NATIONAL POWER CORPORATION

MinGen

PHILIPPINE BIDDING DOCUMENTS

(Procurement of INFRASTRUCTURE PROJECTS)

FOR

REHABILITATION OF AGUS 6 & 7 HPPC DOMESTIC WATER WASTE TREATMENT SYSTEM

P.R. No.: MG-A7T23-005

Contracts Management Office
Logistics Division

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Glossary of Terms, Abbreviations, and Acronyms

ABC –Approved Budget for the Contract.

ARCC – Allowable Range of Contract Cost.

BAC – Bids and Awards Committee.

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

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

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

BIR – Bureau of Internal Revenue.

BSP – Bangko Sentral ng Pilipinas.

CDA – Cooperative Development Authority.

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

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

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

CPI – Consumer Price Index.

DOLE – Department of Labor and Employment.

DTI – Department of Trade and Industry.

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

GFI – Government Financial Institution.

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

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

GOP – Government of the Philippines.

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

LGUs – Local Government Units.

NFCC – Net Financial Contracting Capacity.

NGA – National Government Agency.

PCAB – Philippine Contractors Accreditation Board.

PhilGEPS - Philippine Government Electronic Procurement System.

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

PSA – Philippine Statistics Authority.

SEC – Securities and Exchange Commission.

SLCC – Single Largest Completed Contract.

UN – United Nations.

Section I. Invitation to Bid

NATIONAL POWER CORPORATION

MinGen

Invitation to Bid for *Rehabilitation of Agus 6 & 7 HPPC Domestic Water Waste Treatment System*

1. The *NATIONAL POWER CORPORATION–MINDANAO GENERATION*, through the *approved Corporate Budget of NPC for CY 2023* intends to apply the sum of ***Five Million Seven Hundred Seventy Thousand Pesos (PHP5,770,000.00)*** being the Approved Budget for the Contract (ABC) to payments under the contract for ***Rehabilitation of Agus 6 & 7 HPPC Domestic Water Waste Treatment System, at Fuentes,Maria Cristina, Iligan City (INFRA2023-AG7-014)***. Bids received in excess of the ABC shall be automatically rejected at bid opening.

2. The *NATIONAL POWER CORPORATION–MINDANAO GENERATION* now invites bids for the above Procurement Project. Completion of the Works is required *Ninety (90) calendar days*. Bidders should have completed a contract similar to the Project. The description of an eligible bidder is contained in the Bidding Documents, particularly, in Section II (Instructions to Bidders).

3. Bidding will be conducted through open competitive bidding procedures using non-discretionary "*pass/fail*" criterion as specified in the 2016 revised Implementing Rules and Regulations (IRR) of Republic Act (RA) No. 9184.

4. Interested bidders may obtain further information from *BAC Secretariat, NATIONAL POWER CORPORATION–MINDANAO GENERATION* and inspect the Bidding Documents at the address given below from *8:00 AM– 5:00 PM Monday to Friday*.

5. A complete set of Bidding Documents may be acquired by interested Bidders on ***February 4-28, 2023*** from the given address and website(s) below and upon payment of the applicable fee for the Bidding Documents, pursuant to the latest Guidelines issued by the GPPB, in the amount of ***Seven Thousand Pesos (PHP 7,000.00)***.The Procuring Entity shall allow the bidder to pay online and present its proof of payment for the fees in person, by facsimile, or through electronic means. For those prospective bidders who wish to pay online, below are the details of the account:

Landbank Account name	:	NPC GENCO 5 COLLECTIONS FUND
Landbank Account number	:	0321-1689-14

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

6. The *NATIONAL POWER CORPORATION–MINDANAO GENERATION* will hold a Pre-Bid Conference on ***February 13, 2023 at 9:00 AM*** at *Bidding Room, NPC-Mindanao Generation Headquarters, Maria Cristina, Iligan City* and/or through videoconferencing/webcasting *via ZOOM,* which shall be open to prospective bidders. Interested online attendees are required to pre-register one (1) day before the scheduled pre-bidding conference. For pre-registration, contact tel. no. (063)-222-3459 or email logistics_afd_mingen@napocor.gov.ph.

7. Bids must be duly received by the BAC Secretariat through manual submission at the office address as indicated below, on or before ***February 28, 2023 at 9:30 AM.*** Late bids shall not be accepted.

8. All bids must be accompanied by a bid security in any of the acceptable forms and in the amount stated in **ITB** Clause 15.

9. Bid opening shall be on ***February 28, 2023 at 9:30 AM*** at the *Bidding Room, NPC-Mindanao Generation Headquarters, Maria Cristina, Iligan City.* Bids will be opened in the presence of the bidders' representatives who choose to attend the activity.

10. *This project requires submission of at least:*
    - ***Certificate of Site Inspection***

11. The *NATIONAL POWER CORPORATION– MINDANAO GENERATION* reserves the right to reject any and all bids, declare a failure of bidding, or not award the contract at any time prior to contract award in accordance with Sections 35.6 and 41 of the 2016 revised Implementing Rules and Regulations (IRR) of RA No. 9184, without thereby incurring any liability to the affected bidder or bidders.

12. For further information, please refer to:

BAC Secretariat
Contracts Management Office
Logistics Division
Mindanao Generation Headquarters
National Power Corporation
Maria Cristina, Iligan City
logistics_afd_mingen@napocor.gov.ph
Tel. No.: (063)222-3459
Fax No.: (063)223-8355/(063)223-4604
www.napocor.gov.ph

13. You may visit the following websites:

For downloading of Bidding Documents: ***https://www.philgeps.gov.ph/*** or **https://www.napocor.gov.ph/BCSD/bids.php**

REYNANTE T. CIRUELA
Chairman, Bids and Awards Committee
Mindanao Generation Headquarters

Date of PhilGEPS Publication: *February 04, 2023*

Section II. Instructions to Bidders

1. Scope of Bid

The Procuring Entity, *NATIONAL POWER CORPORATION–MINDANAO GENERATION* invites Bids for the *REHABILITATION OF AGUS 6 & 7 HPPC DOMESTIC WATER WASTE TREATMENT SYSTEM, with Project Identification NumberINFRA2023-AG7-014.*

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

2. Funding Information

2.1. The GOP through the source of funding as indicated below for CY 2021in the amount of *Seven Hundred Thousand Pesos (PHP700,000.00)*

2.2. The source of funding is:

a. GOCC and GFIs, the proposed Corporate Operating Budget.

3. Bidding Requirements

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

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

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

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

The Procuring Entity, as well as the Bidders and Contractors, shall observe the highest standard of ethics during the procurement and execution of the contract. They or through an agent shall not engage in corrupt, fraudulent, collusive, coercive, and obstructive practices defined under Annex "I" of the 2016 revised IRR of RA No. 9184 or other integrity violations in competing for the Project.

5. Eligible Bidders

5.1. Only Bids of Bidders found to be legally, technically, and financially capable will be evaluated.

5.2. The Bidder must have an experience of having completed a Single Largest Completed Contract (SLCC) that is similar to this Project, equivalent to at least fifty percent (50%) of the ABC adjusted, if necessary, by the Bidder to current prices using the PSA's CPI, except under conditions provided for in Section 23.4.2.4 of the 2016 revised IRR of RA No. 9184.

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

5.3. For Foreign-funded Procurement, the Procuring Entity and the foreign government/foreign or international financing institution may agree on another track record requirement, as specified in the Bidding Document prepared for this purpose.

5.4. The Bidders shall comply with the eligibility criteria under Section 23.4.2 of the 2016 IRR of RA No. 9184.

6. Origin of Associated Goods

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

7. Subcontracts

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

The Procuring Entity has prescribed that:

a. Subcontracting is not allowed.

8. Pre-Bid Conference

The Procuring Entity will hold a pre-bid conference for this Project on the specified date and time and either at its physical address **and/or through videoconferencing/webcasting** as indicated in paragraph 6 of the **IB.**

9. Clarification and Amendment of Bidding Documents

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

10. Documents Comprising the Bid: Eligibility and Technical Components

10.1. The first envelope shall contain the eligibility and technical documents of the Bid as specified in **Section IX. Checklist of Technical and Financial Documents.**

10.2. If the eligibility requirements or statements, the bids, and all other documents for submission to the BAC are in foreign language other than English, it must be accompanied by a translation in English, which shall be authenticated by the appropriate Philippine foreign service establishment, post, or the equivalent office having jurisdiction over the foreign bidder's affairs in the Philippines. For Contracting Parties to the Apostille Convention, only the translated documents shall be authenticated through an apostille pursuant to GPPB Resolution No. 13-2019 dated 23 May 2019. The English translation shall govern, for purposes of interpretation of the bid.

10.3. A valid PCAB License is required, and in case of joint ventures, a valid special PCAB License, and registration for the type and cost of the contract for this Project. Any additional type of Contractor license or permit shall be indicated in the **BDS.**

10.4. A List of Contractor's key personnel (e.g., Project Manager, Project Engineers, Materials Engineers, and Foremen) assigned to the contract to be bid, with their complete qualification and experience data shall be provided. These key personnel must meet the required minimum years of experience set in the **BDS.**

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

11.Documents Comprising the Bid: Financial Component

11.1. The second bid envelope shall contain the financial documents for the Bid as specified in **Section IX. Checklist of Technical and Financial Documents.**

11.2. Any bid exceeding the ABC indicated in paragraph 1 of the **IB** shall not be accepted.

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

12.Alternative Bids

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

13.Bid Prices

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

14.Bid and Payment Currencies

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

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

a. Philippine Pesos.

15.Bid Security

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

15.2. The Bid and bid security shall be valid until ***One Hundred Twenty (120) Calendar Days from the Scheduled Bid Opening.***Any bid not accompanied

by an acceptable bid security shall be rejected by the Procuring Entity as non-responsive.

16.Sealing and Marking of Bids

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

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

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

17.Deadline for Submission of Bids

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

18.Opening and Preliminary Examination of Bids

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

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

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

19.Detailed Evaluation and Comparison of Bids

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

19.2. If the Project allows partial bids, all Bids and combinations of Bids as indicated in the BDS shall be received by the same deadline and opened and evaluated simultaneously so as to determine the Bid or combination of Bids

offering the lowest calculated cost to the Procuring Entity. Bid Security as required by ITB Clause 16 shall be submitted for each contract (lot) separately.

