

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

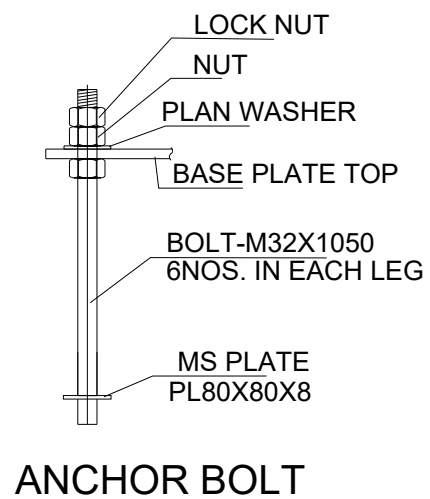
CLIENT: **BHUTAN TELECOM LTD. BHUTAN**

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

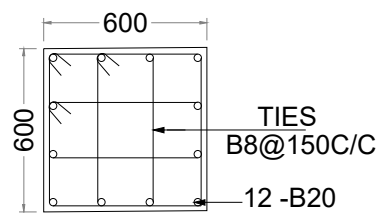
PROJECT: **GENERIC ISOLATED FOUNDATION DESIGN BHUTAN**

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

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

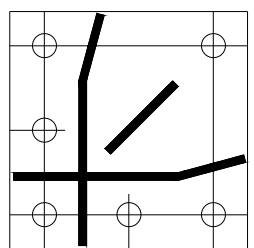


ANCHOR BOLT

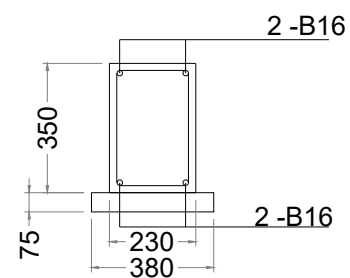


SECTION 2

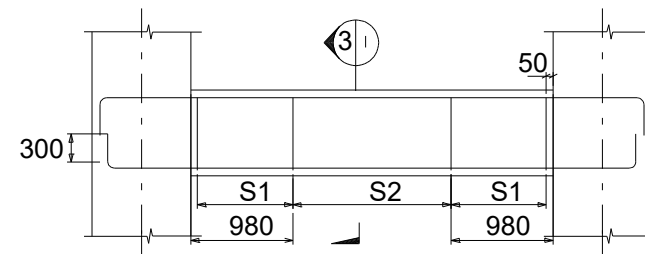
COLUMN 600X600



BASE PLATE



SECTION 3



TIE BEAM (TYP DETAILS)

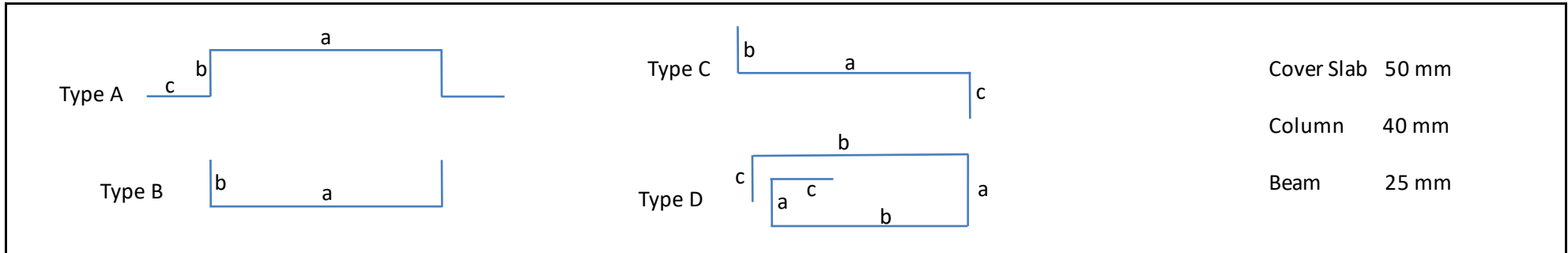
STIRRUP DETAILS
 S1:-2 LEGGED Y8 @ 100 C/C
 S2:-2 LEGGED Y8 @ 200 C/C



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	Size	Size	Size	Length	Qty in Nos both ways or total	Unit wt	Total Weight of
				a	b	c			(kg/m)	(kg)
			(mm)	(mm)	(mm)	(mm)				
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)									

