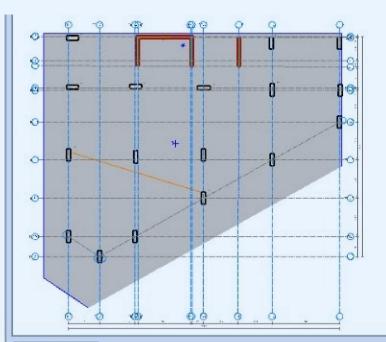
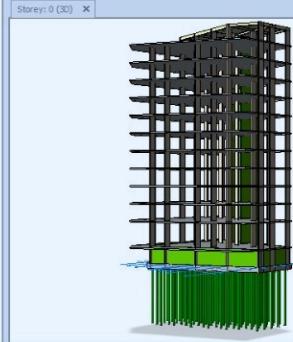
# THE COPYRIGHTS OF THESE PLANS AND DRAWINGS ARE RESERVED FOR DR-MAJID AL BANA







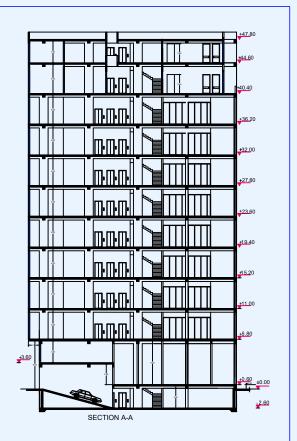












Notes

THE BUILDING SYSTEM WILL BE CONSIDER AS SHEAR WALL BUILDING WITH COLUMNS AND THE SLAB WILL BE AS FLAT SLAB WITH DROP PANEL &M. BEAMS.THE SOFTWARE USED IN DESIGN (CSI ETABS 2022, AND CSI SAFE 2022&PROKON) IS THE GENERAL PROGRAM USED IN THIS DESIGN

COMMERCIAL BUILDING \_

Structural Drawings

DESIGNED BY DR-Majid Albana
CHECKED BY
SCALE As Shown

DATE 6/2025
SHEET NO. Str. 1

# **GENERAL:-**

- 1. ALL DIMENSIONS TO TAKE PRECEDENCE OVER SCALE SHOWN ON PLANS, SECTIONS AND DETAILS, (DO NOT SCALE FROM DRAWINGS).
- 2. ALL DIMENSIONS ARE IN MILLIMETRES AND ALL LEVELS IN METRES (UNO).
- THE STRUCTURAL DRAWINGS SHOULD BE USED IN CONJUNCTION WITH THE ARCHITECTURAL, MECHANICAL, CIVIL, PLUMBING AND ELECTRICAL DRAWINGS.
- 4. ALL OPENINGS SIZE AND LOCATION SHOULD BE VERIFIED AND CHECKED WITH SERVICES DRAWINGS, WHERE OPENINGS SIZES ARE NOT SHOWN ON THE STRUCTURAL DRAWINGS, SITE ENGINEER SHALL INTRODUCE SUCH OPENINGS WITH PROPER FRAMING INCLUDING ANY REVISION TO THE SIZES SHOWN ON THE DRAWINGS.
- 5. DESIGN STANDARED & LOADS :-
- DESIGN & CONSTRUCTION OF REINFORCED CONCRETE STRUCTURES MEMBERS SHALL IN ACCORDANCE WITH ACI-318-95 (ULTIMATE STRENGTH DESIGN METHOD).
- ALL RETANING WALL STRUCTURE SHOULD BE AS BRITISH 8 97- 110 or ACI 93 318.
- MASONARY BRICK OR CONCRETE BLOCK ACCORDING TO B.S.-5628
- 6. LOADING :
- MINIMUM DESIGN LOAD (LIVE LOAD) ACCORDING TO IBC-09.
- SEISMIC LOAD ACCORDING TO IRAQI SEISMIC CODE 1997.
- WIND LOAD ACCORDING TO ASCE-05.
- 7. FOR TYP. SECTIONS & DETAILS SEE ST-G2

# FOUNDATION AND EARTH WORK:-

- 1. FOUNDATION DESIGN BASED ACCORDING TO THE SOIL REPORT PREPARED BY THE & RESEARCH ( , ) , \ \ \ \).
- BEARING CAPACITY ACCORDING TO THE SOIL REPORT IS (90K/m²) AT DEPTH OF (-4.00m) BELOW THE EXISTING N.G.L.
- 3. A WELL COMPACTED SUB-BASE LAYERS OF A TOTAL THICK AS INDICATED IN THE DWG. SHOULD BE USED UNDER FOOTING WITH FOLLOWING SPECIFICATIONS:-
- THE DIMENSION OF THE SUB-BASE LAYERS SHOULD BE LARGER THAN THE DIMENSIONS OF THE FOUNDATION FROM ALL SIDES BY 0.25m.
- THE VALUE OF CALIFORNIA BEARING RATIO (C.B.R) SHALL NOT BE LESS THAN (35% ASTM D)
   1883 AT 95% OF THE MAXIMUM DRY DENSITY ESTABLISHED ACCORDING TO (ASTM D)1557.
- LIQUID LIMIT ≤ 25%.
- PLASTICITY INDEX ≤ 6%
- ORGANIC MATERIAL ≤ 2%.
- SO<sub>3</sub> ≤ 5%.
- TOTAL SOLUBLE SALTS ≤ 5%.
- GYPSUM CONTENT ≤ 10.75%.
- RELATIVE COMPACTION 95% (MODIFIED PROCTOR).
- 4. SULPHATE RESISTANT CEMENT TYPE 5 SHOULD BE USED IN ALL CONCERET WORK IN CONTACT WITH EARTH OR BELOW D.P.C. LEVEL.
- 5. BACKFILL AROUND FOOTINGS AND UTILITY TRENCH WITHIN THE BUILDING AREA SHOULD BE DONE WITH APPROVED SELECTED CLASSIFIED MATERIAL FREE OF CLAY AND SHOULD BE MECHANICALLY COMPACTED IN LAYERS, NOT EXCEEDING 250mm LOOSE THICKNESS TO, 90% OF MAXIMUM PROCTOR DENSITY.

# **CONSTRUCTION JOINT AND WATERPROOFING:-**

- 1. CONSTRUCTION JOINT :-
- CONSTRUCTION JOINT IN FLOORS SHOULD BE LOCATED WITHIN THE MIDDLE THIRD OF SPANS OF SLABS, BEAMS & GIRDERS, JOINT IN GIRDER SHOULD BE OFFSET A MINIMUM DISTANCE OF TWO TIMES THE WIDTH OF INTERSECTING BEAMS.
- AT CONSTRUCTION JOINTS SURFACES SHOULD BE ROUGHENED BY BROOMING OUT MORTAR, EXPOSING 12mm OF COARSE AGGREGATE TWO HOURS AFTER PLACING CONCRETE.
- CONSTRUCTION JOINTS FOR STRUCTURAL SLAB / FOUNDATION / WALLS ETC. AND VOLUME OF CASTING IN A POUR SHOULD BE APPROVED BY THE ENGINEER.
- CONSTRUCTION JOINTS SHOULD BE DOWELED, KEYED AND THOROUGHLY CLEANED, ALL
  CONSTRUCTION JOINTS SHOULD BE CONSTRUCTED IN ACCORDANCE WITH THE TYPICAL
  CONSTRUCTION JOINT DETAILS SHOWN ON THE STRUCTURAL DRAWINGS CONTRACTOR
  HAVE TO PREPARE ANY MISSING DETAILS NOT COVERED IN THE STRUCTURAL DRAWINGS
  AND SUBMIT FOR ENGINEER'S APPROVAL.
- 2. WATERPROOFING :-
- WATER STOPS SHOULD BE USED AT ALL CONSTRUCTION, CONTRACTION & EXPANSION JOINTS, WHERE WATERPROOFING SYSTEM IS APPLIED ALL INTERSECTION PIECES OF WATER STOPS SHOULD BE FACTORY MOLDED.
- ALL CONCRETE WORKS IN CONTACT WITH SOIL FOR NORMAL STRUCTURE SHOULD BE COATED WITH PROTECTIVE LAYER.
- , all dim. from ARCH D.W.G.

