

入 札 図 書

- (1) 契約書案並びに
金抜き明細書
- (2) 一 般 条 件
- (3) 工 事 仕 様 書
- (4) 図 面 集

I. FORM OF CONTRACT

DRAFT

REPUBLIC OF THE PHILIPPINES

CONTRACT

FOR

MODEL INFRASTRUCTURE IMPROVEMENT WORKS

FOR

SOIL RESEARCH AND DEVELOPMENT CENTER PROJECT

(SRDC)

Between:

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

PHILIPPINE OFFICE

and

_____ Co., Ltd.

November 1990

Contents of Contract Agreement

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CONTRACT

FOR

MODEL INFRASTRUCTURE IMPROVEMENT WORKS FOR THE SOIL RESEARCH AND DEVELOPMENT CENTER PROJECT AT SAN ILDEFONSO, BULACAN PROVINCE, THE REPUBLIC OF PHILIPPINES

This contract is executed and delivered this ___th day of _____, 1990 A.D. at the Representative Office of Japan International Cooperation Agency, 2nd Floor, L.C. Building, 375 San. Gil J. Puyat Ave., Ext., Makati, Metro Manila, hereinafter referred to as the "JICA" represented herein by Mr. M. Miyamoto, representative of said Office; and,

_____ Co., Ltd. _____

Metro Manila hereinafter referred to as "the Contractor", represented herein by Mr. _____ of said firm, a national of the Philippines, and duly authorized to represent this firm in this Contract.

JICA and the Contractor mutually agree as follows:

C-01 CONTRACT DOCUMENT

The following documents are hereby incorporated and made a part of this Contract, as though fully written out and set forth herein:

- a) Invitation of Bid
- b) Instructions to Bidders
- c) General Conditions
- d) Technical Specifications
- e) Drawings
- f) Performance Security
- g) Notice of Award
- h) Supplemental Notices

All codes, designations, standards, standard specifications and similar materials which are referred to in the General Conditions, Technical Specifications and Drawings are hereby made a part of this Contract.

All of the above documents are referred to herein as the Contract Documents.

The Bill of Quantities hereto annexed, which was submitted by the contractor on November __, 1990 and accepted by JICA, is an integrated part of this Contract.

C-02 ACCEPTANCE OF BID

JICA has accepted the Bid of the Contractor for furnishing equipment, supplies, materials, tools, labor and other incidentals as well as construction for the Contract Works in conformity and in accordance with and subject to all terms and conditions of the Contract Documents. The Contractor shall furnish the Performance Security under this Contract as stipulated in the General Conditions of the Contract Documents.

C-03 AGREEMENT

The Contractor agrees to furnish equipment, supplies, materials, tools and labor and to perform the construction and the JICA agrees to pay for such, as described in the Contract Documents.

C-04 OBLIGATION OF CONTRACTOR

The Contractor agrees to perform well and faithfully and of the Contract Work and furnish all of the equipment and materials described in the Contract Document and to supply and to provide all equipment, materials, supplies, labor and other facilities requisite for or incidental to the successful completion of the Works and the carrying out of all the duties and obligations imposed by the Contract documents within one hundred and fifteen calendar days (115 cd) after the receipt of the Notice to Proceed.

C-05 OBLIGATION OF JICA

JICA agrees, subject to the terms and conditions of the Contract Documents, to pay the Contractor the amount shown, at the rates and times and in the manner set forth in the Contract Documents.

C-06 MUTUAL OBLIGATIONS

JICA and the Contractor mutually agree to perform fulfill, abide by and submit to any and all of the provisions and requirements and all matters and things contained or expressed in or reasonably to be inferred from the Contract Documents.

C-07 NOTICES

All notices called for by the terms of this Contract shall be effective only at the time of receipt thereof and only when received by the parties to whom they are addressed at the following addresses:

JICA: The Representative
 JAPAN INTERNATIONAL COOPERATION AGENCY
 (Soil Research and Development Center), 2nd Floor, Bureau of Soils
 and Water Management, Department of Agriculture, Elliptical Rd.,
 Diliman, Quezon city, Metro Manila

Contractor: Makati, M.M.

Any change in address by either party shall be made known to the other who will acknowledge the change for purposes of this Paragraph. All notices called for by the

terms of this Contract shall be in English language and shall be sent by messenger or registered mail, or telegram, or cable. However, telegram or cable shall be confirmed by a letter of the same day.

C-08

INTEGRATION

JICA and the Contractor agree that this Contract including the Contract Document expresses and integrates all of the agreements, understanding, promises and covenants of the parties, and supersedes all prior and contemporaneous negotiations, understandings and agreements, whether written or oral and that no modification or alteration of this Contract shall be valid or binding on either party, unless expressed in writing and executed with the same formality as this Contract, except as may otherwise be specifically provided in this Contract.

C-09

JURISDICTION

The proper law, applicable to this Contract shall be the laws in force in the Republic of the Philippines.

C-10

COUNTERPARTS

This Contract is executed seven (7) identical counterparts, five(5) copies for JICA, one (1) copy for the Contractor, and one(1) copy to be submitted to the BUREAU OF SOILS AND WATER MANAGEMENT, DEPARTMENT OF AGRICULTURE, the Philippines.

JICA:

MORIYA MIYAMOTO, Resident Representative,
Philippine Office, Japan International
Cooperation Agency (JICA)

CONTRACTOR:

_____ President, Co., Ltd.

WITNESSES:

Japan International Cooperation Agency (JICA)

_____ Co., Ltd.

SUMMARY OF BILL OF QUANTITIES

Pesos

1. Construction of Soil Tank, Farm Road,
Irrigation & Drainage Facilities, Pump
House, Water Reservoir and Other
Appurtenant Facilities. _____

2. Construction of Well. _____

3. Procurement and Backfilling of
Test Soil. _____

Total _____

1. Construction of Soil Tank, Farm Road, Irrigation & Drainage Facilities, Pump House, Water Reservoir and Other Appurtenant Facilities.

(Pesos)

<u>Work item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit rate</u>	<u>Amount</u>
1. Mobilization	L.S.	-		
2. Temporary facilities, etc.	L.S.	-		
3. Road maintenance	m	1,400		
4. Stripping	m ³	768.6		
5. Excavation	m ³	1,509.9		
6. Backfill	m ³	442		
7. Banking	m ³	660.4		
8. Sod facing	m ²	497		
9. Concrete - class A	m ³	267		
10. do - class C	m ³	35		
11. Reinforcing Steel (60 kg/m ³)	kg	18,350		
12. Gravel bedding	m ³	283		
13. Macadam road	m ³	111		
14. G.I. corrugate sheet	m ²	25		
15. W/Lumber	Set	1		
16. CHB (15×20×40cm)	m ²	17		
17. W/door	Set	2		
18. W/window	Set	4		
19. PVC - 200 mm dia.	m	44		
20. Spoil	m ³	1176.1		
21. Expansion Joint	m	148		
22. -Stop Log	L.S.	18		
23. Step	L.S.	8		

(Pesos)

<u>Work item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit rate</u>	<u>Amount</u>
24. Staff gage	L.S	1		
25. Screen	L.S	1		
26. Steel pipe D=150	m	8		
27. Steel pipe D=50	m	5		
28. Perforated P.V.C 50 mm dia.	m	198		
29. Gate valve 200 mm	set	1		
30. - do - 50 mm	set	10		
31. R.C. pipe 200 mm dia.	m	26		
32. Water delivery test	L.S.	-		
33. Site clearing	L.S.	-		
34. Demobilization	L.S.	-		

Total

2. Construction of Well

<u>Work Item</u>	<u>Estimated Quality</u>	<u>Unit Cost</u>	<u>Amount</u>
1. Mobilization	1 No.		
2. Site preparation	1 No.		
3. Drilling of 200mm dia pilot hole	120m		
4. Geophysical borehole logging	1 No.		
5. Reading to 350mm dia hole	120m		
6. Installation of casing and screen	121m		
7. Furnish and instal centralizers	8 No.		
8. Furnish and instal gravel pack	110m		
9. Furnish and instal gravel fill pipe	11m		
10. Development by surging and bailing	24 hrs		
11. Development by air lifting	12 hrs		
12. Step drawdown pumping tests	1 No.		
13. Constant discharge pumping tests	48 hrs		
14. Coment grouting	10m		
15. Furnish / instal well cap / sounding tube	1 No		
16. Demobilization and site clean-up	1 No.		

Total

3. Procurement and Backfilling of Test Soil

			(Pesos)		
<u>Location & (Hauling Distance)</u>			<u>Volume in Borrow pit</u>	<u>Unit Rate</u>	<u>Amount</u>
1)	Pangasinan	(160 km)	114 m ³		
2)	Pangasinan	(160 km)	114 m ³		
3)	Pamponga	(50 km)	114 m ³		
4)	Bulacan	(1 km)	114 m ³		
5)	Bulacan	(1 km)	114 m ³		
6)	Rizal	(150 km)	114 m ³		
7)	Cavite	(155 km)	114 m ³		
8)	Batangas	(160 km)	114 m ³		
<u>Total</u>			<u>912m³</u>		

This cost includes procurement cost of soil at 5 sites, ie., Pangasinan, Pampauga, Rizal, Cavite and Batangas, and includes, excavation, loading, hauling, unloading, backfilling as directed by the Engineer.

II. GENERAL CONDITIONS

General Conditions

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GENERAL CONDITIONS

GC-01 DEFINITIONS

Wherever the following terms are used in the Contract Documents, they shall have the following meaning:

Philippines : The Republic of the Philippines

JICA : The Japan International Cooperation Agency

JICA's Representatives :

JICA Officers and persons authorized by JICA

Engineer (s) : An individual, partnership, corporation, association, firm or joint venture or syndicate which have been engaged by JICA to assist in engineering services and supervision of the work to be done under this Contract.

Bidder : An individual, partnership, corporation, association, firm or joint venture submitting a Bid to JICA for the performance of the Contract Work.

Contract : The legally executed agreement between the Contractor and JICA for the performance of the Contract Work covered by these Contract Documents.

Contractor : The individual, partnership, corporation, association, joint venture or syndicate having a direct contract with JICA for the implementation of the Contract Work under this Contract.

Sub-Contractor : The individual, partnership, corporation, association or syndicate having a direct contract with the Contractor for furnishing services or work under this Contract.

Contract Documents :

Collectively the Pre-qualification Confidential Statements ; Instruction to Bidders ; General, Special and Local Condition ; Technical Specification ; Invitation for Bids ; the Proposal ; Drawings as defined ; Supplemental Notices ; Notice of Award ; Performance Bond an Evidence of Working Capital ; the Contract ; and Notice to Proceed.

Furnish : All works done and all expensed, including labor, materials, plant and overhead incurred by the

Contractor in providing and delivering to the geographical location designated in the specifications, a specified item, article, or piece of apparatus or equipment.

Erect and Install :

All works done and all expenses, including labor, materials and overhead incurred by the Contractor in receiving a specified item, article, or piece of apparatus or equipment at a geographical location designated in transporting it to and storing it at the site of work, and there erecting, placing or laying it as shown in the plans or as directed, to be by and at the expense of the Contractor unless otherwise specified.

Furnish & Erect, Furnish & Install, Furnish & Place and Furnish & Lay:

All works done and all expenses, including labor, materials, overhead in providing delivery, transporting, storing and erecting, placing, laying as specified item, a piece of apparatus or equipment shown on the plans or as directed by the Project Engineer at the expense of the Contractor, unless otherwise specified.

Supplemental Notice :

A written additional information, provisions and/or other documents as issued by the JICA's Representatives before the opening of Bids and are incorporated in the Contract Documents.

Sureties :

Bank or banks and/or bonding company or companies which are joined and severally bound with the Contractor's faithful performance of the Contract and the payment of all his obligations arising thereunder.

Permanent Works :

The permanent structures to be constructed and completed in accordance with the Contract Documents.

Temporary Works :

All temporary structures of every kind required for the execution and completion of the Permanent Works.

Works :

Refer to Permanent Works and/or Temporary Works.

Construction Plant :

All equipment, facilities, supplies, and other incidentals required for execution and completion

of the work but exclusive of materials or other things intended to form or forming part of the Permanent Works.

- Drawings** : All the Contract and Construction Drawings referred to in these Contract Documents and any modification of such drawings approved in writing by the Engineer and such other drawings as may from time to time furnished or approved in writing by Engineer for construction of the Works.
- Site** : The lands on which the Works are to be executed or carried out and any other lands or places provided by the Bureau of Soils and Water Management (BSWM) for the purposes of the Contract.
- Approved** : Means approved in writing by duly authorized persons.
- Contact Work** : The furnishing of all labor, materials, supplies, equipment, necessary or convenient to the successful completion of the Work and the carrying out of all the duties and obligations imposed by the Contract.
- Extra Work** : Such additional labor, materials, supplies, equipment, facilities, and other incidentals as are required to complete the Works for the purpose for which it was intended but not, originally covered or called for in the Contract.

GC-02 CORRELATION AND INTERPRETATION OF CONTRACT DOCUMENTS

The Contract Documents are complementary and what is called for by one shall be as binding as if called for by all. In case of discrepancy, defective description, errors, omissions, or ambiguity between or in any of the Contract Documents, the following shall be the rules of interpretation.

The Drawings shall govern over the General condition, and the Technical Specifications shall govern over the General Conditions and the Drawings.

The Detailed Drawings shall govern over General Drawing. Figures written on Drawings shall govern over the Drawings themselves.

If the Contractor, either before commencing the work or during its performance, discovers any conflict, discrepancy, error, or omissions between or in any of the Contract Documents or

in case of any question concerning the meaning of the Contract, he shall promptly notify the Engineer thereof in writing. On receipt of such notice, the Engineer shall promptly investigate the matter and give appropriate orders or instructions to the Contractor. Until such orders or instructions are given, the Contractor's performance of any affected portion of the work, after his discovery of the conflict, discrepancy, error omission, or question, shall be at his own risk and he shall bear any additional cost resulting therefrom.

Omissions from the Contract Documents or misdescription of details of work which are manifestly necessary to carry out the intent of the Contract, or which are customarily, shall not relieve the Contractor from performing such omitted or misdescribed details of work but they shall perform as if fully and correctly set forth in the Contract Documents.

GC-03

JURISDICTION

The proper law of this Contract shall be the law in force in the Philippines. Any litigations between the parties that may arise out of or in connection with this Contract or the breach thereof or the performance of work thereunder shall be determined in the Courts in Manila except as may be otherwise specifically provided in these Contract Documents. At or before the time of execution of the Contract, the Contractor shall notify JICA in writing of the appointment of one or more agents satisfactory to JICA upon whom process may be served in connection with any litigations. The Courts shall be deemed to have obtained jurisdiction to render valid judgments upon the Contractor, by such service.

GC-04

STATUTORY REQUIREMENTS

The Contractor shall comply with all applicable laws, acts, codes and regulations of the Philippines and its political subdivisions or any public, municipal or other duly constituted authority which may affect the prosecution of the Contract Work.

GC-05

ROYALTIES AND PATENTS

The Contractor shall pay all royalties and license fees, and shall save harmless and indemnify JICA and the Engineer, their officers, agents and employees against liability, including cost and expenses, for infringement of any patent rights of other protected rights arising out of the performance of the Contract Work.

ASSIGNMENT AND SUBCONTRACTS

The Contractor shall not assign, transfer, pledge, subcontract or make any other disposition of this Contract or any part thereof, or any interest therein except as provided for herein.

Should the Contractor desire to subcontract any service or item of the Contract Work within the provisions stated above, the Contractor shall notify JICA in writing within Fifteen (15) calendar days after the signing of the Contract, and shall submit complete information of the proposed subcontractor including his financial status, experience, organization, personnel and equipment available for the work and the specific service or item of works to be done or subcontracted. The Contractor shall not subcontract any part of the Contract without the prior written approval of JICA and such approval, if given, shall not relieve the Contractor from any liability or obligation under the Contract.

The Contractor agrees that he is as fully responsible to JICA for the acts and omissions of his subcontractors and of persons either directly or indirectly employed by them as he is for the acts and omissions of persons directly employed by him. Nothing contained in the Contract Documents shall create any contractual relation between any subcontractor and JICA.

The Contractor is fully responsible for payment to subcontractors ; however, JICA reserves the right to withhold or deduct such payments from the Contractor's monthly progress payment, should the Contractor refuse or fail to make justifiable payments to any subcontractor in accordance with the subcontract.

