

PART A GENERAL NOTES & SPECIFICATIONS

1. General

1.1 All structural drawings should be read in conjunction with Architectural, Civil, Mechanical, Electrical and other relevant drawings. The contractor should coordinate with Architectural and various service drawings for levels, sizes and location of all Structural members, Floors Walls and Pipes etc.

2. Design

2.1 The Structural design of all concrete elements is based on Building Code Requirements for Structural Concrete (ACI 318-2005) of the American Concrete Institute, USA and Structural Engineering Design Provisions of Uniform Building Code (UBC-1997), USA.

2.2 The Structural design of all masonry elements shall conform to Specification for Masonry Structures (ACI 530.1-99/ASCE 6-99/TMS 602-99) reported by the Masonry Standards Joint Committee (MSJC) USA.

3. Construction

3.1 The Construction Work of all concrete elements should conform to ACI 318-02.

3.2 The Construction Work of all Masonry elements should conform to ACI 530.1-99/ASCE 6-99/TMS 602-99.

4. Materials

4.1 Concrete

4.1.1 Plain Concrete

All Plain concrete shall have a cylinder strength of 1500 psi, at 28 days.

4.1.2 Structural Concrete

a) Except as otherwise specified, all concrete work shall conform to Specifications for Structural Concrete for Buildings (ACI 301-99) of the American Concrete Institute, USA.

b) The structural concrete for all columns shall have a minimum compressive cylinder strength of 4,000 psi, at 28 days.

c) Unless Noted Otherwise all other structural concrete shall have a minimum compressive cylinder strength of 3,000 psi, at 28 days.

Note that specified compressive strength could be achieved through Mix Proportion Design and this design shall be sole responsibility of contractor (or specified in the contract documents).

4.2 Reinforcing Steel

a) General

i) Except as otherwise specified, all reinforcing steel shall be of Grade 60 conform to ASTM A615 with minimum yield strength of 60,000 psi and minimum 8% Tensile Elongation

ii) Bend test shall also be carried out to check Ductility of Bars.

iii) Bolts and Nuts (if any) shall conform to American Welding Standards (AWS)

b) #2 Bars

All #2 bars (if any) shall conform to BS 4449: 1978, Grade 250.

c) Column ties and beam stirrups

All steel for column ties and beam stirrups, except #2 bars, shall conform to ASTM A615 Grade 40 with minimum yield strength of 40,000 psi

6. Clear Concrete Covers to Reinforcement

a) Clear concrete cover to reinforcement, shall be as follows (ACI section 7.7)

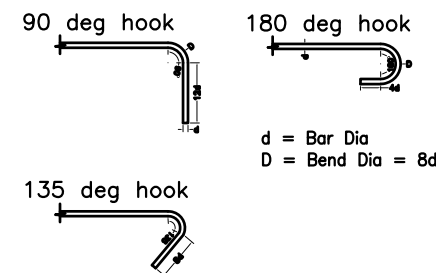
	Member	Cover (in)
1)	Raft, Foundations	2"
2)	Beams and columns	1½"
3)	Slab	¾"
4)	RCC Walls, Shear Walls	¾"
5)	Sanitary Structures	
a)	Wet side	1¼"
b)	Dry side	1"
c)	Soil side	1¼"

b) In order to ensure the specified covers, bars must be secured in position, with the help of cement-sand mortar (or approved equal) spacer blocks, with embedded binding wire.

7. Bar Development

7.1 Standard Hooks

Unless otherwise shown in the drawings, standard hooks shall conform to the following geometry:



7.2 Splice Length

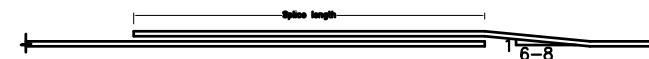
a) Splice length of reinforcing bars shall be as follows.

Bar Designation	Splice length (in)
	Top bars*
#3	24
#4	30
#5	38
#6	45
#7	56
#8	60

* Top bars are horizontal bars, with at least 12 in of fresh concrete below them.

b) For splicing unequal diameter bars, splice length shall be determined by the larger of the two bars.

c) Where required, bar shall have a gradient between 1:6 to 1:8.



8. Compaction

a) The compaction of fill behind and underneath the foundations should not be less than 95% Modified AASHTO.

b) All over excavated areas or doubtful patches shall be filled with approved material or as directed by Engineer in charge.

9. Construction Joints

a) Construction joints shall be located with the prior approval of the Engineer.

b) On proposed construction joint surfaces, all fines shall be removed, on initial setting of concrete, but before its hardening. In order to achieve this sand blasting or wire brushing could be used. Before placing the second-stage concrete, the joint surface shall be cleaned free of all loose material and washed. A bonding agent (SBR or Fosroc, or approved equal) shall be applied to the surface and concrete placed within the period stipulated by the manufacturer.

10. Terms & Abbreviations

Following terms and abbreviations are used in all structural drawings.

a) UNO: Unless Noted Otherwise b) NSL: Natural Surface Level

c) Typ: Typical d) FFL: Finished Floor Level

e) C.Joint: Construction Joint

PART B TERMS & CONDITIONS

(i) Construction on these drawings implies that the client/owner of the building agrees the following:

- That these drawings are property of Iqbal, Uzair & Associates, Lahore.
- Construction on these drawings will be carried out only after the vetting of structural design and drawings, from relevant authority, according to law. Client/owner is solely responsible for any procedural or other violations.
- The responsibility of structural designers (Iqbal, Uzair & Associates) is limited only for providing safe structural design of the building, as per relevant codes.
- In no case the structural designers (Iqbal, Uzair & Associates) assume the responsibility of assuring that the construction of the building is carried out as per these drawings.
- Client/owner of the building assumes full responsibility of assuring that the construction of building is carried out as per design/drawings given by the structural designers. In this regard he must arrange resident engineer, and relevant and required tests must be performed to meet the legal requirements, and to ensure that construction is being carried out according to structural design/drawings.
- Ensuring stability of adjacent buildings is sole responsibility of client/owner of building. This may be accomplished by hiring proper technical consultant. The structural designers (Iqbal, Uzair & Associates) fully agree to cooperate with this consultant, when hired.
- Any request to structural engineers (Iqbal, Uzair & Associates) to provide such a legal document/certificate which enhances or changes their responsibilities in all or any respect, will be considered contrary to these terms & conditions, and hence will be violation of agreement.