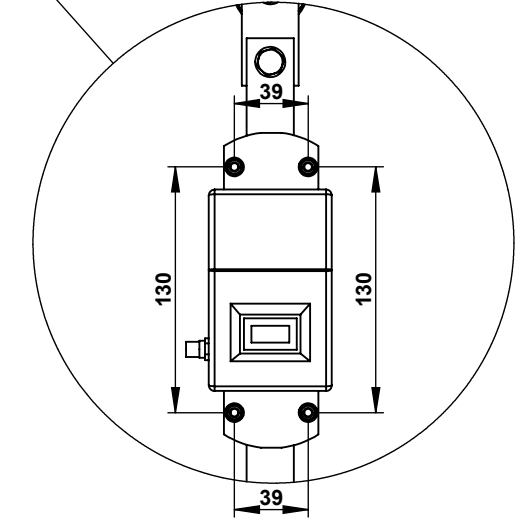
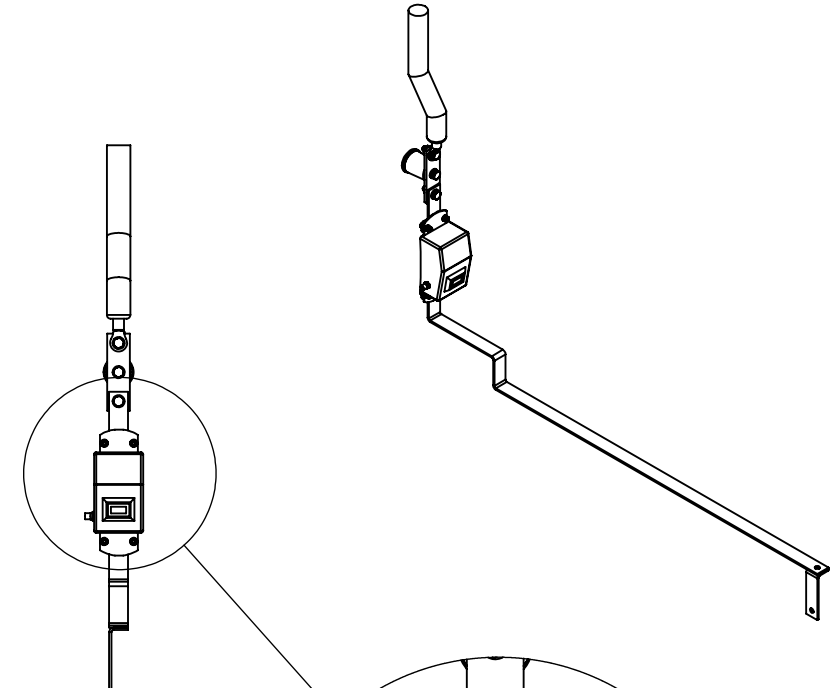
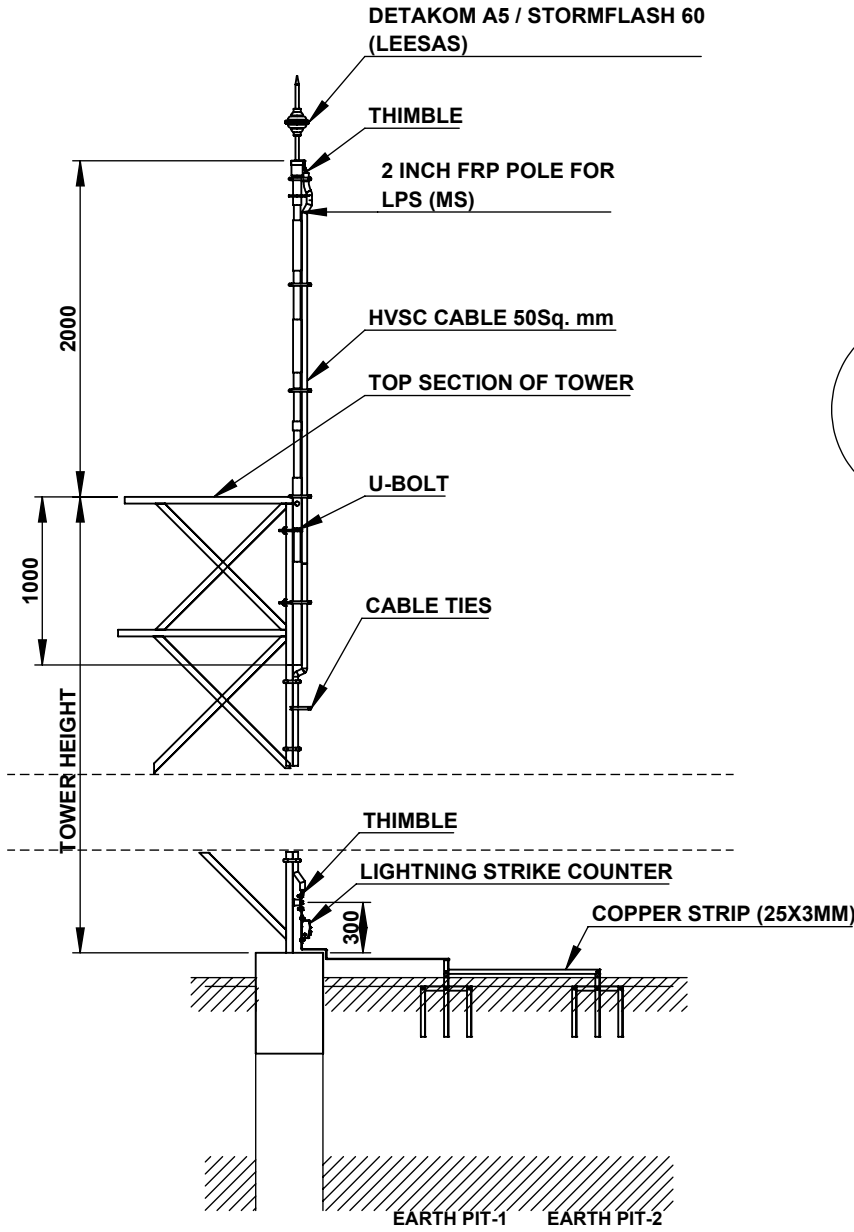
* Chairs Shall be Provided whenever required

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.



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DETAIL A
SCALE 1 : 4



NOTE:-
ALL DIMENSIONS ARE IN MM

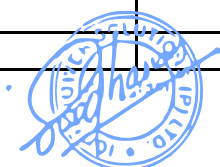
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DRAWN BY: HEMANT	HEMANT	27-01-2024								ICGA10628	LIGHTING ARRESTOR MOUNTING ARRANGEMENT
DESIGNED BY: SUJITH	SUJITH	27-01-2024						ISO 2768-m		REV 00	PROJECT NAME: BHUTAN TELECOM 2024 PROJECT
CHECKED BY: SUJITH	SUJITH	27-01-2024								SHEET NO: 1 OF 1	
										SIZE: A4	

