JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REPUBLIC OF THE PHILIPPINES

THE DETAILED DESIGN STUDY
ON
UPGRADING INTER-URBAN HIGHWAY SYSTEM
ALONG THE PAN-PHILIPPINE HIGHWAY
(PLARIDEL, CABANATUAN AND SAN JOSE BYPASSES)

VOLUME III
TECHNICAL SPECIFICATIONS

PLARIDEL BYPASS

CONTRACT PACKAGE II

December 2002

KATAHIRA & ENGINEERS INTERNATIONAL
YACHIYO ENGINEERING CO., LTD

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REPUBLIC OF THE PHILIPPINES

THE DETAILED DESIGN STUDY
ON
UPGRADING INTER-URBAN HIGHWAY SYSTEM
ALONG THE PAN-PHILIPPINE HIGHWAY
(PLARIDEL, CABANATUAN AND SAN JOSE BYPASSES)

VOLUME III
TECHNICAL SPECIFICATIONS

PLARIDEL BYPASS

CONTRACT PACKAGE II

December 2002

KATAHIRA & ENGINEERS INTERNATIONAL
YACHIYO ENGINEERING CO., LTD

UPGRADING INTER-URBAN HIGHWAY SYSTEM ALONG THE PAN-PHILIPPINE HIGHWAY

PLARIDEL BYPASS
(STA. 39 + 625.00 – STA. 47 + 400.00)
CONTRACT PACKAGE NO. II

BIDDING DOCUMENTS

VOLUME III

TECHNICAL SPECIFICATIONS
(PART II – SPECIAL PROVISIONS)

INTRODUCTION

The **Specifications** describe in detail the work to be executed, the character and quality of materials and workmanship and the special responsibilities of the Contractor that are not covered by the Conditions of Contract. It shall be read in conjunction with the Contract Drawings and the other contract documents.

The Specifications of this project comprise of the " **General Specifications** " (which are the "DPWH Standard Specifications for Public Works and Highways, 1995 Edition, Volume II" and its " **Supplemental Specifications** ", if any, adopted by the DPWH subsequent to the publication of the said Standard Specifications) as well as the " **Special Provisions and Other Supplemental Specifications**" (which are contained in this volume, Volume III – Part II of the BIDDING DOCUMENTS). Pertinent **notes appearing in the Contract Plans or Drawings**, shall also be considered as part and parcel of the technical specifications. Such notes shall take precedence over the General Specifications and the Special Provisions. Further amendments to the Specifications and to any other Bid Documents, if necessary, shall be furnished to prequalified bidders, by means of **Supplemental Notice(s), Bid Bulletin(s) or Addenda.**

The " **DPWH Standard Specifications ", Volume II** is presented in nine (9) parts (PART A, PART B, PART C . . . . up to PART I) with each part (except for Part II), providing the specifications for certain items of work belonging to a particular "type of work" as follows:

PART A - Facilities for the Engineer
PART B - Other General Requirements
PART C - Earthwork
PART D - Subbase and Base Courses
PART E - Surface Courses
PART F - Bridge Construction
PART G - Drainage and Slope Protection Structures
PART H - Miscellaneous Structures, and
PART I - Materials Details

PART A - Facilities for the Engineer and PART B - Other General Requirements prescribe some general requirements of the Contract in terms of " **items of temporary works or facilities** " required for the proper prosecution and completion of the project but which do not necessarily become integral parts of the completed project.

PART C to PART G provide the specifications of " **items of permanent works** " with each part covering only items belonging to the particular type of work that the "part" represents. The specifications hereunder are generally presented under five (5) distinct sections as follows:

1. Description;
2. Material Requirements;
3. Construction Requirements;
4. Method of Measurement; and
5. Basis of Payment.

PART H - Miscellaneous Structures provides the specifications of " **items of permanent works**" regarding structures pertinent to highways, bridges and airport-runways that may not properly be classified as belonging to any of the particular types of work represented by the earlier parts (PART C to PART G).

PART I – Material Details deals with additional and more detailed specifications of individual component materials required in the construction of the " **items of work** " taken up under the earlier eight (8) parts (PART A to PART H).

The "**Special Provisions**" consist of modifications in or additional specifications to the **DPWH Standard Specifications, Volume II** to adjust the latter to conditions and/or requirements peculiar to this project. Some of these modifications and additional specifications may actually be of general application but (in the absence of supplemental specifications formally adopted for the same by the DPWH subsequent to the publication of the **DPWH Standard Specifications for Public Works and Highways, 1995 Edition, Volume II**) they have been included here in the **Special Provisions.**

The "**Special Provisions**" for this project, contained in this volume **(Volume III – Part II of the Bidding Documents),** consist of modifications and additional specifications as follows:

1. Modifications in the specifications of "**standard work items** " (under PART A to PART H of the General Specifications). These modifications are carried out without changing the "**number**" and "**name**" of each of such "**standard work items**", together with PART I for Materials, and

2. " **Additional or special work items** " if any, under each of PART A to PART H, and the specifications of each, (particularly under PART F – BRIDGE CONSTRUCTION and PART H – MISCELLANEOUS STRUCTURES).

   The Item Number of a "**special work item**" is distinguished by placing the symbol "**SPL**" before its designated Arabic number.

3. **PART J – MOBILIZATION AND DEMOBILIZATION,** contains the specification for a special work item designated as:

   SPL 800 – Mobilization and Demobilization

4. Copy of the "Revised Schedule of Minimum Test Requirements **Governing Items of Work of the DPWH Standard Specifications for Highways, Bridges and Airports, (Volume II) per DPWH Memorandum Circular dated 25 January 1989"** is attached as **Appendix - A** of this Volume.

5. If any applicable Special Specification is lacking in this Volume, the corresponding specification in the **AASHTO Standard Specifications for Highway Bridges, Sixteenth Edition, 1996,** shall be deemed to apply.

6. **PART K – PROVISIONAL SUMS**

   Each Provisional Sum shall only be used, in whole or in part, in accordance with the Engineer's instructions and the Contract shall be adjusted accordingly. Conditions of Contract, pertaining to Provisional Sums, is contained in **Sub-clause 13.5, page 38 of the FIDIC Conditions of Contract for Construction, (General Conditions)** which has been adopted by DPWH for its foreign assisted infra-structure projects.

   A summary of the work items (which are provided with provisional sums), together with the provisional sum provided for each, is contained in PART K of this volume on Special Provisions.

PART A

FACILITIES FOR THE ENGINEER

PART A - FACILITIES FOR THE ENGINEER

A.1 REQUIREMENTS

A.1.1 Offices and Laboratories for the Engineer

1. The Contractor shall provide and maintain until final completion and acceptance of the project one (1) unit combined Field Office and Laboratory building and one (1) unit Living Quarters for the Engineer to be erected on a designated government owned site and hereinafter referred to as the "Engineer's Compound". The building shall be constructed with the combination of pre-fabricated metal components and concrete, all in accordance with the standard specifications and design shown on the approved Drawings. The facilities shall be provided with all the necessary electricity, water and drainage services for twenty-four (24) hours a day, for all days of the contract period, for the exclusive use of the Engineer and his staff. The building shall be ready for occupancy and use after three (3) months from the commencement of the Works.

   During the three (3) months period, while the combined Field Office and Laboratory building and the Living Quarters for the Engineer are under construction, the Contractor shall provide temporary facility on a rented building(s) conforming to all the requirements and to the satisfaction of the Engineer. The Contractor shall maintain also such temporary facilities for the Engineer for a certain period specified.

   The Contractor shall obtain approval from the Engineer on the detailed layout of the Engineer's Compound before any work upon them is commenced.

   Where necessary, the Engineer's Compound shall be fenced with barbed wire (or equivalent) to a height as shown on the Drawings and with necessary gates as directed. The estimated perimeter of fencing shall be determined and approved by the Engineer. When required, the ground shall be raised to a grade that will keep it completely free from flooding or to prevent inundation during rainy season. The compound shall be provided with a parking area for at least six (6) vehicles. Outside lighting around the building and parking shall be installed to the satisfaction of the Engineer and be maintained at all times. Appropriate signs shall be installed to identify the facility to public and visitors.

   The Contractor shall furnish within thirty (30) calendar days after receipt of Notice to Proceed, sufficient furnitures and fixtures, and equipments and appliances specified under SCHEDULES A and B respectively, and necessary supplies and consumable stores as prescribed in SCHEDULES E and F, for use in the combined Field Office/Laboratory and Living Quarters, all as required by and to the satisfaction of the Engineer.

   All furnitures and fixtures, appliances and equipment specified herein to be provided, and the laboratory testing equipment and apparatus listed under SCHEDULE C and other items to be purchased, for the use of the Engineer shall be brand new when initially furnished and shall conform with those indicated on the Drawings and/or Specifications as to kind, grades, types and sizes or as determined by the Engineer.

In the absence of potable water supply system within the area, the Contractor shall, after approval of the Engineer, construct and install a 3,000 liters capacity elevated water tank with two (2) horse power deep well pump or equivalent capacity to sufficiently supply the requirements of the Engineer's Compound. Should there be no main electric line available, the Contractor shall also provide a generator or power generating unit with enough capacity to supply the power needed.

All installations, fixtures, fittings and accessories shown are to be understood as minimum requirements only and shall not restrict the Engineer from ordering the Contractor to provide supplementary provision. In the absence of any details or specifications or provisions for the purpose of making alterations or amendments to the Pay Items, the Contractor shall seek approval of the Engineer.

A septic tank, as part of the facilities for the Engineer shall have a capacity of not less than six (6) cubic meters with two compartments. The Contractor must provide a drain field with drain tile or a leaching well with adequate capacity for the personnel and the usage of the facility for the duration of the Contract. The Contractor may propose other satisfactory method for disposing of sanitary waste that may be implemented only after written approval by the Engineer.

It shall be understood that if the Contractor cannot provide the articles as described or intends to supply equivalent substitutes, he should secure the approval of the Engineer and if such approval is granted it will be on the condition that adjustments in prices shall be affected based on the receipted invoice submitted by him.

At the completion of the Contract, the combined Field Office/Laboratory and the Living Quarters for the Engineer shall be turned-over and become property of the Government.

2. *Add the following at the end of Sub-item No. 2:*

All tests and quality control works shall be done by the Contractor's Materials Testing and Laboratory Staff under the direct supervision of the Engineer's representatives.

All tests shall normally be carried out on the Site, except that, certain special tests may subject to the approval of the Engineer, be carried out at an approved independent testing laboratory. The Contractor shall, if so approved, make all necessary arrangements for the supply and delivery of samples to, and collection of samples from such independent laboratory. Unless otherwise specified, the Contractor shall arrange for one copy of the independent testing laboratory test certificate to be delivered to the Engineer's Representative not less than three (3) days before the materials covered by the relevant test certificate are incorporated into the Works, and the test certificate shall be related to the materials from which the samples was taken.

These tests and quality control works shall be the responsibility of the Contractor. He is required to provide laboratory personnels enumerated under

SCHEDULE D in order to carry out the whole tests as they are defined in the Contract or as directed by the Engineer.

The personnel appointed by the contractor shall be well experienced in the type of work to be undertaken and shall be subjected to the approval of the Engineer. They shall work full time and shall be responsible to the Engineer's Materials Supervisor for all works carried out in the Laboratory.

The Engineer shall define from the beginning of the Works, and in accordance with the specifications, all tests to be performed for each kind of materials and/or works, together with the corresponding frequencies to be used and amend or change such statement from time to time during the progress of work if deemed necessary.

3. *Delete Sub-item No. 3 in its entirety.*

4. *Modify the text of this Sub-item with the following:*

The Contractor shall provide and maintain on rental basis, one (1) base station UHF/VHF Transceiver Radio Communication System and four (4) sets of portable (Hand held) Radio Transceiver, complete with accessories for the use of the Engineer. The UHF/VHF transceiver capable of clear reception shall be installed at the location to be designated by the Engineer. One (1) operator who shall man the facility shall also be provided by the Contractor for the duration of the contract works.

The acquisition, installation at locations selected by the Engineer and securing all necessary licenses and permits of the items shall be the responsibility of the Contractor. The communication facilities shall be installed not later than thirty (30) calendar days after the receipt of the Notice to Proceed (NTP). Failure on the part of the Contractor to install such equipment within the time stipulated, the Engineer shall be entitled to take such action as he may be deemed necessary, and charge all relevant expenses to the Contractor by deducting the amount from the Contractor's monthly billing.

5. *Delete Sub-item No. 5 in its entirety.*

6. *This Sub-item is modified and supplemented as follows:*

By way of maintenance, the Contractor shall provide all the necessary personnels specified under SCHEDULE D to maintain all the facilities in good operating condition, to adequately safeguard and secure the building, equipment and property day and night, and to take care household helps, all as directed and approved by the Engineer.

