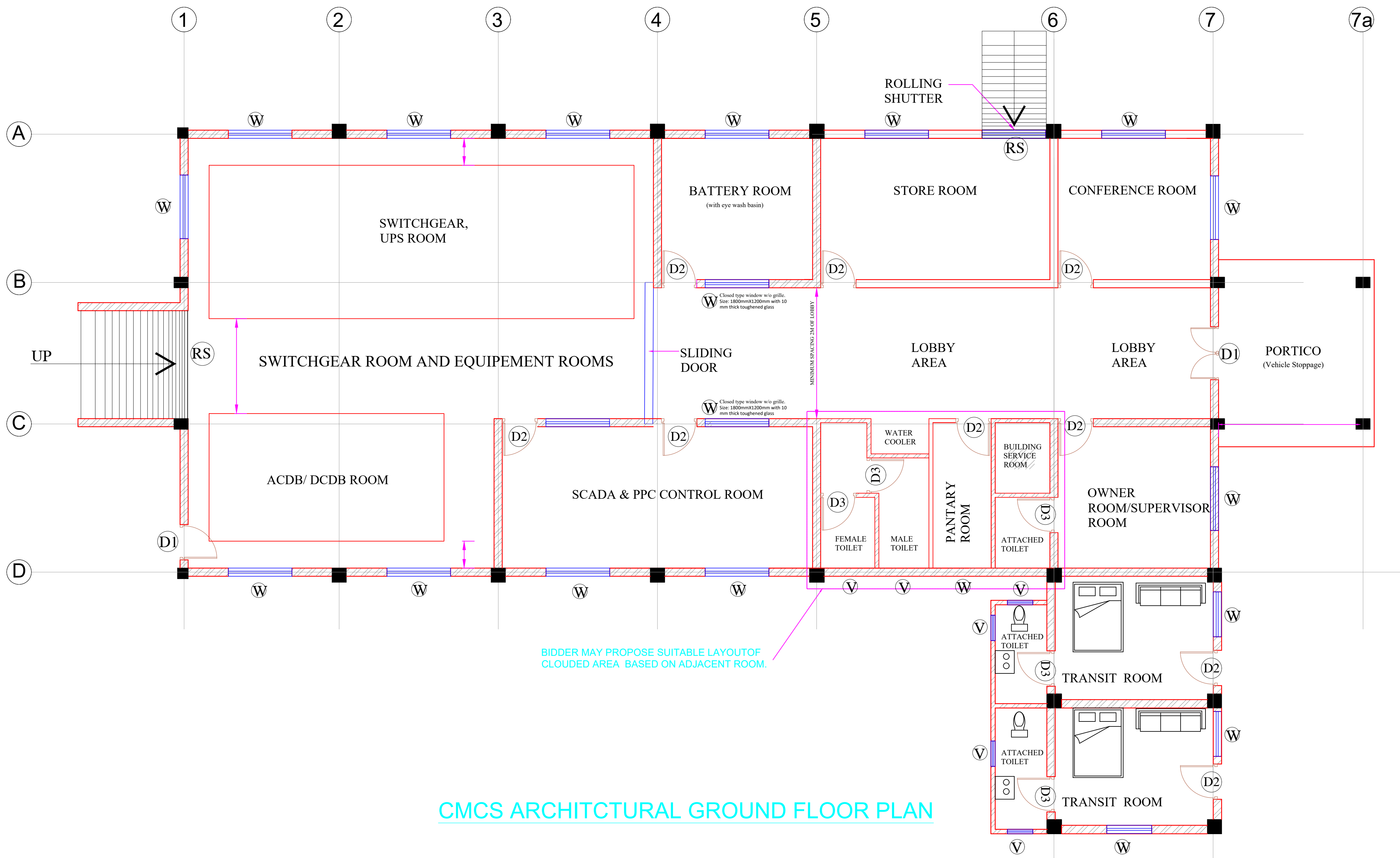
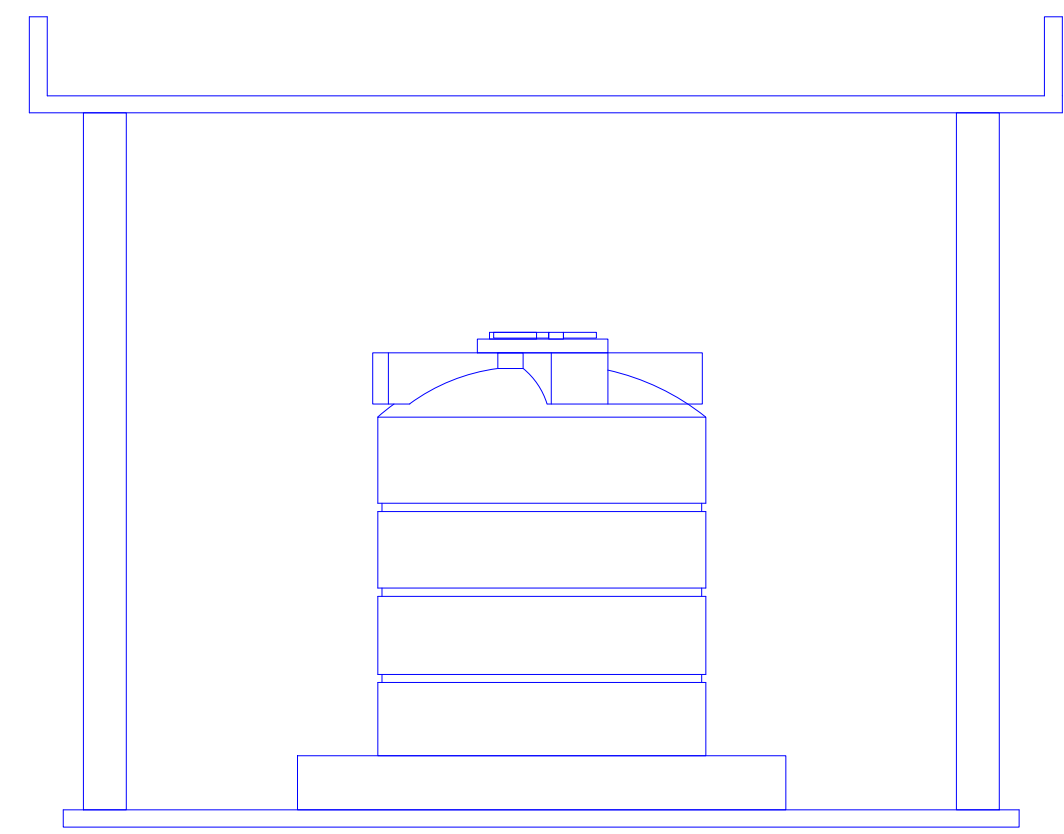


CLAUSE NO.	TECHNICAL SPECIFICATIONS		
	<div data-bbox="557 892 1218 1014"><p><b>PART-B</b></p><p><b>I – TENDER DRAWINGS</b></p></div>		
<p><b>BALANCE OF SYSTEM PACKAGE FOR DEVELOPMENT OF 1500MW GRID CONNECTED SOLAR PV PROJECTS AT RVUNL'S SOLAR PARK IN BIKANER, RAJASTHAN</b></p>		<p><b>PART-B</b></p>	<p><b>PAGE</b> <b>1</b></p>



CMCS ARCHITCTURAL GROUND FLOOR PLAN



WATER TANK ELEVATION

CMCS BUILDING CONSIST OF MINIMUM ROOMS AS BELOW	
DESCRIPTION	
(a) SCADA AND PPC CONTROL ROOM	
(b) ACDB/ DCDB ROOM	
(c) STORE ROOM	
(d) BATTERY ROOM	
(e) OWNER'S ROOM	
(f) PANTRY	
(g) TOILET 2NOS	
(h) LOBBY AREA	
(i) CONFERENCE ROOM	
(j) TRANSIT ROOM	
(k) SWITCHGEAR, UPS ROOM	

CMCS ROOMS	MINIMUM USABLE AREA
SCADA & PPC ROOM	80 SQM. MINIMUM 6.5M WIDTH
STORE ROOM	25 SQM. MINIMUM 5M WIDTH
TOILET X 2 NOS	20 SQM.
PANTRY	10 SQM. MINIMUM 2M WIDTH
OWNER ROOM	24 SQM. MINIMUM 5M WIDTH
CONFERENCE ROOM	40 SQM.
TRANSIT ROOM (2 NOS)	45 SQM. WITH TOILET
ACDB/ DCDB ROOM	AS PER OEM RECOMMENDATION
LOBBY	MIN 2 MTR WIDTH
SWITCHGEAR, UPS ROOM	AS PER OEM RECOMMENDATION

NOTE : Usable area means the internal area of the room excluding the wall thickness.  
Minor re-adjustments of room sizes based on site/application requirement without change in minimum cumulative are requirement of building may be done during detailed engineering with approval of NRGEL

FINISHING SCHEDULE

FINISHING SCHEDULE						
S.NO.	ROOM	FLOOR FINISH	INTERNAL WALL	EXTERNAL WALL	CEILING	BUILDING ROOF &TOP FINISHES
1	SCADA ROOM (AC Room)	Heavy duty vitrified ceramic tile and skirting	12 mm cement plaster with 1:6 (1 cement: 6 coarse sand), with Acrylic Emulsion paint over POP.	18 mm cement plaster in two coats under layer 12 mm thick cement plaster 1:5 (1 cement : 5 coarse sand) finished with a top layer 6 mm thick cement plaster 1:6 (1 cement : 6 fine sand), with exterior emulsion paint.	6 mm cement plaster with 1:3 (1 cement: 3 fine sand). 15 mm thk mineral fibre board in tile form false ceiling.	<ul style="list-style-type: none"><li>• <i>Cast-in-situ</i> <b>RCC</b> Or</li><li>• <i>Cast-in-situ</i> <b>RCC</b> slab with decking sheet (RCC slab with permanent formwork).</li></ul> <p>The slab formwork decking sheet shall be permanently colour coated profile sheet with minimum 0.6mm thickness of grade SS255 as per ASTM A653M / grade G250 as per AS 1397 coated with zinc of class designation Z275 or aluminium zinc alloy of class designation AZ150 or similar.</p> <p>The roof of the building shall be waterproof with Polymeric membrane type waterproofing as per DSR. The roof shall be designed for a minimum superimposed load to 150 kg/m2.</p>
2	OWNER ROOM (AC Room)				6 mm thick cement plaster (CM 1:3). Acid resistant resin based epoxy coating.	
3	BATTERY ROOM (With wash basin)	Acid/Alkali resistance tile flooring. Acid/ Alkali resistant Dado -2100 mm, Above that Acid/Alkali resistant or Chlorinated rubber paint.	12 mm thick cement plaster with 1:6 (1 cement: 6 coarse sand), with Oil bound distemper.		6 mm thick cement plaster (CM 1:3). White wash.	
4	SWITCHGEAR ROOM	Cement concrete flooring with ironite hardener.				
5	LOBBY	Heavy duty vitrified ceramic tile and skirting.				
6	STAIRCASE	Granite/Kota stone flooring 20 mm Thick				
7	STORE ROOM	Granite/Kota stone flooring 20 mm thick				
8	TOILETS/PANTRY	Heavy duty anti-skid ceramic Tiles and dodo 2100 mm.				
9	STEPS	Granite/Kota stone flooring 20 mm thick				
10	RAMP	Cement concrete flooring with ironite hardener.				
11	ACDB/ DCDB, SUBSTATION & C&R PANEL ROOM, TRANSIT ROOM (AC ROOM)	SAME AS SCADA ROOM	SAME AS SCADA ROOM	SAME AS SCADA ROOM	SAME AS SCADA ROOM	SAME AS SCADA ROOM

**Plumbing and sanitary:**  
CMCS building room shall have toilet for both genders and one attached toilet. Each toilet shall have the following minimum fittings of ISI approved of a reputed brand (subject to approval from Engineer in charge).

- 1) Wall mounted WC (Western type) 390 mm high with toilet paper roll holder and all fittings.
- 2) Wall mounted Urinal (430 x 260 x 350 mm size) with all fittings for the male toilet only.
- 3) Washbasin (550 x 400 mm) above the platform with all fittings.
- 4) Bathroom mirror (600 x 450 x 6 mm thick) hardboard backing.
- 5) CP brass towel rail (600 x 20 mm) with C.P. brass brackets.
- 6) Soap holder and liquid soap dispenser.

All fittings, fastener, grating shall be brass with chromium-plated as per relevant IS code. Necessary plumbing lines shall be provided for CMCS room building and Security room near the main gate.

The bidder shall design & provide packaged sewerage treatment plant/septic with soak pit for CMCS and Security room assuming that a total of 15 people shall use the facility. The wastewater/effluents from the sewerage plants/septic tank shall meet the state pollution control board requirement.