# **REINFORCED CONCRETE:-**

1. COMPRESIVE STRENGTH OF CONCRETE SHOULD BE DETERMIND BY THE TABLE BELOW :-

LOCATIONS  MEMBER TYPE	MINIMUM 28 DAYS CUBE COMPRESSIVE STRENGTH (Fcu) ( MPa )	AGGREGATE MAX. SIZE
SCREED	20	10 mm
BLINDING OR LEAN CONCRETE	20	20 mm
SLABS	40	20 mm
PILES	-	20-38 mm
FOUNDATIONS	40	20 mm
COLUMNS AND SHEAR WALLS	50	20 mm
SUSPENDED SLAB, BEAMS AND WALLS	40	20 mm
WATER RETAINING STRUCTURES	-	20 mm
PLAIN CONCRETE	25	20 mm

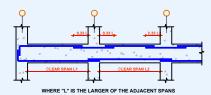
- SULPHATE RESISTANT CEMENT TYPE 5 SHOULD BE USED IN ALL CONCERET WORK IN CONTACT WITH EARTH OR BELOW D.P.C LEVEL.
- REINFORCMENT STEEL CONFORM TO ASTM A615 & A616 OR A617 BARS SHOULD BE GRADE 400 FY=410N/mm (60000psi).
- 4. PLACING OF REINFORCEMENT SHOULD BE ACCORDING TO ACI-315 DETAILING MANUAL
- 5. MINIMUM BARS COVER :-

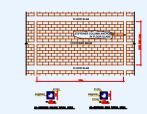
MEMBER	(mm)
SLABS	25
BEAMS & GIRDERS	40
COLUMNS	40
INTERIOR WALLS	25
EXTERIOR FACE OF WALL	40
FORMED FOUNDATION	50
NON-FORMED FOUNDATION	75

- 6. MINIMUM BARS SPACING :-
- CLEAR SPACING BETWEEN PARALLEL BARS SHALL NOT BE LESS THAN BAR DIAMETER OR 4/3 OF MAXIMUM AGGREGATE SIZE BUT NOT LESS THAN 25mm.
- $\bullet$  CLEAR SPACING BETWEEN LAYERS OF BARS TO BE NOT LESS THAN 25mm AND THE UPPER BARS SHOULD BE OVER THE LOWER BARS .
- $\bullet$  IN COLUMNS CLEAR DISTANCE BETWEEN LONGITUDINAL BARS SHOULD BE NOT LESS THAN 1.5 BAR DIAMETER NOR LESS THAN 40mm.
- 7. MINIMUM LAP LENGTH (UNLESS NOTED ON DRAWINGS) SHOULD BE AS TABLE BELWO :-

BAR DIA.(mm)	10	12	16	18	20	22	25
LAP LENGTH (mm) IN COLUMNS	400	500	600	650	700	800	900
LAP LENGTH (mm) IN	400	600	700	800	900	1000	1250

- LAP LOCATION IN SLABS AND BEAMS :-
- \* AT SUPPORT FOR BOTTOM BARS.
- $^{\star}\,$  AT MID SPAN FOR TOP BARS.
- LAP LOCATION IN FOUNDATION :
- \* AT SUPPORT FOR TOP BARS.
- \* AT MID SPAN FOR BOTTOM BARS.
- 8. VERTICAL REINFORCEMENT IN COLUMN :-
- WHERE COLUMN FACE ARE OFFSET 75mm OR MORE SPLICE OF VERTICAL BARS
  TO THE OFFSET FACE SHOULD BE MADE BY SEPARATE DOWELS OVER LAP AS SPECIFIED
  ABOVE.
- WHERE A LONGITUDINAL BARS ARE OFFSET AT SPLICE THE SLOPE OF INCLINED ADJACENT PORTION SHALL NOT EXCEED 1:6 (HORIZANTAL:VERTICAL).
- CHANGING OF REINFORCEMENT BETWEEN FLOORS WHERE SUCH SITUATION OCCURS THE REINFORCEMENT OFF SHOULD BE CUT OFF AT DISTANCE 75mm BELOW FLOOR LEVEL SPACED 100mm AND PLACED BEFOR THE POINT OF BEND.
- WHERE LONGITUDINAL BARS OFFSET,PROVIDE 4TIES.
- 9. HOT & COLD WETHERING SHOULD BE ACCORDING TO ACI-305R-99.
- 10. ALL REINFORCING BAR BENDS TO BE MADE COLD.
- 11. IN ONE-WAY SLAB, SHRINKAGE & TEMPERATURE REINF. STEEL EXTENDING IN THE LONG DIRECTION SHALL BE PLACED IN THE PLACE OF, AND TIED TO THE MAIN REINF. EXTENDING IN THE SHORT DIRECTION.
- 12. MIXING & PLACING CONCRETE SHOULD BE DONE ACCORDING TO ACI 318M 95 (CHAPTER 5) CONDUIT OR PIPE SIZE SHALL NOT EXCEED 30% OF SLAB THICKNESS UNLESS SPECIFICALLY DETAILED OTHERWISE CONCENTRATIONS OF CONDUITS OR PIPES SHOULD BE AVOIDED EXCEPT WHERE DETAILED OPENINGS ARE PROVIDED, ALL SUBJECTED TO ENGINEER'S APPROVAL.





# THE DESIGN LOADS

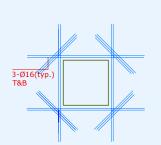
# 1) SUPER IMPOSED DEAD LOAD (SDL):



# 2) LIVE LOADS:

RESIDENTIAL AREAS 3.0 KN/m² STAIRCASE 4.0 KN/m²

Ø10 @ 200



provid construction joint for max.(5mx5m)

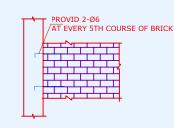
E-WALL CORNERS AND INTERSECTIONS



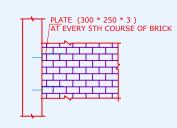


Ø10 @ 200

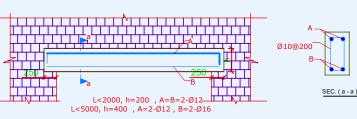
TYPICAL UP STAND DETAIL
ROOF OPENNINGS



CONECTION BETWEEN BRICK WALL
AND R.C. COLUMN
proposel 1



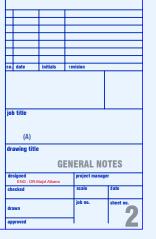
CONECTION BETWEEN BRICK WALL AND R.C. COLUMN proposel 2



LINTEL REINFORCEMENT

### ARCH ARCHITECTURAL BEAM воттом C1 CANT COLUMN TYP C1 CANTILEVER CJ CONSTRUCTION JOIN CENTRE COULMN CONC CONCRETE DETAIL DIMENSION DIM DWG D E.A DRAWING DEPTH EACH EACH FACE EXPANSION JOINT ELEVATION **ELEV EACH WAY** FOOTING FOOTING TYPE-1 FOUNDATION FINISH FLOOR LEVEL GEN GENERAL LIVE LOAD MAX MAXIMIM MECHANICAL MINIMUM MILLIMETRES

ABBREVIATIONS :-



### A. GENERAL

- A1. ALL STRUCTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE RELEVANT CIVIL, INFRASTRUCTURE, ARCHITECTURAL, MECHANICAL, ELECTRICAL DESIGN DRAWINGS, BOQ AND SPECIFICATIONS. IF ANY DISCREP IS FOUND, THE CONTRACTOR SHALL CONTACT THE ENGINEER IMMEDIATELY BEFORE PROCEEDING WITH THE

- OF FORMWORK, ANY DISCREPANCY SHALL BE BROUGHT TO THE NOTICE OF THE ENGINEER FOR CLARIFICATION.
- A5. CONSTRUCTION LOADS SHALL NOT EXCEED THE (SIDL+1) KN PER SQUARE METER. PROVIDE ADEQUATE SHORING AND/OR BRACING WHERE STRUCTURE HAS NOT ATTAINED THE FULL DESIGN STRENGTH.
- A6. REFER TO ARCHITECTURAL (AND OTHER TRADES) DRAWINGS FOR OPENINGS AND SLEEVES IN CONCRETE
  SLABS NOT SHOWN ON STRUCTURAL DRAWINGS, AND FOR SIZE AND LOCATION OF OPENINGS NOT DIMENSIONED
  2.1 GENERAL
  NO BERNARGE S LALLOWED IN CONCRETE AFTER CASTING.

