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# Drawings of Rural Water Supply and Sanitation Modules



unicef

201-89DR-12470

LOW COST RURAL WATER SUPPLIES AND SANITATION

DRAWINGS

INDEX

ITEM	DRAWING NO.
<b>1. <u>PUMP HOUSE</u></b>	
Sectional Elevations	001
Plan and Roofing	002
Power Board and Misc. Details	003
Detail: Deep Well Turbine	004
Detail: Single Stage Centrifugal	005
Booster Pump Assembly Details- Multi Stage Centrifugal	006
<b>2. <u>GROUND LEVEL STORAGE TANK</u></b>	
Tank/Booster Pump Bay - General Arrangement	007
11.4 Cubic Metre (2500gal) G L Tank	
Reinforcement Details (1 of 2)	008*
Reinforcement Details (2 of 2)	009*
22.8 Cubic Metre (5000gal) G L Tank	
Reinforcement Details (1 of 2)	010*
Reinforcement Details (2 of 2)	011*
34.1 Cubic Metre (7500gal) G L Tank	
Reinforcement Details (1 of 2)	012*
Reinforcement Details (2 of 2)	013*
45.5 Cubic Metre (10,000gal) G L Tank	
Reinforcement Details (1 of 2)	014*
Reinforcement Details (2 of 2)	015*
68.3 Cubic Metre (15,000gal) G L Tank	
Reinforcement Details (1 of 2)	016*
Reinforcement Details (2 of 2)	017*
91.0 Cubic Metre (20,000gal) G L Tank	
Reinforcement Details (1 of 2)	018*
Reinforcement Details (2 of 2)	019*
<b>3. <u>GENERAL ARRANGEMENTS</u></b>	
Ground Water Supply	020
Canal Intake Surface Water Supply	021
<b>4. <u>INFILTRATION GALLERY AND INTAKE STRUCTURE</u></b>	
Infiltration Gallery	022
Canal Intake Structures	023
<b>5. <u>HORIZONTAL ROUGHING FILTER</u></b>	
General Arrangement	024
<b>6. <u>PRE-SEDIMENTION BASIN</u></b>	
Plan and Sectional Views	025
Sections and Inlet/Outlet Pipe Detail	026

ITEM

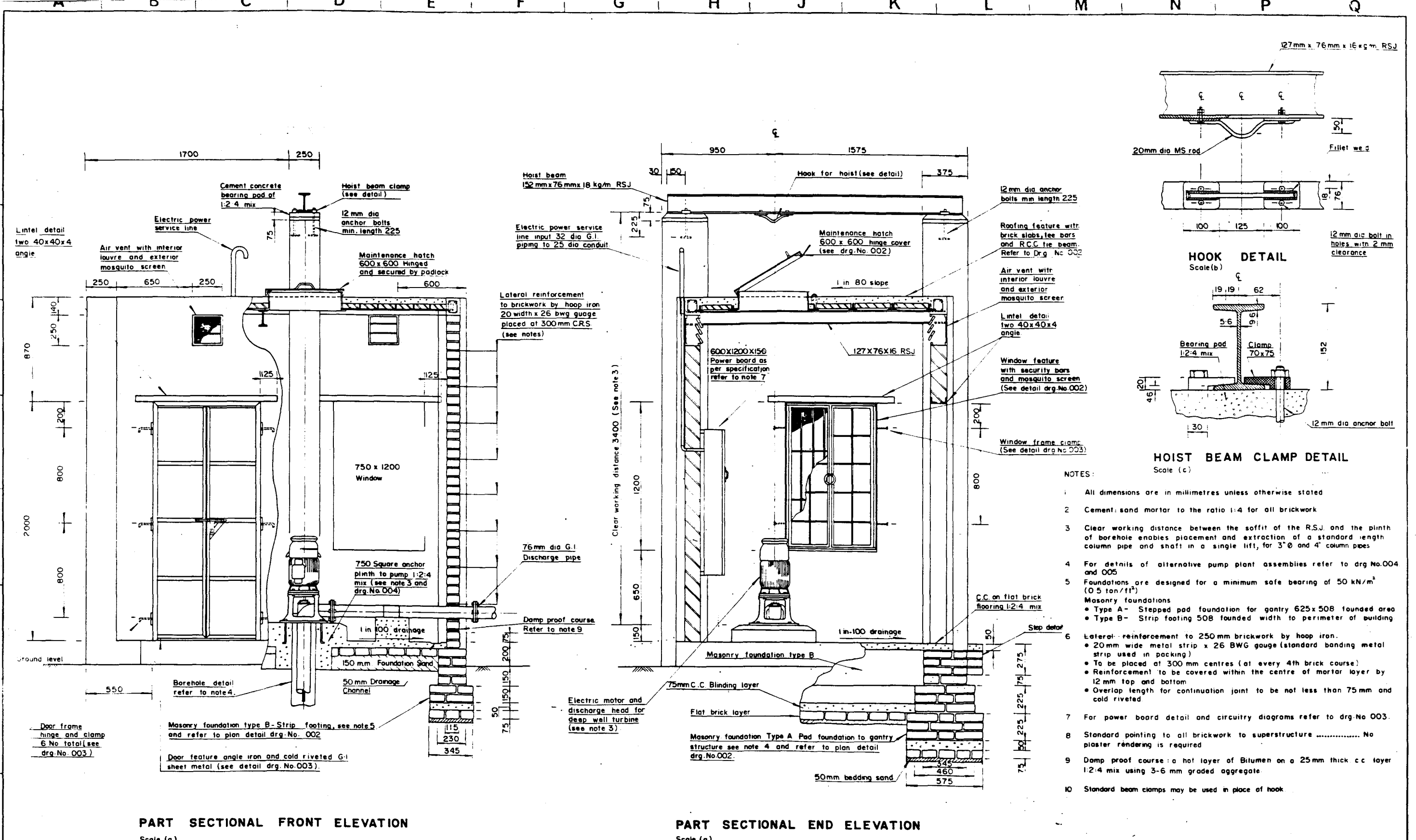
DRAWING NO.

<b>7. <u>SLOW SAND FILTER</u></b>	
General Arrangement - 25 sm Area	027
General Arrangement - 50 sm Area	028
General Details and Information	029
25sm Reinforcement Details (1 of 2)	030*
25sm Reinforcement Details (2 of 2)	031*
50sm Reinforcement Details (1 of 2)	032*
50sm Reinforcement Details (2 of 2)	033*
<b>8. <u>CLEAR WELL</u></b>	
Clear Well/Booster Pump Bay - General Arrangement	034
11.4 Cubic Metre (2500gal) Clear Well	
Reinforcement Details (1 of 2)	035*
Reinforcement Details (2 of 2)	036*
22.8 Cubic Metre (5000gal) Clear Well	
Reinforcement Details (1 of 2)	037*
Reinforcement Details (2 of 2)	038*
34.1 Cubic Metre (7500gal) Clear Well	
Reinforcement Details (1 of 2)	039*
Reinforcement Details (2 of 2)	040*
45.5 Cubic Metre (10,000gal) Clear Well	
Reinforcement Details (1 of 2)	041*
Reinforcement Details (2 of 2)	042*
68.3 Cubic Metre (15,000gal) Clear Well	
Reinforcement Details (1 of 2)	043*
Reinforcement Details (2 of 2)	044*
91.0 Cubic Metre (20,000gal) Clear Well	
Reinforcement Details (1 of 2)	045*
Reinforcement Details (2 of 2)	046*
<b>9. <u>STANDARD DRAWINGS</u></b>	
Community Tank and Stand Post Detail	047
Trenching Details	048
Valve and Chamber Details	049
Improved Dugwell - Twin Hard Pump Assembly	050
Hand Pump Assembly on Tubewell	050A
Improved Dugwell - Single Hand Pump Assembly	051
Spring Capping Detail	052
Break Pressure Tank Detail	053
<b><u>SANITATION</u></b>	
Ventilated Improved Pit Latrine	054
Twin Pit Pour Flush Latrine	055

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NOTES

1. All drawings marked with \* have associated Bending Schedules at the end of this volume.
2. All drawings should be read in conjunction with the accompanying Specification and Bills of Quantities.



LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES

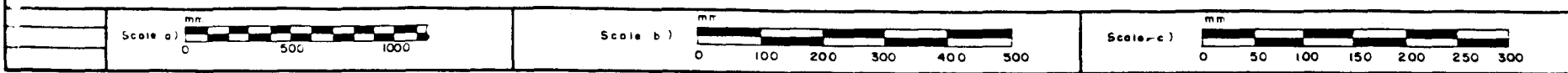
**PUMP HOUSE DETAILS  
SECTIONAL ELEVATIONS**

DRAWING NO 001

SCALE Refer to bar scale

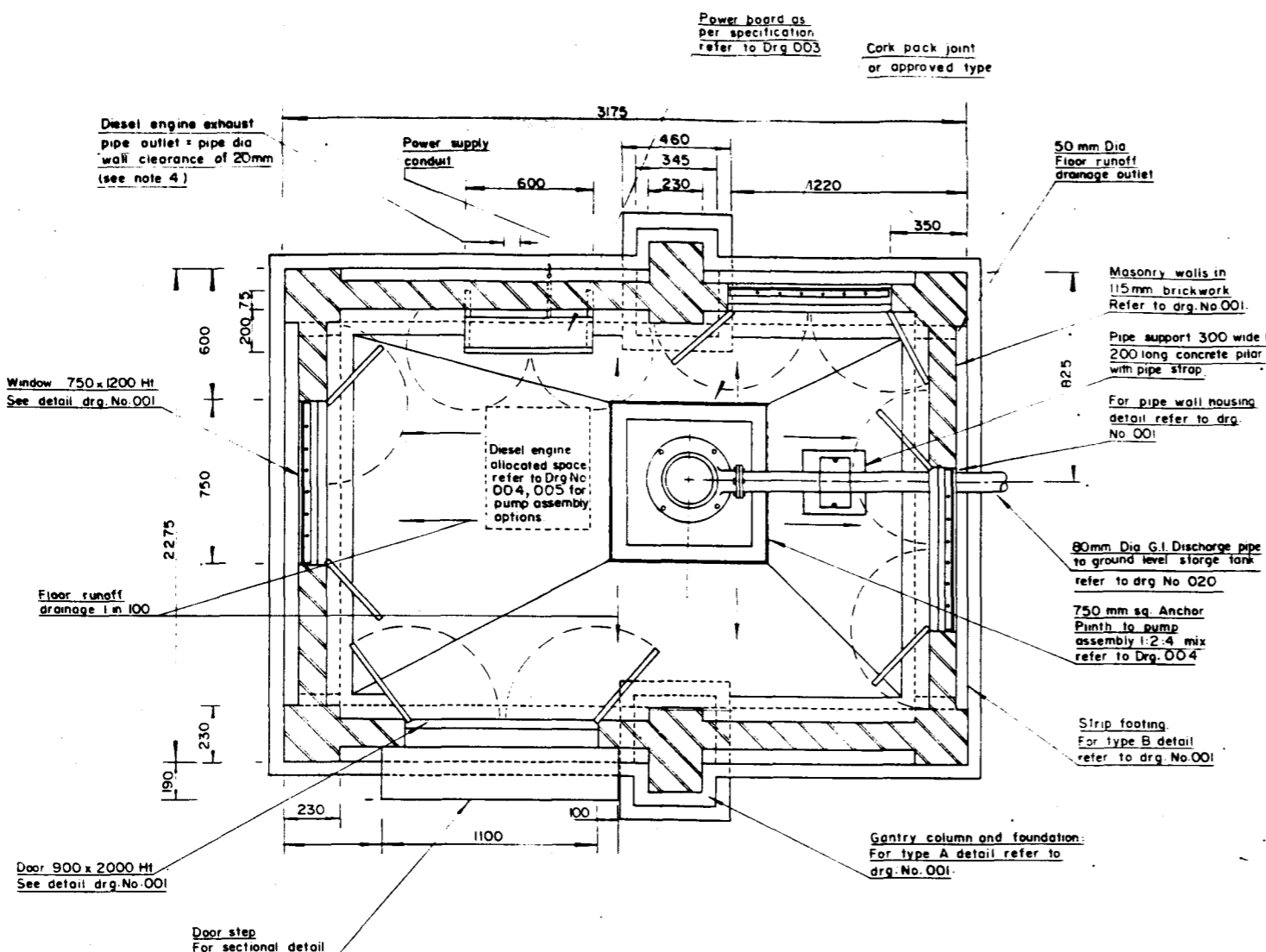
DATE MARCH 1988

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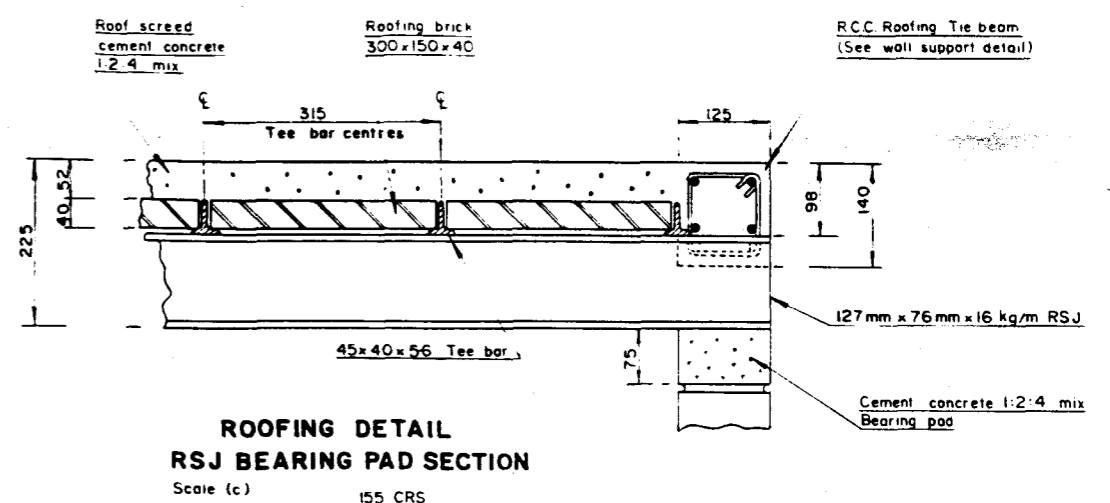


A B C D E F G H J K L M N P Q

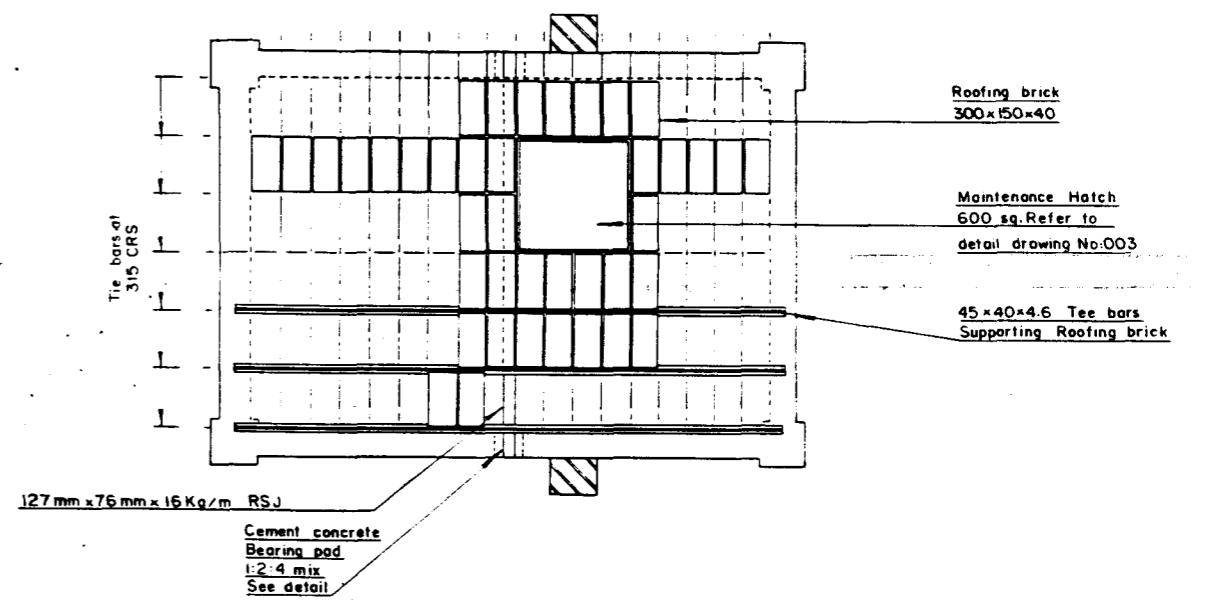
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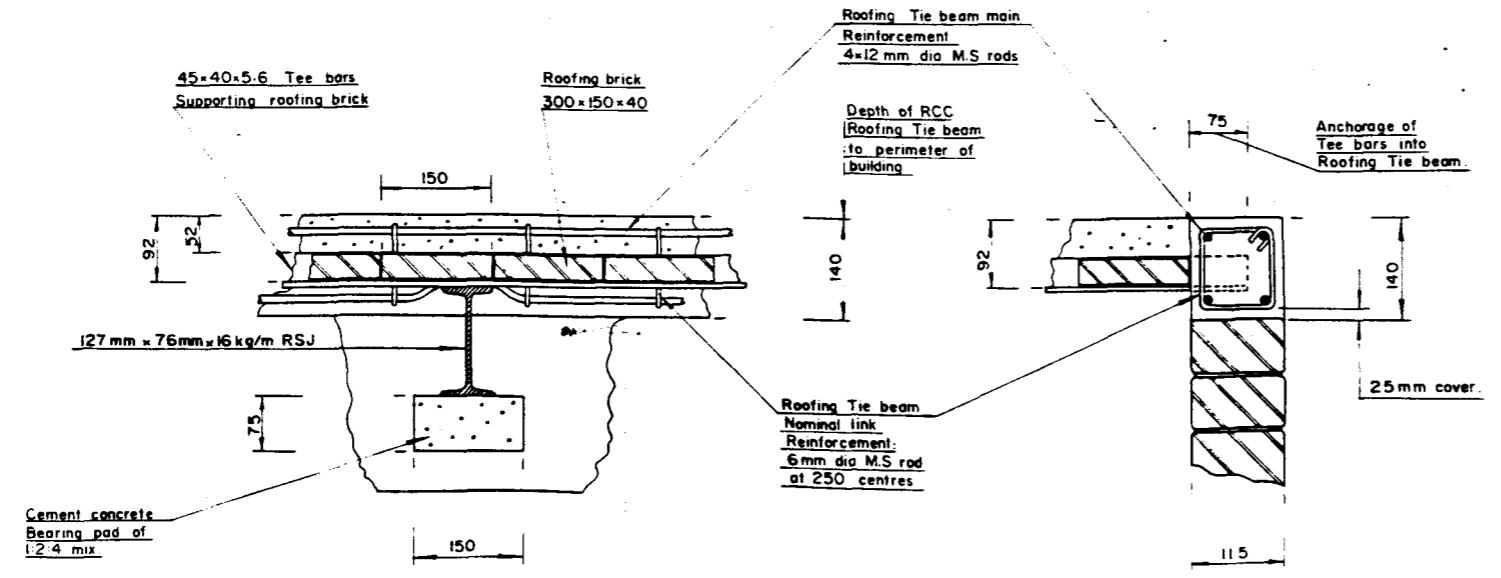
**PART SECTIONAL PLAN**  
Scale (a)



**ROOFING DETAIL  
RSJ BEARING PAD SECTION**  
Scale (c)  
155 CRS



**ROOFING DETAIL PLAN**  
Scale (b)



**ROOFING SLAB SECTIONAL DETAIL RSJ & BEARING PAD**  
Scale (c)

**ROOFING DETAIL WALL SUPPORT**  
Scale (c)

- NOTES:-**
1. All dimensions are in millimetres unless otherwise stated.
  2. In case of no electric power supply, the power board as per specification is still included in the pump house requirements, ready for future connection as and when supply is given.
  3. In calculating the minimum floor dimensions of the pump house, provision has been made for the space required for, standby or primary, diesel drive.
  4. For diesel installation the exhaust pipe is to be adequately lagged and passed through an opening in the wall giving a clearance of 20 mm. around the pipe.

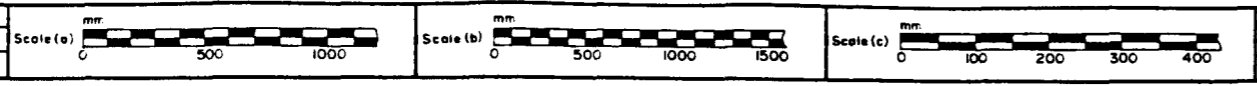
LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES

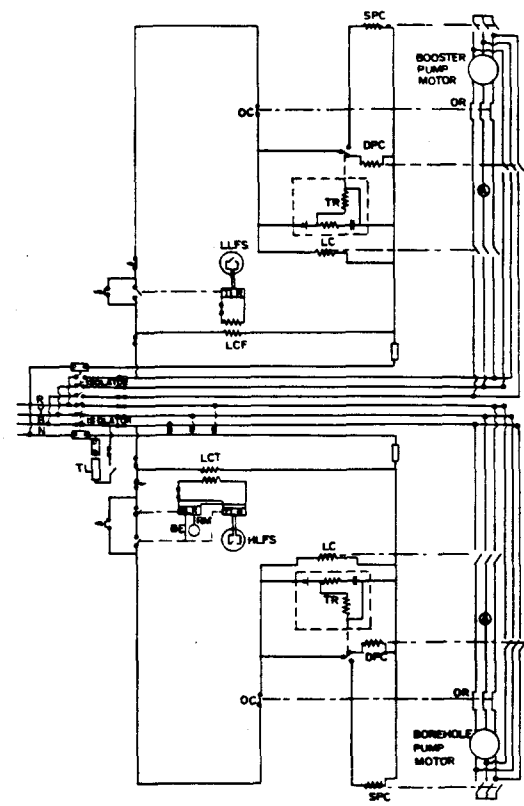
**PUMP HOUSE DETAILS  
PLAN AND ROOFING**

DRAWING NO 002      SCALE Refer to bar scales (a),(b),(c).

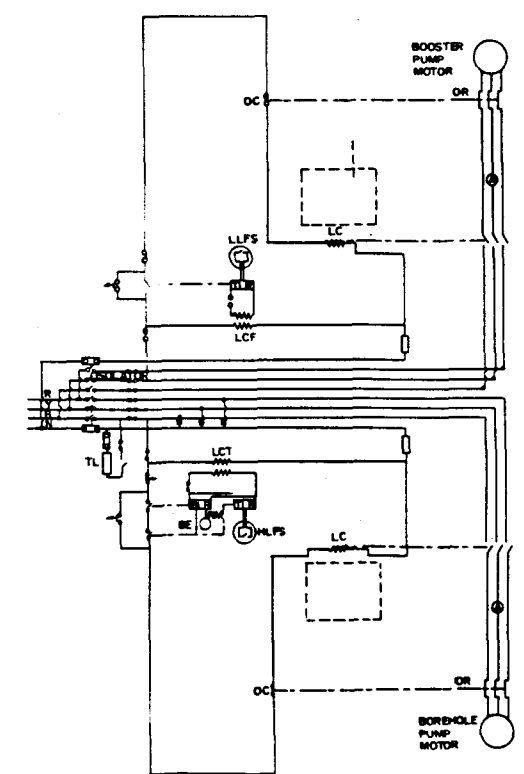
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Swindon, Wiltshire SN4 0DD

DATE: FEB 1988

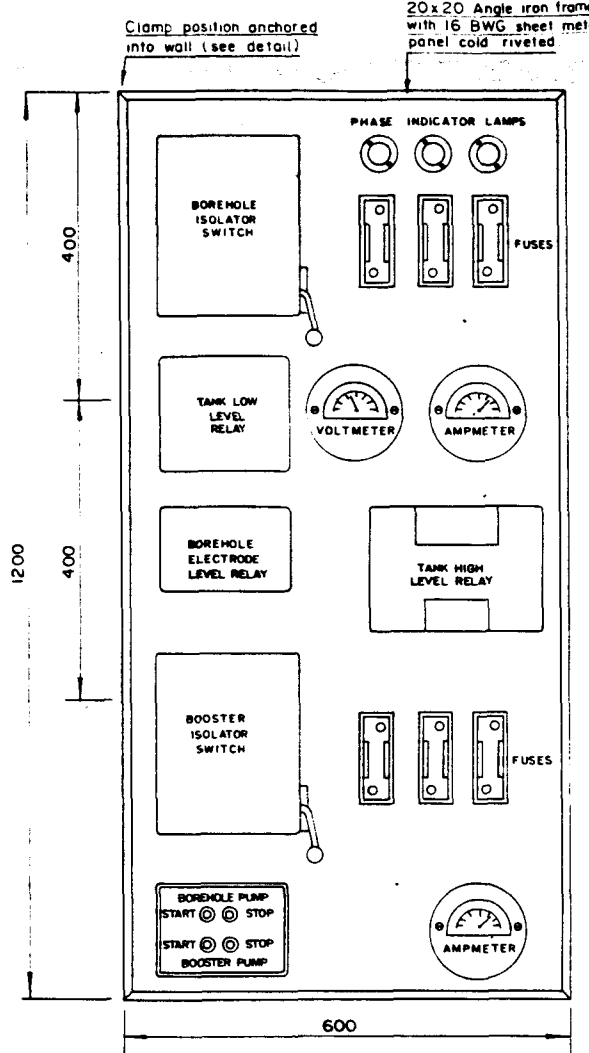




STAR / DELTA CIRCUIT DIAGRAM



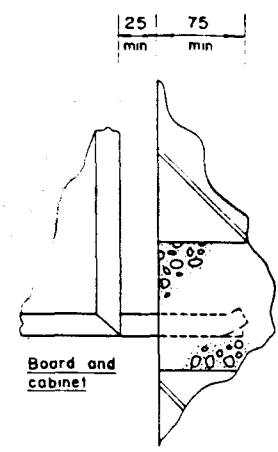
DIRECT ON LINE CIRCUIT DIAGRAM



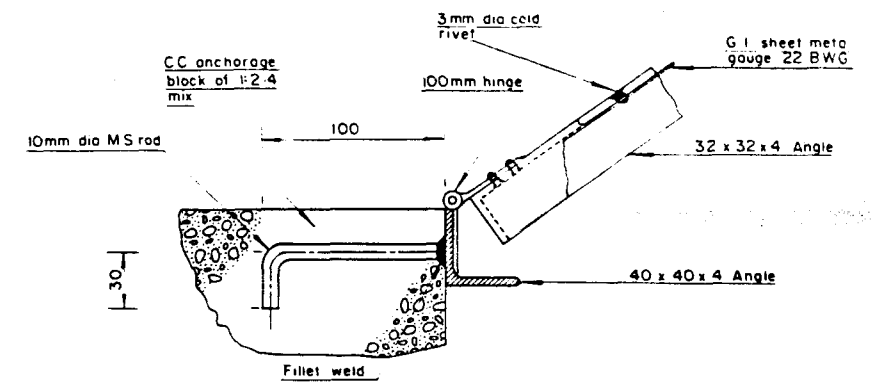
POWER BOARD DETAIL Scale b)

NOTE: Double locking doors with appropriate holes for indicator lamp viewing.

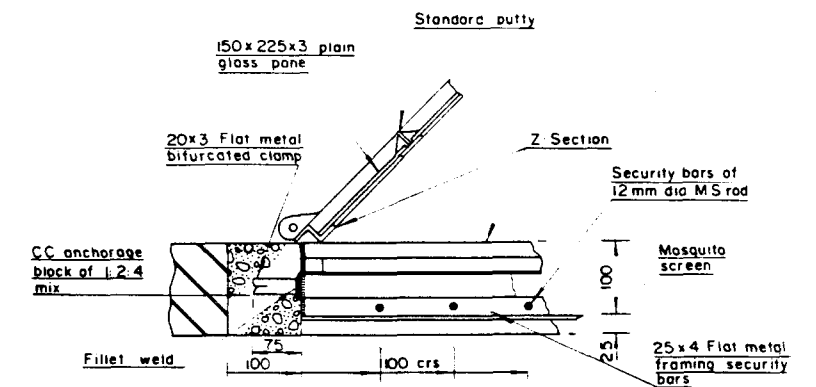
- LEGEND
- |      |                           |    |                    |
|------|---------------------------|----|--------------------|
| DPC  | Delta phase contactor     | *  | Power on indicator |
| SPC  | Star phase contactor      | BE | Borehole electrode |
| OR   | Over load relay           | RM | Rising main        |
| TR   | Timer relay               | ⊕  | Ampmeter           |
| LC   | Line contactor            | □  | Control link       |
| OC   | Over load contact         | ▭  | Link               |
| HLFS | High level float switch   | ⎓  | Switch             |
| LLFS | Low level float switch    | TL | Tube light         |
| TLR  | Tank level relay          |    |                    |
| LCT  | Level control transformer |    |                    |
| —    | Control fuse              |    |                    |
| —    | Power fuse                |    |                    |
| —    | Level contact             |    |                    |
| —    | Push button - stop        |    |                    |
| —    | Push button - start       |    |                    |



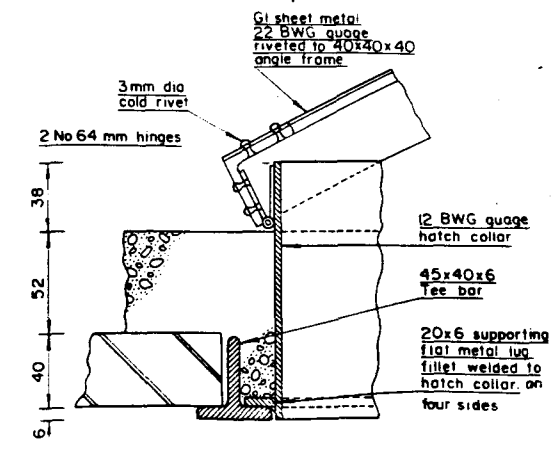
CLAMP DETAIL Scale d)



DOOR HINGE & CLAMP DETAIL Scale c)



WINDOW HINGE & CLAMP DETAIL Scale b)



MAINTENANCE HATCH DETAIL Scale a)

NOTES

- All dimensions are in millimetres unless otherwise stated.
- This booster arrangement has no pressure control on the presumption that the pump will be manually energised at the start of the demand period and manually de-energised before demand drops to below 10% of peak. Under other conditions a pressure control switch should be incorporated.
- Level control transformer voltage ratio to be selected to suit level relays.
- For positioning of board, refer to pump house details drawing numbers 001 and 002.
- Direct on line circuit is replaced by Star/Delta circuit for motor of 5 HP and over.
- A separate transformer is required for motors over 10 HP.
- Direct on line and star delta circuits may be combined if only one motor requirement is above 5 HP.
- For surface water schemes only refer to booster pump element circuit diagrams.

LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES

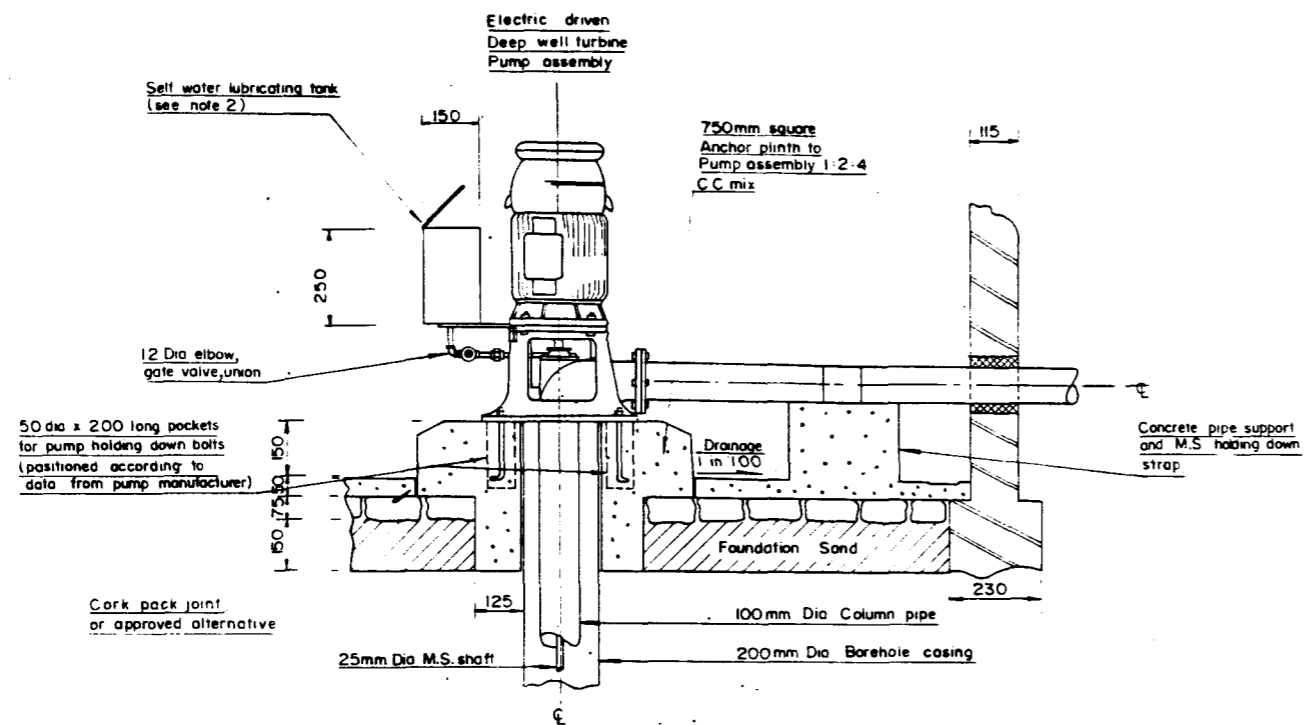
**PUMP HOUSE DETAILS  
POWER BOARD AND MISC. DETAILS**

DRAWING NO 003      SCALE Refer to bar scale a, b, c, d

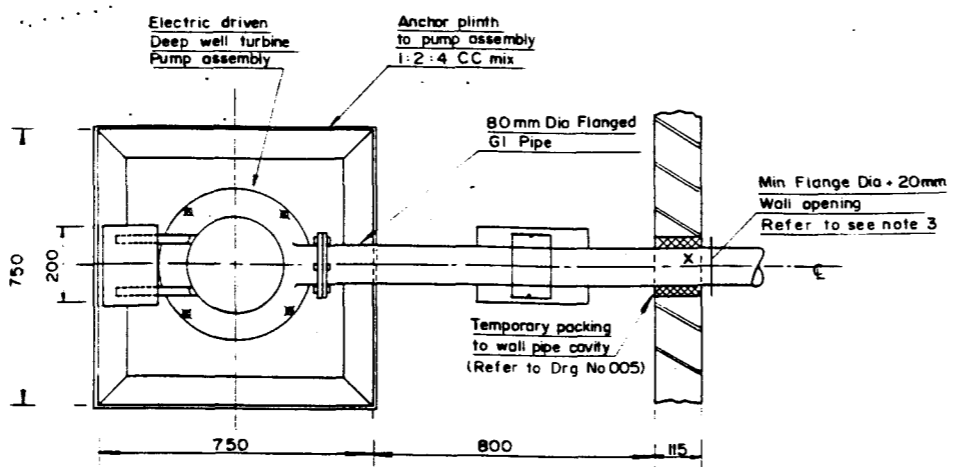
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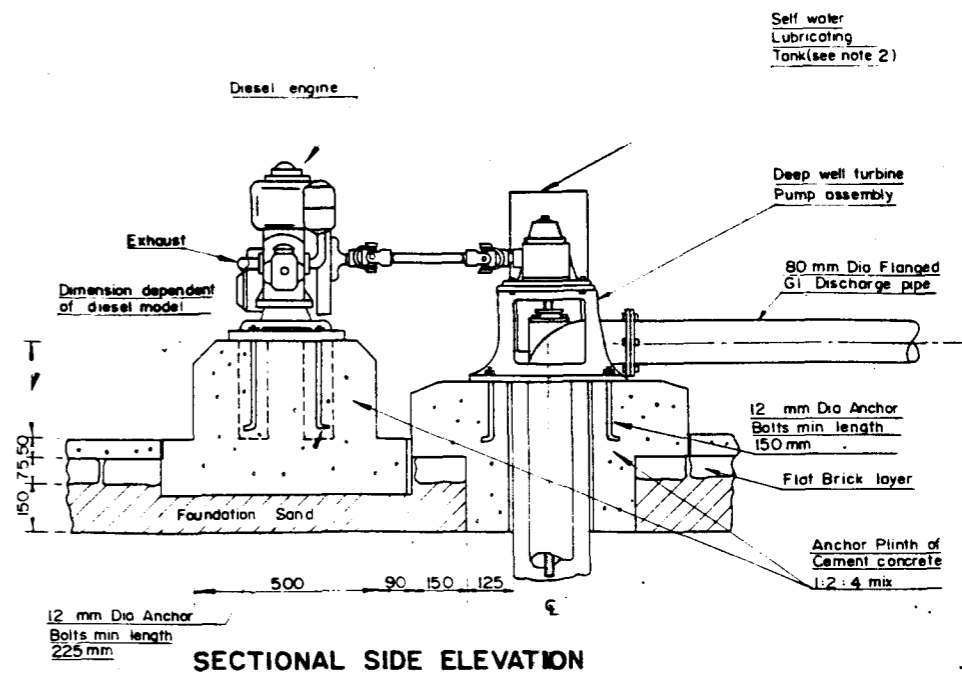


SECTIONAL SIDE ELEVATION

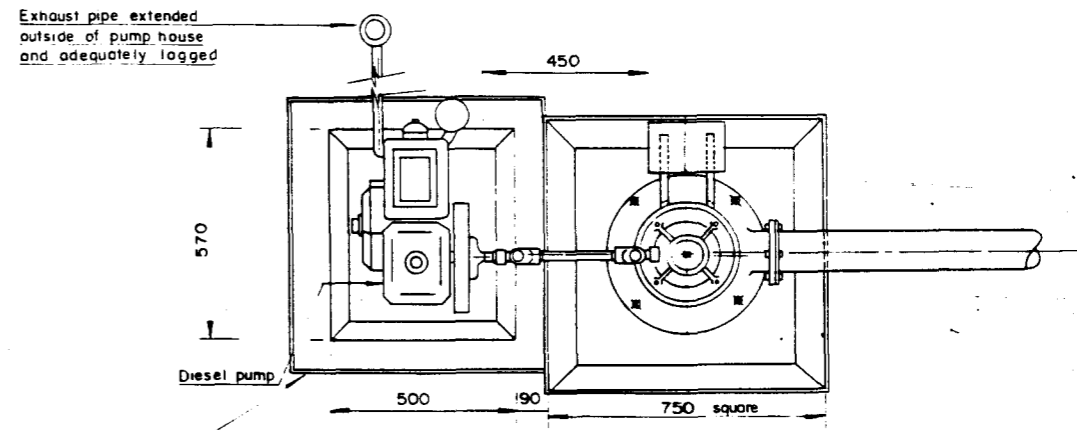


PLAN VIEW

PUMP ASSEMBLY P-1  
ELECTRIC MOTOR COUPLING



SECTIONAL SIDE ELEVATION



PLAN VIEW

PUMP ASSEMBLY P-2  
DIESEL ENGINE COUPLING

- NOTES
1. All dimensions are in millimetres unless otherwise stated.
  2. On initial starting of the pump the self water lubricating tank is opened for a short time in order to ensure adequate lubrication of the line shaft bearings located above the static water level of the borehole.
  3. The size of the wall cavity for the pipe and temporary packing dia 'X' to be not less than the flange diameter + 20 mm tolerance.
  4. Installation and commissioning of pumps to be carried out by pump manufacturer.

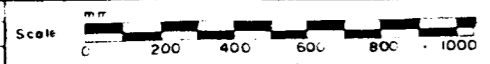
LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES

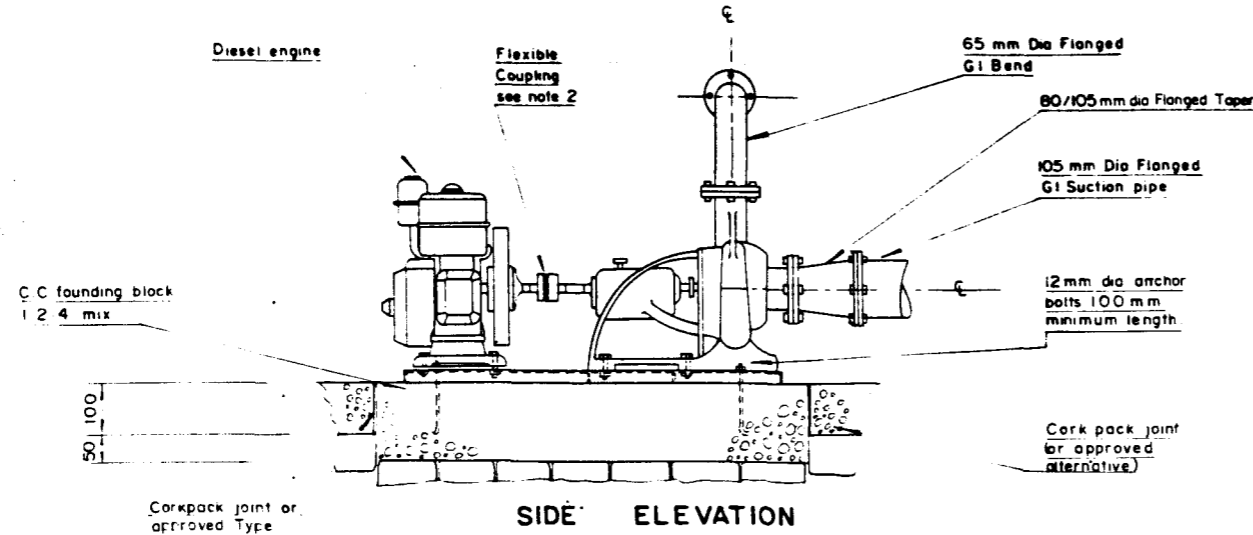
**PUMPING PLANT ASSEMBLY**  
**DETAIL : DEEP WELL TURBINE**

DRAWING NO 004      SCALE Refer to bar scale

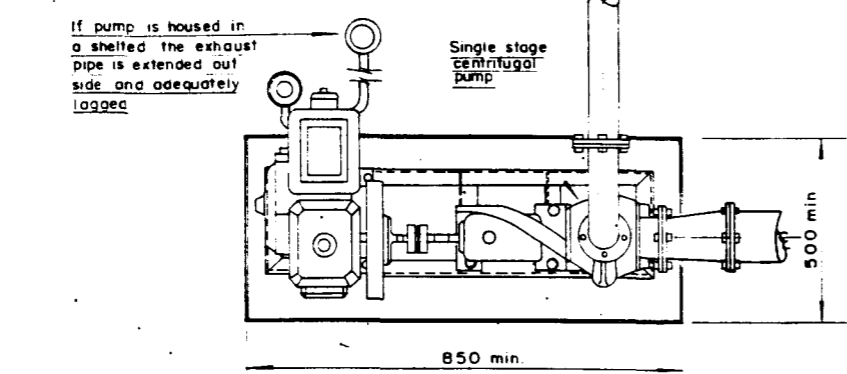
DATE: JUNE 1988

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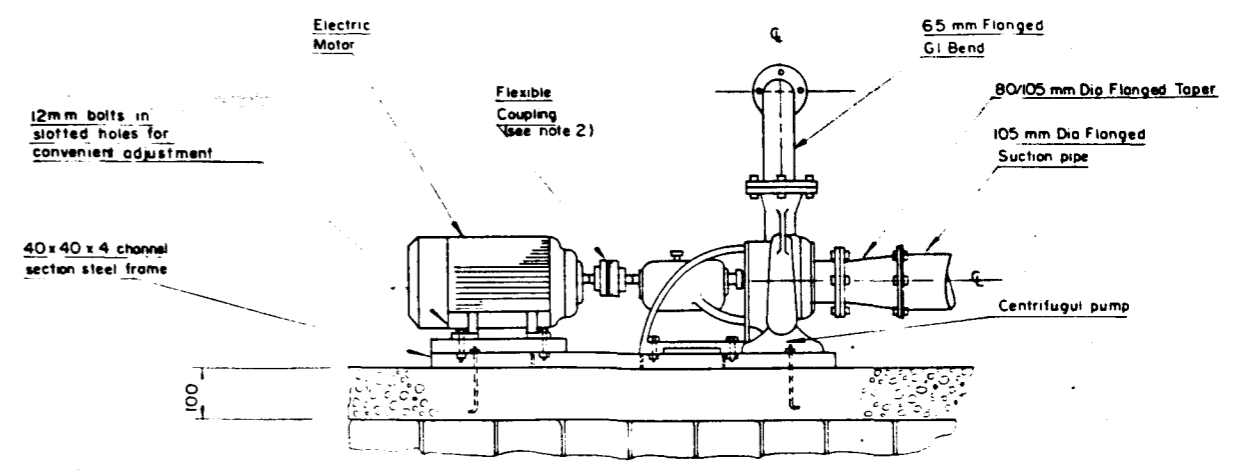


**SIDE ELEVATION**

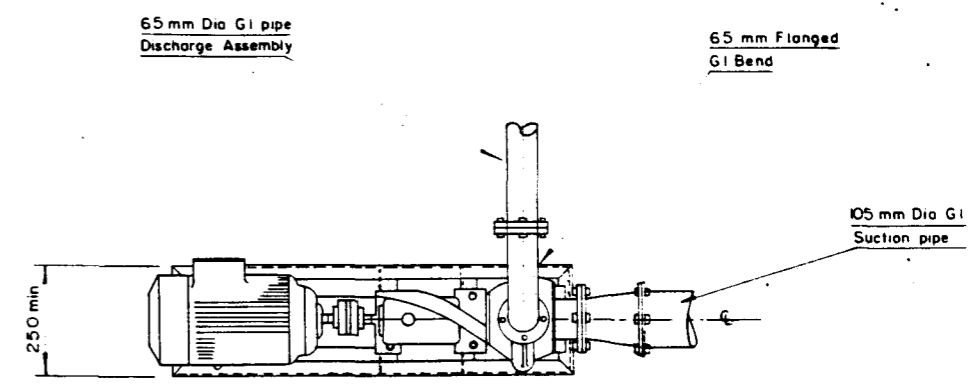


**PLAN VIEW**

**PUMP ASSEMBLY P-3**  
DIESEL ENGINE DIRECT COUPLING

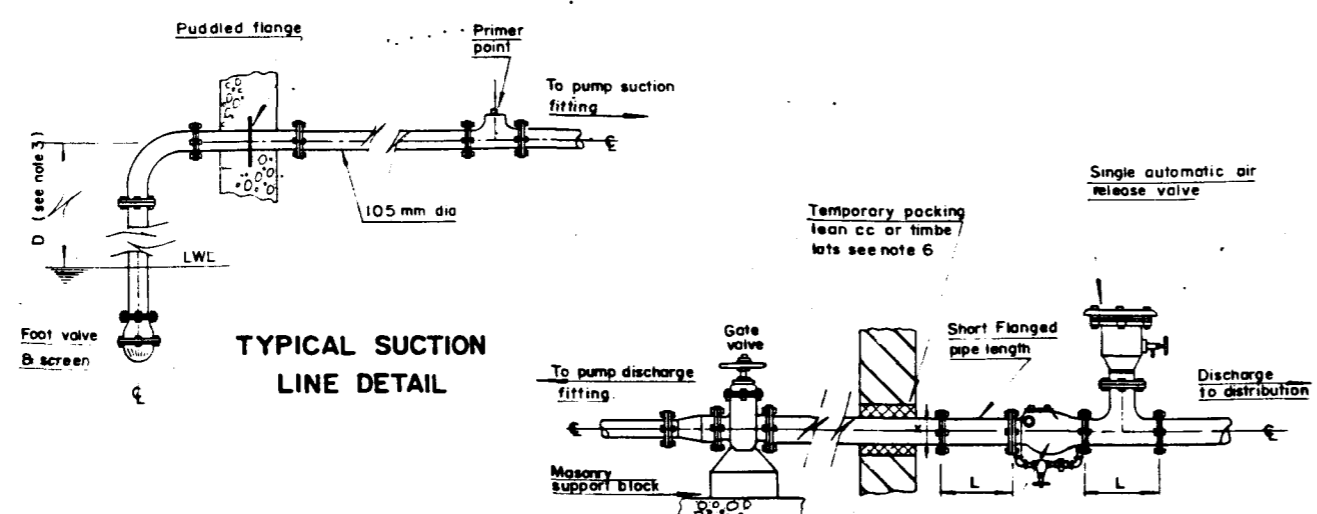


**SIDE ELEVATION**

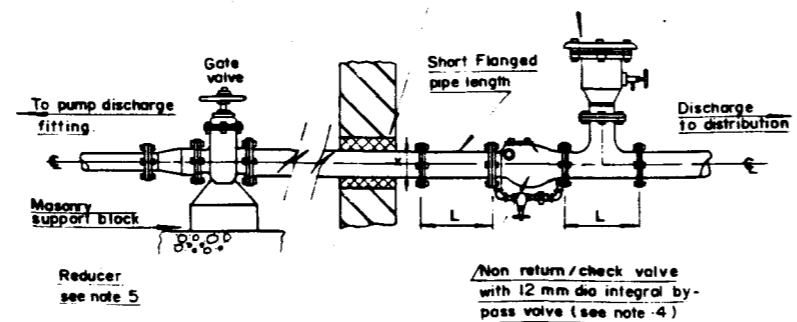


**PLAN VIEW**

**PUMP ASSEMBLY P-4**  
ELECTRIC MOTOR DIRECT COUPLING



**TYPICAL SUCTION LINE DETAIL**



**TYPICAL DISCHARGE LINE DETAIL**

**NOTES:**

1. All dimensions are in millimeters unless otherwise stated.
2. Although pump assemblies feature flexible couplings, alternative arrangement with hardy cross or vee belt attachment may be used (Refer to Drg No 006)
3. Typical suction detail:
  - The depth D from the pumps  $\epsilon$  to the lowest water level to be maximum 1.3 m unless NPSH is calculated for the actual installation.
  - A puddle flange is used whenever the suction line passes through a R.C.C. or masonry water retaining structure.
4. Typical discharge detail:
  - The by pass valve is advised to reduce the effect of pressure build up due to sudden valve closure
  - A short flanged pipelength accomodates convenient changing of old or defective fittings for replacement of differing dimensions, it also allows for tee junction attachment under conversion to double pump stand-by arrangement if required.
5. In the case of increasing the diameter of the pump on the discharge side to suit mains sizing, all fittings detailed are to be placed on the downstream side of the reducer, thus minimising head losses.
6. The size of the wall cavity for the pipe and temporary packing dia X L to be not less than, the flange diameter + 20 mm tolerance.

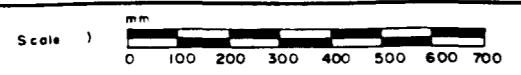
**LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES**

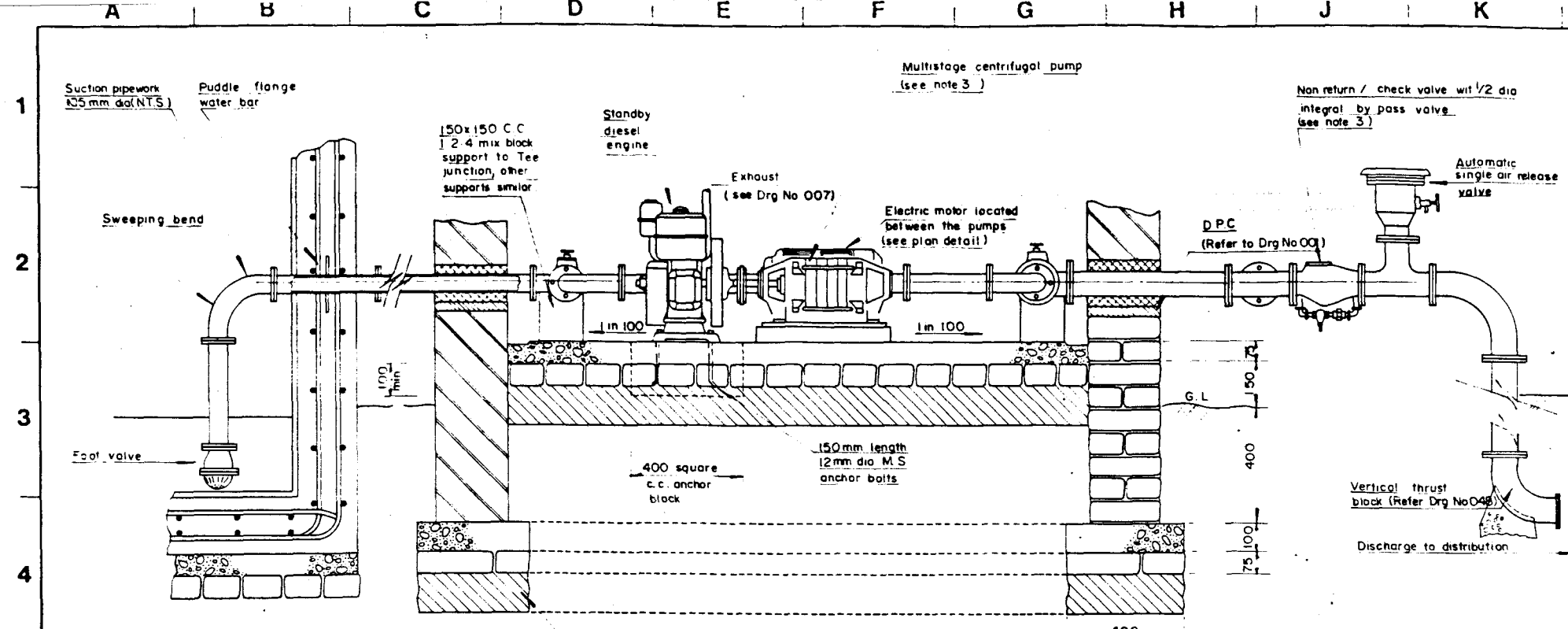
**PUMPING PLANT ASSEMBLY DETAIL:  
SINGLE STAGE CENTRIFUGAL**

DRAWING NO 005 SCALE Refer to bar scale

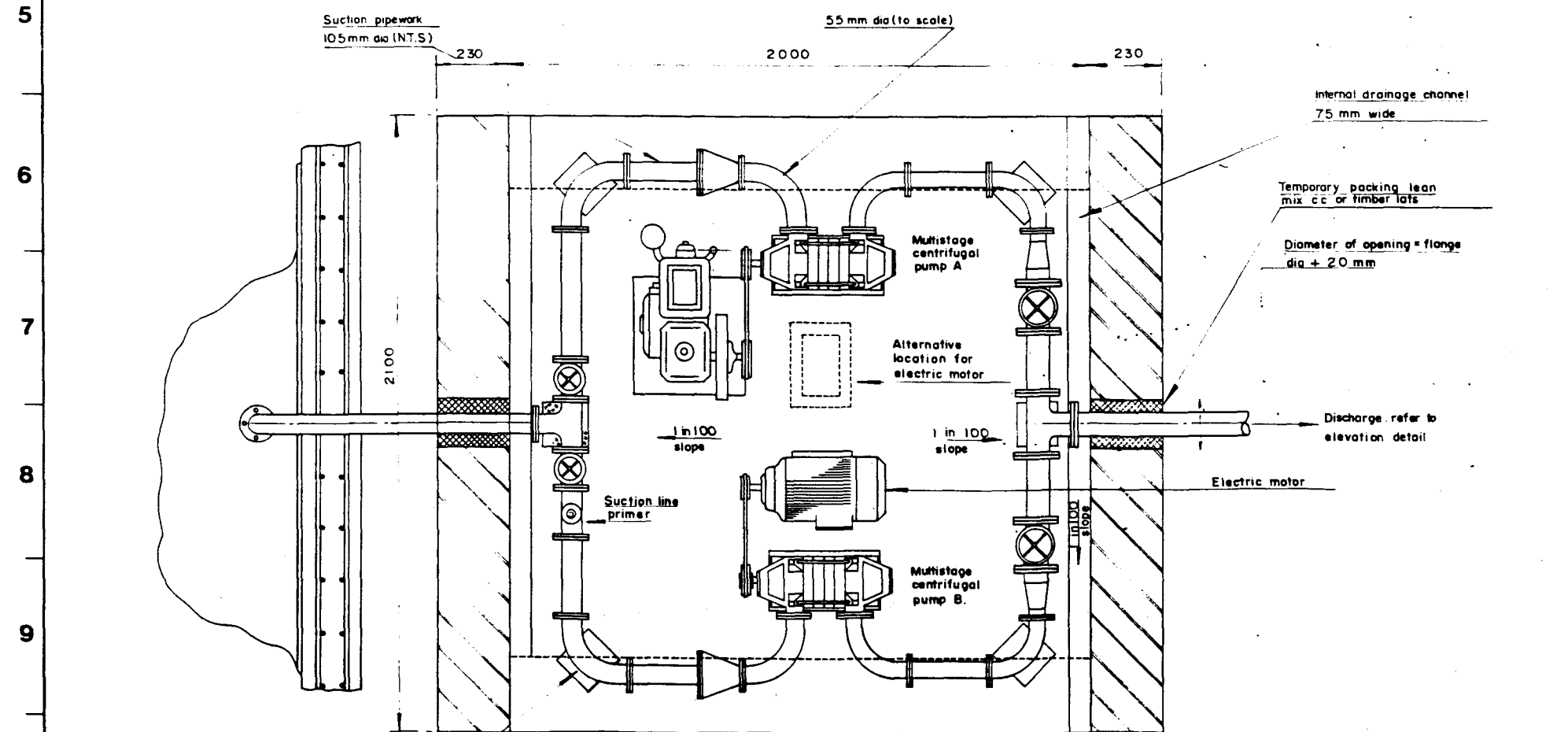
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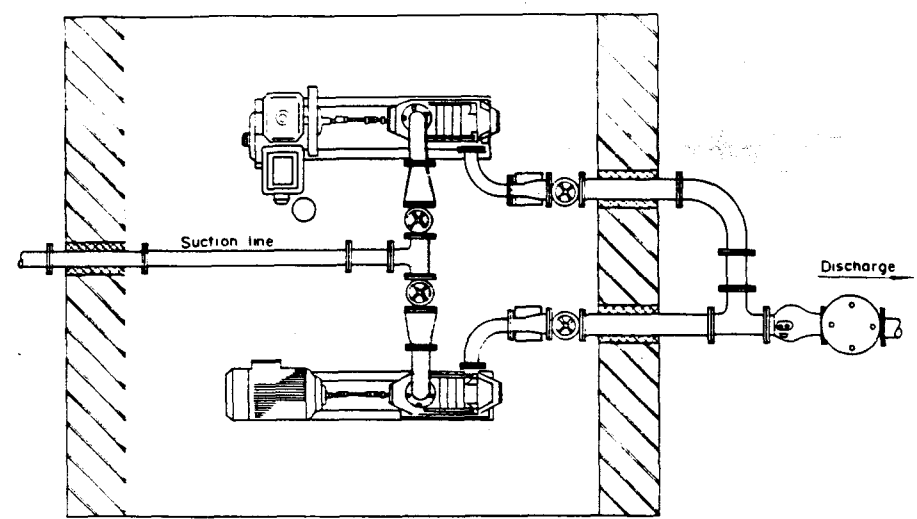




**PART SECTIONAL ELEVATION  
BOOSTER PUMP BAY**

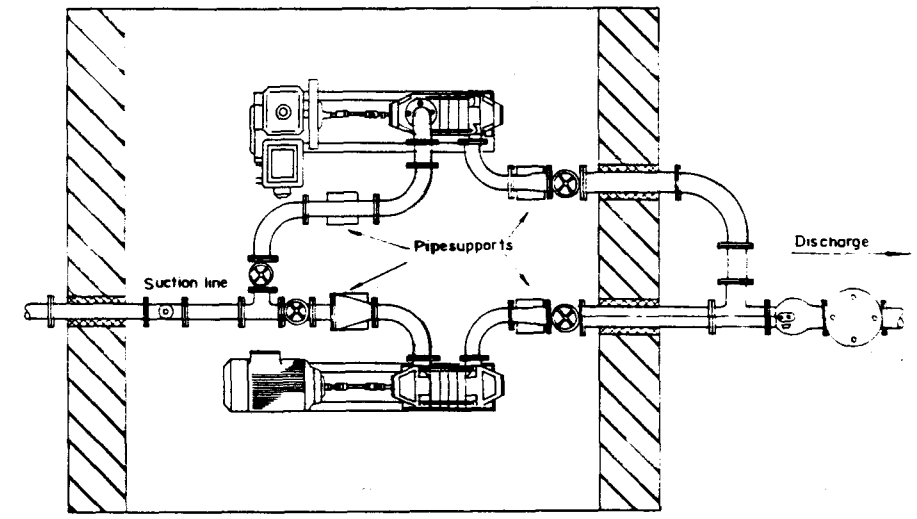


**SECTIONAL PLAN  
VEE BELT DRIVE DETAIL**



**SIMPLE TEE SUCTION LINE ASSEMBLY DETAIL  
FLEXIBLE COUPLING OR HARDY SPICER SHAFT  
DRIVE**

**ALTERNATIVE  
ASSEMBLY DETAIL**



**SIMPLE SWEEPING BEND SUCTION LINE FOR ELECTRIC  
MOTOR PRIMARY DRIVE ASSEMBLY FLEXIBLE COUPLING  
OR HARDY SPICER SHAFT DRIVE**

**ALTERNATIVE  
ASSEMBLY DETAIL**

- NOTES:**
1. Dimensions are in millimeters unless otherwise stated.
  2. Each booster pump assembly layout includes two multistage centrifugal pumps (one as stand by) an electric motor primary drive and a diesel stand by.
  3. A blank stage.
  4. By pass valve is required to reduce the effect of pressure build up due to sudden closure of each valve.
  5. For ground level storage tank detail (Refer Drg No 007).
  6. For clear well detail (Refer Drg No 037).
  7. External pipework to be lagged at higher altitude.

**LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES**

**BOOSTER PUMP ASSEMBLY DETAILS  
MULTI STAGE CENTRIFUGAL**

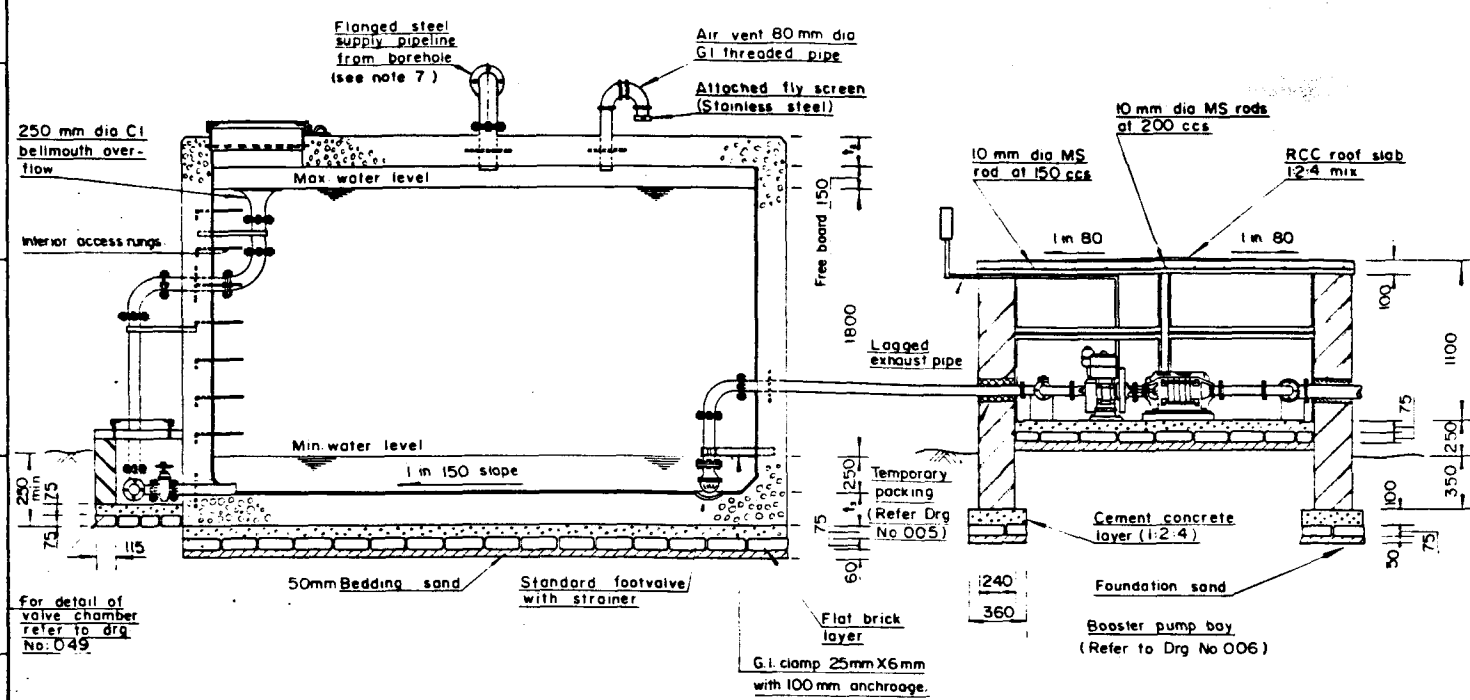
DRAWING NO 006 SCALE Refer to scale bar

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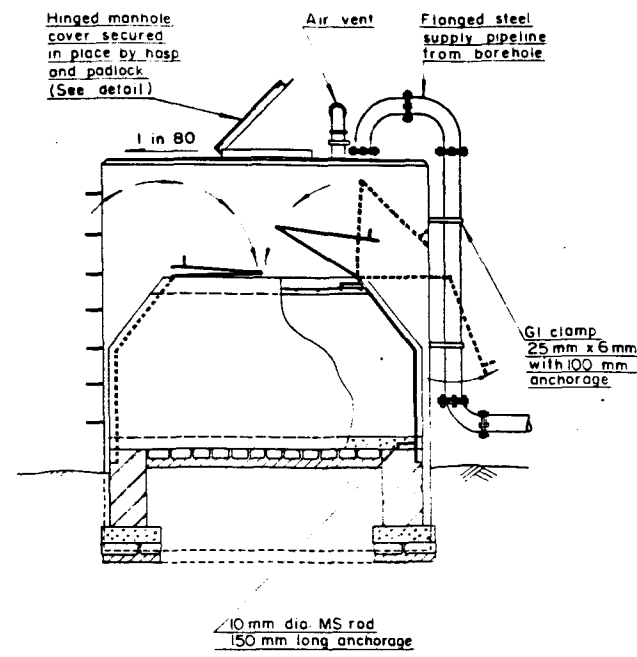




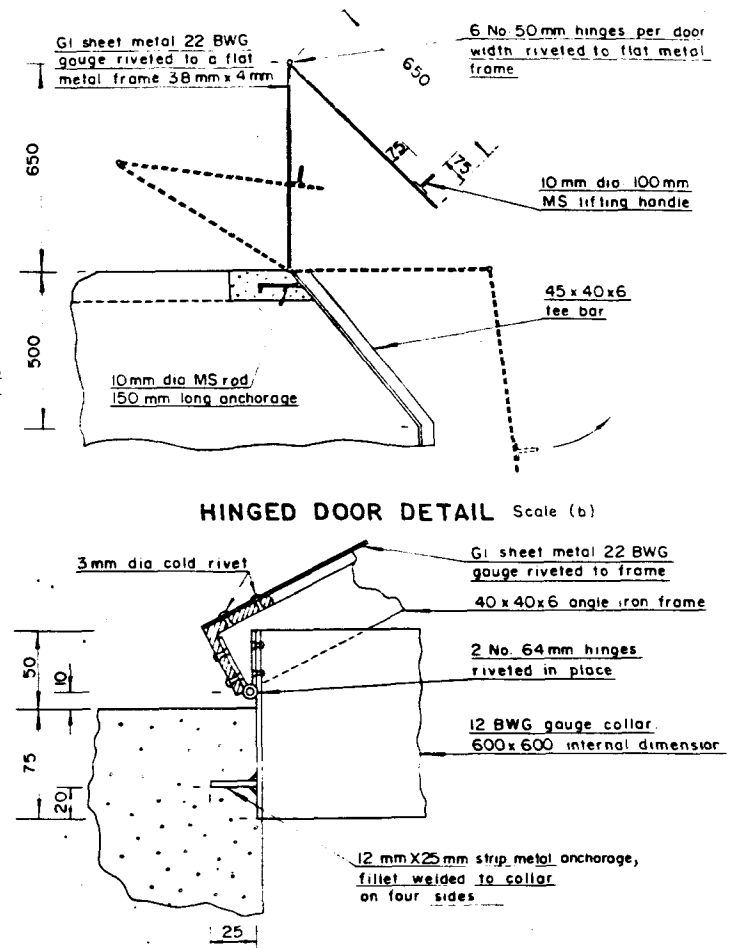
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SECTIONAL FRONT ELEVATION  
Scale (a)



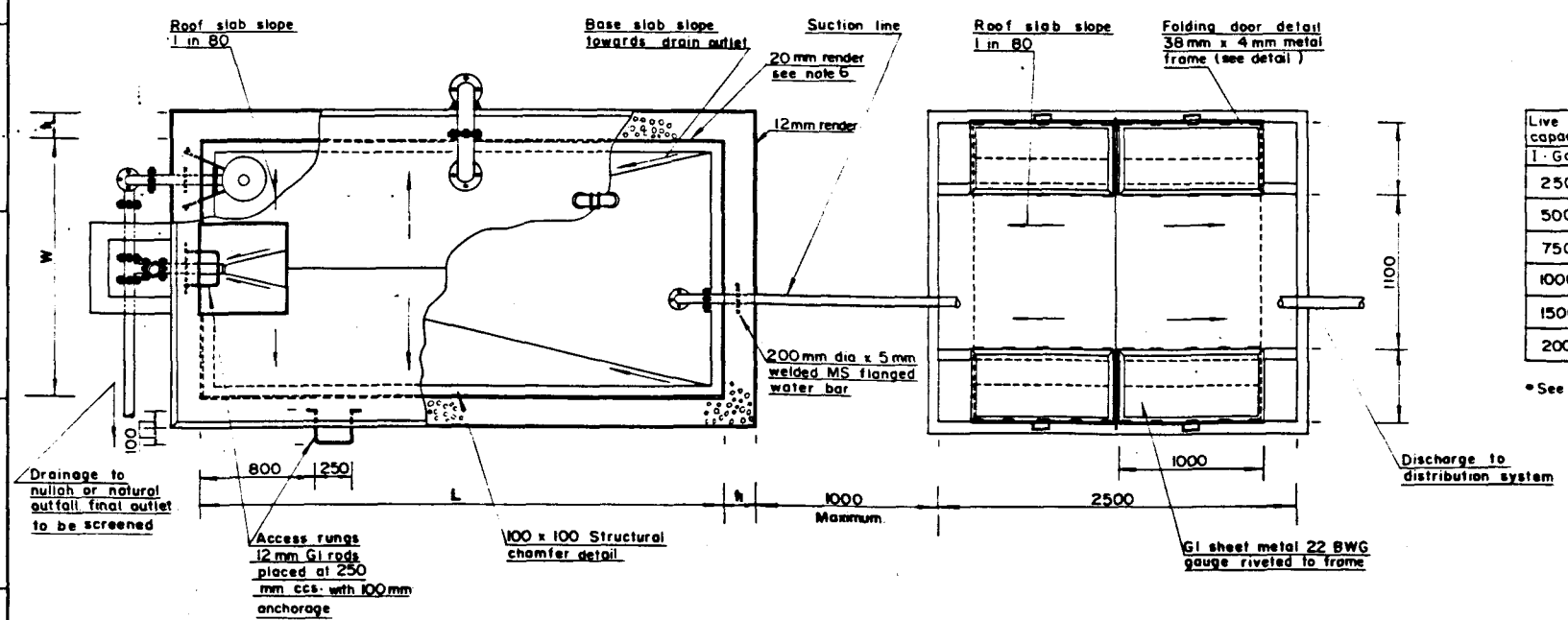
PART CUT  
END ELEVATION  
Scale (a)



MANHOLE COLLAR / HINGE DETAIL  
Scale (c)

NOTES:

- All dimensions are given in millimetres unless otherwise stated.
- The internal dimensions quoted are to the surfaces of the RCC. Live storage capacity is calculated by allowing for the following volumetric reductions:
  - 20 mm thick water proofing plaster rendering. (see note 6)
  - 1 in 150 base slope.
  - 150 mm depth freeboard.
  - 250 mm depth dead storage
- For further details of booster pump arrangements and alternative layouts refer to drg No. 006.
- For full RCC details and notes, for the range of storage tank sizes given in table 1 refer to drg Nos. 008-019 and relevant bending schedules.
- Selection of the required capacity storage tank for a set present population size is determined by the difference of water demand to borehole yield for a required daily delivery period.
- 20 mm thick internal render to walls and base using 1:3 cement, sand ratio with 50% waterproofing pudlo additive.
- Inlet position may be moved to either of the three other sides of the tank as per the convenience of layout (Refer to Drg No. 020) and the instruction of the engineer-in-charge.