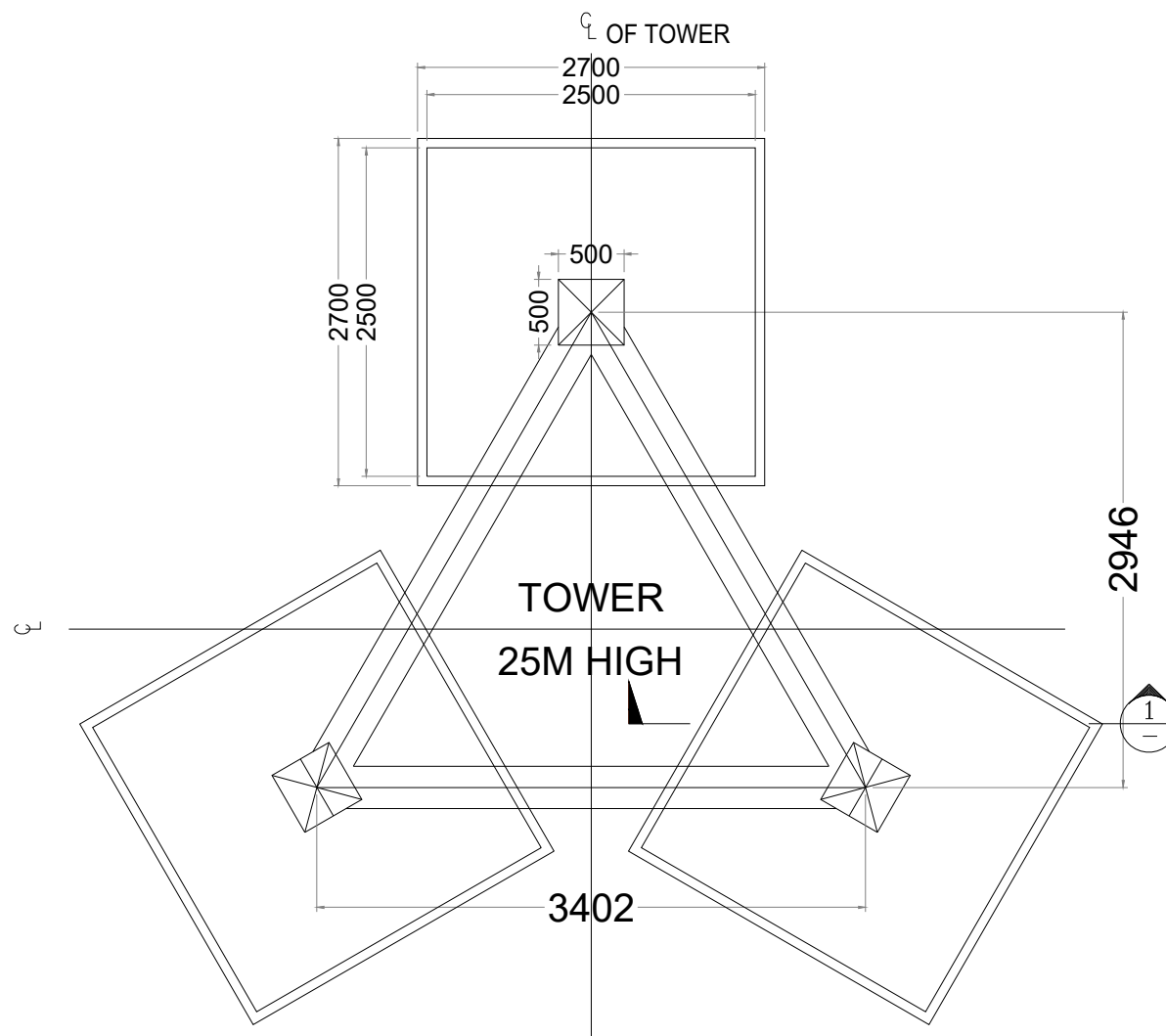
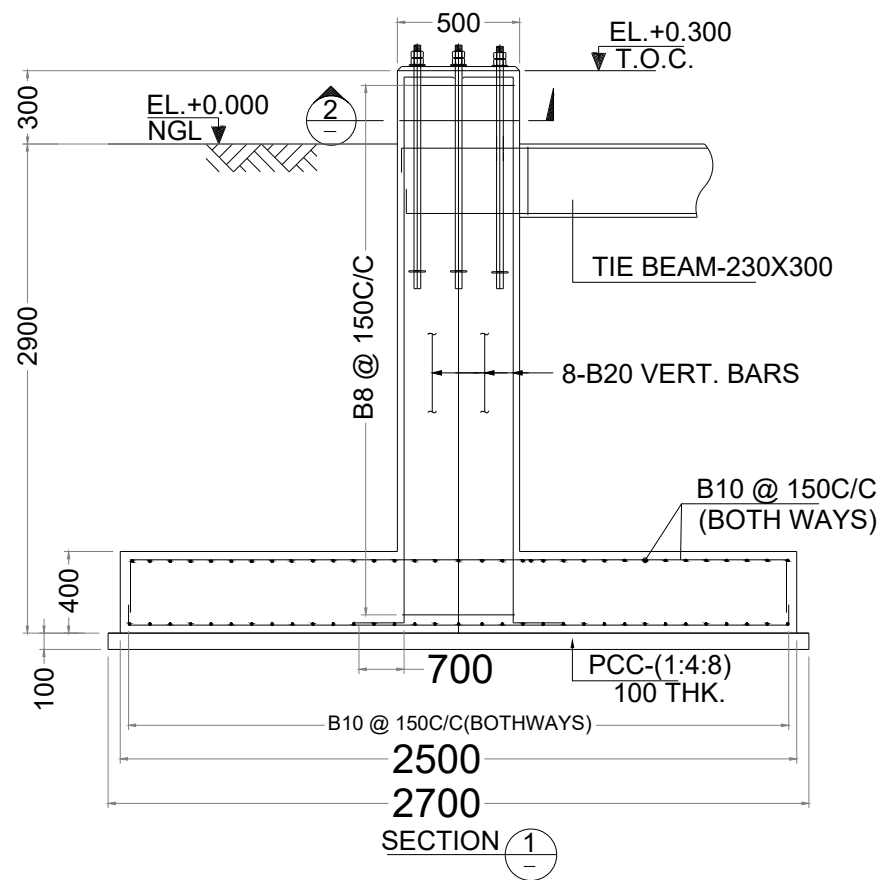
ICON POWER SOLUTIONS(P) LTD.
112-113, Sector-5, IMT Manesar,
Gurugram, Haryana, INDIA-122050
TEL : +91 124 4120600/01/02

ICON POWER SOLUTIONS PVT LTD

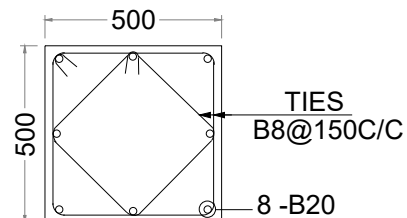
112 113, Sector 5, IMT Manesar, Gurgaon - 122050, Haryana, INDIA

Bhutan Telecom 2024 Project				
Technical Specification sheet of 25 mtr. 3 Legged Angular Tower AGD-438A				
SI			DETAILS	REMARK
1		DESIGN SPECIFICATION	(ANSI/TIA-222G)	
	1.1	Design Wind Velocity		
		Survival	180 KMPH	
		Operational		
	1.2	Twist & Sway	Less than 1.0 degree	
	1.3	Factor of Safety	1.2 For Dead Load	
			1.6 For Wind Load	
	1.4	Antenna Loading	829 Kg	
		Remote Radio Head	9 Nos (26 Kg)	234 Kg
		Sectorial Antenna	9 Nos (25 Kg)	225 Kg
		Antenna Mounting Structure	13 Nos (20 Kg)	260 Kg
		MW Antenna	1.2 Dia (30 Kg) : 2 Nos	60 Kg
			0.9 Dia (30 Kg) : 1 Nos	30 Kg
			0.6 Dia (20 Kg) : 1 Nos	20 Kg
2		Obstruction Light System		
	2.1	No .Of Obstruction Light Lamp&Watts	1 No. LED Type	
	2.2	Power Cable Type&Length	2.5 Sqmm x 35 mtr. Length	2 core armoured
3		Lighting Protection		
	3.1	Lightning Arrestor	Lightning Arrestor (ESE) Detakom – A5 or STORMFLASH 60 (LEESAS)	1 nos with FRP mast and HVSC cable & Counter
4	4.1	Structure Of Tower	Self Suppprtng 3 legged Angular construction with vertical ladder in the center intergrated with cable tray & horizontal cable tray from tower to Building	
	4.2	Main Leg	90 Degree Angle	
	4.3	Bracing	90 Degree Angle	
	4.4	Climbing Ladder	450 mm Rung Width, 300mm Rung space & 700mm Hoop	
	4.5	Cable Tray Verticle	450 mm Width	along the tower Height
	4.6	Cable Tray Horizontal	450 mm Width	6 MTR.
	4.7	Platforms		
		Working	2 Nos	
		Rest	1	
5		Foundation bolt & Template	As Per Tower Design	Included
	5.1	Bolts & Nut with spring &	Hot Dipped Galvanized Property Class 5.6	Extra 5% will be provided
	5.2	Plane washer	As per Standard ASTM A 153	
	5,3	Hot Dipped Galvanization	As per Standard ISO 1461	85 Microns
6	6.1	Weight Per Tower	4450 Kgs	(+/-) 5%
	6.2	Drawing No	AGD-438A	