- A8. NO OPENINGS OR SLEEVES SHALL BE PLACED IN BEAMS OR COLUMNS EXCEPT AS INDICATED ON
- A9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER SETTING OUT OF THE WORKS, FOR CORRECTNESS OF LINE AND LEVEL AND FOR QUALITY CONTROL OF THE MATERIALS. THE APPROVAL OF THE ENGINEER SHALL NOT IN ANY WAY RELEVE THE CONTRACTOR OF HIS RESPONSIBILITY AND ANY ERRORS SHALL BE RECTIFIED BY THE CONTRACTOR TO THE APPROVAL OF THE ENGINEER.

# B. DESIGN CRITERIA

### B1. CODES AND STANDARD

- REINFORCED CONCRETE: BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE, ACI 318M-19
- SEISMIC LOAD DESIGN: BUILDING CODE (IBC 2009) IRAQI SEISMIC CODE

- WIND LOAD DESIGN: AMERICAN SOCIETY OF CIVIL ENGINEERS (ACSE 7-16)

# STRUCTURAL MEMBERS ARE DESIGNED TO RESIST THE TOTAL DEAD LOADS ACTING ON THEM PLUS THE FOLLOWING I TVF LOADS:

- STAIRS			
B2.2 SEISMIC LO	DADS		
- MAXIMUM CO	NSIDERED EARTHQUA	KE MOTION OF 0.2 SEC (Ss)	
- MAXIMUM CO	NSIDERED EARTHQUA	KE MOTION OF 1.0 SEC (S1)	)
- STRUCTURAL	SYSTEM FACTOR		
. cnc			

# 

# C1. CONCRETE

COMPRESSIVE STRENGTH OF CONCRETE, Fou. AS DEFINED BY ASTANDARD 150mm CUBE AT 28 DAYS SHALL BE AS FOLLOWS: A. CONCRETE IN CONTACT WITH SOIL:
• PILE RAFT AND RETAINING WALLS ....

- PILES BLINDING	50MPa 20 MPa
B. CONCRETE FROM BASEMENT FLOOR TO FIFTH FLOOR (EXCEPT THIRD FLOOR):  COLUMNS AND WALLS	50 MPa 40MPa
C. CONCRETE FOR THIRD FLOOR ONLY:  COLUMNS AND WALLS	50 MPa 40 MPa
D. CONCRETE FROM SIXTH FLOOR TO ROOF FLOOR :  - COLUMNS AND WALLS	40 MPa 40 MPa

91	CIACI	OL REQUIREMENTS OF CONCRETE		
	NO	TESTS	TEST METHOD	SPECIFICATION LIMI
	1.	TEMPERATURE (AT PLACEMENT)	ASTM 1064	32 C° MAX.
	2.	SLUMP IN mm (AT PLACEMENT)	BS 1881; pat 102	150 ± 25 mm DR AS ADVISED BY THE SUPPLI
	3.	WATER PERMEABILITY	DIN 1048	8mm MAX.

# C1.2 CONCRETE ADDITIVES

ALL CONCRETE SHALL CONTAIN AN APPROVED WATER REDUCING, PLASTICIZING ADMIXTURE. HIGH-RANGE, WATER REDUCING ADMIXTURES MAY BE UTILIZED. ALL CONCRETE FEMAMENTLY EXPOSED TO THE WEATHER SHALL ALSO CONTAIN AN APPROVED AIR-ENTRAINING ADMIXTURE.

13. NOT WITH-STANDING THE ABOVE, THE CONTRACTOR SHALL CARRY OUT ANY ADDITIONAL. TESTING HE DEMS INCESSARY TO ENSURE SATISFACTORY PERFORMANCE OF THE CLADDING SYSTEM.

15. DATUM LEVEL

CONCRETE	CEMENT TYPE	MAX. AGGREGATE SIZE (mm)	MIN. CEMENT CONTENT (kg/m3)	MAX. W/C RATIO	GGBS/ FLY ASH	28 DAYS STRENGTH (MPV
(SUPER STRUCTURE)	DPC*	20	400*	0.45*	1	
(SUB STRUCTURE)	DPC*	20	400*	0.45*		AS PER C1.1
BLINDING	DPC*	20	250*	0.6*	I	l

\* TO BE CONFIRMED BY SOIL SPECIALIST.

REINFORCEMENT SHALL BE HIGH YIELD (YIELD STRESS = 460MPa) MARKED 'T',
 THE CONTRACTOR SHALL PROVIDE DETAILERWINGS AND SCHEDULES OF THE REINFORCEMENT REINFORCEMENT FOR THE ENGINEER'S APPROVAL, IN ACCORDANCE

WORKING DRAWINGS. THE CONTRACTOR SHALL PROVIDE DETAILED SHOP DRAWINGS AND SCHEDULES OF TI REINFORCEMENT FOR THE ENGINEER'S APPROVAL IN ACCORDANCE WITH THE CONTRACT SPECIFICATIONS.

- WHERE BAR LENGTH IS NOT SPECIFIED, LONGEST PRACTICABLE BAR LENGTH SHALL BE EMPLOYED WITH STAGGERED LAP SPLICES. LAP LENGTH SHALL BE A MINIMUM OF 60 TIMES THE BAR DIAMETER, UNLESS OTHERWISE NOTED.

### C2.2 MINIMUM COVER TO REINFORCEMENT

### COVER TO ALL REINFORCEMENT SHALL BE AS FOLLOWS UNLESS SHOWN OTHERWISE:

- 75mm
   75mm EARTH FACES, 40mm OTHER FACES
   75mm EARTH FACES, 40mm OTHER FACES
   50mm
   30mm
   40mm
   40mm
   60mm EARTH FACES, 40mm OTHER FACES
   30mm
   30mm
   40mm
   60mm EARTH FACES, 40mm OTHER FACES
   60mm EARTH FACES, 40mm OTHER FACES
- WATER TANK WALLS

# EXTERNAL RELATES TO CONCRETE FACES EXPOSED TO EXTERNAL ENVIRONMENT.

D. EARTHWORKS, EXCAVATIONS AND DEWATERING

# D1 WHEN EYCAVATING TO FOUNDATION LEVEL CARE SHOULD BE TAKEN NOT TO DISTURB THE UNDERLYING WHEN EXCAVATING TO FOUNDATION LEVEL CARE SHOULD BE TAKEN NOT TO DISTURB THE UNDER MATERIAL. ALL PUNDATION EXCAVATIONS SHALL BE INSPECTED AND ANY SOFT SPOTS SHALL BE REMOVED AND REPLACED WITH GRANULAR FILL COMPACTED BEFORE CONSTRUCTION PROCEEDS. EXCAVATION SHALL AT ALL TIMES BE CARRIED OUT IN DRY CONDITIONS.

- D2. THE CONTRACTOR SHALL TAKE FULL ACCOUNT OF THE SOIL INVESTIGATION INFORMATION AND HIS OWN THE CONTINUE OF STORE FOR EACH OF THE MEST SAME THE MEST SHARE THE MEST SHARE THE MEST SHARE THE MEST SHARE THE SHARE THE SHARE THE SHARE THE SHARE THE SHARE THE SHARE SHARE SHARE SHARE THE SHARE THE SHARE SHARE SHARE THE SHARE THE SHARE SHARE SHARE THE SHARE SHARE SHARE SHARE THE SHARE SHARE
- D3. IT SHALL REMAIN THE CONTRACTOR'S OBLIGATION TO PROVIDE DRY WORKING CONDITIONS BY ANY MEANS
  HE MIGHT SEE EFFECTIVE. EXCLANTION SHALL BE AT ALL TIMES CARRIED OUT IN DRY CONDITIONS.
  KS. ALL PILES SHALL UTILIZE SELF-COMPACTING CONCRETE (SCC) AND SHALL BE PLACED IN ONE CONTINUOUS
  PILE ORSY WHILE IT REPAINS OPEN. THE DEWATERING SYSTEM LESS OFHALL NOT AFFECT THE EASTING ADJACET.

