to transfer the entire mass of the crib to the foundation seal. When a foundation seal is placed under water, the cofferdams shall be vented or ported at low water level as directed.

Cofferdams shall be constructed to protect green concrete against damage from sudden rising of the stream and to prevent damage to the foundation by erosion. No timber or bracing shall be left in cofferdams or cribs in such a way as to extend into substructure concrete, without written permission from the Engineer.

Any pumping that may be permitted from the interior of any foundation enclosure shall be done in such a manner as to preclude the possibility of any portion of the concrete materials being carried away. Any pumping required during the placing of concrete, or for a period of at least 24 hours thereafter, shall be done from a suitable sump located outside the concrete forms. Pumping to dewater a sealed cofferdam shall not commence until the seal has set sufficiently to withstand the hydrostatic pressure.

Unless otherwise provided, cofferdams or cribs, with all sheeting and bracing involved therewith, shall be removed by the Contractor after the completion of the substructure. Removal shall be effected in such manner as not to disturb or mar finished masonry.

103.3.3 Preservation of Channel

Unless otherwise permitted, no excavation shall be made outside of caissons, cribs, cofferdams, or sheet piling, and the natural stream bed adjacent to structure shall not be disturbed without permission from the Engineer. If any excavation or dredging is made at the site of the structure before caissons, cribs, or cofferdams are sunk in place, the Contractor shall, after the foundation base is in place, backfill all such excavation to the original ground surface or stream bed with material satisfactory to the Engineer.

103.3.4 Backfill and Embankment for Structures Other Than Pipe Culverts

Excavated areas around structures shall be backfilled with free draining granular material approved by the Engineer and placed in horizontal layers not over 150 mm (6 inches) in thickness, to the level of the original ground surface. Each layer shall be moistened or dried as required and thoroughly compacted with mechanical tampers.

In placing backfill or embankment, the material shall be placed simultaneously in so far as possible to approximately the same elevation on both sides of an abutment, pier, or wall. If conditions require placing backfill or embankment appreciably higher on one side than on the opposite side, the additional material on the higher side shall not be placed until the masonry has been in place 14 days, or until tests made by the laboratory under the supervision of the Engineer establishes that the masonry has attained sufficient strength to withstand any pressure created by the methods used and materials placed without damage or strain beyond a safe factor.

Backfill or embankment shall not be placed behind the walls of concrete culverts or abutments or rigid frame structures until the top slab is placed and cured. Backfill and embankment behind abutments held at the top by the superstructure, shall be carried up simultaneously behind opposite abutments or sidewalls of culverts.

All embankments adjacent to structures shall be constructed in horizontal layers and compacted as prescribed in Subsection 104.3.3 except that mechanical tampers may be used for the required compaction. Special care shall be taken to prevent any wedging action against the structure and slopes bounding or within the areas to be filled shall be benched or serrated to prevent wedge action. The placing of embankment and the benching of slopes shall continue in such a manner that at all times there will be a horizontal berm of thoroughly compacted material for a distance at least equal to the height of the abutment or wall to be backfilled against except insofar as undisturbed material obtrudes upon the area.

Broken rocks or coarse sand and gravel shall be provided for a drainage filter or french drain as shown on the Plans.

503.3.7 Bedding, Backfill and Embankment for Pipe Culverts

Bedding, Backfill and Embankment for Pipe Culverts shall be done in accordance with Item 500, Pipe Culverts and Storm Drains.

ITEM 804 – EMBANKMENT

804.1 Description

This item shall consist of the construction of embankment in accordance with this Specification and in conformity with the lines, grades and dimensions shown on the Plans or established by the Engineer.

804.2 Material Requirements

Embankment shall be constructed of suitable materials, in consonance with the following definitions:

a. Suitable Material – Material which is acceptable in accordance with the Contract and which can be compacted in the manner specified in this Item. It can be common material or rock.

b. Selected Borrow for topping – soil of such gradation that all particles will pass a sieve with 75 mm (3 inches) square openings and not more than 15 mass percent will pass the 0.075 mm (No. 200) sieve, as determined by AASHTO T 11. The material shall have a plasticity index of not more than 6 as determined by AASHTO T 90 and a liquid limit of not more than 30 as determined by AASHTO T 89.

c. Unsuitable Material – Material other than suitable materials such as:

   i. Materials containing detrimental quantities of organic materials, such as grass, roots and sewerage.
   ii. Organic soils such as peat and muck.
   iii. Soils with liquid limit exceeding 80 and/or plasticity index exceeding 55.
   iv. Soils with a natural water content exceeding 100%.
   v. Soils with very low natural density, 800 kg/m³ or lower.
   vi. Soils that cannot be properly compacted as determined by the Engineer.

804.3 Construction Requirements

804.3.1 General

Prior to construction of embankment, all necessary clearing and grubbing in that area shall have been performed in conformity with Item 100, Clearing and Grubbing.

Embankment construction shall consist of constructing auxiliary embankments including original slope of the entire area shall step and to the extent the excavation of these cuts or adjacent to the roadway, the placing and compacting of approved material within roadway areas where constructed, fill, base material or other placing and compacting of approved material of bases, pits and other improvements within the roadway area.

Embankments and backfills shall contain no muck, peat, sod, rocks or other unsuitable matter. Rocks larger than 100 mm in diameter shall not be placed in embankments unless otherwise directed by the Engineer.

Where shown on the Plans or directed by the Engineer, the surface of the existing ground shall be compacted to a depth of 150 mm (6 inches) and to the specified requirements in this item.

Where specified on the Plans and Bill of Quantities the top portion of the roadbed to both cuts and embankments, as indicated, shall consist of selected borrow for topping from excavation.

304.3.2 Method of Construction

Where there is evidence of discrepancies on the actual elevations and that shown on the Plans, a reconciliation survey referred to the Datum plane used in the approved Plan shall be undertaken by the Contractor under the control of the Engineer to serve as basis for the computation of the actual volume of the embankment materials.

Each embankment or by the general use horizontal or inclined, as shown here embankment or by the compacted against existing embankments, or where embankment is built one half width at a time, the existing slope that was steeper than 1:1 when measured at right angles to the roadway shall be benched horizontally into firm material as the work progresses, benching will be subject to the Engineer's approval and shall be such that no portion of the original ground and the surface soils of the previous cuts. Material that cannot be placed and compacted along with the embankment materials in accordance with the provisions mentioned in this Section.

Unless shown otherwise on the Plans or directed otherwise, where an embankment of less than 1.2 m (4 feet) before proposals to be by cuts, all soil and vegetable matter shall be removed from the surface upon which the embankment is to be placed and the ground surface shall be completely broken up by plowing, scarifying or stepping to a minimum depth of 150 mm except as provided in Subsection 104.2.2. This plowing shall then be considered as provided in Subsection 104.2.2. Soil not required by the contract shall be topsoiling, the removed or scarified before construction of embankment. Whenever a compacted soil surface consisting granular materials has within 300 mm (12 inches) of the subgrade, such soil shall surface shall be scarified to a depth of at least 150 mm (6 inches) unless otherwise directed by the Engineer. The scarified soils shall then be compacted as provided in Subsection 304.3.3.

When grading operation is specified, the widened embankment shall be constructed in the alignment width shown on the Plans. The existing material shall be removed without destroying the adjacent existing base course material, and all unsuitable/unwanted materials shall be disposed of as provided in Subsection 202.3.3 if necessary this areas shall be compacted before being backfilled.

Roadway embankments of earth material shall be placed in horizontal layers not exceeding 200 mm (8 inches) loose measurements, and shall be compacted as specified before the next layer is placed. However, thicker layers may be placed if shown by test rolls with light compaction effort is used if density requirements is obtained and as approved by the Engineer. Each portion of the other way have obtained and approved by the Engineer. Earthen embankments shall be built up with the whole width of section. Embankments shall be constructed in the full section prior to completion. As the embankment of each layer progresses, continuous leveling and maintaining will be required to assure uniform density. Water shall be added or removed, if necessary, to

[redacted]

[redacted]

[redacted]

[illegible]

Sand

[illegible]

104.3.4 Protection of Roadbed During Construction

[illegible]

104.3.5 Protection of Structure

[illegible]

104.3.6 Rounding and Warping Slopes

[illegible]

104.3.7 Finishing Roadbed and Slopes

[illegible]

[illegible] shall be removed from the site and disposed of in an approved manner.

All earth slopes shall be left with reasonably smooth surfaces and shall be reasonably uniform, without any unsightly mounds, and in reasonably close conformity with the lines or other surfaces indicated on the Plans or as directed by the Engineer with no additional work done except the necessary removal from the work.

Sub-Section 2.2 Excavated Slopes

Cut slopes in any material shall have slope ratios between [illegible] and 2:1 which be commended on plan the first slope from each of a series of short horizontal steps. The toes and heels of successive shall be shown on the Plans. No existing slope shall be undercut or the adjacent slope cannot be shored or kept more vertical than allowable by a safety factor if they fail in the shall line or surface.

Sub-Section 2.3 Earth Slopes

Where called for in the Contract, permanent earth berms shall be constructed of well graded materials with no voids having a diameter greater than 0.05 the height of the berm. Other types of material or soil acceptable, acceptable material shall be approved, as directed by the Engineer.

Section [illegible]

Compacted fills constructed with consist of embanking or doing with placing material as necessary to replace areas as the drawings or as established by the Engineer. Material shall consist of loam, muck, sand, or other satisfactory materials. Compacted shall take precaution to prevent material from damaging with the established areas. Shoulder surface beyond level, will be roughened to provide a bond between the berm and shoulder areas completed. The Contractor shall construct the finished planes with at least 90 more percent of the laboratory density as obtained by AASHTO T 99, Method C. The compaction of the finished compacted fills shall be visibly uniform as the typical cross-section as shown on the Plans.

Miscellaneous Fill Work

Miscellaneous fills consisting shall consist of doing, if necessary and placing material in locations shown on the Plans or as established by the Engineer. Material shall consist as loam, muck, sand or other satisfactory materials. Fills constructed shall take precautions to prevent material from damaging with the established areas. Fills constructed shall take precautions to prevent material from damaging with the established areas.

ITEM 1700 – FILL AND BACKFILL

1700.1 Clearing

The Contractor shall supply, place and compact suitable material in the lines, grades and dimensions and in locations shown on the drawings or instructed.

Random boulders shall be removed from approved sources and shall be free from vegetation, roots, rubbish, topsoil and other objectionable matters. Random boulders placed within [illegible] or on slopeways shall be removed before embanking work has begun there. Fills are to maintain dimensions and shall be placed carefully so as not to damage the [illegible].

Concrete backfill shall be executed in horizontal layers to maximum 150 mm thick, after the [illegible] and shall be thoroughly tamped, vibrated or puddled from layers of approximately, and the finished surface

[illegible]

ITEM 1000 – [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

a. [illegible]

[illegible]

b. [illegible]

[illegible]

c. [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

1. [illegible]

[illegible]

2. [illegible]

When not in use, the [illegible] shall be capped.

Where not shown specifically on the plans, the method of installation shall be subject to the approval of the Engineer.

Expansion of the pipe or the sealing collar of the [illegible] pipe, plastic bushes and grilles of ceiling shall be done prior to final painting and polishing or landscaping work, to avoid disturbance work to avoid disturbance of the finished surface by such operations.

Joints of the connecting pipe with fixed [illegible] shall be tested before placement of concrete fill and no leakage when tested at the rate of 12 liters per square meter with 1 hour working pressure [illegible] and not to exceed allowable. Additional instructions to applied as follows:

1. [illegible] connected as ceiling openings for pipes, conduits and ducts, pipe sleeves, recessed at the rate of 3 liters per square meter in a way 150mm to 200mm wide.

2. Along the exterior perimeter of the slab and under expansion joint at the rate of 3 liters per linear meter in a way 150mm to 200mm wide or shallow trench.

Where [illegible] of wood preservative is necessary, the Contractor shall use Type 4 sealing solution as recommended by the manufacturer.

All wood materials not [illegible] specified in Item 1000 - Concrete and Joining shall be treated with [illegible] wood preservative solution as [illegible] by the Engineer.

ITEM 1000 - REINFORCED CONCRETE

1000.1 Description

This item shall consist of furnishing, placing and finishing concrete in buildings and related structures, [illegible] and drainage works and other [illegible] structures in accordance with the specifications and conforming to the lines, grades, and dimensions shown on the plans.

1000.2 Standards Requirements

1000.2.1 Portland Cement

The term cement as the [illegible] of ITEM 700, Volume II (Blue Book), Portland cement.

1000.2.2 Aggregate

Concrete aggregate shall conform to the requirements of [illegible] of ITEM 311 (Volume II, Blue Book) and ASTM C 33 for [illegible] aggregates, except that aggregates failing to meet these requirements but which have been shown by special tests or actual service to produce concrete of

adequate strength and stability and shall comply with section (3) of withstanding the progression of concrete when subjected by the Engineer.

Removal of permitted elsewhere in the section, the maximum size of the aggregate should be larger than one fifth (1/5) of the narrowest dimension between sides of forms of the member the whole five percents is to be used, but larger than three fourths of the minimum clear spacing between individual reinforcing bars or bundles of bars or pre-stressing tendons.

706.2.2.1 Aggregate Tests

Samples of the fine and coarse aggregates to be used, shall be submitted by the Engineer for tests at least 30 days before the actual concreting operations are to begin. It shall be the responsibility of the contractor to designate the source or sources of aggregates to give the Engineer sufficient time to obtain the necessary samples and submit them for testing.

No aggregate shall be used at all unless it has been proved that it has sufficiently passed all of the tests. Even written authority shall be given for its use.

706.2.3 Water

Water used in mixing concrete shall conform to the requirements of subsection 311.2.3 under Item 311 Part C. of Volume 2, Specifications.

706.2.4 Steel Reinforcement

Reinforcing steel bars shall conform to the requirements of the following Specifications:

Deformed & Plain Billet-Steel Bars for Concrete Reinforcement	(AASHTO M 31)
Steel for Concrete Reinforcement	(AASHTO M 31)
Deformed Rail - Steel and Plain	
Steel for Concrete Reinforcement	(ASTM A 616)
Deformed & Plain - Steel and Plain	
Steel for Concrete Reinforcement	(ASTM A 617)

If reinforcing bars are to be welded, these ASTM specifications shall be supplemented by additional welding requirements as follows:

Low carbon steel for concrete Reinforcement	(ASTM A 706)
Cold-Drawn steel Wire for	(ASTM A 82)
Concrete Reinforcement	(ASTM A 185)
Welded steel wire fabric	(ASTM A 185)
For concrete reinforcement	(ASTM A 496)

except that the usual shear strength requirements of these specifications shall be considered as indicative only since other criteria will be set forth in the detailed engineering plans.

Wire and Strand for Prestressing	(ASTM A 416)

Cement [illegible]

[illegible] galvanized [illegible]

[illegible]

Tensile strength [illegible]	[illegible] MPa
Yield strength [illegible]	[illegible]
Elongation at rupture [illegible]	[illegible]
Reduction of area at rupture	[illegible] percent
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]

[illegible] Admixtures

[illegible]

[illegible]

[illegible] Storage of Materials

Cement and aggregates shall be [illegible]

[illegible] Compliance Requirements

[illegible]

[illegible]

[illegible]

[illegible] Concrete Quality

[illegible]

Concrete [illegible]

[illegible] Methods of Determining the Proportions of Concrete

[illegible]

Method 1: [illegible]

[illegible]

Method 2: [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

TABLE [illegible] MAXIMUM PERMISSIBLE WATER-CEMENT RATIOS FOR CONCRETE [illegible]

Specified compressive strength at 28 days, psi	Maximum permissible water-cement ratio			
	Non-air-entrained concrete		Air-entrained concrete	
	[illegible] per 42.6 kg. bag of cement	Absolute ratio by weight	[illegible] per 42.6 kg. bag of cement	Absolute ratio by weight
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

information on the adequacy of strength development when age strength relationships have been established for the materials and proportions used.

To conform to the requirements of this Item:

1. For structures designed in accordance with the working stress design method of the Code, the average of any five consecutive strength tests of the laboratory-cured specimens representing each class of concrete shall be equal to or greater than the specified strength, f'c and not more than 20 percent of the strength tests shall have values less than the specified.

2. For structures designed in accordance with the ultimate strength design method of the Code and for prestressed structures, the average of any three consecutive strength test of the laboratory-cured specimens representing each class of concrete shall be equal to or greater than the specified strength, f'c and not more than 10 percent of the strength tests shall have values less than the specified strength.

When it appears that the laboratory-cured specimens will fail to conform to the requirements for strength, the Engineer shall have the right to order changes in the concrete sufficient to increase the strength to meet these requirements. The strengths of the job-cured specimens shall be used by the Engineer to determine the adequacy of protection and curing of the concrete and may be used to determine when the forms may be stripped, shoring removed, or the structure placed in service. When, in the opinion of the Building Official, the strengths of the job-cured specimens are inadequate, the contractor may be required to improve the procedures for protecting and curing the concrete, or when tests of field-cured cylinders indicate deficiencies in protection and curing, the Engineer may require tests in accordance with ASTM Specification C 42 or order load tests as outlined in the Code for that portion of the structure where the questionable concrete has been placed.

405.3.7 Splitting Tensile Test of Concrete

To determine the splitting ratio, Fct, for a particular aggregate, test of concrete shall be made as follows:

1. Twenty-four (24) 15 cm. dia by 30 cm long cylinders shall be made in accordance with ASTM C 192, twelve at a compressive strength level of approximately 210 kilograms per square centimeter (3000 psi) and twelve at approximately 280 kilograms per square centimeter (4000 psi) or 350 kilograms per square centimeter (5000 psi). After 7 days moist curing followed by 21 days drying at 23°C (73°F) and 50 percent relative humidity, eight of the twelve cylinders at each of the two strength levels shall be tested for splitting strength and four for compressive strength.

2. The splitting tensile strength shall be determined in accordance with ASTM C 496, and compressive strength in accordance with ASTM C 39.

The ratio, Fct, of splitting tensile strength to the square root of compressive strength shall be obtained by using the average of all 16 splitting tensile tests and all 8 compressive tests.

Minimum Strength. Concrete [illegible] shall have a minimum compressive strength of [illegible] kilograms per square centimeter (3000 psi).

405.3.8 Batching

Batching shall conform to the requirements of Item 405, Structural Concrete.

Measuring and batching of materials shall be done at a batching plant.

1. Portland Cement

[illegible]

[illegible]

2. Water

[illegible]

3. Aggregates

[illegible]

4. Bins and Scales

[illegible]

[illegible]

5. Batching

[illegible]

[illegible]

6. Admixtures

[illegible]

[illegible]

[illegible] Mixing and Delivery

[illegible]

Concrete may be mixed at the site of construction, or it may be supplied ready-mixed from a central plant. Concrete mixed by a combination of hand processing and batch weighing. The mixing and delivery of concrete shall be in accordance with the applicable requirements of ASTM C 94. ASTM C 94 requires as modified by the following paragraphs of this section, that quality control, proportioning of ingredients and batch mixing be field activities. Delivery of concrete shall be regulated so that placing of a succeeding layer occurs before initial set of the previous layer has taken place. The maximum allowable time between delivery of batches shall not be so great as to allow for unsatisfactory joints between batches, and in no case shall exceed 30 minutes.

In proportioning concrete, the water-cement requirements are mandatory. No small volume batching less than 1/3 cubic yard capacity. The weight proportions shall be converted to equivalent volumetric proportions in each case, allowance shall be made for variations in the moisture content of the aggregates, including the batching effect in the aggregate. Batching and mixing shall be in accordance with ASTM C 685. Section 8 through 9.

Concrete mixing by Contractor-owned portable mixer is acceptable only when using an approved volume basis.

The entire mixing of the initial consignment or of a revised mixer, a batch mixer of an approved type shall be used. A mixer having a rated capacity of less than a one-bag batch shall not be used. The volume of concrete mixed per batch shall not exceed the mixer's rated capacity as shown on the manufacturer's standard rating plate or the mixer shall not be overloaded by Contractor. Concrete mixers shall be operated with a speed recommended by the manufacturer. Mixing shall be continued for not less than 90 seconds for mixers having a capacity of 1 cubic yard or less. For mixers having a capacity greater than 1 cubic yard, the mixing time shall not be less than 90 seconds. If batch mixers, the speed of rotation of the drum shall be not less than 90 seconds. If ready-mixed concrete is used, the mixing time shall be not less than 90 seconds. If batch mixers, the speed of rotation of the drum shall be not less than 90 seconds. If ready-mixed concrete is used, the mixing time shall be not less than 90 seconds.

