WELCOME

- **<u>PRESENTATION</u>**
  - Introduction
  - Hollow core slab
  - Precast panels

1. Cladding
2. Load bearing structure- (column/ beam / wall construction)
3. Load bearing structure- (Wall construction)

ASHOK RAISINGHANI

INTRODUCTION

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WHY PRECAST ?

✓Construction speed.

PRECAST BUILDING

12 February 2008

13 April 2008

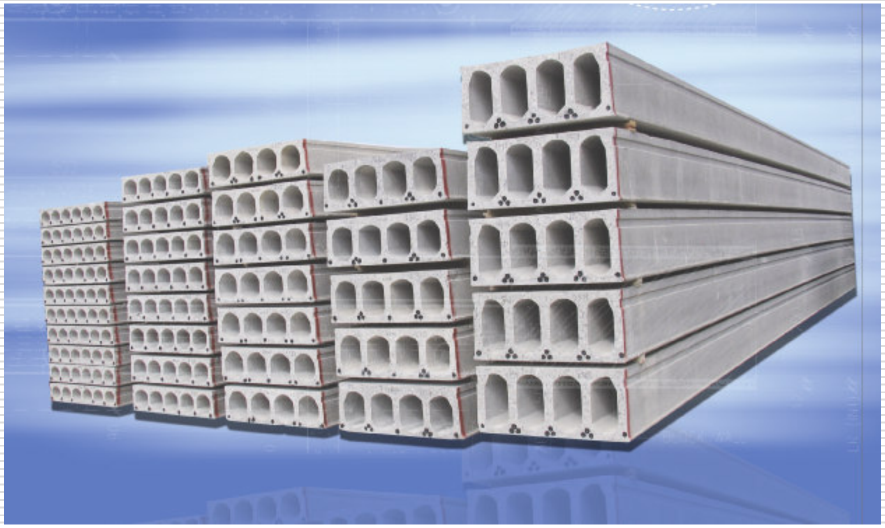
STATUS OF IN SITU BUILDING ON CORRESPONDING DATES

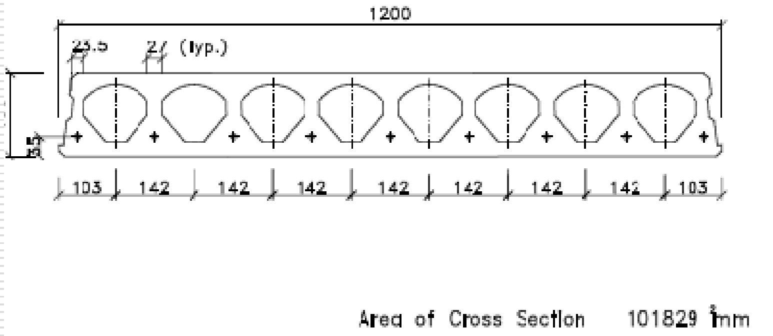
WHY PRECAST ?

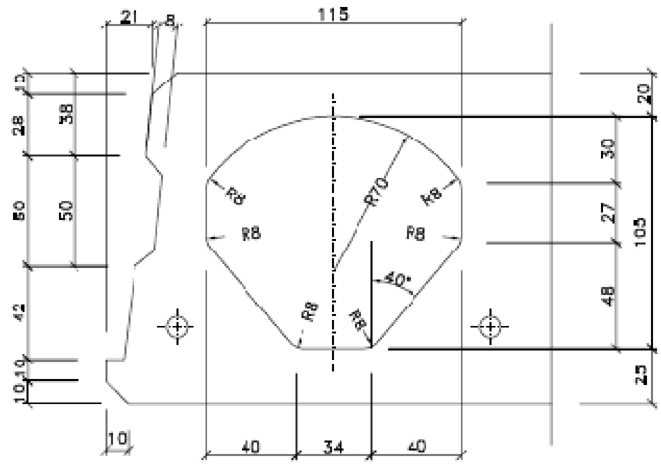
- ✓Plant-fabrication, Quality control.
- ✓Fire resistance and durability
- ✓Better stability under wind , thermal changes, vibration as material is massive and heavy
- ✓Span/ depth for beam/ HCS : 15/35

- With architectural precast concrete we achieve
  - wide variety of highly attractive surfaces, shapes, finishes and colors.
  - Thermal and acoustic efficient product

HOLLOW-CORE SLABS







Less material usage.

Technical information

With pre-stressing we achieve :

- ✓ **Greater span-to-depth ratios,**
- ✓ **More controllable performance,**

Strands	Span	15.0	15.5	16.0	16.5	17.0	17.5	18.0	18.5	19.0	19.5	20.0	20.5	21.0
4x12.5 + 6x15.7 mm	Quls	17.7	16.1	14.5	13.1	11.9	10.7	9.7	8.74	7.8	7.01	6.24	5.53	
Mur= 888 KN-M	Qsls	8.96	8.0	7.1	6.3	5.6	4.95	4.35	3.8	3.27	2.8	2.4	1.95	
Vco= 331 KN	C	-10.2	-9.7	-9.0	-8.1	-6.93	-5.6	-4.0	-2.1	0.0	2.44	5.20	8.2	
	U	2.76	3.14	3.57	4.04	4.55	5.1	5.7	6.38	7.1	7.87	8.7	9.62	
5x12.5 + 6x15.7 mm	Quls	18.8	17.1	15.6	14.1	12.8	11.6	10.6	9.5	8.5	7.7	6.87	6.13	5.43
Mur= 926 KN-M	Qsls	9.60	8.60	7.7	6.87	6.12	5.43	4.8	4.21	3.7	3.18	2.72	2.3	1.90
Vco= 338 KN	C	-11.9	-11.5	-10.9	-10.1	-9.10	-7.89	-6.4	-4.7	-2.7	-0.4	2.2	5.14	8.45
	U	2.76	3.14	3.57	4.04	4.55	5.11	5.7	6.4	7.1	7.8	8.7	9.62	10.59
3x12.5 + 8x15.7 mm	Quls	19.6	17.8	16.2	14.7	13.4	12.1	11.0	9.99	9.02	8.13	7.31	6.54	5.83
Mur= 953 KN-M	Qsls	10.1	9.1	8.2	7.35	6.57	5.85	5.2	4.59	4.04	3.52	3.05	2.6	2.19
Vco= 341 KN	C		-13.2	-12.7	-12.1	-11.2	-10.1	-8.7	-7.1	-5.31	-3.16	-0.7	2.1	5.27
	U		3.14	3.5	4.04	4.55	5.1	5.7	6.38	7.1	7.87	8.7	9.62	10.59

STRUCTURAL CALCULATIONS

- Basis , BS 8110:1997 & referred codes

  - ✓ Designed as Class 2, service tensile stresses between 3.5 to 4.0 n/mm2 allowing tensile stress in concrete but no visible cracks
  - ✓ Concrete cover for 1 hour fire rating
  - ✓ Sections to meet requirements of spalling and bursting
  - ✓On selecting the section , the element is checked as follows:

STRUCTURAL CALCULATIONS- continue

- Ultimate limit state, where shear for un-cracked and cracked section is verified, and Bending resistance at centre is compared with applied moment
- Serviceability limit state, where service stresses at transfer and at service loading stage are calculated together with deflection and compared with limit set up in codes

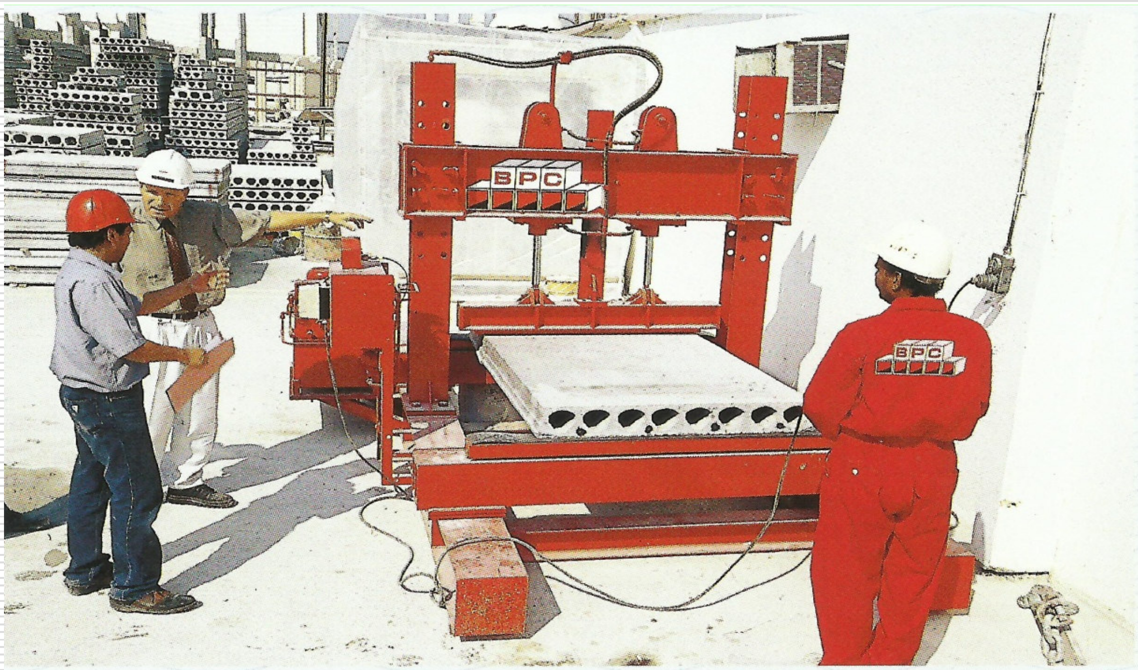
STRUCTURAL CALCULATIONS - continue

- The stresses at service stage are calculated after due consideration of losses (shrinkage strain of 0.0003, creep strain at imposed load of 1.4, elastic shortening and relaxation of strands at 1.25%)both immediate and time bound.

- The design should normally be validated by the load test in shear and bending.
  Since yield point for the strands is higher than rebar, the pre-stressed slabs
  will have higher factor of safety than the cast-in-situ structure, as is evident
  from the test slide

LOAD TEST

LOAD TEST

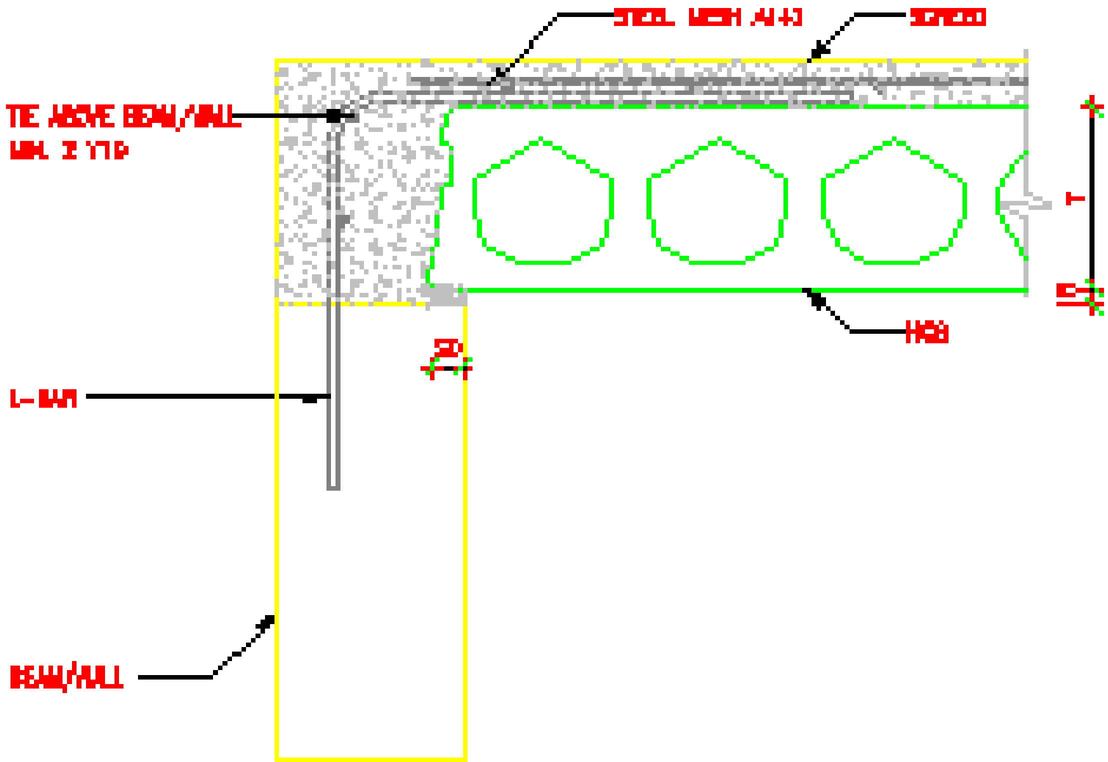


Shear Testing

DETAILS

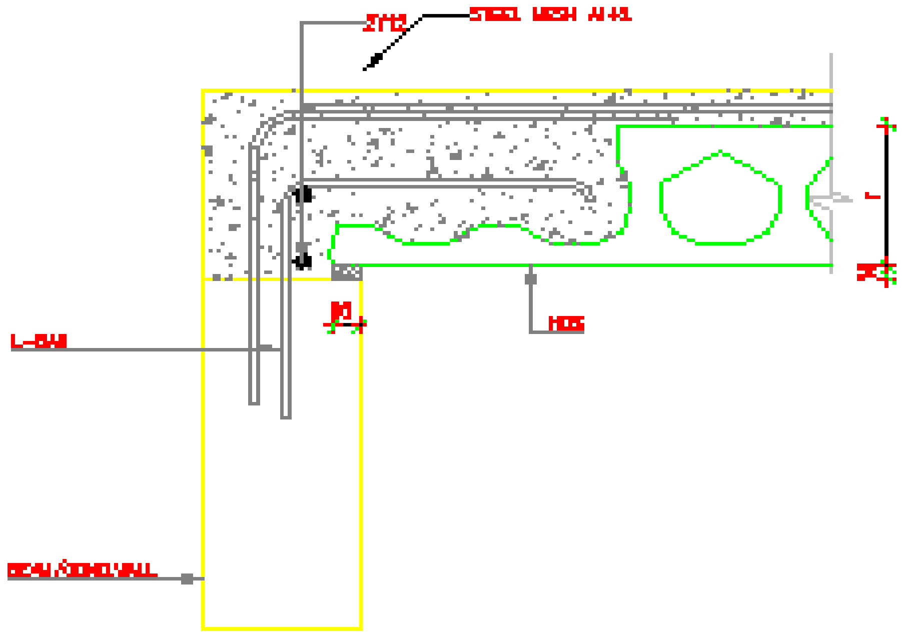
- Details
  - ✓ Precast Concrete Institute
  - ✓ ACI-318
  - ✓ BS or EURO

