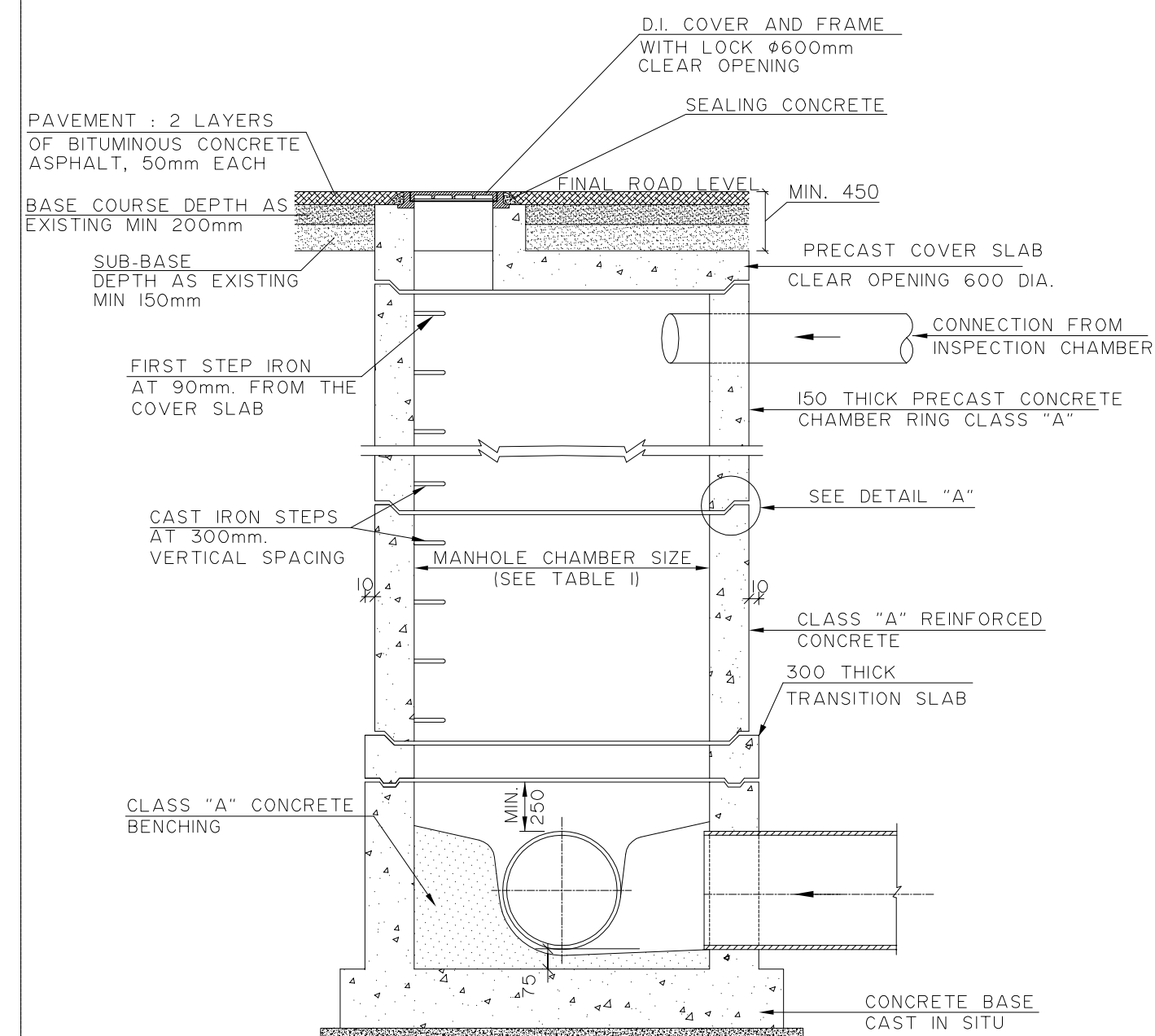
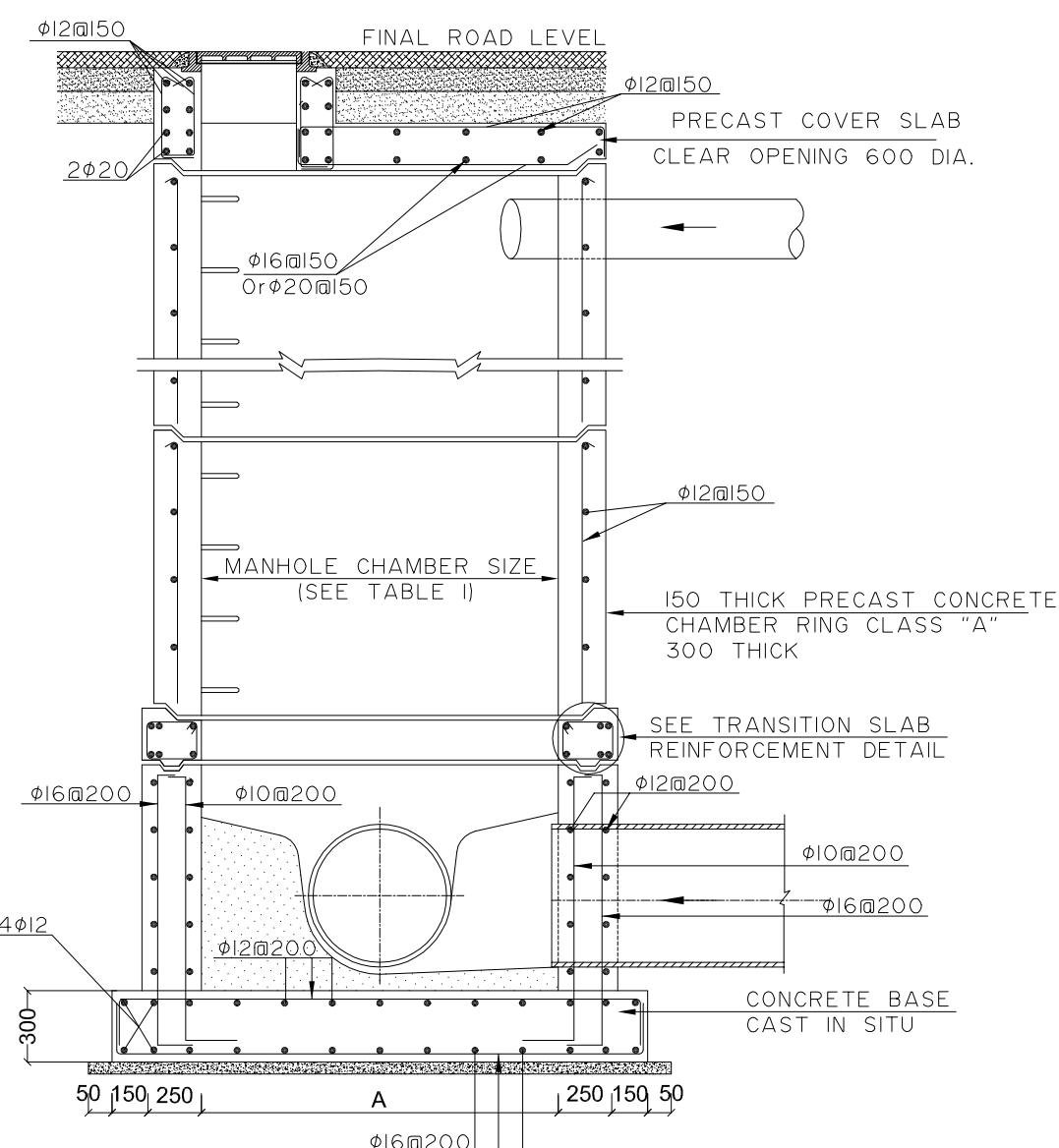


PLAN VIEW



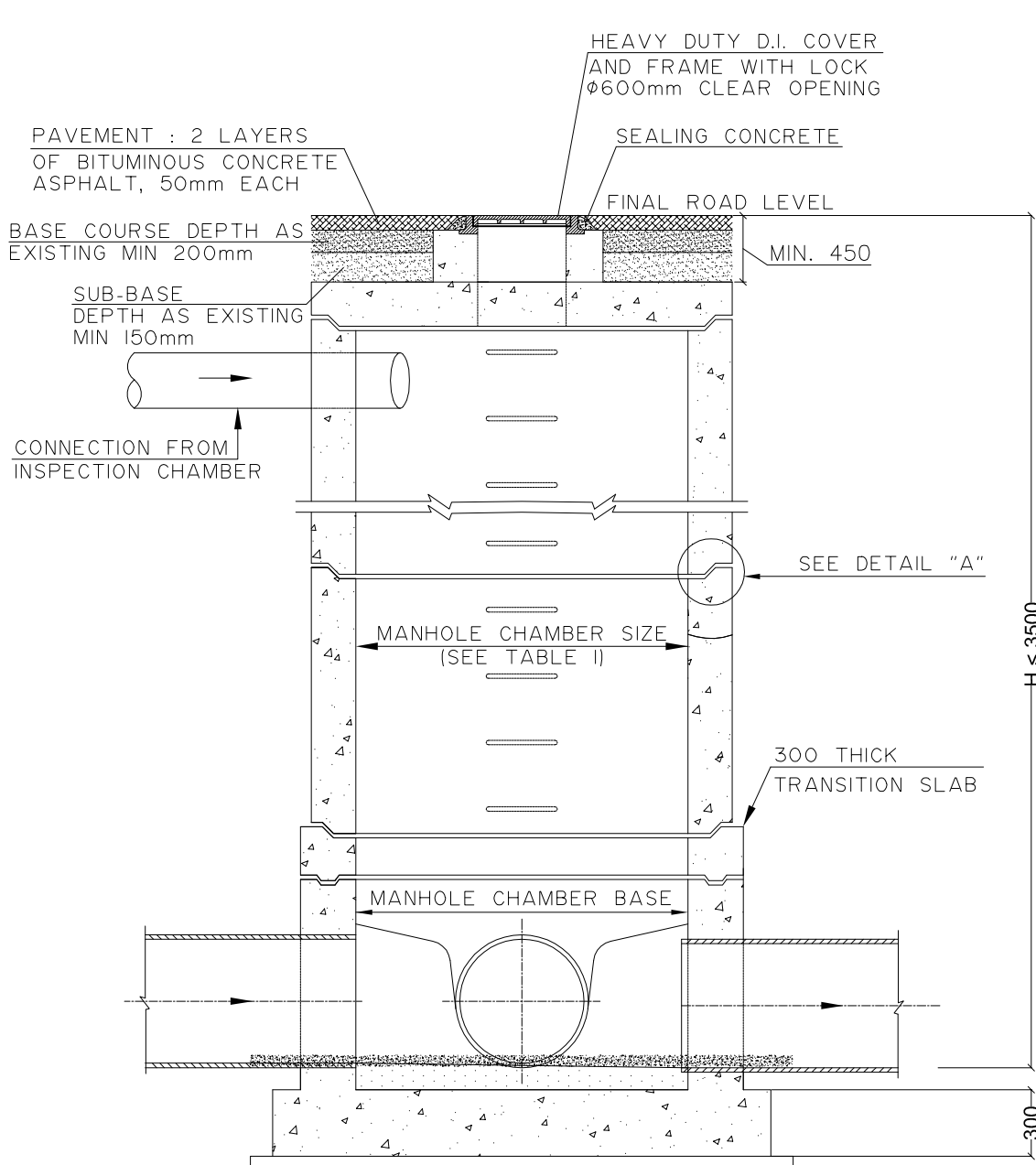
SECTION A-A



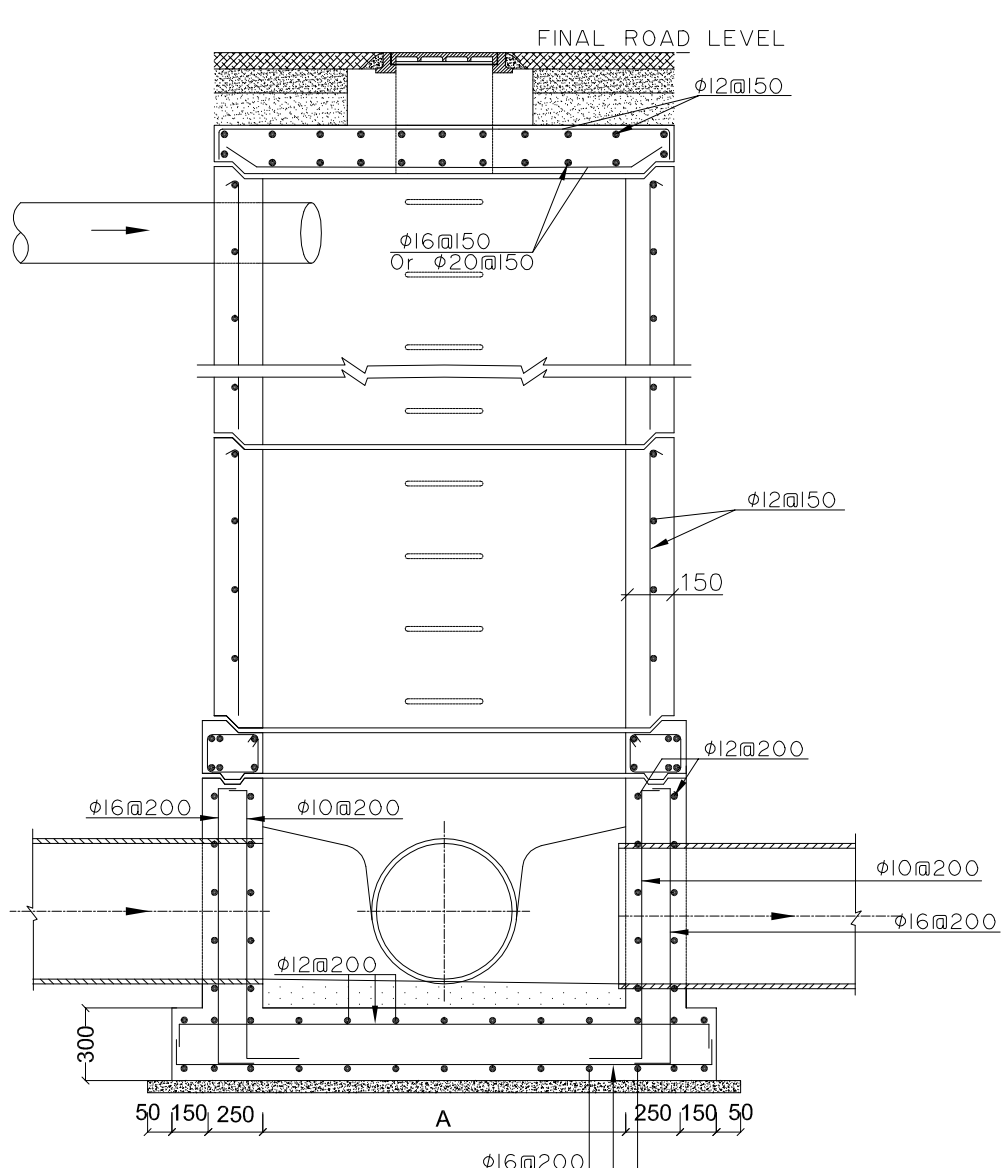
SECTION A-A

TABLE 1

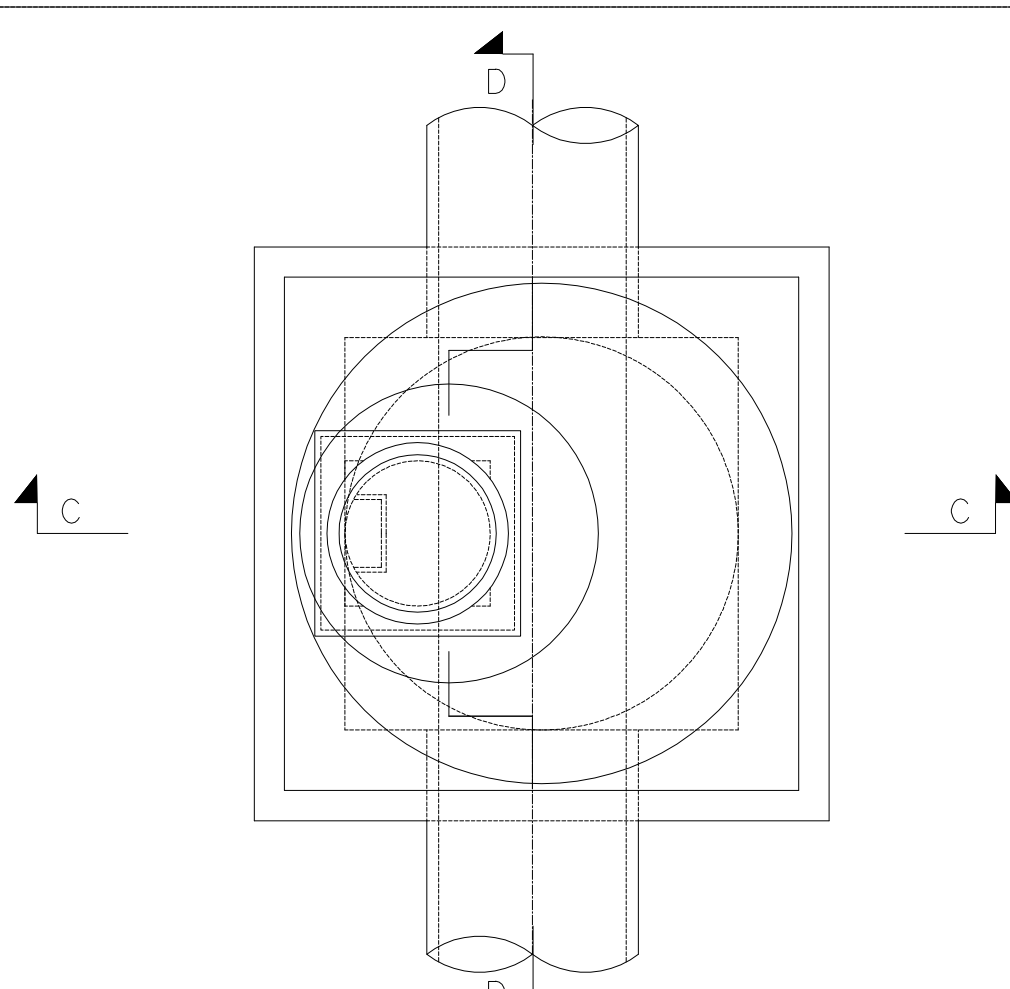
Size of manhole chambers		
Pipe Diameter	Manhole chamber size	Manhole chamber base
200 - 400 mm	1200 mm	1200 x 1200 mm
500 - 800 mm	1500 mm	1500 x 1500 mm
900 - 1500 mm	2000 mm	2000 x 2000 mm



