STRUCTURAL PLAN

GENERAL NOTES:

1.0 GENERAL :

1.1 UNLESS NOTED OTHERWISE, ALL DIMENSIONS SHOWN ARE IN MILLIMETERS AND ELEVATIONS SHOWN ARE IN METERS.

1.2 THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS AT THE SITE, AND SHALL NOTIFY THE ENGINEER OF DISCREPANCIES BETWEEN ACTUAL CONDITIONS AND INFORMATION SHOWN ON THE DRAWINGS BEFORE PROCEEDING WITH THE WORK. THIS SHALL INCLUDE THE LOCATION AND DIMENSIONS OF GROOVES, REGLETS, SLEEVES, CURBS, OPENINGS, EMBEDDED OR ATTACHED ITEMS, ETC. (REFER TO ARCHITECTURAL, MECHANICAL, ELECTRICAL AND PLUMBING.)

1.3 ALL FIGURED DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALE SHOWN ON PLANS, SECTIONS OR DETAILS. SPECIFIC NOTES AND DETAILS ON DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS.

1.4 THE STRUCTURAL DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED STRUCTURES. THEY DO NOT INDICATE THE METHOD OF CONSTRUCTION UNLESS SO STATED. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY MEASURES TO PROTECT THE STRUCTURES, ADJACENT PROPERTIES, WORKMEN AND OTHER PERSONS DURING ALL PHASES OF CONSTRUCTION.

1.5 THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER IN CHARGE OF ANY CONDITION WHICH IN HIS OPINION MIGHT ENDANGER THE STABILITY OF THE STRUCTURES OR CAUSE DISTRESS IN THE STRUCTURES.

1.6 THE CONTRACTOR SHALL PROVIDE TEMPORARY ERECTION BRACINGS AND SHORINGS FOR ALL THE STRUCTURAL MEMBERS AS REQUIRED FOR STRUCTURE STABILITY DURING ALL PHASES OF CONSTRUCTION.

1.7 THE CONTRACTOR SHALL TAKE ALL STEPS NECESSARY TO ENSURE THE PROPER ALIGNMENT OF THE STRUCTURES DURING AND AFTER THE INSTALLATION OF ALL STRUCTURAL AND FINISH MATERIALS.

1.8 THE CONTRACTOR SHALL INFORM THE SUB-CONTRACTORS THAT NO CONSTRUCTION MATERIALS SHALL BE STORED ON POURED FLOORS, AND SHALL ENSURE THAT THE SUB-CONTRACTORS DO NOT VIOLATE THIS IMPORTANT REQUIREMENT.

1.9 TYPICAL DETAILS AND GENERAL NOTES ON S-1 AND S-2 SHALL APPLY TO ALL PARTS OF THE WORKS UNLESS OTHERWISE SHOWN ON THE DRAWINGS.

2.0 STANDARDS AND REFERENCES :

THE FOLLOWING SHALL GOVERN THE DESIGN, FABRICATION AND CONSTRUCTION OF THE PROJECT:

2.1 AMERICAN CONCRETE INSTITUTE (ACI PUBLICATIONS) ; ACI 318-05 BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE ACI 315-94 MANUAL OF STANDARD PRACTICE FOR DETAILS AND DETAILING OF CONCRETE REINFORCEMENT.

2.2 AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) PUBLICATION: MANUAL OF STEEL CONSTRUCTION, NINTH EDITION. "ALLOWABLE STRESS DESIGN" (ASD)

2.3 AMERICAN WELDING SOCIETY (AWS) PUBLICATION D.1.1-2000.

2.4 AMERICAN SOCIETY FOR TESTING MATERIALS (ASTM)

2.5 NATIONAL STRUCTURAL CODE OF THE PHILIPPINES (NSCP) VOL. 1, SIXTH EDITION 2010.

2.6 ASSOCIATION OF STRUCTURAL ENGINEERS OF THE PHILIPPINES (ASEP) HANDBOOK OF STRUCTURAL STEEL SHAPES AND SECTIONS, 2004

2.7 UNIFORM BUILDING CODE (UBC), VOL. 2 1997 EDITION

3.0 BASIC DESIGN LOADS :

3.1. DEAD LOADS (DL) :

3.1.1	CONCRETE	24.00	kN/m^3
3.1.2	STEEL	77.00	kN/m^3
3.1.3	SOIL	18.00	kN/m^3
3.1.4	CEILING	200	Pa
3.1.5	MISCELLANEOUS	200	Pa
3.1.6	100mm THK.CHB WALL	2107	Pa
3.1.7	150mm THK.CHB WALL	2730	Pa
3.1.8	FLOOR TILES PLUS MORTAR	1100	Pa

3.2. LIVE LOADS (LL) :

3.2.1	BASIC FLOOR AREA	1900	Pa
3.2.2	HALLWAYS ABOVE GROUND FLOOR	3800	Pa
3.2.3	STAIRS, HALLWAYS, AND ASSEMBLY	4800	Pa
3.2.4	ROOF	900	Pa

3.3. WIND LOAD (WL)

WIND LOADING ON MWFRS (MAIN WIND FORCE RESISTING SYSTEM) :

$$P = q_{kt}[(GC_{pi})-(GC_{pi})]$$

WHERE :

P= DESIGN WIND PRESSURE, KN/m^2

q = VELOCITY PRESSURE, KN/m^3

= 47.3 x 10^{-6} Kz Kzt V^2 Iw

WHERE :

Kz = VELOCITY PRESSURE COEFFICIENT GIVEN IN NSCP TABLE 207.3 EXPOSURE B.

Kzt = TOPOGRAPHIC FACTOR = 1.0

V = BASIC WIND SPEED SHOWN IN NSCP FIG. 207-1 = 250kph

I = IMPORTANCE FACTOR = 1.15

G = GUST EFFECT FACTOR SHOWN = 0.85

Cp = EXTERNAL PRESSURE COEFFICIENT SHOWN IN NSCP FIG. 207-3

GC_{pi} = PRODUCT OF INTERNAL PRESSURE & GUST EFFECT FACTOR IN NSCP TABLE 207-4.

3.4. SEISMIC LOAD , E

SEISMIC LOADS FOR BUILDING STRUCTURES ARE CALCULATED BASED ON THE FOLLOWING:

$$E = \rho Eh + Ev$$
$$Em = \Omega o\ Eh$$

WHERE:

E = EARTHQUAKE LOAD ON THE STRUCTURE

Eh = THE EARTHQUAKE LOAD DUE TO THE BASE SHEAR, V, OR THE DESIGN LATERAL FORCE Fp.

Em = THE ESTIMATED MAXIMUM EARTHQUAKE FORCE THAT CAN BE DEVELOPED IN THE STRUCTURE.

Ev = THE LOAD EFFECT RESULTING FROM THE VERTICAL COMPONENT OF THE EARTHQUAKE GROUND MOTION AND IS EQUAL TO AN ADDITIONAL OF 0.5 Ca I D TO THE DEAD LOAD EFFECT. D, FOR STRENGTH DESIGN, AND MAY BE TAKEN AS ZERO FOR ALLOWABLE STRESS DESIGN.

Ωo = THE SEISMIC FORCE AMPLIFICATION FACTOR THAT IS REQUIRED TO ACCOUNT FOR STRUCTURAL OVERSTRENGTH.

ρ = RELIABILITY / REDUNDANCY FACTOR WHICH SHALL NOT BE TAKEN LESS THAN 1.0 AND GREATER THAN 1.5, IS GIVEN BY THE FOLLOWING FORMULA:

$$\rho = 2 - \frac{6.1}{r_{max}\sqrt{A_B}}$$

WHERE:

r_{max} = THE MAXIMUM ELEMENT-STORY SHEAR RATIO. FOR A GIVEN DIRECTION OF LOADING, THE ELEMENT-STORY SHEAR RATIO IS THE RATIO OF THE DESIGN OF STORY SHEAR IN THE HEAVILY LOADED SINGLE ELEMENT DIVIDED BY THE TOTAL DESIGN STORY SHEAR.

FOR MOMENT FRAMES, IT SHALL BE TAKEN AS THE MAXIMUM OF THE SUM OF THE SHEARS IN ANY TWO ADJACENT COLUMNS IN A MOMENT FRAME BAY DIVIDED BY THE STORY SHEAR. FOR COLUMNS COMMON TO TWO BAYS, 70 PERCENT OF THE SHEAR IN THAT COLUMN MAY BE USED IN THE COLUMN SHEAR SUMMATION.

A_B = THE GROUND FLOOR AREA OF THE STRUCTURE.

EARTHQUAKE BASE SHEAR, (V) :

THE TOTAL DESIGN BASE SHEAR IN A GIVEN DIRECTION SHALL BE DETERMINED FROM THE FOLLOWING FORMULA:

$$V = \frac{Cv\ I\ (W)}{R\ T}$$

AND NEED NOT EXCEED THE FOLLOWING:

$$V = \frac{2.5\ Ca\ I\ (W)}{R}$$

BUT SHALL NOT BE LESS THAN THE FOLLOWING:

$$V = 0.11\ Ca\ I\ W$$

IN ADDITION FOR SEISMIC ZONE 4, THE TOTAL BASE SHALL ALSO BE NOT LESS THAN THE FOLLOWING:

$$V = \frac{8.5\ Z\ Nv\ I\ (W)}{R}$$

WHERE:

SEISMIC ZONE FACTOR,	Z = 0.40
IMPORTANCE FACTOR	I = 1.5
GLOBAL DUCTILITY CAPACITY	R = 8.5 (SMRF)
SEISMIC FORCE OVERSTRENGTH FACTOR	Ωo = 2.8
SEISMIC SOURCE TYPE	= A
NEAR - SOURCE FACTOR, Nv	= 1.6
NEAR - SOURCE TYPE, Na	= 1.2

4.0 MATERIALS :

4.1 NORMAL WEIGHT CONCRETE :

4.1.1 CONCRETE USED IN THIS WORK SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH @ 28 DAYS AS FOLLOWS:

COLUMN, BEAM, SLAB, & OTHERS	fc' = 28MPa (4,000 PSI)
FOOTING	fc' = 21MPa (3,000 PSI)

4.1.2 ALL CONCRETE SHALL BE DEPOSITED, VIBRATED AND CURED IN ACCORDANCE WITH ACI STANDARD 318-2005.

4.1.3 MINIMUM CONCRETE COVER FOR REINFORCING BARS SHALL BE AS FOLLOWS:
A. FOOTINGS & BOT. OF FOOTING TIE BEAM = 75mm (CAST AGAINST EARTH)
B. BEAMS AND COLUMNS = 40mm (TO STIRRUPS AND TIES)
C. SLABS AND WALLS = 20mm (CAST AGAINST FORMS)

4.1.4 BEFORE CONCRETE IS POURED, CHECK WITH ALL TRADES TO ENSURE PROPER PLACEMENT OF ALL OPENINGS, SLEEVES, CURBS, CONDUITS, ETC. RELATIVE TO THE WORK.

