

# **45m<sup>3</sup> CIRCULAR WATER TANK (FERROCEMENT)**

**D-318**

**16<sup>th</sup> September, 2023**



## DRAWING INDEX

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*Reference is made to;*  
*Large Ferro-Cement Water Tank:*  
*Design Parameters and Construction Details*

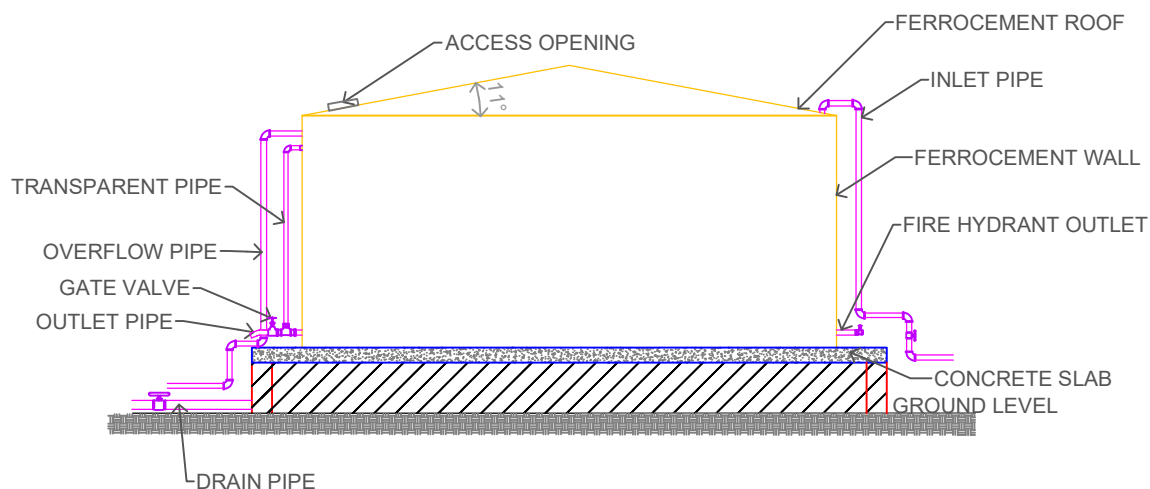
## KEY SPECIFICATIONS

1. All dimensions indicated are in mm unless stated otherwise.
2. Concrete shall be of the grade specified in the drawings with a maximum aggregate size of 20 mm.
3. G.I = Galvanized Iron
4. The applied water pressure was based on a water density of  $10 \text{ kN/m}^3$ .
5. The foundation structure for the tank was designed for a bearing capacity of  $150 \text{ kN/m}^2$ .
6. Footing design is dependent on soil types and flooding risk.