  CONCRETE POUR USING THE TREME METHOD.
- D4. DEWATERING SHALL NOT BE DISCONTINUED WITHOUT THE WRITTEN APPROVAL OF THE ENGINEER AND UNTIL AFTER THE CONSTRUCTION OF THE RAFT.
  COLUMNS
  PARAMETS

# E. WATERPROOFING

E1. GENERALLY ALL CONCRETE IN CONTACT WITH SOIL SHALL REQUIRE WATERPROOFING IN ACCORD WITH THE RECOMMENDATIONS OF THE SOILS INVESTIGATIONS REPORT AND AS SHOWN IN THE

# F. BLOCK WALL CONSTRUCTION

- F1. MINIMUM COMPRESSIVE STRENGTH FOR NON-LOAD BEARING HOLLOW BLOCKS SHALL BE 3.5 MPa.
  F2. MINIMUM COMPRESSIVE STRENGTH FOR NON-LOAD BEARING SOLID BLOCKS SHALL BE 7.0 MPa.
  F3. THE CONCRETE HOLLOW BLOCKS SHALL BE FROM AN APPROVED MANUFACTURER WITH APPROPRIATE STRENGTH AND ADEQUATELY CURED AS PER STRIMDARD SPECIFICATIONS.

# H. CLADDING SYSTEM DESIGN

- H1. THE CLADDING DESIGN SHALL INCORPORATE SUFFICIENT FLEXIBILITY TO ACCOMMODATE ALL ANTICIPATED MOVEMENTS IN THE STRUCTURE INCLUDING THOSE DUE TO THERMAL EFFECTS, LATERAL MOVEMENTS DUE TO WIND OR SEISMIC LOAD AND AXIAL SHORTENING OF COLUMNS.

(1). ALL LEVELS ARE REFERENCED TO ARCHITECTURAL DATUM LEVEL. SHALL BE APPROVED BY THE ENGINEER.

## J. GENERAL FOUNDATIONS NOTES

- 11. ALL FOUNDATIONS SHALL BE CONSTRUCTED UPON WATERPROOFING SYSTEM AND A 100mm CONCRETE BLINDING SLAB WHICH HAS BEEN PLACED OVER AGGREGATE LAYER ACCORDING TO SOIL TEST RECOMMENDATIONS, OVER THE STABLED NATURAL SOIL.
- 12. DO NOT BACKFILL AGAINST PIT OR RETAINING WALLS UNTIL THE CONCRETE HAS ATTAINED FULL DESIGN STRENGTH.
- J3. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY MEASURES TO PREVENT ANY WATER, FROM PENETRATING ANY PILED FOUNDATIONS OR STRUCTURAL (HYDROSTATIC) SLABS BEFORE AND AFTER PLACING CONCRETE, AND UNTIL SUCH SUBGRADES ARE FULLY PROTECTED BY THE PERMANENT BUILDING STRUCTURE.
- 34. THE STRUCTURAL CONCRETE FOR EACH PILED FOOTING SHALL BE PLACED IN ONE (1) CONTINUOUS POUR WITH THE STRUCTURAL RAFT VERTICAL POUR JOINTS SHALL TYPICALLY BE LOCATED IN THE MIDDLE THIRD OF THE SPAN BETWEEN COLUMNS OR WALLS.
- ALL REINFORCING FOR THE FOUNDATIONS, INCLUDING WALL AND COLUMN STARTER BARS SHALL BE PROPERLY SECURED IN PLACE PRIOR TO CONCRETING.
- J6. THE CONTRACTOR SHALL INSTALL THERMOCOUPLE SETS TO MONITOR AND RECORD HEAT GAIN IN THE PILED FOUNDATIONS CONCRETE DURING THE CHEMENT HYDRATION PROCESS. ALL THERMOCOUPLE LOCATIONS SHALL BE COORDINATED TO INSURE THAT THE DEVICES ARE NOT DISRUPTED DURING RELIPROCING MAY DO CONCRETE PRACEMEN EACH THERMOCOUPLE SET CONSISTS OF 5T THERMOCOUPLES AND SHALL BE LOCATED IN INDICATED AREAS OF EACH PILED FOUNDATION FOUR (IN PLAN) AND POSITIONED AS FOLDOWS:
- LH PILED FOUNDATION POUR (IN PLAN) AND POSITIONED AS FOLLOWS:

  ONE (1) THERMOCOUPLE AT THE MID-HEIGHT

  ONE (1) THERMOCOUPLE AND THE MID-HEIGHT AND THE TOP

  ONE (1) THERMOCOUPLE MIDWAY SETWEEN THE MID-HEIGHT AND THE TOP

  ONE (1) THERMOCOUPLE MIDWAY SETWEEN THE MID-HEIGHT AND THE BOTTOM

  ONE (1) THERMOCOUPLE AT 300MM FROM TOP

  (6) (1) THERMOCOUPLE AT 300MM FROM BOTTOM
- TEMPERATURE READINGS FROM EACH THERMOCOUPLE SHALL BE ELECTRONICALLY RECORDED OVER A 90-DAY PERIOD
- REINFORCEMENT DETAILS SHOWN ON DRAWINGS ARE INDICATIVE FOR THE PREPARATION OF THE CONTRACTORS THE CONCRETE MIX DESIGN AND THE CONSTRUCTION TECHNIQUES SHALL BE PREPARED TO LIMIT THE MAXIMUM.

  KI. A COMPREHENSIVE INSTRUMENTATION, MONITORING, AND REPORTING PROGRAM FOR THE INSTALLATION OF T

THE CONCETE MIX DESIGN AND THE CONSTRUCTION TECHNIQUES SHALL BE REPARADE TO LIMIT THE MAXIMUM
TEMPERATURE DETERMENTAL BETWEEN ANY TWO POINTS WITHIN THE FOUNDATION TO 20 DEGREES CELSIUS, ANY
TEMPERATURE DETERMENTAL BETWEEN ANY TWO POINTS WITHIN THE FOUNDATION TO 20 DEGREES CELSIUS. THE ADDITION OF BUT AS A REPLACEMENT FOR A PORTION OF BWY WATER, THE REPERFORMED FOR 100%.

16. STANDARD SONIC INTEGRITY TESTING AT PILE HEAD SHALL BE PERFORMED FOR 100%.

17. STANDARD SONIC INTEGRITY TESTING AT PILE HEAD SHALL BE PERFORMED FOR 100%.

18. STANDARD SONIC INTEGRITY TESTING AT PILE HEAD SHALL BE PERFORMED FOR 100%.

18. THE PROPERTY OF THE STANDARD SHALL BE STAN

- ALL REINFORCING SPLICES SHALL DEVELOP 100% OF THE TENSILE CAPACITY OF THE REINFORCEMENT.

  JB. CONSISTENCY (SLUMP) TESTS SHALL BE PERFORMED FOR EACH OF THE FIRST 5 TRUCKS SUPPLYING ALTERNATIVE MECHANICAL SPLICES MAY BE CONSIDERED, PROVIDED THAT THEY DEVELOP FULL TENSILE STRENGTHEONCRETE FOR THE FOUNDATIONS POURS.
  - CONCRETE CUBE SAMPLES SHALL BE TAKEN FOR THE FOUNDATIONS. THE REQUIREMENTS ARE AS INDICATED
    IN THE TECHNICAL SPECIFICATION "CAST-IN-PLACE CONCRETE".
  - J10. REFER TO THE SOIL INVESTIGATION REPORT No. SR 57/2019 DATED ON OCTOBER 2019 FOR ANY ADDITIONAL REQUIREMENTS.