4.1.5 WHEN CONCRETE WILL BE EXPOSED TO EXTERNAL SOURCES OF CHLORIDES IN SERVICES, SUCH AS DEICING SALTS, BRACKISH WATER, SEAWATER OR SPRAY FROM THESE SOURCES, CONCRETE MUST BE PROPORTIONED TO SATISFY THE SPECIAL EXPOSURE REQUIREMENTS OF ACI 318-2005.

4.1.6 ALL CONCRETE SHALL BE KEPT MOIST FOR A MINIMUM OF 7 CONSECUTIVE DAYS IMMEDIATELY AFTER POURING BY THE USE OF WET BURLAP.

4.2 REINFORCING BARS :

4.2.1 UNLESS OTHERWISE SPECIFIED ON PLANS, ALL REINFORCING BARS SHALL BE DEFORMED WITH A MINIMUM YIELD STRENGTH, fy = 414 MPa (60,000 PSI). FOR DIAMETER 12mm AND BELOW, USE fy = 275 Mpa (40,000 PSI)

4.2.2 ALL REINFORCING BARS SHALL BE CLEANED OF RUST, GREASE OR OTHER MATERIALS WHICH TEND TO IMPAIR BOND.

4.2.3 ALL REINFORCING BARS SHALL BE ACCURATELY AND SECURELY PLACED BEFORE POURING CONCRETE OR APPLYING MORTAR OR GROUT.

4.2.4 LAPPED SPLICES SHALL BE STAGGERED WHERE POSSIBLE.

4.2.5 UNLESS INDICATED OTHERWISE, SPLICING OF REINFORCEMENT SHALL BE IN ACCORDANCE WITH ACI 318-2005.

4.2.6 UNLESS SHOWN OTHERWISE ON PLANS, SPLICES SHALL BE AS FOLLOWS :

A. BEAMS AND FOOTING TIE BEAMS : TOP AND BOTTOM BARS SHALL NOT BE SPLICED WITHIN THE COLUMN OR WITHIN A DISTANCE OF TWICE THE MEMBER DEPTH FROM THE FACE OF THE COLUMN ; AT LEAST TWO EXTRA STIRRUP - TIES SHALL BE PROVIDED AT ALL SPLICES. THE SPLICE LENGTH SHALL NOT BE LESS THAN THE LENGTH IN ITEM 4.2.9 BELOW.

B. COLUMNS : SPLICES WHEN PERMITTED SHALL BE MADE WITHIN THE CENTER HALF OF COLUMN HEIGHT, AND LAP SPLICE SHALL NOT BE LESS THAN 40 BAR DIAMETERS. THE USE OF APPROVED MECHANICAL DEVICES MAY BE PERMITTED PROVIDED THAT NOT MORE THAN ALTERNATE BARS ARE SPLICED AT ANY LEVEL AND THE MINIMUM VERTICAL DISTANCE BETWEEN TWO ADJACENT BAR SPLICES SHALL BE 600mm.

C. CONCRETE MASONRY UNIT (CMU) WALLS : VERTICAL BARS SHALL BE SPLICED AT THE TOP OF WALL FOOTING OR TIE BEAM AND AT THE BOTTOM OF RC LINTEL BEAM OR BEAMS. SPLICE LENGTHS SHALL BE 600mm MIN.

4.2.7 UNLESS INDICATED OTHERWISE, ALL BEAMS TERMINATING AT THE COLUMN SHALL HAVE TOP AND BOTTOM BARS EXTENDING TO THE FAR FACE OF THE COLUMN, TERMINATING IN A STANDARD 90° HOOK LENGTH OF ANCHORAGE NOT LESS THAN 600mm.

4.2.8 SHOP DRAWINGS FOR BENDING AND CUTTING OF REINFORCEMENT SHALL BE SUBMITTED FOR APPROVAL TO THE ENGINEER PRIOR TO FABRICATION.

4.2.9 SPLICE LENGTH OF REINFORCING BARS SHALL BE AS SHOWN IN THE TABLE BELOW.

4.3 STRUCTURAL STEEL/ANCHOR BOLTS/BOLTS/WELDS & WELDMENTS

4.3.1 ALL STRUCTURAL STEEL SHALL HAVE A MINIMUM YIELD STRENGTH, Fy = 248 MPa (36 KSI) AND SHALL CONFORM TO ASTM A 36 SPECIFICATIONS.

4.3.2 ALL STRUCTURAL STEEL SHALL BE FABRICATED AND ERECTED IN ACCORDANCE WITH THE AISC SPECIFICATIONS (9TH EDITION) AND CODE OF STANDARD PRACTICE AS AMENDED TO DATE.

4.3.3 ALL COLD FORMED STEEL SHALL HAVE A MINIMUM STRENGTH, Fy = 230 MPa (33 KSI)

4.3.4 NO STEEL SHALL BE FABRICATED OR ERECTED UNTIL SHOP DRAWINGS HAVE BEEN APPROVED BY THE STRUCTURAL ENGINEER.

4.3.5 ALL SHOP AND FIELD WELDING SHALL BE IN ACCORDANCE WITH AWS D.1.1-2000 AND PERFORMED BY QUALIFIED WELDERS.

4.3.6 UNLESS INDICATED OTHERWISE, WELDING ELECTRODES SHALL BE E70XX, MINIMUM THICKNESS OF WELD SHALL BE 3mm.

4.3.7 UNLESS OTHERWISE INDICATED ALL ANCHOR BOLTS SHALL CONFORM TO ASTM A307 SPECIFICATIONS.

4.3.8 BOLTS FOR MEMBER CONNECTIONS SHALL BE HIGH STRENGTH BOLTS, CONFORMING TO ASTM A325 FRICTION TYPE WITH WASHERS.

4.4 CONCRETE MASONRY UNITS (CMU)

4.4.1 CMU USED IN THESE WORKS SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH @ 28 DAYS AS FOLLOWS :
100mm THICK NON-LOAD BEARING CMU, f'm = 2.4 MPa (350 PSI)
150mm THICK NON-LOAD BEARING CMU, f'm = 2.4 MPa (350 PSI)

4.4.2 ALL CELLS SHALL BE SOLIDLY FILLED WITH GROUT. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 13.80 MPa (2,000 PSI) @ 28 DAYS.

4.4.3 UNLESS INDICATED OTHERWISE, CMU REINFORCEMENT SHALL BE 10mmØ HOR. BARS SPACED @ 600mm AND 10mmØ VERT. BARS SPACED @ 600mm.

4.4.4 ALL WALLS SHALL BE CONSTRUCTED IN CONVENTIONAL RUNNING BOND, UNLESS NOTED OTHERWISE.

4.4.5 GROUT MASONRY IN 2.4m MAXIMUM LIFTS. REINFORCING SHALL BE SECURED AGAINTS DISPLACEMENT PRIOR TO GROUTING BY WIRE POSITIONERS AT INTERVALS NOT EXCEEDING 200 BAR DIAMETERS NOR 3m.

4.4.6 IF WORK IS STOPPED ONE (1) HOUR OR LONGER, PROVIDE HORIZONTAL CONSTRUCTION JOINTS BY STOPPING THE GROUT 50mm BELOW THE TOP OF THE BLOCK.

5.0 CONSTRUCTION JOINTS :

5.1 CONTRUCTION JOINTS NOT INDICATED ON PLANS SHALL BE MADE SO AS TO LEAST IMPAIR THE STRENGTH OF THE STRUCTURE AND SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.

5.2 UNLESS SHOWN OTHERWISE, SLAB ON GRADE SHALL HAVE CONTROL JOINTS @ 6.00m MAXIMUM CENTER TO CENTER.

6.0 NOTES ON BEAMS AND GIRDERS :

6.1 UNLESS OTHERWISE NOTED IN PLANS OR SPECIFICATIONS, CAMBER ALL BEAMS AND GIRDERS AT LEAST 0.006m FOR EVERY 4.50m OF SPAN EXCEPT CANTILEVERS FOR WHICH THE CAMBERS SHALL BE AS NOTED IN THE PLANS OR AS ORDERED BY THE DESIGNERS. BUT IN NO CASE LESS THAN .019m FOR EVERY 3.00m OF FREE SPAN.

6.2 IF THERE ARE TWO OR MORE LAYERS OF REINFORCING BARS , USE SEPARATORS OF SIZE NOT LESS THAN 25mm BARS SPACED ABOUT 1.00m ON CENTER AND PLACED DIAGONALLY. IN NO CASE SHALL THERE BE LESS TWO (2) SEPARATORS BETWEEN LAYERS OF BARS.

6.3 WHEN A BEAM CROSSES A GIRDER, REST BEAM BARS ON TOP OF GIRDER BARS. REINFORCING BARS SHALL BE SYMMETRICAL ABOUT THE CENTER LINE WHENEVER POSSIBLE. UPPER LAYER SHALL BE PLACED DIRECTLY ABOVE THOSE IN THE BOTTOM LAYER. SPACING OF BARS IN LAYER SHALL NOT BE LESS THAN 0.025m NOR ONE BAR DIAMETER.

6.4 GENERALLY, NO SPLICE SHALL BE PERMITTED ON BEAM AT POINT WHERE CRITICAL BENDING STRESSES OCCUR. WELDED SPLICES SHALL DEVELOP IN TENSION AT LEAST 125% OF THE SPECIFIED STRENGTH OF THE BAR, NOT MORE THAN 50% OF THE BARS AT ANY ONE SECTION SHALL BE ALLOWED TO BE SPLICED THEREIN.

6.5 FOR BAR TERMINATIONS OF TOP BARS AT SUPPORT AND MIDSPAN BARS, CUT-OFF ONLY TWO BARS AT EVERY 0.3m INTERVAL (UNLESS REQUIRED IN SPECIFICATIONS, OR NOTED OTHERWISE.)

7.0 FOUNDATIONS :

7.1 FOOTINGS WERE DESIGNED USING AN ASSUMED ALLOWABLE SOIL BEARING CAPACITY OF 150 kPa AT DEPTHS INDICATED IN THE DRAWING. IN CASE THE ACTUAL SOIL BEARING CAPACITY IS FOUND LESS THAN THE ASSUMED 150 kPa, NOTIFY THE STRUCTURAL ENGINEER FOR PROPER REVISION OF FOOTINGS.

7.2 CONFIRMATION OF ACTUAL SOIL BEARING CAPACITY SHALL BE PERFORMED PRIOR TO THE CONSTRUCTION OF THE FOUNDATION.

7.3 WHERE LOOSE/SOFT MATERIAL IS ENCOUNTERED AT DEPTH OF FOOTING/FOUNDATION INDICATED, EXCAVATE TO FIRM LAYER AND REPLACE LOOSE/SOFT MATERIALS UNDERNEATH THE FOOTING WITHIN THE FOOTING AREA PLUS 1/2 DEPTH OF SOIL MATERIAL ON ALL SIDES WITH SELECTED BACKFILL. COMPACT SELECTED BACKFILL TO 95% MAXIMUM DRY DENSITY (ASTM D1557).

