

PHILIPPINE BIDDING DOCUMENTS
(As Harmonized with Development Partners)

**Procurement of
INFRASTRUCTURE
PROJECTS**

Government of the Republic of the Philippines

**Rehabilitation of Potable Water System at Barangay Villa Bello,
Jones, Isabela**

**Sixth Edition
July 2020**

Preface

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

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

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

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

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

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

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

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Glossary of Terms, Abbreviations, and Acronyms

ABC – Approved Budget for the Contract.

ARCC – Allowable Range of Contract Cost.

BAC – Bids and Awards Committee.

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

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

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

BIR – Bureau of Internal Revenue.

BSP – Bangko Sentral ng Pilipinas.

CDA – Cooperative Development Authority.

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

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

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

CPI – Consumer Price Index.

DOLE – Department of Labor and Employment.

DTI – Department of Trade and Industry.

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

GFI – Government Financial Institution.

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

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

GOP – Government of the Philippines.

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

LGUs – Local Government Units.

NFCC – Net Financial Contracting Capacity.

NGA – National Government Agency.

PCAB – Philippine Contractors Accreditation Board.

PhilGEPS - Philippine Government Electronic Procurement System.

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

PSA – Philippine Statistics Authority.

SEC – Securities and Exchange Commission.

SLCC – Single Largest Completed Contract.

UN – United Nations.

Section I. Invitation to Bid

Notes on the Invitation to Bid

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

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

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

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

PROVINCIAL GOVERNMENT OF ISABELA

Invitation to Bid for the Rehabilitation of Potable Water System at Barangay Villa Bello, Jones, Isabela

1. The *Provincial Government of Isabela*, through the *20% Development Fund (EDF 2021)* intends to apply the sum of ***Four Million Three Hundred Ninety Six Thousand Five Hundred Seventy Three & 65/100 Pesos (Php 4,396,573.65)*** for the ***Rehabilitation of Potable Water System at Barangay Villa Bello, Jones, Isabela and Project Identification Number 021-09 Lot 7***, being the Approved Budget for the Contract (ABC) to payments under the contract for each lot. Bids received in excess of the ABC for each lot shall be automatically rejected at bid opening.
2. The *Provincial Government of Isabela* now invites bids for the above Procurement Project. Completion of the Works is required *within Seventy Seven (77) 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 *Bids and Awards Committee (BAC)* and inspect the Bidding Documents at the address given below from 8:00 a.m. to 5:00 p.m.
5. A complete set of Bidding Documents may be acquired by interested bidders on *June 21, 2021* 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 Pesos (Php 5,000.00)*. The Procuring Entity shall allow the bidder to present its proof of payment for the fees to be presented in person.
6. The *Provincial Government of Isabela* will hold a Pre-Bid Conference¹ on *June 29, 2021 at 10:00 a.m.* at BAC office, PGSO Bldg., Alibagu, City of Ilagan, Isabela, if applicable, and/or through videoconferencing/webcasting *via Zoom*, 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 *10:00 A.M., July 12, 2021*. Late bids shall not be accepted.
8. All bids must be accompanied by a bid security in any of the acceptable forms and in the amount stated in **ITB Clause 16**.

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.

9. Bid opening shall be on *10:00 A.M., July 12, 2021* at the given address below. Bids will be opened in the presence of the bidders' representatives who choose to attend the activity.
10. The *Provincial Government of Isabela* 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:

*MARYANN T. BALLESTEROS
BAC Office, PGSO Bldg.,
Capitol City of Ilagan, Isabela
078-323-0570
pgso.isabelaprovince@yahoo.com.ph*

12. You may visit the following websites:

For downloading of Bidding Documents: *PhilGEPS Bid Opportunities of the Province of Isabela.*

June 18, 2021

(Sgd.) RODRIGO T. SAWIT

BAC Chairman

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, *Provincial Government of Isabela* invites Bids for the ***Rehabilitation of Potable Water System at Barangay Villa Bello, Jones, Isabela***, with Project Identification Number ***021-09 Lot 7***.

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 *20% Development Fund (EDF 2021)* in the amount of ***Four Million Three Hundred Ninety Six Thousand Five Hundred Seventy Three & 65/100 Pesos (Php 4,396,573.65)***.

2.2. The source of funding is:

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

3. Bidding Requirements

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

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

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

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

The Procuring Entity, as well as the Bidders and Contractors, shall observe the highest standard of ethics during the procurement and execution of the contract. They or through an agent shall not engage in corrupt, fraudulent, collusive, coercive, and

obstructive practices defined under Annex “I” of the 2016 revised IRR of RA No. 9184 or other integrity violations in competing for the Project.

5. Eligible Bidders

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

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

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

6. Origin of Associated Goods

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

7. Subcontracts

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

The Procuring Entity has prescribed that:

- a. Subcontracting is not allowed.

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 at BAC office, PGSO Bldg., Alibagu, City of Ilagan, Isabela, if applicable, and/or through videoconferencing/webcasting} as indicated in paragraph 6 of the **IB**.

9. Clarification and Amendment of Bidding Documents

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

10. Documents Comprising the Bid: Eligibility and Technical Components

- 10.1. The first envelope shall contain the eligibility and technical documents of the Bid as specified in **Section IX. Checklist of Technical and Financial Documents**.
- 10.2. If the eligibility requirements or statements, the bids, and all other documents for submission to the BAC are in foreign language other than English, it must be accompanied by a translation in English, which shall be authenticated by the appropriate Philippine foreign service establishment, post, or the equivalent office having jurisdiction over the foreign bidder's affairs in the Philippines. For Contracting Parties to the Apostille Convention, only the translated documents shall be authenticated through an apostille pursuant to GPPB Resolution No. 13-2019 dated 23 May 2019. The English translation shall govern, for purposes of interpretation of the bid.
- 10.3. A valid PCAB License is required, and in case of joint ventures, a valid special PCAB License, and registration for the type and cost of the contract for this Project. Any additional type of Contractor license or permit shall be indicated in the **BDS**.
- 10.4. A List of Contractor's key personnel (e.g., Project Manager, Project Engineers, Materials Engineers, and Foremen) assigned to the contract to be bid, with their complete qualification and experience data shall be provided. These key personnel must meet the required minimum years of experience set in the **BDS**.
- 10.5. A List of Contractor's major equipment units, which are owned, leased, and/or under purchase agreements, supported by proof of ownership, certification of availability of equipment from the equipment lessor/vendor for the duration of the project, as the case may be, must meet the minimum requirements for the contract set in the **BDS**.

11. Documents Comprising the Bid: Financial Component

- 11.1. The second bid envelope shall contain the financial documents for the Bid as specified in **Section IX. Checklist of Technical and Financial Documents**.
- 11.2. Any bid exceeding the ABC indicated in paragraph 1 of the **IB** shall not be accepted.

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

12. Alternative Bids

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

13. Bid Prices

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

14. Bid and Payment Currencies

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

14.2. *Payment of the contract price shall be made in:*

- a. Philippine Pesos.

15. Bid Security

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

15.2. The Bid and bid security shall be valid until **November 9, 2021**. Any bid not accompanied by an acceptable bid security shall be rejected by the Procuring Entity as non-responsive.

16. Sealing and Marking of Bids

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

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

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

17. Deadline for Submission of Bids

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

18. Opening and Preliminary Examination of Bids

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

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

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

19. Detailed Evaluation and Comparison of Bids

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

19.2. If the Project allows partial bids, all Bids and combinations of Bids as indicated in the **BDS** shall be received by the same deadline and opened and evaluated simultaneously so as to determine the Bid or combination of Bids offering the lowest calculated cost to the Procuring Entity. Bid Security as required by **ITB** Clause 16 shall be submitted for each contract (lot) separately.

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

20. Post Qualification

Within a non-extendible period of five (5) calendar days from receipt by the Bidder of the notice from the BAC that it submitted the Lowest Calculated Bid, the Bidder shall submit its latest income and business tax returns filed and paid through the BIR

Electronic Filing and Payment System (eFPS), and other appropriate licenses and permits required by law and stated in the **BDS**.

21. Signing of the Contract

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

Section III. Bid Data Sheet

Notes on the Bid Data Sheet (BDS)

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

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

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

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

Bid Data Sheet

ITB Clause			
5.2	For this purpose, contracts similar to the Project refer to contracts which have the same major categories of work, which shall be: <i>Item 803 – Structure Excavation</i> <i>Item 804 – Embankment</i> <i>Item 900 – Structural Concrete</i> <i>Item 902 – Reinforcing Steel Bars</i> <i>Item 1002 – Plumbing Works</i> <i>Item 1016(1) – Watere Proofing Cement Base</i> <i>1018 – Glazed Tiles & Trims</i> <i>1027 – Cement Plaster Finish</i>		
7.1	<i>Subcontracting is not allowed.</i>		
10.3	<i>No Further Instructions</i>		
10.4	The key personnel must meet the required minimum years of experience set below:		
	<u>Key Personnel</u>	<u>General Experience</u>	<u>Relevant Experience</u>
	1. Project Engineer (PE)	Minimum of five (5) years' experience as Licensed Civil	With a minimum of One (1) Rehabilitation/Construction of Water System project handled as Project Engineer
	2. Materials Engineer (ME)	Licensed Civil Engineer	Materials Engineer duly accredited by DPWH
10.5	The minimum major equipment requirements are the following:		
	Minimum Required Equipment	Owned	Leased
	1. One Bagger Mixer	1	0
	2. Concrete Vibrator	1	0
	3. Bar Cutter	1	0
	TOTAL	3	0
12	<i>No Further Instructions</i>		
15.1	The bid security shall be in the form of a Bid Securing Declaration or any of the following forms and amounts: <ol style="list-style-type: none"> a. The amount of not less than <i>Eighty Seven Thousand Nine Hundred Thirty Two Pesos (87,932.00)</i>, if bid security is in cash, cashier's/manager's check, bank draft/guarantee or irrevocable letter of credit; b. The amount of not less than <i>Two Hundred Nineteen Thousand Eight Hundred Twenty Nine Pesos (Php 219,829.00)</i> if bid security is in Surety Bond. 		
19.2	Partial bids are allowed, as follows:		

	<i>[Partial bids not allowed]</i>
20	<i>Latest income and business tax returns filed and paid through the BIR Electronic Filing and Payment System (eFPS)</i>
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

4.1. 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.

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

4. The Contractor's Obligations

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

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

5. Performance Security

- 5.1. Within ten (10) calendar days from receipt of the Notice of Award from the Procuring Entity but in no case later than the signing of the contract by both parties, the successful Bidder shall furnish the performance security in any of the forms prescribed in Section 39 of the 2016 revised IRR.
- 5.2. The Contractor, by entering into the Contract with the Procuring Entity, acknowledges the right of the Procuring Entity to institute action pursuant to RA No. 3688 against any subcontractor be they an individual, firm, partnership, corporation, or association supplying the Contractor with labor, materials and/or equipment for the performance of this Contract.

6. Site Investigation Reports

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

7. Warranty

- 7.1. In case the Contractor fails to undertake the repair works under Section 62.2.2 of the 2016 revised IRR, the Procuring Entity shall forfeit its performance security, subject its property(ies) to attachment or garnishment proceedings, and perpetually disqualify it from participating in any public bidding. All payables of the GOP in his favor shall be offset to recover the costs.
- 7.2. The warranty against Structural Defects/Failures, except that occasioned-on force majeure, shall cover the period from the date of issuance of the Certificate of Final Acceptance by the Procuring Entity. Specific duration of the warranty is found in the SCC.

8. Liability of the Contractor

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

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

9. Termination for Other Causes

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

10. Dayworks

Subject to the guidelines on Variation Order in Annex “E” of the 2016 revised IRR of RA No. 9184, and if applicable as indicated in the **SCC**, the Dayworks rates in the Contractor’s Bid shall be used for small additional amounts of work only when the Procuring Entity’s Representative has given written instructions in advance for additional work to be paid for in that way.

11. Program of Work

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

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

12. Instructions, Inspections and Audits

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

13. Advance Payment

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

14. Progress Payments

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

15. Operating and Maintenance Manuals

- 15.1. If required, the Contractor will provide “as built” Drawings and/or operating and maintenance manuals as specified in the **SCC**.
- 15.2. If the Contractor does not provide the Drawings and/or manuals by the dates stated above, or they do not receive the Procuring Entity’s Representative’s approval, the Procuring Entity’s Representative may withhold the amount stated in the **SCC** from payments due to the Contractor.

Section V. Special Conditions of Contract

Notes on the Special Conditions of Contract

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

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

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

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

Special Conditions of Contract

GCC Clause	
2	<i>Intended Completion date is Seventy Seven Calendar Days (77) starting seven (7) calendar days upon receipt of Notice to Proceed.</i>
4.1	<i>Upon receipt of Notice to Proceed.</i>
6	The site investigation reports are: <i>The site is cleared of any obstruction and right of way issues.</i>
7.2	<i>[In case of permanent structures, such as buildings of types 4 and 5 as classified under the National Building Code of the Philippines and other structures made of steel, iron, or concrete which comply with relevant structural codes (e.g., DPWH Standard Specifications), such as, but not limited to, steel/concrete bridges, flyovers, aircraft movement areas, ports, dams, tunnels, filtration and treatment plants, sewerage systems, power plants, transmission and communication towers, railway system, and other similar permanent structures:] Fifteen (15) years.</i>
10	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 <i>Thirty (30)</i> 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 <i>[1/10 of 1% of Contract Amount]</i> .
13	The amount of the advance payment is <i>[15% of the total contract price and schedule of payment]</i> .
14	Materials and equipment delivered on the site but not completely put in place shall not be included for payment.
15.1	The date by which operating and maintenance manuals are required is <i>[One year after completion date]</i> . The date by which "as built" drawings are required is <i>[within thirty days upon completion]</i> .
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 <i>[1/10 of 1% of Contract Amount]</i> .

Section VI. Specifications

TABLE OF CONTENT

ITEM NO.	DESCRIPTION
B.5	Project Billboards/Signboards
B.7	Occupational safety and Health
B.9	Mobilization/Demobilization
803	Structural Excavation
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900	Structural Concrete
902	Reinforcing Steel Bars
903	Formworks and Falseworks
1002	Plumbing Works
1016(1)a	Water Proofing Cement Base
1018(1)	Glazed Tiles & Trims
1027(1)	Cement Plaster Finish

B.5 PROJECT BILLBOARD

Description

This Item shall consist of furnishing and installing project billboard in accordance with this Specification and details shown on the Plans, or as required by the Engineer.

The project billboard shall comply in all respects with the "COA Circular No. 2013-004" dated January 30, 2013. The information and publicity on projects of Government Agencies including Foreign Funded Projects are being guided by this Circular.

The project billboard will be erected as soon as the award has been made. It will be located at the beginning and at the end of the subproject throughout the project duration.

The size, materials and design to be used for the project signboard will specifically adhere to the General Guidelines No. 2.2.3 of the Circular while the content of the information shall conform to the General Guidelines No. 2.2.6 and the sample format shown in "Annex A" of the

Circular.

Material Requirements

Tarpaulin

The design and format of the tarpaulin shall have the following specifications:

- Color : White
- Size : 8 ft. x 8 ft.
- Resolution : 70 dpi
- Font : Helvetica
- Font Size of Main Information : 3 inches
- Font Size of Sub-Information : 1 inch
- Font Color: Black

Suitable Frame : Rigid wood frame with post;
and Posting: Outside display at the project location after award has been made.