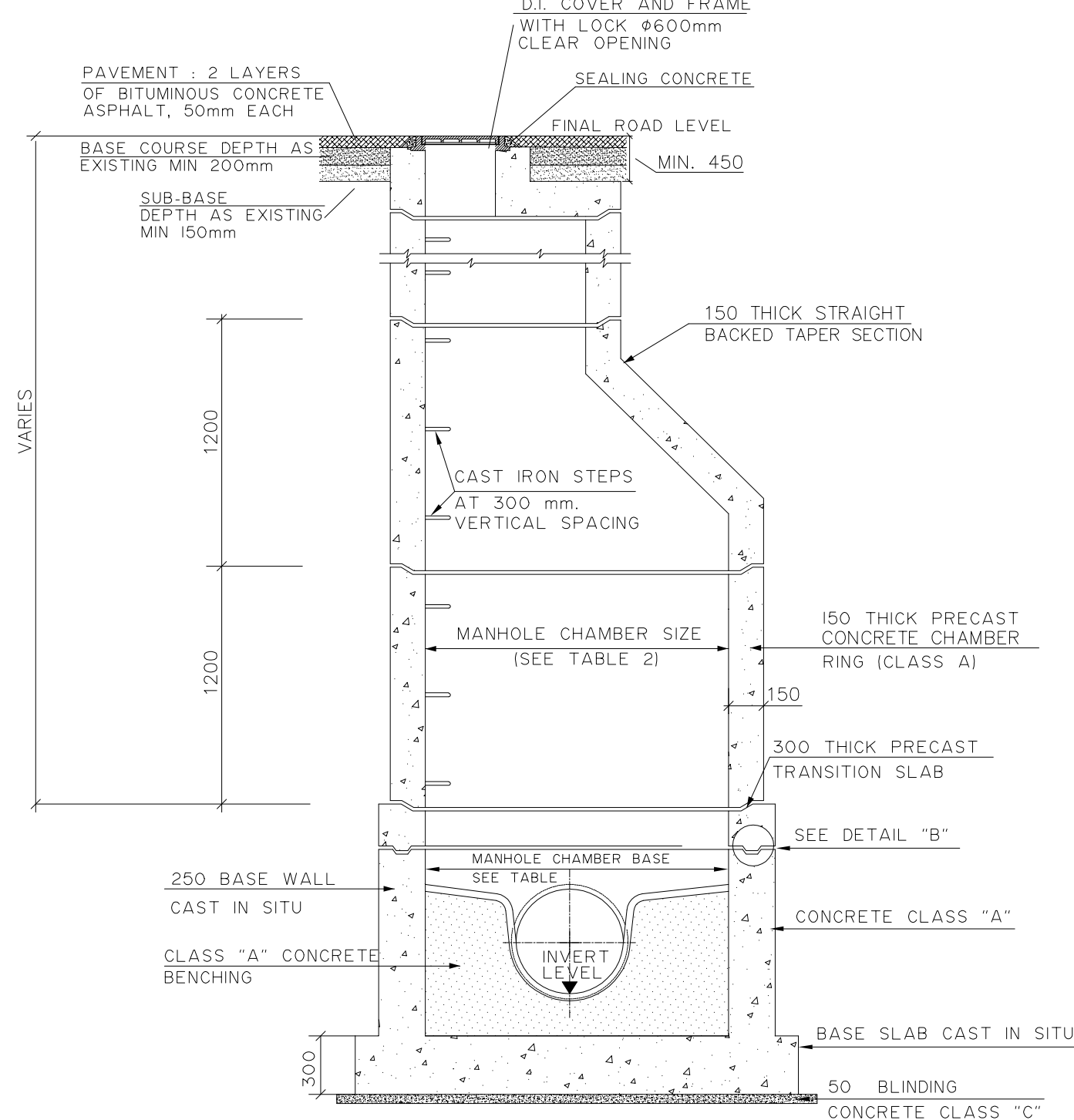
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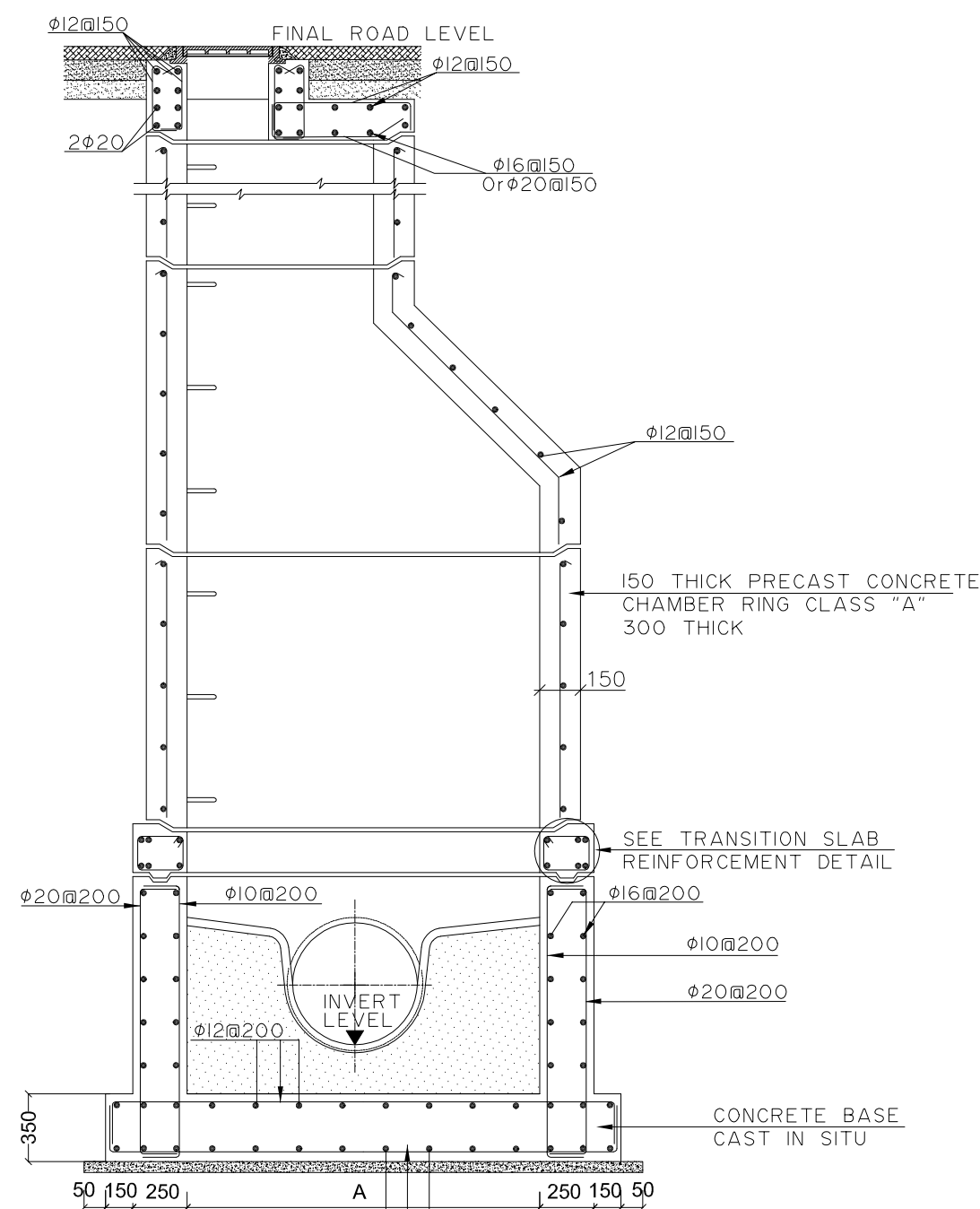
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PLAN VIEW



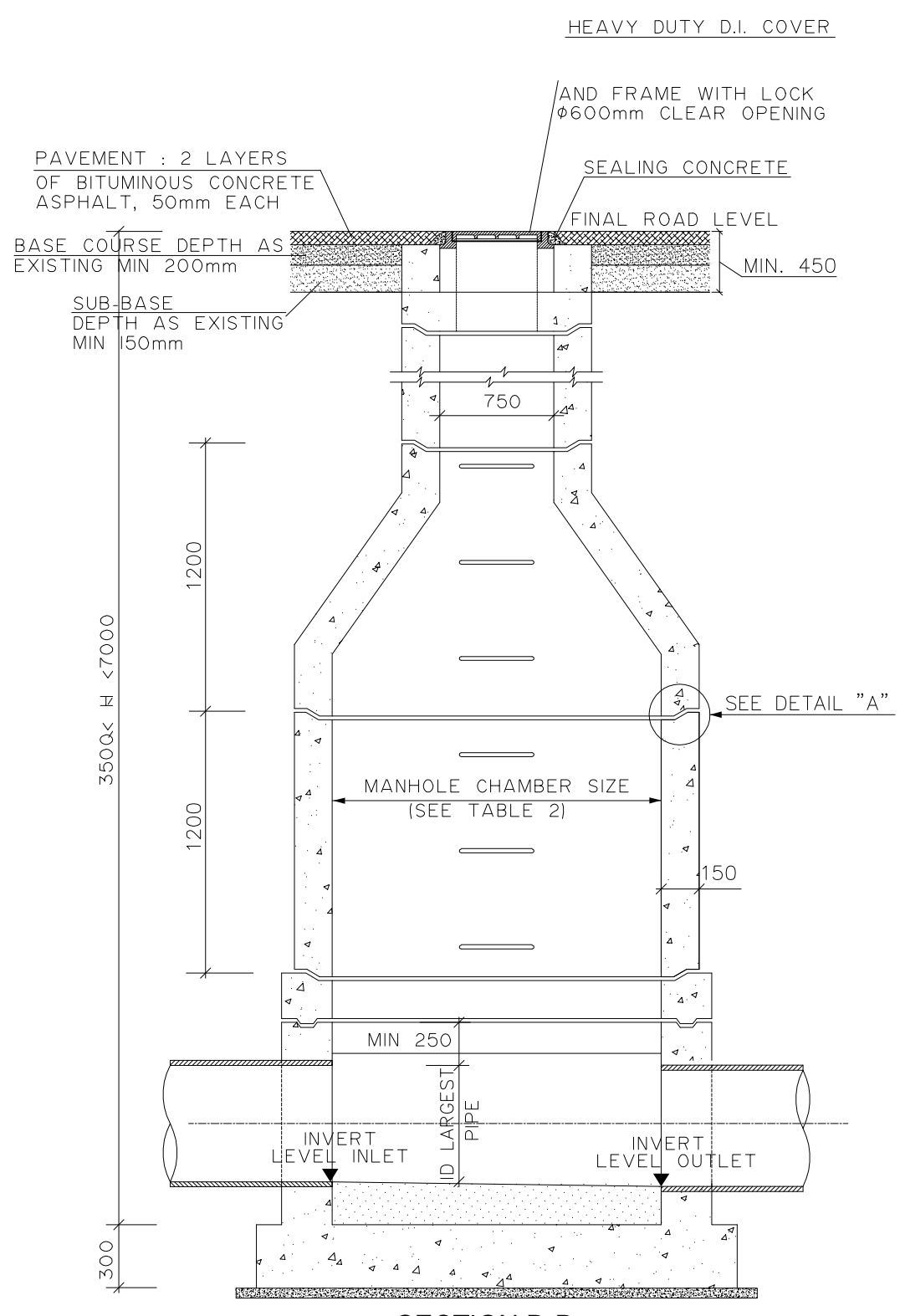
SECTION C-C



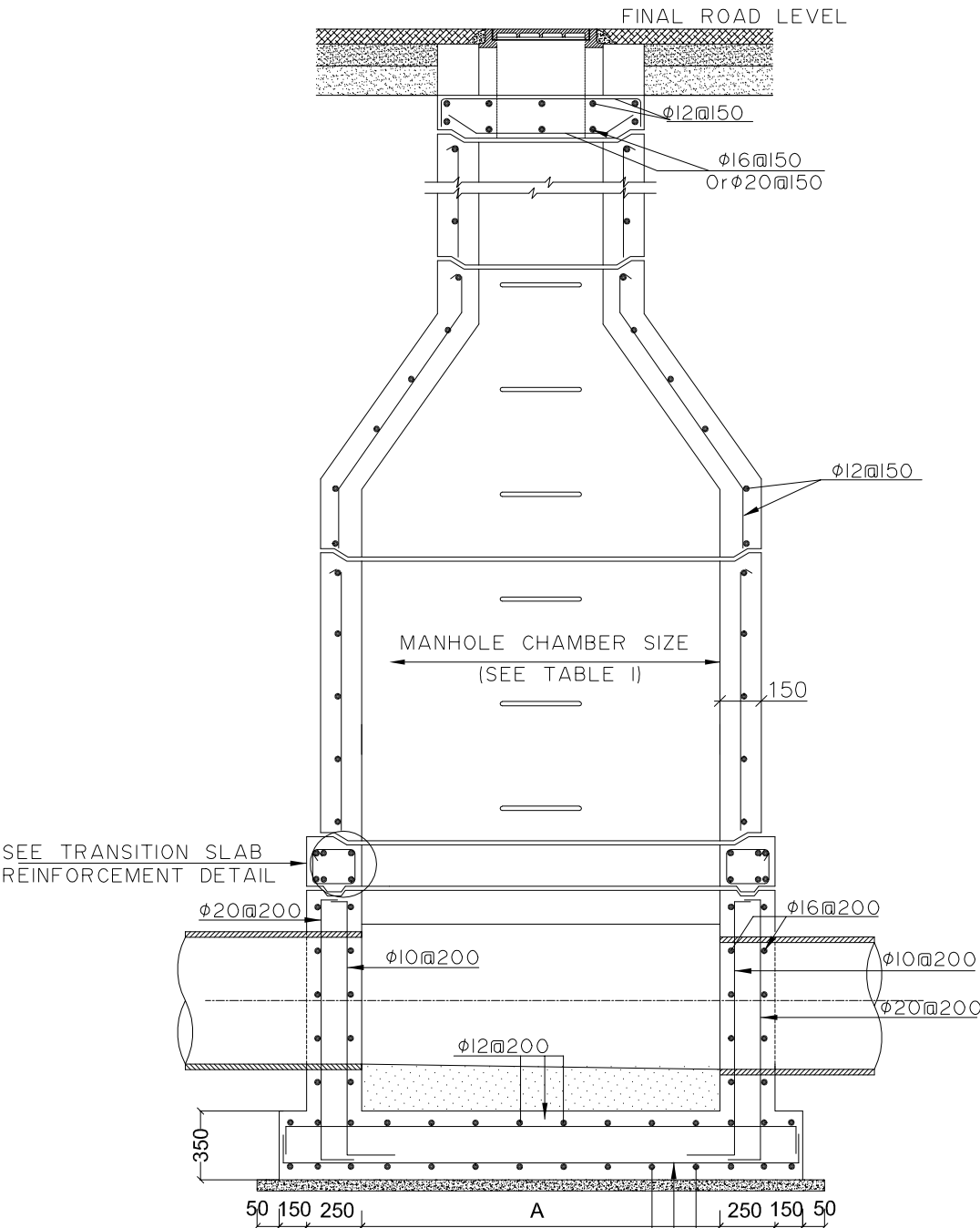
SECTION C-C

TABLE 2

Size of manhole chambers		
Pipe Diameter	Manhole chamber size	Manhole chamber base
200 - 400 mm	1200 mm	1200 x 1200 mm
500 - 800 mm	1500 mm	1500 x 1500 mm
900 - 1500 mm	2000 mm	2000 x 2000 mm



SECTION D-D



SECTION D-D



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Social and Local Development Programme
P.O.Box: 11-3216 Beirut, Lebanon
Tel: 961 1 962491

PROGRAMME: Lebanese Host Communities Support Programme
Support to Integrated Service Provision at the Local Level

PROJECT NAME:
TAL ABBAS EL GHARBI SEWAGE NETWORK

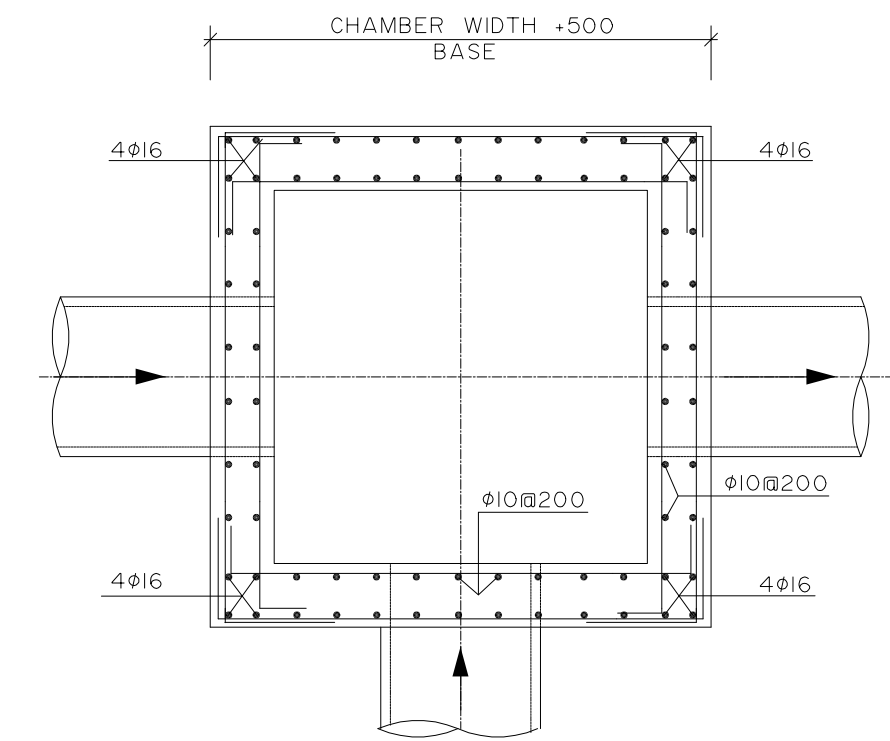
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REV	BY	Date	Description	Appr.

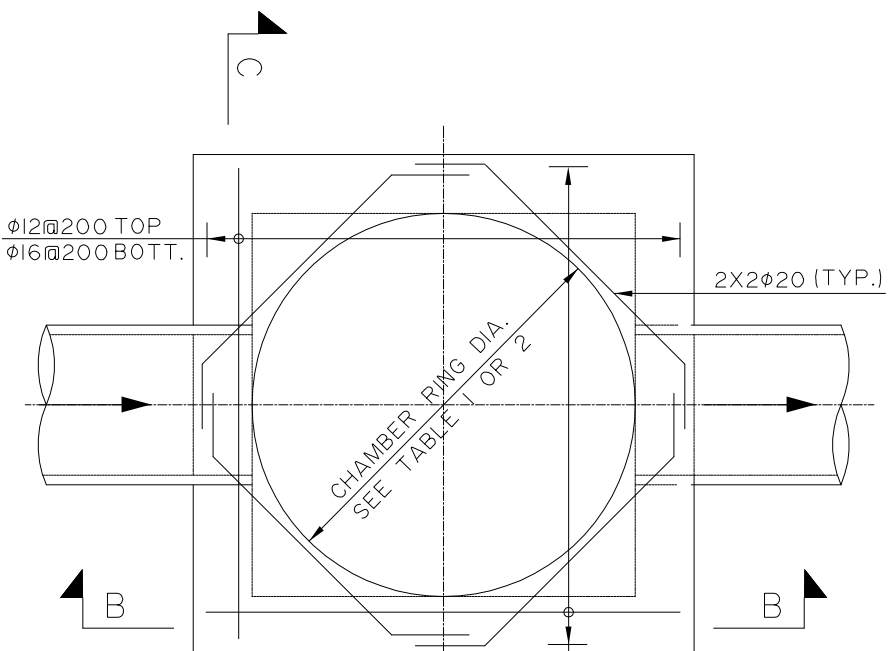
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PROJECT PHASE TENDER
DISCIPLINE CIVIL ENGINEERING
SECTOR
BUILDING
DESIGNED
DRAWN
CHECKED
APPROVED
DATE 03-10-2016
SCALE N.T.S
SHEET SIZE A1

Title
TAL ABBAS EL GHARBI
SEWAGE NETWORK - PHASE 2
SEWAGE TYPICAL DETAILS

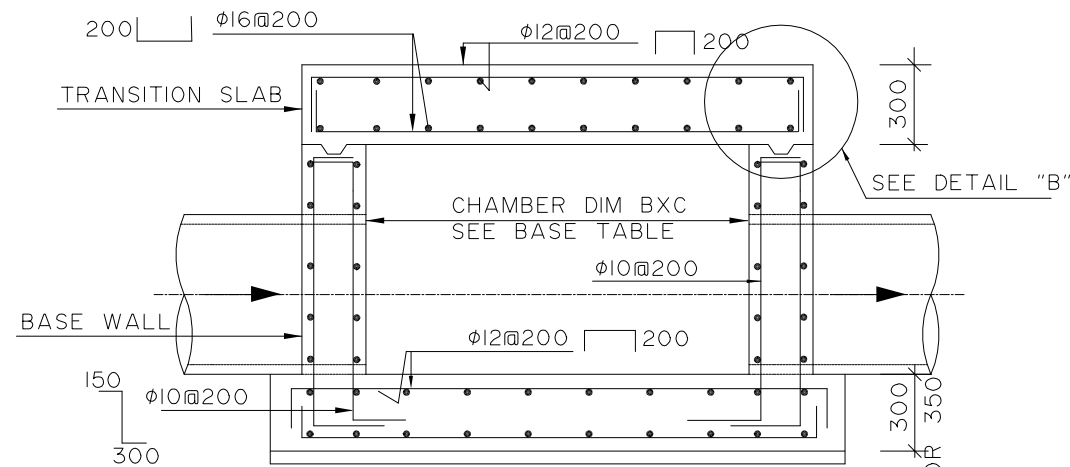
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L1505-PH2-SW-13-REV.0
Project Number Phase Type Drawing Number Revision