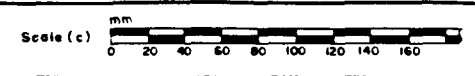
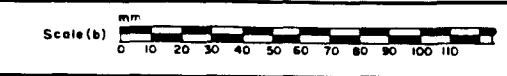
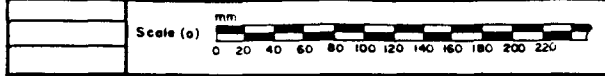


PART CUT PLAN VIEW  
Scale (a)

Table 1.

Live storage capacity l. Gall. m <sup>3</sup>	Dimension			Thickness		
	Length L	Width W	Depth D	Wall t <sub>1</sub>	Roof t <sub>2</sub>	Base t <sub>3</sub>
2500	11.4	3650	1800	2200	200	200
5000	22.8	3650	3650	2200	200	200
7500	34.1	5400	3650	2200	200	200
10000	45.5	5100	5100	2200	250	250
15000	68.3	7650	5100	2200	250	250
20000	91.0	10200	5100	2200	250	250

\* See note 2



LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES

**GROUND LEVEL STORAGE TANK/  
BOOSTER PUMP BAY  
GENERAL ARRANGEMENT**

DRAWING NO. 007

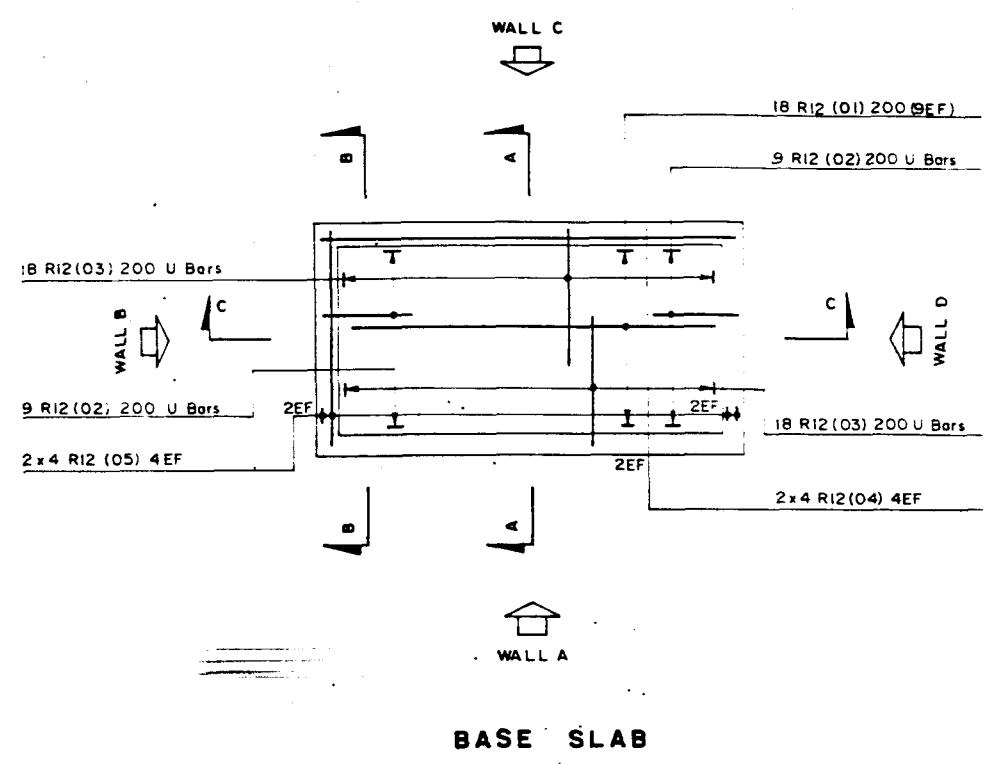
SCALE: Refer to bar scales (a) (b) (c)

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Swindon, Wiltshire, SN4 0DD

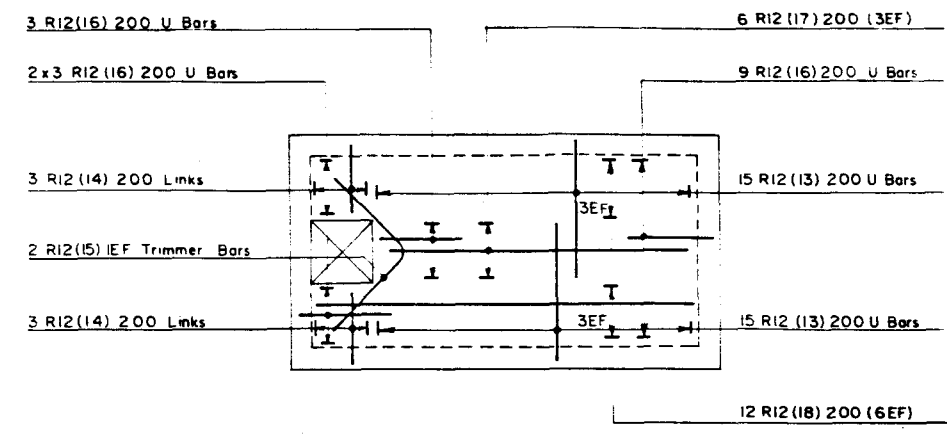
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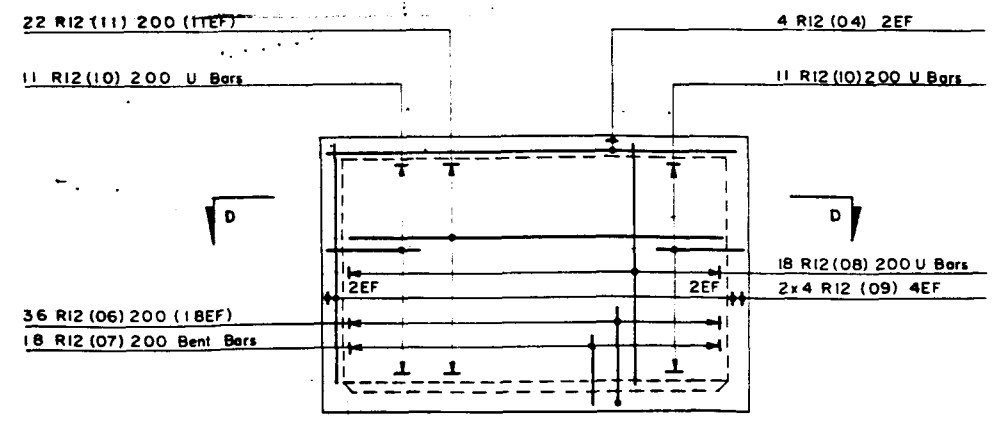
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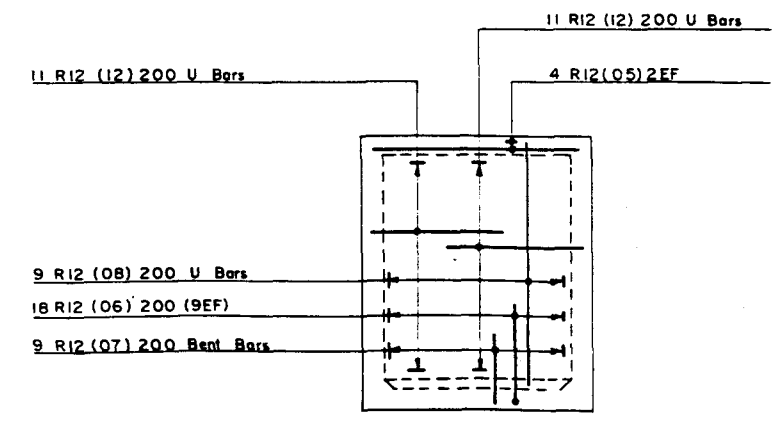
**BASE SLAB**



**ROOF SLAB**



**WALL A  
(WALL C SIMILAR)**

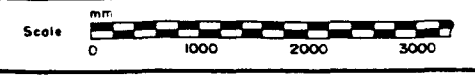


**WALL B  
(WALL D SIMILAR)**

- NOTES**
- This drawing to be read in conjunction with drawing numbers 007 B 009 and the relevant bending schedules.
  - Concrete mix to be 1:1 1/2:3 cement/sand/course aggregate by volume.
  - Minimum concrete strength to be 25 N/mm<sup>2</sup> (3625 lb/in<sup>2</sup>).
  - Maximum aggregate size to be 20mm (3/4 in).
  - Minimum cover to all reinforcement to be 50mm (2 in).
  - Laps to reinforcement to be 40 times the diameter of the smaller bar.
  - Reinforcement to be grade 250 N/mm<sup>2</sup> (36250 lb/in<sup>2</sup>) plain bars.
  - Reinforcement nomenclature:  

3 - R 16 - 39 - 200 - T	Position of bar (see note 9)
	Bar centres (mm)
	Bar mark (see Bending Schedules)
	Diameter of bar in millimetres
	Type of steel (R = mild steel)
	Number of bars
  - Abbreviations referring to positions of reinforcement:  

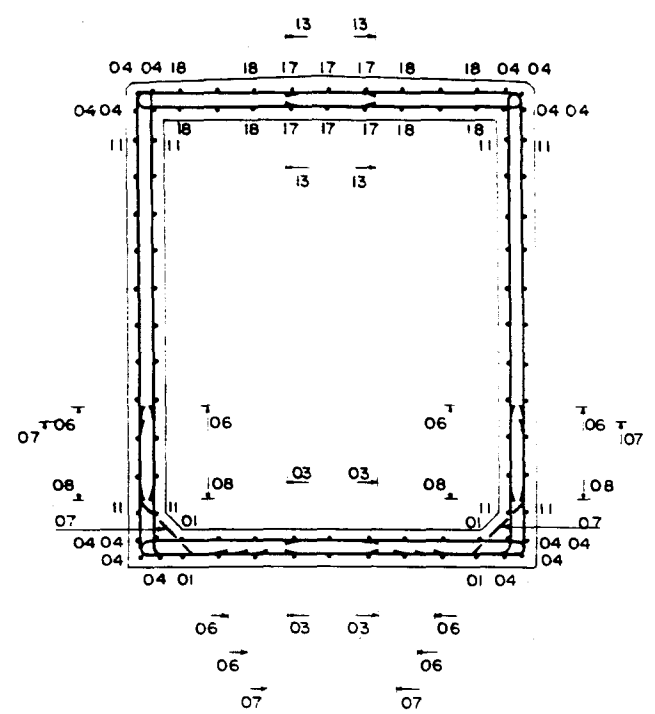
EF = Each face	B = Bottom
NF = Near face	T = Top
FF = Far face	
  - Where reinforcement fouls pipes or openings, bars are either to be bent aside or are to be cut to suit and spliced with similar sized bars.
  - Safe soil bearing pressure should not be less than 50 kN/m<sup>2</sup> (0.45 ton/ft<sup>2</sup>).
  - This drawing is schematic only. Do not scale.
  - The contractor to provide to the Engineer for testing, 3 No. concrete test cubes for each concrete pour.



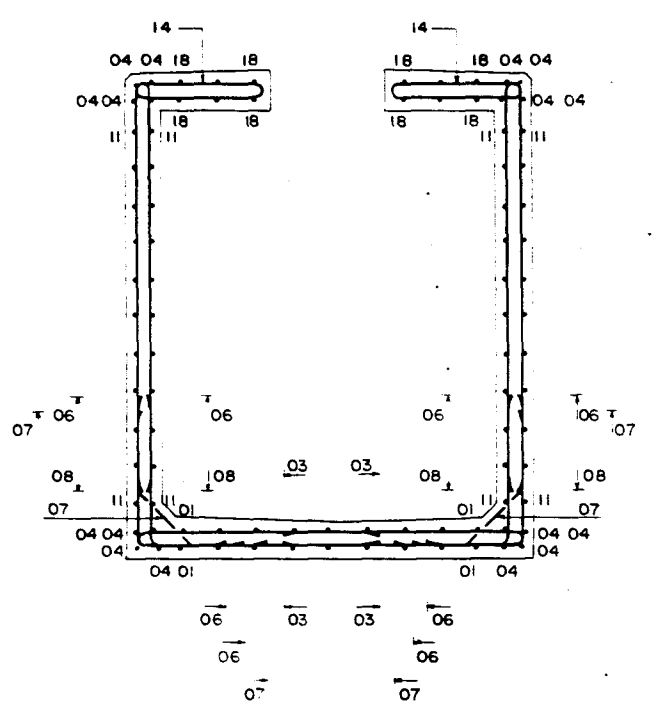
LOW COST WATER SUPPLY AND SANITATION STANDARD DESIGN MODULES	
<b>11.4 CUBIC METRE (2500 GALLON) GROUND LEVEL STORAGE TANK REINFORCEMENT DETAILS (SHEET 1 OF 2)</b>	
DRAWING NO 008	SCALE Refer to bar scale
Sir William Halcrow & Partners Consulting Engineers and Architects Burdopp Park, Swindon, Wiltshire SN4 0QD	
DATE: MAY 1988	

A B C D E F G H J K L M N P Q

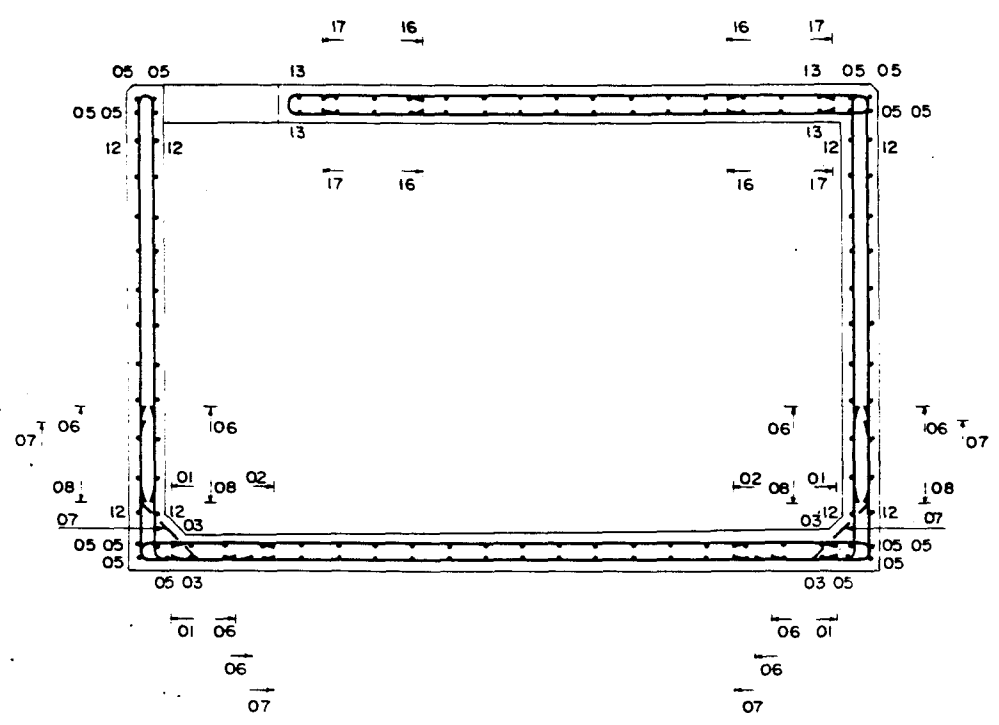
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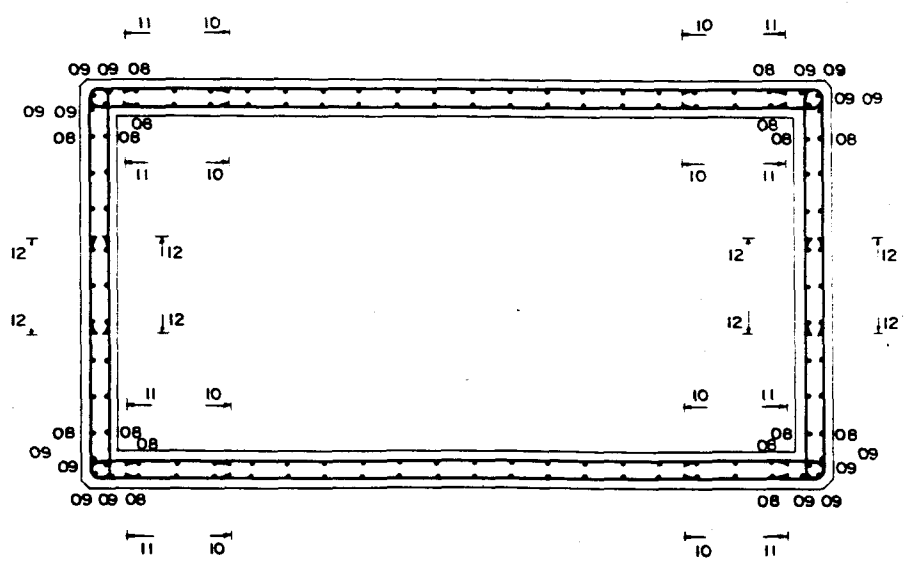
SECTION A - A



SECTION B - B



SECTION C - C



SECTION D - D

NOTES

- 1 For position of sections see drawing number OOB
- 2 Reinforcement nomenclature:  
 05 — Bar mark 05  
 — Position of end of bar
- 3 For bar positions, spacings, and diameters refer to plans and elevations on drawing number OOB.
- 4 For bar shapes and lengths refer to relevant bending schedules.
- 5 The notes on drawing number OOB also apply.
- 6 This drawing is schematic only. Do not scale.

LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES

**11.4 CUBIC METRE (2,500 GALLON)  
GROUND LEVEL STORAGE TANK  
REINFORCEMENT DETAILS (SHEET 2 OF 2)**

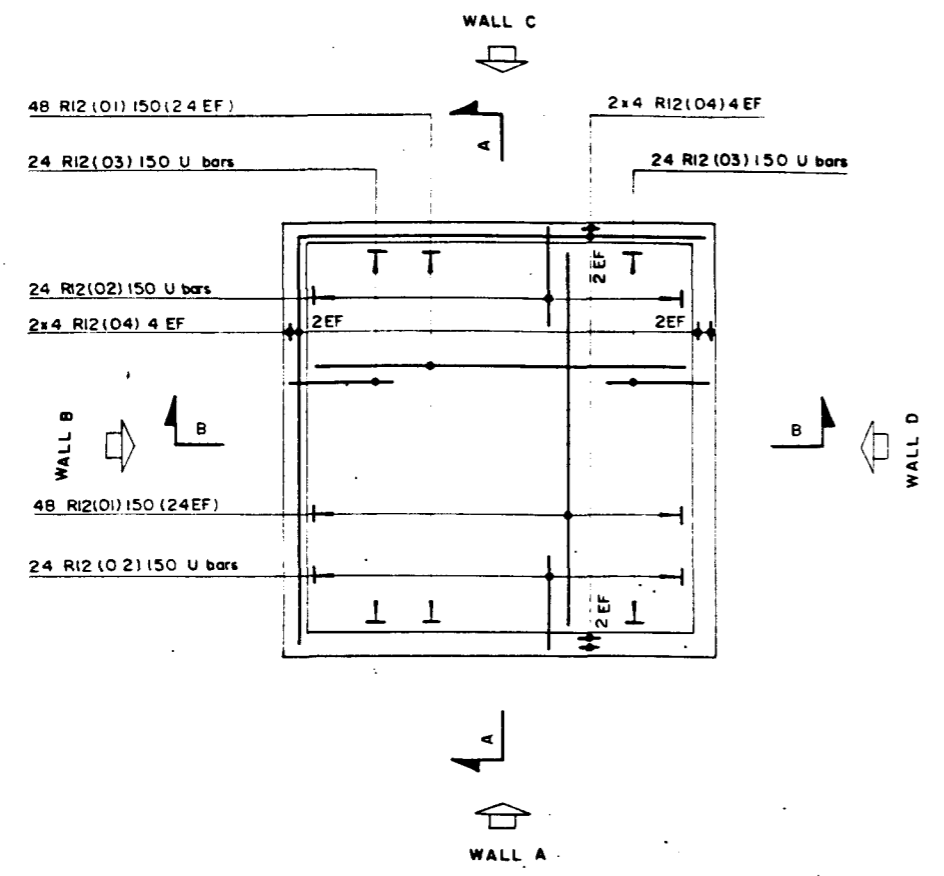
DRAWING NO O09      SCALE Refer to bar scale



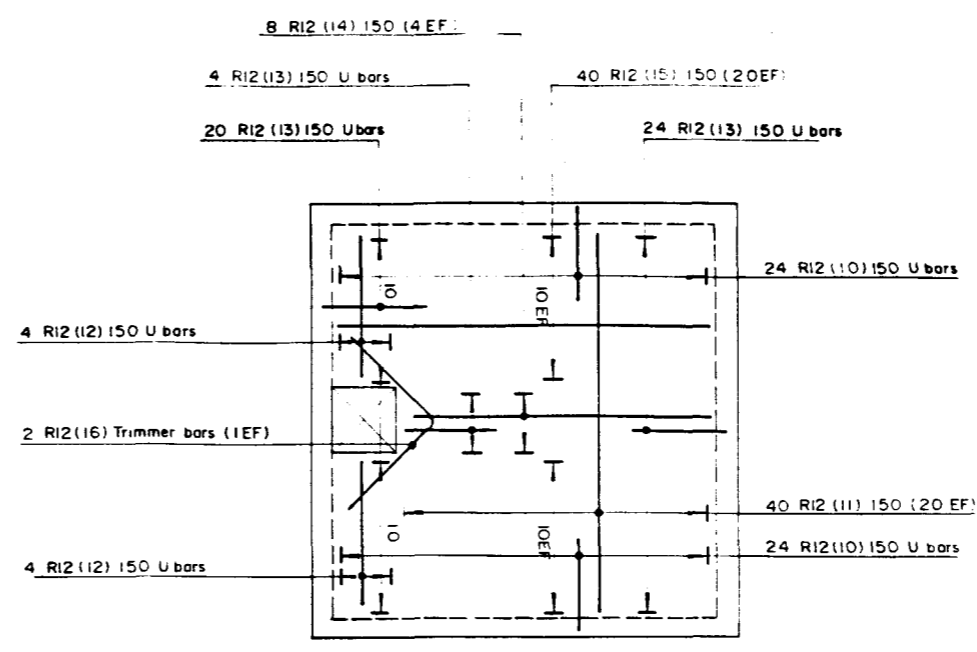
DATE: MAY 1988

Sir William Halcrow & Partners Ltd  
Consulting Engineers and Architects  
Burdorpe Park  
Swindon, Wiltshire, SN4 6DD

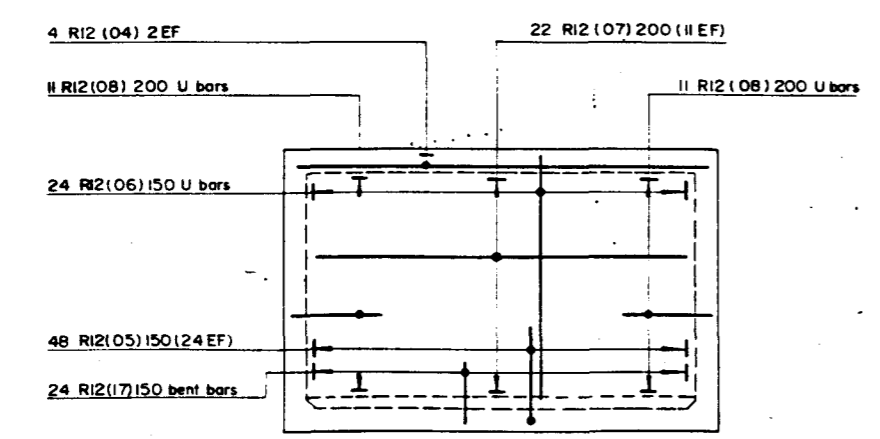
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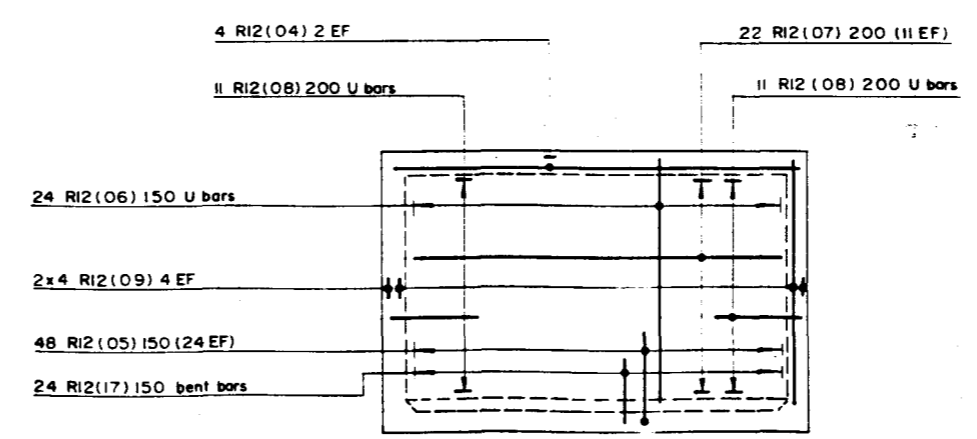
BASE PLAN



ROOF PLAN

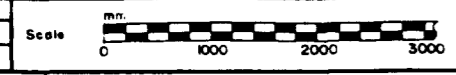


ELEVATION WALL A  
(WALL C SIMILAR)



ELEVATION WALL B  
(WALL D SIMILAR)

- NOTES**
- This drawing to be read in conjunction with drawing numbers 007 B 011 and the relevant bending schedules.
  - Concrete mix to be 1:1½:3 cement/sand/course aggregate by volume.
  - Minimum concrete strength to be 25 N/mm<sup>2</sup> (3625 lb/in<sup>2</sup>) at 28 days.
  - Maximum aggregate size to be 20mm (¾ in).
  - Minimum cover to all reinforcement to be 50mm (2 in).
  - Laps to reinforcement to be 40 times the diameter of the smaller bar.
  - Reinforcement to be grade 250 N/mm<sup>2</sup> (36250 lb/in<sup>2</sup>) plain bars.
  - Reinforcement nomenclature:  
3 - R 16 - 39 - 200 - T  
Position of bar (see note 9)  
Bar centres (mm)  
Bar mark (see Bending Schedules)  
Diameter of bar in millimetres  
Type of steel (R = mild steel)  
Number of bars
  - Abbreviations referring to positions of reinforcement:  
EF = Each face      B = Bottom  
NF = Near face      T = Top  
FF = Far face
  - Where reinforcement fouls pipes or openings, bars are either to be bent aside or are to be cut to suit and spliced with similar sized bars.
  - The contractor to provide to the Engineer for testing, 3 No. concrete test cubes for each concrete pour.
  - Safe soils bearing pressure should not be less than 50 kN/m<sup>2</sup> (0.45 ton/ft<sup>2</sup>).
  - This drawing is schematic only. Do not scale.



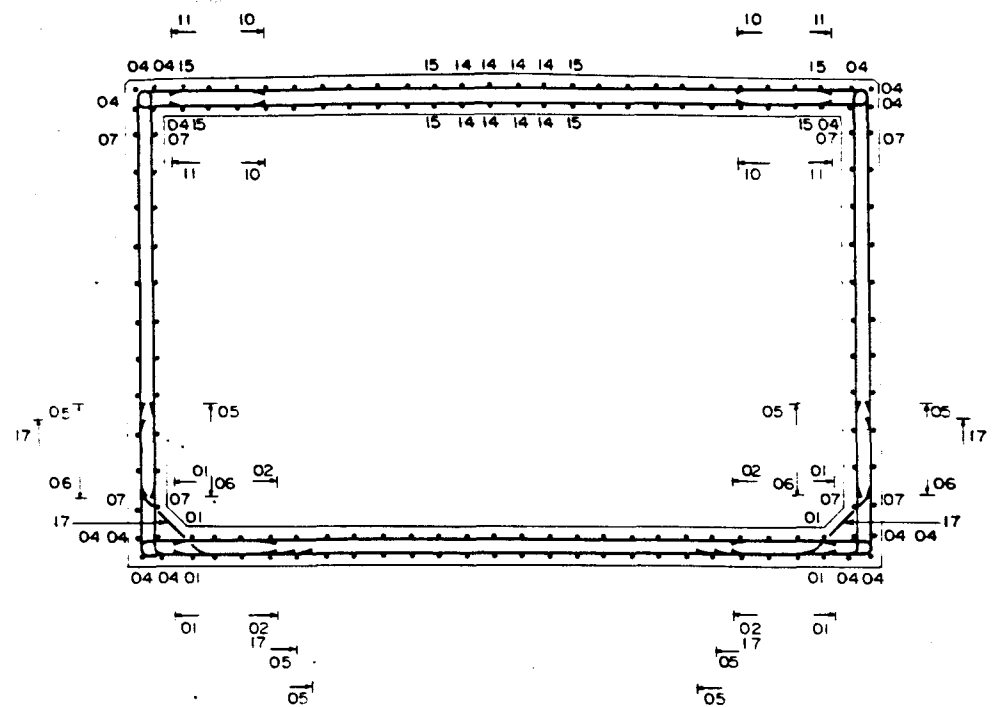
LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES

**22.8 CUBIC METRE (5000 GALLON)  
GROUND LEVEL STORAGE TANK  
REINFORCEMENT DETAILS (SHEET 1 OF 2)**

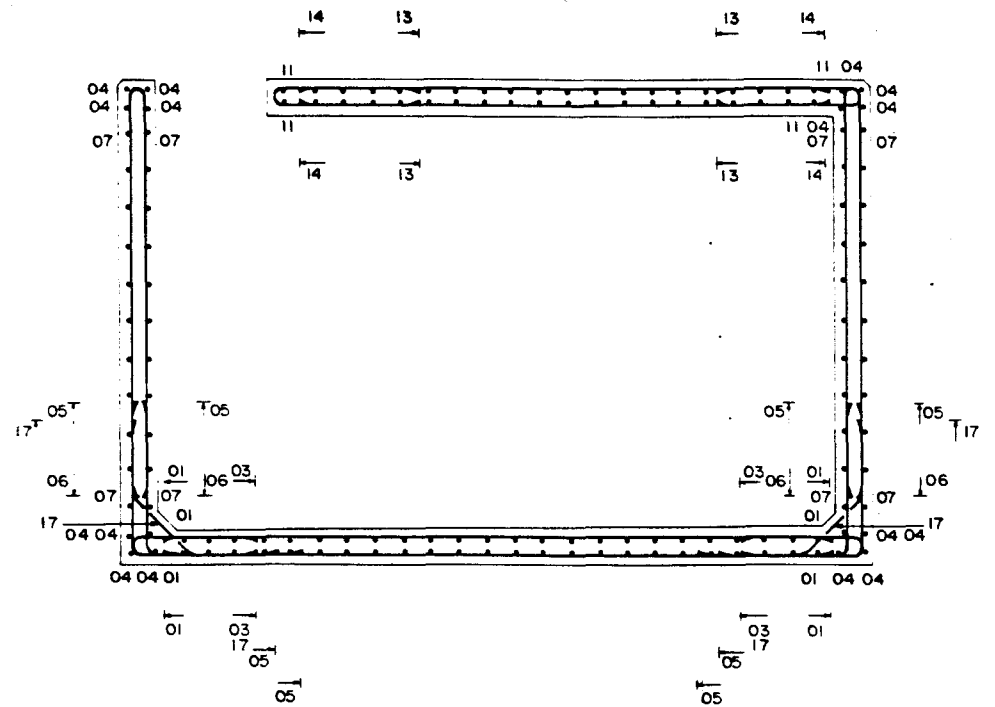
DRAWING NO 010      SCALE Refer to bar scale

DATE MAY 1988

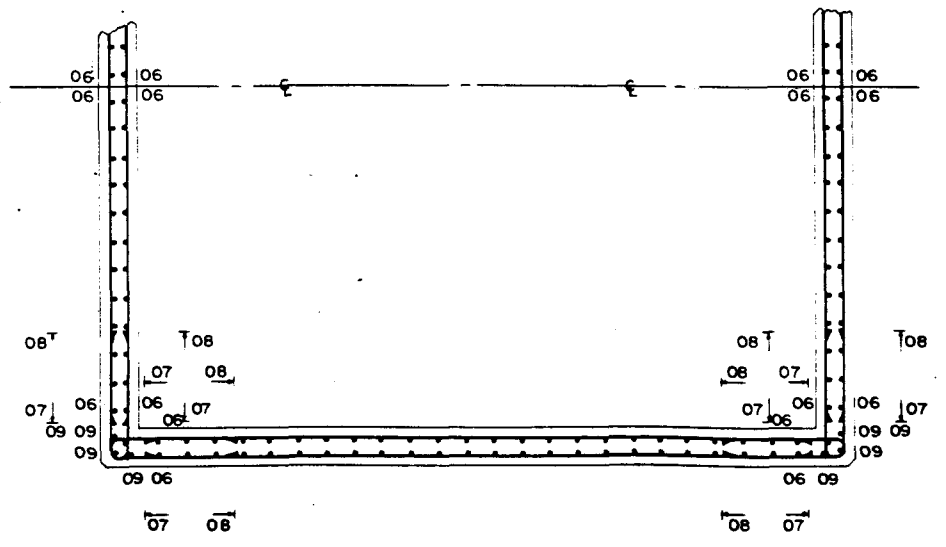
By Willem Hatwell & Partners  
Consulting Engineers and Architects  
Burdens Park  
Swindon, Wiltshire SN4 0QD



SECTION A-A



SECTION B-B



SECTION C-C

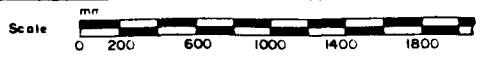
NOTES

- 1 For position of sections see drawing number O10.
- 2 Reinforcement nomenclature:
  - 05 ——— Bar mark 05
  - Position of end of bar
- 3 For bar position spacings and diameters refer to drawing No. O10.
- 4 For shapes and lengths refer to relevant bending schedules.
- 5 The notes on drawing number O10 also apply.
- 6 The drawing is schematic only. Do not scale.

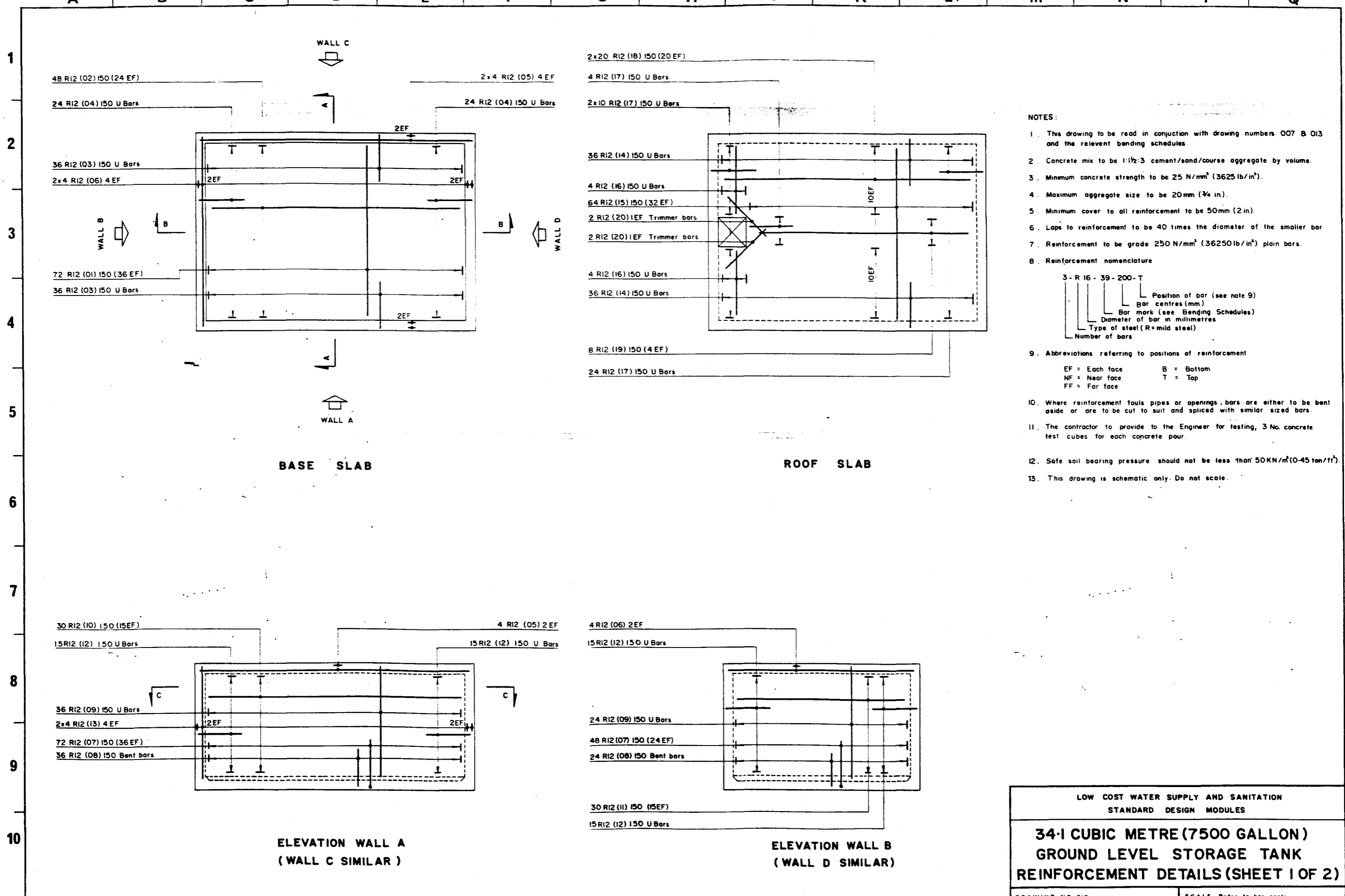
LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES

**22.8 CUBIC METRE (5000 GALLON)  
GROUND LEVEL STORAGE TANK  
REINFORCEMENT DETAILS (SHEET 2 OF 2)**

DRAWING NO O11 SCALE Refer to bar scale



DATE MAY 88  
Sr William Maltrow & Partners  
Consulting Engineers and Architects  
Bundrap Park  
Sunderland, Wiltshire SN4 0QD



- NOTES:**
- This drawing to be read in conjunction with drawing numbers 007 B 013 and the relevant bending schedules.
  - Concrete mix to be 1:1½:3 cement/sand/course aggregate by volume.
  - Minimum concrete strength to be 25 N/mm<sup>2</sup> (3625 lb/in<sup>2</sup>).
  - Maximum aggregate size to be 20mm (¾ in).
  - Minimum cover to all reinforcement to be 50mm (2 in).
  - Laps to reinforcement to be 40 times the diameter of the smaller bar.
  - Reinforcement to be grade 250 N/mm<sup>2</sup> (36250 lb/in<sup>2</sup>) plain bars.
  - Reinforcement nomenclature  
 3 - R 16 - 39 - 200 - T  
 Number of bars      Diameter of bar in millimetres      Bar mark (see Bending Schedules)      Bar centres (mm)      Position of bar (see note 9)      Type of steel (R = mild steel)
  - Abbreviations referring to positions of reinforcement  
 EF = Each face      B = Bottom  
 NF = Near face      T = Top  
 FF = Far face
  - Where reinforcement fouls pipes or openings, bars are either to be bent aside or are to be cut to suit and spliced with similar sized bars.
  - The contractor to provide to the Engineer for testing, 3 No. concrete test cubes for each concrete pour.
  - Safe soil bearing pressure should not be less than 50KN/m<sup>2</sup> (0.45 ton/ft<sup>2</sup>).
  - This drawing is schematic only. Do not scale.

LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES

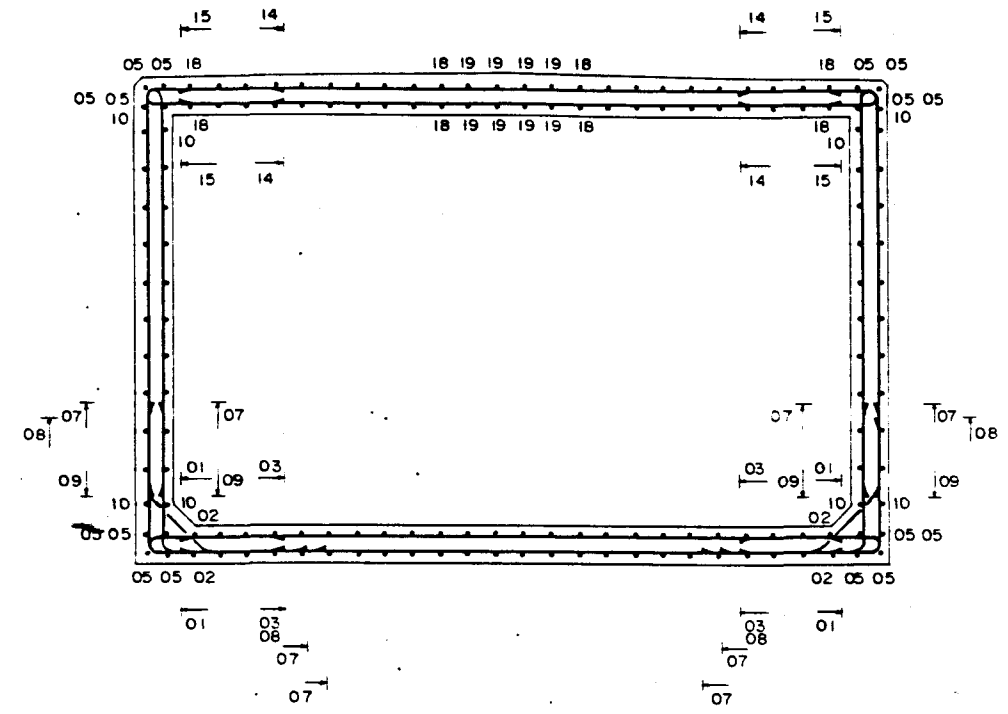
**34.1 CUBIC METRE (7500 GALLON)  
GROUND LEVEL STORAGE TANK  
REINFORCEMENT DETAILS (SHEET 1 OF 2)**

DRAWING NO 012	SCALE Refer to bar scale
By William Malcrew & Partners Consulting Engineers and Architects Burdorp Park Swindon, Wiltshire SN4 0QD	
DATE MAY 1988	

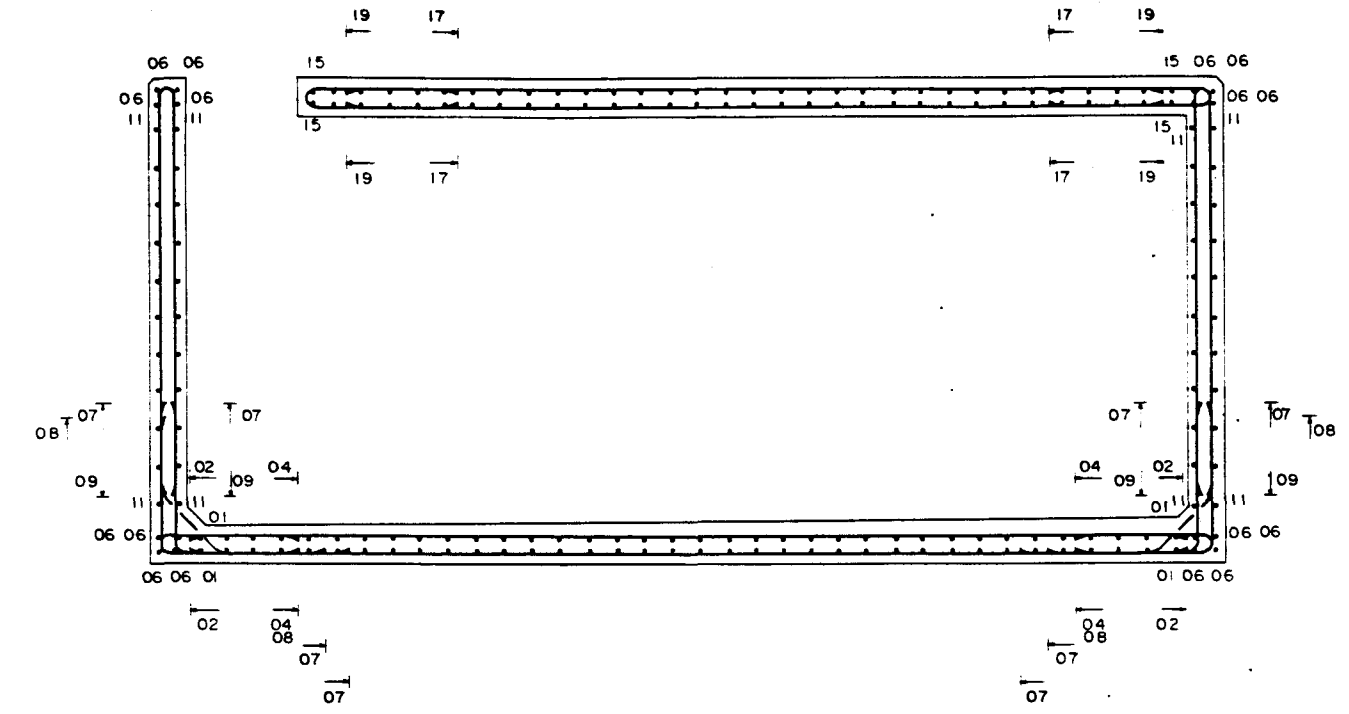


A B C D E F G H I J K L M N O P Q

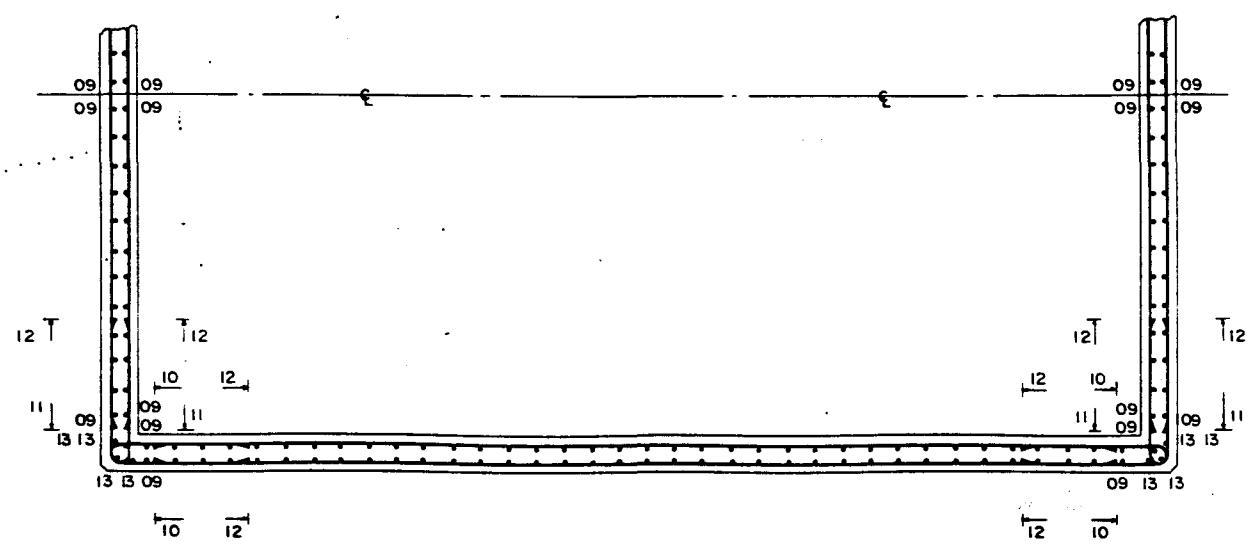
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SECTION A-A




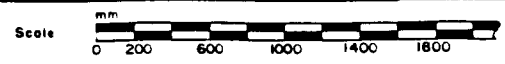
SECTION B-B



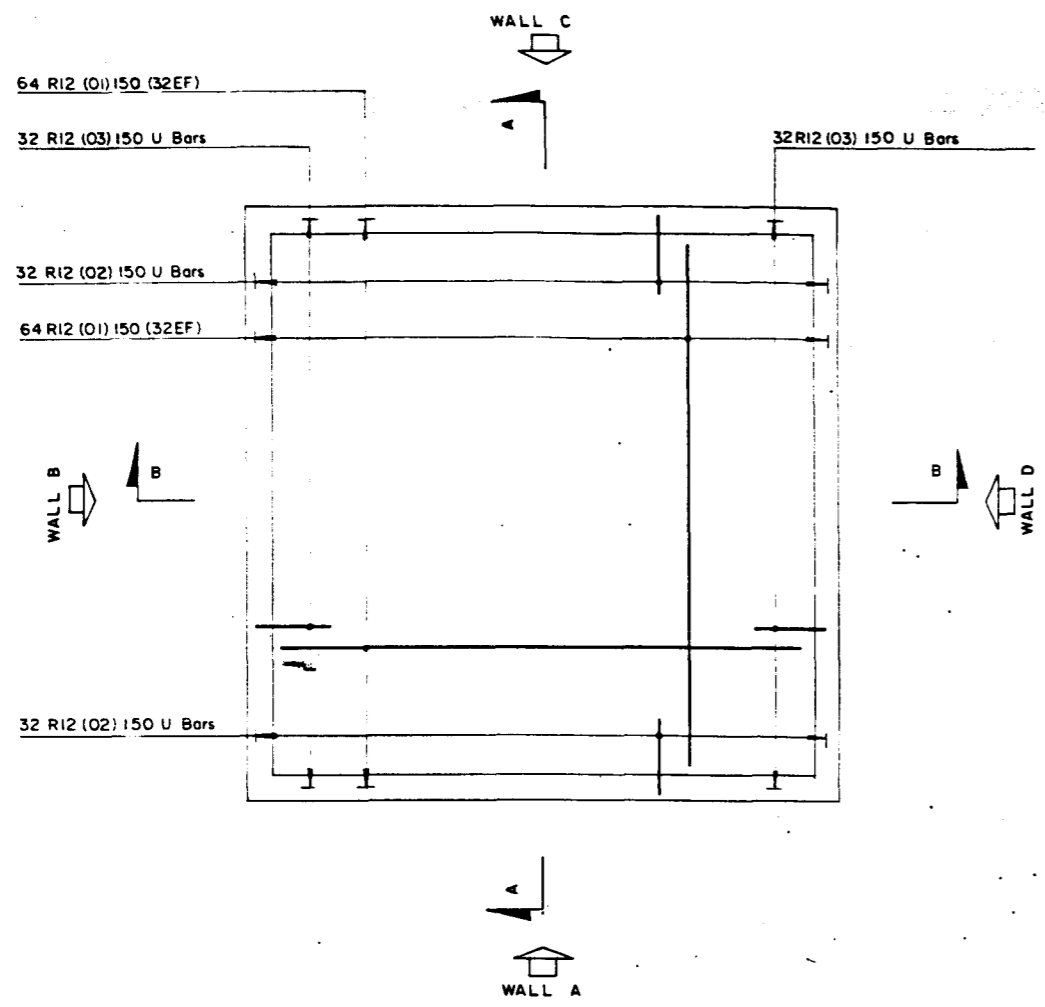
SECTION C-C

NOTES

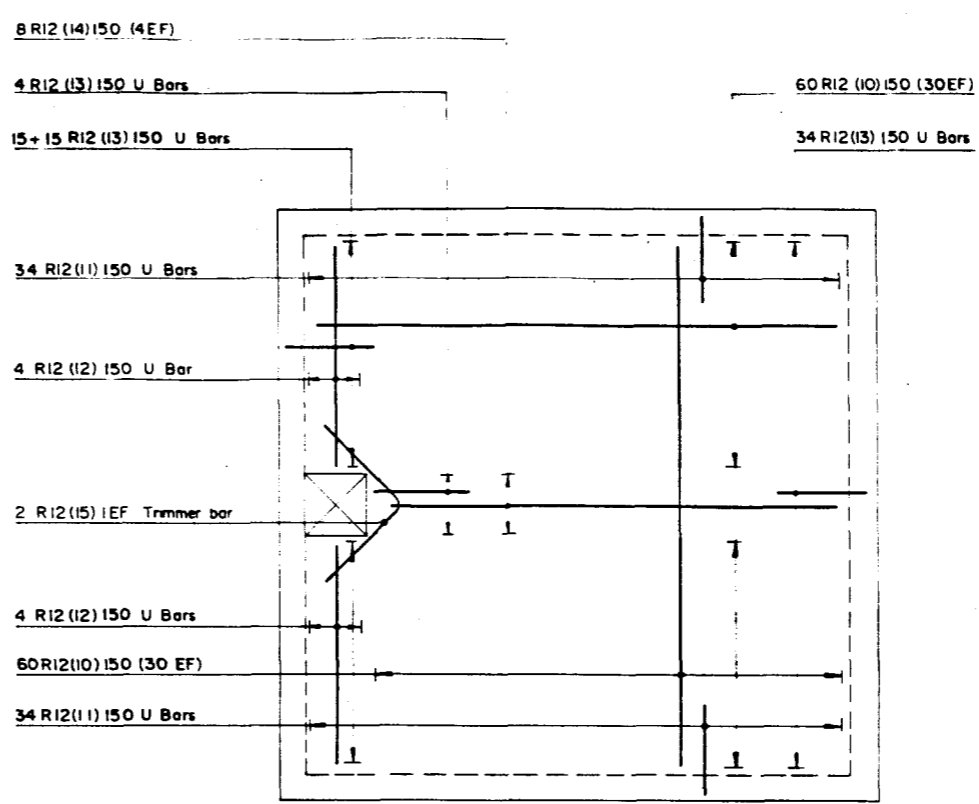
- 1 For position of sections see drawing number 012
- 2 Reinforcement nomenclature:  
 05 — Bar mark 05  
 Position of end of bar
- 3 For bar positions, spacings, and diameters refer to plans and elevations on drawing number 012
- 4 For bar shapes and lengths refer to relevant bending schedules.
- 5 The notes on drawing number 012 also apply
- 6 This drawing is schematic only. Do not scale.



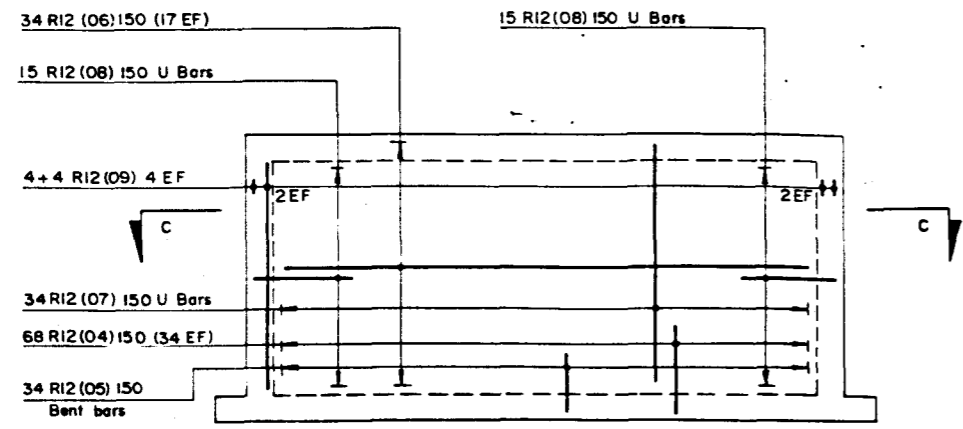
LOW COST WATER SUPPLY AND SANITATION STANDARD DESIGN MODULES	
<b>34.1 CUBIC METRE (7500 GALLON) GROUND LEVEL STORAGE TANK REINFORCEMENT DETAILS (SHEET 2 OF 2)</b>	
DRAWING NO 013	SCALE Refer to bar scale
DATE MAY 88	
Sir William Halcrow & Partners Consulting Engineers and Architects Burdorp Park Sunderland, Wiltshire SN4 0DD	



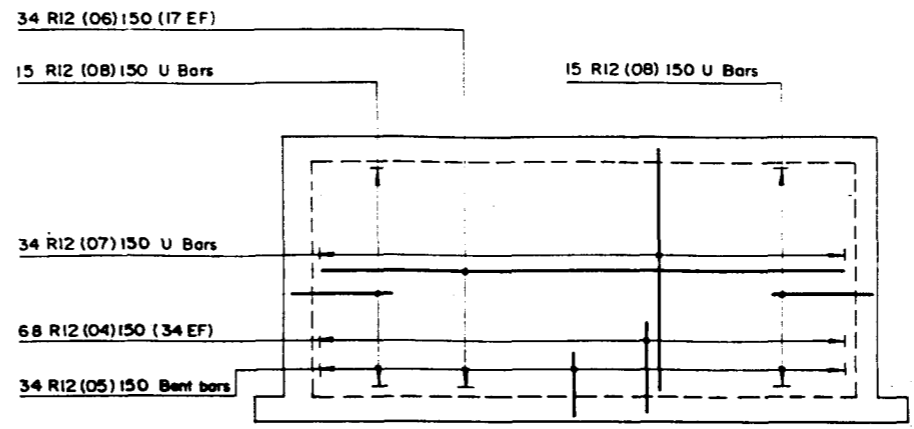
BASE PLAN



ROOF PLAN



ELEVATION WALL A  
(WALL C SIMILAR)



ELEVATION WALL B  
(WALL D SIMILAR)

NOTES

1. This drawing to be read in conjunction with drawing numbers 007 & 015 and the relevant bending schedules.
2. Concrete mix to be 1:1/2:3 cement/sand/course aggregate by volume.
3. Minimum concrete strength to be 25 N/mm<sup>2</sup> (3625 lb/in<sup>2</sup>).
4. Maximum aggregate size to be 20mm (3/4 in).
5. Minimum cover to all reinforcement to be 50mm (2 in).
6. Laps to reinforcement to be 40 times the diameter of the smaller bar.
7. Reinforcement to be grade 250 N/mm<sup>2</sup> (36250 lb/in<sup>2</sup>) plain bars.
8. Reinforcement nomenclature:  

3 - R 16 - 39 - 200 - T	
	Position of bar (see note 9)
	Bar centres (mm)
	Bar mark (see Bending Schedules)
	Diameter of bar in millimetres
	Type of steel (R=mid steel)
	Number of bars
9. Abbreviations referring to position of reinforcement:  

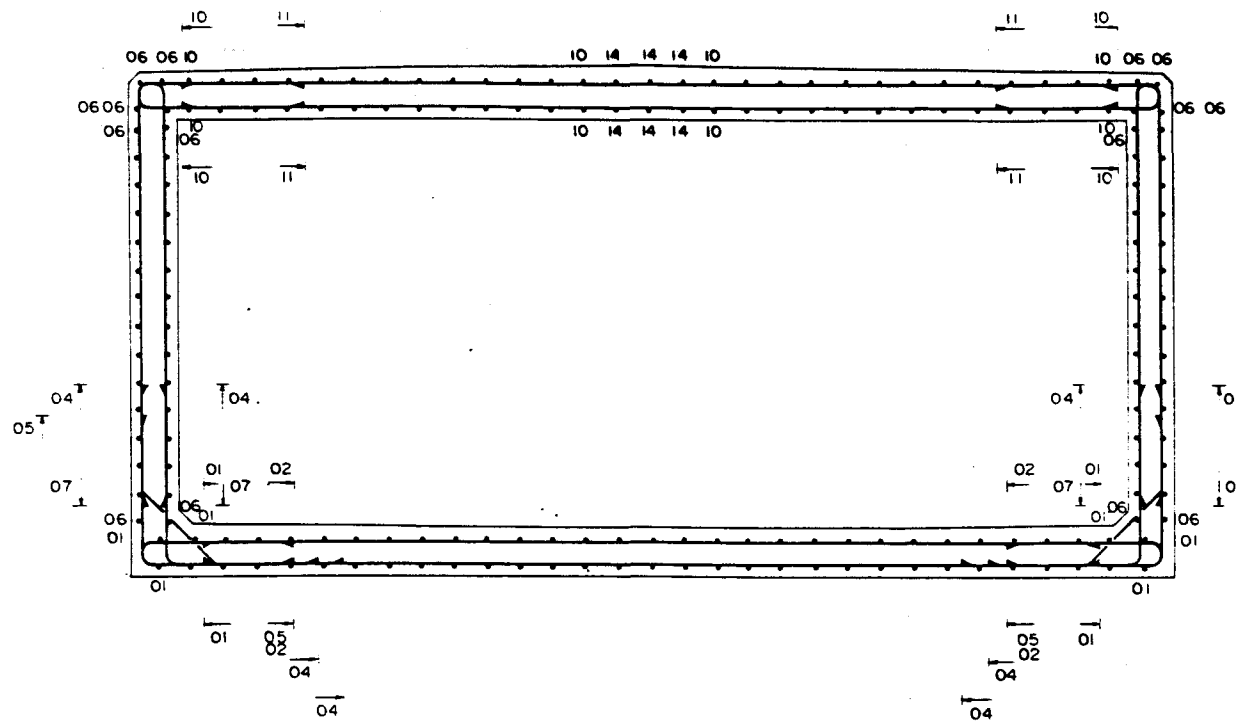
EF = Each face	B = Bottom
NF = Near face	T = Top
FF = Far face	
10. Where reinforcement fouls pipes or openings, bars are either to be bent aside or are to be cut to suit and spliced with similar sized bars.
11. The contractor to provide to the Engineer for testing, 3 No. concrete test cubes for each concrete pour.
12. Safe soil bearing pressure should not be less than 50kN/m<sup>2</sup> (0.45 ton/ft<sup>2</sup>).
13. This drawing is schematic only. Do not scale.

LOW COST WATER SUPPLY AND SANITATION STANDARD DESIGN MODULES	
<b>45.5 CUBIC METRE (10,000 GALLON) GROUND LEVEL STORAGE TANK REINFORCEMENT DETAILS (SHEET 1 OF 2)</b>	
DRAWING NO 014	SCALE Refer to Bar Scale
Sir William Halcrow & Partners Ltd Consulting Engineers and Architects Burscough Park Swindon, Wiltshire, SN4 6DD	
DATE: JUNE 1988	

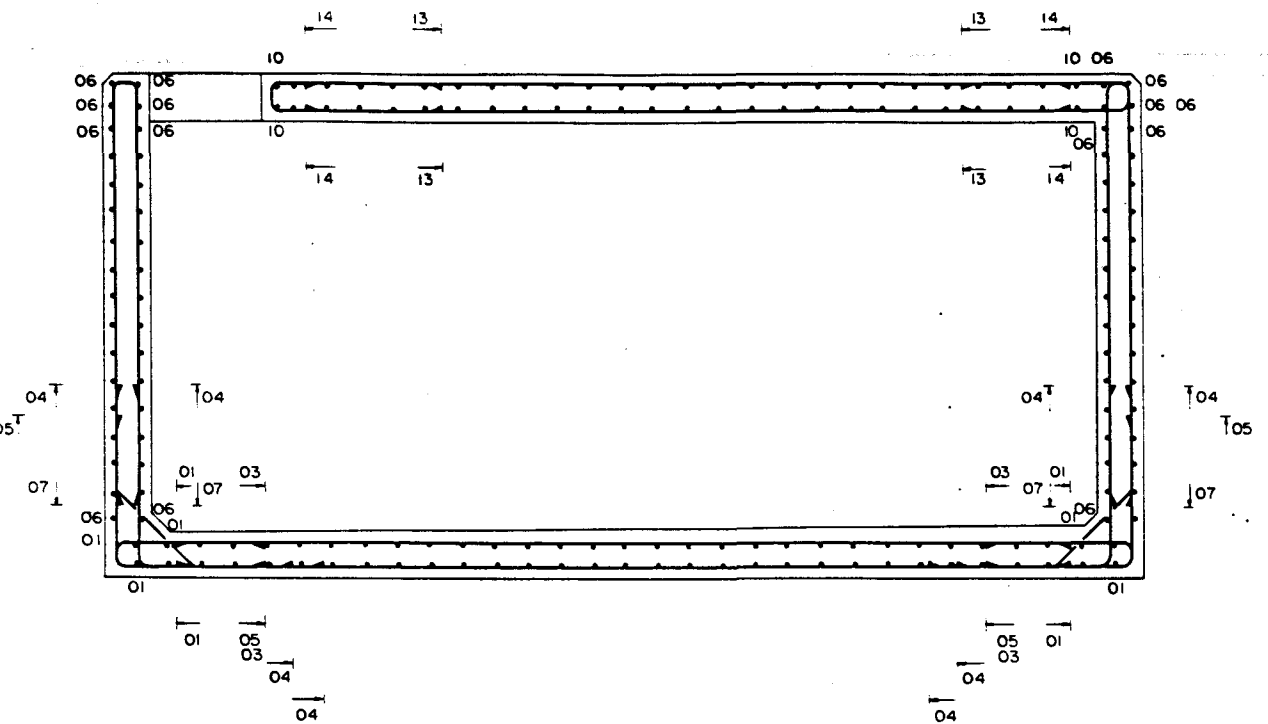


A B C D E F G H J K L M N P Q

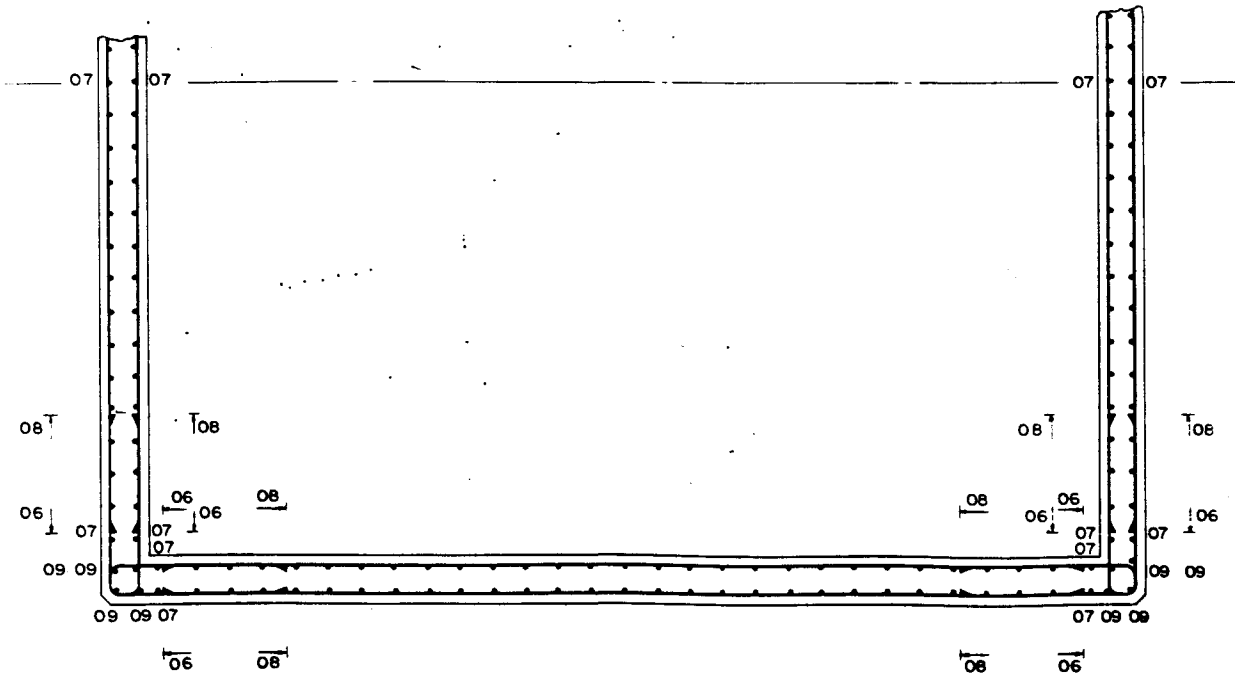
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SECTION A-A




SECTION B-B

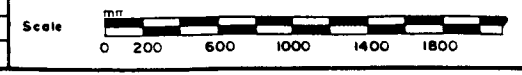


SECTION C-C

NOTES

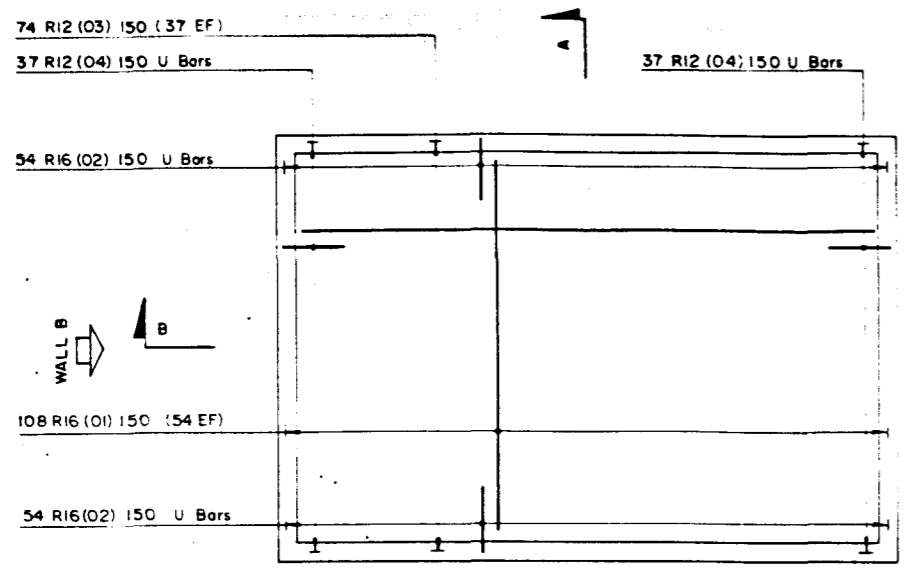
- 1 For position of sections see drawing number O14.
- 2 Reinforcement nomenclature:  
 05 — Bar mark 05  
 Position of end of bar
- 3 For bar positions, spacings, and diameters refer to plans and elevations on drawing number O14.
- 4 For bar shapes and lengths refer to relevant bending schedules.
- 5 The notes on drawing number O14 also apply.
- 6 This drawing is schematic only. Do not scale.