The mixer shall be operated at the speed designated by the manufacturer. Mixer shall be charged so that no part of the charge shall remain in the mixer longer than one and one-half times the specified mixing time. Mixing time shall be measured from the time all materials, except water, are in the drum. Mixing time shall not be less than 90 seconds for mixers having a capacity of 1 cubic yard or less. For mixers having a capacity greater than 1 cubic yard, the mixing time shall not be

Equipment having components made of aluminum or magnesium alloys which would have contact with caustic concrete during mixing, transporting or pumping of Portland Cement concrete, shall not be used.

Aggregates shall be measured by weighing. The apparatus provided for weighing the aggregates shall be suitably designed and constructed for the purpose. The accuracy of all weighing devices except for water shall be such that successive quantities can be measured to within one percent of the desired amounts. The water-measuring device shall be accurate to plus or minus 0.5 liters percent. All measuring devices shall be subject to the approval of the Engineer. Scales and measuring devices shall be tested at the expense of the Contractor as frequently as the Engineer may deem necessary to ensure that accuracy.

Weighing equipment shall be insulated against vibration or movement of other operating equipment in the plant. While the entire batch is weighing, the scale reading at any stage shall not vary from the weight being tested by the Engineer more than one-half percent of the amount, or one-half percent of the total of aggregates, or less than the amount required for the last aggregate in any batch.

2. Mixing Concrete at Site

Concrete shall be mixed in the machine which, in the discharging mixing blade type and the mixing time in which shall be specified uniformity of the mixing again recommended by the manufacturer. The batch and fineness modulus of mixers shall be measured as specified above any part of which is worn fifteen or more below the original height of the manufacturer's design. Mixers and agitators which have an accumulated hard concrete or mortar shall not be used.

When both cement is used and volume of the batch is 0.5m3 or more, the water and weigh hopper for Portland Cement shall be separate and distinct from the aggregate hopper or hoppers. The discharge mechanism of the bulk cement weigh hopper shall be interlocked against opening before the full amount of cement is in the hopper. The discharging mechanism shall also be interlocked against opening when the amount of cement in the hopper is underweight by more than one (1) percent or overweight by more than 2 times percent of the amount specified.

When the aggregate contains more water than the quantity necessary to produce a saturated surface dry condition, appropriate overplus shall be taken and the moisture content determined for each load of aggregate.

The mixer shall be so charged that some water will enter in advance of cement and aggregate. All water shall be in the mixer by the end of the first quarter of the specified mixing time.

Batches shall be uniform and charged into the mixer so that a part of each of successive fractions of water as the proportion of cement or mixture of aggregate or fractions as to other conditions shall result in only the required quantity of moisture in the concrete mixture.

The entire contents of a batch mixer shall be removed from the mixer before materials for a succeeding batch are placed therein. The mixture containing a batch except water shall be completed and discharged into the mixer.

All [illegible] shall be mixed for not less than [illegible] minutes, measured from the time all materials, including water, are in the drums. During the period of mixing, the mixer shall operate at the speed for which it has been designed.

Mixers shall be equipped with an automatic timing device that can be locked by the Engineer. The time device and discharge mechanism shall be so interlocked that during normal operation no part of the batch will be charged until the specified mixing time has elapsed.

The first batch of concrete materials placed in the mixer shall contain a sufficient excess of cement, sand, and water to coat inside of the drum without reducing the required mortar content of the mix. When mixing is to cease for a period of one hour or more, the mixer shall be thoroughly cleaned.

3. Mixing Concrete at Central Plant

Mixing at the central plant shall conform to the requirements for mixing at the site.

4. Mixing Concrete in Truck

Truck mixers, unless otherwise authorized by the Engineer, shall be of the revolving drum type, water-tight, and so constructed that the concrete can be mixed to insure a uniform distribution of materials throughout the mass. All solid materials for the concrete shall be accurately measured and charged into the drum at the proportioning plant. Except as subsequently provided, the truck mixer shall be equipped with a device by which the quantity of water added can be readily verified. The mixing water may be added directly to the batch, in which case a tank is not required. Truck mixers may be required to be provided with a means of which the mixing time can be readily verified by the Engineer.

The maximum size of batch in truck mixers shall not exceed the maximum rated capacity of the mixer as stated by the manufacturer and stamped in metal on the mixer. Truck mixing, shall, unless otherwise directed be continued for not less than 100 revolutions after all ingredients, including water, are in the drum. The mixing speed shall not be less than 4 rpm nor more than 6 rpm.

Mixing shall begin within 30 minutes after the cement has been added either to the water or aggregate, but when cement is charged into a mixer drum containing water or surface wet aggregate and when the temperature is above 32°C, this limit shall be reduced to 15 minutes. The limitation in time between the introduction of the cement to the aggregate and the beginning of the mixing may be waived when, in the judgement of the Engineer, the aggregate is sufficiently free from moisture, so that there will be no harmful effects on the cement.

When a truck mixer is used for transportation, the mixing time specified in Subsection 405.3.2 in a stationary mixer may be reduced to 30 seconds and the mixing completed in a truck mixer. The mixing time in the truck mixer shall be as specified for truck mixing.

5. Transporting Mixed Concrete

Mixed concrete may only be transported to the delivery point in truck agitators or truck mixers operating at the speed designated by the manufacturers of the equipment as agitating speed, or in non-agitating hauling equipment, provided the consistency and workability of the mixed concrete upon discharge at the delivery point is suitable for adequate placement and consolidation in place.

Truck agitators shall be loaded not to exceed the manufacturer's guaranteed capacity. They shall maintain the mixed concrete in a thoroughly mixed and uniform mass during hauling.

No additional mixing water shall be incorporated into the concrete during hauling or after arrival at the delivery point.

Unless otherwise specified, all order lists and bending diagrams shall be furnished by the Contractor for approval of the Engineer. The approval of order lists and bending diagrams by the Engineer shall in no way relieve the Contractor of responsibility for the correctness of such lists and diagrams. Any expense incident to the revision of materials furnished in accordance with such lists and diagrams to make them comply with the Plans shall be borne by the Contractor.

404.3.2 Protection of Material

Steel reinforcement shall be stored above the surface of the ground upon platforms, skids, or other supports and shall be protected as far as practicable from mechanical injury and surface deterioration caused by exposure to conditions producing rust. When placed in the work, reinforcement shall be free from dirt, detrimental rust, loose scale, paint, grease, oil, or other foreign materials. Reinforcement shall be free from injurious defects such as cracks and laminations. Rust, surface seams, surface irregularities or mill scale will not be cause for rejection, provided the minimum dimensions, cross sectional area and tensile properties of a hand wire brushed specimen meets the physical requirements for the size and grade of steel specified.

404.3.3 Bending

All reinforcing bars requiring bending shall be cold-bent to the shapes shown on the Plans or required by the Engineer. Bars shall be bent around a circular pin having the following diameters (D) in relation to the diameter of the bar (d):

Nominal diameter, d, mm	Pin diameter (D)
10 to 20	6d
25 to 28	8d
32 and greater	10d

Hooks and bends in stirrups or ties may be bent to the diameter of the principal bar enclosed therein.

404.3.4 Placing and Fastening

All steel reinforcement shall be accurately placed in the position shown on the Plans or required by the Engineer and firmly held there during the placing and setting of the concrete. Bars shall be tied at all intersections except where spacing is less than 300 mm in each direction, in which case, alternate intersections shall be tied. Ties shall be fastened on the inside.

Distance from the forms shall be maintained by means of stays, blocks, ties, hangers, or other approved supports, so that it does not vary from the position indicated on Plans by more than 6 mm. Blocks for holding reinforcement from contact with the forms shall be precast mortar blocks of approved shapes and dimensions. Layers of bars shall be separated by precast mortar blocks or by other equally suitable devices. The use of pebbles, pieces of broken stone or brick, metal pipe and wooden blocks shall not be permitted. Unless otherwise shown on the Plans or required by the Engineer, the minimum distance between bars shall be 40 mm. Reinforcement in any member shall be placed and then inspected and approved by the Engineer before the placing of concrete begins. Concrete placed in violation of this provision may be rejected and removal may be required. If fabric reinforcement is shipped in rolls, it shall be straightened before being placed. Bundled bars shall be tied together at not more than 1.8m intervals.

404.3.5 Splicing

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

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

Splice Type	Grade 40	Grade 60	But not less than
Tension	24 bar diameter	36 bar diameter	300 mm
Compression	20 bar diameter	24 bar diameter	300 mm

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

404.3.6 Lapping of Bar Mat

Sheets of mesh or bar mat reinforcement shall overlap each other sufficiently to maintain a uniform strength and shall be securely fastened at the ends and edges. The overlap shall not be less than one mesh in width.

ITEM 1046 - MASONRY WORKS

1046.1 Description

This Item shall consist of furnishing all necessary materials, tools, equipment and labor necessary to complete the execution of the masonry works using Concrete Hollow Blocks, Lumber Blocks and Autoclaved Aerated Concrete (AAC) blocks as shown on the Plans and/or as specified.

1046.2 Material Components

1046.2.1 Hydraulic Cement

Hydraulic Cement shall conform to the applicable requirements of Subsection [illegible], Portland Cement of Item 700, Hydraulic Cement.

1046.2.2 Aggregates

1046.2.2.1 Aggregates for Concrete Hollow Blocks and Mortar/Grout

Aggregates shall conform to the applicable requirements of Subsection 405.2.2, Concrete Aggregates of Item 405, Structural Concrete. 1046.2.2.2 Aggregates/Fillers for Autoclaved Aerated Concrete (AAC) blocks. Aggregates and admixtures shall conform to the applicable requirements of ASTM C332, Standard Specification for Lightweight Aggregates for Insulating Concrete and ASTM C618, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan in Concrete, respectively.

1005.2.3 Water

Water shall conform to the applicable requirements of Subsection [illegible], Water of Item 405, Reinforced Concrete.

1005.2.4 Reinforcing Steel

1005.2.4.1 Reinforcing Steel for Concrete Hollow Blocks and Louver Blocks

Reinforcing steel shall conform to the applicable requirements of Item 404, Reinforcing Steel.

1005.2.4.2 Reinforcing Steel for Autoclaved Aerated Concrete (AAC) Blocks

[illegible] shall conform to the applicable requirements of [illegible], Standard Specification for Rail-Steel and Axle-Steel [illegible] for Concrete Reinforcement.

1005.2.5 Mortar for Concrete Hollow Blocks and Louver Blocks

Mortar shall consist of sand, cement and water conforming to the requirements of Item 405, Reinforced Concrete, mixed in the proportion of one (1) part cement to three (3) parts sand by volume, and sufficient water to obtain the required consistency.

1005.2.6 [illegible] for Autoclaved Aerated Concrete (AAC) Blocks

[illegible] shall conform to the applicable requirements of [illegible], Standard Specification for [illegible] and [illegible]

1005.2.7 [illegible] for Autoclaved Aerated Concrete (AAC) Blocks

[illegible] shall conform to the applicable requirements of ASTM [illegible], Standard Specification for [illegible]

1005.2.8 [illegible] for Autoclaved Aerated Concrete (AAC) Blocks

[illegible]

1005.2.9 [illegible] for Autoclaved Aerated Concrete (AAC) Blocks

[illegible] shall conform to the applicable requirements of ASTM [illegible], [illegible] for [illegible] for Autoclaved Aerated Concrete (AAC) [illegible]

1005.2.10 [illegible] for [illegible] Aerated Concrete (AAC) [illegible]

[illegible] shall conform to the applicable requirements of ASTM [illegible], Standard Specification for [illegible]

1005.2.11 Concrete Hollow Blocks and Louver Blocks

[illegible] shown on the Plans.

1005.2.11.1 Load Bearing Concrete Hollow Blocks

Load-bearing concrete hollow blocks shall conform to the physical requirements of the Tables 1046.1 and 1046.2 as prescribed on ASTM C90: Standard Specifications for Load-Bearing Concrete Masonry Units.

Table 1046.1 – Thickness of Face Shells and Webs

Nominal Width (W) of Units, mm	Minimum Face Shell Thickness (fsc), mm	Minimum Web Thickness (tw): Webs, mm	Equivalent Web Thickness, mm/linear m
76.2 and 102	19	19	136
152	25	25	188
203	32	25	188
254 and greater	35	29	209

Table 1046.2 – Strength, Absorption, and Density Classification Requirements

Density Classification	Oven-Dry Density of Concrete, kg/m³	Maximum Water Absorption, kg/m³		Minimum Net Area Compressive Strength, MPa (Psi)	
	Average of 3 Units	Average of 3 Units	Individual Units	Average of 3 Units	Individual Units
Lightweight	Less than 1680	288	320	13.1 (1900)	11.7 (1700)
Medium Weight	1680 to less than 2000	240	272	13.1 (1900)	11.7 (1700)
Normal Weight	2000 or more	208	240	13.1 (1900)	11.7 (1700)

1046.5.1.2 Non-load bearing Concrete Hollow Blocks and Louver Blocks

Non-load bearing concrete hollow blocks shall be clearly marked to prevent their use as load bearing units.

1. Type I, Moisture Controlled Units – Units shall conform to the requirements of Tables 1046.3, 1046.4 and 1046.5.

2. Type II, Non-Moisture Controlled Units – Units designated as Type II shall conform to the requirements of Table 1046.4.

Table 1046.3 – Weight Classification

Weight Classification	Oven-Dry Density of Concrete, kg/m³
Lightweight	Less than 1680
Medium Weight	1680 to less than 2000
Normal Weight	2000 or more

Table 1046.4 – Strength Requirements

	Compressive Strength (average net area), Min., MPa (Psi)
Average of 3 Units	4.14 (600)
Individual Unit	3.45 (500)

Table 1046.5 – Moisture Content Requirements for Type I Units

Total Linear Drying Shrinkage, %	Moisture Content, Max., % of Total Absorption (Average of 3 Units) Humidity Conditions at Job Site or Plant Location		
	Humid[a]	Intermediate[b]	Arid[c]
Less than 0.03	45	40	35
0.03 to less than 0.045	40	35	30
0.045 to 0.065, max	35	30	25

Notes: [a] Mean annual relative humidity above 75%
[b] Mean annual relative humidity 50 to 75%
[c] Mean annual relative humidity less than 50%

Table 3000.4 - Weight Classification

Strength Class	Specified Min. Concrete Comp. Strength, f'c (MPa)	Weight Limits, kg/m3	
		Lower Limit =	Upper Limit =
NWC-H	42	2240	2500
	35	2240	2500
NWC-M	28	2240	2500
	21	2240	2500
NWC-L	17	2240	2500
	14	2240	2500

Table 3000.5 - Strength Requirements

Strength Class	Minimum Compressive Strength, f'c (MPa)
NWC-H	42
NWC-M	21 to 35
NWC-L	14 to 17

Table 3000.6 - Average Air-dried Density Requirements

Strength Class	Average Density (kg/m3)
NWC-H	2240
NWC-M	2240
NWC-L	2240

3000.2.12 Approved Concrete Mixes

Ordinary and Structural Light Weight or Weight of structural normal concrete Mixes shall not exceed from 28 mm from the specified Concrete mixes as the Plans. Ready-mix Testing Authorized Normal Concrete Mixes shall conform to the strength requirements of the following tables as prescribed in ASTM C1602 Standard Specification for Mixing Water Used in Production of Hydraulic Cement Concrete (ASTM).

3000.2.13 Other Requirements for Concrete Mixes Mixing and Lower Mixing

For proposing agents, mixing agitators, mixing water ingredients, fully placed mixes, and other constituents that are chemically contaminated or suitable for use in concrete mixing and conform to applicable ASTM standards

3000.3 Construction Requirements

3000.3.1 Concrete Mixture Sampling and Delivery Mixture

3000.3.1.1 Batching

Materials shall be batched with mixing by proportion specified by the Engineer. Mixing shall be done using aggregate in a fixed proportion with or other plants. The aggregates and cement shall be used in uniform. Except for mixture and specific water over the mixture and ice. Concrete with the proportion with the right amount of water from these mixers or. Mixture shall be free from deposition such as dirt and grease. The batch mixer to avoid concrete. Mixing and measuring devices shall be observed as per the manufacturer's recommendation.

3000.3.1.2 Mixing

The of operation mixtures shall be used as the manufacturer's recommendation. The result of a prepared mixture should be filled and be (c) to eight (8) cycles of composition are required to using the remaining

[illegible] Finish Blocks shall be protected from the sun with plastic sheets or any suitable covering during the [illegible].

1046.2.1.3 Curing

After being removed from the mold, the Concrete Hollow Blocks (CHB) and Lintel Blocks shall be covered with a plastic sheet or burlap and kept damp and shielded for at least seven (7) days [illegible] [illegible].

1046.2.1.4 Installation

1. All Concrete work shall be laid true to line, level, plumb and neat in accordance with the Plans.
2. Units shall be laid [illegible] all [illegible] joints, [illegible] and all [illegible] shall be neatly finished.
3. No Concrete or support shall be attached to the wall [illegible] where specifically permitted by the Engineer.
4. Concrete wall shall be [illegible] clean and free from [illegible] in the drawings.
5. [illegible] shall be [illegible] all [illegible], with a minimum of [illegible].
6. Where [illegible] cutting is necessary, all cuts shall be neat and [illegible].
7. Units shall be placed while the mortar is soft and plastic. Any unit disturbed to the extent that the initial bond is broken after initial positioning shall be removed and re-laid in fresh mortar.
8. [illegible] (ASTM C270) [illegible] within [illegible] hours of initial mixing.

1046.2.1.5 Reinforcement for Concrete Hollow Blocks

Reinforcement shall be done in accordance with the [illegible] Plans as to size, spacing and other requirements of Section [illegible] of the [illegible]. Reinforcing Steel Reinforcement shall be clean and free from loose [illegible] and any coatings that will reduce bond.

1046.2.1.6 Finish and Appearance

1. All units shall be sound and free of cracks or other defects that interfere with the proper placement of the unit or significantly impair the strength or permanence of the construction. Minor cracks, incidental to the usual method of manufacture or minor chipping resulting from customary methods of handling in shipment and delivery, are not grounds for rejection.
2. Where units are to be used in exposed wall construction, the face or faces that are to be exposed shall not show chips or cracks, [illegible] permitted, or other imperfections when viewed from [illegible].
   - Five (5) percent of a [illegible] containing [illegible] larger than [illegible] in any dimension, [illegible] not larger than [illegible] percent of the nominal height of the unit, is permitted.

3. The color and texture of paint shall be specified in the purchase. The finished surface finish will be assessed to your shelf and there to an approved sample, consisting of not less than two (2) units, representing the range of texture and color permitted.

4. All [illegible] are number more than five (5) percent of units, damaged units does not conform the requirements of the above specification.

Item 4.1.3 Sampling and Compaction Concrete Hollow Blocks and Cement

Delivery of Samples for Quality Tests shall observe follows:

1. One (1) Quality Test for every 10,000 units or fraction pounds.

2. Six (6) specimens as for sampled for each (1) building area in which three (3) specimens for Compression Test and the remaining three (3) for Moisture Content and Water Absorption.

Units shall be tested in accordance with ASTM C140, Standard Test Methods of Sampling and Testing Concrete Masonry Units and Related Units and ASTM C426, Standard Test Method for Linear Drying Shrinkage of Concrete Masonry Units.

4.1.3.3 Storage and Handling of Masonry Units

The blocks shall be stored in such a way as to avoid contact with contaminants like clay shall be protected on pallets or other supports from moisture with ground and covered to protect against wetting. The block shall be handled with care and during unloading of the equipment. [illegible] Manufacturer Quality Control Blocks

4.1.3.4 Installation

1. Concrete hollow units laid in the given lines.

2. Make regular adjustments of spacing, construction, plumbing, check, or spacing for adequate control before laying masonry units.

3. Masonry unit shall be clean and free from dust or loose mortar or [illegible].

4. The base and joint shall be considered prior to laying the first layer of masonry unit. Mortar setting with 2:1 sand: cement ratio shall be prepared on mortar board if able or approved mixer for [illegible].

5. Adhesive shall be mixed using manufacturer's specifications. Use a water using a power mixer and a non-absorptive pail or mixing container. Adhesive that has started should not be used. Refer to manufacturer's instructions for the pot life of the adhesive mix.

6. The wall adhesive shall be set and bonded with masonry blocks on the mortar bonds or mortar bed of masonry unit.

7. Laying of masonry unit shall be continued until the block have a complete before moving up to the next layer. The adhesive shall be applied at two (2) mm thick using a notched trowel on the [illegible] positions that will belong three (3) - five (5) mm gap on the wall into contact to allow one unit movement. Aligned level and dimension shall be regularly checked using water leveled and level line.

8. Joint and [illegible] shall be filled with adhesive. Excess adhesive should be removed on the joints or wiped off immediately.