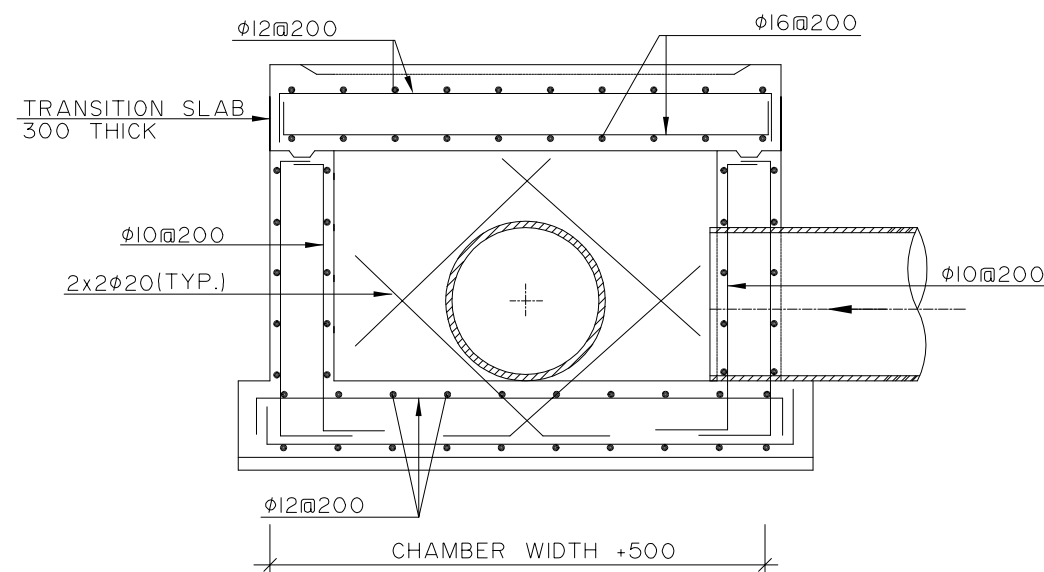
SECTION PLAN OF BASE WALL



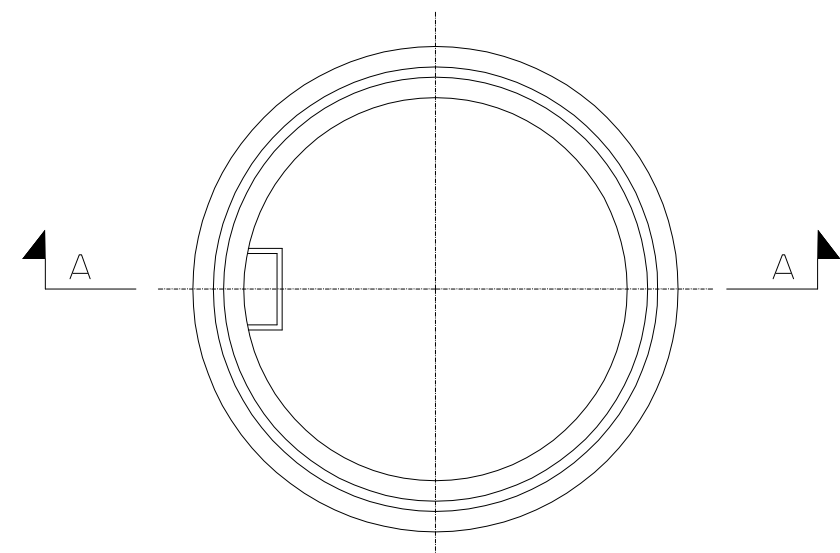
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TRANSITION SLAB



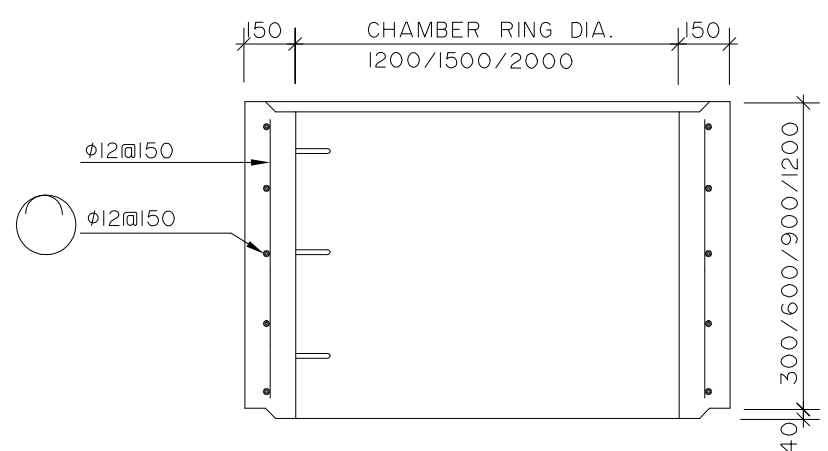
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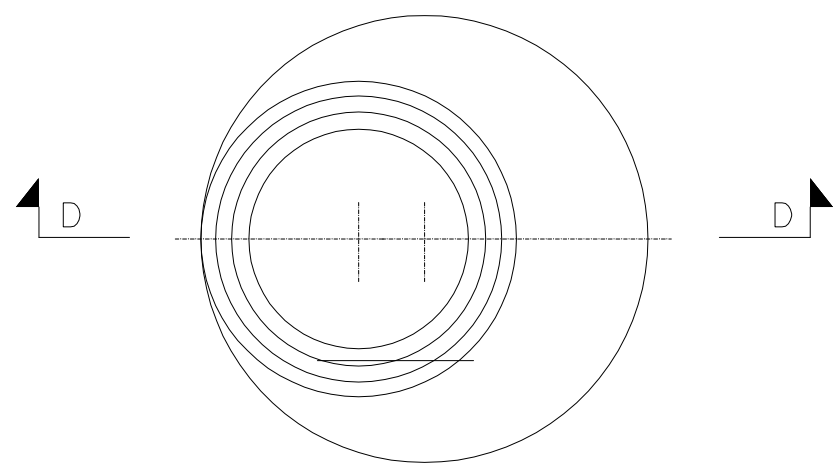
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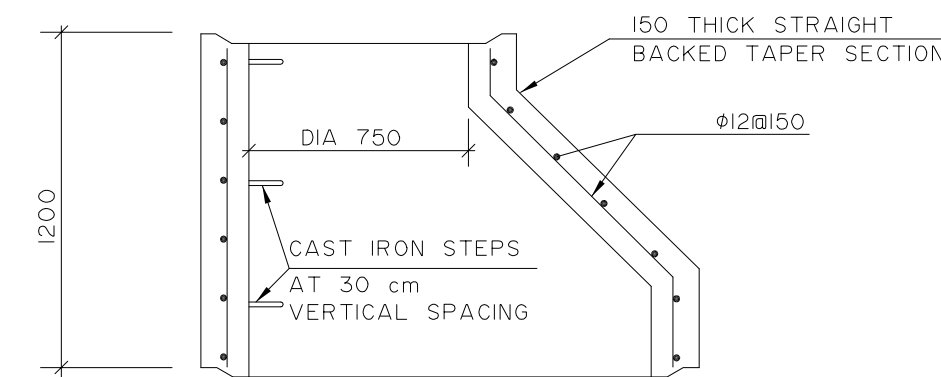
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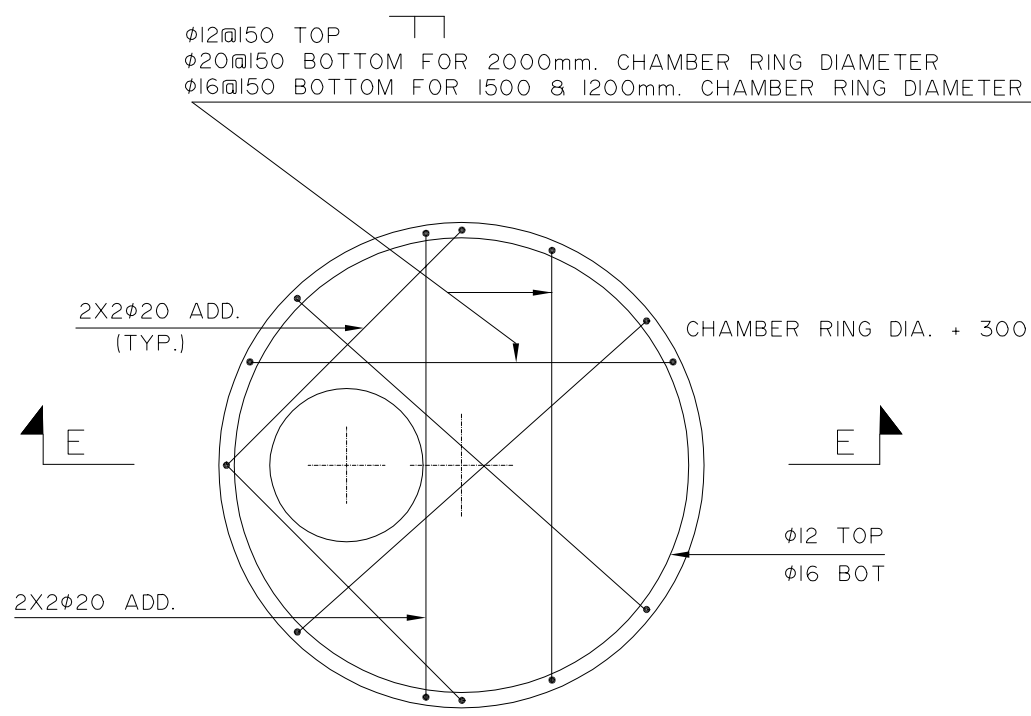
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STANDARD CHAMBER RING



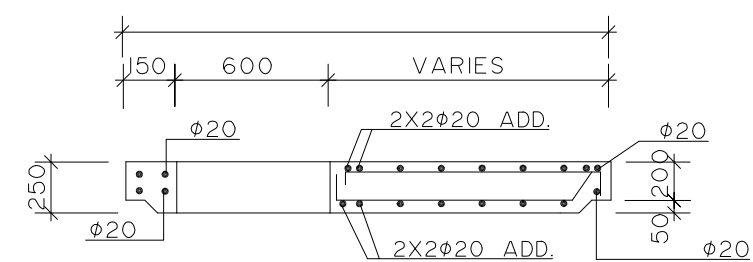
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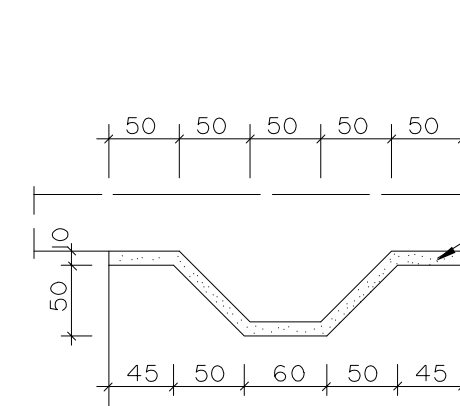
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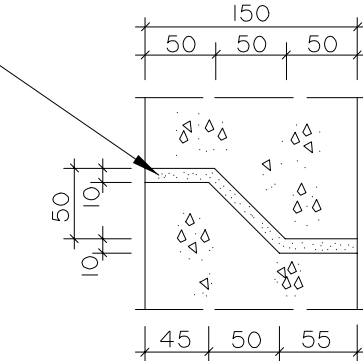
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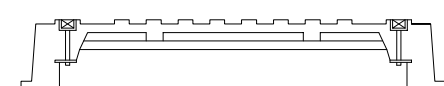
SECTION E-E
COVER SLAB REINFORCEMENT



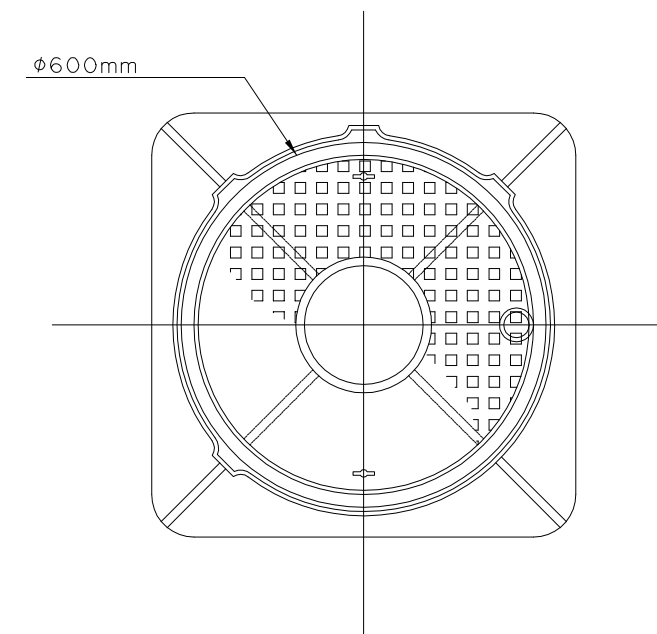
DETAIL "B"



DETAIL "A"



SECTION VIEW



DETAIL "C"

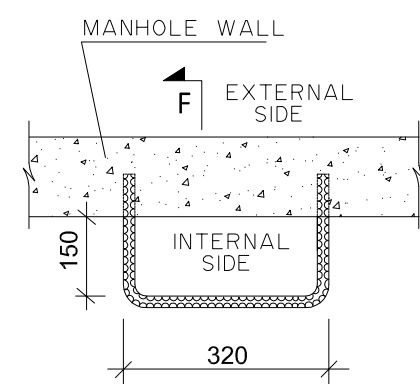
HEAVY DUTY, CLASS D-400, 40T ON ROAD SURFACES
MEDIUM DUTY, CLASS C-250, 25T ON SIDEWALKS

DETAILS "A" AND "B"

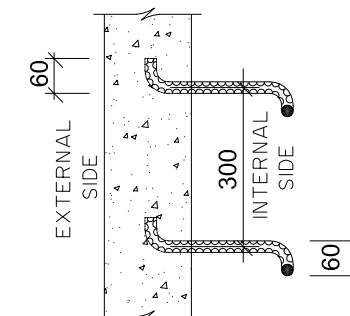
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DUCTILE IRON COVER WITH FRAME AND LOCK

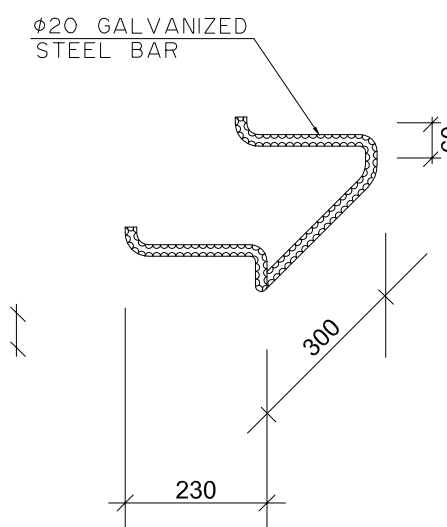
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PLAN VIEW