LOW COST WATER SUPPLY AND SANITATION STANDARD DESIGN MODULES	
<b>45.5 CUBIC METRE (10,000 GALLON) GROUND LEVEL STORAGE TANK REINFORCEMENT DETAILS (SHEET 2 OF 2)</b>	
DRAWING NO O15	SCALE: Refer to bar scale
Sir William Halcrow & Partners Ltd Consulting Engineers and Architects Burdett Park, Sandown, Wiltshire, SN4 6DD	
DATE: JUNE 1988	

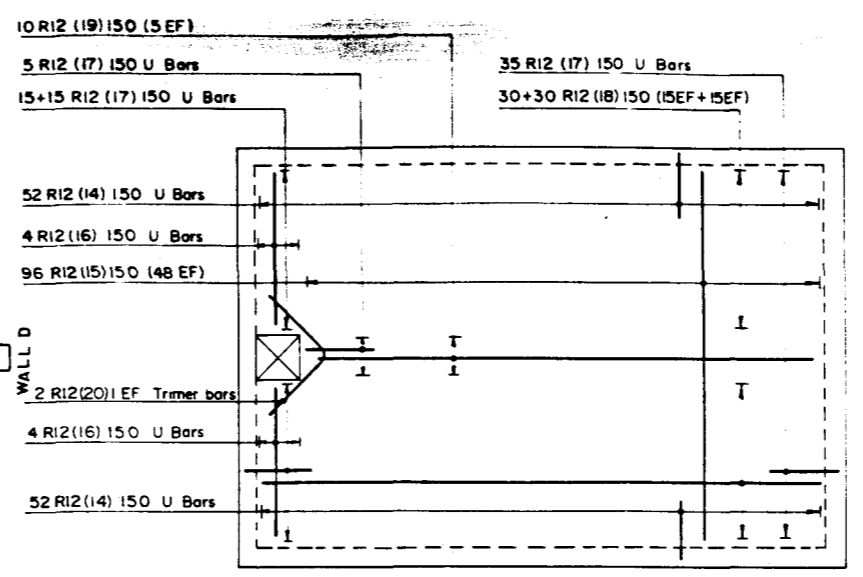


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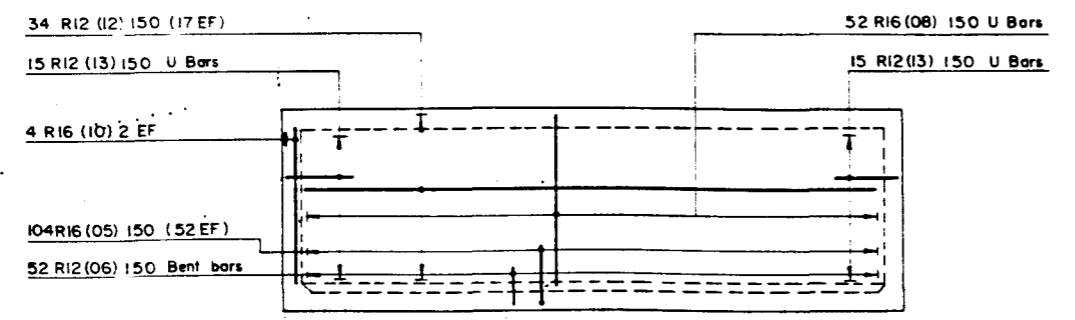
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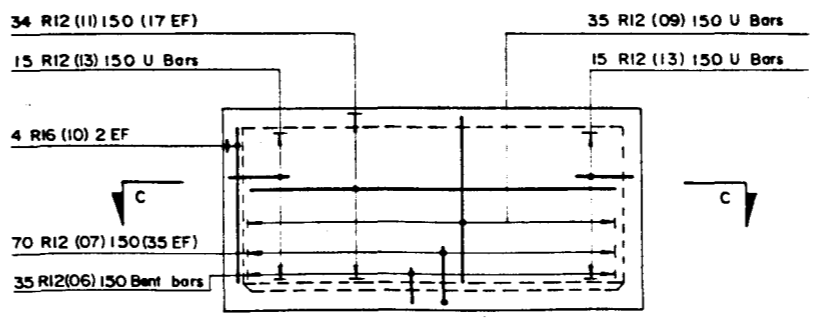
BASE PLAN



ROOF PLAN



ELEVATION WALL A  
(WALL C SIMILAR)



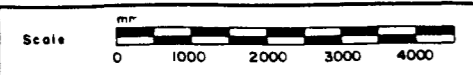
ELEVATION WALL B  
(WALL D SIMILAR)

NOTES:

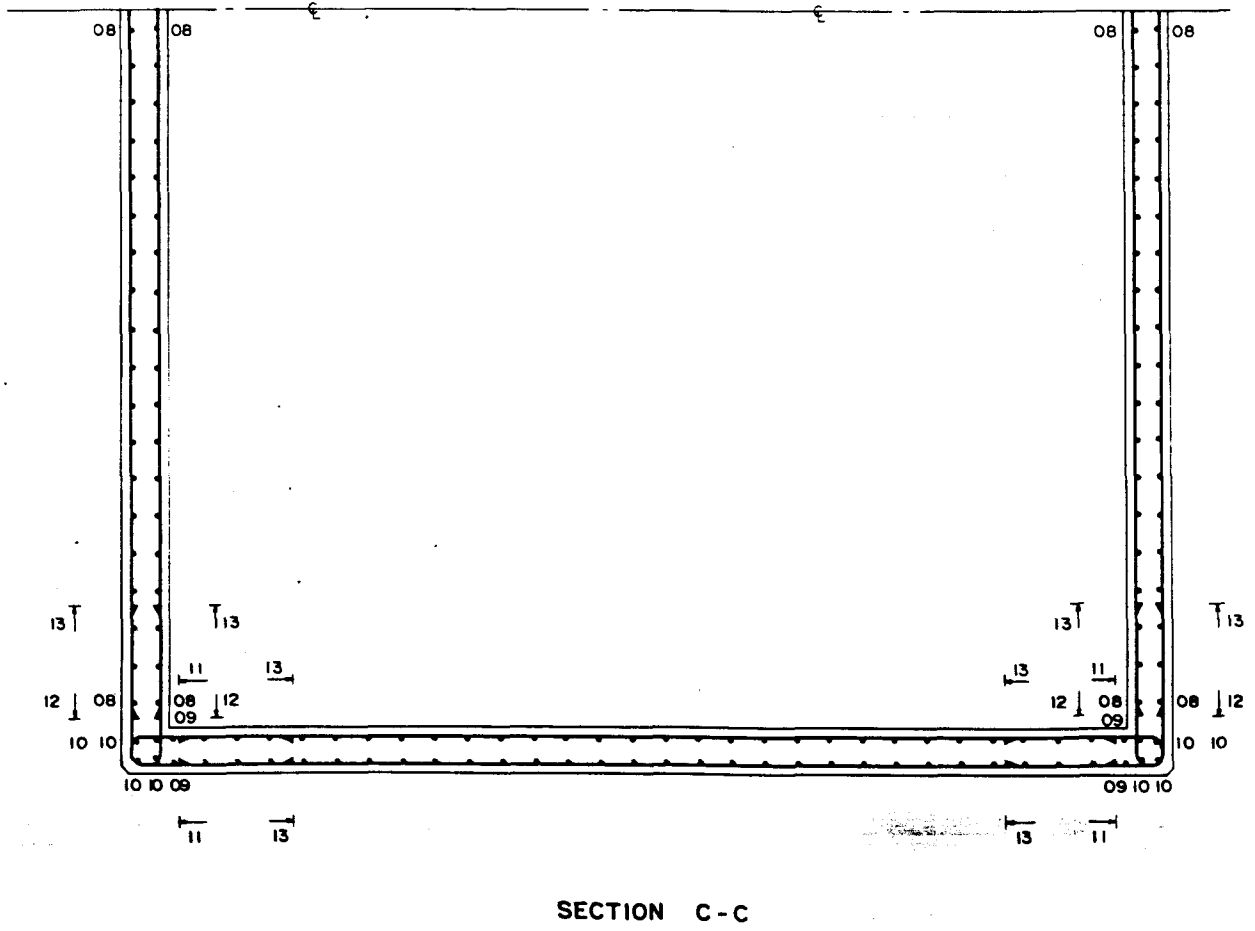
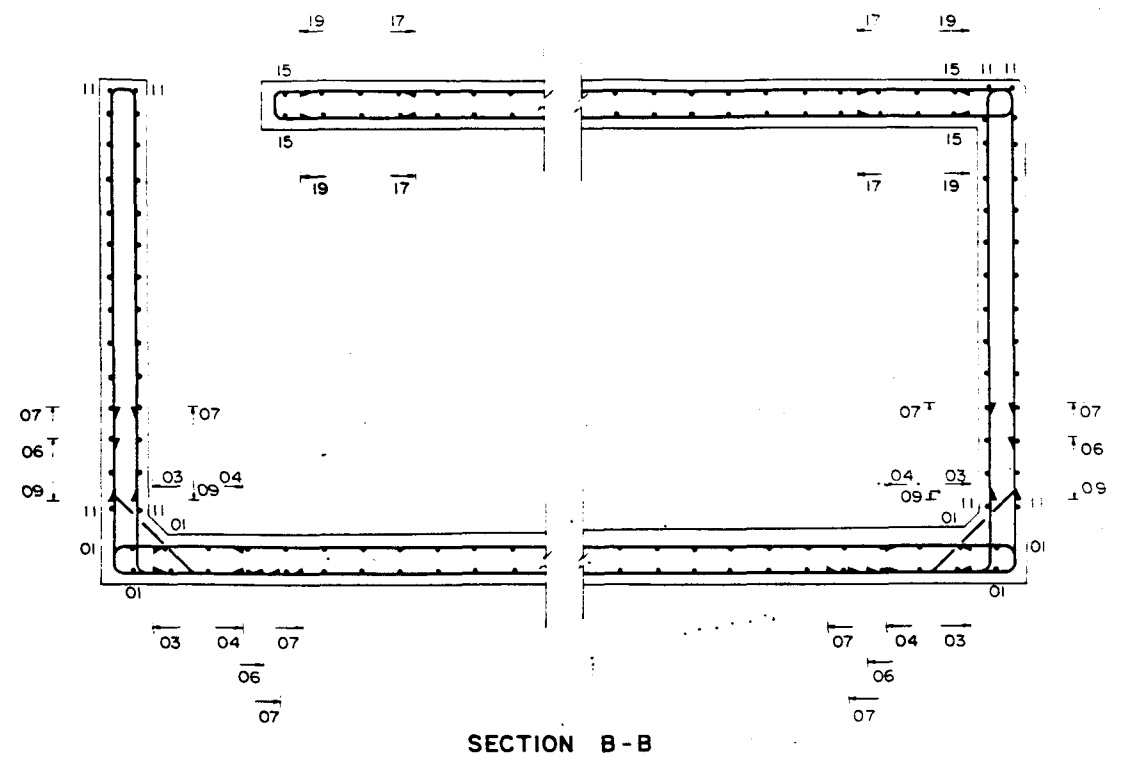
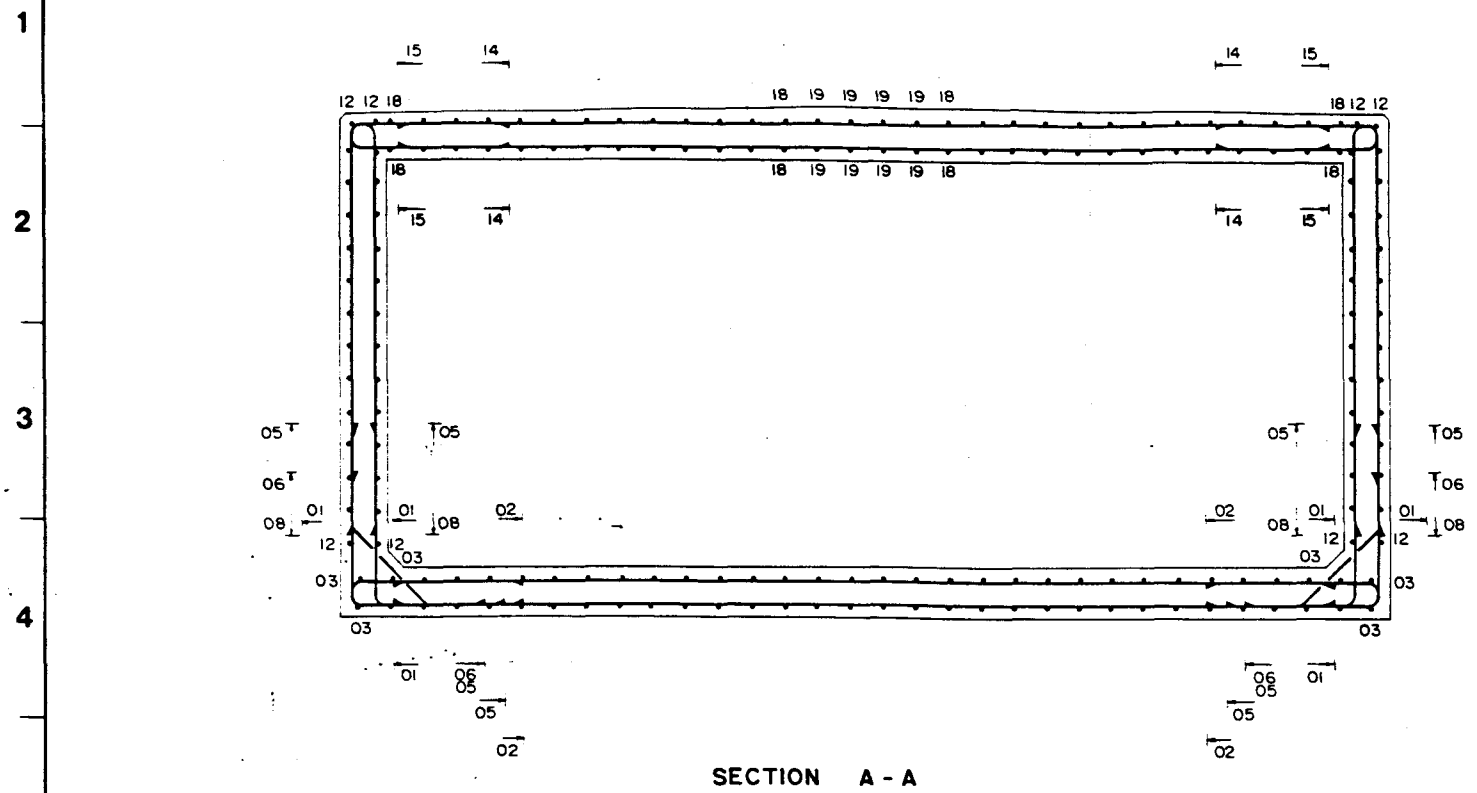
1. This drawing to be read in conjunction with drawing numbers 007 B 017 and the relevant bending schedules
2. Concrete mix to be 1:1 1/2:3 cement/sand/course aggregate by volume.
3. Minimum concrete strength to be 25 N/mm<sup>2</sup> (3625 lb/in<sup>2</sup>).
4. Maximum aggregate size to be 20mm (3/4 in).
5. Minimum cover to all reinforcement to be 50mm (2 in).
6. Laps to reinforcement to be 40 times the diameter of the smaller bar.
7. Reinforcement to be grade 250 N/mm<sup>2</sup> (36250 lb/in<sup>2</sup>) plain bars.
8. Reinforcement nomenclature:  

3-R 16 - 39-200-T	Position of bar (see note 9)
	Bar centres (mm)
	Bar mark (see Bending Schedules)
	Diameter of bar in millimetres
	Type of steel (R=mid steel)
	Number of bars
9. Abbreviations referring to position of reinforcement:  

EF = Each face	B = Bottom
NF = Near face	T = Top
FF = Far face	
10. Where reinforcement fouls pipes or openings, bars are either to be bent aside or are to be cut to suit and spliced with similar sized bars.
11. The contractor to provide to the Engineer for testing,  
3 No. concrete test cubes for each concrete pour.
12. Safe soil bearing pressure should not be less than 50kN/m<sup>2</sup> (0.45 ton/ft<sup>2</sup>)
13. This drawing is schematic only. Do not scale.



LOW COST WATER SUPPLY AND SANITATION STANDARD DESIGN MODULES	
<b>68.3 CUBIC METRE (15,000 GALLON) GROUND LEVEL STORAGE TANK REINFORCEMENT DETAILS (SHEET 1 OF 2)</b>	
DRAWING NO 016	SCALE: Refer to Bar Scale
Sir William Halcrow & Partners Ltd Consulting Engineers and Architects Burnersop Park Sandown, Wiltshire, SN4 9DD DATE: JUNE 1988	

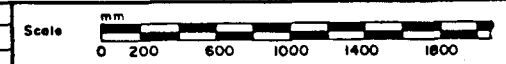


- NOTES**
- 1 For position of sections see drawing number O16
  - 2 Reinforcement nomenclature:
    - 05 ——— Bar mark 05
    - Position of end of bar
  - 3 For bar position, spacings, and diameters refer to plans and elevations on drawing number O16.
  - 4 For bar shapes and lengths refer to relevant bending schedules.
  - 5 The notes on drawing number O16 also apply.
  - 6 This drawing is schematic only. Do not scale.

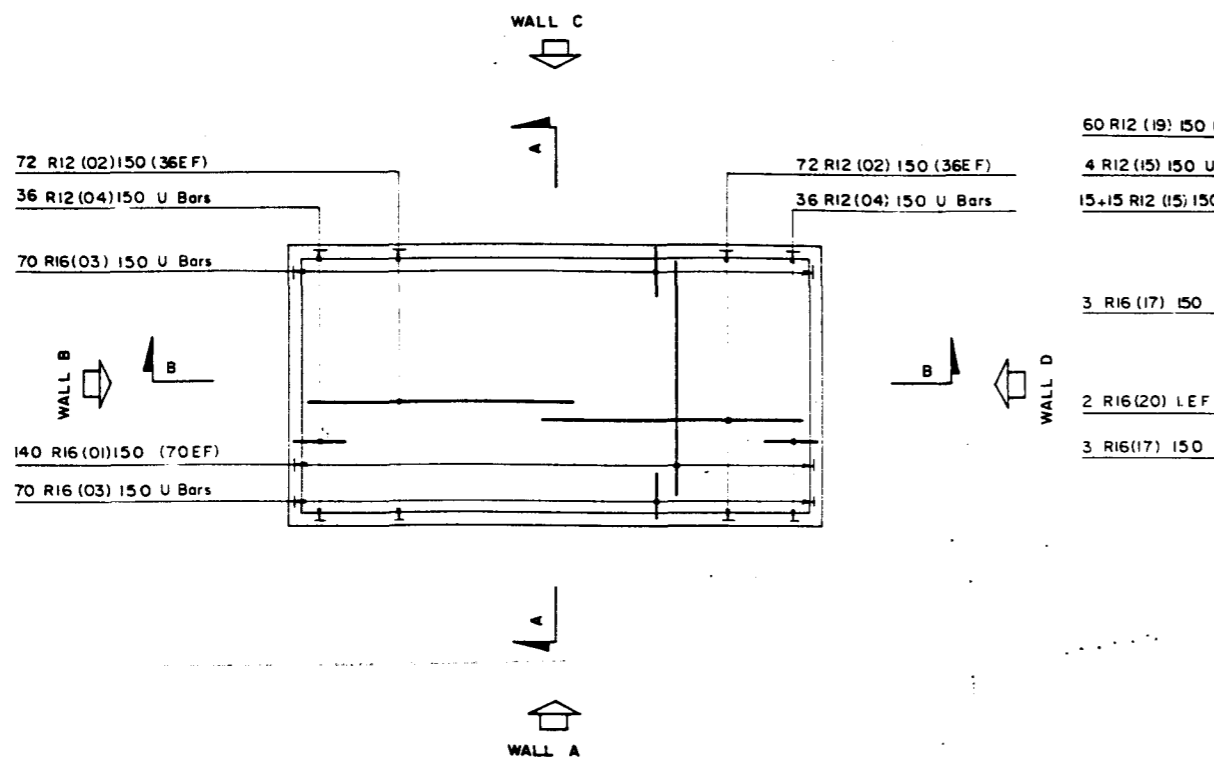
**LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES**

**68.3 CUBIC METRE (15,000 GALLON)  
GROUND LEVEL STORAGE TANK  
REINFORCEMENT DETAILS (SHEET 2 OF 2)**

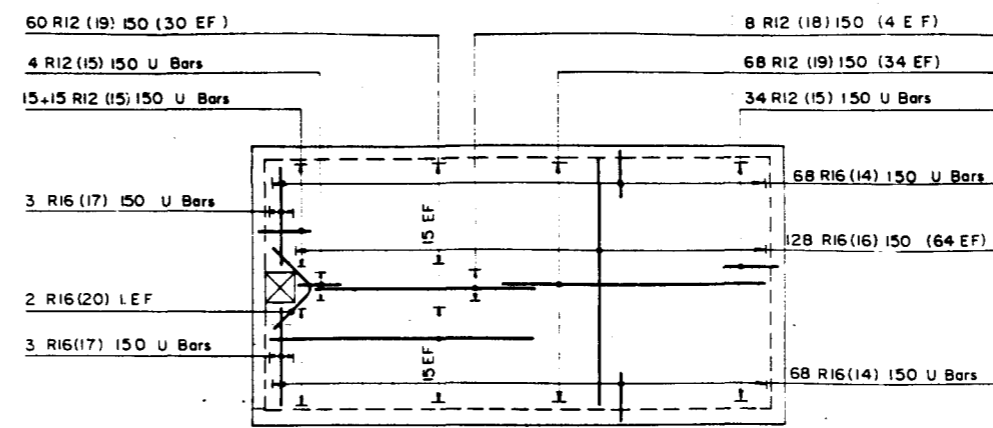
DRAWING NO O17	SCALE Refer to bar scale
Sir William Halcrow & Partners Ltd Consulting Engineers and Architects Burderop Park Swindon, Wiltshire, SN4 0DD	
DATE: JUNE 1988	



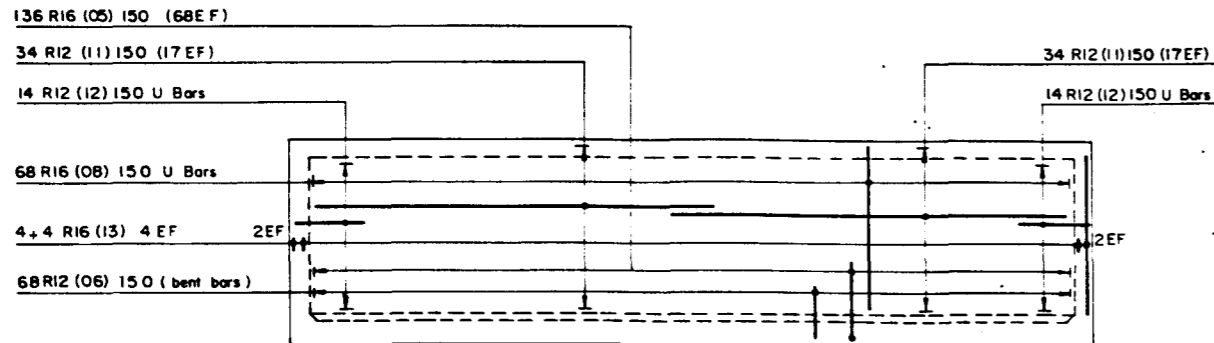
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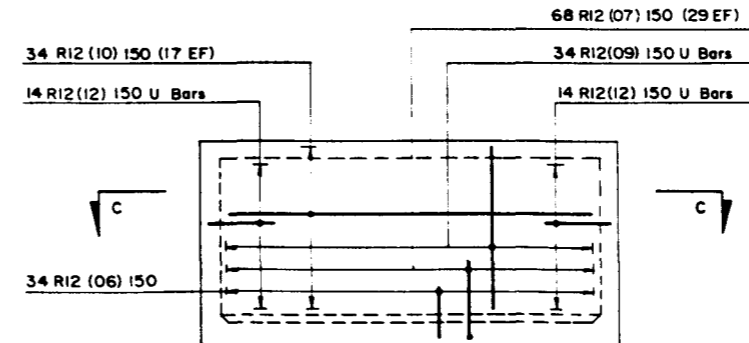
**BASE PLAN (Scale a)**



**ROOF PLAN (Scale b)**



**WALL A ELEVATION A (Scale b)  
(WALL C SIMILAR)**



**WALL B ELEVATION (Scale b)  
(WALL D SIMILAR)**

**NOTES**

1. This drawing to be read in conjunction with drawing numbers 007 B 019 and the relevant bending schedules.
2. Concrete mix to be 1:1/2:3 cement/sand/course aggregate by volume
3. Minimum concrete strength to be 25 N/mm<sup>2</sup> (3625 lb/in<sup>2</sup>).
4. Maximum aggregate size to be 20mm (3/4 in)
5. Minimum cover to all reinforcement to be 50mm (2 in).
6. Laps to reinforcement to be 40 times the diameter of the smaller bar
7. Reinforcement to be grade 250 N/mm<sup>2</sup> (36250 lb/in<sup>2</sup>) plain bars
8. Reinforcement nomenclature:  

3 - R 16 - 39 - 200 - T	
┌───┐	Position of bar (see note 9)
├───┤	Bar centres (mm)
└───┘	Bar mark (see Bending Schedules)
┌───┐	Diameter of bar in millimetres
├───┤	Type of steel (R=mild steel)
└───┘	Number of bars
9. Abbreviations referring to position of reinforcement:  

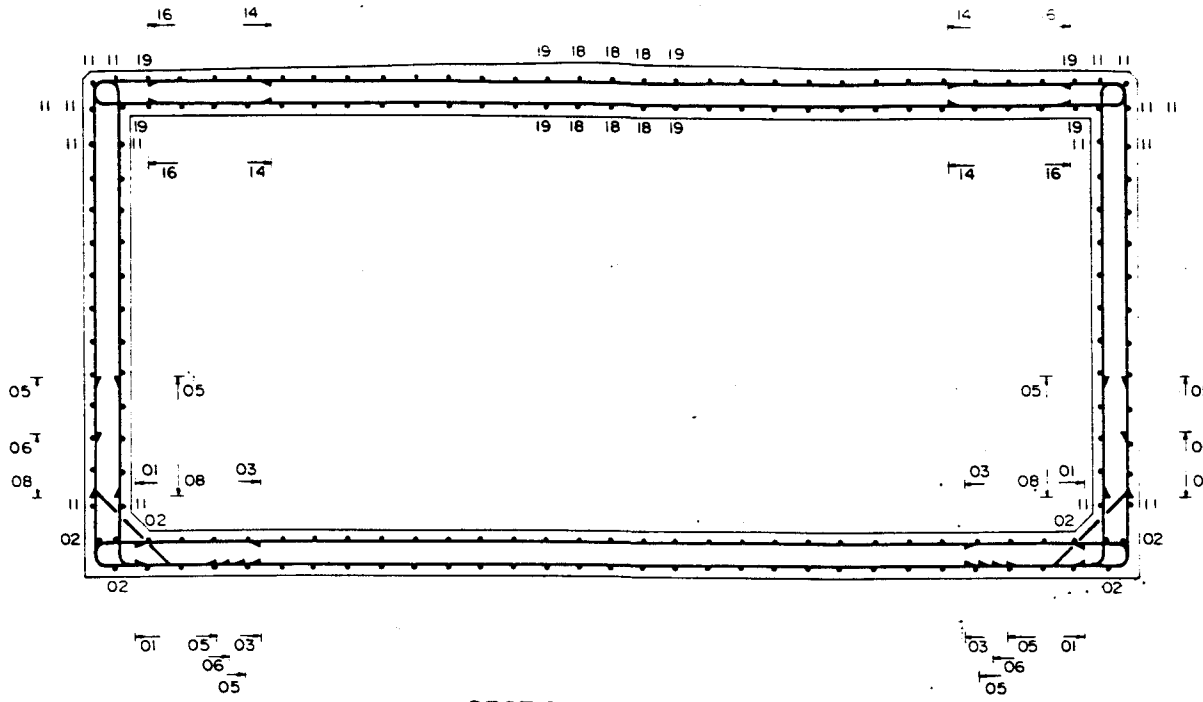
EF = Each face	B = Bottom
NF = Near face	T = Top
FF = Far face	
10. Where reinforcement fouls pipes or openings, bars are either to be bent aside or are to be cut to suit and spliced with similar sized bars.
11. The contractor to provide to the Engineer for testing,  
3 No concrete test cubes for each concrete.
12. Safe soil bearing pressure should not be less than 50kN/m<sup>2</sup> (0.45 ton/ft<sup>2</sup>)
13. This drawing is schematic only. Do not scale.



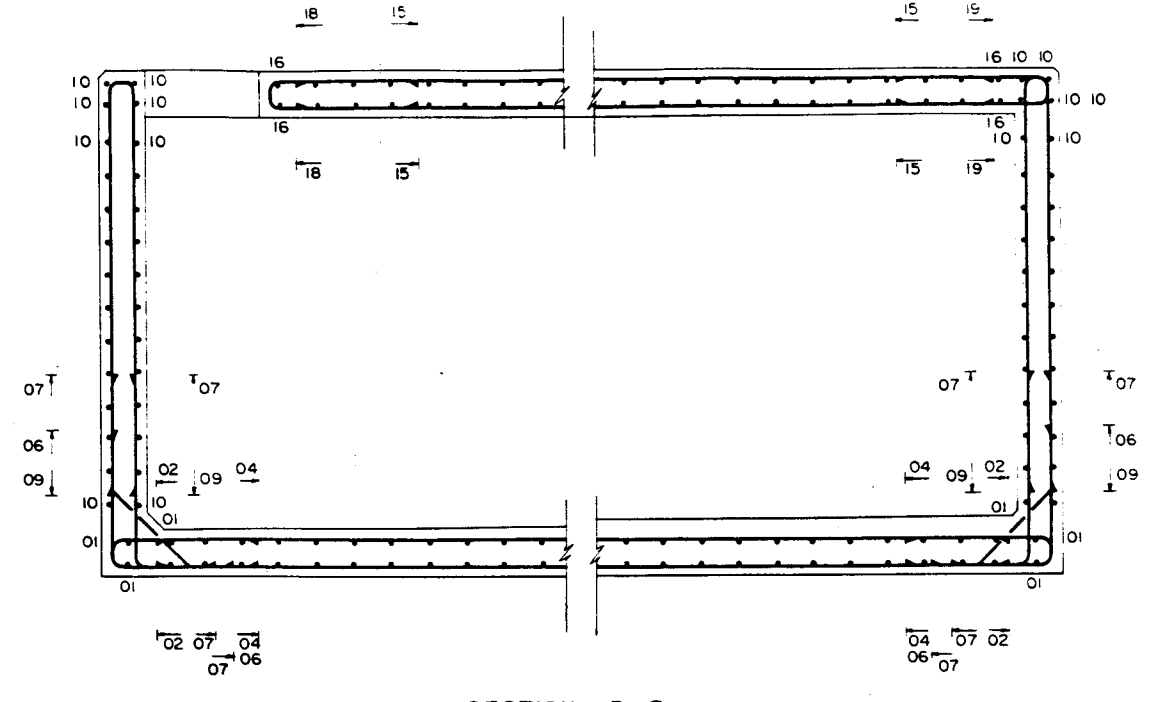
LOW COST WATER SUPPLY AND SANITATION STANDARD DESIGN MODULES	
<b>91.0 CUBIC METRE (20,000 GALLON) GROUND LEVEL STORAGE TANK REINFORCEMENT DETAILS (SHEET 1 OF 2)</b>	
DRAWING NO 018	SCALE: Refer to bar scales
<small>Sir William Halcrow &amp; Partners Ltd Consulting Engineers and Architects Burdorpe Park Swindon, Wiltshire, SN4 0DD</small>	
DATE: JUNE 1988	

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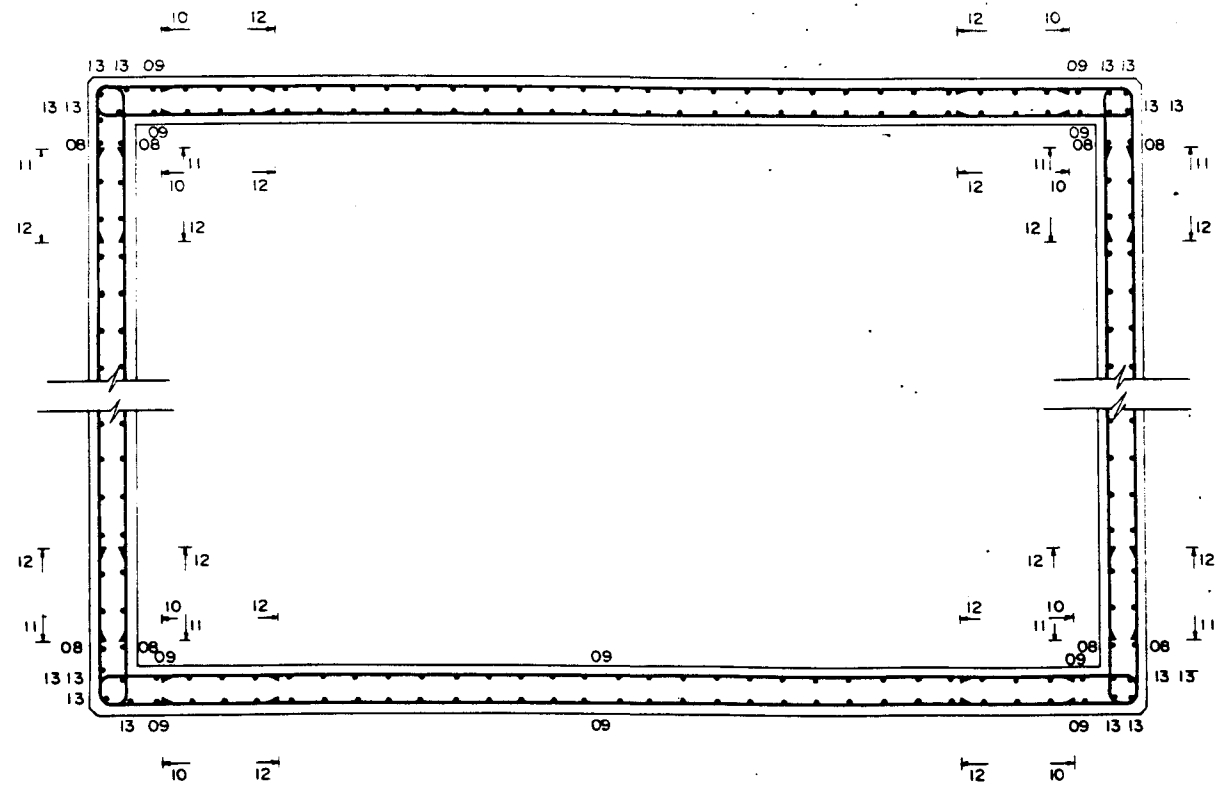
A B C D E F G H J K L M N P Q



SECTION A - A



SECTION B - B



SECTION C - C

NOTES

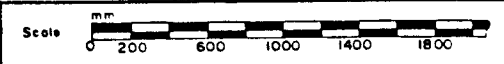
- 1 For position of sections see drawing number O18
- 2 Reinforcement nomenclature
  - 05 ——— Bar mark 05
  - Position of end of bar
- 3 For bar position spacings and diameters refer to drawing No. O18
- 4 For shapes and lengths refer to relevant bending schedules.
- 5 The notes on drawing number O18 also apply.
- 6 The drawing is schematic only. Do not scale.

LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES

**91.0 CUBIC METRE (20,000 GALLON)  
GROUND LEVEL STORAGE TANK  
REINFORCEMENT DETAILS (SHEET 2 OF 2)**

DRAWING NO. O19 SCALE Refer to bar scale.

DATE: JUNE 1988 Sir William Macrow & Partners Ltd  
Consulting Engineers and Architects  
Burderop Park,  
Swindon, Wiltshire, SN4 0DD



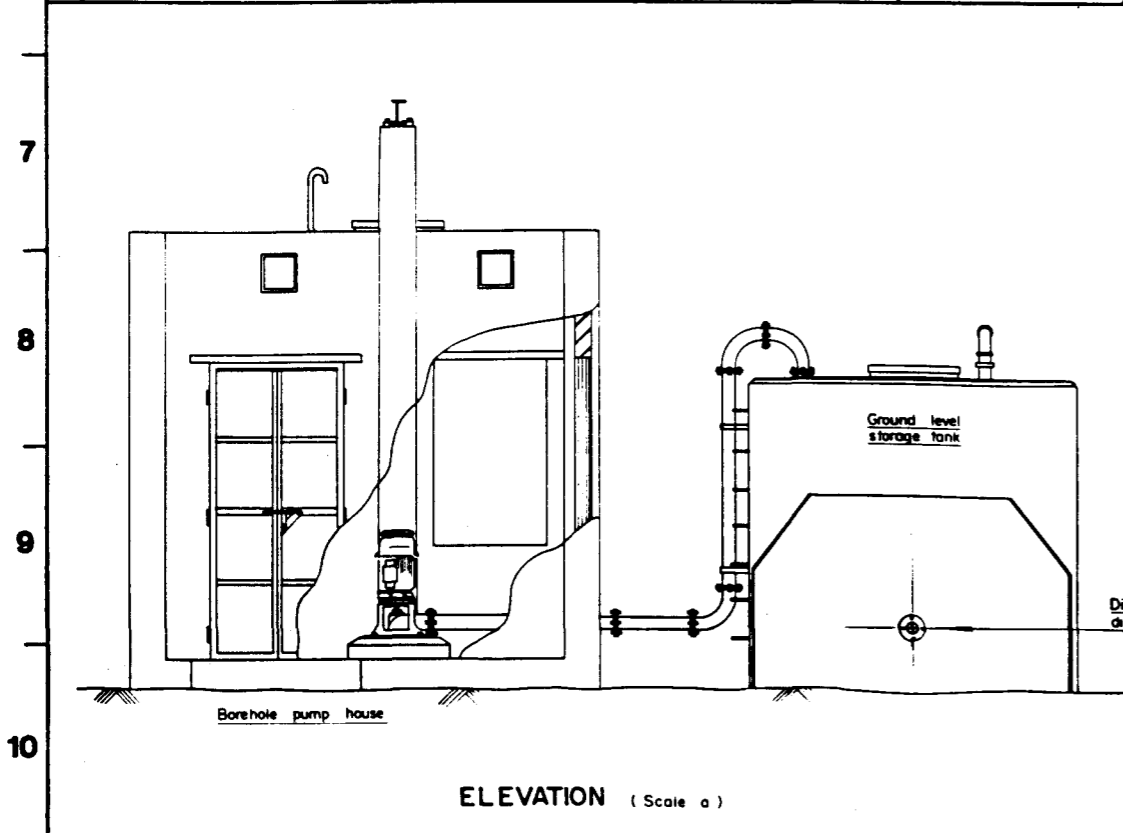
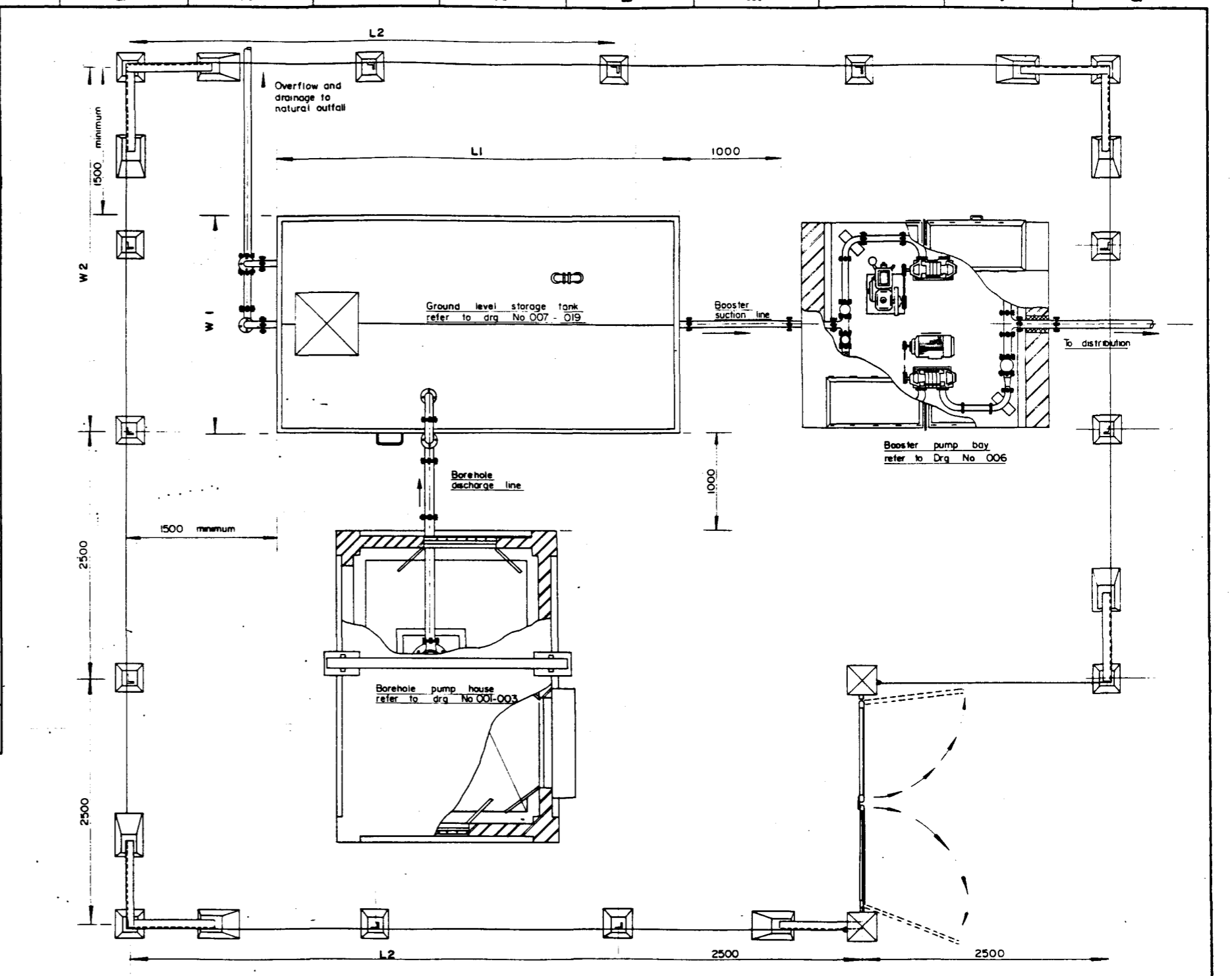
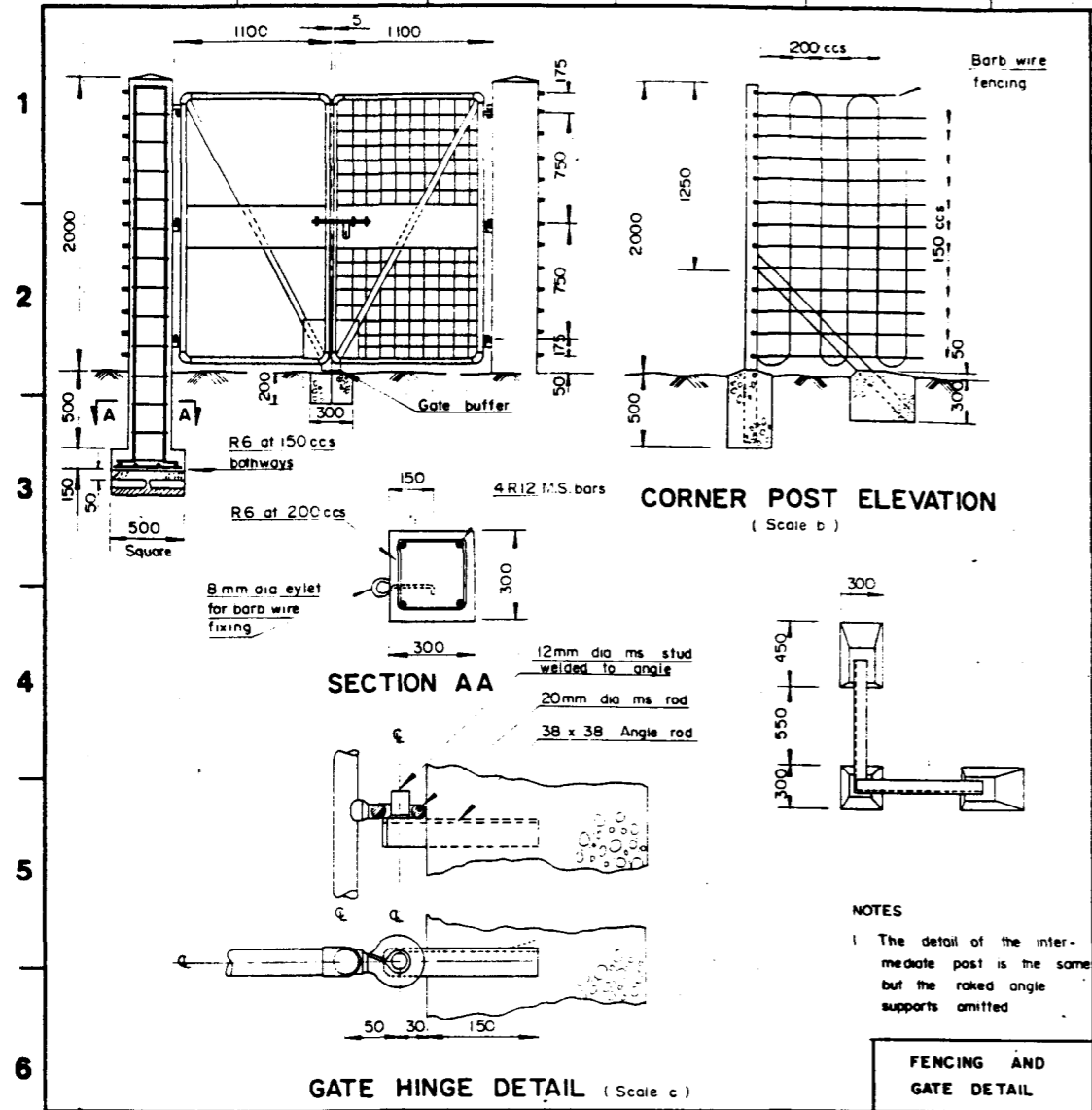


TABLE 1

Storage Live capacity GAL	L1	W1	L2	W2	Land Req. m <sup>2</sup>
2500	11.4	410	2260	5000	94
5000	22.8	410	4110	5000	119
7500	34.1	5660	4110	7500	119
10,000	45.5	5660	5660	7500	150
15,000	68.3	8210	5660	10,000	256
20,000	91.0	10760	5660	12,500	344

NOTES  
1. Gives the minimum land requirements for the various sizes of ground level storage tanks the dimensions L2 W2 are divisible by the post spacing of 2500mm

NOTES  
1. All dimensions are in millimetres unless otherwise stated

**LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES**

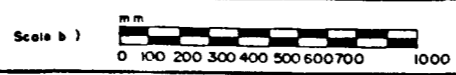
**GROUND WATER SUPPLY  
GENERAL ARRANGEMENT**

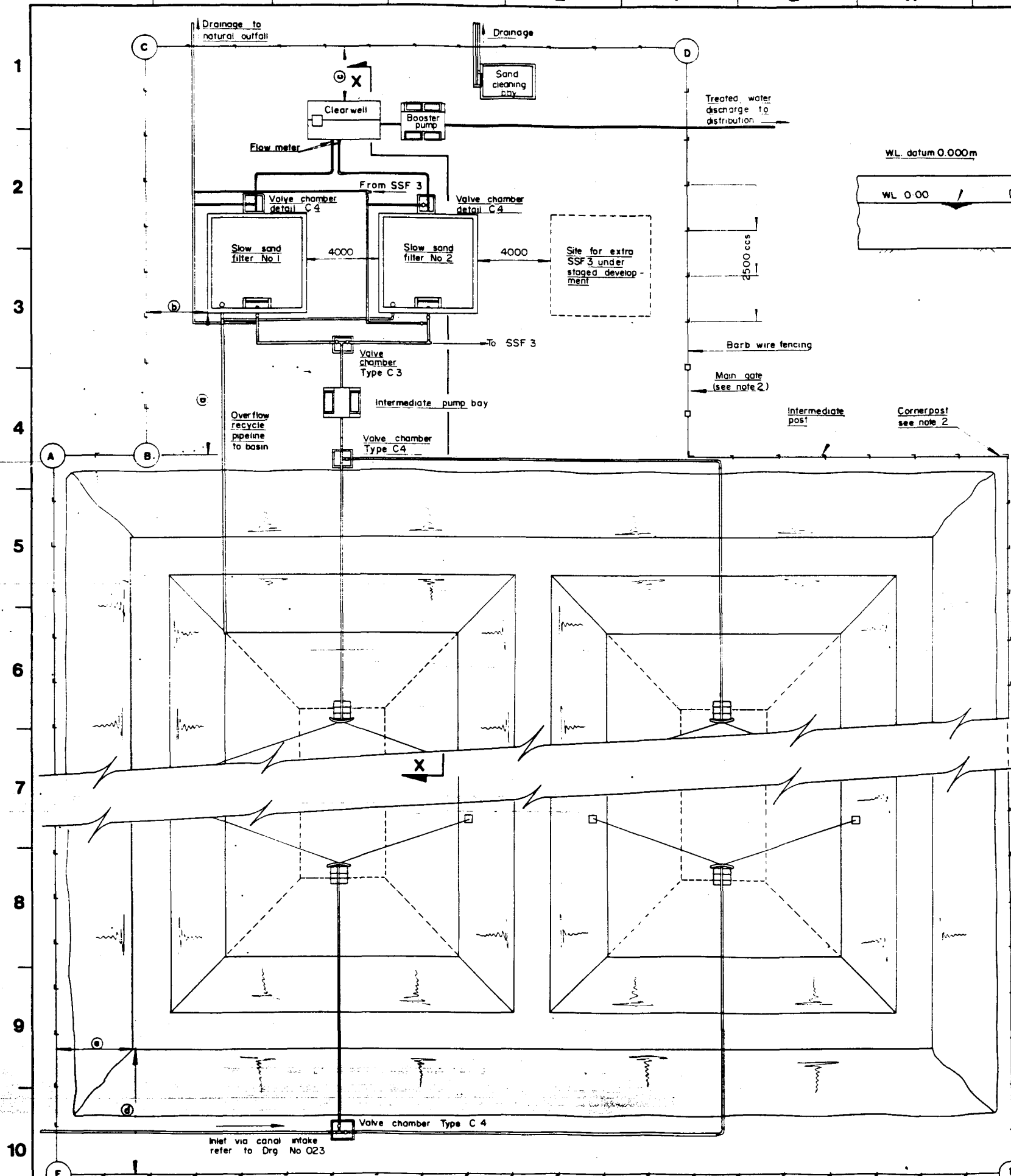
DRAWING NO. 020

SCALE: Refer to bar scale a, b, c.

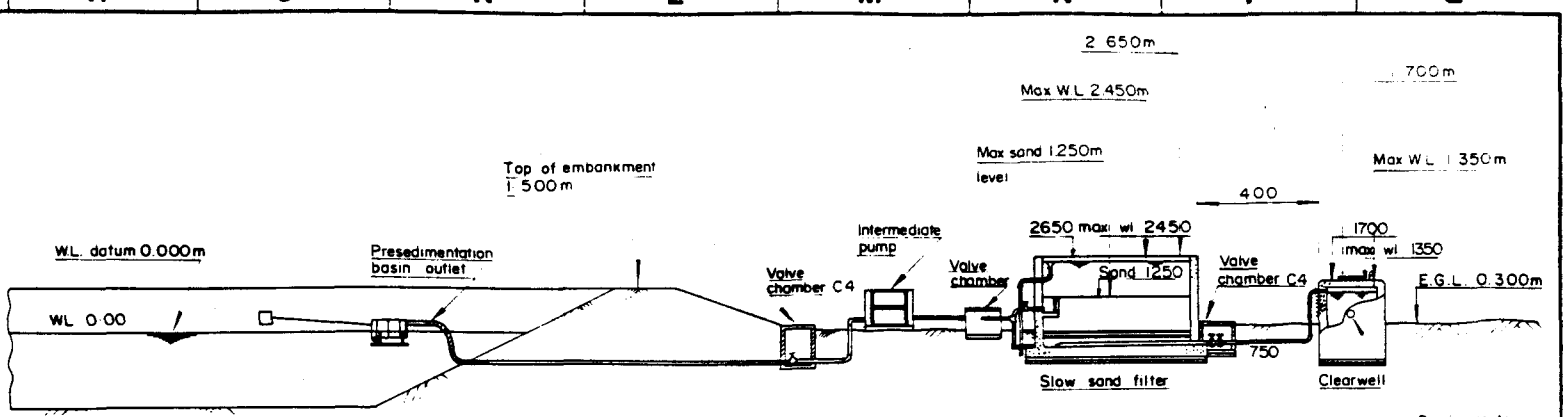
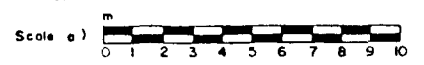
DATE: JULY 88

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Burdorpe Park,  
Bewdley, Wiltshire. SN4 6DD

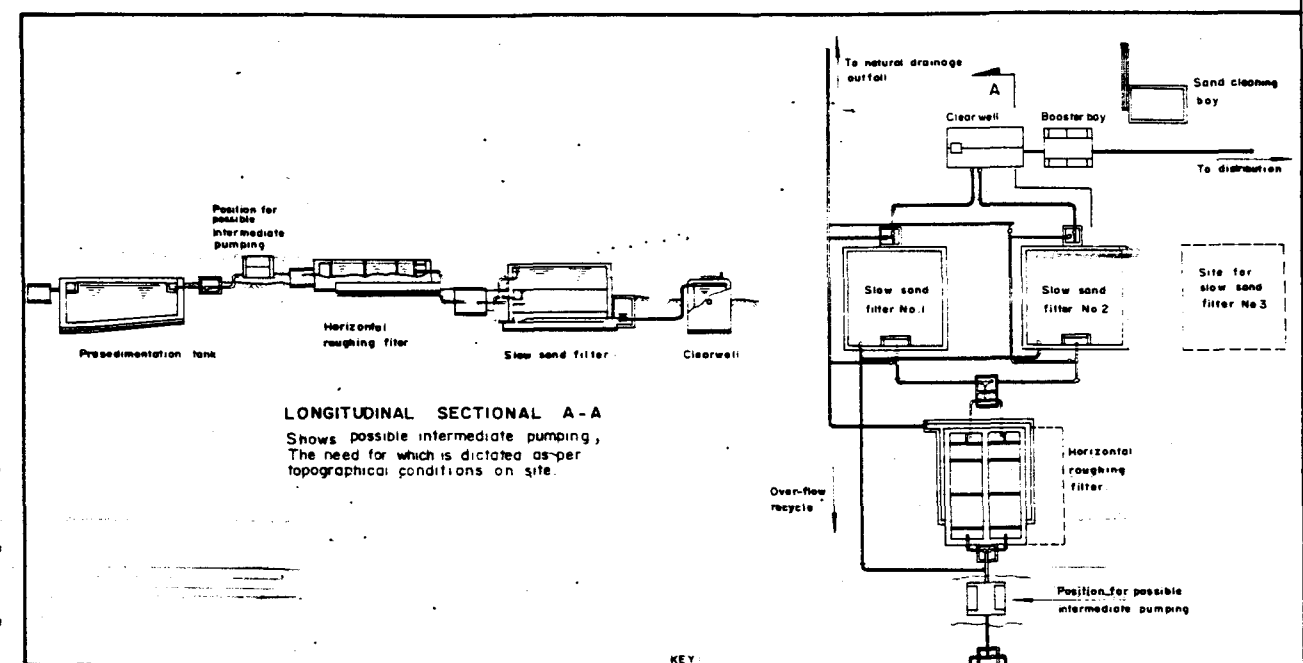




**TREATMENT PLANT PLAN**  
(Example given for population size of 500 Scale a)



**LONGITUDINAL SECTION X - X**  
(Alignment given for topography little or no slope)  
(Scale a)



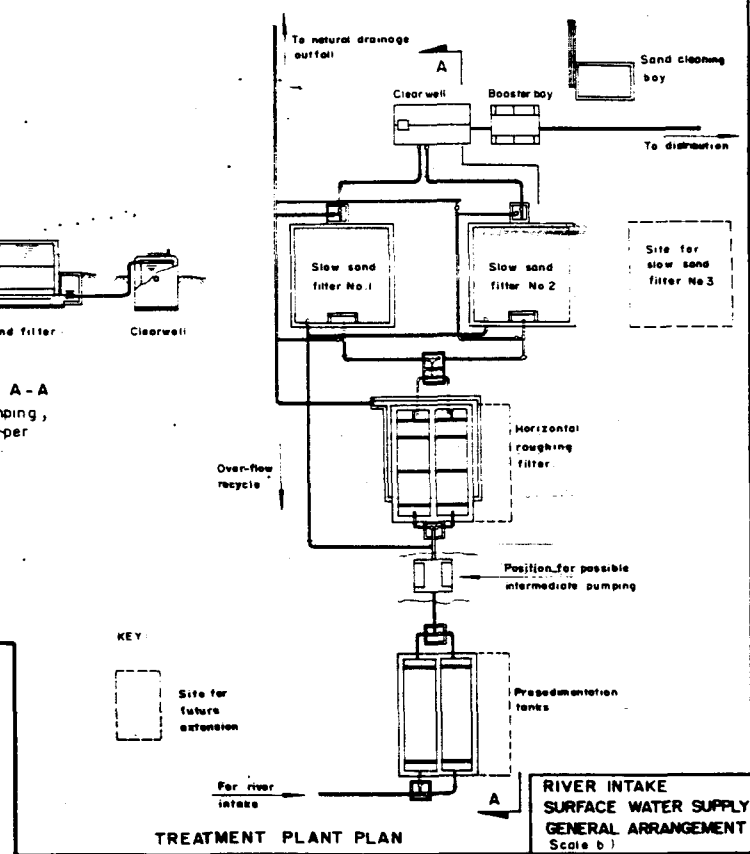
**LONGITUDINAL SECTION A - A**  
Shows possible intermediate pumping,  
The need for which is dictated as per  
topographical conditions on site.

**BOUNDARY DIMENSIONS(m) Table 1**

Population size	AB	BC	CD	EF	AE	Land req. (ha)
Up to 500	5.0	22.5	30.0	52.5	45.0	0.30
500 - 1000	7.5	25.0	30.0	57.5	60.0	0.42
1000 - 1500	7.5	25.0	30.0	65.0	65.0	0.50
1500 - 2000	10.0	25.0	30.0	70.0	72.5	0.58
2000 - 2500	10.0	22.5	30.0	75.0	80.0	0.67
2500 - 3000	10.0	25.0	40.0	77.5	85.0	0.76
3000 - 3500	10.0	25.0	40.0	75.0	87.5	0.76
3500 - 4000	12.5	25.0	40.0	80.0	90.0	0.82
4000 - 6000	15.0	30.0	30.0	95.0	102.5	1.06
6000 - 8000	17.5	30.0	40.0	97.5	117.5	1.27

**SETTING OUT DATA(m) Table 2**

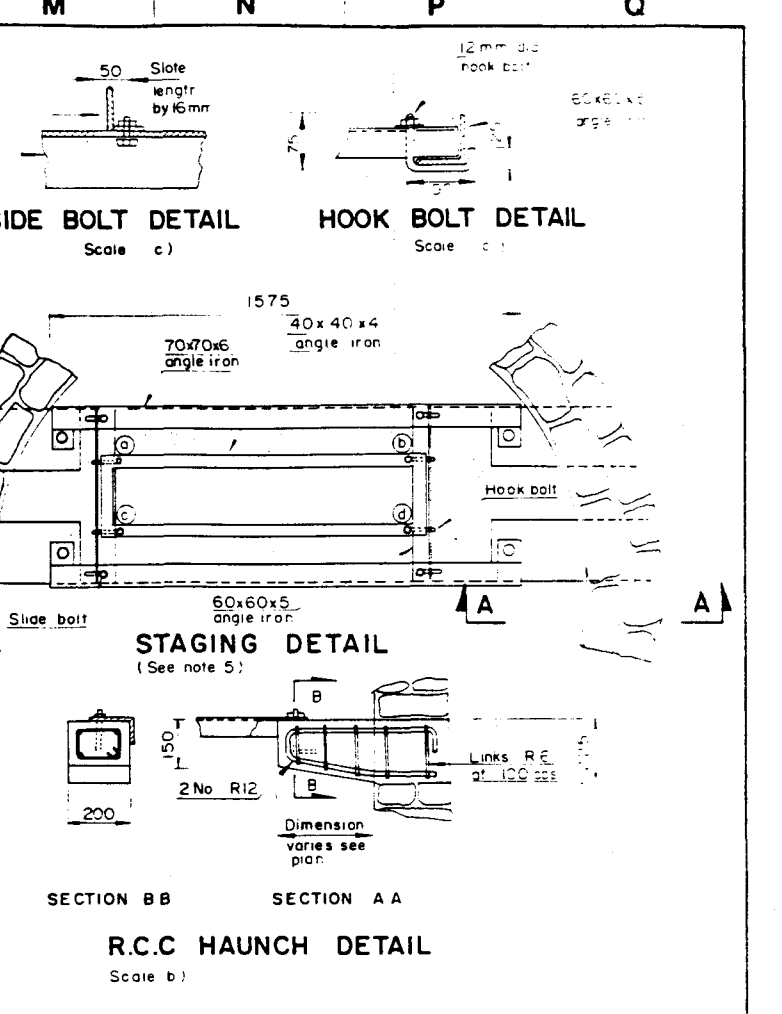
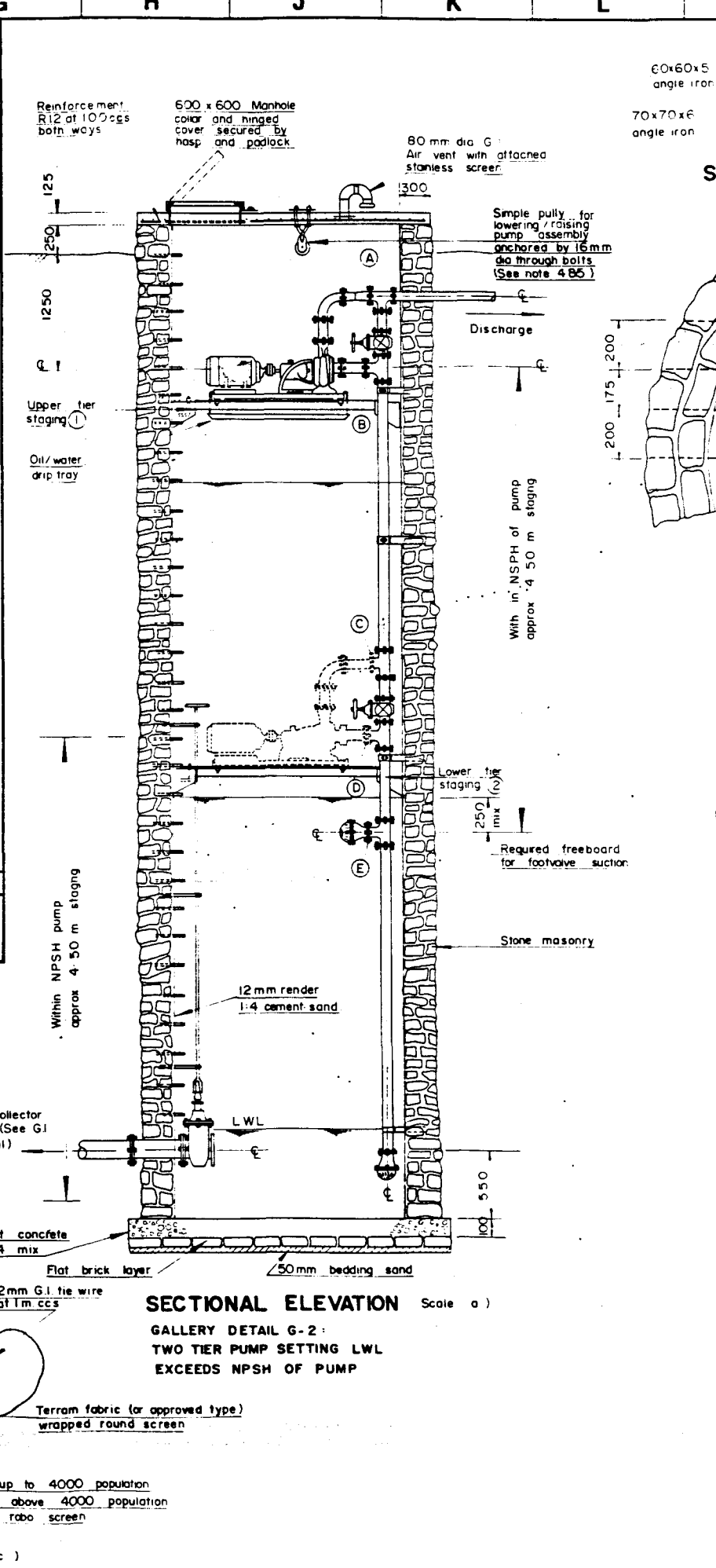
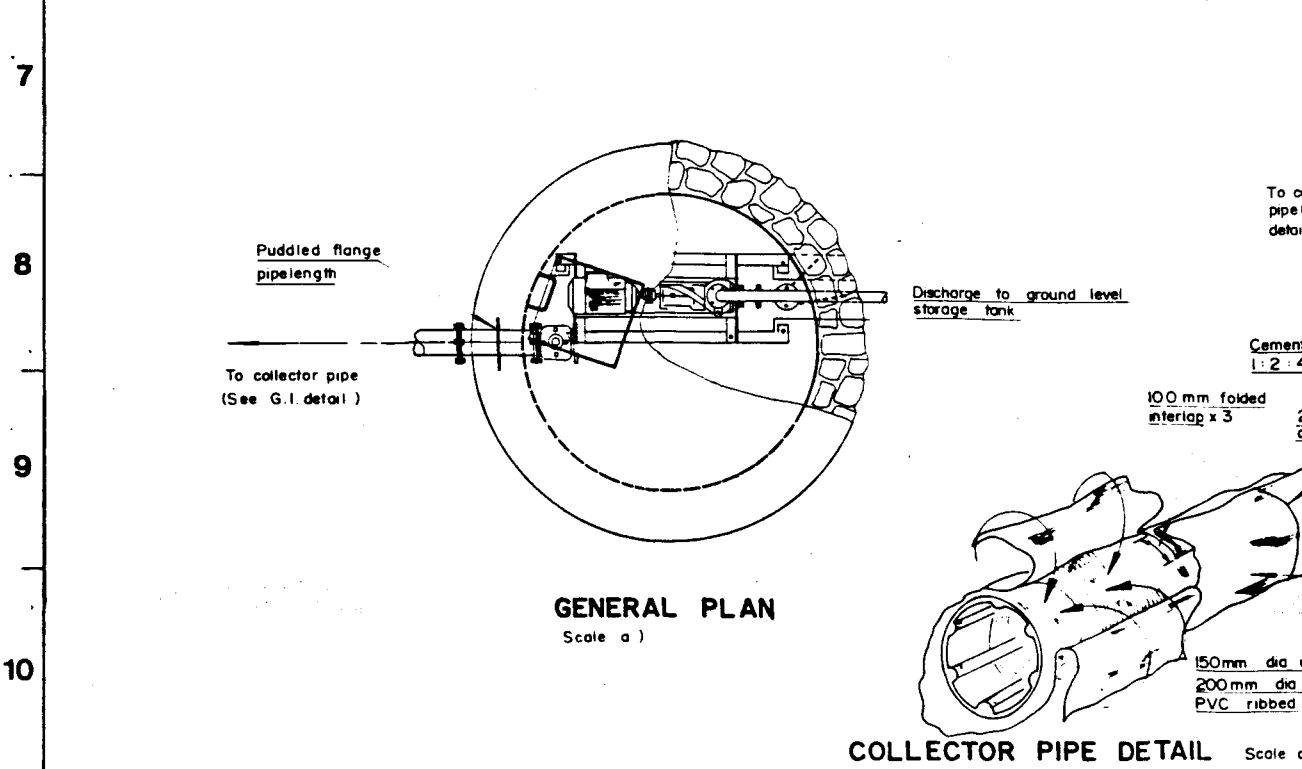
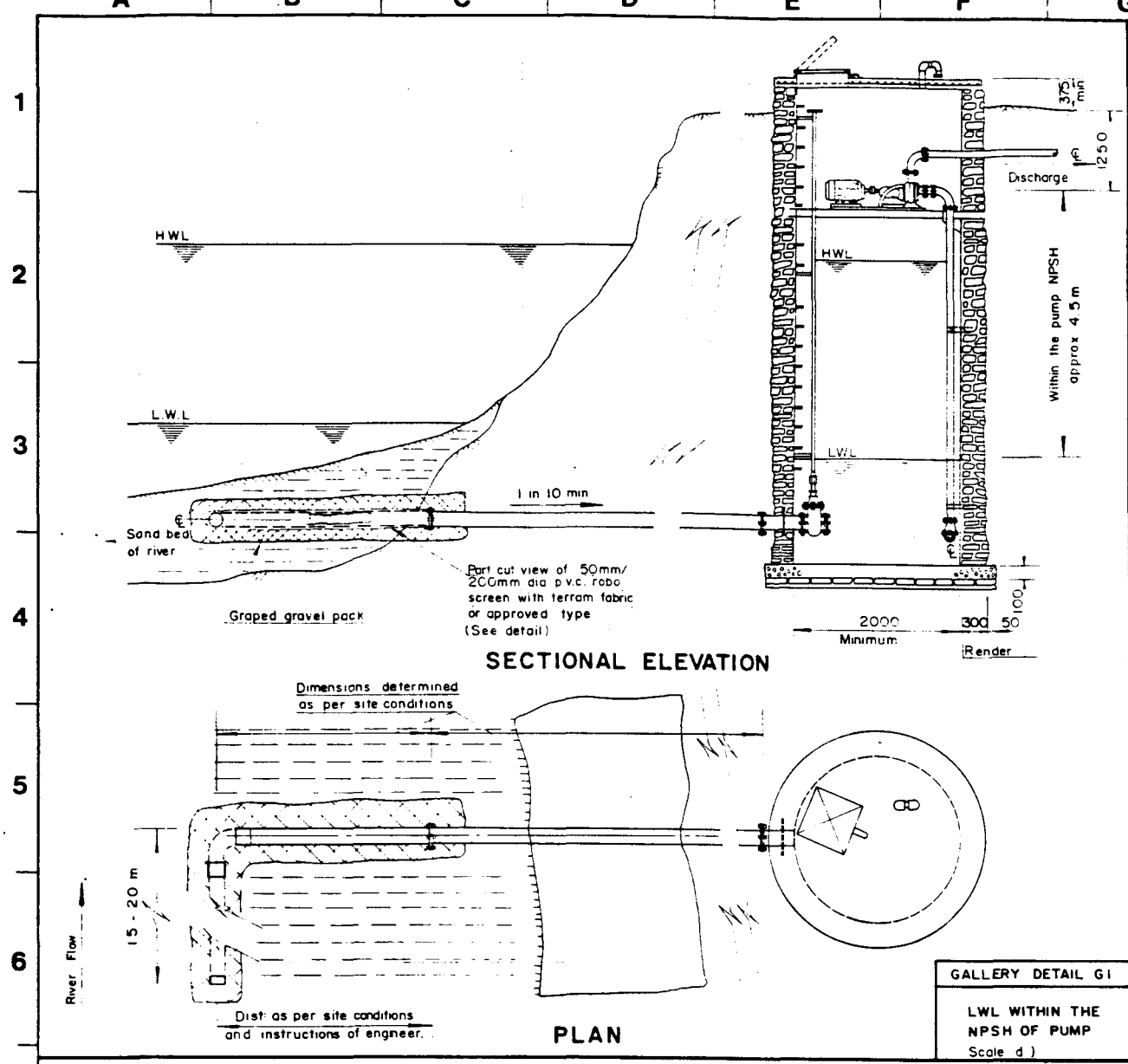
Population size	(a)	(b)	(c)	(d)	(e)
Up to 500	7.8	3.3	3.0	6.8	4.3
500 - 1000	7.4	2.3	3.8	6.8	4.8
1000 - 1500	8.0	2.6	3.5	7.9	5.6
1500 - 2000	8.1	1.5	3.4	8.0	6.0
2000 - 2500	7.1	3.0	1.9	9.3	6.5
2500 - 3000	8.1	3.8	3.4	8.8	6.8
3000 - 3500	7.8	3.6	2.1	9.1	6.6
3500 - 4000	7.7	2.0	2.2	9.3	7.0
4000 - 6000	8.1	3.5	1.8	9.5	7.5
6000 - 8000	8.0	1.8	1.9	10.1	7.8



- NOTES:**
- All dimensions are in millimetres unless otherwise stated
  - The detail of the intermediate post is similar to the corner post but with the raked angle supports omitted. Refer to Drg No 020 for detail
  - Dimensions are calculated for various population sizes allowing for extra land requirement for:-
    - (a) Pre-sedimentation basin sizes, refer to Drg Nos 025, 026
    - (b) Slow sand filter sizes and additional units refer to Drg No 027, 028
    - (c) Clear-well sizes refer to Drg No 034
    - (d) Horizontal roughing filter, refer to Drg No 024
  - For valve chamber details, refer to Drg No 050
  - Pipes shown solid for clarity

**LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES**

**CANAL INTAKE SURFACE WATER SUPPLY  
GENERAL ARRANGEMENT**

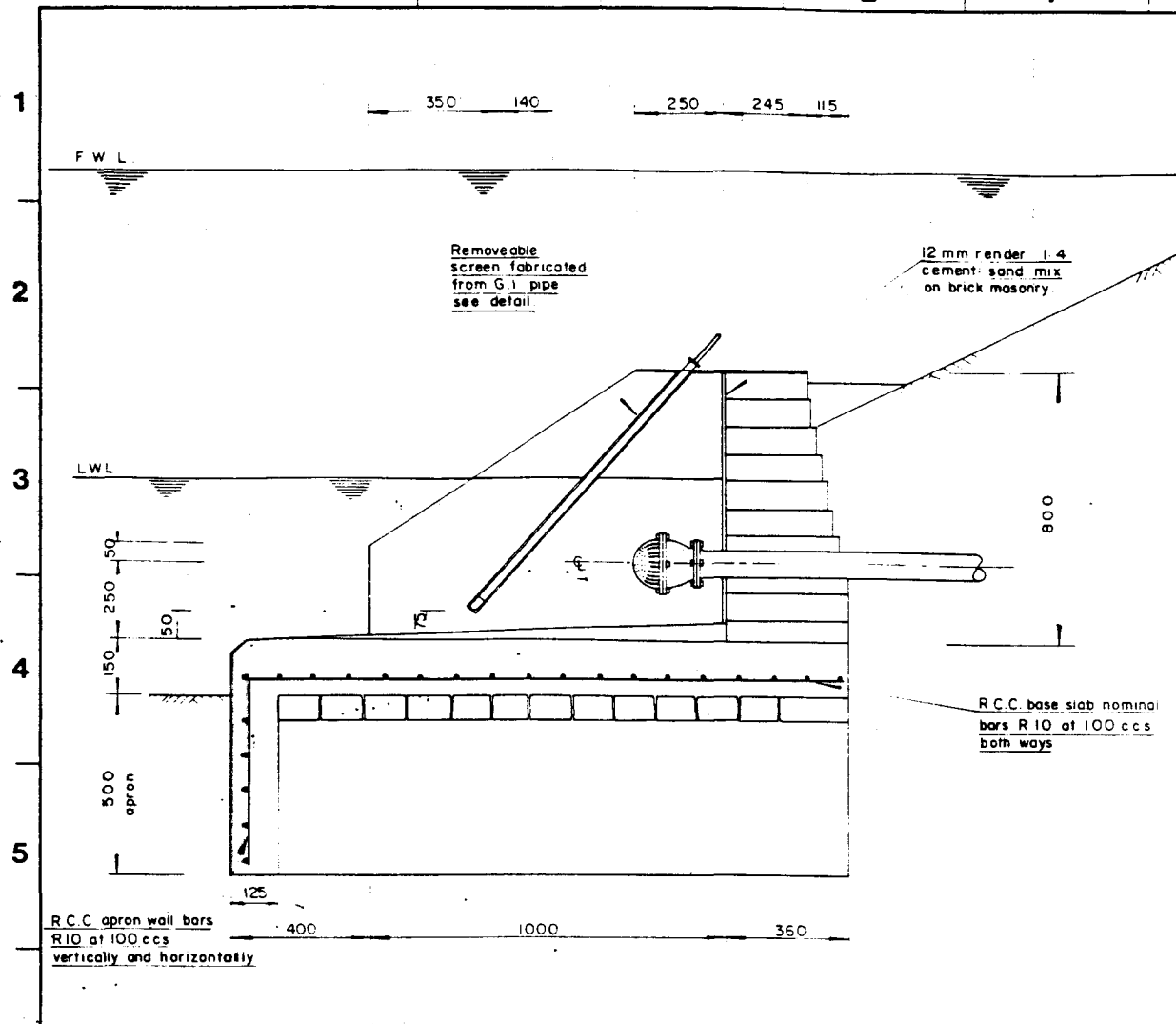


- NOTES**
- All dimensions are in millimetres unless otherwise stated
  - The collector pipe intercepts ground water flow within the sand bed of river
  - The infiltration gallery must be located away from all possible source of pollution
  - For seasonal variation in water levels in excess of the pump net positive suction head (NPSH) (Approx 4.5), a two tier pumps setting arrangement Gallery detail G2, is required
- Pump Assembly setting procedure :-**
- High water level: pump on upper tier staging (1)
    - Gate valve (x) closed
    - Gate valve (y) open
    - Foot valve (E) in position
  - Intermediate water level in excess of pumps NPSH
    - Transfer pump to lower tier staging (2) follows
      - Disconnect at points (A) and (B): Seal with blank plate and gasket (Refer to note 5)
      - Disconnect pump and motor unit from staging (1) & connect to staging (2)
      - Disconnect discharge suction assemblies to unblanked tee junctions (C) and (D) respectively
      - Gate valves: (x) closed, (y) open, Foot valve (E) disconnected and blanked
- For lowering / raising pump assembly staging, simple procedure involves - Loosen hook bolts (a) to (d) Loosen slide bolts move supporting angles aside and raise / lower pump assembly

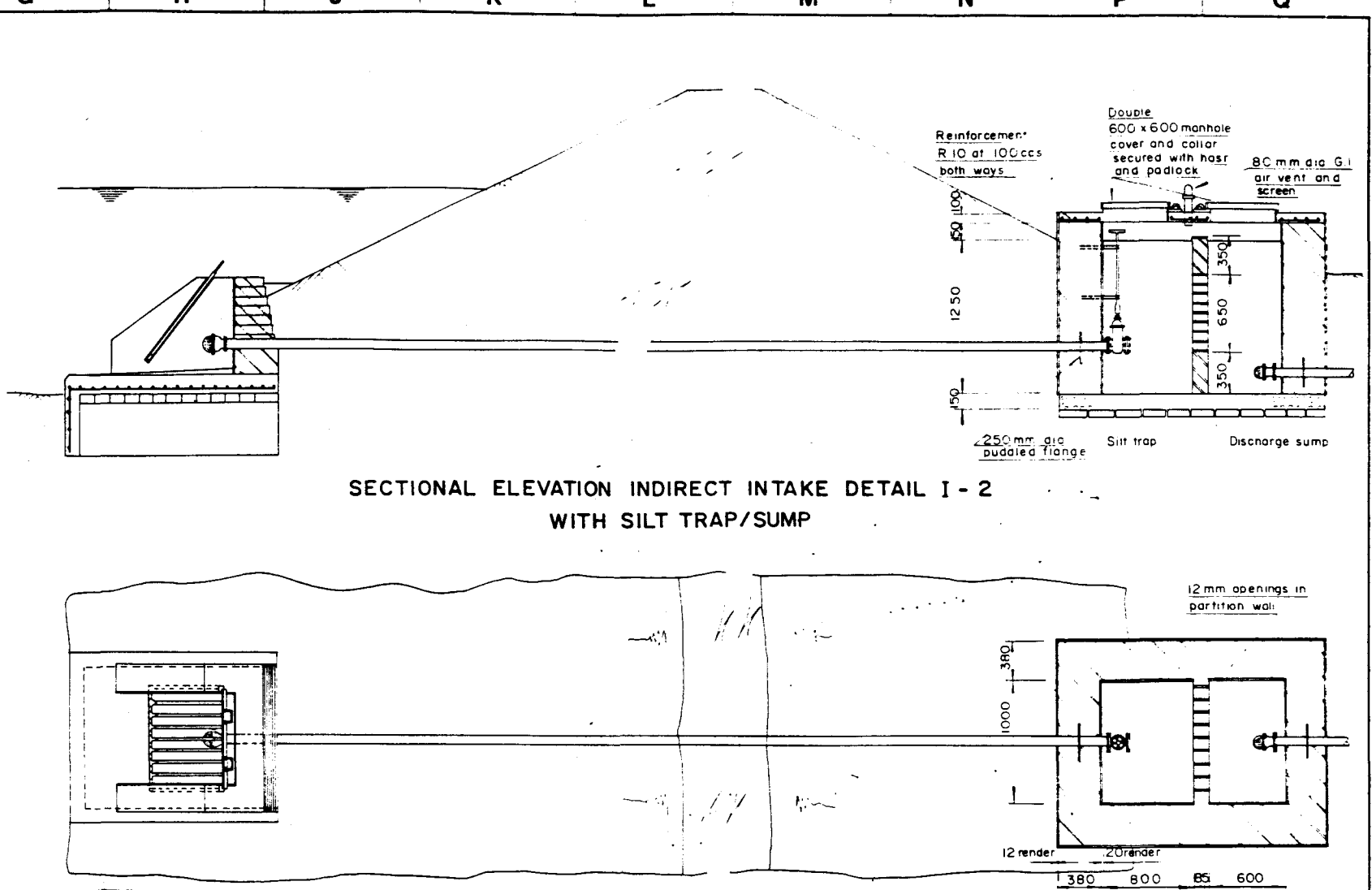
**LOW COST WATER SUPPLY AND SANITATION**  
**STANDARD DESIGN MODULES**

**INFILTRATION GALLERY**

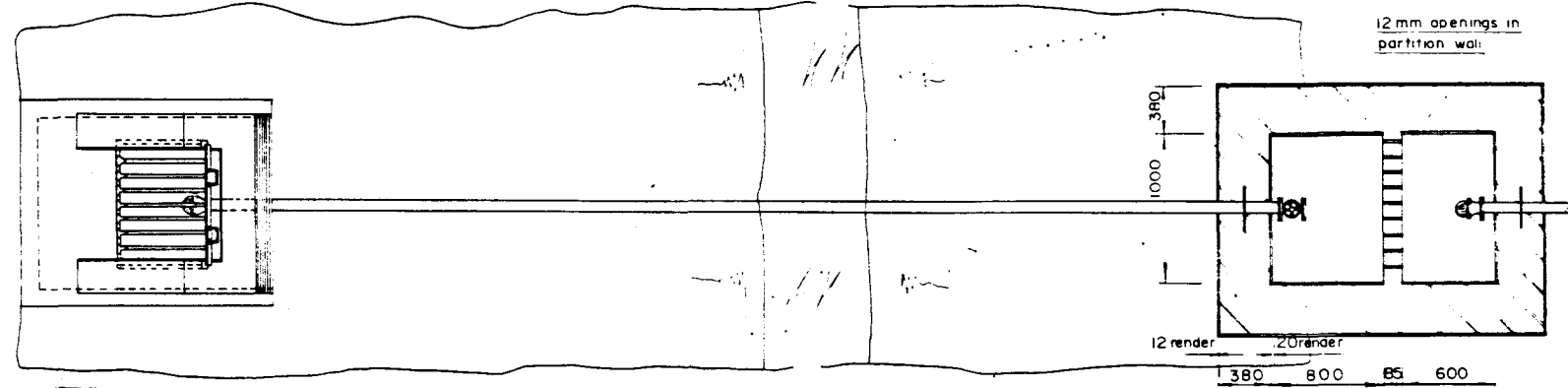




**SECTIONAL ELEVATION DIRECT INTAKE DETAIL I - 1**  
(Scale a)

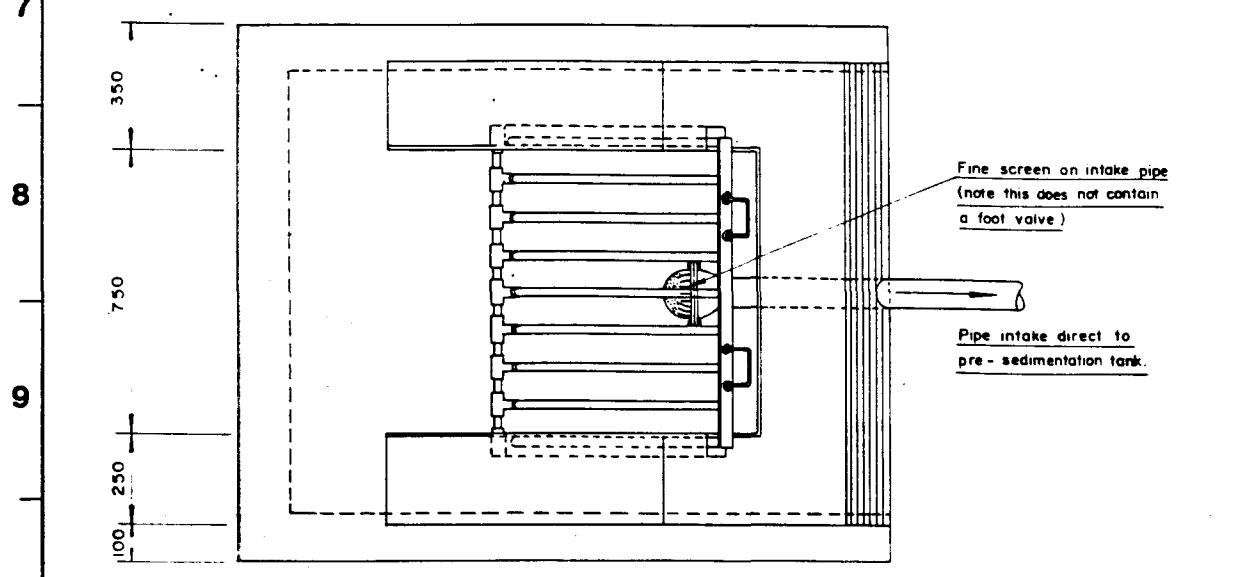


**SECTIONAL ELEVATION INDIRECT INTAKE DETAIL I - 2 WITH SILT TRAP/SUMP**

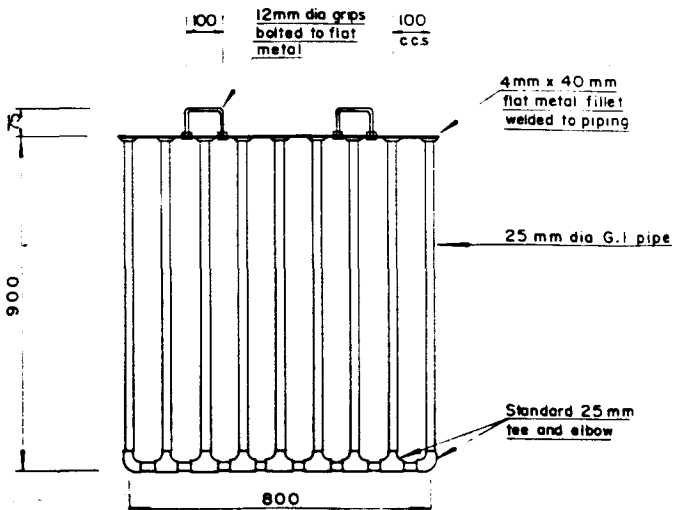


**PLAN DETAIL I - 2**  
(Pipes shown in full for clarity)

ALTERNATIVE DETAIL  
INDIRECT INTAKE I-2  
Scale b



**PLAN DETAIL I-1**  
(Scale a)



**SCREEN DETAIL**  
(Scale a)

**NOTES**

- All dimensions are in millimetres unless otherwise stated.
- The intake discharges water in to the pre-sedimentation basins via intermediate pumping or by gravity flow, as per site conditions.
- Minimum cover to all reinforced concrete to be not less than 50 mm.
- Brick masonry to have mortar of 1:4 cement sand mix.
- 20mm internal render with 5% water proofing additive 12 mm to external brickwork surfaces.

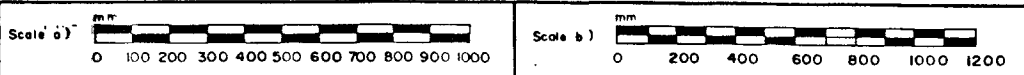
**LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES**

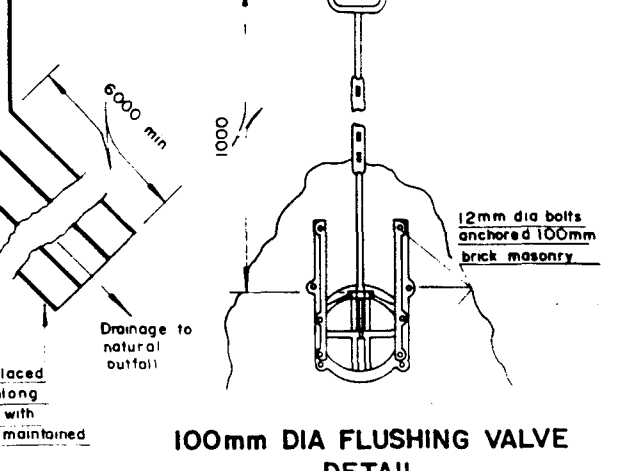
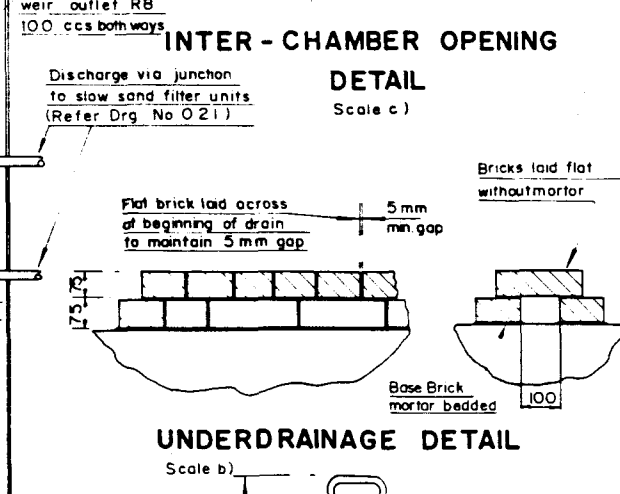
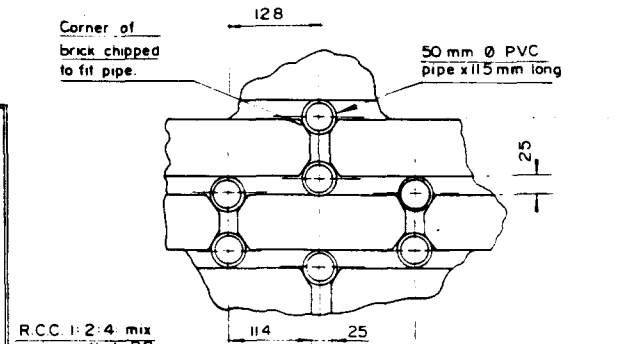
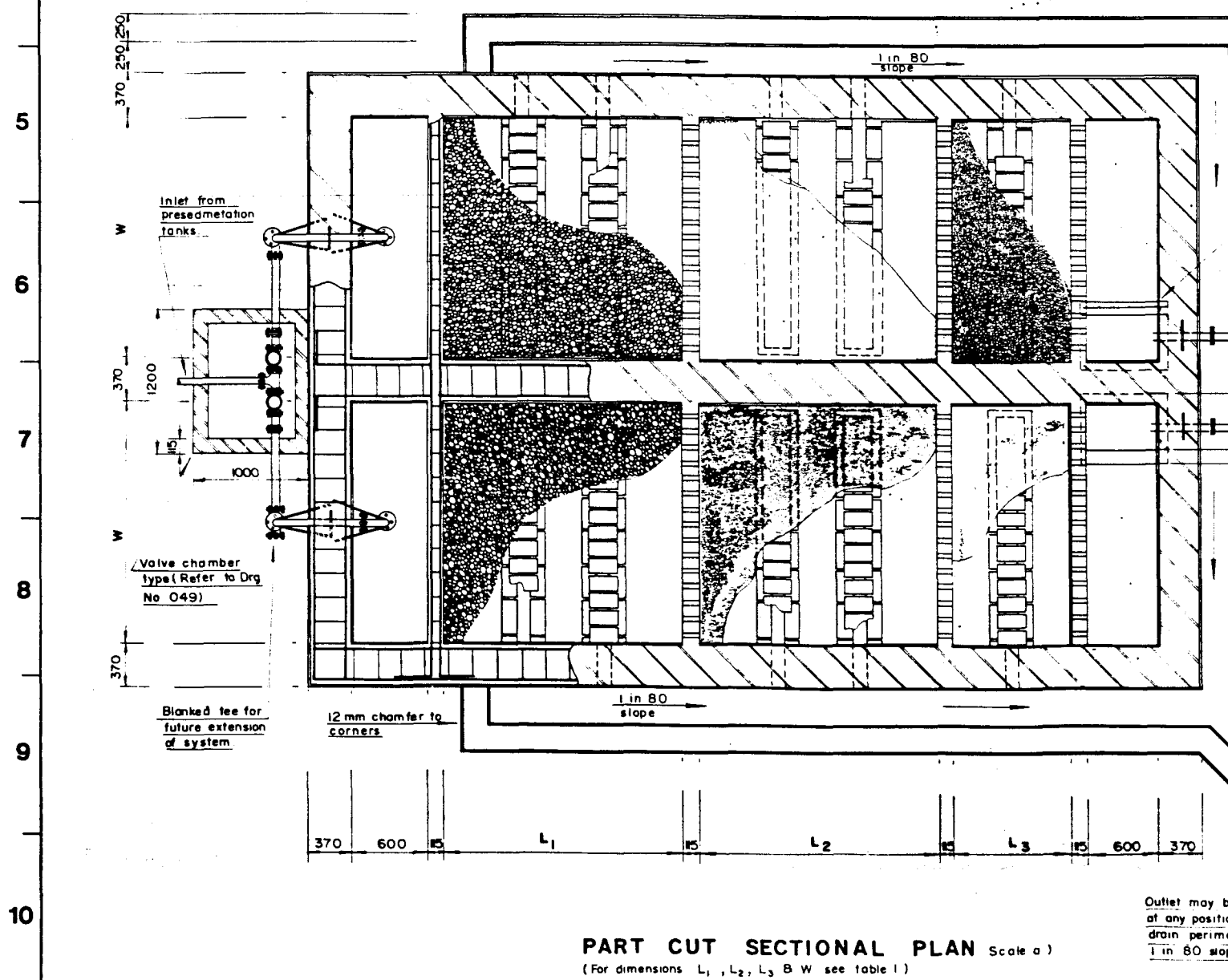
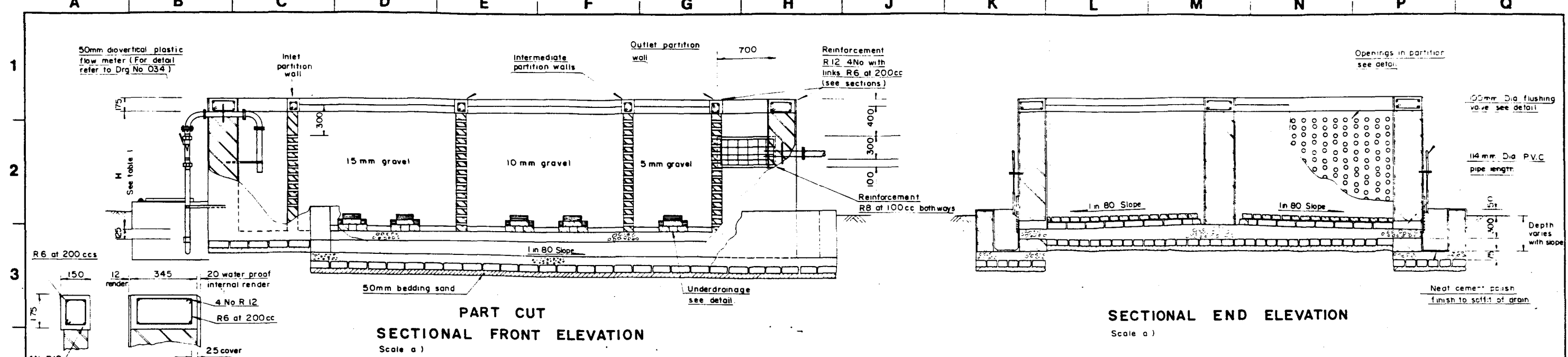
**CANAL INTAKE STRUCTURES**

DRAWING NO. 023      SCALE Refer to bar scale

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Consulting Engineers and Architects,  
Burdorpe Park  
Swindon, Wiltshire, SN4 0DD

DATE: AUGUST 1988





- NOTES**
- All dimensions are in millimetres, unless otherwise stated.
  - This detail, using 50 mm. Dia. PVC piping, and 25 mm mortar joints gives the following design requirements -  
 Inlet partition wall - 10% opening (top and bottom 300mm are sealed in order to retain scum and settled deposits respectively).  
 Intermediate/outlet walls - 15% opening for inter-chamber flows.
  - Refer to table 1 for the various dimensions of filters for the different population sizes.  
 The sizing of the horizontal roughing filter is design for the water consumptive demand for the present population. Additional units rate be given against increased future demand, when required, as per the direction of the Engineer-in-charge.
  - 20 mm thick internal render to walls and base using 1:3 cement sand ratio with 5% water proofing additive 12 mm render to external surfaces.

Table 1

Population Size	Height H	Width W	LENGTH			HRF No	Max Filtr 1/s	Pipe Dia
			L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>			
Up to 500	1200	1000	2000	2000	1000	2	0.38	32
500-1000	1200	2000	2000	2000	1000	2	0.71	32
1000-1500	1500	2000	2000	2000	1000	2	0.79	40
1500-2000	1500	3000	2000	2000	1000	2	1.05	40
2000-2500	1500	3000	2000	2000	1000	2	1.33	50
2500-3000	1500	3500	2000	2000	1000	2	1.58	50
3000-3500	1500	3500	2000	2000	2000	2	1.84	50
3500-4000	1500	3500	2000	2000	1000	3	1.40	50
4000-6000	1500	3500	2000	2000	2000	3	1.58	50
6000-8000	1500	4000	2000	2000	2000	3	2.10	50

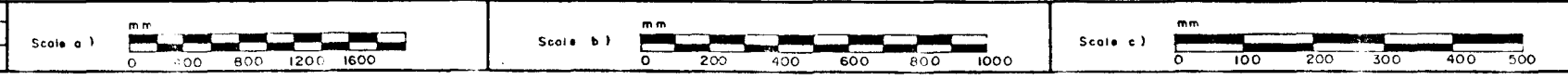
LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES

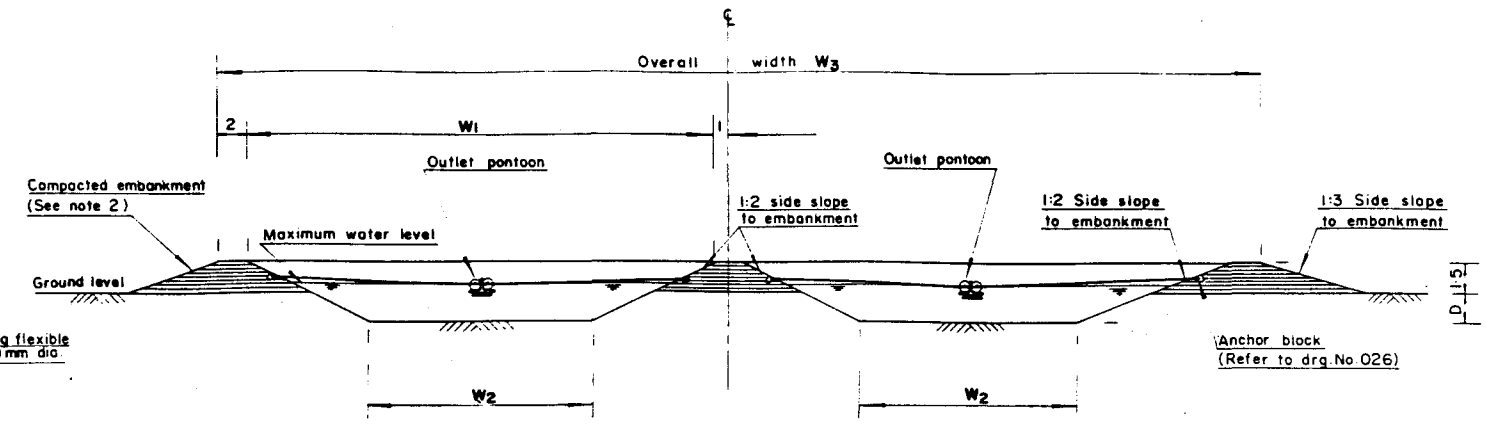
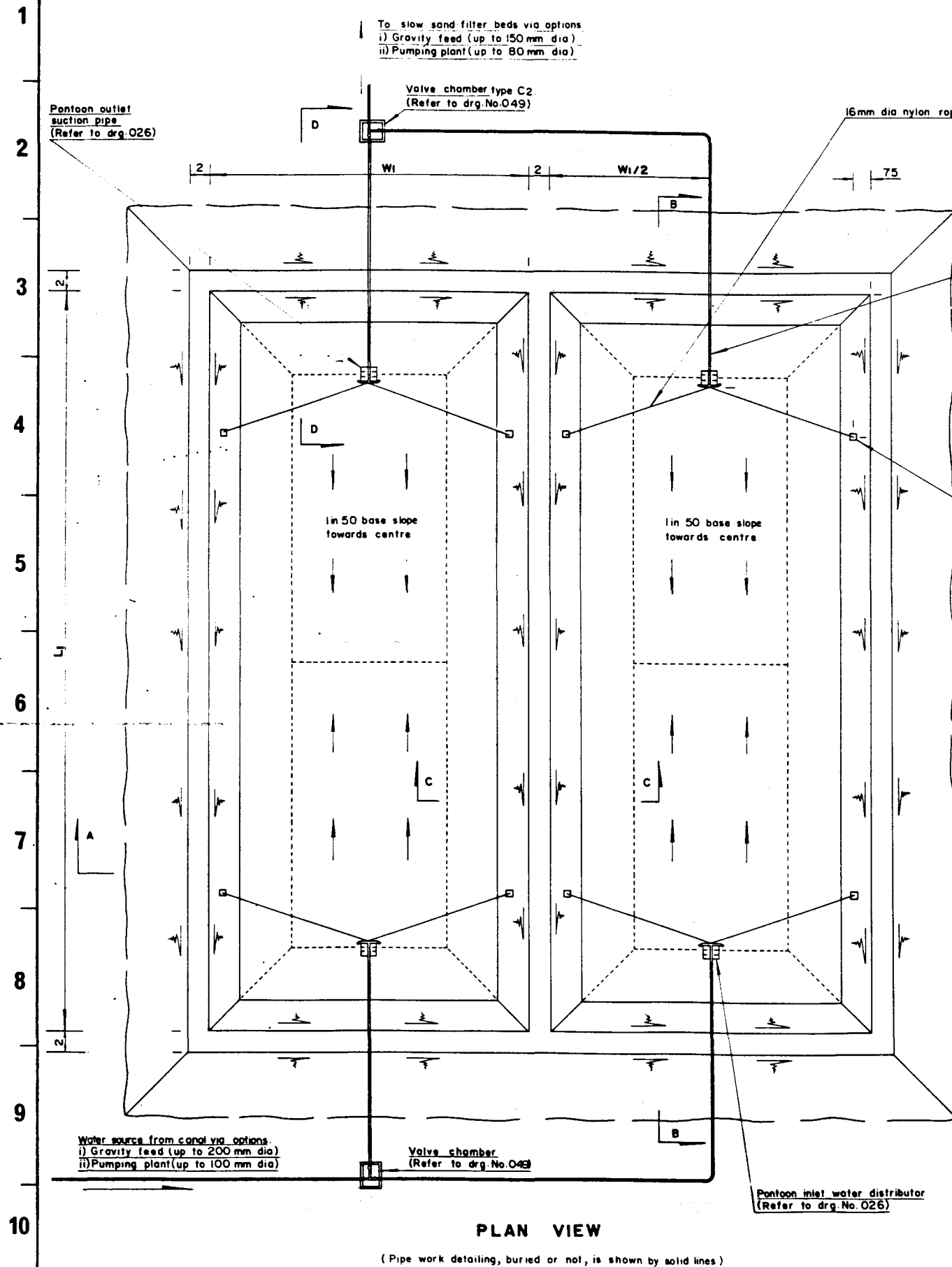
**HORIZONTAL ROUGHING FILTER  
GENERAL ARRANGEMENT**

DRAWING NO. 024      SCALE: Refer to scale bar

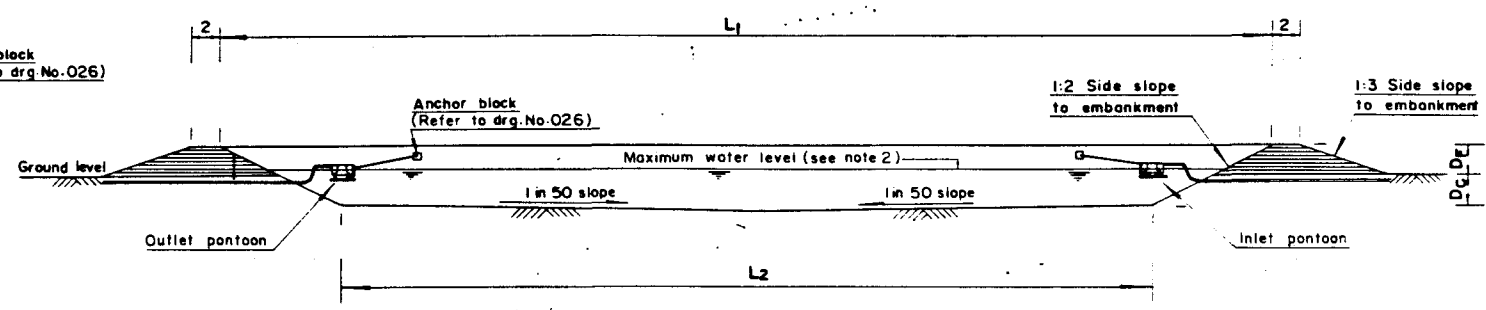
DATE: JULY 1988

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Burdurp Park,  
Swindon, Wiltshire, SN4 0DD





SECTIONAL VIEW AA



SECTIONAL VIEW BB

TABLE I.

Present population size	Max water depth D (m)	Dimensions (m)					Cut Depth Dc (m)	Fill depth Df (m)	Cut-volume (m³)	Overall land area (m²)
		L <sub>1</sub>	L <sub>2</sub>	W <sub>1</sub>	W <sub>2</sub>	W <sub>3</sub>				
Upto 500	2.50	30	14	19	3	44	2.80	1.20	1003	2110
500 1000	2.50	43	27	21	5	48	2.60	1.40	1760	3125
1000 1500	2.50	48	32	24	8	54	2.40	1.60	2300	3920
1500 2000	2.50	55	39	26	10	58	2.30	1.70	2960	4720
2000 2500	2.50	60	44	28	12	62	2.20	1.80	3520	5445
2500 3000	2.50	66	50	29	13	64	2.10	1.90	3940	6140
3000 3500	2.75	68	52	28	12	62	2.30	1.95	4355	6170
3500 4000	2.75	70	54	30	14	66	2.20	2.05	4757	6760
4000 6000	2.75	82	66	37	19	80	2.05	2.20	6660	9245
6000 8000	2.75	96	80	38	22	82	1.90	2.35	8240	10965

IMPORTANT The balance of cut and fill volumes assumes a full compactive effort as per the specification.

NOTES:

- All dimensions are in metres unless otherwise stated.
- Maximum water depth, excluding extra fall given to the base of the tank for sludge is 2.5 metres. (See table I) The height of the embankment above the maximum water level (the free board) is 1.5 metres.
- Dimensions D<sub>c</sub> and D<sub>f</sub> are calculated to give a balance in cut and fill earthworks.
- Embankment in hatched detail denotes earthworks in fill and as such requires full compaction in horizontal layers of 225mm as per specification.
- The presedimentation basins are designed for a storage capacity of 30 days and a water consumptive use of 45 litres per person per day. This allows for a closure period of the irrigation canal for maintenance purposes. (See table I).
- Slopes to the basin sides are given for silty clay soils only. The following slopes for the respective soil conditions are given:  

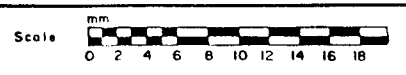
Soil type	Downstream	Upstream
Silty clay	1:3	1:2
Loose sandy soil	1:5	1:3
- For sections C-C and D-D refer to drg.No.026.

**LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES**

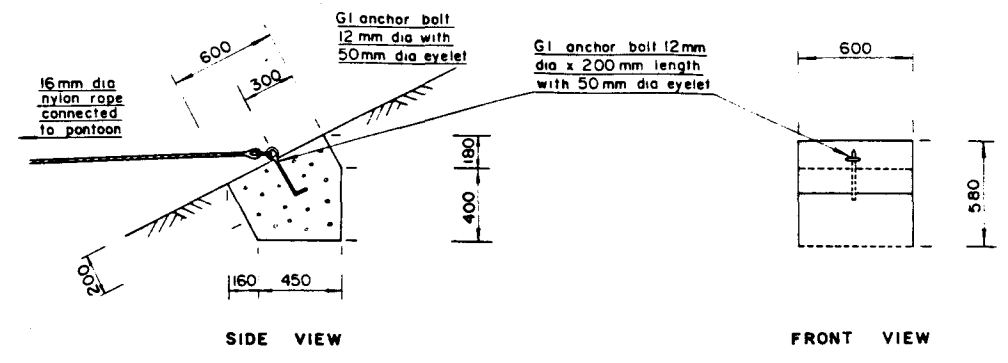
**PRE-SEDIMENTATION BASIN  
PLAN AND SECTIONAL VIEWS**

DRAWING NO 025 SCALE Refer to bar scale

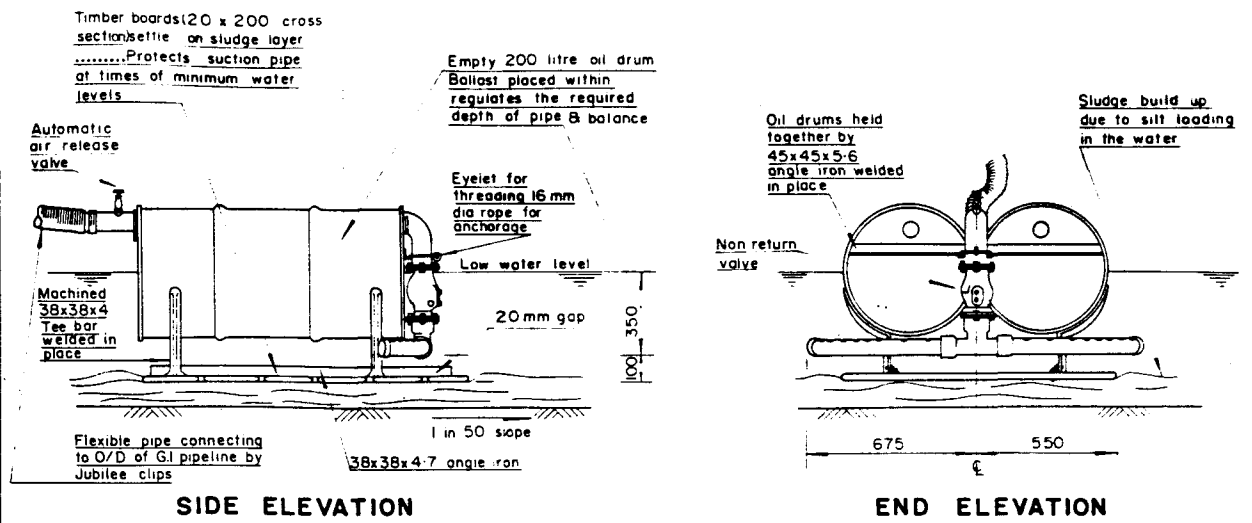
DATE: MARCH 1988  
 Sir Willem Halcrow & Partners  
 Consulting Engineers and Architects  
 Burdorp Park  
 Swindon, Wiltshire SN4 0QD



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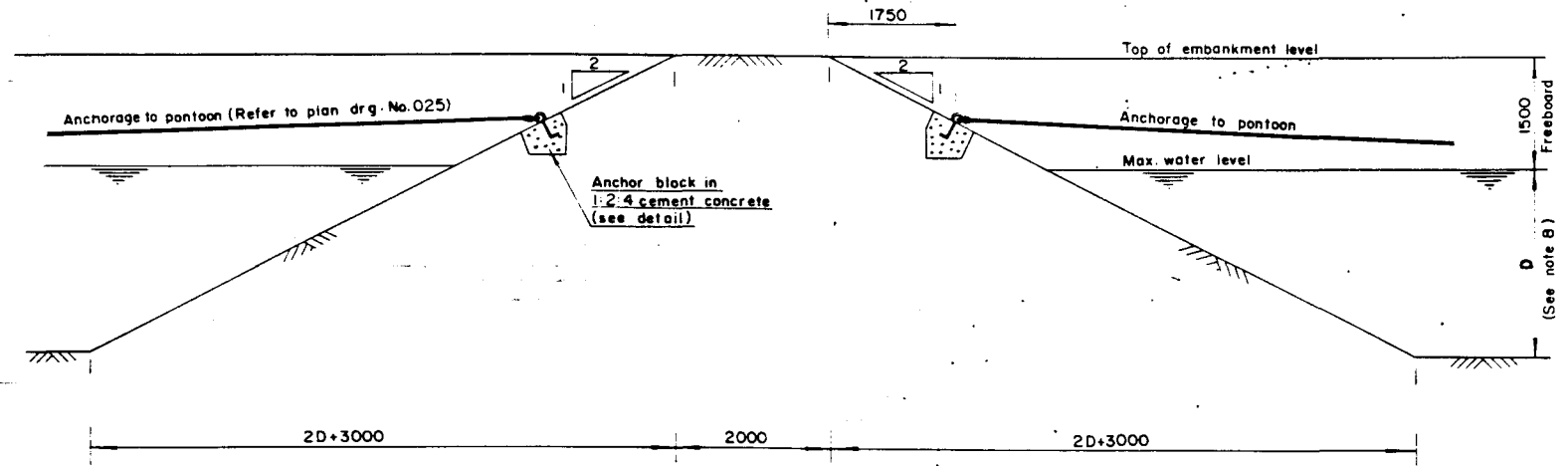


**ANCHOR BLOCK DETAIL**  
Scale (c)

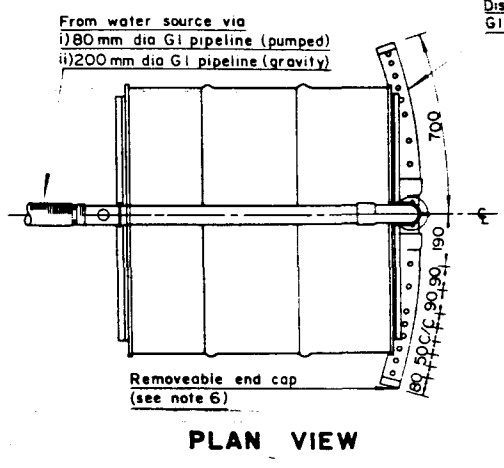


**SIDE ELEVATION**

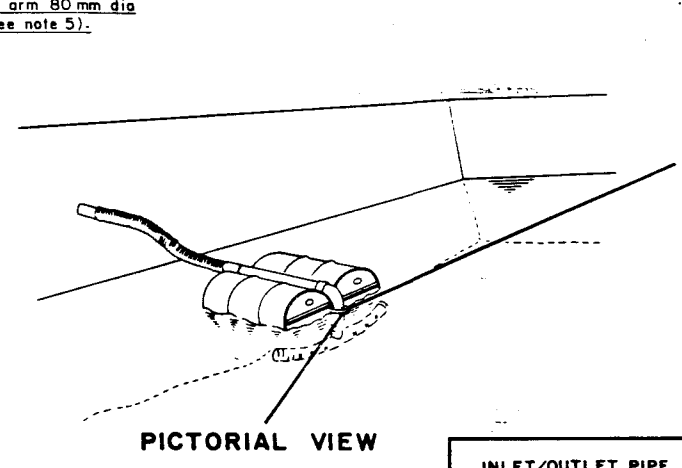
**END ELEVATION**



**SECTIONAL ELEVATION C-C**  
Scale (a)

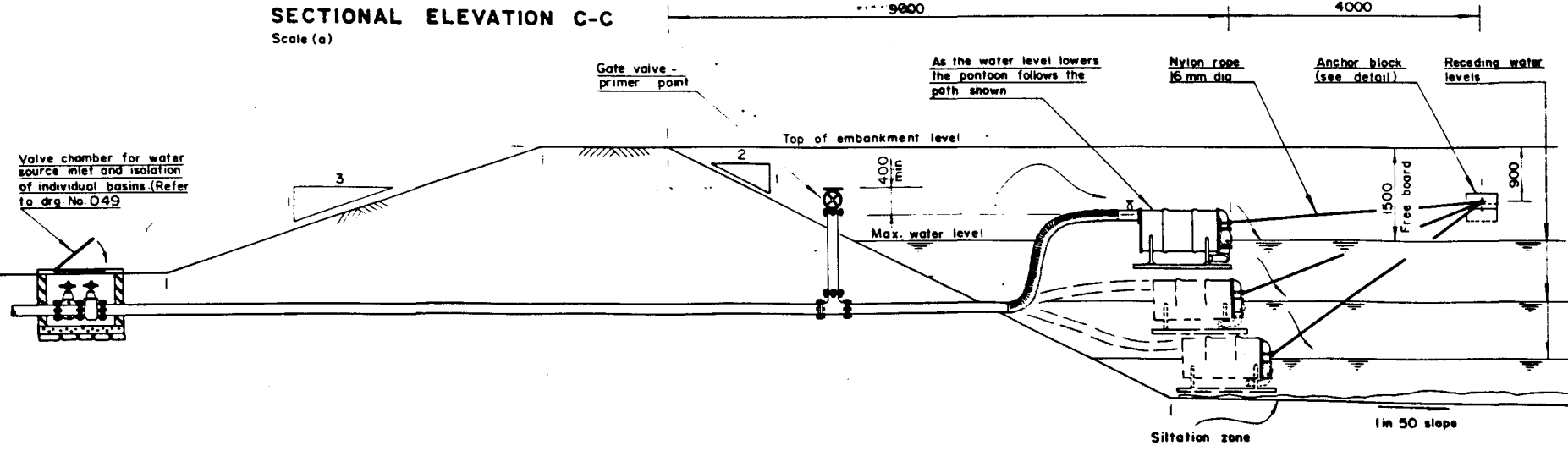


**PLAN VIEW**



**PICTORIAL VIEW**

**INLET/OUTLET PIPE AND PONTOON DETAIL**  
Scale (b)



**SECTIONAL ELEVATION D-D**  
Scale (a)

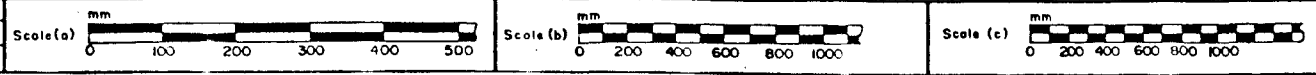
- NOTES:**
1. All dimensions are in millimetres unless otherwise stated.
  2. Refer to drawing No 025 for location of the sectional views C-C and D-D.
  3. Refer to drawing No 049 for details of valve chambers.
  4. Components of the inlet and outlet pontoons to be corrosion protected in accordance with the specification.
  5. The inlet (distributor) and the outlet (suction) pipes are identical in detail with 16 No. 20 mm dia holes drilled at the top of the pipe at the centres indicated.
  6. A removeable end cap is required for periodic flushing.
  7. D<sub>f</sub> is the depth of fill or height of embankment which varies according to basin size, refer to table I drawing No. 025.
  8. D is the maximum depth of water and varies according to basin size, refer to table I drawing No. 025.

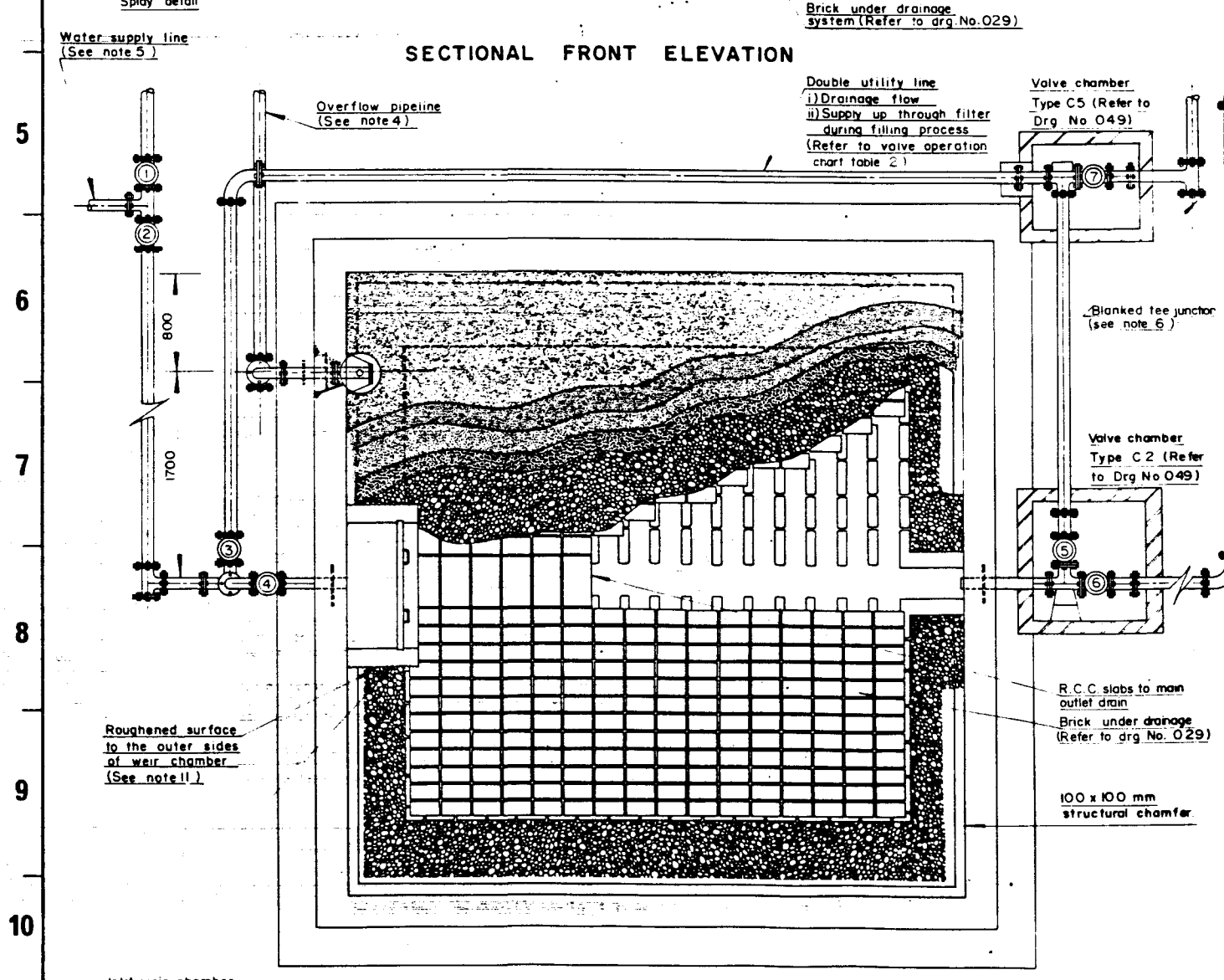
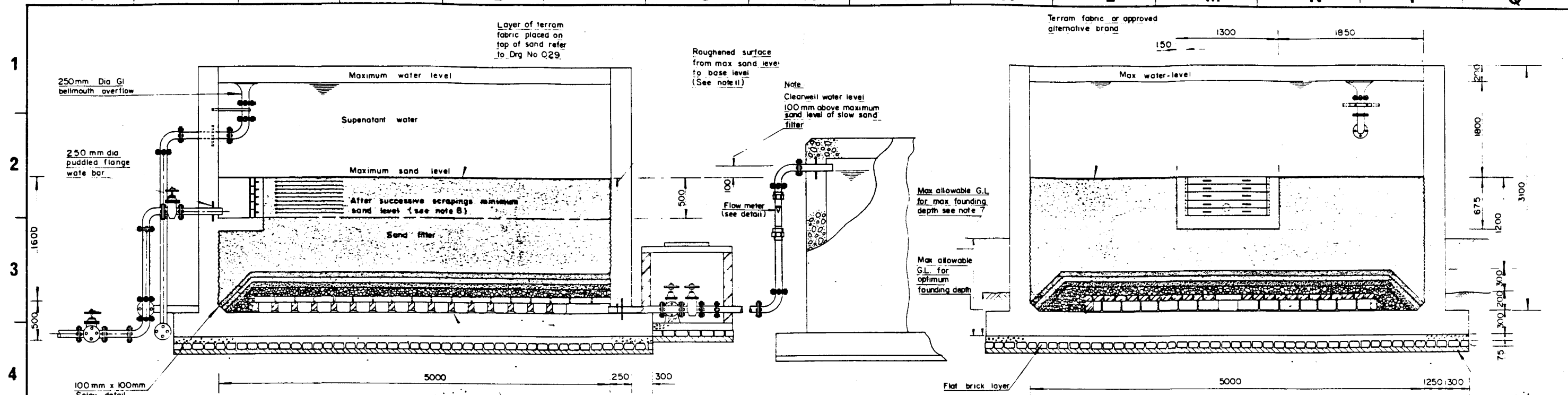
**LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES**

**PRESEDIMENTATION BASIN  
SECTIONS AND INLET/OUTLET PIPE DETAIL**

DRAWING NO 026 SCALE Refer to bar scales (a),(b),(c)

DATE MARCH 1988 By William Malcrow & Partners,  
Consulting Engineers and Architects,  
Burdorpe Park,  
Surrey. Wokingham, RG4 0QC





**CLEARWELL**  
(Refer to drg No 034)

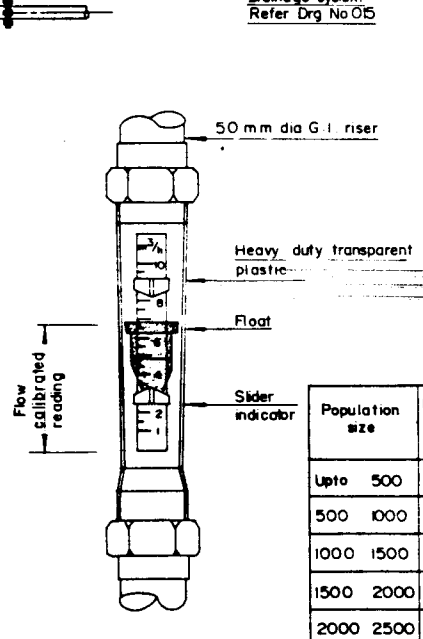


Table 1

Population size	Unit Nos	Filtration rate (For 24hrs) m/h per m	l/s per filter	Pipe dia (mm)
Upto 500	2	0.02	0.14	32
500 1000	2	0.04	0.28	32
1000 1500	2	0.06	0.42	40
1500 2000	2	0.08	0.55	40
2000 2500	2	0.10	0.70	50
2500 3000	3	0.08	0.56	40
3000 3500	3	0.09	0.62	40
3500 4000	3	0.10	0.70	50

Table 2

Valve No	OPERATIONAL FUNCTION
1	Supply and/or slow sand filter No.1 isolation.
2	Supply and/or slow sand filter No.2 isolation.
3	Supernatant drain/reverse refill up through filter
4	Isolation/inlet control.
5	Drainage isolation/refill control.
6	Outlet/filtration control, isolation for refill and or drainage
7	Refill isolation / drainage outlet.

- NOTES:**
- All dimensions are in millimetres unless otherwise stated.
  - For further details of the components of the slow sand filter unit and R.C.C details refer to Drg Nos 021, 029, 030, and 031.
  - Main drainage line interconnects other slow sand filters of the system to a final natural outfall arrangement, as per prevailing site conditions.
  - Overflow pipeline interconnects other slow sand filters of the system and is recycled to the presedimentation basins.
  - The water supply line interconnects other slow sand filters of the system from the presedimentation basins via pump assembly P-5 Refer to drawing Nos. 020 and 005 for respective details.
  - The junction provides for the connection of additional slow sand filter units under staged development requirements.
  - A range of founding depths are allowed for in the structural design of the slow sand filter upto a maximum depth of 1.25m, this accommodates for the variance of the systems hydraulic gradient line as per prevailing topographical conditions. The required depths to be decided by the engineer-in-charge.
  - The removal of the terram and the scraping of the top 25mm of sand layer is necessary once the resistance to flow is such that the required filtration rate cannot be maintained. **IMPORTANT** The minimum depth of sand remaining should not be less than 650 mm above the gravel bed i.e. the level of the top of the weir chamber base as indicated standard practice for the replacement of cleaned sand back to maximum sand level should be followed.
  - As the depth of sand is periodically reduced by scraping (see note 8), under normal operation and maintenance procedure, individual weir boards are removed as and when required.
  - 20mm rendering is given to all interior surfaces 1:3 cement sand ratio using 5% pudlo water proofing additive. Base slope formation levels are cast prior to rendering.
  - The roughened surface prevents short circuiting of water between the wall sides and the sand filter. Fresh rendering to be roughened by hard brush sweeping.

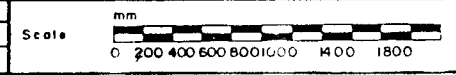
**LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES**

**SLOW SAND FILTER  
GENERAL ARRANGEMENT:  
25 SQUARE METRE PLAN AREA**

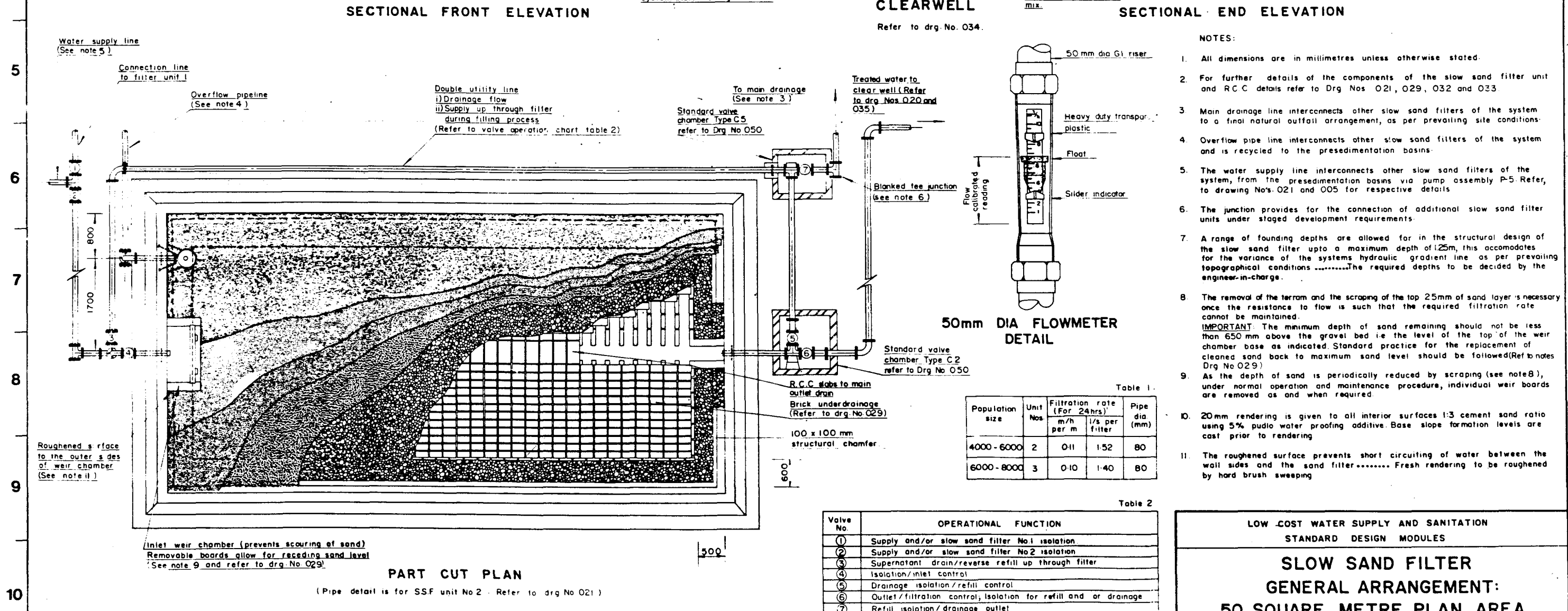
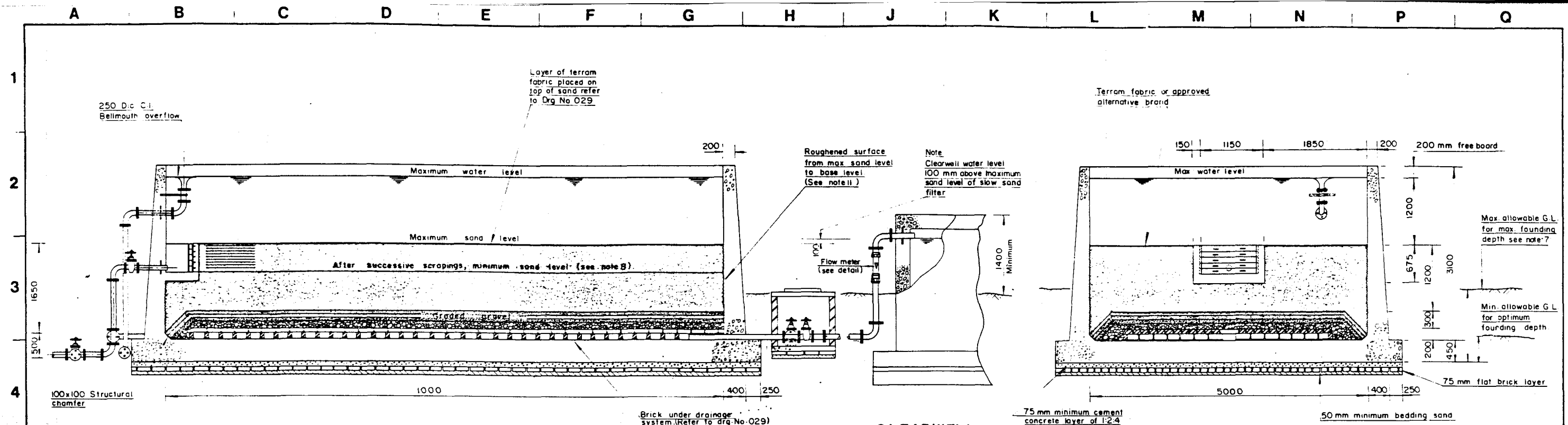
DRAWING NO 027 SCALE Refer to bar scale

DATE: AUGUST 1988

Sr Wilam Malrow & Partners  
Consulting Engineers and Architects  
Burdorpe Park  
Swindon, Wiltshire SN4 0QD



(Pipe detail is for SSF unit No 2 Refer to drg No 021)



- NOTES:**
- All dimensions are in millimetres unless otherwise stated.
  - For further details of the components of the slow sand filter unit and R.C.C. details refer to Drg Nos 021, 029, 032 and 033
  - Main drainage line interconnects other slow sand filters of the system to a final natural outfall arrangement, as per prevailing site conditions.
  - Overflow pipe line interconnects other slow sand filters of the system and is recycled to the presedimentation basins.
  - The water supply line interconnects other slow sand filters of the system, from the presedimentation basins via pump assembly P-5. Refer to drawing Nos 021 and 005 for respective details
  - The junction provides for the connection of additional slow sand filter units under staged development requirements.
  - A range of founding depths are allowed for in the structural design of the slow sand filter upto a maximum depth of 1.25m, this accommodates for the variance of the systems hydraulic gradient line as per prevailing topographical conditions. The required depths to be decided by the engineer-in-charge.
  - The removal of the terram and the scraping of the top 25mm of sand layer is necessary once the resistance to flow is such that the required filtration rate cannot be maintained.  
**IMPORTANT:** The minimum depth of sand remaining should not be less than 650 mm above the gravel bed i.e. the level of the top of the weir chamber base as indicated. Standard practice for the replacement of cleaned sand back to maximum sand level should be followed (Refer to drg No 029)
  - As the depth of sand is periodically reduced by scraping (see note 8), under normal operation and maintenance procedure, individual weir boards are removed as and when required.
  - 20mm rendering is given to all interior surfaces 1:3 cement sand ratio using 5% pudlo water proofing additive. Base slope formation levels are cast prior to rendering
  - The roughened surface prevents short circuiting of water between the wall sides and the sand filter. Fresh rendering to be roughened by hard brush sweeping

Table 1

Population size	Unit Nos	Filtration rate (For 24hrs)		Pipe dia. (mm)
		m <sup>3</sup> /m per m	l/s per filter	
4000-6000	2	0.11	1.52	80
6000-8000	3	0.10	1.40	80

Table 2

Valve No.	OPERATIONAL FUNCTION
①	Supply and/or slow sand filter No.1 isolation
②	Supply and/or slow sand filter No.2 isolation
③	Supernatant drain/reverse refill up through filter
④	Isolation/inlet control
⑤	Drainage isolation/refill control
⑥	Outlet/filtration control; isolation for refill and or drainage
⑦	Refill isolation/drainage outlet

LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES

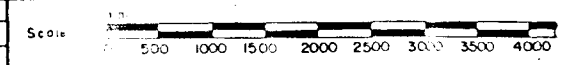
**SLOW SAND FILTER  
GENERAL ARRANGEMENT:  
50 SQUARE METRE PLAN AREA**

DRAWING NO C26

SCALE: Refer to bar scale

Sir William Halcrow & Partners Ltd  
Consulting Engineers and Architects  
Burdorpe Park,  
Swindon, Wiltshire, SN1 0DD

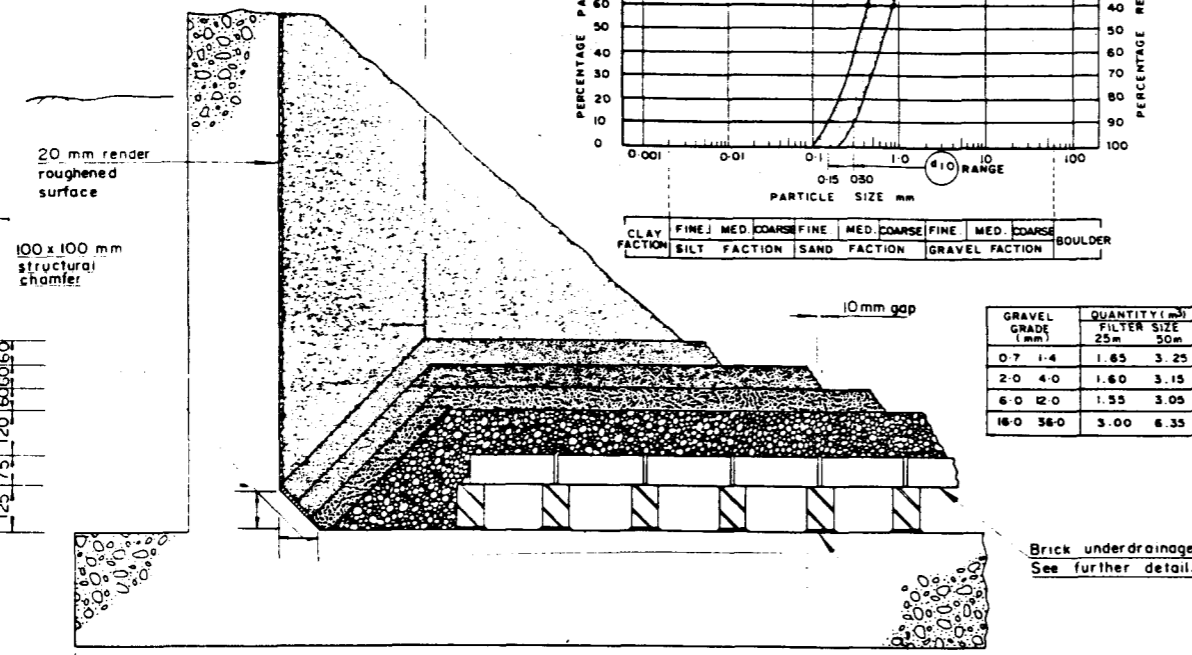
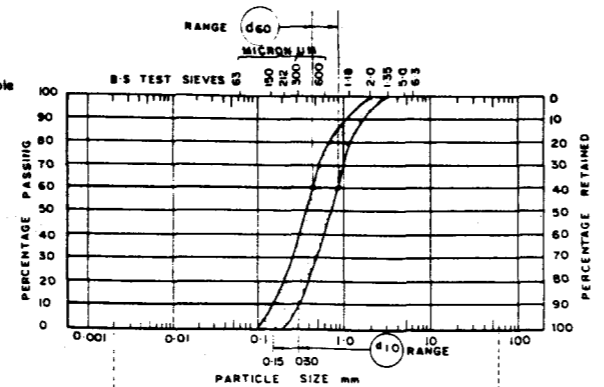
DATE: MAY 1988



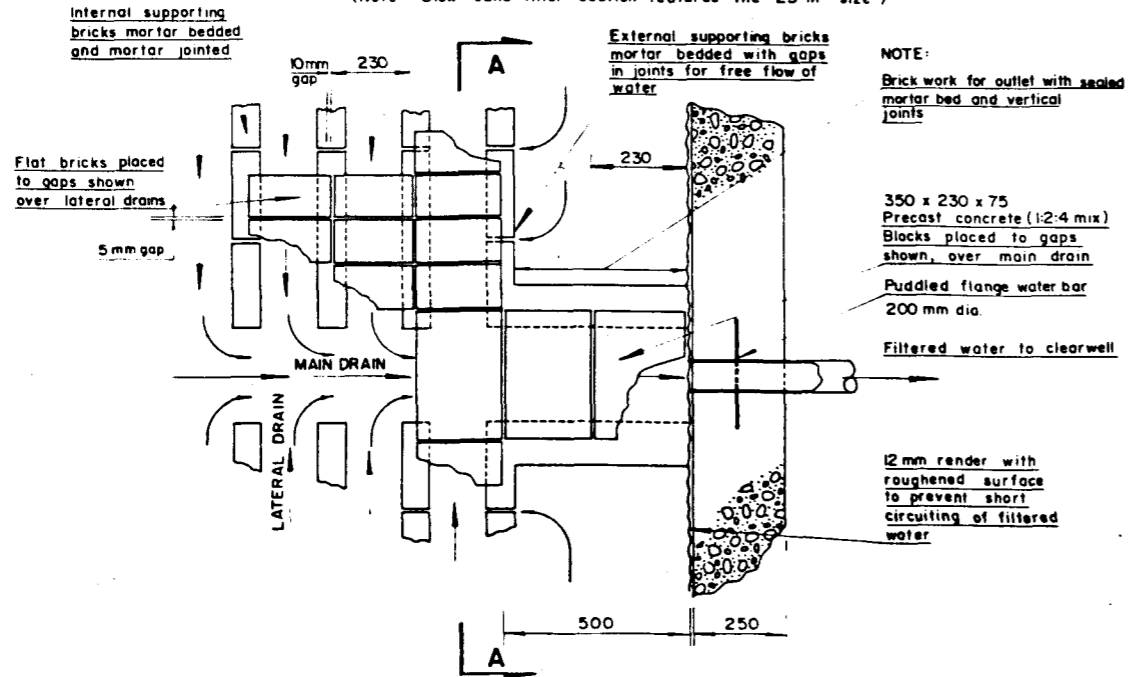
**IMPORTANT**  
Use sand within the required specification range

- With reference to distribution chart
- Effective size dia to be in range 0.15 - 0.30mm (10% of sample may be finer)
  - Uniformity coefficient  $U \leq 3$
  - Maximum size = 3 mm  $\phi$
  - Minimum size = 0.1 mm

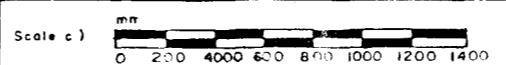
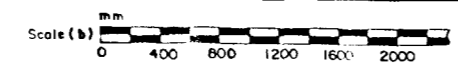
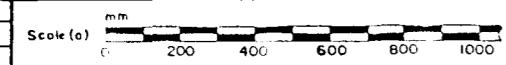
B.S.1377 1975 SAND PARTICLE SIZE DISTRIBUTION CHART



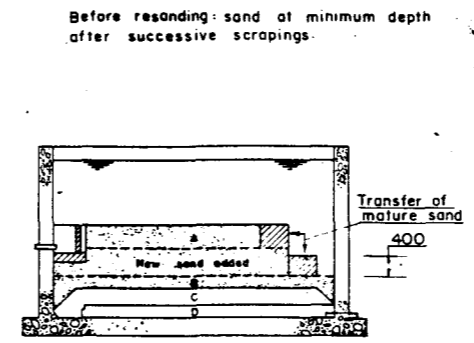
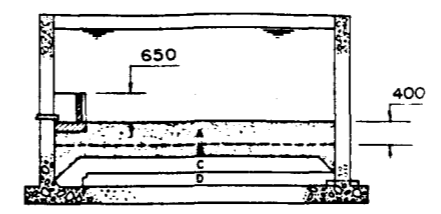
**SAND, GRAVEL AND UNDERDRAINAGE DETAIL** Scale (a)  
(Note: Slow sand filter section features the 25 m size)



**PLAN UNDERDRAINAGE OUTLET DETAIL** Scale (a)

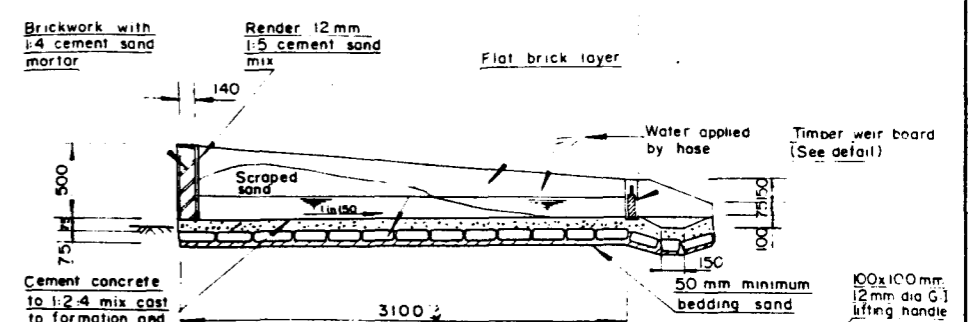


**IMPORTANT:** For resanding the new sand is not added to top of sand bed. Existing filter containing the necessary micro-organisms for purification should be transferred above new sand

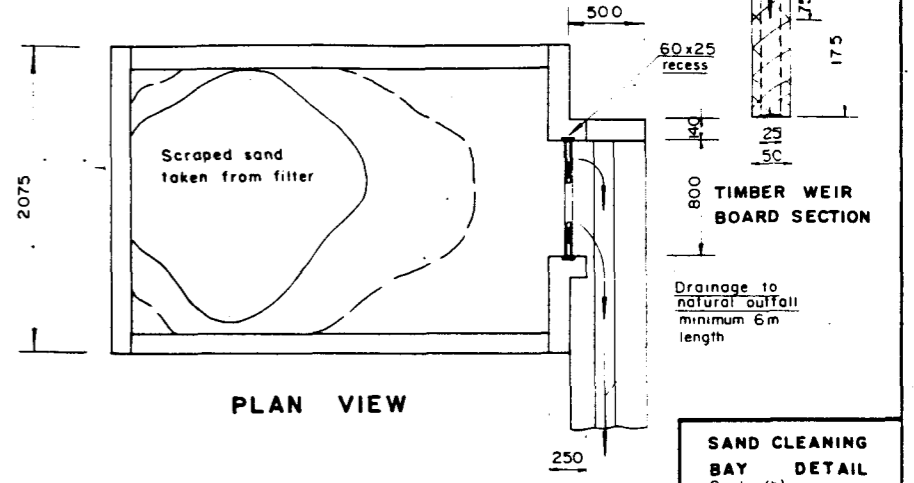


- A Biologically active for effective purification 400mm.
- B Lower undisturbed sand.
- C Gravel bed.
- D Underdrainage

**RESANDING DETAIL** (Not to scale)



**SECTIONAL FRONT ELEVATION**

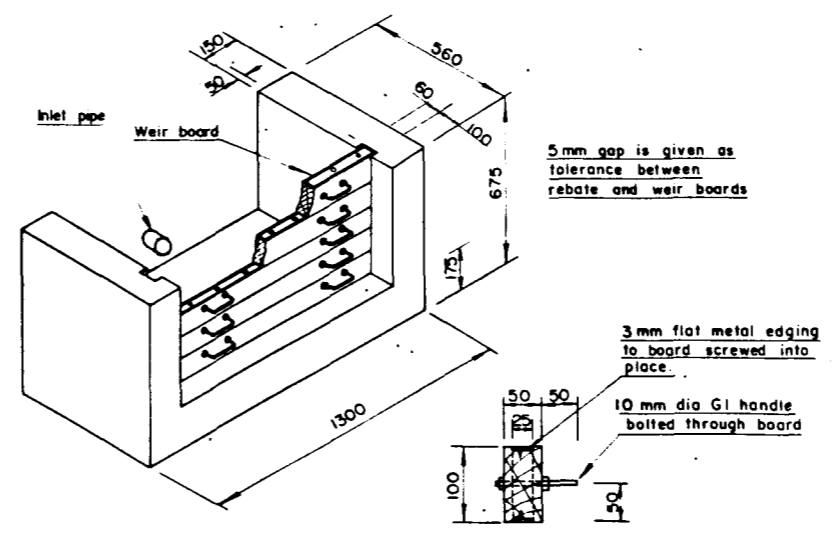


**PLAN VIEW**

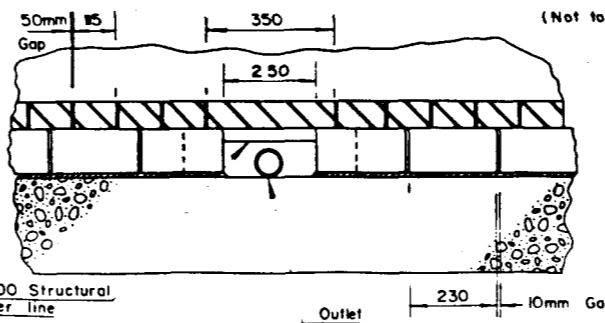
**SAND CLEANING BAY DETAIL** Scale (b)

**NOTES:**

- All dimensions are in millimetres unless otherwise stated.
- Commissioning of the filter is achieved by filling water, initially from the bottom up, until the level rises just above the sand thus allowing final inlet flow without scour and preventing air entrapment.
- Maturation period takes 2-3 weeks, before the newly commissioned filter becomes effective in purifying the water, during which time the filter is operated at 1/4 the design rate and filtrant run to waste. Filter is placed into full operation once the schmutzdecke, a reddish brown sticky coating, has formed on the sand surface.
- Once the required filtration rate can no longer be maintained, due to high resistance to flow of the filter medium, cleaning of the sand is necessary. The frequency of cleaning will vary from 20-40 days, (less with terram fabric in place - see G.A. detail) depending on quality of raw water.
- Cleaning procedure:
  - Drain supernatant to about 100 mm below sand level and remove terram
  - The top 25.0 mm of sand is scraped and removed, observing all necessary levels of hygiene and exposing the sand for the minimum of time. The terram fabric, once cleaned, is placed back to the top of the sand.
  - The filter is refilled with water (see note 2)
  - Filtration rate, initially at 1/4 design rate with filtrant run to waste, is brought up to full design rate over 12 hours, and filtered water placed into supply after 24 hours.
- The scraped sand should be thoroughly cleaned, (see cleaning bay detail), and protected against dust and pollution by adequately storing.
- Resanding (see detail) is required once the sand level reaches a minimum depth of 650 mm, after successive scrapings. After resanding the filter will take a minimum of one week to reach full maturation.



