



**PROVINCIAL GOVERNMENT OF CAMARINES NORTE  
DAET**

# **CONSTRUCTION OF FLOOD CONTROL**

**Brgy. Motherlode, Jose  
Panganiban, Camarines  
Norte**

**June 6, 2023**

# 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.

# TABLE OF CONTENTS

<b>GLOSSARY OF .....</b>	<b>5</b>
<b>TERMS, ABBREVIATIONS, AND ACRONYMS.....</b>	<b>5</b>
<b>SECTION I. INVITATION TO BID .....</b>	<b>8</b>
<b>SECTION II. INSTRUCTIONS TO BIDDERS.....</b>	<b>11</b>
1. Scope of Bid.....	12
2. Funding Information .....	12
3. Bidding Requirements.....	12
4. Corrupt, Fraudulent, Collusive, Coercive, and Obstructive Practices .....	13
5. Eligible Bidders.....	13
6. Origin of Associated Goods .....	13
7. Subcontracts .....	13
8. Pre-Bid Conference .....	14
9. Clarification and Amendment of Bidding Documents.....	14
10. Documents Comprising the Bid: Eligibility and Technical Components.....	14
11. Documents Comprising the Bid: Financial Component .....	15
12. Alternative Bids .....	15
13. Bid Prices .....	15
14. Bid and Payment Currencies .....	16
15. Bid Security.....	16
16. Sealing and Marking of Bids.....	16
17. Deadline for Submission of Bids .....	16
18. Opening and Preliminary Examination of Bids .....	16
19. Detailed Evaluation and Comparison of Bids.....	17
20. Post Qualification.....	17
21. Signing of the Contract .....	17
<b>SECTION III. BID DATA SHEET .....</b>	<b>18</b>
<b>SECTION IV. GENERAL CONDITIONS OF CONTRACT.....</b>	<b>21</b>
1. Scope of Contract.....	22
2. Sectional Completion of Works .....	22
3. Possession of Site.....	22
4. The Contractor's Obligations .....	22
5. Performance Security .....	23

6.	Site Investigation Reports .....	23
7.	Warranty.....	23
8.	Liability of the Contractor.....	23
9.	Termination for Other Causes .....	23
10.	Dayworks .....	24
11.	Program of Work.....	24
12.	Instructions, Inspections and Audits .....	24
13.	Advance Payment.....	24
14.	Progress Payments .....	24
15.	Operating and Maintenance Manuals.....	24
<b>SECTION V. SPECIAL CONDITIONS OF CONTRACT.....</b>		<b>26</b>
<b>SECTION VI. SPECIFICATIONS.....</b>		<b>28</b>
ITEM 100 – CLEARING AND GRUBBING .....		29
ITEM 102 – EXCAVATION.....		31
ITEM 103 – STRUCTURE EXCAVATION .....		36
ITEM 104 – EMBANKMENT .....		41
ITEM 400 – PILING.....		47
ITEM 404 – REINFORCING STEEL .....		69
ITEM 405 – STRUCTURAL CONCRETE.....		72
ITEM 505 – RIPRAP AND GROUTED RIPRAP .....		80
ITEM 508 – HANDLAID ROCK EMBANKMENT .....		81
<b>SECTION VII. DRAWINGS.....</b>		<b>84</b>
<b>SECTION VIII. BILL OF QUANTITIES.....</b>		<b>100</b>
<b>SECTION IX. CHECKLIST OF TECHNICAL AND FINANCIAL DOCUMENTS.....</b>		<b>102</b>
BID FORM .....		105
BID SECURING DECLARATION .....		107
CONTRACT AGREEMENT FORM .....		108
OMNIBUS SWORN STATEMENT .....		110
AFFIDAVIT OF SITE INSPECTION .....		113
AFFIDAVIT OF AVAILABILITY OF KEY PERSONNEL AND EQUIPMENT .....		114
KEY PERSONNEL’S CERTIFICATE OF EMPLOYMENT .....		115
PERFORMANCE SECURING DECLARATION .....		117
DPWH DEPARTMENT ORDER 197 S. 2016.....		119

# *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***



REPUBLIC OF THE PHILIPPINES  
PROVINCE OF CAMARINES NORTE  
Daet

**BIDS AND AWARDS COMMITTEE**

**Invitation to Bid for the Construction of Flood Control,  
Brgy. Motherlode, Jose Panganiban, Camarines Norte**

1. The *Provincial Government of Camarines Norte*, through the *LDRRMF 2023* intends to apply the sum of *Nine Million Nine Hundred Eighty-Four Thousand Nine Hundred Eleven Pesos (P9,984,911.00)* being the Approved Budget for the Contract (ABC) to payments under the contract for the *Construction of Flood Control, Brgy. Motherlode, Jose Panganiban, Camarines Norte*. Bids received in excess of the ABC shall be automatically rejected at bid opening.
2. The *Provincial Government of Camarines Norte* now invites bids for the *Rehab./Construction of 180.50 LM Flood Control with Exemption*. Completion of the Works is required *150 CD*. 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 9184 (RA 9184), otherwise known as the "Government Procurement Reform Act."
4. Bidders may obtain further information from the *Provincial Government of Camarines Norte* and inspect the Bidding Documents at the address given below from *8:00a.m. to 5:00p.m., Monday to Friday*.
5. A complete set of Bidding Documents may be acquired by interested bidders *June 6 – June 29, 2023* at the *Provincial Capitol Building, Daet, Camarines Norte* and from the website of the *Philippine Government Electronic Procurement System (PhilGEPS)* upon payment of the applicable fee for the Bidding Documents, pursuant to the latest Guidelines issued by the GPPB, in the amount of *Ten Thousand Pesos (P10,000.00)*. The Procuring Entity shall allow the bidder to present its proof of payment for the fees in person.
6. The *Provincial Government of Camarines Norte* will hold a Pre-Bid Conference on *June 15, 2023, 2:00p.m.* at the *new BAC Conference Office, at the back of Agro-Sports Center, J. Lukban Street, Daet, Camarines Norte*, which shall be open to prospective bidders.
7. Bids must be duly received by the BAC Secretariat at the address below on or before *June 29, 2023 at 1:30p.m.* 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 15.
9. Bid opening shall be on *June 29, 2023, 2:00 p.m.* at the *new BAC Conference Office, at the back of Agro-Sports Center, J. Lukban Street, Daet, Camarines Norte*. Bids will be opened in the presence of the bidders' representatives who choose to attend the activity.

10. The *Provincial Government of Camarines Norte* 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 Section 35 and 41 of RA 9184 of the revised IRR of RA 9184 without thereby incurring any liability to the affected bidder or bidders.
11. For further information, please refer to:  
*MRS. MERCEDES M. ALFUERTE*  
*Provincial Budget Officer / BAC Chairperson*  
*Provincial Capitol Bldg., Daet, Camarines Norte*  
*(054) 885-1474*
12. You may visit the website:  
*Philippine Government Electronic Procurement System (PhilGEPS)*

  
*MERCEDES M. ALFUERTE*  
*Provincial Budget Officer / BAC Chairperson*

## ***Section II. Instructions to Bidders***

## 1. Scope of Bid

The Procuring Entity, *[indicate name]* invites Bids for the *[insert Procurement Project]*, with Project Identification Number *[indicate number]*.

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

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

## 2. Funding Information

2.1. The GOP through the source of funding as indicated below for *[indicate funding year]* in the amount of *[indicate amount]*.

2.2. The source of funding is:

*[If an early procurement activity, select one and delete others:]*

- a. NGA, the National Expenditure Program.
- b. GOCC and GFIs, the proposed Corporate Operating Budget.
- c. LGUs, the proposed Local Expenditure Program.

*[If not an early procurement activity, select one and delete others:]*

- a. NGA, the General Appropriations Act or Special Appropriations.
- b. GOCC and GFIs, the Corporate Operating Budget.
- c. 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:  
[Select one, delete other/s]

- a. Subcontracting is allowed. The portions of Project and the maximum percentage allowed to be subcontracted are indicated in the **BDS**, which shall not exceed fifty percent (50%) of the contracted Works.
  - b. Subcontracting is not allowed.
- 7.1. *[If Procuring Entity has determined that subcontracting is allowed during the bidding , state:]* The Bidder must submit together with its Bid the documentary requirements of the subcontractor(s) complying with the eligibility criterial stated in **ITB** Clause 5 in accordance with Section 23.4 of the 2016 revised IRR of RA No. 9184 pursuant to Section 23.1 thereof.
- 7.2. *[If subcontracting is allowed during the contract implementation stage, state:]* The Supplier may identify its subcontractor during the contract implementation stage. Subcontractors identified during the bidding may be changed during the implementation of this Contract. Subcontractors must submit the documentary requirements under Section 23.1 of the 2016 revised IRR of RA No. 9184 and comply with the eligibility criteria specified in **ITB** Clause 5 to the implementing or end-user unit.
- 7.3. Subcontracting of any portion of the Project does not relieve the Contractor of any liability or obligation under the Contract. The Supplier will be responsible for the acts, defaults, and negligence of any subcontractor, its agents, servants, or workmen as fully as if these were the Contractor’s own acts, defaults, or negligence, or those of its agents, servants, or workmen.

## **8. Pre-Bid Conference**

The Procuring Entity will hold a pre-bid conference for this Project on the specified date and time and either at its physical address *{[insert if applicable]}* and/or through video conferencing/webcasting } as indicated in paragraph 6 of the **IB**.

## **9. Clarification and Amendment of Bidding Documents**

Prospective bidders may request for clarification on and/or interpretation of any part of 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:*

*[Select one, delete other/s]*

a. Philippine Pesos.

b. *[indicate currency if procurement involves a foreign-denominated bid as allowed by the Procuring Entity, which shall be tradeable or acceptable by the BSP.]*

## 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 *[indicate date]*. 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*

# 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: <b><i>Flood Control</i></b>																											
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: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><u>Key Personnel</u></th> <th style="text-align: center;"><u>General Experience</u></th> <th style="text-align: center;"><u>Relevant Experience</u></th> </tr> </thead> <tbody> <tr> <td><b>Project Manager</b></td> <td style="text-align: center;"><b>one (1)</b></td> <td style="text-align: center;"><b>one (1)</b></td> </tr> <tr> <td><b>Project Engineer</b></td> <td style="text-align: center;"><b>one (1)</b></td> <td style="text-align: center;"><b>one (1)</b></td> </tr> <tr> <td><b>Materials Engineer</b></td> <td style="text-align: center;"><b>one (1)</b></td> <td style="text-align: center;"><b>one (1)</b></td> </tr> </tbody> </table>	<u>Key Personnel</u>	<u>General Experience</u>	<u>Relevant Experience</u>	<b>Project Manager</b>	<b>one (1)</b>	<b>one (1)</b>	<b>Project Engineer</b>	<b>one (1)</b>	<b>one (1)</b>	<b>Materials Engineer</b>	<b>one (1)</b>	<b>one (1)</b>															
<u>Key Personnel</u>	<u>General Experience</u>	<u>Relevant Experience</u>																										
<b>Project Manager</b>	<b>one (1)</b>	<b>one (1)</b>																										
<b>Project Engineer</b>	<b>one (1)</b>	<b>one (1)</b>																										
<b>Materials Engineer</b>	<b>one (1)</b>	<b>one (1)</b>																										
10.5	The minimum major equipment requirements are the following: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><u>Equipment</u></th> <th style="text-align: center;"><u>Capacity</u></th> <th style="text-align: center;"><u>Number of Units</u></th> </tr> </thead> <tbody> <tr> <td>1. Water Pump 100mm suction dia., 2667 lpm, 50mm 16Hp</td> <td></td> <td style="text-align: center;">1</td> </tr> <tr> <td>2. Cargo Truck/Service Truck</td> <td style="text-align: center;">5mt</td> <td style="text-align: center;">1</td> </tr> <tr> <td>3. One Bagger Mixer</td> <td style="text-align: center;">4-6 cu.ft./min.</td> <td style="text-align: center;">1</td> </tr> <tr> <td>4. Concrete Vibrator</td> <td></td> <td style="text-align: center;">1</td> </tr> <tr> <td>5. Drop Hammer</td> <td></td> <td style="text-align: center;">1</td> </tr> <tr> <td>6. Welding Machine</td> <td style="text-align: center;">Electric Driven, DC Output, 500Ampere</td> <td style="text-align: center;">1</td> </tr> <tr> <td>7. Chainsaw</td> <td></td> <td style="text-align: center;">1</td> </tr> <tr> <td>8.</td> <td></td> <td></td> </tr> </tbody> </table>	<u>Equipment</u>	<u>Capacity</u>	<u>Number of Units</u>	1. Water Pump 100mm suction dia., 2667 lpm, 50mm 16Hp		1	2. Cargo Truck/Service Truck	5mt	1	3. One Bagger Mixer	4-6 cu.ft./min.	1	4. Concrete Vibrator		1	5. Drop Hammer		1	6. Welding Machine	Electric Driven, DC Output, 500Ampere	1	7. Chainsaw		1	8.		
<u>Equipment</u>	<u>Capacity</u>	<u>Number of Units</u>																										
1. Water Pump 100mm suction dia., 2667 lpm, 50mm 16Hp		1																										
2. Cargo Truck/Service Truck	5mt	1																										
3. One Bagger Mixer	4-6 cu.ft./min.	1																										
4. Concrete Vibrator		1																										
5. Drop Hammer		1																										
6. Welding Machine	Electric Driven, DC Output, 500Ampere	1																										
7. Chainsaw		1																										
8.																												
12	<b><i>Not Applicable</i></b>																											
15.1	The bid security shall be in the form of a Bid Securing Declaration or any of the following forms and amounts: <ul style="list-style-type: none"> <li>a. The amount of not less than <b><u>PhP 200,000.00</u></b> if bid security is in cash, cashier's/manager's check, bank draft/guarantee or irrevocable letter of credit;</li> <li>b. The amount of not less than <b><u>PhP 500,000.00</u></b> if bid security is in Surety Bond.</li> </ul>																											
19.2	<b><i>Not Applicable</i></b>																											
20	<b><i>No further instructions.</i></b>																											
21	Additional contract documents relevant to the Project that may be required by existing laws and/or the Procuring Entity, such as PERT/CPM, 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***

## **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**

41. 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.
42. 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*

# Special Conditions of Contract

GCC Clause	
2	<i>Not Applicable</i>
4.1	<i>upon receipt of the Notice to Proceed</i>
6	The site investigation reports are: <b><i>Present condition of the actual project site</i></b>
7.2	<i>For semi-permanent structures, such as buildings of types 1, 2, and 3 as classified under the National Building Code of the Philippines, concrete/asphalt roads, concrete river control, drainage, irrigation lined canals, river landing, deep wells, rock causeway, pedestrian overpass, and other similar semi-permanent structures: <b>Five (5) years.</b></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>5 working days</i> of delivery of the Notice of Award.
11.2	The period between Program of Work updates is thirty (30) days.  The amount to be withheld for late submission of an updated Program of Work is 1% of progress billing.
13	The amount of the advance payment is <b><i>15% of the total contract price.</i></b>
14	<b><i>Materials and equipment delivered on the site but not completely put in place shall NOT be included for payment.</i></b>
15.1	The date by which "as built" drawings are required is 15-30 days upon completion date.
15.2	The amount to be withheld for failing to produce "as built" drawings by the date required is 1% of the final contract amount in Philippine pesos.

## *Section VI. Specifications*

## **ITEM 100 – CLEARING AND GRUBBING**

### **100.1 Description**

This item shall consist of clearing, grubbing, removing and disposing all vegetation and debris as designated in the Contract, except those objects that are designated to remain in place or are to be removed in consonance with other provisions of this Specification. The work shall also include the preservation from injury or defacement of all objects designated to remain.

### **100.2 Construction Requirements**

#### **100.2.1 General**

The Engineer will establish the limits of work and designate all trees, shrubs, plants and other things to remain. The Contractor shall preserve all objects designated to remain.

Paint required for cut or scarred surface of trees or shrubs selected for retention shall be an approved asphaltum base paint prepared especially for tree surgery.

Clearing shall extend one (1) meter beyond the toe of the fill slopes or beyond rounding of cut slopes as the case maybe for the entire length of the project unless otherwise shown on the plans or as directed by the Engineer and provided it is within the right of way limits of the project, with the exception of trees under the jurisdiction of the Forest Management Bureau (FMB).

#### **100.2.2 Clearing and Grubbing**

All surface objects and all trees, stumps, roots and other protruding obstructions, not designated to remain, shall be cleared and/or grubbed, including mowing as required, except as provided below:

(1) Removal of undisturbed stumps and roots and nonperishable solid objects with a minimum depth of one (1) meter below subgrade or slope of embankment will not be required.

(2) In areas outside of the grading limits of cut and embankment areas, stumps and nonperishable solid objects shall be cut off not more than 150 mm (6 inches) above the ground line or low water level.

(3) In areas to be rounded at the top of cut slopes, stumps shall be cut off flush with or below the surface of the final slope line.

(4) Grubbing of pits, channel changes and ditches will be required only to the depth necessitated by the proposed excavation within such areas.

(5) In areas covered by cogon/talahib, wild grass and other vegetations, top soil shall be cut to a maximum depth of 150 mm below the original ground surface or as designated by the Engineer, and disposed outside the clearing and grubbing limits as indicated in the typical roadway section.

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

If perishable material is burned, it shall be burned under the constant care of component watchmen at such times and in such a manner that the surrounding vegetation, other adjacent property, or anything

designated to remain on the right of way will not be jeopardized. If permitted, burning shall be done in accordance with applicable laws, ordinances, and regulation.

The Contractor shall use high intensity burning procedures, (i.e., incinerators, high stacking or pit and ditch burning with forced air supplements) that produce intense burning with little or no visible smoke emission during the burning process. At the conclusion of each burning session, the fire shall be completely extinguished so that no smoldering debris remains.

In the event that the Contractor is directed by the Engineer not to start burning operations or to suspend such operations because of hazardous weather conditions, material to be burned which interferes with subsequent construction operations shall be moved by the Contractor to temporary locations clear of construction operations and later, if directed by the Engineer, shall be placed on a designated spot and burned.

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

Woody material may be disposed off by chipping. The wood chips may be used for mulch, slope erosion control or may be uniformly spread over selected areas as directed by the Engineer. Wood chips used as mulch for slope erosion control shall have a maximum thickness of 12 mm (1/2 inch) and faces not exceeding 3900 mm<sup>2</sup> (6 square inches) on any individual surface area. Wood chips not designated for use under other sections shall be spread over the designated areas in layers not to exceed 75 mm (3 inches) loose thickness. Diseased trees shall be buried or disposed off as directed by the Engineer.

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

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

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

### **100.2.3 Individual Removal of Trees or Stumps**

Individual trees or stumps designated by the Engineer for removal and located in areas other than those established for clearing and grubbing and roadside cleanup shall be removed and disposed off as specified under Subsection 100.2.2 except trees removed shall be cut as nearly flush with the ground as practicable without removing stumps.

### 100.3 Method of Measurement

Measurement will be by one or more of the following alternate methods:

Area Basis. The work to be paid for shall be the number of hectares and fractions thereof acceptably cleared and grubbed within the limits indicated on the Plans or as may be adjusted in field staking by the Engineer. Areas not within the clearing and grubbing limits shown on the Plans or not staked for clearing and grubbing will not be measured for payment.

2. Lump-Sum Basis. When the Bill of Quantities contains a Clearing and Grubbing lump-sum item, no measurement of area will be made for such item.

3. Individual Unit Basis (Selective Clearing). The diameter of trees will be measured at a height of 1.4 m (54 inches) above the ground. Trees less than 150 mm (6 inches) in diameter will not be measured for payment.

When Bill of Quantities indicates measurement of trees by individual unit basis, the units will be designated and measured in accordance with the following schedule of sizes:

Diameter at height of 1.4 m	Pay Item Designation
Over 150 mm to 900 mm	Small
Over 900 mm	Large

### 100.4 Basis of Payment

The accepted quantities, measured as prescribed in Section 100.3, 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, which price and payment shall be full compensation for furnishing 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
100 (1)	Clearing and Grubbing	Hectare
100 (2)	Clearing and Grubbing	Lump Sum
100 (3)	Individual Removal of Trees, Small	Each
100 (4)	Individual removal of	Each

## ITEM 102- EXCAVATION

102.1 Description This Item shall consist of roadway and drainage and borrow excavation and the disposal of material in accordance with this Specification and in conformity with the lines, grades and dimensions shown on the Plans or established by the Engineer.

102.1.1 Roadway Excavation Roadway excavation will include excavation and grading for roadways, parking areas, intersections, approaches, slope rounding, benching, waterways and ditches; removal of unsuitable material from the road bed and beneath embankment areas; and

excavating selected material found in the roadway as ordered by the Engineer for specific use in the improvement. Roadway excavation will be classified as “unclassified excavation”, “rock excavation”, “common excavation”, or “muck excavation” as indicated in the Bill of Quantities and hereinafter described.

(1) Unclassified Excavation. Unclassified excavation shall consist of the excavation and disposal of all materials regardless of its nature, not classified and included in the Bill of Quantities under other pay items.

(2) Rock Excavation. Rock excavation shall consist of igneous, sedimentary and metamorphic rock which cannot be excavated without blasting or the use of a ripper, and all boulders or other detached stones each having a volume of 1 cubic meter or more as determined by physical measurements or visually by the Engineer.

(3) Common Excavation. Common excavations shall consist of all excavation not included in the Bill of Quantities under “rock excavation” or other pay items.

(4) Muck Excavation. Muck excavation shall consist of the removal and disposal of deposits of saturated or unsaturated mixtures of soils and organic matter not suitable for foundation material regardless of moisture content.

102.1.2 Borrow Excavation Borrow excavation shall consist of the excavation and utilization of approved material required for the construction of embankments or for other portion of the work, and shall be obtained from approved sources, in accordance with Clause 61 and the following:

(1) Borrow, Case 1 Borrow Case 1 will consist of material obtained from sources designated on the Plans or in the Special Provisions.

(2) Borrow, Case 2 Borrow Case 2 will consist of material obtained from sources provided by the Contractor. The material shall meet the quality requirements determined by the Engineer unless otherwise provided in the Contract. The material shall meet the quality determined by the Engineer unless otherwise provided in the Contract.

## 102.2 Construction Requirements

102.2.1 General When there is evidence of discrepancies on the actual elevations and that shown on the Plans a pre-construction 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 excavated materials. All excavations shall be finished to reasonably smooth and uniform surfaces. No materials shall be wasted without authority of the Engineer. Excavation operations shall be conducted so that material outside of the limits of slopes will not be disturbed. Prior to excavation, all necessary clearing and grubbing in that area shall have been performed in accordance with Item 100, Clearing and Grubbing.

102.2.2 Conservation of Topsoil Where provided for on the Plans or in the Special Provisions,



suitable topsoil encountered in excavation and on areas where embankment is to be placed shall be removed to such extent and to such depth as the Engineer may direct. The removed topsoil shall be transported and deposited in storage piles at locations approved by the Engineer. The topsoil shall be completely removed to the required depth from any designated area prior to the beginning of regular excavation or embankment work in the area and shall be kept separate from other excavated materials for later use.

102.2.3 Utilization of Excavated Materials All suitable material removed from the excavation shall be used in the formation of the embankment, subgrade, shoulders, slopes, bedding, and backfill for structures, and for other purposes shown on the Plans or as directed. The Engineer will designate as unsuitable those soils that cannot be properly compacted in embankments. All unsuitable material shall be disposed off as shown on the Plans or as directed without delay to the Contractor. Only approved materials shall be used in the construction of embankments and backfills. All excess materials, including rock and boulders that cannot be used in embankments shall be disposed off as directed.

Material encountered in the excavation and determined by the Engineer as suitable for topping, road finishing, slope protection, or other purposes shall be conserved and utilized as directed by the Engineer. Borrow material shall not be placed until after the readily accessible roadway excavation has been placed in the fill, unless otherwise permitted or directed by the Engineer. If the Contractor places more borrow than is required and thereby causes a waste of excavation, the amount if such waste will be deducted from the borrow volume.

