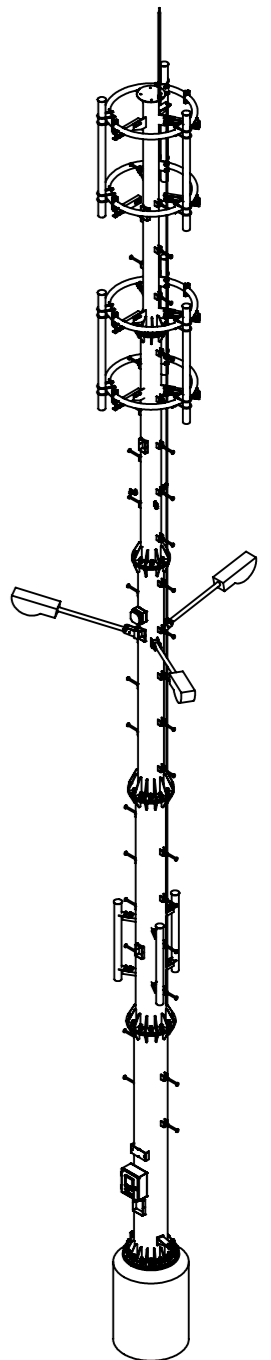
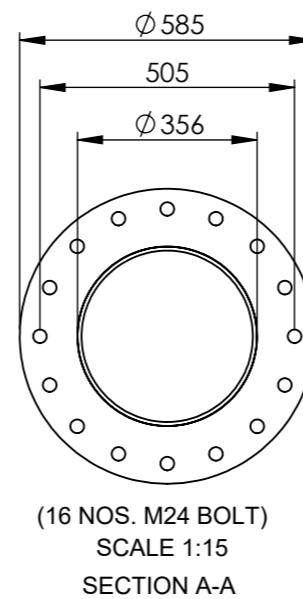
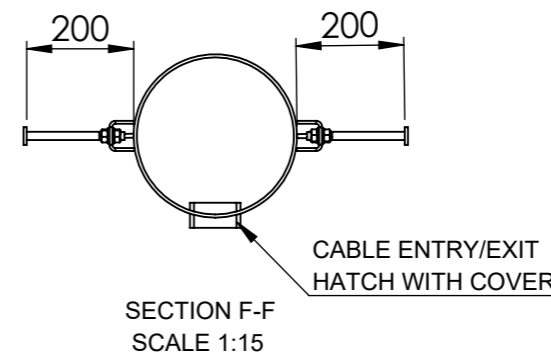
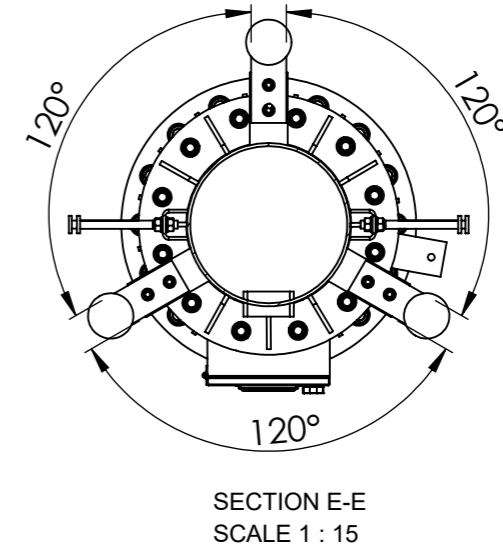
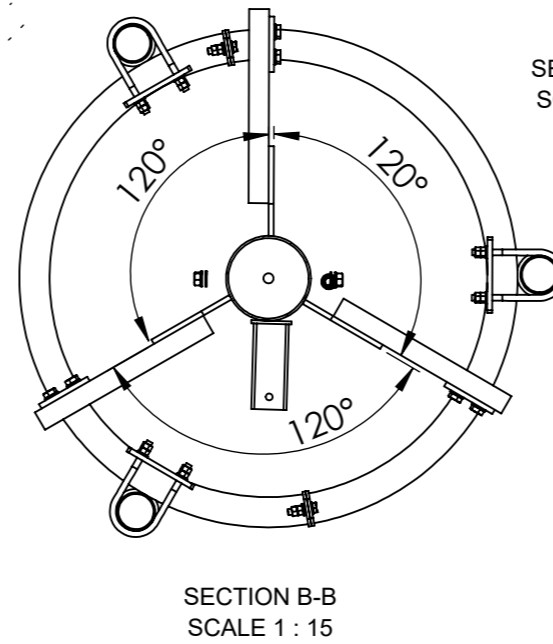
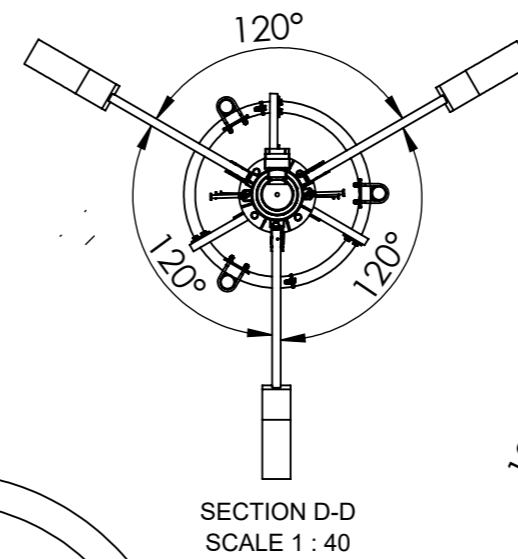
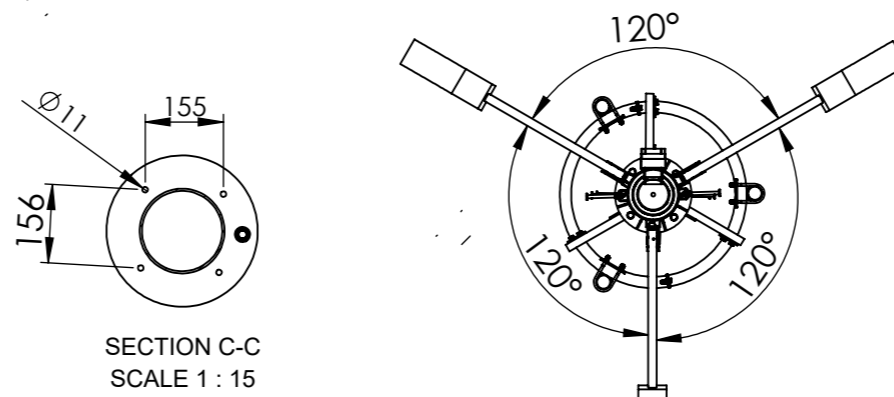
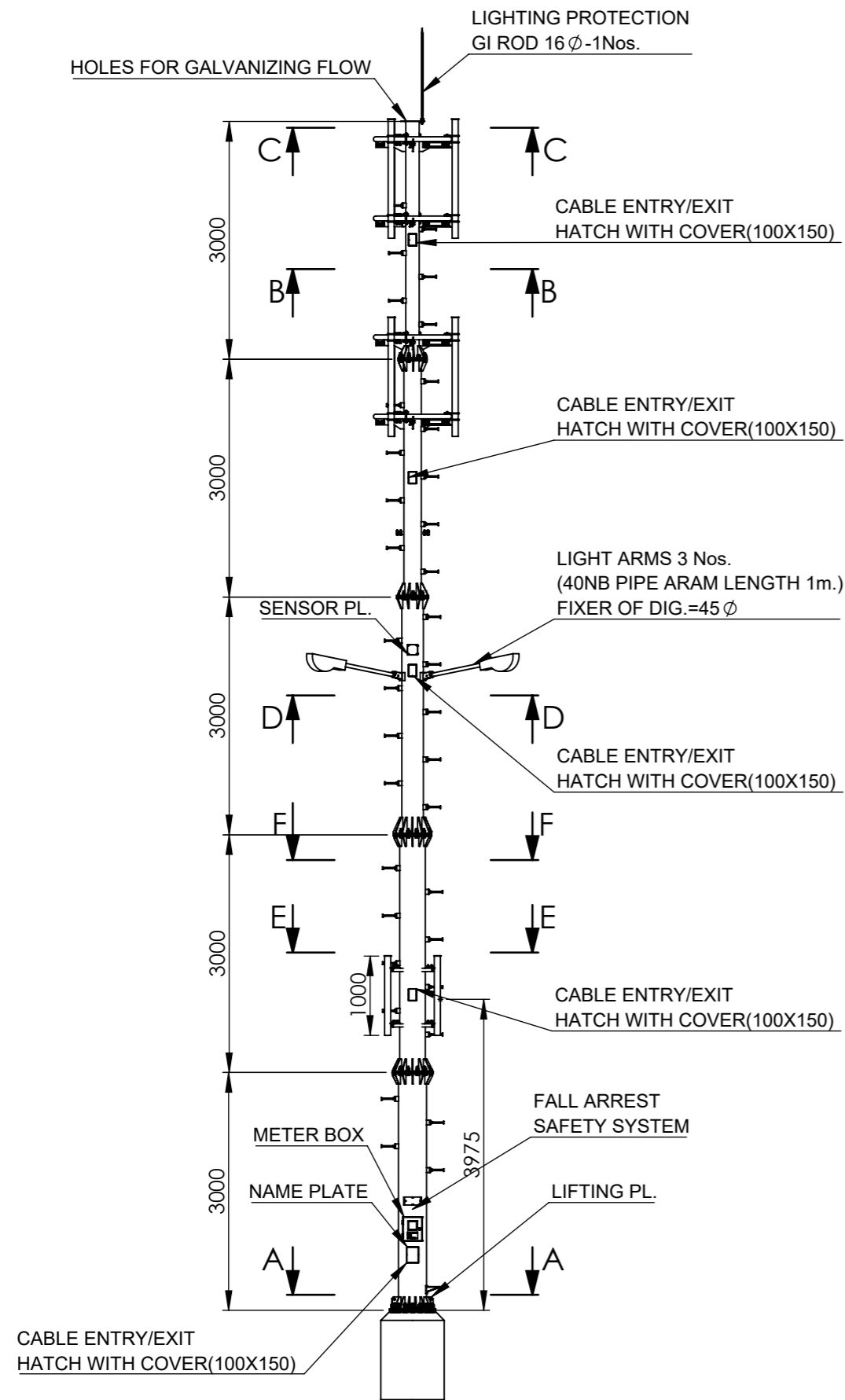