ANNEX 14 PROJECT BILLBOARD

Name of Agency Business Address		PLGU LOGO					
Project: _____	Cost: _____						
Location: _____	Fund Source/s: LP, GOP, LGU						
Implementing Agency/ies: _____							
Development Partner/s: _____							
Contractor/Supplier: _____							
Brief Description of Project: _____							
Project Details:							
Project Date			Project Status				Remarks
Duration	Started	Target Date of Completion	Percentage of Completion	As of (Date)	Cost Incurred to Date	Date Completed	

For particulars or complaints about this project, please contact the Regional Office or Cluster which has audit jurisdiction on this project:

COA Regional Office No./Cluster: _____
Address: _____
Contact No.: _____ or Text COA Citizen's Desk at 0915-5391957

World Bank Anti-Corruption Hotline: 105-11-1-800-831-0463

The information shall contain but not limited to i.) logo of the funding agencies, ii.) the name of implementing agencies, iii.) name of contractor, iv.) subproject's title, location, cost and description, v.) project details to include duration, date started, target date of completion and project status, and vi.) COA and WB Anti-corruption Hotline.

The display/and or affixture of the picture, image, motto, logo, color motif, initials or other symbol or graphic representation associated with the top leadership of the project proponent

or implementing agency/unit/office, on project billboard, is considered unnecessary. (General Guidelines No. 2.2.6)

Post and Frame

Posts and frames/braces shall be made from good lumber with a 2X3 and 2x2 inches size respectively and shall be well-seasoned, straight and free of injurious defects. The frame will be covered with 2 pieces ¼ inch thick marine plywood where the tarpaulin will be attached.

Concrete Foundation Blocks

The concrete for the foundation blocks shall be Class A in accordance with Item 405, Structural Concrete and shall be of the size shown on the Plans.

Construction Requirements

Excavation and Backfilling

Holes shall be excavated to the required depth to the bottom of the concrete foundation as shown on the Plans.

The space around the post shall be backfilled to the ground line with approved material in layers not exceeding 100 mm and each layer shall be moistened and thoroughly compacted. Surplus excavated material shall be disposed of by the Contractor as directed by the Engineer.

Erection of Posts

The posts shall be erected vertically in position inside the formwork of the foundation block prior to the placing of the concrete and shall be adequately supported by bracing to prevent movement of the post during the placing and setting of concrete. The posts shall be located at the positions shown on the Plans.

Tarpaulin Installation

Tarpaulin shall be installed in accordance with the details shown on the Plans. The frame should be covered with the marine plywood before the tarpaulin is attached.

Method of Measurement

The quantities of project billboard shall be in pieces of such signs of the size specified, including the necessary posts and supports erected and accepted.

Basis of Payment

The quantities measured as determined in the Method of Measurement, shall be paid for at the contract unit price for the Pay Items shown in the Bid Schedule which price and payment shall be full compensation for furnishing and installing project billboard, for excavation, backfilling and construction of foundation blocks, and all labor, equipment, tools and incidentals necessary to complete the Item.

Payment will be made under:

--

Pay Item No.	Description	Unit of Measurement
B.5	Project Billboard	Each

B.7 CONSTRUCTION SAFETY & HEALTH PROGRAM

The following shall be the minimum requirements for the approval of a Construction Safety and Health Program (CSHP) under the Department of Labor and Employment (DOLE) Department Order No. 13, Series 1998.

1.1 Company Safety and Health Policy. The following shall apply:

A Company Safety Policy which shall serve as the general guiding principles in the implementation of safety and health on site duly signed by the highest company official or his duly authorized representative who has the over---all control of project execution and should include the contractor’s general policy towards occupational safety, worker’s welfare and health, and environment.

A Safety policy, which shall include the commitment that the contractor shall comply with DOLE minimum safety requirements, including reporting requirements of the Occupational Health and Safety Standards (OSHS), and other relevant DOLE issuances. These may include, but are not limited to the following:

- a. Registration (Rule 1020 and DO 18---02)
- b. Report of Safety Committee Organization (Rule 1040)
- c. Notification of Accidents and Occupational Illnesses (Rule 1050)
- d. Annual Work Accident/Illness Exposure Data Report (Rule 1050)
- e. Application for installation of mechanical/electrical equipment for construction of structure for industrial use (Rule 1070 and 1160)
- f. Annual Medical Report (Rule 1960)

1.2 Specific Construction Safety and Health Program shall contain the tendering agency’s requirements in addition to the minimum requirements under the appropriate sections of D.O. No. 13 whenever deemed as applicable.

1.3 Composition of Construction Safety and Health Committee.

A structure and membership of the construction safety and health committee which shall be consistent with the minimum requirements of Section 11 of D.O. 13, series of 1998.

1.4 Safety and Health Personnel. The following shall apply:

- a. All appointed first---aiders shall be duly trained and certified by the Philippine National Red Cross and shall possess a Certificate of Basic First Aid Training Course (Standard) with a valid PNRC ID Card.

- b. All appointed Safety Officers shall have completed the 40-hour BWC prescribed safety and health course as required by Rule 1030 of the OSHS, as amended by D.O. 16. All full-time safety personnel shall be accredited by the BWC pursuant to D.O. 16.
- c. All physicians and nurses assigned at the project site shall have completed the Bureau prescribed course on occupational safety and health course, pursuant to Rule 1960 of the OSHS.

1.5 Specific duties and responsibilities of the Safety Officer. The following shall apply:

- a. Specific duties and responsibilities shall comply with the outlined duties and responsibilities in Rule 1047 of the OSHS; and
- b. Procedure on the required performance of the assigned duties and responsibilities of safety officers in the construction site.

1.6 Applicable In-plant Safety and Health Promotion and Continuing Information Dissemination. The following shall apply:

- a. Detailed information dissemination or advisories to the new employees prior to on-site assignment, e.g. conduct of safety orientation, company's health and safety policies, hazards related to the job safety measures, safe work procedures.
- b. Detailed programs on continuing education such as trainings and seminars, if any, that shall be given to employees, e.g. BOSH, refresher course, first aid training, refresher course toolbox meeting, construction safety training for site safety officers, 80-hour advance safety course prescribe.
- c. Arrangements for conveying information on safety and health IEC materials e.g. Posters/comics/flyers, safety signages, handbooks/manuals, bulletin boards
- d. Arrangements for setting up sub-committees on safety and health, where necessary.
- e. Schedule of safety related activities, e.g. toolbox meeting, health and safety committee meeting

1.7 Accident and incident investigation, recording, and reporting. The following shall apply:

- a. All accidents or incidences shall be investigated and recorded.
- b. All work related accidents resulting to disabling injuries and dangerous occurrences as defined in OSH Standards (Rule 1050) shall be reported.
- c. Responsible or duly authorized officer for accident or incident investigation recording and reporting who are either the employer/owner/project manager/safety officer
- d. Accident Report shall contain the minimum information as required in DOLE/BWC/OHSD/IP-6.
- e. Shall notify the appropriate DOLE Regional within 24 hours in case of fatal accidents. An accident investigation shall be conducted by the Regional Office within forty eight

(48) hours after receipt of initial report of the employer.

1.8 Provisions for the protection of the general public within the vicinity of the company premises during construction and demolition. The following shall apply:

- a. Measures in order to ensure the safety of the general public shall be pursuant to Rule 11 of the National Building Code---Implementing Rules and Regulations: Protection of Pedestrians During Construction or Demolition
- b. Appropriate provisions and rules of OSHS
 - Rule 1412.09: Protection of the Public
 - Rule 1412.12: Protection against collapse of Structure
 - Rule 1412.16: Traffic Control
 - Rule 1413: Excavation
 - Rule 1417: Demolition
 - Rule 1060: Premises of Establishments
 - D.O. 13, Section 9: Construction Safety Signs
 - Other relevant provisions of OSHS.

1.9 General safety within construction premises. The following shall apply:

The provisions for danger signs, barricades, and safety instructions for workers, employees, public, and visitors such as, housekeeping; walkway surfaces; means of access i.e. stairs, ramps, floor openings, elevated walkways, runways and platforms; and, light.

1.10 Environmental Control (Rule 1070 of the Standards). The following shall apply:

- a. Monitoring and control of hazardous noise, vibration and air---borne contaminants such as gases, fumes, mists and vapors.
- b. Provisions to comply with minimum requirements for lighting, ventilation and air movement.

1.11 Guarding of hazardous machinery (Rule 1200 of the Standards). The following shall apply:

- a. Provisions for installation/design of built---in machine guards.
- b. Provisions for built---in safety in case of machine failure.
- c. Provisions for guarding of exposed walkways, access---ways, working platforms.

1.12 Provisions for and use of Personal Protective Equipment (PPE) --- (Rule 1080 of the Standards). The following shall apply:

- a. Appropriate types and duly tested PPEs to be issued to workers after the required training on their use.
- b. Provisions for maintenance, inspection and replacement of PPEs.

- c. In all cases the basic PPE commonly required for all types of construction projects are hard hats, safety shoes and working gloves. Other PPEs shall be required depending on the type of work and hazards.

1.13 Handling of Hazardous Substances – (Rule 1090 of the Standards). The following shall apply:

Provision for identification, safe handling, storage, transport and disposal of hazardous substances and emergency procedure in accordance with Material Safety Data Sheet (MSDS) in cases of accidents.

1.14 General materials handling and storage procedures. – (Rule 1150 of the Standards). The following shall apply:

- Safe use of mechanical materials handling equipment
- Secured and safe storage facilities
- Regular housekeeping as necessary so as not to constitute and/or present hazards
- Clearly marked clearance limits
- Proper area guarding of storage facilities

1.15 Installation, use and dismantling of hoist and elevators.---Rule 1415.10 Testing and Examination of Lifting Appliance, Rule 1220 Elevators and Related Equipment. The following shall apply:

- a. Provisions to ensure safe installation, use and dismantling of hoist and elevator;
- b. Periodic inspection of hoists and elevators.

1.16 Testing and inspection of electrical and mechanical facilities and equipment. The following Rules of the Occupational Safety and Health Standards shall apply: **Rule Coverage**

- a. Rule 1160 --- Boiler
- b. Rule 1170 --- Unfired Pressure Vessels
- c. Rule 1210 --- Electrical Safety
- d. Rule 1220 --- Elevators and Related Equipment
- e. Rule 1410 --- Construction Safety
- f. Rule 1415.10 – Training and Examination of Lifting Appliance

1.17 Workers skills and certification. The following shall apply:

- a. Provisions to ensure that workers are qualified to perform the work safely.
- b. Provisions to ensure that only qualified operators are authorized to use and operate electrical and mechanical equipment.

1.18 Provisions for emergency transportation facilities for workers. The following shall apply:

Rule 1963.02 of the Occupational Safety and Health Standards – Emergency Medical and Dental Services

1.19 Fire Protection Facilities and Equipment. The following rule shall apply:

- a. Fire protection facilities and equipment as required under Rule 1940 of the OSHS
- b. Proposed structure and membership of fire brigade
- c. Provision for training on emergency preparedness

1.20 First aid and health care medicines, equipment and facilities.

- a. Identification of the proposed first aid and health care facilities that the employer shall provide satisfying the minimum requirements of OSHS.
- b. Identification of the medical and health supplies, such as medicines and equipment to be provided.
- c. In all cases, the provision of first aid medicines and emergency treatment shall be mandatory.
- d. In the absence of the required on site health care facilities, the employer shall attach a copy of a written contract with a recognized emergency health provider as required under the OSHS.

1.21 Workers Welfare Facilities. The following shall apply:

- a. Provisions for toilet and sanitary facilities
- b. Proposed bathing, washing, facilities
- c. Proposed facilities for supplying food and eating meals
- d. Proposed facilities for supplying potable water for drinking and for washing
- e. Proposed facilities for locker rooms, storing and changing of clothes for workers.

1.22 Proposed Hours of Work and Rest and Rest Breaks. The following shall apply:

- a. Work schedules, working hours, shifting schedules
- b. Frequency and length of meals and breaks
- c. Schedule of rest periods

1.23 Waste Disposal. The following shall apply:

- a. Proposed method of clearing and disposal of waste.
- b. Provisions for permits and clearance where require in disposal of hazardous wastes.

1.24 Disaster and Emergency Preparedness Contingency

1.25 Safety Program . The Safety Programs shall contain the following:

- a. Standard work procedures.

- b. Job hazard analysis for the following activities as applicable to the project.
- c. Other hazardous work, not outline herein but will be performed during project execution must also be included.

The activities may consist of any number of the following, depending on the nature of the project, vis-à-vis exposure to hazards:

- a. Site Clearing
- b. Excavations
- c. Erection and dismantling of scaffolds and other temporary working platforms
- d. Temporary electrical connections/installations
- e. Use of scaffolds and other temporary working platforms
- f. Working at unprotected elevated working platforms or surfaces
- g. Work over water
- h. Use of power tools and equipment
- i. Gas and electric welding and cutting operations
- j. Working in confined spaces
- k. Use of internal combustion engines
- l. Handling hazardous and/or toxic chemical substances
- m. Use of hand tools
- n. Working with pressurized equipment
- o. Working in hot or cold environments
- p. Handling, storage, usage and disposal of explosives
- q. Use of mechanized lifting appliances for movement of materials
- r. Use of construction heavy equipment
- s. Demolition

The hazard analysis shall contain the following:

- a. Identification of possible hazards for a particular activity.
- b. Identification of any company permits or clearances needed prior to the performance of the activity together with the name of person/s who is authorized to issue such permit or clearance.
- c. Identification of the proposed improvement in work standard procedures that shall be followed during implementation of a particular activity.
- d. Company inspection procedures to ensure safety during the execution of a particular activity.

- e. Identification of emergency procedures in case of accidents or any untoward incident while performing a particular activity.

1.26 Company Penalties/Sanctions for Violation/s of the Provision/s of Safety and Health Program – The appropriate penalties or sanctions for violation of company rules and regulations or those stipulated in the CHSP and the observance of due process.

2. Personal Protective Equipment by Type of Project

2.1 General Building Construction Project (GBC). The following classifications shall apply:

Classification: Air Navigation Facilities, Power Transmission & Distribution, Building and Housing, Communication facilities, Sewerage, water treatment plants and Site/Land development.

2.2 General Engineering Construction Project. The following classifications shall apply:

Classifications: Roads and Airports (Horizontal structure), bridges, irrigation system, flood control and drainages, dams, tunneling, ports and harbor, water supply

2.3 Specialty Construction Project. The following classifications shall apply:

Classifications: Electrical work, mechanical work, plumbing and sanitary work, air conditioning or refrigeration, water proofing work, painting work, communication facilities, foundation or piling work, structural steel work, concrete pre---cast, elevator or escalator, well drilling work, navigational equipment and instrument installation, electromechanical work, metal roofing and siding installation, structural demolition and landscaping.

3. Safety Personnel and Skilled Worker. The following shall apply: **3.1 Minimum Required Safety Personnel.** The following shall apply:

- a. The General Constructor shall provide for a full time officer, who shall be assigned as the general construction safety and health officer to oversee full time the overall management of the Construction Safety and Health Program.
- b. The General Constructor shall provide for additional Construction Safety and Health Officer/s in accordance with the requirements for Safety Officer of D.O. 16, s. 2001, depending of the total number of personnel assigned to the construction project site.
- c. The General Constructor shall provide for one (1) Construction Safety and Health Officer for every ten (10) units of heavy equipment assigned to the project site.
- d. Each construction contractors/subcontractors shall provide for the required number of safety officers in accordance with the requirements of D.O. 16 series 2001.