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

20. Post Qualification

Within a non-extendible period of five (5) calendar days from receipt by the Bidder of the notice from the BAC that it submitted the Lowest Calculated Bid, the Bidder shall submit its latest income and business tax returns filed and paid through the BIR Electronic Filing and Payment System (eFPS), and other appropriate licenses and permits required by law and stated in the **BDS**.

21. Signing of the Contract

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

Section III. Bid Data Sheet

Bid Data Sheet

<table>
<tr><td>ITB Clause</td><td></td></tr>
<tr><td>5.2</td><td>For this purpose, contracts similar to the Project refer to contracts which have the same major categories of work, which shall be;
<u>Construction of Vertical Projects</u></td></tr>
<tr><td>7.1</td><td>Subcontracting is not allowed.</td></tr>
<tr><td>10.3</td><td>None</td></tr>
<tr><td>10.4</td><td>The key personnel must meet the required minimum years of experience set below:
<table>
<tr><th><u>Key Personnel</u></th><th><u>General Expertise</u></th><th><u>Relevant Experience</u></th></tr>
<tr><td>1 - Project Engineer</td><td>Licensed Civil Engineer</td><td>At least five (5) years experience in related works</td></tr>
<tr><td>1 - Construction Foreman</td><td>B.S. Civil Engineering Graduate</td><td>At least three (3) years experience in similar works</td></tr>
<tr><td></td><td>Civil Engineering Technology Graduate</td><td>At least five (5) years experience in similar works</td></tr>
<tr><td></td><td>Non-graduate</td><td>At least five (5) years working experience as Construction Foreman in similar works</td></tr>
<tr><td>1 - Construction Safety and Health Officer (SO2)</td><td>Construction Safety Officer 2</td><td>At least forty (40) hours of Construction Safety and Health (COSH) Training from Occupational Safety and Health Center (OSHC) or Safety Training Organizations (STOs) accredited by the Department of Labor and Employment (DOLE). Must be present during the whole duration of the project)</td></tr>
</table></td></tr>
</table>

	(1) Valid Professional Regulation Commission (PRC) license for professional personnel; (2) Certificate of Training with accreditation from DOLE for the Construction Safety & Health Officer; and (4) Diploma and/or Service Record/Certificate of Employment of previous and/or current employer for Construction Foreman ***shall be submitted during post qualification by the winning bidder.*** Project Engineer or Foreman and Construction Safety & Health Officer maybe one person, as long as he meets the requirements of the two positions. Provided however, that there is no overlapping of projects undertaken by the same contractor and supervised by the same person. The above key personnel must be either employed by the applicant or contracted by the applicant to be employed for the contract to be bid.
10.5	The minimum major equipment requirements are the following: Equipment — Capacity — Number of Units Siphoning Equipment — At least 3.0 cu.m. — One (1) Mini Dump Truck — 3.0 cu.m. — One (1) Jack Hammer — 2000W — Two (2) Backhoe — 0.80 cu.m. — One (1) Plate Compactor — 2.5 Tons — One (1) Concrete Mixer — 1-bagger — Two (2) Concrete Vibrator — 5 HP — Two (2)
12	N/A
15.1	The bid security shall be in the form of a Bid Securing Declaration or any of the following forms and amounts: a. The amount of not less than **PHP115,400.00** ***(2% of ABC)***, if bid security is in cash, cashier's/manager's check, bank draft/guarantee or irrevocable letter of credit; b. The amount of not less than **PHP288,500.00*****(5% of ABC)***, if bid security is in Surety Bond.
19.2	Partial bids are allowed, as follows:
20	Additional documents to be submitted during Post-Qualification: 1. Other appropriate licenses and permits required by law and stated in the Bidding documents. *a. Original Bank Statement year ending prior to bid opening;* *b. Valid and updated PhilGEPS Registration (Platinum Membership)(all pages);*

	c. *Registration Certificate from Securities and Exchange Commission (SEC), Department of Trade and Industry (DTI) for sole proprietorship, or Cooperative Development Authority (CDA) for cooperatives or its equivalent document;* d. *Mayor's or Business permit issued by the city or municipality where the principal place of business of the prospective bidder is located, or the equivalent document for Exclusive Economic Zones or Areas;* e. *Valid Tax clearance per E.O. No. 398, s. 2005, as finally reviewed and approved by the Bureau of Internal Revenue (BIR).Quarterly Income Tax Returns filed and paid through the BIR Electronic Filing and Payment System (eFPS);* f. *The prospective bidder's audited financial statements, showing, among others, the prospective bidder's total and current assets and liabilities, stamped "received" by the BIR or its duly accredited and authorized institutions, for the preceding calendar year which should not be earlier than two (2) years from the date of bid submission;* g. *Philippine Contractors Accreditation Board (PCAB) License;* h. *Board of Accountancy (BOA) Certificate;* 2. *Contract and/or Notice of Award as supporting documents for NPC MinGen Form No. NPCMGNSF-INFR-01, if applicable;* 3. *(a) Valid Professional Regulation Commission (PRC) license for professional personnel; (b) Certificate of Training with accreditation from DOLE for the Construction Safety & Health Officer; (c) TESDA Training Certificate (NC II) of Welders or Electrician; and (d) Diploma and/or Service Record/Certificate of Employment of previous and/or current employer for Construction Foreman, Welders, Electrician & Plumber - as supporting documents for NPC MinGen Form No. NPCMGNSF-INFR-05, if applicable.* 4. *Certificate of Site Inspection issued by Plant/Department Manager or his authorized representative.*
21	Additional contract documents relevant to the Project that may be required by existing laws and/or the Procuring Entity, prior to contract signing, such as: a) Approved construction schedule and S-curve b) Approved manpower schedule c) Construction methods d) Approved equipment utilization schedule e) Construction safety and health program approved by the DOLE f) Approved Project Evaluation Review Technique/Critical Path Method (PERT/CPM)

Section IV. General Conditions of Contract

1. Scope of Contract

This Contract shall include all such items, although not specifically mentioned, that can be reasonably inferred as being required for its completion as if such items were expressly mentioned herein. All the provisions of RA No. 9184 and its 2016 revised IRR, including the Generic Procurement Manual, and associated issuance s, constitute the primary source for the terms and conditions of the Contract, and thus, applicable in contract implementation. Herein clauses shall serve as the secondary source for the terms and conditions of the Contract.

This is without prejudice to Sections 74.1 and 74.2 of the 2016 revised IRR of RA No, 9184 allowing the GPPB to amend the IRR, which shall be applied to all procurement activities, the advertisement, posting, or invitation of which were issued after the effectivity of the said amendment.

2. Sectional Completion of Works

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

3. Possession of Site

4.1. The Procuring Entity shall give possession of all or parts of the Site to the Contractor based on the schedule of delivery indicated in the SCC, which corresponds to the execution of the Works. If the Contractor suffers delay or incurs cost from failure on the part of the Procuring Entity to give possession in accordance with the terms of this clause, the Procuring Entity's Representative shall give the Contractor a Contract Time Extension and certify such sum as fair to cover the cost incurred, which sum shall be paid by Procuring Entity.

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

4. The Contractor's Obligations

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

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

5. Performance Security

5.1. Within ten (10) calendar days from receipt of the Notice of Award from the Procuring Entity but in no case later than the signing of the contract by both parties, the successful Bidder shall furnish the performance security in any of the forms prescribed in Section 39 of the 2016 revised IRR.

5.2. The Contractor, by entering into the Contract with the Procuring Entity, acknowledges the right of the Procuring Entity to institute action pursuant to RA No. 3688 against any subcontractor be they an individual, firm, partnership, corporation, or association supplying the Contractor with labor, materials and/or equipment for the performance of this Contract.

6. Site Investigation Reports

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

7. Warranty

7.1. In case the Contractor fails to undertake the repair works under Section 62.2.2 of the 2016 revised IRR, the Procuring Entity shall forfeit its performance security, subject its property(ies) to attachment or garnishment proceedings, and perpetually disqualify it from participating in any public bidding. All payables of the GOP in his favor shall be offset to recover the costs.

7.2. The warranty against Structural Defects/Failures, except that occasioned-on force majeure, shall cover the period from the date of issuance of the Certificate of Final Acceptance by the Procuring Entity. Specific duration of the warranty is found in the SCC.

8. Liability of the Contractor

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

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

9. Termination for Other Causes

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

10.Dayworks

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

11.Program of Work

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

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

12.Instructions, Inspections and Audits

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

13.Advance Payment

The Procuring Entity shall, upon a written request of the Contractor which shall be submitted as a Contract document, make an advance payment to the Contractor in an amount not exceeding fifteen percent (15%) of the total contract price, to be made in lump sum, or at the most two installments according to a schedule specified in the

SCC, subject to the requirements in Annex "E" of the 2016 revised IRR of RA No. 9184.

14. Progress Payments

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

15. Operating and Maintenance Manuals

15.1. If required, the Contractor will provide "as built" Drawings and/or operating and maintenance manuals as specified in the SCC.

15.2. If the Contractor does not provide the Drawings and/or manuals by the dates stated above, or they do not receive the Procuring Entity's Representative's approval, the Procuring Entity's Representative may withhold the amount stated in the SCC from payments due to the Contractor.