PROVISIONS FOR FURNISHING FURNITURES /FIXTURES, EQUIPMENT AND APPLIANCES FOR THE COMBINED FIELD OFFICE/LABORATORY AND LIVING QUARTERS FOR THE ENGINEER

SCHEDULE A – Furnitures and Fixtures for the Combined Field Office/Laboratory and Living Quarters for the Engineer

For the Combined Field Office/Laboratory:

Description	Unit	Quantity
Executive Table, KD Tanguile, dark brown non-gloss varnish, 75 cm. x 150 cm. 3 drawers on one side and center drawer provided with locks and keys and 1/4" thick glass	Each	2
Office Table, KD Tanguile, dark brown non-gloss varnish, 60 cm. x 120 cm. 3 drawers on one side and center drawer provided with locks and keys	Each	10
Executive chairs on rollers, padded with back and arm rest to match executive table	Each	2
Swivel Chair on rollers, padded with back and arm rest to match	Each	2
Office Desks, 75 cmx150cm with 3 drawers on each side with locks and keys	Each	
Stacking chair, padded with backrest	Each	30
Drafting Table, KD Tanguile, dark brown non - gloss varnish 80 cm x 150 cm with drafting stool with padded seat of synthetic leather upholstery	Each	1
Complete set of drafting instrument, K&E of model or equivalent	Set	1
Typist Table, KD Tanguile, dark brown non - gloss varnish 60 x 100 cm. With chair padded seat of synthetic leather upholstery	Each	1
Conference Table, KD Tanguile Dark brown, non gloss varnish, 140 x 240 x 32 cm. deep with shelves	Each	1

Table for Office Copier	Each	1
Steel Filing Cabinet for Horizontal Plan, 5 drawers	Each	1
Steel Filing Cabinet, 4 drawers with lock and keys, fire resistant	Each	6
Venetian Blinds for all Windows	Lot	1
For the Living Quarters:		
Single bed, 187 cm. long by 90 cm. Wide with 10 cm. Thick foam rubber mattress	Each	3
Double deck bed with 10 cm. Thick foam rubber mattress	Each	5
Chairs, upright with padded seat and backrest	Each	27
Venetian Blinds for all Windows	Lot	1
Dining table for 8 persons, KD Tanguile, dark brown, non – gloss varnish, 6 mm. Thick glass top	Unit	1
Chairs with backrest, KD Tanguile, dark brown, non – gloss varnish	Each	8
Long sofa with padded arm and backrest synthetic leather upholstery	Each	1
Sofa lounge chairs, with padded arm and backrest, synthetic leather upholstery	Each	2
Cupboard, KD Tanguile, 122 cm. wide by 32 cm. Deep, with 5 shelves and panel doors with locks and keys, painted	Each	1

SCHEDULE B - Equipments and Appliances for the Combined Field Office/Laboratory and Living Quarters for the Engineer

For the Combined Field Office/Laboratory:

Description	Unit	Quantity
IBM Typewriter Set III, with standard carriage or equivalent	Each	1
Electronic Calculator, Casio FX 4200 or equivalent	Each	8
Desk type calculator w/ registering type Casio or Equivalent	Each	1
Photo Copier, Sharp SF-2414, 14 CPM or equivalent	Each	1
Air Conditioning Unit, window type with timer complete with standard accessories, 2.5 hp which will operate on 220 V cycle single phase current with timer	Unit	4
ASUS P3BF/P3B-133, Intel Pentium IV 800 MHz (Slot 1) 128 MB DIMM RAM, 20 GB Quantum/Maxtor hard disk, 1.44 MB Floppy disk drive (TEAC), 52X Creative CD-ROM drive (with Infra Red), 32 MB Video Card (AGP), CMI 8738 PCI Sound Card (32 bit) or with AM/FM Sound Card, NTC 102-104 keyboard PS/2, 3 button mouse (Logitech, PS/2), 17" Color Monitor (Viewsonic), UPS with AVR (A.P.C.), Dust Cover, Mid Tower Casing with 300 watts power supply, Altec Lansing speaker with surround and Sub (latest model). 2 USB Ports, ASUS 56 kbps in V.90 Modem Riser Card, ASUS PCI-L101 Fast Ethernet LAN Card, 10BASE-T LAN Twist Pair Straight Cable 10m Length with connectors	Set	3
Plain Paper Tele/Fax Machine	Unit	1
Regular Licensed Installer CD's MS-Windows 2000 Microsoft Office 2000 included Power Point , Symantec Norton System Works 2002 included Anti-Virus software	Unit	1
External ASUS CD-RW Drive 8x Record / 4x Rewrite / 32x Read included CD Recording Software with ASUS PCI-DA2200 SCSI RAID Card or	Unit	1

equivalent ASUS Internal Drive		
LAN Hub Port for 10BASE-T Cable with 4 ports min	Unit	1
HP Scanner for A3 Size included Scan Software with SCSI Card or USB Connector (latest model)	Unit	1
HP Printer, DeskJet 1120C or higher (latest model)	Unit	1
HP Printer, Laser Jet 6L or higher (latest model)	Unit	1
Standard Computer Table	Unit	3
Magnetic whiteboard, 4' x 8' on roller stand, usable both side	Each	2
Autofocus 35 mm SLR Compact Camera with at least 35-70 mm Zoom lens or equivalent	Each	1
Electric Stand Fan, 16" diameter blade	Each	6
Fire Extinguisher, 10 lbs.	Each	2
Wall Clock	Each	1
Electric Air Pot, 3.5 liter capacity	Each	1
Manual Punching/Binding Machine IB, Master, 24 pins, Switzerland	Each	1
For the Living Quarters:		
Air-conditioning unit, window type w/ timer complete with standard access. 1.0 hp which will operate on 220 V cycle single phase current	Each	3
Refrigerator, 10 cu. ft.	Each	1
Gas stove with two (2) burner complete with hose, regulator and LPG tank	Unit	1
Electric Stand Fan, 16" diameter blade	Each	7
Fire Extinguisher, 10 lbs.	Each	2
Wall Clock	Each	1

Electric Air Pot, 3.5 liter capacity	Each	1
Set of kitchenwares for at least 12 persons consisting of the following: Spoons, forks, knives, cups and saucers, serving plates, placemats, ash, rice plates, pitchers, kitchen knives, ash trays, bolos, casserole, frying fan, canisters	Set	1
Water Purifier/Filter System	Each	1
Petromax or approved equal for emergency use	Each	2

PROVISIONS FOR FURNISHING LABORATORY TESTING EQUIPMENT /APPARATUS

SCHEDULE C - Laboratory Testing Equipment/Apparatus

	Description	Unit	Quantity
I.	**Soil Testing Equipment**		
a.)	**Gradation**		
3"	- 8" dia. Brass Sieve	Each	1
2"	- 8" dia. Brass Sieve	Each	1
1 1/2"	- 8" dia. Brass Sieve	Each	1
1"	- 8" dia. Brass Sieve	Each	1
3/4"	- 8" dia. Brass Sieve	Each	1
1/2"	- 8" dia. Brass Sieve	Each	1
3/8"	- 8" dia. Brass Sieve	Each	1
#4	- 8 " dia. Brass Sieve	Each	1
#10	- 8" dia. Brass Sieve	Each	1
#12	- 8" dia. Brass Sieve	Each	1
#40	- 8" dia. Brass Sieve	Each	1
#200	- 8" dia. Brass Sieve	Each	1
#200	- 8" dia. Brass Sieve	Each	1

Brass Pan 2" x 8" diameter	Each	1
Brass Cover with ring	Each	1
Brass, Wire, Sieve	Each	1
Galvanized Steel Pan, 24" x 24" x 3" with handle	Each	1
Galvanized Steel Pan, 18" x 18" x 3" with handle	Each	1
Vol. Flask with Top, 500 ml.	Each	2
Mechanical Operated Sieve Shaker	Each	1
Wash Bottle, 1000 ml.	Each	1
Triple Balance, 2610 gms., 0.10 grams sensitivity or equivalent	Each	1
Drying Pans - 12" x 12" x 3"	Each	2
Sieve Brushes	Each	2
Sample Splitter 2-1/2" chute width	Each	1
Sample Splitter 1-1/2" chute width	Each	1
Hard Bristle Brushes	Each	2
Paint Brush - 2.5	Each	2

b.) Atterberg Limits

1. Liquid Limit Test Set with counter consisting of the following:

Liquid Limit Set with spatula & grooving tool	Each	1
Graduated Cylinder, 100ml	Each	1
Evaporating Dish, 250 ml, 115mm x 45mm	Each	1

2. Plastic Limit Test Set consisting of the following:

Plastic Limit Plate	Each	1
Graduated Cylinder, 25 ml	Each	1
Evaporating Dish, 120 ml, 90mm x 37mm long	Each	1

	Aluminum Moisture Can, 3 oz. with cover	Dozen	1
	Plastic dispensing bottle, 250ml	Each	1
	Set of triple beam balance, 311 capacity with sensitivity of 0.01 gram	Set	1
3.	Wash bottle, 1000ml	Each	1
4.	Dial – 0 gram balance, 310 grams capacity x 0.01 gram sensitivity 0' haus	Each	1

c.) Moisture Density Relation

Compaction Mold, 4" dia., 1/30 cu. ft. with collar and base plate	Each	1
Compaction Rammer, 5.5 lb. X 12" drop	Each	1
Compaction Mold, 6" dia. 1/13.33 cu. ft. with extension collar and base plate	Each	1
Compaction Hammer, 10 lbs. X 18" drop	Each	1
Steel Straight Edge, 12 - inch x 1 1/2" x 1/8"	Each	1
Mixing Towel, 2.5" x 4.5" blade	Each	2
Spatula, 8 inches blade	Each	1
Spatula, 4 inches blade	Each	1
Trimming Knife	Each	1
Heavy Duty Solution Balance, 20 kg. Capacity	Each	1
Mixing Pan, 24" x 24" x 3" with blade	Each	1
Moisture Can, 500 cc with cover	Each	6

d.) Laboratory CBR

Items included per set:

Mechanical Loading Press, 45 KN cap. w/ metric dial reading to 0.025 mm	Unit	1

CBR Mold, 6" dia. X 7" w/ collar and base plate	Each	3
Slotted Surcharge Weight, 25 lbs.	Each	2
Circular Surcharge Weight, 25 lbs.	Each	2
Straight Edge, 12" x 1-1/2" x 1/8"	Each	1
Spacer Disk	Each	1
CBR Swell Plate	Each	1
Dial Indicator Reading to 0.025 mm for penetration	Each	1
Swell Dial Indicator	Each	1
Holder of Penetration Dial		
Tripod Attachment	Each	1
4.5 T Capacity Proving Ring	Each	1
Filter Screen, 100 mesh, 5-5/16" dia.	Each	1
Filter Screen, 15 cm., Box of 100	Box	1
e.) Field Density		
Sand Cone and Jug	Set	1
Replacement Jug, Plastic	Set	1
Density Plate	Set	1
Sample Can	Pieces	10
Liquid Sample bags, 8" x 14"	Each	200
Sampling Spoon	Each	2
Plastic Bags, 8" x 14" x 0.0035	Each	200
Field Can, 1 Gallon	Each	1
Steel Chisel, 1" width	Each	1
Ball Hammer	Each	1
Sand Scoop	Each	1
Speedy Moisture Tester with Reagents	Unit	1

Field Scale, 15 kgs; 4.5 gram Sensitivity	Set	1
Ottawa Sand	Each	1
f.) Organic Impurities		
1. Graduated Test Bottle, 12 oz.	Pieces	6
2. Sodium Hydroxide Solution	Bottles	2
3. Color Standard Chart for Organic Impurities	Each	2
II. Concrete Testing Equipment		
#4 - 8" dia. Brass Sieve	Each	1
#8 - 8" dia. Brass Sieve	Each	1
#16 - 8" dia. Brass Sieve	Each	1
#30 - 8" dia. Brass Sieve	Each	1
#50 - 8" dia. Brass Sieve	Each	1
#100 - 8" dia. Brass Sieve	Each	1
#200 - 8" dia. Brass Sieve	Each	1
Portable Compression Testing Machine, 100 tons	Unit	1
Sample Splitter, 2-1/2" Opening	Unit	1
Cylinder Mold, 6" x 12"	Each	4
Slump Cone & Base w/ Graduated Tamping Rod	Set	1
Beam Molds, 6" x 6" x 18"	Pieces	36
Mixing Pan, 24" x 24" x 3"	Each	2
Pressure Meter, 1/4 cu. ft.	Each	1
Cement Trowel (rectangular blade)	Each	1
Cement Trowel (triangular blade)	Each	1
Density Basket , 2.36 mm mess	Each	1

Yield Bucket, 1/2 cu.ft.	Each	1
Yield Bucket, 1 cu.ft.	Each	1
Concrete Airmeter	Each	1
Platform on Balance, 100 kgs capacity, 200 grams sensitivity	Each	1
Capping Set	Set	1
Core Drilling Machine 4" dia.	Unit	1
Core Drilling Machine 6" dia.	Unit	1
Specimen Cutting Machine, 4" dia.	Unit	1
Specimen Cutting Machine, 6" dia.	Unit	1
Vicat Apparatus	Each	1
Gilmore Needle	Each	1
Cylinder Capper, 6" x 12"	Each	1
Cylinder Carrier, 6" x 12"	Each	1
Warmer, 220V, 50/60 H2	Each	1
Capping Ladle, 8 oz.	Each	1
III. Miscellaneous Equipment & Items		
Laboratory Oven, Double Wall, 220v/60, AC cycle 24" x 24" x 34.5"	Unit	1
Gas Range, 3 Burners with Oven	Each	1
Graduated Cylinder, 1000 ml	Each	1
Graduated Cylinder, 500 ml	Each	1
Graduated Cylinder, 100 ml	Each	1
Graduated Cylinder, 50 ml	Each	1
Graduated Cylinder, 25 ml	Each	1
Sand Equivalent Set	Set	1
Speedy Moisture Tester w/ Reagents	Each	1
Vernier Caliper	Each	1

Hot Plate, 12" x 24" x, 220 V	Each	1
Vertical Capping Set	Each	1
Glass Plate, 15 cm x 15 cm	Each	1
Stanley Steel Tape, 5 M.	Each	1
Pipe Wrench, 500 mm	Each	1
Trowel, 150 mm Blade	Each	1
Steel Straight Edge, 300 mm long	Each	1
Stainless Steel Mixing Bowl, 5 liters capacity	Each	2
Calcium Carbide Reagent	Box	1
Plastic Buckets	Each	2
Sand Equivalent Stock Solution	Bottles	10
Shovel, Short Handled	Each	1
L.A. Abrasion Machine	Unit	1
Pick	Each	1
Sodium Hydroxide Solution for Organic Impurities	Bottles	10
Paint Brush, 2.5 cm. wide	Each	6
Sodium Sulphate Solution for Soundness	Bottles	10
Rubber Mallet, 15 cm. diameter	Each	6
Distilled Water		
Scoop, Square Mouth, Cast Aluminum 76 cm x 20 cm diameter	Each	1

IV. Publications

Part I AASHTO Specifications, latest Edition	Each	1
Part II AASHTO Tests, latest Edition	Each	1

The Contractor shall carry out the underlisted minimum tests requirement. Unless otherwise stated, the tests shall be as specified under the following AASHTO Methods:

a) **Soil and Aggregate Testing**

Test Reference (AASHTO Designation)	**Standard Method Test For:**
T- 11	Amount of material finer than 0.075 mm sieve in aggregate
T - 19	Unit Weight of aggregate
T - 27	Sieve Analysis of Fine and Coarse Aggregate
T - 30	Mechanical Analysis of Extracted Aggregates
T - 84	Specific Gravity and Absorption of Coarse Aggregates
T - 85	Specific Gravity and Absorption of fine Aggregates
T - 87	Dry Preparation of Disturbed Soil Aggregate Samples for Test
T - 88	Particle Size Analysis of Soils
T - 89	Determining the Liquid Limit of Soils
T - 90	Determining the Plastic limit and Plasticity Index of Soils
T- 92	Determining the Shrinkage Factors of Soils
T - 96	Resistance to Abrasion by use of LA Machine
T - 99	Moisture Density Relations of Soils using a 2.5 kgs. Rammer and 305 mm Drop (Standard AASHTO).
T - 100	Specific Gravity of Soils
T - 134	Moisture-Density Relations of Soil Cement Mixture
T - 176	Plastic Fines in Grade Aggregates and Soils by use of the Equivalent Test

