PHILIPPINE BIDDING DOCUMENTS

Government of the
Republic of the Philippines

Procurement of INFRASTRUCTURE PROJECTS

First Edition
May 2025

Preface

These Philippine Bidding Documents (PBD) for the procurement of Infrastructure Projects (hereinafter referred to also as the "Works") through *[Competitive Bidding, Limited Source Bidding, or Competitive Dialogue*[1]*]* have been prepared by the Government of the Philippines (GoP) for use by all branches, agencies, departments, bureaus, offices, or instrumentalities of the Government, including government-owned and/or -controlled corporations (GOCC), government financial institutions (GFI), state universities and colleges (SUC), local government units (LGU), and autonomous regional government. The procedures and practices presented in this document have been developed through broad experience, and are for mandatory[2] use in projects that are financed in whole or in part by the GoP or any foreign government/foreign or international financing institution in accordance with the provisions of the Implementing Rules and Regulations (IRR) of Republic Act No. 12009 (RA No. 12009).

This PBD is 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: (a) the objectives, scope, and expected outputs and/or results of the proposed contract; (b) the eligibility requirements of Bidders; (c) the expected contract duration; and (d) the obligations, duties, and/or functions of the winning bidder.

In order to simplify the preparation of the Bidding Documents for each procurement, the PBD groups the provisions that are intended to be used unchanged in Section II. Instructions to Bidders (ITB) and in Section IV. General Conditions of Contract (GCC). Data and provisions specific to each procurement and contract should be included in Section III. Bid Data Sheet (BDS); Section V. Special Conditions of Contract (SCC); Section VI. Specifications; Section VII. Drawings; and Section VIII. Bill of Quantities. The forms to be used are provided in Section IX. Philippine Bidding Documents Related Forms.

Prudence must be exercised to check the relevance of the provisions of the PBD against the requirements of the specific Works to be procured. In addition, 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, except for the notes introducing Section IX. Philippine Bidding Documents Related Forms, where the information is useful for the Bidder. 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 proposal submission," should be furnished in the BDS and SCC. 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, SCC, 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

---

1 For Second Stage of Competitive Dialogue under Section 29.4.2 of IRR of RA No. 12009.

2 Unless the Treaty or International or Executive Agreement expressly provides use of foreign government/foreign or international financing institution procurement guidelines.

strictly follow. The Bidding Documents should not contain footnotes except Section IX. Philippine Bidding Documents Related Forms since these provide important guidance to Bidders.

d) The cover page should be modified as required to identify the Bidding Documents and date of issue.

e) The Project title page should be modified as required to identify the Project title and number, name and address of the Procuring Entity.

f) If modifications must be made to the bidding requirements, they can be presented in the BDS. Modifications for specific Project or Contract details should be provided in the SCC as amendments to the Conditions of Contract. For easy completion, whenever reference has to be made to specific clauses in the BDS or SCC, these terms shall be printed in bold type face on Section II. Instructions to Bidders, and Section IV. General Conditions of Contract, respectively. To facilitate easy reference and completion, clauses from the BDS and SCC shall appear in bold type face in Sections II and IV, respectively.

PROVINCIAL GOVERNMENT OF CAMARINES NORTE
DAET CAMARINES NORTE

Procurement of
INFRASTRUCTURE PROJECTS:

CONSTRUCTION OF FARM TO MARKET ROAD

Brgy. Bagacay, Labo, Camarines Norte

ITB-2026-097

October 20, 2026

TABLE OF CONTENTS

Glossary of Acronyms, Terms, and Abbreviations 6

Definition of Terms **8**

Section I. Invitation to Bid **11**

Section II. Instructions to Bidders **12**

A. General **17**

B. Contents of Bidding Documents **24**

C. Preparation of Bids **25**

D. Submission and Opening of Bids **32**

E. Evaluation and Comparison of Bids **34**

F. Award of Contract **39**

Section III. Bid Data Sheet **42**

Section IV. General Conditions of Contract **49**

Section V. Special Conditions of Contract **78**

Section VI. Specifications **79**

Section VII. Drawings **222**

Section VIII. Bill of Quantities **223**

Section IX. Philippine Bidding Documents Related Forms **225**

Section X. Checklist of Technical and Financial Documents **243**

Glossary of Acronyms, Terms, and Abbreviations

ABC – Approved Budget for the Contract.

ADR – Alternative Dispute Resolution.

ARCC – Allowable Range of Contract Cost.

BAC – Bids and Awards Committee.

BIR – Bureau of Internal Revenue.

BSP – Bangko Sentral ng Pilipinas.

CDA – Cooperative Development Authority.

COS – Contract of Service.

CPI – Consumer Price Index.

DOLE – Department of Labor and Employment.

DTI – Department of Trade and Industry.

GCC - General Conditions of Contract.

GFI – Government Financial Institution.

GOCC – Government-Owned and/or –Controlled Corporation.

GoP – Government of the Philippines.

GPPB – Government Procurement Policy Board.

HoPE – Head of Procuring Entity.

JO – Job Order.

IRR – Implementing Rules and Regulations.

ITB – Instructions to Bidders.

LCB- Lowest Calculated Bid.

LCRB – Lowest Calculated Responsive Bid.

LGUs – Local Government Units.

LoC – Line of Credit

MAB – Most Advantageous Bid.

MARB – Most Advantageous Responsive Bid.

MEARB – Most Economically Advantageous Responsive Bid.

MYCA – Multi-Year Contracting Authority.

NFCC – Net Financial Contracting Capacity.

NGA – National Government Agency.

PCAB – Philippine Contractors Accreditation Board.

PhilGEPS - Philippine Government Electronic Procurement System.

PSA – Philippine Statistics Authority.

RA No. – Republic Act Number.

SARB – Single Advantageous and Responsive Bid.

SCC - Special Conditions of Contract.

SCRB – Single Calculated and Responsive Bid.

SEARB – Single Economically Advantageous Responsive Bid.

SEC – Securities and Exchange Commission.

SLCC – Single Largest Completed Contract.

SRRB – Single Rated and Responsive Bid.

UN – United Nations.

Definition of Terms

Bid – a signed offer, proposal, or quotation submitted by a supplier, manufacturer, distributor, contractor, consultant, or service provider in response to the requirements of the Procuring Entity as stated in the Bidding Documents. (IRR of RA No. 12009, Section 5[c]).

Bidder – a supplier, manufacturer, distributor, contractor, consultant, and service provider, whether public or private, who submits a Bid in response to the requirements of the Procuring Entity as stated in the Bidding Documents. (IRR of RA No. 12009, Section 5[d]).

Bidding Documents – the documents issued by the Procuring Entity as the basis for Bids, furnishing all information necessary to prospective bidder to prepare a Bid for the Goods, Infrastructure Projects, and Consulting Services required by the Procuring Entity. (IRR of RA No. 12009, Section 5[e])

Bill of Quantities – a list of the specific items of the Work and their corresponding unit prices, lump sums, and/or provisional sums.

Consulting Services – services for Infrastructure Projects and other types of projects or activities of the government requiring adequate external technical and professional expertise that are beyond the capability or capacity of the government 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. (IRR of RA No. 12009, Section 5[i]).

Contract – the agreement entered into between the Procuring Entity and the Contractor to execute, complete, and maintain the Works and as recorded in the Contract Form signed by the parties, including all attachments and appendices thereto and all documents incorporated by reference therein.

Contract Price – the price stated in the Notice of Award and thereafter to be paid by the Procuring Entity to the Contractor for the execution of the Works in accordance with this Contract.

Contract Time Extension (CTE) – the allowable period for the Contractor to complete the Works in addition to the original Completion Date stated in this Contract.

Contractor – 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.

Days – refers to calendar days; months to calendar months.

Dayworks – varied work inputs subject to payment on a time basis for the Contractor's employees and Equipment, in addition to payments for associated Materials and Plant.

Defect – any part of the Works not completed in accordance with the Contract.

Defects Liability Certificate – the certificate issued by the Procuring Entity upon correction of defects by the Contractor.

Defects Liability Period – the one (1) year period between contract completion and final acceptance within which the Contractor assumes the responsibility to undertake the repair of any damage to the Works at its own expense.

Drawings – graphical presentations of the Works. They include all supplementary details, shop drawings, calculations, and other information provided or approved for the execution of this Contract.

Effective Date of the Contract – the date indicated in the contract. However, the Contractor shall commence performance of its obligations only upon receipt of the Notice to Proceed.

Foreign-funded Procurement or Foreign-Assisted Project – refers to the acquisition of Goods, Consulting Services, and the contracting for Infrastructure Projects by the Government of the Philippines which are wholly or partly funded by foreign loans or grants pursuant to a Treaty or International or Executive Agreement.

Funding Source – Organization named in the SCC.

Goods – refer to (i) all items, supplies, and materials, whether in the nature of equipment, furniture, stationery, materials for construction, or personal property of any kind, needed in the transaction of public businesses or in the pursuit of any government undertaking, project or activity; or (ii) general support services which pertain to all types of services except Consulting Services and Infrastructure Projects, such as the repair and maintenance of equipment and furniture, as well as trucking, hauling, janitorial, security, and related or analogous services. Personnel Services or individual COS or JO engagements do not fall under this definition; (IRR of RA No. 12009, Section 5[n]).

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;" (IRR of RA No. 12009, Section 5[r]).

Lot – refers to one or more infrastructure projects that are grouped or bundled together based on factors, such as scope, location, or other relevant parameters, as determined by the End-User or Implementing Unit of the Procuring Entity. Each lot is distinct within the project and may be awarded as a separate contract.

MARB – refers to the award criteria in the procurement of Infrastructure where the considerations for the award of contract are the eligibility of the bidder, the responsiveness of its bid to the technical requirements, and the most advantageous bid in reference to the highest rated offer based on the quality component of the bid.

Materials – refer to all supplies, including consumables, used by the Contractor for incorporation in the Works.

MEARB – refers to the award criteria in the procurement of Infrastructure where the considerations for the award of contract are the eligibility of the bidder, the responsiveness of its bid to the technical requirements, and the determination of the most economically advantageous bid in reference to the quality-price ratio allocated to the technical and financial components of the bid.

Notice to Proceed – refers to a written notice issued by the Procuring Entity to the Contractor requiring the latter to begin the commencement of the work not later than a specified or determinable date.

Online submission – pertains to the submission of the bid for Infrastructure Projects and the bid envelopes containing the technical and financial components of the bid through electronic means or through the electronic bidding facility of the PhilGEPS, once available.

Permanent Works – refer to all permanent structures and all other project features and facilities required to be constructed and completed in accordance with this Contract which shall be delivered to the Procuring Entity, and which shall remain at the Site after the removal of all Temporary Works.

Plant – refers to the machinery, apparatus, and the like intended to form an integral part of the Permanent Works.

Procuring Entity - the organization acquiring the Infrastructure Project, as named in the SCC.

Project – refers to a specific or identified procurement covering Goods, Infrastructure Projects 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.

Program of Work – refers to the big-picture plan and comprehensive schedule that details construction-related tasks to ensure the timely and efficient delivery of the project.

Site Investigation Reports – refers to those that were included in the Bidding Documents and are factual and interpretative reports about the surface and subsurface conditions at the Site.

Slippage – refers to a delay in work execution occurring when actual accomplishment falls below the target as measured by the difference between the scheduled and actual accomplishment of the Work by the Contractor as established from the work schedule. This is actually described as a percentage of the whole Works.

Simple Infrastructure Projects – refers to construction, improvement, rehabilitation, demolition, repair, restoration, or maintenance of structures, technical facilities and systems with an Approved Budget for the Contract (ABC) not exceeding Ten Million Pesos (PhP 10,000,000.00) built at the community level for the sustenance of lives and livelihoods of the population living in a community and built according to the needs and aspirations of the community population.

Verified Report – the report submitted by the Implementing Unit to the HoPE setting forth its findings as to the existence of grounds or causes for termination and explicitly stating its recommendation for the issuance of a Notice to Terminate.

Section I. Invitation to Bid

INVITATION TO BID
for the
Construction of Farm to Market Road, Brgy. Bagacay, Labo, Camarines Norte

1. The ***Provincial Government of Camarines Norte***, through the ***20% Development Fund AB2026*** intends to apply the sum of ***Two Million Nine Hundred Seventy-Seven Thousand Seven Hundred Thirty-Nine Pesos and Sixteen Centavos (P2,977,739.16)*** being the Approved Budget for the Contract (ABC) to payments under the contract for the ***Construction of Farm to Market Road, Brgy. Bagacay, Labo, 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 ***Construction of 144.00LM x 6.00m x 0.20m thk road.*** Completion of the Works is required ***120 CD***. Bidders should have completed, within ***10 years*** from the date of submission and receipt of bids, a contract similar to the Project. The description of an eligible bidder is contained in the Bidding Documents, particularly, in Section II (*Instructions* to Bidders).

3. Bidding will be conducted through competitive bidding procedures using non-discretionary "pass/fail" criterion as specified in the IRR, otherwise known as the "New Government Procurement Act (NGPA)."

   Bidding is restricted to Filipino citizens/sole proprietorships, cooperatives, and partnerships or organizations with at least sixty percent (60%) interest or outstanding capital stock belonging to citizens of the Philippines.

4. Interested 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, except Holidays.***

5. A complete set of Bidding Documents may be acquired by interested bidders on ***October 20, 2026 – October 29, 2026*** at the ***Provincial Capitol Building, Daet, Camarines Norte*** and upon payment of the applicable fee for the Bidding Documents, pursuant to the latest Guidelines issued by the GPPB, in the amount of ***Five Thousand Pesos (P5,000.00).***

   It may also be downloaded free of charge from the website of the Philippine Government Electronic Procurement System (PhilGEPS) and the website of the Procuring Entity, provided that bidders shall pay the applicable fee for the Bidding Documents not later than the submission of their bids.

6. Bids must be duly received by the Bids and Awards Committee (BAC) Secretariat **through manual submission** at the address below on or before ***October 29, 2026 at 1:30p.m.*** Late bids shall not be accepted.

7. All bids must be accompanied by a Bid Security in any of the acceptable forms and in the amount stated in **ITB** Clause 16.

8. Bid opening shall be on ***October 29, 2026, 2:00 p.m. onwards*** at the ***Provincial Capitol Building, Daet, Camarines Norte***. Bids will be opened in the presence of the bidders'

representatives who choose to attend the activity, provided that an Authorization Letter shall be submitted to the BAC on or before the scheduled opening of bids. ***Only one (1) representative for each Bidder may physically attend the bid opening.***

9. The Bid Evaluation and Award Criteria are **Lowest Calculated Bid (LCB)** and **Lowest Calculated and Responsive Bid (LCRB)**, respectively.

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 70 of R.A. No. 12009, without thereby incurring any liability to the affected bidder or bidders.

11. For further information, please refer to:

ENGR. HAROLD R. GESTIADA, EnP
P.A.B.E. / Head, BAC Secretariat
Bids and Awards Committee Office,
Provincial Capitol Bldg., Daet, Camarines Norte
baccamnorte2025@gmail.com

12. You may visit the website:

For downloading of Bidding Documents:

Philippine Government Electronic Procurement System (PhilGEPS)

Provincial Government of Camarines Norte Official Website (www.camsnorte.com)

MAXIMO P. MAGANA, JR.
Provincial Assessor / BAC Chairperson

Section II. Instructions to Bidders

TABLE OF CONTENTS

A. GENERAL **17**

1. Scope of Bid 17
2. Source of Funds 17
3. Corrupt, Fraudulent, Collusive, Coercive, and Obstructive Practices 17
4. Conflict of Interest 18
5. Eligible Bidders 19
6. Bidder's Responsibilities 21
7. Origin of Goods and Services 23
8. Subcontracts 23

B. CONTENTS OF BIDDING DOCUMENTS **24**

9. Pre-Bid Conference 24
10. Clarification and Amendment of Bidding Documents 24

C. PREPARATION OF BIDS **25**

11. Language of Bids 25
12. Documents Comprising the Bid: Technical and Financial Components 25
13. Bid Prices 27
14. Bid Currencies 27
15. Bid Validity 27
16. Bid Security 27
17. Format and Signing of Bids 31
18. Sealing and Marking of Bids 31

D. SUBMISSION AND OPENING OF BIDS **32**

19. Deadline for Submission of Bids 32
20. Late Bids 32
21. Modification and Withdrawal of Bids 32
22. Opening and Preliminary Examination of Bids 33

E. EVALUATION AND COMPARISON OF BIDS **34**

23. Process to be Confidential 34
24. Clarification of Bids 34
25. Detailed Evaluation and Comparison of Bids 34
26. Post-Qualification 36

27. Reservation Clause 38

F. AWARD OF CONTRACT 39

28. Contract Award 39
29. Signing of the Contract 39
30. Performance Security 40
31. Notice to Proceed 41
32. Protest Mechanism 41

A. General

1) Scope of Bid

1.1 The Procuring Entity, ***Provincial Government of Camarines Norte***, invites Bids for the ***Construction of Farm to Market Road, Brgy. Bagacay, Labo, Camarines Norte***, with Project Identification Number ***ITB-2026-097.***

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

1.2 The winning Bidder will be expected to complete the Works by the intended completion date specified in **SCC** Clause 1.1.

2) Source of Funds

The Procuring Entity has a budget or received funds from the Funding Source named in the **BDS**, and in the amount indicated in the **BDS**. It intends to apply part of the funds received for this Project to cover eligible payments under the contract.

3) Corrupt, Fraudulent, Collusive, Coercive, and Obstructive Practices

3.1 Unless otherwise specified in the **BDS**, the Procuring Entity, as well as Bidders and Contractors, shall observe the highest standard of ethics during the procurement and execution of the contract. In pursuance of this policy, the Procuring Entity:

a) defines, for purposes of this provision, the following terms under existing laws, rules, and regulations:

i) "corrupt practice" means an act by which officials in the public or private sectors improperly and unlawfully enrich themselves, others, or induce others to do so, by misusing the position in which they are placed, and includes the offering, giving, receiving, or soliciting of anything of value to influence the action of any such official in the procurement process or in contract execution; entering, on behalf of the government, into any contract or transaction manifestly and grossly disadvantageous to the same, whether or not the public officer profited or will profit thereby, and similar acts as provided in RA No. 3019.

ii) "fraudulent practice" means a misrepresentation of facts for purposes of influencing a procurement process or the execution of a contract to the detriment of the Procuring Entity, which includes collusive practices among Bidders (prior to or after bid submission) designed to establish bid prices at artificial, non-competitive levels and to deprive the Procuring Entity of the benefits of free and open competition.

iii) "collusive practices" means a scheme or arrangement between two or more Bidders, with or without the knowledge of the Procuring Entity, designed to establish bid prices at artificial, non-competitive levels.

iv) "coercive practices" means harming or threatening to harm, directly or indirectly, persons, or their property to influence their participation in a procurement process, or affect the execution of a contract;

v) "obstructive practice" is

a) deliberately destroying, falsifying, altering or concealing of evidence material to an administrative proceedings or investigation or making false statements to investigators in order to materially impede an administrative proceedings or investigation of the Procuring Entity or any foreign government/foreign or international financing institution relative to allegations of a corrupt, fraudulent, coercive or collusive practice; and/or threatening, harassing or intimidating any party to prevent the latter from disclosing its knowledge of matters relevant to the administrative proceedings or from pursuing such proceedings or investigation; or

b) acts intended to materially impede the exercise of the inspection and audit rights of the Procuring Entity or any foreign government/foreign or international financing institution herein.

b) Undertakes to reject a proposal for award upon *prima facie* determination that the Bidder recommended for award has engaged in any of the prohibited practices mentioned in this Clause for purposes of competing for the contract.

3.2 Further, the Procuring Entity will seek to impose the maximum civil, administrative, and/or criminal penalties available under the applicable laws on individuals and organizations deemed to be involved in any of the practices mentioned in **ITB** Clause 4.

3.3 Furthermore, the Funding Source and the Procuring Entity reserve the right to inspect and audit records and accounts of a Bidder or Contractor in the bidding for and performance of a contract themselves or through independent auditors as reflected in the **GCC** Clause 36.

4) Conflict of Interest

4.1 All Bidders found to have conflicting interests shall be disqualified to participate in the procurement at hand, without prejudice to the imposition of appropriate administrative, civil, and criminal sanctions. A Bidder may be considered to have conflicting interests with another Bidder in any of the events described in paragraphs (a) through (c) and a general conflict of interest in any of the circumstances set out in paragraphs (d) through (f) below:

a) A Bidder has controlling shareholders or beneficial owners in common with another Bidder;

b) A Bidder receives or has received any direct or indirect subsidy from any other Bidder;

c) A bidder has the same legally authorized representative as that of another Bidder for purposes of this Bid;

d) A bidder has a relationship, directly or through third parties, that puts them in a position to have access to information about or influence on the bid of another Bidder or influence the decisions of the Procuring Entity regarding this bidding process. This may include a firm or an organization that lends, or temporarily seconds, its personnel to firms or organizations that are engaged in consulting services for the preparation related to procurement for or implementation of

the project if the personnel would be involved in any capacity on the same project;

e) A bidder who participated as a consultant in the preparation of the design or technical specifications of the goods and related services that are the subject of the bid; or

f) A bidder who lends, or temporarily seconds, its personnel to firms or organizations which are engaged in consulting services for the preparation related to procurement for or implementation of the project, if the personnel would be involved in any capacity on the same project.

4.2 All Bidding Documents shall be accompanied by an Omnibus Sworn Statement of the Bidder that it is not related, by consanguinity or affinity up to the third civil degree, to the HoPE, Procurement Agent (if engaged), the head of the Project Management Office (PMO), the End-User or Implementing Unit or any members of the Bids and Awards Committee (BAC), Technical Working Group (TWG), and BAC Secretariat.[3]

4.3 The Bidder shall also disclose the ultimate beneficial ownership of the entity it represents. Failure to comply shall be a ground for the automatic disqualification of the bid in consonance with Section 59 of the IRR. For this reason, relationship to the aforementioned persons within the third civil degree of consanguinity or affinity shall automatically disqualify the Bidder from participating in the procurement of contracts of the Procuring Entity notwithstanding the act of such persons inhibiting themselves from the procurement process. This Clause shall apply to the following persons and affiliates:

a) In the case of individuals or sole proprietorships, to the Bidders and their spouses;

b) In the case of partnerships, to the partnership itself and its partners;

c) In the case of cooperatives, to the cooperative itself and members of the board of directors, general manager or chief executive officer;

d) In the case of a partnership, joint venture, or consortium, to the entity itself, its members or partners, as well as any person or entity that is a member of a blacklisted partnership, joint venture, or consortium; and

e) In the case of corporations, a single stockholder, together with their relatives up to the third civil degree of consanguinity or affinity, and their assignees, holding at least twenty percent (20%) of the shares therein, its chairperson and president, shall be blacklisted after they have been determined to hold the same controlling interest in a previously blacklisted corporation or in two corporations that have been blacklisted; the corporations of which they are part shall also be blacklisted.

5) Eligible Bidders

[3] Section 81.1 of the IRR.

5.1 Only Bids found to be legally, technically, and financially eligible will be evaluated. For procurement of Infrastructure Projects, the following persons shall be eligible to participate in this bidding:

a) Duly licensed Filipino citizens or sole proprietorships;

b) Partnerships duly organized under the laws of the Philippines and of which at least sixty percent (60%) of the interest belongs to citizens of the Philippines;

c) Corporations duly organized under the laws of the Philippines, and of which at least sixty percent (60%) of the outstanding capital stock belongs to citizens of the Philippines;

d) Cooperatives duly organized under the laws of the Philippines; and

e) Persons or entities forming themselves into a Joint Venture (JV), i.e., a group of two (2) or more persons or entities that intend to be jointly and severally responsible or liable for a particular contract; Provided, however, that in accordance with relevant laws, rules, and regulations, Filipino ownership or interest of the joint venture concerned shall be at least sixty percent (60%); Provided, further, that joint ventures in which Filipino ownership or interest is less than sixty percent (60%) may be eligible where the structures to be built require the application of techniques or technologies which are not adequately possessed by a person or entity meeting the sixty percent (60%) Filipino ownership requirement; Provided, furthermore, that in the latter case, Filipino ownership or interest shall not be less than twenty-five percent (25%). For this purpose, Filipino ownership or interest shall be based on the contributions of each of the member of the joint venture as specified in their Joint Venture Agreement (JVA); Provided, finally, that the primary purpose of each member of the joint venture must be similar or related to the requirement of the project to be bid out.

5.2 The Procuring Entity may also invite foreign bidders when provided for under any Treaty or International or Executive Agreement as specified in the **BDS**.

5.3 In accordance with RA No. 4566 or the "Contractors' License Law" as amended by RA No. 11711 or "An Act Further Amending Republic Act No. 4566", the persons or entities enumerated in Section 52 of the IRR may participate in the procurement of Infrastructure Projects if it has been issued a license by the Philippine Contractors Accreditation Board (PCAB) to engage or act as a contractor.

5.4 The Bidder must have completed an SLCC that is similar to the procurement project to be bid, and whose value must be equivalent to at least fifty percent (50%) of the ABC, adjusted to current prices using the Philippine Statistics Authority (PSA) consumer price indices; Provided, that any change to the fifty percent (50%) requirement may be allowed, subject to the recommendation of the Procuring Entity, which shall be submitted to the GPPB for consideration; Provided, further, that contractors under Small A and Small B categories without similar experience on the procurement project to be bid may be allowed to bid if the cost of such contract is not more than the Allowable Range of Contract Cost of their registration based on the guidelines as prescribed by the PCAB.

For foreign-funded procurement, the GoP and the foreign government, or foreign or international financing institution may agree on another track record requirement, as specified in the **BDS**.

Moreover, a contract shall be considered similar to the procurement project if it has the same major categories of work. The Procuring Entity may clarify in the Bidding Documents what is regarded as major categories of work, guided by the principle of proportionality and Fit-for-Purpose approach.

5.5 The SLCC shall be supported by an Owner's Certificate of Final Acceptance issued by the project owner other than the Contractor, or a final rating of at least Satisfactory in the Constructors Performance Evaluation System (CPES), or a similar performance and monitoring system. In the case of contracts with the private sector, an equivalent document shall be submitted.

5.6 The computation of a bidder's NFCC must be at least equal to the ABC to be bid, calculated as follows:

> NFCC = [(Current assets minus current liabilities) (15)] minus the value of all outstanding or uncompleted portions of the projects under ongoing contracts, including awarded contracts yet to be started, coinciding with the procurement project to be bid; Provided, That a different formula may be adopted subject to the recommendation of the Procuring Entity, which shall be submitted to the GPPB for consideration.

The value of the domestic bidder's current assets and current liabilities shall be based on the latest AFS submitted to the BIR.

For purposes of computing the foreign bidders' NFCC, the value of the current assets and current liabilities shall be based on their latest AFS prepared in accordance with international financial reporting standards.

6) Bidder's Responsibilities

6.1 The Bidder or its duly authorized representative shall submit a sworn statement in the form prescribed in Section IX. Philippine Bidding Documents Related Forms as required in **ITB** Clause 12.1(h)(iv).

6.2 Before submitting their bids, the Bidders are deemed to be knowledgeable of all existing laws, decrees, ordinances, acts and regulations of the Philippines which may affect this Project in any way.

6.3 The Bidder undertook the following responsibilities:

a) Took steps to carefully examine and ensure full understanding and comprehension of the Bidding Document, its requirements, clauses, and provisions;

b) Acknowledged all conditions, local or otherwise, affecting the implementation of the contract;

c) Made an estimate of the facilities available and needed for the contract to be bid, if any;

d) Complied with its responsibility to inquire or secure Supplemental Bid Bulletin(s);

e) Ensured that it is not "blacklisted" or barred from bidding by the Government of the Philippines (GoP) or any of its agencies, offices, corporations, or LGUs,

including foreign government, or foreign/ international financing institutions whose blacklisting rules have been recognized by the GPPB; by itself or by reason of its relation, membership, association, affiliation, or controlling interest with another blacklisted person or entity;

f) Ensured that each of the documents submitted in satisfaction of the bidding requirements is an authentic copy of the original, complete, and that all statements and information provided therein are true and correct;

g) Authorized the HoPE or its duly authorized representative/s to verify all the documents submitted;

h) Ensured that the signatory 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, to sign, and execute the ensuing contract, accompanied by the duly notarized Special Power of Attorney, Board or Partnership Resolution, or Secretary's Certificate, whichever is applicable;

i) Complied with the disclosure provision under Section 81 and 82 of RA No. 12009 and its IRR in relation to other provisions of RA No. 3019;

j) Complied with existing labor laws and standards. Moreover, the Bidder undertakes to:

   i) Ensure the entitlement of workers to wages, hours of work, safety and health and other prevailing conditions of work as established by national laws, rules and regulations; or Collective Bargaining Agreement (CBA) or arbitration award, if and when applicable.

      In case there is a finding by the Procuring Entity or the Department of Labor and Employment (DOLE) of underpayment or non-payment of workers' wages and wage-related benefits, the Bidder agrees that the performance security or portion of the contract amount shall be withheld in favor of the complaining workers pursuant to appropriate provisions of RA No. 12009, without prejudice to the institution of appropriate actions under the Labor Code, as amended, and other social legislations;

   ii) Comply with Occupational Safety and Health Standards (OSHS) and correct deficiencies, if any.

      In case of imminent danger, injury or death of the worker, the Bidder undertakes to suspend contract implementation pending clearance to resume from the DOLE Regional Office, in compliance with the Work Stoppage Order; and

   iii) Inform the workers of their conditions of work, labor clauses under the contract specifying wages, hours of work and other benefits under prevailing national laws, rules and regulations; or CBA or arbitration award, if and when applicable, through posting in two (2) conspicuous places in the establishment's premises.

k) Ensured that it 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;

l) Examined all instructions, forms, terms, and specifications in the Bidding Documents;

m) Determined and complied with all matters pertaining to the contract to be bid, including but not limited to: (i) the location and the nature of the contract, project, or work; (ii) climatic conditions; (iii) transportation facilities; (iv) 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 (v) other factors that may affect the cost, duration and execution or implementation of the contract, project, or work; and

n) Ensured that all information in the Bidding Documents, including bid or supplemental bid bulletin(s) issued, are correct and consistent. The Procuring Entity shall not assume any responsibility regarding erroneous interpretations or conclusions by the prospective or eligible Bidder out of the data furnished by the Procuring Entity.

Failure to observe any of the above responsibilities shall be at the risk of the Bidder concerned;

6.4 The Bidder, by the act of submitting its bid, shall be deemed to have inspected the site, determined the general characteristics of the contract works and the conditions for this Project and examine all instructions, forms, terms, and project requirements in the Bidding Documents.

6.5 Further, the Bidder shall bear all costs associated with the preparation and submission of its bid, and the Procuring Entity shall in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

In case of failure of bidding, the Bidding Documents fee may be applied in the re-bidding for the same Project.

6.6 Furthermore, the Bidder should be aware that the Procuring Entity will accept bids only from those that have paid the applicable fee for the Bidding Documents at the office indicated in the Invitation to Bid.

7) Origin of Goods and Services

Unless otherwise indicated in the **BDS**, there is no restriction on the origin of Goods, or Contracting of Works or Services other than those prohibited by a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations.

8) Subcontracts

8.1 Unless otherwise specified in the **BDS**, the Bidder may subcontract portions of the Works to an extent as may be approved by the HoPE and as stated in the **BDS**. However, the subcontracted portion shall not exceed fifty (50%), or a different percentage of the ABC, on a per project basis, as approved by the GPPB.

8.2 Subcontracting of any portion of the Project shall not relieve the Bidder from any liability or obligation that may arise from the contract.

8.3 Subcontractors must meet the eligibility criteria as stated in the **BDS** and shall submit the same eligibility documents as the general contractor. Failure of a subcontractor to meet the eligibility criteria does not affect the eligibility of the general contractor for the procurement project. In such case, the portion intended to be subcontracted to the ineligible subcontractor shall be assumed by the general contractor.

8.4 Subcontracting arrangement, if allowed, including the time of submission of the eligibility documents of the subcontractor, shall be disclosed in the **BDS.**

B. Contents of Bidding Documents

9) Pre-Bid Conference

9.1 If so specified in the **BDS**, a pre-bid conference shall be held either at the Procuring Entity's physical address and/or online through videoconferencing, webcasting, or similar technology, or a combination thereof, on the date indicated therein, to clarify and address the Bidders' questions on the technical and financial components of this Project.

9.2 The pre-bid conference shall be held at least twelve (12) calendar days before the deadline for the submission of and receipt of bids, but not earlier than seven (7) calendar days from the posting of the invitation to bid and other bidding documents on the PhilGEPS website.

9.3 Bidders are highly encouraged to attend the pre-bid conference to fully understand the Procuring Entity's requirements. While non-attendance of the Bidder will in no way prejudice its bid, the Bidder is deemed to know any changes and/or amendments to the Bidding Documents, as may be provided in the Supplemental Bid Bulletin.

The proceedings of the pre-bid conference shall be recorded, and the corresponding minutes shall be prepared not later than five (5) calendar days after the pre-bid conference. The minutes shall be made available to prospective Bidders not later than five (5) days upon written request.

9.4 Decisions of the BAC amending any provision of the Bidding Documents shall be issued in writing through a Supplemental Bid Bulletin at least seven (7) calendar days before the deadline for the submission and receipt of bids.

10) Clarification and Amendment of Bidding Documents

10.1 Prospective bidders may request for clarification(s) on and/or interpretation of any part of the Bidding Documents. Such a request must be in writing and submitted to the BAC of the Procuring Entity at the address or electronic mail indicated in the **BDS** or through the electronic bidding facility of PhilGEPS, as may be applicable, at least ten (10) calendar days before the deadline set for the submission and receipt of Bids.

10.2 The BAC shall respond to the said request by issuing a Supplemental Bid Bulletin duly signed by the BAC Chairperson. It shall be made available to all those who have properly secured the Bidding Documents, at least seven (7) calendar days before the deadline for the submission and receipt of Bids.

10.3 Supplemental Bid Bulletins may also be issued upon the Procuring Entity's initiative for purposes of clarifying or modifying any provision of the Bidding Documents not later than seven (7) calendar days before the deadline for the submission and receipt of Bids. Any modification to the Bidding Documents shall be identified as an amendment.

10.4 Any Supplemental Bid Bulletin issued by the BAC shall also be posted on the PhilGEPS website, in any conspicuous place in the premises of the Procuring Entity, and on the website or social media platforms of the Procuring Entity, if available, or such other channels as may be authorized by the GPPB. It shall be the responsibility of all prospective bidders, including those who have properly secured the Bidding Documents, to inquire and secure Supplemental Bid Bulletins that may be issued by the BAC. However, Bidders who have submitted bids before the issuance of the Supplemental Bid Bulletin must be accordingly informed by the BAC, and be allowed to modify or withdraw their bids prior to the deadline for the submission and receipt of bids in accordance with ITB Clause 21.

C. Preparation of Bids

11) Language of Bids

The eligibility requirements or statements, the bids, and all other documents to be submitted to the BAC must be in English. If the eligibility requirements or statements, the bids, and all other documents submitted to the BAC are in foreign language other than English, it must be accompanied by a translation of the documents in English. The documents shall be translated by the relevant foreign government agency, the foreign government agency authorized to translate documents, or a registered translator in the foreign bidder's country. The Bidder shall cause the authentication of the translated documents and shall be authenticated by the appropriate Philippine foreign service establishment or post or the equivalent office having jurisdiction over the foreign bidder's affairs in the Philippines. However, for Contracting Parties to the Apostille Convention, the documents shall be authenticated through an apostille by the Competent Authority, as defined in Section 20.2.9.2 of the IRR, except for countries identified by the DFA that will still require legalization (red ribbon) by the relevant Embassy or Consulate. The English translation shall govern, for purposes of interpretation of the bid.

12) Documents Comprising the Bid: Technical and Financial Components

12.1 The first bid envelope shall contain the following technical documents, including the eligibility documents:

a) PhilGEPS Certificate of Registration (Platinum Membership) in accordance with Section 20 of the IRR;

b) PCAB License and Registration, in case of Joint Venture (JV);

c) Statement 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;

d) Statement of the Bidder's SLCC, in accordance with **ITB** Clause 5.5.

The SLCC shall be supported by an Owner's Certificate of Final Acceptance issued by the project owner other than the Contractor, or a final rating of at least satisfactory in the CPES, or a similar performance and monitoring system. In case of contracts with the private sector, an equivalent document shall be submitted;

e) NFCC computation in accordance with **ITB** Clause 5.6;

f) Joint Venture Agreement (JVA), if applicable;

g) Bid Security in the prescribed form and amount in accordance with **ITB** Clause 16, and validity period under **ITB** Clause 15;

h) Project Requirements, which shall include the following:

i) Organizational chart of the personnel to be deployed for the procurement project to be bid;

ii) List of Contractor's personnel (e.g., Project Manager, Project Engineers, Materials Engineers, and Foremen), to be assigned to the procurement project to be bid, with their complete qualifications and experience data. These personnel must meet the required minimum years of experience set in the **BDS**;

iii) List of Contractor's major equipment units which are owned, leased, or under purchase agreements, supported by proof of ownership or certification of availability of equipment from the equipment lessor or vendor for the duration of the project, as the case may be, which must meet the minimum requirements for the contract set in the **BDS**; and

iv) Omnibus Sworn Statement in accordance with Section 54.3 of the IRR.

12.2 The second bid envelope shall contain the Financial Bid Form, which includes the bid prices and the bill of quantities, in accordance with **ITB** Clauses 13.1.

12.3 Whenever necessary, modifications may be made to the foregoing provisions specifically for major and specialized procurement to suit the particular needs of the Procuring Entity, subject to the approval of the GPPB.

12.4 All bids that exceed the ABC shall not be accepted. Unless otherwise indicated in the **BDS**, for foreign-funded procurement, the ABC shall be applied as the ceiling to bid prices provided the following conditions are met:

a) Bidding Documents are obtainable free of charge on a freely accessible website. If payment of Bidding Documents is required by the Procuring Entity, payment could be made upon the submission of bids.

b) The Procuring Entity has procedures in place to ensure that the ABC is based on recent estimates made by the engineer or the responsible unit of the Procuring Entity and that the estimates are based on adequate detailed engineering and reflect the quality, supervision and risk, and inflationary factors, as well as prevailing market prices, associated with the types of works or goods to be procured.

c) The Procuring Entity has trained cost estimators on estimating prices and analyzing bid variances. In the case of Infrastructure Projects, the Procuring Entity must also have trained quantity surveyors.

d) The Procuring Entity has established a system to monitor and report bid prices relative to ABC and engineer's or Procuring Entity's estimate.

e) The Procuring Entity has established a monitoring and evaluation system for contract implementation to provide feedback on actual total costs of goods and works.

However, the GoP and the foreign government, or foreign or international financing institutions may agree to waive the foregoing conditions.

13) Bid Prices

13.1 The contract shall be for the whole Works, as described in the Bidding Documents, based on the priced Bill of Quantities submitted by the Bidder.

13.2 The Bidder shall fill in rates and prices for all items of the Works described in the Bill of Quantities. In case partial bids are allowed in the ITB, bids not addressing or providing all of the required items in the Bidding Documents including, where applicable, the Bill of Quantities, shall be considered non-responsive and shall be automatically disqualified. In this regard, where a required item is provided, but no price is indicated, the same shall be considered as non-responsive, but specifying a zero (0) or a dash (-) for the said item would mean that it is being offered for free to the Government, except those required by law or regulations to be provided for.

13.3 For the given scope of work in the contract as awarded, all bid prices shall be considered as fixed prices, and therefore not subject to price escalation during contract implementation, except under extraordinary circumstances as specified in GCC Clause 45.

14) Bid Currencies

14.1 All bid prices shall be quoted in Philippine Peso unless otherwise provided in the **BDS**. 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 Daily Reference Exchange Rate Bulletin on the day of the bid opening.[4]

14.2 If so allowed in accordance with **ITB** Clause 14.1, the Procuring Entity, for purposes of bid evaluation and comparing the bid prices, will convert the currencies in which the bid price is expressed to Philippine Peso at the foreign exchange rates.

14.3 Unless otherwise specified in the **BDS**, payment of the contract price shall be made in Philippine Peso.

15) Bid Validity

15.1 Bids shall remain valid for the period specified in the **BDS** which shall not exceed one hundred twenty (120) calendar days from the date of the opening of bids.

15.2 Should it become necessary to extend the validity of the bids and the bid securities beyond one hundred twenty (120) calendar days, the Procuring Entity concerned shall request in writing all those who submitted bids for such extension before the expiration date therefor. Bidders, however, shall have the right to refuse to grant such extension without forfeiting their Bid Security.

16) Bid Security

[4] RA No. 8183 or "An Act to Assure Uniform Value to Philippine Coin and Currency."

16.1 The Bidder, at its option, shall submit a Bid Security in the form and amount as stated in the **BDS**, which may include the following:

Form of Bid Security	**Amount of Bid Security (Not less than the required Percentage of the ABC)**
(a) Cash or cashier's/manager's check issued by a bank. *For biddings conducted by LGUs, the Cashier's or Manager's check may be issued by other banks certified by the BSP as authorized to issue such financial instrument.*	Two percent (2%)
(b) Bank draft/guarantee or irrevocable Letter of Credit issued by a bank; Provided, however, that it shall be confirmed or authenticated by a local bank, if issued by a foreign bank. *For biddings conducted by LGUs, the Bank Draft/ Guarantee, or irrevocable letter of credit may be issued by other banks certified by the BSP as authorized to issue such financial instrument.*	Five percent (5%)
(c) Surety bond callable upon demand issued by a surety or insurance company duly certified by the Insurance on as authorized to issue such security.	Five percent (5%)
(d) Bid Securing Declaration	Not Applicable

The Bid Security shall be denominated in Philippine Peso and posted in favor of the Procuring Entity.

16.2 The Bid Security should be valid for the period specified in the **BDS**. Any bid not accompanied by an acceptable Bid Security shall be considered as non-responsive and rejected by the Procuring Entity.

16.3 In no case shall the Bid Security be returned later than the expiration of the bid validity period indicated in the Bidding Documents, unless it has been extended in accordance with Section 57.2 of the IRR. In case the bidder is required to extend its bid validity, the bidder may, at its discretion, substitute a Bid Securing Declaration for the extended period as a replacement of its Bid Security; Provided, that the option to substitute is indicated in the **BDS.**

16.4 Upon signing and execution of the contract, pursuant to **ITB** Clause 29, and the posting of the performance security pursuant to **ITB** Clause 30, the Bid Security of the successful Bidder's Bid Security will be discharged, but in no case later than its validity period as indicated in **ITB** Clause 15.