(ii) Vetting and granting permission to construct on these drawing by the relevant legal authority implies that the legal authority agrees the following:

- The responsibility of structural designers (Iqbal, Uzair & Associates) is limited only for providing safe structural design of the building, as per relevant codes.
- Client/owner of the building assumes full responsibility of assuring that the construction of building is carried out as per design/drawings given by the structural designers. In this regard he must arrange resident engineer, and relevant and required tests must be performed to meet the legal requirements, and to ensure that construction is being carried out according to structural design/drawings.

DRAWING TITLE

GENERAL NOTES 1 OF 2

JOB NO.

DRAWING NO.

0001

SIGNATURES

REVISION SUFFIX

SCALE

DATE

JULY.02.2020

DRAWN

M.ABUBAKAR

CHECKED

M.JUMAR HAYAT

CONSULTING ARCHITECT AND ENGINEER



CLIENT

JOB TITLE

PART A GENERAL NOTES & SPECIFICATIONS

1. General

1.1 All structural drawings should be read in conjunction with Architectural, Civil, Mechanical, Electrical and other relevant drawings. The contractor should coordinate with Architectural and various service drawings for levels, sizes and location of all Structural members, Floors Walls and Pipes etc.

2. Design

2.1 The Structural design of all concrete elements is based on Building Code Requirements for Structural Concrete (ACI 318-2005) of the American Concrete Institute, USA and Structural Engineering Design Provisions of Uniform Building Code (UBC-1997), USA.

2.2 The Structural design of all masonry elements shall conform to Specification for Masonry Structures (ACI 530.1-99/ASCE 6-99/TMS 602-99) reported by the Masonry Standards Joint Committee (MSJC) USA.

3. Construction

3.1 The Construction Work of all concrete elements should conform to ACI 318-02.

3.2 The Construction Work of all Masonry elements should conform to ACI 530.1-99/ASCE 6-99/TMS 602-99.

4. Materials

4.1 Concrete

4.1.1 Plain Concrete

All Plain concrete shall have a cylinder strength of 1500 psi, at 28 days.

4.1.2 Structural Concrete

- a) Except as otherwise specified, all concrete work shall conform to Specifications for Structural Concrete for Buildings (ACI 301-99) of the American Concrete Institute, USA.
- b) The structural concrete for all columns shall have a minimum compressive cylinder strength of 4,000 psi, at 28 days.
- c) Unless Noted Otherwise all other structural concrete shall have a minimum compressive cylinder strength of 3,000 psi, at 28 days.

Note that specified compressive strength could be achieved through Mix Proportion Design and this design shall be sole responsibility of contractor (or specified in the contract documents).

4.2 Reinforcing Steel

- a) General
 - i) Except as otherwise specified, all reinforcing steel shall be of Grade 60 conform to ASTM A615 with minimum yield strength of 60,000 psi and minimum 8% Tensile Elongation
 - ii) Bend test shall also be carried out to check Ductility of Bars.
 - iii) Bolts and Nuts (if any) shall conform to American Welding Standards (AWS)
- b) #2 Bars

All #2 bars (if any) shall conform to BS 4449: 1978, Grade 250.
- c) Column ties and beam stirrups

All steel for column ties and beam stirrups, except #2 bars, shall conform to ASTM A615 Grade 40 with minimum yield strength of 40,000 psi

5. Quality and Testing of Material

- a) Fresh Portland cement of Approved Brand shall be used for all concrete works.
- b) Lawrencepur Sand and Margalla Coarse Aggregates (or approved equal) shall be used for all concrete work and shall be free of Dust, Mud, and Flaky particles.
- c) Coarse Aggregates shall have well graded size from Minimum 1/2" to 3/4" Maximum.
- d) At least 3 Cylinder Cores (6" x 12") shall be taken from each pour of Concrete to test 28 days Compressive Strength of Concrete. If during testing Strength is Less than Specified Strength concrete shall be dismantled and repoured and testing procedure will be repeated.

6. Clear Concrete Covers to Reinforcement

a) Clear concrete cover to reinforcement, shall be as follows (ACI section 7.7)

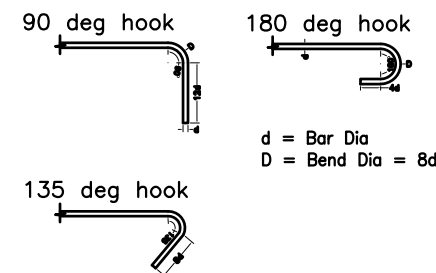
	Member	Cover (in)
1)	Raft, Foundations	2"
2)	Beams and columns	1 1/2"
3)	Slab	3/4"
4)	RCC Walls, Shear Walls	3/4"
5)	Sanitary Structures	
a)	Wet side	1 1/4"
b)	Dry side	1"
c)	Soil side	1 1/4"

b) In order to ensure the specified covers, bars must be secured in position, with the help of cement-sand mortar (or approved equal) spacer blocks, with embedded binding wire.

7. Bar Development

7.1 Standard Hooks

Unless otherwise shown in the drawings, standard hooks shall conform to the following geometry:



7.2 Splice Length

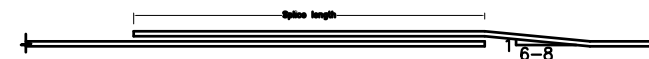
a) Splice length of reinforcing bars shall be as follows.

Bar Designation	Splice length (in)
	Top bars*
#3	24
#4	30
#5	38
#6	45
#7	56
#8	60

* Top bars are horizontal bars, with at least 12 in of fresh concrete below them.

b) For splicing unequal diameter bars, splice length shall be determined by the larger of the two bars.

c) Where required, bar shall have a gradient between 1:6 to 1:8.