3.2 Qualification and Training of Safety and Health Personnel and Skilled Workers. The following shall apply:

- a. Training of OSH Personnel shall be pursuant to D.O. 16 series of 2001 and its Procedural Guidelines.
- b. Worker Skills Certification for the critical operations/occupations shall be pursuant to

D.O. 13 and D.O. 19 as well as the TESDA requirements on worker competency.

4. Construction Heavy Equipment. The following shall apply:

4.1 Accreditation of Organization for Testing of Construction Heavy Equipment shall be pursuant to D.O. No. 16 and its Implementing Guidelines and Procedural Guidelines on Accreditation and Performance Audit of Testing Organization for Construction Heavy Equipment.

4.2 Conduct of Inspection and Test of Construction Heavy Equipment shall be pursuant to Sec. 10 of D.O. No. 13 and its Procedural Guidelines. The following shall apply:

- a. Procedural Guidelines on Accreditation and Performance Audit of Testing Organization for Construction Heavy Equipment
- b. Standard Checklist for Testing and Inspection of Construction Heavy Equipment.
- c. Inspection Procedures for DOLE Inspectors

4.3 TESDA Certification Requirements for Operators. Certification for Operators shall be in accordance with the requirements of TESDA on worker competency.

4.4 Monitoring and Evaluation of CHE Test/Inspection conducted shall be pursuant to the Procedural Guidelines on Accreditation and Performance Audit of Testing Organization for Construction Heavy Equipment.

5. Signages and Barricades. The following shall apply:

Construction Safety Signages shall be provided as a precaution and to advise the workers and the general public of the hazards existing in the worksite.

5.1 Signage Procedures: The signages shall be:

- a. Posted in prominent positions and at strategic locations.
- b. As far as practicable, be in the language understandable to most of the workers employed in the site.
- c. For non-raised floor areas, the attached yellow CAUTION sign shall be used when using yellow CAUTION tape.
- d. For non-raised floor areas, the attached red DANGER sign shall be used when using the red DANGER tape.
- e. Placed in designated areas at four (4) feet from ground level, if there is no other more practicable height placement.
- f. Regularly inspected and maintained in good condition to achieve its purpose. Signages that are damaged; illegible or that no longer apply as to purpose, site or language, shall be removed or be replaced by the safety officer when needed.
- g. Removed after the hazard is completely eliminated. If upon work completion the hazard is still present, the signage shall remain in place.

- h. Designed and constructed following the Overall Dimensions of Safety Signs Formula as required by the OSHS
- i. Specific with the type of hazard and should indicate the name of the contaminant/ substance involved (for chemical hazards), and the type of PPE or respiratory equipment to be worn.

5.2 Posting of Signages shall include, but not limited to the following places:

- a. Areas where there are risks of falling objects.
- b. Areas where there are risks of falling, slipping, tripping among workers and the public
- c. Prior to entry in project sites, locations and its perimeter.
- d. Where there is mandatory requirement on the usage of PPEs.
- e. Areas where explosives and flammable substances are used or stored
- f. Approaches to working areas where danger from toxic or irritant airborne contaminants/ substances may exist,
- g. All places where contact with or proximity to electrical facility/equipment can cause danger
- h. All places where workers may come in contact with dangerous moving parts of machinery or equipment
- i. Locations of fire alarms and fire---fighting equipment
- j. Locations for instructions on the proper usage of specific construction equipment, tools.

5.3 Barricading Procedures: The following shall apply:

- a. The contractor shall provide all necessary barricades, safety tapes, safety cones or safety lines as required in isolating or protecting an unsafe work area from other workers, pedestrians or vehicular traffic.
- b. Barricades shall completely enclose the hazardous area and effectively limit unintentional or casual entry.
- c. Barricades shall be three (3) feet vertical height from the ground, when no other more practical height specification is available.
- d. Barricades shall be maintained in good condition to achieve its purpose.
- e. Barricades that are damaged; faded or that no longer apply as to purpose, site or meaning, shall be removed or shall be replaced by the safety officer.
- f. Barricade tape shall not be used on the floor as this presents a slipping hazard of its own.
- g. In addition to using the proper warning tape, the contractor shall use the appropriate safety signage when barricading an area.

h. All barricades shall be removed after the hazard is completely eliminated.

I. Upon work completion, if the hazard is still present, the barricade shall remain in place.

5.4 Installation of barricades shall include, but not limited to the following worksites conditions:

- a. hazardous areas
- b. trip hazard
- c. robotic movement
- d. energized electrical works
- e. overhead suspended load test
- f. critical high pressure test
- g. chemical introduction
- h. fall exposure
- i. Emergency Response Zone
- j. Unsafe condition zone
- k. Danger zone
- l. Confined and enclosed space

6. Construction Safety and Health Committee. The following shall apply:

6.1 Composition

- a. Project Manager or his representative as chairperson ex-officio
- b. General Construction Safety and Health Officer
- c. Construction Safety and Health Officers
- d. Safety representatives (SAFETY OFFICER) from each subcontractor.

If DOLE's minimum requirements based on the number of workers of the contractor requires only a part time safety officer, the safety officer need not be an accredited safety practitioner or consultant.

- e. Doctors, nurses and other health personnel pursuant to the requirements stated in Rule 1042 of the OSHS
- f. Workers' representatives

If there are no contractor's sub-contractors or the constructor is a subcontractor, the safety and health committee shall be in accordance with the requirements of Rule 1040 of the Occupational Safety and Health Standards.

6.2 Duties and responsibilities

- a. The Project Manager or his representative shall act as the Chairperson of the committee.
- b. The committee shall conduct safety meetings at least once a month.
- c. The persons constituting the Safety and Health Committee shall, as far as practicable, be at the construction site whenever construction work is being undertaken.
- d. The committee shall continually plan and develop accident prevention programs.
- e. The committee shall review reports of inspection, accident investigation and monitor implementation of the safety program.
- f. The committee shall provide necessary assistance to government authorities authorized to conduct inspection in the proper conduct of their activities
- g. The committee shall initiate and supervise safety trainings for its employees
- h. The committee shall conduct safety inspection at least once a month, and shall conduct investigation of work accidents and shall submit a regular report to DOLE.
- i. The committee shall initiate and supervise the conduct of daily brief safety meetings or toolbox meetings.
- j. The committee shall prepare and submit to DOLE, reports on said committee meetings.
- k. The committee shall develop a disaster contingency plan and organize such emergency service units as may be necessary to handle disaster situations.

7. Construction Safety and Health Reports. The following shall apply:

7.1 The Construction Safety and Health Report shall include:

- a. Monthly summary of all safety and health committee meetings
- b. Summary of all accident investigations /reports
- c. Corrective/Preventive measures/action for each hazard
- d. Periodic hazards assessment with corresponding remedial measures for new hazards
- e. Safety promotions and trainings conducted/attended

7.2 Submission of Reports. The following shall apply:

- a. All general constructors shall be required to submit a monthly construction safety and health report to the BWC copy furnished the DOLE Regional Office concerned.
- b. In case of any dangerous occurrence or major accident resulting in death or permanent total disability, the concerned employer shall notify the appropriate DOLE Regional Office within twenty---four (24) hours from occurrence.
- c. After the conduct of investigation by the concerned construction safety and health officer, the employer shall report all disabling injuries to the DOLE Regional Office on or before the 20th of the month following the date of occurrence of accident using the

8. Cost of Construction Safety and Health Program. The following shall apply:

8.1 The total cost of implementing a Construction Safety and Health Program shall be mandatory and shall be made an integral part of the project's construction cost as a separate pay item, duly quantified and reflected in the Project's Tender Documents and likewise reflected in the Project's Construction Contract Documents.

8.2 The cost of the following PPEs: helmet, eye goggles, safety shoes, working gloves, rain coats, dust mask, ear muffs, rubber boots, and other similar PPE's shall be indicated/enumerated per cost, per worker, foreman, leadman, jackhammer operator, carpenter, electrician, mason, steelman, painter, mechanic, welder, plumber, heavy equipment operator, physician/inspector, and other such personnel.

8.3 The PPEs shall be sufficient in number for all workers particularly where simultaneous construction activities/operations in different areas are being undertaken.

8.4 The cost of the minimum required inventory of medicines, supplies and equipment as indicated in "Attachment C" of the OHS Standards shall be included.

8.5 The safety personnel manpower cost salaries/wages, benefits shall be included.

8.6 Cost of safety promotions/activities, training conducted and salaries of safety and health personnel, medical personnel employed or engaged by constructor.

9. Safety and Health Information. The following shall apply:

9.1 Workers shall be adequately and suitably:

- a. Informed of potential safety and health hazards to which they may be exposed at their workplace.
- b. Instructed and trained on the measures available for the prevention, control and protection against those hazards.

9.2 Every worker shall receive instruction and training regarding general safety and health common to construction sites which shall include, but not limited to the following:

- a. The basic rights and duties of the workers at the construction site.
- b. The means of access and egress, both during normal work and in emergency situations.
- c. The measures for good housekeeping.
- d. The location and proper use of welfare and first---aid facilities.
- e. The proper care and use of the items or personal protective equipment and protective clothing provided the workers.
- f. The general measures for personal hygiene and health protection.
- g. The fire precautions to be taken.

- h. The action to be taken in case of any emergency.
- i. The requirements of relevant health and safety rules and regulations.

9.3 *The instruction, training and information materials provided shall be given in a language or dialect understood by the worker.*

Written, oral, visual and participative approaches shall be used to ensure that the worker has understood and assimilated the information.

9.4 Each supervisor or any person e.g. foreman, lead man, gangboss, and other similar personnel shall conduct daily tool box or similar meetings prior to the start of the operations for the day to discuss with the workers and to anticipate safety and health problems related.

9.5 No person shall be deployed in a construction site unless he has undergone a safety and health awareness seminar conducted by safety professionals or accredited organizations or other institutions recognized by DOLE.

9.6 *Specialized instruction and training shall be provided to the following:*

- a. Drivers and operators of lifting appliances, transport, earth---moving and materials---handling equipment and machinery; or any equipment of specialized or dangerous nature.
- b. Workers engaged in the erection or dismantling of scaffolds.
- c. Workers engaged in excavations at least one (1) meter deep or deep enough to cause danger, shafts, earthworks, underground works or tunnels.
- d. Workers handling explosives or engaged in blasting operations.
- e. Workers engaged in pile---driving.
- f. Workers in compressed air cofferdams and caissons.
- g. Workers engaged in the erection of prefabricated parts of steel structural frames and tall chimneys, and in concrete work, form work and other such type of work.
- h. Workers handling hazardous substances and materials.
- i. Workers as signalers and riggers.
- j. Other types of workers as may be categorized by TESDA

10. Welfare Facilities. The following shall apply:

The employer shall provide the following welfare facilities in order to ensure humane working conditions:

10.1 *Adequate supply of safe drinking water:*

- a. If the water is used in common drinking areas, it shall be stored in closed containers from which the water is dispensed through taps or cocks. Such containers shall be cleaned and disinfected at regular intervals but not exceeding fifteen (15) days.
- b. Notices shall be posted conspicuously in locations where there is water supply that is

not for drinking purposes

10.2 Adequate sanitary and washing facilities:

- a. Adequate facilities for changing and for the storage and drying of work clothes.
- b. Adequate accommodation facilities for taking meals and for shelter.
- c. Adequate washing facilities regardless of sex for every 25 employees up to the first 100 and an additional of one (1) facility for every 40 additional workers.
- d. Suitable living accommodation for workers and as may be applicable for their families, such as separate sanitary, washing and sleeping facilities for men and women workers.

10.3 Adequate and suitable toilet and bath facilities for both male and female workers at the following ratio:

- a. Where the number of female workers exceeds 100, one (1) and bath facilities for every 20 female workers up to the first 100 and one (1) toilet and bath facilities for every 30 additional female workers.
- b. Where the number of male workers exceeds 100 and sufficient urinals have been provided, one (1) toilet and bath facilities for every 25 males up to the first 100 and one (1) more for every 40 additional male workers.
- c. Every toilet shall be provided with enclosure, partitioned off so as to provide/ensure privacy. If feasible, shall have a proper door and fastenings, so doors shall be tight fitting and self-closing.
- d. Urinals shall be placed or screened so as not to be visible from other parts of the site, or other workers.
- e. Rest rooms shall be so arranged so as to be conveniently accessible to the workers and shall be kept clean and orderly at all times.
- f. Adequate hand-washing facilities shall be so provided within or adjacent to the toilet facilities
- g. In cases where persons of both sexes are employed, toilet and bath facilities for each sex shall be situated or partitioned so that the interior will not be visible even when the door of any facility is opened from any place where persons of the other sex have to work or pass.
- h. If toilet and bath facilities for one sex adjoin those for the other sex, the approaches shall be separate, and toilet and bath facilities for each sex shall be properly indicated.

Mode of Measurement

Method of Measurement shall be paid for at the contract unit price for the Pay Items shown in the Bid Schedule which price and payment shall be full compensation for the provision of Personal Protective Equipment (PPE) and Devices, Medicines, Medical Supplies and other incidentals necessary to complete the item.

Basis of Payment

Payment shall be made on a proportional basis, calculated by multiplying the percentage rate of physical progress to the total lump sum amount every progress billing.

Payment will be made under:

Pay Item No.	Description	Unit of Measurement
B.7	Construction Safety & Health program	Lump Sum

B.9 MOBILIZATION AND DEMOBILIZATION**General**

Work under this Contract shall be in accordance with the terms and conditions stipulated in the Bid Documents.

Scope of Work

This Section includes mobilization, demobilization, assembly, and disassembly of all proposed minimum equipment including incidentals necessary to complete the work. It shall be computed based on the equipment requirements of the project stipulated in the proposal and contract booklet. In no case shall mobilization and demobilization exceed 1% of the Estimated Direct Cost (EDC) of the civil works items

Mobilization

- a) The Contractor shall mobilize and put into operation all equipment required to undertake the Bid Documents, which is the Bill of Quantities and all associated work items.
- b) Mobilization shall include the transferring to the job-sites of all equipment necessary for the execution and completion of the work subject to the confirmation of the LGU.
- c) Equipment encountering breakdowns must be repaired at the most expeditious method possible at no cost to the LGU. In the event that the equipment call for major repair works that cannot be undertaken at the site, the Contractor shall replace such equipment with equal or better performance capacity at no additional mobilization costs to the LGU, and the Contractor shall not be entitled to any time extension.
- d) The Contractor will be held responsible for any damage to existing structures, works, materials, or equipment because of his operations. The Contractor shall repair or replace any damaged structures, works, materials, or equipment to the satisfaction of the LGU, and at no additional cost to the Procuring Entity.
- e) The Contractor shall be responsible for all damage to streets, roads, railroads, curbs,

sidewalks, highways, shoulders, ditches, embankment, culverts, bridges, or other public or private property, which may be caused by the transport of equipment to or from the Works.

- f) All construction equipment provided by the Contractor shall, when brought on to the Site, be deemed to be exclusively intended for the construction and completion of the Works and the Contractor shall not remove the same or any part thereof without the approval of the LGU.
- g) The LGU shall not at any time be liable for the loss or damage to any of the said construction plant and equipment provided by the Contractor.