**INLET WEIR CHAMBER DETAIL** Scale (c)



**SECTION A-A OUTLET DETAIL** Scale (a)

**LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES**

**SLOW SAND FILTER  
GENERAL DETAILS AND INFORMATION**

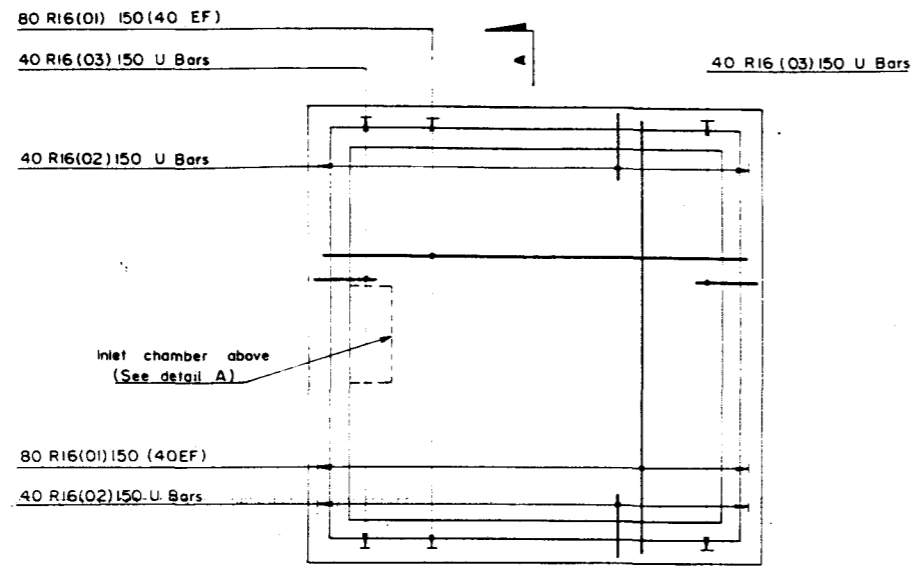
DRAWING NO. 029      SCALE: Refer to bar scales (a),(b).

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Burdurton Park  
Swindon, Wiltshire, SN4 9DD

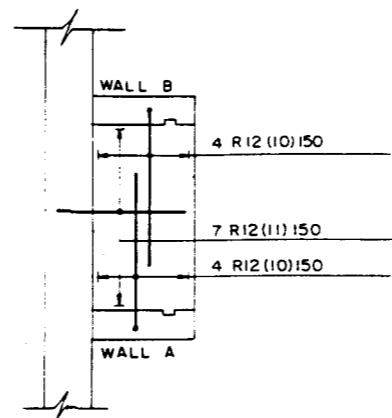
DATE: MAY 1988

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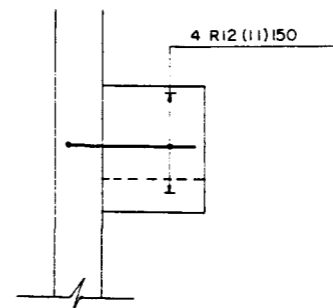
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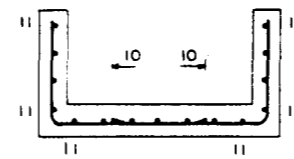
BASE PLAN (Scale a)



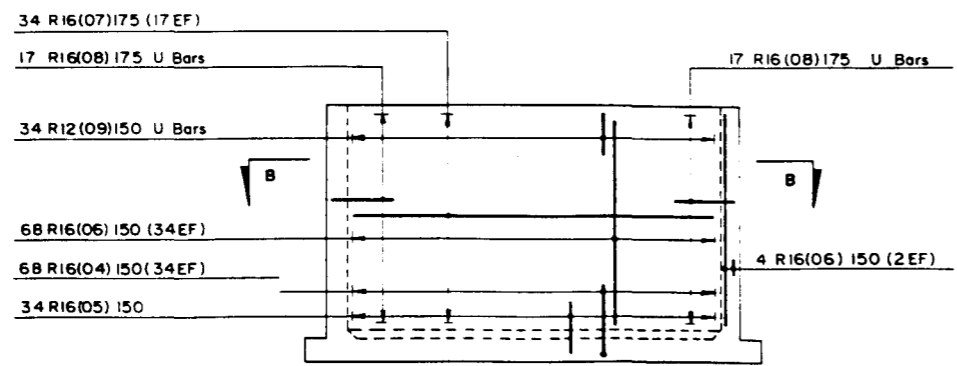
DETAIL A - INLET CHAMBER (Scale b)



ELEVATION WALL A (Scale b) (WALL B SIMILAR BUT HANDED)



SECTION C-C (Scale b)



TYPICAL WALL ELEVATION (Scale a) (4 No. THUS)

NOTES:

1. This drawing to be read in conjunction with drawing numbers 027, 029 & 031 and the relevant bending schedules.
2. Concrete mix to be 1:1½:3 cement/sand/course aggregate by volume.
3. Minimum concrete strength to be 25 N/mm<sup>2</sup> (3625 lb/in<sup>2</sup>).
4. Maximum aggregate size to be 20mm (¾ in).
5. Minimum cover to all reinforcement to be 50mm (2 in).
6. Laps to reinforcement to be 40 times the diameter of the smaller bar.
7. Reinforcement to be grade 250 N/mm<sup>2</sup> (36250 lb/in<sup>2</sup>) plain bars.
8. Reinforcement nomenclature:  

3 - R 16 - 39 - 200 - T	
	Position of bar (see note 9)
	Bar centres (mm)
	Bar mark (see Bending Schedules)
	Diameter of bar in millimetres
	Type of steel (R=mild steel)
	Number of bars
9. Abbreviations referring to positions of reinforcement  

EF = Each face	B = Bottom
NF = Near face	T = Top
FF = Far face	
10. Where reinforcement fouls pipes or openings, bars are either to be bent aside or are to be cut to suit and spliced with similar sized bars.
11. Safe soil bearing pressure should not be less than 75 kN/m<sup>2</sup> (0.7 ton/ft<sup>2</sup>).
12. The contractor to provide to the Engineer for testing, 3 No. concrete test cubes for each concrete pour.
13. This drawing is schematic only. Do not scale.

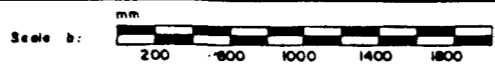
LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES

**25 SQUARE METRE SLOW SAND FILTER  
REINFORCEMENT DETAILS (SHEET 1 OF 2)**

DRAWING NO. 030      SCALE Refer to bar scales

DATE: MAY 1988

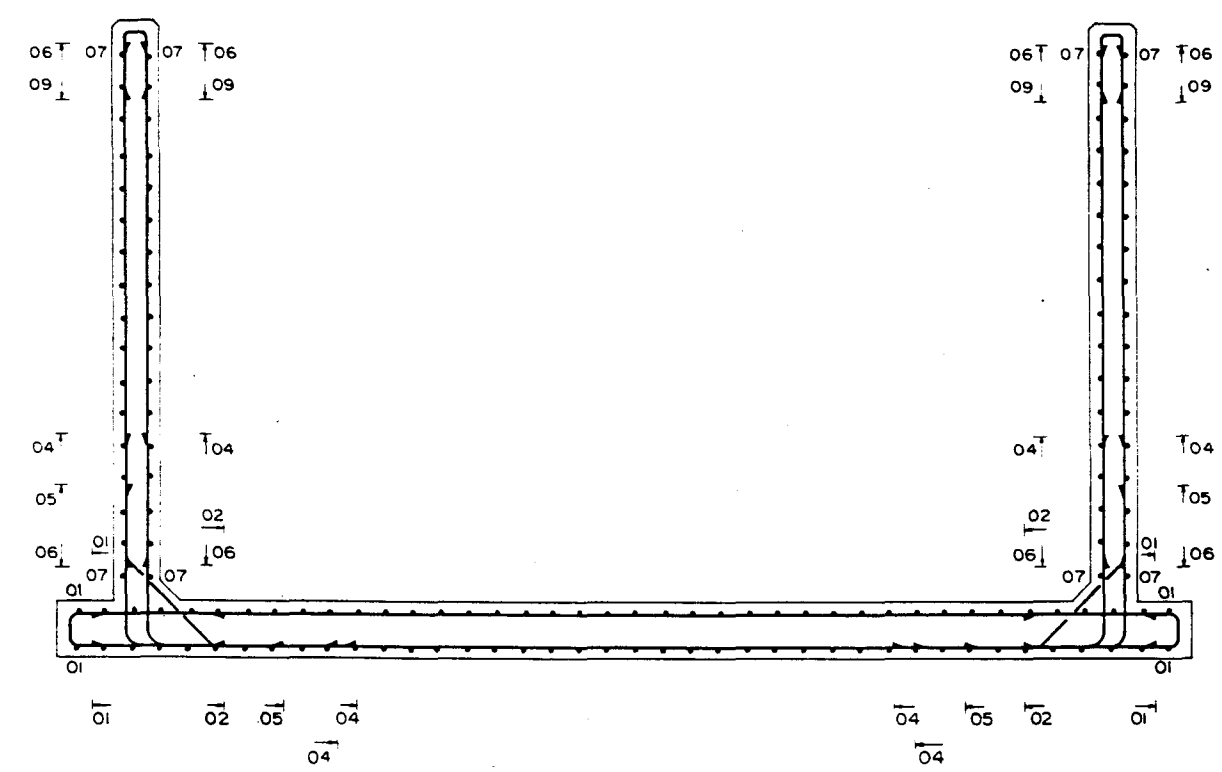
Sir William Halcrow & Partners Ltd  
Consulting Engineers and Architects,  
Burdorpe Park,  
Surrey, Wiltshire, SN4 8DD



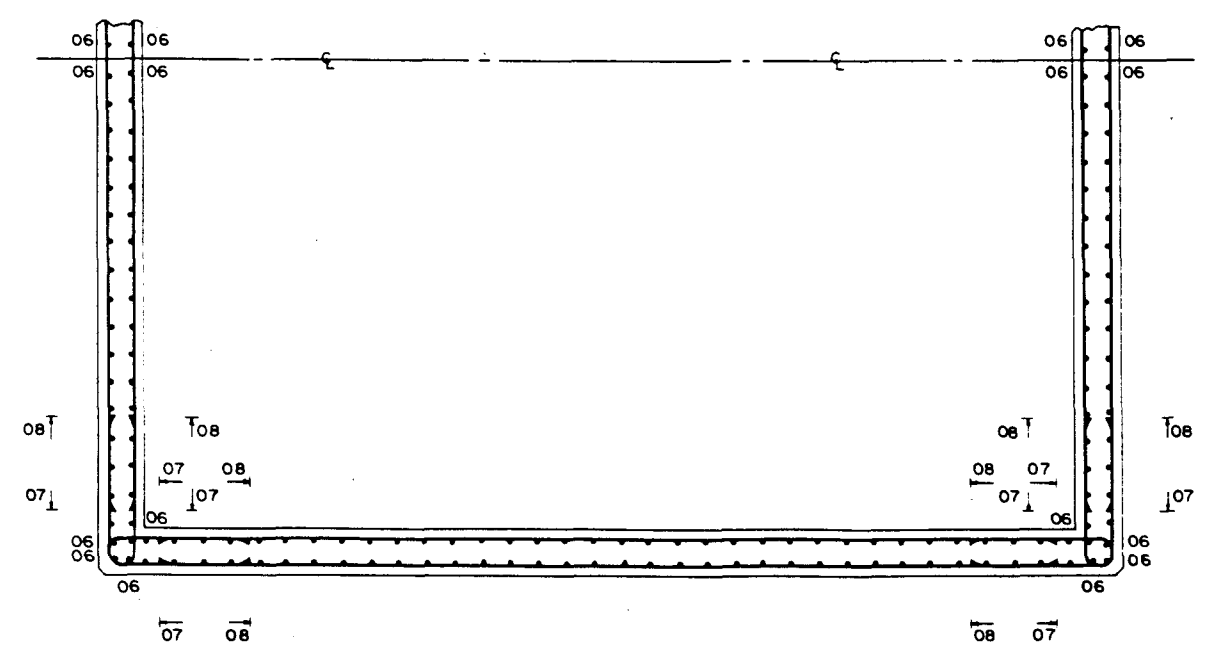


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SECTION A - A

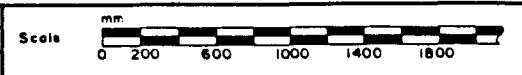


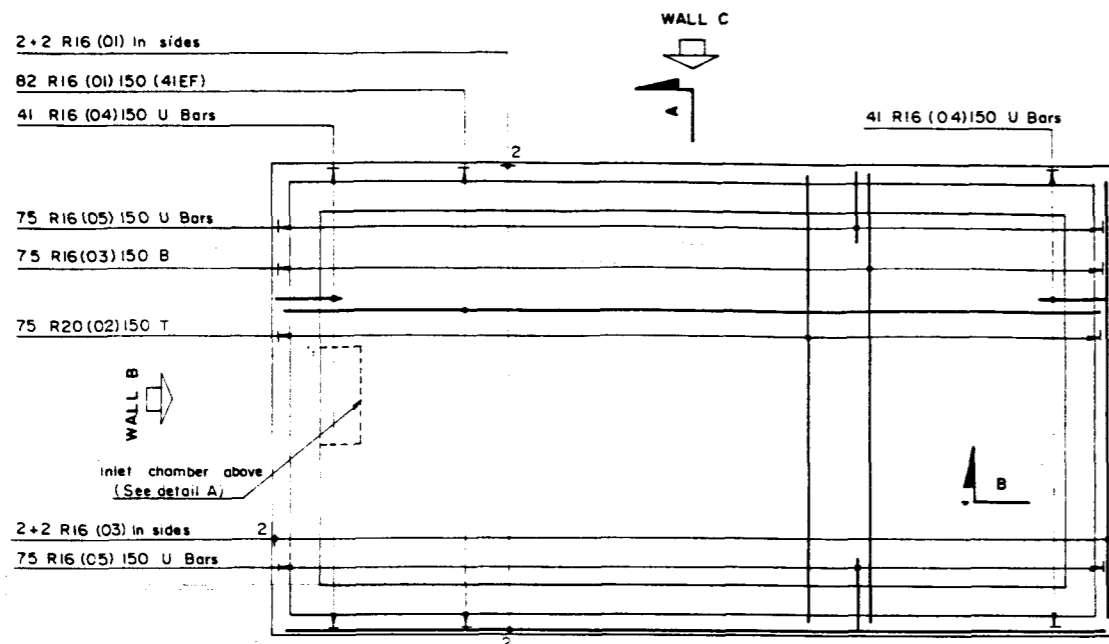
SECTION B - B

NOTES

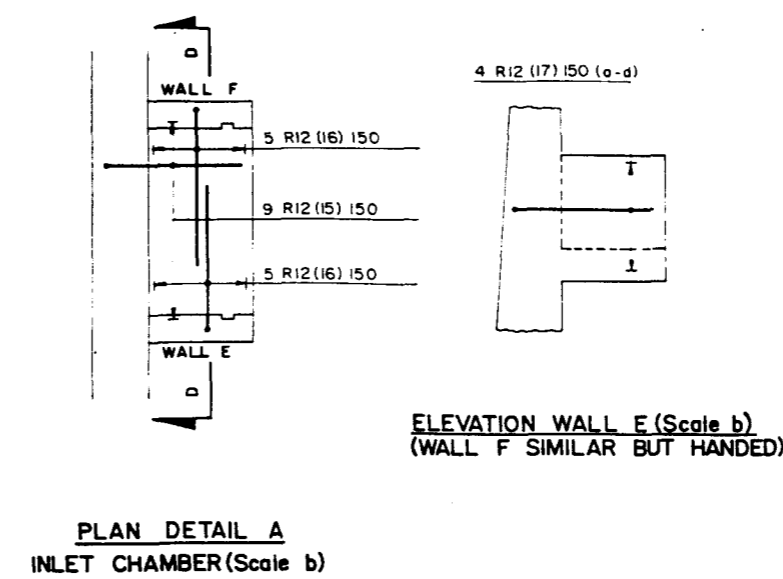
- 1 For position of sections see drawing number 030.
- 2 Reinforcement nomenclature:  
 05 — Bar mark 05  
 Position of end of bar
- 3 For bar positions, spacings, and diameters refer to plans and elevations on drawing number 030.
- 4 For bar shapes and lengths refer to relevant bending schedules.
- 5 The notes on drawing number 030 also apply.
- 6 This drawing is schematic only. Do not scale.

LOW COST WATER SUPPLY AND SANITATION STANDARD DESIGN MODULES	
<b>25 SQUARE METRE SLOW SAND FILTER REINFORCEMENT DETAILS (SHEET 2 OF 2)</b>	
DRAWING NO 031	SCALE Refer to bar scale
Sir William Halcrow & Partners Ltd Consulting Engineers and Architects, Burscough Park, Swindon, Wiltshire, SN4 6DD	
DATE: MAY 1988	



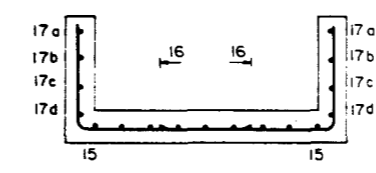


**BASE PLAN (Scale a)**

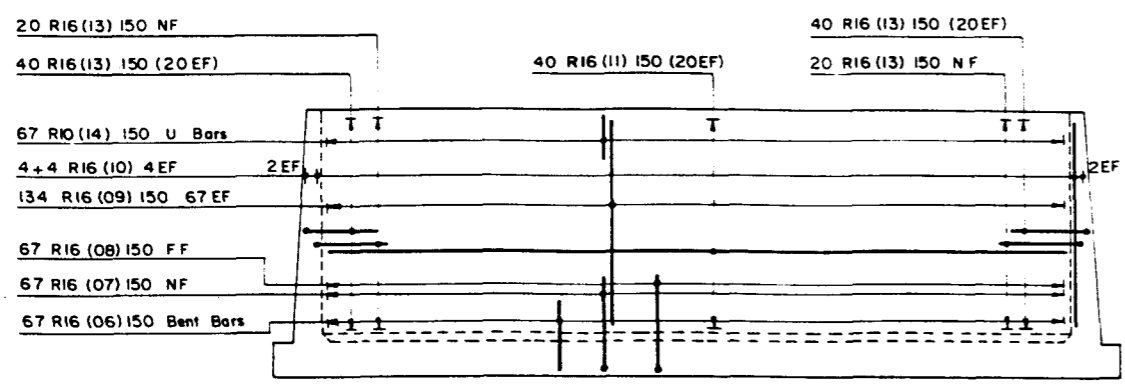


**PLAN DETAIL A  
INLET CHAMBER (Scale b)**

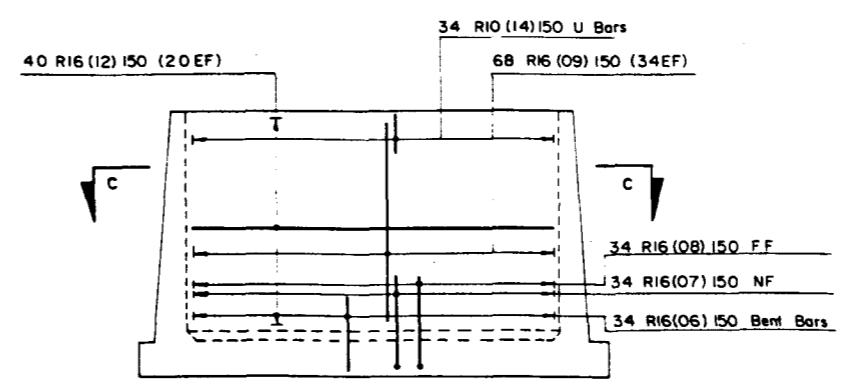
**ELEVATION WALL E (Scale b)  
(WALL F SIMILAR BUT HANDED)**



**SECTION D-D (Scale b)**



**ELEVATION WALL A (Scale a)  
(WALL C SIMILAR)**



**ELEVATION WALL B (Scale a)  
(WALL D SIMILAR)**

- NOTES**
- This drawing to be read in conjunction with drawing numbers 028, 029, 033 and the relevant bending schedules
  - Concrete mix to be 1:1/2:3 cement/sand/course aggregate by volume.
  - Minimum concrete strength to be 25N/mm<sup>2</sup> (3625 lb/in<sup>2</sup>).
  - Maximum aggregate size to be 20mm (3/4 in)
  - Minimum cover to all reinforcement to be 50mm (2 in).
  - Laps to reinforcement to be 40 times the diameter of the smaller bar.
  - Reinforcement to be grade 250 N/mm<sup>2</sup> (36250 lb/in<sup>2</sup>) plain bars.
  - Reinforcement nomenclature  
3 - R 16 - 39 - 200 - T  
Position of bar (see note 9)  
Bar centres (mm)  
Bar mark (see Bending Schedules)  
Diameter of bar in millimetres  
Type of steel (R=mild steel)  
Number of bars
  - Abbreviations referring to positions of reinforcement  
EF = Each face      B = Bottom  
NF = Near face     T = Top  
FF = Far face
  - Where reinforcement fouls pipes or openings, bars are either to be bent aside or are to be cut to suit and spliced with similar sized bars
  - Safe soil bearing pressure should not be less than 75 kN/m<sup>2</sup> (0.7 ton/ft<sup>2</sup>).
  - This drawing is schematic only. Do not scale
  - The contractor to provide to the Engineer for testing,  
3 No. concrete test cubes for each concrete pour.

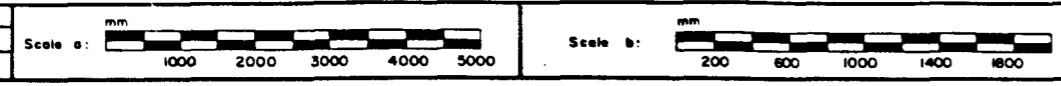
LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES

**50 SQUARE METRE SLOW SAND FILTER  
REINFORCEMENT DETAILS (SHEET 1 OF 2)**

DRAWING NO 032      SCALE Refer to bar scales

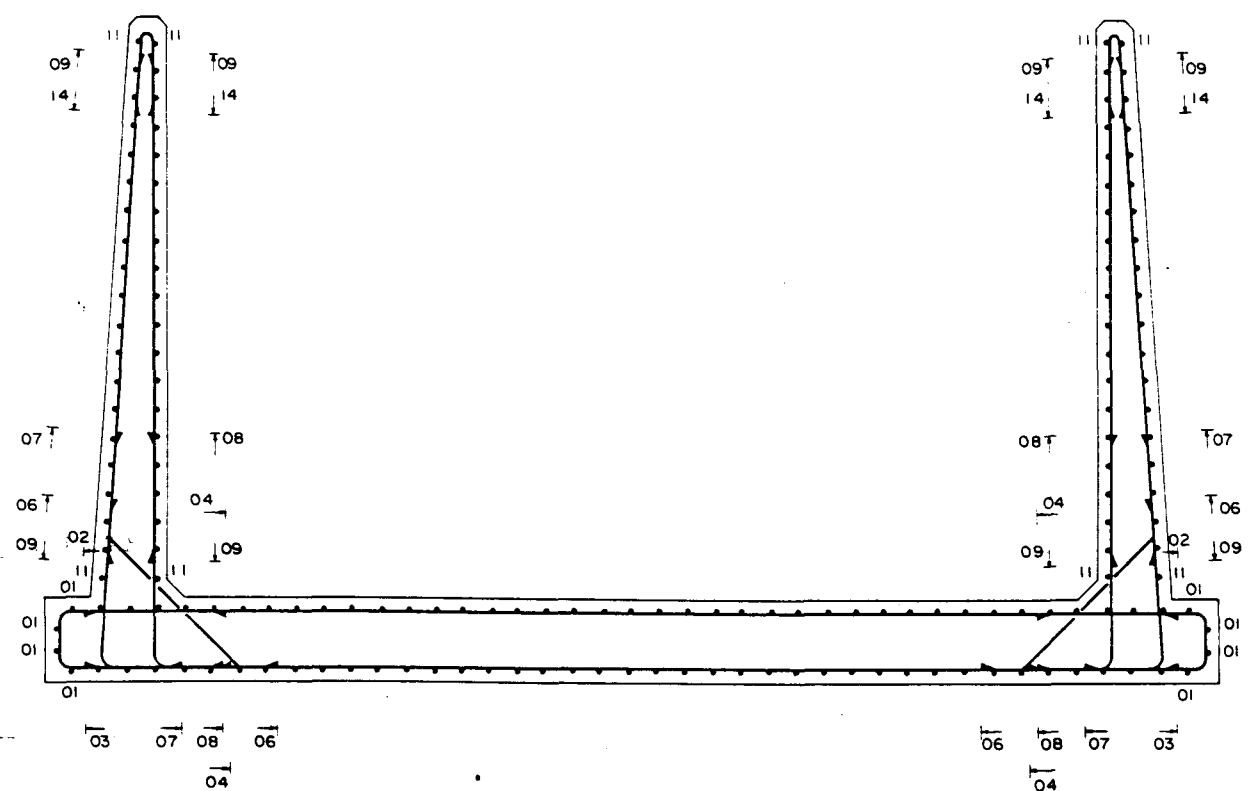
DATE JUNE 1988

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Consulting Engineers and Architects  
Bundara Park,  
Surrey, Wiltshire, SN4 6DD

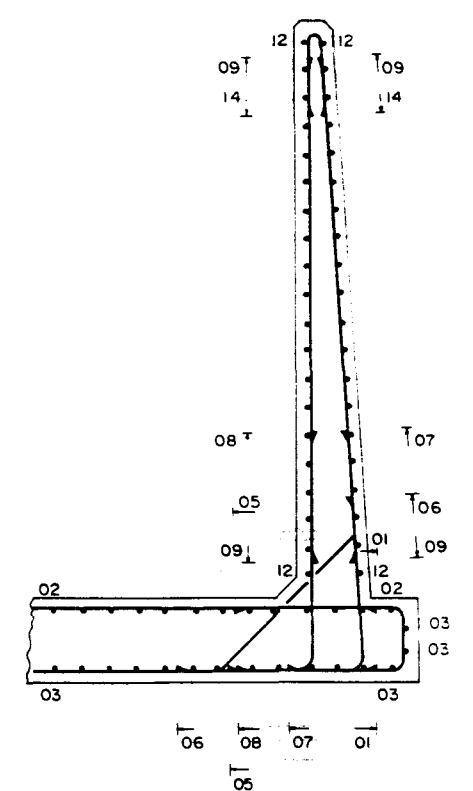


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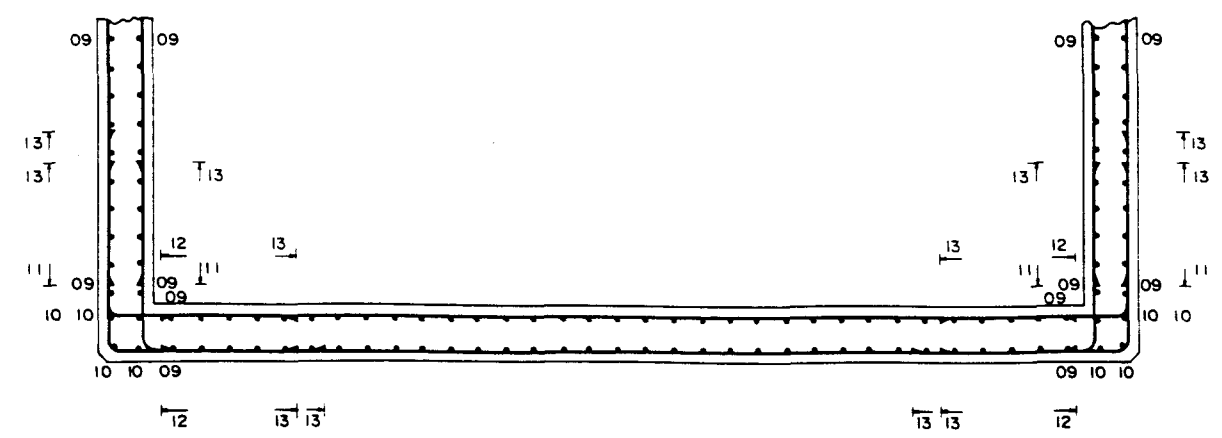
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SECTION A - A




SECTION B - B

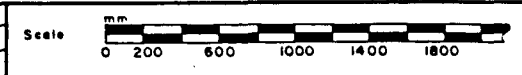


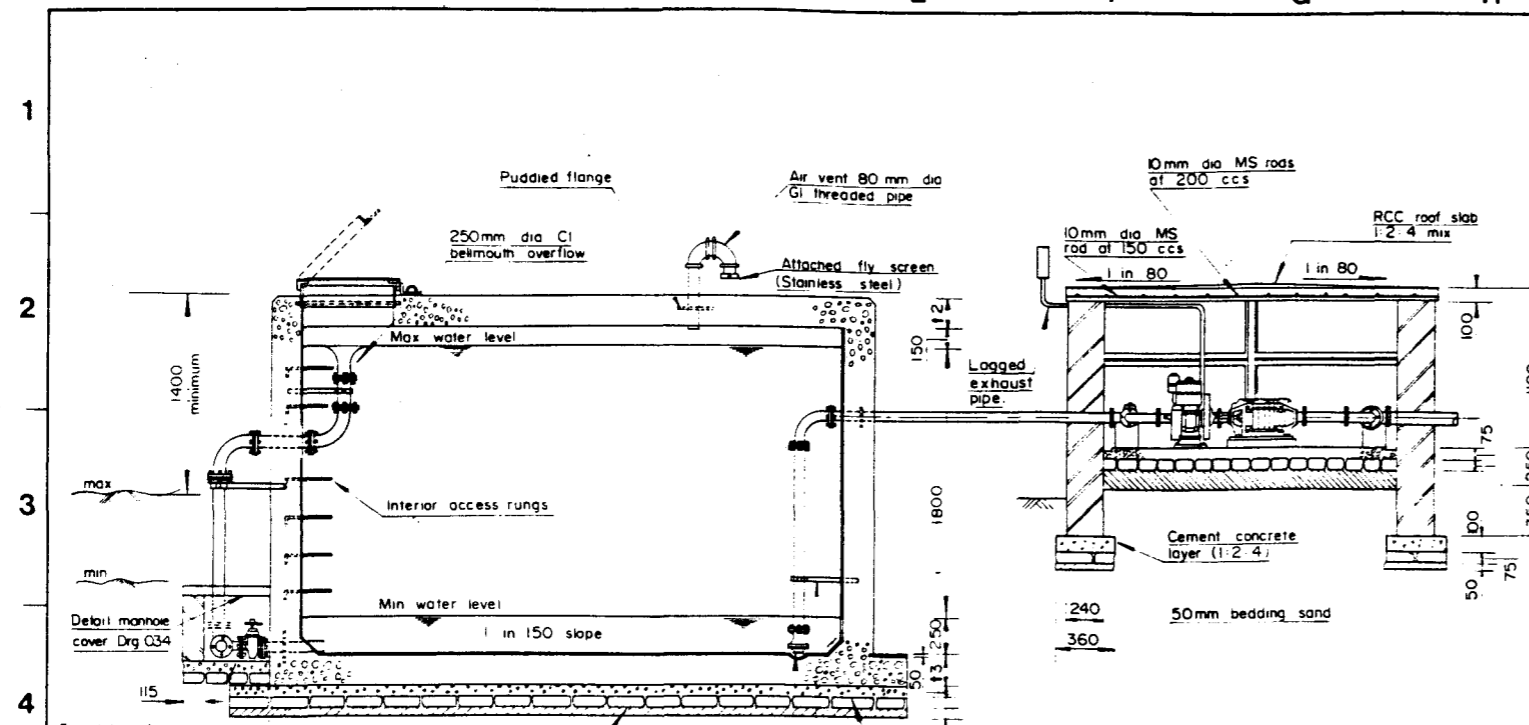
SECTION C - C

NOTES

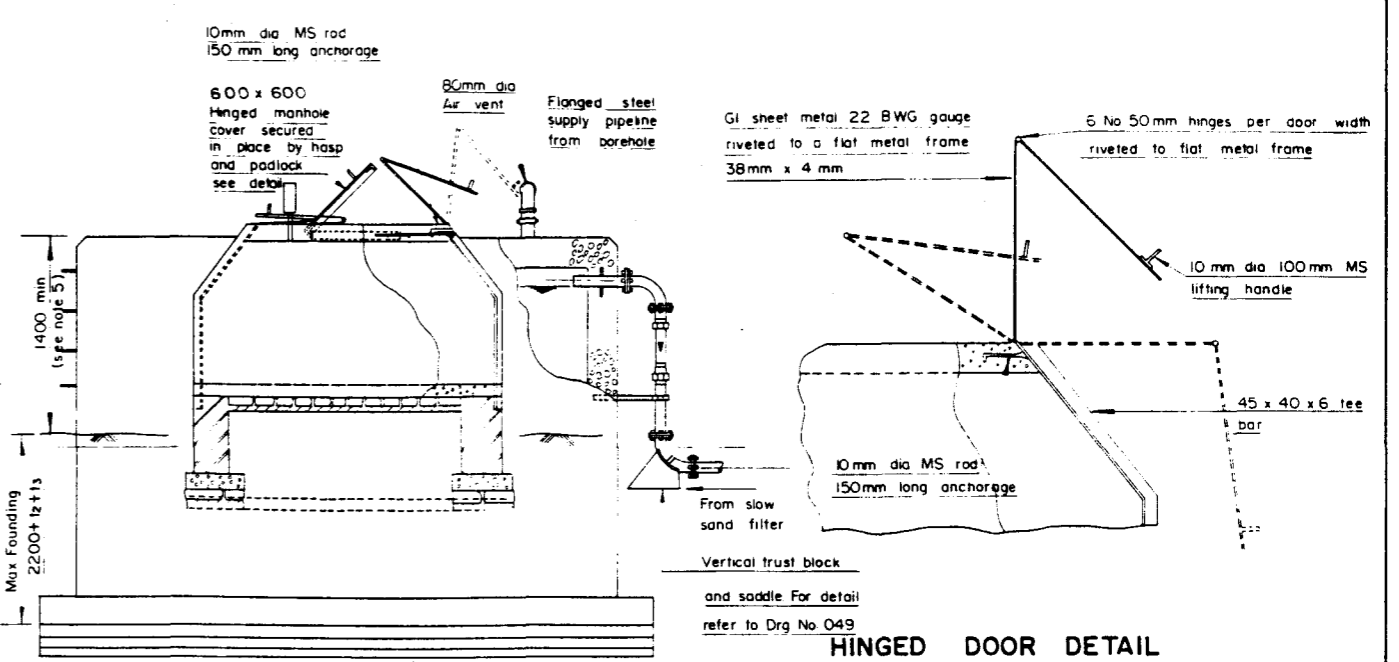
- 1 For position of sections see drawing number 032.
- 2 Reinforcement nomenclature:  
 05 — Bar mark 05  
 Position of end of bar
- 3 For bar positions, spacings, and diameters refer to plans and elevations on drawing number 032.
- 4 For bar shapes and lengths refer to relevant bending schedules.
- 5 The notes on drawing number 032 also apply.
- 6 This drawing is schematic only. Do not scale.

LOW COST WATER SUPPLY AND SANITATION STANDARD DESIGN MODULES	
<b>50 SQUARE METRE SLOW SAND FILTER REINFORCEMENT DETAILS (SHEET 2 OF 2)</b>	
DRAWING NO 033	SCALE: Refer to bar scale
<small>Sir William Halcrow &amp; Partners Ltd Consulting Engineers and Architects Burdens Park Swindon, Wiltshire, SN4 8DD</small>	
DATE: JUNE 1988	

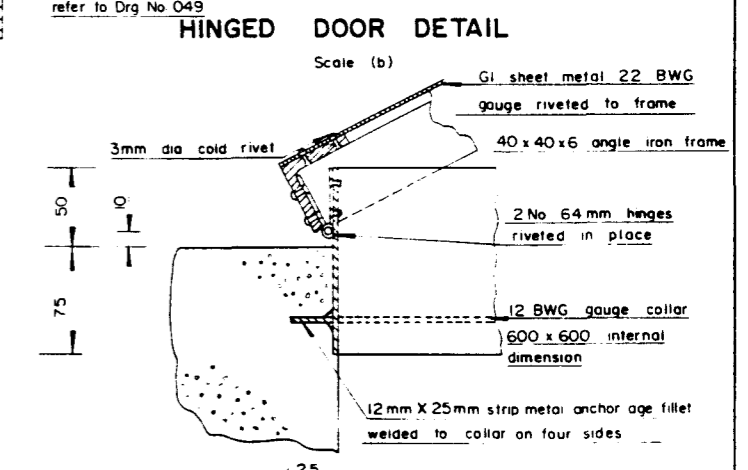




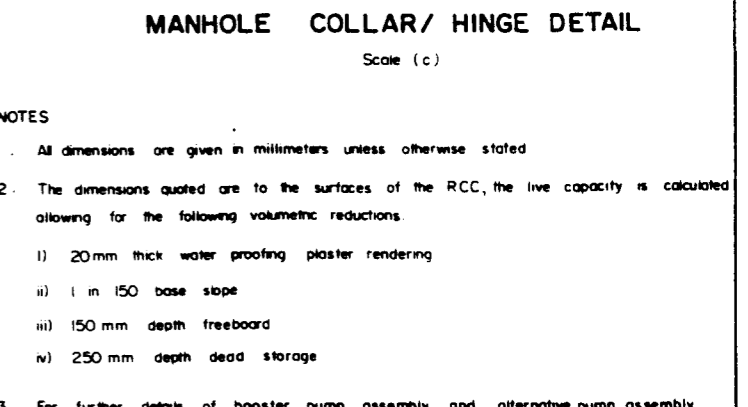
**SECTIONAL FRONT ELEVATION**  
Scale (a)



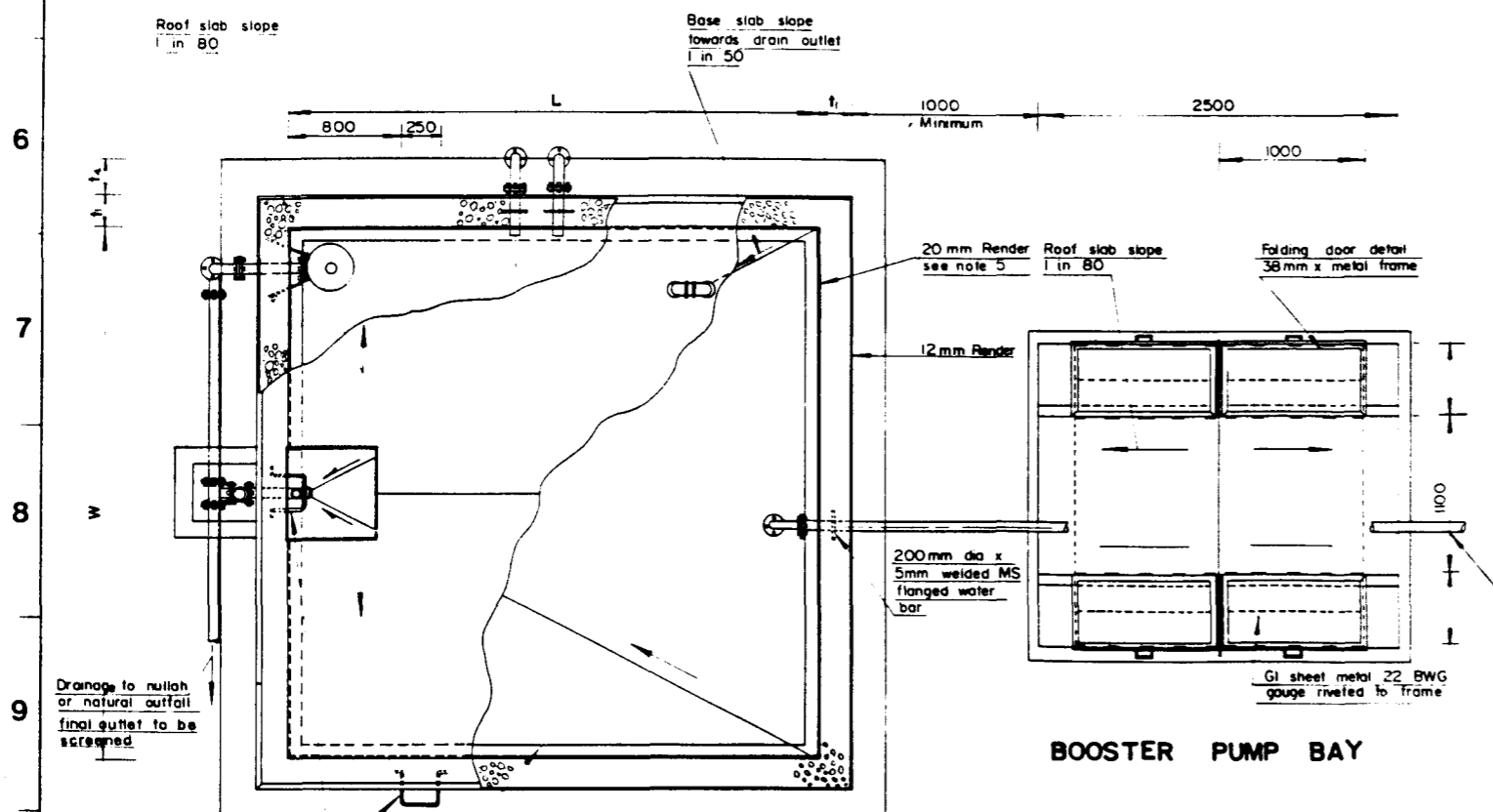
**PART CUT SECTIONAL END ELEVATION**  
Scale (a)



**HINGED DOOR DETAIL**  
Scale (b)



**MANHOLE COLLAR/ HINGE DETAIL**  
Scale (c)



**PART CUT PLAN VIEW**  
Scale (a)

Live capacity	Dimension			Thickness			Heel Length (mm) (2) Detail	
	Gal	m <sup>3</sup>	Length L	Width W	Depth D	Wall t <sub>1</sub>		Roof t <sub>2</sub>
2500	11.4	3650	1800	2200	200	200	200	200
5000	22.8	3650	3650	2200	200	200	200	250
7500	34.1	5400	3650	2200	200	200	200	350
10,000	45.5	5100	5100	2200	250	250	250	300
15,000	68.3	7650	5100	2200	250	250	250	400
20,000	91.0	10200	5100	2200	250	250	300	400

(1) See note 2  
(2) No heel is required for this size clearwell.

- NOTES**
- All dimensions are given in millimeters unless otherwise stated.
  - The dimensions quoted are to the surfaces of the RCC, the live capacity is calculated allowing for the following volumetric reductions:
    - 20 mm thick water proofing plaster rendering
    - 1 in 150 base slope
    - 150 mm depth freeboard
    - 250 mm depth dead storage
  - For further details of booster pump assembly and alternative pump assembly layouts, refer to drg No 006. Level to be set according to calculated suction head and NPSH for the booster pump.
  - For full RCC details, for the range of clearwell sizes, refer to drg Nos 035-046 and relevant bending schedules.
  - 20 mm thick internal render to walls and base using 1:3 cement sand ratio with 5% water proofing pulvis additive.

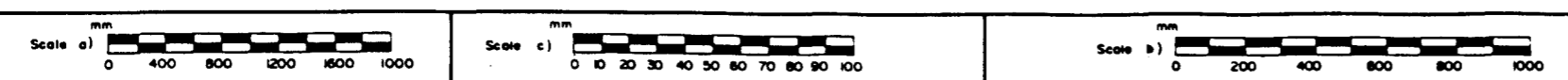
LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES

**CLEARWELL / BOOSTER PUMP BAY  
GENERAL ARRANGEMENT**

DRAWING NO 034 SCALE

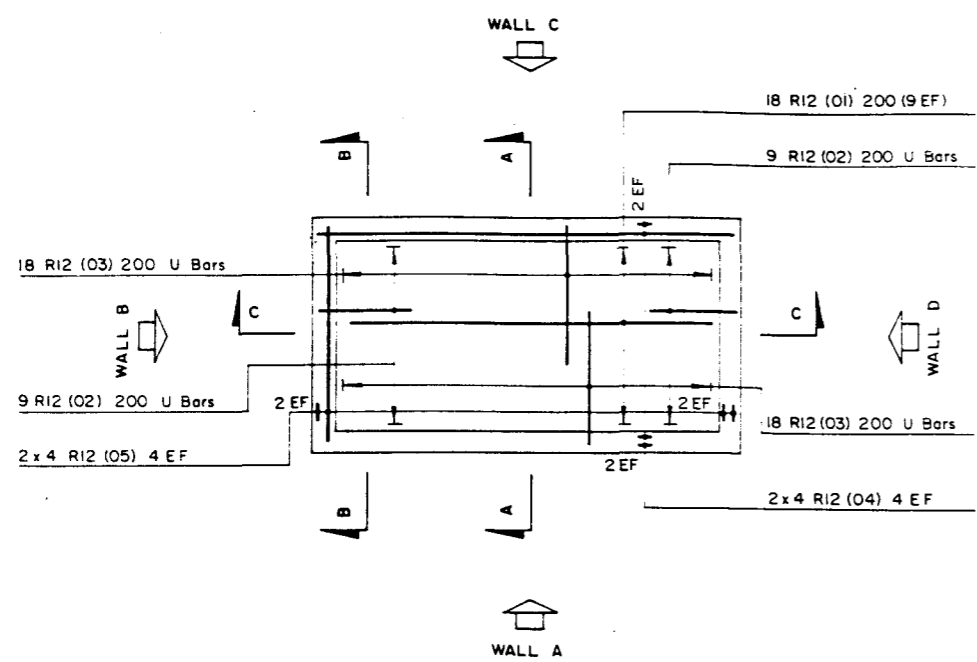
Sir William Halcrow & Partners Ltd  
Consulting Engineers and Architects  
Bundarigatta Pans  
Sunderland, Wiltshire, SA4 0DD

DATE

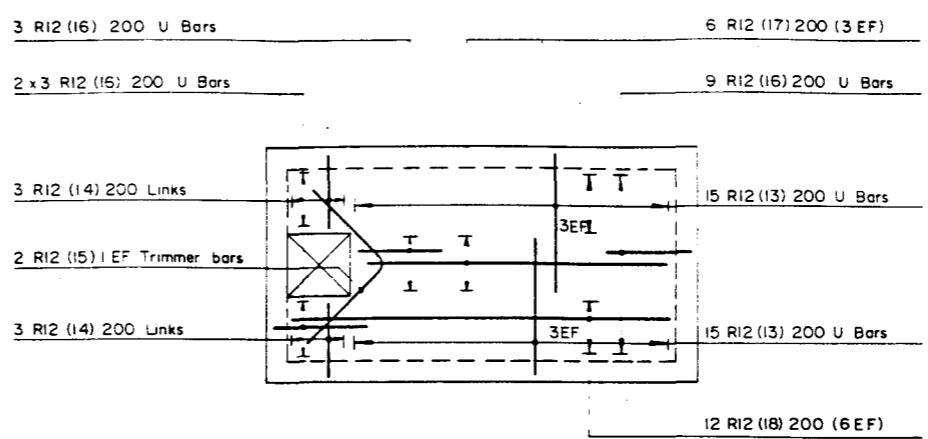


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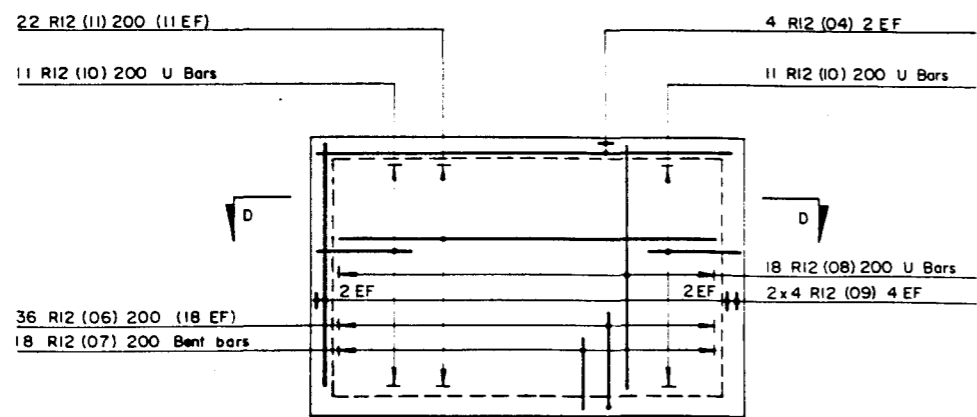
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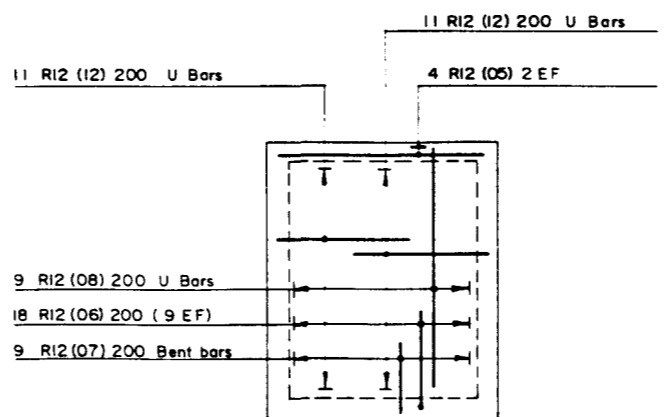
BASE SLAB



ROOF SLAB



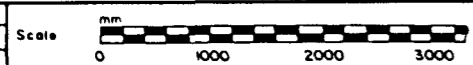
WALL A  
(WALL C SIMILAR)



WALL B  
(WALL D SIMILAR)

NOTES

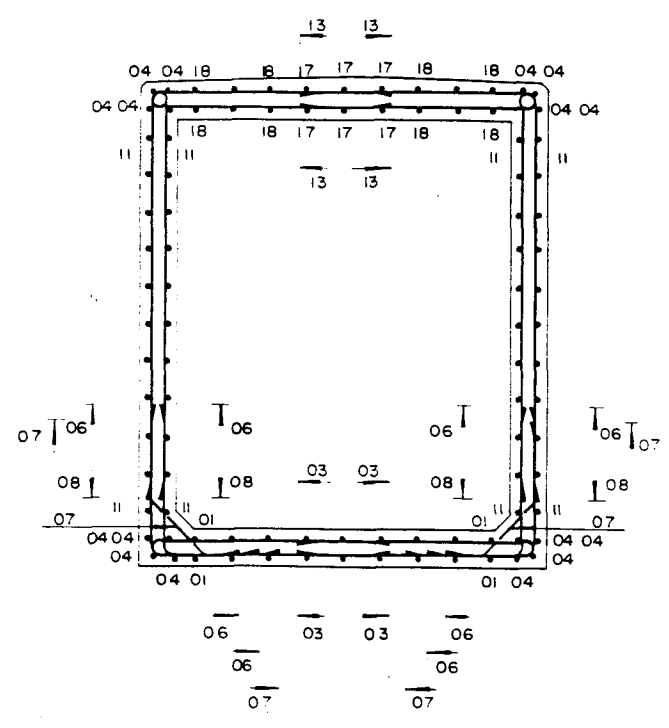
1. This drawing to be read in conjunction with drawing Nos. 034 & 036 and the relevant bending schedules.
2. Concrete mix to be 1:1½:3 cement/sand/course aggregate by volume.
3. Minimum concrete strength to be 25 N/mm<sup>2</sup> (3625 lb/in<sup>2</sup>).
4. Maximum aggregate size to be 20mm (¾ in).
5. Minimum cover to all reinforcement to be 50mm (2 in).
6. Laps to reinforcement to be 40 times the diameter of the smaller bar.
7. Reinforcement to be grade 250 N/mm<sup>2</sup> (36250 lb/in<sup>2</sup>) plain bars.
8. Reinforcement nomenclature:  
 3 - R 16 - 39 - 200 - T  
 Position of bar (see note 9)  
 Bar centres (mm)  
 Bar mark (see Bending Schedules)  
 Diameter of bar in millimetres  
 Type of steel (R=mid steel)  
 Number of bars
9. Abbreviations referring to position of reinforcement:  
 EF = Each face      B = Bottom  
 NF = Near face      T = Top  
 FF = Far face
10. Where reinforcement fouls pipes or openings, bars are either to be bent aside or are to be cut to suit and spliced with similar sized bars.
11. Safe soil bearing pressure should not be less than 50 kN/m<sup>2</sup> (0.45 ton/ft<sup>2</sup>).
12. This drawing is schematic only. Do not scale.
13. The contractor to provide to the Engineer for testing, 3 No. concrete test cubes for each concrete pour.



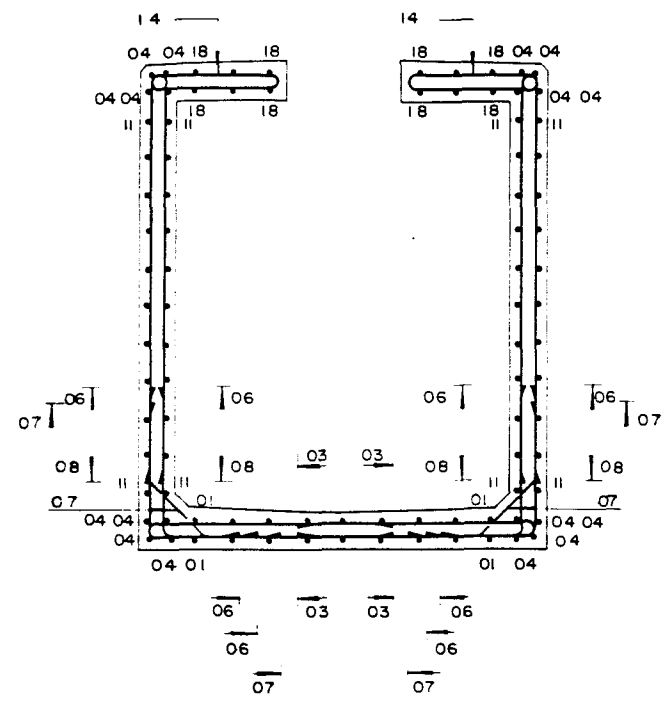
LOW COST WATER SUPPLY AND SANITATION STANDARD DESIGN MODULES	
11.4 CUBIC METRE (2500 GALLON) CLEAR WELL	
<b>REINFORCEMENT DETAILS (SHEET 1 OF 2)</b>	
DRAWING NO 035	SCALE Refer to bar scale
DATE JUNE 1988	
Sir William Halcrow & Partners Ltd Consulting Engineers and Architects Burdett Park Swindon, Wiltshire SN4 0OD	

A B C D E F G H J K L M N P Q

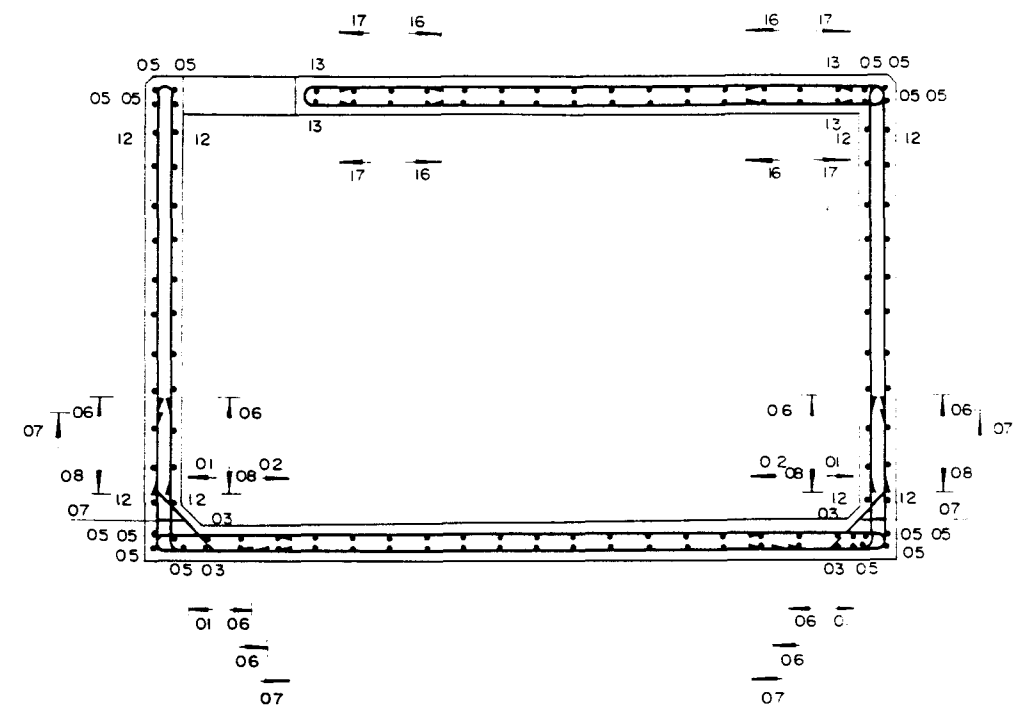
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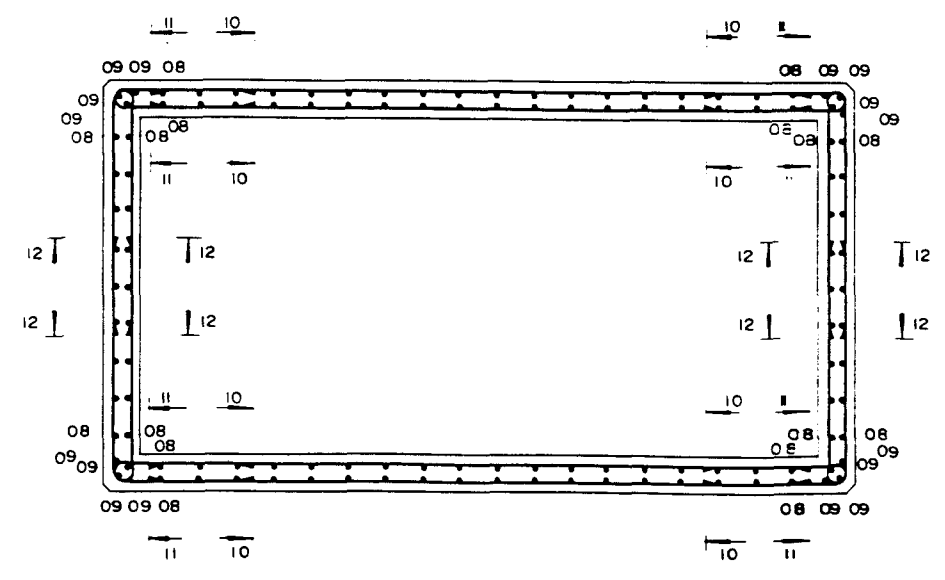
SECTION A-A



SECTION B-B



SECTION C-C



SECTION D-D

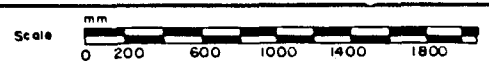
NOTES

1. For position of sections see drawing number 035
2. Reinforcement nomenclature:
  - 05 ——— Bar mark 05
  - Position of end of bar
3. For bar position spacings and diameters refer to drawing No 035
4. For shapes and lengths refer to relevant bending schedules
5. The notes on drawing number 035 also apply
6. The drawing is schematic only. Do not scale.

LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES

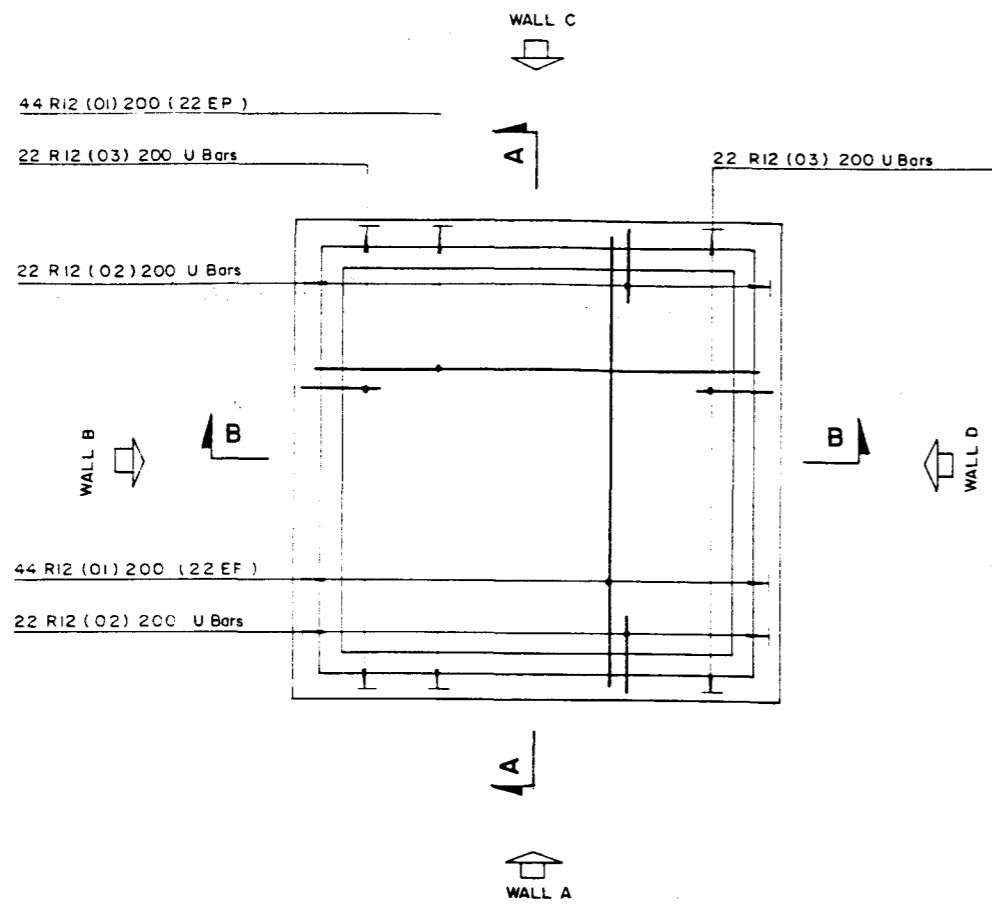
**11.4 CUBIC METRE (2500 GALLON)  
CLEAR WELL  
REINFORCEMENT DETAILS (SHEET 2 OF 2)**

DRAWING NO 036 SCALE Refer to bar scale

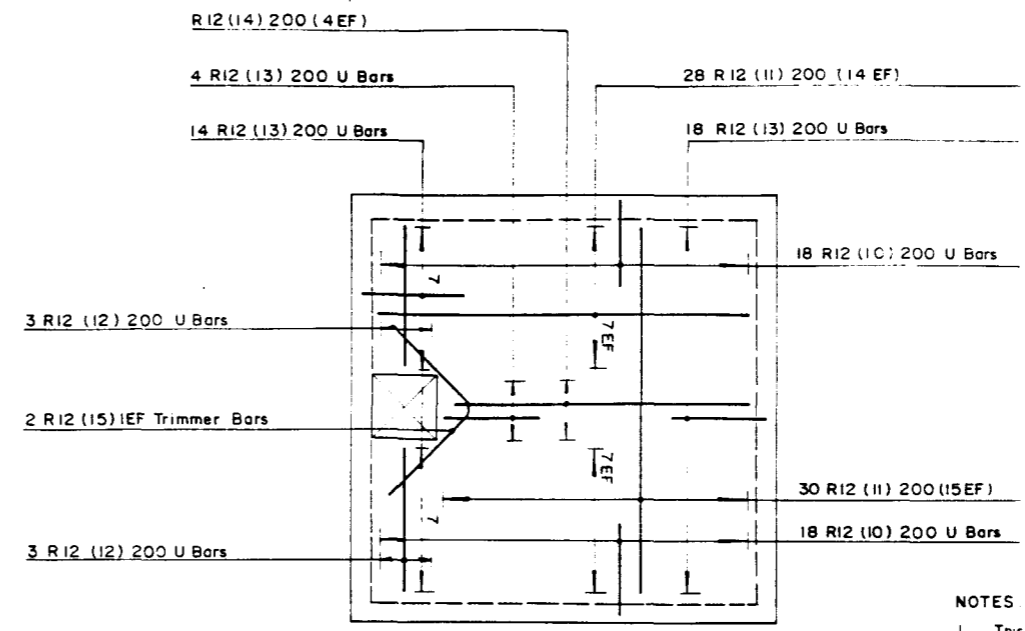


DATE: JULY 1988  
 Sir Willem Melcrow & Partners Ltd  
 Consulting Engineers and Architects  
 Burwood Park  
 Sandton, Witwatersrand 2046

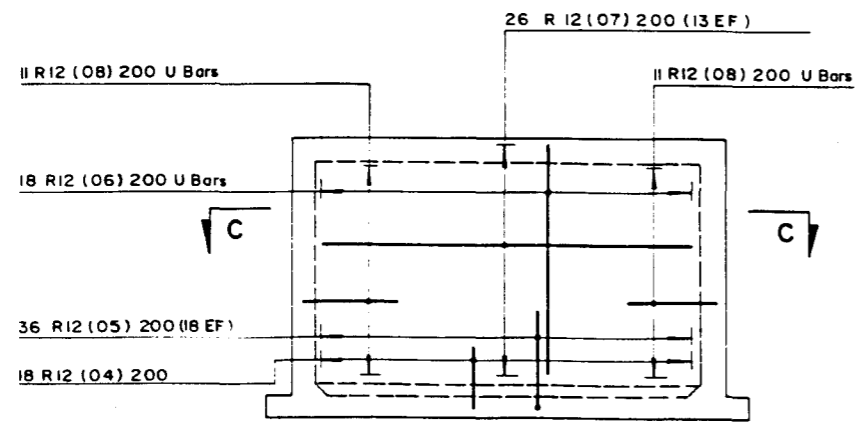
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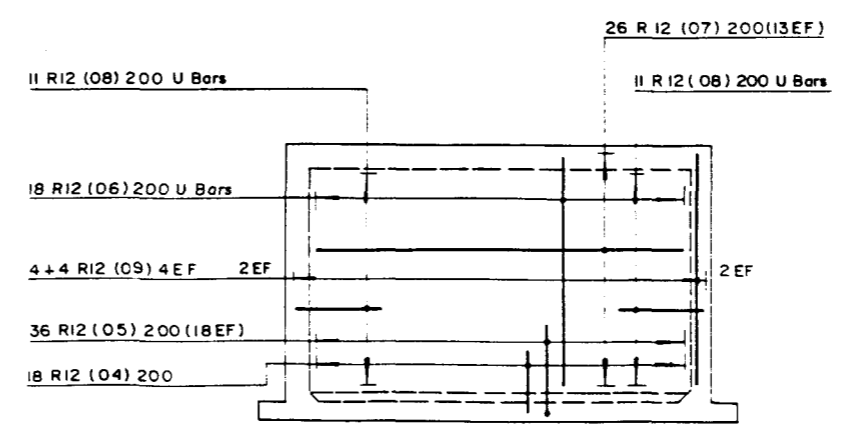
BASE PLAN



ROOF PLAN



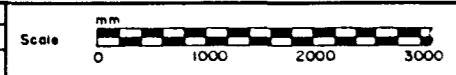
ELEVATION WALL A  
(WALL C SIMILAR)



ELEVATION WALL B  
(WALL D SIMILAR)

NOTES

- 1 This drawing to be read in conjunction with drawing numbers 034 B 038 and the relevant bending schedules
- 2 Concrete mix to be 1 1/2 : 3 cement/sand/course aggregate by volume
- 3 Minimum concrete strength to be 25 N/mm<sup>2</sup> (3625 lb/in<sup>2</sup>) at 28 days
- 4 Maximum aggregate size to be 20mm (3/4 in)
- 5 Minimum cover to all reinforcement to be 50mm (2 in)
- 6 Laps to reinforcement to be 40 times the diameter of the smaller bar
- 7 Reinforcement to be grade 250 N/mm<sup>2</sup> (36250 lb/in<sup>2</sup>) plain bars
- 8 Reinforcement nomenclature  
 3 - R 16 - 39 - 200 - T  
 Position of bar (see note 9)  
 Bar centres (mm)  
 Bar mark (see Bending Schedules)  
 Diameter of bar in millimetres  
 Type of steel (R = mild steel)  
 Number of bars
- 9 Abbreviations referring to positions of reinforcement:  
 EF = Each face      B = Bottom  
 NF = Near face      T = Top  
 FF = Far face
- 10 Where reinforcement faults pipes or openings, bars are either to be bent aside or are to be cut to surt and spliced with similar sized bars
- 11 The contractor to provide to the Engineer for testing, 3 No concrete test cubes for each concrete pour
- 12 Safe soil bearing pressure should not be less than 50 kN/m<sup>2</sup> (0.45 ton/ft<sup>2</sup>)
- 13 This drawing is schematic only. Do not scale



LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES

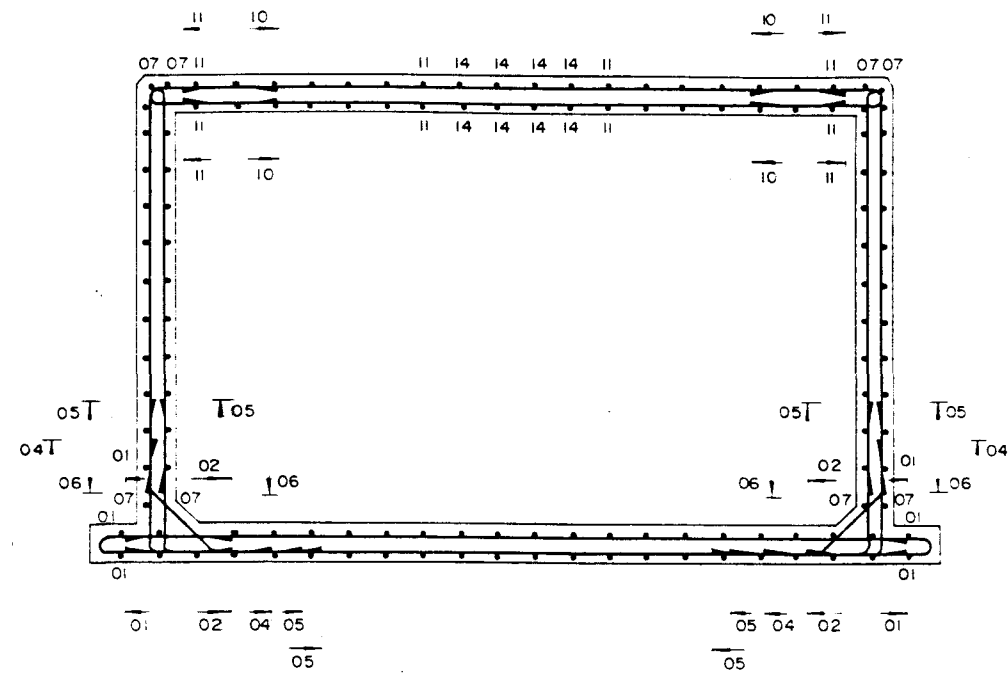
**22.8 CUBIC METRE (5000 GALLON)  
CLEAR WELL**

**REINFORCEMENT DETAIL (SHEET 1 OF 2)**

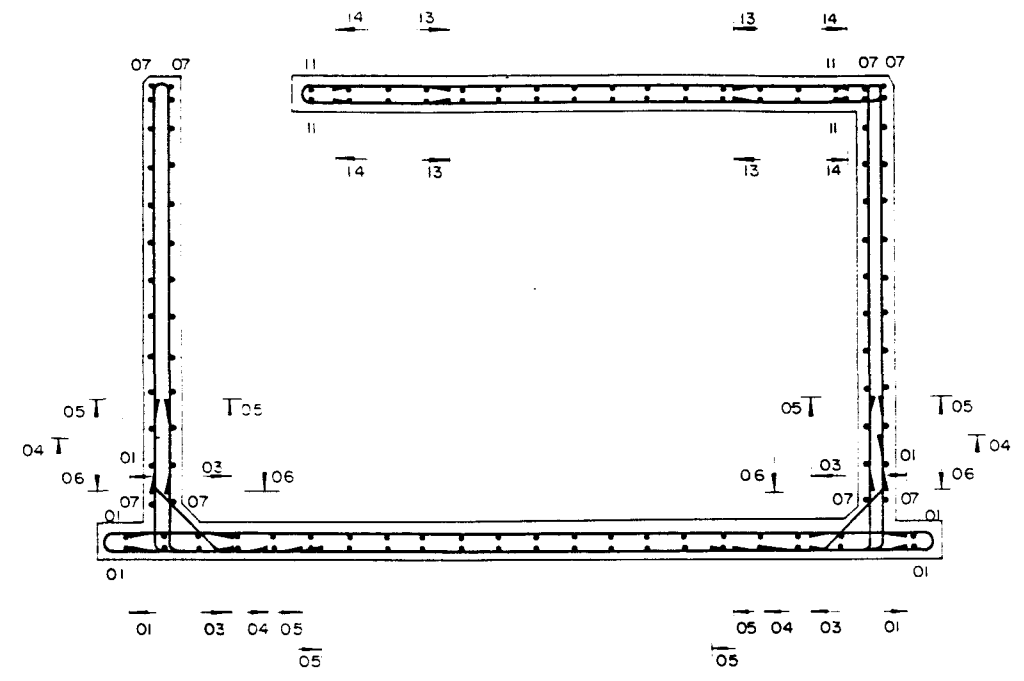
DRAWING NO 037	SCALE Refer to bar scale
Sir William McCreaw & Partners Ltd Consulting Engineers and Architects Burderop Park Swindon, Wiltshire SN4 0DD	
DATE JUNE 1988	

A B C D E F G H J K L M N P Q

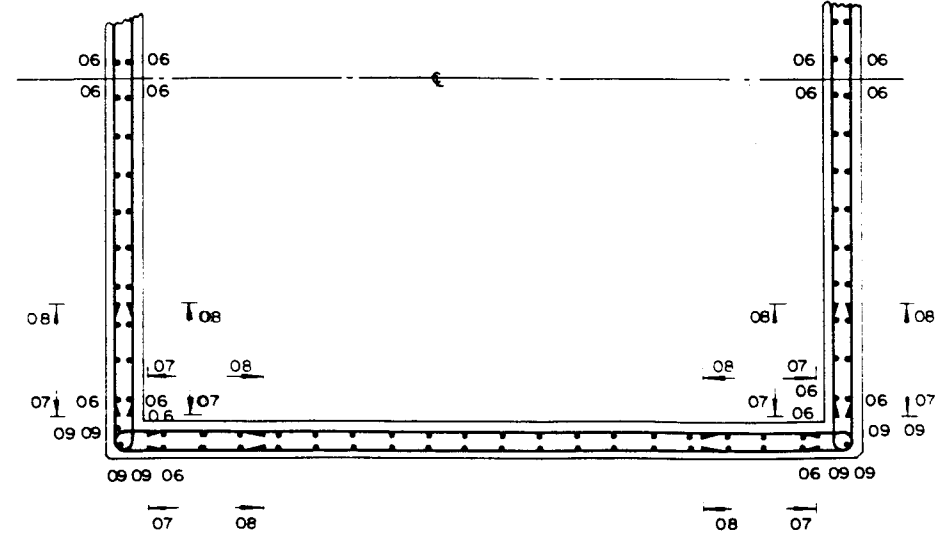
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SECTION A-A



SECTION B-B

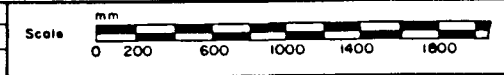


SECTION C-C

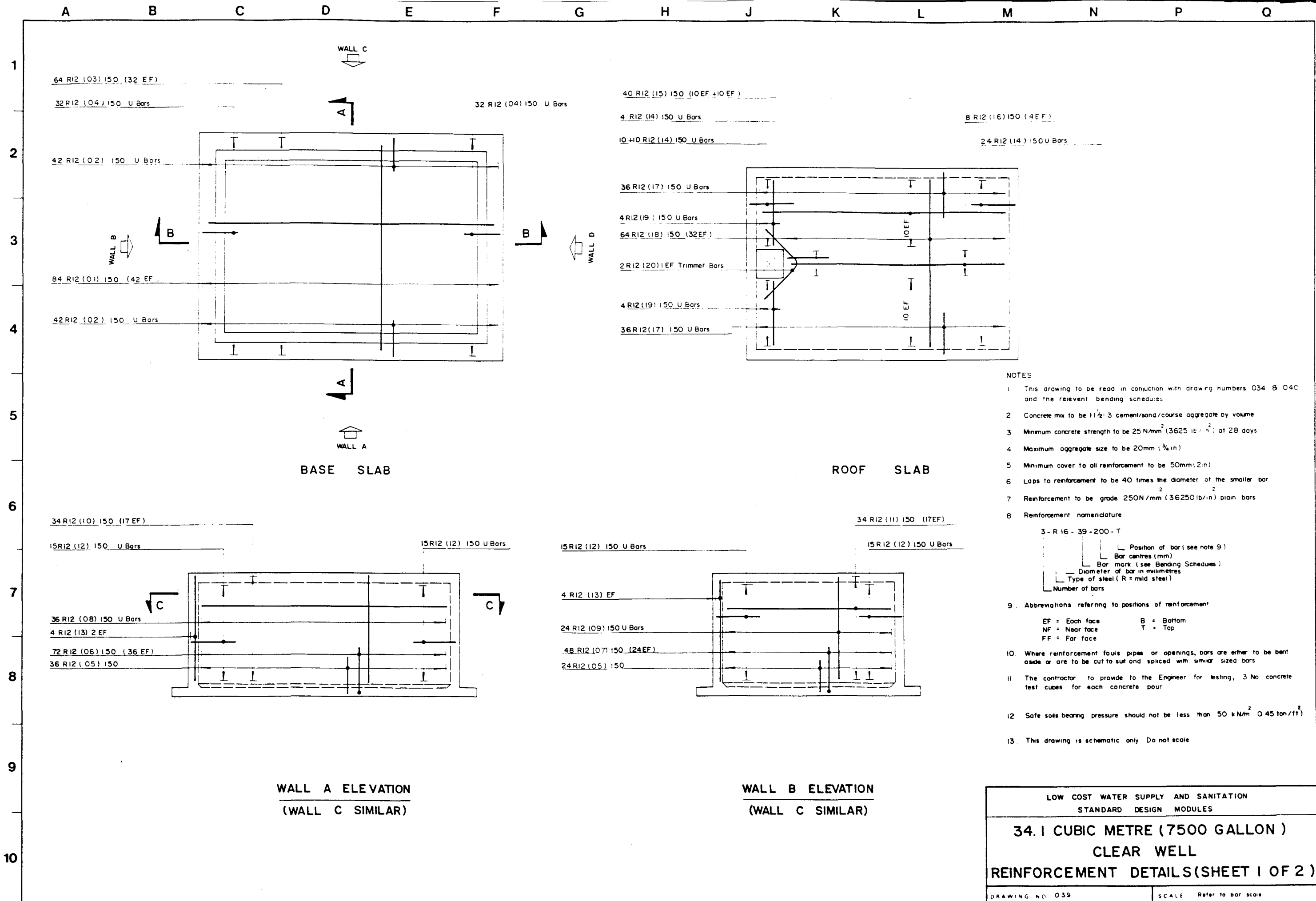
NOTES

1. For position of sections see drawing number 037
2. Reinforcement nomenclature:
  - 05 — Bar mark 05
  - Position of end of bar
3. For bar position spacings and diameters refer to drawing No. 037
4. For shapes and lengths refer to relevant bending schedules
5. The notes on drawing number 037 also apply
6. The drawing is schematic only. Do not scale

LOW COST WATER SUPPLY AND SANITATION STANDARD DESIGN MODULES	
<b>22.8 CUBIC METRE (5000 GALLON) CLEAR WELL REINFORCEMENT DETAILS (SHEET 2 OF 2)</b>	
DRAWING NO 038	SCALE Refer to bar scale
Sir William Halcrow & Partners Ltd Consulting Engineers and Architects Burdett Park Swindon, Wiltshire SN4 0DD	
DATE JUNE 1988	







- NOTES**
- This drawing to be read in conjunction with drawing numbers 034 & 040 and the relevant bending schedules
  - Concrete mix to be 1 1/2 : 3 cement/sand/course aggregate by volume
  - Minimum concrete strength to be 25 N/mm<sup>2</sup> (3625 lb/in<sup>2</sup>) at 28 days
  - Maximum aggregate size to be 20mm (3/4 in)
  - Minimum cover to all reinforcement to be 50mm (2 in)
  - Laps to reinforcement to be 40 times the diameter of the smaller bar
  - Reinforcement to be grade 250N/mm<sup>2</sup> (36250 lb/in<sup>2</sup>) plain bars
  - Reinforcement nomenclature  
3 - R 16 - 39 - 200 - T  
    - Position of bar (see note 9)
    - Bar centres (mm)
    - Bar mark (see Bending Schedules)
    - Diameter of bar in millimetres
    - Type of steel (R = mild steel)
    - Number of bars
  - Abbreviations referring to positions of reinforcement  
 EF = Each face      B = Bottom  
 NF = Near face     T = Top  
 FF = Far face
  - Where reinforcement fouls pipes or openings, bars are either to be bent aside or are to be cut to suit and spliced with similar sized bars
  - The contractor to provide to the Engineer for testing, 3 No concrete test cubes for each concrete pour
  - Safe soils bearing pressure should not be less than 50 kN/m<sup>2</sup> (0.45 ton/ft<sup>2</sup>)
  - This drawing is schematic only. Do not scale

LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES

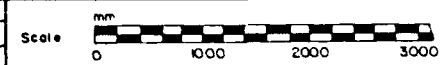
**34.1 CUBIC METRE (7500 GALLON)  
CLEAR WELL**

**REINFORCEMENT DETAILS (SHEET 1 OF 2)**

DRAWING NO 039      SCALE Refer to bar scale

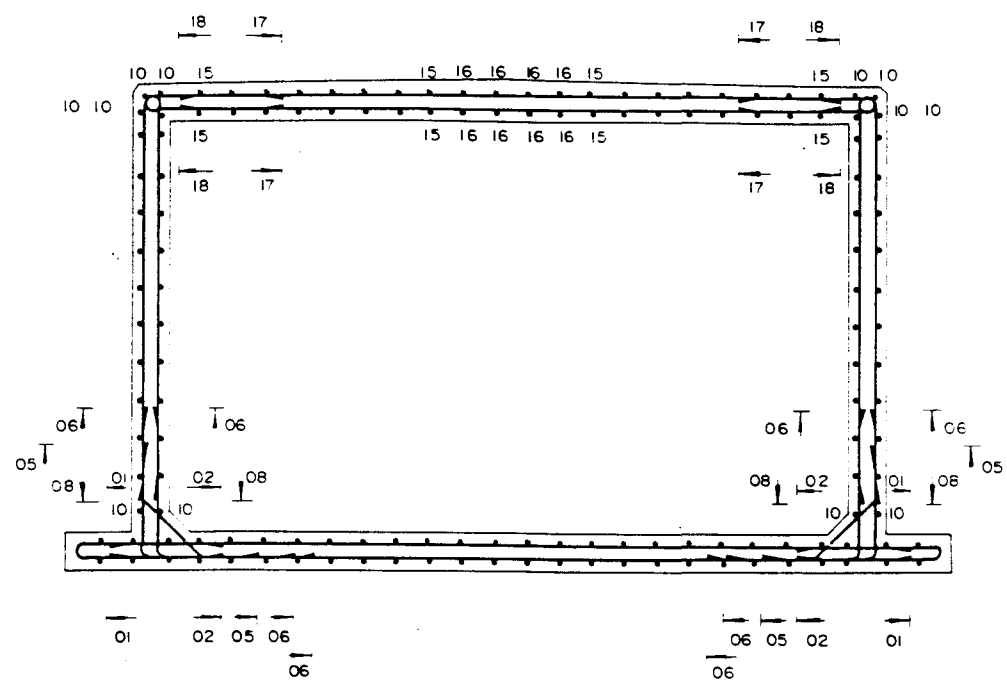
DATE JUNE 1988

Sir William Halcrow & Partners Ltd  
Consulting Engineers and Architects  
Burdorpe Park  
Swindon Wiltshire SN4 0DP

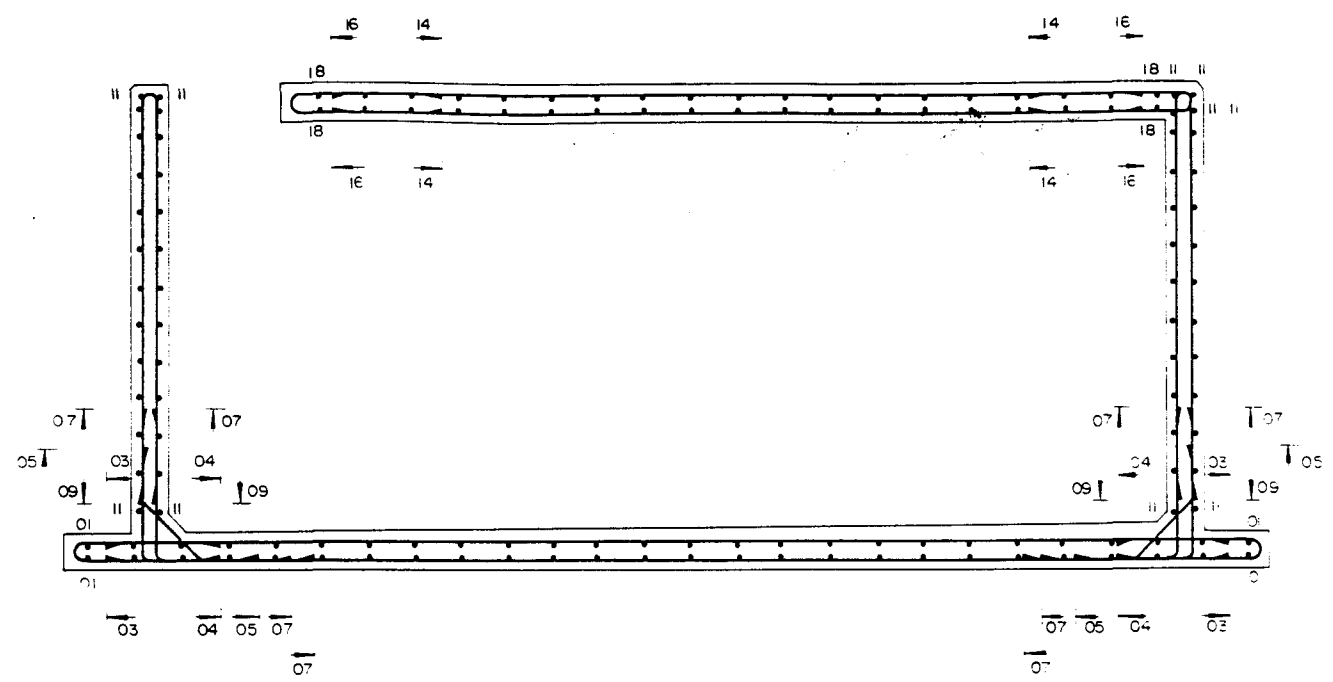


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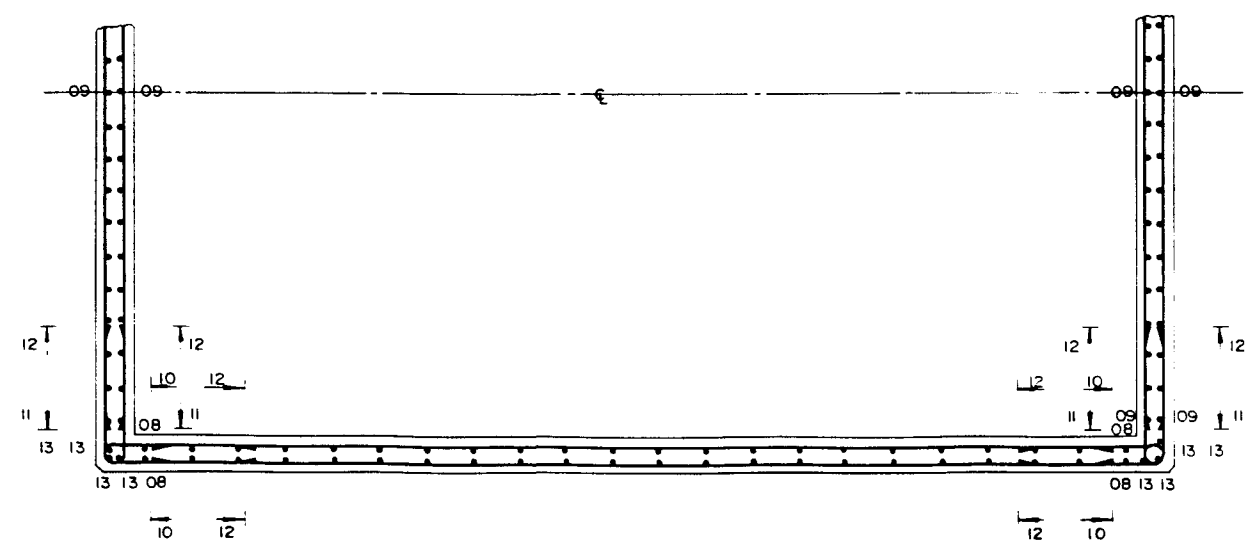
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SECTION A-A



SECTION B-B

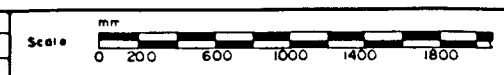


SECTION C-C

NOTES

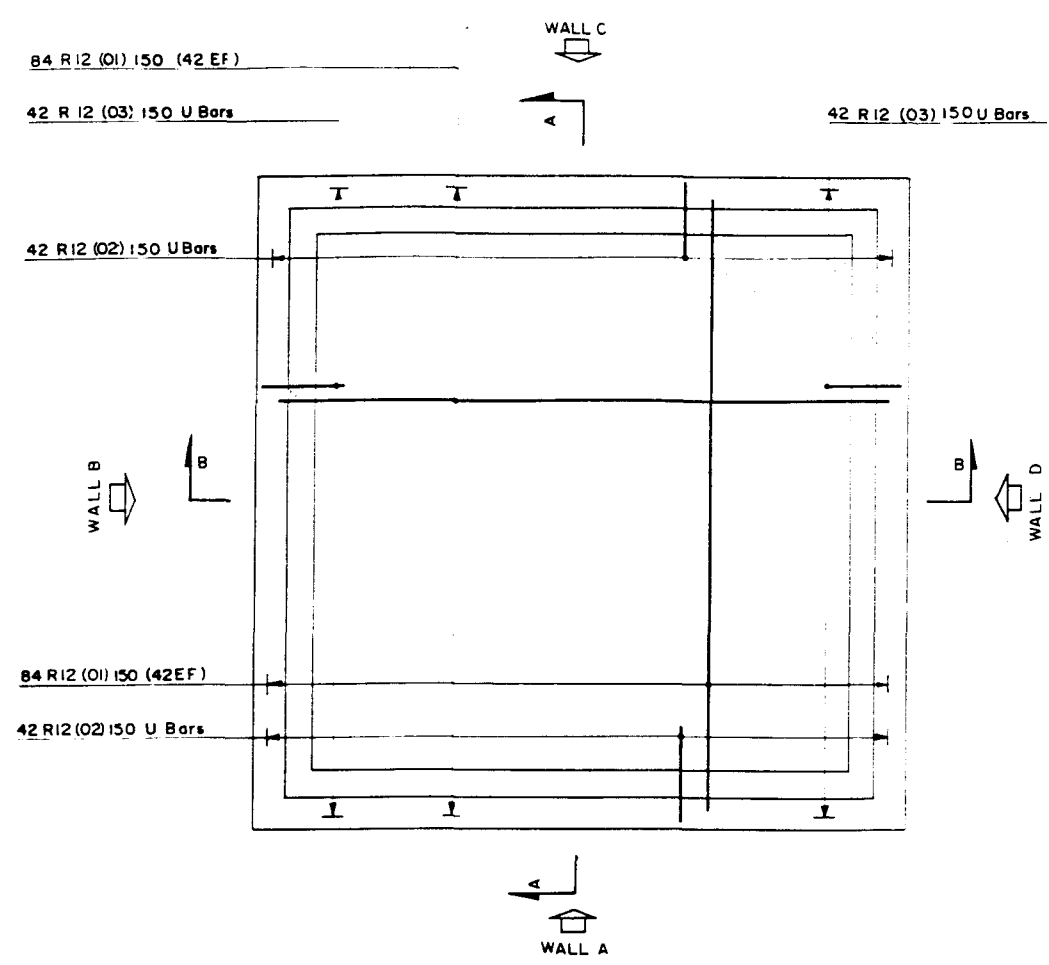
1. For position of sections see drawing number 039
2. Reinforcement nomenclature
  - 05 ——— Bar mark 05
  - Position of end of bar
3. For bar position spacings and diameters refer to drawing No 039
4. For shapes and lengths refer to relevant bending schedules
5. The notes on drawing number 039 also apply
6. The drawing is schematic only Do not scale

LOW COST WATER SUPPLY AND SANITATION STANDARD DESIGN MODULES	
<b>34.1 CUBIC METRE (7500 GALLON ) CLEAR WELL</b>	
<b>REINFORCEMENT DETAIL (SHEET 2 OF 2)</b>	
DRAWING NO 040	SCALE Refer to bar scale
Sir William Halcrow & Partners Ltd Consulting Engineers and Architects Burdaraop Park Swindon, Wiltshire, SN4 0DD	
DATE JULY 1988	

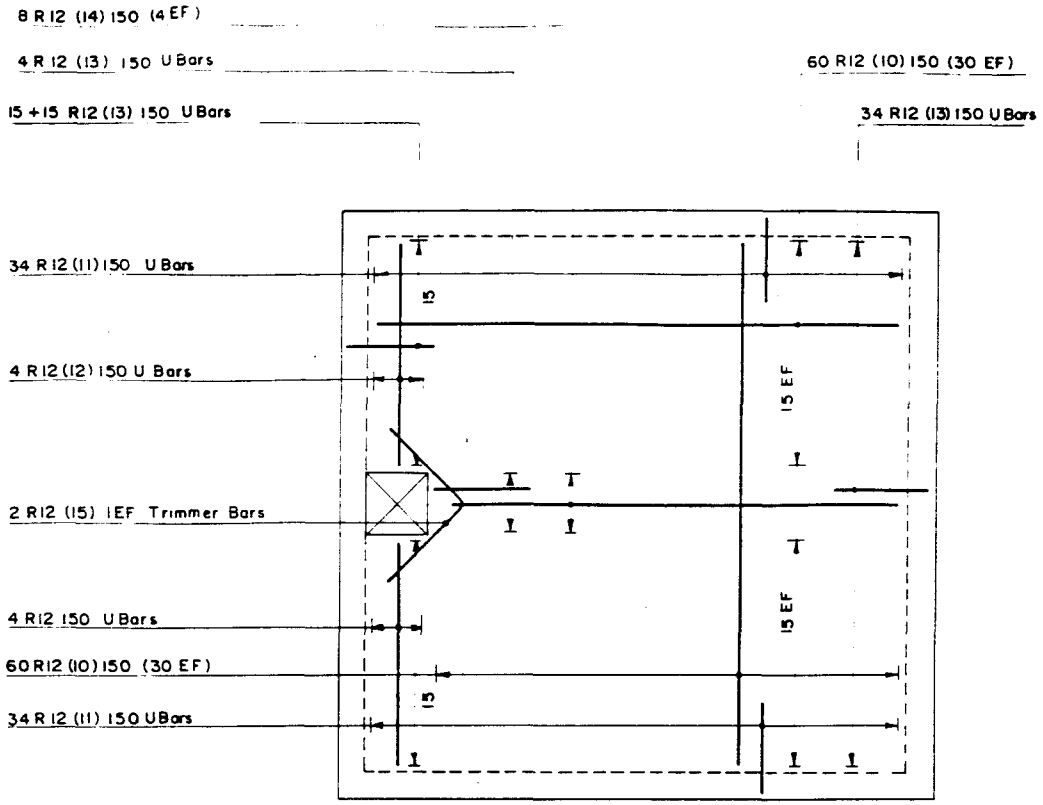


A B C D E F G H J K L M N P Q

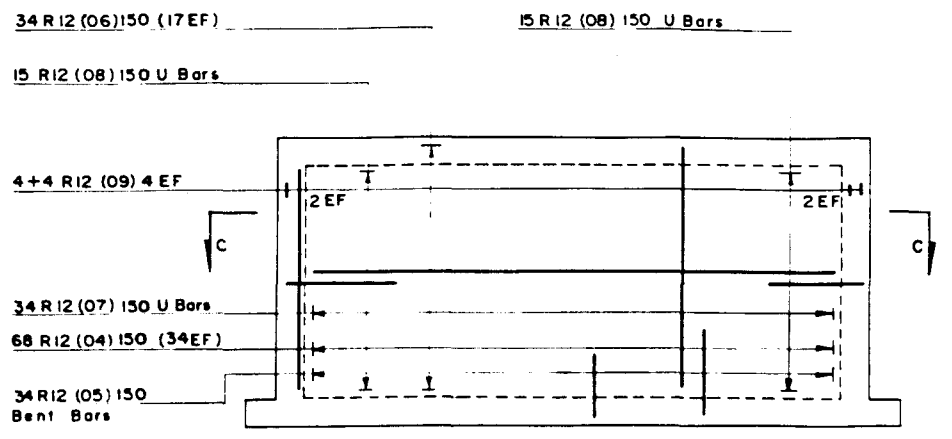
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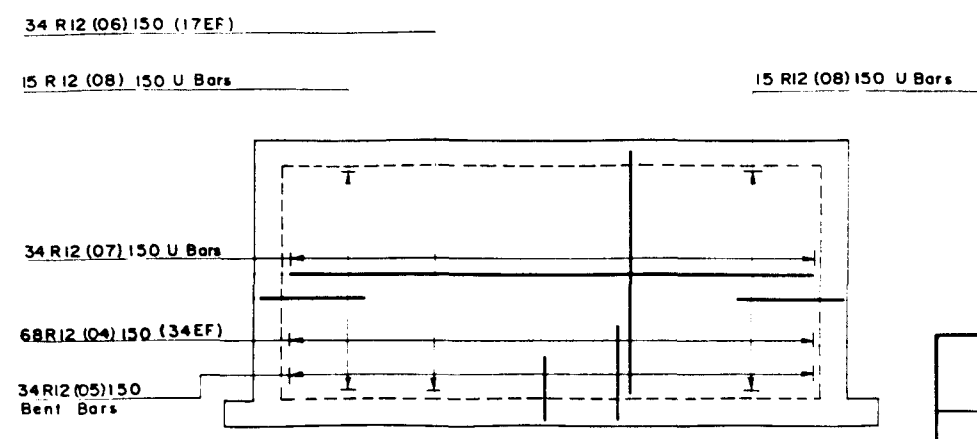
BASE PLAN



ROOF PLAN



ELEVATION WALL A  
WALL C SIMILAR



ELEVATION WALL B  
WALL D SIMILAR

- NOTES:
1. This drawing to be read in conjunction with drawing numbers 034 & 042 and the relevant bending schedules.
  2. Concrete mix to be 1:1½:3 cement/sand/course aggregate by volume.
  3. Minimum concrete strength to be 25 N/mm<sup>2</sup> (3625 lb/in<sup>2</sup>) at 28 days.
  4. Maximum aggregate size to be 20mm. (¾ in.)
  5. Minimum cover to all reinforcement to be 50mm. (2 in.)
  6. Laps to reinforcement to be 40 times the diameter of the smaller bar.
  7. Reinforcement to be grade 250 N/mm<sup>2</sup> (36250 lb/in<sup>2</sup>) mild steel plain bars.
  8. Reinforcement nomenclature  

3 - R 16 - 39 - 200 - T	Position of bar (See note 9)
┌──┴──┐	Bar centres (mm)
┌──┴──┐	Bar mark (See bending schedules)
┌──┴──┐	Diameter of bar in millimetres
┌──┴──┐	Type of steel (R - mild steel)
┌──┴──┐	Number of bars.
  9. Abbreviations referring to position of reinforcement  
 EF = Each face    B = Bottom  
 NF = Near face    T = Top  
 FF = Far face
  10. Where reinforcement fouls pipes or openings, bars are either to be bent aside or to be cut to suit and spliced with similar sided bars.
  11. The contractor to provide to the Engineer for testing 3 no. concrete test cubes for each concrete pour.
  12. Safe soil bearing pressure should not be less than 50 KN/m<sup>2</sup> (0.45 ton/ft<sup>2</sup>).
  13. This drawing is schematic only. Do not scale.

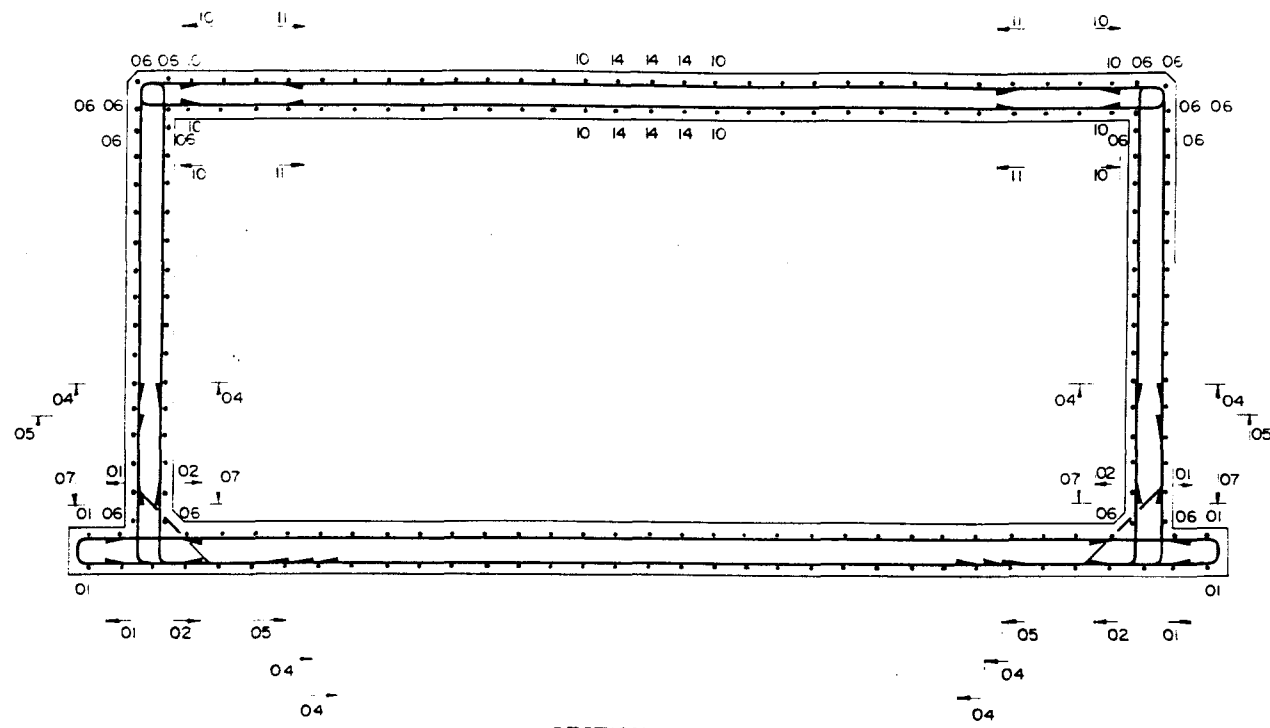
LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES

**45.5 CUBIC METRE (10,000 GALLONS)  
CLEAR WELL**

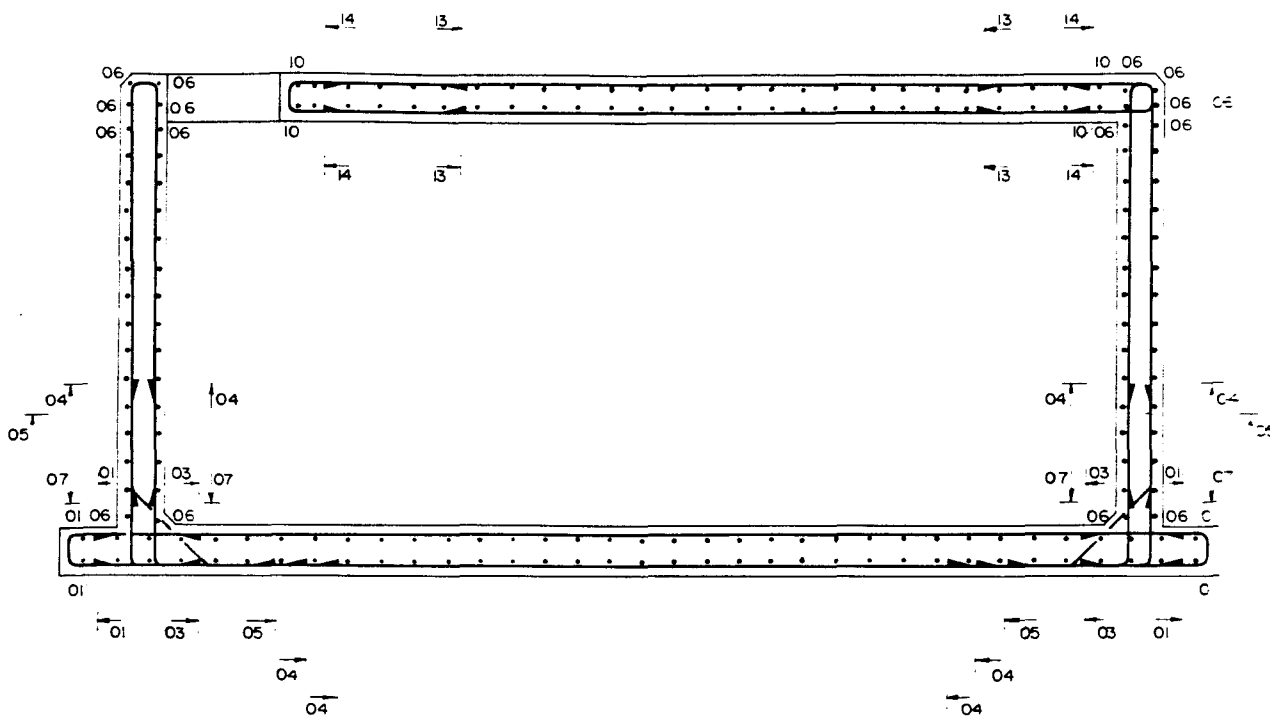
**REINFORCEMENT DETAILS SHEET 1 of 2**

DRAWING NO 041	SCALE Refer to Bar Scale
Sir William Halcrow & Partners Ltd Consulting Engineers and Architects Buryard Park Sandon, Wiltshire SN4 0DD	
DATE JUNE 1988	

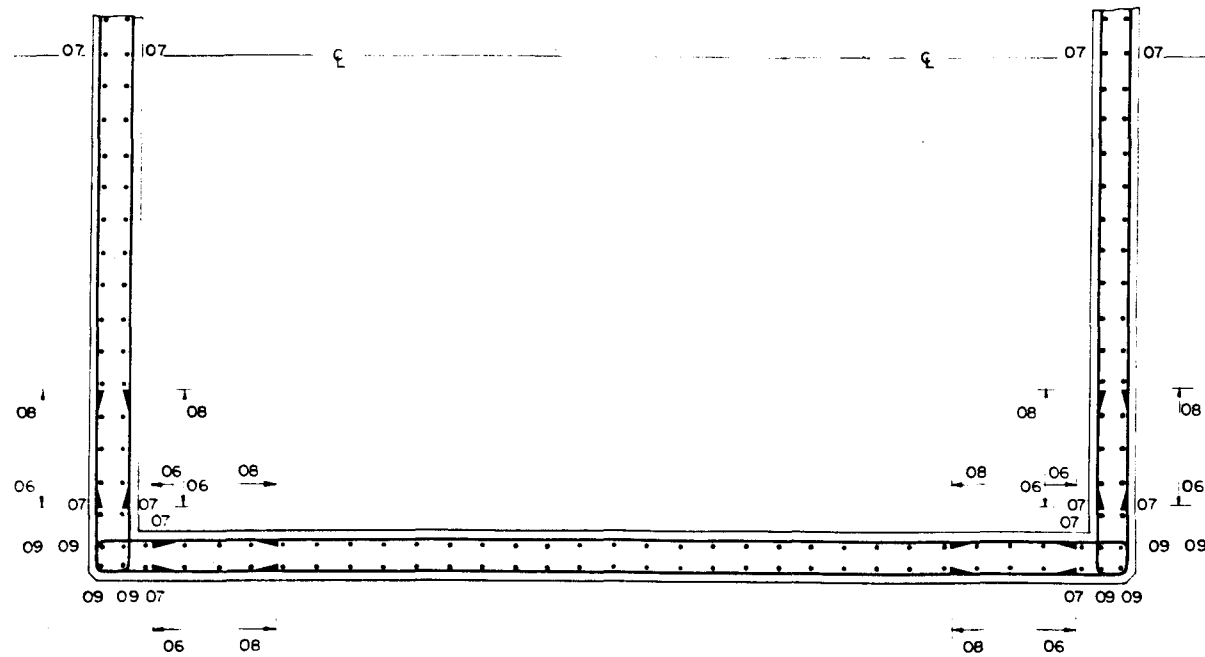
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SECTION A-A



SECTION B-B



SECTION C-C

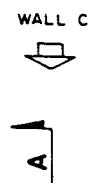
NOTES

1. For position of sections see drawing number 041
2. Reinforcement nomenclature  
 05 ——— Bar mark 05  
 ——— Position of end of bar
3. For bar positions, spacings and diameters refer to plans and elevations on drawing number 041.
4. For bar shapes and lengths refer to relevant bending schedules
5. The notes on drawing number 041 also apply.
6. This drawing is schematic only Do not scale

LOW COST WATER SUPPLY AND SANITATION STANDARD DESIGN MODULES	
<b>45.5 CUBIC METRE (10,000 GALLON)          CLEAR WELL</b>	
<b>REINFORCEMENT DETAILS SHEET 2 of 2</b>	
DRAWING No 042	SCALE Refer to sheet 1.0.0
Sir William Halcrow & Partners Ltd Consulting Engineers and Architects Burgess Quay Southampton, Hampshire, SO9 4CC	
DATE JUNE 1988	

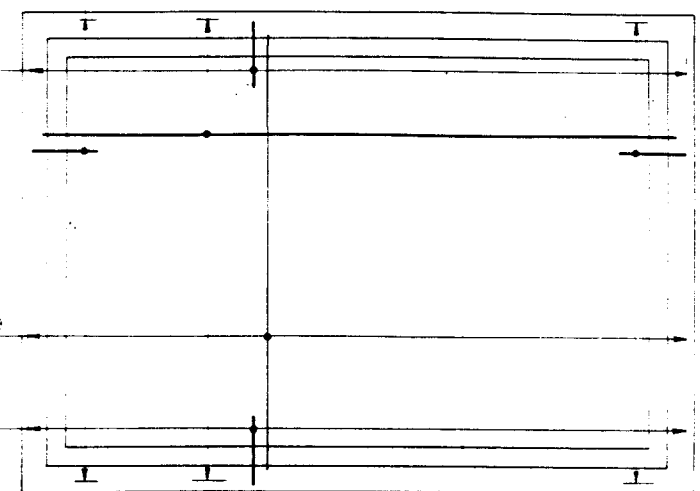
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84R12 (03) 150 (42T, 42B)  
42R12 (04) 150 U Bars

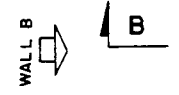


42R12 (04) 150 U Bars

58R16 (02) 150 U Bars



116 R16 (01) 150 (58T, 58B)

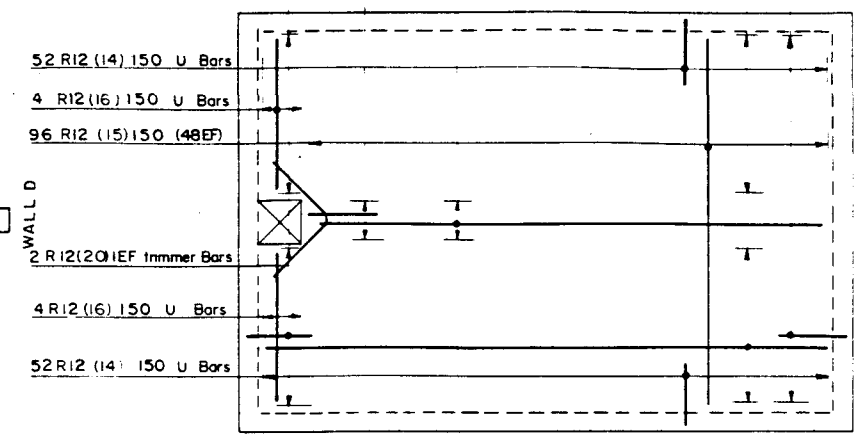


58R16 (02) 150 U Bars

BASE PLAN

10R12 (19) 150 (5EF)  
5 R12 (17) 150 U Bars  
15 + 15 R12 (17) 150 U Bars

35 R12 (17) 150 U Bars  
30.30 R12 (18) 150 (15EF, 15EF)



ROOF PLAN

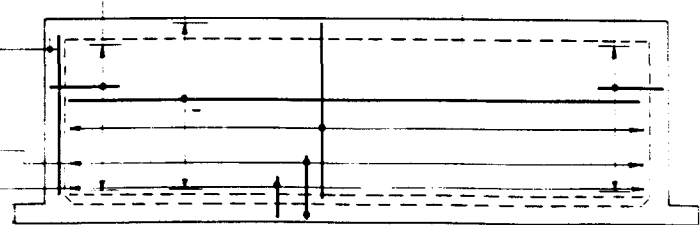
34R12 (12) 150 (17EF)  
15 R12 (13) 150 U Bars

52 R16 (08) 150 U Bars  
15 R12 (13) 150 U Bars

4R16 (10) 2 EF

104 R16 (05) 150 (52 EF)

52 R12 (06) 150 Bent bars



ELEVATION WALL A  
WALL C SIMILAR

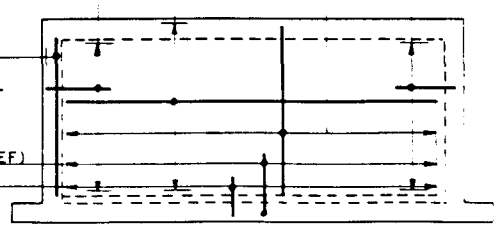
34 R12 (11) 150 (17EF)  
15 R12 (13) 150 U Bars

35 R12 (09) 150 U Bars  
15 R12 (13) 150 U Bars

4 R16 (10) 2 EF

70 R12 (07) 150 (35 EF)

35 R12 (06) 150 Bent bars



ELEVATION WALL B  
WALL D SIMILAR

NOTES

- This drawing to be read in conjunction with drawing numbers 034 B C44 and the relevant bending schedules
- Concrete mix to be 1:1 1/2:3 cement/sand/course aggregate by volume
- Minimum concrete strength to be 25 N/mm<sup>2</sup> (3625 lb/in<sup>2</sup>)
- Maximum aggregate size to be 20 mm (3/4 in)
- Minimum cover to all reinforcement to be 50 mm (2 in)
- Laps to reinforcement to be 40 times the diameter of the smaller bar
- Reinforcement to be grade 250 N/mm<sup>2</sup> (36250 lb/in<sup>2</sup>) plain bars
- Reinforcement nomenclature  

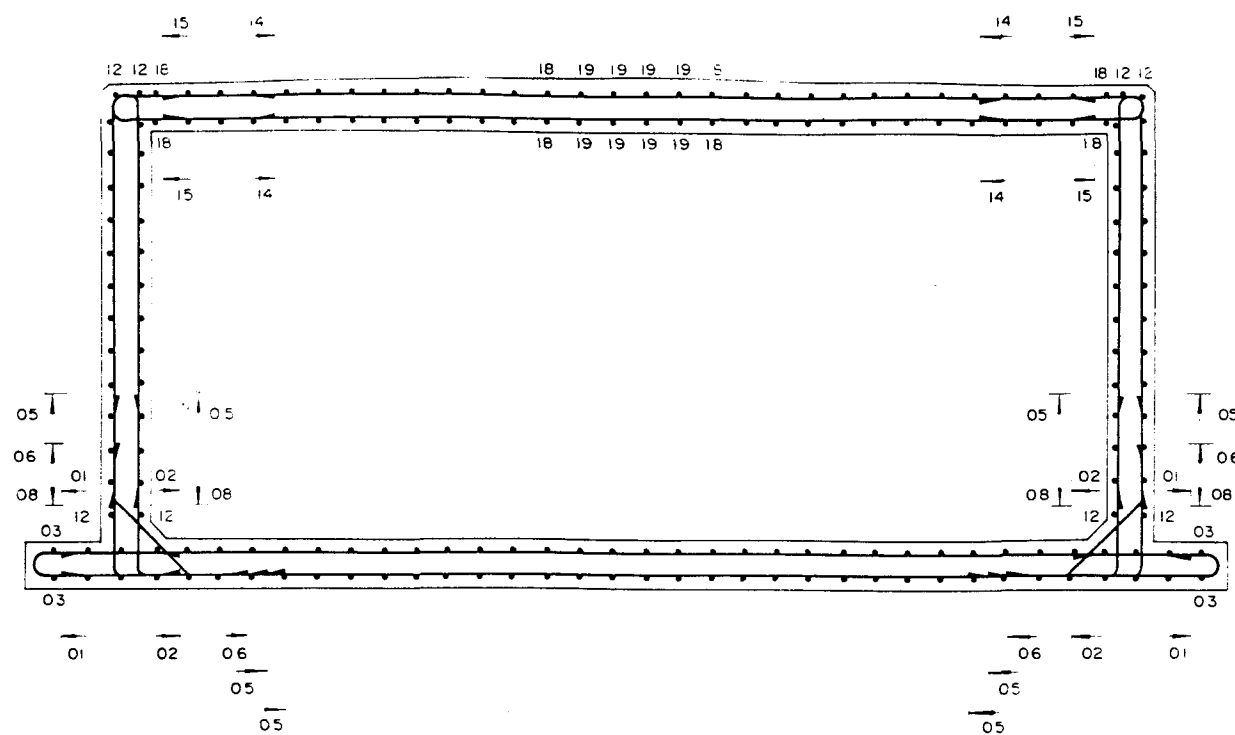
3 - R 16 - 39 - 200 - T	Position of bar (see note 9)
┌───┐	Bar centres (mm)
└───┘	Bar mark (see Bending Schedules)
┌───┐	Diameter of bar in millimetres
└───┘	Type of steel (R=mid steel)
3	Number of bars
- Abbreviations referring to positions of reinforcement  

EF = Each face	B = Bottom
NF = Near face	T = Top
FF = Far face	
- Where reinforcement fouls pipes or openings, bars are either to be bent aside or are to be cut to suit and spliced with similar sized bars
- Safe soil bearing pressure should not be less than 50 kN/m<sup>2</sup> (0.45 ton/ft<sup>2</sup>)
- This drawing is schematic only Do not scale
- The contractor to provide to the Engineer for testing, 3 No concrete test cubes for each concrete pour

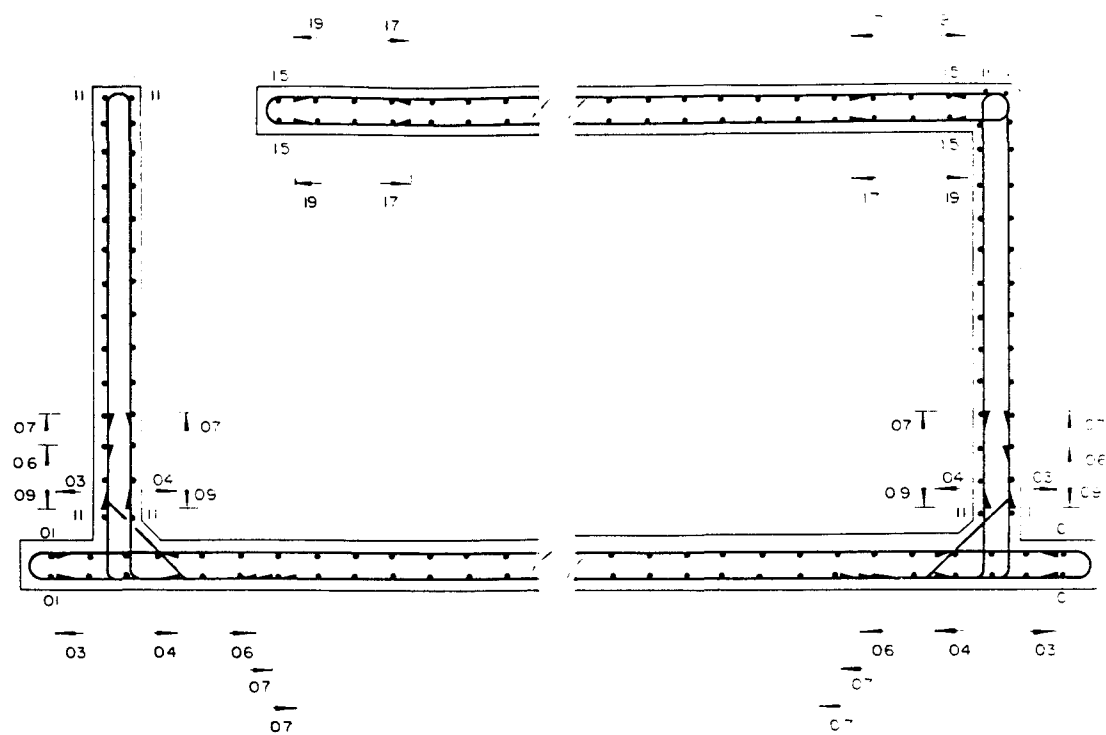


LOW COST WATER SUPPLY AND SANITATION STANDARD DESIGN MODULES	
68.3 CUBIC METRE (15,000 GALLON) CLEAR WELL	
REINFORCEMENT DETAILS SHEET 1 of 2	
DRAWING NO 043	SCALE Refer to bar scale
DATE AUGUST 1988	
Sir William Macrow & Partners Ltd Consulting Engineers and Architects Burdorpe Park Bendon, Wiltshire SN4 0DQ	

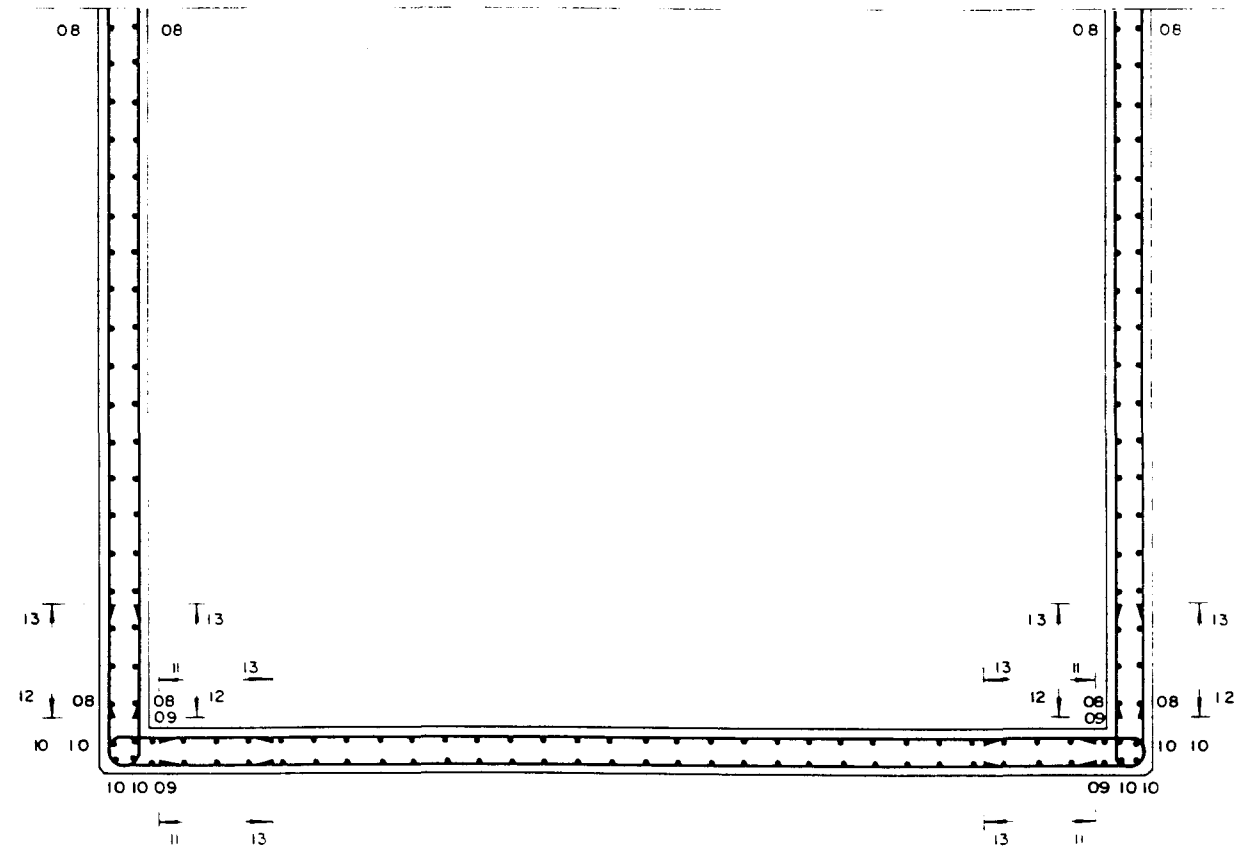
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SECTION A-A




SECTION B-B

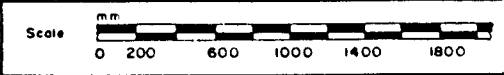


SECTION C-C

NOTES

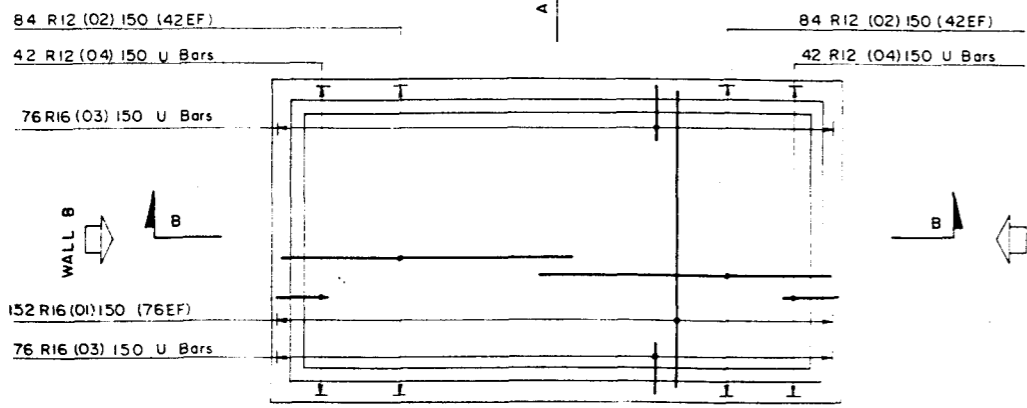
1. For position of sections see drawing number 043
2. Reinforcement nomenclature  
 05 — Bar mark 05  
 Position of end of bar
3. For bar positions, spacings, and diameters refer to plans and elevations on drawing number 043
4. For bar shapes and lengths refer to relevant bending schedules
5. The notes on drawing number 043 also apply
6. This drawing is schematic only Do not scale

LOW COST WATER SUPPLY AND SANITATION STANDARD DESIGN MODULES	
<b>68.3 CUBIC METRE (15,000 GALLON) CLEAR WELL</b>	
<b>REINFORCEMENT DETAILS SHEET 2 of 2</b>	
DRAWING NO 044	SCALE Refer to bar scale
<small>Sir William Halcrow &amp; Partners Ltd          Consulting Engineers and Architects          Burswood Park          Swindon, Wiltshire SN4 0GJ</small>	
DATE AUGUST 1988	

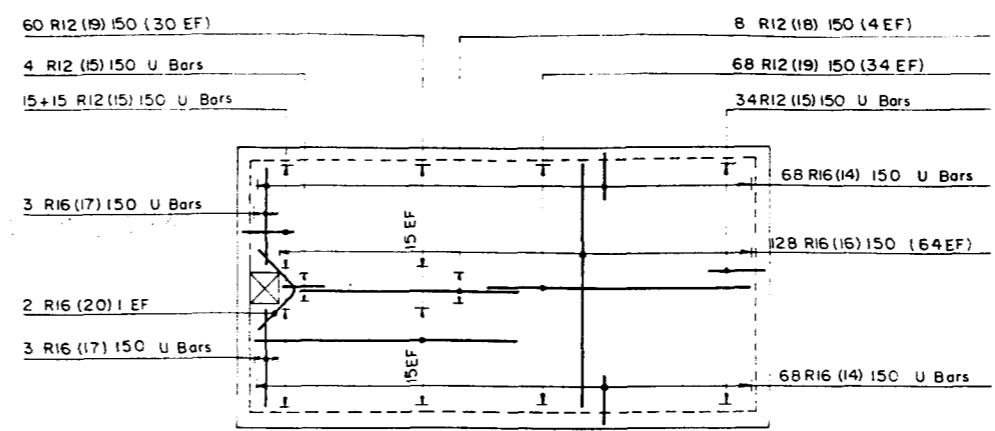


A B C D E F G H J K L M N P Q

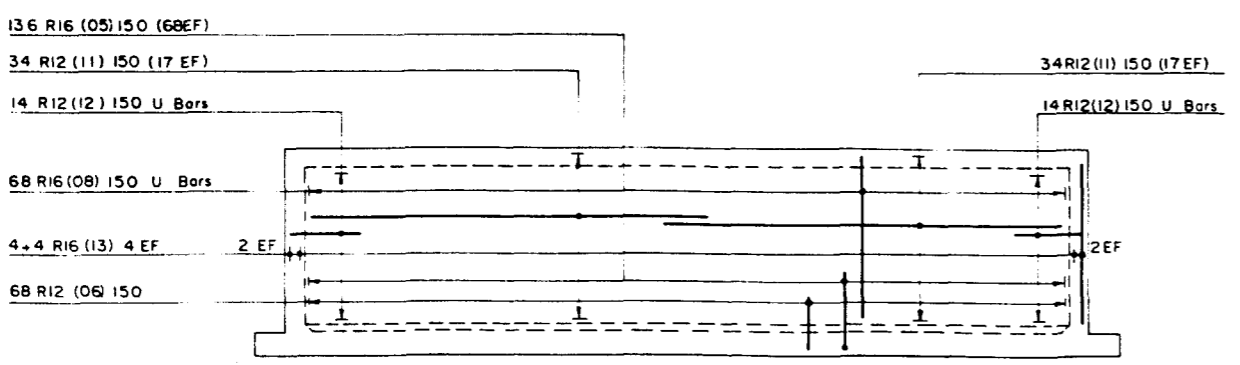
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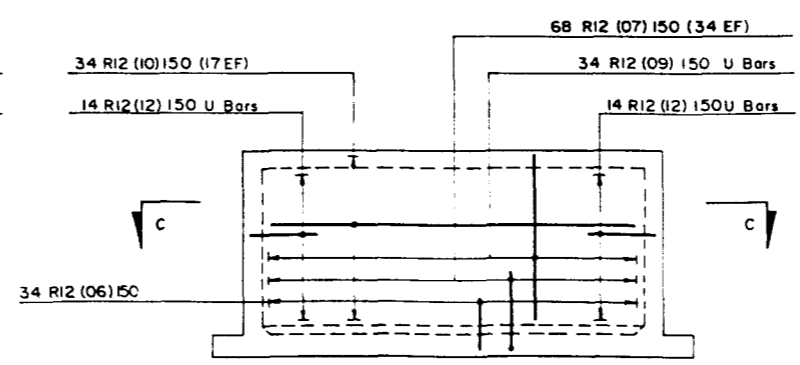
BASE PLAN (Scale a)



ROOF PLAN (Scale b)



WALL A ELEVATION A (Scale b)  
(WALL C SIMILAR)



WALL B ELEVATION (Scale b)  
(WALL D SIMILAR)

NOTES

1. This drawing to be read in conjunction with drawing numbers 034 B 046 and the relevant bending schedules
2. Concrete mix to be 1:1/2:3 cement/sand/course aggregate by volume
3. Minimum concrete strength to be 25 N/mm<sup>2</sup> (3625 lb/in<sup>2</sup>)
4. Maximum aggregate size to be 20mm (3/4 in)
5. Minimum cover to all reinforcement to be 50mm (2 in)
6. Laps to reinforcement to be 40 times the diameter of the smaller bar
7. Reinforcement to be grade 250 N/mm<sup>2</sup> (36250 lb/in<sup>2</sup>) plain bars
8. Reinforcement nomenclature:  
3 - R 16 - 39 - 200 - T  
Position of bar (see note 9)  
Bar centres (mm)  
Bar mark (see Bending Schedules)  
Diameter of bar in millimetres  
Type of steel (R= mild steel)  
Number of bars
9. Abbreviations referring to position of reinforcement:  
EF = Each face      B = Bottom  
NF = Near face      T = Top  
FF = Far face
10. Where reinforcement fouls pipes or openings, bars are either to be bent aside or are to be cut to suit and spliced with similar sized bars
11. The contractor to provide to the Engineer for testing, 3 No. concrete test cubes for each concrete pour
12. Safe soil bearing pressure should not be less than 50kN/m<sup>2</sup> (0.45 ton/ft<sup>2</sup>)
13. This drawing is schematic only. Do not scale.

LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES

**91.0 CUBIC METRE (20,000 GALLON)  
CLEAR WELL**

**REINFORCEMENT DETAILS (SHEET 1 OF 2)**

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DRAWING NO 045      SCALE Refer to Bar Scales

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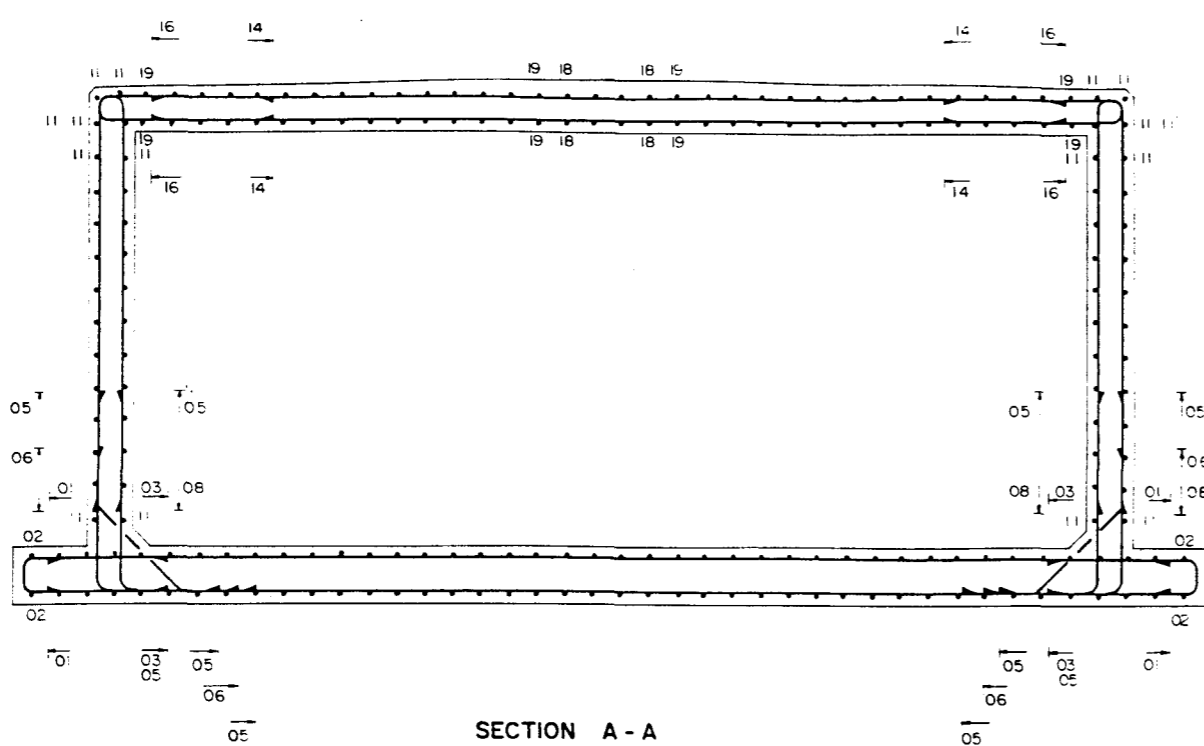
DATE: JUNE 1988

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Burdens Park  
Swindon, Wiltshire, SN4 6DD

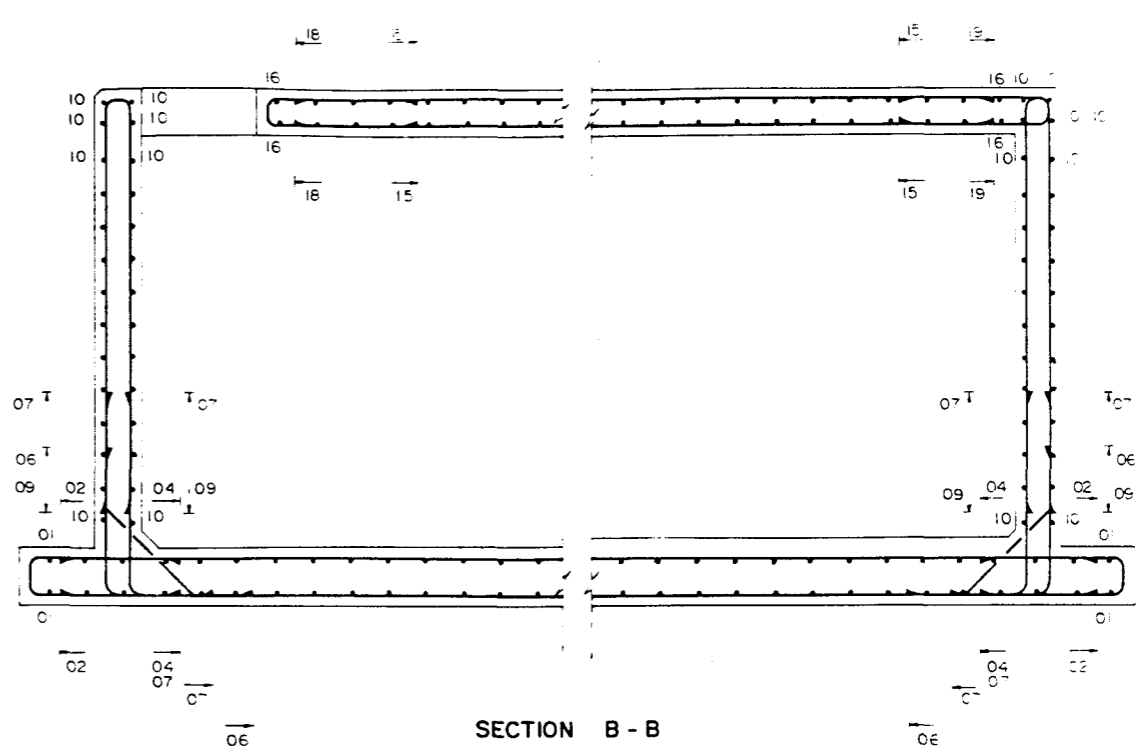


A B C D E F G H J K L M N P Q

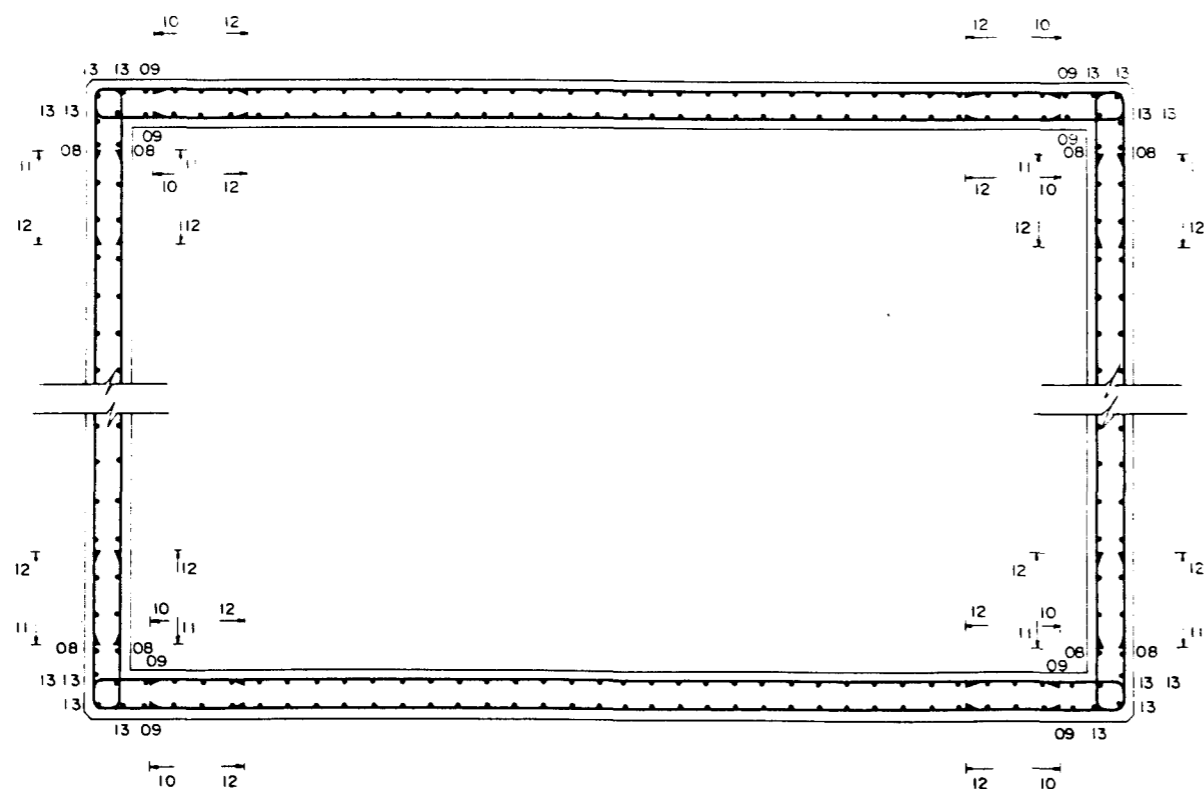
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SECTION A - A

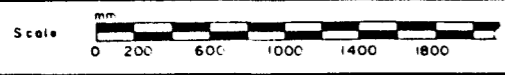


SECTION B - B



SECTION C - C

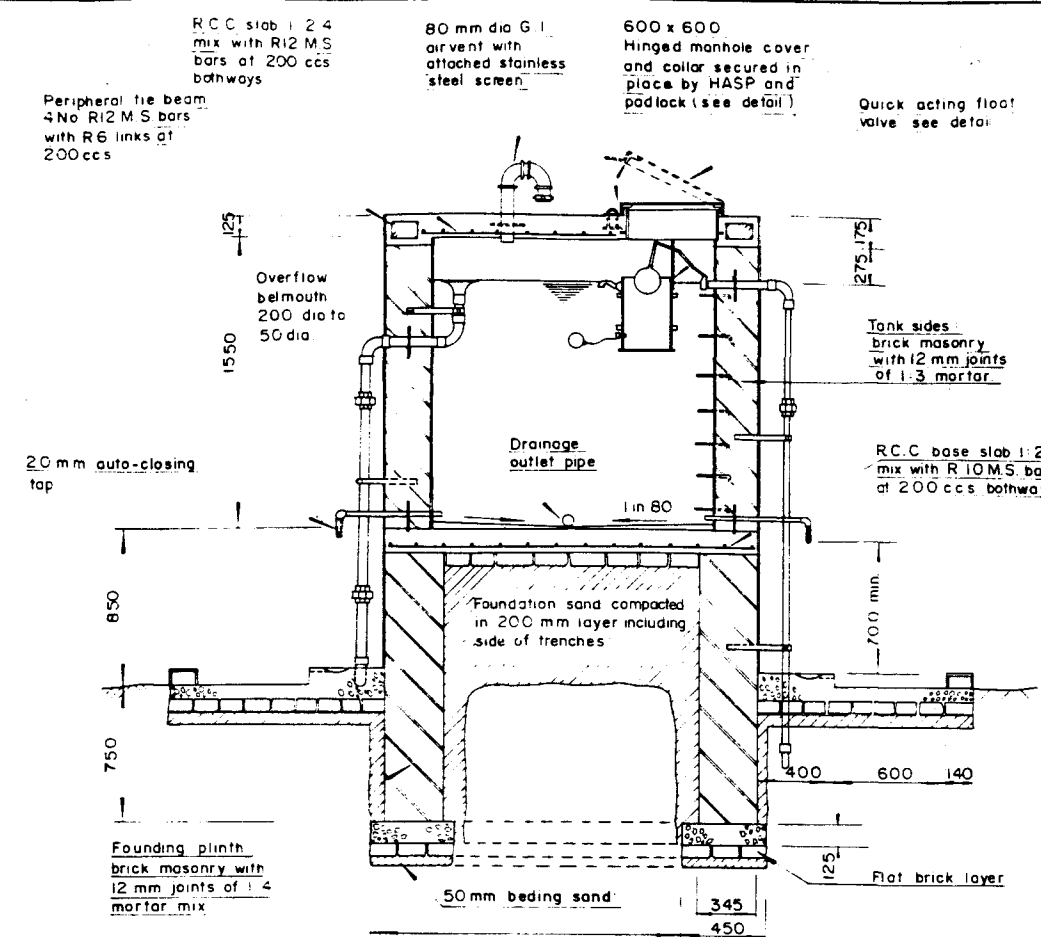
- NOTES
- 1 For position of sections see drawing number 045.
  - 2 Reinforcement nomenclature  
 05 ——— Bar mark 05  
 ——— Position of end of bar
  - 3 For bar positions, spacings, and diameters refer to plans and elevations on drawing number 045
  - 4 For bar shapes and lengths refer to relevant bending schedules
  - 5 The notes on drawing number 045 also apply
  - 6 This drawing is schematic only. Do not scale



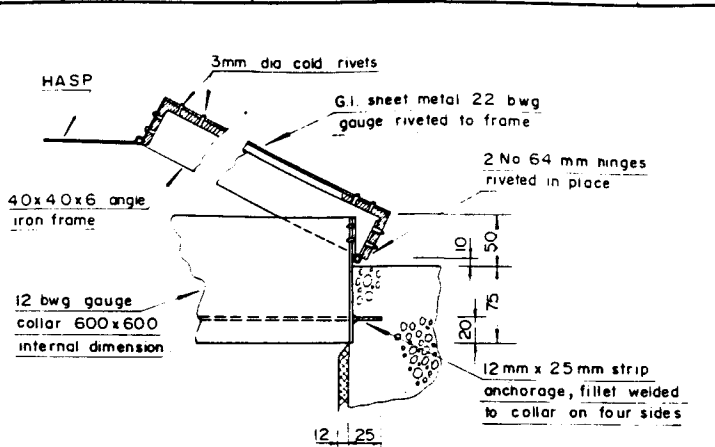
LOW COST WATER SUPPLY AND SANITATION STANDARD DESIGN MODULES	
91.0 CUBIC METRE (20,000 GALLON) CLEAR WELL REINFORCEMENT DETAILS (SHEET 2 OF 2)	
DRAWING NO 046	SCALE Refer to bar scale
Sir William Halcrow & Partners Ltd Consulting Engineers and Architects Burdorp Park Swindon Wiltshire SN4 0DD	
DATE JUNE 1988	



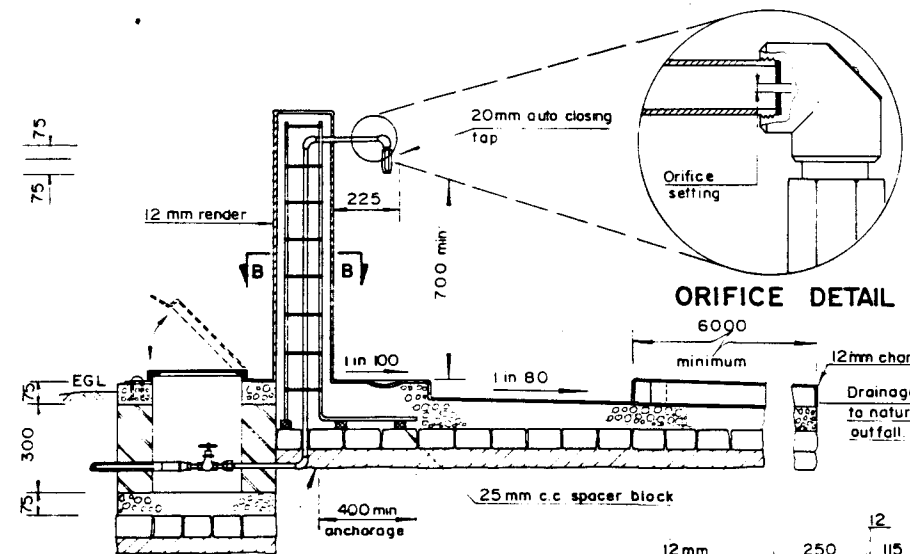
A B C D E F G H J K L M N P Q



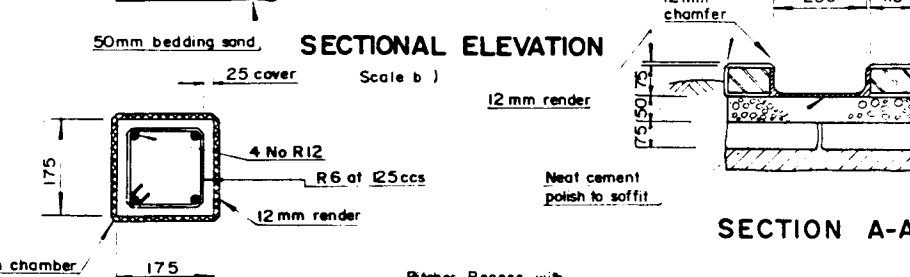
**SECTIONAL ELEVATION**  
Scale a)



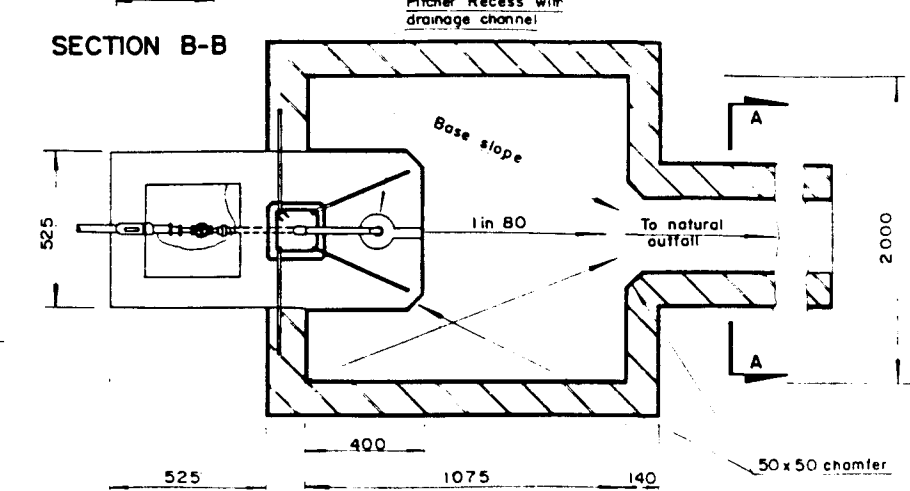
**MANHOLE COVER & COLLAR DETAIL**  
Scale c)



**ORIFICE DETAIL**

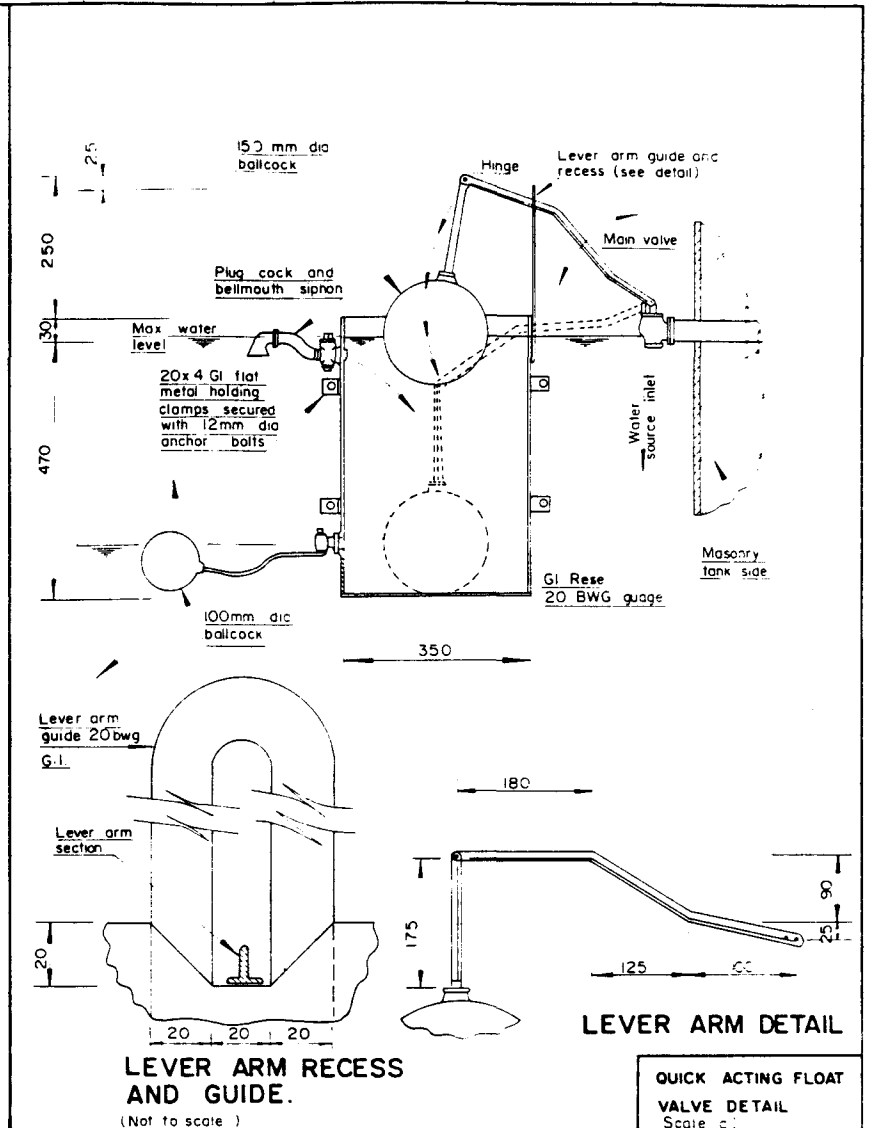


**SECTIONAL ELEVATION**  
Scale b)



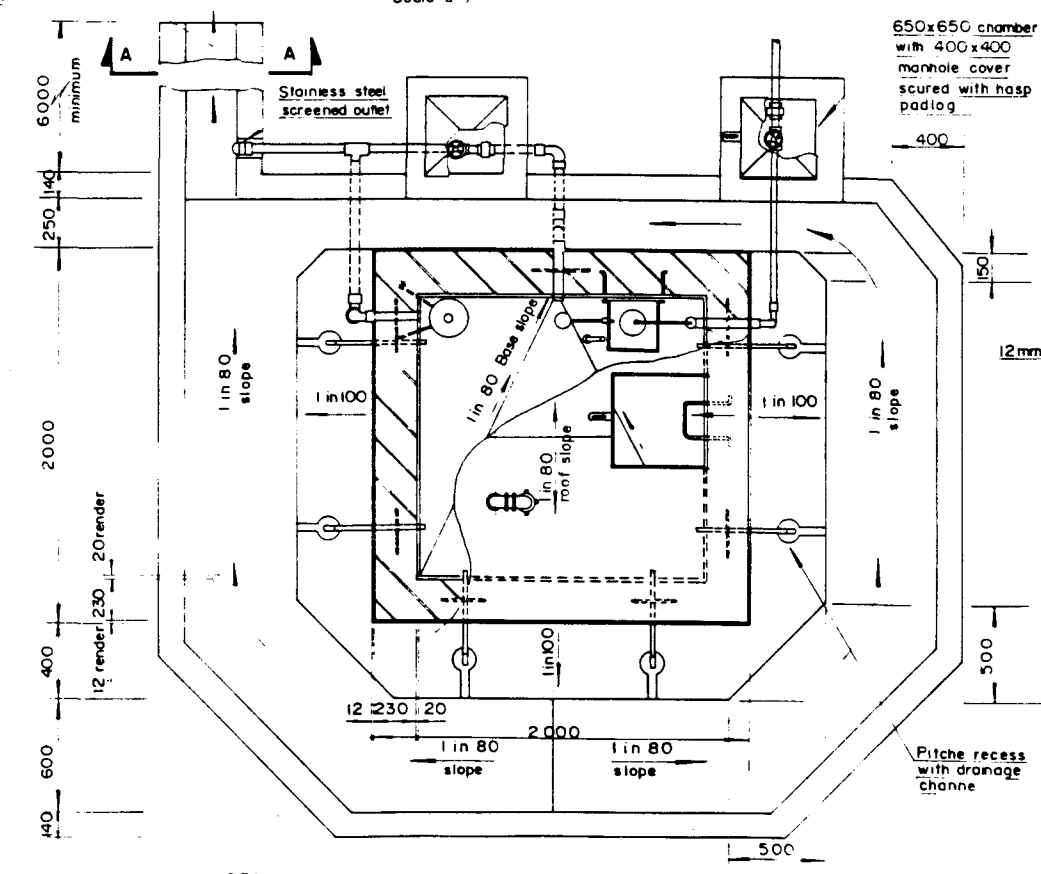
**SECTION B-B**

**STANDPOST DETAIL PLAN**  
Scale b)



**LEVER ARM RECESS AND GUIDE.**  
(Not to scale.)

**QUICK ACTING FLOAT VALVE DETAIL**  
Scale c)



**COMMUNITY TANK DETAIL PART CUT SECTIONAL PLAN**  
Scale a)

- NOTES**
- All dimensions are in millimetres unless otherwise stated
  - Walking distance for peripheral users should be within the limits of 200 - 400 m
  - Optimum discharge capacity of one standpost is 13.5 litres per minute
  - One standpost or tap position should serve no more than 100 people
  - 20 mm render with 5% pudlo waterproof additive (or approved type) to be given to interior surface of community tank 12 mm render 1:5 mix to all other surfaces.
  - A coating of neat cement polish to be given to all drainage and run-off surfaces
  - Aperture size for orifice setting is determined by design computations from the TAG 'BRANCH' computer programme
  - Stone masonry may be used as an alternative to brickwork, all dimensions remaining the same except for the standpost cross sectional size 175 mm (Refer to section BB) to be increased to 230 mm

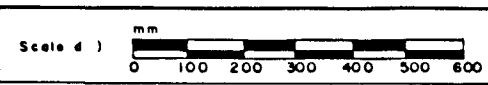
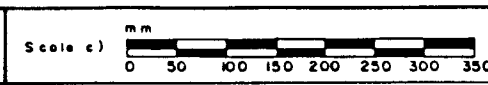
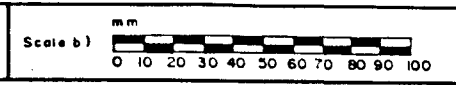
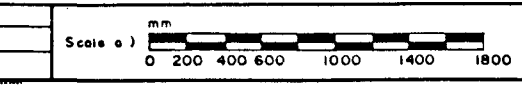
LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES

**COMMUNITY TANK AND STANDPOST DETAIL**

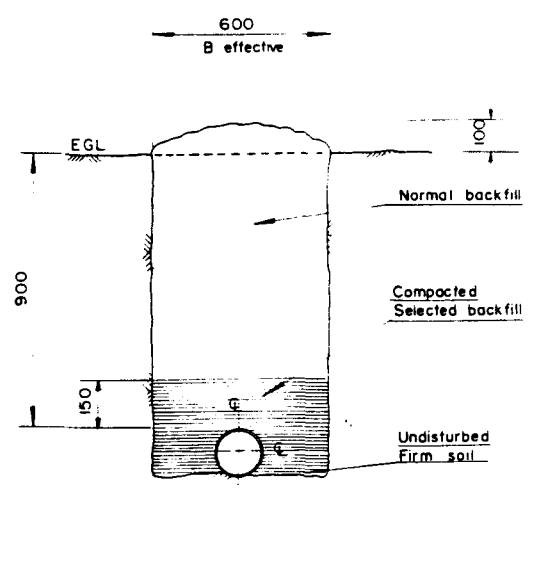
DRAWING NO 047 SCALE Refer to bar scale a,b,c,d

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Swindon Wiltshire SN4 9DD

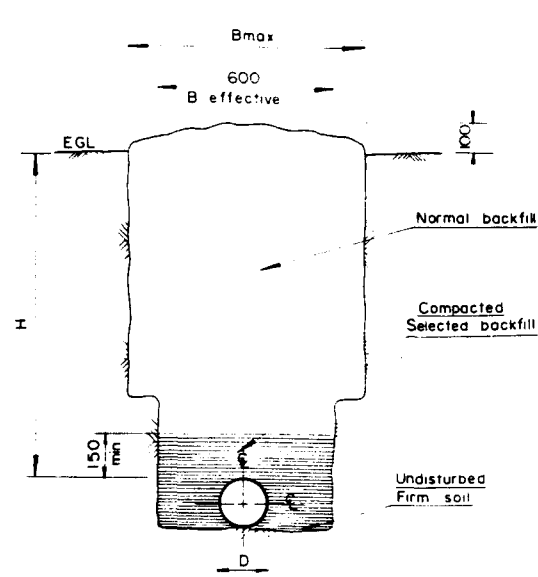
DATE: AUGUST 1988



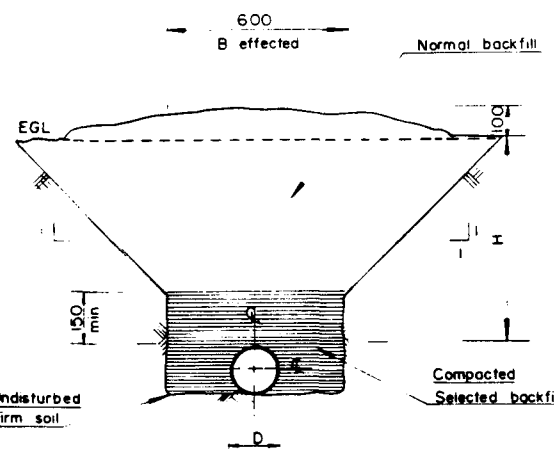
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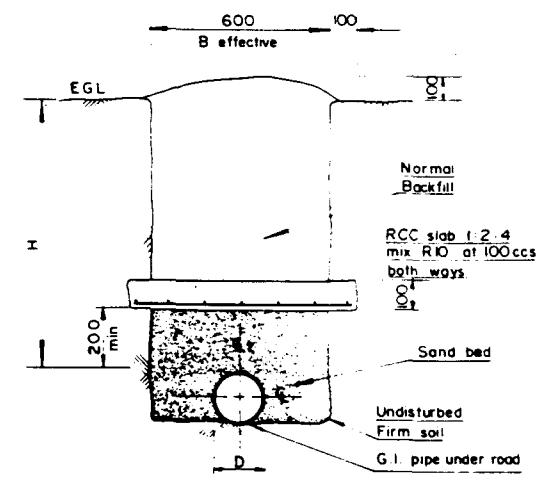
**TRENCH DETAIL T 1**  
NORMAL SIZE VERTICAL TYPE



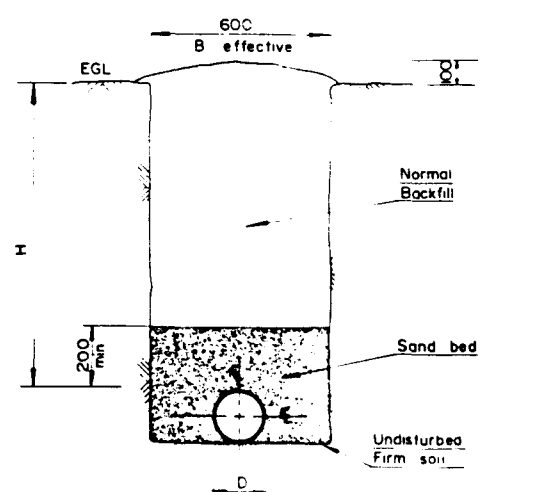
**TRENCH DETAIL T 2**  
INCREASED DEPTH STEPPED TYPE  
(FIRM SOIL CONDITIONS)



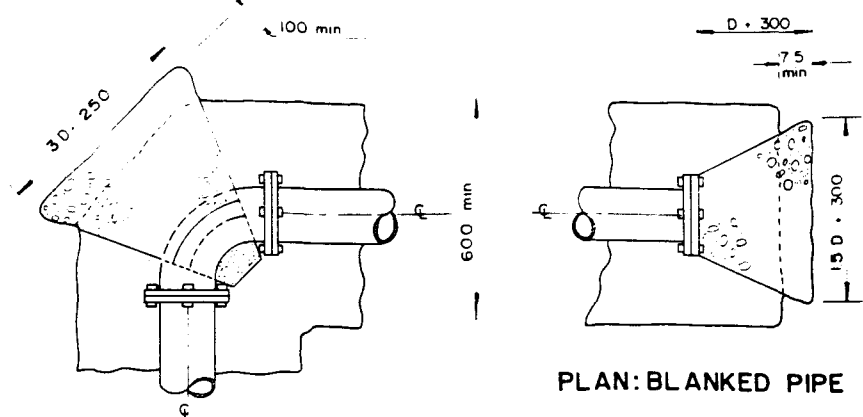
**TRENCH DETAIL T 3**  
NOMINAL INCREASE DEPTH VEE TYPE  
(LOOSE SOIL CONDITIONS)



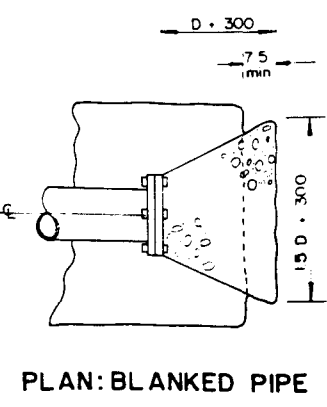
**TRENCH DETAIL T 4**  
ROAD CROSSING  
(DEPTH H NOMINAL 600 - 1000)



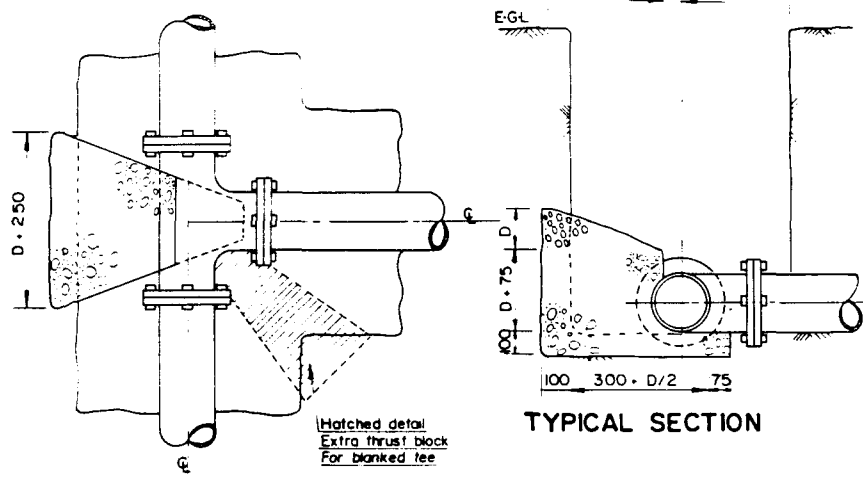
**TRENCH DETAIL T 5**  
ROAD CROSSING  
(DEPTH H GREATER THAN 1000 Scale a)



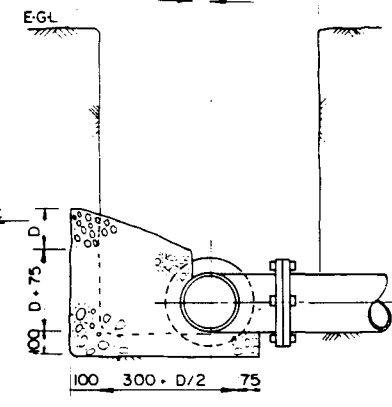
**PLAN SWEEPING BEND OR ELBOW DETAIL**



**PLAN: BLANKED PIPE**

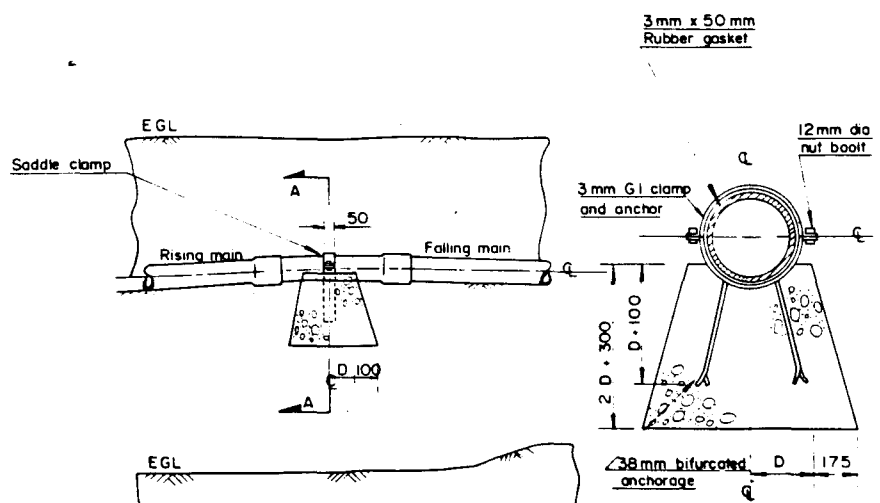


**PLAN: TEE JUNCTION**

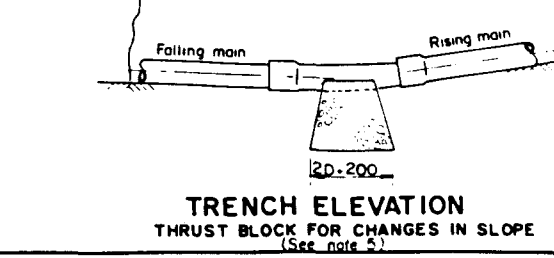


**TYPICAL SECTION**

**HORIZONTAL THRUST BLOCK DETAILS**

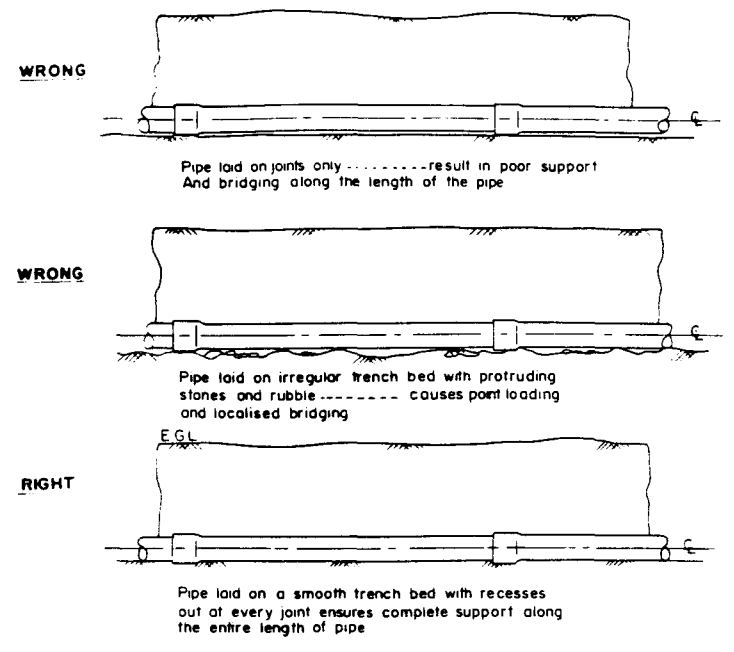


**SECTION A-A SADDLE CLAMP DETAIL**  
(Scale c)



**TRENCH ELEVATION THRUST BLOCK FOR CHANGES IN SLOPE**  
(See note 2)

**VERTICAL THRUST BLOCK DETAILS**  
(Scale d)



**LONGITUDINAL SECTION TRENCH PREPARATION**  
(Scale d)

**NOTES**

- All dimensions are in millimetres, unless otherwise stated.
- Vertical alignment of pipeline in order to collect air at high points, and drain at low points, the pipeline should not be laid completely level. Minimum recommended slopes are:  
Riser main slope 0.003 over maximum distance of 800m  
Falling main slope 0.006 over maximum distance of 400m  
See drg No 049 for details of air valve & washout valve chambers.
- Nominal dimensions of the pipeline trench to be as follows:  
DEPTH (900 + D)mm to soffit of pipe  
WIDTH 600mm for manually excavated trenches.
- Materials for backfilling, given only on completion of the standard pressure testing procedure, to be of the following type:  
**COMPACTED SELECTED MATERIAL:** Excavated material, sieved to exclude stones larger than 10mm, compacted in layers of 75mm up to a minimum pipe cover of 150mm.  
**NORMAL BACKFILL:** Placement of the remaining excavated material and mounded above EGL, by a minimum of 100mm height to accommodate consolidation.  
**SAND:** Imported if necessary, for backfill to trenching of nominal depth crossing roads.
- The trench bed to be levelled to remove all high spots and protruding stones. Low spots to be made up with compacted selected material. Soft spots to be removed and made up with compacted selected material (see note 4).
- The detailing of flanged steel or PVC pipe is interchangeable, with dimension D taken as follows:  
Dimension D: Internal diameter for steel piping  
External diameter for PVC piping
- Size of pipes are determined from optimisation runs using the tag-branch computer programme.
- Thrust block required for pipe diameter 80mm and greater.

LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES

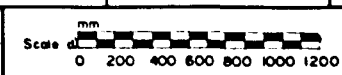
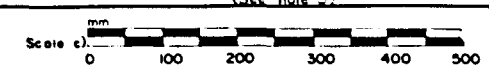
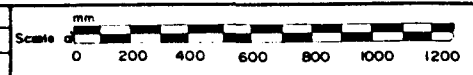
**TRENCHING DETAILS**

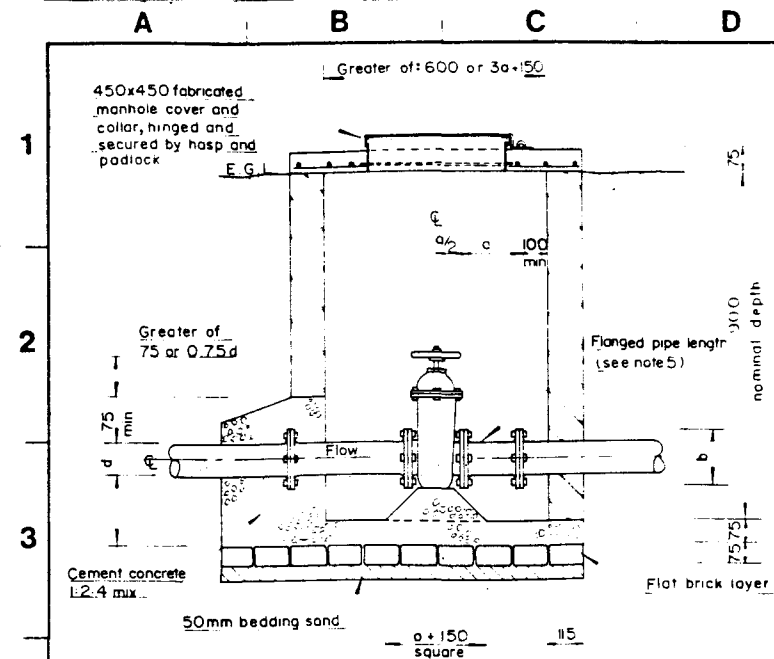
DRAWING NO 048

SCALE Refer to bar scale a) - d)

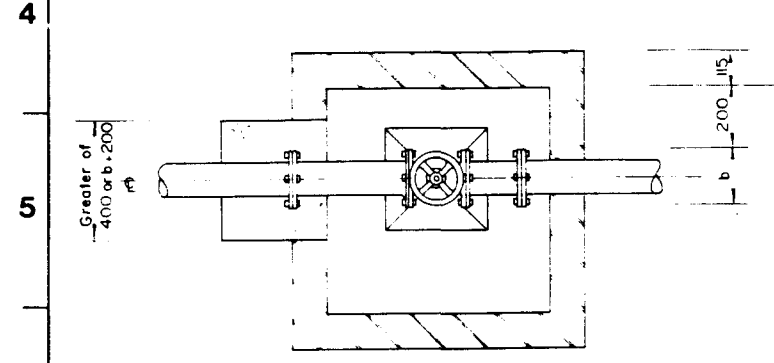
DATE: JUNE 1988

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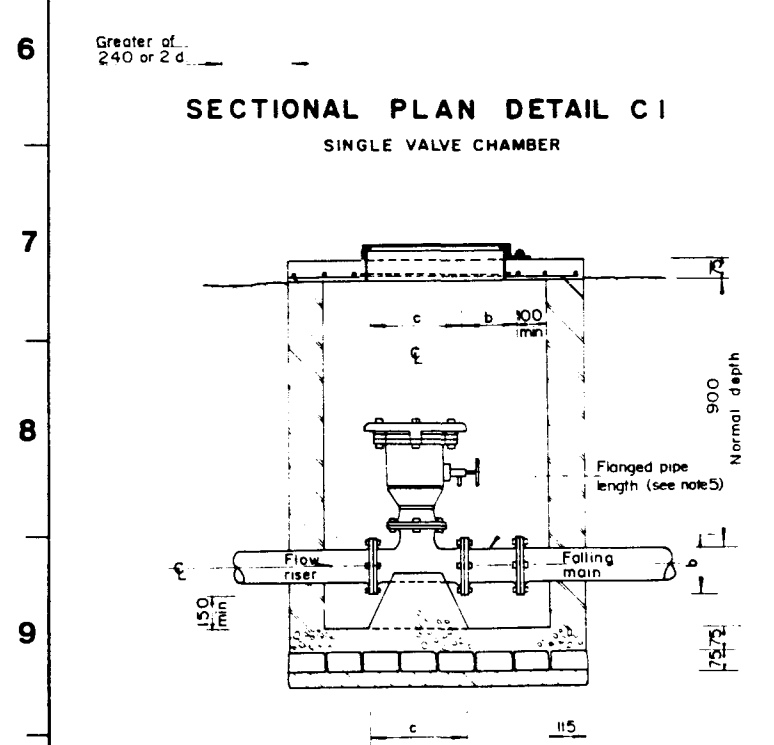




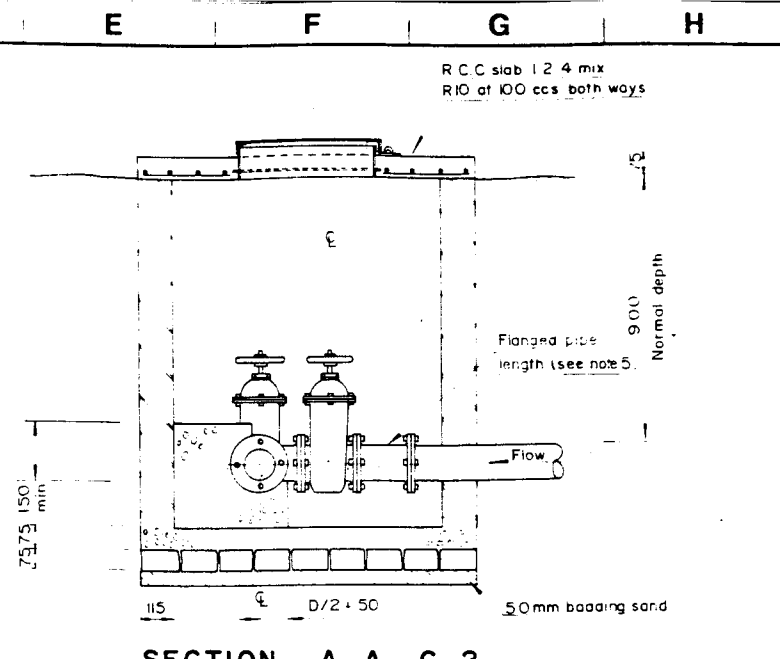
SECTIONAL ELEVATION C 1



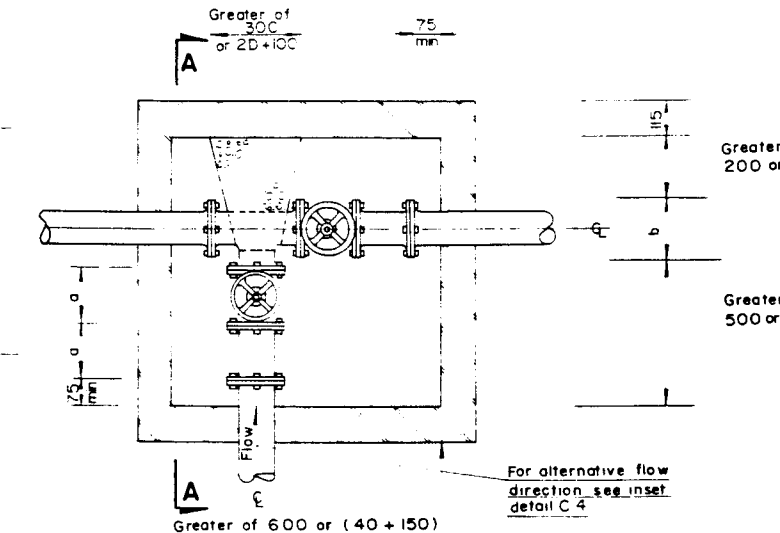
SECTIONAL PLAN DETAIL C 1  
SINGLE VALVE CHAMBER



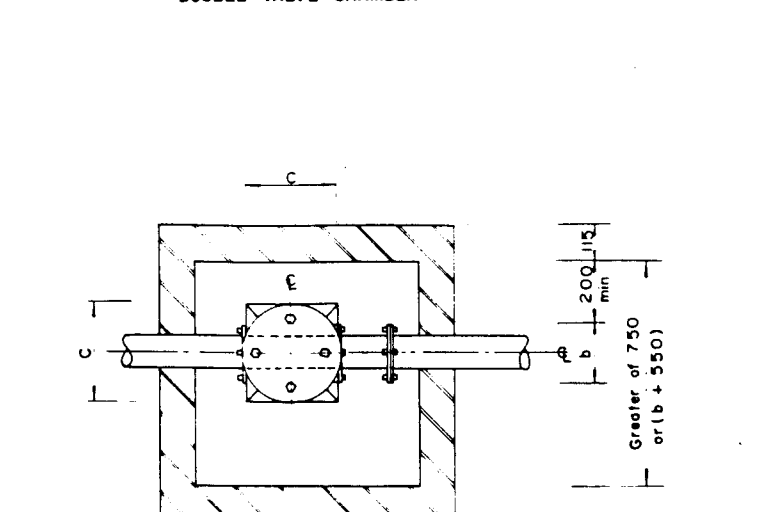
SECTIONAL ELEVATION DETAIL C 6  
SINGLE AIR VALVE CHAMBER



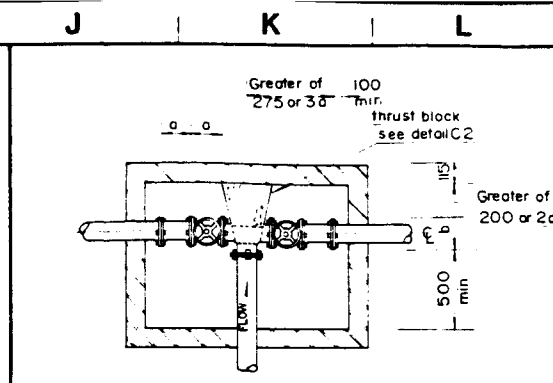
SECTION A-A C 2



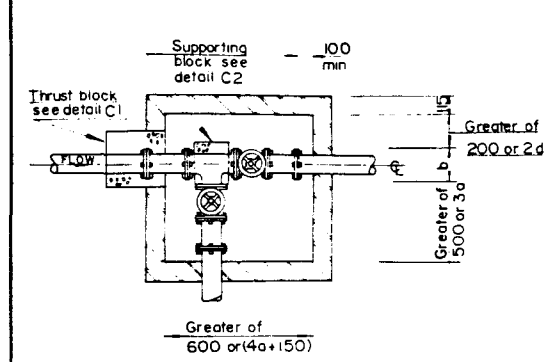
SECTIONAL PLAN DETAIL C 2  
DOUBLE VALVE CHAMBER



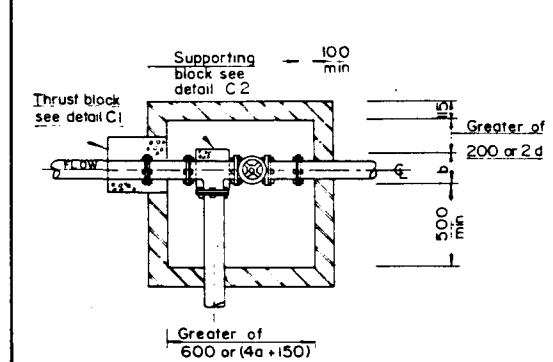
PLAN DETAIL C 6



VALVE CHAMBER DETAIL C 3



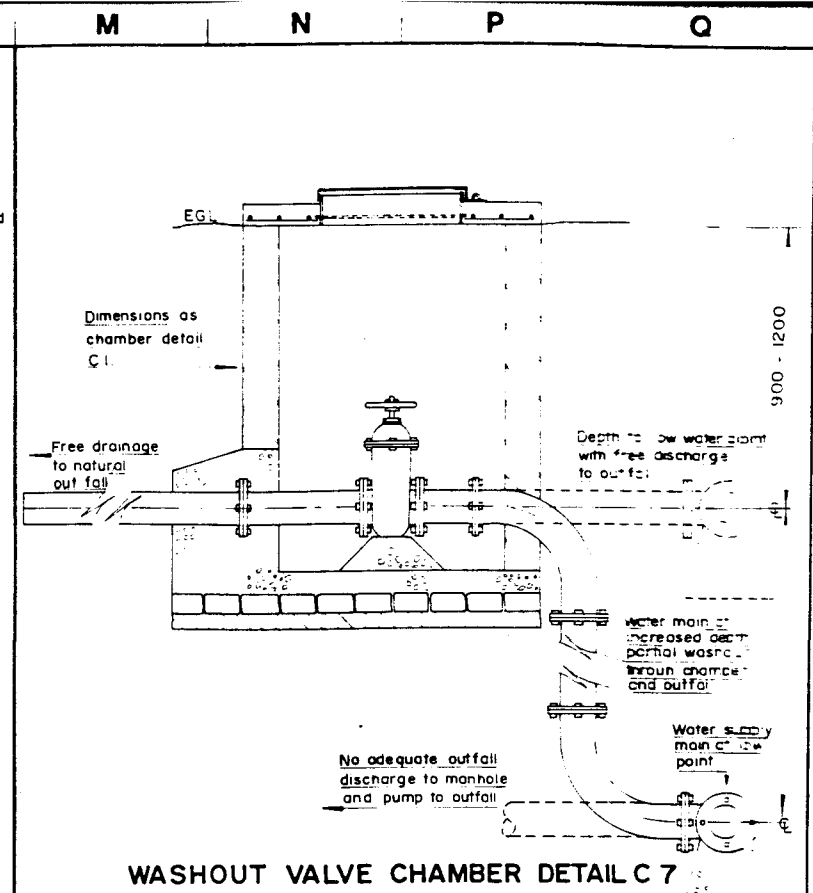
VALVE CHAMBER DETAIL C 4



VALVE CHAMBER DETAIL C 5

Note  
For changed flow direction thrust block detail c 2 is required.

FURTHER CHAMBER ARRANGEMENTS (Scale b)



WASHOUT VALVE CHAMBER DETAIL C 7

Note  
Dotted line details alternative arrangement under increased mains depth.

- NOTE
- All dimensions are in millimetres, unless otherwise stated
  - For valve requirements at pump assembly plant refer to drawing numbers 004-006
  - For changes in vertical alignment
    - Air release valve chambers are required at high points along the mains pipelength, for tapping entrapped air pockets
    - Washout valve chambers are required at all low points along the mains pipelength, for periodic flushing out of accumulated deposit, which may result in restricting flow
  - In long pipelines, valve chambers are to be installed to enable sections to be isolated for periodic inspection and / or repairs. to be placed every 3.5 km
  - A short flanged pipelength accommodates convenient changing of old or defective fittings for replacement of similar fittings but of different manufactured dimensions

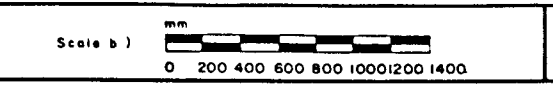
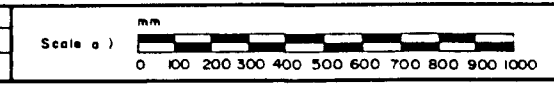
LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES

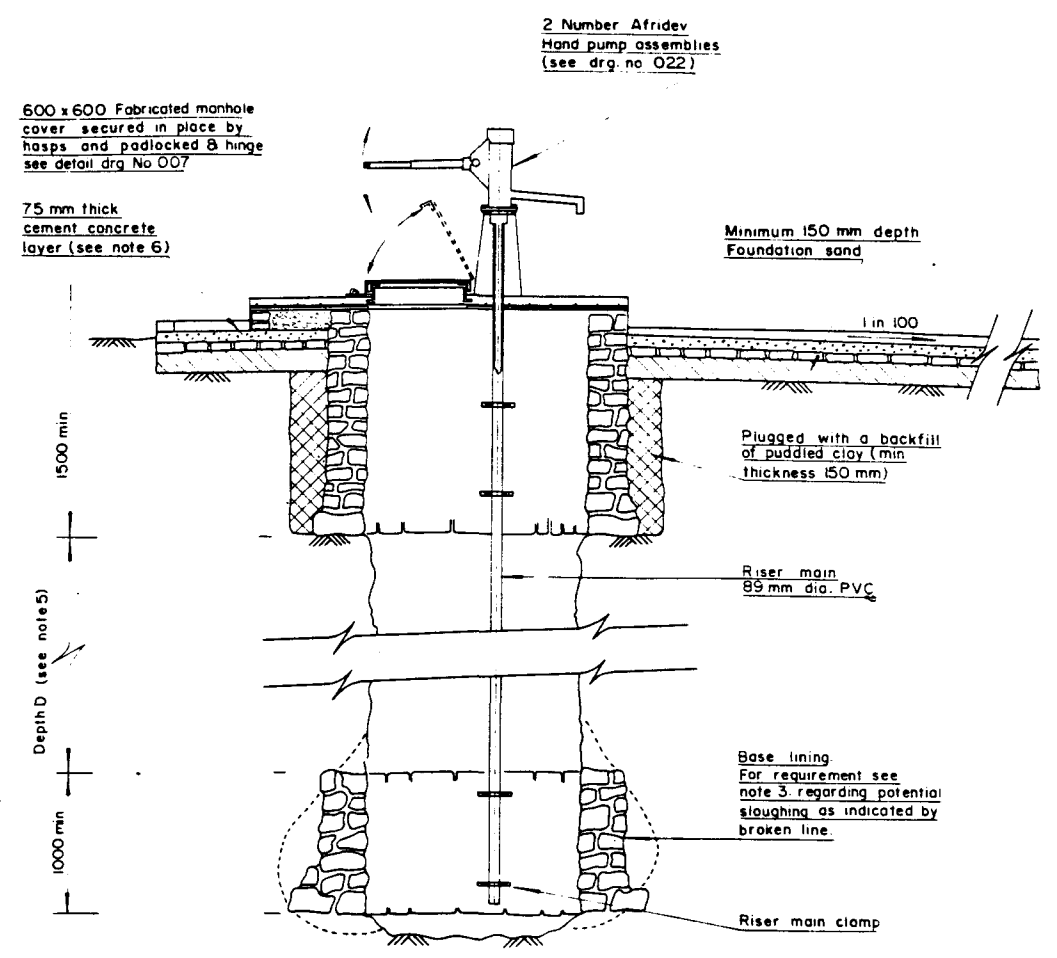
**VALVE AND CHAMBER DETAILS**

DRAWING NO C49      SCALE Refer to bar scale

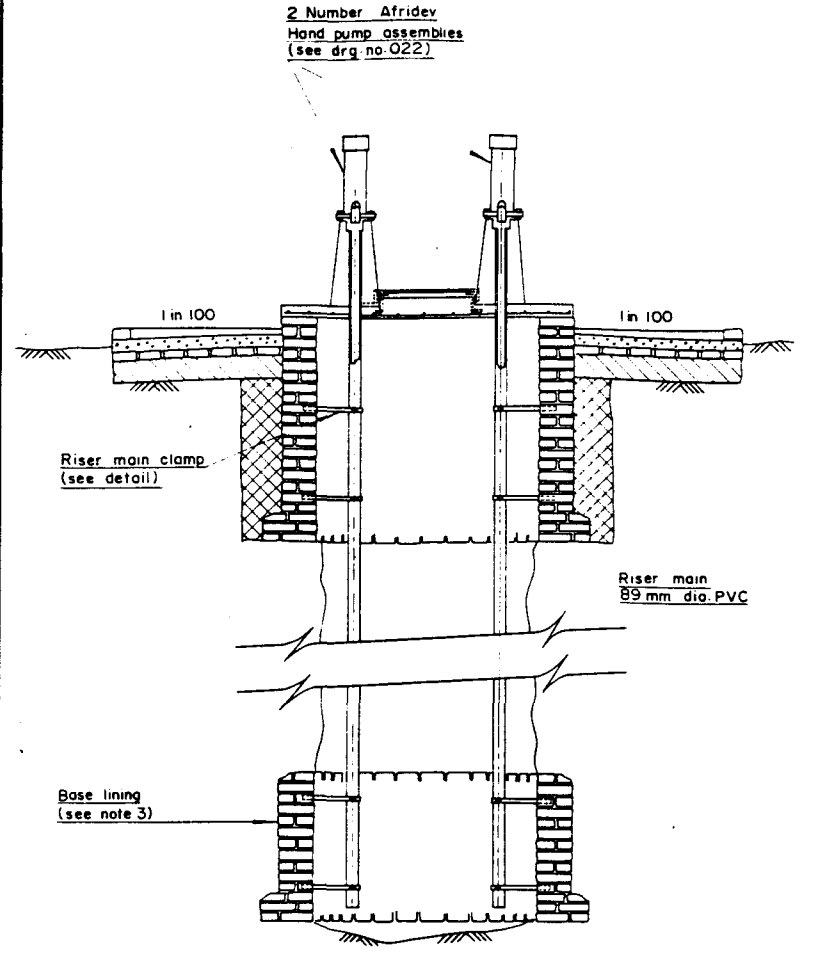
DATE: AUG 1988

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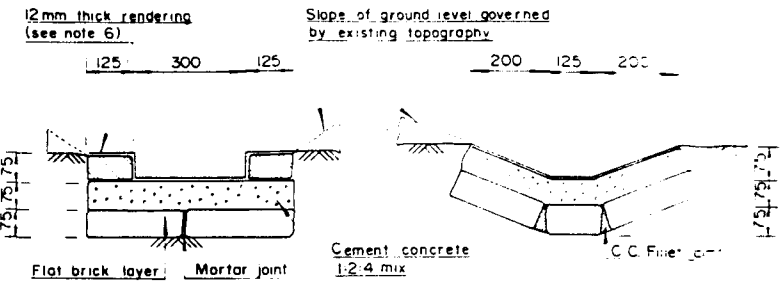




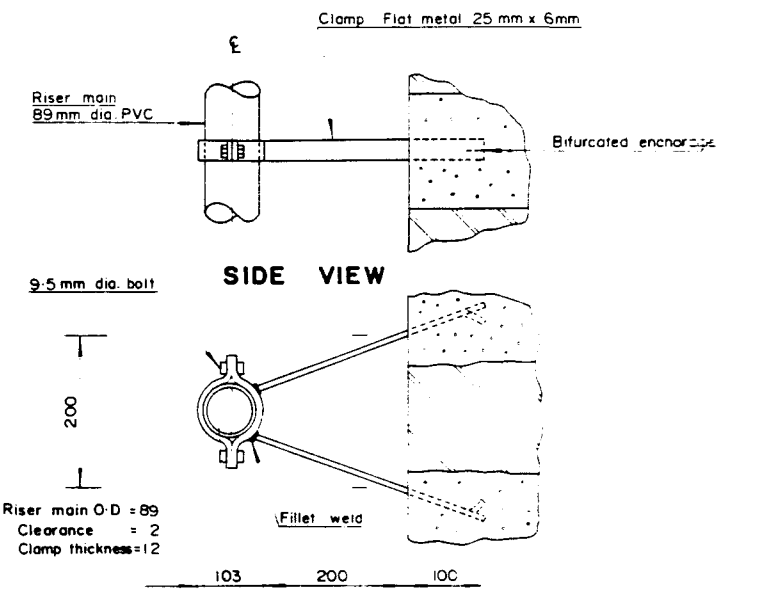
**SECTIONAL FRONT ELEVATION**  
STONE MASONRY FEATURE (SEE INSET)  
Scale (a)



**SECTIONAL SIDE ELEVATION**  
Scale (a)  
**ALTERNATIVE DETAIL**  
**BRICKWORK LINING**

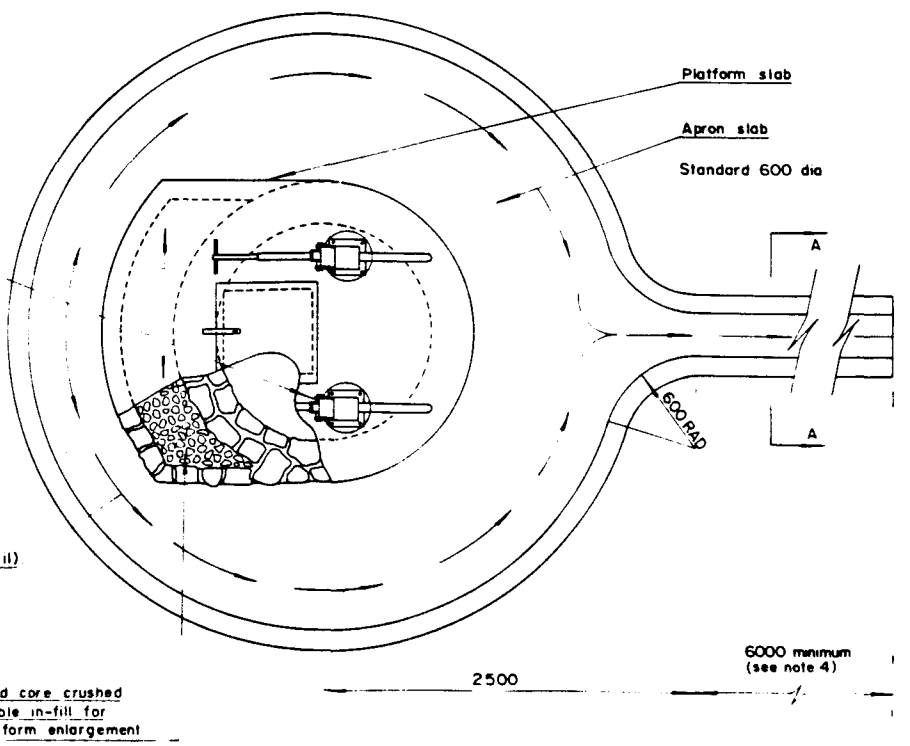


**SECTION AA**  
Scale (b)  
**ALTERNATIVE DETAIL FOR SECTION AA**  
Scale (b)

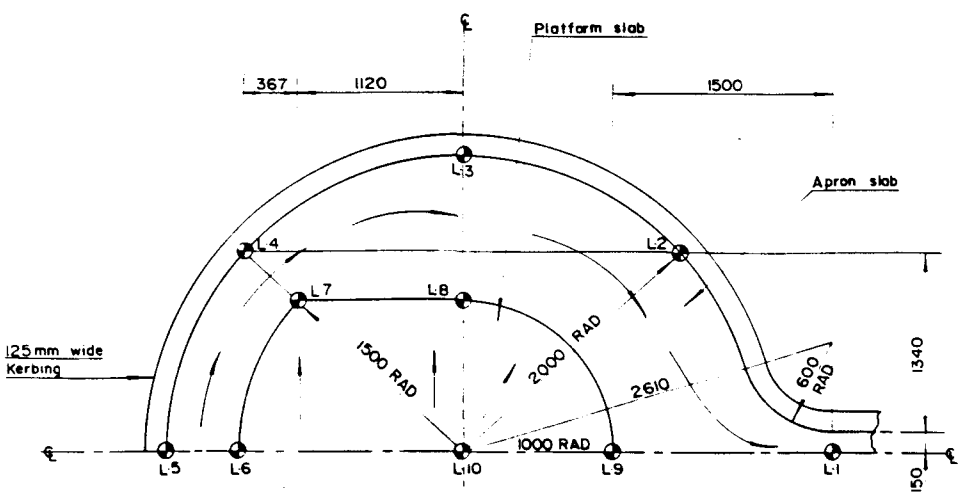


**RISER MAIN CLAMP DETAIL**  
Scale (c)

- NOTES:**
- All dimensions are in millimetres unless otherwise stated.
  - Important: The setting out data is provided in order to assist in ensuring that all the required slopes to the apron and platform are followed correctly. Level L1 is taken as the arbitrary datum 0.00.
  - Base lining placed under conditions of loose sandy soils to protect against potential sloughing or under cutting as indicated by the broken line details.
  - Minimum length of drain given as 6 metres away from the well point and to drain out to local nullah or field drainage systems.
  - The length of the unlined section of the well is dependant upon the soils and characteristics of the water bearing stratum and the instruction of the Engineer-in-charge.
  - A cement polish finish on 12mm rendering is to be given to platform, apron and drain surfaces.



**PLAN VIEW**  
Scale (a)



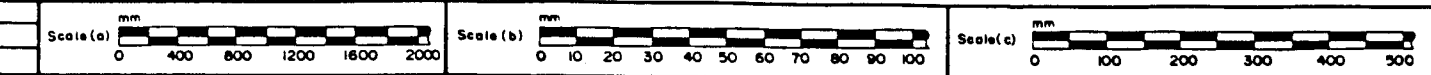
Level	Apron slab (m)	Top of Kerb (m)	Level	Apron slab (m)	Top of Platform (m)
L1	0.000	0.089	L6	0.066	0.086
L2	0.017	0.106	L7	0.056	0.076
L3	0.034	0.123	L8	0.045	0.076
L4	0.051	0.140	L9	0.010	0.076
L5	0.066	0.155	L10		0.086

**APRON AND PLATFORM SETTING OUT DATA**  
(SEE NOTE 2)  
Scale (c)

LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES  
**IMPROVED DUG WELL**  
**TWIN HAND PUMP ASSEMBLY**

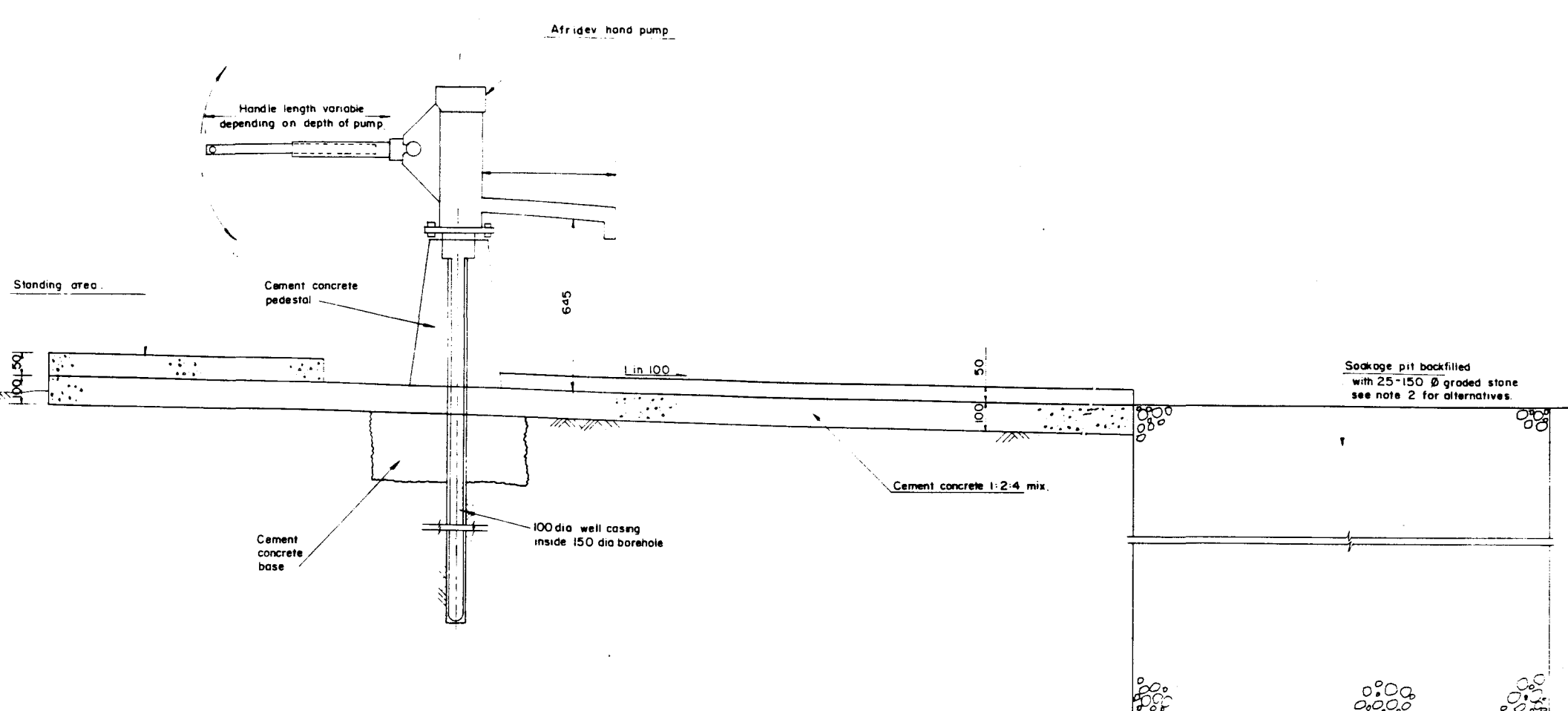
DRAWING NO 050 SCALE Refer to bar scales (a), (b) & (c)

DATE APRIL 1988  
Sir William Holcrow & Partners  
Consulting Engineers and Architects  
Burdock Park  
Swindon Wiltshire SN4 0DD

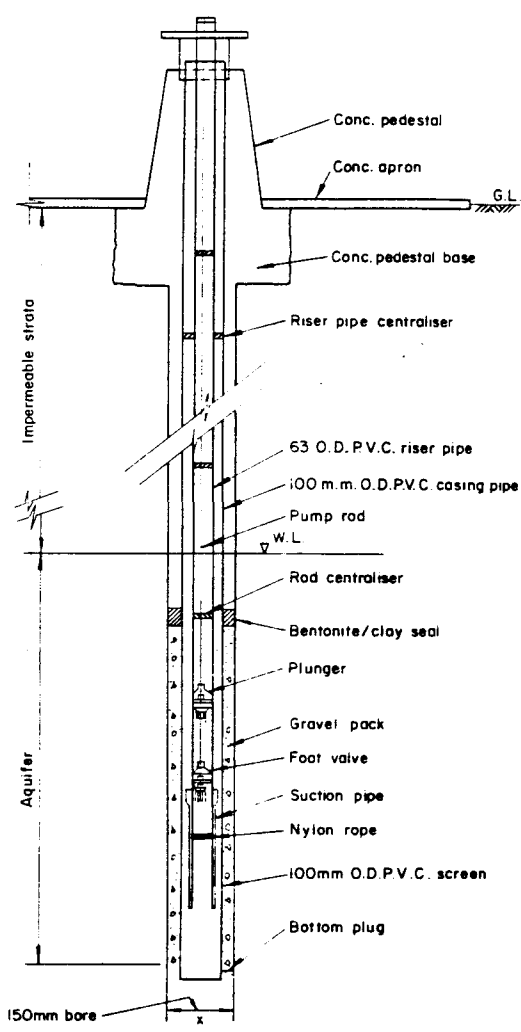


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A B C D E F G H J K L M N P Q

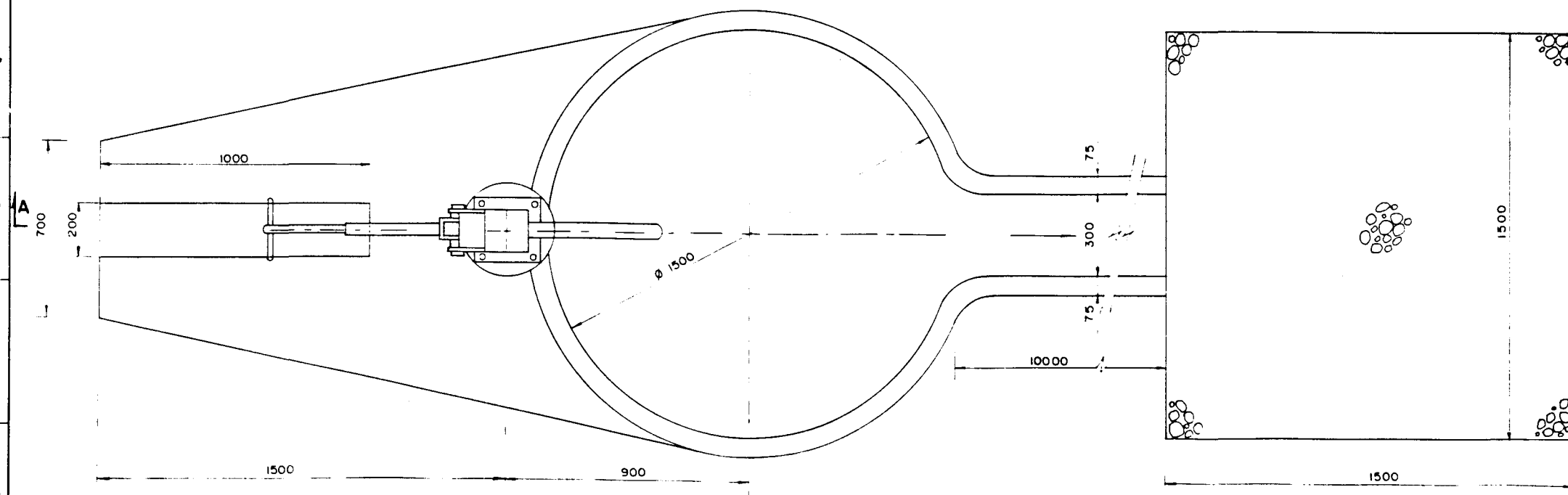


**SECTIONAL FRONT ELEVATION AA**  
Scale (a)



**SECTION THROUGH AFRIDEV HAND PUMP ON TUBEWELL**  
Not to Scale

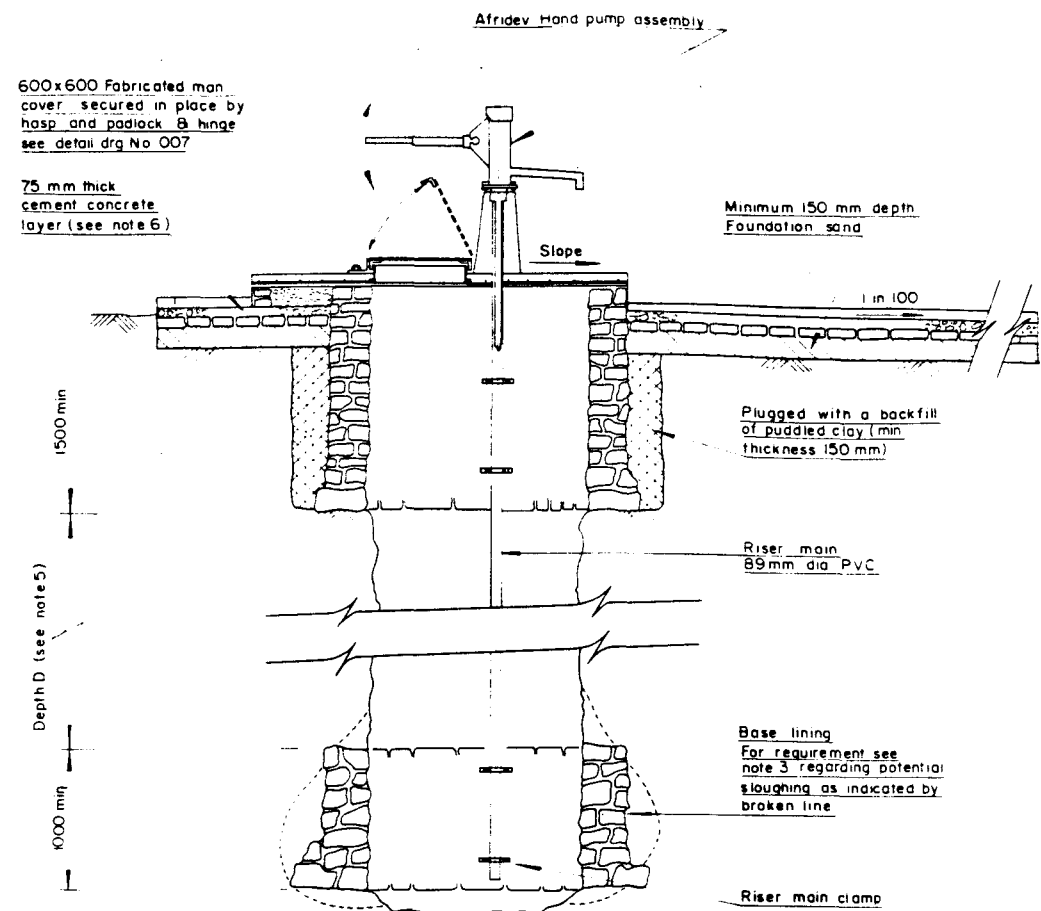
- NOTES:**
- All dimensions are in millimetres unless otherwise stated.
  - Minimum length of concrete lined drain to be 10 metres away from the edge of the apron area. If possible this should drain out to a local nullah or field drainage system. If no local drainage point is available then a soakage pit should be constructed as shown.
  - A cement polish finish on 12 mm rendering is to be given to platform, apron and drain surfaces.
  - The plan and sectional views of the pump apron and drain have been taken from the Afridev Handpump Installation Manual.