# K. REINFORCED CONCRETE BORED PILES

- K1. THE SOIL INVESTIGATION REPORT No. SR 57/20/3 DATED ON OCTOBER 20/3HAS BEEN PREPARED AND SHALL B CONSIDERED HART OF THE CONSTRUCTION DOCUMENTATION. THE INFORMATION GIVEN IN THE SOIL REPORT IS SOILEY AGUIDE. RESPONSIBILITY IS ACCEPTED BY THE OWNER OF THE BINGINEER FOR ITS CORRECTIVES.
- K2. ALL PILES SHALL BE BORED CAST IN SITU USING TEMPORARY STEEL CASING.
- ALL PERMANENT PILING CONCRETE SHALL BE DESIGNED FOR A PUMPED TREMIE CONCRETE MIX AND AT LEAST INCLUDE WATER REDUCTING PLASTIZERS AND MICROSILICA ADMIXTURES. PILE CONCRETE MIX SHALL BE DESIGNED FOR ENHANCED LONG-TERM DURABILITY.
- K6. REINFORCED CONCRETE BORED PILLING OF CIRCULAR CONFIGURATION SHALL DEVELOP THE SCHEDULED MINIMUM ALLOWABLE LOAD CAPACITIES WITH A MINIMUM SAFETY FACTOR OF 2.0.
- K7. PILES SHALL BE PLACED A MINIMUM OF 2.5 TIMES THE PILE DIAMETER, CENTER-TO-CENTER OF THE PILES, UNLESS NOTED OTHERWISE.
- K8. THE PILE DETAILS SHOWN ARE INDICATIVE ONLY. THE PILING CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING PILES THAT SATISFY THE REQUIREMENTS OF THE SPECIFICATION AND CAPABLE OF SUPPORTING THE LOADS SPECIFIED.
- K9. THE ROTTOM OF EACH DILE SHALL BE CLEANED OF EXCESS LOOSE MATERIALS BY AIR LIFT PROCEDURES PRIOR
- K10. ALL CONCRETE SHALL BE PLACED UTILIZING AN APPROVED PUMPED TREMIE CONCRETE SEQUENCE. ALL CONCRETE SHALL BE PLACED TO THE TOP OF THE BORE HOLE, AND THE EXCESS CONCRETE AND LAITANCE MATERIALS TRIMMED BOACK AT A LATER DATE. K11. THE PILING CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ADDITIONAL LOAD TESTS, MATERIAL TESTING, OR NEW PILES AS THE RESULT OF ANY DEFECTIVE PILES THAT HAVE BEEN INSTALLED OR DEVIATIONS IN PILE LOCATION, VERTICALITY IN EXCESS OF THE ALLOWED TOLERRICES.
- STRENGTH AND ADEQUATELY CURED AS PER STANDARD SPECIFICATIONS.

  F.J. JOINTS BETWEEN CONCRETE BLOCKWING AND COLUMNS TO BE REINFORCED WITH 200 WIDE GALVANIZED STEEL EVANDED META. SCURRED BOTH SIDES OF THE SOLD FRANCE OF THE S

# K2. PILING MATERIAL

	ONCRETE STRENGTH 8 DAY CUBIC STRENGTH)	50 MPa
RE	EINFORCING BARS	EPOXY COATED HIGH TENSILE STEEL (YIELD STRESS = 460MPa )
PI	LE HEAD GROUT	85 MPa CEMENT GROUT WITH MICROSILICA OR APPROVED EQUIVALENT
CE	EMENT TYPE	ASTM TYPE-V
M	AX. WATER CEMENT RATIO	0.42
М	IN CEMENT CONTENT	400 kg/m3

### K3. PILE TESTING

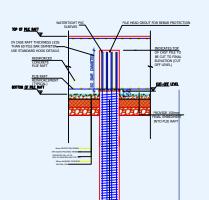
- K14. THE CONTRACTOR SHALL ALLOW FOR 2 PRELIMINARY PILES AS LISTED IN THE TABLE BELOW, THE LOCATION OF WHICH SHALL BE AGREED WITH THE ENGINEER. THE PRELIMINARY TEST PILES SHALL BE LOADED UNDER STATIC COMPRESSIVE LOADS TO 1.5 TIMES THE PILE CAPACITY.

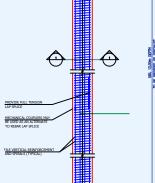
PRELIM	INARY PILE LOA	AD TESTS
PILE DIAMETER (mm)	TEST TYPE	TEST LOAD (kN)
520	COMPRESSION	2200

KIS. THE CONTRACTOR SHALL PERFORM COMPRESSIVE LOAD TESTS ON WORKING PILES AS LISTED IN THE TABLE BELOW, PILES SHALL BE LOADED UNDER STATIC COMPRESSIVE LOADS TO 1.25 TIMES THE PILE CAPACITY.

	WORKING F	PILE LOAD TESTS	;
MARK	PILE DIAMETER (mm)	TEST TYPE	TEST LOAD (kN)
P6	520	COMPRESSION	2000
P54	520	COMPRESSION	2000
DC2	F20	COMPRESSION	2000

TEST PILES , AND THE LOAD TESTING THEREOF SHALL BE ESTABLISHED AND REVIEWED PRIOR TO THE START







### M. JOINTS

- M.1 THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS SHOWING PROPOSED CONSTRUCTION / CONTRACTION JOINTS LAYOUT & DETAIL FOR APPROVAL
- M.2 CONTRACTION JOINTS SHALL BE IMPLEMENTED AND PERFORMED BY MAX. 10.0m AS PER TYPICAL STRUCTURAL DETAIL.

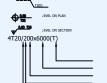
# N. ABBREVIATIONS

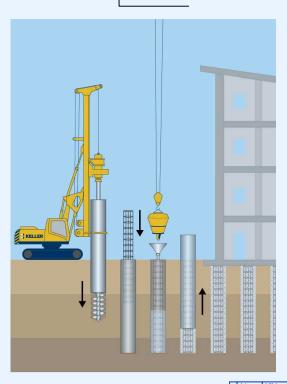


THICKNESS OF SOLID SLABS **⊕** 

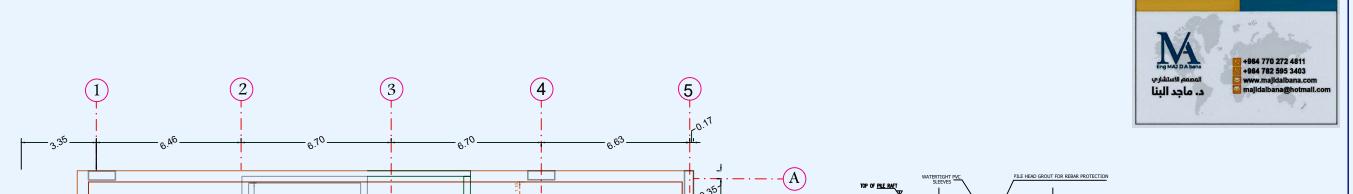
PLANTED WALL MILD STEEL BARS STIRRUPS SETTLEMENT JOINT T TOP BARS
TOF TOP LEVEL OF FOUND
TOC TOP LEVEL OF SLAB
TYP. TYPICAL

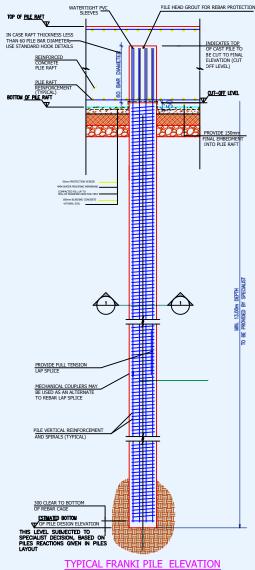
TYP. TYPICAL
T&B TOP AND BOTTOM
U U SHAPED BARS
VER VERTICAL BARS
VAR. VARIABLE SHEAR WALL NUMBER 1





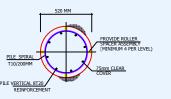
no. date initials revision **GENERAL STRUCTURAL NOTES** 3