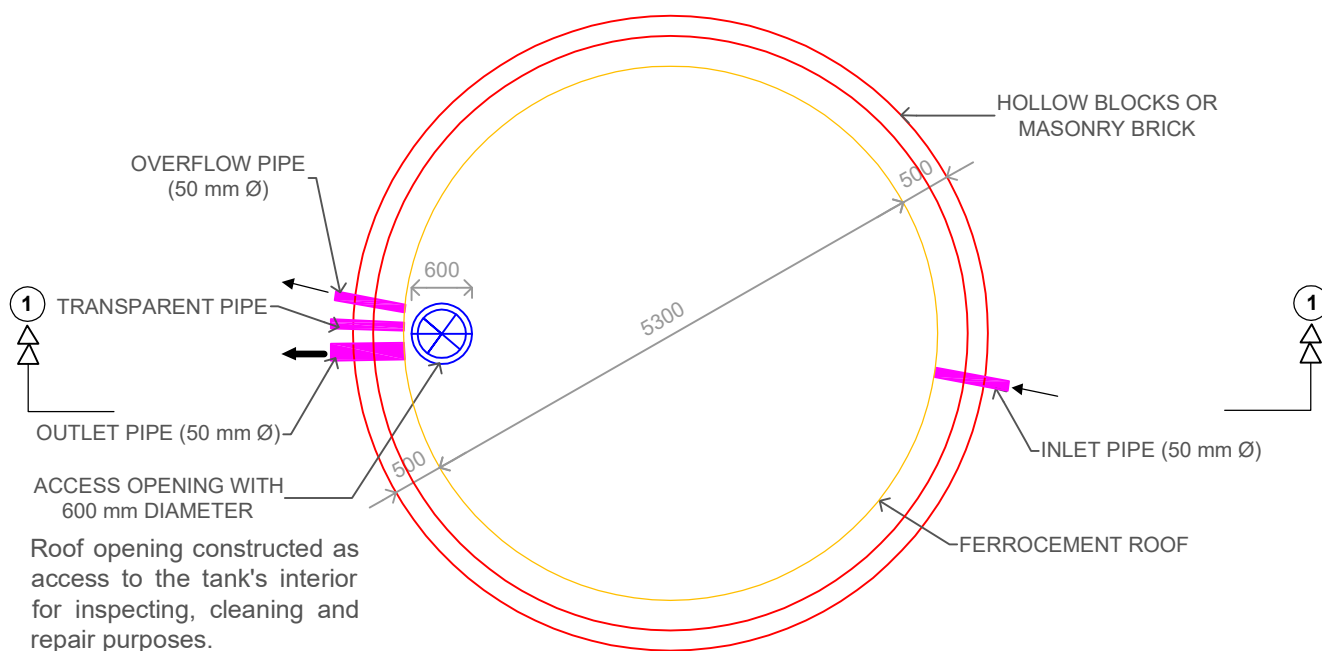
*Reference is made to;*

*Large Ferro-Cement Water Tank:*

*Design Parameters and Construction Details*



## ELEVATION



## ROOF PLAN

DRAWING NO.

**D318**

DRAWING TITLE

**CIRCULAR WATER TANK  
45 m<sup>3</sup> (FERROCEMENT)  
PLAN AND ELEVATION**

DRAWN BY

**Sheilla C. A**

CHECKED BY

SCALE

**1: 75**

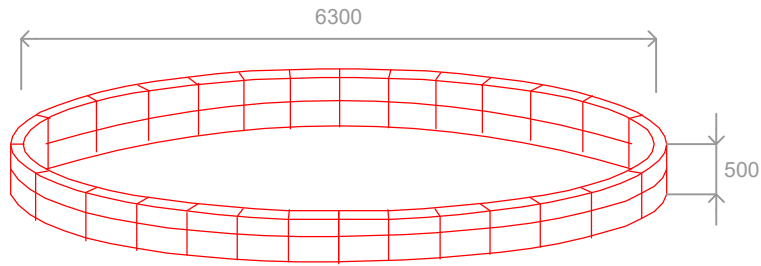
DATE

**16/09/23**

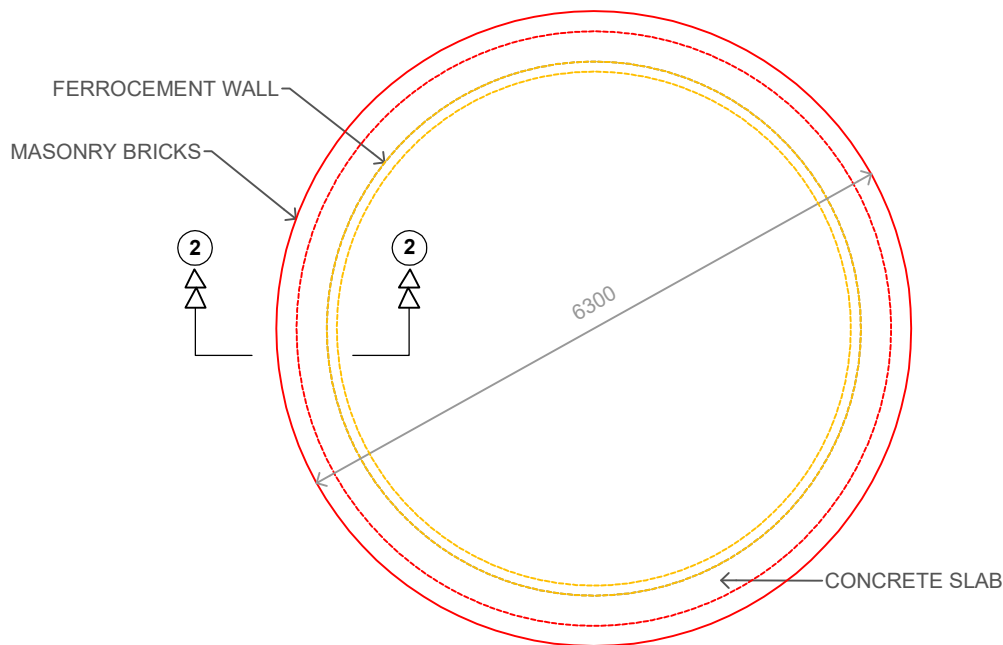


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## MASONRY BRICK LAYOUT



## FOUNDATION PLAN

### NOTES

1. Select a suitable site for the foundation, taking into consideration the source of water supply, areas in which water is to be distributed, possibility of flooding and practical aspects of construction. The final decision on the footing design should be taken by a qualified engineer and will be determined by the nature of the soils in the area. Additional footing below the ground should be added for more stability in areas with poor soils.
2. The site must be properly cleared and any loose material well compacted.
3. Depending on the nature of the terrain at the site, protection retaining walls may be required in order to improve soil stability around the structure

DRAWING NO.