8. Compaction

a) The compaction of fill behind and underneath the foundations should not be less than 95% Modified AASHTO.

b) All over excavated areas or doubtful patches shall be filled with approved material or as directed by Engineer in charge.

9. Construction Joints

a) Construction joints shall be located with the prior approval of the Engineer.

b) On proposed construction joint surfaces, all fines shall be removed, on initial setting of concrete, but before its hardening. In order to achieve this sand blasting or wire brushing could be used. Before placing the second-stage concrete, the joint surface shall be cleaned free of all loose material and washed. A bonding agent (SBR or Fosroc, or approved equal) shall be applied to the surface and concrete placed within the period stipulated by the manufacturer.

10. Terms & Abbreviations

Following terms and abbreviations are used in all structural drawings.

- | | |
|--------------------------------|-------------------------------|
| a) UNO: Unless Noted Otherwise | b) NSL: Natural Surface Level |
| c) Typ: Typical | d) FFL: Finished Floor Level |
| e) C.Joint: Construction Joint | |

PART B TERMS & CONDITIONS

(i) Construction on these drawings implies that the client/owner of the building agrees the following:

1. That these drawings are property of Iqbal, Uzair & Associates, Lahore.
2. Construction on these drawings will be carried out only after the vetting of structural design and drawings, from relevant authority, according to law. Client/owner is solely responsible for any procedural or other violations.
3. The responsibility of structural designers (Iqbal, Uzair & Associates) is limited only for providing safe structural design of the building, as per relevant codes.
4. In no case the structural designers (Iqbal, Uzair & Associates) assume the responsibility of assuring that the construction of the building is carried out as per these drawings.
5. Client/owner of the building assumes full responsibility of assuring that the construction of building is carried out as per design/drawings given by the structural designers. In this regard he must arrange resident engineer, and relevant and required tests must be performed to meet the legal requirements, and to ensure that construction is being carried out according to structural design/drawings.
6. Ensuring stability of adjacent buildings is sole responsibility of client/owner of building. This may be accomplished by hiring proper technical consultant. The structural designers (Iqbal, Uzair & Associates) fully agree to cooperate with this consultant, when hired.
7. Any request to structural engineers (Iqbal, Uzair & Associates) to provide such a legal document/certificate which enhances or changes their responsibilities in all or any respect, will be considered contrary to these terms & conditions, and hence will be violation of agreement.

(ii) Vetting and granting permission to construct on these drawing by the relevant legal authority implies that the legal authority agrees the following:

1. The responsibility of structural designers (Iqbal, Uzair & Associates) is limited only for providing safe structural design of the building, as per relevant codes.
2. Client/owner of the building assumes full responsibility of assuring that the construction of building is carried out as per design/drawings given by the structural designers. In this regard he must arrange resident engineer, and relevant and required tests must be performed to meet the legal requirements, and to ensure that construction is being carried out according to structural design/drawings.

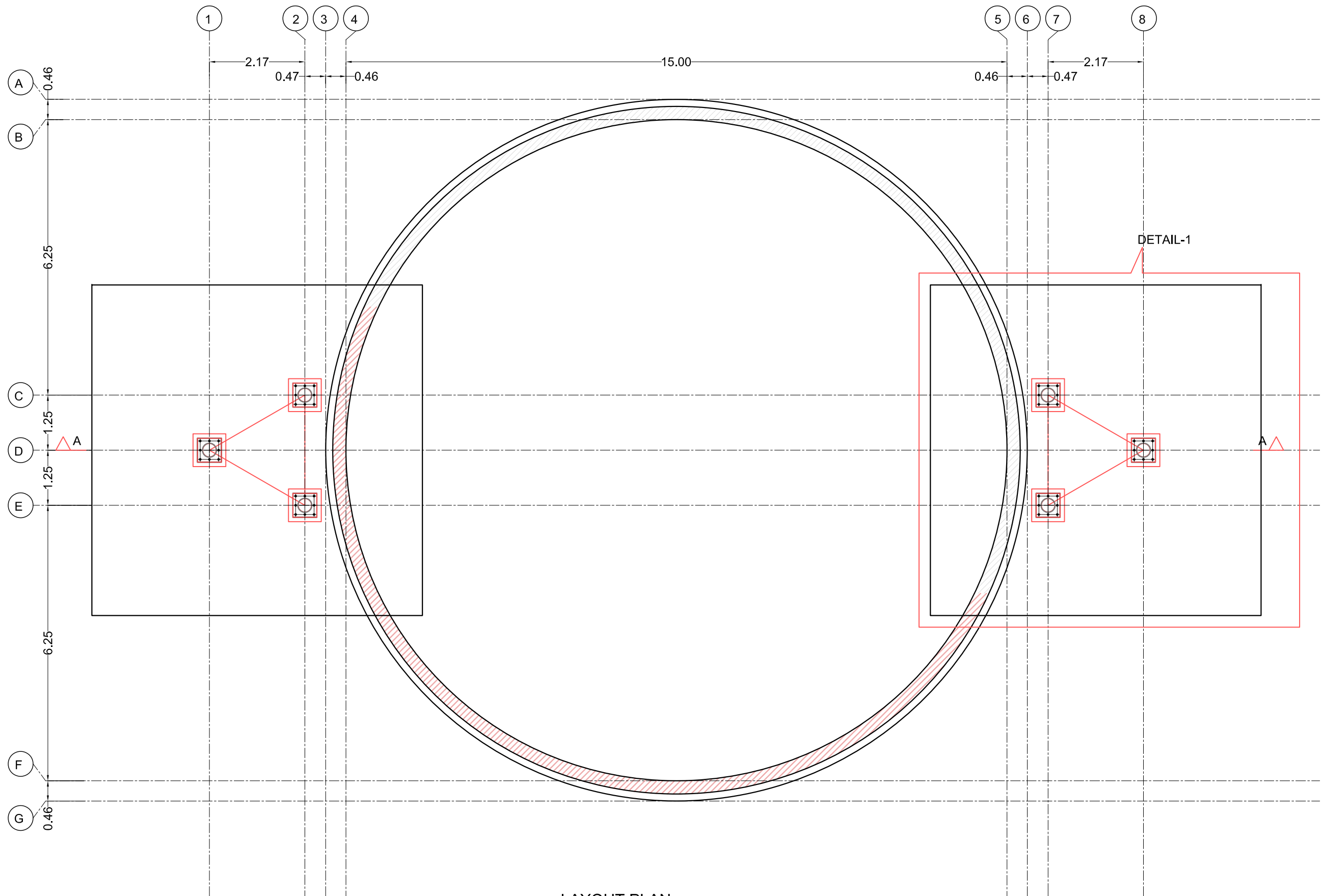
DRAWING TITLE			
GENERAL NOTES			
1 OF 2			
JOB NO. ---		DRAWING NO. 0001	
SIGNATURES		REVISION SUFFIX	
SCALE	DATE	DRAWN	CHECKED
	JULY.02.2020	M.ABUBAKAR	M.JUMAR HAYAT

