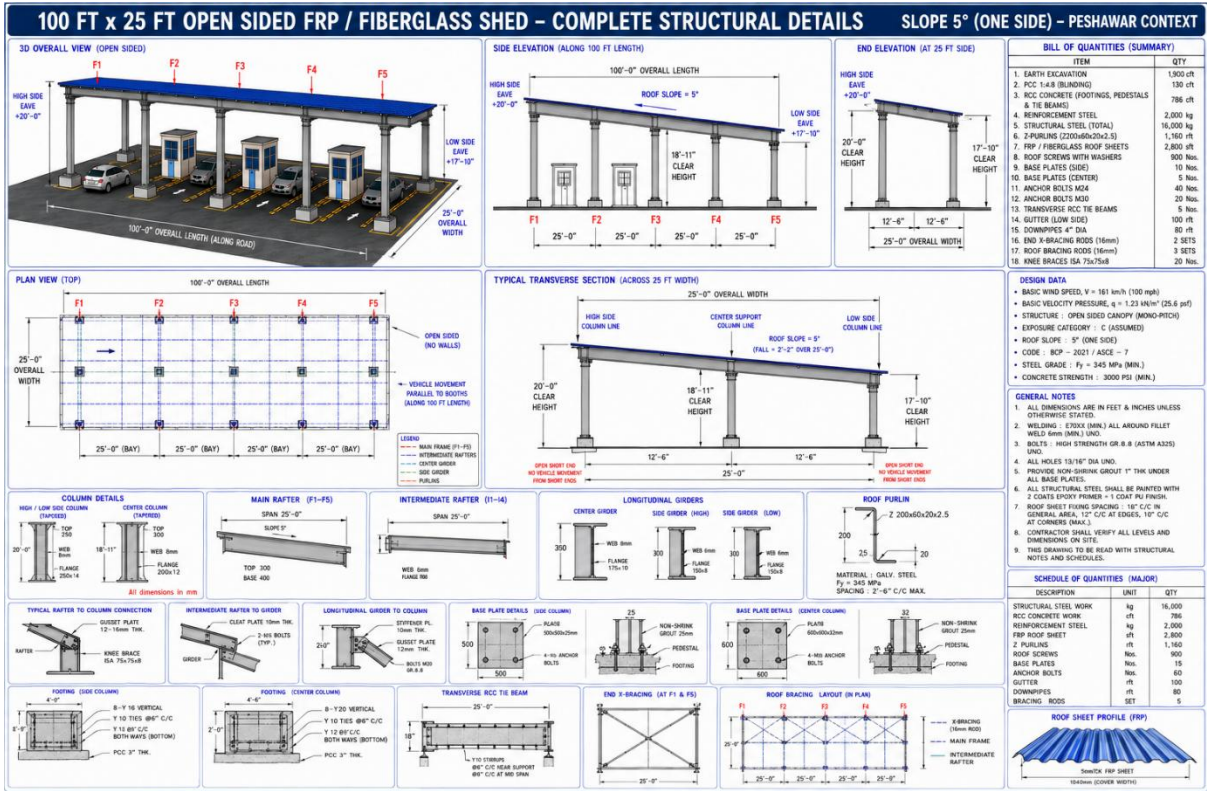
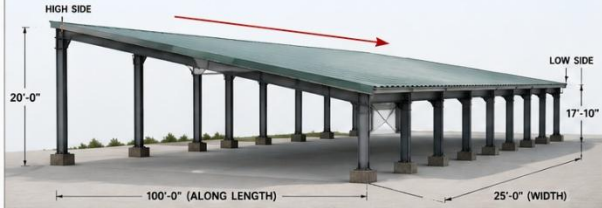




100 ft x 25 ft OPEN SIDED FRP ROOFING - ITEMS, CALCULATION & BOQ SPECIFICATION

ROOF TYPE: ONE SIDE SLOPE
SLOPE 5° (HIGH SIDE TO LOW SIDE)



1. ROOF AREA CALCULATION

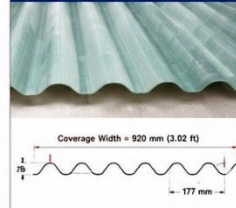
Plan width (W) = 25.00 ft
Roof slope = 5°
Sloping width = $W / \cos 5^\circ$
= $25 / 0.996 = 25.10$ ft
Length (L) = 100.00 ft
Net roof area = L x Sloping width
= 100×25.10
= 2,510 sft
Add 10% for laps, cutting & wastage
= $2,510 \times 10\% = 251$ sft

