



## MEMORANDUM

FOR : The Regional Executive Director  
DENR MIMAROPA Region  
1515 L&S Building  
Roxas Blvd., Ermita, Manila

FROM : The Assistant Secretary for Policy, Planning and Foreign Assisted and  
Special Projects and Director, in concurrent capacity

SUBJECT : **SUBMISSION OF PROPOSED SITE FOR THE  
CONSTRUCTION OF SMALL WATER IMPOUNDING  
STRUCTURE (SWIS) FOR CY 2022**

DATE : **MAY 18 2021**



This pertains to your Memorandum regarding the proposed site for the construction of Small Water Impounding System (Spring Development) within the province of Palawan for CY 2022.

In this regard, review and evaluation conducted by this Office disclosed the following findings on the proposed establishment site of SWIS:

LOCATION	FINDINGS	RECOMMENDATIONS
• Barangay Inogbong, Bataraza, Palawan	The proposed site is located within forest land and National Greening Program (NGP) site.	This Office interposes no objection to the proposed sites.
• Barangay Caruray, San Vicente, Palawan	The proposed site is located within forest land and Community Based Forest Management Agreement (CBFMA) Area of Caruray Marketing Corp. Also, it is approximately 400 meters from the nearest NGP site.	
• Barangay Estrella Vilage, Narra, Palawan	The proposed site is located within forest land, established NGP site and Malasgao priority critical watersheds supporting National Irrigation System.	

LOCATION	FINDINGS	RECOMMENDATIONS
<ul style="list-style-type: none"> <li>• Barangay Guadalupe, Coron, Palawan</li> <li>• Barangay Cataban, Taytay, Palawan</li> <li>• Barangay Binduyan, Puerto Princesa City, Palawan</li> </ul>	The proposed sites are adjacent within established NGP sites and CBFMA Areas.	The water from the established SWIS should be effectively delivered to NGP sites through strategic installation of delivery pipes.
<ul style="list-style-type: none"> <li>• Barangay Alimanguan, San Vicente, Palawan</li> <li>• Barangay Conception, Busuanga, Palawan</li> <li>• Barangay Decabobo, Coron, Palawan</li> <li>• Barangay Bintuan, Coron, Palawan</li> </ul>	The proposed sites are only located within forest land. These are not situated, or near, to any NGP sites and/or CBFMA Areas.	This Office recommends that the proposed sites be located within established forest plantations for its effective management and maintenance.
<ul style="list-style-type: none"> <li>• Barangay Kemdeng, San Vicente, Palawan</li> </ul>	The proposed site is not located within forest land and any NGP sites and/or CBFMA areas.	Based on FMB Technical Bulletin No. 13-A, entitled Supplemental Standard Cost and Design for Small Water Impounding System (Spring Development), SWIS should be established within forest/public land.

Please note that you must coordinate with stakeholders prior to the establishment of SWIS (Spring Development) and copy furnish this Office of the report of the said activity. Attached herein is the FMB Technical Bulletin No. 13-A for your ready reference.

FOR YOUR INFORMATION AND APPROPRIATE ACTION, PLEASE.

  
**MARCIAL C. AMARO, JR., CESO III**

*Copy Furnished:  
The Undersecretary for Field Operations and Environment*





Republic of the Philippines  
Department of Environment and Natural Resources  
**FOREST MANAGEMENT BUREAU**  
Visayas Avenue, Diliman, 1100 Quezon City  
Tel. No. (632) 927-4788 Fax No. (632) 928-9313  
E-mail Address: fimbdenr@mozcom.com / Website: <http://forestry.denr.gov.ph>

## MEMORANDUM

FOR : All Regional Directors  
All PENROs and CENROs

FROM : The Director

SUBJECT : **TECHNICAL BULLETIN NO. 13-4 SUPPLEMENTAL  
STANDARD COST AND DESIGN FOR SMALL WATER  
IMPOUNDING SYSTEM (SPRING DEVELOPMENT)**

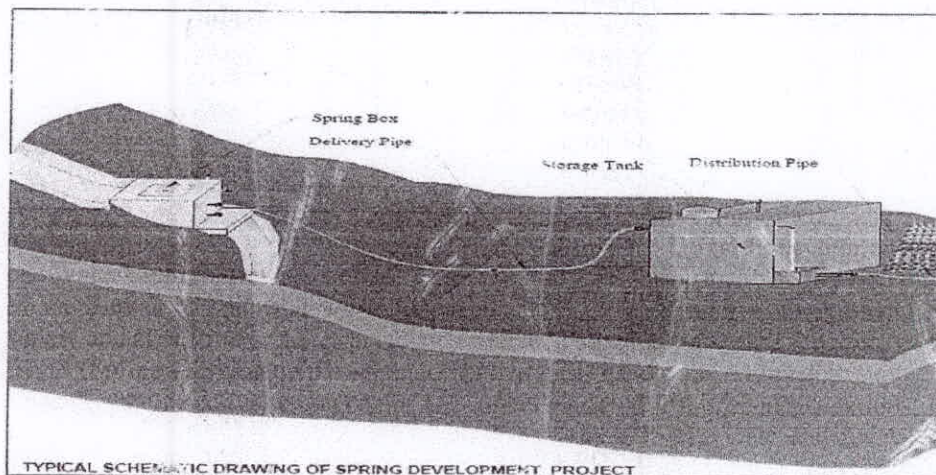
DATE : JUN 27 2010



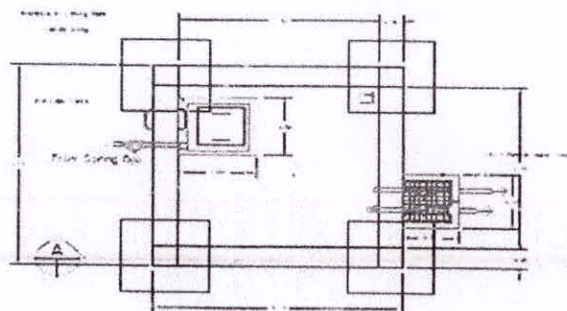
### 1. The Technical Bulletin

This Technical Bulletin provides supplemental guidelines for the standard cost and design of Small Water Impounding System (Spring Development) cited under FMB Technical Bulletin No. 13 "Standard Cost and Design for Forest Protection and Soil and Water Conservation Measures". It is one of the small-scale technologies developed by the Bureau of Soils and Water Management (BSWM) to address the problems of supply and allocation of water in certain watershed communities. The functions of the SWIS (Spring Development), among others, are: (a) ensure the sustainable supply of water for the effective management and maintenance of established plantations; (b) enhance and stabilize the condition of soil; and (c) help eliminate and reduce the impacts of flooding and severe cases of soil erosion.

The SWIS (Spring Development) consists of concrete spring box or intake structure, storage tank, and PE pipes or concrete canals for distribution by gravity as seen on the diagram and designs below.