15MTR FLANGE MOUNT MONOPOLE 2024 PROJECT

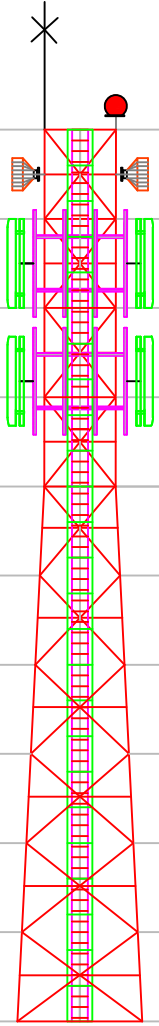


DESIGN NOTE		
1	All Dimension are in Millimetre, Expected otherwise shown.	
2	Antenna Configuration:	
	750 mm below top level (150 kg)	3 Nos GSM Antenna : 3 x 25 = 75 kg 3 Nos Radio : 3 x 25 = 75 kg
	3250 mm below top level (330 kg)	6 Nos GSM Antenna : 6 x 25 = 150 kg 6 Nos Radio : 6 x 25 = 150 kg 1 No Microwave Antenna : 1 x 30 = 30 kg
	9150 mm below top level (65 kg)	1 No BBU : 1 x 25 = 25 kg 1 No Battery : 1 x 35 = 35 kg 1 No Rectifier : 1 x 5 = 5 kg
	Material:	
3	All Structure steel will be hot-dip galvanized confirming to IS standards Anchor bolts shall confirm as per 5.6 grade	
4	Fall Arrest safety system will be included along with all monopoles.	
5	Total Tower Weight : ≥1350 kg	