Section V. Special Conditions of Contract

Special Conditions of Contract

GCC Clause	
2	**Sectional completion is not specified.**
4.1	The **Procuring Entity** shall give possession of the Site to the Contractor ***on the start date.***
6	The site investigation reports are: **NONE**
7.2	**Fifteen (15) years**
10	Dayworks are not applicable to the contract.
11.1	The Contractor shall submit the Program of Work to the Procuring Entity's Representative **upon contract signing** or within **three (3)**days of delivery of the Notice of Award.
11.2	The amount to be withheld for late submission of an updated Program of Work is **Fifty (50) %**of the billed amount. The updating of Program of Work shall be done bi-monthly.
13	**The amount of the advance payment is 15% of contract amount and paid in lump sum.**
14	No further instruction.
15.1	The date by which operating and maintenance manuals are required is **upon completion of the project.** The date by which "as built" drawings are required is **upon completion of the project.**
15.2	The amount to be withheld for failing to produce "as built" drawings and/or operating and maintenance manuals by the date required is **one hundred percent (100%) of the final billing.**

Section VI. Specifications

PROJECT HIGHLIGHTS

PH-1.0 GENERAL

The Purpose of Rehabilitation of Agus 6 & 7 HPPC Domestic Water Waste Treatment System is to conform with the DENR regulations and to comply with the discharge permit requirements

PH-2.0 LOCATION

The project is located at Agus 6 & 7 HEP Complex, Fuentes, Maria Cristina, Iligan City

PH-3.0 SCOPE OF WORK

The major activities shall include but not limited to the following:

Part I. Mobilization

Part II. General Requirements

a. Occupational Safety and Health Program

Part III. Demolition of Existing Septic Tank

a. Siphoning
b. Removal of Structure, Obstruction and Disposal

Part IV. Construction of Septic Tank

a. Concrete (3000 PSI)
b. Application of Waterproofing System
c. Gravel Fill
d. Structural Backfill

Part V. Clean-Up Works and Demobilization

PH-4.0 CONTRACT PERIOD

The work duration of the entire project is **Ninety (90) Calendar Days** reckoned from receipt of the Notice to Proceed

The total contract period is inclusive of five (5) rainy/unworkable days considered unfavourable for the execution of works at site. The contract period shall be reckoned from the date of contract effectively as specified in the Notice to Proceed.

PH-5.0 CONTRACTOR'S CLASSIFICATION

The contractor must have a valid Philippine Contractor's Accreditation Board (PCAB) license of at least **Category C or D – General Building** with inter-agency registration of at least **Small B – Water Treatment Plant & System.**

TECHNICAL SPECIFICATIONS

In accordance with the specifications provided in the plans, the contractor shall furnish all materials, labor, tools, equipment and other incidentals, and shall undertake the complete at Agus 6 & 7 HEP, Fuentes, Maria Cristina, Iligan City.

All materials to be used shall conform to applicable standard. If upon visual inspection the materials appear to be of poor quality or fail to meet the standard, the NPC inspector has the authority to reject the same out rightly.

The Contractor shall perform all activities necessary for the completion of the project satisfactory to NPC and in accordance with the approved plans and these specifications.

Scope

This section covers the construction and/or maintenance of access roads, drainage system and other appurtenant structures, moving-in of the Contractor's construction equipment, setting up of the Contractor's camp and the disposition of the Contractor's various facilities at the end of the Contract.

TS 01 - MOBILIZATION

The Contractor upon receipt of the Notice-to-Proceed shall immediately mobilize and transport his plant, equipment, materials and labor forces to the site and demobilize or remove the same at the completion of project and level/ clear the site acceptable to the Engineer and the Owner. Mobilization and Demobilization are incidental to other items of work and will not be measured for payment.

Moving-in

The contractor shall bring to the site all his necessary construction equipment and plant and install all stationary construction equipment and plant at location and in the manner approved by the NPC. The Contractor shall submit sufficient detailed plans showing the proposed location of such stationary equipment and plant and other pertinent data. No installation of such stationary equipment shall be undertaken unless the corresponding plans have been approved by the NPC.

Contractor's Camp Facilities

The Contractor shall provide and grade his camp site, construct his camp, employee housing, warehouse, machine and repair shops, fuel storage tanks and provide such related facilities and sanitary conveniences that the Contractor deems necessary for maintaining health, peace and order in the camp and work areas. The areas that may be used by the Contractor within the plant site shall be designated by the NPC.

The Contractor shall provide, maintain and operate, under competent direction, such camps and facilities as are necessary for the housing, feeding and accommodation of his employees.

Water Supply

The Contractor shall, at his own expense, be responsible for the supply, installation, operation and maintenance of a safe and adequate supply of drinking and domestic water.

Sewerage Disposal and Sanitation

The Contractor shall, at his own expense, be responsible for the installation, operation and maintenance of an adequate sewerage disposal and sanitation system and shall provide adequate toilet and wash-up facilities for his employees at his camp and in the areas where work is being carried out.

The Contractor shall execute the work with due regard to adequate sanitary provisions and applicable codes and shall take all necessary steps to prevent the pollution of water in any spring, river, or other sources of water supply. All toilets or wash-up facilities shall be subject to the prior and continuing approval of the NPC.

Fire Protection

The Contractor shall observe all necessary precautions against fire, shall provide and maintain at his own expense, portable fire-fighting equipment he may deem necessary, and shall comply with all applicable laws of the Philippines relating thereto.

In the event of an uncontrollable fire occurring in the area of the Contractor's operation, the Contractor shall have to extinguish the fire immediately at his own expense, to the full extent of the

manpower and equipment employed under the contract at the time of the fire.

The Contractor shall indemnify NPC against all liabilities, claims, damages and/or lawsuits arising thereto.

Construction Power

The Construction shall be responsible for providing his own electric power supply required for construction and erection/installation. If power is available from NPC and should the Contractor elect to utilize the NPC's power supply, he shall make an arrangement with NPC concerned group as to the billing rates and other requirements needed for direct connection to NPC.

Camp Security

The Contractor shall provide sufficient security in the construction site to prevent illegal entry or work damaged during nights, holidays and other period when work is not executed; and during working hours. The Contractor shall take ample precautions against fire by keeping away flammable materials, and ensure that such materials are properly handled and stored. Fires shall not be allowed within the area of construction, except when permitted by the NPC End-User or Representative.

Construction Material Storage

The Contractor is required to put up warehouse(s) with capacities sufficient to store the construction materials required in the work, the warehouse(s) shall be specifically for this contract, notwithstanding his other facilities in the site that may serve the purpose.

Removal of Camp and Construction Facilities

After the completion of the work covered by the contract and prior to acceptance of the completed work, the entire camp facilities of the Contractor, including its water supply system, electric distribution system, quarters, warehouses, shops, dining halls, commissaries, temporary shed and other facilities therein shall be removed by the Contractor. The site shall be cleared and cleaned as directed by the NPC.

Care of Water during Construction

In accordance with the specifications contained in this section or otherwise directed, the Contractor shall construct and maintain all necessary temporary drainage ditches and other temporary protective works and he shall also furnish, install, maintain and operate necessary pumping equipment and other devices to protect construction operation free from water coming from any source, including rain.

Drainage and Dewatering

The Contractor shall be responsible for dewatering foundation areas so that work can be carried out on a suitably dry condition. The Contractor shall construct drainage ditches, holes, culverts, furnish, maintain and operate at his own expense all necessary pumps and other dewatering devices to keep all work area free from water.

After the work is completed and before it is accepted by the NPC, the Contractor shall remove all pumping equipment and shall remove, fill or plug all temporary drainage structures as directed, all at his expense.

Disposal Area

The proposed location of disposal area shall be at the site designated by the Engineer. It is the responsibility of the Contractor to disposed off site all construction debris and be considered in the preparation of his proposal.

Disposal of all Rubbish, Demolition Waste etc.

The Contractor shall be entirely responsible for and ensure the safe and hygienic collection, transportation and disposal of all rubbish, tires, liquid/solid waste material off-site arising from construction activities and from site offices, canteen and etc., and for disposal of demolition waste that cannot be recycled. Fires and burning of rubbish and waste on the Site will not be permitted, nor the burying of rubbish and waste. Particular care shall be taken in identification and safe disposal of hazardous materials (if any).

Relationships with Local Communities and Authorities

In siting and operating his facilities and in executing the Works, the Contractor shall, at all times, and to the extent possible, minimize the impact of his activities on existing communities. Where communities are likely to be affected by major activities such as the establishment of a camp or extensive road closure or bypassing, he shall liaise closely with the concerned communities and their representatives and, if so directed, shall attend additional meetings arranged by the Engineer to resolve issues and claims and minimize impacts on local communities. Any problems arising from his operations and which cannot be resolved by the Contractor shall be referred to the Engineer. The Contractor shall be responsible for any compensation due to reinstatements necessary with respect to any damage caused by him to areas outside the Site and no separate payment will be made in this regard.

Cleaning-up

The Contractor shall at all times keep the construction area including storage area used by him free from accumulations of waste material or rubbish. Upon completion of construction, the Contractor shall leave the work and premises in a clean, neat and workmanlike conditions satisfactory to the Engineer.

MEASUREMENT AND PAYMENT

No separate measurement and payment shall be made for the Contractor's Construction Facilities. The entire cost thereof shall be included in the various pay items in the Bill of Quantities.

No separate measurement and payment will be made for the Care of Water During Construction operations. The cost of furnishing, constructing, maintaining, operating and removing of temporary drainage structure, pumping system and other dewatering devices necessary to keep construction operations free from water, shall be included in the various pay items in the Bill of Quantities for structures where such care of water is required.

TS - 02 GENERAL REQUIRMENTS

a. Occupational Safety and Health Program

Scope

This Section pertains to the environmental and safety provisions, requirements and conditions that shall govern during the execution of all civil works under this project.

General Conditions

The Contractor shall ensure compliance with the applicable environmental and safety regulations, as well as ECC conditions, during installation/construction of this project through the implementation of measures that include, but not limited to the following:

a. Designate a Safety Officer and a Pollution Control Officer who shall respectively handle all safety and environmental concerns of the project.

b. Prepare and submit Construction Safety Health Plan (CSHP)

c. Properly manage debris and various waste generated during installation/construction, such as the following:

- Dispose of demolition and construction debris in a designated or NPC approved disposal area(s);
- Stockpile (and cover if possible) or haul to the designated and/or pre developed dump sites (spoil disposal areas) that shall be provided with suitable drainage-equipped with sediments traps, stripped top soil, spoils from quarry/borrow sites and excavated materials;
- Segregate solid wastes, such as empty cement sacks, scraps of tin or wood, used wires and other domestic, garbage, for recycling or storage in NPC-approved temporary storage areas and further disposal to LGU-designated disposal sites
- Properly handle, store and dispose off, through DENR-accredited transporter/treater, hazardous wastes i.e. used oils, paints, thinner, Etc.

d. Limit construction activities that generate excessive noise to daytime works only to prevent nuisance to nearby residents during rest hours.

e. As far as practicable, undertake site stripping, grading and excavation during dry weather.

f. Construction/Installation shall be carried-out in a manner where landslides and erosions are minimized.

g. Avoid unnecessary opening/clearing of areas outside construction sites or destruction of vegetable cover, especially cutting of existing trees, and to revegetate disturbed areas.

h. Spray water, whenever and wherever necessary, to minimize dust generation.

i. Provide PPE's and other safety provisions required by DOLE, for its project/site works.