**D318**

DRAWING TITLE

**CIRCULAR WATER TANK  
45 m3 (FERROCEMENT)  
FOUNDATION LAYOUT & PLAN**

DRAWN BY

**Sheilla C. A**

SCALE

**1: 75**

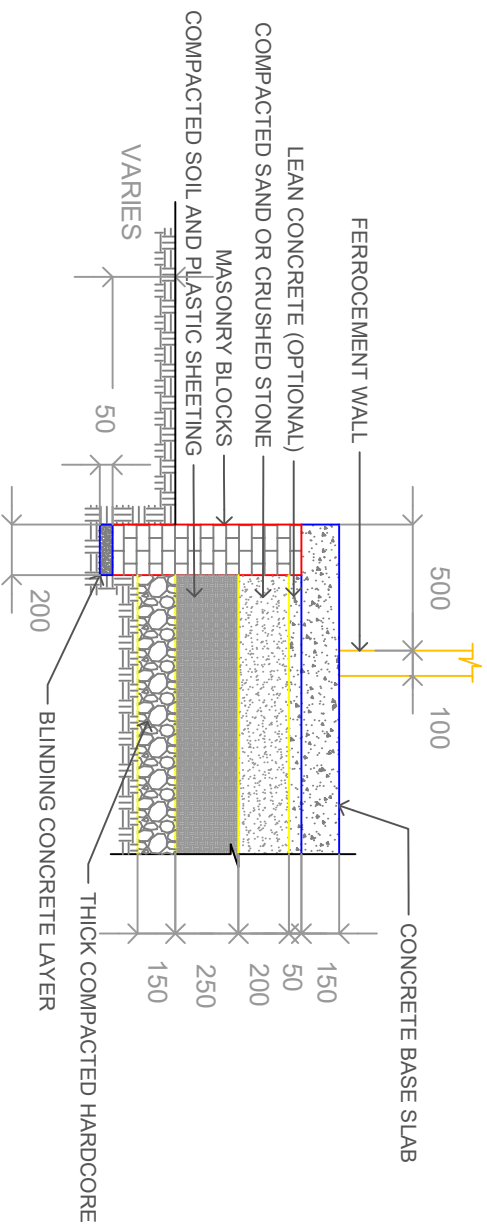
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DATE

**16/09/23**




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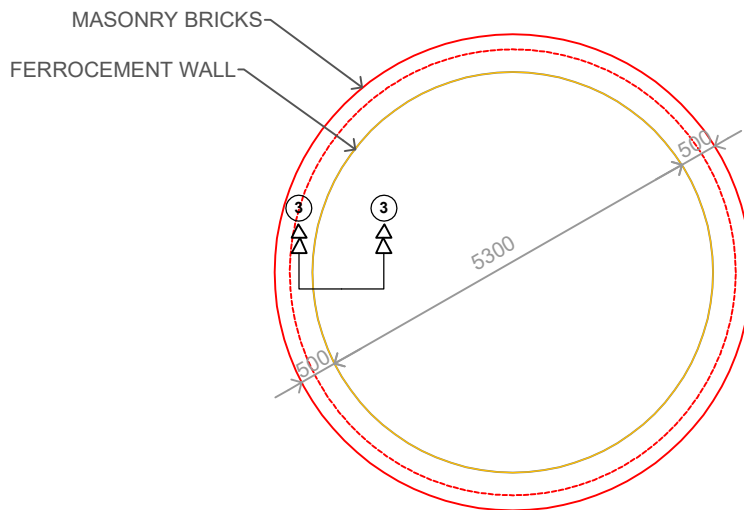