7.4 ALL COLUMN FOOTINGS SHALL REST ON 100mm THK COMPACTED GRAVEL BASE COURSE, UNLESS OTHERWISE STATED.

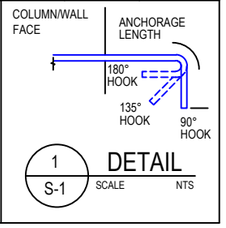
7.5 FILL/BACKFILL SHALL BE PLACED IN 200mm LAYERS AND EACH LAYER SHALL BE COMPACTED TO 95% MAXIMUM DRY DENSITY BEFORE SUBSEQUENT LAYERS ARE TO BE LAID.

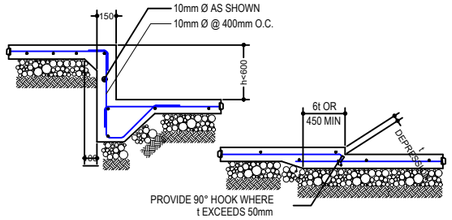
LAP SPLICE & ANCHORAGE LENGTH TABLE

BAR DIAMETER (mm)	ANCHORAGE LENGTH (m)	STANDARD HOOK (m)			LAP SPLICE (m)				UNIT WEIGHT (kg/m)	MIN. LAP SPLICE LENGTH OF COL. REINF. INDIVIDUAL BARS	
					TENSION BAR		COMP. BAR				
		90°	180°	135°	TOP BAR	OTHERS	TOP BAR	OTHERS		W/ TIES	W/ SPIRAL
10	0.50	0.15	0.13	0.10	0.42	0.30	0.42	0.30	0.617	0.30	0.30
12	0.50	0.20	0.15	0.12	0.42	0.30	0.42	0.30	0.889	0.30	0.30
16	0.60	0.25	0.18	0.14	0.73	0.52	0.87	0.62	1.580	0.52	0.47
20	0.60	0.30	0.20	0.20	0.91	0.65	1.10	0.78	2.469	0.65	0.58
25	0.68	0.40	0.28	0.26	1.15	0.82	1.40	1.00	3.858	0.80	0.73
28	0.86	0.48	0.38	-	1.45	1.03	1.53	1.09	4.840	0.90	0.82
32	1.12	0.56	0.43	-	1.90	1.35	1.74	1.24	6.327	1.03	0.93
36	1.43	0.61	0.48	-	2.40	1.70	2.00	1.40	8.00	1.20	1.05

NOTES:

1. ACI SECTION 12.4 STATES THAT DEVELOPMENT LENGTH OF INDIVIDUAL BARS W/IN A BUNDLE, IN TENSION OR COMPRESSION, SHALL BE THAT FOR THE INDIVIDUAL BAR, INCREASED 20% FOR THREE BAR BUNDLE, AND 33% FOR FOUR BAR BUNDLE.
2. FOR COLUMNS, AT ANY LEVEL NO MORE THAN ALTERNATE BARS SHOULD BE SPLICED. NOT MORE THAN 33% OF THE BARS SHALL BE SPLICED W/IN THE REQUIRED LAP LENGTH. MINIMUM DISTANCE BETWEEN TWO ADJACENT BAR SPLICES SHALL BE 600mm.
3. TOP BARS ARE HORIZONTAL BARS W/ MORE THAN 300mm DEPTH OF CONCRETE CAST BELOW THE REINFORCEMENT.
4. AS MUCH AS POSSIBLE, SPLICES SUBJECTED TO TENSILE STRESSES ARE DISCOURAGE, THESE SHOULD BE AVOIDED OR PROVIDED W/ STANDARD HOOKS.

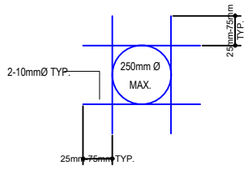




1 S-2 DEPRESSED SLAB & SLAB EDGE DETAILS

SCALE NTS

STANDARD DETAIL CONNECTION

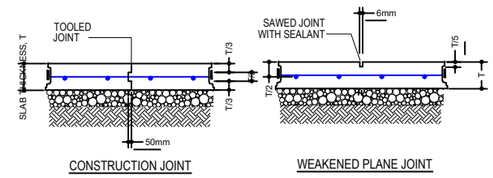


NOTE:

1. REINF. TO BE SAME BAR SIZE AND SPACING AS ADJACENT REINF. BARS ON SLABS.
2. FOR CLOSURE SLABS AT OPENINGS AND BLOCKS OUT, REBARS TO BE THE SAME SIZE, AND 2/3 THE SPACING OF BARS AS ADJACENT SLABS.

2 S-2 TYP. PIPE SLEEVE OPENING FOR SLABS

SCALE NTS

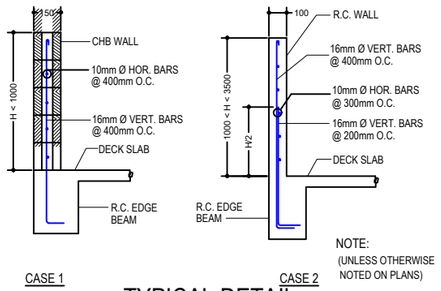


NOTE:

1. CONTROL JOINTS CAN BE EITHER CONSTRUCTION JOINTS OR WEAKENED PLANE JOINTS.

3 S-2 CONTROL JOINTS FOR SLAB-ON GRADE

SCALE NTS

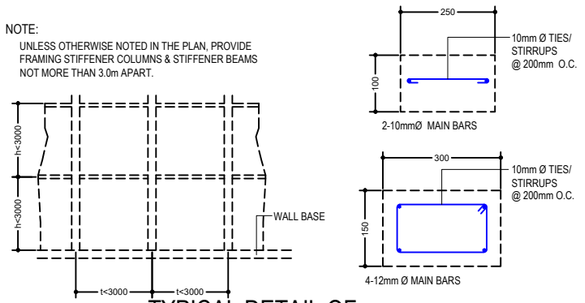


NOTE:
(UNLESS OTHERWISE NOTED ON PLANS)

4 S-2 TYPICAL DETAIL SECTION OF PARAPET

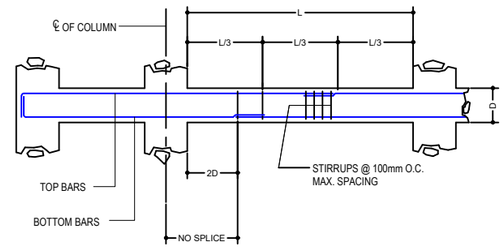
SCALE NTS

NOTE:
UNLESS OTHERWISE NOTED IN THE PLAN, PROVIDE FRAMING STIFFENER COLUMNS & STIFFENER BEAMS NOT MORE THAN 3.0m APART.



5 S-2 TYPICAL DETAIL OF STIFFENER BEAMS & COLUMNS

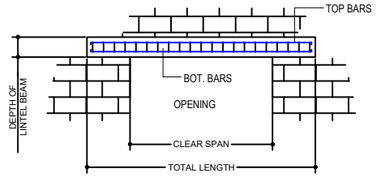
SCALE NTS



6 S-2 TYP. SPLICE DETAILS FOR BEAMS FRAMING INTO COLUMN

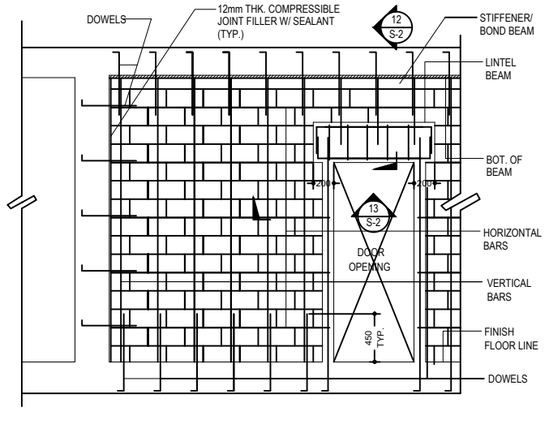
SCALE MTS

LINTEL IN BLOCK WALLS (SAME THICKNESS AS CMU)						
CLEAR SPAN L (mm)	TOTAL LENGTH mm	MIN. fc' Mpa	HEIGHT OF LINTEL BEAM (mm)	REINFORCEMENT		STIRRUPS
				BOTTOM	TOP	
1200	1800	13.8	200	2-10mm Ø	2-10mm Ø	10mm Ø @ 200
1500	2100	13.8	225	2-12mm Ø	2-12mm Ø	10mm Ø @ 200
1800	2400	13.8	250	2-16mm Ø	2-16mm Ø	10mm Ø @ 200
2100	2700	17.2	250	2-16mm Ø	2-16mm Ø	10mm Ø @ 200
2400	3000	17.2	300	2-16mm Ø	2-16mm Ø	10mm Ø @ 200
2700	3300	17.2	300	2-16mm Ø	2-16mm Ø	10mm Ø @ 200
3000	3800	17.2	350	3-16mm Ø	2-16mm Ø	10mm Ø @ 200
3300	4100	17.2	400	3-16mm Ø	2-16mm Ø	10mm Ø @ 200
3600	4400	17.2	450	4-16mm Ø	2-16mm Ø	10mm Ø @ 200



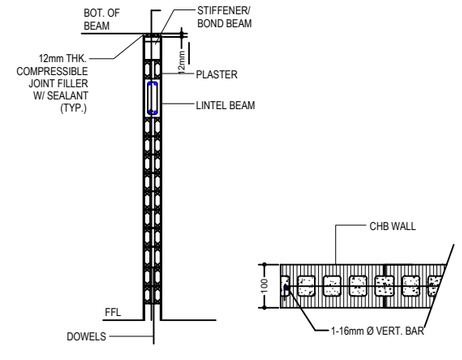
7 S-2 REINF. CONCRETE LINTEL BEAM IN CHB WALLS

SCALE MTS



8 S-2 TYP. CHB WALL ELEVATION

SCALE MTS



9 S-2 SECTION

SCALE MTS

10 S-2 SECTION

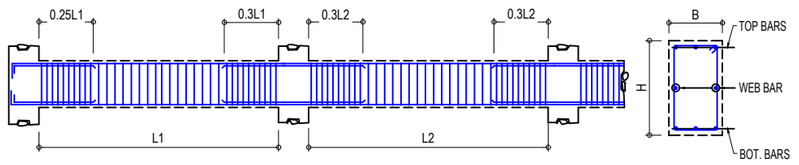
SCALE MTS

SCHEDULE OF FOOTINGS

MARK	D (DEPTH) mm	t (THICK.) mm	L (LENGTH) mm	W (WIDTH) mm	REINFORCEMENT				REMARKS
					TOP		BOTTOM		
					"A"	"B"	"C"	"D"	
F1	700	300	1800	1800	-	-	9-20mm Ø	9-20mm Ø	ISOLATED FOOTING
F2	700	300	2000	2000	-	-	9-20mm Ø	9-20mm Ø	ISOLATED FOOTING
F3	700	300	2000	2000	-	-	9-20mm Ø	9-20mm Ø	ISOLATED FOOTING
F4	700	300	2500	2500	-	-	15-20mm Ø	15-20mm Ø	ISOLATED FOOTING

SCHEDULE OF FOOTING TIE BEAMS (FTB)

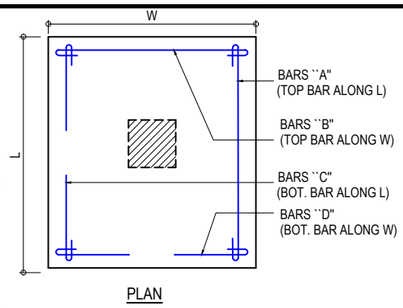
MARK	SIZES (mm)	REINFORCING BARS				ARRANGEMENT			STIRRUPS SIZE SPACING	REMARKS
		AT SUPPORT		AT MID - SPAN		AT EXT. SUPP.	AT MID SPAN	AT INT. SUPP.		
		TOP	BOTTOM	TOP	BOTTOM					
FTB1	250x350	4-20mm Ø	4-20mm Ø	3-20mm Ø	3-20mm Ø				10mm Ø STIRRUPS 1@ 50mm, 3@100mm, 3@150mm, REST@ 200mm O.C.	
FTB2	300x450	5-20mm Ø	5-20mm Ø	3-20mm Ø	3-20mm Ø				10mm Ø STIRRUPS 1@ 50mm, 3@100mm, 5@150mm, REST@ 200mm O.C.	