JICA may by written notice require the Contractor to terminate a subcontract if a subcontractor fails to perform the work in accordance with the Contract. In such event, the subcontractor shall leave the site immediately and JICA will not be liable for such termination.

FAMILIARITY WITH CONTACT WORK

The Contractor shall be responsible for having taken steps necessary to satisfy himself as to the nature and locations as well as the time limit for completion of the Contract Work, the type of equipment and facilities needed preliminary to and during the prosecution of the Contract Work, the general and local condition, and all other matters which can in any way affect the Contract Work or the cost thereof. Any failure by the Contractor to do so will not relieve him from responsibility for successfully

performing the Contract Works without additional expense to JICA. JICA assumes no responsibility for any understanding or representations concerning conditions made by any of its representative prior to the execution of this Contract, unless such understanding or representation are expressly stated in the Contract Documents.

GC-08

LIABILITY FOR SPECIAL RISKS

JICA shall (1) hold the Contractor harmless from all liability for damages or destruction of the Works or property whether owned by JICA, or any other third parties and for injury or loss of life caused, directly or indirectly, by declared or undeclared war, invasion, insurrection, or usurped power in the Philippines, hereinafter referred to as "Special Risks", (2) compensate the Contractor when occasioned directly or indirectly by said special risks for (a) legitimate costs and expenses, and (b) loss or damages to property of the Contractor at the site including that in transit within the Philippines to the project site .

GC-09

RESPONSIBILITY FOR CONTRACT WORK

From the commencement of the Contract Work until its final or partial acceptance as specified herein, the Contractor shall assume full responsibility for the Contract Work. The Contractor shall be responsible for any damage to or destruction of the Work, except for special risks as provided for in Clause GC-08 "Liability for Special Risks", to make no claims against JICA for damages to the works from any cause except for said special risks.

GC-10

SAFETY OF PERSONNEL AND THIRD PARTIES-PREVENTION OF ACCIDENTS-RESPONSIBILITY

Except for special risks as provided for in Clause GC-08 "Liability for Special Risks", the Contractor is solely responsible for the safety, protection and security of his personnel, third parties, the public at large, the works, equipment, installations, etc. Accordingly the Contractor shall comply faithfully with any and all pertinent laws, at his own expense, take all requisite protective measures to the end of eliminating the occurrence of accidents, loss or damage of any kind during the performance of the Contract Work and until their final acceptance. The Contractor shall provide, erect and maintain all necessary barricades, suitable and sufficient warning lights, danger signals and other signs, and shall take all necessary precautions for the protection of the Work and the safety of this personnel and the public. Roads closed to traffic shall be protected by effective barricades and obstructions shall

be illuminated at night in accordance with the existing pertinent ordinances and other regulations.

Provided the stipulations of the pertinent laws, decrees, regulations and other ordinances in force in the Philippines do not contain different provisions, the Contractor shall comply with the applicable provisions of the U.S Bureau of Reclamation Publication, "Construction Safety Standard". The Contractor shall furthermore cooperate with JICA on all matters concerning the prevention of accidents. To this end, the Contractor shall fully acquaint himself with JICA's regulations and printed instructions, which JICA may, from time to time, issue during the performance of the Contract Work and the Contractor shall strictly observe and comply with all such regulations and instructions. The Contractor shall cooperate closely with JICA and the Engineer or related personnel to develop an effective safety program construction of the Works.

In the event the Contractor fails to observe his above obligations, JICA may, at the Contractor's expense, take whatsoever measure is deemed necessary by JICA for the protection of JICA, Contractor's personnel and third parties and order the immediate interruption of dangerous work. The Contractor shall not be entitled to any indemnification or time extension on account of such interruption. It is understood that JICA's right referred to above shall in no way diminish the Contractor's responsibility hereunder.

The Contractor shall report in writing within twenty four (24) hours from their occurrence to JICA, the local Police and the Local Inspector, all accidents occurring on any of the Contract Work or in connection therewith. In the event of serious or fatal accidents, the Contractor shall leave unchanged the conditions existing at the site of the accident so that the authorities may proceed with their investigations ascertain the causes of the accident.

The Contractor shall be solely and exclusively responsible for any loss or damage, death or injuries, resulting from the performance of the Contract Work or in connection therewith, sustained by any person or party. The Contractor shall save harmless JICA from any and all claims or court actions raised or instigated against it by any person or party for any loss, damage or injuries caused by the Contractor, his personnel, his mechanical equipment, and materials or his work yard installations, and shall at his own expense indemnify such person or party for its loss, damage or injury.

CONTRACTOR'S EMPLOYEES AND SUPERINTENDENCE

The Contractor shall give efficient superintendence to the works, using his best skill and attention, and shall during the execution of the Contract Work provide a competent full time Superintendent and necessary assistants.

The Superintendent shall be the authorized representative of the Contractor and shall receive on behalf of the Contractor directions and instructions from JICA. The designation of the Superintendent shall be approved in writing by JICA of which approval may at any time be withdrawn. If such approval is withdrawn, the Contractor shall, as soon as practicable after receiving written notice from JICA, remove the Superintendent from the Site and shall not thereafter employ him again on the Site in any capacity and shall promptly replace him by another Superintendent approved by JICA.

The Engineer shall be at liberty to object to and require the Contractor by written notice remove forthwith from the Site any other person employed by the Contractor in the execution of the Contract Work, who in the opinion of the Engineer misconducts himself or is incompetent or negligent in the proper performance of his duties or whose employment is otherwise considered by the Engineer to be undesirable, and such person shall not be again employed without the written permission of the Engineer.

All expenses associated with removal of such Contractor's employees shall be paid by the Contractor who shall save harmless JICA and the Engineer from any claim arising from such actions.

INSPECTION OF CONTRACT WORK

All the Contract Work shall be performed in a skillful and workmanlike manner. Inspection of all the Contract Work shall be made by JICA while such Contract Work is in progress to ascertain that the completed works will comply in all respects with the standards and requirements set forth in these Contract Documents. Notwithstanding such inspection, the Contractor shall be held responsible for the acceptability of the finished Works.

The Engineer shall assist JICA in the inspection of all the Contract Work.

JICA, the Engineer and their representatives shall at all times have access to the Works whenever it is in preparation or in progress, and the Contractor shall provide proper facilities for such access, and shall furnish promptly, without additional charge, all facilities, labor and supplies reasonably needed for safe and convenient inspection. The Contractor shall give JICA

timely notice of readiness of the Works for inspection, and JICA shall perform said inspection in such a manner as not to delay the Contract Work unnecessarily.

If any works should be covered up without prior approval or consent of JICA, it must, if required by JICA, be uncovered for examination and properly restored at the Contractor's expense unless JICA has unreasonably delayed inspection after notice of readiness for inspection has been given.

Re-examination of any Works may be ordered by JICA and, if so ordered, the Works must be uncovered by the Contractor. If such works is found to be in accordance with the Contract Documents, JICA shall pay the cost of re-examination and replacement plus fifteen percent (15%). If such works is not in accordance with the Contract Documents, the Contractor shall bear such re-examination and replacement costs and shall not be entitled to any extension of time on this account.

GC-13 CORRECTION OF WORKS

The contractor shall promptly replace all materials and correct all the Works determined by JICA or the Engineer as failing to meet the Contract requirements. The Contractor shall promptly replace and correct the Works in accordance with the Contract without expense to JICA and shall bear the cost of damage done to other parties occasioned by such removal or replacement.

If the Contractor does not take action to replace and correct such condemned materials and damaged works within ten (10) calendar days after written notice, JICA may (1) by contract or otherwise, replace such materials or correct such Works and charge the cost thereof to the Contractor, or (2) terminate the Contractor's right to proceed as provided for in Clause GC-14 "JICA's Right To Take Over Contract Work".

Failure or negligence by JICA or its agents to condemn or reject bad or inferior Works or materials shall not be construed to imply acceptance of the same if such bad or inferior Works or materials were not discovered at any time prior to the final acceptance of the Contract Work by JICA.

If JICA deems it inexpedient to correct the Works that has been damaged or that was not done in accordance with the Contract, an equitable deduction from the Contract Amount shall be made therefor, unless the Contractor elects to correct the Works.

(a) Right to take Over
should the Contractor:

1. Be adjudged a bankrupt; or
2. Become insolvent or make a general assignment of his assets for the benefit of his creditors; and or
3. In the opinion of JICA be unreasonably or unnecessarily delayed in the performance of the Contract Work; or
4. Abandon the Contract Work; or
5. Assign the Contract or sublet the Contract Work other than permitted herein; or
6. Fail to complete the construction of the Work as herein specified; or
7. Violate any of the Conditions, covenants and agreement of this Contract;

then, in any of these cases, JICA shall have the right to terminate the employment of the Contractor and to take over the Contract Work, after giving the Contractor and his sureties fifteen (15) calendar days prior written notice to that effect. Such notice shall contain the reasons for such intention to take over, and then if within fifteen (15) calendar days after serving such notice the Contractor fails to overcome or extinguish the causes or reasons for such intention to take over or fails to make satisfactory arrangement for its correction, the right of the Contractor to prosecute the Contract Work by himself shall terminate.

(b) Completion of Contractor Work by JICA

In such event JICA may take over the Contract Work and prosecute the same to completion, by contract or otherwise, and shall have the right at its option to take possession of and utilize in completing the Contract Work such materials, equipment, and construction plant as may be on the Sites and necessary therefor.

(c) Liability of Contractor and Sureties

It is expressly agreed that in the event JICA takes over the Contract Work from the Contractor, the latter and his Sureties shall continue to be liable under this Contract for any expense in the completion of the Contract Work in excess

of the Contract Price and the bond filed by the Contractor and other monies due to the Contractor from JICA shall be answerable for such expense and, for any and all damages that JICA may suffer as a result of and in connection with take-over.

(d) Payments

If the Contract Work is taken over by JICA under Clause GC-14 "JICA's Right to Take Over Contract Work:", the Contractor shall not be entitled to receive any further payment until the Work is completed.

JICA shall ascertain and fix the value of the Works already completed by the Contractor but not paid for and all usable materials on the Sites. The cost of completing the Works shall be charged against the Contract Price of the remaining Works and in case of insufficiency thereof, the excess cost shall be chargeable against the defaulting Contractor and his Sureties.

In the event that the total expenditures of JICA on completion of the Contract Work are not in excess of the Contract Price, the difference between said total expenditures and the Contract Price shall be applied to settle claims filed under Clause GC-26 "Payments By Contractor Unpaid Claims" and the balance, if any, shall be paid to the Contractor, provided, however, that no amount in excess of the combined value of the unpaid completed Work, retained percentages and usable materials at the time of taking over of the Work shall be so paid nor shall any claim for prospective profits for the work done after JICA shall have taken over be considered or allowed. The Contractor shall not stand to benefit from the portion of the Contract Work taken over by JICA.

GC-15 EXTENSION OF TIME DUE TO FORCE MAJEURE

The Contractor shall not be in default under this Contract because of any delays in the prosecution or completion of the Contract work or any separable part thereof, of which delays are caused by "force majeure", provided that the Contractor submits a claim in accordance with the provisions of Clause GC-16 "Claims For Extension of Time For Completion", and in the opinion of JICA the delays are caused by force majeure.

"Force Majeure" shall be defined as any event, the happening or pernicious results which could not be prevented even though a person against whom it happened or threatened to happen were to take such appropriate care or necessary precautionary measure as might be expected from him.

CLAIMS FOR EXTENSION OF TIME FOR COMPLETION

Should the amount of Additional or Extra Work of any kind or other special circumstances of the Contractor lead to an extension of time for the completion of the Contract Work under this Contract, JICA shall determine the amount of such extension; provided that JICA is not bound to take into account any claim for an extension of time unless the contractor has, prior to the expiration of the Contract time and within twenty-eight (28) calendar days after such work has been commenced or after the circumstances leading to such claim have arisen, delivered to JICA a notice giving full and detailed particulars of any claim for an extension of time in order that it may be investigated at that time. Failure to provide such notice shall constitute a waiver by the Contractor of any claim. On receipt of full and detailed particulars, JICA's Representative shall extend the time for completing the Contract Work, when, in the JICA's opinion, the findings of fact justify an extension.

CONTRACTOR'S RIGHT TO SUSPEND CONTRACT WORK OR TERMINATE CONTRACT

If the Contract Work should be completely stopped except due to normal seasonal rains, for a continuous period of more than ninety (90) calendar days, through no act or fault of the Contractor or of anyone employed by him or as a result of the occurrence of special risks as provided for in Clause GC-08 "Liability For Special Risks", then the Contractor, without prejudice to any other right or remedy, shall have the right to give JICA fifteen (15) calendar days written notice to stop the contract Work or terminate this Contract and recover from JICA payment for any loss or damage to the Contractor arising out of or in connection with or by consequence of such termination and if the Contract Work is not resumed within fifteen (15) calendar days after receipt of such notice due to no fault of the Contractor, the Contractor may terminate the Contract.

DISPUTE AND ARBITRATION

Any controversy or dispute arising out of or relating to this Contract which cannot be resolved by mutual agreement shall be decided by JICA within fifteen (15) calendar days from receipt of a written notice from the Contractor, and who shall furnish the Contractor a written copy of his decision. Such decision shall be final and conclusive unless within thirty (30) calendar days from the date of receipt thereof, the contractor shall deliver to JICA a written notice that he disagrees with the decision and desires that the dispute be submitted to arbitration. Pending decision from arbitration the Contractor shall proceed diligently with the

performance of the Contract and in accordance with the decision of JICA.

When formal arbitration is requested, an Arbitration Board shall be formed in the following manner: JICA and the Contractor shall each appoint a third member who shall act as chairman. If either of the parties, i.e., JICA or the Contractor fails to appoint a member to this Arbitration Board within thirty (30) calendar days subsequent to the date on which the Contractor requested arbitration, the appointment shall be made by the Judge of the court having jurisdiction. If the two first members of this board cannot agree upon a third member within fifteen (15) calendar days from the last date of their own appointment, the third member shall be appointed by the judge of the court having jurisdiction. No one with a financial interest in the subject under arbitration will be permitted to serve on this board. This board may engage experts to act in an advisory capacity without vote on decisions. Minutes shall be kept of all meetings and shall be signed by all members of this Board. All decisions by this board shall require simple majority. All interested parties shall be informed of the decisions of this board in writing over the signature of the chairman. Expenses of this board shall be paid in accordance with the decision of the Arbitration Board. The decision of the Arbitration Board shall be binding on both parties.

JICA and Contractor shall have the right to institute suit against each other, as the case may be, in any court of competent jurisdiction, in the Philippines, to enforce any decision or award rendered in arbitration proceedings. JICA shall have same right as above to enforce a ruling of the Representatives in the event said ruling is final and conclusive as above described.

GC-19 LANGUAGE AND UNIT SYSTEM OF WEIGHTS AND MEASURES

All drawings, designs, specifications, manuals, name plates, markings, operating instruction, estimates, statements, charts, schedules, reports, notices, documents and all written communications between JICA or the Engineer and the Contractor, concerning this Contract, shall be in the English language and the metric system of weights and measures in principle may be used.

GC-20 COVENANT AGAINST CONTINGENT FEES

The Contractor warrants that he has not employed or retained any person or selling agency to solicit or secure this Contract upon any agreement for a commission, percentage, brokerage, or contingent fee, excepting bonafide employees, or bonafide established selling or commercial agencies maintained by the

Contractor for the purpose of securing business. For breach or violation of this warranty, JICA shall have the right to terminate the Contract without liability, or in its discretion, to deduct from the value of the Contract, the full amount of such commission, percentage, brokerage, or contingent fees.

GC-21 WARRANTY AGAINST BENEFITS

The Contractor warrants that he has not given or promised to give any money or gift to any employees of JICA, or any Philippine Government instrumentality to secure this Contract.

GC-22 PUBLIC OFFICIALS AND ENGINEERS NOT PERSONALLY LIABLE

There shall be no personal liability upon JICA representatives, agents or employees or Engineers for any act performed in the discharge of any duty imposed, or the exercise of any power or authority conferred upon them by, or within the scope of the Contract, it being understood that in all matters they act solely as agents and representatives of JICA.