# SECTION 2-2

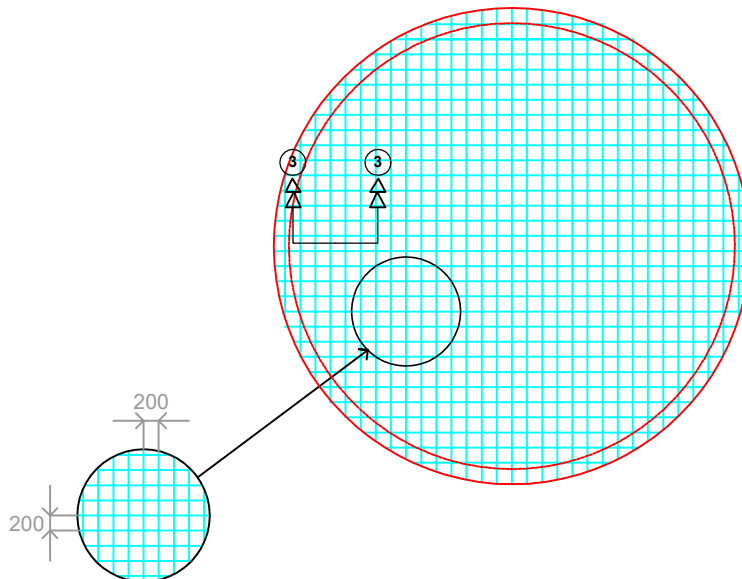
## NOTES

1. Footing design dependent on soil types and flooding risk; consult local engineer.
2. Lean concrete can be added to provide a level base and water-tightening layer for the concrete slab to be cast upon. Lean concrete mix proportion = 1:4:8 (Cement: Sand: Aggregate by weight).
3. Ferrocement Mortar for wall = 1:2:0.4 (Cement: Sand: Aggregate by weight).
4. Slab Concrete = 1:2:4 (Cement: Sand: Water by weight). The slab surface should be levelled with a trowel or smooth planks.
5. Use Ordinary Portland Cement Type I or Type II for tropical countries and Type II for cold climates.

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<b>D318</b>	<b>CIRCULAR WATER TANK</b> <b>45 m3 (FERROCEMENT)</b> <b>SECTION</b>	<b>Shella C. A</b> CHECKED BY	<b>1 : 30</b> DATE <b>16/09/23</b>	



## WATER TANK PLAN



T8 @ 200 mm spacing (ST1 & SB1: 2 layers)

## BASE SLAB REINFORCEMENT DETAIL

### NOTES

1. The two layers of slab reinforcement can be prepared either at its final location or a nearby location and then moved to the final place. The distance between the layers can be controlled using small separators made up of crushed concrete pebbles or precast pieces.
2. The steel reinforcement should be free from grease, oil detergents, organic matter and cracks of blow holes.
3. Tie wire should consist of soft galvanized wires of 24 or 26 gauge. Cut pieces of wire from meshes could also be used for tying.

DRAWING NO.

**D318**

DRAWING TITLE

**CIRCULAR WATER TANK  
45 m3 (FERROCEMENT)  
BASE SLAB DETAILS (1)**

DRAWN BY

**Sheilla C. A**

SCALE

**1: 100**

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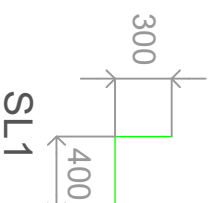
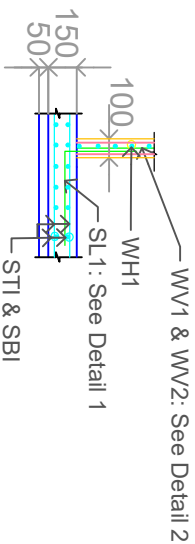
DATE

**16/09/23**



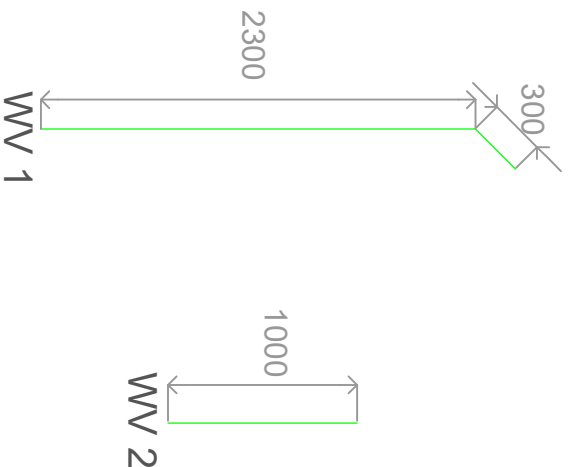
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## SECTION 3-3: SLAB DETAIL