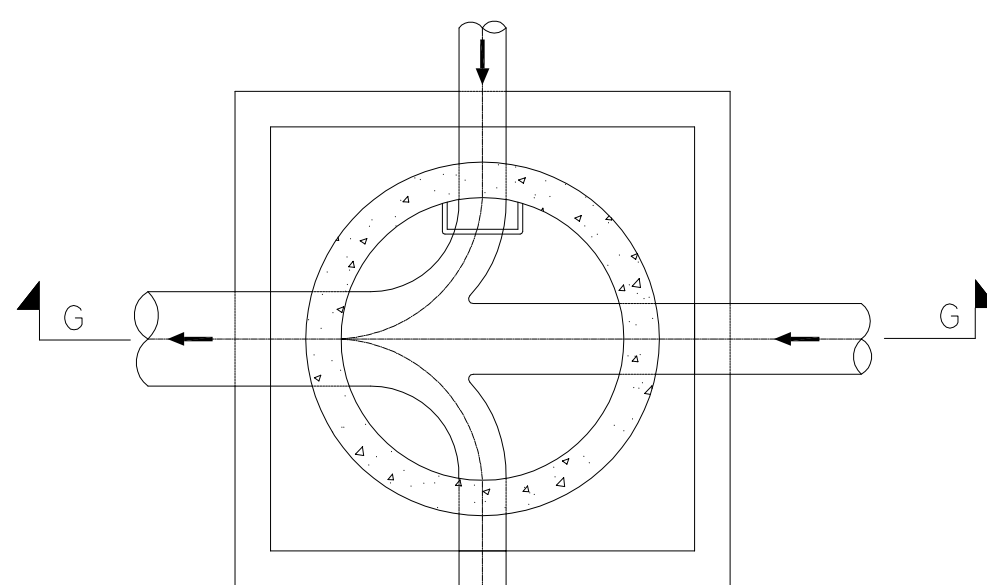
SECTION F-F



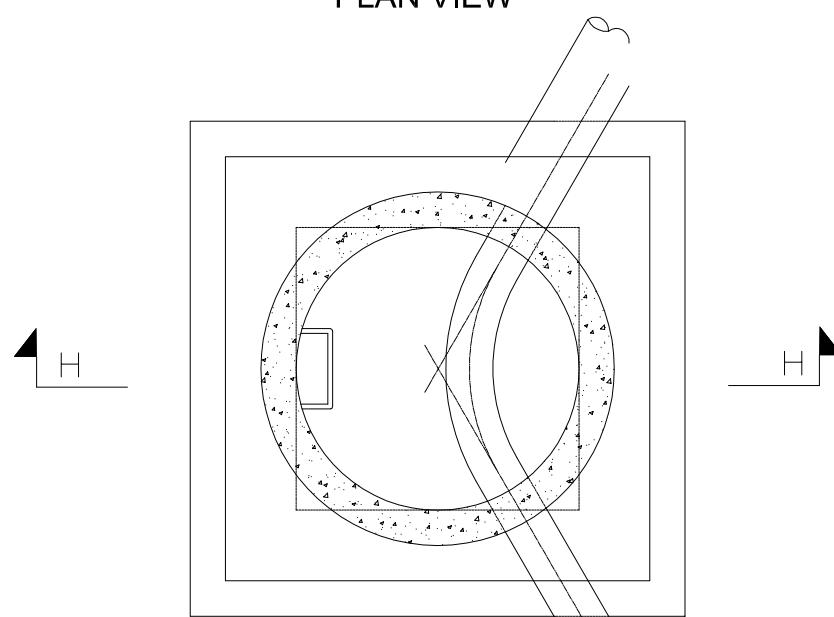
ELEVATION

MANHOLE STEP DETAIL

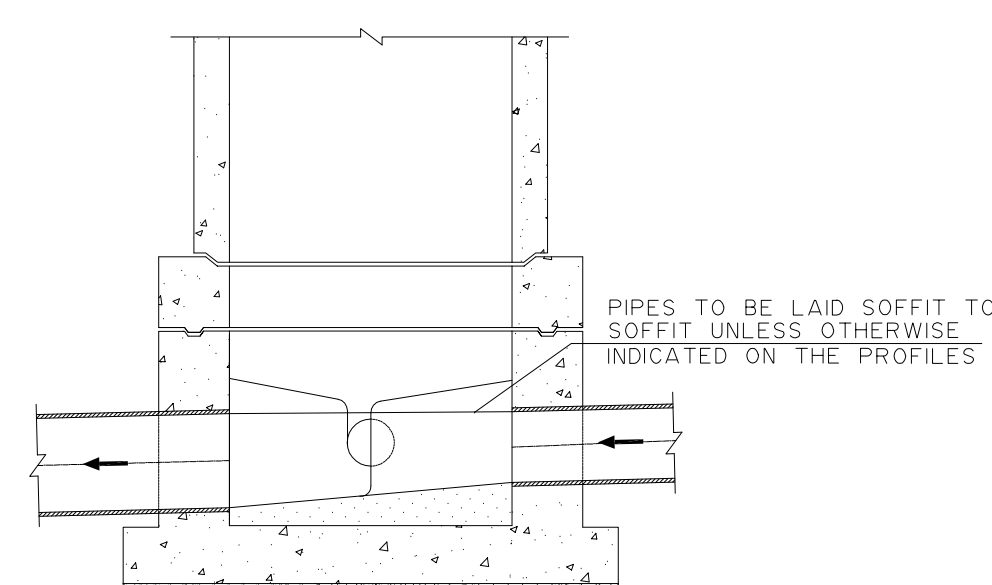
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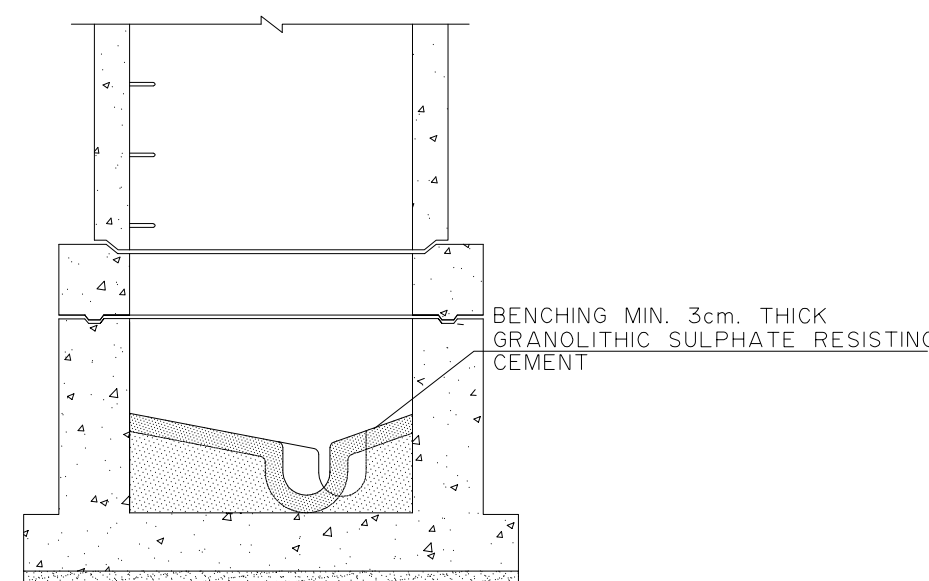
PLAN VIEW



PLAN VIEW



SECTION G-G



SECTION H-H

TYPICAL JUNCTION AND BEND FOR MANHOLE

5



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PROJECT NBR.	L1505			
PROJECT PHASE	TENDER			
DISCIPLINE	CIVIL ENGINEERING			
SECTOR				
BUILDING				
DESIGNED				
DRAWN				
CHECKED				
APPROVED				
DATE	03-10-2016			
SCALE	N.T.S			
SHEET SIZE	A1			

Title
TAL ABBAS EL GHARBI
SEWAGE NETWORK - PHASE 2
SEWAGE TYPICAL DETAILS

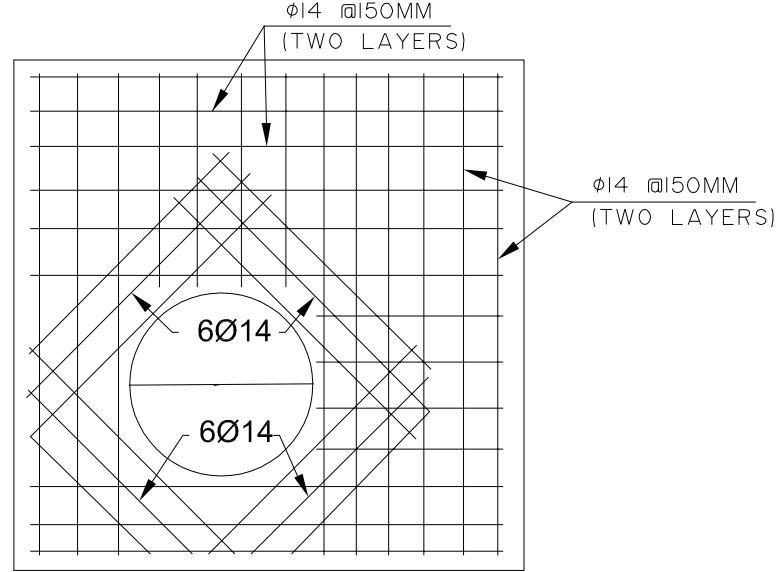
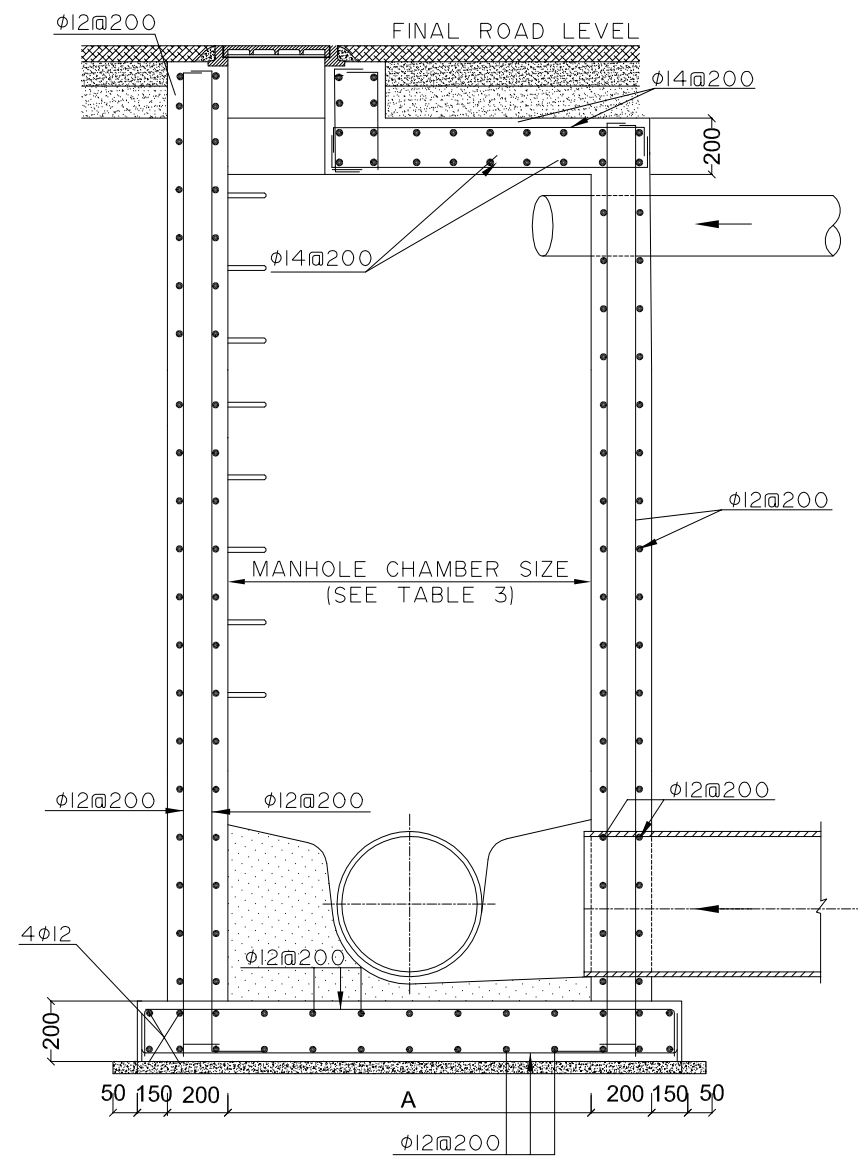
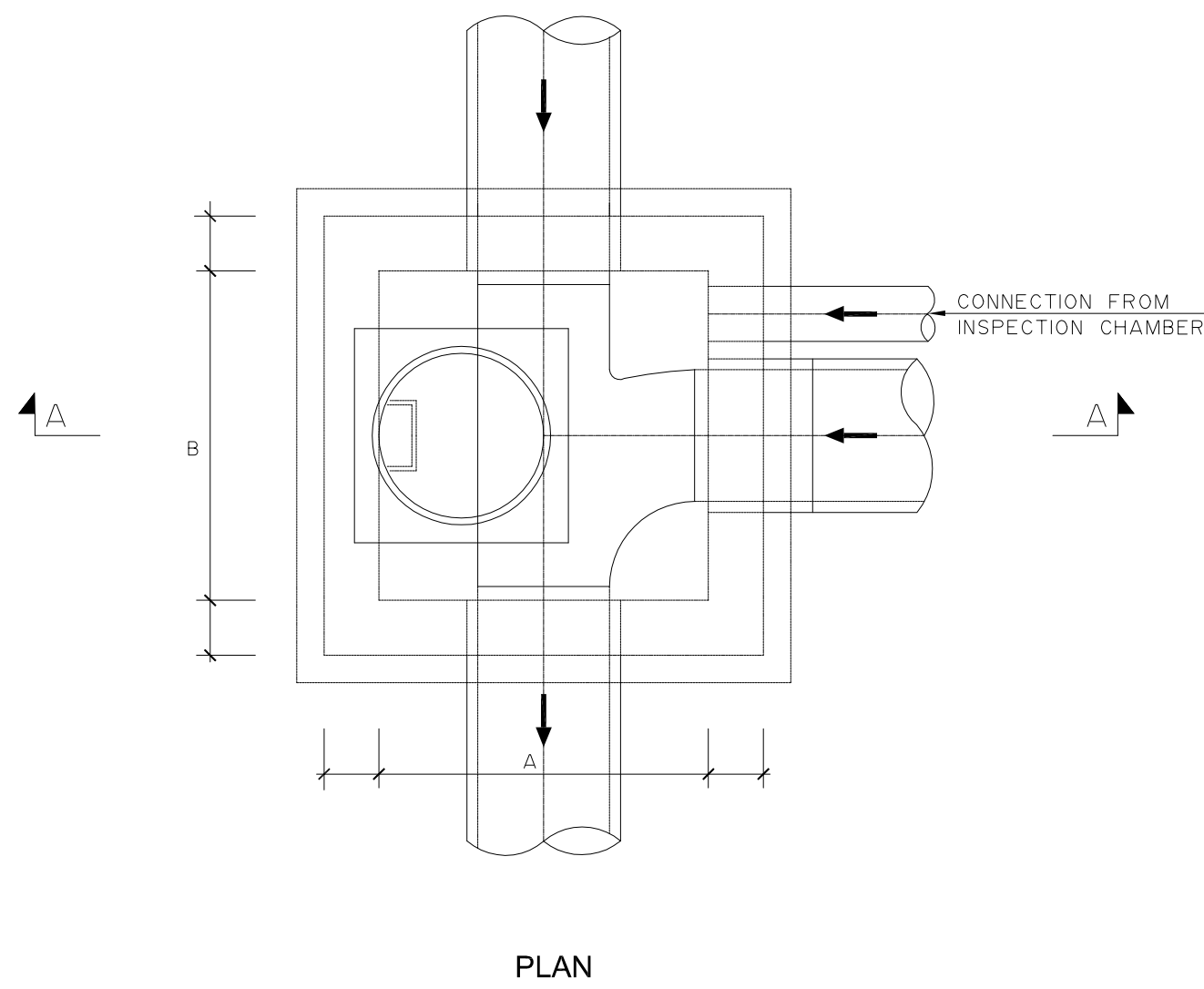
Sheet 2 OF 5

L1505-PH2-SW-14-REV.0

Project Number Phase Type Drawing Number Revision

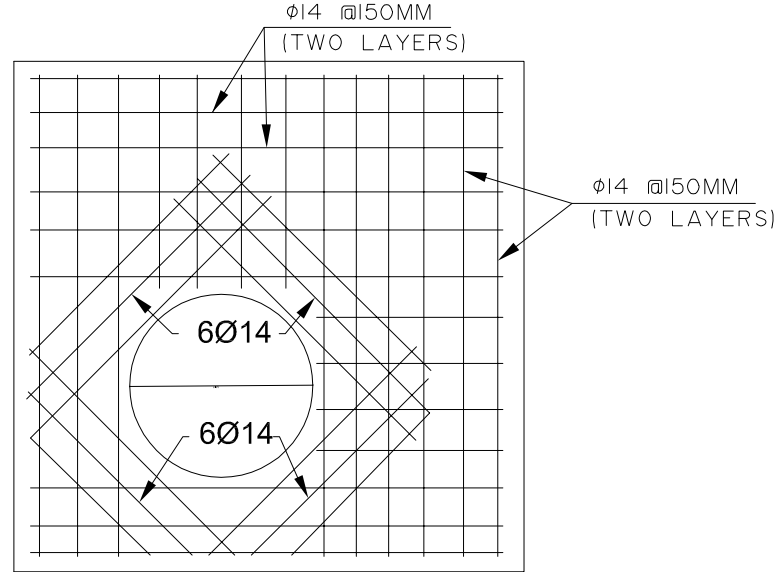
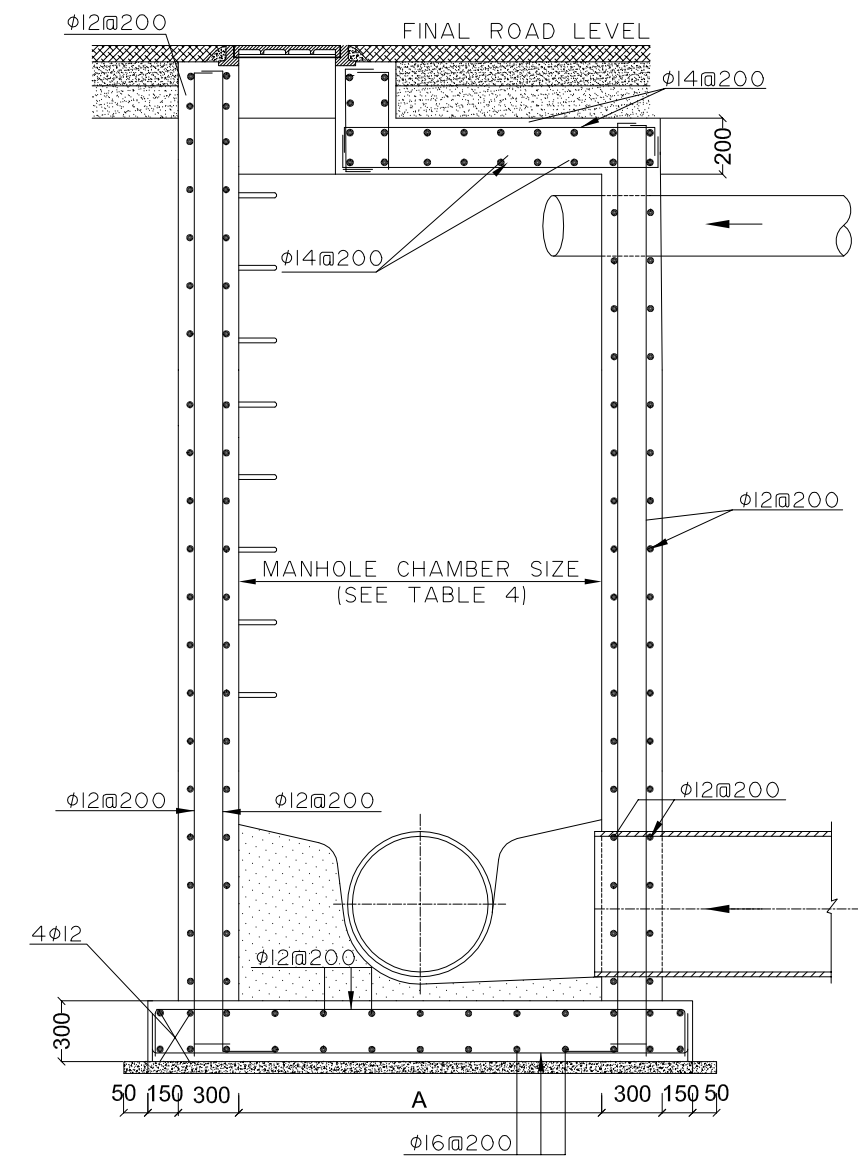
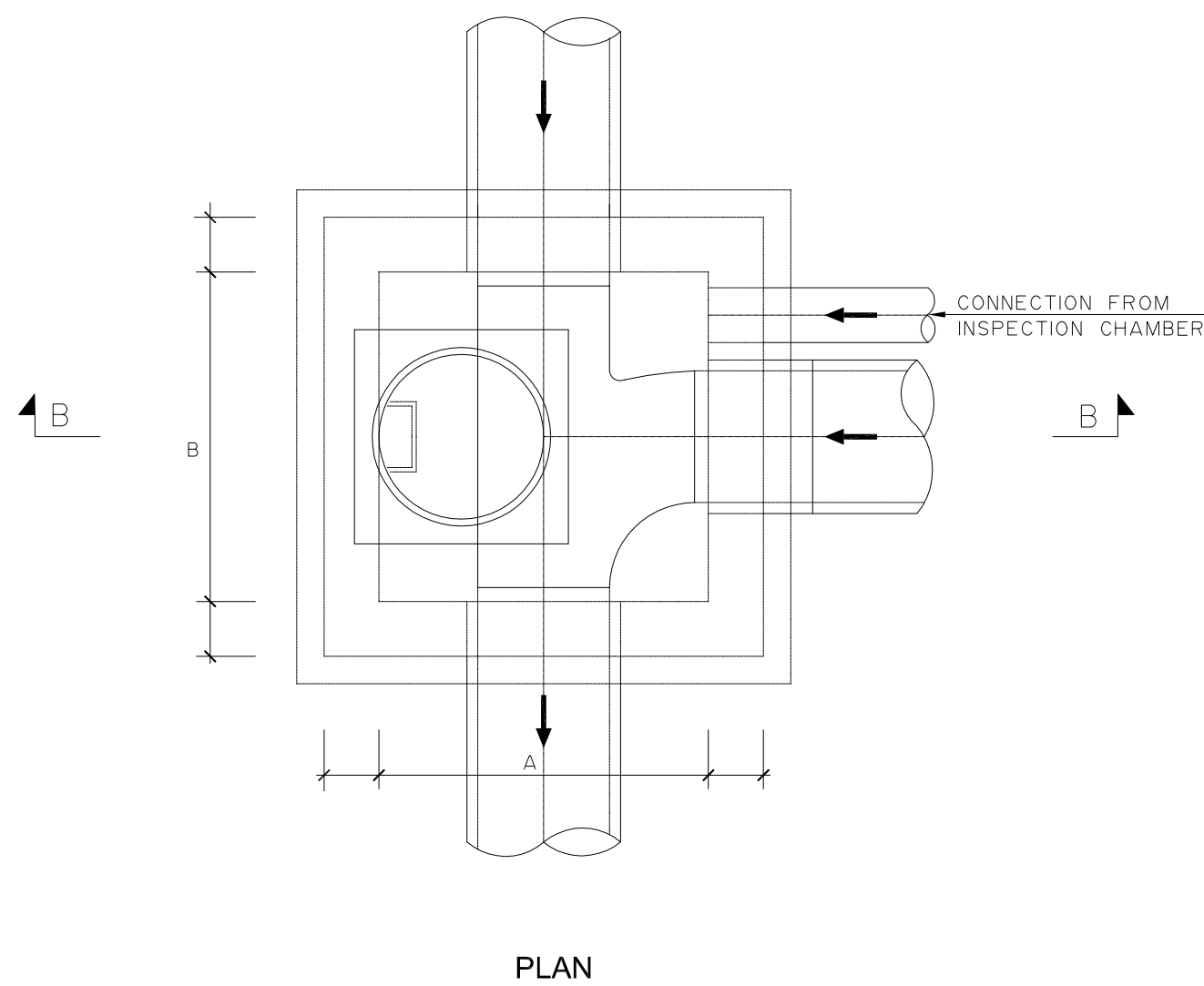
MANHOLE STRUCTURAL DETAILS

1



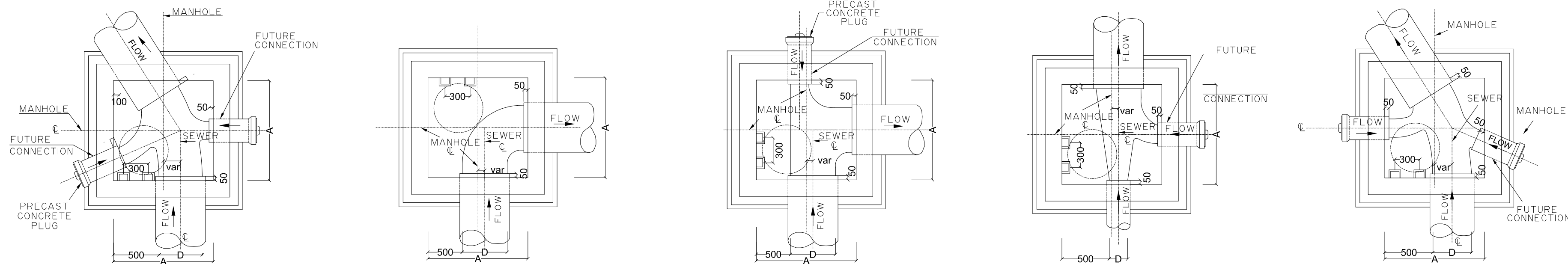
DIA. OF LARGEST PIPE	A x B
200 - 600 mm.	1200 x 1200 mm.
700 - 900 mm.	1500 x 1500 mm.
1000 - 1500 mm.	2000 x 2000 mm.