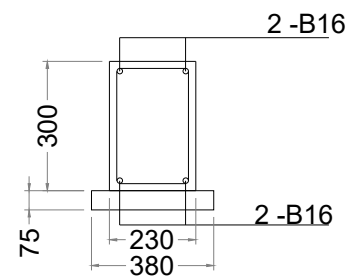




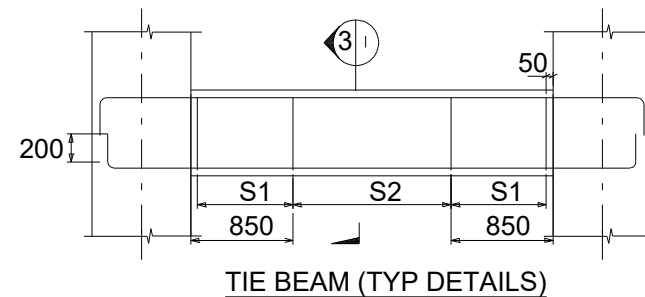
FOUNDATION KEY PLAN



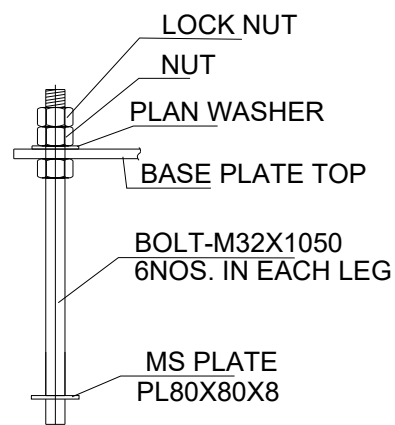
SECTION 2
COLUMN 500X500



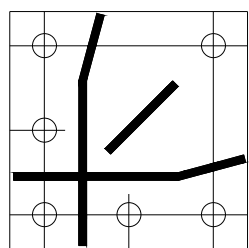
SECTION 3



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



ANCHOR BOLT



BASE PLATE

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
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- 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	66.0
PCC-(1:4:8)	CUM	2.45
RCC-M20	CUM	10.2
STEEL-Fe415	KG	860

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 25M HIGH TRIANGULAR TOWER SBC : 10 T/SQM

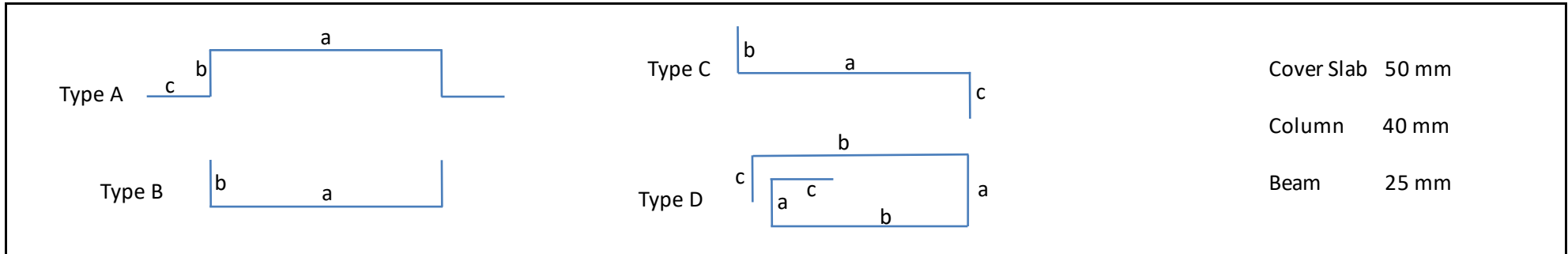
DRAWING No.	SH. NO.	REV.
AGD-438A		



ICON POWER SOLUTIONS PVT LTD

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

25 Mtr 3L Tower Bar Bending Schedule



Item	Position	Type	Dia. Of Rebar	Size	Size	Size	Length	Qty in Nos both ways or total	Unit wt	Total Weight of
				a	b	c			(kg/m)	(kg)
			(mm)	(mm)	(mm)	(mm)				
Raft Slab	Top	B	B10	2400	300	-	3000	102	0.62	189.72
	Bottom	B	B10	2400	300	-	3000	102	0.62	189.72
Tie Beams	Top	B	B16	3802	200	-	4202	6	1.58	39.83
	Bottom	B	B16	3802	200	-	4202	6	1.58	39.83
	Strips	D	B8	180	250	80	1020	66	0.40	26.93
Column	Main	C	B20	3100	380	700	4180	24	2.47	247.79
	Ties	D	B8	412	412	80	1808	66	0.40	47.73
		D	B8	320	320	80	1440	66	0.40	38.02
	Total (Approx. 10% extra considered)									

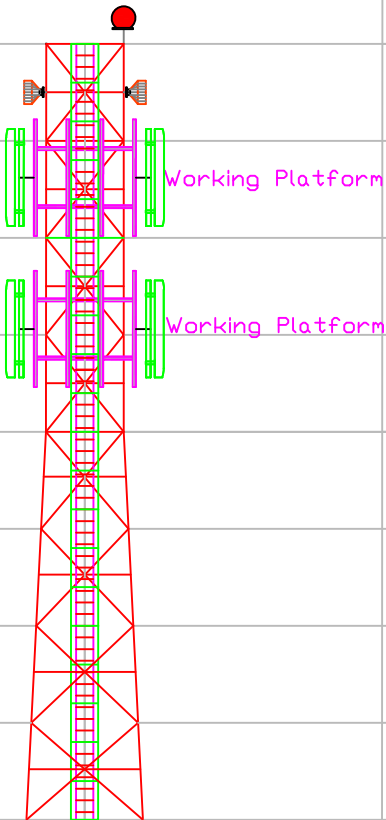
* Chairs Shall be Provided whenever required

Notes :

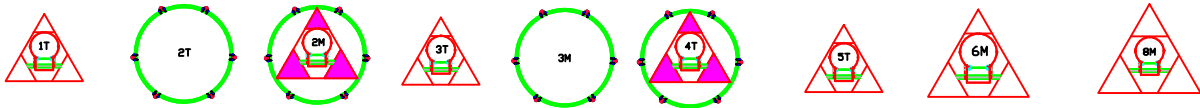
1. Dimensions of Bars are along the Center Lines.
3. Splicing of Bars should not be more than 50%. Length of splice as per Standards.



LEVEL		20000	17500	15000	12500	10000	7500	5000	2500	0000
FACE WIDTH	2000	2000	2000	2000	2000	2000	2250	2500	2750	3000
PLATFORM			Working Platform	Working Platform						
LEG JOINT NAME	A	B	C	D	E					
LEG LENGTH	2500	2500	2500	2500	2500	2503	2503	2503	2503	2503
LEGS SIZE	65x65x6	75x75x6	100x100x10	120x120x10						
PANEL NO	1	2	3	4	5	6	7	8		
LENGTH (METER)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5		
DIAGONALS	50x50x4	55x5	60x60x5	50x5	50x5	50x5	50x5	50x5		
PANEL TOP- HORIZONTALS	50x50x4	50x50x4								
PANEL MID- HORIZONTALS	45x45x04	45x45x04	50x50x4	50x50x4						
PLAN BRACING	45x45x04	45x45x04	50x50x4	50x50x4	50x50x4	50x50x4	50x50x4	50x50x4		
SEC. BRACING										