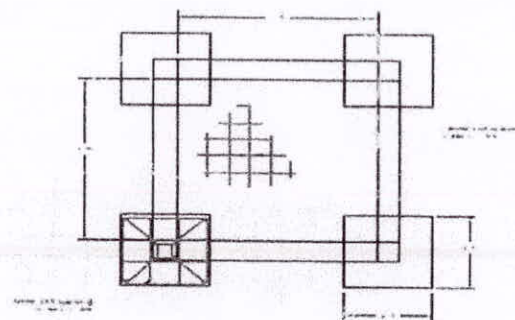


TYPICAL SCHEMATIC DRAWING OF SPRING DEVELOPMENT PROJECT



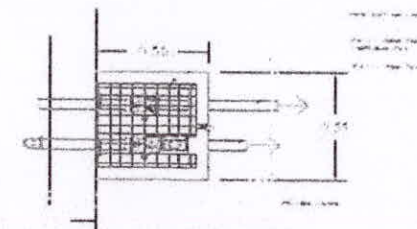
**GROUND LEVEL PLAN**

Scale: 1/4" = 1'-0"



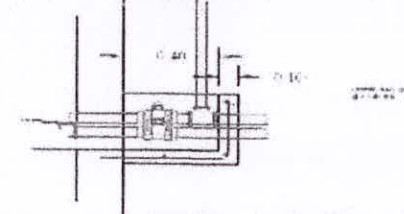
**FOUNDATION PLAN**

Scale: 1/4" = 1'-0"



**PLAN**

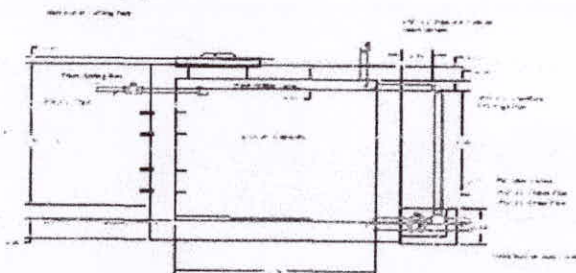
Scale: 1/2" = 1'-0"



**PLAN**

Scale: 1/2" = 1'-0"

**DETAIL OF VALVE BOX**



**FRONT ELEVATION**

Scale: 1/4" = 1'-0"

1. Tank Covering Box is shown in plan view at 1/4" = 1'-0".

2. Tank Covering Box is shown in plan view at 1/4" = 1'-0".

3. Tank Covering Box is shown in plan view at 1/4" = 1'-0".

4. Tank Covering Box is shown in plan view at 1/4" = 1'-0".

5. Tank Covering Box is shown in plan view at 1/4" = 1'-0".

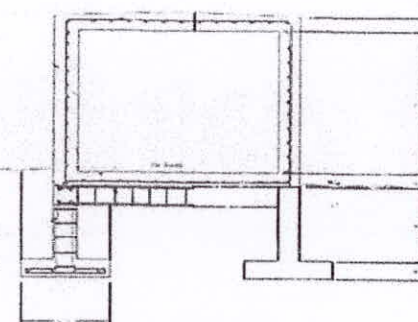
6. Tank Covering Box is shown in plan view at 1/4" = 1'-0".

7. Tank Covering Box is shown in plan view at 1/4" = 1'-0".

8. Tank Covering Box is shown in plan view at 1/4" = 1'-0".

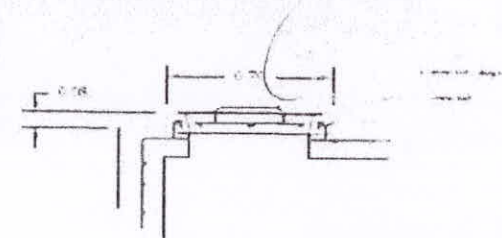
9. Tank Covering Box is shown in plan view at 1/4" = 1'-0".

10. Tank Covering Box is shown in plan view at 1/4" = 1'-0".



**SECTION 1A**

Scale: 1/4" = 1'-0"