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] Finish and Appearance

1. [illegible]

2. [illegible]

3. [illegible]

4. [illegible]

[illegible] Sampling and Testing

[illegible]

1. [illegible]

2. [illegible]

[illegible]

[illegible] Storage and Handling of Masonry Works

[illegible]

ITEM 1027 – CEMENT PLASTER FINISH

1027.1 Description

[illegible]

1027.2 Material Requirements

[illegible]

1027.2.1 Cement

Portland cement shall conform with the requirements as defined in Item 700, Hydraulic Cement.

1027.2.2 Hydrated Lime

Hydrated lime shall conform with the requirements as defined in Item 701, Hydrated Lime.

1027.2.3 Fine Aggregates

[illegible]

1027.3 Construction Requirements

1027.3.1 Mixture

a. [illegible]

b. [illegible]

1027.3.2 Surface Preparation

a. [illegible]

b. [illegible]

1027.3.3 Application

a. [illegible]

b. [illegible]

before the application of the finish coat, the brown coat surface shall be evenly moistened with potable water. [illegible]

Wherever indicated on the Plans to be "[illegible]", the Contractor [illegible]. Cement plaster shall not be applied directly to:

a. [illegible]

b. [illegible]

[illegible]

[illegible]

ITEM [illegible] – [illegible] CEILING

[illegible] Description

[illegible]

[illegible] Material Requirements

[illegible]

Lumber of different species [illegible]

[illegible] Grades of Lumber and Usage

1. [illegible]

   [illegible]

2. [illegible]

3. [illegible]

4. Concrete grade lighter than limestone light medium load not weight than 20 mm in thickness, with no total requirements without exposure, without decay, sound holes, and suitable for use with metric water due to water industry and suitable also for good fields.

   Concrete grade lighter shall be used for light maintenance the and additional ceiling gate as a holder.

1.1.1 Labor Systems and Wages

1.1 Workmanship conditions on the Plans. The following Building Systems shall be used for maintenance:

1. Transportation grading for wheelchair Hardware with an exact, glasses, glass playgrounds. Exit and entrance licenses such as contract with contractor to maintain it.

2. Code approved ground for door and window frames and to maintain framework, for doors for hanging supporting materials as mentioned Glass for floor glass and other wooden refurbished parts.

3. Building glassroom grading for roof framing, load-bearing light roofing materials such as galvanized iron, aluminum or composite sheets, for wall framing, building rubble, hangers and shelves.

4. Composite precast grading for doors and windows, frames and glass thresholds, coverings, millwork, railings, doors cabinets, seals, shelvings, flooring and tiling.

5. Epoxy painted grades, for static railings, Building Boards wall cabinets doors, floor coverings, millwork work, millwork, doors and kitchens when fabricated as work in the Plans.

6. Pipe support grades for parts of the workmanship as enumerated under Section 1.1.2 (a), when supported as work on the Plans.

1.1.2 Material Covered

Ranges symbols for framing and siding boards shall be of kind or type stated each. For the materials covered shall not exceed 22 percent. Grooved lumber for exterior and interior finishing, for doors with windows without, a panel doors and framing boards shall be kiln dried and shall not have a moisture content more than 14 percent at the time of installation in the structure.

1.1.3 Description of Lumber Grade

Any lumber usually used for the purpose intended may be substituted for the specified kind subject to the prior approval of the Engineer, provided the substitution shall be on equal or better grade acceptable to the Engineer. In the event of substitution with a better grade, no additional cost therefore shall be allowed to the contractor.

1.1.4 Plywood

Plywood shall be good grade-and-stock all laminated wood strips of uniform width and the thickness bonded together with water resistant resin glue. The laminated strip shall be finished light brown with water grade lacquer or varnish unless otherwise specified. Each 2 mm core strip shall be bonded to the core. The plywood of not more than 10 mm long shall be cut from natural such as split or veneer, the filling or wedging.

1.1.5 Plywood

Plywood shall conform to the requirements of the Philippine Trade Standards PS 1-20. Thickness of a single layer hardwood shall not be less than 1.7 mm. The veneers shall be superimposed in layers with grains

[illegible]

[illegible] Lumber

[illegible]

[illegible] Materials Other Than Lumber

[illegible] Plastic Form

Where required for the [illegible] [illegible] Color and design shall be selected from the manufacturer's standard and approved by the Engineer.

[illegible] Glue

Glue shall be [illegible] water [illegible]

[illegible] Hardware

Bolts, screws, nails and straps shall be [illegible] All hardware shall be [illegible]

1. Nails [illegible]
2. [illegible]
3. [illegible]
4. Bolts and nuts shall be [illegible] of not less than 240 MPa. [illegible]
5. [illegible] shall be of the shape and sizes shown in the Plans.

[illegible]

[illegible] Quality of Materials

[illegible] by the Engineer or his authorized representative.

[illegible]

Lumber and other materials shall be protected from dampness during and after delivery at the site. Materials shall be delivered well in advance of actual need and in adequate quantity to preclude delay of the work. Lumber shall be piled in an orderly stack at least 150 mm above ground and at sheltered place where it will be of least obstruction to the work.

1003.2.3 Shop Drawings

Shop drawings complete with essential dimensions and details of construction, as may be required by the Engineer in connection with carpentry and joinery work, shall be submitted for approval before proceeding with work.

1003.2.4 Rough Carpentry

Rough carpentry covers timber structural framing for roof, framing, siding, partitions and ceiling.

1. Framing shall be [illegible] grade or structural grade lumber of the species specified under Section [illegible]

2. Rough carpentry shall be done to true levels and dimensions. It shall be squared, aligned, plumbed and well fitted at joints.

3. Trusses and other roof framing shall be assembled. [illegible] as shown or indicated on the Plans.

4. Furnishings, accessories and anchors of [illegible] shall be provided and fitted where necessary.

5. Structural members shall not be cut, bored or notched for the passage of conduits or pipes without prior approval of the Engineer. Members damaged by such cutting or boring shall be reinforced by means of specifically formed and approved steel plates or shapes, otherwise damaged structural members shall be removed and replaced to the satisfaction of the Engineer.

6. Timber bearing in contact with concrete or masonry shall be treated with [illegible] painted with bituminous paint.

1003.2.5 Finished Carpentry

Finished carpentry covers works on flooring, siding and roofing boards, doors, cabinets, balustrades, windows and trims.

1. Finishing lumber shall be selected grade, free from defects and where exposed in finished work, shall be selected for color and grain.

2. Joints of [illegible] shall be [illegible], mitered or [illegible] glued. [illegible] shall be [illegible]

3. Frames shall be [illegible] and secure [illegible] in place [illegible], setting and spacing of joints.

4. The [illegible] shall be as specified under Section 1003.2.1 [illegible] shown on the Plans.

5. Plywood shall be specified under Section 1003.2.4

6. [illegible]

7. [illegible]

8. [illegible]

ITEM 1010(1)a – WOODEN FLUSH DOOR ITEM 1011(2)b – WOODEN PANEL DOOR

1010.1 Description

[illegible]

1010.2 Material Requirements

1010.2.1 Lumber

[illegible]

1010.2.2 Plywood

[illegible]

1010.2.3 Adhesive

[illegible]

1010.2.4 Glass

[illegible]

[illegible]

1010.2.5 Hardware

[illegible]

1010.3 Construction Requirements

1015.3.1 Fabrication

Wooden doors and windows, including frames, shall be fabricated in accordance with the design and sizes shown on the Plans. The fabricated articles shall be finished square, smoothly sanded and free from blemish or damage.

1. Flush-type Hollow Core Doors

   Flush type hollow-core doors shall be adequately framed with stiles and top and bottom rails having a minimum thickness of 34 mm and width of 75 mm. Two intermediate rails or more [illegible] shall be provided for stiffness.

   [illegible]

   [illegible]

2. Flush Type Solid Core Doors

   Flush type solid core doors shall be fabricated in the same manner as the hollow core type except that the spaces between stiles and rails shall be filled [illegible]

3. Panel Doors

   The stiles and rails of panel doors shall have a minimum thickness of [illegible] mm and width of [illegible] mm.

   [illegible]

4. Window Sashes with Glass Panes or Glass Panels

   [illegible]

5. Window Sashes w/ [illegible]

[illegible]

[illegible]

[illegible]

4. [illegible]

[illegible]

5. [illegible]

[illegible]

6. [illegible]

[illegible]

[illegible]

1. [illegible]

[illegible]

Fixtures set in masonry work may be installed after laying hollow concrete blocks, bricks or adobe. Space between fixtures and masonry shall be fully filled with cement mortar proportioned 1:3

2. Hinge Doors

Hinged doors, whether panel or flush type with standard height of 2100 mm and width of not more than 900 mm shall be hung with four loose – pin butt hinges, 100 mm x 100. Swing out exterior doors shall be hung with four butt – pin butt hinges. Two hinges shall be fitted 250 mm from the top and bottom edge of door. The other two hinges shall be fitted at the third point between the top and bottom hinges. Care should be taken to ensure that the hinges are fitted such that their pins are aligned for ease of pin insertion and smoothness of operation. For added smoothness pins should be lightly greased. Hammering of hinges to obtain proper alignment shall not be allowed.

For wide and heavier doors such as narra panel doors, an additional hinge shall be fitted 300 mm below the top hinge to counteract the door tilting effect.

Mounting screws shall be screwed in place to their entire length, not hitted into place or countersunk. Hammering of screw into place shall not be permitted.

3. Sliding Doors

Overhead tracks, standard, locally manufactured as per Plans shall be installed level and straight by bracket secured in place with lag screws supplied with set. Brackets shall be spaced 1000 mm on centers. Hangers, two each per door leaf, shall be pre-fitted and bolted to the door rail. For panel doors the hangers shall be centered on the door stiles. For flush doors, the hangers shall be centered 100 mm from the edge of the door. If there is no adequate space for installing the door with its attached rollers through either end of track the pre fitted hangers shall be disconnected for connection to the rollers.

After installation on the track, set the door plumb and in alignment by means of the adjustment mechanism incorporated with the roller assembly.

4. Lock Installation

Locks of doors shall be fitted at the same height, centered 1000 mm above the finishing floor level. Lock shall be installed in conformity with the templates and instruction supplied with lockset. Holes for mounting lock shall be properly bored to provide snug fit and rigid attachment of the lock to the doors. Strike plate shall be fitted on the door frame in alignment with the lock latch.

5. Sliding Type Window Sashes

Sashes shall be trimmed to fit the height of opening. A clearance of 3 mm shall be provided between the bargeboard base of the top rail and the bottom of the window head. The same clearance shall be provided between the sash tongue and the groove at the window head. Paraffin wax shall be applied to the contacts of sliding surfaces. The bottom rails shall be fitted with standard brass guides spaced 75 mm from both ends of the rail, rounded flush with the lower face and secured with three brass screws each guide.

6. Case Type Window Sashes

Sashes shall be trimmed to fit the opening, with provision for butt lapping of meeting stiles. Right side sash shall lap over the left side sash. Sashes shall be fitted with two loose – plated narrow

[illegible]

7. [illegible]

[illegible]

ITEM 1007 – ROLLING UP DOORS

1007.1 Description

This item shall consist of furnishing all plant, labor, tools, equipment and rolling up door required as shown on the Plans and in accordance with the Specification.

1007.2 Materials Requirements

[illegible]

1. Curtain – [illegible]

   Curtain is composed of:

   a. [illegible]

   b. End locks – [illegible]

      [illegible]

   c. [illegible]

2. [illegible]

3. [illegible]

4. [illegible]

5. Gaskets – shall be fabricated from seamless resin engine or processed cell formed elastomeric and organic. Exposed to temperatures not more exposed to heavy wear pressure. Designed with groove depths ranging from [illegible] depending upon the width of the joint and not less than [illegible]

[illegible]

Gland shall be machine-fully operated and with provisions for manual operation by means of [illegible] the concrete backed by the satisfactory performance. All the door shall be built in with the unit.

[illegible]

1. Iron and metal aluminum resin engine assembly shipped, placed, hand, access over by profile machine and tightly, seamless with aluminum concrete machine made.

2. Allow all adhesive during all work to be completely before any installation work in use for ensure the installation of all natural hand engine.

3. Assembly sliding as shown in accordance with the manufacturer instructions manual or as indicated in the shop drawing approved.

4. All grooves and rebates for gaskets, beadings and other accessories shall be formed accurately.

[illegible]

Curtain shall be formed of each unit of finished bar by associated slats type, which shall engage a rod wedge in each gutter. A plunger type cylinder lock is provided as standard equipment.

[illegible]

Upon completion and before final acceptance of the equipment, the Contractor shall furnish the [illegible] a written guarantee stating that the rolling up door equipment and installation, for one year period. The guarantee shall be for the period of one [illegible] from the date of final acceptance of the work. Any part of the equipment that becomes defective during the term of the guarantee shall be replaced and made good by the Contractor at his own expense or a manner satisfactory to the [illegible]

ITEM 1000 – ALUMINUM GLASS WINDOWS

[illegible]

The item shall consist of furnishing all aluminum glass window materials, labor, tools and equipment necessary and incidental for the proper construction and completion of the Project in accordance with the Plans and Specifications.

[illegible]

1000.2.1 Frame: The panel members shall be fabricated from extruded aluminum section free to finish with clean, straight, sharply defined profile and free from defects impairing strength or durability. The finished aluminum member shall conform to the specifications requirements and tests in ASTM B 221.

1000.2.2 Screws, bolts, washers, bolts, rivets and other miscellaneous fastening devices used to make up aluminum materials such as aluminum, stainless steel, etc.

1000.2.3 Hardware for fixing and locking shutter shall be closely matched to the extruded aluminum section and adjustable to the type and method of opening.

[illegible]

[illegible]

[illegible]

[illegible] Construction Requirements

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

Title 3.0.1 The standard shall be provided in accordance with the Specifications

ITEM 1048(1)–GLAZED TILES (150 mm) - UNGLAZED TILES

1048.1 Description

This item shall consist of furnishing all materials, labor, equipment, tools and appliances necessary and incidental to undertaking the proper installation of walls and floor tiles as shown on the Plans and in accordance with the Specifications.

1048.2 Material Requirements

1048.2.1 Common Tiles and Grout

Shall be made of clay or a mixture of clay and other acceptable ceramic material and shall be of the size and shape shown on the Plans. The tiles are classified by AASHTO M 252 as to their degree of water absorption. Ceramic tiles are made with manufactured edges by dust pressing or extrusion which the edges are ground to their correct size and shape after firing. Tiles shall be of the glazed or unglazed as shown on the Plans and shall be free from cracks, chips, crazing, warping, or other defects that would prevent a satisfactory installation. The tiles shall be uniform in color, size and texture.

1048.2.1.1 Glazed Tiles and Trims

Glazed tiles and trim shall have the appearance face of ceramic, impervious material over the body of the tiles and trims. The glazed surfaces may be either white or colored, depending on the color scheme designated by the Engineer. Standard glazed tiles may be bright lustrous, matte-like (flash glazed), matte (dull), or crystalline (mottled and textured) glaze resistance to abrasion. Glazed tiles are cured principally for walls; crystalline glazed tiles may be used for floors provided thereafter or floors are used as light duty floors.

1048.2.1.2 Unglazed Tiles

Unglazed tiles shall be hard dense tile of homogeneous composition. Its color and characteristics are determined by the material used in the body, the method of manufacture and the thermal treatment. It is used primarily for floors and walls.

1048.2.2 Mortar

Mortar are manufactured to match well the tiles' texture and to coordinate within the installation. Mortar are divided in various grades and are made with cement, lime, hydrated, cement, portland, etc. that are necessary for setting or applying a tile either between cementing sheets.

1048.2.3 Accessories

Accessories are items like bond, finishing and shall be well-matched tiles with colors to coordinate with the color of the adjacent tiles.

1048.2.3.1 Cement

Cement shall be Portland cement conforming to the specifications requirements governing in item 1001, Hydraulic Cement.

1048.2.3.2 Sand

Sand shall be well graded from coarse to fine and shall conform to the requirements.

1048.2.3.3 Lime

Lime shall be hydrated lime with free hydrated oxide and magnesium oxide content not to exceed 8 percent by weight.

1018.3 Construction Requirements

No work shall be started until mapping-in for plumbing, electrical and other trades have been completed and tested. The work on all other trades shall be protected from damage.

1018.3.1 Applied Plastering

a. Plastering for gypsum board and hardwood shall consist of two coats of 1:2:3 (one part cement, two parts lime, three parts sand) mixture. Surface to receive the coat be wet. Use brush in dry, hot weather. Allow at least seven days curing of concrete and setting time condition work shall not be allowed in cement and unsuitable dry conditions are barred.

b. Base coat shall be 7 mm(1/4") thick.

1018.3.1.1 Thoroughly dampen surfaces of masonry or concrete walls before mortar coat is applied.

1018.3.1.2 On masonry or concrete surfaces that apply a thin coat will, however, then bring it out sufficiently to accommodate the total irregularities of the walls or a thickness not less than 10mm at any point.

1018.3.1.3 Apply the weather coat to provide good weatherproof by forms the mortar into two fully hardened.

1018.3.2 Installation Procedure

Construction shall be started in other areas as installation for a minimum of one day.

1018.3.2.1 General Plastering Work

a. Dampen wood base if necessary then, gentlemanly portion of plaster and finishes to minimum coat base and coat by to coat.

b. Thoroughly surface the surface of wall that to not allow the surface.

c. Apply a level work board with thickness of plaster board 7.5mm thick to the wall surface at to back of the tile to be laid.

d. Lay the tiles mat to scuffle base panel splashed wall when the surface below the level wall was initially set.

e. Continue with the next 3.5 tile to rub and grooves 2mm over the last finishing and back and to ground together tiles.

f. Intermediate extensions shall be formed accurately using the appropriate form.

g. All lamp shall be right straight and level to surface, maintain and plaster corners, maintaining the alignments lines.

1018.3.2.2 Wall Tiles Against Floor Tiles

a. [illegible]

b. [illegible]

c. [illegible]

d. [illegible]

e. [illegible]

f. [illegible]

[illegible]

[illegible]

[illegible]

1. [illegible]

2. [illegible]

3. [illegible]

4. [illegible]

[illegible]

1. [illegible]

2. [illegible]

3. [illegible]

[illegible]

[illegible]

This Item shall consist of furnishing all cement plaster materials, labor, tools and equipment required in undertaking cement plaster finish as shown on the Plans and in accordance with this Specification.

1027.2 Material Requirements

Manufactured materials shall be delivered in the manufacturer's original unbroken packages or containers which are labeled plainly with the manufacturer's name and trademark.

1027.2.1 Cement

Portland cement shall conform with the requirements as defined in Item 701, Hydraulic cement.

1027.2.2 Hydrated Lime

Hydrated lime shall conform with the requirements as defined in Item 701, hydrated lime.

1027.2.3 Fine aggregates

Fine aggregates shall be clean, washed [illegible] sharp river sand and free from dirt, clay, organic matter or other deleterious substances. Sand derived from crushed gravel or stone may be used with the engineer's approval but in no case shall sand used be derived from the above [illegible] for use as [illegible] aggregates.

1027.3 Construction Requirements

1027.3.1 Mixture

1. Mortar mixture for scratch coat shall be freshly prepared and uniformly mixed in the proportion by volume of one part Portland cement, three (3) parts sand and one fourth (1/4) part hydrated lime.

2. The finish coat shall be pure Portland cement [illegible] conforming to the requirements of Item 701, Hydraulic Cement and mixed with water to required consistency and [illegible].

1027.3.2 Surface Preparation

a. After removal of formwork concrete surface shall be roughened to improve adhesion of cement plaster.

b. Surfaces to receive cement plaster shall be cleaned of all projections, dust, loose particles, grease or bond [illegible]. Before any application of plaster is commenced all surfaces that are to be plastered shall be wetted thoroughly with clean water to produce a uniformly moist condition.

1027.3.3 Application

a. Scratch coat mortar mix shall be applied with sufficient material and pressure [illegible] of the surface with the [illegible] and [illegible]. The [illegible] shall be [illegible] before the surface [illegible].

b. The finish coat shall not apply until after the scratch coat has been [illegible] and [illegible] have taken place [illegible]. Just before the application of the finish coat, the [illegible] surface shall be evenly moistened with [illegible] water. The finished coat shall be floated first to a true and even surface, then [illegible] in a manner that will force the [illegible] to penetrate the [illegible]. Surfaces [illegible]

[illegible]

[illegible]

a. [illegible]

b. [illegible]

[illegible]

[illegible]

[illegible] – MASONRY PAINTING [illegible] – WOOD PAINT

[illegible] Description

[illegible]

[illegible] Material Requirements

[illegible]

[illegible] Tinting Colors

[illegible]

[illegible] Neutralizer

[illegible]

[illegible] Silicon Water Repellent

[illegible]

[illegible] Patching Compound

[illegible]

[illegible] Varnish

[illegible] shall be a homogeneous mixture of resin, filler and solvent. It shall be relatively paste-like in nature, highly resistant to water and has almost excellent sealing, caulking, adhering, bonding, and vibration-free properties for a maximum period.