ERECTION DETAILS



SLAB AND WALL CONNECTION

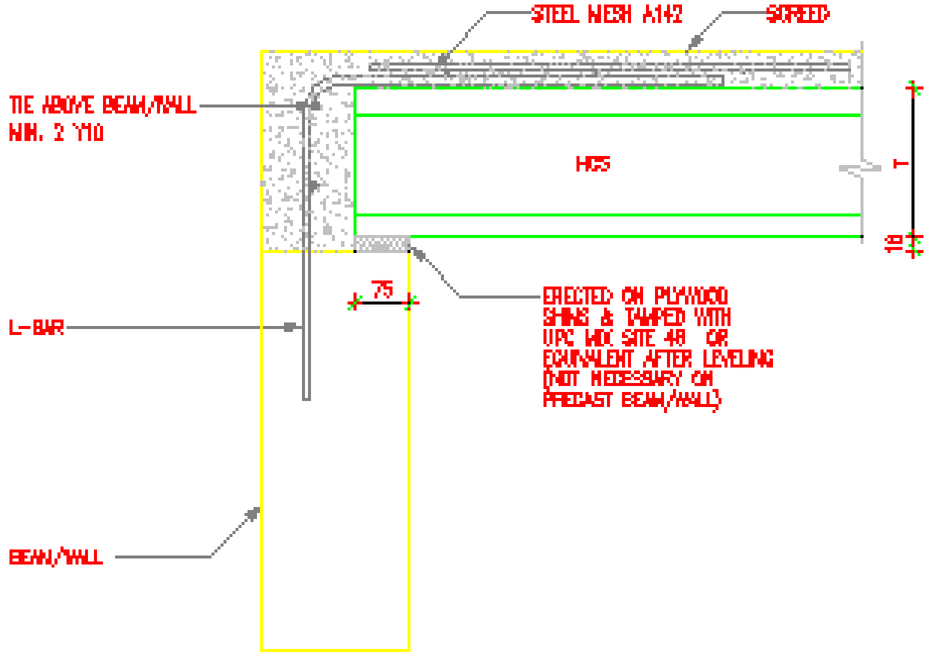
ERECTION DETAILS



SECTION DETAIL OF CAST-IN-SITU BEAM – HCS

SLAB AND WALL CONNECTION

ERECTION DETAILS

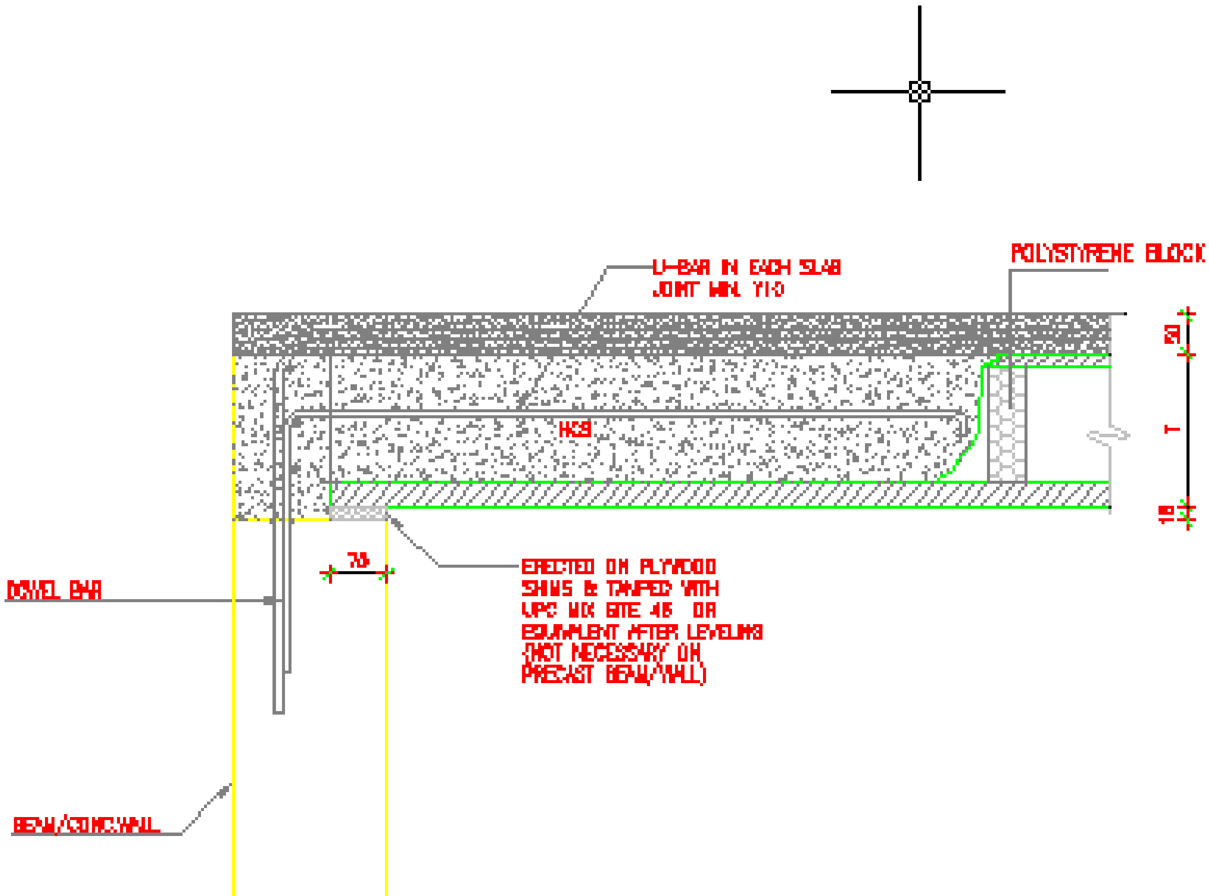


DIAPHRAGM ACTION WITH TOPPING

SECTION DETAIL OF CAST-IN-SITU BEAM – HCS

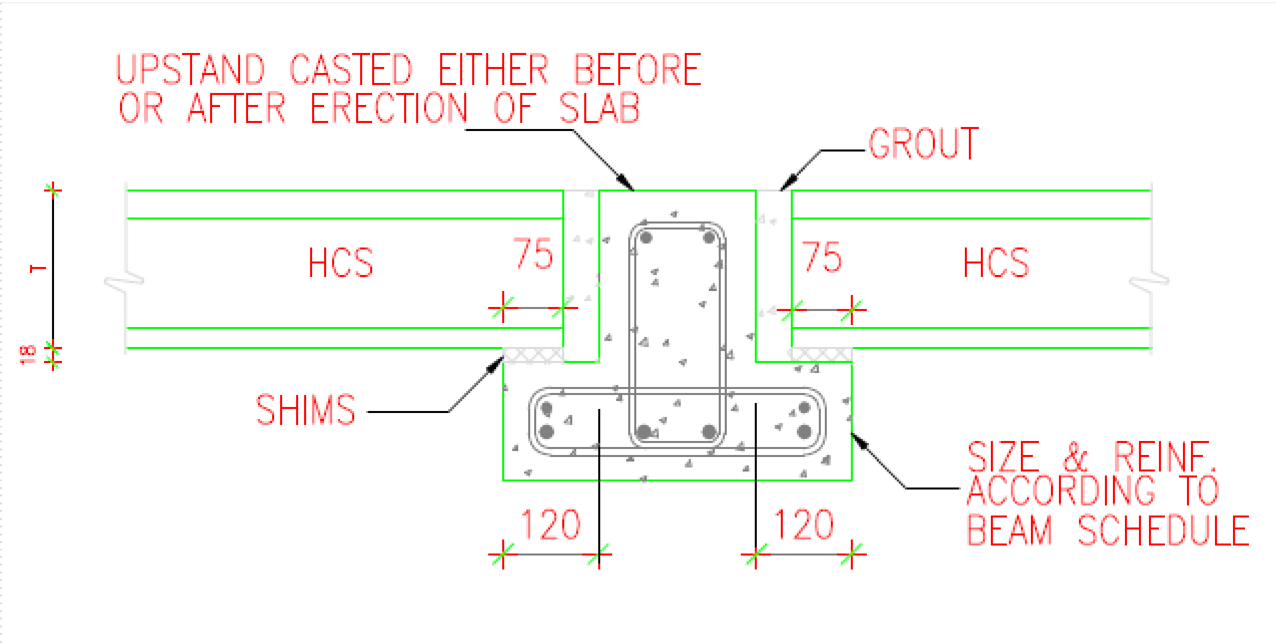
SLAB AND WALL CONNECTION

ERECTION DETAILS



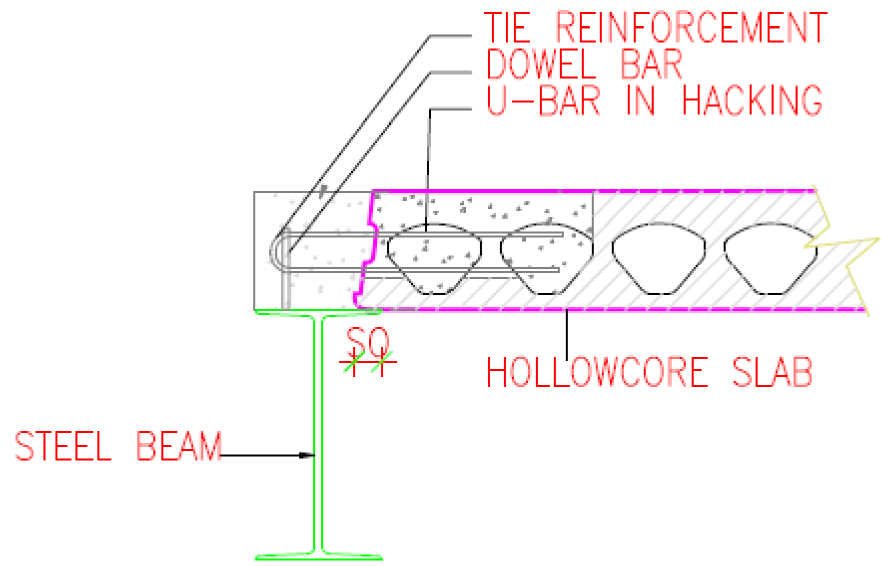
SLAB AND WALL CONNECTION

ERECTION DETAILS



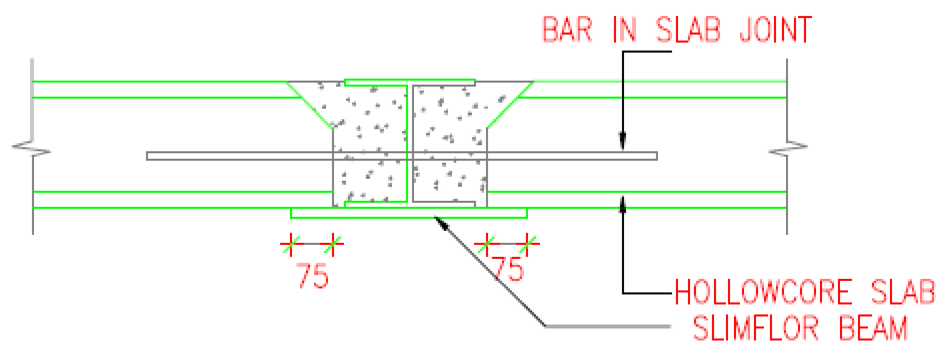
SLAB AND BEAM CONNECTION

ERECTION DETAILS



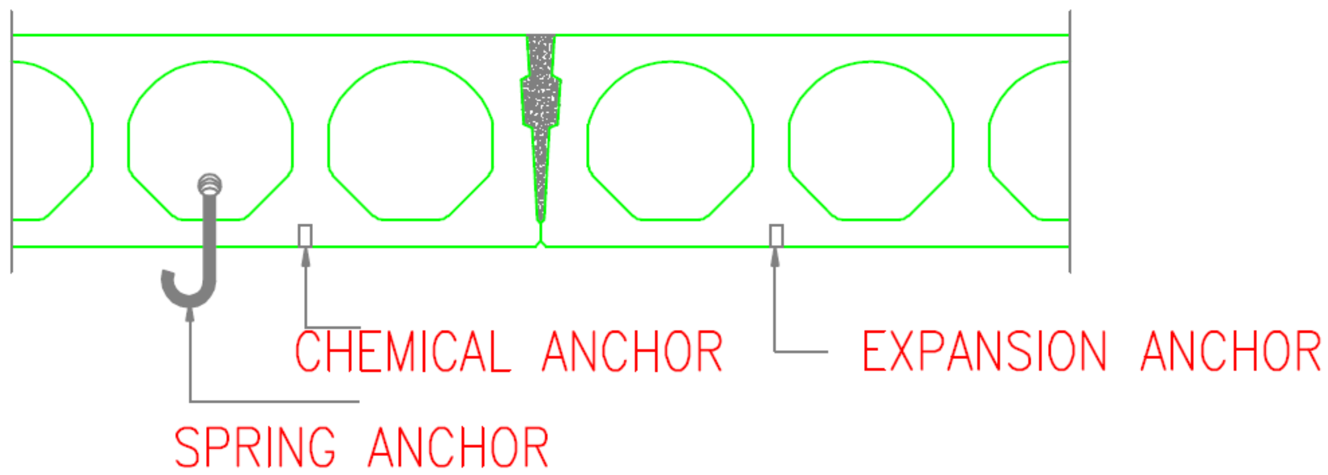
SLAB AND BEAM CONNECTION

ERECTION DETAILS



SLAB AND BEAM CONNECTION

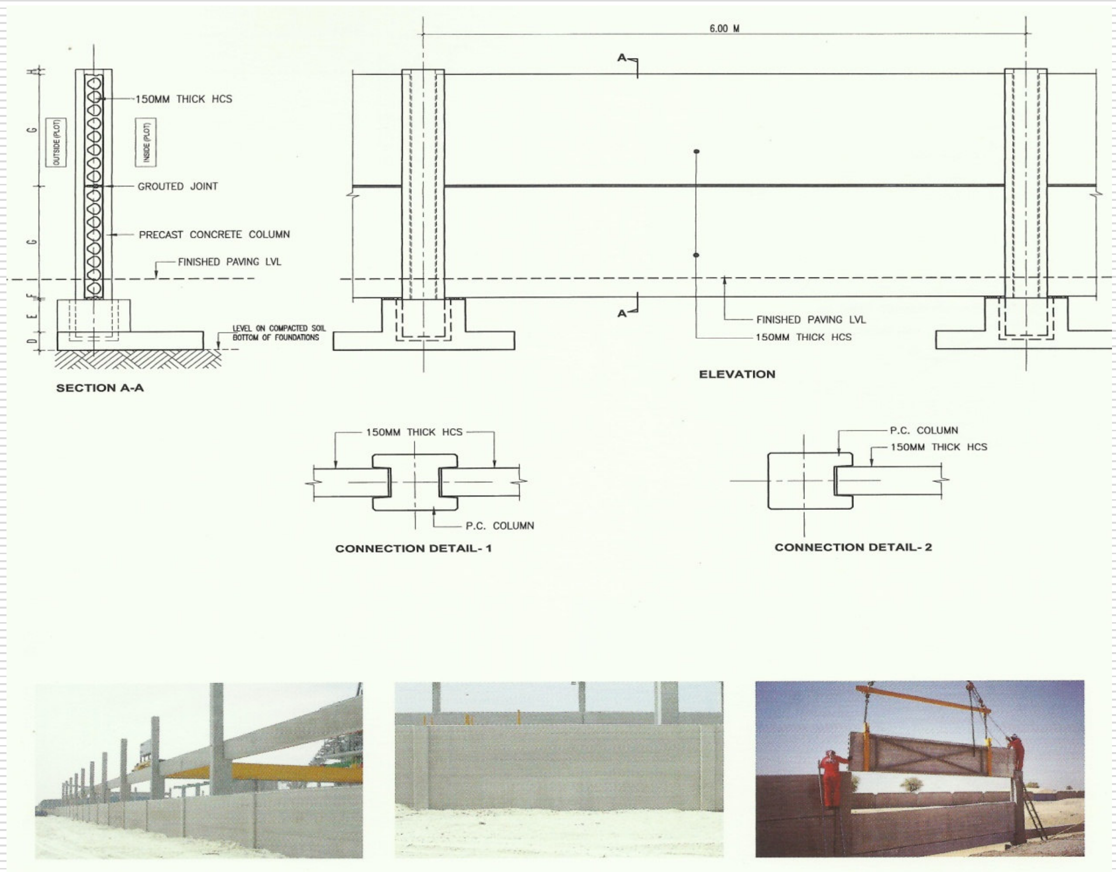
ERECTION DETAILS

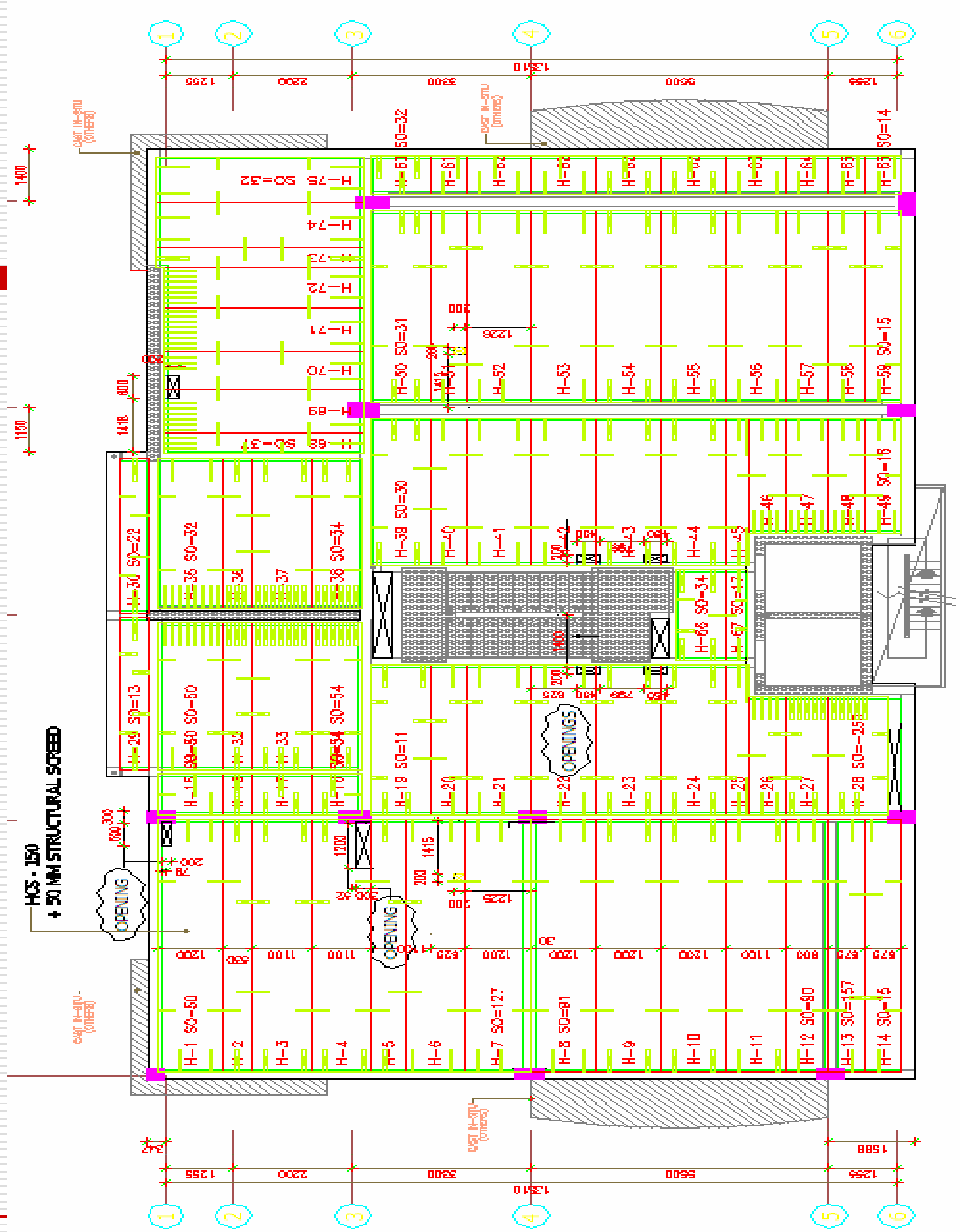


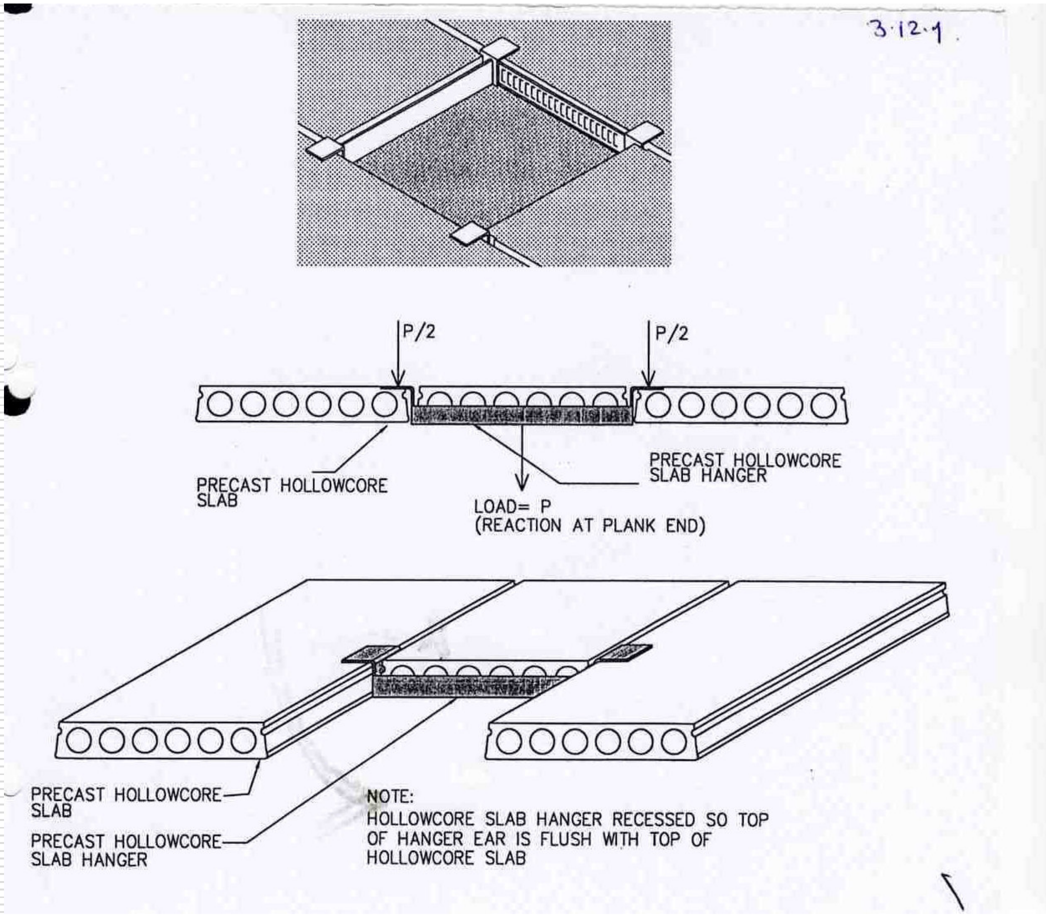
ANCHOR DETAILS

APPLICATIONS OF HCS

✓Boundary Wall




HCS - 150
+ 50 MM STRUCTURAL SCREED
OPENING
OPENING
OPENINGS
13310
1255
2200
3300
5500
1255


3.12.1
P/2
P/2
PRECAST HOLLOWCORE SLAB
PRECAST HOLLOWCORE SLAB HANGER
LOAD= P
(REACTION AT PLANK END)
PRECAST HOLLOWCORE SLAB
PRECAST HOLLOWCORE SLAB HANGER
NOTE:
HOLLOWCORE SLAB HANGER RECESSED SO TOP OF HANGER EAR IS FLUSH WITH TOP OF HOLLOWCORE SLAB

FACADES

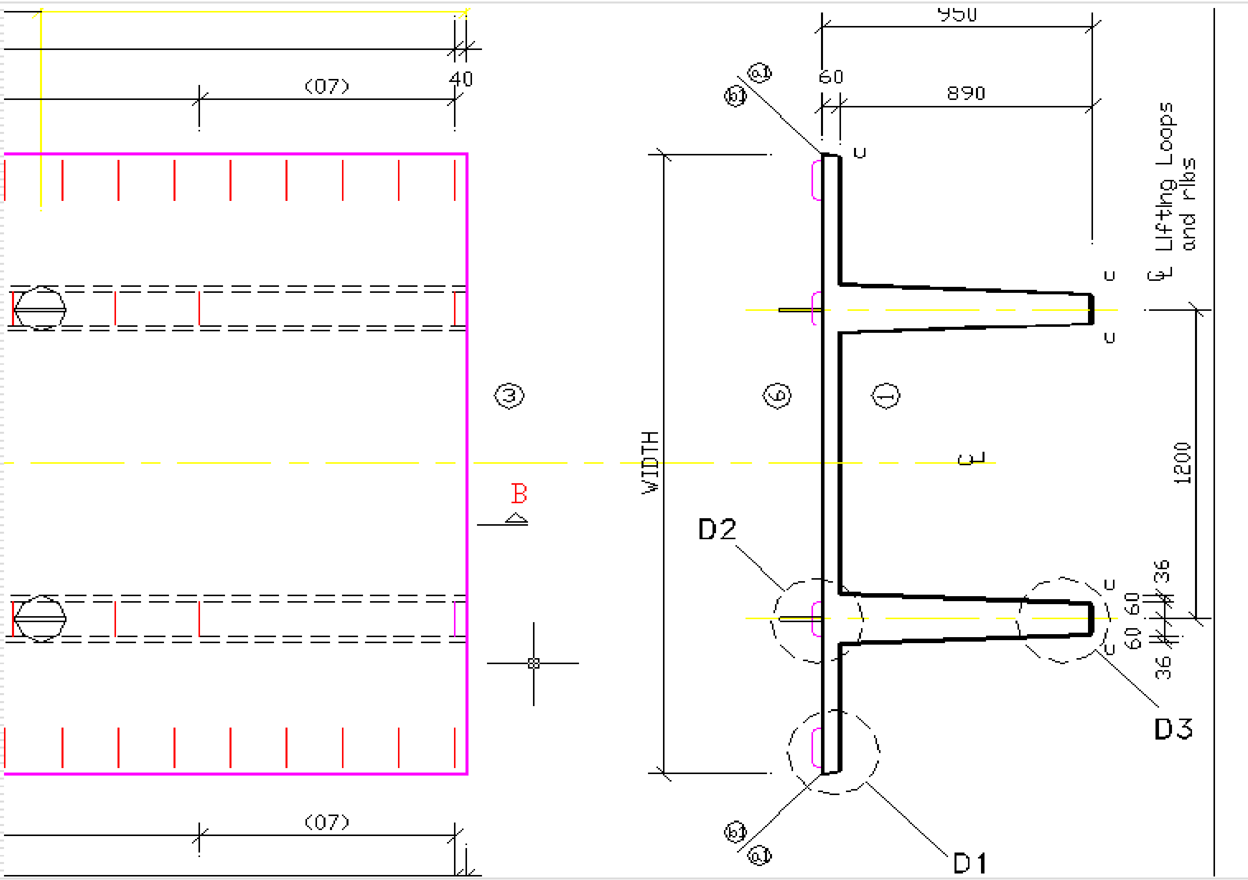
TYPICAL MIX DESIGN

Mix Design General Specification – Hollow Core Slabs For details and specifications of mix design, please follow EDP link (T:\General\Production\MIX DESIGNS\MIX DESIGN\ACTUAL MIX DESIGNS\HOLLOW CORE)									
Mix no	28 days co. strength (N/mm^2)	Min. cement content (Kg/m^3)			Min. micro silica kg/m3 **Concrete**	Slu (mm)	Fresh concrete density (Kg/m^3)	W / C max	Rems
		Grey	MSRC	White					
198-60	60	390			0	25	2468	0.38	Hollow core slabs
1931-60	60	390			0	25	2468	0.38	Hollow core slab
199-60	60	390			0	25	2468	0.38	Hollow core slab
195-75	75	450			60	25	2468	0.32	Hollow core slabs