16.5 The Bid Security may be forfeited based on any of the following grounds, as provided under Rule VIII, X, XI, and XXI of the IRR:

a) If a Bidder:

i) With the Lowest Calculated Responsive Bid (LCRB), Most Economically Advantageous Responsive Bid (MEARB), Most Advantageous Responsive Bid (MARB), Single Calculated and Responsive Bid (SCRB), Single Economically Advantageous Responsive Bid (SEARB), or Single Advantageous Responsive Bid (SARB) withdraws, fails, refuses or is unable to: (i) submit the documents required under Section 66.5 of the IRR; (ii) enter into contract with the Procuring Entity; or (iii) post the required performance security within the period stipulated in the IRR and in accordance with **ITB** Clause 30;

ii) Causes the delay, without justifiable cause, of the screening for eligibility, opening of bids, evaluation and post evaluation of Bids, and awarding of contracts;

iii) Refuses to clarify or validate in writing its bid during post-qualification within a period of seven (7) calendar days from receipt of the request for clarification;

iv) Withdraws a bid, or refuses to accept an award, or refuses or fails to enter into contract with the Procuring Entity without justifiable cause, after the approval of the HoPE for having been the declared LCRB or MEARB, as the case may be;

v) Refuses or fails to furnish performance security within the prescribed time;

vi) Commits of three (3) or more of any of the acts imposed with suspension, as provided under Section 99 of the IRR;

vii) Uses force, fraudulent machinations, coercion, undue influence or pressure on any member of the BAC or any officer or employee of the Procuring Entity to take a particular action for its own favor or gain, or to the advantage of a particular bidder;

viii) Colludes with one (1) or more bidders and submitting different bids as if they were bona fide, when they knew that one or more of them was so much higher than the other that it could not be honestly accepted and that the contract will surely be awarded to the pre-arranged lowest bid;

ix) Maliciously submits different bids through two (2) or more persons, corporations, partnerships, or any other business entity in which it has interest, to create the appearance of competition that does not in fact exist so as to be declared as the winning bidder;

x) Enters into an agreement with other bidder/s which call upon one to refrain from bidding for procurement contracts, or which call for withdrawal of bids already submitted, or which are otherwise intended to secure an undue advantage to any of the bidders;

xi) Fails to faithfully disclose its relationship, regardless of the time of its discovery, with the HoPE, members of the BAC, the TWG, and the BAC Secretariat, the head of the PMO or the End-User or Implementing Unit, and the project consultants of the Procuring Entity, or of the procurement agent, whichever is applicable, by consanguinity or affinity up to the third civil degree pursuant to Section 81 of the IRR;

xii) Submits beneficial ownership information containing false entries;

xiii) Allows the use of one's name or uses the name of another for purposes of public bidding;

xiv) Submits eligibility requirements and bids containing false information or falsified documents or the concealment of such information that will materially alter the outcome of eligibility screening or any stage of the procurement;

xv) Accesses the contents of any Bid submitted to the Procuring Entity before the opening of bids, without authorization;

xvi) Has any documented attempt to unduly influence the outcome of the bidding;

xv) Employs schemes which stifle or suppress any procurement activity; or

xvi) Commits a third offense imposed with blacklisting under the Act by the same Procuring Entity, or a combination of three (3) violations imposed with blacklisting by the Procuring Entity and other Procuring Entities, as posted on the GPPB portal;

b) If a Winning Bidder:

i) Conducts poor performance or unsatisfactory quality and/or progress of work. Poor performance shall be as follows:

i.i) Negative slippage of fifteen percent (15%) and above within the critical path of the project due entirely to the fault or negligence of the winning bidder; or

i.ii) Non-compliance of the materials and workmanship with the approved specifications arising from the fault or negligence of the winning bidder.

ii) In case it is determined prima facie that the winning bidder has engaged, before or during the implementation of the contract, in the following unlawful deeds and behaviors relative to contract acquisition and implementation:

ii.i) Corrupt, fraudulent, collusive and coercive practices;

ii.ii) Drawing up or using forged documents; or

ii.iii) Using adulterated materials, means or methods, or engaging in production contrary to rules of science or trade.

iii) Assigns or subcontracts the contract or any part thereof or substituting key personnel named in the proposal without prior written approval by the Procuring Entity;

iv) Willfully or deliberately abandons or does not perform the project or contract by the winning bidder resulting in substantial breach thereof without lawful and/or just cause;

v) Has its contract terminated due to its default or unlawful acts; or

vi) Fails to comply with the provision on warranty that requires to repair any noted defect or damage to the Infrastructure Project due to the use of materials of inferior quality within ninety (90) calendar days from the issuance of the order by the HoPE to undertake such repairs.

17) Format and Signing of Bids

17.1 Bidders shall submit their bids through their duly authorized representative using the appropriate forms provided in Section IX. Philippine Bidding Documents Related Forms on or before the deadline specified in the **ITB** Clause 19 in two (2) separate sealed bid envelopes which shall be submitted simultaneously, whether through manual or online submission. The first shall contain the technical component of the bid, including the eligibility requirements under **ITB** Clause 12, and the second shall contain the financial component of the bid.

17.2 Forms as mentioned in **ITB** Clause 17.1 must be completed without any alterations to their format. No substitute form shall be accepted.

17.3 Each and every page of the Bid Form, including the Bill of Quantities, under Section IX hereof, shall be signed by the duly authorized representative/s of the Bidder. Failure to do so shall be a ground for the rejection of the bid.

17.4 Any insertions, erasures, or overwriting shall be valid only if they are signed or initialed by the duly authorized representative/s of the Bidder.

18) Sealing and Marking of Bids

18.1 Bidders shall enclose their technical documents described in **ITB** Clause 12 in one sealed envelope marked "TECHNICAL COMPONENT,", and the financial component in another sealed envelope marked "FINANCIAL COMPONENT,", sealing them all in an outer envelope marked "BID."

18.2 The Bid shall be typed or written in ink and shall be signed by the Bidder or its duly authorized representative/s.

18.3 All envelopes shall:

a) contain the name of the contract to be bid in capital letters;

b) bear the name and address of the Bidder in capital letters;

c) be addressed to the Procuring Entity's BAC in accordance with **ITB** Clause 18.1;

d) bear the specific identification of this bidding process indicated in the **ITB** Clause 1.1; and

e) bear a warning "DO NOT OPEN BEFORE…" the date and time for the opening of bids, in accordance with **ITB** Clause 19.

18.4 For manually submitted bid envelopes that are not properly sealed and marked, as required in the Bidding Documents, the same shall be accepted; Provided, That the bidder or its duly authorized representative shall acknowledge such condition of the bid as submitted. On the other hand, unsealed or unmarked bid envelopes, or bids that cannot be opened or corrupted in case of online submission, shall be rejected.

The BAC shall assume no responsibility for misplaced or lost contents of the improperly sealed or marked bid, or for its premature opening.

D. Submission and Opening of Bids

19) Deadline for Submission of Bids

Bids must be received by the Procuring Entity's BAC at the address indicated in the **Invitation to Bid,** or through the e-bidding facility of the PhilGEPS, on or before the date and time indicated in the **BDS**.

20) Late Bids

Bids, including the eligibility requirements, submitted after the deadline shall be rejected by the BAC. The BAC shall record in the Minutes of the Meeting the submission and opening of bids, the Bidder's name, its representative, and the time the late bid was submitted.

21) Modification and Withdrawal of Bids

21.1 Bidders may modify their bids before the deadline for the submission and receipt of bids.

a) For manual submission and receipt of bids, the Bidders shall not be allowed to retrieve their original bid, but shall only be allowed to submit the bid modification by sending another bid, equally sealed, properly identified, linked to its original bid, and marked as a "modification," thereof, and stamped "received" by the BAC. Bid modifications received after the applicable deadline shall not be considered and shall be returned to the bidder unopened.

b) For online submission of bids, the Bidders shall not be allowed to retrieve their original Bid, but shall only be allowed to submit the bid modification, send another Bid equally secured, properly identified labelled as a "modification" of the one previously submitted. The time indicated in the latest bid receipt page generated shall be the official time of submission. Bids modification submitted after the applicable deadline shall not be accepted.

21.2 Bidders may withdraw their bids in writing before the deadline for submission and receipt of bids. Withdrawal of bids after the applicable deadline shall be subject to appropriate sanctions as prescribed in the IRR.

Bidders may also express their intention not to participate in the bidding in writing, which should be received by the BAC before the deadline for submission and receipt of bids. Bidders that withdraw their bids shall no longer be allowed to submit another bid for the same contract, directly or indirectly.

21.3 No bid may be modified after the deadline for submission and receipt of bids. Further, no bid may be withdrawn in the interval between the deadline for submission and receipt of bids, and the expiration of bid validity specified by the Bidder in the Financial Bid Form. Withdrawal of bid during this interval shall result in the forfeiture of the Bidder's Bid Security pursuant to **ITB** Clause 16.5, and the imposition of administrative sanctions as prescribed by RA No. 12009 and without prejudice to the imposition of civil and criminal sanctions as provided under applicable laws.

Alternative Bids shall be rejected. For this purpose, Alternative Bid shall pertain to an offer made by a bidder in addition or as a substitute to its original bid, which may be included as part of its original bid or submitted separately. A bid with options shall likewise be considered an Alternative Bid regardless of whether said bid proposal is contained in a single envelope or submitted in two (2) or more separate bid envelopes.

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.

Each Bidder shall submit only one Bid, either individually or as a partner in a JV. A Bidder who submits or participates in more than one bid (other than as a subcontractor if a subcontractor is permitted to participate in more than one bid) will cause all the proposals with the Bidder's participation to be disqualified. This shall be without prejudice to any applicable criminal, civil and administrative penalties that may be imposed upon the persons and entities concerned.

22) Opening and Preliminary Examination of Bids

22.1 The BAC shall open the bids in public, immediately after the deadline for submission and receipt of bids, as specified in the **BDS**. In case the Bids cannot be opened as scheduled due to justifiable reasons, the BAC shall take custody of the submitted Bids and reschedule the opening of Bids on the next working day or at the soonest possible time, through the issuance of a Notice of Postponement to be posted on the PhilGEPS website and the website of the Procuring Entity concerned.

22.2 The manner of opening of the bids for Infrastructure Projects shall depend on the award criterion to be adopted, as follows:

a) For LCRB and MEARB, the BAC shall open the technical and financial proposals on the same day; and

b) For MARB, only the technical proposals shall be opened while the financial proposals shall remain unopened and shall be kept securely by the BAC until the specified time of their opening as indicated in the **BDS**. Only the financial proposals of the bidders who have met the highest technical score for MAB shall be opened.

22.3 The Procuring Entity shall prepare the minutes of the proceedings of the bid opening that shall include, as a minimum: (a) names of Bidders, their bid price (per lot, if applicable, and/or including discount, if any), bid security, findings of preliminary

examination, and whether there is a withdrawal or modification; and (b) attendance sheet. The BAC members shall sign the abstract of bids as read.

22.4 The Bidders or their duly authorized representatives may attend the opening of bids. The BAC shall ensure the integrity, security, and confidentiality of all submitted bids. The Abstract of bids, as read, and the minutes of the bid opening shall be made available to the public, upon written request and payment of a specified fee to recover the cost of materials.

22.5 To ensure transparency and accurate representation of the bid submission, the BAC Secretariat shall notify in writing all bidders whose bids it has received through mail at its PhilGEPS-registered physical address or official e-mail address. The said notice shall be issued within seven (7) calendar days from the date of the bid opening.

E. Evaluation and Comparison of Bids

23) Process to be Confidential

23.1 Members of the BAC, its staff and personnel, Secretariat, and TWG, as well as Observers, are prohibited from making or accepting any communication with any bidder regarding the evaluation of their bids until the issuance of the Notice of Award, unless otherwise allowed in the case of **ITB** Clause 24.

23.2 Any effort by a Bidder to influence the Procuring Entity in the Procuring Entity's decision in respect of bid evaluation, bid comparison or contract award will result in the rejection of the bid.

24) Clarification of Bids

To assist in the evaluation, comparison, and post-qualification of the bids, the Procuring Entity may ask in writing any Bidder for a clarification of its bid. All responses to requests for clarification shall be in writing. Any clarification submitted by a Bidder in respect to its bid that is not in response to the request of the Procuring Entity shall not be considered.

25) Detailed Evaluation and Comparison of Bids

25.1 The Procuring Entity's evaluation of bids shall be based on the bid price quoted in the Bid Form, which includes the Bill of Quantities.

25.2 The Procuring Entity will undertake the detailed evaluation and comparison of the bids which have passed the opening and preliminary examination of bids, pursuant to **ITB** Clause 22, to determine the Lowest Calculated Bid (LCB), Most Economically Advantageous Bid (MEAB), and Most Advantageous Bid (MAB).

25.3 The award criterion shall be determined as follows:

a) For LCB:

i) The detailed evaluation of the financial component of the bids, to establish the correct calculated prices of the bids; and

ii) The ranking of the total bid prices as so calculated from the lowest to highest, where the bid with the lowest price shall be identified as the LCB.

b) For MEAB, the BAC shall evaluate the quality and price proposals to determine the MEAB using the following steps:

i) The quality proposal together with the price proposal shall be considered in the evaluation of bids. The quality proposals shall be evaluated first using the criteria in the **BDS**. The price proposals of the bids that meet the minimum quality score shall then be opened.

ii) The price and quality proposals shall be given corresponding weights with the price proposal given a minimum weight of fifteen percent (15%) up to a maximum of forty percent (40%). The weight of the quality criteria shall be adjusted accordingly such that their total weight in percent together with the weight given to the price proposal shall be equal to one hundred percent (100%).

iii) To further promote green public procurement, the sustainability of materials or structures with green specifications shall be given greater weight in the evaluation of bids. As approved by the BAC, the exact weights shall be indicated in the **BDS.** The BAC shall rank the bidders in descending order based on the combined numerical ratings of their quality and price proposals. The bidder with the best overall score using the quality-price ratio shall be referred to as the MEAB.

iv) The HoPE shall approve or disapprove the recommendations of the BAC within two (2) calendar days after receipt of the results of the evaluation from the BAC.

The quality component shall be assessed on the basis of criteria with corresponding numerical weights indicated in the **BDS**, which may include qualitative, environmental, or social aspects linked to the subject matter of the contract. These may include any or a combination of the following:

a) Quality and technical merit, including technical competence and a credible track record;

b) Aesthetic and functional design and characteristics;

c) Approach and methodology;

d) Accessibility;

e) Tools and equipment;

f) Social, environmental, economic, and innovative characteristics;

g) Organization, qualification, and experience of employees or staff assigned to perform the contract;

h) Ongoing contracts and work commitments; or

i) Other relevant criteria in relation to the subject Infrastructure Projects to be procured.

c) For MAB

i) The BAC shall evaluate the quality proposals to determine the MAB using the quality components. The quality components shall be assessed on the basis of the criteria with corresponding numerical weights indicated in the **BDS** to determine the bidder with the highest technical rating.

ii) The second bid envelope of the bidder obtaining the highest technical rating shall be opened. If the financial proposal is equal to or lower than the ABC, the bid shall be accepted and determined as the MAB; otherwise, the same shall be rejected and the bidder will be disqualified.

25.4 In order to eliminate bias in evaluating the quality proposals, it is recommended that the highest and lowest scores for each bidder for each criterion shall not be considered in determining the average scores of the bidders, except when the evaluation is conducted in a collegial manner.

25.5 The BAC shall immediately conduct a detailed evaluation of all bids using non-discretionary criteria in considering the following:

a) Completeness of the bid. Unless the **BDS** allows partial bids, bids not addressing or providing all of the required items in the BDS shall be considered non-responsive and, thus, automatically disqualified.

However, when no price or a zero (0) or a dash (-) is indicated in a required item in the bid form, the same shall be construed that it is being offered for free to the Government, except those required by law or regulations to be provided for; and

b) Arithmetical corrections. The BAC shall consider computational errors and omissions to enable proper comparison of all eligible bids. It may also consider bid correction if expressly allowed in the **BDS**. Any adjustment shall be calculated in monetary terms to determine the calculated prices.

25.6 Based on the detailed evaluation of bids, those that comply with the above-mentioned requirements shall be ranked in the ascending order of their total calculated bid prices, as evaluated and corrected for computational errors, discounts and other modifications, to identify the LCB, MEAB, or MAB. Total calculated bid prices, as evaluated and corrected for computational errors, discounts and other modifications, which exceed the ABC shall not be considered, unless otherwise indicated in the **BDS**.

25.7 The BAC shall evaluate all bids on an equal footing to ensure fair and competitive bid comparison. For this purpose, all bidders shall be required to include in their bids the cost of all taxes, such as, but not limited to, value-added tax (VAT), income tax, local taxes, and other fiscal levies and duties. Such bids, including said taxes, shall be the basis for the bid evaluation and comparison.

25.8 If so indicated pursuant to **ITB** Clause 1.1, bids may be submitted for individual lots, or for any combination thereof, provided that all bids and combinations of bids 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 prices quoted shall correspond to all of the requirements specified for each lot. Bid Security as required by **ITB** Clause 16 shall be submitted for each contract (lot) separately. The basis for evaluation of lots is specified in **BDS** Clause 25.5 (a).

26) Post - Qualification

26.1 The BAC shall determine to its satisfaction whether the Bidder that is evaluated as having submitted the LCB, MEAB, or MAB, as the case may be, complies with and is responsive to all the requirements and conditions specified in **ITB** Clauses 5 and 12. The Bidder, within a non-extendible period of five (5) calendar days from receipt of notice from the BAC that it submitted the LCB, MEAB, or MAB, shall submit all the eligibility documents supporting its PhilGEPS Certificate of Registration (Platinum Membership), its latest income and business tax returns filed for the preceding quarter which should not be earlier than two (2) quarters from the date of submission and receipt of bid, and other appropriate licenses and permits required by law and stated in the **BDS**.

26.2 Failure to submit any of the post-qualification requirements on time, or a finding against the veracity thereof, shall disqualify the Bidder for award; Provided, That in the event that a finding against the veracity of any of the documents submitted is made, it shall cause the forfeiture of the Bid Security.

26.3 The determination shall be based upon an examination of the documentary evidence of the Bidder's qualifications submitted pursuant to **ITB** Clause 12, as well as other information as the Procuring Entity deems necessary and appropriate, using a non-discretionary "pass/fail" criterion, which shall be completed within a period of twelve (12) calendar days.

26.4 If the BAC determines that the bidder with the LCB, MEAB, or MAB passes all the criteria for post-qualification, it shall declare the said bid as the LCRB, MEARB, MARB, SCB, SEAB, or Single Advantageous Bid (SAB) and recommend to the HoPE the award of contract to the said bidder at its submitted bid price or its calculated bid price, whichever is lower or, in the case of quality-based evaluation procedure, submitted bid price or its negotiated price, whichever is lower.

If, however, the BAC determines that the bidder with the LCB, MEAB, MAB, SCB, SEAB, or SAB fails to meet the post-qualification criteria, it shall immediately notify the Bidder in writing of its post-disqualification and the grounds for such determination.[5]

26.5 Immediately after the BAC has notified the first bidder of its post-disqualification, and notwithstanding any pending request for reconsideration thereof, the BAC shall initiate and complete the same post-qualification process on the bidder with the second LCB, MEAB, or MAB. If the second bidder passes the post-qualification and provided that the request for reconsideration of the first bidder has been denied, the second bidder shall be post-qualified as the bidder with the LCB, MEAB, or MAB.

26.6 If the second bidder, however, fails the post-qualification, the procedure for post-qualification shall be repeated for the bidder with the next LCB, MEAB, or MAB and so on, until the LCRB, MEARB, or MARB, as the case may be, is determined for award, subject to the procedure of Notice and Execution of Award.

26.7 Within a period not exceeding ten (10) calendar days from the determination by the BAC of the LCRB, MEARB, MARB, SCRB, SEARB, or SARB and the recommendation to award the contract, the HoPE or its duly authorized representative shall approve or disapprove the said recommendation.

---

[5] Sec 63.5 of the IRR.

26.8 In case of approval, the HoPE or its duly authorized representative shall immediately issue the Notice of Award to the bidder with the LCRB, MEARB, MARB, SCRB, SEARB, or SARB, as the case may be.

In the event that the approving authority shall disapprove the resolution on the award of the contract, such disapproval shall be based only on valid, reasonable, and justifiable grounds as enumerated under Section 70 of the IRR to be expressed in writing. A copy of the decision disapproving the resolution shall be furnished to the BAC and the bidder.

27) Reservation Clause

27.1 Notwithstanding the eligibility or post-qualification of a bidder and without incurring any liability, the HoPE or its duly authorized representative at any stage of the procurement, reserves the right to review its qualifications, reject any and all bids, declare a failure of bidding or not award the contract in the following situations:

a) If it has reasonable grounds to believe that a misrepresentation has been made by the said bidder; or

b) If it has reasonable grounds to believe that there has been a change in the bidder's capability to undertake the project from the time it submitted its eligibility requirements.

Should such review uncover any misrepresentation made in the eligibility and bidding requirements, statements or documents, or any changes in the situation of the Bidder which will adversely affect its capability to undertake the Project so that it no longer meets the prescribed eligibility or bid evaluation criteria, the Procuring Entity shall consider the said Bidder as ineligible and disqualify it from participating further in the bidding process or being awarded the contract.

27.2 Based on the following grounds, the HoPE or its duly authorized representative reserves the right to reject any and all Bids, declare a Failure of Bidding at any time prior to the contract award, or not to award the contract, without thereby incurring any liability, and make no assurance that a contract shall be entered into as a result of the bidding:

a) If there is *prima facie* evidence of collusion between appropriate public officers or employees of the Procuring Entity, or between the BAC and any of the bidders, or if the collusion is between or among the bidders themselves, or between a bidder and a third party, including any act which restricts, suppresses or nullifies or tends to restrict, suppress or nullify competition or influences or tends to influence the bidding process;

b) If the BAC is found to have failed in complying with the applicable law or in following the prescribed bidding procedures; or

c) If there are any justifiable and reasonable ground where the award of the contract will not redound to the benefit of the government, in instances where (i) the physical and economic conditions have significantly changed so as to render the project no longer economically, financially or technically feasible as determined by the HoPE; (ii) the Project is no longer necessary as determined by the HoPE; and (iii) the source of funds for the Project has been withheld or reduced through no fault of the Procuring Entity.

F. Award of Contract

28) Contract Award

28.1 Subject to **ITB** Clause 26, the HoPE or its duly authorized representative shall award the contract to the Bidder whose bid has been determined to be the LCRB, MEARB, MARB, SCRB, SEARB, or SARB, as the case may be.

28.2 Prior to the expiration of the period of bid validity, the Procuring Entity shall notify the winning Bidder in writing that its bid has been accepted, through a Notice of Award duly received by the Bidder or its representative personally or by registered mail or electronically, receipt of which must be confirmed in writing within two (2) days by the Bidder with the LCRB, MEARB, MARB, SCRB, SEARB, or SARB, as applicable, and submitted personally or sent by registered mail or electronically to the Procuring Entity.

28.3 Within ten (10) calendar days from receipt by the winning bidder of the Notice of Award, the following conditions should be complied with before the contract may be awarded:

a) Submission of the following documents:

i) Valid JVA, if applicable;

ii) The SEC Certificate of Registration of the foreign corporation, if applicable; or

iii) Valid PCAB license and registration for the type and cost of the Project for foreign bidders when the Treaty or International or Executive Agreement expressly allows submission of such license and registration as a pre-condition to the Notice of Award.

b) Posting of the performance security in accordance with **ITB** Clause 30; and

c) Signing of the contract as provided in **ITB** Clause 29.

29) Signing of the Contract

29.1 Within ten (10) calendar days from receipt of the Notice of Award, the winning Bidder shall post the required performance security, sign and date the contract, and return it to the Procuring Entity.

29.2 The Procuring Entity shall enter into a contract with the successful Bidder within the same ten (10) calendar day period provided that all the documentary requirements are complied with.

29.3 The following documents shall form part of the contract:

a) Contract Agreement;

b) Bidding Documents;

c) Winning Bidder's bid, including the technical and financial proposals, and all other documents/statements 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;

d) Performance Security;

e) Notice of Award of Contract; and

f) Other contract documents that may be required by existing laws and/or specified in the **BDS**.

30) Performance Security

30.1 To guarantee the faithful performance by the winning bidder of its obligations under the contract, it shall post a performance security prior to the signing of the contract. Furthermore, the successful bidder shall be required to update the performance security posted before to the issuance of a variation order, if any.

30.2 Sectors enumerated under Section 76.1[6] of the IRR may be allowed to post Performance Securing Declaration (PSD) as specified in the **BDS.**

30.3 The performance security shall be in a form selected by the Procuring Entity in the amount indicated in the **BDS**, which shall not be less than the percentage of the total contract price in accordance with the following price schedule:

Form of Performance Security	**Amount of Performance Security (Not less than the Percentage of the Total Contract Price)**
a) Cash or Cashier's or Manager's check issued by a bank. *For biddings conducted by LGUs, the cashier's or manager's check may be issued by other banks certified by the BSP*	

6 Section 76.1. *The GPPB, once data is available from relevant agencies, shall maintain a registry of entities belonging to the following sectors:*
a) Farmers as certified by the Department of Agriculture (DA);
b) Fisherfolk as certified by the Bureau of Fisheries and Aquatic Resources (BFAR);
c) Persons with disabilities as certified by the National Council for Disability Affairs (NCDA) pursuant to RA No. 7277, otherwise known as the Magna Carta for Disabled Persons, as amended;
d) Solo parents as certified by the Department of Social Welfare and Development (DSWD); e) Microenterprises and social enterprises as certified by the MSMED Council;
f) Startups, spin-offs, and other forms of entity involved in science, technology, and innovation activities as certified by the DTI, DICT, NIC or the Department of Science and Technology (DOST), as may be applicable;
g) Cooperatives duly registered with the CDA pursuant to RA No. 6938, otherwise known as the Cooperative Code of the Philippines, as amended; and
h) Other relevant sectors as may be determined by the GPPB to ensure inclusivity and diversity in the procurement process.

as authorized to issue such financial instrument.	Ten percent (10%)
b) Bank draft or guarantee or irrevocable Letter of Credit issued by a local bank. If issued by a foreign bank, it shall be confirmed or authenticated by a local bank.	
c) Surety bond callable upon demand issued by a surety or insurance company duly certified by the IC as authorized to issue such security.	Thirty Percent (30%)

30.4 The performance security shall be denominated in Philippine Peso and posted in favor of the Procuring Entity, which shall be forfeited in the event it is established that the winning bidder is in default in any of its obligations under the contract.

31) Notice to Proceed

The Procuring Entity shall issue the Notice to Proceed to the winning Bidder not later than three (3) calendar days from the date of approval of the contract by the appropriate signatories. All notices called for by the terms of the contract shall be effective only at the time of receipt thereof by the successful Bidder.

32) Protest Mechanism

Decisions of the BAC in all stages of procurement may be protested to the HoPE in accordance with Section 83 of the IRR.

Section III. Bid Data Sheet

Bid Data Sheet

ITB Clause	
1.1	The Procuring Entity is ***Provincial Government of Camarines Norte*** The Project title is ***Construction of Farm to Market Road, Brgy. Bagacay, Labo, Camarines Norte.*** The identification number of the Contract is ***ITB-2026-097.***
2	The Funding Source is: 2.1 The GOP through the source of funding as indicated below for ***20% Development Fund AB2026*** in the amount of ***Two Million Nine Hundred Seventy-Seven Thousand Seven Hundred Thirty-Nine Pesos and Sixteen Centavos (P2,977,739.16).*** 2.2 The source of funding is: a. LGUs, the proposed Local Expenditure Program.
3.1	No further instructions.
5.2	Bidding is restricted to eligible bidders as defined in ITB Clause 5.2.
5.4	Contracts similar to the Project shall be those described as follows: ***Road Construction***

7	No further instructions.
8.1	*"Subcontracting is not allowed."*
8.3	"Not applicable."
9.1	Pre-Bid Conference is not required.
10.1	The Procuring Entity's address is: *2nd Floor, BAC Office* *Provincial Capitol Bldg., Daet, Camarines Norte* ***ENGR. HAROLD R. GESTIADA, EnP*** *P.A.B.E / Head, BAC Secretariat* *baccamnorte2025@gmail.com*
12.1(h)(ii)	The minimum work experience requirements for key personnel are the following: Key Personnel — General Experience — Relevant Experience **Project Manager** — **one (1)** — **one (1)** **Project Engineer** — **one (1)** — **one (1)** **Materials Engineer** — **one (1)** — **one (1)** **Safety Officer** — **one (1)** — **one (1)** **Construction Foreman** — **one (1)** — **one (1)**

12.1(h)(iii)	The minimum major equipment requirements are the following: Equipment — Capacity — Number of Units 1. 4x4 Pickup Type vehicle — 1 2. Backhoe — 1 3. Dump Truck — 2 4. Chain Saw — 1 5. Bulldozer — 1 6. Motorized Road Grader — G7 10A — 1 7. Vibratory Roller — 10 m.t., SP56 — 1 8. Water Truck — 1600 L — 1 9. Transit Mixer — 5 cu.m. — 4 10. Concrete Vibrator — 2 11. Batching Plant — 30 cu.m. — 1 12. Payloader — 1.50 cu.m., LX80-2C — 1 13. Concrete Screeder — 5.5 Hp — 1 14. Concrete Saw, Blade Ø 14" — 7.5 Hp — 1 15. Bar Cutter, Single Phase — 25 mm. — 1 16. One Bagger Mixer — 1 17. Backhoe (Wheel Type) — 1

12.4	The ABC is ***Two Million Nine Hundred Seventy-Seven Thousand Seven Hundred 77Thirty-Nine Pesos and Sixteen Centavos (P2,977,739.16).*** Any bid with a financial component exceeding this amount shall not be accepted.
14.1	The bid prices shall be quoted in Philippine Peso.
14.3	Payment shall be made in Philippine Peso.
15.1	Bids will be valid for *120 days* from bid opening.
16.1	The Bid Security shall be in the form of a Bid Securing Declaration, and choose at least two (2) from any of the following: 1. The amount of not less than ***2% of ABC***, if bid security is in cash. 2. The amount of not less than ***2% of ABC***, if bid security is in cashier's check. 3. The amount of not less than ***2% of ABC***, if bid security is in manager's check. 4. The amount of not less than ***5% of ABC***, if bid security is in bank draft. 5. The amount of not less than ***5% of ABC***, if bid security is in guarantee. 6. The amount of not less than ***5% of ABC***, if irrevocable Letter of Credit. 7. The amount of not less than ***5% of ABC***, if Surety Bond.
16.2	The Bid Security shall be valid until *120 days from opening of bid.*
16.3	In case of extension of bid validity and bid security validity period, Substitution of the bid security form is allowed. Bid Securing Declaration and the following forms may be used: a) Cash or Cashier's or Manager's Check issued by a Bank. b) Bank draft/guarantee or irrevocable Letter of Credit issued by a Bank: Provided, however, that it shall be confirmed or authenticated by a local Bank, if issued by a foreign bank. c) Surety bond callable upon demand issued by a surety or insurance company duly certified by the Insurance Commission as authorized to issue such security.
19	The address for submission of bids is at ***2nd Floor, BAC Office, Provincial Capitol Bldg., Daet, Camarines Norte*** The deadline for submission of bids is on or before ***October 29, 2026, at 1:30 p.m..***
21.5	"No further instructions."

22.1	The date and time of bid opening is on ***October 29, 2026, 2:00 p.m. onwards.*** The place of bid opening is at ***2nd Floor, BAC Office, Provincial Capitol Bldg., Daet, Camarines Norte***
22.2(b)	"Not applicable".
25.3 (c)(i)	"Not applicable"
25.5 (a)	Partial bid is not allowed. The infrastructure project is packaged in a single lot and the lot shall not be divided into sub-lots for the purpose of bidding, evaluation, and contract award. In all cases, the NFCC computation, if applicable, must be sufficient for all the lots or contracts to be awarded to the Bidder.
25.5 (b)	Bid correction is not allowed.
25.6	No further instructions.
26	For purposes of Post-qualification, the following document(s) shall be required to be submitted/presented within five (5) calendar days from receipt of notice of post-qualification from the BAC: 1. Income Tax Returns for year 2021 (BIR Form 1701 or 1702); 2. Latest Value Added Tax Returns (Forms 2550M and 2550Q) or Percentage Tax Returns (Form 2551M) for the last six (6) months before the deadline of the submission of bids. The income tax and business tax returns stated above should have been filed through the Electronic Filing and Payment System (eFPS). 3. Updated Certificate of accomplishments signed by the Owner or Owner's Project Engineer for on-going projects
29.3(f)	1. The documents required in Section 66.5 of the IRR of R.A. 12009 shall form part of the Contract. 2. Additional contract documents relevant to the Project that may be required by existing laws and/or the Procuring Entity, such construction schedule, S-curve, and PERT-CPM, manpower schedule, construction methods, equipment utilization schedule, construction safety and health (CSH) program approved by the DOLE, and other acceptable tools of project scheduling. 3. Preliminary conceptual design plans in accordance with the degree of

	details specified by the procuring entity; 4. Design and construction methods; and 5. Value engineering analysis of design and construction methods 6. Program of Work showing the general methods, arrangements, order, and timing for all activities in the work.
30.2	"Not applicable"
30.3	The Performance Security shall be in the form: *[choose one from any of the following:]* 1) The amount of not less than ***10% of the contract price***, if performance security is in cash. 2) The amount of not less than ***10% of the contract price***, if performance security is in cashier's check. 3) The amount of not less than ***10% of the contract price***, if performance security is in manager's check. 4) The amount of not less than ***10% of the contract price***, if performance security is in bank draft. 5) The amount of not less than ***10%* of *the contract price***, if performance security is in guarantee. 6) The amount of not less than **10% of *the contract price***, if performance security is irrevocable LoC. Or 7) The amount of not less than **30% of *the contract price***, if performance security is Surety Bond.

Section IV. General Conditions of Contract

TABLE OF CONTENTS

1. General Terms 52
2. Interpretation 52
3. Governing Language and Law 53
4. Communications 53
5. Possession of Site 53
6. The Contractor's Obligations 53
7. Subcontracting 54
8. Advance Payment 55
9. Progress Payments 56
10. Payment Documents 57
11. Retention 57
12. Performance Security 58
13. Detailed Engineering and Site Investigation Reports 59
14. Licenses and Permits 60
15. Contractor's Risk and Warranty Security 60
16. Procuring Entity's Risk 62
17. Insurance 63
18. Liquidated Damages 64
19. Settlement of Disputes 64
20. Liability of the Contractor 65
21. Termination for Breach of Contract 65
22. Termination Due to Force Majeure 66
23. Termination by Contractor 66
24. Termination for Convenience 67
25. Termination for Unlawful Acts 667
26. Termination for Other Causes 667
27. Procedures for Termination of Contracts 68
28. Approval of Drawings and Temporary Works by the Procuring Entity 69
29. Acceleration and Delays Ordered by the Procuring Entity 70
30. Contractor's Right to Claim 70
31. Dayworks 70
32. Early Warning 70

33. Program of Work 70
34. Management Conferences 71
35. Bill of Quantities 71
36. Instructions, Inspections and Audits 72
37. Identifying Defects 72
38. Correction of Defects 72
39. Uncorrected Defects 72
40. Variation Orders 72
41. Contract Completion 74
42. Suspension of Work 74
43. Payment on Termination 75
44. Extension of Contract Time 75
45. Price Escalation 76
46. Completion 76
47. Taking Over 77
48. Operating and Maintenance Manuals 77

1) General Terms

In this Contract, the following terms shall be interpreted as indicated:

1.1 The **Intended Completion Date** refers to the date specified in the **SCC** when the Contractor is expected to have completed the Works. The intended Completion Date may be revised only by the Procuring Entity by issuing an extension of time or an acceleration order.

1.2 The **Procuring Entity** is the party who employs the Contractor to carry out the Works stated in the **SCC**.

1.3 The **Site** is the place provided by the Procuring Entity where the Works shall be executed and any other place or places which may be designated in the **SCC**, or notified to the Contractor by the Procuring Entity as forming part of the Site.

1.4 The **Start Date**, as specified in the **SCC**, is the date when the Contractor is obliged to commence execution of the Works. It does not necessarily coincide with any of the Site Possession Dates.

1.5 **Work(s)** refer to the Permanent Works and Temporary Works to be executed by the Contractor in accordance with this Contract, including (i) the furnishing of all labor, materials, equipment and others incidental, necessary or convenient to the complete execution of the Works; (ii) the passing of any tests before acceptance by the Procuring Entity; (iii) and the carrying out of all duties and obligations of the Contractor imposed by this Contract as described in the **SCC.** In line with this, Temporary Works are works designed, constructed, and installed by the Contractor that are needed for construction or installation of the Permanent Works, which are subsequently removed.

2) Interpretation

2.1 In interpreting the Conditions of Contract, singular also means plural, male also means female or neuter, and the other way around. Headings have no significance. Words have their normal meaning under the language of this Contract unless specifically defined. The Procuring Entity will provide instructions clarifying queries about the Conditions of Contract.

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

2.3 The documents forming this Contract shall be interpreted in the following order of priority:

a) Contract Agreement;

b) Bid Data Sheet;

c) Instructions to Bidders;

d) Addenda to the Bidding Documents;

e) Special Conditions of Contract;

f) General Conditions of Contract;

g) Specifications;

h) Bill of Quantities; and

i) Drawings.

3) Governing Language and Law

3.1 This Contract shall be interpreted in accordance with the laws of the Republic of the Philippines.

3.2 This Contract has been executed in the English language, which shall be the binding and controlling language for all matters relating to the meaning or interpretation of this Contract. All correspondence and other documents pertaining to this Contract which are exchanged by the parties shall be written in English.

4) Communications

Communications between parties that are referred to in the Conditions shall be effective only if made in writing. A notice shall be effective only when it is received by the concerned party.

5) Possession of Site

5.1 On the date specified in the **SCC**, the Procuring Entity shall grant the Contractor possession of so much of the Site as may be required to enable it to proceed with 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 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.

5.2 If possession of a portion is not given by the date stated in the **SCC** Clause 1.3, 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 shall be in accordance with **GCC** Clause 44.

5.3 The Contractor shall bear all costs and charges for special or temporary right-of-way required by it in connection with access to the Site. The Contractor shall also provide at its own cost any additional facilities outside the Site required by it for purposes of the Works.

5.4 The Contractor shall allow the Procuring Entity and any person authorized by the Procuring Entity access to the Site and to any place where work in connection with this Contract is being carried out or is intended to be carried out.

6) The Contractor's Obligations

6.1 The Contractor shall carry out the Works properly and in accordance with this Contract. The Contractor shall provide all supervision, labor, Materials, Plant and Contractor's Equipment, which may be required. All Materials and Plant on Site shall be deemed to be the property of the Procuring Entity.

6.2 The Contractor shall commence execution of the Works on the Start Date and shall carry out the Works in accordance with the Program of Work submitted by the Contractor, as updated with the approval of the Procuring Entity, and complete them by the Intended Completion Date.

6.3 The Contractor shall be responsible for the safety of all activities on the Site.

6.4 The Contractor shall carry out all instructions of the Procuring Entity that comply with the applicable laws where the Site is located.

6.5 The Contractor shall employ the key personnel named in the Schedule of Key Personnel, as referred to in the **SCC**, 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.

6.6 If the Procuring Entity asks the Contractor to remove a member of the Contractor's staff or work force, for justifiable cause, the Contractor shall ensure that the person leaves the Site within seven (7) days and has no further connection with the Work in this Contract.

6.7 During Contract implementation, the Contractor and its subcontractors shall abide at all times by all labor laws, including child labor related enactments, and other relevant rules.

6.8 The Contractor shall submit to the Procuring Entity for consent the name and particulars of the person authorized to receive instructions on behalf of the Contractor.

6.9 The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities, and the Procuring Entity between the dates given in the schedule of other contractors particularly when they shall require access to the Site. The Contractor shall also provide facilities and services for them during this period. The Procuring Entity may modify the schedule of other contractors, and shall notify the Contractor of any such modification thereto.

6.10 Should anything of historical or other interest or of significant value be unexpectedly discovered on the Site, it shall be the property of the Procuring Entity. The Contractor shall notify the Procuring Entity of such discoveries and carry out the Procuring Entity's instructions in dealing with them.

7) Subcontracting

7.1 Unless otherwise indicated in the **SCC**, the Contractor shall not subcontract portions of the Works beyond the percentage specified in **BDS** Clause 8.1. If subcontracting is allowed, the arrangement, including the timing for submission of the subcontractor's eligibility documents, shall be disclosed.

7.2 For subcontracting arrangements, the following rules shall apply for both locally-funded projects and to projects financed through Official Development Assistance, except those covered by treaty, or international, or executive agreements:

a) The subcontracted portion of the contract shall be subject to the approval of the HoPE and the following conditions:

i) The subcontracted portion shall not exceed fifty percent (50%), or a different percentage on a per project basis as approved by the GPPB. The threshold percentages fixed herein shall be subject to the periodic review and adjustments as may be deemed appropriate by the GPPB; and

ii) The subcontracted portion shall be limited to components that are not deemed "significant or material" to the project as determined by the Procuring Entity.

b) Subcontracting arrangement, if allowed, including the time of submission of the eligibility documents of the subcontractor, shall be disclosed in the Bidding Documents;

c) Subcontractors must meet the eligibility criteria and shall submit the same eligibility documents as the general contractor.

Failure of a subcontractor to meet the eligibility criteria does not affect the eligibility of the general contractor for the procurement project. In such case, the portion intended to be subcontracted to the ineligible subcontractor shall be assumed by the general contractor;

d) The general contractor shall remain liable for the subcontractor's actions, defaults, delays, and negligence;

e) The general contractor and the subcontractor are obliged to comply with the provisions of the contract and shall share liability, jointly and severally, in cases of violation of safety standards or other labor standards insofar as the subcontracted portion is concerned; and

f) For purposes of post-qualification in accordance with its objective and process under the IRR, the value of the entire completed and accepted Project, including the subcontracted portion, shall be credited as experience of the general contractor. In the case of the subcontractor, the following rules shall apply:

i) The subcontractor shall get credit for one hundred percent (100%) of the value of the subcontracted portion of the project performed;

ii) Subcontractors shall be eligible to concessional windows of GFIs that treat receivables from the government as loan security; the receivables of subcontractors due from their general contractor shall similarly be accepted as loan security by GFIs; and

iii) Contract performance monitoring, such as the use of CPES, among others, shall also be mandatorily applied to the work experience of the subcontractors.

8) Advance Payment

8.1 The Procuring Entity shall make an advance payment on the Contract Price 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**.

8.2 The advance payment shall be made only upon:

i) Written request of the contractor which shall form part of the contract document; and

ii) Submission of an irrevocable standby Letter of Credit of equivalent value from a bank as confirmed by the Procuring Entity; a bank guarantee; or a surety bond callable upon demand issued by a duly licensed surety or insurance company, at the option of the Procuring Entity.

8.3 The advance payment shall be recovered from the Contractor through deductions in amounts equivalent to the percentage of the total contract price that corresponds to the value of the advance payment granted.

8.4 Once a month, Contractors may submit documents, such as Monthly Certificates,[7] to show the progress or partial completion of a project. The Contractor may reduce its standby letter of credit or guarantee instrument by the amounts refunded by the Monthly Certificates, or any equivalent document subject to auditing and accounting rules, in the advance payment.

9) Progress Payments

9.1 Once a month, the Contractor may submit a statement of work accomplished (SWA) or progress billing and corresponding request for progress payment for work accomplished. The SWA should show the amounts which the Contractor considers itself to be entitled to up to the end of the month, to cover (i) the cumulative value of the Works it executed to date, based on the items in the Bill of Quantities, and (ii) adjustments made for approved Variation Orders executed. Alternatively, the Procuring Entity may require in the Bidding Documents that the SWA or progress billing and the corresponding request for progress payment may only be submitted upon actual completion of the Infrastructure Project or a specific portion, segment, milestone or phase thereof.