Accident Prevention Officer; Accidents

Due precautions shall be taken by the Contractor, at his own cost, to ensure the safety and protection against accidents of all staff and labor engaged on the Works, local residents in the vicinity of the Works, and the public traveling through the Works. The Contractor shall have on his staff on Site a designated Safety Officer qualified to promote and maintain safe working practices. This Safety Officer shall have authority to issue instructions and shall take protective measures to prevent accidents, including but not limited to, the establishment of safe working practices and the training of staff and labor in their implementation.

The Contractor shall be responsible for all costs including medical treatment, transport, accommodation etc. incurred by any member of the public or his labor force whether on direct contract or sub-contract as a result of injuries or illness arising from the execution of the Works.

Protective Clothing and Safety Equipment

The Contractor shall, at his own expense, provide protective clothing and safety equipment to all staff and labor engaged on the Works to the satisfaction of the Engineer. Such clothing and equipment shall include, at a minimum, high visibility vests for workers directing traffic, protective footwear for workmen undertaking concrete mixing work, protective footwear and gloves for workmen performing paving works, dust masks, rubber boots, rain coats and otherwise as appropriate to the job on hand and to the Engineer's satisfaction.

Medical and First–Aid Facilities

The Contractor shall provide and maintain throughout the duration of the Contract, a medical examining room and sickbay together with all necessary supplies and equipment to be sited in the Contractor's main camp. The rooms shall be used exclusively for medical purposes and shall be of good quality construction with electric lighting and otherwise suitable for their purpose. The sickbay shall have at least one bed, and shall be provided with adjacent washing and sanitation facilities. The Contractor shall employ permanently on site at least one fully trained medical aide, nurse or paramedic who shall be engaged solely for medical duties. The Contractor shall, at his own expense, provide first aid equipment at all camps and work sites to the satisfaction of the Engineer, and shall ensure that at all camps and works sites where 20 or more persons are engaged on the Works there shall at all times be a person qualified in first-aid with access to appropriate first-aid equipment. The location of the medical room and other medical and first-aid arrangements shall be made known to all employees by posting suitable notices at prominent locations around the site and by verbal instruction upon recruitment.

MEASUREMENT AND PAYMENT

Measurement and payment shall be made at the contract unit price or lot price as specified in the Bid Price Schedule. Payment shall include all cost in furnishing labor, materials, tools equipment and other incidentals necessary for the satisfactory implementation of these requirements.

TS - 02 DEMOLITION OF EXISTING SEPTIC TANK

Site Clearing, Grubbing (Cutting of Vegetation and Pruning of Trees) and Hauling Materials

Description

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

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

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

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

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

In areas where hand clearing as directed by NPC Engineer or Representative, no requirement of wheels or trucks shall be used. Care shall be taken to ensure that the grass, moss cover, or the natural ground is not disturbed. The materials shall be properly disposed. Materials and debris maybe disposed of by the methods and at locations approved by NPC Engineer or Representative, on or off the project. If disposal is by burying, the debris shall be placed in layers with the material so disturbed to avoid nesting. Each layer shall be covered or mixed with earth material by the land-fill method to fill all voids. The top layer of material buried shall be covered with at least 300mm of earth or other approved material and shall be graded, shaped and compacted to present a pleasing appearance. If the disposal location is off the project, the Contractor shall make all necessary arrangements with property owners in writing for obtaining suitable disposal locations which are outside the limits of view from the project. The cost involved shall be included in the unit bid price. A copy of such agreement shall be furnished to NPC Engineer or Representative. The disposal areas shall be seeded, fertilized and mulched at the Contractor's expense.

Woody material may be disposed of by chipping. The wood chips may be used for mulch, slope erosion control or may be uniformly spread over selected areas as directed by NPC Engineer or Representative. Wood ships used a s mulch for slope erosion control shall have a maximum thickness of 12 mm and faces not exceeding 3,900 mm2 on any individual surface area.

Wood chips not designated for use under other sections shall be spread over the designated areas in layers not to exceed 75mm loose thickness. Diseased trees shall be buried or disposed of as directed by NPC Engineer or Representative. Timber cut inside the area staked for clearing shall be felled within the area to be cleared.

A. Siphoning

Description

This item shall consist of Operation and Maintenance on the septic tank and other treatment systems.

It shall be performed and observed by the household or the owner of the system to achieve its maximum efficiency and long life. Proper maintenance of these systems extends the service life and will continue to operate and function well for decades.

1. Septic tank must be desludged every 4 years to maintain its designed treatment efficiency.
2. Keep a record of pumping, inspections, maintenance, and repairs.
3. Inspect the tank for cracks, and check that baffles or tees are in place. Check for ponding of water near the treatment and disposal system.
4. Refrain from using septic starters, additives or feeders. i.e. enzymes
5. Practice water conservation to prevent overloading the septic tank system. Check for defective toilet tank valves, repair leaky fixtures, and install appliances and fixtures that use less water and avoid wasteful practices.
6. Divert excess rainwater runoff away from the septic tank and leaching field system.
7. Keep trees and deep-rooted plants and shrubs away from the immediate area that may intrude or clog the system.
8. Do not park or drive heavy vehicles or equipment over the septic system or any of its components.
9.

Prohibited Discharge

1. Flammable or explosive substance whethersolid,liquid or gaseous;

2. Any sanitary napkin, clothing or plastic material orliner;

3. Disinfectant or deodorant, antiseptic or germicide powder or fluid, unless specifically stated to be suitable for use in a septic tank;

4. Stormwater, including roof and rainwater tank overflow, and surface drainage waters;

5. Backflush waters from a swimming pool or water softener discharge from a spa bath/pool.

6. All large objects, food, oil, and grease shall not be conveyed into the septic tank, and

7. Any other matter or substance which, in the opinion of the Local Health Authority, would impair the effective function/purpose of a septic tank

MEASUREMENT AND PAYMENT

Measurement and payment shall be made at the contract unit price or lot price as specified in the Bid Price Schedule. Payment shall include all cost in furnishing labor, materials, tools equipment and other incidentals necessary for the satisfactory implementation of these requirements.

B. Removal of Obstruction and Disposal

Description

This Item shall consist of the removal wholly or in part, and satisfactory disposal of structure and obstruction which are not designated or permitted to remain at the site.

Selected Big Boulders and Soil found near the area shall be used as Embankment for the proposed Slope Protection along the River Bank. Transportation for these Materials to designated site shall also be included in this Pay Item.

The Contractor shall perform the work described above, within and adjacent to the construction site, on Government land or easement, as shown on the Plans or as directed by NPC Engineer. All designated salvable material shall be removed, without unnecessary damage, in sections or pieces which may be readily transported, and shall be stored by the Contractor at specified places on the project or as otherwise shown in the Special Provisions. Salvaged material which are damaged thru negligence shall be replaced or restored at the Contractor's expense. Waste material may be disposed of by the Contractor in NPC-owned sites as shown in the Special Provision or permitted by NPC Engineer. Otherwise, the Contractor shall arrange disposal of waste at no expense to NPC and shall be in accordance with the requirements for disposal site selection and hauling activity stipulated in the Contract. Perishable material shall be handled as designated inClearing and Grubbing. Nonperishable material may be disposed of outside the limits of view from the project with written permission of NPC, the property owner on whose property the material is placed. Copies of all agreements with property owners are to be furnished to the Engineer. Basements or cavities left by the structure removal shall be filled

with acceptable material to the level of the surrounding ground and, if within prism of construction, shall be compacted to the required density.

All existing culverts and other drainage structures in use by traffic shall not be removed until satisfactory arrangements have been made to accommodate traffic. The removal of existing culverts within embankment areas will be required only as necessary for the installation of new structures. Abandoned culverts shall be broken down, crushed and sealed or plugged. All retrieved culvert for future use as

determined by the Engineer shall be carefully removed and all precautions shall be employed to avoid breakage or structural damage to any of its part. All sections of structures removed which are not designated for stockpiling or re-laying shall become the property of NPC and be removed from the project or disposed of in a manner approved by NPC Engineer. Where such portions of existing structures lie wholly or in part within the limits for a new structure, they shall be removed as necessary to accommodate the construction of the proposed structure.

Structures designated to become the property of the Contractor shall be removed from the right-of-way. Blasting shall not be allowed, but other operations necessary for the removal of an existing structure or obstruction, which may damage new construction, shall be completed prior to placing the new work, unless otherwise provided in the Special Provisions. When removing manholes, catch basins or drop inlets, any functioning sewer lines connected to it shall be restored and properly connected. Satisfactory by-pass service shall be maintained during the construction operations.

Removal of portions of pavement, slabs, sidewalks, curbs, gutters, and similar structures shall be undertaken with sufficient care to avoid breakage or damage to the portion of the structures designated to remain. The portion of the structure shall be removed from an existing joint, or sawed and chipped to a true line with a vertical face. Before concrete removal begins, a saw cut, 19 mm deep when steel reinforcement is to remain and deeper when steel reinforcement is to be removed with concrete, shall be made into the surface of the concrete at the perimeter of the removal limits. Concrete shall be completely removed (exposing the deformed surface of the bar) from existing steel reinforcing bars which extend from the existing members and are specified to remain. Steel reinforcement that are to be removed shall be cut to a minimum of 25.4 mm behind the final surface, where void resulted to the removal thereof shall be filled with epoxy mortar and finished to a sound, smooth, uniform colored surface. The retained concrete surface at which fresh concrete surface will be placed shall be roughened, cleaned, and saturated. When a portion of existing concrete is removed without replacement, the concrete surface of the remaining portion shall be cleaned to a smooth surface of less than 1.6 mm profile. In case of damage to the remaining structure, it shall be repaired or replaced at the Contractor's expense. For structures with an asphalt wearing course, the wearing course shall be removed separately before removing the portion designated to be removed.

Contractor is oblige to follow the scope of works and must cooperate to the End User Decision in providing the necessary equipment to dispose the said materials.