THERMAL AND ACOUSTIC PROPERTIES

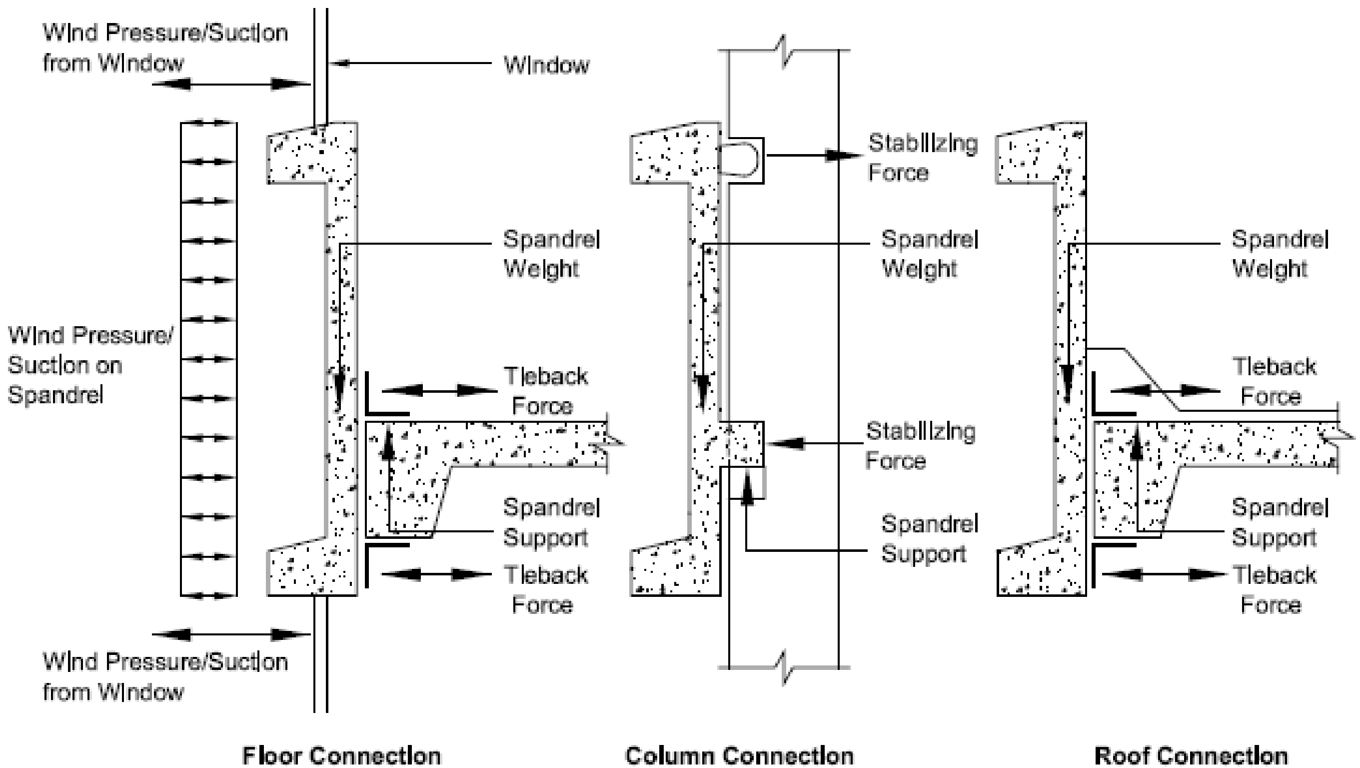
Slab type	R-value (m^2k/W)	U-Value ($W/m^2 °K$)	noise reduction
HCS 150	0.12	8.33	50
HCS 200	0.15	6.67	53
HCS 265	0.17	6.00	56
HCS 320	0.2	5.0	58
HCS 400	0.22	4.75	60
HCS 500	0.24	4.43	63
HCS 150+ 75	0.16	6.0	54
HCS 200+ 75	0.19	5.1	57
HCS 265+ 75	0.23	4.4	61
HCS 320+ 75	0.24	4.0	62
HCS 400+ 75	0.28	3.5	64
HCS 500+ 75	0.34	2.9	68
Solid slab t=225	0.13	6.2	56
Solid slab t=275	0.17	5.75	59
Solid slab t=315	0.2	4.92	60
Solid slab t=395	0.25	4.0	56
Solid slab t=475	0.3	3.25	66

DOUBLE T SLABS:



PRECAST PANELS

ARCHITECTURAL PRECAST CLADDING



STRUCTURAL CALCULATIONS

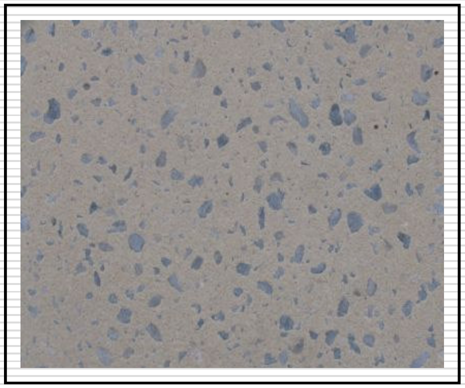
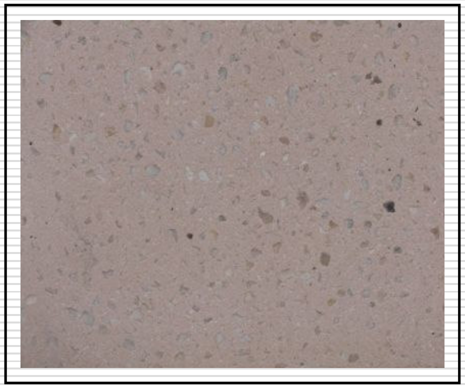
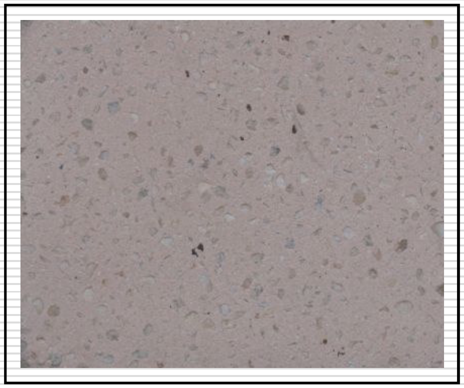
- Basis : Euro code, ACI, PCI
  - ✓ Vertical load bearing corbel of the panel: This could either be placed at top or bottom
  - ✓ Fixings to support horizontal force can either be at top or bottom
  - ✓The cladding to be designed for gravity, wind , Seismic and movements forces such as ,thermal, shrinkage and movement of supporting structure
  - ✓Allowances for tolerances for production, erection and supporting structure
  - ✓Design details to stop for any air and water leakage and also stopping condensation

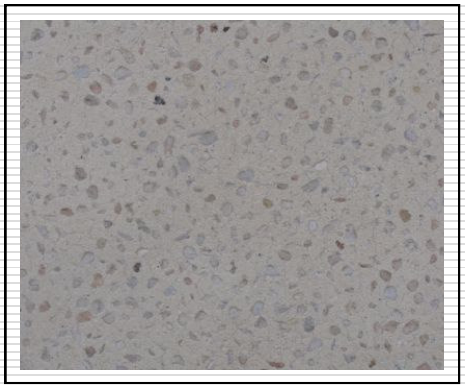
FINISHES



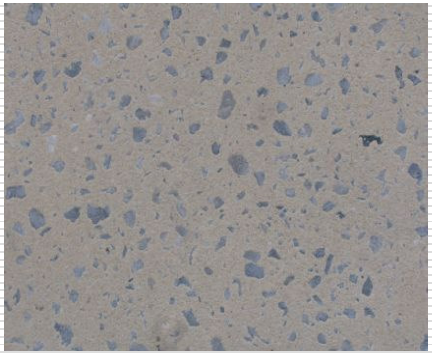
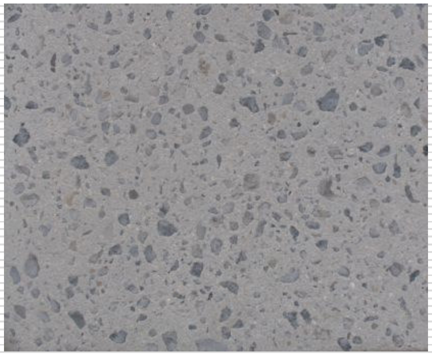
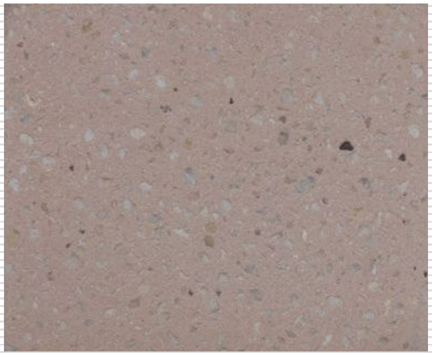


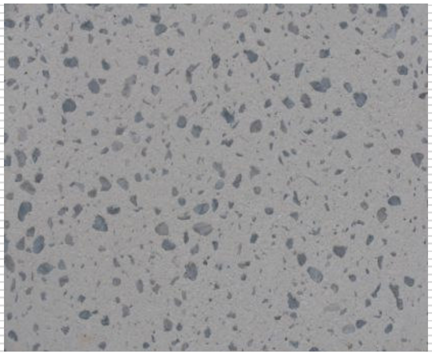

FINISHES




FINISHES

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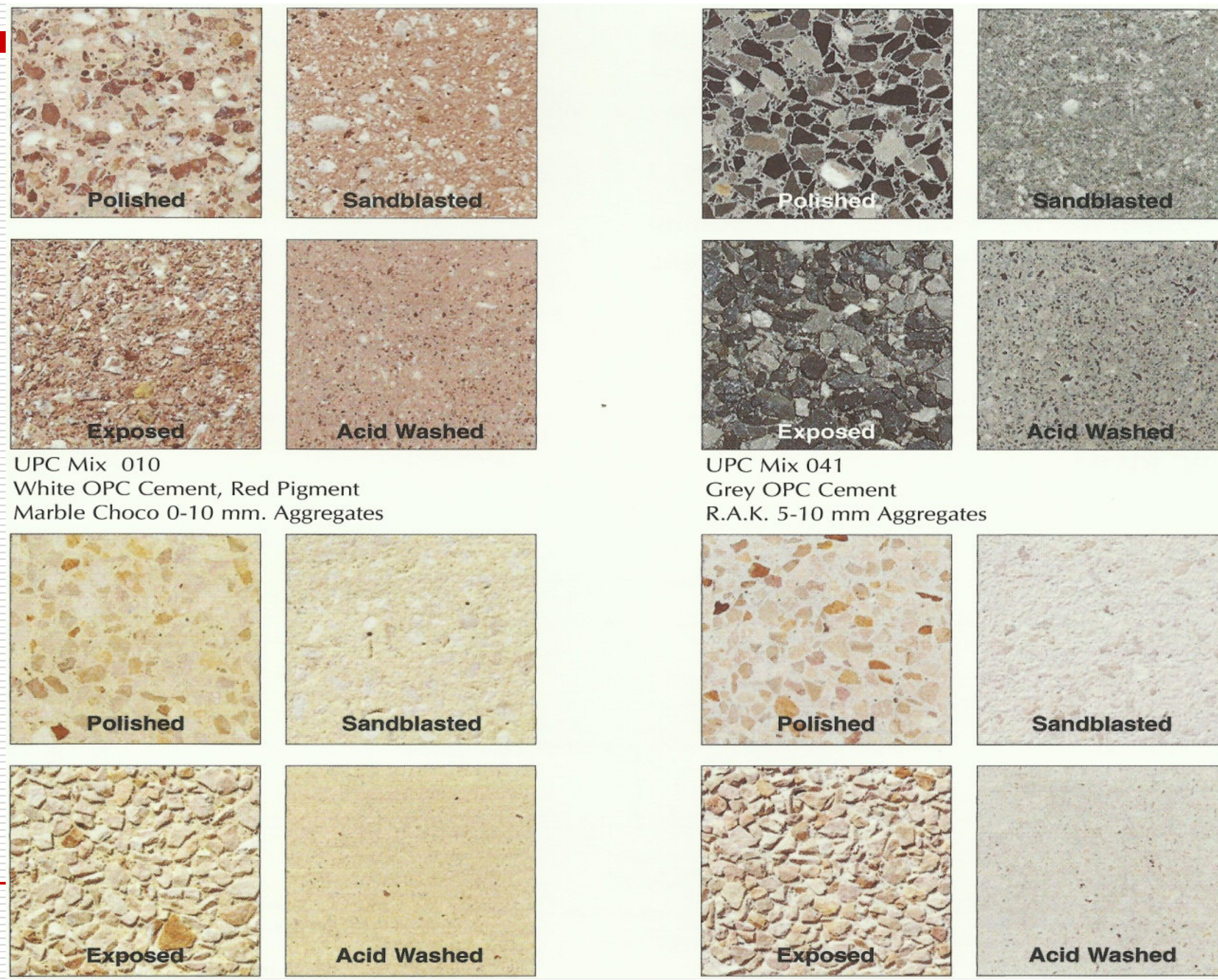
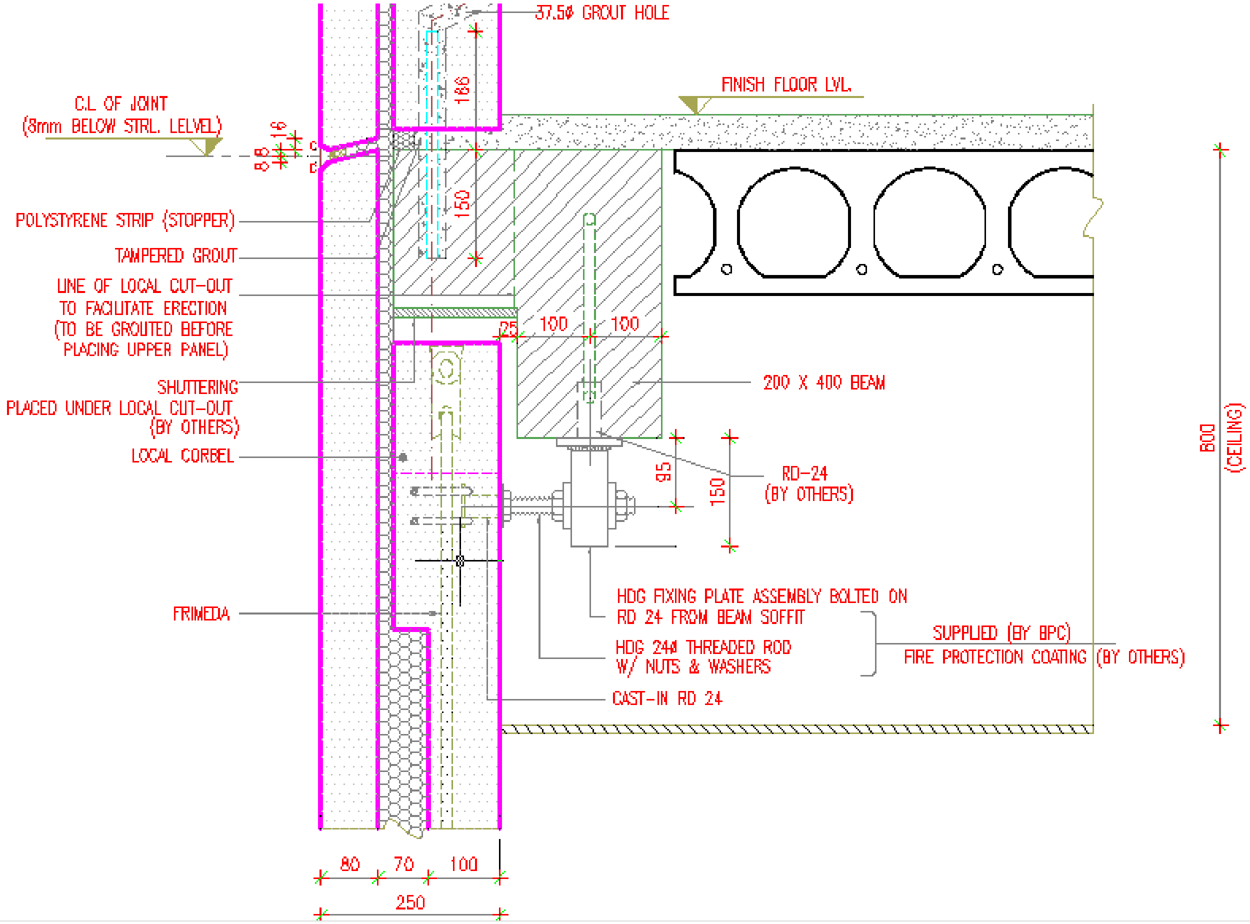
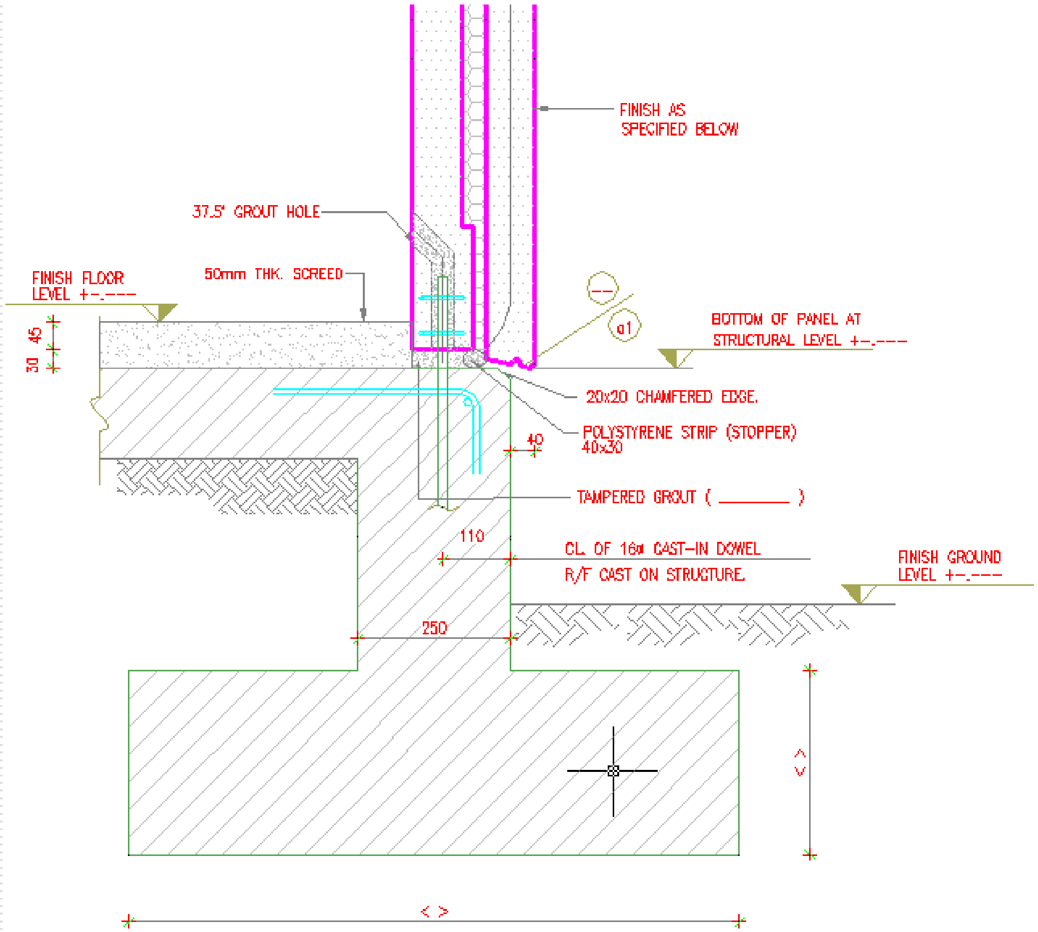

Polished
Sandblasted
Exposed
Acid Washed
UPC Mix 010
White OPC Cement, Red Pigment
Marble Choco 0-10 mm. Aggregates
Polished
Sandblasted
Exposed
Acid Washed
Polished
Sandblasted
Exposed
Acid Washed
UPC Mix 041
Grey OPC Cement
R.A.K. 5-10 mm Aggregates
Polished
Sandblasted
Exposed
Acid Washed

ERECTION DETAILS



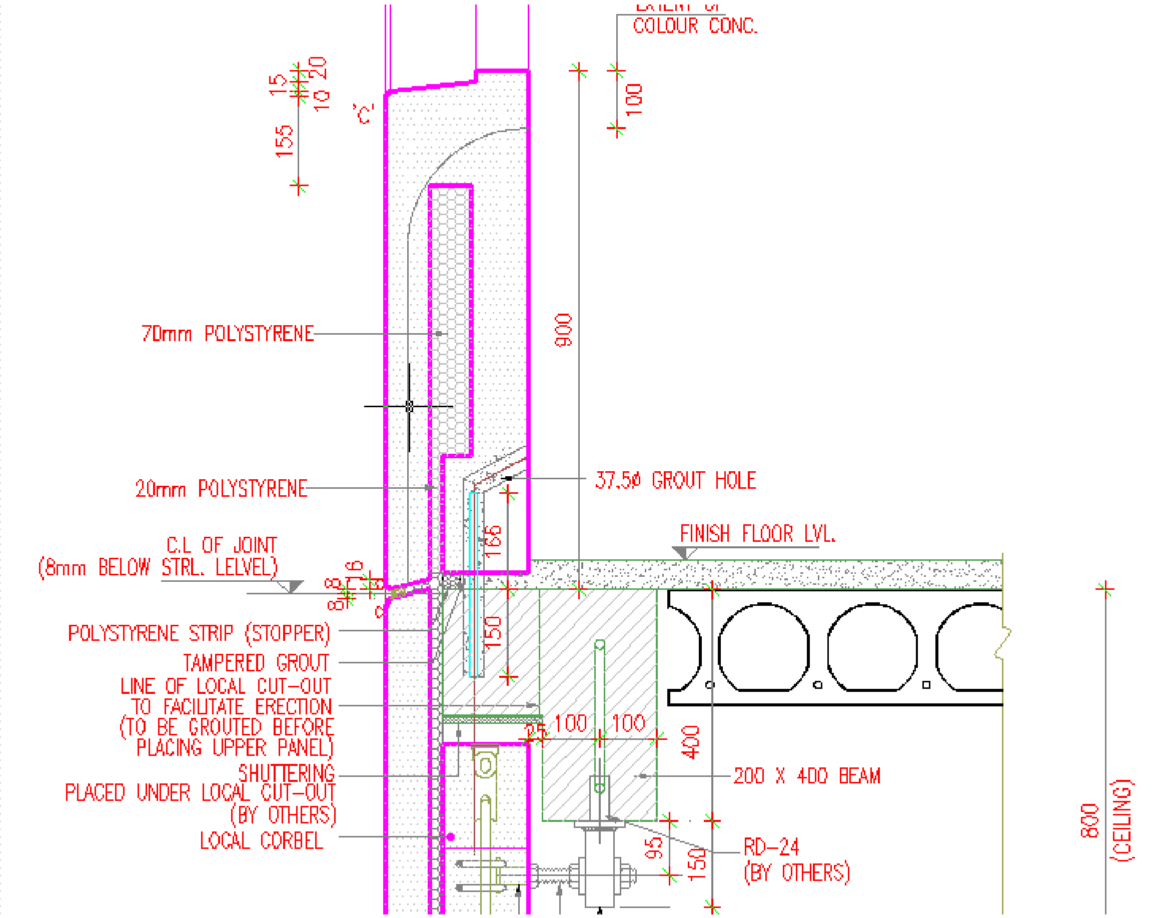
PANEL TO PANEL AND SLAB CONNECTION

ERECTION DETAILS



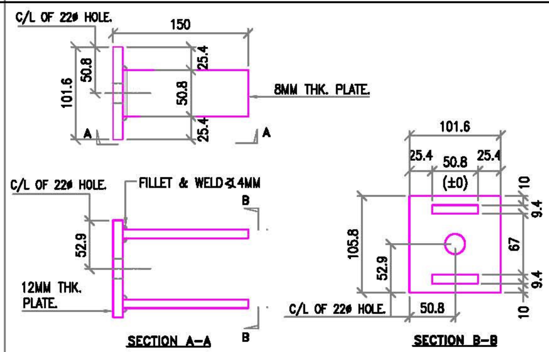
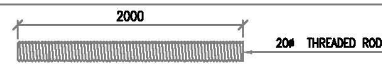
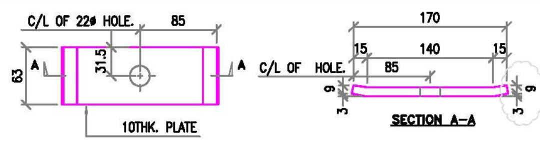
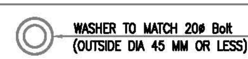
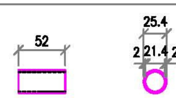
PANEL TO GROUND BEAM CONNECTION