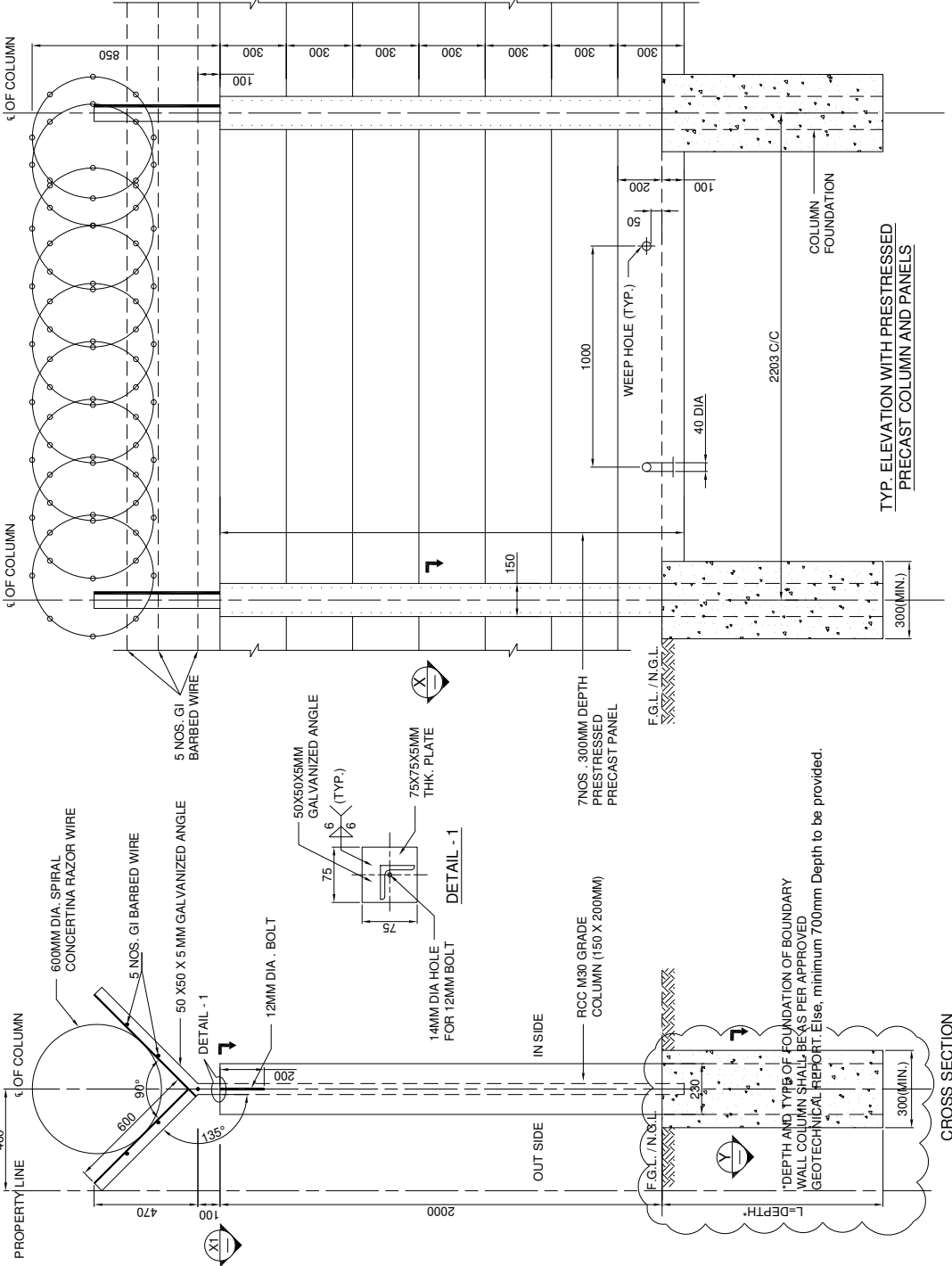
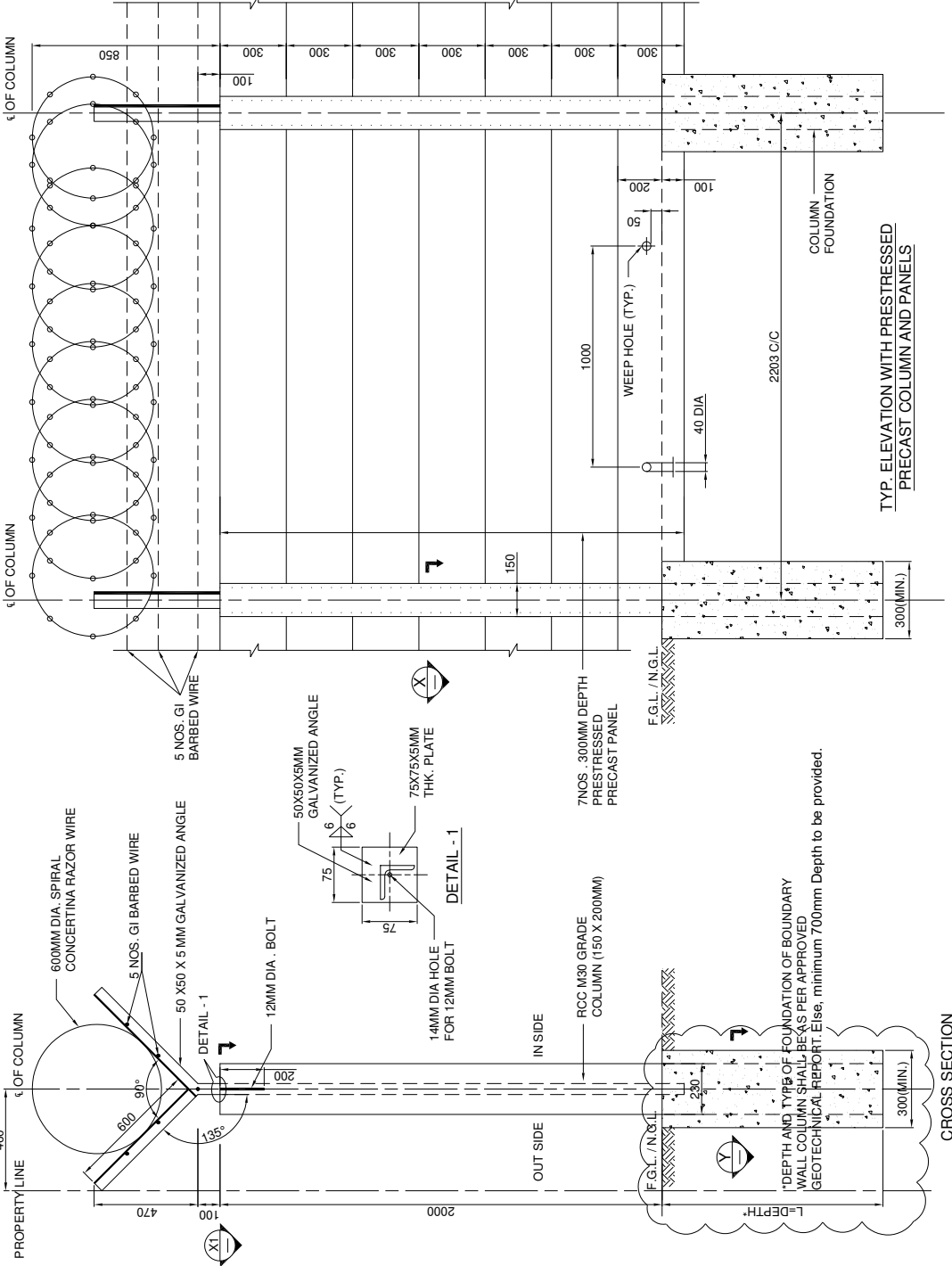
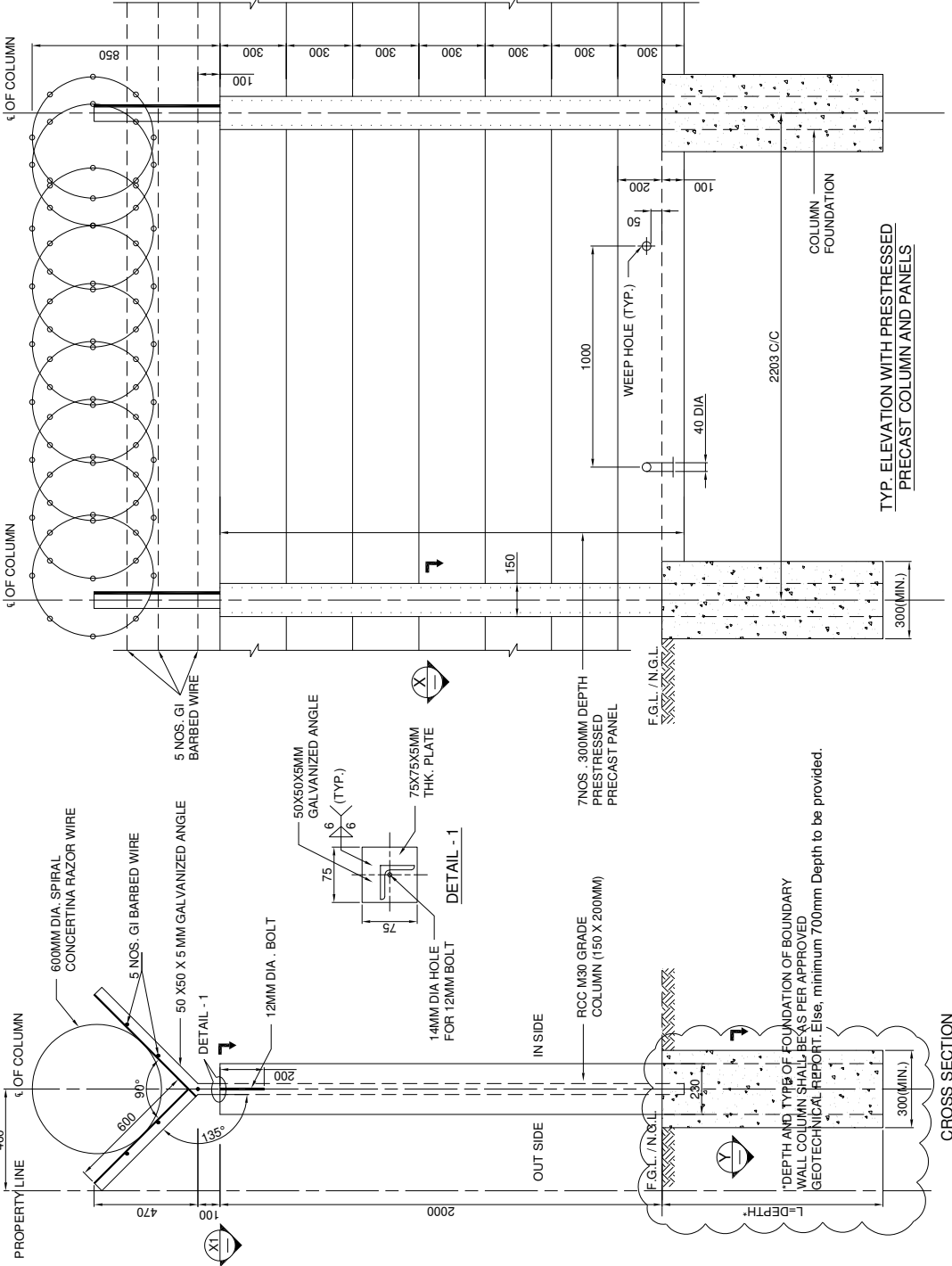
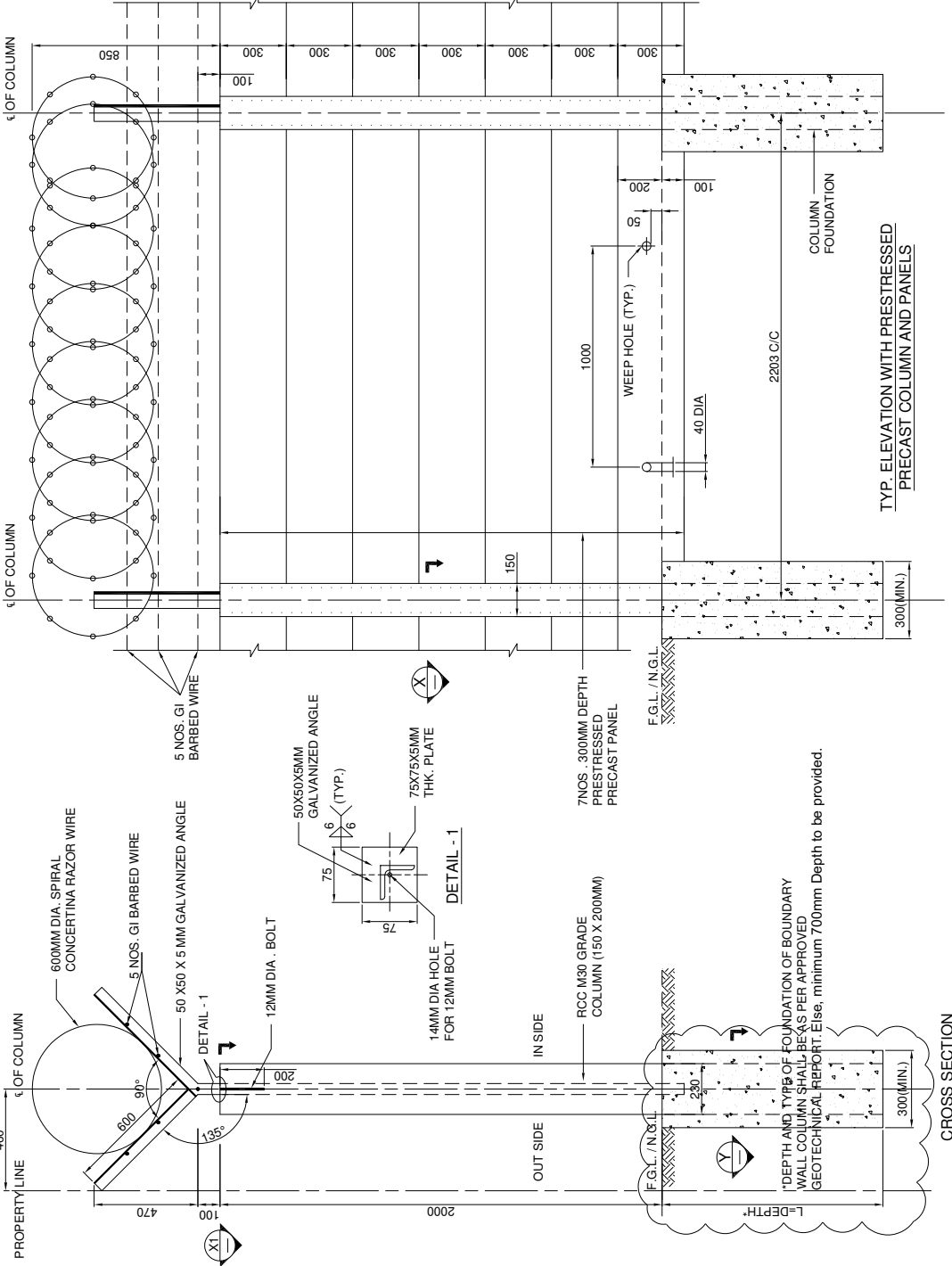
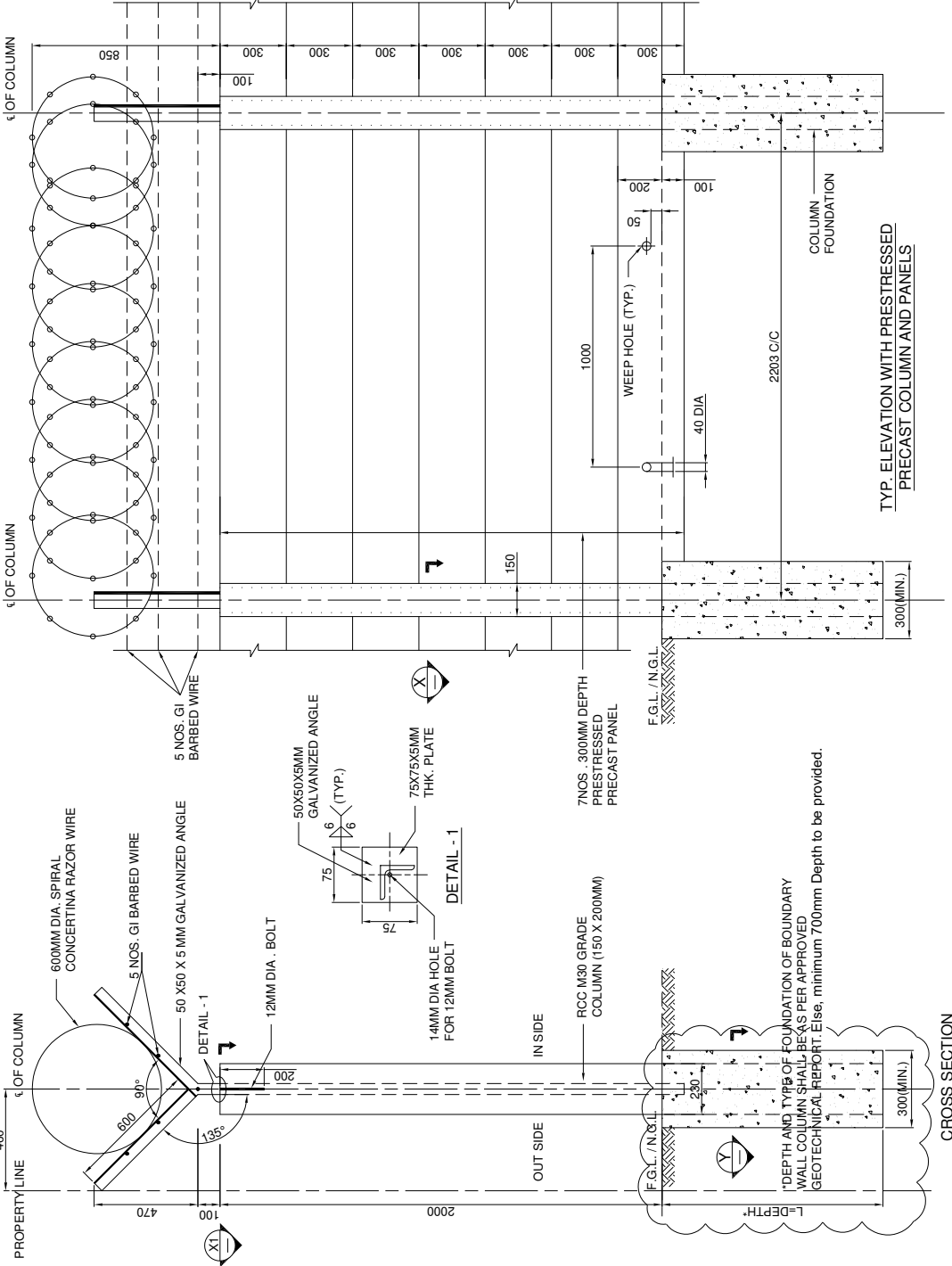
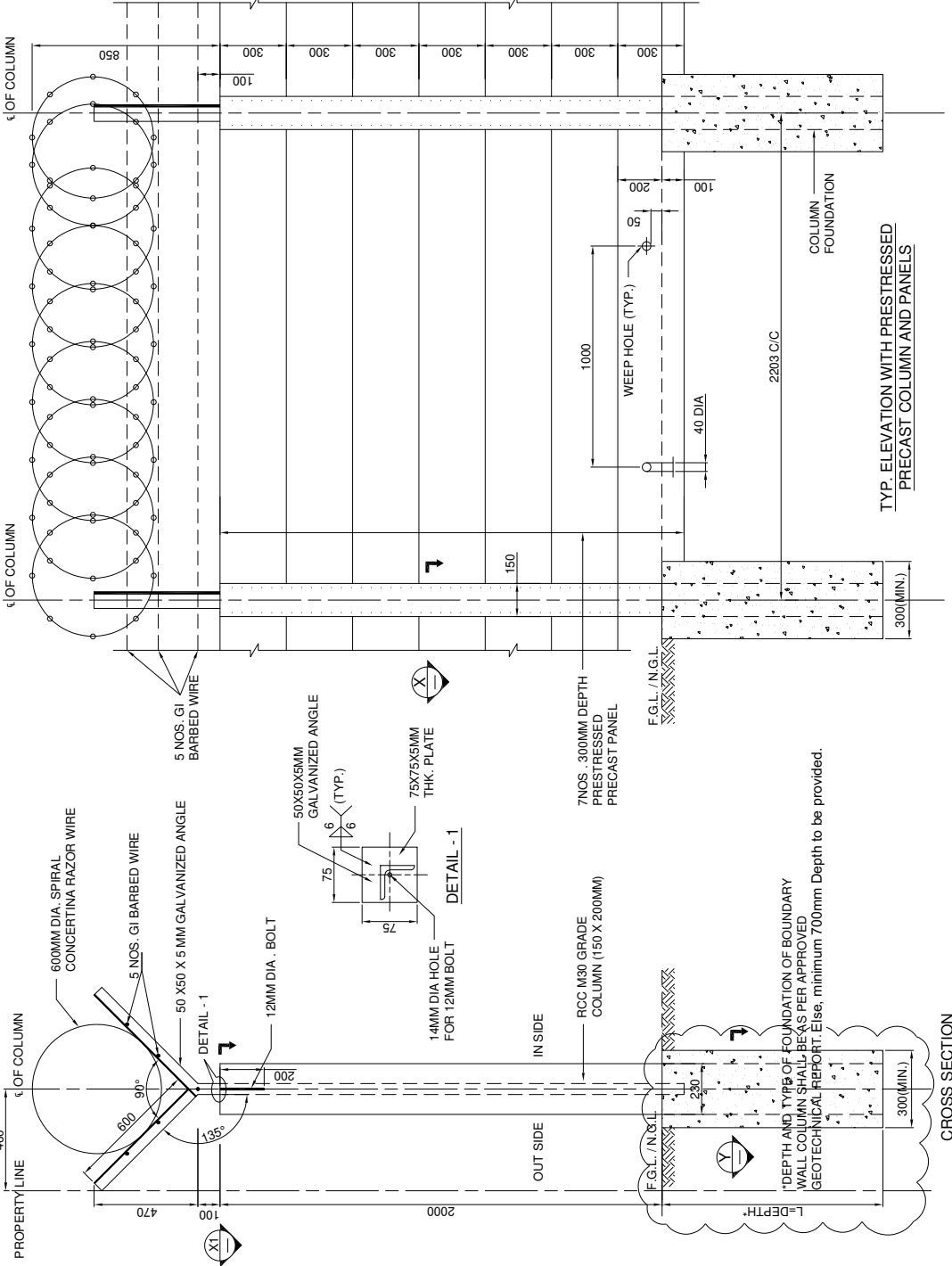
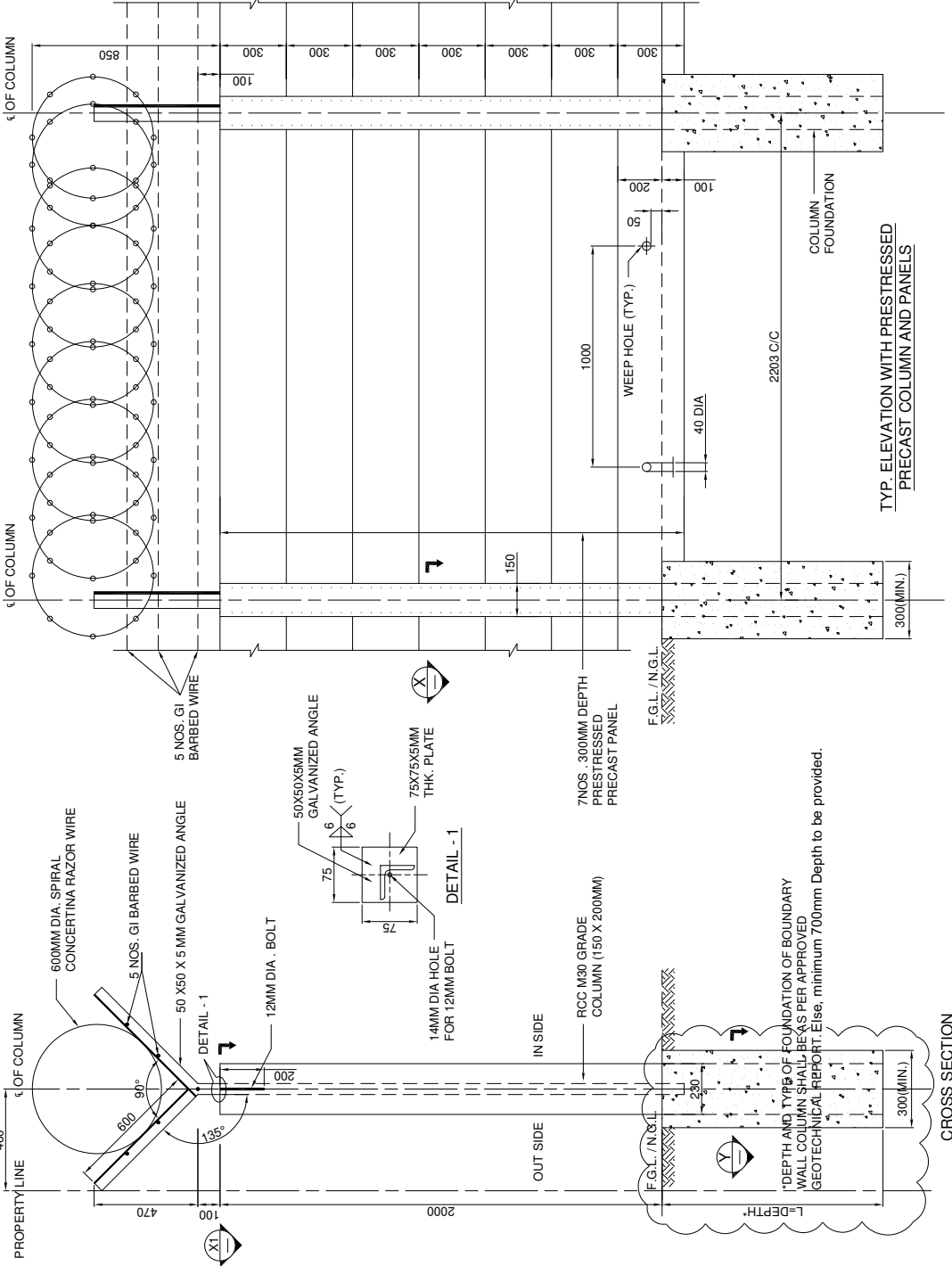
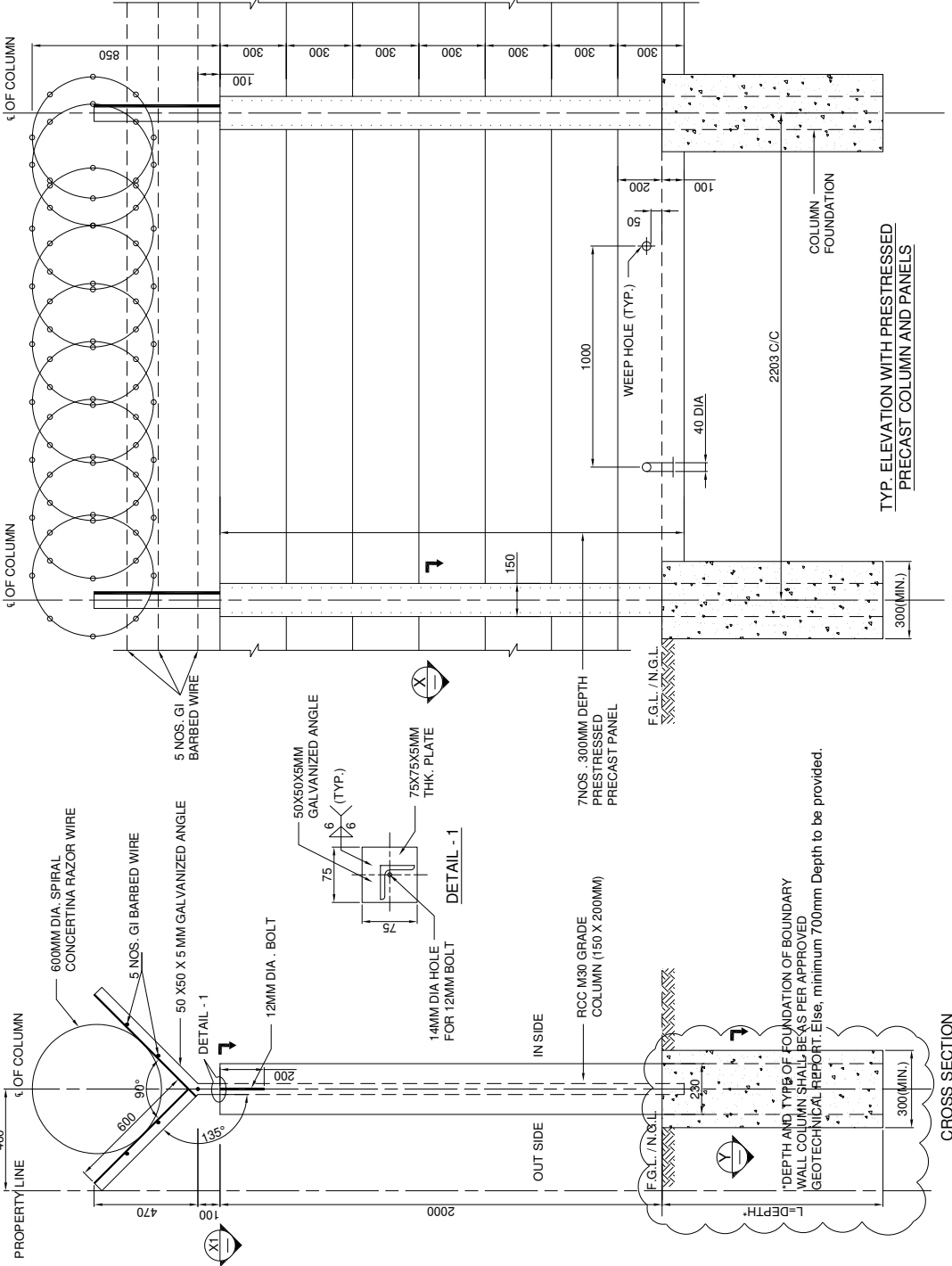
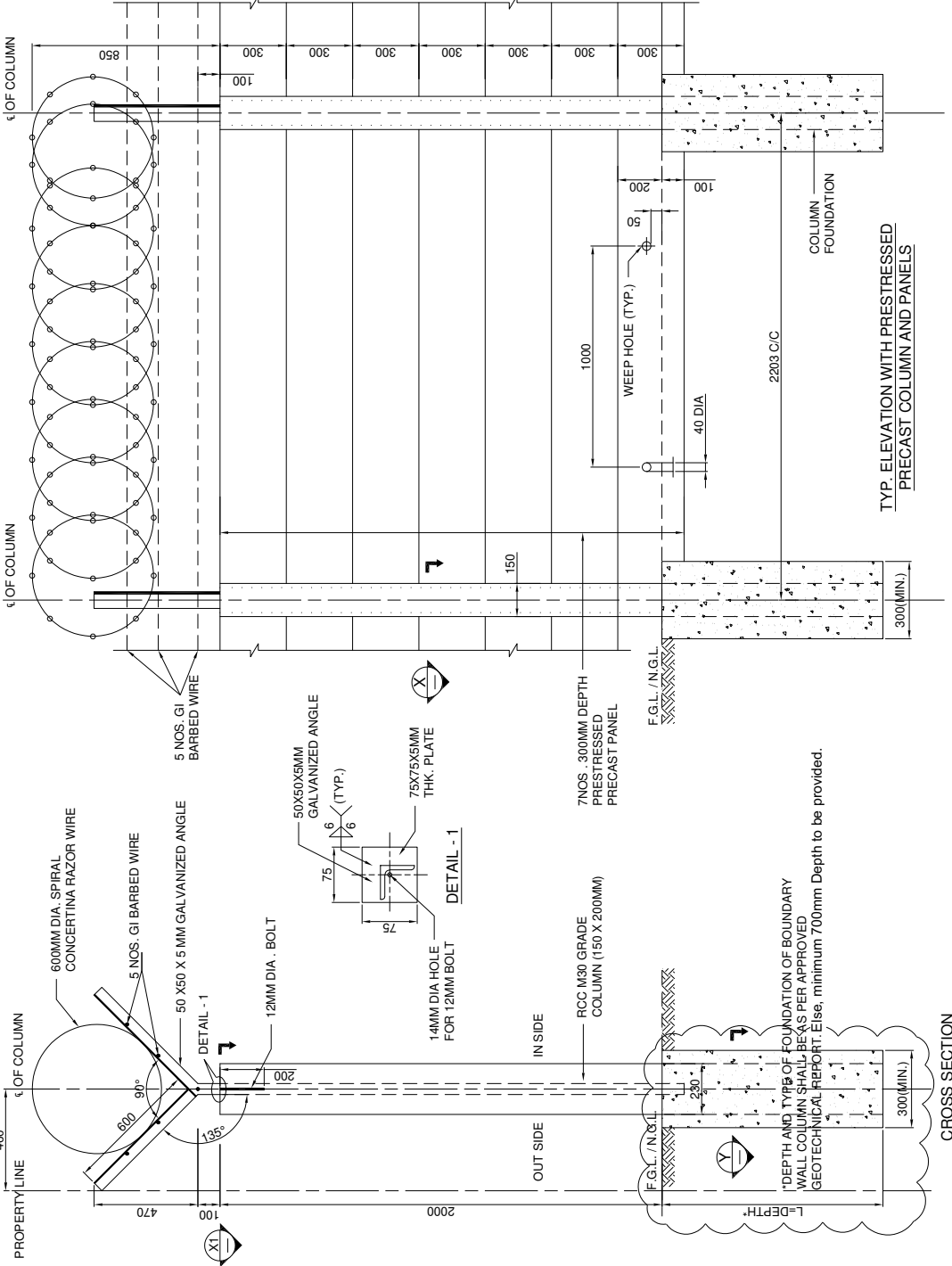
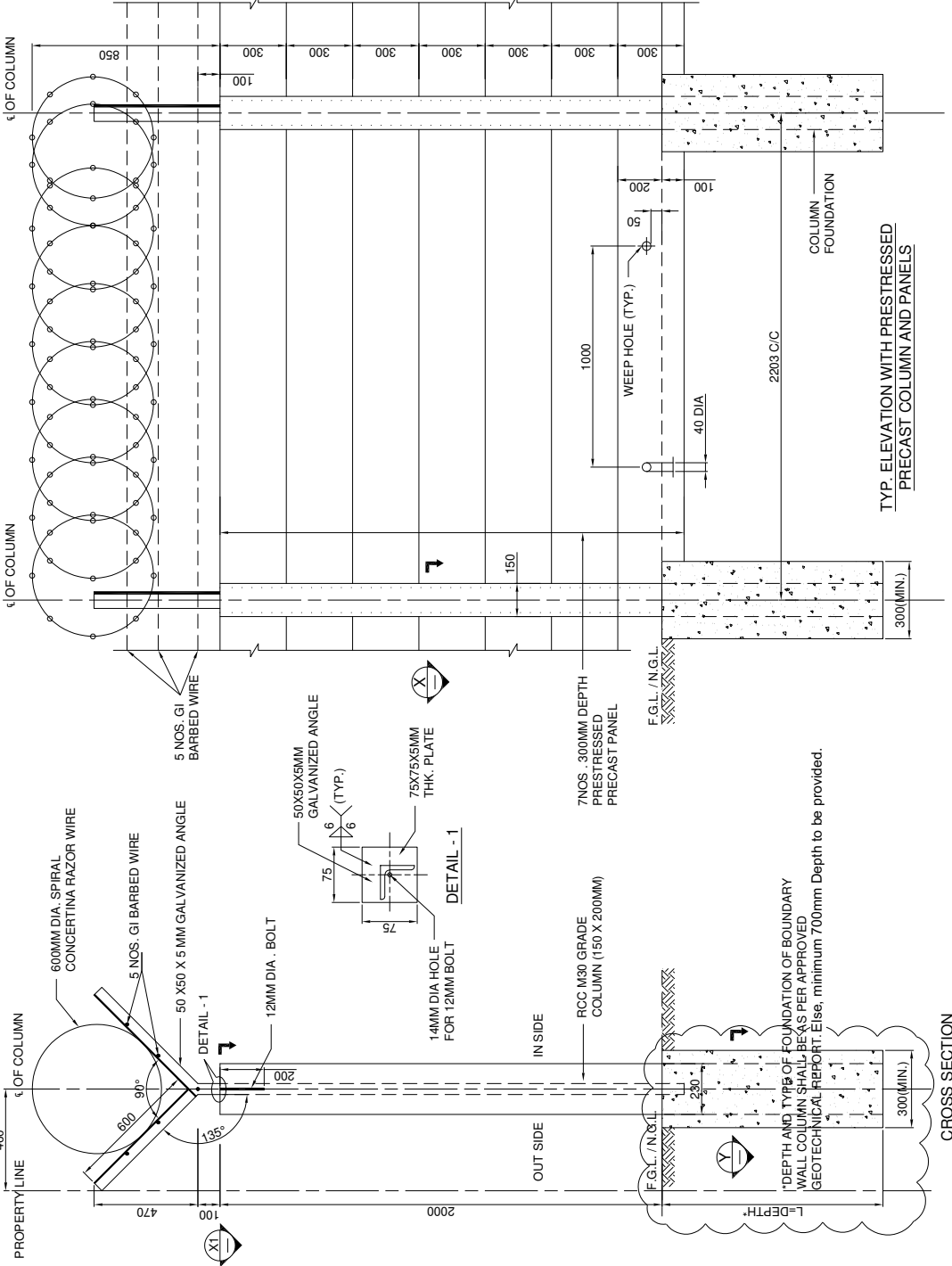
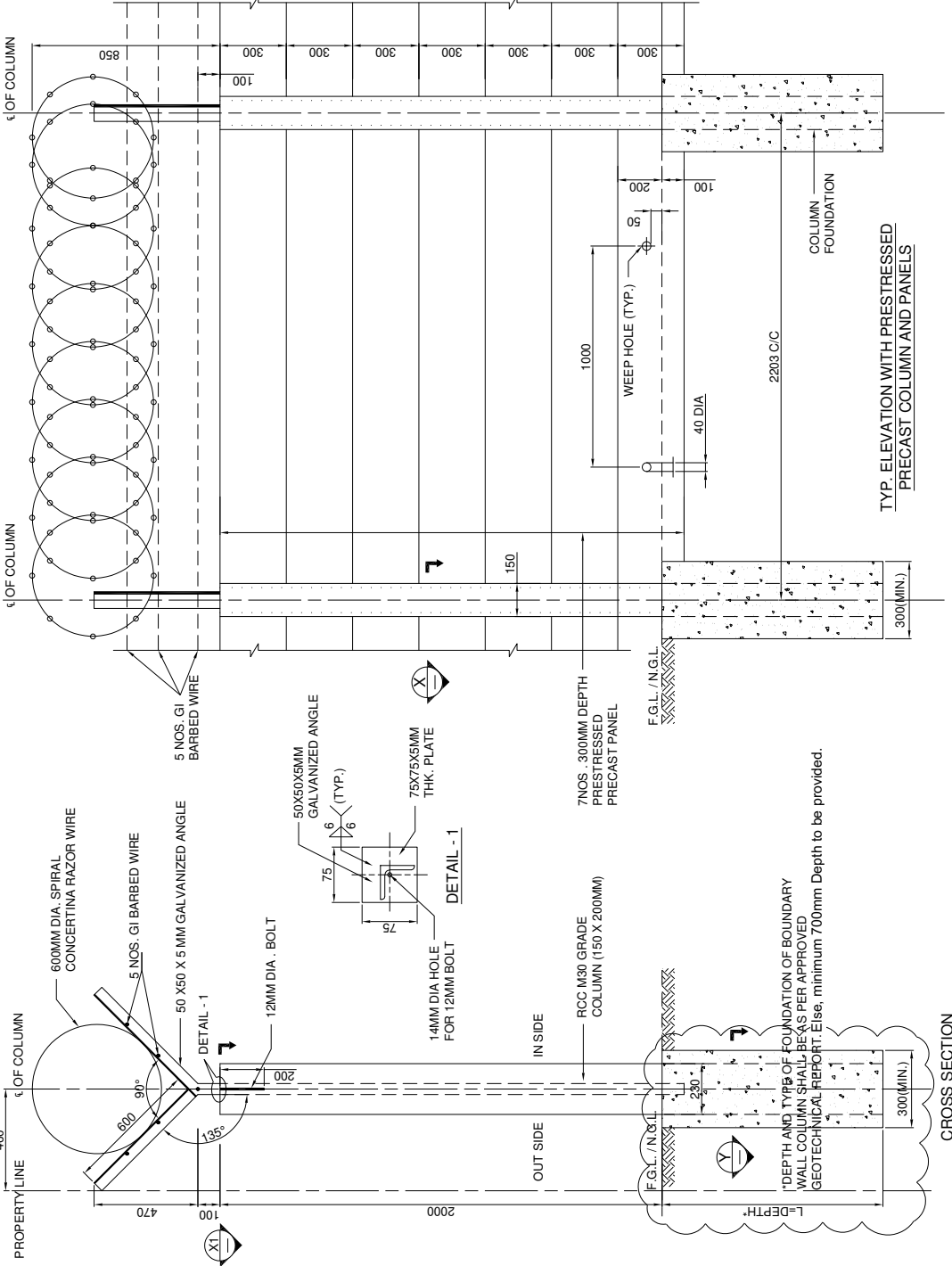
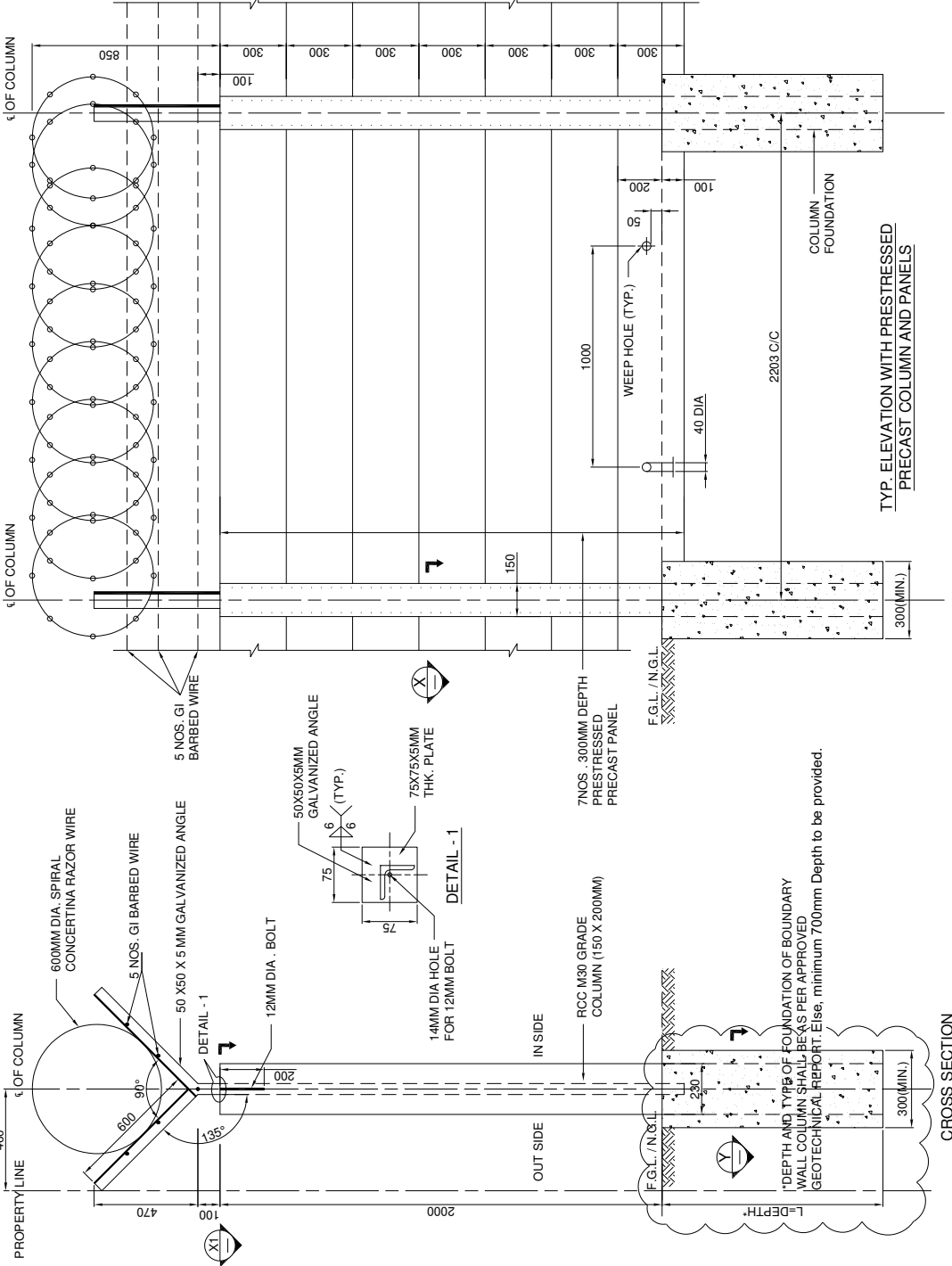
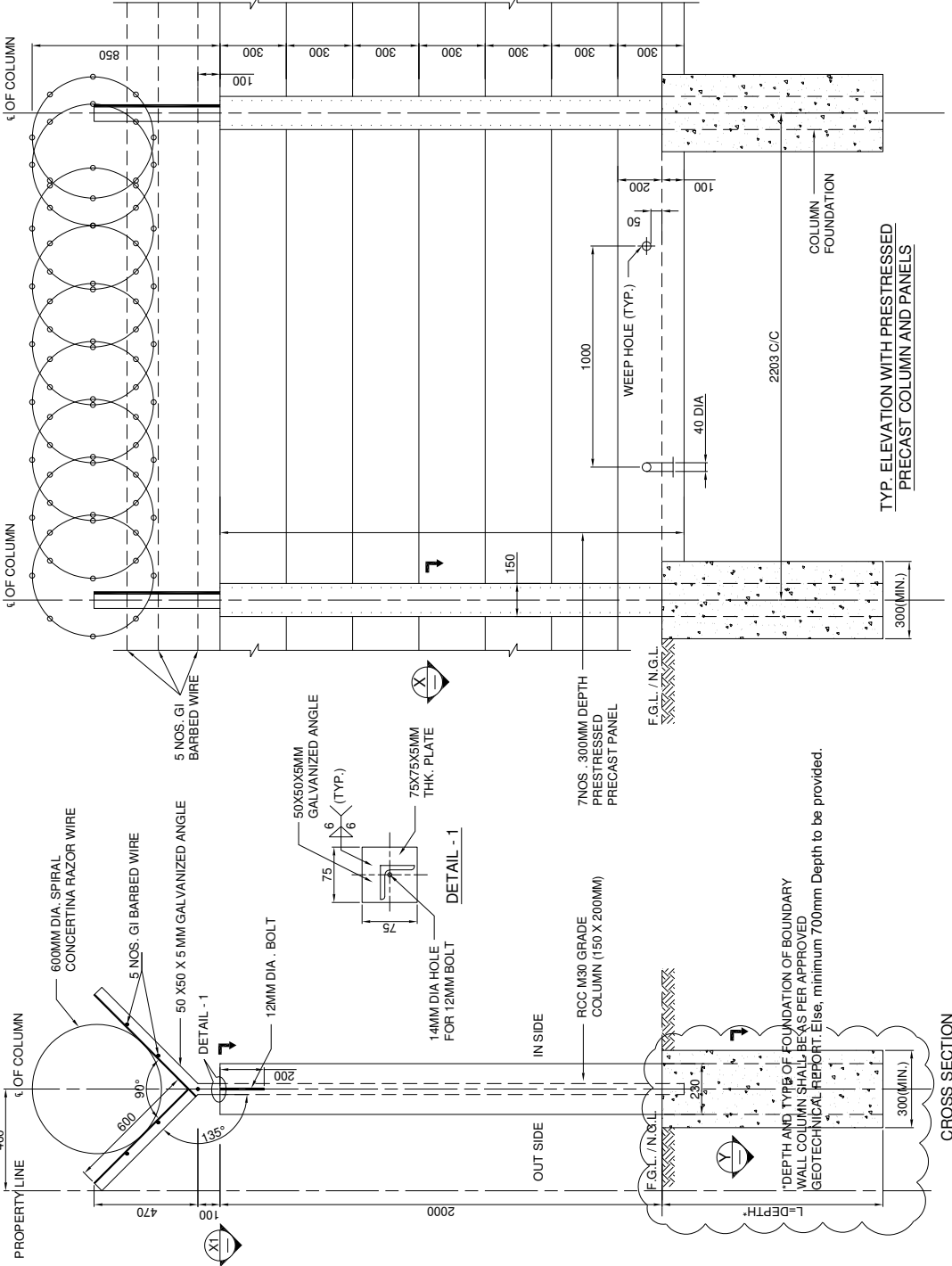
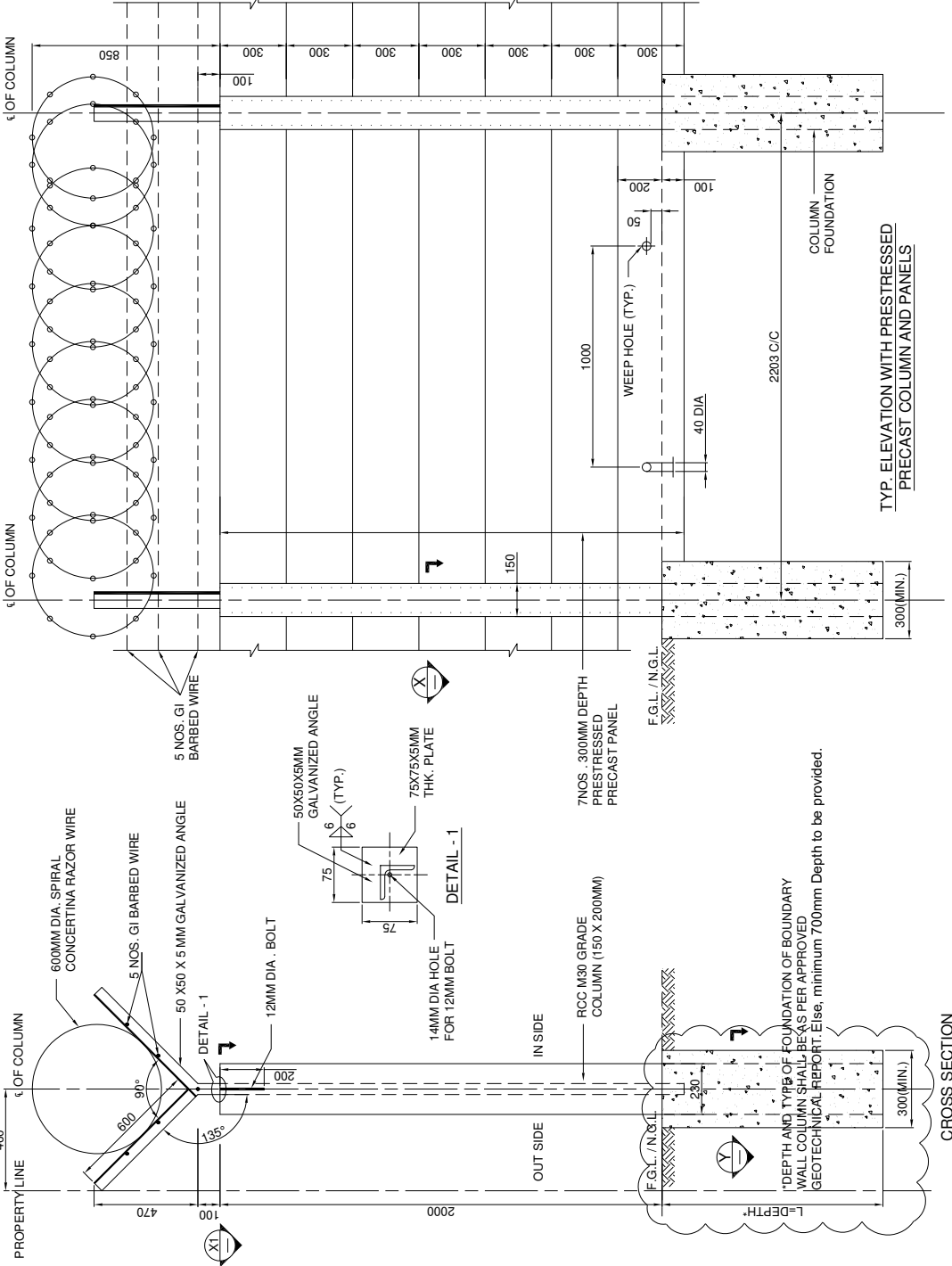
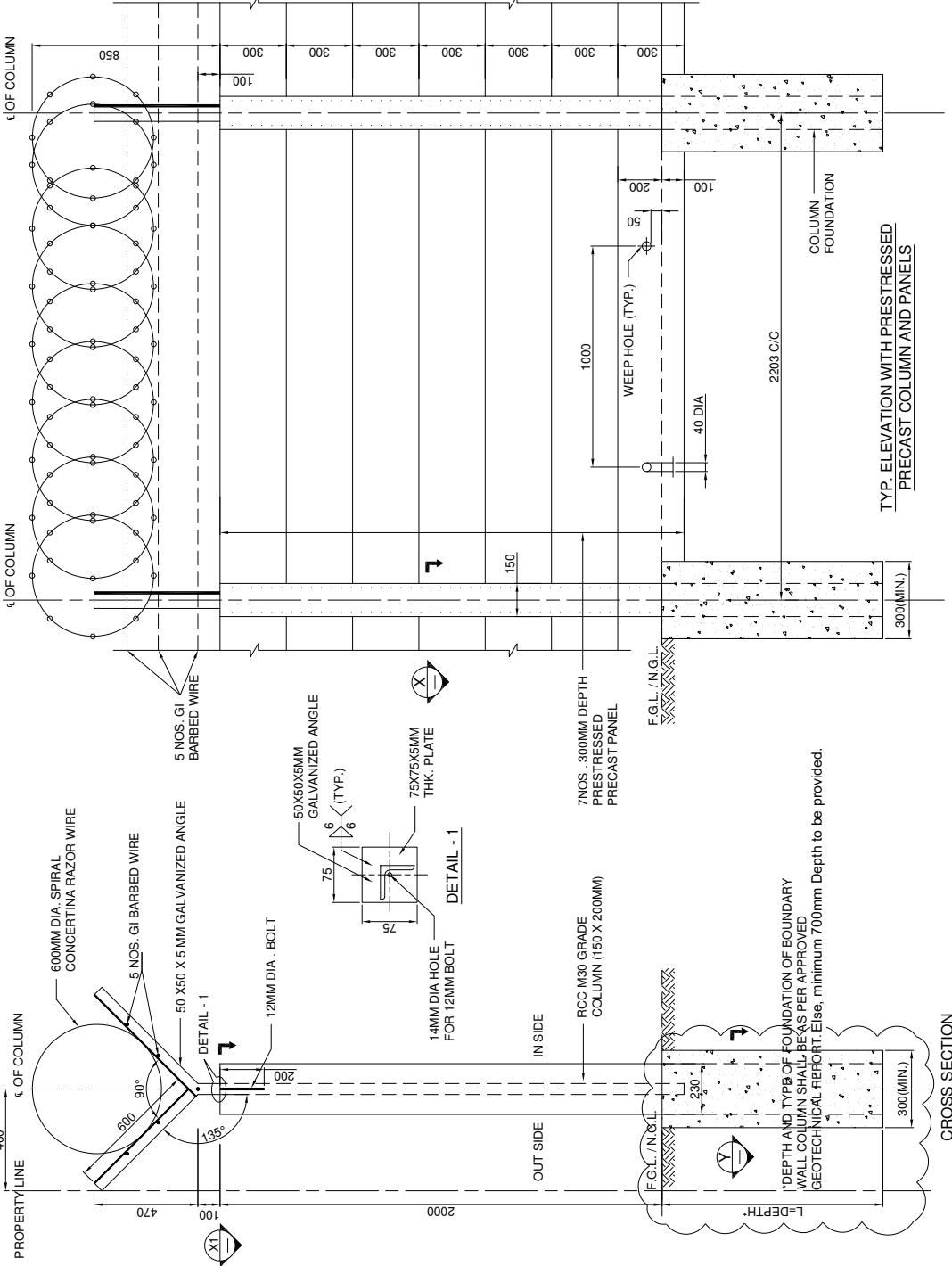
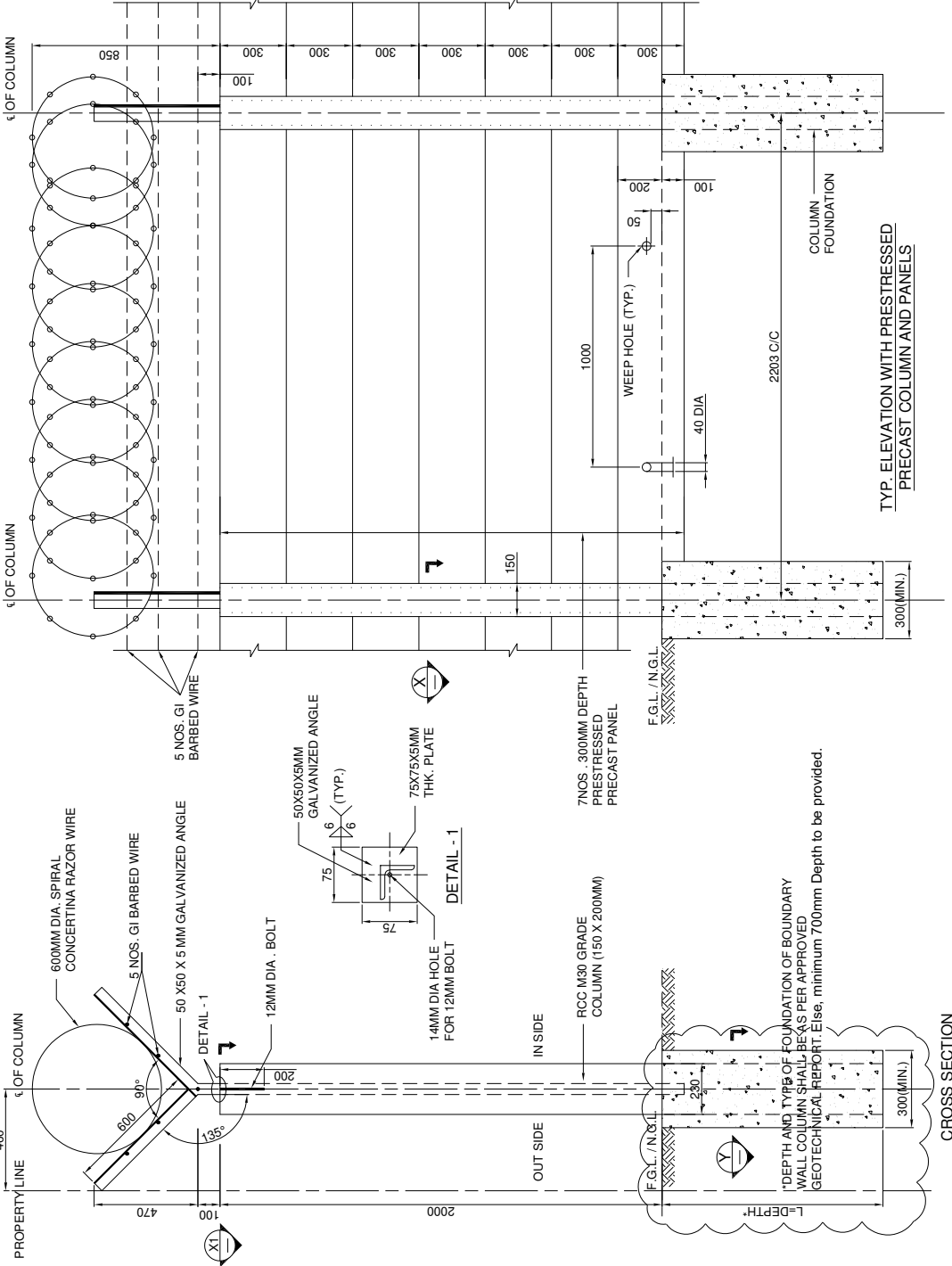
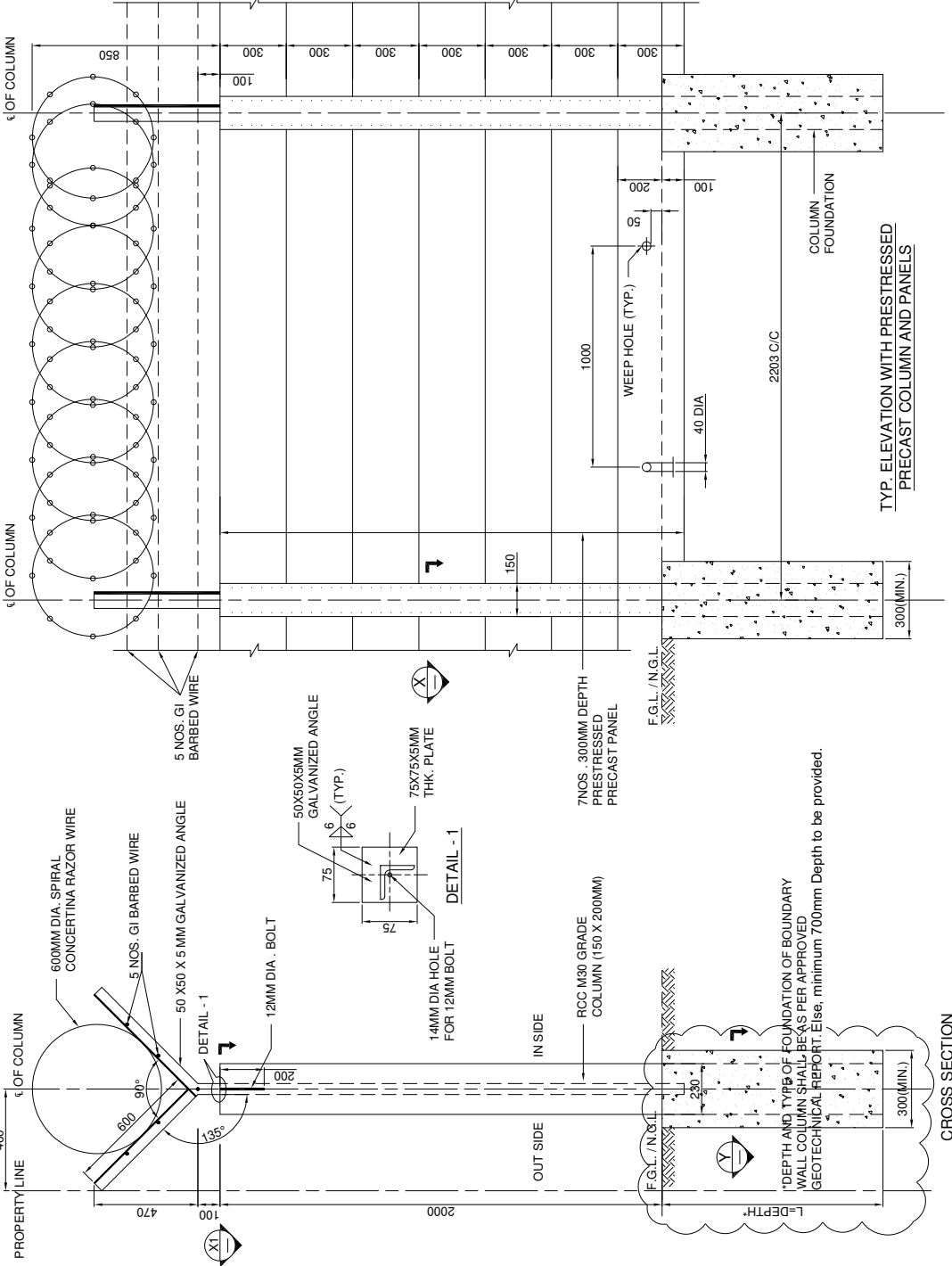
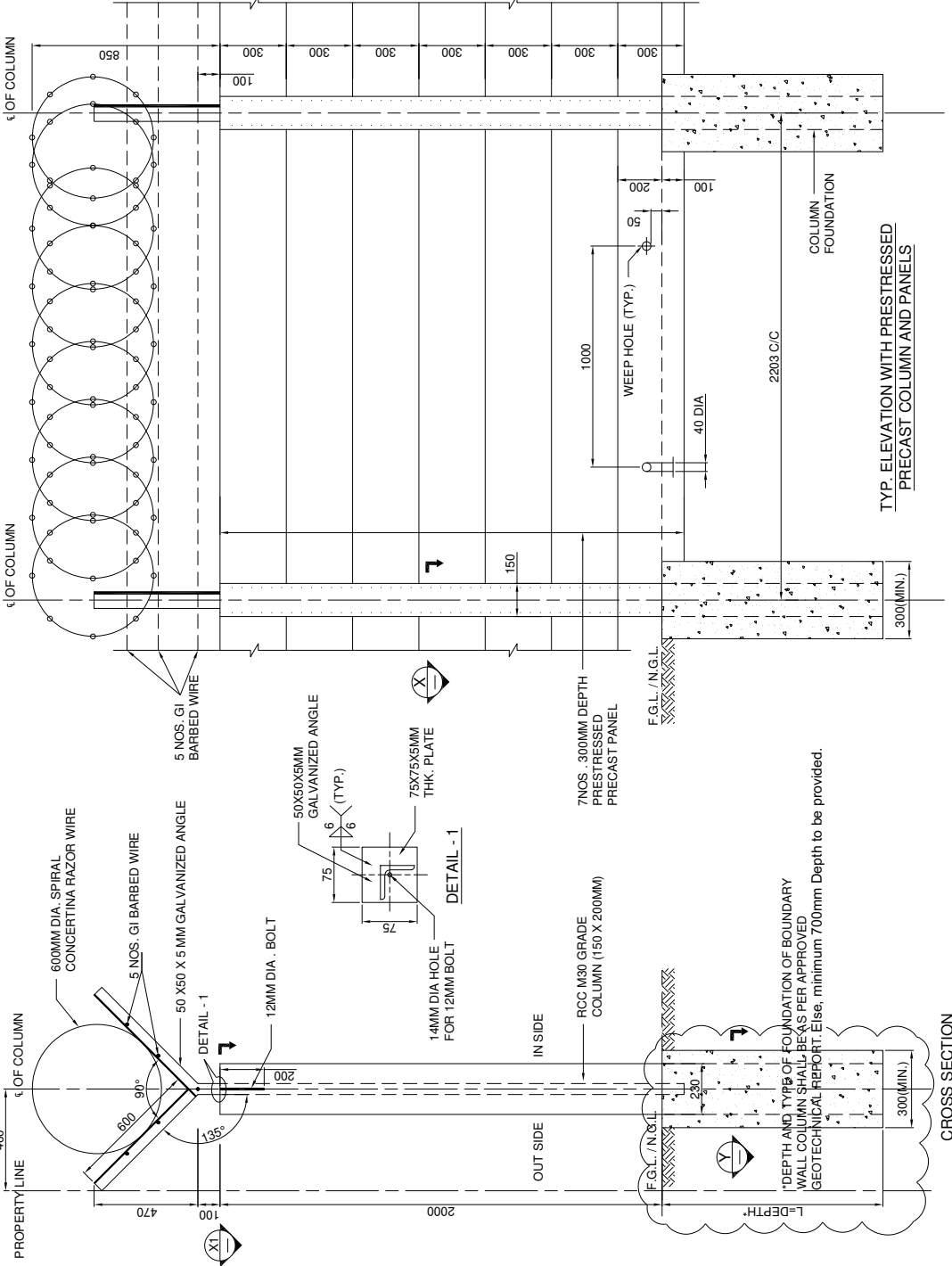
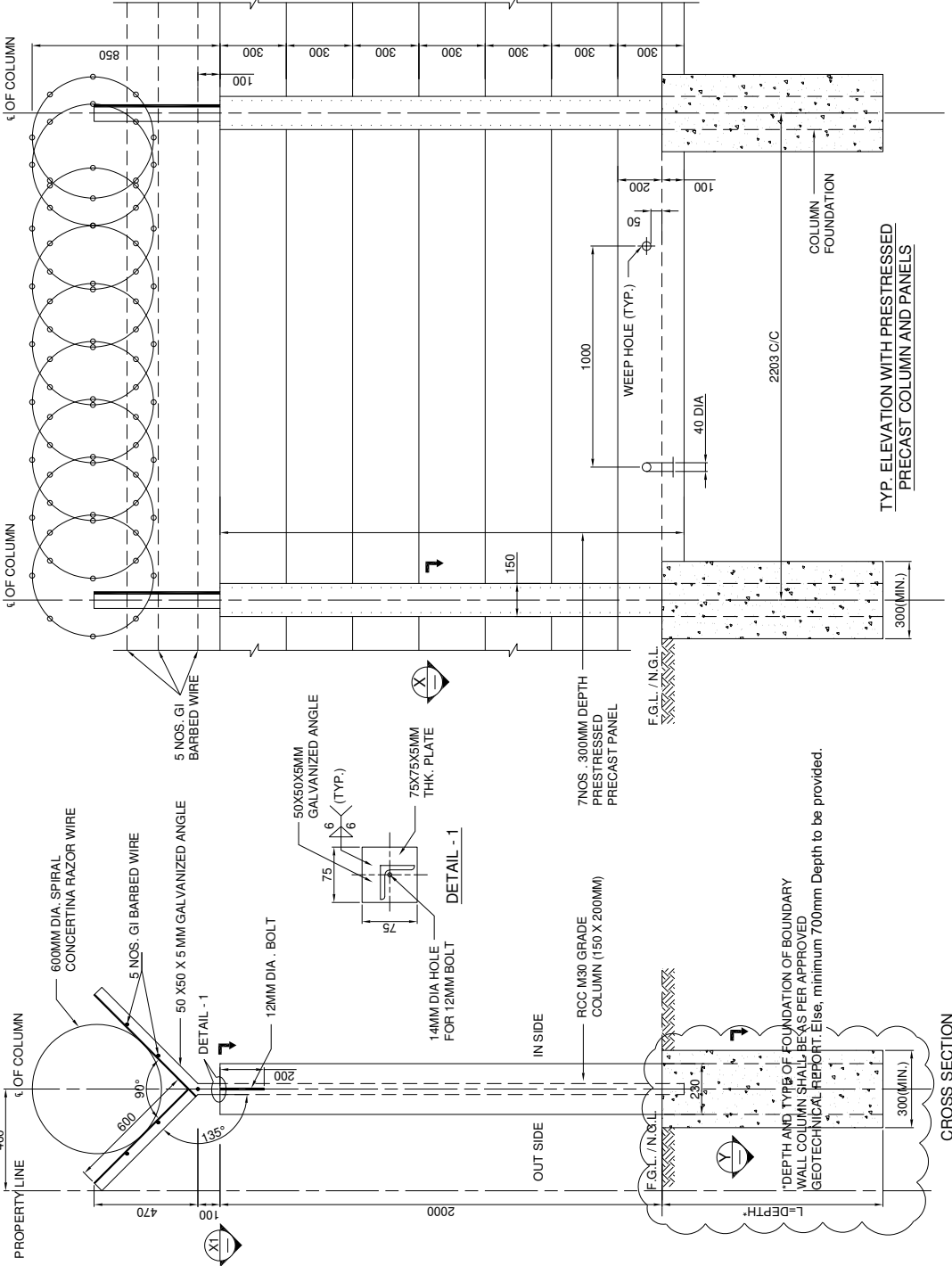
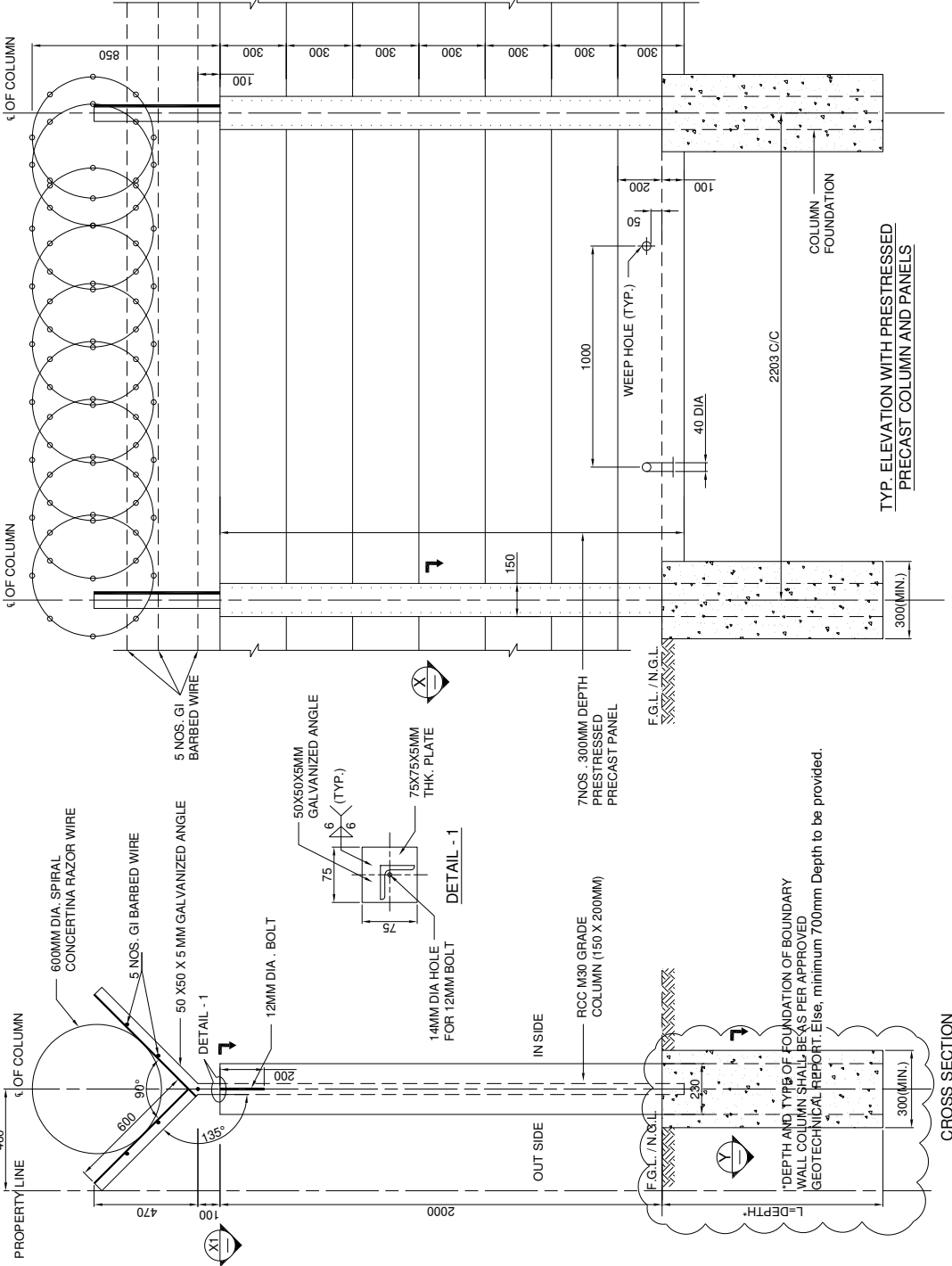
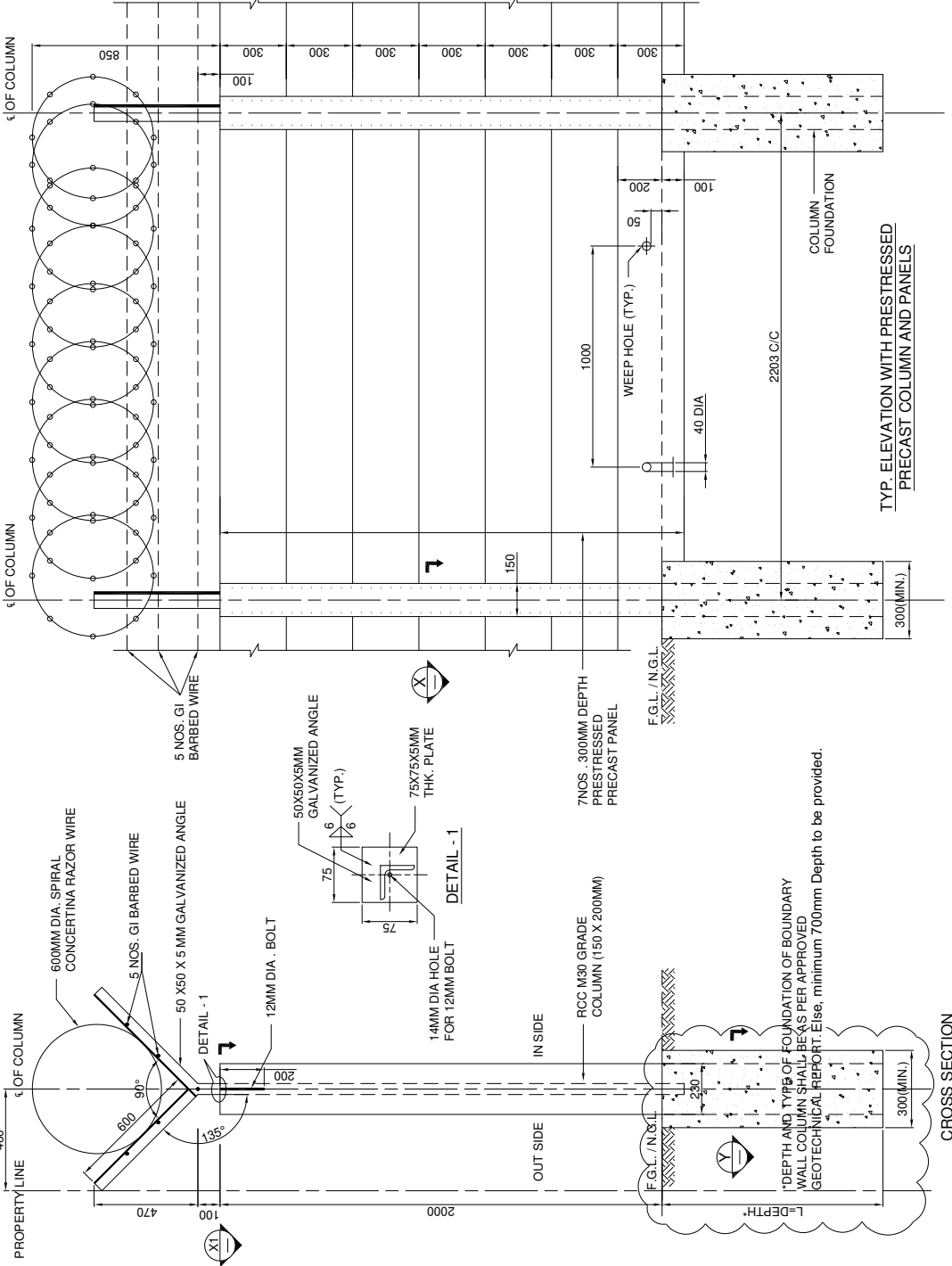
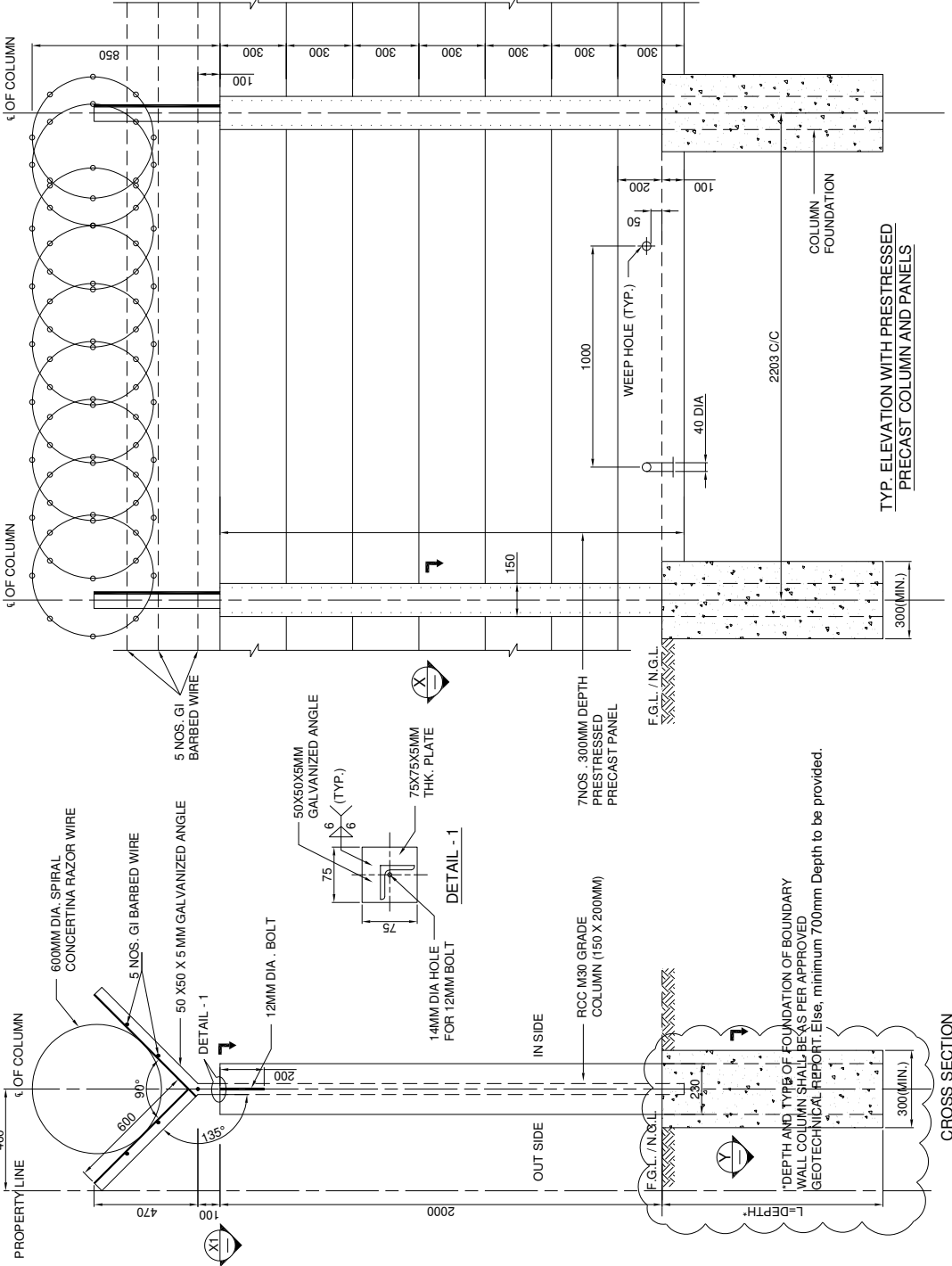
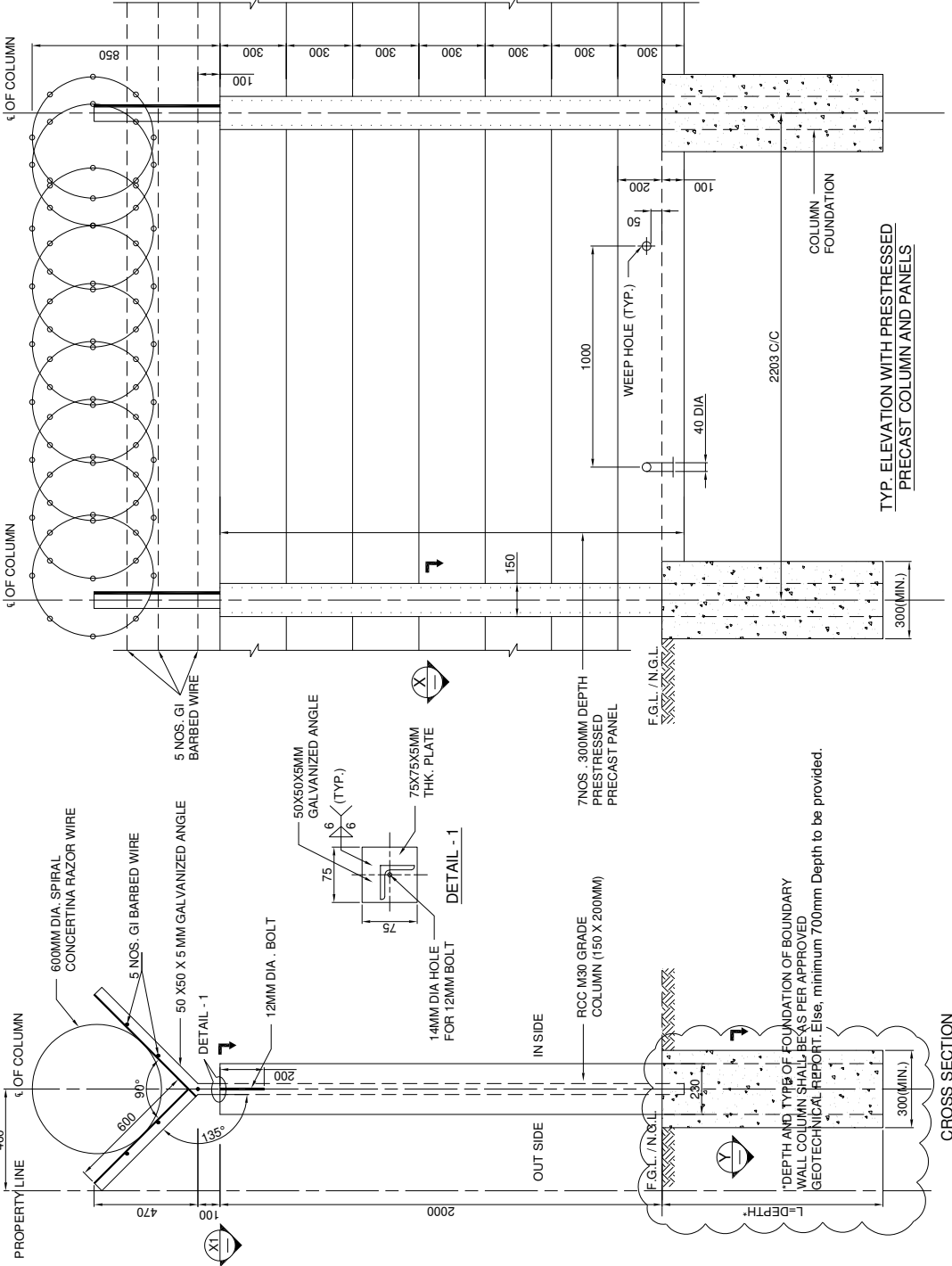
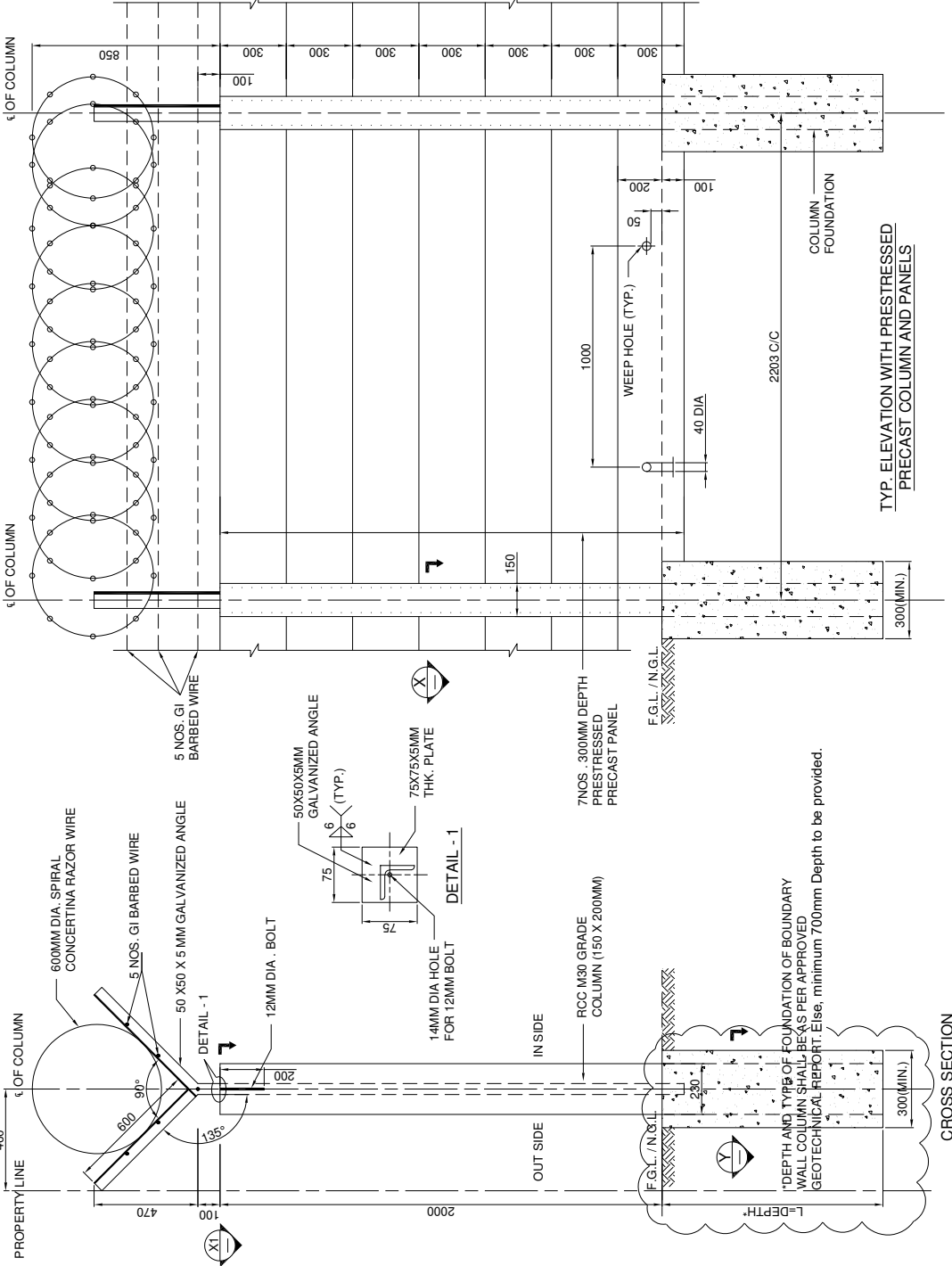
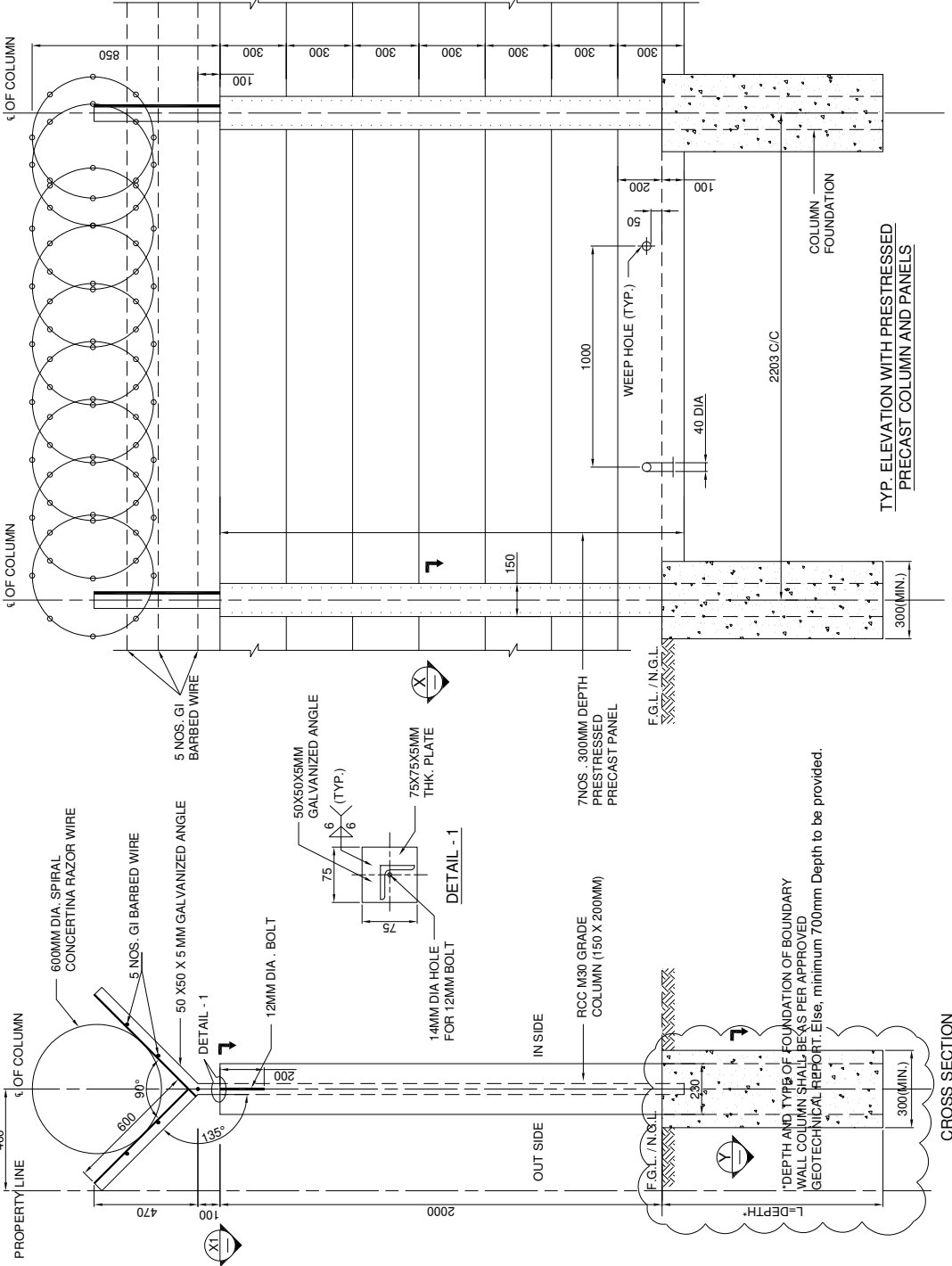
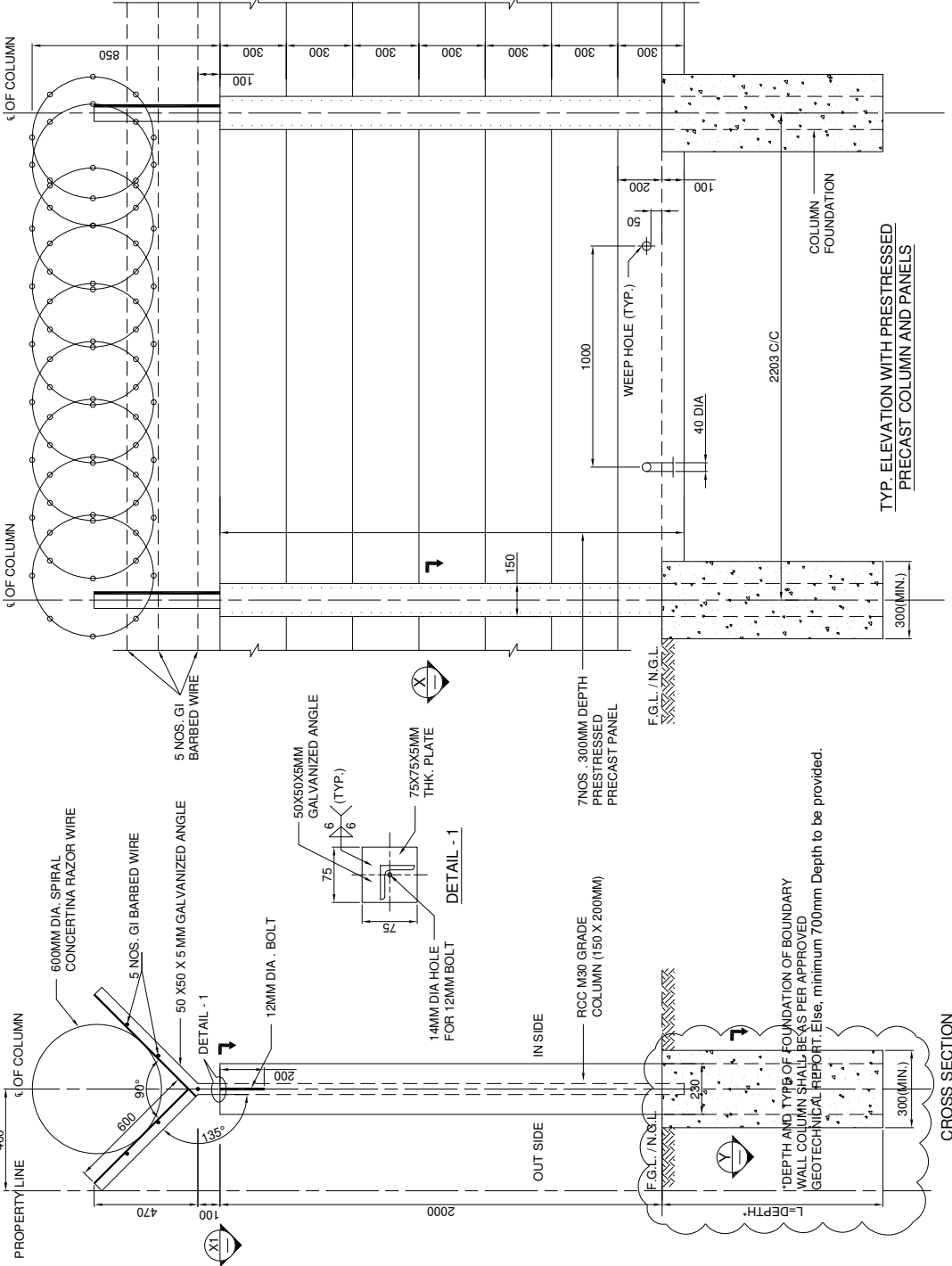
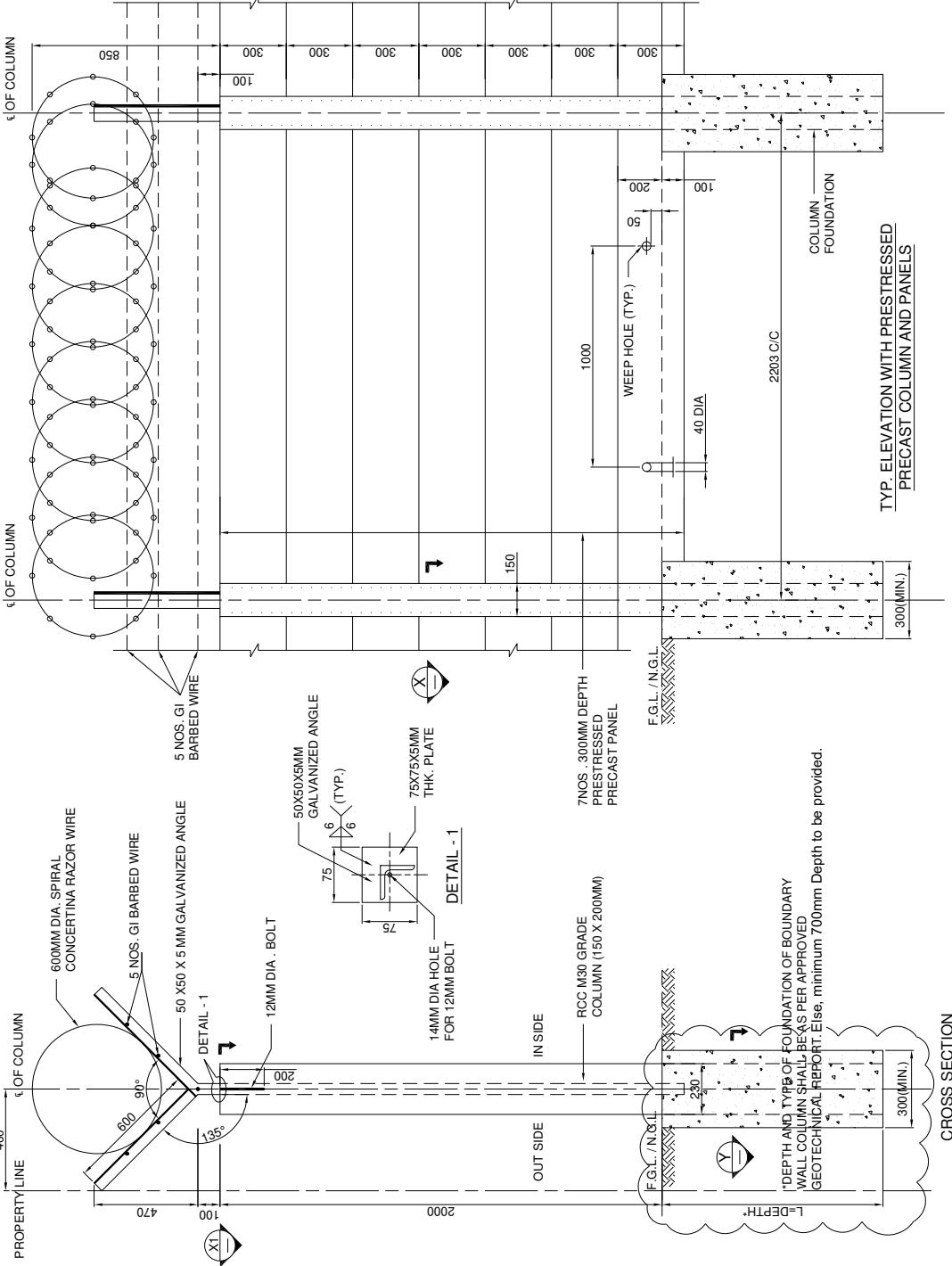
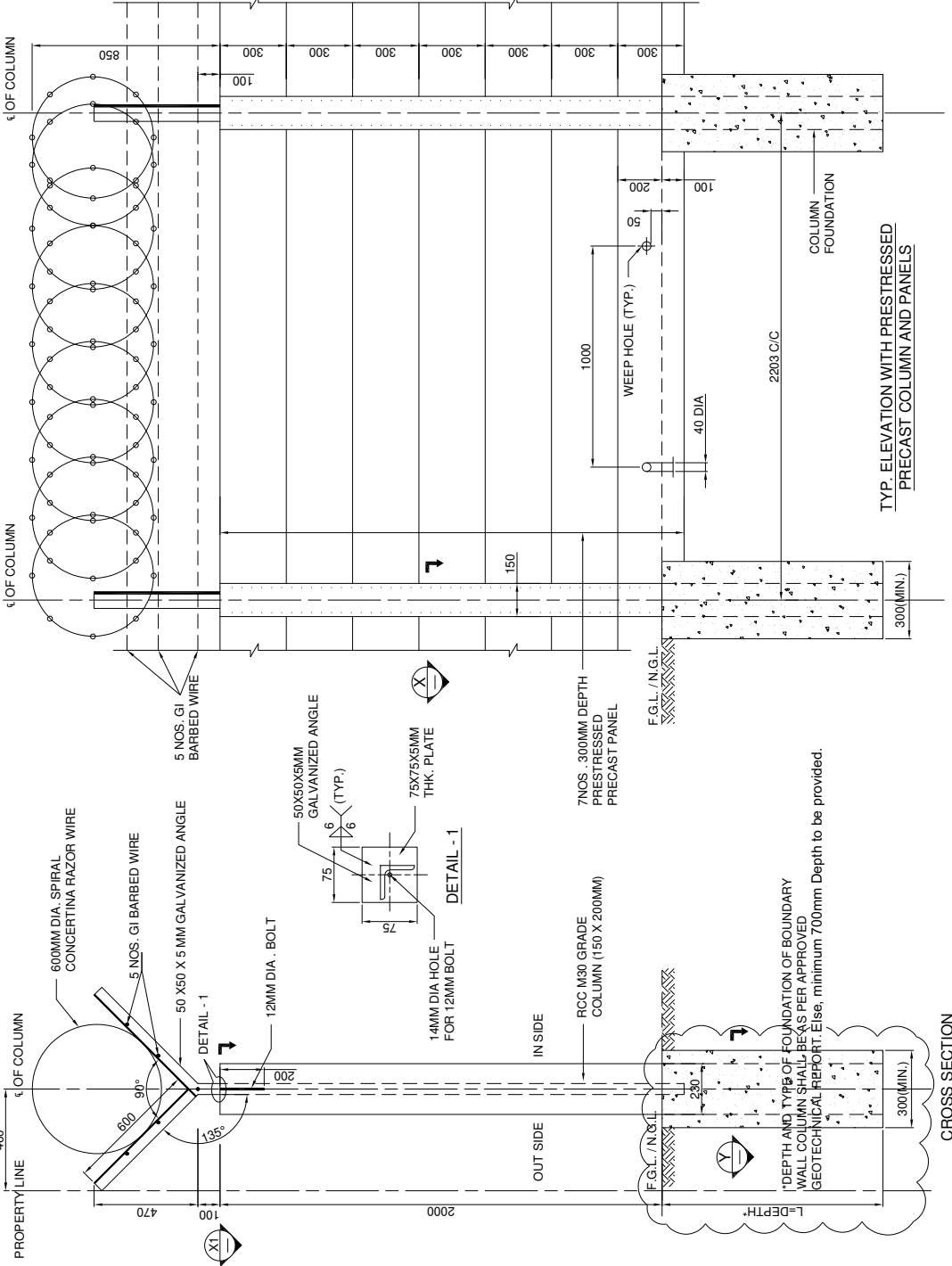
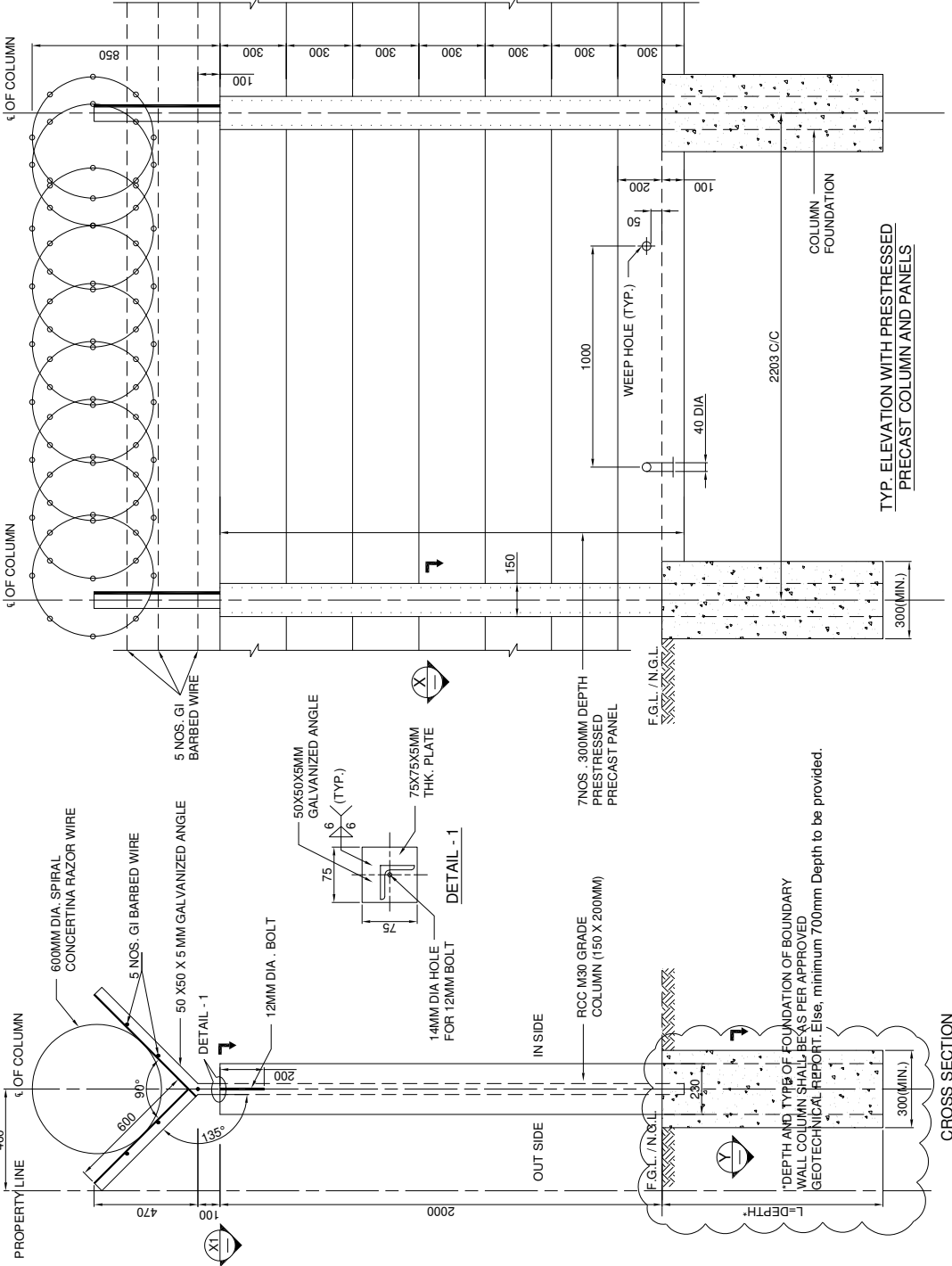
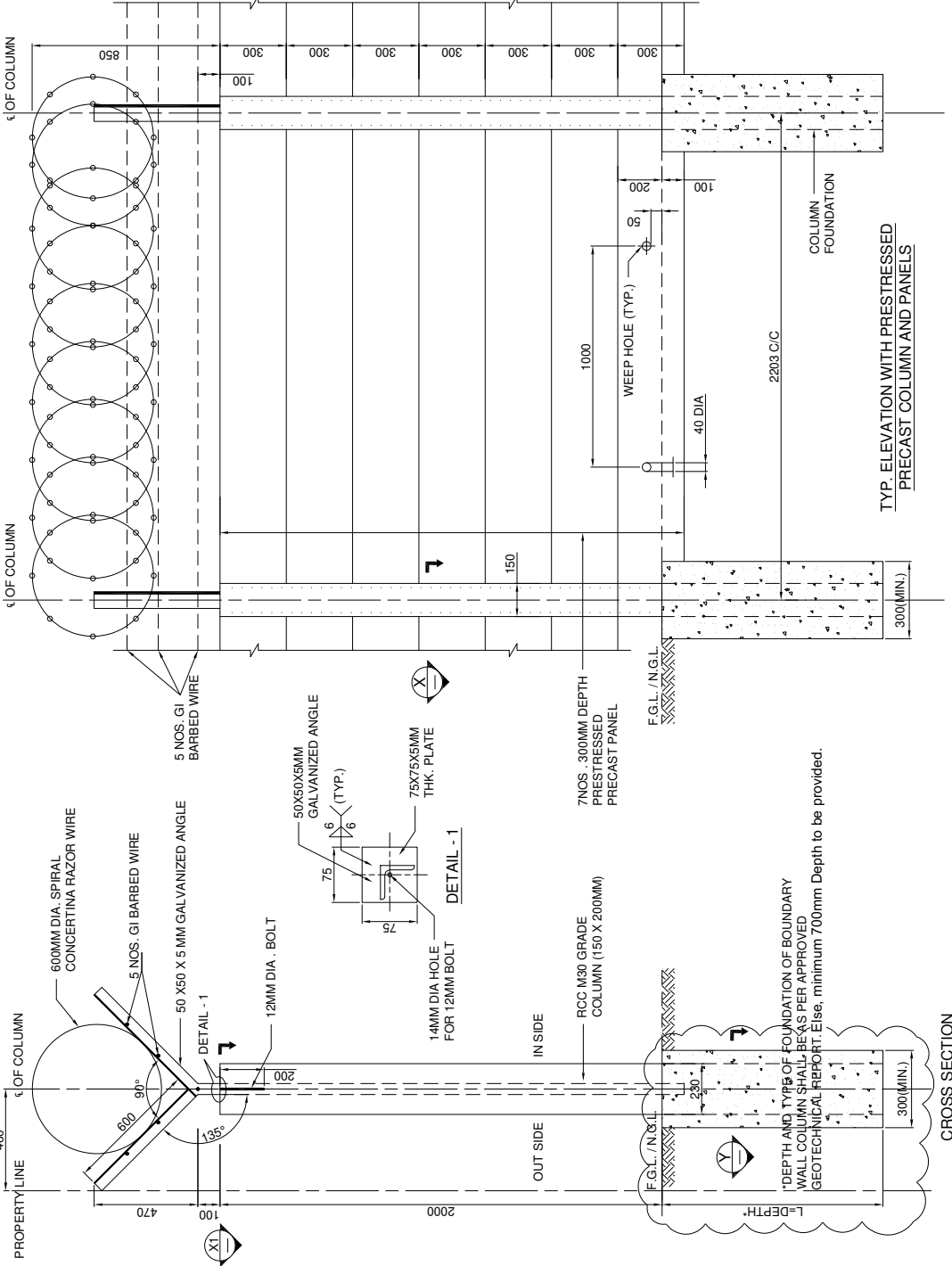
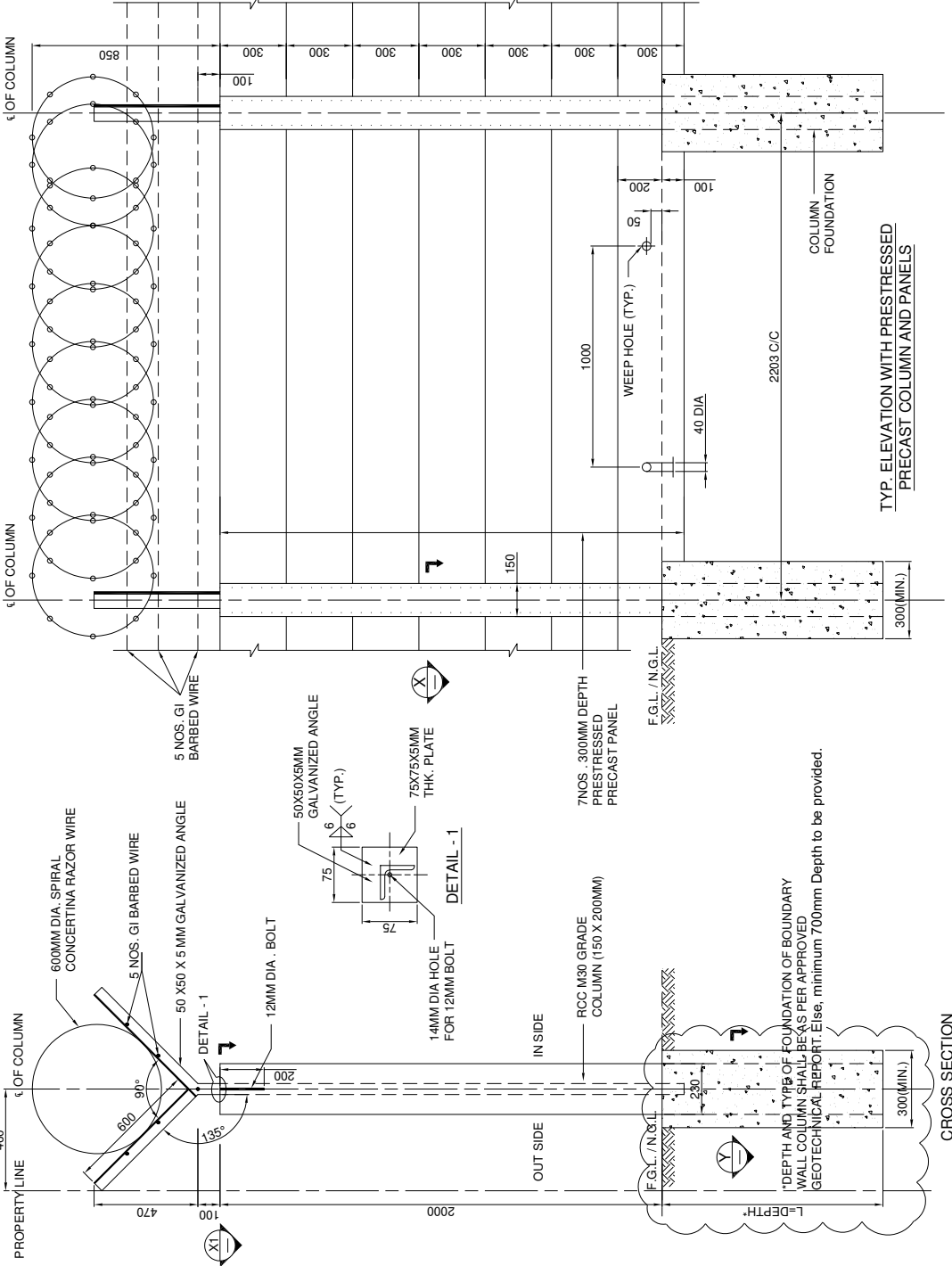
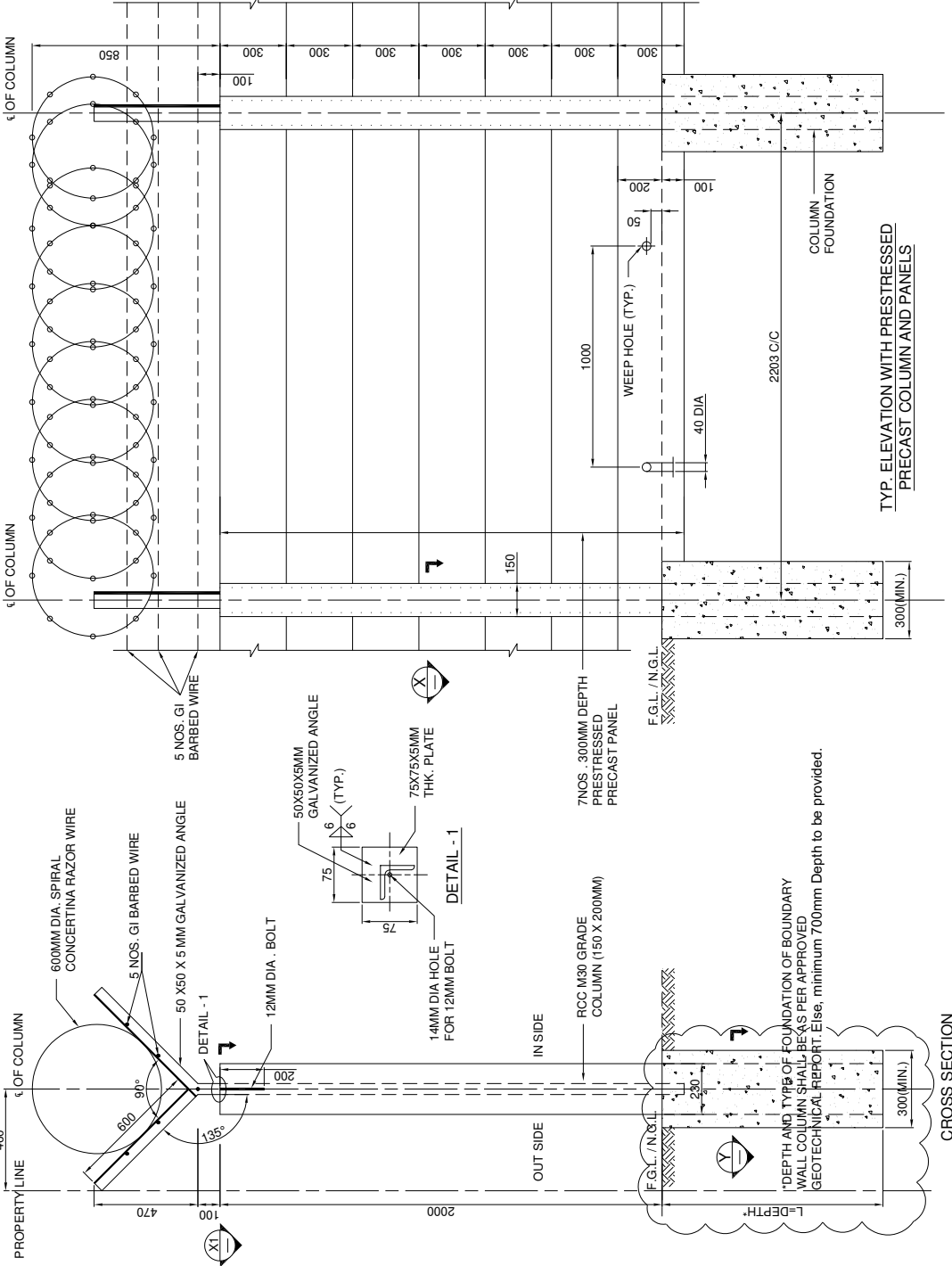
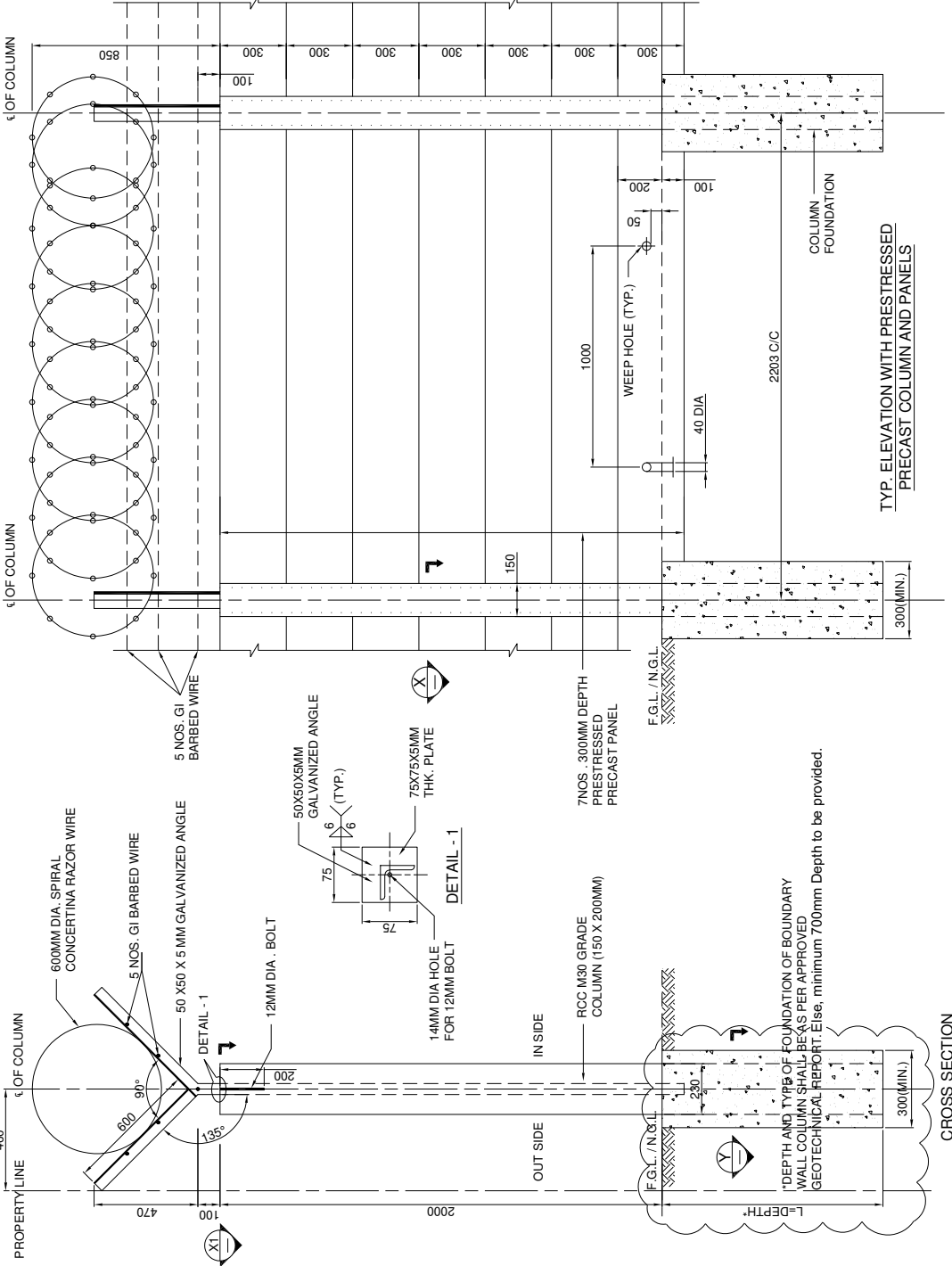
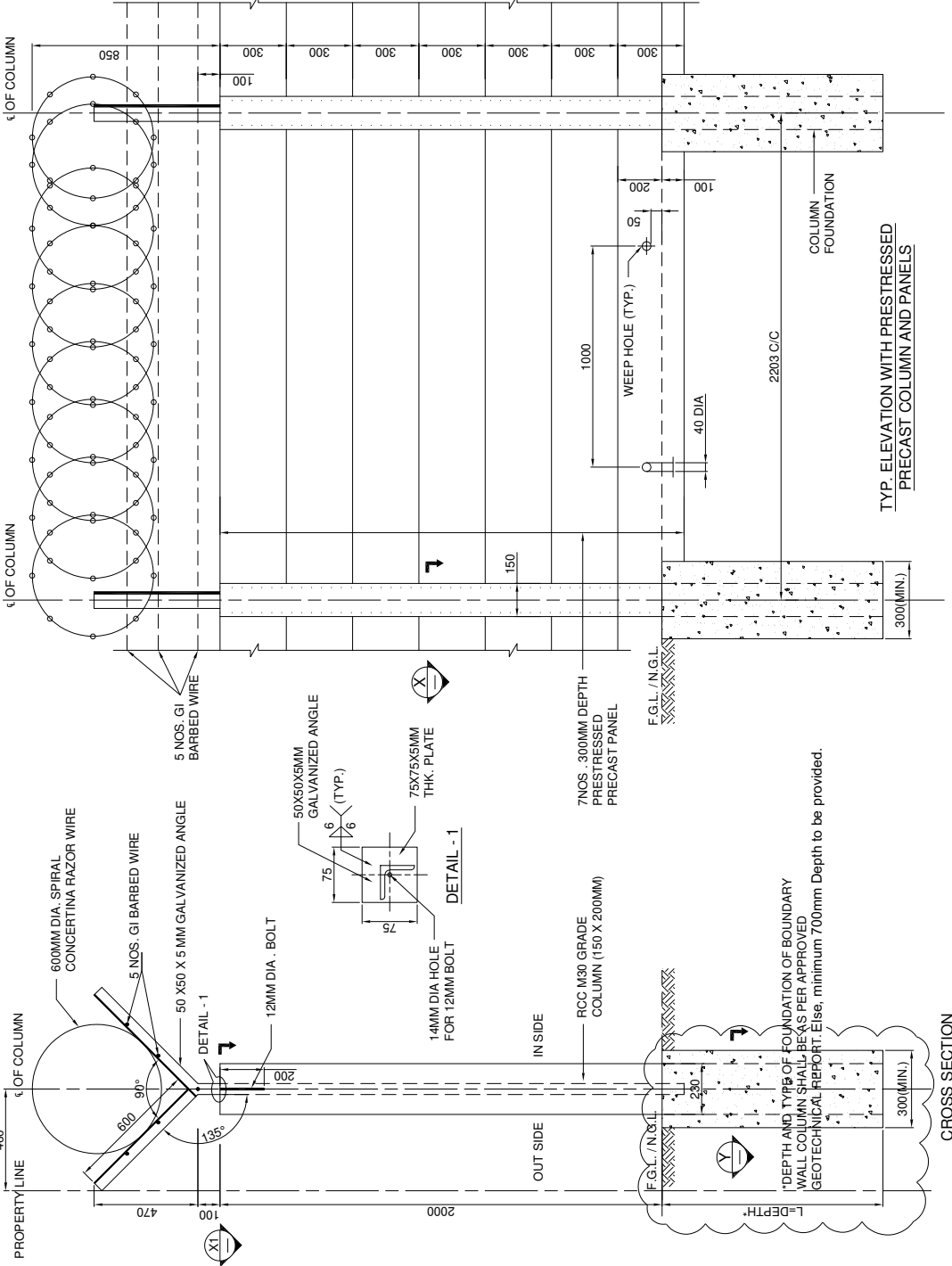
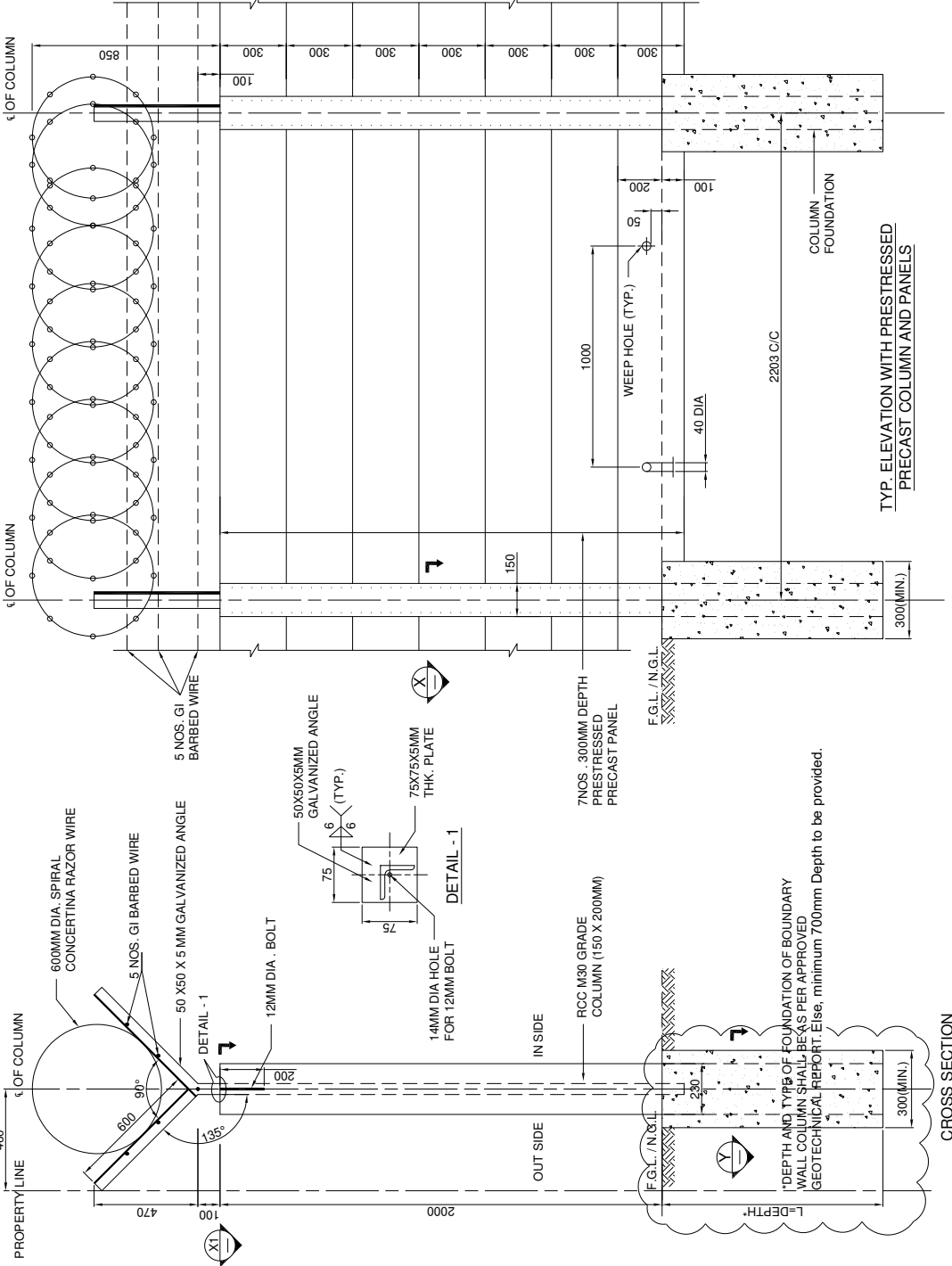
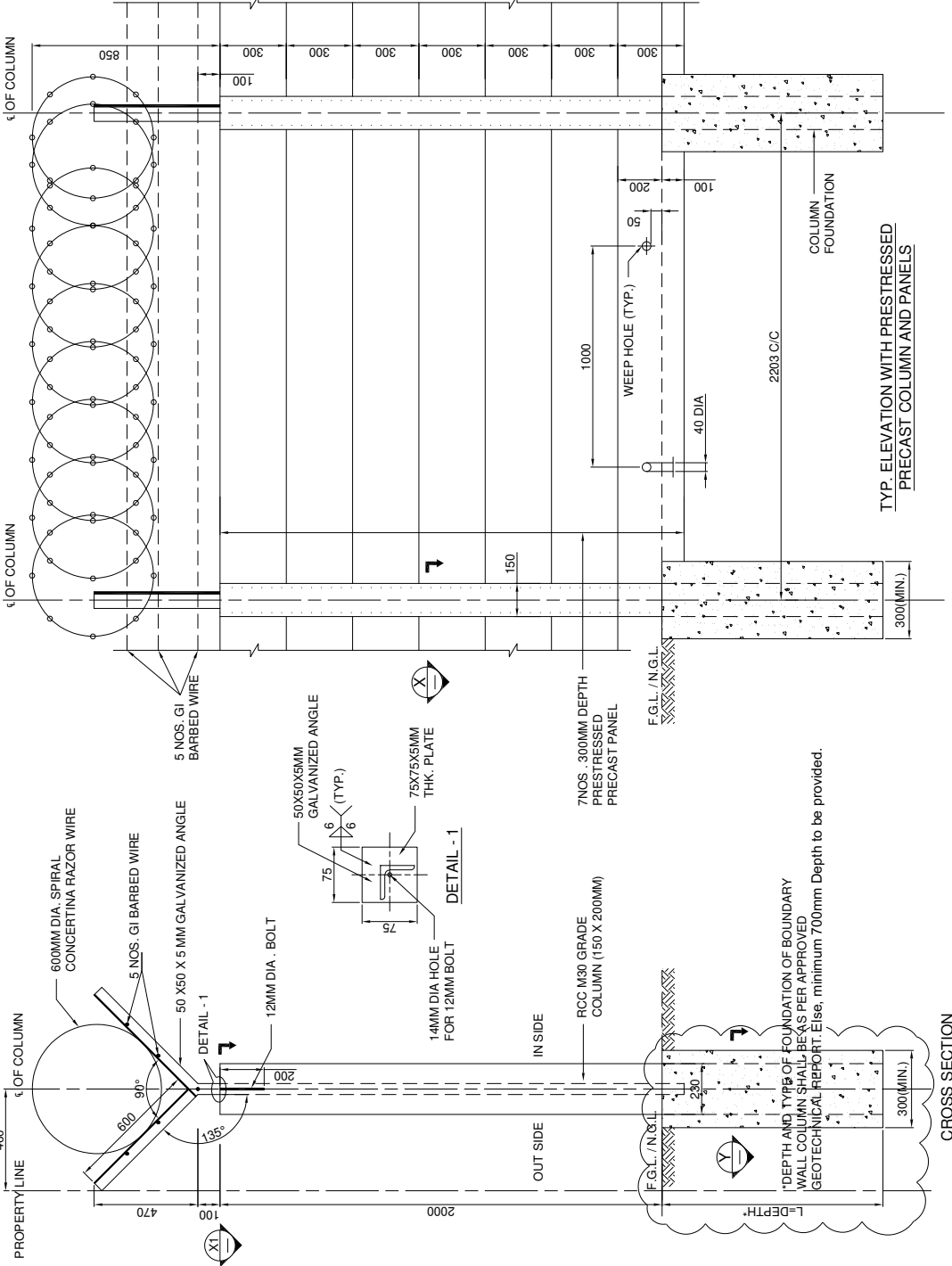
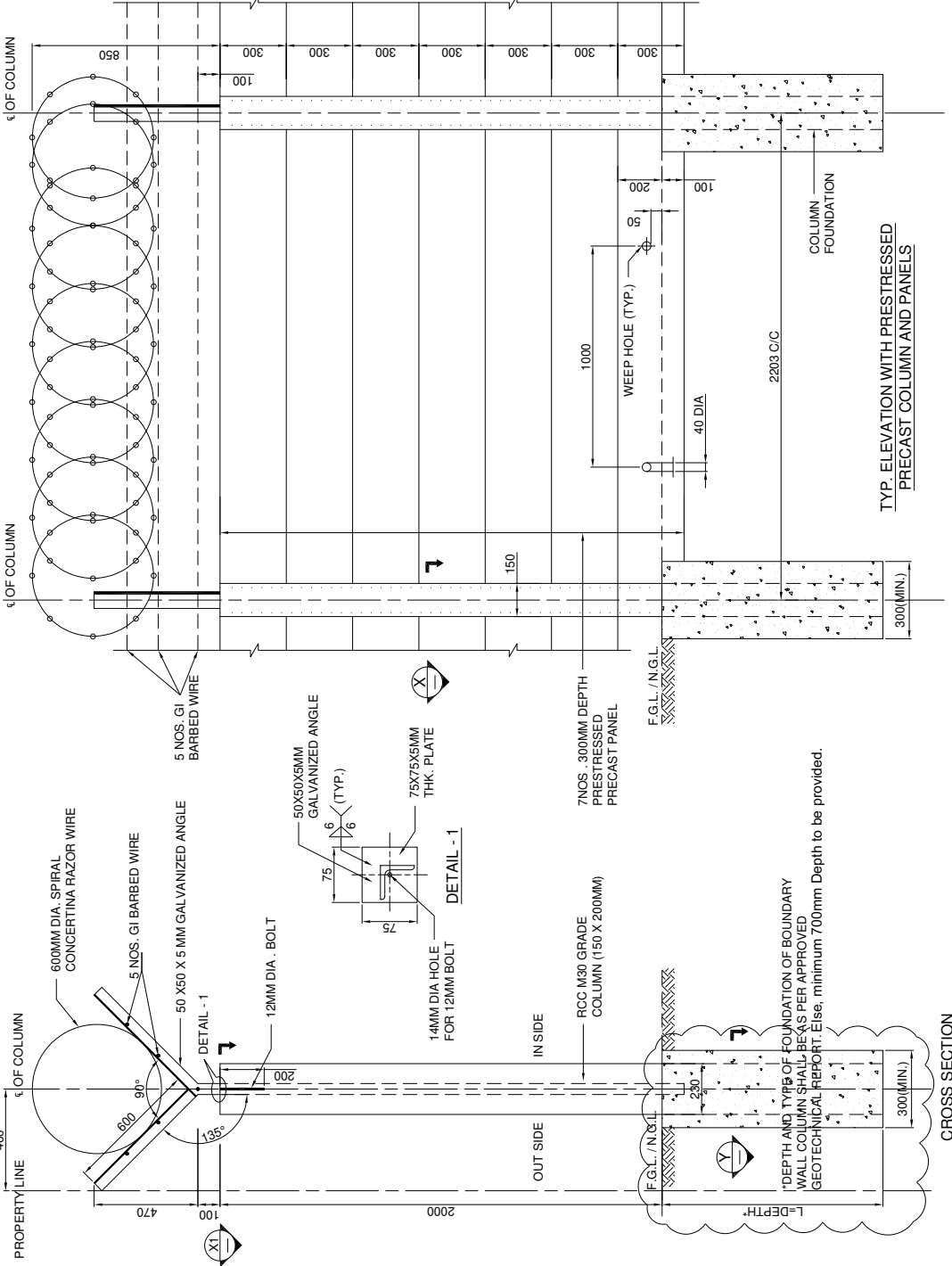
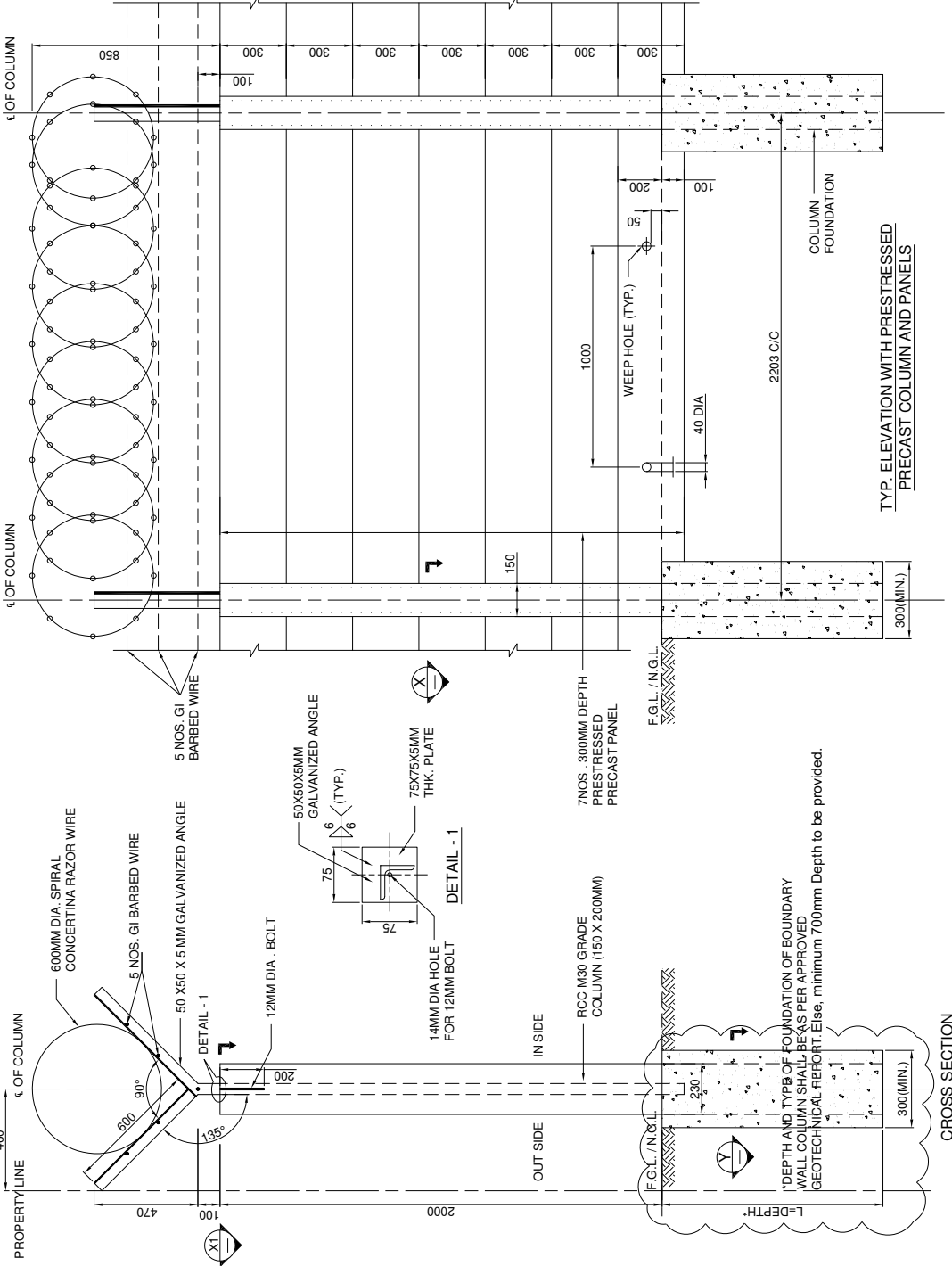
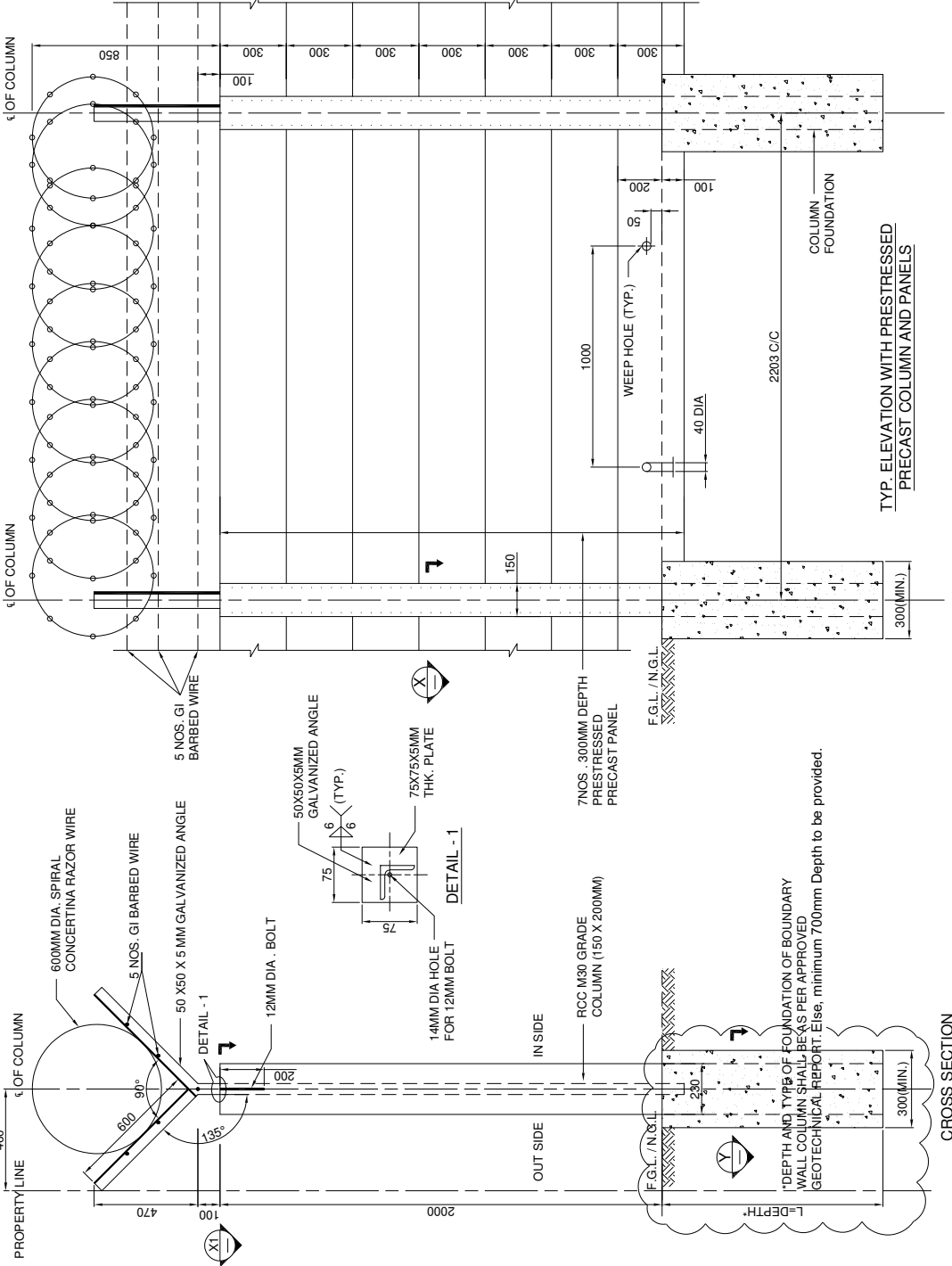
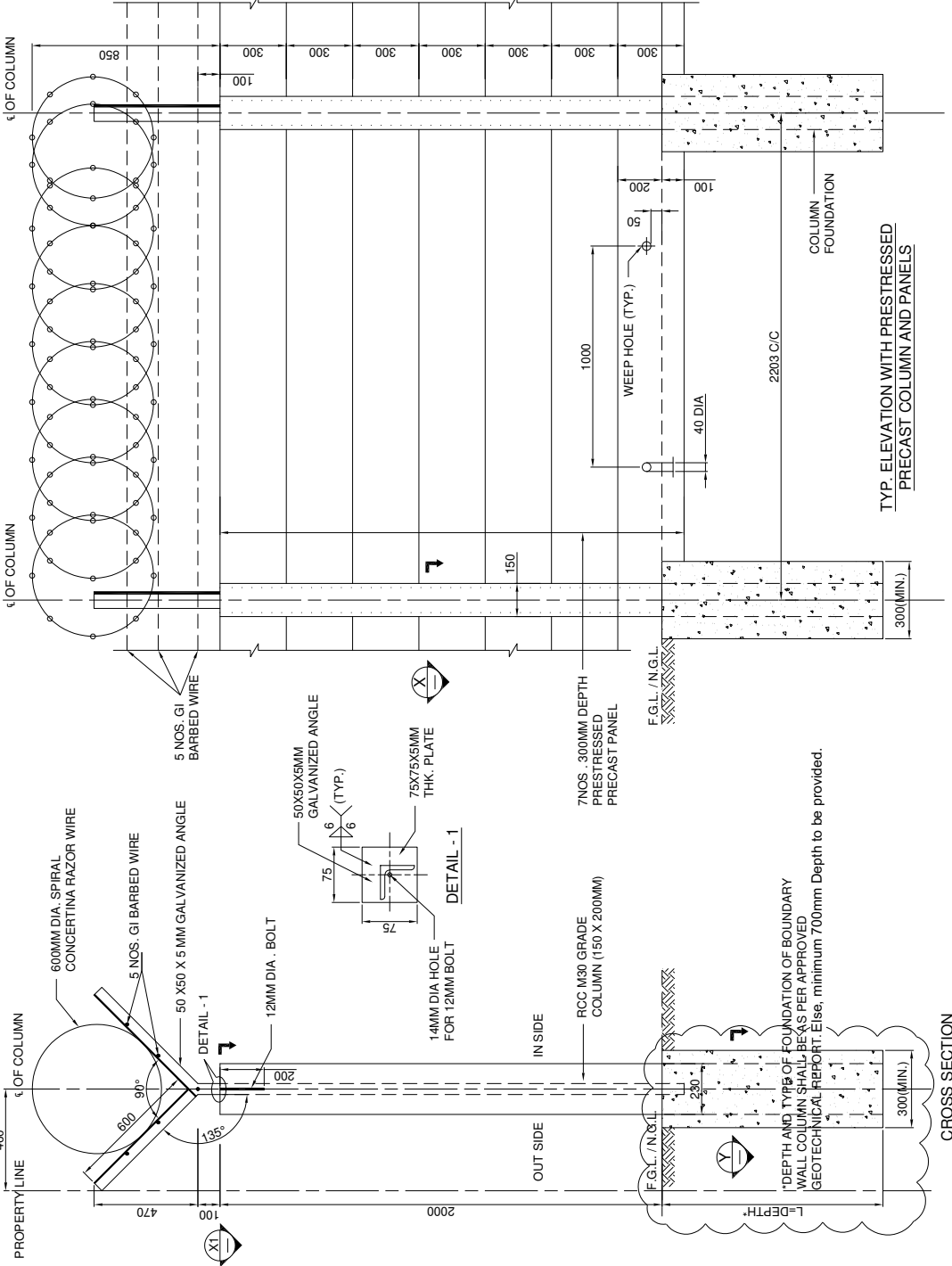
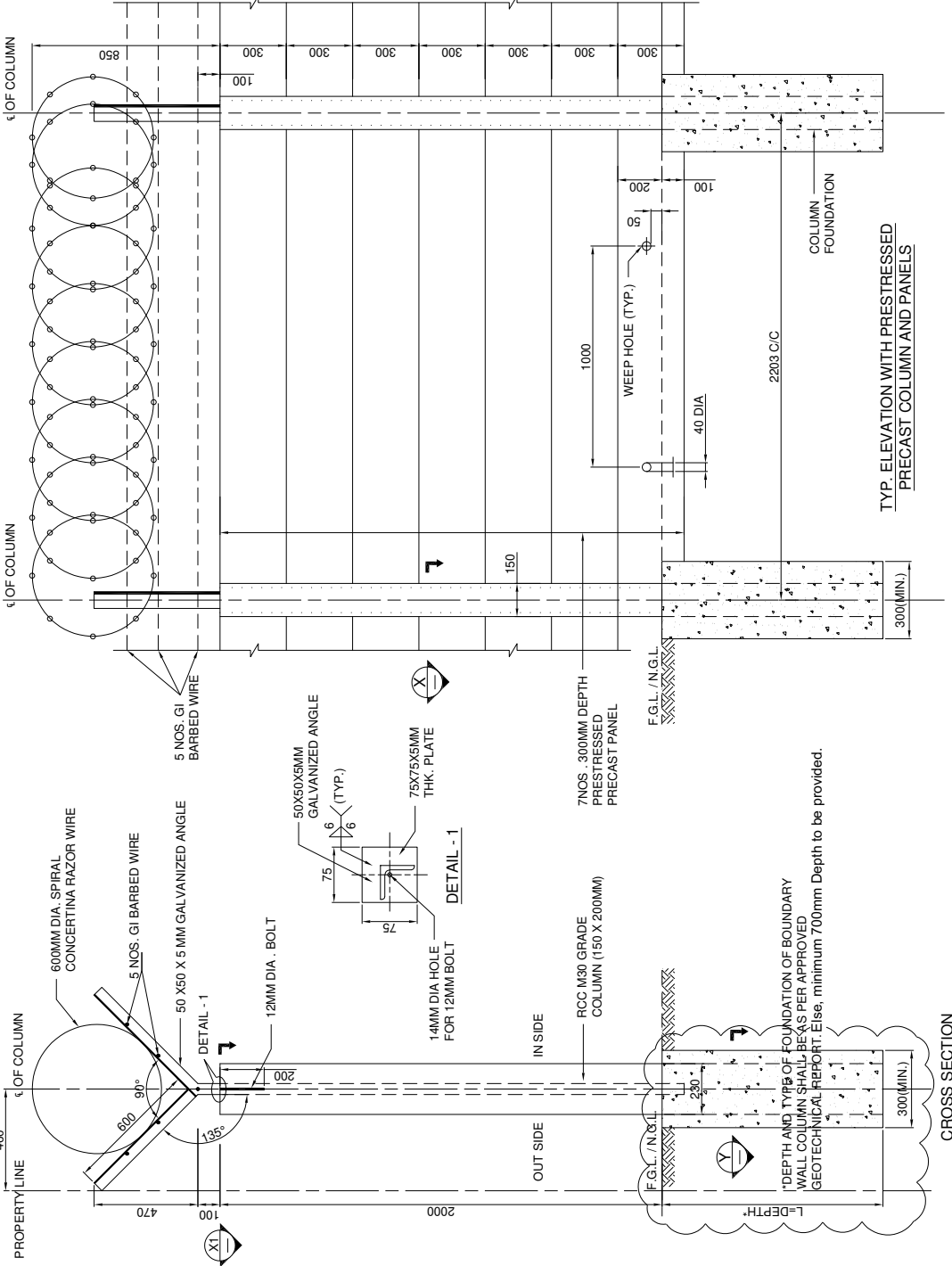
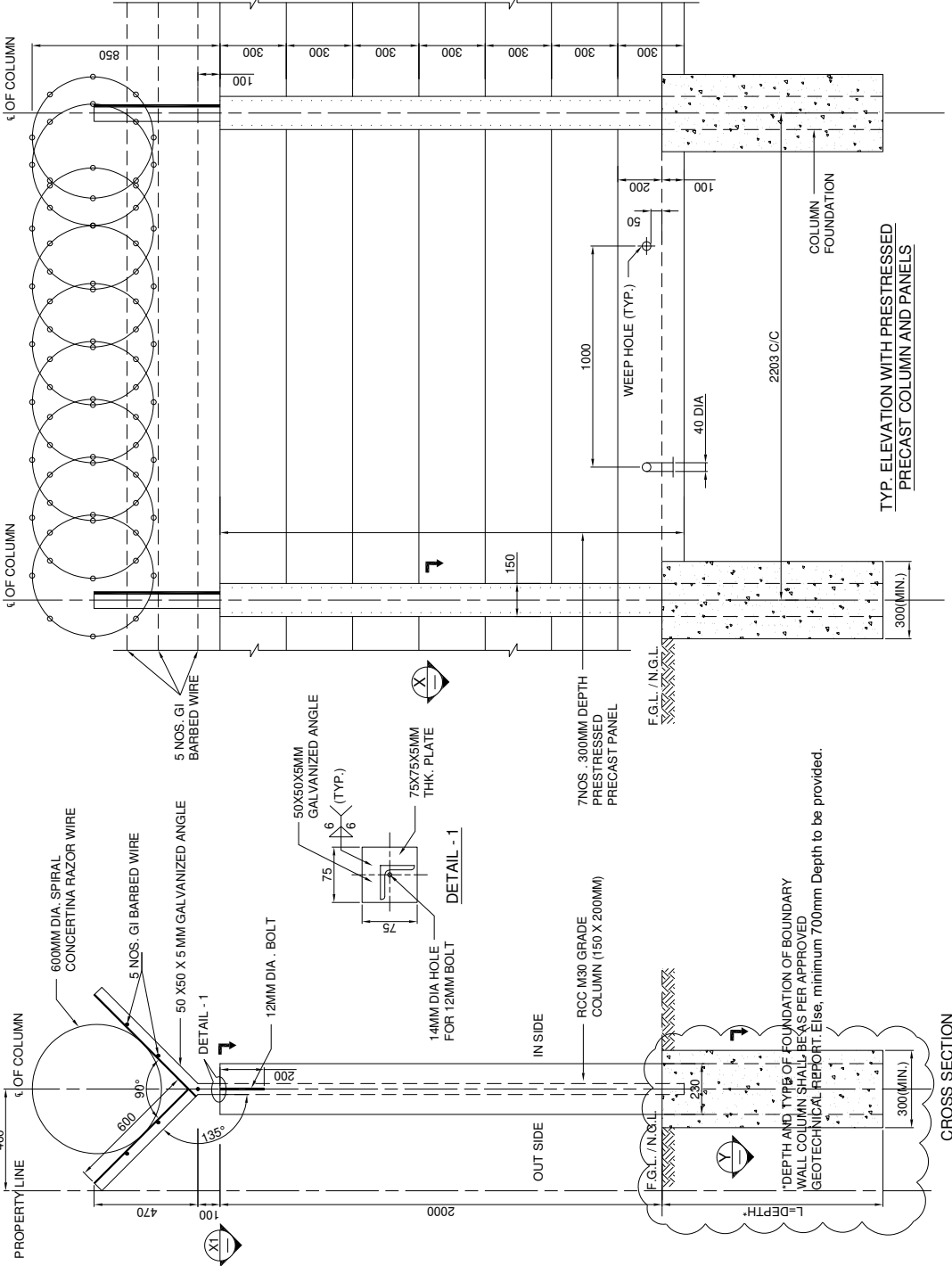
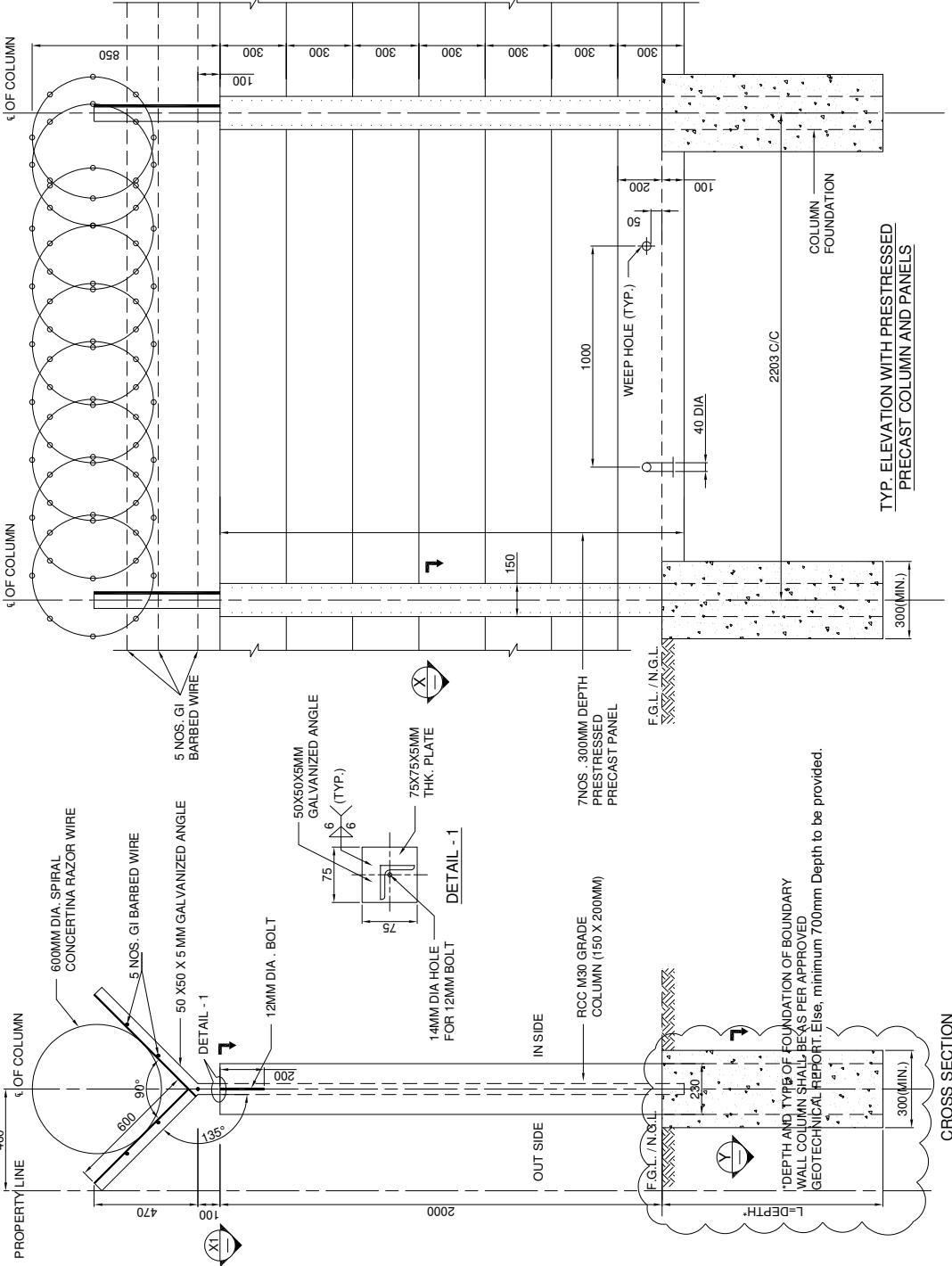