[illegible] Lacquer

Lacquer shall be any type of organic coating that dries rapidly and wholly by evaporation of its solvents. Typical solvents are acetone, alcohols and ketones. Although lacquers were generally based on cellulose nitrate, [illegible] are widely use, vinyl resins, phenolics and acetate butyrate are to improve adhesion and durability.

[illegible] Shellac

Shellac shall be a solution of shellac in a volatile alcoholic solvent. It shall be dark brown in color. The resin is generally dissolved in ethanol and denatured grades.

[illegible] Sanding Sealer

Sanding sealer shall be a [illegible] drying lacquer. Formulated to provide work [illegible] good sanding [illegible] and increasing sanding [illegible] and also intended to eliminate sanding of filler.

[illegible] Sizing Coat

Sizing coat shall be [illegible] applied to filling wood surface [illegible].

[illegible] Wood Paste Filler

Wood paste filler shall be ready for use for filling pore and closing open grain of wood work. It shall produce a good finish for varnishing work or both [illegible] and other solvent products.

[illegible] Varnish

Color	
a.) [illegible]	[illegible]
Shall be applied	[illegible]
b.) [illegible]	[illegible]
c.) [illegible]	[illegible]
	[illegible]
d.) [illegible]	[illegible]
	[illegible]
e.) [illegible]	[illegible]
f.) [illegible]	[illegible]

[redacted]	
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]

[redacted]

[redacted]

[redacted]

[illegible] shall be taken care and kept free from [illegible] and [illegible] from surfaces. Wipes, unpainted galvanized metal with rotting solution and allow it to dry. Rinses resulted in stone and bricks with Red Lead Primer paint shall be approved by the Engineer.

In addition, the processing shall accomplish the following:

a. Steps, inserts, and etc. will be provided with proper labeling materials and treated finishes with appropriate materials.

b. Material or damaged steps used, or parts shall be good primed with appropriate wood primer.

c. Painting of [illegible] works shall not be commenced when it is too hot or cold.

d. Allow appropriate [illegible] using applicable and [illegible] paint.

e. All hardware will be [illegible] and removed or protected prior to painting and varnishing work.

[illegible] Application

Paints shall be applied by [illegible] and brushing only. Spray equipment may be used provided that all safety requirements are fulfilled and adequate ventilation is provided.

Paints prior to application to the wood surface shall be thoroughly mixed. It must be non-sticky when it is ready to apply. Stirring will [illegible] and [illegible] the ingredients. Thinning shall be kept [illegible] and [illegible] as to the right volume of [illegible] with it. This procedure changes the [illegible] properties of the paint.

[illegible] Sanding and Cleaning

All the time, all application work shall [illegible] as sign of deterioration. Paint shall be thoroughly mixed, stirred and kept at a uniform consistency during application. Thinner of different manufacturer shall not be mixed. When thinning is necessary, the same be done immediately prior to application in accordance with the manufacturer's directions. Do not mix [illegible] paint of [illegible] [illegible] and [illegible] of the paint.

[illegible] Methods

All [illegible] to be used under this item shall be stored in a proper place to be approved by the Engineer and such place shall be always kept [illegible] and clean. Necessary precautions to avoid fire must be observed by removing [illegible] and all the time of daily work.

[illegible] Cleaning

[illegible] and other [illegible] shall be [illegible] to be [illegible] or [illegible] at the end of daily work. Upon completion of the work, all [illegible], [illegible] and paint [illegible] shall be removed. Paint [illegible], etc. or stains on adjacent surfaces shall be removed and the entire [illegible] clean and presentable to the Engineer.

[illegible] Measurement of Payment

a. All paints shall be strictly applied. Three [illegible] of paints [illegible] and [illegible] to prevent [illegible] of brush marks.

b. All work shall be thoroughly dry before the [illegible] coat is applied.

c. [illegible]

d. [illegible]

e. [illegible]

[illegible] Procedure for [illegible] Finish

a. [illegible]

b. [illegible]

c. [illegible]

d. [illegible]

e. [illegible]

f. [illegible]

g. [illegible]

[illegible] Procedure for Varnish Finish

a. Sand surface thoroughly

b. Fill all cracks and other wood imperfections with wood paste filler

c. Apply oil stain

d. [illegible] sanding sealer

e. Sand surface along the grain

f. Spray three (3) coats of clear [illegible]

g. Polish surface [illegible]

h. [illegible]

[illegible] Procedure for [illegible] Finish

a. Sand surface thoroughly

b. [illegible]

i. [illegible]

ii. [illegible]

iii. [illegible]

ITEM 0643 – METAL STAIR RAILING

643.1 Description

This work shall consist of steel stairways and the steel railings, pipe railings or composite railings, constructed in reasonably close conformity with the lines, grades and dimensions shown on the Plans or established by the Engineer.

The work shall include fabricating, assembling, testing, painting, welding and providing items not specifically called for in the Special Provisions or shown on the Plans. Stairways and railings shall have smooth, even welding, symmetrical and alike welds, rounded edges and railings and bar moldings. The work shall also include any temporary metal connections not otherwise provided for, all in accordance with these Specifications, Plans and Special Provisions.

643.2 Material Requirements

Materials shall meet the requirements of Item 712, Structural Metals, Item 718, Welded Structural Steel, and Item 720, Bolting Structural Steel, and Item 730, Paints.

643.3 Construction Requirements

643.31 Inspection

The Contractor shall give the Engineer at least fifteen (15) days' notice prior to the beginning of work at the mill or shop, so that the required inspection may be made. The term "mill" as here used, shall include any rolling mill, shop or foundry where material for the work is to be manufactured or fabricated. No material shall be rolled or fabricated until such inspection has been provided.

The Contractor shall furnish the Engineer with copies of the certified mill records of the steel heats involved, preferably before but not later than the delivery of the steel to the job site.

The Contractor shall furnish all facilities for inspection and the Engineer shall be always allowed free access to the mill or shop and workmen. The Contractor shall furnish, without charge, all labor, machines, materials and tools necessary to prepare test specimens.

Inspection at the mill or shop is provided as a means of facilitating the work and avoiding errors and it is expressly stipulated, that it will not relieve the Contractor from any responsibility for defective material or workmanship and he bound by for rejection later. The acceptance of any material or fabrication inspected at the mill or shop by the Engineer shall not preclude their subsequent rejection if found defective before final completion of the work. Inspection of welding will be in accordance with the provisions of Section 714 of the "Standard Specifications for Bridges and Highway Construction" of the Bureau of Public Works.

643.32 Shop Painting and Coating

When so specified in the Contract, stock material shall be segregated into category designated as "identified" or "unidentified". Identified material is material which can be positively identified as having been rolled from a given heat for which certified mill test can be presented. Unidentified material shall include all other grades of such materials. When it is proposed to use unidentified material, the Engineer shall be notified of such intention at least fifteen (15) days in advance of commencing fabrication to permit sampling and testing. When so instructed or directed, the Contractor shall select such material as he wishes to use from stock, and place it in such position that it will be accessible for inspection and sampling. The Contractor shall select identified samples from, or fabricated members as practical, and furnish the certified mill test reports on each of such heat numbers. Test samples shall be drawn from each heat number so identified, one for a tension test and one for a bend test.

In the case of unidentified stock, the Engineer may, at his discretion, select any number of samples and specimens.

Each ten tons, or fraction thereof, of bolts and nuts taken shall be subject to tension test. The bolts or nuts shall be furnished to the Engineer free each for the test purposes.

Structural material, either plain or fabricated, shall be stored above the ground upon platforms, skids or other supports. It shall be kept free from dirt, grease or other foreign matter, and it shall be protected as far as practicable from corrosion.

403.3.3 Workmanship

These Specifications apply to welded, bolted and riveted construction. The Contractor may, however, with approval of the Engineer, substitute high tensile strength steel bolts equivalent to the rivets in any connection.

Workmanship and finish shall be equal to the best general practice in modern bridge shops. Portions of the work exposed to view shall be finished neatly. Shearing, flame cutting, and chipping shall be done carefully and accurately.

Structural material, either plain or fabricated, shall be stored above the ground upon platforms, skids or other supports. It shall be kept free from dirt, grease or other foreign matter, and it shall be protected as far as practicable from corrosion.

Rolled material before being laid out or worked must be straight. If straightening is necessary, it shall be done by methods that will not injure the metal. Sharp kinks and bends will be cause for rejection of the material.

Preparation of material shall be in accordance with AWS (American Welding Society) D 1.1, paragraph 3.2 as modified by AASHTO Standard Specification for Welding of Structural Steel Highway Bridges.

403.3.4 Finishing and Shaping

Finished members shall be true to line and free from twists, bends and open joints.

1. **Edge Planing**

   Sheared edges of plates more than 15.9 mm (5/8 inch) in thickness and carrying calculated stresses shall be planed to a depth of 6.4 mm (1/4 inch). Re-entrant cuts shall be filleted before cutting.

2. **Facing of Bearing Surfaces**

   The surface finish of bearing and base plates and other bearing surfaces that are to come in contact with each other or with concrete shall meet the American National Standards Institute surface roughness requirements as defined in ANSI B46.1-47, Surface Roughness Waviness and Lay, Part I.

Steel slabs	ANSI 2,000
Heavy plates in contact in shoes to be welded	ANSI 1,000
Milled ends of compression members, stiffeners and fillers	ANSI 500
Milled ends of compression members, stiffeners and fillers flange edges and rockers	ANSI 500
Pins and pin holes	ANSI 250
Sliding bearings	ANSI 125
	ANSI 125

3. Abutting Joints

Abutting joints in compression members and girder flanges, and in tension members where so specified on the drawings, shall be faced and brought to an even bearing. Where joints are not faced, the opening shall not exceed 6.5 mm.

4. End Connection Angles

Floor beams, stringers and girders having end connection angles shall be built to exact length back to back of connection angles with a permissible tolerance of 0 mm to minus 1.6 mm. If end connections are faced, the finished thickness of the angles shall not be less than that shown on the detail drawings, but in no case less than 9.5 mm.

5. Lacing Bars

The ends of lacing bars shall be neatly rounded unless another form is required.

6. Fabrication of Members

Unless otherwise shown on the Plans, steel plates for main members and splice plates for flanges and main tension members, not secondary members, shall be cut and fabricated so that the primary direction of rolling is parallel to the direction of the main tensile and/or compressive stresses.

Fabricated members shall be true to line and free from twists, bends and open joints.

7. Web Plates (Planed or Milled)

In girders having no cover plates and not encased in concrete, the top edge of the web shall not project above the backs of the flange angles and shall not be more than 3.2 mm below at any point. Any portion of the plate projecting beyond the angles shall be chipped flush with the backs of the angles. Web plates of girders having cover plates may be not more than 12.7 mm less in width than the distance back-to-back of flange angles.

Splices in webs of girders without cover plates shall be sealed on top with red lead paste prior to painting.

At web splices, the clearance between the ends of the plates shall not exceed 6.5 mm. The clearance at the top and bottom ends of the web splice plates shall not exceed 6.5 mm.

8 [illegible]

[illegible]

a. [illegible]

b. [illegible]

ASTM DESIGNATION		THICKNESS, mm				
		[illegible]	Over [illegible] to [illegible]	Over [illegible] to [illegible]	Over [illegible] to [illegible]	Over [illegible] to [illegible]
A36		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
A242		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
A440		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
A441		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
A529		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
A572	Gr 42	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Gr 45	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Gr 50	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Gr 55	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Gr 60	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Gr 65	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	A588	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	A514	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

i. [illegible]

ii. [illegible]

8 Bolted bonding. Conversion of the plate for bolted to a value of 1.0 over throughout measurement the plate when bolting tolerance

9 Field Millwork

Field millwork of gusset and stiffener material as supports for [illegible] shall have full bearing joints milled, ground or as suitable steel in compression seats or flanges, except as shown on the Plans or specified on the flanges to which they transmit load or have other engineering need. Millwork not required to support bearing shall make close contact as specified otherwise. A sufficiently tight to transfer entire plate being provided, except that for welded flanges, the ends of stiffeners adjacent to the flanges flanges shall be not more as shown on the Plans. Fillet weld stiffeners shall be milled to [illegible] non-abutment end.

Bearing will be permitted [illegible] the of milling or grinding if noted on the Plans or in the Special Provisions. Symbols, signs, generally, stiffeners, and other detailed material shall not be omitted or sacrificed to facilitate simple manner approved by the Engineer.

10 Erection

No holes may be flame cut without the prior written permission from the Engineer. All approved flame cut holes shall be ground smooth. Reamed or drilled holes shall be accurately finished, true to size, perpendicular to the face of the member and cylindrical for the full thickness of the hole. Holes shall be punched and countersunk for alignment and assembly. All misaligned holes shall be enlarged with steel reamers or the edge of the hole of such diameter that [illegible] is considered to be within values that have not exceed in plans or the standard. The reamers shall be arranged and have their holes and the pin holes shall be accurately located on the centerline of the top. The [illegible] of any hole in the plane of the holes shall not exceed 1.5 mm or 10% plus.

The edges of members shall be [illegible] the [illegible] material shall [illegible] and be cut smooth and free from [illegible] with hand mechanically operated [illegible] thereof. If small chips, gutter or a notch is [illegible], it shall be ground or [illegible] as directed [illegible] plates.

11 Assembling and Erection Bolting

All [illegible] members which are [illegible] in the [illegible] to be [illegible] shall have [illegible] reaming, fitting and straightening done after [illegible] assembling and reaming. Bolt assembly shall be in accordance with ASTM E 44. The temperature shall be [illegible] during the [illegible] and reaming so that the temperature of the [illegible] will be more than 37.8°C at any one time.

Members not [illegible] which shall not be completed or [illegible] and shall be shown [illegible] only with the approval of the Engineer.

A [illegible] of each [illegible] shall identify the pieces in the [illegible] and show the [illegible] and assembly [illegible]. Proper [illegible] including [illegible] shall be provided for [illegible] at any time the temperature of members in the [illegible]. The assembly of the [illegible] shall be [illegible] only with the approval of the Engineer.

Structure, such as bridge [illegible], [illegible], or [illegible] when you set up by welding sections of plate together shall be [illegible] in accordance with the provisions of [illegible] AWS D1.1 and [illegible] by the Plans, Specifications or Special Provisions governing the Contract.

12 Field

When full size tests of fabricated structural members or eyebars are required by the Contract, the Plans or Specifications will state the number and nature of the tests, the results to be attained and the measurements of strength, deformation or other performance that are to be made. The Contractor shall provide suitable facilities, material, supervision and labor necessary for making and recording the tests. The members tested shall be paid for in accordance with Subsection 403.2.3.1. The cost of testing, including equipment handling, supervision, labor and incidentals for making the tests shall be included in the contract price for the fabrication or fabrication and erection of structural steel, whichever is the applicable item in the Contract, unless otherwise specified.

403.3.9 Pins and Rollers

Pins and rollers shall be accurately turned to the dimensions shown on the Plans and shall be straight, smooth, and free from flaws. Pins and rollers more than 228.6 mm in diameter shall be forged and annealed. Pins and rollers 228.6 mm or less in diameter may be either forged and annealed or cold-finished carbon-steel shafting.

In pins larger than 228.6 mm in diameter, a hole not less than 50.8 mm in diameter shall be bored full length along the axis after the forging has been allowed to cool to a temperature below the critical range, under suitable conditions to prevent injury by too rapid cooling, and before being annealed.

Pin holes shall be bored true to the specified diameter, smooth and straight, at right angles with the axis of the member and parallel with each other unless otherwise specified.

The final surface shall be produced by a finishing cut.

The distance outside to outside of holes in tension members and inside to inside of holes in compression members shall not vary from that specified more than 0.8 mm. Boring of holes in built-up members shall be done after the riveting is completed.

The diameter of the pin hole shall not exceed that of the pin by more than 0.51 mm for pins 127 mm or less in diameter, or 0.8 mm for larger pins.

The pilot or driving nuts for each size of pin shall be furnished, unless otherwise specified. All holes for rivets or bolts shall be either punched or drilled. Material forming parts of a member composed of not more than five thicknesses of metal may be punched 1.6 mm larger than the nominal diameter of the rivets or bolts whenever the thickness of the material is not greater than 19.0 mm for structural steel, 16.0 mm for high-strength steel or 12.7 mm for quenched and tempered alloy steel, unless sub-punching and reaming is required for field connections.

When there are more than five thicknesses or when any of the main material is thicker than 19 mm for structural steel, 16.0 mm for high-strength steel, or 12.7 mm for quenched and tempered alloy steel, all holes shall either be subdrilled or drilled full size.

When required for field connections, all holes shall either be sub-punched or sub-drilled (subdrilled if thickness limitation governs).

4.8 mm smaller and, after assembling, reamed 1.6 mm larger or drilled full size 1.6 mm larger than the nominal diameter of the rivets or bolts.

When permitted by design criteria, enlarged or slotted holes are allowed with high strength bolts. For punched holes, the diameter of the die shall not exceed the diameter of the punch by more than 1.6 mm. If any holes must be enlarged to admit the fasteners, they shall be reamed. Holes shall be clean cut without torn or ragged edges. Poor matching of holes will be cause for rejection.

1. Piling for Footing and Slabs

Excavation of soil for piling shall be done with boring machine. The depth of excavation shall be determined, well planned and firmly done together with hole before removing or making excavation. Excavated pieces shall be piled round. If necessary, for the removal of earth and sewage purposes by the sanitary operations. The pipe line shall be over hole stone, bricks and other hard objects. Footings of buildings (concrete columns) the load bears. Footings shall be made of concrete with steel bars. The thickness of footing shall not be more than 1.5 times larger than the nominal diameter of the steel.

Steel connection angles, and starter bars shall be carefully attached to correct positions and rolled / clamped, or otherwise firmly held in place until hooked.

Pads and connections cleaned to the sites and be allowed to cure at least all practicable to prevent damage to alignment and hardening.

2. Slab Assembling

The first placement of slab consists of forms, stones, embedded steel bars, long bolts, steel bars, plate girders and right beams shall be assembled in the slab with other materials/concrete assembly in the footing and then shall have that activity have started acquainted the slab for construction are established. Assembly shall be "Concrete Slabs Assembly" unless "Progressive Placed Assembly" or "Slumps Complete Structure Assembly" is included in the Special Provisions or on the Plans.

Steel connections with temporary Connection Bolts Connections shall be in accordance with the requirement of AISC of the Specifications.

Each assembly, including certain, diamond, stainless of bars and bright rolled parts, shall be approved by the Engineer before starting a commercial to follow an NFC drilled shall assemble a diameter.

The fabricator shall furnish the Engineer a number diagram showing the number of each piece used in the assembly and the erection number of both gallery and fractions of each length (in ft) work maximum, if NC plans maximum) in case of conference beams and girders of right beams. When the steel assembly is Field Trusses or Girder Assembly or Special Complete Structure Assembly, the number diagram shall show the number assembled in the shop. When any of the other methods of steel assembly is used, the number diagram shall show assembled number. Methods of assembly shall be determined as:

a. Full of Truss or Girders Assembly shall consist of assembling all members of each truss with the load, beam bars, continuous beam line, plate girder or right beams at site line.

b. Progressive Truss or Girder Assembly shall consist of assembling initially the steel beam, plate girder, beam bars, continuous beam line, plate girder, or right beams. All members in at least three continuous shop sections or panels but not less than the number of panels connected with three continuous metal lengths (i.e., length between field splices) and not more than 45.72 m or sixty of thickness ranges from 45.72 m. All members that connect or reinforcement connections connected will be connected shall be added to the assembly and all the assembly added any member is removed from the assembly and so that the connection portion of the members is where two number shall.

c. Full Chord Assembly shall consist of assembling with geometric angles at the joints, the full length of each chord or each truss of open spandrel arch, or each leg of each bent or tower, then reaming their field connection holes while the members are assembled, and reaming the web member connections to steel templates set at geometric (not cambered) angular relation to the chord lines. Field connection holes in web members shall be reamed to steel templates. At least one end of each web member shall be milled or shall be scribed normal to the longitudinal axis of the member and the templates at both ends of the member shall be accurately located from one of the milled ends or scribed lines.

d. Progressive Chord Assembly shall consist of assembling contiguous chord members in the manner specified for Full Chord Assembly and in the number and length specified for Progressive Truss or Girder Assembly.

e. Special Complete Structure Assembly shall consist of assembling the entire structure, including the floor system. (This procedure is ordinarily needed only for complicated structures such as those having curved girders, or extreme skew in combination with severe grade or camber). The assembly including camber, alignment, accuracy of holes and fit of milled joints shall be approved by the Engineer before reaming is commenced.

f. A Contractor shall furnish the Engineer a camber diagram showing the camber at each panel point of each truss, arch rib, continuous beam line, plate girder, or rigid frame. When shop assembly is Full Truss or Girder Assembly or Special Complete Structure Assembly, the camber diagram shall show the camber measured in assembly. When any of the other methods of shop assembly is used, the camber diagram shall show calculated camber.

g. Check Assemblies with Numerically Controlled Drilled Field Connections. A check assembly shall be required for each major structural type of each project, unless otherwise designated on the Plans or in the Special Provisions and shall consist of at least three contiguous shop sections or, in a truss, all members in at least three contiguous panels but not less than the number of panels associated with three contiguous chord lengths (i.e. length between field splices). Check assemblies should be based on the proposed order erection, joints in bearings, special complex points, and similar considerations. Such special points could be the portals of skewed trusses, etc.