The Procuring Entity or Project Engineer shall check the Contractor's SWA and certify the amount to be paid to the Contractor as progress payment. Materials and equipment delivered onsite but not yet incorporated in the Works shall not be included for payment, except as otherwise stipulated in the **SCC**.

9.2 The Procuring Entity shall deduct the following from the certified gross amounts to be paid to the Contractor as progress payment:

a) Cumulative value of the work previously certified and paid for.

b) Portion of the advance payment to be recouped.

c) Retention money in accordance with the conditions of the contract.

d) Amount to cover third-party liabilities.

e) Amount to cover uncorrected discovered defects in the Works.

[7] Commission on Audit (COA) Circular 2012-001.

9.3 Payments shall be adjusted by deducting therefrom the amounts for advance payments and retention. The Procuring Entity shall pay the Contractor the amounts certified by the Procuring Entity within twenty-eight (28) days from the date each certificate was issued. No payment of interest for delayed payments and adjustments shall be made by the Procuring Entity.

9.4 The first progress payment may be paid by the Procuring Entity to the Contractor, as indicated in the **SCC**; Provided, That at least a percentage of the Works has been accomplished as certified by the Procuring Entity and as indicated in the **SCC**.

9.5 Items of the Works for which a price of "0" (zero) has been entered will not be paid for by the Procuring Entity and shall be deemed covered by other rates and prices in the Contract.

10) Payment Documents

10.1 Subject to existing accounting and auditing rules and regulations,[8] the Contractor shall submit to the Procuring Entity monthly statements of the estimated value of the work executed less the cumulative amount certified previously.

10.2 The Procuring Entity shall check the Contractor's monthly statement and certify the amount to be paid to the Contractor.

10.3 The value of Work executed shall:

a) be determined by the Procuring Entity;

b) comprise the value of the quantities of the items in the Bill of Quantities completed; and

c) include the valuations of approved variations.

10.4 The Procuring Entity may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later information.

11) Retention

11.1 The Procuring Entity shall retain from each payment due to the Contractor an amount equal to a percentage thereof using the rate as specified in GCC Clause 11.2. The said amount will serve to guarantee indemnity for uncorrected discovered defects and third-party liabilities arising from this Contract. This retention money shall be utilized if the contractor fails to repair the discovered defects. Should the retention money be insufficient, the PE may forfeit the performance security, which may ultimately lead to the termination of the contract.[9]

11.2 Progress payments are subject to retention of ten percent (10%) referred to as the retention money. Such retention shall be based on the total amount due to the

---

[8] COA Circular No. 2012-001.

[9] Supreme Court rulings (e.g. New Bian Yek Commercial, Inc. vs. Office of the Ombudsman, et. al., GR No. 169338[2009], and Tondo Medical Center vs. Rante, G.R. No. 230645 [2019] have affirmed this purpose, stating that retention money is a form of security to ensure the satisfactory completion of works and to cover any defects or third-party claims that may arise after project completion.

Contractor prior to any deduction and shall be retained from every progress payment until fifty percent (50%) of the value of the Works, as determined by the Procuring Entity, are completed.

If, after fifty percent (50%) completion, the work is satisfactorily done and on schedule, no additional retention shall be made; otherwise, the ten percent (10%) retention shall be imposed, which may be decreased to 5 percent (5%) by the Procuring Entity based on justifiable causes.[10]

11.3 The total retention money shall be due for release upon final acceptance of the Works. The Contractor may, however, request the substitution of the retention money for each progress billing with irrevocable standby Letters of Credit from a bank, bank guarantees or surety bonds callable on demand, of amounts equivalent to the retention money substituted for and acceptable to Government; Provided, That the project is on schedule and is satisfactorily undertaken. Otherwise, the ten (10%) percent retention shall be made. Said irrevocable standby letters of credit, bank guarantees and/or surety bonds, to be posted in favor of the Government shall be valid for a duration to be determined by the concerned implementing office/agency or Procuring Entity and will answer for the purpose for which the ten (10%) percent retention is intended, *i.e.*, to cover uncorrected discovered defects and third party liabilities.

11.4 On completion of the whole Works, the Contractor may substitute retention money with an "on demand" Bank guarantee in a form acceptable to the Procuring Entity.

12) Performance Security

12.1 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 winning Contractor shall furnish the performance security in any of the forms prescribed in **ITB** Clause 30 in relation to **BDS** Clause 30.2 and 30.3.

12.2 The performance security posted in favor of the Procuring Entity shall be forfeited in the event it is established that the Contractor is in default in any of its obligations under the contract.

12.3 The performance security shall remain valid until issuance by the Procuring Entity of the Certificate of Final Acceptance. In case the performance security issued is valid for a specific period shorter than the term of the contract, including the defects liability period, the same shall be renewed or extended as often as necessary and immediately submitted to the Procuring Entity. In case of approved contract time extensions, the Contractor shall cause the extension of the validity of the performance security to cover the said extensions.

12.4 The performance security may be released by the Procuring Entity after the issuance of the Certificate of Final Acceptance; Provided, That the Procuring Entity has no claims filed against the performance security.

12.5 The Contractor shall post an additional performance security following the amount and form specified in **ITB** Clause 30 to cover any cumulative increase of more than ten

[10] Section 71.2.8 of the IRR.

percent (10%) over the original value of the contract as a result of change orders, extra work orders and supplemental agreements, as the case may be.

12.6 In case of a reduction in the contract value or for partially completed Works under the contract which are usable and accepted by the Procuring Entity the use of which, in the judgment of the implementing agency or the Procuring Entity, will not affect the structural integrity of the entire project, the Procuring Entity shall allow a proportional reduction in the original performance security, provided that any such reduction is more than ten percent (10%) and that the aggregate of such reductions is not more than fifty percent (50%) of the original performance security.

12.7 Unless otherwise indicated in the **SCC**, the Contractor, by entering into the Contract with the Procuring Entity, acknowledges the right of the Procuring Entity to institute action pursuant to Act No. 3688[11] 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.

13) Detailed Engineering and Site Investigation Reports

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

13.2 Detailed engineering shall proceed only on the basis of the feasibility or preliminary engineering study made which establishes the technical viability of the project and conformance to land use and zoning guidelines prescribed by existing laws. The findings contained in the feasibility study, if undertaken for the project, shall be examined. If, in the course of this exercise, it is found that amendments would be desirable in the design standards of principal features, as proposed, specific recommendations for such changes shall be supported by detailed justifications, including their effects on the cost, and the economic justifications, if necessary.

13.3 A schedule of detailed engineering activities shall include the following:

a) Survey;

b) Site Investigation;

c) Soils and Foundation Investigation;

d) Construction Materials Investigation;

e) Preparation of Design Plans;

f) Preparation of Technical Specifications;

g) Preparation of Quantity and Cost Estimates;

h) Preparation of Scope of Work;

i) Preparation of Proposed Construction Schedule (and estimated Cash Flow for projects with Schedule over six (6) months;

[11] Also known as "An Act for the Protection of Persons Furnishing Material and Labor for the Construction Of Public Works".

j) Preparation of Site or Right-of-Way Plans including Schedule of Acquisition;

k) Preparation of Utility Relocation Plan;

l) Preparation and Submission of Design Report;

m) Environmental Impact Statement for critical project, as defined by the Department of Environment and Natural Resources;

n) Preparation of minimum requirements for a Construction Safety and Health Program for the project being considered;

o) Value Engineering Studies; and

p) Preparation of report on asset climate hazards, risk assessment, disaster response strategies, and readiness planning.

13.4 Work under detailed architectural and engineering design shall include, among others, the items stated in Section 8.3 of the IRR.

14) Licenses and Permits

The Procuring Entity may, if requested by the Contractor, assist him in applying for permits, licenses or approvals, which are required for the Works.

15) Contractor's Risk and Warranty Security

15.1 From the time project construction commenced up to final acceptance, the Contractor shall assume full responsibility for any damage or destruction of the works, except those occasioned by force majeure; and the safety, protection, security, and convenience of its personnel, third parties, and the public at large, as well as the works, equipment, installation and the like to be affected by its construction work.

15.2 The defects liability period for infrastructure projects shall be one (1) year from project completion up to final acceptance by the Procuring Entity. During this period, the Contractor shall undertake the repair works, at its own expense, of any damage to the Works on account of the use of materials of inferior quality, defects in the construction, or due to any violation of the terms of the contract, within ninety (90) calendar days from the time the HoPE has issued an order to undertake repair. In case of failure or refusal to comply with this mandate, the Procuring Entity shall undertake such repair works and shall be entitled to full reimbursement of expenses incurred therein upon demand.

15.3 The defects liability period shall be covered by the performance security of the Contractor required in Section 68 of the IRR, which shall guarantee that the Contractor performs its responsibilities stated in **GCC** Clause 15.1 Unless otherwise indicated in the **SCC**, in case the Contractor fails to comply with the preceding paragraph, the Procuring Entity shall forfeit its performance security, subject its properties to attachment or garnishment proceedings, and may impose the appropriate penalty under Sections 99, 100, and 101 of the IRR. All payables of the GoP in its favor shall be offset to recover the costs.

15.4 The following persons shall be held responsible for "Structural Defects," i.e., major faults or flaws or deficiencies in one or more key structural elements of the project which may lead to structural failure of the completed elements or structure, or "Structural Failures," i.e., where one or more key structural elements in an

infrastructure facility fails or collapses, thereby rendering the facility or part thereof incapable of withstanding the design loads, and/or endangering the safety of the users or the general public:

a) Contractor – Where Structural Defects or Failures arise due to faults attributable to improper construction, use of inferior quality/substandard materials, and any violation of the contract plans and specifications, the Contractor shall be held liable;

b) Consultants – Where Structural Defects or Failures arise due to faulty and/or inadequate design and specifications as well as construction supervision, then the consultant who prepared the design or undertook construction supervision for the project shall be held liable;

c) Procuring Entity's Representatives or Project Manager or Construction Managers and Supervisors – The project owner's representative, project manager, construction manager, and supervisor shall be held liable in cases where the Structural Defects or Failures are due to their willful intervention in altering the designs and other specifications; negligence or omission in not approving or acting on proposed changes to noted defects or deficiencies in the design and/or specifications and the use of substandard construction materials in the project;

d) Third Parties - Third Parties shall be held liable in cases where Structural Defects or Failures are caused by work undertaken by them such as leaking pipes, diggings or excavations, underground cables and electrical wires, underground tunnel, mining shaft and the like, in which case the applicable warranty to such structure should be levied to third parties for their construction or restoration works; and

e) Users - In cases where Structural Defects or Failures are due to abuse or misuse by the End-User or Implementing Unit of the constructed facility and/or non–compliance by a user with the technical design limits and/or intended purpose of the same, then the user concerned shall be held liable.

15.5 The warranty against Structural Defects or Failures, except those occasioned by force majeure, shall cover the period specified in the **SCC** reckoned from the date of issuance of the Certificate of Final Acceptance by the Procuring Entity. On the other hand, such warranty shall likewise be applied against non-structural defects for instances that pertain to faults or deficiencies in non-load bearing components or finishes of the Project, such as minor cracks, leaks, or defects in workmanship or materials, which do not affect the stability or safety of the structure but may impact its appearance, functionality, or usability.

15.6 To guarantee that the Contractor shall perform its responsibilities, it shall be required to post a warranty security, which shall be stated in Philippine Peso, in the form chosen by the Procuring Entity in accordance with the following schedule:

Form of Warranty	**Amount of Warranty Security Not less than the Percentage (%) of Total Contract Price**
(a) Cash or letter of credit issued by bank; Provided, however, that the letter of credit shall be confirmed or authenticated	Five Percent (5%)

by a local bank, if issued by a foreign bank. For biddings conducted by LGUs, the Letter of Credit may be issued by other banks certified by the BSP as authorized to issue such financial instrument.	
(b) Bank guarantee confirmed by bank. For biddings conducted by LGUs, the bank draft/guarantee may be issued by other banks certified by the BSP as authorized to issue such financial instrument.	Ten Percent (10%)
(c) Surety bond callable upon demand issued by GSIS or any surety or insurance company duly certified by the Insurance Commission	Thirty Percent (30%)

15.7 The warranty security shall be stated in Philippine Peso and shall remain effective within one (1) year from the date of issuance of the Certificate of Final Acceptance by the Procuring Entity, and returned only after the lapse of the said one (1) year period. This one (1) year period shall cover both structural and non-structural defects or failures; Provided, That in cases of structural defects or failures, warranties beyond the one (1) year period shall be subject to applicable laws, rules, and regulations such as the New Civil Code of the Philippines.

15.8 In case of structural/non-structural defects or failure occurring during the applicable warranty period provided in **GCC** Clause 15.5, the Procuring Entity shall undertake the necessary restoration or reconstruction works and shall be entitled to full reimbursement by the parties found to be liable for expenses incurred therein upon demand, without prejudice to the imposition of administrative sanctions as prescribed by RA No. 12009 and without prejudice to the imposition of civil and criminal sanctions as provided under applicable laws against the responsible persons as well as the forfeiture of the warranty security posted in favor of the Procuring Entity.

16) Procuring Entity's Risk

16.1 From the Start Date until the Certificate of Final Acceptance has been issued, the following are risks of the Procuring Entity:

a) The risk of personal injury, death, or loss of or damage to property (excluding the Works, Plant, Materials, and Equipment), which are due to:

i) any type of use or occupation of the Site authorized by the Procuring Entity after the official acceptance of the Works; or

ii) negligence, breach of statutory duty, or interference with any legal right by the Procuring Entity or by any person employed or contracted by it, except the Contractor.

b) The risk of damage to the Works, Plant, Materials, and Equipment to the extent that it is due to a fault of the Procuring Entity or in the Procuring Entity's design, or due to war or radioactive contamination directly affecting the country where the Works are to be executed.

17) Insurance

17.1 The Contractor shall, under its name and at its own expense, obtain and maintain, for the duration of this Contract, the following insurance coverage:

a) Contractor's All Risk Insurance, with an exception for Simple Infrastructure Projects, as applicable;

b) Transportation to the project Site of Equipment, Machinery, and Supplies owned by the Contractor;

c) Personal injury or death of Contractor's employees; and

d) Comprehensive insurance for third party liability to Contractor's direct or indirect act or omission causing damage to third persons.

17.2 The Contractor shall provide evidence to the Procuring Entity that the insurances required under this Contract have been effected and shall, within a reasonable time, provide copies of the insurance policies to the Procuring Entity.

17.3 The Contractor shall notify the insurers of changes in the nature, extent, or program for the execution of the Works and ensure the adequacy of the insurances at all times in accordance with the terms of this Contract and shall produce to the Procuring Entity the insurance policies in force including the receipts for payment of the current premiums.

The above insurance policies shall be obtained from any reputable insurance company approved by the Procuring Entity.

17.4 If the Contractor fails to obtain and keep in force the insurances referred to herein or any other insurance required to be obtained under the terms of this Contract, the Procuring Entity may obtain and keep in force any such insurances and pay such premiums as may be necessary for the purpose. From time to time, the Procuring Entity may deduct the amount it shall pay for said premiums including twenty five percent (25%) therein from any monies due, or which may become due, to the Contractor, without prejudice to the Procuring Entity exercising its right to impose other sanctions against the Contractor pursuant to the provisions of this Contract.

17.5 In the event the Contractor fails to observe the above safeguards, the Procuring Entity may, at the Contractor's expense, take whatever measure is deemed necessary for its protection and that of the Contractor's personnel and third parties, and/or order the interruption of dangerous Works. In addition, the Procuring Entity may refuse to make the payments under **GCC** Clause 9 until the Contractor complies with this Clause.

17.6 The Contractor shall immediately replace the insurance policy obtained as required in this Contract, without need of the Procuring Entity's demand, with a new policy issued by a new insurance company acceptable to the Procuring Entity for any of the following grounds:

a) The issuer of the insurance policy to be replaced has:

i) become bankrupt;

ii) been placed under receivership or under a management committee;

iii) been sued for suspension of payment;

iv) been suspended by the Insurance Commission and its license to engage in business or its authority to issue insurance policies has been cancelled; or

v) Where reasonable grounds exist that the insurer may not be able, fully and promptly, to fulfill its obligation under the insurance policy.

18) Liquidated Damages

18.1 When the Contractor fails to satisfactorily complete the Works under the contract within the specified contract duration, inclusive of duly granted time extensions, if any, the Contractor shall be liable for liquidated damages in an amount equal to at least one-tenth (1/10) of one percent (1%) of the cost of the unperformed portion of the Works for every day of delay.

18.2 In computing liquidated damages, the Procuring Entity shall determine the usability of the project. A project or a portion thereof may be deemed usable when it starts to provide the desired benefits as certified by the End-User or Implementing Unit and approved by the HoPE.

18.3 To be entitled to liquidated damages, the Procuring Entity does not have to prove that it has incurred actual damages. Such amount shall be deducted from any money due, or which may become due the Contractor under the contract, collected from the retention money or other securities posted by the Contractor, or a combination thereof, whichever is convenient to the Procuring Entity.

18.4 In case the total sum of liquidated damages reaches ten percent (10%) of the total contract price, the Procuring Entity may rescind or terminate the contract, without prejudice to other courses of action and remedies available under the circumstances.

18.5 If the Intended Completion Date is extended after liquidated damages have been paid, the Procuring Entity shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment schedule.

19) Settlement of Disputes

19.1 Any dispute arising from the implementation of a contract covered by the Act and the IRR shall primarily be resolved and settled amicably by mutual consultation or agreement.

19.2 In case of failure to settle the dispute amicably, the parties may mutually agree in writing to resort to other modes of alternative dispute resolution (ADR) to promote efficiency in the procurement process. Accordingly, they are encouraged to select the most expeditious mode of ADR available.

If arbitration is chosen as the ADR method, this shall be incorporated as a provision in the contract and referred to the Arbitrator specified in the **SCC.**

19.3 If the dispute remains unresolved after exhausting the remedies provided above, it may be submitted to other forms of ADR, such as mediation, conciliation, early neutral evaluation, mini-trial, or any combination thereof, in accordance with RA No. 9285, otherwise known as the "Alternative Dispute Resolution Act of 2004". However,

disputes that are within the competence or jurisdiction of the Construction Industry Arbitration Commission shall be referred to the same for resolution.[12]

20) 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.

21) Termination for Breach of Contract

21.1 The Procuring Entity shall terminate the contract for breach thereof when any of the following conditions are present:

a) Due to the Contractor's fault and while the project is on-going, it has incurred negative slippage of fifteen percent (15%) or more in accordance with Presidential Decree No. 1870, s. 1983;

b) Due to the Contractor's fault and after the contract time has expired, it has incurred a negative slippage of ten percent (10%) or more in the completion of the work;

c) The Contractor abandons the contract works, plainly demonstrates an intention not to continue the performance of the Contractor's obligations under the contract, refuses or fails to comply with the Procuring Entity's instructions, or fails to proceed expeditiously and without delay despite a written notice by the Procuring Entity;

d) When the Contractor, without reasonable excuse, fails to comply with the Notice of Rejection given by the Project Engineer that, after examination therein, the Infrastructure Project is found to be defective or otherwise not in accordance with the Contract, or a Project Engineer's instruction to conduct remedial work, within 30 days after receiving the said notice;

e) The Contractor does not actually have on the project site the minimum essential equipment listed on the Bid necessary to prosecute the Works in accordance with the approved work plan and equipment deployment schedule as required for the project;

f) The Contractor does not execute the Works in accordance with the contract or persistently or flagrantly neglects to carry out its obligations under the contract;

g) The Contractor neglects or refuses to remove materials or to perform a new work that has been rejected as defective or unsuitable;

h) The Contractor subcontracts any part of the contract works without approval by the Procuring Entity; or

i) The Contractor becomes bankrupt or insolvent; goes into liquidation, administration, reorganization, winding-up, or dissolution; becomes subject to the appointment of a liquidator, receiver, administrator, manager, or trustee;

---

12 Executive Order No. 1008 (Construction Industry Arbitration Law); and Construction Industry Arbitration Commission Revised Rules of Procedure.

enters into a composition or arrangement with the Contractor's creditors; or any act is done or any event occurs which is analogous to or has a similar effect to any of these acts or events under applicable laws.

21.2 All materials on the Site, Plant, Works, including Equipment paid under this Contract, including those identified by the Procuring Entity in the **SCC** pursuant to GCC Clause 9.1, shall be deemed to be the property of the Procuring Entity if this Contract is terminated because of the Contractor's breach.

22) Termination Due to Force Majeure

22.1 For purposes of this Contract the terms "*force majeure*" and "fortuitous event" may be used interchangeably. In this regard, a fortuitous event or *force majeure* shall be interpreted to mean an event which could not have been foreseen, or though foreseen, was inevitable. It shall not include ordinary unfavorable weather conditions, and any other cause the effects of which could have been avoided with the exercise of reasonable diligence by the Contractor.

22.2 If this Contract is discontinued by an outbreak of war or by any other similar event entirely outside the control of either the Procuring Entity or the Contractor, the Procuring Entity shall certify that this Contract has been discontinued. The Contractor shall make the Site safe and stop work as quickly as possible after receiving the certificate and shall be paid for all Works carried out before receiving it and for any Work carried out afterwards to which a commitment was made by the Procuring Entity.

22.3 If the event continues for a period of eighty-four (84) days, either party may then give notice of termination, which shall take effect twenty-eight (28) days after the giving of the notice.

22.4 After termination, the Contractor shall be entitled to payment of the unpaid balance of the value of the Works executed and of the materials and Plant, in relation to GCC Clause 9.1 and 21.2, adjusted by the following:

(a) any sum to which the Contractor is entitled under **GCC** Clause 30; and

(b) any sum to which the Procuring Entity is entitled.

22.5 The net balance due shall be paid or repaid within a reasonable time period from the time of the notice of termination.

23) Termination by Contractor

The Contractor may terminate this Contract with the Procuring Entity if the Works are completely stopped for a continuous period of at least sixty (60) calendar days through no fault of its own, due to any of the following reasons:

a) Failure of the Procuring Entity to deliver, within a reasonable time, supplies, materials, right-of-way, or other items it is obligated to furnish under the terms of this Contract;

b) Substantial failure of the Procuring Entity to perform its obligations under the contract, and such failure constitutes a material breach of the Procuring Entity's obligations under the contract;

c) Prolonged suspension by the Procuring Entity, through no fault of the Contractor, which affects the substantial part of the Infrastructure Project; or

d) The prosecution of the Work is disrupted by the adverse peace and order situation, as certified by the Armed Forces of the Philippines Provincial Commander and approved by the Secretary of National Defense.

24) Termination for Convenience

The Procuring Entity, by notice sent to the Contractor, may terminate the Contract, in whole or in part, at any time, if it has determined the existence of any of the following conditions that make contract implementation economically, financially, or technically impractical or unnecessary:

a) If physical and economic conditions have significantly changed so as to render the project no longer economically, financially, or technically feasible, as determined by the HoPE; or

b) The HoPE has determined the existence of conditions that make project implementation impractical or unnecessary, such as, but not limited to, fortuitous events, changes in laws and government policies.

25) Termination for Unlawful Acts

The Procuring Entity may terminate the contract in case it is determined prima facie that the Contractor, including any joint venture partner therein, has engaged, before or during the implementation of the contract, in unlawful deeds and behaviors relative to contract acquisition and implementation. These unlawful acts include, but are not limited to, the following:

a) Corrupt, fraudulent, collusive, coercive, and obstructive practices as defined in **ITB** Clause 3.1, unless otherwise specified in the **SCC**;

b) Drawing up or using forged documents;

c) Using adulterated materials, means, or methods, or engaging in production contrary to rules of science or trade; or

d) Any other act analogous to the foregoing.

26) Termination for Other Causes

26.1 The Procuring Entity may terminate this Contract, in whole or in part, at any time for its convenience. The HoPE may terminate this Contract for the convenience of the Procuring Entity if physical and economic conditions have significantly changed so as to render the project no longer economically, financially, or technically feasible, as determined by the HoPE; or if the HoPE has determined the existence of conditions that make project implementation impractical or unnecessary, such as, but not limited to, fortuitous events, changes in laws and government policies.

26.2 The Procuring Entity or the Contractor may terminate this Contract if the other party causes a fundamental breach of this Contract.

26.3 Other breaches of Contract shall include, but shall not be limited to, the following:

a) The Contractor stops work for twenty-eight (28) days when no stoppage of work is shown on the current Program of Work and the stoppage has not been authorized by the Procuring Entity;

b) The Procuring Entity instructs the Contractor to delay the progress of the Works, and the instruction is not withdrawn within twenty-eight (28) days;

c) A payment certified by the Procuring Entity is not paid to the Contractor within eighty-four (84) days from the date of the Procuring Entity's certificate;

d) The Procuring Entity gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Procuring Entity;

e) The Contractor does not maintain a Security, which is required; and

f) The Contractor has delayed the completion of the Works by the number of days for which the maximum amount of liquidated damages can be paid, as defined in the **GCC** 18.

26.4 The Funding Source or the Procuring Entity, as appropriate, will seek the imposition of administrative sanctions as prescribed by RA No. 12009 and without prejudice to the imposition of civil and criminal sanctions as provided under applicable against individuals and organizations deemed to be involved with corrupt, fraudulent, or coercive practices.

26.5 When persons from either party to this Contract gives notice of a fundamental breach to the Procuring Entity in order to terminate the existing contract for a cause other than those listed under **GCC** Clause 26.3, the Procuring Entity shall decide whether the breach is fundamental or not.

26.6 If this Contract is terminated, the Contractor shall stop work immediately, make the Site safe and secure, and leave the Site as soon as reasonably possible.

27) Procedures for Termination of Contracts

27.1 The following provisions shall govern the procedures for the termination of this Contract:

a) **Verification** - Upon receipt of a written report of acts or causes which may constitute grounds for termination as aforementioned, or upon its own initiative, the End-User or Implementing Unit shall, within a period of seven (7) calendar days, verify the existence of such grounds and cause the execution of a Verified Report, with all relevant evidence attached;

b) **Notice to Terminate** - Upon recommendation by the End-User or Implementing Unit, the HoPE shall terminate contracts only by written notice to the Contractor conveying the termination of the contract. The notice shall state:

(i) that the Contract is being terminated for any of the grounds aforementioned, and a statement of the acts that constitute the grounds constituting the same;

(ii) the extent of termination, whether in whole or in part;

(iii) an instruction to the Contractor to show cause as to why this contract should not be terminated; and

(iv) special instructions of the Procuring Entity, if any.

The Notice to Terminate shall be accompanied by a copy of the Verified Report;

c) **Show Cause** - Within a period of seven (7) calendar days from receipt of the Notice of Termination, the Contractor shall submit to the HoPE a verified position paper stating why the contract should not be terminated. If the Contractor fails to show cause after the lapse of the seven (7) day period, either by inaction or by default, the HoPE shall issue an order terminating the contract;

d) **Rescission of Notice of Termination** - The Procuring Entity may, at any time before receipt of the Contractor's verified position paper, withdraw the Notice to Terminate if it is determined that certain items or works subject of the notice had been completed, delivered, or performed before the Contractor's receipt of the notice;

e) **Decision** - Within a non-extendible period of ten (10) calendar days from receipt of the verified position paper, the HoPE shall decide whether or not to terminate the contract. It shall serve a written notice to the Contractor of its decision and, unless otherwise provided, the contract is deemed terminated from receipt of the Contractor of the notice of the decision. The termination shall only be based on the grounds stated in the Notice to Terminate.

f) **Contract Termination Review Committee (CTRC)** - The HoPE may create a committee to assist him in the discharge of its functions under the IRR. All decisions recommended by the CTRC shall be subject to the approval of the HoPE

g) **Take-over of Contracts** - If a Procuring Entity terminates the contract due to default, insolvency, or for cause, it may enter into a Negotiated Procurement (Take-over of Contracts) pursuant to Section 35.3 of the IRR.

h) **Notice by Contractor** - The Contractor must serve a written notice to the Procuring Entity of its intention to terminate the contract at least thirty (30) calendar days before its intended termination. The contract is deemed terminated if it is not resumed in thirty (30) calendar days after the receipt of such notice by the Procuring Entity.

27.2 Notwithstanding Section 99 of RA No. 12009 and as provided by applicable laws, the Procuring Entity shall impose on Contractors after the termination of the contract, the penalty of suspension for one (1) year for the first offense, suspension for two (2) years for the second offense from participating in the public bidding process, for violations committed during the contract implementation stage, as stated in the **SCC.**

28) Approval of Drawings and Temporary Works by the Procuring Entity

28.1 All Drawings prepared by the Contractor for the execution of the Temporary Works, are subject to prior approval by the Procuring Entity before its use.

28.2 The Contractor shall be responsible for design of Temporary Works.

28.3 The Procuring Entity's approval shall not alter the Contractor's responsibility for design of the Temporary Works.

28.4 The Contractor shall obtain approval of third parties to the design of the Temporary Works, when required by the Procuring Entity.

29) Acceleration and Delays Ordered by the Procuring Entity

29.1 When the Procuring Entity wants the Contractor to finish before the Intended Completion Date, the Procuring Entity will obtain priced proposals for achieving the necessary acceleration from the Contractor. If the Procuring Entity accepts these proposals, the Intended Completion Date will be adjusted accordingly and confirmed by both the Procuring Entity and the Contractor.

29.2 If the Contractor's Financial Proposals for an acceleration are accepted by the Procuring Entity, they are incorporated in the Contract Price and treated as a Variation.

30) Contractor's Right to Claim

If the Contractor incurs cost as a result of any of the events under **GCC** Clauses 22, 23 and 24 in relation to **GCC** Clause 20, the Contractor shall be entitled to the amount of such cost. If as a result of any of the said events, it is necessary to change the Works, this shall be dealt with as a Variation.

31) Dayworks

31.1 Subject to **GCC** Clause 40 on Variation Order, and if applicable as indicated in the **SCC**, the Contractor shall determine the Dayworks rates to be included or indicated in the Bid. The Dayworks rates in the Contractor's bid shall be used for small additional amounts of work only when the Procuring Entity has given written instructions in advance for additional work to be paid for in that way.

31.2 All work to be paid for as Dayworks shall be recorded by the Contractor on forms approved by the Procuring Entity. Each completed form shall be verified and signed by the Procuring Entity within two (2) days of the work being done.

31.3 The Contractor shall be paid for Dayworks subject to obtaining signed Dayworks forms from both the Procuring Entity and Contractor.

32) Early Warning

32.1 The Contractor shall warn the Procuring Entity at the earliest opportunity of specific likely future events or circumstances that may adversely affect the quality of the work, increase the Contract Price, or delay the execution of the Works.

32.2 The Contractor shall cooperate with the Procuring Entity in making and considering proposals for how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the work and in carrying out any resulting instruction of the Procuring Entity. Should such events or circumstances arise which increase the Contract price or delay the execution of Works, the provisions on variation order shall apply.

33) Program of Work

33.1 Within the time stated in the **SCC**, the Contractor shall submit to the Procuring Entity for approval a Program of Work showing the general methods, arrangements, order, and timing for all the activities in the Works.

33.2 An update of the Program of Work shall show the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work, including any changes to the sequence of the activities.

33.3 The Contractor shall submit to the Procuring Entity 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 may withhold the amount stated in the **SCC** from the next payment schedule and continue to withhold this amount until the next payment after the date on which the overdue Program of Work has been submitted.

33.4 The Procuring Entity's approval of the Program of Work shall not alter the Contractor's obligations. A revised Program of Work produced by the Contactor shall show the effect of any approved Variations, and shall include all Variations. The Contractor may revise the Program of Work, based on the Variation Order, and submit it to the Procuring Entity again.

33.5 When the Program of Work is updated, the Contractor shall provide the Procuring Entity with an updated cash flow forecast. The cash flow forecast shall include different currencies, as defined in the Contract, converted as necessary using the Contract exchange rates.

34) Management Conferences

34.1 Either the Procuring Entity or the Contractor may require the other to attend a Management Conference. The Management Conference shall review the plans for remaining work and deal with matters raised in accordance with the early warning procedure.

34.2 The Procuring Entity shall record the business of Management Conferences and provide copies of the record to those attending the Conference and to the Procuring Entity. The responsibility of the parties for the actions to be taken shall be decided by the Procuring Entity either at the Management Conference or after the Management Conference. The Procuring Entity shall communicate these responsibilities in writing to all who attended the Conference.

35) Bill of Quantities

35.1 The Bill of Quantities shall contain items of work for the construction, installation, testing, commissioning of work, materials, and labor among others, to be done by the Contractor.

35.2 The Bill of Quantities is used to calculate the Contract Price. The Contractor is paid for the quantity of the work done at the rate in the Bill of Quantities for each item.

35.3 If the final quantity of any work item completed differs from the quantity indicated in the Bill of Quantities, and the difference does not exceed twenty-five percent (25%) of the original quantity for that item, the Procuring Entity shall adjust the Contract accordingly.

This shall be allowed only if the total amount of all such changes does not go beyond ten percent (10%) of the total Contract price, subject to applicable laws, rules, and regulations.

35.4 If requested by the Procuring Entity, the Contractor shall provide the Procuring Entity with a detailed cost breakdown of any rate in the Bill of Quantities.

36) Instructions, Inspections and Audits

36.1 The Procuring Entity shall at all reasonable times during construction of the Works be entitled to examine, inspect, measure and test the materials and workmanship, and to check the progress of the construction.

36.2 If the Procuring Entity instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a defect and the test shows that it does, the Contractor shall pay for the test and any samples. In the absence of any defect, the test shall be a compensation event with no adverse consequences to the contractor.

36.3 The Contractor shall permit the Funding Source named in the **SCC** to inspect the Contractor's accounts and records relating to the performance of the Contractor and to have them audited by auditors appointed by the Funding Source, if so required by the Funding Source.

37) Identifying Defects

The Procuring Entity shall check the Contractor's work and notify the Contractor of any defects that are found. Such checking shall not affect the Contractor's responsibilities. The Procuring Entity may instruct the Contractor to check noted defects and test any work that the Procuring Entity considers as substandard and/or defective.

38) Correction of Defects

38.1 The Procuring Entity shall give notice to the Contractor of any defects before the end of the Defects Liability Period, which is one (1) year from project completion up to final acceptance by the Procuring Entity.

38.2 Every time notice of a defect is given, the Contractor shall correct the notified defect within ninety (90) calendar days from the time the HoPE has issued an order to undertake repair.

38.3 The Contractor shall correct the defects which they notice themselves before the end of the Defects Liability Period.

38.4 The Procuring Entity shall certify that all defects have been duly corrected.

39) Uncorrected Defects

39.1 The Procuring Entity shall give the Contractor at least fourteen (14) days' notice of its intention to use a third party to correct a Defect. If the Contractor does not correct the Defect himself within the period, the Procuring Entity may have the Defect corrected by the third party. The cost of the correction will be deducted from the Contract Price.

39.2 The use of a third party to correct defects that are uncorrected by the Contractor will in no way relieve the Contractor of its liabilities and warranties under the Contract.

40) Variation Orders

40.1 Variation Orders may be issued by the Procuring Entity to cover any increase or decrease in quantities, including the introduction of new work items that are not

included in the original contract or reclassification of work items that are either due to change of plans, design or alignment to suit actual field conditions resulting in disparity between the preconstruction plans used for purposes of bidding and the "as staked plans" or construction drawings prepared after a joint survey by the Contractor and the Government after award of the contract.

Provided, That in case of positive or additive Variation Order/s, the cumulative amount thereof shall not exceed ten percent (10%) of the original contract price; Provided, further, That the scope of works shall not be reduced as to accommodate a positive Variation Order. In all cases, the addition of works under Variation Orders should be within the general scope of the project as bid and awarded.

40.2 Any cumulative positive Variation Order beyond ten percent (10%) of the original contract price shall be the subject of another procurement project to be bid out if the Works are separable from the original contract. In exceptional cases where it is urgently necessary to complete the original scope of work, the HoPE, upon the recommendation of the End-User or Implementing Unit, may authorize positive Variation Order/s resulting to a cumulative value of the positive Variation Orders beyond ten percent (10%) but not more than twenty percent (20%) of the original contract price.

All progress payments shall first be charged against the advance payment until the latter has been fully exhausted, at the option of the Procuring Entity.

40.3 A Variation Order may either be in the form of a Change Order or Extra Work Order:

a) A Change Order may be issued by the HoPE or duly authorized representative to cover any increase or decrease in quantities of original work items in the contract.

b) An Extra Work Order may be issued by the implementing official to cover the introduction of new work necessary for the completion, improvement or protection of the project which was not included as items of work in the original contract, such as, where there are subsurface or latent physical conditions at the site differing materially from those indicated in the contract, or where there are duly unknown physical conditions at the site of an unusual nature differing materially from those ordinarily encountered and generally recognized as inherent in the work or character provided for in the contract.

40.4 For Variation Orders, the Contractor shall be paid for additional work items whose unit prices shall be derived based on the following:

a) For additional or extra works duly covered by Change Orders involving work items which are exactly the same or similar to those in the original contract, the applicable unit prices of work items original contract shall be used.

b) For additional or extra works duly covered by Extra Work Orders involving new work items that are not in the original contract, the unit prices of the new work items shall be based on the direct unit costs used in the original contract (e.g., unit cost of cement, rebars, form lumber, labor rate, equipment rental, etc.). All new components of the new work item shall be fixed prices; Provided, The same is acceptable to both the Government and the Contractor; Provided further, That the direct unit costs of new components shall be based on the Contractor's estimate as validated by the Procuring Entity concerned via documented canvass in accordance with existing rules and regulations. The direct cost of the new work item shall then be combined with the mark-up

factor (i.e., taxes and profit) used by the Contractor in its bid to determine the unit price of the new work item.

40.5 Under no circumstances shall a Contractor proceed to commence work under any Change Order or Extra Work Order unless it has been approved by the HoPE or its duly authorized representative. However, under any of the following conditions, the Procuring Entity's representative or Project Engineer may, subject to the availability of funds and within the limits of its delegated authority, allow the immediate start of work under any Change Order or Extra Work Order:

a) In the event of an emergency where the prosecution of the work is urgent to avoid detriment to public service, or damage to life and/or property; and/or

b) When time is of the essence;

Provided, however, That such approval is valid on work done up to the point where the cumulative increase in value of work on the project which has not yet been duly fully approved does not exceed five percent (5%) of the adjusted original contract price.

Provided, further, That immediately after the start of work, the corresponding Change Order or Extra Work Order shall be prepared and submitted for approval in accordance with the abovementioned rules. Payments for Works satisfactorily accomplished on any Change Order or Extra Work Order may be made only after approval of the same by the HoPE or its duly authorized representative.

Provided, finally, That for a Change Order or Extra Work Order involving a cumulative amount exceeding five percent (5%) of the original contract price, no work thereon may be commenced unless said Change Order or Extra Work Order has been approved by the HoPE or its duly authorized representative.

41) Contract Completion

Once the project reaches an accomplishment of ninety-five percent (95%) of the total contract amount, the Procuring Entity may constitute an inspectorate team to conduct preliminary inspection and submit a punch-list to the Contractor in preparation for the final turnover of the project. Said punch-list will contain, among others, the remaining Works, Work deficiencies for necessary corrections, and the specific duration/time to fully complete the project within the approved remaining contract time. This, however, shall not preclude the claim of the Procuring Entity for liquidated damages, if applicable.

42) Suspension of Work

42.1 The Procuring Entity shall have the authority to suspend the work wholly or partly by written order for such period as may be deemed necessary, due to *force majeure* or any fortuitous event or for failure on the part of the Contractor to correct bad conditions which are unsafe for workers or for the general public, to carry out valid orders given by the Procuring Entity or to perform any provisions of the contract, or due to adjustment of plans to suit field conditions as found necessary during construction. The Contractor shall immediately comply with such order to suspend the work wholly or partly.

42.2 The Contractor or its duly authorized representative shall have the right to suspend work operation on any or all projects or activities along the critical path of activities after fifteen (15) calendar days from date of receipt of written notice from the Contractor to the district engineer, regional director, consultant or equivalent official, as the case may be, due to the following:

a) There exist right-of-way problems which prohibit the Contractor from performing work in accordance with the approved construction schedule.

b) Requisite construction plans which must be owner furnished are not issued to the Contractor precluding any work called for by such plans.

c) Peace and order conditions that make it extremely dangerous, if not possible, to work. However, this condition must be certified in writing by the Philippine National Police station which has responsibility over the affected area and confirmed by the Department of the Interior and Local Government (DILG) Regional Director.

d) There was a failure on the part of the Procuring Entity to deliver government-furnished materials and equipment as stipulated in the contract.

e) Delay in the payment of Contractor's claim for progress billing beyond forty-five (45) calendar days from the time the Contractor's claim has been certified by the Procuring Entity's authorized representative that the documents are complete, unless there are justifiable reasons for the delay in payment which shall be communicated in writing to the Contractor.

42.3 In case of total suspension, or suspension of activities along the critical path, which is not due to any fault of the Contractor, the elapsed time between the effectivity of the order suspending operation and the order to resume work shall be allowed to the Contractor by adjusting the contract time accordingly.

43) Payment on Termination

43.1 If the Contract is terminated because of a breach of Contract by the Contractor, the Procuring Entity shall issue a certificate for the value of the work done and Materials ordered less advance payments received up to the date of the issue of the certificate, and less the percentage to apply to the value of the work not completed, as indicated in the **SCC**. Additional liquidated damages shall not apply. If the total amount due to the Procuring Entity exceeds any payment due to the Contractor, the difference shall be a debt payable to the Procuring Entity.

43.2 If the Contract is terminated for the Procuring Entity's convenience, or due to a breach of Contract by the Procuring Entity, the Procuring Entity shall issue a certificate for the value of the work done, Materials ordered, the reasonable cost of removal of Equipment, repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting and securing the Works, and less advance payments received up to the date of the certificate.

43.3 The net balance due shall be paid or repaid within twenty-eight (28) days from the notice of termination.

43.4 If the Contractor has terminated the Contract under **GCC** Clauses 23 to 24, the Procuring Entity shall promptly return the Performance Security to the Contractor.

44) Extension of Contract Time

44.1 Should the amount of additional work or other special circumstances warrant the entitlement of the Contractor to an extension of contract time, the Procuring Entity shall determine the amount of such extension; Provided, That the Contractor has notified the Procuring Entity of its claim for extension of contract time prior to the expiration of

the contract time, and within thirty (30) calendar days after the additional work has been commenced or the circumstances leading to such claim have arisen, as the case may be, in order to give the Procuring Entity the opportunity to investigate the claim. Failure to provide such notice shall constitute a waiver of such a claim by the Contractor. Upon receipt of full and detailed particulars, the Procuring Entity shall examine the facts and extent of the delay and shall extend the contract time to complete the contract work when, in the Procuring Entity's opinion, the findings of facts justify an extension.

44.2 No extension of contract time shall be granted to the Contractor due to ordinary unfavorable weather conditions and inexcusable negligence of the Contractor to provide the required equipment, supplies, or materials.

44.3 Extension of contract time may be granted only when the affected activities fall within the critical path of the PERT, CPM, Precedence Diagram Method or any other project management tool.