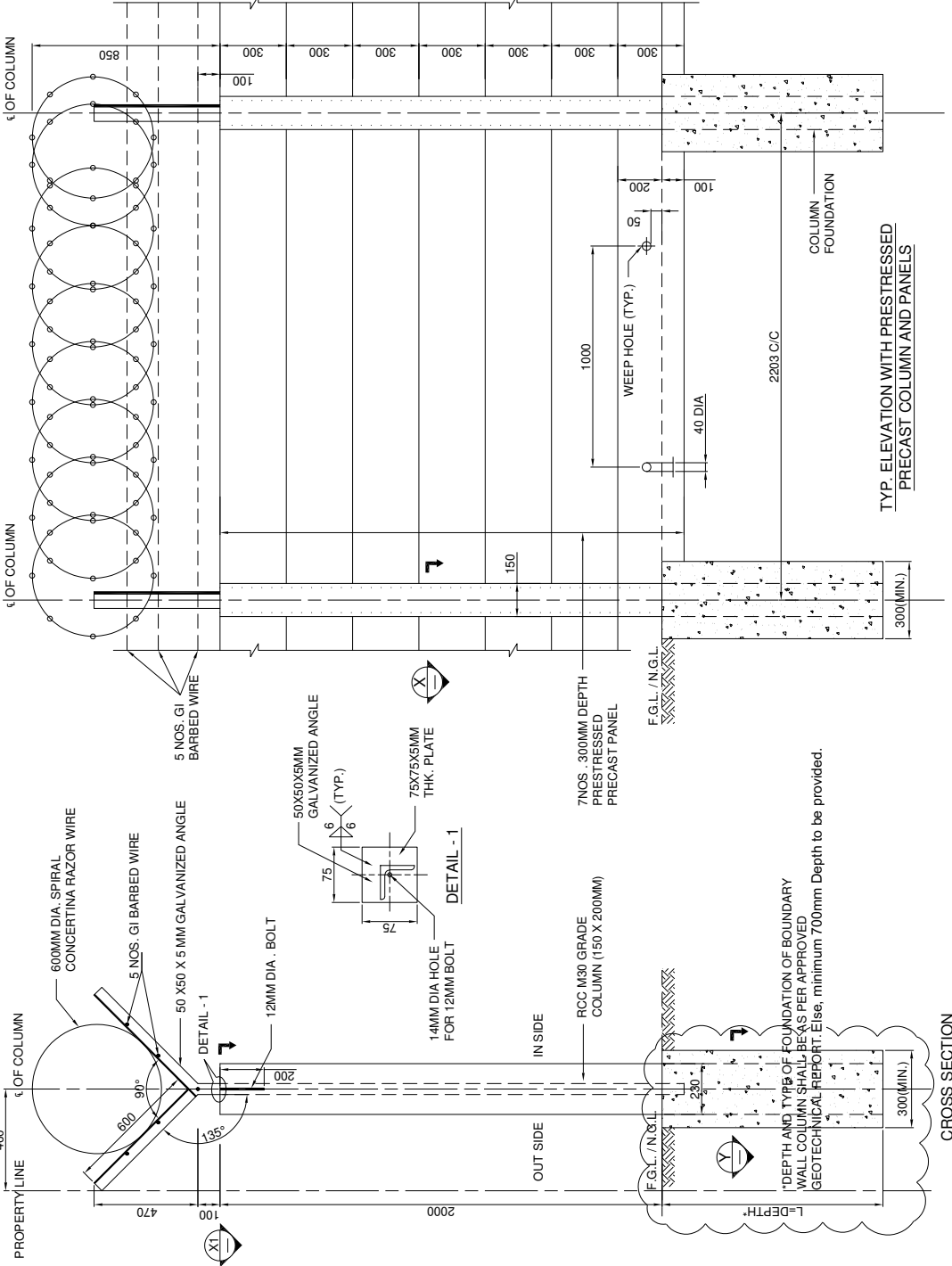
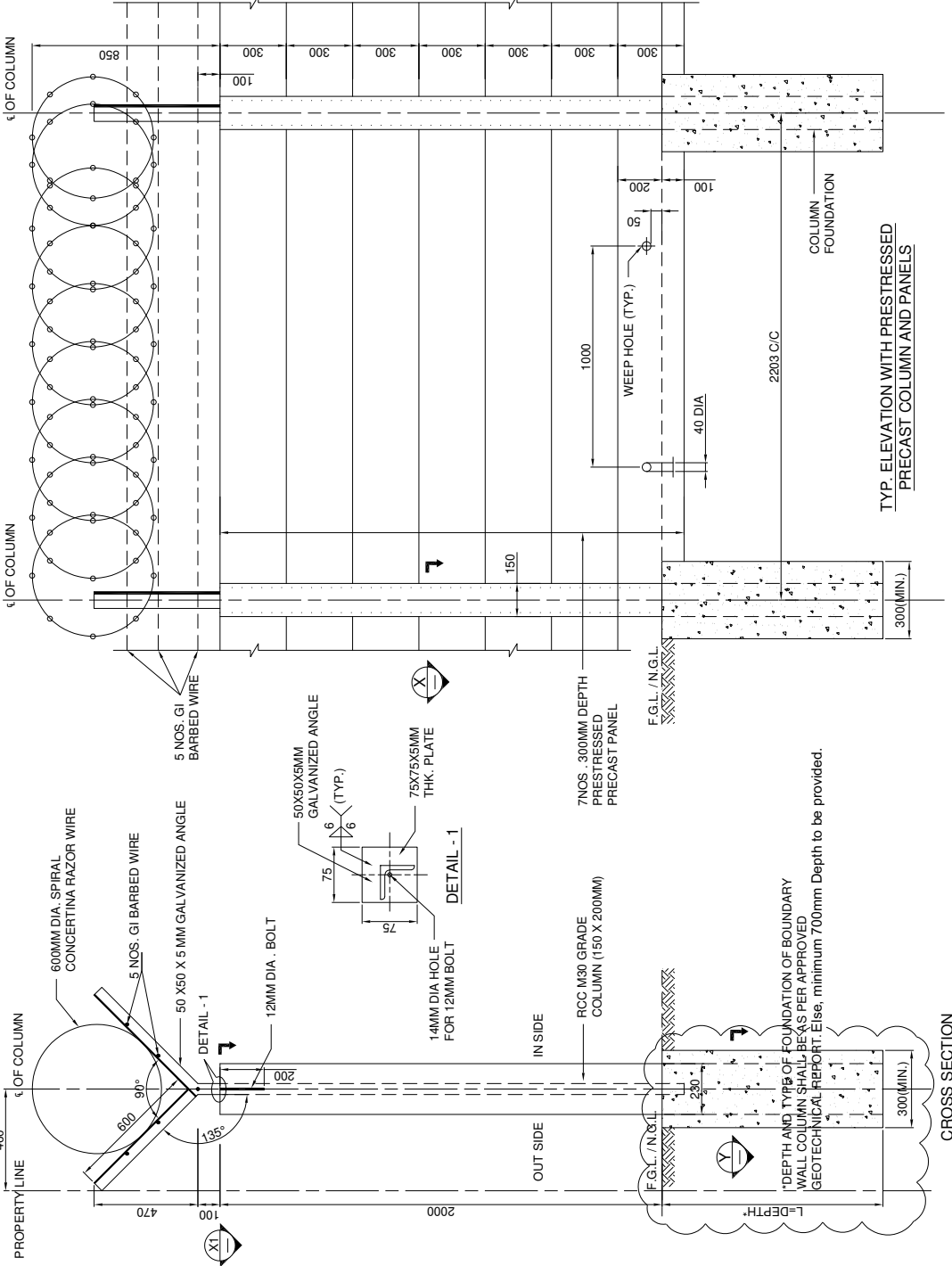
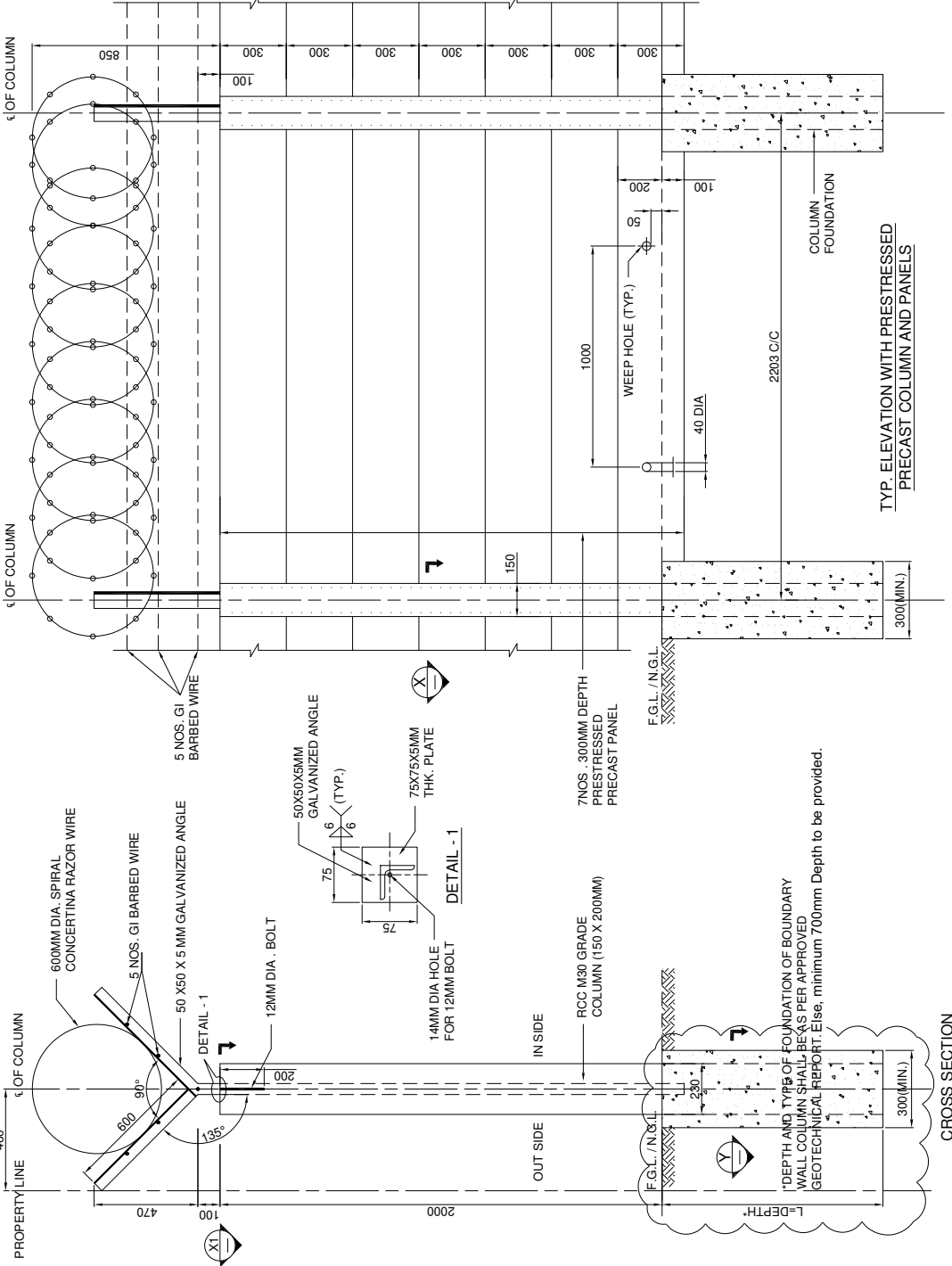
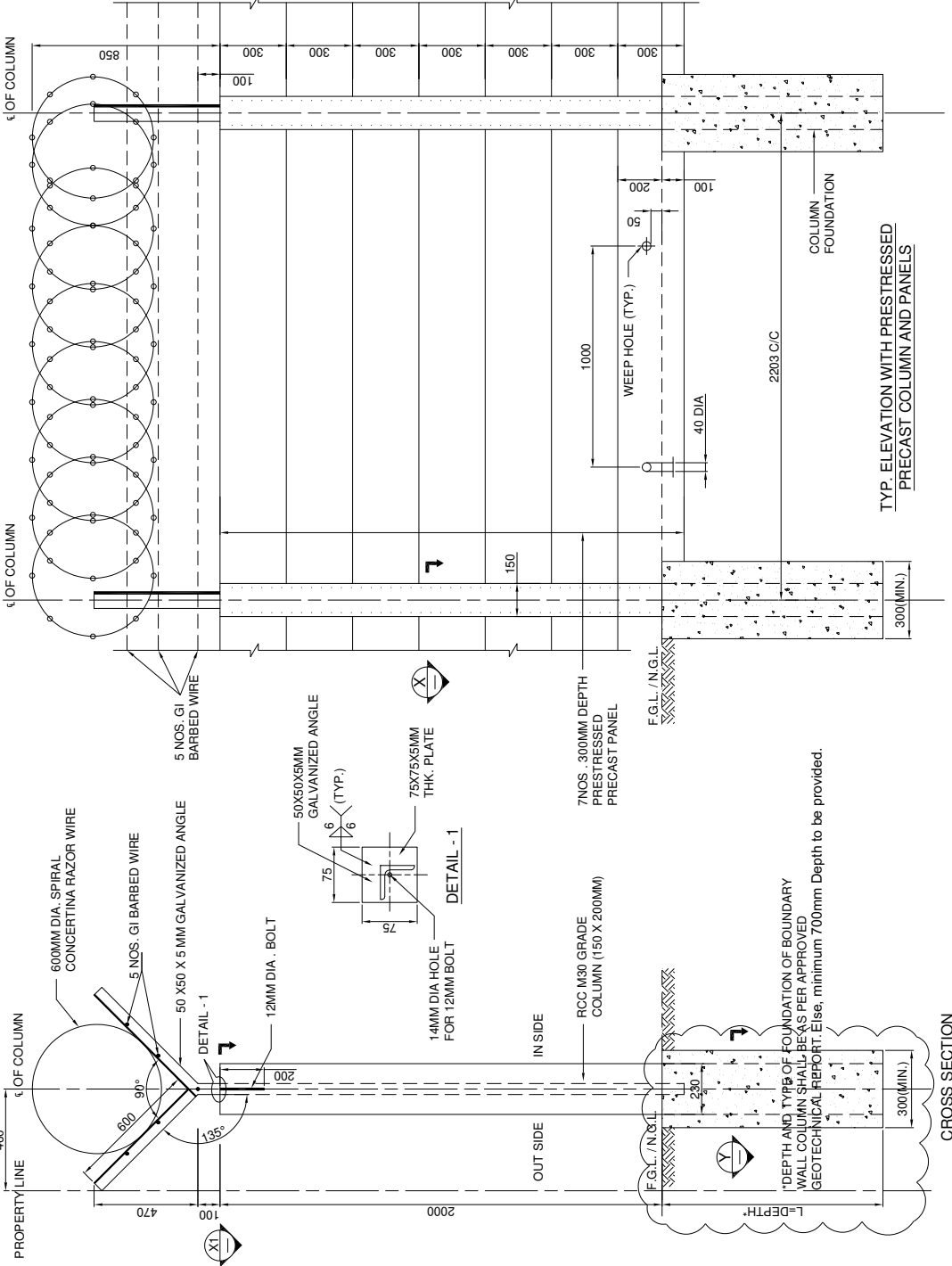
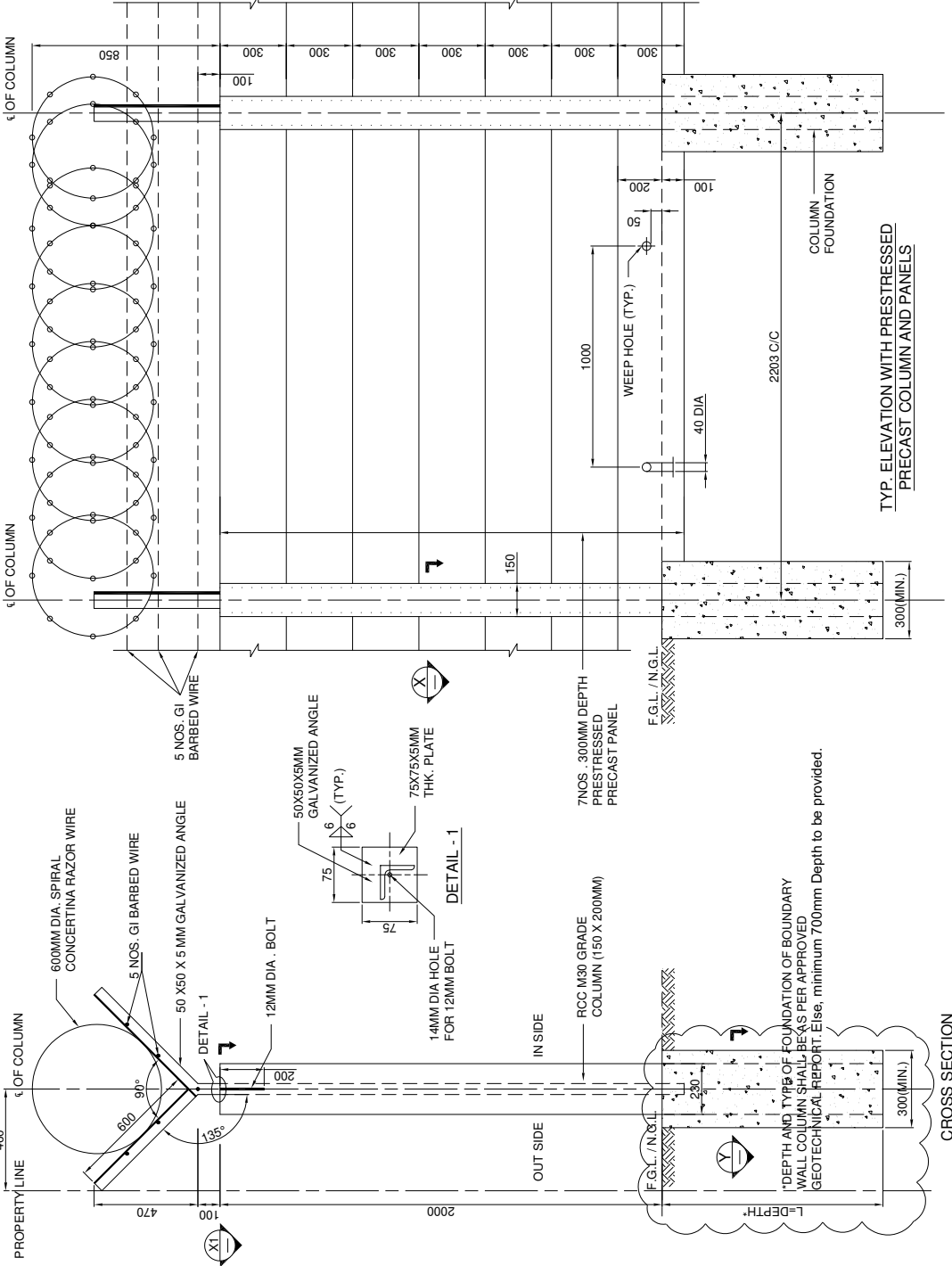
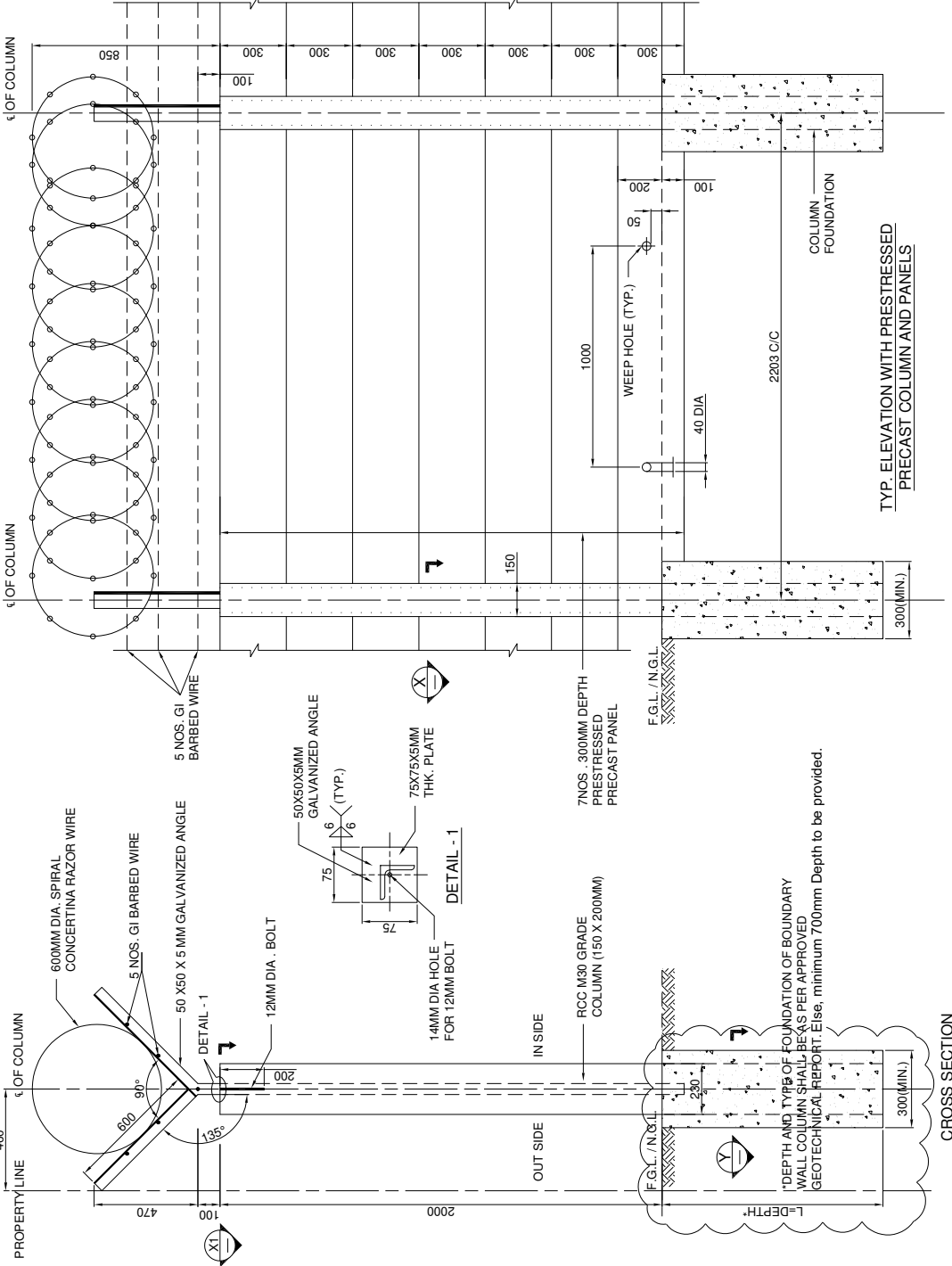
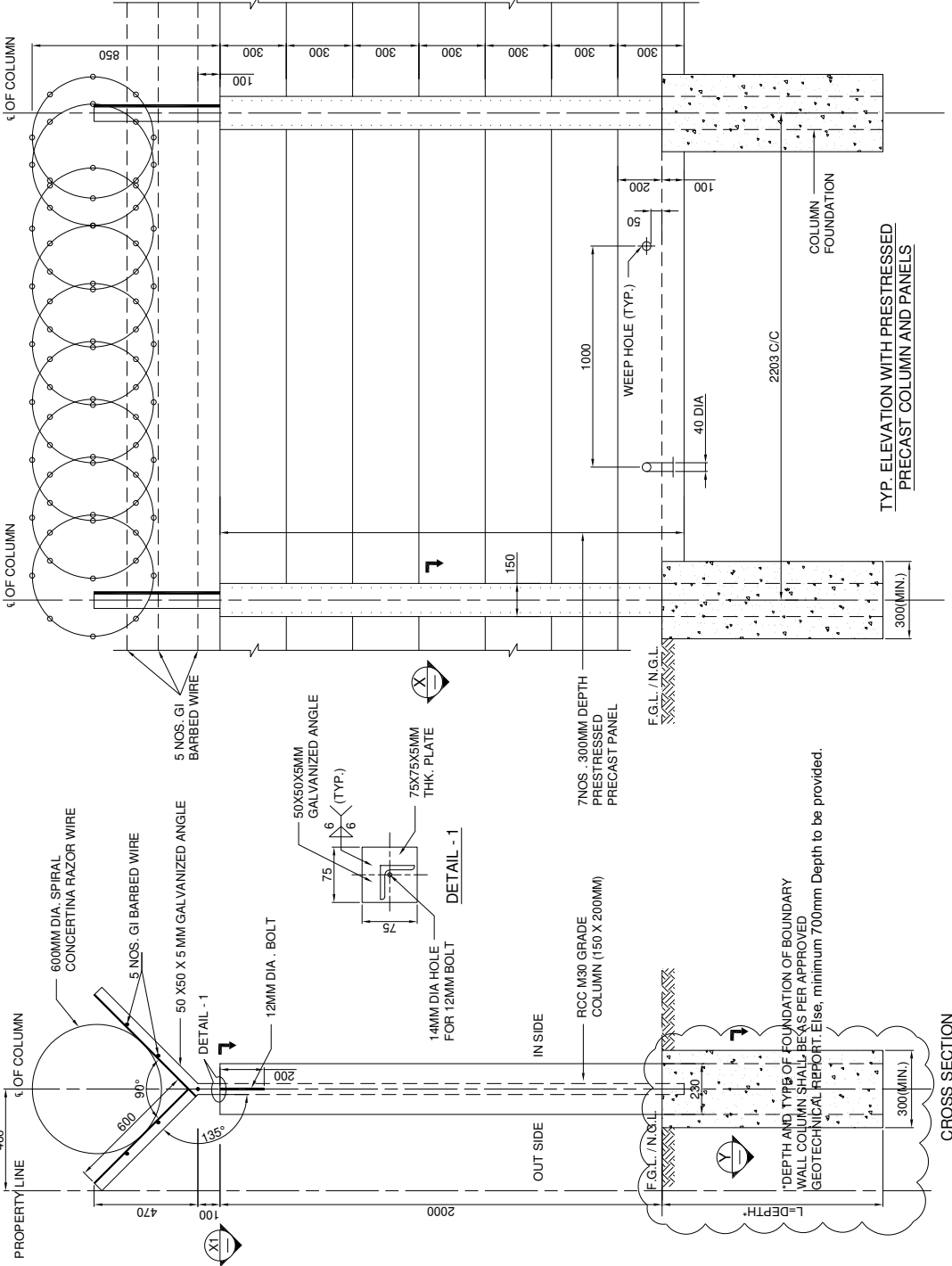
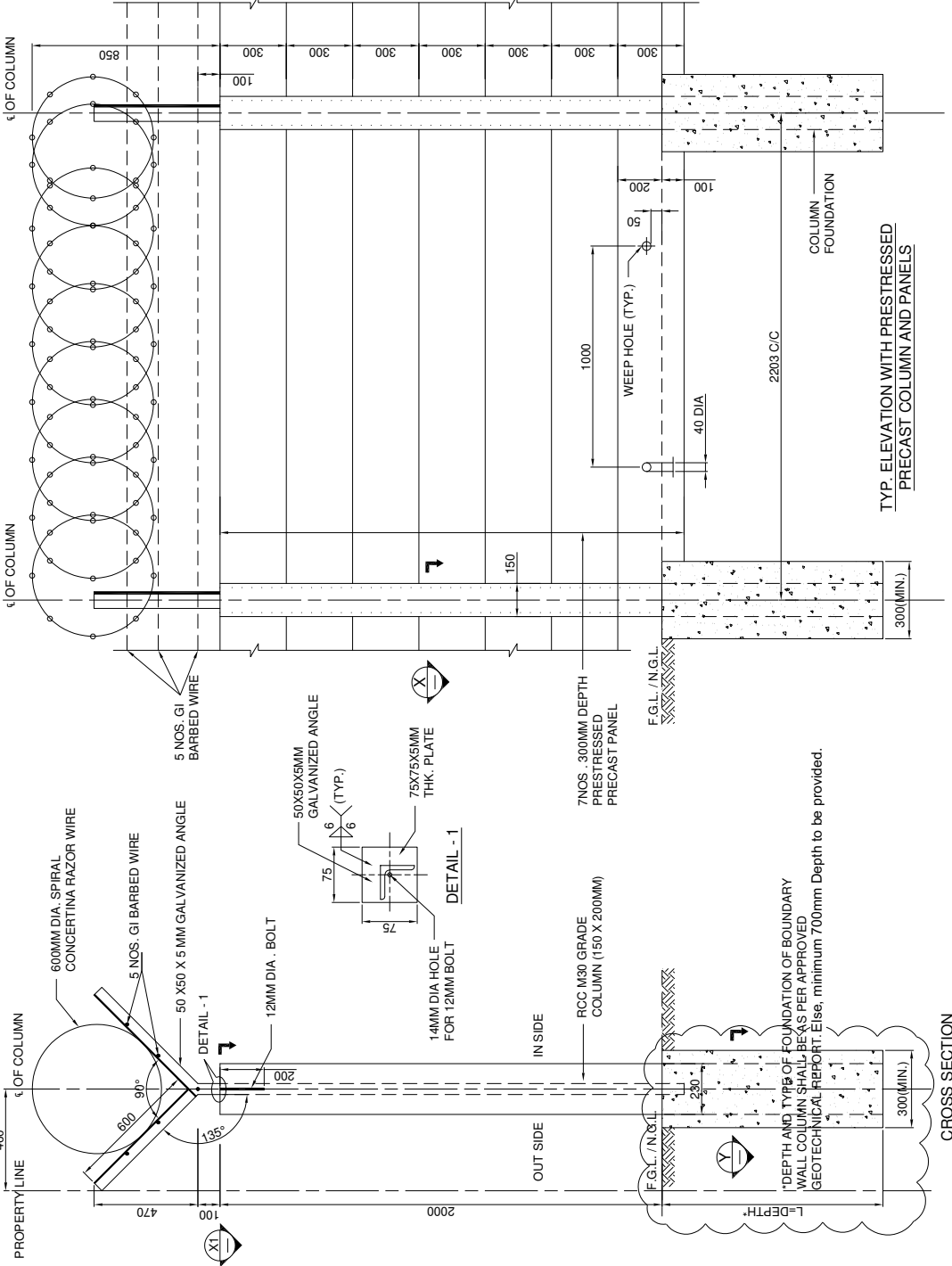
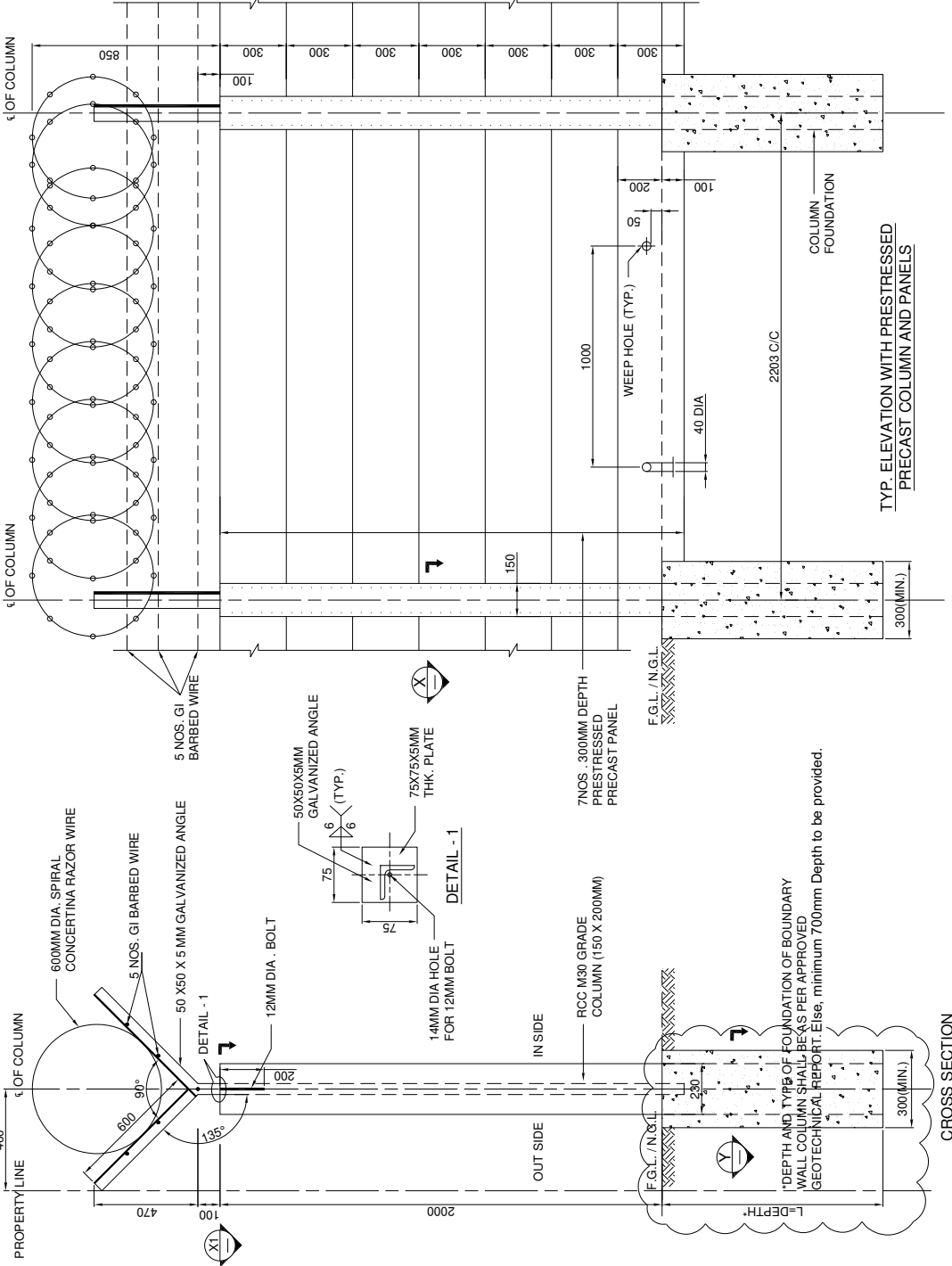
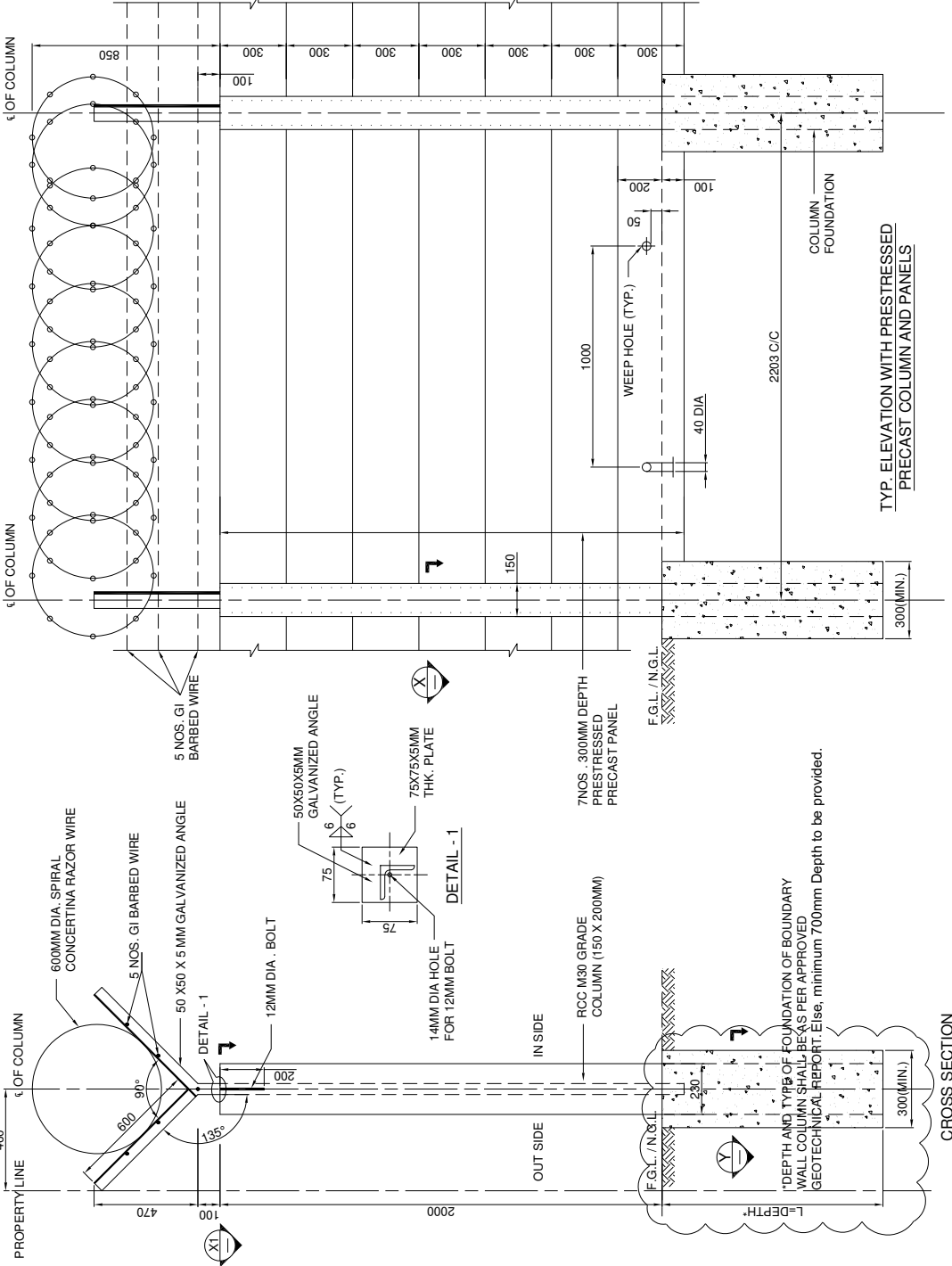
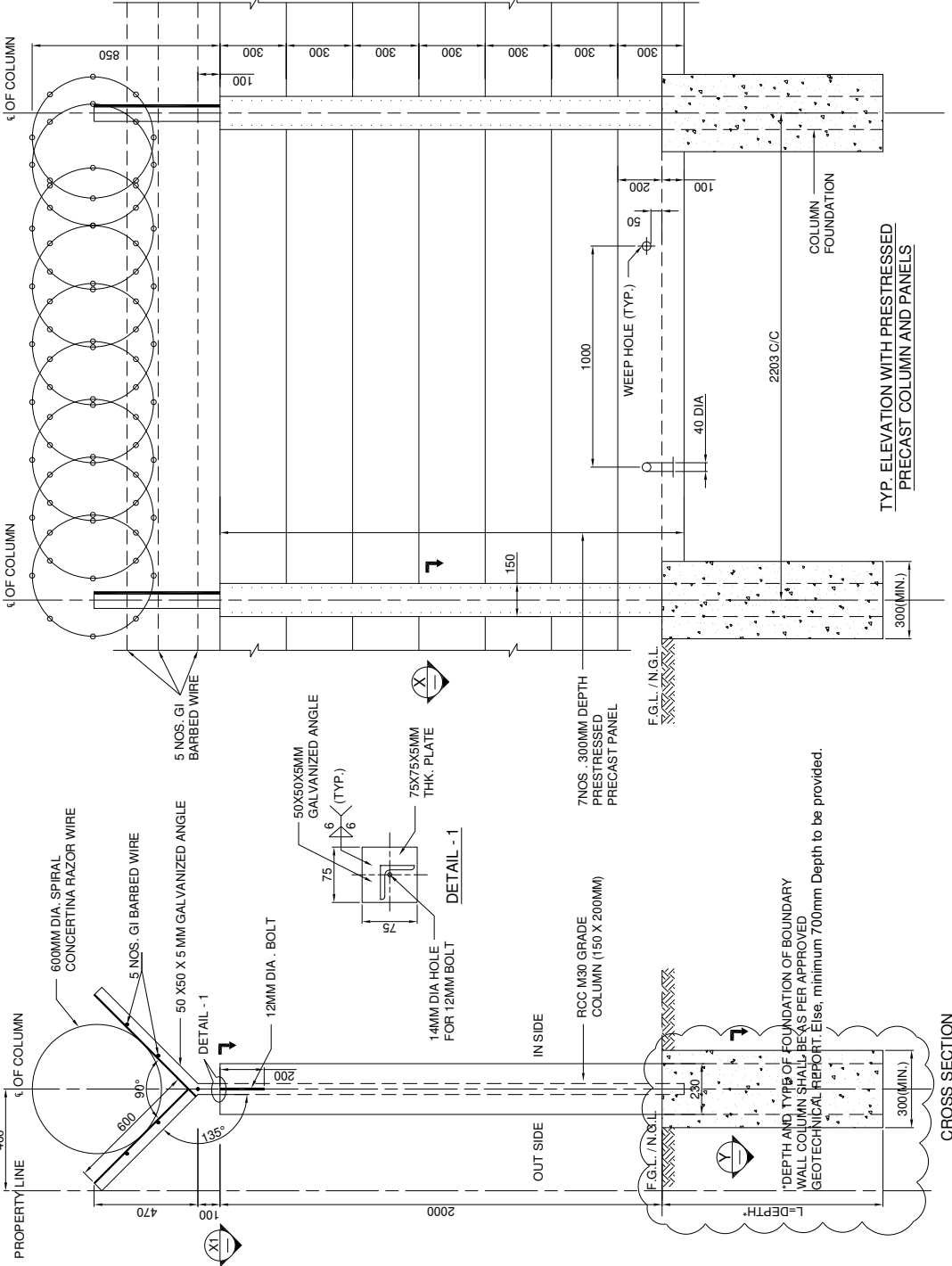
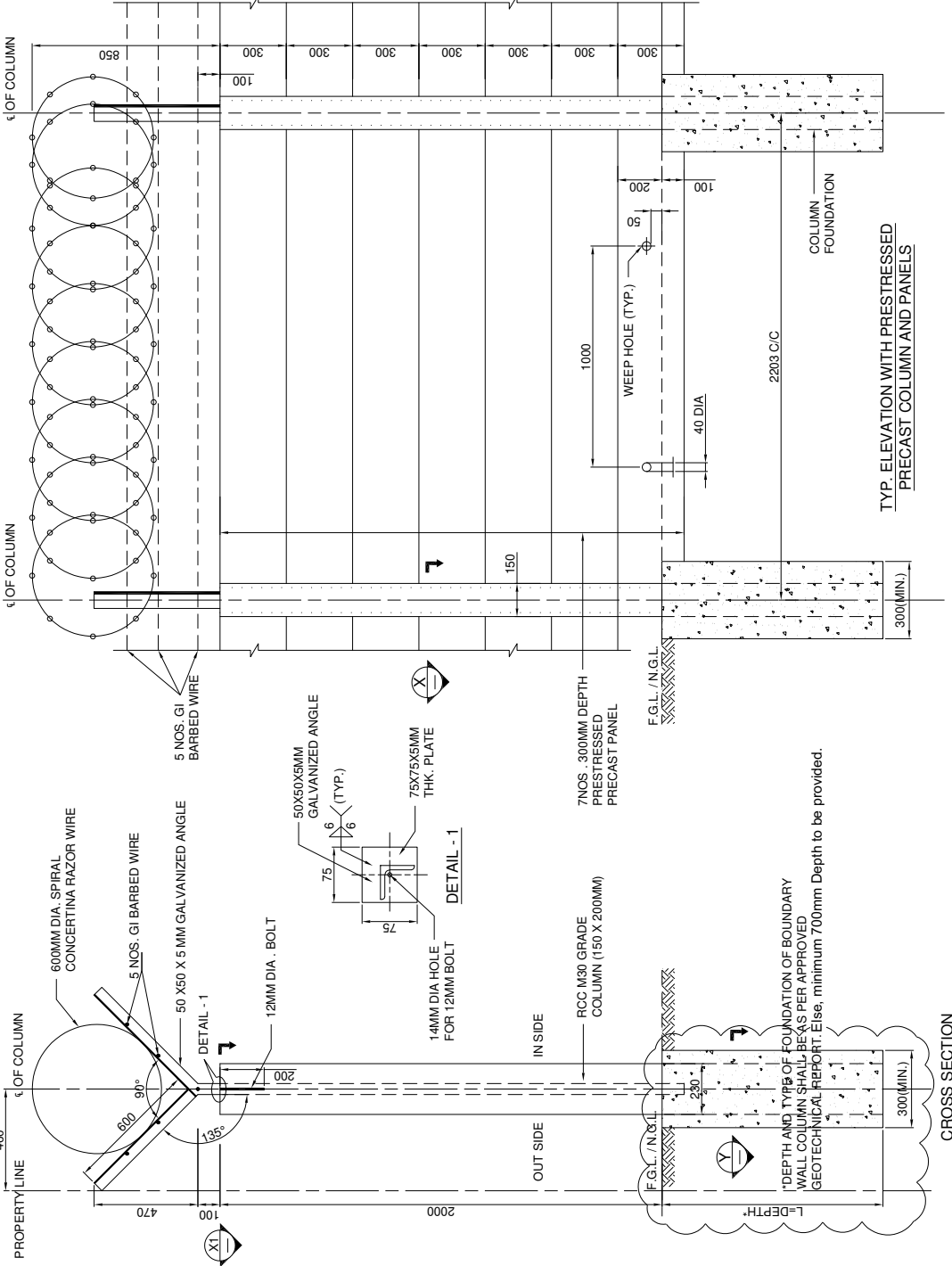
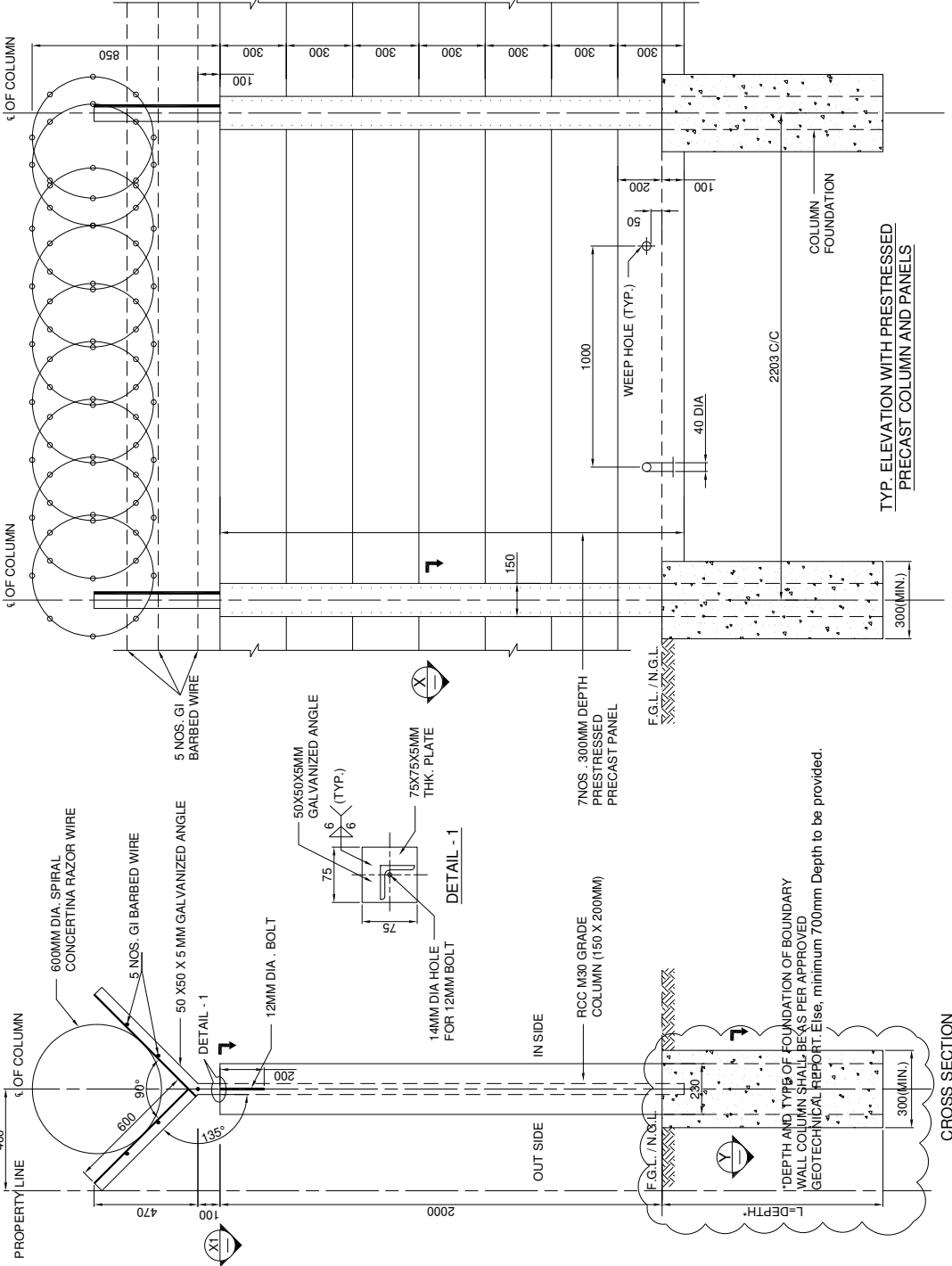
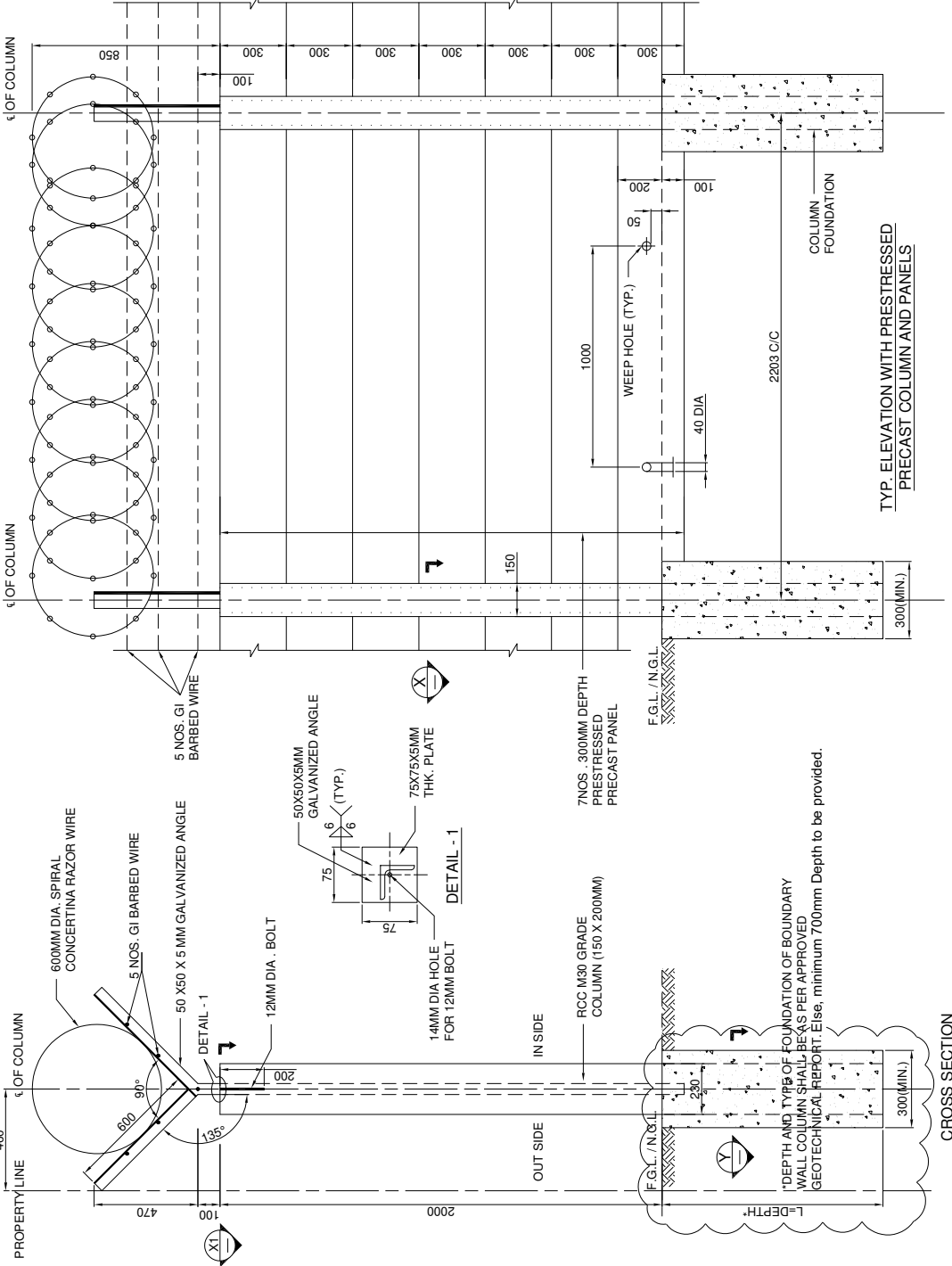
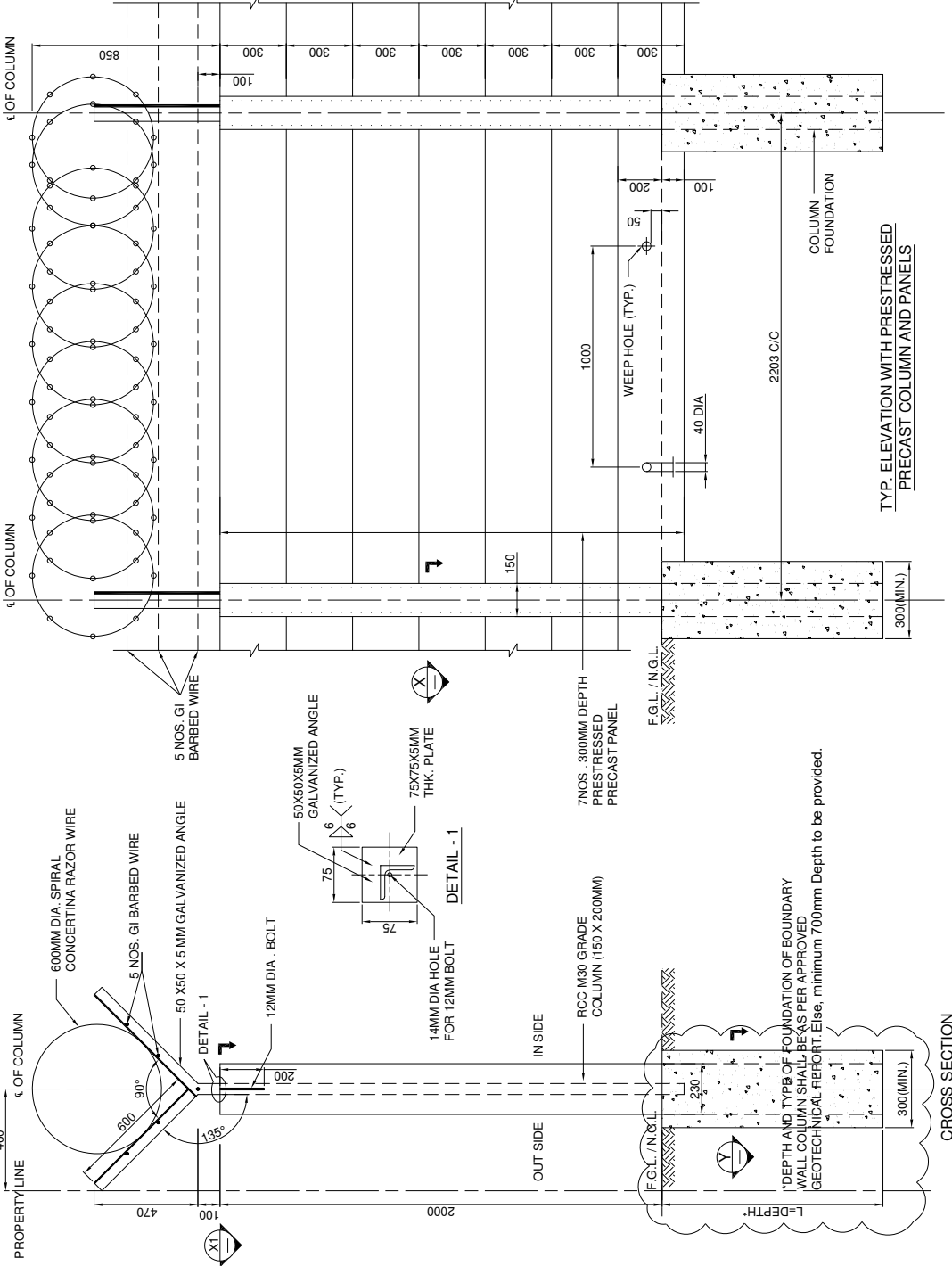
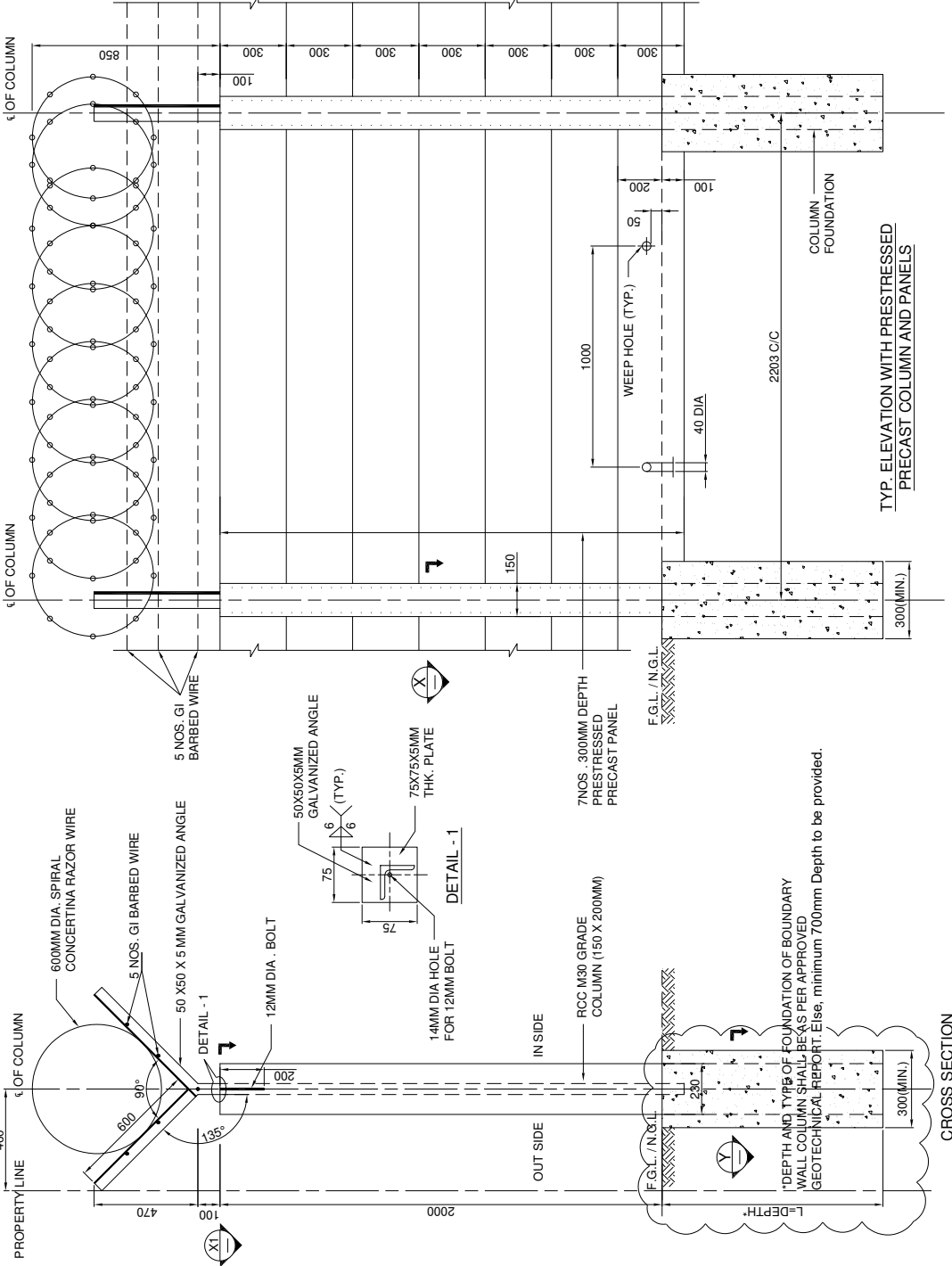
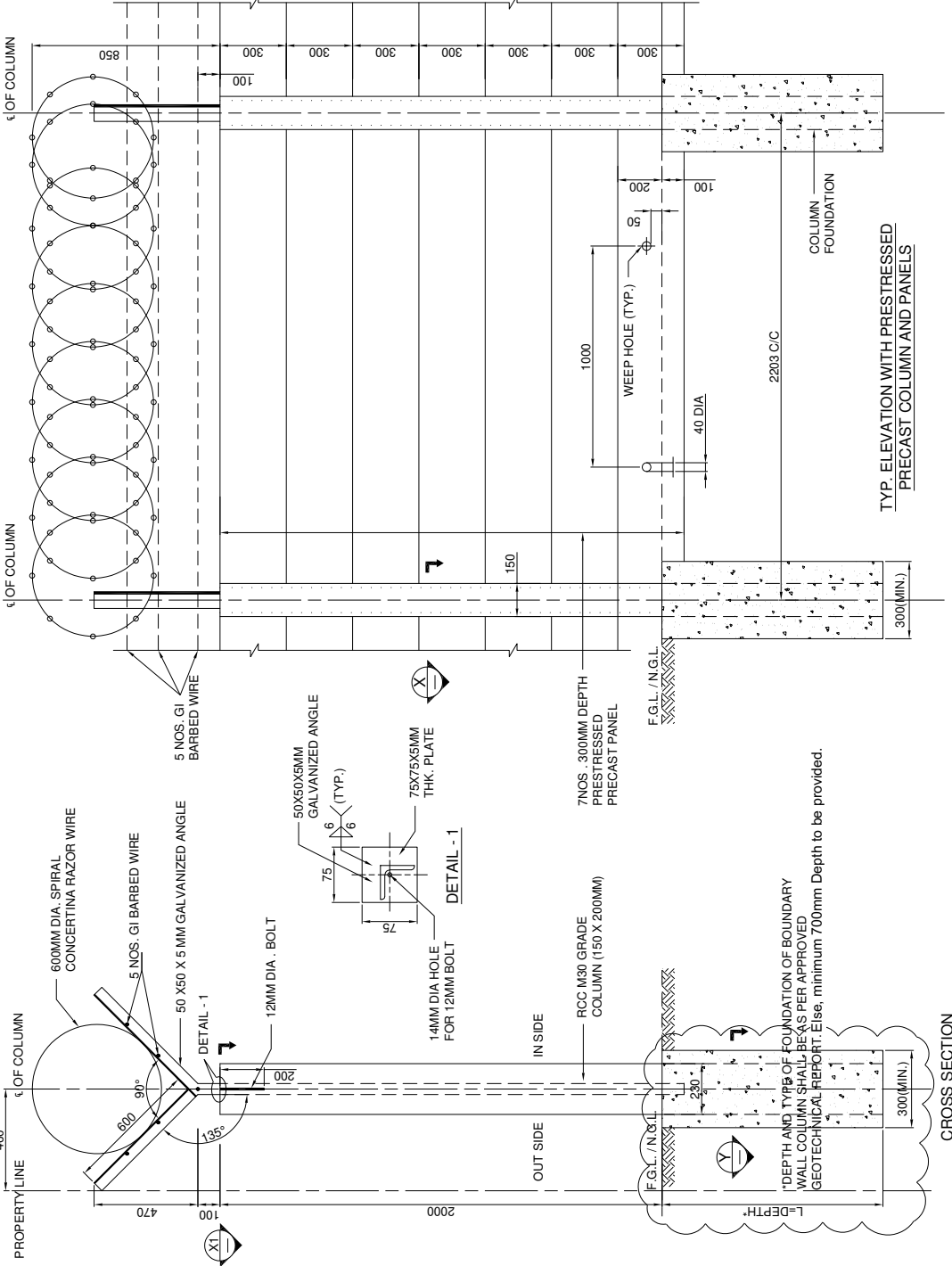
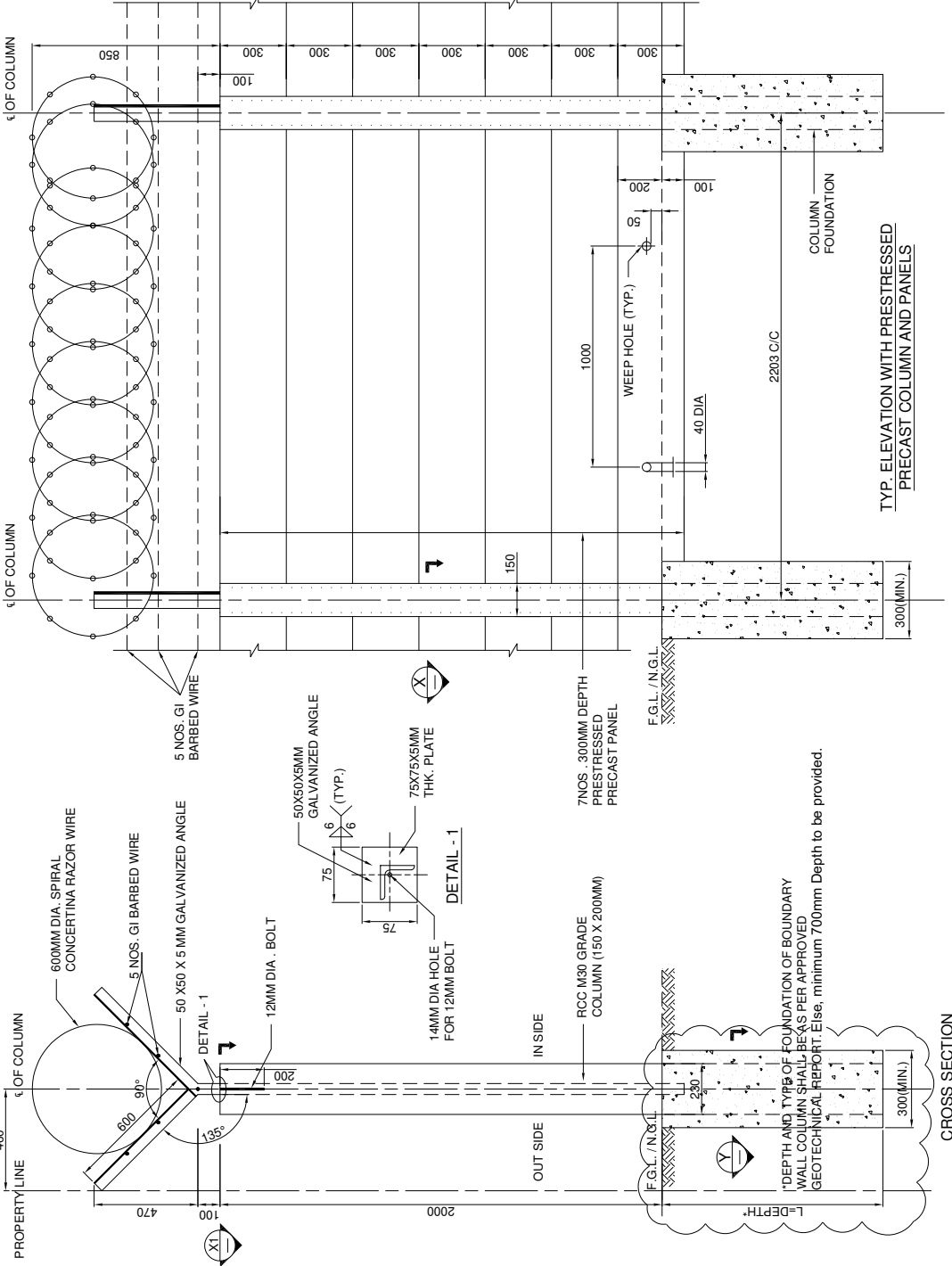
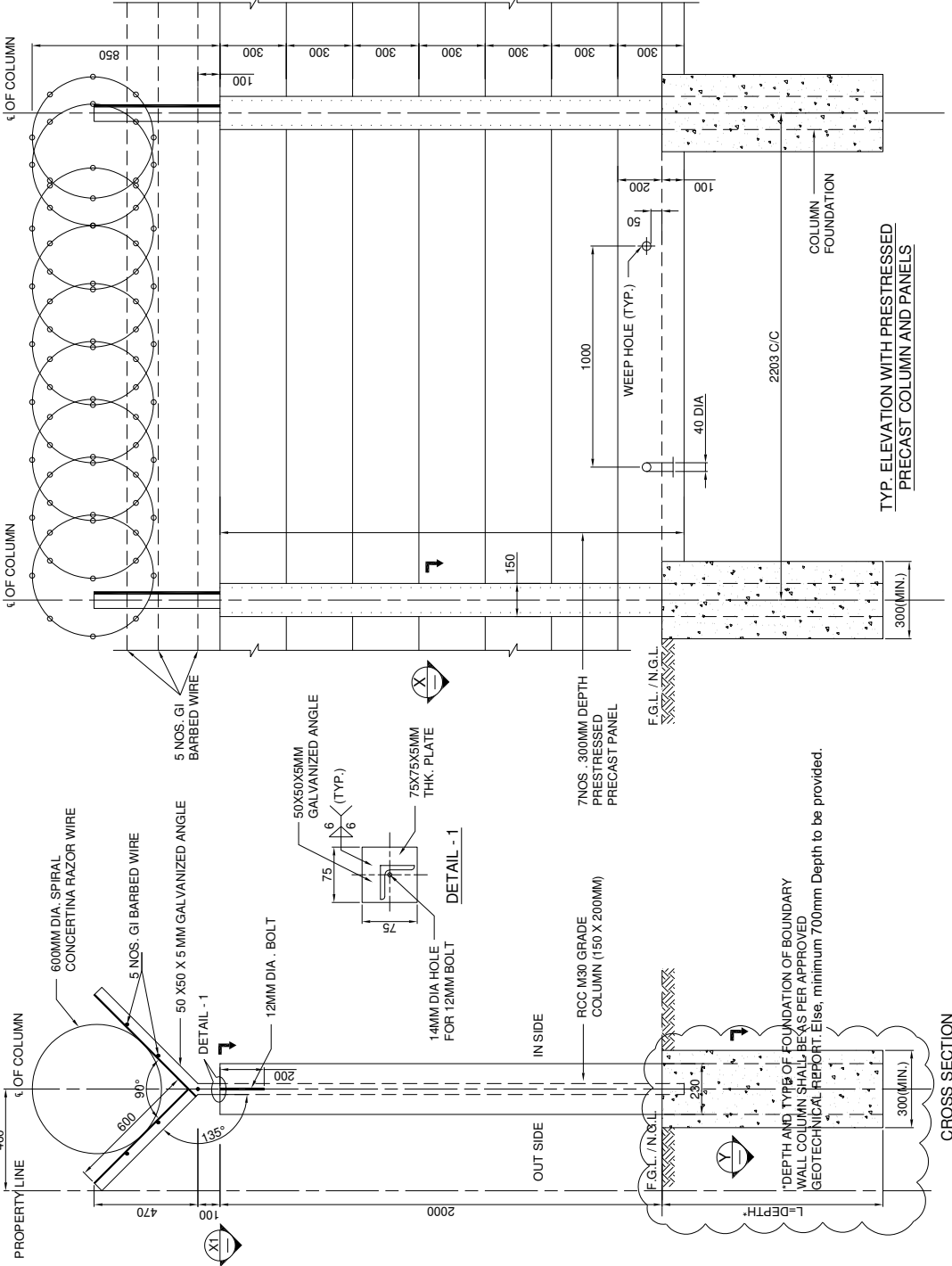
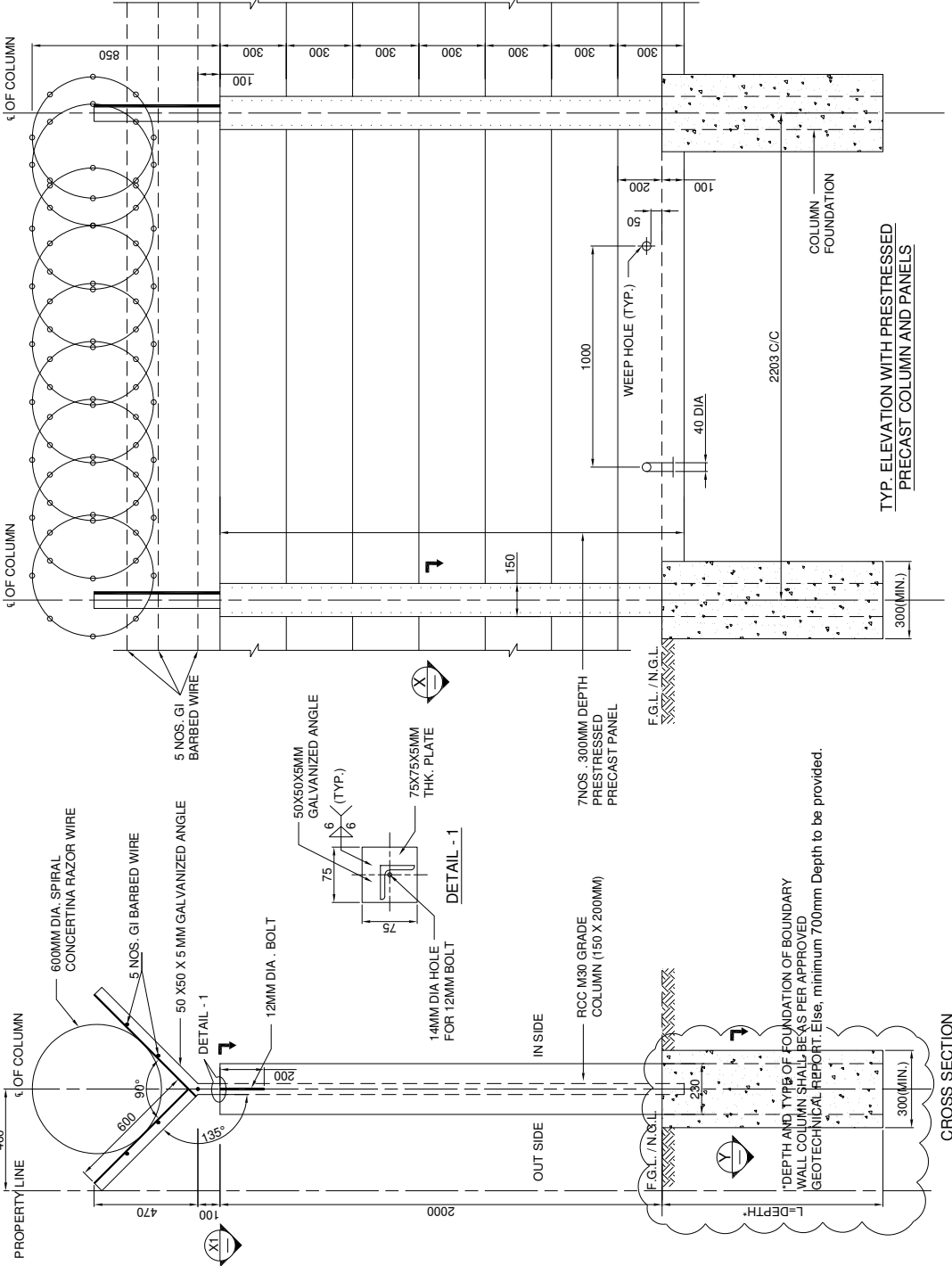
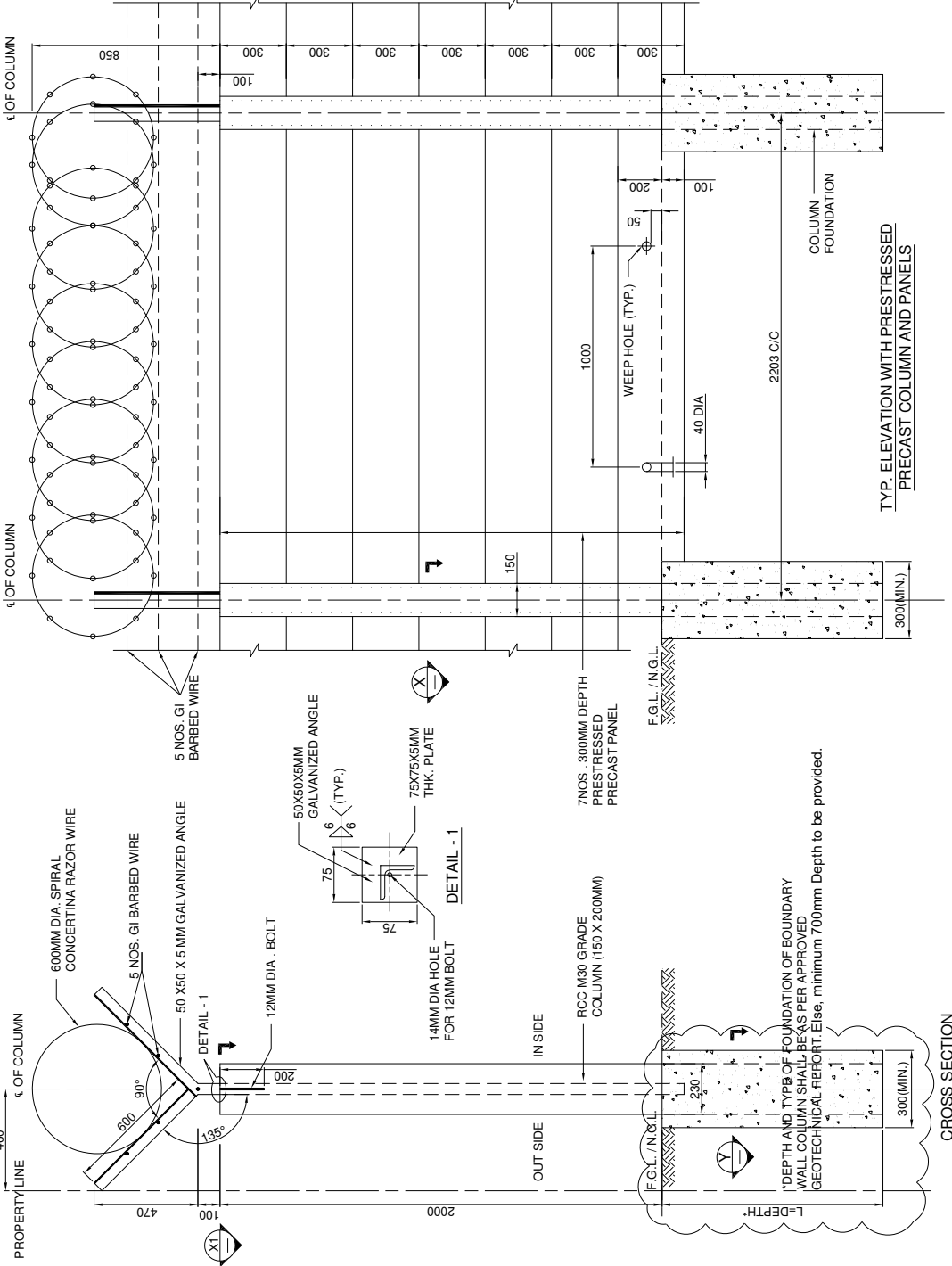
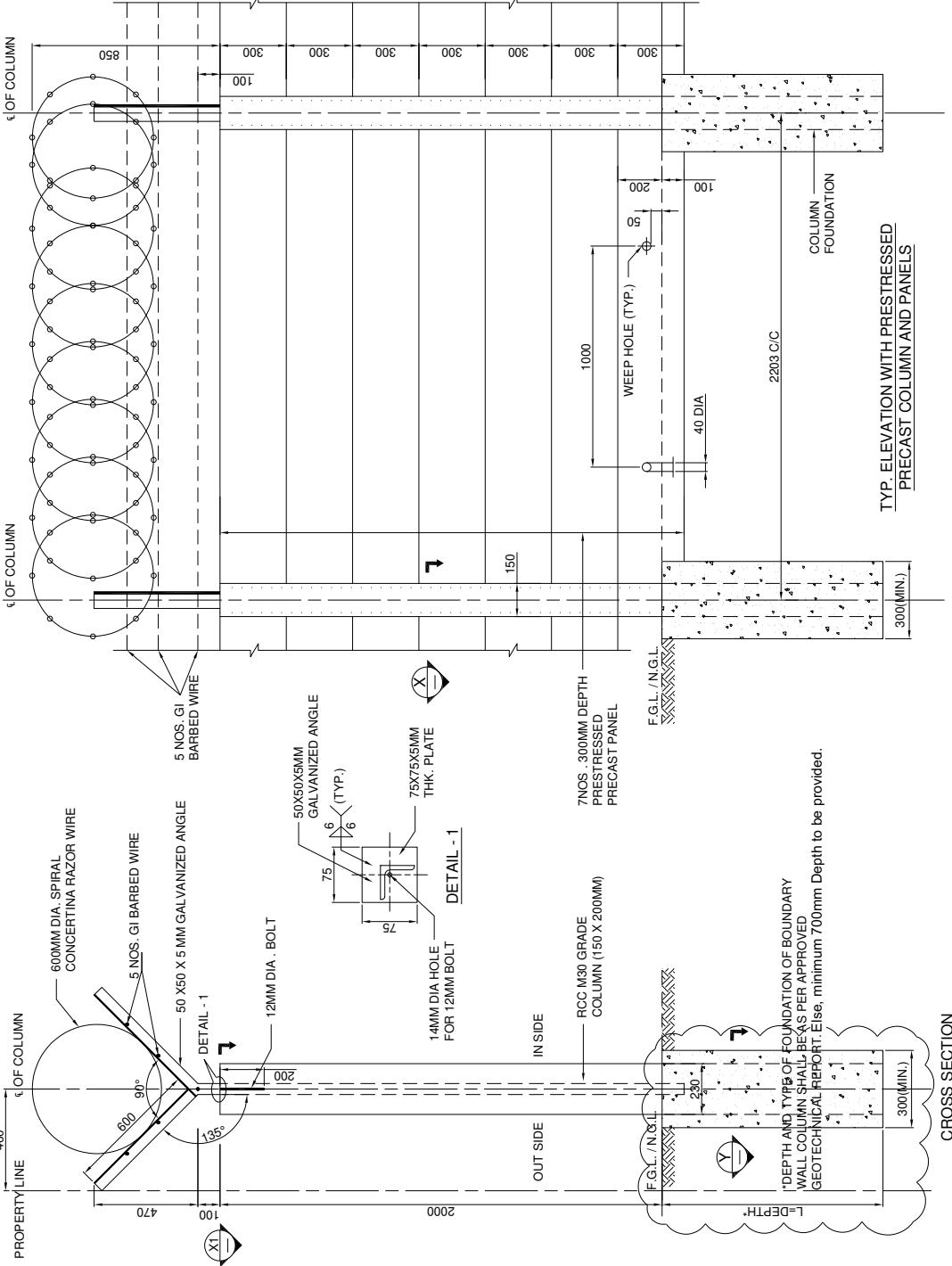
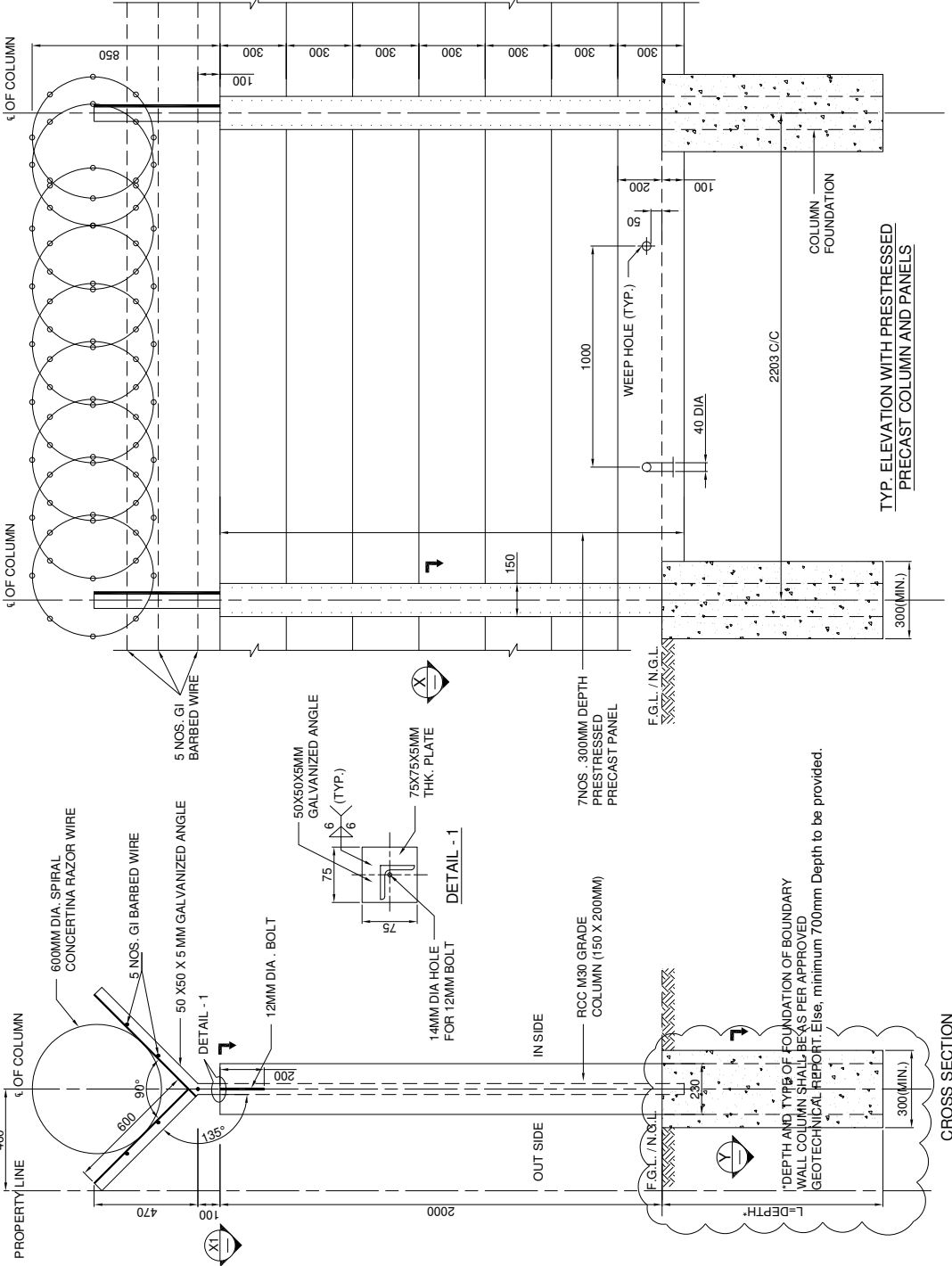
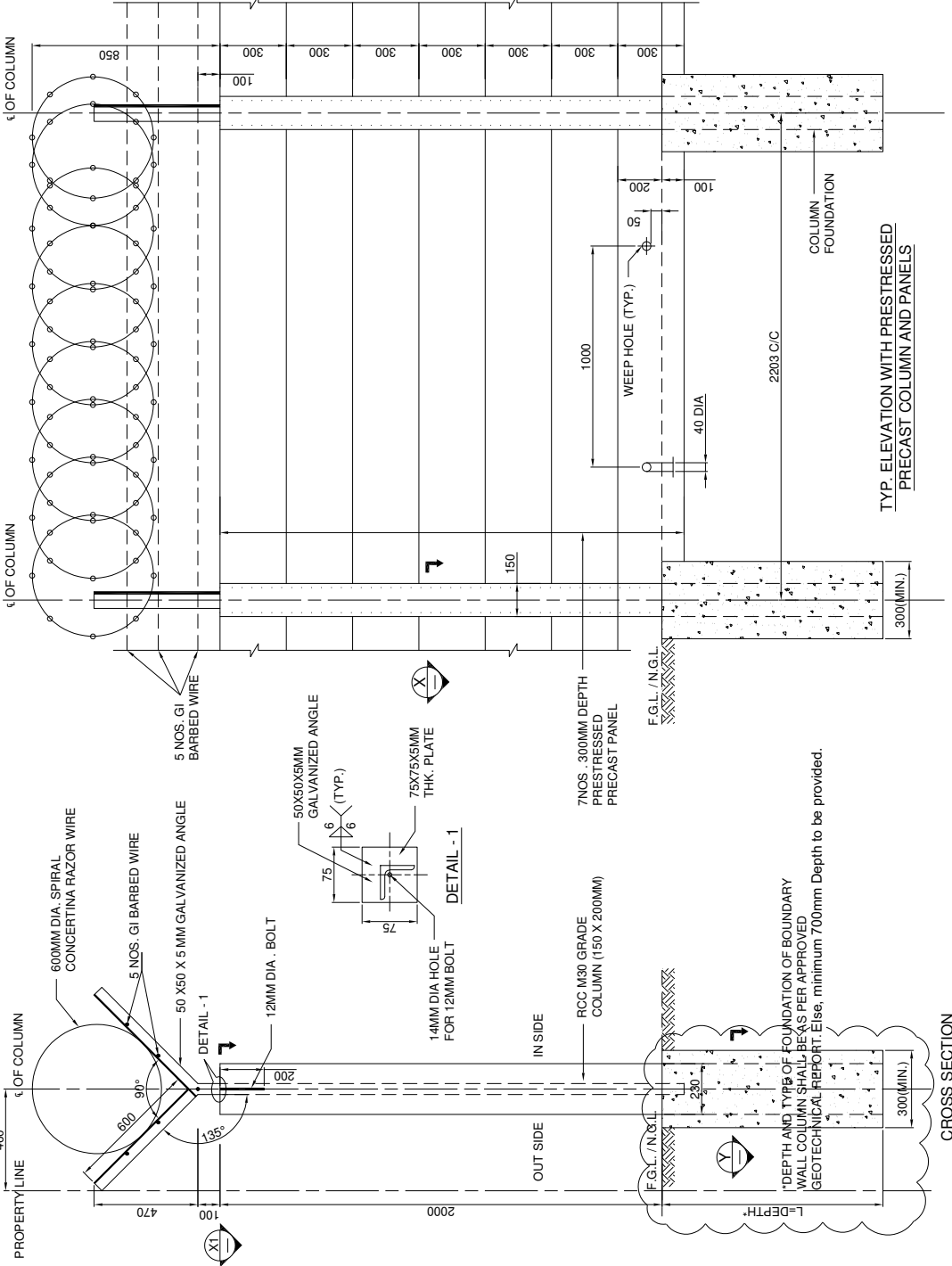
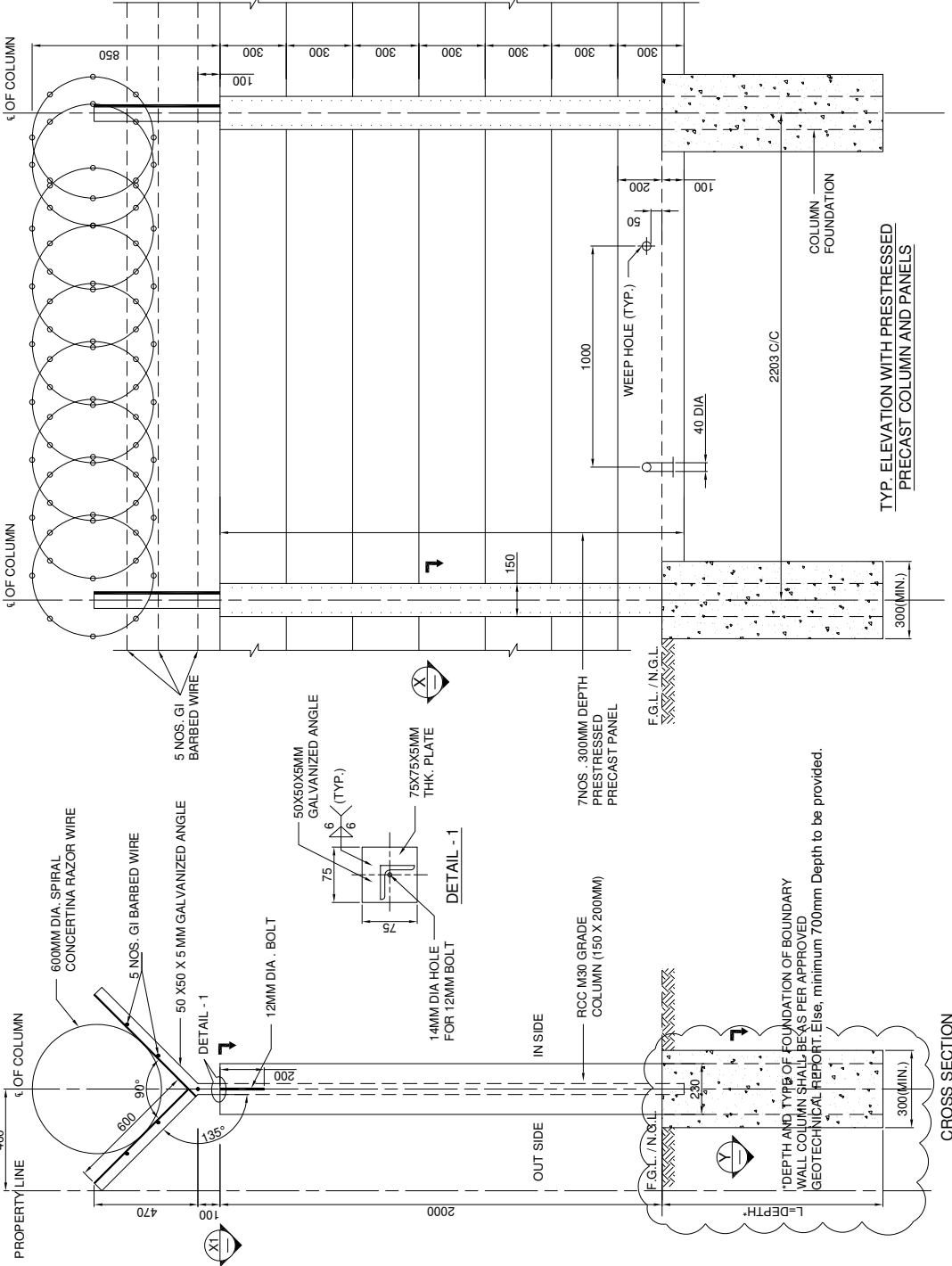
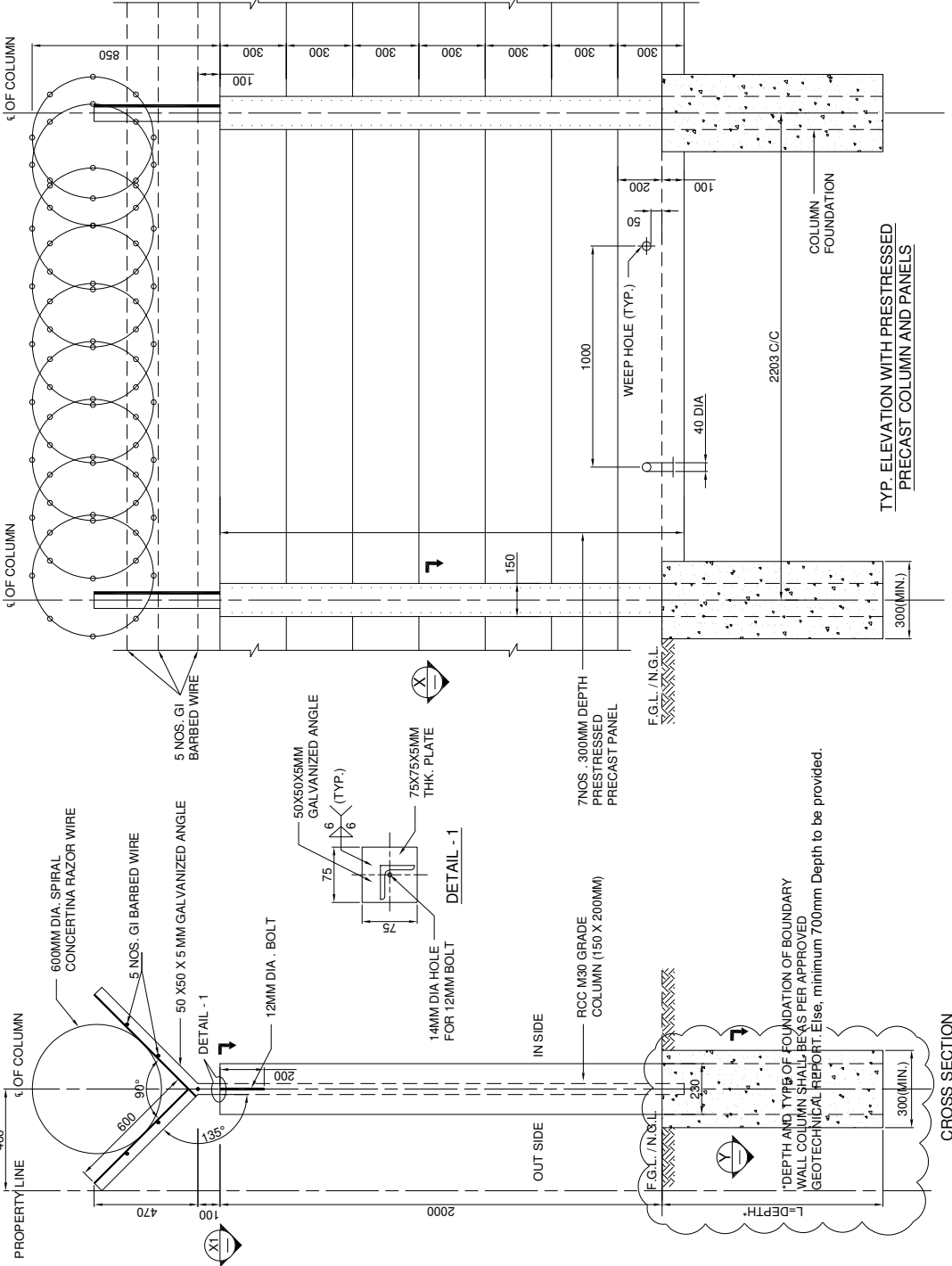
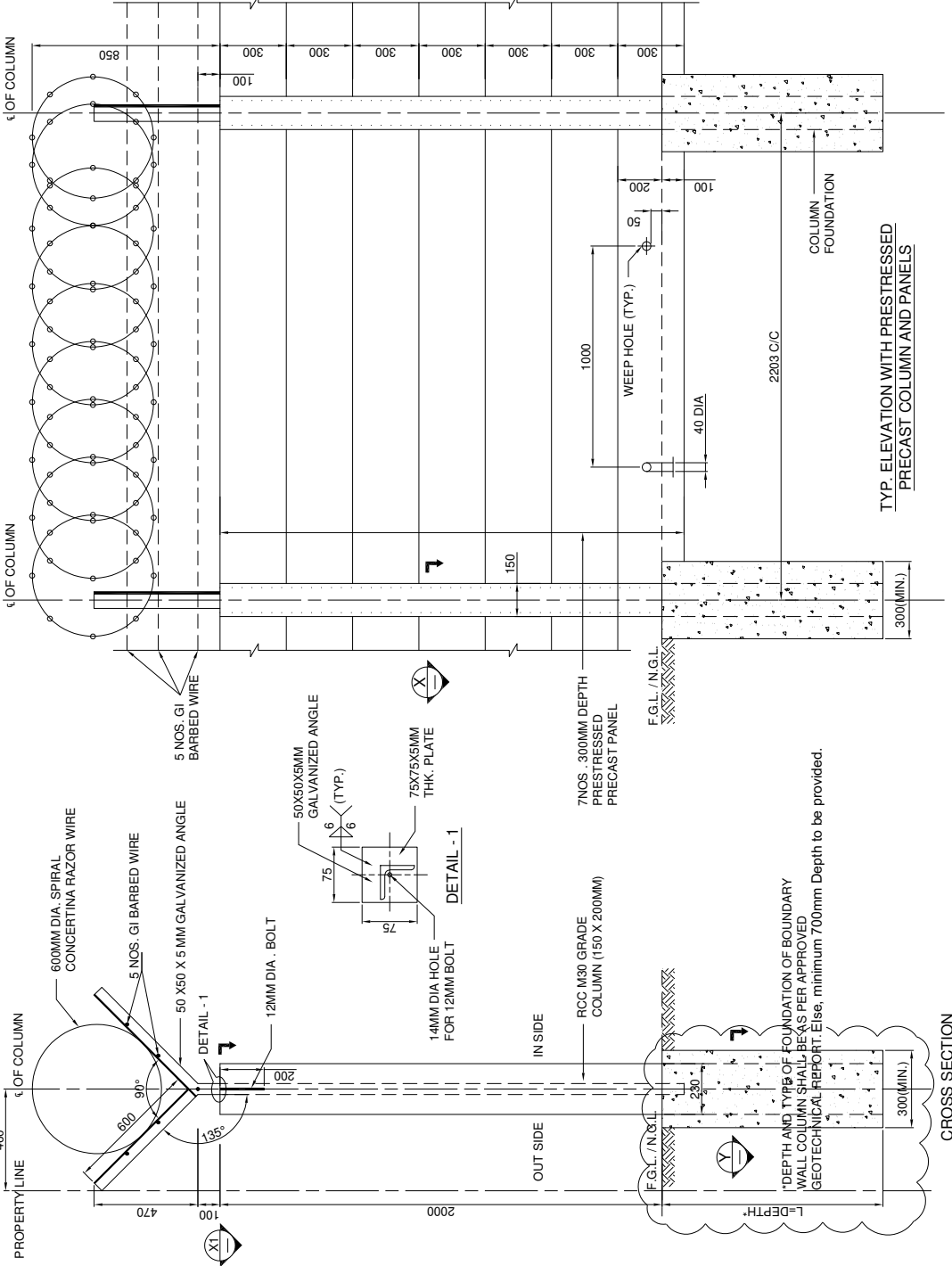
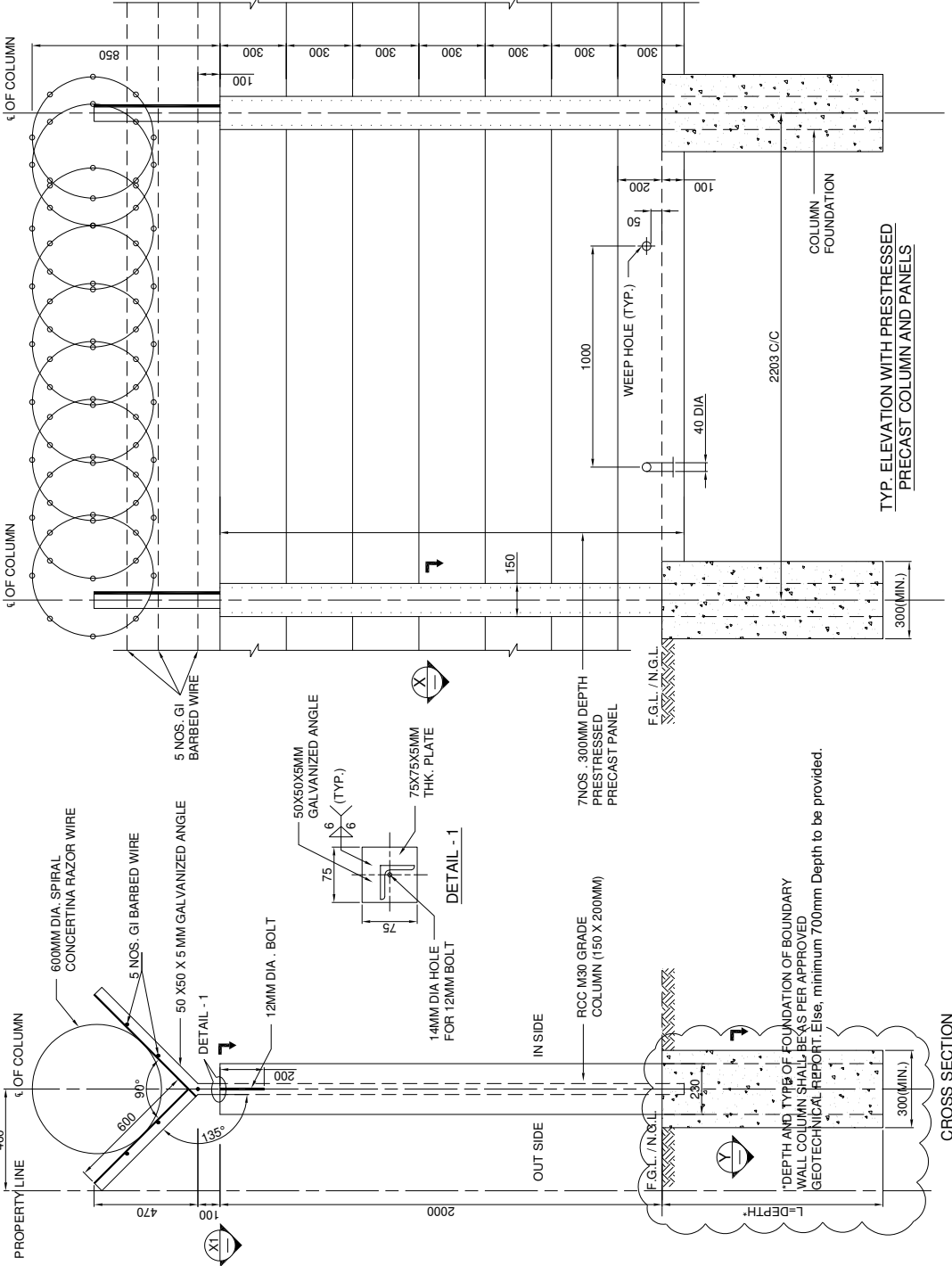
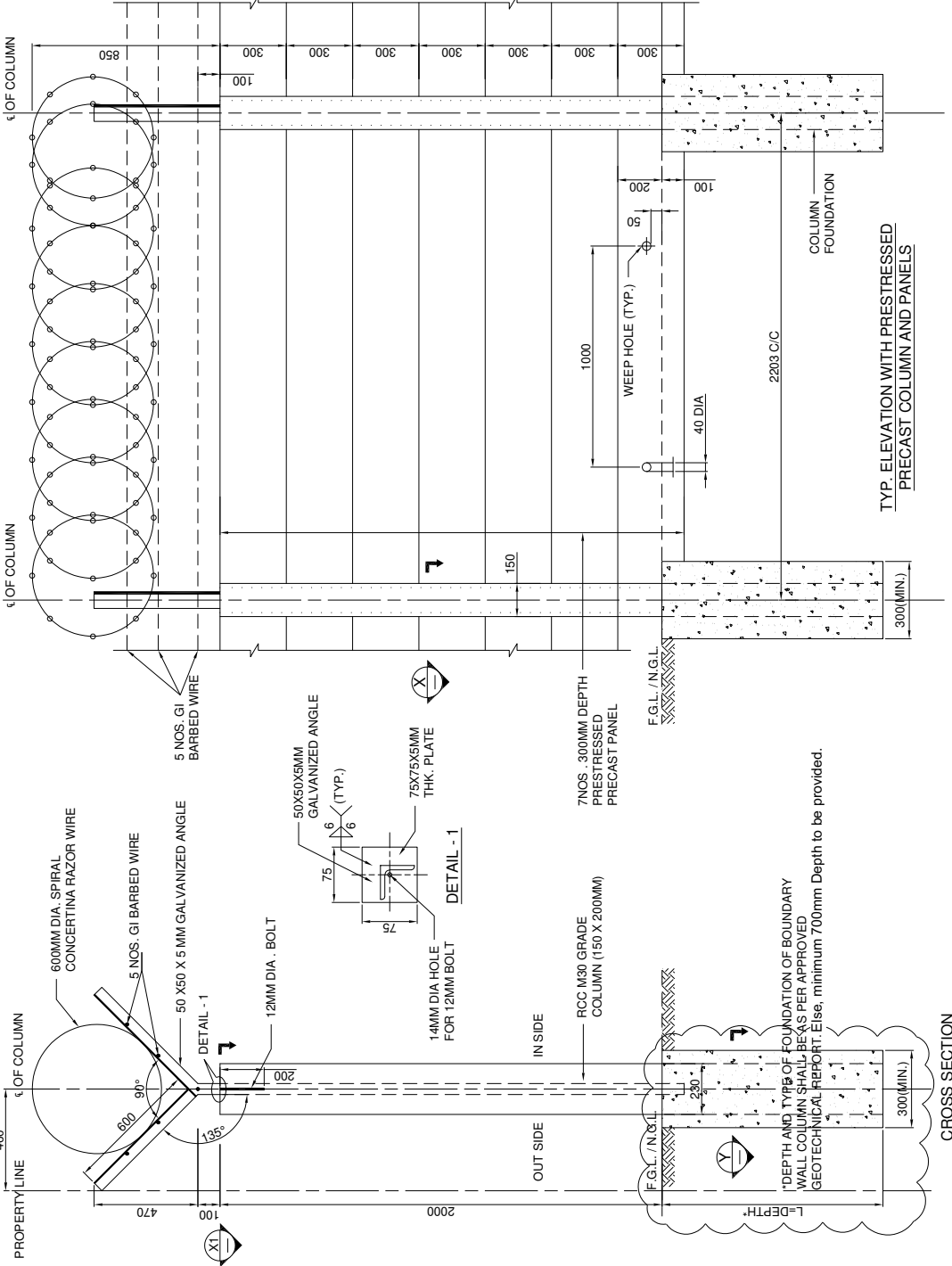
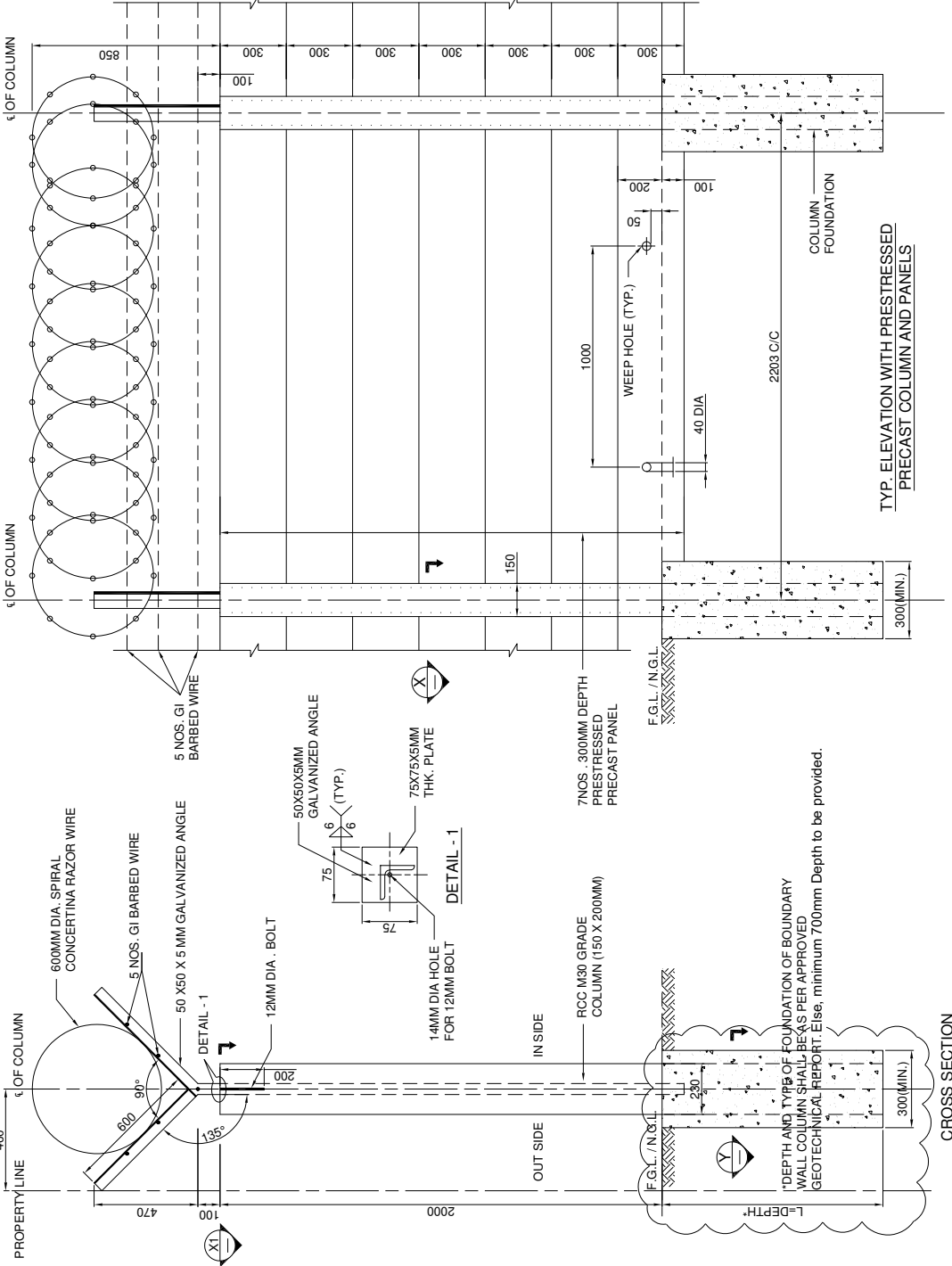
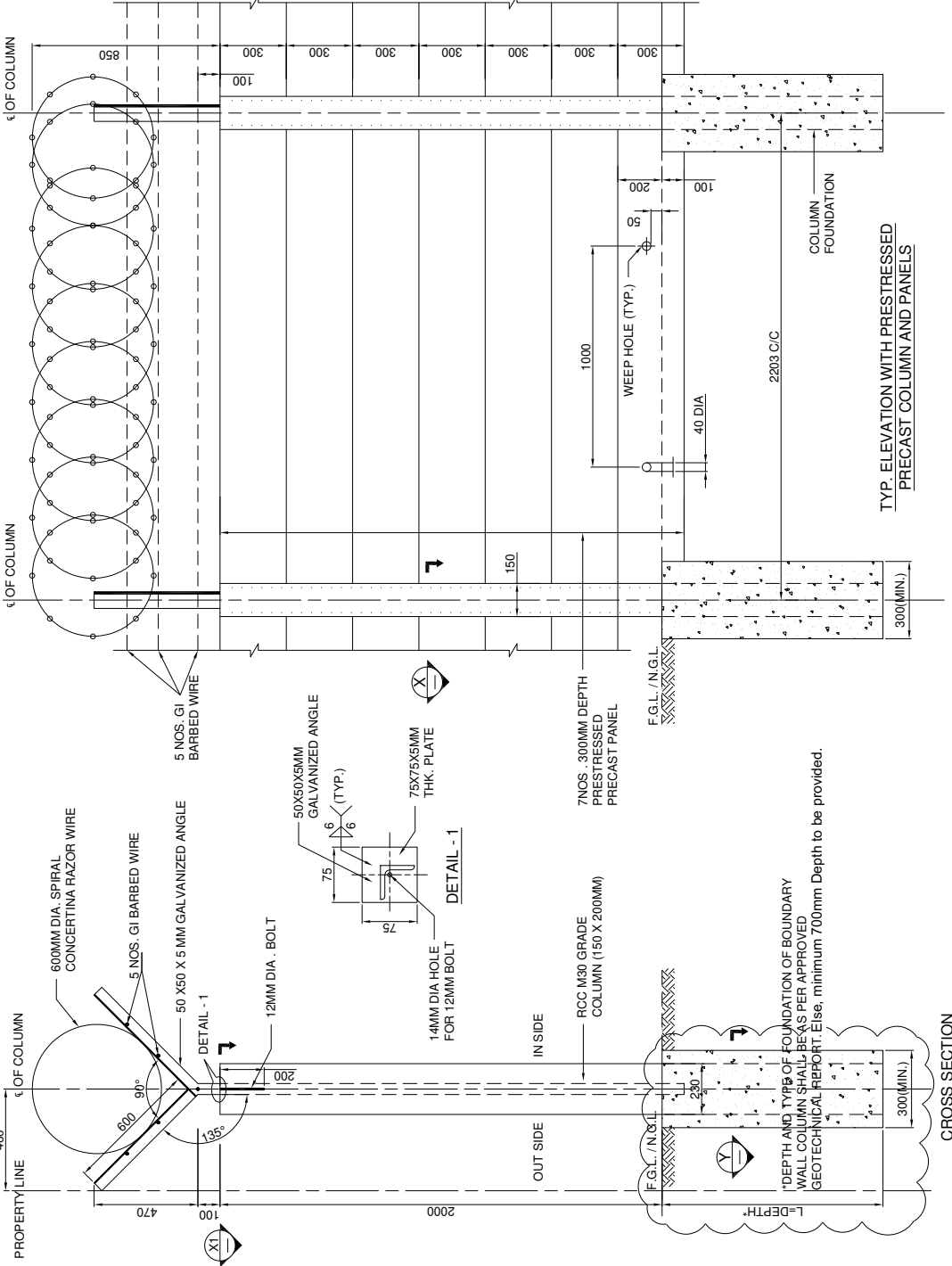
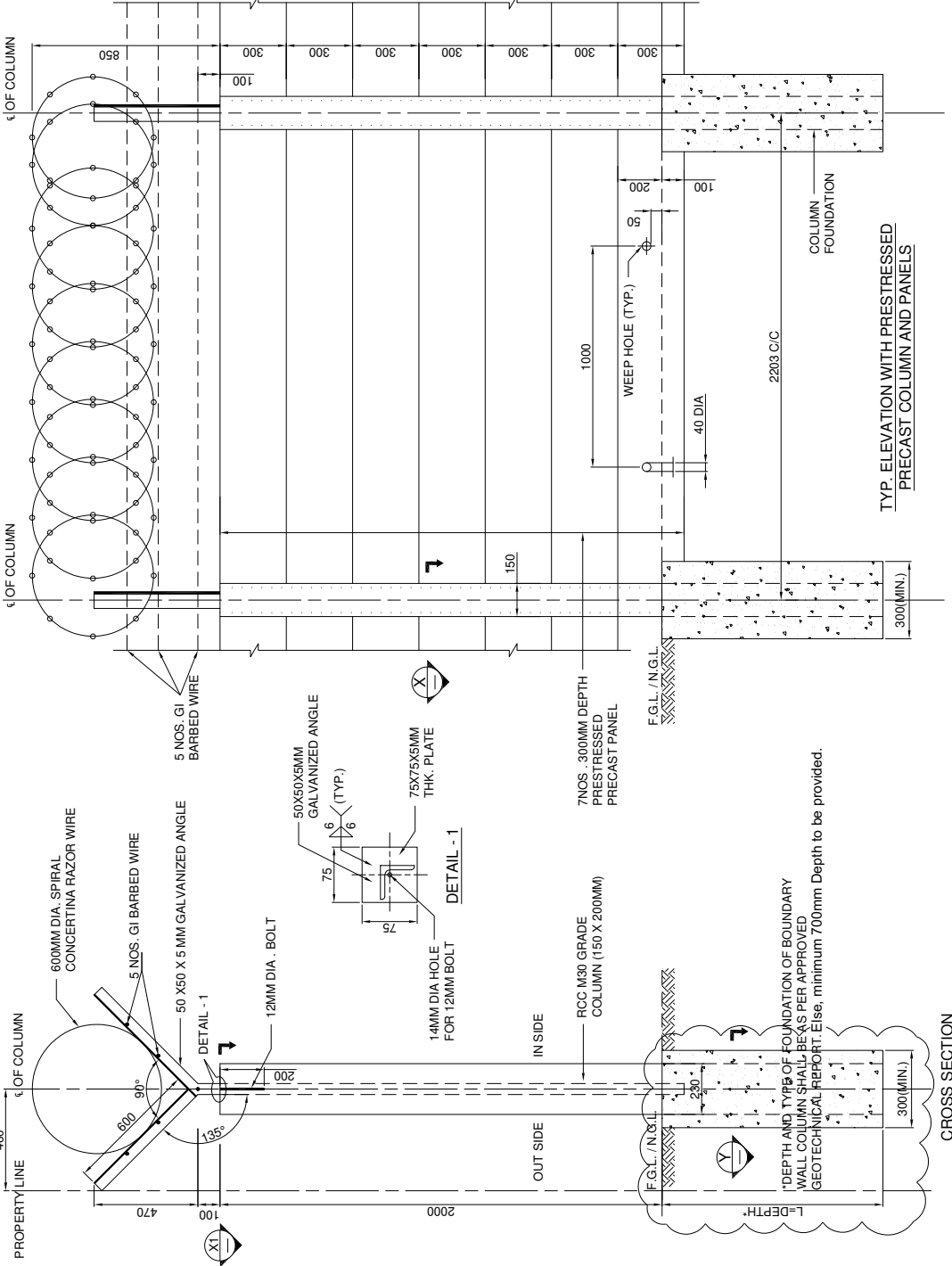
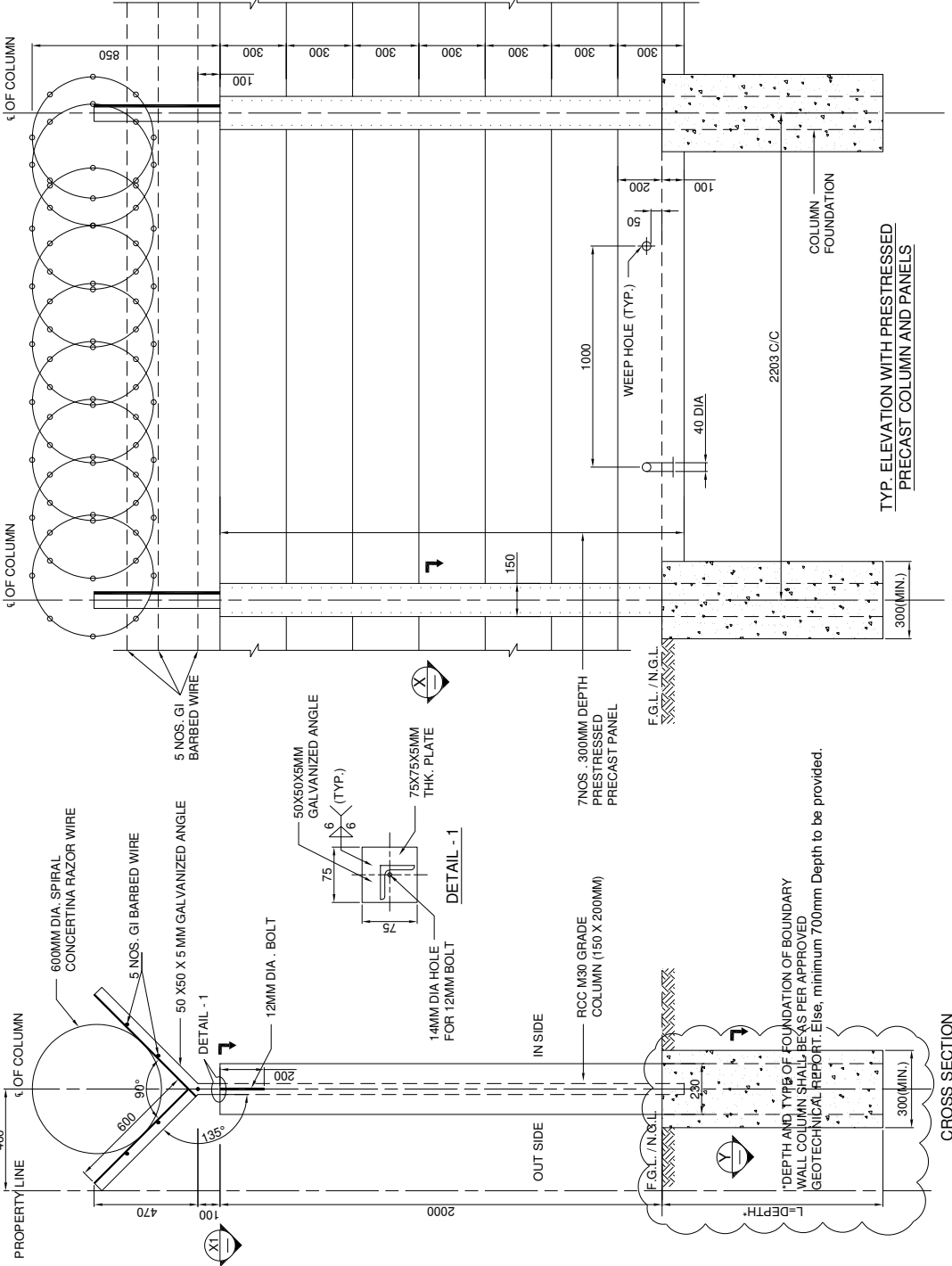
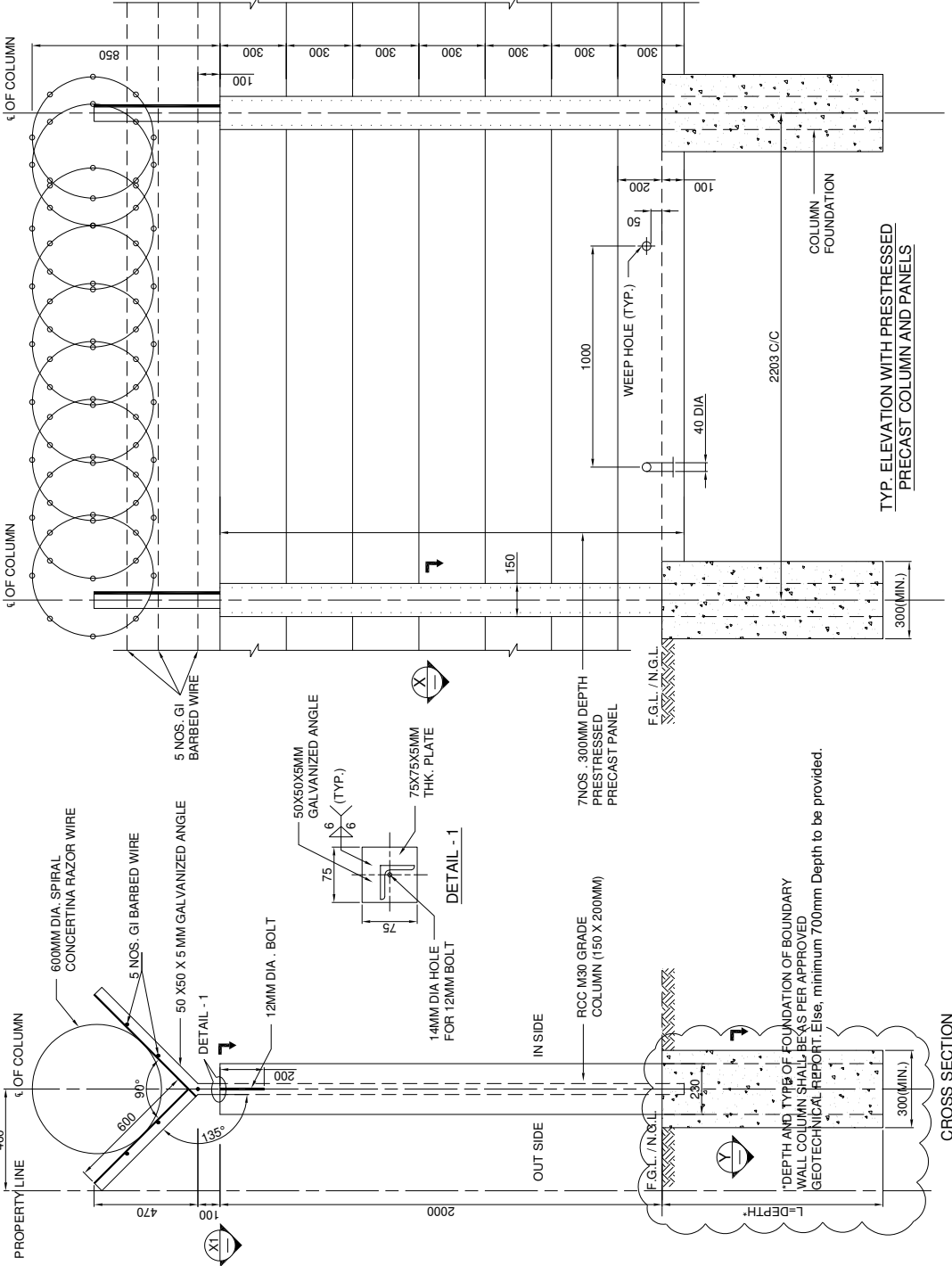
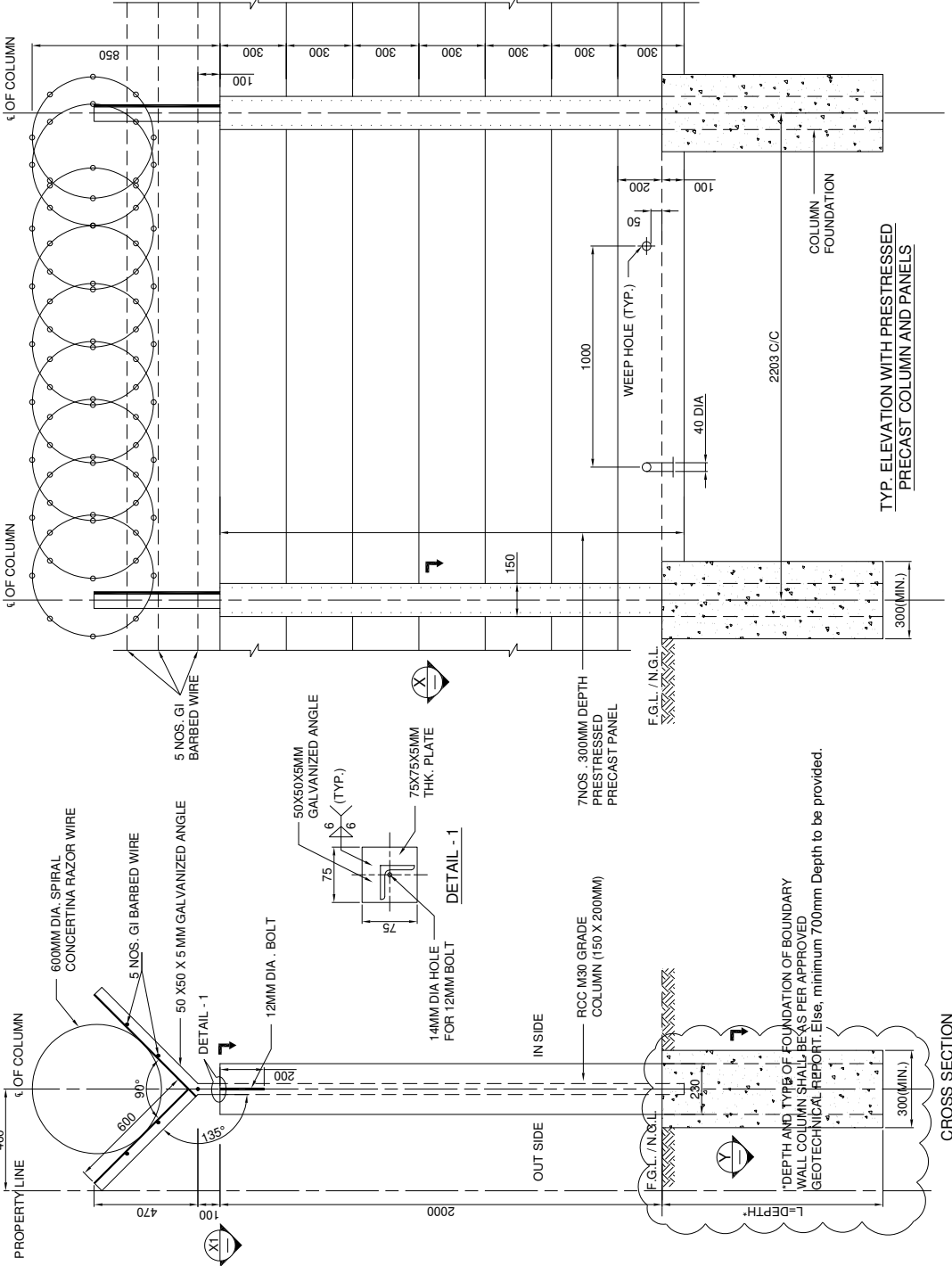
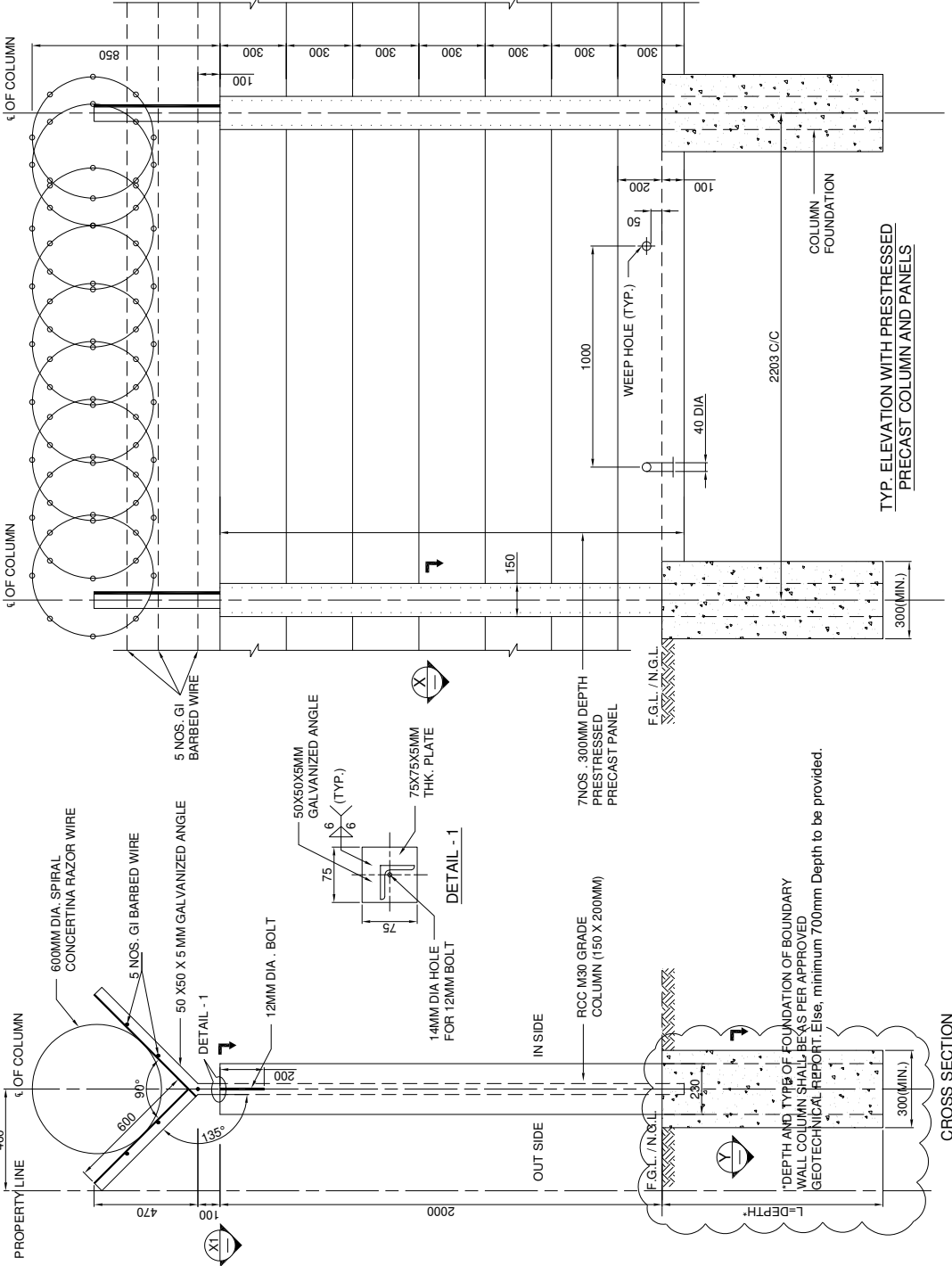
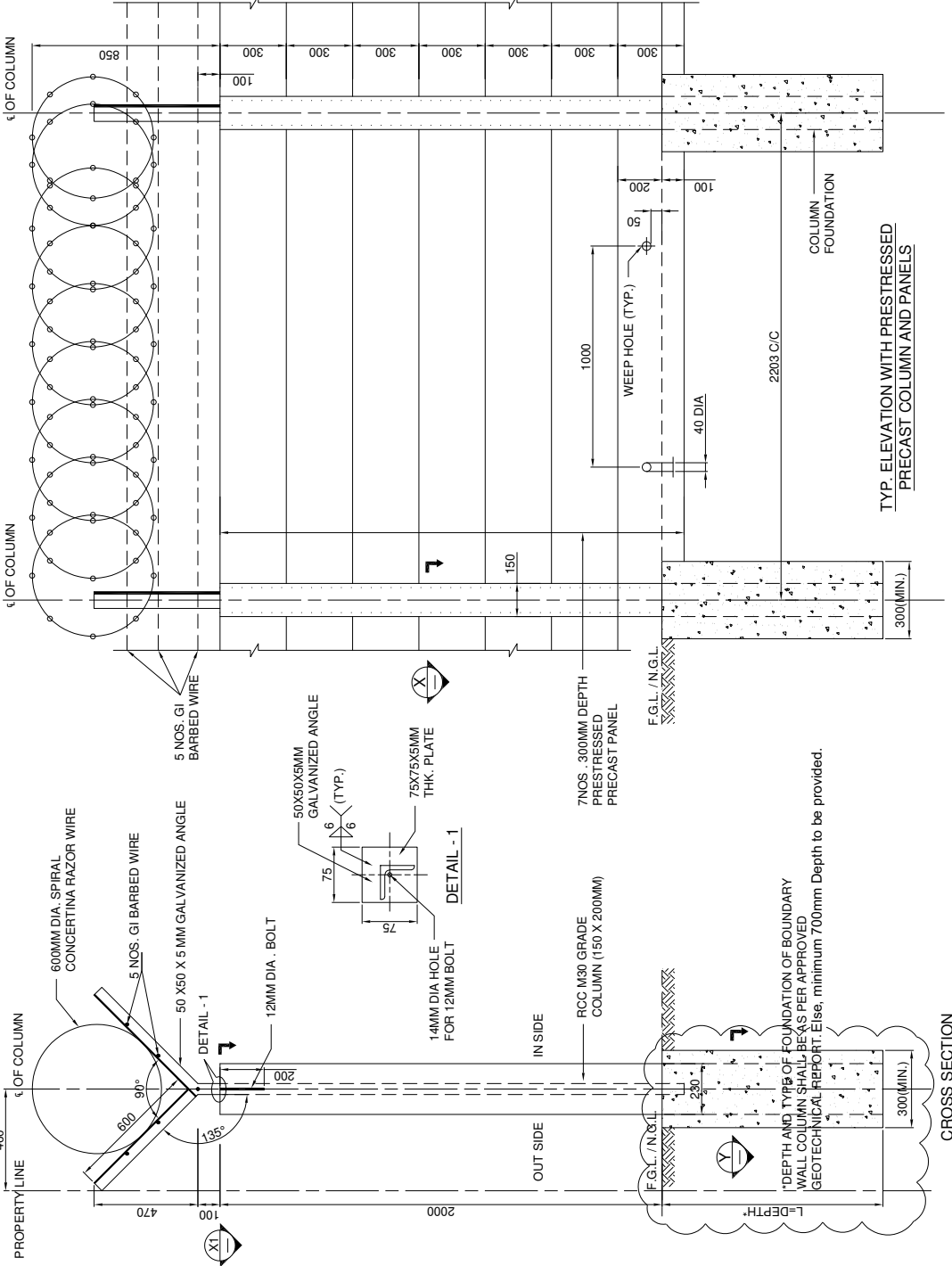
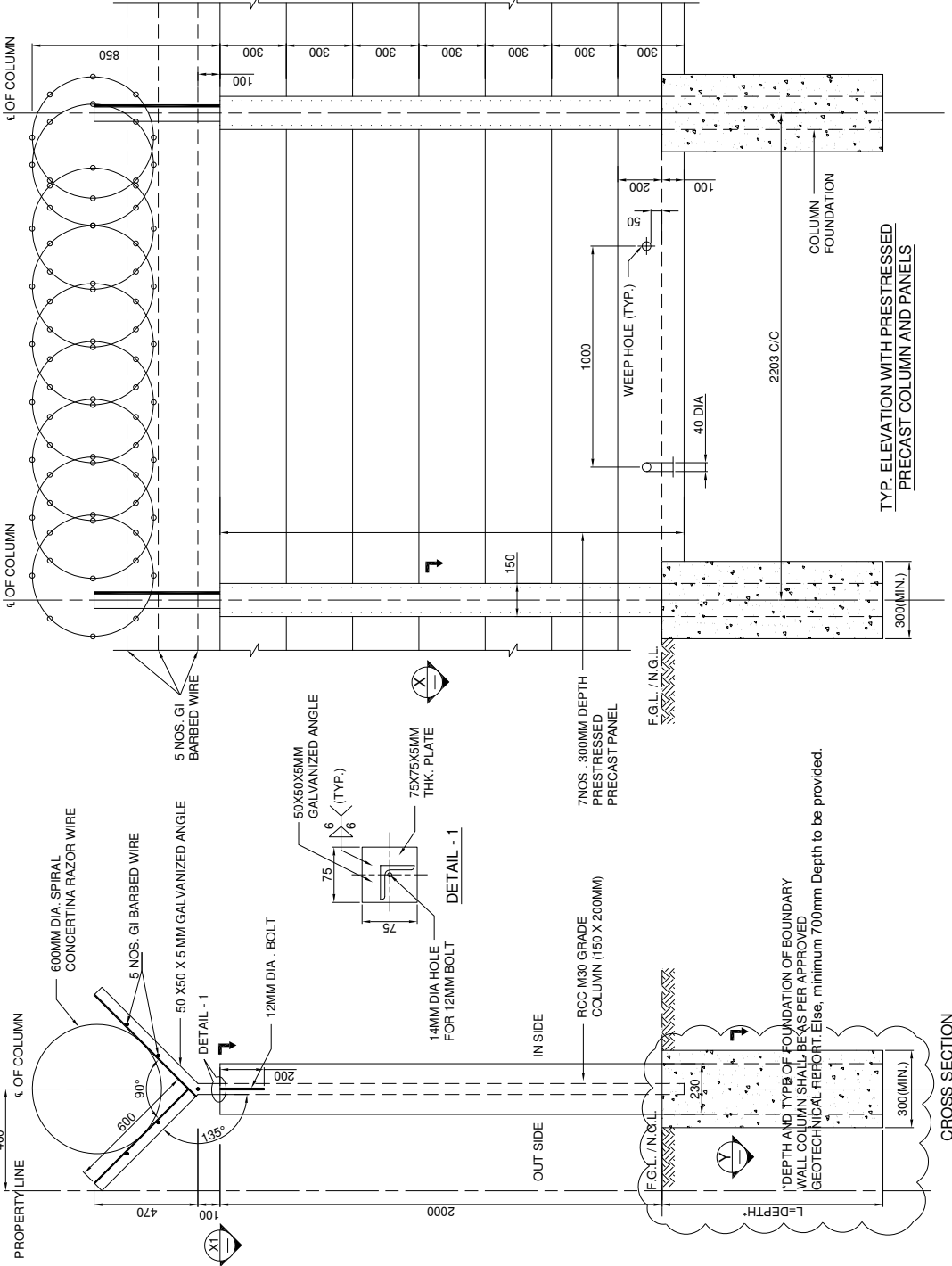
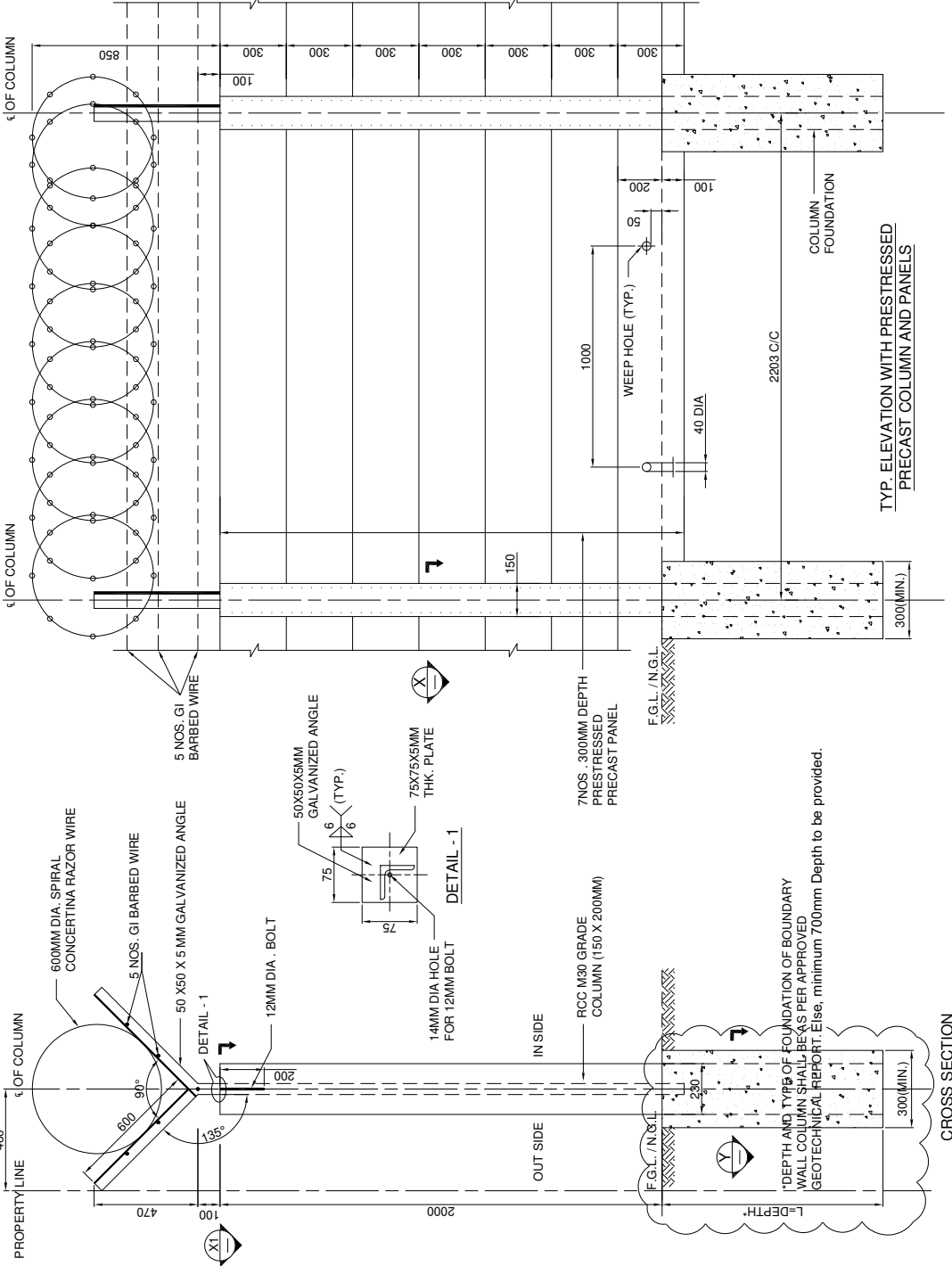
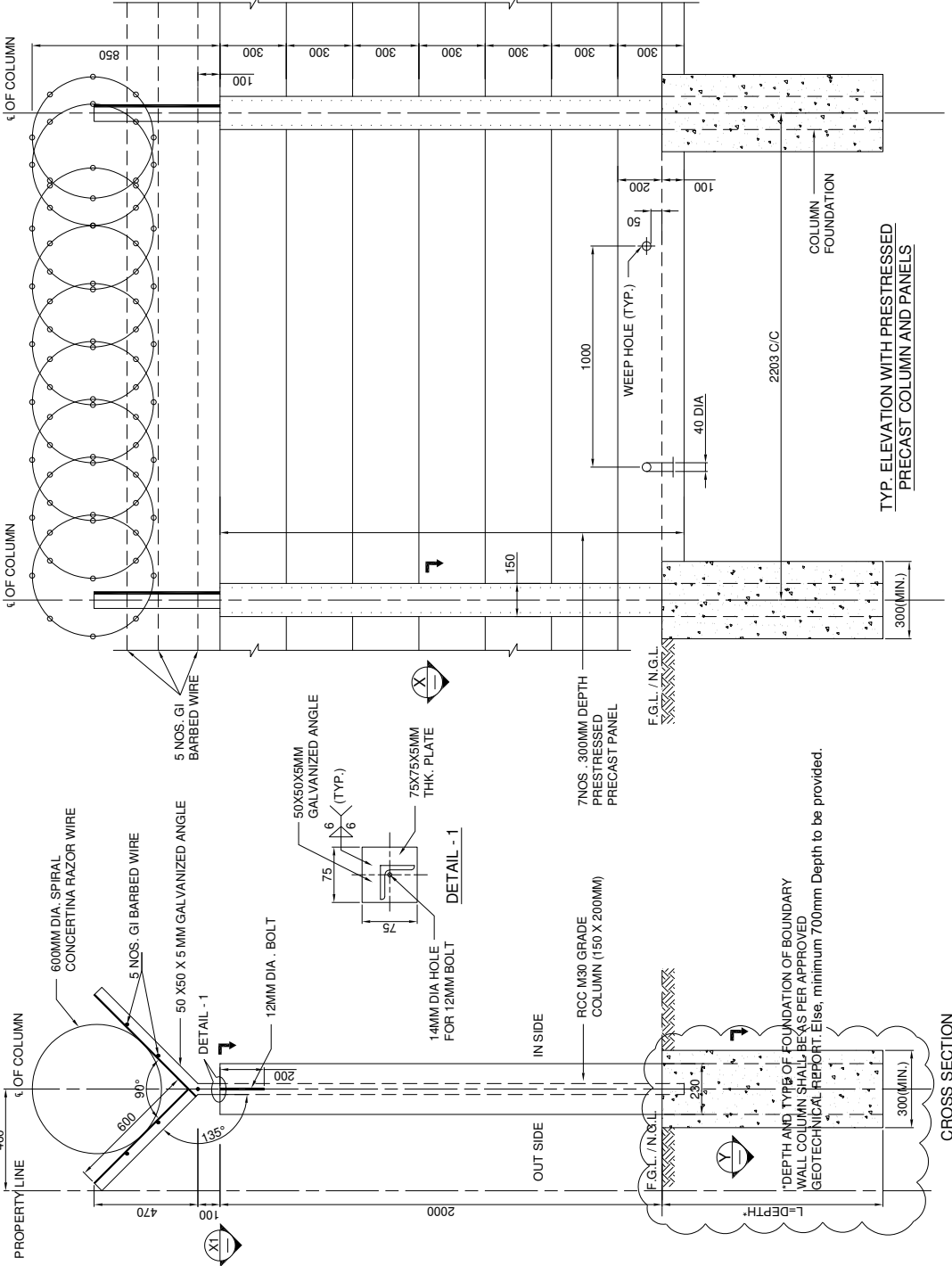
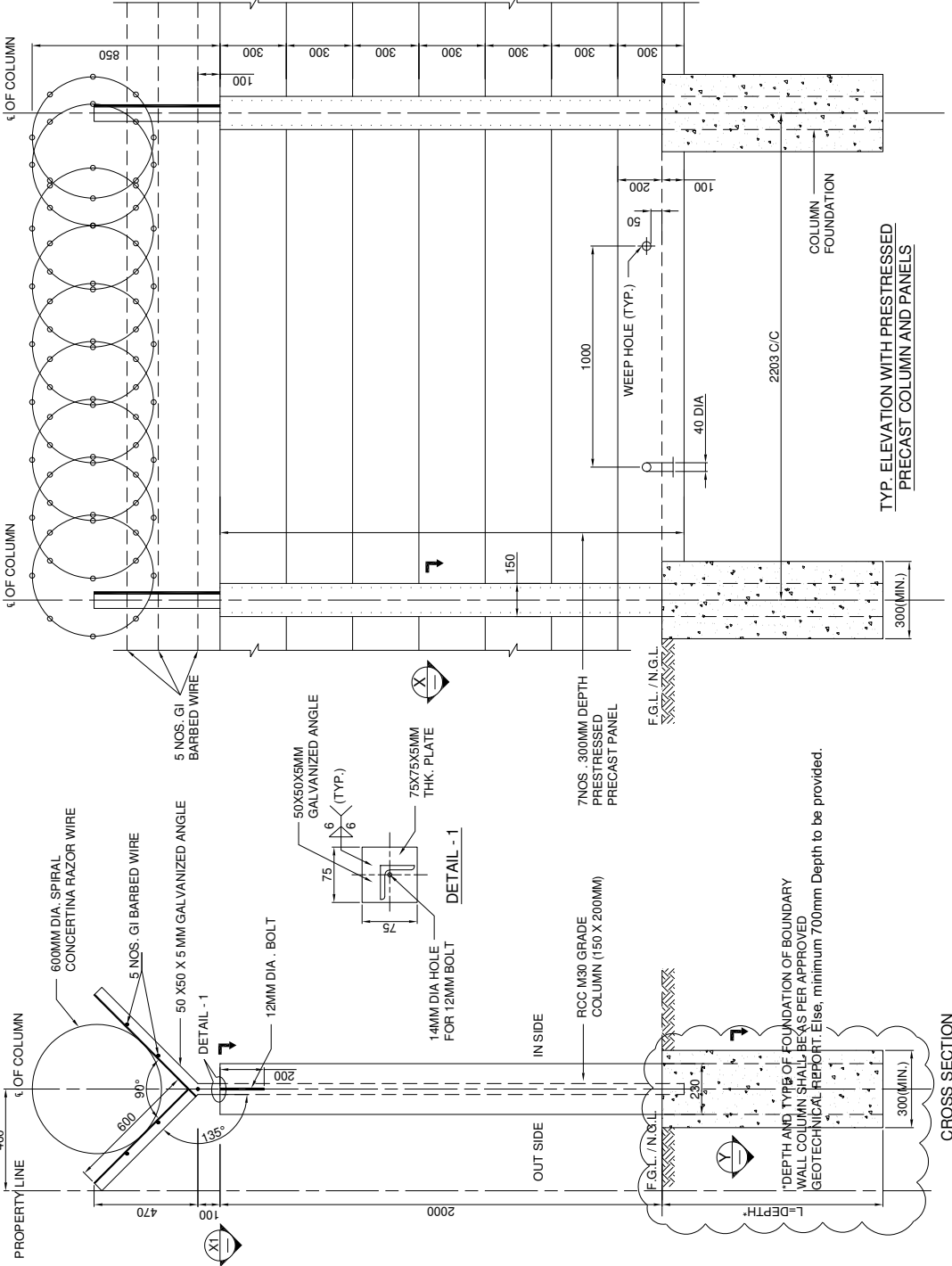
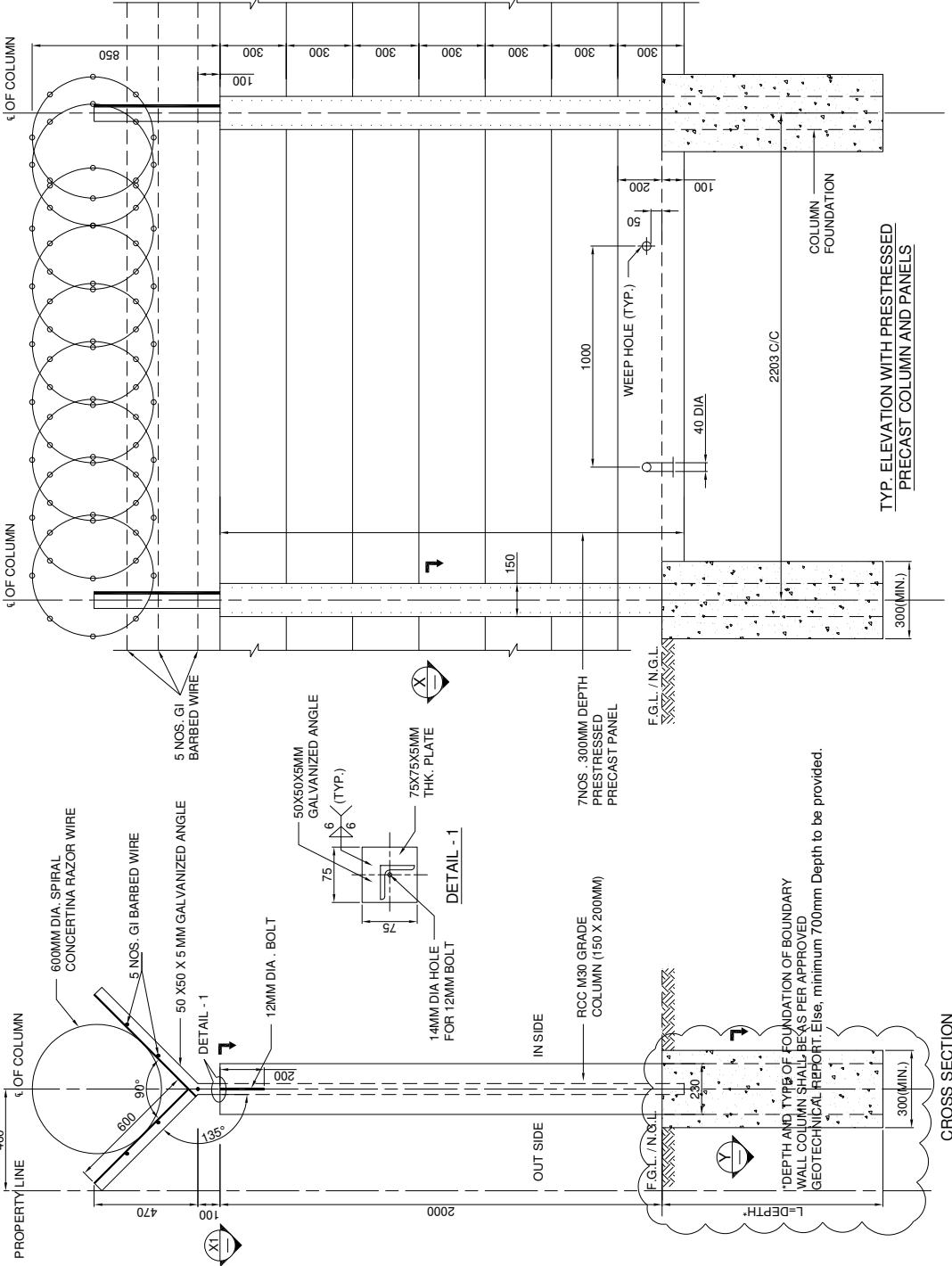
NOTES