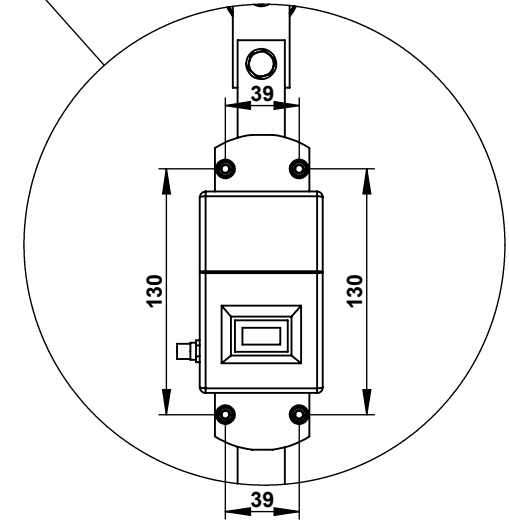
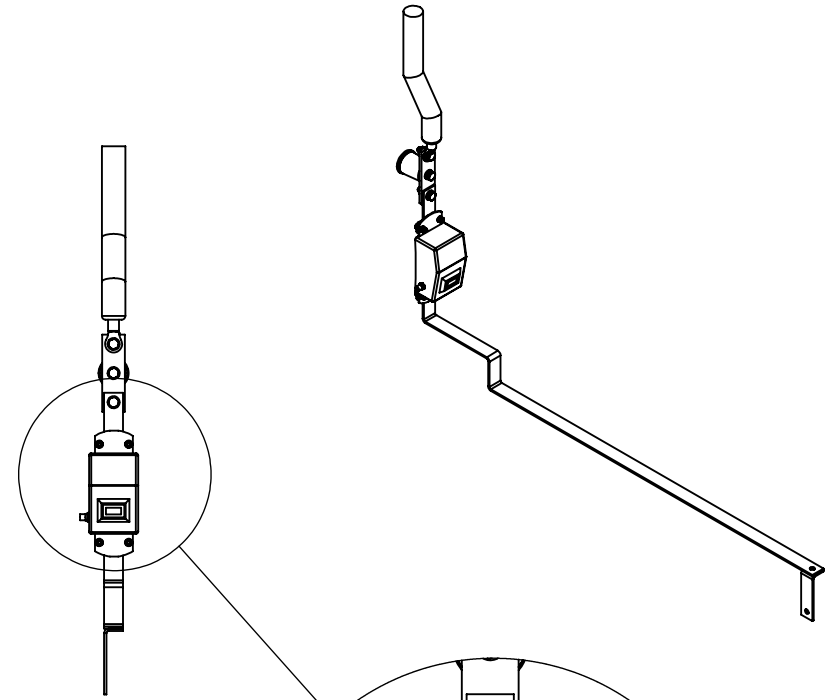
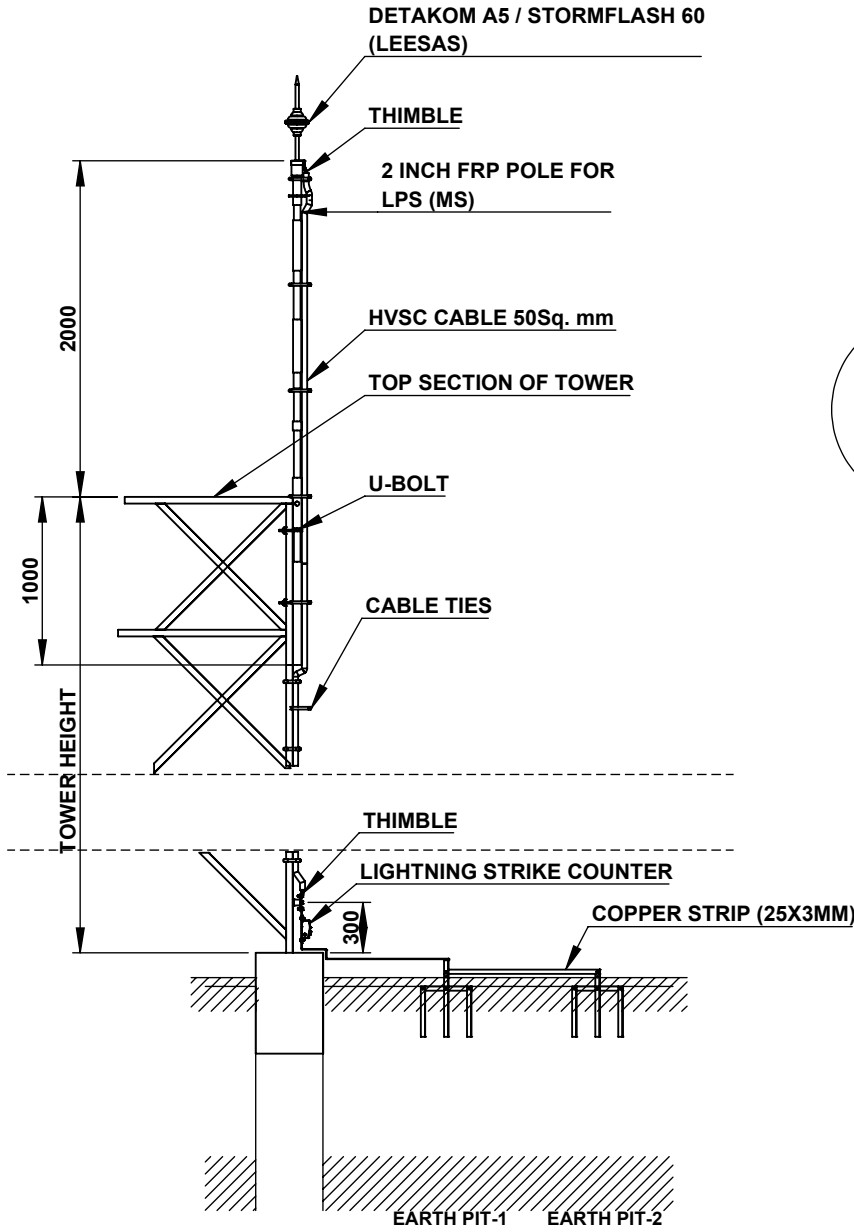
PLAN VIEWS



<p>1) Remote Radio Head- 9nos (Total Weight 234kgs.)</p> <p>2) Sectoral Antennas - 9nos (Total Weight 225kgs.)</p> <p>3) Microwave Antennas (0.6m)-1nos(20kgs.)</p> <p>3) Microwave Antennas (0.9m)-1nos(30kgs.)</p> <p>4) Microwave Antennas (1.2m)-1nos (Total Weight 30kgs.)</p> <p>5) Antennas Mounting Structure (Total Weight 260kgs.)</p>	TITLE	20 METER TOWER	Wind Speed	180 KMPH	Design	TIA/EIA-222 G
	SUB. TITLE	TRIANGULAR ANGULAR TOWER	Deflection	< 1.0 Degree	Rev.	
	Drawing No.	AGD-438B	Loading	799 kgs.	Drawn Date	25-01-2024
	Icon Power Solutions Pvt Ltd			Tower Weight 3550 kgs.		