T - 180	Moisture Density Relation using 4.55 kgs. Rammer and 475 mm Drop (Modified AASHTO)
T - 191	Density of Soil in place by Sand cone Test
T - 193	California Bearing Ratio
T - 203	Soil Investigation and Sampling by Auger Borings

Determining of the Moisture Content by "Speedy Moisture Tester" Method:

ASTM 1632	Compaction of Soil-Cement Mixture Specimen
ASTM 1633	Seven (7) Days Compressive Strength Test of Soil-Cement Mixture

b) **Concrete Testing**

Test Reference (AASHTO Designation)	**Standard Method Test For:**
T - 21	Organic Impurities of Sands for Concrete
T - 22	Compressive Strength of Cylindrical Concrete Specimens
T - 23	Making and Curing Compressive and Flexural Test Specimens in the Field
T- 24	Concrete Core Sampling
T - 26	Quality of Water to be used in Concrete
T - 97	Flexural Strength of Concrete
T - 119	Slump of Portland Cement Concrete
T - 121	Weight per Cubic Foot, Yield and Air Content of Concrete
T - 123	Capping Cylindrical Concrete Specimens
T - 126	Making and Curing Concrete Compression and Flexure Test Specimens in the Laboratory
T - 141	Sampling of Fresh Concrete
T - 148	Measuring Length of Drilled Concrete Cores

PROVISIONS FOR OPERATION/MAINTENANCE OF THE COMBINED FIELD OFFICE/LABORATORY AND THE LIVING QUARTERS FOR THE ENGINEER

SCHEDULE D - Operation/Maintenance of Combined Field Office/Laboratory and Living Quarters

	Description	Quantity
a)	**Operation/Maintenance Staff**	
	Messenger/Utility Man	one (1)
	Watchman/Security Guard	three (3)
	Cook/Maid	one (1)
b)	**Laboratory Staff**	
	Laboratory Technician	two (2)
	Laboratory Aide	four (4)
	Clerk Typist/Encoder	one (1)
c)	**Survey Personnel**	
	Survey Aide	two (2)
	Instrument Man	One (1)
	Draftsman/Plotter	One (1)
	Laborer	two (2)
d)	**Miscellaneous**	
	Water Bill	28 months
	Electric Bill	28 months

PROVISIONS FOR FURNISHING SUPPLIES AND CONSUMABLE STORES FOR THE COMBINED FIELD OFFICE/LABORATORY AND THE LIVING QUARTERS FOR THE ENGINEER

SCHEDULE E - Supplies and Consumable Stores for Combined Field Office/Laboratory

Description	Unit	Quality
a) **Office Supplies (to be provided only on the 1st month)**		
Stapler	Each	6
Staple Remover	Each	6
Two (2) Hole Puncher	Each	2
Tape Dispenser	Each	4
Triangle, 30 x 60 x 12"	Each	1
Triangle, 45 x 45 x 12"	Each	1
Protractor, 360 x 18" dia.	Each	1
Highway Curves, Metric	Each	1
Triangular Scale, Metric	Each	2
Erasing Shield, Stainless	Each	2
Incoming/Outgoing Table Tray	Each	5
Waste Paper Bin	Each	10
Pencil Sharpener	Each	2
Steel Ruler, 36 inches	Each	1
Scissors	Each	2
First Aid Kit	Each	2
Stamp Pad w/ Ink	Set	1
Complete Set of Technical Pen with box, # 0.1 - #1.2	Set	1
Field Book	Piece	6
Record Book	Piece	6
Mechanical Pencil 0.5 mm	Each	15
Lettering Set (Leroy)	Each	1
T – Square, 90 cm. Long	Each	1
NT Cutter	Each	2

b) Office Supply (Monthly)

Cartridge (Computer Printer/Ink)	Each	1
Diskette, High Grade	Each	4
Bond Paper, A4 size	Ream	5
Bond Paper, Long	Ream	1
Yellow Pad Paper	Pad	4
Carbon Paper	Box	1
Staedtler Pencil (2B, HB & F)	Each	6
Ballpen	Each	6
Sign Pen	Each	6
Eraser, Staedtler	Each	6
Correction Fluid	Each	2
Scotch Tape	Roll	1
Masking Tape	Roll	1
Magic Tape, 18 mm, 33 mm	Roll	1
Dry Battery , AA	Dozen	1
Field Book	Piece	1
Staple Wire	Box	1
Paper Clip	Box	2
Brown Envelope, Long	Piece	15
Brown Envelope, Short	Piece	15
Expanding Envelope, Long	Piece	6
Letter Envelope, White	Piece	15
Letter Envelope, Brown	Piece	15
Folder, Long	Piece	15
Folder, Short	Piece	15
Fastener	Box	1

Ink Eraser	Each	3
Pencil Lead, 0.5 mm 2B, HB, F	Tube	3
Technical Pen #0.1 - #0.6	Each	6
Technical Pen #0.8 - #1.0 & #1.2	Each	3
Cross – section Paper	Roll	1/2
Tracing Paper	Roll	1/4
Mylar Drafting Film	Roll	1/4
Copy Paper, A3 size	Ream	1/2
Colored Pencil, 12's	Set	1
Marker (stabilo)	Piece	4
Paper Glue	Bottle	2
Toner (Copy Machine)	Tube	1/2
Typewriter Ribbon	Each	1
Cutter Blade	Piece	4
Film (36 shots) 35 mm	Roll	2

c.) Consumable Stores (Monthly)

Toilet Paper	Roll	10
Insect Spray (Baygon), 350 g.	Each	1
Toilet Deodorant	Each	2
Incandescent Bulb, 60 - 100 W	Each	2
Fluorescent Tube, 20-40 W	Each	2
Toilet Soap	Each	4
Floor Map Rug	Each	1
Replenishment of First Aid Kit	Lot	1
Broom	Each	2

d.) Laboratory Consumable Stores (Monthly)

Sodium Hydroxide Solution	Bot.	2
Capping Compound	Box	1
Sodium Sulphate	Bottle	4
Calcium Carbide Reagent	Box	1
Sand Equivalent Stock Solution	Bottle	3
Color Standard Chart	Set	1
Distilled Water	Gallon	5
Plastic Bags, 8" x 14" size 0.00035 substance	Each	1,000

e.) Consumable Stores to be supplied upon request (Not to Exceed the quantity below)

Drum (Copy Machine)	Each	3
Developer (Copy Machine)	Each	4
Cleaning Blade (Copy Machine)	Each	4
Cleaning Roller (Copy Machine)	Each	4

SCHEDULE F - Supplies and Consumable Stores for the Living Quarters

Description	Unit	Quantity
a.) Supplies (To be provided only on the first month)		
Pairs of polyester pillows, 30 cm. X 60 cm. X 15 cm.	Pair	13
Pillow Cases, 40 cm. X 80 cm.	Each	26
Bed Sheets, Cotton, 150 cm. X 200 cm.	Each	13
Blankets, cotton, 160 cm. X 200 cm.	Each	13
b.) Consumable Stores (Monthly)		
Toilet Paper	Roll	12
Insect Spray (Baygon), 350 g	Each	2
Toilet Deodorant	Piece	3

Incandescent Bulb, 60 - 100 Watts	Each	2
Fluorescent Tube, 20 - 40 Watts	Each	2
Toilet Soap	Each	6
Floor Map Rug	Each	1
Broom	Each	2

A.1.2 Vehicles for the Engineer

This item is modified to read as follows:

The Contractor shall provide within thirty (30) calendar days upon receipt of Notice to Proceed the following vehicles on rental basis, for the exclusive use of the Engineer and his staff. The vehicles shall be brand new, latest model, with car airconditioner, car stereo and preferably Nissan, Mazda, Mitsubishi, Isuzu or any equivalent, accepted and approved by the Engineer.

3 units	-	4WD Pick-Up Type, Double Crew Cab, service Vehicle, 2200cc, Diesel Engine with factory installed air-conditioner
1 unit	-	Car, Sedan, 1600 CC, gasoline engine, complete with all accessories
2 units	-	Wagon, diesel engine, complete with all car accessories

The vehicle shall comply in all respect, with all relevant Philippine National or Local Laws, statutes and regulations and shall be provided with comprehensive insurance, spare tires and wheels, and all necessary tools for minor repair.

In order to comply a continuous operation and efficient maintenance of the service vehicles, the Contractor shall provide monthly operating expenses including salary of the drivers, cost of fuel, lubricant, servicing and minor repair.

The monthly operating expenses of the vehicles shall be provided within the first week of each month. If the Contractor fails to comply with this requirement, the Engineer may advance the needed amount which shall be reimbursed by the Contractor upon presentation of necessary supporting documents.

If the Contractor fails to reimburse the said expenses on or before the 15th of the succeeding month, the Engineer shall make the billing directly to the Employer in the amount equivalent to the unit price as stipulated in the Contract.

In case of major repair and/or breakdown of the service vehicles, the Contractor shall provide the equivalent substitute immediately.

In case the Contractor fails to provide the transport vehicles within the stipulated time, the Engineer shall be entitled to provide such vehicles in a way he deems fit under the government regulations and charge the cost to the Contractor.

A.1.3 Assistance to the Engineer

This item is amended with the following paragraphs:

The Contractor shall supply within thirty (30) days from the commencement of the work and maintain for the duration of the contract, the provision of surveying, leveling and measuring instruments, together with the necessary personnels listed under SCHEDULE G and H, respectively.

Surveying, leveling and measuring instruments and apparatus to be provided shall be as prescribed herein this specification:

PROVISIONS FOR FURNISHING SURVEY INSTRUMENTS /EQUIPMENTS

SCHEDULE G - Survey Instruments/Equipment

Description	Unit	Quantity
Topcon Theodolite, Model TL-20G, 20-second angle accuracy, 30 x-erect image telescope magnification, vertical index compensator, complete with standard accessories including carrying case and adjusting tool set, made in Japan, with aluminum tripod, model TA-165	Unit	1
Wild/Leica Automatic Level, Model NA824, 24 x erect image telescope magnification, complete with standard accessories, with aluminum tripod, model TA-165	Unit	1
50 meters steel tape, K & E or similar	Each	1
Range Poles, 3 meters, Boit Aluminum	Each	3
Leveling Rods, 5 meters, Boit Aluminum	Each	2
Survey Umbrella	Each	1
Index Pocket Steel Tape, 5 meters, with stop locking system	Each	1
Index Pocket Steel Tape, 3 meters, with stop locking system	Each	1
Claw Hammer	Each	1

Adequate supply of pegs, concrete blocks, survey monuments, steel pins, paint hammer, saws, metal templates, straight edges, record book and other materials approved by the Engineer as necessary for the work shall be supplied by the Contractor.

All survey instruments/equipments provided under this item as "Assistance to the Engineer" shall remain the property of the Contractor upon completion of the Contract.

The following survey personnel shall also be provided by the Contractor subject to the approval of the Engineer.

No separate payment shall be made for complying with the requirements of this item as they are considered subsidiary to all pay items of the Contract.

PROVISIONS FOR OPERATION/MAINTENANCE OF SURVEY INSTRUMENTS/EQUIPMENTS

SCHEDULE H - Survey Personnel

Description	Quantity
Instrument Man	one (1)
Survey Aides	two (2)
Draftsman/Plotter	one (1)
Draftsman/Plotter	one (1)

These personnel shall work under the direct supervision of the Engineer or his duly authorized representatives.

A.1.4 Photographs

This item is modified and supplemented as follows:

The Contractor shall provide a photographic record of the Construction Work. Such photographs shall be taken when and where as directed by the Engineer or under the following occasions or events:

a) When a portion of the work is difficult or impossible to inspect at the time of a particular operation, where a portion will be covered by backfill, or filling materials after completion and acceptance of the work by the Engineer.

b) When or where special or unusual features of the work or latent conditions on the site are present.

When taking the photographs, the Contractor is required to observe that:

a) An Indicator such as scale, pole or similar item shall be placed thereon to signify or illustrate the relative dimensions of the pictures.

b) Each picture shall be captioned and identified as to date, location, description of the work in progress or completed operation or activity or presence of unusual features.

c) Each picture shall be properly referenced.

d) The picture shall be clearly discernible in color having a dimension of not less than 12.5cm x 9cm (D.O. No. 55, Series of 1994).

All photographs shall be submitted at intervals of not less than one (1) month or as required, taken selectively by the Engineer, which represent the progress of the works.

The photographs selected by the Engineer, which shall have his signature with copies furnished by the Contractor, shall be compiled in albums provided by the Contractor for the purpose and shall be so arranged in consecutive order in accordance with the construction program submitted to and approved by the Engineer. Each album shall show the name of the Project on the cover and shall contain a location map of the construction site.

All photographs retained by the Engineer shall become the property of the Owner.

A set of photographs shall consist of ten (10) proof prints at ten (10) each per month.

A.2 MEASUREMENT AND PAYMENT

A.2.1 Measurement

Delete Sub-items 1 to 6 and substitute the following:

1. Lump sum items shall be provided for the following:

    a) Combined Field Office and Laboratory Building and Living Quarter for the Engineer including facilities for electricity, potable water, sewage and drainage system. The lump sum shall also include the cost of site preparation and ground improvement.

    b) Provisions for furnishing Furnitures/Fixtures, Equipment and Appliances and publications specified under SCHEDULE A and B.

    c) Provisions for furnishing Laboratory Testing Equipment/Apparatus specified under SCHEDULE C.

    d) Provisions for temporary field office, laboratory and living quarters for the Engineer on a rental basis for three (3) months.

2. Operation and maintenance of the temporary and permanent Field Office, Laboratory and Living Quarters for the Engineer specified under SCHEDULE D will be paid for from the time the Engineer occupies the buildings until the final completion of the Contract. Payment shall be made on a monthly basis at the contract unit price shown in the Bill of Quantities.