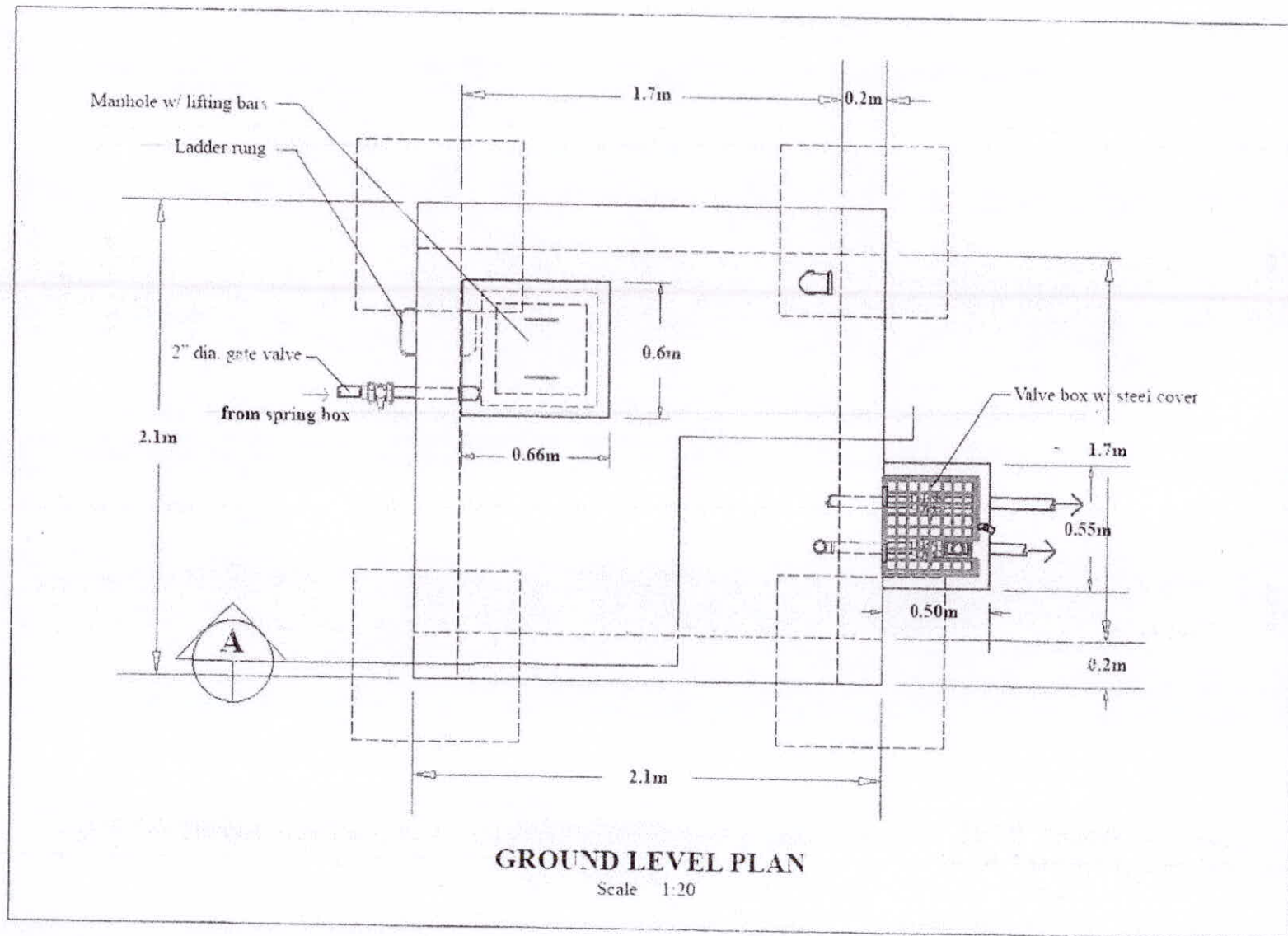
**DETAIL OF MANHOLE**

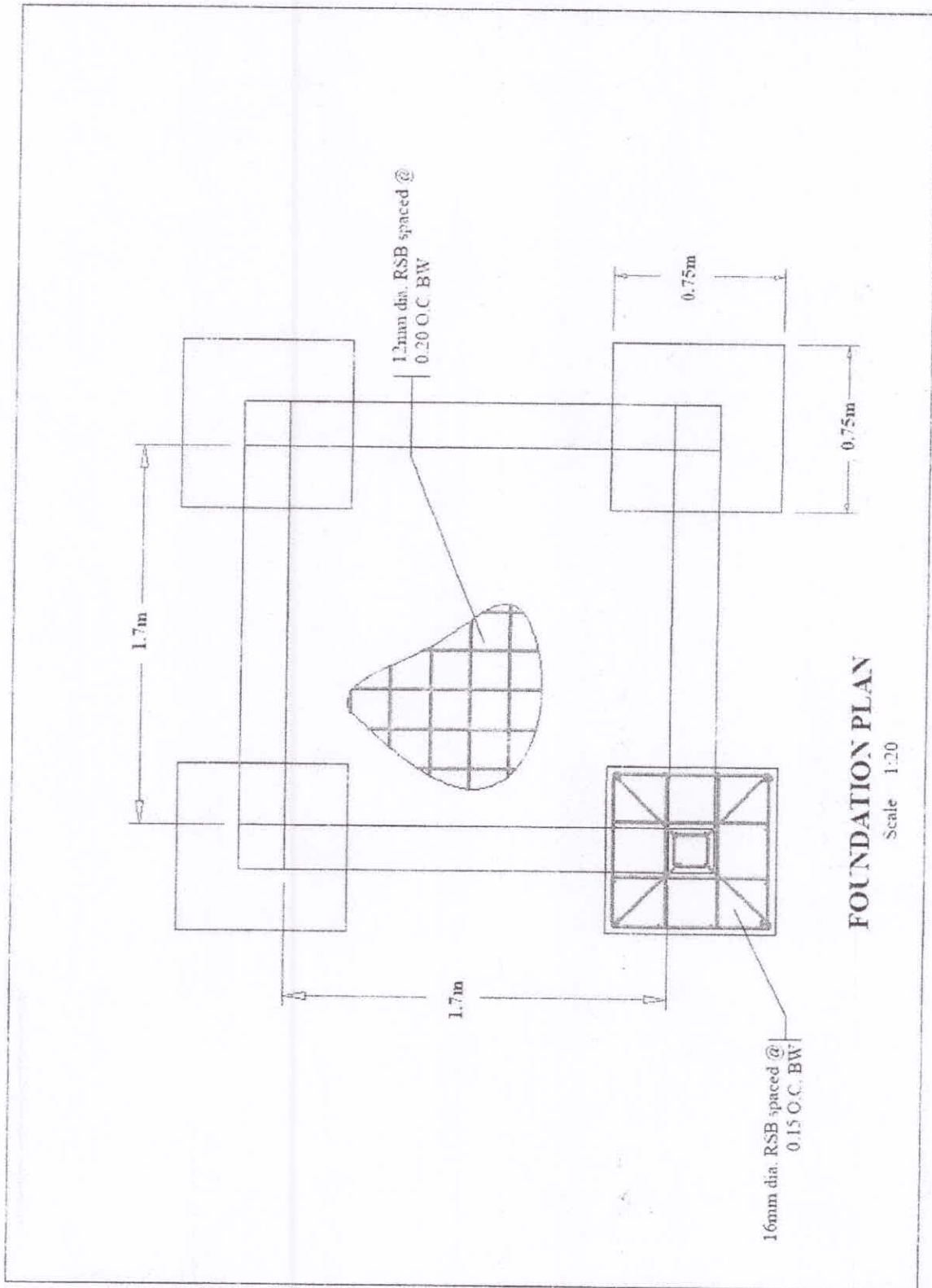
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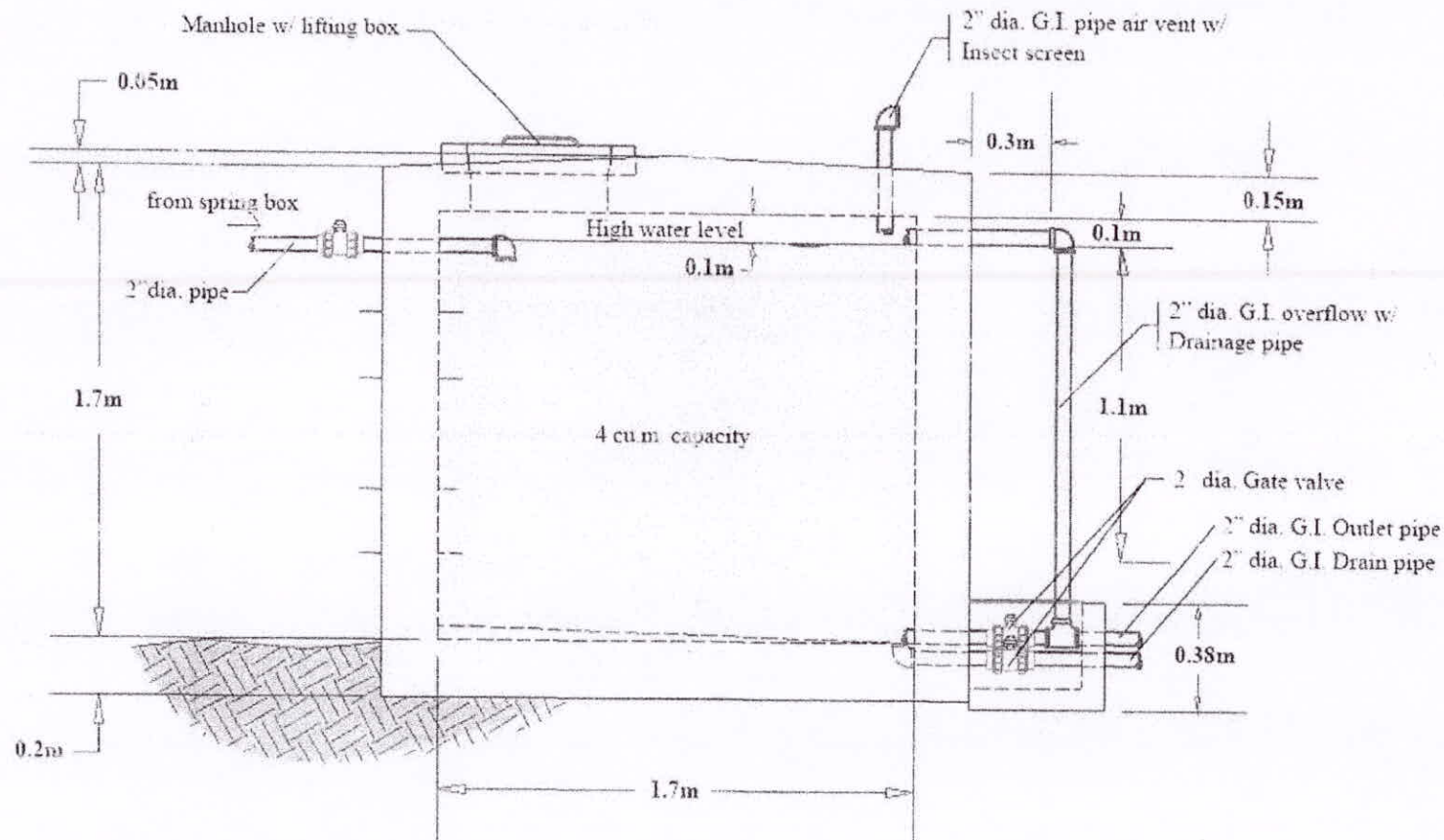
- Note:
- 1. Provide additional reinforcements and concrete support in case of larger capacity of storage tank.
  - 2. Size of delivery and distribution pipe may vary depending on site situation.