Use of either geometric angles (giving theoretically zero secondary stresses under dead-load conditions after erection) or cambered angles (giving theoretically zero secondary stresses under no-load conditions) should be designated on the Plans or in the Special Provisions.

The check assemblies shall preferably be the first such sections of each major structural type to be fabricated.

No match-marking and no shop assemblies other than the check assemblies shall be required.

If the check assembly fails in some specific manner to demonstrate that the required accuracy is being obtained, further check assemblies may be required by the Engineer for which there shall be no additional cost to the contracting authority.

407.3.8 Rivets and Riveting

[illegible]

[illegible]

[illegible]

[illegible]

1047.3.1 Bolted Connections, Connections, Turned and Ribbed Bolts

1. General

   [illegible]

   [illegible]

   [illegible]

2. Unfinished Bolts

   [illegible]

3. Turned Bolts

   [illegible]

bolts threaded to provide for a tight drawing fit. Threads shall be entirely outside of the holes. A washer shall be provided under the nut.

e. Ribbed Bolts

The body of the ribbed shall be of an approved form with continuous longitudinal ribs. The diameter of the body measured on a circle through the points of the ribs shall be 2.00 mm greater than the nominal diameter specified for the bolts.

Ribbed bolts shall be furnished with round heads conforming to ANSI B 18.5 unless otherwise specified. Nuts shall be hexagonal, either recessed or with a washer of suitable thickness. Ribbed bolts shall make a driving fit with the holes. The hardness of the ribs shall be such that the ribs do not mash down enough to permit the bolts to turn in the holes during tightening. If for any reason the bolt twists before drawing tight, the holes shall be carefully reamed and an oversized bolt used as a replacement. The Contractor shall provide and arrange himself bolt oversized bolts for this replacement in an amount not less than ten percent (10%) of the number of ribbed bolts specified.

403.2.10 Bolted Connections (High Tensile-Strength Bolts)

1. Bolts

Bolts shall be AASHTO M 164 (ASTM A 325) or AASHTO M 253 (ASTM A 490) high-strength bolts. Other fasteners which meet the chemical requirements of AASHTO M 164 or M 253 and which meet the mechanical requirements of the same specification in full size tests and which have body diameter and bearing areas under the head and nut, or their equivalents, not less than those provided by a bolt and nut of the same nominal dimensions prescribed above, may be used subject to the approval of the Engineer. Bolt lengths shall be determined by adding the grip-length values given in Table 403.3 to the total thickness of connected material. The values of Table 403.3 compensate for manufacturer's tolerances, the use of heavy semi-finished hexagonal nut and a positive "stick through" at the end of the bolt. For each hardened flat washer that is used add 4 mm to the tabular value and for each beveled washer add 8 mm. The length determined shall be adjusted to the next longer 6.5 mm.

Table 403.3 - Grip Length Values

Bolt Size (mm)	To determine required bolt length, add (mm)
9.5	17.5
12.7	22.2
19.1	25.4
22.2	28.6
25.4	31.7
28.6	38.1
31.7	41.3

[illegible]	[illegible]
[illegible]	[illegible]

[illegible]

3. [illegible]

[illegible]

[illegible]

a. [illegible]

b. [illegible]

c. [illegible]

d. [illegible]

e. [illegible]

[illegible]

4. [illegible]

a. [illegible]

[illegible]

[illegible]

3. Turn-of-Nut Tightening. [illegible]

[illegible]

4. Lock Pin and Collar Fasteners. [illegible]

Table [illegible] - Nut Rotation from Snug Tight Condition

[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]			[illegible]
[illegible]	[illegible] [illegible]	[illegible] [illegible]	
			[illegible]

[illegible]

[illegible]

4. [illegible]

[illegible]

[illegible]

a. [illegible]

b. [illegible]

c. [illegible]

d. [illegible]

e. [illegible]

[illegible]

Welding shall be done in accordance with the best modern practice and the applicable requirements of AWS D1.1 except as modified by AASHTO "Standard Specifications for Welding of Structural Steel Highway Bridges".

407.3.12 Erection

1. **General**

   The Contractor shall provide the falsework and all tools, machinery and appliances, including drift pins and fitting-up bolts necessary for the expeditious handling of the work and shall erect the metal work, remove the temporary construction, and do all work necessary to complete the structure, as required by the Contract and in accordance with the Plans and these Specifications.

   Pursuant to the Plans or in the Special Provisions, the Contractor shall dismantle the old structure on the bridge site in accordance with Item 101, Removal of Structures and Obstructions.

407.3.13 Handling and Storing Materials

Materials to be stored shall be placed on skids above the ground. It shall be kept clean and properly drained. Girders and beams shall be placed upright and shored. Long members, such as columns and chords, shall be supported on skids placed near enough together to prevent injury from deflection. If the Contract is for erection only, the Contractor shall check the material turned over to him against the shipping lists and report promptly in writing any shortage or damage discovered. He shall be responsible for the loss of any material while in his care, or for any damage caused to it after being received by him.

407.3.14 Falsework

The falsework shall be properly designed and substantially constructed and maintained for the loads which will come upon it. The Contractor shall prepare and submit to the Engineer working drawings for falsework and working drawings for changes in any existing structure for maintaining traffic, in accordance with [illegible].

407.3.15 Method and Equipment

Before starting the work of erection, the Contractor shall inform the Engineer fully as to the method of erection he proposes to follow, and the amount and character of equipment he proposes to use, which shall be subject to the approval of the Engineer. The approval of the Engineer shall not be considered as relieving the Contractor of the responsibility for the safety of his method or equipment or from carrying out the work in full accordance with the Plans and Specifications. No work shall be done until such approval by the Engineer has been obtained.

407.3.16 Straightening Bent Material

The straightening of plates, angles, other shapes and built up members, when permitted by the Engineer, shall be done by methods that will not produce fracture or other injury. Distorted members shall be straightened by mechanical means or, if approved by the Engineer, by the carefully planned and supervised application of a limited amount of localized heat, except that heat straightening of AASHTO M 244 (ASTM A 514) or ASTM A 517 steel members shall be done only under rigidly controlled procedures, each application subject to the approval of the Engineer. In no case shall the maximum temperature of the AASHTO M 244 (ASTM A 514) or ASTM A 517 steel exceed 607.2°C, nor shall the temperature exceed 510°C at the weld metal or within 152.4 mm of weld metal. Heat shall not be applied directly on weld metal. In all other steels, the temperature of the heated area shall not exceed 648.9°C (a dull red) as controlled by temperature indicating crayons, liquids or bimetal thermometers.

Parts to be heat-straightened shall be substantially free of stress and from external forces, except stresses resulting from mechanical means used in conjunction with the application of heat.

Following the straightening of a bend or buckle, the surface of the metal shall be carefully inspected for evidence of fracture.

[illegible] Assembling Steel

The parts shall be accurately assembled as shown on the working drawings and any match-marks shall be followed. The material shall be carefully handled so that no parts will be bent, broken or otherwise damaged. Hammering which will injure or distort the members shall not be done. Bearing surfaces and surfaces to be in permanent contact shall be cleaned before the members are assembled. Unless erected by the cantilever method, truss spans shall be erected on blocking so placed as to give the bottom chord camber. The blocking shall be left in place until the tension chord splices are fully connected with permanent fasteners and all other truss connections pinned and bolted. [illegible]

[illegible]

[illegible] Riveting

Pneumatic hammers shall be used for field riveting, except where the use of hand tools is permitted by the Engineer. [illegible]

[illegible] shall not be driven by hand. [illegible] Connections shall be accurately and securely fitted up before the rivets are driven.

Drifting shall be only such as to draw the parts into position and not sufficient to enlarge the holes or distort the metal. [illegible] Rivets shall be heated uniformly to a "light cherry red" color and shall be driven while hot. They shall not be overheated or burned. Rivet heads shall be full and symmetrical, concentric with the shank, and shall have full bearing all around. They shall not be smaller than the heads of the shop rivets. Rivets shall be tight and shall grip the connected parts securely together. Caulking or recupping will not be permitted. In removing rivets, the surrounding metal shall not be injured. If necessary, they shall be drilled out.

[illegible] Pin Connections

Pilot and driving nuts shall be used in driving pins. They shall be furnished by the Contractor without charge. Pins shall be so driven that the members will take full bearing on them. Pin nuts shall be screwed up tight and the threads burred at the face of the nut with a pointed tool.

[illegible] Setting Shoes and Bearings

Bridge shoes and bearing plates shall not be placed on bridge seat bearing areas that are improperly finished, deformed, or irregular. They shall be set level in exact position and shall have full and even bearing. The shoes and bearing plates may be set by either of the following methods:

1. Method 1

[illegible]

a. [illegible]

b. [illegible]

c. [illegible]

2. Method 2

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

a. SSPC – SP – [illegible]

b. SSPC – SP – [illegible]

c. SSPC SP-[illegible]

d. SSPC SP-[illegible]

[illegible]

[illegible]

When paint systems No. 1 or 1 are specified, the steel surfaces shall be blast cleaned in accordance with SSPC - SP - 10. When paint systems No. 2, 4 & 5 are specified, the steel surface shall be blast cleaned in accordance with SSPC - SP - 6.

Item 3.02 System of Paint

The paint systems to be applied shall consist of one as set forth in Table 403.4 and as specified in the Special Provisions.

Painting Steel Surface

1. Time of Set Coating

[illegible]

[illegible]

2. Storage of Paint and Thinner

[illegible]

[illegible]

[illegible]

3. Mixing and Thinning

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

into a clean container. The pigment in the paint shall be lifted from the bottom of the container with a broad, flat paddle, lumps shall be broken up, and the pigment thoroughly mixed with the vehicle. The [illegible] of vehicle shall be returned to the paint with simultaneous stirring, or pouring repeatedly from one container to another until the composition is uniform. The bottom of the container shall be inspected for unmixed pigment. [illegible] The [illegible] shall be added to the large container of paint and mixed with the [illegible].

Paint which does not have a limited pot life, or does not deteriorate on standing, may be mixed at any time before using, but if settling has occurred, it must be remixed immediately before using. Paint shall not remain in spray pots, painters buckets, etc., overnight, but shall be gathered into a container and remixed before use.

[illegible]

The type of thinner shall comply with the paint specification.

When the use of thinner is permissible, thinner shall be added to paint during the mixing process. Painters shall not [illegible] When the use of thinner is permissible, thinner shall be added to paint during the mixing process. Painters shall not add thinner to paint after it has been thinned to the correct consistency.

All thinning shall be done under the supervision of one acquainted with the correct amount and type of thinner to be added to the paint.

Table 1032.4 - Paint Systems

	Paint System				
	1	2	3	4	5
High Pollution or Coastal Site	X	X	X		
Others				X	X

Note:

1. The paint system chosen [illegible]
2. Coastal - within [illegible] of [illegible]
   High pollution - air pollution environment such as industrial areas
   [illegible]

All [illegible] shall be [illegible] by one of the following systems. The required system or choice of systems will be shown in the Contract.

System [illegible] while the other systems are [illegible].

Coating Products	Specifications	Min. Dry Film
System 1 – Vinyl Paint System		
Wash Primer Intermediate Coat 2nd Coat 3rd Coat Finish Coat	[illegible]	[illegible]
	[illegible]	[illegible]
	[illegible]	[illegible]
	[illegible]	[illegible]
	[illegible]	[illegible]
	[illegible] Total thickness	[illegible]
System 2 – Epoxy/Polyamide System		
Primer Coat Intermediate Coat 3rd Coat Finish Coat Total thickness	[illegible]	[illegible]
	[illegible]	[illegible]
	[illegible]	[illegible]
	[illegible]	[illegible]
* The third coat may be eliminated [illegible]		

Coating Thickness	Specifications	Min. Dry Film
System 1 – Vinyl Paint System		
Wash Primer Intermediate Coat 2nd Coat 3rd Coat Finish Coat	[illegible]	[illegible]
	[illegible]	[illegible]
	[illegible]	[illegible]
	[illegible]	[illegible]
	[illegible] Total thickness	[illegible]
System 2 – Epoxy/Polyamide System		

[illegible]	[illegible]	[illegible] 76.20
	[illegible]	[illegible] 76.20
	[illegible]	76.20 [illegible]
[illegible]		

Coating Thickness	Specifications	Min. Dry Film
System 3 - [illegible] Coating System		
Prime Coat [illegible] [illegible] [illegible] Top Coat/Finish Coat	[illegible] [illegible] Thickness [illegible] [illegible] [illegible] Total thickness	[illegible] 76.20 [illegible] [illegible] 48.90 - 127 12.70 38.10 [illegible] 152.40
System 4 - [illegible] System		
Prime Coat Intermediate Coat Finish Coat	[illegible] [illegible] Total thickness	[illegible] 60.00 50.80 114.30 - 152.40
[illegible] a minimum thickness of 152.40 mpc		
[illegible] System		
Prime Coat/Intermediate Coat/ [illegible] Top Coat/Finish Coat	[illegible] [illegible] [illegible] [illegible]	[illegible] [illegible]

[redacted]

[redacted]

[redacted]

Spray Application of Paint

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

Shop Priming

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

e. Field Painting

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

f. Drying of Painted Work

[illegible]

g. Storing of Painted Steel

[illegible]

[illegible]

[illegible]

[illegible]

ITEM 1002 – PLUMBING

1002.1 Description

[illegible] materials, tools, equipment and [illegible] as shown on the Plans [illegible] in accordance with the [illegible] of the National Plumbing Code, and this Specification.

[illegible] Material Requirements

All [illegible]

[illegible] Cast Iron Soil Pipes and Fittings

a. Pipes and fitting materials shall comply with the specification requirements defined in [illegible]. The material description and standards of manufacture are herein described:

1. Cast Iron – [illegible]

2. Quality of Iron – [illegible]

3. [illegible]

4. [illegible]

b. [illegible]

c. [illegible]

d. [illegible]

[illegible] Water Supply Pipes and Fittings

a. Pipes and fitting materials shall comply with the specification requirements defined in [illegible]. The material description and standards of manufacture are herein described:

Fittings shall be [illegible]

b. Valves

[illegible]

a. [redacted]

[redacted]

b. [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

a. [redacted]

b. [redacted]

c. [redacted]

[redacted]

a. [redacted]

b. [redacted]

a. [illegible]

b. [illegible]

c. [illegible]

d. [illegible]

e. [illegible]

[illegible]

a. [illegible]

b. [illegible]

c. [illegible]

d. [illegible]

e. [illegible]

f. [illegible]

g. [illegible]

[illegible]

[illegible]

a. [illegible]

b. [illegible]

c. [illegible]

d. [illegible]

e. [illegible]

- [redacted]

[redacted]

a. [redacted]

b. [redacted]

c. [redacted]

d. [redacted]

[redacted]

[redacted]

The Contractor [redacted]

[redacted]

a. [redacted]

b. [redacted]

c. [redacted]

d. [redacted]

e. [redacted]

f. [redacted]

g. [redacted]

[illegible] specified in these Rules, they have to submit the plan and specifications for change in the plan of the one line diagram to the electrical plan of the existing load center system. Where it becomes necessary to use steel cables, fittings or other hardware for anchorage of the conductor shall be obtained prior to installation of the same.

a. All [illegible] shall be [illegible] with [illegible] in [illegible] and [illegible] shall be [illegible] with [illegible] in [illegible] and [illegible] shall be [illegible] with [illegible] in [illegible] and

d. Drain Cocks

1. [illegible]

e. [illegible]

1. [illegible]

f. [illegible]

[illegible]

g. [illegible]

[illegible]

1. [illegible]

[illegible]

2. [illegible]

3. [illegible]

4. [illegible]

5. [illegible]

6. [illegible]

[illegible]

a. [illegible]

b. [illegible]

c. [illegible]

c. Bolts and nuts shall be hexagonal and screwed in such manner that each adjacent end shall not project more than one thread.

1602.3.4 Drainage, Ventilation and Water Connection

a. Pipe hangers shall be strength and as applicable, have been approved and shown when the detail to have small number pipe arrangements and pipe which shall have hangers spaced not over 1.83 m apart installed near to tee.

b. Chains, straps, perforated and brackets or other approved means of adjustment for the proper slope for gravity or to adjust or relieve lines or individual valve lines to maintain proper slope system lines as noted.

c. Provide hangers near the end of the line or horizontal projects of pipe running parallel to pipe lines to which shall.

d. Provide shall be with lines and shall be arranged to provide a recommended or the pipe-combined hanger ring for permitted adjustment of the lines to pipe horizontal direction and shall be installed before placing of concrete.

e. Vertical line hangers or to field be secured with at least of pipe shall be spaced not more than 4 m apart for an individual or the plane.

1602.3.5 Piping and Testing

a. Pipes to water supplied pipes passing through floor finished walls or ceiling shall be fitted with chrome-iron plated steel brass plates or stainless nickel and iron or steel plates on the two sides.

b. Pipes shall be kept sealed to cover and close the hole around the same pipes when it should be properly installed as shown permanently.

c. Final water pressure by each pipe shall be rendered watertight by hour sheet testing and tested sliding to shall submit at least 700 kPa above the pipe and 200 kPa daily and

1602.3.6 Protection and Cleaning

a. During the installation of fixtures and accessories and until final acceptance, protect items with adjustable caps or by other approved means to maintain fixtures in perfect condition.

b. All exposed or sheet drawings shall be painted shall get right of ground, dirt or other foreign materials upon completion.

c. Upon completion, thoroughly clean all fixtures and accessories as shown the work in polished condition.

1602.3.7 Inspection, Warranty, Test and Disinfection

All pipes, fittings, traps, fixtures, appurtenances and equipment of the plumbing and drainage system shall be inspected and approved by the Engineering-owner compliance with all requirements of these and regulations referred to in this Specification.

1602.3.7.1 Drainage System Test

a. The entire drainage and venting system shall have all necessary openings which can be plugged to permit the entire system to be filled with water to the level of the highest stack vent above the roof.

b. The system shall hold this water for a full 30 minutes during which time there shall be no drop greater than 100 mm.

c. Where only a portion of the system is to be tested, the test shall be conducted in the same manner as described for the entire system except that a vertical stack [illegible] higher than the highest horizontal line to be tested may be installed and filled with water to maintain sufficient pressure or water pressure may be used to supply the required pressure.

d. When the Engineer decides that an additional test is needed, such as an air or smoke test on the drainage system, the Contractor shall perform such test without any additional cost.

1002.3.7.2 Water Test on System

a. Upon completion of the roughing-in and before connecting fixtures, the entire cold water piping system shall be tested at a hydrostatic testing pressure and made tight and leak proof.

b. Where the piping system is to be concealed, the piping system shall be separately tested to [illegible] the test described for the entire system and in the presence of the Engineer or his duly designated representative.

1002.3.7.3 Defective Work

a. Upon completion of the roughing-in and before connecting fixtures, the entire cold water piping system shall be tested at a hydrostatic testing pressure and made tight and leak proof.

b. Any defective material replaced for the satisfactory performance of the system under test shall be at the expense of the Contractor.

c. Caulking of screwed joints or holes will not be permitted.

1002.3.7.4 Chlorination

a. The entire water distribution system shall be thoroughly flushed and treated with chlorine before it is turned over for use.

b. Disinfection materials shall be liquid chlorine or hypochlorite and shall be introduced in manner approved as prescribed or approved by the Engineer into the water distribution system.

c. After a contact period of not less than sixteen hours, the heavily chlorinated water shall be flushed from the system with potable water.

d. Valves in the water distribution system shall be opened and closed several times during the 16 hours chlorination treatment is done.

1002.3.8 As – Built Drawings

Upon completion of the work, the Contractor shall submit two sets of prints of as-built drawings on one set of the drawings in a neat and workmanship manner. These prints shall show changes or actual locations and conditions of the plumbing system in comparison with the original drawings.

ITEM 1101 – WIRES AND WIRING DEVICES

1101.1 Description

[illegible]

1101.2 General Requirements

[illegible]

[illegible]

[illegible]

1101.3 Construction Requirements

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

ITEM VIII – CONCRETE, FORMS AND FITTINGS

1000.1 Description

This item shall consist of the furnishing and installation of the complete concrete work, including all necessary materials, labor, tools, equipment, and services required for the proper execution of the work, in accordance with the lines, grades, and dimensions shown on the approved plans, as specified herein, or as directed by the Project Engineer.