3. All supplies and consumable stores for the combined Field Office/ Laboratory and the Living Quarters shall be in accordance with SCHEDULES E and F herein this specification. Payment shall be made on a monthly basis.

4. The quantities for the provisions of communication system provided on rental basis shall be the number of each type of communication equipment supplied including maintenance, accessories, licenses and fees, and shall be paid on a monthly basis.

5. Operation and maintenance of vehicles for the Engineer as specified will be paid for during the time which the Engineer is supplied with each type of vehicles until the completion of the project. The unit of measurement to be paid shall be per vehicle per month.

6. The quantities for progress photographs shall be the number of photos taken and the number of each selected pictures provided as progress photographs.

A.2.2 Payment

Add herein this item the following as:

Payment will be made under:

Pay Item No.	Description	Unit of Measurement
A (1) a	Provision of Combined Field Office, Laboratory Building and Engineer's Quarter	Lump Sum
A (1) b	Operation / Maintenance Combined Field Office / Laboratory Building and Living Quarters for the Engineer (Schedule D)	Month
A (1) c	Provision of Furnitures / Fixtures for the Combined Field Office /Laboratory Building and Living Quarters for the Engineer (Schedule A)	Lump Sum
A (1) d	Provision of Equipment and Appliances for the Combined Field Office /Laboratory Building and Living Quarters for the Engineer (Schedule B)	Lump Sum
A (1) e	Provision of Office Supplies and Consumable Stores for Field Office, Laboratory and Living Quarters for the Engineer (Schedule E and F)	Month
A (1) f	Provide / Operate / Maintain Communication Equipments for the Engineer (Rental Basis)	Month

A (2) a	Provide/Operate/Maintain one (1) Service Car, Sedan, 1600 CC, gasoline engine (Rental Basis)	Vehicle-Month
A (2) b	Provide/Operate/Maintain two (2) Wagon Type Service Vehicle (Rental Basis)	Vehicle-Month
A (2) c	Provide/Operate/Maintain three (3) 4WD Pick-Up Type, Double Crew Cab Service Vehicle for the Engineer (Rental Basis)	Vehicle-Month
A (3) a	Provision of Testing Equipments, Apparatus and Publications (Schedule C)	Lump Sum
A (3) b	Progress Photographs (Proof Prints and Negatives)	Each

PART B

OTHER GENERAL REQUIREMENTS

PART B - OTHER GENERAL REQUIREMENTS

The text under Part B of the General Specifications is modified to read as follows:

B.1 OFFICES, SHOPS, STORES AND WORKMEN'S ACCOMMODATION FOR CONTRACTOR

Add the following specifications at the end of this item as follows:

The selection of the site shall be the responsibility of the Contractor and shall be approved by the Engineer. It is entirely up to the Contractor to make whatever arrangements he deems necessary with the landowners regarding the use of land for the purpose of erecting camps, workshops, garages, stockpiling of materials, locations of plant, housing of labor and staff, welfare facilities, etc. All costs incurred in connection with the rental or lease of such land shall be at the Contractor's expense.

The Contractor shall be solely responsible for the erection, maintenance and subsequent disposal of whatever facilities he deems necessary to execute the Works.

The Contractor shall not be permitted to erect temporary buildings or structures within the road right-of-way without prior written approval from the Engineer.

B.2 MEDICAL ROOM AND FIRST AID FACILITIES

Supplement the following as paragraph 5:

The medical room and first aid facilities shall be provided by the Contractor with the following equipment and furniture as a minimum requirements:

One (1)	ea	Washbasin (hand) with hot and cold water tap
Two (2)	ea	Beds
Two (2)	ea	Chairs
One (1)	ea	Office Table
One (1)	ea	Electric kettle or other equipment for boiling water
One (1)	set	Complete first aid outfit (as may be required by the subsequent amendment thereto). An adequate supply of bed sheets, pillows, blankets and linen. The medical room shall be provided with water supply and electricity at all times and shall be adequately lighted and ventilated.

Delete the title and text of B.3 and substitute the following:

B.3 STIPULATIONS RELATING TO CONTRACT DOCUMENTS

In connection with the Contract Documents issued by the Department of Public Works and Highways, the Bidder/Contractor is instructed to observe and comply with the following stipulations:

a) All informations are for the exclusive use of the Employer, Engineer and the Bidder/Contractor and should be treated as private and confidential.

b) The data in the Bid Documents which are obtained, recorded and given interpretation in accordance with accepted engineering principles, practices and methodology for purposes of design shall be considered as basis or reference in securing bids and/or determining working activities and construction operations. It is assumed that data may indicate the actual site conditions to be encountered and it is the Contractor's obligation to conduct his own field examination and investigation.

c) The submission of bids shall be done as sufficient evidence that the Contractor has performed such examination and investigation.

d) Refer to Article 1.8 of the Instructions to Bidders for requirements of the Contractor to attend organized site visit.

e) If during the execution of the Works there should exist variations from the data originally contained in the Contract Documents, it shall be the Contractor's responsibility to forthwith notify the Engineer in writing for such variations, who in turn shall issue also in writing for appropriate instruction. The Contractor shall not be compensated for whatever variations of work may arise unless otherwise proper notification to the Engineer has been made. Refer to Clause 13.1 of the Conditions of Contract.

Add the following specification to read as:

B.4 QUALITY CONTROL OF MATERIALS

All Quality Control Procedures should be in accordance with the DPWH Bureau of Research and Standard Requirements and the Construction Manager's own Quality Control/Quality Assurance Procedure.

B.4.1 Source of Supply and Quality of Materials

Promptly after receiving the contract award, the Contractor shall notify the Engineer of all proposed material sources, including fabricators of steel or other finished products. Prior to delivery of materials, sources shall be approved first by the Engineer. If approved sources are unable to provide acceptable or uniform products, the Contractor shall locate other sources and obtain approval from the Engineer.

All equipments, materials, and articles incorporated into the permanent work shall:

1. Be new, unless the Specifications permit otherwise;
2. Meet the requirements of the contract and be approved by the Engineer;
3. Be inspected or tested at any time during their preparation and use; and
4. Not be used in the work if they become unfit after being previously approved.

B.4.2 Samples and Tests for Acceptance

The Contractor shall deliver material samples (from the Contractor, Producer, or Fabricator) to the Engineer prior to execution of work. In providing samples, the Contractor shall provide the Engineer with sufficient time and quantities for approval before use. The Engineer may require samples at any time. Samples not taken in the presence of the Engineer will not be accepted for test, unless the Engineer permits otherwise.

The Contractor shall designate his experienced personnel as direct contact person for major item testing and acceptance. In case of his absence, the Contractor shall designate other personnel of the same experience to ensure the direct contact is maintained during the execution of work.

The Engineer will designate also an experienced representative as point of contact for materials testing and acceptance.

All field and laboratory materials testing to be undertaken by the Contractor, shall be in accordance with the methods described in the contract documents, or in the recognized standards of national organizations. The following provisions will apply when the Contractor uses the specifications or methods from the sources named hereunder.

ASTM – American Society for Testing and Materials. The ASTM designation number refers to this society's latest adopted or tentative standard. The standard or tentative standard in effect on the bid advertising date, will apply in each case.

Copies of any separate ASTM specifications or testing method may be obtained from: the American Society for Testing and Materials, 1916 Race Street, Philadelphia, USA.

AASHTO – American Association of State Highway and Transportation Officials. An AASHTO number refers to that organization's currently published (1) "Standard Specifications for Transportation Materials and Methods of Sampling and Testing" or any adopted revisions, or (2) "Interim Specifications and Methods of Sampling and Testing adopted by the AASHTO Subcommittee on Materials."

Any standards, revisions, and interim standards in effect on the bid advertising date will apply.

Copies of "Standard Specifications for Transportation Materials and Methods of Sampling and Testing" may be obtained from the American Association of State Highway and Transportation Officials, 917 National Press Building, Washington, DC, USA.

B.4.3 Removed and Rejected Materials

The Contractor may, prior to sampling, select to remove any defective material(s) and replace it with new material(s) at no expense to the Employer. Any such new material will be sampled, tested and evaluated for acceptance as a sub-lot in accordance with the sampling and testing procedure.

The Engineer may reject a sub-lot wherein tests show to be defective. Such rejected material shall not be used in the work, and the results or tests run on the rejected material will not be included in the original lot acceptance tests.

B.4.4 Manufacturer's Certificate of Compliance

The Engineer may accept certain materials on the basis of a Manufacturer's Certificate of Compliance as an alternative to material inspection and testing. When a Manufacturer's Certificate of Compliance is authorized by these Specifications, the certificate shall be furnished prior to the use of material.

The Contractor may request, in writing, authority from the Engineer to install such material prior to submitting the required certification; however, no payment shall be made for the work in the absence of the acceptable Manufacturer's Certificate of Compliance. The Employer reserves the right to deny the request for good cause.

If for any reason, the Contractor has no acceptable Manufacturer's Certificate of Compliance on the completion date of the work, the Employer may process the final payment without paying for the work performed on such basis.

The Manufacturer's Certificate of Compliance must identify the manufacturer, the type and quantity of material being certified, the applicable specifications being affirmed, and the signature of a responsible corporate official of the manufacturer and include supporting mill tests or documents. A Manufacturer's Certificate of Compliance shall be furnished with each lot of material delivered to the site and the lot so certified shall be clearly identified in the certificate.

All materials used and identified in the Manufacturer's Certificate of Compliance may be sampled and tested at any time. Any material not conforming to the requirements will be subject to rejection whether in place or not. The Employer reserves the right to refuse to accept materials not on the basis of a Manufacturer's Certificate of Compliance.

B.4.5 Handling and Storing Materials

In storage and handling, the Contractor shall protect any materials against damage from careless handling, from exposure to weather, from mixture with foreign matter, and from all other causes. The Engineer will reject and refuse to test materials improperly handled or stored.

B.4.6 Sieves for Testing

Test sieves shall be made either: (1) of woven wire cloth conforming to AASHTO Designation M 92 or ASTM Designation E 11, or (2) of square-hole, perforated plates conforming to ASTM Designation E 323.

B.4.7 The Contractor shall comply with the requirements of the **"Revised Schedule of Minimum Test Requirements Governing Items of Work of the DPWH Standard Specifications for Highways, Bridges and Airports, Volume II"**. Appendix "A" is a copy of the DPWH Memorandum Circular dated 25 January 1989 containing the said "Revised Schedule".

B.5 TRANSPORTATION AND HANDLING

B.5.1 Description

This Item sets out the requirements for the transportation and handling of soils, asphalt and concrete materials, pre-cast concrete items, equipment and tools, and other materials required by the Contractor for the completion of work.

The provisions of Item B.4 Quality Control of Materials shall be treated as being complementary to the contents of this Item.

B.5.2 Construction Requirements

B.5.2.1 Standards

Work processes shall be conducted in strict conformity with the National, Provincial and District regulations governing the work as well as requirements for the preservation of natural resources and the environment.

B.5.2.2 Coordination with Others

The Contractor's attention is directed to the fact that he will be required to coordinate his transport operations with the work being performed or to be performed on other Contracts, with work of the subcontractors, utility companies and others as may be required.

If interference in operations of different Contractors, the Engineer shall have a sole power to direct each Contractor and to determine the sequence of work necessary to expedite the completion of the entire project, and in all cases his decision shall be accepted as final and no cause for claim.

B.5.2.3 Weight Limitations and Legal Requirements

If required, the Engineer may impose weight restrictions for the protection of any existing road or structure within the vicinity of the project. The Contractor shall have site responsibility for complying with all legal weight restrictions on existing roads and highways used for his work. The Contractor shall provide portable scales as may be required to ensure compliance.

The Contractor shall be responsible for any damage to roads or structures resulting from his construction operations.

In case hauling operations made by the Contractor may cause damage to public road or structure, or may cause flooding which results to stop the operation, the Engineer

may direct the Contractor to use an alternative route. The Contractor shall have no right of any claims for additional compensation to his damage during operations.

B.6 FIELD ENGINEERING SERVICES

B.6.1 Description

The Contractor shall provide all necessary skilled and experienced engineering personnel to execute both survey and any field works conforming to the requirements given to him by the Engineer. Quality performance of work and strict conformity to the dimensions required by the Engineer shall be observed in the field.

Field survey work to be performed by the Contractor shall include but not necessarily limited to the following:

1. Setting-out / staking-out of the Works; and
2. Measurements for pay quantities

In addition to the above routine field survey services, the Contractor shall provide geo-technical engineering specialist to monitor and ensure compliance with additional soil borings, if ordered by the Engineer.

B.6.2 Setting-Out / Staking-Out of the Work

1. The Contractor shall have sole responsibility for establishing and maintaining all horizontal and vertical control points required or as may be directed by the Engineer. Information for the existing control monuments is shown on the Plans and shall be used by the Contractor for establishing the horizontal and vertical controls needed for his work.

2. Schedule and notification to survey shall be provided to the Engineer and be subject for review and monitoring by the Engineer's representative.

3. The Contractor shall make minor adjustments subject to the Engineer's approval in the event that discrepancies are found between the information shown on the Plans and the actual field conditions.

4. From the control points provided by the Engineer and Employer, the Contractor shall establish all additional and intermediate controls for accurately locating all structures, centerlines, right-of-way limits, slopes, etc. as shown on the Plans and required by the Contract.

5. Should the Engineer so require, the Contractor shall to the extent required to provide to the Engineer all necessary instruments, personnel, labor and

materials that the Engineer may require for checking the setting out or for any other relevant work to be done.

B.6.3 Measurements for Pay Quantities

1. The Contractor and Engineer shall jointly measure the Works for the purpose of establishing progress and final pay quantities.

2. The Contractor shall provide all necessary personnel and equipment to perform the measurements for payment required by the Contract. Such measurements and quantity calculations will not be accepted unless conducted jointly with and monitored by the Engineer.

3. Whenever required for the purposes of measurement of quantities, the Contractor shall take cross sections on the original ground at intervals of 20 meter or less, as directed by the Engineer. The profiles so established shall be plotted on tracing paper to a scale, size and layout as stipulated by the Engineer. The drawn cross sections shall include the proposed finished lines derived from the approved design details.

   The original profile together with the three copies shall be submitted to the Engineer who will endorse one copy with his approval, or his revision thereof, and return it to the Contractor.