- 1 THE DETAIL CONSTRUCTION & DESIGN DRAWING OF CMCS BUILDING SHALL BE DEVELOPED BY BIDDER AND SUBMITTED TO NRGEL FOR APPROVAL BEFORE START OF WORK.
- 2 SOME MINOR CHANGES IN DETAIL CONSTRUCTION OF CMCS BUILDING WITH RESPECT TO TENDER DRAWING MAY BE PORPOSE BY BIDDER AS PER RECOMENDATION OF EQUIPMENT MANUFACTURER, BETTER PERFORMANCE AND LOCATION OF SCADA ROOM AND VIEW POINT. THE SAME SHALL BE SUBJECT TO NRGEL APPROVAL.
- 3 EQUIPMENT IN CMCS SWITCHGEAR ROOM AS PER APPROVAL OF SLD AND LAYOUT.
- 4 MINIMUM CLEARENCE BETWEEN BACK SIDE OF ANY FLOOR MOUNTED PANEL AND THE WALL SHALL BE 850 MM OR MANUFACTURER RECOMENDATION, WHICHEVER IS HIGHER.
- 5 MINIMUM WORKING CLEARENCE BEFORE FRONT PANELS OF ANY SWITCHGEAR,PCU OR SIMILLAR EQUIPEMENT GENERALLY SHALL NOT BE LESS THEN 2200MM.
- 6 CMCS BUILDING EQUIPMENTS ROOM LENGTH/GRID SHALL BE DETERMINED BASED ON ACTUAL REQUIREMENT.
- 7 THE HEIGHT OF PARAPET WALL SHALL BE MINIMUM 300 MM ABOVE THE TOP OF ROOF LEVEL. STRUCTURAL STEEL HAND RAILINGS OF MINIMUM 700 MM HEIGHT SHALL ALSO BE PROVIDED OVER THE PARAPET WALL
- 8 THE ROOF SLOPE SHALL NOT BE LESS THAN 1:100 AND THE ROOF SHALL BE PROVIDED WITH RCC/PVC WATER GUTTER
- 9 RCC SUNSHADE OVER THE OPENINGS WITH 300 MM PROJECTION ON BOTH SIDES OF THE OPENINGS. PROJECTION OF SUNSHADE FROM THE WALL SHALL BE MINIMUM 450 MM OVER WINDOW OPENINGS AND DOOR OPENINGS EXCEPT FOR MAIN ENTRANCE DOOR.
- 10 THE APPROACH ROAD SHALL CONNECT BOTH THE TRANSIT ROOMS.
- 11 THE ROOF SHAL HAVE A VIEWING GALLERY/ OBSERVATION DECK FOR PANORAMIC VIEW OF PROJECT
- 12 AN ALMIRAH/ CLOSED STORAGE SPACE SHALL BE PROVIDED IN C&R PANEL ROOM FOR STORAGE OF SPARE IED'S, ELECTRONIC CARDS ETC.
- 13 THE ROOF OF CMCS BUILDING AND PARKING SHEDS SHALL BE SUITABLE FOR INSTALLATION OF ROOFTOP SOLAR PV PANELS
- 14 FURNITURE & FIXTURES/FACILITIES FOR OWNER'S ROOM, CONFERENCE ROOM, TRANSIT ROOM, STORE ROOM ARE IN THE SCOPE OF THE BIDDER AND THE SAME SHALL BE REVIEWED BY NTPC PM/SITE TEAM AS PER FUNCTIONAL REQUIREMENTS DURING DETAILED ENGINEERING STAGE