### DETAIL 1

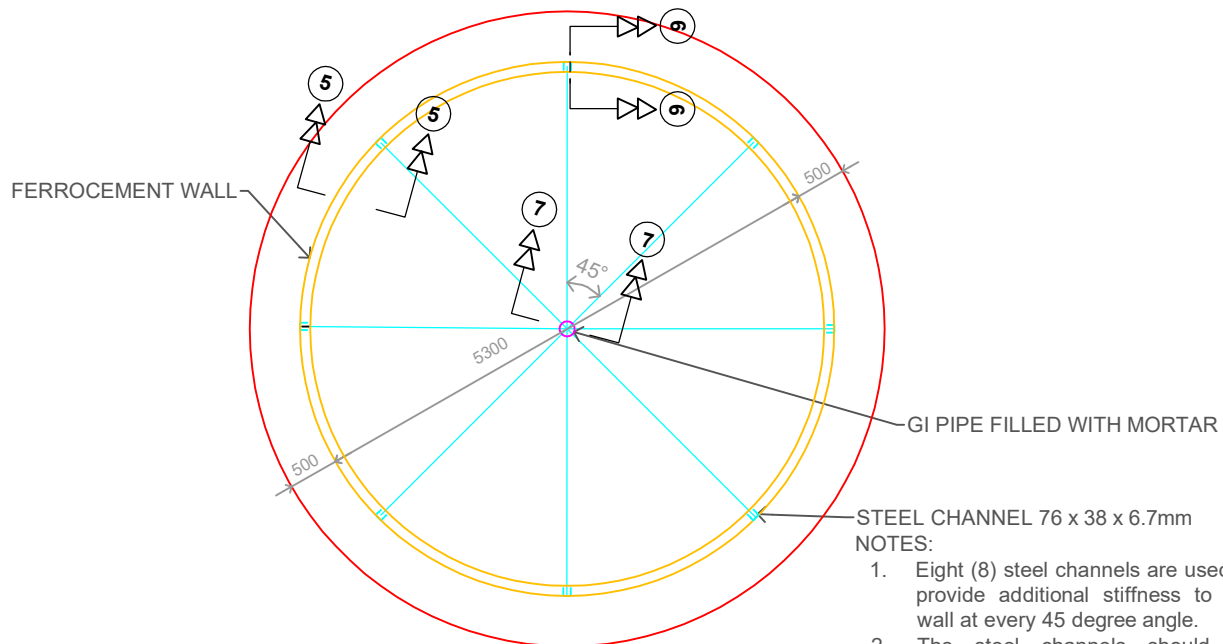
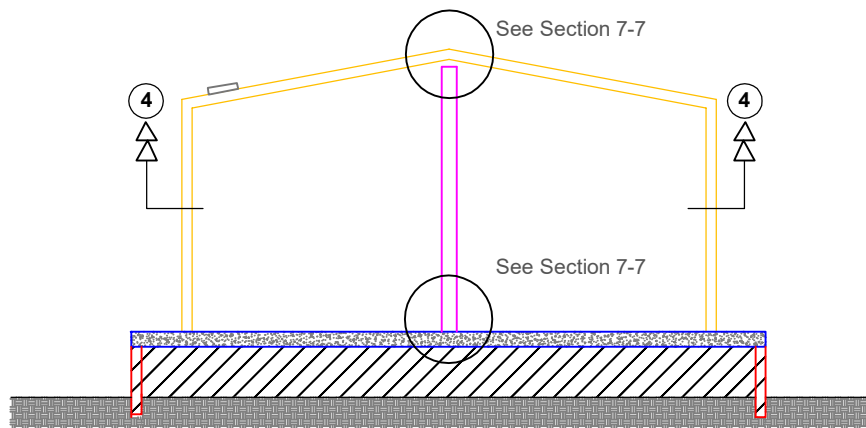


#### NOTES

1. Vertical bars (WV1 and WV2) are T8 @ 125 mm spacing.
2. Horizontal bars (WH1) are T6 @ 200 mm spacing.
3. L-shaped bars (SL1) are T8 @ 125 mm spacing.
4. L-shaped bars improve strength and constructability and should be tied into the base slab reinforcement.
5. One or two tie wires are required for each L-shaped bar.
6. Tie wires should consist of soft galvanized wires of 24 or 26 gauge. Cut pieces of wire from meshes could also be used for tying.