**SAMPLE DESIGN OF CONCRETE TANK**







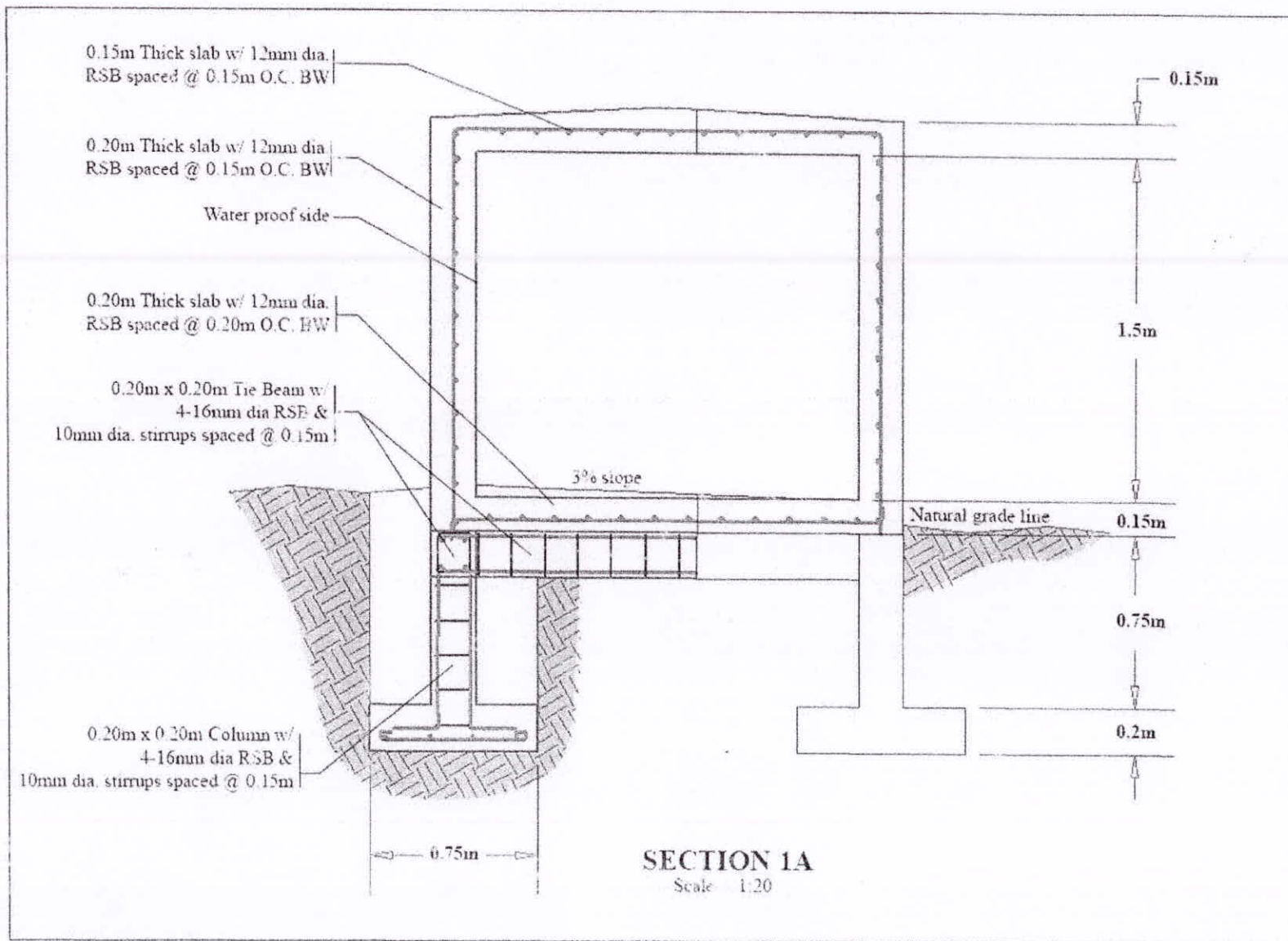


**NOTE:**

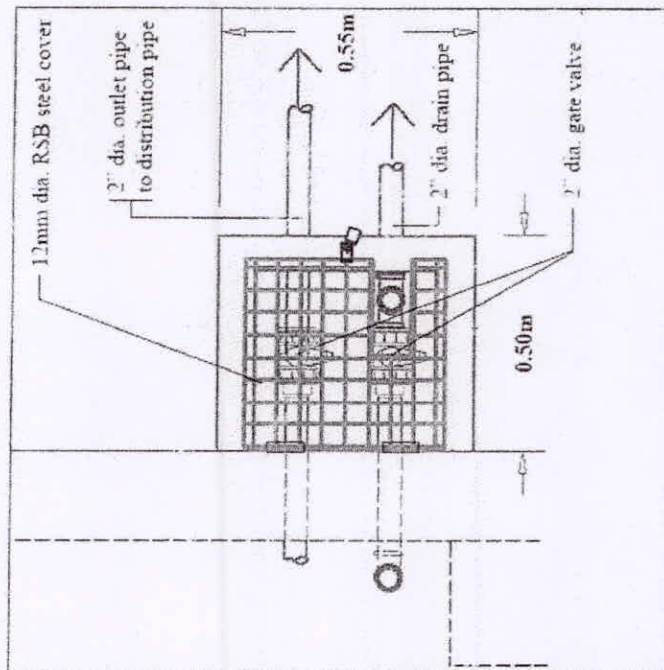
- Provide additional reinforcements and concrete support in case of larger capacity of storage tank.
- Size of delivery and distribution pipe may vary depending on site situation.