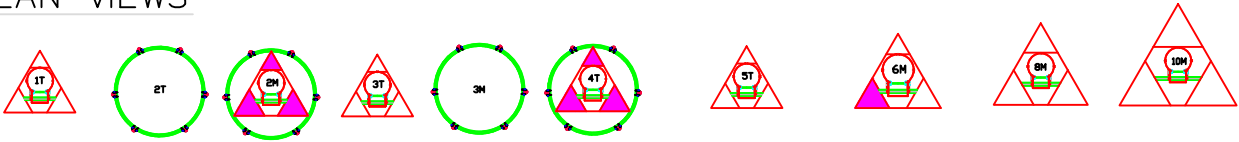
LEVEL	FACE WIDTH	PLATFORM
25000	2000	
22500	2000	Working Platform
20000	2000	Working Platform
17500	2000	Working Platform
15000	2000	
12500	2250	
10000	2500	Rest Platform
7500	2750	
5000	3000	
2500	3250	
0000	3500	

LEG JOINT NAME	LEG LENGTH	LEGS SIZE
A	2500	65x65x6
B	2500	75x75x6
C	2500	100x100x10
D	2503	120x120x10
E	2503	130x130x12
F	2503	

PANEL NO	LENGTH(METER)	DIAGONALS	PANEL TOP- HORIZONTALS	PANEL MID- HORIZONTALS	PLAN BRACING	SEC. BRACING
1	2.5	50x50x4	50x50x4	45x45x04	45x45x04	
2	2.5	50x50x4	50x50x4	45x45x04	45x45x04	
3	2.5	55x5	50x50x4	45x45x04	45x45x04	
4	2.5	60x60x5	50x50x4	45x45x04	45x45x04	
5	2.5	50x5	50x50x4	50x50x4	50x50x4	
6	2.5	50x5	50x50x4	50x50x4	50x50x4	
7	2.5	50x50x5	50x50x4	50x50x4	50x50x4	
8	2.5	50x50x5	50x50x4	50x50x4	50x50x4	
9	2.5	55x55x5	50x50x4	50x50x4	50x50x4	
10	2.5	50x50x4	50x50x4	50x50x4	50x50x4	

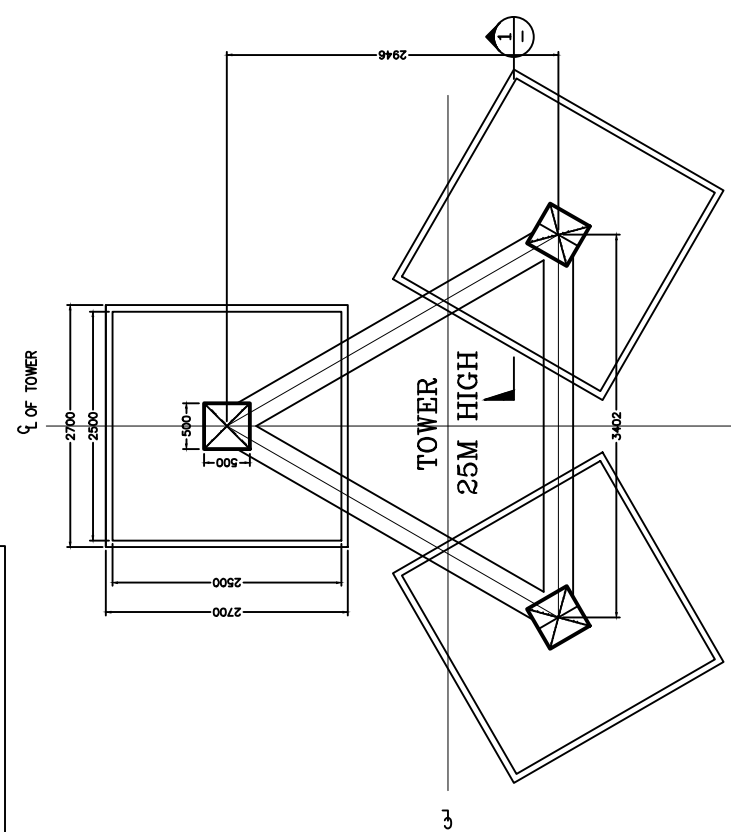


PLAN VIEWS

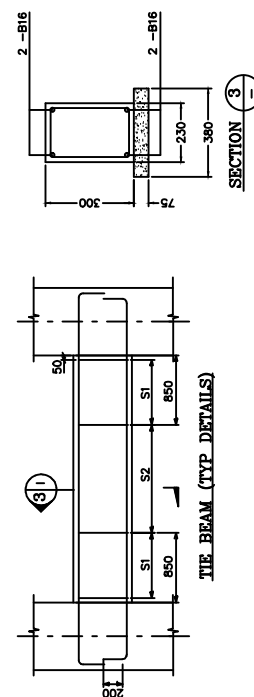


- 1) Remote Radio Head- 6+4nos (Total Weight 270kgs.)
- 2) Sectoral Antennas - 6+4nos (Total Weight 242kgs.)
- 3) Microwave Antennas (0.9m)-2nos (Total Weight 50kgs.)
- 4) Microwave Antennas (1.2m)-2nos (Total Weight 60kgs.)
- 5) Antennas Mounting Structure (Total Weight 270kgs.)

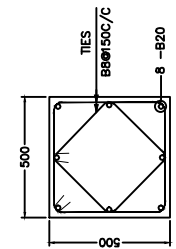
TITLE	25 METER TOWER	Wind Speed	180 KMPH	Design	TIA/EIA-222 G
SUB. TITLE	TRIANGULAR ANGULAR TOWER	Deflection	< 1.0 Degree	Rev.	
Drawing	BT - 2024 Project	Loading	892 kgs.	Drawn Date	08-12-2023
BHUTAN TELECOM LTD.			Tower Weight 4450 kgs.		