44.4 No extension of contract time shall be granted when the reason given to support the request for extension was already considered in the determination of the original contract time during the conduct of detailed engineering and in the preparation of the contract documents as agreed upon by the parties before contract perfection.

44.5 Extension of contract time may be granted in the cases indicated in the **SCC.**

44.6 The written consent of the bank, or surety or insurance company, as the case may be, must be attached to any request of the Contractor for extension of contract time and submitted to the Procuring Entity for consideration and the validity of the Performance Security shall be correspondingly extended.

44.7 The Procuring Entity shall extend the Intended Completion Date if a Variation is issued which makes it impossible for the Intended Completion Date to be achieved by the Contractor without taking steps to accelerate the remaining work, which would cause the Contractor to incur additional costs. No payment shall be made for any event which may warrant the extension of the Intended Completion Date.

44.8 The Procuring Entity shall decide whether and by how much to extend the Intended Completion Date within twenty (20) days of the Contractor asking the Procuring Entity for a decision thereto after fully submitting all supporting information. If the Contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date.

45) Price Escalation

In the event of an extraordinary increase in prices of specific components of the Infrastructure Project, price escalation may be considered, subject to prior approval of the GPPB. If the cost of construction components increases by more than ten percent (10%) of the unit price of work items, as determined against the prevailing price indices of the PSA, a price escalation may be authorized at a no-loss, no-gain basis, using the appropriate formula prescribed by the GPPB. For the purpose of this Section, the PSA shall ensure that its price indices are region-specific and updated on a monthly basis

46) Completion

The Contractor shall request the Procuring Entity to issue a Certificate of Completion of the Works, and the Procuring Entity will do so upon determining that the work is completed.

47) Taking Over

The Procuring Entity shall take over the Site and the Works within seven (7) days from the date of issuance of a Certificate of Completion; Provided, That it shall not release the Contractor of its responsibilities within the defects liability period.

48) Operating and Maintenance Manuals

48.1 If "as built" Drawings and/or operating and maintenance manuals are required, the Contractor shall supply them by the dates stated in the **SCC**.

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

Section V. Special Conditions of Contract

Special Conditions of Contract

<table>
<tr><td>GCC Clause</td><td></td></tr>
<tr><td>1.1</td><td>The Intended Completion Date is 120 Calendar Days reckoned from the start date indicated in the Notice to Proceed (NTP).</td></tr>
<tr><td>1.2</td><td>The Procuring Entity is Provincial Government of Camarines Norte, Provincial Capitol, Daet, Camarines Norte.</td></tr>
<tr><td>1.3</td><td>The Site is located at Brgy. Bagacay, Labo, Camarines Norte.</td></tr>
<tr><td>1.4</td><td>The start date shall be the date of receipt of the Notice to Proceed.</td></tr>
<tr><td>1.5</td><td>The Works consist of Construction of 144.00 LM x 6.00m x 0.20m thk road.</td></tr>
<tr><td>2.2</td><td>Not Applicable.</td></tr>
<tr><td>5.1</td><td>The PGCN shall give possession of all parts of the Site to the Contractor from the start date indicated in the Notice to Proceed (NTP).</td></tr>
<tr><td>6.5</td><td>The Contractor shall employ the following Key Personnel:
<table>
<tr><td>Item No.</td><td>Designation</td><td>Name</td></tr>
<tr><td>1</td><td>Project Manager</td><td></td></tr>
<tr><td>2</td><td>Project Engineer</td><td></td></tr>
<tr><td>3</td><td>Materials Engineer</td><td></td></tr>
<tr><td>4</td><td>Safety Officer</td><td></td></tr>
<tr><td>5</td><td>Construction Foreman</td><td></td></tr>
</table></td></tr>
<tr><td>7.1</td><td>No further instructions.</td></tr>
<tr><td>8.1</td><td>The advance payment shall be in accordance with Section 71.2.5 of the IRR of R.A. No. 12009.

The Procuring Entity shall make an advance payment to the contractor in an amount not exceeding 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 Instruction to Bidders and other relevant bidding document.

The advance payment shall be made only upon:

a. Written request of the contractor which shall form part of the contractor documents; and

b. Submission of an irrevocable standby Letter of Credit of equivalent value from a bank as confirmed by the Procuring Entity; a bank guarantee; or a surety bond callable upon demand issued by a duly licensed surety or insurance company, at the option of the Procuring Entity.</td></tr>
</table>

9.1	Materials and equipment delivered onsite but not yet incorporated in the Works shall NOT be included for payment.
9.4	The advance payment shall be repaid by the contractor by deducting *fifteen percent (15%)* from his periodic progress payments a percentage equal to the percentage of the total contract price used for the advance payment. The first progress payment may be paid by the Procuring Entity to the Contractor; Provided, that at least *five percent (5%)* of the Works has been accomplished as certified by the Procuring Entity.
12.7	No further instructions.
13.1	The site investigation reports are: *Site survey, boundary stake-out, topographic survey, geotechnical report and all signed and sealed pertinent data related to the conditions of the project site.*
15.3	No further instructions.
15.5	*In case of semi-permanent structures, such as buildings of types 1, 2, and 3 as classified under the National Building Code of the Philippines, concrete or asphalt roads, concrete river control, drainage, irrigation lined canals, river landing, deep wells, rock causeway, pedestrian overpass, and other similar semi-permanent structures: Five (5) years.* .
20	"No additional provision." *Or if the Contractor is a joint venture, "*All partners to the joint venture shall be jointly and severally liable to the Procuring Entity."
25(a)	No further instructions.
27.2	a) Failure of the Contractor, due solely to its fault or negligence, to mobilize and start work or performance within the specified period in the Notice to Proceed ("NTP"); b) Failure by the Contractor to fully and faithfully comply with its contractual obligations without valid cause, or failure by the Contractor to comply with any written lawful instruction of the Procuring Entity or its representative(s) pursuant to the implementation of the contract. For the procurement of infrastructure projects or consultancy contracts, lawful instructions include but are not limited *to* the following: i) Employment of competent technical personnel, competent engineers and/or work supervisors; ii) Provision of warning signs and barricades in accordance with approved plans and specifications and contract provisions; iii) Stockpiling in proper places of all materials and removal from the project site of waste and excess materials**,** including broken pavement

	and excavated debris in accordance with approved plans and specifications and contract provisions; iv) Deployment of committed equipment, facilities, support staff and manpower; and v) Renewal of the effectivity dates of the performance security after its expiration during the course of contract implementation. c) Assignment and subcontracting of the contract or any part thereof or substitution of key personnel named in the proposal without prior written approval by the Procuring Entity. d) Poor performance by the Contractor or unsatisfactory quality and/or progress of work arising from its fault or negligence as reflected in the CPES rating sheet. In the absence of the CPES rating sheet, the existing performance monitoring system of the Procuring Entity shall be applied. Any of the following acts by the Contractor shall be construed as poor performance: i) Negative slippage of fifteen (15%) and above within the critical path of the project due entirely to the fault or negligence of the Contractor; and ii) Quality of materials and workmanship not complying with the approved specifications arising from the Contractor's fault or negligence. e) Willful or deliberate abandonment or non-performance of the project or contract by the Contractor resulting to substantial breach thereof without lawful and/or just cause. In addition to the penalty of suspension, the performance security posted by the Contractor shall also be forfeited.]
31.1	Dayworks are applicable at the rate shown in the Contractor's original Bid subject to the guidelines on Variation Order in Section 71.2 of the IRR of RA12009.
33.1	The Contractor shall submit the Program of Work to the Procuring Entity within *10* days of delivery from the Notice of Award.
33.3	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 the contract amount.*
36.3	The Funding Source is the ***PGCN-20% Development Fund AB2026***
43.1	The percentage to apply to the value of the work not completed is *10%.*

44.5	a) rainy/unworkable days considered unfavorable for the prosecution of the Works at the site, based on the actual conditions obtained at the site, in excess of the number of rainy/unworkable days pre-determined by the Procuring Entity in relation to the original contract time during the conduct of detailed engineering and in the preparation of the contract documents as agreed upon by the parties before contract perfection, and/or b) major calamities such as exceptionally destructive typhoons, floods and earthquakes, and epidemics, c) delays attributable to the Procuring Entity, such as non-delivery on time of materials, working drawings, or written information to be furnished by the Procuring Entity, non-acquisition of permit to enter private properties or non-execution of deed of sale or donation within the right-of-way resulting in complete paralyzation of construction activities, and d) other meritorious causes as determined by the Procuring Entity and approved by the HoPE such as shortage of construction materials, general labor strikes, and peace and order problems that disrupt construction operations through no fault of the Contractor may be considered as additional grounds for extension of contract time provided they are publicly felt and certified by appropriate government agencies such as DTI, DOLE, DILG, and DND, among others.
48.1	The Operating and Maintenance Manuals [one (1) original and three (3) copies and PDF file in flash drive]; and As-Built Drawings [One (1) Original in Mylar, three (3) Blueprint Copies and electronic file in USB] shall be submitted to and approved by the Procuring Entity or its duly authorized representative before the issuance of the Certificate of Completion.
48.2	The amount to be withheld for failing to produce "as built" drawings and/or operating and maintenance manuals by the date required is *is final billing and retention money.*

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 mm2 (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 or ripper, and all boulders or other detached stones each having a volume of 1 cubic meter or meter as determined by physical measurements or visually by the Engineer.

(3) Common Excavation. Common excavations shall consists 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 consists 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 Contractor. 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 ad 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 forms 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 (6inches) 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 or 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 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 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 lest 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

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

Cofferdams or cribs for foundation construction shall in general, be carried well below the bottoms of the footings and shall be well braced and as nearly watertight as practicable. In general, the interior dimensions of cofferdams shall be such as to give sufficient clearance for the construction of forms and the inspection of their exteriors, and to permit pumping outside of the forms. Cofferdams or cribs which are tilted or moved laterally during the process of sinking shall be righted or enlarged so as to provide the necessary clearance.

When conditions are encountered which, as determined by the Engineer, render it impracticable to dewater the foundation before placing the footing, the Engineer may require the construction of a

concrete 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 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 (3 inches) square openings and not more than 15 mass percent will pass the 0.075 mm (No. 200) sieve, as determined by AASHTO T 11. The material shall have a plasticity index of not more than 6 as determined by ASSHTO T 90 and a liquid limit of not more than 30 as determined by AASHTO T 89.

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

   (a) Materials containing detrimental quantities of organic materials, such as

grass, roots and sewerage.

(b) Organic soils such as peat and muck.

(c) Soils with liquid limit exceeding 80 and/or plasticity index exceeding 55.

(d) Soils with a natural water content exceeding 100%.

(e) Soils with very low natural density, 800 kg/m^3 or lower.

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

104.3 *Construction Requirements*

104.3.1 General

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

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

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

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

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

104.3.2Methods of Construction

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

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

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

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

Roadway embankment of earth material shall be placed in horizontal layers not exceeding 200 mm (8 inches), loose measurement, and shall be compacted as specified before the next layer is placed. However, thicker layer maybe placed if vibratory roller with high compactive effort is used provided that density requirement is attained and as approved by the Engineer. Trial section to this effect must be conducted and approved by the Engineer. Effective spreading equipment shall be used on each lift to obtain uniform thickness as determined in the trial section prior to compaction. As the compaction of each layer progresses, continuous leveling and manipulating will be required to assure uniform density. Water shall be added or removed, if necessary, in order to obtain the required density. Removal of water shall be accomplished through aeration by plowing, blading, discing, or other methods satisfactory to the Engineer.

Where embankment is to be constructed across low swampy ground that will not support the mass of trucks or other hauling equipment, the lower part of the fill may be constructed

by dumping successive loads in a uniformly distributed layer of a thickness not greater than necessary to support the hauling equipment while placing subsequent layers.

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

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

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

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

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

104.3.3 Compaction

Compaction Trials

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

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

Earth

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

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

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

Rock

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

Embankment materials classified as rock shall be deposited, spread and leveled the full width of the fill with sufficient earth or other fine material so deposited to fill the interstices to produce a dense compact embankment. In addition, one of the rollers, vibrators, or compactors meeting the requirements set forth in Subsection 106.2.1, Compaction Equipment, shall compact the embankment full width with a minimum of three complete passes for each layer of embankment.

104.3.4 Protection of Roadbed During Construction

During the construction of the roadway, the roadbed shall be maintained in such condition that it will be well drained at all times. Side ditches or gutters emptying from cuts to

embankments or otherwise shall be so constructed as to avoid damage to embankments by erosion.

104.3.5 Protection of Structure

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

104.3.6 Rounding and Warping Slopes

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

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

104.3.7 Finishing Roadbed and Slopes

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

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

104.3.8 Serrated Slopes

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

104.3.9 Earth Berms

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

Compacted Berm

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

Uncompacted Berm

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

104.4 Method of Measurement

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

Material from excavation per Item 102 which is used in embankment and accepted by the Engineer will be paid under Embankment and such payment will be deemed to include the cost of excavating, hauling, stockpiling and all other costs incidental to the work.

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

104.5 Basis of Payment

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

Payment will be made under:

Pay Item Number	Description	Unit of Measurement
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 105 – SUBGRADE PREPARATION

105.1 Description

This Item shall consist of the preparation of the subgrade for the support of overlying structural layers. It shall extend to full width of the roadway. Unless authorized by the Engineer, subgrade

preparation shall not be done unless the Contractor is able to start immediately the construction of the pavement structure.

105.2 Material Requirements

Unless otherwise stated in the Contract and except when the sub grade is in rock cut, all materials below sub grade level to a depth 150 mm or to such greater depth as may be specified

shall meet the requirements of Section 104.2, Selected Borrow for Topping.

105.3 Construction Requirements

105.3.1 Prior Works

Prior to commencing preparation of the sub grade, all culverts, cross drains, ducts and the like (including their fully compacted backfill), ditches, drains and drainage outlets shall be completed. Any work on the preparation of the subgrade shall not be started unless prior work herein described shall have been approved by the Engineer.

105.3.2 Subgrade Level Tolerances

The finished compacted surface of the subgrade shall conform to the allowable tolerances as specified hereunder:

Permitted variation from	+	20 mm
design LEVEL OF SURFACE	-	30 mm
Permitted SURFACE IRREGULARITY		
MEASURED BY 3-m STRAIGHT EDGE		30 mm

Permitted variation from design CROSSFALL OR CAMBER	±	0.5 %
Permitted variation from design LONGITUDINAL GRADE over 25 m length	±	0.1 %

105.3.3 Subgrade in Common Excavation

Unless otherwise specified, all materials below subgrade level in earth cuts to a depth 150 mm or other depth shown on the Plans or as directed by the Engineer shall be excavated. The material, if suitable, shall be set aside for future use or, if unsuitable, shall be disposed off in accordance with the requirements of Subsection 102.2.9.

Where material has been removed from below subgrade level, the resulting surface shall be compacted to a depth of 150 mm and in accordance with other requirements of Subsection 104.3.3.

All materials immediately below subgrade level in earth cuts to a depth of 150 mm, or to such greater depth as may be specified, shall be compacted in accordance with the requirements of Subsection 104.3.3.

105.3.4 Subgrade in Rock Excavation

Surface irregularities under the subgrade level remaining after trimming of the rock excavation shall be leveled by placing specified material and compacted to the requirements of Subsection 104.3.3.

105.3.5 Subgrade on Embankment

After the embankment has been completed, the full width shall be conditioned by removing any soft or other unstable material that will not compacted properly. The resulting areas and all other low sections, holes, or depressions shall be brought to grade with suitable material. The entire roadbed shall be shaped and compacted to the requirements of Subsections

104.3.3. 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 cross-sections shown on the Plans.

105.3.6 Subgrade on Existing Pavement

Where the new pavement is to be constructed immediately over an existing Portland Cement concrete pavement and if so specified in the Contract the slab be broken into pieces with greatest dimension of not more than 500 mm and the existing pavement material compacted as specified in Subsection 104.3.3, as directed by the Engineer. The resulting subgrade level shall, as part pavement construction be shaped to conform to the allowable tolerances of Subsection 105.3.2 by placing and compacting where necessary a leveling course comprising the material of the pavement course to be placed immediately above.

Where the new pavement is to be constructed immediately over an existing asphalt concrete pavement or gravel surface pavement and if so specified in the Contract the pavement shall be scarified, thoroughly loosened, reshaped and recompacted in accordance with Subsection

104.3.3. The resulting subgrade level shall conform to the allowable tolerances of Subsection 105.3.2.

105.3.7 Protection of Completed Work

The Contractor shall be required to protect and maintain at his own expense the entire work within the limits of his Contract in good condition satisfactory to the Engineer from the time he first started work until all work shall have been completed. Maintenance shall include repairing and recompacting ruts, ridges, soft spots and deteriorated sections of the subgrade caused by the traffic of the Contractor's vehicle/equipment or that of the public.

105.3.8 Templates and Straight-edges

The Contractor shall provide for use of the Engineer, approved templates and straight-edges in sufficient number to check the accuracy of the work, as provided in this Specification.

105.4 Method of Measurement

105.4.1 Measurement of Items for payment shall be provided only for:

The compaction of existing ground below subgrade level in cuts of common material as specified in Subsection 105.3.3.

The breaking up or scarifying, loosening, reshaping and recompacting of existing pavement as specified in Subsection 105.3.6. The quantity to be paid for shall be the area of the work specified to be carried out and accepted by the Engineer.

105.4.2 Payment for all work for the preparation of the subgrade, including shaping to the required levels and tolerances, other than as specified above shall be deemed to be included in the Pay Item for Embankment.

105.5 Basis of Payment

The accepted quantities, measured as prescribed in Section 105.4, shall be paid for at the appropriate contract unit price for Pay Item listed below that is included in the Bill of Quantities which price and payment shall be full compensation for the placing or removal and disposal of 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
105 (1)	Subgrade Preparation (Common Material)	Square Meter
105 (2)	Subgrade Preparation (Existing Pavement)	Square Meter
105 (3)	Subgrade Preparation (Unsuitable Material)	Square Meter

ITEM 200 – AGGREGATE SUBBASE COURSE

Description

This item shall consist of furnishing, placing and compacting an aggregate subbase course on a prepared subgrade in accordance with this Specification and the lines, grades and cross- sections shown on the Plans, or as directed by the Engineer.

Material Requirements

Aggregate for subbase shall consist of hard, durable particles or fragments of crushed stone, crushed slag, or crushed or natural gravel and filler of natural or crushed sand or other finely divided mineral matter. The composite material shall be free from vegetable matter and lumps or balls of clay, and shall be of such nature that it can be compacted readily to form a firm, stable subbase.

The subbase material shall conform to Table 200.1, Grading Requirements

Table 200.1 – Grading Requirements

Sieve Designation		Mass Percent Passing
Standard, mm	Alternate US Standard	
50	2”	100
25	1”	55 – 85
9.5	3/8”	40 – 75
0.075	No. 200	0 - 12

The fraction passing the 0.075 mm (No. 200) sieve shall not be greater than 0.66 (two thirds) of the fraction passing the 0.425 mm (No. 40) sieve.

The fraction passing the 0.425 mm (No. 40) sieve shall have a liquid limit not greater than 35 and plasticity index not greater than 12 as determined by AASHTO T 89 and T 90, respectively.

The coarse portion, retained on a 2.00 mm (No. 10) sieve, shall have a mass percent of wear not exceeding 50 by the Los Angeles Abrasion Tests as determined by AASHTO T 96.

The material shall have a soaked CBR value of not less than 25% as determined by AASHTO T 193. The CBR value shall be obtained at the maximum dry density and determined by AASHTO T 180, Method D.

Construction Requirements

200.3.1 Preparation of Existing Surface

The existing surface shall be graded and finished as provided under Item 105, Subgrade Preparation, before placing the subbase material.

200.3.2 Placing

The aggregate subbase material shall be placed at a uniform mixture on a prepared subgrade in a quantity which will provide the required compacted thickness. When more than one layer is required, each layer shall be shaped and compacted before the succeeding layer is placed.

The placing of material shall begin at the point designated by the Engineer. Placing shall be from vehicles especially equipped to distribute the material in a continuous uniform layer or windrow. The layer or windrow shall be of such size that when spread and compacted the finished layer be in reasonably close conformity to the nominal thickness shown on the Plans.

When hauling is done over previously placed material, hauling equipment shall be dispersed uniformly over the entire surface of the previously constructed layer, to minimize rutting or uneven compaction.

200.3.3 Spreading and Compacting

When uniformly mixed, the mixture shall be spread to the plan thickness, for compaction.

Where the required thickness is 150 mm or less, the material may be spread and compacted in one layer. Where the required thickness is more than 150 mm, the aggregate subbase shall be spread and compacted in two or more layers of approximately equal thickness, and the maximum compacted thickness of any layer shall not exceed 150 mm. All subsequent layers shall be spread and compacted in a similar manner.

The moisture content of subbase material shall, if necessary, be adjusted prior to compaction by watering with approved sprinklers mounted on trucks or by drying out, as required in order to obtain the required compaction.

Immediately following final spreading and smoothening, each layer shall be compacted to the full width by means of approved compaction equipment. Rolling shall progress gradually from the sides to the center, parallel to the centerline of the road and shall continue until the whole surface has been rolled. Any irregularities or depressions that develop shall be corrected by loosening the material at these places and adding or removing material until surface is smooth and uniform. Along curbs, headers, and walls, and at all places not accessible to the roller, the subbase material shall be compacted thoroughly with approved tampers or compactors.

If the layer of subbase material, or part thereof, does not conform to the required finish, the Contractor shall, at his own expense, make the necessary corrections.

Compaction of each layer shall continue until a field density of at least 100 percent of the maximum dry density determined in accordance with AASHTO T 180, Method D has been achieved. In-place density determination shall be made in accordance with AASHTO T 191.

200.3.4 Trial Sections

Before subbase construction is started, the Contractor shall spread and compact trial sections as directed by the Engineer. The purpose of the trial sections is to check the suitability of the materials and the efficiency of the equipment and construction method which is proposed to be used by the Contractor. Therefore, the Contractor must use the same material, equipment and procedures that he proposes to use for the main work. One trial section of about 500 m^2 shall be made for every type of material and/or construction equipment/procedure proposed for use.

After final compaction of each trial section, the Contractor shall carry out such field density tests and other tests required as directed by the Engineer.

If a trial section shows that the proposed materials, equipment or procedures in the Engineer's opinion are not suitable for subbase, the material shall be removed at the Contractor's expense, and a new trial section shall be constructed.

If the basic conditions regarding the type of material or procedure change during the execution of the work, new trial sections shall be constructed.

200.3.5 Tolerances

Aggregate subbase shall be spread with equipment that will provide a uniform layer which when compacted will conform to the designed level and transverse slopes as shown on the Plans. The allowable tolerances shall be as specified hereunder:

Permitted variation from design THICKNESS OF LAYER	± 20 mm
Permitted variation from design	+10 mm

LEVEL OF SURFACE	-20 mm
Permitted SURFACE IRREGULARITY	
Measured by 3-m straight-edge	20 mm
Permitted variation from design	
CROSSFALL OR CAMBER	±0.3%
Permitted variation from design	
LONGITUDINAL GRADE	
over	
25 m in length	±0.1%

Method of Measurement

Aggregate Subbase Course will be measured by the cubic meter (m^3). The quantity to be paid for shall be the design volume compacted in-place as shown on the Plans, and accepted in the completed course. No allowance will be given for materials placed outside the design limits shown on the cross-sections. Trial sections shall not be measured separately but shall be included in the quantity of subbase herein measured.

Basis of Payment

The accepted quantities, measured as prescribed in Section 200.4, shall be paid for at the contract unit price for Aggregate Subbase Course which price and payment shall be full compensation for furnishings 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
200	Aggregate Subbase Course	Cubic Meter

ITEM 200 – AGGREGATE SUBBASE COURSE

Description

This item shall consist of furnishing, placing and compacting an aggregate subbase course on a prepared subgrade in accordance with this Specification and the lines, grades and cross-sections shown on the Plans, or as directed by the Engineer.

Material Requirements

Aggregate for subbase shall consist of hard, durable particles or fragments of crushed stone, crushed slag, or crushed or natural gravel and filler of natural or crushed sand or other finely divided mineral matter. The composite material shall be free from vegetable matter and lumps or balls of clay, and shall be of such nature that it can be compacted readily to form a firm, stable subbase.

The subbase material shall conform to Table 200.1, Grading Requirements

Table 200.1 – Grading Requirements

Sieve Designation		Mass Percent Passing
Standard, mm	Alternate US Standard	
50	2”	100
25	1”	55 – 85
9.5	3/8”	40 – 75
0.075	No. 200	0 - 12

The fraction passing the 0.075 mm (No. 200) sieve shall not be greater than 0.66 (two thirds) of the fraction passing the 0.425 mm (No. 40) sieve.

The fraction passing the 0.425 mm (No. 40) sieve shall have a liquid limit not greater than 35 and plasticity index not greater than 12 as determined by AASHTO T 89 and T 90, respectively.

The coarse portion, retained on a 2.00 mm (No. 10) sieve, shall have a mass percent of wear not exceeding 50 by the Los Angeles Abrasion Tests as determined by AASHTO T 96.

The material shall have a soaked CBR value of not less than 25% as determined by AASHTO T 193. The CBR value shall be obtained at the maximum dry density and determined by AASHTO T 180, Method D.

Construction Requirements

200.3.1 Preparation of Existing Surface

The existing surface shall be graded and finished as provided under Item 105, Subgrade Preparation, before placing the subbase material.

200.3.2 Placing

The aggregate subbase material shall be placed at a uniform mixture on a prepared subgrade in a quantity which will provide the required compacted thickness. When more than one layer is required, each layer shall be shaped and compacted before the succeeding layer is placed.

The placing of material shall begin at the point designated by the Engineer. Placing shall be from vehicles especially equipped to distribute the material in a continuous uniform layer or windrow. The layer or windrow shall be of such size that when spread and compacted the finished layer be in reasonably close conformity to the nominal thickness shown on the Plans.

When hauling is done over previously placed material, hauling equipment shall be dispersed uniformly over the entire surface of the previously constructed layer, to minimize rutting or uneven compaction.

200.3.3 Spreading and Compacting

When uniformly mixed, the mixture shall be spread to the plan thickness, for compaction.

Where the required thickness is 150 mm or less, the material may be spread and compacted in one layer. Where the required thickness is more than 150 mm, the aggregate subbase shall be spread and compacted in two or more layers of approximately equal thickness, and the maximum compacted thickness of any layer shall not exceed 150 mm. All subsequent layers shall be spread and compacted in a similar manner.

The moisture content of subbase material shall, if necessary, be adjusted prior to compaction by watering with approved sprinklers mounted on trucks or by drying out, as required in order to obtain the required compaction.

Immediately following final spreading and smoothening, each layer shall be compacted to the full width by means of approved compaction equipment. Rolling shall progress gradually from the sides to the center, parallel to the centerline of the road and shall continue until the whole surface has been rolled. Any irregularities or depressions that develop shall be corrected by loosening the material at these places and adding or removing material until surface is smooth and uniform. Along curbs, headers, and walls, and at all places not accessible to the roller, the subbase material shall be compacted thoroughly with approved tampers or compactors.

If the layer of subbase material, or part thereof, does not conform to the required finish, the Contractor shall, at his own expense, make the necessary corrections.

Compaction of each layer shall continue until a field density of at least 100 percent of the maximum dry density determined in accordance with AASHTO T 180, Method D has been achieved. In-place density determination shall be made in accordance with AASHTO T 191.

200.3.4 Trial Sections

Before subbase construction is started, the Contractor shall spread and compact trial sections as directed by the Engineer. The purpose of the trial sections is to check the suitability of the materials and the efficiency of the equipment and construction method which is proposed to be used by the Contractor. Therefore, the Contractor must use the same material, equipment and procedures that he proposes to use for the main work. One trial section of about 500 m^2 shall be made for every type of material and/or construction equipment/procedure proposed for use.

After final compaction of each trial section, the Contractor shall carry out such field density tests and other tests required as directed by the Engineer.

If a trial section shows that the proposed materials, equipment or procedures in the Engineer's opinion are not suitable for subbase, the material shall be removed at the Contractor's expense, and a new trial section shall be constructed.

If the basic conditions regarding the type of material or procedure change during the execution of the work, new trial sections shall be constructed.

200.3.5 Tolerances

Aggregate subbase shall be spread with equipment that will provide a uniform layer which when compacted will conform to the designed level and transverse slopes as shown on the Plans. The allowable tolerances shall be as specified hereunder:

Permitted variation from design THICKNESS OF LAYER	± 20 mm
Permitted variation from design	+10 mm

LEVEL OF SURFACE	-20 mm
Permitted SURFACE IRREGULARITY	
Measured by 3-m straight-edge	20 mm
Permitted variation from design	
CROSSFALL OR CAMBER	±0.3%
Permitted variation from design	
LONGITUDINAL GRADE	
over	
25 m in length	±0.1%

Method of Measurement

Aggregate Subbase Course will be measured by the cubic meter (m^3). The quantity to be paid for shall be the design volume compacted in-place as shown on the Plans, and accepted in the completed course. No allowance will be given for materials placed outside the design limits shown on the cross-sections. Trial sections shall not be measured separately but shall be included in the quantity of subbase herein measured.

Basis of Payment

The accepted quantities, measured as prescribed in Section 200.4, shall be paid for at the contract unit price for Aggregate Subbase Course which price and payment shall be full compensation for furnishings 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
200	Aggregate Subbase Course	Cubic Meter

ITEM 201 – AGGREGATE BASE COURSE

201.1 Description

This Item shall consist of furnishing, placing and compacting an aggregate base course on a prepared subgrade/subbase in accordance with this Specificaton and the lines, grades, thickness and typical cross-sections shown on the Plans, or as established by the Engineer.

201.2 Material Requirements

Aggregate for base course shall consist of hard, durable particles or fragments of crushed stone, crushed slag or crushed or natural gravel and filler of natural or crushed sand or other finely divided mineral matter. The composite material shall be free from vegetable matter and lumps or balls of clay, and shall be of such nature that it can be compacted readily to form a firm, stable base.

In some areas where the conventional base course materials are scarce or non-available, the use of 40% weathered limestone blended with 60% crushed stones or gravel shall be allowed, provided that the blended materials meet the requirements of this Item.

The base course material shall conform to Table 201.1, whichever is called for in the Bill of Quantities

Table 201.1 – Grading Requirements

Sieve Designation		Mass Percent Passing	
Standard, mm	Alternate US Standard	Grading A	Grading B

50	2”	100	
37.5	1-1/2”	-	100
25.0	1”	60 – 85	-
19.0	¾”	-	60 – 85
12.5	½”	35 – 65	-
4.75	No. 4	20 – 50	30 – 55
0.425	No. 40	5 – 20	8 – 25
0.075	No. 200	0 – 12	2 – 14

The fraction passing the 0.075 mm (No. 200) sieve shall not be greater than 0.66 (two thirds) of the fraction passing the 0.425 mm (No. 40) sieve.

The fraction passing the 0.425 mm (No. 40) sieve shall have a liquid limit not greater than 25 and plasticity index not greater than 6 as determined by AASHTO T 89 and T 90, respectively.

The coarse portion, retained on a 2.00 mm (No. 10) sieve shall have a mass percent of wear not exceeding 50 by the Los Angeles Abrasion test determined by AASHTO T 96.

The material passing the 19 mm (3/4 inch) sieve shall have a soaked CBR value of not less than 80% as determined by AASHTO T 193. The CBR value shall be obtained at the maximum dry density (MDD) as determined by AASHTO T 180, Method D.

If filler, in addition to that naturally present, is necessary for meeting the grading requirements or for satisfactory bonding, it shall be uniformly blended with the base course material on the road or in a pugmill unless otherwise specified or approved. Filler shall be taken from sources approved by the Engineer, shall be free from hard lumps and shall not contain more than 15 percent of material retained on the 4.75 mm (No. 4) sieve.

201.3 Construction Requirements

201.3.1 Preparation of Existing Surface

The existing surface shall be graded and finished as provided under Item 105, Subgrade Preparation, before placing the base material

It shall be in accordance with all the requirements of Subsection 200.3.2, Placing.

201.3.3 Spreading and Compacting

It shall be in accordance with all the requirements of Subsection 200.3.3, Spreading and Compacting.

201.3.4 Trial Sections

Trial sections shall conform in all respects to the requirements specified in Subsection 200.3.4.

201.3.5 Tolerances

The aggregate base course shall be laid to the designed level and transverse slopes shown on the Plans. The allowable tolerances shall be in accordance with following: Permitted variation from design	± 10 mm

THICKNESS OF LAYER

Permitted variation from design	+ 5 mm
LEVEL OF SURFACE	-10 mm
Permitted SURFACE IRREGULARITY	5 mm
Measured by 3-m straight-edge	
Permitted variation from design	± 0.2%
CROSSFALL OR CAMBER	
Permitted variation from design	± 0.1%
LONGITUDINAL GRADE over	
25 m in length	

201.4 Method of Measurement

Aggregate Base Course will be measured by the cubic meter (m3). The quantity to be paid for shall be the design volume compacted in-place as shown on the Plans, and accepted in the completed base course. No allowance shall be given for materials placed outside the design limits shown on the crosssections. Trial sections shall not be measured separately but shall be included in the quantity of aggregate base course.

201.5 Basis of Payment

The accepted quantities, measured as prescribed in Section 201.4, shall be paid for at the contract unit price for Aggregate Base Course 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
201	Aggregate Base Course	Cubic Meter

ITEM 311 – PORTLAND CEMENT CONCRETE PAVEMENT

311.1 Description

This Item shall consist of pavement of Portland Cement Concrete, with or without reinforcement, constructed on the prepared base in accordance with this Specification and in conformity with lines, grades, thickness and typical cross-section shown on the Plans.

311.2 Material Requirements

311.2.1 Portland Cement

It shall conform to the applicable requirements of Item 700, Hydraulic Cement. Only Type I Portland Cement shall be used unless otherwise provided for in the Special Provisions. Different brands or the same brands from different mills shall not be mixed nor shall they be used alternately unless the mix is approved by the Engineer. However, the use of Portland Pozzolan Cement Type IP meeting the requirements of AASHTO M 240/ASTM C 695, Specifications for Blended Hydraulic Cement shall be allowed, provided that trial mixes shall be done and that the mixes meet the concrete strength requirements, the AASHTO/ASTM provisions pertinent to the use of Portland Pozzolan Type IP shall be adopted.

Cement which for any reason, has become partially set or which contains lumps of caked cement will be rejected. Cement salvaged from discarded or used bags shall not be used.

Samples of Cement shall be obtained in accordance with AASHTO T 127.

311.2.2 Fine Aggregate

It shall consist of natural sand, stone screenings or other inert materials with similar characteristics, or combinations thereof, having hard, strong and durable particles. Fine aggregate from different sources of supply shall not be mixed or stored in the same pile nor used alternately in the same class of concrete without the approval of the Engineer.

It shall not contain more than three (3) mass percent of material passing the 0.075 mm (No. 200 sieve) by washing nor more than one (1) mass percent each of clay lumps or shale. The use of beach sand will not be allowed without the approval of the Engineer.

If the fine aggregate is subjected to five (5) cycles of the sodium sulfate soundness test, the weighted loss shall not exceed 10 mass percent.

The fine aggregate shall be free from injurious amounts of organic impurities. If subjected to the colorimatic test for organic impurities and a color darker than the standard is produced, it shall be rejected. However, when tested for the effect of organic impurities of strength of mortar by AASHTO T 71, the fine aggregate may be used if the relative strength at 7 and 28 days is not less than 95 mass percent.

The fine aggregate shall be well-graded from coarse to fine and shall conform to Table 311.1

Table 311.1 – Grading Requirements for Fine Aggregate

Sieve Designation	Mass Percent Passing
9.5 mm (3/8 in)	100
4.75 mm (No. 4)	95 – 100
2.36 mm (No. 8)	-
1.18 mm (No. 16)	45 – 80
0.600 mm (No. 30)	-
0.300 mm (No. 50)	5 – 30
0.150 mm (No. 100)	0 – 10

311.2.3 Coarse Aggregate

It shall consist of crushed stone, gravel, blast furnace slag, or other approved inert materials of similar characteristics, or combinations thereof, having hard, strong, durable pieces and free from any adherent coatings.

It shall contain not more than one (1) mass percent of material passing the 0.075 mm (No. 200) sieve, not more than 0.25 mass percent of clay lumps, nor more than 3.5 mass percent of soft fragments.

If the coarse aggregate is subjected to five (5) cycles of the sodium sulfate soundness test, the weighted loss shall not exceed 12 mass percent.

It shall have a mass percent of wear not exceeding 40 when tested by AASHTO T 96.

If the slag is used, its density shall not be less than 1120 kg/m^3 (70 lb./cu. ft.). The gradation of the coarse aggregate shall conform to Table 311.2.

Only one grading specification shall be used from any one source.

Table 311.2 – Grading Requirement for Coarse Aggregate

Sieve Designation		Mass Percent Passing		
Standard Mm	Alternate U. S. Standard	Grading A	Grading B	Grading C
75.00	3 in.	100	-	-
63.00	2-1/2 in.	90-100	100	100
50.00	2 in.	-	90-100	95-100
37.5	1-1/2 in.	25-60	35-70	-
25.0	1 in.	-	0-15	35-70
19.0	¾ in.	0-10	-	-
12.5	½ in.	0-5	0-5	10-30
4.75	No. 4	-	-	0-5

311.2.4 Water

Water used in mixing, curing or other designated application shall be reasonably clean and free of oil, salt, acid, alkali, grass or other substances injurious to the finished product. Water will be tested in accordance with and shall meet the requirements of Item 714, Water.

Water which is drinkable may be used without test. Where the source of water is shallow, the intake shall be so enclosed as to exclude silt, mud, grass or other foreign materials

311.2.5 Reinforcing Steel

It shall conform to the requirements of Item 404, Reinforcing Steel. Dowels and tie bars shall conform to the requirements of AASHTO M 31 or M 42, except that rail steel shall not be used for tie bars that are to be bent and restraightened during construction. Tie bars shall be deformed bars. Dowels shall be plain round bars. Before delivery to the site of work, one-half of the length of each dowel shall be painted with one coat of approved lead or tar paint.

The sleeves for dowel bars shall be metal of approved design to cover 50 mm (2 inches), plus or minus 5 mm (1/4 inch) of the dowel, with a closed end, and with a suitable stop to hold the end of the sleeve at least 25 mm (1 inch) from the end of the dowel. Sleeves shall be of such design that they do not collapse during construction.

311.2.6 Joint Fillers

Poured joint fillers shall be mixed asphalt and mineral or rubber filler conforming to the applicable requirements of Item 705, Joint Materials.

Preformed joint filler shall conform to the applicable requirements of Item 705. It shall be punched to admit the dowels where called for in the Plans. The filler for each joint shall be furnished in a single piece for the full depth and width required for the joint.

311.2.7 Admixtures

Air-entraining admixture shall conform to the requirements of AASHTO M 154.

Chemical admixtures, if specified or permitted, shall conform to the requirements of AASHTO M 194.

Fly Ash, if specified or permitted as a mineral admixture and as 20% partial replacement of Portland Cement in concrete mix shall conform to the requirements of ASTM C 618.

Admixture should be added only to the concrete mix to produce some desired modifications to the properties of concrete where necessary, but not as partial replacement of cement.

311.2.8 Curing Materials

Curing materials shall conform to the following requirements as specified;

a) Burlap cloth - AASHTO M 182

b) Liquid membrane forming compounds - AASHTO M 148

c) Sheeting (film) materials - AASHTO M 171

Cotton mats and water-proof paper can be used.

311.2.9 Calcium Chloride/Calcium Nitrate

It shall conform to AASHTO M 144, if specified or permitted by the Engineer, as accelerator

311.2.10 Storage of Cement and Aggregate

All cement shall be stored, immediately upon delivery at the Site, in weatherproof building which will protect the cement from dampness. The floor shall be raised from the ground. The buildings shall be placed in locations approved by the Engineer. Provisions for storage shall be ample, and the shipments of cement as received shall be separately stored in such a manner as to allow the earliest deliveries to be used first and to provide easy access for identification and inspection of each shipment. Storage buildings shall have capacity for storage of a sufficient quantity of cement to allow sampling at least twelve (12) days before the cement is to be used. Bulk cement, if used, shall be transferred to elevated air tight and weatherproof bins. Stored cement shall meet the test requirements at any time after storage when retest is ordered by the Engineer. At the time of use, all cement shall be free-flowing and free of lumps.

The handling and storing of concrete aggregates shall be such as to prevent segregation or the inclusion of foreign materials. The Engineer may require that aggregates be stored on separate platforms at satisfactory locations.

In order to secure greater uniformity of concrete mix, the Engineer may require that the coarse aggregate be separated into two or more sizes. Different sizes of aggregate shall be stored in separate bins or in separate stockpiles sufficiently removed from each other to prevent the material at the edges of the piles from becoming intermixed.

311.2.11 Proportioning, Consistency and Strength of Concrete

The Contractor shall prepare the design mix based on the absolute volume method as outlined in the American Concrete Institute (ACI) Standard 211.1, “Recommended Practice for Selecting Proportions for Normal and Heavyweight Concrete”.

It is the intent of this Specification to require at least 364 kg of cement per cubic meter of concrete to meet the minimum strength requirements. The Engineer shall determine from laboratory tests of the materials to be used, the cement content and the proportions of aggregate

and water that will produce workable concrete having a slump of between 40 and 75 mm (1-1/2 and 3 inches) if not vibrated or between 10 and 40 mm (1/2 and 1-1/2 inches) if vibrated, and a flexural strength of not less than 3.8 MPa (550 psi) when tested by the third-point method or 4.5 MPa (650 psi) when tested by the mid-point method at fourteen (14) days in accordance with AASHTO T97 and T177, respectively; or a compressive strength of 24.1 MPa (3500 psi) for cores taken at fourteen (14) days and tested in accordance with AASHTO T24.

Slump shall be determined using AASHTO T 119.

The designer shall consider the use of lean concrete (econocrete) mixtures using local materials or specifically modified conventional concrete mixes in base course and in the lower course composite, monolithic concrete pavements using a minimum of 75 mm (3 inches) of conventional concrete as the surface course.

The mix design shall be submitted to the Engineer for approval and shall be accompanied with certified test data from an approved laboratory demonstrating the adequacy of the mix design. A change in the source of materials during the progress of work may necessitate a new design mix.

311.3 Construction Requirements

311.3.1 Quality Control of Concrete

1. General

The Contractor shall be responsible for the quality control of all materials during the handling, blending, and mixing and placement operations.

2. Quality Control Plan

The Contractor shall furnish the Engineer a Quality Control Plan detailing his production control procedures and the type and frequency of sampling and testing to insure that the concrete produces complies with the Specifications. The Engineer shall be provided free access to recent plant production records, and if requested, informational copies of mix design, materials certifications and sampling and testing reports.

3. Qualification of Workmen

Experienced and qualified personnel shall perform all batching or mixing operation for the concrete mix, and shall be present at the plant and job site to control the concrete productions whenever the plant is in operation. They shall be identified and duties defined as follows:

a. Concrete Batcher. The person performing the batching or mixing operation shall be capable of accurately conducting aggregate surface moisture determination and establishing correct scale weights for concrete materials. He shall be capable of assuring that the proportioned batch weights of materials are in accordance with the mix design.

b. Concrete Technician. The person responsible for concrete production control and sampling and testing for quality control shall be proficient in concrete technology and shall have a sound knowledge of the Specifications as they relate to concrete production. He shall be capable of conducting tests on concrete and concrete materials in accordance with these Specifications. He shall be capable of adjusting concrete mix designs for improving workability and Specification compliance and preparing trial mix designs. He shall be qualified to act as the concrete batcher in the batcher's absence.

