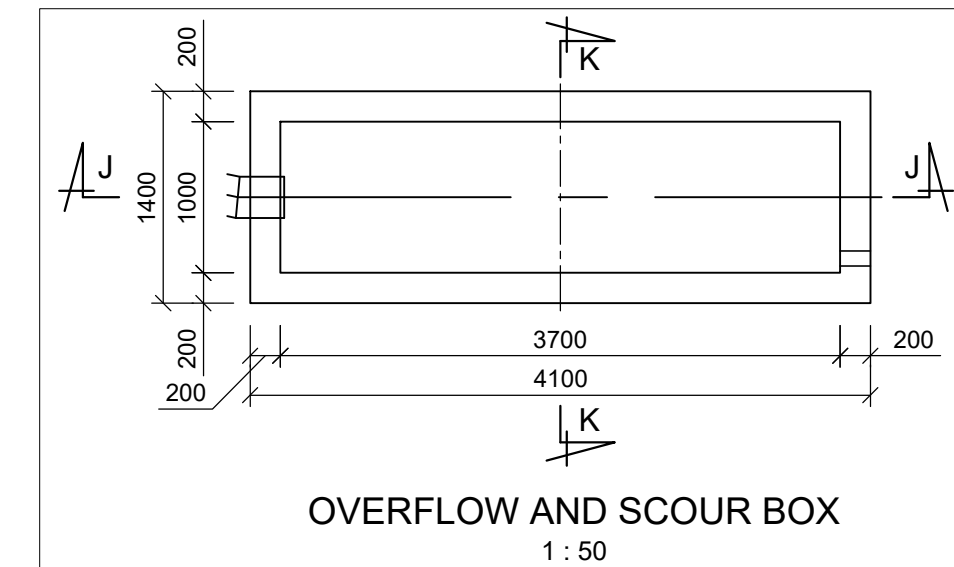
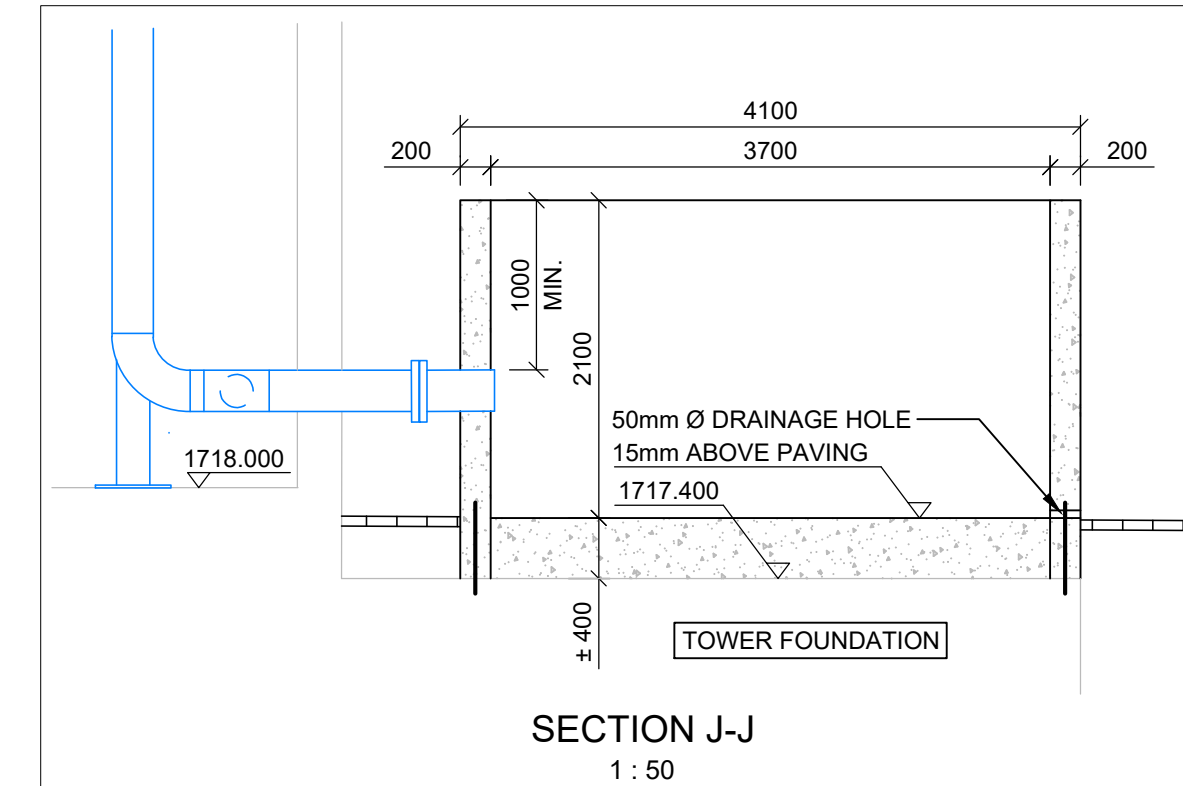
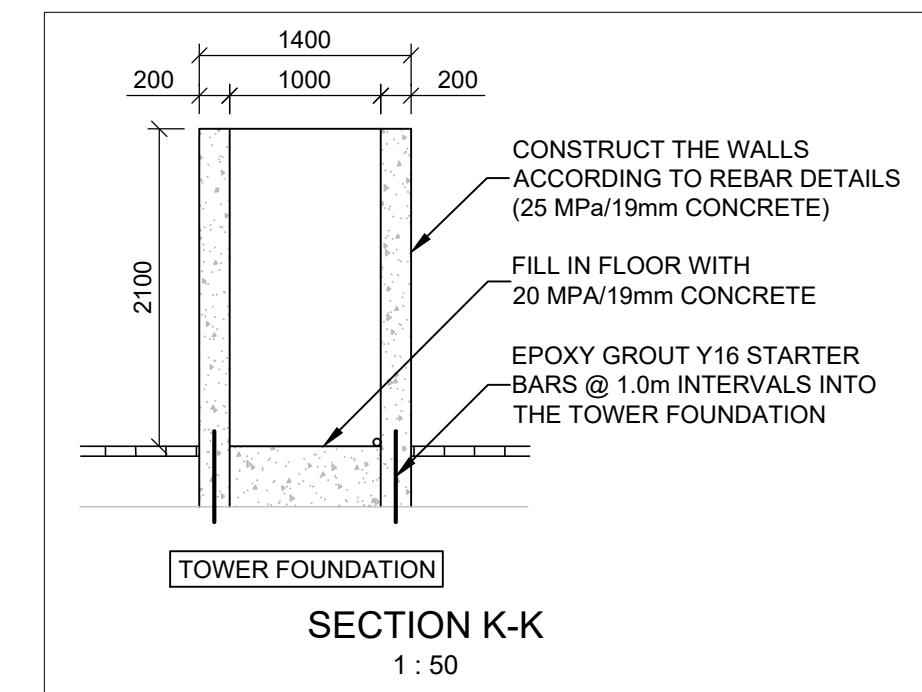
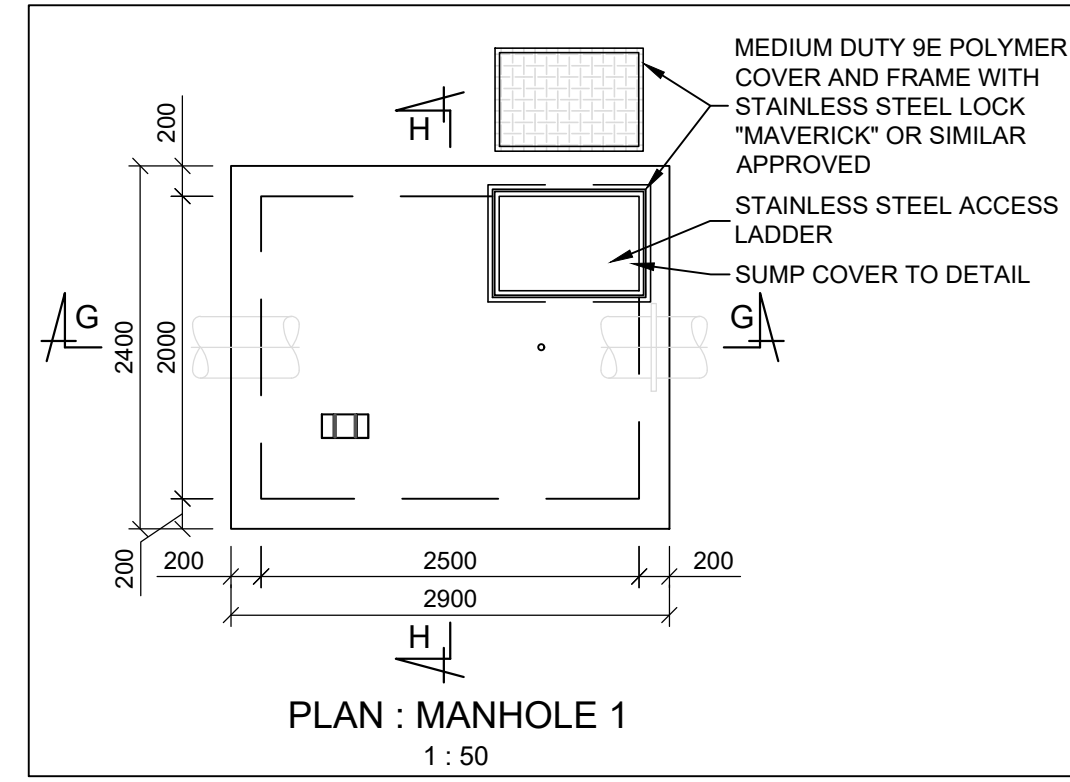
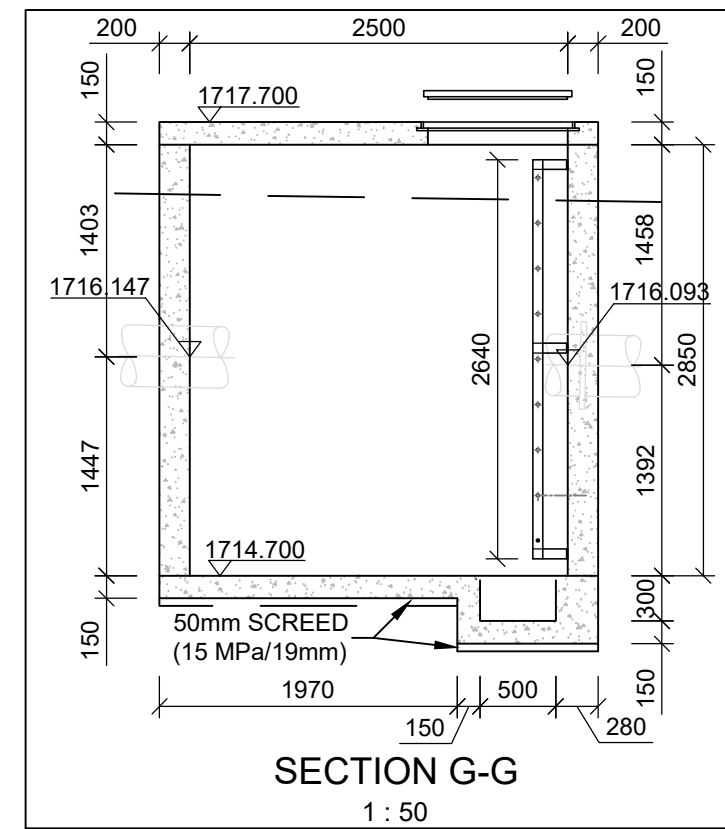
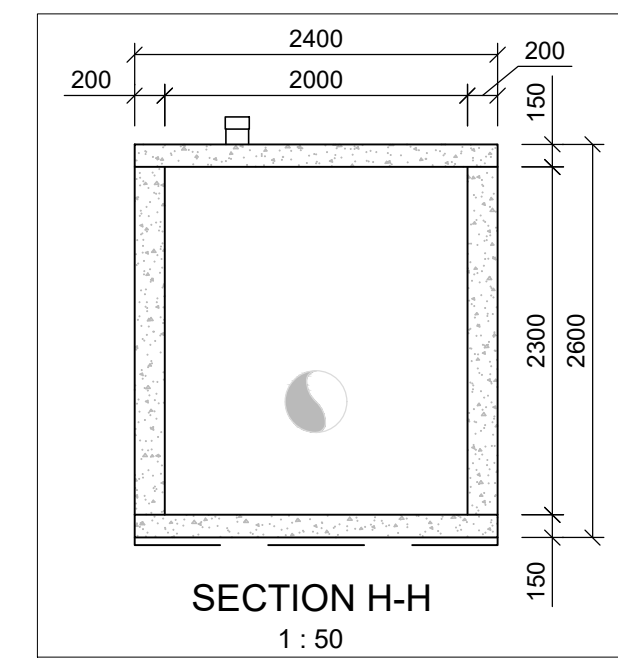
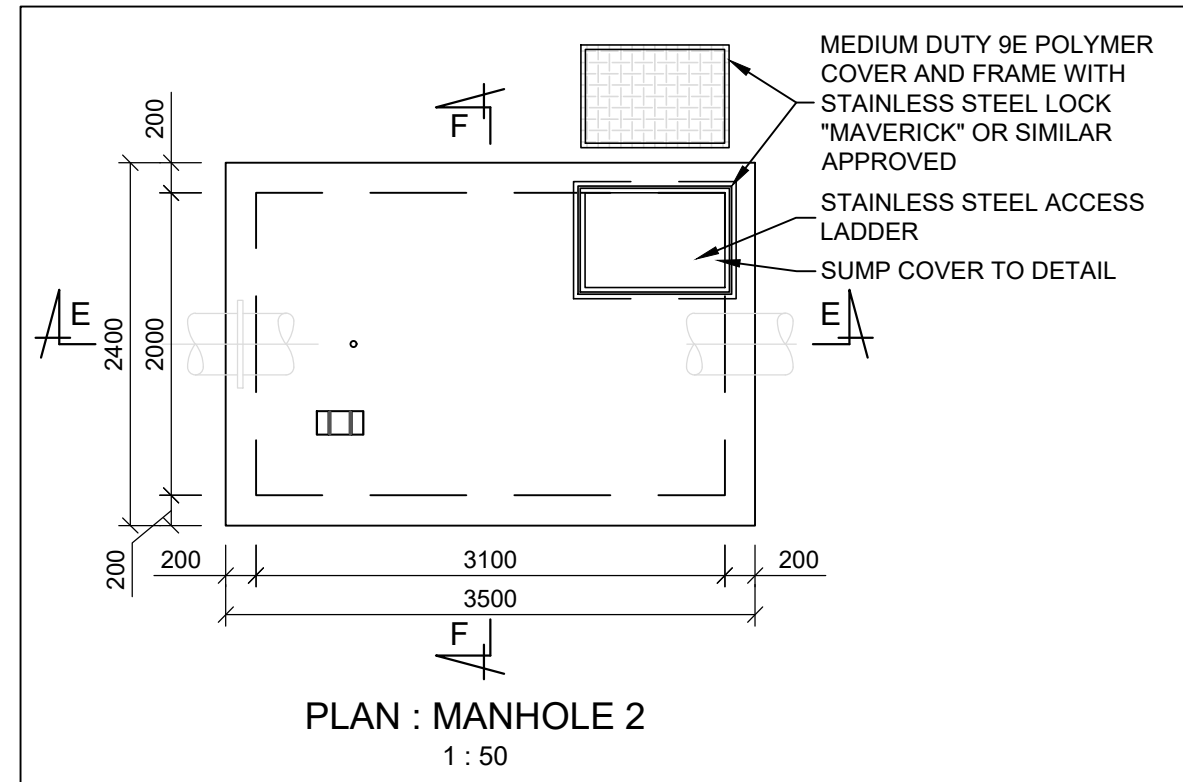
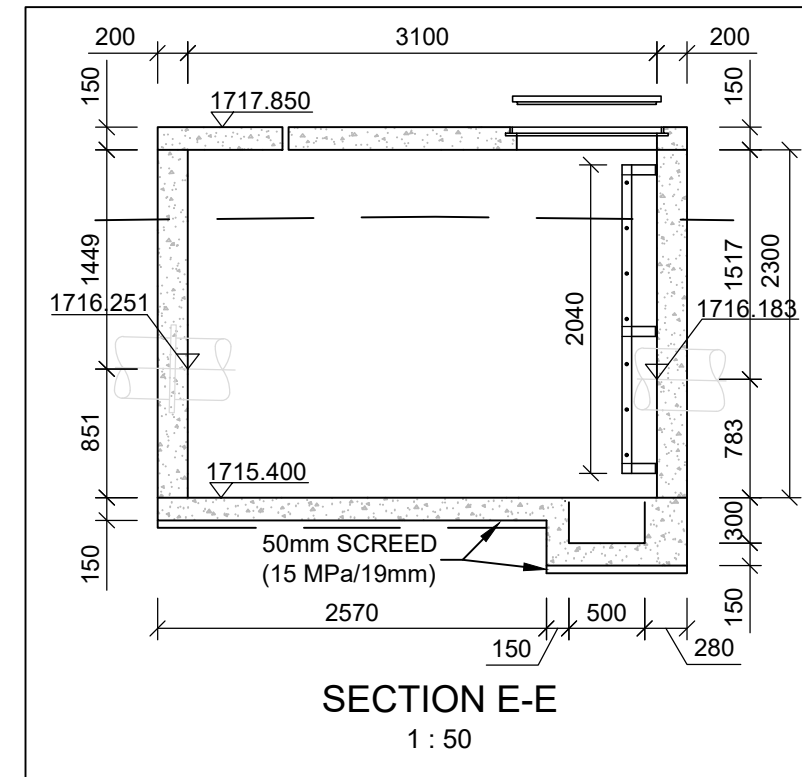
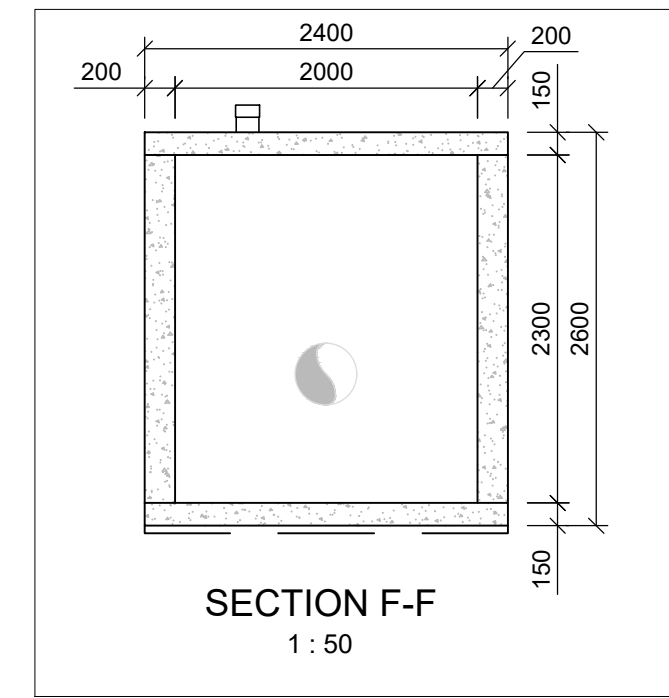
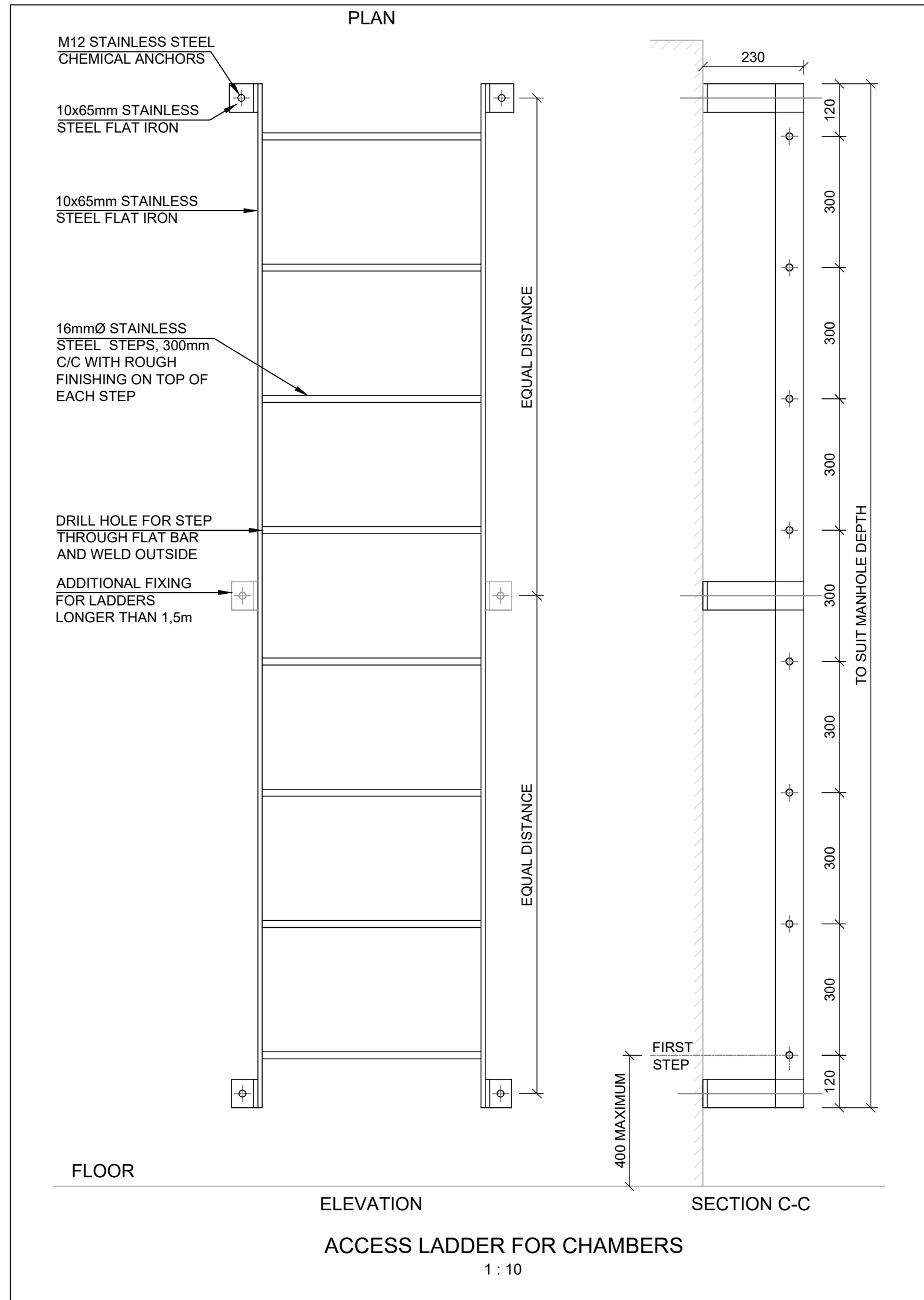
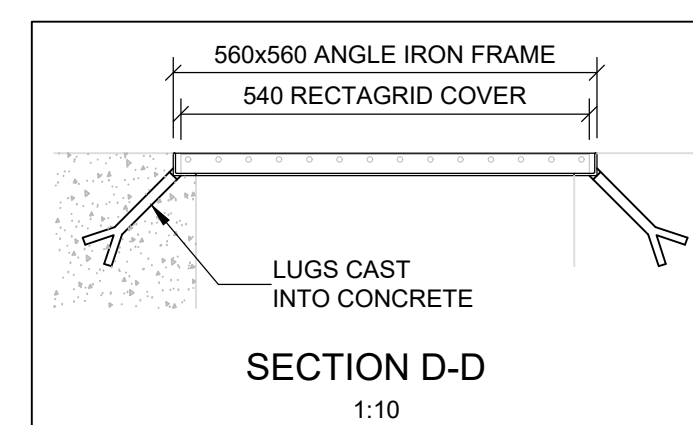
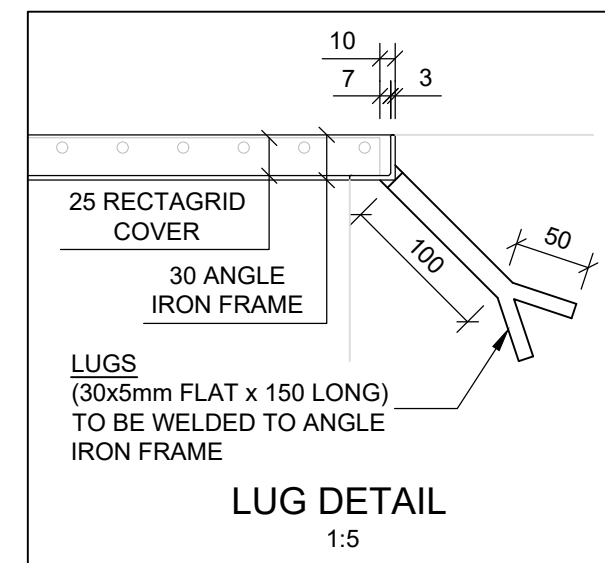
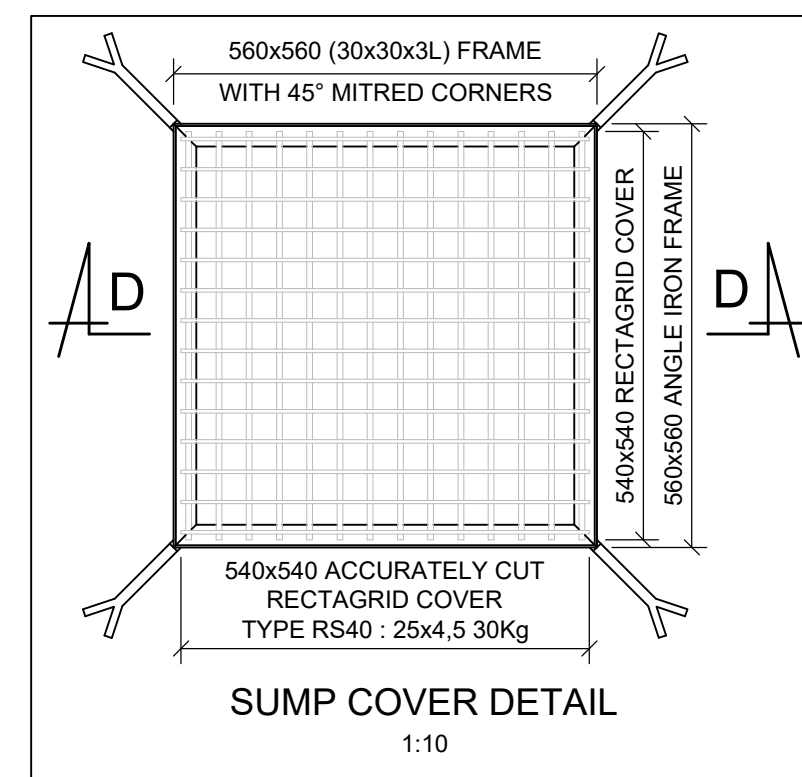
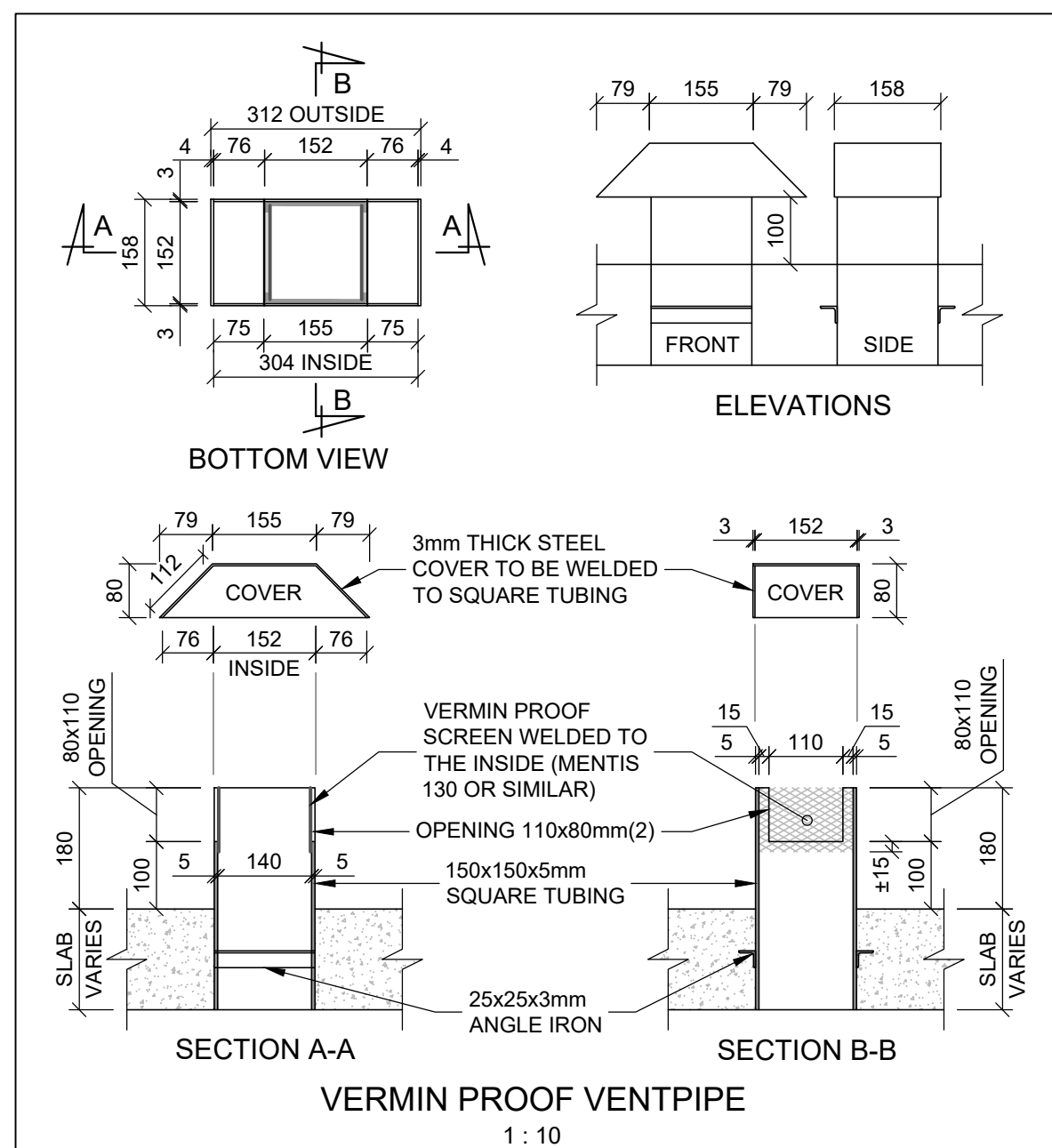


Bar Mark	Bar Type & Diameter (mm)	Cut Length of Bar (mm)	Number of Bars	Total Weight (kg)	Shape code	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	Radius (mm)
BASE											
1	Y32	14,850	244	23,459	20	14,850					
2	Y25	14,850	152	8,919	20	14,850					
3	R16	5,820	100	942	83	800	1,630	800			
4	Y20	2,725	244	1,682	36	1,000	1,645	1,000			
5	Y25	5,350	186	3,932	38	1,200	4,110				
6	Y20	2,475	96	601	38	1,220	1,215				
7	Y16	6,855	2	20	65	6,855					1,930
8	Y16	7,485	2	24	65	7,485					2,130
9	Y16	8,115	2	26	65	8,115					2,330
10	Y16	8,745	2	28	65	8,745					2,530
11	Y16	9,370	2	30	65	9,370					2,730
12	Y20	10,400	90	2,367	65	10,400					3,050
13	Y20	10,000	90	2,276	65	10,000					2,850
WALL											
14	Y20	6,000	186	2,822	20	6,000					
15	Y16	11,500	186	3,462	20	11,500					
16	Y16	7,330	186	2,207	20	7,330					
17	Y16	10,400	174	2,929	65	10,400					3,050
18	Y16	10,000	174	2,816	65	10,000					2,850
CONE											
19	Y20	2,740	248	1,718	34	2,500	200				
20	Y20	3,550	128	1,149	62	2,500	1,545	1,000			
21	Y20	4300	120	1,305	62	2,500	1,745	1,000			
22	Y20	3550	128	1,149	62	2,500	1,390	1,000			
23	Y20	3260	120	989	62	2,820	2,000	440			
24	Y20	2170	128	702	72	670	750				
25	Y32	9950	4	258	65	9,950					2,650
26	Y32	10600	4	275	65	10,600					2,850
27	Y32	11,200	4	290	65	11,200					3,050
28	Y32	12150	4	315	65	12,150					3,350
29	Y16	3,360	65	353	49	820	820	1800	650	580	
30	Y16	7,440	406	4,894	20	7440					
31	Y16	4,000	287	1,858	20	4000					
32	Y20	4,800	60	728	65	4,800					3,620
33	Y20	5,450	72	992	65	5,450					4,243
34	Y20	6,100	72	1,111	65	6,100					4,866
35	Y20	6,800	72	1,238	65	6,800					5,490
36	Y20	7,450	72	1,357	65	7,450					6,113
37	Y20	8,100	72	1,475	65	8,100					6,737
38	Y20	8,750	72	1,593	65	8,750					7,360
39	Y20	9,400	72	1,712	65	9,400					7,984
40	Y20	10,050	72	1,830	65	10,050					8,607
41	Y20	10,700	72	1,948	65	10,700					9,230
42	Y20	11,250	60	1,707	65	11,250					9,750
OUT TANK WALL											
43	Y12	7150	396	2,578	62	850	600				
44	Y12	7000	405	2,581	62	1,130	792				
45	Y16	2050	405	1,344	62	880	630				
46	Y16	11050	302	5,401	65	11,050	11,050				9,750
47	Y16	10850	302	5,303	65	10,850	10,850				9,575
48	Y10	395	405	65	38	150	175	150			
IN TANK WALL											
49	Y20	2780	60	422	65						1,641
50	Y20	3360	60	510	65						2,135
51	Y20	4130	60	627	65						2,629
52	Y16	12800	61	1,264	62	1214	955				
53	Y16	12450	69	1,390	62	1100	865				
54	Y20	1720	69	300	62	1090	756				
55	Y16	5,360	140	1,215	65						1,450
56	Y16	9,520	140	2,157	65						1,625
57	Y12	4,600	24	101	65						1,700
58	Y12	5,550	24	121	65						2,220
59	Y12	2,040	76	141	74	1,000	100				
ROOF											
60	Y32	10,800	36	2,517	65						9,650
61	Y20	800	304	615	74	240	240				
62	Y12	12,100	81	892	20	12,100					
63	Y12	12,100	81	892	20	12,100					
64	Y16	6,200	48	482	20	6,200					
65	Y16	6,200	36	361	20	6,200					
66	Y16	1,800	40	117	20	1,800					
67	Y16	3,900	45	284	20	3,900					
68	Y16	3,000	48	233	20	3,000					
69	Y16	2,400	56	218	20	2,400					
70	Y16	1,900	48	148	20	1,900					
71	Y16	1,200	28	54	20	1,200					
72	Y16	1,100	40	71	20	1,100					
73	Y16	1,120	28	51	20	1,120					
High Yield Total Weight				120,951	kg						
Mild Steel Total Weight				942	kg						



NOTES:

1. ALL REINFORCEMENT TO BE APPROVED BY ENGINEER BEFORE ANY CONCRETE SHALL BE CAST.
2. MIN. CONCRETE COVER 40mm UNLESS SHOWN OTHERWISE.
3. ALL CONCRETE SHALL BE 25 MPa/19mm UNLESS SHOWN OTHERWISE.
4. ALL CAST IN SITU CONCRETE MUST BE CURED FOR AT LEAST 72 HOURS BY COVERING WITH POLYTHENE SHEETING OR BY SPRAYING THE SURFACE WITH WHITE PIGMENTED CURING COMPOUND ACCORDING TO MAASTHO M145 AT A RATE OF 0.3 l/m² WITH A MECHANICAL SPRAYER AFTER SURFACE TEXTURE HAS BEEN APPLIED.
5. ALL STRUCTURAL STEELWORK TO BE PAINTED WITH AN APPROVED COLOUR EPOXY-TAR PAINT TO SABS 801 IN ACCORDANCE WITH SANS 1200 H.
6. ALL STEELWORK TO BE ACCORDING TO BS 4360. ALL WELDING TO BE ACCORDING TO SANS 044.