GC-23 NO WAIVER OF LEGAL RIGHTS

JICA shall not be precluded or estopped by any measurements, estimate or certificate made either before or after the completion and acceptance of Work and payment therefore from showing the true amount and character of the Work performed and materials furnished by the Contractor, nor from showing that any such measurements, estimate or certificate is untrue or is incorrectly made nor that the work or materials do not in fact conform with the Contract. JICA shall not be precluded or estopped notwithstanding any such measurement, estimate or certificate and payment in accordance therewith from recovering from the Contractor. Neither the Acceptance by JICA or by its representative, nor any extension of time, nor any possession taken by JICA shall operate as a waiver of any portion of the Contract or any other power herein reserved, or of any right to damages. A waiver of any breach of the Contract shall not be held to be a waiver of any other or subsequent breach.

GC-24 PUBLICATION AND PICTURES

Publicizing the Works or any part thereof; without the prior written approval of JICA in the form of announcements or publication, either verbal or in writing, or pictures, movies or in any other manner, is prohibited.

GC-25 ANTIQUES AND OBJECTS OF VALUE

All ruins, relics, coins and other artistic or antique objects of any nature and value discovered during the performance

of the Contract Work belong to the Republic of the Philippines. The Contractor upon discovery of such objects shall immediately inform JICA, and pending such action on his part, shall take all indicated measures including suspension of any affected part of the Contract Work for preserving instant and guarding said objects. No rights whatsoever shall accrue to the Contractor and no compensation of any nature shall be due to him for the discovery of said objects and all rights accruing under the law to the discoverer shall devolve exclusively to the National Irrigation Administration.

GC-26 PAYMENTS BY CONTRACTOR-UNPAID CLAIMS

The Contractor shall pay punctually the workmen employed on the Contract Work and the persons furnishing materials and services therefor, and deliver the Works free from all claims of any description, and, if required, he shall furnish JICA with a statement sworn before an officer duly authorized to administer oaths that all persons who have done work or furnished materials or services under this Contract, and shall have filed any account of such claims with JICA have been fully paid and in case such evidence is not furnished as aforesaid, such amount as JICA may consider necessary to meet the lawful claims of the persons aforesaid shall be deducted from the money due to the Contractor, and shall not be allowed until the liabilities aforesaid shall have been fully discharged and the evidence thereof furnished JICA or until their lack of equity has been established. If such written evidence is not furnished before the final payment under this Contract falls due, JICA may pay such lawful claims in whole or in part to the person or persons, firms or corporations claiming the same, and charge the amount thus paid to the Contractor, who shall accept the same as payment from the amount due to this Contract.

GC-27 CHANGED CONDITIONS

The contractor shall promptly, and before such conditions are disturbed, notify JICA in writing of: (a) sub-surface or latent physical conditions at the Site differing materially from those indicated in this Contract Documents, or (b) unknown physical conditions at the Site or an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this contract. JICA shall investigate the conditions, and if it finds that such conditions do so materially differ and provided that the Contractor has submitted a claim in accordance with the Clause GC-16 "Claims For Extension Of Time For Completion" and Clause GC-29 "Claims For Extra Work" then JICA shall direct the Contractor to perform such Extra Work, as provided for in Clause GC-28 "Extra

Work" as may be necessary in the opinion of JICA and he shall grant the Contractor such extension of time as may be justified.

GC-28

EXTRA WORK

JICA may, at any time by written order and without notice to the Sureties, direct the Contractor to perform extra work if such Extra is within the general scope of this Contract. No Extra Work shall be undertaken unless in pursuance of such written order by JICA, and no claim for payment shall be valid unless the Extra Work was so ordered. The Contractor shall promptly proceed with the Extra Work as directed by JICA and the amounts to be paid the Contractor for any such Extra Work shall be determined subsequently by one or more of the following methods:

- (a) By applicable unit prices contained in the Contractor's Proposal for like work.
- (b) By a supplemental Bill of Quantities and Schedule of proposed by the Contractor and approved by JICA.
- (c) By a reasonable lump sum proposal from the Contractor acceptable to JICA.
- (d) By cost-plus-percentage basis. The Contractor shall be reimbursed for all actual necessary cost, as determined by JICA; in doing the Extra Work which shall include the following:
 - 1. his direct labor costs, exclusive of those included in (4) below.
 - 2. all materials used on the Extra Work included in the Works.
 - 3. all supplies, fuel, lubricants, power and other incidentals, and
 - 4. an allowance for use of this Construction equipment as provided for in the Special Conditions, and

The Contractor shall receive an additional payment of fifteen (15) percent of all such cost to cover his indirect overhead costs plus five (5) percent of all costs including indirect overhead as his profit.

If the parties are unable to agree on any of the methods for payment to the Contractor specified in sub-paragraphs (a), (b), and (c) then such Extra Work shall be done on a cost-plus-percentage basis as described in sub-paragraph (d) above.

The cost of the Extra Work done shall be submitted at intervals to be determined by JICA in a satisfactory form and which shall be approved or adjusted at once by JICA. Request for payment by the Contractor for any Extra Work shall be accompanied by a statement, with the above approved supporting forms, giving a detailed accounting and record of the amount for which he claims payment. Said requests for payment shall be included with the Contractor's monthly statements for progress payments.

GC-29 CLAIMS FOR EXTRA WORK

If the Contractor claims that Construction Drawings or any instructions issued by JICA during the term of the contract involve extra cost or should other special circumstances of any kind whatsoever occur such as to fairly entitle the Contractor to extra cost under this Contract, JICA shall determine the amount of such extra cost; provided that JICA is not bound to take into account any claim for any extra cost unless Contractor has within twenty-eight (28) calendar days after such work has been commenced or after the circumstance leading to such claim have arisen, delivered to JICA a notice giving full and detailed particulars of any claim for extra cost in order that it may be investigated at the time. Failure to provide such notice shall constitute a waiver by the Contractor of any claim. On receipt of full and detailed particulars the Administrator shall examine the facts and shall grant the Contractor extra cost when, in JICA's opinion, the findings of fact justify and extra cost.

GC-30 NIGHTS, SUNDAYS, HOLIDAYS AND OVERTIME

Work at night, on Sundays, on Holidays, as overtime shall be governed by the pertinent laws, regulations and acts and shall be the sole responsibility of the Contractor. All costs and expenses associated with work at night, on Sundays, on Holidays as overtime shall be paid by the Contractor and shall be included in the Bid prices submitted by the Contractor for this Contract.

GC-31 NOTICE TO PROCEED

JICA, after approval of the Contract, will issue to the Contractor a Notice to Proceed with the Contract Work.

GC-32 CONSTRUCTION PROGRAM

Within seven (7) calendar days after date of receipt of Notice to Proceed, the Contractor shall furnish JICA a complete construction program providing for the orderly performance of the Contract Work, showing in detail the proposed program shall be in such form and in such detail as to show properly the sequence of operations, the period of time required for completion of the

Contract Work under each item or group of items in the Bill of Quantities. such construction programs shall be up-dated and submitted at intervals a of not more than two (2) months; however, the Contractor shall immediately advise JICA of any proposed change in the construction program. Revised construction programs shall show construction operations for each item of the Contract Work from the starting date to the anticipated completion date, indicating the periods during which Contract Work was previously underway, as well as estimated future period of construction operations.

The Contractor will also submit a schedule of the Contact Work by the Critical Path Method (CPM), the Program Evaluation and Review Technique (PERT), or by a similar type of construction scheduling as a supplement to the program specified above.

JICA may withhold approval of progress payment estimates in case the Contractor fails to submit the construction Program of its revision within the time herein specified until such time they are submitted.

GC-33 STATISTICAL REPORTS

The Contractor shall within seven (7) calendar days after the end of each month furnish JICA, without cost to JICA in a form and number of copies to be determined by the Engineer, the following:

- (a) Physical Progress Reports for the month and estimated progress for the succeeding month.
- (b) Completion Schedules (target and actual) based on the approved Construction Program as provided for in Clause GC-32 "construction Program".
- (c) A Tabulation of Employees showing the supervisory staff and the numbers of the several classes of labor employed by the Contractor during the month.
- (d) A listing of equipment utilized for performance of the Contract Work during the month.

GC-34 CONSTRUCTION EQUIPMENT AND TOOLS

All the construction equipment and tools to be used for the Contract Work shall be furnished by the Contractor. As specifically mentioned in Clause IB-09 "Data to be Submitted with the Bid", the Contractor shall furnish JICA a complete list of all brand new and good running condition construction equipment that the requires in connection with this Contract Work. The Contractor shall prepare subsequently a schedule of delivery for

the said equipment based on his construction schedule and operations program. No separate payment shall be made for the costs of construction equipment and tolls and such cost shall be included in the Bid prices for various items in the Bill of Quantities.

GC-35 RIGHT TO CHANCE

JICA reserves the right to make changes in the work as are required for its proper completion, including, but not limited to design modifications which increase or decrease the quantities of unit price items of the work. JICA may also order the elimination of a portion of the work, even though required for proper completion if, due to BSWM's right-of-way acquisition difficulties, the Contractor would be unduly delayed in performing that portion of the work.

All quantities stated in the Contract for unit price items of work are estimates only and actual measured quantities of such work will vary from such estimated quantities. Such variations are not changes within the scope and meaning of this Contract, and shall be adjusted for payment purposes in the monthly and final estimate of work.

JICA may grant the Contractor extension of time for the completion of the work or extra work for delays due to the changes in the work and other specified causes, all to the extent provide for by Clause GC-15 "Extension Of Time Due to Force Majeure" and Clause GC-16 "Claims For Extension Of Time Of Completion".

All orders for changes will given in writing. An order which provide for an adjustment or an extension of time will be given only by change order.

GC-36 SUSPENSION OF THE WORK

By written order to the Contractor, JICA may suspended the Work wholly or in part, for such period as JICA may deem necessary, for any of the following reasons:

- (a) Failure of the Contractor to carry out orders given or to perform any provisions of the Contract Documents; or
- (b) The convenience and benefit of JICA in which case the order will constitute an order for a change in the work pursuant to Clause GC-35 "Right to Change".

The Contractor shall immediately comply with such written order, and shall resume the suspended work only upon JICA's written order to do so.

A suspension ordered under (a) above shall not be cause for time extension or additional compensation.

A suspension ordered under (b) above will be considered a cause for time extension as provided for by Clause GC-16 "Claims for Extension of Time for Completion", and adjustment in compensation to the same extent as other changes in the work.

GC-37

PERFORMANCE SECURITY

The contractor shall, at the time of executing the Contract, provide performance security deposited with and made payable to JICA in the amount equivalent to not less than five percent (5%) of the total Contract Amount in the form of surety bond, or bank guarantee or any combination thereof, issued by a bonding company acceptable to JICA.

JICA will not accept Performance Security in cash.

Failure to deposit satisfactory performance security at the time of execution of the Contract or such extended time as may be allowed by JICA shall be a breach of this Contract, and JICA may, at its discretion, cancel the Contract and accept some other Bidders, or invites further bidding.

Should any Surety upon the bond furnished under this paragraph shall become unacceptable to JICA, or, if any Surety shall fail to furnish reports as to its financial condition from time to time, as requested by JICA, the Contractor shall promptly furnish such replacement security as may be required from time to time to protect the interest of JICA; up to a sum equal to the amount of the original security.

JICA may require additional performance security if the Contract is increased appreciably.

The cost of the Performance Bond which is acceptable to JICA is enclosed herewith.

GC-38

PAYMENT IF CONTRACT TERMINATED

If the Contract shall be terminated as provided for in Clause GC-17 "Contractor's Right to Stop Contract Work or Terminate Contract" the Contractor shall be paid by JICA for:

- (a) All work executed prior to the date of termination at the rates and prices provided in the Contract.
- (b) The amount paid, as verified by JICA, for materials ordered for the Work which have been delivered to the Contractor or of which the Contractor is legally liable to accept delivery, such materials becoming the property of JICA.
- (c) The amount actually incurred by the Contractor in the expectation of completing the whole of the Works insofar as such expenditure have not been covered by the payments in subparagraph (a) and (b) above.
- (d) The actual and reasonable cost of removal of the Contractor's Construction Plant and return thereof to the Contractor's place of registration.

Provided that against any payments due from JICA under this paragraph JICA shall be entitled to be credited with any outstanding amount due from the Contractor for sums previously paid by JICA to the Contractor in respect of the execution of the Contract Work.

GC-39

PREPARATORY WORK

The Contractor shall furnish labor, materials, supplies, equipment, and other facilities to install such Temporary works as described in Chapter I of the Technical Specifications.

Payment for furnishing all materials, equipment and labor for the preparation of the camp area and for constructing the Contractor's Temporary Works will be made at the lump sum price stated in the Bill of Quantities. This price is fixed by JICA and is not subject to change. Payment will be made on the basis of percentage of facilities installed as estimated by the Contractor and approved by JICA. Not included in these items is the cost of operation and maintenance of Contractor's Temporary Works of which cost shall be included in the prices tendered in the various items of the Bill of Quantities.

GC-40

PAYMENT

JICA agrees to effect payments for the Construction works in check to the Contractor in the following manner;

- a) Advance Payment, The amount of (Pesos _____), equivalent to forty (40) percent of the Contractor Price to be effected not later than fifteen (15) days after the Contractor's request for payment in writing provided that the Contractor has submitted to JICA a bank guarantee or a surety bond.

acceptable to JICA and equivalent to the amount of Advance Payment. The bank guarantee or surety bond will be released upon repayment of advance Payment by the Contractor.

- b) The Second Payment, to be effected two (2) months after the signing of the Contract according to the progress of the Contract Works satisfactorily executed by the Contractor and accepted by the Engineer upon the request of the Contractor. Payment shall be deducted by forty (40) percent to cover repayment of above Advance Payment.
- c) Final Payment, to be effected upon the satisfactory completion of the Contract Works by the Contractor and final acceptance by the Engineer of JICA of the remaining amount of the Contract Price.

The payments under b) and c) shall be effected within twenty (20) days after the respective acceptance of the Contract Works by the Engineer.

It is expressly understood that the payments by JICA do not mean the acceptance of the Works by the Engineer nor relief of the Contractor from its responsibilities under the Contract.

GC-41

LIQUIDATED DAMAGES

If the Contractor refuses or fails to satisfactorily complete the Contract Work covered by the Contract within the time specified herein plus any extension thereof, authorized by JICA, and is hereby in default under the Contract, the exact damages caused to JICA by such delay will be impossible to ascertain accurately. In lieu thereof, the Contractor agrees to pay JICA, as liquidated damages and not by way of penalty, the amount equivalent to 0.1 percent of the difference between the total Contract Price and the value of the completed portions of the Contract certified by the Engineer as usable as the expiration of the Contract duration for each calendar day of delay until the Work is completed and accepted by JICA. To be entitled to such liquidated damages, JICA does not have to prove that it had incurred actual damages. In case JICA becomes entitled to liquidated damages, JICA shall be authorized to deduct the amount of such liquidated damages from any money due or which may become due to the Contractor and/or to collect such liquidated damages from the Performance Security.

III. TECHNICAL SPECIFICATIONS

Technical Specifications

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CHAPTER I. TEMPORARY WORKS AND MOBILIZATION
OF CONSTRUCTION EQUIPMENT

101 Temporary works

The Contractor shall furnish all materials, labor, equipment and tool and install such temporary works as are necessary for the successful completion of the Contract Works.

The Contractor shall submit to the Engineer for approval the Contractor's plan of the temporary works.

The temporary works consist of the following works.

- (1) Access roads and temporary detours in any places required in the Site for construction of the works.
- (2) Contractor's camps, offices, store houses, workshops labor, s camps and other facilities in the site.
- (3) Temporary power and water supplies in the site for construction of the works.

102 Mobilization of equipment

The Contractor shall mobilize and move into the project site (in accordance with the approved Construction program and Equipment moving-in and Utilization schedule) the required construction equipment needed for the successful completion of the Contract work immediately after receipt of the approved Construction program.

201 Scope

This chapter covers stripping, excavation of soil tanks, farmland for sample soil and structures, hauling, land leveling, fill and backfill for structures and soil tank, surface soil handling and disposal of excavated materials.

202 Clearing and grubbing of site

The Contractor shall clear the ground on the site and around the structures to be constructed. Such clearing shall consist of the removal and disposal, in a manner approved by the Engineer, of all trees, stumps, stems, brush, roots, vegetation and other objectionable matters within the site.

Grubbing shall consist of the removal of the tree stumps, roots, brush and rubbish from the work area to be occupied by the embankment structures and from the surface of excavation, and elsewhere as directed by the Engineer. It shall include scraping of the natural ground surface at an adequate depth by effective means to remove all vegetation and other objectionable materials.