MEASUREMENT AND PAYMENT

Measurement and payment shall be made at the contract unit price or lot price as specified in the Bid Price Schedule. Payment shall include all cost in furnishing labor, materials, tools equipment and other incidentals necessary for the satisfactory implementation of these requirements.

TS -04 CONSTRUCTION OF SEPTIC TANK

General

The work to be undertaken under this Section shall include all labor, materials, equipment, plant and other facilities and the satisfactory performance of all work necessary to complete all reinforced concrete work shown on the drawings and specified herein.

The main purpose of a septic tank is the removal of suspended solids and FOG through sedimentation and flotation. The important factor in achieving good sedimentation is maintaining quiescent conditions and can be accomplished through a long wastewater residence time in the septic tank. Tank volume, geometry, and compartmentalization affect the residence time.

Design Consideration and Computation

The National Standard for the design , construction/installation, operation and maintenance of Septic Tank Systems shall consist of the following criteria:

1. Minimum daily inflow or hydraulic load of 50 gallons per person per day (189.20 lcpd)
2. Daily inflow based on not less than ten persons. For Cluster Households with less than 100 occupants, a septic tank is still acceptable . For more than 100 person, an advance sewage treatment system shall be applied.
3. Minimum effective liquid depth of the tank shall be 1.20 meters and additional freeboard on not less than 0.30 meter
4. Minimum detention time of 24 hours
5. A minimum of Two Chambers so that effective capacity of the first chamber is twice that of the second chamber

6. Must be rectangular in shape, structurally sound and watertight
7. Inlet and outlet Connections shall be sanitary tees or baffles constructed of pre-cast concrete or PVC
8. Connection for the inlet, outlet and inspection openings is integrally cast for concrete constructed septic tank. For plastic type materials , the connections shall be mechanically and/or chemically sealed or bonded in order to make it water tight and have strength equal to that of the parent material.
9. Desludging frequency shall be one in every three to five years.
10. Septic Tank size and volume determination shall be based on the scientific formula.

Compartmentalization

All septic tanks shall be of multi-compartment design with a minimum of two (2) compartments. The first of a (2) two-compartment tank shall contain two thirds (2/3) the liquid capacity of the total volume of the tank. Tanks shall be of rectangular design. The minimum depth of the tank shall not be lower than 1.2 meter.

Inlets and Outlets

All inlet and outlet connections shall be sanitary tees or baffles constructed of pre-cast concrete or PVC. Inlet openings may have a minimum diameter equivalent to the diameter of the house sewer but in no instance shall the diameter be less than four (4) inches. The outlet invert shall be three (3) inches below the inlet invert. The inlet and outlet baffles or sanitary tees shall extend at least 12 inches below the liquid level, but to a level no deeper than 40% of the liquid depth. All pipe cutouts for inlet and outlet connections shall be sealed with a watertight concrete (95%) &bentonite (5%) grout mix or standard rubber gaskets. Connections between compartments of multi-compartment tanks shall consist of a four (4) inch diameter sanitary tee or baffle constructed of concrete. All compartment connections shall extend to a level no deeper than 40% of the liquid depth as measured from the liquid level. All inlet, outlet and inter-compartment connections shall be located to provide a minimum air space of two (2) inches between the top of the connection and the underside of the tank cover.

Tank Access/Manhole

Septic tanks shall have removable covers or manholes to provide access for the purpose of inspection and cleaning. Each tank compartment shall be equipped with an access opening and cover. The opening shall be located to provide access to each tank compartmentas well as providing access to the inlet and outlet

connections for routine inspections. Access openings shall be at least 0.50 meter in diameter.

Construction and Installation Considerations

Site Location

1. All tanks shall be placed on a level grade and at a depth that provides adequate gravity flow from the source. It should not be located at a large difference in elevation (low to high) to avoid facilitation of periodic pumping.

2. Where adequate flow from the source is maintained through pumping equipment, the impact of pumping rates and potential surge flows shall be evaluated so as to maintain the treatment efficiency of the septic tank unit.

3. The location of septic tanks shall be in an accessible area for the easement of desludging activities.

4. Septic tanks shall not be installed under the building, park, or driveways unless special provisions have been made suchas structurally sound designs that can withstand heavy loads.

5. Septic tanks shall not be located in areas with high water table to avoid flotation of the tank and in areas where there is steep soil slope or prone to soil erosion or landslides

Installation

1. The excavation shall be large enough to allow safe, unencumbered working conditions but in no case shall be the size of the excavation be less than 0.60 meters beyond the perimeter of the tank.

2. The tank shall be placed on a firm, dry, granular, undisturbed soil that has been graded level. Gravel bedding shall be used on dampor fine-grained soils

3. Backfill material shall be placed and compacted, extending a minimum of 0.60 meters beyond the perimeter of the tank.

4. All tanks shall be tested to ensure watertight conditions and to check alignment and operation of inlet, inter-compartment and outlet connections prior to backfill. When tested, tanks shall be filled to overflowing with water to the observe operation ofall connections and fittings. All visible leaks in the tank observed by the installer shall be repaired prior to backfilling.

Construction Materials

All septic tanks shall be constructed of material as approved and beof sufficient strength so that there will be no structural failure or undue distortion under pressure when either full or empty and be protected from, or designed to withstand, loadings imposed by vehicles, buildings, soil and or ground waters and the internal loadings. Pre-cast reinforced concrete or other suitable material (pre-fab, fiberglass, plastic, etc.) approved as equal by and atthe sole discretion of the Department. Jee, . The septic tank must be installed on a compacted, level base and the top of the tank shall terminate at least 50mm above the finished ground surface level, with the surrounding surface graded away from the septic tank and be provided with access covers as follows:

1. be constructed of a material as approved and beof sufficient strength to withstand all imposed loadings including vehicle loads where situated in vehicle access areas.
2. be constructed so as to be child proof and effectively sealed to prevent the ingress and/or egress of water or gas and be removable for maintenance purposes.

All septic tanks, unless otherwise approved by the Departmentor the Local Health Authority, shall be designed and constructed so that

1. The septic tank will be watertight and retain structural integrity during transportation, installation and operation
2. Pre-cast reinforced concrete tanks shall have a minimum wall thickness of two and one half (2%) inches.
3. Each septic tank shall be constructed with a watertight access riser for each compartment and shall extend above grade at the time of installation. The riser and lid shall be made of concrete, masonry or an equivalent durable material approved by the Department or LHA.

4. If multiple concrete risers are needed then water tight gaskets or hydraulic cement must be placed between eachriser.
5. All tanks shall be watertight, non-corrosive, durable and structurally sound All above finished grade access covers shall be water tight and secure from vandalism.

A. Concrete (3000 PSI)

Material

a) Cement

Except as maybe otherwise provided in these specifications, cement shall conform to the "Specification for Portland Cement" (ASTM C 150 - Latest Revision) and shall be Type I

b) Concrete Aggregates

1.) Concrete aggregates shall be well graded, clean, hard particles of gravel or crushed rock conforming with the "Standard Specifications for Concrete Aggregates (ASTM C - 33 Latest Revision)

2.) The maximum size of the aggregates shall not be larger than one-fifth (1/5) of the narrowest dimension between form and not larger than three fourth (3/4) of the minimum clear spacing between individual reinforcing bars or bundles of bars, and in no case larger 5.1 cm (2 in) in diameter except that larger diameter may be allowed in massive concreting with written permission from the Engineer.

c) Water

Water used in mixing concrete shall be clean and free from injuring amounts of oils, acids, alkali, organic materials or other substances that may be deleterious to concrete or steel

d) Reinforcing Steel

All reinforcing steel bars used shall be new and freefrom rust, oil, defects, greases or kinks. They shall conform to the latest edition of ASTM "SPECIFICATIONS FOR DEFORMED STEEL BARS FOR CONCRETE REINFORCEMENT" Grade 40 as shown or latest equivalent Philippine Bureau of Standard Specifications. Deformed Steel Bars shall have the following unit weights:

SIZE (mm)	Kg/m	SIZE (mm)	Kg/m
6	0.222	20	2.466
8	0.395	25	3.854
10	0.616	28	4.833
12	0.888	32	6.313
16	1.579	36	7.991

e) Admixture:

To increase concrete workability and to control the set of concrete, the engineer can request that an admixture maybe added subject to his approval and it shall be borne by the Contractor.

Water – reducing admixtures, retarding admixtures, accelerating admixtures, water-reducing and retarding admixtures, and water reducing and accelerating admixtures shall conform to "Specification for Chemical Admixtures for Concrete" (ASTM C494).

Other admixtures required for specific construction conditions and conforming to ASTM (C494) "Standard Specification for Chemical Admixtures for Concrete" maybe incorporated in separate concrete design mixes and submitted to the responsible engineer for approval prior to their use.

STORAGE OF MATERIALS

Cement and aggregates shall be stored in such a manneras to prevent deterioration or intrusion by foreign matter. Any material which has deteriorated or which has been damaged shall not be used for concrete. Steel shall be stored under cover or otherwise prevented from rusting.

TESTING OF MATERIALS

Cement and aggregates shall be stored in such a manner as to prevent deterioration or intrusion by foreign matter. Any material which has deteriorated or which has been damaged shall not be used for concrete. Steel shall be stored under cover or otherwise prevented from rusting.

The Owner or his duly authorized representative or the Engineer shall periodically order the test of any material supplied by the Contractor entering into concrete or reinforced concrete to determine its suitability for the intended purpose. Such tests shall be in accordance with the standards of the American Society for Testing and Materials, as noted elsewhere in these specifications. Samples shall be provided by the Contractor without cost to the Owner. Expenses for the testing and cost of transporting samples to testing laboratory shall be borne by the Contractor. Copies of results of tests shallbe furnished to the Owner promptly. Compressive strength specimens for tests of concrete during construction shall be according to "Making and Curing of Concrete Compression and Flexural Strength Test Specimens in the field" (ASTM C-31).

CONTROLLED STRENGTHS OF CONCRETE

1.0.1 Concrete for structural elements shall develop a minimum**28-day compressive cylinder strength of 20.68 MPa (3,000 psi),** unless otherwise specified in the plans.

1.0.2 Concrete for non-structural elements such as cradles, unreinforced encasements, thrust blocks, and partition walls shall develop a minimum **28-day compressive cylinder strength of 17.25 mega Pascal (2,500 psi)**, unless otherwise specified in the plans.