**FRONT ELEVATION**

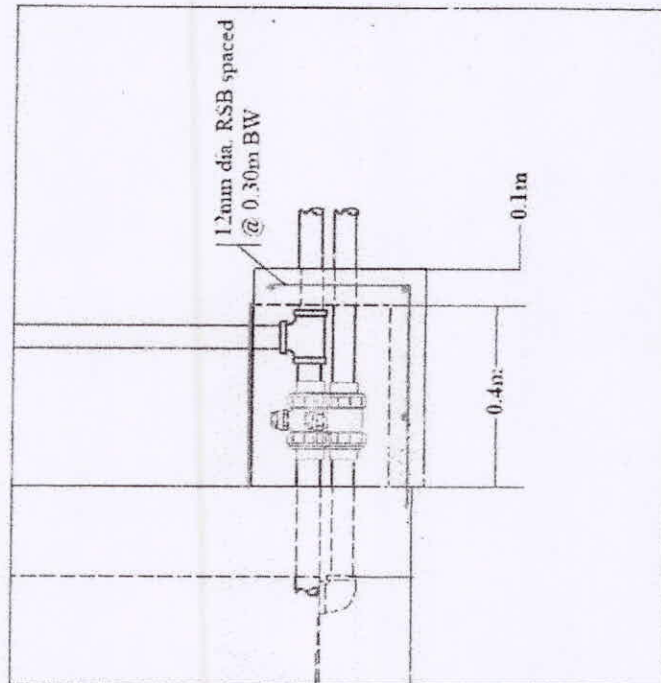
Scale 1:20





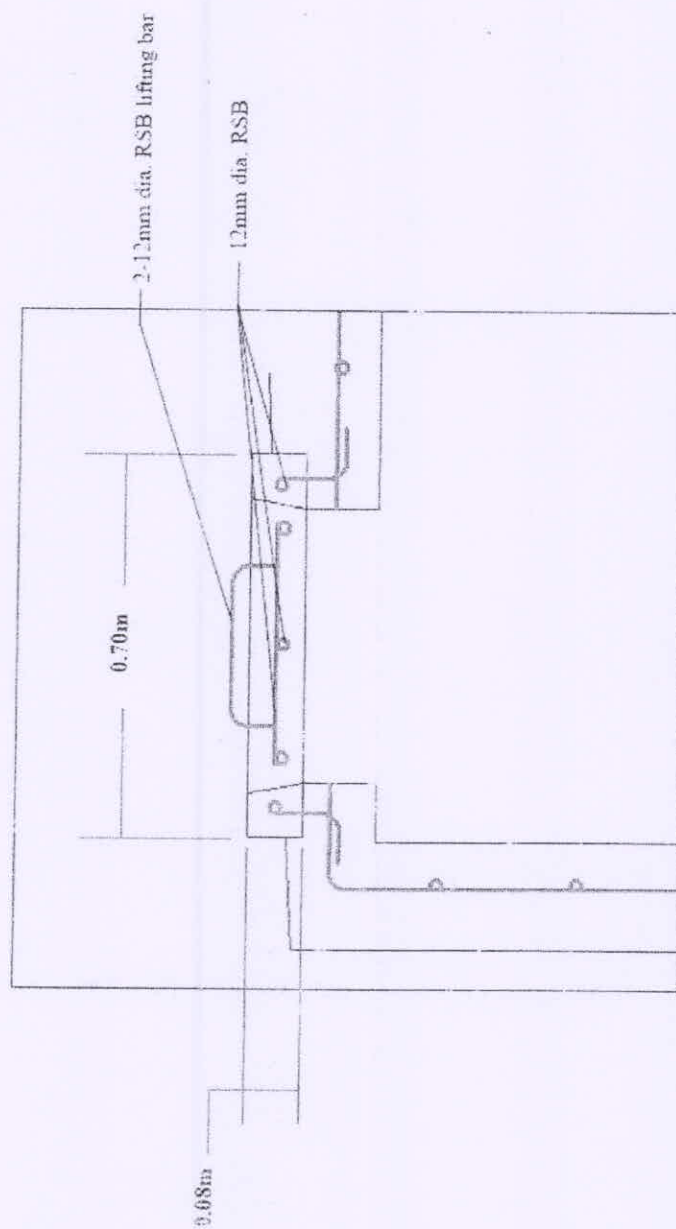


PLAN  
Scale 1:20

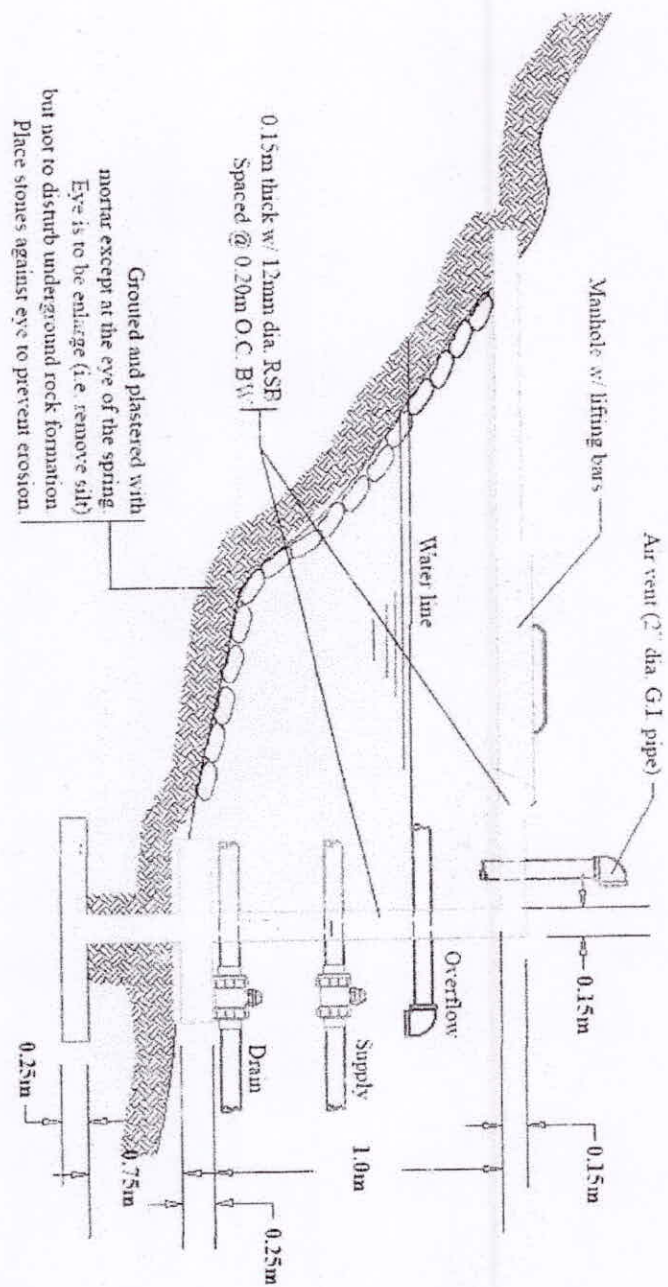


PLAN  
Scale 1:20

## DETAILS OF VALVE BOX

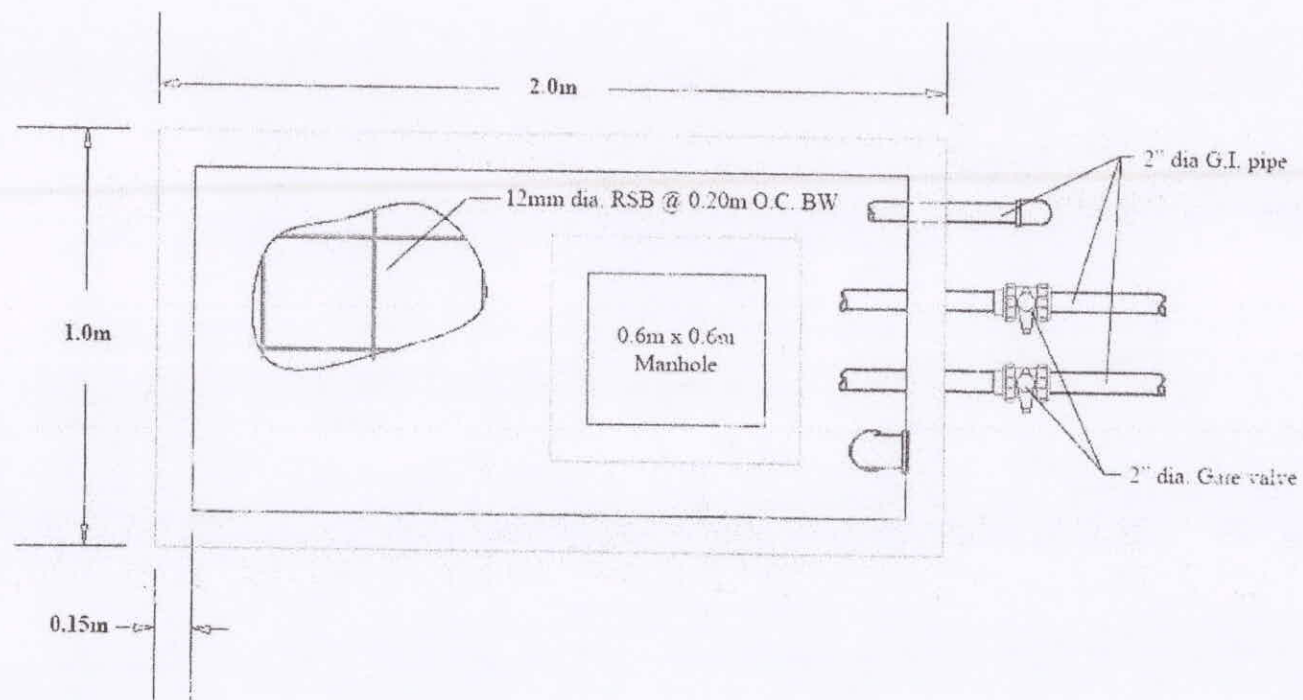


DETAIL OF MANHOLE  
Scale 1:10



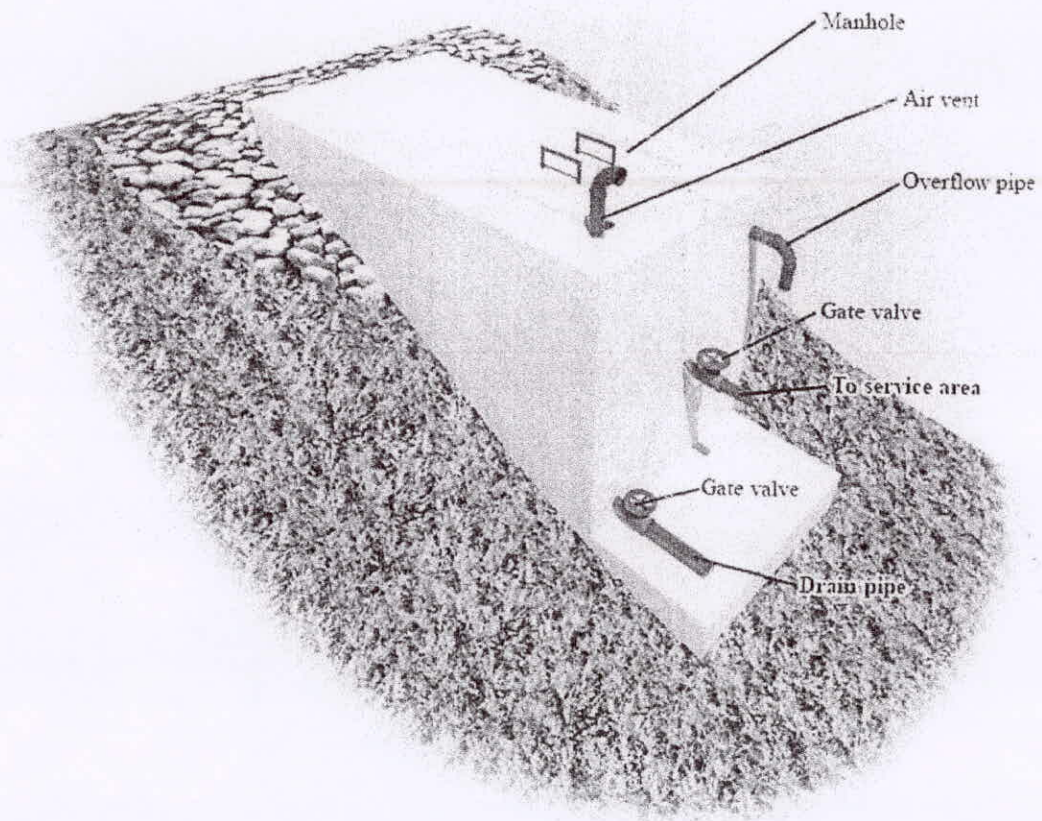
**SIDE VIEW OF SPRING BOX**  
NOT TO SCALE



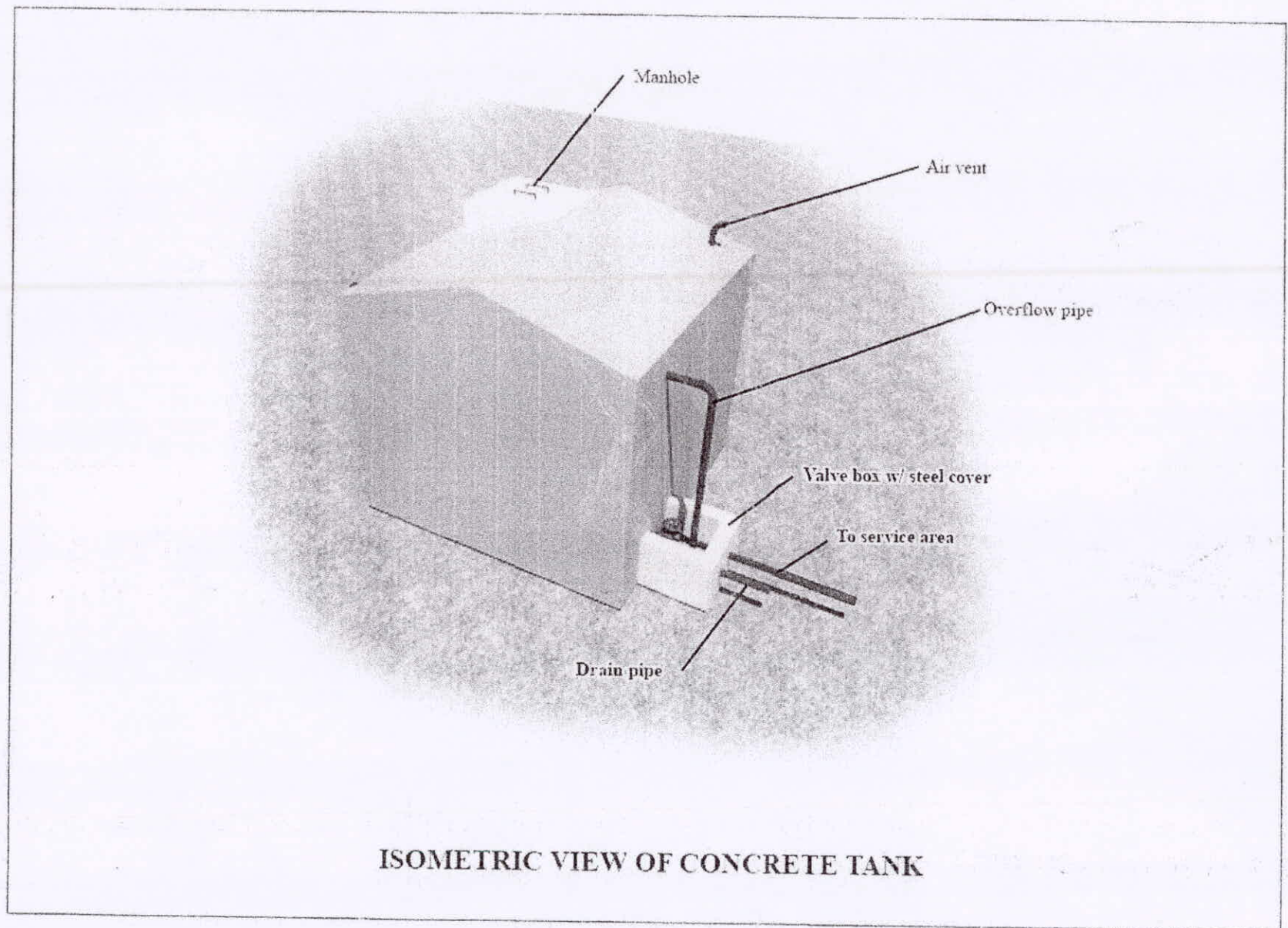


**TOP VIEW OF SPRING BOX**

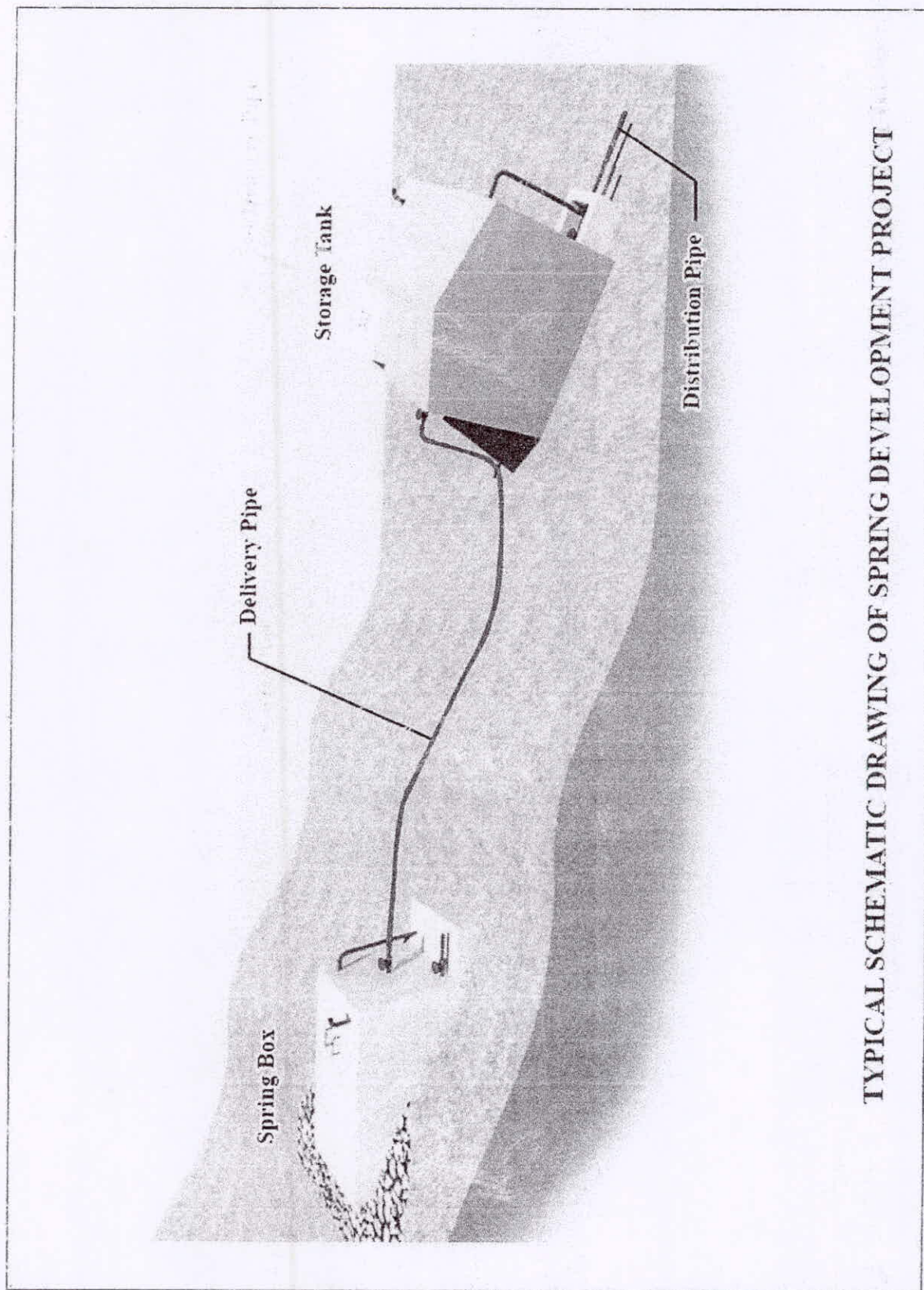
Scale 1:14



ISOMETRIC VIEW OF SPRING BOX







TYPICAL SCHEMATIC DRAWING OF SPRING DEVELOPMENT PROJECT

## **2. Scope and Coverage**

This Supplemental Technical Bulletin shall apply to all components of all forestland development programs and projects.

## **3. Users of this Technical Bulletin**

The intended users of this technical bulletin are personnel of DENR field offices who are involved in planning, implementing and managing of forest resources and forestlands.

## **4. Reconnaissance and Assessment Survey**

Reconnaissance and assessment survey of the proposed site within the forest or public land and coordination with stakeholder beneficiaries, within the watershed, will be conducted in order to calculate the estimated plantation water requirement and storage tank size to be established. The survey will include, among others, the presence of spring with continuous flow of discharge, amount of flow discharge and elevation difference and distance of spring, as source of water, to the proposed location of tank.

All the identified sites will be subjected to coordination, survey, assessment and preparation of GIS generated map, in shape file format. Based on the coordination and survey made, the following information will be submitted: a) Technical description survey of the watershed site using GPS