NOTE:
SUMP COVER AND FRAME TO BE HOT DIPPED GALVANISED

DEPARTMENT DEPARTEMENT	APPROVED GOEDGEKEUR	DESIGNATION AMPSBENAMING	DATE DATUM

CERTIFIED AS BUILT DRAWING GESERTIFISEER AS SOOS GEBOU TEKENING			
FOR NMS CwEc		FOR NMS JOHANNESBURG WATER (PTY) LTD	
DATE DATUM		DATE DATUM	

CONSULTING ENGINEERS - RAADGEWENDE INGENIEURS	SURVEYED - OPGEMEET	DESIGNED - ONTWERP	DRAWN - GETEKEN
CivEc Civil Engineering Consultants	MODDERPONTJEN PHONE (011) 808-1004 FAX (011) 808-1005 PRETORIA PHONE (012) 988-5463 FAX (012) 988-5819	DESIGNED - ONTWERP DRAWN - GETEKEN CHECKED - NAGESSEN SERVICES CHECKED DENSLEIDINGS NAGESSEN GEOTECHNICAL INVESTIGATION GEOTEGNIESE ONDERSOEK	FJH JN HL
PRIVATE DRAWING NO PRIVAAT TEKENING N°	APPROVED GOEDGEKEUR	SERVICES SERWITUTE	APPROVED GOEDGEKEUR
1440a/ST/DET01RR	800162		

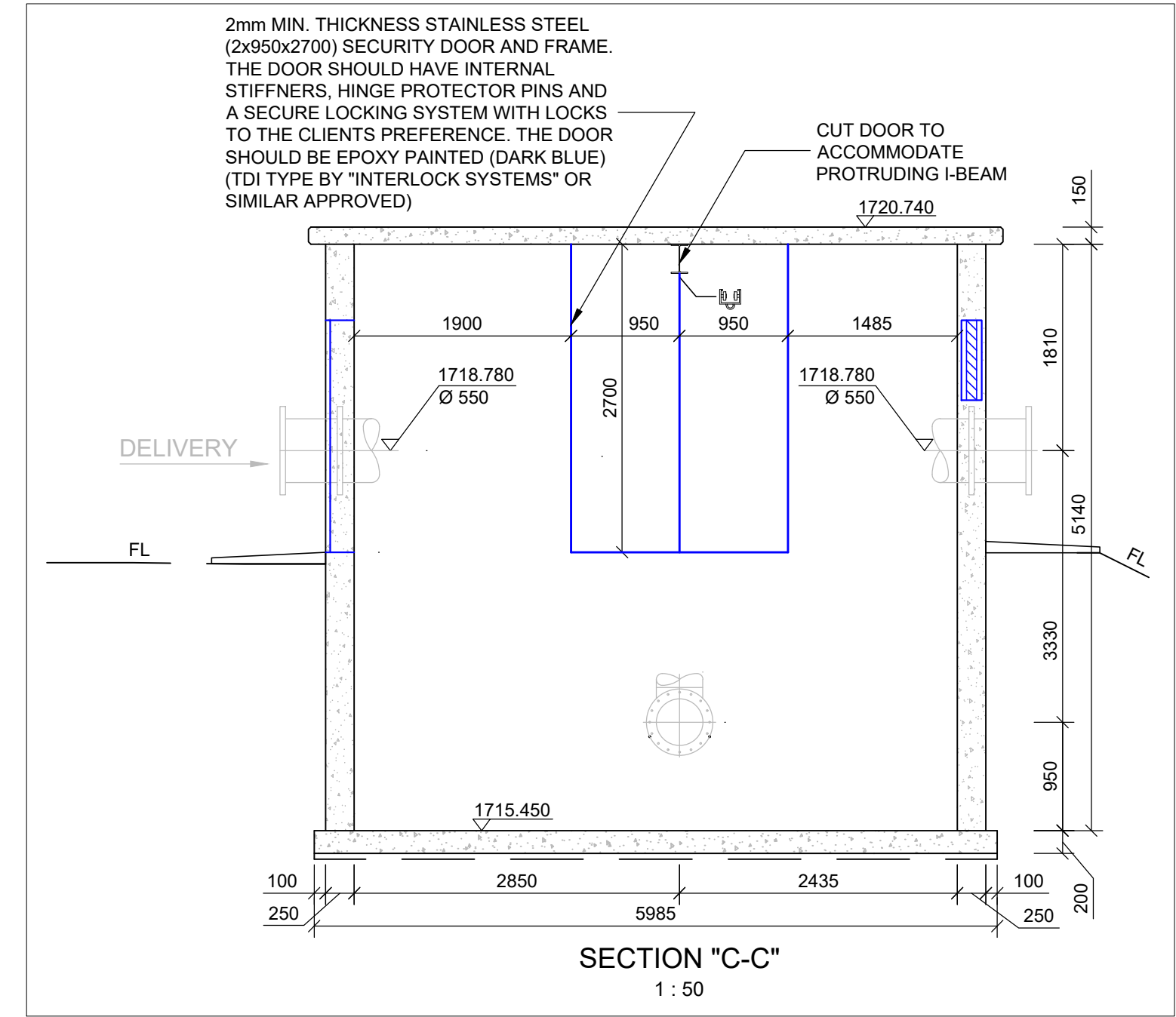
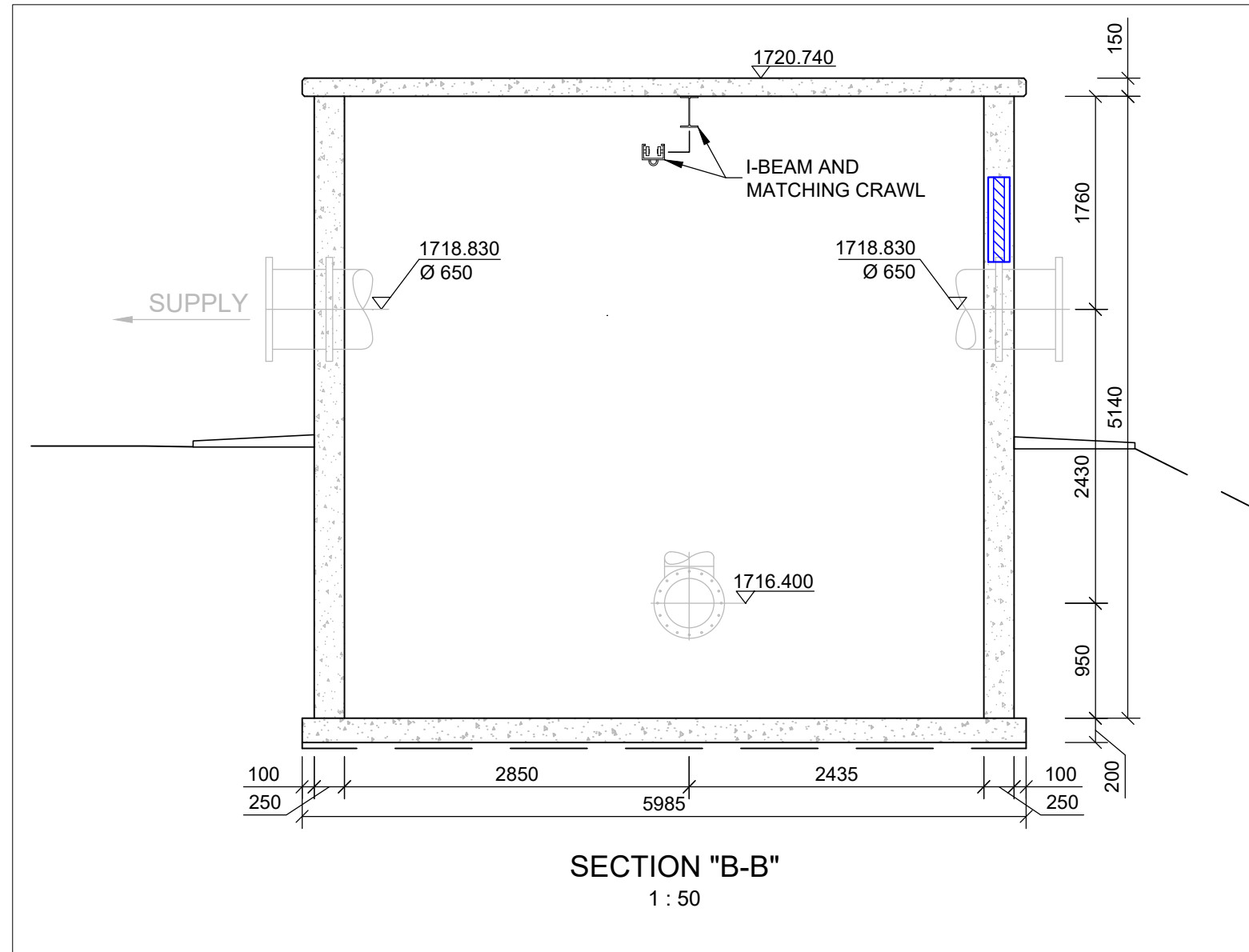
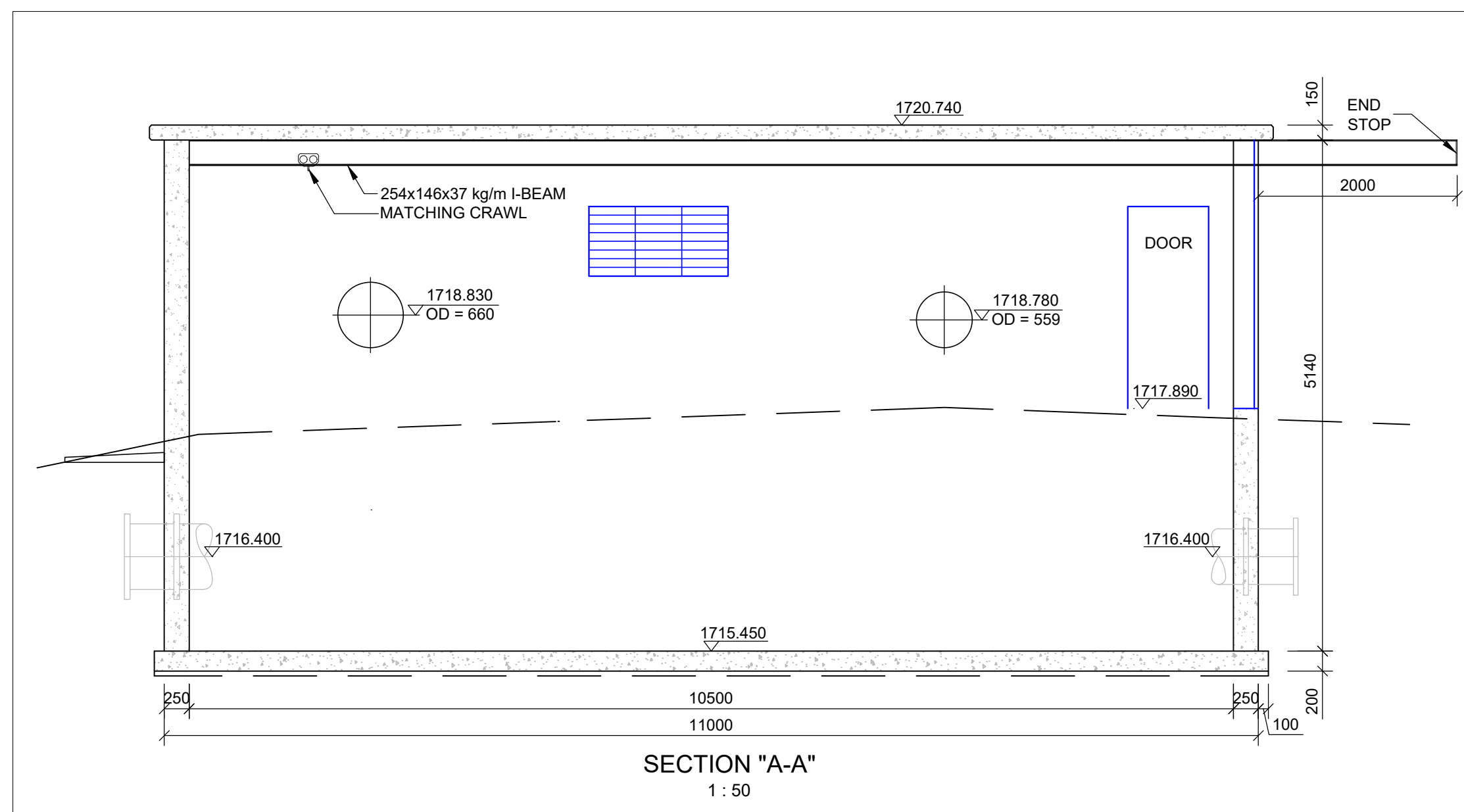
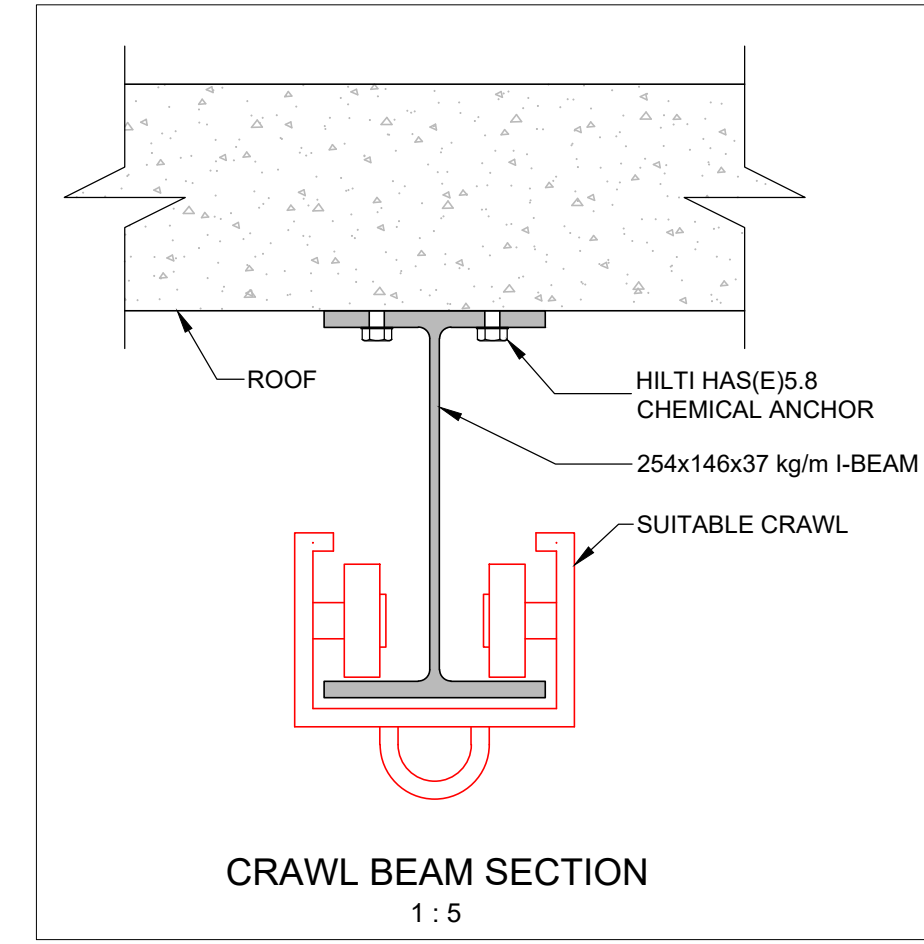
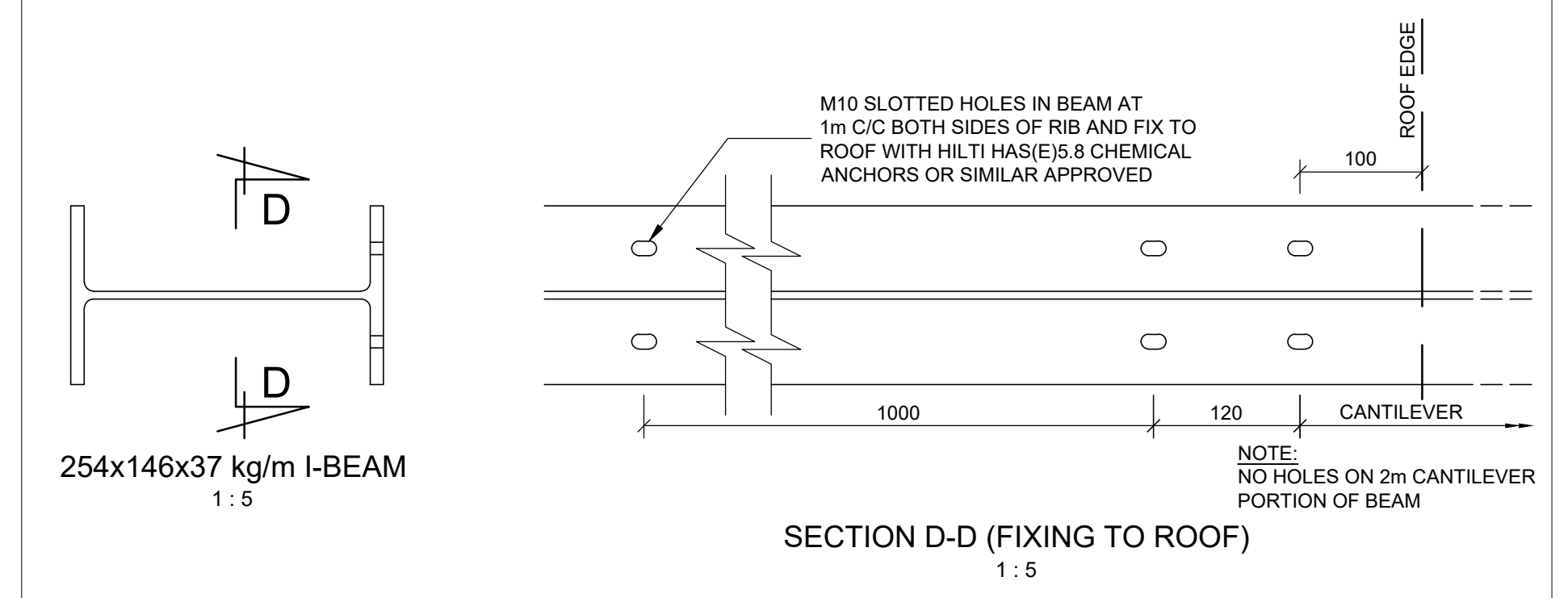
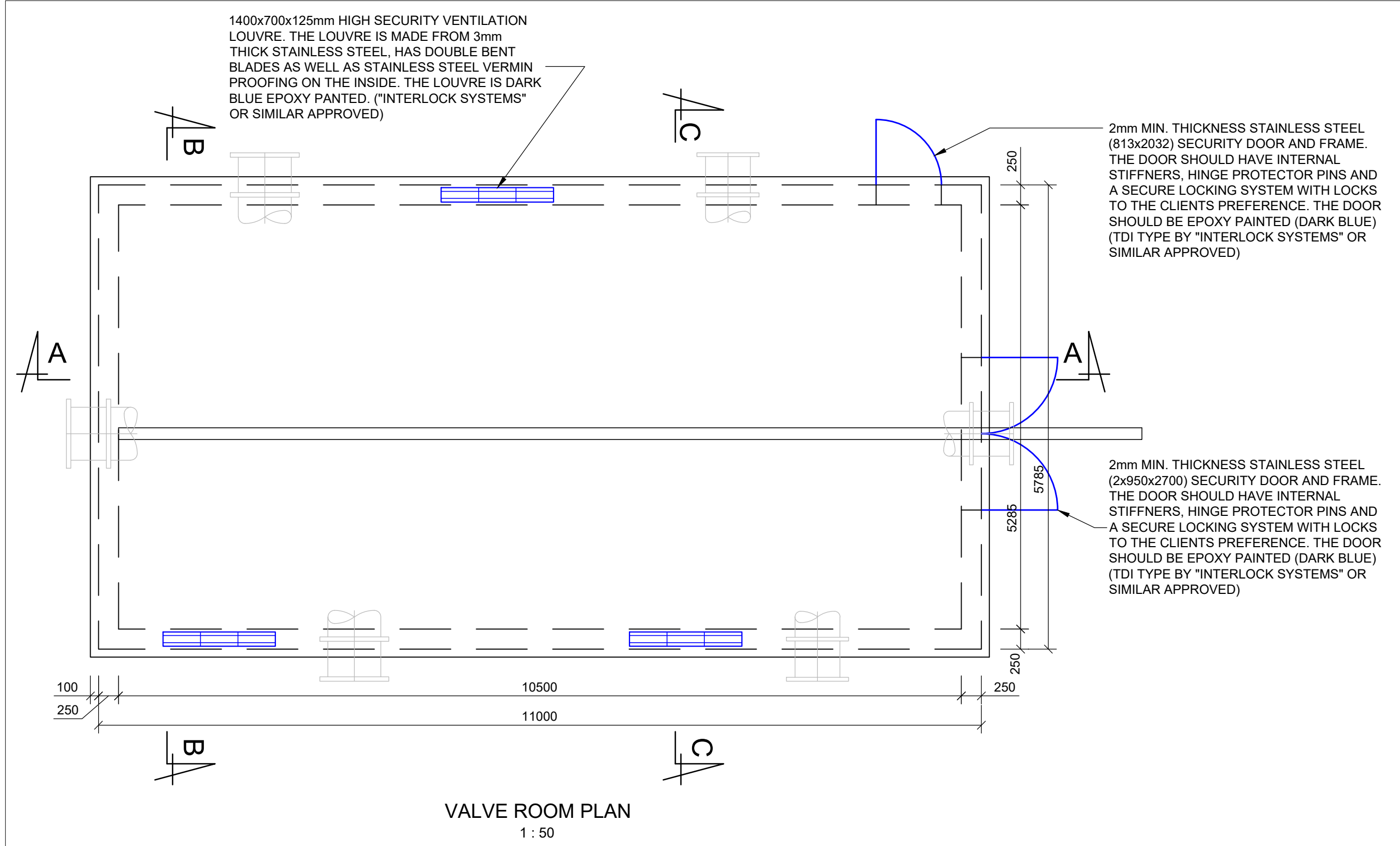
JOHANNESBURG WATER (SOC) LTD	
	17 HARRISON STREET MARSHALLTOWN 2107
	TEL: (011) 688-1400 FAX: (011) 688-1529

CITY OF JOHANNESBURG

CONSTRUCTION OF A 2.25MI WATER TOWER IN ROBERTVILLE WITH ASSOCIATED PIPE AND PUMP WORKS

MANHOLE DETAILS

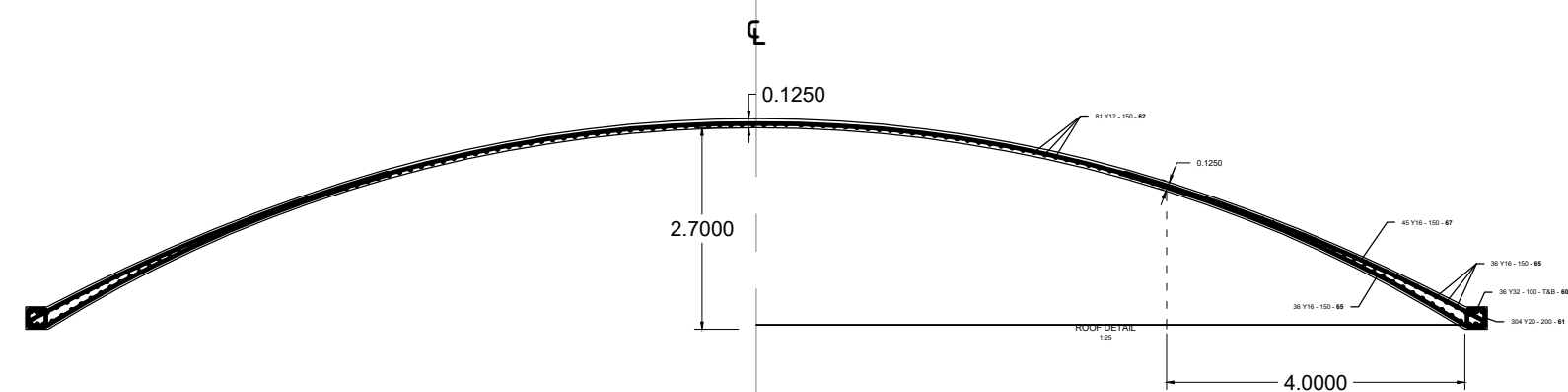
DESIGN MANAGER	SCALE SKAAL	AMENDMENTS - WYSIGINGS	APPROVED GOEDGEKEUR	DATE DATUM	DRAWING No. TEKENING N°	Revision
BESTUURDER ONTWERP	AS SHOWN	0 NEW DRAWING	JN	2018-11-2	1440a/ST/DET01RR	
DATE DATUM					FILE No LEER N°	



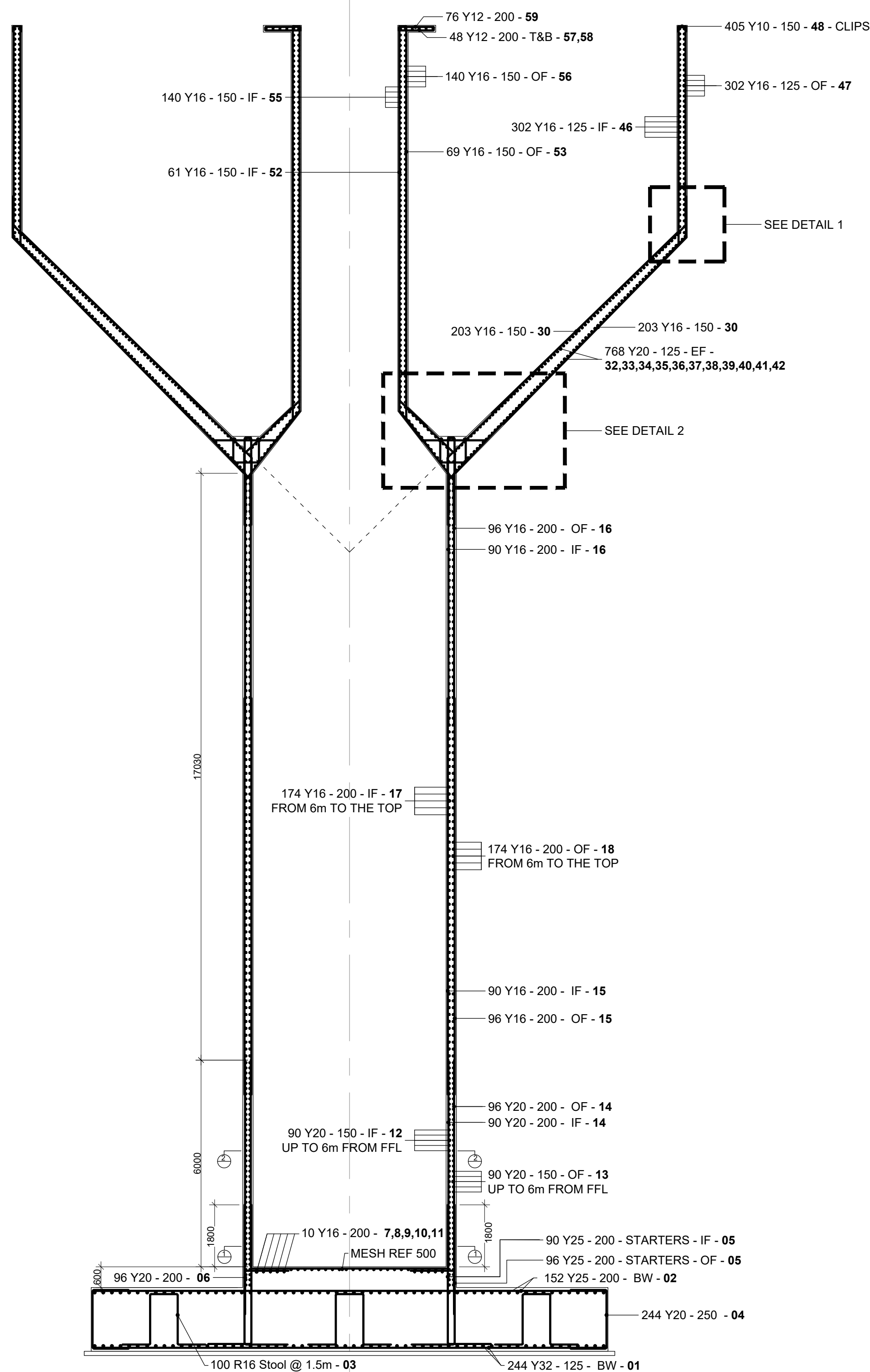
- NOTES**
- BRICKS ARE TO BE ENGINEERING BRICKS TO SANS 227 OR SIMILAR AND TO BE APPROVED BY THE ENGINEER.
 - BRICKS TO BE WELL WETTED AND BONDED WITH 1 : 3 CEMENT : SAND MORTAR WITH SOLIDLY FILLED JOINTS NOT EXCEEDING 10mm. EXPOSED SURFACES TO BE POINTED AS WORK PROGRESSES.
 - ALL BRICKWORK TO BE ENGLISH BOND AND SEMI-FACE FINISH ON EXPOSED SURFACES.
 - ALL REINFORCEMENT TO BE APPROVED BY ENGINEER BEFORE ANY CONCRETE SHALL BE CAST.
 - MIN. CONCRETE COVER 40mm UNLESS SHOWN OTHERWISE.
 - ALL CONCRETE SHALL BE 25 MPa/19mm UNLESS SHOWN OTHERWISE.
 - ALL CAST IN SITU CONCRETE MUST BE CURED FOR AT LEAST 72 HOURS BY COVERING WITH POLYTHENE SHEETING OR BY SPRAYING THE SURFACE WITH WHITE PIGMENTED CURING COMPOUND ACCORDING TO MAASHTO M145 AT A RATE OF 0.3 l/m² WITH A MECHANICAL SPRAYER AFTER SURFACE TEXTURE HAS BEEN APPLIED.
 - ALL STRUCTURAL STEELWORK TO BE PAINTED WITH AN APPROVED COLOUR EPOXY-TAR PAINT TO SABS 801 IN ACCORDANCE WITH SANS 1200 H.
 - ALL STEELWORK TO BE ACCORDING TO BS 4360. ALL WELDING TO BE ACCORDING TO SANS 044.
 - JUNCTION BOX DETAILS ARE AS FOR MANHOLES WITHOUT 600mm HOLE IN REINFORCED CONCRETE SLAB.

DEPARTMENT DEPARTEMENT	APPROVED GOEDGEKEUR	DESIGNATION AMPSBENAMING	DATE DATUM

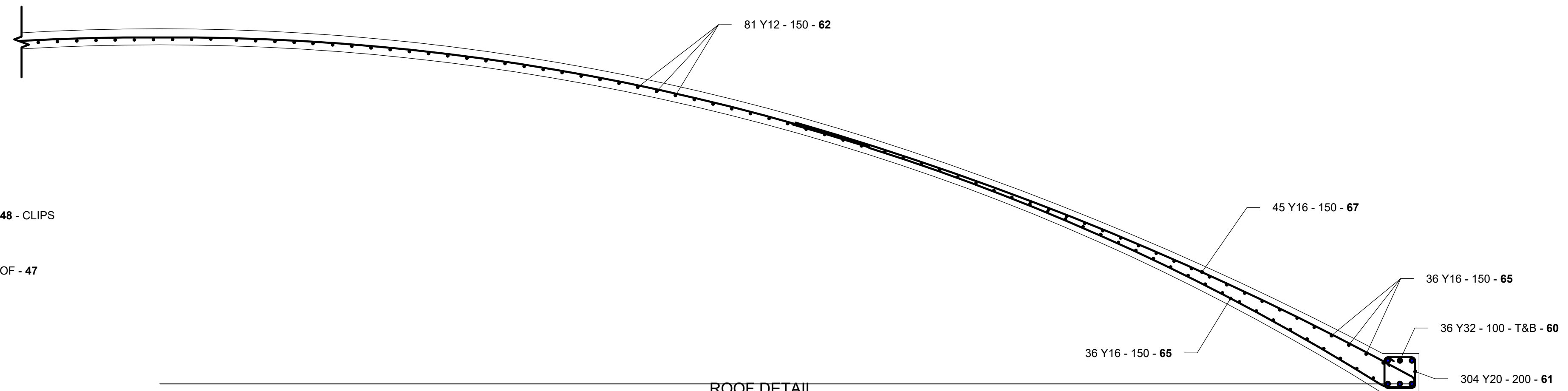
CERTIFIED AS BUILT DRAWING GESERTIFISEER AS SOOS GEBOU TEKENING	
FOR NMS OieC	FOR NMS JOHANNESBURG WATER (PTY) LTD
DATE DATUM	DATE DATUM



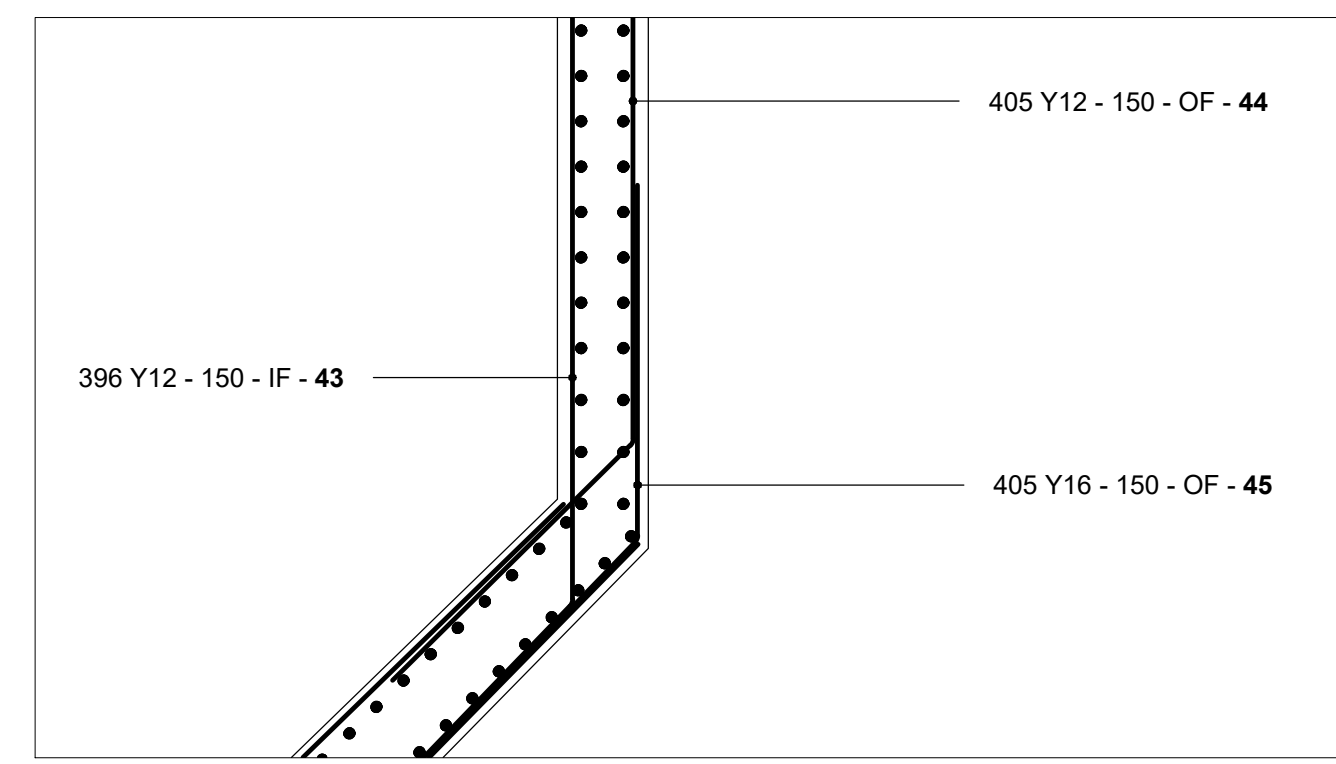
TOWER ROOF STEEL REINFORCEMENT
1:100



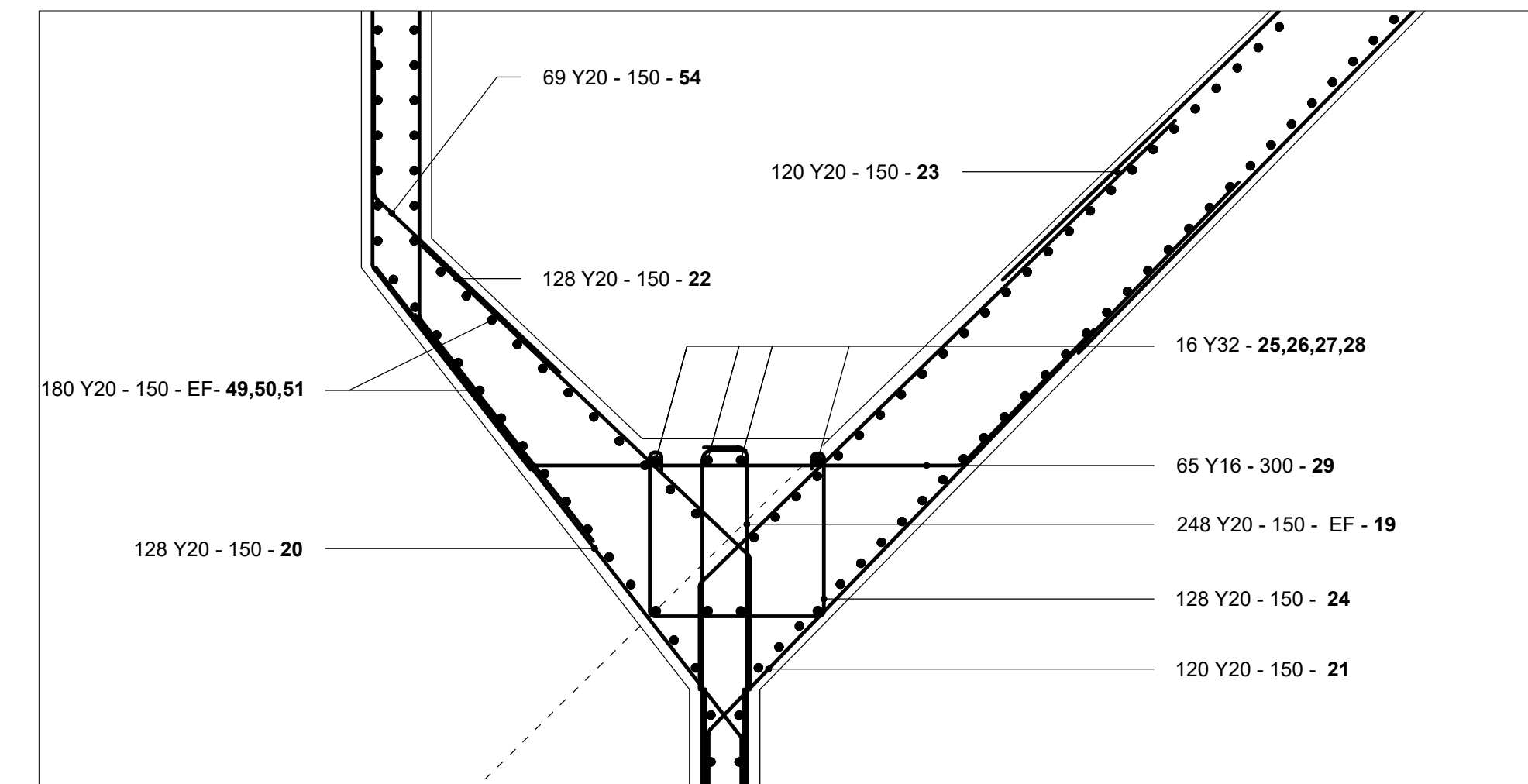
TOWER STEEL REINFORCEMENT
SECTION 3-3
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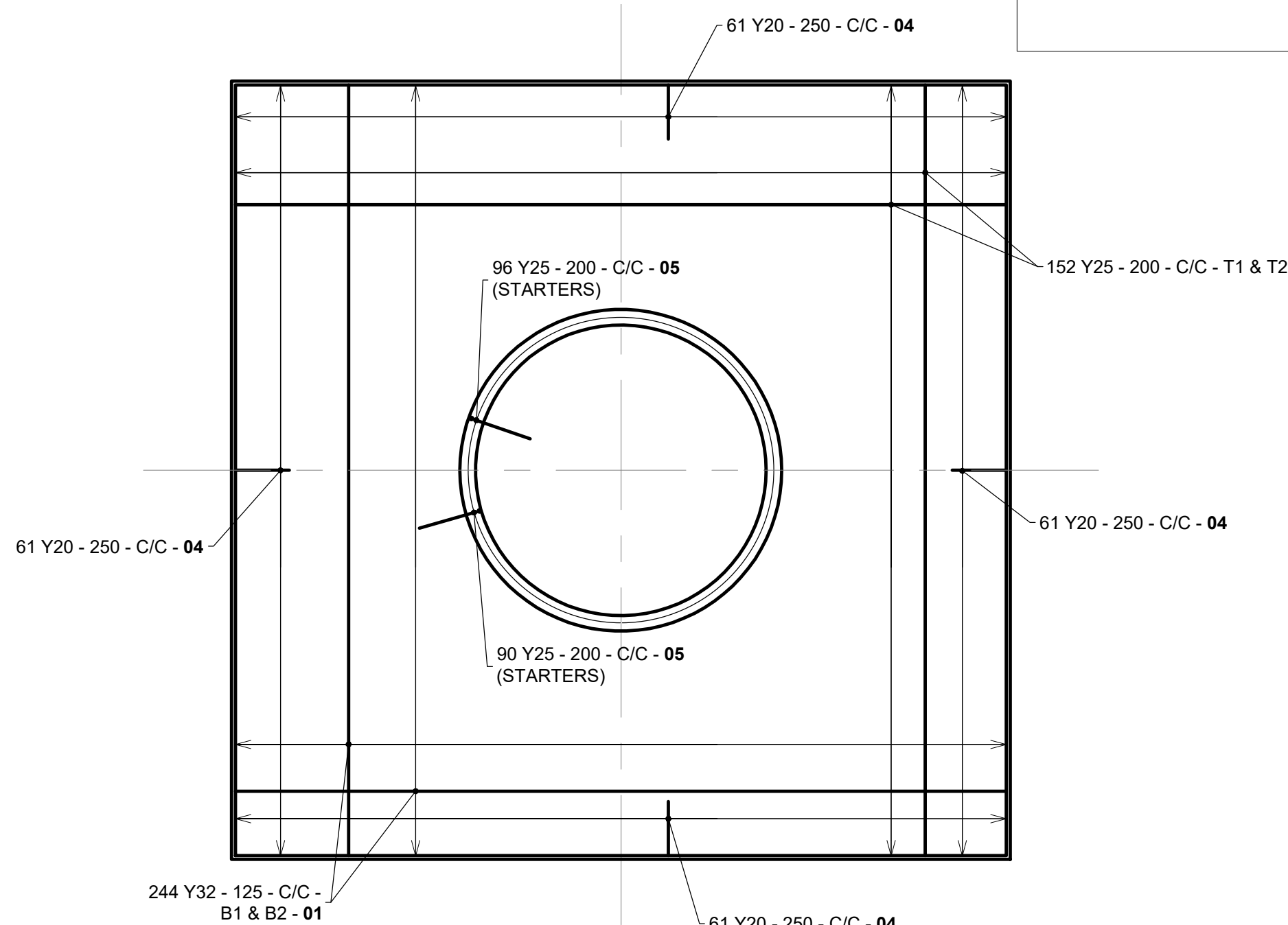
ROOF DETAIL
1:25



DETAIL 1
1:25



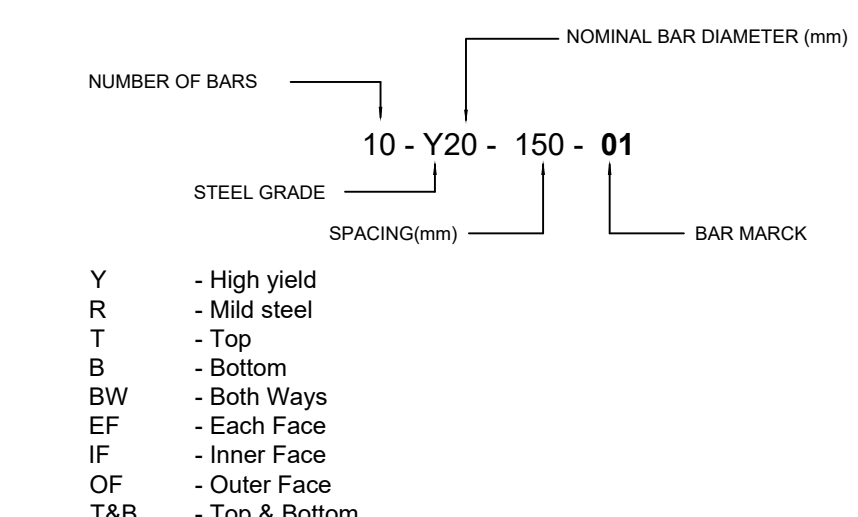
DETAIL 2
1:25



PLAN FOUNDATION
1:100

REINFORCEMENT DETAILING

- The bending of bar reinforcement shall be in accordance with BS4466. The following notation has been adopted on the drawings.