4. At any locations, measurement for pay quantities shall require material volumes to determine the difference between the after-construction (or design) profile and the existing before-construction profile. The Contractor shall carry out as a part of his routine survey work all the necessary topographic surveys in sufficient details to enable the work volumes to be accurately calculated.

5. The Contractor in his routine survey work for quantity measurement requires not only geometric measurement using precise levels, theodolites, chains, etc. but also the taking and measuring of the pavement cores. The Contractor is also required to check the embankment thickness by auger boring or settlement plates. He also keep the haulage truck tallies; determine the asphalt density and bitumen content in both the laboratory and the field; and all such other methods of work volume measurement as the Engineer may direct. The detailed requirements for the measurement of the Works are specified for each Pay Item in the relevant sections of these Technical Specifications.

B.7 PROJECT RECORD DOCUMENTS

B.7.1 Description

Throughout the progress of the Works, the Contractor shall maintain the accurate records of all changes in the Contract Documents on a "Job Set" herein specified and shall transfer the final as built information to the Final Record Documents before the completion of the Works.

B.7.2 Submittal Requirements

1. Submit or make available for review by the Engineer's representative, the job set of Project Record Documents as currently maintained on the 25th of each month. The Engineer's approval of these documents will be a prerequisite for approval of the Monthly Progress Payment Certificates.

2. Submit for the Engineer's approval the Final Project Record Documents at the time of application for Certificate of Substantial Completion. Accompany the submittal with a transmittal letter, containing:
   - Date;
   - Project title and number;
   - Contractor's name and address;
   - Title and number of each record document;
   - Certification that each document as submitted is complete and accurate; and
   - Signature of the Contractor, or his authorized representative.

B.7.3 Project Record Documents

1. Job Set

   Promptly following the Award of Contract, the Contractor shall obtain from the Engineer at no cost to the Contractor, two complete sets of all Documents comprising the Contract.

   The Job Set will include (unless otherwise stated in the Contract) the following:

   - Conditions of Contract
   - Contract Drawings
   - Specifications
   - Addenda
   - Other Modifications to the Contract (if any)

2. Storage of Job Set

The job set shall be stored in the field office in files and racks and the Contractor shall maintain the job set protected from loss and damage until the transfer of as-built data to the Final Project Documents has been completed.

The record documents shall not be used for construction purposes and the documents shall be available at all times for inspection by Engineer and Employer.

B.7.4 Project Records for Materials & Equipment

All records concerning the testing and approval of materials and equipment to be incorporated into the Permanent Works shall form a part of the project records. The Contractor shall develop and maintain a record system which clearly shows the current status of all material sources, testing and approval. All approved samples shall be maintained at the job site.

B.7.5 Update and Maintenance of the Job Set Documents

1. Responsibility

   The Contractor shall delegate the responsibility for the maintenance of Record Documents to his authorized person as prior approved by the Engineer.

2. Identification

   Immediately upon receipt of the job set, identify each of the Documents with the title "PROJECT RECORD DOCUMENTS - JOB SET", in 5 cm high printed letters.

3. Preservation

   Considering the Contract completion time, the probable number of occasions upon which the job set must be taken out for new entries and for examination, and the conditions under which these activities will be performed, devise a suitable method for protecting the job set to the approval of the Engineer.

4. Marking Entries on Drawings

   Using an erasable colored pencil (not ink or indelible pencil), clearly describe the change by notes and by graphic lines as required. Date all entries, call attention to the entry by a "cloud" around the area or areas affected. In the event of overlapping changes, different colors may be used for each of the changes. Keep record documents current and do not permanently conceal any work carried out.

Legibly mark and record the actual construction details such as:

a. Depths of various elements of foundation in relation to datum shown.

b. Horizontal and vertical location of underground utilities referenced to permanent surface improvements.

c. Locations of internal utilities concealed in construction referenced to visible and accessible features of structures.

d. Field changes of dimension and detail

e. Changes made by Change Order.

f. Details not on original Contract Drawings.

5. Timing

All entries shall be made within 24 hours after receipt of the information.

6. Accuracy

Use all the necessary means including the proper tools for measurement to determine the actual locations of the installed items and the accuracy of entries.

The Contractor shall thoroughly coordinate all the changes within the Record Documents and adequately and properly mark such changes on each page of the Specifications, on each sheet of Drawings and other Contract Documents. The accuracy of records shall be such that any future search for items shown on the Contract Documents may be obtained from the approved Record Documents.

B.7.6 Final Record Documents

1. General

The purpose of the Final Record Documents is to provide factual information regarding all aspects of the Works, both concealed and visible, to enable future modification of design to proceed without lengthy and expensive site measurement, investigation and examination.

2. Transfer of Data to Drawings

Carefully transfer all changes of data shown on the job set of Record Drawings to the corresponding original drawing of the Final Report Drawings and clearly indicate the full description of all changes made during construction and the actual location of all items. Call attention to each entry by drawing a "cloud" around the area or areas affected. Make all change entries on the originals neatly, consistently, and in ink or crisp black pencil.

3. Transfer of Data to Other Documents

If Documents other than Drawings have been kept clean and neat during the progress of the Work, and if entries have been sufficiently and orderly with the approval of the Engineer, the job set of those Documents (other than Drawings) will be accepted by the Engineer as Final Record Documents. If any such document is not so approved by the Engineer, secure a new copy of that document from the Engineer and carefully transfer the change data to the new copy for the approval of the Engineer.

4. Review and Approval

Submit the completed set of Final Record Documents to the Engineer at the time of application for the Take Over Certificate. If requested by the Engineer, participate in a review meeting or meetings, execute any required changes and promptly re-submit the Final Record Documents to the Engineer for his acceptance.

5. Changes Subsequent to Acceptance

The Contractor shall have no responsibility of recording changes to the Works subsequent to the issue by the Engineer of the Take Over Certificate. He shall be responsible only for changes resulting from replacements, repairs, and alternations made by him as part of his guarantee, or additional work that he has agreed to carry out during the Defects Liability Period.

B.8 PROVISIONS FOR PASSAGE OF TRAFFIC

The Contractor shall construct and maintain detours wherever the work will interfere with traffic on existing roads, footways or other ways over which there is a public or private right-of-way, until such time as permanent diversions to serve such traffic shall have been completed. No detours shall be constructed and no traffic diverted until the Contractor's proposals therefore have been approved by the Engineer and by the appropriate government authorities. Prior to the commencement of the construction and of the use of detours, the Contractor shall provide the Engineer with a full photographic record of the existing roads, pathways, etc. as directed by the Engineer and shall have the necessary temporary road signs ready for use.

No work will be in any way inconvenient to the traveling public shall be started until adequate provision satisfactory to the Engineer, shall have been made to divert or by-

pass the traffic in safety and in comfort. No road shall be closed to the public except by permission in writing from the Engineer and from the appropriate government authorities. Where traffic conditions permit, one-way-lane may be permitted by the Engineer. When road under construction is being used by the traveling public, special attention shall be given to traffic conditions so that the public can travel in comfort and safety without undue delay. Material stored upon the roadway shall be so well placed and the work shall be so conducted as to cause as little obstruction as possible to the traveling public.

All detours shall be maintained in good condition at all times, if possible and if not specified to be in a higher standard, shall have a total width of at least 6 meters and provided with graveled surface having a minimum compacted thickness of 80 mm. Where existing public or private roads are used as detours, the same shall be maintained in good riding condition at all times and just before completion of the Contract, such roads shall be restored to a condition not less satisfactory than that existing prior to the commencement of the work.

Where part-width construction is adopted, the part-width not under construction shall be made available to public traffic under alternate one-way control.

In such case, the Contractor shall furnish flagmen, pilot car and drivers to direct traffic through the section of road under one-way control. The length of part-width construction shall not exceed 500 m for each section and the distance between successive sections of part-width construction shall not be less than 500 m.

The Contractor shall so conduct his operations as to offer the least possible obstruction, inconvenience and delay to traffic and shall be responsible for adequate traffic control to achieve such an end.

Suitable warning signs, illuminated at night by electric bulbs, lanterns or flares shall be provided to mark the places not yet available to traffic. In part-width construction, the Contractor shall place acceptable barricades along the inside edge of the available surface so that traffic will be confined therein while the other part-width is under construction. One-way control shall continue until the adjoining surface is completed and opened to traffic.

At sections where part-width traffic is in operation, and when so ordered by the Engineer, the movements of the Contractor's equipment from one place of work to another shall be subject to such part-width traffic control. Spillage resulting from hauling operations along or across the roadway, shall be removed immediately at the Contractor's expense.

For further details in connection with "Provisions for Passage of Traffic" see Item SPL 900 (1) - Traffic Management During Construction provided hereinafter.

B.9 DISPOSAL OF MATERIALS OUTSIDE THE PROJECT BOUNDARIES

Proper disposal of materials outside the project boundaries shall be the responsibility of the Contractor. He shall make his own arrangements for the disposal of materials outside of the project boundaries and all the costs involved therein including the cost of hauling shall be considered as covered under the pay items involved in the Contract.

When any materials including excess or unsuitable materials from excavations are to be disposed of outside the project boundaries, the Contractor shall first obtain a written permit from the property owner of the proposed disposal site. He shall submit to the Engineer the said permit or a certified copy thereof, together with a written release from the property owner absolving the Government from any and all responsibilities in connection with the disposal of materials into his property. No material shall be disposed prior to the receipt of written approval and permission from the Engineer.

When materials are disposed of as provided above and if the site is visible from the highway, the Contractor shall make the disposal in a neat and presentable condition as to the satisfaction of the Engineer. The disposal site must not be an eyesore.

B.10 CLEARING/FINISHING THE SITE

Upon completion of all construction operations, the entire roadway or roadways shall be finished/cleared as specified herein these specifications.

Stockpiling of materials on the finished pavement and drifting of materials across the pavement will not be permitted. The finished pavement shall be cleaned of all dirt and foreign materials.

The slopes in embankments; excavations; road approaches; road connections; ditches; channel changes; and material sites within or adjacent to the project boundaries shall be cleared and finished to the lines and grades called for on the plans. Ditches and channels within or adjacent to the project boundaries shall be cleared of debris and obstructions. Sewers, culverts and other drainage facilities and their appurtenant structures constructed under the contract shall be cleaned out. All stores and other waste materials exposed on slopes, which are liable to become loosened, shall be removed and disposed of. All materials and debris resulting from clearing and grubbing operations not previously removed shall be disposed of.

All materials resulting from the above-specified clearing/finishing operations shall become the property of the Contractor and shall be disposed of outside the project boundaries unless otherwise permitted by the special provisions.

Disposal of materials outside the highway right of way shall be in accordance with the provision in Item B.10, "Disposal of Materials outside the Project Boundaries". The entire roadway and right of way shall be left in a neat and presentable condition.

B.11 MEASUREMENTS

B.11.1 Measurement of Quantities

In measuring all acceptably completed bid items of work, the Engineer will:

1. Use SI metric standard measure;

2. Make all measurements as described in this item, unless individual specifications require otherwise;

3. Follow methods generally recognized as conforming to good engineering practice;

4. Conform to the usual practice of the Employer by carrying measurements and computations to the proper significant figure or fraction of units for each item, but not exceeding one decimal place; and

5. Measure horizontally or vertically (unless otherwise specified).

The items listed below shall be defined as follows in all measurements under this item:

1. "Lump Sum" (when used as an item of payment): complete payment for the work described for that item in the contract.

2. "Gage" (in measurement of plates): the U.S Standard Gage.

3. "Gage" (in measurement of galvanized sheets used to manufacture corrugated metal pipe, metal plate, pipe culverts and arches, and metal cribbing): that specified in AASHTO M 36, M 167, M 196, M 197, or M 219.

4. "Gage" (in measurement of wire): that specified in AASHTO M 32.

5. "Tonne" : The metric ton equal to 1,000 kilograms of weight.

For each basis of measurement listed below, the Engineer will use the method of measurements as described herein.

1. Square Meter or Hectare - Measured on the neat dimensions shown on the plans or dimensions altered by the Engineer.

2. Linear Meter (pipe culverts, guard rail, under drains, etc.) - measured parallel to the structure's base or foundation or unless the plans require otherwise.

3. Weight - weighed as required in Item B.13.2.

Volume (of excavation and embankment) - measured by the average-end-area method. All or some computations may be based on ground elevations and other data derived photogrammetrically. The Engineer may correct for curvature.

For each item listed below, the Engineer will use the method of measurement described herein as:

Structure - measured on the neat lines shown on the Plans or as dimensions altered by the Engineer. When a complete structure or structural unit is specified as the unit of measurement, the unit shall include all fittings and accessories.

Standard Manufactured Items (fence, wire, plats, rolled shapes, pipe conduit, etc., when specified) - measured by the manufacturer's identification of gage, unit weight, section dimension, etc. The Engineer will accept manufacturing tolerances set by each industry unless cited specifications require more stringent tolerances.

Cement - measured by bags

Asphalt - measured by the tonne.

No measurement will be made for :

1. Work performed or materials placed outside lines shown on the Plans or set by the Engineer;

2. Materials wasted, used, or disposed of in manner contrary to the contract;

3. Rejected materials (including those rejected after placement if the rejection resulted from the Contractor's failure to comply with the contract);

4. Hauling and disposing of rejected materials;

5. Material remaining on hand after the work is completed, except as provided in the contract; and

6. Any other work or material contrary to any contract provision.

B.11.2 Weighing Equipment

B.11.2.1 General Requirements for Weighing Equipment

Any highway or bridge construction materials to be proportioned or measured and paid for by weight, shall be weighed on scales. These materials include natural, manufactured, or processed materials obtained from natural deposits, stockpiles, or bunkers. The Contractor shall provide, set up, and maintain certified scales to their good weighing condition and use it permanently all throughout weighing work.

Scales shall :

1. Be accurate to within one-half of 1 percent throughout the range of use;

2. Not include spring balances;

3. Include beams, dials, or other reliable readout equipment;

4. Be arranged so that operators and inspectors can safely and easily see dials, beams, rods, and operating scale mechanisms;

5. Be built to prevent scale parts from binding, vibrating, or being displaced and to protect all working parts from falling material, wind, and weather; and

6. Be carefully maintained, with (a) bunkers and platforms kept clear of accumulated materials that could cause errors and (b) knife edges given extra care and protection.

At each batching and platform scale location, the contractor shall keep standard weights for scale calibration and testing. If the Engineer has approved other calibration and testing equipment, the contractor may substitute it for these weights.