and the GPS reading of the specific location of the SWIS (Spring Development) sites; b) Coordination made with the stakeholders; c) detailed engineering design including the bill of materials and cost estimates, of the SWIS (Spring Development); and d) Geo-tagged pictures and plotted GIS map output of the watershed where the SWIS will be established.

The SWIS (Spring Development) shall be strategically located to maintain water pressure at all times and to ensure the flow of water supply by gravity to the service areas or plantation sites.

## **5. Standard Cost for Small Water Impounding System (Spring Development)**

The cost of the following activities is computed based on the guidelines of the Bureau of Soils and Water Management (BSWM) for the construction of SWIS (Spring Development). Thus, close coordination with BSWM in the identification of areas and construction of Spring Box and Storage Tank for SWIS (Spring Development) must be done.

The attached derivation of standard unit cost for a SWIS (Spring Development) was based on the prototype design for a one (1) hectare service area or plantation site. The basic requirement shall be a reinforced concrete water storage tank that can hold four

(4) cubic meter of water and the volume of spring discharge of at least 1.5 liters per second during dry season. The computed unit cost was derived for planning and budgeting purposes only.

Should the identified service area or plantation site is more than 1 hectare that will require a larger volume of water storage tank and that there is only one source of water found in the area, a design analysis shall be computed to ensure stability and determine the dimensions of the structural members of the water storage tank prior to computation of bill of materials and cost estimates.