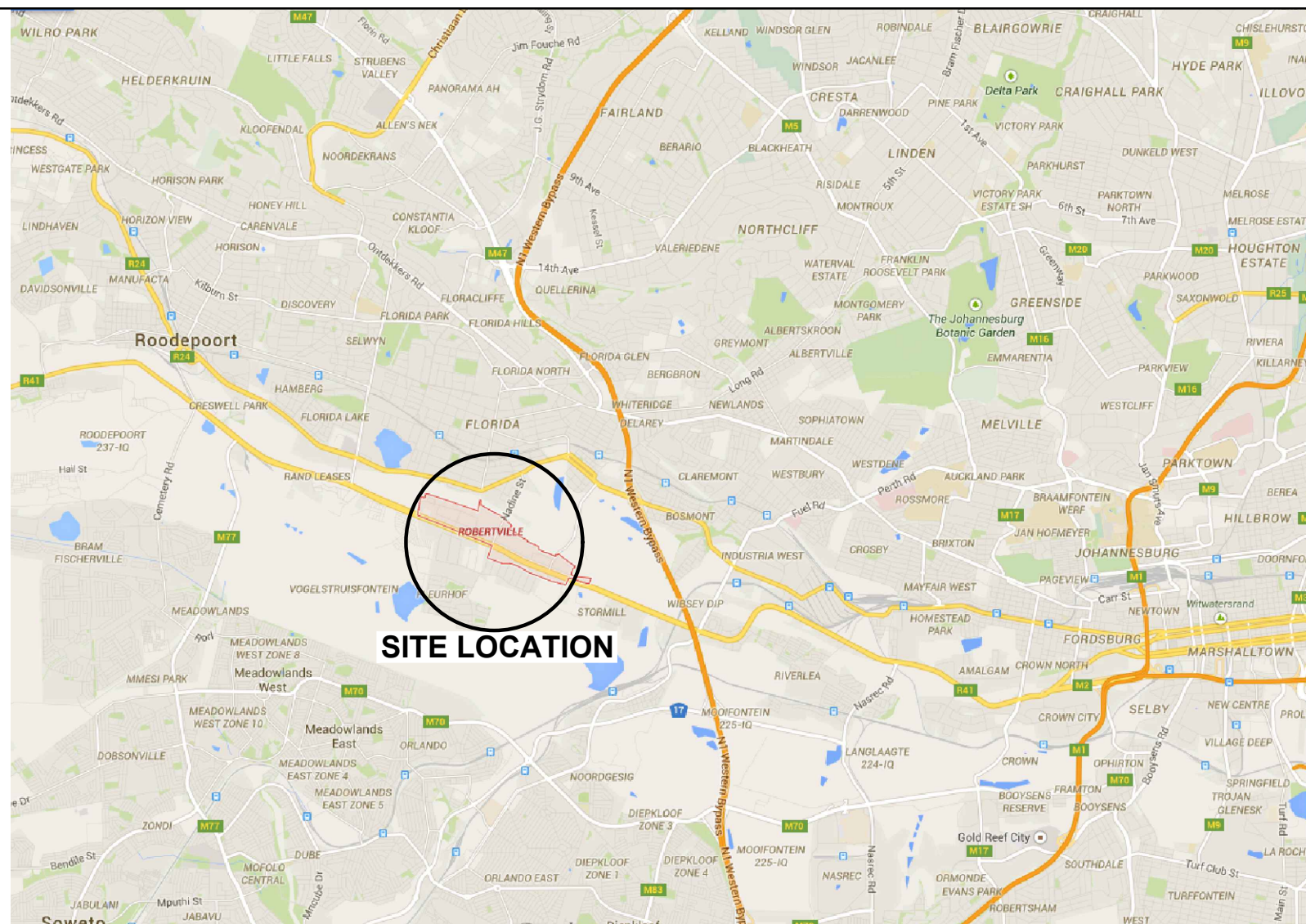
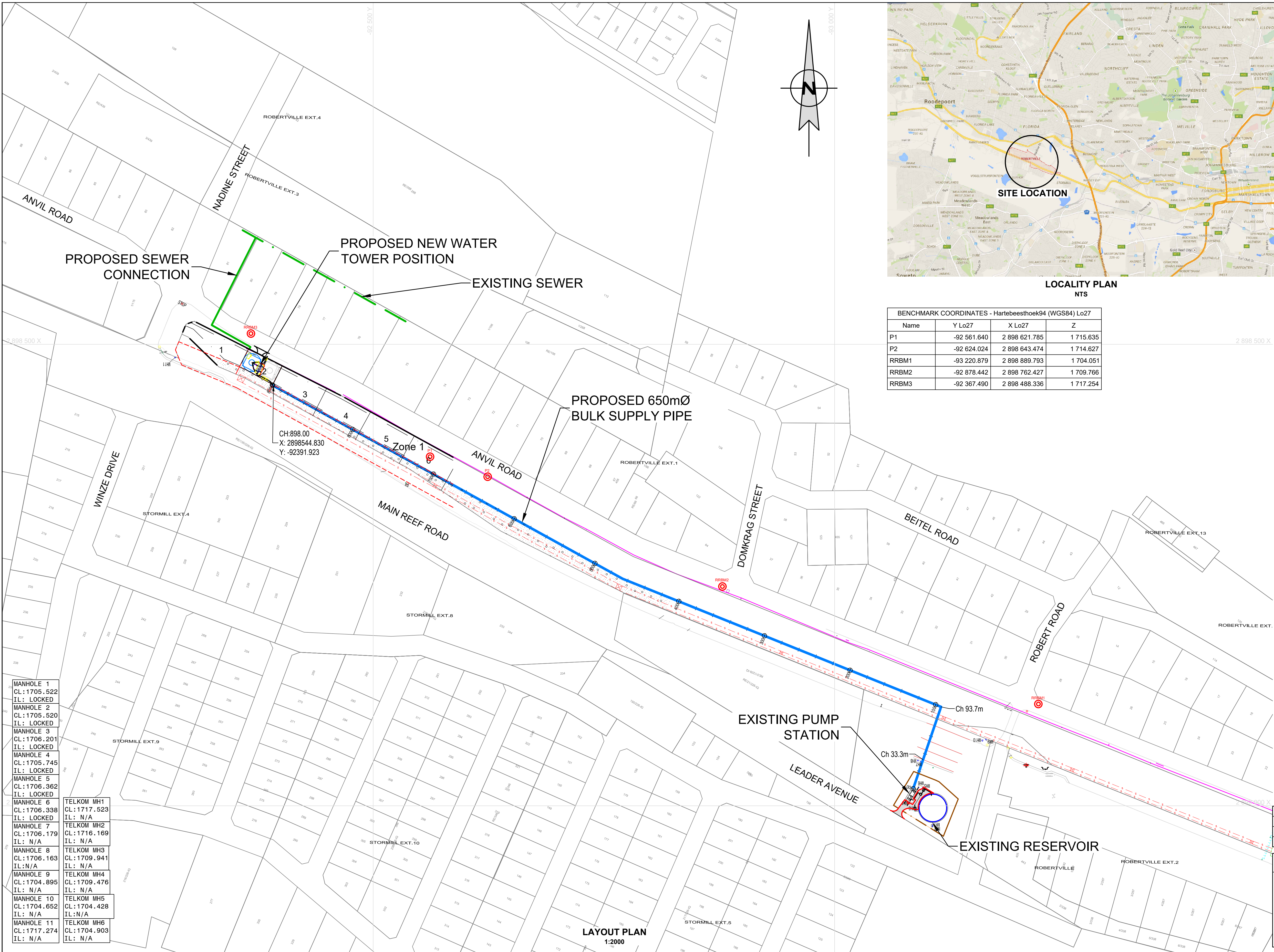


- Lap lengths are to be 50 times the diameter of the smaller bar unless shown otherwise.
- Unless otherwise mentioned, concrete covers to reinforcement are to be as follows:
 - Base (below ground) : 75mm
 - Contact with Water : 75mm
 - Other : 50mm

- Lengths are in mm
- Reinforced bars' dimensions are in mm

DEPARTMENT DEPARTEMENT	APPROVED GOEDGEKEUR	DESIGNATION AMPSBENAMING	DATE DATUM

CERTIFIED AS BUILT DRAWING GESERTIFISEER AS SOOS GEBOU TEKENING	
FOR NMS C&EC	FOR NMS JOHANNESBURG WATER (PTY) LTD
DATE DATUM	DATE DATUM



BENCHMARK COORDINATES - Hartebeesthoek94 (WGS84) Lo27			
Name	Y Lo27	X Lo27	Z
P1	-92 561.640	2 898 621.785	1 715.635
P2	-92 624.024	2 898 643.474	1 714.627
RRBM1	-93 220.879	2 898 889.793	1 704.051
RRBM2	-92 878.442	2 898 762.427	1 709.766
RRBM3	-92 367.490	2 898 488.336	1 717.254

SKAAL OP VERKLEINDE TEKENING
SCALE ON REDUCED DRAWING

100mm OP OORSPRONKLIKE TEKENING
100mm SCALE ON ORIGINAL DRAWING

GENERAL NOTES :

- NO PART OF THIS DRAWING MUST BE SCALED
- ALL DIMENSIONS SHOULD BE CHECKED BEFORE ANY WORK ON THE SITE COMMENCES
- ANY DISCREPANCIES THAT MAY OCCUR DURING THE CONSTRUCTION PHASE OF THIS
- DRAWING MUST BE BROUGHT IMMEDIATELY UNDER THE ATTENTION OF THE ENGINEER

NOTES :

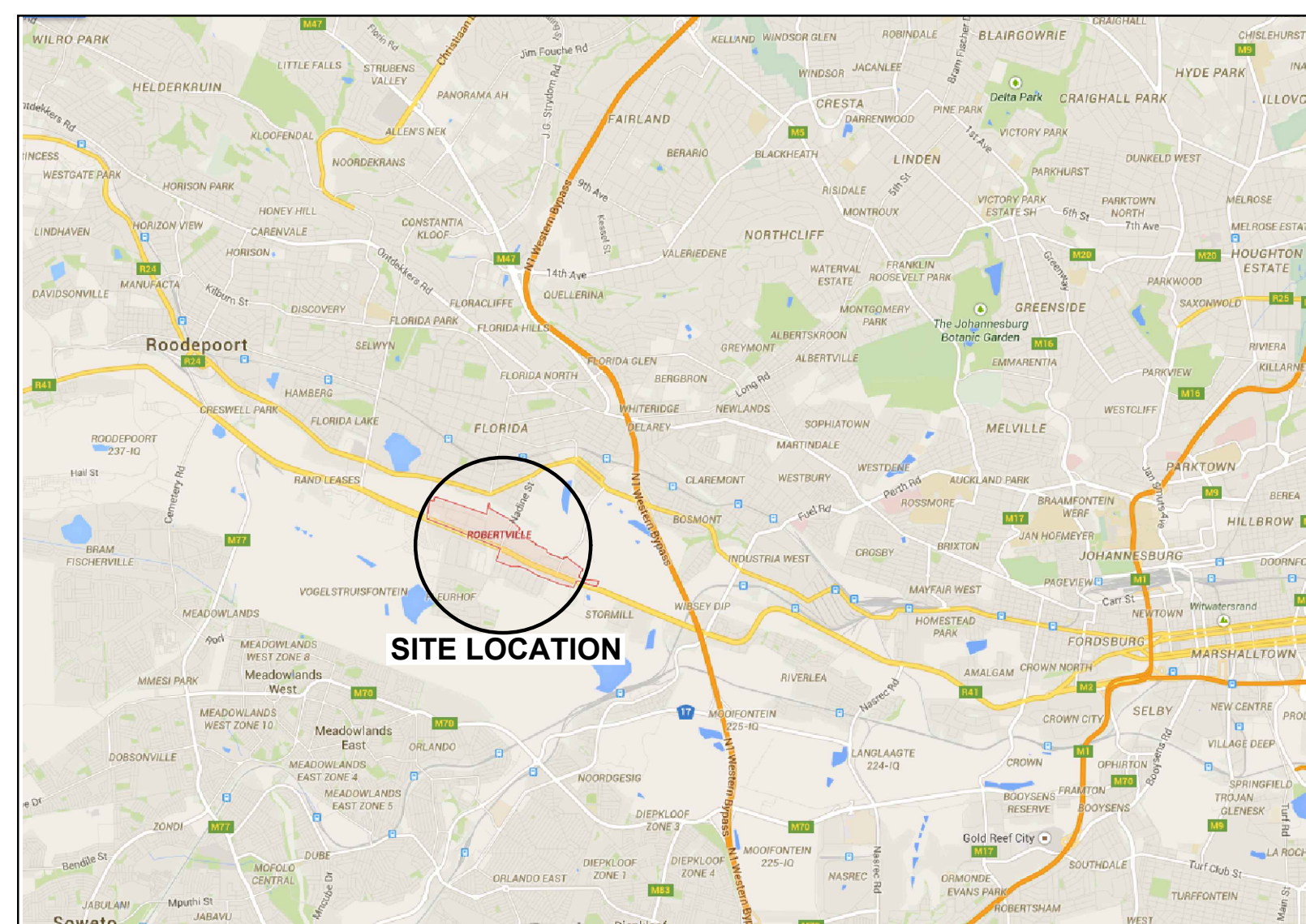
- ALL FLANGES TO BE ACCORDING TO SANS 1123-1977 TABLE 16.
- ALL M.S. FITTINGS TO BE COPON COATED
- ANCHOR BLOCKS TO BE CAST SYMMETRICALLY AROUND CENTRE LINE OF FITTINGS AND AGAINST UNDISTURBED EXCAVATION
- COUPLINGS AND FLANGES SHALL BE LEFT CLEAR OF CONCRETE
- VALVES AND HYDRANTS MUST BE TREATED AS END CAPS AND SHOULD BE CONCRETED INTO THE THRUST BLOCK
- ALL THRUST BLOCKS SHALL BE OF 15MPa CONCRETE
- THE DIMENSIONS OF THE ANCHOR BLOCKS ONLY APPLY IF THE TEST PRESSURE DOES NOT EXCEED 135m (1350 kPa)
- ALL PREFABRICATED FITTINGS TO BE COPON EP 2300 COATED AND LINED
- FLANGED JOINTS AND V.J. COUPLINGS TO BE WRAPPED WITH DENSO TAPE
- ALL PIPE SIZES TO BE CONFIRMED ON SITE PRIOR TO THE ORDERING OF FITTINGS

LEGEND

- BENCHMARKS
- NEW 650mm BULK WATER SUPPLY PIPE
- TOWNSHIP RESERVATION
- POWER LINES
- EXISTING GAS LINE
- NEW WATER PIPES
- ELECTRICAL PYLON
- PROPOSED FENCE
- PROPOSED SEWER CONNECTION
- EXISTING SEWER
- EXISTING ESKOM SERVITUDE

MANHOLE 1 CL: 1705.522 IL: LOCKED	TELKOM MH1 CL: 1717.523 IL: N/A
MANHOLE 2 CL: 1705.520 IL: LOCKED	TELKOM MH2 CL: 1716.169 IL: N/A
MANHOLE 3 CL: 1706.201 IL: LOCKED	TELKOM MH3 CL: 1709.941 IL: N/A
MANHOLE 4 CL: 1705.745 IL: LOCKED	TELKOM MH4 CL: 1709.476 IL: N/A
MANHOLE 5 CL: 1706.362 IL: LOCKED	TELKOM MH5 CL: 1704.428 IL: N/A
MANHOLE 6 CL: 1706.338 IL: LOCKED	TELKOM MH6 CL: 1704.903 IL: N/A
MANHOLE 7 CL: 1706.179 IL: N/A	
MANHOLE 8 CL: 1706.163 IL: N/A	
MANHOLE 9 CL: 1704.895 IL: N/A	
MANHOLE 10 CL: 1704.652 IL: N/A	
MANHOLE 11 CL: 1717.274 IL: N/A	

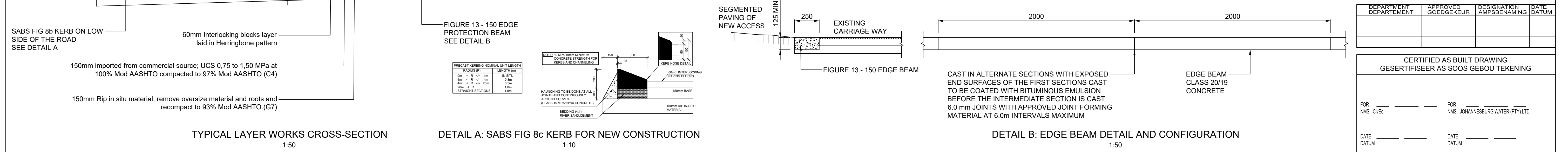
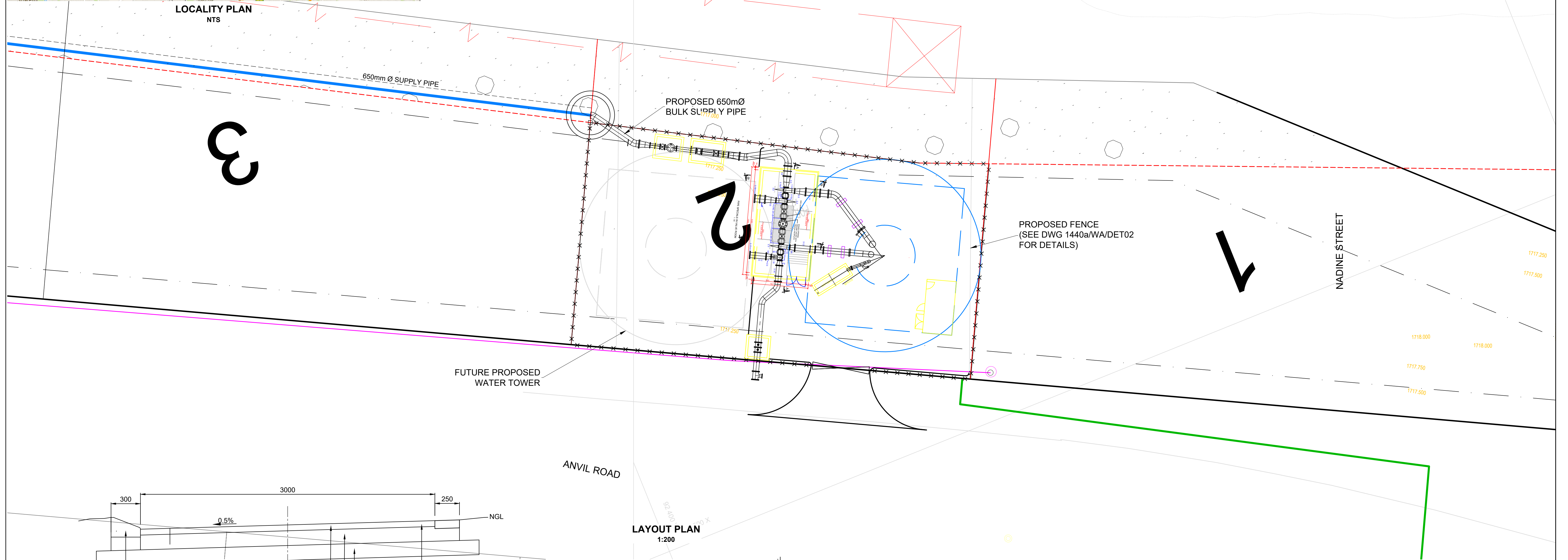
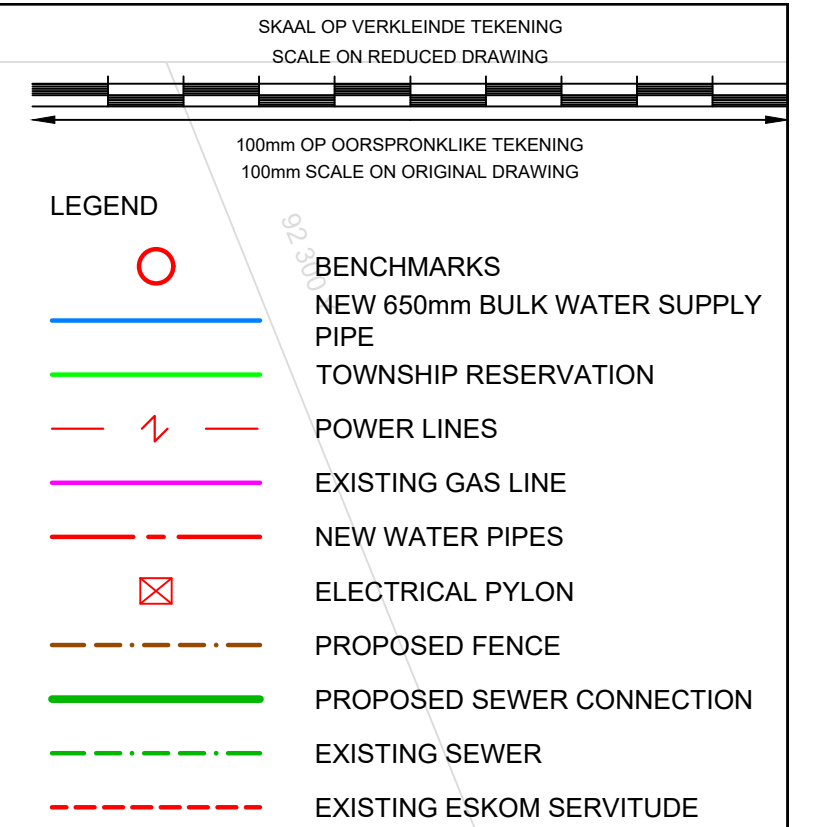
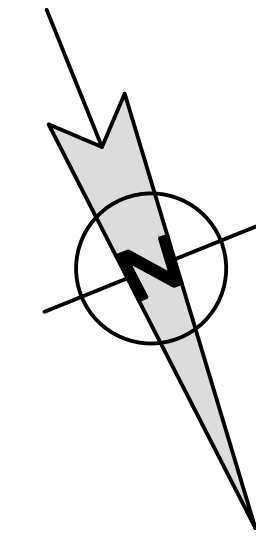
DEPARTMENT DEPARTEMENT	APPROVED GOEDGEKEUR	DESIGNATION AMPSBENAMING	DATE DATUM
CERTIFIED AS BUILT DRAWING GESERTIFISEER AS SOOS GEBOU TEKENING			
FOR NMS Oke	FOR NMS JOHANNESBURG WATER (PTY) LTD		
DATE DATUM	DATE DATUM		

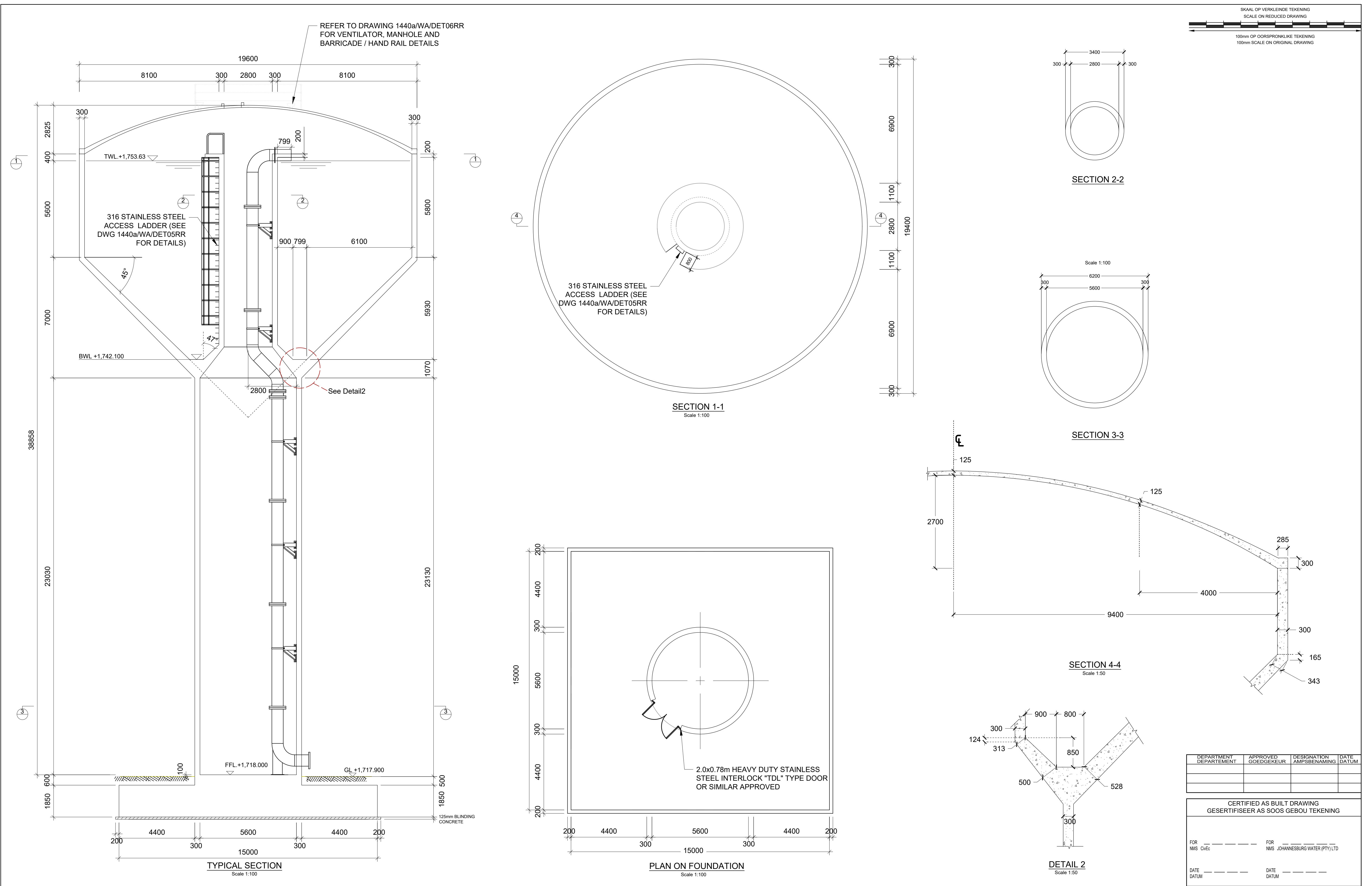


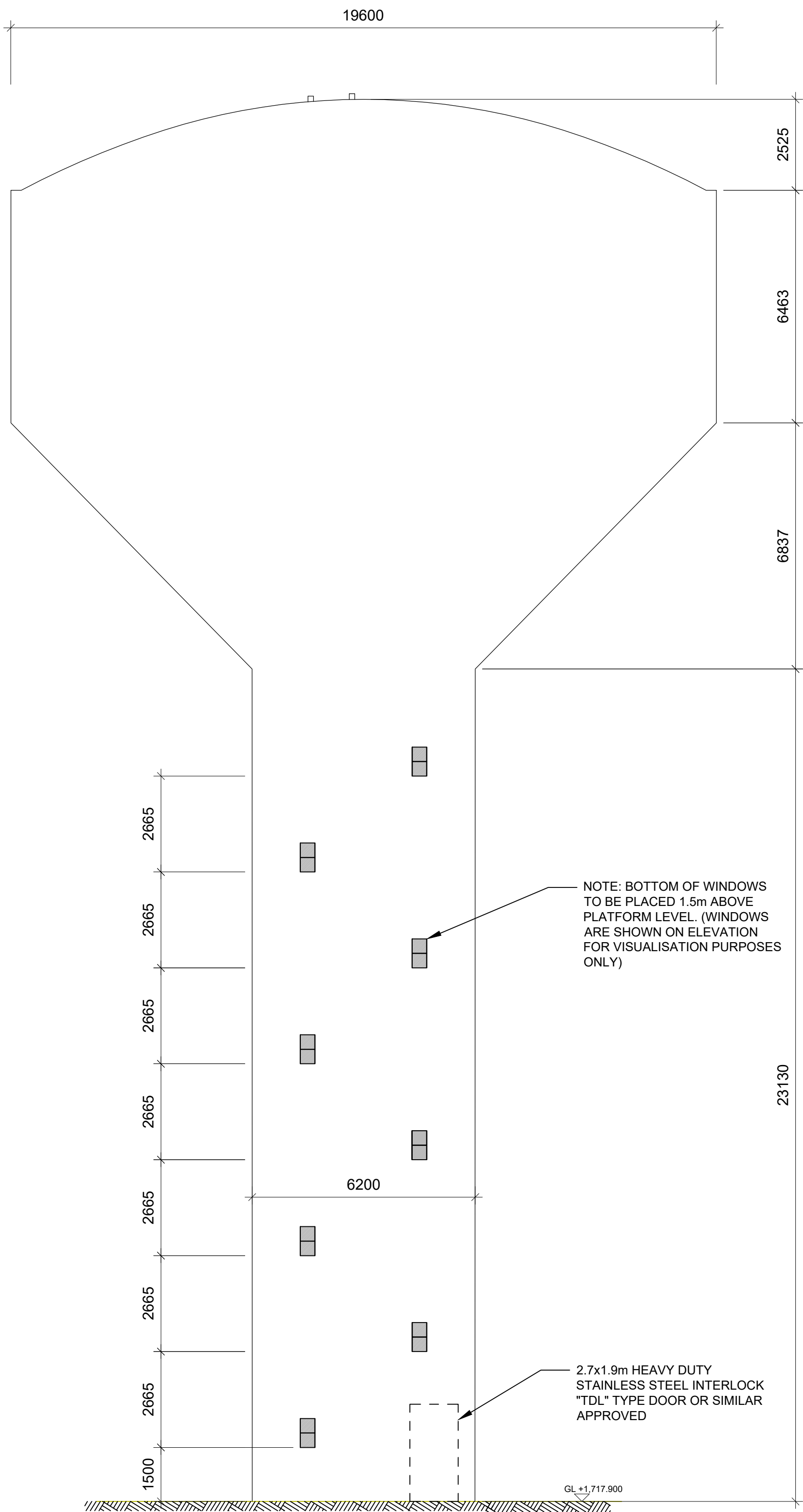
PAVING AREA SETTING OUT COORDINATES - Hartebeesthoek94 (WGS84) Lo27			
Name	Y Lo27	X Lo27	Z
P1	-92 334.244	2 898 480.636	1 717.593
P2	-92 322.360	2 898 483.478	1 717.662
P3	-92 322.894	2 898 484.638	1 717.670
P4	-92 341.863	2 898 494.248	1 717.790
P5	-92 334.681	2 898 508.429	1 717.900
P6	-92 327.716	2 898 509.210	1 717.250
P7	-92 322.534	2 898 514.537	1 717.935
P8	-92 299.459	2 898 492.088	1 717.250
P9	-92 298.092	2 898 491.473	1 717.250
P10	-92 304.112	2 898 479.609	1 717.770
P11	-92 308.573	2 898 481.866	1 717.740
P12	-92 319.491	2 898 478.016	1 717.675
P13	-92 317.106	2 898 468.028	1 717.620

FENCE SETTING OUT COORDINATES - Hartebeesthoek94 (WGS84) Lo27		
Name	Y Lo27	X Lo27
F1	-92 353.369	2 898 533.197
F2	-92 332.616	2 898 524.345
F3	-92 299.444	2 898 492.073
F4	-92 292.859	2 898 489.065
F5	-92 297.125	2 898 478.283
F6	-92 306.023	2 898 474.972
F7	-92 365.094	2 898 504.890

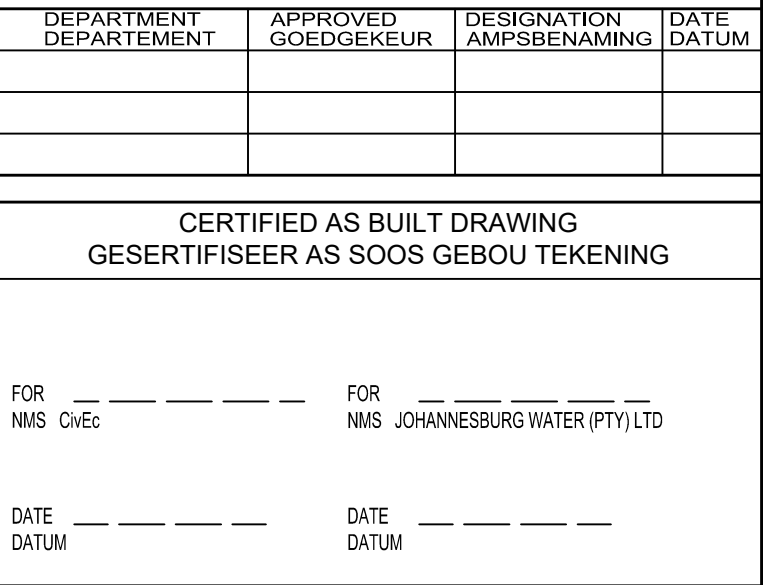
BENCHMARK COORDINATES - Hartbeesthoek94 (WGS84) Lo27			
Name	Y Lo27	X Lo27	Z
P1	-92 561.640	2 898 621.785	1 715.635
P2	-92 624.024	2 898 643.474	1 714.627
RRBM1	-93 220.879	2 898 889.793	1 704.051
RRBM2	-92 878.442	2 898 762.427	1 709.766
RRBM3	-92 367.490	2 898 488.336	1 717.254

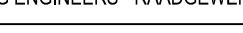






NORTHERN ELEVATION
Scale 1:100

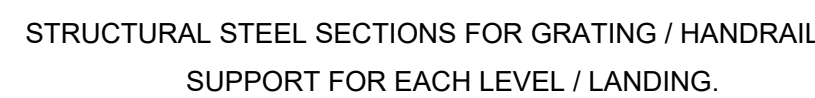
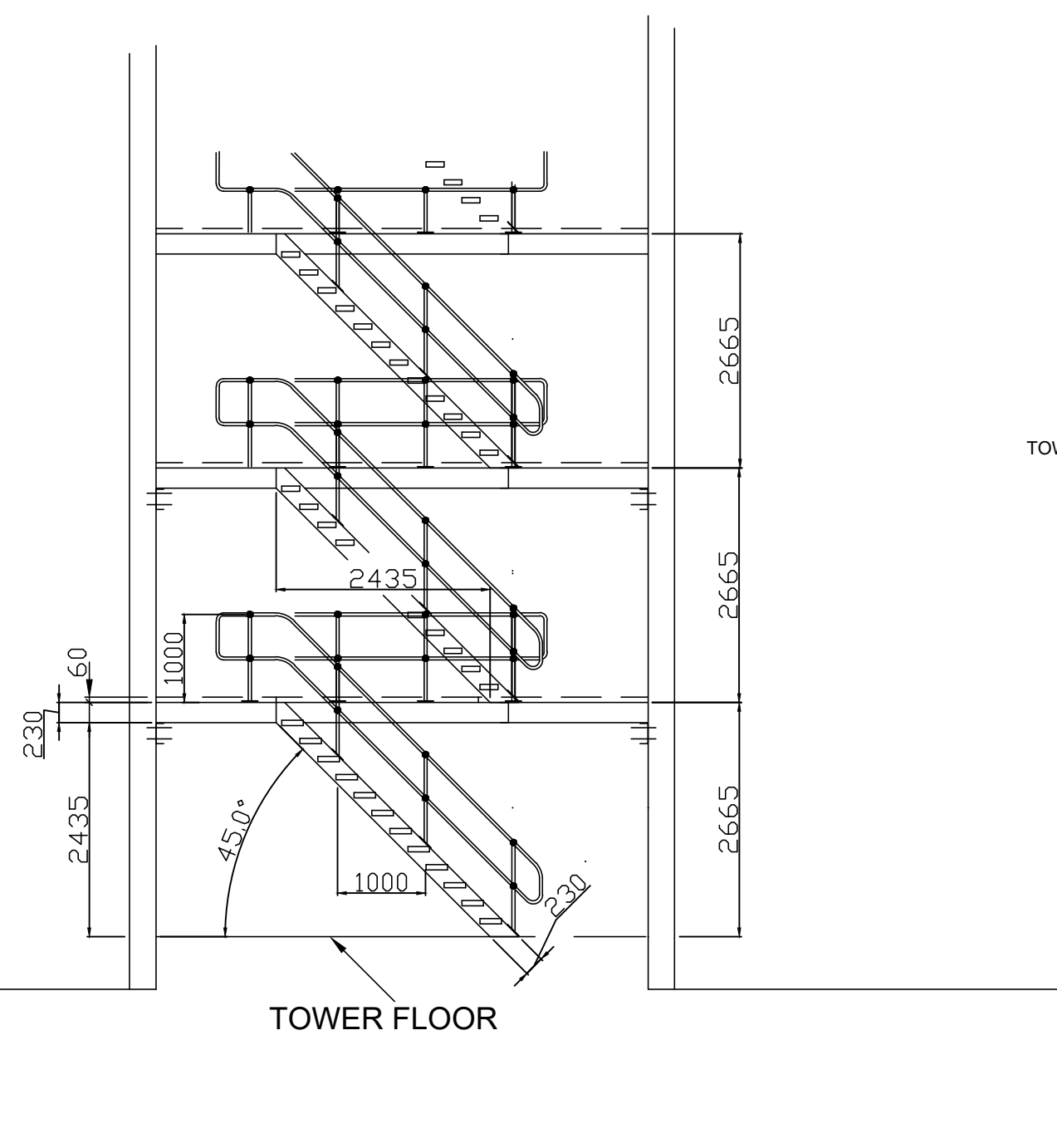


CONSULTING ENGINEERS - RAADGEVEENDE INGENIEURSEN		SURVEYED - ONTWERP	
	MODEERFONTEIN PHONE (011) 608-1004 FAX (011) 608-1003	DESIGNED - ONTWERP DRAWN - GETEKEN	FT
	PRETORIA PHONE (012) 598-5463 FAX (012) 598-3019	CHECKED - NAGESEN SERVICES - OORSEEN	HL
		DENIGINGSNAGESEN	
		GEOTECHNICAL INVESTIGATION GEOTENIESE ONDERSOEK	
		SERVICES SERWITUTE	
PRIVATE DRAWING NO PATENT TEKENING N°		APPROVED GOEDGEKEUR By Eng. No. DATE - DATUM	FT
1440A/WT/DET02RR		800162	

JOHANNESBURG WATER (SOC) LTD	
 Johannesburg Water	16 HARRISON STREET MARSHALLTOWN 2107 TEL: (011) 688-1400 FAX: (011) 688-1529

CITY OF JOHANNESBURG
CONSTRUCTION OF A 2.25MI WATER TOWER IN ROBERTVILLE
WITH ASSOCIATED PIPE AND PUMP WORKS
TOWER SECTION AND ELEVATION

DESIGN MANAGER	SCALE SKAAL	AMENDMENTS - WYSIGINGS		APPROVED GOEDGEKEUR	DATE DATUM	DRAWING NO. TEKENING N ^o .	Revision 
BESTUURDER ONTWERP	AS SHOWN	-	-	-	-	1440a/WT/DET02RR	FILE No LEER N ^o
DATE	DATUM						



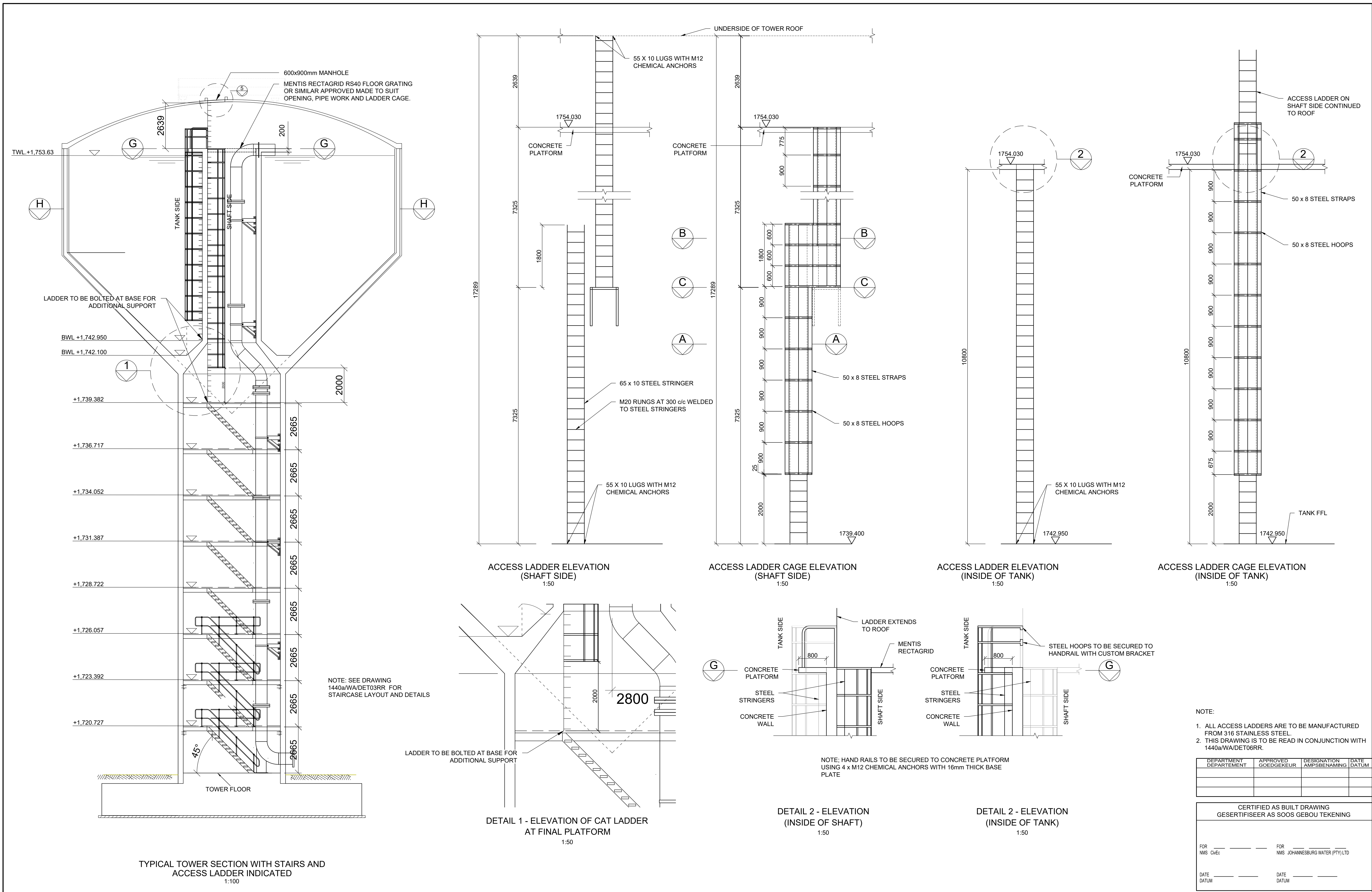
- NOTES:
- 1.) STEEL, GRATING & HANDRAILS TO BE MILD STEEL, HOT DIP GALVANIZED.
 - 2.) FINAL DIMENSIONS TO BE VERIFIED, MEASURED AND CHECKED ON SITE PRIOR TO FABRICATION.
 - 3.) ALL WELDING TO BE IN ACCORDANCE TO SABS STANDARDS.
 - 4.) GRATING, HANDRAIL & STAIRTREADS AS PER MENTIS SALES SPECS.