Demobilization

Demobilization upon request of the Contractor and approval by the LGU shall include the following:

- a) The dismantling, preparation and loading for removal and shipment of all Contractors' equipment at the site after completion of the works.
- b) Transportation of all the above equipment from the site to the Contractor's home station or somewhere else outside the sites.
- c) Removal of all supplementary markers furnished and installed by the Contractor, provided that the LGU has not taken the option to retain the markers.
- d) The clean-up of the Site and the removal of materials, debris, waste, etc., and making good damages or temporary alterations, to the satisfaction of the LGU.
- e) The restoration, up to a degree acceptable to the LGU, of damage to the surrounding area (including vegetation, minor structures etc.) resulting from the construction or construction-related activities

Method of Measurement

The Lump sum price shall provide for the mobilization and demobilization of all Contractor's equipment to cover all costs for mobilization and demobilization, transportation, insurance during transportation, port fees, taxes, utilities, operators and all other incidentals.

The payment shall cover the dismantling of the work site by the Contractor, with removal of all the alterations, construction equipment, so that the site is restored to the state it was in before the installations and equipment were placed there.

Basis of Payment

All costs associated with and necessary for compliance with this Specification shall be included in the Lump Sum price. No additional or separate payment will be made in this regard.

The LGU may at any time withhold payment if in the opinion of the Engineer, the requirements of this Specification section are not provided.

The Lump Sum payments will be paid following the schedule below:

- 50 % of the lump sum cost will be paid for mobilization and 50% for demobilization.
- The progress billing for mobilization is computed by dividing the number of equipment mobilized at the site over the total minimum number of equipment required in the bidding documents multiplied by 50% of the lump sum cost. Likewise, payment for demobilization will follow the computation process for mobilization but only after the completion of the works assigned to the equipment and site restored in good condition.

<u>Pay Item</u>	<u>Description</u>	<u>Unit</u>
B.9	Mobilization and Demobilization	lump sum

ITEM 103 – STRUCTURE EXCAVATION

103.1 Description

This Item shall consist of the necessary excavation for foundation of bridges, culverts, underdrains, and other structures not otherwise provided for in the Specifications. Except as otherwise provided for pipe culverts, the backfilling of completed structures and the disposal of all excavated surplus materials, shall be in accordance with these Specifications and in reasonably close conformity with the Plans or as established by the Engineer.

This Item shall include necessary diverting of live streams, bailing, pumping, draining, sheeting, bracing, and the necessary construction of cribs and cofferdams, and furnishing the materials therefore, and the subsequent removal of cribs and cofferdams and the placing of all necessary backfill.

It shall also include the furnishing and placing of approved foundation fill material to replace unsuitable material encountered below the foundation elevation of structures.

No allowance will be made for classification of different types of material encountered.

103.2 Construction Requirements

103.2.1 Clearing and Grubbing

Prior to starting excavation operations in any area, all necessary clearing and grubbing in that area shall have been performed in accordance with Item 100, Clearing and Grubbing.

103.2.2 Excavation

- (1) General, all structures. The Contractor shall notify the Engineer sufficiently in advance of the beginning of any excavation so that cross-sectional elevations and measurements may be taken on the undisturbed ground. The natural ground adjacent to the structure shall not be disturbed without permission of the Engineer.

Trenches or foundation pits for structures or structure footings 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 structures or structure footings of the full width and length shown. 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, to secure a satisfactory foundation.

Trenches or foundation pits for structures or structure footings 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 structures or structure footings of the full width and length shown. 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, to secure a satisfactory foundation.

- (2) Structures other than pipe culverts. All rock or other hard foundation materials shall be cleaned all loose materials, and cut to a firm surface, either level, stepped, or serrated as directed by the Engineer. All seams or crevices shall be cleaned and grouted. All loose and disintegrated rocks and thin strata 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.

- (3) 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 and for a width of at least one diameter on each side of 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.

103.2.3 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.

103.2.4 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 so as 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 so as 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 masonry, 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 material 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.

103.2.5 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 side 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 excavations to the original ground surface or stream bed with material satisfactory to the Engineer.

103.2.6 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 backfills 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 for 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, and behind the sidewalls of culverts, shall be carried up simultaneously behind opposite abutments or sidewalls.

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 horizontal berm of thoroughly compacted material for a distance at least equal to the height of the abutment or wall to the backfilled against except insofar as undisturbed material obtrudes upon the area.

Broken rock or coarse sand and gravel shall be provided for a drainage filter at weepholes as shown on the Plans.

103.2.7 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.

103.3 Method of Measurement

103.3.1 Structure Excavation

The volume of excavation to be paid for will be the number of cubic metres measured in original position of material acceptably excavated in conformity with the Plans or as directed by the Engineer, but in no case, except as noted, will any of the following volumes be included in the measurement for payment:

- (1) The volume outside of vertical planes 450 mm (18 inches) outside of and parallel to the neat lines of footings and the inside walls of pipe and pipe-arch culverts at their widest horizontal dimensions.

- (2) The volume of excavation for culvert and sections outside the vertical plane for culverts stipulated in (1) above.
- (3) The volume outside of neat lines of underdrains as shown on the Plans, and outside the limits of foundation fill as ordered by the Engineer.
- (4) The volume included within the staked limits of the roadway excavation, contiguous channel changes, ditches, etc., for which payment is otherwise provided in the Specification.
- (5) Volume of water or other liquid resulting from construction operations and which can be pumped or drained away.
- (6) The volume of any excavation performed prior to the taking of elevations and measurements of the undisturbed ground.
- (7) the volume of any material rehandled, except that where the Plans indicate or the Engineer directs the excavation after embankment has been placed and except that when installation of pipe culverts by the imperfect trench method specified in Item 500 is required, the volume of material re-excavated as directed will be included.
- (8) The volume of excavation for footings ordered at a depth more than 1.5 m (60 inches) below the lowest elevation for such footings shown on the original Contract Plans, unless the Bill of Quantities contains a pay item for excavation ordered below the elevations shown on the Plans for individual footings.

103.3.2 Bridge Excavation

The volume of excavation, designated on the Plans or in the Special Provisions as "Bridge Excavation" will be measured as described below and will be kept separate for pay purposes from the excavation for all structures.

The volume of bridge excavation to be paid shall be the vertical 450 mm (18 inches) outside of and parallel to the neat lines of the footing. The vertical planes shall constitute the vertical faces of the volume for pay quantities regardless of excavation inside or outside of these planes.

103.3.3 Foundation Fill

The volume of foundation fill to be paid for will be the number of cubic metres measures in final position of the special granular material actually provided and placed below the foundation elevation of structures as specified, complete in place and accepted.

103.3.4 Shoring, Cribbing, and Related Work

Shoring, cribbing and related work whenever included as a pay item in Bill of Quantities will be paid for at the lump sum bid price. This work shall include

furnishing, constructing, maintaining, and removing any and all shoring, cribbing, cofferdams, caissons, bracing, sheeting water control, and other operations necessary for the acceptable completion of excavation included in the work of this Section, to a depth of 1.5 m below the lowest elevation shown on the Plans for each separable foundation structure.

103.3.5 Basis of Payment

The accepted quantities, measured as prescribed in Section 103.3, shall be paid for at the contract unit price for each of the particular pay items listed below that is included in the Bill of Quantities. The payment shall constitute full compensation for the removal and disposal of excavated materials including all labor, equipment, tools and incidentals necessary to complete the work prescribed in this Item, except as follows:

- (1) Any excavation for footings ordered at a depth more than 1.5 m below the lowest elevation shown on the original Contract Plans will be paid for as provided in Part K, Measurement and Payment, unless a pay item for excavation ordered below Plan elevation appears in the Bill of Quantities.
- (2) Concrete will be measured and paid for as provided under Item 405, Structural Concrete.
- (3) Any roadway or borrow excavation required in excess of the quantity excavated for structures will be measured and paid for as provided under Item 102.
- (4) Shoring, cribbing, and related work required for excavation ordered more than 1.5 m (60 inches) below Plan elevation will be paid for in accordance with Part K.

Payment will be made under:

Pay Item Number	Description	Unit of Measurement
803 (1)a	Structure Excavation (Common Soil)	Cubic Meter

ITEM 104 - EMBANKMENT

104.1 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.

104.2 Material Requirements

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

1. 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.

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 ASSHTO T 90 and a liquid limit of not more than 30 as determined by AASHTO T 89.

2. Unsuitable Material – Material other than suitable materials such as:
 - (a) Materials containing detrimental quantities of organic materials, such as grass, roots and sewerage.
 - (b) Organic soils such as peat and muck.
 - (c) Soils with liquid limit exceeding 80 and/or plasticity index exceeding 55.
 - (d) Soils with a natural water content exceeding 100%.

Soils with very low natural density, 800 kg/m³ or lower.

Soils that cannot be properly compacted as determined by the
Engineer.

104.3 Construction Requirements

104.3.1 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 roadway embankments, including preparation of the areas upon which they are to be placed; the construction of dikes within or adjacent to the roadway; the placing and compacting of approved material within roadway areas where unsuitable material has been removed; and the placing and compacting of embankment material in holes, pits, and other depressions within the roadway area.

Embankments and backfills shall contain no muck, peat, sod, roots or other deleterious matter. Rocks, broken concrete or other solid, bulky materials shall not be placed in embankment areas where piling is to be placed or driven.

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 of this Item.

Where provided on the Plans and Bill of Quantities the top portions of the roadbed in both cuts and embankments, as indicated, shall consist of selected borrow for topping from excavations.

104.3.2 Methods of Construction

Where there is evidence of discrepancies on the actual elevations and that shown on the Plans, a preconstruction 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.

When embankment is to be placed and compacted on hillsides, or when new embankment is to be compacted against existing embankments, or when embankment is built one-half width at a time, the existing slopes that are steeper than 3:1 when measured at right angles to the roadway shall be continuously benched over those areas as the work is brought up in layers. Benching will be subject to the Engineer's approval and shall be of sufficient width to permit operation of placement and compaction equipment. Each horizontal cut shall begin at the intersection of the original ground and the vertical sides of the previous cuts. Material thus excavated shall be placed and compacted along with the embankment material in accordance with the procedure described in this Section.

Unless shown otherwise on the Plans or special Provisions, where an embankment of less than 1.2 m (4 feet) below subgrade is to be made, all sod and vegetable matter shall be removed from the surface upon which the embankment is to be placed, and the cleared surface shall be completely broken up by plowing, scarifying, or steeping to a minimum depth of 150 mm except as provided in Subsection 102.2.2. This area shall then be compacted as provided in Subsection 104.3.3. Sod not required to be removed shall be thoroughly disc harrowed or scarified before construction of embankment. Wherever a compacted road surface containing granular materials lies within 900 mm (36 inches) of the subgrade, such old road surface shall be scarified to a depth of at least 150 mm (6 inches) whenever directed by the Engineer. This scarified materials shall then be compacted as provided in Subsection 104.3.3.

When shoulder excavation is specified, the roadway shoulders shall be excavated to the depth and width shown on the Plans. The shoulder material shall be removed without disturbing the adjacent existing base course material, and all excess excavated materials shall be disposed off as provided in Subsection 102.2.3. If necessary, the areas shall be compacted before being backfilled.

Roadway embankment of earth material shall be placed in horizontal layers not exceeding 200 mm (8 inches), loose measurement, and shall be compacted as specified before the next layer is placed. However, thicker layer maybe placed

if vibratory roller with high compactive effort is used provided that density requirement is attained and as approved by the Engineer. Trial section to this effect must be conducted and approved by the Engineer. Effective spreading equipment shall be used on each lift to obtain uniform thickness as determined in the trial section prior to compaction. As the compaction of each layer progresses, continuous leveling and manipulating will be required to assure uniform density. Water shall be added or removed, if necessary, in order to obtain the required density. Removal of water shall be accomplished through aeration by plowing, blading, discing, or other methods satisfactory to the Engineer.

Where embankment is to be constructed across low swampy ground that will not support the mass of trucks or other hauling equipment, the lower part of the fill may be constructed by dumping successive loads in a uniformly distributed layer of a thickness not greater than necessary to support the hauling equipment while placing subsequent layers.

When excavated material contains more than 25 mass percent of rock larger than 150 mm in greatest diameter and cannot be placed in layers of the thickness prescribed without crushing, pulverizing or further breaking down the pieces resulting from excavation methods, such materials may be placed on the embankment in layers not exceeding in thickness the approximate average size of the larger rocks, but not greater than 600 mm (24 inches).

Even though the thickness of layers is limited as provided above, the placing of individual rocks and boulders greater than 600 mm in diameter will be permitted provided that when placed, they do not exceed 1200 mm (48 inches) in height and provided they are carefully distributed, with the interstices filled with finer material to form a dense and compact mass.

Each layer shall be leveled and smoothed with suitable leveling equipment and by distribution of spalls and finer fragments of earth. Lifts of material containing more than 25 mass percent of rock larger than 150 mm in greatest dimensions shall not be constructed above an elevation 300 mm (12 inches) below the finished subgrade. The balance of the embankment shall be composed of suitable material smoothed and placed in layers not exceeding 200 mm (8 inches) in loose thickness and compacted as specified for embankments.

Dumping and rolling areas shall be kept separate, and no lift shall be covered by another until compaction complies with the requirements of Subsection 104.3.3.

Hauling and leveling equipment shall be so routed and distributed over each layer of the fill in such a manner as to make use of compaction effort afforded thereby and to minimize rutting and uneven compaction.

104.3.3 Compaction

Compaction Trials

Before commencing the formation of embankments, the Contractor shall submit in writing to the Engineer for approval his proposals for the compaction of each type of fill material to be used in the works. The proposals shall include the relationship between the types of compaction equipment, and the number of passes required and the method of adjusting moisture content. The Contractor shall carry out full scale compaction trials on areas not less than 10 m wide and 50 m long as required by the Engineer and using his proposed procedures or such amendments thereto as may be found necessary to satisfy the Engineer that all the specified requirements regarding compaction can be consistently achieved. Compaction trials with the main types of fill material to be used in the works shall be completed before work with the corresponding materials will be allowed to commence.

Throughout the periods when compaction of earthwork is in progress, the Contractor shall adhere to the compaction procedures found from compaction trials for each type of material being compacted, each type of compaction equipment employed and each degree of compaction specified.

Earth

The Contractor shall compact the material placed in all embankment layers and the material scarified to the designated depth below subgrade in cut sections, until a uniform density of not less than 95 mass percent of the maximum dry density determined by AASHTO T 99 Method C, is attained, at a moisture content determined by Engineer to be suitable for such density. Acceptance of compaction may be based on adherence to an approved roller pattern developed as set forth in Item 106, Compaction Equipment and Density Control Strips.

The Engineer shall during progress of the Work, make density tests of compacted material in accordance with AASHTO T 191, T 205, or other approved field density tests, including the use of properly calibrated nuclear testing devices. A correction for coarse particles may be made in accordance with AASHTO T 224. If, by such tests, the Engineer determines that the specified density and moisture conditions have not been attained, the Contractor shall perform additional work as may be necessary to attain the specified conditions.

At least one group of three in-situ density tests shall be carried out for each 500 m of each layer of compacted fill.

Rock

Density requirements will not apply to portions of embankments constructed of materials which cannot be tested in accordance with approved methods.

Embankment materials classified as rock shall be deposited, spread and leveled the full width of the fill with sufficient earth or other fine material so deposited to

fill the interstices to produce a dense compact embankment. In addition, one of the rollers, vibrators, or compactors meeting the requirements set forth in Subsection 106.2.1, Compaction Equipment, shall compact the embankment full width with a minimum of three complete passes for each layer of embankment.

104.3.4 Protection of Roadbed During Construction

During the construction of the roadway, the roadbed shall be maintained in such condition that it will be well drained at all times. Side ditches or gutters emptying from cuts to embankments or otherwise shall be so constructed as to avoid damage to embankments by erosion.