CAST IN SITU REINFORCEMENT - MANHOLE TYPE "A" - H < 3650

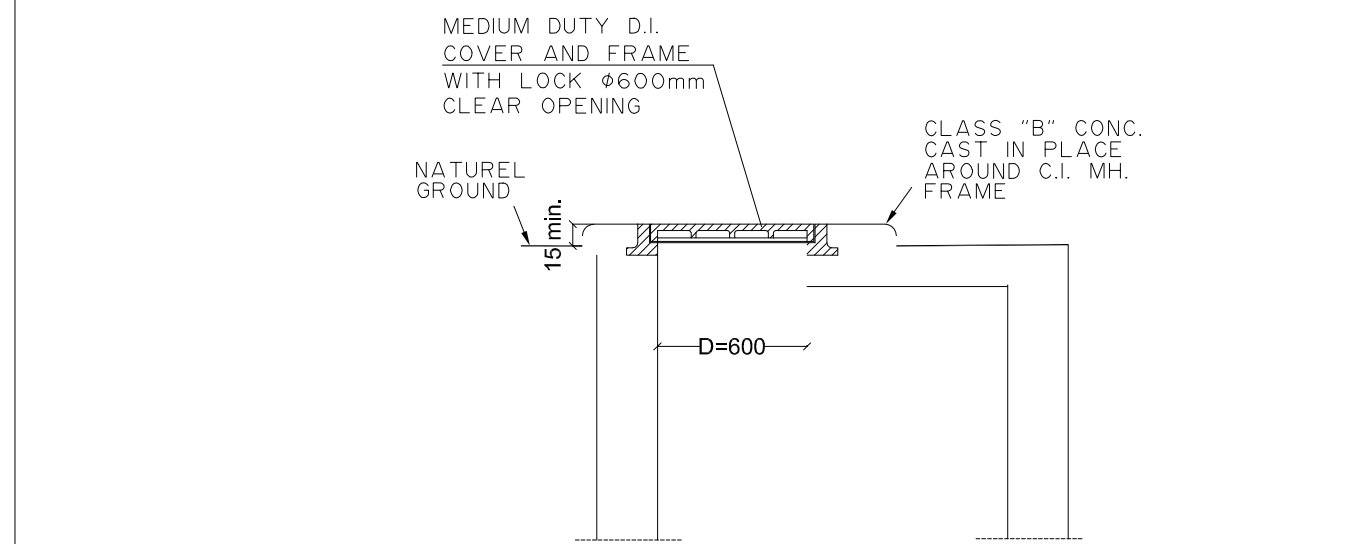


DIA. OF LARGEST PIPE	A x B
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1000 - 1500 mm.	2000 x 2000 mm.

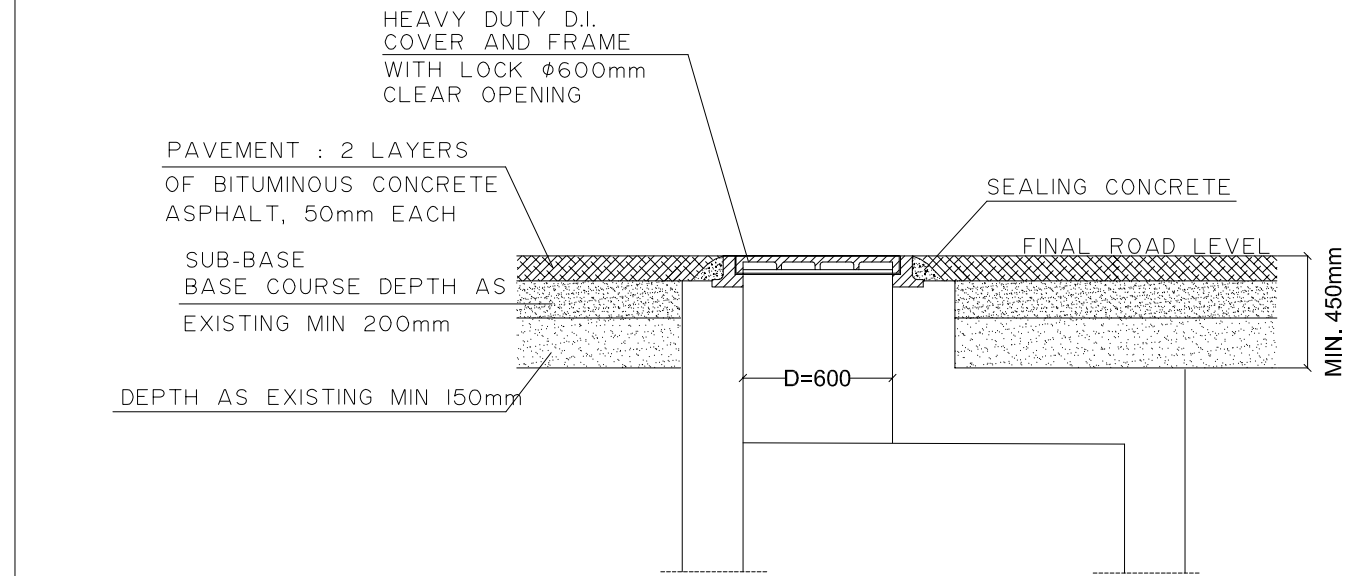
CAST IN SITU REINFORCEMENT MANHOLE TYPE "B" - 3650 < H ≤ 7000



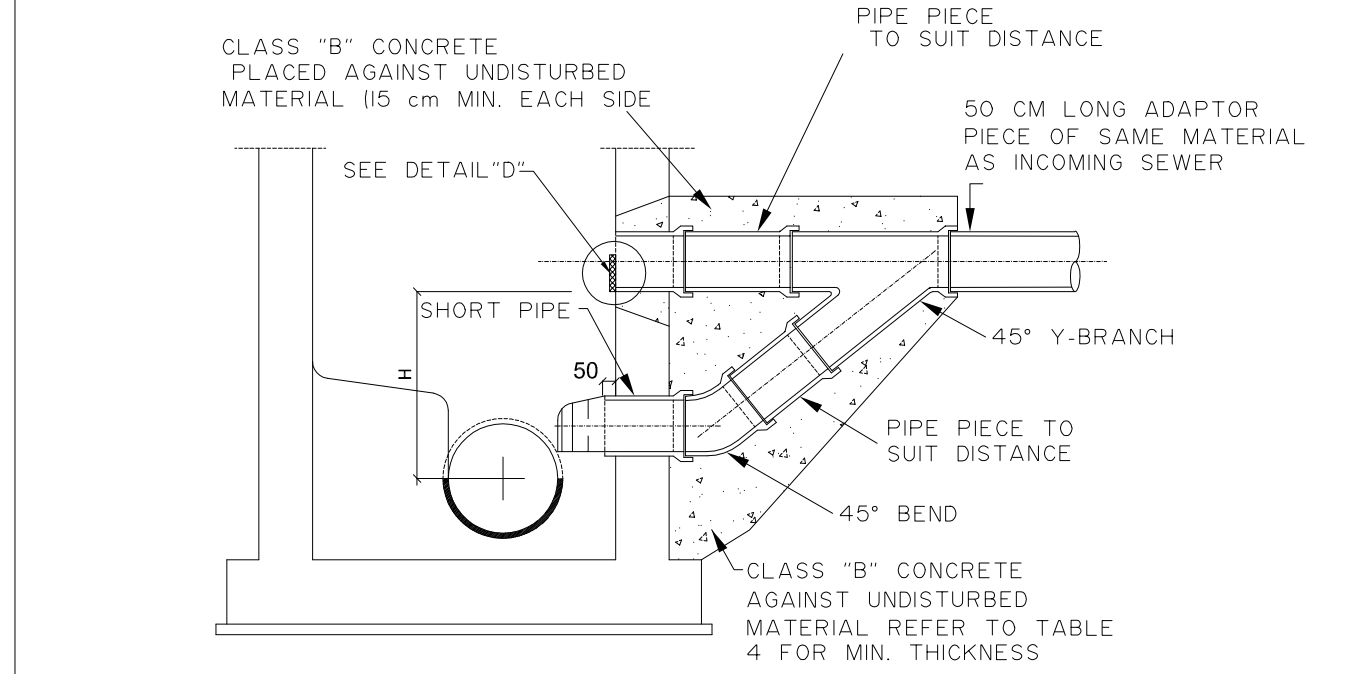
TYPICAL JUNCTION AND BEND FOR CAST IN SITU MANHOLE



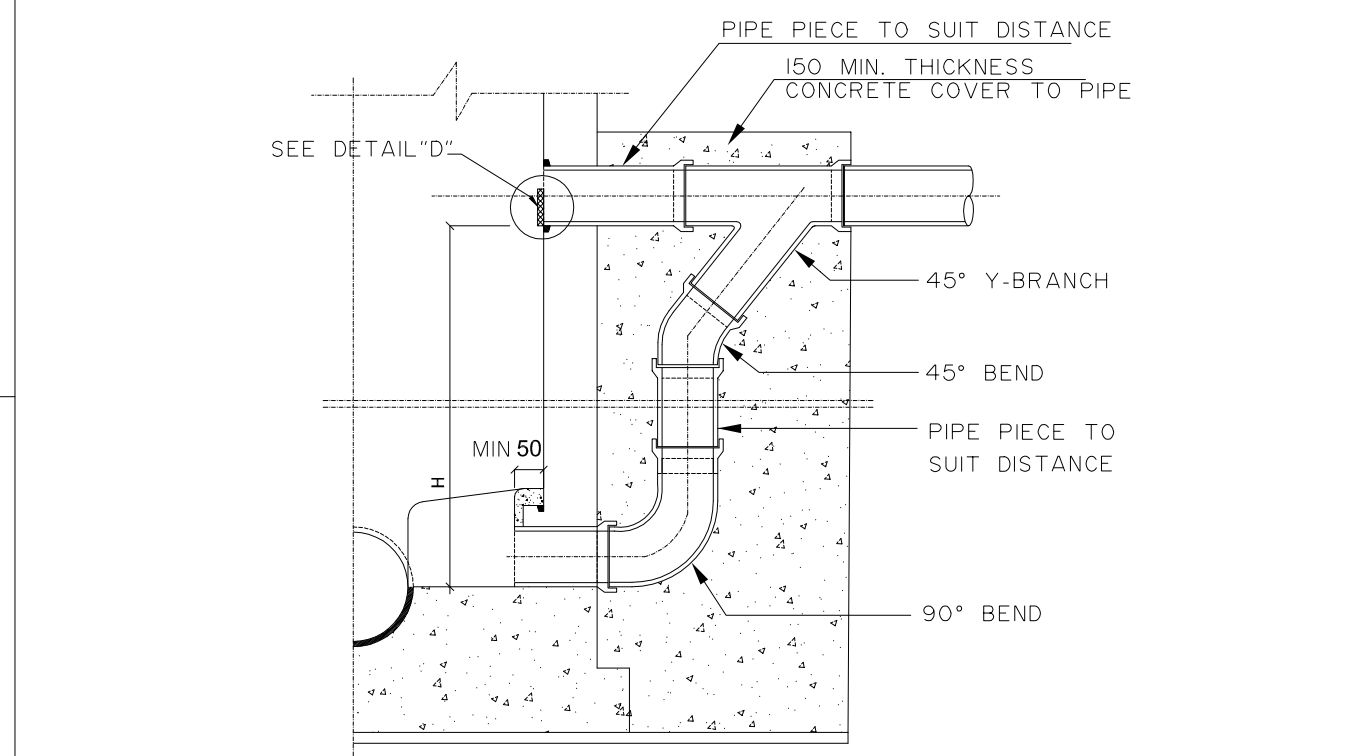
COVER DETAIL IN UNPAVED AREAS



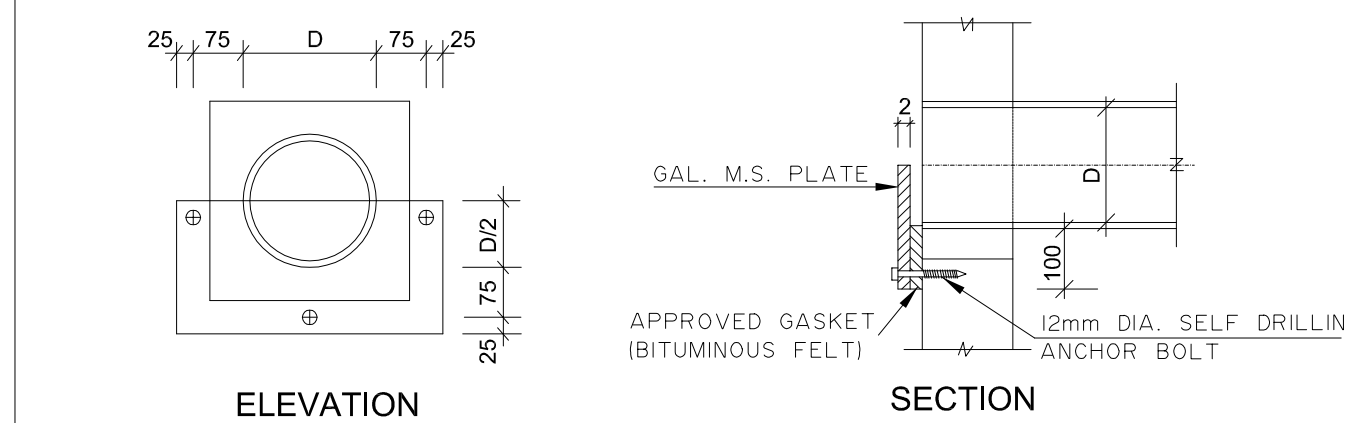
COVER DETAIL IN PAVED AREAS



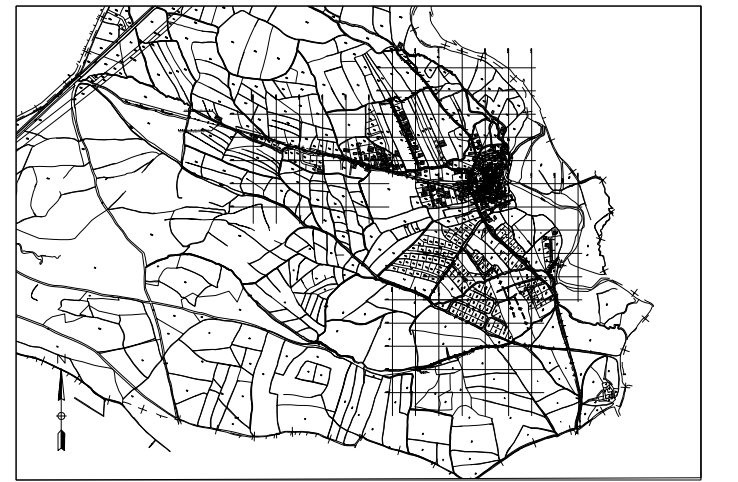
TYPICAL SHALLOW DROP MANHOLE H ≤ 1400mm



TYPICAL DEEP DROP MANHOLE SECTION FOR H > 1400mm



DETAIL "D" (FOR SANITARY MANHOLES ONLY)



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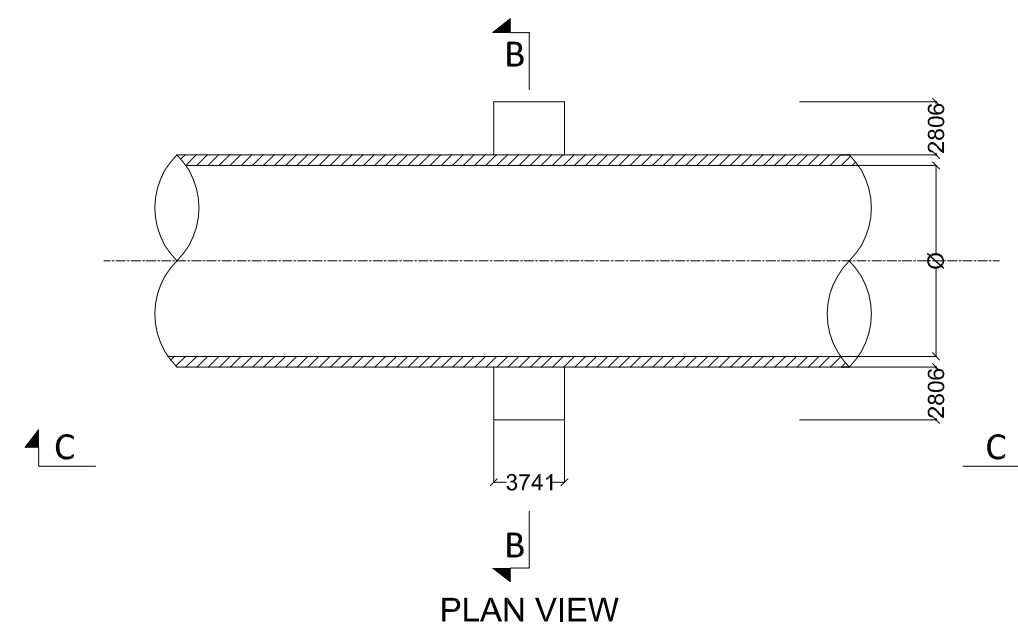
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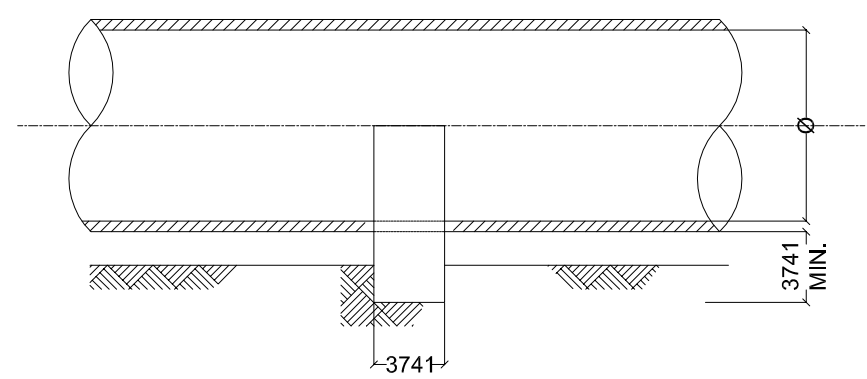
PROJECT NBR. L1505
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DISCIPLINE CIVIL ENGINEERING
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DATE 03-10-2016
SCALE N.T.S
SHEET SIZE A1