Another option shall be by constructing several standard 4 cubic meter reinforced concrete water storage tanks that are strategically located considering the location of other source of water within the vicinity and its proximity to the service areas or plantation sites.



## PROGRAM OF WORKS

### GENERAL INFORMATION

Name of Project : Spring Development Project  
 Description : Construction of Spring Box and Storage Tank  
 Crops Planted : Lowland Vegetables  
 Discharge from Spring : 1.5 liters per second  
 Designed Service Area : 1 hectare  
 Storage Tank Capacity : 4 Cu.M. of Water

Item No.	Description	%	Unit	Qty	Unit Cost	Total Amount
I	EXCAVATION	0.80%	cu m	10	170.00	1,700.00
II	BACKFILL	0.80%	cu m	5	340.00	1,700.00
III	INSTALLATION OF DELIVERY PIPE	22.90%	L.M.	180	270.83	48,750.00
IV	CONSTRUCTION OF SPRING BOX AND STORAGE TANK (4 cu.m. Cap.)	55.75%	lot	1	118,670.00	118,670.00
V	INSTALLATION OF DISTRIBUTION PIPES	19.76%	lot	1	42,060.00	42,060.00
					<b>TOTAL</b>	<b>212,880.00</b>

### BREAKDOWN OF ITEMS

A. Direct Cost	Amount	Percentage
1. Materials	179,160.00	80.38%
2. Hauling of Materials	10,000.00	4.49%
3. Labor	33,720.00	15.13%
<b>TOTAL</b>	<b>222,880.00</b>	<b>100.00%</b>

B. Indirect Cost	Amount	Percentage
1. Overhead, Contingencies & Miscellaneous (O.C.M.) (15% of DC)	33,432.00	15.00%
2. Profit (10% of DC)	22,288.00	10.00%
3. VAT (5% of DC, OCM & Profit)	13,930.00	6.25%
<b>TOTAL</b>	<b>69,650.00</b>	<b>31.25%</b>

**TOTAL PROJECT COST (A + B) 292,530.00**

Say **Php293,000.00**

**PROJECT COST PER CU.M. STORAGE CAPACITY Php73,250.00**

Note: For Direct Cost above 5M, OCM & Profit should be 12% & 8% of EDC, respectively

Source: Bureau of Soils and Water Management

# **SPRING DEVELOPMENT PROJECT**

## **Bill of Materials and Detailed Cost Estimates**

### **Item No. I- EXCAVATION**

Est. Quantity    10 Cu.m.