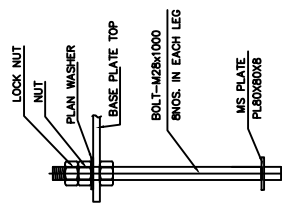
FOUNDATION KEY PLAN



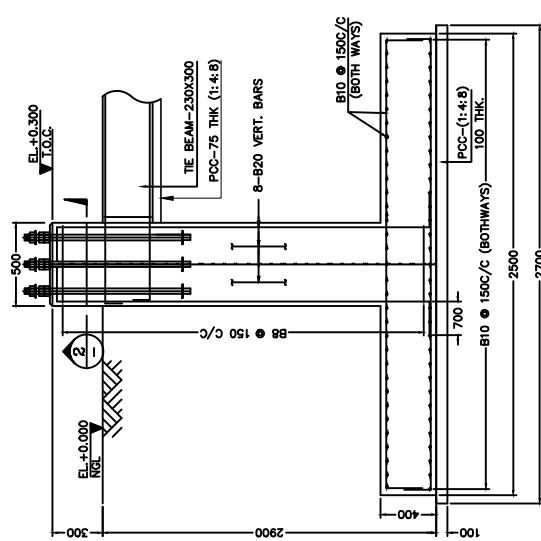
STIRRUP DETAILS
 S1: -2 LEGGED Y8 @ 100 C/C
 S2: -2 LEGGED Y8 @ 200 C/C



SECTION 2
 COLUMN 500X500



ANCHOR BOLT



SECTION 1

- NOTES**
1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
 2. USE M20 GRADE CONCRETE AND F8 500 GRADE FOR STEEL.
 3. CLEAR COVER TO MAIN REINFORCEMENT:-
 (a) 50MM FOR FOUNDATION (b) 25MM FOR BEAMS
 (c) 40MM FOR COLUMNS
 4. PRIOR TO AND DURING CONCRETING ALL BOLTS SHALL BE SECURELY HELD IN POSITION BY USE OF TEMPLATE.
 5. BEFORE COMMENCEMENT OF CONSTRUCTION USING THIS DESIGN, CLIENT/CONTRACTOR SHALL CARRY OUT DETAILED SOIL INVESTIGATION OF EVERY SITE.
 6. THIS FOUNDATION DESIGN SHALL NOT BE USED IN CASE HIGHLY SOIL ARE FOUND AT ANY DEPTH DURING SOIL INVESTIGATION.
 7. CONCRETE SHALL BE MECHANICALLY MIXED & VIBRATED.
 8. SPACING OF BARS SHALL NOT BE MORE THAN 50% AT ANY LOCATION.
 9. PROPER CURING OF CONCRETE SHALL BE DONE.
 10. BENDING OF BARS SHALL BE AS PER IS:2502.
 11. ANY DISCREPANCY SHOULD BE BROUGHT TO THE CONSULTANT'S ATTENTION.

GENERAL DETAILS

S.No	DESCRIPTION	DETAILS
1	SOIL BEARING CAPACITY	10.00 T/SQM
2	DRY DENSITY OF SOIL	1.8 T/SQM
3	ANGLE OF REPOSE	30.00 DEGREE

BILL OF MATERIALS

ITEM	UNIT	TOTAL
EXCAVATION	CUM	66.0
PCC-(1:4:8)	CUM	2.45
RCC-M20	CUM	10.2
STEEL-F8500	KG	860

CHAIRS SHALL BE PROVIDED WHEREVER REQUIRED

BAR BENDING SCHEDULE

REVISION NOTES

REV. NO.	DESCRIPTION	DATE	SIGN.
DRAWN	CHECKED	APPROVED	SCALE
Bhutan Telecom	Bhutan Telecom	Bhutan Telecom	14-12-2023

CLIENT: BHUTAN TELECOM LTD.
 DESIGN BY: BHUTAN TELECOM LTD.
 PROJECT: GENERIC ISOLATED FOUNDATION DESIGN
 BHUTAN
 TITLE: FOUNDATION DETAILS FOR 25M HIGH TRIANGULAR TOWER
 SEC: 10 T/SQM
 DRAWING No. SH. NO. REV.
 BT-2024 Project

FALL ARRESTER SYSTEM FOR MOPOPOLE

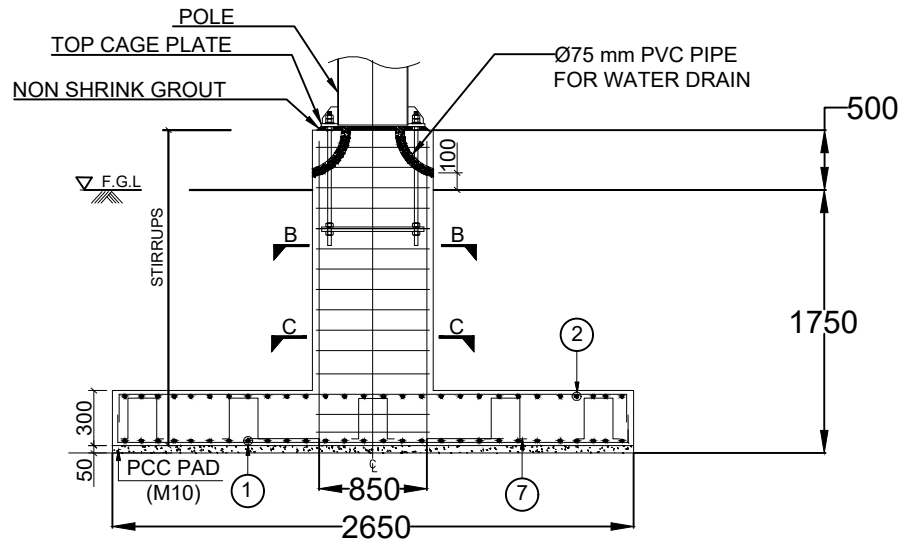
The Fall Arrestor System consists of a stainless steel rope grab that moves along with the user on a vertical lifeline made up of stainless steel wire rope. The rope grab should be able to connect to the attachment element of the user's harness. In the event of a fall, while the user is going up or down the ladder, the rope grab should automatically locks against the wire rope and should prevent the person from falling down. There should be a shock absorber system to reduce the impact force of the fall that would be imparted to the body of the user.

It should be a modular system consistency of different components, made up of Stainless steel to withstand heavy weather conditions & offer maximum corrosion resistance. The system should be able to install on monopole by trained personnel.