CONSULTING ARCHITECT AND ENGINEER



CLIENT

JOB TITLE



LAYOUT PLAN

DRAWING TITLE
LAYOUT PLAN

CONSULTING ARCHITECT AND ENGINEER



ALPHA ENGINEERING CONSULTANTS

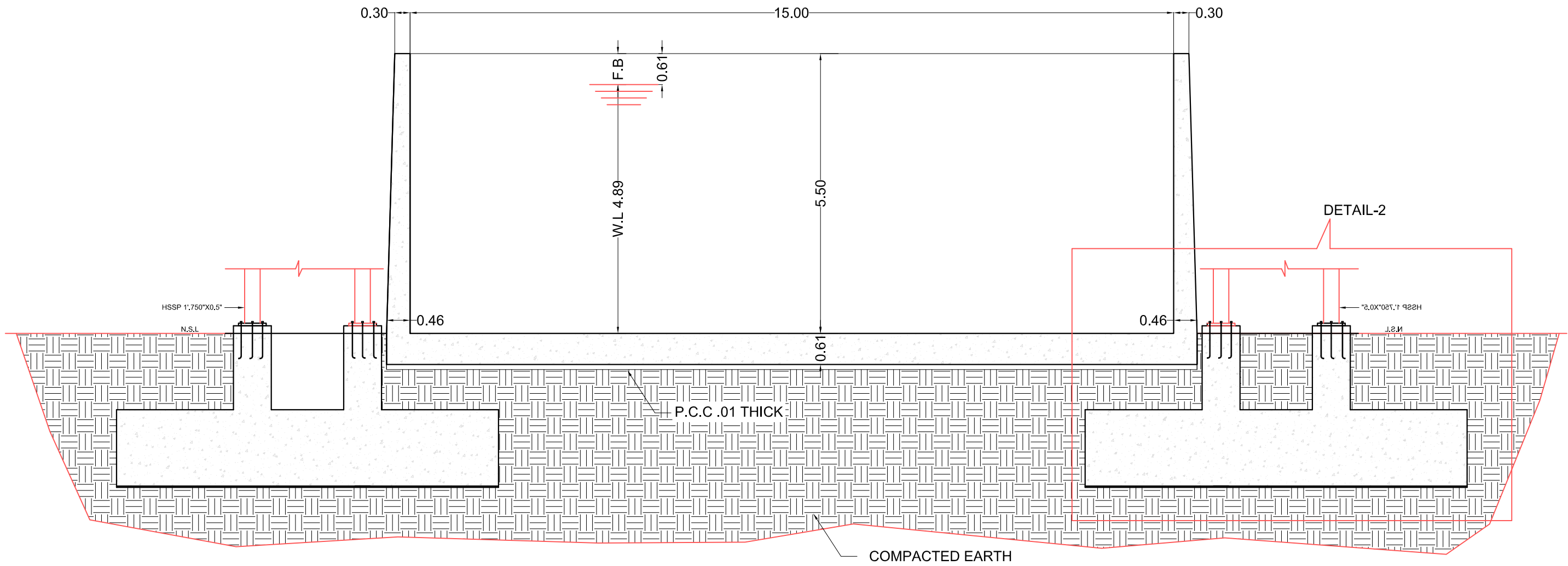
CLIENT
 JOB TITLE

JOB NO. ---
 SIGNATURES
 SCALE
 DATE
 JULY,02,2020

DRAWING NO.
 0003
 REVISION SUFFIX

--	--	--	--	--	--	--	--

 DRAWN
 M.ABUBAKAR
 CHECKED
 M.UMAR HAYAT



SECTION A-A

DRAWING TITLE
SECTION A-A