The holes resulting from the grubbing up shall be filled with approved material and well compacted.

All materials to be burned shall be piled neatly and in a suitable condition, and shall be burned completely. Special precautions shall be taken at all times to prevent fire from spreading and shall make available at all times at the burning site adequate and ready for use fire fighting equipment and supplies.

203 Stripping, removal of surface soil

The stripped surface soil shall be removed and temporarily stored at a place provided by the Contractor for later reuse. Before commencing the works, the Contractor shall submit to the Engineer for approval his proposed place for store of the surface soil.

Thickness of stripping of the surface soil is 20 cm in depth, unless otherwise shown on the drawings or directed by the Engineer. The work includes stripping, collecting, loading, hauling, unloading and stocking at a place approved or directed by the Engineer.

204 Cutting and filling of experimental farm

After stripping and removal of the surface soil, the surface of farm foundation shall be as level as possible by cutting and filling in accordance with the designed elevation shown on the approved drawings.

The cutting portions of foundation desirably shall be slightly lower than filling portions.

The filling works shall be performed at the area of sandy soil from a layer to a layer by spreading the filling clayey materials.

The leveling of surface shall be regulated within the tolerance of 5 cm.

Until the enough bearing capacity for foundation is obtained, the foundation shall be compacted in order to avoid the differential settlement after the execution of cutting and filling by using of a compactor directed by the Engineer.

205 Removal and disposal of gravel materials and sandy soil in soil tank.

The contractor shall remove and dispose to a designated area by the Engineer all the gravel and sandy materials existing within the depth of 50 cm. from the proposed plot elevation.

206 Land leveling work of soil tank

After completion of cutting and filling works, the procured sample soil described in Item 208 shall be hauled to soil tanks and refilled. The leveling of refilled surface shall be performed to avoid uneven land by means approved by the Engineer so as to make the surface within tolerance ± 5.0 cm. at 5 points on each farm plot. Maximum size of clod shall be 5 cm dia. Selected gravel with 2 to 3 cm dia. shall be spread as shown on the drawings.

207 Excavation of structures

Excavation shall mainly mean the excavation of earth material such as soil, sand and gravel other than rock.

Unless otherwise approved, no excavation shall be permitted under water. The site shall be kept well drained and free from inundation caused by rainfall or groundwater during construction.

(a) Excavation of drainage canals, foundation of pipelines and structures shall be carried out in accordance with the lines, grades, slopes and dimensions as shown on the approval drawings or directed by the Engineer.

(b) In case of the over excavation which is not approved or directed by the Engineer, the Contractor shall carry out, at the contractor's own expense, the filling and compaction works by the same materials.

(c) If required bearing capacity for structures is not obtained at the excavation shown on the approved drawings, the excavation shall be continued until the allowed bearing capacity is obtained.

(d) Disposition of excavated materials

The Contractor shall submit to the Engineer the necessary drawings and other specific information of the proposed spoil dump areas for obtaining the approval from the Engineer. The prior consent by the Engineer is quite essential for carrying out spoil dumping at any places excavated materials deemed unsuitable as fill materials shall be wasted to the approved spoil dump areas.

208 Procurement and transportation of sample soil

This item covers procurement and transportation of sample soil for filling soil tanks. The locations of the borrow area for the sample soil are as shown on Fig. _____ to _____. The procurement of material for each soil tank shall be sufficient volume to fill the tank in accordance with the elevation and dimension shown on the drawings. The excavation of the material at the borrow pit shall be carried out in accordance with the relevant specification in other item or as directed by the Engineer. Every effort shall be made during transportation so as not to change the water content of the borrow material.

About 10 percent of extra soil shall be procured and stored at the side of the each soil tank with the manner approved by the Engineer.

209 Fill and backfill

This item covers the specifications for fill and backfill works and as shown in the drawings or otherwise direction given by the Engineer, the Contractor shall furnish and place the earth materials for inspection road, soil tank and structures. Any work of fill and backfill shall not be commenced without prior approval of the Engineer. The slope of the embankment shall be made as the shaping of slope indicated on the drawings or as approved by the Engineer.

Backfill, as referred to herein, is defined as refill works. The materials for backfill works shall be made free from roots, stones, and other objectionable materials and subject to the approval of the Engineer. The backfill materials shall be placed in layers, the each layer being not more than twenty (20) centimeters thick before compaction, thoroughly compacted by using of power tampers or by other method approved by the engineer. No backfill materials shall be placed on concrete structures before a period of fourteen days has elapsed after placing the concrete.

The fill works shall be carried out in conformity with the lines, grades and dimensions indicated on the drawings, unless otherwise directed by the Engineer. The Engineer may instruct to change a slope of the fill works in respect of soil conditions at the site. Such a change will be made according to the quantities of materials available. The changes prescribed by the Engineer should not cause any claims for increase in unit prices.

Any fill material, which are rendered unsuitable after being placed at the site, shall be replaced by the Contractor without only payment thereto. The Contractor shall re-excavate and remove the filled materials which the Engineer considers objectionable and shall also dispose of such material to the spoil area directed by the Engineer, and refill the excavated area as directed without any additional cost.

Backfill for the construction of pipeline shall be carried out after carrying out the leakage test of pipeline. The backfill until 60 cm above the top of the pipe shall be made soon after the inspection for the joint works. The heavy equipment including truck shall not be used for the spreading and the rolling compaction of the above-mentioned backfill works. The backfill of succeeding layers can be carried out by the method and equipment approved by the Engineer.

When sufficient materials for fill and backfill are not available from the ditch excavation, additional materials shall be obtained from sources as approved by the Engineer. The materials shall be quality satisfactory for the purpose.

210 Miscellaneous fills and backfills

The contractor shall furnish, spread and compact the following material in conformity with line, grade and dimension shown on the drawings or as directed by the Engineer :

(a) Selected Gravel

Approved clean and sound pebble with the size 20 to 30 mm shall be applied to the foundation of the sample soil in the soil tanks.

(b) Compacted gravel

Material for compacted gravel at the locations shown on the drawings or designated by the Engineer shall be clean, sound and angular rubble stones with the maximum particle size not exceeding the thickness of layer shown on the drawings or directed by the Consultant, and filling material of well graded gravel and sand mixture for binding. The leveling concrete shall be placed on the

gravel bedding as shown on the drawings or as directed by the Engineer.

211 Measurement and payment

Measurement for payment of earth works shall be made by the drawings approved by the Engineer and the volume will be computed in cubic meters under the dimensions to be directed by the Engineer.

The accepted quantities of earth works, measured provided above, will be paid for at the contracted unit rate in the Bill of Quantities.

The rate shall include all the expenses for execution of earth works.

CHAPTER III. CONCRETE WORKS

301 Scope

The Contractor shall execute the following works as specified herein and as shown on the drawings or otherwise directed by the Engineer.

- (a) Furnish all materials, and mix, transport, place, finish, protect, and cure concrete ;
- (b) Furnish, construct, erect, and remove forms ;
- (c) Construct expansion and contract joints, and furnish and place for water stops, joint fillers, and sealing compound ;
- (d) Prepare, clean, cut bend, and place steel reinforcement.

302 Cement

The cement for mortar and concrete works shall be of quality which conforms to the requirements of the Standard Specifications for Portland Cement.

The cement, in sealed bags unbreakable, shall be stored in weathertight and properly ventilated warehouse with adequate provisions for the prevention of absorption of moisture. All storage facilities shall be subject to approval and shall be such as to permit easy access for inspection and identification. The cement which has been stored for more than one month or which is suspected to be damp shall not be used unless otherwise approved by the Engineer.

303 Water

Water used in mixing concrete shall be fresh, clean and free from injurious amounts of oil, acid, alkali, salt, or organic matter.

304 Fine aggregate

The fine aggregate shall be natural sand not including organic materials and others foreign substances.

Fine aggregate shall consist of hard, tough, and durable particles. The shape of the particles shall be generally rounded or cubical and reasonable free from flat or elongated pieces. The quality of fine aggregate shall be subject to approval by the Engineer.

305 Coarse aggregate

Coarse aggregate shall consist of gravel or crushed gravel, or a combination of gravel and crushed gravel.

Coarse aggregate shall consist of hard, tough, durable, and clean particles. All foreign materials and dust shall be removed by adequate processing. The particle shape of the smallest size of crushed coarse aggregate shall be generally rounded or cubical, and the coarse aggregate shall be reasonably free from flat and elongated particles in all sizes. The quality of coarse aggregate shall be also subject to approval of the Engineer.

306 Proportion of concrete

- (a) The Contractor shall design the mix proportion for every class of concrete placing for the approval by the Engineer.
- (b) Unless otherwise directed by the Engineer, the maximum size of coarse aggregate to be used in the various parts of the work shall be 3/4 inch.
- (c) The designed mix proportion of concrete is indicated as follows;

<u>Class</u>	<u>Minimum 28 days compressive strength</u>	<u>Mixing proportion by volume cement : fine aggregates :coarse aggregates</u>
A.(Reinforced concrete)	210 kg/cm ²	1 : 2 : 4
B.(Plain concrete)	180 kg/cm ²	1 : 3 : 6
c.(Leveling concrete)	135 kg/cm ²	1 : 4 : 6

Other proportions for mixed design may be directed by the Engineer at the site.

307 Mixing

- (a) Concrete shall be mixed in a power driven batch type machine approved by the Engineer.
- (b) the mixing time of concrete shall be more than two minutes but less than five minutes. Overmixing, requiring the introduction of additional water to preserve the required consistency, will not be permitted. The mixer shall be completely emptied before receiving the materials for the succeeding batch and shall be kept clean and washed out after stopping work at the end of each shift.
- (c) The aggregate shall be moisture by watering if it is drier than the condition known as saturated surface dry.

- (d) On commencing work, cement paste for the first batch shall contain sufficient cement mortar to coat the inside of the drum to avoid the reduction of the required mortar content of the mix.

308 Conveying

Concrete shall be conveyed from mixer to forms, as rapidly as practicable by methods which will prevent segregation or loss of ingredients.

309 Placing

- (a) Approval of the Engineer shall be obtained before starting any concrete pour.
- (b) Concrete shall be worked into the corners and angles of the forms and around all reinforcement and embedded without permitting the material to segregate.
- (c) All concrete shall be placed upon clean, damp surfaces free from standing or running water. Prior to placing concrete, the earth foundation shall be satisfactorily compacted in accordance with approved methods.
- (d) Surface upon or against which concrete is to be placed, shall be clean, free from oil, standing or running water, mud, objectionable coatings, debris, and loose, semi-detached or unsound fragments. To insure a firm and tight bond between fresh concrete and other concrete, concrete surfaces, where necessary, shall be chipped or roughened as directed by the Engineer. All surfaces shall be wetted thoroughly to keep them in a completely moist condition before placing concrete. All approximately horizontal surfaces shall be covered with a layer of mortar of the same cement-sand ratio as used in the concrete mix before the concrete is placed.
- (e) Concrete shall be placed and consolidated with the aid of mechanical vibrating equipment or of hand-spading and tamping.

310 Forms

- (a) Forms shall have sufficient strength to withstand the pressure resulting from placement and vibration of the concrete, and shall be maintained rigidly in correct position. Forms shall be sufficiently tight to prevent loss of mortar from the concrete.
- (b) At the time concrete is placed in the forms, the surfaces of the forms shall be free from any objectionable materials and shall be oiled to prevent sticking.

- (c) Forms shall be removed as soon as practicable after the time instructed by the Engineer.

311 Curing and protection

- (a) All concrete shall be moist cured for a period of not less than seven (7) consecutive days by an approved method or combination of methods applicable to local conditions.
- (b) Concrete shall be kept wet by covering with water-saturated material or by other means approved by the Engineer.

312 Reinforcing bar

- (a) the Contractor shall furnish all steel reinforcement materials for concrete works as indicated on the drawings. The Contractor shall prepare, clean, cut, bend and place all reinforcements, as shown on the drawings or directed by the Engineer. The Contractor shall furnish all chains, supports and ties. The reinforcement shall be reasonable free from loose, flaky rust and scale, and free from oil, grease and other coating which might destroy or reduce its bond with concrete.
- (b) The distance from the center of the main reinforcement to the concrete surface shall be 5 cm except such portions as shown in the drawings. The concrete covering the stirrups, spacer bars, and similar secondary reinforcement may be reduced by the diameter of such bars, unless otherwise directed by the Engineer.
- (c) Lapping length at joints of the reinforcing bar shall be at least thirty times of the diameter of the bar and shall be bound by steel wire.
- (d) The reinforcements shall be secured in place by use of metal or concrete supports, spacers or ties. Such supports shall be of sufficient strength to maintain the reinforcement in place throughout the concreting operation. The supports shall be used in such manner that they will not be exposed or contribute in any way to the discoloration or deterioration of the concrete.

313 Measurement and payment

- (a) Measurement for payment for concrete cast in site shall be made by volume in cubic meters of respective classes of concrete placed as computed from the dimensions shown on the drawings approved by the Engineer.
- (b) Measurement for payment for reinforcing bar shall be the weight of reinforcing steels placed in the concrete in metric kilogram as

computed from the approved detailed, bar bending schedule, using theoretical unit weights.

- (c) The accepted quantities of concrete, reinforcing bar and other miscellaneous, will be paid for at the contract unit rate in the Bill of Quantities. The form work and joint materials for contract expansion and other joints shall be deemed to be included in the rate of concrete works.

CHAPTER IV. PIPE WORKS

401 Scope

All pipe, fittings and appurtenances shall be furnished by the Contractor. In addition, the Contractor shall furnish all labor, materials, equipment and incidents required to install the piping, fittings appurtenances as shown on the drawings.

Work to be done shall include hauling, laying, installing, jointing and all other work necessary to produce a completed facility. The Contractor shall furnish and install fitting, sockets, gaskets, flanges, bolts, nuts and all other materials necessary to properly install the work shown on the drawings and as specified.

For each work required for pipe embedding, the specifications for earth and foundation works shall be applied.

402 Shop drawings

The Contractor shall submit detailed working and shop drawings and schedules of all pipe, fittings and appurtenances. Shop drawings shall include but not be limited to the following ;

1. Lists of materials
2. Schedules of pipe lengths
3. Details of proposed joints

403 Pipe and fittings

(a) Joints of galvanized steel pipes shall be of flanged or screwed. All metal parts of joint shall be adequately protected with rustproof paint. Wall thickness of steel pipes shall be as follows.

<u>Diameter</u>	<u>Wall Thickness</u>
200 mm	5.8 mm
50 mm	3.8 mm

(b) Polyvinyl chloride pipes (PVC pipes) shall be provided at one Taper Socket at the end of pipes in compliance with manufactures' standard. The connection's pipes and fittings shall be used suitable bonding agent which is approved by the Engineer.

Wall thickness of PVC pipes shall be more than followings.

<u>Diameter</u>	<u>Wall Thickness</u>
200 mm	7.8 mm
50 mm	3.5 mm

- (c) Wall thickness of Reinforced concrete pipe shall be not less than the followings :

<u>Diameter</u>	<u>Wall Thickness</u>
150 mm	26 mm
200 mm	27 mm

- (d) Netoron pipe or equivalent type is preferable to the perforated PVC for the underground drainage pipe in the soil tank.

404 Installation

- (a) The installation of pipe and fittings shall be strictly in accordance with the manufacture's technical instruction printed.
- (b) In making connections, clean dirt, moisture and oil from pipe and fittings. Particular care shall be taken not to overstress threaded connections at joint.
- (c) In case that the foundation is composed at gravel layer, the foundation shall be replaced by suitable soil material in thickness 10 cm. And also it shall be compacted sufficiently under the instruction of the Engineer.
- (d) After completion of pipe installation, backfill works shall be carefully executed in accordance with the drawings or the direction of the Engineer.
- (e) Cuttings of the pipe shall be kept to a minimum. When cuts are necessary, they shall be perpendicular to the axis of the pipe and smooth. cuts shall be made with tools in conformity with the pipe manufacturer's recommendations.
- (f) Precautions shall be given to avoid damages to the pipes and fittings. In handling and storing the pipes and fittings, every care shall be given to avoid distortion, flattening, scoring or other damages. The pipes and fittings shall not be allowed to drop or strike objects.
- (g) The installation of the underground drainage pipe shall be carried out in the following procedure :
- Prior to the Netoron type pipe installation, a connecting G.I pipe at the end of Netoron type pipe shall be embedded in the center pit, and the soil tank shall be backfilled with the sample soil to the line, grade and dimension shown on the drawing,

- The limited area (only 40 cm wide) of such backfilled soil and selected gravel shall be excavated and the Netoron type pipe shall be installed, and
- The selected gravel and husk shall be backfilled on the pipe as shown on the drawings or as directed by the Engineer.