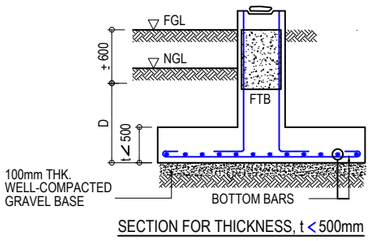
ELEVATION

SECTION

6 ST-3 TYPICAL FOOTING TIE BEAM DETAIL
NOT TO SCALE

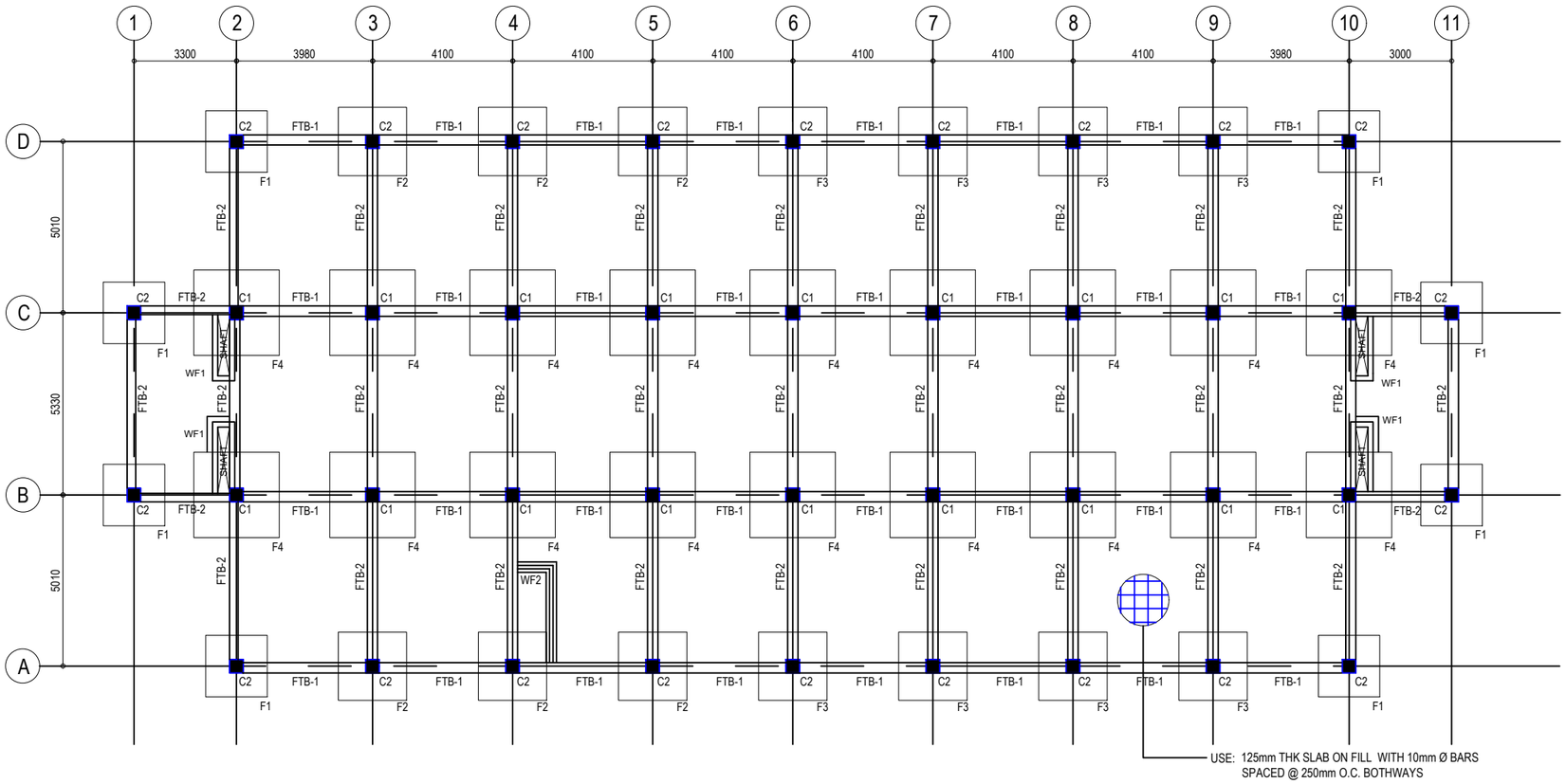


PLAN

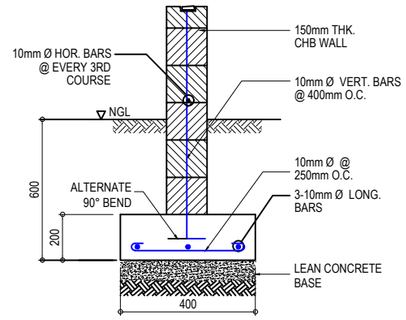


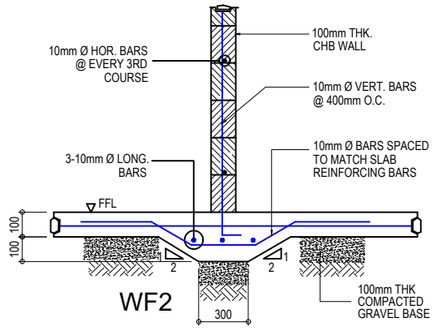
SECTION FOR THICKNESS, t < 500mm

2 ST-3 DETAIL REFERENCE OF FOOTINGS
NOT TO SCALE

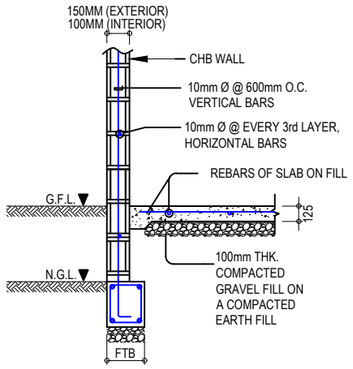


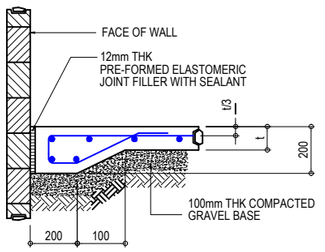
1 ST-3 LOWER GROUND FOUNDATION & FRAMING PLAN
SCALE 1:100 M.





3 ST-3 WALL FOOTING DETAIL
NOT TO SCALE



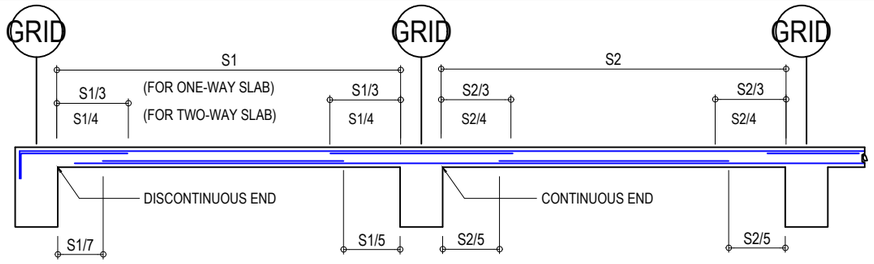


5 ST-3 TYPICAL SLAB ON GRADE DET.
NOT TO SCALE

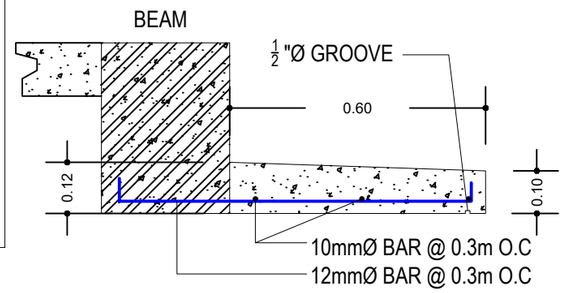
4 ST-3 WALL ON FOOTING TIE BEAM
NOT TO SCALE

SCHEDULE OF SLABS

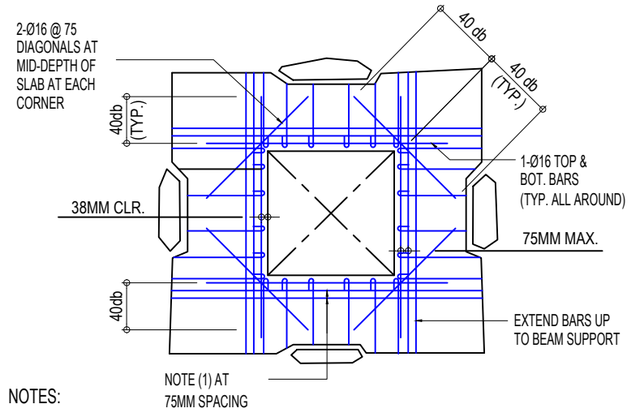
FLOOR LEVEL	MARK	THICKNESS (mm)	BAR LOCATION	BAR DIA.	REINFORCING BARS				REMARKS
					SHORT SPAN		LONG SPAN		
					END	MIDDLE	END	MIDDLE	
ALL	S-1	125	TOP	Ø10	200	200	200	200	TWO-WAY
			BOT.	Ø12	300	300	300	300	