METHOD OF DETERMINING STRENGTH TRIAL BATCH

The Contractor shall submit design mixed and test results of samples made in accordance with "Standard Method of Making and Curing Concrete Compression and Flexure Test Specimens in the Laboratory" (ASTM C-192 Latest Revision) and "Standard Method of Test for Compressive Strength of Molded Concrete Cylinders" (ASTM Designation C-39)

for each strength required, stating the proposed slump and the proportional weights of cement, saturated surface dry aggregates, and water. These mixes shall be proved by the preliminary tests thirty (30) days before concreting and shall show a 28 day strength of fifteen percent (15%) higher than theultimate strength required. No substitution shall be made in the materials or mixed without additional tests to show that quality of concrete is satisfactory.

CONCRETE PROPORTION AND CONSISTENCY

The proportions of aggregate to cement for any concrete shall be such as to produce a mixture which will work readily into the corners and angles of the forms and around reinforcement with the method of placing employed on the work but without permitting the materials to segregate, or excess free water to collect on the surface. The combined aggregates shall be of such composition of sizes that when separated on the No. 4 standard sieve, the weight passing the sieve (fine aggregate) shall not be less than thirty percent (30%) of the total except that these proportions do not necessarily apply to lightweight aggregates.

a. The methods of measuring concrete materials shall be such that proportions can be accurately controlled and easily checked at any time during the work. Measurement of materials for ready-mixed concrete shall conform with the "Standard Specifications for Ready mixed Concrete" (ASTM C-94, Latest Revision) where applicable.

b. Aggregates shall be measured out by weight and to within one percent (1%). Cement shall conform to 40 kg (88 lb.) per bag and this is to be verified from time to time. Water shall be measured by weight or volume to within one and one half (1-1/2 %)

c. The water shall in no case exceed 21.24 liters, and 25.67 liters (5.62 and 6.79 US gallons) per bag of cement for all concrete with specified strength of f'c respectively. Slumps shall be within the following limits:

Portion of Structure	Slump Millimeters	Inches
Columns and end supported beams, girders	50-100	2-4
Walls and thin Vertical sections	75-125	3-5

Footings, slabs on Grade and cantileveredbeams and slabs	50-80	2-3

Slumps shall be according to "Test of Slump for Portland Cement Concrete" (ASTM C-143)

d. **Classification and Design Mixture.** The mixtures forall classes of concrete shall be designed by the Contractor and approved by ICWS to obtain the compressive strength at the age of twenty eight (28) days as specified below.

Class	Size of Maximum Dia. of Aggregate	Minimum Compressive Strength	Designated Size of aggregate
Y	1/2" (12.5mm)	3,000 psi	12.5mm to 4.75mm
AA	3/4" (19mm)	3,000 psi	19mm to 4.75mm
A	1-1/2" (37.5mm)	3,000 psi	37.5mm to 4.75mm
B	2" (50mm)	2,400 psi	50mm to 4.75mm
C	3" (75mm)	2,400 psi	75mm to 4.75mm

e. **Cement Content.** The minimum cement content per cubic meter of concrete for the different classes or gradation of aggregates shall be in accordance with the following:

Class and Gradation of Aggregates	Minimum Cement Content
Y with 1/2"	400 kgs/cu.m
AA with 3/4"	400 kgs/cu.m
A with 1-1/2"	360 kgs/cu.m
B with 2"	600 kgs/cu.m

C with 3"	270 kgs/cu.m
Z with 3"	340 kgs/cu.m

f. Job mix adjustments on water content shall be allowed only with Engineer's permission and provided that cement is also added to maintain the original water cement ratio of the design mix.

EXCLUSION OF WATER

No concrete shall be placed in any structure until all water entering the space to be filled with concrete has been properly cut off or has been diverted by pipes, or other means, and carried out of the forms, clear of the work. No concrete shall be deposited under water without the explicit permission of the Engineer, and then only in strict accordance with his directions, nor shall the Contractor, without explicit permission allow still water to rise on any concrete until the concrete has attained its initial set. Water shall not be permitted to flow over the surface of any concrete in such manner and at such velocity as will injure the surface finish of the concrete. Pumping or other necessary dewatering operations for removing ground water, if required, will be subject to the approval of the Engineer.

MIXING CONCRETE

No hand mixing shall be allowed, except in case of emergency such as mixer breakdown during pouring operations and shall stop at the first allowed construction joints. All concrete shall be machine mixed for at least 1 minutes after all materials including water are in the mixing drum.

The mixer shall be of approved size and type which will insure a uniform distribution of material throughout the mass. It shall be equipped with a device for accurately measuring and controlling amount of water in each batch.

Placing of material in mixer shall be done in such a way that first batch of concrete materials placed in the mixer shall contain sufficient excess of cement, sand and water to coat the inside of the drum without reducing the cement content of the mix to be discharged.

Retempering, i.e. , remixing with the addition of water to concrete that has been partially hardened shall not be permitted.

PREPARATION OF SURFACES FOR CONCRETING

Earth surfaces shall be thoroughly wetted by sprinkling prior to the placing of any concrete, and these surfaces shall be kept moist by frequent sprinkling up to the time of placing concrete thereon. The surface shall be free from standing water, mud, and debris at the time of placing concrete.

Concrete surfaces upon or against which concrete is to be placed, where the placement of the old concrete has been stopped or interrupted so that, in the opinion of the Engineer, the new concrete cannot be incorporated integrally with that previously placed, are defined as construction joints. The surfaces of horizontal joints shall be leveled with a wooden float to provide a reasonably smooth surface. A surface consisting largely of coarse aggregate shall be avoided. Except where the drawings call for joint surfaces to be painted, the joint surfaces shall be cleaned of all laitance, loose or defective concrete, and foreign material. Such cleaning shall be accompanied by sandblasting followed by thorough washing. All pools of water shall be removed from the surface of construction joints before the new concrete is placed. After the surfaces have been prepared to the satisfaction of the Engineer, all approximately horizontal construction joints shall be covered with a layer of mortar approximately 25mm (1") thick. The mortar shall have the same proportion of cement and sand as the regular concrete mixture, unless otherwise directed by the Engineer. The water-cement ratio of the mortar in place shall not exceed that of the concrete to be placed upon it, and the consistency of the mortar shall be suitable for placing and working in a manner hereinafter specified. The mortar shall be spread uniformly and shall be worked thoroughly into all irregularities of the surface, and wire brooms shall be used where possible to scrub the mortar into the surface. Concrete shall be placed immediately upon the fresh mortar.

When placing of concrete is to be interrupted long enough for the concrete to take a set, the working face shall be given a shape by the use of forms or other means that will secure proper union with subsequent work, provided that construction joints shall be made only where approved by the Engineer.

PLACING OF CONCRETE

Concrete which upon or before placing is found not to conform with the requirements specified herein shall be rejected and immediately removed from the work. Concrete which is not placed in accordance with these specifications, or which is of inferior quality, as determined by the engineer, shall be removed and replaced by and at the expense of the Contractor. No concrete shall be placed except in a present of duly authorized representative of the Engineer. Concrete shall not be placed when unsuitable heat or wind will prevent proper placement and curing, as determined by the Engineer, prior to placing any concrete, the Contractor shall give the Engineer twenty four (24) hours written notice.

Concrete shall be deposited in its final position without segregation, re-handling, or flowing. Placing shall be done preferably with buggies, buckets, or wheelborrows. No chutes will be allowed except to transfer concrete from hoppers to buggies, wheelborrows, or buckets in which case, they shall not exceed six (6) meters (20') in aggregate length.

Placing of concrete with a free drop or fall more than 1.20m (4') shall not be allowed, except when approved by the Engineer and when approved sheet metal conduits, pipes or "elephant trunks" are employed. When employed, these conveyors shall be kept full or concrete and the ends kept buried in the newly placed concrete as pouring progresses.

Concrete in forms shall be deposited in uniform horizontal layers not deeper than 450mm (18") and care shall be taken to avoid inclined layers or inclined construction joints except where such care required for sloping members. Each layer shall be placed while the previous layer is still soft. The rate of placing concrete in forms shall not exceed 1.5 meters (5') of vertical rise per hour.

FORMS

General

The Contractor shall provideforms to confine the concrete and shape it to the required lines. Plastering in general, shall not be allowed. The Contractor shallassume full responsibility for the adequate design ofall forms and shall be smooth surface. However, forms which in the opinion of the Engineer are unsafe or inadequate in any respect may at any time be condemned by the Engineer, and the Contractor shall promptly remove the condemned forms from the work and replace them at his own expense. A sufficient number of formsof each kind shall be provided to permit the rate of progress to be maintained. Whenever in the opinion of the Engineer, additional forms are necessary

to maintain theprogressscheduleSuchadditionalforms shall be provided by the Contractor at his own expense. The design and inspection of concrete forms, falsework, and shoring shall comply with applicable safety regulations, and as may be specified in the General Conditions of these specifications.

Materials

a. Except as otherwise expressly approved by the Engineer, all lumber brought at the job site for use as forms, shoring, or bracing shall be new material.

b. All forms shall be smooth surface forms and shall be of the following materials:

Walls	-	Steel or plywood panels
Columns	-	Steel, plywood or surfaces lumber
Roof	-	Plywood
All other work	-	Steel panels, plywood or surfaced lumber

Plywood shall be manufactured especially for concrete form work and shall be oiled with an approved form oil and edge sealed.

c. Column forms shall be checked for plumbness before concrete is deposited. Hand holes shall be provided in column forms at lowest points of pour lifts to render this space accessible for cleaning.

d. All girder, beam and slab centerlines shall be crowned at least 6.3mm (1/4in) in all directions for every 4.57 meters (15ft) span. However, cambers from all cantilevers shall be as indicated on the plans or obtained from the Engineer by the Contractor.

e. The following are the tolerance limits for formwork:

1. Variation from plumb

In line and surfaces of columns, piers, walls and risers.