CONSULTING ARCHITECT AND ENGINEER

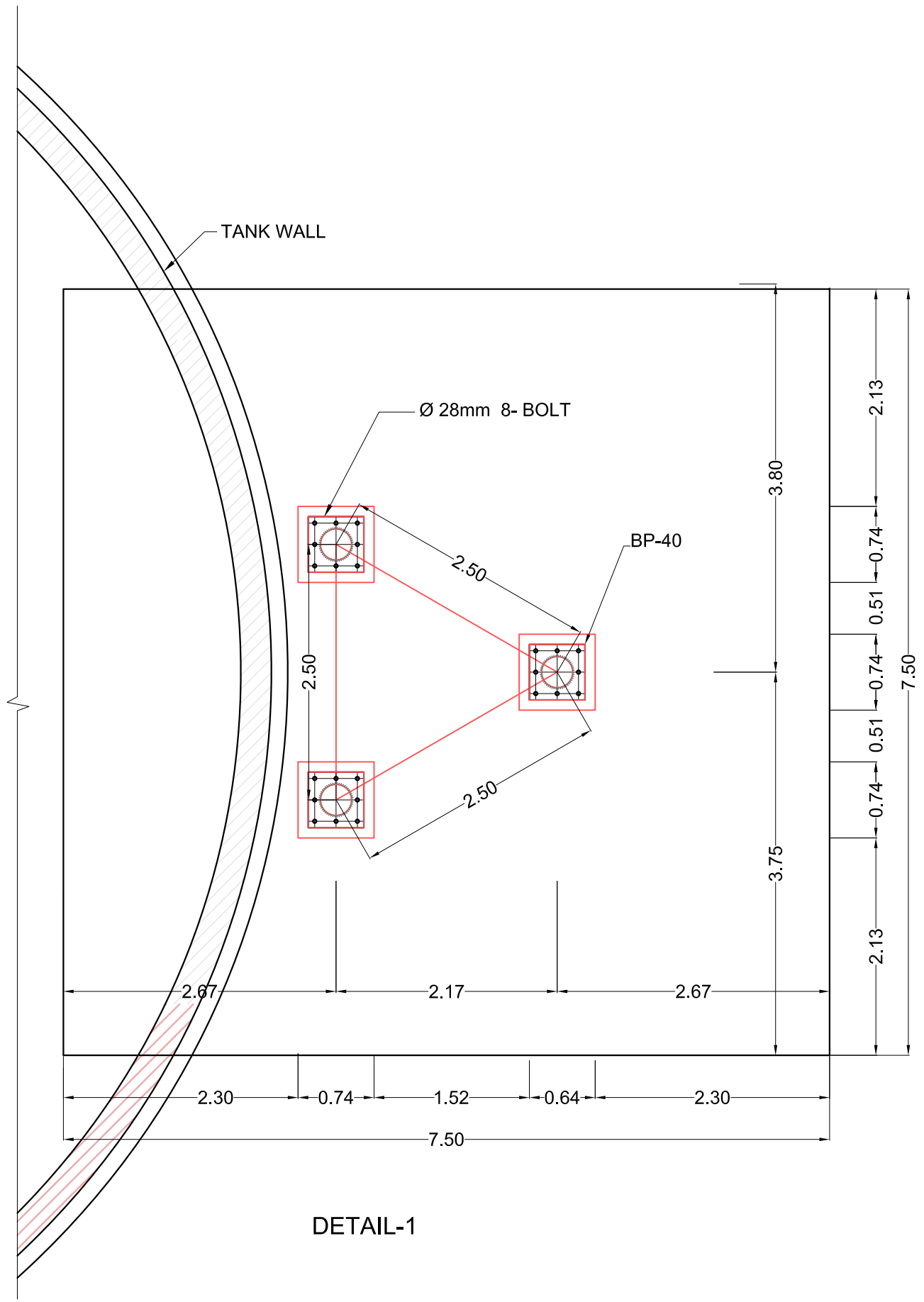


ALPHA ENGINEERING CONSULTANTS

CLIENT
 JOB TITLE

JOB NO. ---
 SIGNATURES
 SCALE
 DATE
 JULY,02,2020

DRAWING NO. 0004
 REVISION SUFFIX
 DRAWN M.ABUBAKAR
 CHECKED M.UMAR HAYAT



DETAIL-1

DRAWING TITLE
DETAIL-1

CONSULTING ARCHITECT AND ENGINEER

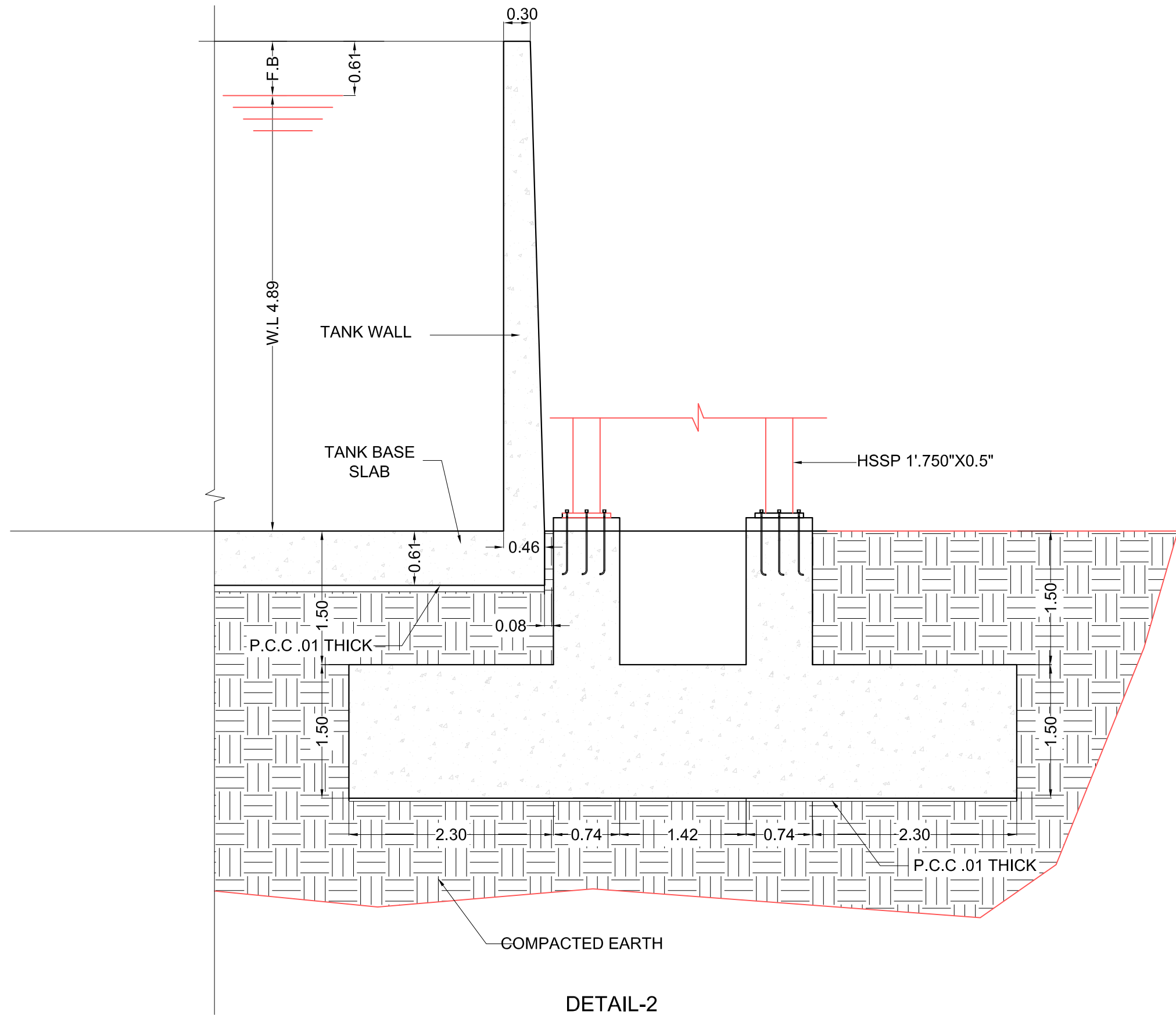


ALPHA ENGINEERING CONSULTANTS

CLIENT

JOB TITLE