WINDOWS, DOORS, VENTILATORS AND ROLLING SHUTTERS DETAILS	
DOOR (D1), External	uPVC/Aluminium Frame with 10 mm thick toughened glass and Collapsible steel Gate with locking system
DOOR (D2), Internal	uPVC/Aluminium Frame with 10 mm thick toughened glass and aluminium grille (Openable/Closed) with locking system
DOOR (D3), Toilet Room	Single leaf uPVC/Aluminium/steel framed solid core flush shutter with locking system.
WINDOW (W)	uPVC/Aluminium Frame with 4 mm thick float glass and aluminium grille (Openable/Closed)
VENTILATOR (V)	Louvered ventilator
ROLLING SHUTTER (RS)	Steel Rolling Shutter (Mechanical Gear Operated), size 3.0x3.0 Meters, Metal rolling shutters and rolling grills as IS: 6248
Collapsible steel Gates	Collapsible Steel Gates, as per CPWD SPEC Vol: 1
Note: 1. All glazing work shall conform to IS 1083 and IS 3548. 2. Steel framed solid core flush shutter as per IS 2202. 3. The glass to use should be from a reputed brand/manufacturer. The glass should be free from distortion and thermal stress.	

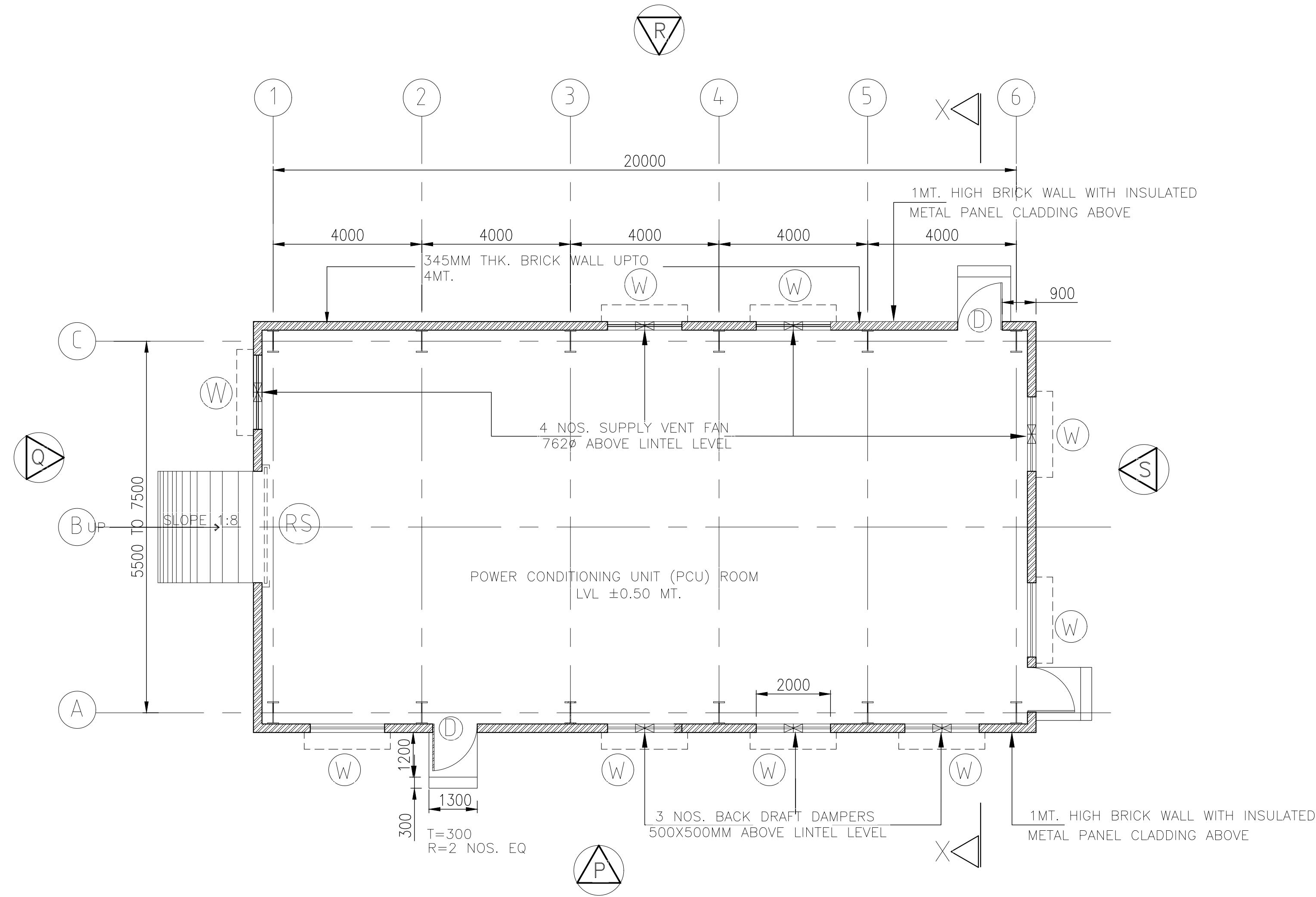
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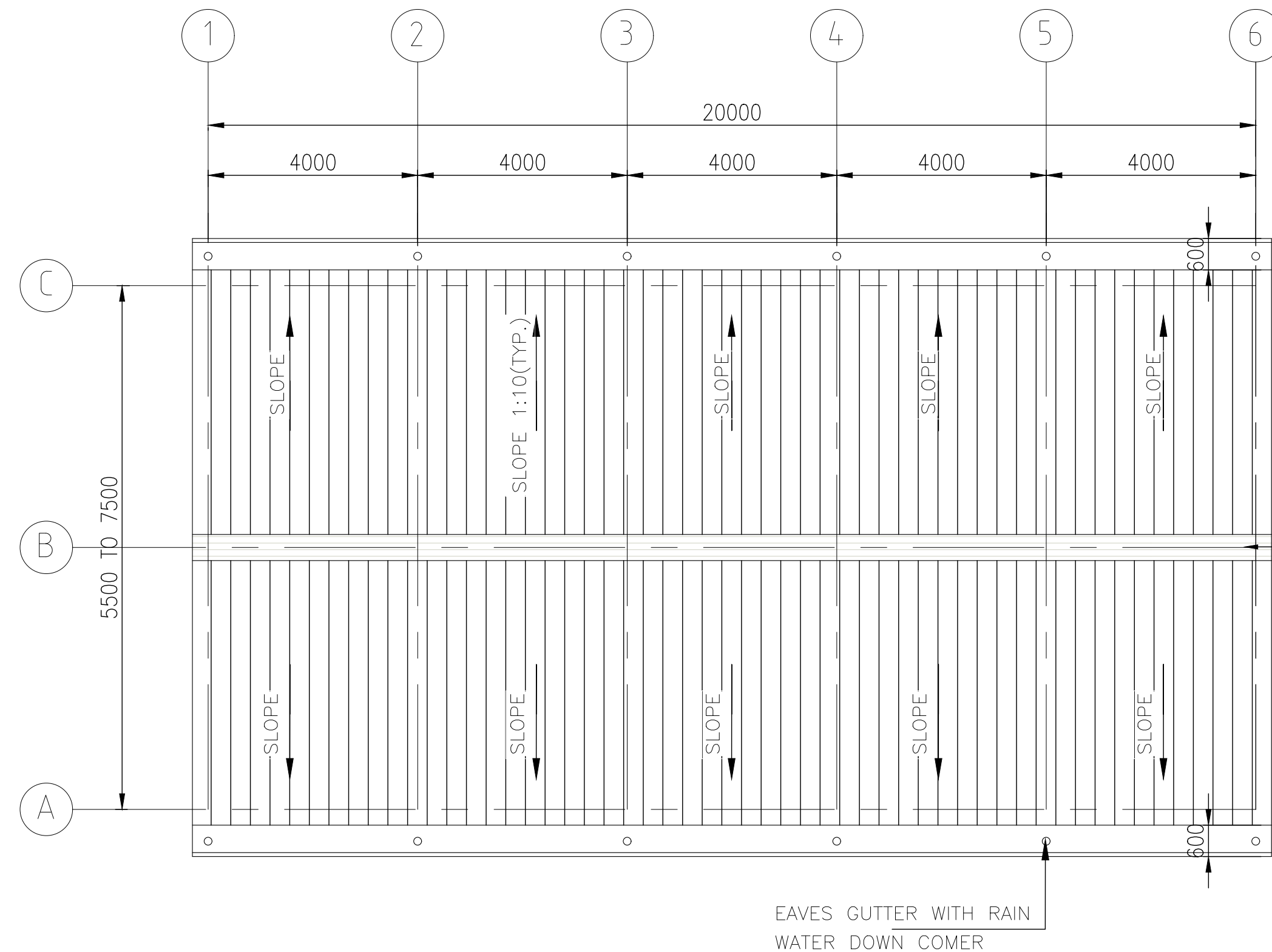