#### **LABOR**

Manpower Description	Quantity	Duration	Rate/Day	Amount
Foreman	1	1	400.00	400.00
Common Laborer	5	1	260.00	1,300.00
Sub-Total				1,700.00

Total Cost of Item		1,700.00
Unit Cost	P/Cu.m.	170.00

### **Item No. II - BACKFILL**

Est. Quantity    5 Cu.m.

#### **LABOR**

Manpower Description	Quantity	Duration	Rate/Day	Amount
Foreman	1	1	400.00	400.00
Common Laborer	5	1	260.00	1,300.00
Sub-Total				1,700.00

Total Cost of Item		1,700.00
Unit Cost	P/Cu.m.	340.00

### **Item No. III - INSTALLATION OF DELIVERY PIPE FROM SPRING BOX TO STORAGE TANK**

Est. Quantity    180 L.M.

#### **1. MATERIALS**

Materials Description	Quantity	Unit	Unit Cost	Amount
Teflone Tape (1"x390") (US Brand)	5	pc	80.00	400.00
HDPE Pipe 2" dia SDR 11	180	L. M.	230.00	41,400.00
Compression Coupling 2" dia	3	pc	950.00	2,850.00
Sub-Total				44,650.00

#### **2. LABOR**

Manpower Description	Quantity	Duration	Rate/Day	Amount
Foreman	1	2	400.00	800.00
Skilled Worker (Pipefitter)	1	2	350.00	700.00
Laborer/Helper	5	2	260.00	2,600.00
Sub-Total				4,100.00

Total Cost of Item		48,750.00
Unit Cost	P/L.M.	270.83

# SPRING DEVELOPMENT PROJECT

## Bill of Materials and Detailed Cost Estimates

Materials Description	Quantity	Unit	Unit Cost	Amount
Teflone Tape (1"x390") (US Brand)	5	pc	80.00	400.00
HDPE Pipe 2" dia SDR 11	180	L. M.	230.00	41,400.00
Compression Coupling 2" dia	3	pc	950.00	2,850.00
		Sub-Total		44,650.00
2. LABOR				
Manpower Description	Quantity	Duration	Rate/Day	Amount
Foreman	1	2	400.00	800.00
Skilled Worker (Pipefitter)	1	2	350.00	700.00
Laborer/Helper	5	2	260.00	2,600.00
		Sub-Total		4,100.00
		Total Cost of Item		48,750.00
		Unit Cost	P/L.M.	270.83
Item No. IV - CONSTRUCTION OF SPRING BOX AND STORAGE TANK (1.7m x 1.7m x 1.5m, inside dimension)				
1. MATERIALS				
Materials Description	Quantity	Unit	Unit Cost	Amount
Portland Cement	65	bag	280.00	18,200.00
Sand Screened	4	cu m	1,000.00	4,000.00
Gravel 3/4	7	cu m	1,200.00	8,400.00
16 mm dia. X 6.0 m Rebars	15	pc	350.00	5,250.00
12 mm dia. X 6.0 m Rebars	67	pc	220.00	14,740.00
10 mm dia. X 6.0 m Rebars	12	pc	175.00	2,100.00
Tie wire gauge # 16	3	kg	80.00	640.00
Sahara	40	pack	45.00	1,800.00



**SPRING DEVELOPMENT PROJECT**

**Bill of Materials and Detailed Cost Estimates**

SPRING DEVELOPMENT PROJECT				
Bill of Materials and Detailed Cost Estimates				
Item No. I - EXCAVATION			Est. Quantity	10 Cu.m.
LABOR				
Manpower Description	Quantity	Duration	Rate/Day	Amount
Foreman	1	1	400.00	400.00
Common Laborer	5	1	260.00	1,300.00
		Sub-Total		1,700.00
		Total Cost of Item		1,700.00
		Unit Cost	P/Cu.m.	170.00
Item No. II - BACKFILL			Est. Quantity	5 Cu.m.
LABOR				
Manpower Description	Quantity	Duration	Rate/Day	Amount
Foreman	1	1	400.00	400.00
Common Laborer	5	1	260.00	1,300.00
		Sub-Total		1,700.00
		Total Cost of Item		1,700.00
		Unit Cost	P/Cu.m.	340.00
Item No. III - INSTALLATION OF DELIVERY PIPE FROM SPRING BOX TO STORAGE TANK				
I. MATERIALS			Est. Quantity	180 L.M.

# **SPRING DEVELOPMENT PROJECT**

## **Bill of Materials and Detailed Cost Estimates**

Gate Valve (brass) 2" dia sched 40	5	pc	2,500.00	12,500.00
G.I. Elbow 90° 2" dia sched 40	6	pc	200.00	1,200.00
G.I. Pipe schedule 40 2" dia	2	pc	2,800.00	5,600.00
2"Ø Universal Transition Fitting/Joiner	2	pc	500.00	1,000.00
2"Ø -1"Ø Universal Transition Fitting/Joiner	1	pc	300.00	300.00
2"Ø GI Tee	1	pc	300.00	300.00
Forms and Scaffolding	1	lot	20,000.00	20,000.00
		Sub-Total		96,030.00
<b>2. LABOR</b>				
Manpower Description	Quantity	Duration	Rate/Day	Amount
Foreman	1	8	400.00	3,200.00
Skilled Worker	1	8	350.00	2,800.00
Laborer	8	8	260.00	16,640.00
		Sub-Total		22,640.00
		Total Cost of Item		118,670.00
		Unit Cost	P/Lot	118,670.00
<b>Item No. V - INSTALLATION OF DISTRIBUTION LINES FROM STORAGE TANK TO SERVICE AREA</b>				
<b>1. MATERIALS</b>				
Materials Description	Quantity	Unit	Unit Cost	Amount
PE Pipes 1" dia (60m) SDR 17	8	pcs	4,500.00	36,000.00
Compression Coupling 1" dia	8	pcs	260.00	2,080.00
Teflone Tape (1"x390") (US Brand)	5	pcs	80.00	400.00
		Sub-Total		38,480.00
<b>2. LABOR</b>				
Manpower Description	Quantity	Duration	Rate/Day	Amount



## SPRING DEVELOPMENT PROJECT

### Bill of Materials and Detailed Cost Estimates

Foreman	1	2	400.00	800.00
Skilled Worker	1	2	350.00	700.00
Laborer	4	2	260.00	2,080.00
		Sub-Total		3,580.00
		Total Cost of Item		42,060.00
		Unit Cost	P/Lot	42,060.00

The above-cited derivation of standard unit cost for SWIS (Spring Development) was based on the proto type design for a one (1) hectare service area of plantation site, a required reinforced concrete (RC) water storage tank that can hold four (4) cubic meters of water and a volume of spring discharge of at least 1.5 liters per second during dry season. The computed unit cost was derived for planning and budgeting purposes only.

#### 6. Engineering Design for Small Water Impounding System (Spring Development)

The required engineering design for this purpose shall be based on the result of the reconnaissance and assessment survey conducted. This is to determine the design parameters such as the estimated service area or plantation site, volume of water required and corresponding size of water storage tank. The detailed engineering design consists of a Reinforced Concrete (RC) spring box connected to an RC water storage tank with a high-density polyethylene (HDPE) delivery pipe and from the water storage tank to the service area or plantation site with a polyethylene (PE) distribution pipe line.

Should the required volume of water exceed the minimum four (4) cubic meters, the design of the RC water storage tank shall be adjusted correspondingly. Such adjustment shall be reflected on the details of the plan which is based on the computed structural analysis to ensure that the structure is stable to hold the required volume of water.

The detailed engineering design and structural analysis shall be approved by a licensed civil engineer.

FOR INFORMATION AND GUIDANCE.

NONITO M. TAMAYO, CESC IV