B.11.2.2 Specific Requirements for Batching Scales

1. All materials proportioned by weight shall be weighed on an accurate and approved scale by qualified operators employed by the Contractor. The scales shall be positioned at locations required and approved by the Engineer.

2. Each scale shall be designated to support a weighing hopper. The arrangement shall make it convenient for the operator to remove material from the hopper while watching read-out devices. Any hopper mounted on a platform scale shall have its center of gravity directly over the platform centerline.

3. Marked intervals on the read-out device shall be spaced evenly throughout and shall be based on scale's nominal rated capacity. These intervals shall be at least 0.5 kilogram but shall not exceed one-tenth of 1 percent of nominal rated capacity.

4. An agent of the scale manufacturer shall test and service any batch scale before its use at each new site and then at 6-month intervals. The Contractor shall provide the Engineer a copy of the final results after each test. Whenever the Engineer requests, the Contractor's operator(s) shall test the scale while the inspector observes.

5. Portland or asphalt cement shall be weighed on a scale not used for other materials.

B.11.2.3 Measurement

If testing shows the scale has been under weighing, it shall be adjusted immediately. The Contractor shall not be compensated for any loss from under weighing.

If the scale has been overweighing, its operation will cease immediately until adjusted. The Employer will calculate the combined weight of all materials weighed after the last test showing accurate results. This combined weight will then be reduced by the percentage of scale error that exceeds one-half of 1 percent.

B.11.2.4 Payment

The Employer will pay for no materials received by weight unless they have been weighed as required in this item or as required by another method the Engineer has approved in writing.

Payment will not be made for any material over the maximum gross legal weight for the hauling vehicle.

Unit contract prices for the various pay items of the project cover all costs related to weighing and proportioning materials for payment. These costs include those for furnishing, installing, certifying, and maintaining scales, those for furnishing check weights and scale house, and those for any other related item covered in this specification.

B.12 PROJECT SIGN BOARD

Unless otherwise specified in other pay item of the contract, the Contractor shall provide and erect project signboard at the exact location approved by the Engineer. The design, layout and wording are all to be approved by the Engineer. All signboards shall display the title of the project, the name of the Employer, the funding agency and the consulting engineering company, and the funding Loan Agreement Reference Number. The signboard shall be maintained in good condition throughout the duration of the Contract, and shall be removed upon completion of the project to the satisfaction of the Engineer.

B.13 MEASUREMENT AND PAYMENT

Unless specifically included in the Bill of Quantities as pay item(s) of work, under **PART B – OTHER GENERAL REQUIREMENTS**, the work(s) shall not be measured for direct payments but shall be considered as subsidiary work for other related Pay Items.

PART C

EARTHWORK

PART C - EARTHWORK

ITEM 100 CLEARING AND GRUBBING

100.1 Description

The first sentence of this Section is modified as follows:

This Item shall consist of the removal and satisfactory disposal of all materials including trees, stumps, roots, vegetations, logs, wastes, debris, top soil and protruding objects except those that are designated to remain in accordance with other items of the Specifications and where directed by the Engineer. The holes resulting from grubbing operations, where directed by the Engineer, shall be filled with approved materials which shall be deposited and compacted to the same dry density as that of the adjoining soil.

100.2 Construction Requirements

100.2.1 General

This Sub-section is supplemented as follows:

Clearing shall be extended to one (1) meter beyond the toe of the fill slopes, or rounding cut slopes, or outside edge of drainage facilities as the case maybe, for the entire length of the project, unless otherwise shown on the Drawings or as directed by the Engineer, with the exception of trees or brush under the jurisdiction of the Bureau of Forest Development and other trees and shrubs designated for preservation. These trees, shrubs or bushes designated to be remained in place shall be carefully trimmed as directed by the Engineer and shall be protected from scarring, debarking and other injuries during construction operations.

100.2.2 Clearing and Grubbing

Add the following after paragraph (4):

In areas covered by cogon, wild grass, talahib and other vegetations, top soil shall be cut with a depth of 20 to 30 centimeters below the original ground surface or as designated by the Engineer, and shall be disposed of outside the clearing and grubbing limits as indicated in the typical roadway section or to the disposal area directed by the Engineer.

100.2.3 Individual Removal of Trees or Stumps

Add the following to read as second paragraph:

The Contractor, prior to any tree cutting/removal operation shall prepare inventory of trees scheduled for cutting/removal for the Engineer's approval. Trees to be cut shall be submitted in tabulated form showing as much information for easy identification as follows:

- Station Limit
- Description/Name/Species of Trees
- Size, Diameter (in centimeter)

- Distance from the centerline of the road
- Location (Left/Right)

Upon Engineer's approval of the list, the Contractor shall make a request from the Local DENR (with the approved list attached) that such number of trees will be cut/removed for the improvement of the project road. No tree shall be cut/removed unless a "PERMIT TO CUT TREES" is issued by the DENR to the Contractor authorizing him to cut only such approved number of trees.

Trees cut shall be disposed of in a manner conforming to the requirements of Sub-section 100.2.2 and with the requirements contained in the DENR permit.

All fees relating to securing permit(s) shall be to the expense of the contractor.

Sizes of individual trees intended to be removed and relocated as indicated on the Drawings or as designated by the Engineer shall be removed and relocated by the Contractor with care.

100.3 Method of Measurements

Delete paragraph (1) and replace with the following to read as:

1. Area Basis: The work to be paid for shall be based on the total area cleared and grubbed which is calculated in hectares within the limits defined on the drawings or as directed by the Engineer including adjustment that may be made to satisfy certain site requirements.

2. The diameter of trees will be measured at a height of 1.4 m (54 inches) above the ground and trees less than 150 mm (6 inches) in diameter will not be measured for payment. In the measurement of trees by individual unit basis, the unit will be designated and measured in accordance with the following shedule of sizes:

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

100.4 Basis of Payment

The following paragraph shall be supplemented:

Pay Item 100 (1), Clearing and Grubbing shall be paid in hectares and shall include the cost of removing all trees except those called for in Items 100 (3) and (4) located in the area designated to be cleared and grubbed. Removal of trees categorized as small and large in Items 100 (3) and 100 (4) shall be paid by the total number of trees removed.

Payment will be made under:

Pay Item No.	Description	Unit of Measurement
100 (1)	Clearing and Grubbing	Hectares
100 (3)	Individual Removal of Trees	Each

100 (4)	Small (150mm – 900mm dia.) Individual Removal of Trees Large (Over 900mm dia.)	Each

ITEM 101 REMOVAL OF STRUCTURES AND OBSTRUCTIONS

101.2 Construction Requirements

101.2.2 Removal of Bridges, Culverts and other Drainage Structures

This Sub-section is modified and supplemented with the following:

a) Bridges

The Contractor shall dismantle, remove and dispose of the existing bridges to be demolished only after the detour structure is completed and traffic is diverted where required. The bridge substructure, if included in the demolition/removal, shall be razed 30 cm from stream bottom and those parts outside the stream shall be removed to a minimum of 60 cm below the proposed ground surface. Where such substructure to be removed are supported on piles, the piles shall be cut 50 cm below the stream bottom or as directed by the Engineer. Where such portions of existing bridges lie wholly or in part within the limits for new bridges, they shall be removed as necessary to accommodate the construction of the proposed structures. If substructures were shown to be retained, such shall be protected during the dismantling/demolition operation to prevent them from getting damaged. Any damage on portions shown to be retained shall be repaired and made good by the Contractor at his own cost and to the satisfaction of the Engineer. Disposal of materials from demolished bridges shall be at the direction and to the satisfaction of the Engineer. Materials required to be salvaged, shall be hauled and stored into stock area designated by the Engineer.

b) Box Culverts (if any)

Structures to be either removed or demolished at locations where box culverts are to be constructed shall be disposed of as directed by the Engineer. Materials to be salvaged in connection with the demolition/removal shall be hauled and stored as directed. Where existing concrete structures are to be demolished, such materials, if approved by the Engineer, maybe utilized for embankment purposes.

c) Reinforced Concrete Pipe Culverts (if any)

Where the removal of structures deals with removal and reinstallation/stockpile of RCP culverts and other drainage structures, the Contractor shall exert extra precautions to prevent damage to the pipes. RC pipes specified to be removed and reinstalled but were damaged during handling shall be replaced by the Contractor at his own expense. All materials to be removed which are not suitable for re-use shall be disposed of as directed by the Engineer, or maybe utilized for filling purposes if found suitable prior to the Engineer's approval.

All other structures removed which are not suitable for use on embankment purposes, shall be stockpiled but disposed away before they may obstruct the prosecution of the Project.

d) Other Drainage Structures

Existing slope protection structures such as hand-laid rock, gabions, and others necessary to be removed under this Specification shall be removed by suitable equipment chosen by the Contractor and approved by the Engineer. Hand-laid rock slope protection shall be demolished, excavated, broken into pieces, removed, hauled and disposed to area designated by the Engineer.

Existing gabions shall be removed by cutting the cages, removing the stones and gravels, hauling and stockpiling to area designated by the Engineer. Stones removed shall be properly stockpiled for future use.

e) Other structures to be removed

All other structures to be removed aside from (a), (b), (c) and (d) within the limits of construction as indicated on the Drawings or as directed by the Engineer which obstruct or interfere the prosecution of the works shall be removed, reinstalled, hauled and stockpiled as the case maybe in accordance with this specification or as directed by the Engineer.

101.2.4 Removal of Pavement, Sidewalks, Curbs, etc.

Supplement the following paragraph to read as:

Where new pavement structure is to be constructed to replace an existing but deteriorated portland cement concrete pavement or asphalt concrete pavement, the slab shall be broken, removed and disposed of as specified on the drawings or as directed by the Engineer.

The use of drop ball or weight shall not be allowed in breaking damaged or deteriorated portions of existing pavement. For asphalt pavement, it shall be removed with the use of motorized grader equipped with straight or articulated blade capable of breaking, scraping and demolishing the existing asphalt concrete pavement.

For concrete pavement, the slab shall be broken with the use of self-propelled hydraulic hammer equipped with interchangeable heads for specific purposes as demolition, breaking and punching. Where necessary, transverse boundaries must be saved full-depth with saw blades.

For existing gravel pavement, it shall be excavated by the Contractor to the desired thickness and elevations shown on the Drawings or as directed by the Engineer. All excavated materials shall be removed, hauled and disposed to area designated by the Engineer. If directed by the Engineer to reuse excavated materials, such materials shall be hauled and stockpiled to proper area designated by the Engineer.

In case where the Engineer instructed the Contractor to cut or remove existing facilities, or parts thereof, such as sewers, drains, water service, gas supply or other utility lines, the Contractor shall provide and maintain satisfactory bypass and/or protection service during the construction period. When only a portion of an existing structure is to be removed, care shall be taken not to impair the value of the retained portion. The use of equipment or devices which might damage the structures, facilities or property meant to

be preserved and retained will not be permitted. During demolition, the contractor shall ensure the safety of his work and the general public.

All materials having salvage value shall be carefully removed to avoid damage and shall be placed in neat piles at the locations to be determined by the Engineer within the construction site. If so provided or directed by the engineer, approved salvaged materials shall be used in the new work, with corresponding adjustment in cost. All other salvaged materials requiring hauling elsewhere (to other individual's use) shall be loaded into the his carrier with the Contractor providing the loading equipment.

All demolished materials not intended for reuse shall be removed or deposited off the site or to disposal area provided by the Contractor and approved by the Engineer.

Add these Sub-sections to read as follows:

101.2.5 Removal of Existing Fence

Existing fence, whether it is barbed wire or cyclone wire as directed by the Engineer to be removed, shall be dismantled and properly be rolled. All posts, concrete or wooden and its foundation shall be pulled by hand or by other mechanical devices. All removed fences, posts and foundation shall be hauled and disposed to the area designated by the Engineer.

CHB fence, post and foundation shall be demolished manually or by mechanical devices, removed, hauled and disposed to area designated by the Engineer.

Resulting holes, trenches and pits due to removal of fences, posts and foundation shall be backfilled and compacted properly as they may level to the original ground line.

101.2.6 Removal of Existing Guardrail

Existing guardrail, whether it is made of steel and concrete or combination of the two inclusive of posts and foundations as directed by the Engineer shall be demolished manually or by mechanical devices, removed, hauled and disposed to area designated by the Engineer. Steel guardrail material intended for reuse and relocation shall be carefully dismantled, removed and stockpiled to safety area designated by the Engineer. It must be covered and protected from corrosion.

Resulting holes and pits due to removal of guardrail, posts and foundations shall be backfilled and compacted properly as they may level to the original ground line.

101.3 Method of Measurement

Substitute this Section to read as follows:

Measurement for the removal of structures and obstructions encountered within the roadway limits shall be paid for on a lump sum basis.

Removal of existing PCC pavement shall be measured and paid for the total net area removed and disposed from the site. No deduction from the cost for the stones and gravels to be reused.

Items not included in the Bill of Quantities shall not be paid for directly, but shall be considered as subsidiary obligation of the Contractor under other Pay Items.

101.4 Basis of Payment

Modify this Section with the following:

The accepted quantities shall be paid for at the Contract unit price or Lump Sum price for each of the Pay Items listed in the Bill of Quantities, which price and payment shall be full compensation for removing and disposing of obstruction, including all materials, labor, equipment, tools and incidentals necessary to complete the work prescribed in this item. The price shall also include backfilling, compacting and hauling of salvaged materials, storage or disposal as provided herein this Specification.

Payment will be made under:

Pay Item No.	Description	Unit of Measurement
101 (1)	Removal of Existing Structures and Obstruction	Lump Sum
101 (3)a	Removal of Existing PCC Pavement	Square Meter

ITEM 102 EXCAVATION

102.1 Description

102.1.1 Roadway Excavation

This Sub-section is amended to read as follows:

Roadway excavation will include excavation and grading of roadways, parking areas, intersections, approaches, slope rounding, benching waterways and ditches; removal of unsuitable material from the roadbed and beneath the embankment areas; and excavating selected materials found in the roadway as ordered by the Engineer for specific use in the improvement. Excavation at the cut sections of the roadway shall be carried down to at least 150 mm below the subgrade level to allow for the placement of selected fill as shown on the drawings. Prior to and after the placement of selected fill, the resulting surfaces shall be compacted to the requirement of Sub-section 105.3.3, Subgrade in Common Excavation.