ERECTION DETAILS



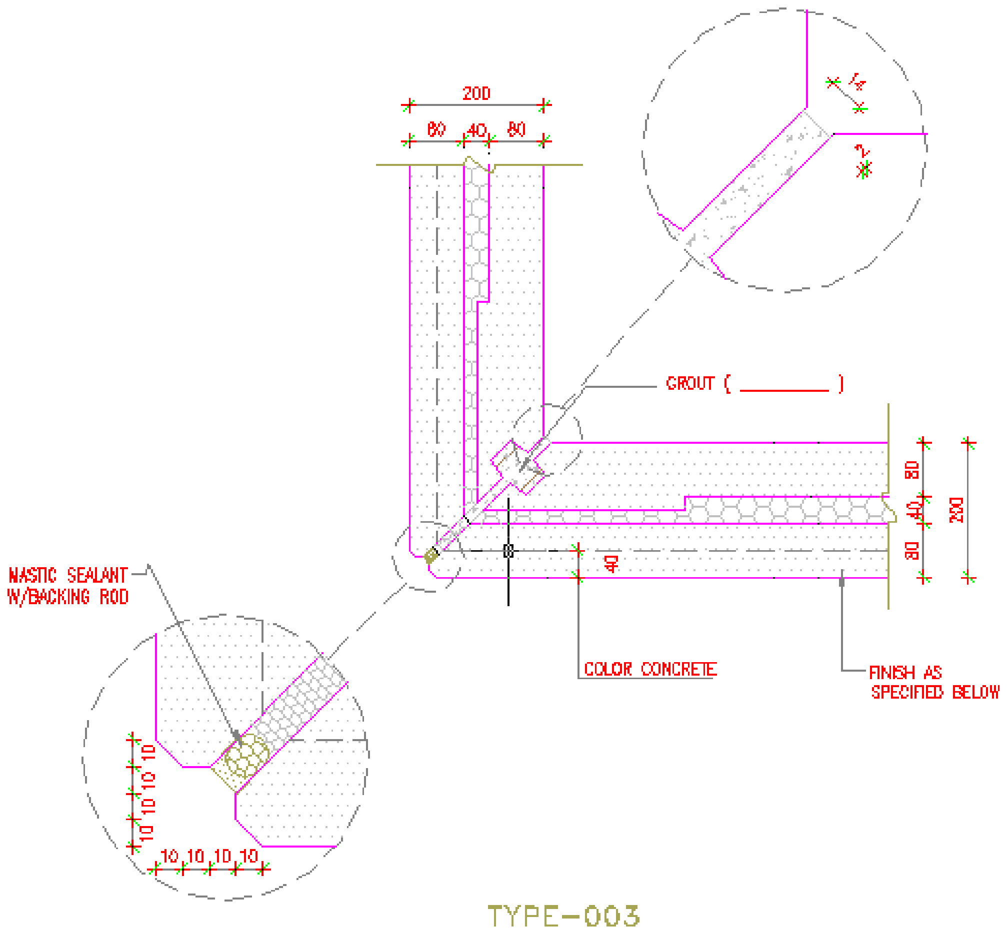
PANEL TO PANEL AND SLAB CONNECTION

ERECTION DETAILS

SI.NO.	QTY. (ØY-1002)	DESCRIPTION
8	1 NOS	
9		
10	2 NOS	
11	4 NOS	
12	2 NOS	
13	1 NOS	

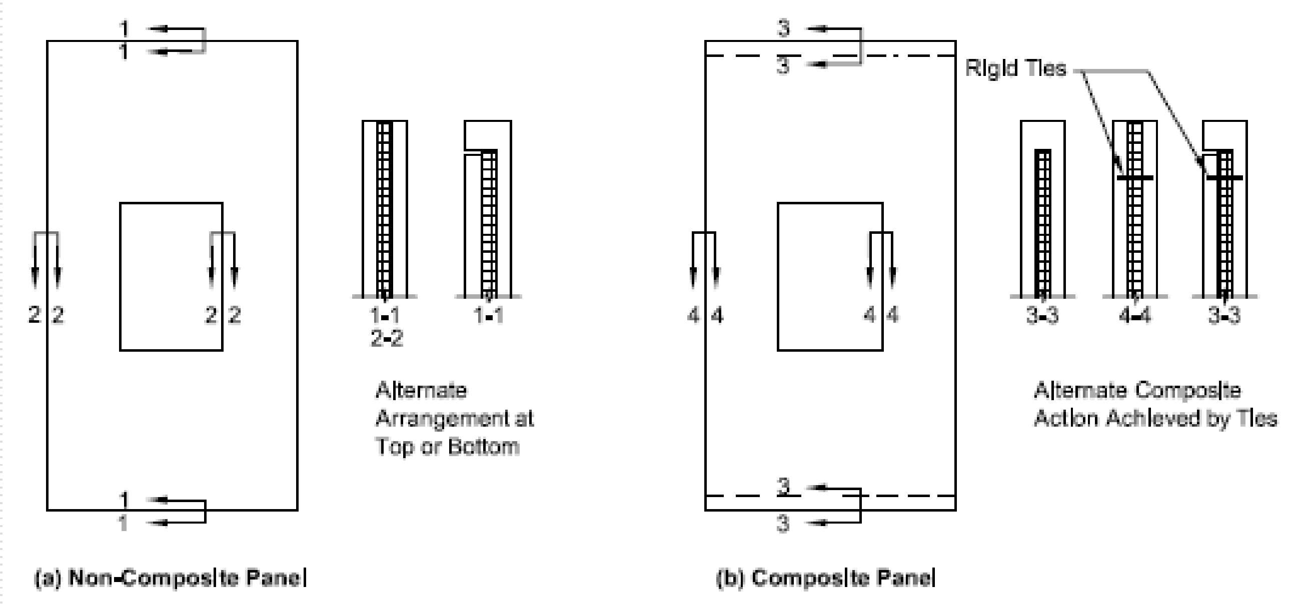
Site part details

ERECTION DETAILS



CORNER CONNECTIONS

SANDWICH PANELS



Non-composite and composite panels

APPLICATIONS

CLADDING FACADE

Shopping mall

Medical College

Office building

CITIBANK Bahrain

LOAD BEARING PRECAST CONSTRUCTION

The method used to resist lateral forces;

- ✓Cantilever column or wall panels for low-rise building
- ✓Shear wall
- ✓Steel or concrete X-bracing
- ✓Moment resisting frames

3.5 Shear Wall Systems

3.5.1 Introduction

Buildings which use shear walls as the lateral force resisting system provide a safe, serviceable and economical solution for wind and earthquake resistance. Shear walls make up most common lateral force resisting systems in the precast, prestressed concrete industry. The excellent performance of shear wall buildings throughout the world, that have been subjected to earthquakes, testifies to the effectiveness of this system. Experience in earthquakes worldwide shows that, in many cases, shear wall buildings continue to be used with full functions after an earthquake. The design of these buildings has typically followed principles used for cast-in-place structures, with modifications made as appropriate for the jointed nature of a precast concrete structural system. Design methods used to achieve successful performance of precast shear wall structures have been largely left to the ingenuity and judgment of the been largely left to the ingenuity and judgment of the design engineer. Observations of performance of structures in earthquakes show that where adequate strength and stiffness were provided to limit interstory drift to about 2%, the resulting displacements and damage were within acceptable levels. In regions of low and moderate seismicity, dry connections with small grout joints are generally used. In regions of high seismicity, connections to the foundation, and connections between precast walls, generally use details which emulate cast-in-place behavior (Section 3.1.2.1) and may include

1. Development of shear wall system

✓Provide at least three non-collinear walls to ensure torsional as well as direct lateral resistance.

✓Overturning will often be the governing criterion. Thus, the first choice is to use shear walls that also function as bearing walls.

✓Arrange shear walls so that they minimize restraint due to volume changes.

✓Consider whether the shear walls could be individual full height walls (vertical joints only).

✓Consider the practicality of shipping and erection when selecting the size of wall panels.

2. Determination of vertical and lateral loads.

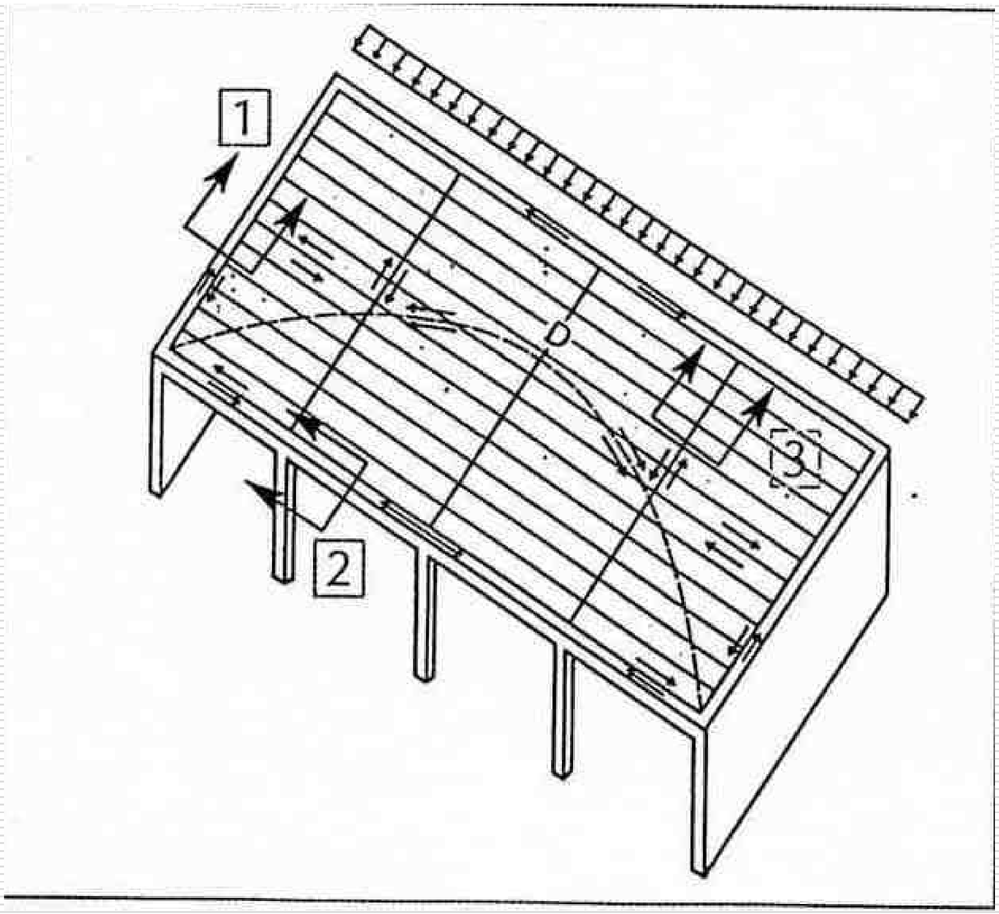
✓Determines the vertical gravity loads that are applicable to each of the shear walls.

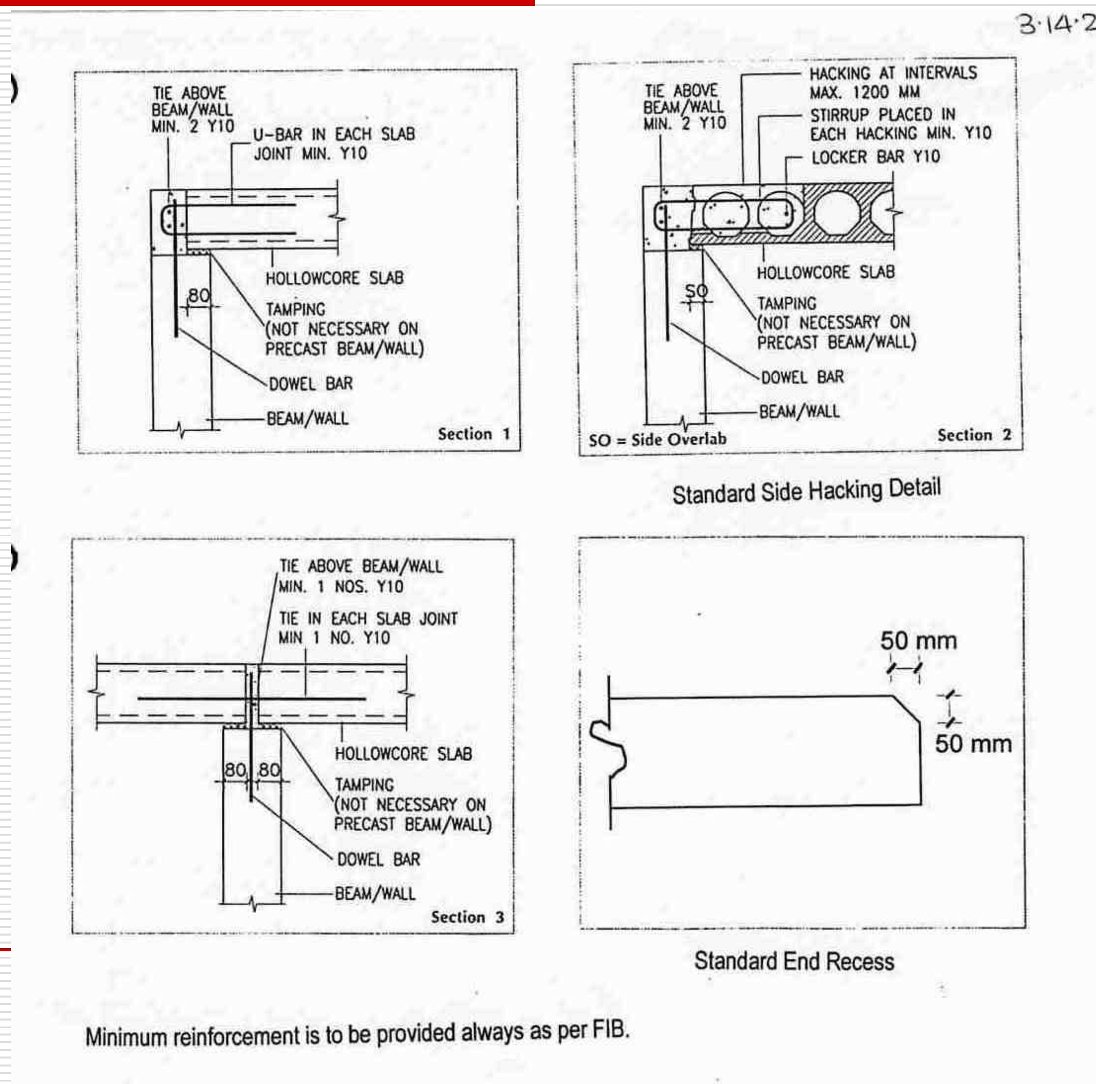
✓Use the applicable seismic design criteria to determine the magnitude of lateral load at each floor, and compare with wind loading and lateral load induced by its own weight. Choose the critical conditions for design.

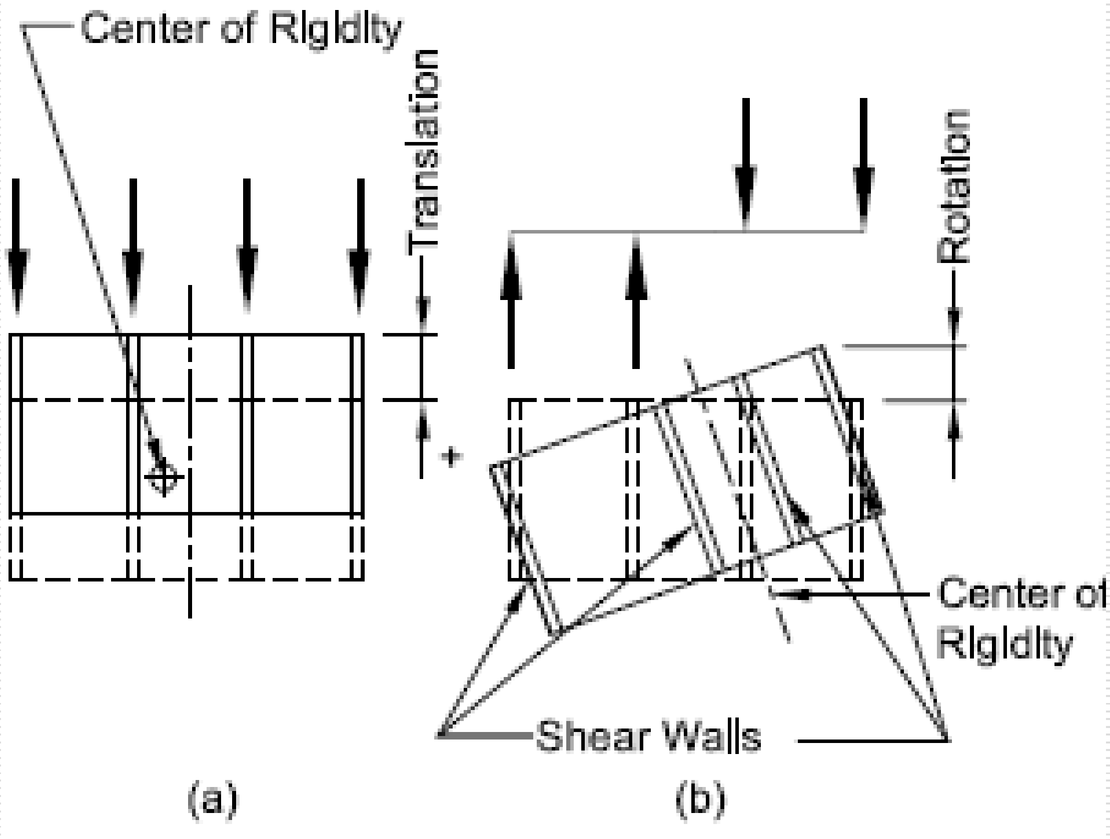
3. Diaphragm design

✓Design the diaphragms to respond elastically to applied lateral loads in order to prevent formation of plastic regions in any diaphragm.

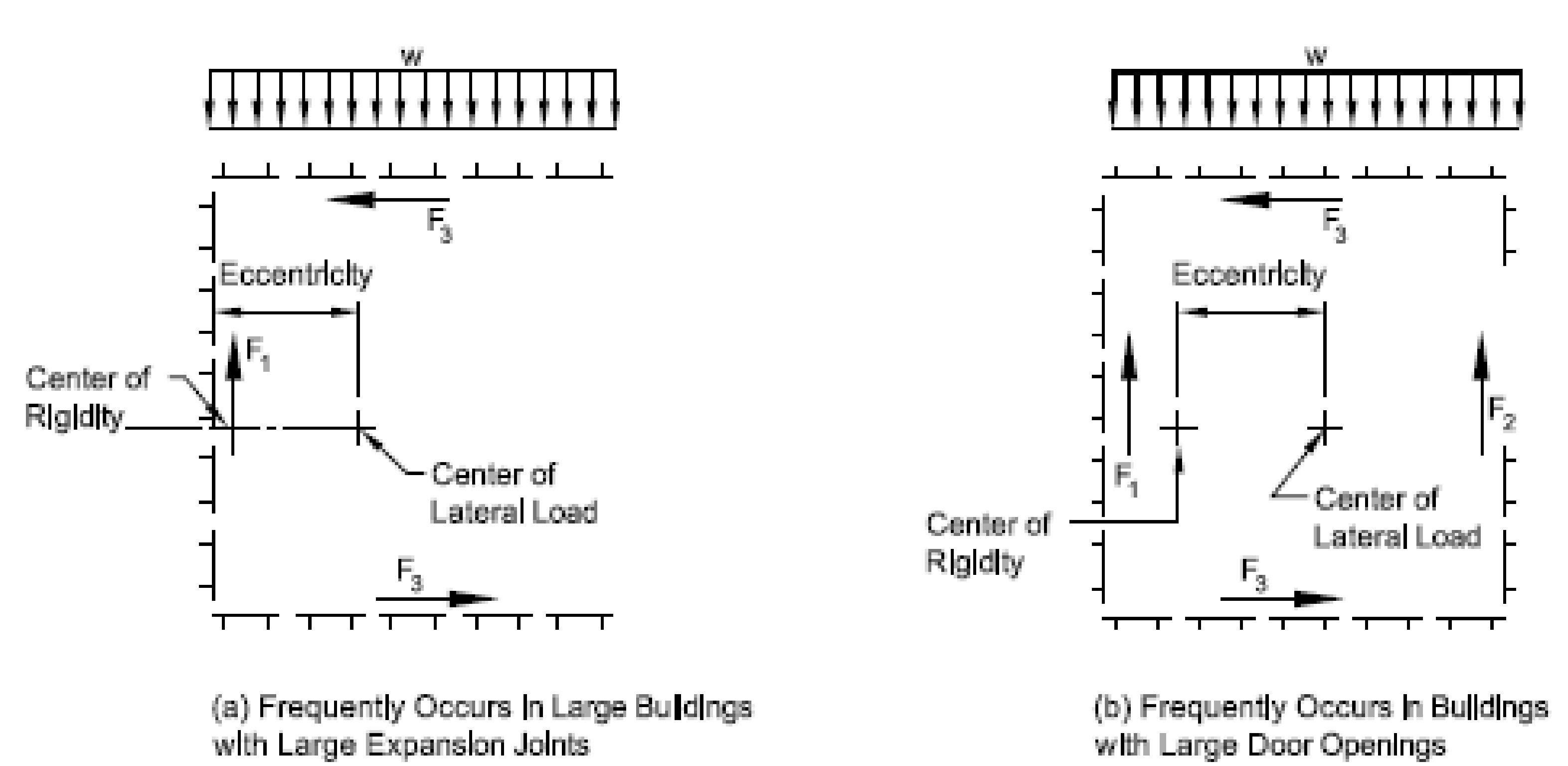
✓Design the diaphragms as beams, provide the necessary tensile reinforcement, for each chord, and choose shear connectors . The diaphragms are flexible when leteral deflection is more than twice storey drift.