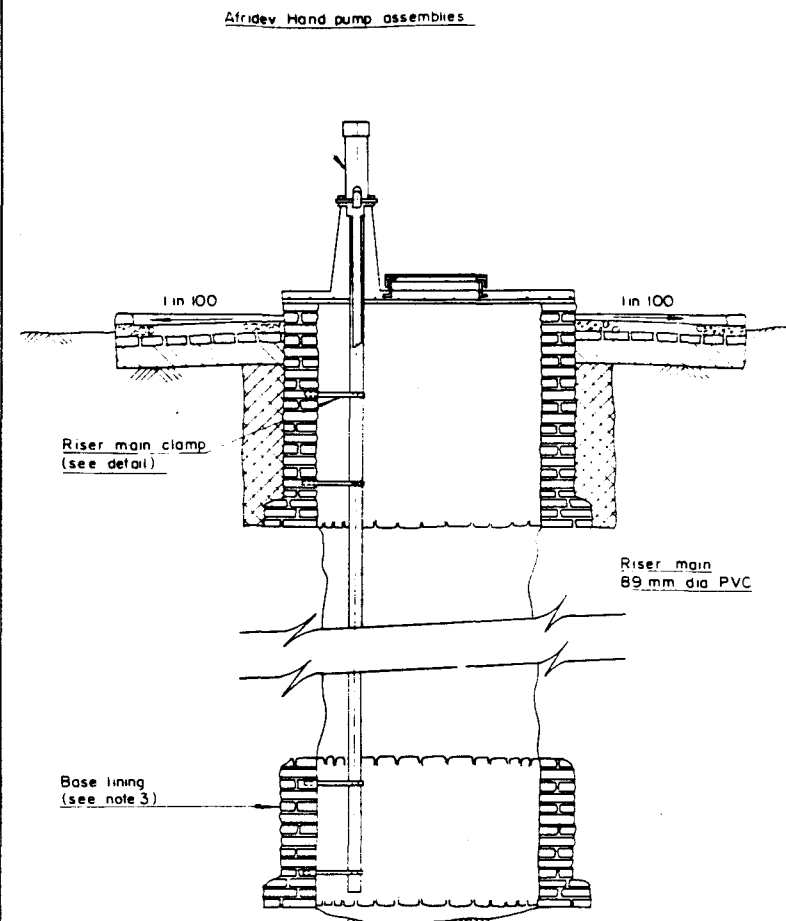
**PLAN VIEW**  
Scale (a)



LOW COST WATER SUPPLY AND SANITATION STANDARD DESIGN MODULES	
<b>HAND PUMP ASSEMBLY ON TUBE WELL</b>	
DRAWING NO 050 A	SCALE Refer to bar scales (a)
DATE JULY 1989	Sir William Halcrow & Partners Ltd Consulting Engineers and Architects Burdurap Park Swindon, Wiltshire SN1 0QD

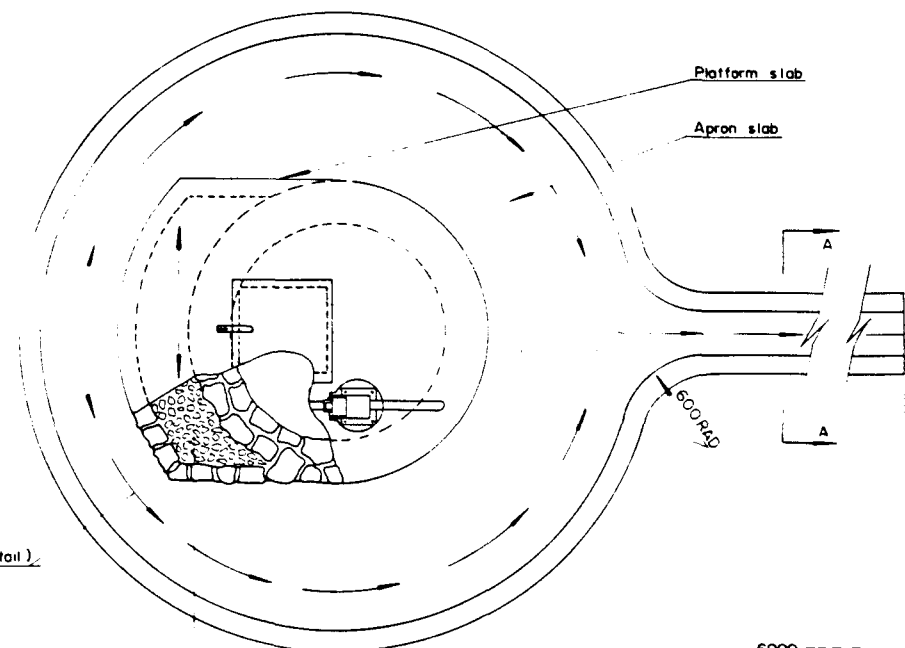


**SECTIONAL FRONT ELEVATION**  
STONE MASONRY FEATURE (SEE INSET)  
Scale (a)

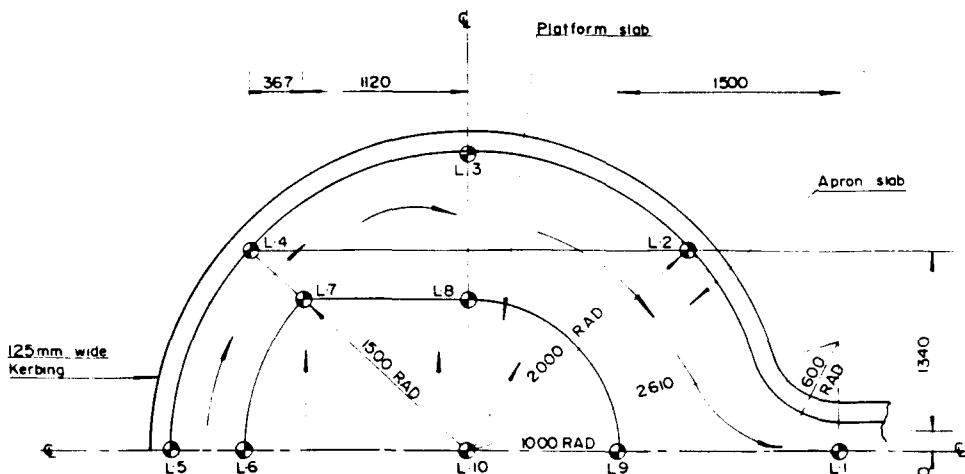


**SECTIONAL SIDE ELEVATION**  
Scale (a)

ALTERNATIVE DETAIL  
BRICKWORK LINING



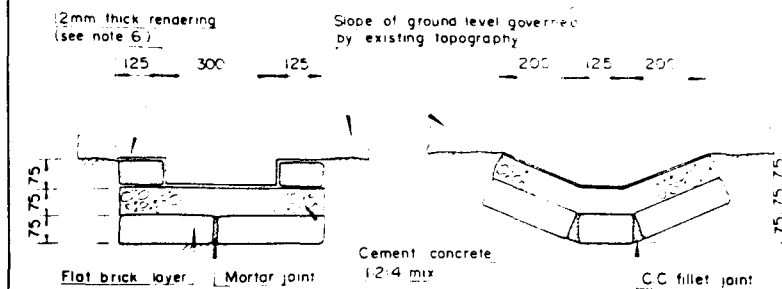
**PLAN VIEW**  
Scale (a)



Level	Apron slab (m)	Top of kerb (m)
L-1	0.000	0.089
L-2	0.017	0.106
L-3	0.034	0.123
L-4	0.051	0.140
L-5	0.066	0.155

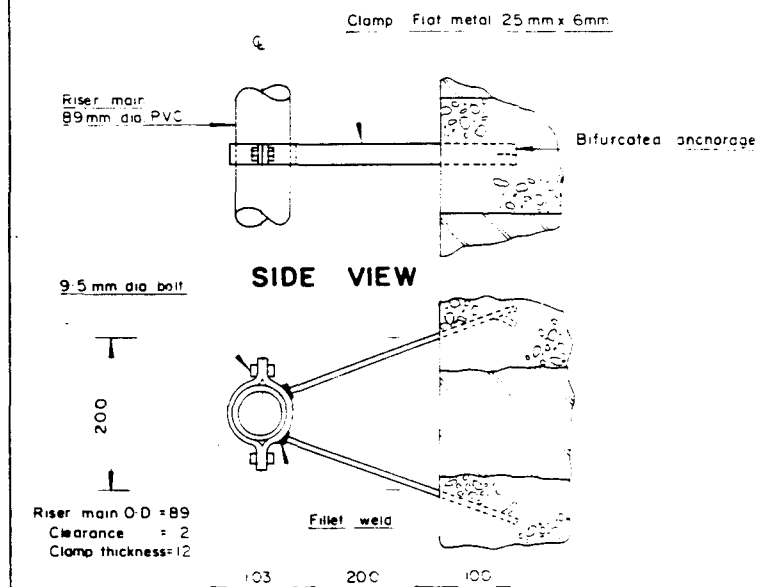
Level	Apron slab (m)	Top of Platform (m)
L-6	0.066	0.086
L-7	0.056	0.076
L-8	0.045	0.076
L-9	0.010	0.076
L-10	—	0.086

**APRON AND PLATFORM SETTING OUT DATA (SEE NOTE 2)**  
Scale (c)



**SECTION AA**  
Scale (b)

**ALTERNATIVE DETAIL FOR SECTION AA**  
Scale (b)



**RISER MAIN CLAMP DETAIL**  
Scale (c)

**NOTES**

- All dimensions are in millimetres unless otherwise stated
- Important The setting out data is provided in order to assist in ensuring that all the required slopes to the apron and platform are followed correctly. Level L1 is taken as the arbitrary datum 0.00
- Base lining placed under conditions of loose sandy soils to protect against potential sloughing or under cutting as indicated by the broken line detail
- Minimum length of drain given as 6 metres away from the well point and to drain out to local nullah or field drainage systems
- The length of the unlined section of the well is dependant upon the soils and characteristics of the water bearing stratum and the instruction of the Engineer-in-charge
- A cement polish finish on 12mm rendering is to be given to platform apron and drain surfaces

LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES

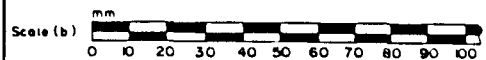
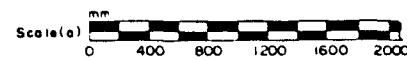
**IMPROVED DUG WELL  
SINGLE HAND PUMP ASSEMBLY**

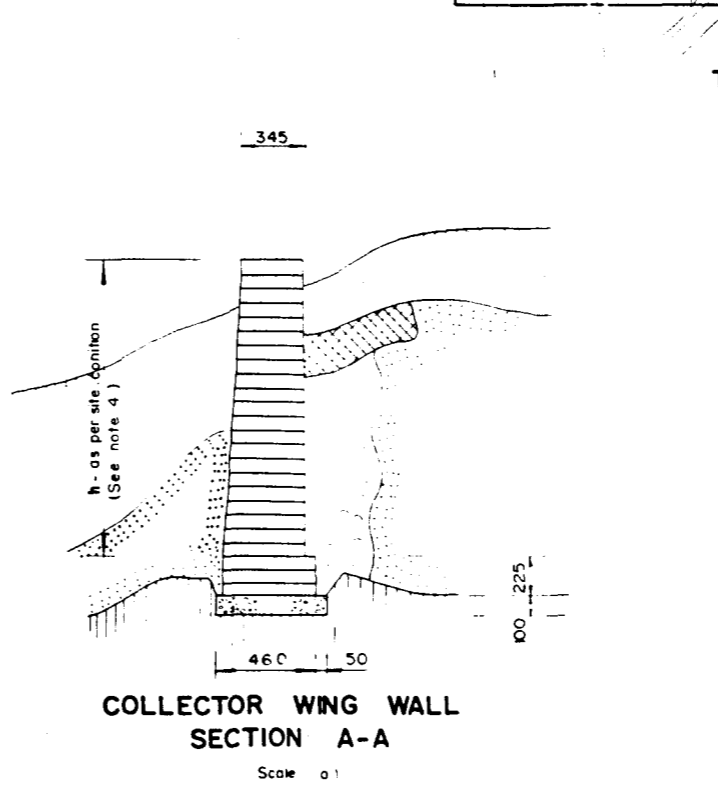
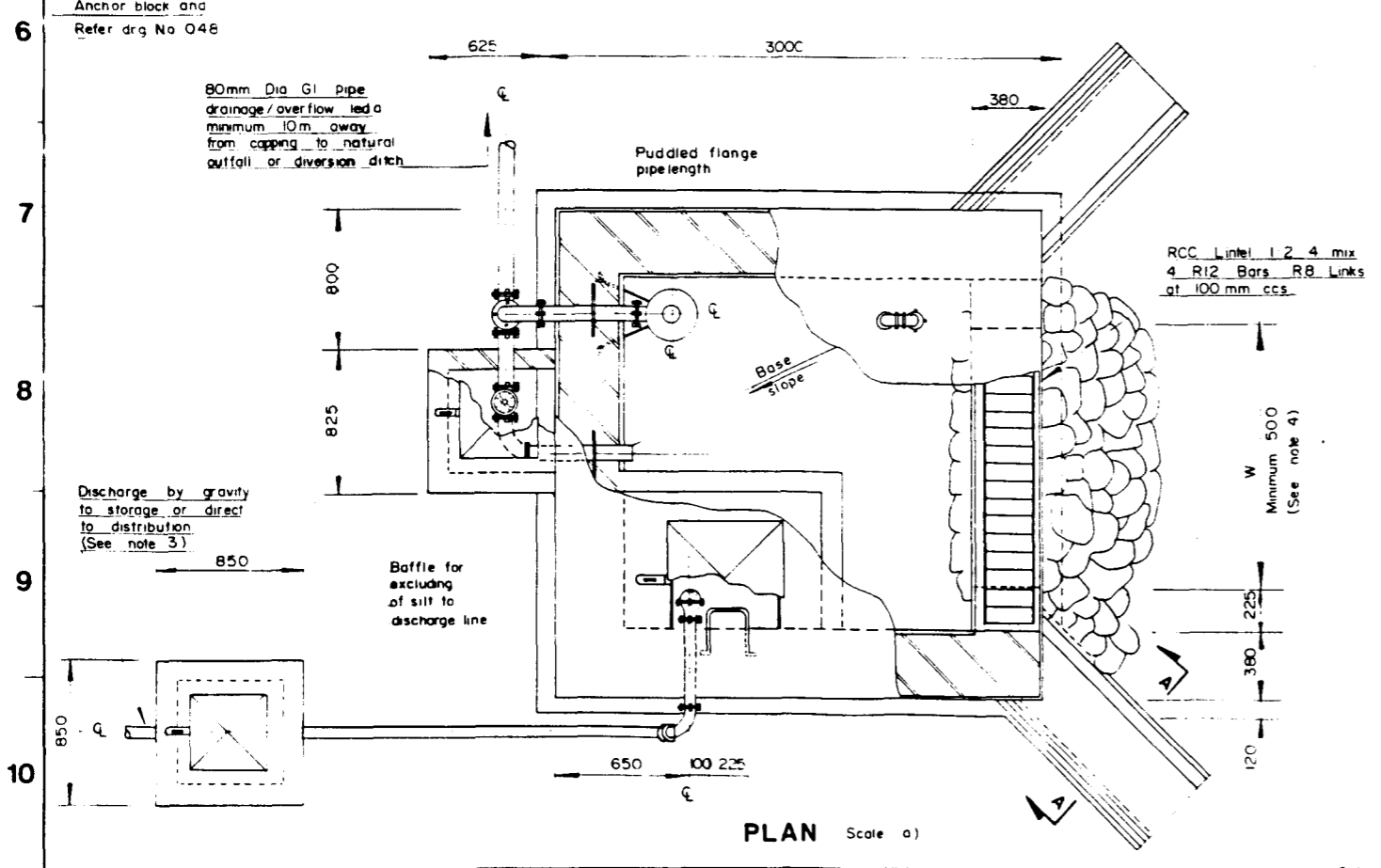
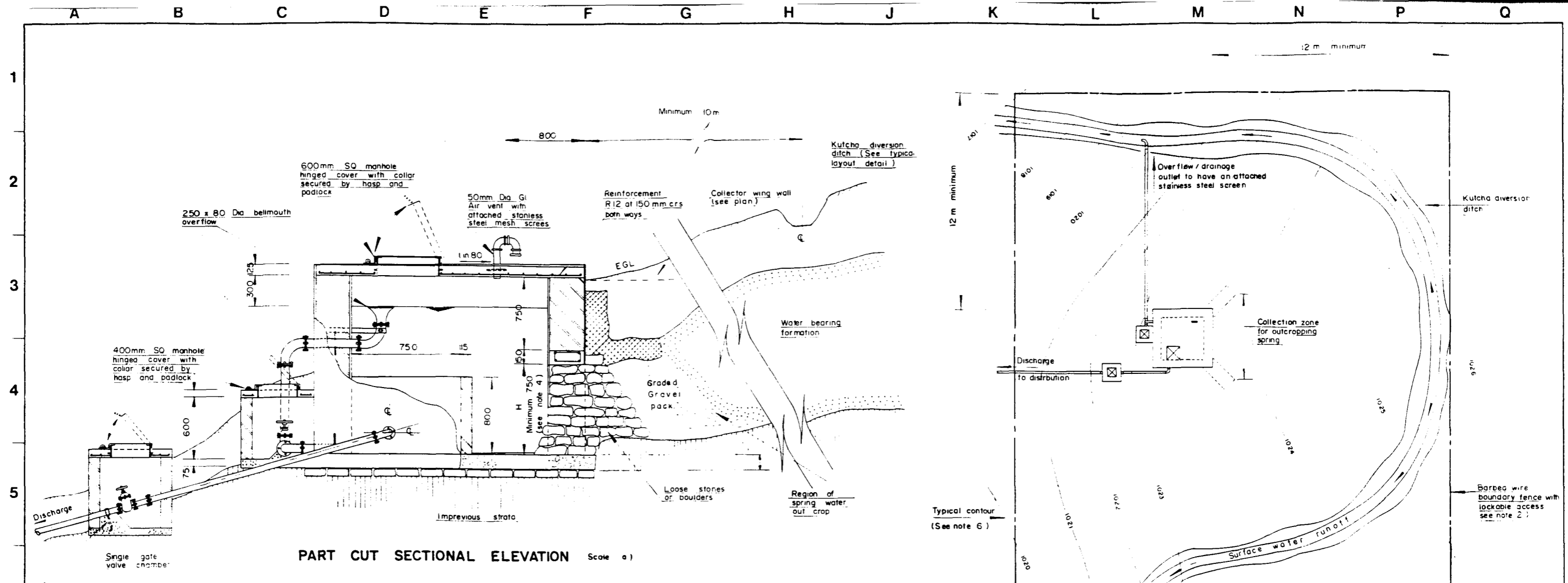
DRAWING NO 051

SCALE Refer to bar scales (a)(b)(c)

DATE JUNE 1988

Sir William Holcrow & Partners  
Consulting Engineers and Architects  
Burdorpe Park  
Sandown Wiltshire SN4 0DD





- NOTES**
- All dimensions are in millimetres unless otherwise stated
  - In order to safeguard against possible pollution of the spring water the following precautions are to be taken:
    - Place puddle clay in outer excavated trenches and above gravel pack (See elevation detail)
    - Attach screens to the air vent and the drainage / overflow outlet
    - Construct a diversion ditch to by-pass surface water as shown in typical layout detail. It is good practice to plant hedges / trees and grass on slope to protect against soil erosion
    - Fence off area from unauthorised persons and wandering animals
  - Requirement for balancing storage is dependant upon available yield of spring and designed water demands
  - Dimensions H and h are determined per site conditions and the instruction of the engineer-in-charge
  - Spring box may be constructed using stone or common brick masonry to dimensions shown
  - Typical contours are given arbitrary values for generalised layout detail

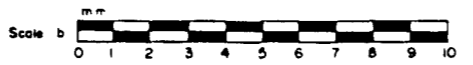
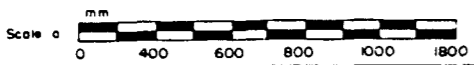
**LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES**

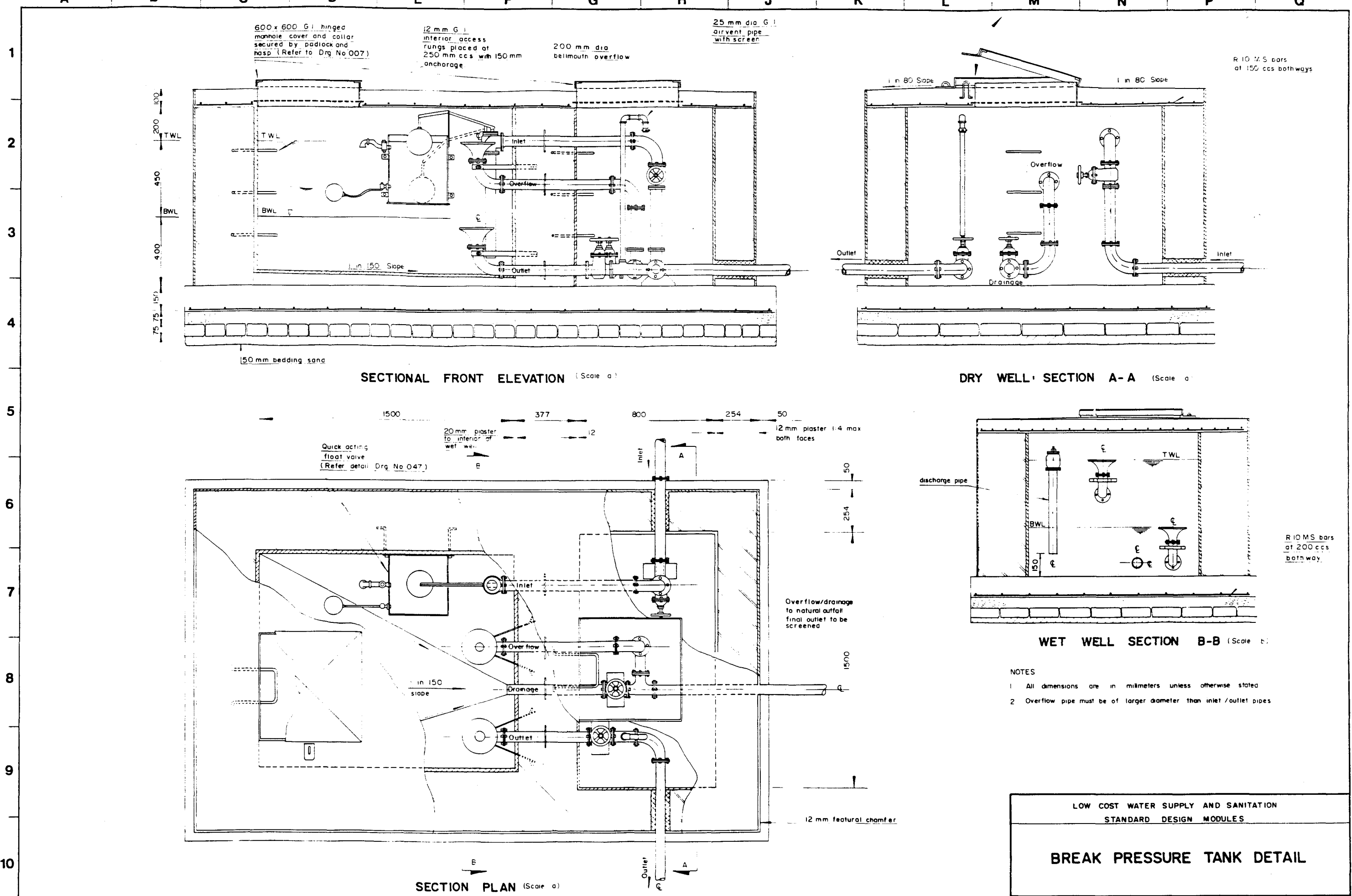
**SPRING CAPPING DETAIL**

DRAWING NO 052      SCALE Refer to bar scale

DATE AUGUST 1988

Sir William Halcrow & Partners Ltd  
Consulting Engineers and Architects  
Burdorpe Park  
Swindon Wiltshire SN4 0DD





**NOTES**

- All dimensions are in millimeters unless otherwise stated
- Overflow pipe must be of larger diameter than inlet / outlet pipes

LOW COST WATER SUPPLY AND SANITATION  
STANDARD DESIGN MODULES

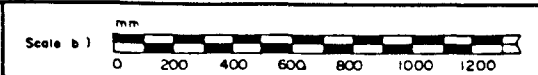
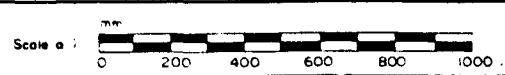
**BREAK PRESSURE TANK DETAIL**

DRAWING NO 053

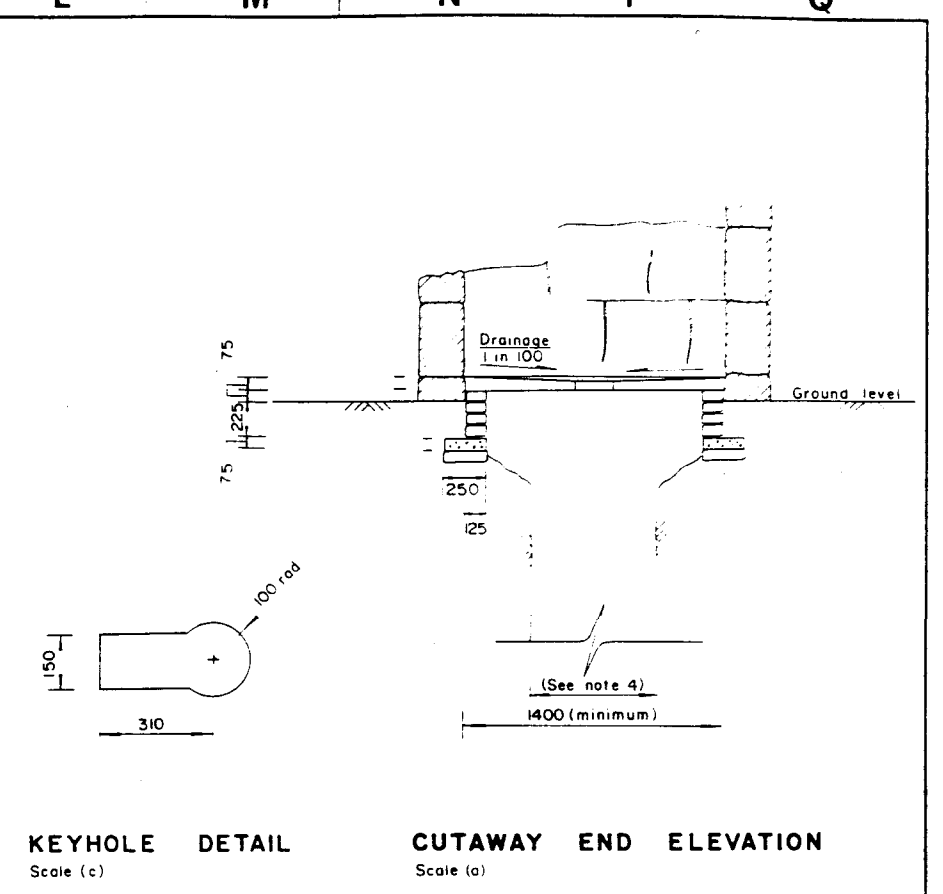
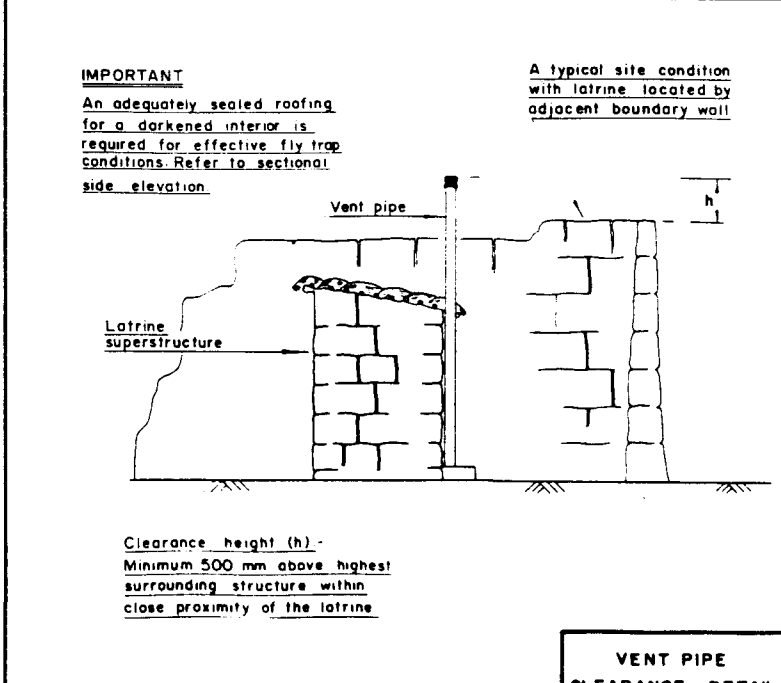
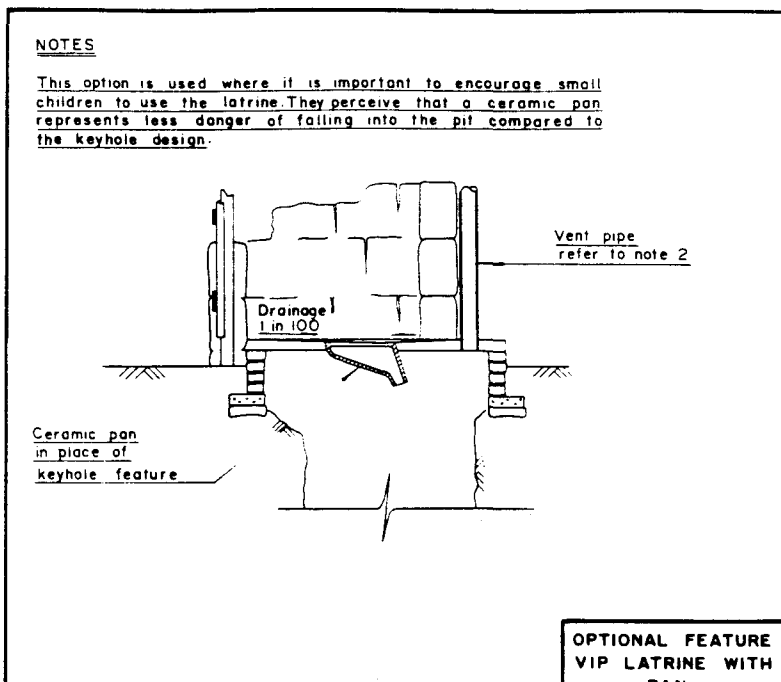
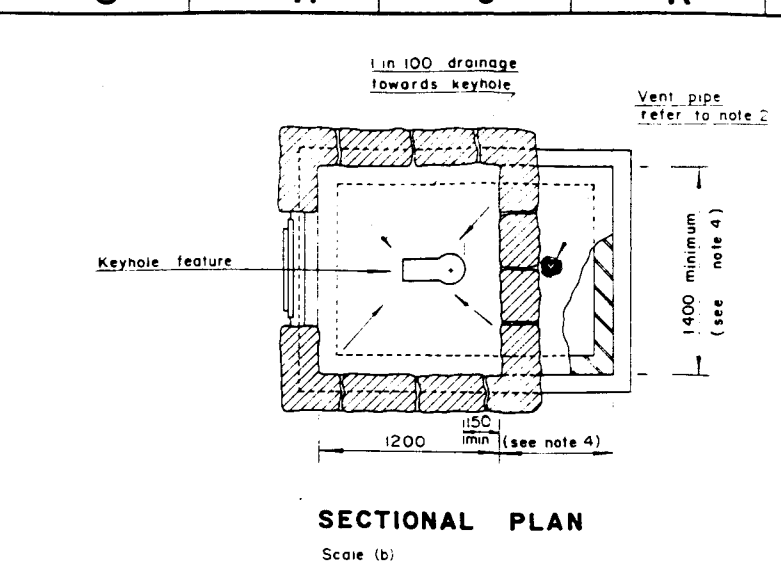
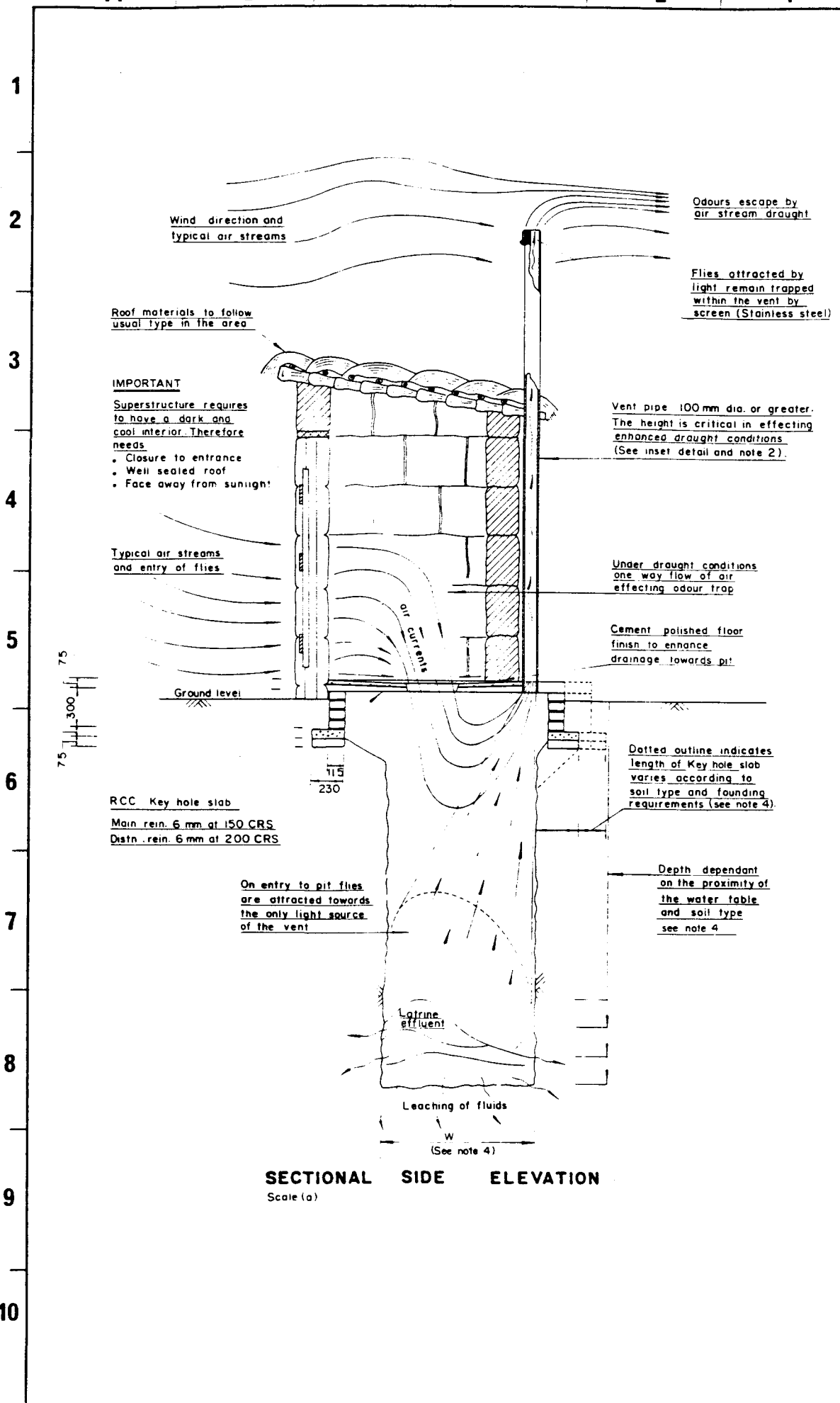
SCALE Refer to bar scale a.e.

DATE: AUGUST 1988

Sir William Macrow & Partners Ltd  
Consulting Engineers and Architects  
Burdock Park  
Swindon Wiltshire SN4 0DD



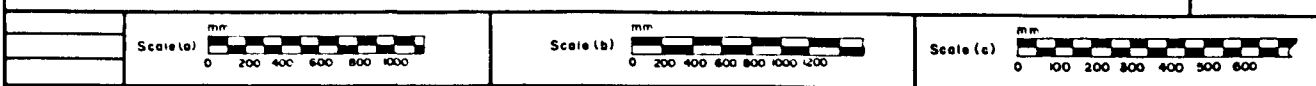


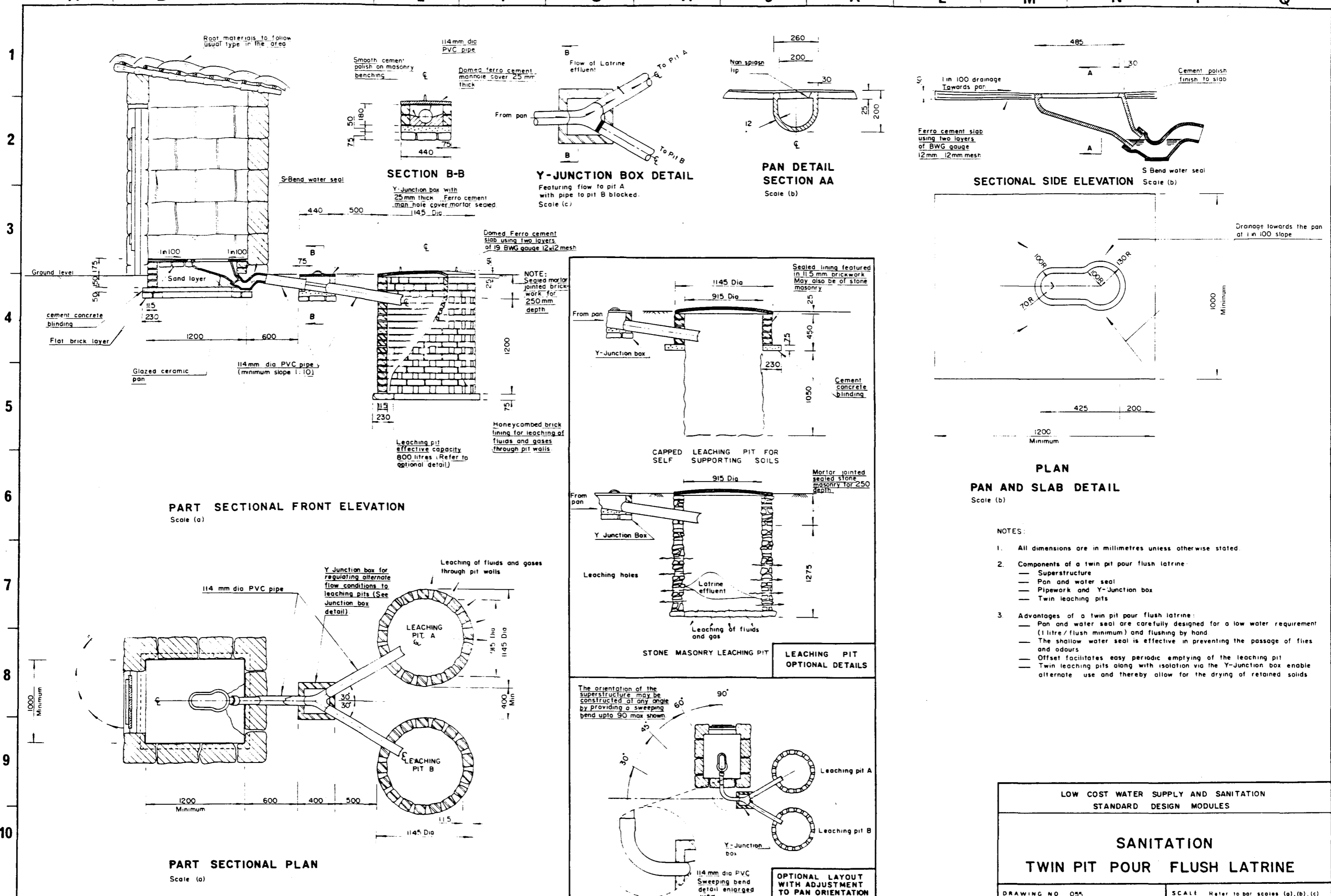


**NOTES**

This option is used where it is important to encourage small children to use the latrine. They perceive that a ceramic pan represents less danger of falling into the pit compared to the keyhole design.

- NOTES:**
- All dimensions in millimetres unless otherwise stated
  - DOs and DONTs for VIP vent pipes:
    - DO - Put the vent outside the superstructure
    - DO - Put it facing the sun
    - DO - Make it 100mm dia or larger
    - DO - Make it as high as possible (See inset clearance detail)
    - DO - Place it directly over the pit
    - DO - Cover it with stainless steel gauze
    - DONT - Put it inside (It gets in the way of the pan)
    - DONT - Have holes or cracks in it (Flies can escape)
    - DONT - Cut it short (Air will not flow)
    - DONT - Cover the vent (It excludes light and stops air flow)
    - DONT - Have a superstructure without a roof (Flies will not be attracted to the vent)
  - It has been observed that the success of a latrine programme is as much dependent on good technology as it is on a good delivery system. Well designed and made latrines will NOT work satisfactorily UNLESS they are introduced to communities in a way that makes them want to use them properly. Thus this drawing should be read together with the "Manual for low cost rural water supplies and sanitation" UNICEF, Quetta, 1988.
  - Dimension is determined according to soil type and founding requirements, as per site conditions and the decision of the Engineer-in-charge





**PART SECTIONAL FRONT ELEVATION**  
Scale (a)

**PART SECTIONAL PLAN**  
Scale (a)

**SECTIONAL SIDE ELEVATION**  
Scale (b)

**PAN AND SLAB DETAIL**  
Scale (b)

**Y-JUNCTION BOX DETAIL**  
Scale (c)

**PAN DETAIL SECTION AA**  
Scale (b)

**CAPPED LEACHING PIT FOR SELF SUPPORTING SOILS**

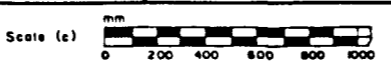
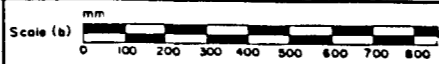
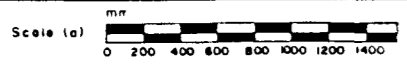
**LEACHING PIT OPTIONAL DETAILS**

**OPTIONAL LAYOUT WITH ADJUSTMENT TO PAN ORIENTATION**

**NOTES:**

- All dimensions are in millimetres unless otherwise stated.
- Components of a twin pit pour flush latrine:
  - Superstructure
  - Pan and water seal
  - Pipework and Y-Junction box
  - Twin leaching pits
- Advantages of a twin pit pour flush latrine:
  - Pan and water seal are carefully designed for a low water requirement (1 litre / flush minimum) and flushing by hand.
  - The shallow water seal is effective in preventing the passage of flies and odours.
  - Offset facilitates easy periodic emptying of the leaching pit.
  - Twin leaching pits along with isolation via the Y-Junction box enable alternate use and thereby allow for the drying of retained solids.

LOW COST WATER SUPPLY AND SANITATION STANDARD DESIGN MODULES	
<b>SANITATION</b> <b>TWIN PIT POUR FLUSH LATRINE</b>	
DRAWING NO 055	SCALE Refer to bar scales (a),(b),(c)
Dr William Harewood & Partners Consulting Engineers and Architects Burdorp Park Swindon Wiltshire SN4 0QD	
DATE MARCH 1988	



Sir William Halcrow & Partners Ltd. Consulting Engineers and Architects. Burderep Park Swindon Wiltshire. SN4 0DD							PROJECT: LOW COST WATER SUPPLY AND SANITATION STANDARD DESIGN MODULES DRAWING TITLE: 11.4 CUBIC METER (2500 GALLON) GROUND LEVEL STORAGE TANK.							Metric Rev 0 Bar Schedule Ref 01 Drg No 008,009 Date MAY 1988	
Member	Bar Mark	Type & size	No of mbrs	No in each	Total No	Length of each bar** m.m	Shape. All dimensions are in accordance with BS 4466 unless otherwise stated	Member	Bar Mark	Type & size	No of mbrs	No in each	Total No	Length of each bar** m.m	Shape. All dimensions are in accordance with BS 4466 unless otherwise stated
BASE SLAB	01	R12	1	18	18	3550	3550	WALLS B & D	05	R12	2	4	8	2050	2050
	02	R12	1	18	18	1550	95		06	R12	2	18	36	1275	800
	03	R12	1	36	36	2725	70		07	R12	2	9	18	1200	400
	04	R12	1	8	8	3900	3900		08	R12	2	9	18	4375	285
	05	R12	1	8	8	2050	2050		12	R12	2	22	44	2750	2175
WALLS A & C	04	R12	2	4	8	3900	3900	ROOF SLAB	13	R12	1	30	30	2725	1350
	06	R12	2	36	72	1275	800		14	R12	1	6	6	1775	45 inside
	07	R12	2	18	36	1200	400		15	R12	1	2	2	2000	1000
	08	R12	2	18	36	4375	285		16	R12	1	18	18	1550	750
	09	R12	2	8	16	2175	2175		17	R12	1	6	6	2750	2750
	10	R12	2	22	44	550	750		18	R12	1	12	12	3550	3550
	11	R12	2	22	44	3550	3550								

BENDING SCHEDULE

\* Specified to the nearest 5mm  
\*\* Specified to the nearest 25mm

Sir William Halcrow & Partners Ltd. Consulting Engineers and Architects. Burderep Park Swindon Wiltshire. SN4 0DD							PROJECT: LOW COST WATER SUPPLY AND SANITATION STANDARD DESIGN MODULES DRAWING TITLE: 22.8 CUBIC METER (5000 GALLON) GROUND LEVEL STORAGE TANK.							Metric Rev 0 Bar Schedule Ref 01 Drg No 010, 011 Date MAY 1988	
Member	Bar Mark	Type & size	No of mbrs	No in each	Total No	Length of each bar** m.m	Shape. All dimensions are in accordance with BS 4466 unless otherwise stated	Member	Bar Mark	Type & size	No of mbrs	No in each	Total No	Length of each bar** m.m	Shape. All dimensions are in accordance with BS 4466 unless otherwise stated
BASE SLAB	01	R12	1	96	96	3550	3550	ROOF SLAB	10	R12	1	48	48	1525	750
	02	R12	1	48	48	1525	70		11	R12	1	40	40	3550	3550
	03	R12	1	48	48	1550	95		12	R12	1	8	8	2875	1425
	04	R12	1	16	16	3900	3900		13	R12	1	48	48	1550	750
WALLS	04	R12	4	4	8	3900	3900	14	R12	1	8	8	3200	3200	
	05	R12	4	48	192	1675	850	15	R12	1	40	40	3550	3550	
	06	R12	4	24	96	4425	70	16	R12	1	2	2	2000	1000	
	07	R12	4	22	88	3550	3550								
	08	R12	4	22	88	1550	95								
	09	R12	4	4	8	2200	2200								
	17	R12	4	24	96	1200	400								

BENDING SCHEDULE

\* Specified to the nearest 5mm  
\*\* Specified to the nearest 25mm

Sir William Halcrow & Partners Ltd. Consulting Engineers and Architects. Burderop Park Swindon, Wiltshire, SN4 0DD							PROJECT: LOW COST WATER SUPPLY AND SANITATION STANDARD DESIGN MODULES DRAWING TITLE: 3.4 CUBIC METER (7,500 GALLON) GROUND LEVEL STORAGE TANK.										Metric Rev 0 Bar Schedule Ref 01 Drg No 012, 013 Date May 1988	
Member	Bar Mark	Type & size	No of mbrs	No in each	Total No	Length of each bar** m.m	Shape All dimensions are in accordance with BS 4466 unless otherwise stated	Member	Bar Mark	Type & size	No of mbrs	No in each	Total No	Length of each bar** m.m	Shape All dimensions are in accordance with BS 4466 unless otherwise stated			
BASE SLAB	01	R12	1	72	72	3550	3550	WALLS B & D	06	R12	2	4	8	3900				
	02	R12	1	48	48	5300	5300		07	R12	2	48	96	1675				
	03	R12	1	72	72	1525	70  750		08	R12	2	24	48	1200				
	04	R12	1	48	48	1550	95  750		09	R12	2	24	48	4425				
	05	R12	1	8	8	5750	5750		11	R12	2	30	60	3550				
	06	R12	1	8	8	3900	3900		12	R12	2	30	60	1550				
WALLS A & B	05	R12	2	4	8	5750	5750	ROOF SLAB	14	R12	1	72	72	1525				
	07	R12	2	72	104	1675			15	R12	1	64	64	3550				
	08	R12	2	36	72	1200			16	R12	1	8	8	2875				
	09	R12	2	36	72	4425	70  2200		17	R12	1	48	48	1550				
	10	R12	2	30	60	5300	5300		18	R12	1	40	40	5300				
	12	R12	2	30	60	1550	95  75		19	R12	1	8	8	4550				
	13	R12	2	8	16	2200	2200		20	R12	1	4	4	1150				

BENDING SCHEDULE

\* Specified to the nearest 5mm  
\*\* Specified to the nearest 25mm

Sir William Halcrow & Partners Ltd. Consulting Engineers and Architects. Burderop Park Swindon, Wiltshire, SN4 0DD							PROJECT: LOW COST WATER SUPPLY AND SANITATION STANDARD DESIGN MODULES DRAWING TITLE: 45.5 CUBIC METRE (10,000 GALLON) GROUND LEVEL STORAGE TANK.										Metric Rev 0 Bar Schedule Ref 01 Drg No. 014, 015 Date JUNE 88	
Member	Bar Mark	Type & size	No of mbrs	No in each	Total No	Length of each bar** m.m	Shape All dimensions are in accordance with BS 4466 unless otherwise stated	Member	Bar Mark	Type & size	No of mbrs	No in each	Total No	Length of each bar** m.m	Shape All dimensions are in accordance with BS 4466 unless otherwise stated			
BASE	01	R12	1	128	128	5000	5000	ROOF	10	R12	1	120	120	5000	5000			
	02	R12	1	64	64	1675	120  800		11	R12	1	68	68	1675	120  800			
	03	R12	1	64	64	1700	145  800		12	R12	1	8	8	4375	120  2150			
WALLS	04	R12	4	68	272	1800		13	R12	1	68	68	1700	145  800				
	05	R12	4	34	136	1175		14	R12	1	8	8	4300	4300				
	06	R12	4	34	136	5000	5000	15	R12	1	2	2	2000	1000				
	07	R12	4	34	136	4475	120  2200											
	08	R12	4	30	120	1600	145  750											
	09	R12	4	4	16	2200	2200											

BENDING SCHEDULE

\* Specified to the nearest 5mm  
\*\* Specified to the nearest 25mm

Sir William Holcrow & Partners Ltd. Consulting Engineers and Architects. Burderep Park Swindon Wiltshire. SN4 0OD							PROJECT: LOW COST WATER SUPPLY AND SANITATION STANDARD DESIGN MODULES DRAWING TITLE: 68.3 CUBIC METRE (15,000 GALLON) GROUND LEVEL STORAGE TANK.							Metric Rev 0 Bar Schedule Ref 01 Drg No 016, 017 Date JUNE 88			
Member	Bar Mark	Type & size	No of mbrs	No in each	Total No	Length of each bar** m.m	Shape All dimensions are in accordance with BS 4466 unless otherwise stated	Member	Bar Mark	Type & size	No of mbrs	No in each	Total No	Length of each bar** m.m	Shape All dimensions are in accordance with BS 4466 unless otherwise stated		
BASE	01	R16	1	108	108	5000		WALLS B & D	06	R12	2	35	70	1150			
	02	R16	1	108	108	1950			07	R12	2	70	140	1800			
	03	R12	1	74	74	7550			09	R12	2	35	70	4475			
	04	R12	1	74	74	1700			10	R16	2	4	8	2200			
WALLS A & C	05	R16	2	104	208	1700			ROOF	14	R12	1	104	104		1950	
	06	R12	2	52	104	1150				15	R12	1	96	96		5000	
	08	R16	2	52	104	4450				16	R12	1	8	8		4350	
	10	R16	2	4	8	2200				17	R12	1	70	70		1700	
	12	R12	2	34	68	7550				18	R12	1	60	60		7550	
	13	R12	2	30	60	1700				19	R12	1	10	10		6850	
										20	R12	1	2	2		2000	

**BENDING SCHEDULE**

\* Specified to the nearest 5mm  
\*\* Specified to the nearest 25mm

Sir William Holcrow & Partners Ltd. Consulting Engineers and Architects. Burderep Park Swindon Wiltshire. SN4 0OD							PROJECT: LOW COST WATER SUPPLY AND SANITATION STANDARD DESIGN MODULES DRAWING TITLE: 91.0 CUBIC METRE (20,000 GALLON) GROUND LEVEL STORAGE TANK.							Metric Rev 0 Bar Schedule Ref 01 Drg No 018, 019 Date JUNE 88		
Member	Bar Mark	Type & size	No of mbrs	No in each	Total No	Length of each bar** m.m	Shape All dimensions are in accordance with BS 4466 unless otherwise stated	Member	Bar Mark	Type & size	No of mbrs	No in each	Total No	Length of each bar** m.m	Shape All dimensions are in accordance with BS 4466 unless otherwise stated	
BASE	01	R16	1	140	140	5000		WALLS B & D	06	R12	2	34	68	1150		
	02	R12	1	144	144	5350			07	R12	2	68	136	1500		
	03	R16	1	140	140	1850			09	R12	2	34	68	4475		
	04	R12	1	72	72	1600			10	R12	2	34	68	5000		
							12		R12	2	28	56	1700			
WALLS A & C	05	R16	2	136	272	1625		ROOF	14	R16	1	136	136	1850		
	06	R12	2	68	136	1150			15	R12	1	68	68	1675		
	08	R16	2	68	136	4450			16	R16	1	128	128	5000		
	11	R12	2	68	136	5350			17	R16	1	6	6	4350		
	12	R12	2	28	56	1700			18	R12	1	8	8	4600		
	13	R16	2	8	16	2200			19	R12	1	128	128	5350		
									20	R16	1	2	2	2000		

**BENDING SCHEDULE**

\* Specified to the nearest 5mm  
\*\* Specified to the nearest 25mm

Sir William Halcrow & Partners Ltd. Consulting Engineers and Architects. Burderep Park Swindon Wiltshire, SN4 0DD							PROJECT: LOW COST WATER SUPPLY AND SANITATION STANDARD DESIGN MODULES DRAWING TITLE: 25 SQUARE METRE SLOW SAND FILTER REINFORCEMENT DETAILS.							Metric Rev 0 Bar Schedule Ref 01 Drg No 030, 031 Date JUNE 88	
Member	Bar Mark	Type & size	No of mbrs	No in each	Total No	Length of each bar** m.m	Shape. All dimensions are in accordance with BS 4466 unless otherwise stated	Member	Bar Mark	Type & size	No of mbrs	No in each	Total No	Length of each bar** m.m	Shape. All dimensions are in accordance with BS 4466 unless otherwise stated
BASE	01	R16	1	160	160	5700		INLET CHAMBER	10	R12	1	8	8	1450	
	02	R16	1	80	80	1700			11	R12	1	15	15	1200	
	03	R16	1	8	8	1725									
WALLS	04	R16	4	68	272	2200									
	05	R16	4	34	136	1200									
	06	R16	4	68	272	2850									
	07	R16	4	34	136	4900									
	08	R16	4	34	136	2000									
	09	R12	4	34	136	850									

**BENDING SCHEDULE**

\* Specified to the nearest 5mm  
\*\* Specified to the nearest 25mm

Sir William Halcrow & Partners Ltd. Consulting Engineers and Architects. Burderep Park Swindon Wiltshire, SN4 0DD							PROJECT: LOW COST WATER SUPPLY AND SANITATION STANDARD DESIGN MODULES DRAWING TITLE: 50 SQUARE METRE SLOW SAND FILTER REINFORCEMENT DETAILS.							Metric Rev 0 Bar Schedule Ref 01 Drg No 032, 033 Date JUNE 88	
Member	Bar Mark	Type & size	No of mbrs	No in each	Total No	Length of each bar** m.m	Shape. All dimensions are in accordance with BS 4466 unless otherwise stated	Member	Bar Mark	Type & size	No of mbrs	No in each	Total No	Length of each bar** m.m	Shape. All dimensions are in accordance with BS 4466 unless otherwise stated
BASE	01	R16	1	82	82	11000		WALLS B & D	06	R16	2	34	68	1650	
	02	R20	1	75	75	6000			07	R16	2	34	68	1700	
	03	R16	1	75	75	6000			08	R16	2	34	68	1700	
	04	R16	1	82	82	2000			09	R16	2	68	136	2800	
	05	R16	1	150	150	2050			12	R16	2	40	80	4900	
WALLS A & C	06	R16	2	67	134	1650		INLET CHAMBER	15	R12	1	9	9	1050	
	07	R16	2	67	134	1700			16	R12	1	10	10	1375	
	08	R16	2	67	134	1700			17a	R12	2	1	2	1025	
	09	R16	2	134	268	2800			b	R12	2	1	2	1025	
	10	R16	2	8	16	2850			c	R12	2	1	2	1050	
	11	R16	2	40	80	9900			d	R12	2	1	2	1050	
	13	R16	2	120	240	2200									
	14	R10	2	67	134	850									

**BENDING SCHEDULE**

\* Specified to the nearest 5mm  
\*\* Specified to the nearest 25mm

Sir William Halcrow & Partners Ltd.  
Consulting Engineers and Architects.  
Burderep Park  
Swindon Wiltshire, SN4 0DD

PROJECT: LOW COST WATER SUPPLY AND SANITATION STANDARD DESIGN MODULES  
DRAWING TITLE: 11.4 CUBIC METRE (2500 GALLON) CLEARWELL REINFORCEMENT DETAILS

Metric Rev 0  
Bar Schedule Ref 01  
Drg No 035, 036  
Date JUNE 88

Member	Bar Mark	Type & size	No of mbrs	No in each	Total No	Length of each bar** m.m	Shape. All dimensions are in accordance with BS 4466 unless otherwise stated	Member	Bar Mark	Type & size	No of mbrs	No in each	Total No	Length of each bar** m.m	Shape. All dimensions are in accordance with BS 4466 unless otherwise stated
BASE SLAB	01	R12	1	18	18	3550	3550	WALLS B & D	05	R12	2	4	8	2050	2050
	02	R12	1	18	18	1550	750		06	R12	2	18	36	1275	800
	03	R12	1	36	36	2725	1350		07	R12	2	9	18	1200	400
	04	R12	1	8	8	3900	3900		08	R12	2	9	18	4375	285
	05	R12	1	8	8	2050	2050		12	R12	2	22	44	2750	2175
WALLS A & C	04	R12	2	4	8	3900	3900	ROOF SLAB	13	R12	1	30	30	2725	1350
	06	R12	2	36	72	1275	800		14	R12	1	6	6	1775	680
	07	R12	2	18	36	1200	400		15	R12	1	2	2	2000	45 inside
	08	R12	2	18	36	4375	285		16	R12	1	18	18	1550	1000
	09	R12	2	8	16	2175	2175		17	R12	1	6	6	2750	750
	10	R12	2	22	44	1550	750		18	R12	1	12	12	3550	2750
	11	R12	2	22	44	3550	3550								3550

BENDING SCHEDULE

\* Specified to the nearest 5mm  
\*\* Specified to the nearest 25mm

Sir William Halcrow & Partners Ltd.  
Consulting Engineers and Architects.  
Burderep Park  
Swindon Wiltshire, SN4 0DD

PROJECT: LOW COST WATER SUPPLY AND SANITATION STANDARD DESIGN MODULES  
DRAWING TITLE: 22.8 CUBIC METRE (5000 GALLON) CLEAR WELL REINFORCEMENT DETAILS

Metric Rev 0  
Bar Schedule Ref 01  
Drg No 037, 038  
Date JUNE 88

Member	Bar Mark	Type & size	No of mbrs	No in each	Total No	Length of each bar** m.m	Shape. All dimensions are in accordance with BS 4466 unless otherwise stated	Member	Bar Mark	Type & size	No of mbrs	No in each	Total No	Length of each bar** m.m	Shape. All dimensions are in accordance with BS 4466 unless otherwise stated
BASE	01	R12	1	88	88	4050	4050	ROOF	10	R12	1	36	36	1525	750
	02	R12	1	44	44	1425	700		11	R12	1	58	58	3550	70
	03	R12	1	44	44	1450	700		12	R12	1	6	6	2850	3550
WALLS	04	R12	4	18	72	1025	400		13	R12	1	36	36	1550	1425
	05	R12	4	36	144	1600	285		14	R12	1	8	8	2900	70
	06	R12	4	18	72	4425	800		15	R12	1	2	2	2000	750
	07	R12	4	26	52	3550	2200							95	
	08	R12	4	22	88	1650	800							2900	
	09	R12	4	4	16	2200	2200							1000	

BENDING SCHEDULE

\* Specified to the nearest 5mm  
\*\* Specified to the nearest 25mm

Sir William Halcrow & Partners Ltd. Consulting Engineers and Architects. Burderep Park Swindon Wiltshire, SN4 0DD							PROJECT: LOW COST WATER SUPPLY AND SANITATION STANDARD DESIGN MODULES DRAWING TITLE: 34.1 CUBIC METRE (7500 GALLON) CLEARWELL REINFORCEMENT DETAILS										Metric Rev 0 Bar Schedule Ref 01 Drg No 039, 040 Date JULY 88	
Member	Bar Mark	Type & size	No of mbrs	No in each	Total No	Length of each bar** m.m	Shape. All dimensions are in accordance with BS 4466 unless otherwise stated	Member	Bar Mark	Type & size	No of mbrs	No in each	Total No	Length of each bar** m.m	Shape. All dimensions are in accordance with BS 4466 unless otherwise stated			
BASE SLAB	01	R12	1	84	84	4350		WALLS B & D	05	R12	2	24	48	1025				
	02	R12	1	84	84	1700			07	R12	2	48	96	1900				
	03	R12	1	64	64	6100			09	R12	2	24	48	4425				
	04	R12	1	64	64	1750			11	R12	2	34	68	3550				
WALLS A & C	05	R12	2	36	72	1025		12	R12	2	30	60	1550					
	06	R12	2	72	144	1900		13	R12	2	4	8	2200					
	08	R12	2	36	72	4400		ROOF SLAB	14	R12	1	48	48	1550				
	10	R12	2	34	68	5300			15	R12	1	40	40	5300				
	12	R12	2	30	60	1550			16	R12	1	8	8	4600				
	13	R12	2	4	8	2200			17	R12	1	72	72	1800				
							18	R12	1	64	64	3550						
							19	R12	1	8	8	2875						
							20	R12	1	2	2	2000						

BENDING SCHEDULE

\* Specified to the nearest 5mm  
\*\* Specified to the nearest 25mm

Sir William Halcrow & Partners Ltd. Consulting Engineers and Architects. Burderep Park Swindon Wiltshire, SN4 0DD							PROJECT: LOW COST WATER SUPPLY AND SANITATION STANDARD DESIGN MODULES DRAWING TITLE: 45.5 CUBIC METRE (10,000 GALLON) CLEARWELL REINFORCEMENT DETAILS										Metric Rev 0 Bar Schedule Ref 01 Drg No 041, 042 Date JUNE 88	
Member	Bar Mark	Type & size	No of mbrs	No in each	Total No	Length of each bar** m.m	Shape. All dimensions are in accordance with BS 4466 unless otherwise stated	Member	Bar Mark	Type & size	No of mbrs	No in each	Total No	Length of each bar** m.m	Shape. All dimensions are in accordance with BS 4466 unless otherwise stated			
BASE	01	R12	1	168	168	5800			13	R12	1	68	68	1700				
	02	R12	1	84	84	1575			14	R12	1	8	8	4300				
	03	R12	1	84	84	1600			15	R12	1	2	2	2000				
WALLS ABC & D	04	R12	4	68	272	1800												
	05	R12	4	34	136	1175												
	06	R12	4	34	136	5000												
	07	R12	4	34	136	4475												
	08	R12	4	30	120	1600												
ROOF	09	R12	4	4	16	2200												
	10	R12	1	120	120	5000												
	11	R12	1	68	68	1675												

BENDING SCHEDULE

\* Specified to the nearest 5mm  
\*\* Specified to the nearest 25mm



Sir William Halcrow & Partners Ltd. Consulting Engineers and Architects. Burderep Park Swindon Wiltshire, SN4 0QD							PROJECT: LOW COST WATER SUPPLY AND SANITATION STANDARD DESIGN MODULES DRAWING TITLE: 68.3 CUBIC METRE (15,000 GALLON) CLEAR WELL REINFORCEMENT DETAILS							Metric Rev 0 Bar Schedule Ref 01 Drg No 043, 044 Date JUNE 88	
Member	Bar Mark	Type & size	No of mbrs	No in each	Total No	Length of each bar** m.m	Shape. All dimensions are in accordance with BS 4466 unless otherwise stated	Member	Bar Mark	Type & size	No of mbrs	No in each	Total No	Length of each bar** m.m	Shape. All dimensions are in accordance with BS 4466 unless otherwise stated
BASE	01	R16	1	116	116	6000		WALLS B & D	06	R12	2	35	70	1150	
	02	R16	1	116	116	1750			07	R12	2	70	140	1800	
	03	R12	1	84	84	8750			09	R12	2	35	70	4475	
	04	R12	1	84	84	1800			10	R16	2	4	8	2200	
WALLS A & C	05	R16	2	104	208	1700		ROOF	14	R12	1	104	104	1950	
	06	R12	2	52	104	1150			15	R12	1	96	96	5000	
	08	R16	2	52	104	4450			16	R12	1	8	8	4350	
	10	R16	2	4	8	2200			17	R12	1	70	70	1700	
	12	R12	2	34	68	7550			18	R12	1	60	60	7550	
	13	R12	2	30	60	1700			19	R12	1	10	10	6850	
								20	R12	1	2	2	2000		

BENDING SCHEDULE

\* Specified to the nearest 5mm  
\*\* Specified to the nearest 25mm

Sir William Halcrow & Partners Ltd. Consulting Engineers and Architects. Burderep Park Swindon Wiltshire, SN4 0QD							PROJECT: LOW COST WATER SUPPLY AND SANITATION STANDARD DESIGN MODULES DRAWING TITLE: 91.0 CUBIC METRE (20,000 GALLON) CLEAR WELL REINFORCEMENT DETAILS							Metric Rev 0 Bar Schedule Ref 01 Drg No 045, 046 Date JUNE 88	
Member	Bar Mark	Type & size	No of mbrs	No in each	Total No	Length of each bar** m.m	Shape. All dimensions are in accordance with BS 4466 unless otherwise stated	Member	Bar Mark	Type & size	No of mbrs	No in each	Total No	Length of each bar** m.m	Shape. All dimensions are in accordance with BS 4466 unless otherwise stated
BASE	01	R16	1	152	152	6000		WALLS B & D	06	R12	2	34	68	1225	
	02	R12	1	168	168	5900			07	R12	2	68	136	1550	
	03	R16	1	152	152	1800			09	R12	2	34	68	4475	
	04	R12	1	84	84	1525			10	R12	2	28	56	5000	
WALLS A & C	05	R16	2	136	272	1700		ROOF	14	R16	1	136	136	2000	
	06	R12	2	68	136	1225			15	R12	1	68	68	1700	
	08	R16	2	68	136	4450			16	R16	1	128	128	5000	
	11	R12	2	68	136	5400			17	R16	1	6	6	4350	
	12	R12	2	28	56	1575			18	R12	1	8	8	4600	
	13	R12	2	8	16	2200			19	R12	1	128	128	5400	
								20	R16	1	2	2	2000		

BENDING SCHEDULE

\* Specified to the nearest 5mm  
\*\* Specified to the nearest 25mm