PLAN AT ± 0.0 MTS. LVL.

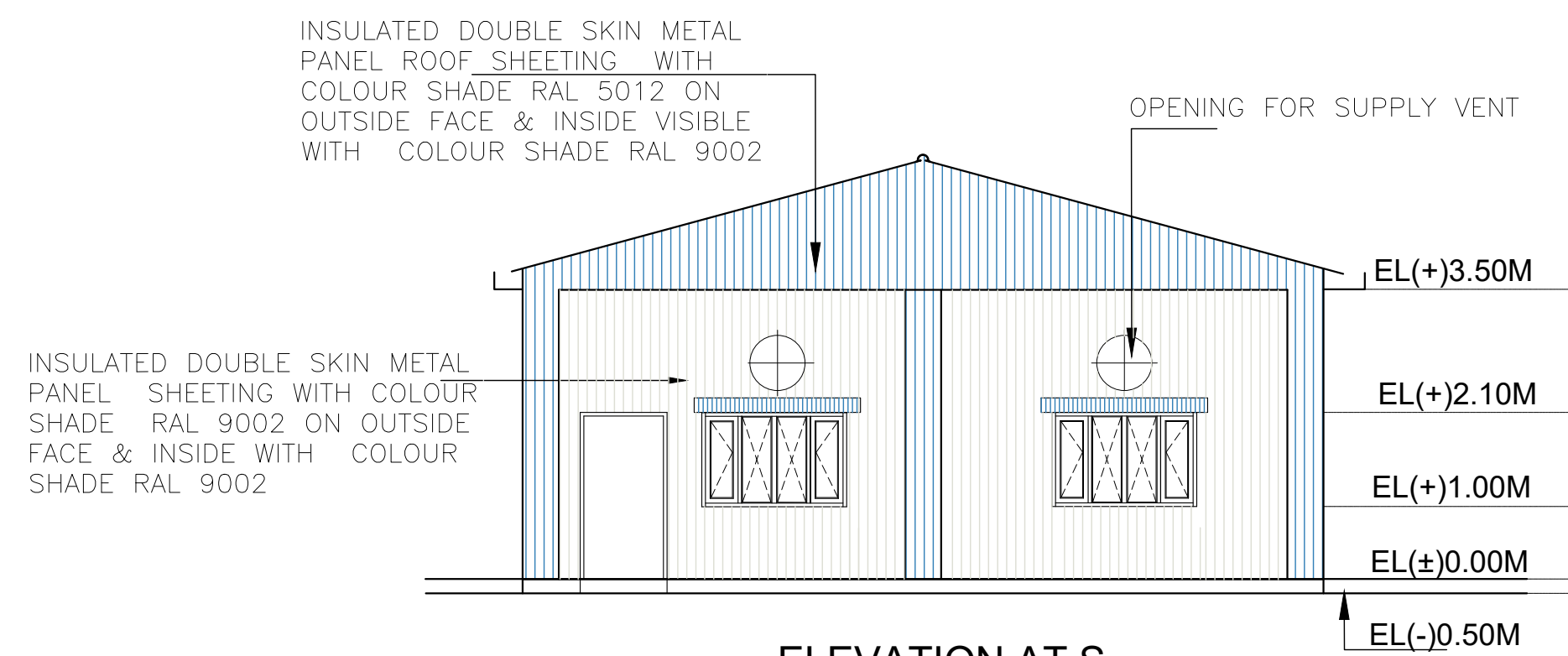


ROOF PLAN

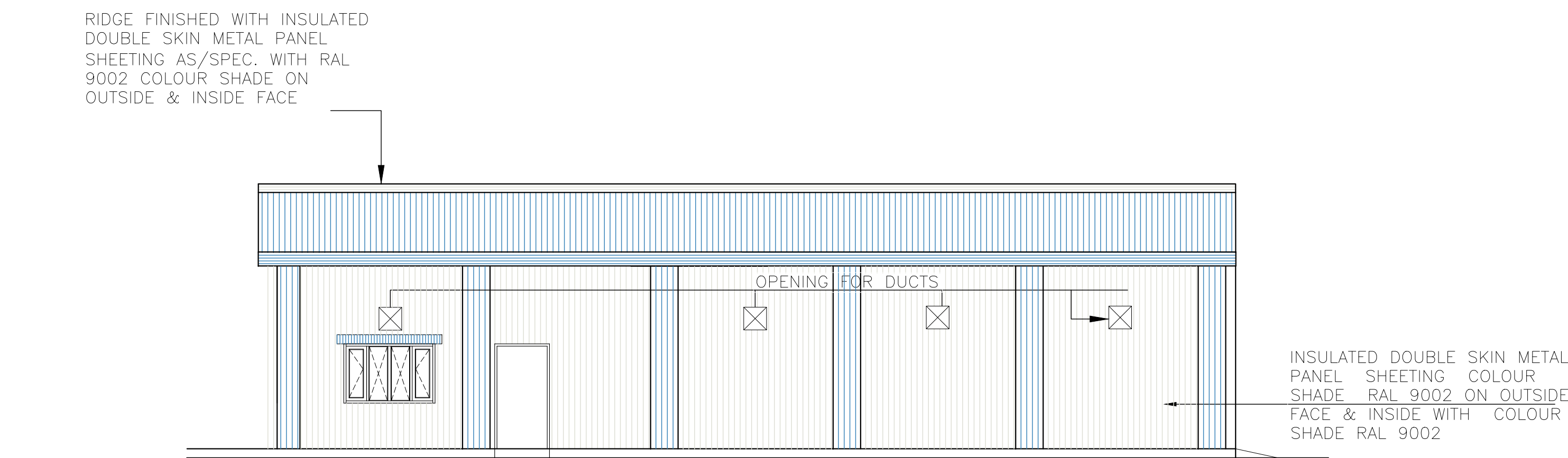
INSULATED DOUBLE SKIN METAL PANEL ROOF SHEETING WITH COLOUR SHADE RAL 5012 ON OUTSIDE FACE & INSIDE VISIBLE WITH COLOUR SHADE RAL 9002

RIDGE FINISHED WITH INSULATED DOUBLE SKIN METAL PANEL SHEETING AS/SPEC. WITH RAL 9002 COLOUR SHADE ON OUTSIDE & INSIDE FACE

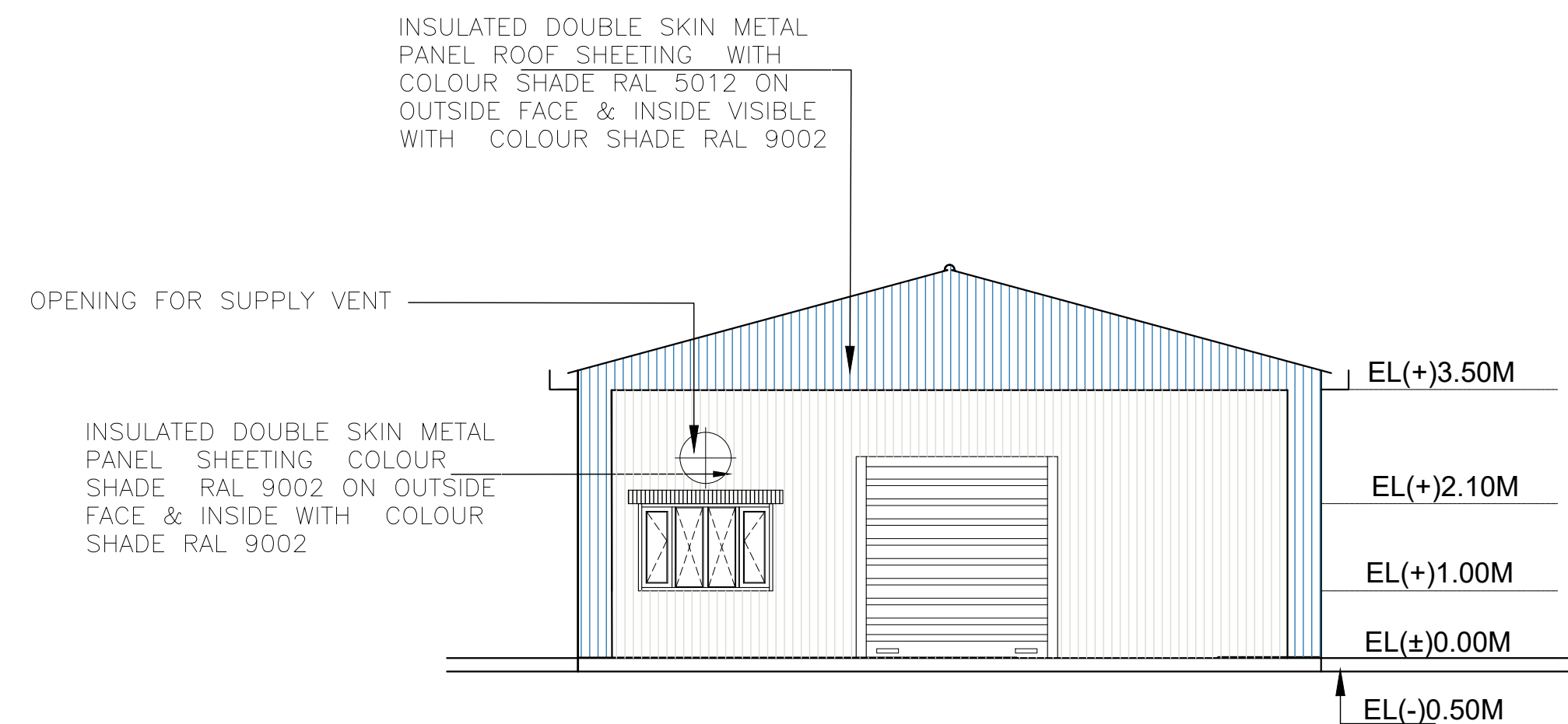
EAVES GUTTER WITH RAIN WATER DOWN COVER



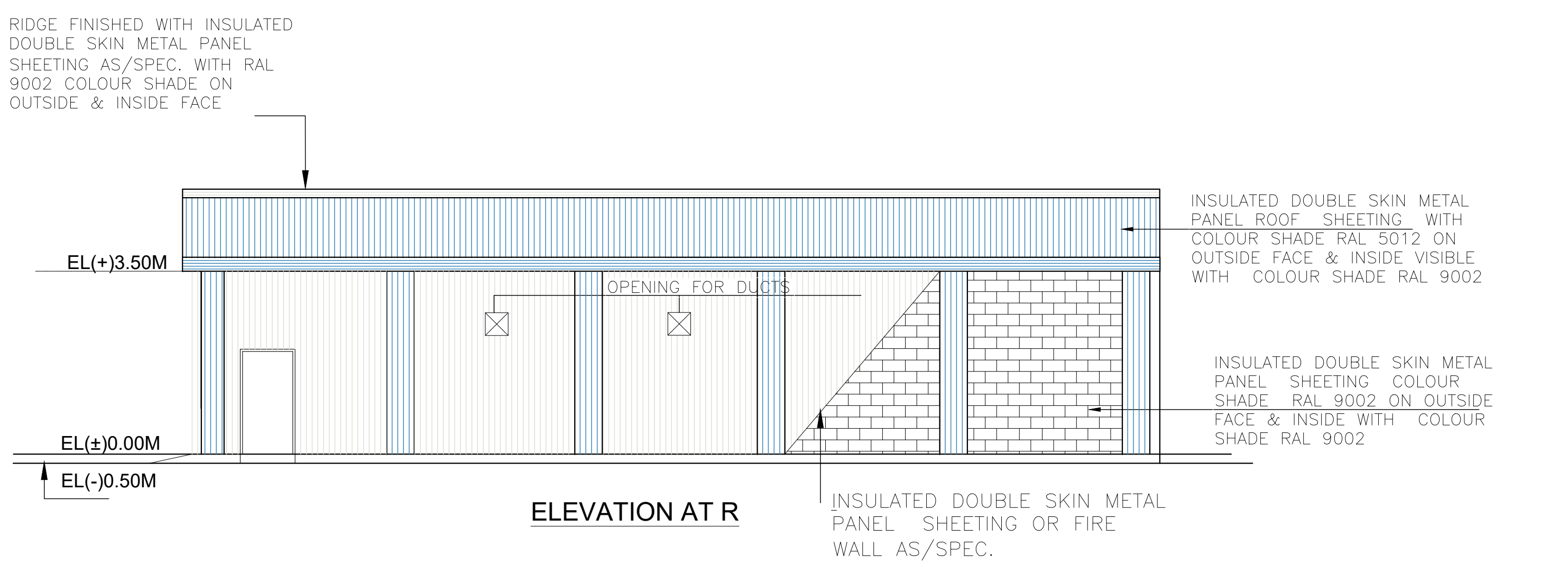
ELEVATION AT S



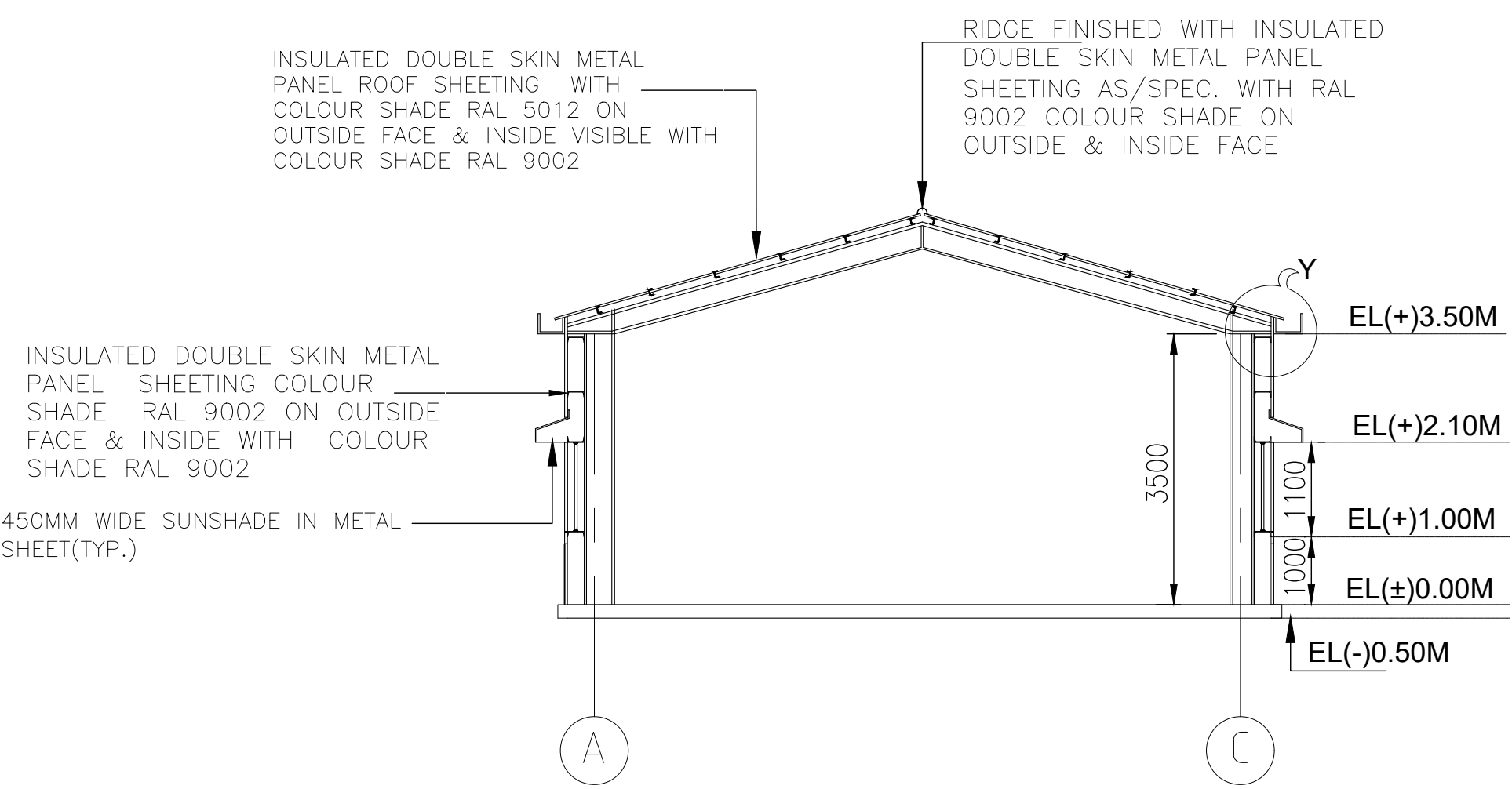
ELEVATION AT P



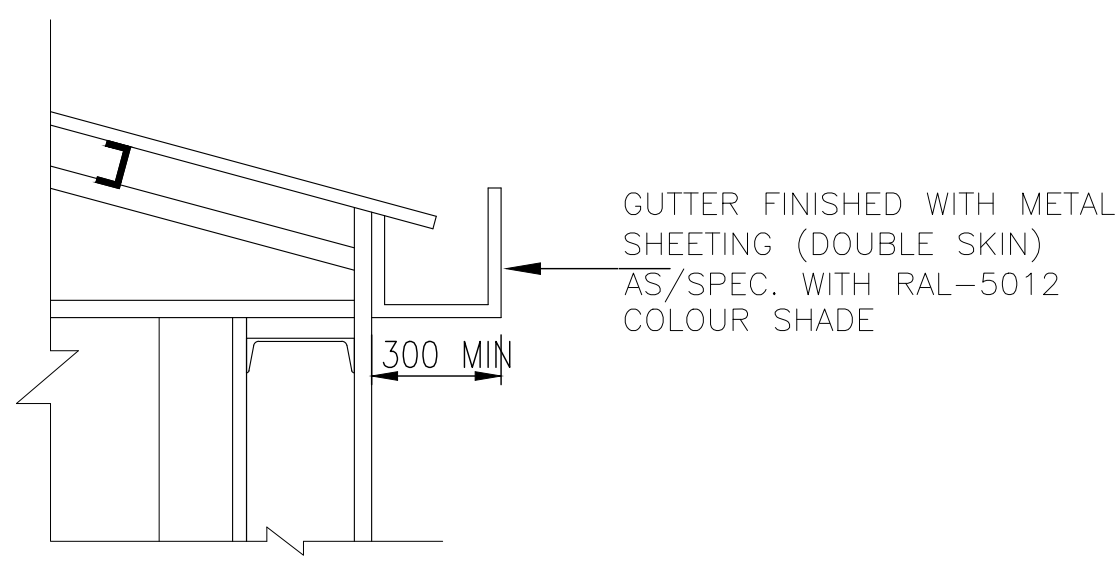
ELEVATION AT Q



ELEVATION AT R



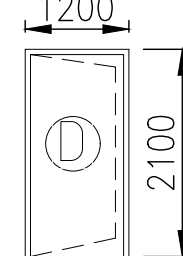
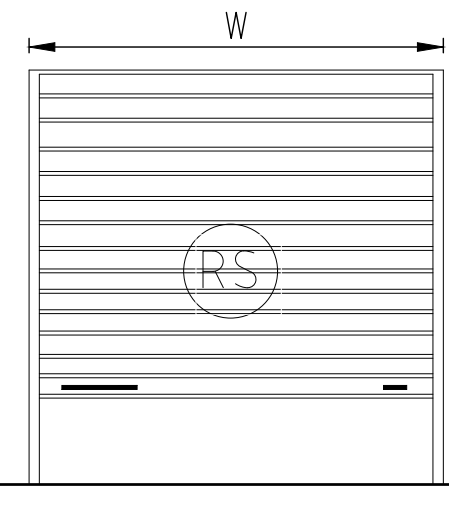
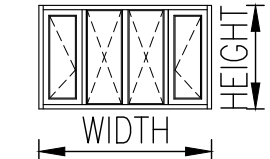
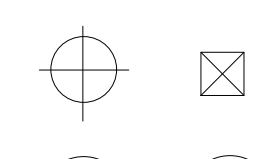
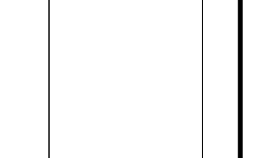
SECTION AT X-X



DETAIL AT Y

NOTES:-

1. ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METERS.
2. DRAWING SHALL NOT BE SCALED ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
3. ANY DOUBT OR DISCREPANCY IN THE DRAWING SHALL BE BROUGHT TO THE NOTICE OF THE ENGINEER-IN-CHARGE BEFORE EXECUTING THE WORK.
4. WORK SHALL BE CARRIED OUT BASED ON DETAIL WORKING DRAWINGS TO BE PREPARED BY THE VENDOR & GOT APPROVED FROM NTPC, BEFORE EXECUTION.
5. OPENING FOR ROLLING SHUTTER, DUCTS AND VENTILATOR'S SHALL BE AS PER INVERTER (PCU) MANUFACTURER RECOMMENDATIONS AND VENDOR DESIGN SUBJECT ON NTPC APPROVAL.
6. LOCATIONS OF DOOR, ROLLING SHUTTER, WINDOWS, VENTS & DUCTS ARE INDICATIVE ONLY. VENTILATION AND DUCTS SHALL BE DESIGN CONSIDERING HEAT CALCULATION OF PEB ROOM.
7. REFER TECHNICAL SPECIFICATION FOR PEB-INVERTER ROOM IN CIVIL WORKS.