104.3.5 Protection of Structure

If embankment can be deposited on one side only of abutments, wing walls, piers or culvert headwalls, care shall be taken that the area immediately adjacent to the structure is not compacted to the extent that it will cause overturning of, or excessive pressure against the structure. When noted on the Plans, the fill adjacent to the end bent of a bridge shall not be placed higher than the bottom of the backfill of the bent until the superstructure is in place. When embankment is to be placed on both sides of a concrete wall or box type structure, operations shall be so conducted that the embankment is always at approximately the same elevation on both sides of the structure.

104.3.6 Rounding and Warping Slopes

Rounding-Except in solid rock, the tops and bottoms of all slopes, including the slopes of drainage ditches, shall be rounded as indicated on the Plans. A layer of earth overlaying rock shall be rounded above the rock as done in earth slopes.

Warping-adjustments in slopes shall be made to avoid injury in standing trees or marring of weathered rock, or to harmonize with existing landscape features, and the transition to such adjusted slopes shall be gradual. At intersections of cuts and fills, slopes shall be adjusted and warped to flow into each other or into the natural ground surfaces without noticeable break.

104.3.7 Finishing Roadbed and Slopes

After the roadbed has been substantially completed, the full width shall be conditioned by removing any soft or other unstable material that will not compact properly or serve the intended purpose. The resulting areas and all other low sections, holes or depressions shall be brought to grade with suitable selected material. Scarifying, blading, dragging, rolling, or other methods of work shall be performed or used as necessary to provide a thoroughly compacted roadbed shaped to the grades and cross-sections shown on the Plans or as staked by the Engineer.

All earth slopes shall be left with roughened surfaces but shall be reasonably uniform, without any noticeable break, and in reasonably close conformity with the Plans or other surfaces indicated on the Plans or as staked by the Engineer, with no variations therefrom readily discernible as viewed from the road.

104.3.8 Serrated Slopes

Cut slopes in rippable material (soft rock) having slope ratios between 0.75:1 and 2:1 shall be constructed so that the final slope line shall consist of a series of small horizontal steps. The step rise and tread dimensions shall be shown on the Plans. No scaling shall be performed on the stepped slopes except for removal of large rocks which will obviously be a safety hazard if they fall into the ditchline or roadway.

104.3.9 Earth Berms

When called for in the Contract, permanent earth berms shall be constructed of well graded materials with no rocks having a diameter greater than 0.25 the height of the berm. When local material is not acceptable, acceptable material shall be imported, as directed by the Engineer.

Compacted Berm

Compacted berm construction shall consist of moistening or drying and placing material as necessary in locations shown on the drawings or as established by the Engineer. Material shall contain no frozen material, roots, sod, or other deleterious materials. Contractor shall take precaution to prevent material from escaping over the embankment slope. Shoulder surface beneath berm will be roughened to provide a bond between the berm and shoulder when completed. The Contractor shall compact the material placed until at least 90 mass percent of the maximum density is obtained as determined by AASHTO T 99, Method C. The cross-section of the finished compacted berm shall reasonably conform to the typical cross-section as shown on the Plans.

Uncompacted Berm

Uncompacted berm construction shall consist of drying, if necessary and placing material in locations shown on the Plans or as established by the Engineer. Material shall contain no frozen material, roots, sod or other deleterious materials. Contractor shall take precautions to prevent material from escaping over the embankment slope.

104.4 Method of Measurement

The quantity of embankment to be paid for shall be the volume of material compacted in place, accepted by the Engineer and formed with material obtained from any source.

Material from excavation per Item 102 which is used in embankment and accepted by the Engineer will be paid under Embankment and such payment will be

deemed to include the cost of excavating, hauling, stockpiling and all other costs incidental to the work.

Material for Selected Borrow topping will be measured and paid for under the same conditions specified in the preceding paragraph.

104.5 Basis of Payment

The accepted quantities, measured as prescribed in Section 104.4, shall be paid for at the Contract unit price for each of the Pay Items listed below that is included in the Bill of Quantities. The payment shall continue full compensation for placing and compacting all materials including all labor, equipment, tools and incidentals necessary to complete the work prescribed in this Item.

Payment will be made under:

Pay Item Number	Description	Unit of Measurement
804 (1)a	Embankment from Structure Excavation	Cubic Meter
804(4)	Gravel Bedding	Cubic Meter

ITEM 900 - REINFORCED CONCRETE

900.1 Description

This Item shall consist of furnishing, placing and finishing concrete in buildings and related structures, flood control and drainage, ports, and water supply structures in accordance with this specification and conforming to the lines, grades, and dimension shown on the plans.

900.2 Materials Requirements

900.2.1 Portland Cement

This shall conform to the requirement of ITEM 700, Volume II (Blue Book), Hydraulic cement.

900.2.2 Concrete Aggregates

Concrete aggregate shall conform to the requirements of subsection 311.2.2 and 311.2.3 under Item 311 of Volume II, (Blue Book) and ASTM C 33 for lightweight aggregates, except that aggregates failing to meet these specifications but which have been shown by special test or actual service to produce concrete of adequate strength and durability may be used under method (2) of determining the proportion of concrete, where authorized by the Engineer.

Except as permitted elsewhere in this section, the maximum size of the aggregate shall be not larger than one-fifth (1/5) of the narrowest dimensions between sides of forms of the member for which the concrete is to be used nor larger than three-fourths of the minimum clear spacing between individual reinforcing bars or bundles of bars or pre-tensioning strands.

900.2.2.1 Aggregate Tests

Samples of the fine and coarse aggregates to be used shall be selected 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 aggregate to give the Engineer sufficient time to obtain the necessary samples and submit them for testing.

No aggregate shall be used until official advice has been received that it has satisfactorily passed all test, at which time written authority shall be given for its use.

900.2.3 Water

Water used in mixing concrete shall conform to the requirement of subsection 311.2.4 under Item 311, Part E of Volume II, (Blue Book).

900.2.4 Metal Reinforcement

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

Deformed & Plain Billet Steel Bars for concrete Reinforcement (ASTM A 615)

Bars for concrete Reinforcement AASHTO M 31

Deformed Rail - Steel and Plain

Bars for Concrete Reinforcement ASTM A 616

Deformed A x b - Steel and Plain

Bars for Concrete Reinforcement

ASTM A 617

If reinforcing bars are to be welded, these ASTM specifications shall be supplemented by requirements assuring satisfactory weldability.

Bar and rod mats for concrete reinforcement

ASTM A 187

Cold-Drawn Steel Wire for

(ASTM A 82)

concrete reinforcement

AASHTO M 32

Welded steel wire fabric

(ASTM A 185)

for concrete reinforcement

AASHTO M55

except that the weld shear strength requirement of those specification shall be extended to include a wire size differential up to and including six gages.

Wire and Strands for prestressed

ASTMA416

Concrete

ASTM A 421

Used in making strands for post-tensioning shall be cold- drawn and either stress-relieved in the case of uncoated strands, or hotdip galvanized in the case of galvanized strands.

High strength alloy steel bar for post- tensioning shall be proofstressed to 90 % of the granted tensile strength. After proofstressing, the bars shall conform to the following minimum properties:

Tensile strength f_s'

1000 MPa

Yield strength (0.2 offset)

0.90 f_s'

Elongation at rupture in

20 diameter

4 percent

Reduction of area at rupture

25 percent

Structural steel

ASTM A 36

Steel Pipe for concrete-filled

ASTM A 53

pipe columns

Cast-Iron Pipe for composite

ASTM A 377

columns

900.2.5 Admixtures

Air-entraining admixtures, if used, shall conform to ASTM C 260.

Water-reducing admixtures, retarding admixtures, water-reducing and retarding admixtures and water reducing and accelerating admixtures, if used, shall conform to the requirements of ASTM C 494.

900.2.6 Storage of Materials

Cement and aggregates shall be stored in such a manner as to prevent their deterioration or the intrusion of foreign matter. Cement shall be stored, immediately upon arrival on the site of the work, in substantial, waterproof bodegas, with a floor raised from the ground sufficiently high to be free from dampness. Aggregates shall be stored in such a manner as to avoid the inclusion of foreign materials.

900.3 Construction Requirements

Notations: The notations used in these regulations are defined as follows:

$f'c$ = compressive strength of concrete

F_{sp} = ratio of splitting tensile strength to square root of compressive strength.

900.3.1 Concrete Quality

All plans submitted for approval or used for any project shall clearly show the specified strength, $f'c$, of concrete of the specified age for which each part of the structure was designed.

Concrete that will be exposed to sulfate containing or other chemically aggressive solutions shall be proportioned in accordance with "Recommended Practice for Selecting Proportions for Concrete (ACI 613)" and Recommended Practice for Selecting Proportions for Structural Lightweight Concrete (ACI 613A)."

900.3.2 Methods of Determining the Proportions of Concrete

The determination of the proportions of cement, aggregate, and water to attain the required strengths shall be made by one of the following methods, but lower water-cement ratios may be required for conformance_ with the quality of concrete.

Method 1, Without preliminary test

Where preliminary test data on the materials to be used in the concrete have not

been obtained the water-cement ratio for a given strength of concrete shall not exceed the values shown in Table 900.1.' When strengths- in excess of 281 kilograms per square centimeter (4000 pounds per square inch) are required or when light weight aggregates or admixtures (other than those exclusively for the purpose of entraining - air) are used, the required water-cement ratio shall be determined in accordance with Method 2.

Method 2. For combination of materials previously evaluated or to be established by trial mixtures.

Water-cement ratios for strengths greater than that shown in Table I 900.1 may be used provided that the relationship between strength and water-cement ratio for the materials to be used has been previously established by reliable test data and the resulting concrete satisfies the requirements of concrete quality.

Where previous data are not available. Concrete trial mixtures having proportions and consistency suitable for the work shall be made using at least three different water-cement ratios (or cement content in the case of lightweight aggregates) which will produce a range of strengths encompassing those required for the work. For each water-cement ratio (or cement content) at least three specimens for each age to be tested shall be made, cured and tested for strength in accordance with ASTM C 39 and C 192.

The strength test shall be made at 7, 14 and 28 days at which the concrete is to receive load, as indicated on the plans. A curve shall be established showing the relationship between water-cement ratio (or cement content) and compressive strength. The maximum permissible water-cement ratio for the concrete to be used in the structure shall be that shown by the curve to produce an average strength to satisfy the requirements of the strength test of concrete provided that the water-cement ratio shall be no greater than that required by concrete quality when concrete that is to be subjected to the freezing temperatures which weight shall have a water-cement ratio not exceeding 6 gal per bag and it shall contain entrained air.

Where different materials are to be used for different portions of the work, each combination shall be evaluated separately.

TABLE 900.1 MAXIMUM PERMISSIBLE WATER-CEMENT RATIOS FOR CONCRETE (METHOD NO.1)

Specified compressive strength at 28 days, psi fc	Maximum permissible water-cement ratio			
	Non air-entrained concrete		Air-entrained concrete	
	U.S. gal. per 42.6	Absolute ratio by	U.S. gal per 42.6	Absolute ratio

	kg. bag of cement	weight	kg. bag of cement	weight
2500	7 ¼	0.642	6 ¼	0.554
3000	6 ½	0.576	5 ¼	0.465
3500	5 ¾	0.510	4 ½	0.399
4000	5	0.443	4	0.354

900.3.3 Concrete Proportions and Consistency

The proportions of aggregate to cement for any concrete shall be such as to produce a mixture which will work readily into the corners and angles of the form and around reinforcement with the method of placing employed on the work, but without permitting the materials to segregate or excess free water to collect on the surface. The methods of measuring concrete materials shall be such that the proportions can be accurately controlled and easily checked at any time during the work.

900.3.4 Sampling and Testing of Structural Concrete

As work progress, at least one (1) set of sample consisting of three (3) concrete cylinder test specimens, 150 x 300 mm shall be taken from each class of concrete placed each day, and each set to represent not more than 75 cu m of concrete.

900.3.5 Consistency

Concrete shall have a consistency such that it will be workable in the required position. It shall be such a consistency that it will flow around reinforcing steel but individual particles of the coarse aggregate when isolated shall show a coating or mortar containing its proportionate amount of sand. The consistency of concrete shall be gauged by the ability of the equipment to properly placed it and not by the difficulty of mixing water shall be determined by the Engineer and shall not be varied without his consent. Concrete as dry as it is practical to place with the equipment specified shall be used.

900.3.6 Strength Test of Concrete

When strength is a basis for acceptance, each class of concrete shall be represented by at least five test (10 specimens). Two specimens shall be made for each test at a given age, and not less than one test shall be made for each 150 cu yd of structural concrete, but there shall be at least one test for each days concreting. The Building Official may require a reasonable number of additional tests during the progress of the work. Samples from which compression test specimens are molded shall be secured in accordance with ASTM C 172. Specimens made to check the adequacy of the proportions for strength of concrete or as a basis for acceptance of concrete shall be made and laboratory-cured in accordance with ASTM C 31. Additional test specimens cured entirely under field conditions may be required by the Building Official to check the adequacy of curing and protection of the concrete. Strength tests shall be made in accordance with ASTM C 39.

The age for strength tests shall be 28 days or, where specified, the earlier age at which the concrete is to receive its full load or maximum j stress. Additional test may be made at earlier ages to obtain advance information on the adequacy of strength development where 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 this chapter, the average of any five consecutive strength tests of the laboratory-cured specimens representing each class of concrete shall be equal on or greater than the specified strength, f_c' , and not more than 20 percent of the strength test shall have values less than that specified.

2. For structures designed in accordance with the ultimate strength design method of this chapter, 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 specimens cured on the job are intended to indicate 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, the contractor may be required to improve the procedures for protecting and curing the concrete, or when test of field-cured cylinders indicate deficiencies in protection and curing, the Engineer may require test in accordance with ASTM Specification C 42 or order load tests as outlined in the load tests of structures for

that portion of the structure where the questionable concrete has been placed.

900.3.7 Splitting Tensile Test of Concrete

To determine the splitting ratio, F_{sp} , for a particular aggregate, test of concrete shall be made as follows:

1. Twenty four (24) 15 cm. dia. by 30 cm long (6 in. dia. by 12 in. 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 23C (73F) and 50 percent relative humidity, eight of the test 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 determine in accordance with ASTM C 496, and compressive strength in accordance with ASTM C 39.

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

Minimum Strength, Concrete other than fill, shall have a minimum compressive strength at 28 days of 140 kilograms per square centimeter (2000 psi).

900.3.8 Batching

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

900.3.9 Mixing and Delivery

Mixing and delivery shall conform to the requirements of Item 405, Structural Concrete.

900.4 Concrete Surface Finishing: General

This shall be in accordance with Item 407, Concrete Structures.

900.5 Curing Concrete (See subsection 407)

900.6 Acceptance of Concrete

The strength of concrete shall be deemed acceptable if the average of 3 consecutive strength test results is equal to or exceed the specified strength and no individual test result falls below the specified strength by more than 15 %.

Concrete deemed to be not acceptable using the above criteria may be rejected unless contractor can provide evidence, by means of core tests, that the quality of concrete represented by the failed test result is acceptable in place. Three (3) cores shall be obtained from the affected area and cured and tested in accordance with AASHTO T24.

Concrete in the area represented by the cores will be deemed acceptable if the average of cores is equal to or at least 85 % and no sample core is less than 75 % of the specified strength otherwise it shall be rejected.