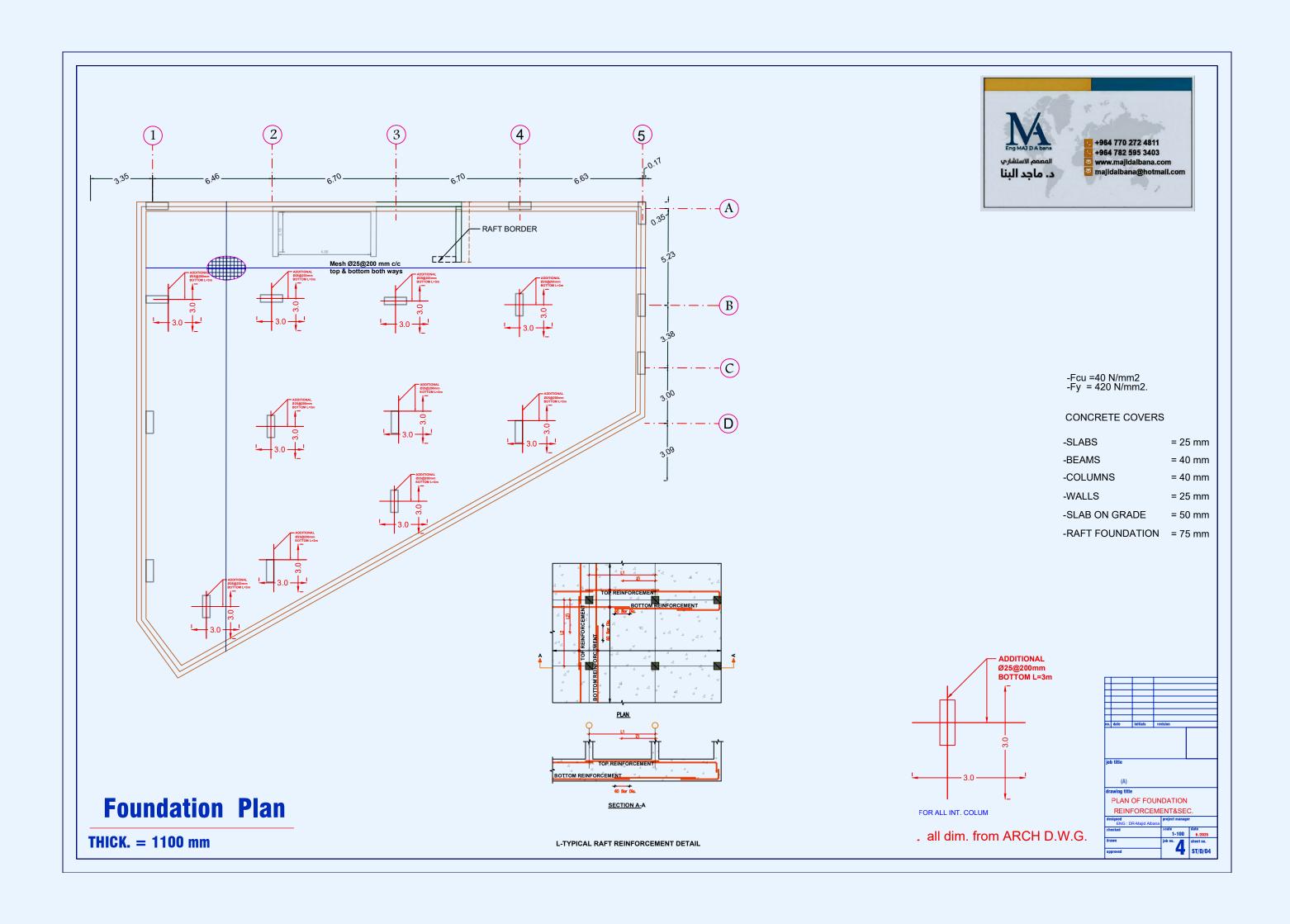
Structure Weight =4,270 tf
Structure Bedding Area =500 m<sup>2</sup>
Pile Count =110
Raft Foundation Bedding Coefficient
Pile Type According To Load Transfer Way =Friction Pile