4. Quality Control Testing

The Contractor shall perform all sampling, testing and inspection necessary to assure quality control of the component materials and the concrete.

The Contractor shall be responsible for determining the gradation of fine and coarse aggregates and for testing the concrete mixture for slump, air content, water-cement ratio and temperature. He shall conduct his operations so as to produce a mix conforming to the approved mix design.

5. Documentation

The Contractor shall maintain adequate records of all inspections and tests. The records shall indicate the nature and number of observations made, the number and type of deficiencies found, the quantities approved and rejected, and nature of any corrective action taken.

The Engineer may take independent assurance samples at random location for acceptance purposes as he deems necessary.

311.3.2 Equipment

Equipment and tools necessary for handling materials and performing all parts of the work shall be approved by the Engineer as to design, capacity and mechanical condition. The equipment shall be at the jobsite sufficiently ahead of the start of construction operations to be examined thoroughly and approved.

1. Batching Plant and Equipment

a. General. The batching shall include bins, weighing hoppers, and scales for the fine aggregate and for each size of coarse aggregate. If cement is used in bulk, a bin, a hopper, and separate scale for cement shall be included. The weighing hopper shall be properly sealed and vented to preclude dusting operation. The batch plant shall be equipped with a suitable non-

resettable batch counter which will correctly indicate the number of batches proportioned.

b. Bins and Hoppers. Bins with adequate separate compartments for fine aggregate and for each size of coarse aggregate shall be provided in the batching plant.

c. Scales. Scales for weighing aggregates and cement shall be of either the beam type or the springless-dial type. They shall be accurate within one-half percent (0.5%) throughout the range of use. Poises shall be designed to be locked in any position and to prevent unauthorized change.

Scales shall be inspected and sealed as often as the Engineer may deem necessary to assure their continued accuracy.

Automatic Weighing Devices. Unless otherwise allowed on the Contract, batching plants shall be equipped with automatic weighing devices of an approved type to proportion aggregates and bulk cement.

2. Mixers.

a. General. Concrete may be mixed at the Site of construction or at a central plant, or wholly or in part in truck mixers. Each mixer shall have a manufacturer's plate attached in a prominent place showing the capacity of the drum in terms of volume of mixed concrete and the speed of rotation of the mixing drum or blades.

b. Mixers at Site of Construction. Mixing shall be done in an approved mixer capable of combining the aggregates, cement and water into a thoroughly mixed and uniform mass within the specified mixing period and discharging and distributing the mixture without segregation on the prepared grade. The mixer shall be equipped with an approved timing device which will automatically lock the discharge lever when the drum has been charged and released it at the end of the mixing period. In case of failure of the timing device, the mixer may be used for the balance of the day while it is being repaired, provided that each batch is mixed 90 seconds. The mixer shall be equipped with a suitable nonresettable batch counter which shall correctly indicate the number of the batches mixed.

c. Truck Mixer and Truck Agitators. Truck mixers used for mixing and hauling concrete, and truck agitators used for hauling central-mixed concrete, shall conform to the requirements of AASHTO M 157.

d. Non-Agitator Truck. Bodies of non-agitating hauling equipment for concrete shall be smooth, mortar-tight metal containers and shall be capable of discharging the concrete at a satisfactory controlled rate without segregation.

3. Paving and Finishing Equipment

The concrete shall be placed with an approved paver designed to spread, consolidate, screed and float finish the freshly placed concrete in one complete pass of the machine in such a manner that a minimum of hand finishing will be necessary to provide a dense and homogeneous pavement in conformance with the Plans and Specifications.

The finishing machine shall be equipped with at least two (2) oscillating type transverse screed.

Vibrators shall operate at a frequency of 8,300 to 9,600 impulses per minute under load at a maximum spacing of 60 cm.

4. Concrete Saw

The Contractor shall provide sawing equipment in adequate number of units and power to complete the sawing with a water-cooled diamond edge saw blade or an abrasive wheel to the required dimensions and at the required rate. He shall provide at least one (1) stand-by saw in good working condition and with an ample supply of saw blades.

5. Forms

Forms shall be of steel, of an approved section, and of depth equal to the thickness of the pavement at the edge. The base of the forms shall be of sufficient width to provide necessary stability in all directions. The flange braces must extend outward on the base to not less than 2/3 the height of the form.

All forms shall be rigidly supported on bed of thoroughly compacted material during the entire operation of placing and finishing the concrete. Forms shall be provided with adequate devices for secure setting so that when in place, they will withstand, without visible spring or settlement, the impact and vibration of the consolidation and finishing or paving equipment.

311.3.3 Preparation of Grade

After the subgrade of base has been placed and compacted to the required density, the areas which will support the paving machine and the grade on which the pavement is to be constructed shall be trimmed to the proper elevation by means of a properly designed machine extending the prepared work areas compacted at least 60 cm beyond each edge of the proposed concrete pavement. If loss of density results from the trimming operations, it shall be restored by additional compaction before concrete is placed. If any traffic is allowed to use the prepared subgrade or base, the surface shall be checked and corrected immediately ahead of the placing concrete.

The subgrade or base shall be uniformly moist when the concrete is placed.

311.3.4 Setting Forms

1. Base Support.

The foundation under the forms shall be hard and true to grade so that the form when set will be firmly in contact for its whole length and at the specified grade. (Any roadbed, which at the form line is found below established grade, shall be filled with approved granular materials to grade in lifts of three (3) cm or less, and thoroughly rerolled or tamped.) Imperfections or variations above grade shall be corrected by tamping or by cutting as necessary.

2. Form Setting

Forms shall be set sufficiently in advance of the point where concrete is being placed. After the forms have been set to correct grade, the grade shall be thoroughly tamped, mechanically or by hand, at both the inside and outside edges of the base of the forms. The forms shall not deviate from true line bv more than one (1) cm at any point.

3. Grade and Alignment

The alignment and grade elevations of the forms shall be checked and corrections made by the Contractor immediately before placing the concrete. Testing as to crown and elevation, prior to placing of concrete can be made by means of holding an approved template in a vertical position and moved backward and forward on the forms.

When any form has been disturbed or any grade has become unstable, the form shall be reset and rechecked.

311.3.5 Conditioning of Subgrade or Base Course

When side forms have been securely set to grade, the subgrade or base course shall be brought to proper cross-section. High areas shall be trimmed to proper elevation. Low areas shall be filled and compacted to a condition similar to that of surrounding grade. The finished grade shall be maintained in a smooth and compacted condition until the pavement is placed.

Unless waterproof subgrade or base course cover material is specified, the subgrade or base course shall be uniformly moist when the concrete is placed. If it subsequently becomes too dry, the subgrade or base course shall be sprinkled, but the method of sprinkling shall not be such as to form mud or pools of water.

311.3.6 Handling, Measuring and Batching Materials

The batch plant site, layout, equipment and provisions for transporting material shall be such as to assure a continuous supply of material to the work.

Stockpiles shall be built up in layers of not more than one (1) meter in thickness. Each layer shall be completely in place before beginning the next which shall not be allowed to "cone" down over the next lower layer. Aggregates from different sources and of different grading shall not be stockpiled together.

All washed aggregates and aggregates produced or handled by hydraulic methods, shall be stockpiled or binned for draining at least twelve (12) hours before being batched.

When mixing is done at the side of the work. aggregates shall be transported from the batching plant to the mixer in batch boxes, vehicle bodies, or other containers of adequate capacity and construction to properly carry the volume required. Partitions separating batches shall be adequate and effective to prevent spilling from one compartment to another while in transit or being dumped. When bulk cement is used, the Contractor shall use a suitable method of handling the cement from weighing hopper to transporting container or into the batch itself for transportation to the mixer, with chute, boot or other approved device, to prevent loss of cement, and to provide positive assurance of the actual presence in each batch of the entire cement content specified.

Bulk cement shall be transported to the mixer in tight compartments carrying the full amount of cement required for the batch. However, if allowed in the Special Provisions, it may be transported between the fine and coarse aggregate. When cement is placed in contact with the aggregates, batches may be rejected unless mixed within 1-1/2 hours of such contact. Cement in original shipping packages may be transported on top of the aggregates, each batch containing the number of sacks required by the job mix.

The mixer shall be charged without loss of cement. Batching shall be so conducted as to result in the weight to each material required within a tolerance of one (1) percent for the cement and two (2) percent for aggregates.

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 over than one (1) percent. Unless the water is to be weighed, the water-measuring equipment shall include an auxiliary tank from which the measuring tank shall be equipped with an outside tap and valve to provide checking the setting, unless other means are provided for readily and accurately determining the amount of water in the tank. The volume of the auxiliary tank shall be at least equal to that of the measuring tank.

311.3.7 Mixing Concrete

The concrete may be mixed at the site of the work in a central-mix plant, or in truck mixers. The mixer shall be of an approved type and capacity. Mixing time will be measured from the time all materials, except water, are in the drum. Ready-mixed concrete shall be mixed and delivered in accordance with requirements of AASHTO M 157, except that the minimum required revolutions at the mixing speed for transit-mixed concrete may be reduced to not less than that recommended by the mixer manufacturer. The number of revolutions recommended by the mixer manufacturer shall be indicated on the manufacturer's serial plate attached to the mixer. The Contractor shall furnish test data acceptable to the Engineer verifying that the make and model of the mixer will produce uniform concrete conforming to the provision of AASHTO M 157 at the reduced number of revolutions shown on the serial plate.

When mixed at the site or in a central mixing plant, the mixing time shall not be less than fifty (50) seconds nor more than ninety (90) seconds, unless mixer performance tests prove adequate mixing of the concrete is a shorter time period.

Four (4) seconds shall be added to the specified mixing time if timing starts at the instant the skip reaches its maximum raised positions. Mixing time ends when the discharge chute opens. Transfer time in multiple drum mixers is included in mixing time. The contents of an individual mixer drum shall be removed before a succeeding batch is emptied therein.

The mixer shall be operated at the drum speed as shown on the manufacturer's name plate attached on the mixer. Any concrete mixed less than the specified time shall be discarded and disposed off by the Contractor at his expense. The volume of concrete mixed per batch shall not exceed the mixer's nominal capacity in cubic metre, as shown on the manufacturer's standard rating plate on the mixer, except that an overload up to ten (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 batches shall be so charged into the drum that a portion of the mixing water shall be entered 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 fifteen (15) seconds of the mixing period. The throat of the drum shall be kept free of such accumulations as may restrict the free flow of materials into the drum.

Mixed concrete from the central mixing plant shall be transported in truck mixers, truck agitators or non-agitating truck specified in Subsection 311.3.2, Equipment. The time elapsed from the time water is added to the mix until the concrete is deposited in place at the Site shall not exceed forty five (45) minutes when the concrete is hauled in non-agitating trucks, nor ninety (90) minutes when hauled in truck mixers or truck agitators, except that in hot weather or under other conditions contributing to quick hardening of the concrete, the maximum allowable time may be reduced by the Engineer.

In exceptional cases and when volumetric measurements are authorized for small project requiring less than 75 cu.m. of concrete 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.

Retempering concrete by adding water or by other means shall not be permitted, except that when concrete is delivered in truck mixers, additional water may be added to the batch materials and additional mixing performed to increase the slump to meet the specified requirements, if permitted by the Engineer, provided all these operations are performedwithin forty-five (45) minutes after the initial mixing operation and the water-cement ratio is not exceeded. Concrete that is not within the specified slump limits at the time of placement shall not be used. Admixtures for increasing the workability or for accelerating the setting of the concrete will be permitted only when specifically approved by the Engineer.

311.3.8 Limitation of Mixing

No concrete shall be mixed, placed or finished when natural light is insufficient, unless an adequate and approved artificial lighting system is operated.

During hot weather, the Engineer shall require that steps be taken to prevent the temperature of mixed concrete from exceeding a maximum temperature of 90^0F (32^0C)

Concrete not in place within ninety (90) minutes from the time the ingredients were charged into the mixing drum or that has developed initial set shall not be used. Retempering of concrete or mortar which has partially hardened, that is remixing with or without additional cement, aggregate, or water, shall not be permitted.

In order that the concrete may be properly protected against the effects of rain before the concrete is sufficiently hardened, the Contractor will be required to have available at all times materials for the protection of the edges and surface of the unhardened concrete.

311.3.9 Placing Concrete

Concrete shall be deposited in such a manner to require minimal rehandling. Unless truck mixers or non-agitating hauling equipment are equipped with means to discharge concrete without segregation of the materials, the concrete shall be unloaded into an approved spreading device and mechanically spread on the grade in such a manner as to prevent segregation. Placing shall be continuous between transverse joints without the use of intermediate bulkheads. Necessary hand spreading shall be done with shovels, not rakes. Workmen shall not be allowed to walk in the freshly mixed concrete with boots or shoes coated with earth or foreign substances.

When concrete is to be placed adjoining a previously constructed lane and mechanical equipment will be operated upon the existing lane, that previously constructed lane shall have attained the strength for fourteen (14) day concrete. If only finishing equipment is carried on the existing lane, paving in adjoining lanes may be permitted after three (3) days.

Concrete shall be thoroughly consolidated against and along the faces of all forms and along the full length and on both sides of all joint assemblies, by means of vibrators inserted in the concrete. Vibrators shall not be permitted to come in contact with a joint assembly, the grade, or a side form. In no case shall the vibrator be operated longer than fifteen (15) seconds in any one location.

Concrete shall be deposited as near as possible to the expansion and contraction joints without disturbing them, but shall not be dumped from the discharge bucket or hopper into a joint assembly unless the hopper is well centered on the joint assembly. Should any concrete material fall on or be worked into the surface of a complete slab, it shall be removed immediately.

311.3.10 Test Specimens

As work progresses, at least one (1) set consisting of three (3) concrete beam test specimens, 150 mm x 150 mm x 525 mm or 900 mm shall be taken from each 330 m^2 of pavement, 230 mm depth, or fraction thereof placed each day. Test specimens shall be made under the supervision of the Engineer, and the Contractor shall provide all concrete and other facilities necessary in making the test specimens and shall protect them from damage by construction operations. Cylinder samples shall not be used as substitute for determining the adequacy of the strength of concrete.

The beams shall be made, cured, and tested in accordance with AASHTO T 23 and T 97.

311.3.11 Strike-off of Concrete and Placement of Reinforcement

Following the placing of the concrete, it shall be struck off to conform to the cross- section shown on the Plans and to an elevation such that when the concrete is properly consolidated and finished, the surface of the pavement will be at the elevation shown on the Plans. When reinforced concrete pavement is placed in two (2) layers, the bottom layer shall be struck off and consolidated to such length and depth that the sheet of fabric or bar mat may be laid full length on the concrete in its final position without further manipulation. The reinforcement shall then be placed directly upon the concrete, after which the top layer of the concrete shall be placed, struck off and screeded. Any portion of the bottom layer of concrete which has been placed more then 30 minutes without being covered with the top layer shall be removed and replaced with freshly mixed concrete at the Contractor's expense. When reinforced concrete is placed in one layer, the reinforcement may be firmly positioned in advance of concrete placement or it may be placed at the depth shown on the Plans in plastic concrete, after spreading by mechanical or vibratory means.

Reinforcing steel shall be free from dirt, oil, paint, grease, mill scale and loose or thick rust which could impair bond of the steel with the concrete.

311.3.12 Joints

Joints shall be constructed of the type and dimensions, and at the locations required by the Plans or Special Provisions. All joints shall be protected from the intrusion of injurious foreign material until sealed.

1. Longitudinal Joint

Deformed steel tie bars of specified length, size, spacing and materials shall be placed perpendicular to the longitudinal joints, they shall be placed by approved mechanical equipment or rigidly secured by chair or other approved supports to prevent displacement. Tie bars shall not be painted or coated with asphalt or other materials or enclosed in tubes or sleeves. When shown on the Plans and when adjacent lanes of pavement are constructed separately, steel side forms shall be used which will form a keyway along the construction joint. Tie bars, except those made of rail steel, may be bent at right angles against the form of the first lane constructed and straightened into final position before the concrete of the adjacent lane is placed, or in lieu of bent tie bars, approved two-piece connectors may be used.

Longitudinal formed joints shall consist of a groove or cleft, extending downward from and normal to, the surface of the pavement. These joints shall be effected or formed by an approved mechanically or manually operated device to the dimensions and line indicated on the Plans and while the concrete is in a plastic state. The groove or cleft shall be filled with either a premolded strip or poured material as required.

The longitudinal joints shall be continuous, there shall be no gaps in either transverse or longitudinal joints at the intersection of the joints.

Longitudinal sawed joints shall be cut by means of approved concrete saws to the depth, width and line shown on the Plans. Suitable guide lines or devices shall be used to assure cutting the longitudinal joint on the true line. The longitudinal joint shall be sawed before the end of the curing period or shortly thereafter and before any equipment or vehicles are allowed on the pavement. The sawed area shall be thoroughly cleaned and, if required, the joint shall immediately be filled with sealer.

Longitudinal pavement insert type joints shall be formed by placing a continuous strip of plastic materials which will not react adversely with the chemical constituent of the concrete.

2. Transverse Expansion Joint

The expansion joint filler shall be continuous from form to form, shaped to subgrade and to the keyway along the form. Preformed joint filler shall be furnished in lengths equal to the pavement width or equal to the width of one lane. Damaged or repaired joint filler shall not be used.

The expansion joint filler shall be held in a vertical position. An approved installing bar, or other device, shall be used if required to secure preformed expansion joint filler at the proper grade and alignment during placing and finishing of the concrete. Finished joint shall not deviate more than 6 mm from a straight line. If joint fillers are assembled in sections, there shall be no offsets between adjacent units. No plugs of concrete shall be permitted anywhere within the expansion space.

3. Transverse Contraction Joint/Weakened Joint

When shown on the Plans, it shall consist of planes of weakness created by forming or cutting grooves in the surface of the pavement and shall include load transfer assemblies. The depth of the weakened plane joint should at all times not be less than 50 mm, while the width should not be more than 6 mm.

a. Transverse Strip Contraction Joint. It shall be formed by installing a parting strip to be left in place as shown on the Plans.

b. Formed Groove. It shall be made by depressing an approved tool or device into the plastic concrete. The tool or device shall remain in place at least until the concrete has attained its initial set and shall then be removed without disturbing the adjacent concrete, unless the device is designed to remain in the joint.

c. Sawed Contraction Joint. It shall be created by sawing grooves in the surface of the pavement of the width not more than 6 mm, depth should at all times not be less than 50 mm, and at the spacing and lines shown on the Plans, with an approved concrete saw. After each joint is sawed, it shall be thoroughly cleaned including the adjacent concrete surface.

Sawing of the joint shall commence as soon as the concrete has hardened sufficiently to permit sawing without excessive ravelling, usually 4 to 24 hours. All joints shall be sawed before uncontrolled shrinkage cracking takes place. If necessary, the sawing operations shall be carried on during the day or night, regardless of weather conditions. The sawing of any joint shall be omitted if crack occurs at or near the joint location prior to the time of sawing. Sawing shall be discounted when a crack develops ahead of the saw. In general, all joints should be sawed in sequence. If extreme condition exist which make it impractical to prevent erratic cracking by early sawing, the contraction joint groove shall be formed prior to initial set of concrete as provided above.

4. Transverse Construction Joint

It shall be constructed when there is an interruption of more than 30 minutes in the concreting operations. No transverse joint shall be constructed within 1.50 m of an expansion joint, contraction joint, or plane of weakness. If sufficient concrete has been mixed at the time of interruption to form a slab of at least 1.5 m long, the excess concrete from the last preceding joint shall be removed and disposed off as directed.

5. Load Transfer Device

Dowel, when used, shall be held in position parallel to the surface and center line of the slab by a metal device that is left in the pavement.

The portion of each dowel painted with one coat of lead or tar, in conformance with the requirements of Item 404, Reinforcing Steel, shall be thoroughly coated with approved bituminous materials, e.g., MC-70, or an approved lubricant, to prevent the concrete from binding to that portion of the dowel. The sleeves for dowels shall be metal designed to cover 50 mm plus or minus 5 mm (1/4 inch), of the dowel, with a watertight closed end and with a suitable stop to hold the end of the sleeves at least 25 mm (1 inch) from the end of the dowel.

In lieu of using dowel assemblies at contraction joints, dowel may be placed in the full thickness of pavement by a mechanical device approved by the Engineer.

311.3.13 Final Strike-off (Consolidation and Finishing)

1. Sequence

The sequence of operations shall be the strike-off and consolidation, floating and removal of laitance, straight-edging and final surface finish. Work bridges or other devices necessary to provide access to the pavement surface for the purpose of finishing straight-edging, and make corrections as hereinafter specified, shall be provided by the Contractor.

In general, the addition of water to the surface of the concrete to assist in finishing operations will not be permitted. If the application of water to the surface is permitted, it shall beapplied as fog spray by means of an approved spray equipment.

2. Finishing Joints

The concrete adjacent to joints shall be compacted or firmly placed without voids or segregation against the joint material assembly, also under and around all load transfer devices, joint assembly units, and other features designed to extend into the pavement. Concrete adjacent to joints shall be mechanically vibrated as required in Subsection 311.3.9, Placing Concrete.

After the concrete has been placed and vibrated adjacent to the joints as required in Subsection 311.3.9, the finishing machine shall be brought forward, operating in a manner to avoid damage or misalignment of joints. If uninterrupted operation of the finishing machine, to over and beyond the joints causes segregation of concrete, damage to, or misalignment of the joints, the finishing machine shall be stopped when the front screed is approximately 20 cm (8 inches) from the joint. Segregated concrete shall be removed from in front of and off the joint. The front screed shall be lifted and set directly on top of the joint and the forward motion of the finishing machine resumed. When the second screed is close enough to permit the excess mortar in front of it to flow over the joint, it shall be lifted and carried over the joint. Thereafter, the finishing machine may be run over the joint without lifting the screeds, provided there is no segregated concrete immediately between the joint and the screed or on top of the joint.

3. Machine Finishing

a. Non-vibratory Method. The concrete shall be distributed or spread as soon as placed. As soon as the concrete has been placed, it shall be struck off and screeded by an approved finishing machine. The machine shall go over each area of pavement as many times and at such intervals as necessary to give the proper compaction and leave a surface of uniform texture. Excessive operation over a given area shall be avoided. The tops of the forms shall be kept clean by an effective device attached to the machine and the travel of the machine on the forms shall be maintained true without wobbling or other variation tending to affect the precision finish.

During the first pass of the finishing machine, a uniform ridge of concrete shall be maintained ahead of the front screed in its entire length.

b. Vibratory Method. When vibration is specified, vibrators for full width vibration of concrete paving slabs, shall meet the requirements in Subsection 311.3.2, Equipment. If uniform and satisfactory density of the concrete is not obtained by the vibratory method at joints, along forms, at structures, and throughout the pavement, the Contractor will be required to furnish equipment and method which will produce pavement conforming to the Specifications. All provisions in item (a) above not in conflict with the provisions for the vibratory method shall govern.

4. Hand Finishing

Hand finishing methods may only be used under the following conditions:

a. In the event of breakdown of the mechanical equipment, hand methods may be used to finish the concrete already deposited on the grade.

b. In narrow widths or areas of irregular dimensions where operations of the mechanical equipment is impractical, hand methods may be used.

Concrete, as soon as placed, shall be struck off and screeded. An approved portable screed shall be used. A second screed shall be provided for striking off the bottom layer of concrete if reinforcement is used.

The screed for the surface shall be at least 60 cm (2 feet) longer than the maximum width of the slab to be struck off. It shall be of approved design, sufficiently rigid to retain its shape, and constructed either of metal or other suitable material shod with metal.

Consolidation shall be attained by the use of suitable vibrator or other approved equipment.

In operation, the screed shall be moved forward on the forms with a combined longitudinal and transverse shearing motion, moving always in the direction in which the work is progressing and so manipulated that neither end is raised from the side forms during the striking off process. If necessary, this shall be repeated until the surface is of uniform texture, true to grade and cross-section, and free from porous areas.

5. Floating

After the concrete has been struck off and consolidated, it shall be further smoothed, trued, and consolidated by means of a longitudinal float, either by hand or mechanical method.

a. Hand Method. The hand-operated longitudinal float shall be not less than 365 cm (12 feet) in length and 15 cm (6 inches) in width, properly stiffened to prevent flexibility and warping. The longitudinal float, operated from foot bridges resting on the side forms and spanning but not touching the concrete, shall be worked with a sawing motion while held in a floating position parallel to the road center line, and moving gradually from one side of the pavement to the other. Movement ahead along the center line of the pavement shall be in successive advances of not more than one-half the length of the float. Any excess water or soupy material shall be wasted over the side forms on each pass.

b. Mechanical Method. The mechanical longitudinal float shall be of a design approved by the Engineer, and shall be in good working condition. The tracks from which the float operates shall be accurately adjusted to the required crown. The float shall be accurately adjusted and coordinated with the adjustment of the transverse finishing machine so that a small amount of mortar is carried ahead of the float at all times. The forward screed shall be adjusted so that the float will lap the distance specified by the Engineer on each transverse trip. The float shall pass over each areas of pavement at least two times, but excessive operation over a given area will not be permitted. Any excess water or soupy material shall be wasted over the side forms on each pass.

c. Alternative Mechanical Method. As an alternative, the Contractor may use a machine composed of a cutting and smoothing float or floats suspended from and guided by a rigid frame. The frame shall be carried by four or more visible wheels riding on, and constantly in contact with the side forms. If necessary, following one of the preceding method of floating, long handled floats having blades not less than 150 cm (5 feet) in length and 15 cm (6 inches) in width may be used to smooth and fill in open-textured areas in the pavement. Long-handled floats shall not be used to float the entire surface of the pavement in lieu of, or supplementing, one of the preceding methods of floating. When strike off and consolidation are done by the hand method and the crown of the pavement will not permit the use of the longitudinal float, the surface shall be floated transversely by means of the long-handled float. Care shall be taken not to work the crown out of the pavement during the operation. After floating, any excess water and laitance shall be removed from the surface of the pavement by a 3-m straight- edge or more in length. Successive drags shall be lapped one-half the length of the blade.

6. Straight-edge Testing and Surface Correction

After the floating has been completed and the excess water removed, but while the concrete is still plastic, the surface of the concrete shall be tested for trueness with a 300 cm long straight-edge. For this purpose, the Contractor shall furnish and use an accurate 300-cm straight-edge swung from handles 100 cm (3 feet) longer than one-half the width of the slab. The straight-edge shall be held in contact with the surface in successive positions parallel to the road center line and the whole area gone over from one side of the slab to the other as necessary. Advances

along the road shall be in successive stages of not more than one-half the length of the straight-edge. Any depressions found shall be immediately filled with freshly mixed concrete, struck

off, consolidated and refinished. High areas shall be cut down and refinished. Special attention shall be given to assure that the surface across joints meets the requirements for smoothness. Straight-edge testing and surface corrections shall continue until the entire surface is found to be free from observable departures from the straight-edge and the slab conforms to the required grade and cross-section.

7. Final Finish

If the surface texture is broom finished, it shall applied when the water sheen has practically disappeared. The broom shall be drawn from the center to the edge of the pavement with adjacent strokes slightly overlapping. The brooming operation should be so executed that the corrugations produced in the surface shall be uniform in appearance and not more than 1.5 mm in depth. Brooming shall be completed before the concrete is in such condition that the surface will be unduly roughened by the operation. The surface thus finished shall be free from rough and porous areas, irregularities, and depressions resulting from improper handling of the broom. Brooms shall be of the quality size and construction and be operated so as to produce a surface finish meeting the approval of the Engineer. Subject to satisfactory results being obtained and approval of the Engineer, the Contractor will be permitted to substitute mechanical brooming in lieu of the manual brooming herein described.

If the surface texture is belt finished, when straight-edging is complete and water sheen has practically disappeared and just before the concrete becomes non-plastic, the surface shall be belted with 2-ply canvass belt not less than 20 cm wide and at least 100 cm longer than the pavement width. Hand belts shall have suitable handles to permit controlled, uniform manipulation. The belt shall be operated with short strokes transverse to the center line and with a rapid advances parallel to the center line.

If the surface texture is drag finished, a drag shall be used which consists of a seamless strip of damp burlap or cotton fabric, which shall produce a uniform of gritty texture after dragging it longitudinally along the full width of pavement. For pavement 5 m or more in width, the drag shall be mounted on a bridge which travels on the forms. The dimensions of the drag shall be such that a strip of burlap or fabric at least 100 cm wide is in contact with the full width of pavement surface while the drag is used. The drag shall consist of not less than 2 layers of burlap with the bottom layer approximately 15 cm wider than the layer. The drag shall be maintained in such condition that the resultant surface is of uniform appearance and reasonably free from grooves over 1.5 mm in depth. Drag shall be maintained clean and free from encrusted mortar. Drags that cannot be cleaned shall be discarded and new drags be substituted.

Regardless of the method used for final finish, the hardened surface of pavement shall have a coefficient of friction of 0.25 or more. Completed pavement that is found to have a coefficient of friction less than 0.25 shall be grounded or scored by the Contractor at his expense to provide the required coefficient of friction.

8. Edging at Forms and Joints

After the final finish, but before the concrete has taken its initial set, the edges of the pavement along each side of each slab, and on each side of transverse expansion joints, formed joints, transverse construction joints, and emergency construction joints, shall be worked with an

approved tool and rounded to the radius required by the Plans. A well – defined and continuous radius shall be produced and a smooth, dense mortar finish obtained. The surface of

the slab shall not be unduly disturbed by tilting the tool during the use.

At all joints, any tool marks appearing on the slab adjacent to the joints shall be eliminated by brooming the surface. In doing this, the rounding of the corner of the slab shall not be disturbed. All concrete on top of the joint filler shall be completely removed.

All joints shall be tested with a straight-edge before the concrete has set and correction made if one edge of the joint is higher than the other.

311.3.14 Surface Test

As soon as the concrete has hardened sufficiently, the pavement surface shall be tested with a 3-m straight-edge or other specified device. Areas showing high spots of more than 3 mm but not exceeding 12 mm in 3 m shall be marked and immediately ground down with an approved grinding tool to an elevation where the area or spot will not show surface deviations in excess of 3 mm when tested with 3 m straight-edge. Where the departure from correct cross-section exceeds 12 mm, the pavement shall be removed and replaced by and at the expense of the Contractor.

Any area or section so removed shall be not less than 1.5 m in length and not less than the full width of the lane involved. When it is necessary to remove and replace a section of pavement, any remaining portion of the slab adjacent to the joints that is less than 1.5 m in length, shall also be removed and replaced.

311.3.15 Curing

Immediately after the finishing operations have been completed and the concrete has sufficiently set, the entire surface of the newly placed concrete shall be cured in accordance with either one of the methods described herein. Failure to provide sufficient cover material of whatever kind the Contractor may elect to use, or the lack of water to adequately take care of both curing and other requirements, shall be a cause for immediate suspension of concreting operations. The concrete shall not be left exposed for more than ½ hour between stages of curing or during the curing period.

In all congested places, concrete works should be designed so that the designed strength is attained.

1. Cotton of Burlap Mats

The surface of the pavement shall be entirely covered with mats. The mats used shall be of such length (or width) that as laid they will extend at least twice the thickness of the pavement beyond the edges of the slab. The mat shall be placed so that the entire surface and the edges of the slab are completely covered. Prior to being placed, the mats shall be saturated thoroughly with water. The mat shall be so placed and weighted down so as to cause them to remain in

intimate contact with the covered surface. The mat shall be maintained fully wetted and in position for 72 hours after the concrete has been placed unless otherwise specified.

2. Waterproof Paper

The top surface and sides of the pavement shall be entirely covered with waterproof paper, the units shall be lapped at least 45 cm. The paper shall be so placed and weighted down so as to cause it to remain in intimate contact with the surface covered. The paper shall have such dimension but each unit as laid will extend beyond the edges of the slab at least twice the thickness of the pavement, or at pavement width and 60 cm strips of paper for the edges. If laid longitudinally, paper not manufactured in sizes which will provide this width shall be securely sewed or cemented together, the joints being securely sealed in such a manner that they do not open up or separate during the curing period. Unless otherwise specified, the covering shall be maintained in place for 72 hours after the concrete has been placed. The surface of the pavement shall be thoroughly wetted prior to the placing of the paper.

3. Straw Curing

When this type of curing is used, the pavement shall be cured initially with burlap or cotton mats, until after final set of the concrete or, in any case, for 12 hours after placing the concrete. As soon as the mats are removed, the surface and sides of the pavement shall be thoroughly wetted and covered with at least 20 cm of straw or hay, thickness of which is to be measured after wetting. If the straw or hay covering becomes displaced during the curing period, it shall be replaced to the original depth and saturated. It shall be kept thoroughly saturated with water for 72 hours and thoroughly wetted down during the morning of the fourth day, and the cover shall remain in place until the concrete has attained the required strength.

4. Impervious Membrane Method

The entire surface of the pavement shall be sprayed uniformly with white pigmented curing compound immediately after the finishing of the surface and before the set of the concrete has taken place, or if the pavement is cured initially with jute or cotton mats, it may be applied upon removal of the mass. The curing compound shall not be applied during rain.

Curing compound shall be applied under pressure at the rate 4 L to not more than 14 m^2 by mechanical sprayers. The spraying equipment shall be equipped with a wind guard. At the time of use, the compound shall be in a thoroughly mixed condition with the pigment uniformly dispersed throughout the vehicle. During application, the compound shall be stirred continuously by effective mechanical means. Hand spraying of odd widths or shapes and concrete surface exposed by the removal of forms will be permitted. Curing compound shall not be applied to the inside faces of joints to be sealed, but approved means shall be used to insure proper curing at least 72 hours and to prevent the intrusion of foreign material into the joint before sealing has been completed. The curing compound shall be of such character that the film will harden within 30 minutes after application. Should the film be damaged from any cause within the 72 hour curing period, the damaged portions shall be repaired immediately with additional compound.

5. White Polyethylene Sheet

The top surface and sides of the pavement shall be entirely covered with polyethylene sheeting. The units used shall be lapped at least 45 cm. The sheeting shall be so placed and weighted down so as to cause it to remain intimate contact with the surface covered. The sheeting

as prepared for use shall have such dimension that each unit as laid will extend beyond the edges of the slab at least twice the thickness of the pavement. Unless otherwise specified, the covering shall be maintained in place for 72 hours after the concrete has been placed.

311.3.16 Removal of Forms

After forms for concrete shall remain in place undisturbed for not less than twenty four (24) hours after concrete pouring. In the removal of forms, crowbars should be used in pulling out nails and pins. Care should be taken so as not to break the edges of the pavement. In case portions of the concrete are spalled, they shall be immediately repaired with fresh mortar mixed in the proportion of one part of Portland Cement and two parts fine aggregates. Major honeycomb areas will be considered as defective work and shall be removed and replaced at the expense of the Contractor. Any area or section so removed shall not be less than the distance between weakened plane joint nor less than the full width of the lane involved.

311.3.17 Sealing Joints

Joints shall be sealed with asphalt sealant soon after completion of the curing period and before the pavement is opened to traffic, including the Contractor's equipment. Just prior to sealing, each joint shall be thoroughly cleaned of all foreign materials including membrane curing compound and the joint faces shall be clean and surface dry when the seal is applied.

The sealing material shall be applied to each joint opening to conform to the details shown on the Plans or as directed by the Engineer. Material for seal applied hot shall be stirred during heating so that localized overheating does not occur. The pouring shall be done in such a manner that the material will not be spilled on the exposed surfaces of the concrete. The use of sand or similar material as a cover for the seal will not be permitted.

Preformed elastomeric gaskets for sealing joints shall be of the cross-sectional dimensions shown on the Plans. Seals shall be installed by suitable tools, without elongation and secured in placed with an approved lubricant adhesive which shall cover both sides of the concrete joints. The seals shall be installed in a compressive condition and shall at time of placement be below the level of the pavement surface by approximately 6 mm.

The seals shall be in one piece for the full width of each transverse joint.

311.3.18 Protection of Pavement

The Contractor shall protect the pavement and its appurtenances against both public traffic and traffic caused by his own employees and agents. This shall include watchmen to direct traffic and the erection of and maintenance of warning signs, lights, pavement bridges or cross-overs, etc. The Plans or Special Provisions will indicate the location and type of device or facility required to protect the work and provide adequately for traffic.

All boreholes after thickness and/or strength determinations of newly constructed asphalt and concrete pavements shall be immediately filled/restored with the prescribed concrete/asphalt mix after completion of the drilling works.

Any damage to the pavement, occurring prior to final acceptance, shall be repaired or the pavement be replaced.

311.3.19 Concrete Pavement – Slip Form Method

If the Contract calls for the construction of pavement without the use of fixed forms, the following provisions shall apply:

1. Grade

After the grade or base has been placed and compacted to the required density, the areas which will support the paving machine shall be cut to the proper elevation by means of a properly designed machine. The grade on which the pavement is to be constructed shall then be brought to the proper profile by means of properly designed machine. If the density of the base is disturbed by the grading operation, it shall be corrected by additional compaction before concrete is placed. The grade should be constructed sufficiently in advance of the placing of the concrete. If any traffic is allowed to use the prepared grade, the grade shall be checked and corrected immediately before the placing of concrete.

2. Placing Concrete

The concrete shall be placed with an approved slip-form paver designed to spread, consolidate, screed and float-finish the freshly placed concrete in one complete pass of the machine in such a manner that a minimum of hand finish will be necessary to provide a dense and homogenous pavement in conformance with the Plans and Specifications. The machine shall vibrate the concrete for the full width and depth of the strip of pavement being placed. Such vibration shall be accompanied with vibrating tubes or arms working in the concrete or with a vibrating screed or pan operating on the surface of the concrete. The sliding forms shall be rigidly held together laterally to prevent spreading of the forms. The forms shall trail behind the paver for such a distance that no appreciable slumping of the concrete will occur, and that necessary final finishing can be accomplished while the concrete is still within the forms. Any edge slump of the pavement, exclusive of edge rounding, in excess of 6 mm shall be corrected before the concrete has hardened.

The concrete shall be held at a uniform consistency, having a slump of not more than 40 mm (1-12/ inches). The slip form paver shall be operated with as nearly as possible a continuous forward movement and that all operations of mixing, delivering and spreading concrete shall be coordinated so as to provide uniform progress with stopping and starting of the paver held to a minimum. If, for any reason, it is necessary to stop the forward movement of the paver the vibratory and tamping elements shall also be stopped immediately. No tractive force shall be applied to the machine, except that which is controlled from the machine.

3. Finishing

The surface smoothness and texture shall meet the requirements of Subsections 311.3.13 and 311.3.14.

4. Curing

Unless otherwise specified, curing shall be done in accordance with one of the methods included in Subsection 311.3.15. The curing media shall be applied at the appropriate time and shall be applied uniformly and completely to all surfaces and edges of the pavement.

5. Joints

All joints shall be constructed in accordance with Subsection 311.3.12.

6. Protection Against Rain

In order that the concrete may be properly protected against rain before the concrete is sufficiently hardened, the Contractor will be required to have available at all times, materials for the protection of the edges and surface of the unhardened concrete. Such protective materials shall consist of standard metal forms or wood planks having a nominal thickness of not less than 50 mm (2 inches) and a nominal width of not less than the thickness of the pavement at its edge for the protection of the pavement edges, and covering material such as burlap or cotton mats, curing paper or plastic sheeting materials for the protection of the surface of the pavement. When rain appears imminent, all paving operations shall stop and all available personnel shall begin placing forms against the sides of the pavement and covering the surface of the unhardened concrete with the protective covering.

311.3.22 Acceptance of Concrete

The strength level of the concrete will be considered satisfactory if the averages of all sets of three (3) consecutive strength test results equal or exceed the specified strength, f_c' and no individual strength test result is deficient by more than 15% of the specified strength, f_c'.

Concrete deemed to be not acceptable using the above criteria may be rejected unless the Contractor can provide evidence, by means of core tests, that the quality of concrete represented by failed test results is acceptable in place. At least three (3) representative cores shall be taken from each member or area of concrete in place that is considered deficient. The location of cores shall be determined by the Engineer so that there will be at least impairment of strength of the structure. The obtaining and testing of drilled cores shall be in accordance with AASHTO T 24.

Concrete in the area represented by the cores will be considered adequate if the average strength of the cores is equal to at least 85% of, and if no single core is less than 75% of, the specified strength, f_c'.

If the strength of control specimens does not meet the requirements of this Subsection, and it is not feasible or not advisable to obtain cores from the structure due to structural considerations, payment of the concrete will be made at an adjusted price due to strength deficiency of concrete specimens as specified hereunder:

Deficiency in Strength of Concrete Specimens, Percent (%)	Percent (%) of Contract Price Allowed
Less than 5	100
5 to less than 10	80
10 to less than 15	70
15 to less than 20	60
20 to less than 25	50
25 or more	0

311.3.23 Opening to Traffic

The Engineer will decide when the pavement may be opened to traffic. The road will not be opened to traffic until test specimens molded and cured in accordance with AASHTO T 23 have attained the minimum strength requirements in Subsection 311.2.11. If such tests are not conducted prior to the specified age the pavement shall not be operated to traffic until 14 days after the concrete was placed. Before opening to traffic, the pavement shall be cleaned and joint sealing completed.

Tolerance and Pavement thickness

1. General

The thickness of the pavement will be determined by measurement of cores from the completed pavement in accordance with AASHTO T 148.

The completed pavement shall be accepted on a lot basis. A lot shall be considered as 1000 linear meters of pavement when a single traffic lane is poured or 500 linear meters when two lanes are poured concurrently. The last unit in each slab constitutes a lot in itself when its length is at least ½ of the normal lot length. If the length of the last unit is shorter than ½ of the normal lot length, it shall be included in the previous lot.

Other areas such as intersections, entrances, crossovers, ramp, etc., will be grouped together to form a lot. Small irregular areas may be included with other unit areas to form a lot.

Each lot will be divided into five (5) equal segments and one core will be obtained from each segment in accordance with AASHTO T 24.

2. Pavement Thickness

It is the intent of this Specification that the pavement has a uniform thickness as called for on the Plans for the average of each lot as defined. After the pavement has met all surface smoothness requirements, cores for thickness measurements will be taken.

In calculating the average thickness of the pavement, individual measurements which are in excess of the specified thickness by more than 5 mm will be considered as the specified thickness plus 5 mm and measurement which are less than the specified thickness by more than 25 mm shall not be included in the average. When the average thickness for the lot is deficient, the contract unit price will be adjusted for thickness in accordance with paragraph (3 below).

Individual areas within a segment found deficient in thickness by more than 25 mm shall be evaluated by the Engineer, and if in his judgment, the deficient areas warrant removal, they shall be removed and replaced by the Contractor with pavement of the specified thickness at his entire expense. However, if the evaluation of the Engineer is that the deficient area should not be removed and replaced, such area will not be paid.