2 / ST-4 TYPICAL SLAB DETAIL
NOT TO SCALE



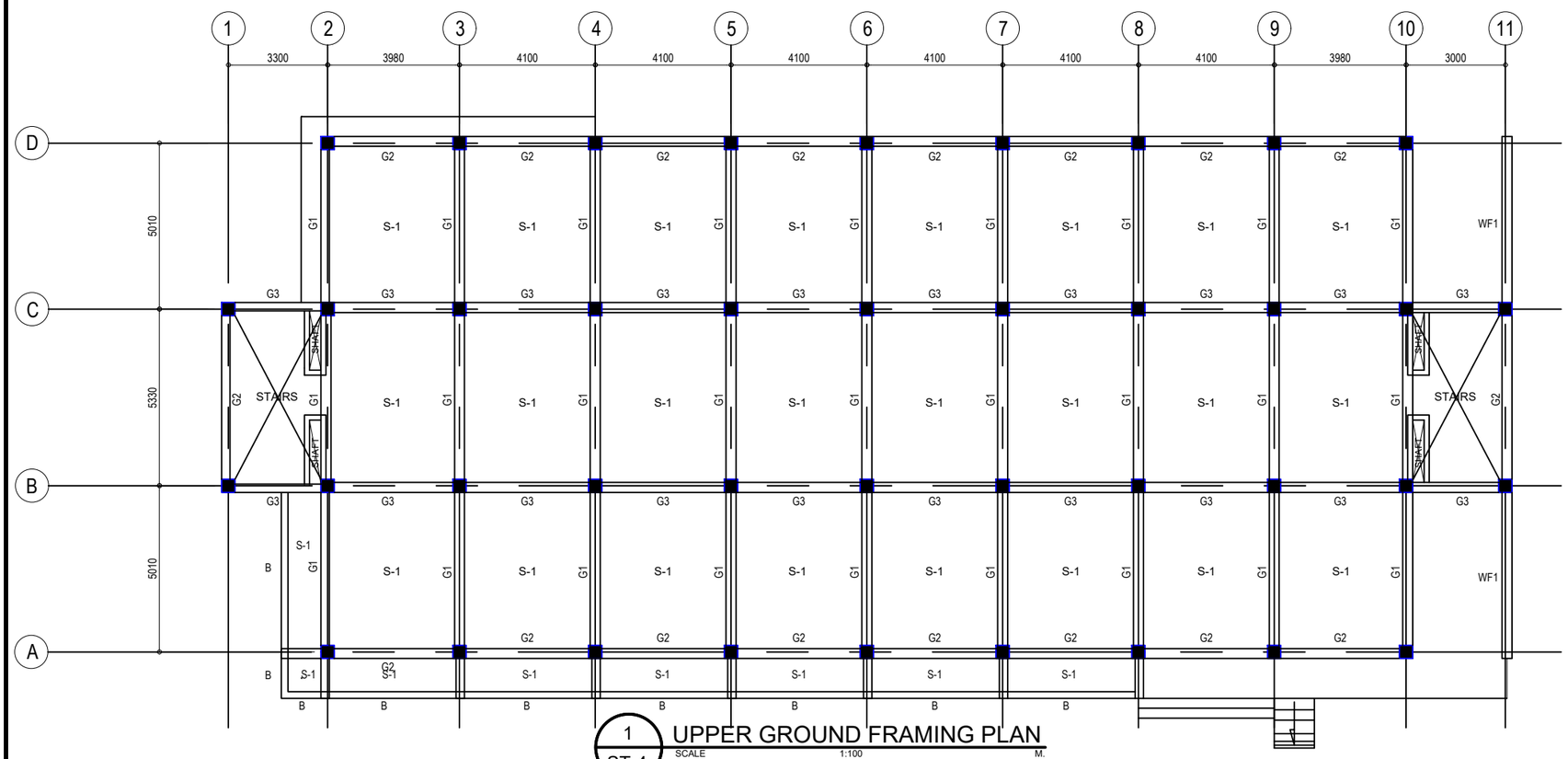
5 / ST-4 TYPICAL CANOPY DETAIL
NOT TO SCALE



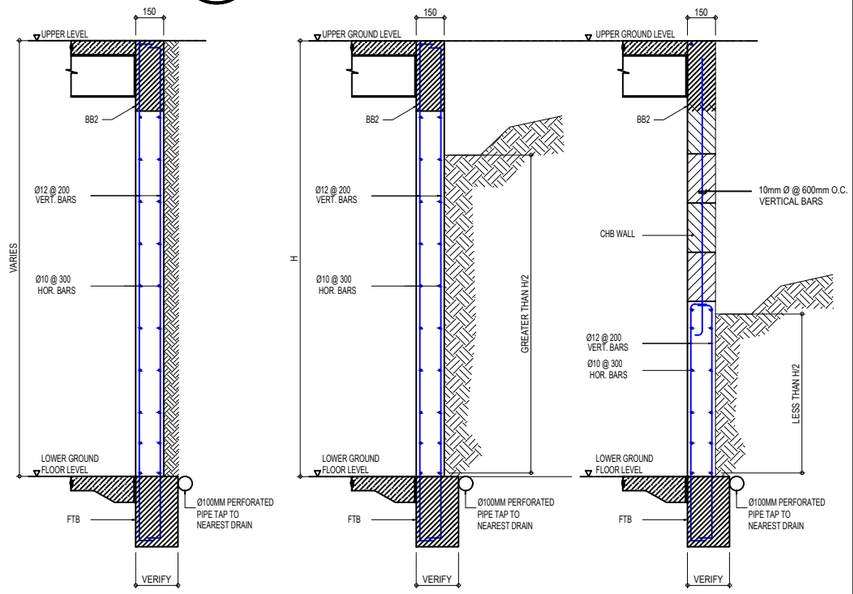
NOTES:

1. ALL TOP AND BOTTOM SLAB BARS INTERRUPTED BY OPENING SHALL BE REPLACED BY ADDITIONAL REINFORCING EQUAL TO THAT INTERRUPTED. PLACE HALF OF THE ADDITIONAL REINFORCING ON EACH SIDE OF OPENING AND EXTEND SAME LENGTH AS REQUIRED OR BAR LAP OF INTERRUPTED REINFORCING.
2. SEE ARCHITECTURAL & MECHANICAL PLANS FOR SLAB OPENING LOCATION.
3. OMIT TRIMMER BARS WHERE OPENING IS FRAMED BY BEAMS.
4. BOXED OUT OPENINGS, RECESSES AND PIPE SLEEVE CLUSTERS SHALL BE TREATED AS FRAMED SLAB OPENING.
5. MAXIMUM DIMENSION FOR EACH SIDE OF OPENING SHALL BE 1200MM. OPENINGS BEYOND THE SAID DIMENSION ARE SUBJECT TO THE APPROVAL OF THE ENGINEER.

3 / ST-4 TYPICAL SLAB OPENING DETAIL
NOT TO SCALE



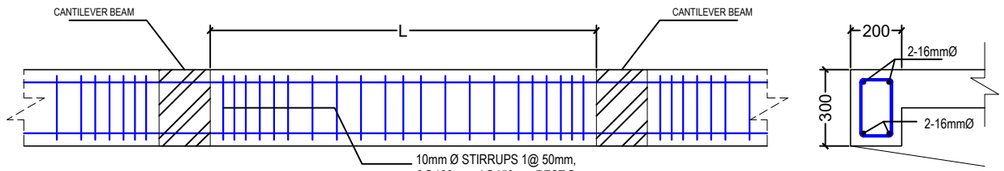
1 / ST-4 UPPER GROUND FRAMING PLAN
SCALE 1:100 M.