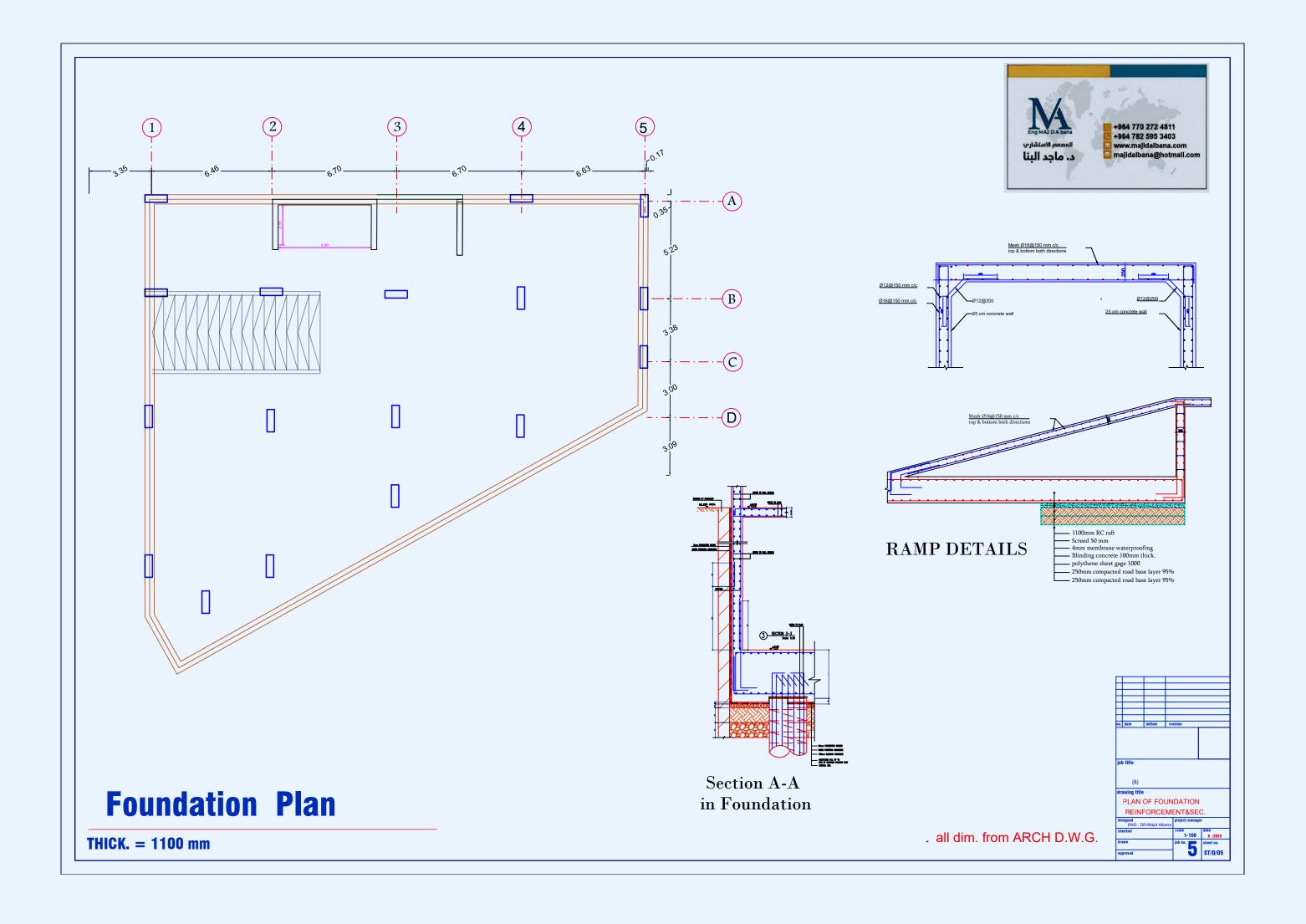
PILES KEY PLAN

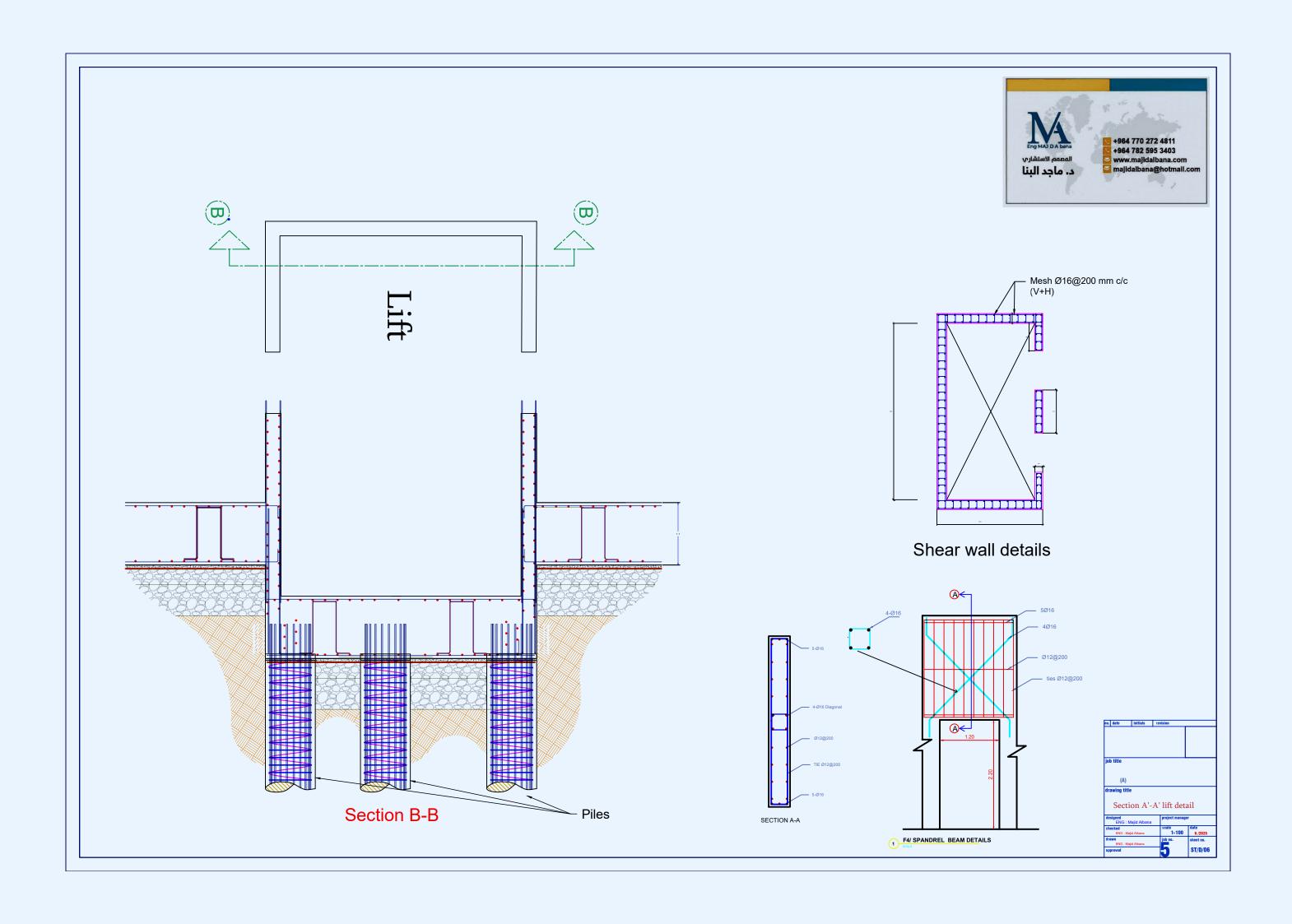


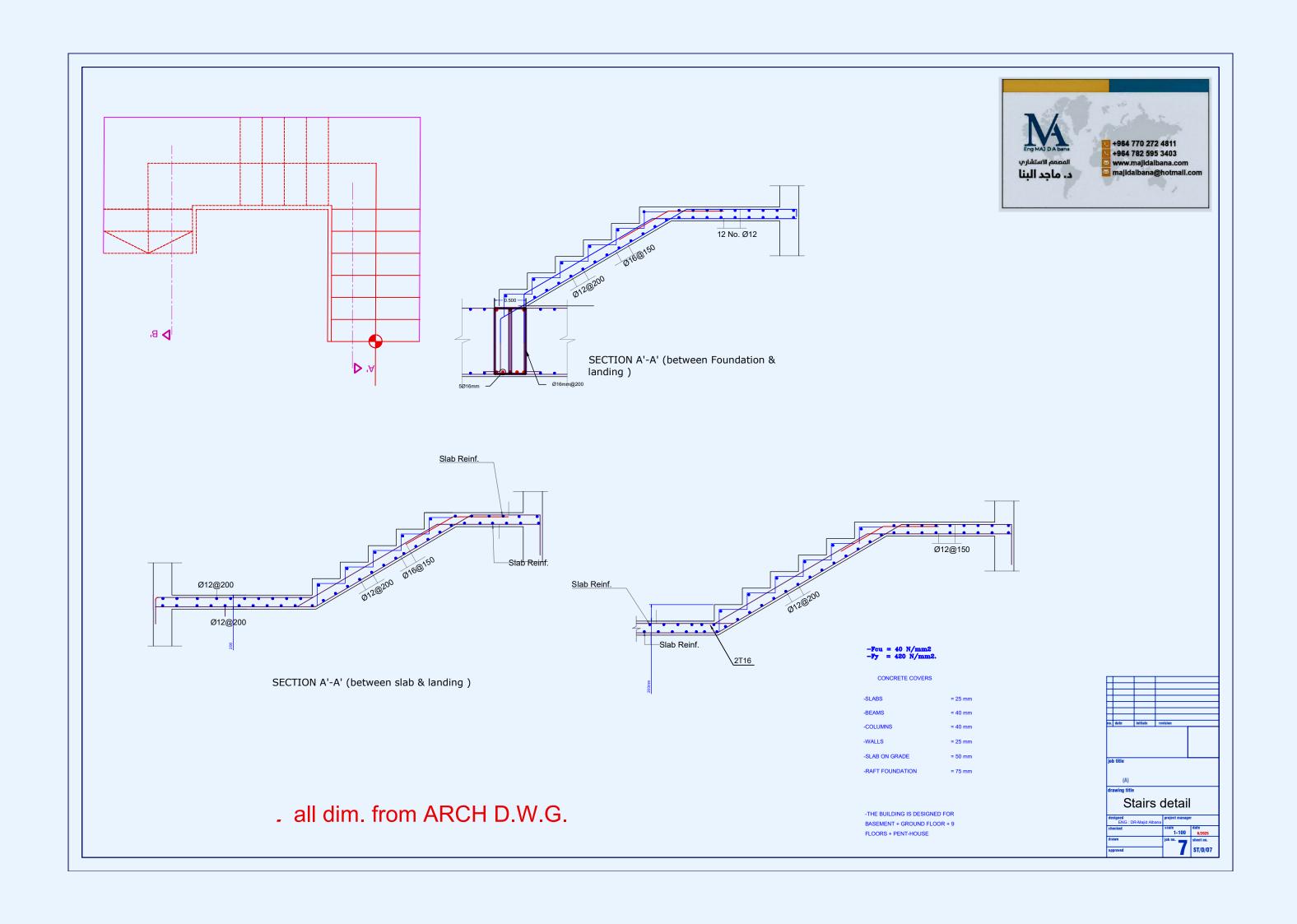
SECTION 1-1

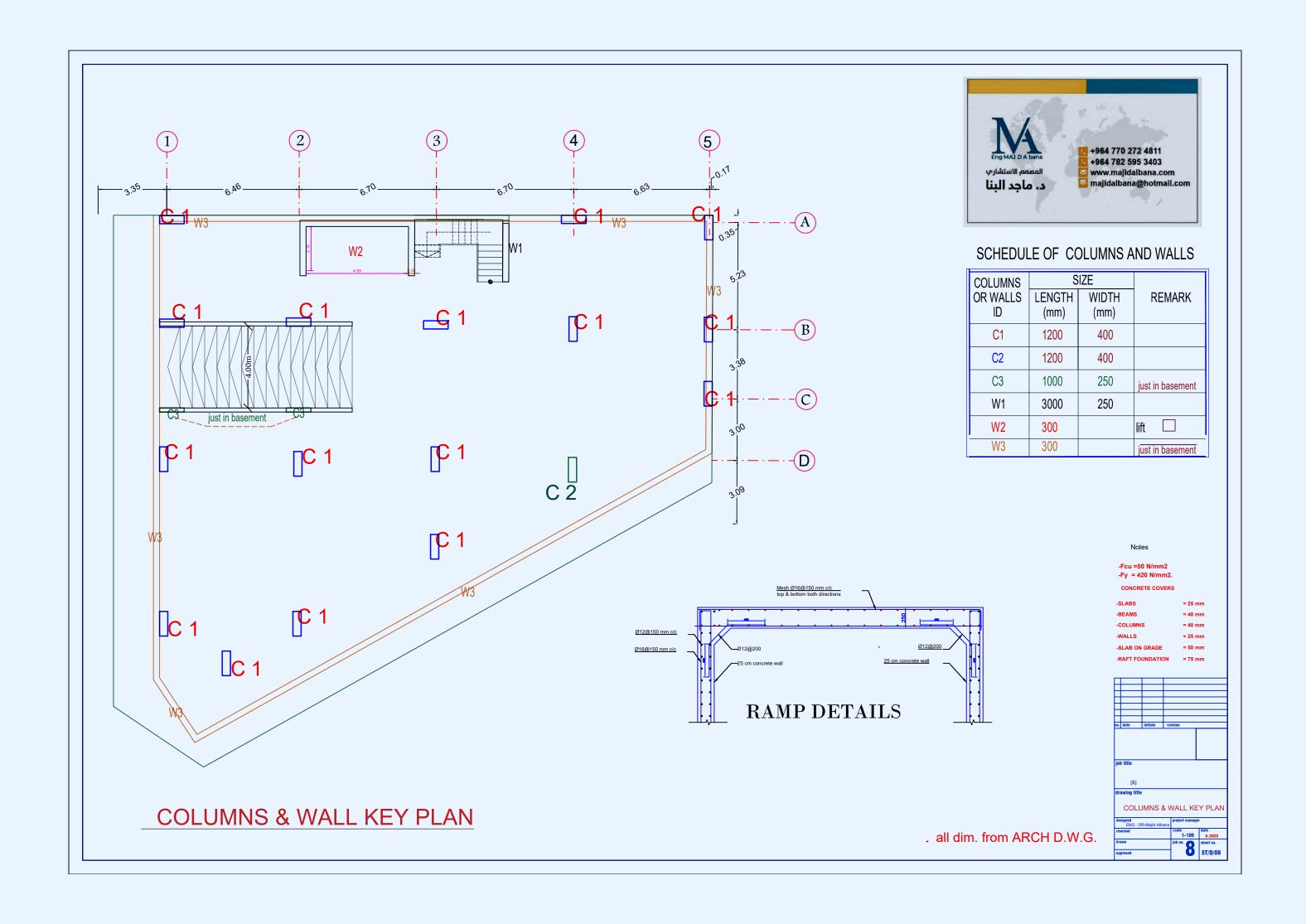
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