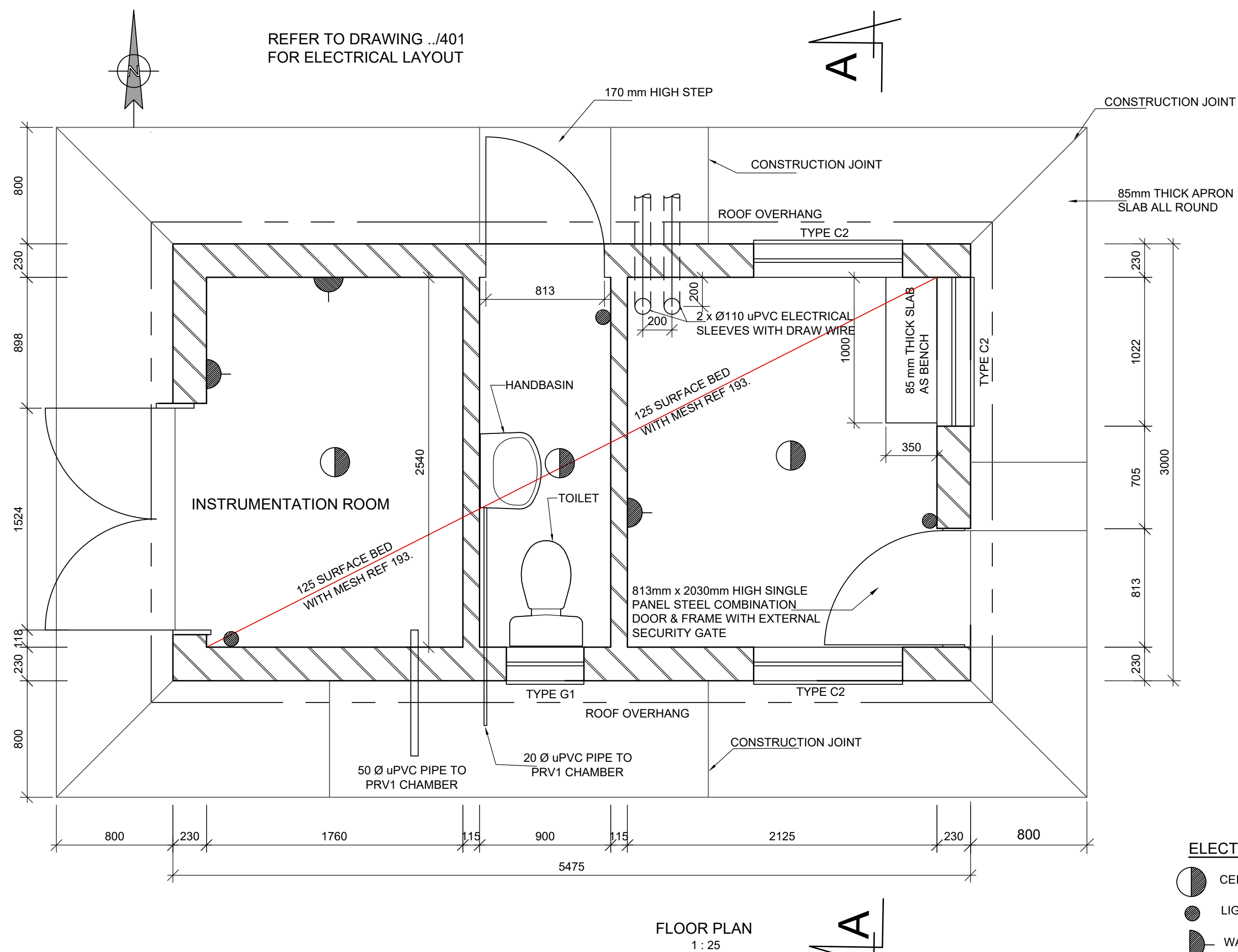
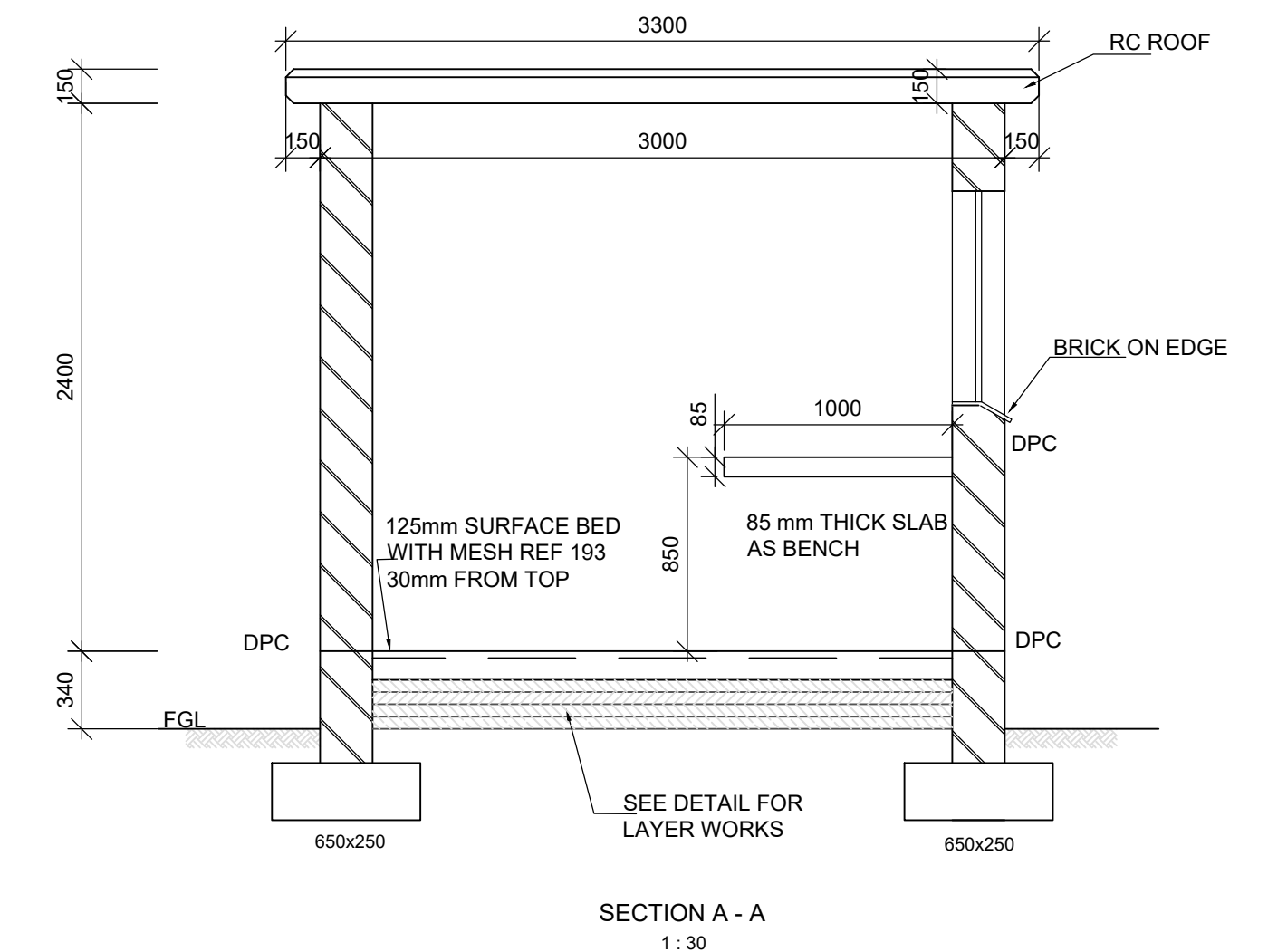
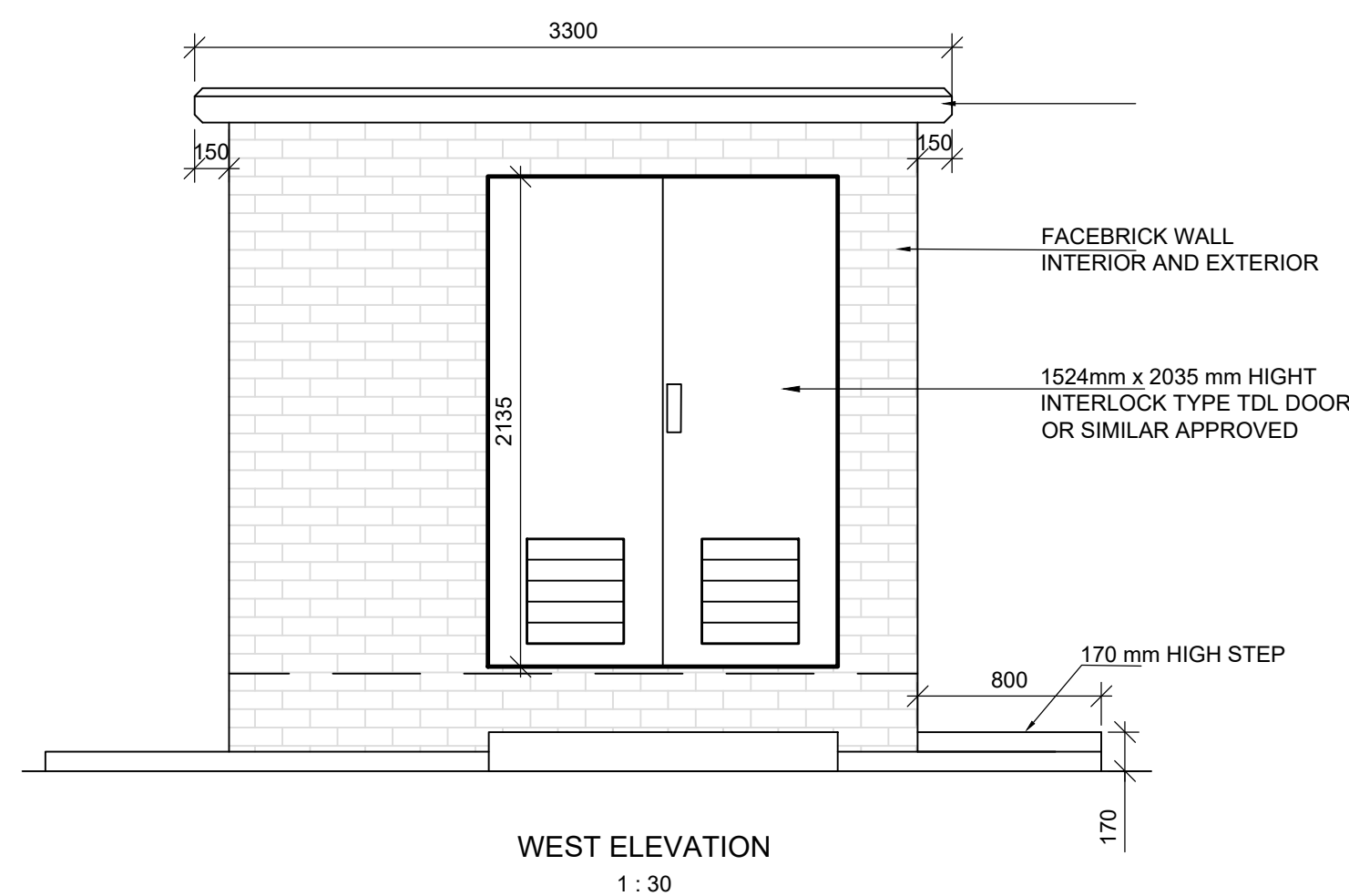
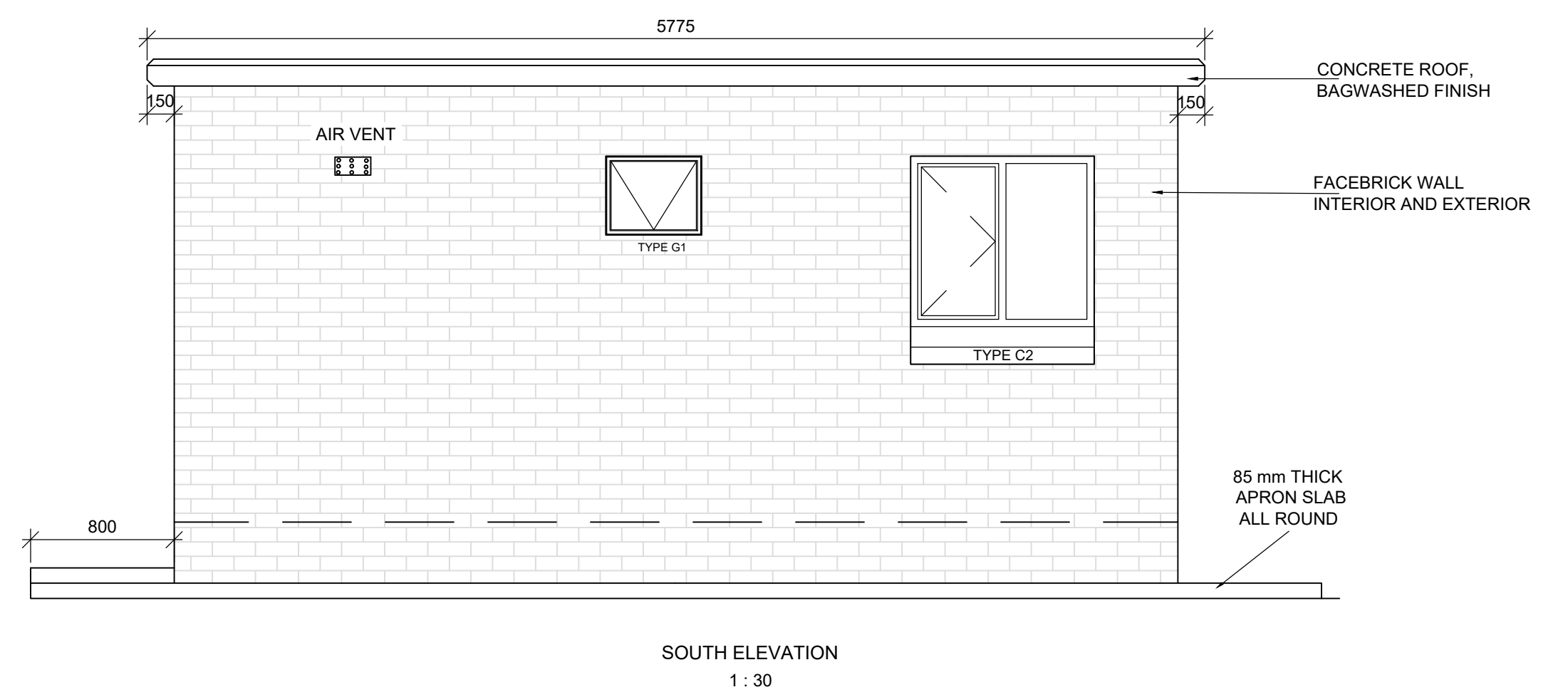
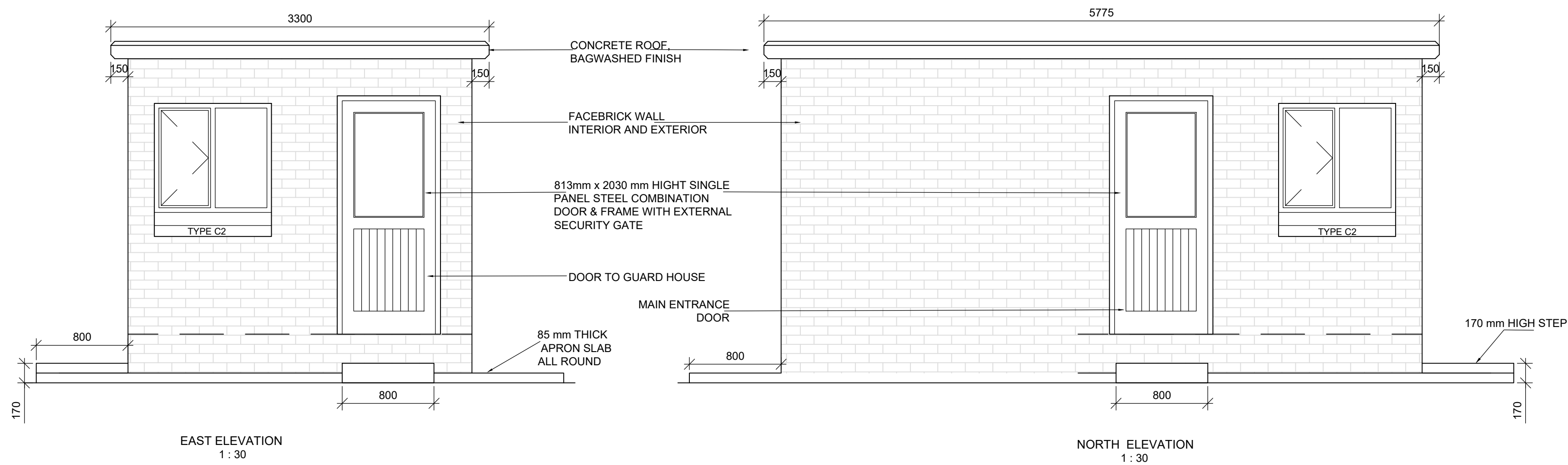
BILL OF QUANTITIES:

TOTAL QTY'S FOR STAIRCASE, QTY'S INCLUDE
STEEL LENGTH, HANDRAIL & GRATING QTY'S.

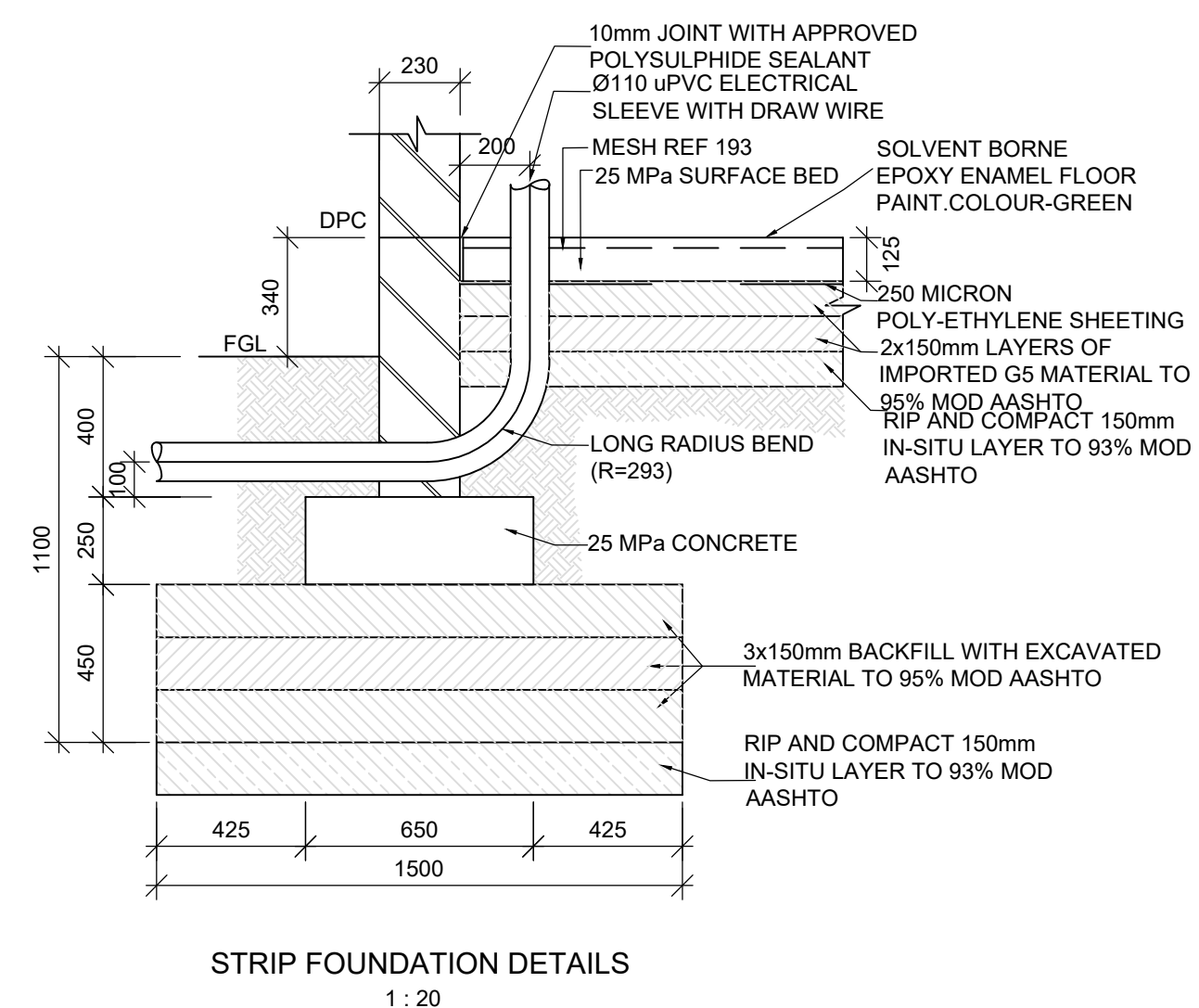
- 1.) STEEL SECTIONS:
 - 1.1.) 230mm x 90mm STEEL CHANNEL: 185m
- 2.) STEEL GRATING:
 - 2.1) RECTAGRID RS40 : 130m²
- 3.) HANDRAILS:
 - 3.1) STANCHIONS:
 - 3.1.1) MT90: 64OFF
 - 3.1.2) MTA45 : 48OFF
 - 3.1.3) ITEM 2M: 32 OFF
 - 3.1.4) ITEM 3: 16 OFF
 - 3.1.5) ITEM 4: 32 OFF
 - 3.1.6) INTERMEDIATE TUBE LENGTH: 230m

CERTIFIED AS BUILT DRAWING GESERTIFISEER AS SOOS GEBOU TEKENING	
FOR _____ NMS CNEC	FOR _____ NMS JOHANNESBURG WATER (PTY) LTD
DATE _____ DATUM _____	DATE _____ DATUM _____

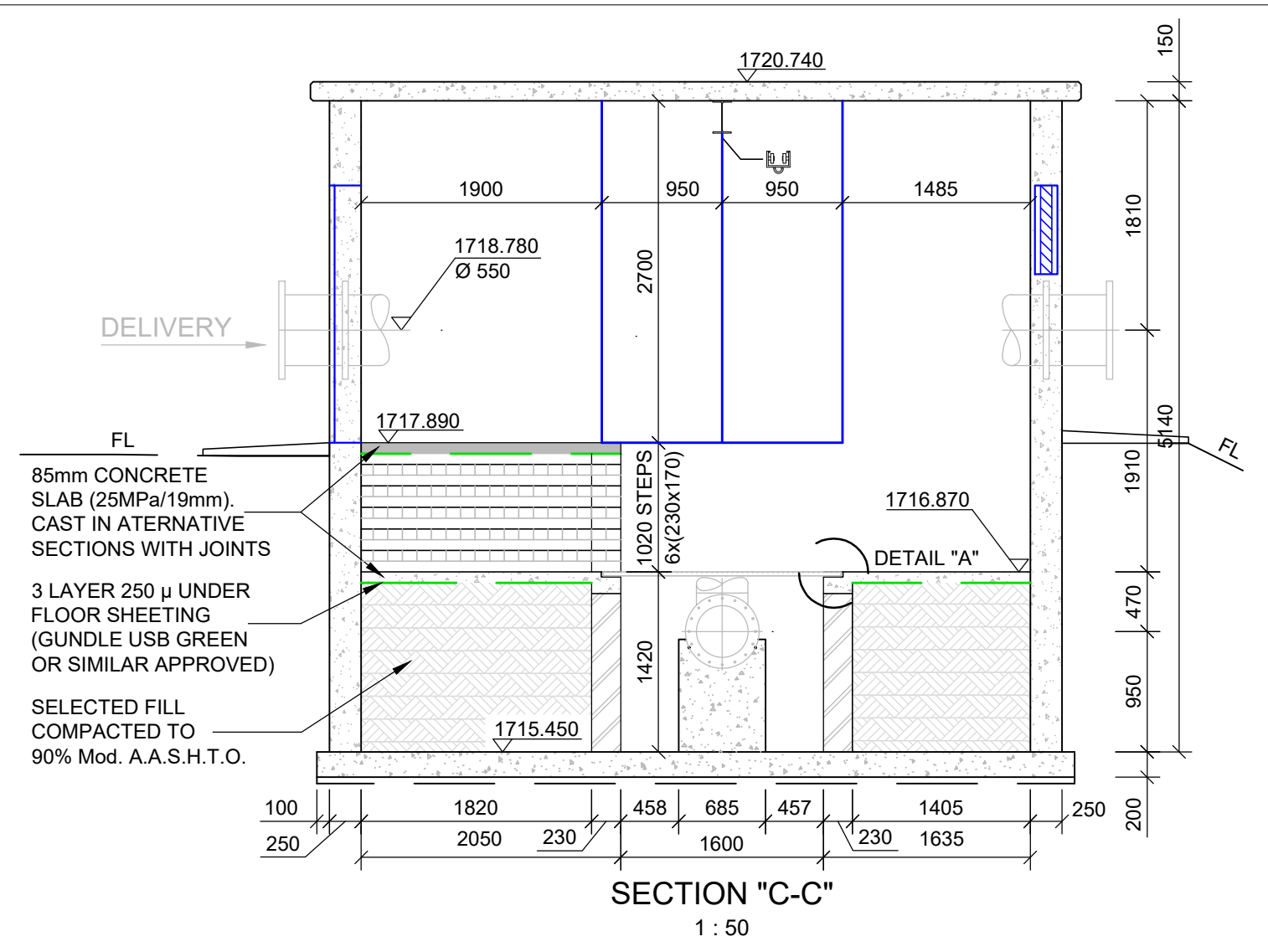
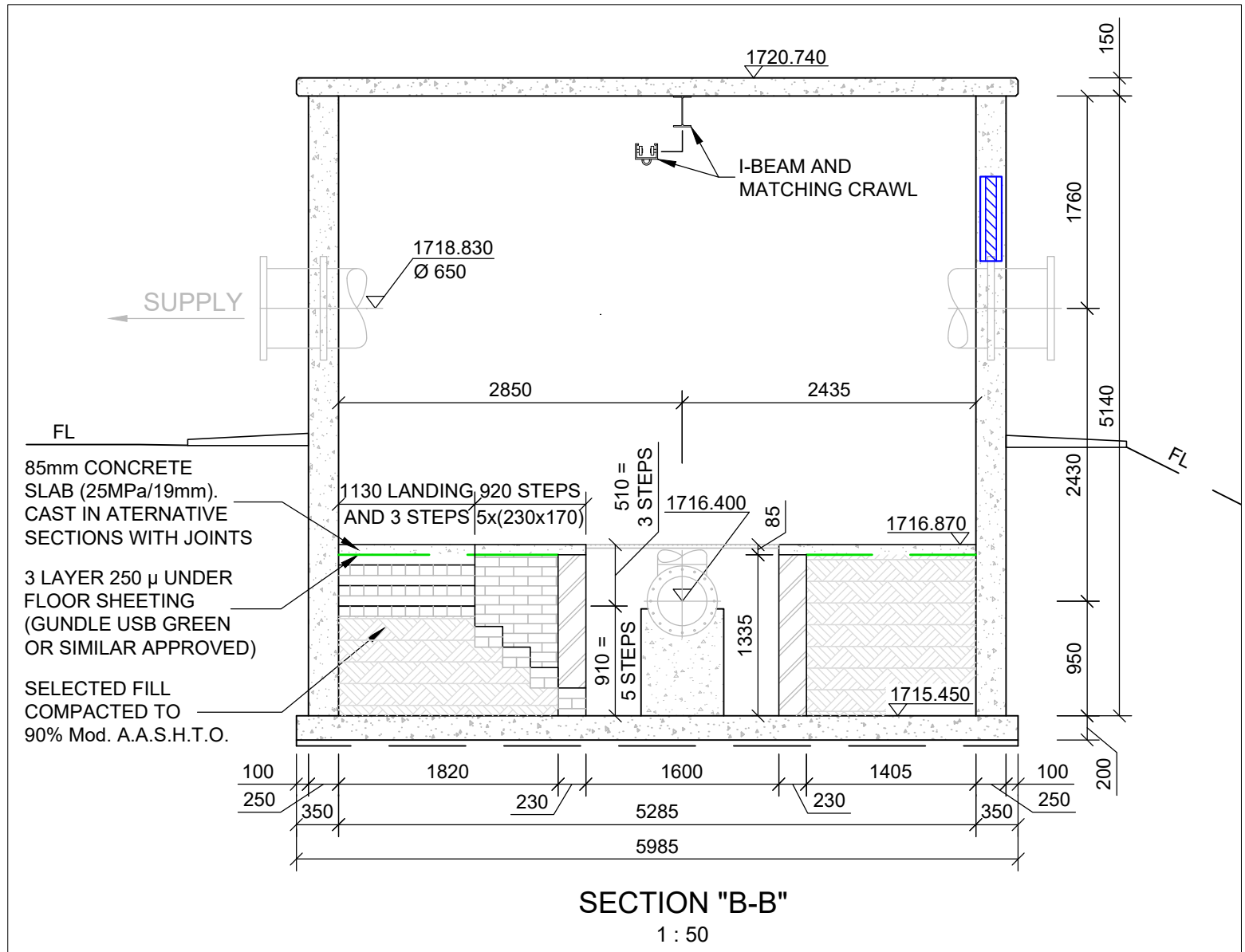
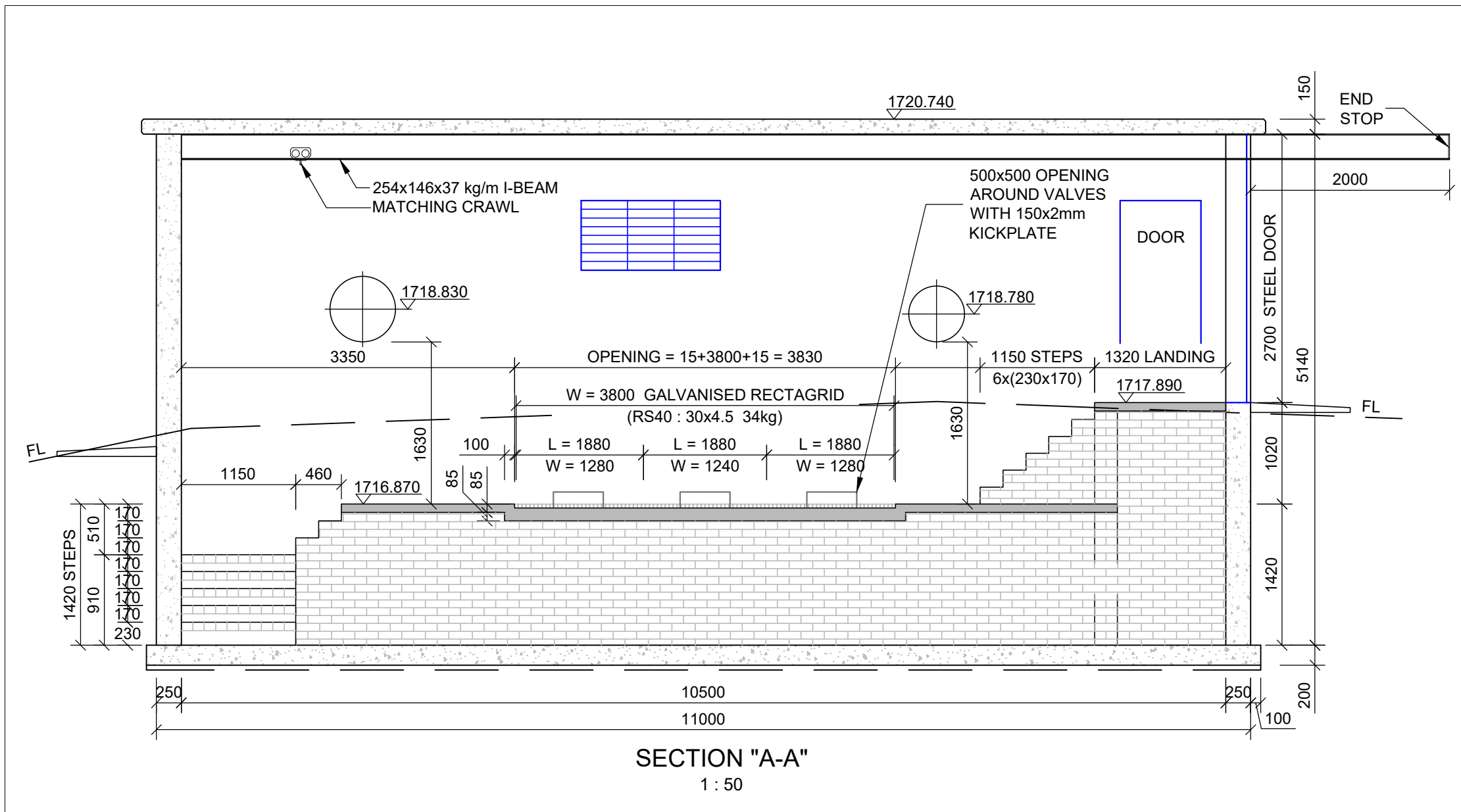
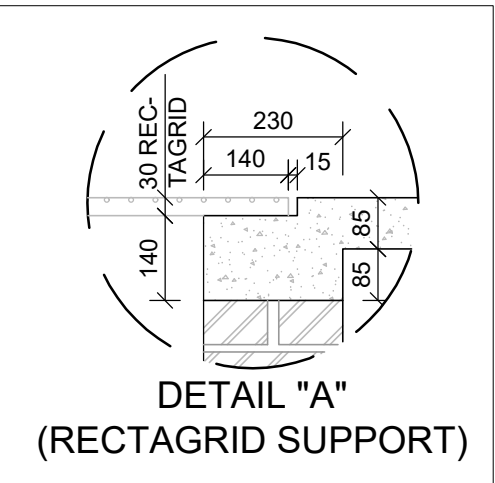
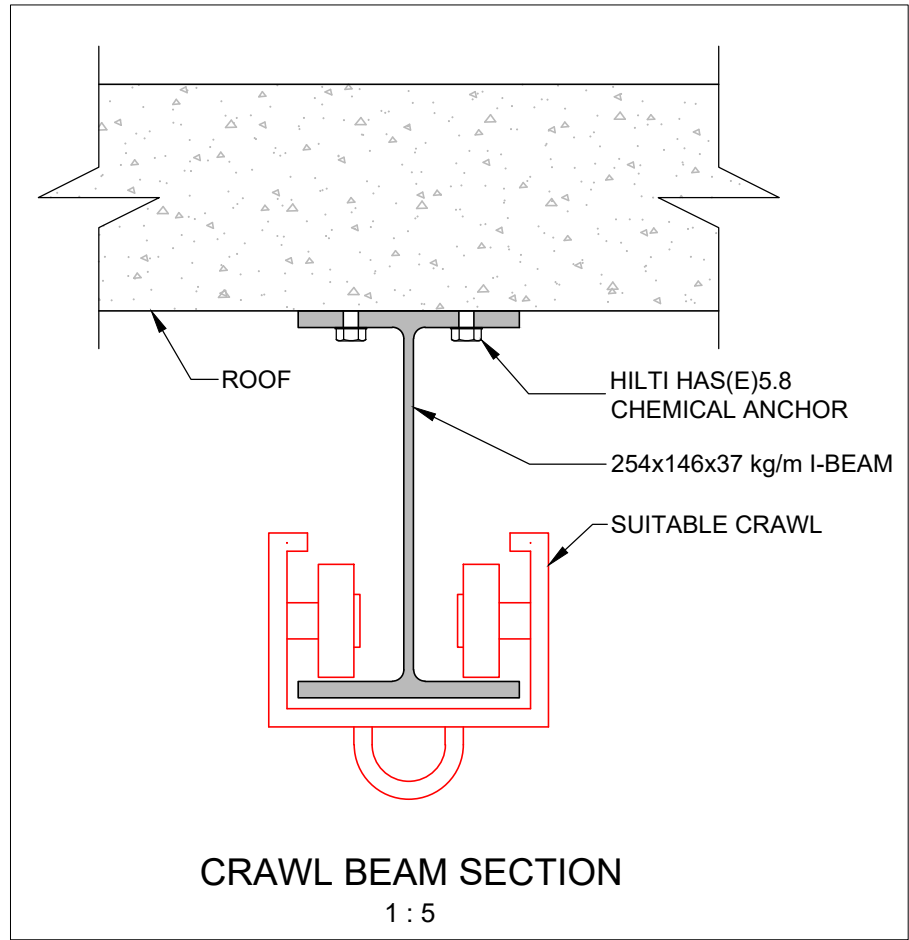
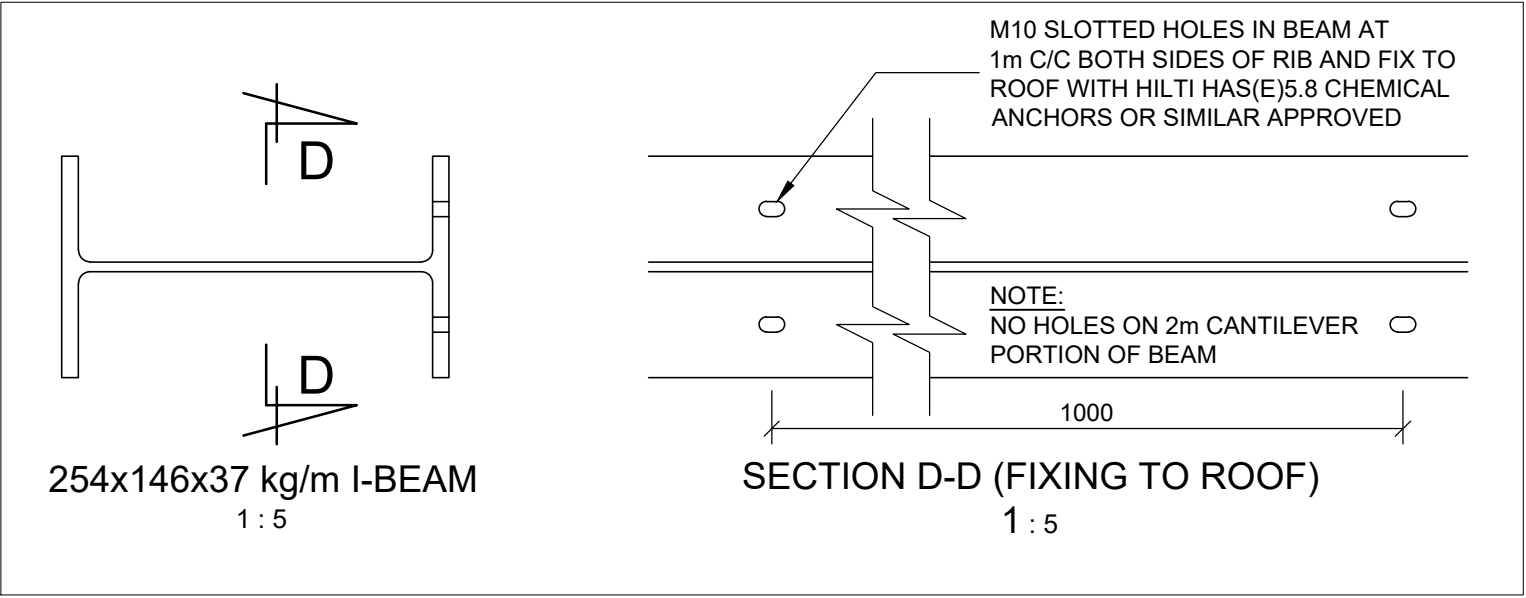
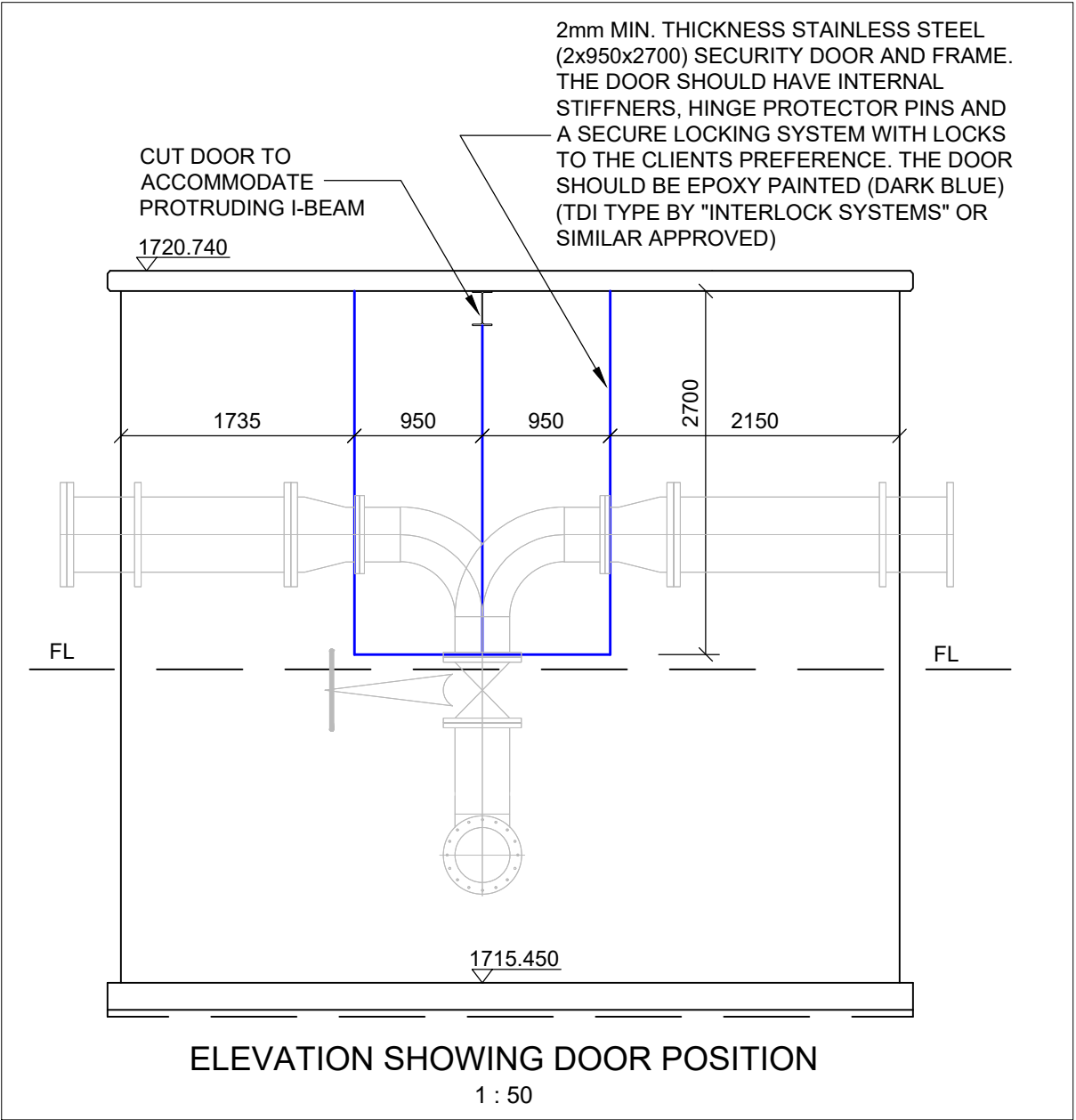