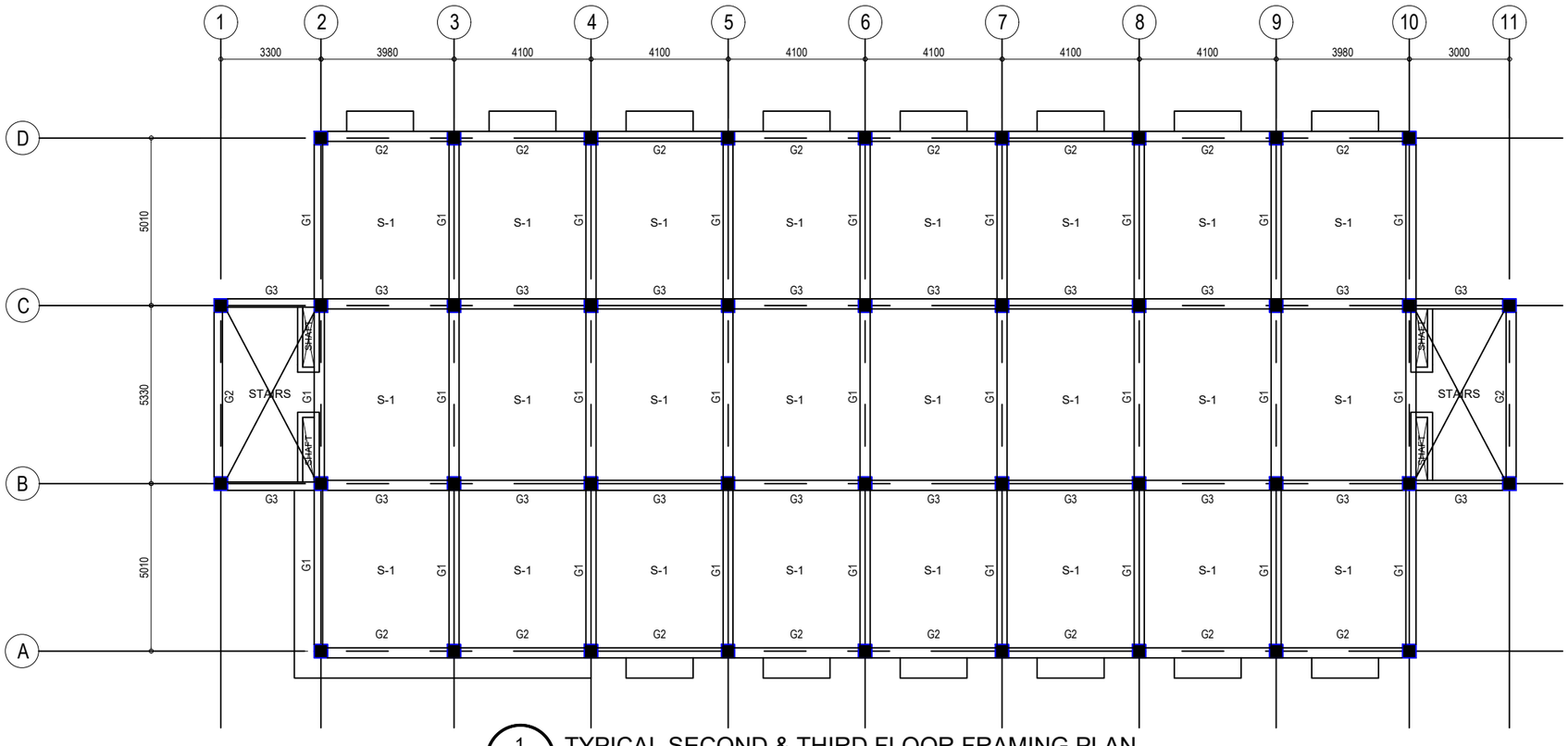
4 / ST-4 TYPICAL RETAINING WALL DETAIL
NOT TO SCALE

SCHEDULE OF COLUMNS

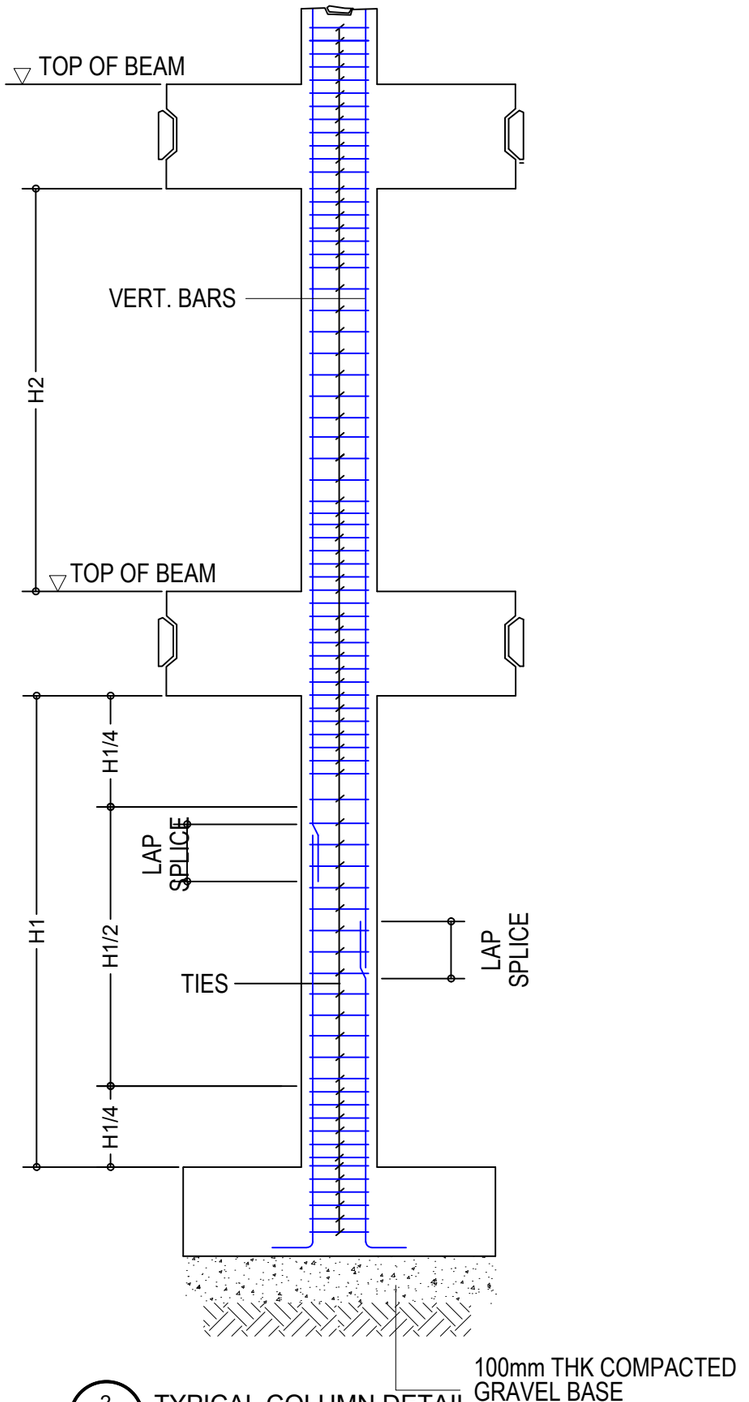
COL. MARK / FLOOR LEVEL	C1	C2	COL. MARK / FLOOR LEVEL	C1	C2
FOUNDATION TO SECOND FLOOR			THIRD FLOOR TO ROOF BEAM		
SIZE (mm)	400X400	350X350	SIZE (mm)	300X300	300X300
VERT. REINF.	4-25mm Ø & 4-20mmØ	8-20mm Ø	VERT. REINF.	8-16mm Ø	8-16mm Ø
TIES	1@50mm,2@100mm,3@150mm, rest @ 200mm		TIES	1@50mm,2@100mm,3@150mm, rest @ 200mm	
SECOND FLOOR TO THIRD FLOOR					
SIZE (mm)	350X350	300X300			
VERT. REINF.	8-20mm Ø	8-20mm Ø			
TIES	1@50mm,2@100mm,3@150mm, rest @ 200mm				



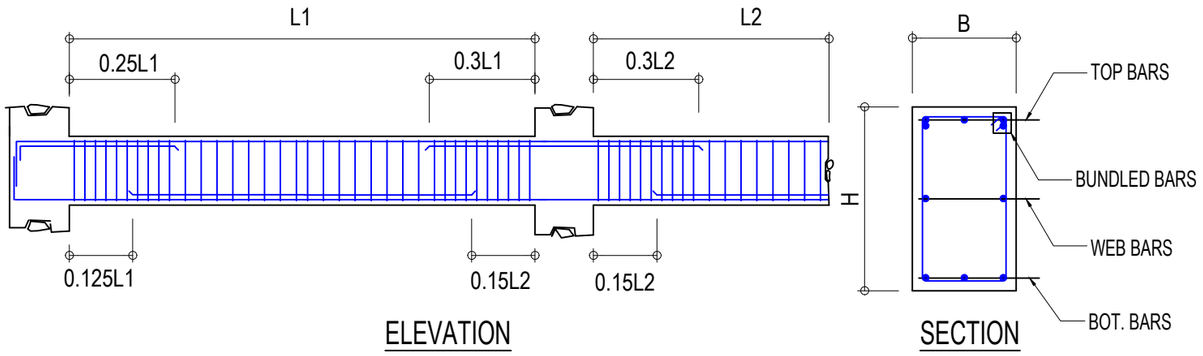
3 / ST-5 TYPICAL BEAM DETAIL (B)
NOT TO SCALE



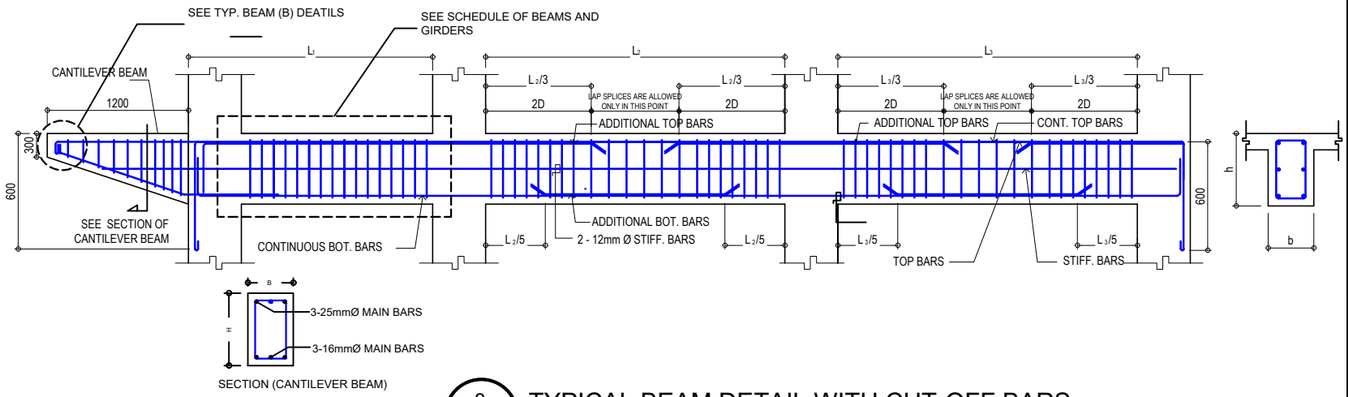
1 / ST-5 TYPICAL SECOND & THIRD FLOOR FRAMING PLAN
SCALE 1:100 M.