TOTAL ROOFING AREA = 2,800 SFT

2. BOQ SUMMARY

Item No.	Description	Unit	Qty.
15.01	FRP Roofing Sheet 5 mm Thick	Sft	2,800
15.02	Roofing Screws with EPDM Washer	Nos	950
15.03	High Side Eave / Head Flashing	Rft	100
15.04	Low Side Gutter / Drip Flashing	Rft	100
15.05	Barge / End Flashing (Both Ends)	Rft	52
15.06	Butyl Sealing Tape & Sealant	LS	1
15.07	Profile Fillers, Closures & Mesh	LS	1

15.01 FRP ROOFING SHEET (5 mm)



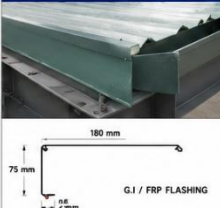
15.02 ROOFING SCREW WITH EPDM WASHER



15.03 HIGH SIDE EAVE / HEAD FLASHING



15.04 LOW SIDE GUTTER / DRIP FLASHING



15.05 BARGE / END FLASHING (BOTH ENDS)



ROOF SHEET INSTALLATION



SIDE LAP (TYPICAL)



END LAP (TYPICAL)



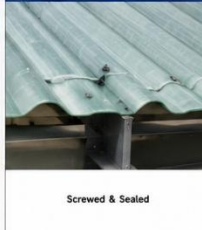
HIGH SIDE EAVE FLASHING



LOW SIDE GUTTER FLASHING



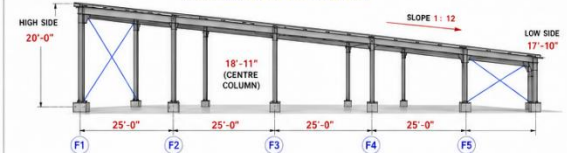
LOW SIDE GUTTER FLASHING



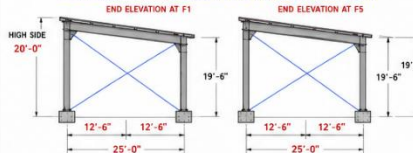
100 FT x 25 FT OPEN SIDED MONO-PITCH FRP SHED - END & ROOF BRACING DETAILS

END AND ROOF BRACING DETAILS, CALCULATIONS AND BOQ ITEMS

1. MAIN VIEW (ALONG 100 FT LENGTH)



2. END ELEVATION - X-BRACING AT F1 & F5 (ONE SIDE SLOPE ONLY)

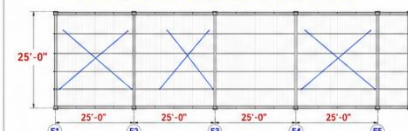


END BRACING CALCULATION

- Width of shed = 25 ft
- Centre column divides into two bays of 12'-6" each
- Height (approx.) = 19.5 ft
- Diagonal length of one rod = $\sqrt{(12.5^2 + 19.5^2)} = 23.20$ ft
- Each bay has 2 diagonal rods
- Length per end = 2 bays x 2 rods = 23.20 ft = 92.80 ft
- For two ends (F1 & F5) = 92.80 x 2 = 185.60 ft

END BRACING ROD LENGTH = 186 RFT

3. ROOF PLANE DIAGONAL BRACING (IN SELECTED BAYS)



ROOF BRACING CALCULATION

- Roof bracing in 3 bays (as shown)
- Each roof bay = 25 ft x 25 ft
- Diagonal length = $\sqrt{(25^2 + 25^2)} = 35.36$ ft
- Each X-bracing set has 2 rods
- Length per set = 2 x 35.36 = 70.72 ft
- For 3 sets = 70.72 x 3 = 212.16 ft

ROOF BRACING ROD LENGTH = 212 RFT

4. TOTAL BRACING ROD CALCULATION

Description	Length (RFT)	Unit Wt. (kg/m)	Weight (kg)
End X-Bracing (F1 & F5)	186	0.482	89.65
Roof Plane Bracing (3 Sets)	212	0.482	102.18
Subtotal	398		191.83
Add 15% for threading, cutting, laps, fixing length & wastage			28.80
TOTAL 16 mm BRACING RODS			= 220 kg