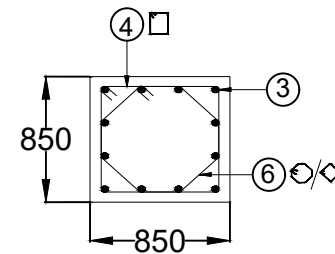
Component Chart

1. **Mounting Bracket:** Material Stainless Steel 316, Breaking Strength >23kN, Complies with EN 795 Type A
2. **Shock Absorber:** Shock Absorber should help to reduce the impact force in the event of a fall.
3. **Wire Rope (Cable Wire):** 8mm Dia Stainless steel 316 cable for vertical lifeline system should be installed on each monopole.
4. **Rope Grab:** The Rope Grab is the fall arrest device that slides through the cable while the user is ascending or descending. It should lock automatically in case of a fall. It should have gravity locking mechanism to ensure that it cannot be fitted to the Cable in the wrong direction.
5. **Set of U-Bolt and Thimble:** The Cable should be suitably terminated at the lower end using a thimble and two U-Bolts of Stainless Steel 316.
6. **Tensioner:** The Tensioner should be installed at the lower point of the Vertical Life Line between the end of the wire rope cable and the bottom mounting Bracket. The free end of the wire rope is suitably terminated by a thimble and two Stainless steel U bolts. Once installed, it can be easily used to regulate the tension in the cable line by simply rotating the central drum of the tensioner. The Tensioner should be Stainless steel to protect from Corrosion.

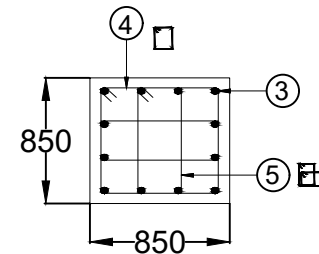
Civil Foundation Drawing - 15 Mtr Monopole



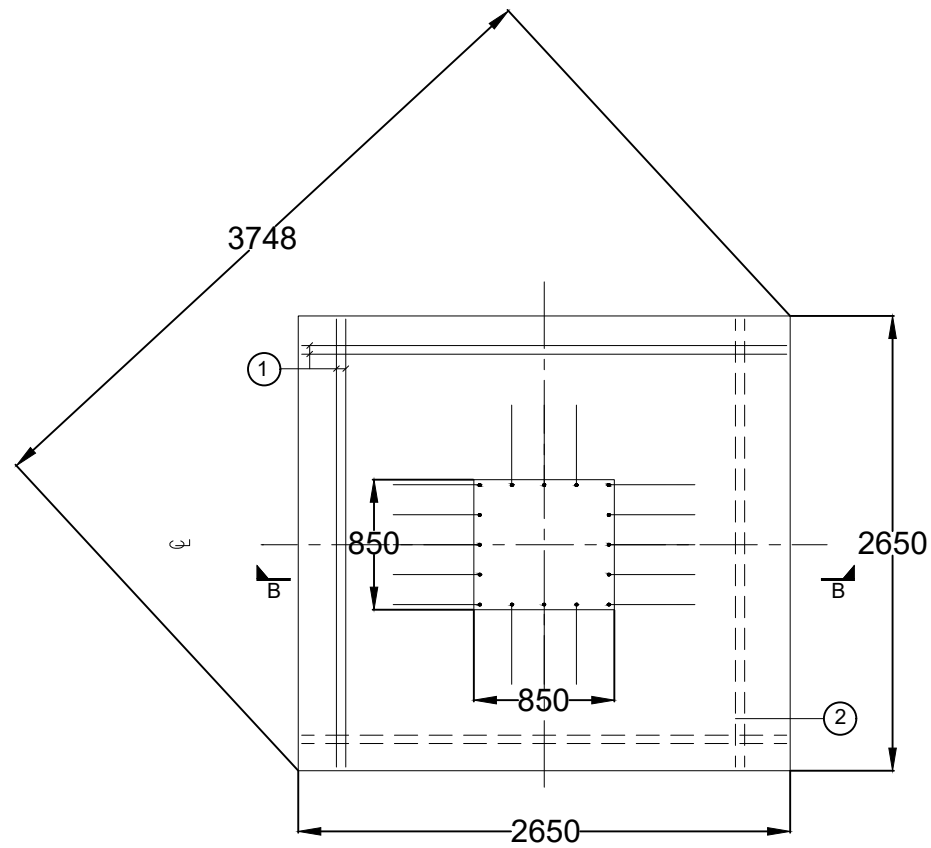
**Foundation DETAIL
(SECTION "A-A")**



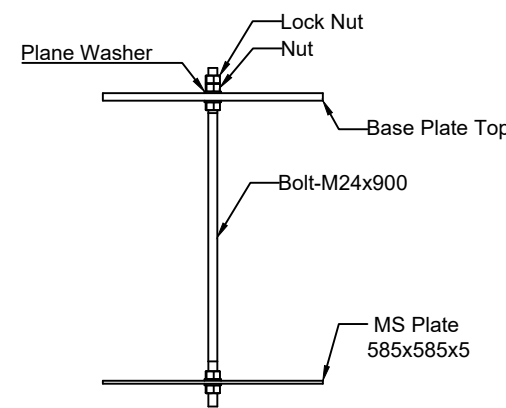
SECTION "B-B"



SECTION "C-C"