1
2
3
D


3·14·2
TIE ABOVE BEAM/WALL MIN. 2 Y10
U-BAR IN EACH SLAB JOINT MIN. Y10
HOLLOWCORE SLAB
80
TAMPING (NOT NECESSARY ON PRECAST BEAM/WALL)
DOWEL BAR
BEAM/WALL
Section 1
TIE ABOVE BEAM/WALL MIN. 2 Y10
HACKING AT INTERVALS MAX. 1200 MM
STIRRUP PLACED IN EACH HACKING MIN. Y10
LOCKER BAR Y10
HOLLOWCORE SLAB
SO
TAMPING (NOT NECESSARY ON PRECAST BEAM/WALL)
DOWEL BAR
BEAM/WALL
SO = Side Overlab
Section 2
Standard Side Hacking Detail
TIE ABOVE BEAM/WALL MIN. 1 NOS. Y10
TIE IN EACH SLAB JOINT MIN 1 NO. Y10
HOLLOWCORE SLAB
80 80
TAMPING (NOT NECESSARY ON PRECAST BEAM/WALL)
DOWEL BAR
BEAM/WALL
Section 3
50 mm
50 mm
Standard End Recess
Minimum reinforcement is to be provided always as per FIB.



Translation and rotation of rigid diaphragms

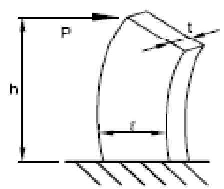
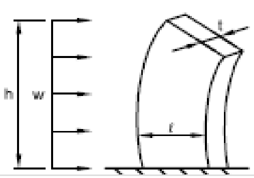


Unsymmetrical shear walls

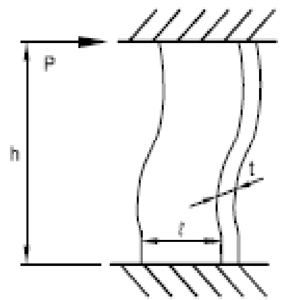
1.Stiffness Analysis

- For a structure with rectangular shear walls of the same material, with a wall height-to-length ratio of less than about 0.3, the flexural stiffness can be neglected, and the distribution made in accordance with the cross-sectional area of the walls. If the height-to-length ratio is greater than about 3.0, the shear stiffness can be neglected, and the distribution made in accordance with the moments of inertia, based on the plan dimensions of the wall.
- When the height-to-length ratio is between 0.3 and 3.0, the effects of both shear and flexural deformations should be considered. In terms of stiffnesses:

Figure 3.10.26 Shear wall deflection

Case	Deflection Due to		Equivalent Moment of Inertia I_{eq}	
	Flexure	Shear	Single Story	Multi-Story
	$\frac{Ph^3}{3\,E\,I}$	$\frac{2.78Ph}{A_wE}$ ($A_w = \ell t$)	$\frac{I}{1+\frac{8.34I}{A_wh^2}}$	$\frac{I}{1+\frac{13.4I}{A_wh^2}}$
	$\frac{Wh^3}{8\,E\,I}$ W = wh	$\frac{1.39Wh}{A_wE}$ W = wh	NA	$\frac{I}{1+\frac{23.6I}{A_wh^2}}$

INERTIA CALCULATIONS

	$\frac{Ph^3}{12EI}$	$\frac{2.78Ph}{A_wE}$	$\frac{I}{1+\frac{33.4I}{A_wh^2}}$	NA

INERTIA CALCULATIONS

Force in the y-direction is distributed to a given wall at a given level due to an applied force in the y-direction at that level:

$$F_y = \frac{V_y K_y}{\Sigma K_y} + \frac{T V_y (x) K_y}{\Sigma K_y (x^2) + \Sigma K_x (y^2)} \qquad \text{(Eq. 3.5.7.2)}$$

Force in the x-direction is distributed to a given wall at a given level due to an applied force in the y-direction at that level:

$$F_x = \frac{T V_y (y) K_x}{\Sigma K_y (x^2) + \Sigma K_x (y^2)} \qquad \text{(Eq. 3.5.7.3)}$$

where:

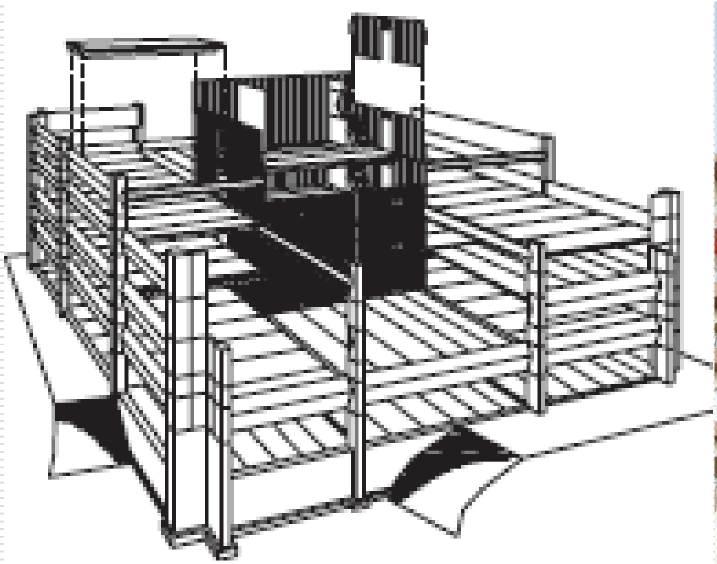
- V_y = lateral force at the level being considered
- K_x, K_y = rigidity in the x- and y-directions, respectively, of the wall under consideration

FORCES CALCULATION

ΣK_x, ΣK_y = summation of rigidities of all walls at the level in the x- and y-directions, respectively

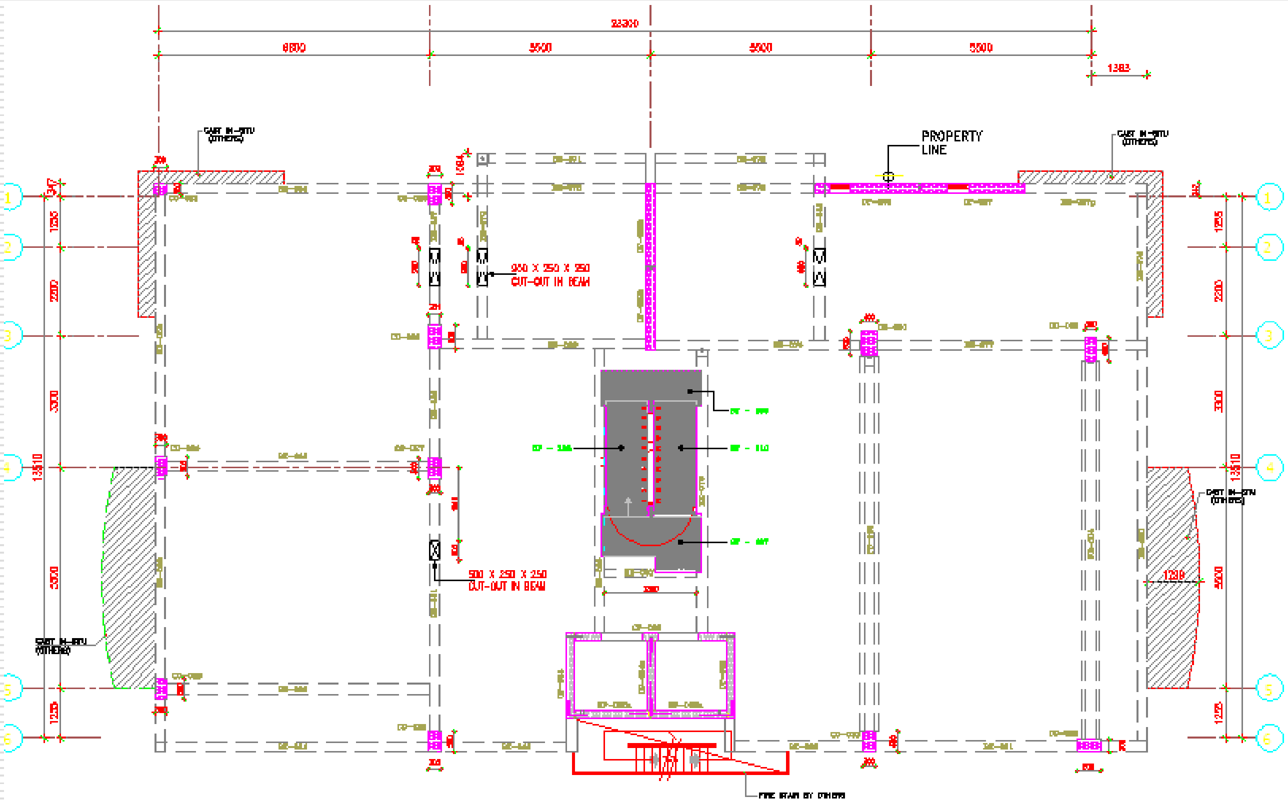
x = distance of the wall from the center of stiffness in the x-direction

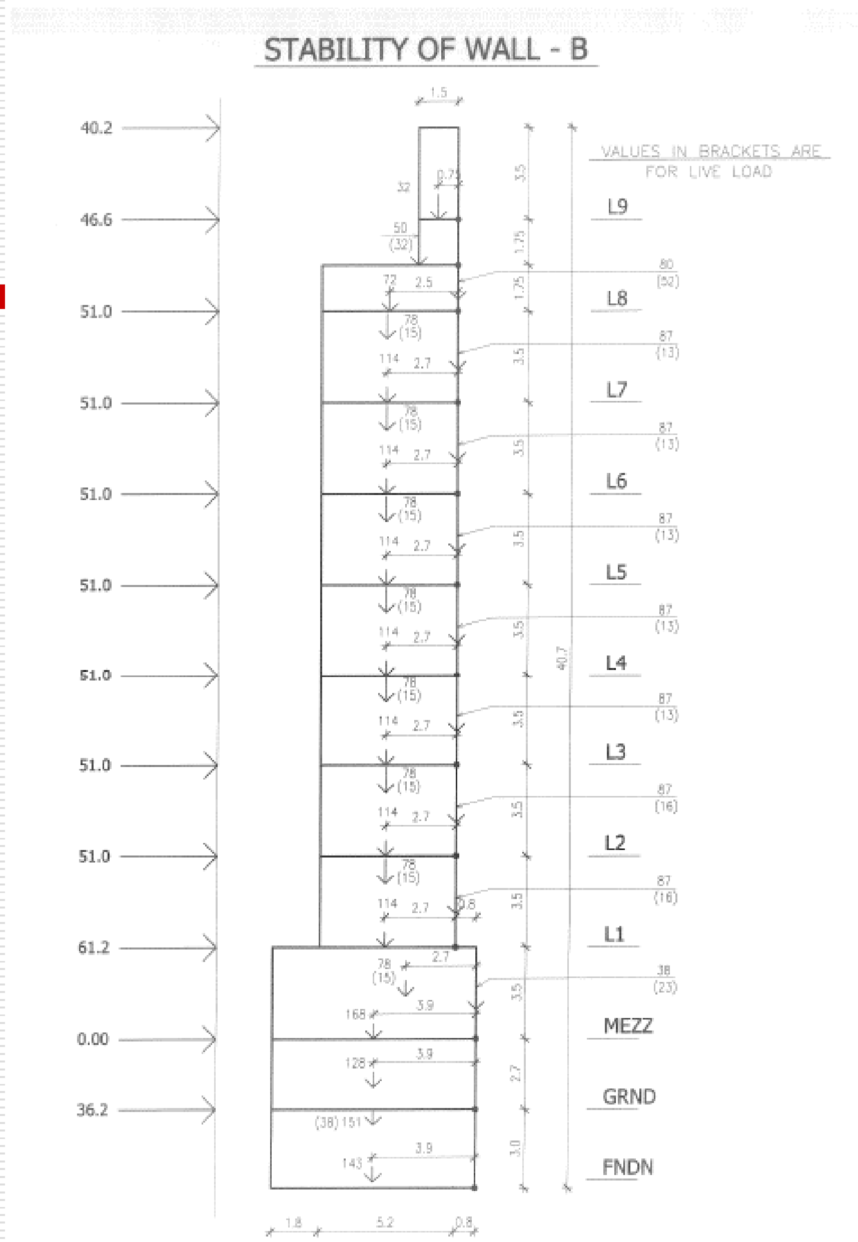
y = distance of the wall from the center of stiffness in the y-direction