Title
TAL ABBAS EL GHARBI
SEWAGE NETWORK - PHASE 2
SEWAGE TYPICAL DETAILS

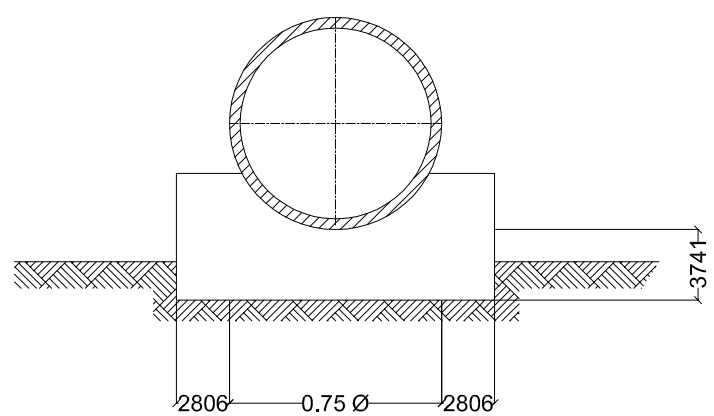
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L1505-PH2-SW-15-REV.0
Project Number Phase Type Drawing Number Revision



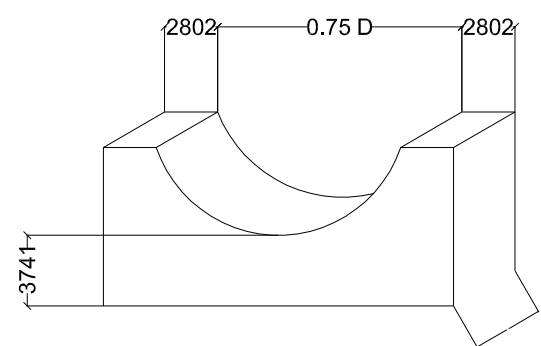
PLAN VIEW



SECTION B-B

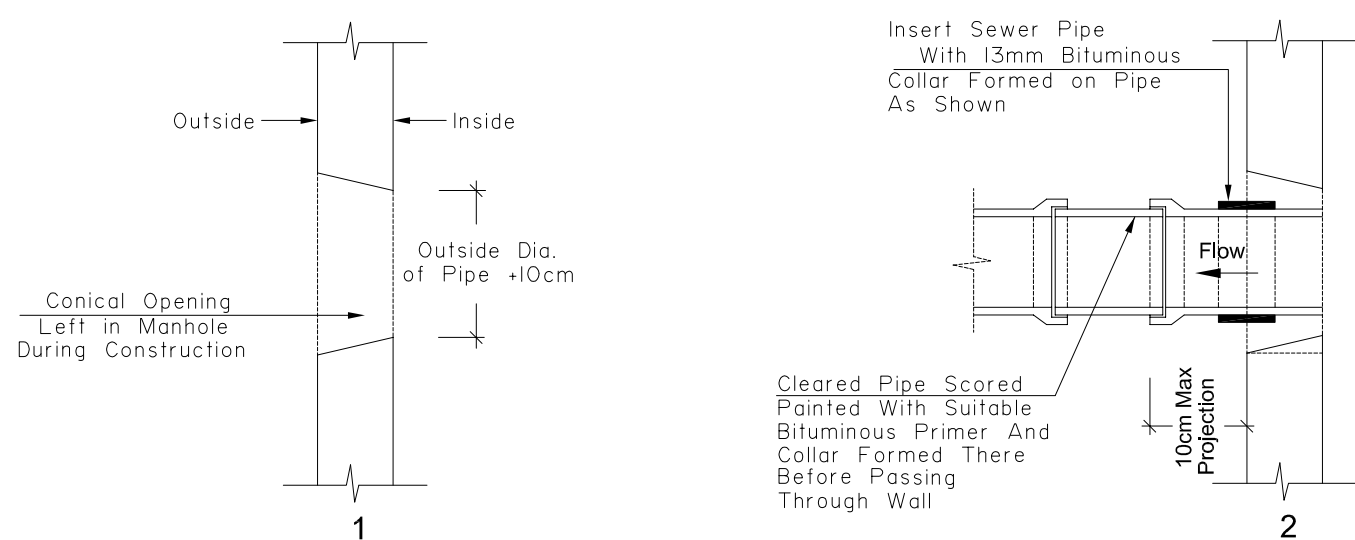


SECTION C-C

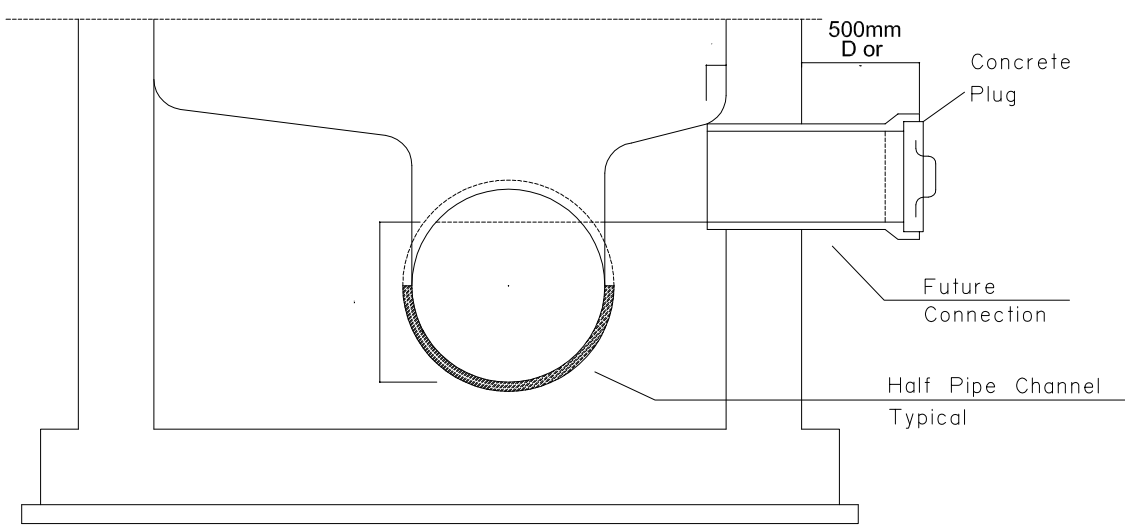


PRECAST CONCRETE PIPE SUPPORT

PRECAST CONCRETE PIPE SUPPORT

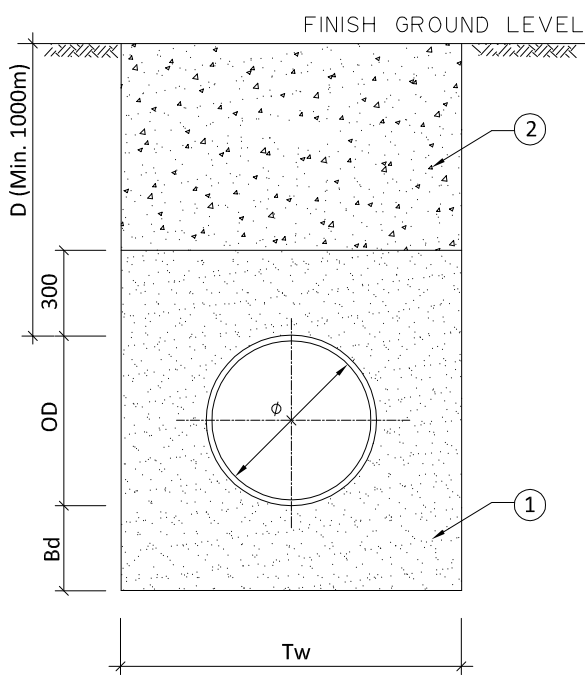


CONSTRUCTION METHOD FOR WATERPROOFING PIPE INLET OR OUTLET TO MANHOLE



TYPICAL FUTURE CONNECTION

FLEXIBLE JOINT DETAIL

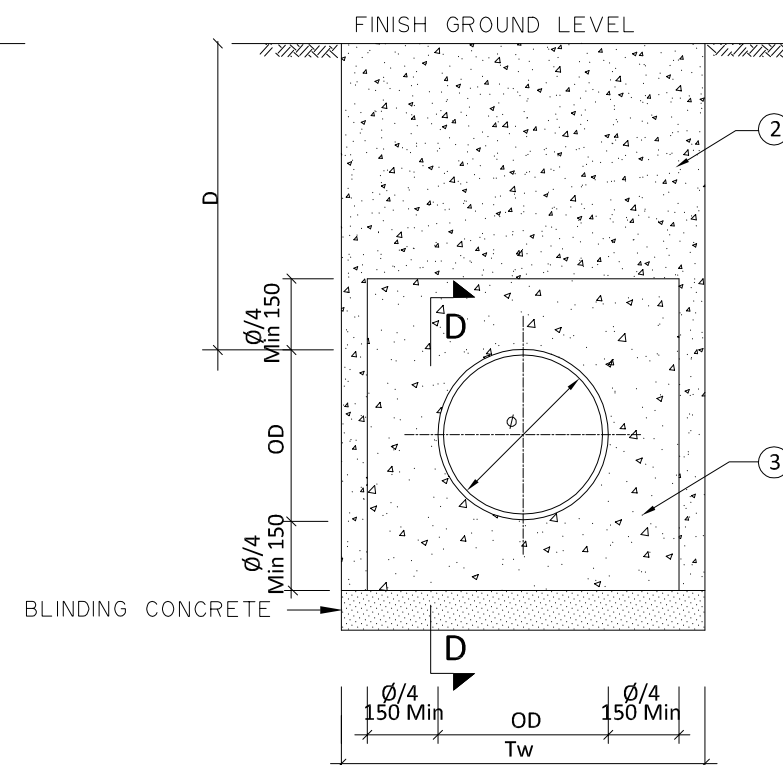


TYPE "A"

5000 ≥ DEPTH OF COVER > 900mm.

NOTE:

- 1- OD = EXTERNAL DIAMETER OF PIPE.
- 2- D = DEPTH OF COVER (m.)
 - a- FOR PRESSURE NETWORKS D ≥ 1.0m, UNLESS OTHERWISE INDICATED.
 - b- FOR GRAVITY NETWORKS REFER TO PROFILES.
- 3- $\phi < 500$ TW = OD + 500
 $600 \leq \phi < 900$ TW = OD + 1000
 $\phi > 1000$ TW = OD + 1200
- 4- DEPTH OF BEDDING = Bd
Bd = 150mm. IN SOIL
Bd = 250mm. IN ROCK
Bd = 200mm. For $\phi \geq 1000$



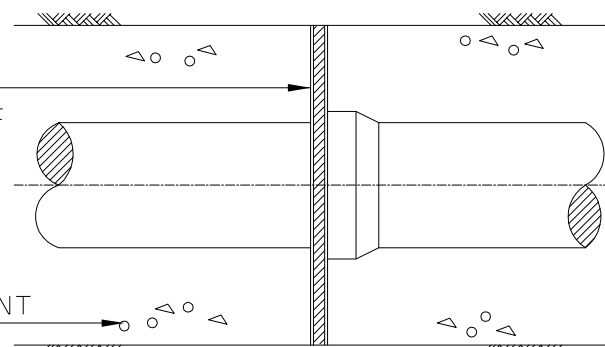
TYPE "B"

DEPTH OF COVER < 1000mm.
DEPTH OF COVER > 4000mm.

- 5- USE TYPE "A" BEDDING FOR ALL NETWORKS EXCEPT FOR THE FOLLOWING CASES WHERE TYPE "B" SHOULD BE USED.
 - a- DEPTH OF COVER IS LESS THAN OR EQUAL TO 1m.
 - b- UNDER STREET LIGHTING POLES.
 - c- AT SEWER LINE / WATER LINE CROSSING, WHERE VERTICAL DISTANCE LESS THAN 0.5m, THE SEWER PIPE SHALL BE ENCASED FOR A DISTANCE OF AT LEAST 4.0m ON EACH SIDE OF THE WATER PIPE.
 - d- DEPTH OF COVER FOR GREATER THAN 4.00m.
- 6- WHEN POURING CONCRETE THE PIPE MUST BE RESTRAINED AGAINST MOVEMENT BY STRAPPING IT TO A BASE SLAB, OR ANCHOR.

BITUMEN IMPREGNATED
COMPRESSIBLE MATERIAL
TO KEEP CONCRETE OUT
OF PIPE JOINT

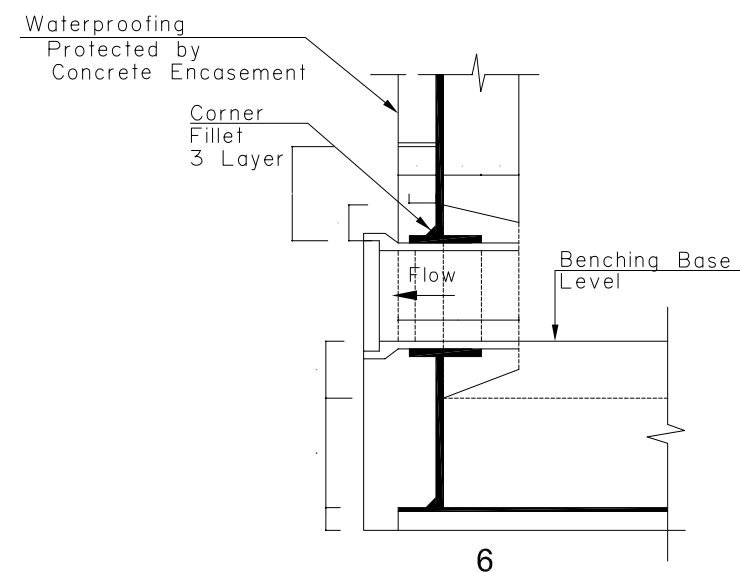
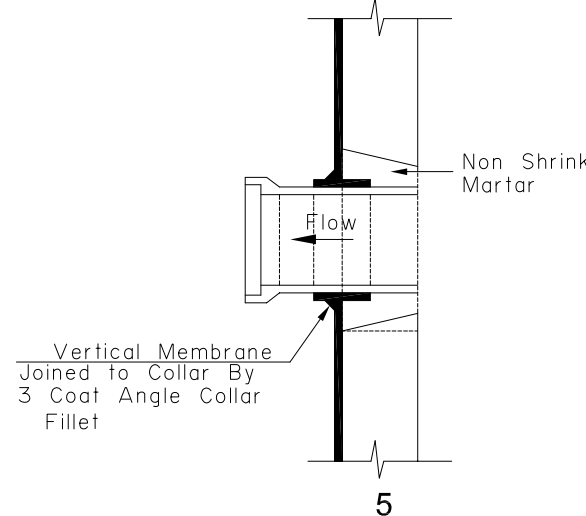
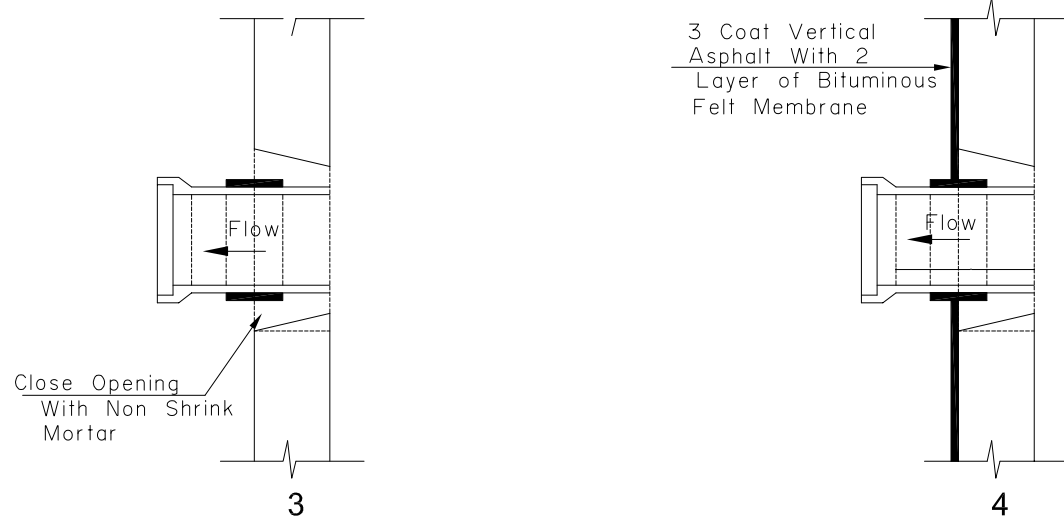
CONCRETE ENCASEMENT



SECTION D-D

FLEXIBLE JOINT FOR CONCRETE SURROUND

2 TYPICAL TRENCH AND PIPE BEDDING DETAILS



3

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETER, UNLESS OTHERWISE INDICATED
2. ALL INFORMATION PROVIDED IS INDICATIVE. DETAILED STRUCTURAL DESIGN AND ARCHITECTURAL SHOP DRAWINGS ARE TO BE PREPARED BY THE CONTRACTOR AND SUBMITTED FOR APPROVAL TO THE ENGINEER.
3. ALL CONCRETE SHALL BE SULFATE RESISTING PORTLAND CEMENT TYPE V WITH A MINIMUM CYLINDRICAL COMPRESSIVE STRENGTH AT 28 DAYS FOR :
CLASS A - REINFORCED & BENCHING CONCRETE = 280 kg / cm²
CLASS B - WHERE INDICATE CONCRETE = 175 kg / cm²
CLASS C - BLINDING & MASS CONCRETE = 105 kg / cm²
4. WATER PROOFING FOR CONCRETE SHALL BE IN THREE LAYERS FOR SURFACE BITUMINOUS COATING APPLIED TO EXTERNAL SURFACES OF MANHOLE WALLS, AND DOUBLE SURFACE COAL TAR EPOXY COATING APPLIED TO INTERNAL SURFACES OF MANHOLE WALLS.
5. MINIMUM CONCRETE COVER TO STEEL REINFORCEMENT SHALL BE =50mm.
6. ALL REINFORCING STEEL BARS SHALL BE DEFORMED HIGH GRADE STEEL HAVING A MINIMUM YIELD STRENGTH OF 4200Kg/cm², AND MILD STEEL HAVING A MINIMUM YIELD OF 2800kg/cm².
7. LAP LENGTH SHALL NOT BE LESS THAN 50 TIMES THE DIAMETER WHERE SPLICE BARS ARE USED, THEIR LENGTH SHALL NOT BE LESS THAN 2x50 DIAMETER.
8. LAPS SHALL BE STAGGERED FROM ONE HOOP TO THE OTHER AND/OR ONE BAR TO THE OTHER IN ORDER TO REDUCE THE NUMBER OF LAPS IN THE SAME SECTION STIRRUPS $\phi 8$ SHALL BE USED ON EACH LAP.
9. ADDITIONAL REINFORCEMENT AROUND OPENINGS SHALL BE PROVIDED BY THE CONTRACTOR UP TO THE APPROVAL OF THE ENGINEER.
10. BENDING OF REINFORCEMENT BARS SHALL BE MECHANICAL FOR DIAMETERS GREATER THAN 12mm AND MANUAL FOR LESS. STRAIGHTENING OF BENDED BARS IS NOT ALLOWED.
11. HOLES MADE BY THE RODS SHALL BE FILLED WITH NON-SHRINK GROUT.
12. ALL PIPES CROSSING THROUGH CONCRETE WALLS SHALL BE PROVIDED WITH A 2cm THICK EXPANSIVE MATERIAL (TAR BASED) OR AS APPROVED BY THE ENGINEER
13. WHERE THERE IS A DISCREPANCY BETWEEN THE REQUIREMENTS IN THE SPECIFICATION AND THOSE SHOWN ON THIS DRAWING, THE SPECIFICATION SHALL BE FOLLOWED UNLESS DIRECTED OTHERWISE BY THE ENGINEER.
14. ALL JOINTS BETWEEN PIPES, FIXTURES AND LINING MATERIAL SHALL BE SEALED.
15. ALL JOINTS BETWEEN PIPES AND CONCRETE SHALL BE WATERTIGHT.