5. ACCESSORIES REQUIRED

Turnbuckles, Clevises & Pins
For End Bracing:
4 rods/end x 2 ends = 8 sets
Turnbuckles, Clevises & Pins
For Roof Bracing:
6 rods (3 sets x 2 rods) = 6 sets
Total Accessories = 14 Sets

6. 16 mm DIA GALVANIZED TENSION ROD



7. TURNBUCKLE (HEAVY DUTY)



8. CLEVIS & PIN



9. GUSSET PLATE (TYPICAL)



10. BRACING CONNECTION AT END



11. ROOF BRACING CONNECTION



12. BOQ ITEMS

Item No.	Description / Specification	Unit	Quantity
13.01	Supplying, fabricating and fixing 16 mm dia galvanized tension-rod X-bracing at end elevation F1, including threaded rods, turnbuckles, clevises, pins, washers, fixing with gusset plates, alignment, tightening and all accessories complete as per drawings.	Set	1
13.02	Supplying, fabricating and fixing 16 mm dia galvanized tension-rod X-bracing at end elevation F5, including threaded rods, turnbuckles, clevises, pins, washers, fixing with gusset plates, alignment, tightening and all accessories complete as per drawings.	Set	1
13.03	Supplying and fixing heavy-duty galvanized turnbuckles, clevises and pins for end X-bracing rods, suitable for 16 mm dia tension rods.	Set	8
13.04	Supplying, fabricating and fixing roof-plane diagonal bracing in selected roof bays, using 16 mm dia galvanized tension rods with turnbuckles, clevises, pins and fixing accessories complete as per structural drawings.	Set	3
13.05	Supplying and fixing bracing gusset plates, minimum 10 mm thick, including cutting, drilling, welding, grinding, primer and fixing complete.	Kg	As per actual

13. COMBINED BOQ LINE (IF REQUIRED)

Supplying, fabricating and fixing complete end and roof-plane bracing system for steel shed, including 16 mm dia galvanized tension rods, X-bracing at end elevations F1 and F5, roof-plane diagonal bracing in selected bays, heavy-duty turnbuckles, clevises, pins, washers, 10 mm thick gusset plates, cutting, threading, drilling, welding, alignment, tightening and all accessories complete in all respects as per approved structural/shop drawings and instructions of Engineer-in-Charge.	Quantity: 2 end bracing sets + 3 roof bracing sets
Unit: Set / Kg	
NOTE: Roof bracing shall follow one-side slope only (from high side to low side). It shall not be assumed as two-way or gable roof slope.	