1000.2 General Requirements

All concrete shall be ready-mix, pre-cast or site-mixed, of the approved type meeting all the requirements of the Philippine National Code and Section 900 of the Philippine Standard Specifications (PSS), Vol I.

Concrete shall be of uniform and dense consistency, free from honeycombs, voids, cracks, or other defects. Surfaces of concrete that will be exposed to view, or that will be painted, shall be finished to a smooth, even surface free from projections, depressions, or irregularities. All exposed edges shall be chamfered, rounded, or beveled as indicated on the drawings or as directed by the Project Engineer, unless otherwise specified.

All concrete surfaces shall be finished to the grades, lines, and cross-sections shown on the plans. Unless otherwise specified, horizontal surfaces shall be finished to a uniform level and smooth finish using a steel trowel or float, while vertical surfaces shall be finished to a smooth, even texture free from voids, honeycombs, or surface irregularities.

All concrete fittings, such as bolts, anchors, and reinforcing steel, shall be installed in accordance with the approved plans and specifications. Fittings shall be securely embedded in the concrete to the depths and locations indicated, and shall be protected from displacement during the placing and curing of the concrete.

1000.3 Construction Requirements

All concrete shall be mixed in the proportions of 1 cement : 2 sand : 4 gravel by volume, or as otherwise specified in the plans or by the Project Engineer, to achieve the minimum compressive strength of 4,000 psi at 28 days, unless otherwise indicated.

Concrete shall be mixed in a mechanical mixer for a minimum of 3 minutes after all the materials are in the drum, or as directed by the Project Engineer. The mixer shall be operated at a speed recommended by the manufacturer, and the drum shall be cleaned thoroughly before and after each batch.

Concrete shall be placed in the forms as soon as practicable after mixing, and shall be compacted by means of vibrators or other approved methods to ensure a dense, homogeneous mass free from voids and honeycombs. Vibrators shall be inserted vertically at regular intervals, and shall not be allowed to remain in one position long enough to cause segregation of the concrete.

Construction joints shall be made only at locations shown on the plans or approved by the Project Engineer. Before placing fresh concrete against hardened concrete, the surface of the hardened concrete shall be thoroughly cleaned, roughened, and wetted to ensure a good bond. A layer of cement grout or bonding agent may be applied to the surface if required.

Expansion joints shall be provided at intervals not exceeding 30 feet, or as shown on the plans, to allow for thermal movement of the concrete. The joints shall be filled with a compressible material, such as asphalt-impregnated fiberboard or rubber, and shall be sealed with a suitable caulking compound to prevent the entry of water and debris.

Reinforcing steel shall be placed in accordance with the approved plans and specifications, and shall be securely tied and supported to prevent displacement during the placing of concrete. The minimum clear cover for reinforcing steel shall be as shown on the plans, or as directed by the Project Engineer, but in no case less than 2 inches for concrete cast against and permanently exposed to earth or weather, and 1 inch for concrete not exposed to weather or in contact with ground.

Concrete shall be cured by keeping it continuously moist for a period of not less than 7 days, or as otherwise specified, by means of ponding, spraying, or covering with wet burlap, sand, or other approved materials. Curing shall commence as soon as the concrete has hardened sufficiently to prevent damage to the surface.

Forms shall be of sufficient strength and rigidity to withstand the pressure of the concrete without deflection or bulging, and shall be constructed in accordance with the lines, grades, and dimensions shown on the plans. Forms shall be thoroughly cleaned and coated with a suitable release agent before each use, and shall be removed only after the concrete has attained sufficient strength to support its own weight and any superimposed loads, as determined by the Project Engineer.

Reinforcing steel shall be cut, bent, and placed in accordance with the approved plans and specifications, and shall be securely tied and supported to prevent displacement during the placing of concrete. The minimum clear cover for reinforcing steel shall be as shown on the plans, or as directed by the Project Engineer, but in no case less than 2 inches for concrete cast against and permanently exposed to earth or weather, and 1 inch for concrete not exposed to weather or in contact with ground.

[illegible]

[illegible]

[illegible]

1100.6 General Specifications

[illegible]

1100.7 Requirements

1. Light fixtures and lamp

   [illegible]

2. Material Requirements

   [illegible]

3. Construction Requirements

   [illegible]

4. Testing

   4.1 [illegible]
   4.2 [illegible]
   4.3 [illegible]

1100.8 Auxiliary System

[illegible]

[illegible]

1100.9 Supervision of the Work and Submission of Certificate of Completion

[illegible]

1100.10 Tests and Certificates

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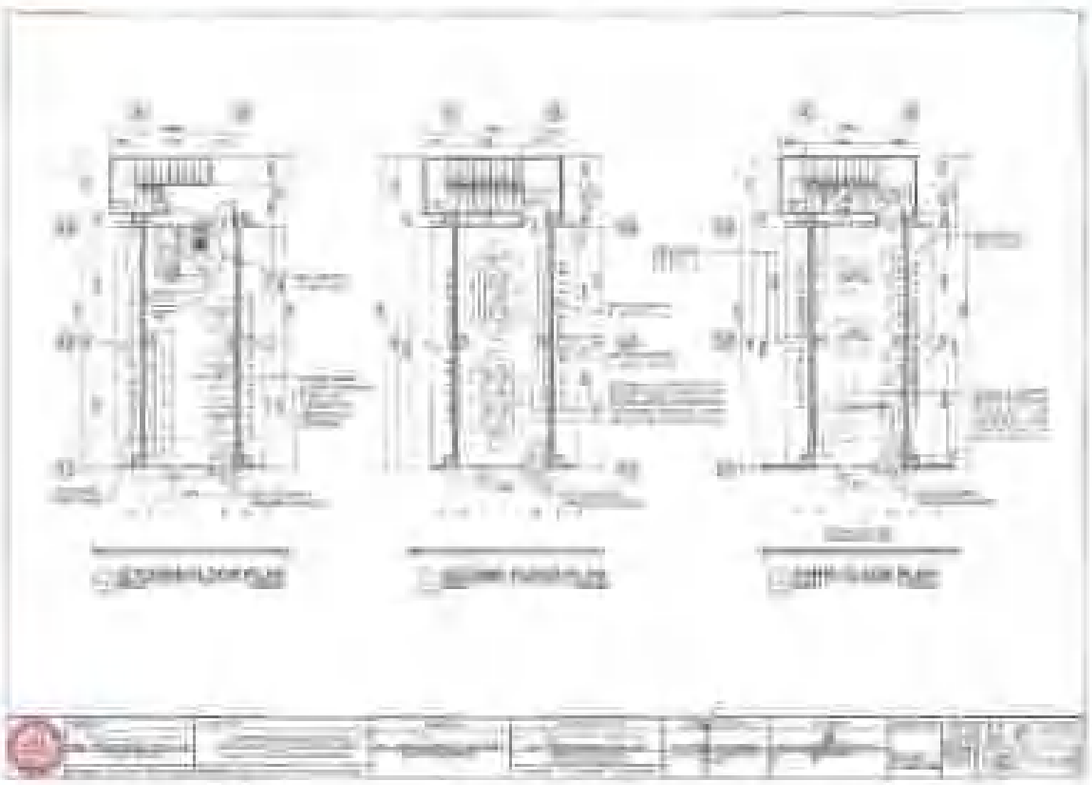
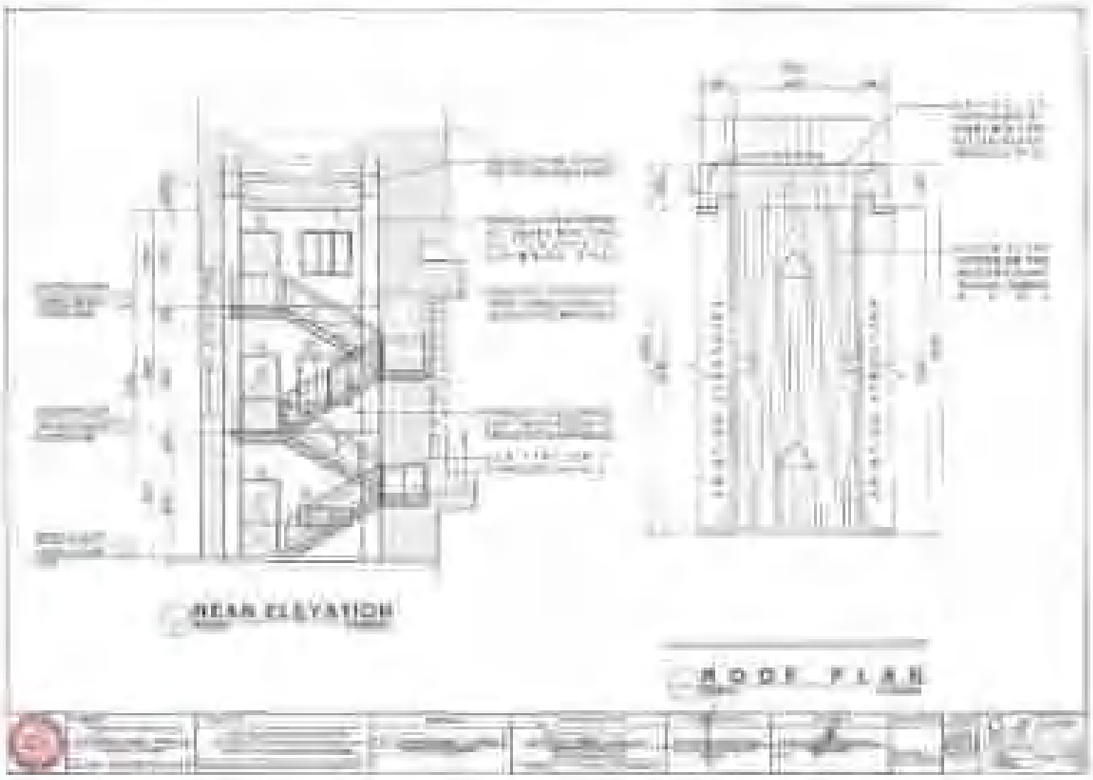
PHYSICAL PLANT AND DEVELOPMENT SERVICES
Visca, Baybay City

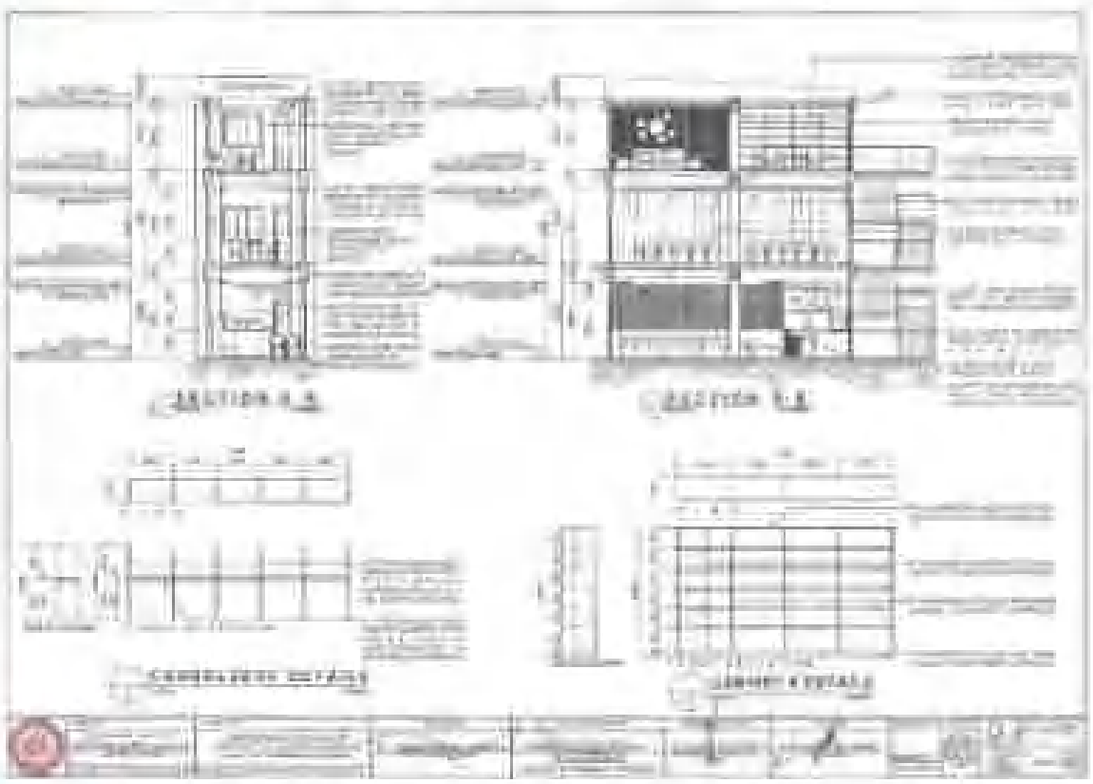
Upon completion of the electrical installation work, the contractor shall submit all test documents and personnel and submit written copies of all test results.

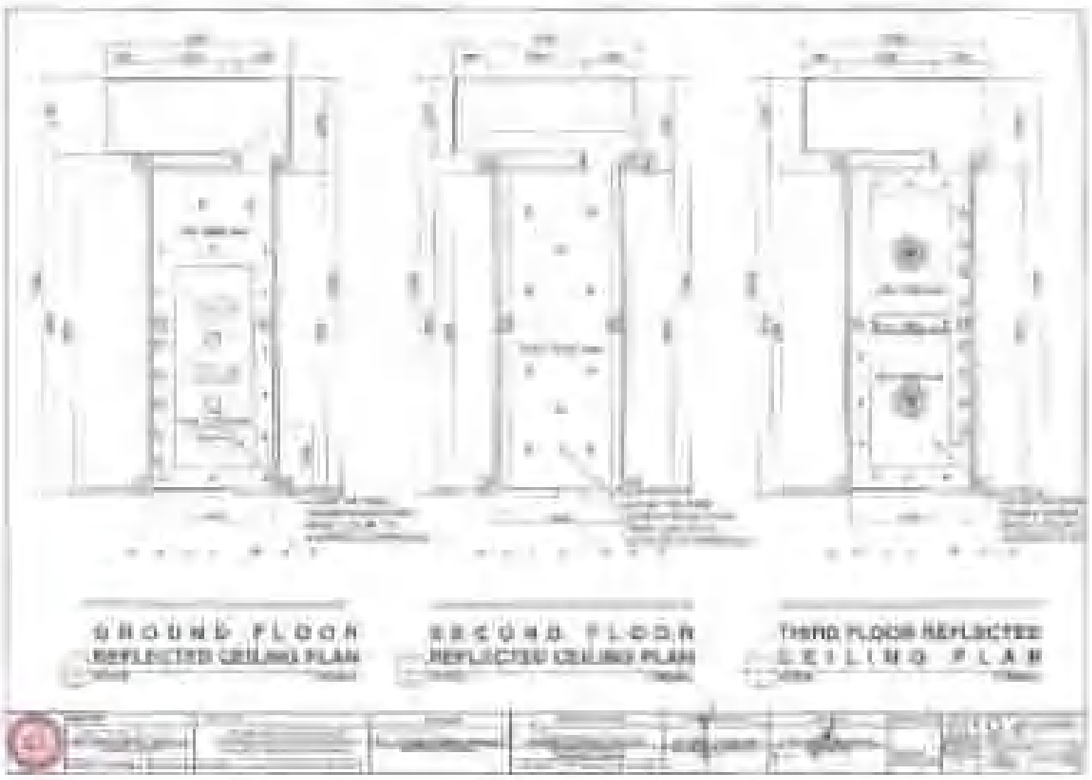
The contractor shall perform the electrical installation in accordance with approved plans and specifications. The contractor shall guarantee that the electrical systems are free from all grounds and from all defective workmanship and materials and will remain so for a period of one year from date and completion of works. Any defects shall be remedied by the contractor at his own expense.