DOOR/ROLLING SHUTTER/WINDOWS/VENTS/DUCTS				
TYPE	SIZE	CILL LVL.	LINTEL LVL.	DESCRIPTION
D	1200X2100	0.00	2100	
RS	REFER NOTE 5 & 6	0.00	H	
WINDOWS VENTILATORS DUCTS	REFER NOTE 5 AND 6.			  

FOR TENDER PURPOSE ONLY

PROJECT  
TITLE  
SIZE  
SCALE  
DRG. NO.  
REV. NO.

BALANCE OF SYSTEM PACKAGE FOR DEVELOPMENT OF 1500NW GRID CONNECTED SOLAR PV PROJECTS AT RVUNL'S SOLAR PARK IN BIKANER, RAJASTHAN

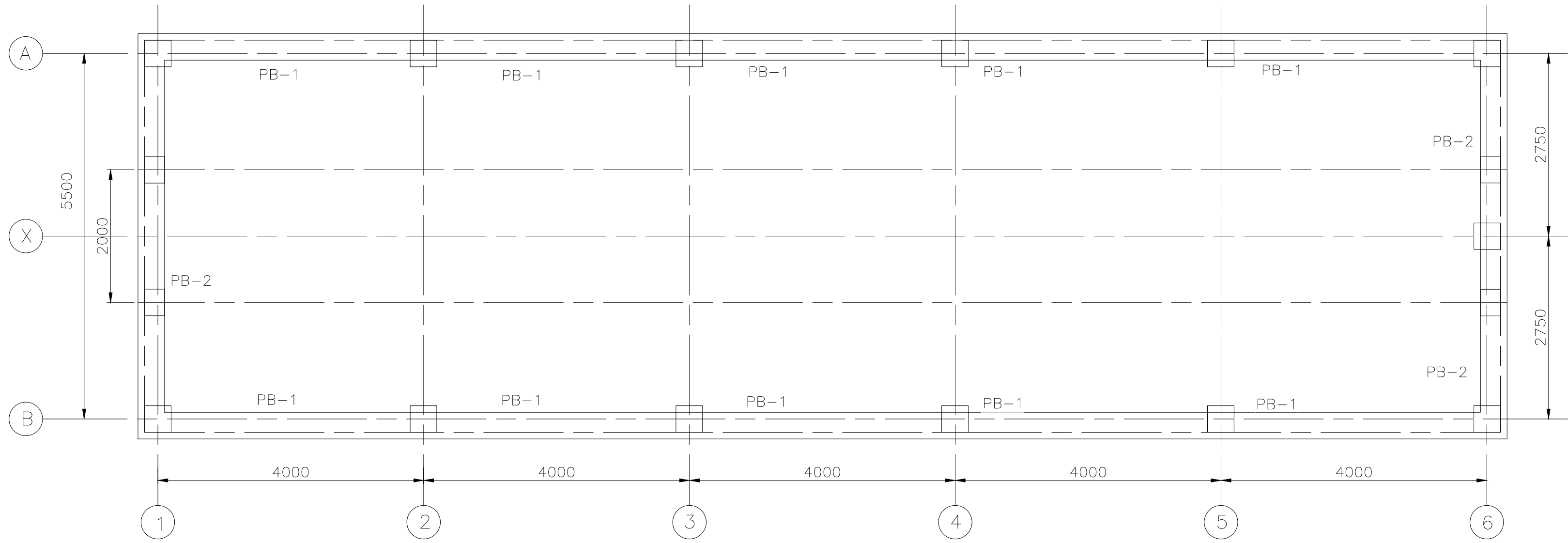
PEB INVERTOR ROOM

5821-004(BOS)-POC-A-005

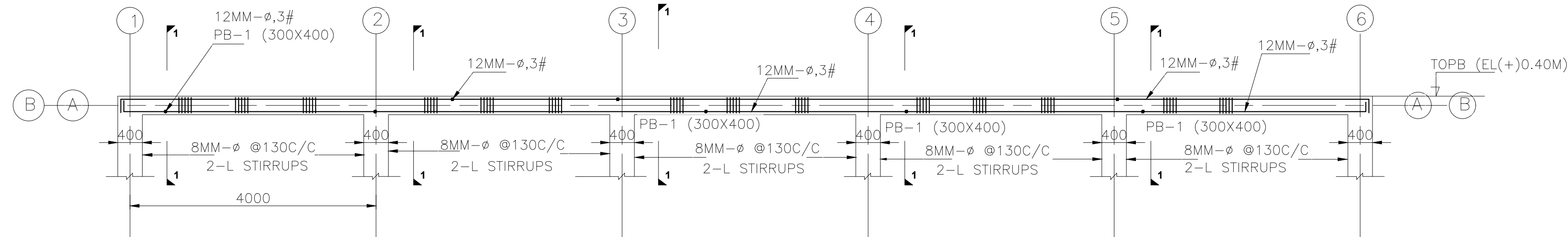
RA

PREPARED BY	CHECKED BY	APPROVED BY	DATE	SIZE	SCALE	DRG. NO.	REV. NO.
	CIVIL ELE.			AO	NTS	5821-004(BOS)-POC-A-005	RA

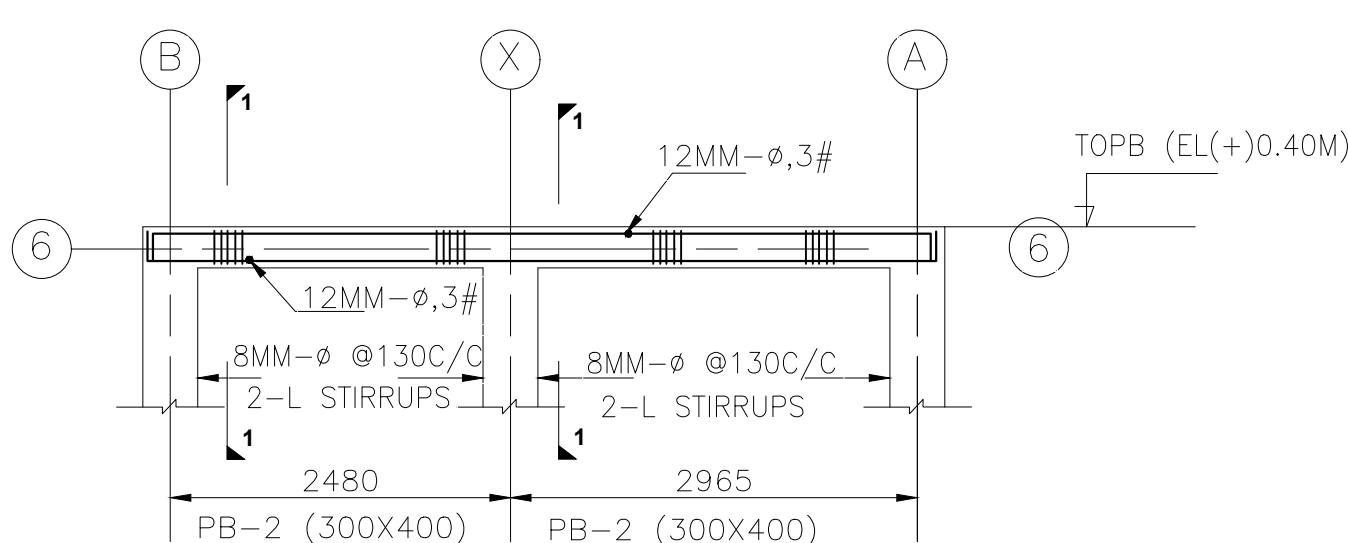
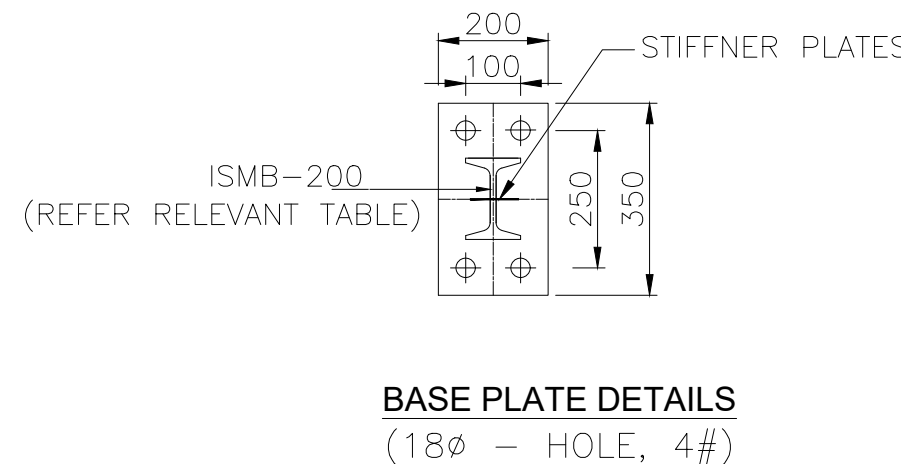
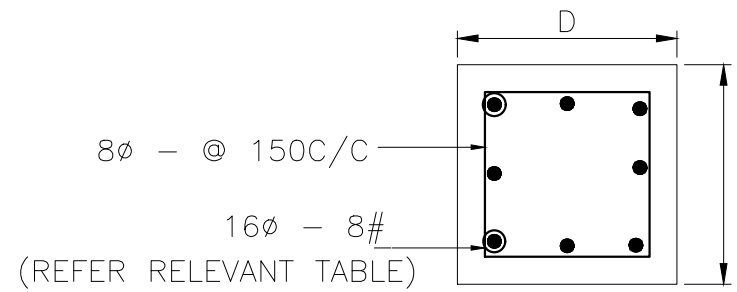
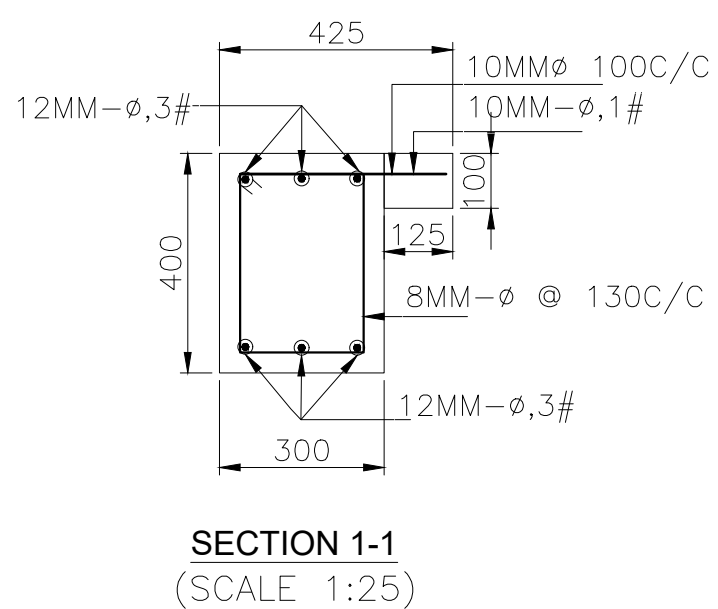
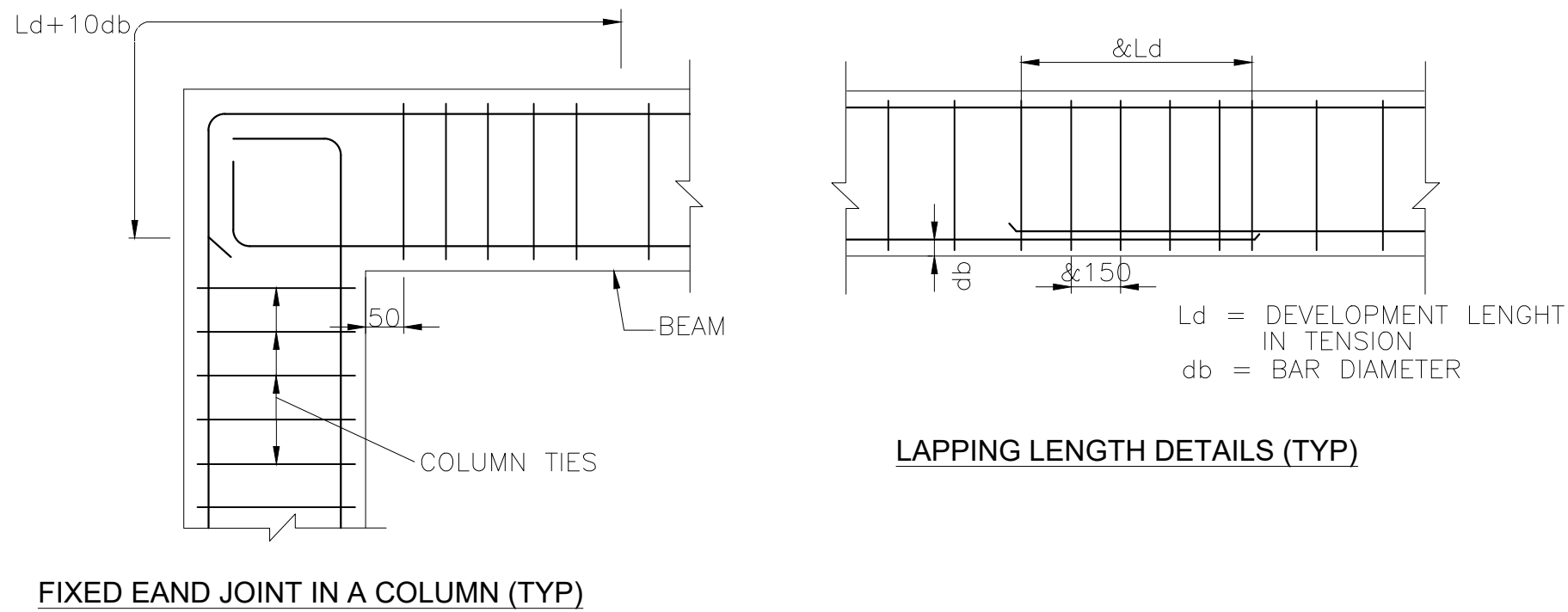




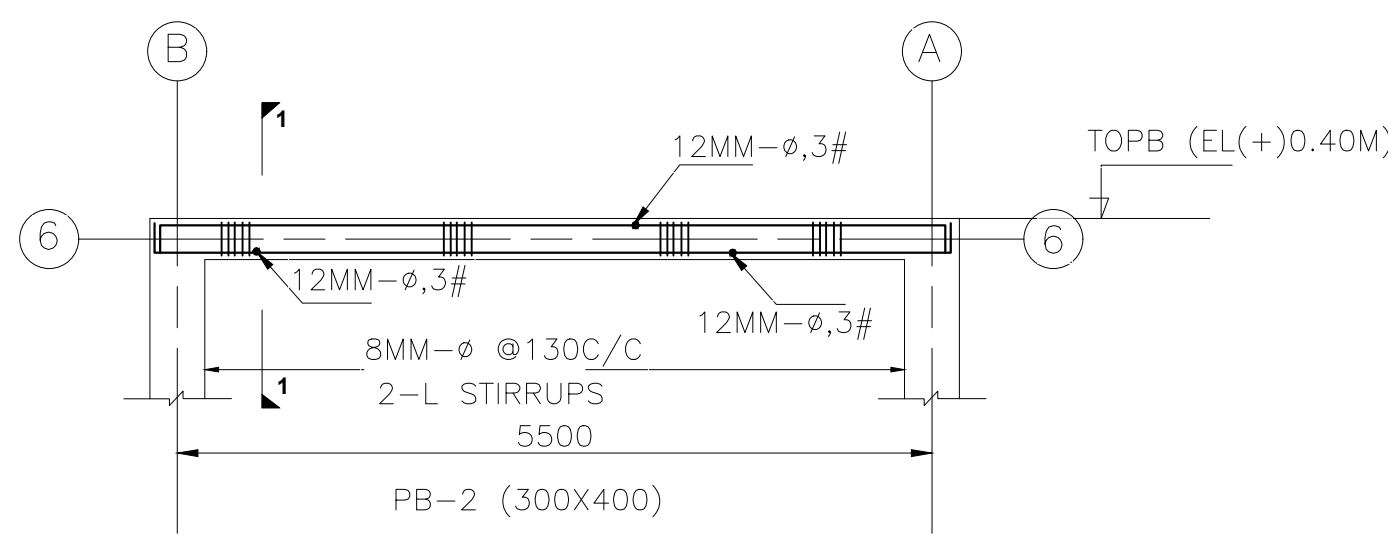
PLINTH BEAM PLAN AT ELEVATION +0.40M



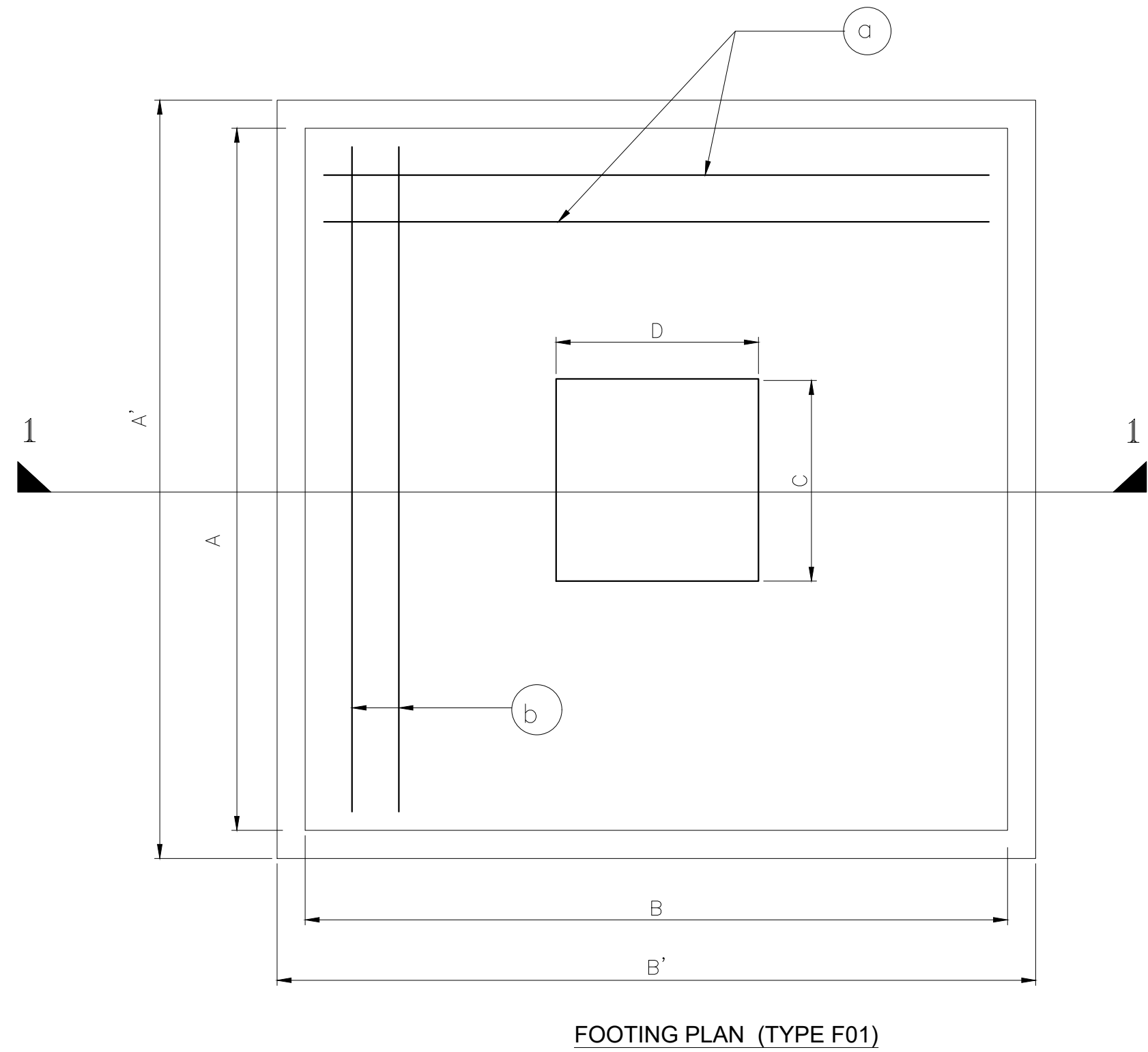
ALONG GRID A & B



PLINTH BEAM ALONG GRID-6



PLINTH BEAM ALONG GRID-1



FOOTING PLAN. (TYPE F01)

TABLE -2

SPAN (S)	COLOUMN / RAFTER	BASE PLATE SIZE	PEDESTAL SIZE	MAIN RAINFORCEMENT OF PEDESTAL
S = 5.5M	ISMB 200	350X200	400X400	16ø-8NOS
5.5M< S <=6.5M	ISMB 250	400X225	450X400	16ø-8NOS
6.5M< S <= 7.5M	ISMB 300	450X250	500X400	16ø-10NOS

TABLE -1, PART-A (FOR SPAN S=5.5M)

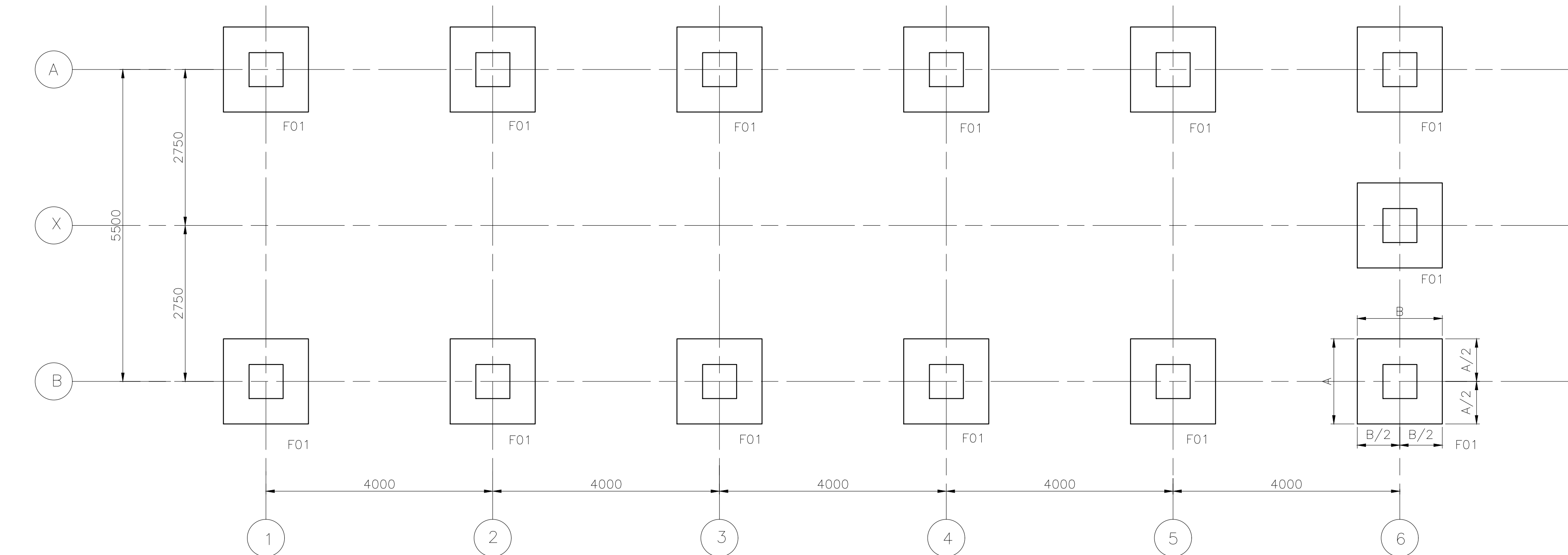
FOUNDATION REINFORCEMENT SCHEDULE									
S.NO.	SBC (IN T/SQM)	COLUMN	A	A'	B	B'	T	a	b
1	20 <= SBC	F01	1400	1500	1400	1500	300	12ø - @250c/c	12ø - @250c/c
2	10 <=SBC < 20	F01	1800	1900	1800	1900	325	12ø - @250c/c	12ø - @250c/c
3	7 <=SBC < 10	F01	2000	2100	2000	2100	350	12ø - @200c/c	12ø - @200c/c
4	5 = SBC < 7	F01	2200	2300	2200	2300	375	12ø - @200c/c	12ø - @200c/c

TABLE -1, PART-B (FOR 5.5M < SPAN <= 6.5M)

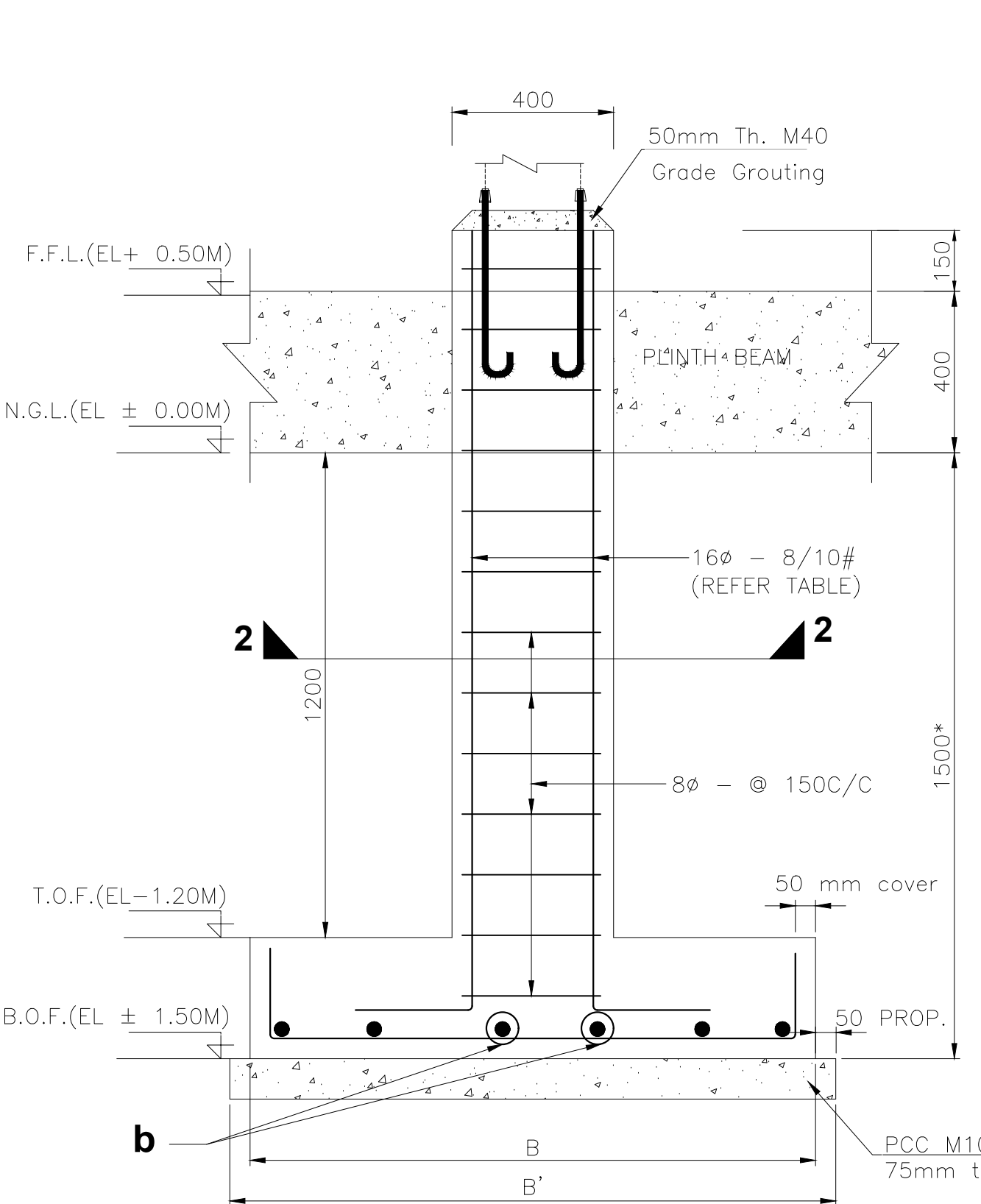
FOUNDATION REINFORCEMENT SCHEDULE									
S.NO.	SBC (IN T/SQM)	COLUMN	A	A'	B	B'	T	a	b
1	20 <= SBC	F01	1500	1600	1500	1600	325	12ø - @250c/c	12ø - @250c/c
2	10 <=SBC < 20	F01	1900	2000	1900	2000	350	12ø - @250c/c	12ø - @250c/c
3	7 <=SBC < 10	F01	2100	2200	2100	2200	375	12ø - @200c/c	12ø - @200c/c
4	5 = SBC < 7	F01	2300	2400	2300	2400	400	12ø - @200c/c	12ø - @200c/c

TABLE -1, PART-C (FOR 6.5M < SPAN <= 7.5M)

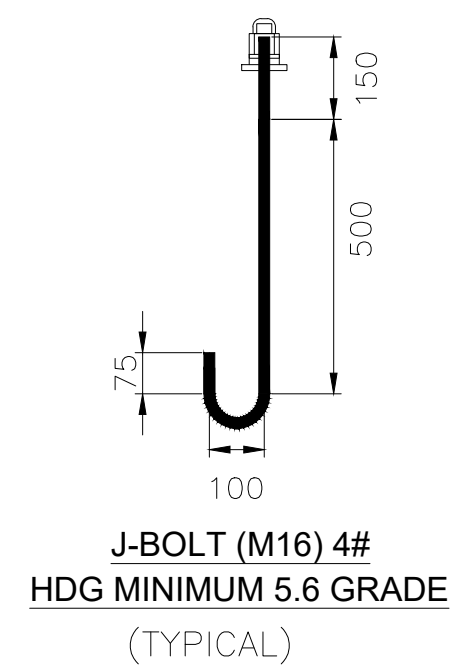
FOUNDATION REINFORCEMENT SCHEDULE									
S.NO.	SBC (IN T/SQM)	COLUMN	A	A'	B	B'	T	a	b
1	20 <= SBC	F01	1600	1700	1600	1700	350	12ø - @250c/c	12ø - @250c/c
2	10 <=SBC < 20	F01	2000	2100	2000	2100	375	12ø - @250c/c	12ø - @250c/c
3	7 <=SBC < 10	F01	2200	2300	2200	2300	400	12ø - @200c/c	12ø - @200c/c
4	5 = SBC < 7	F01	2400	2500	2400	2500	400	12ø - @200c/c	12ø - @200c/c



FOUNDATION FOR INVERTER ROOM  
AT EL. (- 1.20M )



SECTION 1-1  
FOUNDATION DETAILS



## NOTES

- ALL DIMENSIONS ARE IN MILLIMETERS, UNLESS OTHERWISE SPECIFIED.
- GRADE OF CONCRETE SHALL BE M-30 WITH 20mm DOWN GRADED AGGREGATES
- REINFORCEMENT SHALL BE OF HIGH YIELD STRENGTH DEFORMED BAR OF GRADE Fe500 CONFORMING TO IS:1786
- MIN CLEAR COVER TO MAIN REINFORCEMENT SHALL BE AS FOLLOWS FOOTING - 50MM, COLUMN - 50MM, PLINTH BEAM-50MM, SLAB-20MM.
- LAP LENGTH SHALL BE 50D WHERE D IS THE DIA OF THE SMALLER BAR BEING LAPPED
- LAPPING OF BARS SHALL BE SUITABLY STAGGERED AND IN NO CASE MORE THAN 50% BARS SHALL BE LAPPED AT ANY SECTION.
- ALL HOOKS, BENDS, LAPS AND SPLICES SHALL BE AS PER RELEVANT IS CODE
- BIDDER MAY CHOOSE BUILDING SPAN (C/C) FROM 5.5M TO 7.5M. FOUNDATION DETAILS HAVE BEEN MENTIONED FOR DIFFERENT RANGES OF SAFE BEARING CAPACITY (SBC). FOUNDATION COLUMN PEDESTAL, BASE PLATE, REINFORCEMENT DETAILS. SIZES ETC.SHALL BE DECIDED BASED ON TABLE-1 & TABLE-2 CONSIDERING THE SBC AND C/C SPAN. IN CASE OF SBC LESS THEN 5 T/SQM, FOUNDATION SHALL BE DESIGN BY BIDDER CONSIDERING PROJECT SPECIFIC CONDITIONS AND SHALL BE SUBMITTED FOR NTPC APPROVAL.
- NO FOUNDATION SHALL BE LAID ON BACK FILLED SOIL.
- IF ROCK IS ENCOUNTERED AT SHALLOW DEPTH, THEN FOUNDATION MAY BE PLACED AT TOP OF ROCKY STRATA, HOWEVER IN NO CASE DEPTH OF FOUNDATION SHALL BE LESS THAN 1M. SBC SHALL BE DECIDED BY GEOTECHNICAL INVESTIGATION WORK CARRIED OUT BY CONTRACTOR AND APPROVAL BY NTPC IN GEOTECHNICAL INVESTIGATION REPORT.
- DRAWING SHALL NOT BE SCALED. ONLY WRITTEN DIMENSION SHALL BE FOLLOWED.
- PERIPHERAL GARLAND DRAIN SHALL BE MADE ALL AROUND THE PEB INVERTER ROOMS AND CONNECTED TO NEAR BY DRAINS.
- 750MM WIDE PLINTH PROTECTION WITH 100MM THK. PCC LAID OVER WELL COMPACTED 100MM DRY BRICK BALLAST ALL AROUND THE PEB ROOM IN LINE WITH TECHNICAL SPECIFICATION.
- THE FGL OF PEB ROOM SHALL BE MINIMUM 500MM ABOVE SURROUNDING NGL.
- ALL STRUCTURAL STEEL MEMBERS SHALL BE GALVANIZED.THE THICKNESS OF GALVANIZATION SHALL BE IN LINE WITH IS4759. HOWEVER MINIMUM THICKNESS OF GALVANIZATION SHALL BE MAINTAINED AS 110 MICRON FOR ALL MEMBERS.
- BIDDER SHALL SUBMIT THE DETAILED FABRICATION DRAWING AND PUFF PANEL DETAILS (DEVELOPED BASED ON NTPC TENDER DRAWING AND TECHNICAL SPECIFICATION) FOR NTPC INFORMATION BEFORE START OF WORK. ALL WORKS SHALL BE EXECUTED IN LINE WITH APPROVED DRAWING'S.
- ALL BRACING'S LIKE BRC-1, BRC-2 SHALL BE CONTINUED IN EVERY ALTERNATE BAY IN CASE THE NO. OF BAYS ARE INCREASED. THE NO OF BAYS MAY BE REDUCED BASED ON BIDDER REQUIREMENT MAINTAINING THE BRACING IN EVERY ALTERNATE BAY. BIDDER SHALL ENSURE THAT THE BRACING IN BOTH THE DIAGONAL DIRECTIONS ARE PROVIDED IN PEB.
- THE OPENINGS SHOWN IN PEB ARE TENTATIVE VENDOR SHALL FINALIZE THE SAME DURING DETAILED ENGG. BASED ON NTPC APPROVAL. VENTILATION AND DUCTS SHALL BE DESIGN CONSIDERING HEAT CALCULATION AND SUBMIT FOR NTPC APPROVAL BEFORE EXECUTION/MANUFACTURING.
- THE SIZES OF FOUNDATION MENTIONED IN TABLE-1 FOR DIFFERENT RANGES OF SBC ARE MINIMUM SIZE TO BE ADOPTED BY BIDDER.
- THE SIZES OF STRUCTURAL STEEL MEMBERS IN TABLE-2 ARE MINIMUM SIZES TO BE ADOPTED FOR DIFFERENT RANGES OF SPAN.

FOR TENDER PURPOSE ONLY

PROJECT

TITLE

BALANCE OF SYSTEM PACKAGE FOR DEVELOPMENT OF  
1500NW GRID CONNECTED SOLAR PV PROJECTS AT  
RVUNL'S SOLAR PARK IN BIKANER, RAJASTHAN

PEB INVERTOR ROOM

PREPARED BY

CHECKED BY

APPROVED BY

DATE

SIZE

SCALE

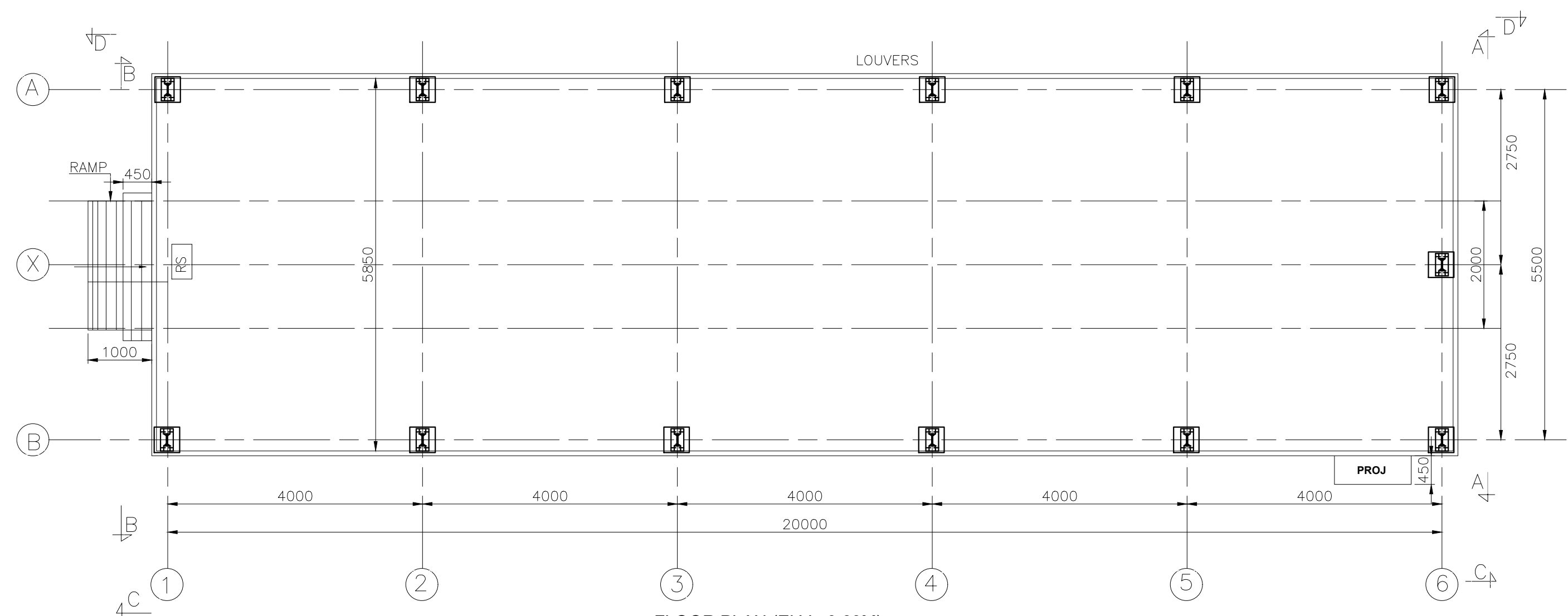
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NO.

5821-004(BOS)-POC-A-005

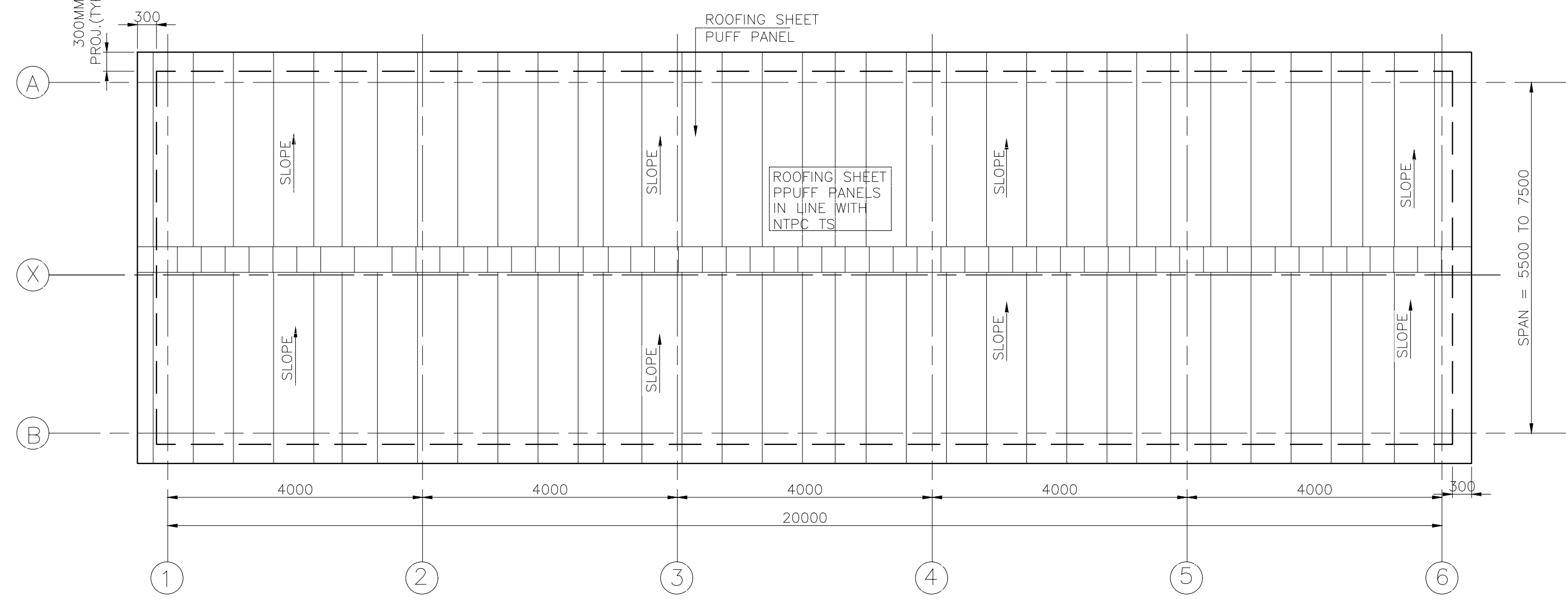
REV. NO.

RA

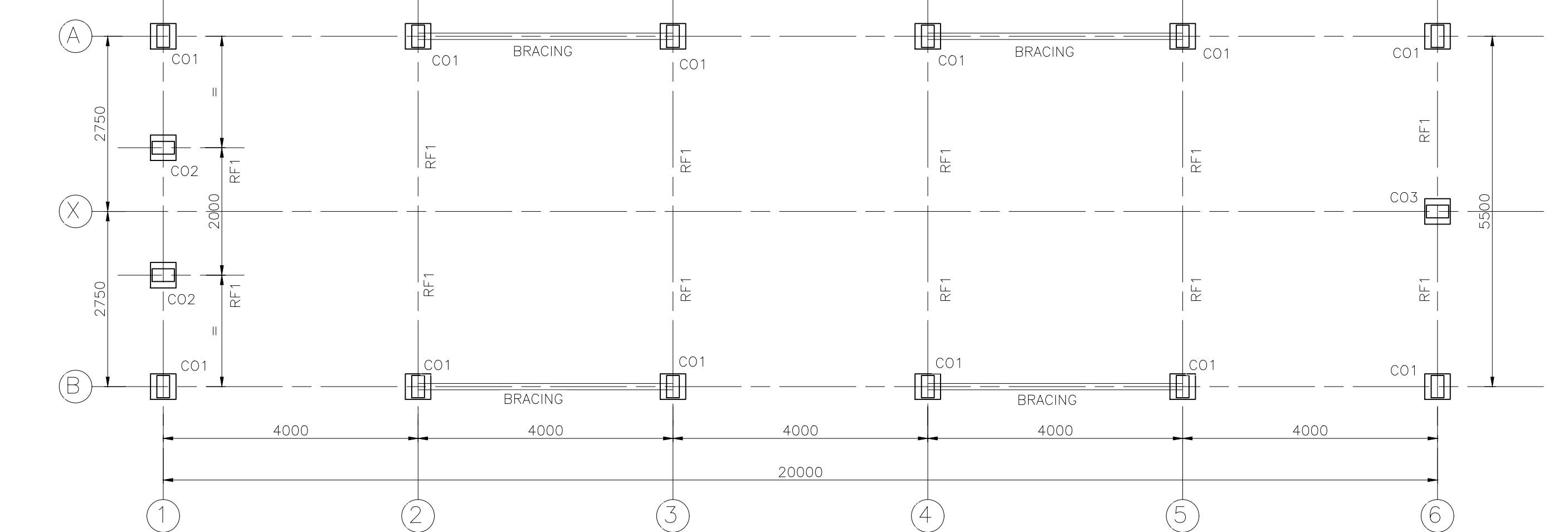




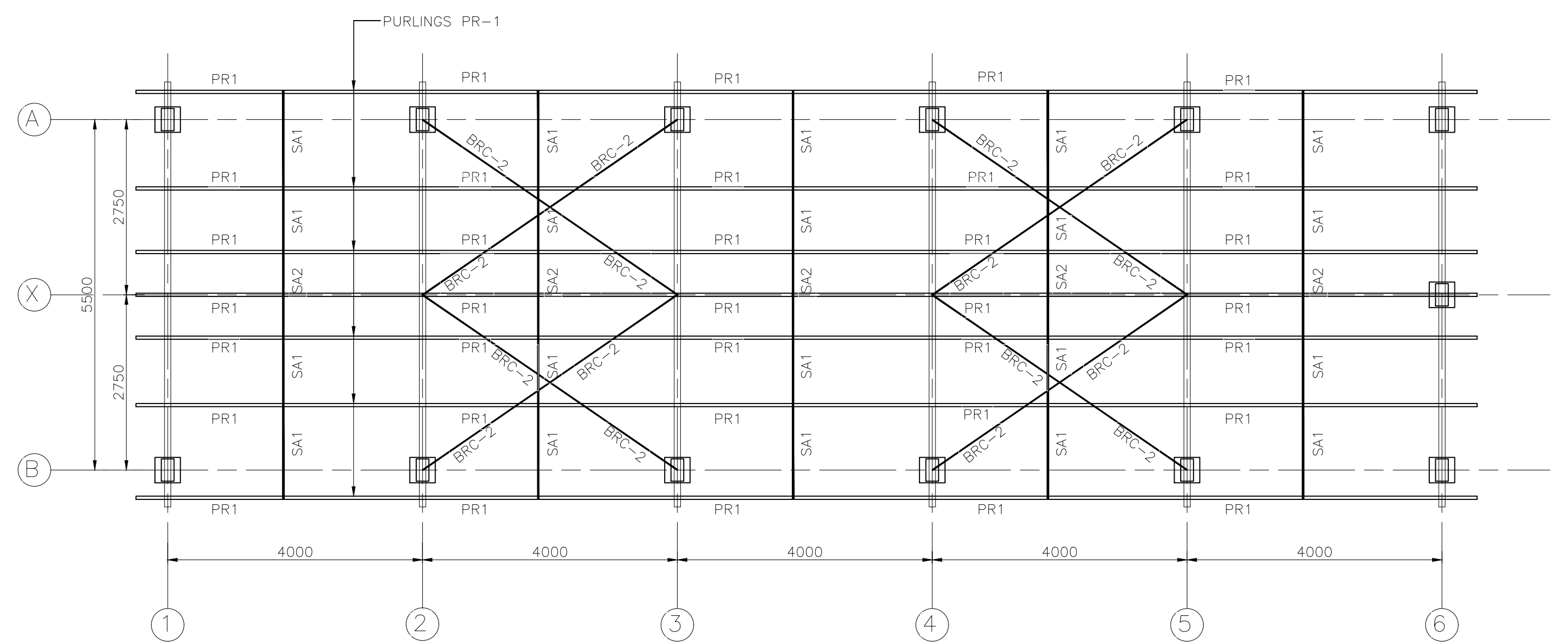
FLOOR PLAN (ELV +0.60M)