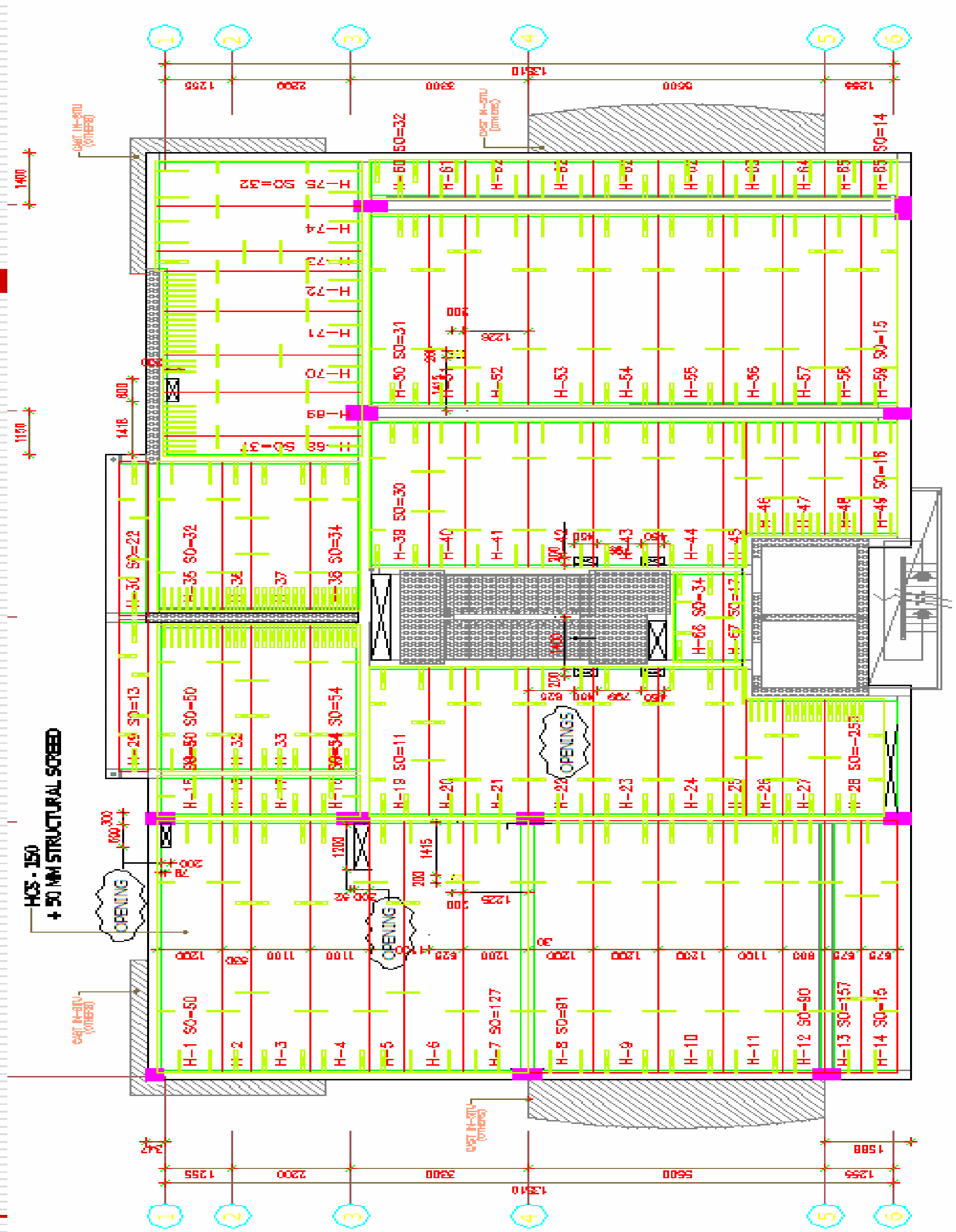
Interior shear wall system

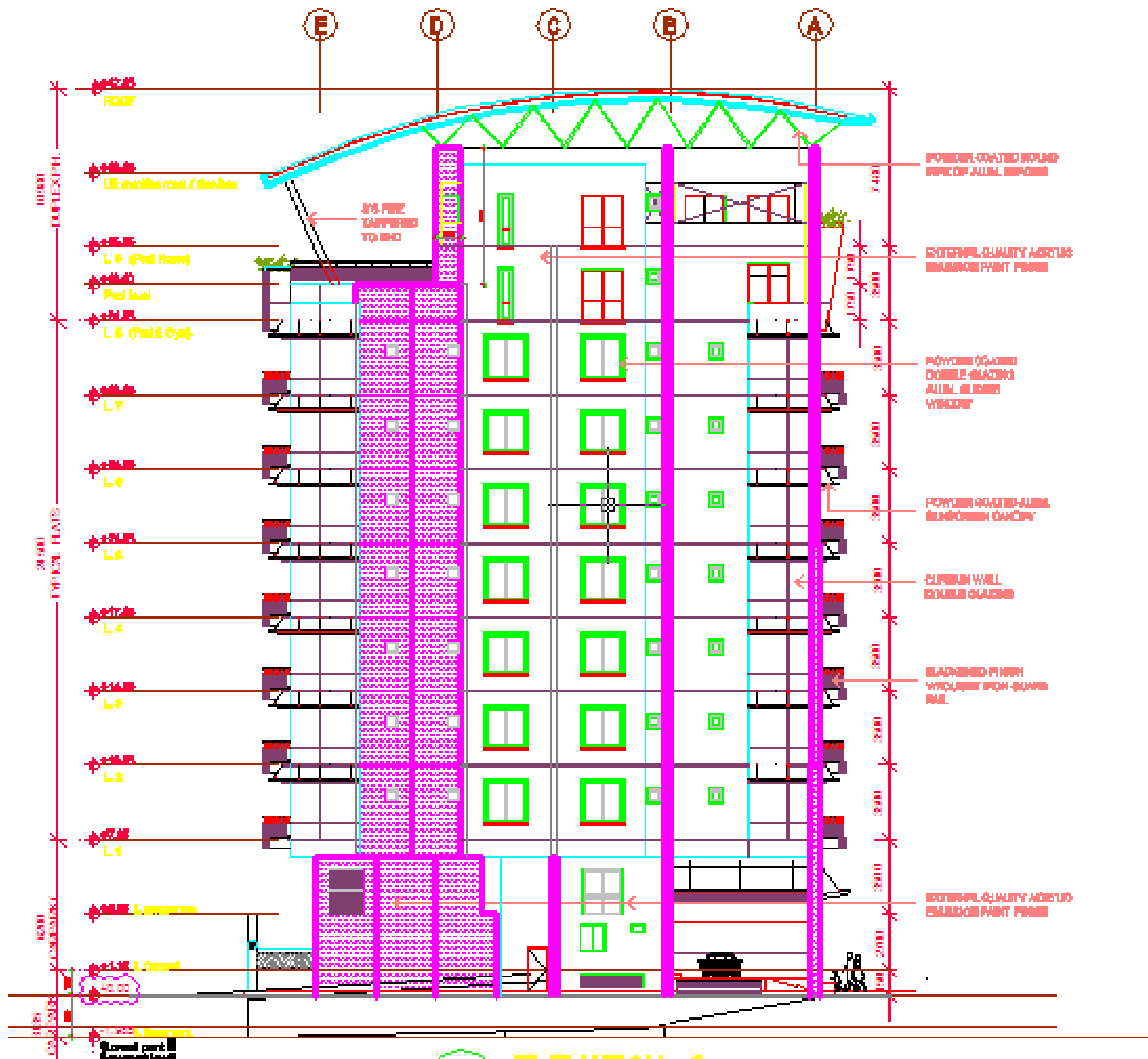
EXAMPLE-1 AOT BUILDING





CALCULATION MODEL FOR STABILITY

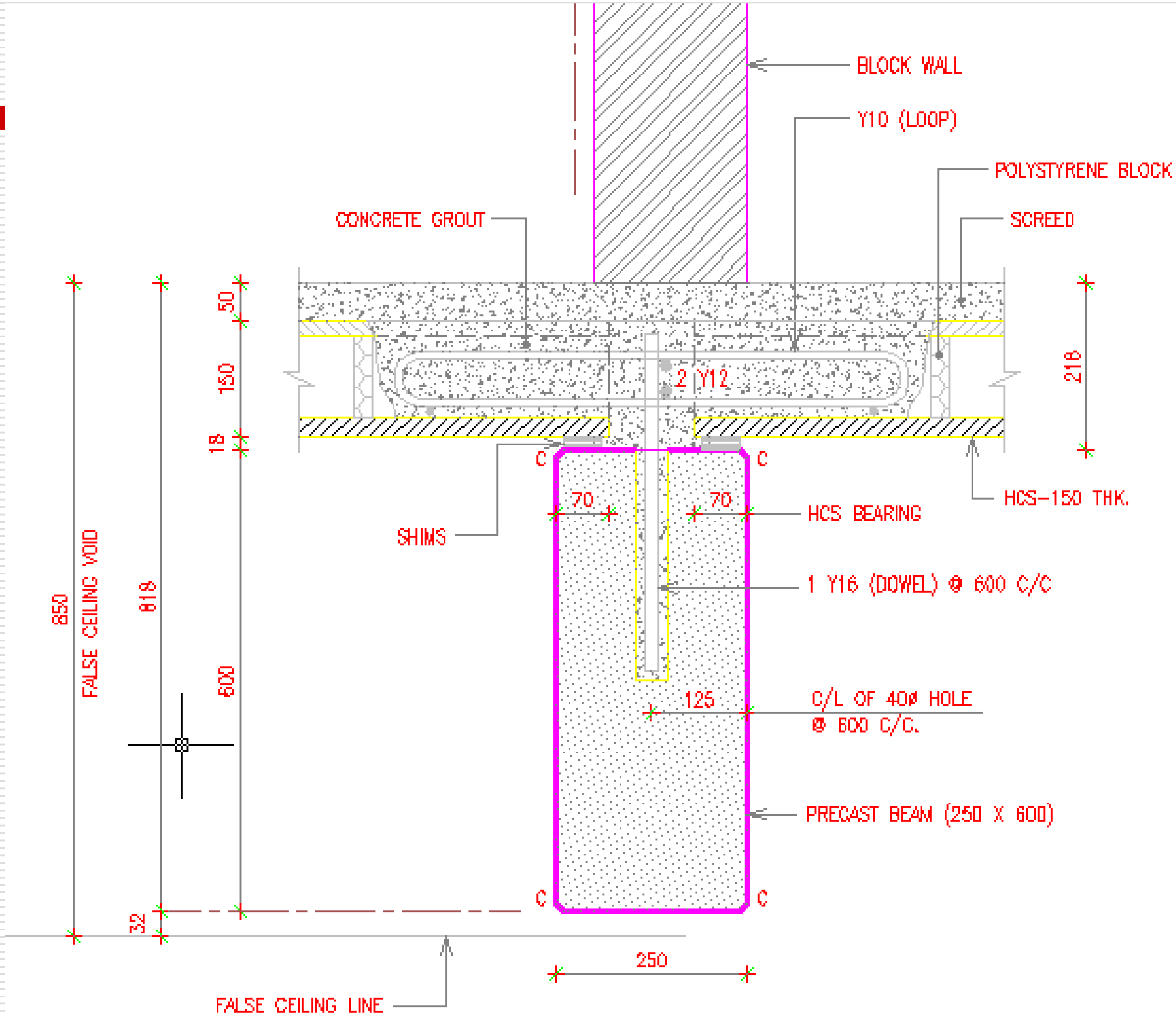

HCS - 150
+ 50 MM STRUCTURAL SCREED
OPENING
OPENING
OPENINGS



ELEVATION - C

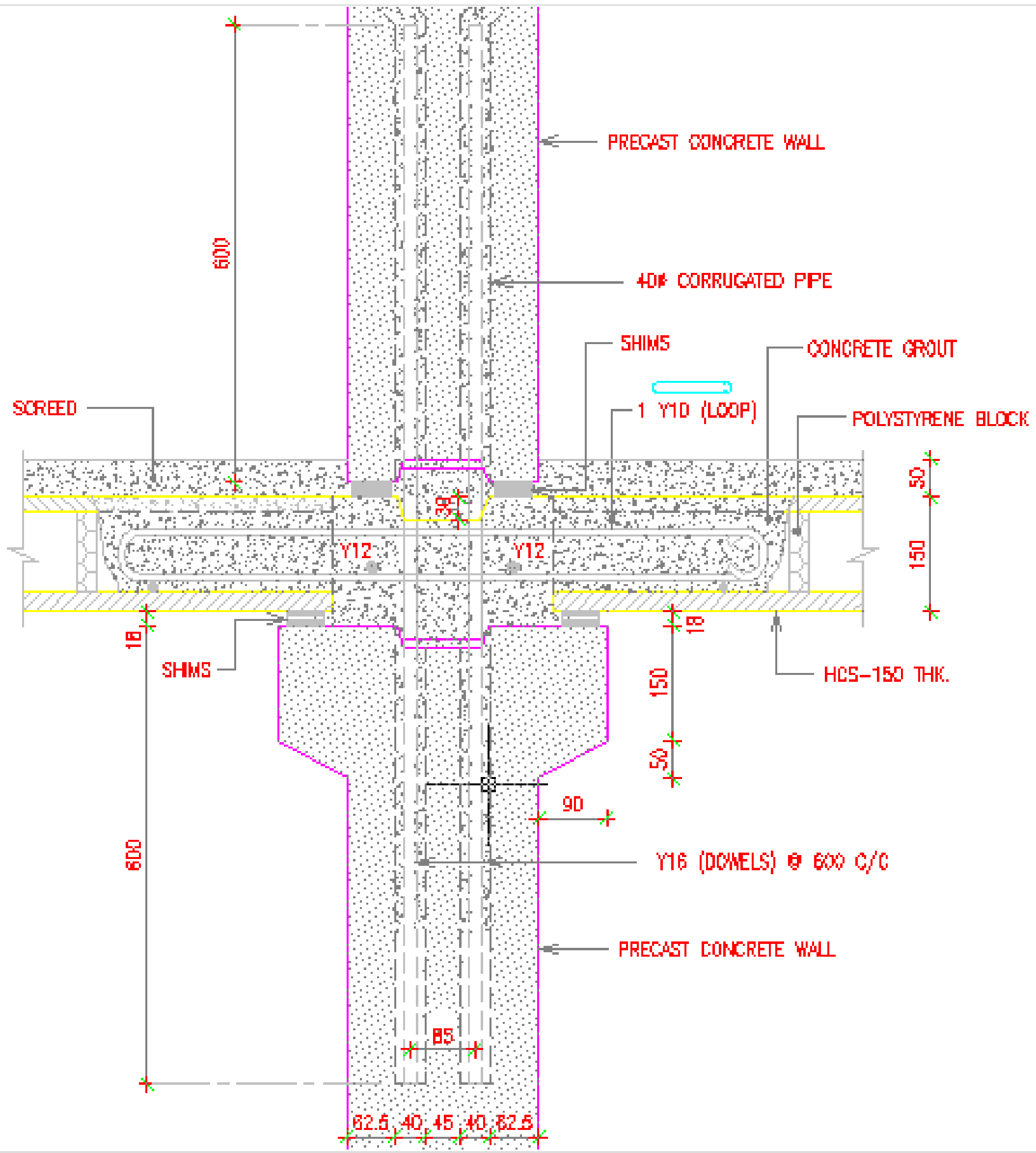
SCALE 1:200

ERECTION DETAILS



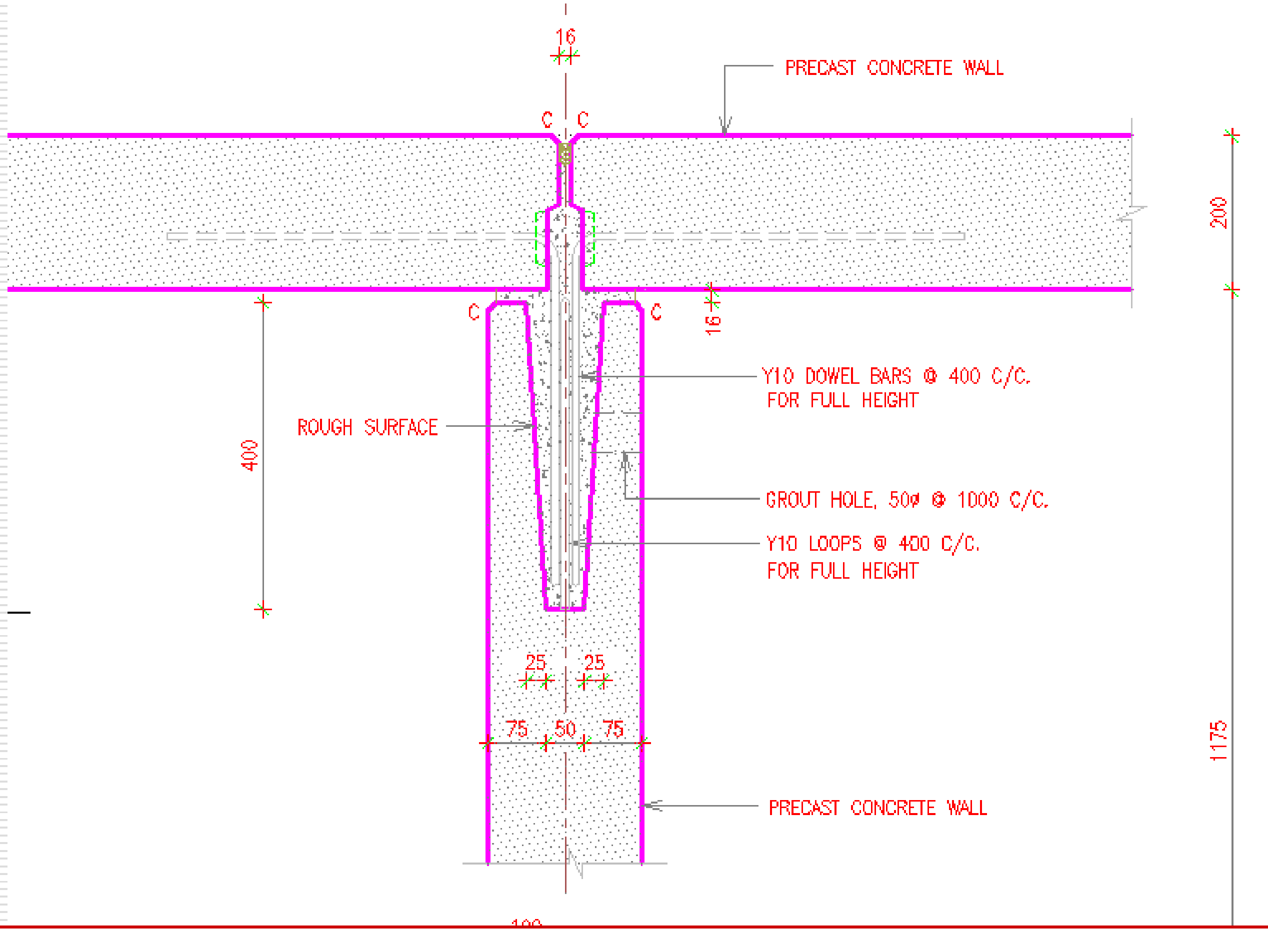
CONNECTION FOR BEAM, SLAB AND WALL

ERECTION DETAILS

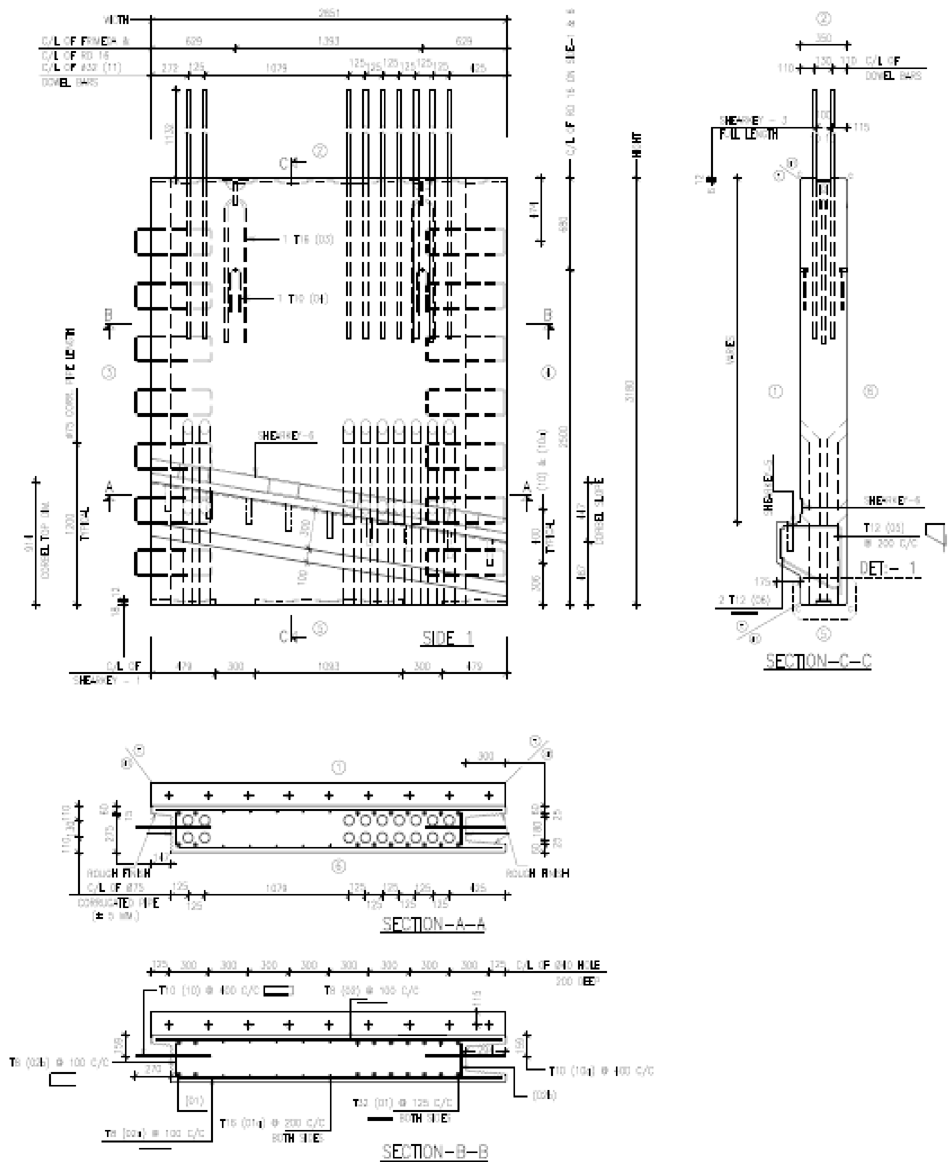


CONNECTION FOR WALL TO WALL AND SLAB

ERECTION DETAILS



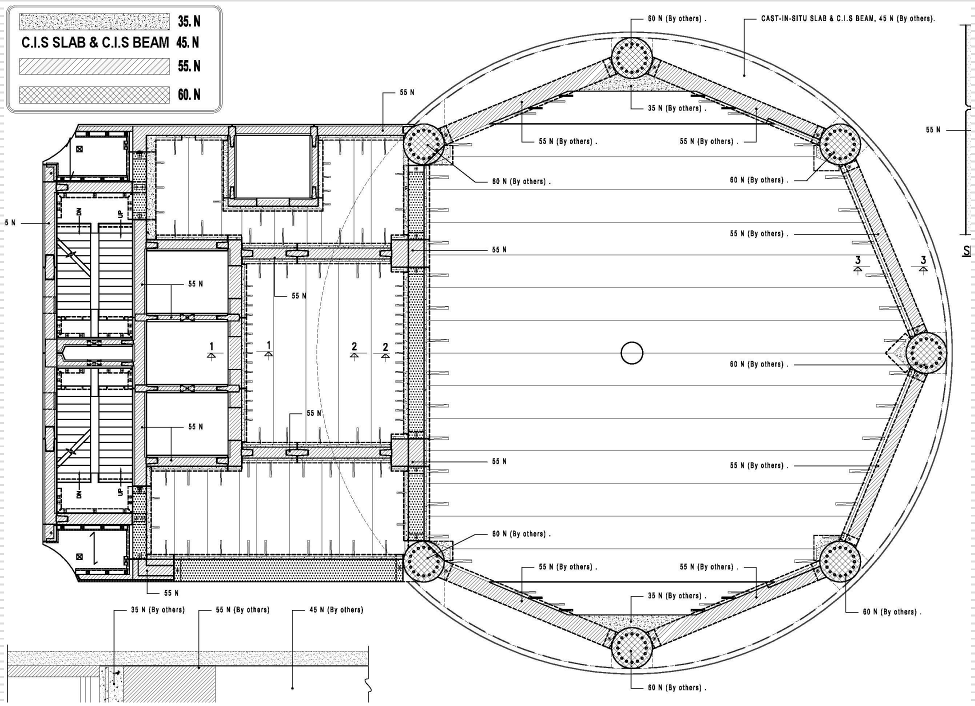
CONNECTION BETWEEN WALL TO WALL

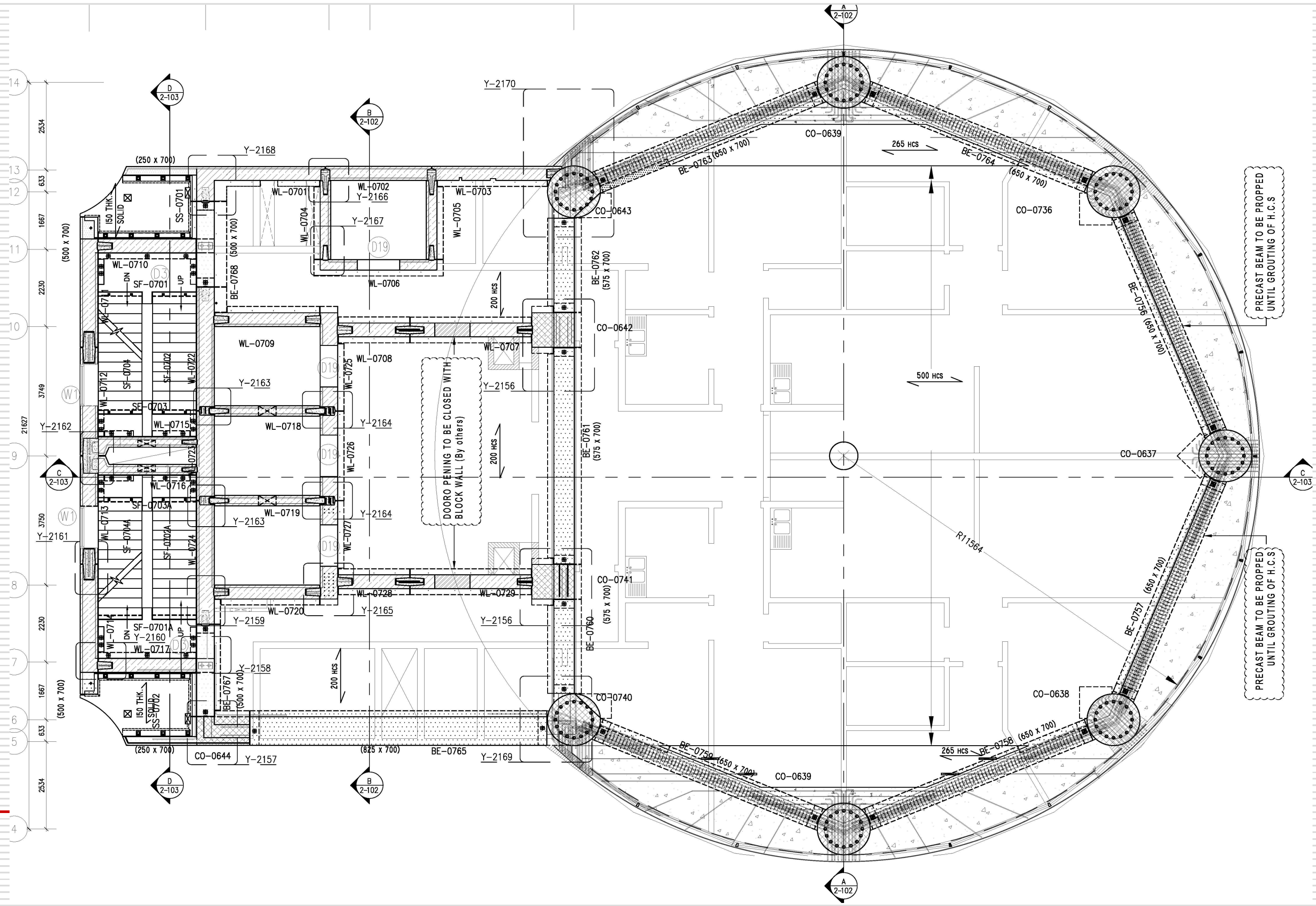


TYPICAL SHEAR WALL

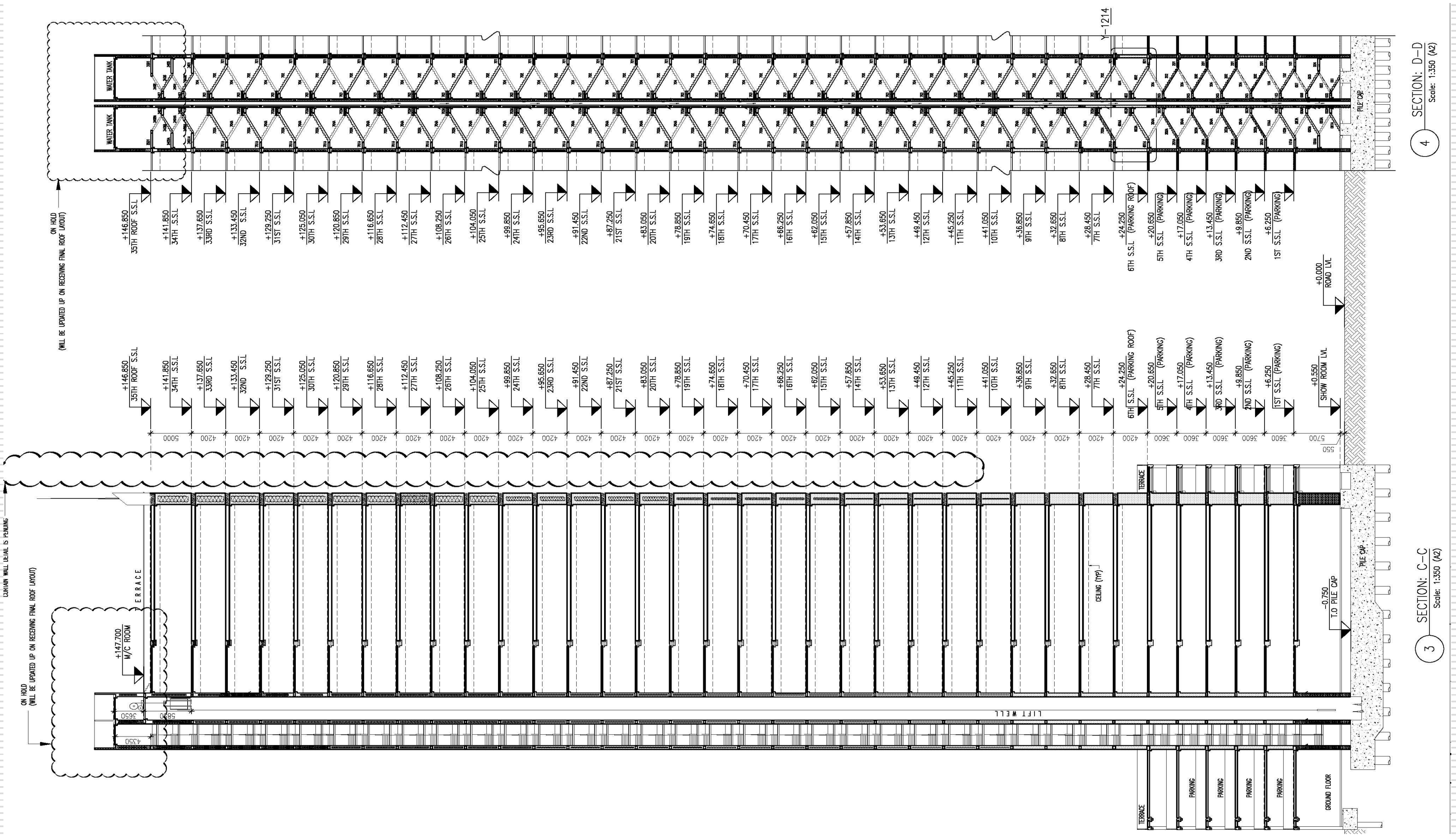
COMPLETED STRUCTURE

EXAMPLE-2 35-STOREY

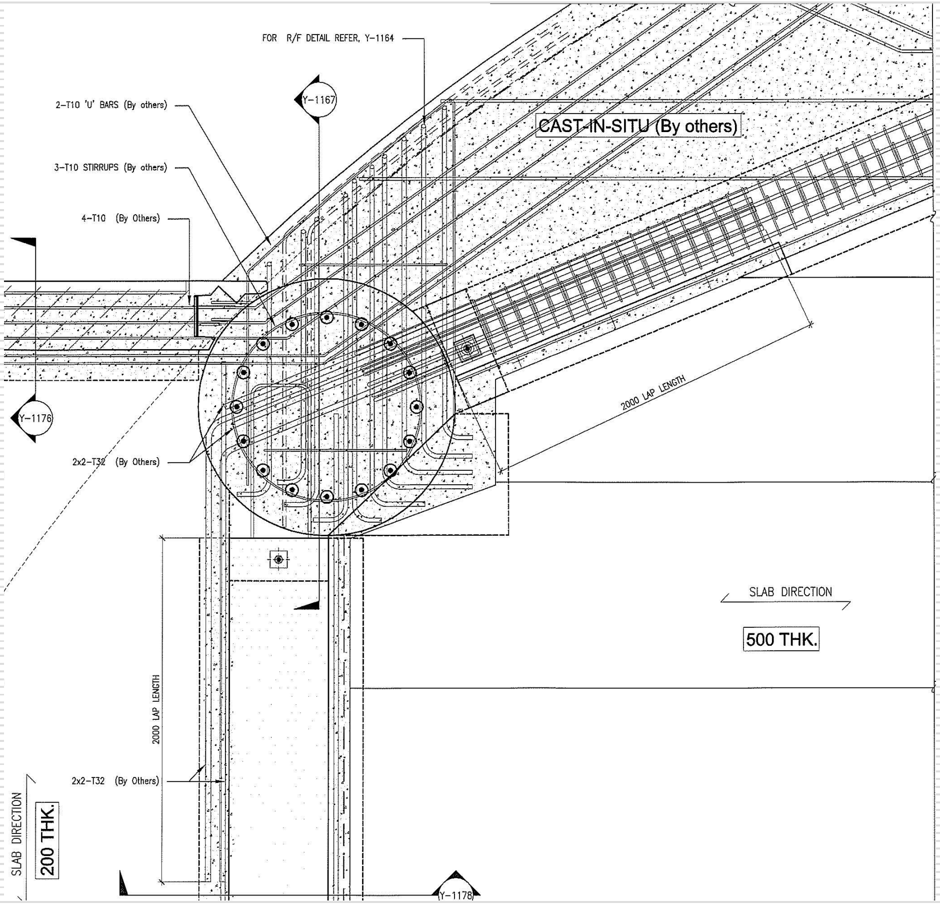




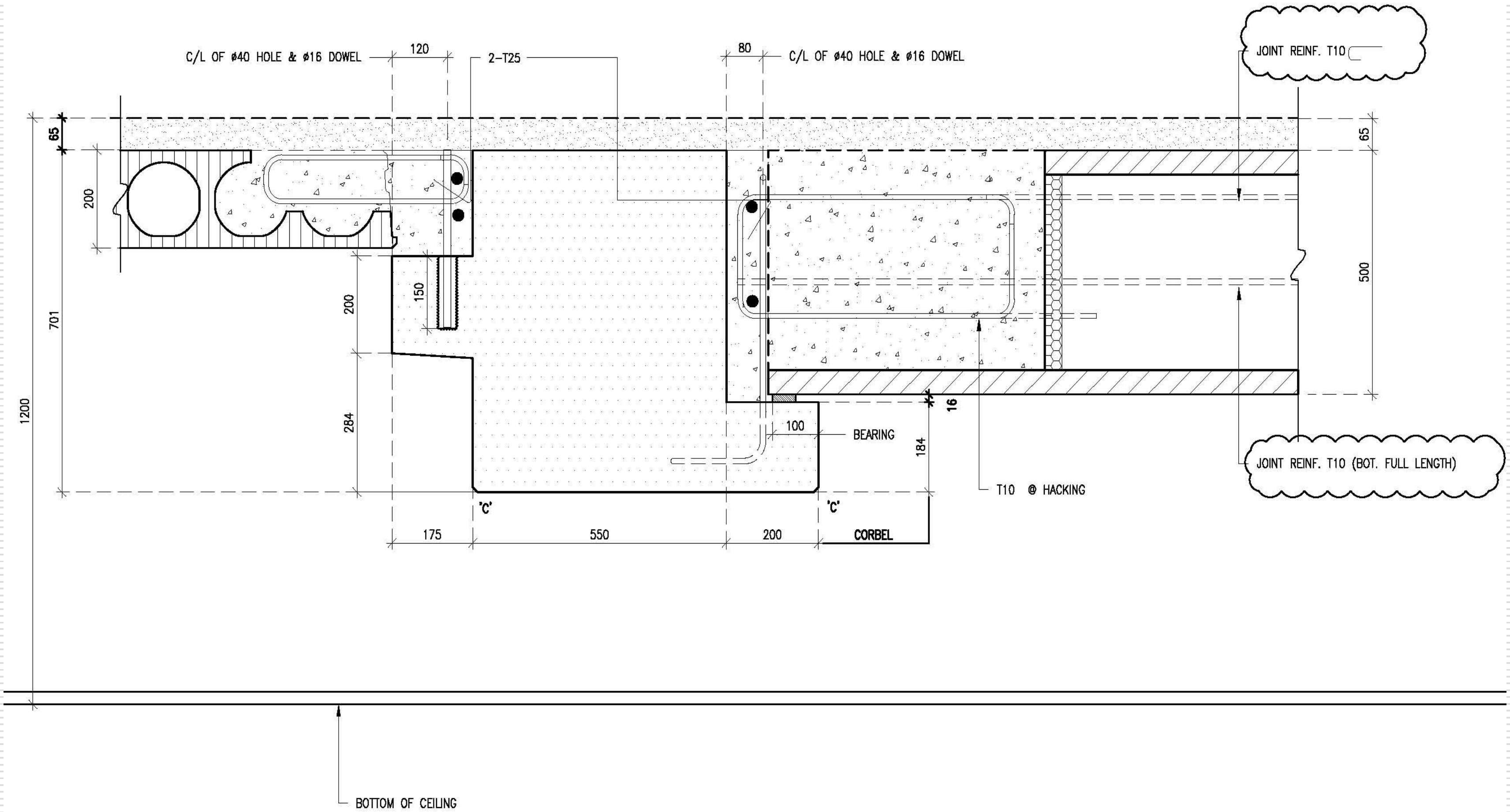
PRECAST BEAM TO BE PROPPED UNTIL GROUTING OF H.C.S
PRECAST BEAM TO BE PROPPED UNTIL GROUTING OF H.C.S)
DOORO PENING TO BE CLOSED WITH BLOCK WALL (By others)
Y-2170
Y-2168
Y-2166
Y-2167
Y-2163
Y-2164
Y-2162
Y-2161
Y-2165
Y-2159
Y-2160
Y-2158
Y-2157
Y-2156
Y-2169
CO-0639
CO-0643
CO-0736
CO-0642
CO-0637
CO-0741
CO-0740
CO-0638
CO-0644
BE-0763 (650 x 700)
BE-0764 (650 x 700)
BE-0756 (650 x 700)
BE-0757 (650 x 700)
BE-0758 (650 x 700)
BE-0759 (650 x 700)
BE-0762 (575 x 700)
BE-0761 (575 x 700)
BE-0760 (575 x 700)
BE-0768 (500 x 700)
BE-0767 (500 x 700)
BE-0765
(825 x 700)
(250 x 700)
(500 x 700)
WL-0701
WL-0702
WL-0703
WL-0704
WL-0705
WL-0706
WL-0707
WL-0708
WL-0709
WL-0710
WL-0715
WL-0716
WL-0717
WL-0718
WL-0719