405 Gate valve

- (a) The gate valves shall be of vertical and flanged type conforming to the applicable Philippines standard.
- (b) The sluice valves shall be suitable for water services piping as the maximum operating pressure of static head up to 7.5 kg/sq.cm.

406 Check valve

- (a) The check valves shall be of flanged swing type in accordance with the applicable Philippines standard.
- (b) The check valves shall be suitable for water services piping at the maximum operating pressure of static head up to 7.5 kg/sq.cm.
- (c) Valve body and disc shall be made of cast iron.

407 Leakage tests

- (a) Before acceptance, pipelines shall be tested by the Contractor in the presence of the Engineer. The Contractor shall furnish all labor, fuel, oil and other equipment required to carry out tests at the Contractor's expense.
- (b) For the irrigation pipe, leakage test, unless otherwise directed by the Engineer, shall be conducted for a continuous two hour period at the maximum operating pressure of the system, 2 kg/cm².
- (c) If any test shows the leakage of any joint, pipe or otherwise ruptures part of the system, the Contractor shall make the necessary repairs and repair the leakage tests. The method of leak-stoppage shall be subject to the approval of the Engineer.

408 Measurement and payment

Measurement for payment for supply and installation of pipe shall be the length in meters of pipes installed, as computed on centerline of the alignment of pipeline including the lengths for straight pipes, bend pipes, tees, flanges, joints, and earth works, but excluding the pipes of pump house and well.

The accepted quantities of pipelines, measured as provided above, will be paid for the contracted unit rate in the Bill of Quantities.

CHAPTER V. WELL CONSTRUCTION WORK

501 Scope

- (a) This Chapter covers construction works of deep well including the equipment and materials to be supplied, and an overview of the well construction procedures, construction methods, sampling, records for irrigation water supply.
- (b) The Contractor shall furnish all plant, labour and materials to complete the work of well construction.
- (c) The structures of the wells shall be of borehole type with gravel pack as shown on the drawings and in accordance with the geological conditions encountered. The basic construction of the wells as specified in detail in this specifications may be altered in conformity with the characteristics of the drilled formation on the job sites. The Contractor is required to prepare all equipment and materials to meet any possible procedure of work and adapt his work to specific conditions of the site without delay.
- (d) The exact drilling points shall be determined during the site transfer under the presence of the Engineer or his representative.
- (e) Information and data pertaining to the geological conditions in and around the drilling sites obtained by the survey for the detailed design will be made available to the Contractor upon request to the Consultant. However, it is expressly understood that the Client will not be responsible for any interpretation or conclusion drawn therefrom by the Contractor.
- (f) Prior Approval

The Contractor shall submit to the Consultant for his approval before shipment of the above material a complete statement of origin, detail specification, shop drawings, catalogue, etc. for the material to be used, and detail construction method and schedule for the work.

502 Materials

(a) Well Casing:

Well casings to be used hereunder as part of the permanent well shall be of mild steel or equivalent. Both ends of pipes shall be threaded.

(b) Well Screen:

- 1) Well screens shall be stainless steel spot welded wire-wound continuous slot screen or equivalent. The number and area of

openings shall be that the expected yield of well may be developed with a minimum loss of head. Screens shall be furnished in nominal effective lengths of 4 m. Both ends of screens shall be provided with suitable end fittings for connection between strings of screen sections and between sections of a screen and the casing pipe.

- 2) The basic design length of screens to be used shall be subject to the penetrated geological conditions, and the exact length and positioning shall be programmed in time for the installation work after the operation of electric resistivity logging.

(c) The Basic Design Length of Screen

The basic design length of screen is tentatively estimated as follows:

Maximum forty (40)% of the entire well depth

The remaining portion of the well will be installed with casings as shown on the Drawings or as approved by the Engineer.

503 Drilling

- (a) The holes shall basically be drilled by the direct rotary, down-the-hole hammer or percussion operation methods.
- (b) The Contractor shall take all necessary measures to ensure the verticality and alignment of the holes.
- (c) The drilling diameter of the wells is 350 mm and the drilling depth is 120 m.

However, the final depth of well shall be determined at well site by the Engineer based on the geological and aquifer condition, etc.

- (d) The drilling fluid, if necessary, may be mixed by the Contractor after approval by the Engineer.
- (e) The electrical conductivity and pH of the mud filtrate may be tested and recorded as directed by the Engineer.
- (f) If the circumstances allow or the Engineer requires, the water table or mud water table shall be recorded at the beginning well drilling work every day.

504 Well logging

- (a) Logging of spontaneous potential and resistivity of earth shall be made in hole immediately after the completion of drilling and before installation of any screens or casing.
- (b) The normal resistivity test method with simultaneous recording of both electrode spacing 25 cm and 100 cm is recommendable.
- (c) The electric logs shall be handed over to the Engineer immediately after the logging has been completed.

505 Installation of casings and screens

- (a) Prior to the commencement of the permanent casing installation, preliminary well development using temporary casing and screen may be required for sufficient times to be approved by the Engineer.
- (b) The Contractor shall submit the casing program of each well to the Engineer based on the results of well logging and the collected samples, and shall install casing pipe and well screen with the approval of the Engineer.
- (c) A well bottom plug shall be installed at the bottom end of the casing pipe.
- (d) Centralizer shall be fitted as approved by the Engineer.
- (e) The Contractor shall pack the annular space between the casing pipe/well screen and the borehole wall by the washed gravel of appropriate grain size which shall be approved by the Engineer.

Unless otherwise instructed by the Engineer, the Contractor shall seal the uppermost portion of annular space of casing and the borehole wall by means of grouting to prevent any direct infiltration of surface water into the borehole.

506 Well development

The Contractor shall develop the borehole by means of jetting, surging or air-lift pumping as approved by the Engineer.

The development shall be continued until the lifted water is judged to be free from sand as otherwise approved by the Engineer.

507 Pumping test

- (a) Following the completion of development work, the Contractor shall conduct the pumping test of the well using approved pump and ancillary equipment.

Pumping test shall include step draw down test, continuous discharge test and recovery test.

- (b) During the period between the completion of the development work and the commencement of the test pumping, the Contractor shall measure and record the static water level in the hole daily.
- (c) The static water level in each production well shall be measured immediately before any test pumping commences.
- (d) Mutual interruption of pump discharge between this proposed well and the existing BSWM well (160 m north-east of the proposed well) shall also be tested by the approved manner by the Engineer.

508 Well head

- (a) During the course of drilling work, the Contractor shall provide and keep in place at each production hole (whenever drilling, testing or other work is not taking place) a suitable tight-fitting temporary cover to seal off the hole.
- (b) After completion of all testing at each hole and when directed by the Engineer, the Contractor shall fix to the top of the casing a cap.

509 Geological samples, analysis and water quality test

- (a) In the course of drilling at each well, the Contractor shall log all formations encountered while drilling and record all variations in the rate of penetration due to changes in the subsoil. Representative samples, each weighing a minimum of 0.5 kg, of the subsoil encountered shall be taken at intervals not exceeding 1 m and at all points where the subsoil changed. A lithologic log based on penetration rates and the lithologic description of the samples shall be maintained.
- (b) Each sample shall be placed in a suitable container such as transparent plastic bottle and shall be clearly and securely labeled with the well reference number, site name, date, time and depth at which it was taken and shall be retained for visual inspection by the Engineer.
- (c) The Contractor shall be responsible for storing the water samples and shall, when instructed by the Engineer, carry out such mineralogical, chemical and physical analyses and tests of these samples as the Engineer may require.
- (d) The results of the analyses and tests shall be presented in a form approved by the Engineer.

510 Records

(a) Detailed records of all operations shall be kept in English during the construction of each production hole. These records shall include:

- 1) Accurate casing, screen and gravel packing record, and tallies and details of all materials, tools, pumps or other equipment used in the holes, whether temporary or permanent.
- 2) Complete logs and records of all development work including pumping. These data shall include well yields, static and pumping water levels, methods and materials used, duration of each operation, results of observations and sand content.
- 3) Plumpness and alignment survey data
- 4) All pumping and step drawdown and constant discharge testing records including full description and duration of all operations.
- 5) All tests of sand content and of pumped water.
- 6) Any other data which the Contractor may be required to record by the Engineer.

(b) Within 2 weeks after the completion of each well, a report in English summarizing the results of performance for that well shall be submitted to the Engineer. It shall contain all details concerning the hole and supporting data and written summary giving the history of all construction and testing operations.

An original and two copies of all test records shall be delivered to the Engineer not later than 15 days after the completion of each test.

511 Alterations

Notwithstanding all those specified in the preceding paragraphs, the Consultant may order the Contractor to alter a portion of the construction procedure and method of the wells. Alteration may also be initiated upon request from the Contractor, subject to the approval of the Engineer.

512 Measurement and Payment

Measurement and Payment for each work item of the well construction shall be made in accordance with the respective item in the Bill of Quantities attached in this Contract.

CHAPTER VI. INSTALLATION OF PUMP

601 Scope

The pump with accessories and necessary spair parts for 2 years operation shall be furnished by the Contractor. The Contractor shall submit to the Engineer the specifications and drawings in conditions assembled, disassembled and installed, which are prepared by the manufactures, in advance.

602 Pump

The capacity of the proposed pump shall satisfied the following specifications or equivalent:

Type	:	Submersible motor multi-stage turbine type pump
Diameter	:	100 mm
Capacity	:	14 liter/second
Total head	:	about 60 m

The pumping unit to be furnished shall be in accordance with the latest applicable standards in the country of origin for the type of pump to be supplied, unless otherwise specified herein. The efficiency of the unit to be furnished shall be as high as practicable and consistent with the best modern design. The pump shall ensure equal or higher quality than the specified special standard or the indicated design requirements of these Contract Documents.

603 Accessories

The accessories shall include, but not limited to the followings:

a.	Low water lever detector with cable	1	lot
b.	Submersible cable (45 m length)	1	lot
c.	Cable band	1	lot
d.	Base plate	1	no.
e.	Anchor bolts, nuts	1	set
f.	Discharge bend	1	no.
g.	Air vent valve	1	no.
h.	Compound gauge	1	no.
i.	Swing check valve	1	no.
j.	Manually operated gate valve	1	no.
k.	Rising columns	1	lot
l.	Bolts, nuts packing for column pipe	1	lot

604 Control panels for pump

Type	:	Wall mounted in-door use type
Incoming power supply	:	AC 400 volt, 3 phase, 60 Hz

Operation method : Manual ON-OFF
Automatic stop at overload and well water level low

Starting method : Star-delta

Meter and indicator : Ammeter, Voltmeter, Indicating lamps for pump-run and low water level alarm, etc.

Material of enclosure : Steel plate

Thickness of plate : Not less than 1.6 mm

605 Electric detector for reservoir

Type : Electro-rod type

Required number : one set

Application : Low and high water level

Depth of reservoir : 2 m

Distance from pump station : Approx. 10 m

606 Installation

The pump shall be installed and incorporated with the structure as indicated in the drawings furnished by the manufacturer.

607 Servicing and operation test

After the pump is completely installed, the pump's accessories shall be cleaned and serviced by the Contractor.

The pump shall be tested before take-over and shall operate smoothly.

608 Guarantee of materials and workmanship

The Contractor shall submit testing record of the pump the test-run of which is to be made by the manufacturers.

The Contractor shall guarantee the quality of the equipment and be fully responsible for any defective equipment and parts found within one (1) year from the date of acceptance.

609 Measurement and payment

Payment for the installation of pumps will be made on the basis of contracted lump sum prices after completion of the Engineer's examination.

CHAPTER VII. INSPECTION ROAD WORKS

701 Scope

The inspection road works consists of setting out of alignment, clearing and grubbing, stripping and excavation, embankment and gravel pavement.

The location, type, longitudinal profiles, transversal sections and other details of the works shall be as indicated on the drawings.

702 Clearing and grubbing of site

This works shall be carried out in compliance with Section 202 at Chapter 2 Earthworks.

703 Stripping of top soil

This works shall be carried out in compliance with Section 203 at Chapter 2 Earthworks.

704 Excavation of road bed

Road bed shall be excavated to the elevation as specified by the drawings or directed by the Engineer. The excavated materials shall be placed on the other site for reuse under direction by the Engineer.

705 Embankment

The Contractor shall submit the reuse plan of the excavated soil to the Engineer for approval. The embankment works shall be executed as follows:

- (a) The area of excavated foundations shall be compacted sufficiently by compactor or means directed by the Engineer.
- (b) Before placing the first of fill on such compacted foundation area, the surface shall be scarified to a depth not less than 50 mm, in order to roughen the surface and provide good bonding of the fill placed thereon.
- (c) The fill shall be placed and spread in continuous layers parallel to the major axis of the farm road.
- (d) The spread of each layers shall not exceed 25 cm in thickness.
- (e) Where the surface has dried too much for proper bonding, it shall be uniformly sprinkled with water, scarified, harrowed and mixed until the moisture content of the in place material is within the required limits. If the moisture content of the in place material is higher than the limited required, such fill shall be controlled

until its moisture content is within required limit or it shall be removed from the site where directed by the Engineer.

- (f) The Contractor shall Control the moisture content of the fill material on the site or the place directed by the Engineer.

706 Compaction

Each layer of the fill material shall be compacted by an approved compactor so that the fill material shall form a single homogeneous mass. When so directed by the Engineer, hand operated heavy duty tampers and/or smooth faced vibrating rollers shall be used for the compaction of fill material placed in areas inaccessible to the compaction equipment selected for normal use. These tampers or rollers shall be air, gasoline or diesel powered. They shall be easily maneuverable and of sufficient capacity to obtain the specified density.

The dry density of the fill shall be not less than required degree of compaction 907.

Note: Degree of compaction

$$= \frac{\text{Dry density of fill in site}}{\text{Max. dry density of standard compaction}} \times 100 (\%)$$

707 Testing of fill

The Contractor shall perform tests on the fill material. Testing will be done as frequently as deemed necessary and the Contractor shall furnish all necessary labor and equipment for testing.

- (a) The compaction test of fill material shall be conducted in accordance with DPWH standard.
- (b) The density of fill in place will be determined by using of sand cone method.

708 Gravel pavement and sod facing

The approved gravel material and sod shall be used for pavement of the inspection roads and its surrounding area as shown on the drawings or as directed by the Engineer.

709 Measurement and payment

Measurement for payment for road embankment works and gravel pavement shall be the volume of compacted materials placed and measured in cubic meters by the average and area method. Measurement for

payment for sod facing (or turfing) shall be the area of facing measured in square meters.

The accepted quantities of road embankment and gravel for pavement, and sod facing measured as provided above, will be paid for the Contracted unit rate in the Bill of Quantities.

CHAPTER VIII. BUILDING WORK

801 Scope

The Contractor shall construct pump house required in the contract in accordance with the specifications and as shown on the drawings.

Details of the building work not fully indicated on the drawings shall be designed by the Contractor in accordance with the standard architectural and engineering practice. The Contractor shall submit to the Engineer which shall be complete and shall contain all required detailed information.

802 materials

All materials used in the building construction shall be subject to the Engineer's approval. The Contractor shall submit to the Engineer samples of the said materials prior to the commencement of relative works for the approval.

803 Earthworks

- (a) The ground for buildings shall be leveled before commencement of the works.
- (b) The earthwork required for foundations and other parts of the buildings shall be carried out to the lines and levels as shown on Drawings and/or directed by the Engineer, in accordance with Chapter II Earthworks.
- (c) The portions around the foundations or other portions requiring backfill shall be filled with good materials and sufficiently compacted.

804 Concrete works

The concrete works shall be performed in accordance with the applicable requirements of Chapter III CONCRETE WORKS. Providing no other kind of concrete is specified in the drawings, Class A shall be used for the floors, columns, beams, footings and low thickness parts and Class A shall be used for the reinforced concrete.

805 Block works

- (a) Concrete block shall be of hollow Type.
- (b) Concrete block shall be as manufactured by manufacturers in the mass production of concrete blocks of good quality and design, and shall be subject to approval by the Engineer. The Engineer shall reserve the right to subject the concrete block to whatever tests

he deems necessary in order to assure the soundness of the product at the Contractor's expense.