BOQ SPECIFICATION

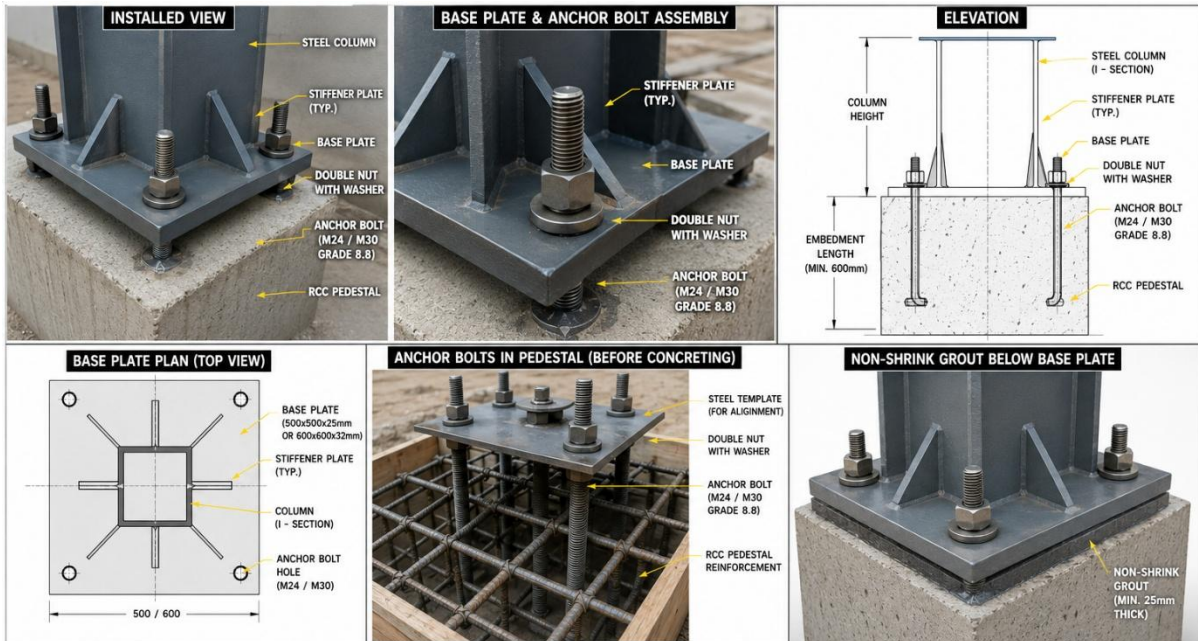
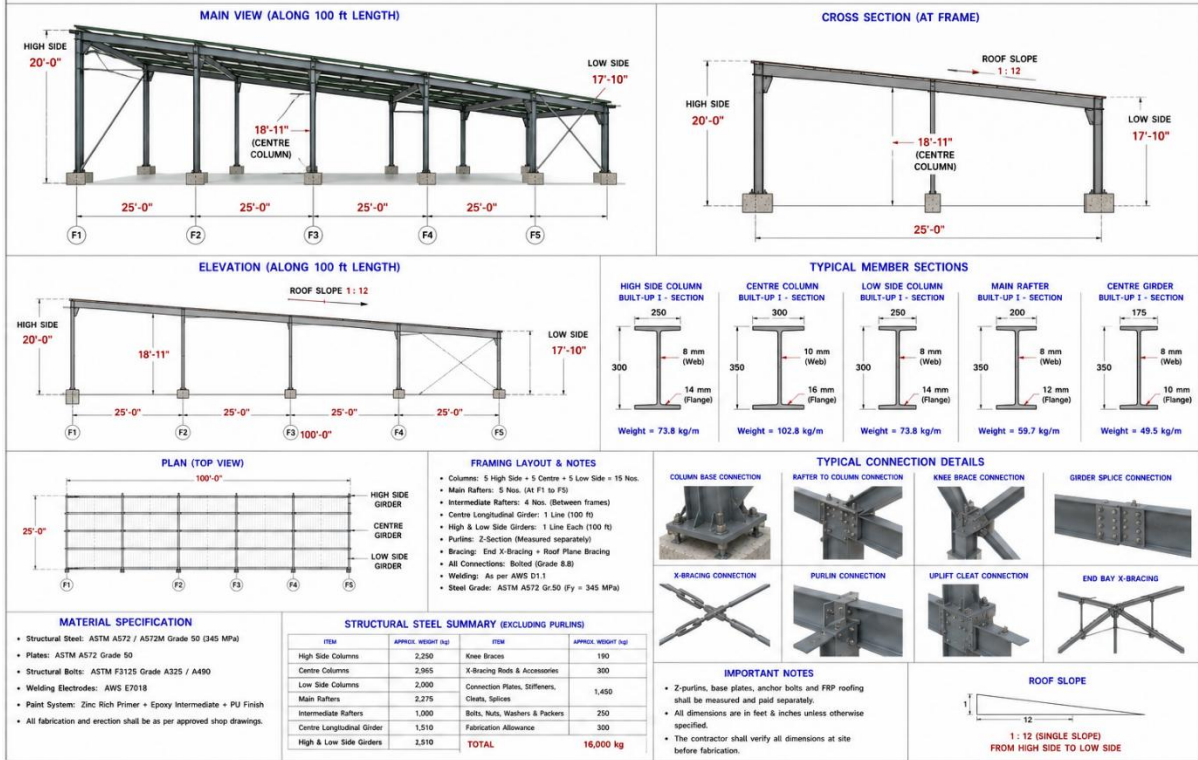
Supplying, fabricating and fixing complete end and roof-plane bracing system for steel shed, including 16 mm dia galvanized tension rods, X-bracing at end elevations F1 and F5, roof-plane diagonal bracing in selected bays, heavy-duty turnbuckles, clevises, pins, washers, 10 mm thick gusset plates, cutting, threading, drilling, welding, alignment, tightening and all accessories complete in all respects as per approved structural/shop drawings and instructions of Engineer-in-Charge.