WL-0720
WL-0728
WL-0729
WL-0725
WL-0726
WL-0727
SS-0701
SS-0702
SF-0701
SF-0701A
SF-0703
SF-0705
150 THK SOLID
265 HCS
500 HCS
200 HCS
R11564
21627
2534
633
1667
2230
3749
3750



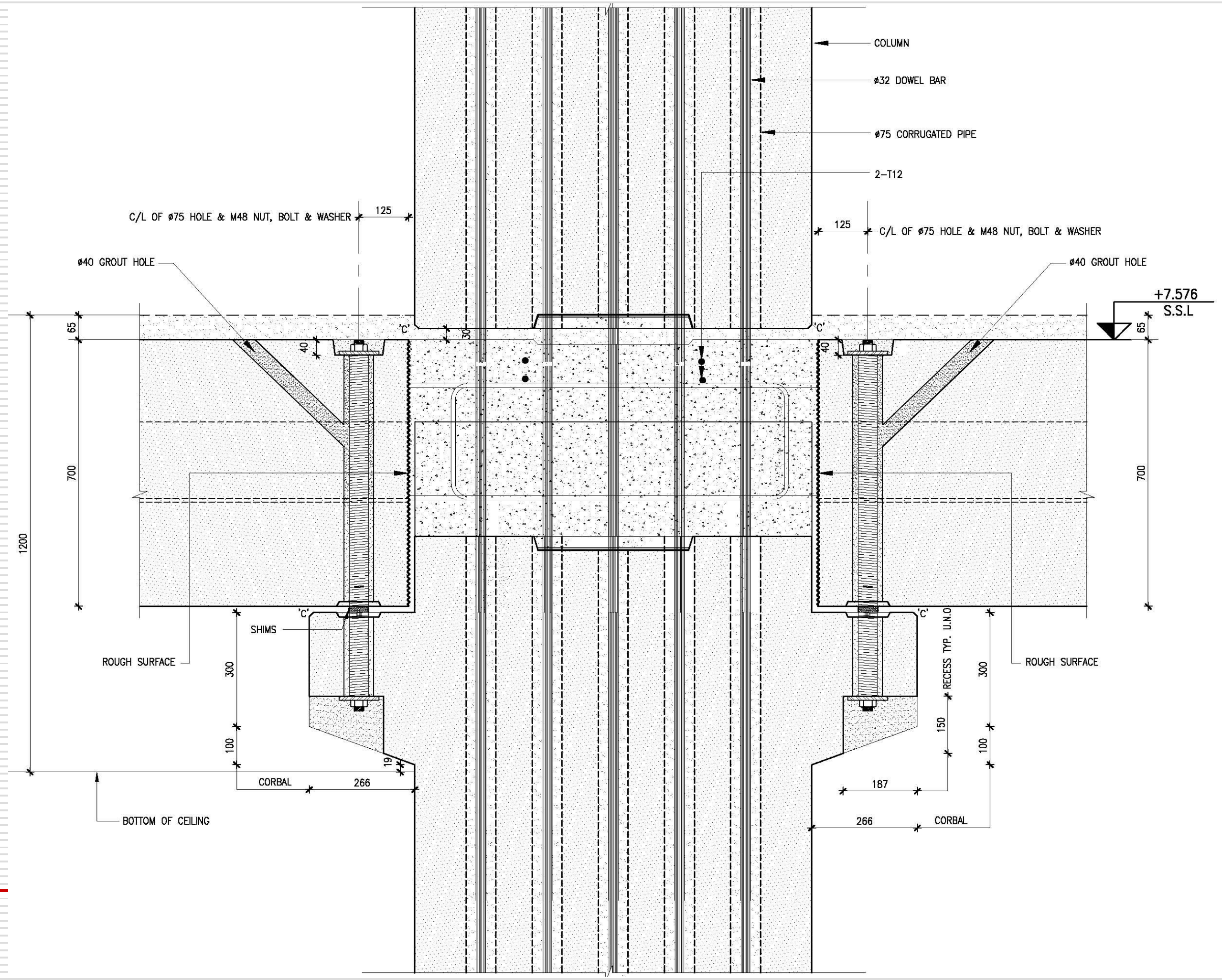
SECTION: D-D
Scale: 1:350 (A2)
SECTION: C-C
Scale: 1:350 (A2)
WATER TANK
WATER TANK
PILE CAP
LIFT WELL
CEILING (TYP)
TERRACE
PARKING
GROUND FLOOR
+146.850 35TH ROOF S.S.L
+141.850 34TH S.S.L
+137.650 33RD S.S.L
+133.450 32ND S.S.L
+129.250 31ST S.S.L
+125.050 30TH S.S.L
+120.850 29TH S.S.L
+116.650 28TH S.S.L
+112.450 27TH S.S.L
+108.250 26TH S.S.L
+104.050 25TH S.S.L
+99.850 24TH S.S.L
+95.650 23RD S.S.L
+91.450 22ND S.S.L
+87.250 21ST S.S.L
+83.050 20TH S.S.L
+78.850 19TH S.S.L
+74.650 18TH S.S.L
+70.450 17TH S.S.L
+66.250 16TH S.S.L
+62.050 15TH S.S.L
+57.850 14TH S.S.L
+53.650 13TH S.S.L
+49.450 12TH S.S.L
+45.250 11TH S.S.L
+41.050 10TH S.S.L
+36.850 9TH S.S.L
+32.650 8TH S.S.L
+28.450 7TH S.S.L
+24.250 6TH S.S.L (PARKING ROOF)
+20.650 5TH S.S.L (PARKING)
+17.050 4TH S.S.L (PARKING)
+13.450 3RD S.S.L (PARKING)
+9.850 2ND S.S.L (PARKING)
+6.250 1ST S.S.L (PARKING)
+0.000 ROAD LVL.
+0.550 SHOW ROOM LVL.
-0.750 T.O PILE CAP
+147.700 M/C ROOM
ON HOLD (WILL BE UPDATED UP ON RECEIVING FINAL ROOF LAYOUT)
CURTAIN WALL DETAIL IS PENDING



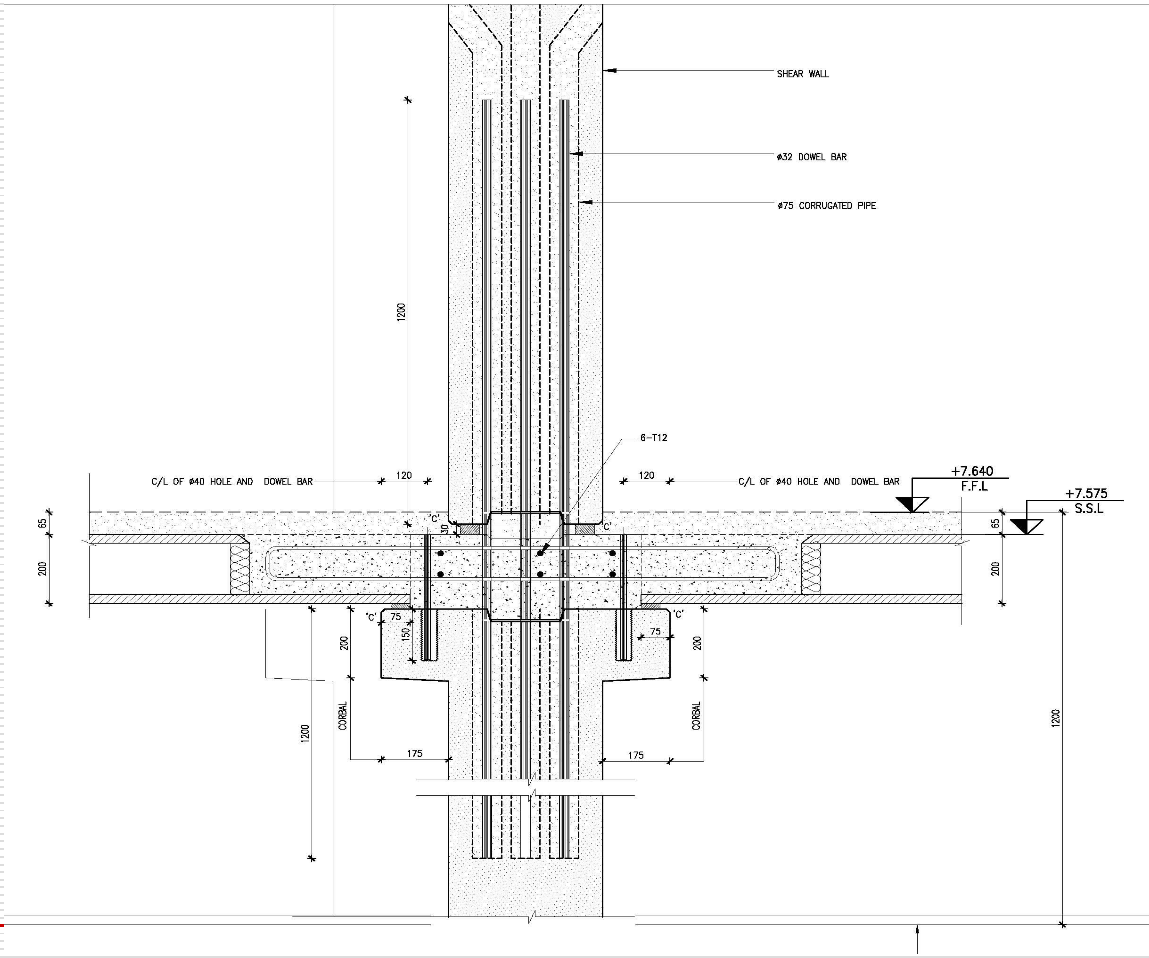
FOR R/F DETAIL REFER, Y-1164
2-T10 'U' BARS (By others)
Y-1167
3-T10 STIRRUPS (By others)
4-T10 (By Others)
CAST-IN-SITU (By others)
Y-1176
2x2-T32 (By Others)
2000 LAP LENGTH
SLAB DIRECTION
500 THK.
2000 LAP LENGTH
2x2-T32 (By Others)
SLAB DIRECTION
200 THK.
Y-1178