**Foundation Plan
(Showing Bottom & Top Reinforcement details)**



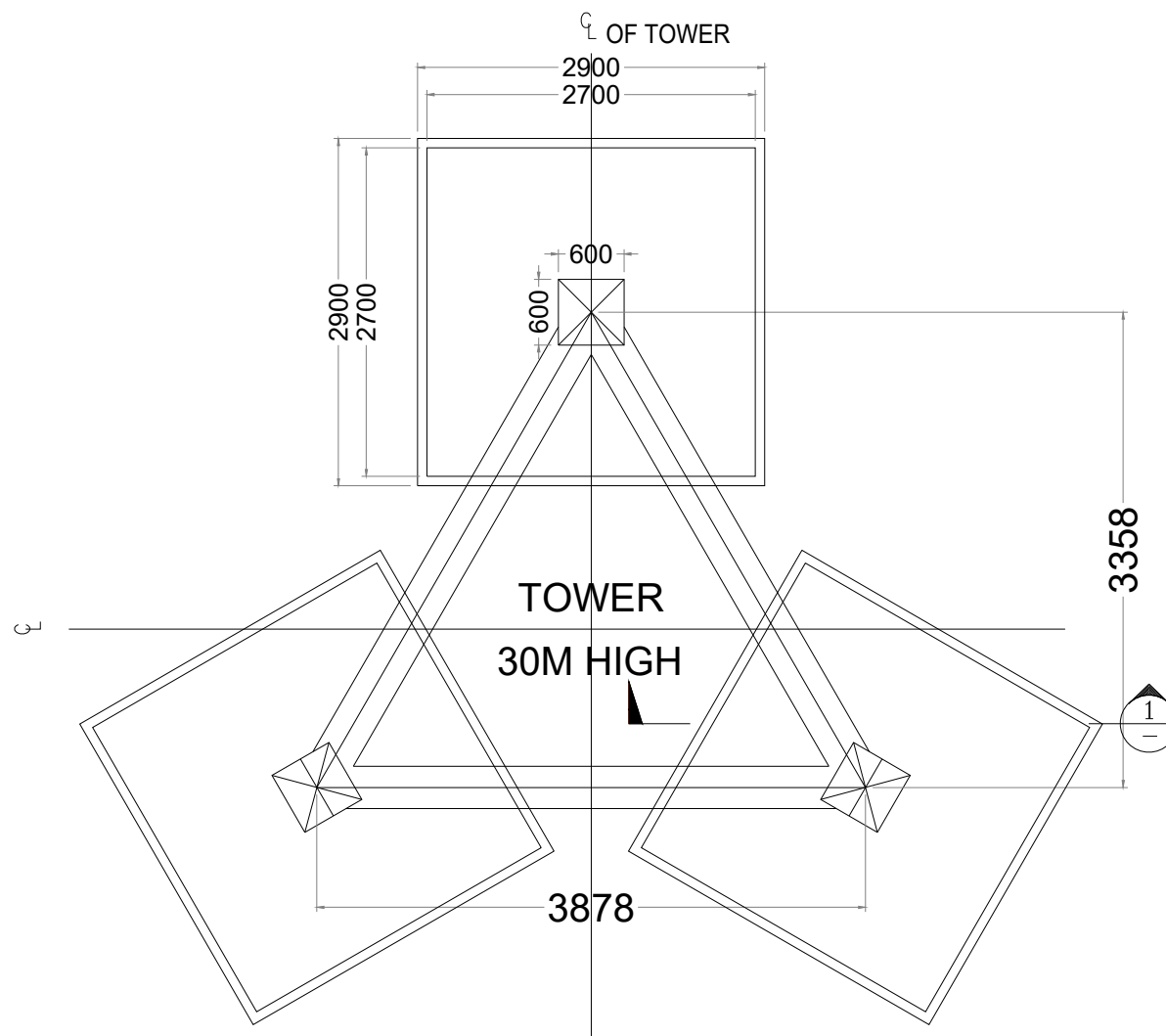
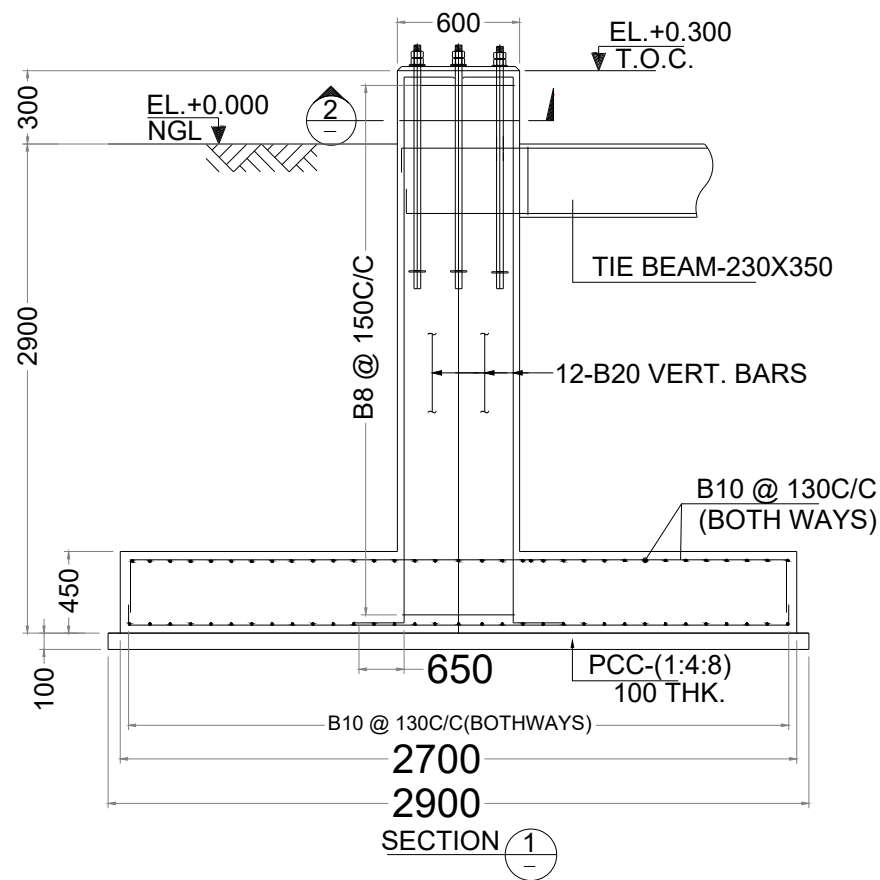
ANCHOR BOLT-16 Qty, Per Set

BAR BENDING SCHEDULE							
#	SHAPE OF BAR	LENGHT OF BAR (mm)	DIA. OF BAR (mm)	SPACING (mm)	NO. OF BARS	UNIT WEIGHT	TOTAL WEIGHT PER POLE
1		2800	16	130	42	1.58	185.8
2		2800	16	250	24	1.58	106.1
3		2800	25	-	12	3.86	130.0
4		3200	8	150	15	0.39	18.7
5		2250	8	150	18	0.39	15.8
6		2600	8	150	6	0.39	6.1
7		800	16	750	16	1.58	20.2
Weight of steel (kg)							482.7

Foundation Quantiy		
Item	Pole	Units
Concrete	3.16	cum
PCC	0.4	cum
Steel	482.7	kg
Shuttering	9.3	sq.m
Excavstior	23.4	cum