- ELECTRICAL**
- CEILING LIGHT
 - LIGHT SWITCH
 - WALL PLUG



DEPARTMENT	APPROVED	DESIGNATION	DATE
DEPARTEMENT	GOEDGEKEUR	AMPSBENAMING	DATUM
CERTIFIED AS BUILT DRAWING GESERTIFISEER AS SOOS GEBOU TEKENING			
FOR NMS DiEc	FOR NMS JOHANNESBURG WATER (PTY) LTD		
DATE DATUM	DATE DATUM		



- ## NOTES
1. BRICKS ARE TO BE ENGINEERING BRICKS TO SANS 227
 2. BRICKS ARE TO BE ENGINEERED TO THE ENGINEER
 3. BRICKS TO BE WELL WETTED AND BONDED WITH 1 : 3 CEMENT : SAND MORTAR WITH SOLIDLY FILLED JOINTS NOT EXCEEDING 10mm. EXPOSED SURFACES TO BE POINTED AS WORK PROGRESSSES.
 4. ALL BRICKWORK TO BE ENGINEERED BOND AND SEMI-FACE FINISH ON EXPOSED SURFACES.
 5. ALL REINFORCEMENT TO BE APPROVED BY ENGINEER BEFORE ANY CONCRETE SHALL BE CAST.
 6. MIN. CONCRETE COVER 40mm UNLESS SHOWN OTHERWISE.
 7. ALL CONCRETE SHALL BE 25 MPa/19mm UNLESS SHOWN OTHERWISE.
 8. ALL CAST IN SITU CONCRETE MUST BE CURED FOR AT LEAST 24 HOURS BY COVERING WITH POLYETHYLENE SHEETING OR BY SPRAYING THE SURFACE WITH WHITE PIGMENTED CURING COMPOUND ACCORDING TO MAASTHO M145 AT A RATE OF 0.3 l/m² WITH A MECHANICAL SPRAYER AFTER SURFACE TEXTURE HAS BEEN APPLIED.
 9. ALL STRUCTURAL STEELWORK TO BE PAINTED WITH AN APPROVED COLOUR EPOXY-TAR PAINT TO SABS 801 IN ACCORDANCE WITH SANS 1200 H.
 10. ALL STEELWORK TO BE ACCORDING TO SABS 0460.
 11. ALL WELDING TO BE ACCORDING TO SANS 438.
 12. ALL JOINT BOX DETAILS ARE AS FOR MANHOLES WITHOUT 600mm HOLE IN REINFORCED CONCRETE SLAB.

DEPARTMENT DEPARTEMENT	APPROVED GOEDGEKEUR	DESIGNATION AMPSBENAMING	DATE DATUM
CERTIFIED AS BUILT DRAWING GESERTIFISEER AS SOOS GEBOU TEKENING			
FOR _____ NMS C/o: _____	FOR _____ NMS JOHANNESBURG WATER (PTY) LTD		
DATE _____ DATUM _____	DATE _____ DATUM _____		

1. REFER TO ALL RELEVANT DRAWINGS AND SPECIFICATIONS, DO NOT SCALE ANY DIMENSIONS.
2. WHERE DISCREPANCIES OCCUR BETWEEN THE PROJECT DRAWINGS OR SPECIFICATIONS, THESE SHOULD BE REPORTED IMMEDIATELY TO THE EMPLOYER'S AGENT.
3. ALL DIMENSIONS AND LEVELS TO BE CHECKED ON SITE
4. MINIMUM BEARING CAPACITY 100 Mpa

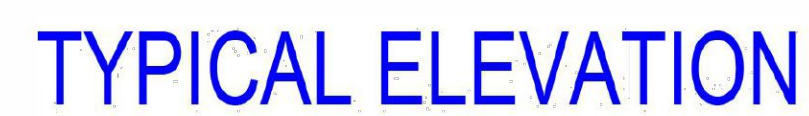
1. EXCAVATIONS FOR FOUNDATIONS TO BE APPROVED BY THE ENGINEER BEFORE CONCRETE IS CAST.
2. ALL FOUNDATIONS TO BE BUILT ON FIRM IN-SITU SOIL (NOT ON FILL).
3. IN-SITU FOUNDATION MATERIAL IS NOT BE COMPACTED.

1.	CONCRETE CHARACTERISTIC 28-DAY STRENGTH:	
	UNLESS OTHERWISE SPECIFIED:	
	FOUNDATIONS.....	30 MPa
	COLUMNS AND WALLS.....	30 / 13 MPa
	SURFACE BEDS.....	30 MPa
	SUSPENDED SLABS.....	30 MPa

- REINFORCEMENT:

1. ALL REINFORCEMENT TO BE CHECKED AND APPROVED BY THE ENGINEER BEFORE CASTING CONCRETE.
2. THE ENGINEER IS TO BE NOTIFIED OF A REINFORCEMENT INSPECTION 24HRS PRIOR.
3. BENDING SCHEDULES AND FIXING DETAILS FOR REINFORCEMENT ARE GIVEN ON SEPARATE SHEETS.
4. MINIMUM COVER TO REINFORCING:

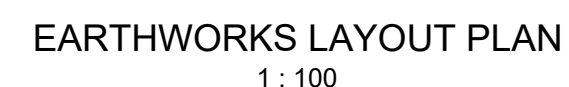
COLUMNS AND SLABS.....	40mm
FOUNDATIONS.....	40mm
WALLS.....	40mm



CERTIFIED AS BUILT DRAWING
GESERTIFISEER AS SOOS GEBOU TEKENING

FOR _____ FOR _____
 NMS ChEc NMS JOHANNESBURG WATER (PTY) LTD

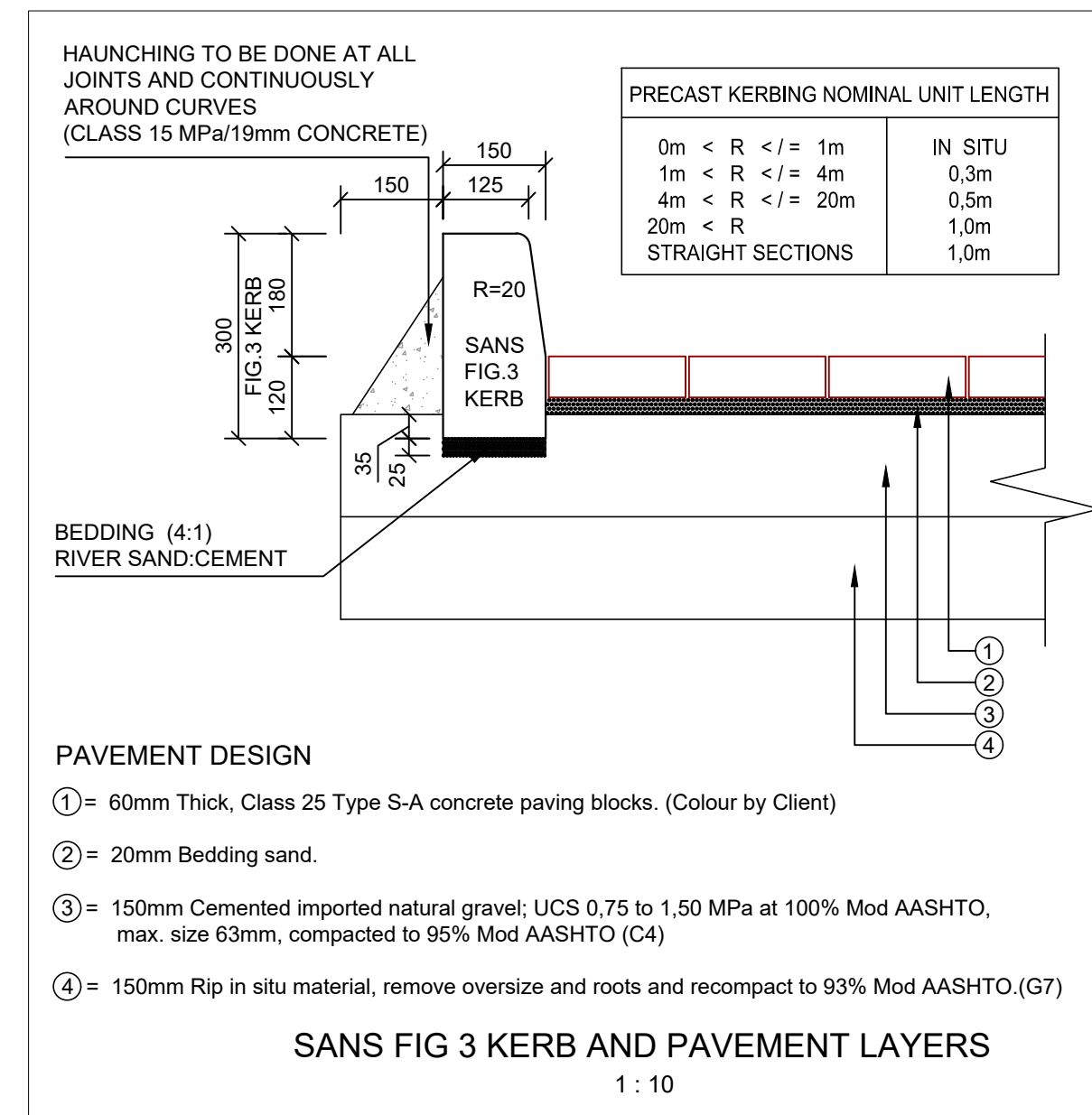
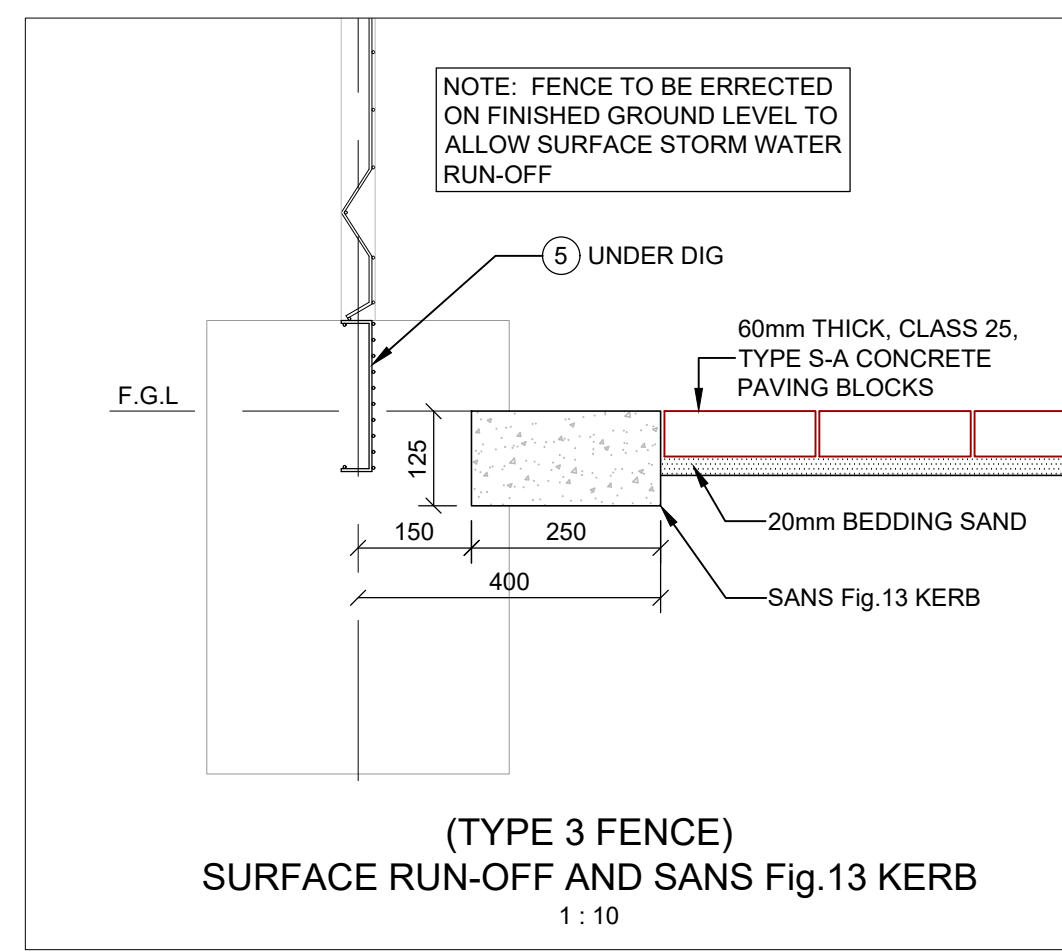
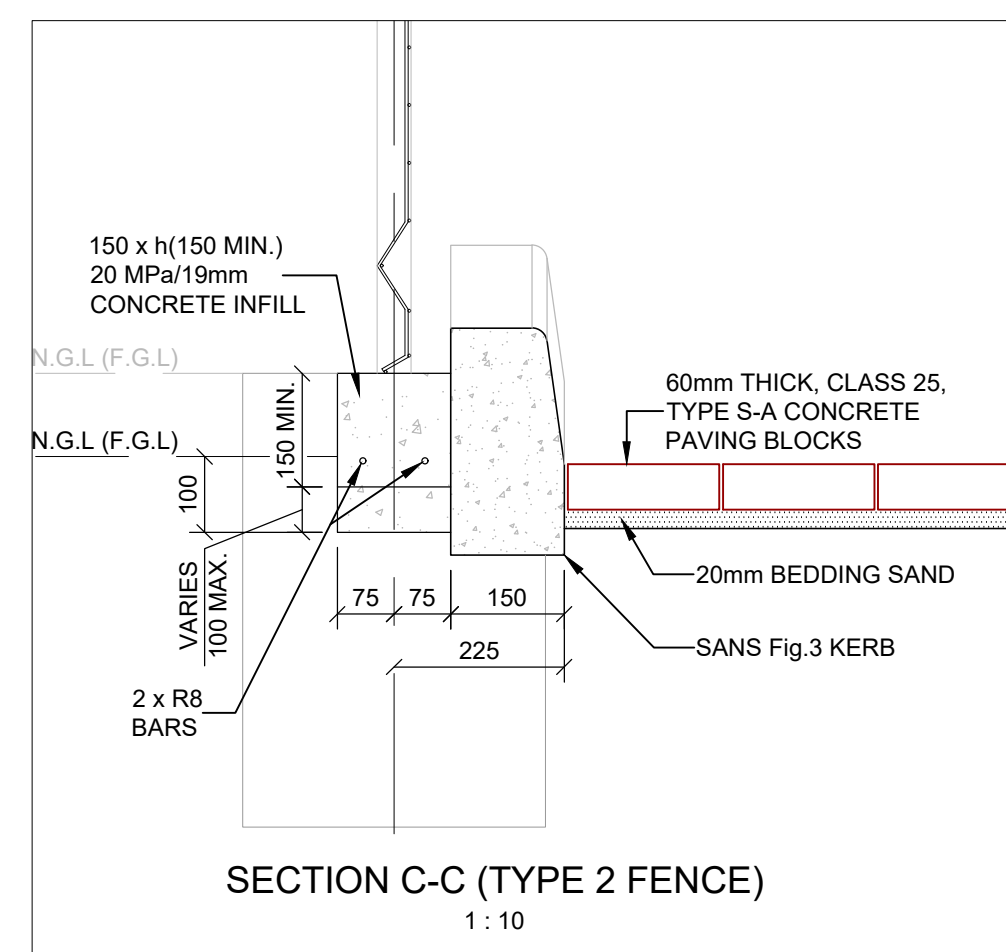
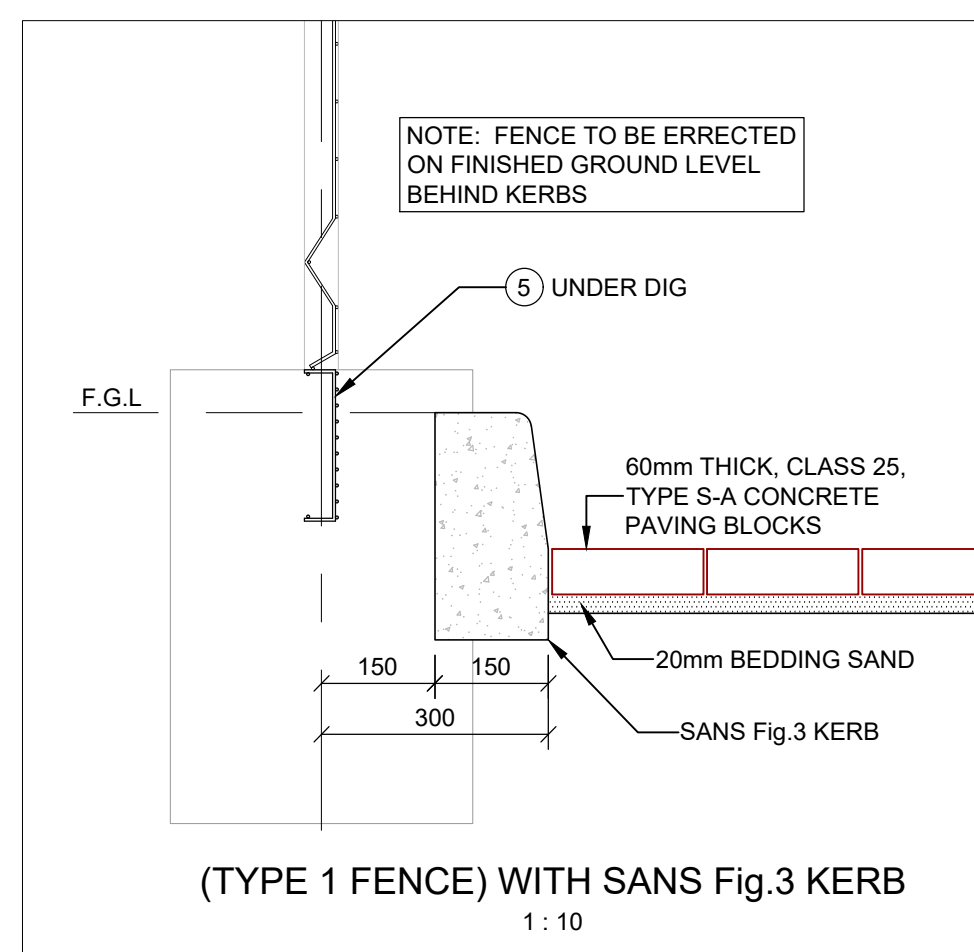
DATE _____ DATE _____
 DATUM _____ DATUM _____



POINT	Y	X	ELEVATION
1	PAVED AREA		
1	-92371.255	2989501.790	1717.277
2	-92373.805	2989504.141	1717.261
3	-92374.627	2989507.519	1717.289
4	-92374.274	2989509.241	1717.355
5	-92379.623	2989512.163	1717.326
6	-92380.664	2989510.803	1717.275
7	-92383.879	2989509.347	1717.192
8	-92387.355	2989508.950	1717.143
9	-92385.657	2989515.633	1717.630
10	-92379.643	2989515.587	1717.342
11	-92373.573	2989508.116	1717.342
12	-92370.232	2989507.821	1717.403
13	-92366.886	2989506.127	1717.465
14	-92365.035	2989505.189	1717.500
15	-92364.132	2989506.974	1717.500
16	-92366.178	2989507.524	1717.465
17	-92369.593	2989505.520	1717.465
18	-92363.230	2989508.175	1717.474
19	-92365.081	2989506.691	1717.630
20	-92371.772	2989513.079	1717.630
21	-92378.462	2989516.468	1717.630
22	-92383.852	2989519.198	1717.800
23	-92381.673	2989523.499	1717.800
24	-92376.074	2989521.702	1717.800
25	-92369.784	2989517.005	1717.854
26	-92367.418	2989516.824	1717.900
27	-92365.617	2989518.370	1717.854
28	-92365.437	2989520.735	1717.900
29	-92366.982	2989522.536	1717.854
30	-92369.348	2989522.716	1717.900
31	-92371.171	2989518.805	1717.900
32	-92371.329	2989518.705	1717.900
33	-92363.093	2989513.616	1717.630
34	-92361.241	2989512.678	1717.417
35	-92359.841	2989515.444	1717.377
36	-92381.692	2989516.381	1717.630
37	-92375.074	2989523.159	1717.900
38	-92360.463	2989528.889	1717.900
39	-92377.074	2989532.579	1717.630
40	-92371.685	2989528.850	1717.630
41	-92364.994	2989526.461	1717.630
42	-92358.303	2989525.072	1717.630
43	-92356.451	2989522.134	1717.280
44	-92355.749	2989525.520	1717.280
45	-92357.568	2989524.525	1717.250
46	-92364.136	2989528.156	1717.212
47	-92370.704	2989533.787	1717.145
48	-92375.995	2989534.711	1717.145

	POINT	Y	X	ELEVATION
	GUARD HOUSE			
G1		-92365.081	28985059.691	1717.400
G2		-92367.757	28985011.046	1717.400
G3		-92365.291	28985015.916	1717.400
G2		-92362.607	2898514.575	1717.400
	OVERFLOW			
L1		-92372.134	2898519.159	1717.400
L2		-92372.174	2898518.457	1717.400
L3		-92376.414	2898519.837	1717.400
L4		-92372.374	2898520.538	1717.400
	VALVE ROOM			
V1		-92376.519	2898520.350	
V2		-92381.679	2898522.964	
V3		-92376.708	2898532.778	
V4		-92371.548	2898530.165	
	CENTRE POINTS			
R1		-92368.363	2898519.177	
R2		-92368.638	2898501.780	
R3		-92384.638	2898515.299	
	FENCE			
F1		-92355.031	2898524.475	
F2		-92354.972	2898504.820	
F3		-92401.420	2898523.280	
F4		-92391.158	2898543.550	
F5		-92361.580	2898527.000	

NOTE: FOR FENCE DETAIL SEE
DRAWING NUMER 1440a/WA/DET10RR

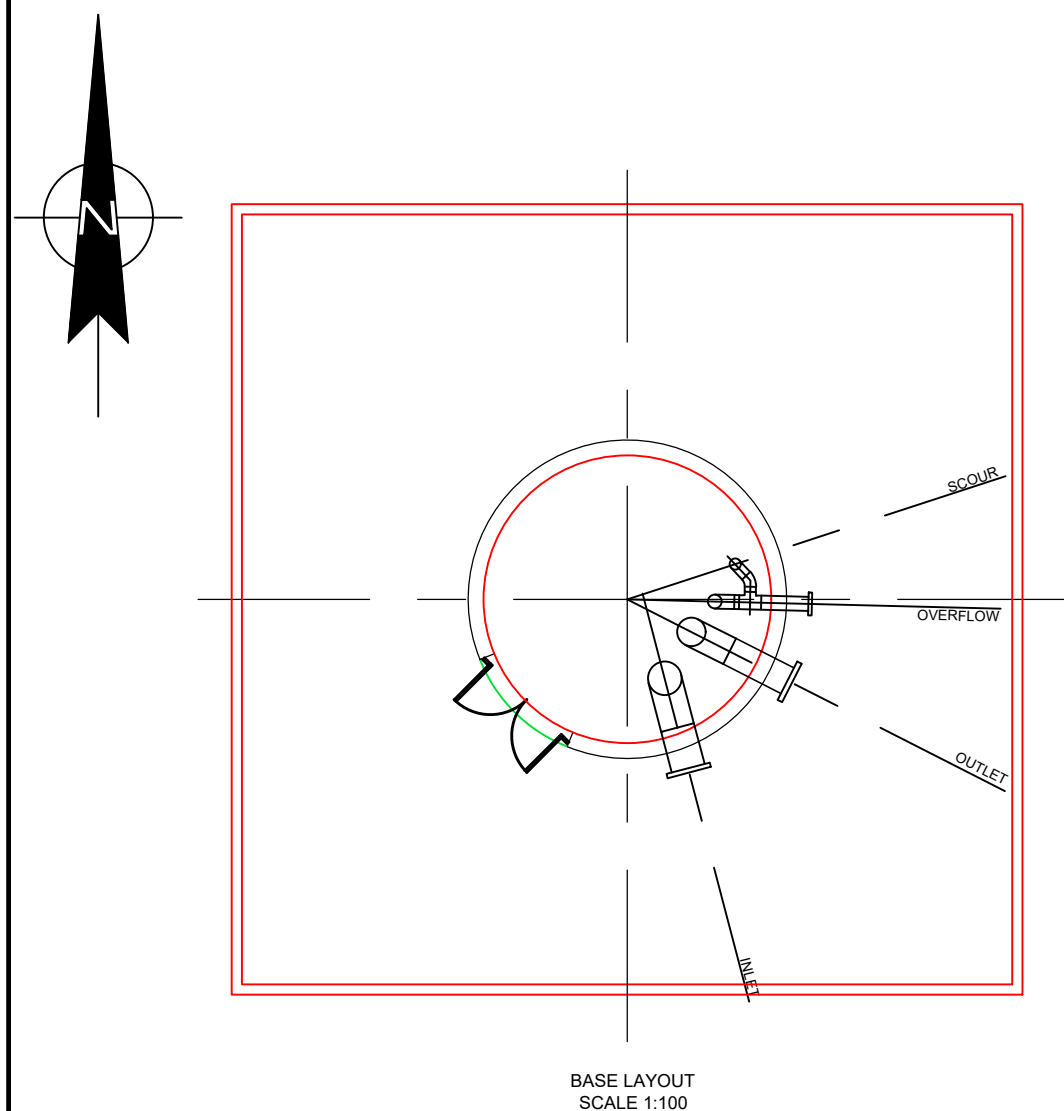


DEPARTMENT DEPARTEMENT	APPROVED GOEDGEKEUR	DESIGNATION AMPSBENAMING	DATE DATUM

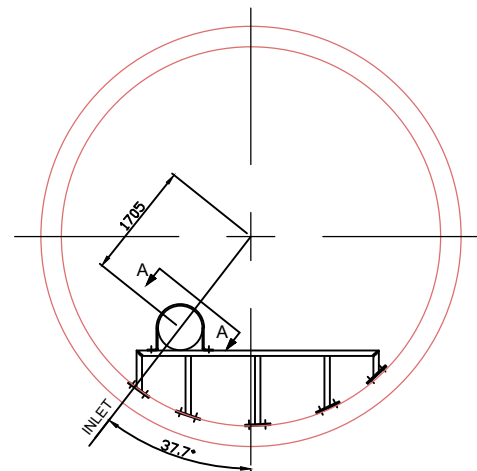
CERTIFIED AS BUILT DRAWING
GESERTIFISEER AS SOOS GEBOU TEKENING

FOR _____ FOR _____
NMS CivEc NMS JOHANNESBURG WATER (PTY) LTD

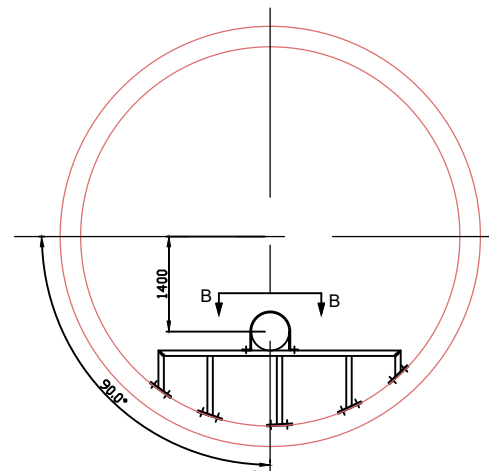
DATE _____ DATE _____
DATUM _____ DATUM _____