- (c) Block shall be finished in stretcher, regular shape, half size, corner lintel and any other regular manufactured type and shape required to ensure a satisfactory arrangement of block installation.
- (d) Block shall be free from substances that will cause staining or pip-outs, and shall be of fine, even texture with straight and true edges. All blocks shall be moist cured for at least 24 hrs and then air cured in covered storage for not less than 14 days before delivery.
- (e) Block shall be of modular type as required for nominal wall thickness of 100 mm or 150 mm. Blocks shall be uniform in size, texture and color. Blocks shall be saw cut where fitted to non-modular space. The unit block shall have a regular rectangular shape and perpendicular aligned holes.

806 Carpentry

(a) Materials

The wood used shall be dried to 24 percent or less in moisture content. And the wood shall be hard.

(b) Preservative treatment and insecticide treatment

All the surfaces of wood in contact with concrete, mortar, etc. shall be coated twice with phenol preservative.

Lauan not treated with insecticide shall not be used.

All metallic parts shall be coated with rust preventives, except the portions embedded in concrete.

(c) Protection

The portions which may be spoiled or damaged during working shall be protected by the covering of paper, board, or any other suitable materials.

807 Roofing

(a) Material

The roof materials shall be No. 26 corrugated galvanized iron sheets. The overlapped portions shall extend more than 2.1/2

crests in crosswise direction and more than 30 cm in lengthwise direction.

808 Joiner's work

(a) Window

The windows shall be of wooden sashes.

(b) Door

The doors shall be wooden flush doors.

(c) Hardwares

All the locks for fittings and other accessory hardwares shall be of first class quality, and their samples shall be submitted and approved by the Engineer.

Door locks : Cylinder locks with master keys Knobs to be made of stainless steel

Door closers : With floor hinge stops

Hinges : Stainless steel pivot hinges

809 Painting

(a) General

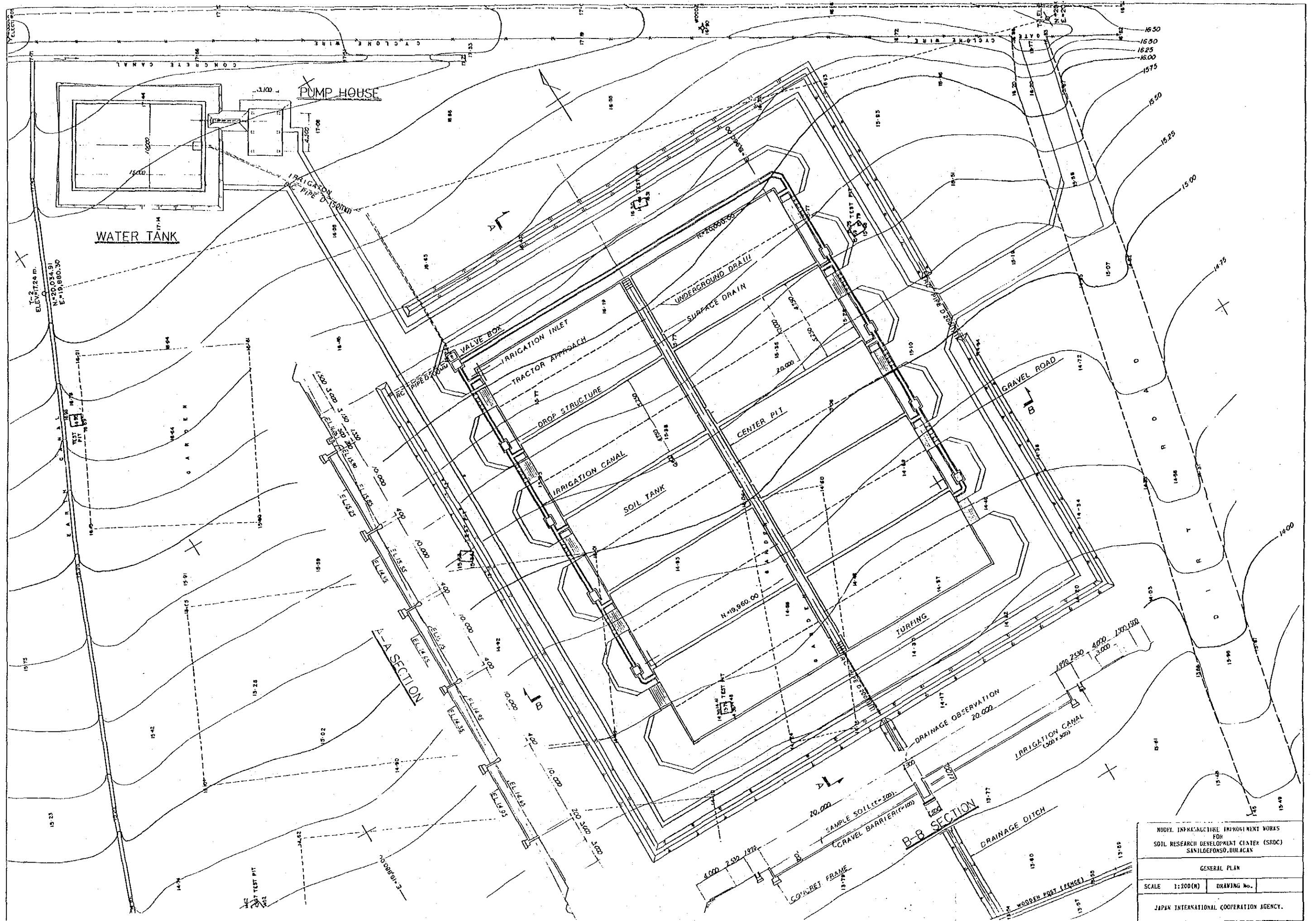
All the facings of woods and steels in the buildings shall be painted in accordance with the Engineer's instruction.

(b) Painting schedule

The painting schedule shall be as shown in the following tables.

Alkyd resin paint

<u>Ferrous portions</u>		<u>Wooden portions</u>	
<u>Painting schedule</u>	<u>No. of coats</u>	<u>Painting schedule</u>	<u>No. of coats</u>
Anticorrosive coat	1	Surface preparation	1
Intermediate coat	1	First coat	1
Finish coat	2	Intermediate coat	1
		Finish coat	2

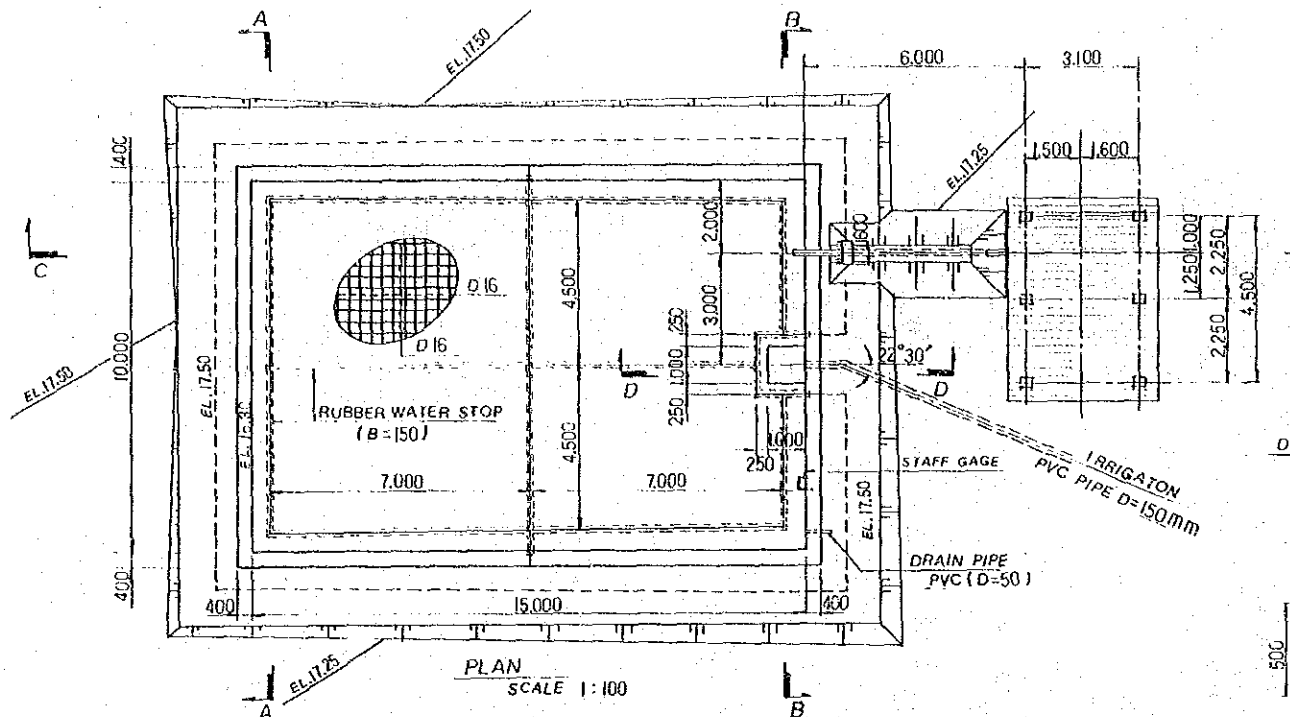


NUHII. INFRASTRUCTURE IMPROVEMENT WORKS
 FOR
 SOIL RESEARCH DEVELOPMENT CENTER (SRDC)
 SAN ILDEFONSO, BULACAN

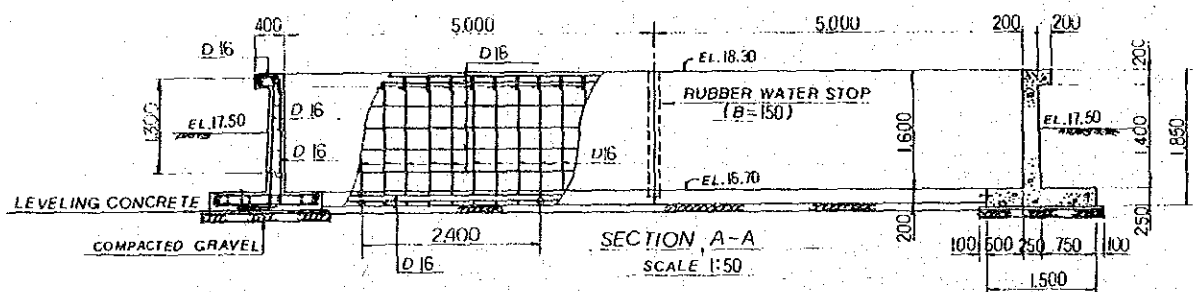
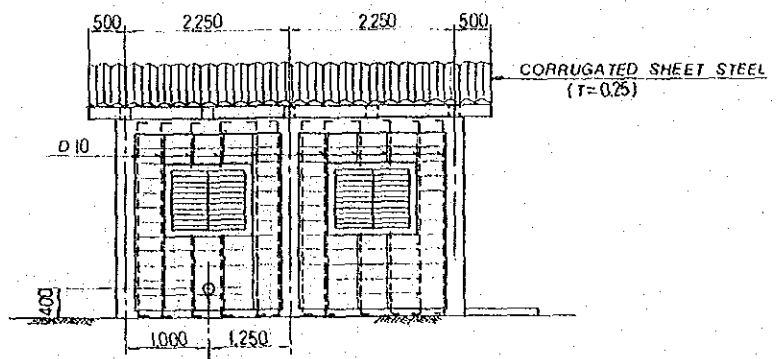
GENERAL PLAN

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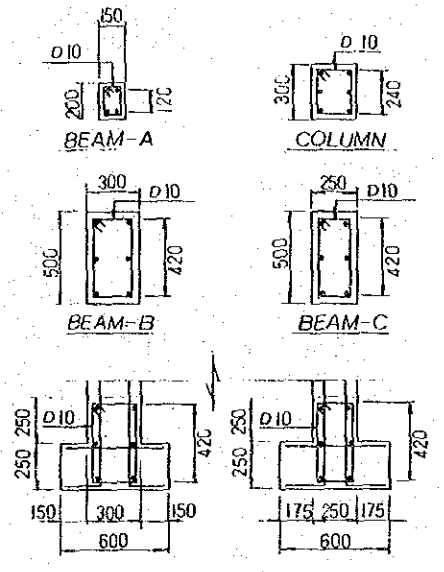
JAPAN INTERNATIONAL COOPERATION AGENCY.