NOTE:-
ALL DIMENSIONS ARE IN MM

DRW. NAME:
15 Mtr MONOPOLE FOUNDATION DRAWING
PROJECT NAME:
BT - 2024 PROJECT



FOUNDATION KEY PLAN

- NOTES**
- ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
 - USE M20 GRADE CONCRETE AND Fe 415 GRADE FOR STEEL.
 - CLEAR COVER TO MAIN REINFORCEMENT:-
(a) 50MM FOR FOUNDATION (b) 25MM FOR BEAMS
(c) 40MM FOR COLUMNS
 - PRIOR TO AND DURING CONCRETING ALL BOLTS SHALL BE SECURELY HELD IN POSITION BY USE OF TEMPLATE.
 - BEFORE COMMENCEMENT OF CONSTRUCTION USING THIS DESIGN, CLIENT/CONTRACTOR SHALL CARRY OUT DETAILED SOIL INVESTIGATION OF EVERY SITE.
 - THIS FOUNDATION DESIGN SHALL NOT BE USED IN CASE HIGHLY SOIL ARE FOUND AT ANY DEPTH DURING SOIL INVESTIGATION.
 - CONCRETE SHALL BE MECHANICALLY MIXED & VIBRATED.
 - SPLICING OF BARS SHALL NOT BE MORE THAN 50% AT ANY LOCATION.
 - PROPER CURING OF CONCRETE SHALL BE DONE.
 - BENDING OF BARS SHALL BE AS PER IS:2502.
 - ANY DISCREPANCY SHOULD BE BROUGHT TO THE CONSULTANT'S ATTENTION.

GENERAL DETAILS

S.No	DESCRIPTION	DETAILS
1	SOIL BEARING CAPACITY	10.00 T/SQM
2	DRY DENSITY OF SOIL	1.8 T/SQM
3	ANGLE OF REPOSE	30.00 DEGREE

BILL OF MATERIALS

ITEM	UNIT	TOTAL
EXCAVATION	CUM	76.3
PCC-(1:4:8)	CUM	2.85
RCC-M20	CUM	13.6
STEEL-Fe415	KG	1200

CHAIRS SHALL BE PROVIDED WHEREEVER REQUIRED

REVISION NOTES

REV. NO.	DESCRIPTION	DATE	SIGN.
DRAWN	CHECKED	APPROVED	DATE
S.K.Chauhan	MOHIT GUPTA	MOHIT GUPTA	25-01-2024

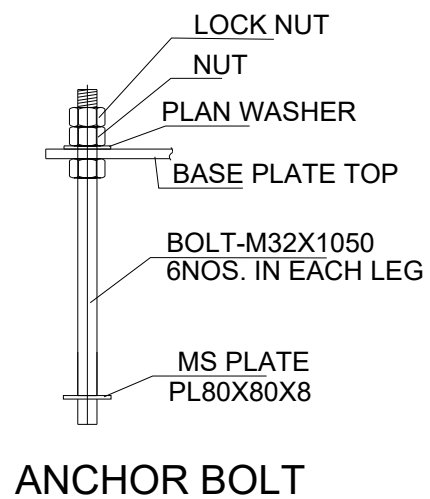
CLIENT: **BHUTAN TELECOM LTD. BHUTAN**

DESIGN BY: **ICON POWER SOLUTIONS PVT. LTD. GURGAON**

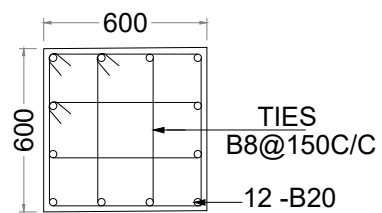
PROJECT: **GENERIC ISOLATED FOUNDATION DESIGN BHUTAN**

TITLE: **FOUNDATION DETAILS FOR 30M HIGH TRIANGULAR TOWER SBC : 10 T/SQM**

DRAWING No.	SH. NO.	REV.
AGD-438		

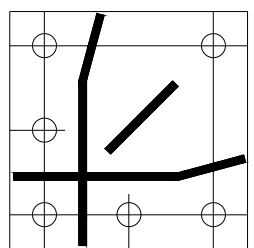


ANCHOR BOLT

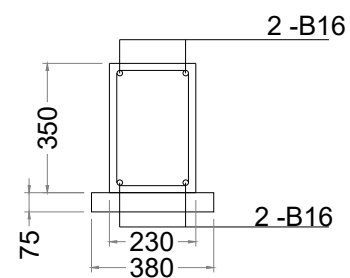


SECTION 2

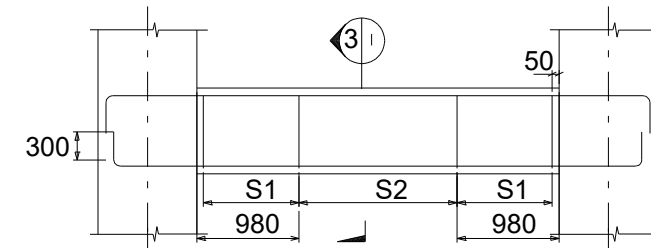
COLUMN 600X600



BASE PLATE



SECTION 3



TIE BEAM (TYP DETAILS)