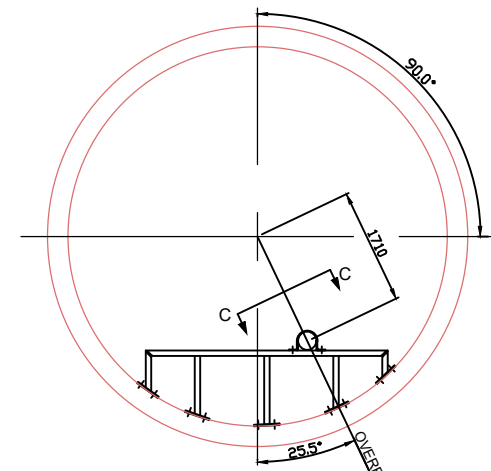
BASE LAYOUT
SCALE 1:100



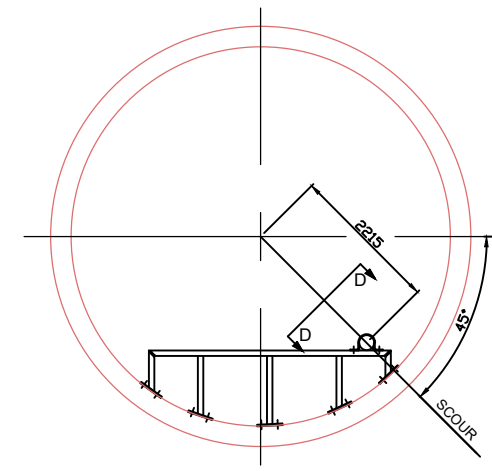
GROUND FLOOR LAYOUT
SCALE 1:85



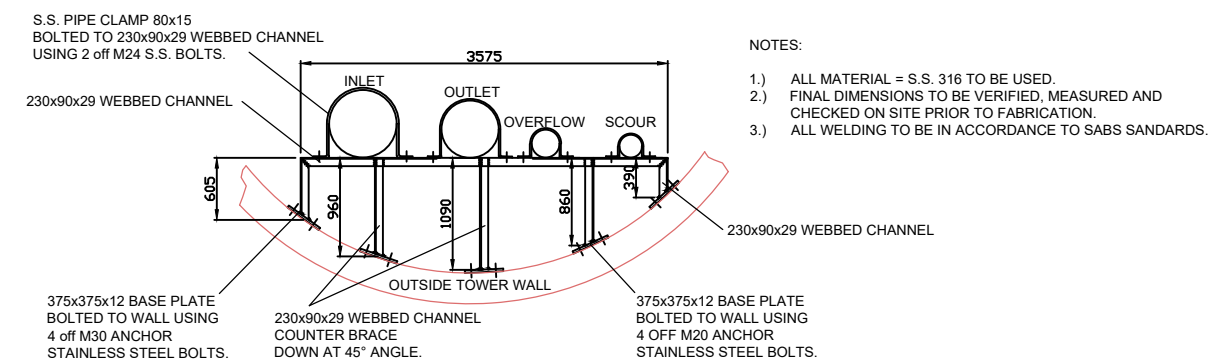
GROUND FLOOR LAYOUT
SCALE 1:85



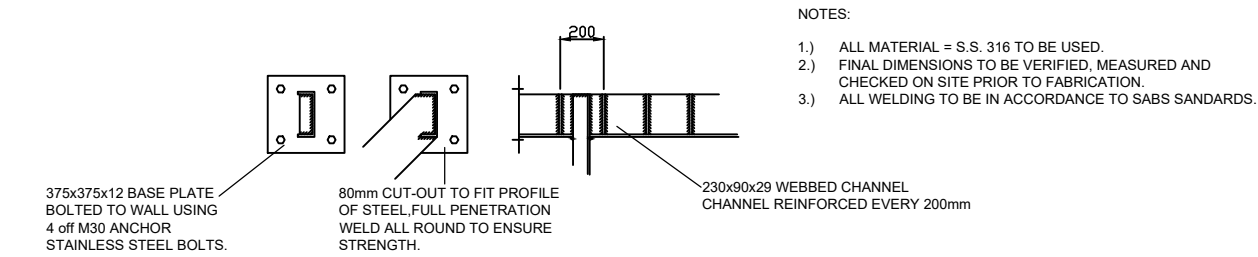
GROUND FLOOR LAYOUT
SCALE 1:85



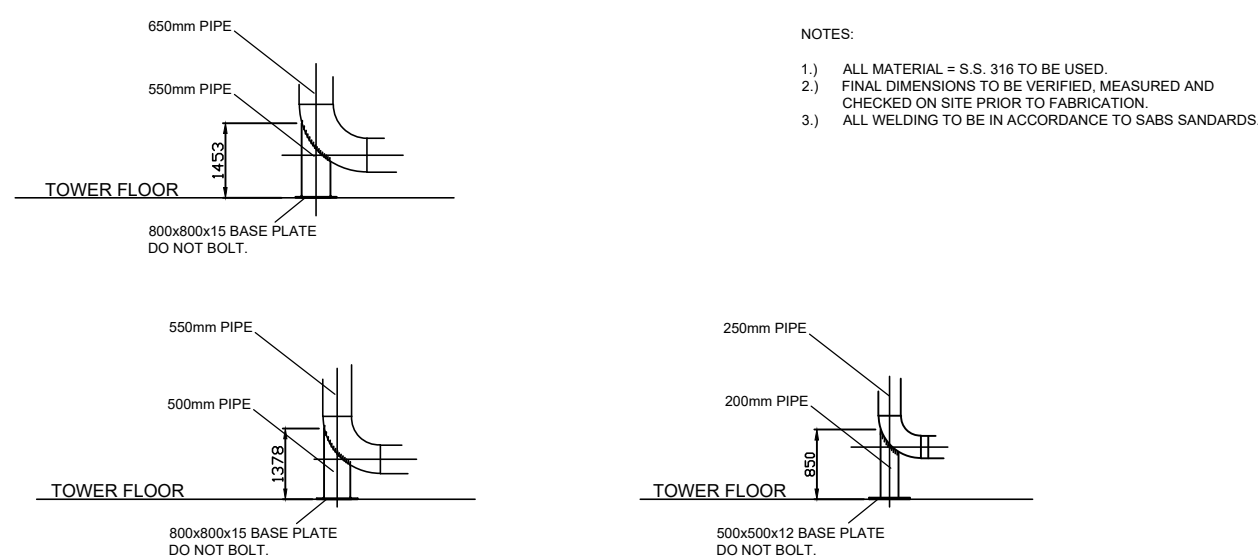
GROUND FLOOR LAYOUT
SCALE 1:85



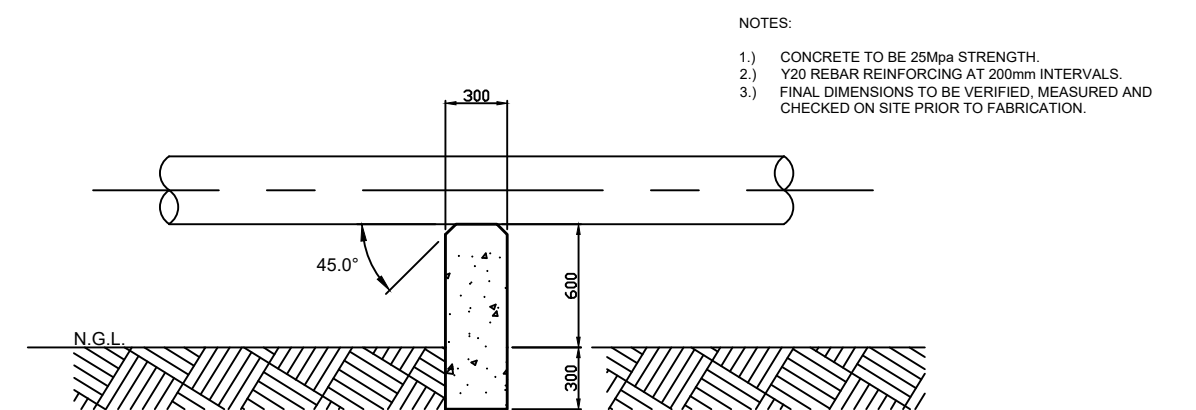
PIPE SUPPORT DETAIL
SCALE 1:50



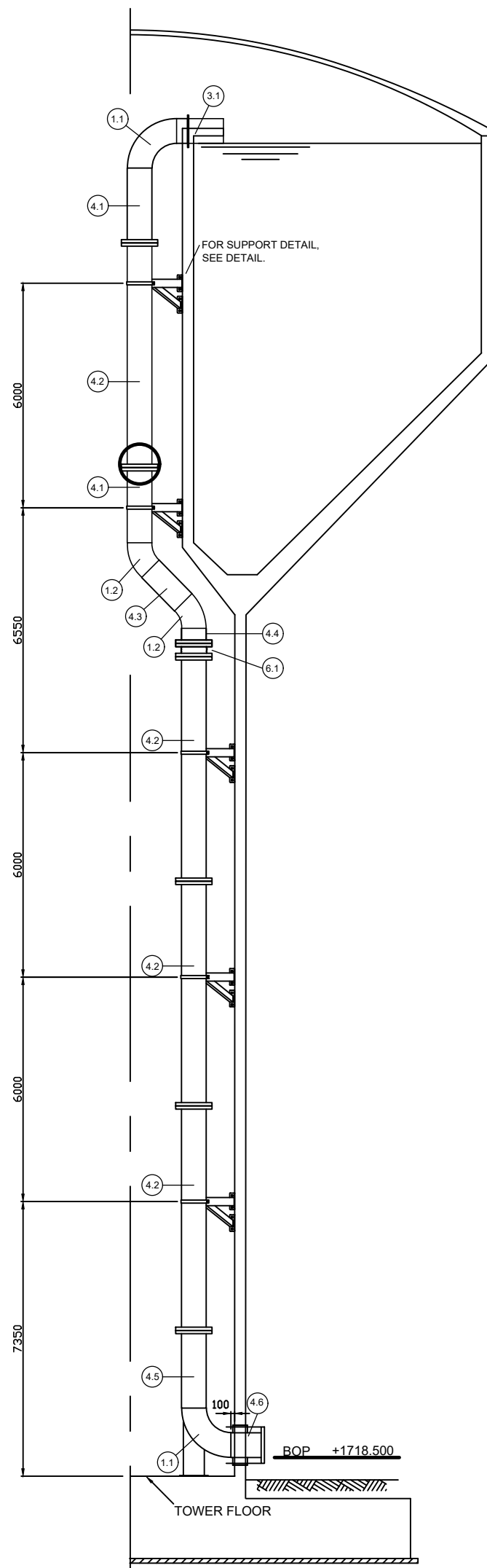
WEBBED REINFORCED CHANNEL
SCALE 1:20



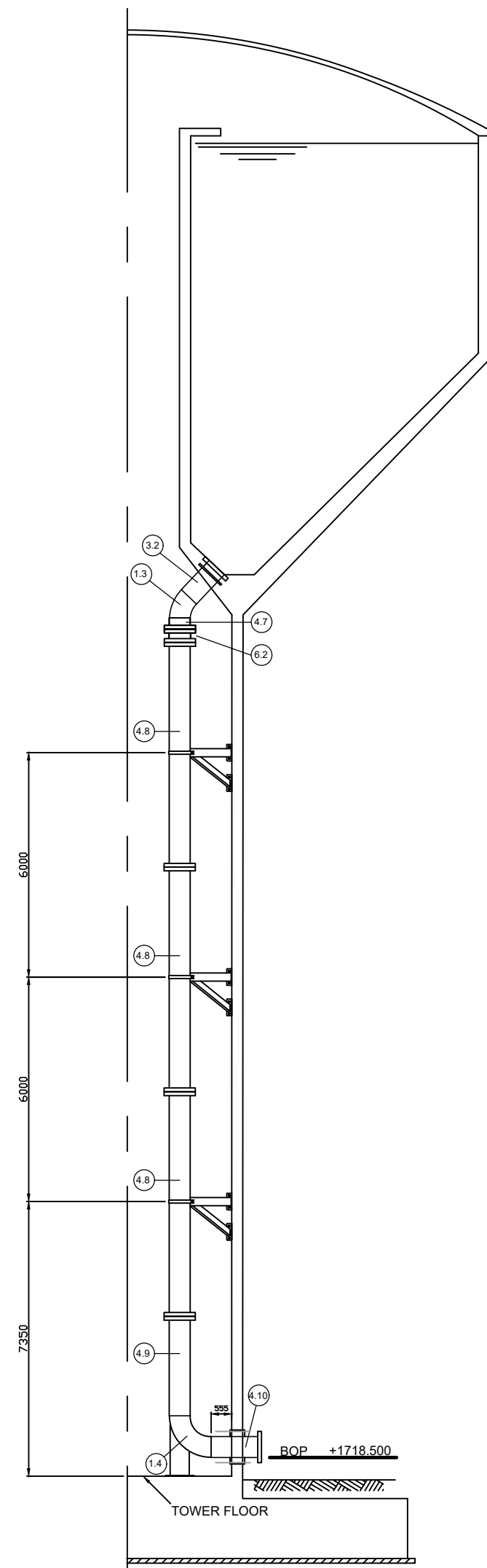
TRUNNION DETAILS
SCALE 1:50



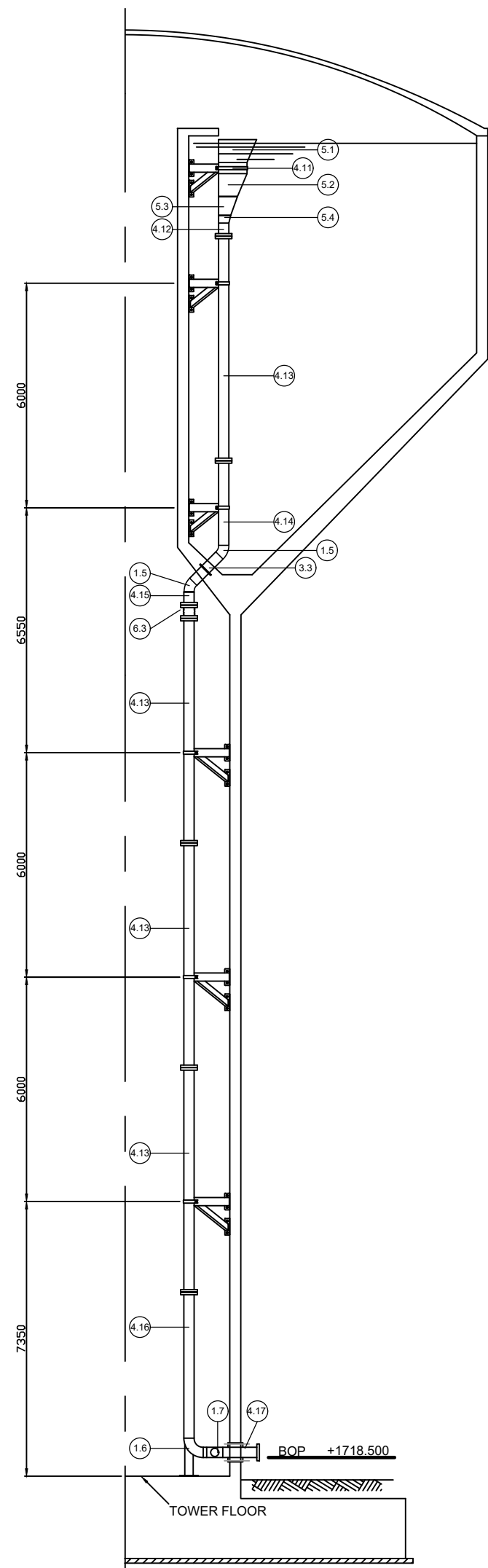
SLEEPER DETAIL
SCALE 1:50



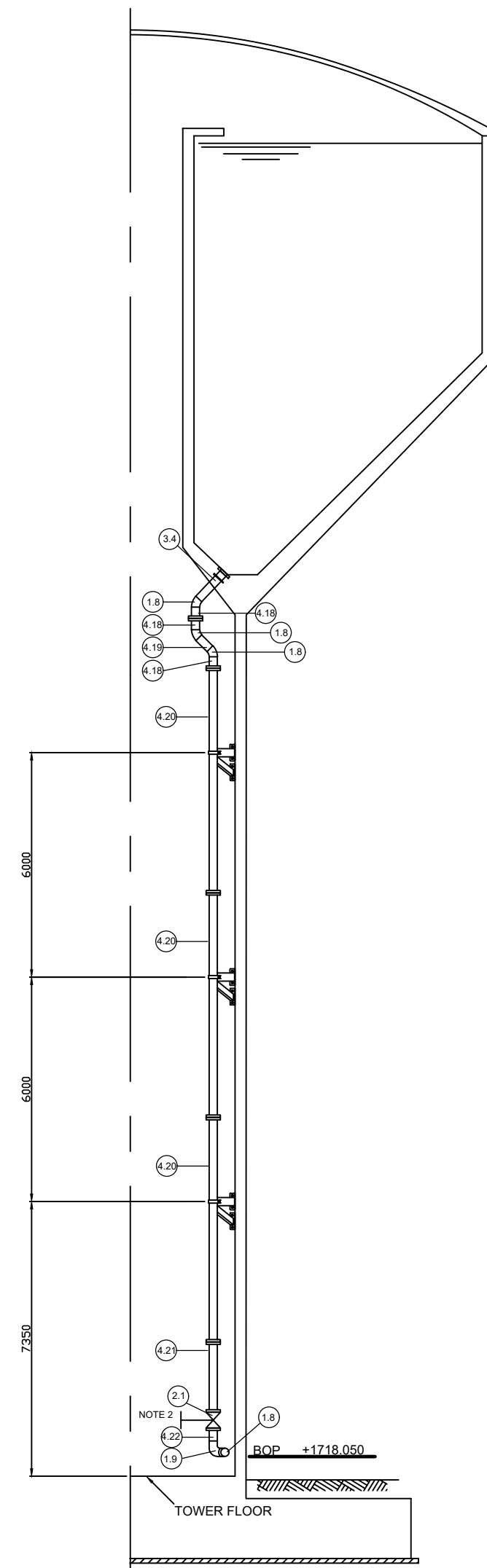
SECTION A - A
650mm INLET
SCALE 1:100



SECTION B - B
550mm OUTLET
SCALE 1:100



SECTION C - C
250mm OVERFLOW
SCALE 1:100



SECTION D - D
200mm SCOUR
SCALE 1:100

DEPARTMENT	APPROVED	DESIGNATION	DATE
DEPARTEMENT	GOEDGEKEUR	AMPSBENAMING	DATUM

CERTIFIED AS BUILT DRAWING
GESERTIFISEER AS SOOS GEBOU TEKENING

FOR NMS ChEc	FOR NMS JOHANNESBURG WATER (PTY) LTD
DATE DATUM	DATE DATUM

CONSULTING ENGINEERS - RAADGEWENDE INGENIEUR
CivEc
Civil Engineering Consultants
PRIVATE DRAWING No
1440aWTPIPE01RR

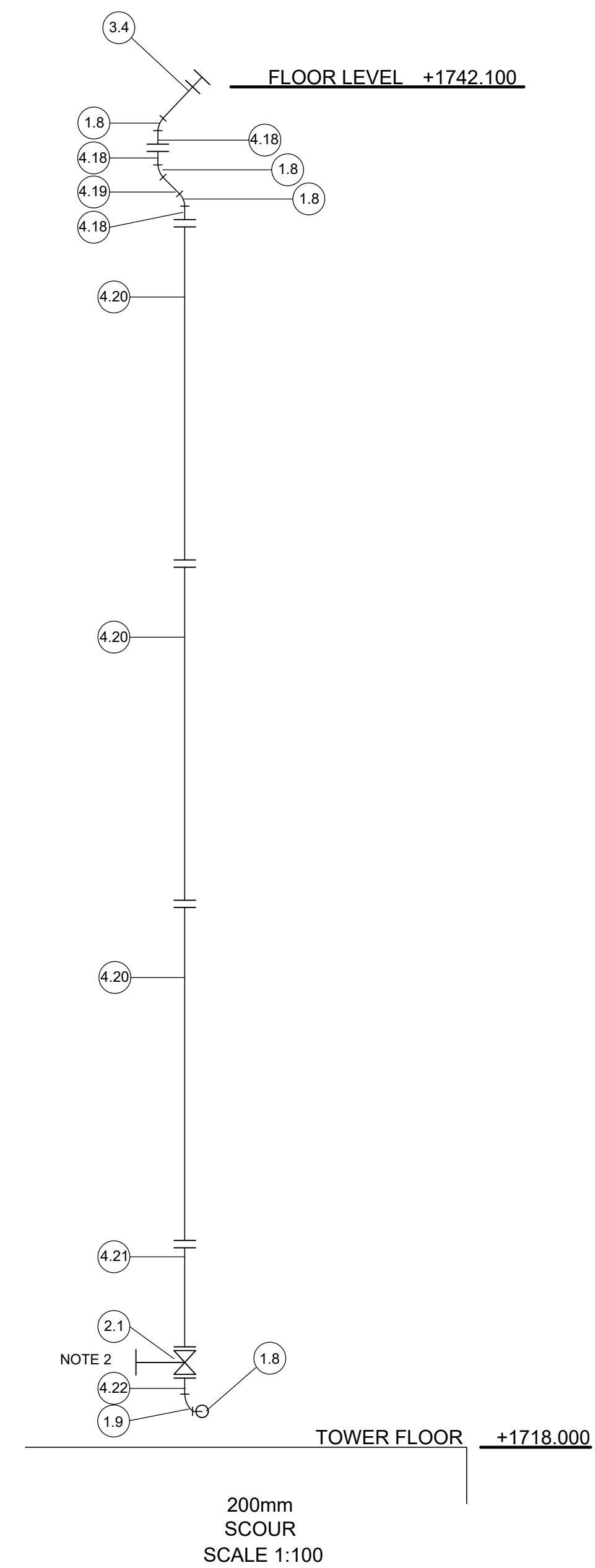
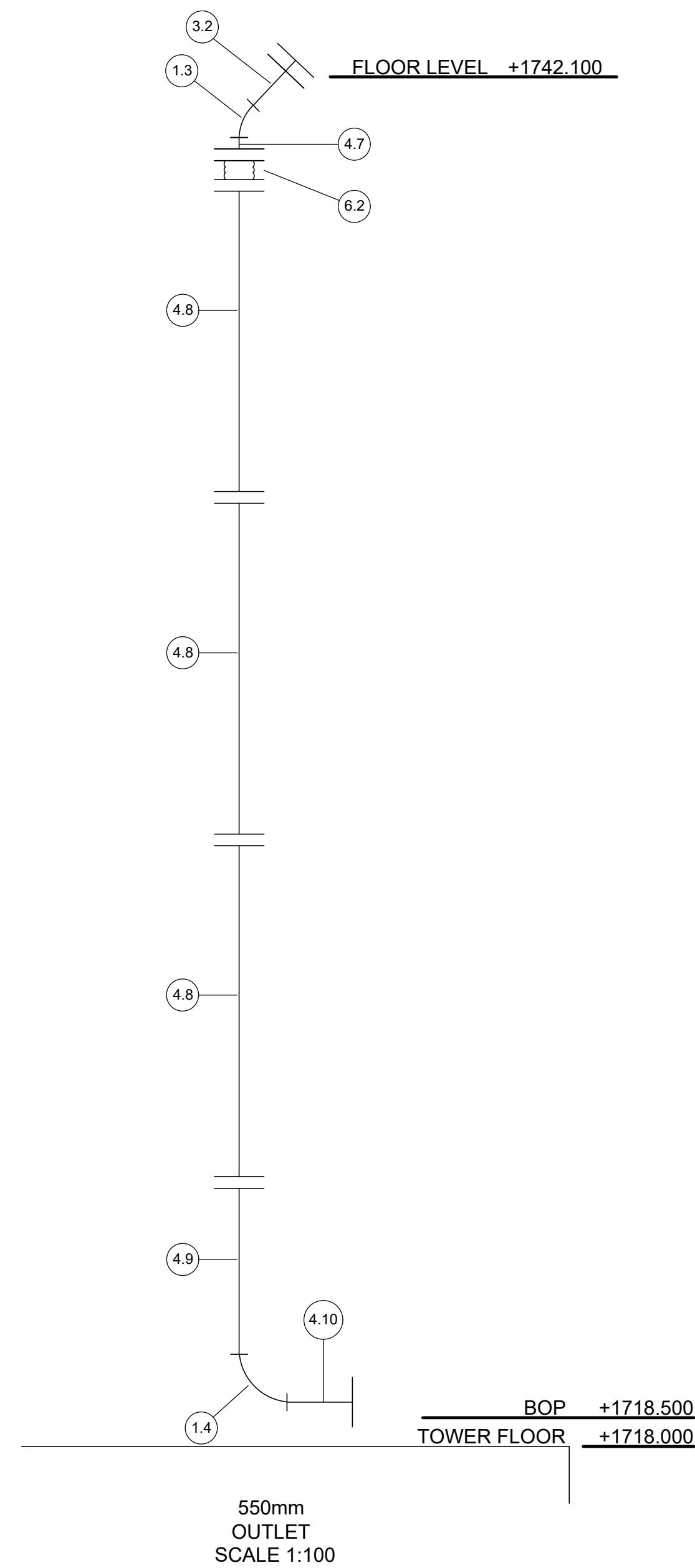
SURVEYED - OPGEMEET	HL
DESIGNED - ONTWERP	JN
DRAWN - GETEKEN	HL
CHECKED - NAGESIEN	
SERVICES CHECKED	
DENSLEIDINGS NAGESIEN	
GEOTECHNICAL INVESTIGATION	
GEOTECHNIESE ONDERSOEK	
SERVICES	
APPROVED	
GOEDGEKEUR	

JOHANNESBURG WATER (PTY) LTD

TRADUNA HOUSE
58 FREDERICK STREET
MARSHALLTOWN
2107
TEL: (011) 688-1400
FAX: (011) 688-1529

CITY OF JOHANNESBURG
CONSTRUCTION OF A 2.25MI WATER TOWER IN ROBERTVILLE
WITH ASSOCIATED PIPE AND PUMP WORKS
TOWER PIPEWORK LAYOUT (Sheet 1 of 4 sheets)

DESIGN MANAGER BESTUURDER ONTWERP	SCALE SKAAL AS SHOWN	AMENDMENTS - WYSIGINGS	APPROVED GOEDGEKEUR	DATE DATUM	DRAWING No. TEKENING N° 1440aWT/PIPE01RR FILE No LEER N°
DATE DATUM					

[illegible]

SCHEDULE OF PIPE SPECIALS FOR ROBERTVILLE WATER TOWERS. 650mm INLET.					
MARK	DIA.	QTY.	MAT.	DESCRIPTION	SKETCH
3.1	650	1	SS Gr 316	PIPE 1255mm LONG PUDDLE FLANGE 305mm FROM LEFT WELD, 870 DIA.	
1.1	650	2	SS Gr 316	90DEG. BEND.	
4.1	650	2	SS Gr 316	PIPE 2000mm LONG. SLIP-ON FLANGE ONE END.	
4.2	650	4	SS Gr 316	PIPE 6000mm LONG. SLIP-ON FLANGE BOTH ENDS.	
4.3	650	1	SS Gr 316	PIPE 1260mm LONG SLIP-ON FLANGE ONE END.	
1.2	650	2	SS Gr 316	45DEG. BEND.	
4.4	650	1	SS Gr 316	PIPE 400mm LONG SLIP-ON FLANGE ONE END.	
4.5	650	1	SS Gr 316	PIPE 2075mm LONG SLIP-ON FLANGE ONE END.	
4.6	650	1	SS Gr 316	PIPE 2520mm LONG SLIP-ON FLANGE ONE END.	
6.1	650	1	SS Gr 316	SS 304 EXPANSION JOINT	

NOTES:

- 1.) FINAL DIMENSIONS TO BE VERIFIED, MEASURED AND CHECKED ON SITE PRIOR TO FABRICATION.
- 2.) HANDWHEEL ORIENTATION TO BE DONE ON SITE TO AVOID CLASH WITH STAIRCASE.
- 3.) FOR ALL FLANGES & VALVE SIZES REFER TO SANS 1123, TABLE:16.
- 4.) ALL EXPANSION JOINTS TO BE SS304 AXIAL BELLOWS C/W MILD STEEL PIPE ENDS WITH 300lbs FLANGES.
- 5.) ALL BENDS TO BE STANDARD LONG RADIUS, MONOLITHIC BENDS.

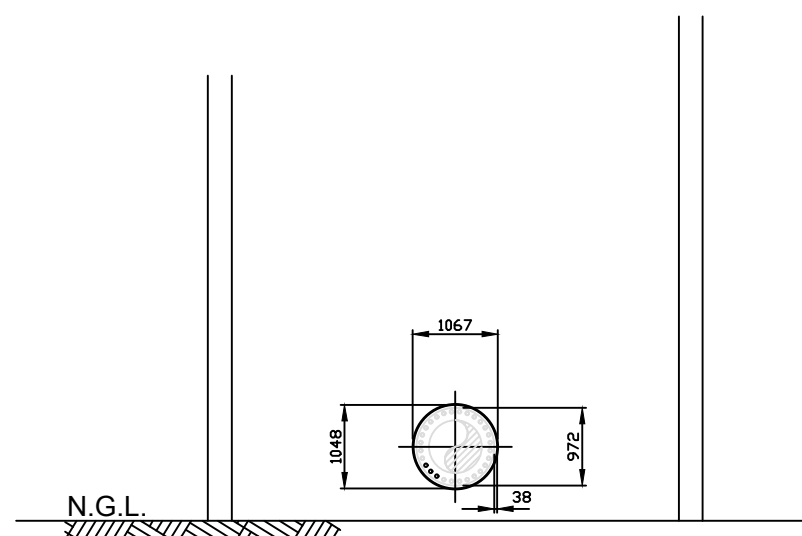
SCHEDULE OF PIPE SPECIALS FOR ROBERTVILLE WATER TOWERS. 550mm OUTLET.					
MARK	DIA.	QTY.	MAT.	DESCRIPTION	SKETCH
3.2	550	1	SS Gr 316	PIPE 1085mm LONG SLIP-ON FLANGE ONE END. PUDDLE FLANGE 825mm FROM LEFT WELD, 800 DIA	
1.3	550	1	SS Gr 316	43.5DEG. BEND.	
4.7	550	1	SS Gr 316	PIPE 300mm LONG SLIP-ON FLANGE ONE END.	
4.8	550	3	SS Gr 316	PIPE 6000mm LONG. SLIP-ON FLANGE BOTH ENDS.	
4.9	550	1	SS Gr 316	PIPE 2660mm LONG SLIP-ON FLANGE ONE END.	
1.4	550	1	SS Gr 316	90DEG. BEND.	
4.10	550	1	SS Gr 316	PIPE 1350mm LONG SLIP-ON FLANGE ONE END.	
6.2	550	1	SS Gr 316	SS 304 EXPANSION JOINT	

SCHEDULE OF PIPE SPECIALS FOR ROBERTVILLE WATER TOWERS. 250mm OVERFLOW.					
MARK	DIA.	QTY.	MAT.	DESCRIPTION	SKETCH
5.1	1000 x 750	1	SS Gr 316	1000mm X 750mm ECCENTRIC REDUCER	
4.11	750	1	SS Gr 316	PIPE 300mm LONG	
5.2	750 x 500	1	SS Gr 316	750mm X 500mm ECCENTRIC REDUCER	
5.3	500 x 300	1	SS Gr 316	500mm X 300mm ECCENTRIC REDUCER	
5.4	300 x 250	1	SS Gr 316	300mm X 250mm ECCENTRIC REDUCER	
4.12	250	1	SS Gr 316	PIPE 350mm LONG SLIP-ON FLANGE ONE END.	
4.13	250	4	SS Gr 316	PIPE 6000mm LONG. SLIP-ON FLANGE BOTH ENDS.	
4.14	250	1	SS Gr 316	PIPE 2260mm LONG SLIP-ON FLANGE ONE END.	
1.5	250	2	SS Gr 316	45DEG. BEND.	
3.3	250	1	SS Gr 316	PIPE 995mm LONG PUDDLE FLANGE 460mm FROM LEFT WELD, 410 DIA.	
4.15	250	1	SS Gr 316	PIPE 350mm LONG SLIP-ON FLANGE ONE END.	
4.16	250	1	SS Gr 316	PIPE 3900mm LONG SLIP-ON FLANGE ONE END.	
1.6	250	1	SS Gr 316	90DEG. BEND.	
1.7	250 x 200	1	SS Gr 316	250 x 200 REDUCING TEE. 100mm PIPE ON 200DIA END. 90mm PIPE ON 250DIA LEFT END.	
4.17	250	1	SS Gr 316	PIPE 980mm LONG SLIP-ON FLANGE ONE END.	
6.3	250	1	SS Gr 316	SS 304 EXPANSION JOINT	

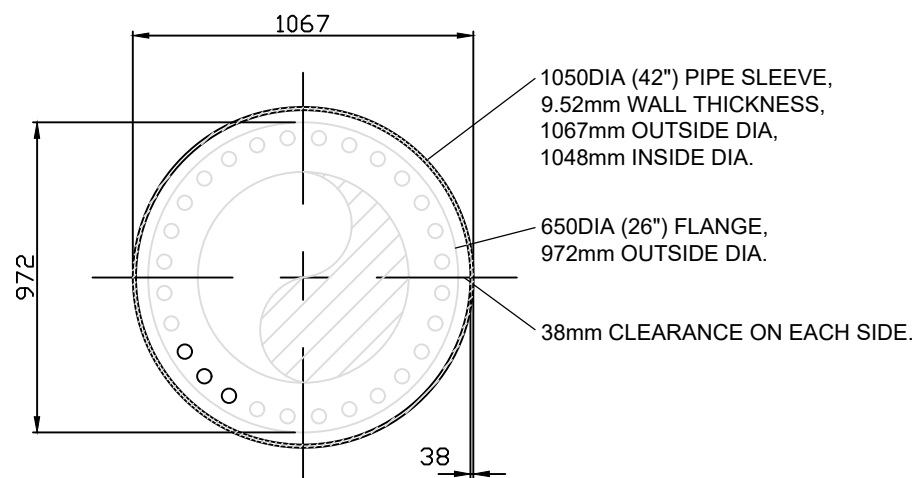
SCHEDULE OF PIPE SPECIALS FOR ROBERTVILLE WATER TOWERS. 200mm SCOUR(DRAIN)					
MARK	DIA.	QTY.	MAT.	DESCRIPTION	SKETCH
3.4	200	1	SS Gr 316	PIPE 1000mm LONG SLIP-ON FLANGE ONE END. PUDDLE FLANGE 765mm FROM BOTTOM WELD, 345 DIA.	
1.8	200	3	SS Gr 316	45DEG. BEND.	
4.18	200	4	SS Gr 316	PIPE 300mm LONG SLIP-ON FLANGE ONE END.	
4.19	200	1	SS Gr 316	PIPE 415mm LONG	
4.20	200	3	SS Gr 316	PIPE 6000mm LONG. SLIP-ON FLANGE BOTH ENDS.	
4.21	200	1	SS Gr 316	PIPE 1875mm LONG SLIP-ON FLANGE BOTH ENDS.	
2.1	200	1	SS Gr 316	TABLE16 GATE VALVE	
4.22	200	1	SS Gr 316	PIPE 350mm LONG SLIP-ON FLANGE ONE END.	
1.9	200	1	SS Gr 316	90DEG. BEND.	

DEPARTMENT	APPROVED	DESIGNATION	DATE
DEPARTEMENT	GOEDGEKEUR	AMPSBENAMING	DATUM

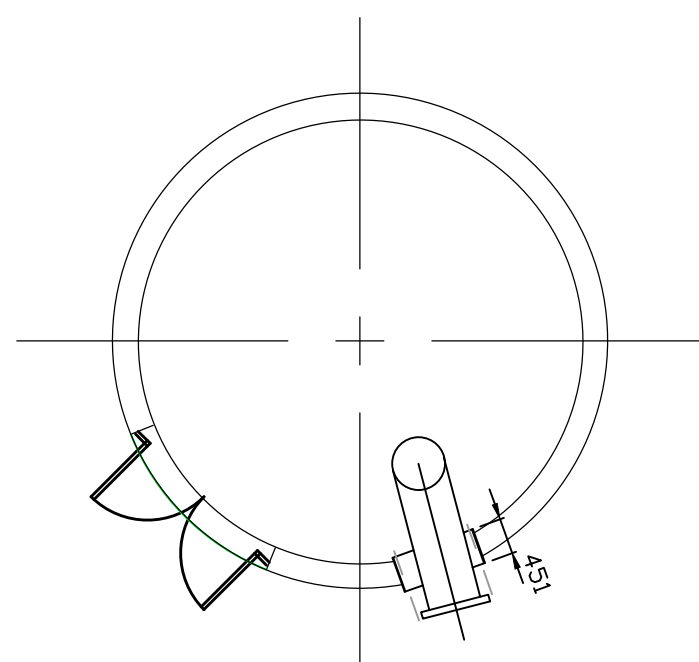
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FOR NMS CnEc	FOR NMS JOHANNESBURG WATER (PTY) LTD
DATE DATUM	DATE DATUM



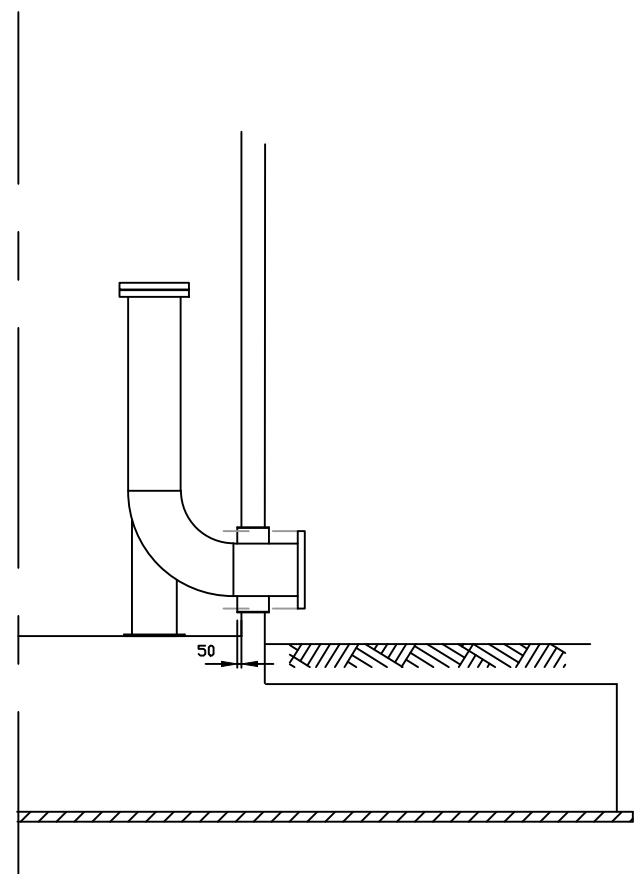
SLEEVE DETAIL FOR
650DIA PIPE
SCALE 1:50



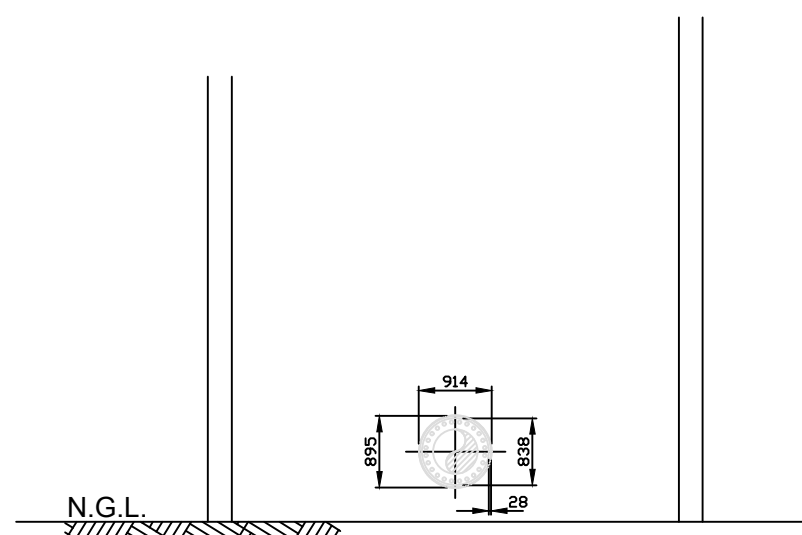
ENLARGED SLEEVE DETAIL
FOR 650DIA PIPE
SCALE 1:25



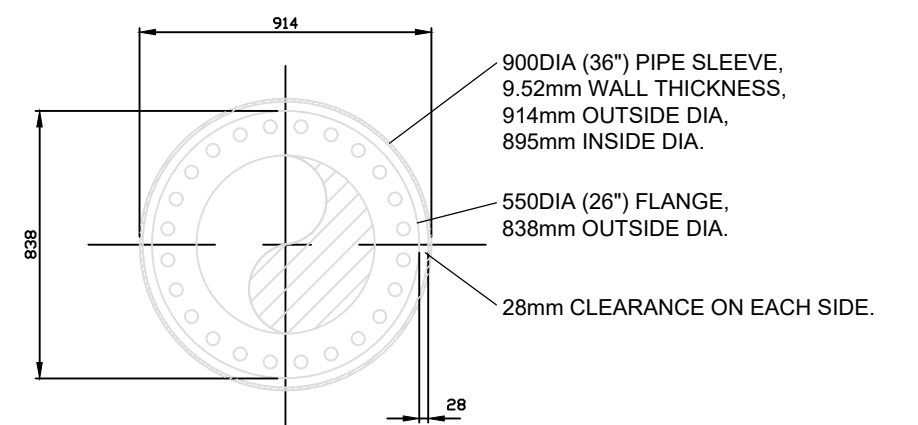
PLAN VIEW OF SLEEVE DETAIL
FOR 650DIA PIPE
SCALE 1:50



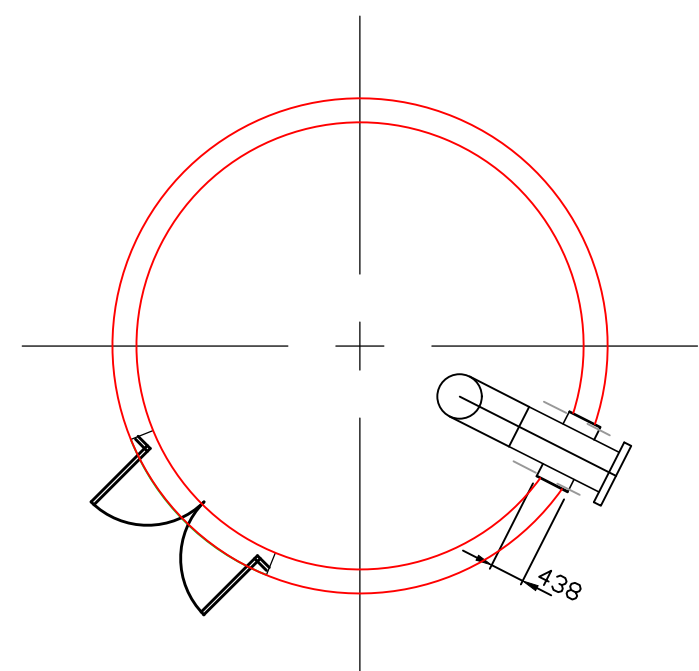
THROUGH WALL DETAIL OF SLEEVE
FOR 650DIA PIPE
SCALE 1:50



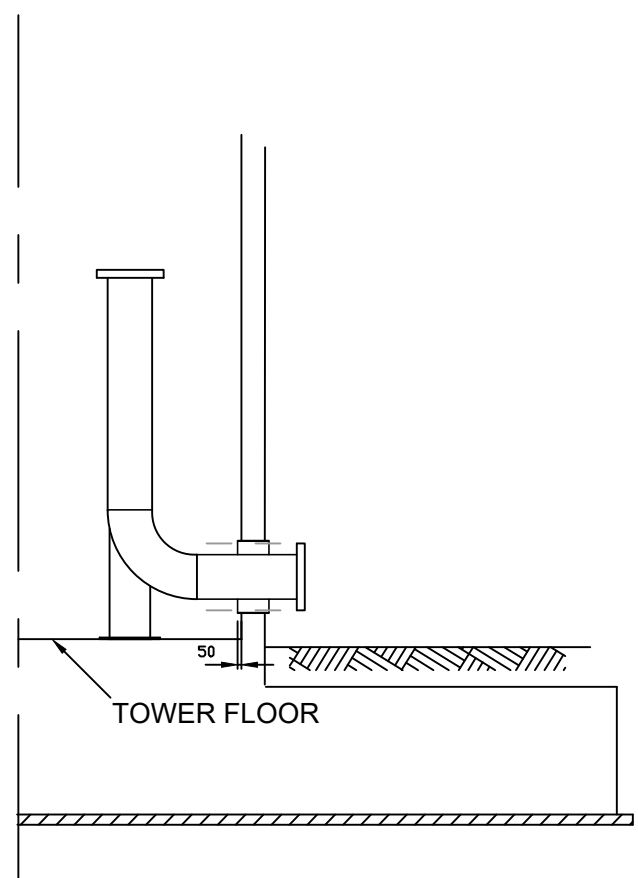
SLEEVE DETAIL FOR
550DIA PIPE
SCALE 1:50