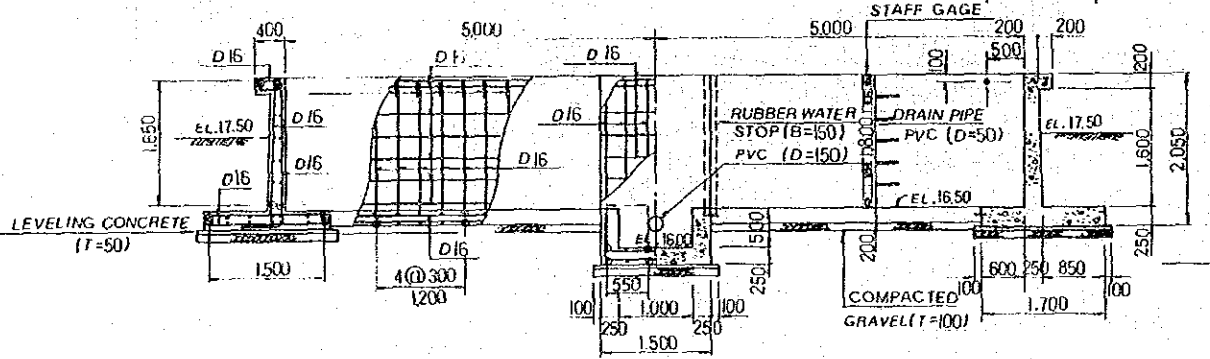
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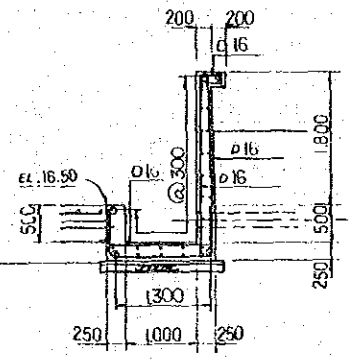
SECTION A-A
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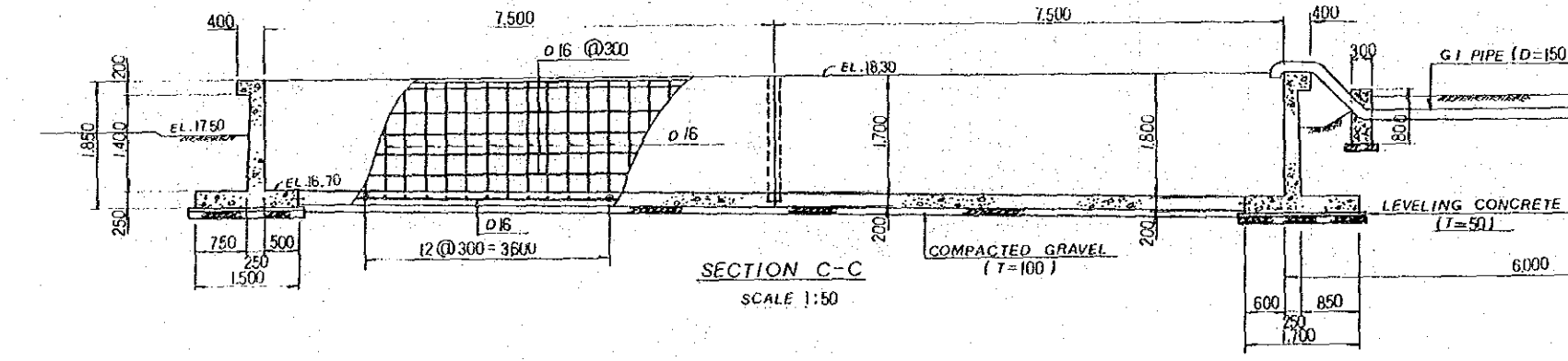
FOOTING
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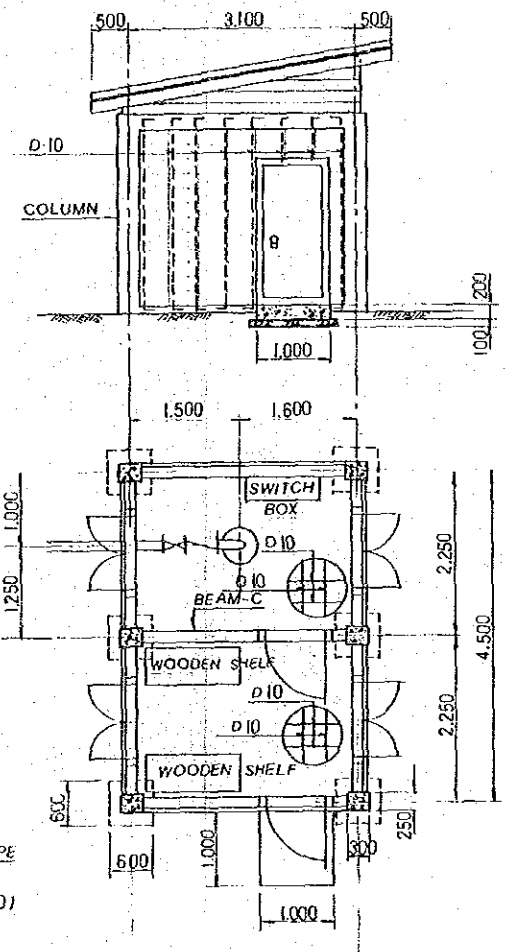
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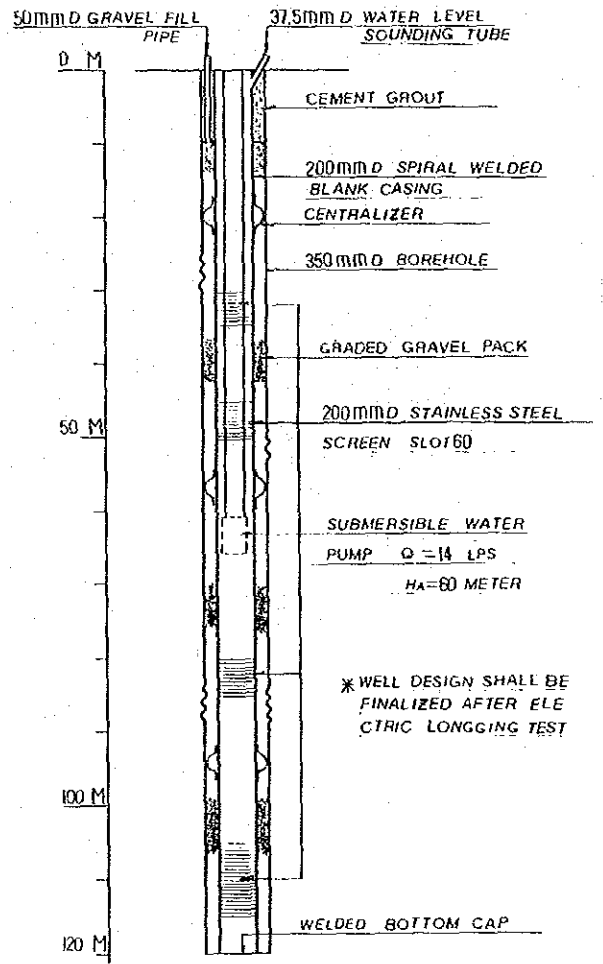
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SECTION C-C
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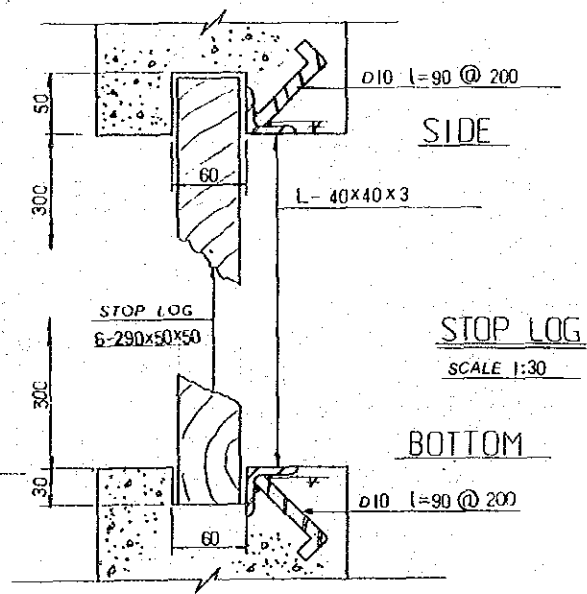
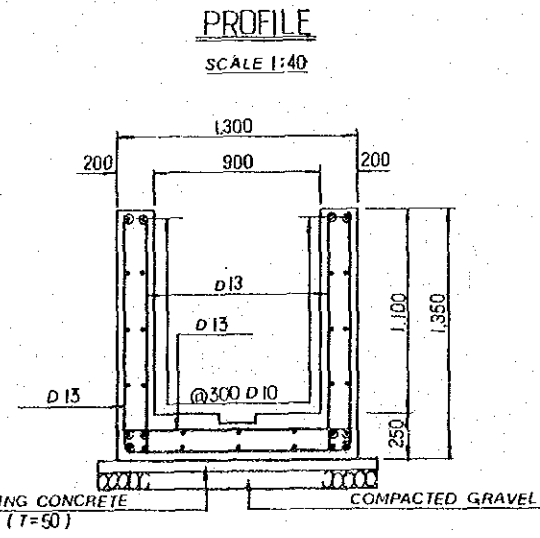
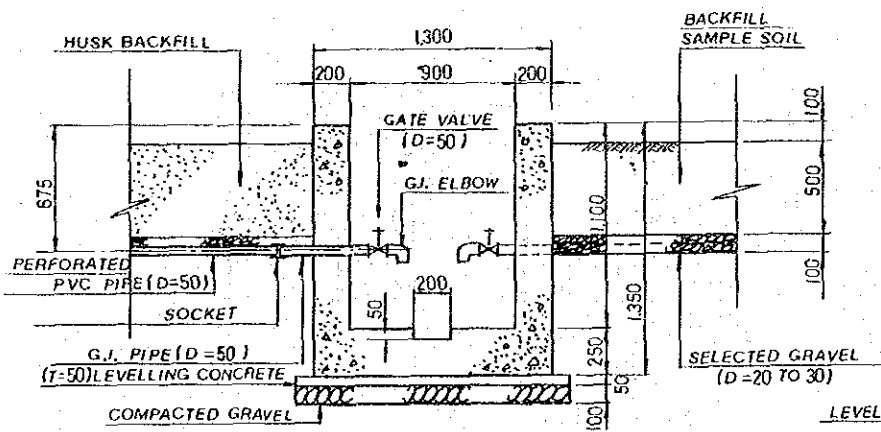
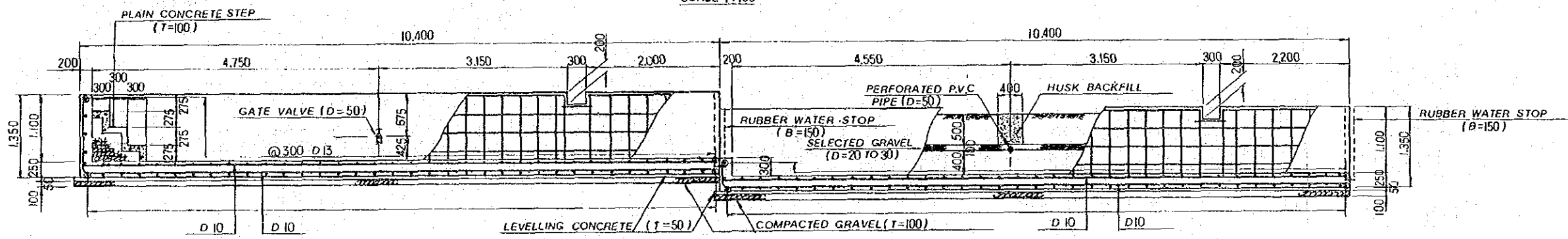
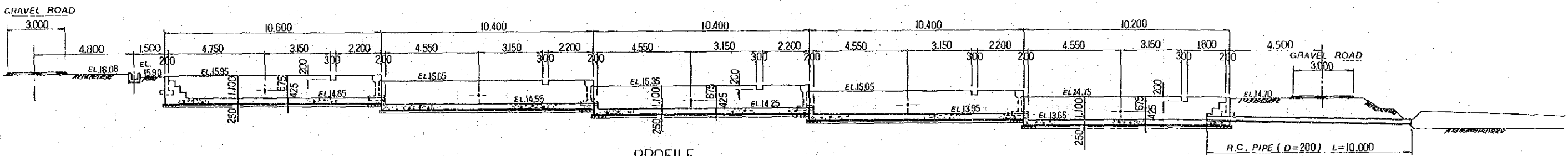
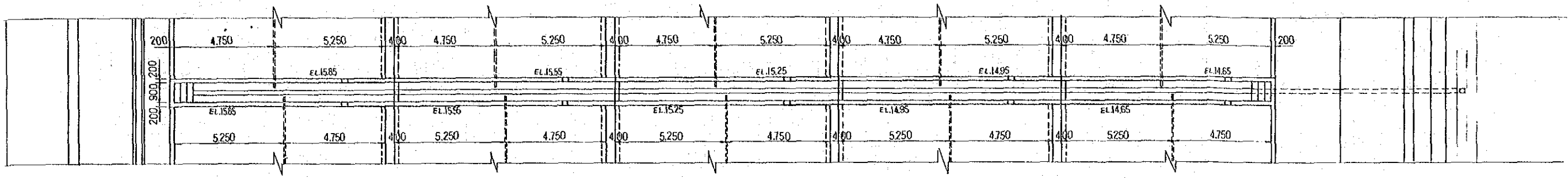


PUMP HOUSE
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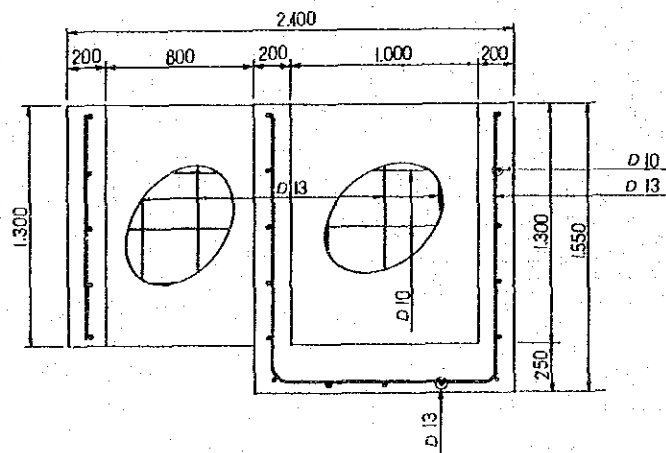
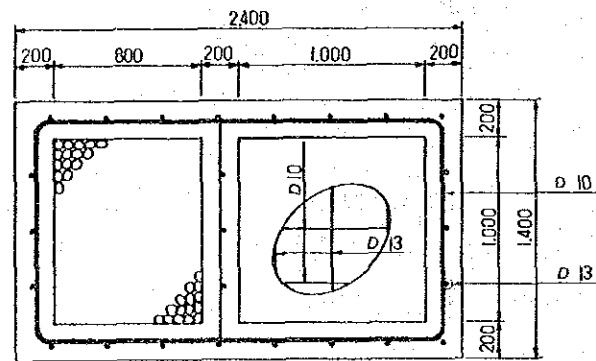
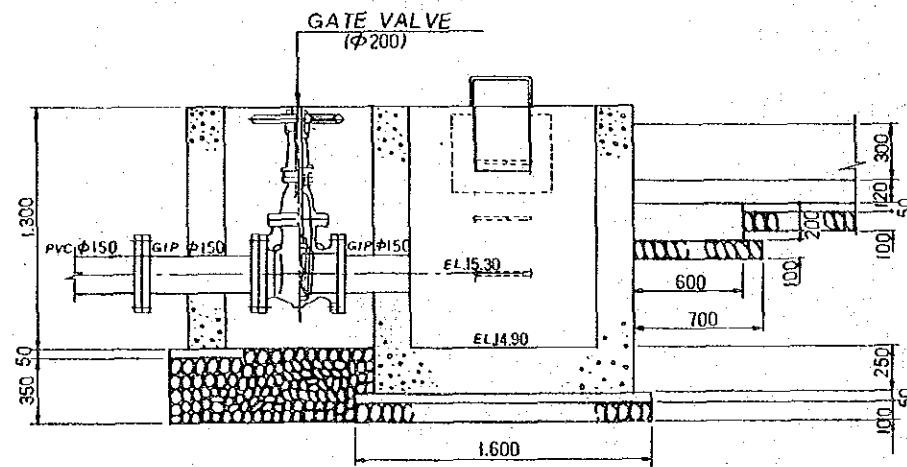
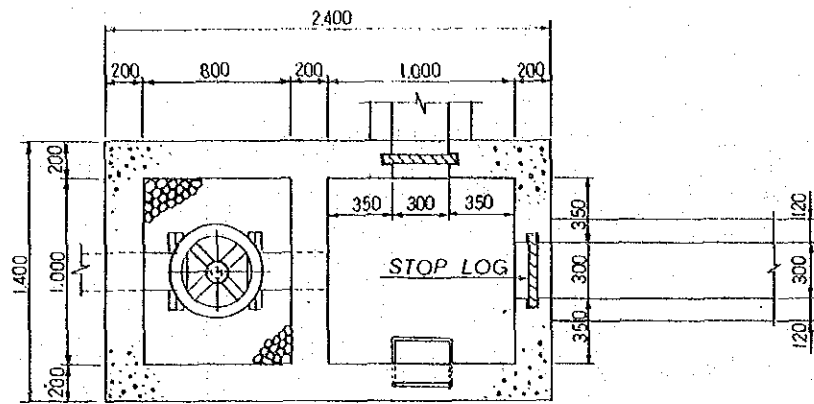