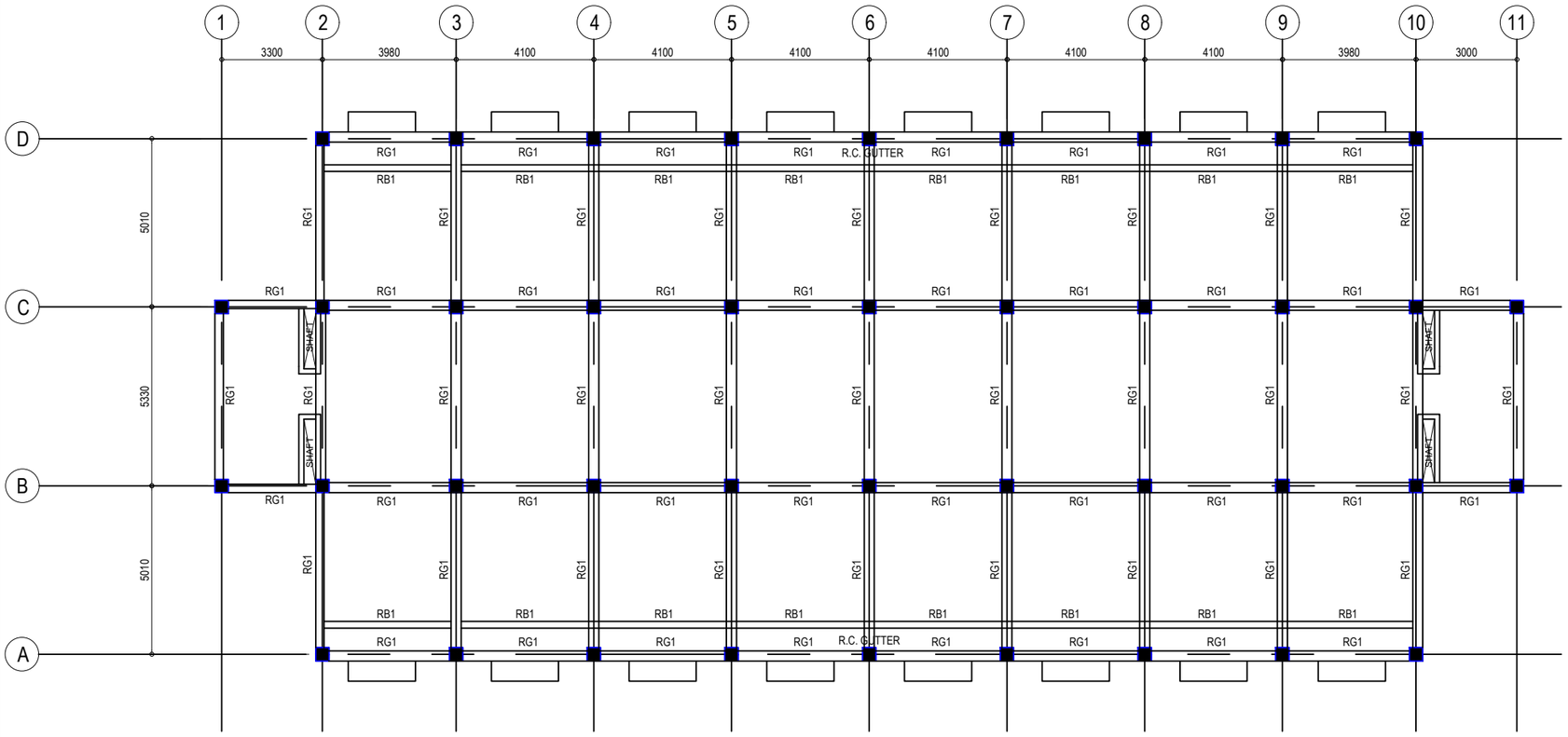
2 / ST-5 TYPICAL COLUMN DETAIL
NOT TO SCALE



2 ST-6 TYPICAL BEAM DETAIL
NOT TO SCALE



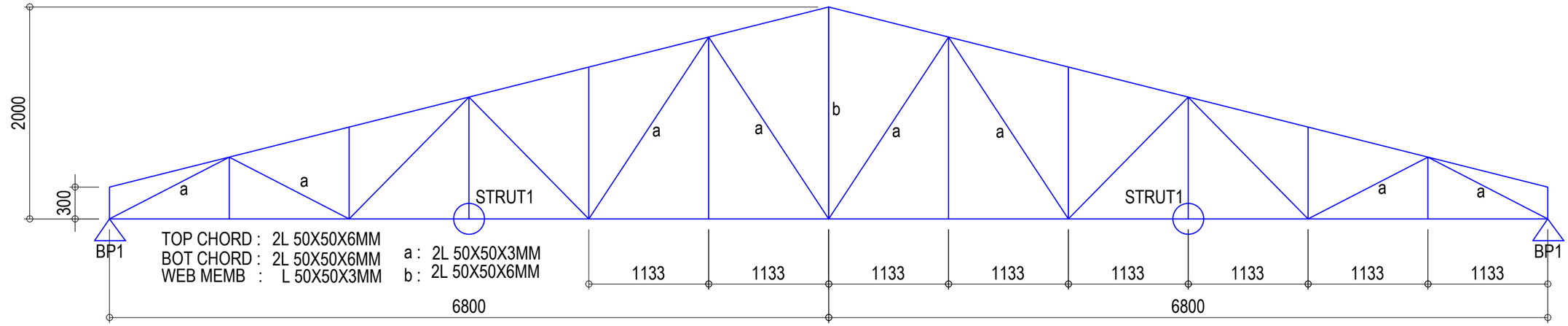
3 ST-6 TYPICAL BEAM DETAIL WITH CUT-OFF BARS
NOT TO SCALE



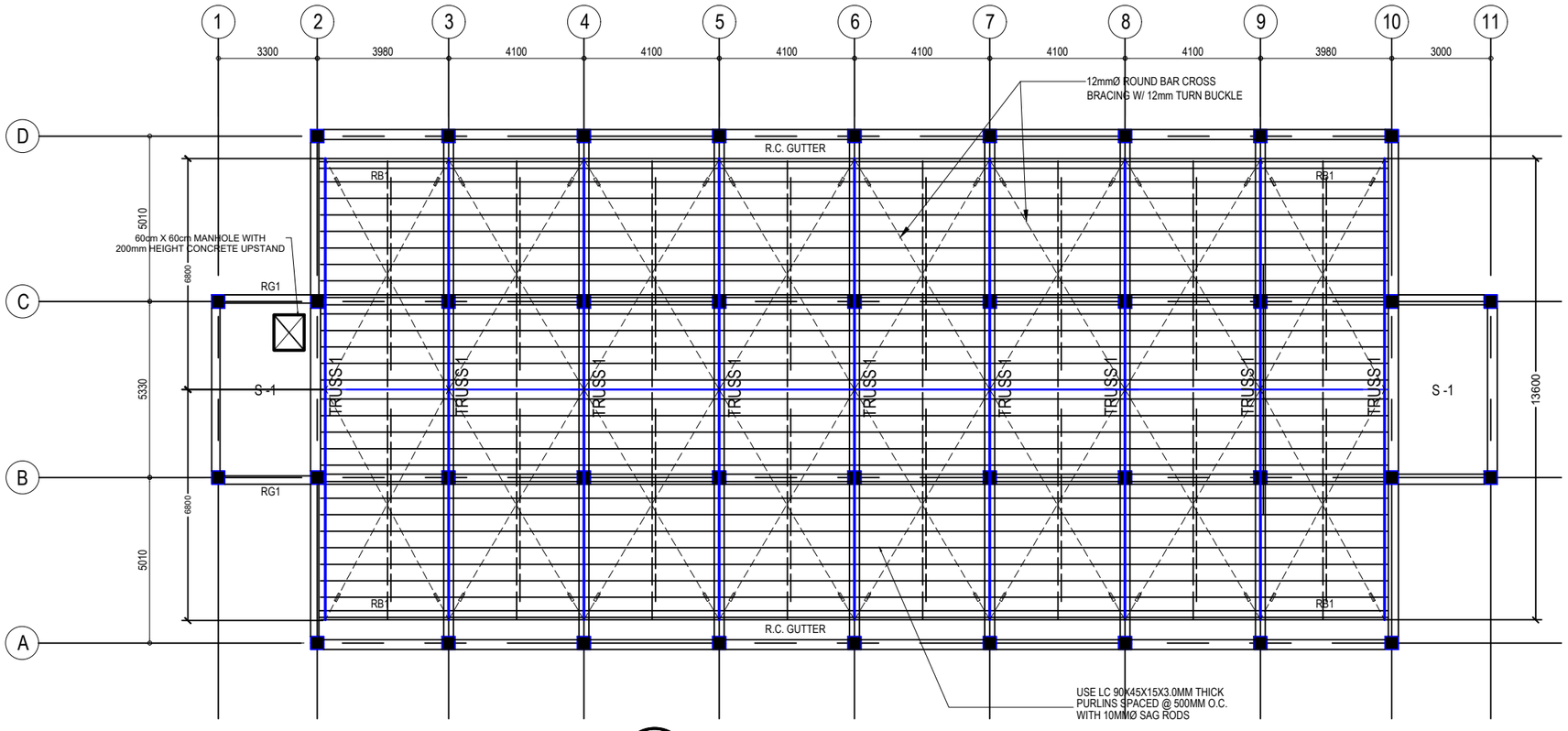
1 ST-6 ROOF BEAM FRAMING PLAN
SCALE 1:100 M.

SCHEDULE OF BEAMS AND GIRDERS

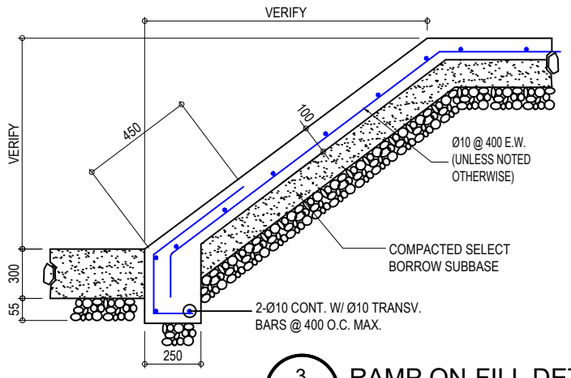
MARK	SIZES (mm)	REINFORCING BARS				ARRANGEMENT			STIRRUPS SIZE SPACING	REMARKS
		AT SUPPORT		AT MID - SPAN		AT EXT. SUPP.	AT MID SPAN	AT INT. SUPP.		
		TOP	BOTTOM	TOP	BOTTOM					
GROUND FLOOR										
G1	350X450	5-25mm Ø	3-25mm Ø	3-25mm Ø	3-25mm Ø				10mm Ø STIRRUPS 1@ 50mm, 3@100mm, 4@150mm,REST@ 200mm O.C.	
G2	300X400	4-20mm Ø	2-20mm Ø	2-20mm Ø	3-20mm Ø				10mm Ø STIRRUPS 1@ 50mm, 3@100mm, 4@150mm,REST@ 200mm O.C.	
G3	350X450	5-20mm Ø	3-20mm Ø	3-20mm Ø	4-20mm Ø				10mm Ø STIRRUPS 1@ 50mm, 3@100mm, 4@150mm,REST@ 200mm O.C.	
SECOND FLOOR										
G1	350X450	5-25mm Ø	3-25mm Ø	3-25mm Ø	3-25mm Ø				10mm Ø STIRRUPS 1@ 50mm, 3@100mm, 4@150mm,REST@ 200mm O.C.	
G2	300X400	4-20mm Ø	2-20mm Ø	2-20mm Ø	3-20mm Ø				10mm Ø STIRRUPS 1@ 50mm, 3@100mm, 4@150mm,REST@ 200mm O.C.	
G3	350X450	5-20mm Ø	3-20mm Ø	3-20mm Ø	4-20mm Ø				10mm Ø STIRRUPS 1@ 50mm, 3@100mm, 4@150mm,REST@ 200mm O.C.	
THIRD FLOOR										
G1	300X400	6-20mm Ø	3-20mm Ø	3-20mm Ø	4-20mm Ø				10mm Ø STIRRUPS 1@ 50mm, 3@100mm, 4@150mm,REST@ 200mm O.C.	
G2	300X400	4-16mm Ø	3-16mm Ø	2-16mm Ø	3-16mm Ø				10mm Ø STIRRUPS 1@ 50mm, 3@100mm, 4@150mm,REST@ 200mm O.C.	
G3	300X400	3-20mm Ø	2-20mm Ø	2-20mm Ø	3-20mm Ø				10mm Ø STIRRUPS 1@ 50mm, 3@100mm, 4@150mm,REST@ 200mm O.C.	
ROOF BEAM LEVEL										
RG1	250X300	3-16mm Ø	2-16mm Ø	2-16mm Ø	3-16mm Ø				10mm Ø STIRRUPS 1@ 50mm, 3@100mm, 4@150mm,REST@ 200mm O.C.	
RB1	250X300	2-16mm Ø	2-16mm Ø	2-16mm Ø	3-16mm Ø				10mm Ø STIRRUPS 1@ 50mm, 3@100mm, 4@150mm,REST@ 200mm O.C.	



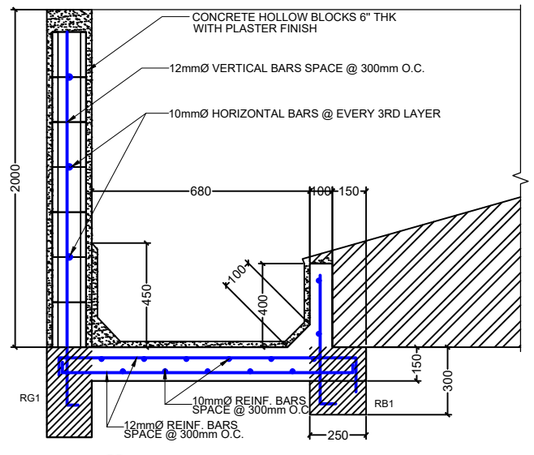
2 ST-7 **TRUSS 1 DETAIL** NOT TO SCALE



1 ST-7 **ROOF FRAMING PLAN** SCALE 1:100 M.



3 ST-7 **RAMP ON-FILL DETAIL** NOT TO SCALE

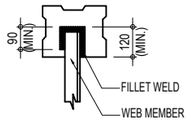


4 ST-7 **TYP. CON. GUTTER DETAILS** NOT TO SCALE

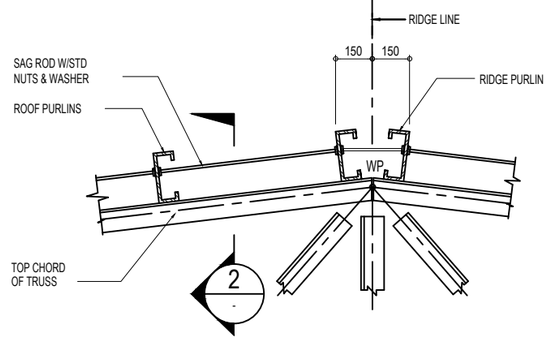
GUSSET PLATE THICKNESS (mm)	MEMBER THICKNESS (mm)	SIZE OF FILLET WELD, t (mm)
6	3.0	3.0
	5.0	3.0
10	6.0	4.5
	8.0	6.0

NOTE:

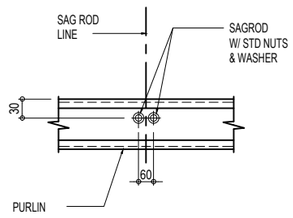
1. GUSSET PLATE DIMENSION (WHERE REQ'D.) SHALL BE DICTATED BY THE MINIMUM REQUIRED LENGTH OF WELD.
2. COLUMN JOINT GUSSET AND CONTINUITY PLATES SHALL HAVE 100% ULTRASONIC INSPECTION FOR DELAMINATION BEFORE AND AFTER WELDING.