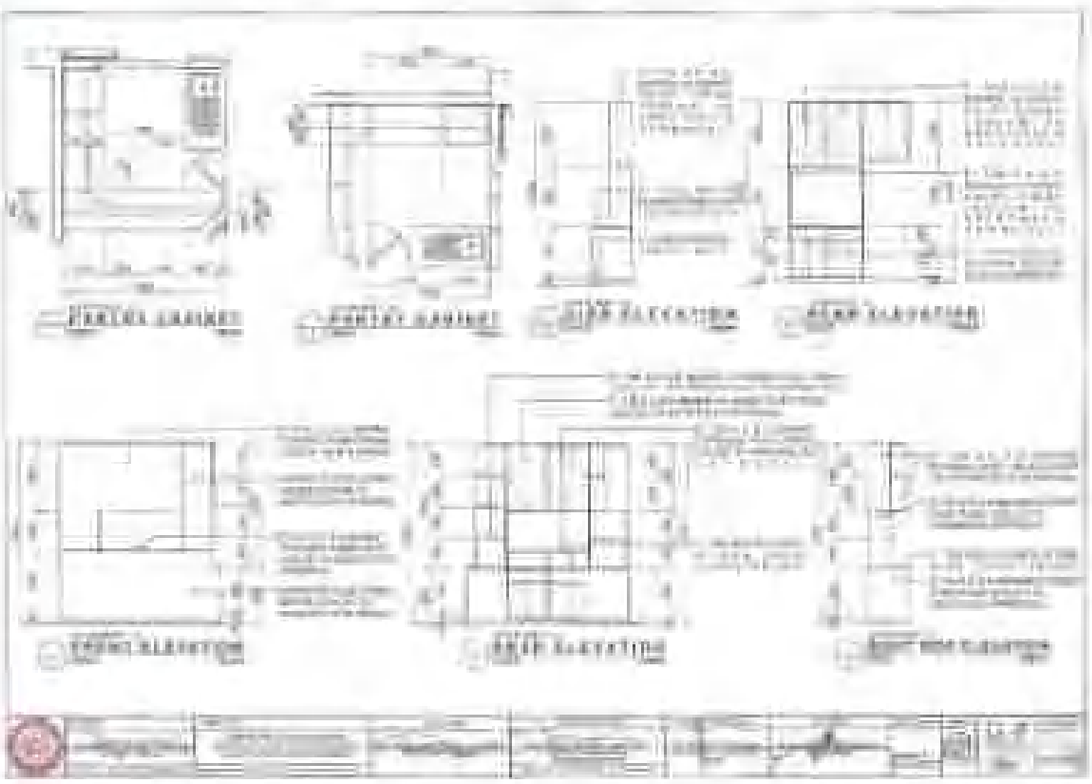
Section VII. Drawings

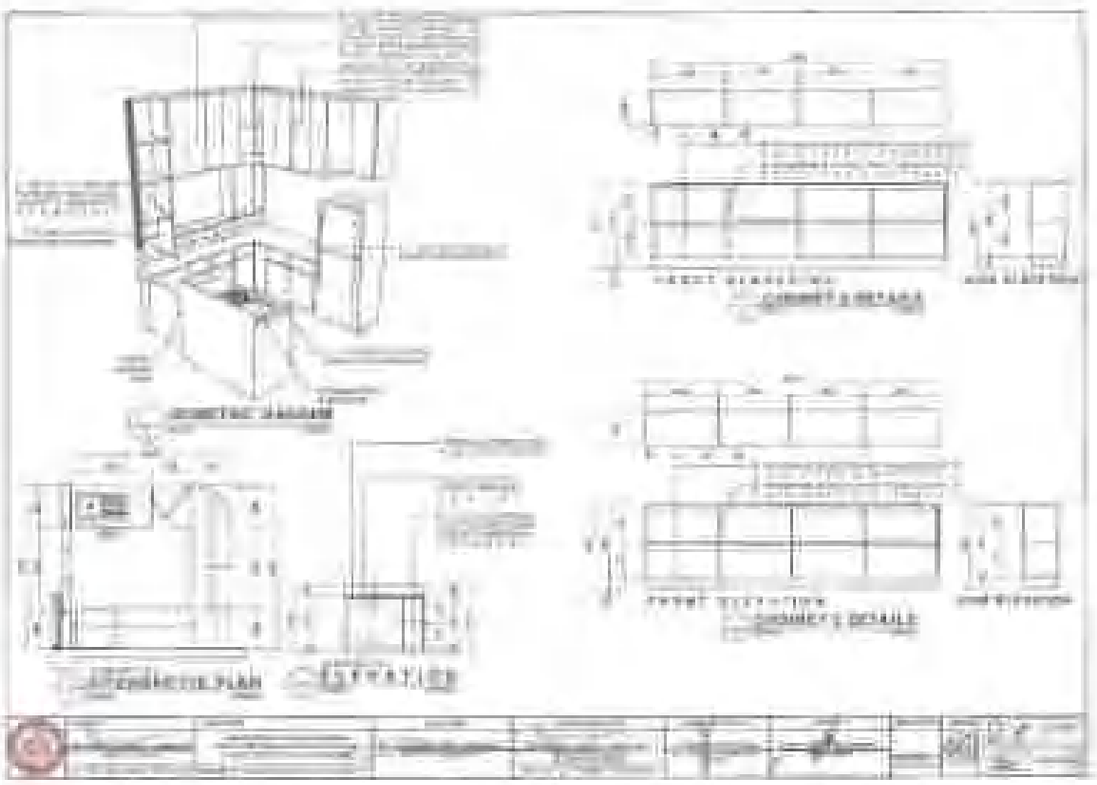


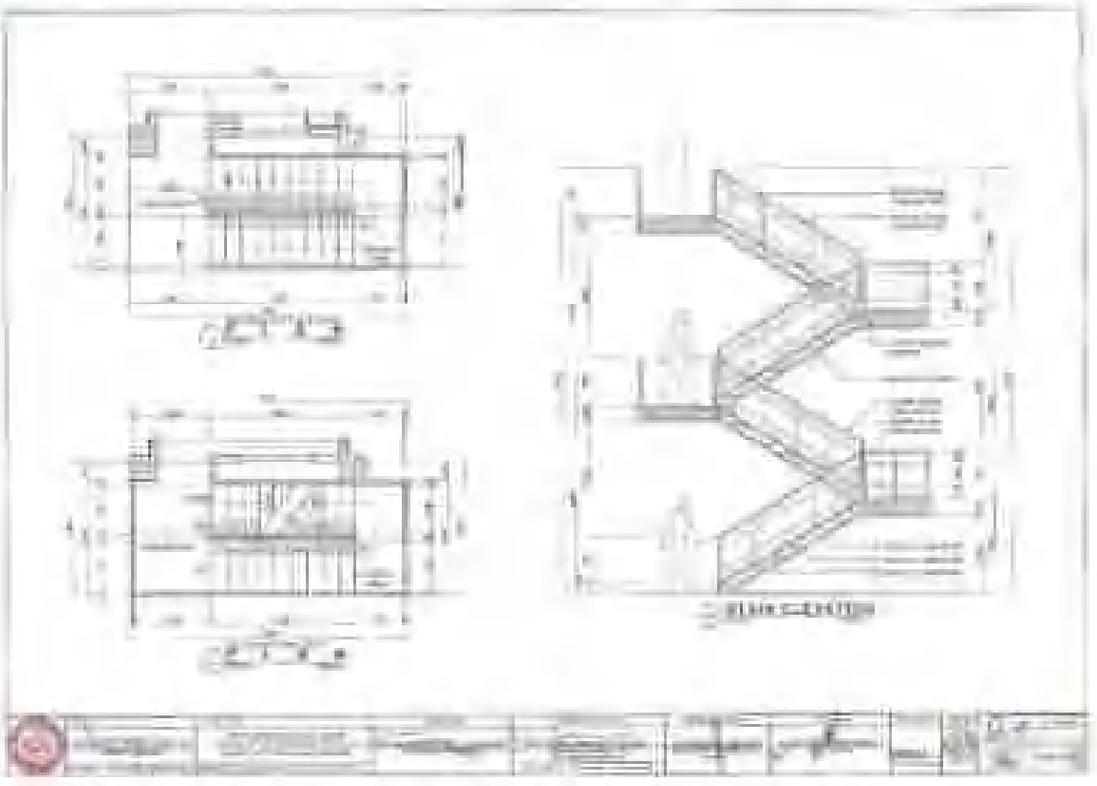

REAR ELEVATION
ROOF PLAN

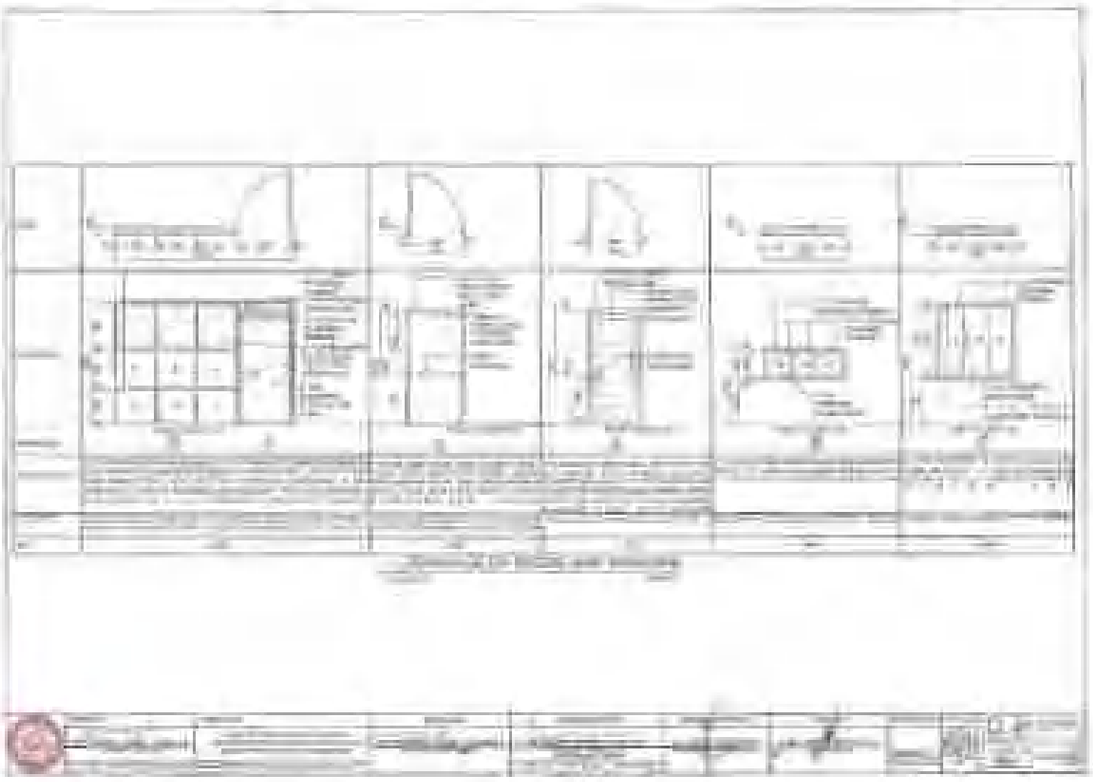


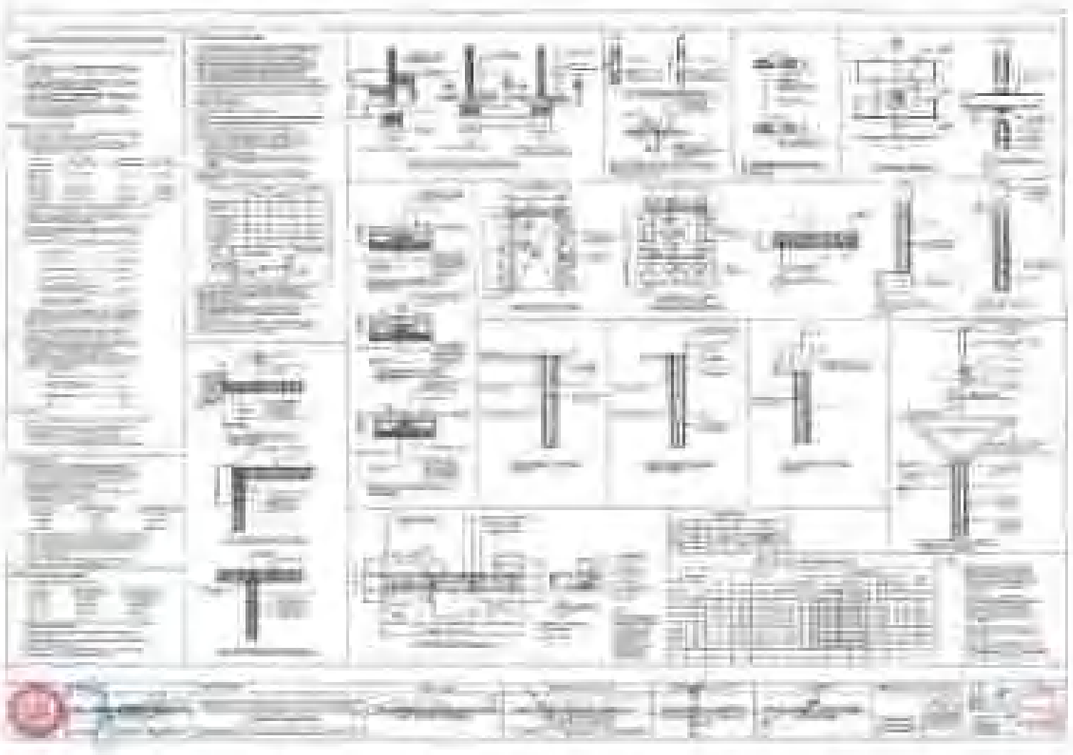

GROUND FLOOR
REFLECTED CEILING PLAN
SECOND FLOOR
REFLECTED CEILING PLAN
THIRD FLOOR REFLECTED
CEILING PLAN

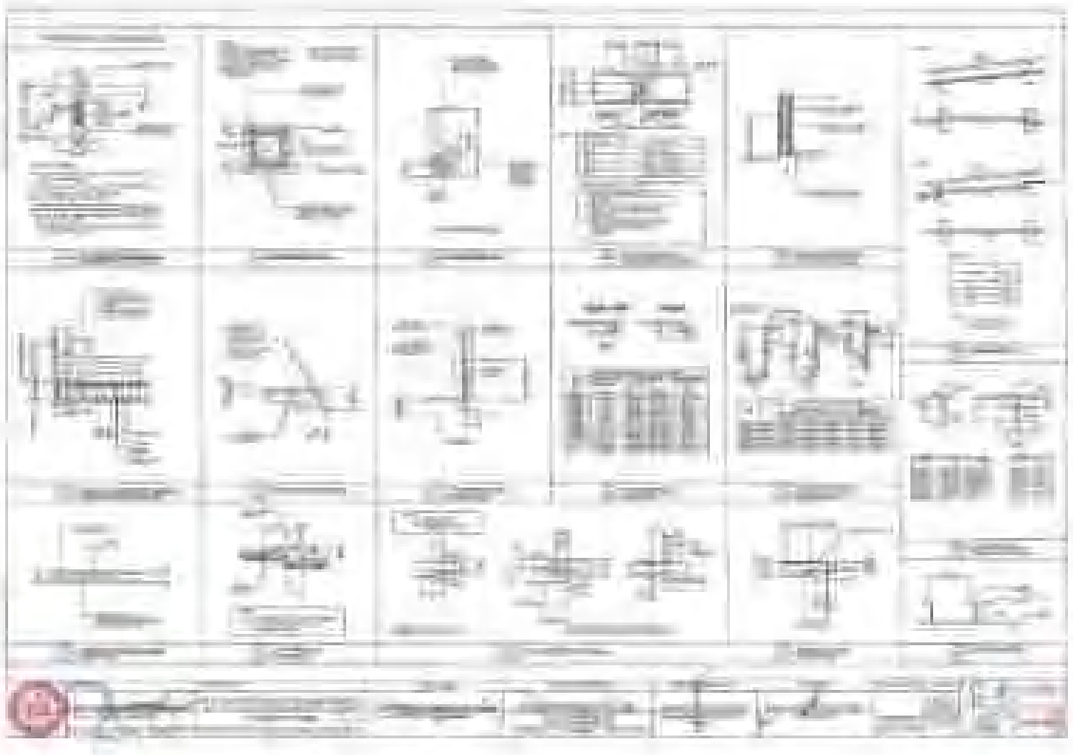


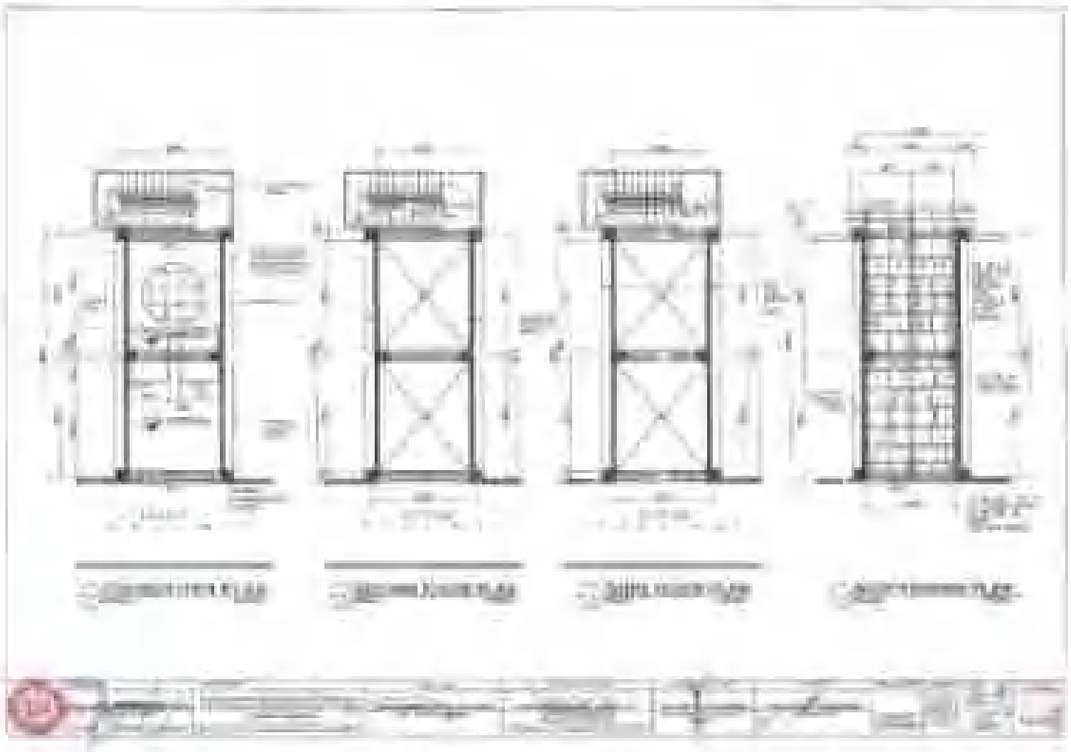


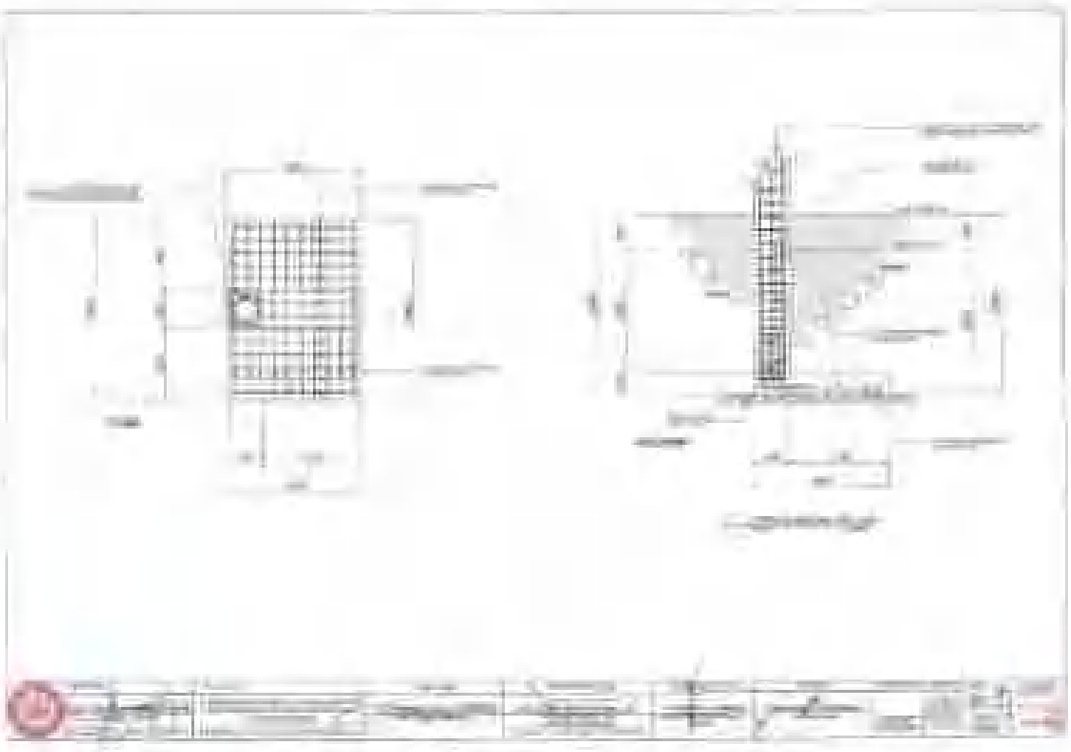


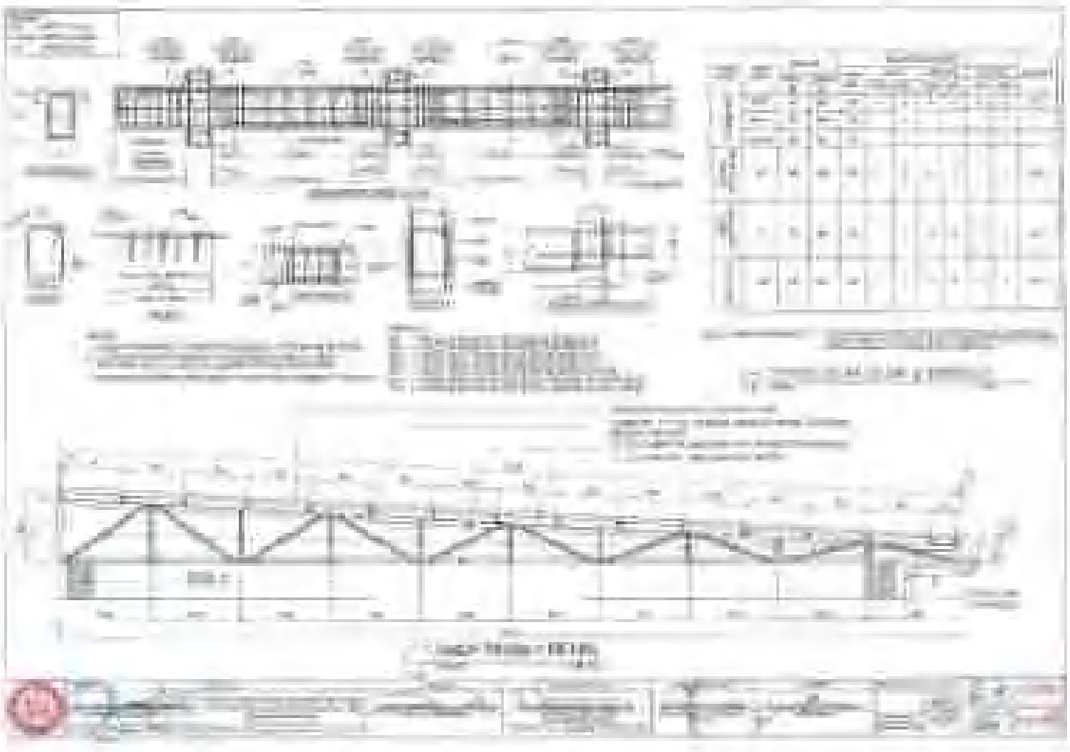


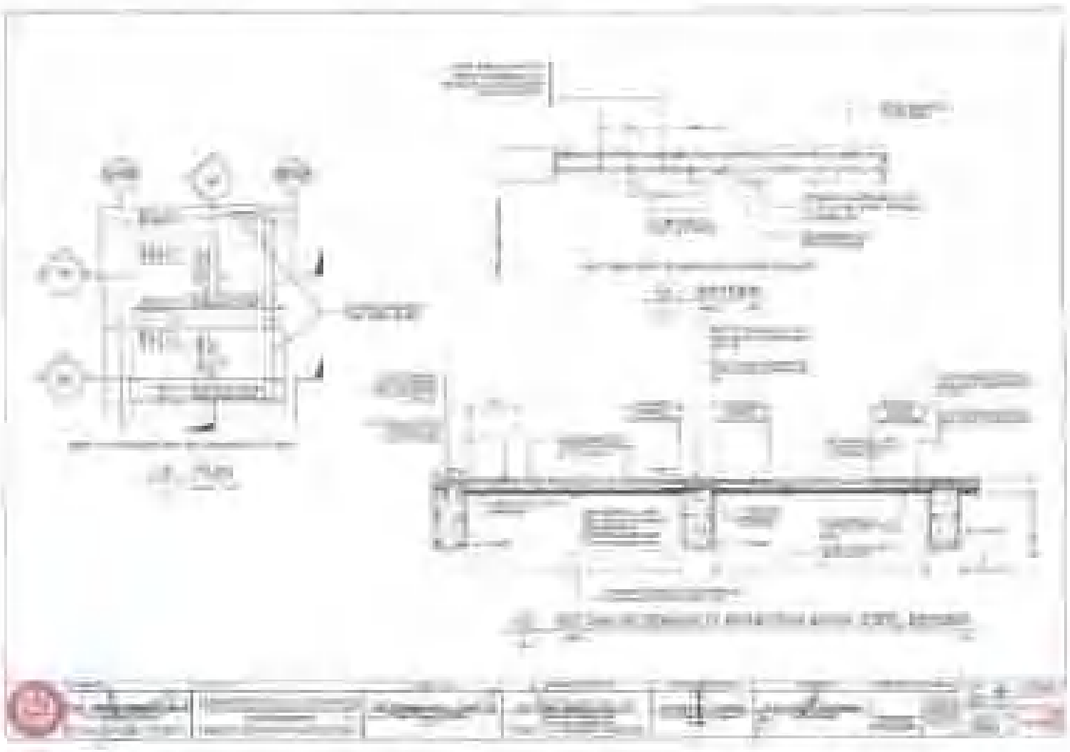


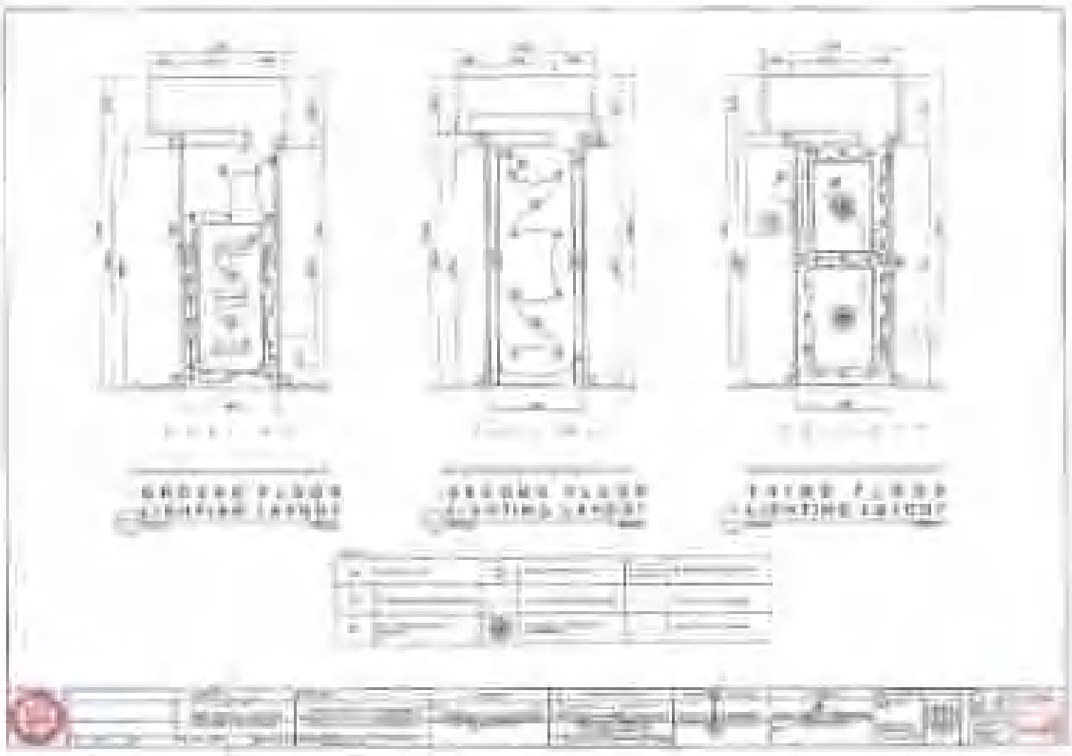


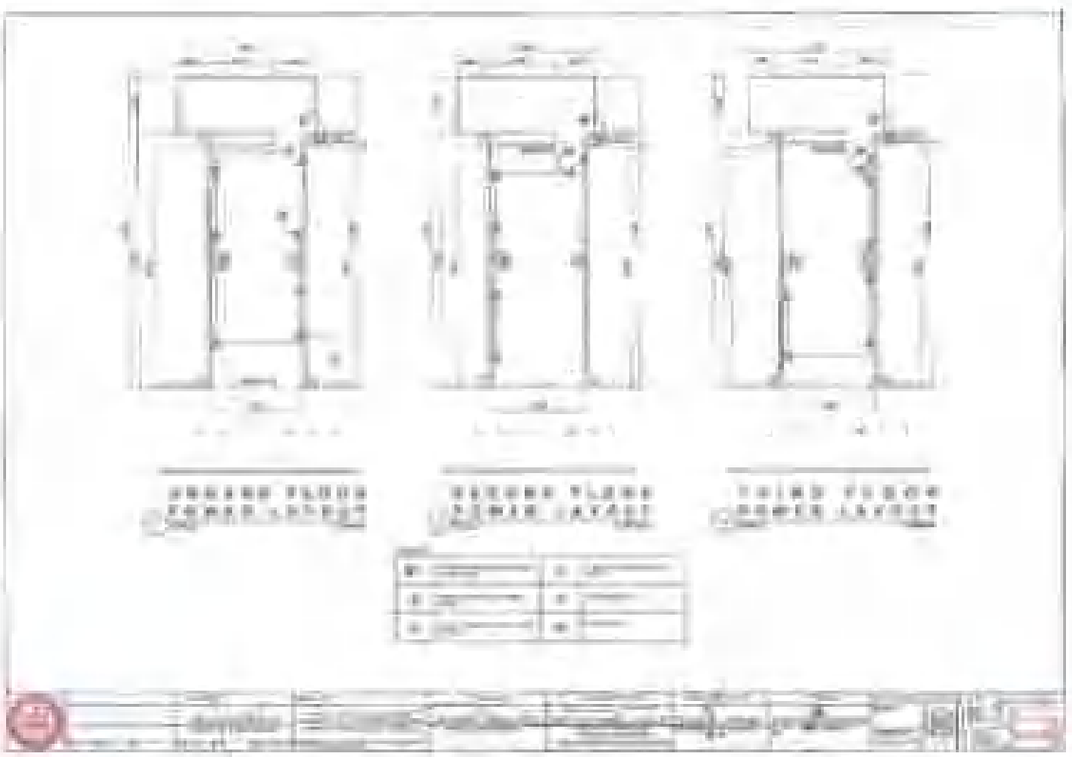


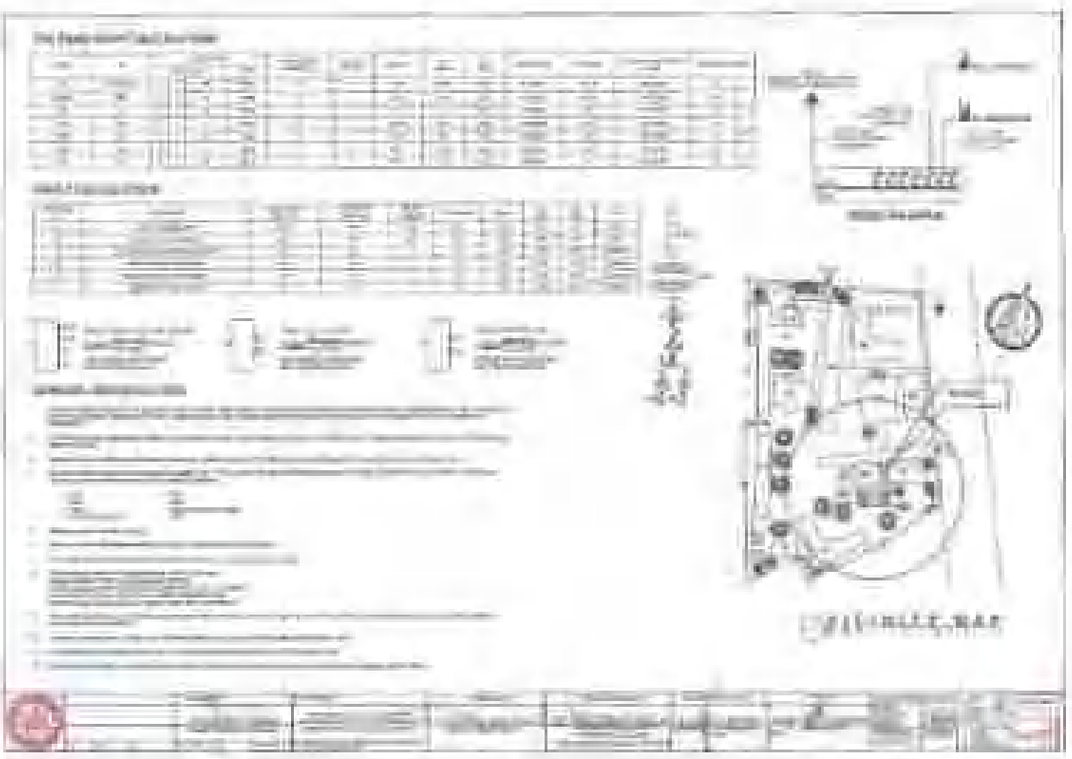


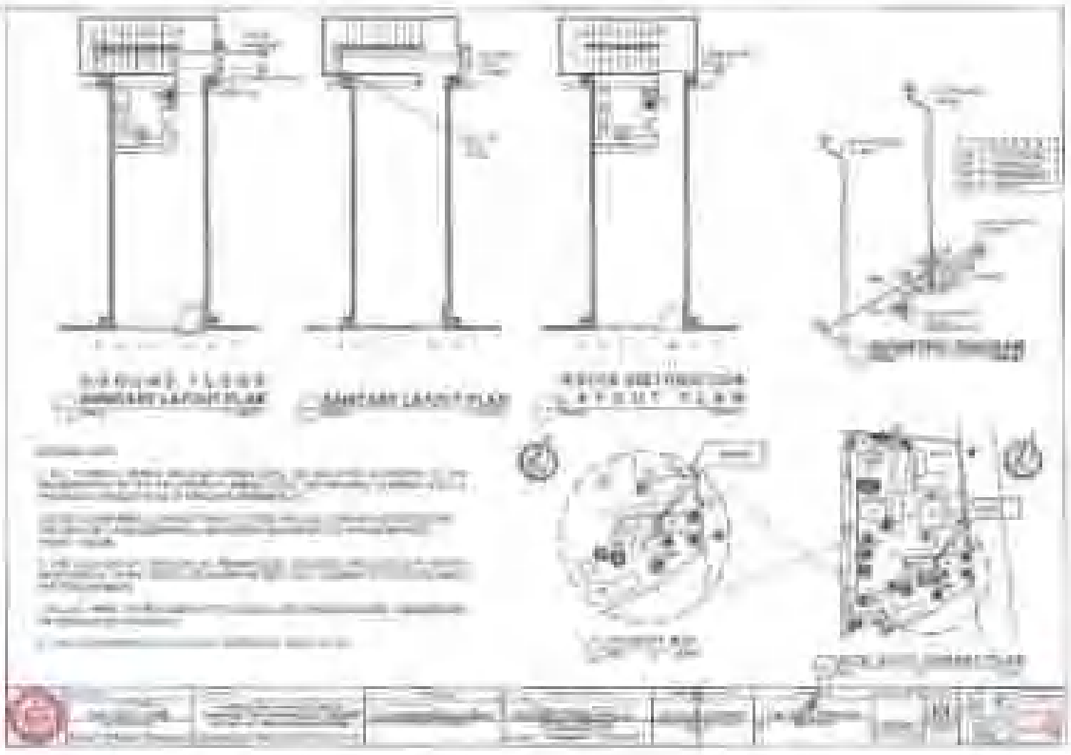


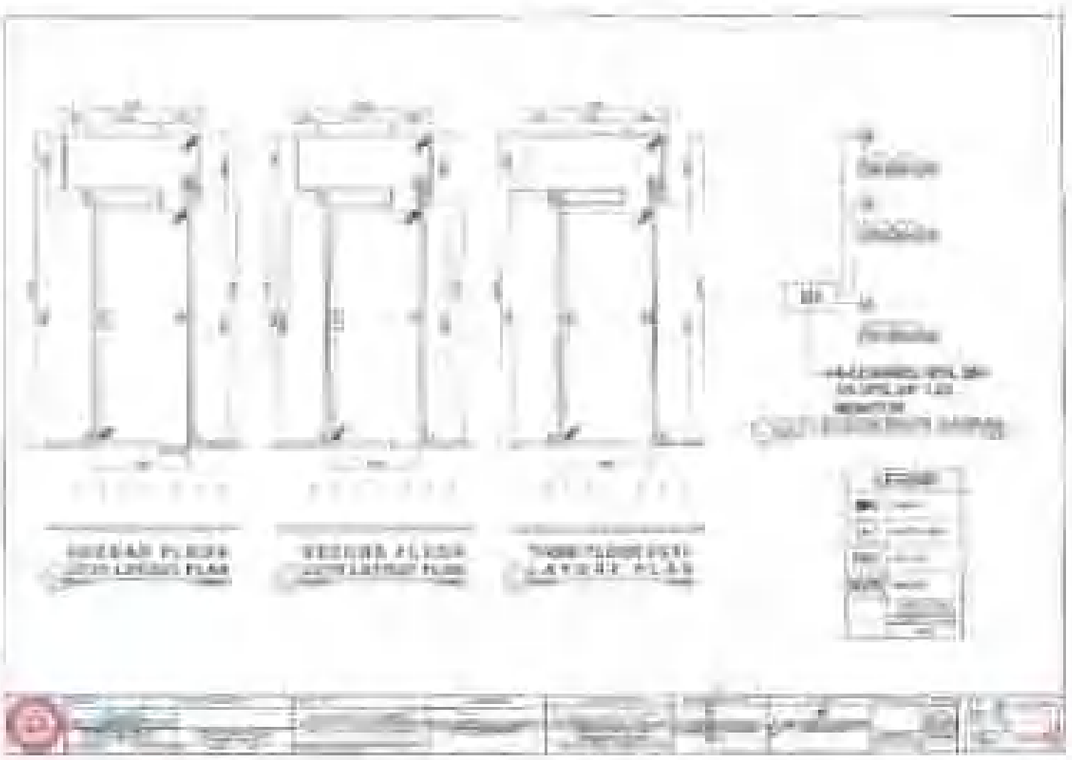


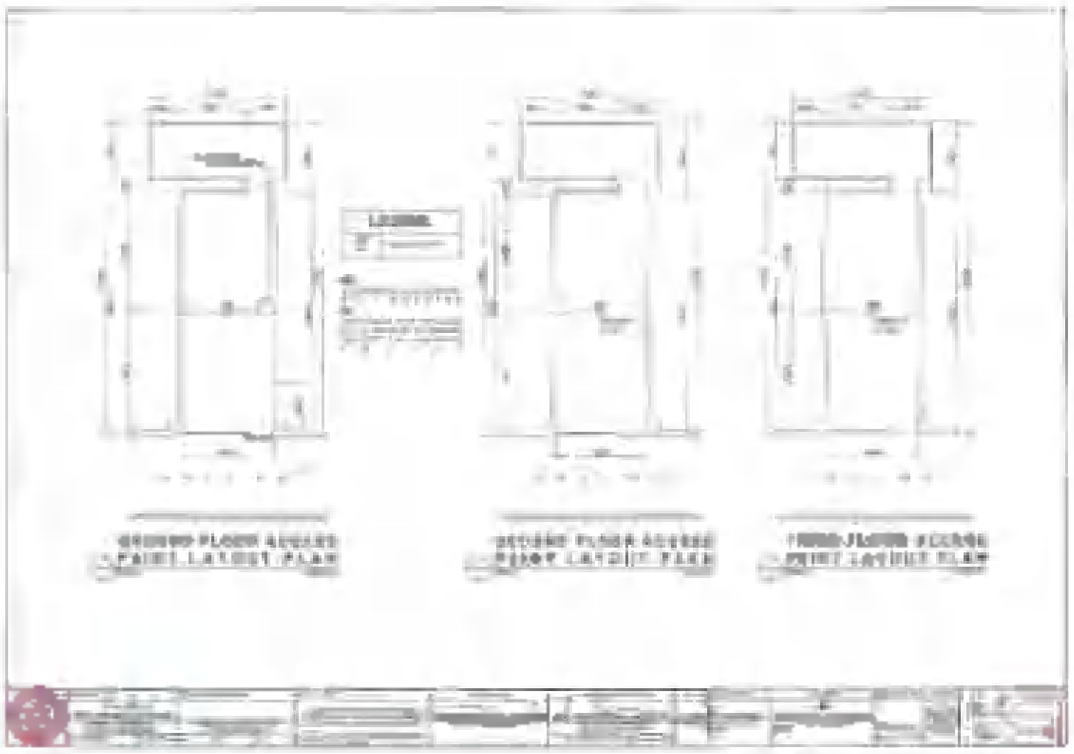












Section VIII. Bill of Quantities

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 Construction 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 authorised 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.

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PHYSICAL PLANT AND ENGINEERING SERVICES
Zamboanga City

BILL OF QUANTITIES

Item/Description		Quantity	Unit	Unit Cost	Amount
I	GENERAL REQUIREMENTS				
B.7	Project Billboard	1	ea		
B.5	Occupational Safety and Health Program	1	l.s.		
B.9	Mobilization and Demobilization	1	l.s.		
B.10	Site Temporary Fence	1	l.s.		
ITEM 101	REMOVAL OF STRUCTURES AND OBSTRUCTIONS				
101 (3)	Removal of Structures and Obstructions	1	l.s.		
ITEM 103	STRUCTURE EXCAVATION				
103 (1)	Structure Excavation	[illegible]	cu.m		
103 (3)	Foundation Fill	[illegible]	cu.m		
ITEM 804	EMBANKMENT				
804 (4)	Gravel Fill	[illegible]	cu.m		
ITEM 900	REINFORCED CONCRETE				
900 (1) c2	Structural Concrete (Class A, 28 Days)	[illegible]	cu.m		
ITEM 902	REINFORCING STEEL				
902 (1) a	Reinforcing Steel (Deformed) Grade 40	[illegible]	kg		
902 (1) a	Reinforcing Steel (Deformed) Grade 60	[illegible]	kg		
ITEM 903	FORMWORKS AND FALSEWORKS				
903 (1)	Formworks and Falseworks	1	l.s.		
ITEM 1001	STORM DRAINAGE AND SEWERAGE SYSTEM				
1001 (7)a1	PVC Pipes and Fittings [illegible] Series 1000	[illegible]	m		
ITEM 1002	PLUMBING WORKS				
1002 (2)	Polypropylene Random Copolymer (PPR-C) Pipes and Fittings [illegible]	1	l.s.		
1002 (16)	Water Closet, Flush Tank (Standard)	3	set		