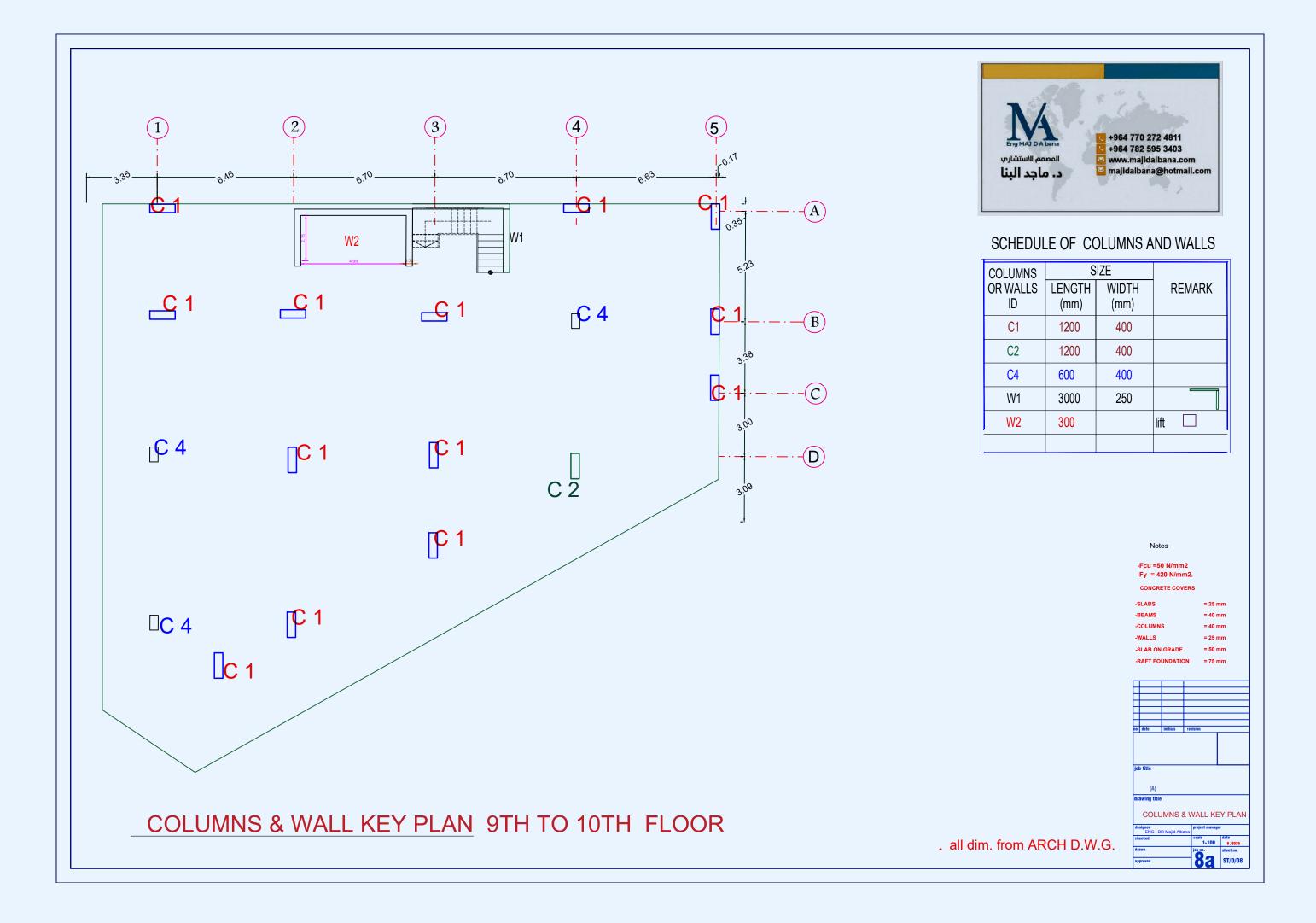


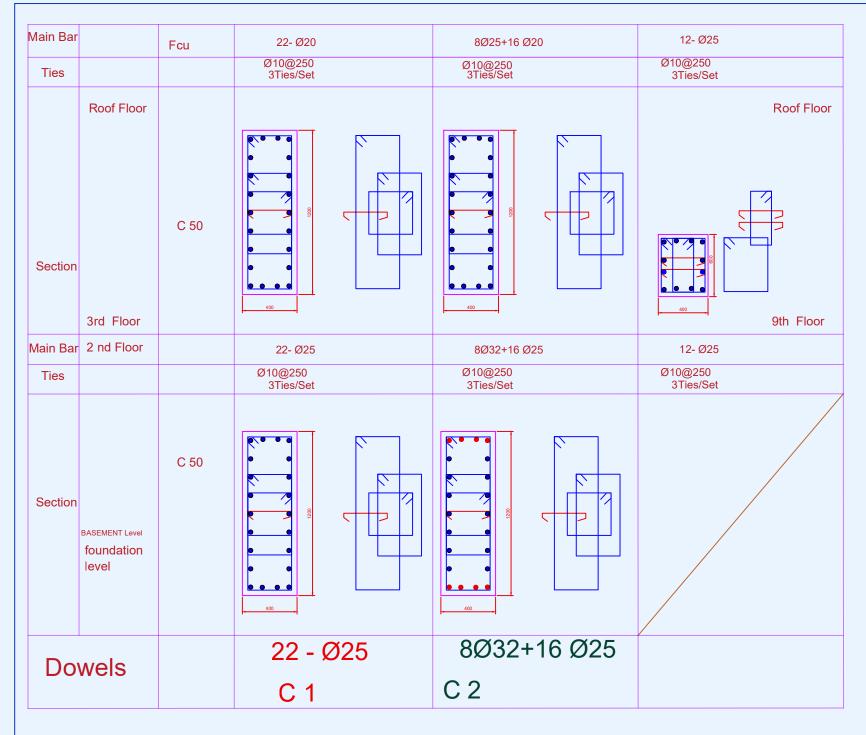


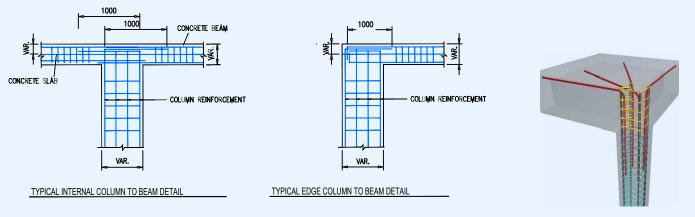


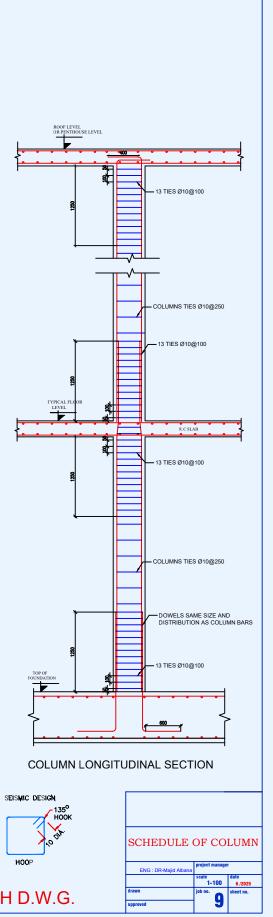














. all dim. from ARCH D.W.G.