900.7 Method of Measurement

The quantity of concrete to be paid shall be the quantity shown in the Bid Schedule, unless changes in design are made in which case the quantity shown in the Bid Schedule will be adjusted by the amount of the change for the purpose of payment. No deduction will be made for the volume occupied by the pipe less than 101 mm (4") in diameter nor for reinforcing steel. anchors, weepholes or expansion materials.

900.8 Basis of Payment

The accepted quantities of structural concrete completed in place will be paid for at the contract unit price for cubic meter as indicated on the Bid Schedule.

Pay Item Number	Description	Unit of Measurement
900(1)	Structural Concrete for Footing Tie Beam, Column, Suspended Slab, Girder/Beam (Class A 28 days)	Cu.m.

900(1)c2	Structural Concrete for Footing & Slab on Fill (Class A 28 days)	Cu.m.
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Such prices and payment shall be full compensation for furnishing all materials, including metal water stops, joints, joint fillers, weep holes, and rock backing and timber bumpers; for all form and false work; for mixing, placing, furnishing, and curing the concrete; and for all labor, materials, equipment, tools and incidentals necessary to complete the item, except that reinforcing steel shall be paid for at the contract unit price per kilogram for reinforcing steel metal pipes and drains, metal conduits and ducts, and metal expansion angles shall be paid for as structural steel that when the proposal does not include an item for structural steel these miscellaneous metal parts shall be paid for as reinforcing steel.

ITEM 902 – REINFORCING STEEL BARS

404.1 Description

This Item shall consist of furnishing, bending, fabricating and placing of steel reinforcement of the type, size, shape and grade required in accordance with this Specification and in conformity with the requirements shown on the Plans or as directed by the Engineer.

404.2 Material Requirements

Reinforcing steel shall meet the requirements of item 710, Reinforcing Steel and Wire Rope.

4.4.3 Construction Requirements

404.3.1 Order Lists

Before materials are ordered, 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 revisions 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

Bends and hooks 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 300mm in each directions, 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 the Plans by more than 6mm. 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 40mm. 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 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
	min. lap	min. lap	

Tension	24 bar dia	36 bar dia	300 mm
Compression	20 bar dia	24 bar dia	300 mm

In lapped splices, the bars shall be placed in contact and wired together. Lapped splices will not be permitted at locations where the concrete section is insufficient to provide 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.

404.4 Method of Measurement

The quantity of reinforcing steel to be paid for will be the final quantity placed and accepted in the completed structure.

No allowance will be made for tie-wires, separators, wire chairs and other material used in fastening the reinforcing steel in place. If bars are substituted upon the Contractor's request and approved by the Engineer and as a result thereof more steel is used than specified, only the mass specified shall be measured for payment.

No measurement or payment will be made for splices added by the Contractor unless directed or approved by the Engineer.

When there is no item for reinforcing steel in the Bill of Quantities, costs will be considered as incidental to the other items in the Bill of Quantities.

404.5 Basis of Payment

The accepted quantity, measured as prescribed in Section 404.4, shall be paid for at the contract unit price for Reinforcing Steel which price and payment shall be full compensation for furnishing and placing all materials, including all labor, equipment, tools and incidentals necessary to complete the work prescribed in this Item.

Payment will be made under:

Pay Item Number	Description	Unit of Measurement
902(1)	Reinforcing Steel Bars	Kilogram

ITEM 903(2) – FORMS AND FALSEWORKS

903.01 Description

This Item shall consist of furnishing, assembling and placing of forms and scaffoldings

of the type, size, shape and grade required in accordance with this Specification and in conformity with the requirements shown on the Plans or as directed by the Engineer.

9033.02 Material Requirements

Marine Plywood (1/4" or 1/2") for forms or equivalent or as approved by the engineer and Lumber or steel scaffoldings or a combination hereof were the materials required under this section.

9033.03 Basis of Payment

The accepted quantity, measured as prescribed in this Section , shall be paid for at the contract unit price for Forms and Scaffoldings which price and payment shall be full compensation for furnishing and placing all materials, including all labor, equipment, tools and incidentals necessary to complete the work prescribed in this Item.

Payment will be made under:

Pay Item Number	Description	Unit of Measurement
903(2)	Forms and Falseworks	Sq.m.

ITEM 1002-PLUMBING

1002.1 Description

This Item shall consist of furnishing all materials, tools, equipment and fixtures required as shown on the Plans for the satisfactory performance of the entire plumbing system including installation in accordance with the latest edition of the National Plumbing Code, and this Specification.

1002.2 Material Requirements

All piping materials, fixtures and appliances fitting accessories whether specifically mentioned or not but necessary to complete this Item shall be furnished and installed.

1002.2.1 Cast Iron Soil Pipes and Fittings

a. Pipes and fitting materials shall comply with the specification requirements defined in PNS/SAO 4-1: 1974. The material description and standards of manufacture are herein described:

1. Cast Iron - the casting shall be made of gray iron which shall be sound, free from cracks, sand holes and blow holes. They shall be uniformly low hardness that permits drilling and cutting by ordinary methods. Pipes and fittings shall be true to pattern and of compact closed grained structure.

2. Quality of Iron - the iron shall be made by the cupola, air furnace, electric furnace or other processes which shall be checked by regular chemical and physical control test. The resultant shall be gray iron of good quality.

3. Manufacture - the pipes shall be made with hub and spigot ends or hub ends only. All hubs for pipes and fittings shall be provided with held lead grooves and all spigot ends shall be made with beads or plain if machine cast centrifugally. Plugs shall be wrought or cast, machined to the dimensions required and shall be free from defects.

4. Freedom from defects - pipes and fittings shall be true, smooth and cylindrical, their inner and outer surfaces being as nearly concentric as practicable. They shall be in all aspects, sound and good casting free from laps, pin holes or other imperfections and shall be neatly dressed and carefully fettled. The ends shall be finished reasonably square to their axes.

b. Clean-outs shall be made of heavy cast brass ferrule with counter sunk screw cover same diameter as the pipe except that they shall not be larger than 100mm diameter.

c. Caulking lead shall be of molten type peg lead conforming to specification requirements defined in ASTM 8-29.

d. Oakum shall be twisted or braided hemp or abaca fibers slightly impregnated with oil.

1002.2.2 WATER SUPPLY Pipes and Fittings

a. Pipes shall be galvanized iron pipe schedule 40 conforming to specification requirements defined in ASTM A-120 with threaded connection. Under roads where necessary shall be suitably protected as shown on the Plans.

Fittings shall be malleable iron Type II, galvanized iron conforming to specification requirements defined in ASTM A338.

b. Valves

Valves for water supply shall be bronze body with threaded ends rated 21.0 kgf/cm. square, All valves shall be gate valves unless otherwise specified. Gate valves shall have solid wedge body and discs conforming to specification requirements defined in ASTM 8-62. Globe valves shall have plug type discs with ferrule threaded ends and bronze body.

c. Unions

Unions on ferrous pipe 50mm in diameter and smaller shall be malleable iron.

d. Water Meter

Water meter where required to be furnished by the Contractor shall be of the type tested and approved by MWSS.

1002.2.3 Approved Alternate Pipes and Fittings

Pipes and fittings for sanitary and potable water lines as approved alternate shall be Un plasticized Polyvinyl Chloride Pipes and Fittings (UPVC).

Pipes and fittings shall be made of virgin materials conforming to specification

requirements defined in ASTM 0-2241 and PNS 65: 1986. Fittings shall be molded type and designed for solvent cement joint connection for water lines and rubber O-ring seal joint for sanitary lines.

1002.2.4 Septic Tank

The septic tank shall be provided as shown on the Plans including all pipe vents and fittings. The various construction materials such as concrete masonry work shall conform to the corresponding Items of these Specifications. Inlet and outlet pipes shall conform to the latest edition of the National Plumbing Code.

1002.2.5 Plumbing Fixtures and Fittings

All fittings and trimmings for fixtures shall be chromium-plated and polished brass unless otherwise approved. Exposed traps and supply pipes for fixtures shall be connected to the roughing in, piping system at the wall unless otherwise indicated on the Plans. Built-in fixtures shall be watertight with provision of water supply and drainage outlet, fittings and trap seal. Unless otherwise specified, all plumbing fixtures shall be made of vitreous china complete with fittings.

a. Water closet shall be vitreous china, free standing toilet combination, round front bottom outlet symphonic wash down bowl with extended rear self and closed coupled tank with cover complete with fittings and mounting accessories. Model make and color shall be submitted for approval prior to delivery at jobsite by the Engineer.

b. Lavatory shall be vitreous china, wall-hung with rear overflow and cast-in soap dishes, pocket hanger with integral china brackets, complete with twin faucets, supply pipes, P-trap and mounting accessories. Where indicated on the Plans to be counter top model make and color shall be approved by the Engineer.

c. Urinal shall be china vitreous, wall-hung wash-out urinal with extended shields and integral flush spreader, concealed wall-hanger pockets, 19mm top spud complete with fitting and mounting accessories. Model make and color shall be approved by the Engineer.

1002.2.6 Bathroom and Toilet Accessories

a. Shower head and fitting shall be movable, cone type with escutcheon arm complete with stainless steel shower valve and control lever, all exposed surface to be chromium finish.

b. Grab bars shall be made of tubular stainless steel pipe provided with safety grip and mounting flange.

c. Floor drains shall be made of stainless steel beehive type, measuring 100mm x 100mm, and provided with detachable stainless strainer, expanded metal lath type.

d. Toilet paper holder shall be vitreous china wall mounted. Color shall reconcile with the adjacent fixture and facing tiles.

e. Soap holder shall be vitreous china wall mounted. Color shall reconcile with the adjacent tile works.

f. Faucet(s) shall be made of stainless steel for interior use.

g. Hose-bib(s) shall be made of bronze cast finish.

1002.2.7 Special Plumbing Fixtures

a. Kitchen sink shall be made of stainless steel self rimming, single compartment complete with supply fittings, strainer traps, dual control lever and other accessories.

b. Laboratory sink shall be made of cast iron metal with white porcelain finish with single compartment, flat rim ledge, 762mm x 533mm complete with supply fittings, strainer, trap and other accessories.

c. Scrub-up sink shall be made of cast iron metal with white porcelain finish measuring 610mm x 610mm complete with supply fittings, strainer, trap and wall mounting accessories.

d. X-ray developing tank shall be made of cast iron white porcelain finish with three (3) compartment x-ray processing tank, drain plug, open standing drain, 19mm IPS inlet spud complete with stand and mounting accessories.

e. Squat bowl(s) shall be vitreous china, wash down squat bowl with integral foot treads, pail flush type. Color, make and type to be approved by the Engineer.

f. Grease traps shall be made of cast bronze with detachable cover and mounting accessories.

1002.2.8 Roof Drains, Downspout, Overflow Pipes and Steel Grating

The Contractor shall provide, fit and/or install necessary drains with strainers, where shown on the Plans. Each drain with strainer shall fit the size of the corresponding downspout (or roof leader) over which it is to be installed and in conformity with the following schedule:

a. Scrapper drains (for balconies, parapet) shall be made of bronze base with flashing. Flange threaded outlet and convex with integral flashing clamp bolted to flange.

b. "Josam" type drains shall be made of bronze base semi-dome with large free area,

flashing clamp and integral gravel stopper. To be used at roof decks, canopies, gutters, and elsewhere indicated on the Plans.

c. Downspouts when encased in concrete, unless otherwise shown on the Plans shall be polyvinyl chloride (PVC). Whether indicated or specified to be cast iron or galvanized iron the same shall meet the specification requirement as herein described.

d. Overflow pipes shall be made of galvanized iron pipe measuring at least 13mm

diameter and spaced 200mm on center.

e. Steel grating shall be made of wrought iron metals of design on shop drawings approved and surfaces to be coated with shop finish.

1002.2.9 Fire Protection System

- a. Fire hose cabinets shall be locally available consisting of 38mm diameter valve hose rack with nipple 30mm rubber lined hose cable with standing 4268 kg/cm square, nozzle 38mm diameter brass, chromium plated.
- b. Fire standpipe system shall consist of risers and hose valves. Pipe shall be extra strong black iron. Valves to be high grade cast bronze mounted withstanding 79.40 kg. working pressure as indicated on the Plans.
- c. Fire extinguisher shall be portable, suitable for Class A, B, C fires, mounted inside cabinet. Cabinet shall be full flush mounting door with aluminum trim for glass plate, frame and box shall be made of gauge 14 galvanized iron sheet with white interior and red exterior baked enamel finish over primer. Cabinet to be wall mounted and size to be able to accommodate the defined components.
- d. Yard hydrant where shown on the Plans shall match the Integrated Fire Department requirements. Outlet shall be single 63mm diameter gate valves with chain connected caps.

1002.2.10 Built-in appliances such as urinal trough, lavatory and slope sink shall be made as indicated on the Plans, exposed surfaces to be tile wainscoting Complete with fitting accessories required as practiced in this specialty trade.

1002.3 Construction Requirement

The Contractor before any installation work is started shall carefully examine the Plans and shall investigate actual structural and finishing work condition affecting all his work. Where actual condition necessitates a rearrangement of the approved pipe layout, the Contractor shall prepare Plan(s) of the proposed pipe layout for approval by the Engineer.

1002.3.1 Installation of Soil, Waste, Drain and Vent Pipes

a. All cast iron soil and drainage pipes shall be pitch 6mm per 300mm but in no case flatter than 3mm per 300mm.

b. Horizontal lines shall be supported by well secured length heavy strap hangers. Vertical lines shall be secured strongly by hooks to the building frame and a suitable brackets or chairs shall be provided at the floor from which they start.

c. All main vertical soil and waste stacks shall be extended full size to and above the roof line to act as vents, except otherwise indicated on the Plans.

d. Vent pipes in roof spaces shall be run as close as possible to underside of roof with horizontal piping pitched down to stacks without forming traps. Vertical vent pipes may be connected into one main vent riser above the highest vented fixtures.

e. Where an end or circuit vent pipe from any fixtures is connected to a vent line serving other fixtures, the connections shall be at least 1.20 m above the floor on which the fixtures are located.

f. Horizontal waste line receiving the discharge from two or more fixtures shall be provided with end vents unless separate venting of fixtures is noted on the Plans.

g. All changes in pipe sizes on soil and waste lines shall be made with reducing fittings or recessed reducers. All changes in directions shall be made by appropriate use of 45 degree wyes, half wyes, long sweep quarter bends or elbows may be used in soil and waste lines where the change in direction of flow is from the horizontal to the vertical and on the discharge from waste closets. Where it becomes necessary to use short radius fittings in other locations the approval of the Engineer shall be obtained prior to installation of the same.

h. All joints of cast iron pipes in bell and spigot shall be firmly packed with oakum or hemp and caulked with pig lead at least 25 mm deep.

i. Cleanouts at the bottom of each soilstack, wastestack, interior downspout and where else indicated shall be the same size as the pipe up to and including 102 mm . 152 mm, for larger pipes.

Cleanouts on floors shall be cast iron ferrule caulked into cast hub and fitted with cast brass screw plug flush with floor. Cleanouts for threaded pipes shall be installed at the foot of soil, waste and drain stacks and on each building drain outside the building.

j. Vent pipe shall be flashed and made watertight at the roof with ferrule lead sheet. Flashing shall be turned down into pipes.

k. Each fixtures and place of equipment requiring connection to the drainage system except fixtures with continuous waste shall be equipped with a trap. Each trap shall be placed as near to the fixture as possible. Traps installed on threaded pipe shall be recessed drainage pattern.

l. Overhead horizontal runs of pipes shall be hung with adjustable wrought iron pipe hanger spaced not over 3.04 m apart except hub and spigot soil pipe which shall have hanger spaced not over 1.50 m apart and located near a hub.