1002 (17)	Faucet	3	pcs		
ITEM 1003	CARPENTRY AND JOINERY WORKS				
1003 (11)a	Fiber Cement Board with Metal Frame (Ceiling)	[illegible]	sq.m		
1003 (14)	PVC Cladding with Metal Frame (Ceiling)	[illegible]	sq.m		
1003 (4)	Cabinets	1	set		
1003 (11)	Fascia Board (Fiber Cement Board)	[illegible]	m		
1003 (13)	Cornices and Miscellaneous Works	1	l.s.		
ITEM 1005	STEEL DOORS AND FRAMES				
1005 (4)	Pre-Painted Metal Roll Steel Door	[illegible]	sq.m		

[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]	[illegible]		
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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 circumstances 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

1. TECHNICAL COMPONENT ENVELOPE

Class "A" Documents

Legal Documents

__ (a) Valid PhilGEPS Registration Certificate (Platinum Membership) (all pages) in accordance with Section 8.5.2 of the IRR;

Technical Documents

__ (c) 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; and

__ (f) Statement of the bidder's Single Largest Completed Contract (SLCC) similar to the contract to be bid, except under conditions provided under the rules; and

__ (g) Special PCAB License in case of Joint Ventures and registration for the type and cost of the contract to be bid; and

__ (h) 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

(i) 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 Foreman), to be assigned to the contract to be bid, with their complete qualification and experience data;

__ c. List of contractor's major equipment units, which are owned, leased, and/or under purchase agreements, supported by proof of ownership or certifications of availability of equipment from the equipment lessor/vendor for the duration of the project, as the case may be; and

__ (j) 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.

Financial Documents

__ (k) The prospective bidder's computation of Net Financial Contracting Capacity (NFCC).

Class "B" Documents

__ (l) 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**

__ (m) Original of duly signed and accomplished Financial Bid Forms; and

Other documentary requirements under RA No. 9184

__ (n) Original of duly signed Bid Prices in the Bill of Quantities; and

__ (o) 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

__ (p) Cash Flow by Quarter.


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