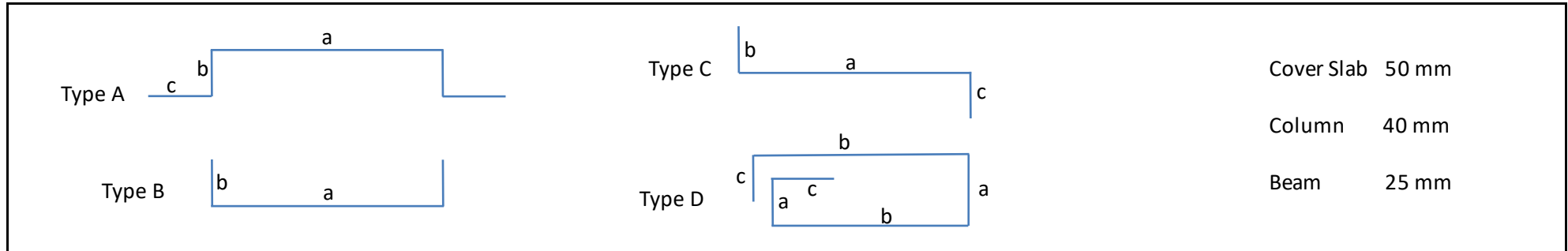
STIRRUP DETAILS
 S1:-2 LEGGED Y8 @ 100 C/C
 S2:-2 LEGGED Y8 @ 200 C/C



ICON POWER SOLUTIONS PVT LTD

112 113, Sector 5, IMT Manesar, Gurgaon -122050, Haryana - INDIA

30 Mtr 3L Tower Bar Bending Schedule



Item	Position	Type	Dia. Of Rebar (mm)	Size	Size	Size	Length (mm)	Qty in Nos both ways or total	Unit wt	Total Weight of
				a (mm)	b (mm)	c (mm)			(kg/m)	(kg)
Raft Slab	Top	B	B10	2600	300	-	3200	126	0.62	249.98
	Bottom	B	B10	2600	300	-	3200	126	0.62	249.98
Tie Beams	Top	B	B16	4378	300	-	4978	6	1.58	47.19
	Bottom	B	B16	4378	300	-	4978	6	1.58	47.19
	Strips	D	B8	180	300	80	1120	72	0.40	32.26
Column	Main	C	B20	3100	480	650	4230	36	2.47	376.13
	Ties	D	B8	512	512	80	2208	69	0.40	60.94
		D	B8	512	191	80	1566	132	0.40	82.68
	Total (Approx. 5% extra considered)									

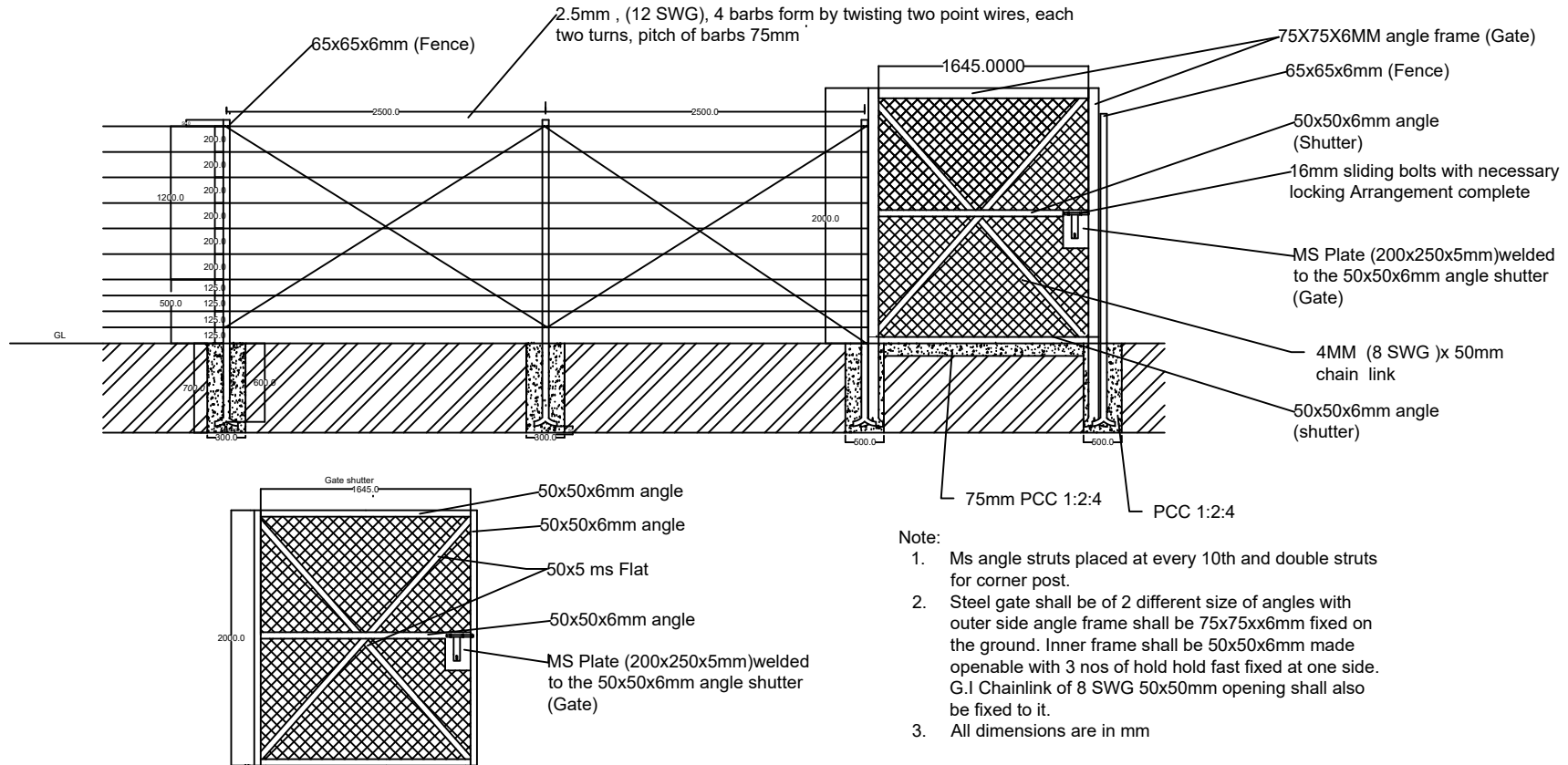
* Chairs Shall be Provided whenever required

Notes :

1. Dimensions of Bars are along the Center Lines.
3. Splicing of Bars should not be more than 50%. Length of splice as per Standards.



BARBED WIRE FENCING AND GATE DRAWING



- Note:**
1. Ms angle struts placed at every 10th and double struts for corner post.
 2. Steel gate shall be of 2 different size of angles with outer side angle frame shall be 75x75x6mm fixed on the ground. Inner frame shall be 50x50x6mm made openable with 3 nos of hold hold fast fixed at one side. G.I Chainlink of 8 SWG 50x50mm opening shall also be fixed to it.
 3. All dimensions are in mm

	Title : Barbed wire fencing	BHUTAN TELECOM LIMITED	
	Checked by:	Approved by:	