JOB NO. ---		DRAWING NO. 0005	
SIGNATURES			
SCALE	DATE JULY.02.2020	DRAWN M.ABUBAKAR	CHECKED M.UMAR HAYAT



DRAWING TITLE

DETAIL-2

CONSULTING ARCHITECT AND ENGINEER

ALPHA ENGINEERING CONSULTANTS

CLIENT

JOB TITLE

JOB NO. ---

SIGNATURES

SCALE

DATE
JULY.02.2020

DRAWING NO. 0006

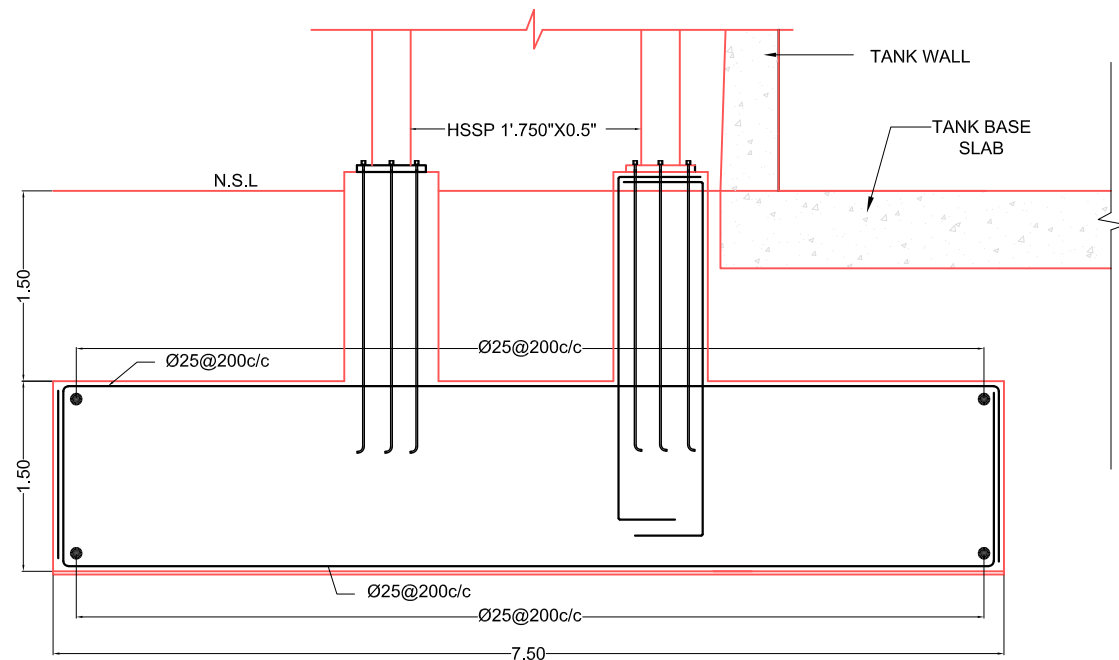
--	--	--	--	--	--	--	--

REVISION SUFFIX

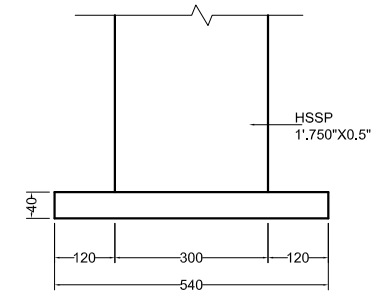
--	--	--	--	--	--	--	--