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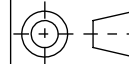
DETAIL A
SCALE 1 : 4



NOTE:-
ALL DIMENSIONS ARE IN MM

NAME	SIGNATURE	DATE	CHANGES	NAME	SIGNATURE	DATE	NO:	TOLERANCE:	SCALE: 1:45	DRW. NO:	DRW. NAME:
DRAWN BY: HEMANT	HEMANT	27-01-2024								ICGA10628	LIGHTNING ARRESTOR MOUNTING ARRANGEMENT
DESIGNED BY: SUJITH	SUJITH	27-01-2024						ISO 2768-m		REV 00	PROJECT NAME: BHUTAN TELECOM 2024 PROJECT
CHECKED BY: SUJITH	SUJITH	27-01-2024								SHEET NO: 1 OF 1	
										SIZE: A4	

ICON POWER SOLUTIONS(P) LTD.
112-113, Sector-5, IMT Manesar,
Gurugram, Haryana, INDIA-122050
TEL : +91 124 4120600/01/02



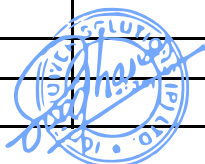
ICON POWER SOLUTIONS PVT LTD

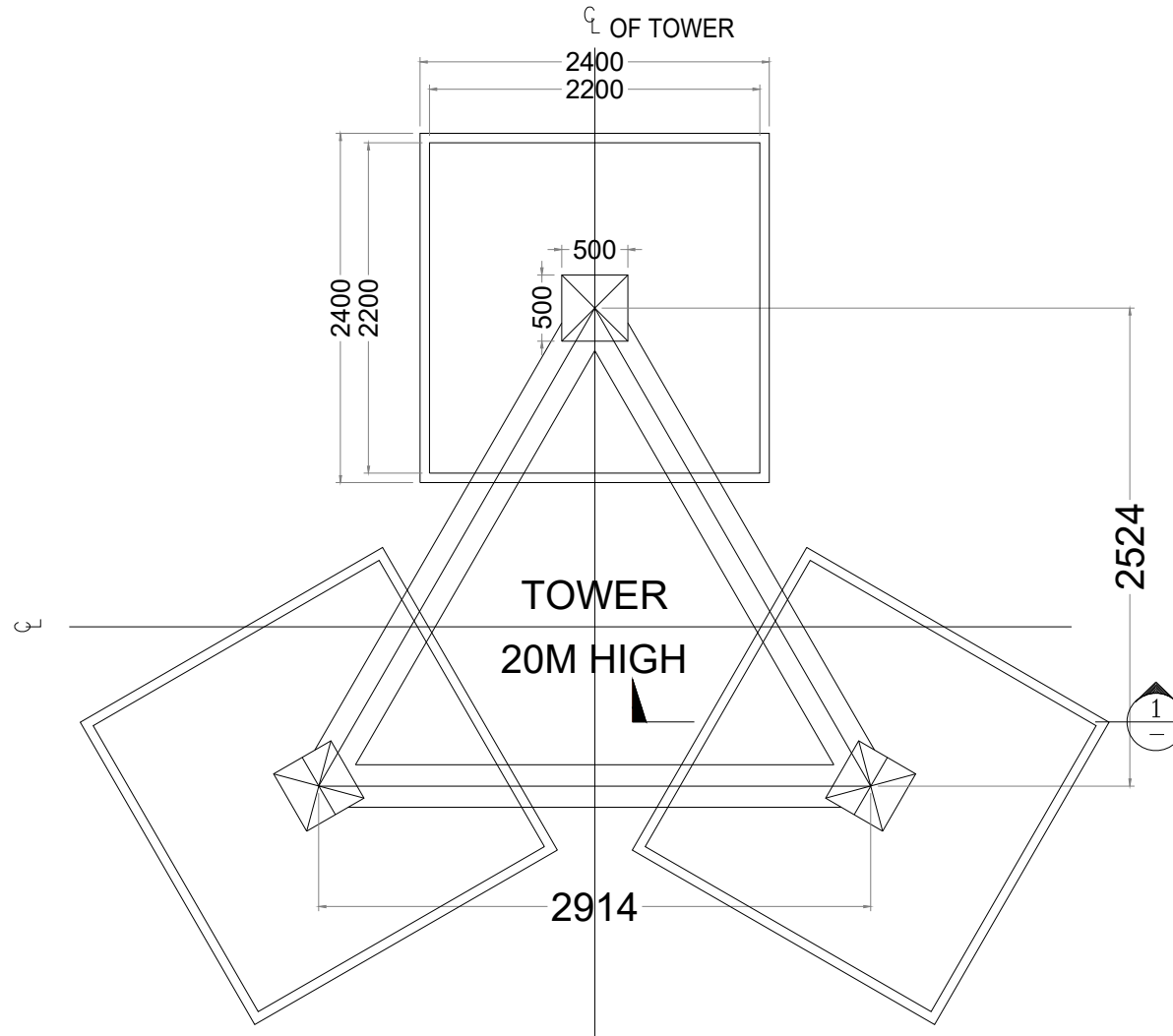
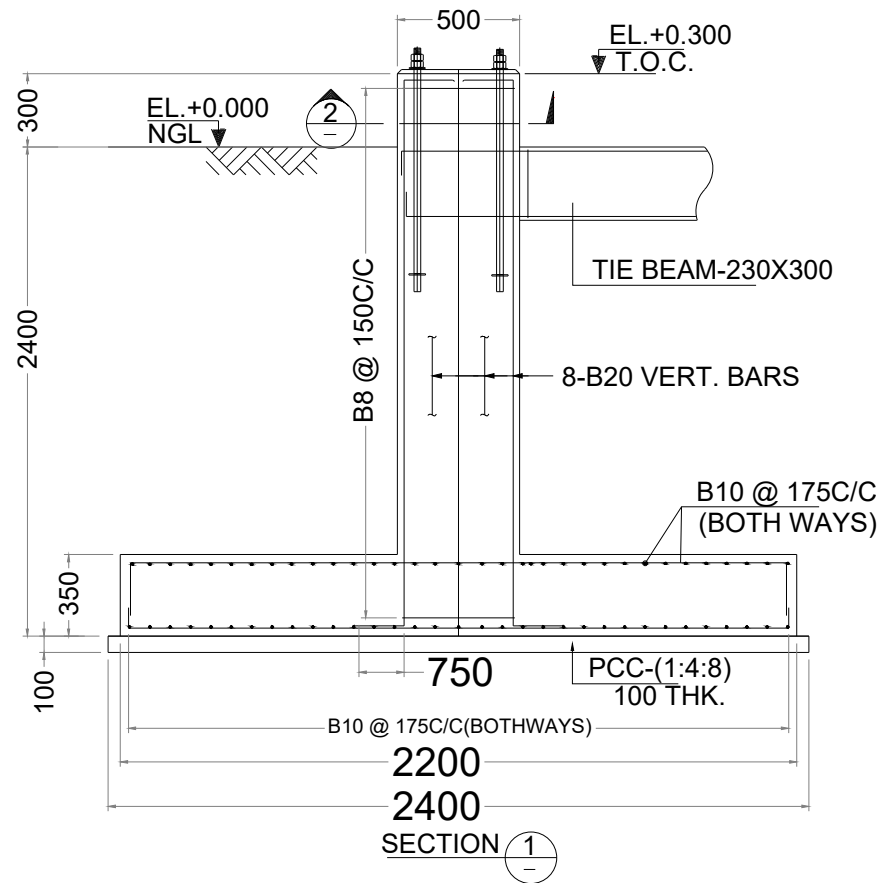
112 113, Sector 5, IMT Manesar, Gurgaon - 122050, Haryana, INDIA