### DETAIL 2

DRAWING NO.	DRAWING TITLE	DRAWN BY	SCALE	 <b>UNHCR</b> The UN Refugee Agency
<b>D318</b>	<b>CIRCULAR WATER TANK</b>	<b>Sheilla C. A</b>	<b>1 : 40</b>	
	<b>45 m3 (FERROCEMENT)</b>	CHECKED BY	DATE	
	<b>BASE SLAB DETAILS (2)</b>		<b>16/09/23</b>	



## SECTION 4-4

### NOTES:

1. Eight (8) steel channels are used to provide additional stiffness to the wall at every 45 degree angle.
2. The steel channels should be placed with the hollow part facing inward for ease of plastering.
3. The height of the channels should be equal to the height of the wall.
4. Steel channels should be free from grease, oil detergents, organic matter, cracks or blow holes.
5. The 8 shallow roof trusses should be welded with the channels at the top.

DRAWING NO.

**D318**

DRAWING TITLE

**CIRCULAR WATER TANK**  
45 m<sup>3</sup> (FERROCEMENT)  
WALL AND CENTRAL COLUMN  
DETAILS (1)

DRAWN BY

**Sheilla C. A**

SCALE

**1: 75**

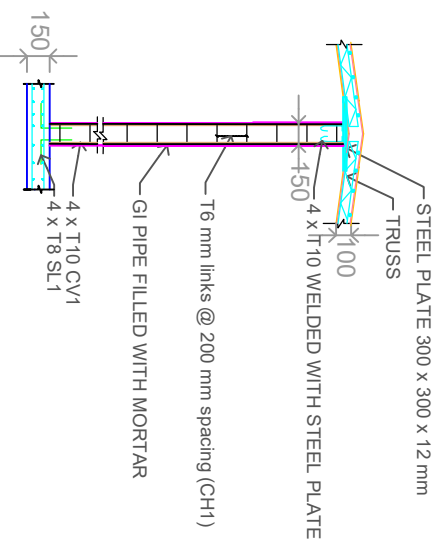
CHECKED BY

DATE

**16/09/23**



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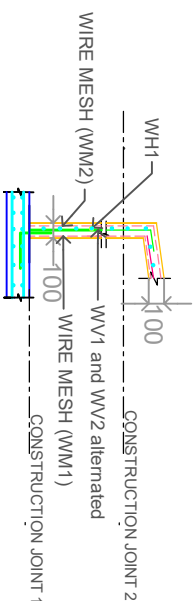
## SECTION 7-7:

# CENTRAL COLUMN

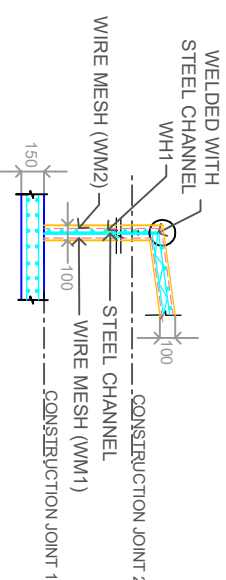
## DETAIL

### NOTES:

1. 4 - 8 vertical dowel bars (SL1) should be placed at the location where the central column is to be erected. The dowel bars should be encased at the bottom end of the pipe.
2. The plate at the top of the column may be fixed before or after erection. It is generally welded with the column rebar at the top.
3. Temporary support may be required to hold the erected column in place.



## SECTION 5-5




## SECTION 6-6

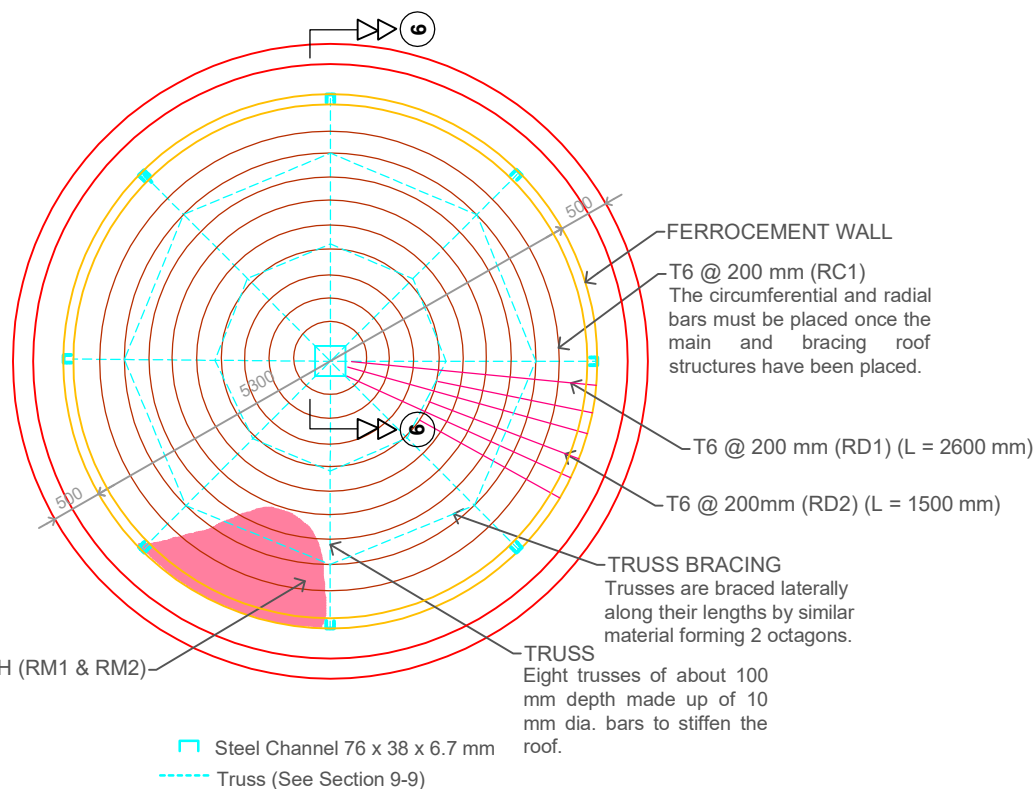
### NOTES:

1. The two layers of wire mesh should be wrapped around the wall reinforcement and fixed with the wire at a few locations.
2. Woven square or hexagonal (chicken mesh) can be used; having openings of 13mm x 13mm, 19mm x 19mm or 25mm x 25mm. For square meshes, wire gauges can range from 18 to 22 gauge, whereas gauges 20 to 26 can be used for chicken mesh.
3. Plastering should commence after completion of wall reinforcement and central column erection.
4. The mortar should have a workable consistency (sand and cement only, ratio 1:2). Water should be limited in the range of 0.35 to 0.45 by weight.


### NOTES:

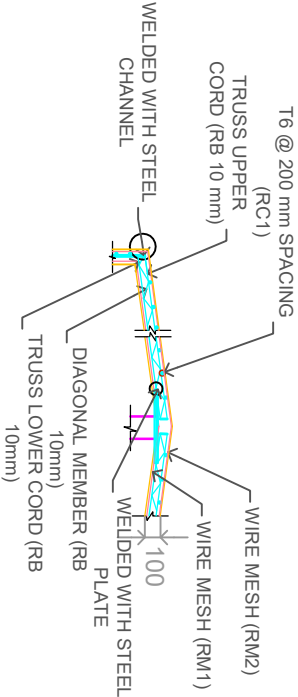
1. Vertical bars (WV1 and WV2) are T8 @ 125 mm spacing.
2. Horizontal bars (WH1) are T6 @ 200 mm spacing.
3. Vertical bars of two different lengths (WV1 & WV2) should be used along the wall - the first type extending up to 1 meter from the base and the other type extending up to the top of the wall with some additional length to bend into the roof (2300 + 300 = 2600 mm). These bars should be fixed with the wire to the L-shaped base bars.

DRAWING NO.	DRAWING TITLE	DRAWN BY	SCALE	 <b>UNHCR</b> The UN Refugee Agency
D318	CIRCULAR WATER TANK 45 m3 (FERROCEMENT) WALL AND CENTRAL COLUMN DETAILS (2)	Shella C. A	1 : 50	
		CHECKED BY	DATE	
			16/09/23	



# SECTION 8-8: ROOF FRAMING PLAN

DRAWING NO.  <b>D318</b>	DRAWING TITLE <b>CIRCULAR WATER TANK 45 m3 (FERROCEMENT) ROOF DETAILS (1)</b>	DRAWN BY <b>Sheilla C. A</b>	SCALE <b>1: 75</b>	 <b>UNHCR</b> The UN Refugee Agency
		CHECKED BY	DATE <b>16/09/23</b>	



## SECTION 9-9: TRUSS DETAIL

### NOTES

1. The roof stiffening trusses are welded with the top of C-channels at the lower end and with the column top base plate at the other end.
2. While cutting bars for the trusses, additional lengths are required to facilitate welding with the C-channels.
3. Plastering of trusses should be done before the rest of the roof structure using the same procedure as that of the wall.
4. Plastering of the roof should be carried out from the top against a sheet of plywood/wooden plank placed on the working area underside. Temporary form work (2-3 props) should be used to support the wooden plank.
5. GI = Galvanized Iron
6. RB = Round Bar