Item No.	Description	Unit	Quantity
13.01	End X-Bracing with 16 mm dia rods at F1	Set	1
13.02	End X-Bracing with 16 mm dia rods at F5	Set	1
13.03	Turnbuckles, clevises & pins for end bracing (16 mm)	Set	8
13.04	Roof-plane diagonal bracing in selected bays (16 mm rods)	Set	3
13.05	Gusset plates 10 mm thick for bracing connections	Kg	Included in steelwork

IMPORTANT

- Roof slope is one side only (High side to Low side).
- Bracing shall be provided at both ends (F1 & F5).
- Roof-plane bracing shall be provided in selected bays only.
- All dimensions are in feet & inches unless otherwise specified.

100 ft x 25 ft OPEN SIDED FRP SHED – STRUCTURAL STEEL FRAME



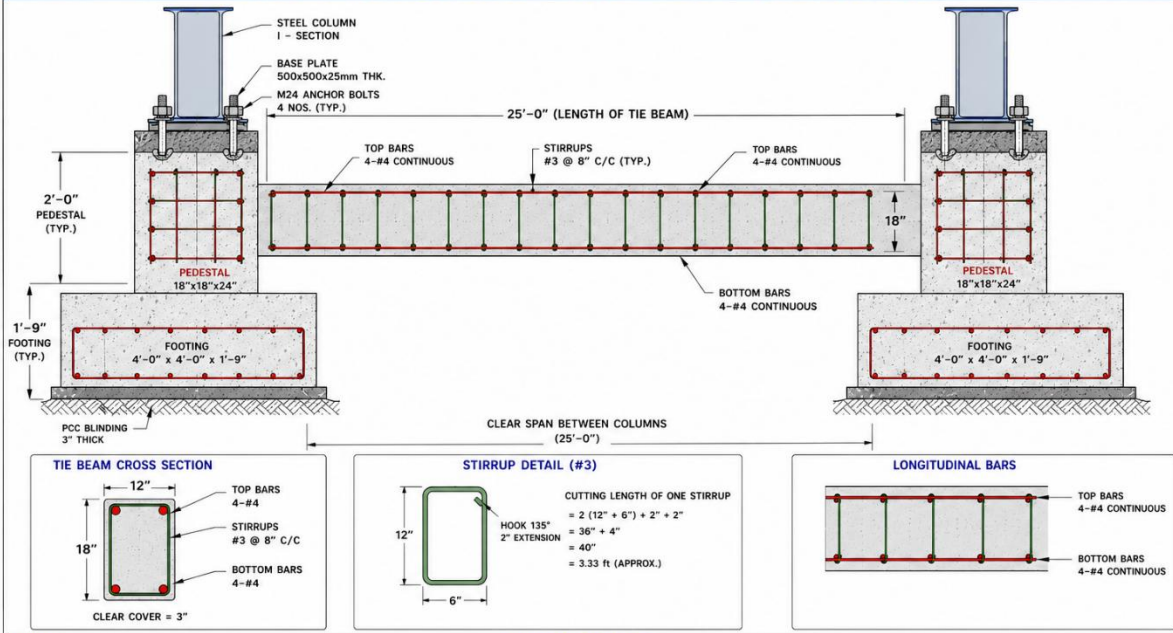
NOTES:

- ALL BASE PLATES SHALL BE FABRICATED FROM APPROVED M.S. PLATE.
- ALL ANCHOR BOLTS SHALL BE GRADE 8.8 WITH DOUBLE NUTS & WASHERS.
- NON-SHRINK GROUT THICKNESS BELOW BASE PLATE SHALL BE MIN. 25mm.
- ALL WELDING SHALL BE AS PER APPROVED SHOP DRAWINGS.

BASE PLATE & ANCHOR BOLT SCHEDULE

COLUMN TYPE	BASE PLATE SIZE (mm)	BASE PLATE THICKNESS (mm)	ANCHOR BOLT SIZE	NO. OF ANCHOR BOLTS	EMBEDMENT LENGTH (mm)
SIDE COLUMN	500 x 500	25	M24	4	600
CENTRE COLUMN	600 x 600	32	M30	4	700

RCC TRANSVERSE TIE BEAM (12" x 18") – SECTION & DETAILS



NOTES:

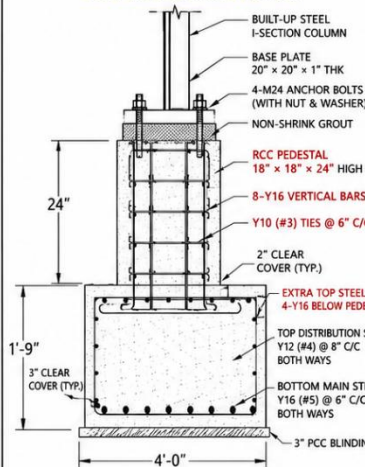
1. CONCRETE: MIN. 3000 PSI
2. REINFORCEMENT: GRADE 60
3. CLEAR COVER: 3" FOR TIE BEAM
4. STIRRUP SPACING: 8" C/C (TYP.)

TIE BEAM SCHEDULE

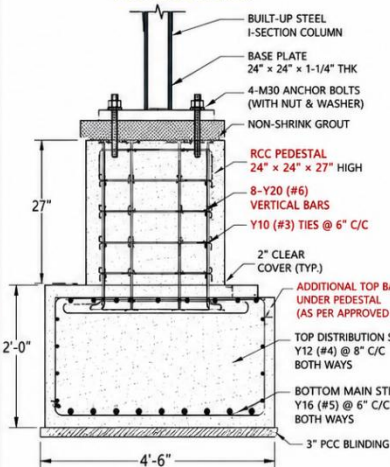
BEAM MARK	SIZE (in)	LENGTH (ft)	NO. OF BEAMS	LONGITUDINAL BARS		STIRRUPS	REMARKS
				TOP	BOTTOM		
TB1	12" x 18"	25'-0"	5 NOS.	4-#4 CONTINUOUS	4-#4 CONTINUOUS	#3 @ 8" C/C	TRANSVERSE TIE BEAM

FOUNDATION & TIE BEAM SECTION DETAILS – SIDE FOOTING, CENTER FOOTING AND TRANSVERSE RCC TIE BEAM

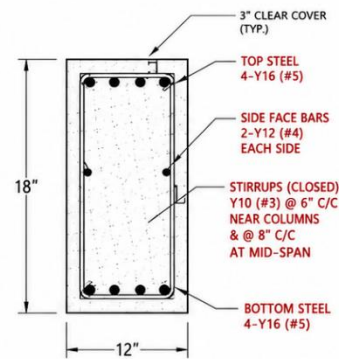
1. ITEM 5.01 – HIGH-SIDE & LOW-SIDE COLUMN FOOTING SECTION



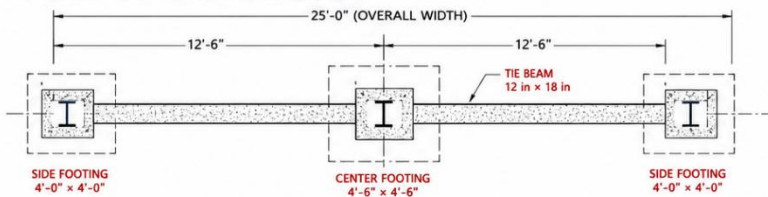
2. ITEM 5.02 – CENTER COLUMN FOOTING SECTION



3. ITEM 6.01 – TRANSVERSE RCC TIE BEAM SECTION



4. TYPICAL PLAN / LAYOUT AT ONE FRAME LINE



5. KEY NOTES

1. Concrete: 3000 psi minimum for footings and tie beams.
2. Pedestal concrete: 4000 psi preferred.
3. Reinforcement steel: Grade 60.
4. All dimensions in feet and inches unless noted.
5. Concrete to be properly vibrated and cured.
6. Anchor bolts to be fixed with templates before casting.
7. Final reinforcement and anchor details subject to approved structural drawings.