o	M.N	03-10-2016	GENERAL REVISION	M.N
REV	BY	Date	Description	Appr.
PROJECT NBR.		L1505		
PROJECT PHASE		TENDER		
DISCIPLINE		CIVIL ENGINEERING		
SECTOR				
BUILDING				
DESIGNED				
DRAWN				
CHECKED				
APPROVED				
DATE		03-10-2016		
SCALE		N.T.S		
SHEET SIZE		A1		

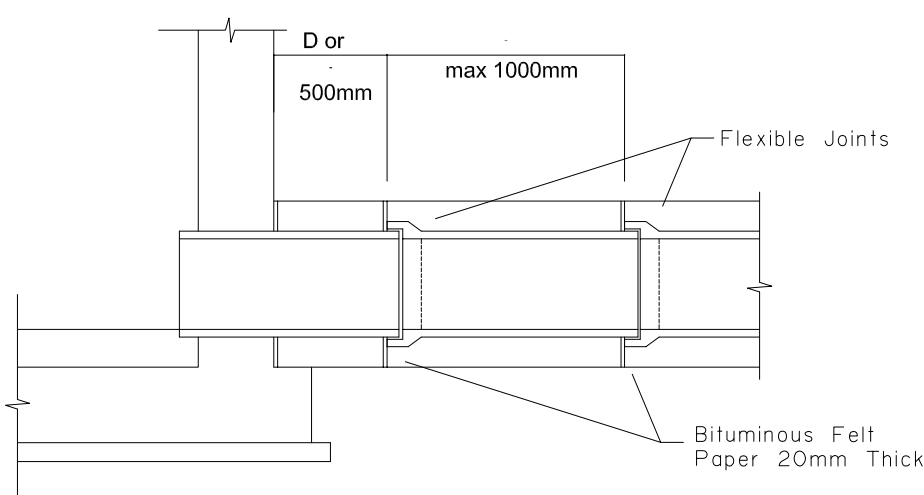
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**TAL ABBAS EL GHARBI
SEWAGE NETWORK - PHASE 2
SEWAGE TYPICAL DETAILS**

Sheet 4 OF 5

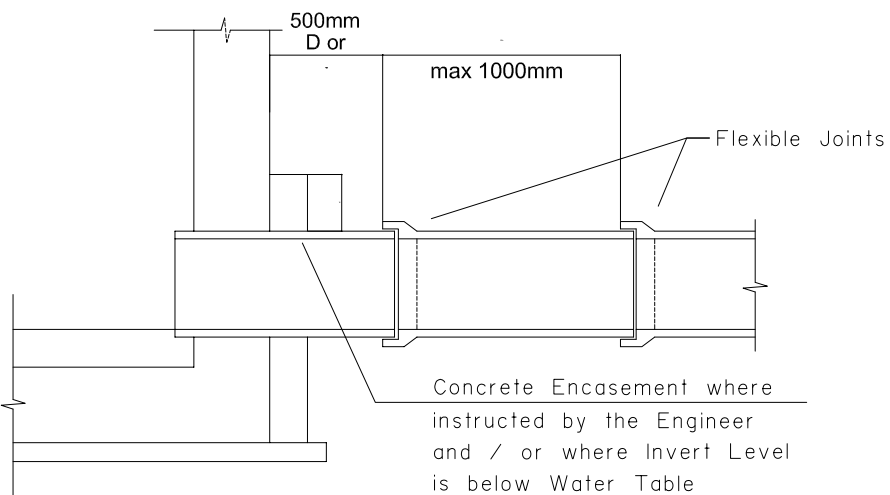
L1505-PH2-SW-16-REV.0

Project Number | Phase | Type | Drawing Number | Revision

4

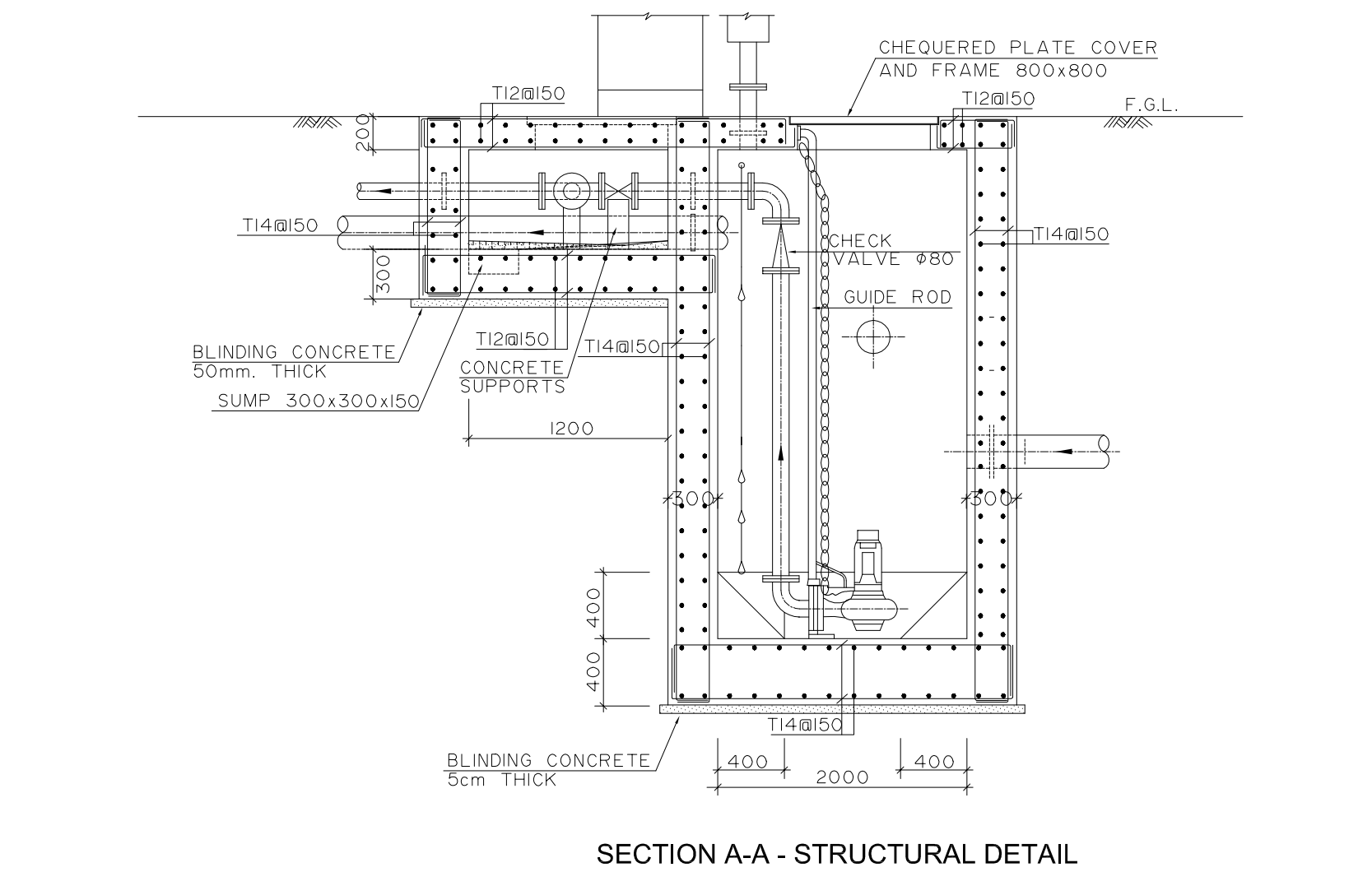
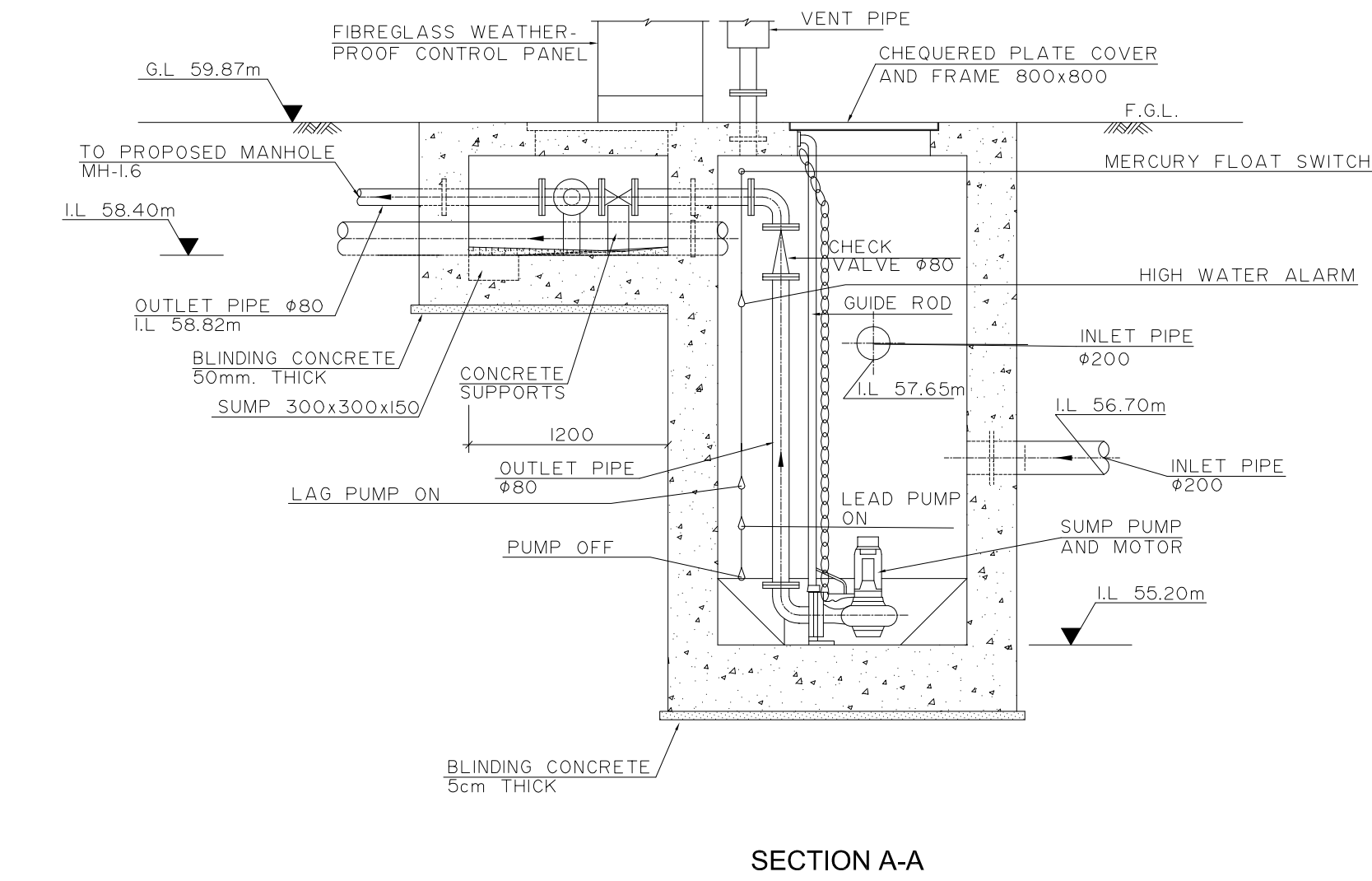
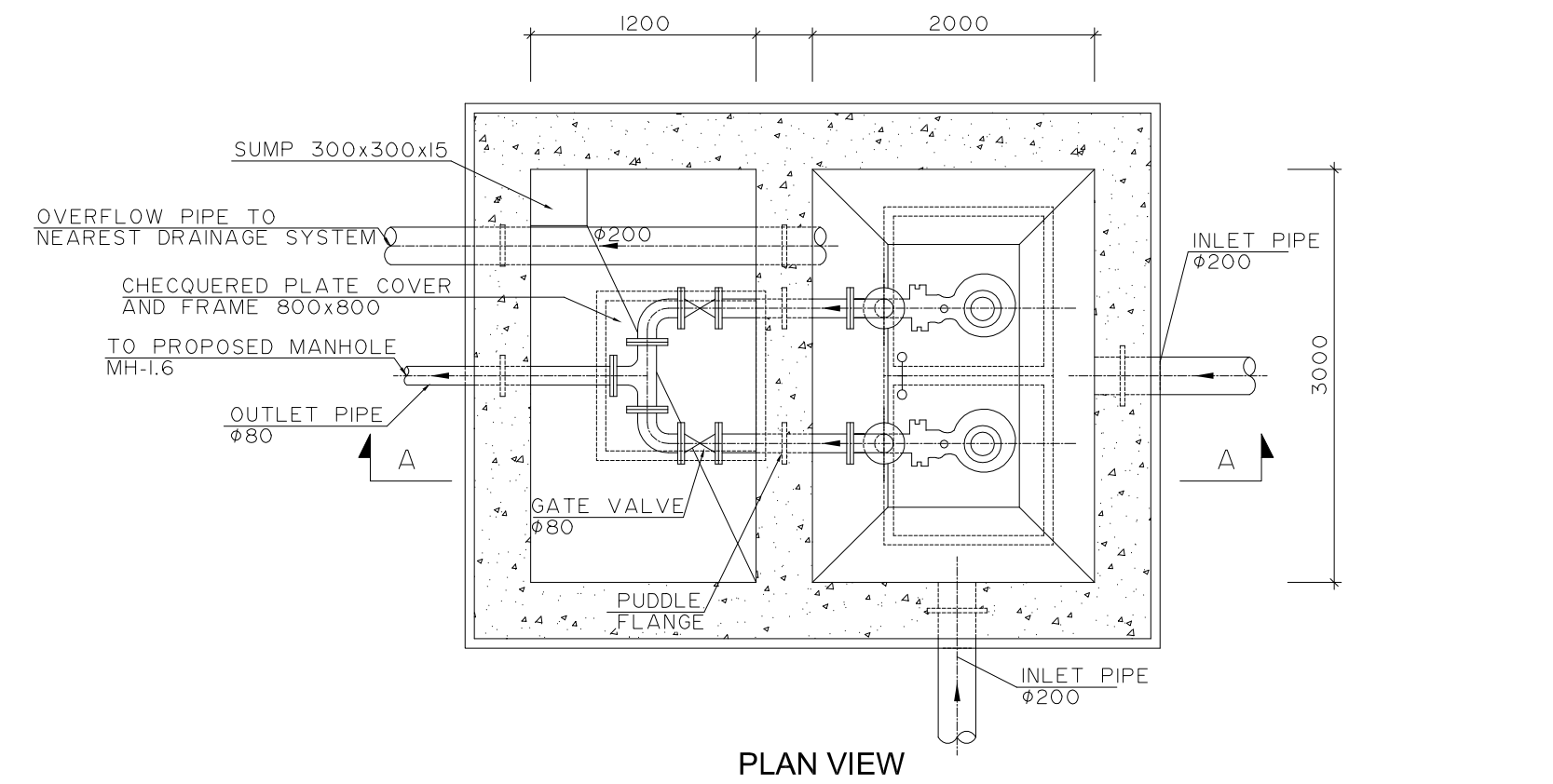