Roadway excavation will be classified as "Common Excavation", Soft Rock Excavation", or "Hard Rock Excavation" as indicated in the Bill of Quantities and hereunder described.

1. Common Excavation shall consist of suitable material acceptable in accordance with the contract for use in the works and is capable for compaction in accordance with the DPWH Standard Specifications to form a stable fill having side slopes as indicated on the drawings.

2. Soft Rock Excavation shall consist of hard material of suitable size for deposition and compaction in accordance with the DPWH Standard Specifications and may

consist of broken stones or other comparable hard inert material which cannot be ripped by a properly equipped tractor with a drawbar power of 160 hp.

3. Hard Rock Excavation shall consist of hard material in masses (including individual rock boulders exceeding 1.0 m^3 in volume) which in the opinion of the Engineer necessitates the use of blasting or with the use of a bulldozer equipped with ripper with a 350 hp or more drawbar power.

4. The classification of earthwork material shall be subject to the approval of the Engineer.

102.1.2 Borrow Excavation

Add the following paragraph:

Irrespective of the source of borrow materials whether as indicated in the drawings, or as directed by the Engineer or from the Contractor's own source, it is understood that materials obtained from these sources are only of the desired quality passing the requirements of the Specifications. All preparatory works, problems of access and other related matters in connection with quarrying operations shall be the sole responsibility of the Contractor.

102.2 Construction Requirements

102.2.1 General

The first paragraph is amended with the following:

Prior to execution of any excavation works in areas where volume of earthwork will be quantified for payment purposes, the Contractor shall conduct his own survey and submit to the Engineer for checking and approval of the corresponding cross-section of the existing ground to serve as references for accurate measurement of quantities.

102.2.2 Conservation of Topsoil

Add the following to this Sub-section:

Except where otherwise specified on the drawings or as directed by the Engineer, the minimum depth of stripping of topsoil shall be 15 centimeters. Stripping of topsoil may not be required underneath the existing pavements to be replaced, unless otherwise instructed.

102.2.5 Presplitting

Add the following sentence:

Regardless of the variance allowed in the formation of the slope in rock excavations, only the volume within the limits indicated in the drawings, unless adjusted by the Engineer, shall be considered as pay quantity.

102.2.6 Excavation of Ditches, Gutters, etc.

Add the following to supplement this Sub-section:

Side ditches at cut sections, whether on rock or on common soil, shall be formed and shaped as shown on the drawings. At sections of fill where the original ground and toe of slope of the designed road meet and where the original ground slopes away from the intersection such that run off water does not accumulate but flow freely away from the roadbed, no drainage ditch will be necessary. However, if the ground slopes down towards the roadbed, the provisions of drainage ditches to convey run-off water away from the road will be necessary., whether or not indicated on the drawings. Whenever the longitudinal gradient of drainage ditches constructed on common soil exceeds the maximum allowed by the drawings or when the conditions exist, which in the opinion of the Engineer, will result to damage of the system through the action of erosion, the Contractor maybe required to provide the corresponding protection. Erosion control protection whenever required shall be constructed in accordance to the relevant provisions of Part G of the Specifications.

Excavation shall be included and govern by the provisions of Item 102. Structures to be constructed related to Erosion Control shall be measured and paid for in accordance with the relevant items in the Bill of Quantities under Parts G, H or Supplemental whichever is appropriate.

102.2.7 Excavation of Roadbed Level

Add the following to this Sub-section:

Tolerance for excavation are as follows:

Cut Slopes in Soils = plus or minus one hundred millimeters (+/- 100 mm)

Cut Slopes in Blasted Rock = plus or minus three hundred millimeters (+/- 300 mm)

102.2.8 Borrow Areas

Add the following into this Sub-section:

Material from borrow areas shall normally be used for the construction of embankment or for backfill when there is no suitable materials available from road excavation. Permission to use material from borrow areas shall first obtain an approval from the Engineer. Nevertheless, the total amount of material from roadway excavation, ditch and water course excavations, and structure excavation after deduction of the material declared unsuitable by the Engineer shall be considered available for use in the work regardless of haul distance. Any surplus material resulting from the Contractor having used materials from borrow materials to replace wasted material from roadway excavation, shall not be measured for payment.

No borrow material shall be taken nearer than 30 meters from the toe of the embankment or the top of the cuts unless called for in the widening of the cuts or authorized by the Engineer. Their distance from the work sites shall not be grounds for claims for extra payment or revision of the contract price.

In addition, no borrow material be obtained from any area within two hundred (200) meters downstream of the drainage structure without approval of the Engineer.

102.2.9 Removal of Unsuitable Materials

Supplement the following paragraphs to this Sub-section:

In general, whenever materials of doubtful characteristics are discovered in any area where excavation is being performed or at places where embankment will be formed which, in the opinion of the Engineer, constitutes materials unsuitable for use for backfill or embankment, such materials so discovered, shall not be used in the works until the Contractor has shown by laboratory test, with the approval of the Engineer that they satisfy the specifications requirements. If the test results show otherwise and if allowed by the Engineer to have this materials be treated or blended to produce the materials of the required quality, the Contractor may perform such treatment or blending to the complete satisfaction of the Engineer. Otherwise all materials declared unsuitable by the Engineer shall be disposed of in accordance with the relevant provisions of the Specifications. In all these cases, the Contractor, in electing to undertake the testing and blending operations, shall not be entitled to extra time account of the delay or additional compensation to take care of the additional expenses he incurred.

When any material including surplus or unsuitable materials from excavation are 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 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 material at the sites.

102.3 Method of Measurement

Add the following paragraph to this Sub-section:

When in the opinion of the Engineer, the control of measurement of excavation cannot be exercised since the materials are being supplied simultaneously to other work for any reasons, the measurement shall be made for the actual truck loads of materials hauled away from the site. The full volume of materials in each truck shall be considered the truck capacity multiplied by an appropriate factor to account for the looseness. The factor shall be determined by dividing the density of the material in the truck by the density of the material at the source. The Contractor will not be required to actually provide truck loads for measurement. Each truck shall be filled so that the material at the side panel is no more than 30 mm below top of the panels and shall be heaped so that in the middle the material is at least 800 mm above the top of the panels. Trucks filled in this manner shall be considered truck loads.

102.4 Basis of Payment

The volume measured shall be paid for at the Contract unit price per cubic meter which payment shall constitute full compensation for all labor, equipment, tools and incidentals necessary to complete the excavation and disposal of the materials.

Payment will be made under:

Pay Item No.	Description	Unit of Measurement

102 (1) Unsuitable Excavation Cubic Meter

ITEM 103 STRUCTURE EXCAVATION

103.1 Description

The following paragraphs shall be added:

For purpose of classification of structure excavation as basis for measurement and payment, bridge excavation shall be measured and paid differently from other structure excavations.

Structure excavation starts after the temporary cofferdam construction is completed. The excavation shall be done mechanically and will proceed until ten(10) centimeters (minimum) higher than the abutment and pier footing designed bottom elevation. The final excavation and trimming shall be done manually to conform to the level and lines indicated in the drawings. The bottom of the excavation works shall be free from irregular mounds or any foreign materials.

Structure excavation shall be limited to the excavation for bridges, box culverts, revetments, pipe culverts, retaining walls, headwalls, wingwalls, catch basins, manholes, drop inlets, and other structures for the whole or part of the structure as shown on the drawings. The work shall consist of excavation in earth or rock within the limits of the work as specified or shown on the drawings and backfilling of these structures with suitable material. The work shall also include disposal of surplus materials, all necessary draining, pumping, bailing, sheeting, shoring, the construction of cribs and cofferdams and their subsequent removal, and the removal of existing structures or parts thereof which obstruct or encroach upon the structural excavation.

Excavation for structures will be classified for measurement and payment as "Structure Excavation Above Ordinary Water Level (OWL)" as the case may be, and such classes shall include all materials and shall be the excavation above the OWL indicated on the drawings.

"Structure Excavation Below Ordinary Water Level" shall be the excavation below the OWL indicated on the drawings.

The water elevations shown on the Drawings are approximate only and any variation in elevation found during construction shall not be used as a basis for extra compensation for this Item.

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

103.2 Construction Requirements

103.2.2 Excavation

In paragraph (1), supplement the following:

Any excavation carried beyond the limits shown or described on the drawings or specifications or beyond the dimension resulting from adjustments made by the Engineer shall be backfilled with materials acceptable and as directed by the Engineer.

103.2.4 Cofferdams

Add the following into this Sub-section:

The Contractor shall, upon request of the Engineer, submit drawings required to show in detail the procedure and method of construction of the temporary facilities as means of support or protection to enhance or facilitate excavation under critical situations as when the presence of water or other natural phenomenon threaten the stability of the permanent structures to be constructed therein.

103.3 Method of Measurement

The quantities to be paid for shall be measured in cubic meter in original position of materials excavated in conformity with the lines, grades, elevations and dimensions shown in the Drawings and accepted by the Engineer.

103.3.3 Foundation Fill

The volume of foundation fill to be paid for shall be measured in cubic meter in final position of gravel material placed, compacted, completed and accepted by the Engineer.

103.3.5 Basis of Payment

Item No. (4) is deleted and substituted with the following:

Shoring, cribbing, and related protective works if required in the construction and not paid separately shall be considered subsidiary to the item for which they are constructed and utilized.

Payment will be made under:

Pay Item No.	Description	Unit of Measurement
103 (1)	Structure Excavation	Cubic Meter
103 (2)a	Bridge Excavation Common, Above OWL	Cubic Meter
103 (2)b	Bridge Excavation Common, Below OWL	Cubic Meter
103 (2)c	Bridge Excavation Common, Below OWL	Cubic Meter
103 (3)a	Gravel Foundation Fill	Cubic Meter
103(6)	Pipe Culverts and Drain Excavation	Cubic Meter
103(7)	Granular Backfill for Pipe Culvert	Cubic Meter

ITEM 104 EMBANKMENT

104.2 Material Requirements

The following paragraphs shall be supplemented:

All materials excavated from roadway, structures, drainage and ditches to the extent that they are suitable in the formation of embankment and backfill shall be utilized as such.

Selected material to be used for embankment shall be river run gravelly-sand as shown and specified on the drawing or as directed and approved by the Engineer.

Modify the second sentence of the third paragraph to read as follows:

The material shall have the plasticity index ranging from 6-11 as determined by AASHTO T90, a liquid limit of not more than 35 as determined by AASHTO T89 and a minimum soaked CBR of 7% at 95% MDD.

104.3 Construction Requirements

104.3.2 Method of Construction

Add the following paragraph:

In places where the road has to be raised by embankment over the existing road, as shown on the Drawings or directed by the Engineer, the surface of the existing road shall be ripped, to a depth specified on the Drawings. It shall then be bladed, reshaped and compacted to the same or greater density as the material to be placed thereon provide a uniform foundation for the embankment material to follow.

The existing concrete pavement less than 100 centimeters below subgrade shall be broken down in such a way that it could be disposed of in a place designated by the Engineer.

104.3.3 Compaction

Supplement the following after the last paragraph:

Placing of fill shall be suspended if, in the opinion of the Engineer, there is no adequate compaction and grading equipment available on site in operating condition, to enable the fill to be shaped and compacted immediately upon placement.

104.3.5 Protection of Structures

Add the following to this Sub-section:

Any movement or displacement or whatever defect on the structures that may result due to improper method of backfilling and compacting shall be corrected by the Contractor at his own cost and shall not be entitled to any extra time on account of the delay incurred to correct the defect.

104.3.10 Foundation of Embankment on Existing Pavement

Prior to an execution of an embankment upon existing pavement, the Contractor shall scarify the existing pavement as directed by the Engineer. Gravel surfacing be scarified and thoroughly loosened to a minimum depth of 100 mm.

104.4 Method of Measurement

This Section is modified and supplemented as follows:

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 detained from any source including haulage.

Material from excavation per Item 102 which is used in embankment and accepted by the Engineer will be paid under Item 102, Excavation.

Any material coming from roadways, structures, drainage or ditches excavations which are suitable for use but are replaced by the Contractor with borrow materials without prior approval by the Engineer, shall not be measured for payment.

104.5 Basis of Payment

Payment will be made under:

Pay Item No.	Description	Unit of Measurement
104 (1)	Embankment (from Roadway Excavationl)	Cubic Meter
104 (3)a	Embankment (from Borrow Excavation)	Cubic Meter
104 (3)b	Embankment from Borrow Excavation (For Bridges)	Cubic Meter

ITEM 105 SUBGRADE PREPARATION

105.3 Material Requirements

105.3.3 Subgrade in Common Excavation

Add to this item the following:

a) Common excavation is considered to occur where the designed subgrade level cuts into the original ground (in most cases this is the existing road surface) and in earth cuts where the proposed road centerline deviates from the existing centerline wholly or in part of the existing roadway width.

b) All material within 30 centimeters below subgrade level, when moulded at the optimum moisture content, as determined by AASHTO T99 and at 95 percent of the maximum dry density, as determined by AASHTO T180, shall have the unsoaked CBR value of 15 in cut and 25 in fill.

c) The roadbed material in cut shall be moistured or dried to a uniform moisture content within + or –2% of optimum moisture and then thoroughly compacted to :

- 95% of the maximum density as determined by AASHTO T180 in case the roadbed will constitute the subgrade of the new pavement.
- 100% of the maximum dry density, as determined by AASHTO T180, in case the roadbed will constitute the subbase of the new pavement.

105.3.6 Subgrade on Existing Pavement

Add the following paragraph:

Where the existing deteriorated Portland Cement Concrete Pavement (PCCP) or Asphalt Concrete Pavement (ACP) to be replaced requires the formation of embankment to bring it to the required grade, the Contractor, if not specified on the drawings or upon instruction of the Engineer, shall scarify, reshape and recompact the surface to the required compaction density prior to the placement of embankment. Subsequent formation of fill up to the subgrade level shall satisfy the degree of compaction as prescribed under Sub-item 104.3.3 after which the subgrade shall be prescribed as outlined in Sub-item 105.3.5.

In both excavation and embankment formation, the areas covered by widened road sections and road shoulders are included in the same process of stabilization.

105.4 Method of Measurement

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

Insert the words "at or" between "ground" and "below" in paragraph (1).

Add paragraphs (3) and (4):

3) The preparation of the subgrade at locations where unsuitable materials have been excavated and disposed shall be measured in square meters which shall be calculated from surveys carried out defining the limits as delineated by the Engineer.

4) Should a leveling course is necessary to correct the irregularities of the prepared subgrade or for non-compliance to the maximum allowable tolerances prescribed in Sub-item 105.3.2, such course shall not be measured separately but is deemed to have been included in the Pay Item for Embankment.

105.5 Basis of Payment

Payment will be made under:

Pay Item No.	Description	Unit of Measurement
105 (1)	Subgrade Preparation (Common Materials)	Square Meter

PART D

SUBBASE AND BASE COURSE

PART D - SUBBASE AND BASE COURSE

ITEM 200 AGGREGATE SUBBASE COURSE

200.2 Material Requirements

Aside from the first paragraph, this Sub-section is modified and supplemented with the following:

The sources of aggregate subbase are listed in the Soils and Materials Report to serve as guide of their locations. These include the results of tests conducted on them to determine their individual quality and characteristics.

The Contractor shall carry out all relevant tests required prior to their use and whenever such tests become necessary as determined by the Engineer.

Table 200.1 "Grading Requirements" is replaced by the following table, and must have a smooth grading curve.

TABLE 200.1 – GRADING REQUIREMENTS FOR AGGREGATE SUBBASE

SIEVE DESIGNATION		
Standard (mm)	**Alternate US Standard**	**Mass Percent Passing**
50	2"	100
25	1"	55-80
9.5	3/8"	40-70
2	No. 10	20-45
0.425	No. 40	10-30
0.075	No. 200	5-15

The portion passing the 0.425 mm (No. 40) sieve shall have a liquid limit not greater than 35 and a plasticity index not greater than 12 as determined by AASHTO T89 and T90, respectively and sand equivalent value of not less than 40 as determined by AASHTO T176. When used for filling of shoulder as shown on the drawings, the plasticity index shall not be more than 8 and the liquid limit shall be 30% maximum.

The material shall have a soaked CBR value of not less than 25% determined in accordance with AASHTO T193. The CBR value shall be obtained at the maximum dry density by AASHTO T180, Method D.

The coarse aggregate material retained on a 4.75 mm (No. 4) sieve shall have a mass percentage of wear not exceeding 50 by the Los Angeles Abrasion Test as determined by AASHTO T96.

If fillers, in addition to that naturally present in the aggregate subbbase materials are necessary for meeting the grading requirements and/or for satisfactory bonding of material, it shall be uniformly blended with the subbase course material on the road. The material for such purpose shall be obtained 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 No. 4 sieve.

After each layer of subbase course material has been placed with blending material, when required, shall be thoroughly mixed to the full depth of the required layer by scarifying and blading. When and if directed by the Engineer, the materials shall be watered to prevent segregation of particle sizes and to obtain the moisture content required for compaction. When uniformity attained, the mixture shall be spread smoothly to the cross-section shown on the drawings.

200.3 Construction Requirements

200.3.3 Spreading and Compacting

Delete the last paragraph of this Sub-section and substitute the following:

The compacted dry density of each layer of the compacted subbase shall not be less than 98 percent of the maximum dry density determined according to AASHTO T180, Method D. The field density shall be determined according to AASHTO T191.

200.4 Method of Measurement

Aggregate subbase course will be measured by the cubic meter and the quantity to be paid for shall be the design volume compacted in-place as shown on the Drawings, and accepted by the Engineer in the completed subbase course.

200.5 Basis of Payment

Payment will be made under:

Pay Item No.	Description	Unit of Measurement
200 (1)	Aggregate Subbase Course	Cubic Meter

ITEM 201 AGGREGATE BASE COURSE

201.2 Material Requirements

Aside from the first paragraph, this Sub-section is modified and supplemented with the following:

The sources of aggregate base are listed in the Soils and Materials Report to serve as guide of their locations. These include the results of tests conducted on them to determine their individual quality and characteristics.

The Contractor shall carry out all relevant tests required prior to their use and whenever such tests become necessary as determined by the Engineer.

Unless otherwise specified and determined by the Engineer, Table 201.1 "Grading Requirements" is shown as follows

TABLE 201.1 – GRADING REQUIREMENTS FOR AGGREGATE BASE

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	3/4"	-	60 - 85
12.5	1/2"	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

If fillers, in addition to that naturally present, are necessary for meeting the grading requirements and/or for satisfactory bonding of material, it shall be uniformly blended with the base course material on the road unless otherwise specified or approved by the Engineer. The material for such purpose shall be obtained from sources approved by the Engineer. 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 No. 4 sieve.

201.3.3 Spreading and Compacting

Delete the last paragraph of this Sub-section and substitute the following:

The compacted dry density of each layer of the compacted base shall not be less than 98 percent of the maximum dry density determined according to AASHTO T180, Method D. The field density shall be determined according to AASHTO T191.

201.4 Method of Measurement

Aggregate base course will be measured by the cubic meter and the quantity to be paid for shall be the design volume compacted in-place as shown on the Drawings, and accepted by the Engineer in the completed base course.

201.4 Basis of Payment

Payment will be made under:

Pay Item No.	Description	Unit of Measurement
201 (1)	Aggregate Base Course	Cubic Meter

PART E

SURFACE COURSES

PART E - SURFACE COURSES

ITEM 300 AGGREGATE SURFACE COURSE

300.1 Description

This Item shall consist of a wearing or top course composed of gravel or crushed aggregate and filler material, whichever is called for in the Bill of Quantities, constructed on a prepared base in conformity with the lines, grades and typical cross-sections shown on the Drawings.

300.2 Material Requirements

Aggregate to be used under this Item shall be natural material, hard, durable particles or fragments of stone or gravel and sand or other fine mineral particles free from vegetable matter and lumps or balls that if compacted, it can readily form a firm and stable layer. When tested by AASHTO T11 and T27, the aggregate shall conform to the grading requirements tabulated hereunder:

Sieve Designation		Mass Percent Passing			
Standard mm	Alternate U.S. Standard	Grading A	Grading B	Grading C	Grading D
25	1"	100	100	100	100
9.5	3/8"	50-85	60-100	-	-
4.75	No. 4	35-65	50-85	55-100	70-100
2.00	No. 10	25-50	40-70	40-100	55-100
0.425	No. 40	15-30	25-45	20-50	30-70
0.075	No. 200	5-20	5-20	6-20	8-25

The coarse aggregate material retained on the 2.00 mm (No. 10) sieve shall have a mass percent of wear by the Los Angeles Test (AASHTO T96) of not more than 45.

When tested by AASHTO T89 and T90, the fraction passing the 0.425 mm (No. 40) sieve shall have a liquid limit not greater than 35 and a plasticity index ranging from 4 to 9.

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

300.3 Construction Requirements

300.3.4 Surface Course Thickness and Tolerances

Thickness of aggregate surface course shall be in accordance with the thickness shown on the Drawings. The allowable tolerances shall be as follows:

Permitted variation from design thickness of layer	÷15mm - 5 mm
Permitted variation from design level of surface	÷15mm - 5 mm
Permitted surface irregularity measured by	5mm
3-m straight edge	

Permitted variation from design crossfall or camber	+0.2 %
Permitted variation from design longitudinal grade over 25 m in length	+0.1 %

300.4 Method of Measurement

The quantity to be paid for shall be measured by the cubic meter of aggregate surface course including all fillers, compacted in-place, completed and accepted by the Engineer. No allowance will be given for material placed outside the design limits shown on the cross-sections.

300.5 Basis of Payment

The accepted quantity as provided in Section 300.4, Method of Measurement shall be paid for at the Contract unit price shown in the Bill of Quantities. The price and payment shall constitute full compensation for furnishing, handling, placing and spreading, watering and compacting all materials, including all labor and equipment, tools and incidentals necessary to complete the Item.

Payment will be made under:

Pay Item No.	Description	Unit of Measurement
300 (1)	Gravel Surface Course	Cubic Meter

ITEM 311 PORTLAND CEMENT CONCRETE PAVEMENT

311.2 Material Requirements

311.2.11 Proportioning, Consistency and Strength of Concrete

Supplement the following to this Sub-section:

The Contractor shall submit design mixes obtained from samples made in accordance with Standard Method of Making and Curing Concrete Compression and Flexure Tests Specimen in the Laboratory for each strength required, stating the proposed slump and the proportioning weights of cement, saturated surface aggregates and water. These mixes shall be proven by preliminary tests thirty (30) days before concreting and shall show a 28-day strength of fifteen (15%) percent higher than the ultimate strength required. No substitution shall be made in the materials or mix without additional tests to show that the quality of concrete is satisfactory.

The proportion of aggregate to cement for concrete pavement shall be such that to produce a mixture which will work readily into the corners and around reinforcements, if any, with the method of placing concrete without permitting the materials to segregate or allow free water to collect on the surface. The combined aggregates shall be such compositions of sizes that when separated on the No.4 standard sieve, the weight passing the sieve (fine aggregate) shall not be less than thirty (30%) percent or greater than fifty (50%) percent of the total, except that these proportions do not necessarily apply to lightweight aggregates. The method of measuring concrete materials shall be such that the proportions can be accurately controlled and easily checked anytime during work.

Aggregates shall be measured preferably by weight and to within one (1%) percent. Water shall be measured by weight or volume to within one and one-half (1 1/2%) percent. The water shall in no case, exceed 23 liters per bag (40 kg) of cement for all concrete with specified minimum flexural strength of 550 psi when tested by the third-point method or 650 psi by the mid-point method and a compressive strength of 3,500 psi.

Job mix adjustment of water content shall be allowed only on permission of the Engineer, provided that cement is also added to keep the original water-cement ratio of the design mix.

311.3 Construction Requirements

311.3.1 Quality Control of Concrete

Add the following paragraph at the end of this Sub-section:

The Owner, his duly authorized representative or the Engineer shall have the right to order the test of any materials supplied by the Contractor entering into concrete pavement or reinforced concrete pavement whenever there is a reasonable doubt as to their suitability for the purpose. Such test shall be in accordance with the standards of the ASTM or AASHTO for testing materials noted elsewhere in the Specifications. Samples shall be provided by the Contractor without cost to the Owner. Expenses for testing and cost of transporting samples to the laboratory shall be borne by the Contractor. Copies or results of tests shall be furnished to the Owner promptly.

311.3.7 Mixing Concrete

Add the following to this Sub-section:

If mixing, transporting and depositing of concrete is done other than the procedure prescribed under this sub-clause is allowed by the Engineer, the Contractor shall remain to be solely responsible to observe and produce concrete with the same quality required in the Specifications.

No hand mixing shall be allowed during concreting operations except on emergency cases such as batching plant breakdown and shall stop at the first allowed construction joint. All concrete shall be machine mixed for at least 1½ minutes after all materials including water are in the mixing drum.

The batching plant shall be of an approved capacity and type which will insure a uniform distribution of materials throughout the mass. It shall be equipped with a device for accurately measuring and controlling the amount of mixing water in each batch. The first batch of concrete materials placed in the mixer shall contain a sufficient excess of cement, sand and water to coat the inside of the drum without reducing the cement concrete of the mix to be discharged.

311.3.9 Placing Concrete

Supplement this Sub-section with the following:

Concrete shall be deposited on its final position in such a manner to require minimal re-handling or flowing without segregation. Placing of concrete shall be preferably done by

the use of buggies, buckets or wheelbarrows. 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 a grade in such manner as to prevent segregation.

No chutes will be allowed except to transfer concrete from hoppers to buggies, wheelbarrows or buckets on which case the chutes shall exceed six (6) meters in aggregate length. Placing of concrete with a free drop or fall of more than 1.5 meters shall not be allowed except when sheet metal conduits, pipes or elephant trunks are employed.

When stoppages of concreting operations eventually occur for any reason, construction joints shall be placed horizontally or as directed by the Engineer and be provided with shear keys and dowels to develop bond. Construction joints shall be approved by the Engineer

The Contractor shall provide forms that will produce the placed concrete in a correct and aligned manner. Plywood, metal or surfaced lumber forms shall be used for all exposed concrete surfaces. Plastering in general shall not be allowed so that extra care shall be exercised by the Contractor.

Forms and shoring shall not be removed until the concrete has adequately set and stable enough to withstand the anticipated loadings, and in no case less than two (2) days after concreting. Removal of forms may be allowed earlier provided that test samples of concrete are taken and are shown to withstand safely dead and construction loads.

311.3.18 Protection of Pavement

Modify this Sub-section with the following:

The contractor shall protect the pavement and its appurtenances both against public traffic and traffic caused by its own construction equipments. This shall include watchmen to direct traffic, the erection of and maintenance of warning signs, lights, pavement bridges or crossovers, etc.

Any damage to the pavement from the opening of traffic for public use until final acceptance shall be repaired or replaced by the contractor without additional compensation.

311.3.21 Opening to Traffic

Modify this Sub-section with the following:

The Engineer will decide the opening of pavement to traffic after test specimens molded and cured in accordance with AASHTO T23 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 opened to traffic until fourteen (14) days after the concrete was placed. Before opening to traffic, the pavement shall be cleansed thoroughly and all joints shall be sealed completely.

311. 3.22 Tolerance and Pavement Thickness

Add the following to Sub-section 311.3.22 (2), Pavement Thickness:

Outside and inner shoulders of super elevation equal or greater than seven percent (7%) should be paved with 15 centimeters thick Portland Cement Concrete Pavement (PCCP) between P.C. and P.T. or as shown on the drawings.

311.4 Method of Measurement

Add at the end of the paragraph:

"All reinforcing steel bars incorporated in the concrete pavement shall not be measured separately for payment, cost of which has been considered paid under this particular Item.

Supplement the following to this Section:

The area to be paid for under this Item shall be the number of square meters of concrete pavement placed and accepted in accordance with the drawings measured from the outside edge of width to the other edge by the length horizontally measured 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 for payment.

Shoulder paved for a superelevation of more than 7.0 % shall be measured one (1) meter from the outside and innerside edge by the length horizontally measured along PC to PT.

311.5 Basis of Payment

The accepted quantity measured as specified in Sub-section 311.4, Method of Measurement shall be paid for at the contract unit price for Portland Cement Concrete Pavement, which price and payment shall constitute 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 No.	Description	Unit of Measurement
311 (1) a	PCC Pavement (Plain), t=280 mm	Square Meter
311 (1) c	PCC Pavement (Plain), t=230 mm	Square Meter
311 (2)	PCC Pavement (Reinforced), t=300 mm	Square Meter