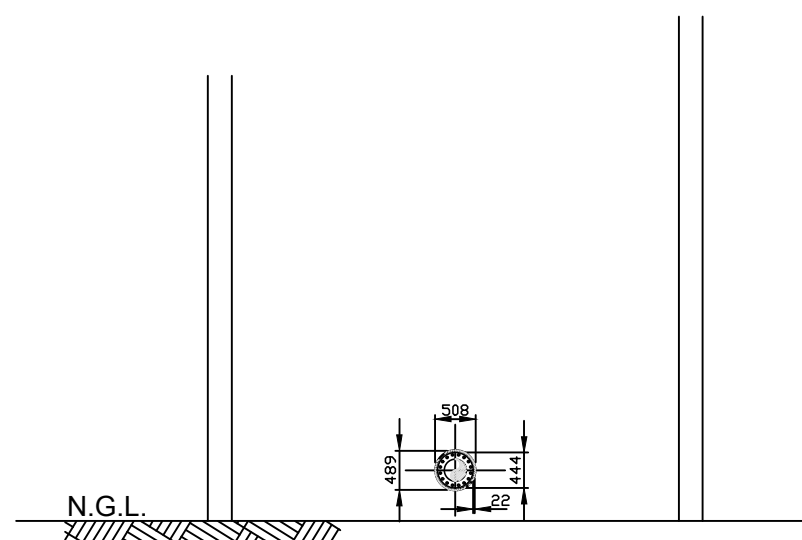
ENLARGED SLEEVE DETAIL
FOR 550DIA PIPE
SCALE 1:25



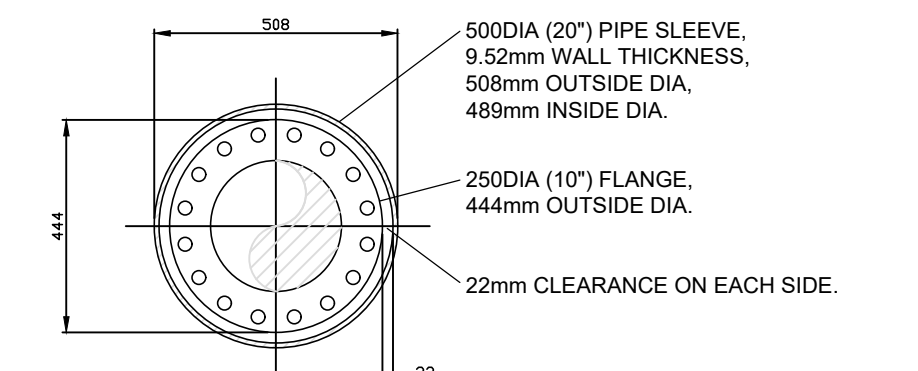
PLAN VIEW OF SLEEVE DETAIL
FOR 550DIA PIPE
SCALE 1:50



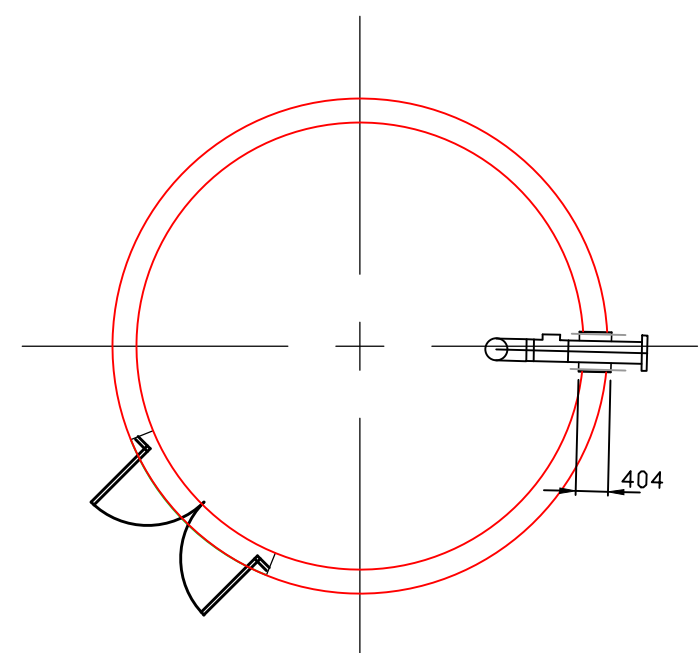
THROUGH WALL DETAIL OF SLEEVE
FOR 550DIA PIPE
SCALE 1:50



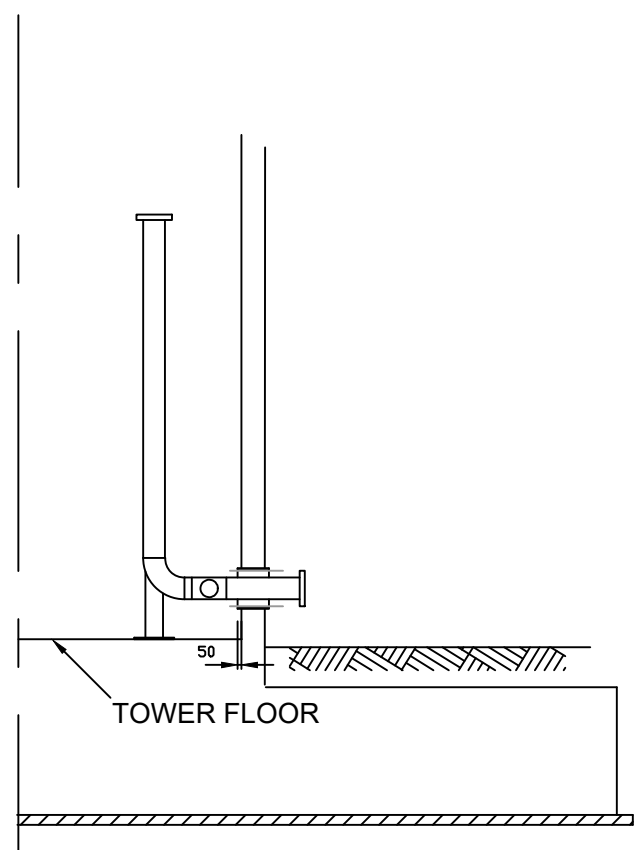
SLEEVE DETAIL FOR
250DIA PIPE
SCALE 1:50



ENLARGED SLEEVE DETAIL
FOR 250DIA PIPE
SCALE 1:25



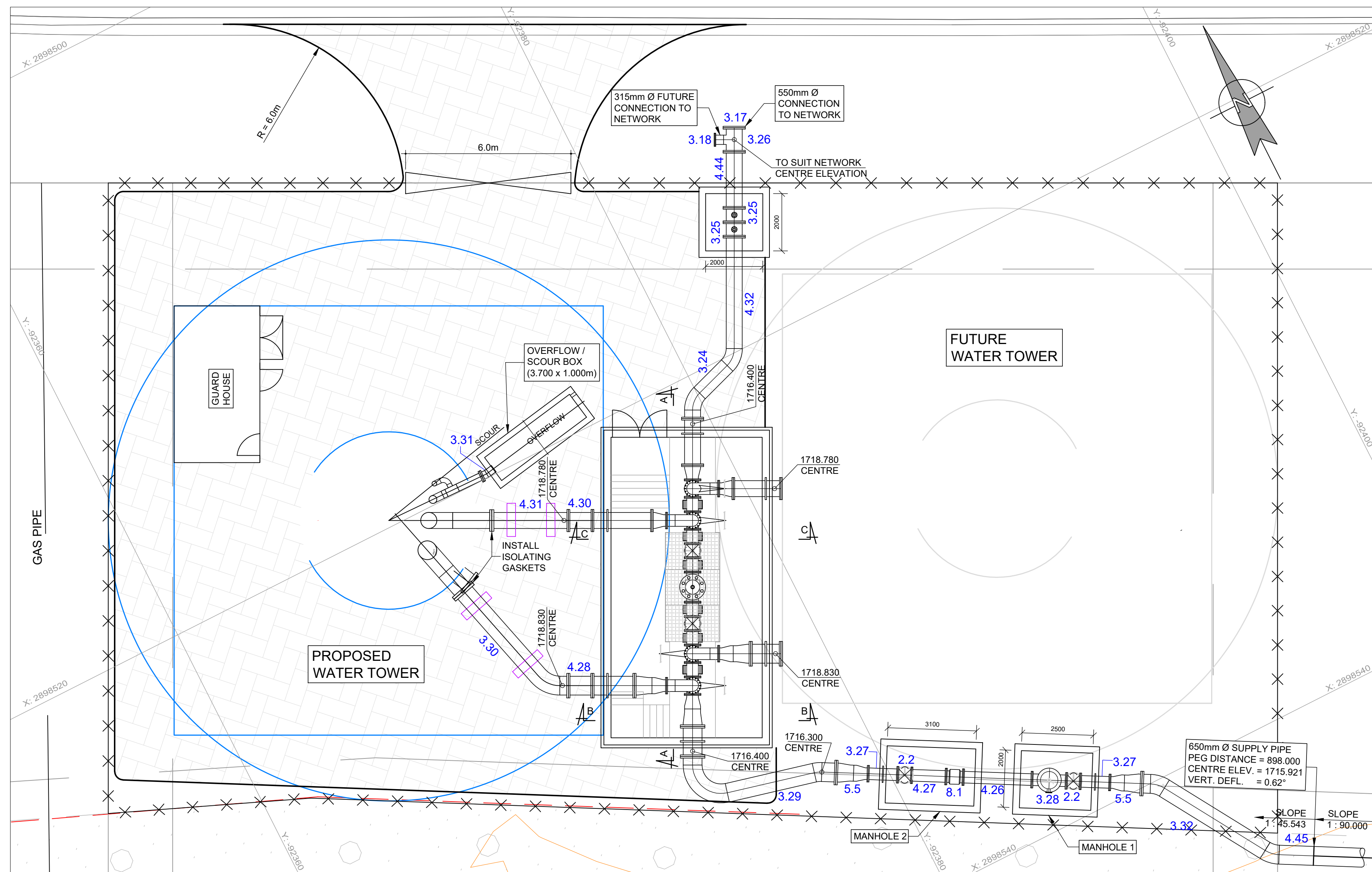
PLAN VIEW OF SLEEVE DETAIL
FOR 250DIA PIPE
SCALE 1:50



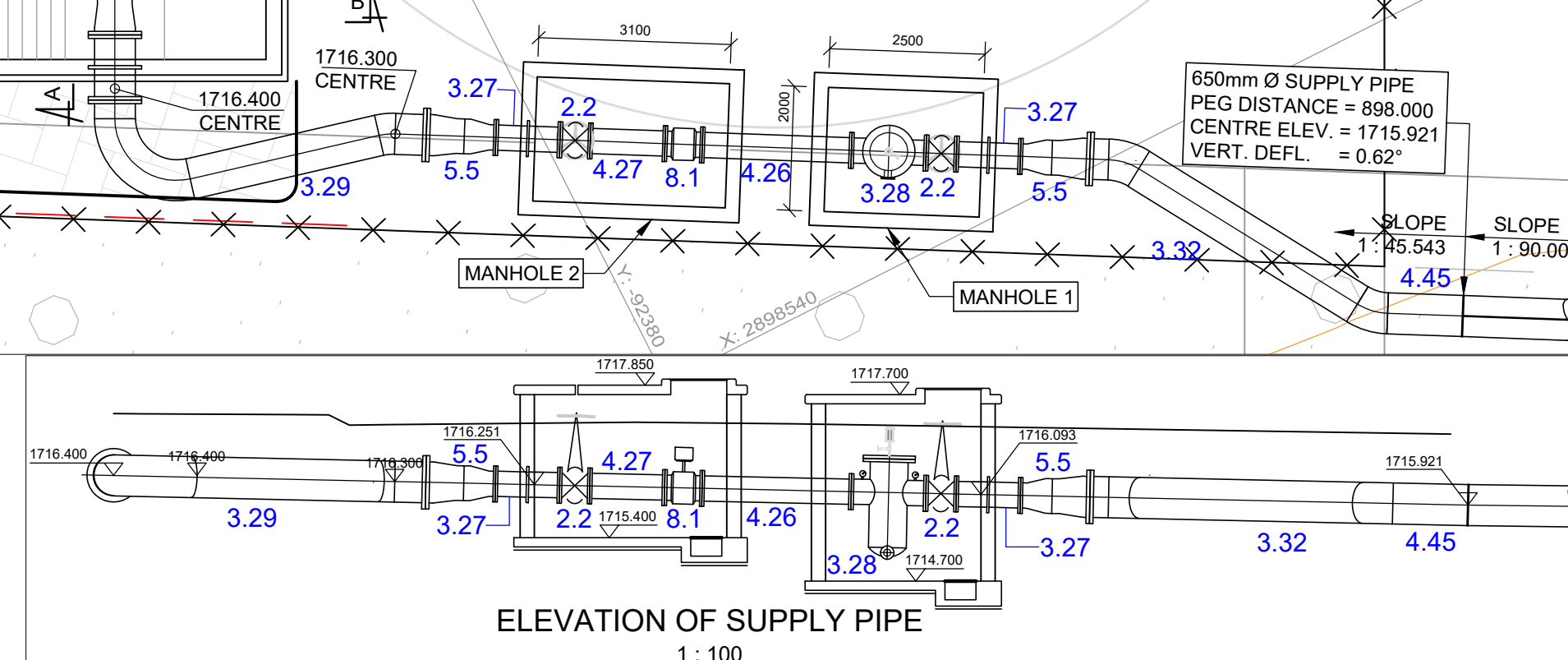
THROUGH WALL DETAIL OF SLEEVE
FOR 250DIA PIPE
SCALE 1:50

DEPARTMENT DEPARTEMENT	APPROVED GOEDGEKEUR	DESIGNATION AMPSBENAMING	DATE DATUM

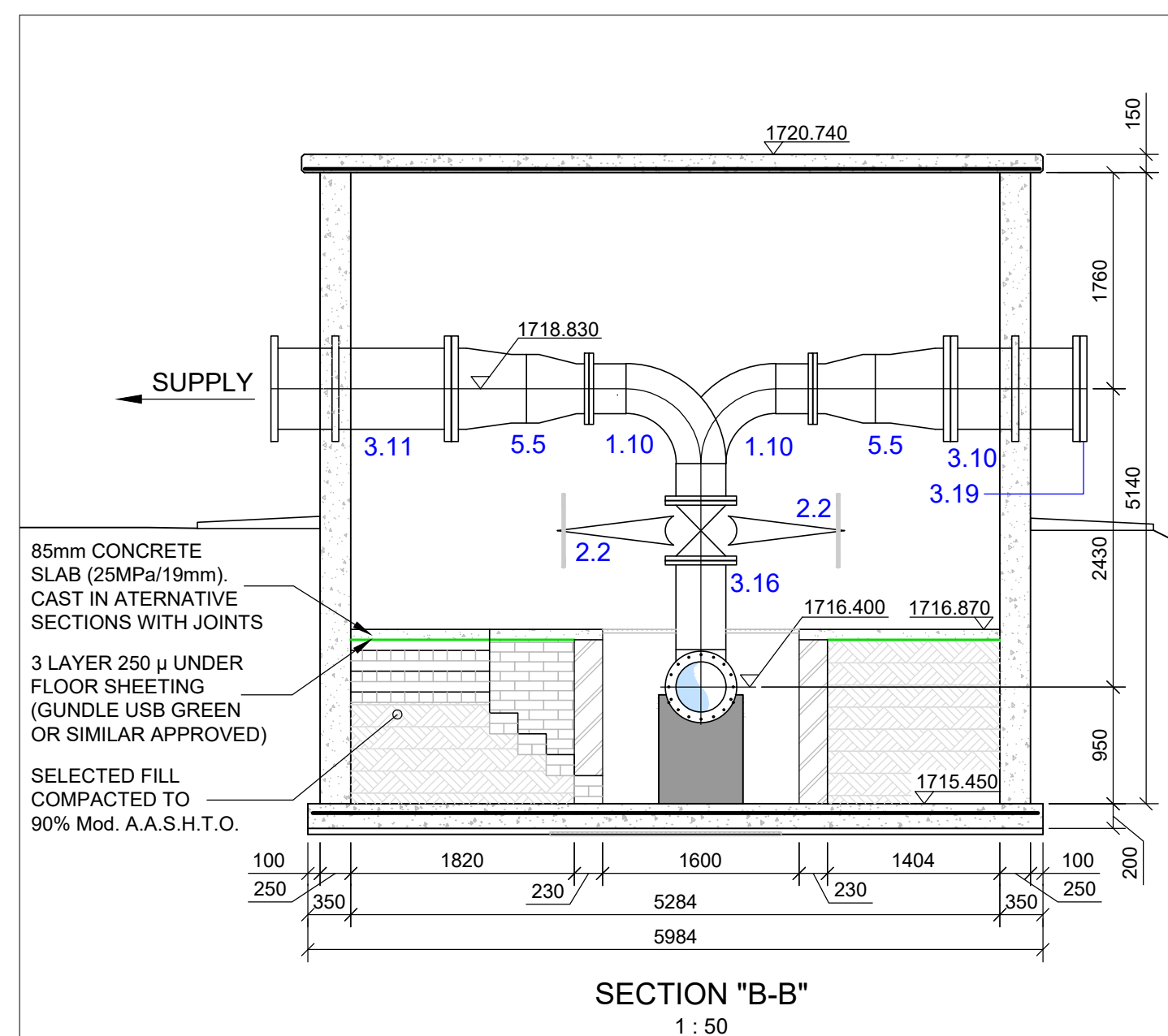
CERTIFIED AS BUILT DRAWING GESERTIFISEER AS SOOS GEBOU TEKENING			
FOR NMS CHec	FOR NMS JOHANNESBURG WATER (PTY) LTD		
DATE DATUM	DATE DATUM		



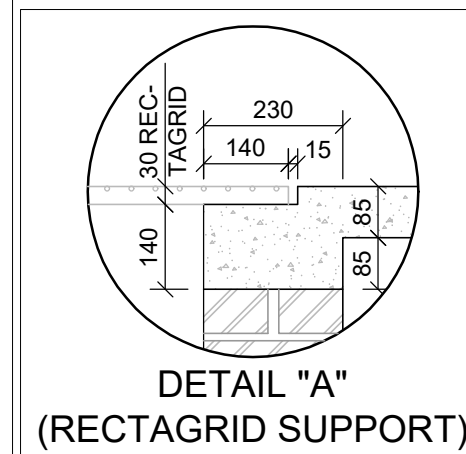
PIPE LAYOUT ON SITE
1:100



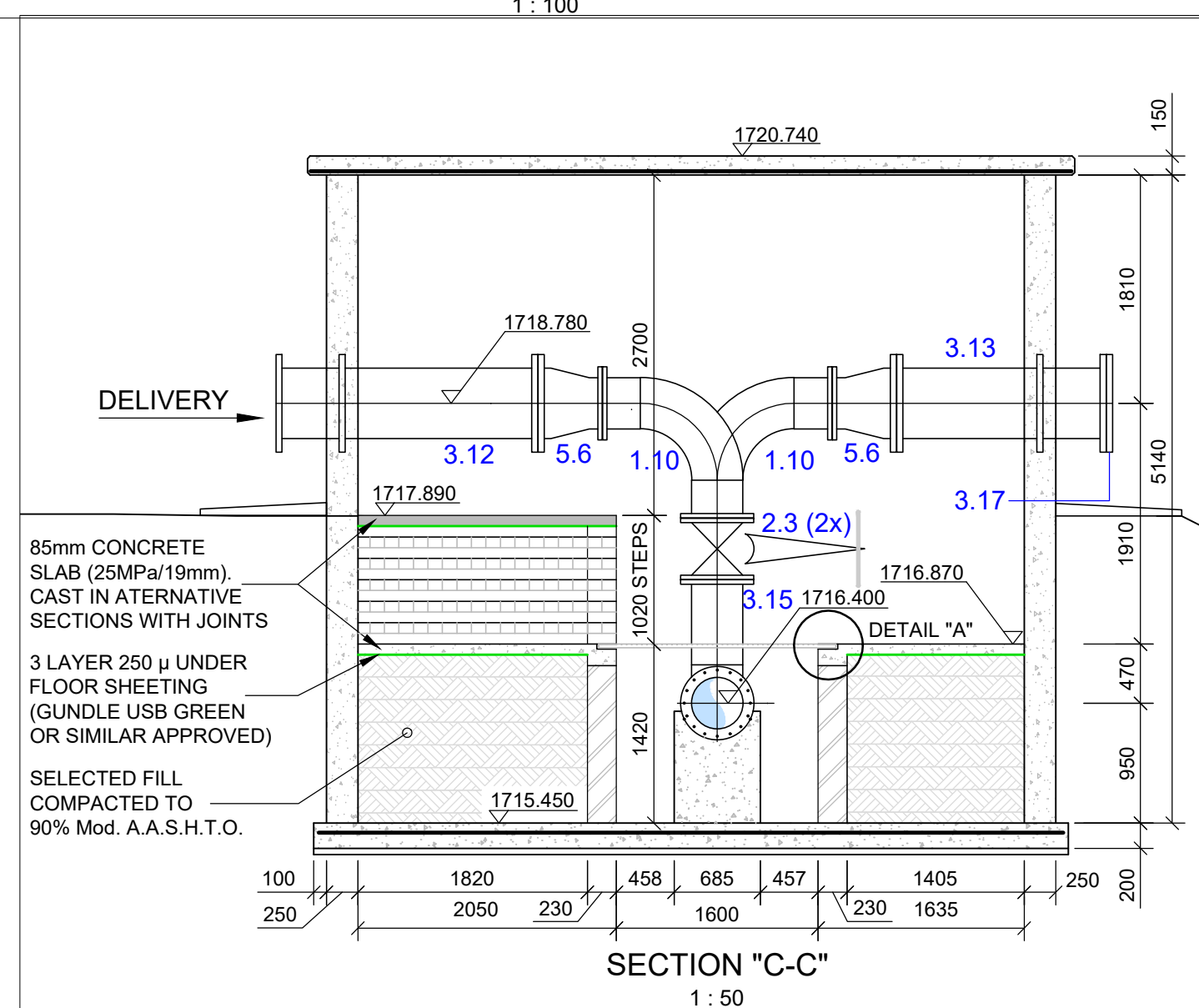
ELEVATION OF SUPPLY PIPE
1:100



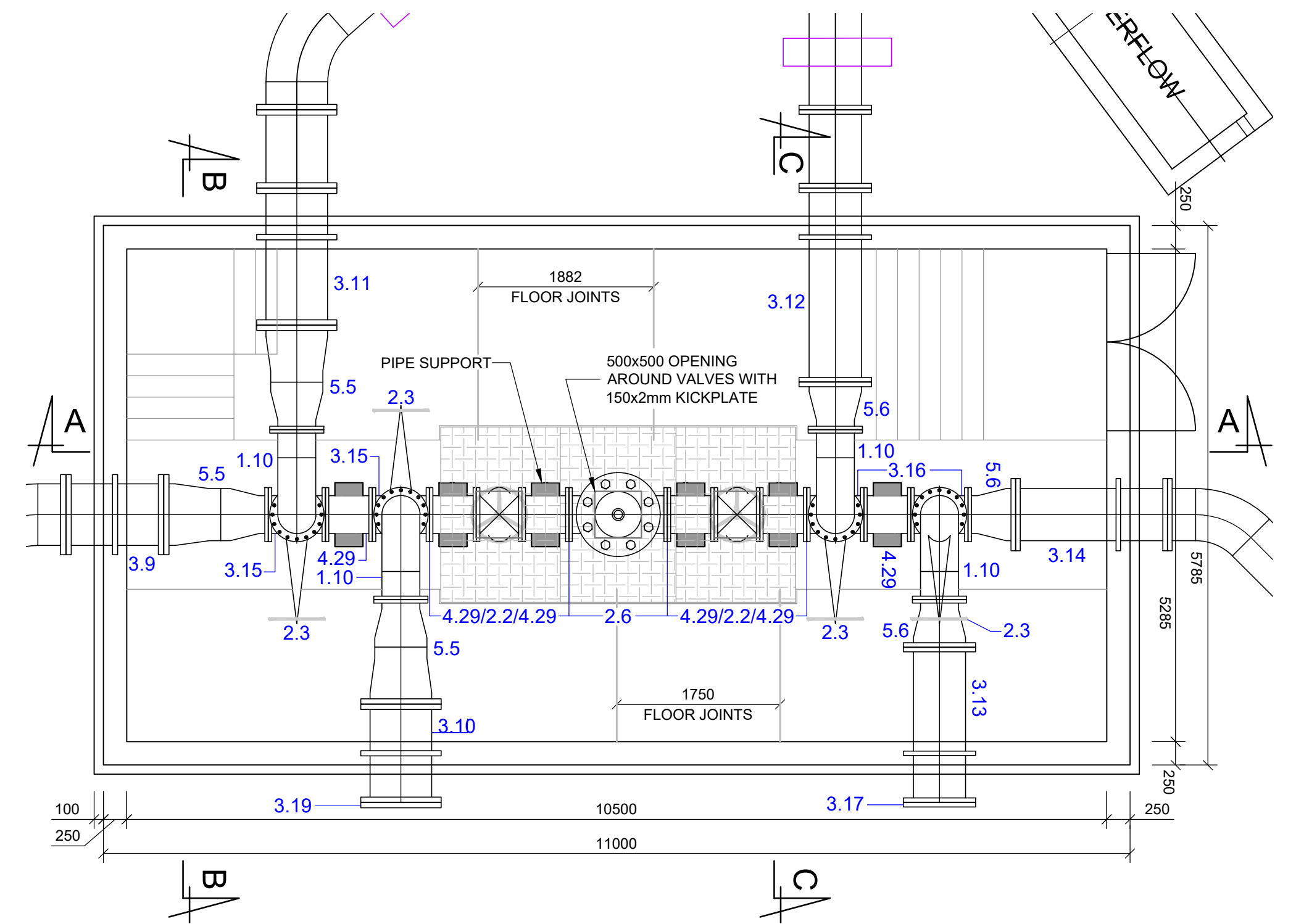
SECTION "B-B"
1:50



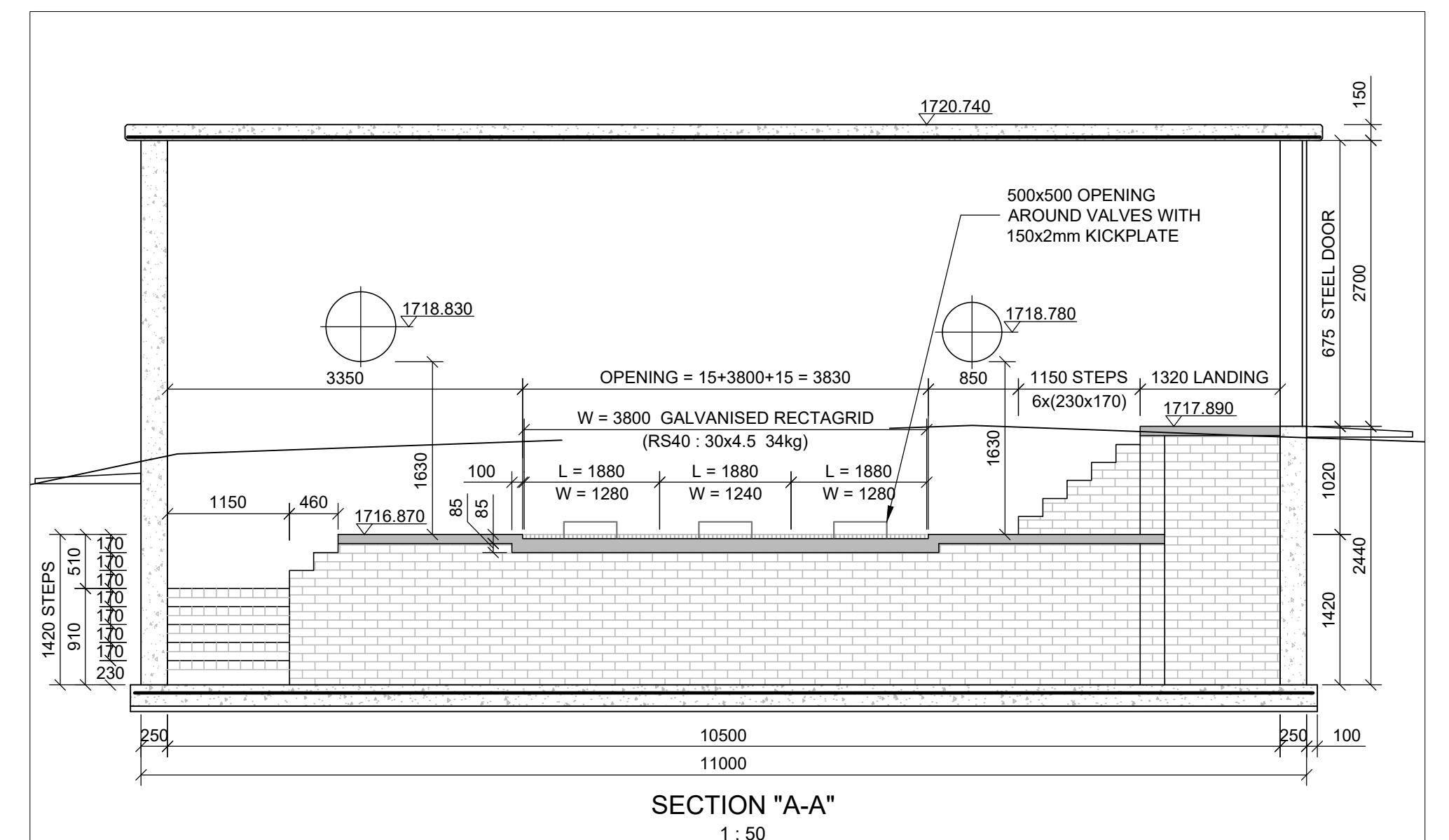
DETAIL "A"
(RECTAGRID SUPPORT)



SECTION "C-C"
1:50



PIPE SPECIALS IN VALVE ROOM
1:50



SECTION "A-A"
1:50

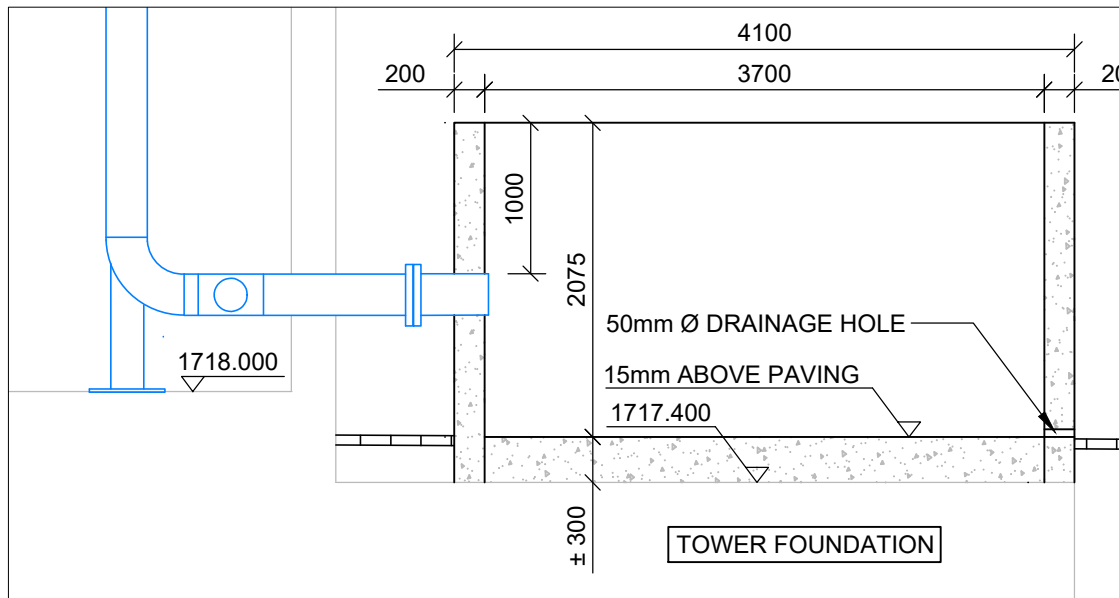
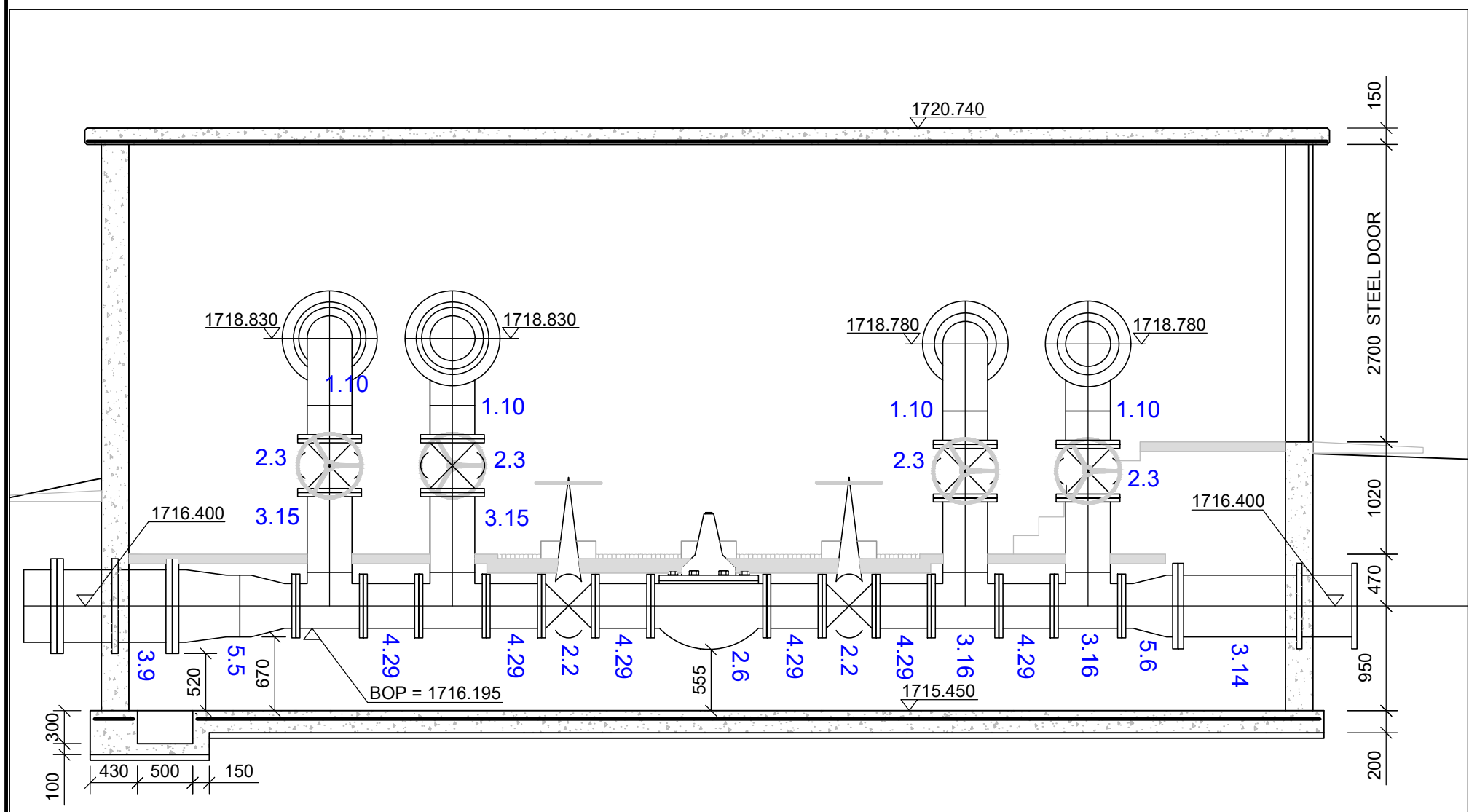
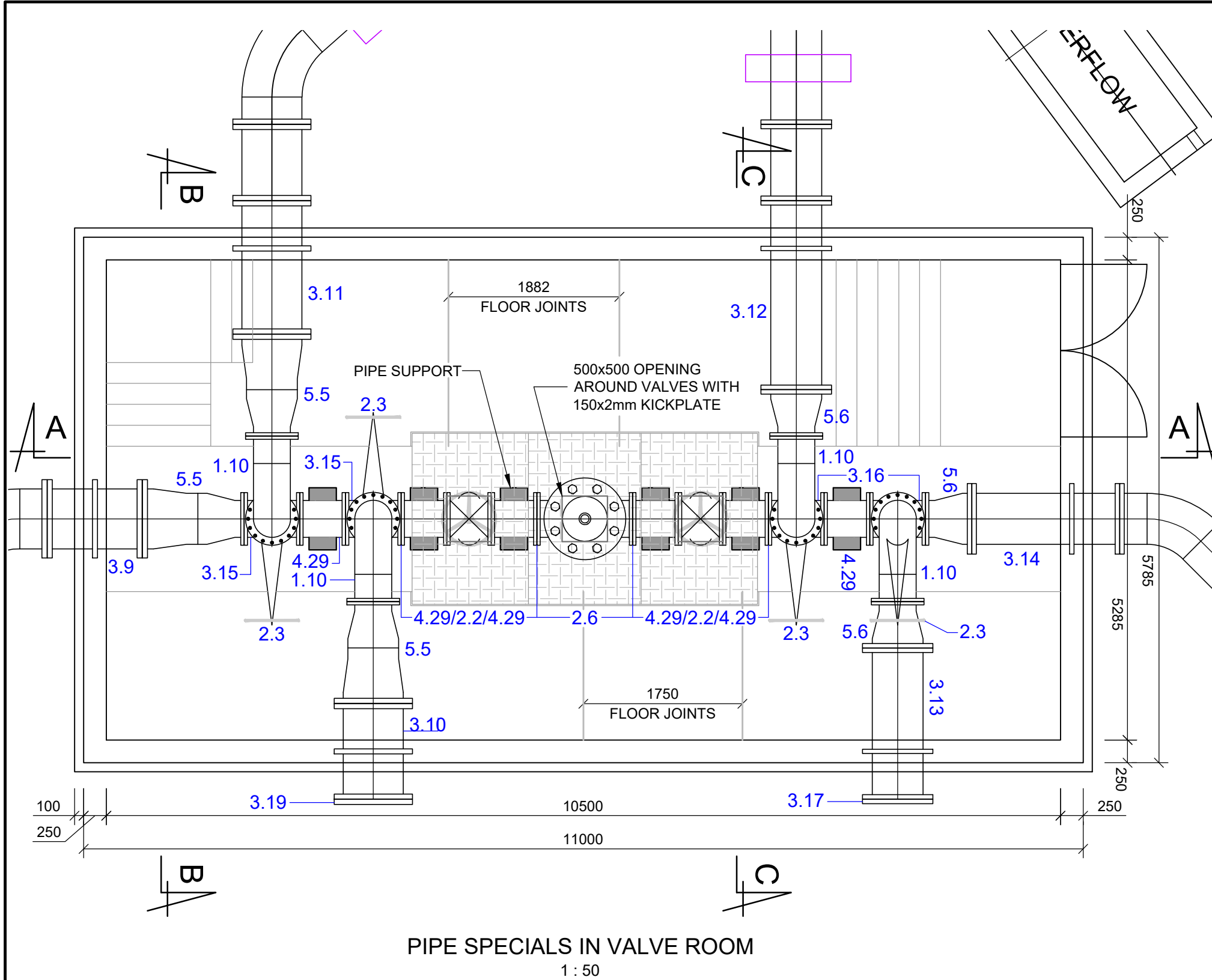
NOTES:
1. FOR DETAIL ON PIPE SPECIALS SEE DRAWING 1440a/WA/Pipe6
2. FOR VALVE ROOM CHAMBER DETAIL SEE DRAWING 1440a/WA/Det08

NOTES

- THE EXACT POSITION OF EXISTING PIPES AND OTHER SERVICES TO BE DETERMINED ON SITE WITH SPECIAL ATTENTION WHEN CONNECTING TO EXISTING FACILITIES.
- ALL PIPE DIMENSIONS TO BE FINALISED ON SITE.
- ALL FLANGES TO BE ACCORDING TO SANS 1123-1977 TABLE 1600/3 WITH SPECIAL CARE TO DRILLING PATTERNS OF VALVES, ETC.
- C.A.F. FLANGE GASKETS MUST BE USED.
- M.S. = MILD STEEL AND S.S. = STAINLESS STEEL.
- STEEL GRADE, PIPE LINING AND COVER TO BE ACCORDING TO SPECIFICATION.
- THE POSITION OF THE PIPE SUPPORTS TO BE FINALISED ON SITE.
- ANCHOR BLOCKS TO BE CAST SYMMETRICALLY AROUND CENTRE LINE OF FITTINGS AND AGAINST UNDISTURBED EXCAVATION. (15MPa/19mm CONCRETE TO BE USED)
- COUPLINGS AND FLANGES SHALL BE LEFT CLEAR OF CONCRETE
- ALL CONCRETE SHALL BE CLASS 25MPa/19mm UNLESS SHOWN OTHERWISE.
- FLANGED JOINTS AND V.J. COUPLINGS, EXPOSED TO SOIL, TO BE WRAPPED WITH DENSO TAPE.