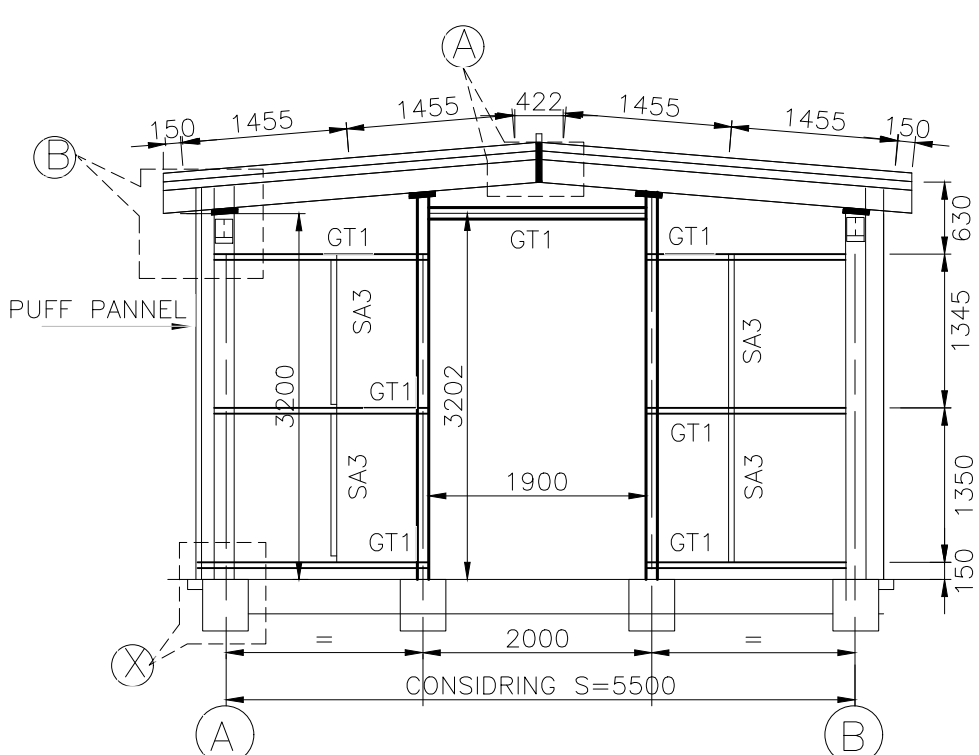
ROOF PLAN



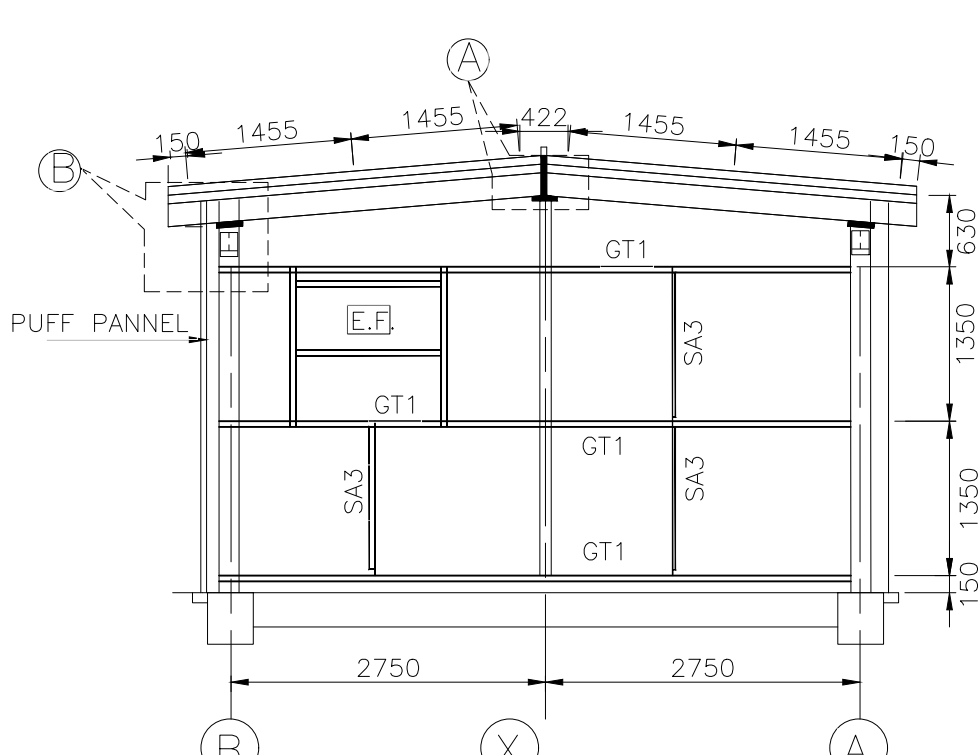
SIDE BRACING PLAN



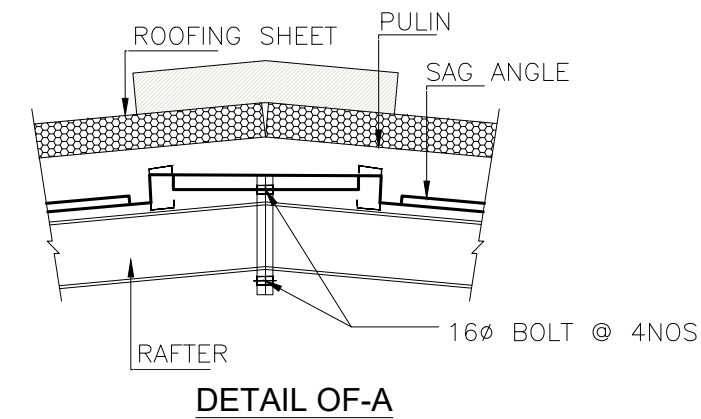
PURLINS PLANS & TOP BRACING PLAN



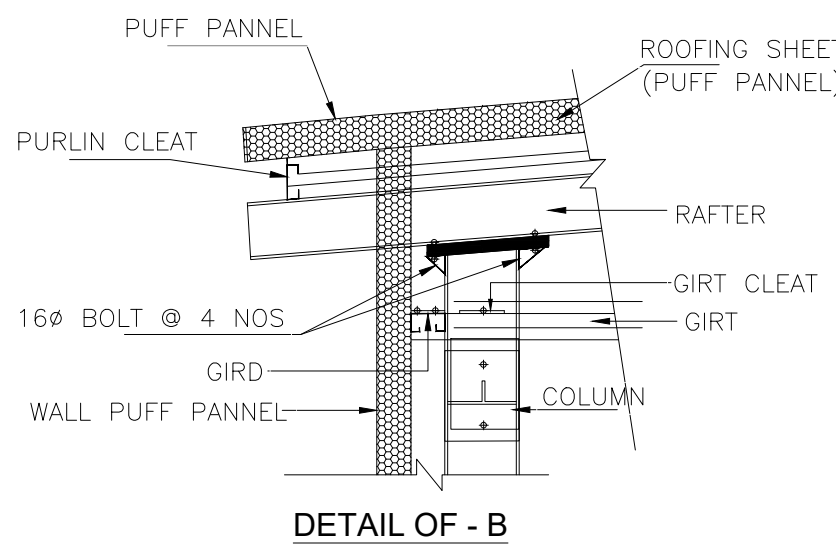
GABLE END ELEVATION ALONG GRID-1



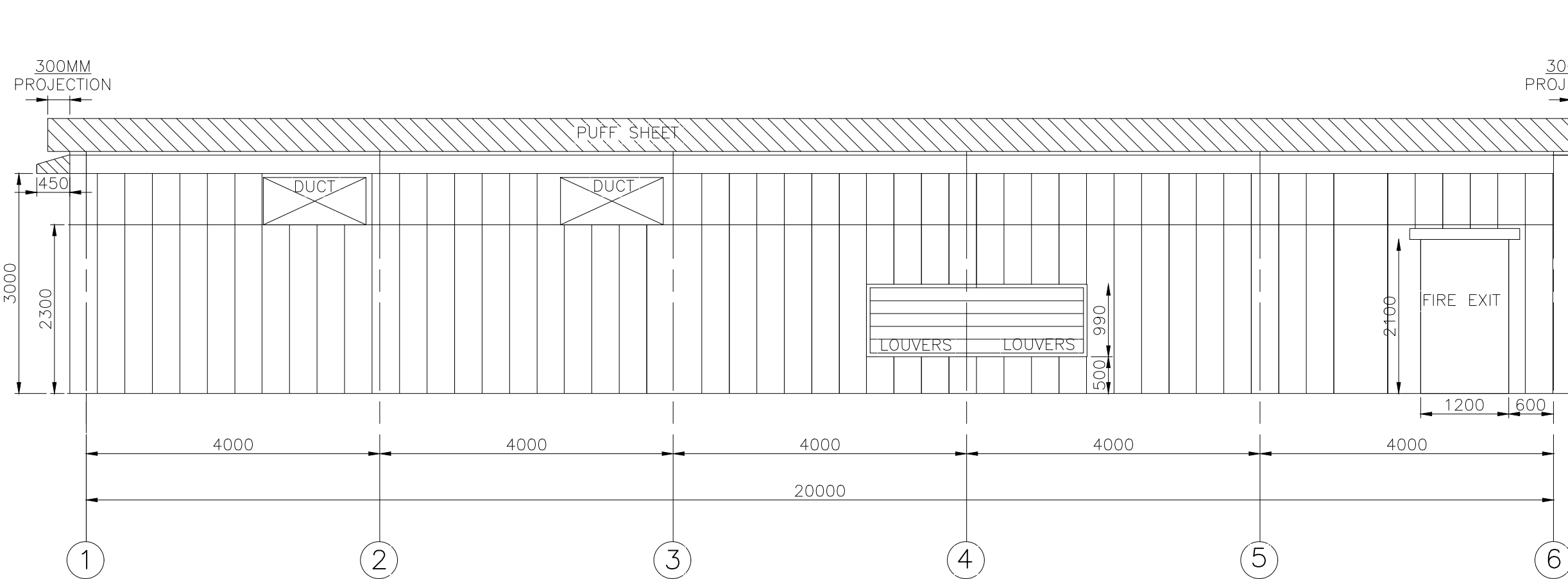
GABLE END ELEVATION ALONG GRID-6



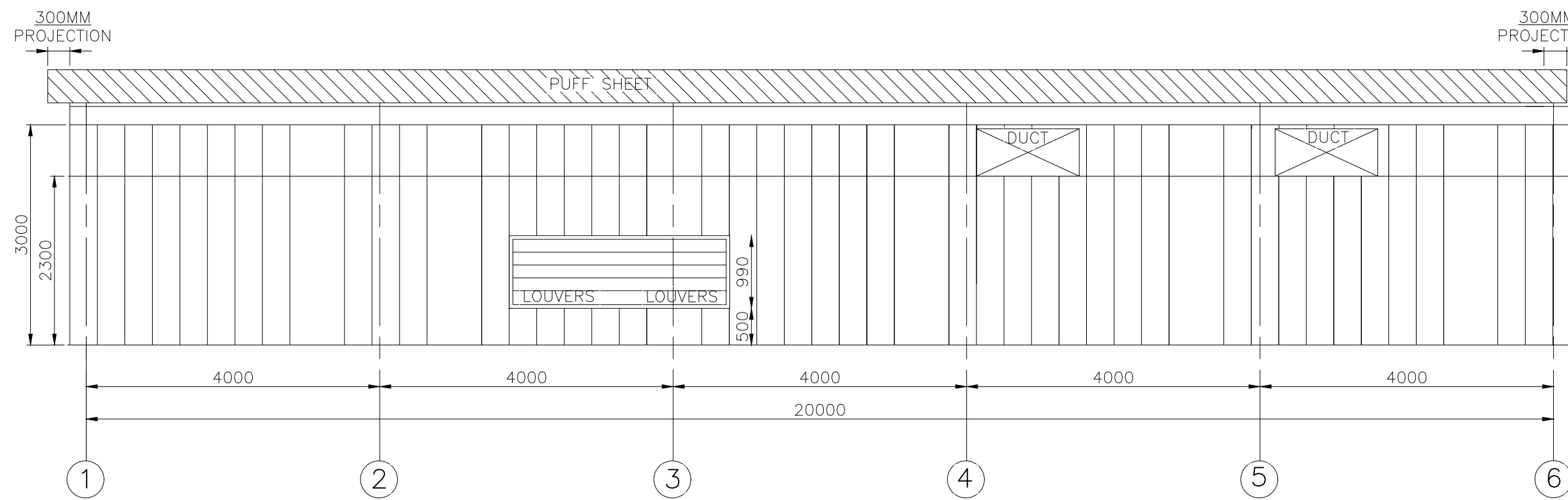
DETAIL OF-A



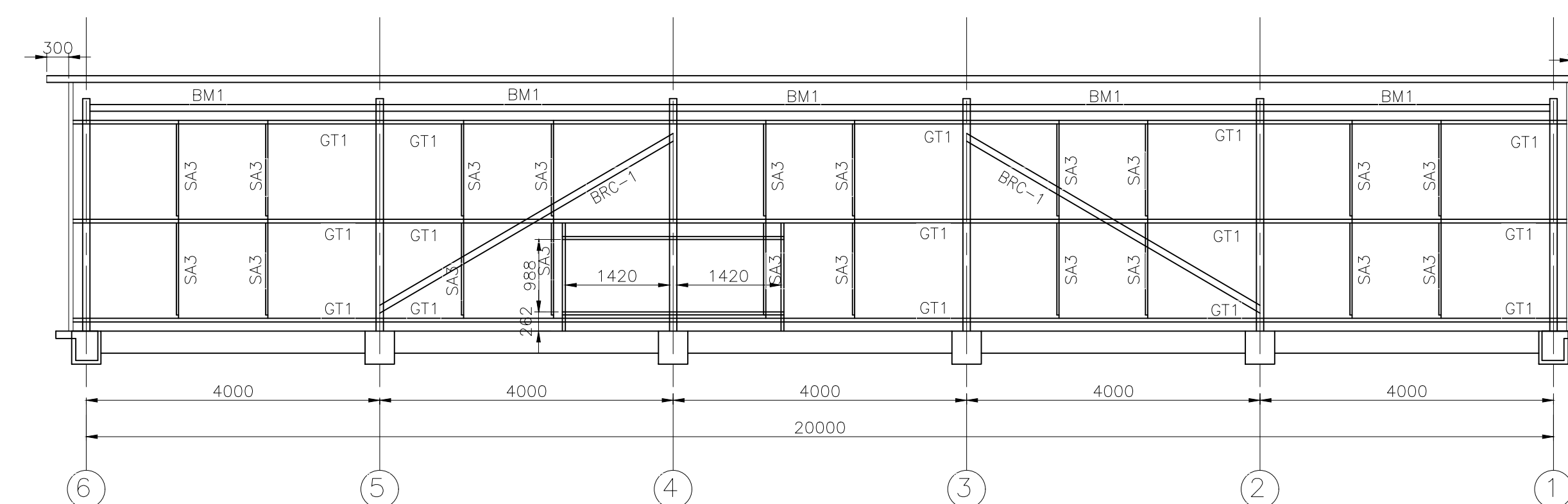
DETAIL OF-B



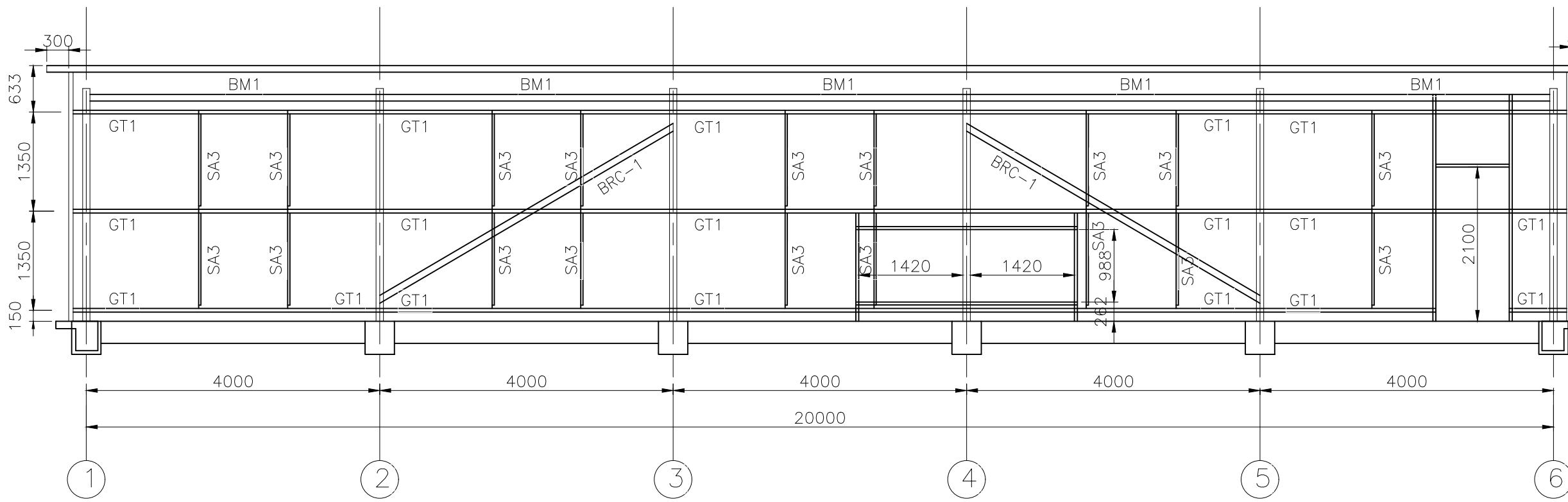
SIDE WALL ELEVATION ALONG GRID-B



SIDE WALL ELEVATION ALONG GRID-A



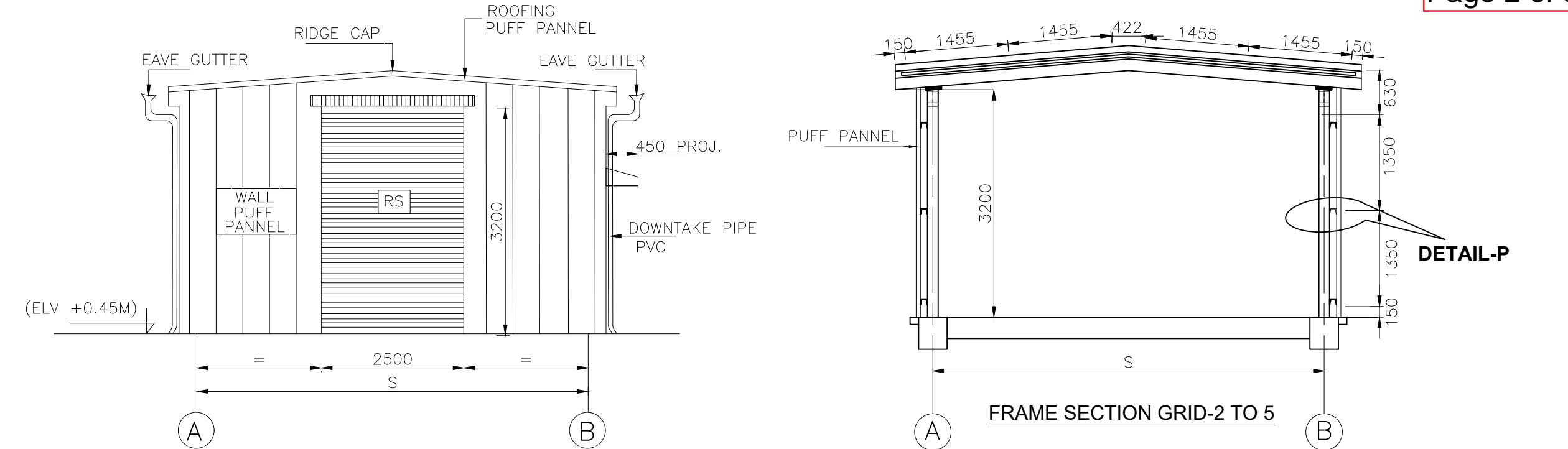
SIDE WALL MEMBERS VIEW ALONG GRID B



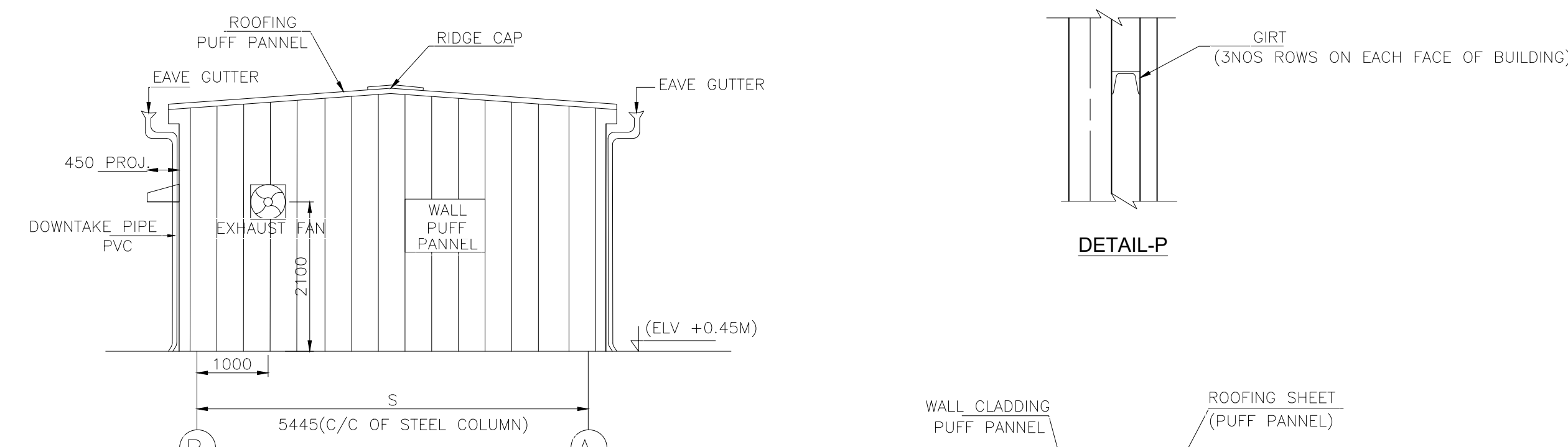
SIDE WALL MEMBERS VIEW ALONG GRID A

TABLE -2, BILL OF MATERIAL						
S.NO	PART MARK	DESCRIPTION	SPAN (S)			SHAPE
			S = 5.5M	5.5M< S <= 6.5M	6.5M< S <= 7.5M	
1	PR1	C-PURLIN	100x50x20x3.15	100x50x20x3.15	100x50x20x3.15	COLD FORM
2	GT1	C-GIRT	100x50x20x3.15	100x50x20x3.15	100x50x20x3.15	COLD FORM
3	RF1	RAFTER	ISMB-200	ISMB-250	ISMB-300	HOT ROLLED
4	CO1	COLUMN	ISMB-200	ISMB-250	ISMB-300	HOT ROLLED
5	CO2	COLUMN	ISMB-200	ISMB-250	ISMB-300	HOT ROLLED
6	CO3	COLUMN	ISMB-200	ISMB-250	ISMB-300	HOT ROLLED
7	SP1	STRUT ANGLE	ANGLE-65x65x5	ANGLE-65x65x5	ANGLE-65x65x5	HOT ROLLED
8	BM1	BEAM HEADER	ISMB-150	ISMB-150	ISMB-150	HOT ROLLED
9	SA-1	SAG ANGLE	50X50X3	50X50X3	50X50X3	HOT ROLLED
10	SA-2	SAG ANGLE	50X50X3	50X50X3	50X50X3	HOT ROLLED
11	SA-3	SAG ANGLE	50X50X3	50X50X3	50X50X3	HOT ROLLED
12	BRC-1,BRC-2	STRUT PIPE	89MM (OD)	89MM (OD)	89MM (OD)	HOT ROLLED

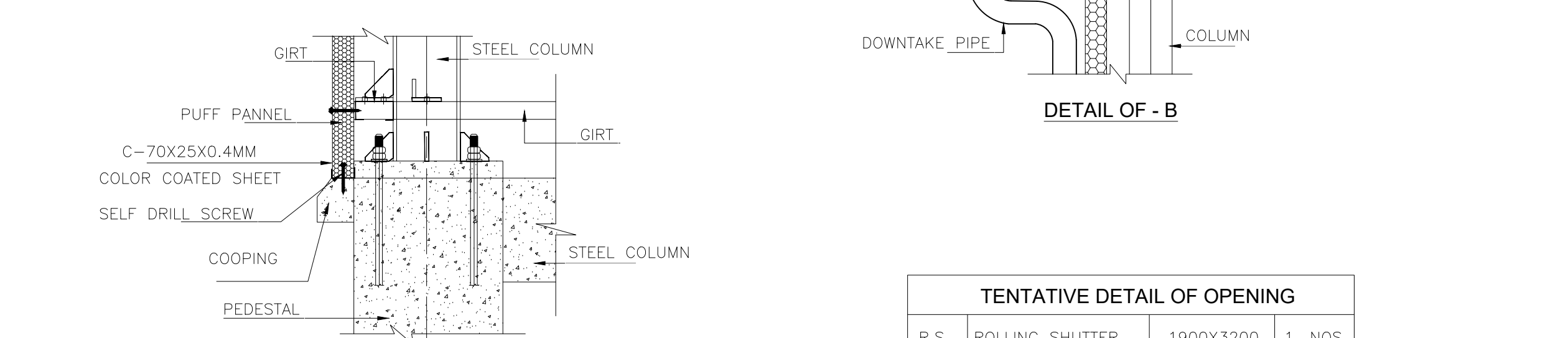
\* PURLIN SPACING SHALL BE MAINTAINED AS MAXIMUM 1450 MM FOR ALL SIZES OF SPANS.



GABLE END ELEVATION ALONG GRID-1



GABLE END ELEVATION ALONG GRID-6



DETAILS OF -X

FLOOR & PUFF PANEL CONNECTION DETAIL

### NOTES

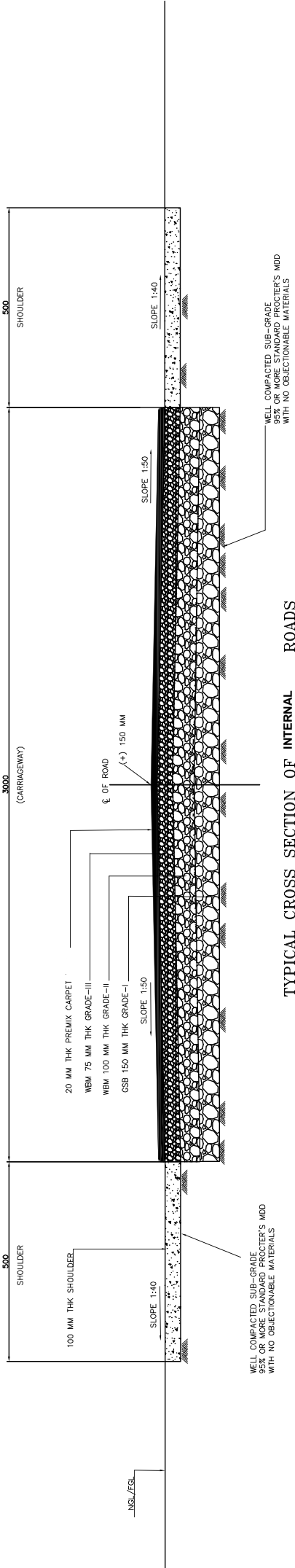
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- ALL HOOKS, BENDS, LAPS AND SPLICES SHALL BE AS PER RELEVANT IS CODE
- BIDDER MAY CHOOSE BUILDING SPAN (C/C) FROM 5.5M TO 7.5M. FOUNDATION DETAILS HAVE BEEN MENTIONED FOR DIFFERENT RANGES OF SAFE BEARING CAPACITY (SBC). FOUNDATION COLUMN PEDESTAL, BASE PLATE, REINFORCEMENT DETAILS, SIZES ETC SHALL BE DECIDED BASED ON TABLE-1 & TABLE-2 CONSIDERING THE SBC AND C/C SPAN. IN CASE OF SBC LESS THEN 5 T/50M, FOUNDATION SHALL BE DESIGN BY BIDDER CONSIDERING PROJECT SPECIFIC CONDITIONS AND SHALL BE SUBMITTED FOR NTPC APPROVAL.
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FOR TENDER PURPOSE ONLY

PROJECT TITLE: PEB INVERTOR ROOM

PREPARED BY	CHECKED BY	APPROVED BY	DATE	SIZE	SCALE	DRG. NO.	REV. NO.
	CIVIL ELE.			AO	NTS	5821-004(BOS)-POC-A-005	RA

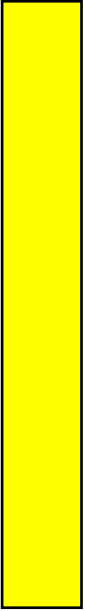




TYPICAL CROSS SECTION OF INTERNAL ROADS

NOTES

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN METRES.
2. THE LEVEL AT THE TOP OF THE ROAD SHALL CORRESPOND TO THE LEVEL AT THE TOP OF BITUMINOUS CARPET AT THE CENTRE OF ROAD.
3. CAMBER SHALL BE PROVIDED AT SUBGRADE LEVEL.
4. C B R VALUE OF THE SUBGRADE LEVEL SHOULD BE MINIMUM 4%, IF ACTUAL CBR IS LESS THAN 4% IN A PARTICULAR STRETCH THEN THE SAME MATERIAL SHALL MODIFIED WITH INCREASE IN GSB THICKNESS.
5. THE SHOULDERS ON BOTH SIDES OF THE ROAD SHALL BE PROPERLY COMPACTED.
6. THE ROAD SHALL BE MINIMUM 150 MM ABOVE FGL.
7. WBM 100MM THICKNESS MAY BE MODIFIED TO 75MM THICKNESS FOR WBM CONSTRUCTION, WITH CORRESPONDING INCREASE OF 50MM IN GSB THICKNESS.
7. MAIN APPROACH ROAD IS DEFINED AS THE EXISTING OR PROPOSED ROAD AS NATIONAL HIGHWAYS, STATE HIGHWAYS, DISTRICT ROADS, OTHER DISTRICT ROADS, VILLAGE ROADS AND SOLARPARK ROADS, TO BE DEVELOPED BY GOVT. BODIES OR DEVELOPERS NEAR THE VICINITY OF SOLAR PLANT/PLOT.



Land & Transmission System, R

SOLAR P






Typical Detail of Roads

PREPARED BY		CHECKED	
RAM	SG	CIVIL	E
	A		

5821-004(BOS)-POC-A-006A

R0

BANDAREWALA

	ROAD - 15 M WIDE NEW ROAD (SPPD SCOPE)
	
	
	ROAD - 9 M WIDE KACHA RASTA (SPPD SCOPE)
	ROAD - 6 M WIDE PERIPHERAL ROAD (SPPD SCOPE)

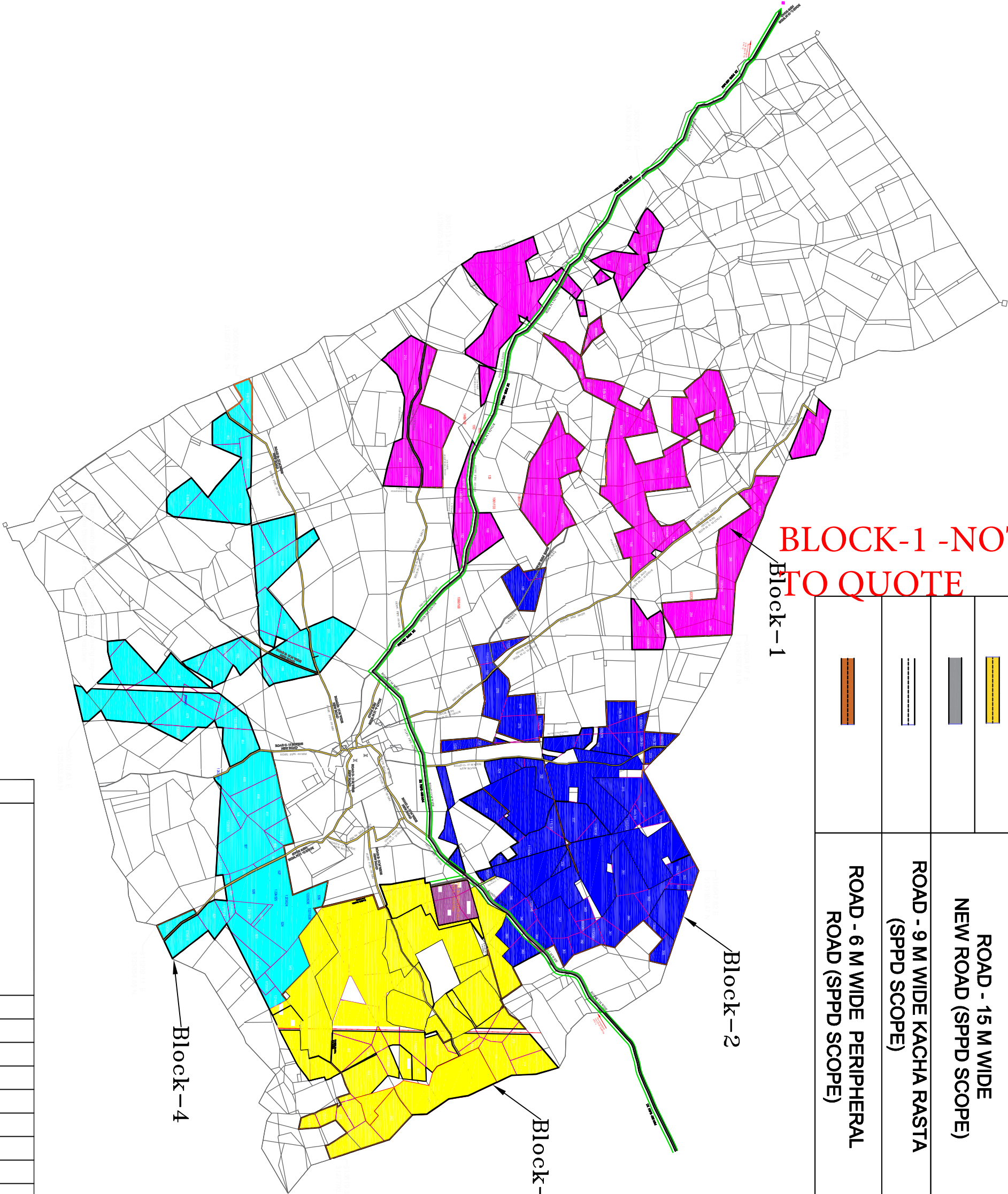
BLOCK-1 -NOT  
TO QUOTE

Block-1

Block-2

Block-3

Block-4



1. **General**
- a. The tender drawings shall be read in conjunction with the provision of Technical Specifications.
- b. The details show in drawing are suggestive and for tender purpose only.
- c. One no. PSS for power evacuation is envisaged at central location as shown in Tender Drawings.
- d. Land will be provided on "as is where is" basis and bidders are advised to visit the site location to appraise themselves with the site conditions.
- e. Any Cables / Pipes etc. if laid by other Vendors before Road Construction, are to be routed underground, considering Future Road Construction above at a later date.
- f. Layout of Roads / Drains / Transmission lines shown in the Tender drawings might vary slightly during execution as per overall requirements of Park and Projects. Suitable turning radius (Minimum 8.0m at Internal side of Road) at all turning locations and overtaking zones at distributed locations, shall be suitably provided in the Roads.
- g. All permanent Internal road & drains including all other facilities mentioned in Scope of Work, are in respective bidder's scope.
- h. Permanent facilities envisaged in Owner's scope would not be considered as a pre-requisite for BOS Package work activities by bidders.
- i. **All temporary arrangements w.r.t approach roads, drainage, office set up etc. as necessary to take up the project construction work, are in bidder's scope as per provisions of Tender Documents.**
- j. Coordinates shown in the given layout drawing for given facilities are suggestive for purpose of tender drawing. Minor adjustment by Owner / Bidders can be made as per requirement of project, on mutual discussions basis depending upon the technical feasibility of any such change. However, any such changes would be implemented only after written approval from the owner.
- k. Block layout has been marked for common areas reserved for PSS and adjacent facilities, mentioned as PSS-3. Detailed planning w.r.t actual sizing and locations with in the block, would be carried out during detailed Engineering stage.
- l. Land parcels and block layout is tentative, there may be minor changes as per actual site conditions.

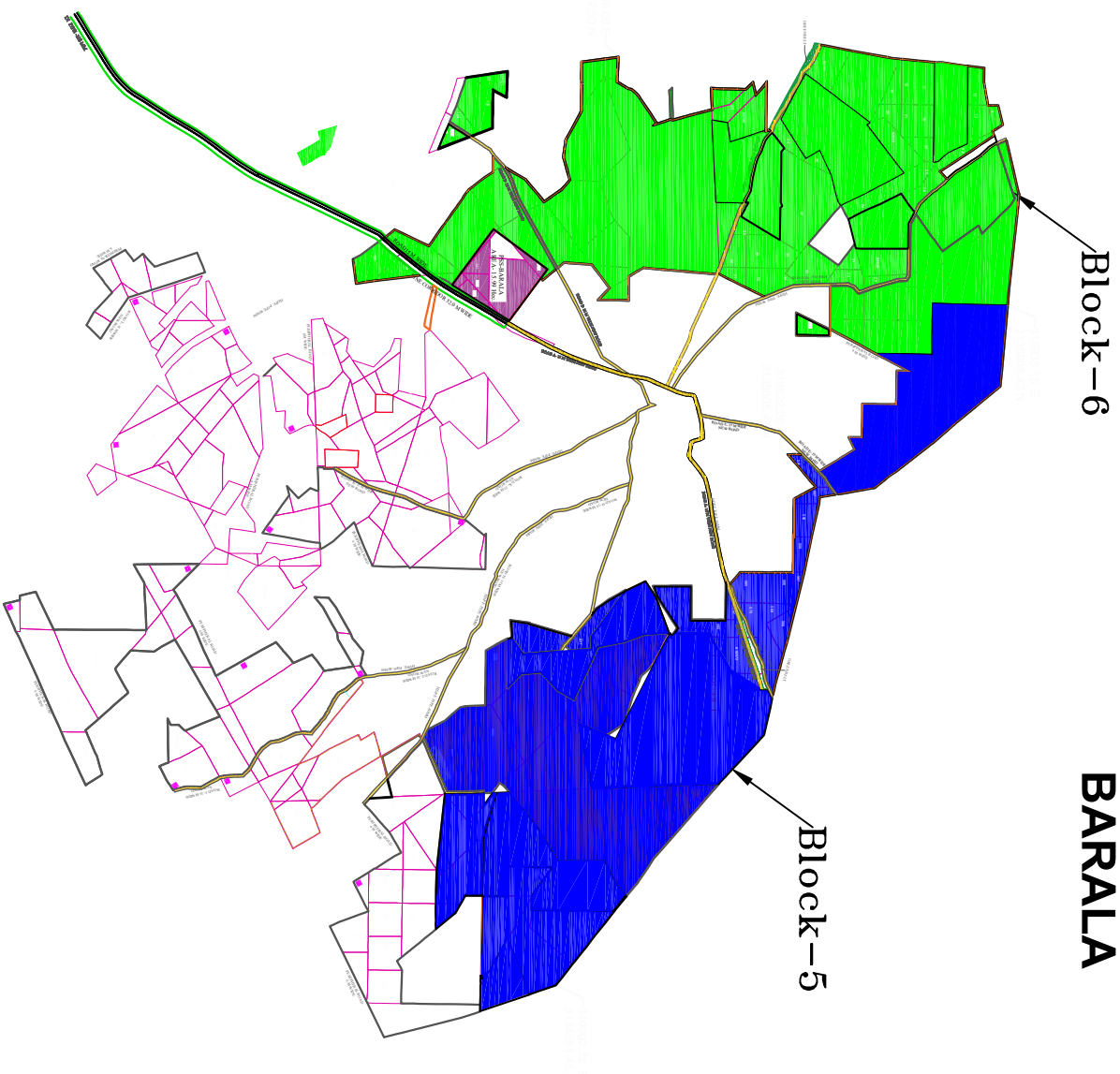
(E. NEERING DIVISION)

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REV.NO	DESCRIPTION	DESIGNED	CHECKED	APPROVED	DATE
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1					
2					
3					
4					
5					
6					

PROJECT				TITLE			
BALANCE OF SYSTEM PACKAGE FOR DEVELOPMENT OF CONNECTED SOLAR PV PROJECTS AT RVUNIL'S SOLAR PARK IN BIKANER, RAJASTHAN				VICINITY MAP AND BLOCK LAYOUT- BANDAREWALA			
SIZE	SCALE	DRG. NO.	DATE	SIZE	SCALE	DRG. NO.	DATE
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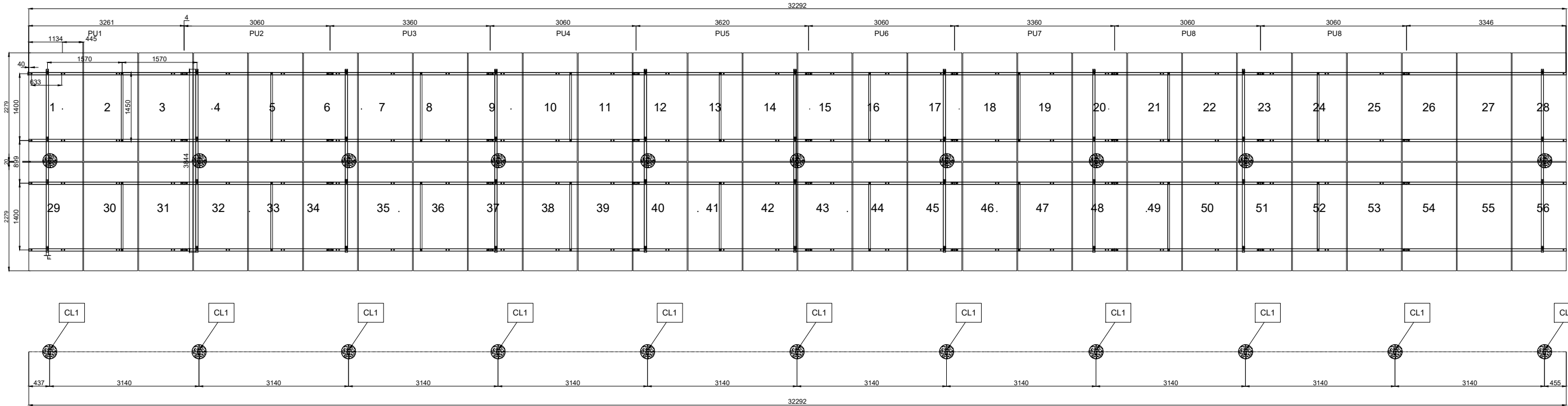
PROJECT											
BALANCE OF SYSTEM PACKAGE FOR DEVELOPMENT OF CONNECTED SOLAR PV PROJECTS AT RVINLU'S SOLAR PARK IN BIKANER, RAJASTHAN											
TITLE											
VICINITY MAP AND BLOCK LAYOUT- BARALA											
REV.NO	DESCRIPTION	DRAWN	DESIGN	CHKD.	BY					APPR.	
					CLEARED	(UO)	MCH (MS)	ELEC	C&I		STR.
0	RELAY FOR TRIPPER	RM	RM	RM				RM		RM	

1. **General**
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  - d. Land will be provided on "as is where is" basis and bidders are advised to visit the site location to appraise themselves with the site conditions.
  - e. Any Cables / Pipes etc. if laid by other Vendors before Road Construction, are to be routed underground, considering Future Road Construction above at a later date.
  - f. Layout of Roads / Drains / transmission lines shown in the Tender drawings might vary slightly during execution as per overall requirements of Park and Projects. Suitable turning radius (Minimum 8.0m at Internal side of Road) at all turning locations and over/turning zones at distributed locations, shall be suitably provided in the Roads.
  - g. All permanent Internal road & drains including all other facilities mentioned in Scope of Work, are in respective bidder's scope.
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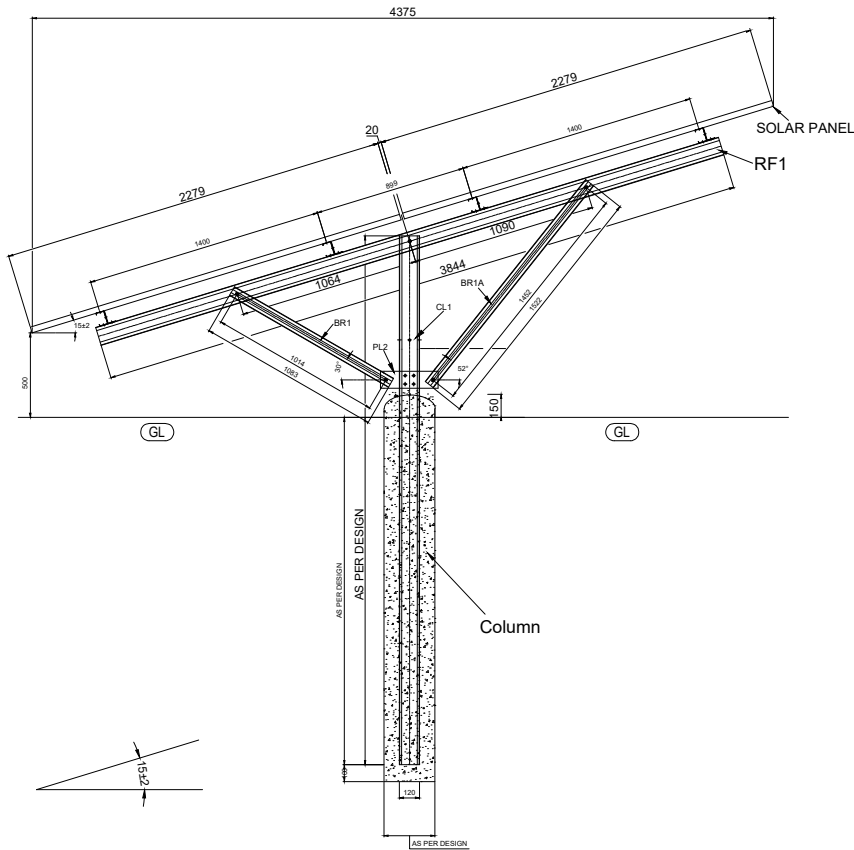
CAUTION  
THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED.  
IT MUST NOT BE USED OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY.

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REV.

DRAWING NO.

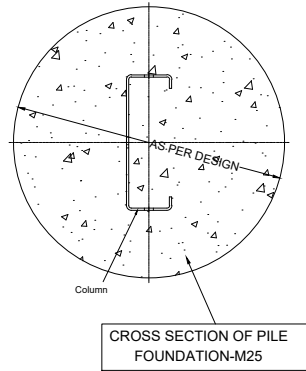


PLAN OF STRUCTURE (WITH SOLAR MODULE) FOR 0°



SIDE VIEW FOR FIXED TILT 15±2° PV MODULE SIZE


TENDER DRG  
TENTATIVE PURPOSE ONLY



④ TILT ANGLE, MODULE DIMENSION, PILE DIMENSION, FASTENERS & STRUCTURAL SECTIONS MENTIONED IN THE DRAWING IS INDICATIVE ONLY. BIDDER HAS TO DESIGN THE SECTION AS PER TECHNICAL SPEC.

- GENERAL NOTES:
- ALL DIMENSIONS ARE IN mm. UNLESS OTHERWISE SPECIFIED.
  - DO NOT SCALE THE DRAWING ONLY WRITTEN DIMENSIONS TO BE READ.
- NOTES:(THIS NOTE HAS TO BE READ ALONG WITH THE BOM)
- DIMENSIONS FOR COLD ROLLED STEEL ANGLE/CHANNEL SECTIONS SHALL BE IN ACCORDANCE WITH IS:811:1987.
  - DIMENSIONS OF PLATES, FLAT BARS SHALL CONFORM TO IS:1730.
  - FABRICATION AND ERECTION SHALL BE CARRIED OUT IN ACCORDANCE WITH IS:800 AND IS:801.
  - ALL MMS MEMBERS TO BE HOT DIP GALVANIZED IN ACCORDANCE WITH IS:2629-1985 AND IS:4759. HOWEVER THE MINIMUM GALVANIZATION THICKNESS TO BE AS PER BOM.
  - NO WELDING ON ANY MEMBER.
  - GENERAL ASSY. TOLERANCE LINEAR ±2.00mm.
  - GENERAL ASSY. TOLERANCE ANGULAR ±1°.
  - HOLES SIZES ARE SHOWN AFTER GALVANIZATION/TOLERANCE.
  - REMOVE ALL SHARP AND BURR EDGES.

GENERAL TOLERANCE FOR FABRICATION			
SL NO.	DESCRIPTION	TOLERANCE IN mm.	REMARKS.
1	END SECURITY	±2	
2	CD OF SLOT	±2	
3	CD OF HOLE	±2	
4	HOLE DIA		
	<10mm	±0.4	
	≥10mm	±0.5	
5	SLOT DIMENSIONS		
	<10mm	±0.5	
	≥10mm<30mm	±0.8	
	≥30mm	±1.0	
NO POSITIVE TOLERANCE IS PERMITTED IN PV MODULE MOUNTING SLOTS ON PURLINS.			
6	LENGTH	±1.0mm./m	
7	SECTION GEOMETRY	AS PER IS 811	
8	STRAIGHTNESS	≥1/1000 OF LENGTH BOTH AXIS (AS PER IS 811)	
9	ANGULAR TOLERANCE	±1°	
10	THICKNESS	-0.05 mm TO 1.0mm.	

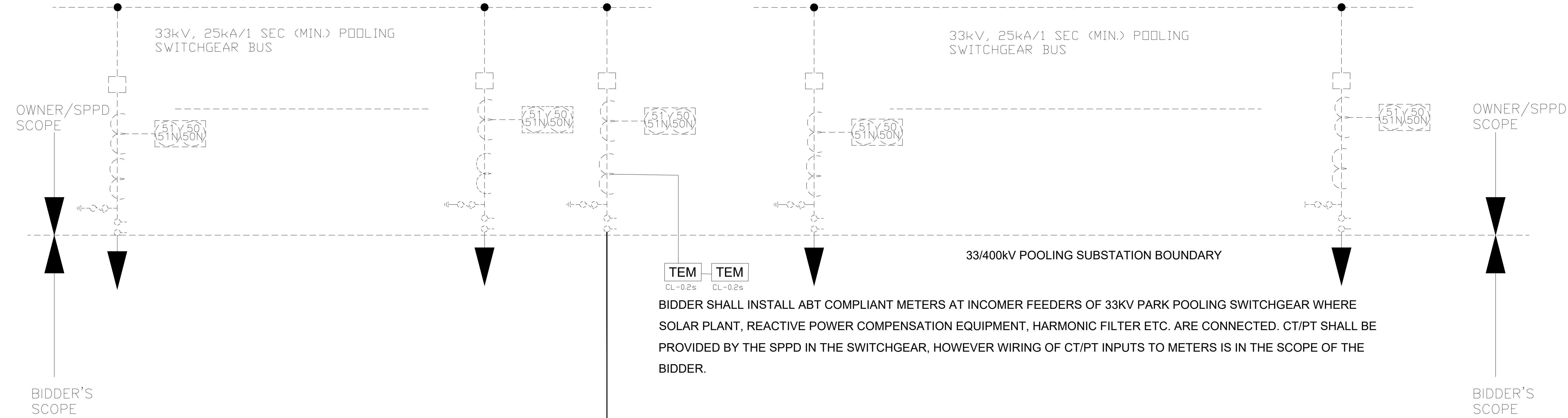
<div><div><div>बीएसईएल</div><div>BHARAT HEAVY ELECTRICALS LIMITED</div><div>BHEL</div></div><div><div>SOLAR BUSINESS DIVISION</div><div>BENGALURU - 12.</div></div></div>				DRN.	NAME	SIGN.	DATE	NO. OF VAR.	
					R.CHINNASAMY		23.04.2025		
				CKD.	R.PALANI KUMAR		23.04.2025	--	
				APPD.	PUNAM MISHRA		23.04.2025		
DEPT. PV ENGG.	UNTOL. DIMS. GR.		SCALE  N.T.S	WEIGHT(KG)  --- (Approx)	REF. TO ASSY. DRG.  --	ITEM NO.  --	NO. OF ITEMS  --		
CODE 0439	REFER GENERAL NOTES								
TITLE  MODULE MOUNTING STRUCTURE GENERAL ARRANGEMENT					DRAWING NO.  BHEL- TD- MMS- GA- 2502			REV.  00	
					SHEET. NO. 01		NO. OF SHEETS. 01		



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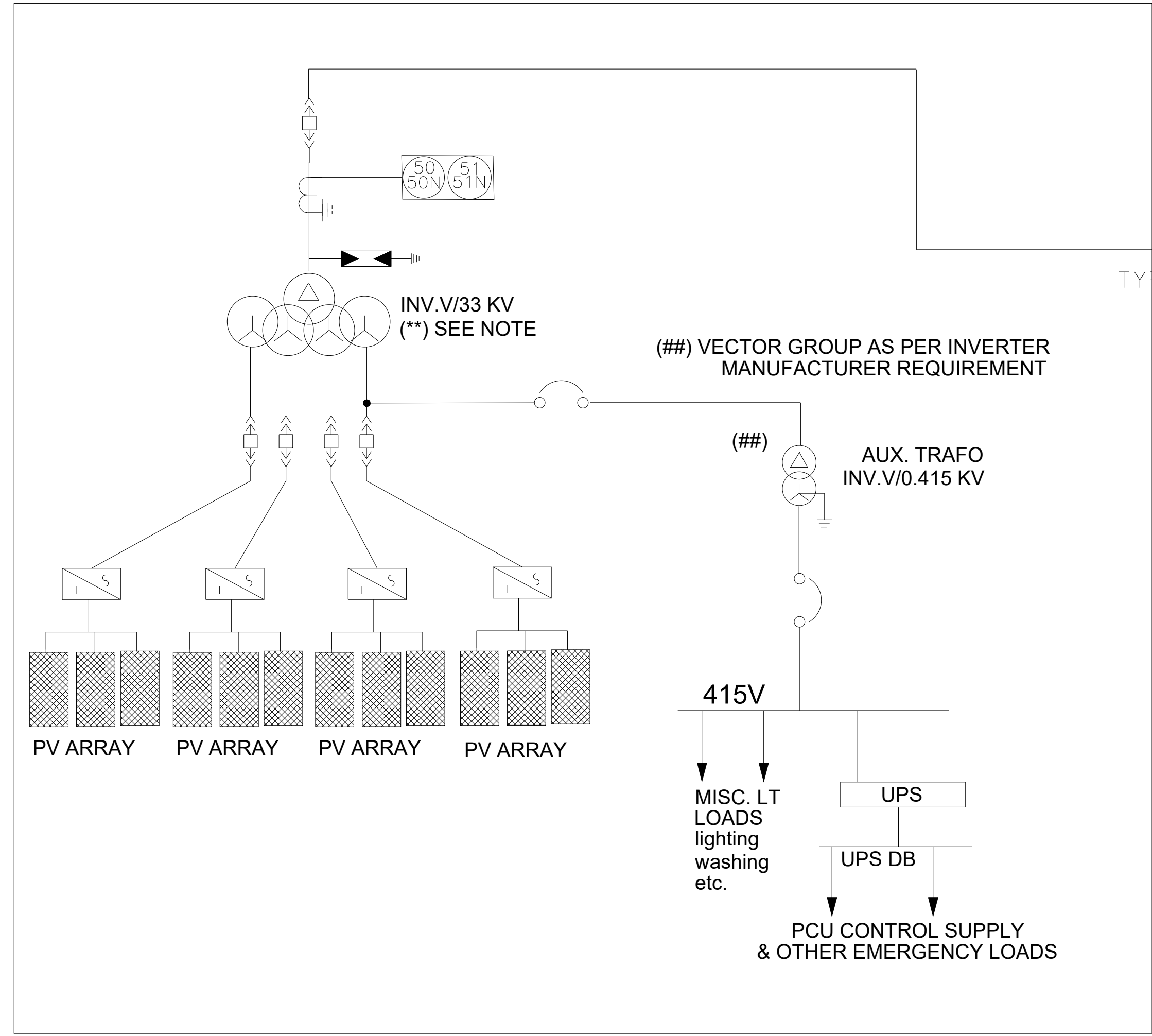
33 kV MAIN POOLING INDOOR SWITCHGEAR AT RVUNL'S 33/400kV SUBSTATION SWITCHYARD



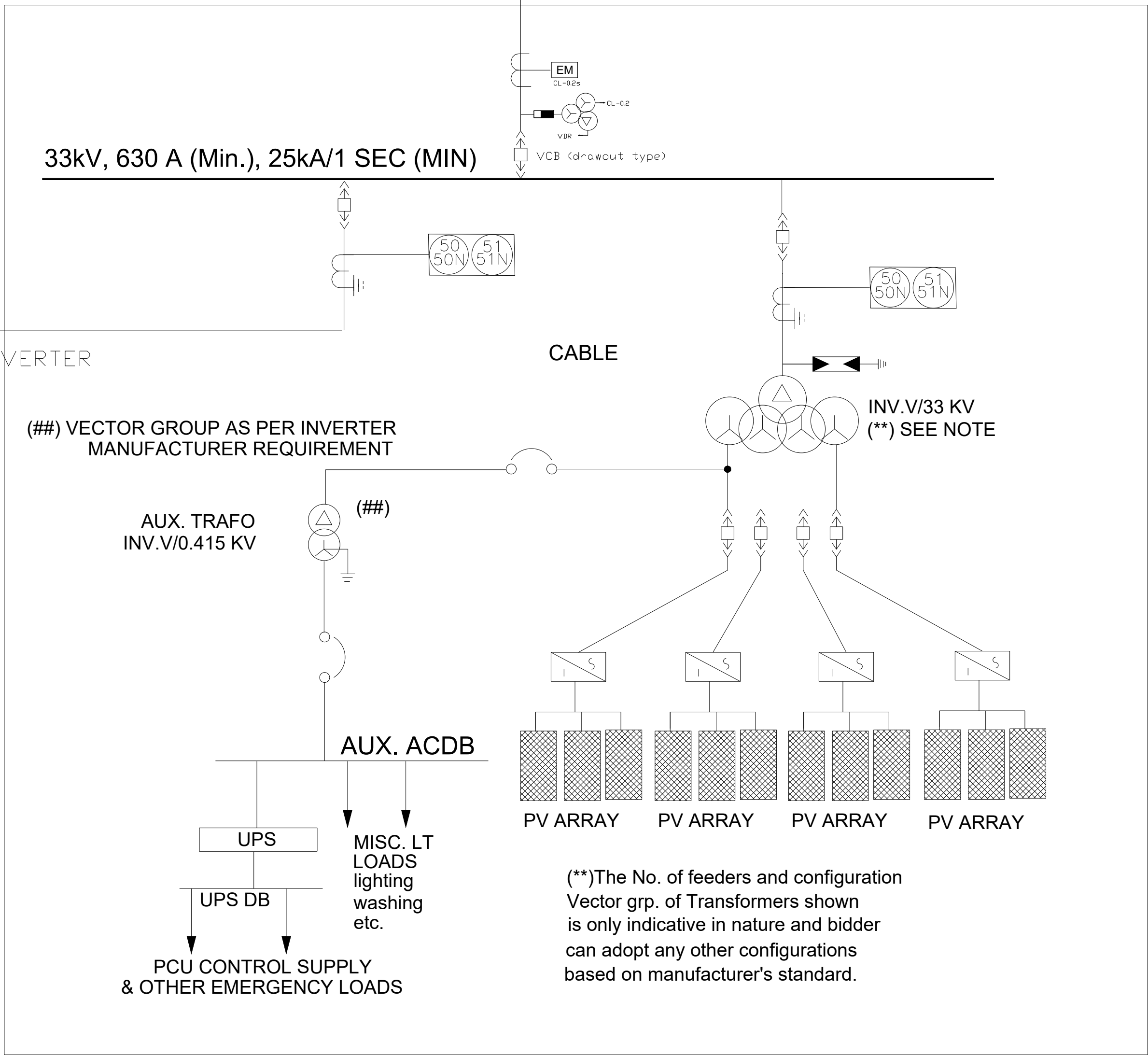
A TOTAL OF 16 INCOMER FEEDERS SHALL BE PROVIDED AT 33KV PARK POOLING SWITCHGEAR FOR INTERCONNECTION OF SOLAR PLANT CABLES, DYNAMIC REACTIVE POWER COMPENSATION EQUIPMENT AND HARMONIC FILTERS OF EACH 250MW BLOCK. THE POWER FROM EACH BLOCK SHALL BE EQUALLY DIVIDED (TO THE EXTENT POSSIBLE) AMONG THE ABOVE 33KV FEEDERS DESIGNATED FOR THE RESPECTIVE BLOCK. 33KV CABLES SHALL BE SUITABLY SIZED TO CARRY THE POWER FROM SOLAR PLANT.

ALTERNATE CONFIGURATION TO LOCAL POOLING SWITCHGEAR :-  
BIDDER CAN DIRECTLY TERMINATE CABLE (UPTO 3 SETS) FROM UPTO THREE SEPARATE SAME CAPACITY BLOCKS (WITH ICOG) AT ONE SPPD POOLING STATION 33KV FEEDER. IF ANY OF THE SEPARATE FEEDERS (UPTO THREE) PROPOSED BY THE BIDDER FOR TERMINATION AT ONE NTPC REL'S 33KV POOLING SWITCHGEAR FEEDER IS OF DIFFERENT CAPACITY FROM THE OTHER(S), THEN THE SAME MAY ALSO BE ALLOWED FOR INTERCONNECTION TO THE SAME FEEDER, AFTER REVIEWING THE INVERTER BLOCK CAPACITIES TAKING INTO ACCOUNT THE ELECTRICAL PROTECTION REQUIREMENTS.

(Max. 30 MW)  
33kV CABLE



Typical scheme for pooling through inverter



LOCAL POOLING SWITCHGEAR (if applicable)

NOTES:

- SEPARATE CMCS BUILDINGS SHALL BE CONSTRUCTED BY THE BIDDER IN EACH 250MW BLOCK UNDER BIDDER'S SCOPE. BIDDER SHALL PLACE THE SCADA/OWS/EWS PANEL, PPC ETC. AT THE RESPECTIVE CMCS BUILDING. BIDDER SHALL PROVIDE AUXILIARY SUPPLY ARRANGEMENT AND SUITABLE UPS WITH BACK UP TIME AS MENTIONED IN THE TECHNICAL SPECIFICATIONS FOR EQUIPMENT IN CMCS BUILDING (AS REQUIRED).
- IN CASE OF OUTDOOR INVERTER, THE INBUILT LT TRANSFORMER FOR AUX SUPPLY SHOULD BE DESIGNED AND SIZED IN ORDER TO TAKE CARE OF ALL EMERGENCY LOADS AND MISCELLANEOUS LOADS RELATED TO MAINTENANCE ACTIVITY WITH REDUNDANCY.
- SUITABLE UPS AND/OR DC SYSTEM WITH BACK UP AS PER TS IS TO BE PROVIDED FOR AUXILIARY POWER SUPPLY FOR PCS (IF REQUIRED) AND OTHER PROTECTION CONTROL AND ANY EMERGENCY LOADS.
- THE INVERTER TRANSFORMER ARRANGEMENT SHOWN IS TYPICAL, THE TRANSFORMER CONFIGURATION, VECTOR GROUP, IMPEDANCE, INSULATION CLASS ETC. AS PER INVERTER MANUFACTURER RECOMMENDED DESIGN PARAMETER /ARRANGEMENT.
- BIDDER SHALL USE 33kV CABLE FOR CONNECTING FROM LOCAL POOLING SWITCHGEAR TO SPPD'S 33kV MAIN PARK POOLING SWITCHGEAR DIRECTLY. SUPPLY OF CABLES AND ACCESSORIES INCLUDING JOINTING AND TERMINATION KITS INCLUDING LAYING AND TERMINATION SHALL BE IN THE SCOPE OF THE BIDDER.
- OTGT TEST SHALL BE PERFORMED AT 33 KV PARK POOLING SWITCHGEAR INCOMERS FROM SOLAR PLANT.
- BIDDER MAY USE LOCAL POOLING SWITCHGEAR FOR LOCAL POOLING OR CONNECT INVERTER TRANSFORMER OUTPUT TO THE 33KV PARK POOLING SWITCHGEAR THROUGH ICOG TYPE BREAKER PANEL AT INVERTER TRANSFORMER END.
- BIDDER TO PROVIDE POWER PLANT CONTROLLER AND CONDUCT GRID CONNECTIVITY COMPLIANCE STUDY/REPORT AS PER LATEST CEA TECHNICAL STANDARD FOR CONNECTIVITY TO GRID AND FURNISH INFORMATION FOR MODELING SOLAR PV GENERATING STATION IN INDIAN GRID AND VALID STEADY STATE, DYNAMIC MODELS IN PSSIE AND PSCAD FORMAT AS PER CONNECTIVITY REQUIREMENT. INVERTER BENCHMARKING REPORT SHALL ALSO BE SUBMITTED BY THE BIDDER TO OWNER.
- INVERTER SHALL BE PROVIDED WITH DUAL OR MULTIMASTER FACILITY & WMS SHALL BE PROVIDED WITH DUAL OR SINGLE MASTER FACILITY.
- BIDDER TO PROVIDE NECESSARY ARRANGEMENT TO TRANSMIT SOLAR PLANT DATA TO STATE LDC/RLDC/REMC AS PER TELEMETRY REQUIREMENT OF RELEVANT REGULATION, GUIDELINES. NECESSARY COMMUNICATION INFRASTRUCTURE/ SOFTWARE IN THIS REGARD UPTO LDC SHALL BE UNDER BIDDER'S SCOPE.
- THE METALLIC SCREEN/ARMOUR OF CORE AND CONDUCTOR OF HT CABLES SHALL BE CAPABLE OF CARRYING SYSTEM EARTH FAULT CURRENT.

FOR TENDER PURPOSE ONLY

PROJECT		BALANCE OF SYSTEM PACKAGE FOR DEVELOPMENT OF 1500MW GRID CONNECTED SOLAR PV PROJECTS AT RVUNL'S SOLAR PARK IN BIKANER, RAJASTHAN	
TITLE		BLOCK SINGLE LINE DIAGRAM	
PREPARED BY	CHECKED BY	APPROVED BY	DATE
	CIVIL	ELE.	
SIZE	SCALE	DRG. NO.	REV. NO.
			R1