#### 102.2.4 Prewatering

Excavation areas and borrow pits may be prewatered before excavating the material. When prewatering is used, the areas to be excavated shall be moistened to the full depth, from the surface to the bottom of the excavation. The water shall be controlled so that the excavated material will contain the proper moisture to permit compaction to the specified density with the use of standard compacting equipment. Prewatering shall be supplemented where necessary, by truck watering units, to ensure that the embankment material contains the proper moisture at the time of compaction. The Contractor shall provide drilling equipment capable of suitably checking the moisture penetration to the full depth of the excavation.

#### 102.2.5 Presplitting

Unless otherwise provided in the Contract, rock excavation which requires drilling and shooting shall be presplit.

Presplitting to obtain faces in the rock and shale formations shall be performed by: (1) drilling holes at uniform intervals along the slope lines, (2) loading and stemming the holes with appropriate explosives and stemming material, and (3) detonating the holes simultaneously.

Prior to starting drilling operations for presplitting, the Contractor shall furnish the Engineer a plan outlining the position of all drill holes, depth of drilling, type of explosives to be used, loading pattern and sequence of firing. The drilling and blasting plan is for record purposes only and will

not absolve the Contractor of his responsibility for using proper drilling and blasting procedures. Controlled blasting shall begin with a short test section shall be presplit, production drilled and blasted and sufficient material excavated whereby the Engineer can determine if the Contractor's method are satisfactory. The Engineer may order discontinuance of the presplitting when he determines that the materials encountered have become unsuitable for being presplit.

The holes shall be charged with explosives of the size, kind strength, and at the spacing suitable for the formations being presplit, and with stemming material which passes a 9.5 mm (3/8 inch) standard sieve and which has the qualities for proper confinement of the explosives.

The finished presplit slope shall be reasonably uniform and free of loose rock. Variance from the true plane of the excavated backslope shall not exceed 300 mm (12 inches); however, localized irregularities or surface variations that do not constitute a safety hazard or an impairment to drainage courses or facilities will be permitted.

A maximum offset of 600 mm (24 inches) will be permitted for a construction working bench at the bottom of each lift for use in drilling the next lower presplitting pattern.

#### 102.2.6 Excavation of Ditches, Gutters, etc.

All materials excavated from side ditches and gutters, channel changes, irrigation ditches, and such other ditches as may be designated on the Plans or staked by the Engineer, shall be utilized as provided in Subsection 102.2.3.

Ditches shall conform to the slope, grade, and shape of the required cross-section, with no projections of roots, stumps, rock, or similar matter. The Contractor shall maintain and keep open and free from leaves, sticks, and other debris all ditches dug by him until final acceptance of the work.

Furrow ditches shall be formed by plowing a continuous furrow along the line staked by the Engineer. Methods other than plowing may be used if acceptable to the Engineer. The ditches shall be cleaned out by hand shovel work, by ditcher, or by some other suitable method, throwing all loose materials on the downhill side so that the bottom of the finished ditch shall be approximately 450 mm (18 inches) below the crest of the loose material piled on the downhill side. Hand finish will not be required, but the flow lines shall be in satisfactory shape to provide drainage without overflow.

#### 102.2.7 Excavation of Roadbed Level

Rock shall be excavated to a depth of 150 mm (6 inches) below subgrade within the limits of the roadbed, and the excavation backfilled with material designated on the Plans or approved by the Engineer and compacted to the required density.

When excavation methods employed by the Contractor leave undrained pockets in the rock surface, the Contractor shall at his own expense, properly drain such depressions or when permitted by the Engineer fill the depressions with approved impermeable material.

Material below subgrade, other than sold rock shall be thoroughly scarified to a depth of 150 (6 inches) and the moisture content increased or reduced, as necessary, to bring the material throughout this 150 mm layer to the moisture content suitable for maximum compaction. This layer shall then be compacted in accordance with Subsection 104.3.3.

#### 102.2.8 Borrow Areas

The Contractor shall notify the Engineer sufficiently in advance of opening any borrow areas so that cross-section elevations and measurements of the ground surface after stripping may be taken, and the borrow material can be tested before being used. Sufficient time for testing the borrow material shall be allowed.

All borrow areas shall be bladed and left in such shape as to permit accurate measurements after excavation has been completed. The Contractor shall not excavated beyond the dimensions and elevations established, and no material shall be removed prior to the staking out and cross-sectioning of the site. The finished borrow areas shall be approximately true to line and grade established and specified and shall be finished, as prescribed in Clause 61, Standard Specifications for Public Works and Highways, Volume 1. When necessary to remove fencing, the fencing shall be replaced in at least as good condition as it was original. The Contractor shall be responsible for the confinement of livestock when a portion of the fence is removed.

#### 102.2.9 Removal of Unsuitable Material

Add the following paragraph:

When any material, including excess unsuitable material from excavations, is to be disposed of outside the right-of-way the Contractor shall first obtain a written permit from the property owner of the proposed disposal site. He shall then submit to the Engineer the said permit or a certified copy thereof together with a written release by the property owner absolving the government from any and all responsibility in connection with the disposal of materials on his property. No disposal of any material shall be done on the disposal site before a permission is granted by the Engineer. The disposal of material at the site as provided above shall be made in a neat and uniform manner and to the satisfaction of the Engineer.

#### 102.3 Methods of Measurement

The cost of excavation of material which is incorporated in the Works or in other areas of fill shall be deemed to be included in the Items of Work where the material is used.

Measurement of Unsuitable or Surplus Material shall be the net volume in its original position.

For measurement purposes, surplus suitable material shall be calculated as the difference between the net volume of suitable material required to be used in embankment corrected by applying a shrinkage factor or a swell factor in case of rock excavation, determined by laboratory tests to get

its original volume measurement, and the net volume of suitable material from excavation in the original position. Separate pay items shall be provided for surplus common, unclassified and rock material.

The Contractor shall be deemed to have included in the contract unit prices all costs of obtaining land for the disposal of unsuitable or surplus material.

#### 102.4 Basis of Payment

The paragraph under this Section is amended as follows: The accepted quantities, measured as prescribed in Section 102.3 shall be paid for at the contract unit price for each of the Pay Items listed below that are included in the Bill of Quantities, which price and payment shall be full compensation for the removal and disposal of excavated materials including labor, equipment, tools and incidentals necessary to complete the work prescribed in this Item, inclusive of haul and any “overhaul” described under Item 107.

Payment will be made under:

Payment Item	Description	Unit of Measurement
102 (1)	Unsuitable Excavation	cu.m
102 (2)	Surplus Common Excavation	cu.m.

### **ITEM 103 - STRUCTURE EXCAVATION**

#### 103.1 Description

This Item shall consist of the necessary excavation for foundation of bridge, 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 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 allowances will be made for classification of different types of material encountered.

#### 103.2 Construction Requirements

### 103.2.1 Clearing and Grubbing

### 103.2.2 Excavation

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 footing 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 footing 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.

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

After each excavation is completed, the Contractor shall notify the Engineer to that effect and no footing, bedding material or pipe culvert shall be placed until the Engineer has approved the depth of excavation and the character of the foundation material.

Structures other than pipe culverts. All rocks 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.

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, harden, 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 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 Material

All excavated material, 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 times so as to endanger the partly finished structure.

#### 103.2.4 Cofferdams

uitable 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 for such a 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 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 (6inches) 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 shall not be placed until masonry has been 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<sub>38</sub> 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 on conformity with the Plans 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.

The volume outside of vertical planes 450 mm (18inches) 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. The volume of excavation for culvert and sections outside the vertical plane for culverts stipulated in (1) above.

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.

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,

Volume of water or other liquid resulting from construction operations and which can be pumped or drained away.

The volume of any excavation performed prior to the taking of elevations and measurements of the undisturbed ground.

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.

The volume of excavation for footings ordered at a depth more than 1.5m (60inches) 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.

### 103.3.3 Free Draining Backfill

The Contractor shall supply, place and compact free-draining backfill to the lines, grades and dimensions and in the locations shown on the Drawings or instructed.

Free draining backfill shall be obtained from approved sources and shall be well graded with a maximum dimension of 150 mm, and not more than 5% smaller than 0.075 mm. Freed draining backfill placed within 1 m of concrete structures shall not contain rocks larger than 75 mm in maximum dimension and shall be placed carefully so as not to damage the structure.

The material shall be handled and placed in such a manner as to prevent segregation.

Free draining backfill shall be deposited in horizontal layers not more than 150 mm thick after being compacted, and shall be thoroughly wetted for the purpose of compaction, as determined by the Engineer, and the moisture content shall be uniform throughout the layer.

Free draining backfill shall be compacted with 2 passes of a vibratory plate compactor having a minimum static mass of 100 kg.

### 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:

Any excavation for footings ordered at a depth more than 1.5m 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.

Concrete will be measured and paid for as provided under Item 405, Structural Concrete. 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.

Payment will be made under:

Pay Item Number	Description	Unit of Measurement
103 (1)	Structure Excavation	Cubic Meter
103 (2)	Backfill (from structural excavation)	Cubic Meter
103 (3)	Foundation Fill	Cubic Meter
103 (4)	Excavation ordered below Plan elevation	Cubic Meter
103 (6)	Pipe culverts and drain excavation	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 (3inches) 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:
  - Materials containing detrimental quantities of organic materials, such as grass, roots and sewerage.
  - Organic soils such as peat and muck.
  - Soils with liquid limit exceeding 80 and/or plasticity index exceeding 55.
  - Soils with a natural water content exceeding 100%.
  - Soils with very low natural density, 800 kg/m<sup>3</sup> 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 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 be 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 Constructions

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 described 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. These 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 requirements are attained and as approved by the Engineer. Trial section to this effect must be conducted and 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 (48inches) in height and provided they are carefully distributed, with the interstices filled with finer material to a 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 (12inches) 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 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 embankment, 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 10m 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 materials 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 in 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 if 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 overtuning 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 silt 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.

#### 104.3.10 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 material. 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.

#### 104.3.11 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.

#### 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
104 (1)	Embankment	Cubic Meter
104 (2)	Selected, Borrow for topping, Case 1	Cubic Meter
104 (3)	Selected Borrow for topping, Case 2	Cubic Meter
104 (4)	Earth Berm	Meter

## **ITEM 400 – PILING**

### **400.1 Description**

#### **400.1.1 Scope**

This Item shall consist of piling, furnished, driven or placed, cut and spliced in accordance with this Specification and in reasonably close conformity with the Plans.

The Contractor shall furnish the piles in accordance with an itemized list, which will be provided by the Engineer, showing the number and lengths of all piles. When cast-in-place concrete piles are specified on the Plans, the Engineer will not furnish the Contractor an itemized list showing the number and length of piles. When test piles and load tests are required in conformance with Subsection 400.1.2 and 400.1.3, respectively, the data obtained from driving test piles and making test loads will be used in conjunction with other available sub-soil information to determine the number and lengths of piles to be furnished. The Engineer will not prepare the itemized list of piles for any portion of the foundation area until all specified loading tests in the Contract representative of the portion have been completed.

In determining lengths of piles for ordering and to be included for payment, the lengths given in the order list will be based on the lengths which are assumed to remain in the completed structure. The Contractor, shall, without added compensation, increase the lengths to provide for the fresh heading and for such additional length as maybe necessary to suit the Contractor's method of operation.

#### **400.1.2 Test Piles**

For his own information, the Contractor may drive at the location of the regular piles indicated on the Plans such test piles as he may consider necessary in addition to the test piles specified in the Contract and shall be considered as regular piles. When called for in the Bill of Quantities, a pile if required to be subjected to load test shall conform to the provision as provided in Subsection 400.1.3, Load Tests. The Contractor shall furnish and drive test piles of the dimensions and at the locations designated by the Engineer. They shall be of the material shown in the Bill of Quantities and shall be driven to refusal or to such tip elevation or approximate bearing value as the Engineer may request. Test piles shall be driven with the same hammer that is used for driving foundation piles.

When the Engineer requests a load test to determine a bearing value, the first load test pile shall be driven to the specified bearing value as determined by the applicable formula in Subsection 400.1.4 for Timber Pile Bearing Value by Formula. Subsequent test piles to be load-tested shall be driven to the specified bearing value as determined by the applicable formula modified by the results of prior



test loads and foundation data. The ground at each test pile shall be excavated to the elevation of the bottom of the footing before the pile is driven.

#### **400.1.3 Load Tests**

Load tests for piles shall be either Static or Pile Testing by Low-Strain Dynamic Method, High-Strain Dynamic Method and Cross-Hole Sonic Logging.

When load tests are specified, the number and location of piles to be tested will be designated by the Engineer. Load tests shall be done by methods approved by the Engineer. The Contractor shall submit to the Engineer for approval detailed plans of the loading apparatus he intends to use. The apparatus shall be so constructed as to allow the various increments of the load to be placed gradually without causing vibration to the test piles. If the approved method requires the use of tension (anchor) piles, such tension piles shall be of the same type and diameter as the permanent piles and shall be driven in the location of permanent piles when feasible. Piling not a part of the structure shall be removed or cut off at least 300mm below the bottom of the footing or finished elevation of the ground upon completion of the test load. Permanent piling used as anchor piling which is raised during the test load shall be redriven to original grade and bearing.

##### **400.1.3.1 Static Testing**

Suitable approved apparatus for determining accurately the load on pile and the settlement of the pile under increment of load shall be supplied by the Contractor.

Test loading shall consist of the application of incremental static loads to a pile and measuring the resultant settlement. The loads shall be applied by a hydraulic jack acting against suitable anchorage, transmitting the load directly to the pile, or other methods designated by the Plans or approved by the Engineer.

The load shall be applied in increments of 5 or 10 tonnes as directed by the Engineer. Gross settlement readings, loads and other data shall be recorded by the Engineer immediately before and after the applications of each load increment.

Each load increment shall be held for an interval of two and one-half minutes. Each succeeding increment shall be as directed by the Engineer or as shown on the Plans and shall be applied immediately after the two and one-half minute interval readings have been made.

When a load-settlement curve obtained from these data shows that the pile has failed; i.e., the load can be held only by the constant pumping and the pile or shaft is being driven into the ground, pumping shall cease. Gross settlement readings, loads and other data shall be recorded immediately after pumping has ceased and again after an interval of two and one-half minutes for a total period of five (5) minutes. All loads shall then be removed and the member allowed to recover. Gross settlement readings shall be made immediately after all loads have been removed and at each interval of two and one-half minutes for a total period of five (5) minutes.

All load tests shall be carried to failure or to the capacity of the equipment, unless otherwise noted on the Plans.

After the completion of loading tests, the load used shall be removed and the piles including tension piles, shall be utilized in the structure if found by the Engineer to be satisfactory for such use. Test piles not loaded shall be utilized similarly. If any pile, after serving its purpose as a test or tension

pile, is found unsatisfactory for utilization in the structure, it shall be removed if so ordered by the Engineer or shall be cut off below the ground line of footings, whichever is applicable.

When diesel or other types of hammers requiring calibration are to be used, the Contractor shall make load tests even though no load tests are called for in the Bill of Quantities, except that load tests will not be required when the hammer is to be used only for driving piles to refusal, rock or a fixed tip elevation or the hammer is of a type and model that has been previously calibrated for similar type, size and length of pile, and foundation material. Calibration data must have been obtained from sources acceptable to the Engineer.

#### **400.1.3.2 Pile Testing**

Pile testing shall be done by Low-Strain Dynamic Method, High-Strain Dynamic Method or Cross-Hole Sonic Logging Method as required in the plans or as directed by the Engineer.

##### **400.1.3.2.1 Low-Strain dynamic Method**

Pile integrity testing by Low-Strain Dynamic Method shall conform to ASTM D-5882-96. It is a so-called Low Strain Method, since it requires the impact of only a small hand-held hammer, and also referred to as a Non-Destructive Method.

##### **400.1.3.2.2 High-Strain Dynamic Testing**

Pile Integrity testing by High-Strain Dynamic Method shall conform to ASTM D4945-97. High-Strain Dynamic Method shall be applied to confirm the design parameters and capacities assumed for the piles as well as to confirm the normal integrity of testing of the piles. It is considered supplemental to the lowstrain and sonic-type integrity testing of the cast-in-place piles. It is a nondestructive relatively quick test and it is intended that the test shaft be left in a condition suitable for use in production. The shaft used for the test will be instrumented and tested by the testing specialist, as approved by the Engineer, meeting requirements in accordance to ASTM D4945-97.

##### **400.1.3.2.3 Cross-Hole Sonic Logging of Bored Holes**

By sending ultrasonic pulses through concrete from one probe to another (probes located in parallel tubes), the Cross-hole Sonic Logging (CSL) procedure inspects the drilled shaft structural integrity, and extent and location of defects, if any. At the receiver probe, pulse arrival time and signal the concrete affects strength. For equidistant tubes, uniform concrete yields consistent arrival times with reasonable pulse wave speed and signal strengths. Non – uniformities such as contamination, soft concrete, honeycombing, voids, or intrusions of foreign objects exhibit delayed arrival time with reduced signal strength.

#### **400.1.4 Timber Pile Bearing Value by Formula**

When load tests are called for in the Bill of Quantities and when diesel or other hammers to be calibrated are used, the minimum number of hammer blows per unit of pile penetration needed to obtain the specified bearing value of piles shall be determined by load tests, as provided in Subsections 400.1.2 and 400.1.3. In the absence of load tests, the safe bearing value of each timber pile shall be determined by whichever of the following approximate formulas is applicable:

1000 WH

For gravity hammer,  $P = \frac{1000 WH}{49} \times \frac{1}{6 S + 25.4}$

For single-action steam or air hammers, and for diesel hammers having unrestricted rebound of ram,  
 $1000 WH$

$$P = \frac{1000 WH}{6 S + 2.54}$$

For double-action steam or air hammers, and diesel hammers having enclosed ram,  
 $1000 E$

$$P = \frac{1000 E}{6 S + 2.54}$$

For diesel or steam hammers on very heavy piles,  
 $1000 E$

$$P = \frac{1000 E}{6 S + 2.54 (W_p/W)}$$

P	=	Safe load per pile in Newton or kg
W	=	Weight of the striking part of the hammer in Newton or kg
H	=	Height of fall of ram in metres
S	=	Average penetration per blow in mm for the last 5 to 10 blows for gravity hammers and the last 10 to 20 blows for steam hammers
E	=	Hammer energy, N.m or kg.m
W <sub>p</sub>	=	Weight of pile

The above formula are applicable only when:

1. The hammer has a free fall.
2. The head of the pile is free from broomed or crushed wood fiber or other serious impairment.
3. The penetration is reasonably quick and uniform.
4. There is no measurable bounce after the blow.
5. A follower is not used.

If there is a measurable bounce, twice the height of bounce shall be deducted from H to determine its value in the formula.

The bearing power as determined by the appropriate formula listed in this Subsection, will be considered effective only when it is less than the crushing strength of the pile. Other recognized formulas may be used if fully detailed in the Special Provisions.

When bearing power is determined by a formula, timber piles shall be driven until a computed safe bearing power of each is not less than 18 tonnes.

#### 400.1.5 Concrete and Steel Pile Bearing Values

The bearing values for concrete and steel pile will be determined by the Engineer using the following formulas:

a. Modified Hiley's Formula or any formula from brochures of the equipment used, shall be used when the ratio of weight of ram or hammer to weight of pile is greater than one fourth (1/4).

$$R_u = \frac{2WH(W)}{(S+K)(W+W_p)}$$

$$R_a = \frac{R_u}{FS}$$

Where:

$R_u$  = ultimate capacity of piles (KN)

$R_a$  = capacity of pile (KN)–shall be greater than the required

$W$  = weight of ram or hammer (KN)

$H$  = height of fall of ram (mm)

$W_p$  = weight of pile (KN)

$S$  = average penetration for the last ten blows (mm)  $K$  = 10 mm (unless otherwise observed/computed during driving)

$FS$  = factor of safety (min. = 3)

b. Hiley's Formula shall be used when the ratio of the weight of ram or hammer to weight of pile is less than one fourth (1/4).

$$R_u = \frac{efWH(W)(W + n^2 W_p)}{(W + W_p)} \times \frac{S + 1/2 (C_1 + C_2 + C_3)}{R_u}$$

$$R_a = \frac{R_u}{FS}$$

where:

$R_u$  = ultimate capacity of pile (KN)  $R_a$  = capacity of pile (KN)

$ef$  = efficiency of hammer (refer to table)

$W$  = weight of ram (KN)

$W_p$  = weight of pile (KN)

$H$  = height of fall of ram (mm)

$S$  = average penetration for last ten blows (mm)  $C_1$  = temporary compression allowance for pile head and cap (refer to table)

$C_2 = R_u L / A E_p$

$C_3$  = range from 2.54mm to 5.08mm (0.1" to 0.2") for resilient soil to 0 for hard pan (rock, very dense sand and gravel)

$L$  = length of pile

$A$  = cross-sectional area of pile  $E_p$  = modulus of elasticity of pile  $n$  = coefficient of restitution (refer to table)

$FS$  = factor of safety (min. = 3)

Required minimum penetration of all piles shall be six (6) meters. However, for exposed piles, the embedded length shall be equal or greater than the exposed length but not less than 6.0m.

Note:

Formula for other pile hammers with suggested factor of safety should be as provided/recommended by their respective manufacturer.

### Values of $C_1$ for Hiley Formula

Temporary Compression Allowance C1 for Pile Head and Cap

Materials to which blow is applied	Easy Driving: P1 = 3.45 MPa (500 psi) on Pile Butt If no cushion, mm (in.)	Medium Driving: P1 = 6.90 MPa (1000 psi) on Head or Cap. mm (in.)	Hard Driving: P1 = 10.34 MPa (1500 psi) on Head or Cap. mm (in.)	Very Hard Driving: P1 = 13.88 MPa (2000 psi) on Head or Cap. mm (in.)
Head of timber pile	1.27 (0.05)	2.54 (0.10)	3.81 (0.15)	5.08 (0.20)
76–100mm (3-4 in.) packing inside cap on head of precast concrete piles	1.27 + 1.778b (0.05 + 0.07)b 0.635 (0.025) 1.016 (0.04) 0.508 (0.02) 0	2.54 + 3.81b (0.10 + 0.15)b 1.27 (0.05) 2.032 (0.08) 1.016 (0.04) 0	3.81 + 5.588b (0.015 + 0.22)b 1.905 (0.075) 3.048 (0.12) 1.524 (0.06) 0	5.08 + 7.62b (0.20 + 0.30)b 2.54 (0.10) 4.064 (0.16) 2.032 (0.08) 0
Concrete Pile Steel-covered cap. containing wood packing but steel piling at pipe 4.76mm (3/16 in.) red electrical tuber disk between two 10mm (3/8”) steel plates, for use with severe driving on Monotube pile Head of steel piling of pipe				

b The first figure represent the compression of the cap and wood dolly or packing above the cap, whereas the second figure represent the compression of the wood packing between the cap and the pile head.

$$P_1 = R_u/A$$

Values of Efficiency of Hammer, $e_f$	$e_f$
Hammer Type	
Drop Hammer released by trigger	1.00
Drop Hammer actuated by rope and friction winch	0.75
McKiernan-Terry Single-acting hammers	0.85
Warrington-Vulcan Single-acting hammers	0.75
Differential-acting hammers	0.85
McKiernan-Terry, Industrial B. Ownhoist, National and Union double-acting hammers	1.00
Diesel Hammers	

Values of Coefficient of Restitution, $n$	
Pile Type Head Condition Drop, Single Double Acting or Acting	
Diesel Hammers	
Hammer	
Reinforced Helmet with composite plastic or Concrete green heart dolly on top of pile	0.40 0.50
Helmet with Timber dolly, and packing on top of pile	0.25 0.40
Hammer direct on pile with pad -	0.50 only
Steel Driving cap with Standard plastic or greenheart dolly	0.50 0.50
Driving cap with Timber dolly	0.30 0.30
Hammer direct on pile -	0.50
Timber Hammer direct on pile	0.25 0.40

The formulas specified in the preceding Subsection for timber piling may be used in determining a rough approximation for the bearing power of precast and cast-in-place concrete piles and of steel piles.

In all cases when the bearing power of concrete and steel piles is determined by formula, the piles shall be driven until the safe bearing power of each is computed to be not less than 27 tonnes.

#### **400.1.6 Safe Loads**

When the safe bearing power of any pile is found by test or computation to be less than the design load, longer piles or additional piles shall be driven as ordered in writing by the Engineer.

#### **400.1.7 Jetted Piles**

The safe bearing power of jetted piles shall be determined by actual tests or by the appropriate methods and formulas given in the preceding Subsections. No jet shall be used during the test blows.

#### **400.2 Material Requirements**

The kind and type of piles shall be as specified on the Plans and Bill of Quantities. No alternative type or kind of piling shall be used.

### 400.2.1 Untreated Timber Piles

Timber shall conform to the requirements of Item 713, Treated and Untreated Timber. The specie shall be specified on the Plans. Unless otherwise noted on the Plans or Special Provisions, only the best grade shall be used. It shall be free from loose knots, splits, wormholes, decay, warp, ring separation or any defect which will impair its strength or render it unfit for its intended use. Any specie specified on the Plans may be used for untreated timber and if the specie is not available, a specie of equivalent strength and durability may be used if authorized by the Engineer.

Round piles shall be cut above the ground swell and shall taper from butt to tip. A line drawn from the center of the tip to the center of the butt shall not fall outside of the cross-section of the pile at any point more than one percent of the length of the pile.

In short bends, the distance from the center of the pile to a line stretched from the center of the pile above the bend to the center of the pile below the bend shall not exceed four percent of the length of the bend or a maximum of 65mm.

Unless otherwise specified, all piles shall be peeled removing all rough bark and at least 80 percent of the inner bark. Not less than 80 percent of the surface on any circumference shall be clean wood. No strip of inner bark remaining on the pile shall be more than 20mm wide and 200mm long. All knots shall be trimmed close to the body of the pile.

The pile sizes shall conform to the dimensions shown in Table 400.1.

Table 400.1 – Dimension of Piles Length of Pile Minimum mm	Diameter (1 metre from the Butt) Maximum mm	Minimum Tip Diameter, mm
		200
		180
		150
Less than 12 metres	300	450
12 to 18 metres	320	450
More than 18 metres	350	500

The diameter of the piles shall be measured in their peeled condition. When the pile is not exactly round, the average of three measurements may be used. For any structure, the butt diameters for the same lengths of pile shall be as uniform as possible.

Square piles shall have the dimensions shown on the Plans.

### 400.2.2 Treated Timber Piles

Timber shall conform to the requirements of Item 713, Treated and Untreated Timber. Treatment shall consist of the forcing of either creosote oil or creosote petroleum oil mixture into the outer fibers of the timber by a heat and pressure process. The process shall be in accordance with ASTM D-1760 Standard Specification for Pressure Treatment of Timber Products, but with such changes as temperatures, pressures, duration of treatment and other factors affecting the final treatment that experience has shown to be necessary in the treatment of structural timbers sawn from woods native to the Philippines. The treatment shall be so regulated that the curing process will not induce excessive checking. The minimum penetration of the preservative into the surface of the timber shall be 20 mm. All piles shall retain the minimum amount of preservative specified in Table 400.2.

Table 400.2 – Minimum Preservative Per Cubic Metre of Wood Use	Type of Processing
Empty Cell Process	Full Cell Process

General Use Marine 195 kg  
Use

320 kg

The Engineer shall inspect the timber prior to the treatment to determine conformance with the Specifications and suitability of conditions for treatment. He shall be permitted free access to the plant in order that temperatures, pressures and quantities and type of treatment materials used may be observed. Samples of the creosote or creosote petroleum mixtures shall be furnished as required for test.

The timber shall be checked to determine penetration of treatment, quantity of free preservative remaining on the timber and any visual evidence that the treatment has been performed in a satisfactory manner. The penetration of treatment shall be determined by boring a sufficient number of well-distributed holes to determine the average penetration. All such holes shall be plugged with plugs approximately 2 mm larger in diameter than the bit used in boring the holes.

If the penetration of preservative is less than the required amount, the entire charge, or such parts thereof shall be retreated. If after treatment the penetration is still insufficient, the treated pieces shall be rejected.

#### **400.2.3 Concrete Piles**

Concrete shall conform to the requirements of Item 405, Structural Concrete. Concrete shall be Class "C" unless otherwise specified in the Plans.

Concrete shall be proportioned to achieve a range of 6"-8" (150 mm to 200 mm) slump, self-compacting mix.

The use of appropriate plasticizer/additives to assure mix fluidity and consistency shall be allowed and with the Engineer's approval. A retardant of proven adequacy and approved by the Engineer may be used to ensure that early hardening of concrete during operation will not occur.

Reinforcing steel shall conform to the requirements of Item 404, Reinforcing Steel. Prestressing reinforcing steel shall be high-tensile steel wire conforming to AASHTO M 204 or other high-tensile metals conforming to AASHTO Standards.

#### **400.2.4 Steel Shells**

##### **1. Shells Driven Without a Mandrel**

Unless otherwise called for on the Plans or Special Provisions, shells for cast-in-place concrete piles shall have a minimum 305mm diameter at cut off and a minimum 203mm diameter at tip: made from not less than 4.55mm in thickness plate stock conforming to AASHTO M 183. Shells may either be spirally welded or longitudinally welded and may either be tapered or constant in section. Tips shall be sealed as shown on the Plans.

##### **2. Shells Driven With a Mandrel**

The shell shall be of sufficient strength and thickness to withstand driving without injury and to resist harmful distortion and/or buckling due to soil pressure after driven and the mandrel removed. Butt and tip dimension shall be as called for on the Plans or Special Provisions.

#### **400.2.5 Steel Pipes**



Filled Steel Pipes (filled with concrete) shall conform to the requirements of ASTM A 252, Grade 2, Welded and Seamless Pipe Piles. Closure Plates for closed piles shall conform to the requirements of AASHTO M 183.

Unfilled Tubular Steel Piles shall conform to the requirements of ASTM A 252, Grade 2, with chemical requirements meeting ASTM Designation A 53, Grade B. The wall thickness shall not be less than 4.76mm.

#### **400.2.6 Steel H-Piles**

Steel H-Piles shall be rolled steel sections of the weight and shape called for on the Plans. They shall be structural steel meeting the requirements of AASHTO M 183 provided that, where the Special Provisions called for copperbearing structural steel, the steel shall not contain less than one-fifth percent nor more than zero point thirty five percent (0.35%) of copper, except that steel manufactured by the acid-bessemer process shall not be used.

#### **400.2.7 Sheet Piles**

Steel sheet piles shall meet the requirements of AASHTO M 202 (ASTM A 328), or AASHTO M 223. All other sheet piles shall meet the requirements prescribed above the particular material specified. The joints shall be practically water-tight when the piles are in place.

#### **400.2.8 Pile Shoes**

Pile shoes shall be as called for on the Plans.

#### **400.2.9 Splices**

Material for pile splices, when splicing is allowed, shall be of the same quality as the material used for the pile itself and shall follow the requirements given on the Plans.

#### **400.2.10 Paint**

It shall conform to Item 709, Paints.

### **400.3 Construction Requirements**

#### **400.3.1 Location and Site Preparation**

Piles shall be driven where indicated on the Plans or as directed by the Engineer.

All excavations for the foundation on which the piles are to be driven shall be completed before the pile driving, unless otherwise specified or approved by the Engineer. After driving is completed, all loose and displaced materials shall be removed from around the piles by hand excavation, leaving clean solid surface to receive the concrete of the foundation. Any requirement for granular fill and lean concrete shall be indicated on the Plans or as directed by the Engineer.

#### **400.3.2 Determination of Pile Length**

Pile length and bearing capacity shall be determined by the Engineer from the results of the test piling and load tests.

The criterion for pile length may be one of the following:

1. Piles in sand and gravel shall be driven to a bearing power determined by the use of the pile driving formula or as decided by the Engineer.
2. Piles in clay shall be driven to the depth ordered by the Engineer. However, the bearing power shall be controlled by the pile driving formula if called for by the Engineer.
3. Piles shall be driven to refusal on rock or hard layer when so ordered by the Engineer.

The Contractor shall be responsible for obtaining the correct pile length and bearing capacity according to the criteria given by the Engineer.

#### **400.3.3 Pile Driving**

All piles shall be driven as shown on the Plans or as ordered in writing by the Engineer. They shall be driven within an allowed variation of 20mm per metre of pile length from the vertical or batter as shown on the Plans. The maximum allowable variation at the butt end of the pile shall be 75mm in any direction from the location shown on the Plans or as directed by the Engineer. Each pile shall, after driving, be within 150mm from the theoretical location underneath the pile cap or underneath the superstructure in case of pile bents. All piles pushed up by the driving of adjacent piles or any other cause shall be redriven.

Piles shall be used only in places where the minimum penetration of 3m in firm materials, or 5m in soft materials can be obtained. Whereas soft upper stratum overlies a hard stratum, the piles shall penetrate the hard materials at sufficient depths to fix the ends rigidly.

All pile driving equipment is subject to the Engineer's approval. The Contractor is responsible for sufficient weight and efficiency of the hammers to drive the piles down to the required depth and bearing capacity. Hammers shall be gravity hammers, single and double acting steam or pneumatic hammers or diesel hammers. Gravity hammers shall not weigh less than 60 percent of the combined weight of the pile and driving head but not less than 2,000 kg. The fall shall be regulated so as to avoid injury to the pile and shall in no case exceed 4.50m for timber and steel piles and 2.50m for concrete piles unless otherwise specified or approved by the Engineer.

The plant and equipment furnished for steam hammers shall have sufficient capacity to maintain, under working condition, the pressure at the hammer specified by the manufacturer. The boiler or pressure tank shall be equipped with an accurate pressure gauge and another gauge shall be supplied at the hammer intake to determine the drop in pressure between the gauges. When diesel hammers or any other types requiring calibration are used, they shall be calibrated with test piling and/or test loads in accordance with Subsection 400.1.2, Test Piles.

Water jets shall be used only when permitted in writing by the Engineer. When water jets are used, the number of jets and the nozzle volume and pressure shall be sufficient to erode freely the material adjacent to the pile. The plant shall have sufficient capacity to deliver at all time a pressure equivalent to at least 690 KPa at two 19 mm (3/4 inch) jet nozzles. The jets shall be shut off before the required penetration is reached and the piles shall be driven solely by hammers to final penetration as required by the Engineer.

Piles shall be supported in line and position with leads while being driven. Pile driving leads shall be constructed in such a manner as to afford freedom of movement of the hammer, and shall be held in position by guys or steel braces to insure rigid lateral support to the pile during driving. The leads shall be of sufficient length to make the use of a follower unnecessary and shall be so designed as to

permit proper placing of batter piles. The driving of the piles with followers shall be avoided if practicable and shall be done only under written permission from the Engineer.

The method used in driving piles shall not subject them to excessive and undue abuse producing crushing and spalling of the concrete, injurious splitting, splintering and brooming of the wood or deformation of the steel. Manipulation of piles to force them into proper position if considered by the Engineer too excessive will not be permitted.

The pile tops shall be protected by driving heads, caps or cushions in accordance with the recommendation of the manufacturer of the pile hammer and to the satisfaction of the Engineer. The driving head shall be provided to maintain the axis of the pile with the axis of the hammer and provide a driving surface normal to the pile.

Full length piles shall be used where practicable. Splicing of piles when permitted, shall be in accordance with the provisions of Subsection 400.3.7 and 400.3.8. All piles shall be continuously driven unless otherwise allowed by the Engineer.

Piles shall not be driven within 7 m of concrete less than 7 days old.

#### **400.3.4 Timber Piles**

Piles shall be strapped with three metal straps: one about 450mm from the butt, one about 600mm from the butt, and the third, about 300mm from the tip. Additional straps shall be provided at about 4.5m on centers between tip and butt. Strapping should encircle the pile once and be tensioned as tightly as possible. Straps shall be 38mm wide, 0.8mm thick, cold rolled, fully heat treated, high tensile strapping, painted and waxed.

Treated piles shall be strapped after treatment.

Point protection shall be considered for all timber piles. Where timber piles must penetrate dump fill, or may encounter obstructions or be driven to hard strata, point protection shall be used. A boot that encompasses and utilizes the entire end area of the pile is preferred.

#### **400.3.5 Timber Pile Bents**

Piles for any one bent shall be carefully selected as to size, to avoid undue bending or distortion of the sway bracing. Care shall be exercised in the distribution of piles of various sizes to obtain uniform strength and rigidity in the bents of any given structure.

Cut offs shall be made accurately to insure full being between caps and piles of bents.

#### **400.3.6 Precast Concrete Piles**

Precast concrete piles shall be of the design shown on the Plans.

Prestressed concrete piles shall be prestressed as prescribed in Item 406, Prestressed Concrete Structures. The piles shall be cast separately and concrete in each pile shall be placed continuously. The completed piles shall be free from stone pockets, honeycombs, or other defects, and shall be straight and true to the form specified. The forms shall be true to line and built of metal, plywood or dressed lumber. A 25mm chamfer strip shall be used in all corners. Form shall be water-tight and shall not be removed until at least twenty-four (24) hours after the concrete is placed.

Piles shall be cured and finished in accordance with Items 405, Structural Concrete and 406, Prestressed Concrete Structures.

Cylinder specimens shall be made and tested in accordance with Item 405. Piles shall not be moved until the tests indicate that the concrete has attained a compressive strength of at least 80 percent (80%) of the design 28-day compressive strength and they shall not be transported or driven until the design 28-day compressive strength has been attained.

If testing equipment is not available, as in isolated areas, piles shall not be moved until after fourteen (14) days after casting and shall not be transported or driven prior to 28 days after casting. If high early strength cement is used, piles shall not be moved, transported or driven prior to 7 days after casting.

When concrete piles are lifted or moved, they shall be supported at the points shown on the Plans; if not shown, they shall be supported at the quarter points.

### **400.3.7 Cast-in-place Concrete Piles**

#### **1. Drilled Holes**

All holes for concrete piles cast in drilled holes shall be drilled dry to tip elevation shown on the Plans. All holes will be examined for straightness and any hole which on visual inspection from the top shows less than one-half the diameter of the hole at the bottom of the hole will be rejected. Suitable casings shall be furnished and placed when required to prevent caving of the hole before concrete is placed.

All loose material existing at the bottom of the hole after drilling operations have been completed shall be removed before placing concrete.

The use of water for drilling operations or for any other purpose where it may enter the hole will not be permitted. All necessary action shall be taken to prevent surface water from entering the hole and all water which may have infiltrated into the hole shall be removed before placing concrete.

Concrete shall be placed by means of suitable tubes. Prior to the initial concrete set, the top 3m of the concrete filled pile or the depth of any reinforcing cage, whichever is greater, shall be consolidated by acceptable vibratory equipment. Casing, if used in drilling operations, may be left in place or removed from the hole as concrete is placed. The bottom of the casing shall be maintained not more than 1.5m nor less than 0.3m below the top of the concrete during withdrawal and placing operations unless otherwise permitted by the Engineer. Separation of the concrete during withdrawal operations shall be avoided by vibrating the casing.

#### **2. Steel Shells and Pipes**

The inside of shells and pipes shall be cleaned and all loose materials removed before concrete is placed. The concrete shall be placed in one continuous operation from tip to cut-off elevation and shall be carried on in such a manner as to avoid segregation. The top 3m of concrete filled shells, or to the depth of any reinforcing cage, whichever is greater, shall be consolidated by acceptable vibratory equipment.

Pipes shall be of the diameter shown on the Plans. The pipe wall thickness shall not be less than that shown on the Plans but in no case less than 5mm. The pipe, including end closures, shall be of sufficient strength to be driven by the specified methods without distortion.

Closure plates and connecting welds shall not project more than 12.5mm beyond the perimeter of the pile tips.

No shell or pipe shall be filled with concrete until all adjacent shells, pipes, or piles within a radius of 1.5m or 4 ½ times the average pile diameter, whichever is greater, have been driven to the required resistance.

After a shell or pipe has been filled with concrete, no shell, pipe or pile shall be driven within 6m thereof until at least 7 days have elapsed.

### 3. Drilled Shafts

Drilled shafts are deep foundations formed by boring a cylindrical hole into soil and/or rock and filling the hole with concrete. Drilled shafts are also commonly referred to as caissons, bored piles or drilled piers.

Drilled shafts, like driven piles, transfer structural loads to bearing stratum well below the base of the structure by passing soils having insufficient strength to carry the design loads.

Drilled shafts are classified according to their primary mechanism for deriving load resistance either as floating shafts (i.e., shafts transferring load primarily by side resistance), or end-bearing shafts (i.e., shafts transferring load primarily by tip resistance). Occasionally, the bases of shafts are enlarged (i.e., belled or underreamed) to improve the load capacity of end bearing shafts on less than desirable soils, or to increase the uplift resistance of floating shafts.

Effects of ground and ground water conditions on shaft construction operations should be considered and delineated, when necessary, the general method of construction to be followed to ensure the expected performance. Because shafts derive their capacity from side and tip resistance which are a function of the condition of the materials in direct contact with the shaft, it is important that the construction procedures be consistent with the material conditions assumed in the design. Softening, loosening or other changes in soil and rock conditions caused by the construction method could result in a reduction in shaft capacity and an increase in shaft displacement. Therefore, evaluation of the effects of shaft construction procedure on load capacity must be considered an inherent aspect of the design.

Drilled shafts are normally sized in 15.24cm (6-inch diameter increments with a minimum diameter of 45.72cm (18")). The diameter of a shaft socketed into rock should be a minimum of 15.24cm (6") larger than the socket diameter.

If a shaft must be inspected by the entry of a person, the shaft diameter shall not be less than 76.20cm (30").

Drilled shafts constructed in dry, noncaving soils can usually be excavated without lateral support of the hole. Other ground conditions where caving, squeezing or sloughing soils are present require installation of a steel casing or use of a slurry for support of the hole. Such conditions and techniques may result in loosening of soil around the shaft, or altering of frictional resistance between the concrete shaft and surrounding soil.

The center-to-center spacing between shafts is normally restricted to a minimum of 3B to minimize the effects of interaction between adjacent shafts during construction or in service. However, larger spacings may be required where drilling operations are difficult or where construction must be completed in very short time frames.

Particular attention should be given to the potential for deposition of loose or wet material in the bottom of the hole, or the buildup of a cake of soft material around the shaft perimeter prior to concrete placement. Adequate cleaning and inspection of rock sockets should always be performed to assure

good contact between the rock and shaft concrete. If good contact along the shaft cannot be confirmed, it may be necessary to assume that all load is transferred to the tip. If the deposition of soft or loose material in the bottom of the hole is expected, the shaft may have to be designed to carry the entire design load through side resistance.

A number of methods can be used to prevent caving during the drilling of holes and the placement of concrete. It is preferred that drilled shafts be constructed in stable non-sloughing soil without excessive ground water. If impossible, consider the following three different construction methods:

a. The construction of the pile or shaft in a wet condition while the walls of the excavation are stabilized by hydrostatic pressure of water or a mineral slurry until the concrete is placed by tremie methods for the full length of the pile.

Mineral slurry used in the drilling process shall have both a mineral grain size that will remain in suspension and sufficient viscosity and gel characteristics to transport excavated material to a suitable screening system. The percentage and specific gravity of the material used to make the suspension shall be sufficient to maintain the stability of the excavation and to allow proper concrete placement. The level of the slurry shall be maintained at a height sufficient to prevent caving of the hole.

The mineral slurry shall be premixed thoroughly with clean fresh water and adequate time allotted for hydration prior to introduction into the shaft excavation. Adequate slurry tanks will be required when specified. No excavated slurry pits will be allowed when slurry tanks are required on the project without written permission of the Engineer. Adequate desanding equipment will be required when specified. Steps shall be taken as necessary to prevent the slurry from “setting up” in the shaft excavation, such as agitation, circulation, and adjusting the properties of the slurry.

Control tests using suitable apparatus shall be carried out by the Contractor on the mineral slurry to determine density, viscosity, and pH. An acceptable range of values for those physical properties is shown in the following table.

<b>Range of Values (At 20o [68oF])</b> Property (Units)	Time of Slurry Introduction	Time of Concreting (In Hole)	Test Method
Density (KN/m3)	10.10 to 10.86	10.10 to 11.79	Density Balance
Viscosity (sec. per quart)	28 to 45	28 to 45	Marsh Cone
pH	8 to 11	8 to 11	pH Paper or Meter

Note:

a) Increase density values by 0.314 KN/m3 (2 pcf) in salt water.

b) If desanding is required; sand content shall not exceed 4 percent (by volume) at any point in the shaft excavation as determined by the American Petroleum Institute sand content test.

Tests to determine density, viscosity and pH values shall be done during the shaft excavation to establish a consistent working pattern.

Prior to placing shaft concrete, slurry samples shall be taken from the bottom and at intervals not exceeding 3.05m (10 feet) for the full height of slurry. Any heavily contaminated slurry that has accumulated at the bottom of the shaft shall be eliminated. The mineral slurry shall be within specification requirements immediately before shaft concrete placement.

### **Excavation Inspection**

The Contractor shall provide equipment for checking the dimensions and alignment of each shaft excavation. The Contractor under the direction of the Engineer shall determine the dimensions and alignment of the drilled shaft. Final shaft depth shall be measured after final cleaning.

The base of the shaft excavation may be cleaned using a cleaning bucket followed by airlifting. Reverse circulation techniques may also be used to clean the base of the shaft. The shaft excavation shall be cleaned so that a minimum of 50 percent of the base will have less than 12.5mm of sediment and at no place on the base more than 37.5mm of sediment. The Engineer will determine shaft cleanliness.

b. The use of steel casing which is installed during drilling operations to hold the hole open and usually withdrawn during concrete placement.

Casing, if used in operation, shall be metal, smooth, clean, watertight, and of ample strength to withstand both handling and driving stresses and the pressure of both concrete and the surrounding earth materials. The outside diameter of casing shall not be less than the specified size of the shaft. It shall conform to AASHTO M 270 (ASTM A 709) Grade 36 unless otherwise specified.

Temporary casings shall be removed while the concrete remains workable. Generally the removal of temporary casing shall not be started until concrete placement in the shaft is at or above ground surface. Movement of casing by rotating, exerting downward pressure and tapping to facilitate extraction or extraction with a vibratory hammer will be permitted. Casing extraction shall be at a slow, uniform rate with the pull in line with the shaft axis.

A sufficient head of concrete shall be maintained above the bottom of the casing to overcome the hydrostatic pressure of water or drilling fluid outside of the casing.

c. The use of a permanent casing which is left in place within the portion of the pile which is in unstable material.

A permanent casing is applied as protection from the presence of surface water during drilling and as support later for the installation of the rebar cage and as a concrete form in drilling under water.

### **Reinforcing Steel Cage Construction and Placement**

The reinforcing steel cage consisting of the steel shown on the Plans plus cage stiffener bars, spacers, centralizers and any other necessary appurtenances shall be completely assembled and placed as a unit immediately after the shaft excavation is inspected and accepted and prior to shaft concrete placement.

Where the reinforcing cage length is too long for placement as a single unit the cage may be placed in separate units such that appropriate means of splicing the longitudinal steel is provided for. The Contractor shall submit his plans for such splices to the Engineer for approval.

The reinforcing steel in the hole shall be tied and supported so that the reinforcing steel will remain within allowable tolerances until the concrete will support the reinforcing steel. When concrete is placed by suitable tubes, temporary hold-down devices shall be used to prevent uplifting of the steel cage during concrete placement. Concrete spacers or other approved noncorrosive spacing devices shall be used at sufficient intervals not exceeding 1.50 meters along the shaft to insure concentric location of the cage within the shaft excavation. When the size of the longitudinal reinforcing steel exceeds 25mm, such spacing shall not exceed 3.0 meters.

### **Concrete Placement, Curing and Protection**

Concrete shall be placed as soon as possible after reinforcing steel cage placement. Concrete placement shall be continuous in the shaft to the top elevation of the shaft. Placement shall continue after the shaft is full until good quality concrete is evident at the top of the shaft. Concrete shall be placed through a suitable tube.

For piles less than 2.5 meters in diameter, the elapsed time from the beginning of concrete placement in the shaft to the completion of placement shall not exceed 2 hours. For piles 2.50 meters and greater in diameter, the concrete placing rate shall not be less than 9.0 meters of pile height per each 2-hour period. The concrete mix shall be of such design that the concrete remains in a workable plastic state throughout the 2-hour placement limit.

When the top of pile elevation is above ground, the portion of the pile above ground shall be formed with a removable form or permanent casing when specified.

The upper 1.5 meters of concrete shall be vibrated or rodded to a depth of 1.5 meter below the ground surface except where soft uncased soil or slurry remaining in the excavation will possibly mix with the concrete.

After placement, the temporarily exposed surfaces of the shaft concrete shall be cured in accordance with the provision in Sub-section 407.3.8 – Curing Concrete.

For at least 48 hours after pile concrete has been placed, no construction operations that would cause soil movement adjacent to the shaft, other than mild vibration, shall be conducted.

### **Construction Tolerances:**

The following tolerances shall be maintained in constructing drilled shaft.

a. The drilled shaft shall be within 7.62cm (6”) of the plan position in the horizontal plane at the plan elevation for the top of the shaft.

b. The vertical alignment of the shaft excavation shall not vary from the plan alignment by more than 20.83 mm/m (1/4 inch per foot) of depth.

c. After all the shaft concrete is placed, the top of the reinforcing steel cage shall be no more than 15.24 cm (6”) above and no more than 7.62 cm (3”) below plan position.

d. When casing is used, its outside diameter shall not be less than the shaft diameter shown on the plans. When casing is not used, the minimum diameter of the drilled shaft shall be the diameter shown on the plans for diameters 60.96 cm (24”) or less, and not more than 2.54

cm (1 inch) less than the diameter shown on the plans for diameters greater than 60.96 cm (24”).



- e. The bearing area of bells shall be excavated to the plan bearing area as a minimum. All other plan dimensions shown for the bells may be varied, when approved, to accommodate the equipment used.
- f. The top elevation of the shaft shall be within 2.54 cm (1 inch) of the plan top of shaft elevation.
- g. The bottom of the shaft excavation shall be normal to the axis of the shaft within 62.5 mm/m (3/4 inch per foot) of shaft diameter.

Drilled shaft excavations constructed in such a manner that the concrete shaft cannot be completed within the required tolerances are unacceptable.

**400.3.8 Steel H-Pile**

Steel H-Pile shall consist of structural steel shapes of the sections indicated on the Plans. When placed in the leads, the pile shall not exceed the camber and sweep permitted by allowable mill tolerance. Piles bent or otherwise damaged will be rejected. The loading, transporting, unloading, storing and handling of steel H-pile shall be conducted so that the metal will be kept clean and free from damage.

**400.3.9 Unfilled Tubular Steel Piles**

The tubular steel piles should be or as specified by the Engineer.

The minimum wall thickness shall be as indicated in the following table: Outside Diameter	Less than 355 mm	355 mm and over
Minimum wall thickness	6.5 mm	9.5 mm

Cutting shoes for piles driven open end may be inside or outside of the pipe. They may be high carbon structural steel with a machined ledged for pile bearing or cast steel with a ledge, designed for attachment with a simple weld.

**400.3.10 Splicing**

Splicing when permitted shall be made as shown on the Plans and in accordance with this Subsection.

1. Precast Concrete Piles

- a. By using prefabricated joints mounted in the forms and cast together with the piles sections and joined together as specified by the manufacturer and approved by the Engineer. The joints shall be of the design and type as specified or shown on the Plans.
- b. By cutting away the concrete at the end of the pile, leaving the reinforcing steel exposed for a length of 40 bar diameters for corrugated or deformed bars and 60 bar diameters for plain bars. The final cut of the concrete shall be perpendicular to the axis of the pile. Reinforcement of the same size as that used in the pile shall be spliced to the projecting steel in accordance with Item 404, Reinforcing Steel, and the necessary formwork shall be placed, care being taken to prevent leakage along the pile. The concrete shall be of the same quality as that used in the pile. Just prior to placing concrete, the top of the pile shall be wetted thoroughly and covered with a thin coating of neat cement, retempered mortar,

or other suitable bonding material to the satisfaction of the Engineer. The forms shall remain in place not less than seven (7) days. The pile shall not be driven until the safe design has been reached.

c. By any other method shown on the Plans or approved by the Engineer. Curing and finishing of extensions shall be the same as in the original pile.

## 2. Prestressed Piles

Splicing of prestressed precast piles will generally not be permitted, but when permitted, it shall be made in accordance with (1) above, but only after driving has been completed. Reinforcement bars shall be included in the pile head for splicing to the extension bars. No additional driving will be permitted. The Contractor, at his option, may submit alternative plans of splicing for consideration by the Engineer.

## 3. Steel Piles, Shells or Pipes

If the length of the steel pile, shell or pipe driven is insufficient to obtain the specified bearing power, an extension of the same cross-section shall be spliced to it. Unless otherwise shown on the Plans, splices shall be made by butt-welding the entire cross-sections to form an integral pile using the electric arc method. The sections connected shall be properly aligned so that the axis of the pile shall be straight. Bent and/or damaged piles shall be rejected.

### **400.3.11 Cutting Off and Capping Piles**

The top of foundation piles shall be embedded in the concrete footing as shown on the Plans.

Concrete piles shall, when approved by the Engineer, be cut off at such a level that at least 300mm of undamaged pile can be embedded in the structure above. If a pile is damaged below this level, the Contractor shall repair the pile to the satisfaction of the Engineer. The longitudinal reinforcement of the piles shall be embedded in the structure above to a length equal to at least 40 times the diameter of the main reinforcing corrugated bars (60 diameters for plain bars). The distance from the side of any pile to the nearest edge of the cap shall not be less than 200mm.

When the cut off elevation for a precast pile or for the steel shell or pile for a cast in place concrete pile is below the elevation of the bottom of the pile cap, the pile may be built-up from the butt of the pile to the elevation of the bottom of the cap by means of reinforced concrete extension constructed in accordance with Subsection 400.3.10 or as approved by the Engineer.

Cut-offs of structural steel piles shall be made at right angles to the axis of the pile. The cuts shall be made in clear, straight lines and any irregularity due to cutting or burning shall be leveled-off with deposits of weld metal prior to placing bearing caps.

### **400.3.12 Defective Piles**

Any pile delivered with defects, or damaged in driving due to internal defects or by improper driving, or driven out of its proper location, or driven below the elevation fixed by the Plans or by the Engineer, shall be corrected at the Contractor's expense by one of the following methods approved by the Engineer for the pile in question:

1. Any pile delivered with defects shall be replaced by a new pile.
2. Additional pile shall be driven/casted at the location as directed by the Engineer.
3. The pile shall be spliced or built-up as otherwise provided herein on the underside of the footing lowered to properly embed the pile.

A precast concrete pile shall be considered defective if it has a visible crack, extending around the four sides of the pile, or any defect which, in the opinion of the Engineer, affects the strength or life of the pile.

When a new pile is driven or cast to replace a rejected one, the Contractor at his own expense, shall enlarge the footing as deemed necessary by the Engineer.

#### **400.3.13 Protecting Untreated Timber Trestle Piles**

The heads of untreated piles shall be treated as follows:

The sawed surface shall be thoroughly brush-coated with two (2) applications of hot creosote oil or other approved preservative.

#### **400.3.14 Protecting Treated Timber Trestle Piles**

All cuts and abrasions in treated timber piles shall be protected by a preservative approved by the Engineer.

#### **400.3.15 Painting Steel Piles**

Unless otherwise provided, when required steel piles extend above the ground surface or water surface, they shall be protected by paint as specified for cleaning and painting metal surfaces in accordance with Item 403, Metal Structures. This protection shall extend from the elevation shown on the Plans to the top of the exposed steel.

#### **400.3.16 Pile Records**

The Contractor shall keep records of all piles driven or installed. A copy of the record shall be given to the Engineer within two (2) days after each pile is driven. The record form to be used shall be approved by the Engineer. The pile records shall give full information on the following: Driven Piles

#### **Cast-in-Place Piles**

1. Pile type and dimension
2. Date of casting and concrete quality (for concrete piles)
3. Date of driving
4. Driving equipment: type, weight & efficiency of hammer, etc.
5. Description of cushion on pile head

1. Date of boring or driving (For steel shell) & casting
2. Pile type and nominal dimension
3. Length of finished pile and tip elevation
4. Details of penetration during boring or driving of steel shell (driving records as for driven piles)

- |  |   |
|--|---|
| 6. Depth driven and tip elevation  | 5. Concrete quality and consistency                       |
|  | 6. Time interval between boring or driving and concreting |
| 7. Final set for the last 20 blows (for every 10 piles and when the Engineer so requires the penetration along the whole depth driven shall be recorded) | 7. Volume of concrete placed in concrete                  |
| 8. For gravity and single-acting hammers: the height of drop   |   |
| 9. For double acting-hammers --- the frequency of blows  |   |
| 10. Details of any interruption in driving   |   |
| 11. Level of pile top immediately after driving and the level when all piles in the group are driven   |   |
| 12. Details of re-driving  |   |

#### **400.4 Method of Measurement**

##### **400.4.1 Timber, Steel and Precast Concrete Piles**

###### **1. Piles Furnished**

The quantity to be paid for will be the sum of the lengths in metres of the piles of the several types and lengths ordered in writing by the Engineer, furnished in compliance with these Specifications and stockpiles in good condition at the project site by the Contractor and accepted by the Engineer. The length to be paid for will include test and tension piles ordered by the Engineer, but not those furnished by the Contractor at his option. No allowance will be made for piles, including test piles, furnished by the Contractor to replace piles previously accepted by the Engineer that are subsequently lost or damaged while in stockpile, or during handling or driving, and are ordered by the Engineer to be removed from the site of work.

In case extensions of piles are necessary, the extension length will be included in the length of pile furnished, except for cut off lengths used for extensions and already measured for payment.

###### **2. Piles Driven**

The quantity to be paid for will be the sum of the lengths in metres of the piles driven in the completed work measured from the pile tip elevation to the bottom of pile caps, footings or bottom of concrete superstructure in the case of pile bents. Measurement will not include additional piles or test piles driven that may be necessary to suit the Contractor's method of construction and were driven at his option.

Unless otherwise provided for, preboring, jetting or other methods used for facilitating pile driving operations will not be measured directly but will be considered subsidiary to pay items.

#### **400.4.2 Cast-In-Place Concrete Piles**

The quantity to be paid for will be the sum of actual lengths in meters of the piles cast and left in-place in the completed and accepted work.

Measurements will be from the pile tip to the bottom of cap or footing. Portions of piles cast deeper than the required length through over-drilling will not be measured for payment.

#### **400.4.3 Pile Shoes**

The quantity to be paid for, including test pile shoes, will be the number of pile shoes driven shown on the Plans or ordered in writing by the Engineer, furnished by the Contractor in accordance with these Specifications and accepted by the Engineer. Pile shoes furnished by the Contractor at his option or to replace those that are lost or damaged in stockpile or handling will not be measured for payment.

#### **400.4.4 Load Tests**

The quantity of the load tests to be paid for will be the number of tests completed and accepted except that load tests made to calibrate different types of hammers, if not included in the Bill of Quantities, will not be measured for payment.

Anchor and test piling which are not part of the completed structure, will be included in the unit bid price for each "Load Test". Anchor and test piling or anchor and test shafts which are a part of the permanent structure will be paid for under the appropriate Item.

#### **400.4.5 Splices**

The quantity to be paid for will be the number of splices which may be required to drive the pile in excess of the estimated length shown on the Plans for cast-in-place steel pipes or shells or in excess of the order length furnished by the Engineer for all other types of piling. Splices made for the convenience of the Contractor or to fabricate piles cut offs will not be paid for.

#### **400.5 Basis of Payment**

The accepted quantities, measured as prescribed in Section 400.4 shall be paid for at the contract unit price for each of the particular item listed below that is included in the Bill of Quantities, which price and payment shall be full compensation for furnishing and placing all materials, including all labor equipment tools and incidentals as well as temporary works, staging areas or craneway necessary to complete the work prescribed in this Item.

Payment will be made under:

Pay Item	Description	Unit of Measurement
400 (1)	Untreated Timber Piles, furnished	Meter
400 (2)	Treated Timber Piles, preservative, furnished	Meter
400 (3)	Steel H-Piles, furnished	Meter
400 (4)	Precast Concrete Piles, furnished	Meter
400 (5)	Precast, Prestressed Concrete Piles, furnished	Meter
400 (6)	Structural Steel Sheet Piles, furnished	Meter
400 (7)	Precast Concrete Sheet Piles, furnished	Meter
400 (8)	Untreated Timber Piles, driven	Meter
400 (9)	Treated Timber Piles, driven	Meter
400 (10)	Steel H-Piles, driven	Meter
400 (11)	Steel Pipes Piles	Meter
400 (12)	Structural Steel Sheet Piles, driven	Meter
400 (13)	Precast Concrete Sheet Piles, driven	Meter
400 (14)	Precast Concrete Piles, driven	Meter
400 (15)	Precast, Prestressed Concrete Piles, driven	Meter
400 (16)	Test Piles, furnished and driven	Meter
400 (17)	Concrete Piles cast in Drilled Holes	Meter
400 (18)	Concrete Piles cast in Steel Shells	Meter
400 (19)	Concrete Piles cast in Steel Pipes	Meter
400 (20)	Pile Shoes	Each
400 (21)	Splices	Each
400 (22)	Load Tests	Each
400 (23)	Bored Piles (dia. ___m)	Meter
400 (24)	Permanent Casing (dia. ___m)	Meter

## **ITEM 404 – REINFORCING STEEL**

### **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 min. lap	Grade 60 min. lap	But not less than
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
404	Reinforcing Steel	Kilogram



## **ITEM 405 – STRUCTURAL CONCRETE**

### **405.1 Description**

#### **405.1.1 Scope**

This Item shall consist of furnishing, bending, placing and finishing concrete in all structures except pavements in accordance with this Specification and conforming to the lines, grades, and dimensions shown on the Plans. Concrete shall consist of a mixture of Portland Cement, fine aggregate, coarse aggregate, admixture when specified, and water mixed in the proportions specified or approved by the Engineer.

#### **405.1.2 Classes and Uses of Concrete**

Five classes of concrete are provided for in this Item, namely: A, B, C, P and Seal. Each class shall be used in that part of the structure as called for on the Plans.

The classes of concrete will generally be used as follows:

Class A – All superstructures and heavily reinforced substructures. The important parts of the structure included are slabs, beams, girders, columns, arch ribs, box culverts, reinforced abutments, retaining walls, and reinforced footings.

Class B – Footings, pedestals, massive pier shafts, pipe bedding, and gravity walls, unreinforced or with only a small amount of reinforcement.

Class C – Thin reinforced sections, railings, precast R.C. piles and cribbing and for filler in steel grid floors.

Class P – Prestressed concrete structures and members.

Seal – Concrete deposited in water.

### **405.2 Material Requirements**

#### **405.2.1 Portland Cement**

It shall conform to all the requirements of Subsection 311.2.1.

#### **405.2.2 Fine Aggregate**

It shall conform to all the requirements of Subsection 311.2.2.

#### **405.2.3 Coarse Aggregate**

It shall conform all the requirements of Subsection 311.2.3 except that gradation shall conform to Table 405.1.

Table 405.1 – Grading Requirements for Coarse Aggregate

Sieve Designation		Mass Percent Passing					Class Seal
Standard	Alternate	Class A	Class B	Class C	Class P		
Mm	US Standard						
63	2-1/2"	100	100	100	100	100	
50	2"	95 – 100	95 – 100	90 – 100	95 – 100	95 – 100	
37.5	1-1/2"	-	-	40 – 70	-	-	
25	1"	35 – 70	35 – 70	0 – 15*	20 – 55	25 – 60	
19.0	3/4"	-	-		0 – 10*	-	
12.5	1/2"	10 – 30	10 – 30			0 – 10*	
9.5	3/8"	0 - 5	- 0 - 5				
4.75	No.4						

\* The measured cement content shall be within plus (+) or minus (-) 2 mass percent of the design cement content.

#### **405.2.4 Water**

It shall conform to the requirements of Subsection 311.2.4

#### **405.2.5 Reinforcing Steel**

It shall conform to the requirements of Item 710, Reinforcing Steel and Wire Rope.

#### **405.2.6 Admixtures**

Admixtures shall conform to the requirements of Subsection 311.2.7

#### **405.2.7 Curing Materials**

Curing materials shall conform to the requirements of Subsection 311.2.8.

#### **405.2.8 Expansion Joint Materials**

Expansion joint materials shall be:

1. Preformed Sponge Rubber and Cork, conforming to AASHTO M 153.
2. Hot-Poured Elastic Type, conforming to AASHTO M 173.
3. Preformed Fillers, conforming to AASHTO M 213.

#### **405.2.9 Elastomeric Compression Joint Seals**

These shall conform to AASHTO M 220.

#### **405.2.10 Elastomeric Bearing Pads**

These shall conform to AASHTO M 251 or Item 412 – Elastomeric Bearing Pads.

**405.2.11 Storage of Cement and Aggregates**

Storage of cement and aggregates shall conform to all the requirements of Subsection 311.2.10.

**405.3 Sampling and Testing of Structural Concrete**

As work progresses, at least one (1) sample consisting of three (3) concrete cylinder test specimens, 150 x 300mm (6 x 12 inches), shall be taken from each seventy five (75) cubic meters of each class of concrete or fraction thereof placed each day.

Compliance with the requirements of this Section shall be determined in accordance with the following standard methods of AASHTO:

Sampling of fresh concrete T 141

Weight per cubic metre and air content (gravi-Metric) of concrete T 121

Sieve analysis of fine and coarse aggregates T 27

Slump of Portland Cement Concrete T 119

Specific gravity and absorption of fine aggregate T 84

Tests for strength shall be T 23  
made in accordance with the  
following: Making and curing  
concrete compressive and  
flexural tests specimens in the  
field

Compressive strength of T 22  
molded concrete Cylinders

Class Of Concrete	Minimum Cement Content Per m <sup>3</sup> kg (bag**)	Maximum Water/ Cement Ratio kg/kg	Consisten cy Range in Slump mm (inch)	Designate d Size of Coarse Aggregate Square Opening Std. mm	Minimum Compressive Strength of 150x300mm Concrete Cylinder Specimen at 28 days, MN/m <sup>2</sup> (psi)
-------------------------	---	---	---	--	--

A	360	0.53	50 – 100	37.5	–	20.7
B	(9 bags)	0.58	(2 – 4)	4.75		(3000)
C	320	0.55	50 – 100	(1-1/2”	–	16.5
P	(8 bags)	0.49	(2 – 4)	No. 4)		(2400)
Seal	380	0.58	50 – 100	50 – 4.75		20.7
	(9.5 bags)		(2 – 4)	(2” – No.		(3000)
	440		100 max.	4)		37.7
	(11 bags)		(4 max.)	12.5	–	(5000)
	380		100 – 200	4.75		20.7
	(9.5 bags)		(4 - 8)	(1/2”	–	(3000)
				No. 4)		
				19.0	–	
				4.75		
				(3/4”	–	
				No. 4)		
				25 – 4.75		
				(1” – No.		
				4)		

\* The measured cement content shall be within plus or minus 2 mass percent of the design cement content.

\*\* Based on 40 kg/bag

#### 405.4.2 Consistency

Concrete shall have a consistency such that it will be workable in the required position. It shall be of such a consistency that it will flow around reinforcing steel but individual particles of the coarse aggregate when isolated shall show a coating of mortar containing its proportionate amount of sand. The consistency of concrete shall be gauged by the ability of the equipment to properly place it and not by the difficulty in mixing and transporting. The quantity 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.

#### 405.4.3 Batching

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

##### 1. Portland Cement

Either sacked or bulk cement may be used. No fraction of a sack of cement shall be used in a batch of concrete unless the cement is weighed. All bulk cement shall be weighed on an approved weighing device. The bulk cement weighing hopper shall be properly sealed and vented to preclude dusting operation. The discharge chute shall not be suspended from the weighing hopper and shall be so arranged that cement will neither be lodged in it nor leak from it.

Accuracy of batching shall be within plus (+) or minus (-) 1 mass percent.

##### 2. Water

Water may be measured either by volume or by weight. The accuracy of measuring the water shall be within a range of error of not more than 1 percent.

### 3. Aggregates

Stockpiling of aggregates shall be in accordance with Subsection 311.2.10. All aggregates whether produced or handled by hydraulic methods or washed, shall be stockpiled or binned for draining for at least 12 hours prior to batching. Rail shipment requiring more than 12 hours will be accepted as adequate binning only if the car bodies permit free drainage. If the aggregates contain high or non-uniform moisture content, storage or stockpile period in excess of 12 hours may be required by the Engineer.

Batching shall be conducted as to result in a 2 mass percent maximum tolerance for the required materials.

### 4. Bins and Scales

The batching plant shall include separate bins for bulk cement, fine aggregate and for each size of coarse aggregate, a weighing hopper, and scales capable of determining accurately the mass of each component of the batch.

Scales shall be accurate to one-half (0.5) percent throughout the range used.

### 5. Batching

When batches are hauled to the mixer, bulk cement shall be transported either in waterproof compartments or between the fine and coarse aggregate. When cement is placed in contact with moist aggregates, batches will be rejected unless mixed within 1-1/2 hours of such contact. Sacked cement may be transported on top of the aggregates.

Batches shall be delivered to the mixer separate and intact. Each batch shall be dumped cleanly into the mixer without loss, and, when more than one batch is carried on the truck, without spilling of material from one batch compartment into another.

### 6. Admixtures

The Contractor shall follow an approved procedure for adding the specified amount of admixture to each batch and will be responsible for its uniform operation during the progress of the work. He shall provide separate scales for the admixtures which are to be proportioned by weight, and accurate measures for those to be proportioned by volume. Admixtures shall be measured into the mixer with an accuracy of plus or minus three (3) percent.

The use of Calcium Chloride as an admixture will not be permitted.

#### **405.4.4 Mixing and Delivery**

Concrete may be mixed at the site of construction, at a central point or by a combination of central point and truck mixing or by a combination of central point mixing and truck agitating. Mixing and delivery of concrete shall be in accordance with the appropriate requirements of AASHTO M 157 except as modified in the following paragraphs of this section, for truck mixing or a combination of central point and truck mixing or truck agitating. Delivery of concrete shall be regulated so that placing is at a continuous rate unless delayed by the placing operations. The intervals between delivery of batches shall not be so great as to allow the concrete in place to harden partially, and in no case shall such an interval exceed 30 minutes.

In exceptional cases and when volumetric measurements are authorized, for small project requiring less than 75 cu.m. per day of pouring, the weight proportions shall be converted to equivalent volumetric proportions. In such cases, suitable allowance shall be made for variations in the moisture condition of the aggregates, including the bulking effect in the fine aggregate. Batching and mixing shall be in accordance with ASTM C 685, Section 6 through 9.

Concrete mixing, by chute is allowed provided that a weighing scales for determining the batch weight will be used.

For batch mixing at the site of construction or at a central point, a batch mixer of an approved type shall be used. Mixer having a rated capacity of less than a one-bag batch shall not be used. The volume of concrete mixed per batch shall not exceed the mixer's nominal capacity as shown on the manufacturer's standard rating plate on the mixer except that an overload up to 10 percent above the mixer's nominal capacity may be permitted, provided concrete test data for strength, segregation, and uniform consistency are satisfactory and provided no spillage of concrete takes place. The batch shall be so charge into the drum that a portion of the water shall enter in advance of the cement and aggregates. The flow of water shall be uniform and all water shall be in the drum by the end of the first 15 seconds of the mixing period. Mixing time shall be measured from the time all materials, except water, are in the drum. Mixing time shall not be less than 60 seconds for mixers having a capacity of 1.5m<sup>3</sup> or less. For mixers having a capacity greater than 1.5m<sup>3</sup>, the mixing time shall not be less than 90 seconds. If timing starts, the instant the skip reaches its maximum raised position, 4 seconds shall be added to the specified mixing time. Mixing time ends when the discharge chute opens.

The mixer shall be operated at the drum speed as shown on the manufacturer's name plate on the mixer. Any concrete mixed less than the specified time shall be discarded and disposed off by the Contractor at his own expenses.

The timing device on stationary mixers shall be equipped with a bell or other suitable warning device adjusted to give a clearly audible signal each time the lock is released. In case of failure of the timing device, the Contractor will be permitted to continue operations while it is being repaired, provided he furnishes an approved timepiece equipped with minute and second hands. If the timing device is not placed in good working order within 24 hours, further use of the mixer will be prohibited until repairs are made.

Retempering concrete will not be permitted. Admixtures for increasing the workability, for retarding the set, or for accelerating the set or improving the pumping characteristics of the concrete will be permitted only when specifically provided for in the Contract, or authorized in writing by the Engineer.

#### 1. Mixing Concrete: General

Concrete shall be thoroughly mixed in a mixer of an approved size and type that will insure a uniform distribution of the materials throughout the mass.

All concrete shall be mixed in mechanically operated mixers. Mixing plant and equipment for transporting and placing concrete shall be arranged with an ample auxiliary installation to provide a minimum supply of concrete in case of breakdown of machinery or in case the normal supply of concrete is disrupted. The auxiliary supply of concrete shall be sufficient to complete the casting of a section up to a construction joint that will meet the approval of the Engineer.

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

Concrete mixers shall be equipped with adequate water storage and a device of accurately measuring and automatically controlling the amount of water used.

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

Weighing equipment shall be insulated against vibration or movement of other operating equipment in the plant. When the entire plant is running, the scale reading at cut-off shall not vary from the weight designated by the Engineer more than one mass percent for cement, 1-1/2 mass percent for any size of aggregate, or one (1) mass percent for the total aggregate in any batch.

## 2. Mixing Concrete at Site

Concrete mixers may be of the revolving drum or the revolving blade type and the mixing drum or blades shall be operated uniformly at the mixing speed recommended by the manufacturer. The pick-up and throw-over blades of mixers shall be restored or replaced when any part or section is worn 20mm or more below the original height of the manufacturer's design. Mixers and agitators which have an accumulation of hard concrete or mortar shall not be used.

When bulk cement is used and volume of the batch is 0.5m<sup>3</sup> or more, the scale and weigh hopper for Portland Cement shall be separate and distinct from the aggregate hopper or hoppers. The discharge mechanism of the bulk cement weigh hopper shall be interlocked against opening before the full amount of cement is in the hopper. The discharging mechanism shall also be interlocked against opening when the amount of cement in the hopper is underweight by more than one (1) mass percent or overweight by more than 3 mass percent of the amount specified.

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

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

Cement shall be batched and charged into the mixer so that it will not result in loss of cement due to the effect of wind, or in accumulation of cement on surface of conveyors or hoppers, or in other conditions which reduce or vary the required quantity of cement in the concrete mixture.

The entire content of a batch mixer shall be removed from the drum before materials for a succeeding batch are placed therein. The materials composing a batch except water shall be deposited simultaneously into the mixer.

All concrete shall be mixed for a period of not less than 1-1/2 minutes after all materials, including water, are in the mixer. During the period of mixing, the mixer shall operate at the speed for which it

has been designed.

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

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

### 3. Mixing Concrete at Central Plant

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

### 4. Mixing Concrete in Truck

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

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

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

When a truck mixer is used for transportation, the mixing time specified in Subsection 405.4.4 (3) at a stationary mixer may be reduced to 30 seconds and the mixing completed in a truck mixer. The mixing time in the truck mixer shall be as specified for truck mixing.

### 5. Transporting Mixed Concrete

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

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

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



The rate of discharge of mixed concrete from truck mixers or agitators shall be controlled by the speed of rotation of the drum in the discharge direction with the discharge gate fully open.

When a truck mixer or agitator is used for transporting concrete to the delivery point, discharge shall be completed within one hour, or before 250 revolutions of the drum or blades, whichever comes first, after the introduction of the cement to the aggregates. Under conditions contributing to quick stiffening of the concrete or when the temperature of the concrete is 30oC, or above, a time less than one hour will be required.

#### 6. Delivery of Mixed Concrete

The Contractor shall have sufficient plant capacity and transportation apparatus to insure continuous delivery at the rate required. The rate of delivery of concrete during concreting operations shall be such as to provide for the proper handling, placing and finishing of the concrete. The rate shall be such that the interval between batches shall not exceed 20 minutes. The methods of delivering and handling the concrete shall be such as will facilitate placing of the minimum handling.

#### 405.5 Method of Measurement

The quantity of structural concrete to be paid for will be the final quantity placed and accepted in the completed structure. No deduction will be made for the volume occupied by pipe less than 100mm (4 inches) in diameter or by reinforcing steel, anchors, conduits, weep holes or expansion joint materials.

#### 405.6 Basis of Payment

The accepted quantities, measured as prescribed in Section 405.5, shall be paid for at the contract unit price for each of the Pay Item listed below that is included in the Bill of Quantities.

Payment shall constitute full compensation for furnishing, placing and finishing concrete including all labor, equipment, tools and incidentals necessary to complete the work prescribed in the item.

Payment will be made under:

Pay Item Number	Description	Unit of Measurement
405 (1)	Structural Concrete, Class A	Cubic Meter
405 (2)	Structural Concrete, Class B	Cubic Meter
405 (3)	Structural Concrete, Class C	Cubic Meter
405 (4)	Structural Concrete, Class P	Cubic Meter
405 (5)	Seal Concrete	Cubic Meter

### ITEM 505 – RIPRAP AND GROUTED RIPRAP

This Item shall consist of the furnishing and placing of riprap with or without grout as the case may be, with or without filter backing, furnished and constructed in accordance with this Specification and to the lines and grades and dimensions shown on the Plans.

Stones for riprap shall consist of rock as nearly as rectangular in section as is practical, except that riprap of Class A may consist of round natural stones. The stones shall be sound, tough, durable,

dense, resistant to the action of air and water, and suitable in all respects for the purpose intended.

Mortar for grouted riprap shall consist of sand, cement and water conforming to the requirements given under Item 405, Structural Concrete, mixed in the proportion of one part cement to three parts sand by volume, and sufficient water to obtain the required consistency.

The horizontal and vertical contact surface between stones shall be embedded by cement mortar having a minimum thickness of 20 mm. Sufficient mortar shall be used to completely fill all voids leaving the face of the stones exposed.

When grouted riprap is specified, stones shall be placed by hand, or individually by machine as specified for riprap placed above the water line. The spaces between the stones shall then be filled with cement mortar throughout the thickness of the riprap. Sufficient mortar shall be used to completely fill all voids, except that the face surface of the stones shall be left exposed.

Grout shall be placed from bottom to top of the surface swept with a stiff broom. After grouting is completed, the surface shall be cured as specified in Item 405, Structural Concrete for a period of at least three days.

The stones shall also be laid in a manner that the vertical and horizontal alignments of the exposed face shall, as possible be maintained in a straight line.

All waste materials shall be properly disposed in an area directed by the LGU Project Engineer.

Chip or cut concrete shall be removed from the water or from the vicinity of the structures immediately after the completion of the concreting works.

Surplus excavated materials shall be disposed in an area designated by the Barangay and the LGU Project Engineer.

The quantities to be measured for payment shall be the number of cubic meters of riprap or grouted riprap, volume of which is included in the **Bill of Quantities**, including stones placed in the toe trench laid in position and accepted.

## **ITEM 508 – HAND-LAID ROCK EMBANKMENT**

### **508.1 Description**

This Item shall consist of hand-laid rock embankment, as designated in the Bid Schedule, constructed in accordance with this Specification and in conformity with the lines and grades shown on the Plans or established by the Engineer.

### **508.2 Material Requirements**

Stones shall be sound and durable and furnished in a well-balanced ranged of sizes meeting the requirements herein.

Unless otherwise provided by the Plans or Special provisions, all stones shall be more than 0.015 cubic meter in volume and not less than 75 percent of the total volume of rock embankment and

shall consist of stones 0.03 cubic meter in volume. Stones obtained from excavation performed under this contract may be used. Adobe stone shall not be used, unless otherwise specified.

### **508.3 Construction Requirements**

Sufficient excavation shall be made to expose a foundation bed that is satisfactory to the Engineer. The stones shall be founded on this bed and laid to the lines and dimensions required.

Stones shall be laid flat and securely placed with broken joint lines. The larger stones shall generally be located in the lower part of the structure and voids shall be eliminated to the extent possible. Spalls smaller than the minimum stone size specified in Section 506.2, Material Requirements, shall be used to check the larger stones solidly in position and to substantially fill voids between the major stones as laid in the embankment. The exposed face of the rock mass shall be reasonably uniform, with no projections of more than 150 mm, beyond the neat lines shown on the Plans or as directed by the Engineer.

Backfill adjacent to the hand-laid rock embankment shall be filled entirely with acceptable material coming from excavation items and compacted.

### **508.4 Method of Measurement**

The quantity to be paid for will be the number of cubic meter of hand-laid rock embankment measured in place, completed and accepted.

### **508.5 Basis of Payment**

The quantity determined, as provided in Section 508.4, Method of Measurement , will be paid for at the contract price per cubic meter for HandLaid Rock Embankment, which price and payment shall constitute full compensation for furnishing, selecting, and transporting stones, for placing stones by hand, for backfilling, and for all labor, equipment, tools and incidentals necessary to complete the Item including foundation excavation.

Payment will be made under:

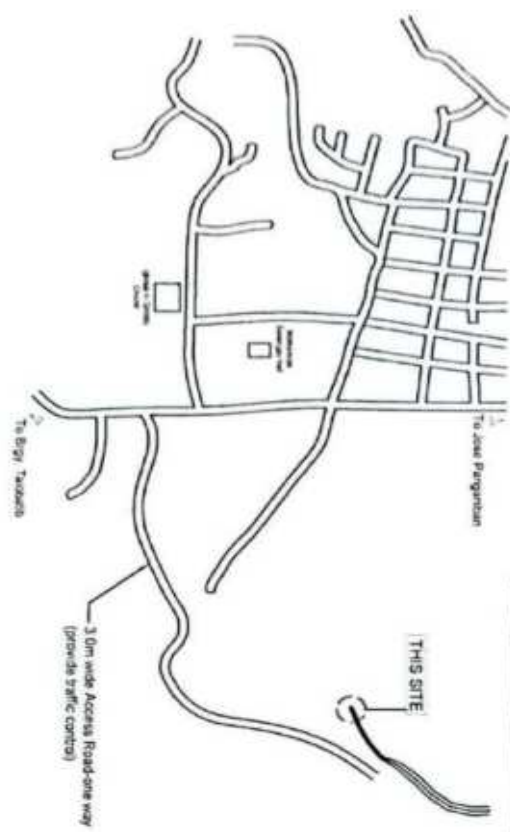
Pay Item Number	Description	Unit of Measurement
508	Hand-Laid Rock Embankment	Cubic Meter



## *Section VII. Drawings*



STATION LIGHT			
From	To	Description	Remarks
0+000	0+064	Line Canal	Both Side
0+064	0+087	Flood Control	Right Side
0+087	0+180.50	Flood Control	Both Side

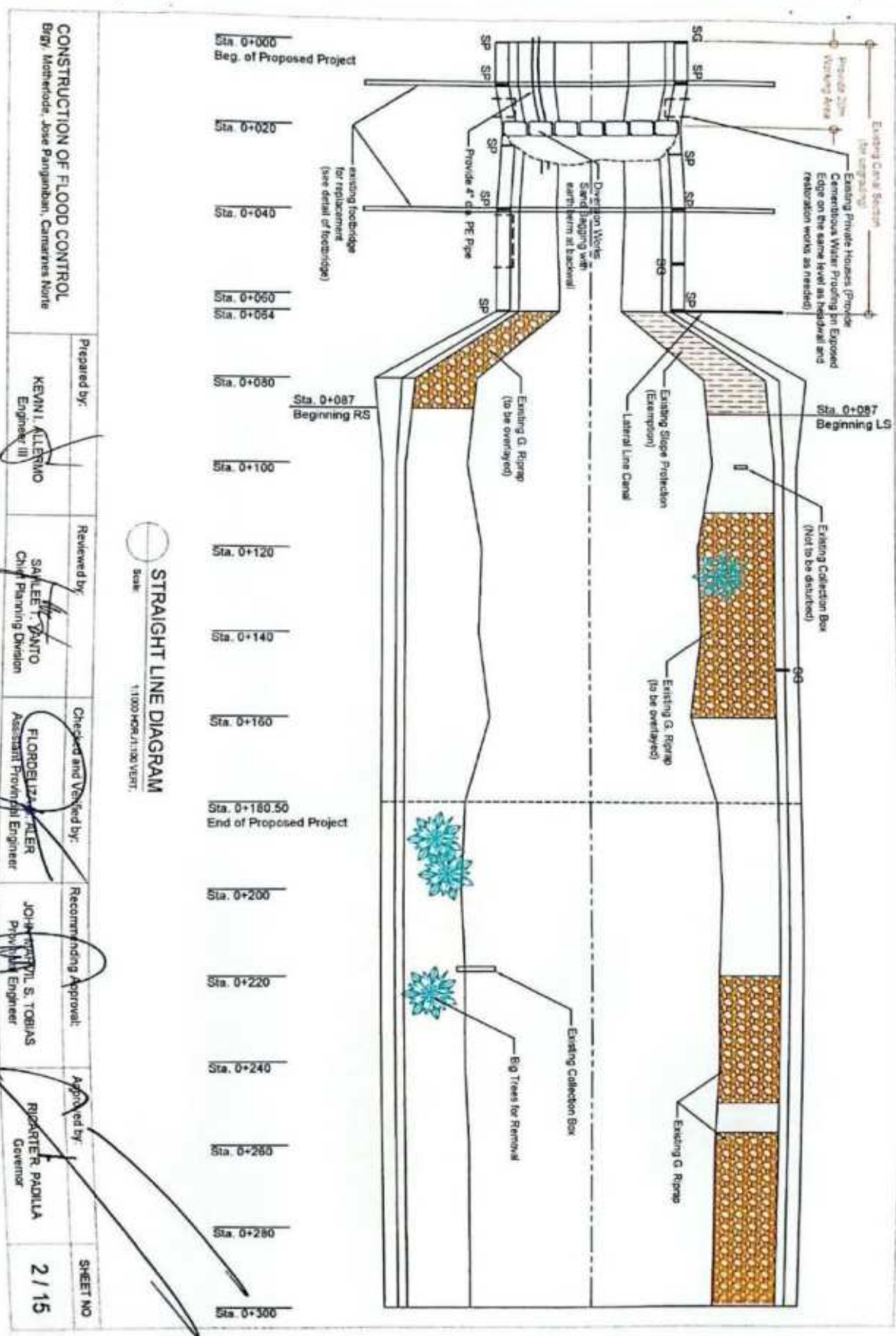


LOCATION MAP  
N.T.S.

ITEM	DESCRIPTION	QTY.	UNIT
I	CLEARING AND GRUBBING	1.00	LS
II	STRUCTURE EXCAVATION	912.46	CUM
III	FOUNDATION FILL	61.28	CUM
IV	SHOPIED, CRABBING AND RELATED WORKS	1.00	LS
V	EMBANKMENT	58.53	CUM
VI	HAZARDOUS ROCK REMOVAL	136.56	CUM
VII	GRAVELLED RIPRAP	231.38	CUM
VIII	CG PIPE PILE	213.00	LM
IX	REINFORCING STEEL BAR	22,339.32	KGS
X	STRUCTURAL CONCRETE	284.02	CUM
XI	SLUICE GATE	1.00	LDT
XII	TRAFFIC MANAGEMENT	1.00	LDT
XIII	BURRHOUSE	1.00	LDT
XIV	OCCUPATIONAL SAFETY AND HEALTH PROGRAM	1.00	LDT
XV	PROJECT BILLBOARD	2.00	UNIT

**CONSTRUCTION OF FLOOD CONTROL**  
Big Motherhood, Jose Panganiban, Comarres Norte

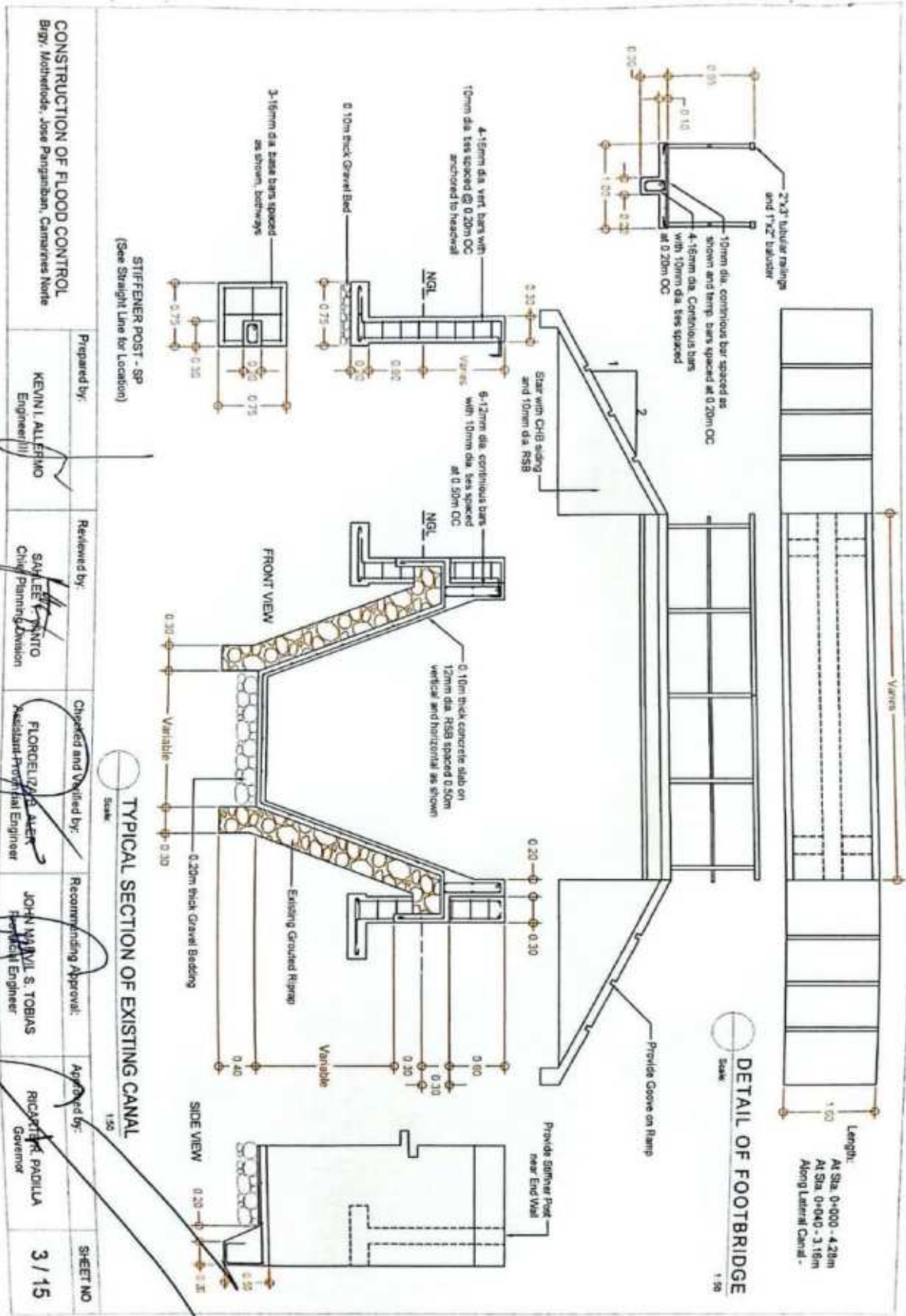
Prepared by: <b>KEVIN I. ALLENJO</b> Engineer III	Reviewed by: <b>SAV-EE DANTO</b> Chief Planning Division	Checked and Verified by: <b>FLORDELIZ AN ALER</b> Assessment Professional Engineer	Recommending Approval: <b>JOHN WIL S. TOBIAS</b> Professional Engineer	Approved by: <b>RODARTE R. PADILLA</b> Governor	SHEET NO <b>1 / 15</b>
---	--	--	--	---	---------------------------



STRAIGHT LINE DIAGRAM  
 Scale 1:1000 HORIZONTAL:VERT.

**CONSTRUCTION OF FLOOD CONTROL**  
 Brgy. Mactorda, Jose Pangamban, Camarines Norte

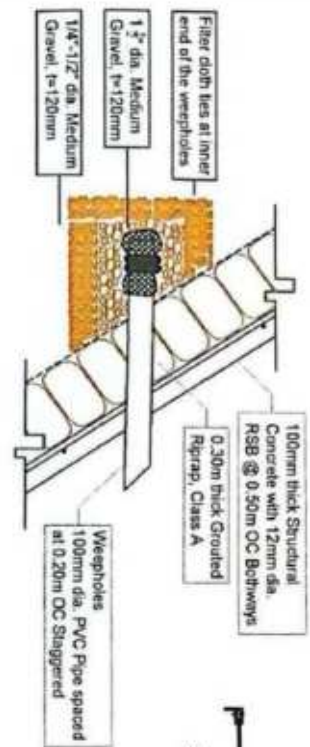
Prepared by: KEVIN I. ALERMO Engineer III	Reviewed by: SANTO JANTO Chief Planning Division	Checked and Verified by: FLORDELIZA ALER Assistant Provincial Engineer	Recommending Approval: JOHN PAUL S. TOBIAS Provincial Engineer	Approved by: RICARTE PADILLA Governor	SHEET NO 2 / 15
---	--	--	--	---	--------------------



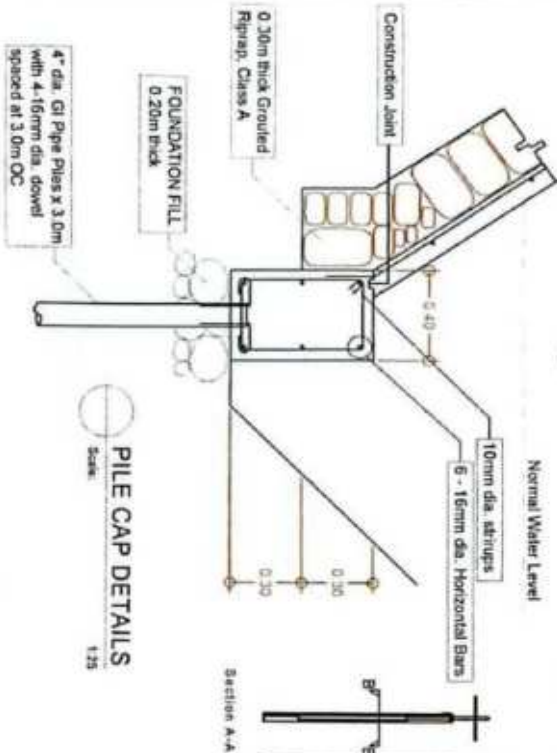
Prepared by:	Reviewed by:	Checked and Verified by:	Recommending Approval:	Approved by:	SHEET NO
KEVIN L. ALEFMO Engineer III	SAVILE P. PANTO Chief Planning Division	FLORENCE Z. ALVARO Assistant Professional Engineer	JOHN MARVIN S. TOBIAS Professional Engineer	RICARDO R. PADILLA Governor	3 / 15



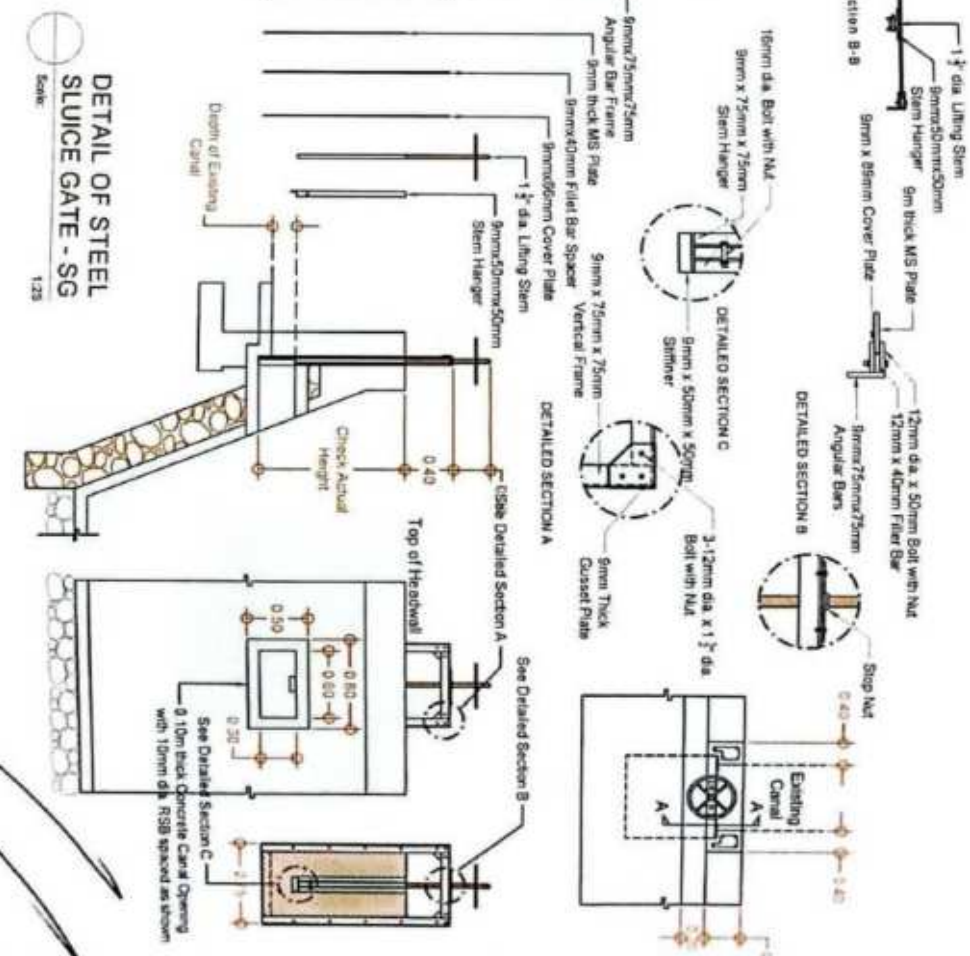




**WEEPHOLE DETAILS**  
Scale: 1:25



**PILE CAP DETAILS**  
Scale: 1:25



**DETAIL OF STEEL SLUICE GATE - SG**  
Scale: 1:25

**CONSTRUCTION OF FLOOD CONTROL**

Prepared by:  
**KEVIN I. ALLANAN**  
Engineer II

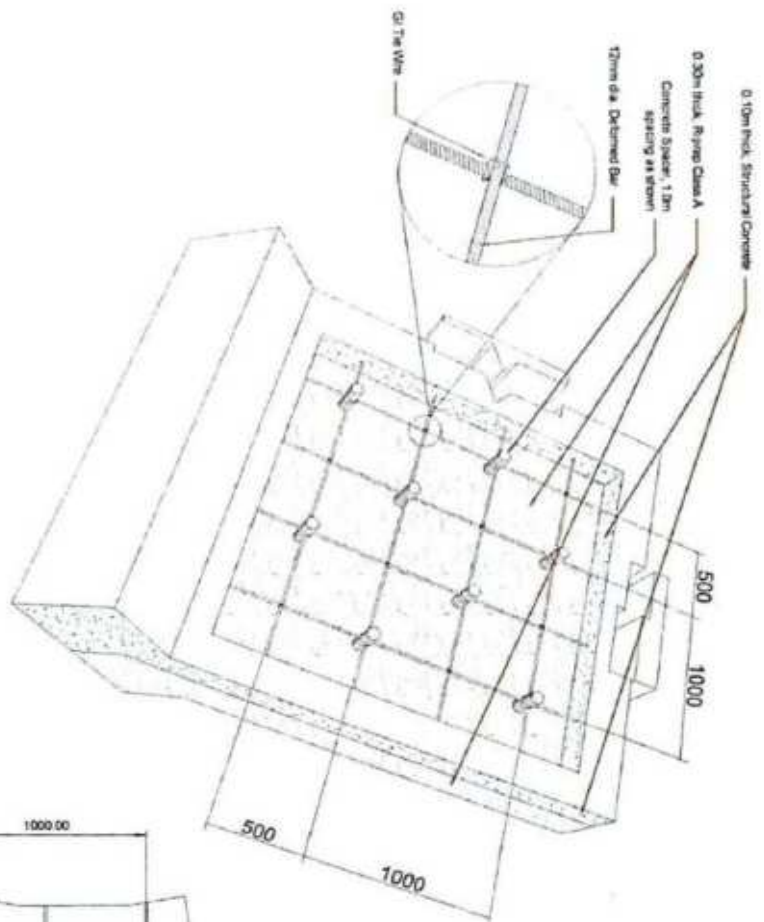
Reviewed by:  
**SAULEE T. MANITO**  
Chief Planning Division

Checked and Verified by:  
**FLORENZILZA B. FERRER**  
Assistant Provincial Engineer

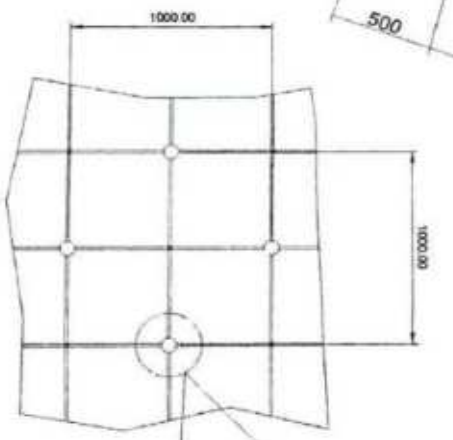
Recommending Approval:  
**JOHN MARVIN S. TOBIAS**  
Provincial Engineer

Approved by:  
**RICARTE R. PADILLA**  
Governor

SHEET NO  
**5 / 15**



PERSPECTIVE VIEW SHOWING CONCRETE SPACER  
N.T.S.



SPACER DETAILS  
1:20

- NOTES:
1. THE LENGTH OF ONE ELEMENT FOR RIGID REINFORCEMENTS SHOULD NOT BE MORE THAN 50M.
  2. USED 40 x 80 x 50mm MARINE PLYWOOD AS FORMWORKING FOR CONCRETE SLOPE.
  3. PROVIDE 75mm x 50mm HEIGHT CONCRETE SPACER TIED IN EVERY ALTERNATE INTERSECTION OF REBARS FOR CONCRETE SLOPE AT TOP OR RIPPAP & BOTTOM OF FORMWORKING.
  4. SPACERS SHALL BE STAGGERED AS FAR AS POSSIBLE AND WITH A MINIMUM SEPARATION OF NOT LESS THAN 40 BAR DIAMETERS. NOT MORE THAN 50% OF THE BARS MAY BE SPAUCED IN THE SAME CROSS-SECTION.
  5. BARS SHALL BE TIED AT ALL INTERSECTIONS EXCEPT WHERE SPACING IS LESS THAN 300MM IN EACH DIRECTION, IN WHICH CASE ALTERNATE INTERSECTIONS SHALL BE TIED. TIES SHALL BE FASTENED ON THE INSIDE.
  6. CONCRETE COVER FOR ALL STRUCTURES SHALL NOT BE LESS THAN 40mm OR AS RECORDED IN THE PLAN.
  7. THE LOWEST LOCATION OF WEERPOLES SHALL BE 500mm ABOVE GROUNDWATER LEVEL.

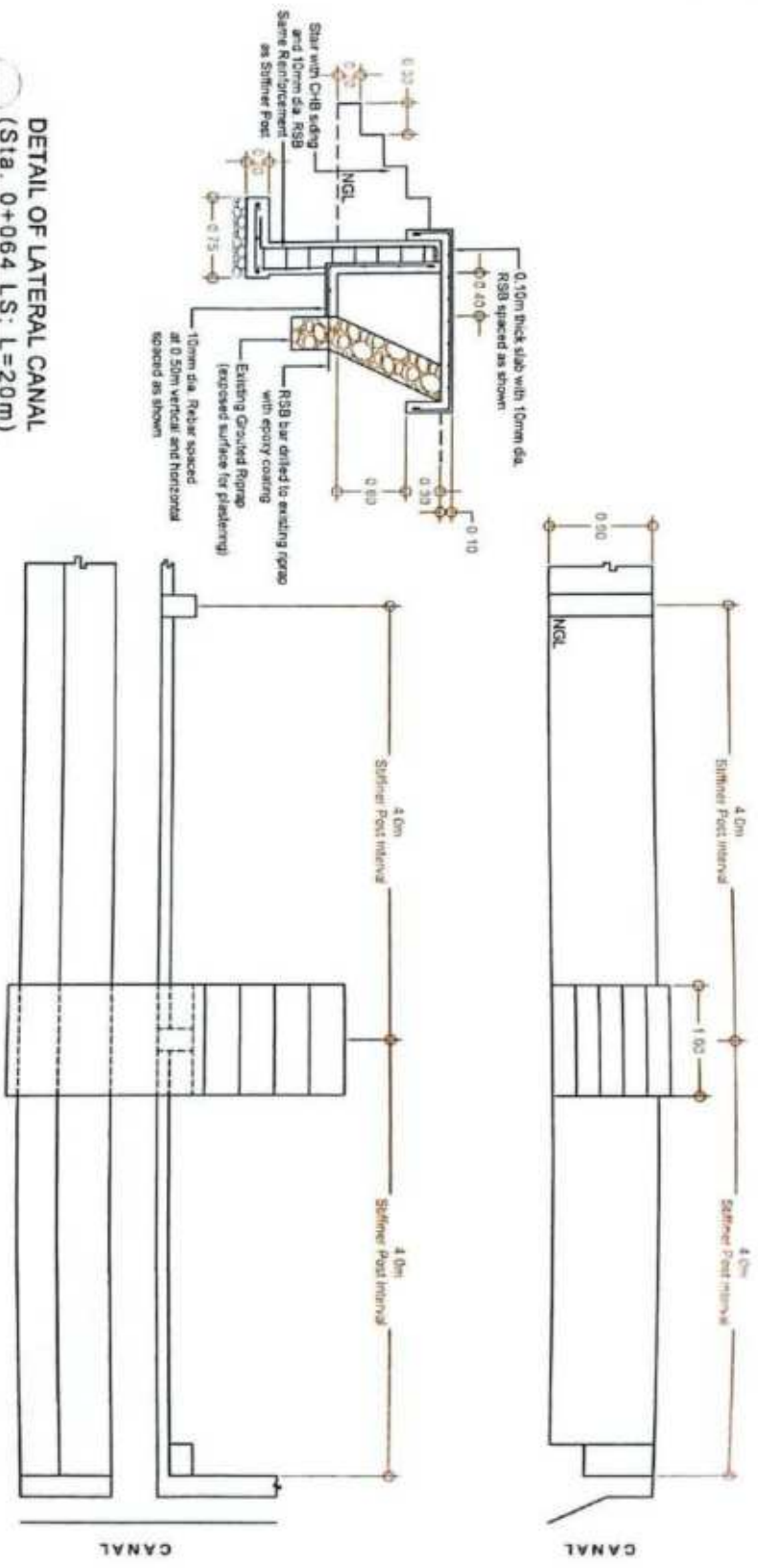
CONSTRUCTION OF FLOOD CONTROL  
Bldg, Motherhood, Jose Panganiban, Camarines Norte

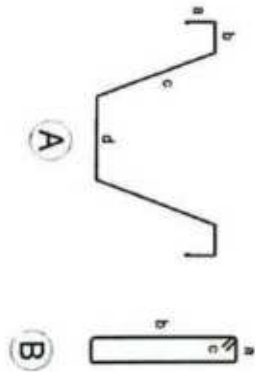
Prepared by:	Reviewed by:	Checked and Verified by:	Recommending Approval:	Approved by:	SHEET NO
KEVIN I. ALERIO Engineer III	SAULEE TABITO Chief Planning Division	FLORDELIZA ALER Assistant Project Engineer	JOHN MARCEL S. TOBIAS Project Engineer	RICARDO PADILLA Governor	6 / 15

**CONSTRUCTION OF FLOOD CONTROL**  
 Brgy. Motherode, Jose Panganiban, Camarines Norte

Prepared by:	Reviewed by:	Checked and Verified by:	Recommending Approval:	Approved by:	SHEET NO
KENNI L. AVERNO Engineer II	SAMUEL ROSTO Chief Planning Division	FLORDELIZA ALER Assistant Electrical Engineer	JOHN MARUL S. TOBIAS Project Engineer	RICARTER KADILLA Governor	7 / 15

**DETAIL OF LATERAL CANAL**  
 (Sta. 0+064 L.S. L=20m)  
 Scale: 1:30

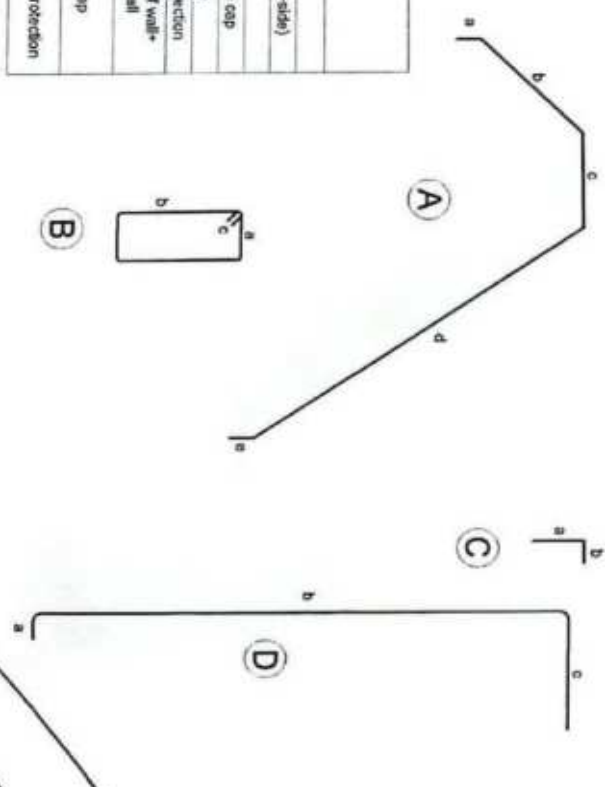




BAR DIAGRAM	SIZE	REINFORCEMENT SCHEDULE								TOTAL LENGTH OF BAR	UNIT WEIGHT	LOCATION
		a	b	c	d	e	f	g				
A	12	1.20	1.20	4.40	1.50	-	-	-	-	8.30	0.89	sidewalk+slope+flooring
B	10	0.30	1.40	0.065	-	-	-	-	-	1.77	0.62	ties at headwall
STR	12	-	-	-	-	-	-	-	-	-	0.89	horizontal bars at head+slope+sidewalk+slope+flooring

BAR BENDING DIAGRAM  
SCALE: 1/16" = 1'-0"

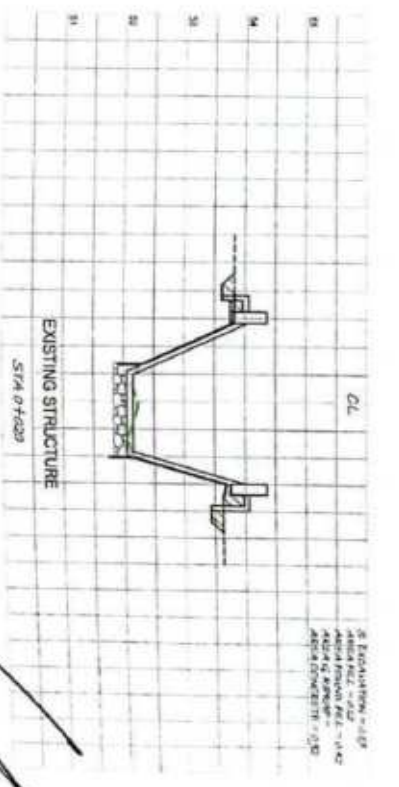
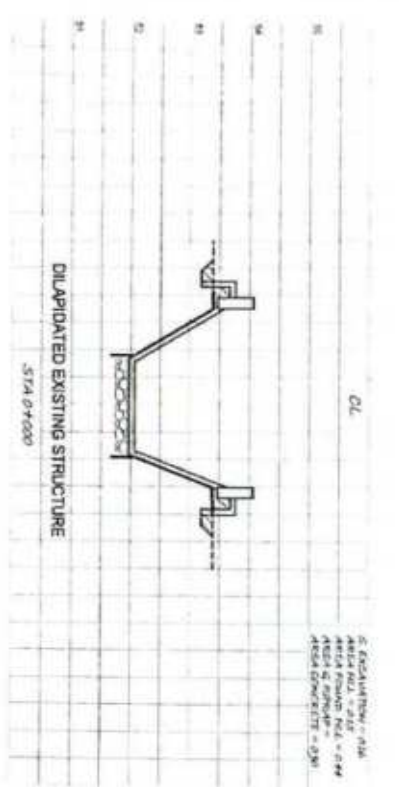
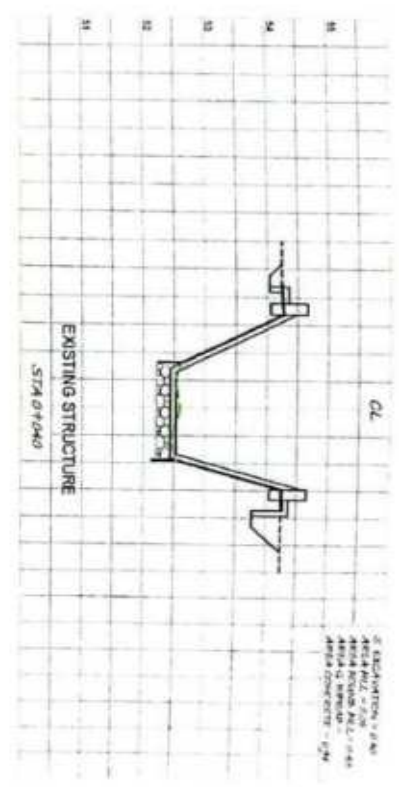
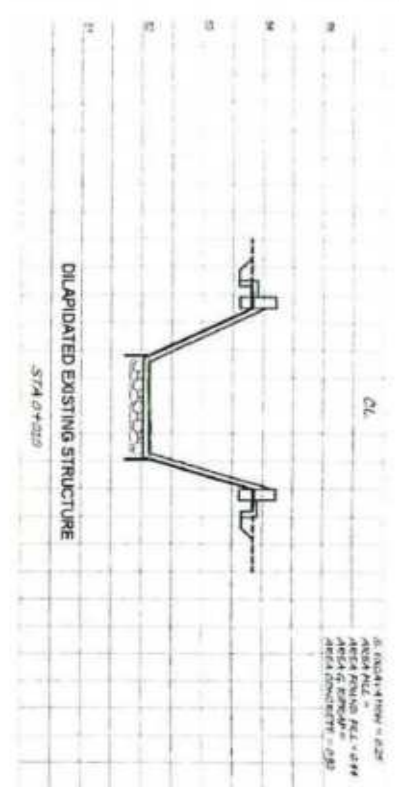
BAR DIAGRAM	SIZE	REINFORCEMENT SCHEDULE									TOTAL LENGTH OF BAR	UNIT WEIGHT	LOCATION
		a	b	c	d	e	f	g					
A	12	0.40	2.40	1.70	6.60	0.45	-	-	-	-	11.55	0.89	slope+sidewalk
B	10	0.50	2.20	0.065	-	-	-	-	-	-	2.77	0.62	ties at cut-off wall (rear+side)
B	10	0.50	2.20	0.065	-	-	-	-	-	-	2.77	0.62	ties at headwall
B	10	0.70	2.20	0.065	-	-	-	-	-	-	2.77	0.62	ties at foundation of pile cap
C	16	0.50	-	-	-	-	-	-	-	-	0.50	1.58	dowel bar at g/p pipe pile
D	12	0.25	3.50	1.00	-	-	-	-	-	-	4.75	0.89	vertical bars at end protection
STR	12	-	-	-	-	-	-	-	-	-	-	0.89	horizontal bars at cut-off wall+slope+sidewalk+headwall
STR	16	-	-	-	-	-	-	-	-	-	-	1.58	horizontal bars at pile cap
STR	12	-	-	-	-	-	-	-	-	-	-	0.89	horizontal bars at end protection



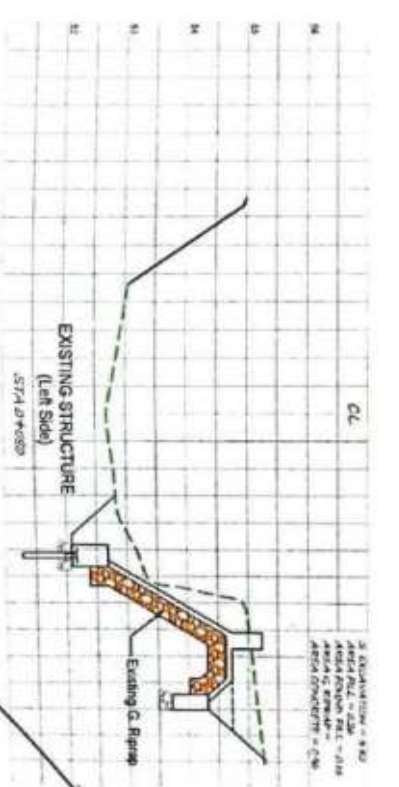
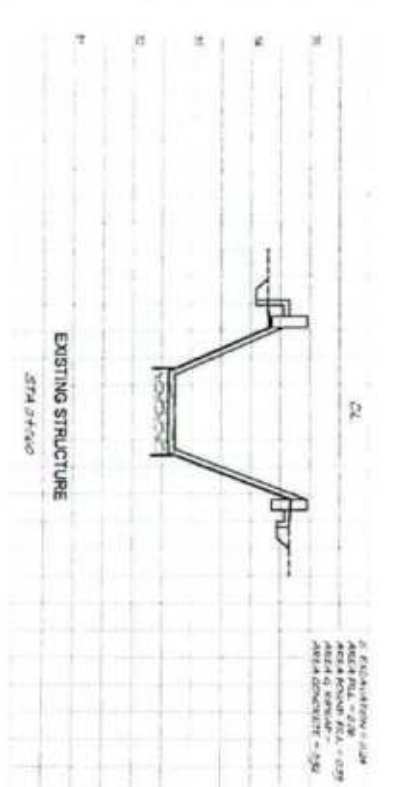
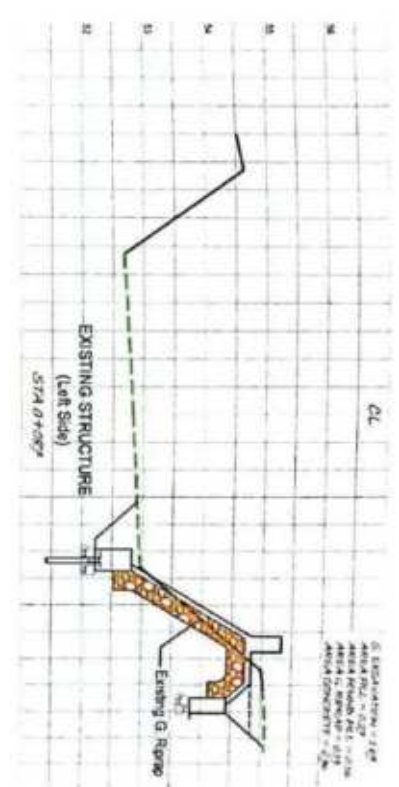
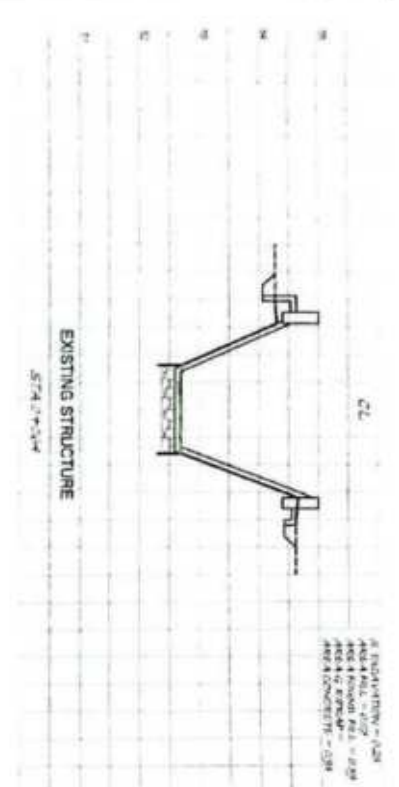
**CONSTRUCTION OF FLOOD CONTROL**  
 Bigy, Moropode, Jose Pangamban, Camarines Norte

Prepared by:	Reviewed by:	Checked and Verified by:	Recommending Approval:	Approved by:	SHEET NO
KENN I. ALEJANDRO Engineer III	SAMUEL T. YAMTO Chief Planning Division	FLORDELIZA B. ALERA Assistant Project Engineer	JOHN MARVIL S. TOBIAS Project Engineer	RICARDO R. PADILLA Governor	8 / 15





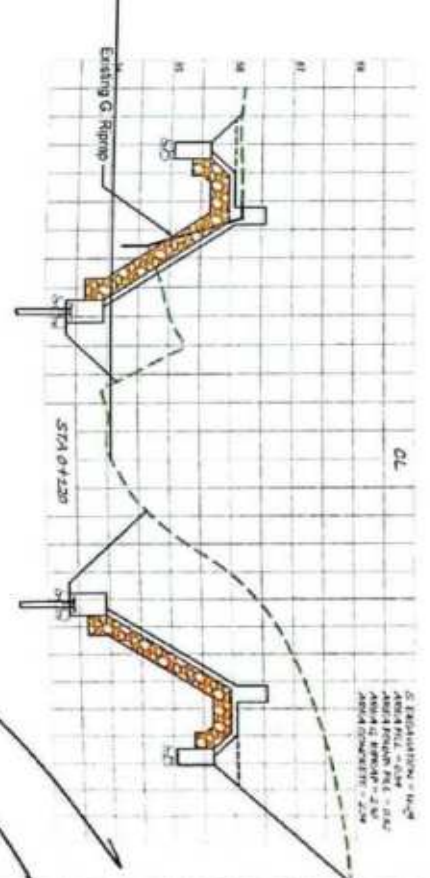
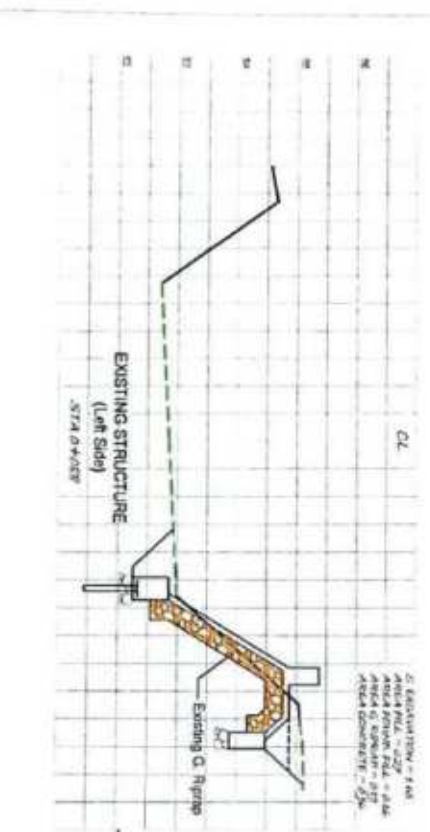
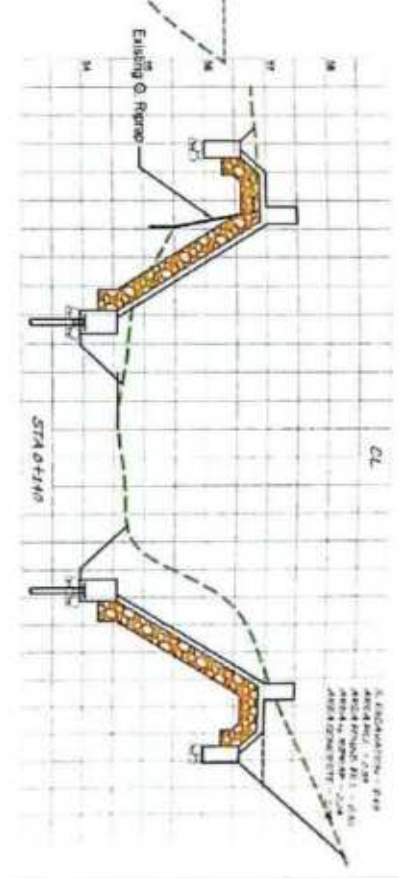
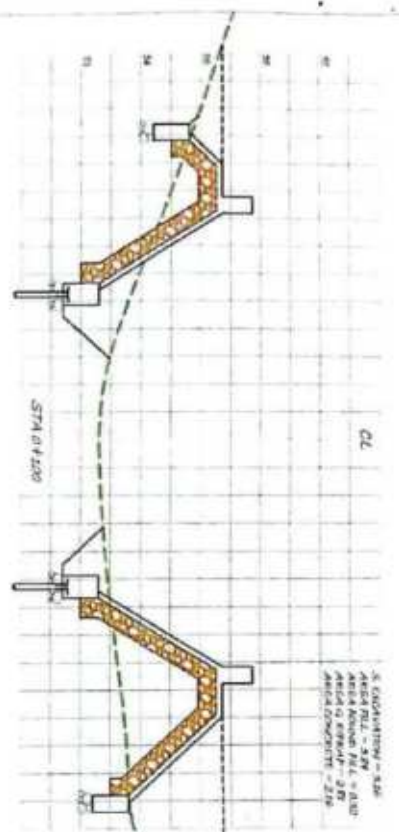
<b>CONSTRUCTION OF FLOOD CONTROL</b> Brgy. Muthelode, Jose Panganiban, Camarines Norte	Prepared by:	Reviewed by:	Checked and Verified by:	Recommending Approval:	Approved by:	SHEET NO
	KEVIN I. ALLENADO Engineer III	SAN JET YVON D Chief Planning Division	FLORDELIZAN Assistant Professional Engineer	JOHN MARVIN S. TOBIAS Professional Engineer	RICARTE R. PADILLA Governor	12 / 15



**CONSTRUCTION OF FLOOD CONTROL**  
 Bigy Motherode, Jose Panganiban, Camarines Norte

Prepared by:	Reviewed by:	Checked and Verified by:	Recommending Approval:	Approved by:	SHEET NO
 <b>KEVIN I. ALENNO</b> Engineer III	 <b>SAVILOR S. TOLEDO</b> Chief Planning Division	 <b>FLORDELIZA P. LACER</b> Assistant Provincial Engineer	 <b>JOHN MARK S. TOBIAS</b> Provincial Engineer	 <b>RICARDO R. ADILLA</b> Governor	<b>13 / 15</b>





**CONSTRUCTION OF FLOOD CONTROL**  
 Bigy, Motherlode, Jose Pangasinan, Camarines Norte

Prepared by:	KEVINI ALERINO Engineer III	Reviewed by:	SAULEE CRISTO Chief Planning Division	Checked and Verified by:	R. ORDEJIZ Assistant Provincial Engineer	Recommending Approval:	JOHN THOMAS S. TOBIAS Provincial Engineer	Agreed by:	RICARTEK PADILLA Governor	SHEET NO	14 / 15
--------------	--------------------------------	--------------	--	--------------------------	---	------------------------	--	------------	------------------------------	----------	---------

**CONSTRUCTION OF FLOOD CONTROL**  
 Brig. Waterworks, Jose Pungalan, Caraveras Norte

Prepared by:  
**KEVIN I. ALEMANO**  
 Engineer III

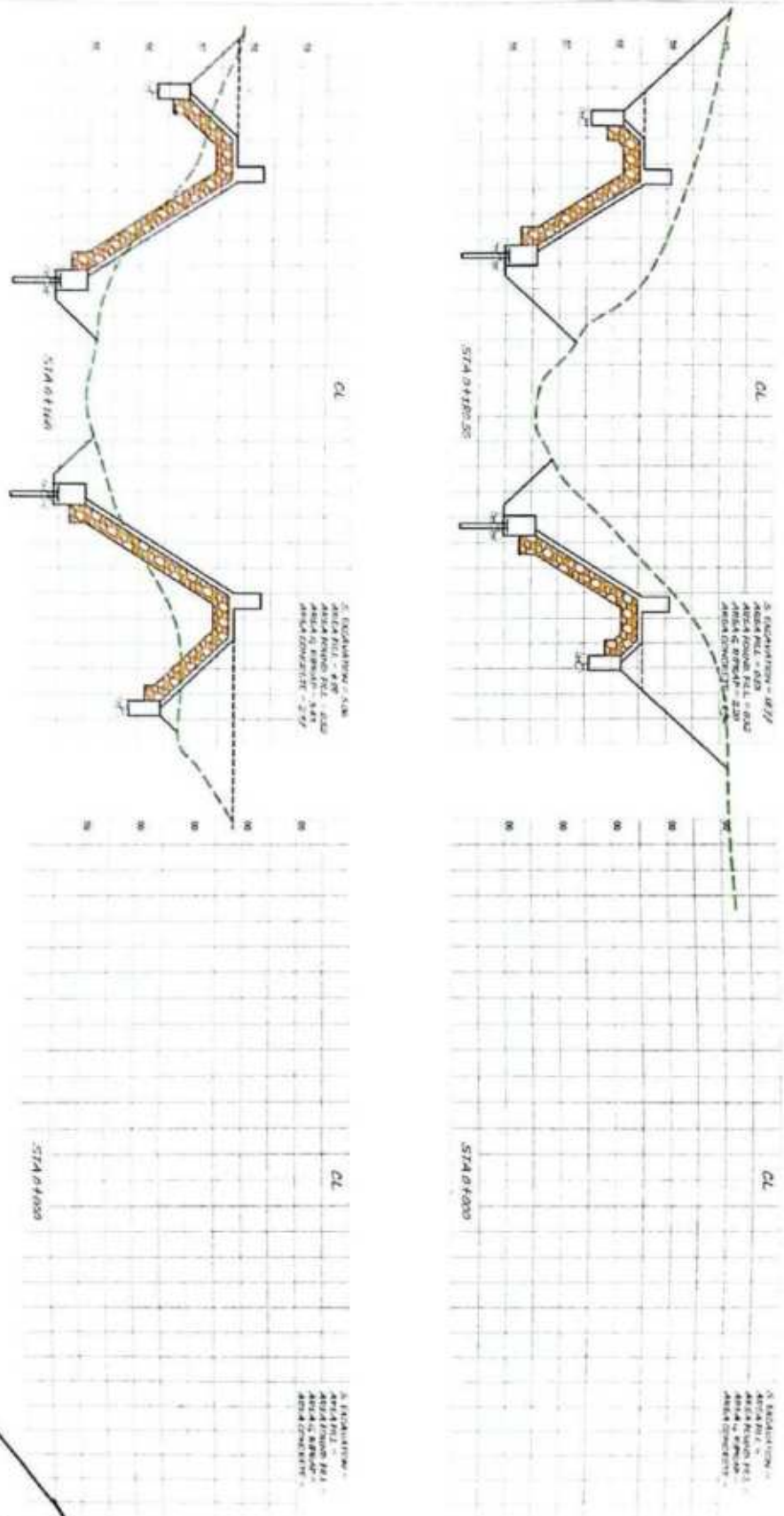
Reviewed by:  
**DAVEE I. GASTO**  
 Chief Planning Division

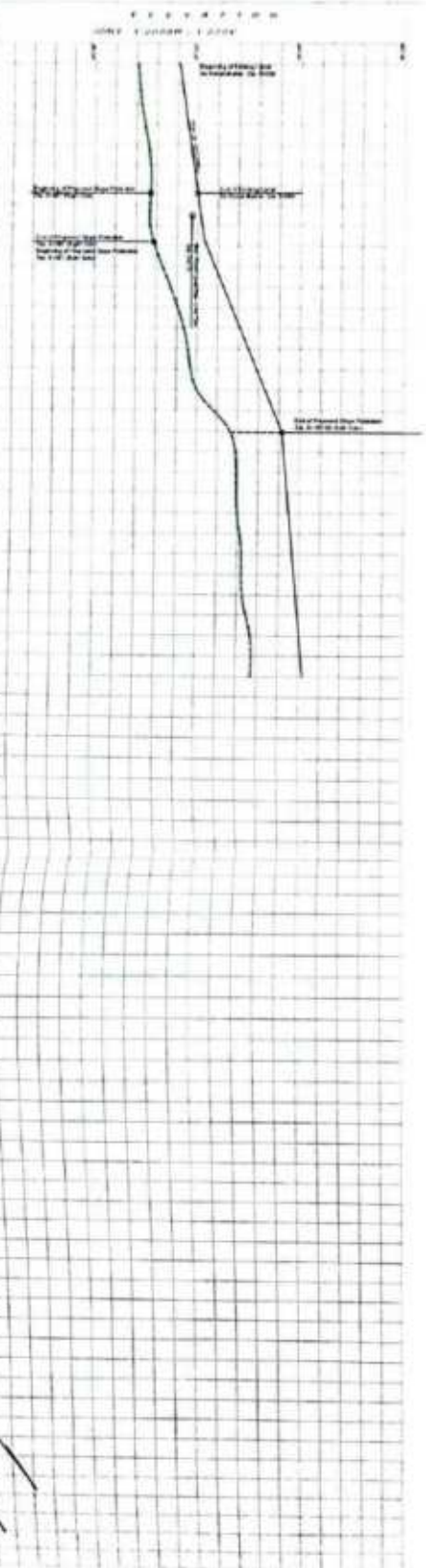
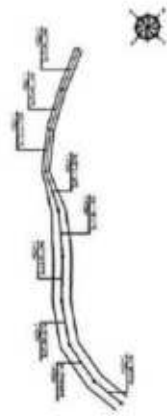
Checked and Verified by:  
**RODRIGUA B. BARRER**  
 Assistant Provincial Engineer

Recommending Approval:  
**JOHN MARVILLE S. TOBIAS**  
 Provincial Engineer

Approved by:  
**RICARTE R. PADILLA**  
 Governor

SHEET NO.  
**15 / 15**





Station	Elevation (ft)
57.00	54.00
56.75	54.25
56.50	54.50
56.25	54.75
56.00	55.00
55.75	55.25
55.50	55.50
55.25	55.75
55.00	56.00
54.75	56.25
54.50	56.50
54.25	56.75
54.00	57.00
53.75	57.25
53.50	57.50
53.25	57.75
53.00	58.00
52.75	58.25
52.50	58.50
52.25	58.75
52.00	59.00
51.75	59.25
51.50	59.50
51.25	59.75
51.00	60.00
50.75	60.25
50.50	60.50
50.25	60.75
50.00	61.00
49.75	61.25
49.50	61.50
49.25	61.75
49.00	62.00
48.75	62.25
48.50	62.50
48.25	62.75
48.00	63.00
47.75	63.25
47.50	63.50
47.25	63.75
47.00	64.00
46.75	64.25
46.50	64.50
46.25	64.75
46.00	65.00
45.75	65.25
45.50	65.50
45.25	65.75
45.00	66.00
44.75	66.25
44.50	66.50
44.25	66.75
44.00	67.00
43.75	67.25
43.50	67.50
43.25	67.75
43.00	68.00
42.75	68.25
42.50	68.50
42.25	68.75
42.00	69.00
41.75	69.25
41.50	69.50
41.25	69.75
41.00	70.00
40.75	70.25
40.50	70.50
40.25	70.75
40.00	71.00
39.75	71.25
39.50	71.50
39.25	71.75
39.00	72.00
38.75	72.25
38.50	72.50
38.25	72.75
38.00	73.00
37.75	73.25
37.50	73.50
37.25	73.75
37.00	74.00
36.75	74.25
36.50	74.50
36.25	74.75
36.00	75.00
35.75	75.25
35.50	75.50
35.25	75.75
35.00	76.00
34.75	76.25
34.50	76.50
34.25	76.75
34.00	77.00
33.75	77.25
33.50	77.50
33.25	77.75
33.00	78.00
32.75	78.25
32.50	78.50
32.25	78.75
32.00	79.00
31.75	79.25
31.50	79.50
31.25	79.75
31.00	80.00
30.75	80.25
30.50	80.50
30.25	80.75
30.00	81.00
29.75	81.25
29.50	81.50
29.25	81.75
29.00	82.00
28.75	82.25
28.50	82.50
28.25	82.75
28.00	83.00
27.75	83.25
27.50	83.50
27.25	83.75
27.00	84.00
26.75	84.25
26.50	84.50
26.25	84.75
26.00	85.00
25.75	85.25
25.50	85.50
25.25	85.75
25.00	86.00
24.75	86.25
24.50	86.50
24.25	86.75
24.00	87.00
23.75	87.25
23.50	87.50
23.25	87.75
23.00	88.00
22.75	88.25
22.50	88.50
22.25	88.75
22.00	89.00
21.75	89.25
21.50	89.50
21.25	89.75
21.00	90.00
20.75	90.25
20.50	90.50
20.25	90.75
20.00	91.00
19.75	91.25
19.50	91.50
19.25	91.75
19.00	92.00
18.75	92.25
18.50	92.50
18.25	92.75
18.00	93.00
17.75	93.25
17.50	93.50
17.25	93.75
17.00	94.00
16.75	94.25
16.50	94.50
16.25	94.75
16.00	95.00
15.75	95.25
15.50	95.50
15.25	95.75
15.00	96.00
14.75	96.25
14.50	96.50
14.25	96.75
14.00	97.00
13.75	97.25
13.50	97.50
13.25	97.75
13.00	98.00
12.75	98.25
12.50	98.50
12.25	98.75
12.00	99.00
11.75	99.25
11.50	99.50
11.25	99.75
11.00	100.00

**CONSTRUCTION OF FLOOD CONTROL**  
 8700 SHERBORN, 1907 PLYMOUTH, CHARLESTON, MISSISSIPPI

DESIGNED BY: *REVIN I. ALLEN*  
 REVIEWED BY: *SAULET I. DAVANTO*  
 CHECKED AND REVISIONS BY: *LUDWIG A. ALLEN*  
 RECOMMENDING APPROVAL: *JOHN SAUL*  
 APPROVED BY: *MICHAEL R. PASQUA*

SHEET NO. 11/15

**DRAWINGS AVAILABLE AT THE BAC OFFICE**

## ***Section VIII. Bill of Quantities***

**BILL OF QUANTITIES**  
**CONSTRUCTION OF FLOOD CONTROL**  
 Brgy. Motherlode, Jose Panganiban, Camarines Norte

Item No.	Scope of Work	Unit	Quantity	Unit Price	TOTAL
I	CLEARING AND GRUBBING	LS	1.00		
II	STRUCTURE EXCAVATION	CU.M.	912.46		
III	FOUNDATION FILL	CU.M.	61.28		
IV	SHORING, CRIBBING AND RELATED WORKS	LOT	1.00		
V	EMBANKMENT	CU.M.	58.53		
VI	HANDLAID ROCK EMBANKMENT	CU.M.	136.56		
VII	GROUTED RIPRAP	CU.M.	231.38		
VIII	GI PIPE PILE	LM	213.00		
IX	REINFORCING STEEL BAR	KGS	22,339.32		
X	STRUCTURAL CONCRETE	CU.M.	284.02		
XI	SLUICE GATE	LOT	1.00		
XII	TRAFFIC MANAGEMENT	LOT	1.00		
XIII	BUNKHOUSE	LOT	1.00		
XIV	OCCUPATIONAL SAFETY AND HEALTH PROGRAM,	LOT	1.00		
XV	PROJECT BILLBOARD	UNIT	2.00		
<b>TOTAL</b>					

Amount in words:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
 Signature over Printed Name

Date:

***Section IX. Checklist of Technical and Financial Documents***

# Checklist of Technical and Financial Documents

## I. TECHNICAL COMPONENT ENVELOPE

### *Class "A" Documents*

#### Legal Documents

- (a) Valid PhilGEPS Registration Certificate (Platinum Membership) (all pages);

#### 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) 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. Affidavit of Availability of Key Personnel and Equipment (notarized)
  - c. 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;
  - d. Key Personnel's Certificate of Employment (notarized)
  - e. 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 copy of Affidavit of Site Inspection; **and**
- (l) 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.

- (m) Approved Plan

]

*Financial Documents*

- (n) 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**
- (o) The prospective bidder's computation of Net Financial Contracting Capacity (NFCC).

*Class "B" Documents*

- (p) 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**

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

*Other documentary requirements under RA No. 9184*

- (r) Original of duly signed Bid Prices in the Bill of Quantities; **and**
- (s) 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**
- (t) Cash Flow by Quarter.

---

## BID FORM

Date : \_\_\_\_\_

Project Identification No. : \_\_\_\_\_

**To: HON. RICARTE R. PADILLA**  
**Governor**  
**PLGU- Camarines Norte**

Having examined the Philippine Bidding Documents (PBDs) including the Supplemental or Bid Bulletin Numbers *[insert numbers]*, the receipt of which is hereby duly acknowledged, we, the undersigned, declare that:

- a. We have no reservation to the PBDs, including the Supplemental or Bid Bulletins, for the Procurement Project: *[insert project name]*;
- b. We offer to execute the Works for this Contract in accordance with the PBDs;
- c. The total price of our Bid in words and figures, excluding any discounts offered below is: *[insert information]*;
- d. The discounts offered and the methodology for their application are: **NONE**;
- e. The total bid price includes the cost of all taxes, such as, but not limited to: *(i) value added tax (VAT), (ii) income tax, (iii) local taxes, and (iv) other fiscal levies and duties*, which are itemized herein and reflected in the detailed estimates,
- f. Our Bid shall be valid within the period stated in the PBDs, and it shall remain binding upon us at any time before the expiration of that period;
- g. If our Bid is accepted, we commit to obtain a Performance Security in the amount of **30%** percent of the Contract Price for the due performance of the Contract, or a **Performance Securing Declaration** in lieu of the allowable forms of Performance

Security, subject to the terms and conditions of issued GPPB guidelines<sup>1</sup> for this purpose;

- h. We are not participating, as Bidders, in more than one Bid in this bidding process, other than alternative offers in accordance with the Bidding Documents;
- i. We understand that this Bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal Contract is prepared and executed; and
- j. We understand that you are not bound to accept the Lowest Calculated Bid or any other Bid that you may receive.
- k. We likewise certify/confirm that the undersigned, is the duly authorized representative of the bidder, and granted full power and authority to do, execute and perform any and all acts necessary to participate, submit the bid, and to sign and execute the ensuing contract for the *[insert project name]* of the **Provincial Government of Camarines Norte**.
- l. We acknowledge that failure to sign each and every page of this Bid Form, including the Bill of Quantities, shall be a ground for the rejection of our bid.

Name: \_\_\_\_\_

Legal Capacity: \_\_\_\_\_

Signature: \_\_\_\_\_

Duly authorized to sign the Bid for and behalf of: \_\_\_\_\_

Date: \_\_\_\_\_

REPUBLIC OF THE PHILIPPINES)

CITY OF \_\_\_\_\_) S.S.

\_\_\_\_\_

## **BID SECURING DECLARATION**

**Project Identification No.: *[Insert number]***

To: ***HON. RICARTE R. PADILLA***  
***Governor***  
***PLGU- Camarines Norte***

I/We, the undersigned, declare that:

1. I/We understand that, according to your conditions, bids must be supported by a Bid Security, which may be in the form of a Bid Securing Declaration.
2. I/We accept that: (a) I/we will be automatically disqualified from bidding for any procurement contract with any procuring entity for a period of two (2) years upon receipt of your Blacklisting Order; and, (b) I/we will pay the applicable fine provided under Section 6 of the Guidelines on the Use of Bid Securing Declaration, within fifteen (15) days from receipt of the written demand by the procuring entity for the commission of acts resulting to the enforcement of the bid securing declaration under Sections 23.1(b), 34.2, 40.1 and 69.1, except 69.1(f), of the IRR of RA No. 9184; without prejudice to other legal action the government may undertake.
3. I/We understand that this Bid Securing Declaration shall cease to be valid on the following circumstances:
  - a. Upon expiration of the bid validity period, or any extension thereof pursuant to your request;
  - b. I am/we are declared ineligible or post-disqualified upon receipt of your notice to such effect, and (i) I/we failed to timely file a request for reconsideration or (ii) I/we filed a waiver to avail of said right; and
  - c. I am/we are declared the bidder with the Lowest Calculated Responsive Bid, and I/we have furnished the performance security and signed the Contract.

IN WITNESS WHEREOF, I/We have hereunto set my/our hand/s this \_\_\_\_\_day of *[month]* *[year]* at *[place of execution]*.

*[Insert NAME OF BIDDER OR ITS AUTHORIZED REPRESENTATIVE]*

*[Insert signatory's legal capacity]*

Affiant

**[Jurat]**

*[Format shall be based on the latest Rules on Notarial Practice]*

# ***Contract Agreement Form***

*[insert project name]*

*[not required to be submitted with the Bid, but it shall be submitted within ten (10) days after receiving the Notice of Award]*

---

## **CONTRACT AGREEMENT**

THIS AGREEMENT, made this *[insert date]* day of *[insert month]*, *[insert year]* between *[name and address of PROCURING ENTITY]* (hereinafter called the “Entity”) and *[name and address of Contractor]* (hereinafter called the “Contractor”).

WHEREAS, the Entity is desirous that the Contractor execute *[name and identification number of contract]* (hereinafter called “the Works”) and the Entity has accepted the Bid for *[contract price in words and figures in specified currency]* by the Contractor for the execution and completion of such Works and the remedying of any defects therein.

NOW THIS AGREEMENT WITNESSETH AS FOLLOWS:

1. In this Agreement, words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to.
2. The following documents as required by the 2016 revised Implementing Rules and Regulations of Republic Act No. 9184 shall be deemed to form and be read and construed as part of this Agreement, *viz.*:
  - a. Philippine Bidding Documents (PBDs);
    - i. Drawings/Plans;
    - ii. Specifications;
    - iii. Bill of Quantities;
    - iv. General and Special Conditions of Contract;
    - v. Supplemental or Bid Bulletins, if any;
  - b. Winning bidder’s bid, including the Eligibility requirements, Technical and Financial Proposals, and all other documents or statements submitted;

Bid form, including all the documents/statements contained in the Bidder’s bidding envelopes, as annexes, and all other documents submitted (*e.g.*, Bidder’s response

to request for clarifications on the bid), including corrections to the bid, if any, resulting from the Procuring Entity's bid evaluation;

- c. Performance Security;
  - d. Notice of Award of Contract and the Bidder's conforme thereto; and
  - e. Other contract documents that may be required by existing laws and/or the Procuring Entity concerned in the PBDs. **Winning bidder agrees that additional contract documents or information prescribed by the GPPB that are subsequently required for submission after the contract execution, such as the Notice to Proceed, Variation Orders, and Warranty Security, shall likewise form part of the Contract.**
3. In consideration for the sum of *[total contract price in words and figures]* or such other sums as may be ascertained, *[Named of the bidder]* agrees to *[state the object of the contract]* in accordance with his/her/its Bid.
  4. The *[Name of the procuring entity]* agrees to pay the above-mentioned sum in accordance with the terms of the Bidding.

IN WITNESS whereof the parties thereto have caused this Agreement to be executed the day and year first before written.

*[Insert Name and Signature]*

*[Insert Name and Signature]*

*[Insert Signatory's Legal Capacity]*

*[Insert Signatory's Legal Capacity]*

*for:*

*for:*

*[Insert Name of Supplier]*

*[Insert Procuring Entity]*

#### **Acknowledgment**

*[Format shall be based on the latest Rules on Notarial Practice]*

# OMNIBUS SWORN STATEMENT

*[shall be submitted with the Bid]*

---

REPUBLIC OF THE PHILIPPINES )

CITY/MUNICIPALITY OF \_\_\_\_\_ ) S.S.

## *AFFIDAVIT*

I, [Name of Affiant], of legal age, [Civil Status], [Nationality], and residing at [Address of Affiant], after having been duly sworn in accordance with law, do hereby depose and state that:

1. *[Select one, delete the other:]*

*[If a sole proprietorship:]* I am the sole proprietor or authorized representative of [Name of Bidder] with office address at [address of Bidder];

*[If a partnership, corporation, cooperative, or joint venture:]* I am the duly authorized and designated representative of [Name of Bidder] with office address at [address of Bidder];

2. *[Select one, delete the other:]*

*[If a sole proprietorship:]* As the owner and sole proprietor, or authorized representative of [Name of Bidder], I have full power and authority to do, execute and perform any and all acts necessary to participate, submit the bid, and to sign and execute the ensuing contract for [Name of the Project] of the [Name of the Procuring Entity], as shown in the attached duly notarized Special Power of Attorney;

*[If a partnership, corporation, cooperative, or joint venture:]* I am granted full power and authority to do, execute and perform any and all acts necessary to participate, submit the bid, and to sign and execute the ensuing contract for [Name of the Project] of the [Name of the Procuring Entity], as shown in the attached [state title of attached document showing proof of authorization (e.g., duly notarized Secretary's Certificate, Board/Partnership Resolution, or Special Power of Attorney, whichever is applicable)];

3. [Name of Bidder] is not "blacklisted" or barred from bidding by the Government of the Philippines or any of its agencies, offices, corporations, or Local Government Units, foreign government/foreign or international financing institution whose blacklisting rules have been recognized by the Government Procurement Policy Board, **by itself or by relation, membership, association, affiliation, or controlling interest with another**

**blacklisted person or entity as defined and provided for in the Uniform Guidelines on Blacklisting;**

4. Each of the documents submitted in satisfaction of the bidding requirements is an authentic copy of the original, complete, and all statements and information provided therein are true and correct;
5. [Name of Bidder] is authorizing the Head of the Procuring Entity or its duly authorized representative(s) to verify all the documents submitted;

6. *[Select one, delete the rest:]*

*[If a sole proprietorship:]* The owner or sole proprietor is not related to the Head of the Procuring Entity, members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat, the head of the Project Management Office or the end-user unit, and the project consultants by consanguinity or affinity up to the third civil degree;

*[If a partnership or cooperative:]* None of the officers and members of [Name of Bidder] is related to the Head of the Procuring Entity, members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat, the head of the Project Management Office or the end-user unit, and the project consultants by consanguinity or affinity up to the third civil degree;

*[If a corporation or joint venture:]* None of the officers, directors, and controlling stockholders of [Name of Bidder] is related to the Head of the Procuring Entity, members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat, the head of the Project Management Office or the end-user unit, and the project consultants by consanguinity or affinity up to the third civil degree;

7. [Name of Bidder] complies with existing labor laws and standards; and
8. [Name of Bidder] is aware of and has undertaken the responsibilities as a Bidder in compliance with the Philippine Bidding Documents, which includes:
  - a. Carefully examining all of the Bidding Documents;
  - b. Acknowledging all conditions, local or otherwise, affecting the implementation of the Contract;
  - c. Making an estimate of the facilities available and needed for the contract to be bid, if any; and
  - d. Inquiring or securing Supplemental/Bid Bulletin(s) issued for the [Name of the



Project].

9. [Name of Bidder] did not give or pay directly or indirectly, any commission, amount, fee, or any form of consideration, pecuniary or otherwise, to any person or official, personnel or representative of the government in relation to any procurement project or activity.

**10. In case advance payment was made or given, failure to perform or deliver any of the obligations and undertakings in the contract shall be sufficient grounds to constitute criminal liability for Swindling (Estafa) or the commission of fraud with unfaithfulness or abuse of confidence through misappropriating or converting any payment received by a person or entity under an obligation involving the duty to deliver certain goods or services, to the prejudice of the public and the government of the Philippines pursuant to Article 315 of Act No. 3815 s. 1930, as amended, or the Revised Penal Code.**

IN WITNESS WHEREOF, I have hereunto set my hand this \_\_\_ day of \_\_\_, 20\_\_ at \_\_\_\_\_, Philippines.

*[Insert NAME OF BIDDER OR ITS AUTHORIZED REPRESENTATIVE]*

*[Insert signatory's legal capacity]*

Affiant

**[Jurat]**

*[Format shall be based on the latest Rules on Notarial Practice]*

---

REPUBLIC OF THE PHILIPPINES)

CITY OF \_\_\_\_\_) S.S.

**AFFIDAVIT OF SITE INSPECTION**

I,           (Representative of the Bidder)          , of legal age,           (civil status)          , Filipino and residing at           (Address of the Representative)          , under oath, hereby depose and say:

1. That I am the           (Position in the Bidder)           of the           (Name of the Bidder)          , with office at           (Address of the Bidder)          ;
2. That I have inspected the site for           (Name of the Contract)          , located at           (location of the Contract)          ;
3. That I am making this statement as part of the requirement for the Technical Proposal of the           (Name of the Bidder)           for           (Name of the Contract)          .

**IN FAITH WHEREOF**, I hereby affix my signature this            day of           , 20           at           , Philippines.

\_\_\_\_\_  
AFFIANT

Witness:

\_\_\_\_\_

**SUBSCRIBED AND SWORN TO** before me this           , day of            20          , affiant exhibiting to me his/her Community Tax Certificate No.            issued on            at           , Philippines.

\_\_\_\_\_  
(Notary Public)

Until \_\_\_\_\_  
PTR No. \_\_\_\_\_  
Date \_\_\_\_\_  
Place \_\_\_\_\_  
TIN \_\_\_\_\_

Doc. No. \_\_\_\_\_  
Page No. \_\_\_\_\_  
Book No. \_\_\_\_\_  
Series of \_\_\_\_\_

Bids and Awards Committee  
Provincial Government of Camarines Norte

**AFFIDAVIT OF AVAILABILITY OF KEY PERSONNEL AND EQUIPMENT**

I, \_\_\_\_\_ of legal age, Filipino, married/single/widow, and, a resident of \_\_\_\_\_, owner/proprietor of \_\_\_\_\_ after having been duly sworn to in accordance with law, depose and declare;

1. That I/we have engage and contracted the service of Engr. \_\_\_\_\_ (herein called the Resident/Project Engineer), a Registered Civil Engineer with Professional License No. \_\_\_\_\_ issued on \_\_\_\_\_ and who has paid his Professional Tax for the Current Year \_\_\_\_\_;
2. That the said Engineer shall be appointed and designated as our Resident/Project Engineer to personally manage and supervise the construction.
3. That the said Engineer shall employ the best care, skill and ability in supervising the project in accordance with the Contract Agreement, contract plan, and other provisions embodied in the proposed contract;
4. That the said Engineer shall be personally present at the jobsite to supervise all the phase of the construction work at all time;
5. That all other key personnel are available for the project;
6. That equipment needed for the project, are likewise available;
7. That any willful violation on my/our part of the herein condition may prejudice my/our standing as a reliable contractor in future biddings in your office.

**IN WITNESS WHEREOF**, I have here unto set my hands this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_ at \_\_\_\_\_, Philippines.

\_\_\_\_\_  
Affiant's Printed Name and Signature

WITNESSES:

\_\_\_\_\_

**SUBSCRIBED AND SWORN** to before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_ affiant exhibiting to me his/her Resident Certificate No.: \_\_\_\_\_ issued \_\_\_\_\_ at \_\_\_\_\_.

\_\_\_\_\_  
Notary Public

Doc No.: \_\_\_\_\_  
Page No.: \_\_\_\_\_  
Book No.: \_\_\_\_\_  
Series of: \_\_\_\_\_

Bids and Awards Committee  
 Provincial Government of Camarines Norte  
 Provincial Capitol Building  
 Daet, Camarines Norte

**KEY PERSONNEL’S CERTIFICATE OF EMPLOYMENT**

\_\_\_\_\_ *Date*

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Dear Sir / Madame:

I am       (Name of Nominee)       a Licensed Engineer with Professional License No. \_\_\_\_\_ issued on       (date of issuance)       at       (place of issuance)      .

I hereby certify that       (Name of Bidder)       has engaged my services as       (Designation)       for       (Name of the Contract)      , if awarded to it.

As       (Designation)      , I supervised the following completed projects similar to the contract under bidding:

<u>NAME OF PROJECT</u>	<u>OWNER</u>	<u>COST</u>	<u>DATE COMPLETED</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

At present, I am supervising the following projects:

<u>NAME OF PROJECT</u>	<u>OWNER</u>	<u>COST</u>	<u>DATE COMPLETED</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

In case of my separation for any reason whatsoever from the above-mentioned Contractor, I shall notify the       (Name of the Procuring Entity)       at least twenty one (21) days before the effective date of my separation.

As (Designation), I know I will have to stay in the job site all the time to supervise and manage the Contract works to the best of my ability, and aware that I am authorized to handle only one (1) contract at a time.

I do not allow the use of my name for the purpose of enabling the above-mentioned Contractor to qualify for the Contract without any firm commitment on my part to assume the post of (Designation) therefore, if the contract is awarded to him since I understand that to do so will be a sufficient ground for my disqualification as (Designation) in any future (Name of the Procuring Entity) bidding or employment with any Contractor doing business with the (Name of the Procuring Entity).

\_\_\_\_\_  
(Signature of Engineer)

WITNESSES:

\_\_\_\_\_

DRY SEAL

Republic of the Philippines )  
\_\_\_\_\_ ) S.S.

**SUBSCRIBED AND SWORN TO** before me this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_ affiant exhibiting to me his Residence Certificate No. \_\_\_\_\_ issued on \_\_\_\_\_ at \_\_\_\_\_.

NOTARY PUBLIC  
PTR No.: \_\_\_\_\_  
Issued at: \_\_\_\_\_  
Issued on: \_\_\_\_\_  
Until 31 December 20\_\_\_\_

Doc. No.: \_\_\_\_\_;  
Page No. : \_\_\_\_\_;  
Book No.: \_\_\_\_\_;  
Series of \_\_\_\_\_;

## PERFORMANCE SECURING DECLARATION

Invitation to Bid: [Insert Reference Number indicated in the Bidding Documents]

To: **HON. RICARTE R. PADILLA**  
**Governor**  
**PLGU- Camarines Norte**

I/We, the undersigned, declare that:

1. I/We understand that, according to your conditions, to guarantee the faithful performance by the supplier/distributor/manufacture/contractor/consultant of its obligations under the Contract, I/we shall submit a Performance Securing Declaration within a maximum period of ten (10) calendar days from the receipt of the Notice of Award prior to the signing of the Contract.
2. I/We accept that: I/we will be automatically disqualified from bidding for any procurement contract with any procuring entity for a period of one (1) year for the first offense, or two (2) years **for the second offense**, upon receipt of your Blacklisting Order if I/We have violated my/our obligations under the Contract;
3. I/We understand that this Performance Securing Declaration shall cease to be valid upon:
  - a. issuance by the Procuring Entity of the Certificate of Final Acceptance, subject to the following conditions:
    - i. Procuring Entity has no claims filed against the contract awardee;
    - ii. It has no claims for labor and materials filed against the contractor; and
    - iii. Other terms of the contract; or
  - b. replacement by the winning bidder of the submitted PSD with a performance security in any of the prescribed forms under Section 39.2 of the 2016 revised IRR of RA No. 9184 as required by the end-user.

**IN WITNESS WHEREOF**, I/We have hereunto set my/our hand/s this \_\_\_\_ day of [month] [year] at [place of execution].

*[Insert NAME OF BIDDER OR  
ITS AUTHORIZED  
REPRESENTATIVE]*

*[Insert signatory's legal capacity]*

Affiant

**[Jurat]**

*[Format shall be based on the latest Rules on Notarial Proc*



Republic of the Philippines  
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS  
**OFFICE OF THE SECRETARY**  
Manila

OPD. 13 2/16/16  
10-10-2016

07 OCT 2016

DEPARTMENT ORDER )  
NO. **197** )  
Series of 2016 *OPD. 13 2/16/16*

SUBJECT: Revised Guidelines in the  
Preparation of Approved Budget for  
the Contract (ABC)

The following policies, rules and procedures relative to the preparation of the "Approved Budget for the Contract" (ABC) previously prescribed under Department Order No. 22, Series of 2015, are hereby revised/reiterated.

The ABC shall be prepared on the basis of the design plans for the project which has been duly approved by authorized officials in accordance with existing regulations.

All items of work to be used in preparing the ABC shall conform to the Standard Specifications for Highways, Bridges and Airports, revised 2013, Standard Specifications for Public Works Structures, 1995, and approved Special Specifications for the project.

The ABC shall be composed of the Direct Cost and the Indirect Cost.

A. The Direct Cost shall consist of the following:

A.1 Cost of materials to be used in doing the work item called for, which shall include, inter alia, the following:

A.1.1 Cost at source, including processing, crushing, stockpiling, loading, royalties, local taxes, construction and/or maintenance of haul roads, etc.

A.1.2 Expenses for hauling to project site.

A.1.3 Handling expenses.

A.1.4 Storage expenses.

A.1.5 Allowance for waste and/or losses, not to exceed 5% of materials requirement.

A.2 Cost of Labor:

A.2.1 Salaries and wages, as authorized by the Department of Labor and Employment.

A.2.2 Fringe benefits, such as vacation and sick leaves, benefits under the Workmen's Compensation Act, GSIS and/or SSS contributions, allowances, 13<sup>th</sup> month pay, bonuses, etc.



**A.3 Equipment Expenses:**

A.3.1 Rental rates of equipment shall be based on the prevailing "Association of Carriers and Equipment Lessors, (ACEL) Inc." approved for use by the DPWH (Presently it is the 2014 ACEL Rates). Rental rates of equipment not indicated in the ACEL booklet shall be taken from the rental rates prepared by the Bureau of Equipment. For simplicity in computation, the operated rental rates are preferred over the bare rental rates as the former includes operator's wages, fringe benefits, fuel, oil, lubricants and equipment maintenance. The make, model and capacity of the equipment should be indicated in the detailed unit cost analysis.

A.3.2 Mobilization and demobilization shall be treated as a separate pay item. It shall be computed based on the equipment requirements of the project stipulated in the proposal and contract booklet. Mobilization and demobilization shall not exceed 1% of the Estimated Direct Cost (EDC) of the civil works items. However, in special cases wherein requirements for mobilization/demobilization exceed 1%, an approval to utilize the actual computed mobilization/demobilization cost shall be secured from the concerned Undersecretary for Operations.

A.4 Cost for Permits, Clearances and other Government Taxes (i.e. MMDA Permit, LGU Permits, Bureau of Fire Protection Clearance, etc.) shall be included in the cost under Part B - Other General Requirements of the Program of Works (POW) and Estimate/ABC.

**B. The Indirect Cost shall consist of the following:**

B.1 Overhead Expenses - ranges from 7 - 11% of the EDC, which includes the following:

B.1.1 Engineering and Administrative Supervision.

B.1.2 Transportation allowances.

B.1.3 Office Expenses, e.g., for office equipment and supplies, power and water consumption, communication and maintenance.

B.1.4 Premium on Contractor's All Risk Insurance (CARI).

B.1.5 Financing Cost.

B.1.5.1 Premium on Bid Security

B.1.5.2 Premium on Performance Security

B.1.5.3 Premium on Surety for Advance Payment

B.1.5.4 Premium on Warranty Bond (one year)

B.2 Contingencies - ranges from 0.5 - 3% of the EDC. These include expenses for meetings, coordination with other stakeholders, billboards (excluding Project Billboard which is a pay item under the General Requirements), stages during ground breaking & inauguration ceremonies, and other unforeseen events.

- B.3 Miscellaneous Expenses – ranges from 0.5 - 1% of the EDC. These include laboratory tests for quality control and plan preparation.
- B.4 Contractor's Profit Margin – shall be 8% of the EDC for projects above P5Million and 10% for projects P5Million and below.
- B.5 VAT Component – shall be 5% of the sum of the EDC, OCM and Profit.
- B.6 The following items shall not be subjected to OCM and Profit mark-up:
  - B.6.1 Mobilization and demobilization
  - B.6.2 Provision of Service Vehicle
  - B.6.3 Permits and Clearances
- B.7 The following non-civil works items shall not be subjected to OCM mark-up:
  - B.7.1 Field/Laboratory Office & Living Quarters (Rental Basis)
  - B.7.2 Furnishing of Furniture, Laboratory Equipment, Survey Equipment and Consumables
  - B.7.3 Assistance to the Engineers
  - B.7.4 Photographs
  - B.7.5 Health and Safety
  - B.7.6 Traffic Management
  - B.7.7 Environmental Compliance
  - B.7.8 Communication Equipment, etc.

**NOTE:** For the percentage to be used for Nos. B.1, B.2 and B.3, see OCM (Overhead, Contingencies and Miscellaneous) column in the tabulation below.

ESTIMATED DIRECT COST (EDC)	INDIRECT COST % FOR OCM AND PROFIT		TOTAL INDIRECT COST % FOR OCM AND PROFIT
	OCM (% OF EDC)	PROFIT (% OF EDC)	
Up to P5Million	15	10	25
Above P5M up to P50M	12	8	20
Above P50M up to P150M	10	8	18
Above P150M	8	8	16

- C. The prescribed format for the calculation of the ABC is shown in Attachment "A".
  - C.1 Instructions for filling-up the format:

- C.1.1 Columns (1) to (4) are self-explanatory.
  - C.1.2 Column (5) is the EDC of the work item as calculated and reflected in the cost analysis prepared by the Estimator.
  - C.1.3 Columns (6) and (7) are the mark-ups in percent for OCM and profit.
  - C.1.4 Column (8) is the total mark-up, which is the sum of the percentages under columns (6) and (7).
  - C.1.5 Column (9) is the Peso value of the total mark-up. It is determined by multiplying the total mark-up on percent in column (8) with the EDC (column 5).
  - C.1.6 Column (10) is the VAT component which is 5% of the sum of columns (5) and (9).
  - C.1.7 Column (11) is the total estimated Indirect Cost which is the sum of columns (9) and (10).
  - C.1.8 Column (12) is the total estimated Total Cost or the sum of columns (5) and (11).
  - C.1.9 Column (13) is the unit cost for each item of works, determined by dividing the estimated Total Cost in column (12) by its total quantity in column (3).
- C.2 Procedures in preparing, processing and corresponding signatories specified under Department Order No. 163, Series of 2015 in the preparation of Program of Work (POW) and Approved Budget for the Contract (ABC) shall be observed.

Since the ABC is to be compared with the Contractor's bid and is the ceiling for acceptable bid prices in accordance with the provision of R.A. 9184, the ABC should be based on the approved Bidding Documents for the contract which contain the same work items and quantities as those to be used by the contractors in preparing their bid.

DPWH estimators shall continuously update their information/statistics on market prices of all construction inputs submitted for incorporation in the quarterly Construction Materials Price Database (CMPD). All assumptions in generating the estimate should be shown in the cost analysis.

In all cases, estimates for special items of work (SPL) should be accompanied with plans and specifications, methods of construction, measurements and payments duly approved by the Bureau of Research and Standards (BRS).

This Order shall take effect immediately and shall supersede Department Order No. 22, Series of 2015.

  
**MARK A. VILLAR**  
Acting Secretary

6.1 WRD/PCA

Department of Public Works and Highways  
Office of the Secretary



WIN6W01961