DEPARTMENT	APPROVED	DESIGNATION	DATE
DEPARTEMENT	GOEDGEKEUR	AMPSBENAMING	DATUM

CERTIFIED AS BUILT DRAWING GESERTIFISEER AS SOOS GEBOU TEKENING	
FOR NMS CHC	FOR NMS JOHANNESBURG WATER (PTY) LTD
DATE	DATE



ITEM	NUMBER	DESCRIPTION OF ITEMS	DETAIL SKETCH
1	4	BENDS 400mm Ø, 90° M.S. LONG RADIUS BEND WITH 300 FLANGED CUT LENGTHS ON BOTH ENDS. (C-E=910 WITH R=610)	
2	4	VALVES 400mm Ø PN16, DUCTILE IRON TO SANS 936 SG 42, ANTI CLOCKWISE CLOSING, GEARBOX OPERATED (6:1 RATIO), VERTICALLY INSTALLED WEDGE TYPE GATE VALVE. VALVE ACCORDING TO SANS 664 AND TO COMPLY WITH JOHANNESBURG WATER SPECIFICATION. FLANGES TO BE FLAT FACED TO SANS 1123 TABLE 1600 (F-F=470). (VOSA "D" SERIES OR SIMILAR APPROVED)	
2.3	4	400mm Ø PN16, DUCTILE IRON TO SANS 936 SG 42, ANTI CLOCKWISE CLOSING, GEARBOX OPERATED (6:1 RATIO), HORIZONTALLY INSTALLED WEDGE TYPE GATE VALVE. VALVE ACCORDING TO SANS 664 AND TO COMPLY WITH JOHANNESBURG WATER SPECIFICATION. FLANGES TO BE FLAT FACED TO SANS 1123 TABLE 1600 (F-F=470). (VOSA "D" SERIES OR SIMILAR APPROVED)	
2.6	1	400mm Ø, EPOXY COATED, DUCTILE IRON, FLANGED PN16, COMBINATION CONTROL VALVE. THE VALVE SHOULD BE ABLE TO CONTROL THE FLOW TO 500 l/s AT 30m PRESSURE. ("CLA-VAL 100-01 SERIES" OR SIMILAR APPROVED)	
3	1	GENERAL 650mm Ø M.S. FULLY FLANGED CUT LENGTH WITH PUDDLE FLANGE. (E-E=1045)	
3.9	1	650mm Ø M.S. FULLY FLANGED CUT LENGTH WITH PUDDLE FLANGE. (E-E=1050)	
3.10	1	650mm Ø M.S. FULLY FLANGED CUT LENGTH WITH PUDDLE FLANGE. (E-E=1050)	
3.11	1	650mm Ø M.S. FULLY FLANGED CUT LENGTH WITH PUDDLE FLANGE. (E-E=1465)	
3.12	1	550mm Ø M.S. FULLY FLANGED CUT LENGTH WITH PUDDLE FLANGE. (E-E=2075)	
3.13	1	550mm Ø M.S. FULLY FLANGED CUT LENGTH WITH PUDDLE FLANGE. (E-E=1660)	
3.14	1	550mm Ø M.S. FULLY FLANGED CUT LENGTH WITH PUDDLE FLANGE. (E-E=1625)	
3.15	2	400mm Ø M.S. FULLY FLANGED EQUAL TEE WITH A 725 LONG SPOOL PIECE ADDED TO THE BRANCH END. (F-F=610 AND C-F=1030)	
3.16	2	400mm Ø M.S. FULLY FLANGED EQUAL TEE WITH A 675 LONG SPOOL PIECE ADDED TO THE BRANCH END. (F-F=610 AND C-F=980)	
3.17	2	BLANK FLANGE TO SEAL 550mm Ø END.	
3.18	1	BLANK FLANGE TO SEAL 300mm Ø END.	
3.19	1	BLANK FLANGE TO SEAL 650mm Ø END.	
3.24	1	550mm Ø M.S. 45° LONG RADIUS S-BEND WITH A 300 FLANGED CUT LENGTH ON ONE END. THE OTHER BEVEL EDGED. THE LENGTH OF THE CENTRE SPOOL PIECE IS DEPENDANT ON THE ELEVATION DIFFERENCE BETWEEN THE TWO PIPES AND IS TO BE FINALISED ON SITE. (BEND C-E=347 AND R=838)	
3.25	2	550mm Ø M.S. FULLY FLANGED CUT LENGTH. (E-E=500) A FLANGED CUT LENGTH AND BLANK FLANGE ADDED TO ACCOMMODATE THE ELECTROMAGNETIC INSERTION FLOWMETER. ALL DIMENSIONS TO BE VARIFIED WITH THE SUPPLIER	
3.26	1	550x300mm Ø M.S. TEE WITH A 300x300mm Ø CUT LENGTH ADDED. ALL ENDS FLANGED	
3.27	2	400mm Ø M.S. FULLY FLANGED CUT LENGTH WITH PUDDLE FLANGE. (E-E=1030)	
3.28	1	400mm Ø M.S. FULLY FLANGED POT OR BASKET STRAINER WITH 500mm Ø BODY AND A 100mm Ø TANGENTIAL FLANGED SCOUR OUTLET. THE BODY SHOULD HAVE A FULL SIZED (500mm Ø) FLANGED INSPECTION OPENING COVERED WITH A BLANK FLANGE. IT MUST INCLUDE A HEAVY DUTY GRADE 304 STAINLESS STEEL REMOVABLE CARTRIDGE WITH A COMBINED OPEN AREA OF 0.377m². THE STRAINER SHOULD BE EQUIPPED WITH A DN50 PN25 AIR RELEASE AND VACUUM BREAK VALVE, INSTALLED ON TOP OF THE COVER (VENT-O-MAT RBX2511 OR SIMILAR APPROVED). IT SHOULD ALSO HAVE INLET AND OUTLET GLYCERINE FILLED PRESSURE GAUGES AND GAUGE COCKS. (F-F = ±1200)	

ITEM	NUMBER	DESCRIPTION OF ITEMS	DETAIL SKETCH
3.29	1	650mm Ø M.S. LONG RADIUS S-BEND WITH FLANGED CUT LENGTHS OF 300 AND 500 ADDED TO ENDS AND A CENTRE SPOOL PIECE OF 3120. THE TWO BENDS ARE 15° AND 102.94° (R = 991) (PIPE SLOPE = 1 : 45.543)	
3.30	1	650mm Ø, 37.65° M.S. LONG RADIUS BEND WITH FLANGED CUT LENGTHS ON BOTH ENDS. (C-E=300 AND 3966 WITH R=991)	
3.31	1	250mm Ø, 11.25° S.S. KINK WITH ONE END FLANGED, OTHER END BUTT ENDED	
3.32	1	650mm Ø M.S. LONG RADIUS S-BEND WITH A FLANGED CUT LENGTH OF 300 ADDED TO ONE END, THE OTHER END BEVEL EDGED. A CENTRE SPOOL PIECE OF 4140 IS ADDED. BOTH BENDS ARE 29.68° (R = 991)	
4		CUT LENGTHS	
4.26	1	400mm Ø M.S. FULLY FLANGED CUT LENGTH. (E-E=2400)	
4.27	1	400mm Ø M.S. FULLY FLANGED CUT LENGTH. (E-E=1200)	
4.28	1	650mm Ø M.S. FULLY FLANGED CUT LENGTH. (E-E=835)	
4.29	6	400mm Ø M.S. FULLY FLANGED CUT LENGTH. (E-E=500)	
4.30	1	550mm Ø M.S. FULLY FLANGED CUT LENGTH. (E-E=835)	
4.31	1	550mm Ø M.S. FULLY FLANGED CUT LENGTH. (E-E=2675)	
4.32	1	550mm Ø M.S. ONE FLANGED OTHER END BEVEL EDGED CUT LENGTH. (E-E=3910)	
4.44	1	550mm Ø M.S. FULLY FLANGED CUT LENGTH. (E-E=1955)	
4.45	1	650mm Ø M.S. BEVEL EDGED CUT LENGTH, ONE END MITRED FOR VERTICAL DEFLECTION ANGLE 0.62°. (E-E=1210)	
5		REDUCERS	
5.5	5	650x400mm Ø M.S. FULLY FLANGED CONCENTRIC REDUCER. TWO STANDARD REDUCERS 660x559 AND 559x406 JOINED. (E-E=1118)	
5.6	3	550x400mm Ø M.S. FULLY FLANGED CONCENTRIC REDUCER. (E-E=508)	
8		WATER METERS	
8.1	1	400mm Ø PN16, FULL BORE ELECTROMAGNETIC FLOW METER AND TRANSMITTER, COMPLETE WITH TERMINAL BOX, CONDUITS, CABLES, ETC. ALL TO JOHANNESBURG WATER SPECIFICATION. [SITRANS FM MAGFLO MAG 5100 W FLOW SENSOR AND SITRANS FM MAG 5000 TRANSMITTER BY SIEMENS, USED FOR DIMENSIONS] (F-F=600)	

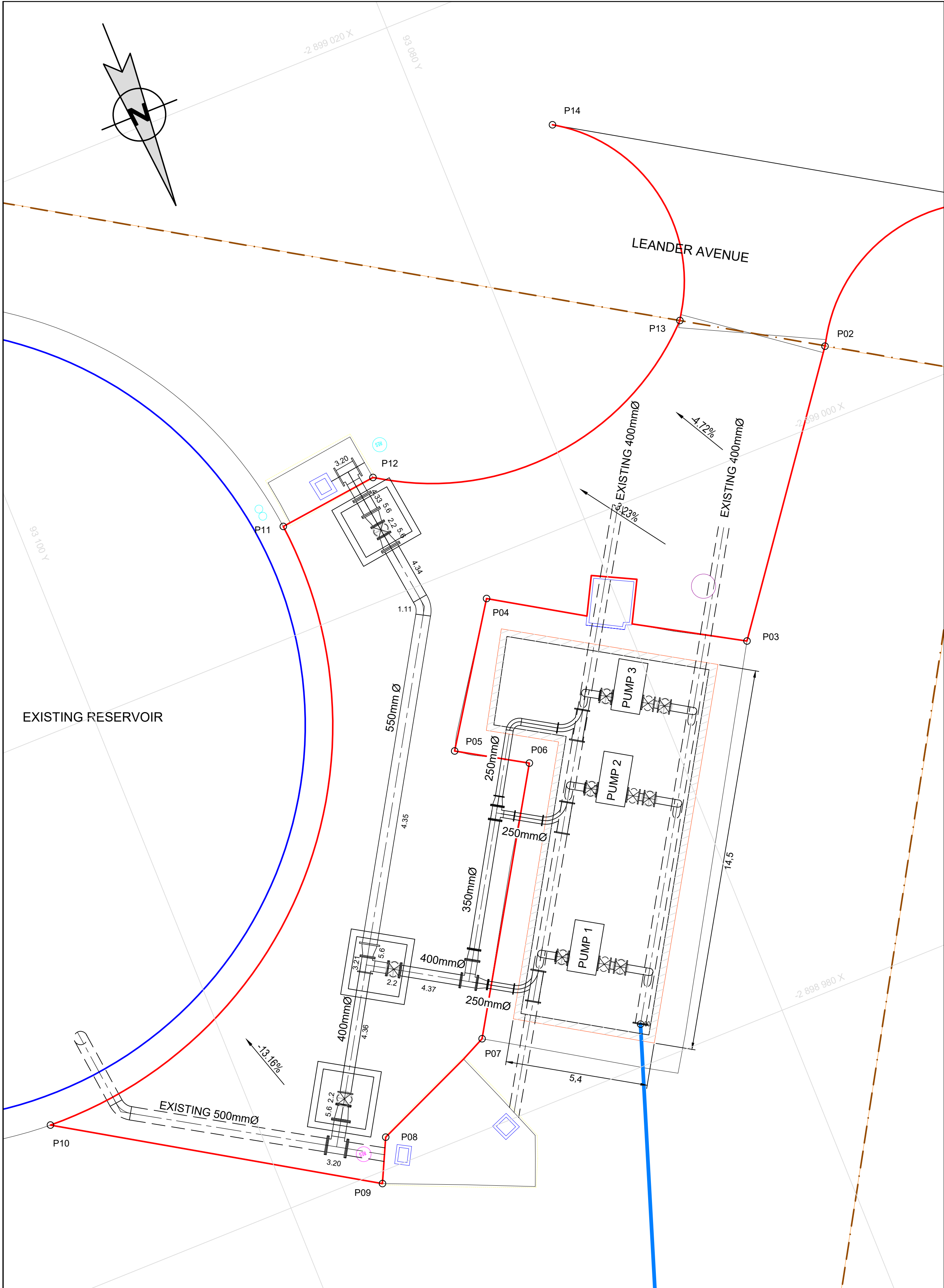
NOTE:
FOR VALVE ROOM CHAMBER DETAIL
SEE DRAWING 1440a/WA/Det08

NOTES

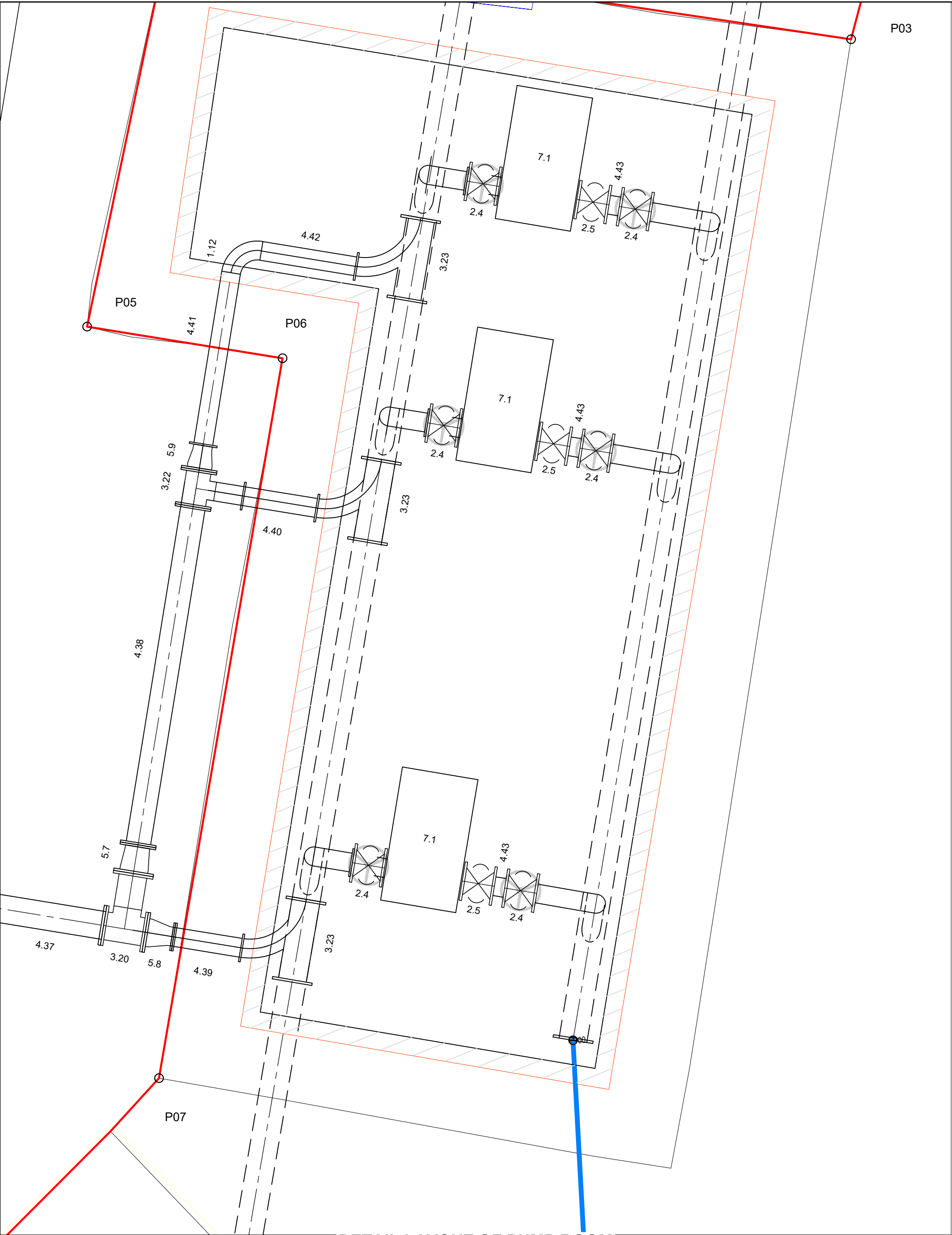
- THE EXACT POSITION OF EXISTING PIPES AND OTHER SERVICES TO BE DETERMINED ON SITE WITH SPECIAL ATTENTION WHEN CONNECTING TO EXISTING FACILITIES.
- ALL PIPE DIMENSIONS TO BE FINALISED ON SITE.
- ALL FLANGES TO BE ACCORDING TO SANS 1123-1977 TABLE 1600/3 WITH SPECIAL CARE TO DRILLING PATTERNS OF VALVES, ETC.
- C.A.F. FLANGE GASKETS MUST BE USED.
- M.S.= MILD STEEL AND S.S.= STAINLESS STEEL.
- STEEL GRADE, PIPE LINING AND COVER TO BE ACCORDING TO SPECIFICATION.
- THE POSITION OF THE PIPE SUPPORTS TO BE FINALISED ON SITE.
- ANCHOR BLOCKS TO BE CAST SYMMETRICALLY AROUND CENTRE LINE OF FITTINGS AND AGAINST UNDISTURBED EXCAVATION. (15MPa/19mm CONCRETE TO BE USED)
- COUPLINGS AND FLANGES SHALL BE LEFT CLEAR OF CONCRETE
- ALL CONCRETE SHALL BE CLASS 25MPa/19mm UNLESS SHOWN OTHERWISE.
- FLANGED JOINTS AND V.J. COUPLINGS, EXPOSED TO SOIL, TO BE WRAPPED WITH DENSO TAPE.

DEPARTMENT	APPROVED	DESIGNATION	DATE
DEPARTEMENT	GOEDGEKEUR	AMPSBENAMING	DATUM

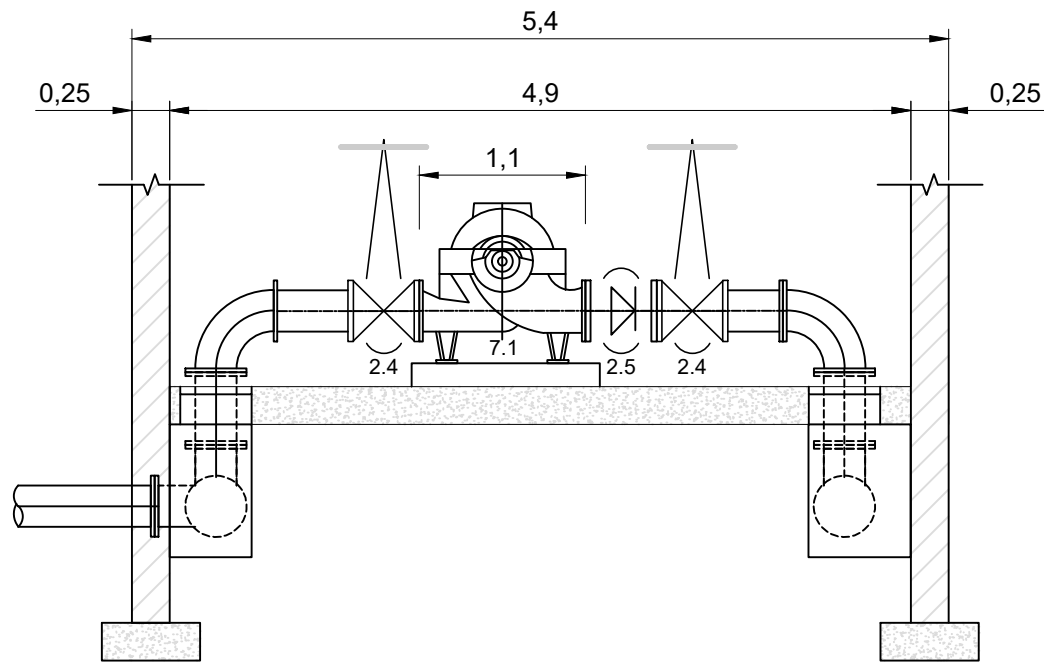
CERTIFIED AS BUILT DRAWING GESERTIFISEER AS SOOS GEBOU TEKENING			
FOR NMS CHC	FOR NMS JOHANNESBURG WATER (PTY) LTD	DATE DATUM	DATE DATUM



LAYOUT PLAN
1:100



DETAIL LAYOUT OF PUMP ROOM
1:50



PUMP SECTION AND CONFIGURATION
1:50

ITEM	NUMBER	DESCRIPTION OF ITEMS
1		BENDS
1.11	1	550mm Ø, 55.00° M.S. BEVEL EDGED BEND.
1.12	1	250mm Ø, 90.00° M.S. BEVEL EDGED BEND.
2		VALVES
2.2	3	400mm Ø PN16, CAST IRON, HAND WHEEL OPERATED, ANTI CLOCKWISE CLOSING WITH NON-RISING SPINDLE, WEDGE TYPE GATE VALVE. VALVE ACCORDING TO SANS 664 AND FLANGES TO BE FLAT FACED TO SANS 1123 TABLE 1600 (F-F=470). (VOSA "D" SERIES OR SIMILAR APPROVED)
2.4	6	250mm Ø PN16, CAST IRON, HAND WHEEL OPERATED, ANTI CLOCKWISE CLOSING WITH NON-RISING SPINDLE, WEDGE TYPE GATE VALVE. VALVE ACCORDING TO SANS 664 AND FLANGES TO BE FLAT FACED TO SANS 1123 TABLE 1600. (VOSA "D" SERIES OR SIMILAR APPROVED)
2.5	3	250mm Ø, EPOXY COATED, DUCTILE IRON, FLANGED PN16, SINGLE DOOR SWING NON-RETURN VALVE. (VOSA OR SIMILAR APPROVED)
3		GENERAL
3.20	2	500mm Ø M.S. FULLY FLANGED EQUAL TEE WITH A 505 LONG SPOOL PIECE ADDED TO THE BRANCH END. (F-F=610 AND C-F=810)
3.21	2	400mm Ø M.S. FULLY FLANGED EQUAL TEE WITH A 505 LONG SPOOL PIECE ADDED TO THE BRANCH END. (F-F=610 AND C-F=810)
3.22	1	350mm Ø x 250mm Ø M.S. FULLY FLANGED REDUCING TEE.
3.23	3	400mm Ø x 250mm Ø M.S. FULLY FLANGED SWEEP TEE.
4		CUT LENGTHS
4.33	1	550mm Ø B.E.F (l = 586)
4.34	1	550mm Ø O.E.F (l = 2187)
4.35	1	550mm Ø O.E.F - BEVELLED EDGE (l = 12 631)
4.36	1	400mm Ø B.E.F (l = 3955)
4.37	1	400mm Ø B.E.F (l = 2293)
4.38	1	350mm Ø B.E.F (l = 4895)
4.39	1	250mm Ø B.E.F (l = 958)
4.40	1	250mm Ø B.E.F (l = 1053)
4.41	1	250mm Ø O.E.F (l = 2508)
4.42	1	250mm Ø O.E.F (l = 1377)
4.43	1	250mm Ø B.E.F (l = 150)
5		REDUCERS
5.6	4	550x400mm Ø M.S. FULLY FLANGED CONCENTRIC REDUCER.
5.7	1	400x350mm Ø M.S. FULLY FLANGED CONCENTRIC REDUCER.
5.8	1	400x250mm Ø M.S. FULLY FLANGED CONCENTRIC REDUCER.
5.9	1	350x250mm Ø M.S. FULLY FLANGED CONCENTRIC REDUCER.
7		PUMPS
7.1	3	KSB SA OMEGA 250-480A (423 IMPELLER) WITH A WEG 250kW 380v 355 M/L 4p MOTOR. (OR SIMILAR APPROVED)

NOTES

- THE EXACT POSITION OF EXISTING PIPES AND OTHER SERVICES TO BE DETERMINED ON SITE WITH SPECIAL ATTENTION WHEN CONNECTING TO EXISTING FACILITIES.
- ALL PIPE DIMENSIONS TO BE FINALISED ON SITE.
- ALL FLANGES TO BE ACCORDING TO SANS 1123-1977 TABLE 1600/3 WITH SPECIAL CARE TO DRILLING PATTERNS OF VALVES, ETC.
- C.A.F. FLANGE GASKETS MUST BE USED.
- M.S. = MILD STEEL AND S.S. = STAINLESS STEEL.
- STEEL GRADE, PIPE LINING AND COVER TO BE ACCORDING TO SPECIFICATION.
- THE POSITION OF THE PIPE SUPPORTS TO BE FINALISED ON SITE.
- ANCHOR BLOCKS TO BE CAST SYMMETRICALLY AROUND CENTRE LINE OF FITTINGS AND AGAINST UNDISTURBED EXCAVATION.
- COUPLINGS AND FLANGES SHALL BE LEFT CLEAR OF CONCRETE.
- ALL THRUST BLOCKS SHALL BE OF 15MPa CONCRETE
- FLANGED JOINTS AND V.J. COUPLINGS TO BE WRAPPED WITH DENSO TAPE.

DEPARTMENT DEPARTEMENT	APPROVED GOEDGEKEUR	DESIGNATION AMPSBENAMING	DATE DATUM

CERTIFIED AS BUILT DRAWING GESERTIFISEER AS SOOS GEBOU TEKENING	
FOR NMS OMEGA	FOR NMS JOHANNESBURG WATER (PTY) LTD
DATE DATUM	DATE DATUM

CONSULTING ENGINEERS - RAADGEWENDE INGENIEURS

CivEc

Civil Engineering Consultants

MODDERFONTEIN
PHONE: (011) 988-1004
FAX: (011) 988-1005
PRETORIA
PHONE: (012) 998-5463
FAX: (112) 998-3619

PRIVATE DRAWING No
PRIVAT TEKENING Nr
1440b/RE/PIPE01RR

APPROVED
GOEDGEKEUR

PR. Eng. No.
800162

DATE: DATUM

SURVEYED - OPGEMEET

DESIGNED - ONTWERP

DRAWN - GETEKEN

CHECKED - NAGESIEN

SERVICES CHECKED

DIENSLEDINGS NAGESIEN

GEOTECHNICAL INVESTIGATION

GEOTEGNIESE ONDERSOEK

SERVICES

GOEDGEKEUR

JOHANNESBURG WATER (SOC) LTD

Johannesburg Water

17 HARRISON STREET
MARSHALLTOWN
2107
TEL: (011) 688-1400
FAX: (011) 688-1529

CITY OF JOHANNESBURG

CONSTRUCTION OF A 2.25MI WATER TOWER IN ROBERTVILLE
WITH ASSOCIATED PIPE AND PUMP WORKS
RESERVOIR SITE PIPE LAYOUT AND DETAILS

DESIGN
MANAGER
BESTUURDER
ONTWERP

SCALE
SKAAL

AS SHOWN

DATE
DATUM

AMENDMENTS - WYSIGINGS

APPROVED
GOEDGEKEUR

DATE
DATUM

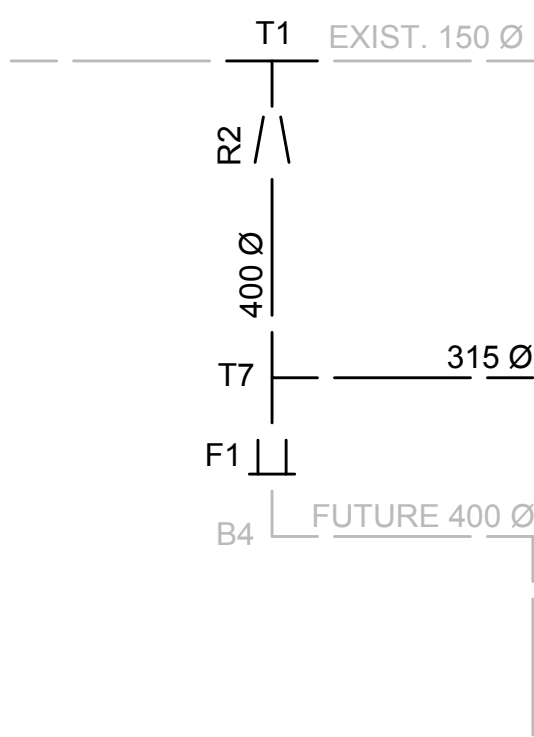
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TEKENING Nr.
1440b/RE/PIPE01RR

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LEER Nr.

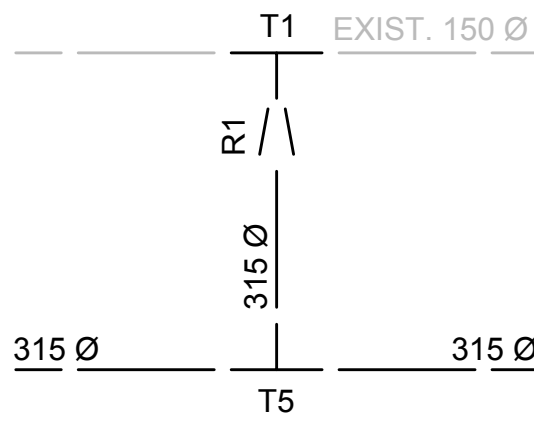
Revision



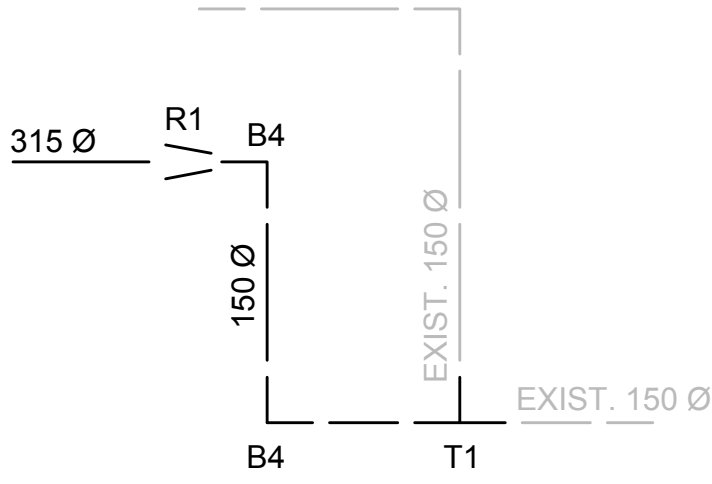
DETAIL LAYOUT 01: UPGRADES ON ANVIL STREET AND MAIN REEF ROAD BETWEEN ROBERT ROAD AND NADINE ROAD
1:1 000



DETAIL RT2.3-A



DETAIL RT2.3-B



DETAIL RT2.3-C

SKAAL OP VERKLEINDE TEKENING
SCALE ON REDUCED DRAWING

100mm OP OORSPRONKLIKE TEKENING
100mm SCALE ON ORIGINAL DRAWING

GENERAL NOTES :

1. NO PART OF THIS DRAWING MUST BE SCALED
2. ALL DIMENSIONS SHOULD BE CHECKED BEFORE ANY WORK ON THE SITE COMMENCES
3. ANY DISCREPANCIES THAT MAY OCCUR DURING THE CONSTRUCTION PHASE OF THIS DRAWING MUST BE BROUGHT IMMEDIATELY UNDER THE ATTENTION OF THE ENGINEER

NOTES :

1. ALL FLANGES TO BE ACCORDING TO SANS 1123-1977 TABLE 16.
2. ALL M.S. FITTINGS TO BE COPON COATED.
3. ANCHOR BLOCKS TO BE CAST SYMMETRICALLY AROUND CENTRE LINE OF FITTINGS AND AGAINST UNDISTURBED EXCAVATION.
4. COUPLINGS AND FLANGES SHALL BE LEFT CLEAR OF CONCRETE
5. VALVES AND HYDRANTS MUST BE TREATED AS END CAPS AND SHOULD BE CONCRETED INTO THE THRUST BLOCK
6. ALL THRUST BLOCKS SHALL BE OF 15MPa CONCRETE
7. THE DIMENSIONS OF THE ANCHOR BLOCKS ONLY APPLY IF THE TEST PRESSURE DOES NOT EXCEED 135M (1350 KPa)
8. ALL PREFABRICATED FITTINGS TO BE COPON EP 2300 COATED AND LINED.
9. FLANGED JOINTS AND V.J. COUPLINGS TO BE WRAPPED WITH DENSFO TAPE.
10. ALL PIPE SIZES TO BE CONFIRMED ON SITE PRIOR TO THE ORDERING OF FITTINGS.

LEGEND

EXISTING WATER

EXISTING SEWER

NEW WATER PIPES

CLOSED VALVE

OPEN VALVE

PIPE DETAILS

200mm Ø: High Impact PVC-u Class 16, with shouldered-end Coupling.
250mm Ø: High Impact PVC-u Class 16, with shouldered-end Coupling.
315mm Ø: High Impact PVC-u Class 16, with shouldered-end Coupling.
400mm Ø: HDPE Class 16 PE 100 SDR 11, jointed by electro fusion or butt welding.

LEGEND FOR PIPE COMPONENTS

TEES

T1 = 150mm Ø CAST IRON EQUAL TEE
T2 = 160mm Ø CAST IRON EQUAL TEE
T3 = 200mm Ø CAST IRON EQUAL TEE
T4 = 250mm Ø CAST IRON EQUAL TEE
T5 = 315mm Ø STEEL EQUAL TEE
T6 = 400mm Ø STEEL EQUAL TEE
T7 = 315mm Ø x 400mmØ STEEL REDUCING TEE

FLANGE ADAPTOR

F1 = 400mm Ø STEEL FLANGE ADAPTOR

REDUCERS

R1 = 150mm Ø x 315mm Ø STEEL REDUCERS
R2 = 150mm Ø x 400mm Ø STEEL REDUCERS

BEND

B1 = 11¼° STEEL BEND
B2 = 22½° STEEL BEND
B3 = 45° STEEL BEND
B4 = 90° STEEL BEND

DEPARTMENT DEPARTEMENT	APPROVED GOEDGEKEUR	DESIGNATION AMPSBENAMING	DATE DATUM

CERTIFIED AS BUILT DRAWING
GESERTIFISEER AS SOOS GEBOU TEKENING

FOR
NMS
DATE

FOR
NMS JOHANNESBURG WATER (PTY) LTD
DATE



SKAAL OP VERKLEINDE TEKENING
SCALE ON REDUCED DRAWING

100mm OP OORSPRONKLIKE TEKENING
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DETAIL LAYOUT 01: UPGRADES ON ANVIL STREET AND MAIN REEF ROAD BETWEEN ROBERT ROAD AND NADINE ROAD
1:1 000



DEPARTMENT DEPARTEMENT	APPROVED GOEDGEKEUR	DESIGNATION AMPSBENAMING	DATE DATUM

CERTIFIED AS BUILT DRAWING
GESERTIFISEER AS SOOS GEBOU TEKENING

FOR
NMS CIEc

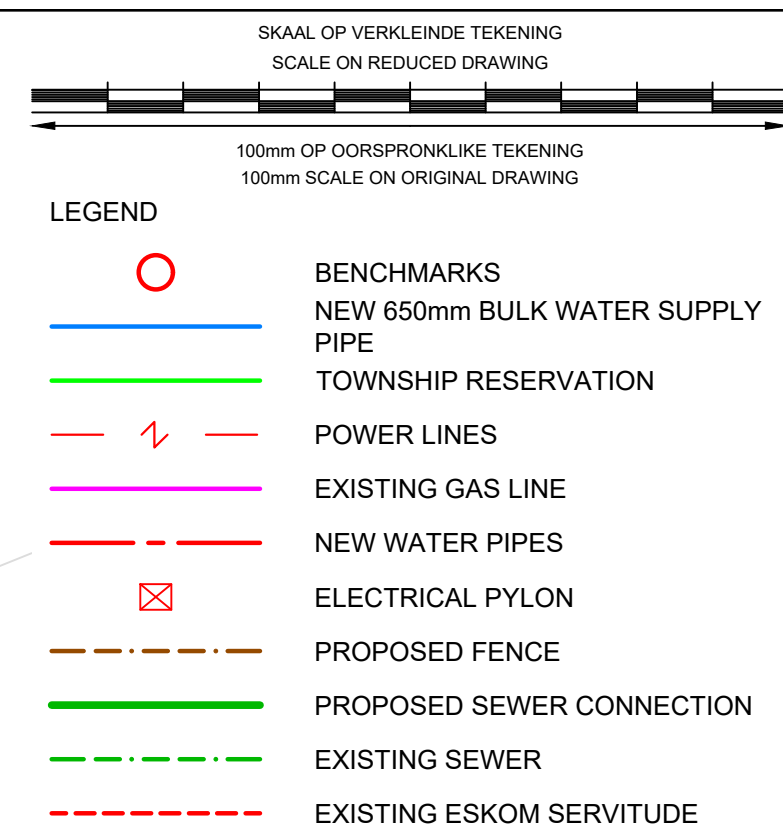
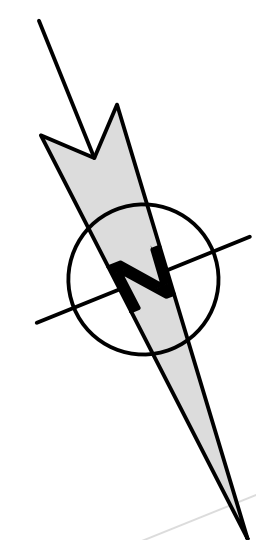
FOR
NMS JOHANNESBURG WATER (PTY) LTD

DATE
DATUM

DATE
DATUM



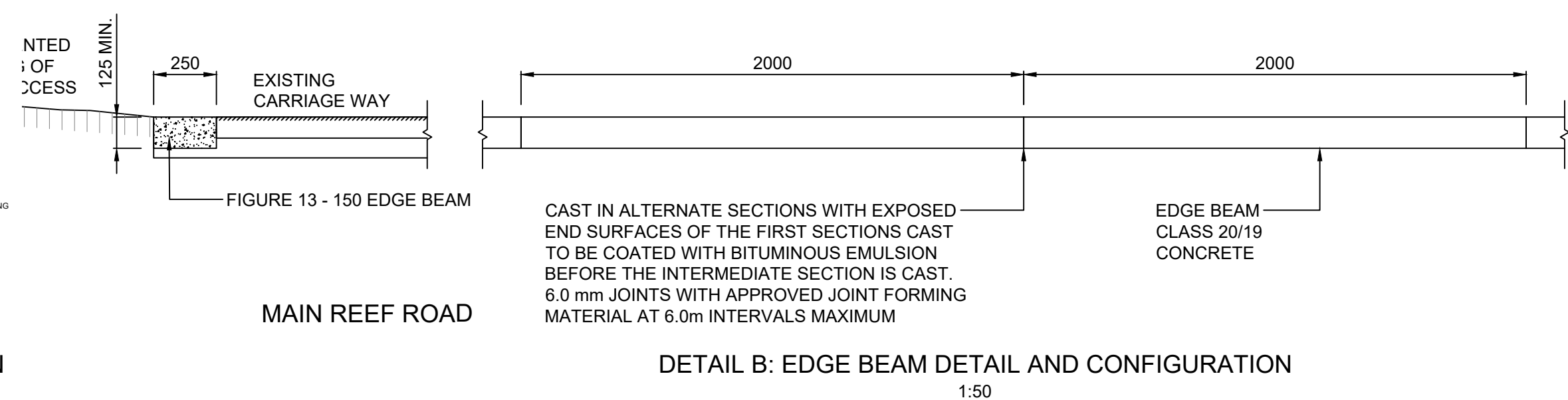
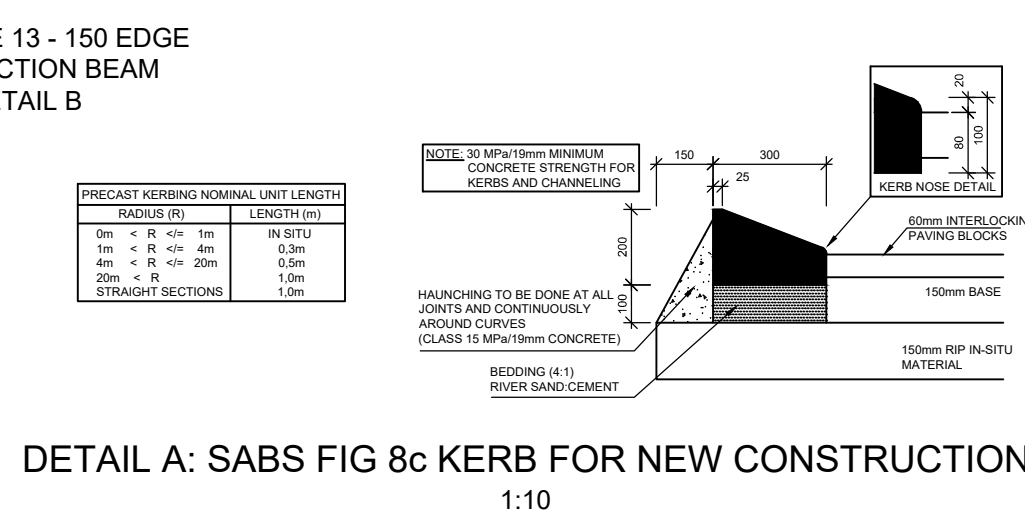
BENCHMARK COORDINATES - Hartebeesthoek94 (WGS84) Lo27			
Name	Y Lo27	X Lo27	Z
P1	-92 561.640	2 898 621.785	1 715.635
P2	-92 624.024	2 898 643.474	1 714.627
RRBM1	-93 220.879	2 898 889.793	1 704.051
RRBM2	-92 878.442	2 898 762.427	1 709.766
RRBM3	-92 367.490	2 898 488.336	1 717.254



EXISTING RESERVOIR

ROOF LEVEL = 1718.80

TWL = 1718.13



CERTIFIED AS BUILT DRAWING
GESERTIFISEER AS SOOS GEBOU TEKENING

FOR _____
NMS CIVEC

FOR _____
NMS JOHANNESBURG WATER (PTY) LTD

DATE _____
DATUM

DATE _____
DATUM