1002.3.2 Water Pipes, Fittings and Connections.

All water pipings inside the building and underground, 100 mm.diameter and smaller shall be galvanized iron threaded pipe with malleable iron fittings.

a. The water piping shall be extended to 'all fixtures, outlets, and equipment from the gate valves installed in the branch near the riser.

b. The cold water system shall be installed with a fall towards a main shutoff valve and drain. Ends of pipes and outlets shall be capped or plugged and left ready for future connections.

c. Mains and Branches

1.All pipes shall be cut accurately to measurements and shall be worked into place without springing or forcing. Care shall be taken so as not to weaken the structural portions of the building.

2.All piping above the ground shall be run parallel with the lines of the building unless otherwise indicated on the Plans.

3.All service pipes, valves and fittings shall be kept at sufficient distance from other work to permit finished covering not less than 12.5mm from such work or from finished covering on the different service.

4.No water piping shall be buried in floors, unless specifically indicated on the Plans and approved by the Engineer.

5.Changes in pipes shall be made with reducing fittings.

d. Drain Cocks

1. Pipe drain indicated on the drawings shall consist of 12 mm globe valve with renewable disc and installed at low points on the cold water piping so that all piping shall slope 100 mm in 30.5 m.

e. Threaded Pipe Joints

1. All pipes shall be reamed before threading. All screw joints shall be made with graphite and oil or with an approved graphite compound applied to make threads only. Threads shall be full cut and not more than three threads on the pipe shall remain exposed.

f. Expansion and Contraction of Pipes

Accessible contraction-expansion joints shall be made whenever necessary. Horizontal runs of pipe over 15m in length shall be anchored to the wall to the supporting structure about midway on the run to force expansion and contraction equally toward the ends or as shown on the Plans.

g.Fire Standpipe System

Fire standpipe system shall consist of risers and hose valve. Pipe shall be extra strong black iron. Valves to be underwriter's approval high grade cast bronze mounted.

h. Valves and Hose Bibs

1.Valves shall be provided on all supplied fixture as herein specified.

2.The cold water connections to the domestic hot water heater shall be provided with gate valves and the return circulation connection shall have gate and a check valve.

3.All connection to domestic hot water heaters shall be equipped with unions between valve and tanks.

4.Valve shall not be installed with its stem below the horizontal. All valves shall be gate valves unless otherwise indicated on the Plans.

5.Valves up to and including 50 mm diameter shall be threaded ends, rough bodies and finished trimmings, except those on chromium plated brass pipe.

6.Valves 63 mm in diameter and larger shall have iron bodies, brass mounted and shall have either screws or flange ends.

7.Hose bibs shall be made of brass with 12.5 mm inlet threads, hexagon shoulders and 19 mm male.

1002.3.3 Fixtures, Equipment and Fastenings

a.All fixtures and equipment shall be supported and fastened in a safe and satisfactory workmanship as practiced.

b.All fixtures, where required to be wall mounted on concrete or concrete hollow block wall, fasten with brass expansion bolts. Expansion bolts shall be 6 mm diameter with 20 mm threads to 25 mm into solid concrete, fitted with loose tubing or sleeves of proper length to acquire extreme rigidity.

c.Inserts shall be securely anchored and properly flushed into the walls. Inserts shall be concealed and rigid.

d.Bolts and nuts shall be horizontal and exposed. It shall be provided with washers and chromium plate finish.

1002.3.4 Pipe Hangers, Inserts and Supports

a.Pipe hangers shall be wrought iron or malleable iron pipe spaced not more than 3m apart for horizontal runs or pipe, except hub and spigot soil pipe which shall have hanger spaced not over 1.50 m apart located near the hub.

b. Chains, straps perforated turn-buckles or other approved means of adjustment except the' turn-buckles may be omitted for hangers on sailor waste lines or individual toilet rooms to maintain stacks when spaced does not permit.

c. Trapeze hangers may be used in lieu of separate hangers on pipe running parallel to and close to each other.

d. Inserts shall be cast steel and shall be of type to receive a machine bolt or nut after installation. Insert may be permitted adjustmentof the bolts in one horizontal direction and shall be installed before pouring of concrete.

e.Wrought iron clamps or collars to support vertical runs of pipe shall be spaced not more than 6 m apart for as indicated on the Plans.

1002.3.5 Plates and Flashing

a. Plates to cover exposed pipes passing through floor finished walls or ceiling shall be fitted with chromium plated cast brass plates or chromium plated cast iron or steel plates on ferrous pipes.

b. Plates shall be large enough to cover and close the hole around the area where pipes pass. It shall be properly installed to insure permanence.

c. Roof areas penetrated by vent pipes shall be rendered watertight by lead sheet flashing and counter flashing. It shall extend at least 150 mm above the pipe and 300 mm along the roof.

1002.3.6 Protection and Cleaning

a. During installation of fixtures and accessories and until final acceptance, protect items with strippable plastic or other approved means to maintain fixtures in perfect conditions.

b. All exposed metal surfaces shall be polished clean and rigid of grease, dirt or other foreign materials upon completion.

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

1002.3.7 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 Engineer to insure compliance with all requirements of all Codes and Regulations referred to in this Specification.

1002.3.7.1 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 102 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 3.00 m highest horizontal line to be tested may be installed and filled with water to maintain sufficient pressure or water pump may be used to supply the required pressure.

d. If and when the Engineer decides that an additional test is needed, such as an air to 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 pressure 1 1/2 times the expected working pressure in the system during operation and remained tight and leak-proofed.

b. Where piping system is to be concealed the piping system shall be separately in manner similar to that described for the entire system and in the presence of the Engineer or his duly designated representative.

1002.3.7.3 Defective Work

a. All defective materials replaced and tested will be repeated until satisfactory performance is attained.

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

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

1002.3.7.3 Disinfection

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

b. Disinfection materials shall be liquid chlorine or hypochlorite and shall be introduced in a manner approved as practiced 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 for 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 with all as-built changes shown on the drawings in a neat workmanship manner. Such prints shall show changes or actual installation and conditions of the plumbing system in comparison with the original drawings.

1002.4 Method of Measurement

The work done under this Item shall be quantified per length and/or number of units as provided in the Bill of Quantities, tested and accepted to the satisfaction of the Engineer.

1002.5 Basis of Payment

The quantified items, installed in place shall be the basis for payment based from the unit bid price for which prices and payments shall constitute full compensation including labor, materials and incidentals necessary to complete this Item.

Payment shall be made:

Pay Item Number	Description	Unit of Measurement
1002	Plumbing Works (Tank on Grade to Elevated Water Tank)	Ln.m.
ITEM 1016 - WATERPROOFING		
1016.1 Description		
<p>This Item shall consist of furnishing all waterproofing materials, labor, tools, equipment and other facilities and undertaking the proper installation works required as shown on the Plans and in accordance with this Specification.</p>		
1016.2 Material Requirements		
1016.2.1 Cement-base Waterproofing		
<p>1016.2.1.1 Cement-base waterproofing powder mix shall be cement-base, aggregate type, heavy duty, water-proof coating for reinforced concrete surface and masonry exposed to water. The aggregates are graded and sized so as to mesh perfectly and are selected for purity, hardness, strength and are non-metallic. When mixed with other ingredients are free flowing, water-proof coatings that possesses strength durability and density.</p>		
<p>1016.2.1.2 Additive binders shall be of special formulation of acrylic polymers and modifiers in liquid form used as additive with cement-base powder mix that improves adhesion and mechanical properties.</p>		
<p>1016.2.1.3 Water shall be clean, clear and potable.</p>		
1016.2.2 Membrane Waterproofing		
<p>1016.2.2.1 Primer shall be of asphalt cold applied, free from water and other foreign matters, and shall conform to the specifications requirement defined in ASTM 0-41.</p>		
<p>1016.2.2.2 Built-up membrane shall be made of smoothly woven fibers that are impervious to acid, heat, and dampness and totting. It should permit complete penetration of asphalt compound or bituminous coating in the woven glass fiber.</p>		
<p>1016.2.2.3 Preformed membrane shall be self-sealing flexible cold applied bituminous sheets bonded to 0.15 mm thick polyethylene film.</p>		
1016.2.2.4 Mopping Materials		

a) Type A soft adhesive self-sealing asphalt for structure below ground level.

b) Type B where asphalt is not exposed on temperature exceeding 51.7 Celsius for structure above ground level.

c) Type C where asphalt is exposed on vertical surface in direct sunlight or above temperature of 51.7 Celsius structure above ground level.

1016.2.3 Liquid waterproofing alternate material shall be of elastomeric or other substances applied in liquid form and cured to an impervious membrane.

1016.2.3 Hydrolithic Waterproofing

a) Hydrolithic waterproofing mix shall be of heavy cement-based coating compatible to reinforced concrete wall. It must prevent built-up of water vapor which causes blistering, flaking and peeling of paint films.

b) Material must thoroughly fill and seal pores and voids that it can be used against water pressure on the interior surface of walls below grade.

1016.3 Construction Requirements

Roof decks, balconies, toilet and bathrooms, gutters, parapet walls and other areas indicated on the plans to be waterproof shall first be rendered with cement-based waterproofing before any type of waterproofing is applied.

1016.3.1 Surface Preparation

1016.3.1.1 Concrete surface to be applied with waterproofing shall be structurally sound, clean and free of dirt, loose mortar particles, paints films oil, protective coats, efflorescence laitance, etc.

1016.3.1.2 All defects shall be properly corrected and carefully formed to provide a smooth surface that is free of marks and properly cured prior to application works.

1016.3.1.3 Inside corners where vertical and horizontal structure meet shall be provided with cants measuring 50 mm by 50 mm or rounded at corners a minimum of 50 mm radius.

a) Concrete slabs shall be properly graded to drain rainwater. Provide a minimum pitch of 1 on

100 satisfactorily drain rainwater freely into the drainage lines, gutters and downspouts.

b) Drainage connections and weep holes shall be set to permit the free flow of water.

c) Any expansion and contraction joints shall be cleaned, primed, fitted with a

backing rod and caulked with sealant.

d) Provide reglets of about 40 mm deep by 40 mm wide and 250 mm above floor finish along walls or parapets for the termination of the membrane.

e) Prepared surfaces shall be cured and kept wet by sprinkling with water at regular intervals for a period of at least three days and allow surface to actually set within seven days.

f) Ensure that the prepared surface has completely set and all defects repaired.

g) When there is reasonable doubt as to the presence of moisture in the surface to be applied with membrane expose that same direct to sunlight for another 2 days or heat all suspected area using blow torch.

1016.3.2 Preformed or built-up membrane

1016.3.2.1 Application procedure

a) Prior to application of membrane concrete surfaces should be sound and cured without the use of curing compound. Apply a coat of concrete neutralizer to remove oil dirt's and other contaminants.

b) Apply asphalt primer at the rate of one gallon per 100 square feet evenly by spraying or by paint brush.

c) Application shall be done one direction strip by and overlapping each other to assure uniform thickness.

d) Allow primer to dry until it is ready to receive next coat or layer as specified in the manufacturing instructional manual.

e) As soon as primer coating is workable, lay a single layer of preformed or built-up membrane smoothly free from irregularities and folds.

f) Lay preformed or built up membrane conforming to size and shape of the surface area to be covered.

g) Carefully lay side and end laps in order to assure an even thickness throughout the whole, surface area to be covered.

h) When the whole surface area is completely covered apply a single coat of asphalt primer at the rate of 3 to 4 gallons per (100 square feet).

i) Meshes of treated woven glass fibers shall not be completely closed or sealed by the primer coat, but shall sufficiently open to allow successive mopping of the ply material to seep through.

j) Cover ply not more than the minimum amount of surfacing necessary to prevent sticking on ply.

k) After application surface shall be uniformly smooth, free from irregularities folds and knots.

l) Repeat the procedures until 5 plies have been satisfactorily installed or as many layers required or specified in the plans.

m) Where weather disturbance interrupt the work and exposing the membrane to moisture remove the layer exposed to moisture and repeat procedure until completion of the process.

1016.3.2.2 Protective Coatings

a) Where laying of the built-up or preformed membrane conforms with the number of plies required as shown on the plans lay a mixture or sand mastic in the proportion of one part asphalt or bituminous material and four parts coarse screened sand by volume. With a steel trowel at an average of 3 mm thick over the surface of membrane.

b) Then at the rate of one gallon per (100 square feet) apply aluminum heat reflecting finish thoroughly over the dried sand mastic coating.

1016.3.2.3 Metal Cap Flashing

a) Provide cap flashing gauge 24 plain G.I. where shown on the Plans.

b) Where cap flashing is connected to preformed lock in through-wall form upper edge' of cap flashing to engage .in preformed lock. Mallet lock down tight to provide a spring action against base flashing.

c) Then at the rate of one gallon per (100 square feet) apply aluminum heat reflecting finish thoroughly over the dried sand mastic coating.

d) Where cap flashing is terminated in raked joints or in prepared masonry or stone reglet fasten flashing with wedge every 12 inches and fill reglet on vertical surfaces continuous with plastic cement and on horizontal surfaces, continuous with molten lead.

1016.3.3 Membrane Waterproofing Cement Topping

a) Provide concrete cement topping of at least 50 mm thick on the membrane after five days where protective coatings has been applied.

b) Concrete cement topping should be class "A" with 9 mm pea gravel and preferably provided with 2-way 6 mm dia. temperature steel bars.

1016.3.4 Liquid Waterproofing as Membrane

Before any coat of liquid waterproofing is applied concrete cement surface shall conform to the requirement defined in sub-section 1017.3.1.1.

1016.3.4.1 Application procedure

a) Prior to application of membrane concrete surfaces should be sound and cured without the use of curing compound. Apply a coat of concrete neutralizer to removed oil, dirt and other contaminants.

b) Apply a primer coat of elastomeric coating standard of the manufacturer at the rate of 1/3 gallon per 9.28 meter square 100 square feet over the surface area to be applied.

c) After the primer coat has dried penetrating and sealing the concrete surface areas coated apply 25 dry mills of coating at the rate of one gallon per 100 square meters for 3 coatings on the same concrete surface areas coated with liquid waterproofing.

d) The concrete surface areas coated shall be allowed to dry in twenty four hours if relative humidity is above 4.44 Celsius.

e) Liquid waterproofing membrane may be applied by paint brushairless spray, notched trowel, squeegee or roller preferably 20-25 mills maximum thickness each wet coat.

1016.3.4.2 Precaution

a) Liquid waterproofing membrane should not be applied unless the ambient temperature is 4.44 Celcius or higher and should not proceed during inclement weather condition.

b) Extra care shall be observed by persons doing the application works especially those that have skin sensitiveness must wear gloves while applying the liquid waterproofing. The liquid water-proofing membrane compound is highly combustible.

1016.3.5 Protection of membrane waterproofing surfaces in general.

a) Concrete topping in situation where it is desirable to have a bond between membrane waterproofing and topped slab it is recommended that the concrete topping be placed as the membrane dries, usually 48 hours after final coat is applied.

b) If a bond is not required, the membrane should be protected with asphalt asbestos board or asphalt felt paper such time as topping or concrete covering is applied. Prior to topping or placing concrete covering the membrane shall be inspected and initiate repair work where necessary.

c) Exposed membrane surfaces at concrete gutters and areas not frequently disturbed may be allowed.

d) Membrane waterproofing at basement shall be covered and, 'protected' by installing tightly butted asphalt impregnated protection boards with a minimum thickness of 6 mm and preferably 12 mm on horizontal areas.