A- FOR PIPES IN CONCRETE SURROUND

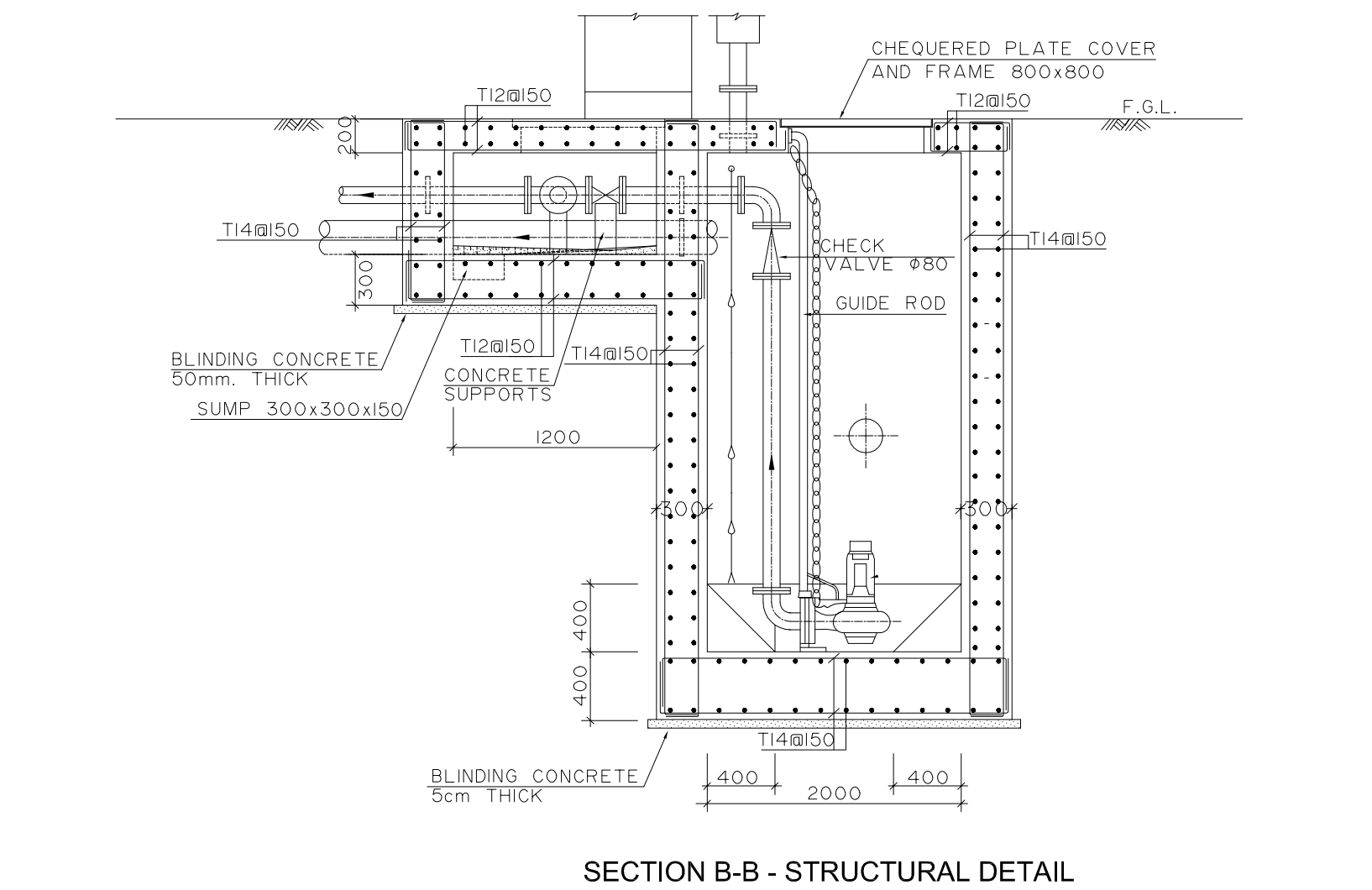
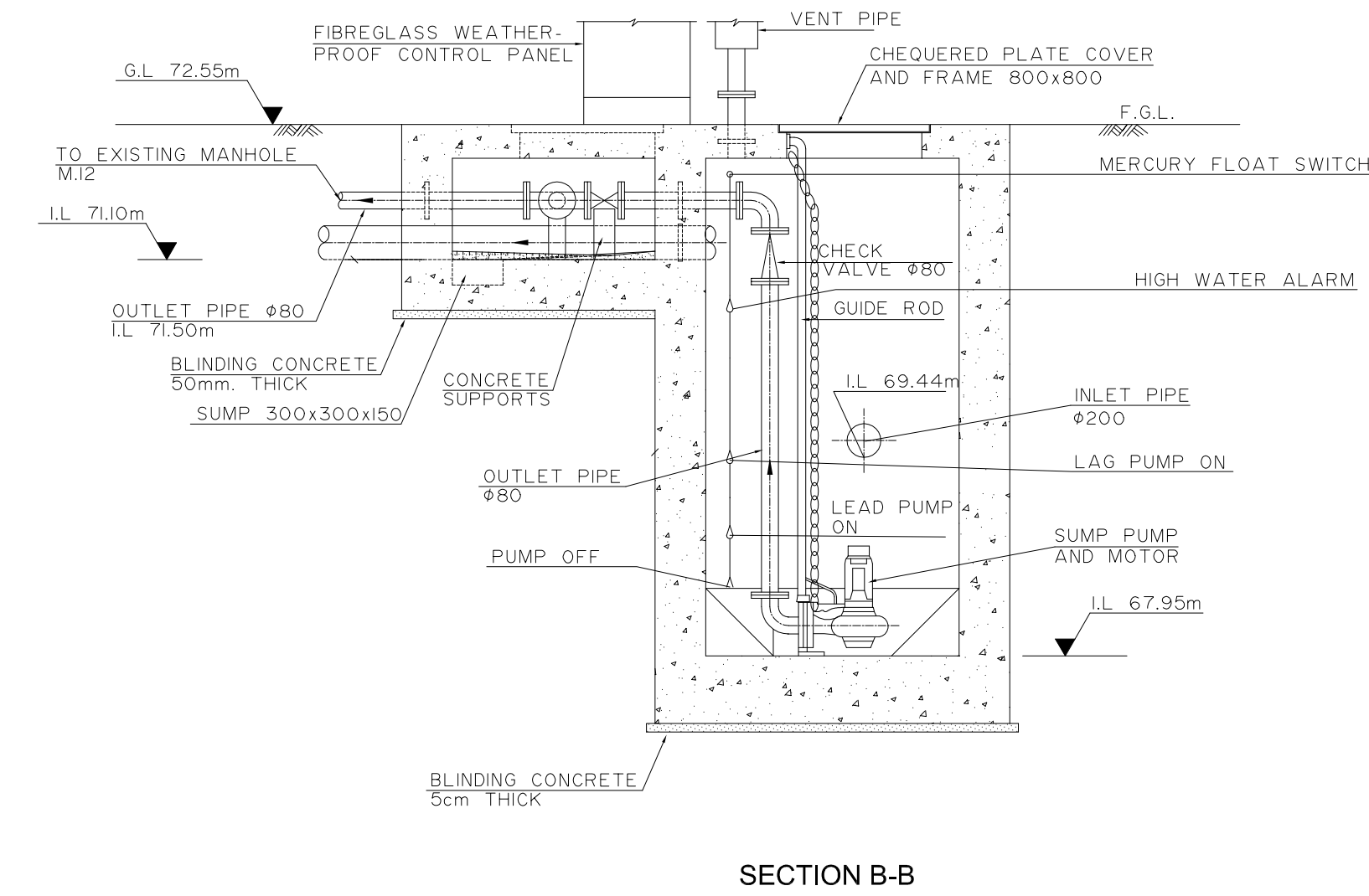
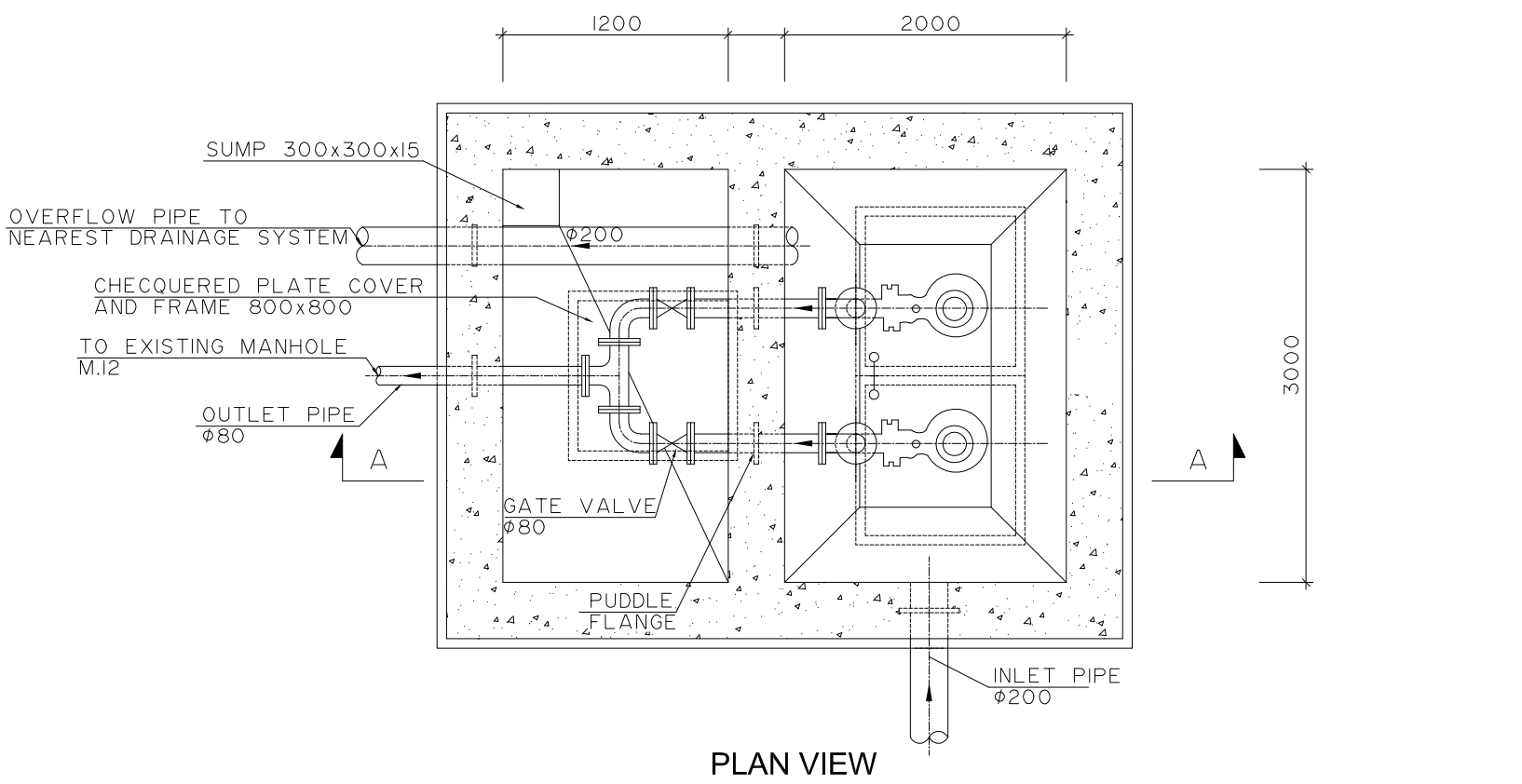


B- FOR PIPES IN ORDINARY BACKFILL

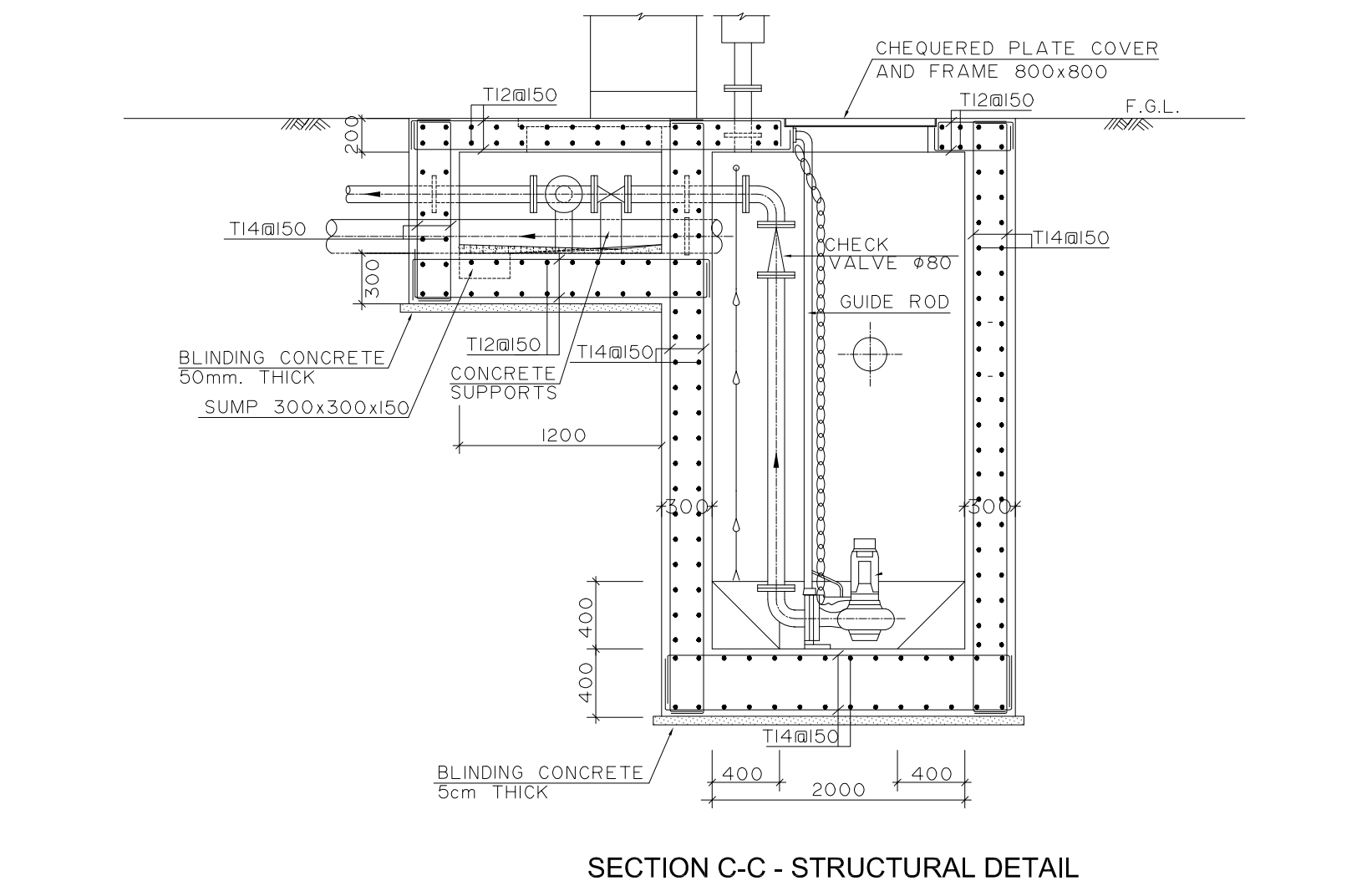
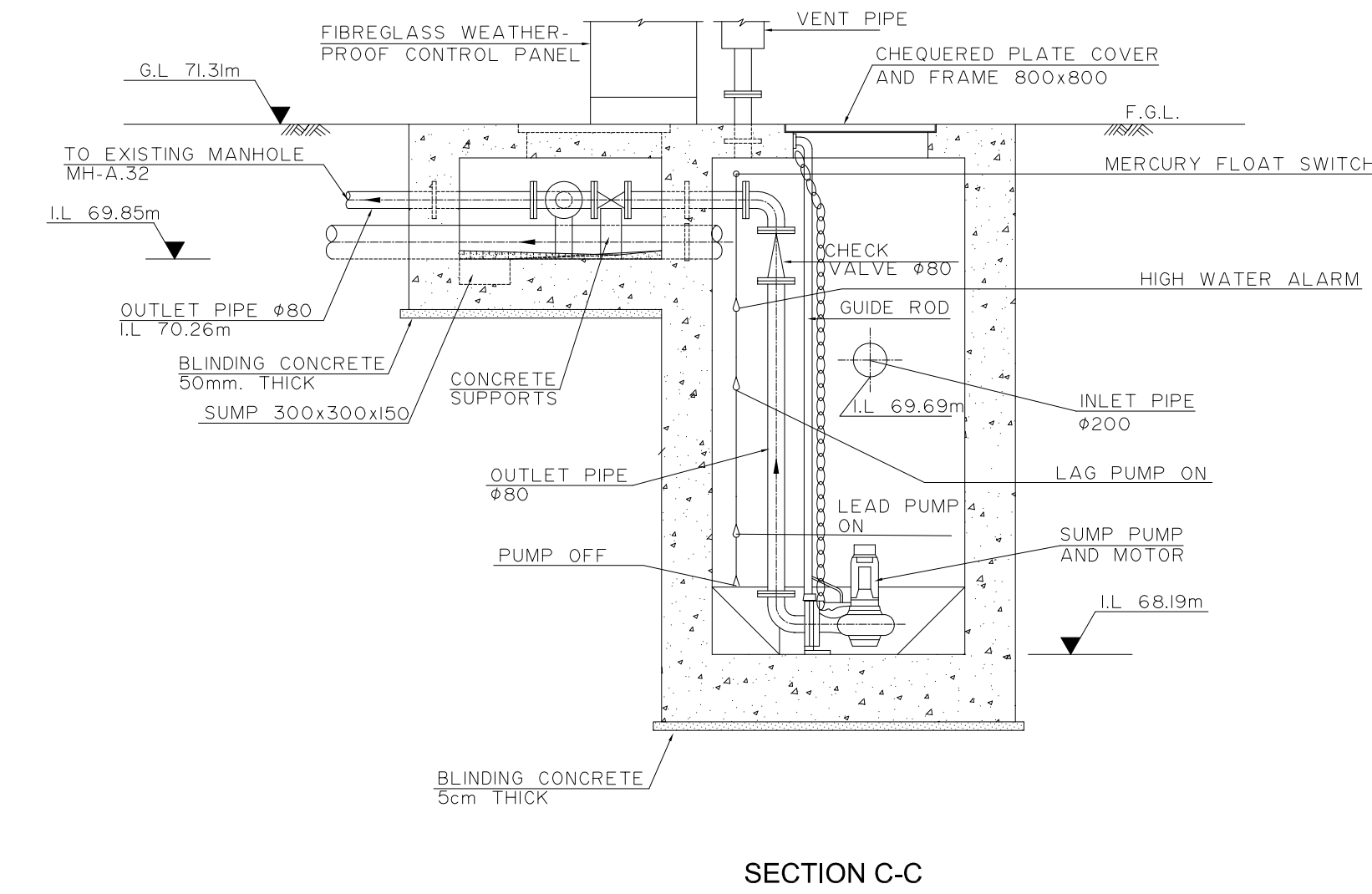
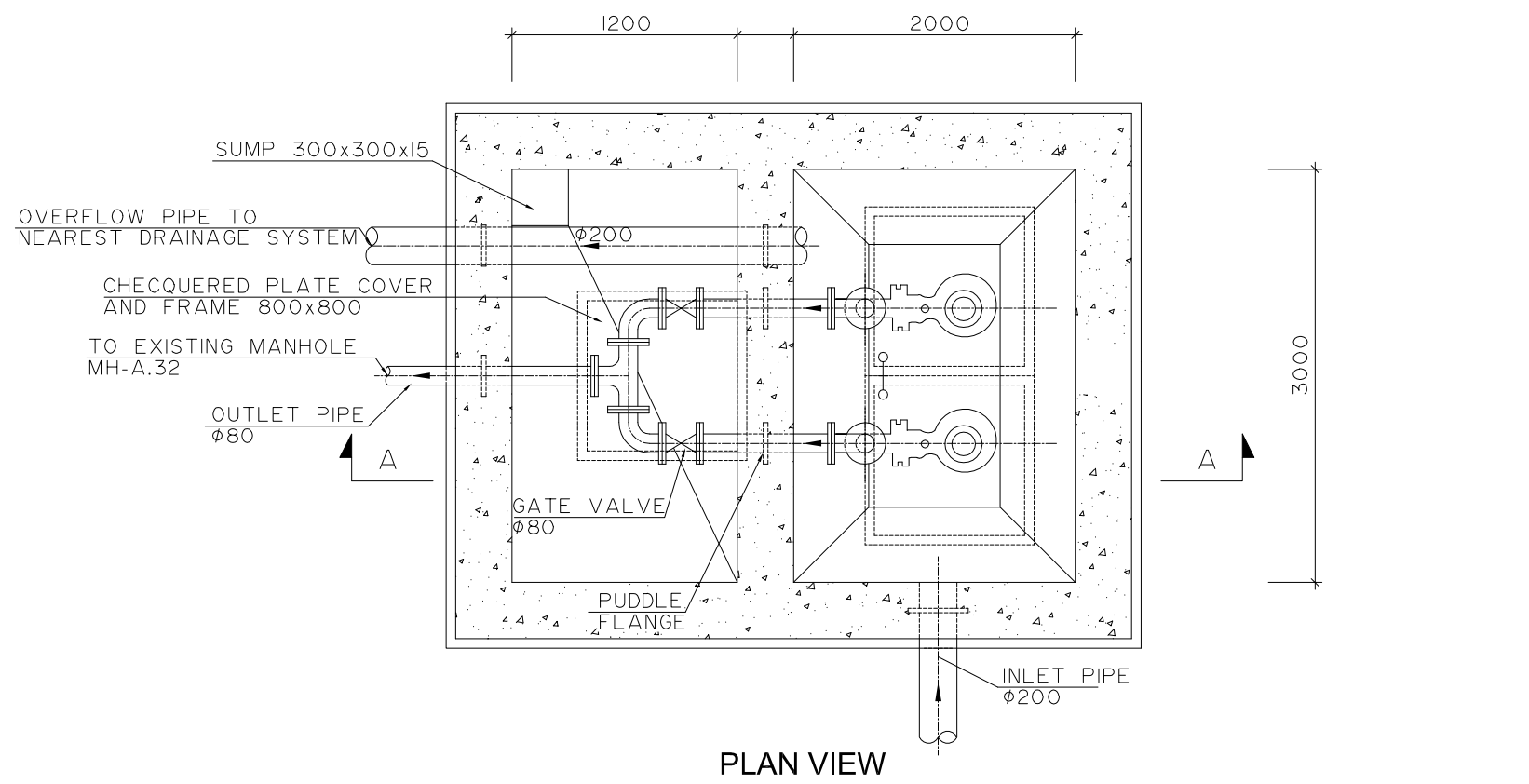
5



PUMP STATION AT LINE K - P.S-K.1



PUMP STATION AT LINE Q - P.S-Q.1



PUMP STATION AT LINE P - P.S-P.1



KEY PLAN

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United Nation Development Programme
UNDP Lebanon
Social and Local Development Programme
P.O.Box: 11-3216 Beirut, Lebanon
Tel: 961 1 962491

PROGRAMME: Lebanese Host Communities Support Programme
Support to Integrated Service Provision at the Local Level

PROJECT NAME: TAL ABBAS EL GHARBI SEWAGE NETWORK

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0	M.N	03-10-2016	GENERAL REVISION	M.N
PROJECT NBR. L1505				
PROJECT PHASE TENDER				
DISCIPLINE CIVIL ENGINEERING				
SECTOR				
BUILDING				
DESIGNED				
DRAWN				
CHECKED				
APPROVED				
DATE 03-10-2016				
SCALE N.T.S				
SHEET SIZE A1				

Title
TAL ABBAS EL GHARBI
SEWAGE NETWORK - PHASE 2
SEWAGE TYPICAL DETAILS

Sheet 5 OF 5

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Project Number Phase Type Drawing Number Revision