DRAWN: M.ABUBAKAR

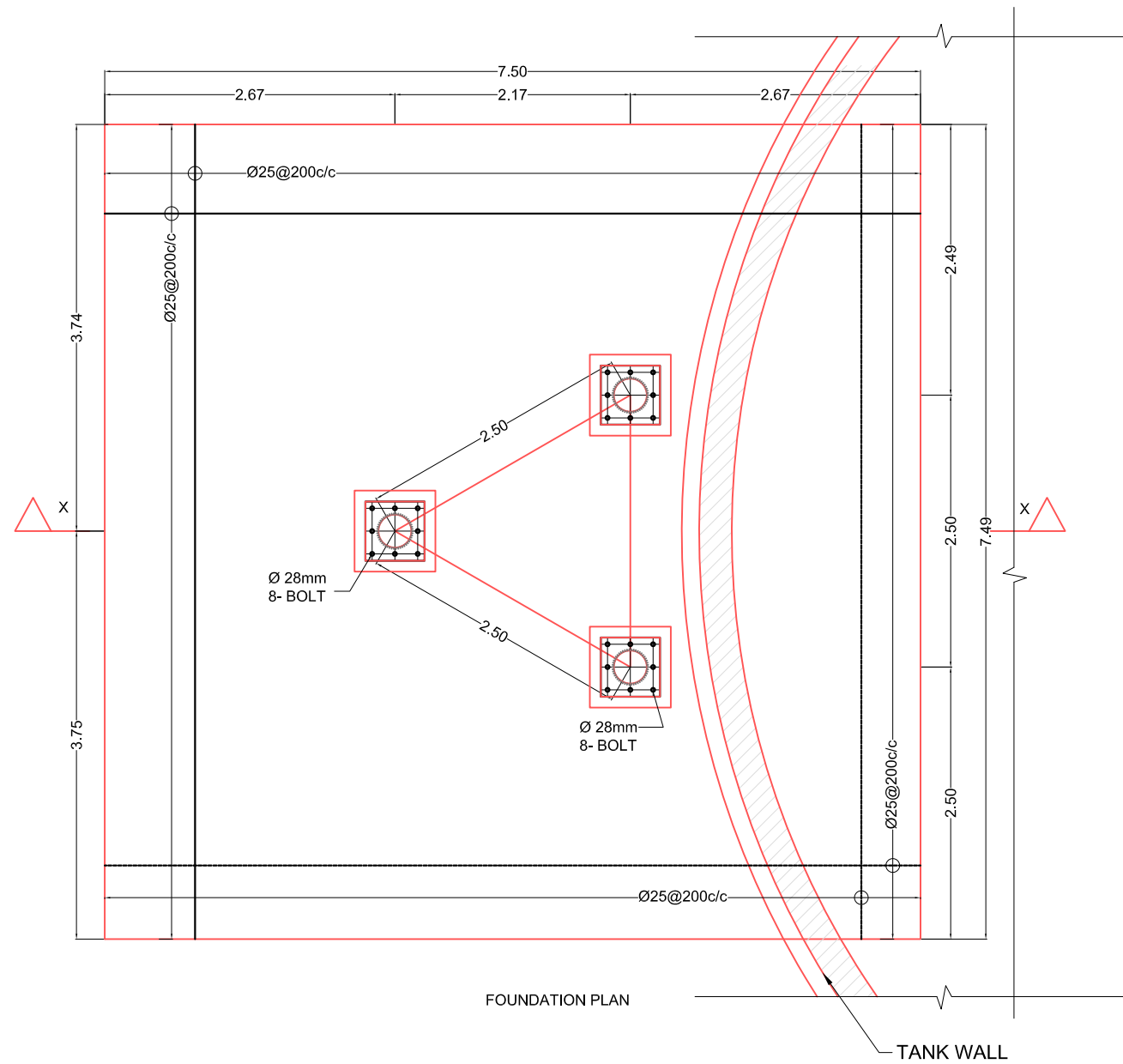
CHECKED: M.UMAR HAYAT



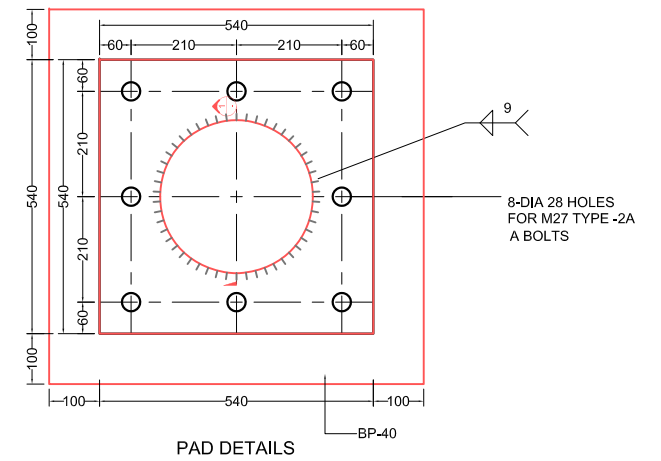
SECTION A-A



SECTION 1-1



FOUNDATION PLAN



PAD DETAILS

DRAWING TITLE
TOWER FOUNDATION AND REINFORCEMENT DETAILS

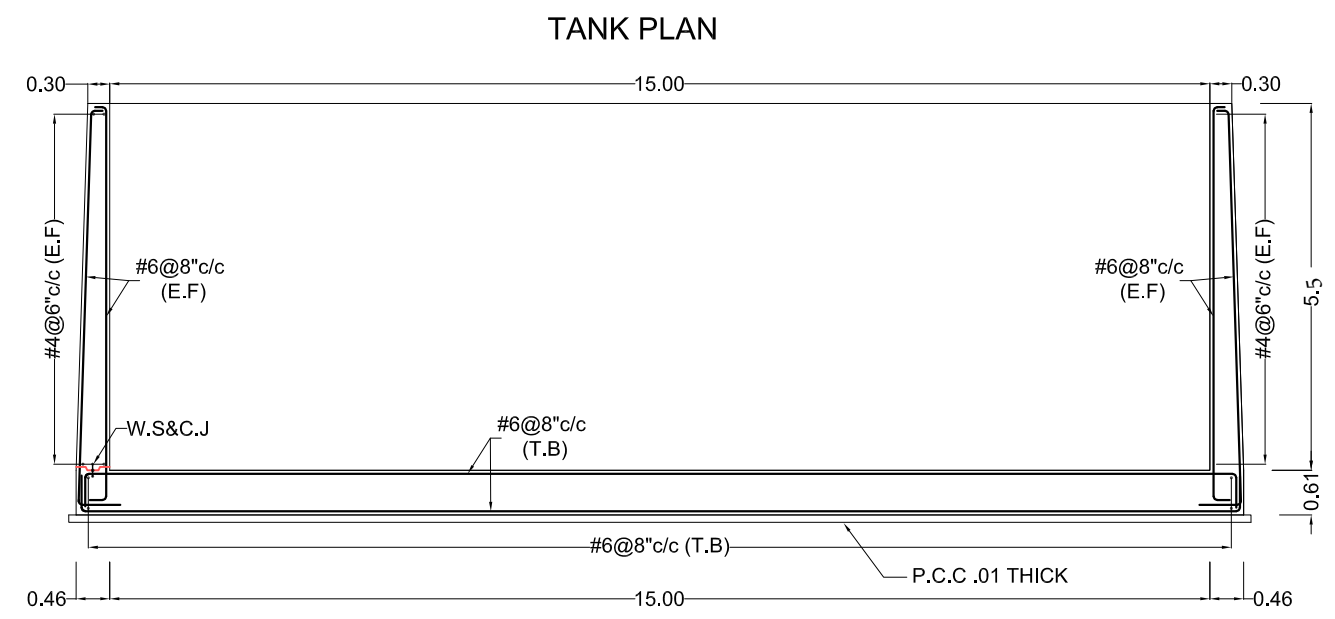
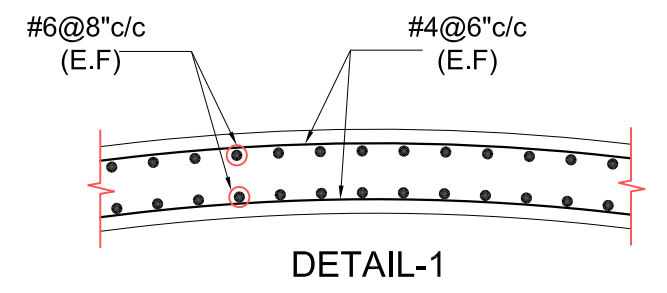
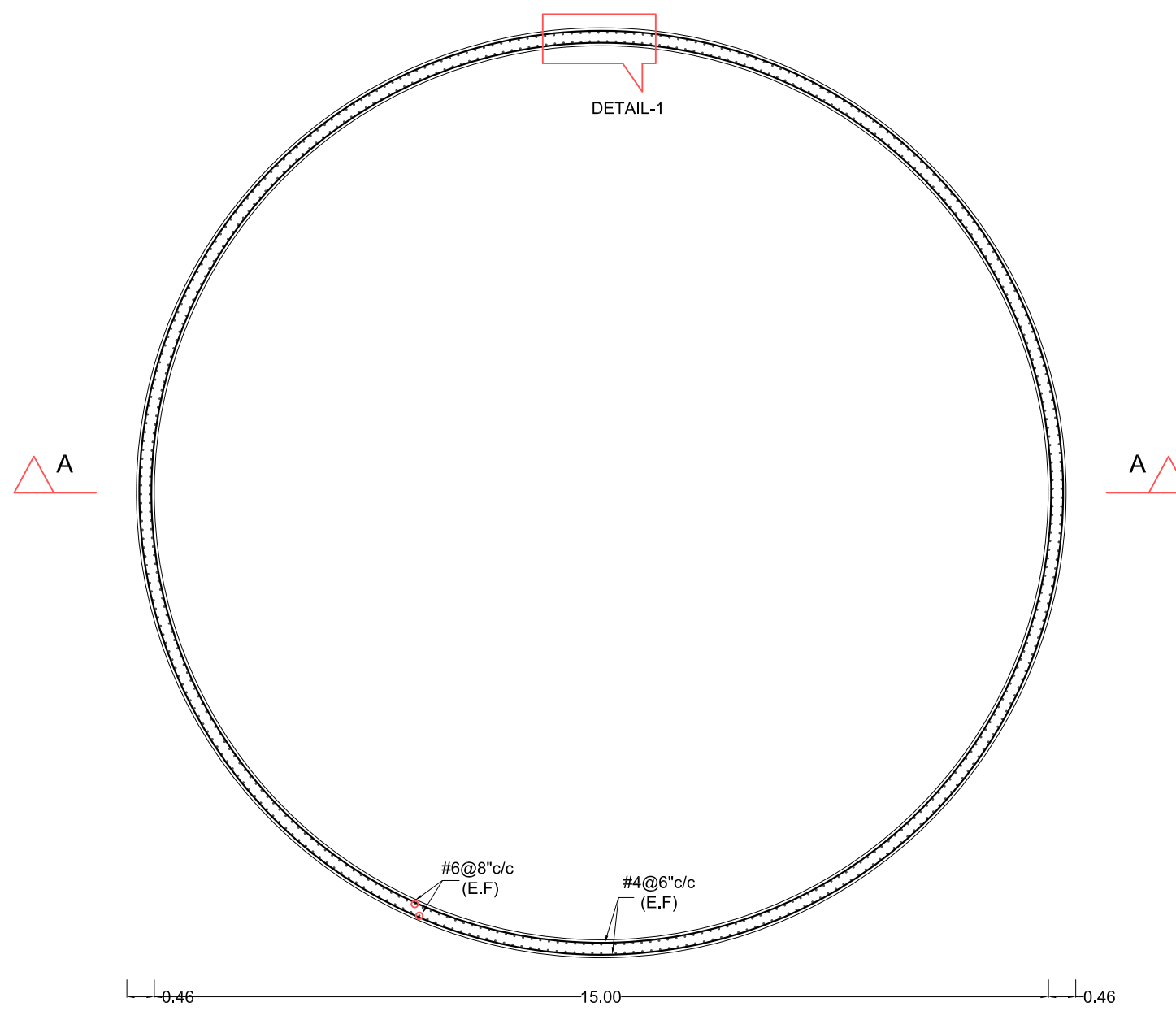
CONSULTING ARCHITECT AND ENGINEER



ALPHA ENGINEERING CONSULTANTS

CLIENT	
JOB TITLE	

JOB NO.	---	DRAWING NO.	0007
SIGNATURES		REVISION SUFFIX	
SCALE	DATE	DRAWN	CHECKED
	JULY,02,2020	M.ABUBAKAR	M.UMAR HAYAT



TANK PLAN

SECTION A-A

DRAWING TITLE
**TANK REINFORCEMENT STRUCTURE
 PLAN AND DETAILS**

CONSULTING ARCHITECT AND ENGINEER



ALPHA ENGINEERING
CONSULTANTS

CLIENT

 JOB TITLE

JOB NO. ---	DRAWING NO. 0008
SIGNATURES	
SCALE	DATE JULY.02.2020
DRAWN M.ABUBAKAR	CHECKED M.UMAR HAYAT