All projections and pipes must be protected with asbestos cloth approximately 6 mm thick. Install the bituminous paving with extra care to avoid damage, lift or curl the underlying protection boards.

1016.4 Method of Measurement

This Item shall be measured in square meters for areas actually rendered with membrane waterproofing and number of packages for integrally waterproofed areas accepted to the satisfaction of the Engineer.

1016.5 Basis of Payment

The accepted quantities, measured as prescribed in Section 1017.4 shall be paid for at the Contract unit price for integral and membrane waterproofing work which price and payment shall be full compensation for furnishing and applying integral and membrane waterproofing materials including the use of equipment and tools, labor and incidentals necessary to complete the work.

Pay Item Number	Description	Unit of Measurement
1016 (a)	Cement-base waterproofing	m ²

ITEM 1018 - CERAMIC TILES

1018.1 Description

This Item shall consist of furnishing all ceramic tiles and cementitious materials, tools and equipment including labor required in undertaking the proper installation of walls and floor tiles as shown on the Plans and in accordance with this Specification.

1018.2 Material Requirements

1018.2.1 Ceramic tiles and trims shall be made of clay, or a mixture of clay and other materials which is called the body of the tile. Tile bodies are classified by ASTM C 242 as to their degree of water absorption. Ceramic tiles and trims are manufactured either by dust-pressed process in which the clays are ground to dust mixed with a minimum of water shaped in steel dies and then fired or by plastic process in which the clays are made plastic by mixing with water, shaped by extrusion or in molds and then fired.

1018.2.1.1 Glazed Tiles and Trims

Glazed tiles' and trims shall have an impervious face of ceramic materials fused onto the body of the tiles and trims. The glazed surface may be clear white or colored depending on the color scheme approved by the Engineer. Standard glazes may be bright (glossy) semimatte (Less glossy) matte (dull) or crystalline (mottled and textured; good resistance to abrasion). Glazed tiles are used principally for walls; crystalline glazed tiles may be used for floors provided however that these are used as light duty floors.

1018.2.1.2 Unglazed Tiles

Unglazed tiles shall be hard dense tile of homogeneous composition.

Its color and characteristics are determined by the materials used in the body, the method of manufacture and the thermal treatment. It is used primarily for floors and walks.

1018.2.1.3 Trims

Trims are manufactured to match wall tile color, texture and to coordinate with it in dimension. These are shaped in various ceramic trim units such as caps, bases, coves, bullnoses, corners, angles, etc.that are necessary for edging or making a transition between intersecting planes.

1018.2.1.4 Accessories

Accessories like some soap holders and shall be made wall mounted type with colors to reconcile with the color of the adjacent wall tiles.

1018.2.1.5 Cement

Cement shall be Portland conforming to the specification requirements defined in Item 700, Hydraulic Cement.

1018.2.1.6 Sand

Sand shall be well graded fine aggregate clean river sand, free from soluble salts and organic impurities.

1018.2.1.7 Lime

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

1018.3 Construction Requirements

Tile work shall not be started until roughing-ins for plumbing, electrical and other trades have been completed and tested. The work of all other trades shall be protected from damage.

1018.3.1 Surface Preparation

a) Mortar mix for scratch coat and setting bed shall consist of one part Portland cement 1/4 part lime and 3 parts sand by volume. Surface to receive tile must be level, true to elevation, dry, free from dirt, oil and other ointments. Allow at least seven days curing of scratch coat and setting bed.

Installation work shall not be allowed to proceed until unsatisfactory conditions are corrected.

b) Bond coat shall be portland cement paste.

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

1018.3.1.2 On masonry or concrete surface first apply a thin coat with pressure, then bring it out sufficiently to compensate for the major irregularities of the surface to a thickness not less than 10 mm. at any point.

1018.3.1.3 Evenly rate scratch coat to provide good mechanical key before the mortar mix has fully hardened.

1018.3.2 Installation Procedure

Ceramic tiles shall be soaked in clean water prior to installation for a minimum of one hour

1018.3.2.1 Ceramic Glazed Wall Tiles

- a) Determine and mark layout of ceramic tiles, joint location, position of trims and fixtures so as to minimize cut less than one-half tile in size.
- b) Thoroughly dampen surface of wall but do not saturate surface.
- c) Apply a bond coat mix with consistency of cream paste 1.5 mm thick to the wall surface or to the back of the tile to be laid.
- d) Lay the tiles true to profile then exert pressure and tamp tile surface before the bond coat mix has initially set.
- e) Continue with the next full tile to be laid and pressed firmly upon the setting bed tamped until flush and in place of the other tiles.
- f) Intersections and returns shall be formed accurately using the appropriate trims.
- g) All lines shall be kept straight and true to profiles, plumbed and internal corners rounded using the appropriate trims.

1018.3.2.2 Vitrified Unglazed Floor Tiles

- a) Before tile is applied the floor surface shall be tested for levelness or uniformity of slope by flooding it with water. Area where water ponds are filled or levelled, shall be retested before the setting bed is applied.
- b) Establish lines of borders and center of the walls at the field work in both direction to permit the pattern to be laid with a minimum of cut tiles.
- c) Clean concrete subfloor then moisten but do not soak. Then sprinkle dry cement over the surface and spread the mortar on the setting bed.
- d) Apply and spread mortar mix for setting bed and tamp to assure good bond over the entire area to be laid with tile.
- e) Pitch floor to drain as shown on Plans or as directed by the Engineer
- f) Allow the setting bed to set sufficiently to be worked over then spread a bond coat over the surface and lay tile in accordance with Items 1019.3.2.1 a, b, c, d, e, f, g.

1018.3.3 Grouting and Pointing

1018.3.3.1 Tiles shall have laid in place for at least 24 hours before grouting of the joints is started. Grouting mortar shall be white Portland cement or blended with pigments to acquire the color appropriate for the ceramic tile.

1018.3.3.2 Grouting mortar shall be applied over the tile by float or squeegee stroked diagonally across the joints. Remove excess mortar with a wet sponge stroked diagonally or in a circular motion after 12-15 minutes. Follow with a barely damp or dry sponge to remove remaining haze while smoothing all grouted joints.

1018.3.3 Cleaning

- a) Clean ceramic tile surfaces thoroughly as possible upon completion of grouting.
- b) Remove all grout haze, observing tile manufacturers recommendations as to use of acid or chemical cleaners.
- c) Rinse tile thoroughly with clean water before and after using chemical cleaners.
- d) Polish surface of tile with soft cloth.

1018.3.4 Protection from Construction Dirt

- a) Apply a protective coat of neutral cleanser solution diluted with water in the proportion of 1:4 or 1 liter cleanser concentrate to 1 gallon water.
- b) In addition, cover tile flooring with heavy-duty no staining construction paper, taped in place.
- c) Just before final acceptance of the work remove paper and rinse protective coat of neutral cleaner from tile surface. Do not let protective paper get torn 'or removed.

1018.4 Method of Measurement

All works performed under this Item shall be measured in square meters for areas actually laid with ceramic tiles and accepted to the satisfaction of the Engineer.

1018.5 Basis of Payment

Ceramic tile work determined and provided in the Bill of Bill of Quantities shall be paid for based at the unit bid price which price and payment constitute full compensation for furnishing all materials, tools, equipment and other incidentals necessary to complete this Item.

Payment shall be made under:

Pay Item Number	Description	Unit of Measurement
1018.2.1.1	Glazed tiles and trims	m ²

ITEM 1027 - CEMENT PLASTER FINISH

1027.1 Description

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 labelled plainly with the manufacturer's name and trademark.

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

Fine aggregates shall be clean, washed 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 such sand be derived from stone unsuitable for use as coarse aggregates.

1027.3 Construction Requirements

1027.3.1 Mixture

- a) Mortar mixture for brown 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.
- b) Finish coat shall be pure Portland Cement properly graded conforming to the requirements of Item 700, Hydraulic Cement and mixed with water to approved consistency and plasticity.

1027.3.2 Surface Preparation

- a) After removals of formworks reinforce concrete surfaces 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 and bond breakers. Before any application of brown coat 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) Brown coat mortar mix shall be applied with sufficient pressure starting from the lower portion of the surface to fill the grooved and to prevent air pockets in the reinforced concrete/masonry work and avoid mortar mix drooping. The brown coat shall be lightly broomed/ or scratch before surface had properly set and allowed to cure.
- b) Finish coat shall not be applied until after the brown coat has seasoned for seven days and corrective measures had been done by the Contractor on surfaces that are defective. Just before the application of the finish coat, the brown coat surface shall be evenly moistened with potable water. Finish coat shall be floated first to a true and even surface, then troweled in a manner that will force the mixture to penetrate into the brown coat. Surfaces applied with finish coat shall then be smooth with paper in a circular motion to remove trowel marks, checks and blemishes. All cement plaster finish shall be 10 mm thick minimum on vertical concrete and/or masonry walls.

Wherever indicated on the Plans to be "Simulated Red Brick Finish", the Contractor shall render brick design on plaster surface before brown coat had properly set and then allowed to dry. Cement plaster shall not be applied directly to:

- a) Concrete or masonry surface that had been coated with bituminous compound and,
- b) Surfaces that had been painted and previously plastered.

1027.3.4 Workmanship

Cement plaster finish shall be true to details and plumbed. Finish surface shall have no visible junction marks where one (1) Day's work adjoins the other. Where directed by the Engineer or as shown on the Plans vertical and horizontal groove joints shall be 25 mm wide and 10 mm deep.

1027.4 Method of Measurement

All cement plaster finish shall be measured in square meters or part thereof for work actually completed in the building.

1027.5 Basis of Payment

The work quantified and determined as provided in the Bill of Quantities shall be paid for at the Contract Unit Price which price constitutes full compensation including labor, materials, tools and equipment and incidentals necessary to complete this Item.

Payment will be made under:

Pay Item Number	Description	Unit of Measurement
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1027	Cement Plaster Finish	Sq.m.
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Section VII. Drawings

[Insert here a list of Drawings. The actual Drawings, including site plans, should be attached to this section, or annexed in a separate folder.]

Section VIII. Bill of Quantities

Item No.	Scope of Work	Unit	Quantity	Unit Price	TOTAL
B.5	Project Billboard/Signboard	Each	1.00		
B.7	Occupational Safety & Health	L.S.	1.00		
B.9	Mobilization/Demobilization	L.S.	1.00		
803(1)a	Structure Excavation (Common Soil)	Cu.m.	525.93		
804(1)a	Embankment from Structure Excavation	Cu.m.	488.96		
804(4)	Gravel Bedding	Cu.m.	1.94		
900(1)c2	Structural Concrete for Footing and Slab on Fill (Class A, 28 days)	Cu.m.	9.14		
900(1)	Structural Concrete for Columns and Beams (Class A, 28 days)	Cu.m.	42.90		
902(1)	Reinforcing Steel of Reinforced Concrete Structures	Kgs.	6,491.39		
903(2)	Formworks and Falseworks	Sq.m.	323.59		
1002	Plumbing Works (Tank on Grade to Elevated Water Tank)	Ln.m.	90.00		
1016(1)a	Water Proofing Cement Base	Sq.m.	97.47		
1018(1)	Glazed Tiles and Trims	Sq.m.	108.00		
1027(1)	Cement Plaster Finish	Sq.m.	496.86		
Total Bid Cost					

Amount in Words: _____

Section IX. Checklist of Technical and Financial Documents

Notes on the Checklist of Technical and Financial Documents

The prescribed documents in the checklist are mandatory to be submitted in the Bid, but shall be subject to the following:

- a. GPPB Resolution No. 09-2020 on the efficient procurement measures during a State of Calamity or other similar issuances that shall allow the use of alternate documents in lieu of the mandated requirements; or
- b. any subsequent GPPB issuances adjusting the documentary requirements after the effectivity of the adoption of the PBDs.

The BAC shall be checking the submitted documents of each Bidder against this checklist to ascertain if they are all present, using a non-discretionary “pass/fail” criterion pursuant to Section 30 of the 2016 revised IRR of RA No. 9184.

Checklist of Technical and Financial Documents

I. TECHNICAL COMPONENT ENVELOPE

Class “A” Documents

Legal Documents

- ☐ (a) Valid PhilGEPS Registration Certificate (Platinum Membership) (all pages);
or
- ☐ (b) Registration certificate from Securities and Exchange Commission (SEC), Department of Trade and Industry (DTI) for sole proprietorship, or Cooperative Development Authority (CDA) for cooperatives or its equivalent document;
and
- ☐ (c) Mayor’s or Business permit issued by the city or municipality where the principal place of business of the prospective bidder is located, or the equivalent document for Exclusive Economic Zones or Areas;
and
- ☐ (e) Tax clearance per E.O. No. 398, s. 2005, as finally reviewed and approved by the Bureau of Internal Revenue (BIR).

Technical Documents

- ☐ (f) Statement of the prospective bidder of all its ongoing government and private contracts, including contracts awarded but not yet started, if any, whether similar or not similar in nature and complexity to the contract to be bid; **and**
- ☐ (g) Statement of the bidder’s Single Largest Completed Contract (SLCC) similar to the contract to be bid, except under conditions provided under the rules;
and
- ☐ (h) Philippine Contractors Accreditation Board (PCAB) License;
or
Special PCAB License in case of Joint Ventures;
and registration for the type and cost of the contract to be bid; **and**
- ☐ (i) Original copy of Bid Security. If in the form of a Surety Bond, submit also a certification issued by the Insurance Commission;
or
Original copy of Notarized Bid Securing Declaration; **and**
- ☐ (j) Project Requirements, which shall include the following:
 - ☐ a. Organizational chart for the contract to be bid;
 - ☐ b. List of contractor’s key personnel (*e.g.*, Project Manager, Project Engineers, Materials Engineers, and Foremen), to be assigned to the contract to be bid, with their complete qualification and experience data;
 - ☐ c. List of contractor’s major equipment units, which are owned, leased, and/or under purchase agreements, supported by proof of ownership or certification of availability of equipment from the equipment lessor/vendor for the duration of the project, as the case may be; **and**
- ☐ (k) Original duly signed Omnibus Sworn Statement (OSS);

and if applicable, Original Notarized Secretary's Certificate in case of a corporation, partnership, or cooperative; or Original Special Power of Attorney of all members of the joint venture giving full power and authority to its officer to sign the OSS and do acts to represent the Bidder.

Financial Documents

- ☐ (l) The prospective bidder's audited financial statements, showing, among others, the prospective bidder's total and current assets and liabilities, stamped "received" by the BIR or its duly accredited and authorized institutions, for the preceding calendar year which should not be earlier than two (2) years from the date of bid submission; **and**
- ☐ (m) The prospective bidder's computation of Net Financial Contracting Capacity (NFCC).

Class "B" Documents

- ☐ (n) If applicable, duly signed joint venture agreement (JVA) in accordance with RA No. 4566 and its IRR in case the joint venture is already in existence;
or
duly notarized statements from all the potential joint venture partners stating that they will enter into and abide by the provisions of the JVA in the instance that the bid is successful.

II. FINANCIAL COMPONENT ENVELOPE

- ☐ (o) Original of duly signed and accomplished Financial Bid Form; **and**

Other documentary requirements under RA No. 9184

- ☐ (p) Original of duly signed Bid Prices in the Bill of Quantities; **and**
- ☐ (q) Duly accomplished Detailed Estimates Form, including a summary sheet indicating the unit prices of construction materials, labor rates, and equipment rentals used in coming up with the Bid; **and**
- ☐ (r) Cash Flow by Quarter.