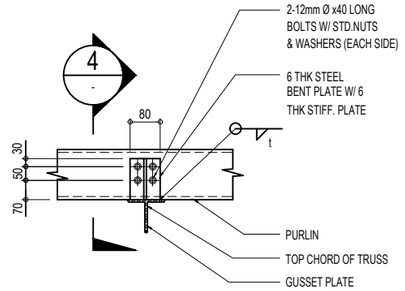
1 / S-12 SCHEDULE OF WELDS
SCALE NTS



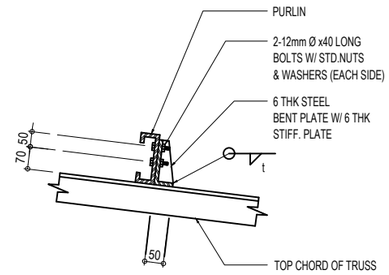
1 / S- TYPICAL SAGROD CONNECTION DETAIL
SCALE NTS



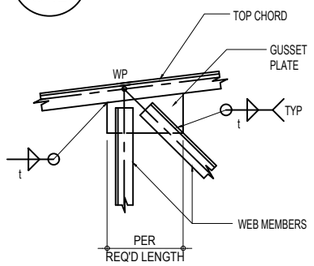
2 / S- SECTION
SCALE NTS



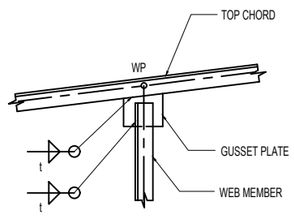
3 / S- TYPICAL PURLIN CONNECTION DETAIL
SCALE NTS



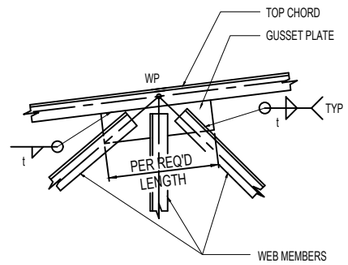
4 / S- SECTION
SCALE NTS



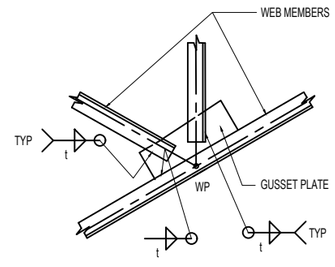
5 / S- DETAIL
SCALE NTS



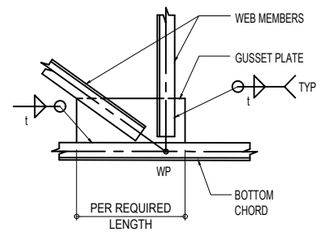
6 / S- DETAIL
SCALE NTS



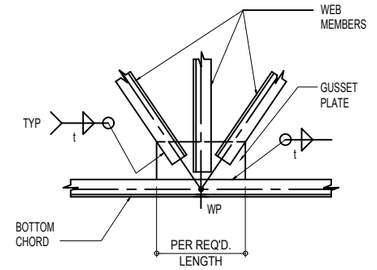
7 / S- DETAIL
SCALE NTS



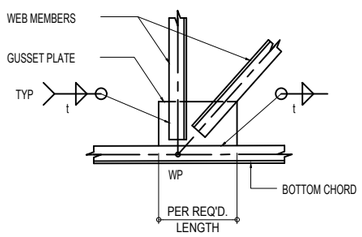
8 / S- DETAIL
SCALE NTS



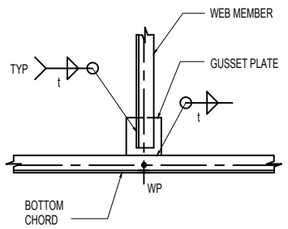
9 / S- DETAIL
SCALE NTS



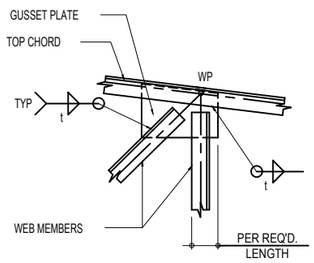
10 / S- DETAIL
SCALE NTS



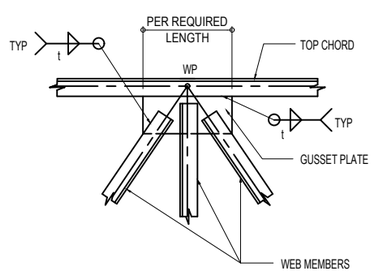
11 / S- DETAIL
SCALE NTS



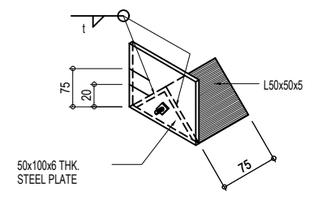
12 / S- DETAIL
SCALE NTS



13 / S- DETAIL
SCALE NTS

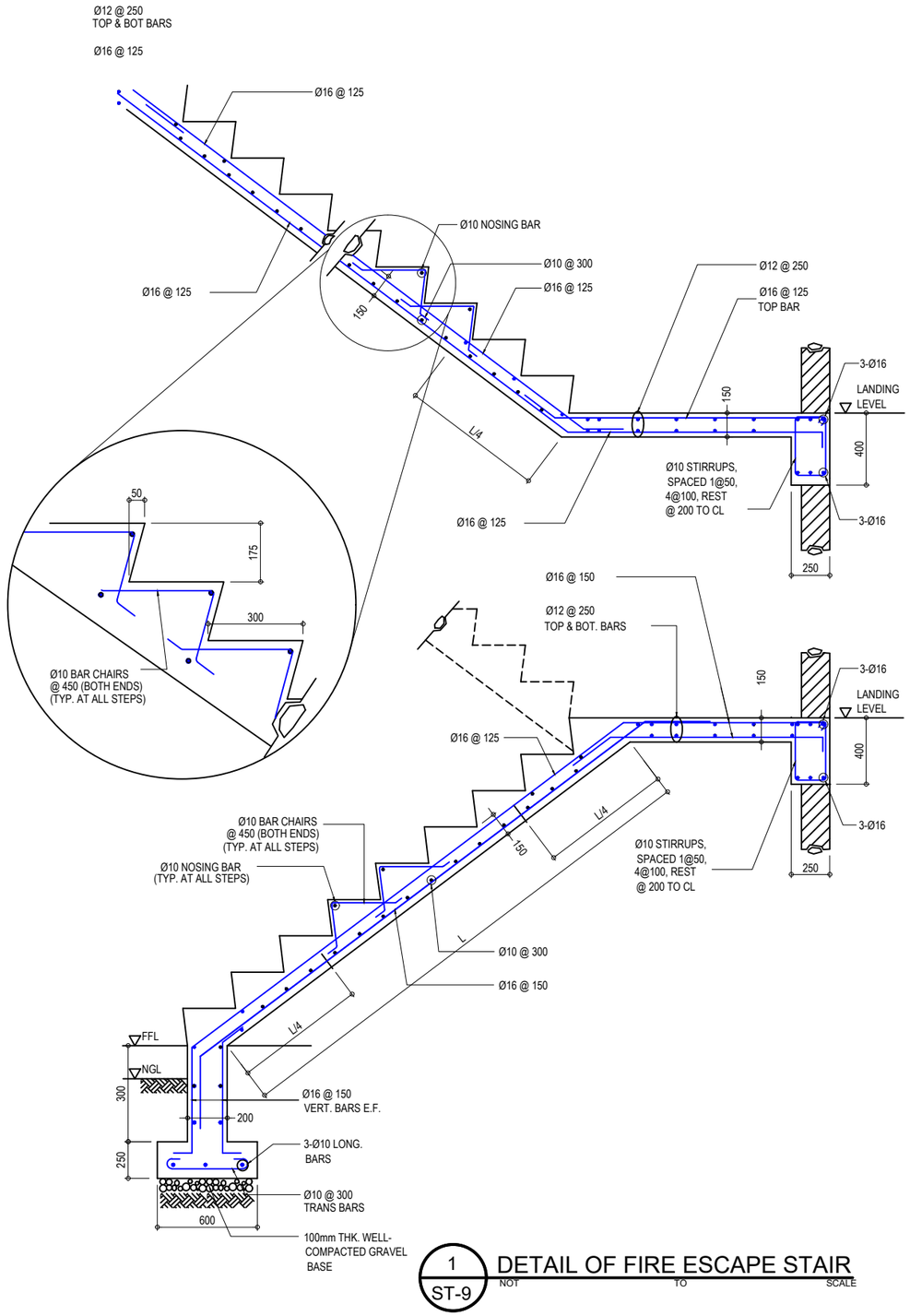


14 / S- DETAIL
SCALE NTS

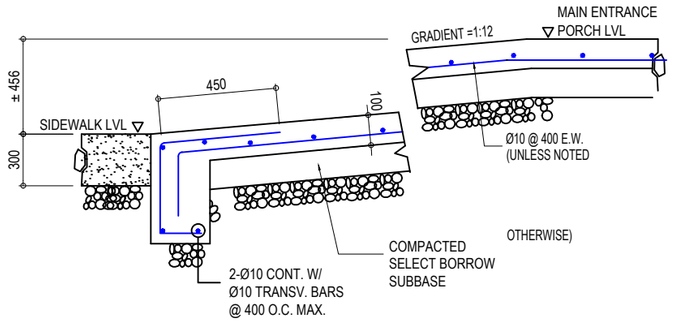


15 / S- ANGULAR BUCKLE DETAIL
SCALE NTS

1 / ST-8 TRUSS CONNECTION DETAIL
NOT TO SCALE



1 ST-9 DETAIL OF FIRE ESCAPE STAIR
NOT TO SCALE



2 ST-9 DETAIL SECTION OF PWD RAMP
NOT TO SCALE

3 ST-9 DETAIL OF STAIR ON-FILL
NOT TO SCALE