In 3.05m (10ft)	6.3mm (1/4")
6.10m (20ft)	9.5mm (3/8")
12.20m (40ft) or more	19.0mm (3/4")

For exposed corner columns and/or piers, control joint groves and other conspicuous lines

In any bay 6.10m (20ft) max	6.3mm (1/4")
In 12.20m (40ft) or more	13.00mm (1/2")

2. Variation in cross-sectional dimensions of columns and piers, beams, and thickness of walls and slabs.

Minus	6.3mm (1/4")
Plus	13.00mm (1/2")

3. Footings

Variations in dimensions on drawings (applied to concrete only and not to reinforcing bars or dowels)

Minus	13.00mm (1/2")
Plus	50.00mm (2")

Misplacement of eccentricity, two percent (2%) of the footings width in the direction of misplacement but not to exceed 50.0mm (2").

Reduction in thickness	Five percent (5%) at specified thickness

4. Variation in steps

a) In a flight of steps

Rise	3.2mm (1/8")
Tread	6.3mm (1/4")

b.) In consecutive steps

Rise	1.6mm (1/16")
Tread	3.2mm (1/9")

When required for another work, or when requested by the Owner or his Engineer, the Contractor shall remove or relocate shoring, but existing shoring shall not be disturbed until new shores are set in position.

f. Design

1. All forms shall be true in every respect to the required shape and size, shall conform to the established alignment and grade, and shall be of sufficient strength and rigidity to maintain their position and shape under the loads and operations incident to placing and vibrating the concrete. Suitable and effective means shall be provided on all forms for holding adjacent edges and ends of panels and sections tightly together and in accurate alignment so as to prevent the formation of ridges, fins, or offsets, or similar surface defects in the finished concrete. Plywood, 16.0mm (5/8") and greater in thickness, may be fastened directly to studding if the studs are close enough to prevent visible deflection marks in concrete. The forms shall be tight so as to prevent the loss of water, cement, and fines during placing and vibrating of the concrete. Adequate clean-out holes shall be provided at the bottom of each lift of forms. The size, number, and location of such cleanouts shall be subject to the approval of the Engineer.

2. Concrete construction joints will not be permitted on locations other than those shown or specified, except as may be approved by the Engineer. When a second lift is placed on hardened concrete, special precaution shall not be taken in the way of the number, location, and tightening of ties at the top of the old lift and bottom of the new to prevent any unsatisfactory effect whatsoever on the concrete. Pipe stubs and anchor bolts shall be set in the form where required.

3. Unless otherwise shown, exterior corners in concrete members shall be provided with 19.0mm (3/4") chamfers. Re-entrant corners in concrete members shall not have fillets unless otherwise shown.

4. Reservoir forms and falseworks supporting the roof slab shall be designed for a minimum additional live load of 0.90 Kpa (20psf).

g. Form Ties

Form ties with integral water stops shall be provided with a cork or other suitable means for forming a conical hole to insure that the form-tie may be broken off back of the face of the concrete. The maximum diameter or removable cones for rod ties, or of other removable form-tie fasteners having a circular cross-section, shall not exceed 38mm (1-1/2") and all such fasteners shall be such as to leave holes of regular shape reaming. Holes left by the removal of fasteners from the ends of snap-ties or form-ties shall be reamed with suitable toothed reamers so as to leave the surfaces of the holes clean and rough before being filled with mortar as provided in Section 17.20. Wire ties for holding forms will not be permitted. No form tying device or part thereof, other than metal, shall be left embedded in the concrete, nor shall any tie be removed in such manner as to leave a hole extending through the interior of the concrete member. The use of snap-ties which cause spalling of the concrete upon form stripping or tie removal will not be permitted. If steel panel forms are used, rubber grommets shall be provided where the ties pass through the form in order to prevent loss of cement paste. Where metal rods extending through the concrete are used to support or to strengthen forms, the rods shall remain embedded and shall terminate not less than 25mm (1in) back from the formed face or faces of the concrete. Form ties or metal rods left embedded in concrete of water retaining tanks shall be equipped with an integral metal waterstop not less than 38mm(1-1/2") in diameter.

h. Vertical Surfaces

All vertical surfaces of concrete members shall be formed, except where placement of the concrete against the ground is called for on

the drawings or explicitly authorized by the Engineer. Not less than 25mm (1") of concrete shall be added to the thickness of the concrete member as shown where concrete is permitted to be placed against trimmed ground in lieu of forms. Such permission will be granted only for members of comparatively limited height and where the character of the ground is such that it can be trimmed to the required lines and will stand securely without caving or sloughing until concrete has been placed.

i. Maintenance of Forms

Forms shall be maintained at all times in good condition, particularly as to size, shape, strength, rigidity, tightness, and smoothness of surface. Forms when in place, shall conform to the established alignment and grades. Before concrete is placed, the forms shall be thoroughly cleaned. The form surfaces shall be treated with a non-staining mineral oil or other lubricant approved by the Engineer. Any excess lubricant shall be satisfactorily removed before placing the concrete. In addition, all forms shall be given a preliminary oil treatment by the, manufacturer or shall be oiled by the Contractor at least two (2) weeks in advance of their use. Care shall be exercised to keep oil off the surfaces of steel reinforcement and other metal items to be embodied in concrete. Forms maybe reused if in good condition and if approved by the Engineer. Light sanding between uses will be required wherever necessary in the opinion of the Engineer to obtain uniform surface texture on all exposed concrete surfaces. Exposed concrete surface are defined as surfaces which are permanently exposed to view. In the case of forms for the inside wall surfaces of hydraulic structures, unused tie rod holes shall be covered with metal caps or shall be filled by other methods approved by the Engineer.

j. Removal of Forms

Directions of the Engineer concerning the removal offorms shall be strictly followed. Forms and shoring shall not be removed until concrete is adequately set and strong enough to withstand anticipated loading and this work shall be done with care so as to avoid injury to the concrete. No heavy loading on green concrete will be permitted. In the case of roof slabs and above-ground floor slabs, forms shall remain in place until test cylinders for the roof

concrete attain a minimum compressive strength of 15.52 MPa (2,250 psi) provided that no forms shall be disturbed or removed under an individual panel or unit before the concrete in the adjacent panel or unit has attained a strength of 15.52 MPA (2,250 psi) and has been in place for a minimum of even (7) days. The time required to establish said strength will be determined by the Engineer who will make several test cylinders for this purpose from concrete used in the first group of roof panels placed. If the time so determined is more than the seven-day minimum, then it shall be used as the minimum length of time. Forms for all vertical walls and columns shall remain in place at least three (3) days after the concrete has been placed. Forms for all parts of the work not specifically mentioned herein shall remain in place for prods of time as ordered by the Engineer

TAMPING AND VIBRATING

As concrete is placed in the forms or in excavations, it shall be thoroughly settled and compacted throughout the entire depth of the layer which is being consolidated, into a dense, homogeneous mass, filling all corners and angles, thoroughly embedding the reinforcement, eliminating rock pockets, and bringing only a slight excess of water to the exposed surface of concrete during placement.

Care shall be used in placing concrete around waterstops. The concrete shall be carefully worked by rodding and vibrating to make sure that all air and rock pockets have been eliminated. Where flat-strip type waterstops are used, the concrete shall be worked under the waterstops are used, the concrete shall be worked under the waterstops by hand making sure that all air and rock pockets have been eliminated.

Concrete in wall shall be internally vibrated and at the same time rammed, stirred, or worked with suitable appliances, tamping bars, shovels, or forked tools until it completely fills the forms or excavations and closes snugly against all surfaces. Subsequent layers previously placed have been worked thoroughly as specified. Except in special cases where their use is deemed impracticable by the Engineer, the Contractor shall use internally vibrated, high speed power vibrators not less than 8000 rpm of an approved immersion

type in sufficient numbers, with standby units as required, to accomplish the results herein specified within fifteen (15) minutes after concrete of the prescribed consistency is placed in the forms. The vibrating head shall be kept from contact with the surfaces of the forms. Care shall be taken not to vibrate concrete excessively or to work it in any manner that causes segregation of its face.

CARE AND REPAIR OF CONCRETE

The Contractor shall protect all concrete against injury or damage from excessive heat, lack of moisture, over stress, or any other cause until final acceptance by the Owner. Particular care shall be taken to the drying of concrete and to avoid roughening orotherwise damaging the surface. Any concrete found to be damaged or which may have been originally defective at any time prior to the final acceptance of the complete work, or which departs from the established line or grade, or which for any other reason does not conform with the specifications shall be satisfactorily repaired or removed and replaced with acceptable concrete at the Contractor's expense.

FINISH OF CONCRETE SURFACE

All finished or formed surfaces shall conformaccurately with the shape, alignment, grades and sections as indicated on the plans or as prescribed by the Engineer. Surfaces shall be free from fins, bulges, ridges, offsets, honeycombing, or roughness of any kind, and shall present a finished, smooth, continuous hard surface.

Except as otherwise provided herein, unformed top surfaces of concrete shall be brought to uniform surfaces and worked with suitable tools to a reasonably smooth woodfloat finish. Excessive floating of surfaces while the concrete is plastic will not be permitted. All surfaces shall be placed monothically with the base slab. Dusting of dry cement and sand on the concrete surface to absorb excess moisture will not be permitted. Floor slabs and exposed tops of walls and curbsshallbe given a steel trowel finish. At the Contractor's option, the above mentioned floor slabs may be finished with a power float after screeding. Subsequent to the aforementioned finish, all sloping surfaces of floor slabs shall be lightly boomed to provide a skid resistant surface.

TREATMENT OF SURFACE DEFECTS

As soon as forms are removed, all exposed surfaces shall be carefully examined and any irregularities shall be immediately rubbed or ground in a satisfactory manner in order to secure a smooth, uniform, and continuous surface. Plastering or coating of surfaces to be smoothed will not be permitted. No repairs shall bemade until after inspection by the Engineer, and then only in strict accordance with his directions. Concrete containing voids, holes, honeycombing, similar depression defects shall be completely removed and replaced; provided that where required or approved by the Engineer, defects shall be repaired with gunite or with cement mortar placed by an approved compressed air mortar gun. In no case will extensive patching of honeycombed concrete be permitted. All repairs and replacements herein specified shall be promptly executed by the Contractor at his own expense.

DEPOSITING CONCRETE

Depositing:

Depositing shall be done without segregation, remanding or flowing of concrete. It shall be done with the use of buggies, buckets or wheelbarrows. Use of chutes will not be allowed except to transfer concrete from hoppers to buggies, wheelbarrows or buckets in which case shall not exceed 20 feet in aggregate length placing of concrete with a free drop of fall of more than 5 feet are not allowed. Conveyors when used shall be kept full of concrete and ends shall be kept buried in the newly placed concrete as pouring progresses.