PROPOSED WELL DESIGN

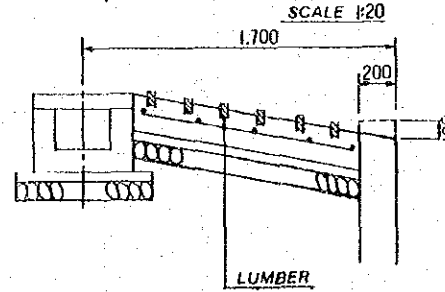
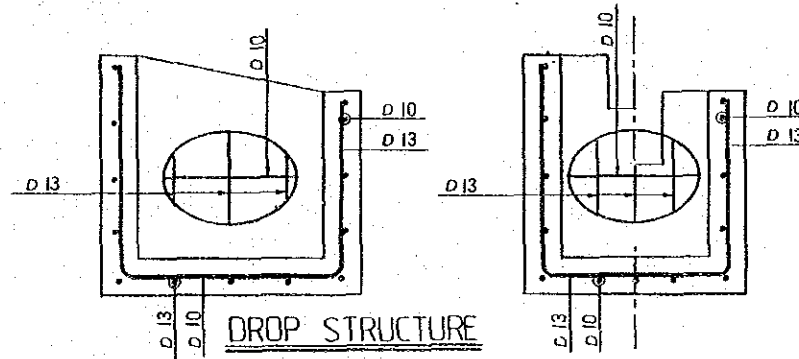
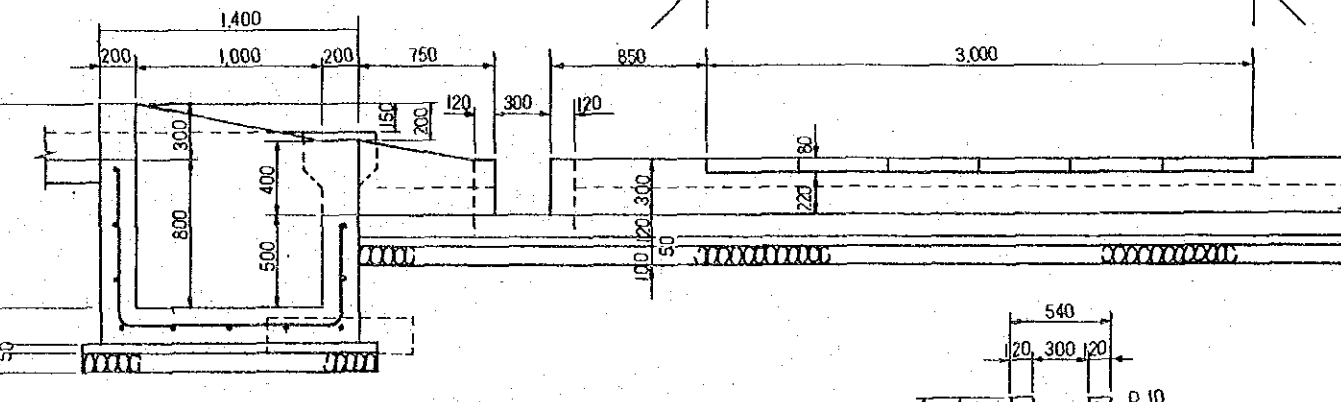
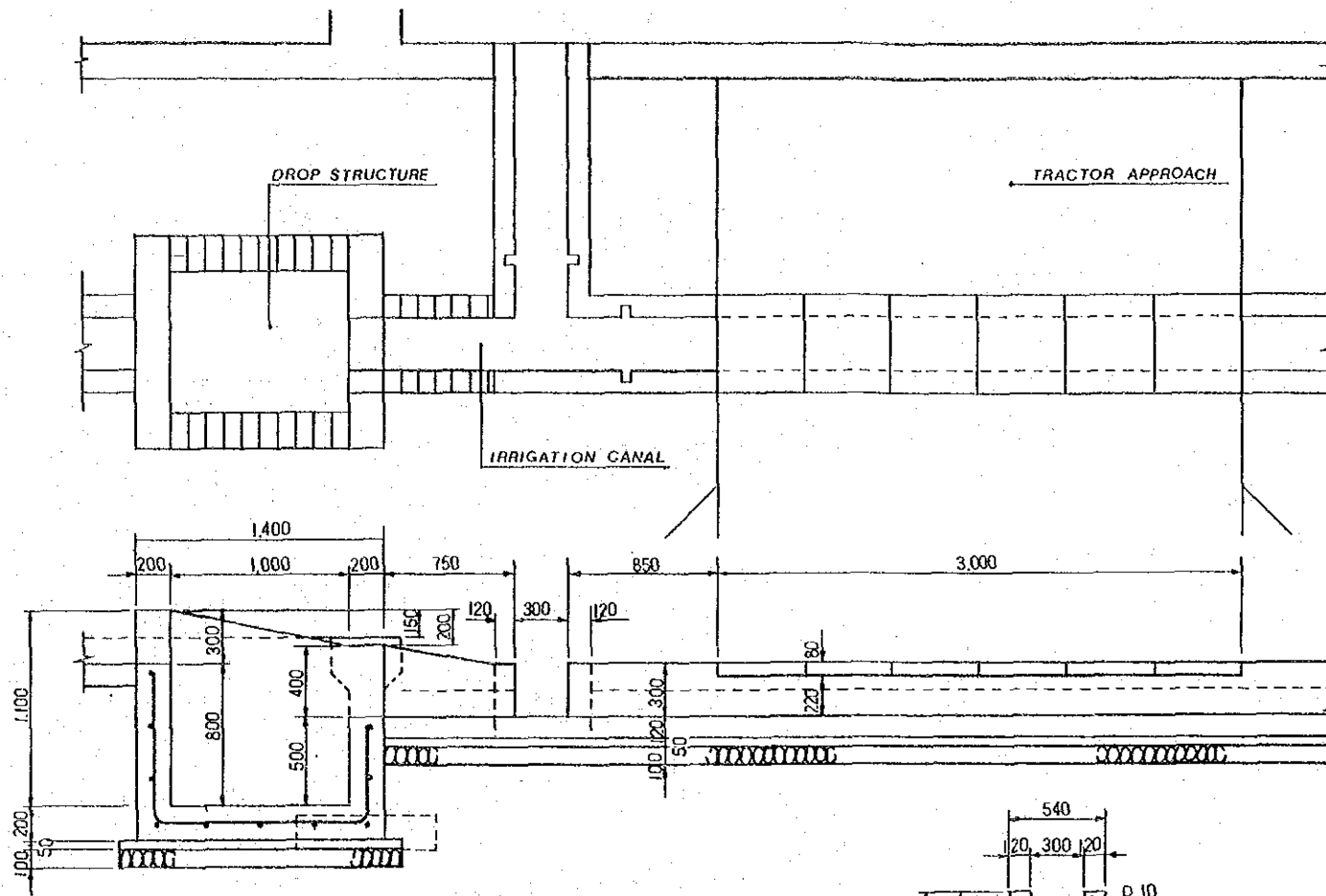
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RESERVOIR, PUMP HOUSE AND WELL	
SCALE	DRAWING NO.
JAPAN INTERNATIONAL COOPERATION AGENCY	



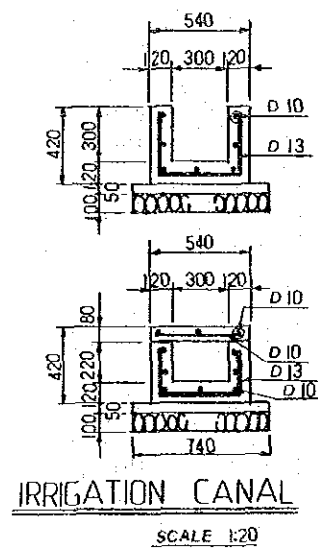
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FOR SOIL RESEARCH DEVELOPMENT CENTER (S.R.D.C.), SANILDEFONSO, BULACAN		
CENTER PIT		
SCALE	(M)	DRAWING No.
JAPAN INTERNATIONAL COOPERATION AGENCY.		



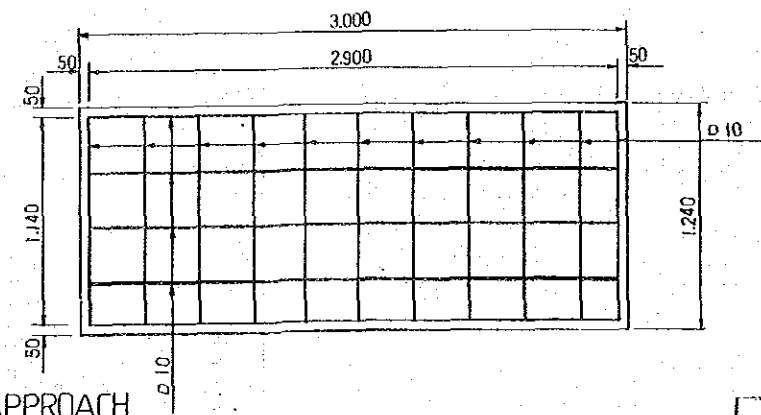
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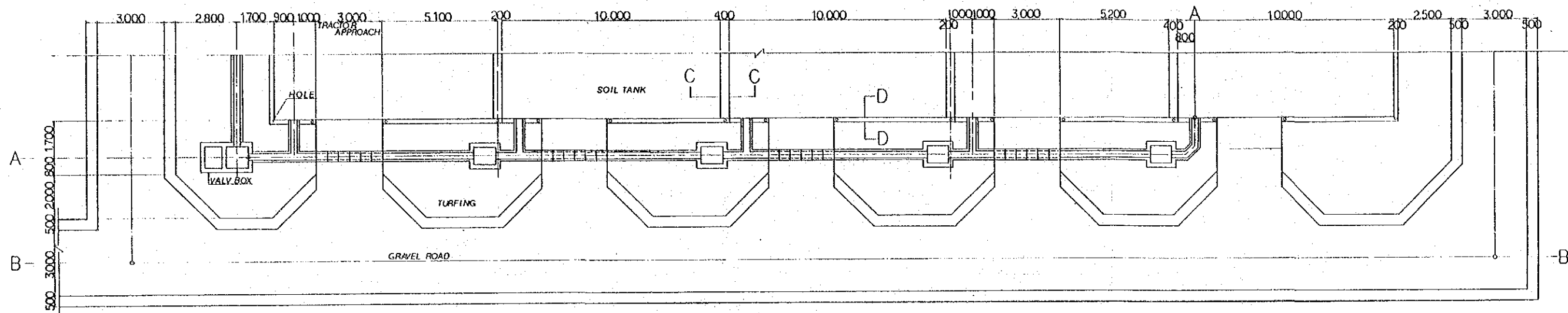
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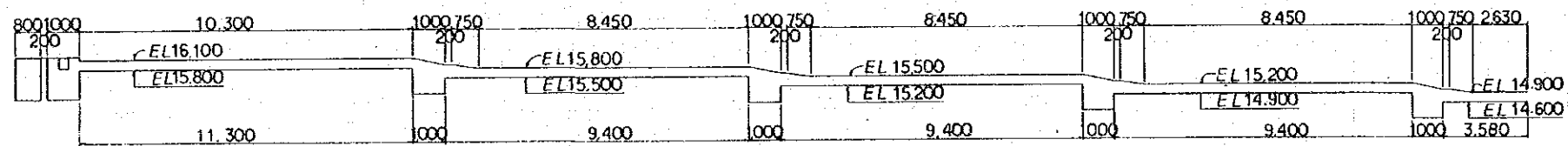
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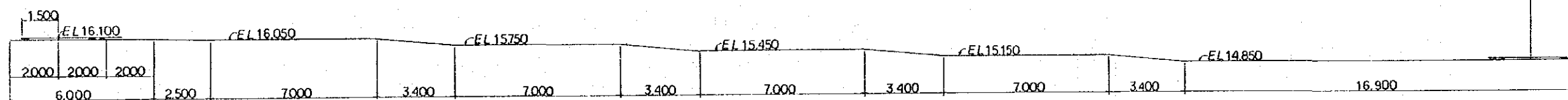
MODEL INFRASTRUCTURE IMPROVEMENT WORKS FOR SOIL RESEARCH DEVELOPMENT CENTER (SRDC) SANTILDEFONSO, BULACAN	
IRRIGATION CANAL, INSPECTION ROAD AND RELATED STRUCTURE (I)	
SCALE 1:20 (M)	DRAWING No.
JAPAN INTERNATIONAL COOPERATIVE	



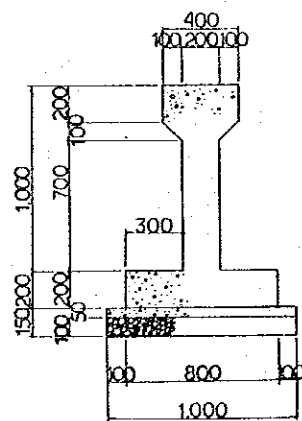
PLANE
SCALE 1:10



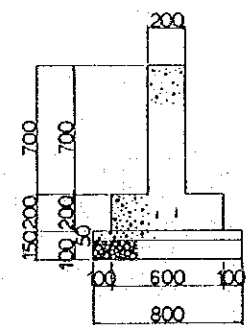
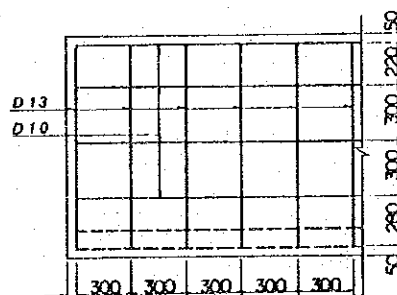
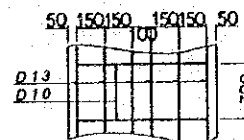
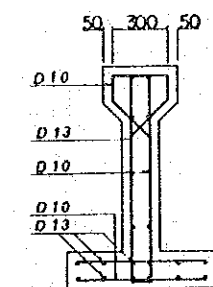
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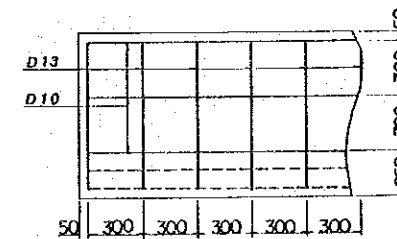
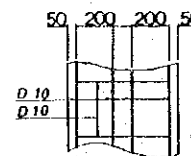
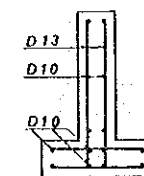
B—B
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C—C SECTION
SCALE 1:20



D—D SECTION
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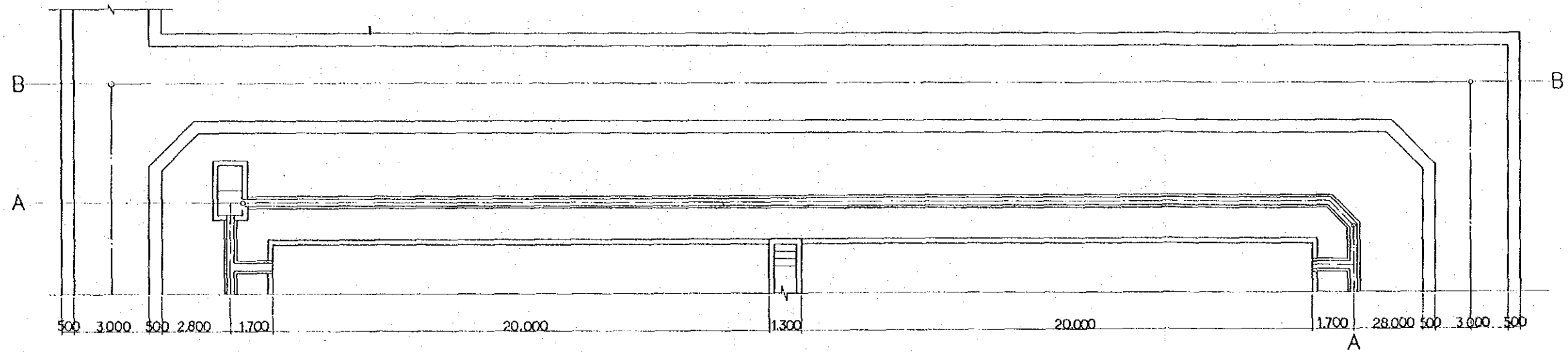


MODEL INFRASTRUCTURE IMPROVEMENT WORKS
FOR
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SANILDEFONSO, BULACAN

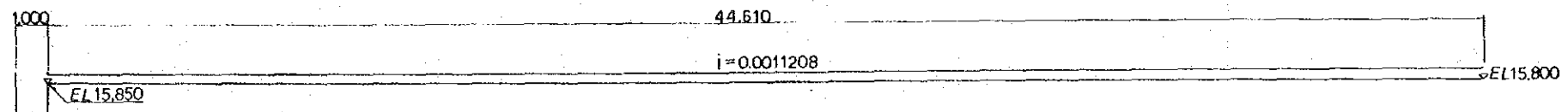
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STRUCTURE(2)

SCALE (M) DRAWING No. _____

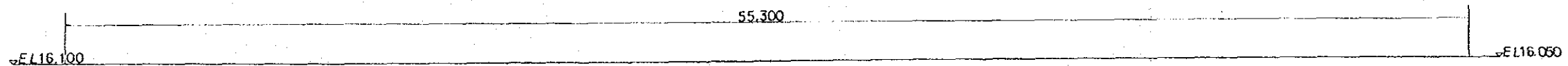
JAPAN INTERNATIONAL COOPERATION AGENCY.



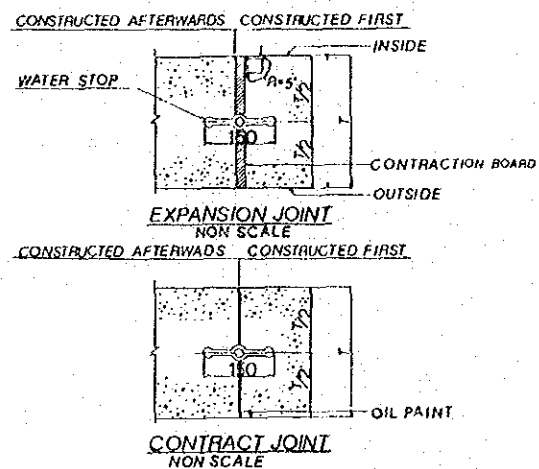
PLAN
SCALE 1:10



A—A
SCALE 1:10



B—B
SCALE 1:10



MODEL INFRASTRUCTURE IMPROVEMENT WORKS FOR SOIL RESEARCH DEVELOPMENT CENTER (SRDC) SAMILOFONSO, BULACAN		
IRRIGATION CANAL, INSPECTION ROAD AND RELATED STRUCTURE(S)		
SCALE	(H)	DRAWING No.
JAPAN INTERNATIONAL COOPERATION AGENCY.		

JICA