DIAGONAL MEMBER


Welded to Upper and Lower Cord

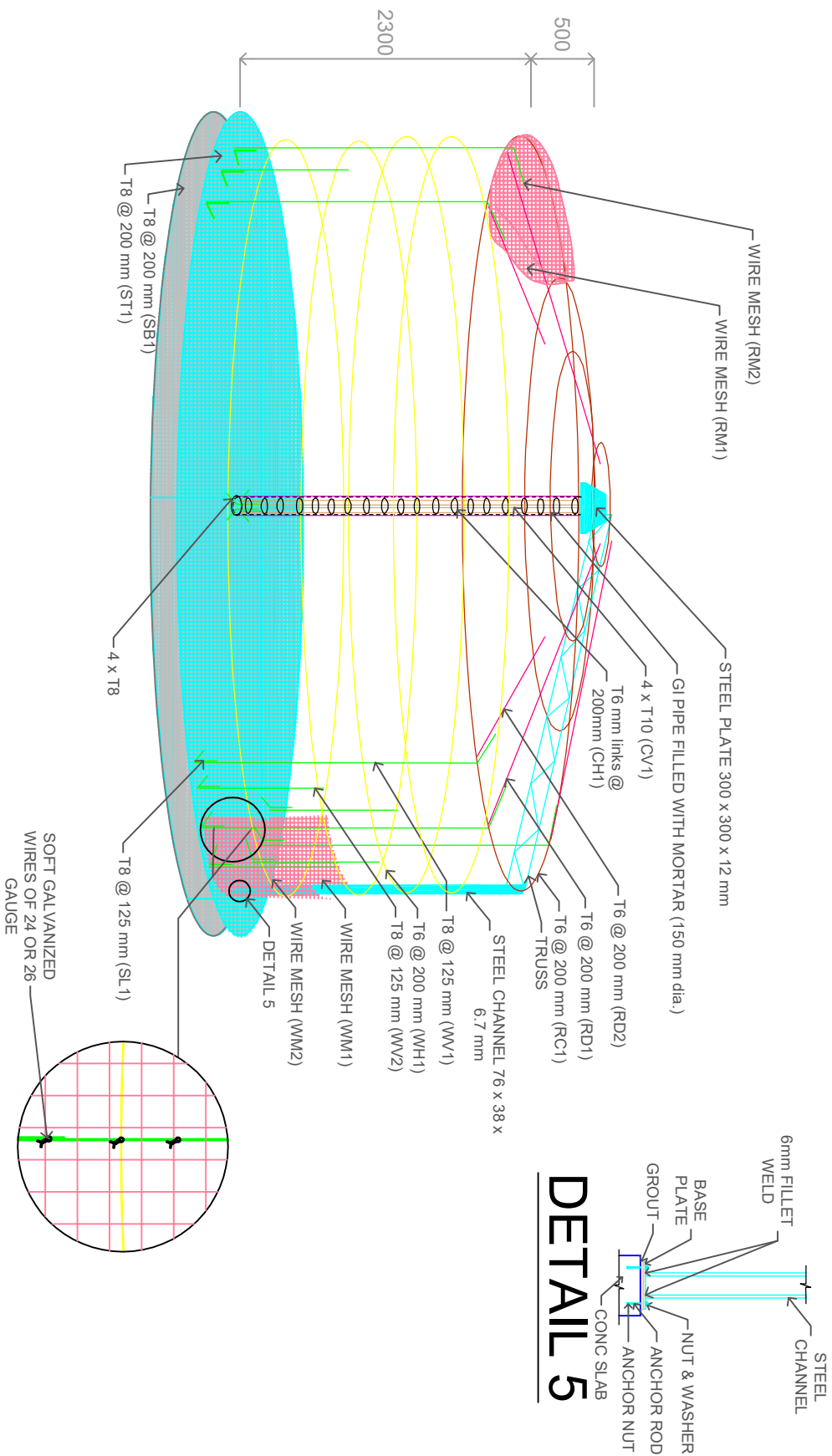
## DETAIL 3



TRUSS UPPER AND LOWER CORD DETAIL

## DETAIL 4

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D318	CIRCULAR WATER TANK 45 m3 (FERROCEMENT) ROOF DETAILS (2)	Shella C. A	1 : 50	
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			16/09/23	



DRAWING NO.

D318

DRAWING TITLE

CIRCULAR WATER TANK  
45 m3 (FERROCEMENT)  
REINFORCING STEEL SKELETON

DRAWN BY

Shella C. A

SCALE

1 : 50

CHECKED BY

DATE  
16/09/23