PROJECT : 100 FT x 25 FT OPEN-SIDED MONO-PITCH

DRAWING TITLE : FOUNDATION & TIE BEAM SECTION DETAILS

DRAWING NO. : STR-05

DESIGN BASIS

- IS 456:2000
- ACI 318-19
- AISI 360-16

UNITS

- DIMENSIONS: FEET & INCHES
- ELEVATIONS: FEET & INCHES

CLEAR COVER

- FOOTING / TIE BEAM : 3"
- PEDESTAL : 2"

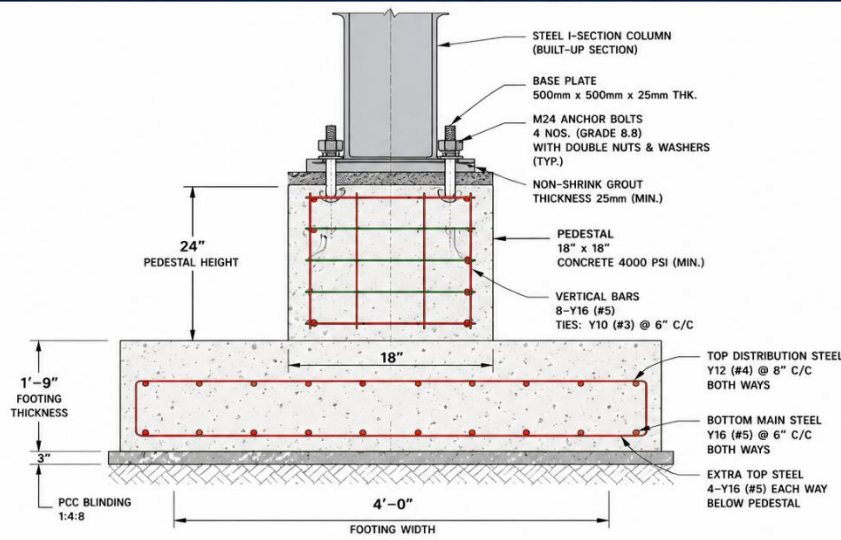
DATE : MAY 2024

DRAWN BY : _____

CHECKED BY : _____

APPROVED BY : _____

ITEM 5.01 - RCC FOOTING FOR HIGH SIDE & LOW SIDE COLUMNS SECTION DETAIL



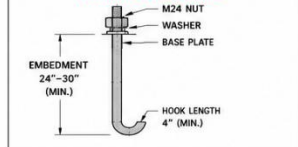
FOOTING & PEDESTAL DETAILS

FOOTING SIZE	4'-0" x 4'-0" x 1'-9"
PEDESTAL SIZE	18" x 18" x 24"
CONCRETE (FOOTING)	3000 PSI (MIN.)
CONCRETE (PEDESTAL)	4000 PSI (MIN.)
REINFORCEMENT STEEL	GRADE 60
CLEAR COVER (FOOTING)	3"
CLEAR COVER (PEDESTAL)	2"

REINFORCEMENT SCHEDULE

FOOTING	
BOTTOM MAIN STEEL	Y16 (#5) @ 6" C/C B.W.
TOP DISTRIBUTION STEEL	Y12 (#4) @ 8" C/C B.W.
EXTRA TOP STEEL BELOW PEDESTAL	4-Y16 (#5) EACH WAY
PEDESTAL	
VERTICAL BARS	8-Y16 (#5)
TIES / STIRRUPS	Y10 (#3) @ 6" C/C
CLEAR COVER	2"

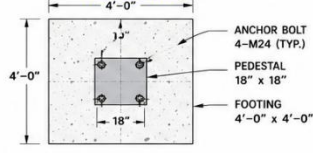
ANCHOR BOLT DETAILS



NOTES:

- ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE STATED.
- ALL CONCRETE SHALL BE VIBRATED PROPERLY.
- ALL REINFORCEMENT SHALL BE DEFORMED BARS. WELDING NOT ALLOWED.
- PEDESTAL & FOOTING SURFACES SHALL BE LEVEL AND CLEAN BEFORE STEEL ERECTION.

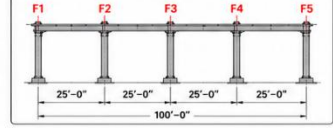
PLAN (TOP VIEW)



MATERIAL SPECIFICATIONS

- CONCRETE: 3000 PSI (FOOTING), 4000 PSI (PEDESTAL)
- REINFORCEMENT: GRADE 60
- STEEL: ASTM A572 GRADE 50 (MIN.)
- ANCHOR BOLTS: ASTM F1554 GRADE 8.8
- WELDING ELECTRODE: E7018 (LOW HYDROGEN)
- GROUT: NON-SHRINK GROUT

KEY PLAN



100 FT x 25 FT OPEN SIDED FRP / FIBERGLASS SHED - COMPLETE STRUCTURAL DETAILS

SLOPE 5° (ONE SIDE) - PESHAWAR CONTEXT