Vibrations:

No placing of concrete will be allowed without vibrators. Segregation due to over vibration shall be avoided.

Construction Joints:

If possible concreting shall be done continuous until section is complete. When stoppage of concrete operations occur, construction joints shall be placed either horizontally or vertically as indicated by the Engineer and provided with shear keys or dowels to develop bond. Construction joints shall be per plan or shall be approved or as directed by the Engineer

MEASUREMENT AND PAYMENT

Measurement and payment shall be made at the contract cubic meter (cu.m.) price as specified in the Bid Price Schedule. Payment shall include all cost in furnishing labor, materials, tools equipment and other incidentals necessary for the satisfactory implementation of these requirements.

B. Application of Waterproofing System

This Item shall consist of furnishing, and application of waterproofing System on Inside Dimension of proposed septic Tank in accordance with this Specification or as established by NPC Engineer

Water Tightness

All tank joints must be sealed properly. The joints should be clean and dry before the application of the joint sealer. After all joints have been made and cured, a watertightnesstest should be performed using hydrostatic or vacuum tests. Manway risers and inspection ports should be included in the test. Leaks, whether exfiltrating or infiltrating, are serious. Infiltration of clear water to the tank from should be designed for water tightness. Exfiltration can threaten ground water quality with partially treated wastewater and can lowerthe liquid level below the outlet baffle so it and subsequent processes can become fouled with scum. Also, leaks can cause the tank to collapse.

Material

1. Leak Plug, Rapid Setting Mortar for Plugging Leak On Running Water

Leak Plug is supplied as a dry powder which needs only the addition of water to produce an ultra-rapid set plugging mortar. It is designed to seal leaks in running water where conventional mortars would be washed away. It is ideal to seal leaks prior to applying waterproof renderings in basement. Upon setting, the product develops excellent structural strength and water tightness.

Method of Application

Surface Preparation

Surfaces should be brushed clean to remove loose material, dust and laitance. Areas to be patched should be cut back to a depth of 20mm and

given a good mechanical key. Feather edges must not be allowed. Allowance should be made for wastage when estimating.

All surfaces must be damped down with clean water just prior to application of LEAK PLUG.

Mixing

Mixing proportion: 1 part water to 3 parts LEAK PLUG by volume. Due to rapid set use only the quantity which can be utilized within the prescribed time.

Application

Apply the mixed LEAK PLUG in place, ensuring maximum contact with the substrate before the material sets. If being used to plug a running water leak, the mixed

LEAK PLUG should be held in place until it reaches initial set.

Setting time

Normal setting time is 45 to 90 seconds at 30 °C. Time may vary according to ambient conditions.

Curing

Standard concrete curing procedures should be followed to prevent rapid water loss and consequent loss of strength

2. Crystor, Crystalline Capillary Waterproofer

Watergard Crystor is a crystalline waterproofing formulation of selected blends of cement, very fine treated silica sand, and various proprietary active chemicals providing a lasting imperviousness to water. Watergard Crystor is a unique chemical treatment for the waterproofing and protection of concrete. In the presence of moisture, the active chemicals in Crystor penetrate concrete and react chemically with free lime to produce insoluble crystals. This

crystalline growth reduces porosity by blocking capillaries and filling hairline non-structural cracks caused by shrinkage or expansion.

Areas Of Application

Watergard Crystor can be applied on both new and old structures either on the water retaining side or on the negative side. Watergard Crystor is recommended for the following typical applications:

- water treatment and sewage structures
- basement walls
- irrigation tunnels
- supporting walls and columns
- tunnels, manholes, silos
- foundation slabs inside underground garages

Remove existing coatings, smooth surfaces or laitance by acid etching, water blasting or sand blasting. Structural defects such as cracks, faulty construction joints and honeycombing should be routed out to sound concrete and repaired with LEAK PLUG. Saturate routed area and leave damp for application of WATERGARD CRYSTOR.

Mixing

Slurry coat

Mix 25 kg bag of WATERGARD CRYSTOR with 8.75 liters of clean water. Mix thoroughly with a slow speed drill equipped with a recommended mixing paddle until a creamy consistency is achieved. Allow the mix to rest for 15 minutes to allow for chemical reaction. It should then adhere to the brush without dripping. If mixture thickens, re-stir to reduce consistency. Do not add extra water.

Application

Prior to the application of WATERGARD CRYSTOR, saturate concrete surface with water to promote reaction. WATERGARD CRYSTOR slurry coat may be applied with a brush or broom. Be sure to work slurry well into openings, rough surfaces, joints and routed out areas. Allow a time interval of

24 hours and moisten surface before applying second coat. Finish with final strokes in one direction.

Dry shake for newly poured concrete:

Use WATERGARD CRYSTOR as is, directly from the container. Wearing rubber gloves, distribute the powder evenly by hand, over freshly poured concrete 1.25 to 1.35 kg/m2 per application before final troweling works. It is best to distribute the powder at half the recommended rate in one direction, and the other half at a right angle to the first application.

Surface Preparation

Concrete surface to be treated must be clean and free of laitance, dirt, paint coating, and other foreign matter.

Release the powder as close to the wet concrete as possible to prevent material from blowing away. Two applications are recommended with a roughened finish on the first application providing adequate adhesion of the second application. Float slab and trowel to final finish.

Finishing

When the last coat has stiffened, float it to desired texture with a sponge or wood float.

Curing and Protection

Proper curing procedures are important to ensure the durability and quality of the coating. To prevent surface cracking, curing must begin as soon as the CRYSTOR coating has reached initial set. Moist curing using continuous water spray is recommended.

Keep WATERGARD CRYSTOR treatments moist and cured for a minimum of 48 hours by spraying surfaces with a fine mist of water three times a day for 2 – 3 days (under moist conditions). In warmer climates, more frequent spraying may be required.

Estimating Data

WATERGARD CRYSTOR slurry coat: 1.0 – 1.3 kg/m2 per application by brush.

Note: Actual coverage rates will depend upon the profile and porosity of the substrate.

Storage

WATERGARD CRYSTOR should be stored in protected dry areas. The shelf life is 12 months in its original unopened packing in a cool ventilated place below 35°C in a shaded dry environment. Do no store in direct sunlight.

Precautions

Do not use WATERGARD CRYSTOR over previous coated surface without proper surface preparation.

Freshly applied WATERGARD CRYSTOR treatment must be protected from extreme weather conditions such as rain or high temperature for a period of not less than 48 hours after application.

For water retaining structures, WATERGARD CRYSTOR treatment should be cured for 14 days before filling with liquid.

MEASUREMENT AND PAYMENT

Measurement and payment shall be made at the contract per lot price as specified in the Bid Price Schedule. Payment shall include all cost in furnishing labor, materials, tools equipment and other incidentals necessary for the satisfactory implementation of these requirements.

C. Gravel Fill

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

Material Requirements

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

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

The subbase material shall conform to Table 200.1, Grading Requirements.

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

The fraction passing the 0.075 mm (No. 200) sieve shall not be greater than 0.66 (two thirds) of the fraction passing the 0.425 mm (No. 40) sieve. The fraction passing the 0.425 mm (No. 40) sieve shall have a liquid limit not greater than 35 and plasticity index not greater than 12 as determined by AASHTO 89 and T 90, respectively. The coarse portion, retained on a 2.00 mm (No. 10) sieve, shall have a mass percent of wear not exceeding 50 by Los Angeles Abrasion Tests as determined by AASHTO T 96.

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

MEASUREMENT AND PAYMENT

Measurement and payment shall be made at the contract cubic meter (cu.m.) price as specified in the Bid Price Schedule. Payment shall include all cost in furnishing labor, materials, tools equipment and other incidentals necessary for the satisfactory implementation of these requirements.

D. Structural Backfill and Fill

Excavation

Rock excavation shall consist of excavation of igneous, sedimentary and metamorphic rocks matrixes with soil or sandy silt, and all boulders or other detached stones each having a volume of one cubic meter or more as determined by physical measurements or visually by the field engineer, which can be excavated using jackhammer, hydraulic excavator backhoe, or hydraulic vibratory breaker/hammer.

To protect workers from injuries and fatalities, preventive measures should be implemented when workers begin excavating. General Safety measures : inspect trenches daily before work begins; don't go near an unprotected trench; check weather conditions before work, be mindful of rain and storms; keep heavy equipment away from trench edges; be mindful of the location of utilities underground. Always wear proper protective equipment; don't work beneath raised loads. Planning and implementation of safety measures must be done by a competent person.

All excavation shall conformed to the line and grade. It shall be finished to reasonably smooth and uniform surfaces and no material shall be wasted without authority of the NPC Engineer. All excavation shall be in accordance with the standard engineering practice. The above mention project shall be furnish only with the approved drawing.

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

The excavation shall conform to the lines, grades, cross sections an dimensions shown on the Plans. NPC Engineer shall order the removal of any soft spots, debris or organic material exposed when excavated areas shall be trimmed cut to than even surface free of loose material and compact as specified by NPC Engineer to the density prescribed on the Plans.

Backfill Materials

This Item shall consist of placing Mixed Gravel, Sand and Soil and compacting for embankment of the proposed Slope Protection along the River Bank.

MEASUREMENT AND PAYMENT

Measurement and payment shall be made at the contract cubic meter (cu.m.) price as specified in the Bid Price Schedule. Payment shall include all cost in furnishing labor, materials, tools equipment and other incidentals necessary for the satisfactory implementation of these requirements.

TS-05 CLEARING AND DEMOBILIZATION

Before moving out, the contractor shall restore the orderly state of worksite by clearing all temporary structures. Remove all excess/waste materials and store in designated areas.

Before the Contractor will demobilize its construction equipment/ tools, materials and crew, he shall secure approval from NPC security office for the release of the contractor's equipment and to surrender the workers Identification (I.D) cards. A joint inspection with the NPC inspector and Contractor will be conducted to make sure that all his accomplishment / work that needs remedial attention or correction shall be done prior to the issuance of the Certificate of Completion. The Certificate of Completion will serve as basis for the processing of payments.