Bhutan Telecom 2024 Project

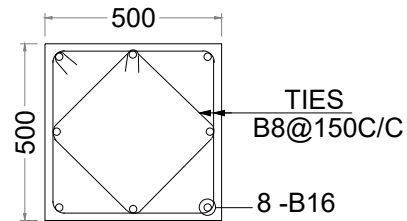
Technical Specification sheet of 20 mtr. 3 Legged Angular Tower AGD-438B

S.No	DETAILS		REMARK	
1	DESIGN SPECIFICATION		(ANSI/TIA-222G)	
1.1	Design Wind Velocity			
	Survival	180 KMPH		
	Operational			
1.2	Twist & Sway	Less than 1.0 degree		
1.3	Factor of Safety	1.2 For Dead Load		
		1.6 For Wind Load		
1.4	Antenna Loading	799 Kg		
	Remote Radio Head	9 Nos (26 Kg)	234 Kg	
	Sectorial Antenna	9 Nos (25 Kg)	225 Kg	
	Antenna Mounting Structure	13 Nos (20 Kg)	260 Kg	
	MW Antenna	1.2 Dia (30 Kg) : 1 Nos	30 Kg	
		0.9 Dia (30 Kg) : 1 Nos	30 Kg	
		0.6 Dia (20 Kg) : 1 Nos	20 Kg	
2	Obstruction Light System			
2.1	No .Of Obstruction Light Lamp&Watts	1 No. LED Type		
2.2	Power Cable Type&Length	2.5 Sqmm x 30 mtr. Length	2 core armoured	
3	Lighting Protection			
3.1	Lightning Arrestor	Lightning Arrestor (ESE) Detakom – A5 or STORMFLASH 60 (LEESAS)	1 nos with FRP mast and HVSC cable & Counter	
4	4.1	Structure Of Tower	Self Supprting 3 legged Angular construction with vertical ladder in the center intergrated with cable tray & horizontal cable tray from tower to Building	
	4.2	Main Leg	90 Degree Angle	
	4.3	Bracing	90 Degree Angle	
	4.4	Climbing Ladder	450 mm Rung Width, 300mm Rung space & 700mm Hoop	
	4.5	Cable Tray Verticle	450 mm Width	along the tower Height
	4.6	Cable Tray Horizontal	450 mm Width	6 MTR.
	4.7	Platforms		
		Working	2 Nos	
		Rest	0	
5	Foundation bolt & Template		As Per Tower Design	Included
	5.1	Bolts & Nut with spring &	Hot Dipped Galvanized Property Class 5.6	Extra 5% will be provided
	5.2	Plane washer	As per Standard ASTM A 153	
	5.3	Hot Dipped Galvanization	As per Standard ISO 1461	85 Microns
6	6.1	Weight Per Tower	3550 Kgs	(+/-) 5%
	6.2	Drawing No	AGD-438B	

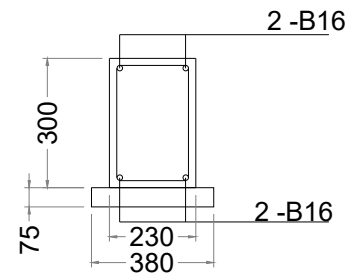




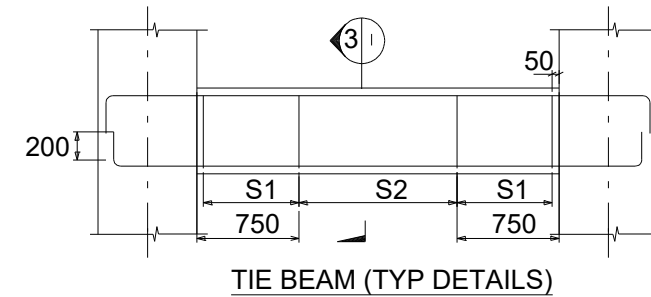
FOUNDATION KEY PLAN



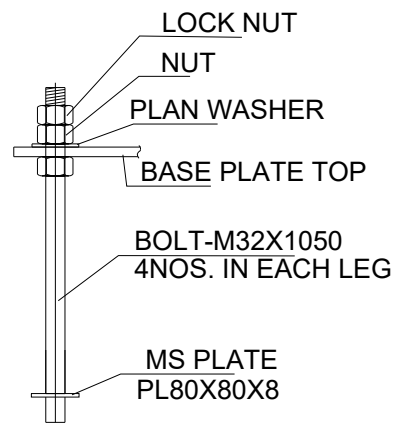
SECTION 2
COLUMN 500X500



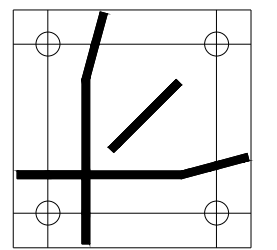
SECTION 3



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



ANCHOR BOLT



BASE PLATE

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	43.6
PCC-(1:4:8)	CUM	1.95
RCC-M20	CUM	7.34
STEEL-Fe415	KG	680

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 20M HIGH TRIANGULAR TOWER
SBC : 10 T/SQM