When the measurement of any core is less than the specified thickness by more than 25 mm, the actual thickness of the pavement in this area will be determined by taking additional cores at no less than 5 m intervals parallel to the center line in each direction from the affected location until a core is found in each direction, which is not deficient in thickness by more than 25 mm. The area of slab for which no payment will be made shall be the product of the paving width multiplied by the distance along the center line of the road between transverse sections found not deficient in thickness by more than 25 mm. The thickness of the remainder of the segment to be used to get the average thickness of each lot shall be determined by taking the average thickness of additional cores which are not deficient by more than 25 mm.

3. Adjustment for Thickness

When the average thickness of the pavement per lot is deficient, payment for the lot shall be adjusted as follows:

Deficiency in the Average Thickness per lot (mm)		Percent (%) of Contract Price Per Lot
0 – 5		100% payment

6 – 10		95% payment
11 – 15		85% payment
16 – 20		70% payment
21 – 25		50% payment
More than 25		Remove and replace/ No payment

No acceptance and final payment shall be made on completed pavement unless core test for thickness determination is conducted, except for Barangay Roads where the implementing office is allowed to waive such test.

311.4 Method of Measurement

The area to be paid for under this Item shall be the number of square meters (m^2) of concrete pavement placed and accepted in the completed pavement. The width for measurements will be the width from outside edge to outside edge of completed pavement as placed in accordance with the Plans or as otherwise required by the Engineer in writing. The length will be measured horizontally along the center line of each roadway or ramp. Any curb and gutter placed shall not be included in the area of concrete pavement measured.

311.5 Basis of Payment

The accepted quantity, measured as prescribed in Section 311.4, shall be paid for at the contract unit price for Portland Cement Concrete Pavement, which price and payment shall be full compensation for preparation of roadbed and finishing of shoulders, unless otherwise provided by the Special Provisions, furnishing all materials, for mixing, placing, finishing and curing all concrete, for furnishing and placing all joint materials, for sawing weakened plane joints, for fitting the prefabricated center metal joint, for facilitating and controlling traffic, and for furnishing all labor, equipment, tools and incidentals necessary to complete the Item.

Payment will be made under:

Pay Item Number	Description	Unit of Measurement
311 (1)	PCC Pavement (Plain)	Square meter
311 (2)	PCC Pavement (Reinforced)	Square 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				
Standard Mm	Alternate US Standard	Class A	Class B	Class C	Class P	Class Seal
63	2-1/2”		100			
50	2”	100	95 – 100			
37.5	1-1/2”	95 – 100	-			100

25	1”	-	35 – 70		100	95 – 100
19.0	¾”	35 – 70	-	100	95 – 100	-
12.5	½”	-	10 – 30	90 – 100	-	25 – 60
9.5	3/8”	10 – 30	-	40 – 70	20 – 55	-
4.75	No.4	0 - 5	0 - 5	0 – 15*	0 – 10*	0 – 10*

* 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 made in accordance with the following:

Making and curing concrete compressive and flexural tests specimens in the field	T 23
Compressive strength of molded concrete Cylinders	T 22

405.4 Production Requirements

405.4.1 Proportioning and Strength of Structural Concrete

The concrete materials shall be proportioned in accordance with the requirements for each class of concrete as specified in Table 405.2, using the absolute volume method as outlined in the American Concrete Institute (ACI) Standard 211.1. "Recommended Practice for Selecting Proportions for Normal and Heavyweight Concrete". Other methods of proportioning may be employed in the mix design with prior approval of the Engineer. The mix shall either be designed or approved by the Engineer. A change in the source of materials during the progress of work may necessitate a new mix design.

The strength requirements for each class of concrete shall be as specified in Table 405.2.

Table 405.2 - Composition and Strength of Concrete for Use in Structures

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

A	360 (9 bags)	0.53	50 – 100 (2 – 4)	37.5 – 4.75 (1-1/2” – No. 4)	20.7 (3000)

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

* 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 than12 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 inplace 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 $1.5m^3$ or less. For mixers having a capacity greater than $1.5m^3$, 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 $0.5m^3$ 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 other-wise 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^{o}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 30^{o}C, 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 407– CONCRETE STRUCTURES

407.1 Description

This Item shall consist of the general description of the materials, equipment, workmanship and construction requirements of concrete structures and the concrete portions of composite structures conforming to the alignment, grades, design, dimensions and details shown on the Plans and in accordance with the Specifications for piles, reinforcing steel, structural steel, structural concrete and other items which constitute the completed structure. The class of concrete to be used in the structure or part of the structure shall be as specified in Item 405, Structural Concrete.

407.2 Material Requirements

1. Concrete and Concrete Ingredients Concrete and concrete materials shall conform to the requirements in Item 405, Structural Concrete. Unless otherwise shown on the Plans or specified in Special Provisions, concrete shall be of Class A.

2. Reinforcing Steel Reinforcing steel shall conform to the requirements in Item 404, Reinforcing Steel.

3. Structural Steel Structural steel shall conform to the requirements of corresponding materials in Item 403, Metal Structures.

4. Bridge Bearing (Elastomeric Bearing Pad) Elastomeric bearing pads shall conform to Item 412, Elastomeric Bearing Pads.

5. Paints Paints shall conform to the requirements in Item 411, Paint.

6. Waterproofing and Dampproofing Unless otherwise shown on the Plans or indicated in Special Provisions, materials for waterproofing and dampproofing shall conform to the requirements of the following specifications:

a. AASHTO M 115 Asphalt for dampproofing and waterproofing.

b. AASHTO M 116 Primer for the use with Asphalt in dampproofing and waterproofing.

c. AASHTO M 117 Woven cotton fabrics saturated with bituminous substances for use in waterproofing.

d. AASHTO M 118 Coal-Tar pitch for roofing, dampproofing and waterproofing.

e. AASHTO M 121 Creosote for priming coat with coal-tar pitch dampproofing and waterproofing.

f. AASHTO M 159 Woven burlap fabric saturated with bituminous substances for use in waterproofing.

g. AASHTO M 166 Numbered cotton duck and array duck.

h. AASHTO M 239 Asphalt for use in waterproofing membrane construction.

7. Concrete Curing Compound Curing compound shall conform to the requirements of AASHTO M 148 Liquid membrane-forming compounds for curing concrete.

8. Joint Filler Unless otherwise shown on the Plans or in Special Provisions, materials for expansion joint filler shall conform to the requirements of the following specifications:

a. AASHTO M 33 Preformed expansion joint filler for concrete.

b. AASHTO M 153 Preformed sponge rubber and cork expansion joint fillers for concrete paving and structural construction.

c. AASHTO M 173 Concrete joint sealer hot poured elastic type.

d. AASHTO M 213 Preformed expansion joint filler for concrete paving and structural construction-non-extruding and resilient bituminous types.

e. AASHTO M 220 Preformed elastomeric compression joint seals for concrete.

407.2.1 Proportioning and Strength of Structural Concrete

This shall be in accordance with Item 405, Structural Concrete.

407.2.2 Sampling and Testing

This shall be in accordance with Item 405, Structural Concrete.

407.3 Construction and Requirements

407.3.1 Handling and Placing Concrete: General

Concrete shall not be placed until forms and reinforcing steel have been checked and approved by the Engineer. If lean concrete is required in the Plan or as directed by the Engineer prior to placing of reinforcing steel bar, the lean concrete should have a minimum compressive strength of 13.8 MPa (2,000 psi)..

In preparation for the placing of concrete all sawdust, chips and other construction debris and extraneous matter shall be removed from inside the formwork, struts, stays and braces, serving temporarily to hold the forms in correct shape and alignment, pending the placing of concrete at their locations, shall be removed when the concrete placing has reached an elevation rendering their service unnecessary.

These temporary members shall be entirely removed from the forms and not buried in the concrete. No concrete shall be used which does not reach its final position in the forms within the time stipulated under “Time of Hauling and Placing Mixed Concrete”.

Concrete shall be placed so as to avoid segregation of the materials and the displacement of the reinforcement. The use of long troughs, chutes, and pipes for conveying concrete to the forms shall be permitted only on

written authorization of the Engineer. The Engineer shall reject the use of the equipment for concrete transportation that will allow segregation, loss of fine materials, or in any other way will have a deteriorating effect on the concrete quality. Open troughs and chutes shall be of metal lined; where steep slopes are required, the chutes shall be equipped with baffles or be in short lengths that reverse the direction of movement to avoid segregation. All chutes, troughs and pipes shall be kept clean and free from coatings of hardened concrete by thoroughly flushing with water after each run. Water used for flushing shall be discharged clear of the structure. When placing operations would involve dropping the concrete more than 1.5 m, concrete shall be conveyed through sheet metal or approved pipes. As far as practicable, the pipes shall be kept full of concrete during placing and their lower end shall be kept buried in the newly placed concrete. After initial set of the concrete, the forms shall not be jarred and no strain shall be placed on the ends of projecting reinforcement bars. The concrete shall be placed as nearly as possible to its final position and the use of vibrators for moving of the mass of fresh concrete shall not be permitted.

407.3.1.1 Placing Concrete by Pneumatic Means

Pneumatic placing of concrete will be permitted only if specified in the Special Provisions or authorized by the Engineer. The equipment shall be so arranged that vibration will not damage freshly placed concrete. Where concrete is conveyed and placed by pneumatic means, the equipment shall be suitable in kind and adequate in capacity for the work. The machine shall be located as close as practicable to the work. The discharge lines shall be horizontal or inclined upwards from the machine. The discharge end of the line shall not be more than 3 m from the point of deposit. At the conclusion of placing the concrete, the entire equipment shall be thoroughly cleaned.

407.3.1.2 Placing of Concrete by Pumping

The placing of concrete by pumping will be permitted only if specified or if authorized by the Engineer. The equipment shall be so arranged that vibration will not damage freshly placed concrete. Where concrete is conveyed and placed by mechanically applied pressure the equipment shall be suitable in kind and adequate in capacity for the work. The operation of the pump shall be such that a continuous stream of concrete without air pockets is produced. When pumping is completed, the concrete remaining in the pipeline, if it is to be used, shall be ejected in such a manner that there will be no contamination of the concrete or separation of the ingredients. After this operation, the entire equipments shall be thoroughly cleaned.

407.3.1.3 Placing Concrete in Water

Concrete shall not be placed in water except with approval of the Engineer and under his immediate supervision. In this case the method of placing shall be hereinafter specified. Concrete deposited in water shall be Class A concrete with a minimum cement content of 400 kg/m3 of concrete.

The slump of the concrete shall be maintained between 10 and 20 cm. To prevent segregation, concrete shall be carefully placed in a compact mass, in its final position, by means of a tremie, a bottom-dump bucket, or other approved means, and shall not be disturbed after being placed. A tremie shall consist of a tube having a diameter of not less than 250 mm constructed in sections having flanged couplings fitted with gaskets with a hopper at the top.

The tremie shall be supported so as to permit free movement of the discharge and over the entire top surface of the work and so as to permit rapid lowering when necessary to retard or stop the flow of concrete. The discharge end shall be closed at the start of work so as to prevent water entering the tube and shall be completely submerged in concrete at all times; the tremie tube shall be kept full to the bottom of the hopper.

When a batch is dumped into the hopper, the flow of concrete shall be induced by lightly raising the discharge 232 end, but always keeping it in the placed concrete. The flow shall be continuous until the work is completed. When the concrete is placed with a bottom-dump bucket, the top of the bucket shall be open. The bottom doors shall open freely downward and outward when tripped.

The buckets shall be completely filled and slowly lowered to avoid backwash. It shall not be dumped until it rests on the surface upon which the concrete is to be deposited and when discharged shall be withdrawn slowly until well above the concrete.

407.3.2 Compaction of Concrete

Concrete during and immediately after placing shall be thoroughly compacted. The concrete in walls, beams, columns and the like shall be placed in horizontal layers not more than 30 cm thick except as hereinafter provided. When less than a complete layer is placed in one operation, it shall be terminated in a vertical bulkhead.

Each layer shall be placed and compacted before the preceding layer has taken initial set to prevent injury to the green concrete and avoid surfaces of separation between the layers. Each layer shall be compacted so as to avoid the formation of a construction joint with a preceding layer. The compaction shall be done by mechanical vibration. The concrete shall be vibrated internally unless special authorization of other methods is given by the Engineer or is provided herein.

Vibrators shall be of a type, design, and frequency approved by the Engineer. The intensity of vibration shall be such as to visibly affect a mass of concrete with a 3 cm slump over a radius of at least 50 cm. A sufficient number of vibrator shall be provided to properly compact each batch immediately after it is placed in the forms.

Vibrators shall be manipulated so as to thoroughly work the concrete around the reinforcement and embedded fixtures and into the corners and angles of the forms and shall be applied at the point of placing and in the area of freably placed concrete.

The vibrators shall be inserted into and withdrawn from the concrete slowly. The vibration shall be of sufficient duration and intensity to compact the concrete thoroughly but shall not be continued so as to cause segregation and at any one point to the extent that localized areas of grout are formed.

Application of vibrators shall be at points uniformly spaced, and not farther apart than twice the radius over which the vibration is visibly effective. Vibration shall not be applied directly or thru the reinforcement to sections or layers of concrete that have hardened to the degree that the concrete ceases to be plastic under vibration. It shall not be used to make concrete flow in the forms over distances so great as to cause segregation, and vibrators shall not be used to transport concrete in the forms of troughs or chutes.

407.3.3 Casting Sections and Construction Joints

The concrete in each form shall be placed continuously. Placing of concrete in any such form shall not be allowed to commence unless sufficiently inspected and approved materials for the concrete is at hand, and labor and equipment are sufficient to complete the pour without interruption. Joints in the concrete due to stopping work shall be avoided as much as possible. Such joints, when necessary, shall be constructed to meet the approval of the Engineer.

When the placing of concrete is temporarily discontinued, the concrete, after becoming firm enough to retain its shape, shall be cleaned of laitance and other objectionable material to a sufficient depth to expose sound concrete. Where a “faster edge” might be produced at a construction joint, as in the sloped top surface of a wingwall, an inset formwork shall be used to produce an edge thickness of not less than 15 cm in the succeeding layer.

Work shall not be discontinued within 50 cm of the top of any face, unless provision has been made for a coping less than 50 cm thick, in which case if permitted by the Engineer, the construction joint may be made at the underside of coping. Immediately following the discontinuance of placing concrete, all accumulations of mortar splashed upon the reinforcing steel and the surfaces of forms shall be removed. Dried mortar chips and dust shall not be puddled into the unset concrete.

Care shall be exercised, during the cleaning of the reinforcing steel, not to injure or break the concrete-steel bond at and near the surface of the concrete. 407.3.4 Casting Box Culverts In general, the base slab of box culverts shall be placed and allowed to set before the remainder of the culvert is constructed. In the construction of box culverts the side walls and top slab may be constructed as a monolith. If the concrete in the walls and

top slab is placed in two separate operations, special care shall be exercised in order to secure bonding in the construction joint and appropriate keys shall be left in the sidewalls for anchoring the top slab. Each wingwall shall be constructed, if possible, as a monolith. Construction joints where unavoidable, shall be horizontal and so located that no joints will be visible in the exposed face of the wingwall above the ground line. Vertical construction joints shall be at right angles to the axis of the culverts.

407.3.5 Casting Columns, Slabs and Girders

Concrete in columns shall be placed in one continuous operation, unless otherwise directed. The concrete shall be allowed to set for at least 20 hours before the caps are placed. Unless otherwise permitted by the Engineer, no concrete shall be placed in the superstructure until the column forms have been stripped sufficiently to determine the condition of the concrete in the column.

The load of the superstructure shall not be allowed to come upon the bents until they have been in place at least 14 days, unless otherwise permitted by the Engineer. 234 Concrete in slab spans shall be placed in one continuous operation for each span unless otherwise provided.

Concrete in T-Beam or deck girder spans shall be placed in one continuous operation unless otherwise directed. If it is permitted to place the concrete in two separate operations, each of the operations, shall be continuous: first, to the top of the girder stems, and second, to completion. In the latter case, the bond between stem and slab shall be secured by means of suitable shear keys which may be formed by the use of timber blocks approximately 50 mm x 100 mm in crosssection having a length of 100 mm less than the width of the girder stem. These key blocks shall be placed along the girder stems as required, but the spacing shall not be greater than 300 mm center to center.

The blocks shall be beveled and oiled in such a manner as to insure their ready removal, and they shall be removed as soon as the concrete has set sufficiently to retain its shape. If the contractor wishes to place the concrete in two separate operations, he shall, with his request for permission to do so, submit plans and proposals of the required changes to the reinforcement, which plans and proposals shall be subject to the approval of the Engineer.

In box girders, the concrete in the bottom slab be poured first, as a separate operation. The concrete in the webs and the top slab shall be placed in one continuous operation unless otherwise specified. If it is permitted to place the concrete in more than one operation, the requirements for T-beam shall apply.

407.3.6 Construction Joints

Construction joints shall be made only where shown on the Plans or called for in the pouring schedule, unless otherwise approved by the Engineer. Shear keys or reinforcement shall be used, unless otherwise specified, to transmit shear or to bond the two sections together. Before depositing new concrete on or against concrete which has hardened, the forms shall be retightened.

The surface of the hardened concrete shall be roughened as required by the Engineer, in a manner that will not leave loose particles of aggregate or damage concrete at the surface. It shall be thoroughly cleaned of foreign matter and laitance.

When directed by the Engineer, the surface of the hardened concrete which will be in contact with new concrete shall be washed with water to this satisfaction, and to insure an excess of mortar at the juncture of the hardened and the newly deposited concrete, the cleaned and saturated surfaces, including vertical and inclined surfaces shall first be thoroughly covered with a coating of mortar of the same proportion of sand and cement as the class of concrete used against which the new concrete shall be placed before the grout or mortar has attained its initial set. The placing of concrete shall be carried continuously from joint to joint. The face edges of all joints which are exposed to view shall be carefully finished true to line and elevation.

235 407.3.7 Concrete Surface Finishing Surface finishing shall be classified as follows:

Class 1, Ordinary Finish

Class 2, Rubbed Finish

Class 3, Floated Finish

All concrete shall be given Class 1, Ordinary Finish and additionally any further finish as specified. Unless otherwise specified, the following surfaces shall be given a Class 2, Rubbed Finish.

1. The exposed faces of piers, abutments, wingwalls, and retaining walls.

2. The outside faces of girders, T-beams, slabs, columns, brackets, curbs, headwalls, railings, arch rings, spandrel walls and parapets.

Excluded, however, are the tops and bottoms of floor slabs and sidewalks, bottoms of beams and girders, sides of interior beams and girders, backwalls above bridge seats or the underside of copings. The surface finish on piers and abutments shall include all exposed surfaces below the bridge seats to 20 cm below low water elevation or 50 cm below finished ground level when such ground level is above the water surface. Wingwalls

shall be finished from the top to 50 cm below the finished slope lines on the outside face and shall be finished on top and for a depth of 20 cm below the top on the back sides.

Unless otherwise specified, the surface of the traveled way shall be Class 3, Floated Finish.

Class 1, Concrete Ordinary Finish

Immediately following the removal of forms, all fins and irregular protection shall be removed from all surface except from those which are not to be exposed or are not to be waterproofed. On all surfaces the cavities produced by form ties and all other holes, honeycomb spots, broken corners or edges and other defects shall be thoroughly cleaned, and after having been kept saturated with water for a period of not less than three hours shall be carefully pointed and made true with a mortar of cement and fine aggregate mixed in the proportions used in the grade of the concrete being finished. Mortar used in pointing shall not be more than one hour old. The mortar patches shall be cured as specified under Subsection 407.3.8. All construction and expansion joints in the completed work shall be left carefully tooled and free of all mortar and concrete. The joint filler shall be left exposed for its full length with a clean and true edges.

The resulting surface shall be true and uniform. All repaired surfaces, the appearance of which is not satisfactory to the Engineer, shall be “rubbed” as specified below.

Class 2, Concrete Rubbed Finish 236 After removal of forms, the rubbing of concrete shall be started as soon as its condition will permit. Immediately before starting this work, the concrete shall be kept thoroughly saturated with water for a minimum period of three hours. Sufficient time shall have elapsed before the wetting down to allow the mortar used in the pointing of road holes and defects to thoroughly set. Surfaces to be finished shall be rubbed with a minimum coarse carborundum stone using a small amount of mortar on each face.

The mortar shall be composed of cement and fine sand mixed in the proportions used in the concrete being finished. Rubbing shall be continued until all form marks, protections and irregularities have been removed, all voids have been filled, and a uniform surface has been obtained. The face produced by this rubbing shall be left in place at this time. After all concrete above the surface being created has been cast, the final finish shall be obtained by rubbing with a fine carborundum stone and water.

This rubbing shall be continued until the entire surface is of smooth texture and uniform color. After the final rubbing is completed and the surface has dried, it should be rubbed with burlap to remove loose powder and shall be left free from all unsound patches, paste, powder and objectionable marks.

Class 3, Concrete Floated Finish After the concrete is compacted as specified in Subsection 407.3.2, Compaction of Concrete, the surface shall be carefully struck off with a strike board to conform to the cross-section and grade shown on the Plans. Proper allowance shall be made for camber if required. The strike board may be operated longitudinally or transversely and shall be moved forward with a combined longitudinal and transverse motion, the manipulation being such that neither is raised from the side forms during the process. A slight excess of concrete shall be kept in front of the cutting edge at all times. After striking off and consolidating as specified above, the surface shall be made uniform by longitudinal or transverse floating or both. Longitudinal floating will be required except in places where this method is not feasible.

The longitudinal float, operated from foot bridges, shall be worked with a sawing motion while held in a floating position parallel to the road centerline and passing gradually from one side of the pavement to the other. The float shall then be moved forward one-half of each length and the above operation repeated. Machine floating which produces an equivalent result may be substituted for the above manual method. The transverse float shall be operated across the pavement by starting at the edge and slowly moving to the center and back again to the edge.

The float shall then be moved forward one-half of each length and the above operation repeated. Care shall be taken to preserve the crown and cross-section of the pavement. After the longitudinal floating has been completed and the excess water removed, but while the concrete is still plastic, the slab surface shall be tested for trueness with a straight-edge. For the purpose, the Contractor shall furnish 237 and use an accurate 3 m straight-edge swing handless 1 m longer than one half the width of the slab.

The straight-edge shall be held in successive positions parallel to the road centerline and in contact with the surface and the whole area gone over from one side of the slab to the other as necessary advancement along the deck shall be in successive stages of not more than one-half the length of the straight edge. Any depression found shall be immediately filled with freshly mixed concrete, struck off, consolidated and refinished. The straight-edge testing and refloating shall continue until the entire surface is found to be free from observable departure from the straight-edge and the slabs has the required grade and contour, until there are no deviations of more than 3 mm under the 3 m straight-edge.

When the concrete has hardened sufficiently, the surface shall be given a broom finish. The broom shall be an approved type. The strokes shall be square across the slabs from edge to edge, with adjacent strokes slightly overlapped, and shall be made by drawing the broom without tearing the concrete, but so as to produce regular corrugations not over 3 mm in depth. The surface as thus finished shall be free from porous spots, irregularities, depressions and small pockets or rough spots such as may be caused by accidental disturbing, during the final brooming of particles of coarse aggregate embedded near the surface.

Concrete Surface Finish for Sidewalk.

After the concrete has been deposited in place, it shall be compacted and the surface shall be struck off by means of strike board and floated with a wooden or cork float. An edging tool shall be used on all edges and at all expansion joints. The surface shall not vary more than 3 mm under a 3 m straight-edge. The surface shall have a granular or matted texture which will not slick when wet.

407.3.8 Curing Concrete

All newly placed concrete shall be cured in accordance with this Specification, unless otherwise directed by the Engineer. The curing method shall be one or more of the following:

1. Water Method The concrete shall be kept continuously wet by the application of water for a minimum period of 7 days after the concrete has been placed. The entire surface of the concrete shall be kept dump by applying water with an atomizing nozzle. Cotton mats, rugs, carpets, or earth or sand blankets may be used to retain the moisture. At the expiration of the curing period the concrete surface shall be cleared of the curing medium.

2. Curing Compound

Surfaces exposed to the air may be cured by the application of an impervious membrane if approved by the Engineer.

The membrane forming compound used shall be practically colorless liquid. The use of any membrane-forming compound that will alter the natural color of the concrete or impart a slippery surface to any wearing surface shall be prohibited. The compound shall be applied with a pressure spray in such a manner as to cover the entire concrete surface with a uniform film and shall be of such character that it will harden within 30 minutes after application. The amount of compound applied shall be ample to seal the surface of the concrete thoroughly. Power-operated spraying equipment shall be equipped with an operational pressure gauge and means of controlling the pressure.

The curing compound shall be applied to the concrete following the surface finishing operation immediately after the moisture sheen begins to disappear from the surface, but before any drying shrinkage or craze cracks begin to appear. In the event of any delay, in the application of the curing compound, which results in any drying or cracking of the surface, application of water with an atomizing nozzle as specified under “Water Method”, shall be started immediately and shall be continued until the application of the compound is resumed or started, however, the compound shall not be applied over any resulting free standing water. Should the film of compound be damaged from any cause before the expiration of 7 days after the concrete is placed in the case of structures, the damaged portion shall be repaired immediately with additional compound.

Curing compound shall not be diluted or altered in any manner after manufacture. At the time of use, the compound shall be in a thoroughly mixed condition. If the compound has not been used within 120 days after the date of manufacture, the Engineer may require additional testing before the use to determine compliance to requirements. An anti-setting agent or a combination of anti-setting agents shall be incorporated in the curing compound to prevent caking. The curing compound shall be packaged in clean barrels or steel containers or shall be supplied from a suitable storage tank located on the Site. Storage tank shall have a permanent system designed to completely redisperse any settled material without introducing air or any other foreign substance. Containers shall be well-sealed with ring seals and lug type crimp lids. The linings of the containers shall be of a character that will resist the solvent of the curing compound. Each container shall be labeled with a manufacturer's name, specification number, batch number, capacity and date of manufacture, and shall have label warning concerning flammability. The label shall also warn that the curing compound shall be well-stirred before use. When the curing compound is shipped in tanks or tank trunks, a shipping invoice 239 shall accompany each load.

The invoice shall contain the same information as that required herein for container labels.

Curing compound may be sampled by the Engineer at the source of supply and on the Site.

3. Waterproof Membrane Method

The exposed finished surfaces of concrete shall be sprayed with water, using a nozzle that so atomizes the flow that a mist and not a spray is formed until the concrete has set, after which a curing membrane of waterproof paper or plastic sheeting shall be placed. The curing membrane shall remain in place for a period of not less than 72 hours.

Waterproof paper and plastic sheeting shall conform to the specification of AASHTO M 171. The waterproof paper or plastic sheeting shall be formed into sheets of such width as to cover completely the entire concrete surface.

All joints in the sheets shall be securely cemented together in such a manner as to provide a waterproof joint. The joint seams shall have a minimum lap of 100 mm. The sheets shall be securely weighed down by placing a bank of earth on the edges of the sheets or by other means satisfactory to the Engineer. Should any portion of the sheets be broken or damaged within 72 hours after being placed, the broken or damaged portions shall be immediately repaired with new sheets properly cemented into place. Sections of membrane which have lost their waterproof qualities or have been damaged to such an extent as to render them unfit for curing, the concrete shall not be used.

4. Forms-in-Place Method

Formed surfaces of concrete may be cured by retaining the form inplace. The forms shall remain in place for a minimum period of 7 days after the concrete has been placed, except that for members over 50 cm in least dimensions, the forms shall remain in place for a minimum period of 5 days. Wooden forms shall be kept wet by watering during the curing period.

5. Curing Cast-In-Situ

Concrete All newly placed concrete for cast-in-situ structures, other than highway bridge deck, shall be cured by the water method, the forms inplace method, or as permitted herein, by the curing compound 240 method, all in accordance with the requirements of Subsection,

407.3.8 Curing Concrete.

The curing compound method may be used on concrete surfaces which are to be buried under ground and surfaces where only Ordinary Surface Finish is to be applied and on which a uniform color is not required and which will not be visible from public view.

The top surface of highway bridge decks shall be cured by either the curing compound method or the water method. The curing compound shall be applied progressively during the deck finishing operations. The water cure shall be applied not later than 4 hours after completion of the deck finishing.

When deemed necessary by the Engineer during periods of hot weather, water shall be applied to concrete surface being cured by the curing compound method or by the forms-in-place method until the Engineer determine that a cooling effect is no longer required.

6. Curing Pre-Cast Concrete (except piles)

Pre-cast concrete members shall be cured for not less than 7 days by the water method or by steam curing. Steam curing for pre-cast members shall conform to the following provisions:

a. After placement of the concrete, members shall be held for a minimum 4-hour pre-steaming period.

b. To prevent moisture loss on exposed surfaces during the presteaming period, members shall be covered immediately after casting or the exposed surface shall be kept wet by fog spray or wet blankets.

c. Enclosures for steam curing shall allow free circulation of steam about the member and shall be constructed to contain the live steam with a minimum moisture loss. The use of tarpaulins or similar flexible covers will be permitted, provided they are kept in good condition and secured in such a manner to prevent the loss of steam and moisture.

d. Steam at jets shall be low pressure and in a saturated condition. Steam jets shall not impinge directly on the concrete, test cylinders, or forms. During application of the steam, the temperature rise within the enclosure shall not exceed 20oC per hour.

The curing temperature throughout the enclosure shall not exceed 65oC and shall be maintained at a constant level for a sufficient time necessary to develop the required compressive strength. Control cylinders shall be covered to prevent moisture loss and shall be placed in a location where temperature of the enclosure will be the same as that of the concrete. 241

e. Temperature recording devices that will provide an accurate continuous permanent record of the curing temperature shall be provided. A minimum of one temperature recording device per 50 m of continuous bed length will be required for checking temperature.

f. Curing of pre-cast concrete will be considered completed after the termination of the steam curing cycle.

7. Curing Pre-cast Concrete Piles All newly placed concrete for pre-cast concrete piles, conventionally reinforced or prestressed shall be cured by the “Water Method” as described in Subsection

407.3.8, Curing Concrete, except that the concrete shall be kept under moisture for at least 14 days. At the option of the Contractor, stream curing may be used in which case the steam curing provisions of Subsection

407.3.8 (6), Curing Pre Cast Concrete (except piles) shall apply except that the concrete shall be kept wet for at least 7 days including the holding and steaming period.

407.3.9 Falsework Design and Drawings Detailed working drawings and supporting calculations of the false work shall be furnished by the Contractor to the Engineer. No falsework construction shall start until the Engineer has reviewed and approved the design. The Contractor shall provide sufficient time for the Engineer to complete this review. Such time shall be proportionate to the complexity of the falsework design and in no case be less than two weeks. The Contractor may review the falsework drawings at any time provided sufficient time is allowed for the Engineer‟s review before construction is started on the revised portion.

Assumptions used in design of the falsework shall include but not be limited to the following:

1. The entire superstructure cross-section, except for the railing, shall be considered to be placed at one time, except when in the opinion of the Engineer, a portion of the load is carried by members previously cast and having attained a specified strength.

2. The loading used on timber piles shall not exceed the bearing value for the pile and shall in no case exceed 20 tonne per pile.

3. Soil bearing values and soil condition (wet and dry) shall be designated by the Contractor on the falsework drawings. Falsework footings shall be designed to carry the loads imposed upon them without exceeding estimated soil bearing values or allowable settlements.

4. The maximum loadings and deflections used on jacks, brackets, columns and other manufactured devices shall not exceed the manufacture‟s recommendations. If requested by the Engineer, 242 the Contractor shall furnish catalogue or other data verifying these recommendations.

5. If the concrete is to be prestressed, the falsework shall be designed to support any increased or readjusted loads caused by the prestressing forces.

6. Joints supporting slabs and overhangs shall be considered as falsework and designed as such.

For the construction of falsework over and adjacent to roadways where falsework openings are required for maintaining traffic, the Contractor shall provide any additional features for the work needed to insure that the falsework will be stable if subjected to impact by vehicles.

The falsework design at the locations where said openings are required shall include but not be limited to the following minimum provisions:

a. Each exterior stringer in a span shall be securely anchored to the following cap or framing.

b. Adequate bracing shall be used during all stages of falsework construction and removal over or adjacent to public traffic.

c. Falsework members shall be at least 300 mm clear of temporary protective railing members. The falsework drawings shall include a superstructure placing diagram showing proposed concrete placing sequence and construction joint locations, except that where a schedule for placing concrete is shown on the Contract Plans, no deviation will be permitted there from unless approved in writing by the Engineer.

The falsework drawings shall show pedestrian openings which are required through the falsework. Anticipated total settlements of falsework and forms shall be indicated by the Contractor on the falsework drawings. These should include falsework footing settlements over 20 mm will not be allowed unless otherwise permitted by the Engineer.

Deck slab forms between girders shall be constructed with no allowance for settlement relative to the girders. Detailed calculations by the Contractor showing the stresses deflections, and camber necessary to compensate for said deflections in all load supporting members shall be supplied. After approving the Contractor‟s falsework deflection camber, the Engineer will furnish to the Contractor the amounts of camber necessary to compensate for vertical alignment or anticipated structure deflection, if these are not shown on the drawings.

The total camber used in constructing falsework shall be the sum of the aforementioned cambers.

407.3.10 Falsework Construction

The falsework shall be constructed to conform to the falsework drawings. The materials used in the falsework construction shall be of the quantity and quality necessary to withstand the stresses imposed. The workmanship used in falsework shall be of such quality that the falsework will support the loads imposed on it without excessive settlement or take-up beyond that shown on the falsework drawings.

When falsework is supported on piles, the piles shall be driven to a bearing value equal to the total calculated pile loading as shown on the falsework drawings. Suitable jacks or wedges shall be used in connection with falsework to set the forms to their required grade and to take up any excessive settlement in the falsework either before or during the placing of concrete.

The Contractor shall provide tell-tales attached to the soffit forms easily readable and in enough systematically-placed locations to determine the total settlement of the entire portion of the structure where concrete is being placed. Should unanticipated events occur, including settlements that deviate more than ±20 mm from those indicated on the falsework drawings, which in the opinion of the Engineer would prevent obtaining a structure conforming to the requirement of the Specification, the placing of concrete shall be discontinued until corrective measures satisfactory to the Engineer are provided. In the event satisfactory measures are not provided prior to initial set of the concrete in the affected area, the placing of concrete shall be discontinued at a location determined by the Engineer.

All unacceptable concrete shall be removed.

407.3.11 Removing Falsework

Unless otherwise shown on the drawings, or permitted by the Engineer, falsework supporting any span of a supported bridge shall not be released before 14 days after the last concrete, excluding concrete above the bridge deck, has been placed. Falsework supporting any span of a continuous or rigid frame bridge shall not be released before 14 days after the last concrete excluding concrete above the bridge deck, has been placed in that span and in the adjacent portions of each adjoining span for a length equal to at least half the length of the span where falsework is to be released.

Falsework supporting deck overhangs and deck slabs between girders shall not be released until 7 days after the deck concrete has been placed. In addition to the above requirements, no falsework for bridges shall be released until the supported concrete has attained a compressive strength of at least 80% of the required 28-day strength. Falsework for cast-in place prestressed portion of structure shall not be released until after the prestressing steel has been tensioned.

All falsework materials shall be completely removed. Falsework piling shall be removed at least 50 cm below the surface of the original ground or stream bed. When falsework piling is driven within the limits of ditch or channel 244 excavation areas, the falsework piling within such areas shall be removed to at least 50 cm below the bottom and side slopes of said excavated areas. All debris and refuse resulting from work shall be removed and the site left in a neat and presentable condition.

407.3.12 Formwork Design and Drawings

The Contractor shall prepare drawings and materials data for the formwork and shutters to be submitted to the Engineer for approval unless otherwise directed. The requirements for design of formwork are the same as described under Section 407.3.9.

407.3.13 Formwork Construction

Concrete forms shall be mortar-tight, true to the dimensions, lines and grades of the structure and with the sufficient strength, rigidity, shape and surface smoothness as to leave the finished works true to the dimensions shown on the Plans or required by the Engineer and with the surface finish as specified. Formwork and shutters are to be constructed in accordance with the approved Plans. The inside surfaces of forms shall be cleaned of all dirt, mortar and foreign material.

Forms which will later be removed shall be thoroughly coated with form oil prior to use. The form oil shall be of commercial quality form oil or other approved coating which will permit the ready release of the forms and will not discolor the concrete.

Concrete shall not be deposited in the forms until all work in connection with constructing the forms has been completed, all materials required for the unit to be poured, and the Engineer has inspected and approved said forms and materials. Such work shall include the removal of all dirt, chips, sawdust and other foreign material from the forms.

The rate of depositing concrete in forms shall be such to prevent bulging of the forms or form panels in excess of the deflections permitted by the Specification. Forms for all concrete surfaces which will not be completely enclosed or hidden below the permanent ground surface shall conform to the requirements herein for forms for exposed surfaces. Interior surfaces of underground drainage structures shall be completely enclosed surfaces. Formwork for concrete place under water shall be watertight.

When lumber is used, this shall be planed, tongued and grooved. Forms for exposed concrete surface shall be designed and constructed so that the formed surface of the concrete does not undulate excessively in any direction between studs, joists, form stiffeners, form fasteners, or wales. Undulations exceeding either 2 mm or 1/270 of the center to center distance 245 between studs, joists, form stiffeners, form fasteners, or wales will be considered to be excessive.

Should any form of forming system, even though previously approved for use, produce a concrete surface with excessive undulations, its use shall be discontinued until modifications satisfactory to the Engineer have been made. Portions of concrete structures with surface undulations in excess of the limits herein specified may be rejected by the Engineer.

All exposed surfaces of similar portions of a concrete structure shall be formed with the same forming material or with materials which produce similar concrete surface textures, color and appearance. Forms for exposed surfaces shall be made of form materials of even thickness and width and with uniform texture. The materials shall have sharp edges and be mortar-tight. Forms for exposed surfaces shall be constructed with triangular fillets at least 20 mm wide attached so as to prevent mortar runs and to produce smooth straight chamfers at all sharp edges of the concrete.

Form fasteners consisting of form bolts, clamps or other devices shall be used as necessary to prevent spreading of the forms during concrete placement. The use of ties consisting of twisted wire loops to hold forms in position will not be permitted. Anchor devices may be cast into the concrete for later use in supporting forms or for lifting precast members. The use of driven types of anchorage for fastening forms of form supports to concrete will not be permitted.

407.3.14 Removal of Forms and Falsework

Forms and falsework shall not be removed without the consent of the Engineer. The Engineer‟s consent shall not relieve the Contractor of responsibility for the safety of the work. Blocks and bracing shall be removed at the time the forms are removed and in no case shall any portion of the wood forms be left in the concrete. Falsework removal for continuous or cantilevered structures shall be as directed by the Engineer or shall be such that the structure is gradually subjected to its working stress.

When concrete strength tests are used for removal of forms and supports, such removal should not begin until the concrete has attained the percentage of the specified design strength shown in the table below.

Minimum Time Minimum Percentage Design Strength Centering under girders, beams frames or arches Floor slabs Walls Columns Sides of beams and all other vertical surfaces 14 days 14 days 1 day 1 day 2 days 80% 70% 70% 70% 70% In continuous structures, falsework shall not be released in any span until the first and second adjoining spans on each side have reached the strength specified herein, or in the Special Specifications. When cast-in-place post tensioned bridges are constructed, falsework shall remain in place until all post tensioning has been accomplished.

Falsework under all spans of continuous structures shall be completely released before concrete is placed in railings and parapets. In order to determine the condition of column concrete, forms shall be removed from columns before releasing supports from beneath beams and girders. Forms and falsework shall not be released from under concrete without first determining if the concrete has gained adequate strength without regard to the time element. In the absence of strength determination, the forms and falsework are to remain in place until removal is permitted by the Engineer.

The forms for footings constructed within cofferdams or cribs may be left in place when, in the opinion of the Engineer, their removal would endanger the safety of the cofferdam or crib, and when the forms so left intact will not be exposed to view in the finished structure.

All other forms shall be removed whether above or below the ground line or water level. All forms shall be removed from the cells of concrete box girders in which utilities are present and all formwork except that necessary to support the deck slab shall be removed from the remaining cells of the box girder.

To facilitate finishing, forms used on ornamental work, railing, parapets and exposed vertical surfaces shall be removed in not less than 12 nor more than 48 hours, depending upon weather conditions. In order to determine the condition of concrete in columns, forms shall always be removed from them before the removal of shoring from beneath beams and girders. Falsework and centering for spandrel-filled arches not be struck until filling at the back of abutments has been placed up to the spring line.

Falsework supporting the deck of rigid frame structure shall not be removed until fills have been placed back to the vertical legs.

407.4 Method of Measurement

The quantity of structural steel, structural concrete, reinforcing steel or other Contract Pay Items shall constitute the completed and accepted structure which shall be measured for payment in the manner prescribed in the several items involved.

407.5 Basis of Payment

The quantities measured as provided in Section 407.4, Method of Measurement shall be paid for at the contract price for the several pay items which price and payment shall be full compensation for furnishing, preparing, fabricating, placing, curing and for all labor, equipment, tools and incidentals necessary to complete the Item. Such payment shall constitute full payment for the completed structure ready for use.

Payment will be made under:

Pay Item Number	Description	Unit of Measurement
405 (1)	Concrete Class A, C & P	Cu.m.
405 (2)	Concrete Post/Baluster	Each
	Railings	Linear Meter
405 (3)	Parapet Walls	Cu.m.
400	Piling	Linear Meter
103	Structure Excavation	Cu.m.
601	Sidewalk Concrete	Sq.m. or Cu.m.
404	Reinforcing Steel Bars	Kg
407 (1)	Lean Concrete	Cu.m.

When more than one item is specified, means of identification shall be inserted in parenthesis immediately after the Pay Item and letter suffixes shall be included within the parenthesis of the Pay Item Number.

ITEM 506 STONE MASONRY

506.1 Description

This Item shall consist of stone masonry in minor structures, in headwall for culverts, in retaining walls at the toes of slope, and at other places called for on the plans, constructed on the prepared foundation bed, in accordance with this Specification and to the lines, grades and dimensions shown on the Drawings. This work also includes construction of weep holes.

506.2 Material Requirements

506.2.1 Stone

Stones shall be clean, hard and durable and shall be subject to the approval of the Engineer. Unless otherwise specified on the Drawings or as directed by the Engineer, stones for masonry shall be Class A as described in Item 504, Riprap and Grouted Riprap. Stones shall have roughly similar blunted ends.

506.2.2 Mortar

The mortar for stone masonry shall be composed of one (1) part Portland cement to two (2) parts of sand by volume and sufficient water to obtain the required consistency and shall conform to the requirements of materials under Item 405, Structural Concrete.

506.3 Construction Requirement

506.3.1 Selection and Placing

Care shall be taken to prevent the bunching of small stone or stones of the same size. Large stones shall be used in the corners. All stones shall be cleaned thoroughly and wetted immediately before being set, and the bed shall be cleaned and moistened before the mortar is spread. They shall be laid with there longest faces horizontal in full beds of mortar, and the joint shall be flushed with mortar.

506.3.2 Weepholes

It shall conform to the requirement of item 504, Riprap and Grouted Riprap.

506.3.3 Cleaning Exposed Faces

Immediately after being laid, all outside face stone shall be thoroughly cleaned of mortar stains and shall be kept clean until the work is completed.

506.4 Method of Measurement

Stone Masonry shall be measured by the number of cubic meter in place, completed and accepted by the Engineer in accordance with the Drawings. Only accepted work will be measured for payment and the

computation of the quantity thereof will be based on the volume within the limiting dimensions designated on the Drawings or as determined by the Engineer. No separate measurement shall be made for filter materials.

506.5 Basis of Payment

The quantities measured as provided under Sub-Section 506.4, Method of Measurement shall be paid for at the Contract unit price as listed in the Bill of Quantities, which price and payment shall be full compensation for excavation and preparation of the bed, for furnishing and placing all materials including weep holes, filter materials, backfill, and additional fill to bring the riprap bed to the line, grades and dimension as shown on the Drawings and for all labor, equipment, tools and incidentals necessary to complete the work Item.

Payment will be made under:

Pay Item Number	Description	Unit of Measurement
506(1)	Stone Masonry	Cubic Meter

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 Hand-Laid 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

(SEE ATTACHED PLAN)

Section VIII. Bill of Quantities

BILL OF QUANTITIES

CONSTRUCTION OF FARM TO MARKET ROAD

Brgy. Bagacay, Labo, Camarines Norte

Item No.	Scope of Work	Unit	Quantity	Unit Price	TOTAL
A.1.1 (3)	PROVISION OF FIELD OFFICE FOR THE ENGINEER	Month	4.00		
A.1.1 (8)	PROVISION OF 4x4 PICK UP TYPE SERVICE VEHICLE FOR THE ENGINEER ON RENTAL BASIS	Days	15.00		
B.5	PROJECT BILLBOARD/SIGNBOARD	Each	1.00		
B.7	OCCUPATIONAL SAFETY AND HEALTH PROGRAM	Month	4.00		
B.9	MOBILIZATION/DEMOBILIZATION	LS	1.00		
100(2)	INDIVIDUAL REMOVAL OF TREES (small b, 150-300MM, Ø)	Ea.	2.00		
102(1)	SURPLUS COMMON EXCAVATION	Cu.m.	1,069.48		
103	STRUCTURE EXCAVATION	Cu.m.	38.00		
104(2)	EMBANKMENT (from excavated materials)	Cu.m.	184.60		
105(1)	SUBGRADE PREPARATION	Sq.m.	864.00		
200(1)	AGGREGATE SUBBASE COURSE	Cu.m.	189.72		
201	AGGREGATE BASE COURSE	Cu.m.	140.88		
311(1)	PORTLAND CEMENT CONCRETE PAVEMENT (Unreinforced) 0.23m thick	Sq.m.	864.00		
506(1)	STONE MASONRY	Cu.m.	73.00		
TOTAL					

Amount in words:

_____

_____

_____

Signature over Printed Name

Date:

Section IX. Philippine Bidding Documents Related Forms

TABLE OF CONTENTS

Bid Form **227**

Contract Form **229**

Omnibus Sworn Statement Form **232**

Bid Securing Declaration Form **236**

Affidavit of Site Inspection **239**

Affidavit of availability of Key Personnel and Equipment **240**

Key Personnel's Certificate of Employment **241**

Bid Form for Procurement of Infrastructure Projects

[Note: The duly accomplished form shall be submitted with the Bid]

BID FORM

Project Identification No.: *[Insert number]*

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

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

a) I/We have no reservation to the PBD, including the Supplemental Bid Bulletins, for the Procurement Project *[Project Title]*;

b) I/We offer to execute the Works for this Contract in accordance with the PBD;

c) The total price of our Bid in words and figures, excluding any discount offered below, is *[insert information]*

d) The discounts offered and the methodology for their application, if any, are: *[insert information*]; *or indicate N/A if no discount offered]*

e) The total bid price in words and figures, after applying the applicable discount, includes the cost of all taxes, such as, but not limited to*[specify the applicable taxes, e.g. (i) value added tax (VAT), (ii) income tax, (iii) local taxes, and (iv) other fiscal levies and duties]*, which are itemized in the Detailed Estimates.

f) This Bid shall remain valid within a period stated in the PBD, and it shall be binding upon me/us at any time before the expiration of that period;

g) If our bid is accepted, I/we commit to enter to a contract and provide a performance security in the form, amounts, and within the times prescribed in the PBD, and hereby acknowledge the consequences under the IRR of RA No. 12009 on forfeiture of Bid Security or enforcement of Bid Securing Declaration and on Blacklisting.

Until a formal Contract is prepared and executed, this Bid, together with your written acceptance thereof and your Notice of Award, shall be binding upon the Bidder.

I/We understand that you are not bound to accept the Lowest Calculated Bid or any Bid you may receive.

I/We certify/confirm that we comply with the eligibility requirements pursuant to the PBD.

The undersigned is authorized to submit the bid on behalf of *[Name of the Bidder]* as evidenced by the attached *[State the Written Authority]*.

I/We acknowledge that failure to sign each and every page of this Bid Form, including the attached Schedule of Prices, shall be a ground for the rejection of our bid.

Duly authorized to sign the Bid for and behalf of:

[Insert Bidder's Name]

[Signature over Printed Name]
[Position/Designation]
[Date]

Contract Form

[Note: The duly accomplished form is not required to be submitted with the Bid but shall be submitted within ten (10) days after receiving the Notice of Award]

CONTRACT FOR [Insert Project Title]

THIS CONTRACT executed on the _____ day of _____ 20_____ between:

[Name of Procuring Entity], a government agency of the Republic of the Philippines, hereinafter called "the Entity";

-and-

[Name of Contractor] Filipino of legal age or a company duly organized and existing under the laws of [city and country], with principal office at [insert address], hereinafter called "the Contractor".

WHEREAS**,** the Entity invited Bids for certain goods and ancillary services, particularly *[Brief description of Project]*;

WHEREAS, the Contractor submitted a responsive bid and was awarded the contract for the procurement in the total amount of ***[****Contract price in words and figures, including currency]*, hereinafter referred to as the "Contract Price."

NOW, THEREFORE, for and in consideration of the foregoing premises, the parties hereby agree as follows:

1) Unless otherwise stated, terms and expressions used in this Contract shall have the same meanings as those assigned to them in the Conditions of Contract, which form an integral part of this Contract.

2) The following documents as required by the Implementing Rules and Regulations of Republic Act No. 12009 shall be deemed to form and be read and construed as integral part of this Contract, *viz.*:

   a) Philippine Bidding Documents (PBD);

      i. Drawings/Plans;
      ii. Scope of Work;
      iii. Invitation to Bid;
      iv. Instructions to Bidders;
      v. Bid Data Sheet;
      vi. 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;
      vii. Bill of Quantities;
      viii. General and Special Conditions of Contract;
      ix. Supplemental Bid Bulletins, if any; and
      x. Other contract documents that may be required by existing laws and/or the Entity.

   b) Winning bidder's bid, including the Eligibility Requirements, Technical and Financial Proposals, and all other documents or statements submitted;

   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 PBD, such as but not limited to the Notice to Proceed and Warranty Security.

3) In consideration of the Contract Price of *[Contract Price in words and figures]*, or such other sums as may be determined in accordance with the terms of the Contract, the Supplier agrees to deliver and perform the items and related services for the *[Project Title]* described herein in accordance with the terms and conditions specified in the Contract and its annexed documents.

4) The *[Name of the Procuring Entity]* agrees to pay the above-mentioned sum to the Supplier in accordance with the schedule and manner provided in the Bidding Documents and its annexes.

5) Any dispute, difference, or claim arising out of or relating to this Contract, including its existence, validity, interpretation, breach, or termination thereof, may be submitted to arbitration or other form of alternative dispute resolution in accordance with the applicable law, such as Republic Act (RA) No. 9285 (Alternative Dispute Resolution Act of 2004) or Executive Order No 1008, series 1985 (Construction Industry Arbitration Law).

IN WITNESS WHEREOF**,** the parties hereto have caused this Contract to be executed in accordance with the laws of the Republic of the Philippines on the day and year first above written

For the Procuring Entity Head of the Procuring Entity or Duly Authorized Representative	*For the Bidder* Duly authorized to sign the Contract for and behalf of *[Bidders Name]*:
[Signature over Printed Name][Position/Designation] *[Date]*	*[Signature over Printed Name]* *[Position/Designation]* *[Date]*

Signed in the presence of:

[Name and Signature]	*[Name and Signature]*
Witness – Procuring Entity	*Witness- Supplier*

ACKNOWLEDGMENT

BEFORE ME, A Notary Public for and in the _____, City/Province of _____, this _____ day of _____, 20_____, personally appeared the above-named persons who have satisfactorily proven to me their identity, through their identifying documents written below their names and signatures, that they are the same persons who executed and voluntarily signed the foregoing instrument consisting of ____ pages, including this page where this Acknowledgement is written, which they acknowledged before me as their free and voluntary act and deed.

WITNESS MY HAND AND SEAL this ___ day of *[month] [year]*.

NAME OF NOTARY PUBLIC
Notarial Commission No. _____
Notary Public for _____ until _____
Roll of Attorneys No. _____
PTR No. __, *[date issued], [place issued]*
IBP No. __, *[date issued], [place issued]*

Doc. No. _____
Page No. _____
Book No. _____
Series of _____

Omnibus Sworn Statement Form

[Note: The duly accomplished form shall be submitted with the Bid]

REPUBLIC OF THE PHILIPPINES)
CITY/MUNICIPALITY OF _____) S.S.

OMNIBUS SWORN STATEMENT

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

1) *Select one, delete the others:*
   - *If sole proprietorship:* I am the sole proprietor or authorized representative of *[Name of Bidder]* with office address at *[Address of Bidder]*;

   - *If 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]*;

   - *If individual consultant not registered under a sole proprietorship, in case of Consulting Services:* I am the individual consultant or authorized representative of *[Name of Bidder]* with office address at *[Address of Bidder]*;

2) *Select one, delete the others:*

   - *If 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 *[Project Title]* of the *[Name of the Procuring Entity][insert* "as supported by the attached duly notarized Special Power of Attorney" *for authorized representative]*;

   - *If 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 *[Project Title]* of the *[Name of the Procuring Entity]*, as supported by the attached duly notarized Special Power of Attorney, Board/Partnership Resolution, or Secretary's Certificate, whichever is applicable*;*

   - *If individual consultant not registered under a sole proprietorship, in case of Consulting Services:* As the individual consultant 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 *[Project Title]* of the *[Name of the Procuring Entity]*, as supported by the attached duly notarized Special Power of Attorney *for authorized representative*;

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;

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 others:*

   - *If sole proprietorship :* The *[Name of Bidder]* and its spouse are not related by consanguinity or affinity up to the third civil degree to the Head of the Procuring Entity, Procurement Agent (if engaged), End-User or Implementing Unit, project consultants, head of the Project Management Office, or the members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat;

   - *If partnership :* The partnership itself and the partners of *[Name of Bidder]* are not related by consanguinity or affinity up to the third civil degree to the Head of the Procuring Entity, Procurement Agent (if engaged), End-User or Implementing Unit, project consultants, head of the Project Management Office, or the members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat;

   - *If cooperative:* The cooperative itself and members of the board of directors, general manager, or chief executive officer of *[Name of Bidder]* are not related by consanguinity or affinity up to the third civil degree to the Head of the Procuring Entity, Procurement Agent (if engaged), End-User or Implementing Unit, project consultants, head of the Project Management Office, or the members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat;

   - *If corporation, or joint venture:* The corporation or joint venture itself, and officers, directors, and controlling stockholders of *[Name of Bidder]* are not related by consanguinity or affinity up to the third civil degree to the Head of the Procuring Entity, Procurement Agent (if engaged), End-User or Implementing Unit, project consultants, head of the Project Management Office, or the members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat;

   - *If individual consultant not registered under a sole proprietorship, in case of Consulting Services:* The individual consultant and its spouse are not related by consanguinity or affinity up to the third civil degree to the Head of the Procuring Entity, Procurement Agent (if engaged), End-User or Implementing Unit, project consultants, head of the Project Management Office, or the members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat;

7) It is understood that failure to faithfully disclose its relationship with the HoPE, members of the BAC, the TWG, and the BAC Secretariat, the head of the PMO or the end-user unit or implementing unit, and the project consultants of the Procuring Entity, or of the procurement agent by consanguinity or affinity up to the third civil degree, as well as its submission of beneficial ownership information containing false entries shall be subject to blacklisting under Section 100 of the IRR of RA No. 12009, without prejudice to criminal and civil liabilities under applicable laws, including their accessory penalties, if any.

   Select one, delete the rest:

- *In case of corporations: [Name of Bidder]* declares its beneficial ownership information consistent with its updated General Information Sheet or Beneficial Ownership Declaration Form or any other document duly submitted to the SEC and has maintained a valid and updated file therein in compliance with Sections 20.2.9.1, 81, and 82 of the IRR of Republic Act (RA) No. 12009.

- *In case of Foreign Bidders: [Name of Bidder]* submitted an appropriate equivalent document in English issued by the country of the bidder concerned in accordance with Section 20.2.9.2 of the IRR of RA No. 12009.

8) *[Name of Bidder]* complies with existing labor laws and standards; and

9) *[Name of Bidder]* is aware of and has undertaken the following responsibilities as a Bidder:
   a) Carefully examine all of the Bidding Documents;
   b) Acknowledge all conditions, local or otherwise, affecting the implementation of the Contract;
   c) Made an estimate of the facilities available and needed for the contract to be bid, if any; and
   d) Inquire or secure Supplemental Bid Bulletin(s) issued for the *[Project Title]*.

10) *[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.

11) In case advance payment was made or given to *[Name of Bidder]*, failure to perform or deliver any of the obligations and undertakings in the contract shall be sufficient grounds to constitute criminal liability under existing laws.

IN WITNESS WHEREOF, I have hereunto set my hand this __ day of ___, 20__ at _____, Philippines.

Duly authorized to sign the Bid for and behalf of:

[Insert Bidder's Name]

[Affiant's Signature over Printed Name]
[Position/Designation]
[Date]

JURAT

SUBSCRIBED AND SWORN to before me this _____ day of *[month] [year]* at *[place of execution]*, Philippines. Affiant/s is/are personally known to me and was/were identified by me through competent evidence of identity as defined in the 2004 Rules on Notarial Practice (A.M. No. 02-8-13-SC). Affiant/s exhibited to me

his/her *[insert type of government identification card used]*, with his/her photograph and signature appearing thereon, with no. _____.

WITNESS MY HAND AND SEAL this ___ day of *[month] [year]*.

NAME OF NOTARY PUBLIC
Notarial Commission No. _____
Notary Public for _____ until _____
Roll of Attorneys No. _____
PTR No. __, *[date issued], [place issued]*
IBP No. __, *[date issued], [place issued]*

Doc. No. _____
Page No. _____
Book No. _____
Series of _____.

Bid Securing Declaration Form

[The duly accomplished form shall be submitted with the Bid

if bidder opts to provide this type of bid security]

REPUBLIC OF THE PHILIPPINES)

CITY/MUNICIPALITY OF _____) S.S.

BID SECURING DECLARATION

Project Identification No.: ***[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 shall enter into contract with the Procuring Entity and furnish the required performance security within ten (10) calendar days as indicated in the Bidding Documents, from receipt of the Notice of Award;

   b) I/we will be automatically disqualified from bidding for any procurement contract with any Procuring Entity upon receipt of your Blacklisting Order; and

   c) I/We will pay the applicable fine 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 52.2 (a), 63.2, 69.1 and 100, except 100.3 (c), of the IRR of RA No. 12009; without prejudice to other legal action the government may undertake;

	Applicable Fine
a) in the case of a single bidder	i) two percent (2%) of the Approved Budget for the Contract (ABC); or ii) the difference between the evaluated bid price and the ABC whichever is higher
b) in the case of multiple bidders	i) two percent (2%) of the ABC; or ii) the difference between the evaluated bid prices with the bidder with Lowest Calculated/Highest Rated Bid and the bidder with the next Lowest

	Calculated/Highest Rated Bid, and so on whichever is higher
c) in case of violations committed prior to the opening of the financial envelope	i) a fixed amount of two percent of the ABC,

3) I/We understand that this Bid Securing Declaration shall cease to be valid on the following circumstances:

   a) Upon expiration of the bid validity period, or any extension thereof pursuant to your request;

   b) I am/we are declared ineligible or post-disqualified upon receipt of your notice to such effect, and (i) I/we failed to timely file a request for reconsideration or (ii) I/we filed a waiver to avail of said right;

   c) I am/we are declared the bidder with the *[Insert Award Criterion[1]]* 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]*.

Duly authorized to sign the Bid for and behalf of:

[Insert Bidder's Name]

[Signature over Printed Name]
[Position/Designation]
[Date]

JURAT

SUBSCRIBED AND SWORN to before me this _____ day of *[month] [year]* at *[place of execution]*, Philippines. Affiant/s is/are personally known to me and was/were identified by me through competent evidence of identity as defined in the 2004 Rules on Notarial Practice (A.M. No. 02-8-13-SC). Affiant/s exhibited to me his/her *[insert type of government identification card used]*, with his/her photograph and signature appearing thereon, with no. _____.

WITNESS MY HAND AND SEAL this ___ day of *[month] [year]*.

NAME OF NOTARY PUBLIC
Notarial Commission No. _____
Notary Public for _____ until _____
Roll of Attorneys No. _____
PTR No. __, *[date issued], [place issued]*
IBP No. __, *[date issued], [place issued]*

Doc. No. _____
Page No. _____
Book No. _____
Series of _____

Standard Form Number: **SF-INFR-51**

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

Provincial Capitol Building
Daet, 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:

NAME OF PROJECT	**OWNER**	**COST**	**DATE COMPLETED**
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

At present, I am supervising the following projects:

NAME OF PROJECT	**OWNER**	**COST**	**DATE COMPLETED**
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

In case of my separation for any reason whatsoever from the above-mentioned Contractor, I shall notify the __*(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: _____
Until31 December 20____

Doc. No.: _____;
Page No. : _____;
Book No.: _____;
Series of _____;

Section X. Checklist of Technical and Financial Documents

Checklist of Technical and Financial Documents

Note: This shall serve as a guide in the preparation of the bid submission. Any inconsistencies between the Bid Data Sheet (BDS) and this Checklist, the BDS shall prevail.

I. TECHNICAL COMPONENT ENVELOPE

Class "A" Documents

Legal Documents

☐ (a) Valid and updated PhilGEPS Registration Certificate (Platinum Membership) (all pages) (In compliance with Section 20.2.9.1 of IRR of RA No. 12009); and

Technical Documents

☐ (b) 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**

☐ (c) Statement of the bidder's Single Largest Completed Contract (SLCC) similar to the contract to be bid, except under conditions provided under the rules; (This statement shall be supported by contracts, owner's final acceptance or equivalent document, and CPES rating sheets, if applicable. These supporting documents shall be numbered and tabbed in the same sequence as the list of contracts appears in this statement.); **and**

☐ Special PCAB License in case of Joint Ventures/Consortium; **and** registration for the type and cost of the contract to be bid (GPPB Resolution No.15-2021); **and**

☐ (d) 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**

(e) Project Requirements, which shall include the following:

☐ a. Organizational chart for the contract to be bid;

☐ b. List of contractor's key personnel (*e.g.*, Project Manager, Project Engineers, Materials Engineers, and Foremen), to be assigned to the contract to be bid, with their complete qualification and experience data;

☐ c. List of contractor's major equipment units, which are owned, leased, 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

☐ d. Key Personnel's Certificate of Employment (notarized)

☐ e. Original duly signed Omnibus Sworn Statement (OSS);

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

Financial Documents

☐ (f) 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

☐ (g) The prospective bidder's computation of Net Financial Contracting Capacity (NFCC).

Class "B" Documents

☐ (h) 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;

II. FINANCIAL COMPONENT ENVELOPE

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

Other documentary requirements under RA No. 12009

☐ (j) Original of duly signed Bid Prices in the Bill of Quantities; **and**

☐ (k) Duly accomplished Detailed Estimates Form, including a summary sheet indicating the unit prices of construction materials, Dayworks Schedule, labor rates, and equipment rentals used in coming up with the Bid; **and**

☐ (l) Cash Flow by Quarter.

DAYWORKS SCHEDULE - LABOR

Project Name: Rebidding for the Design and Build of _____

NO.	TYPE OF LABOR	UNIT	RATE
L01	Foreman	Hour	
L03	Heavy Equipment Operator	Hour	
L06	Driver	Hour	
L07	Skilled Laborer	Hour	
L10	Other (specify)	Hour	

Uncontrolled when printed and emailed

DAYWORKS SCHEDULE - MATERIALS

Project Name: Rebidding for the Design and Build of _____

NO.	TYPE OF MATERIALS/SPECIFICATION	UNIT	RATE
M01	Aggregate Subbase Course	Cu.M.	
M02	Portland Cement	Bag	
M22	Others (Specify)		

Uncontrolled when printed and emailed

Republic of the Philippines
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
OFFICE OF THE SECRETARY
Bonifacio Drive, Port Area, Manila

BAGONG PILIPINAS

097.13 DPWH
02 · 10 · 2025

FEB 0 7 2025

DEPARTMENT ORDER)
)
NO. 30)
Series of 2025 fmf 2/10/2025

SUBJECT: **Guidelines in the Preparation of Program of Works (POW) and Approved Budget for the Contract (ABC)**

In line with the Department's Quality Policy to deliver right projects at the right cost, the following policies, guidelines, and procedures relative to the preparation of cost estimates such as the Program of Works (POW) and Approved Budget for the Contract (ABC) are hereby established.

The POW and ABC, together with the Detailed Unit Price Analysis (DUPA), shall be prepared based on the design plans for the project which has been duly approved by the authorized officials in accordance with existing regulations. All pay items to be incorporated in the POW and ABC shall conform to the most recent editions of the Department of Public Works and Highways (DPWH) Standard Specifications for Highways, Bridges, and Airports (Volume II), DPWH Standard Specifications for Public Works Structures (Buildings, Ports and Harbors, Flood Control and Drainage Structures and Water Supply Systems) (Volume III), and latest issuances on Standard Specifications.

I. Approved Budget for the Contract (ABC)

The ABC shall consist of both Direct Cost and Indirect Cost.

A. The **Direct Cost** shall consist of the following:

1. **For Material Component** – the price of materials to be used in doing the works called for shall include, inter alia, the following:

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

1.2. Expenses for hauling from source to project site

1.3. Handling expenses

1.4. Storage expenses

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

1.6. Allowance for swell/shrinkage of materials (e.g., sand, gravel, subbase/base course, etc.)

2. **For Labor Component** – the cost of labor shall include the following:

   2.1. Salaries and wages, as authorized by the Department of Labor and Employment (DOLE), issued by the DPWH through a memorandum.

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

3. **For Equipment Component** – the equipment expenses shall comply with the following:

   3.1. Rental rates of equipment shall be based on the current Association of Carriers and Equipment Lessors (ACEL) Equipment Guidebook approved for use by the DPWH. Rental rates of equipment not indicated in the ACEL Equipment Guidebook shall be taken from the rental rates prepared by the Bureau of Equipment (BOE). 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 to be utilized should be indicated in the DUPA.

   3.2. Mobilization/Demobilization pay item shall be calculated based on the equipment requirements of the project stipulated in the proposal and contract booklet. The cost of mobilization and demobilization shall not exceed 1% of the Estimated Direct Cost (EDC) of all programmed pay items that are civil works in nature, including those pay items under Facilities for the Engineers and Other General Requirements that are civil work in nature. However, in exceptional circumstances where the mobilization and demobilization cost exceed the prescribed 1% threshold, the DUPA reflecting the actual computed mobilization and demobilization costs shall be approved, duly signed, by the approving authority, in accordance with the latest limits of delegated authority governing the approval of POW and ABC. A copy of the approved DUPA for Mobilization/Demobilization, along with the corresponding POW and ABC, must be submitted to the BOC within fifteen (15) calendar days from the date of approval.

   3.3. Permits and Clearances pay item shall include the cost of securing MMDA permit, LGU permits, Bureau of Fire Protection Clearance, and other government fees.

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

1. **Overhead, Contingencies, and Miscellaneous** (OCM) Expenses:

   1.1. Overhead Expense shall be 7% to 11% of the EDC, and shall include the following:

      1.1.1. Engineering and administrative supervision

      1.1.2. Transportation allowances

1.1.3. Office expenses (e.g., for the rental of office and quarters, service vehicle, office equipment and supplies, power and water consumption, communication and maintenance)

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

1.1.5. Financing cost such as:

a. Premium on Bid Security

b. Premium on Performance Security

c. Premium on Surety for Advance Payment

d. Premium on Warranty Security (one year)

1.2. Contingencies shall be 0.5% to 3% of the EDC, and shall include expenses for monthly/weekly meetings, coordination meetings with other stakeholders, billboards (excluding Project Billboard/Signboard required by the DPWH and other Government Agencies such as: COA, DENR, etc., which shall be programmed under Part B - Other General Requirements), stages during the groundbreaking and inauguration ceremonies, and unforeseen/other events relative thereto.

1.3. *Miscellaneous Expenses shall be 0.5% to 1% of the EDC*, and shall include laboratory tests for quality control and plan preparation.

2. **Contractor's Profit** (CP) shall be 8% of the EDC for projects with EDC of above PhP 5 Million and 10% for projects with EDC of PhP 5 Million and below.

For ease of calculation, the mark-up percentages for OCM and CP, based on the EDC, shall be specified in the following table.

Estimated Direct Cost (EDC)	OCM (% of EDC)	CP (% of EDC)	Total (% of EDC)
Up to PhP 5 Million	15	10	25
Above PhP 5 Million to PhP 50 Million	12	8	20
Above PhP 50 Million to PhP 150 Million	10	8	18
Above PhP 150 Million	8	8	16

The applicability of OCM and CP for pay items under Facilities for the Engineer (Part A) and Other General Requirements (Part B) are set forth in **Annexes A** and **B.**

3. **Value Added Tax** (VAT) Component – shall be a percentage of the sum of the EDC, OCM, and CP. The applicable rate shall be based on the latest guidelines issued by the DPWH Finance Service, in adherence to the provisions of the National Internal Revenue Code and its amendments, wherein the

Republic of the Philippines
gppb
Government Procurement Policy Board

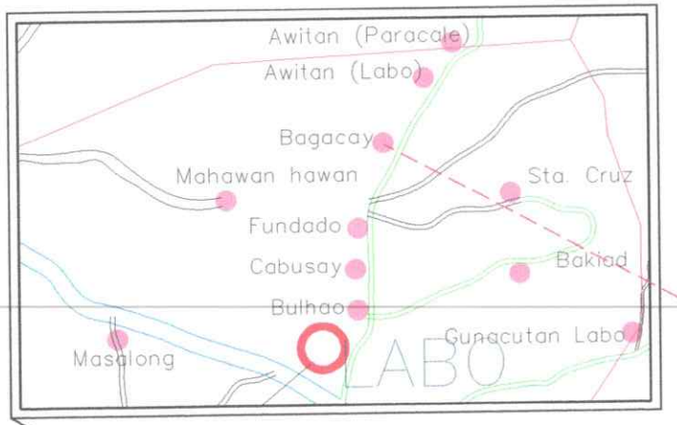
Republic of the Philippines
Province of Camarines Norte
Daet

DETAILED ENGINEERING DESIGN

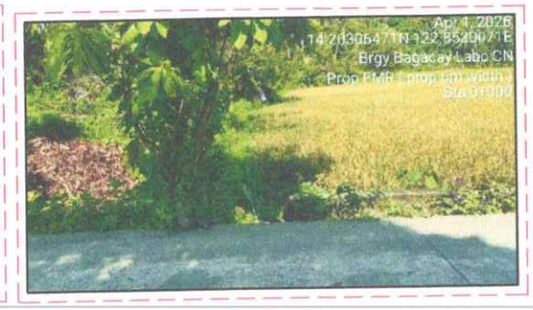
CONSTRUCTION OF FARM TO MARKET ROAD

Brgy. Bagacay Labo Camarines Norte

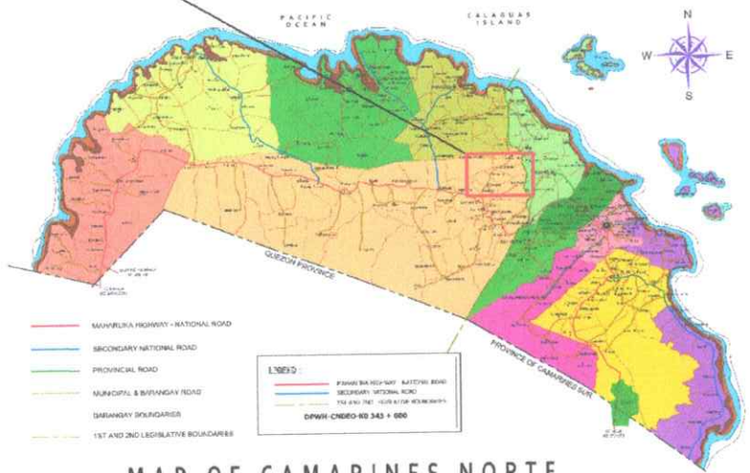
Construction of 144.00 LM x 6.00m x 0.20m thk Road



End of Data Survey



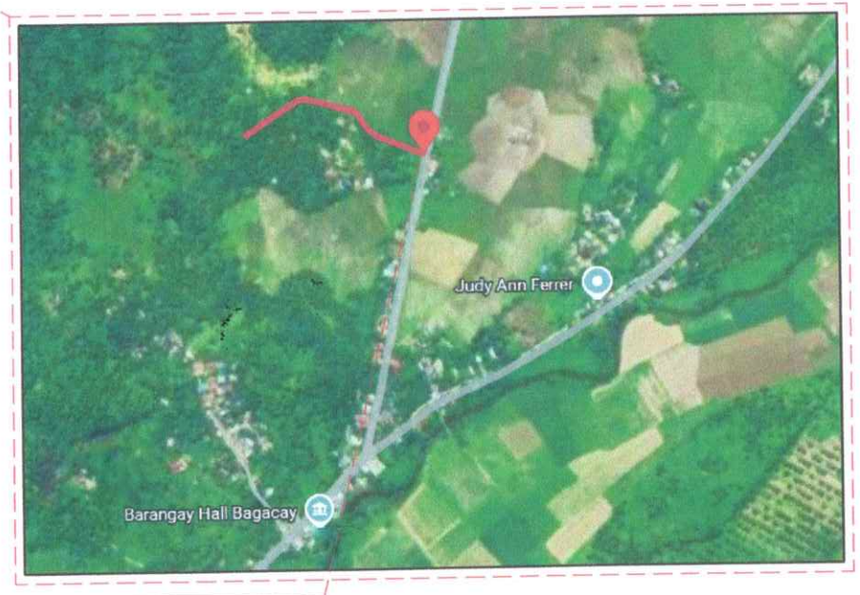
Beg. of Prop. Project (Sta. 0+000.00)



MAP OF CAMARINES NORTE

PROVINCIAL MAP

Scale: NTS



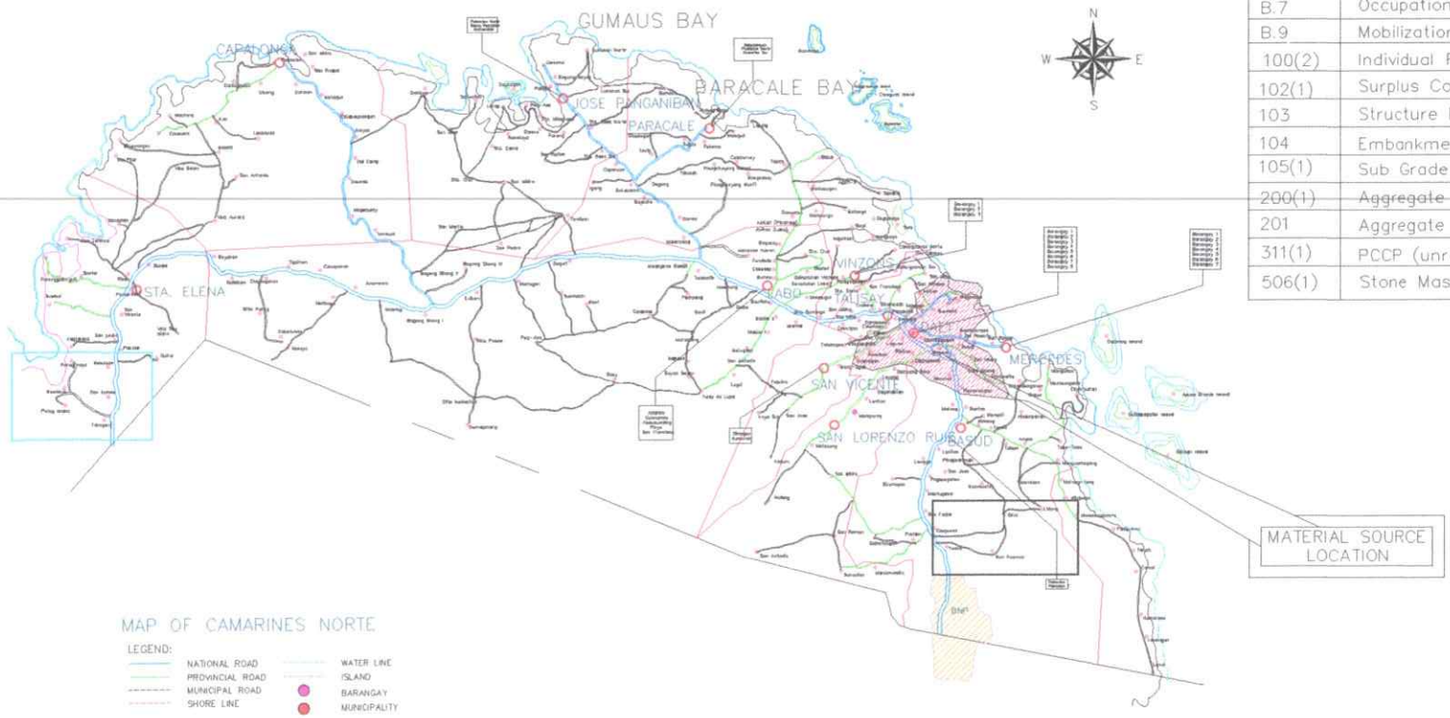
Beg. – 14.20306471 N, 122.8530071E

LOCATION MAP

Scale: NTS

PROVINCE OF CAMARINES NORTE OFFICE OF THE PROVINCIAL ENGINEER DAET, CAMARINES NORTE	PROJECT TITLE: **CONSTRUCTION OF FARM TO MARKET ROAD** Brgy. Bagacay, Labo Camarines Norte	PREPARED BY: **ANGELA P. BABAGAY** ENGINEER 1	CHECKED & SUBMITTED BY: **SAHLEE T. YANTO** CHIEF–PLANNING DIVISION	REVIEWED BY: **BELLA B. ORIOLA** CHIEF CONSTRUCTION DIVISION/ACTING ASST. PROVINCIAL ENGINEER	RECOMMENDING APPROVAL: **JOHN MARVIN S. TOBIAS** PROVINCIAL ENGINEER	APPROVED BY: **RICARTE R. PADILLA** PROVINCIAL GOVERNOR	SHEET CONTENT LOCATION PLAN SHEET NO. 01/11

Item No.	Description	Quantity	Unit
A.1.1(3)	Provision of Field Office for the engineer	4	month
A.1.1(8)	Provision of 4x4xpickup type service vehicle for the engineer on rental basis	15	days
B.5	Project Billboard/Signboard	1	each
B.7	Occupational Safety and Health Program	4	month
B.9	Mobilization/Demobilization	1	L.S
100(2)	Individual Removal of Trees (small b, 301–500mm ø)	2	each
102(1)	Surplus Common Excavation	1,069.48	Cu.m.
103	Structure Excavation	38.00	Cu.m.
104	Embankment (from Excavated Materials)	184.60	Cu.m.
105(1)	Sub Grade Preparation	864.00	sq.m.
~~200(1)~~	~~Aggregate Sub Base Course~~	~~189.72~~	~~Cu.m.~~
201	Aggregate Base Course	140.88	Cu.m.
311(1)	PCCP (unreinforced), 0.20m thick	864.00	Sq.m.
506(1)	Stone Masonry	73.00	Cu.m.



MATERIAL SOURCE MAP

Scale:
NTS

	PROJECT TITLE:	PREPARED BY:	CHECKED & SUBMITTED BY:	REVIEWED BY:	RECOMMENDING APPROVAL:	APPROVED BY:	SHEET CONTENT
PROVINCE OF CAMARINES NORTE OFFICE OF THE PROVINCIAL ENGINEER DAET, CAMARINES NORTE	CONSTRUCTION OF FARM TO MARKET ROAD Brgy. Bagacay, Labo Camarines Norte	ANGELA P. BABAGAY ENGINEER 1	SAHLEE T. YANTO CHIEF–PLANNING DIVISION	BELLA B. ORIOLA CHIEF CONSTRUCTION DIVISION/ACTING ASST. PROVINCIAL ENGINEER	JOHN MARVIL S. TOBIAS PROVINCIAL ENGINEER	RICARTE R. PADILLA PROVINCIAL GOVERNOR	SUMMARY OF QUANTITIES SHEET NO. 02/11

GENERAL NOTES

a. STATIONS ARE GIVEN IN KILOMETERS WITH OR WITHOUT DECIMALS.

b. PIPE CULVERT DIAMETERS AND DIMENSIONS ARE GIVEN IN METERS.

c. RADII, ELEVATIONS, FLOOD LEVELS, ETC, ARE GIVEN IN METERS WITH OR WITHOUT DECIMALS.

d. UNLESS OTHERSWISE SHOWN, ALL DISTANCE ARE IN METERS.

a. THE ROAD STATIONS AND ELEMENTS OF CURVES ARE RELATIVE TO THE CENTER LINE OF THE ROAD.

b. ALL STATIONS ALONG ROAD CENTERLINE ARE RECKONED FROM EXISTING BARANGAY ROAD.

a. ELEVATIONS GIVEN IN COLUMN "FINISHED GRADE ELEVATION" REFER TO THE GRADE AS SHOWN IN THE TYPICAL ROADWAY SECTION.

b. GROUND LEVEL AND FINISH ROAD LEVELOF THE ROAD REFER TO THE GROUND PROFILE FOR THE ROAD CENTERLINE.

MATERIALS SPECIFICATIONS:

AGGREGATES FOR SUB BASE COUSE SHALL CONSIST OF HARD, DURABLE PARTICLES OR FRAGMENTS OF CRUSHED SONES,CRUSHED SLAGS OR CRUSHED OR NATURAL GRAVEL AND FILLER OR CRUSHED SAND OR OTHER FINELY DIVIDED MINERAL MATTER. THE COMPOSITE MATERIAL SHALL BE OF SUCH NATURE THAT IT CAN BE COMPACTED READILY TO FORM A FIRM

EMBANKMENT

a. EMBANKMENT PROTECTION IS GENERALLY PROVIDED AREAS AND OTHER LOCATIONS SHOWN IN THE PLAN.

b. MUCKS LAYERS MUST BE REMOVED FIRST BEFORE EMBANKMENT IS PLACED. CANALS AND DIKES MUST BE CONSTRUCTED AFTER THE FOOTING.

CULVERTS

a. DRAINAGE SCHEDULE FOR CULVERTS AND BOX CULVERTS ARE SHOWN IN THE PLANS.

b. LOCATION OF EXISTING DRAINAGE STRUCTURES,INVERT ELEVATIONS, SIDE DITCHES SHALL BE VERIFIED AND ADJUSTED TO SUIT ACTUAL FIELD CONDITIONS. CONDITIONS OF DRAINAGE STRUCTURES TO BE EXTENDED MUST BE CHECKED FOR DEFECTS. ALL DEFECTS SHALL BE REPAIRED BEFORE EXTENSIONS ARE MADE.EXTENSIONS AND OTHER IMPROVEMENTS OF EXISTING DRAINAGE STRUCTURES ARE SUBJECT TO CHANGE AND SHALL BE DETERMAINED IN THE FIELD BY THE ENGINEER.

c. CULVERTS SHALL BE PROVIDED WITH GRANULAR PIPE BEDDING.

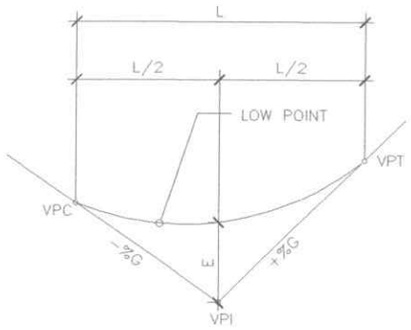
d. ANY MISCELLANEOUS REMOVAL NOT SHOWN ON THE PLANS INCLUDING REMOVING THE HEADWALLS AND WINGWALLS OF EXISTING DRAINAGE STRUCTURES THAT ARE TO BE EXTENDED OR IMPROVED AND THE DISPOSAL OF RESULTING MATERIALS SHALL BE CONSIDERED AS SUBSIDIARY WORK PERTAINING TO OTHER CONTRACT ITEMS.

DESIGN PARAMETER:

1. Right of way	15.00 m Minimum
2. Super elevation	8.00 % Maximum
3. Cross Slope	
Carriageway and Paved Shoulders	1.50 % – 2.00 %
Gravel Shoulder Surfacing	3.00 %
Sidewalk and Gutter	1.50 %
4. Carriageway width	6.10 m
5. Shoulder Width	1.00 m
6. Length of Tangent between Reverse Curve	30.00 m Min.
7. Length of Vertical Curve	60.00 m Min. from PI
8. Longitudinal Grade	
Cut Section	0.50 % Min.
On Cut/Fill Section	12.00 % Max.
9. Side slope ratio (H:V)	
Common materials cut slope	1.5:1 to 1:1
Rippable cut slope	0.50:1 to 1:1
Hard/solid rock	0.25:1 to 0.50:1
Minimum fill slope	1.5:1
10. Cross drains	910.00 mm Min.
(Pipe culvert: 15-yer flood with sufficient freeboard to contain the 25-year flood return period)	
11. Slope protection	
12. Aggregate Subbase Course thickness	200mm Min.
13. PCCP	200mm Min.
14. Dowel and Tie Bars	
Longitudinal	16mm dia. DSB @ 0.75m spacing x 0.60m length
Traverse	16mm dia. Plain round bar @ 0.30m spacing x 0.60m length
15. Warning signs	Refer to DPWH Highway Safety Manual
16. Pavement Markings	

PROVINCE OF CAMARINES NORTE
OFFICE OF THE PROVINCIAL ENGINEER
DAET, CAMARINES NORTE

PROJECT TITLE:	PREPARED BY:	CHECKED & SUBMITTED BY:	REVIEWED BY:	RECOMMENDING APPROVAL:	APPROVED BY:	SHEET CONTENT	
CONSTRUCTION OF FARM TO MARKET ROAD Brgy. Bagacay, Labo Camarines Norte	ANGELA P. BABAGAY ENGINEER 1	SAHLEE T. YANTO CHIEF – PLANNING DIVISION	BELLA B. ORIOLA CHIEF CONSTRUCTION DIVISION/ACTING ASST. PROVINCIAL ENGINEER	JOHN MARVIL S. TOBIAS PROVINCIAL ENGINEER	RICARTE R. PADILLA PROVINCIAL GOVERNOR	GENERAL NOTES	SHEET NO. 03/11



LEGEND:

VPI – VERTICAL POINT OF ENTERSECTION
VPC – VERTICAL POINT OF CURVATURE
VPT – POINT OF TANGENCY
L – LENGHT OF VERTICAL CURVE
K – K FACTOR
E – EXTERNAL DISTANCE
−%G – PERCENT GRADE

VERTICAL PARABOLIC CURVE (SYMMETRICAL)

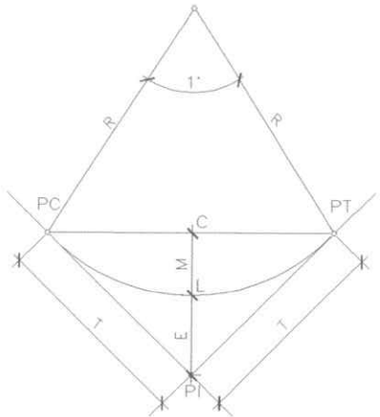
NOT DRAWN TO SCALE

IF ANY VERTICAL PARABOLIC CURVE

H = (g2 – g1) LVC/8

K = L / A

A = (g2 – g1)



LEGEND:

PI – POINT OF ENTERSECTION
PC – POINT OF CURVATURE
PT – POINT OF TANGENCY
I/Ic – INTERSECTION ANGLE
Da – DEGREE OF CURVATURE(ARC DEFINITION)
Dc – DEGREE OF CURVATURE(CHORD DEFINITION)
T – TANGENT LENGHT
R – HORIZONTAL RADIUS
L – LENGHT OF CURVATURE
C – CHORD LENGHT
E – EXTERNAL DISTANCE
M – EXTERNAL DISTANCE

HORIZONTAL CURVE (CIRCULAR)

NOT DRAWN TO SCALE

NOTE:

FOR 'Da' ASSUMED ARC= 100m;
FOR 'Dc' ASSUMED CHORD=100M

ANGLE "I" IS SUBTENDED BY A20m ARC

NO HORIZONTAL CURVE IS REQUIRED WHERE THE CENTRAL ANGLE IS LESS THAN ONE(1) DEGREE

ALGEBRAIC DIFFERENCES IS 50% OR LESS

FURMULAS:

T= R Tan I/2

C= 2R Sin I/2

M= Rx (1 Cos I/2)

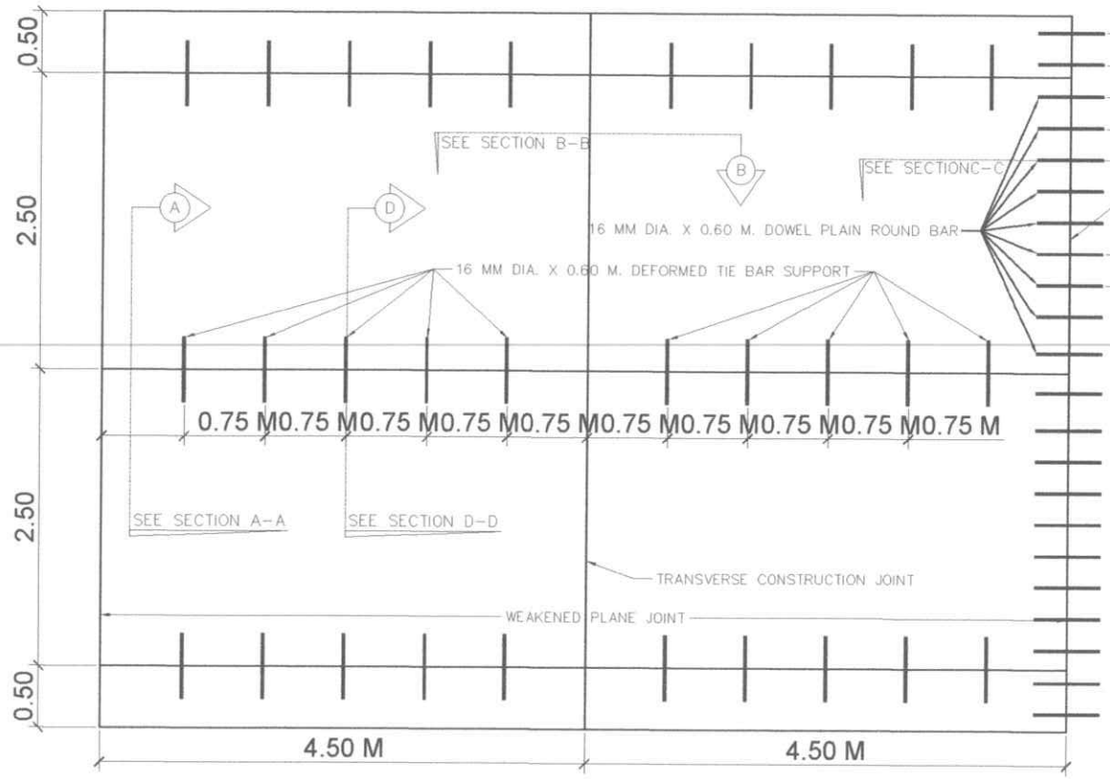
Ex= Rx (Sec I/2)

D= 1145.916/R

$Lc = \frac{PI \times I \times R}{180}$

$Lc = \frac{20 \times I}{D}$

PROVINCE OF CAMARINES NORTE OFFICE OF THE PROVINCIAL ENGINEER DAET, CAMARINES NORTE	PROJECT TITLE: CONSTRUCTION OF FARM TO MARKET ROAD Brgy. Bagacay, Labo Camarines Norte	PREPARED BY: ANGELA P. BABAGAY ENGINEER I	CHECKED & SUBMITTED BY: SAHLEE T. YANTO CHIEF–PLANNING DIVISION	REVIEWED BY: BELLA B. ORIOLA CHIEF CONSTRUCTION DIVISION/ACTING ASST. PROVINCIAL ENGINEER	RECOMMENDING APPROVAL: JOHN MARVIL S. TOBIAS PROVINCIAL ENGINEER	APPROVED BY: RICARTE R. PADILLA PROVINCIAL GOVERNOR	SHEET CONTENT: GENERAL NOTES SHEET NO. 04/11



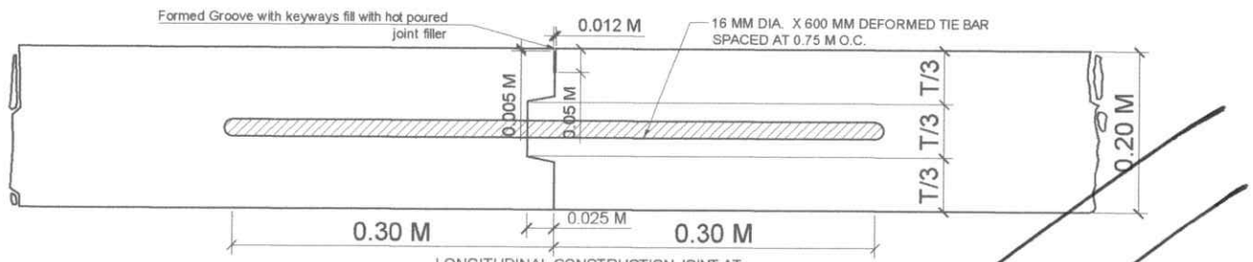
NOTE:
1. TRANSVERSE CONSTRUCTION (CONTACT) JOINT SHALL BE PROVIDED AT THE END OF ANY RUN WHERE LAYING OF CONCRETE HAS BEEN STOPPED FOR THIRTY MINUTES (30 M.) MINIMUM OR LONGER.
2. TRANSVERSE CONSTRUCTION JOINTS WHICH OCCUR AT LOCATION OF WEAKENED PLANE JOINTS SHOULD BE BUILT JOINTS WITH DOWELS. IF THE JOINT OCCURS IN THE MIDDLE THIRD OF THE WEAKENED JOINT INTERVAL (1.50 M. TO 3.0 M.) IT SHOULD BE KEYED JOINTS WITH THE BARS.
3. DRILLING OF HOLES ON EXISTING PCCP AND AFTER STRUCTURES SHALL BE PERFORMED USING POWER TOOLS, THE HOLES SHALL BE PROPERLY CLEANED BEFORE GROUT/EPOXY INJECTION AND INSTALLATION OF DOWELS/TIE BAR.

ROADWAY PLAN (FOR TWO LANE PAVEMENT)

NOT TO SCALE

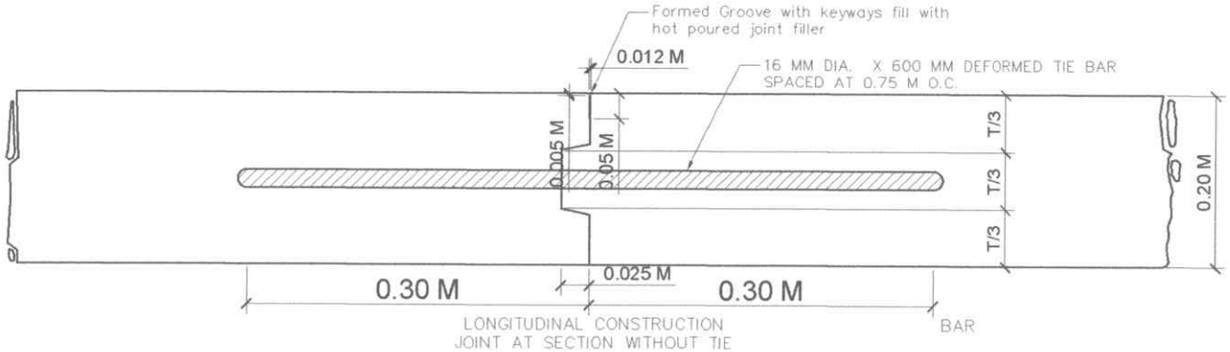
SECTION D-D

SCALE 1:5 MTS



LONGITUDINAL CONSTRUCTION JOINT AT SECTION WITH TIE BAR

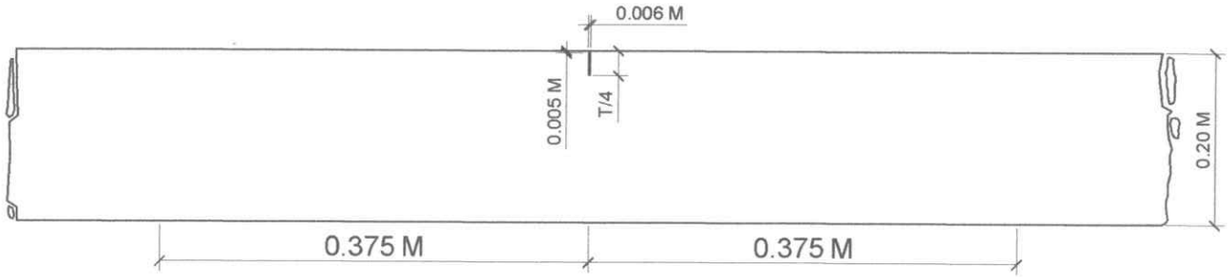
PROVINCE OF CAMARINES NORTE OFFICE OF THE PROVINCIAL ENGINEER DAET, CAMARINES NORTE	PROJECT TITLE: CONSTRUCTION OF FARM TO MARKET ROAD Bgy. Bagacay, Labo Camarines Norte	PREPARED BY: ANGELA P. BABAGAY ENGINEER I	CHECKED & SUBMITTED BY: SAHLEE T. YANTO CHIEF-PLANNING DIVISION	REVIEWED BY: BELLA B. ORIOLA CHIEF CONSTRUCTION DIVISION/ACTING ASST. PROVINCIAL ENGINEER	RECOMMENDING APPROVAL: JOHN MARVIL S. TOBIAS PROVINCIAL ENGINEER	APPROVED BY: RICARTE R. PADILLA PROVINCIAL GOVERNOR	SHEET CONTENT: SECTION DETAIL SHEET NO. 05/11



LONGITUDINAL CONSTRUCTION JOINT AT SECTION WITHOUT TIE

SECTION A-A

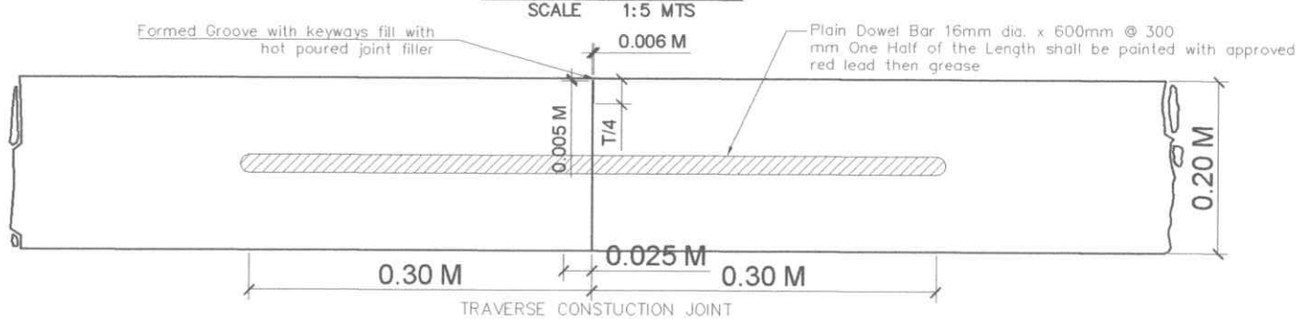
SCALE 1:5 MTS



WEAKENED PLANE JOINT OR CONTRACTION JOINT

SECTION B-B

SCALE 1:5 MTS



TRAVERSE CONSTUCTION JOINT

SECTION C-C

SCALE 1:5 MTS

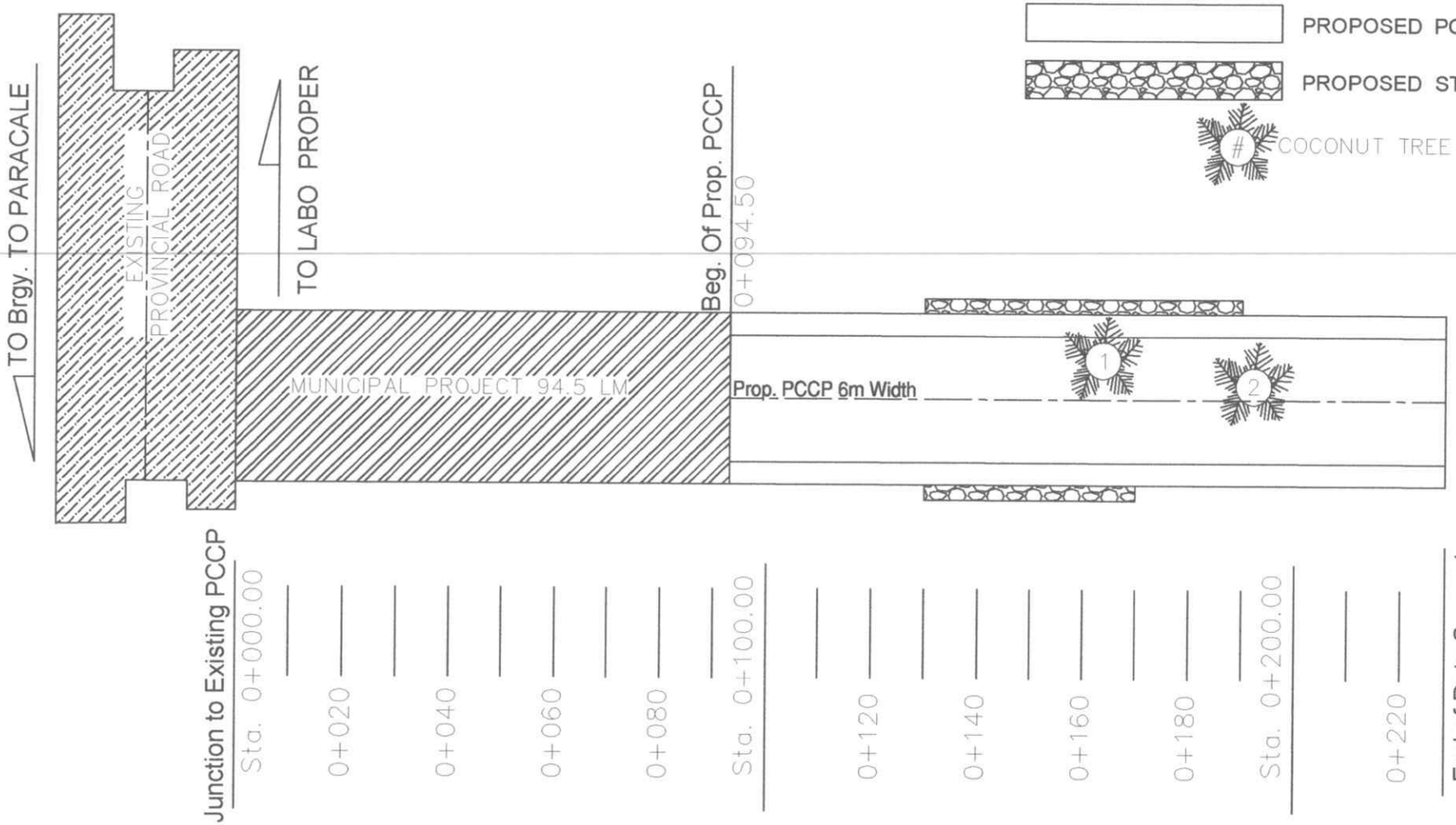
PROVINCE OF CAMARINES NORTE OFFICE OF THE PROVINCIAL ENGINEER DAET, CAMARINES NORTE	PROJECT TITLE: CONSTRUCTION OF FARM TO MARKET ROAD Brgy. Bagacay, Labo Camarines Norte	PREPARED BY: ANGELA P. BABAGAY ENGINEER I	CHECKED & SUBMITTED BY: SAHLEE T. YANTO CHIEF – PLANNING DIVISION	REVIEWED BY: BELLA B. ORIOLA CHIEF CONSTRUCTION DIVISION/ACTING ASST. PROVINCIAL ENGINEER	RECOMMENDING APPROVAL: JOHN MARVIL S. TOBIAS PROVINCIAL ENGINEER	APPROVED BY: RICARTE R. PADILLA PROVINCIAL GOVERNOR	SHEET CONTENT: SECTION DETAIL SHEET NO. 06/11

LEGEND:

PROPOSED PCCP

PROPOSED STONE MASONRY

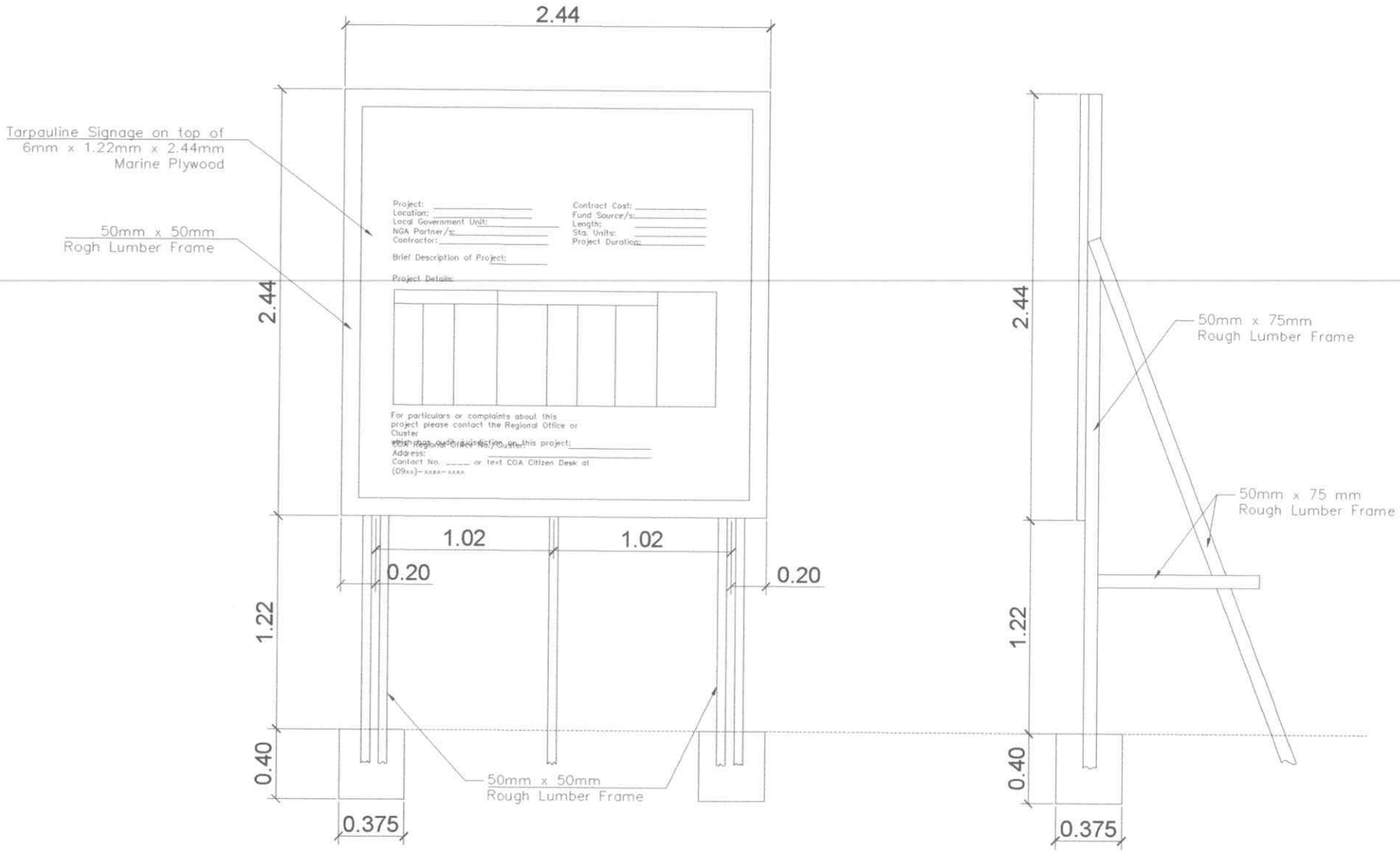
COCONUT TREE FOR REMOVAL



STRAIGHT LINE DIAGRAM

SCALE NTS

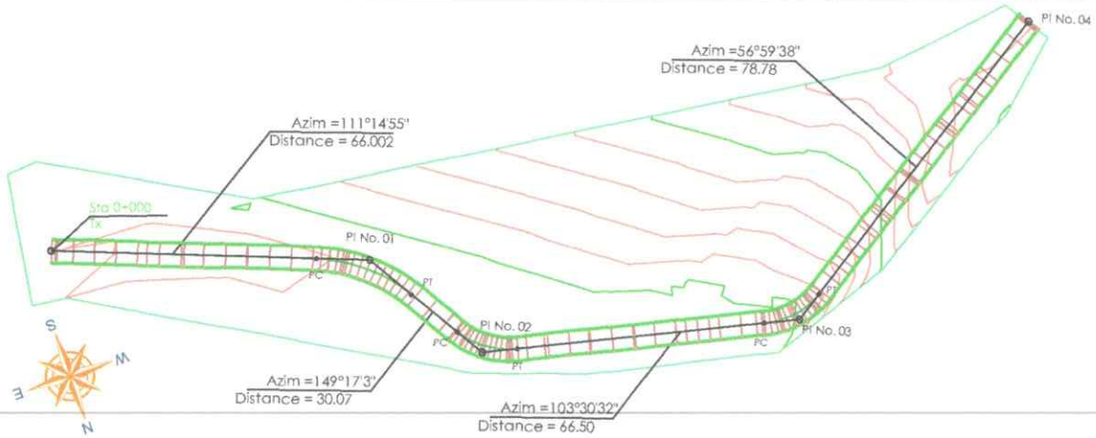
PROVINCE OF CAMARINES NORTE OFFICE OF THE PROVINCIAL ENGINEER DAET, CAMARINES NORTE	PROJECT TITLE: CONSTRUCTION OF FARM TO MARKET ROAD Brgy. Bagacay, Labo Camarines Norte	PREPARED BY: ANGELA P. BABAGAY ENGINEER 1	CHECKED & SUBMITTED BY: SAHLEE T. YANTO CHIEF–PLANNING DIVISION	REVIEWED BY: BELLA B. ORIOLA CHIEF CONSTRUCTION DIVISION/ACTING ASST. PROVINCIAL ENGINEER	RECOMMENDING APPROVAL: JOHN MARVEL S. TOBIAS PROVINCIAL ENGINEER	APPROVED BY: RICARTE R. PADILLA PROVINCIAL GOVERNOR	SHEET CONTENT: STRAIGHT LINE DIAGRAM SHEET NO. 07/11



(BILLBOARD 1) FRONT & REAR ELEVATION

SCALE: 1:200 METERS

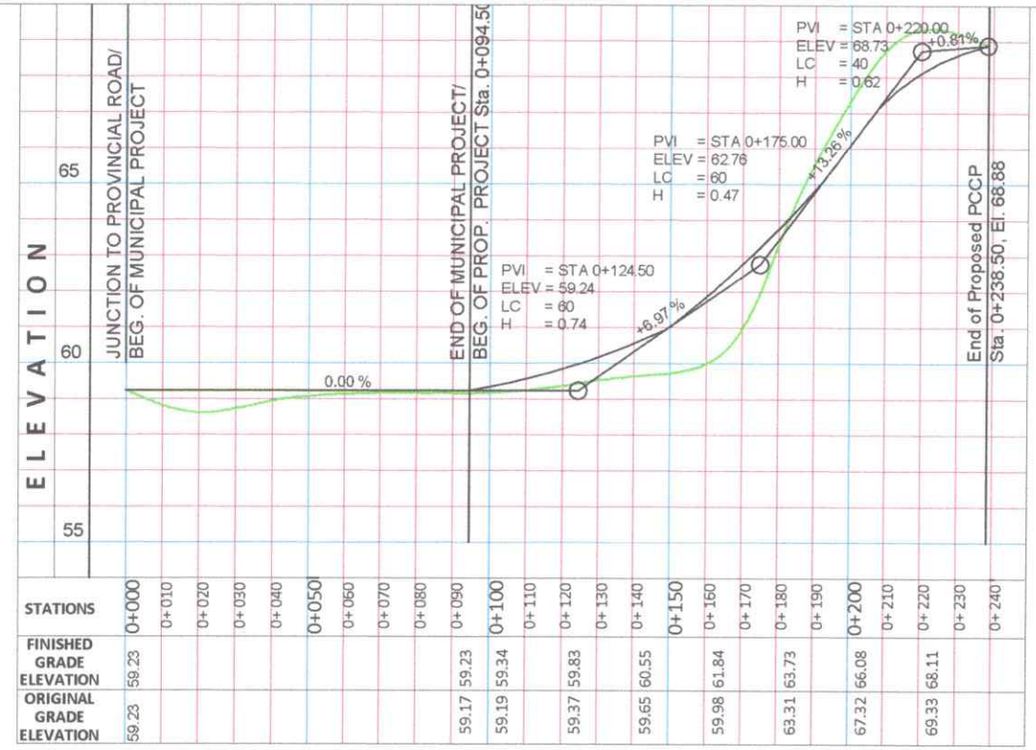
PROVINCE OF CAMARINES NORTE OFFICE OF THE PROVINCIAL ENGINEER DAET, CAMARINES NORTE	PROJECT TITLE:	PREPARED BY:	CHECKED & SUBMITTED BY:	REVIEWED BY:	RECOMMENDING APPROVAL:	APPROVED BY:	SHEET CONTENT
	CONSTRUCTION OF FARM TO MARKET ROAD Brgy. Bagacay, Labo Camarines Norte	ANGELA P. BABAGAY ENGINEER 1	SAHLEE T. TANTO CHIEF-PLANNING DIVISION	BELLA B. ORIOLA CHIEF CONSTRUCTION DIVISION/ACTING ASST. PROVINCIAL ENGINEER	JOHN MARVIL S. TOBIAS PROVINCIAL ENGINEER	RICARTE R. PADILLA PROVINCIAL GOVERNOR	DETAIL OF BILLBOARD SHEET NO. 08/11



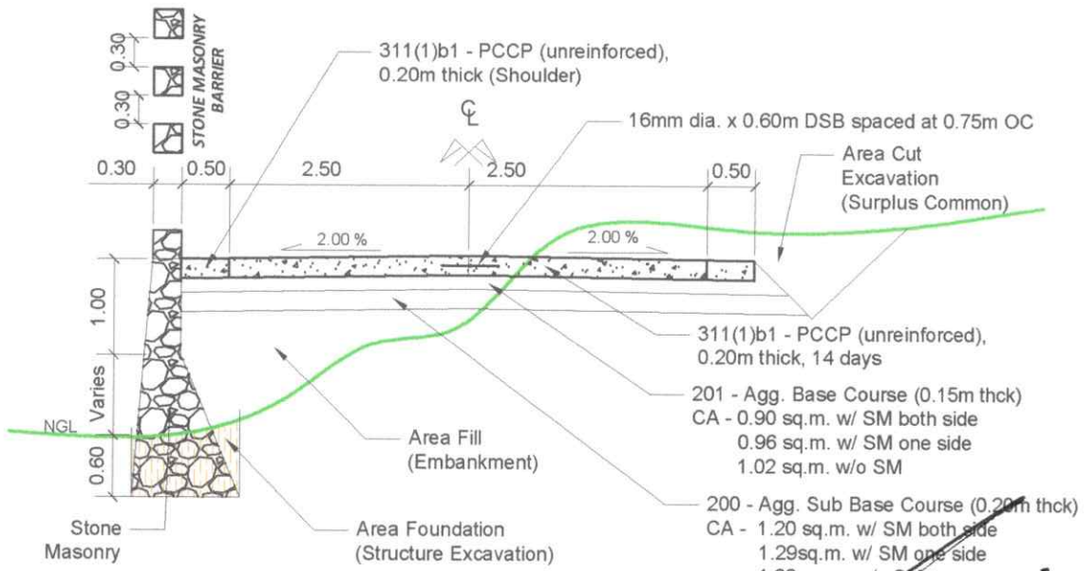
ELEMENTS OF CURVE

PI No.	PI Station	Azimuth			I			R	T	Lc	e	PC Station PC	PT S
Tx	0+000.000	0 South											
1	0+066.000	111	14	55	38	2	7	20.79	**7.16**	13.80	**1.20**	0+058.836	0+0
2	0+096.070	149	17	3	45	46	30	17.55	**7.41**	14.02	**1.50**	0+088.660	0+1
3	0+162.570	103	30	32	46	30	54	13.57	**5.83**	11.01	**1.20**	0+156.739	0+1
4	0+238.500	56	59	38									

TRAVERSE AND PROFILE



STATIONS	0+000	0+010	0+020	0+030	0+040	0+050	0+060	0+070	0+080	0+090	0+100	0+110	0+120	0+130	0+140	0+150	0+160	0+170	0+180	0+190	0+200	0+210	0+220	0+230	0+240
FINISHED GRADE ELEVATION	59.23									59.23	59.34		59.83		60.55		61.84		63.73		66.08		68.11		
ORIGINAL GRADE ELEVATION	59.23									59.17	59.19		59.37		59.65		59.98		63.31		67.32		69.33		

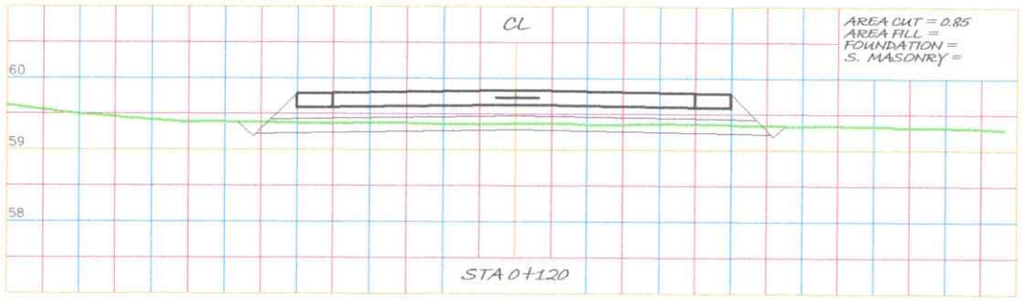


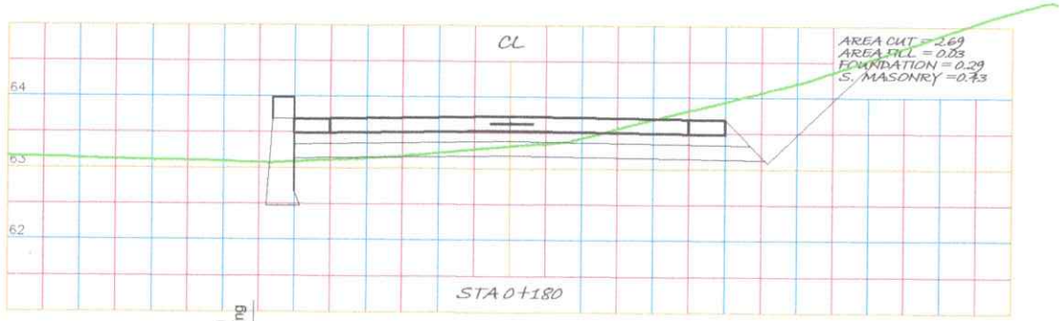
TYPICAL DETAIL OF PCCP

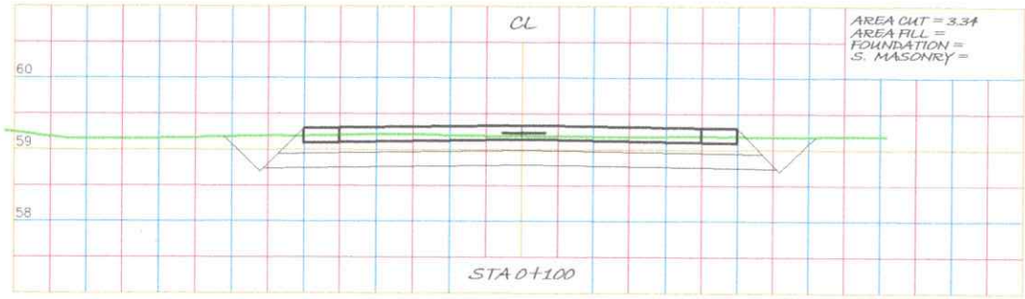
SCALE 1:75 MTS

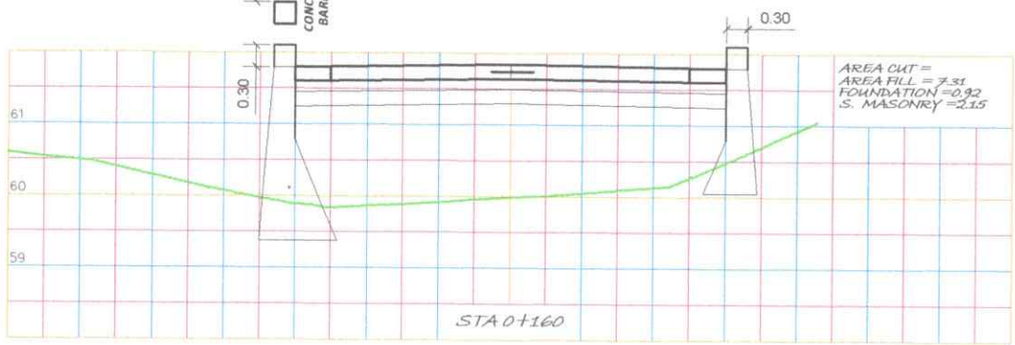
PROVINCE OF CAMARINES NORTE
OFFICE OF THE PROVINCIAL ENGINEER
DAET, CAMARINES NORTE

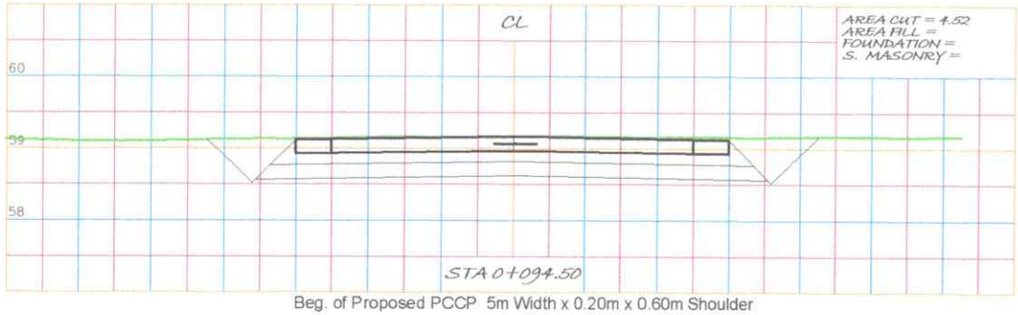
PROJECT TITLE:	PREPARED BY:	CHECKED & SUBMITTED BY:	REVIEWED BY:	RECOMMENDING APPROVAL:	APPROVED BY:	SHEET CONTENT
CONSTRUCTION OF FARM TO MARKET ROAD Brgy. Bagacay, Labo Camarines Norte	ANGELA P. BABAGAY ENGINEER 1	SAHLEE T. YANTO CHIEF – PLANNING DIVISION	BELLA B. ORIOLA CHIEF CONSTRUCTION DIVISION/ACTING ASST. PROVINCIAL ENGINEER	JOHN MARVIL S. TOBIAS PROVINCIAL ENGINEER	RICARTE R. PADILLA PROVINCIAL GOVERNOR	PROFILE /TRAVERSE/ PCCP DETAIL SHEET NO. 09/11



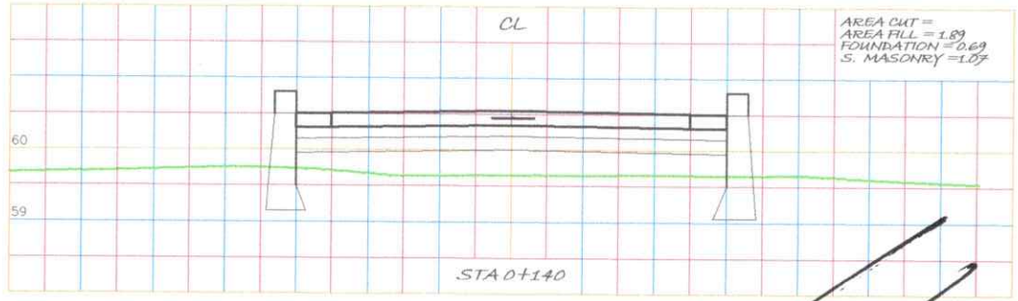




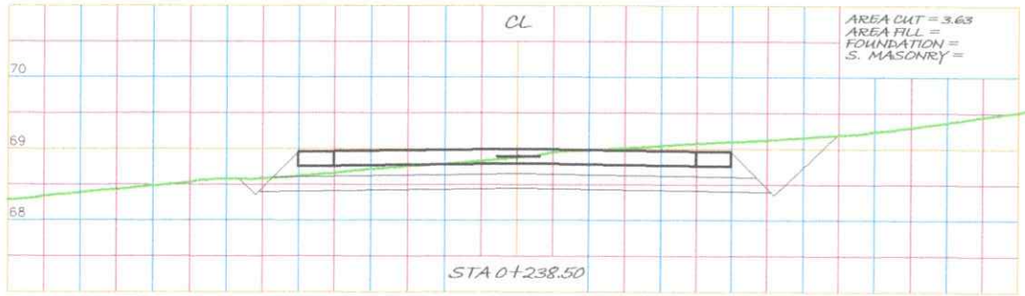




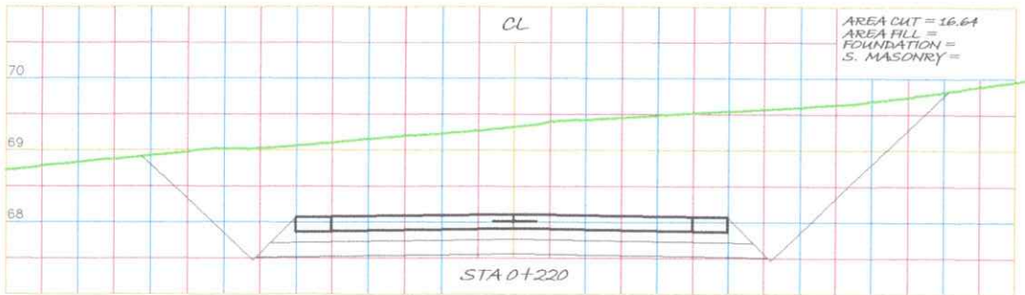
Beg. of Proposed PCCP 5m Width x 0.20m x 0.60m Shoulder

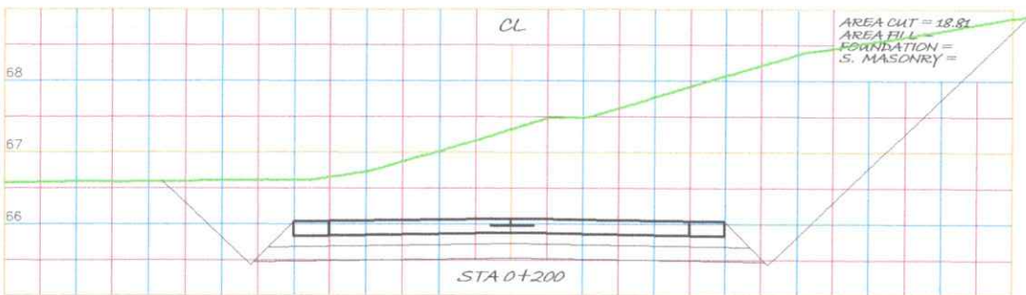


PROVINCE OF CAMARINES NORTE OFFICE OF THE PROVINCIAL ENGINEER DAET, CAMARINES NORTE	PROJECT TITLE: CONSTRUCTION OF FARM TO MARKET ROAD Brgy. Bagacay, Labo Camarines Norte	PREPARED BY: ANGELA P. BABAGAY ENGINEER 1	CHECKED & SUBMITTED BY: SAHLEE T. YANTO CHIEF – PLANNING DIVISION	REVIEWED BY: BELLA B. ORIOLA CHIEF CONSTRUCTION DIVISION/ACTING ASST. PROVINCIAL ENGINEER	RECOMMENDING APPROVAL: JOHN MARVIL S. TOBIAS PROVINCIAL ENGINEER	APPROVED BY: RICARTE R. PADILLA PROVINCIAL GOVERNOR	SHEET CONTENT CROSS SECTION DETAIL SHEET NO. 10/11



End of Proposed PCCP / End of Data Survey





PROVINCE OF CAMARINES NORTE OFFICE OF THE PROVINCIAL ENGINEER DAET, CAMARINES NORTE	PROJECT TITLE: CONSTRUCTION OF FARM TO MARKET ROAD Brgy. Bagacay, Labo Camarines Norte	PREPARED BY: ANGELA P. BABAGAY ENGINEER 1	CHECKED & SUBMITTED BY: SAHLEE T. YANTO CHIEF-PLANNING DIVISION	REVIEWED BY: BELLA B. ORIOLA CHIEF CONSTRUCTION DIVISION/ACTING ASST. PROVINCIAL ENGINEER	RECOMMENDING APPROVAL: JOHN MARVIL S. TOBIAS PROVINCIAL ENGINEER	APPROVED BY: RICARTE R. PADILLA PROVINCIAL GOVERNOR	SHEET CONTENT CROSS SECTION DETAIL SHEET NO. 11/11