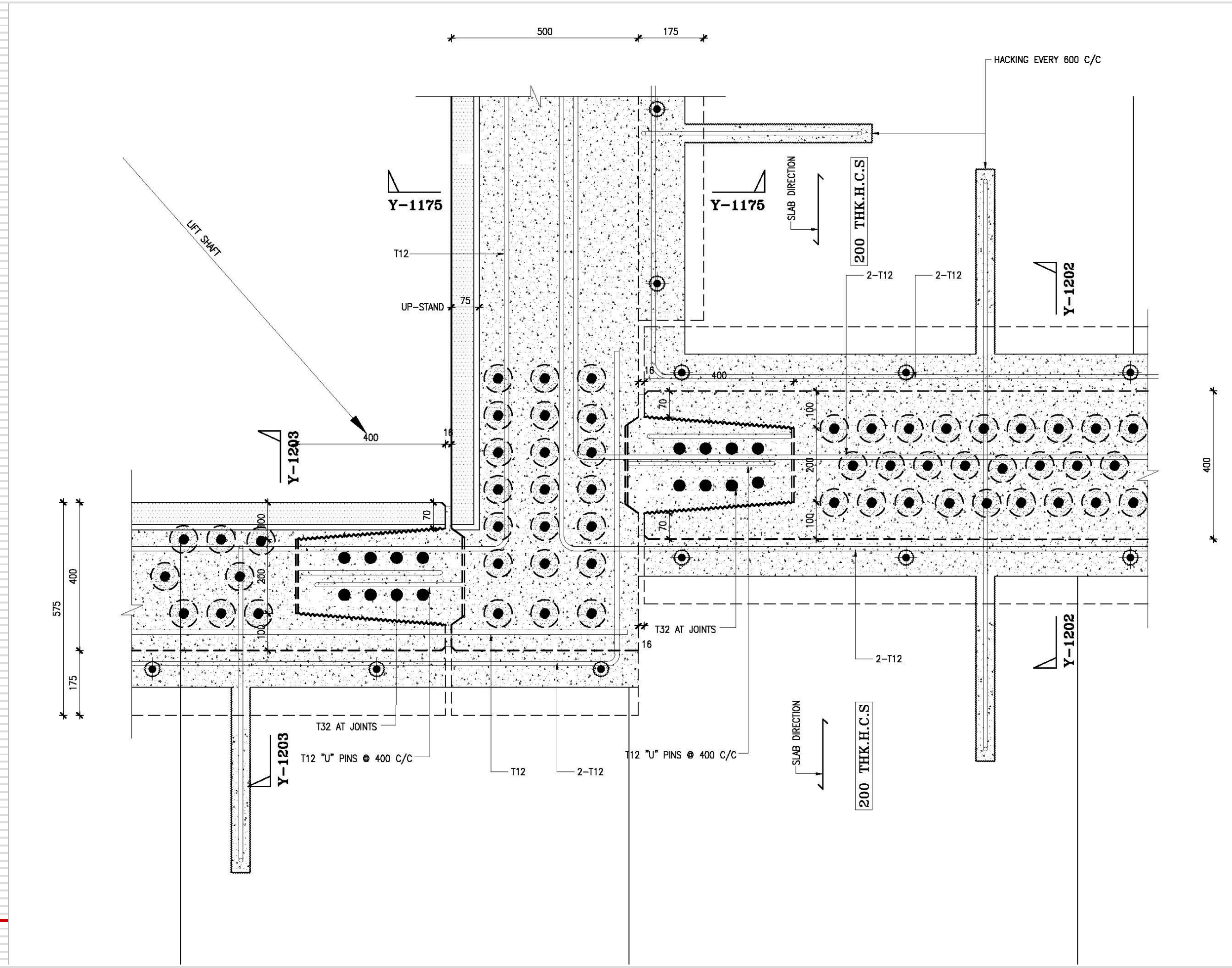


C/L OF ø40 HOLE & ø16 DOWEL
120
2-T25
80
C/L OF ø40 HOLE & ø16 DOWEL
JOINT REINF. T10
65
200
701
1200
150
200
284
500
16
100
BEARING
184
T10 @ HACKING
JOINT REINF. T10 (BOT. FULL LENGTH)
'C'
'C'
175
550
200
CORBEL
BOTTOM OF CEILING

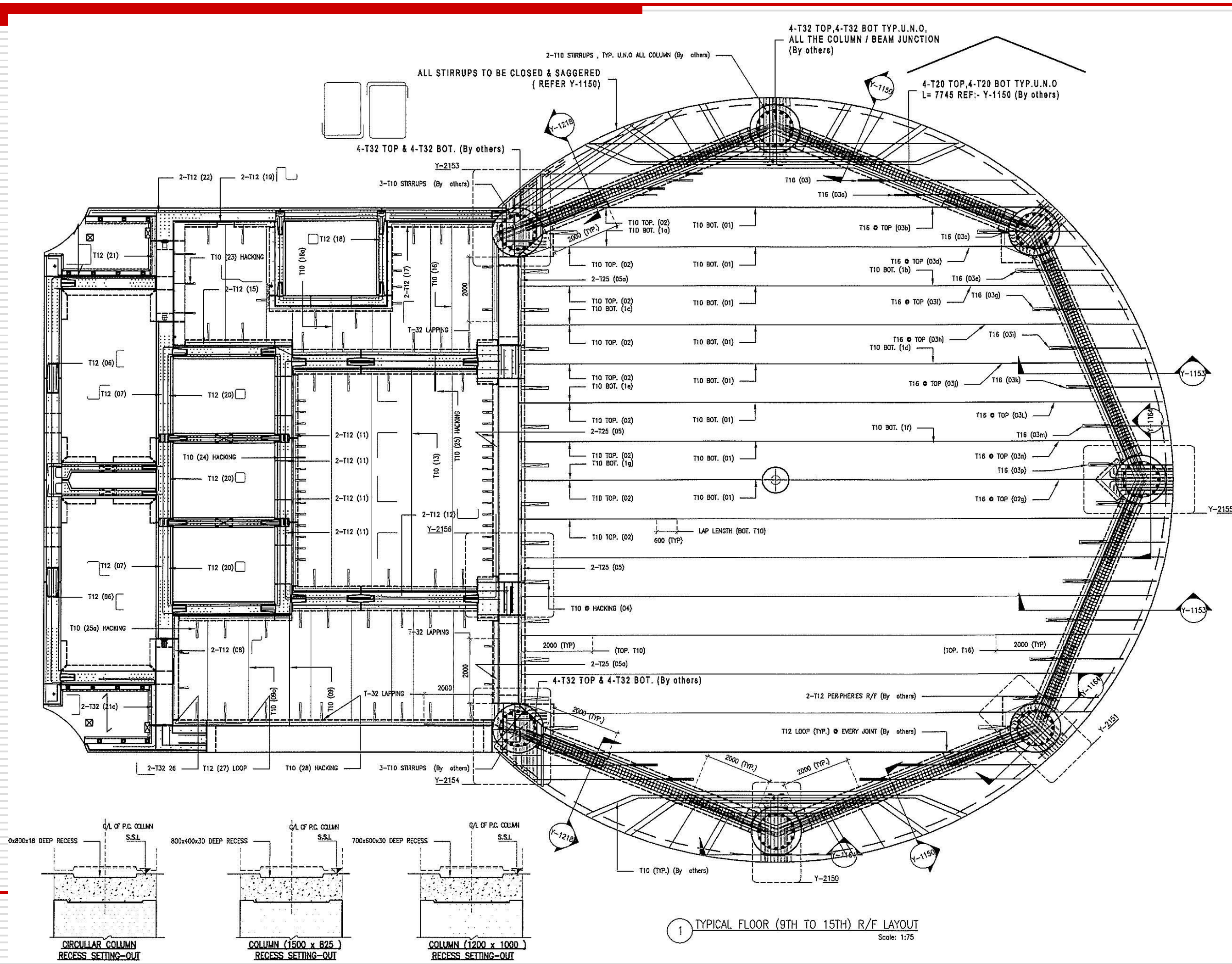


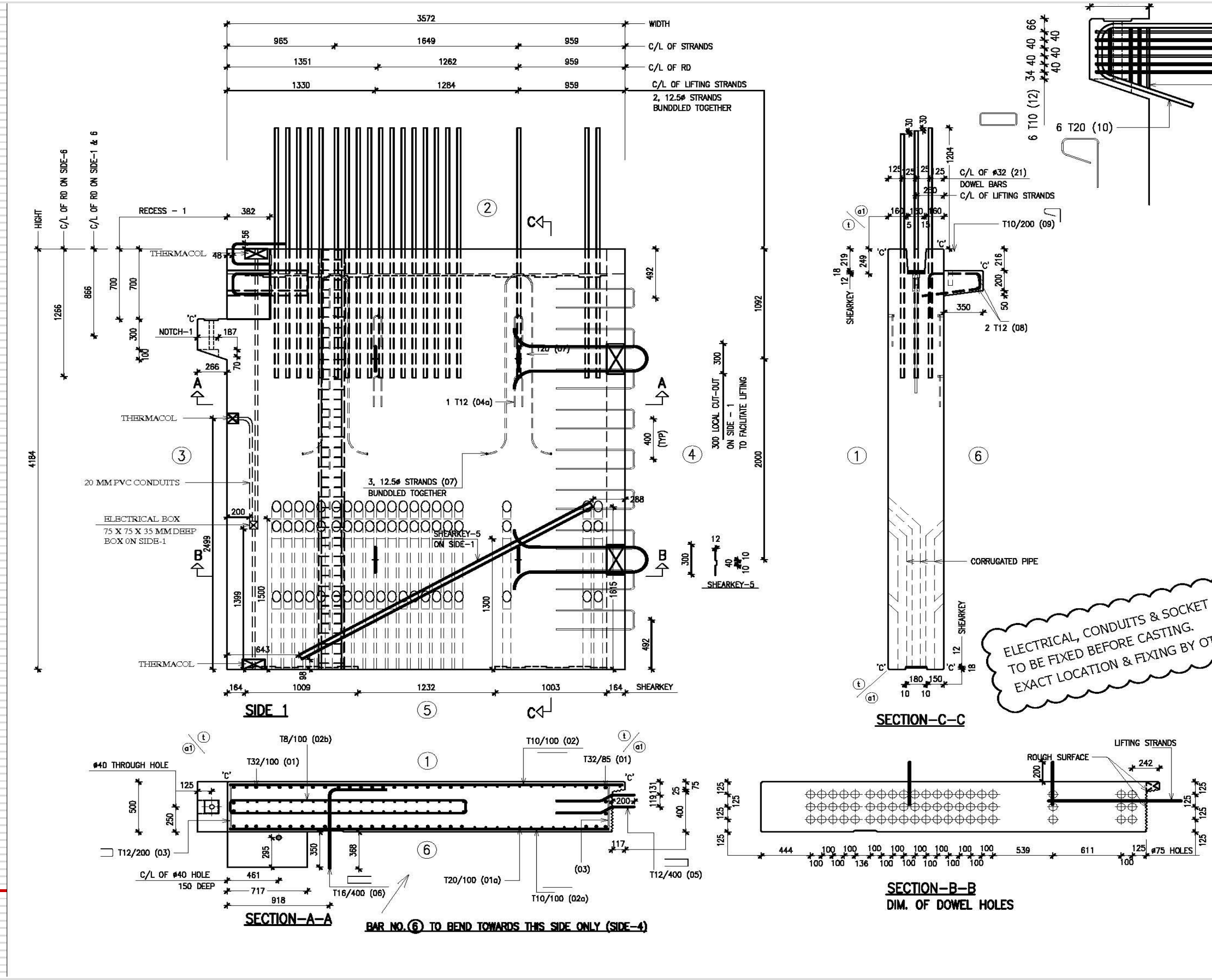
COLUMN
ø32 DOWEL BAR
ø75 CORRUGATED PIPE
2–T12
C/L OF ø75 HOLE & M48 NUT, BOLT & WASHER
125
ø40 GROUT HOLE
+7.576
S.S.L
65
40
30
'C'
700
1200
SHIMS
ROUGH SURFACE
300
100
19
CORBAL
266
BOTTOM OF CEILING
RECESS TYP. U.N.O
150
187


SHEAR WALL
ø32 DOWEL BAR
ø75 CORRUGATED PIPE
1200
6-T12
C/L OF ø40 HOLE AND DOWEL BAR
120
120
C/L OF ø40 HOLE AND DOWEL BAR
+7.640
F.F.L
+7.575
S.S.L
65
200
30
'C'
75
150
200
CORBAL
175
1200
175
CORBAL
200
75
65
200
1200



500
175
HACKING EVERY 600 C/C
Y-1175
Y-1175
SLAB DIRECTION
200 THK.H.C.S
LIFT SHAFT
T12
UP-STAND
75
2-T12
2-T12
Y-1202
16
400
400
Y-1203
70
100
200
100
575
400
175
T32 AT JOINTS
16
2-T12
Y-1202
T32 AT JOINTS
T12 "U" PINS @ 400 C/C
T12
2-T12
T12 "U" PINS @ 400 C/C
SLAB DIRECTION
200 THK.H.C.S
Y-1203


4-T32 TOP,4-T32 BOT TYP.U.N.O,
ALL THE COLUMN / BEAM JUNCTION
(By others)
4-T20 TOP,4-T20 BOT TYP.U.N.O
L= 7745 REF:- Y-1150 (By others)
ALL STIRRUPS TO BE CLOSED & SAGGERED
(REFER Y-1150)
4-T32 TOP & 4-T32 BOT. (By others)
4-T32 TOP & 4-T32 BOT. (By others)
CIRCULLAR COLUMN
RECESS SETTING-OUT
COLUMN (1500 x 825)
RECESS SETTING-OUT
COLUMN (1200 x 1000)
RECESS SETTING-OUT
TYPICAL FLOOR (9TH TO 15TH) R/F LAYOUT
Scale: 1:75


SIDE 1
SECTION-A-A
SECTION-B-B
DIM. OF DOWEL HOLES
SECTION-C-C
BAR NO. 6 TO BEND TOWARDS THIS SIDE ONLY (SIDE-4)
WIDTH
C/L OF STRANDS
C/L OF RD
C/L OF LIFTING STRANDS
2, 12.5# STRANDS BUNDDLED TOGETHER
3, 12.5# STRANDS (07) BUNDDLED TOGETHER
RECESS - 1
NOTCH-1
THERMACOL
20 MM PVC CONDUITS
ELECTRICAL BOX
75 X 75 X 35 MM DEEP BOX ON SIDE-1
SHEARKEY-5 ON SIDE-1
SHEARKEY-5
SHEARKEY
300 LOCAL CUT-OUT ON SIDE - 1 TO FACILITATE LIFTING
HIGHT
C/L OF RD ON SIDE-6
C/L OF RD ON SIDE-1 & 6
1 T12 (04a)
C/L OF #32 (21) DOWEL BARS
C/L OF LIFTING STRANDS
T10/200 (09)
2 T12 (08)
6 T20 (10)
6 T10 (12)
CORRUGATED PIPE
ELECTRICAL, CONDUITS & SOCKET B TO BE FIXED BEFORE CASTING. EXACT LOCATION & FIXING BY OTH
#40 THROUGH HOLE
T8/100 (02b)
T32/100 (01)
T10/100 (02)
T32/85 (01)
T12/200 (03)
C/L OF #40 HOLE 150 DEEP
T16/400 (06)
T20/100 (01a)
T10/100 (02a)
T12/400 (05)
ROUGH SURFACE
LIFTING STRANDS
#75 HOLES

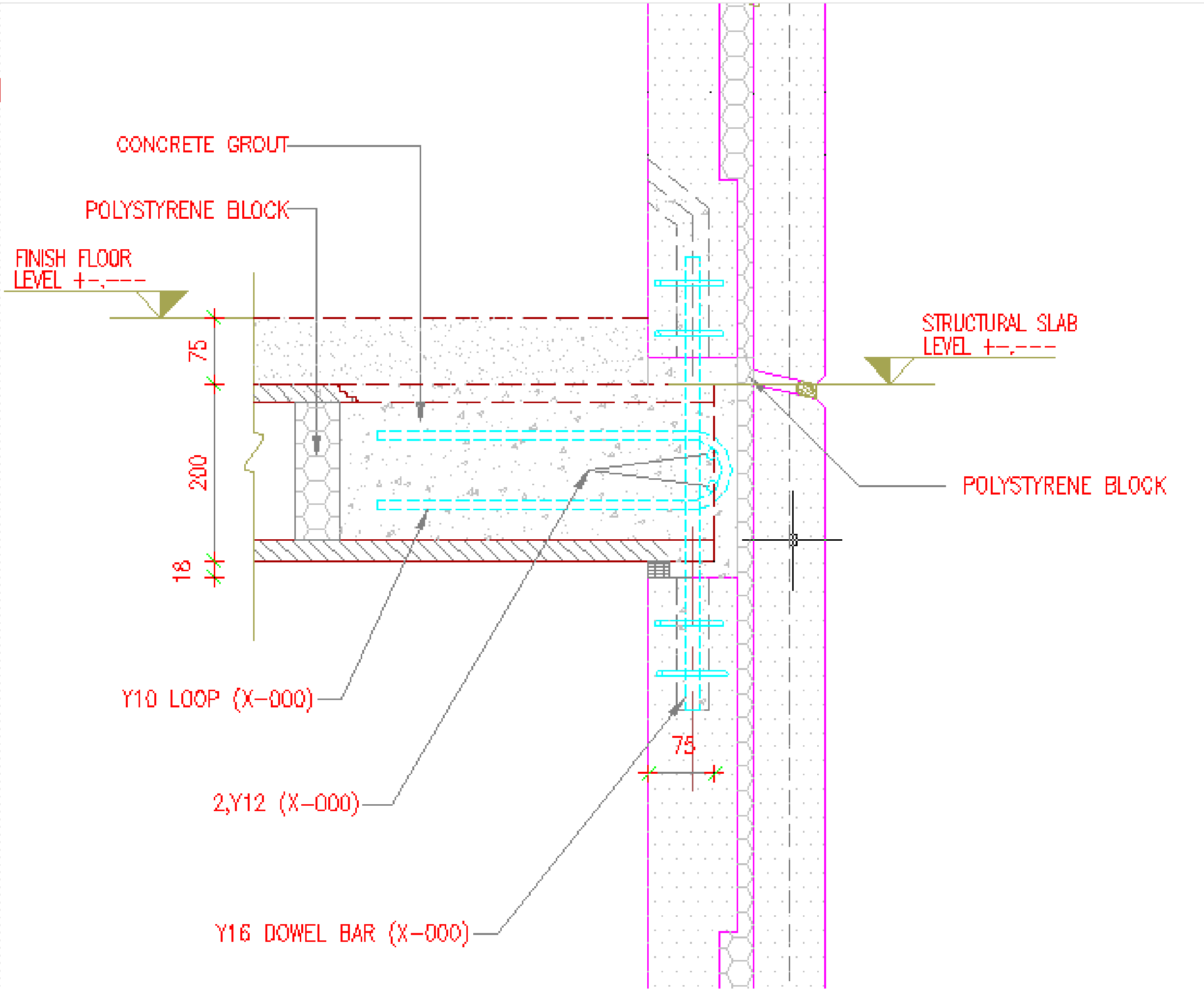

ELITE GRANDE HOTEL

PROJECTS

24 Storey

35 Storey on completion

ERECTION DETAILS FOR LOAD BEARING PANELS



PANEL TO PANEL CONNECTIONS

PRECAST LOAD BEARING PROJECTS

PRECAST LOAD BEARING PROJECTS

- .


شركة البحرين للخرسانة المسبوكة ذ.م.م.
BAHRAIN PRECAST CONCRETE CO. W.L.L.

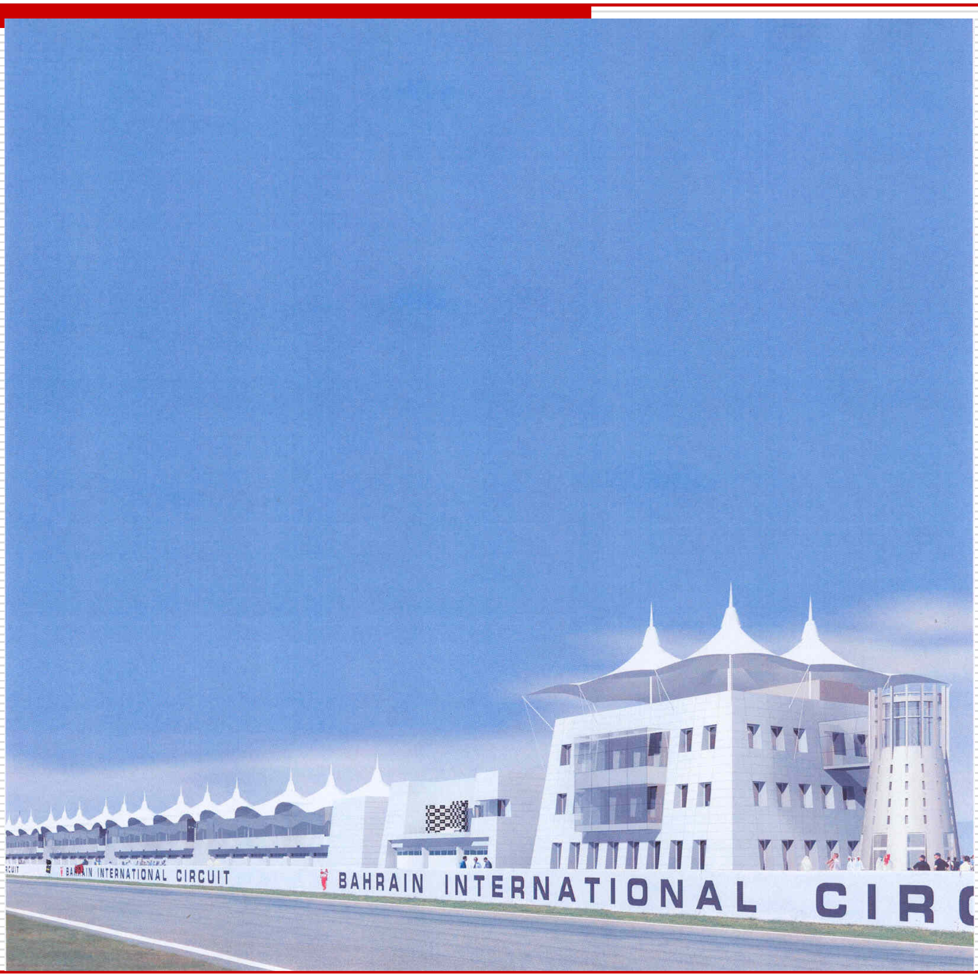

AL-IMAN SCHOOL

MONUMENTS


ISA TOWN


alba
ALBA HEALTHCARE CENTRE
مركز البا الصحي


مبنى مكاتب من خمس أدوار
FIVE STOREY OFFICE BUILDING
GEMAC
جيماك
AL MOAYYED CONSTRUCTION
AIR CONDITIONING CONTRACTOR


BAHRAIN INTERNATIONAL CIRCUIT
BAHRAIN INTERNATIONAL CIRC