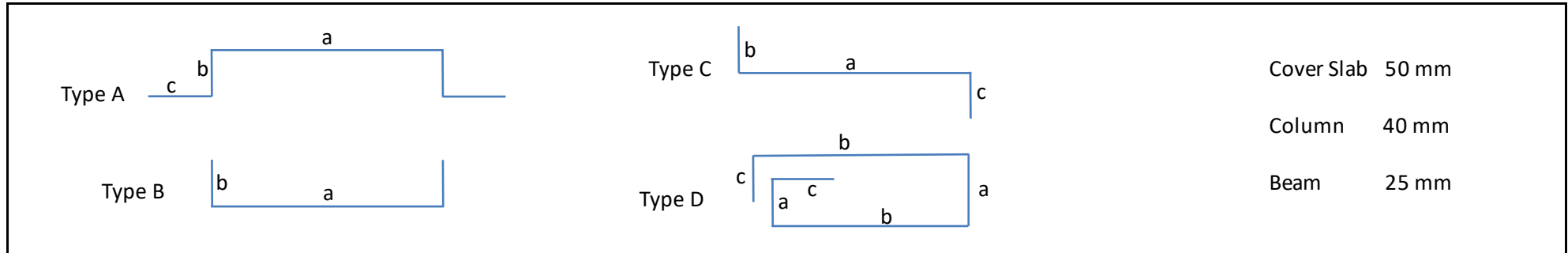
DRAWING No.	SH. NO.	REV.
AGD-438B		



ICON POWER SOLUTIONS PVT LTD

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

20 Mtr 3L Tower Bar Bending Schedule



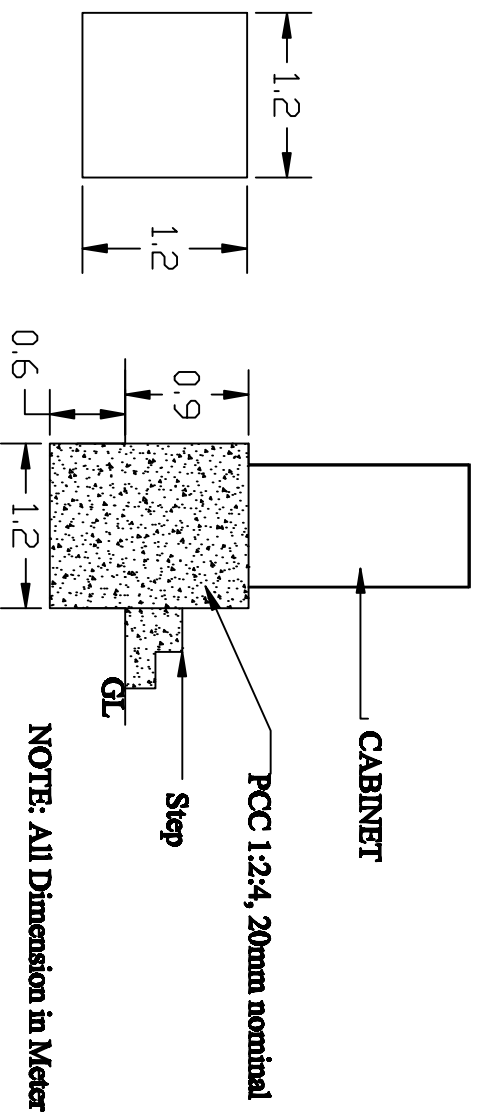
Item	Position	Type	Dia. Of Rebar	Size	Size	Size	Length	Qty in Nos both ways or total	Unit wt	Total Weight of
				a	b	c			(kg/m)	(kg)
			(mm)	(mm)	(mm)	(mm)				
Raft Slab	Top	B	B10	2100	300	-	2700	78	0.62	130.57
	Bottom	B	B10	2100	300	-	2700	78	0.62	130.57
Tie Beams	Top	B	B16	3314	200	-	3714	6	1.58	35.21
	Bottom	B	B16	3314	200	-	3714	6	1.58	35.21
	Strips	D	B8	180	250	80	1020	54	0.40	22.03
Column	Main	C	B20	2600	380	750	3730	24	2.47	221.11
	Ties	D	B8	412	412	80	1808	57	0.40	41.22
		D	B8	320	320	80	1440	57	0.40	32.83
	Total (Approx. 5% extra considered)									

* Chairs Shall be Provided whenever required

Notes :

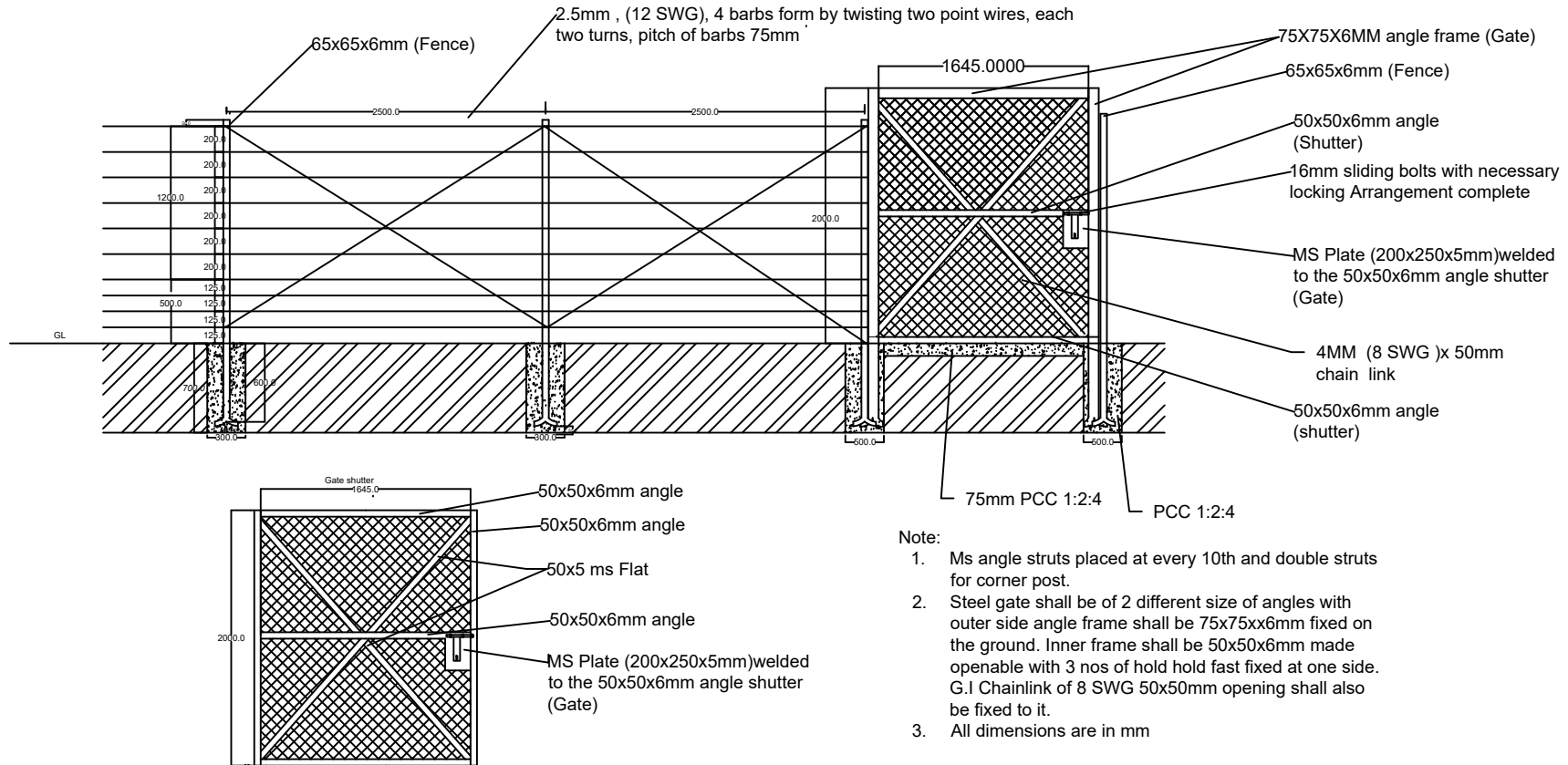
1. Dimensions of Bars are along the Center Lines.
3. Splicing of Bars should not be more than 50%. Length of splice as per Standards.





CABINET STAND FOR HIGH ALTITUDE

BARBED WIRE FENCING AND GATE DRAWING



Title : Barbed wire fencing

BHUTAN TELECOM LIMITED

Checked by:

Approved by: