



**REPUBLIC OF KENYA**

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**

**DESIGN REVIEW AND CONSTRUCTION SUPERVISION OF MARALAL WATER SUPPLY  
PROJECT-PHASE 1**

**VOLUME III**

**ENGINEERING DRAWINGS**

**MARCH 2024**

**MARALAL WATER SUPPLY PROJECT  
SCHEDULE OF ENGINEERING DRAWING**

DRAWING No.	DRAWING TITLE	DRAWING No.	DRAWING TITLE
<b>1</b>	<b>GENERAL LAYOUT (GL)</b>	<b>g</b>	<b>BACK WASH PUMP HOUSE</b>
MWS/GL/01	MARALAL WATER SUPPLY PROJECT- GENERAL LAYOUT	MWS/TW/BWPH/01	MARALAL WATER SUPPLY PROJECT - BACKWASH PUMP HOUSE _GENERAL LAYOUT
<b>2</b>	<b>RAW WATER LINE (RWL)</b>	MWS/TW/BWPH/02	MARALAL WATER SUPPLY PROJECT - BACKWASH PUMP HOUSE _SECTION A-A
M/WS/RWGM/01	RAW WATER GRAVITY MAIN (CHAINAGE 0+000~0+576.00)	MWS/TW/BWPH/03	MARALAL WATER SUPPLY PROJECT - BACKWASH PUMP HOUSE _SECTION B-B
M/WS/RWGM/02	RAW WATER GRAVITY MAIN (CHAINAGE 0+576.00~1+152.00)	MWS/TW/BWPH/04	MARALAL WATER SUPPLY PROJECT - BACKWASH PUMP HOUSE _ELEVATIONS
M/WS/RWGM/03	RAW WATER GRAVITY MAIN ( CHAINAGE 1+152.00~1+416.22)	MWS/TW/BWPH/05	MARALAL WATER SUPPLY PROJECT - BACKWASH PUMP HOUSE _SCHEDULE OF PIPES (PART 1)
M/WS/RWGM/04	RAW WATER GRAVITY MAIN HYDRAULIC GRADIENT LINE	MWS/TW/BWPH/06	MARALAL WATER SUPPLY PROJECT - BACKWASH PUMP HOUSE _SCHEDULE OF PIPES (PART 2)
<b>3</b>	<b>MARALAL WATER TREATMENT WORKS</b>	MWS/TW/BWPH/07	MARALAL WATER SUPPLY PROJECT - BACKWASH PUMP HOUSE _SCHEDULE OF PIPES (PART 3)
MWS/TW/GL/01	MARALAL WATER SUPPLY PROJECT - WATER TREATMENT WORKS GENERAL LAYOUT	MWS/TW/BWPH - STR/01	MARALAL WATER SUPPLY PROJECT - BACKWASH PUMP HOUSE STRUCTURAL DETAILS - 3D STRUCTURALMODEL
MWS/TW/P/01	MARALAL WATER SUPPLY PROJECT - WATER TREATMENT WORKS GENERAL PROFILE A-A	MWS/TW/BWPH - STR/02	MARALAL WATER SUPPLY PROJECT - BACKWASH PUMP HOUSE STRUCTURAL DETAILS - FOUNDATION SLAB AND WALL REINFORCEMENT DETAILS
MWS/TW/P/02	MARALAL WATER SUPPLY PROJECT - WATER TREATMENT WORKS GENERAL SECTION 1-1 & 2-2	MWS/TW/BWPH - STR/03	MARALAL WATER SUPPLY PROJECT - BACKWASH PUMP HOUSE STRUCTURAL DETAILS - SUSPENDED SLAB REINFORCEMENT DETAILS
MWS/TW/P/03	MARALAL WATER SUPPLY PROJECT - WATER TREATMENT WORKS GENERAL SECTION 3-3 & 4-4	MWS/TW/BWPH - STR/04	MARALAL WATER SUPPLY PROJECT - BACKWASH PUMP HOUSE STRUCTURAL DETAILS - RC BEAM REINFORCEMENT DETAILS
MWS/TW/P/04	MARALAL WATER SUPPLY PROJECT - WATER TREATMENT WORKS GENERAL SECTION 5-5	MWS/TW/BWPH - STR/05	MARALAL WATER SUPPLY PROJECT - BACKWASH PUMP HOUSE STRUCTURAL DETAILS - RC BEAM REINFORCEMENT DETAILS
<b>A.</b>	<b>CHEMICAL STORAGE, MIXING AND DOSING BUILDING</b>	MWS/TW/BWPH - STR/05	MARALAL WATER SUPPLY PROJECT - BACKWASH PUMP HOUSE STRUCTURAL DETAILS -STAIRCASE AND COLUMN REINFORCEMENT DETAILS
MWS/TW/CSMD/01	MARALAL WATER SUPPLY PROJECT - CHEMICAL STORAGE, MIXING AND DOSING BUILDING - GROUND FLOOR PLAN	MWS/TW/BWPH - STR/06	MARALAL WATER SUPPLY PROJECT - BACKWASH PUMP HOUSE STRUCTURAL DETAILS - QUANTITIES AND TAKEOFFS [PART 1]
MWS/TW/CSMD/02	MARALAL WATER SUPPLY PROJECT - CHEMICAL STORAGE, MIXING AND DOSING BUILDING - FIRST FLOOR PLAN	MWS/TW/BWPH - STR/07	MARALAL WATER SUPPLY PROJECT - BACKWASH PUMP HOUSE STRUCTURAL DETAILS - QUANTITIES AND TAKEOFFS [PART 2]
MWS/TW/CSMD/03	MARALAL WATER SUPPLY PROJECT - CHEMICAL STORAGE, MIXING AND DOSING BUILDING - SECTION A-A	<b>H</b>	<b>ELEVATED BACKWASH TANK</b>
MWS/TW/CSMD/04	MARALAL WATER SUPPLY PROJECT - CHEMICAL STORAGE, MIXING AND DOSING BUILDING - SECTION B-B	MWS/TW/BT/01	MARALAL WATER SUPPLY PROJECT - ELEVATED BACKWASH TANK - FOUNDATION DETAILS AND SECTIONS
MWS/TW/CSMD/05	MARALAL WATER SUPPLY PROJECT - CHEMICAL STORAGE, MIXING AND DOSING BUILDING - MISCELLANEOUS DETAILS	MWS/TW/BT/02	MARALAL WATER SUPPLY PROJECT - ELEVATED BACKWASH TANK - ELEVATIONS
<b>B.</b>	<b>STILLING WELL ,FLOCCULATION BASIN &amp; DOSING CHANNEL</b>	MWS/TW/BT/03	MARALAL WATER SUPPLY PROJECT - ELEVATED BACKWASH TANK - ELEVATIONS & PLATFORM DETAILS
MWS/TW/FB/01	MARALAL WATER SUPPLY PROJECT - FLOCCULATION BASIN _LAYOUT AND SECTIONS	MWS/TW/BT/04	MARALAL WATER SUPPLY PROJECT - ELEVATED BACKWASH TANK - PIPEWORK DETAILS
MWS/TW/SW_DC&W /01	MARALAL WATER SUPPLY PROJECT - STILLING WELL,DOSING CHANNEL AND FLOW MEASUREMENT WEIR	MWS/TW/GH/01	MARALAL WATER SUPPLY PROJECT - GUARD HOUSE- (TYPE C) - PLAN AND SECTION
MWS/TW/FB - STR/01	MARALAL WATER SUPPLY PROJECT - FLOCCULATION BASIN STRUCTURAL DETAILING _3D STRUCTURAL MODELS	<b>J</b>	<b>SLUDGE AND BACKWASH WATER LAGOON</b>
MWS/TW/FB - STR/02	MARALAL WATER SUPPLY PROJECT - FLOCCULATION BASIN STRUCTURAL DETAILING _RC SLAB REINFORCEMENT DETAIL	MWS/TW/SBWL/01	MARALAL WATER SUPPLY PROJECT - SLUDGE AND BACKWASH WATER LAGOON - PLAN
MWS/TW/FB - STR/03	MARALAL WATER SUPPLY PROJECT - FLOCCULATION BASIN STRUCTURAL DETAILING _SECTION REINFORCEMENT DETAIL	MWS/TW/SBWL/02	MARALAL WATER SUPPLY PROJECT - SLUDGE AND BACKWASH WATER LAGOON - SECTIONS
MWS/TW/FB - STR/04	MARALAL WATER SUPPLY PROJECT - FLOCCULATION BASIN STRUCTURAL DETAILING _MATERIAL TAKE-OFF & BAR BENDING SCHEDULE (PART 1)	MWS/TW/SBWL/03	MARALAL WATER SUPPLY PROJECT - SLUDGE AND BACKWASH WATER LAGOON - OVERFLOW PIPEWORK
MWS/TW/FB - STR/05	MARALAL WATER SUPPLY PROJECT - FLOCCULATION BASIN STRUCTURAL DETAILING _MATERIAL TAKE-OFF & BAR BENDING SCHEDULE (PART 2)	MWS/TW/SBWL - STR/01	MARALAL WATER SUPPLY PROJECT - SLUDGE AND BACKWASH WATER LAGOON - DIVIDING WALL STRUCTURAL DETAILS AND BAR BENDING SCHEDULE
MWS/TW/SW-STR/01	MARALAL WATER SUPPLY PROJECT - CHEMICAL - STILLING WELL STRUCTURAL DETAILING _LAYOUTS AND REINFORCEMENT DETAILS FOR SLABS AND FOUNDATIONS	<b>J</b>	<b>SLUDGE DRYING BEDS</b>
MWS/TW/SW-STR/02	MARALAL WATER SUPPLY PROJECT - STILLING WELL STRUCTURAL DETAILING _SECTIONS, ELEVATIONS AND REINFORCEMENT DETAILS FOR BEAMS, COLUMNS AND WALLS	MWS/TW/SBD/01	MARALAL WATER SUPPLY PROJECT - SLUDGE DRYING BEDS - PLAN
MWS/TW/SW-STR/03	MARALAL WATER SUPPLY PROJECT - STILLING WELL STRUCTURAL DETAILING _3D MODEL, COLUMN AND BEAM REINFORCEMENT DETAILS	MWS/TW/SBD/02	MARALAL WATER SUPPLY PROJECT - SLUDGE DRYING BEDS - SECTIONS
MWS/TW/SW-STR/04	MARALAL WATER SUPPLY PROJECT - STILLING WELL STRUCTURAL DETAILING _BAR BENDING SCHEDULES	MWS/TW/SBD - STR/01	MARALAL WATER SUPPLY PROJECT - SLUDGE DRYING BEDS - STRUCTURAL SECTIONS
<b>C</b>	<b>SEDIMENTATION TANK</b>	<b>K</b>	<b>RECYCLED WATER PUMP HOUSE</b>
MWS/TW/ST/01	MARALAL WATER SUPPLY PROJECT - SEDIMENTATION TANKS _LAYOUT	MWS/TW/RWPH/01	MARALAL WATER SUPPLY PROJECT - RECYCLED WATER PUMP HOUSE
MWS/TW/ST/02	MARALAL WATER SUPPLY PROJECT - SEDIMENTATION TANKS _SECTIONS	<b>L</b>	<b>OPERATOR'S OFFICE, LABORATORY &amp; STORE</b>
MWS/TW/ST/03	MARALAL WATER SUPPLY PROJECT - SEDIMENTATION TANKS _SCOUR CHAMBER, V-NOTCH WEIR AND COVER SLABS	MWS/TW/OP/01	MARALAL WATER SUPPLY PROJECT - OPERATOR'S OFFICE, LABORATORY & STORE - PLAN, ELEVATIONS AND SECTIONS
MWS/TW/ST-STR/01	MARALAL WATER SUPPLY PROJECT - SEDIMENTATION TANKS _STRUCTURAL DETAILS	<b>M</b>	<b>WORKS PIPELINES</b>
MWS/TW/ST-STR/02	MARALAL WATER SUPPLY PROJECT - SEDIMENTATION TANKS _BAR BENDING SCHEDULE	MWS/TW/WP/01	MARALAL WATER SUPPLY PROJECT - WORKS PIPELINES
<b>D</b>	<b>FILTERS</b>	<b>N</b>	<b>GUARD HOUSE</b>
MWS/TW/F/01	MARALAL WATER SUPPLY PROJECT - FILTER _SECTIONS AND DEFLECTOR PLATE DETAILS	MWS/TW/GH/01	MARALAL WATER SUPPLY PROJECT - GUARD HOUSE - PLAN AND SECTION
MWS/TW/F/02	MARALAL WATER SUPPLY PROJECT - FILTER PIPE WORK SUPPORT DETAILS	<b>O</b>	<b>STAFF HOUSE</b>
MWS/TW/F/03	MARALAL WATER SUPPLY PROJECT - FILTER LAYOUT & PIPE DETAILS	MWS/TW/SH/01	MARALAL WATER SUPPLY PROJECT - STAFF HOUSE
MWS/TW/F/04	MARALAL WATER SUPPLY PROJECT - FILTERED WATER COLLECTION &UPVC LATERALS SUPPORTING DETAILS	<b>P</b>	<b>ELECTRICAL DRAWINGS</b>
MWS/TW/F/05	MARALAL WATER SUPPLY PROJECT - FILTERED WATER COLLECTION COVER SLAB & LATERAL PIPE DETAILS	MWS/TW/E/01	MARALAL WATER SUPPLY PROJECT - ELECTRICAL SYMBOLS
MWS/TW/F/06	MARALAL WATER SUPPLY PROJECT -FILTERS INLET CHANNEL & FILTER MEDIA DETAILS	MWS/TW/E/02	MARALAL WATER SUPPLY PROJECT - ELECTRICAL WORKS LAYOUT
MWS/TW/F/07	MARALAL WATER SUPPLY PROJECT -FILTERS CONTROL ROOM FLOOR PLAN	MWS/TW/E/03	MARALAL WATER SUPPLY PROJECT - MAIN DISTRIBUTION BOARD
MWS/TW/F-STR/01	MARALAL WATER SUPPLY PROJECT -FILTERS STRUCTURAL DETAILS	MWS/TW/E/04	MARALAL WATER SUPPLY PROJECT - CHROLINE STORAGE,MIXING AND DOSING BUILDING ELECTRICAL SYSTEM LAYOUT
MWS/TW/F-STR/02	MARALAL WATER SUPPLY PROJECT -FILTERS STAIRCASE, FILTER CONTROL ROOM, COLUMNS BEAMS AND STAIRCASE SUPPORT STRUCTURAL DETAILS	MWS/TW/E/05	MARALAL WATER SUPPLY PROJECT - CHROLINE STORAGE,MIXING AND DOSING BUILDING DISTRIBUTION BOARD AND MOTOR CONTROL CENTER
MWS/TW/F-STR/03	MARALAL WATER SUPPLY PROJECT -FILTERS BAR BENDING SCHEDULE	MWS/TW/E/06	MARALAL WATER SUPPLY PROJECT - CHEMICAL STORAGE, MIXING AND DOSING BUILDING ELECTRICAL SYSTEM LAYOUT
MWS/TW/F-STR/04	MARALAL WATER SUPPLY PROJECT -FILTERS CONTROL ROOM TYPICAL TRUSS DETAILS	MWS/TW/E/07	MARALAL WATER SUPPLY PROJECT - CHEMICAL STORAGE, MIXING AND DOSING BUILDING DISTRIBUTION BOARD AND MOTOR CONTROL CENTER
<b>E</b>	<b>TREATED WATER TANK (500 M3)</b>	MWS/TW/E/08	MARALAL WATER SUPPLY PROJECT - FILTER GALLERY AND FILTER CONTROL ROOM ELECTRICAL SYSTEM LAYOUT
M/WS/TW/TWT/01	MARALAL WATER SUPPLY PROJECT - TREATED WATER TANK (500m³)	MWS/TW/E/09	MARALAL WATER SUPPLY PROJECT - BACKWASH PUMPHOUSE ELECTRICAL SYSTEM LAYOUT
M/WS/TW/TWT- STR/01	MARALAL WATER SUPPLY PROJECT - TREATED WATER TANK STRUCTURAL DETAILING _3D STRUCTURAL MODELS	MWS/TW/E/10	MARALAL WATER SUPPLY PROJECT - OPERATORS OFFICE, LABORATORY & STORE ELECTRICAL SYSTEM LAYOUT
M/WS/TW/TWT- STR/02	MARALAL WATER SUPPLY PROJECT - TREATED WATER TANK STRUCTURAL DETAILING _PLAN	MWS/TW/E/11	MARALAL WATER SUPPLY PROJECT - GUARD HOUSE ELECTRICAL SYSTEM
M/WS/TW/TWT- STR/03	MARALAL WATER SUPPLY PROJECT - TREATED WATER TANK STRUCTURAL DETAILING _MAIN WALL REINFORCEMENT DETAILS	<b>Q</b>	<b>MATERIALS LAB</b>
M/WS/TW/TWT- STR/04	MARALAL WATER SUPPLY PROJECT - TREATED WATER TANK STRUCTURAL DETAILING _TOP SLAB, COLUMNS, UPSTAND BEAM AND COLUMN BASE DETAILS	MWS/TW/ML/01	MARALAL WATER SUPPLY PROJECT - MATERIALS LAB
M/WS/TW/TWT- STR/05	MARALAL WATER SUPPLY PROJECT - TREATED WATER TANK STRUCTURAL DETAILING _MATERIAL TAKE-OFF AND BAR BENDING SCHEDULE (PART 1)		
M/WS/TW/TWT- STR/06	MARALAL WATER SUPPLY PROJECT - TREATED WATER TANK STRUCTURAL DETAILING _MATERIAL TAKE-OFF AND BAR BENDING SCHEDULE (PART 2)		
<b>F</b>	<b>CHLORINE STORAGE, MIXING AND DOSING BUILDING</b>		
M/WS/TW/CB/01	MARALAL WATER SUPPLY PROJECT - CHLORINE STORAGE, MIXING AND DOSING BUILDING _PLAN		
MWS/TW/CB/02	MARALAL WATER SUPPLY PROJECT - CHLORINE STORAGE, MIXING AND DOSING BUILDING _SECTIONS		
MWS/TW/CB/03	MARALAL WATER SUPPLY PROJECT - CHLORINE STORAGE, MIXING AND DOSING BUILDING _ MISCELLANEOUS DETAILS		

<b>R</b>	<b>TREATED WATER MAIN</b>		
M/WS/TWM/01	MARALAL WATER SUPPLY PROJECT- PROFILE AND LAYOUT - TREATED WATER MAIN - CHAINAGE 0+000.00 ~ 0+576.00		
M/WS/TWM/02	MARALAL WATER SUPPLY PROJECT- PROFILE AND LAYOUT - TREATED WATER MAIN - CHAINAGE 0+576.00 ~ 1+152.00		
M/WS/TWM/03	MARALAL WATER SUPPLY PROJECT- PROFILE AND LAYOUT - TREATED WATER MAIN - CHAINAGE 1+152.00 ~ 1+728.00		
M/WS/TWM/04	MARALAL WATER SUPPLY PROJECT- PROFILE AND LAYOUT - TREATED WATER MAIN - CHAINAGE 1+728.00 ~ 2+304.00		
M/WS/TWM/05	MARALAL WATER SUPPLY PROJECT- PROFILE AND LAYOUT - TREATED WATER MAIN - CHAINAGE 2+304.00 ~ 2+880.00		
M/WS/TWM/06	MARALAL WATER SUPPLY PROJECT- PROFILE AND LAYOUT - TREATED WATER MAIN - CHAINAGE 2+880.00 ~ 3+456.00		
M/WS/TWM/07	MARALAL WATER SUPPLY PROJECT- PROFILE AND LAYOUT - TREATED WATER MAIN - CHAINAGE 3+456.00 ~ 4+032.00		
M/WS/TWM/08	MARALAL WATER SUPPLY PROJECT- PROFILE AND LAYOUT - TREATED WATER MAIN - CHAINAGE 4+032.00 ~ 4+608.00		
M/WS/TWM/09	MARALAL WATER SUPPLY PROJECT- PROFILE AND LAYOUT - TREATED WATER MAIN - CHAINAGE 4+608.00~5+184.00		
M/WS/TWM/10	MARALAL WATER SUPPLY PROJECT- PROFILE AND LAYOUT - TREATED WATER MAIN - CHAINAGE 0+000.00 ~ 5+082		
<b>S</b>	<b>DISTRIBUTION TO EXISTING TANKS</b>		
M/WS/DL - 01/01	MARALAL WATER SUPPLY PROJECT- PLAN - MAIN DISTRIBUTION LINE-LINE 01 - CHAINAGE 0+000.00 ~ 0+472.01		
M/WS/DL - 01/02	MARALAL WATER SUPPLY PROJECT- PROFILE - MAIN DISTRIBUTION LINE-LINE 01 - CHAINAGE 0+000.00 ~ 0+472.01		
M/WS/DL - 01/03	MARALAL WATER SUPPLY PROJECT- HYDRAULIC GRADIENT LINE - TREATED WATER LINE AND DISTRIBUTION LINE 1(TO EXISTING TANKS) - CHAINAGE 0+000.00 ~ 5 + 681		
<b>T</b>	<b>STANDARD DRAWINGS</b>		
M/WS/S/SD/01	STANDARD DETAILS - PROJECT SIGNBOARD DETAILS		
M/WS/S/SD/02	STANDARD DETAILS- DETAILS OF VALVE CHAMBERS		
M/WS/S/SD/03	STANDARD DRAWINGS - DETAILS OF PRECAST CONCRETE - COVERS FOR VALVE CHAMBERS		
M/WS/S/SD/04	STANDARD DRAWINGS - DETAILS OF TRENCH AND PIPE - CROSSINGS FOR WATER PIPES		
M/WS/S/SD/04	STANDARD DRAWINGS - DETAILS OF TRENCH AND PIPE - CROSSINGS FOR WATER PIPES		
M/WS/S/SD/05	STANDARD DRAWINGS - TYPICAL WATER KIOSK DETAILS - SHEET 1 OF 3		
M/WS/S/SD/06	STANDARD DRAWINGS - TYPICAL WATER KIOSK DETAILS - SHEET 2 OF 3		
M/WS/S/SD/07	STANDARD DRAWINGS - TYPICAL WATER KIOSK DETAILS - SHEET 3 OF 3		
M/WS/S/SD/08	STANDARD DRAWINGS - DETAILS OF MANHOLES AND INSPECTION CHAMBERS - SHEET 1 OF 2		
M/WS/S/SD/09	STANDARD DRAWINGS - DETAILS OF MANHOLES AND INSPECTION CHAMBERS - SHEET 2 OF 2		
M/WS/S/SD/10	STANDARD DRAWINGS - DETAILS OF BEDDING AND HAUNCHES FOR PIPES, Y- JUNCTION DETAILS AND SOAK AWAY PIT DETAILS		
M/WS/S/SD/11	STANDARD DRAWINGS - THRUST BLOCKS, ANCHOR BLOCKS AND INDICATOR POST DETAILS		
M/WS/S/SD/12	STANDARD DRAWINGS - TYPICAL ROAD CROSS SECTION DETAILS		
M/WS/S/SD/13	STANDARD DRAWINGS - DETAILS OF STORM WATER CATCH PIT AND EARTH DRAINS		
M/WS/S/SD/14	STANDARD DRAWINGS - DETAILS OF G.M.S. LADDER AND GUARD RAILING		
M/WS/S/SD/15	STANDARD DRAWINGS - DETAILS OF FENCING POSTS		
M/WS/S/SD/16	STANDARD DRAWINGS - DETAILS OF GATES - SHEET 1 OF 2		
M/WS/S/SD/17	STANDARD DRAWINGS - DETAILS OF GATES - SHEET 2 OF 2		
M/WS/S/SD/18	STANDARD DRAWINGS - DETAILS OF INVERT BLOCK DRAINS AND HEADWALL		
M/WS/S/SD/19	STANDARD DRAWINGS - TYPICAL DETAILS OF CONSUMER WATER METER INSTALLATION ON A SERVICE LINE		
M/WS/S/SD/20	STANDARD DRAWINGS - DETAILS OF OPEN MESH FLOORING		
M/WS/S/SD/21	STANDARD DRAWINGS - DETAILS OF PIERS FOR PIPE AERIAL CROSSINGS		
M/WS/S/SD/22	STANDARD DRAWINGS - DETAILS OF REINFORCED CHAMBER		
M/WS/S/SD/23	STANDARD DRAWINGS - DETAILS OF CHECKERED PLATE - COVERS FOR CHAMBERS - (SHEET 1 OF 2)		
M/WS/S/SD/24	STANDARD DRAWINGS - DETAILS OF CHECKERED PLATE - COVERS FOR CHAMBERS - (SHEET 2 OF 2)		
M/WS/S/SD/25	STANDARD DRAWINGS - DETAILS OF MILD STEEL METALN - COVERS FOR CHAMBERS - (SHEET 1 OF 2)		
M/WS/S/SD/26	STANDARD DRAWINGS - DETAILS OF MILD STEEL METAL - COVERS FOR CHAMBERS - (SHEET 2 OF 2)		
M/WS/S/SD/27	STANDARD DRAWINGS - DOOR SCHEDULE - SHEET 1 OF 2		
M/WS/S/SD/28	STANDARD DRAWINGS - DOOR SCHEDULE - SHEET 2 OF 2		
M/WS/S/SD/29	STANDARD DRAWINGS - WINDOW SCHEDULE		



- NOTES:**
1. CONTOUR LEVELS ARE IN METERS AT ONE METER INTERVALS
  2. MINIMUM PIPELINE SLOPES TO BE 1:500
  3. DRAWING TO BE READ IN CONJUNCTION WITH STANDARD DRAWINGS
  4. ALL PIPE FITTINGS TO BE CONFIRMED ON SITE DURING SETTING OUT


- LEGEND:**
- ROAD (TARMAC)
  - ROAD / TRACK (EARTH / MURRAM)
  - CHAINLINK FENCE
  - BARBED WIRE FENCE
  - FENCE / HEDGE
  - 32 CONTOURS, 1m INTERVAL
  - ELECTRIC POST
  - CULVERT
  - GATE
  - ROCK OUTCROPS
  - PROPOSED WATER MAIN
  - EXISTING QUARRY FENCE
- TP10** TRAVERSE POINT & No.
- TREES
- HORIZONTAL BEND (H) OR VERTICAL BEND (V) WITH ANGLE INDICATED
- GV** GATE VALVE
- WM** WATER METER
- WO-01** WASHOUT VALVE & No.
- SAV-01** SINGLE ORIFICE AIR VALVE & No.
- PIPELINE GRADIENT WITH SLOPE DIRECTION (SLOPE MIN. OR 1 IN n)
- CONTROL POINT

**CONTROL POINTS**

NORTHING	EASTING	ELEVATION	DESCRIPTION
124384.426	239789.916	2045.325	T8
123949.361	239976.187	2033.506	T9
123497.036	240289.493	2034.716	TP
123339.751	240355.639	2031.802	T10
123071.969	240456.581	2032.275	T12
124384.431	239789.924	2045.323	T7
125337.992	238710.623	2093.905	T2A
125087.118	238467.115	2097.308	T1
125067.303	238507.520	2094.498	T1A
122727.298	240629.864	2035.268	T13
120098.386	242787.045	1918.667	T16
122385.501	240923.306	1983.404	T14
121328.205	241975.695	2024.908	TP

REVISION	DESCRIPTION

CLIENT / EMPLOYER:



**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
P.O. BOX 495-70100  
GARISSA

REVIEWED BY:

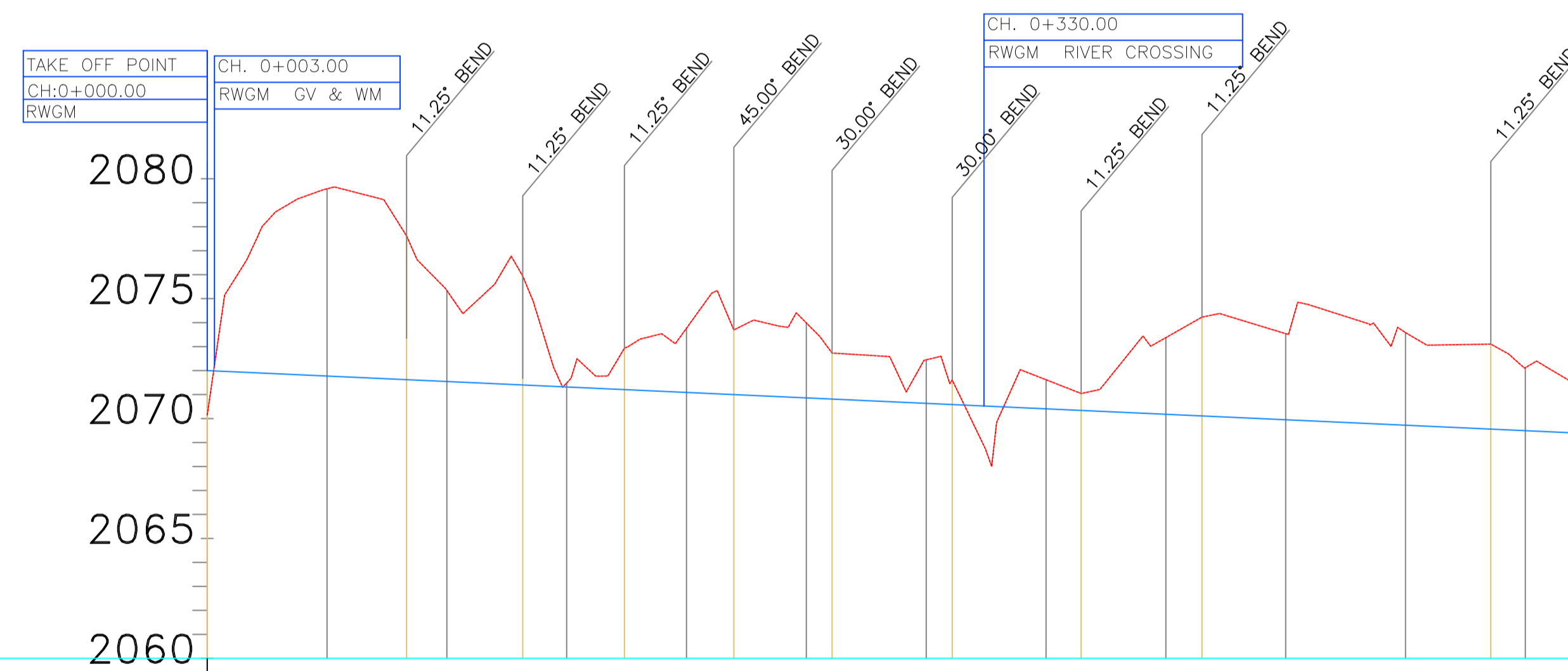
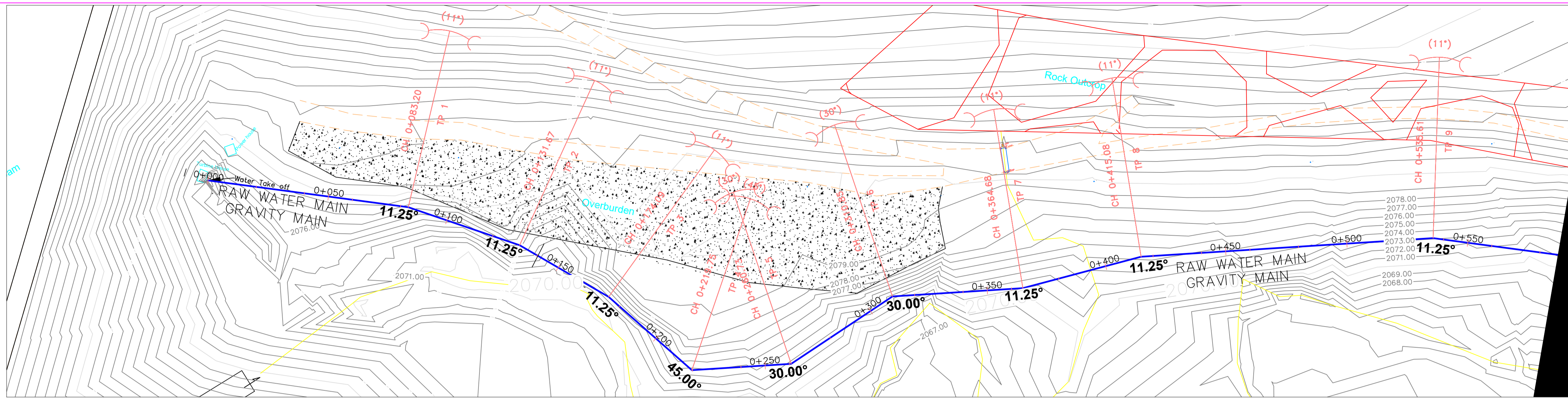


**Interconsult Engineers Ltd**  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane,  
Tel. 4441648/4441651  
Nairobi.

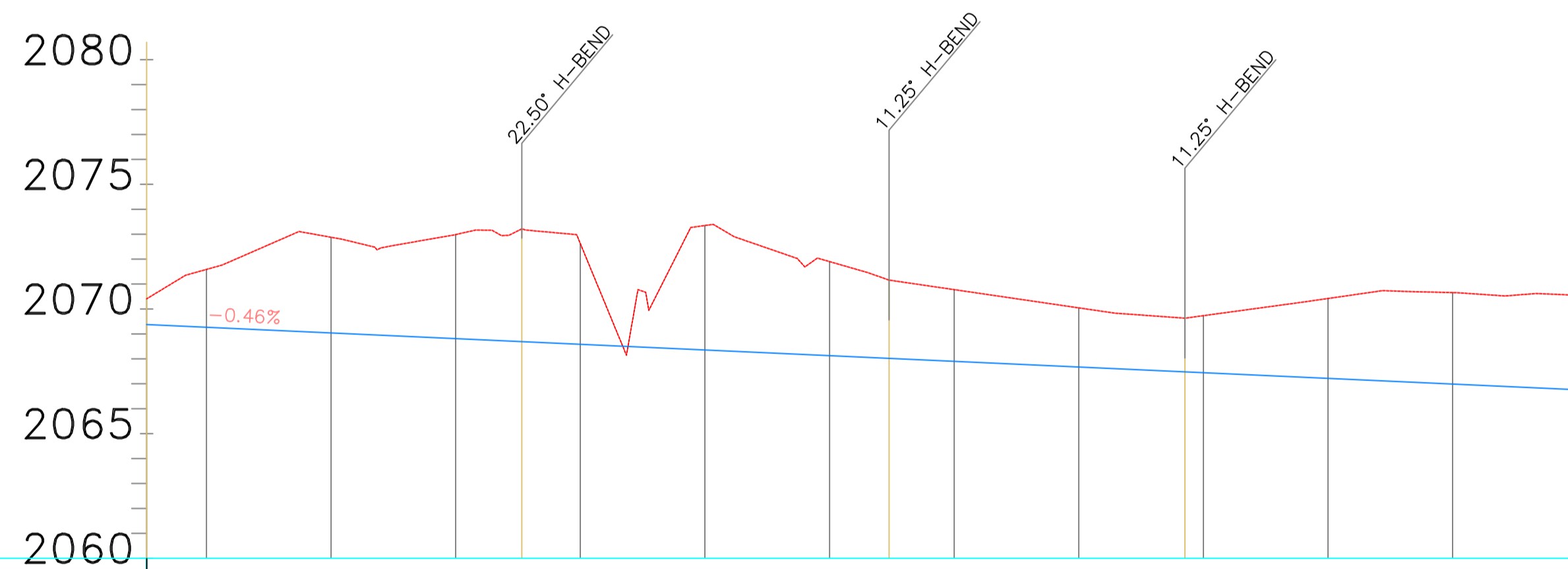
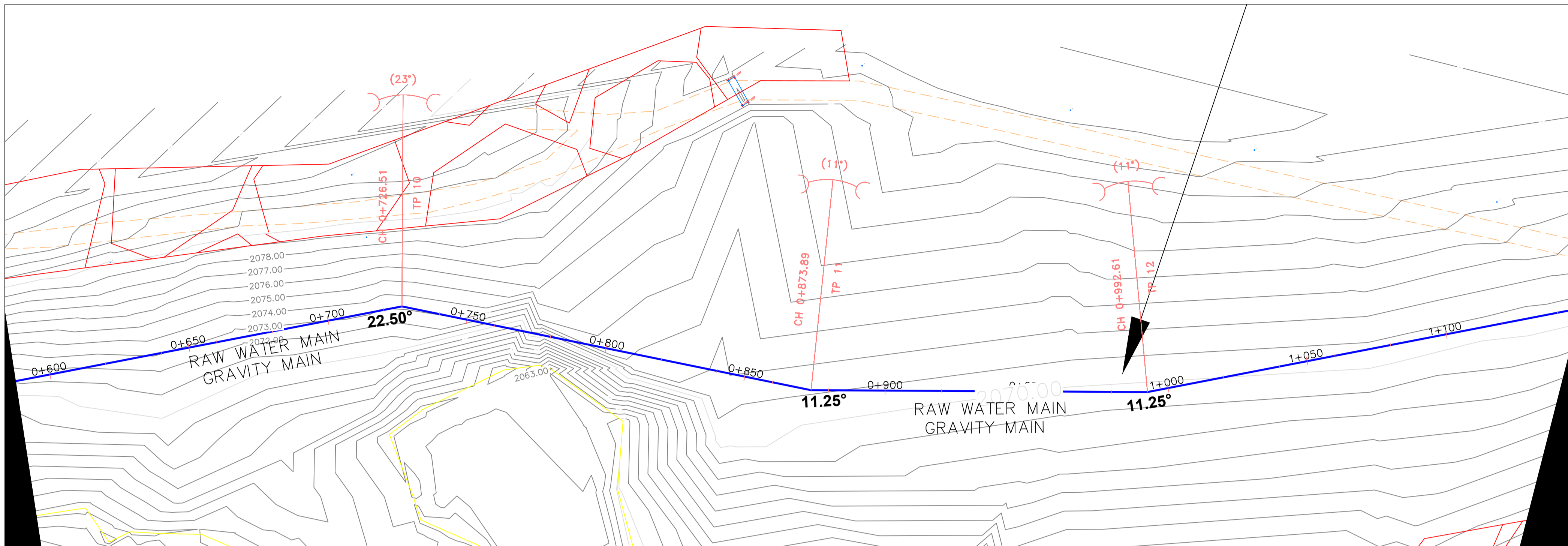
DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT**  
**WATER TREATMENT WORKS GENERAL LAYOUT**

Designed by: N.W	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: 1:500	Date: FEBRUARY 2024
DRAWING No. <b>MWS/GL/01</b>	REV. <b>0</b>

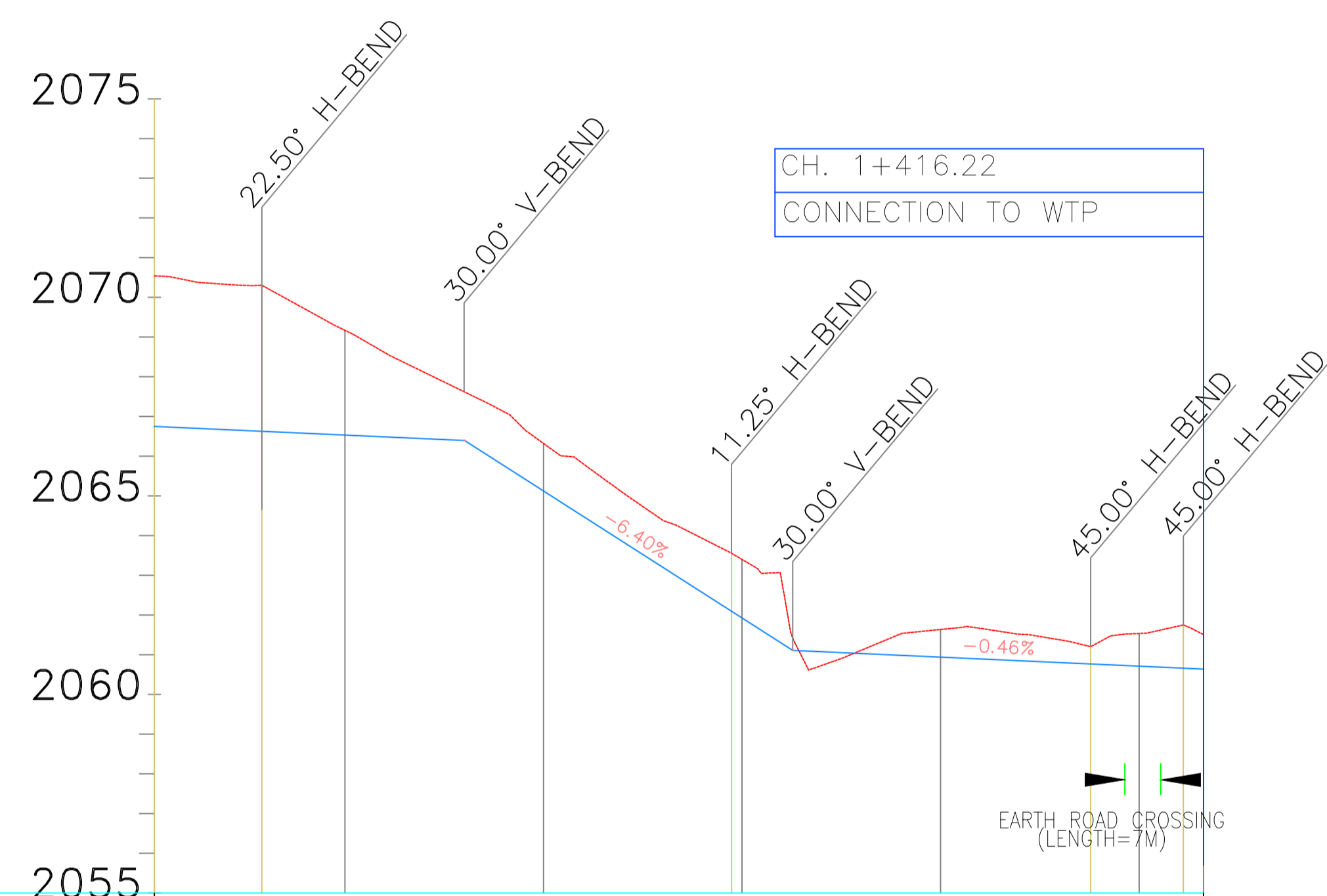
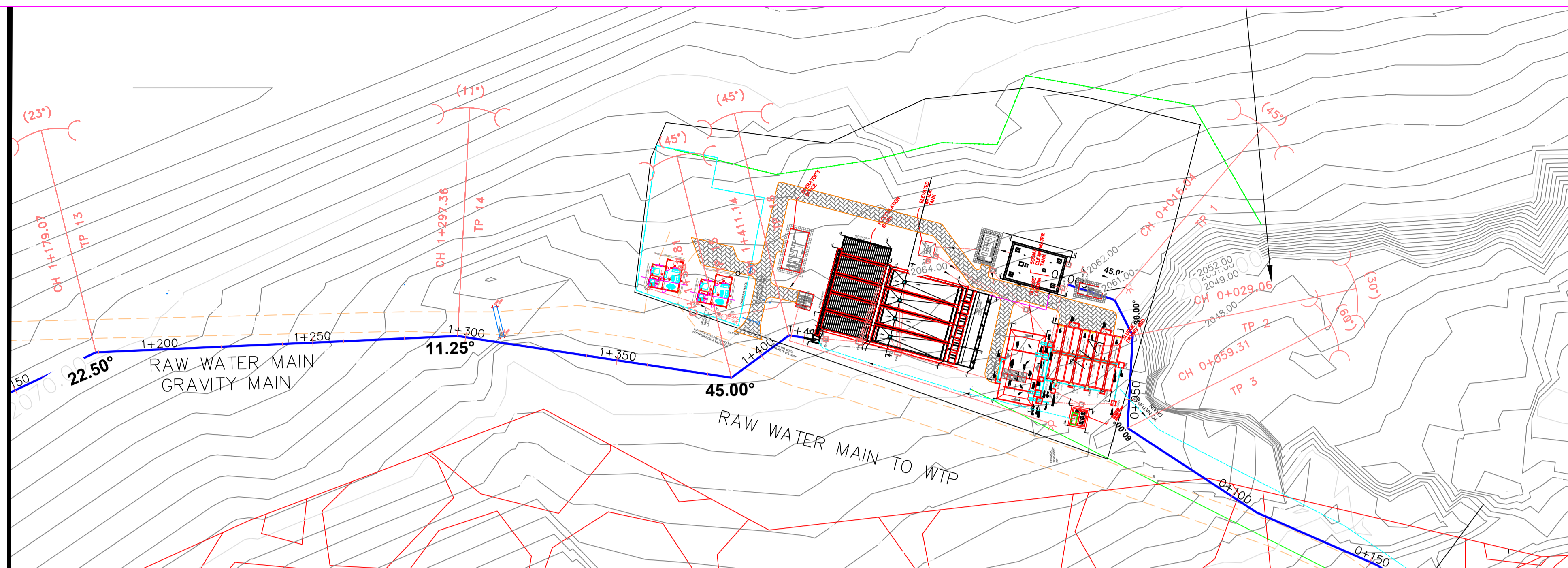
**RAW WATER  
GRAVITY MAIN**



DATUM (m)	2060															
TYPE AND SIZE OF PIPE	DN 450 PN 10 EPOXY COATED STEEL PIPE															
EXISTING GROUND LEVEL (m)	2070.15	2077.61	2075.34	2075.94	2072.94	2073.77	2073.70	2072.73	2072.45	2071.61	2071.04	2073.37	2074.23	2073.58	2073.10	2070.41
DEPTH OF INVERT (m)	-1.85	5.99	3.79	4.54	1.73	2.68	2.70	1.92	1.81	1.02	0.71	3.20	4.12	3.86	3.54	1.03
CHAINAGE (m)	0+000.00	0+083.20	0+100.00	0+131.67	0+174.09	0+200.00	0+219.75	0+260.73	0+300.00	0+310.85	0+364.68	0+400.00	0+415.08	0+500.00	0+535.61	0+576.00
INVERT LEVEL (m)	2072.00	2071.62	2071.54	2071.40	2071.21	2071.09	2071.00	2070.81	2070.63	2070.58	2070.34	2070.18	2070.11	2069.72	2069.56	2069.38
SLOPE OF PIPE (1/n)	-1:219.45															



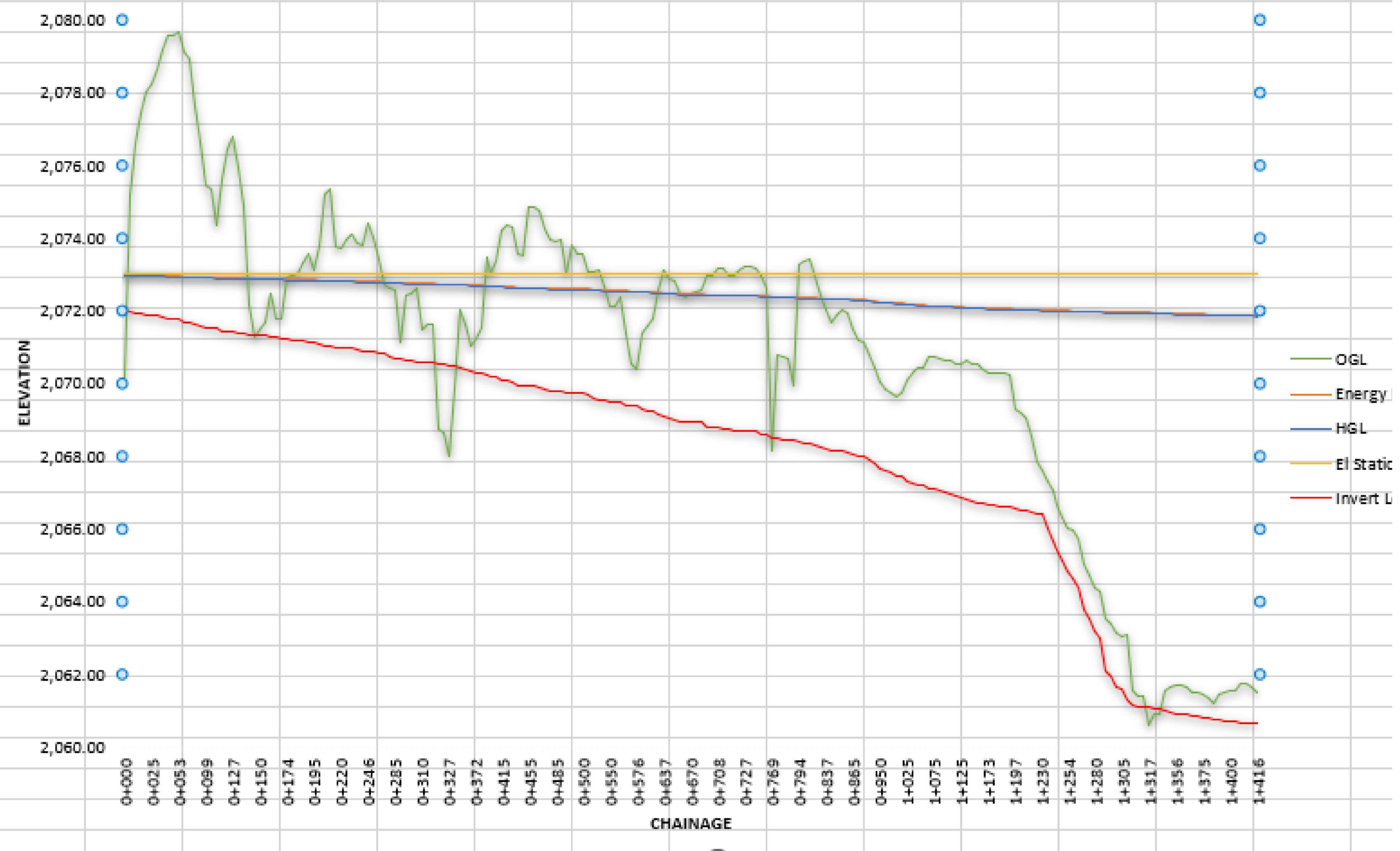
DATUM (m)	2060											
TYPE AND SIZE OF PIPE	DN 450 PN 10 EPOXY COATED STEEL PIPE											
EXISTING GROUND LEVEL (m)	2070.41	2071.59	2072.99	2073.21	2073.35	2071.16	2070.78	2069.93	2070.66	2070.54		
DEPTH OF INVERT (m)	1.03	2.32	4.18	4.52	4.99	3.14	2.88	2.25	3.67	3.79		
CHAINAGE (m)	0+576.00	0+600.00	0+700.00	0+726.51	0+800.00	0+873.89	0+900.00	0+992.61	1+100.00	1+152.00		
INVERT LEVEL (m)	2069.38	2069.27	2068.81	2068.69	2068.35	2068.02	2067.90	2067.44	2066.99	2066.75		
SLOPE OF PIPE (1/n)	-1:219.45											



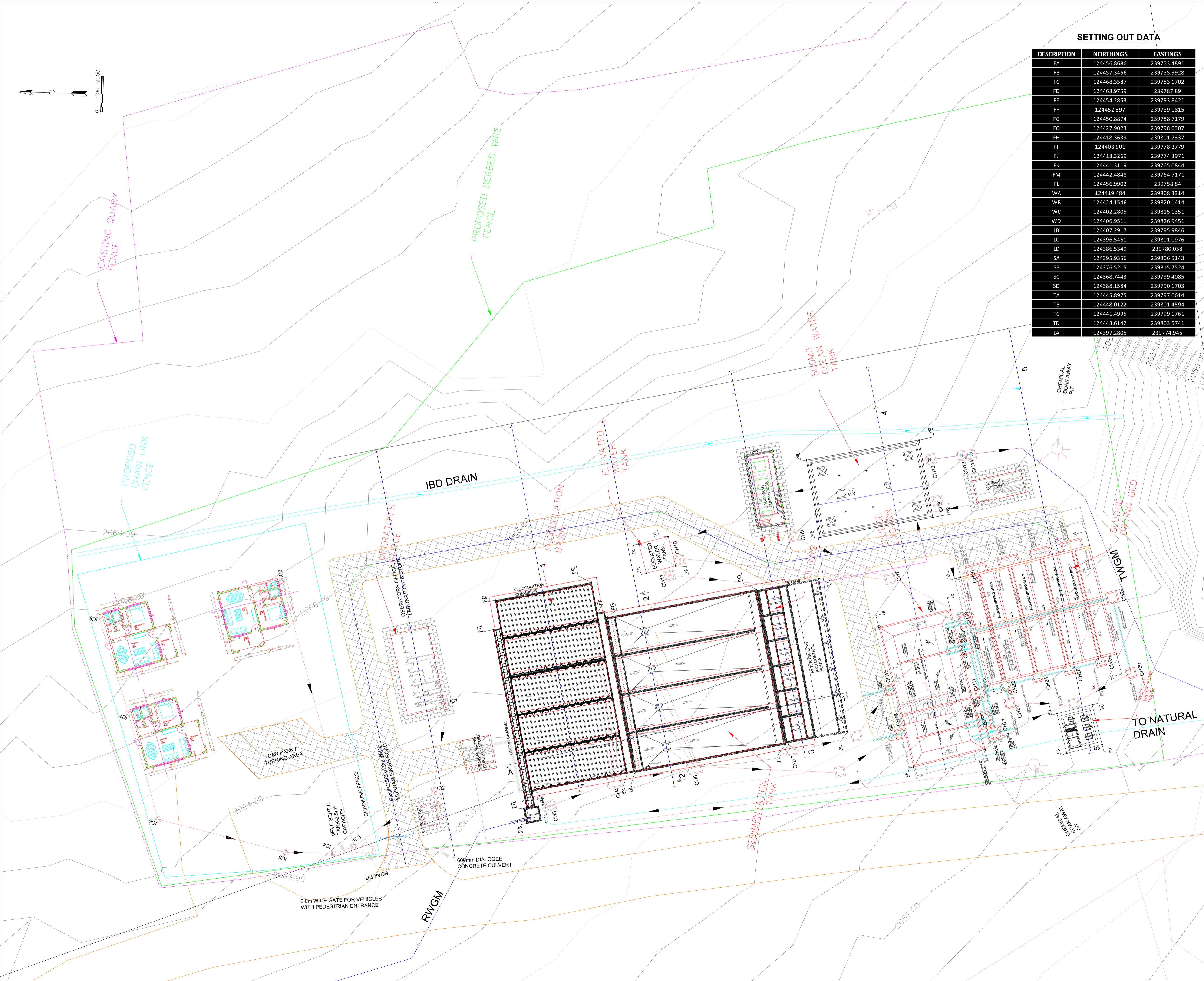
DATUM (m)	2055									
TYPE AND SIZE OF PIPE	DN 450 PN 10 EPOXY COATED									
EXISTING GROUND LEVEL (m)	2070.54	2070.30	2069.17	2067.62	2063.56	2061.42	2061.20	2061.54	2061.75	2061.51
DEPTH OF INVERT (m)	3.79	3.68	2.64	1.22	1.48	0.31	0.44	0.82	1.09	0.87
CHAINAGE (m)	1+152.00	1+179.07	1+200.00	1+230.14	1+387.81	1+312.77	1+387.81	1+400.00	1+411.14	1+416.22
INVERT LEVEL (m)	2066.75	2066.63	2066.53	2066.39	2062.08	2061.11	2060.77	2060.71	2060.64	2060.64
SLOPE OF PIPE (1/n)	-1:219.45			-1:15.63		-1:219.45				



# RAW WATER MAIN-HYDRAULIC ANALYSIS



# **WATER TREATMENT WORKS LAYOUT AND PROFILES**



**SETTING OUT DATA**

DESCRIPTION	NORTHINGS	EASTINGS
FA	124456.8686	239753.4891
FB	124457.3466	239755.9928
FC	124468.3587	239783.1702
FD	124468.9759	239787.89
FE	124454.2853	239793.8421
FF	124452.397	239789.1815
FG	124450.8874	239788.7179
FO	124427.9023	239798.0307
FH	124418.3639	239801.7337
FI	124408.901	239778.3779
FJ	124418.3269	239774.3971
FK	124441.3119	239765.0844
FM	124442.4848	239764.7171
FL	124456.9902	239758.84
WA	124419.484	239808.3314
WB	124424.1546	239820.1414
WC	124402.2805	239815.1351
WD	124406.9511	239826.9451
LB	124407.2917	239795.9846
LC	124396.5461	239801.0976
LD	124386.5349	239780.058
SA	124395.9356	239806.5143
SB	124376.5215	239815.7524
SC	124368.7443	239799.4085
SD	124388.1584	239790.1703
TA	124445.8975	239797.0614
TB	124448.0122	239801.4594
TC	124441.4995	239799.1761
TD	124443.6142	239803.5741
LA	124397.2805	239774.945

- NOTES:**
- CONTOUR LEVELS ARE IN METERS AT ONE METER INTERVALS
  - MINIMUM PIPELINE SLOPES TO BE 1:500
  - DRAWING TO BE READ IN CONJUNCTION WITH STANDARD DRAWINGS
  - ALL PIPE FITTINGS TO BE CONFIRMED ON SITE DURING SETTING OUT


- LEGEND:**
- ROAD (TARMAC)
  - ROAD / TRACK (EARTH / MURRAM)
  - CHAINLINK FENCE
  - BARBED WIRE FENCE
  - FENCE / HEDGE
  - CONTOURS, 1m INTERVAL
  - ELECTRIC POST
  - CULVERT
  - GATE
  - ROCK OUTCROPS
  - PROPOSED WATER MAIN
  - EXISTING QUARRY FENCE
  - TRaverse Point & No.
  - TREES
  - HORIZONTAL BEND (H) OR VERTICAL BEND (V) WITH ANGLE INDICATED
  - GATE VALVE
  - WATER METER
  - WASHOUT VALVE & No.
  - SINGLE ORIFICE AIR VALVE & No.
  - PIPELINE GRADIENT WITH SLOPE DIRECTION (SLOPE MIN. OR 1 IN n)
  - IBD DRAIN

**CONTROL POINTS**

NORTHING	EASTING	ELEVATION	DESCRIPTION
124384.426	239789.916	2045.325	T8
123949.361	239976.187	2033.506	T9
123497.036	240289.493	2034.716	TP
123339.751	240355.639	2031.802	T10
123071.969	240456.581	2032.275	T12
124384.431	239789.924	2045.323	T7
125337.992	238710.623	2093.905	T2A
125087.118	238467.115	2097.308	T1
125067.303	238507.520	2094.498	T1A
122727.298	240629.864	2035.268	T13
120098.386	242787.045	1918.667	T16
122385.501	240923.306	1983.404	T14
121328.205	241975.695	2024.908	TP

REVISION	DESCRIPTION

CLIENT / EMPLOYER:



**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
P.O. BOX 495-70100  
GARISSA

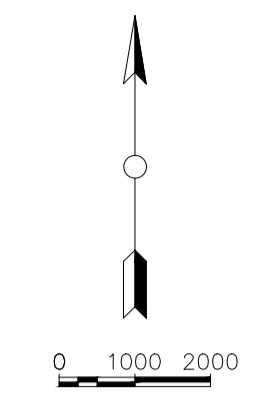
REVIEWED BY:



**Interconsult Engineers Ltd**  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane,  
Tel. 4441648/4441651  
Nairobi.

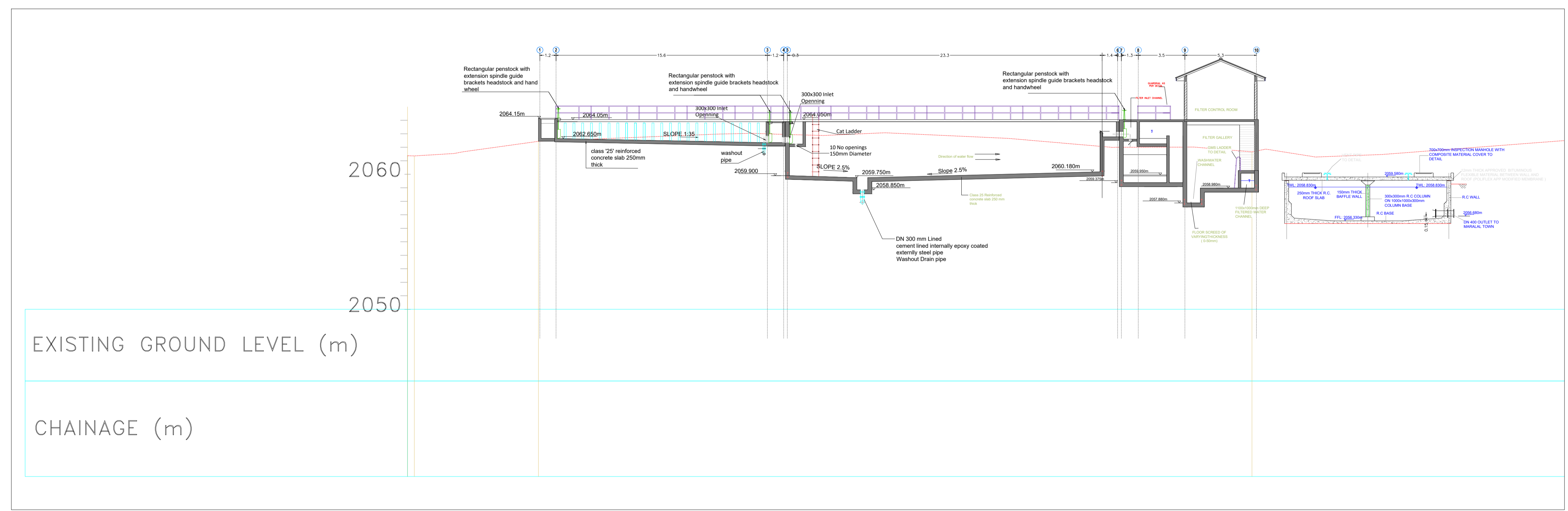
DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT**  
**WATER TREATMENT WORKS GENERAL LAYOUT**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: 1:500	Date: FEBRUARY 2024



- NOTES:**
1. CONTOUR LEVELS ARE IN METERS AT ONE METER INTERVALS
  2. MINIMUM PIPELINE SLOPES TO BE 1:500
  3. DRAWING TO BE READ IN CONJUNCTION WITH STANDARD DRAWINGS
  4. ALL PIPE FITTINGS TO BE CONFIRMED ON SITE DURING SETTING OUT

- LEGEND:**
- ROAD (TARMAC)
  - ROAD / TRACK (EARTH / MURRAM)
  - CHAINLINK FENCE
  - BARBED WIRE FENCE
  - FENCE / HEDGE
  - CONTOURS, 1m INTERVAL
  - ELECTRIC POST
  - CULVERT
  - GATE
  - ROCK OUTCROPS
  - PROPOSED WATER MAIN
  - EXISTING QUARRY FENCE
  - TRAVERSE POINT & No.
  - TREES
  - HORIZONTAL BEND (H) OR VERTICAL BEND (V) WITH ANGLE INDICATED
  - GATE VALVE
  - WM WATER METER
  - WO-01 WASHOUT VALVE & No.
  - SAV-01 SINGLE ORIFICE AIR VALVE & No.
  - PIPELINE GRADIENT WITH SLOPE DIRECTION (SLOPE MIN. OR 1 IN n)




**WTP PROFILE A-A**

**CONTROL POINTS**

NORTHING	EASTING	ELEVATION	DESCRIPTION
124384.426	239789.916	2045.325	T8
123949.361	239976.187	2033.506	T9
123497.036	240289.493	2034.716	TP
123339.751	240355.639	2031.802	T10
123071.969	240456.581	2032.275	T12
124384.431	239789.924	2045.323	T7
125337.992	238710.623	2093.905	T2A
125087.118	238467.115	2097.308	T1
125067.303	238507.520	2094.498	T1A
122727.298	240629.864	2035.268	T13
120098.386	242787.045	1918.667	T16
122385.501	240923.306	1983.404	T14
121328.205	241975.695	2024.908	TP


REVISION	DESCRIPTION

CLIENT / EMPLOYER:



**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
P.O. BOX 495-70100  
GARISSA

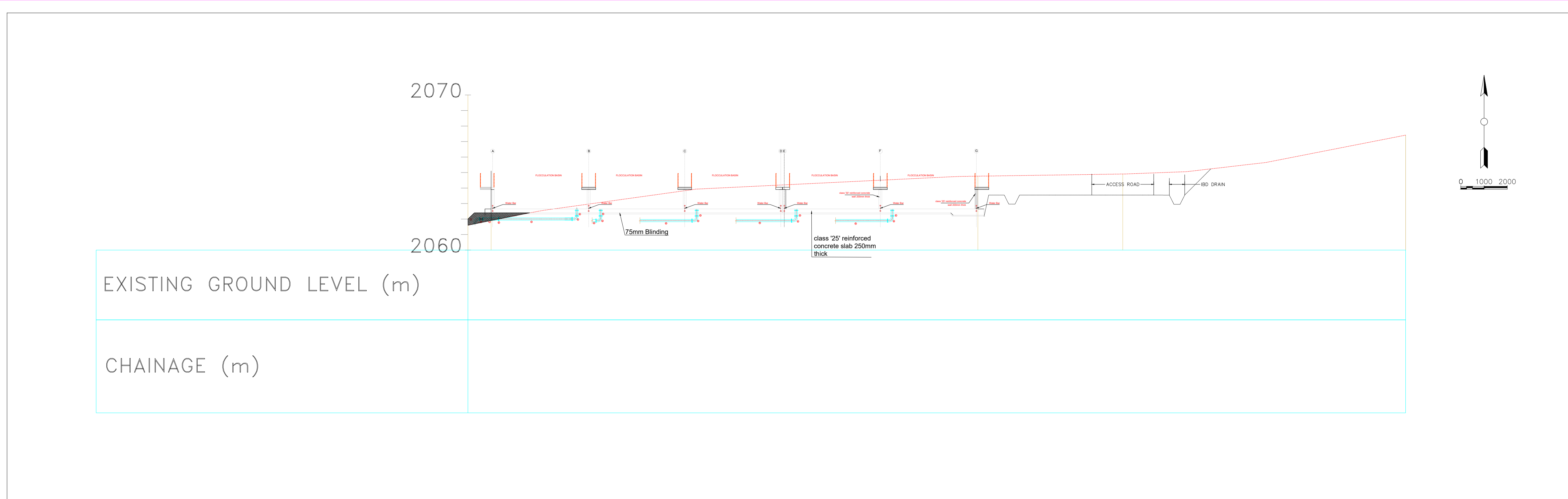
REVIEWED BY:



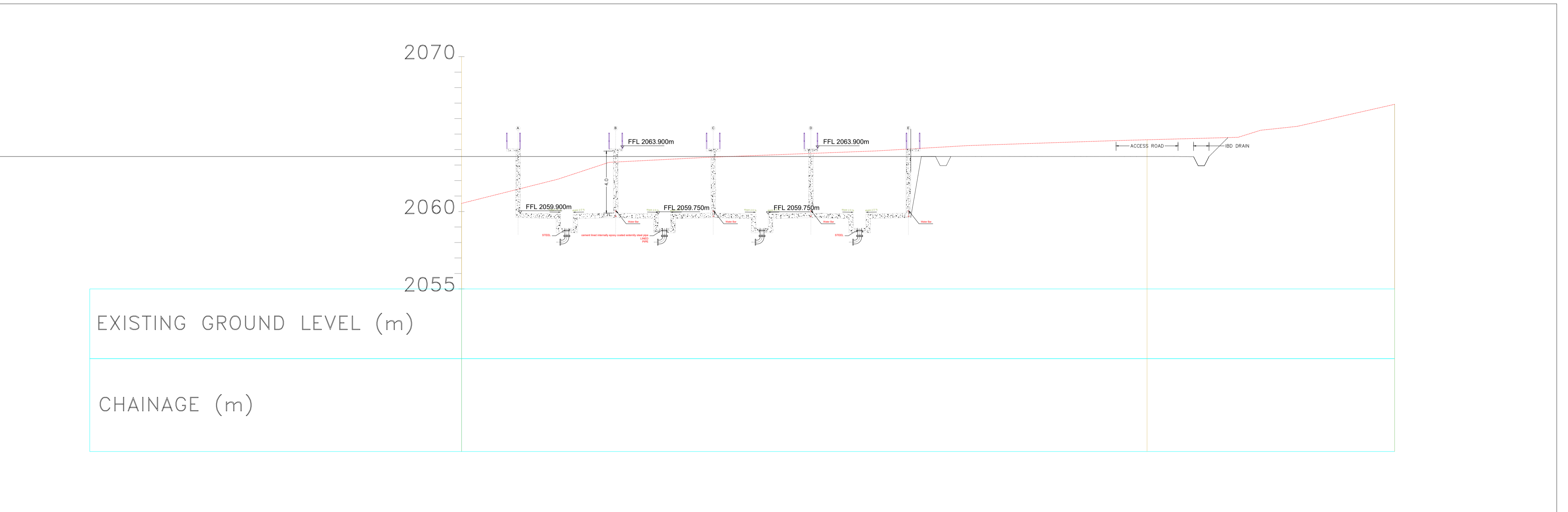
**Interconsult Engineers Ltd**  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane,  
Tel. 4441648/4441651  
Nairobi.

DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT**  
**WATER TREATMENT WORKS GENERAL**  
**PROFILE A-A**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: 1:150	Date: FEBRUARY 2024
DRAWING No. <b>MWS/TW/P/01</b>	REV. <b>0</b>



WTP PROFILE 1-1



WTP PROFILE 2-2

**NOTES:**

1. CONTOUR LEVELS ARE IN METERS AT ONE METER INTERVALS
2. MINIMUM PIPELINE SLOPES TO BE 1:500
3. DRAWING TO BE READ IN CONJUNCTION WITH STANDARD DRAWINGS
4. ALL PIPE FITTINGS TO BE CONFIRMED ON SITE DURING SETTING OUT

**LEGEND:**


- ROAD (TARMAC)
- ROAD / TRACK (EARTH / MURRAM)
- CHAINLINK FENCE
- BARBED WIRE FENCE
- FENCE / HEDGE
- 32 CONTOURS, 1m INTERVAL
- ELECTRIC POST
- CULVERT
- GATE
- ROCK OUTCROPS
- PROPOSED WATER MAIN
- EXISTING QUARRY FENCE
- △TP10 TRAVERSE POINT & No.
- TREES
- HORIZONTAL BEND (H) OR VERTICAL BEND (V) WITH ANGLE INDICATED
- GV GATE VALVE
- WM WATER METER
- WO-01 WASHOUT VALVE & No.
- SAV-01 SINGLE ORIFICE AIR VALVE & No.
- PIPELINE GRADIENT WITH SLOPE DIRECTION (SLOPE MIN. OR 1 IN n)

**CONTROL POINTS**

NORTHING	EASTING	ELEVATION	DESCRIPTION
124384.426	239789.916	2045.325	T8
123949.361	239976.187	2033.506	T9
123497.036	240289.493	2034.716	TP
123339.751	240355.639	2031.802	T10
123071.969	240456.581	2032.275	T12
124384.431	239789.924	2045.323	T7
125337.992	238710.623	2093.905	T2A
125087.118	238467.115	2097.308	T1
125067.303	238507.520	2094.498	T1A
122727.298	240629.864	2035.268	T13
120098.386	242787.045	1918.667	T16
122385.501	240923.306	1983.404	T14
121328.205	241975.695	2024.908	TP

REVISION	DESCRIPTION

CLIENT / EMPLOYER:

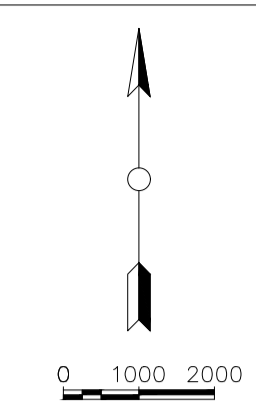


**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
P.O. BOX 495-70100  
GARISSA

REVIEWED BY:  **Interconsult Engineers Ltd**  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane,  
Tel. 4441648/4441651  
Nairobi.

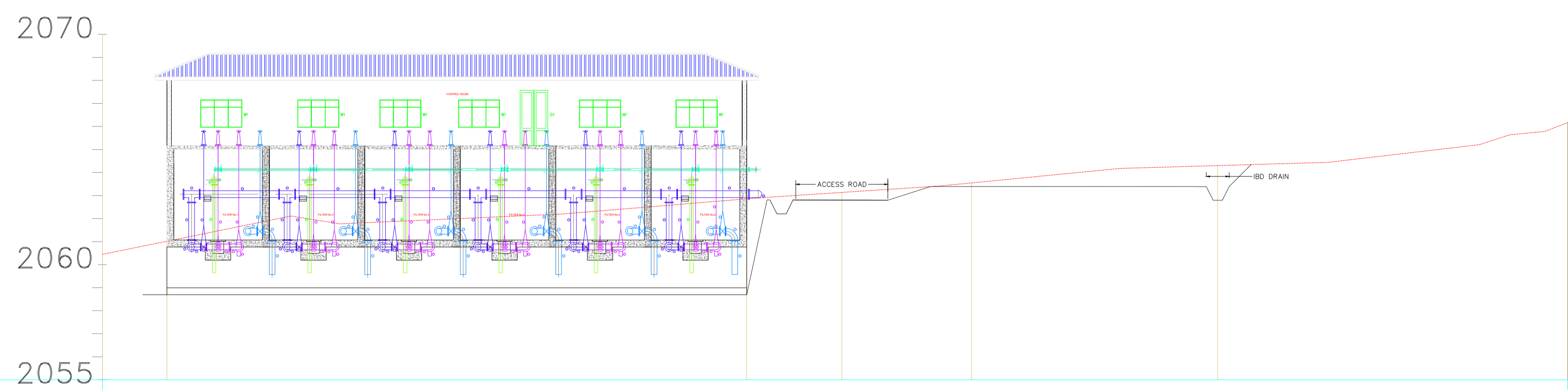
DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT**  
**WATER TREATMENT WORKS GENERAL**  
**SECTION 1-1 & 2-2**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: 1:150	Date: FEBRUARY 2024



- NOTES:**
1. CONTOUR LEVELS ARE IN METERS AT ONE METER INTERVALS
  2. MINIMUM PIPELINE SLOPES TO BE 1:500
  3. DRAWING TO BE READ IN CONJUNCTION WITH STANDARD DRAWINGS
  4. ALL PIPE FITTINGS TO BE CONFIRMED ON SITE DURING SETTING OUT

- LEGEND:**
- ROAD (TARMAC)
  - ROAD / TRACK (EARTH / MURRAM)
  - CHAINLINK FENCE
  - BARBED WIRE FENCE
  - FENCE / HEDGE
  - 32 CONTOURS, 1m INTERVAL
  - ELECTRIC POST
  - CULVERT
  - GATE
  - ROCK OUTCROPS
  - PROPOSED WATER MAIN
  - EXISTING QUARRY FENCE
  - TP10 TRAVERSE POINT & No.
  - TREES
  - HORIZONTAL BEND (H) OR VERTICAL BEND (V) WITH ANGLE INDICATED
  - GV GATE VALVE
  - WM WATER METER
  - WO-01 WASHOUT VALVE & No.
  - SAV-01 SINGLE ORIFICE AIR VALVE & No.
  - PIPELINE GRADIENT WITH SLOPE DIRECTION (SLOPE MIN. OR 1 IN n)



EXISTING GROUND LEVEL (m)

CHAINAGE (m)


**WTP PROFILE 3-3**

**CONTROL POINTS**

NORTHING	EASTING	ELEVATION	DESCRIPTION
124384.426	239789.916	2045.325	T8
123949.361	239976.187	2033.506	T9
123497.036	240289.493	2034.716	TP
123339.751	240355.639	2031.802	T10
123071.969	240456.581	2032.275	T12
124384.431	239789.924	2045.323	T7
125337.992	238710.623	2093.905	T2A
125087.118	238467.115	2097.308	T1
125067.303	238507.520	2094.498	T1A
122727.298	240629.864	2035.268	T13
120098.386	242787.045	1918.667	T16
122385.501	240923.306	1983.404	T14
121328.205	241975.695	2024.908	TP


REVISION	DESCRIPTION

CLIENT / EMPLOYER:



**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
P.O. BOX 495-70100  
GARISSA

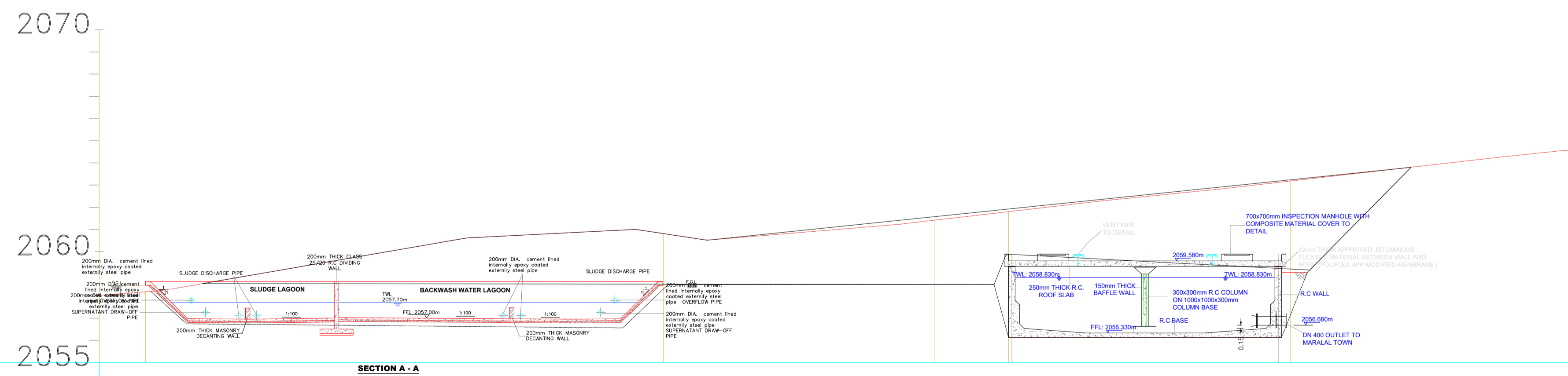
REVIEWED BY:



**Interconsult Engineers Ltd**  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane,  
Tel. 4441648/4441651  
Nairobi.

DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT**  
**WATER TREATMENT WORKS GENERAL**  
**SECTION 3-3 & 4-4**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: 1:150	Date: FEBRUARY 2024
DRAWING No. <b>MWS/TW/P/03</b>	REV. 0



EXISTING GROUND LEVEL (m)

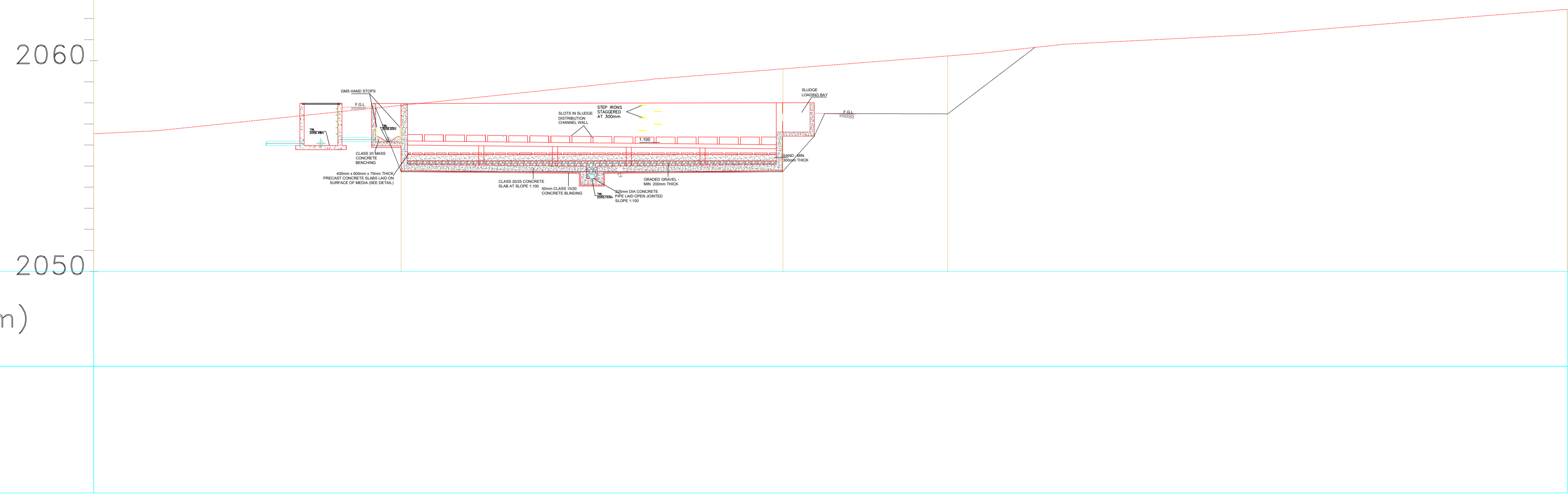
CHAINAGE (m)

**WTP PROFILE 4-4**

2070  
2060  
2050

EXISTING GROUND LEVEL (m)

CHAINAGE (m)



### WTP PROFILE 5-5

- NOTES:**
1. CONTOUR LEVELS ARE IN METERS AT ONE METER INTERVALS
  2. MINIMUM PIPELINE SLOPES TO BE 1:500
  3. DRAWING TO BE READ IN CONJUNCTION WITH STANDARD DRAWINGS
  4. ALL PIPE FITTINGS TO BE CONFIRMED ON SITE DURING SETTING OUT


- LEGEND:**
- ROAD (TARMAC)
  - ROAD / TRACK (EARTH / MURRAM)
  - CHAINLINK FENCE
  - BARBED WIRE FENCE
  - FENCE / HEDGE
  - 32 CONTOURS, 1m INTERVAL
  - ELECTRIC POST
  - CULVERT
  - GATE
  - ROCK OUTCROPS
  - PROPOSED WATER MAIN
  - EXISTING QUARRY FENCE
  - TP10 TRAVERSE POINT & No.
  - TREES
  - HORIZONTAL BEND (H) OR VERTICAL BEND (V) WITH ANGLE INDICATED
  - GV GATE VALVE
  - WM WATER METER
  - WO-01 WASHOUT VALVE & No.
  - SAV-01 SINGLE ORIFICE AIR VALVE & No.
  - PIPELINE GRADIENT WITH SLOPE DIRECTION (SLOPE MIN. OR 1 IN n)

**CONTROL POINTS**

NORTHING	EASTING	ELEVATION	DESCRIPTION
124384.426	239789.916	2045.325	T8
123949.361	239976.187	2033.506	T9
123497.036	240289.493	2034.716	TP
123339.751	240355.639	2031.802	T10
123071.969	240456.581	2032.275	T12
124384.431	239789.924	2045.323	T7
125337.992	238710.623	2093.905	T2A
125087.118	238467.115	2097.308	T1
125067.303	238507.520	2094.498	T1A
122727.298	240629.864	2035.268	T13
120098.386	242787.045	1918.667	T16
122385.501	240923.306	1983.404	T14
121328.205	241975.695	2024.908	TP


REVISION	DESCRIPTION

CLIENT / EMPLOYER:



NORTHERN WATER WORKS  
DEVELOPMENT AGENCY  
P.O. BOX 495-70100  
GARISSA

REVIEWED BY:



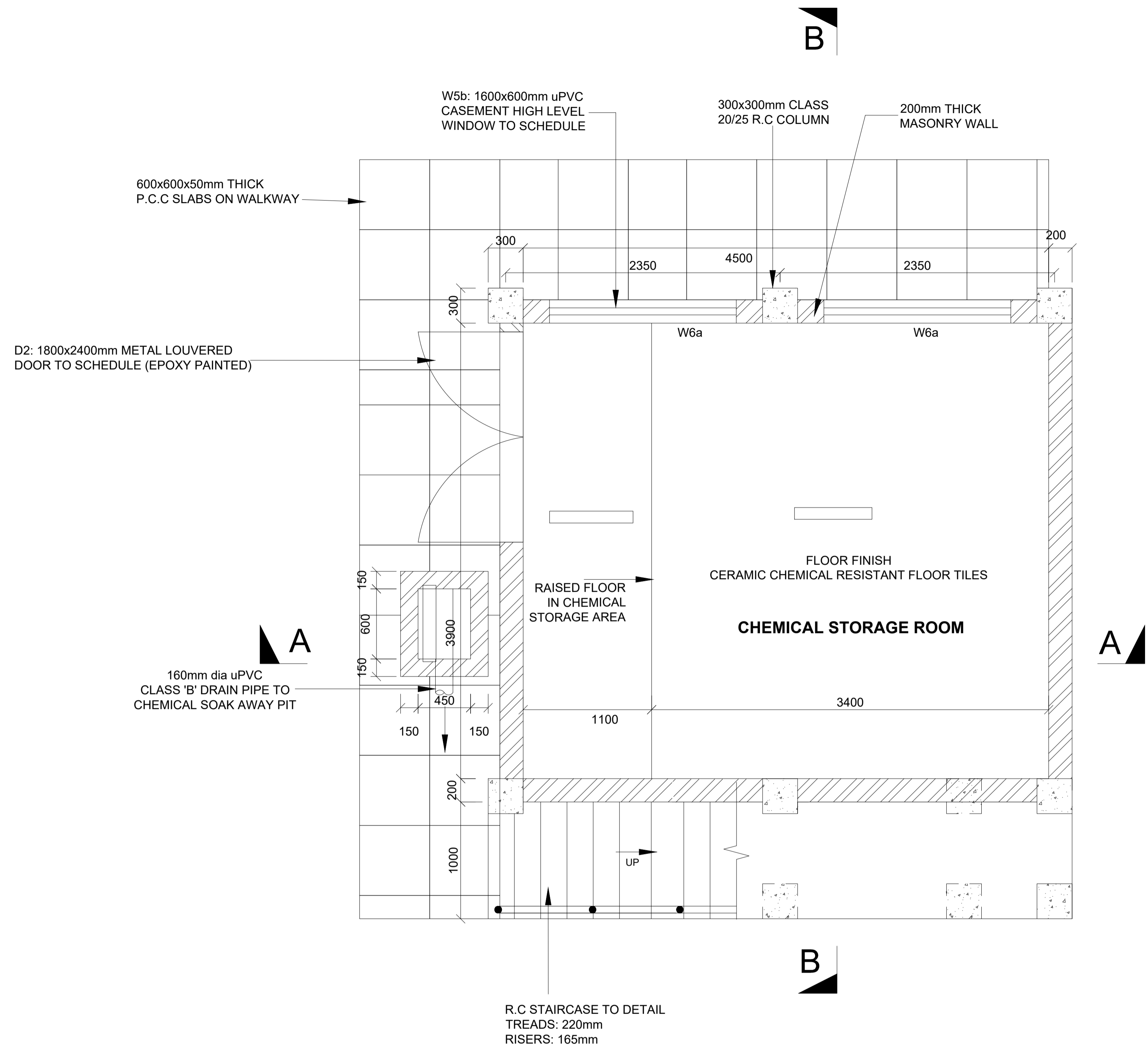
Interconsult Engineers Ltd  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane,  
Tel. 4441648/4441651  
Nairobi.

DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT  
WATER TREATMENT WORKS GENERAL  
SECTION 5-5**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: 1:150	Date: FEBRUARY 2024
DRAWING No. <b>MWS/TW/P/04</b>	REV. 0

# **CHEMICAL STORAGE, MIXING AND DOSING BUILDING**






**CHEMICAL STORAGE, MIXING AND DOSING BUILDING  
GROUND FLOOR PLAN  
(CHEMICAL STORAGE ROOM)**

**NOTES:**

1. DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
2. ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
3. ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
4. ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
5. CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
6. ABBREVIATIONS  
  - R.C - REINFORCED CONCRETE
  - D.P.C - DAMP PROOF COURSE
  - E.G.L - EXISTING GROUND LEVEL
  - F.G.L - FINISHED GROUND LEVEL
  - F.F.L - FINISHED FLOOR LEVEL
  - P.C.C - PRECAST CONCRETE
  - G.C.I - GALVANIZED CORRUGATED IRON
7. EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE
8. FOR WINDOW SCHEDULE, SEE DRG. NO. MWS/SD/29
9. FOR DOOR SCHEDULE, SEE DRG. NO. MWS/SD/27-28

REVISION	DESCRIPTION	DATE

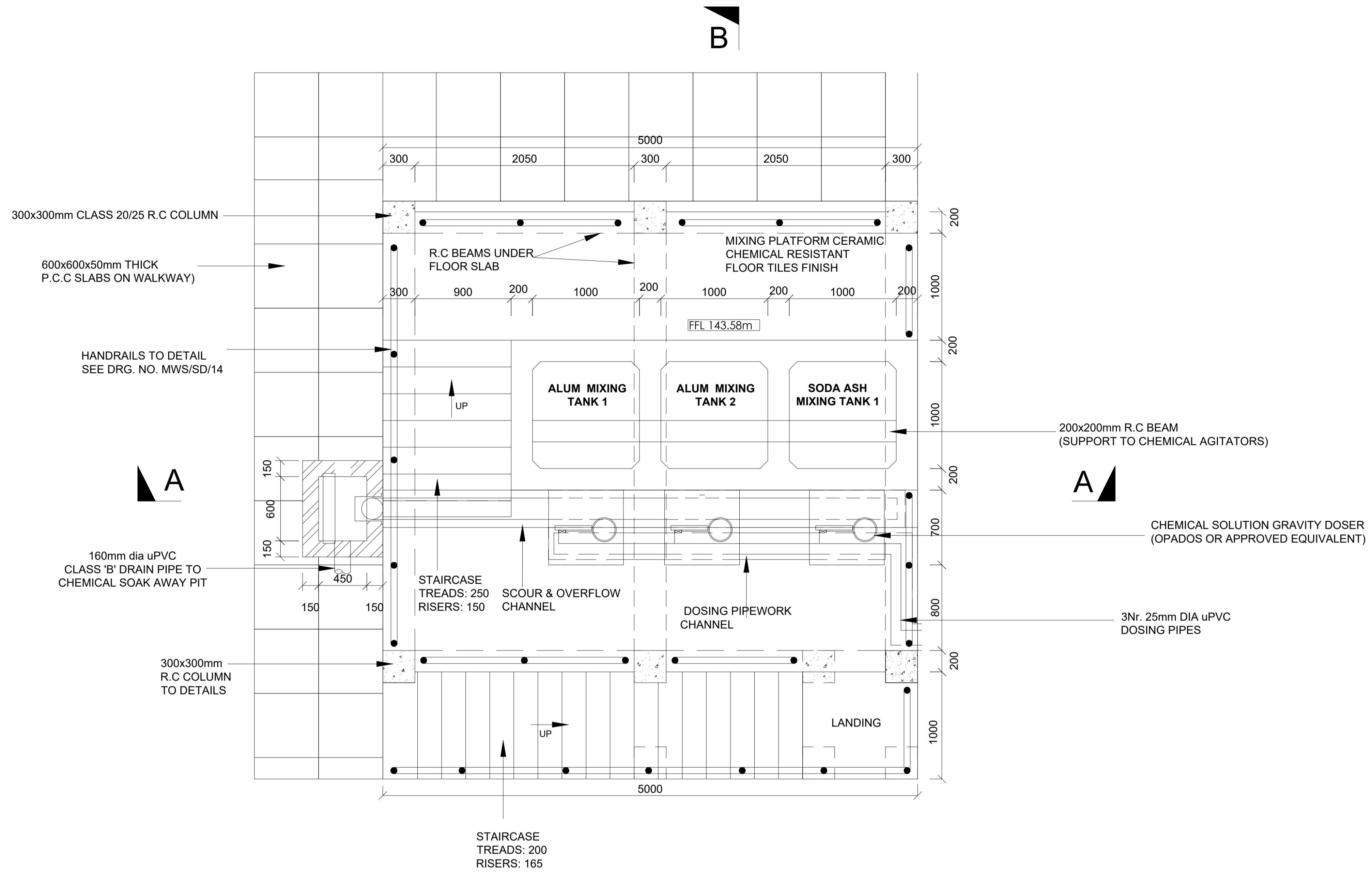
CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS  
DEVELOPMENT AGENCY**  
P.O. BOX 495-70100  
GARISSA

REVIEWED BY:  

**Interconsult Engineers Ltd**  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane.  
Tel. 4441648/4441651  
Nairobi.

DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT  
CHEMICAL STORAGE, MIXING AND  
DOSING BUILDING  
GROUND FLOOR PLAN**

Designed by:	N.M	Drawn by:	I.M.W
Checked by:	P.M.M	Approved by:	K.M
Scale:	1:50	Date:	FEBRUARY 2024
DRAWING No.	MWS/TW/CSMD/01	REV.	0




**CHEMICAL STORAGE, MIXING AND DOSING BUILDING  
FIRST FLOOR PLAN  
(CHEMICAL MIXING ROOM)**

**NOTES:**

1. DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
2. ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
3. ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
4. ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
5. CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
6. ABBREVIATIONS  
  - R.C - REINFORCED CONCRETE
  - D.P.C - DAMP PROOF COURSE
  - E.G.L - EXISTING GROUND LEVEL
  - F.G.L - FINISHED GROUND LEVEL
  - F.F.L - FINISHED FLOOR LEVEL
  - P.C.C - PRECAST CONCRETE
  - G.C.I - GALVANIZED CORRUGATED IRON
7. EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE
8. FOR WINDOW SCHEDULE, SEE DRG. NO. MWS/SD/29
9. FOR DOOR SCHEDULE, SEE DRG. NO. MWS/SD/27-28

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS  
DEVELOPMENT AGENCY**  
P.O. BOX 495-70100  
GARISSA

REVIEWED BY:  

**Interconsult Engineers Ltd**  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane.  
Tel. 4441648/4441651  
Nairobi.

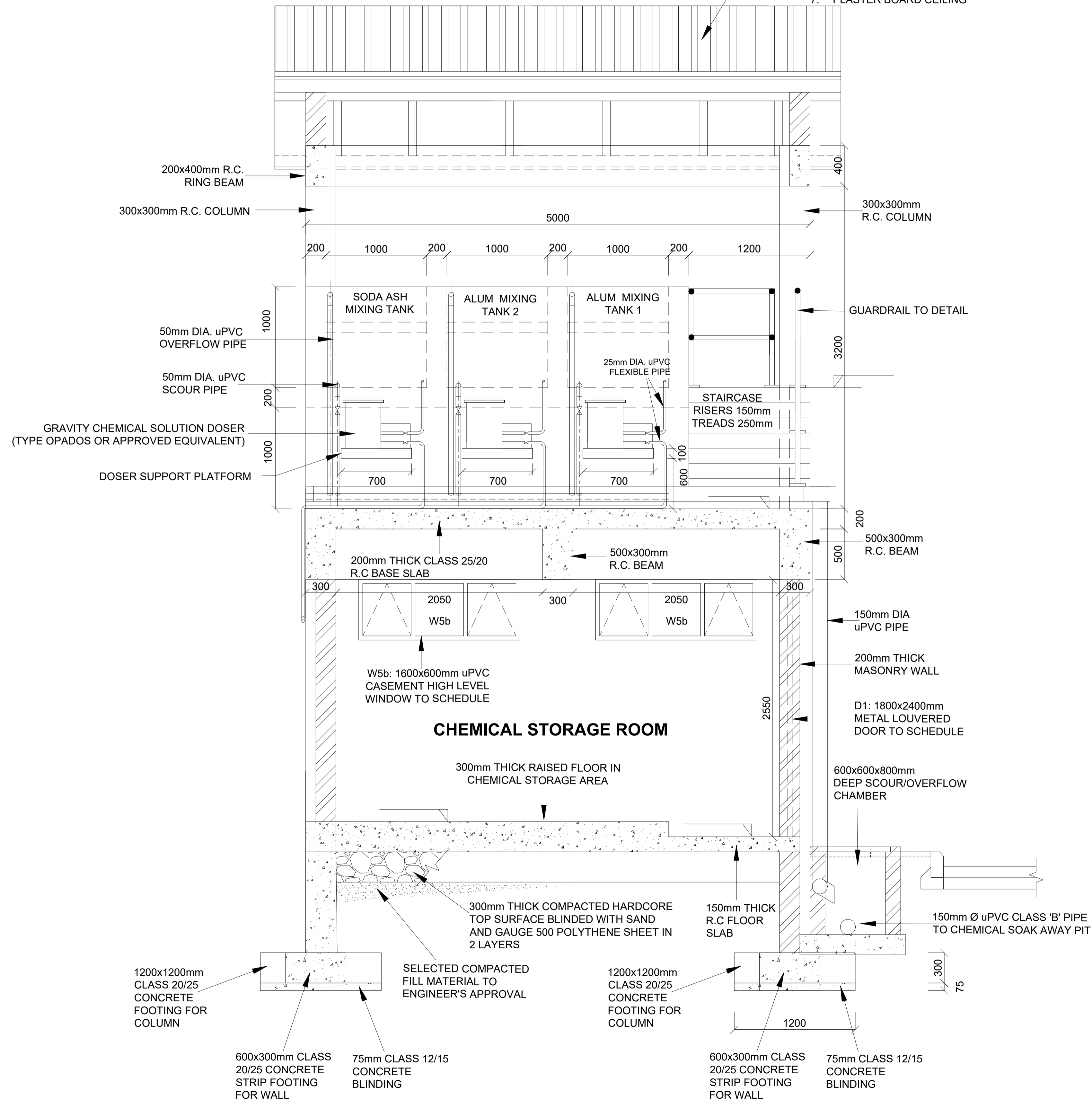
DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT  
CHEMICAL STORAGE, MIXING AND  
DOSING BUILDING  
FIRST FLOOR PLAN**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: 1:50	Date: FEBRUARY 2024
DRAWING No. MWS/TW/CSMD/02	REV. 0

**ROOF**

GAUGE 28 PRE-PAINTED ITS APPROVED ROOFING SHEETS; COLOUR TO APPROVAL OF THE ENGINEER

1. 150x50 INTERMEDIATE RAFTERS AT 600 C/C
2. 150x50 PURLINS AT 1500 C/C
3. TIMBER TRUSSES AT APPROX. 1800 C/C (NO TRUSSES ALONG END WALLS. END WALL LOAD BEARING) - 150x50 RAFTERS AND TIE BEAM - 100x50 STRUTS
4. 100x50 WALL PLATE
5. EX. 75x25 CORNICE
6. EX. 250x50 H/W FASCIA
7. PLASTER BOARD CEILING




**SECTION A-A**

**NOTES:**

1. DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
2. ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
3. ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
4. ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
5. CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
6. ABBREVIATIONS  
  - R.C - REINFORCED CONCRETE
  - D.P.C - DAMP PROOF COURSE
  - E.G.L - EXISTING GROUND LEVEL
  - F.G.L - FINISHED GROUND LEVEL
  - F.F.L - FINISHED FLOOR LEVEL
  - P.C.C - PRECAST CONCRETE
  - G.C.I - GALVANIZED CORRUGATED IRON
7. EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE
8. FOR WINDOW SCHEDULE, SEE DRG. NO. MWS/SD/29
9. FOR DOOR SCHEDULE, SEE DRG. NO. MWS/SD/27-28

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

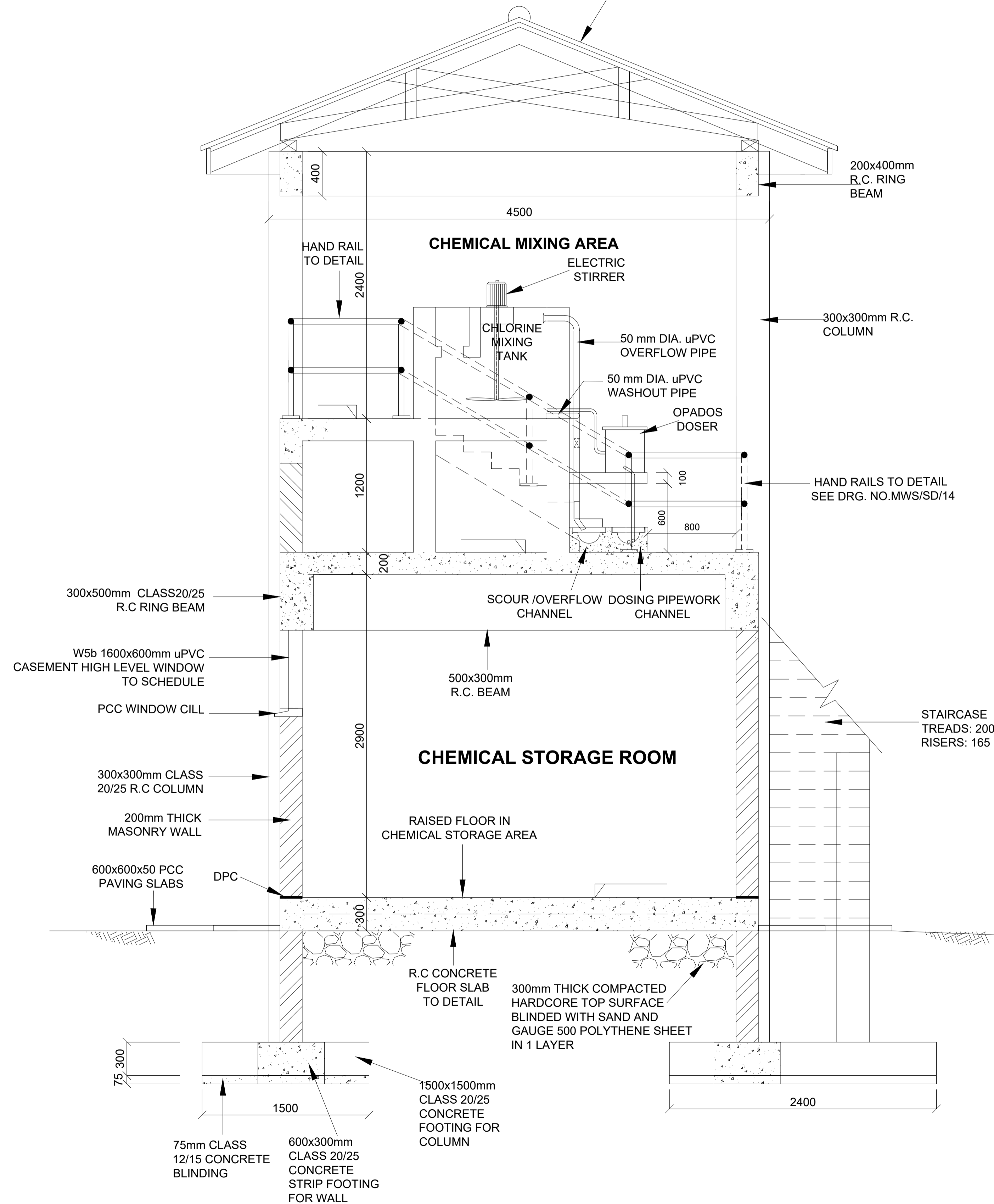
REVIEWED BY:  

**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT**  
**CHEMICAL STORAGE, MIXING AND DOSING BUILDING**  
**SECTION A-A**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
1:50	Date: FEBRUARY 2024
DRAWING No. MWS/TW/CSMD/03	REV. 0


- ROOF**  
GAUGE 28 PRE-PAINTED ITS APPROVED ROOFING SHEETS;COLOUR TO APPROVAL OF THE ENGINEER
- 150x50 INTERMEDIATE RAFTERS AT 600 C/C
  - 150x50 PURLINS AT 1500 C/C
  - TIMBER TRUSSES AT APPROX. 1800 C/C (NO TRUSSES ALONG END WALLS. END WALL LOAD BEARING) - 150x50 RAFTERS AND TIE BEAM - 100x50 STRUTS
  - 100x50 WALL PLATE
  - EX. 75x25 CORNICE
  - EX. 250x50 H/W FASCIA
  - PLASTER BOARD CEILING



**NOTES:**

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
- ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
- CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
- ABBREVIATIONS  
R.C - REINFORCED CONCRETE  
D.P.C - DAMP PROOF COURSE  
E.G.L - EXISTING GROUND LEVEL  
F.G.L - FINISHED GROUND LEVEL  
F.F.L - FINISHED FLOOR LEVEL  
P.C.C - PRECAST CONCRETE  
G.C.I - GALVANIZED CORRUGATED IRON
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE
- FOR WINDOW SCHEDULE, SEE DRG. NO. MWS/SD/29
- FOR DOOR SCHEDULE, SEE DRG. NO. MWS/SD/27-28

REVISION	DESCRIPTION	DATE

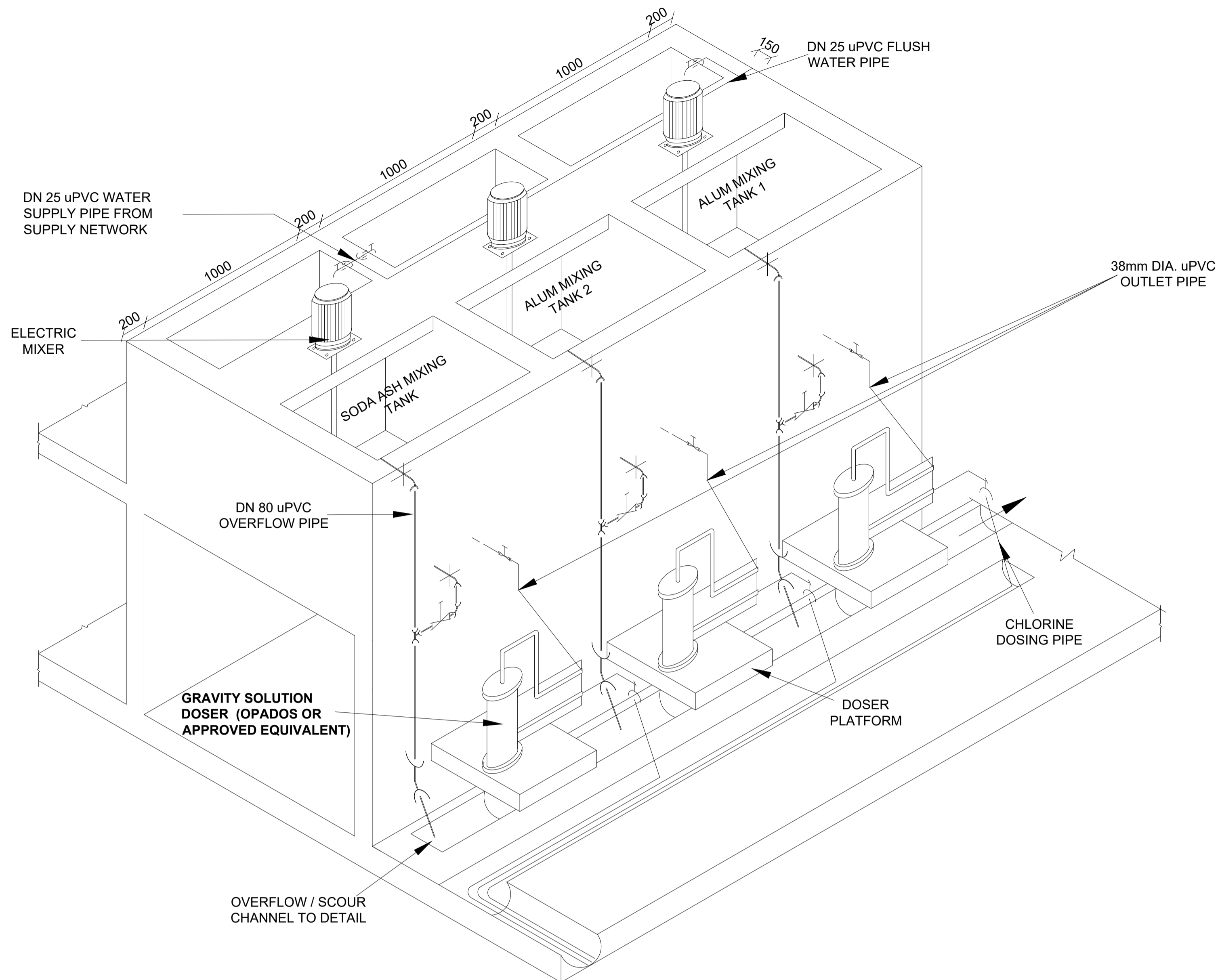
CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:  

**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT  
 CHEMICAL STORAGE, MIXING AND  
 DOSING BUILDING  
 SECTION B-B**

Designed by:	N.M	Drawn by:	I.M.W
Checked by:	P.M.M	Approved by:	K.M
Scale:	1:50	Date:	FEBRUARY 2024
DRAWING No.	MWS/TW/CSMD/04	REV.	0



**NOTES:**

1. CHLORINE DOSING PIPES ARE HDPE

**LEGEND FOR ISOMETRIC DETAILS OF CLEAR WATER SUPPLY TO CHEMICAL MIXING TANKS**

- uPVC PIPE
- ⊥ uPVC SOCKETED TEE
- ⌋ uPVC SOCKETED BEND
- SOCKET OR COUPLER
- ⊥ uPVC TAP

**LEGEND FOR ISOMETRIC DETAILS OF CHEMICAL DOSING PIPEWORK**

- uPVC PIPE
- ⊥ uPVC SOCKETED STOP VALVE
- ⊥ uPVC SOCKETED TEE
- ⌋ uPVC SOCKETED BEND WITH RODING EYE

**LEGEND FOR ISOMETRIC DETAILS OF OVERFLOW PIPEWORK**

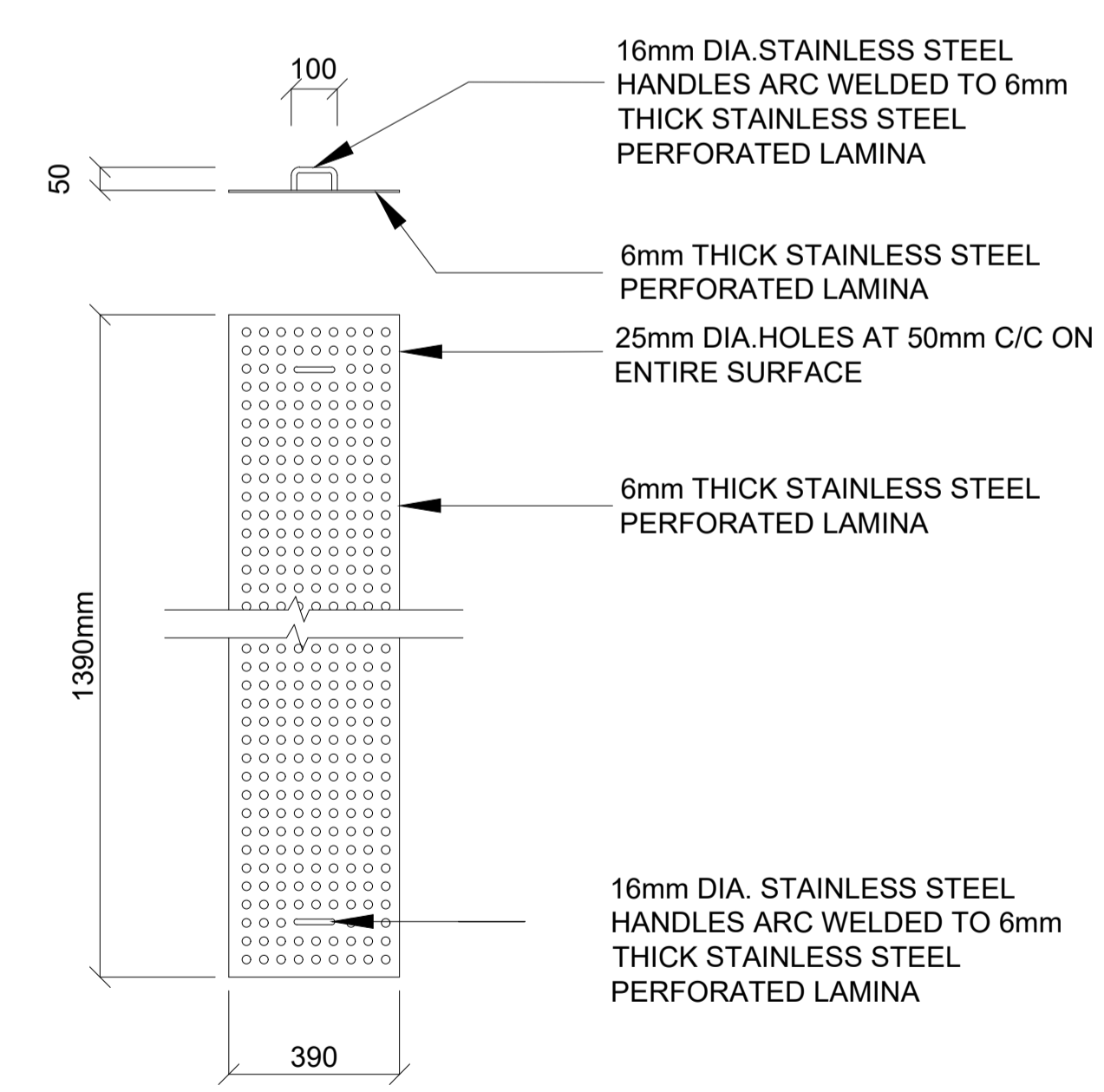
- uPVC PIPE
- ⌋ uPVC SOCKETED BEND (90°)

**LEGEND FOR ISOMETRIC DETAILS OF SCOUR PIPEWORK**

- uPVC PIPE
- ⊥ uPVC SOCKETED STOP VALVE
- ⌋ uPVC SOCKETED BEND
- ⌋ uPVC SIGOT BEND WITH ONE END THREADED

**NOTES:**

1. CHEMICAL DOSING PIPES SHALL BE REINFORCED NYLON PIPES OR UPVC AS INDICATED ON DETAILS
2. SHOP DRAWINGS FOR PIPEWORK AND STIRRER TO BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE FABRICATION

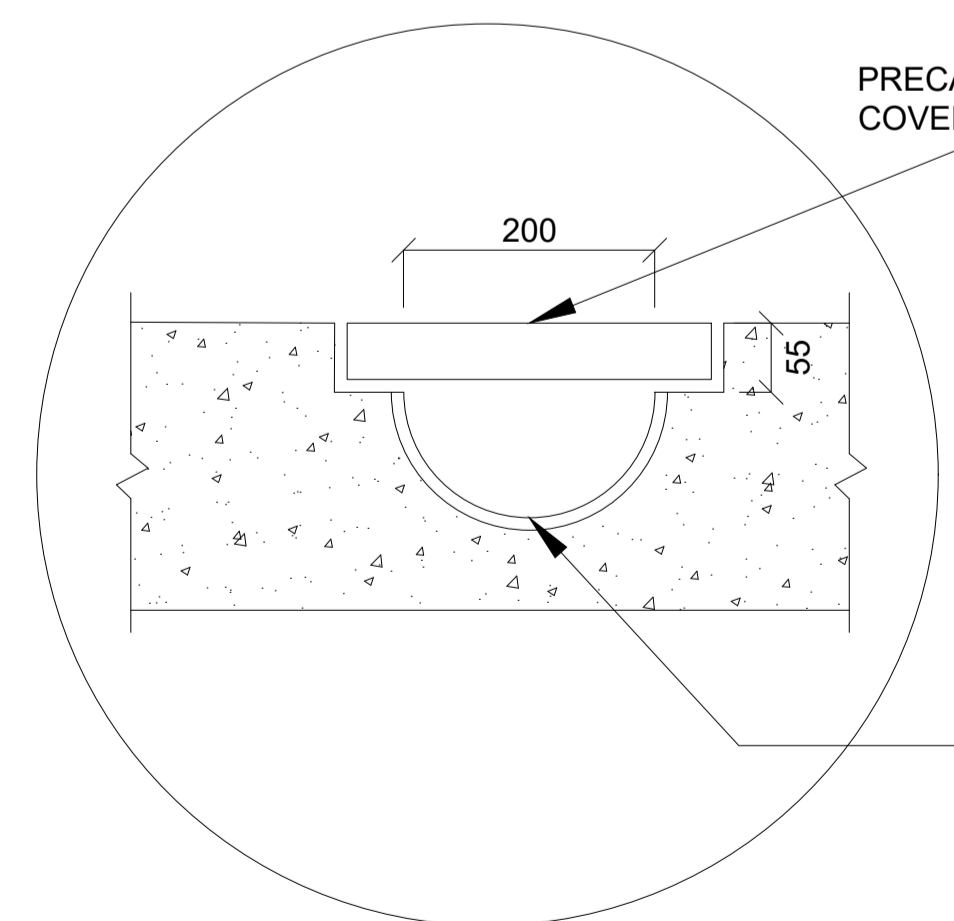


**SECTION AND PLAN OF CHEMICAL MIXING TRAY**

NOT TO SCALE

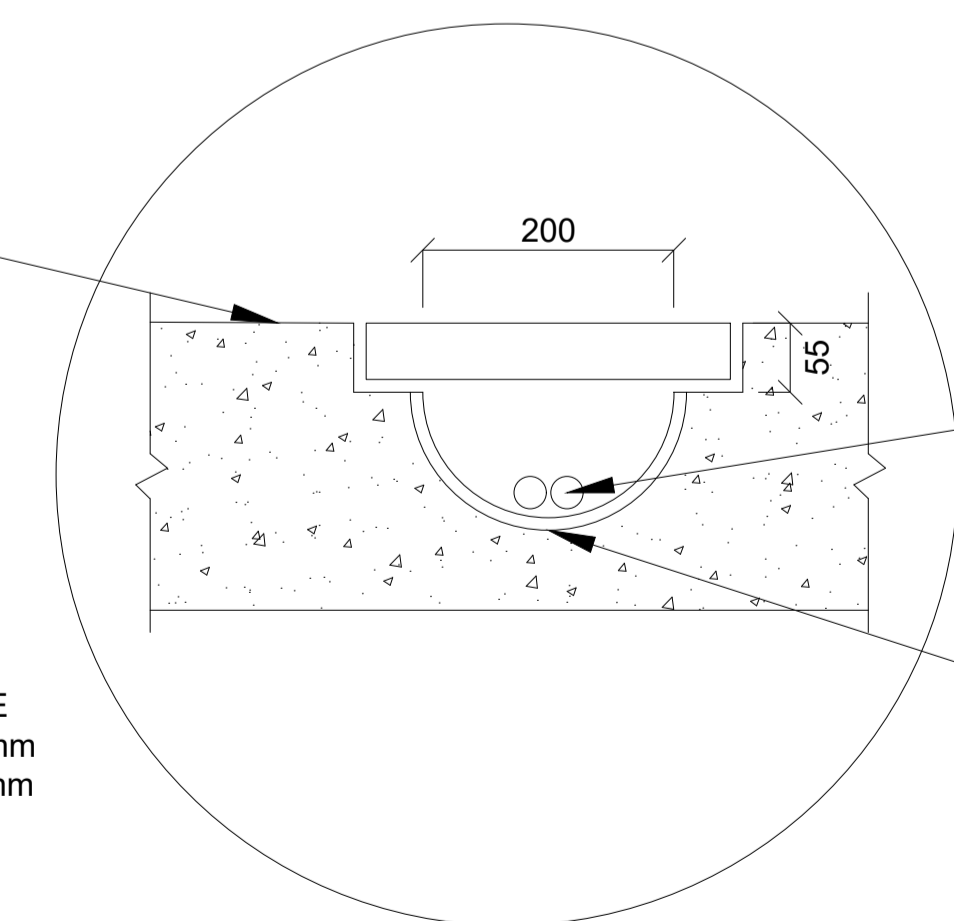
**SCHEMATIC DETAILS OF CHLORINE DOSING PIPES AND CLEAR WATER SUPPLY TO MIXING TANKS**  
(NB: NLY 2NR TANKS SHOWN, OTHER SIMILAR)

NOT TO SCALE



**OVERFLOW / SCOUR CHANNEL DETAIL**


NOT TO SCALE



**CHEMICAL DOSING PIPEWORK CHANNEL DETAIL**

NOT TO SCALE

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

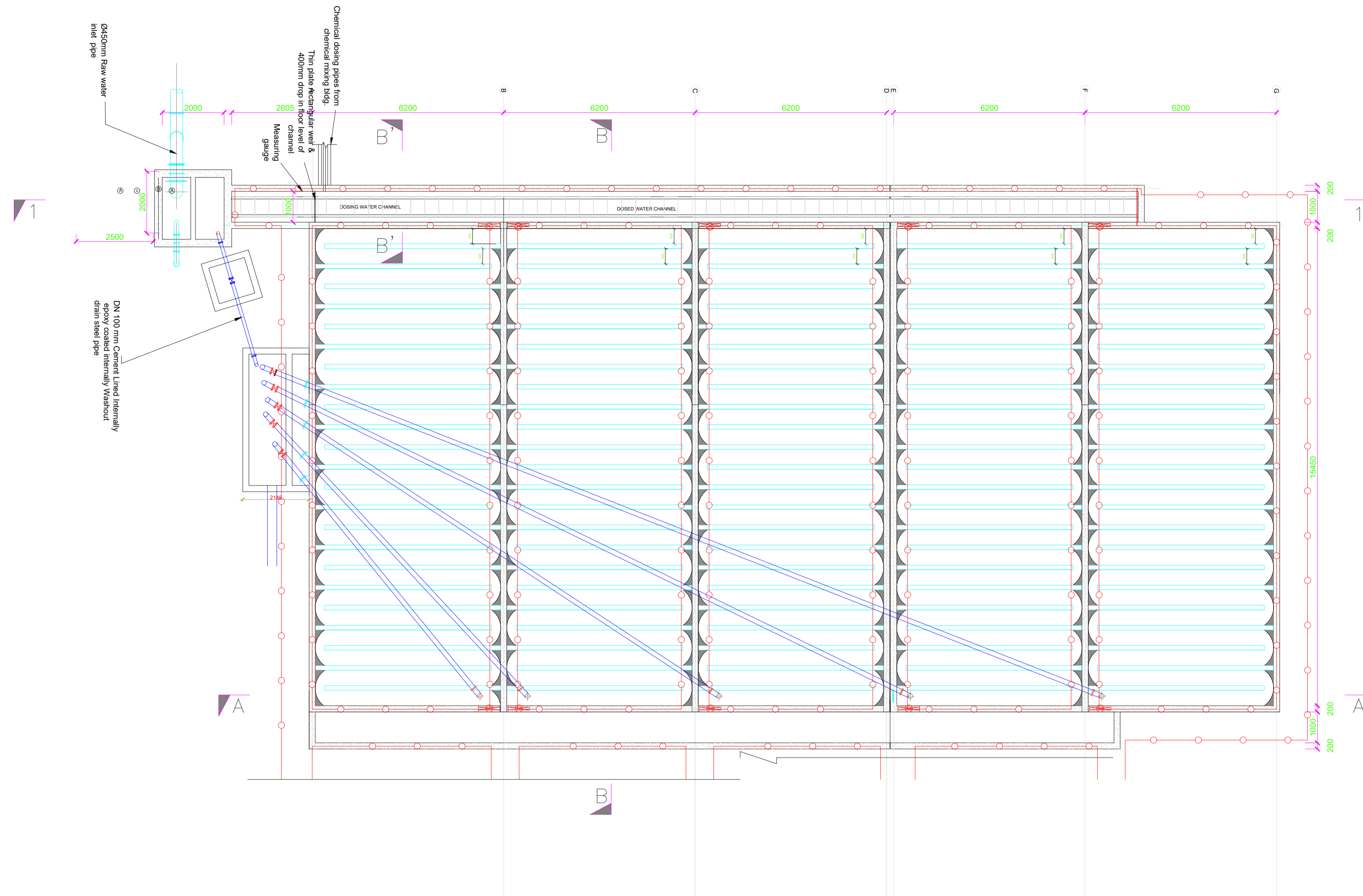
REVIEWED BY:  

**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT**  
**CHEMICAL STORAGE, MIXING AND DOSING BUILDING**  
**MISCELLANEOUS DETAILS**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
1:50	Date: FEBRUARY 2024
DRAWING No. MWS/TW/CSMD/05	REV. 0

# **FLOCCULATION BASIN**




STILLING WELL, CHEMICAL DOSING CHANNEL AND FLOCCULATION BASIN  
PLAN

**NOTES:**

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
- ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
- CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
- ABBREVIATIONS
  - R.C - REINFORCED CONCRETE
  - D.P.C - DAMP PROOF COURSE
  - E.G.L - EXISTING GROUND LEVEL
  - F.G.L - FINISHED GROUND LEVEL
  - F.F.L - FINISHED FLOOR LEVEL
  - P.C.C - PRECAST CONCRETE
  - G.C.I - GALVANIZED CORRUGATED IRON
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE

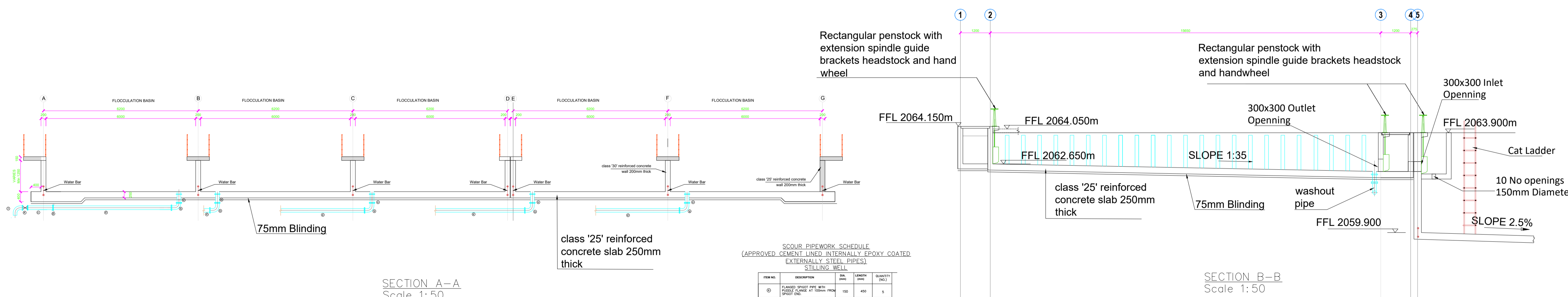
REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:  

**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT**  
**FLOCCULATION BASIN LAYOUT AND SECTIONS**



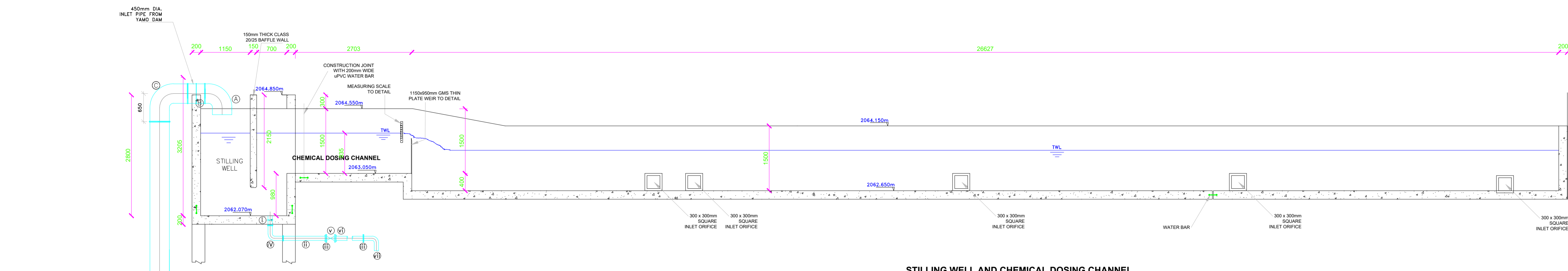
SECTION A-A  
Scale 1:50

SECTION B-B  
Scale 1:50

SCOUR PIPEWORK SCHEDULE  
(APPROVED CEMENT LINED INTERNALLY EPOXY COATED EXTERNALLY STEEL PIPES)  
STILLING WELL

ITEM NO.	DESCRIPTION	UNIT	QUANTITY
1	FLANGED SPIGOT PIPE WITH FIBRE FLOOR AT TOP AND SPIGOT END	100	100
2	ALL FLANGED BY BEND	100	100
3	SINGLE FLANGED SPIGOT PIPE	100	1000
4	FLANGED SPIGOT PIPE (OUT TO TOP OF THE FIBRE FLOOR)	100	1000
5	ALL FLANGED CAST IRON WITH DOWN-LONG EXTENDED SPIGOT END	100	100
6	SINGLE FLANGED BY BEND	100	100
7	COUPLERS	100	100

Designed by:	N.M	Drawn by:	I.M.W
Checked by:	P.M.M	Approved by:	K.M
	1:50	Date:	FEBRUARY 2024
DRAWING No.	MWS/TW/FB/01	REV.	0



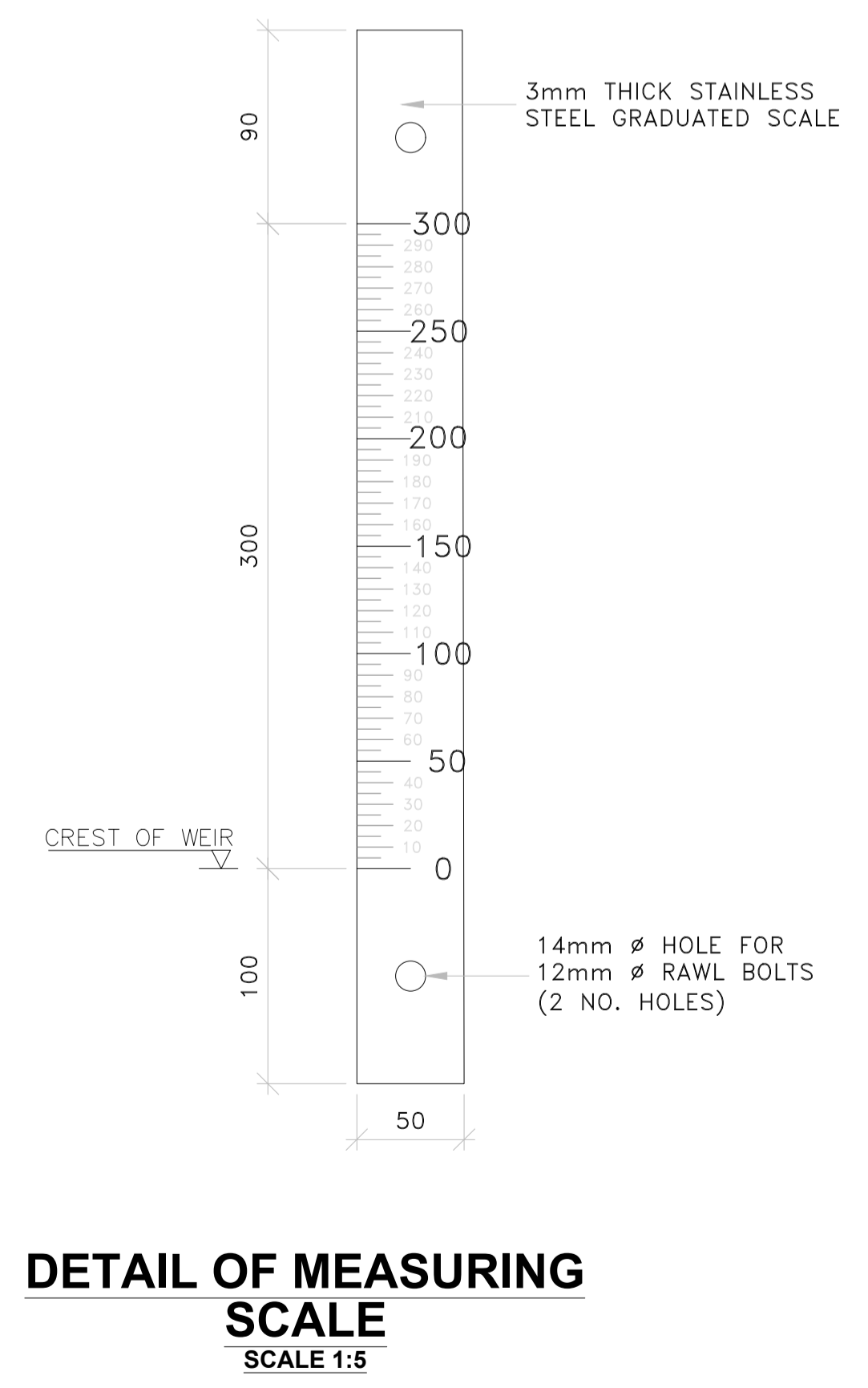
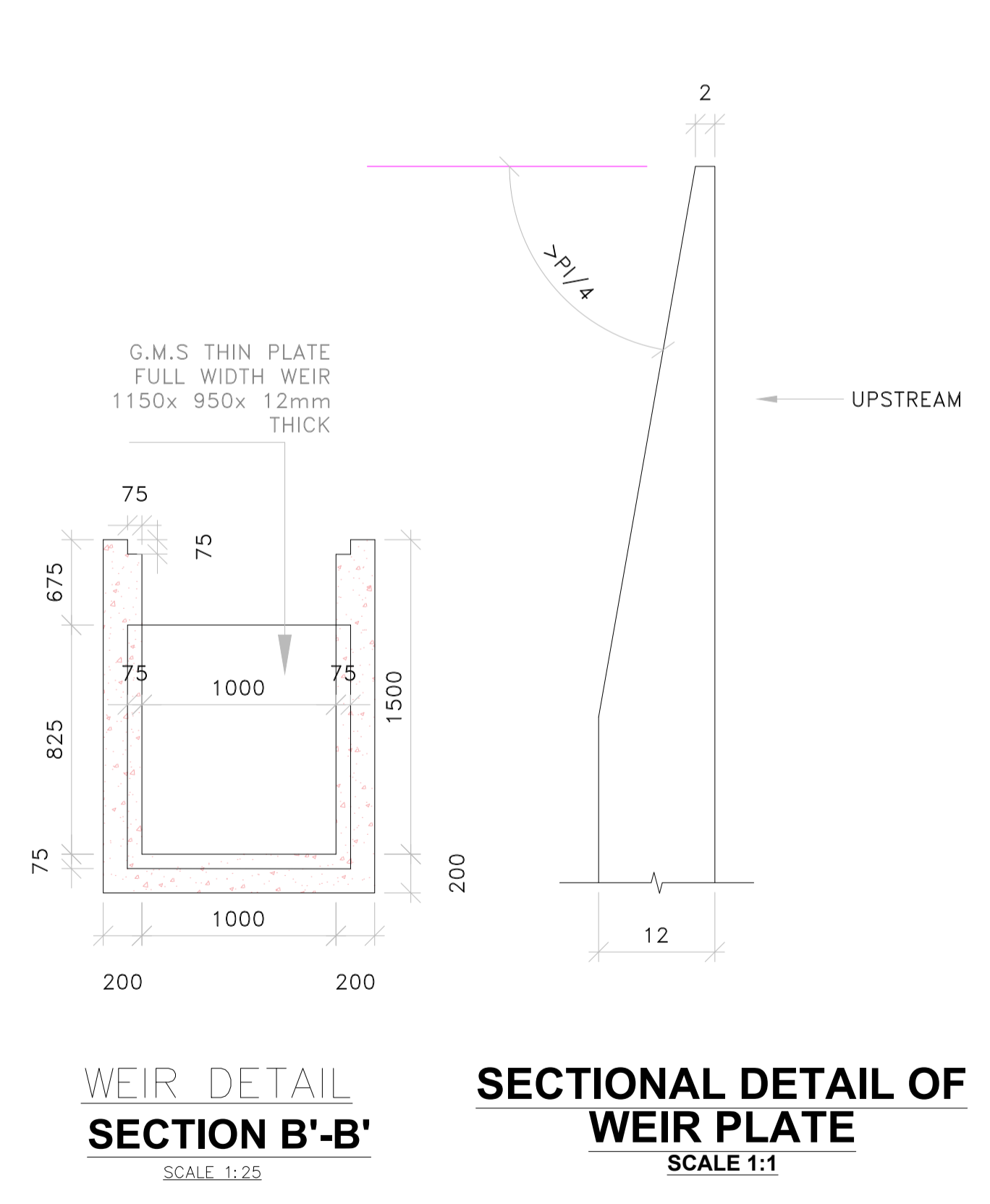
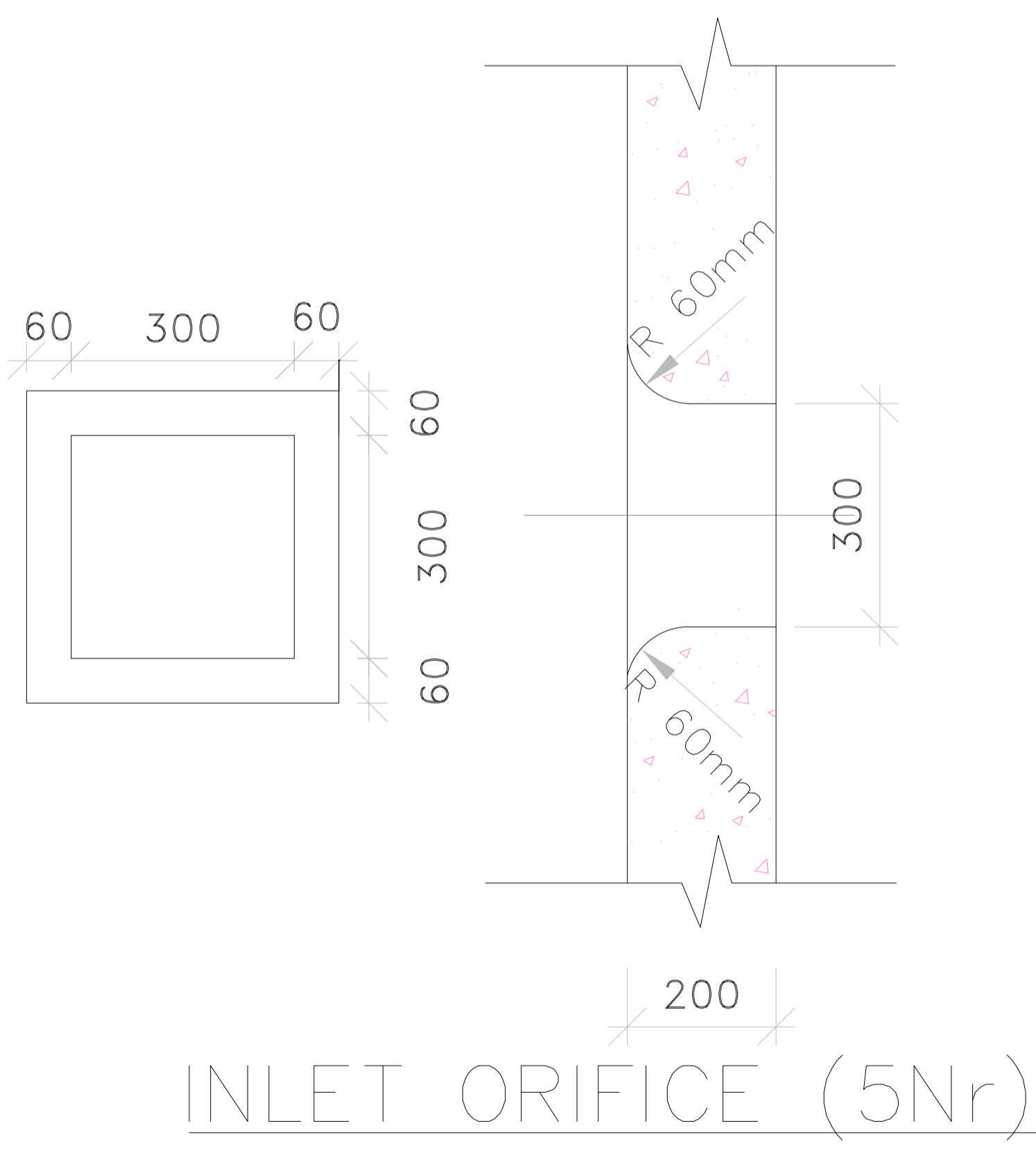
**STILLING WELL AND CHEMICAL DOSING CHANNEL  
SECTION 1-1  
SCALE 1:20**

**SCOUR PIPEWORK SCHEDULE  
(APPROVED CEMENT LINED INTERNALLY EPOXY COATED  
EXTERNALLY STEEL PIPES)**

STILLING WELL			
ITEM NO.	DESCRIPTION	QTY	UNIT
1	FLANGED SPIGOT PIPE WITH BELLOUSH AND PUDDLE FLANGE AT 100mm FROM FLANGED END	100	225
2	FLANGED SPIGOT PIPE (CUT TO SUIT)	100	1000
3	FLANGE ADAPTOR	100	-
4	ALL FLANGED 90° BEND	100	1
5	ALL FLANGED GATE VALVE WITH 150mm LONG EXTENDED OPERATING SPINDLE	100	190
6	FLANGED SPIGOT PIPE (CUT TO SUIT)	100	2450
7	SINGLE FLANGED 90° BEND	100	1

**RAW WATER GRAVITY MAIN  
INLET PIPEWORK SCHEDULE  
(APPROVED CEMENT LINED INTERNALLY EPOXY COATED  
EXTERNALLY STEEL PIPES)**

ITEM NO.	DESCRIPTION	QTY	UNIT
1	SINGLE FLANGED 90° BEND	1	1
2	ALL FLANGED PIPE WITH PUDDLE FLANGE AT 200mm FROM ONE END	450	400
3	ALL FLANGED 90° BEND	600	2
4	FLANGED SPIGOT PIPE (CUT TO SUIT ON SITE)	450	4900
5	FLANGE ADAPTOR	450	-
6	FLANGED SPIGOT PIPE (CUT TO SUIT ON SITE)	450	1200
7	COUPLING	450	-



- NOTES:**
- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
  - ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
  - ALL INTERNAL PLASTED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
  - ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
  - CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
  - ABBREVIATIONS
    - R.C – REINFORCED CONCRETE
    - D.P.C – DAMP PROOF COURSE
    - E.G.L – EXISTING GROUND LEVEL
    - F.G.L – FINISHED GROUND LEVEL
    - F.F.L – FINISHED FLOOR LEVEL
    - P.C.C – PRECAST CONCRETE
    - G.C.I – GALVANIZED CORRUGATED IRON
  - EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE

REVISION	DESCRIPTION	DATE

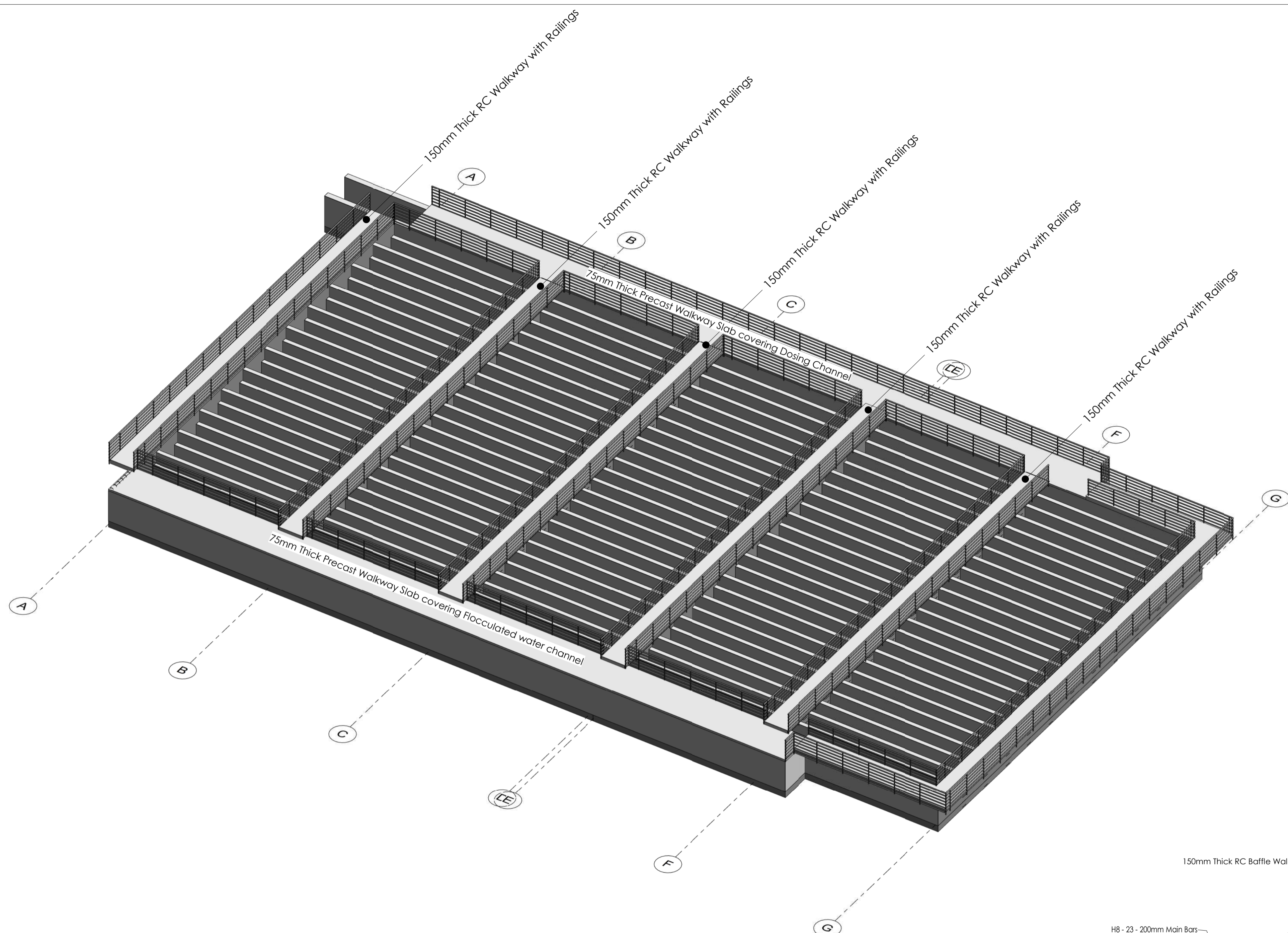
**CLIENT / EMPLOYER:**  
  
**NORTHERN WATER WORKS  
 DEVELOPMENT AGENCY  
 P.O. BOX 495-70100  
 GARISSA**

**REVIEWED BY:**  
  
**Interconsult Engineers Ltd  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane.  
 Tel. 4441648/4441651  
 Nairobi.**

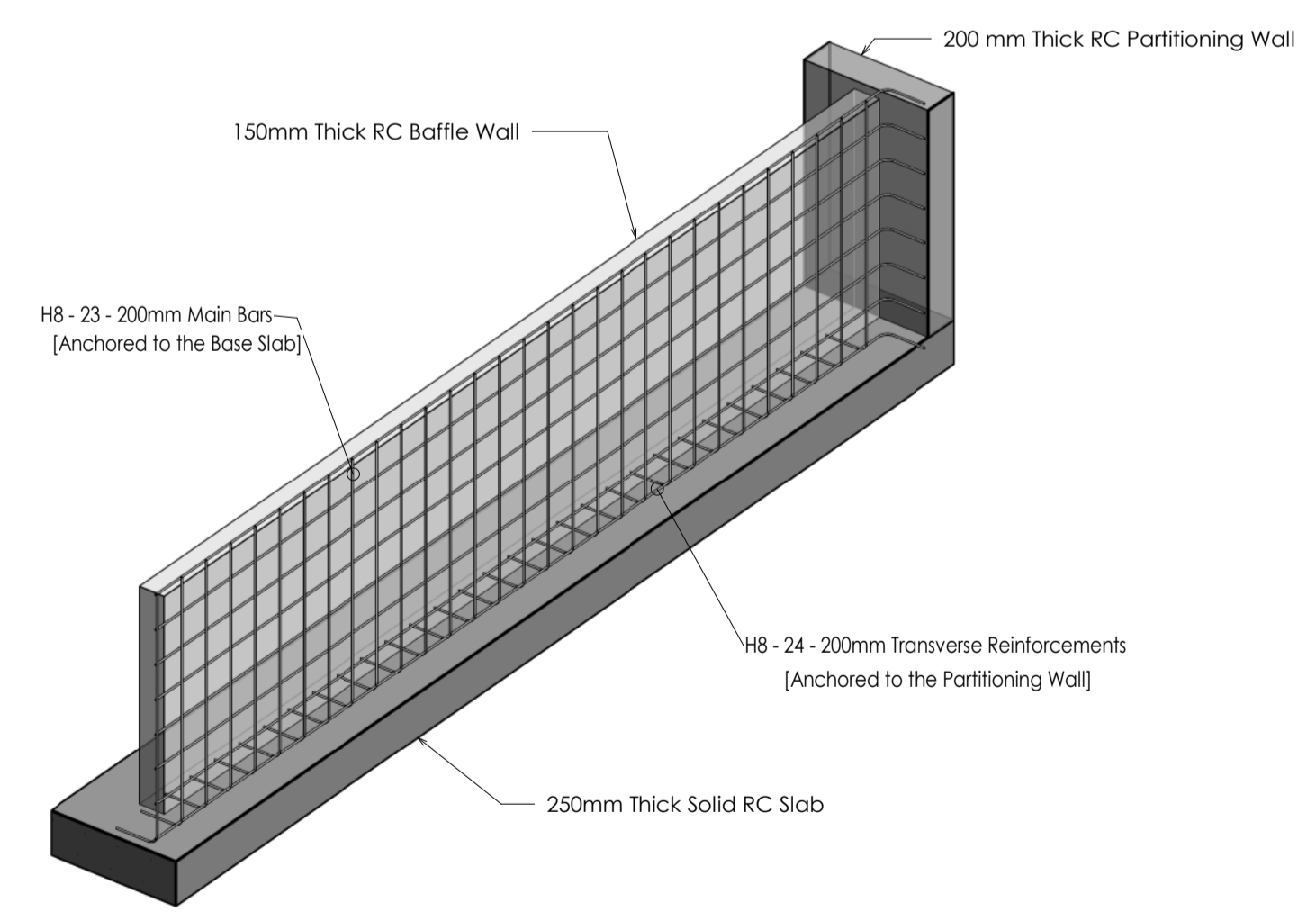
**DRAWING TITLE:**  
**MARALAL WATER SUPPLY PROJECT  
 STILLING WELL, DOSING  
 CHANNEL AND WEIR**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: 1:50	Date: FEBRUARY 2024
DRAWING No. MWS/TW/SW,DC&W /01	REV. 0





**3D MODEL OF FLOCCULATION TANK**  
SCALE 1:50



**RC BAFFLE WALL 3D STRUCTURAL SECTION**  
SCALE 1:25

- NOTES**
- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED.
  - ALL EXPOSED CONCRETE EDGES HAVE A 25mm x 25mm CHAMFER.
  - ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT.
  - ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING.
  - ALL REINFORCED CONCRETE TO BE CLASS 25/30 EXCEPT WHERE OTHERWISE SPECIFIED.
  - ABBREVIATIONS:
    - RC - REINFORCED CONCRETE.
    - DPC - DAMP PROOF COURSE.
    - EGL - EXISTING GROUND LEVEL.
    - FGL - FINISHED GROUND LEVEL.
    - FFL - FINISHED FLOOR LEVEL.
    - PCC - PRECAST CONCRETE.
    - GCI - GALVANIZED CORRUGATED IRON.
    - H - HIGH YIELD DEFORMED BARS TO BS 4449:2005.
  - EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 x 40 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE.
  - FOR WINDOW SCHEDULES SEE DRG. NO. MWS/SD/29.
  - FOR DOOR SCHEDULES SEE DRG. NO. MWS/SD/27 & 28.

REVISION	DESCRIPTION	DATE

CLIENT



NORTHERN WATER WORKS DEVELOPMENT AGENCY  
P.O. BOX 495 - 70100  
GARISSA.

PROJECT  
**MARALAL WATER SUPPLY PROJECT**

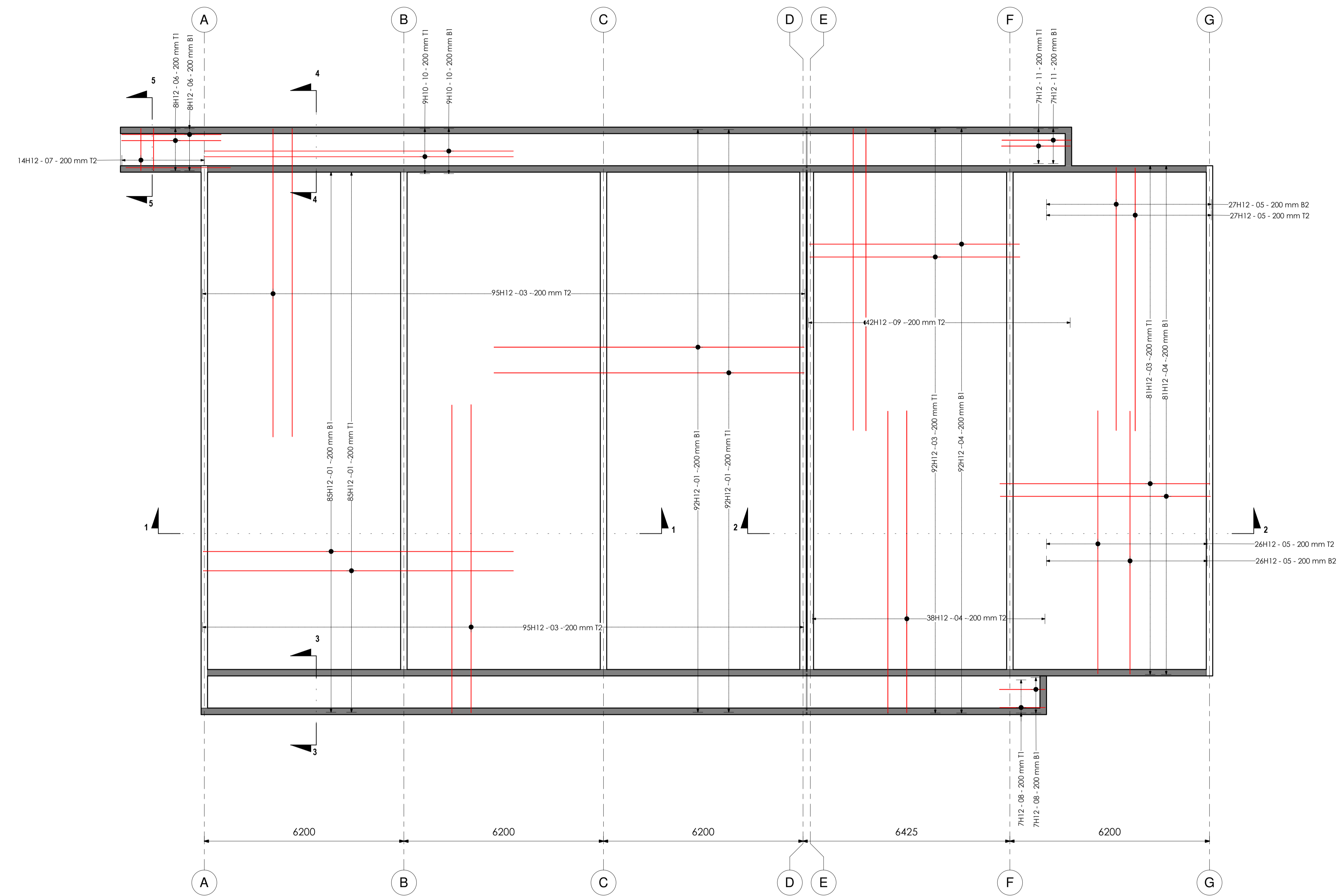
REVIEWED BY



Interconsult Engineers Ltd  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane.  
Tel. 4441648/4441651  
NAIROBI.

DRAWING TITLE  
**FLOCCULATION BASIN STRUCTURAL DETAILING**  
3D STRUCTURAL MODELS OF THE FLOCCULATION TANK AND RC BAFFLE WALLS

Designed By:	N.M.	Drawn By:	G.G.
Checked By:	P.M.M.	Approved By:	K.M.
Scale:	AS SHOWN	Date:	FEBRUARY 2024
DRAWING No.	MWS/TW/FB - STR/01	REV.	0



**250mm THICK RC SLAB REINFORCEMENT DETAILING**

SCALE 1:50

**NOTES**

1. DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED.
2. ALL EXPOSED CONCRETE EDGES HAVE A 25mm x 25mm CHAMFER.
3. ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT.
4. ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING.
5. ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED.
6. ABBREVIATIONS:  
 RC - REINFORCED CONCRETE.  
 DPC - DAMP PROOF COURSE.  
 EGL - EXISTING GROUND LEVEL.  
 FGL - FINISHED GROUND LEVEL.  
 FFL - FINISHED FLOOR LEVEL.  
 PCC - PRECAST CONCRETE.  
 GCI - GALVANIZED CORRUGATED IRON.  
 H - HIGH YIELD DEFORMED BARS TO BS 4449:2005.
7. EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE.
8. FOR WINDOW SCHEDULES SEE DRG. NO. MWS/SD/29.
9. FOR DOOR SCHEDULES SEE DRG. NO. MWS/SD/27 & 28.

REVISION	DESCRIPTION	DATE

CLIENT



NORTHERN WATER WORKS DEVELOPMENT AGENCY  
 P.O. BOX 495 - 70100  
 GARISSA.

PROJECT  
**MARALAL WATER SUPPLY PROJECT**

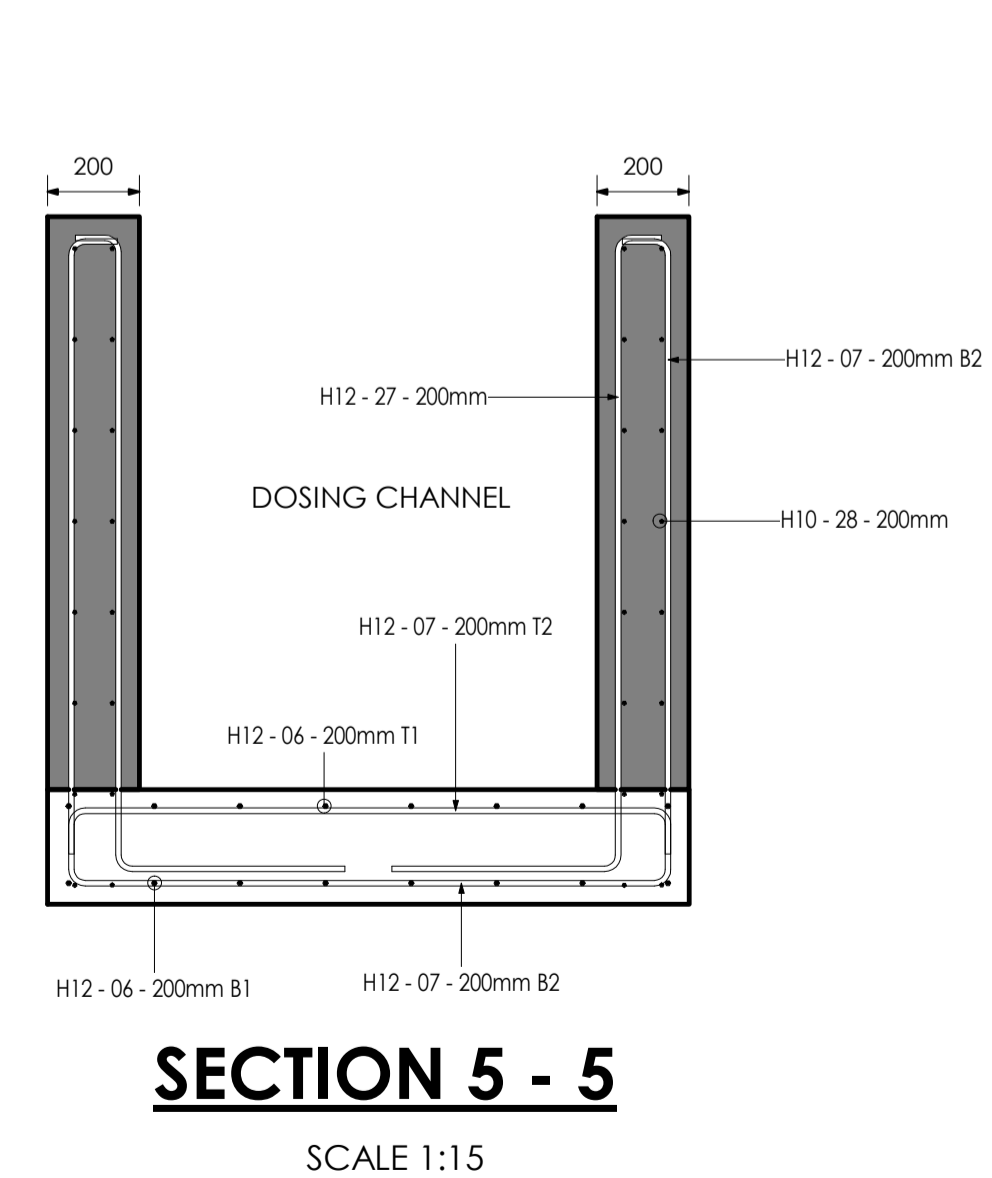
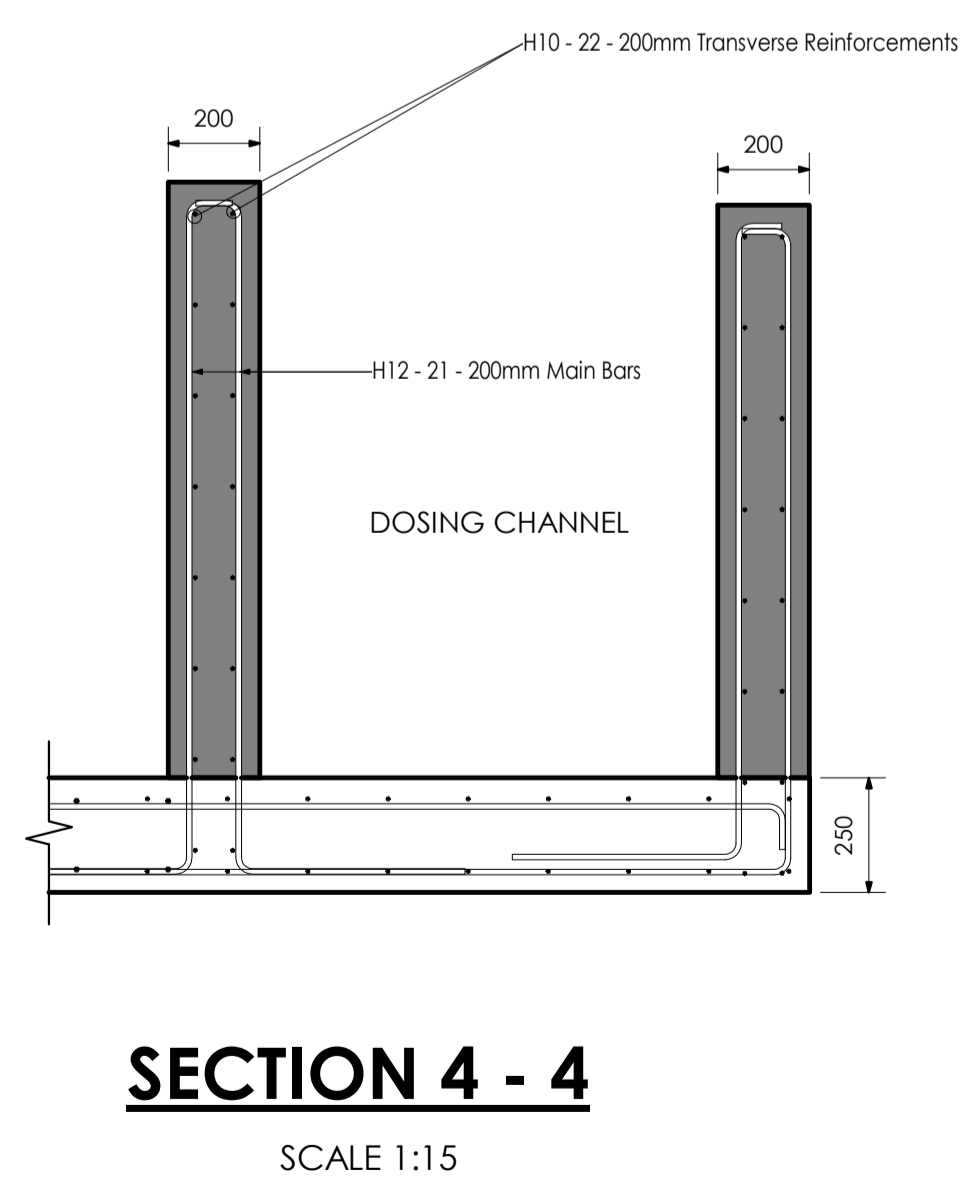
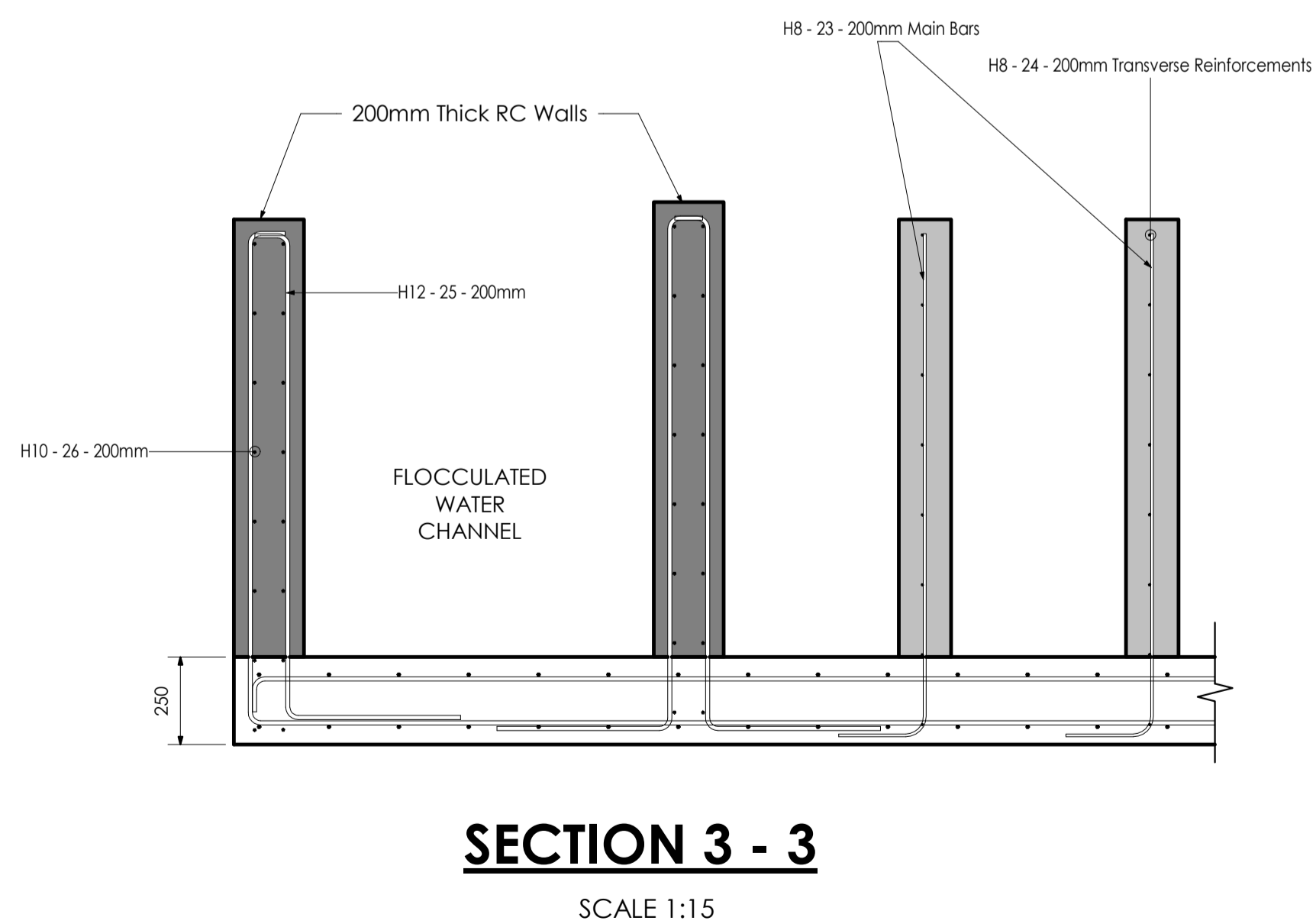
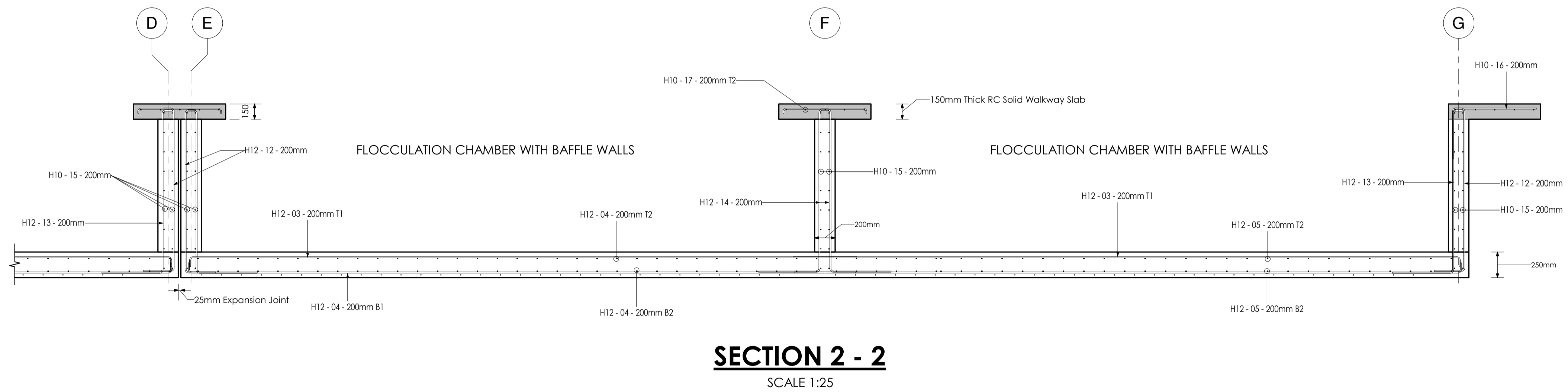
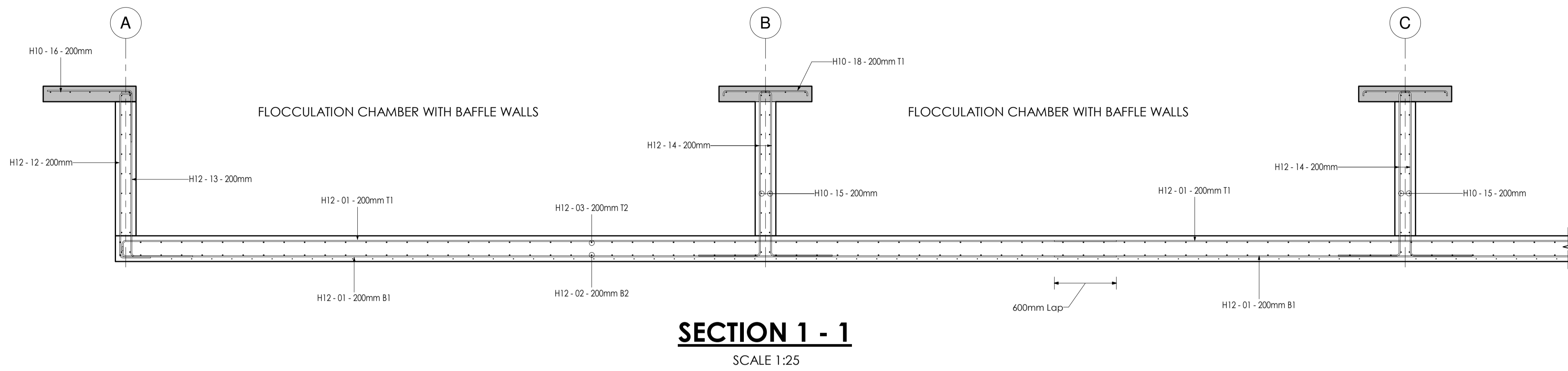
REVIEWED BY



Interconsult Engineers Ltd  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane.  
 Tel. 4441648/4441651  
 NAIROBI.

DRAWING TITLE  
**FLOCCULATION BASIN STRUCTURAL DETAILING**  
 RC SLAB REINFORCEMENT DETAIL

Designed By:	N.M.	Drawn By:	G.G.
Checked By:	P.M.M.	Approved By:	K.M.
Scale:	AS SHOWN	Date:	FEBRUARY 2024
DRAWING No.	MWS/TW/FB - STR/02	REV	0



**NOTES**

1. DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED.
2. ALL EXPOSED CONCRETE EDGES HAVE A 25mm x 25mm CHAMFER.
3. ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT.
4. ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING.
5. ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED.
6. ABBREVIATIONS:  
RC - REINFORCED CONCRETE.  
DPC - DAMP PROOF COURSE.  
EGL - EXISTING GROUND LEVEL.  
FGL - FINISHED GROUND LEVEL.  
FFL - FINISHED FLOOR LEVEL.  
PCC - PRECAST CONCRETE.  
GCI - GALVANIZED CORRUGATED IRON.  
H - HIGH YIELD DEFORMED BARS TO BS 4449:2005.
7. EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 x 40 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE.
8. FOR WINDOW SCHEDULES SEE DRG. NO. MWS/SD/29.
9. FOR DOOR SCHEDULES SEE DRG. NO. MWS/SD/28.

REVISION	DESCRIPTION	DATE

CLIENT



NORTHERN WATER WORKS DEVELOPMENT AGENCY  
P.O. BOX 495 - 70100  
GARISSA.

PROJECT

**MARALAL WATER SUPPLY PROJECT**

REVIEWED BY



Interconsult Engineers Ltd  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane.  
Tel. 4441648/4441651  
NAIROBI.

DRAWING TITLE

**FLOCCULATION BASIN STRUCTURAL DETAILING**

SECTION REINFORCEMENT DETAILS

Designed By:	N.M.	Drawn By:	G.G.
Checked By:	P.M.M.	Approved By:	K.M.
Scale:	AS SHOWN	Date:	FEBRUARY 2024
DRAWING No.	MWS/TW/FB - STR/03	REV.	0

BAFFLE WALLS BBS											
STRUCTURAL ELEMENT	BAR MARK	BAR DIAMETER	BAR LENGTH	Quantity	TOTAL BAR LENGTH	SHAPE CODE	A	B	C	REINFORCEMENT VOLUME	REBAR WEIGHT
Baffle Walls	23	8 mm	1657 mm	3450	49710 mm	12	1438 mm	250 mm	0 mm	287350.17 cm <sup>3</sup>	2368.48 kg
Baffle Walls	24	8 mm	6039 mm	920	48312 mm	12	5820 mm	250 mm	0 mm	279268.99 cm <sup>3</sup>	2301.87 kg
TOTAL				4370						566619.16 cm <sup>3</sup>	4670.36 kg

DOSING CHANNEL WALL BBS											
STRUCTURAL ELEMENT	BAR MARK	BAR DIAMETER	BAR LENGTH	Quantity	TOTAL BAR LENGTH	SHAPE CODE	A	B	C	REINFORCEMENT VOLUME	REBAR WEIGHT
DOSING CHANNEL	27	12 mm	1939 mm	161	286972 mm	23	100 mm	1389 mm	500 mm	35306.61 cm <sup>3</sup>	291.01 kg
DOSING CHANNEL	28	10 mm	11500 mm	48	92000 mm	00	11500 mm	0 mm	0 mm	39388.03 cm <sup>3</sup>	324.66 kg
TOTAL				209						74694.65 cm <sup>3</sup>	615.67 kg

FLOCCULATED WATER CHANNEL BBS											
STRUCTURAL ELEMENT	BAR MARK	BAR DIAMETER	BAR LENGTH	Quantity	TOTAL BAR LENGTH	SHAPE CODE	A	B	C	REINFORCEMENT VOLUME	REBAR WEIGHT
FLOCCULATED WATER CHANNEL	25	12 mm	1939 mm	132	255948 mm	23	100 mm	1389 mm	500 mm	28947.04 cm <sup>3</sup>	238.60 kg
FLOCCULATED WATER CHANNEL	26	10 mm	11500 mm	48	92000 mm	00	11500 mm	0 mm	0 mm	32889.96 cm <sup>3</sup>	271.10 kg
TOTAL				180						61837.00 cm <sup>3</sup>	509.69 kg


MAIN WALLS (Section 1) BBS											
STRUCTURAL ELEMENT	BAR MARK	BAR DIAMETER	BAR LENGTH	Quantity	TOTAL BAR LENGTH	SHAPE CODE	A	B	C	REINFORCEMENT VOLUME	REBAR WEIGHT
MAIN WALLS (Sec 1)	12	12 mm	1950 mm	326	635700 mm	21	100 mm	1600 mm	300 mm	71895.98 cm <sup>3</sup>	592.60 kg
MAIN WALLS (Sec 1)	13	12 mm	2250 mm	326	733500 mm	23	600 mm	1600 mm	100 mm	82956.90 cm <sup>3</sup>	683.77 kg
MAIN WALLS (Sec 1)	14	12 mm	2248 mm	480	1079040 mm	23	600 mm	1597 mm	100 mm	122036.55 cm <sup>3</sup>	1005.89 kg
MAIN WALLS (Sec 1)	15	10 mm	9135 mm	252	2042820 mm	00	9135 mm	0 mm	0 mm	160442.71 cm <sup>3</sup>	1322.45 kg
TOTAL				1384	4491060 mm					437332.13 cm <sup>3</sup>	3604.71 kg

MAIN WALLS (Section 2) BBS											
STRUCTURAL ELEMENT	BAR MARK	BAR DIAMETER	BAR LENGTH	Quantity	TOTAL BAR LENGTH	SHAPE CODE	A	B	C	REINFORCEMENT VOLUME	REBAR WEIGHT
MAIN WALLS (Section 2)	21	12 mm	2020 mm	581	317140 mm	23	100 mm	1470 mm	500 mm	132733.29 cm <sup>3</sup>	1094.05 kg
MAIN WALLS (Section 2)	22	10 mm	11500 mm	64	92000 mm	00	11500 mm	0 mm	0 mm	57805.30 cm <sup>3</sup>	476.46 kg
MAIN WALLS (Section 2)	23	12 mm	1911 mm	52	49686 mm	21	120 mm	1441 mm	400 mm	11238.71 cm <sup>3</sup>	92.64 kg
MAIN WALLS (Section 2)	24	10 mm	8300 mm	32	66400 mm	00	8300 mm	0 mm	0 mm	20860.18 cm <sup>3</sup>	171.94 kg
TOTAL				729						222637.48 cm <sup>3</sup>	1835.09 kg

## NOTES

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED.
- ALL EXPOSED CONCRETE EDGES HAVE A 25mm x 25mm CHAMFER.
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT.
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING.
- ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED.
- ABBREVIATIONS:
  - RC - REINFORCED CONCRETE.
  - DPC - DAMP PROOF COURSE.
  - EGL - EXISTING GROUND LEVEL.
  - FGL - FINISHED GROUND LEVEL.
  - FFL - FINISHED FLOOR LEVEL.
  - PCC - PRECAST CONCRETE.
  - GCI - GALVANIZED CORRUGATED IRON.
  - H - HIGH YIELD DEFORMED BARS TO BS 4449:2005.
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE.
- FOR WINDOW SCHEDULES SEE DRG. NO. MWS/SD/29.
- FOR DOOR SCHEDULES SEE DRG. NO. MWS/SD/27 & 28.

REVISION	DESCRIPTION	DATE

	<b>NORTHERN WATER WORKS DEVELOPMENT AGENCY</b>  P.O. BOX 495 - 70100 GARISSA.
---	--

<b>PROJECT</b>  <b>MARALAL WATER SUPPLY PROJECT</b>
---

<b>REVIEWED BY</b>  	<b>Interconsult Engineers Ltd</b> Consulting Engineers Jadhala Place, 4th Floor, Ngong Lane. Tel. 4441648/4441651 NAIROBI.
---	---

<b>DRAWING TITLE</b>  <b>FLOCCULATION BASIN STRUCTURAL DETAILING</b>  MATERIAL TAKE-OFFS AND BAR BENDING SCHEDULES [PART 1 OF 2]
--

Designed By: N.M.	Drawn By: G.G.
Checked By: P.M.M.	Approved By: K.M.
Scale: AS SHOWN	Date: FEBRUARY 2024
DRAWING No: MWS/TW/FB - STR/04	REV: 0

RC SLAB BBS												
STRUCTURAL ELEMENT	BAR MARK	BAR DIAMETER	BAR PLACEMENT	BAR LENGTH	Quantity	TOTAL BAR LENGTH	SHAPE CODE	A	B	C	REINFORCEMENT VOLUME	REBAR WEIGHT
RC SLAB	01	12 mm	B1	9711 mm	177	893412 mm	11	100 mm	9636 mm	0 mm	194397.02 cm <sup>3</sup>	1602.32 kg
RC SLAB	01	12 mm	T1	9711 mm	177	893412 mm	11	100 mm	9636 mm	0 mm	194397.02 cm <sup>3</sup>	1602.32 kg
RC SLAB	02	12 mm	B2	11041 mm	190	1048895 mm	21	106 mm	1410 mm	9575 mm	237254.46 cm <sup>3</sup>	1955.57 kg
RC SLAB	03	12 mm	T1	6603 mm	173	607476 mm	11	100 mm	6528 mm	0 mm	129193.24 cm <sup>3</sup>	1064.88 kg
RC SLAB	03	12 mm	T2	9650 mm	190	916750 mm	11	9575 mm	100 mm	0 mm	207363.96 cm <sup>3</sup>	1709.20 kg
RC SLAB	04	12 mm	B1	6603 mm	173	607476 mm	11	100 mm	6528 mm	0 mm	129193.24 cm <sup>3</sup>	1064.88 kg
RC SLAB	04	12 mm	B2	10854 mm	38	412452 mm	21	106 mm	1412 mm	9386 mm	46647.22 cm <sup>3</sup>	384.49 kg
RC SLAB	04	12 mm	T2	9461 mm	38	359518 mm	11	9386 mm	100 mm	0 mm	40660.53 cm <sup>3</sup>	335.14 kg
RC SLAB	05	12 mm	B2	8245 mm	53	222615 mm	11	8170 mm	100 mm	0 mm	49421.84 cm <sup>3</sup>	407.36 kg
RC SLAB	05	12 mm	T2	8245 mm	53	222615 mm	11	8170 mm	100 mm	0 mm	49421.84 cm <sup>3</sup>	407.36 kg
RC SLAB	06	12 mm	B1	3165 mm	8	25320 mm	11	100 mm	3090 mm	0 mm	2863.62 cm <sup>3</sup>	23.60 kg
RC SLAB	06	12 mm	T1	3165 mm	8	25320 mm	11	100 mm	3090 mm	0 mm	2863.62 cm <sup>3</sup>	23.60 kg
RC SLAB	07	12 mm	B2	4250 mm	14	59500 mm	41	106 mm	1412 mm	1314 mm	6729.29 cm <sup>3</sup>	55.47 kg
RC SLAB	07	12 mm	T2	1464 mm	14	20496 mm	21	100 mm	1314 mm	100 mm	2318.04 cm <sup>3</sup>	19.11 kg
RC SLAB	08	12 mm	B1	1495 mm	7	10465 mm	11	100 mm	1420 mm	0 mm	1183.56 cm <sup>3</sup>	9.76 kg
RC SLAB	08	12 mm	T1	1495 mm	7	10465 mm	11	100 mm	1420 mm	0 mm	1183.56 cm <sup>3</sup>	9.76 kg
RC SLAB	09	12 mm	B2	10853 mm	42	455826 mm	21	105 mm	1412 mm	9385 mm	51552.71 cm <sup>3</sup>	424.92 kg
RC SLAB	09	12 mm	T2	9461 mm	42	397362 mm	11	9386 mm	100 mm	0 mm	44940.58 cm <sup>3</sup>	370.42 kg
RC SLAB	10	10 mm	B1	9600 mm	9	86400 mm	00	9600 mm	0 mm	0 mm	6785.84 cm <sup>3</sup>	55.93 kg
RC SLAB	10	10 mm	T1	9600 mm	9	86400 mm	00	9600 mm	0 mm	0 mm	6785.84 cm <sup>3</sup>	55.93 kg
RC SLAB	11	12 mm	B1	2215 mm	7	15505 mm	11	2140 mm	100 mm	0 mm	1753.57 cm <sup>3</sup>	14.45 kg
RC SLAB	11	12 mm	T1	2215 mm	7	15505 mm	11	2140 mm	100 mm	0 mm	1753.57 cm <sup>3</sup>	14.45 kg
TOTAL					1436						1408664.18 cm <sup>3</sup>	11610.91 kg

WALKWAY BBS												
STRUCTURAL ELEMENT	BAR MARK	BAR DIAMETER	BAR LENGTH	Quantity	TOTAL BAR LENGTH	SHAPE CODE	A	B	C	REINFORCEMENT VOLUME	REBAR WEIGHT	
Walkway	16	10 mm	1299 mm	206	267594 mm	11	500 mm	820 mm	0 mm	21016.78 cm <sup>3</sup>	173.23 kg	
Walkway	17	10 mm	8036 mm	50	401800 mm	00	8036 mm	0 mm	0 mm	31557.30 cm <sup>3</sup>	260.11 kg	
Walkway	18	10 mm	879 mm	316	277764 mm	21	50 mm	820 mm	50 mm	21815.53 cm <sup>3</sup>	179.81 kg	
Walkway	19	10 mm	5001 mm	5	25005 mm	00	5001 mm	0 mm	0 mm	1963.89 cm <sup>3</sup>	16.19 kg	
Walkway	20	10 mm	5838 mm	5	29190 mm	21	50 mm	5779 mm	50 mm	2292.58 cm <sup>3</sup>	18.90 kg	
Walkway	21	10 mm	8728 mm	10	87280 mm	00	8728 mm	0 mm	0 mm	6854.96 cm <sup>3</sup>	56.50 kg	
TOTAL					592	1088633 mm					85501.04 cm <sup>3</sup>	704.74 kg

RC SLABS CONCRETE SCHEDULE		
Type Comments	SLAB THICKNESS IN mm	CONCRETE VOLUME
RC FOUNDATION SLAB	250 mm Thick	141.28 m <sup>3</sup>
RC WALKWAYS	150mm Thick	14.16 m <sup>3</sup>
TOTAL		155.43 m <sup>3</sup>

RC WALL CONCRETE SCHEDULE			
STRUCTURAL ELEMENT	APPROXIMATE HEIGHT	WALL LENGTH IN mm	APPROXIMATE VOLUME
RC BAFFLE WALL	1250	667005	122.91 m <sup>3</sup>
RC CHAMBER WALLS	1300	110753	28.59 m <sup>3</sup>
RC MAIN WALL	<varies>	122864	31.21 m <sup>3</sup>
TOTAL: 129		900621	182.71 m <sup>3</sup>

CONCRETE SCHEDULE SUMMARY	
STRUCTURAL ELEMENT	CONCRETE VOLUME
RC BAFFLE WALL	122.91 m <sup>3</sup>
RC CHAMBER WALLS	28.59 m <sup>3</sup>
RC FOUNDATION SLAB	141.28 m <sup>3</sup>
RC MAIN WALL	31.21 m <sup>3</sup>
RC WALKWAYS	14.16 m <sup>3</sup>
TOTAL	338.14 m <sup>3</sup>


BBS SUMMARY		
BAR SIZE	REINFORCEMENT VOLUME	REBAR WEIGHT
H8	566619.16 cm <sup>3</sup>	4670.36 kg
H10	439479.67 cm <sup>3</sup>	3622.41 kg
H12	1880207.58 cm <sup>3</sup>	15497.61 kg
TOTAL	2886306.41 cm <sup>3</sup>	23790.38 kg

## NOTES

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED.
- ALL EXPOSED CONCRETE EDGES HAVE A 25mm x 25mm CHAMFER.
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT.
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING.
- ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED.
- ABBREVIATIONS:
  - RC - REINFORCED CONCRETE.
  - DPC - DAMP PROOF COURSE.
  - EGL - EXISTING GROUND LEVEL.
  - FGL - FINISHED GROUND LEVEL.
  - FFL - FINISHED FLOOR LEVEL.
  - PCC - PRECAST CONCRETE.
  - GCI - GALVANIZED CORRUGATED IRON.
  - H - HIGH YIELD DEFORMED BARS TO BS 4448:2005.
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 x 40 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE.
- FOR WINDOW SCHEDULES SEE DRG. NO. MWS/SD/29.
- FOR DOOR SCHEDULES SEE DRG. NO. MWS/SD/28.

REVISION	DESCRIPTION	DATE

CLIENT



NORTHERN WATER WORKS DEVELOPMENT AGENCY  
P.O. BOX 495 - 70100  
GARISSA.

PROJECT

### MARALAL WATER SUPPLY PROJECT

REVIEWED BY



Interconsult Engineers Ltd  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane.  
Tel. 4441648/4441651  
NAIROBI.

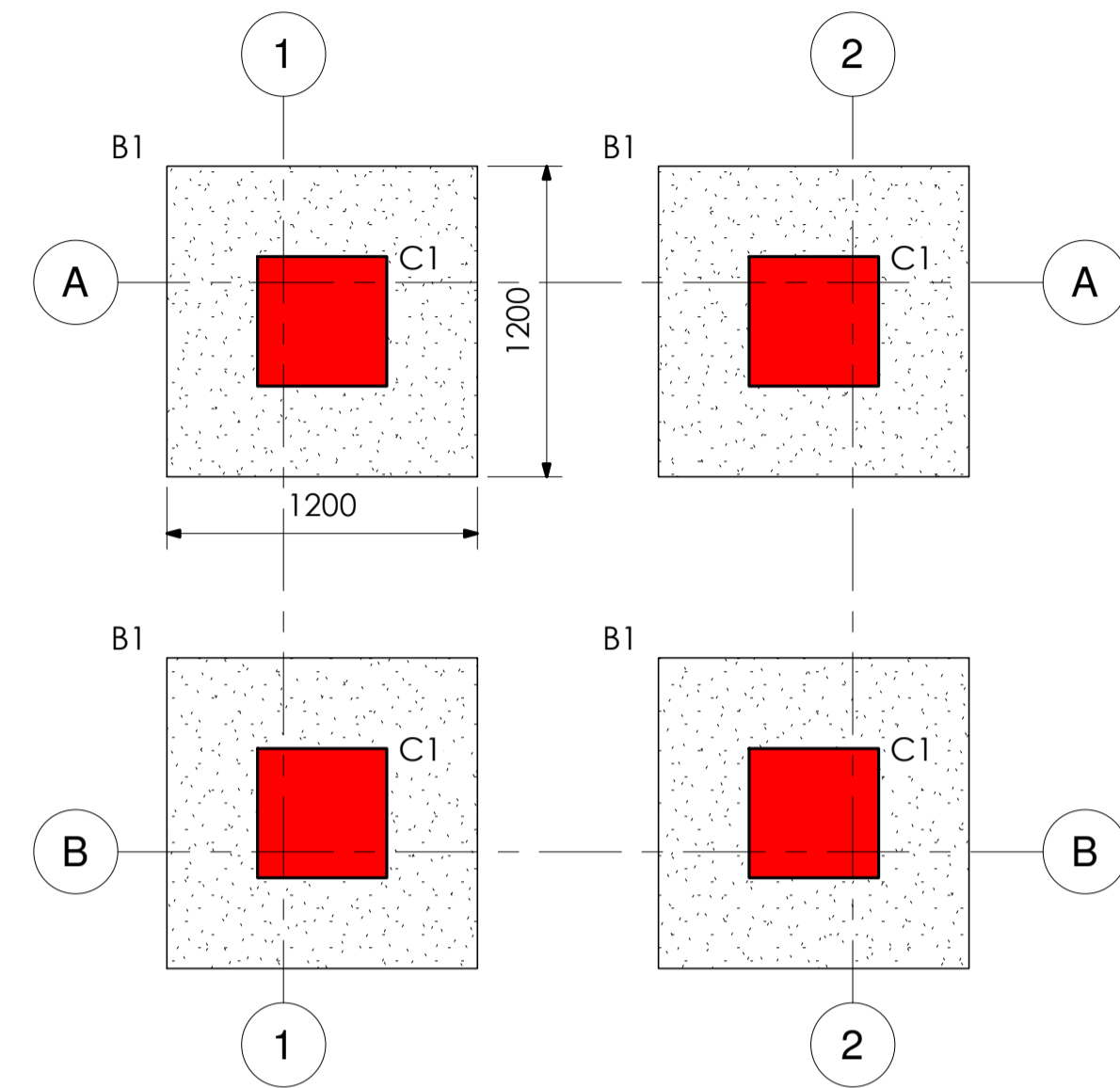
DRAWING TITLE

### FLOCCULATION BASIN STRUCTURAL DETAILING

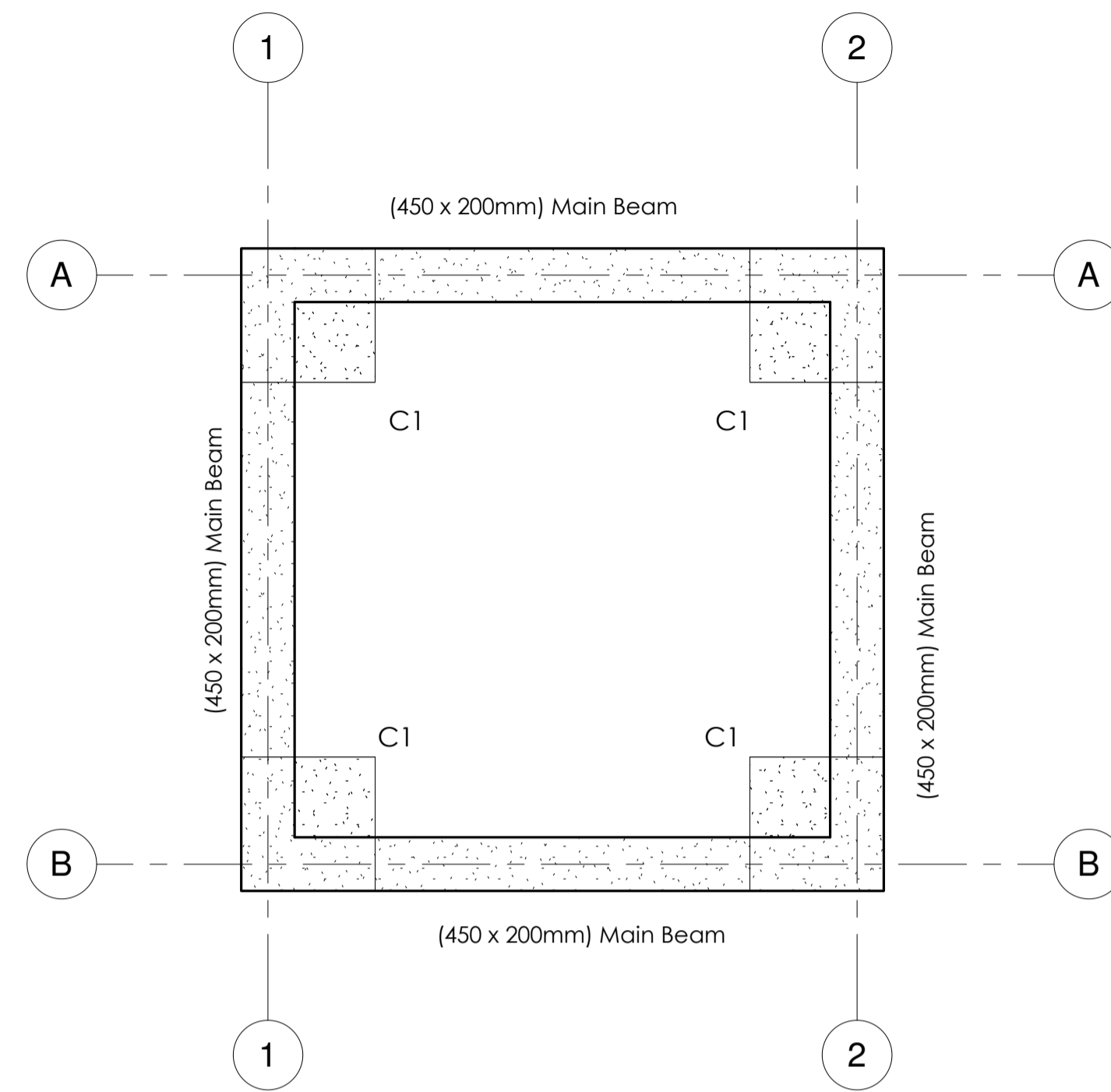
#### MATERIAL TAKE-OFFS AND BAR BENDING SCHEDULES [PART 2 OF 2]

Designed By:	N.M.	Drawn By:	G.G.
Checked By:	P.M.M.	Approved By:	K.M.
Scale:	AS SHOWN	Date:	FEBRUARY 2024
DRAWING No.	MWS/TWFB - STR/05	REV.	0

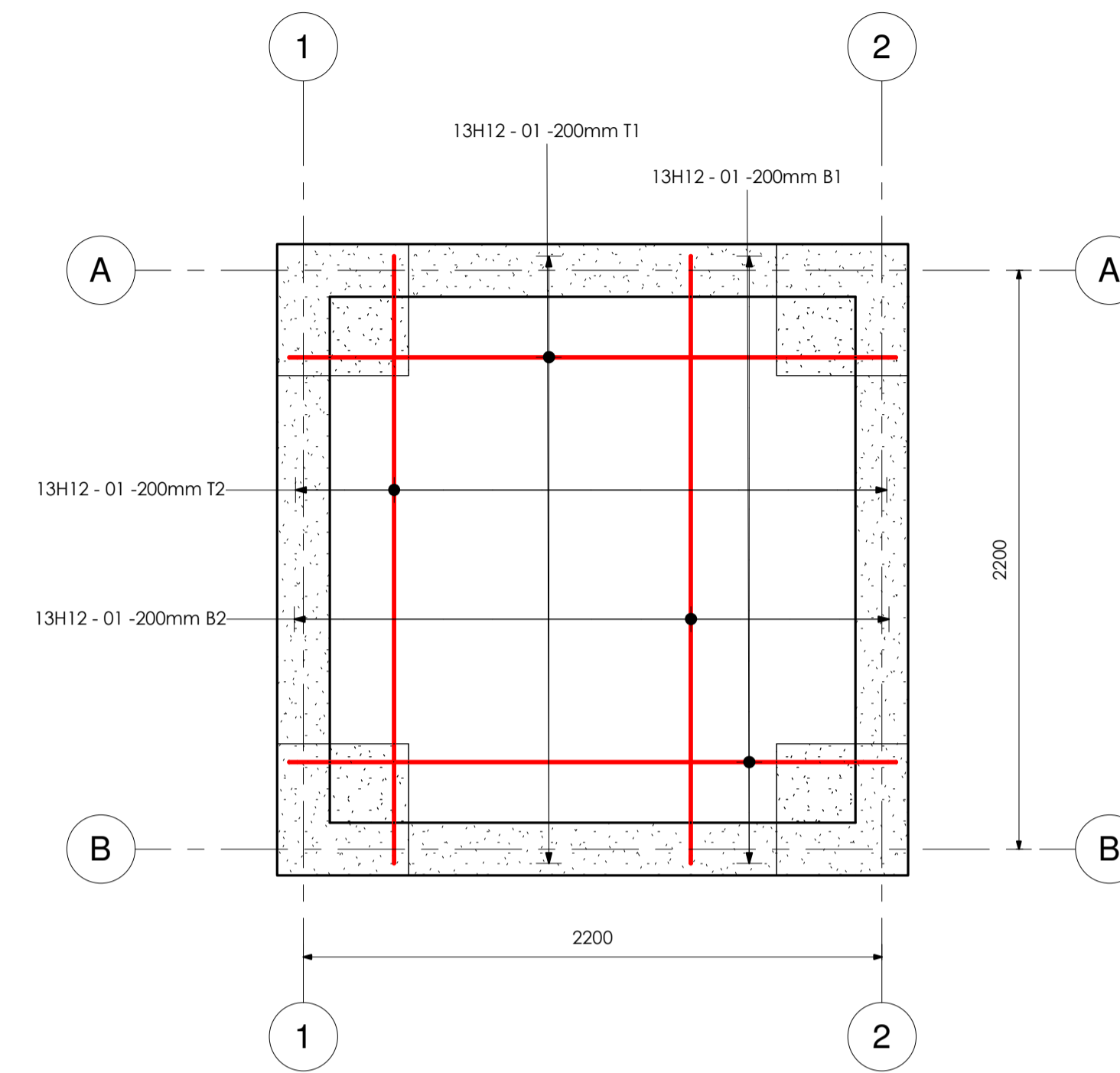
# **STILLING WELL**



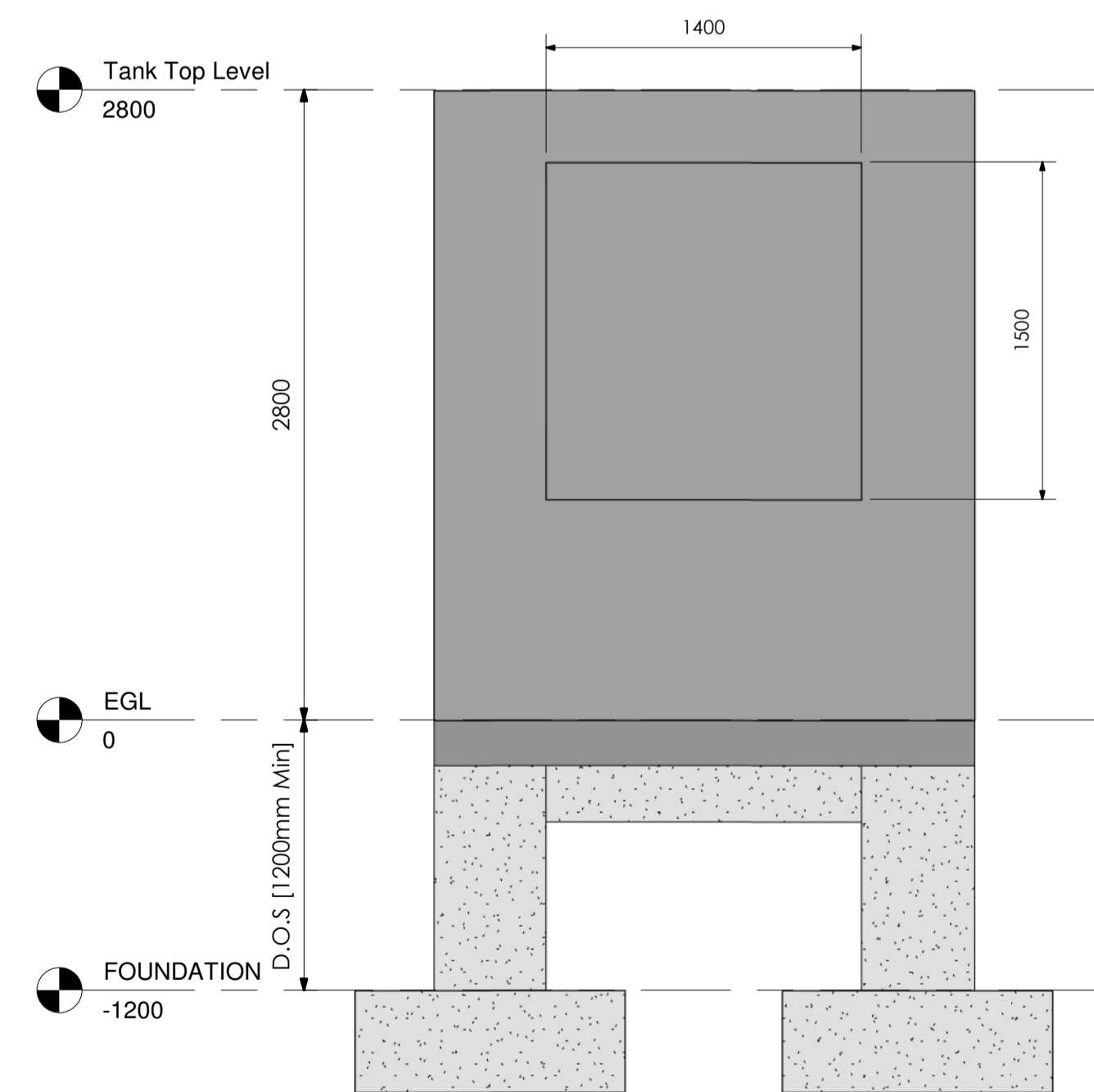
**FOUNDATION LAYOUT**  
SCALE 1:25



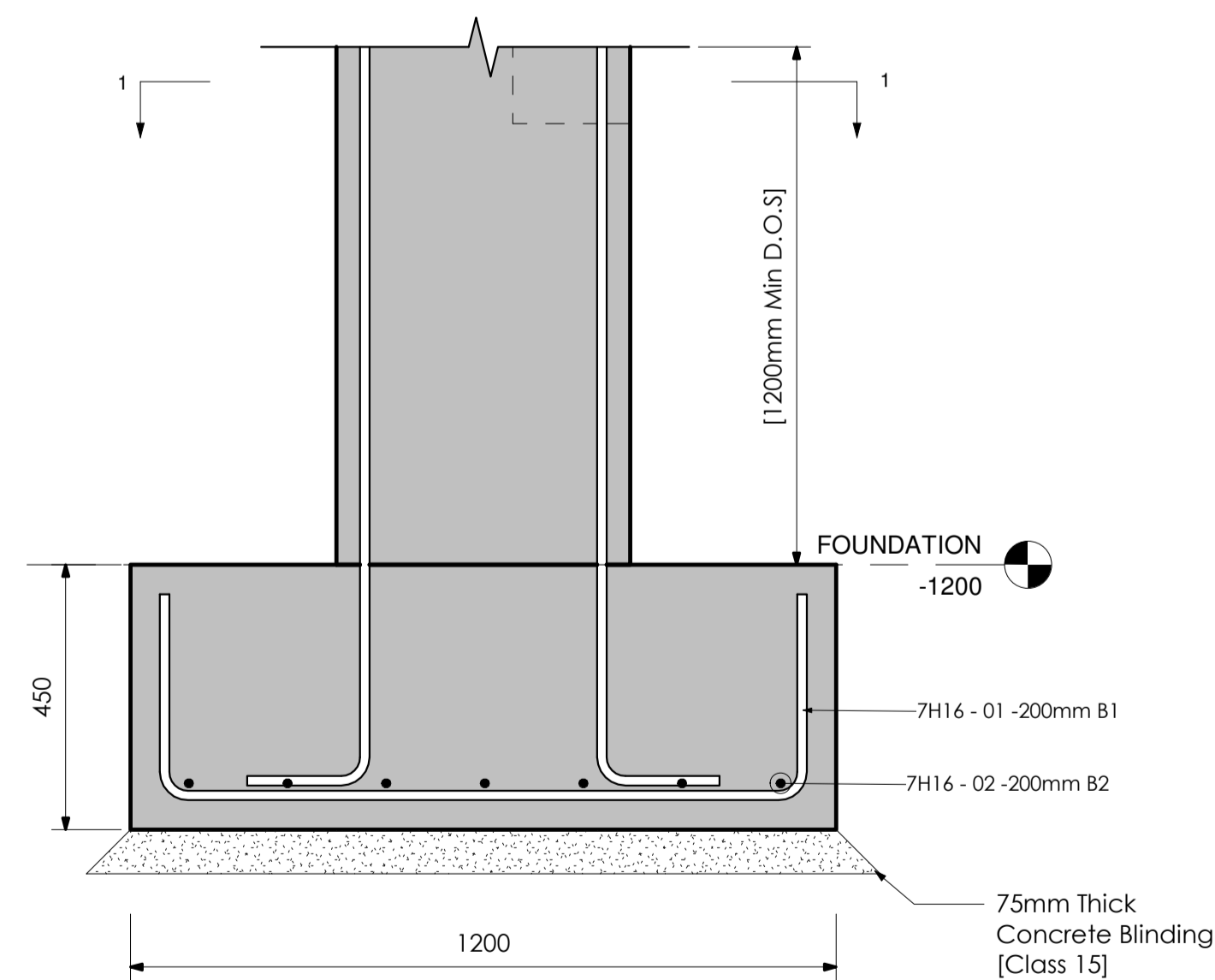
**200mm THICK STILLING WELL  
SLAB PLAN LAYOUT**  
SCALE 1:20



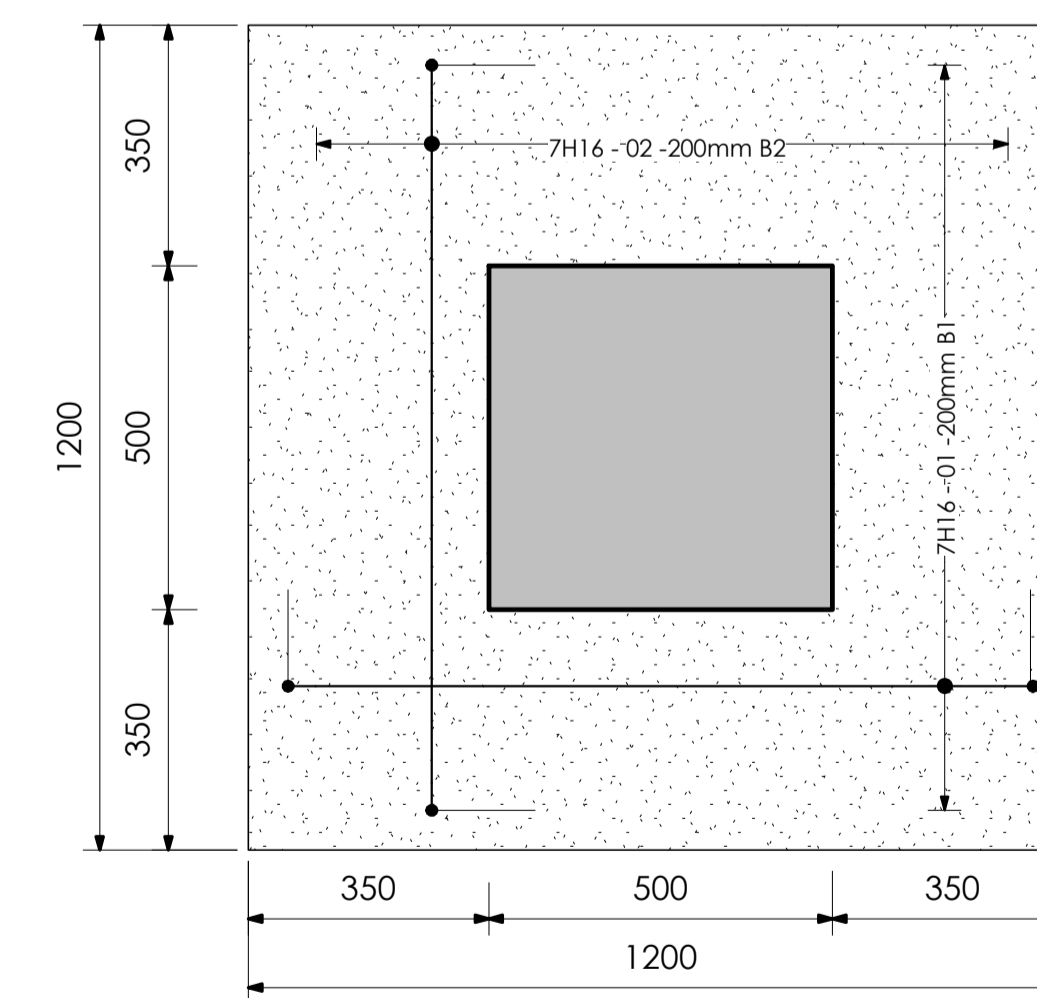
**200mm THICK STILLING WELL  
SLAB RC DETAILS**  
SCALE 1:20



**STILLING WELL ELEVATION VIEW**  
SCALE 1:25



**COLUMN BASE B1 ELEVATION DETAIL**  
(1200mm x 1200mm x 450mm)  
SCALE 1:10




**COLUMN BASE B1 PLAN DETAIL**  
(1200mm x 1200mm x 450mm)  
SCALE 1:10

**NOTES**

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED.
- ALL EXPOSED CONCRETE EDGES HAVE A 25mm x 25mm CHAMFER.
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT.
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING.
- ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED.
- ABBREVIATIONS:  
RC - REINFORCED CONCRETE.  
DPC - DAMP PROOF COURSE.  
EGL - EXISTING GROUND LEVEL.  
FGL - FINISHED GROUND LEVEL.  
FFL - FINISHED FLOOR LEVEL.  
PCC - PRECAST CONCRETE.  
GCI - GALVANIZED CORRUGATED IRON.  
H - HIGH YIELD DEFORMED BARS TO BS 4449:2005.
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 40 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE.
- FOR WINDOW SCHEDULES SEE DRG. NO. MWS/SD/29.
- FOR DOOR SCHEDULES SEE DRG. NO. MWS/SD/7 28.

REVISION	DESCRIPTION	DATE

CLIENT




NORTHERN WATER WORKS DEVELOPMENT AGENCY  
P.O. BOX 495 - 70100  
GARISSA.

PROJECT

**MARALAL WATER SUPPLY PROJECT**

REVIEWED BY



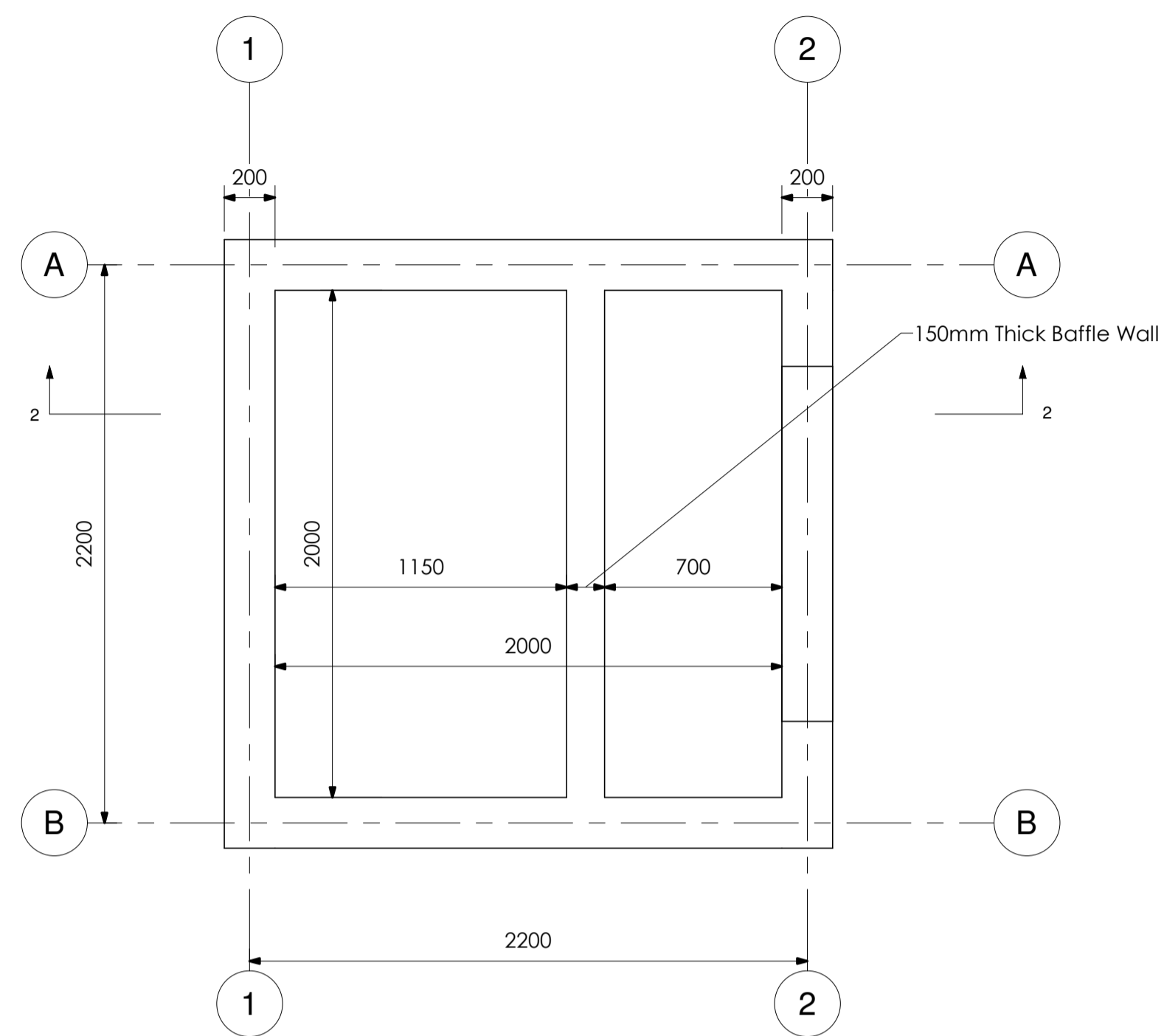
Interconsult Engineers Ltd  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane.  
Tel. 4441648/4441651  
NAIROBI.

DRAWING TITLE

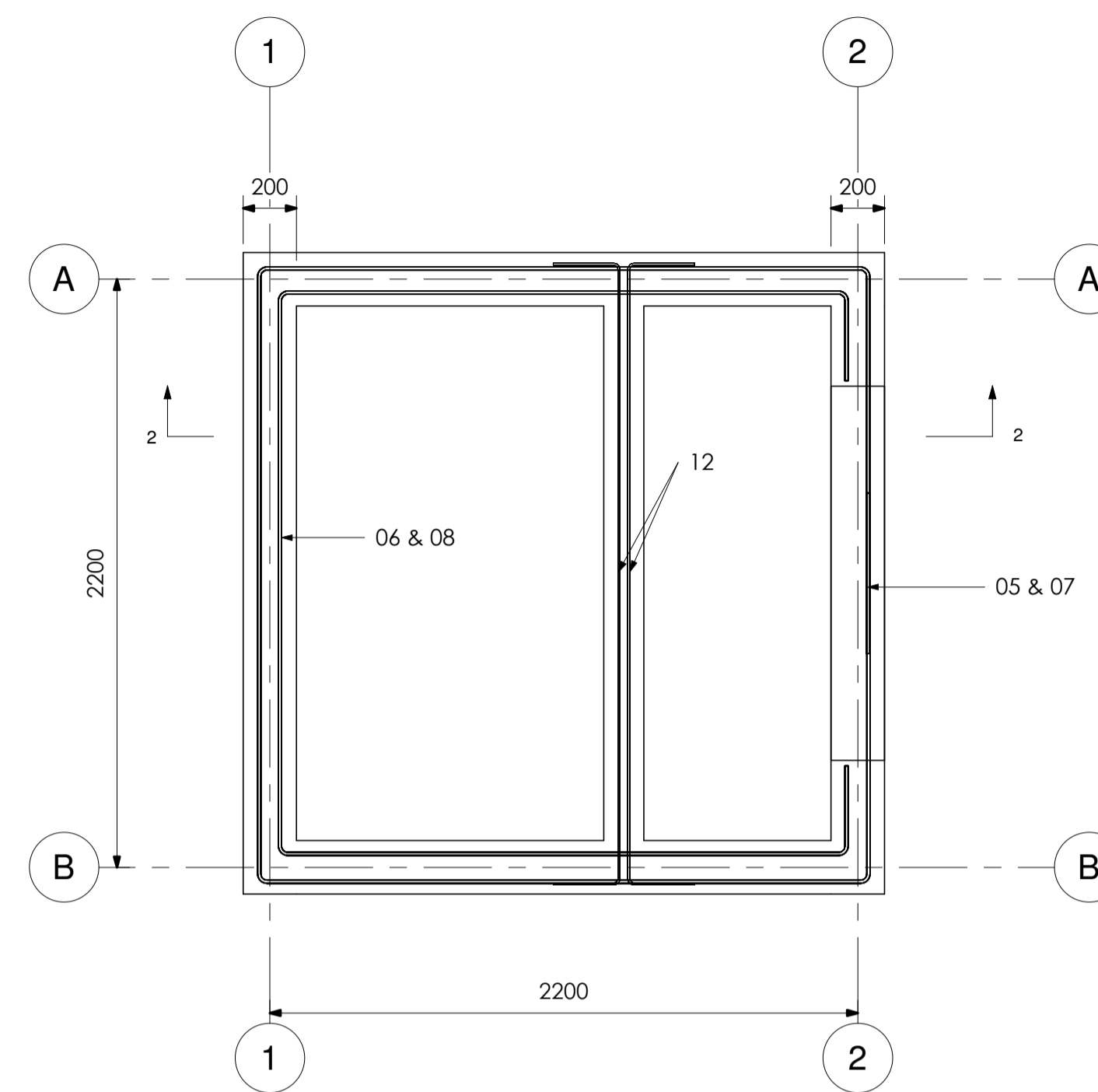
**STILLING WELL  
STRUCTURAL DETAILING**

LAYOUTS AND REINFORCEMENT  
DETAILS FOR SLABS AND  
FOUNDATIONS

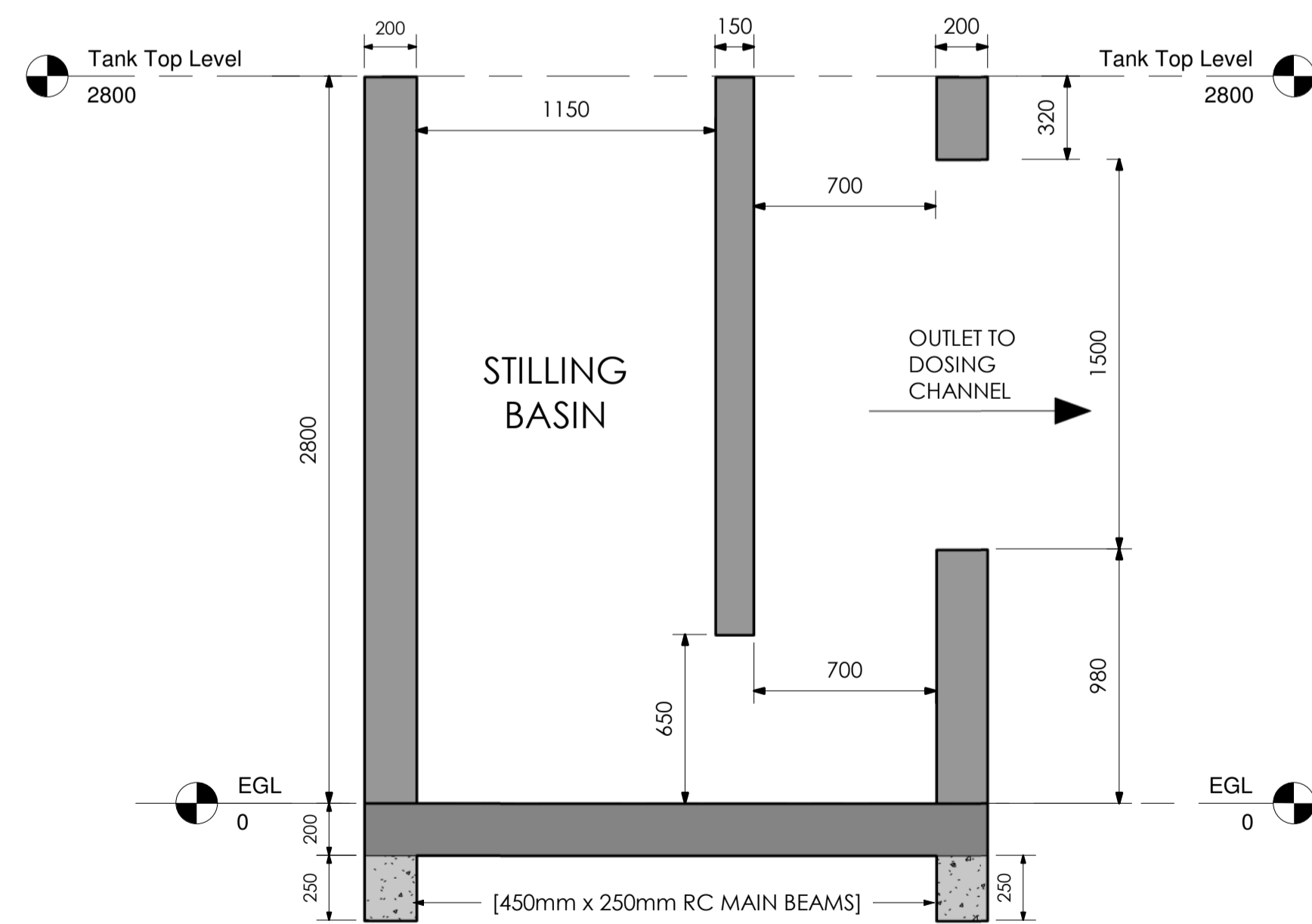
Designed By:	N.M.	Drawn By:	G.G.
Checked By:	P.M.M.	Approved By:	K.M.
Scale:	AS SHOWN	Date:	FEBRUARY 2024
DRAWING No.	MWS/TW/SW - STR/01	REV.	0



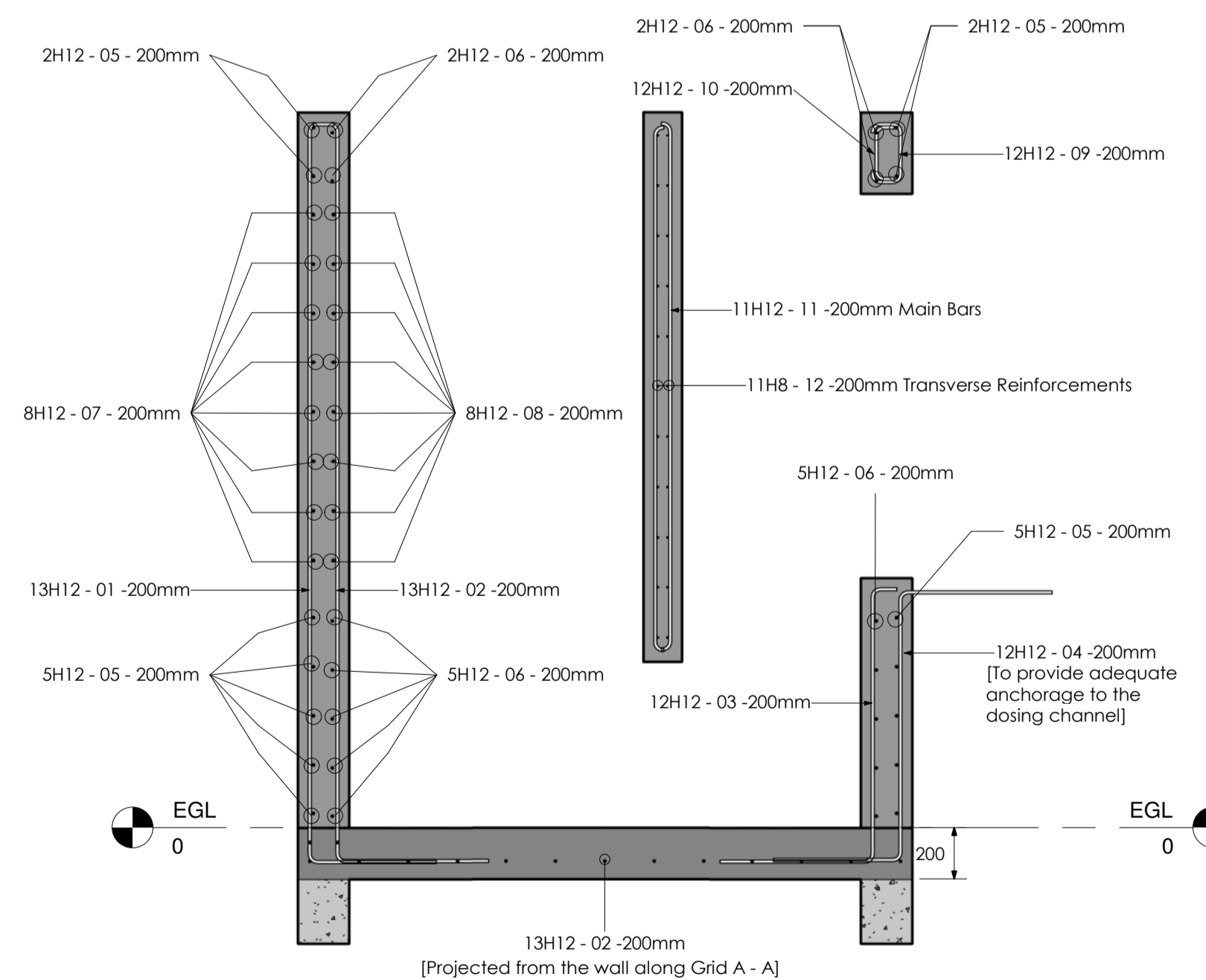
**STILLING WELL TOP LEVEL PLAN LAYOUT**  
SCALE 1:20



**STILLING WELL PLAN REINFORCEMENT DETAIL**  
SCALE 1:20



**STILLING WELL WALL SECTION 2 - 2 LAYOUT**  
SCALE 1:20




**STILLING WELL WALL REINFORCEMENT DETAIL**  
SCALE 1:20

**NOTES**

1. DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED.
2. ALL EXPOSED CONCRETE EDGES HAVE A 25mm x 25mm CHAMFER.
3. ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT.
4. ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING.
5. ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED.
6. ABBREVIATIONS:  
RC - REINFORCED CONCRETE.  
DPC - DAMP PROOF COURSE.  
EGL - EXISTING GROUND LEVEL.  
FGL - FINISHED GROUND LEVEL.  
FFL - FINISHED FLOOR LEVEL.  
PCC - PRECAST CONCRETE.  
GCI - GALVANIZED CORRUGATED IRON.  
H - HIGH YIELD DEFORMED BARS TO BS 4449:2005.
7. EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 40 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE.
8. FOR WINDOW SCHEDULES SEE DRG. NO. MWS/SD/29.
9. FOR DOOR SCHEDULES SEE DRG. NO. MWS/SD/7 28.

REVISION	DESCRIPTION	DATE

CLIENT



NORTHERN WATER WORKS DEVELOPMENT AGENCY  
P.O. BOX 495 - 70100  
GARISSA.

PROJECT

**MARALAL WATER SUPPLY PROJECT**

REVIEWED BY



Interconsult Engineers Ltd  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane.  
Tel. 4441648/4441651  
NAIROBI.

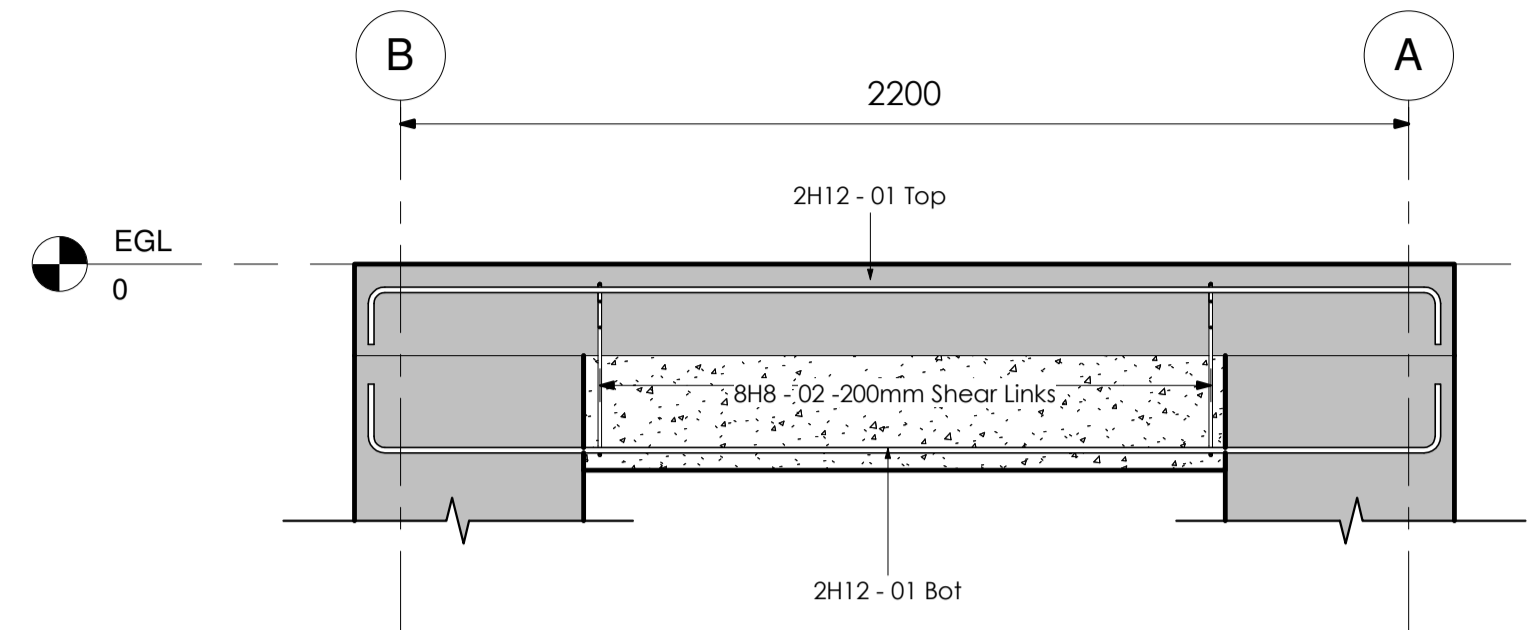
DRAWING TITLE

**STILLING WELL STRUCTURAL DETAILING**

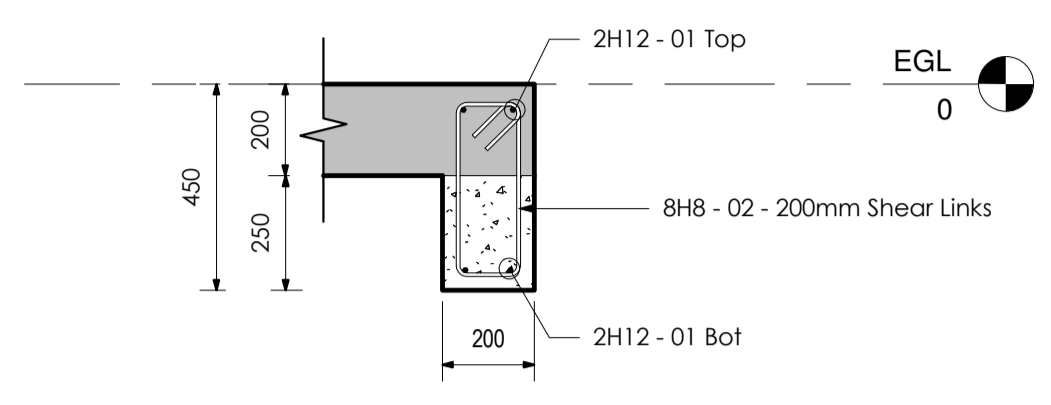
SECTIONS, ELEVATIONS AND REINFORCEMENT DETAILS FOR BEAMS, COLUMNS AND WALLS

Designed By:	N.M.	Drawn By:	G.G.
Checked By:	P.M.M.	Approved By:	K.M.
Scale:	AS SHOWN	Date:	FEBRUARY 2024
DRAWING No.	MWS/TWSW - STR/02	REV	0

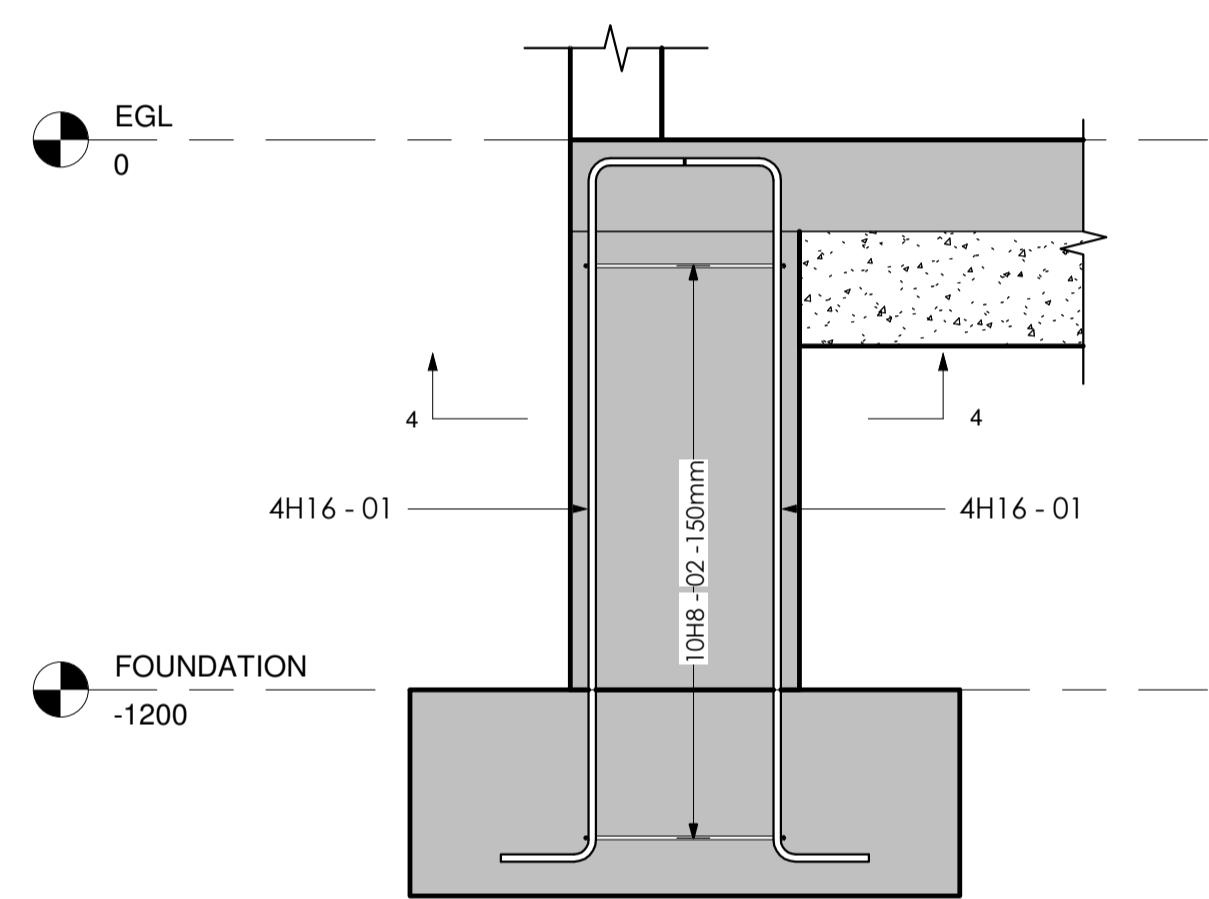




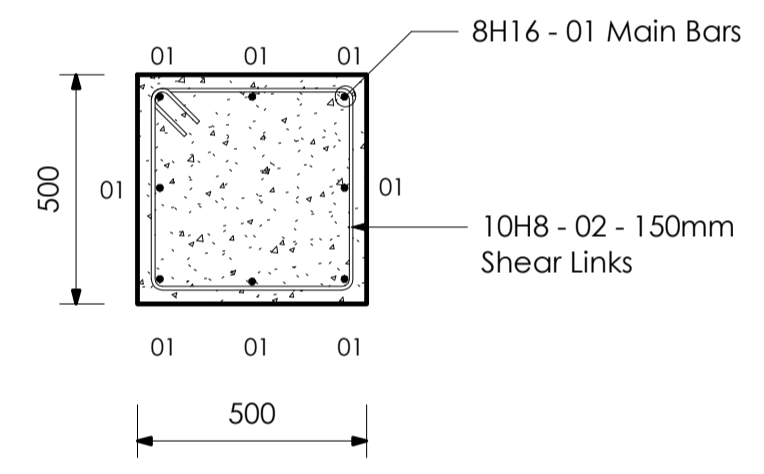
**MAIN BEAM ELEVATION** (450mm x 200mm)  
SCALE 1:15



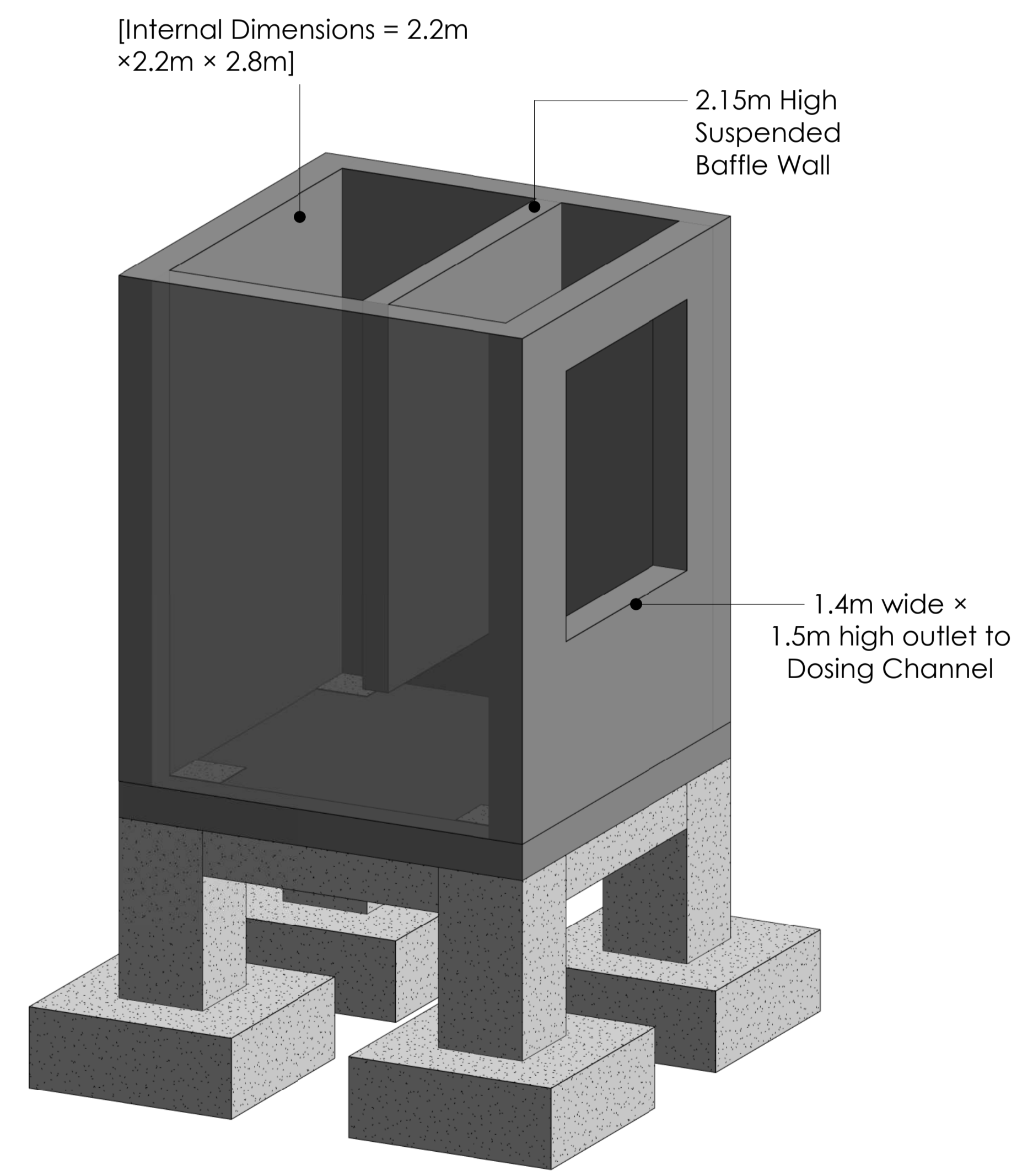
**MAIN BEAM SECTION**  
SCALE 1:15



**COLUMN C1 RC DETAILS** (500mm x 500mm)  
SCALE 1:15



**COLUMN C1 Section**  
SCALE 1:15




**3D STRUCTURAL MODEL OF STILLING WELL**  
SCALE 1:20

**NOTES**

1. DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED.
2. ALL EXPOSED CONCRETE EDGES HAVE A 25mm x 25mm CHAMFER.
3. ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT.
4. ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING.
5. ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED.
6. ABBREVIATIONS:  
RC - REINFORCED CONCRETE.  
DPC - DAMP PROOF COURSE.  
EGL - EXISTING GROUND LEVEL.  
FGL - FINISHED GROUND LEVEL.  
FFL - FINISHED FLOOR LEVEL.  
PCC - PRECAST CONCRETE.  
GCI - GALVANIZED CORRUGATED IRON.  
H - HIGH YIELD DEFORMED BARS TO BS 4449:2005.
7. EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE.
8. FOR WINDOW SCHEDULES SEE DRG. NO. MWS/SD/29.
9. FOR DOOR SCHEDULES SEE DRG. NO. MWS/SD/7 28.

REVISION	DESCRIPTION	DATE

CLIENT



NORTHERN WATER WORKS DEVELOPMENT AGENCY  
P.O. BOX 495 - 70100  
GARISSA.

PROJECT

**MARALAL WATER SUPPLY PROJECT**

REVIEWED BY



Interconsult Engineers Ltd  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane.  
Tel. 4441648/4441651  
NAIROBI.

DRAWING TITLE

**STILLING WELL STRUCTURAL DETAILING**

3D MODEL, COLUMN AND BEAM REINFORCEMENT DETAILS

Designed By:	N.M.	Drawn By:	G.G.
Checked By:	P.M.M.	Approved By:	K.M.
Scale:	AS SHOWN	Date:	FEBRUARY 2024
DRAWING No.	MWS/TWSW - STR/03	REV.	0

**COLUMN BASE BBS**

STRUCTURAL ELEMENT	BAR MARK	BAR DIAMETER	BAR LENGTH	NO. OF BARS	TOTAL BAR LENGTH	SHAPE CODE	REBAR SHAPE IMAGE	A	B	C	Reinforcement Volume	REBAR WEIGHT
Pad Footing	01	16 mm	1750 mm	28	12250 mm	21		350 mm	1100 mm	350 mm	2463.01 cm³	77.34 kg
Pad Footing	02	16 mm	1700 mm	28	11900 mm	21		325 mm	1100 mm	325 mm	2392.64 cm³	75.13 kg
TOTAL				56							152.47 kg	

**BASIN SLAB BBS**

STRUCTURAL ELEMENT	BAR MARK	BAR DIAMETER	BAR PLACEMENT	BAR LENGTH	NO. OF BARS	TOTAL BAR LENGTH	SHAPE CODE	REBAR SHAPE IMAGE	A	B	C	Reinforcement Volume	REBAR WEIGHT
BASIN SLAB	01	12 mm	B1	2475 mm	13	32175 mm	21		100 mm	2320 mm	100 mm	3638.91 cm³	28.57 kg
BASIN SLAB	01	12 mm	B2	2450 mm	13	31850 mm	21		80 mm	2320 mm	80 mm	3602.15 cm³	28.28 kg
BASIN SLAB	01	12 mm	T1	2475 mm	13	32175 mm	21		100 mm	2320 mm	100 mm	3638.91 cm³	28.57 kg
BASIN SLAB	01	12 mm	T2	2450 mm	13	31850 mm	21		80 mm	2320 mm	80 mm	3602.15 cm³	28.28 kg
TOTAL				52								113.68 kg	

**BEAMS BBS**

STRUCTURAL ELEMENT	BAR MARK	BAR DIAMETER	BAR PLACEMENT	BAR LENGTH	NO. OF BARS	TOTAL BAR LENGTH	SHAPE CODE	REBAR SHAPE IMAGE	A	B	C	D	E	Reinforcement Volume	REBAR WEIGHT
Beam	01	12 mm	Bot	2600 mm	8	5200 mm	21		150 mm	2340 mm	150 mm	0 mm	0 mm	588.11 cm³	18.47 kg
Beam	01	12 mm	Top	2550 mm	8	5100 mm	21		125 mm	2340 mm	125 mm	0 mm	0 mm	576.80 cm³	18.11 kg
Beam	02	8 mm	Shear Links	1225 mm	32	9800 mm	51		140 mm	380 mm	110 mm	110 mm	0 mm	492.60 cm³	15.47 kg
TOTAL				48										52.05 kg	

**COLUMNS BBS**

STRUCTURAL ELEMENT	BAR MARK	BAR DIAMETER	BAR LENGTH	NO. OF BARS	TOTAL BAR LENGTH	SHAPE CODE	REBAR SHAPE IMAGE	A	B	C	D	E	Reinforcement Volume	REBAR WEIGHT
COLUMN	01	16 mm	1900 mm	32	60800 mm	23		205 mm	1535 mm	205 mm	0 mm	0 mm	12224.57 cm³	95.96 kg
COLUMN	02	8 mm	1950 mm	40	78000 mm	51		440 mm	440 mm	110 mm	110 mm	0 mm	3920.71 cm³	30.78 kg
TOTAL				72	138800 mm								16145.27 cm³	126.74 kg

**WALLS BBS**

PARTITION	BAR MARK	BAR DIAMETER	BAR LENGTH	NO. OF BARS	TOTAL BAR LENGTH	SHAPE CODE	REBAR SHAPE IMAGE	A	B	C	Reinforcement Volume	REBAR WEIGHT
MAIN WALLS	01	12 mm	3450 mm	45	155250 mm	21		100 mm	2895 mm	500 mm	<varies>	137.83 kg
MAIN WALLS	02	12 mm	3550 mm	45	159750 mm	23		600 mm	2895 mm	100 mm	<varies>	141.83 kg
MAIN WALLS	03	12 mm	1750 mm	12	21000 mm	23		600 mm	1075 mm	100 mm	2375.04 cm³	18.64 kg
MAIN WALLS	04	12 mm	2125 mm	12	25500 mm	23		600 mm	1055 mm	500 mm	2883.98 cm³	22.64 kg
MAIN WALLS	05	12 mm	9700 mm	7	67900 mm	41		1445 mm	2290 mm	2305 mm	7679.31 cm³	60.28 kg
MAIN WALLS	06	12 mm	9425 mm	7	65975 mm	41		1350 mm	2155 mm	2100 mm	7461.60 cm³	58.57 kg
MAIN WALLS	07	12 mm	7700 mm	8	61600 mm	41		420 mm	2305 mm	2320 mm	6966.80 cm³	54.69 kg
MAIN WALLS	08	12 mm	6950 mm	8	55600 mm	41		335 mm	2130 mm	2110 mm	6288.21 cm³	49.36 kg
MAIN WALLS	09	12 mm	475 mm	12	5700 mm	41		50 mm	120 mm	240 mm	644.65 cm³	5.06 kg
MAIN WALLS	10	12 mm	325 mm	12	3900 mm	21		75 mm	215 mm	75 mm	441.08 cm³	3.46 kg
TOTAL				168	622175 mm							552.38 kg

**RC COLUMN CONCRETE SCHEDULE**

STRUCTURAL ELEMENT	ELEMENT SIZES	NO. OF COLUMNS	LENGTH	CONCRETE VOLUME
RC COLUMN	500mm X 500mm	4	4820	1.00 m³
TOTAL				1.00 m³

**RC SLAB CONCRETE SCHEDULE**

STRUCTURAL ELEMENT	ELEMENT SIZE	VOLUME
RC SLAB	200mm Thick	1.15 m³
TOTAL: 1		1.15 m³

**RC PAD FOUNDATION CONCRETE SCHEDULE**

STRUCTURAL ELEMENT	ELEMENT SIZE	LABEL	TOTAL NO.	VOLUME
RC PAD FOOTING	1200mm x 1200mm x 450mm	B1	4	2.59 m³
Grand total				2.59 m³

**RC WALL CONCRETE SCHEDULE**

STRUCTURAL ELEMENT	ELEMENT SIZE	LENGTH IN MM	WALL HEIGHT	VOLUME
RC Wall	200mm Thick	2200	2150	0.65 m³
RC Wall	200mm Thick	8800	2800	4.51 m³
TOTAL				5.15 m³

**RC BEAM CONCRETE SCHEDULE**

STRUCTURAL ELEMENT	ELEMENT SIZE	LENGTH IN MM	VOLUME
RC BEAM	(200mm x 450mm)	8800	0.28 m³
TOTAL			0.28 m³

**TOTAL RC CONCRETE SUMMARY**

STRUCTURAL ELEMENTS	CONCRETE VOLUMES
RC BEAM	0.28 m³
RC COLUMN	1.00 m³
RC PAD FOOTING	2.59 m³
RC SLAB	1.15 m³
RC Wall	5.15 m³
TOTAL	10.18 m³

**TOTAL BBS SUMMARY**


Type	Reinforcement Volume	REBAR WEIGHT
H8	8987.47 cm³	74.08 kg
H12	112670.39 cm³	928.69 kg
H16	31647.15 cm³	260.85 kg
TOTAL	153305.01 cm³	1263.62 kg

**NOTES**

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED.
- ALL EXPOSED CONCRETE EDGES HAVE A 25mm x 25mm CHAMFER.
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT.
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING.
- ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED.
- ABBREVIATIONS:  
 RC - REINFORCED CONCRETE.  
 DPC - DAMP PROOF COURSE.  
 EGL - EXISTING GROUND LEVEL.  
 FGL - FINISHED GROUND LEVEL.  
 FFL - FINISHED FLOOR LEVEL.  
 PCC - PRECAST CONCRETE.  
 GCI - GALVANIZED CORRUGATED IRON.  
 H - HIGH YIELD DEFORMED BARS TO BS 4449:2006.
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 40 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE.
- FOR WINDOW SCHEDULES SEE DRG. NO. MWS/SD/29.
- FOR DOOR SCHEDULES SEE DRG. NO. MWS/SD/7 28.

REVISION	DESCRIPTION	DATE

CLIENT



NORTHERN WATER WORKS DEVELOPMENT AGENCY  
 P.O. BOX 495 - 70100  
 GARISSA.

**MARALAL WATER SUPPLY PROJECT**

REVIEWED BY



Interconsult Engineers Ltd  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane.  
 Tel. 4441648/4441651  
 NAIROBI.

**STILLING WELL STRUCTURAL DETAILING**

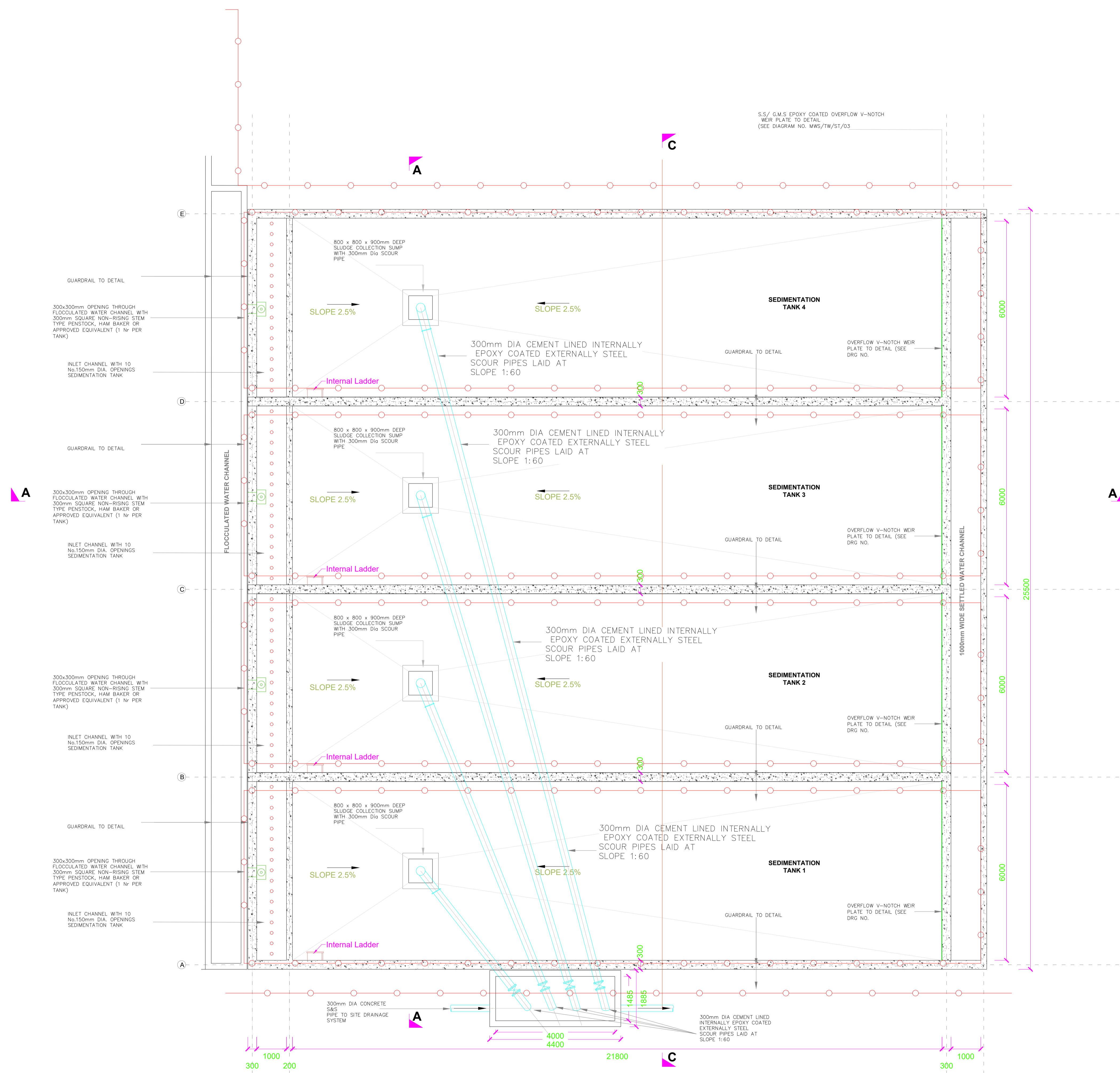
**BAR BENDING SCHEDULES**

Designed By:	N.M.	Drawn By:	G.G.
Checked By:	P.M.M.	Approved By:	K.M.
Scale:	AS SHOWN	Date:	FEBRUARY 2024
DRAWING No.	MWS/TW/SW - STR/04	REV.	0


# **SEDIMENTATION TANK**

**NOTES:**

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
- ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
- CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
- ABBREVIATIONS
  - R.C - REINFORCED CONCRETE
  - D.P.C - DAMP PROOF COURSE
  - E.G.L - EXISTING GROUND LEVEL
  - F.G.L - FINISHED FLOOR LEVEL
  - F.F.L - FINISHED FLOOR LEVEL
  - P.C.C - PRECAST CONCRETE
  - G.C.I - GALVANIZED CORRUGATED IRON
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE



REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:  

**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane.  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT**  
**SEDIMENTATION TANK LAYOUT**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
1:50	Date: FEBRUARY 2024
DRAWING No. MWS/TW/ST/01	REV. 0

Rectangular penstock with extension spindle guide brackets headstock and handwheel on 300mm wide outlet

FLOCCULATED WATER CHANNEL

300x300mm INLET OPENING

10 No OPENINGS 150mm DIAMETER

CONSTRUCTION JOINT WITH 200mm WIDE uPVC WATER BAR

300mm DIA CEMENT LINED INTERNALLY EPOXY COATED EXTERNALLY STEEL SCOUR PIPES LAID AT SLOPE 1:60

800 x 800 x 900mm DEEP SLUDGE COLLECTION SUMP WITH 150mm Dia SCOUR PIPE

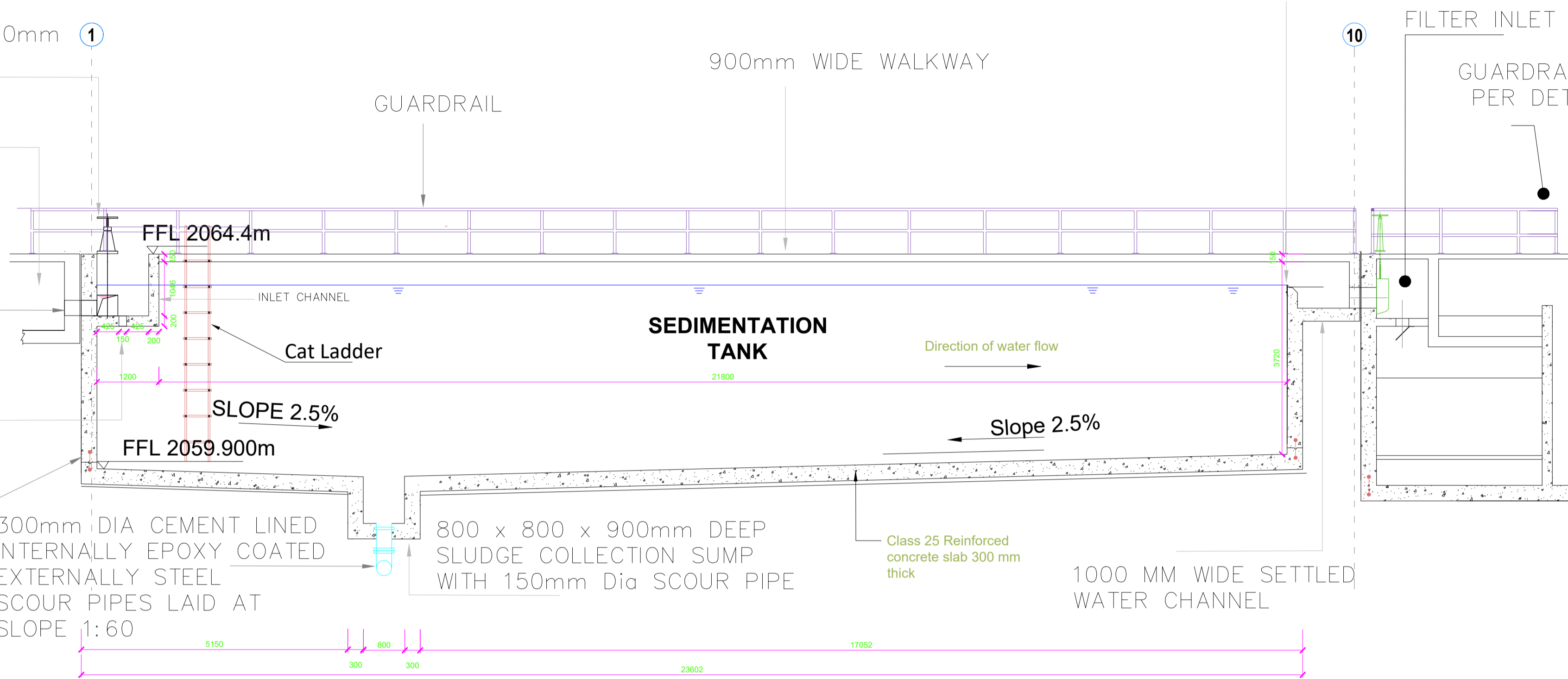
Class 25 Reinforced concrete slab 300 mm thick

1000 MM WIDE SETTLED WATER CHANNEL

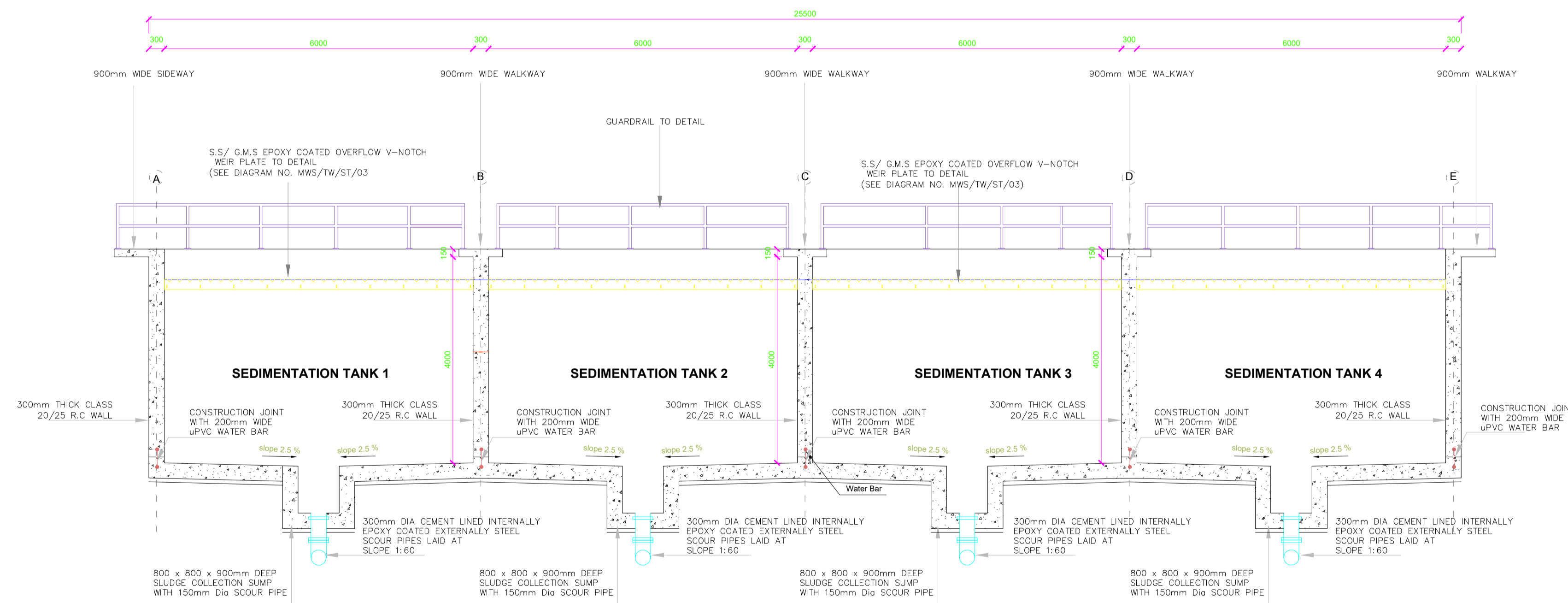
S.S/ G.M.S EPOXY COATED OVERFLOW V-NOTCH WEIR PLATE TO DETAIL (SEE DIAGRAM NO. MWS/TW/ST/03)

FILTER INLET CHANNEL

GUARDRAIL AS PER DETAIL



SECTION A-A



SECTION B-B

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
- ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
- CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
- ABBREVIATIONS
  - R.C - REINFORCED CONCRETE
  - D.P.C - DAMP PROOF COURSE
  - E.G.L - EXISTING GROUND LEVEL
  - F.G.L - FINISHED GROUND LEVEL
  - F.F.L - FINISHED FLOOR LEVEL
  - P.C.C - PRECAST CONCRETE
  - G.C.I - GALVANIZED CORRUGATED IRON
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:



NORTHERN WATER WORKS  
DEVELOPMENT AGENCY  
P.O. BOX 495-70100  
GARISSA

REVIEWED BY:

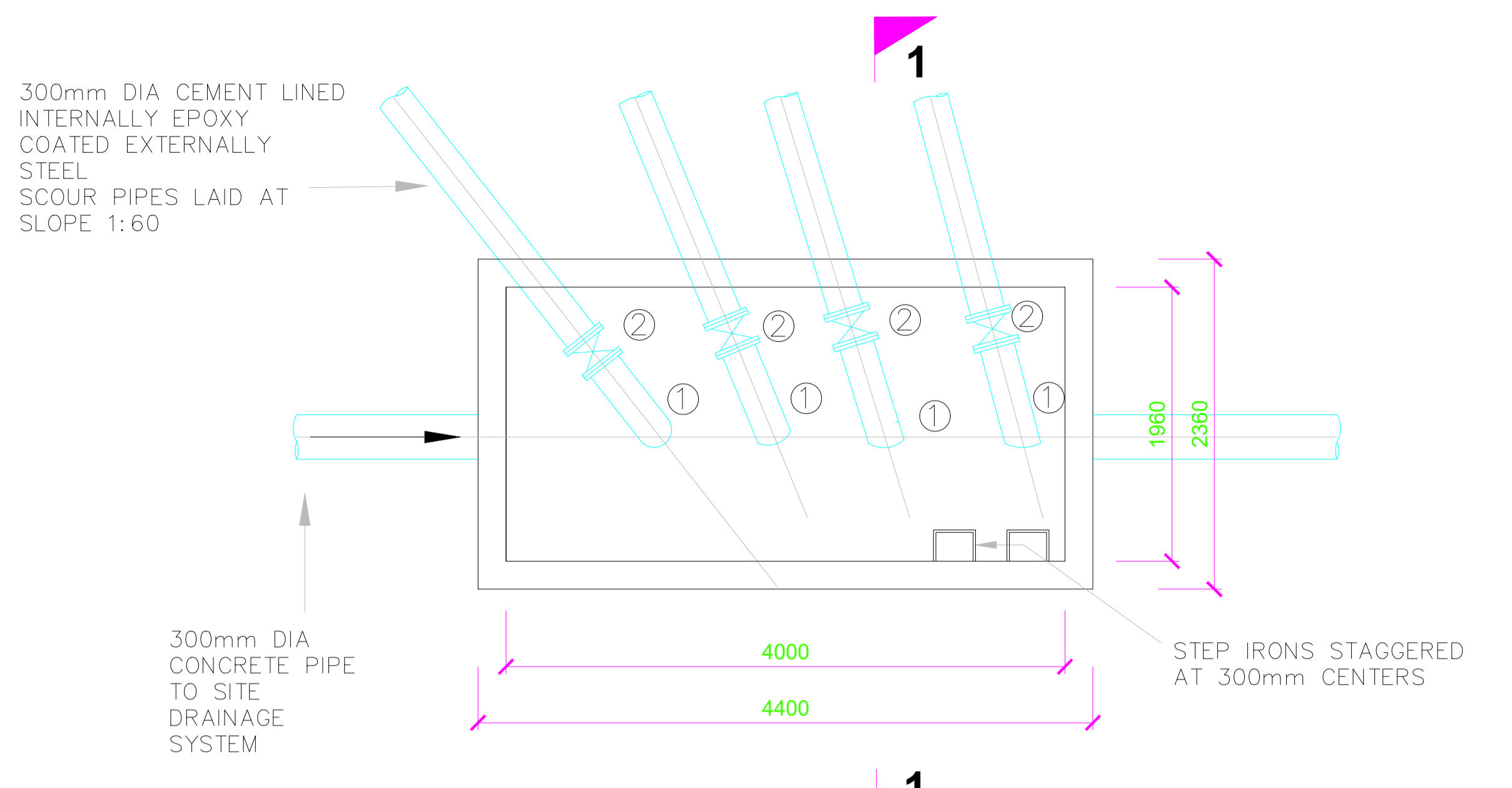


Interconsult Engineers Ltd  
Consulting Engineers  
Ngada Place, 4th Floor,  
Ngong Lane.  
Tel. 4441648/4441651  
Nairobi.

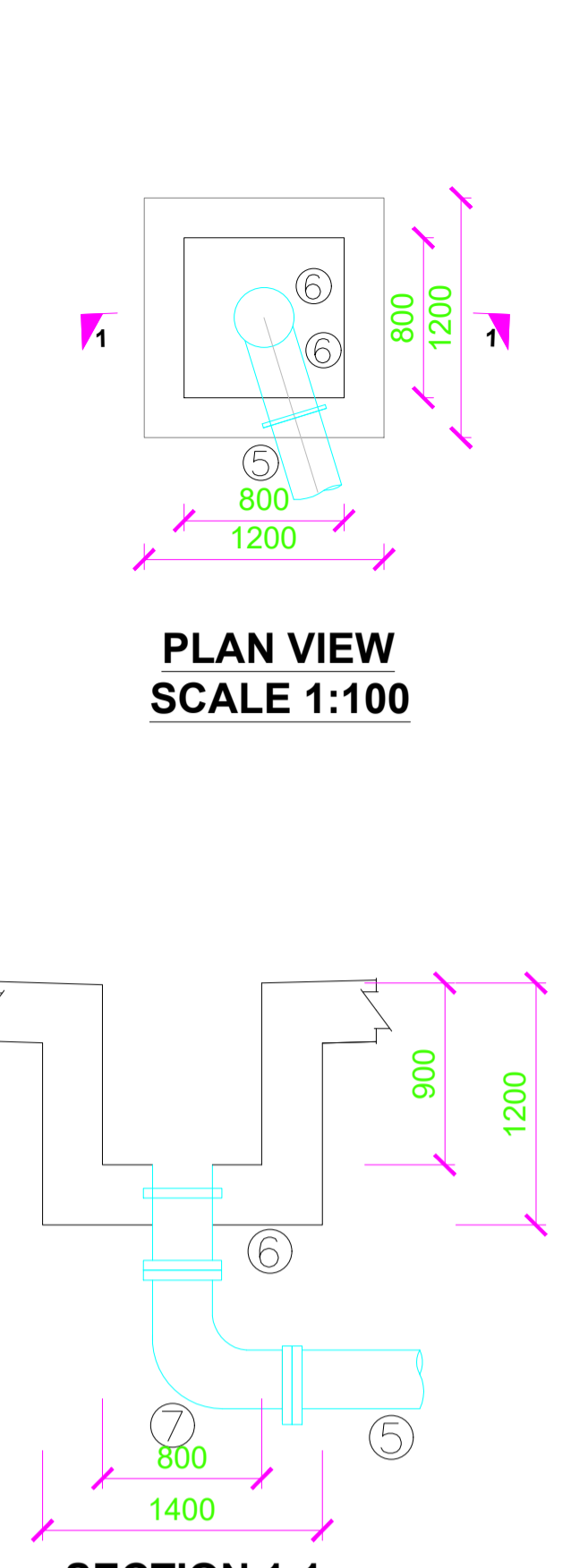
DRAWING TITLE:

**MARALAL WATER SUPPLY PROJECT**  
**SEDIMENTATION TANK SECTIONS**

Designed by:	N.M	Drawn by:	I.M.W
Checked by:	P.M.M	Approved by:	K.M
	1:50	Date:	FEBRUARY 2024
DRAWING No.	MWS/TW/ST/02	REV.	0



**SCOUR CHAMBER PLAN**  
(NOTE: CHAMBER COVER NOT SHOWN FOR CLARITY)  
SCALE 1:75

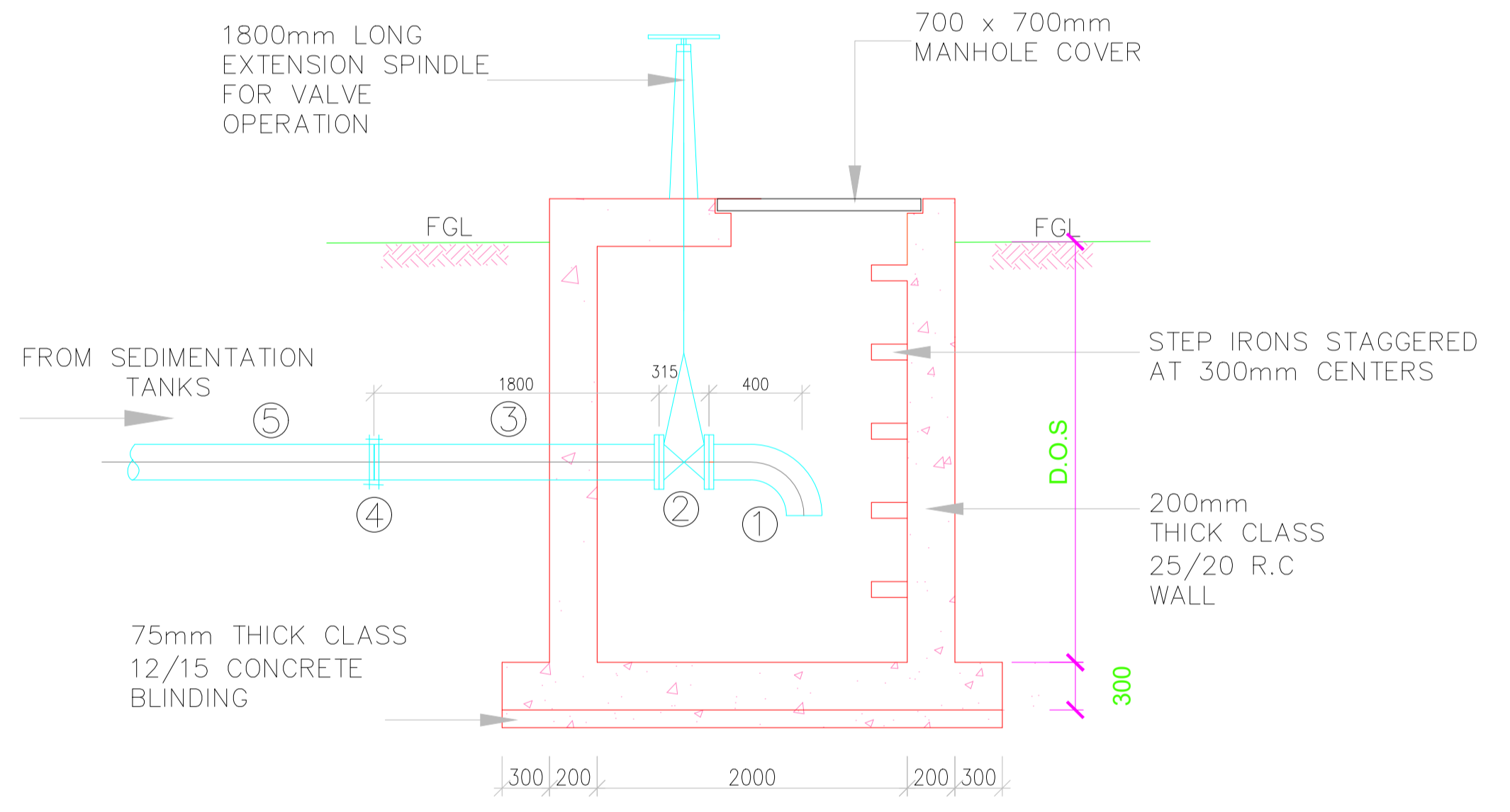
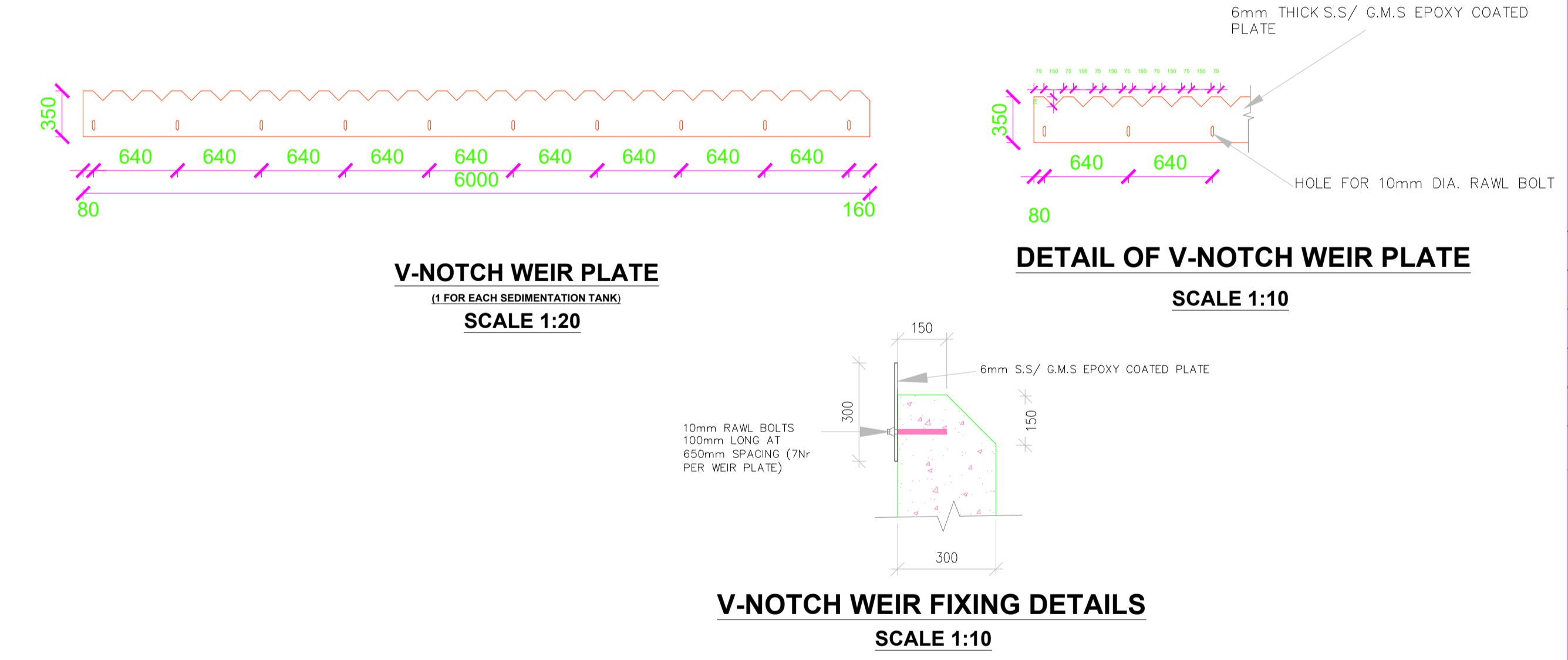


**SCOUR PIPEWORK SCHEDULE**  
(APPROVED CEMENT LINED INTERNALLY EPOXY COATED EXTERNALLY STEEL PIPES)

ITEM NO.	DESCRIPTION	DIA. (mm)	LENGTH (mm)	QUANTITY (NO.)
①	SINGLE FLANGED 90° BEND	300	400	4
②	ALL FLANGED GATE VALVE WITH 2800mm EXTENSION SPINDLE	300	210	4
③	FLANGED SPIGOT PIPE	300	VARYING	4
④	COUPLINGS	300	-	4
⑤	FLANGED PIPE (CUT TO SUIT ON SITE)	300	VARYING	4
⑥	SINGLE FLANGED PIPE WITH A PUDDLE FLANGE 150MM FROM ONE END	300	527	4
⑦	DOUBLE FLANGED 90° BEND	300	400	4

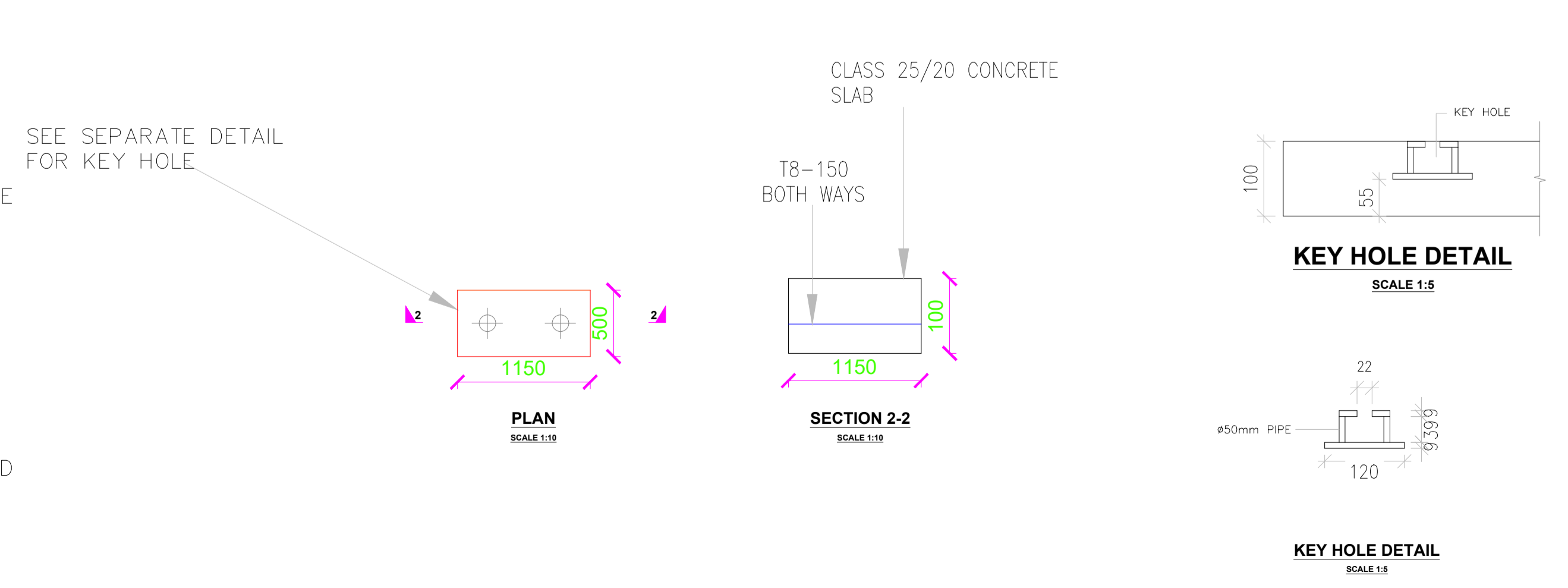
- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
- ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
- CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
- ABBREVIATIONS
  - R.C - REINFORCED CONCRETE
  - D.P.C - DAMP PROOF COURSE
  - E.G.L - EXISTING GROUND LEVEL
  - F.G.L - FINISHED GROUND LEVEL
  - F.F.L - FINISHED FLOOR LEVEL
  - P.C.C - PRECAST CONCRETE
  - G.C.I - GALVANIZED CORRUGATED IRON
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE

**DETAILS OF OVERFLOW V-NOTCH WEIR PLATE**



**SECTION 1-1**  
SCALE 1:75

**DETAILS OF P.C.C COVER SLABS OVER FLOCCULATED WATER CHANNEL**



**ROOF PLAN**  
SCALE 1:75

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
P.O. BOX 495-70100  
GARISSA

REVIEWED BY:

**Interconsult Engineers Ltd**  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane,  
Tel. 4441648/4441651  
Nairobi.

DRAWING TITLE:

**MARALAL WATER SUPPLY PROJECT**  
**SEDIMENTATION TANK SCOUR CHAMBER**  
**V-NOTCH WEIR AND COVER SLABS**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
1:50	Date: FEBRUARY 2024
DRAWING No. MWS/TW/ST/03	REV. 0

Rectangular penstock with extension spindle guide brackets headstock and handwheel on 300mm wide inlet

FLOCCULATED WATER CHANNEL

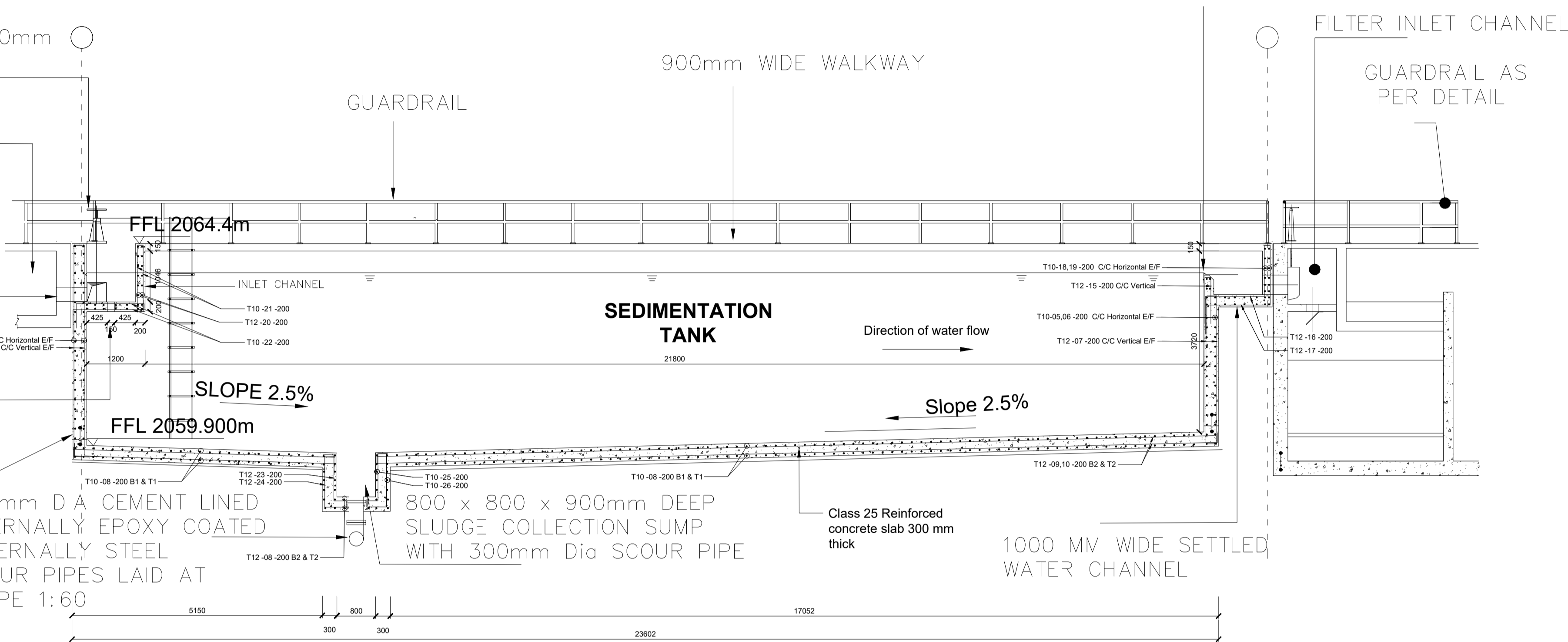
300x300mm INLET OPENING

10 No OPENINGS 150mm DIAMETER

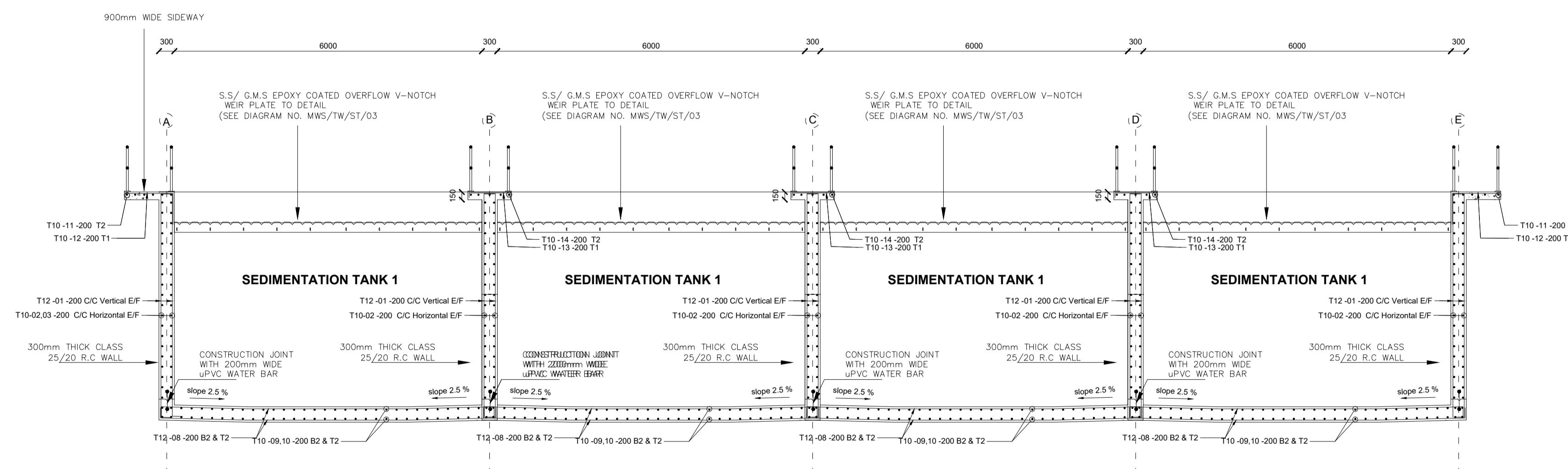
CONSTRUCTION JOINT WITH 200mm WIDE uPVC WATER BAR

300mm DIA CEMENT LINED INTERNALLY EPOXY COATED EXTERNALLY STEEL SCOUR PIPES LAID AT SLOPE 1:60

S.S/ G.M.S EPOXY COATED OVERFLOW V-NOTCH WEIR PLATE TO DETAIL (SEE DIAGRAM NO. MWS/TW/ST/03)




SECTION A-A



- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
- ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
- CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
- ABBREVIATIONS
  - R.C - REINFORCED CONCRETE
  - D.P.C - DAMP PROOF COURSE
  - E.G.L - EXISTING GROUND LEVEL
  - F.G.L - FINISHED GROUND LEVEL
  - F.F.L - FINISHED FLOOR LEVEL
  - P.C.C - PRECAST CONCRETE
  - G.C.I - GALVANIZED CORRUGATED IRON
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

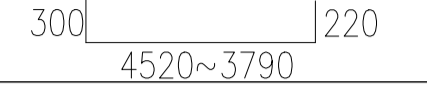





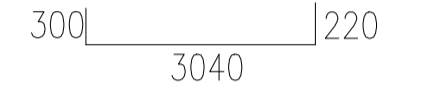





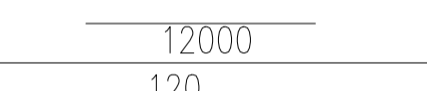
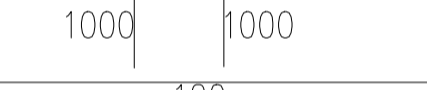
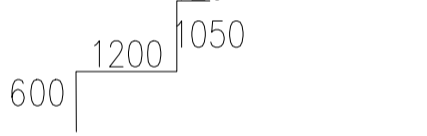
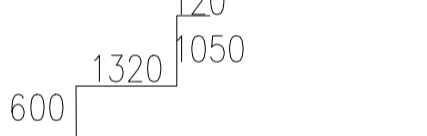

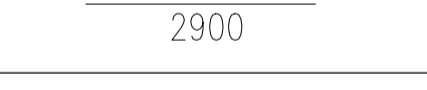
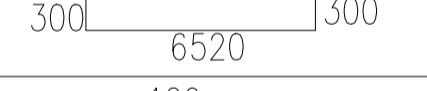
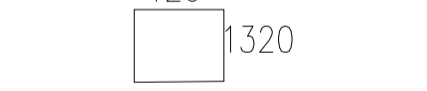
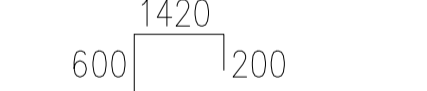
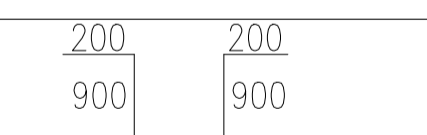
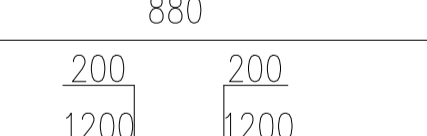
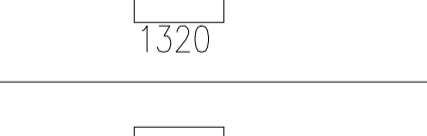
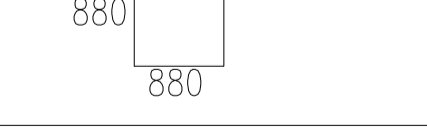
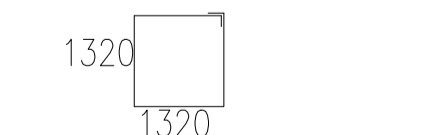
REVIEWED BY:  

**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane.  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT**  
**SEDIMENTATION TANK STRUCTURAL DETAILS**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
1:50	Date: FEBRUARY 2024
DRAWING No. MWS/TW/ST-STR/01	REV. 0

## The Steel Bar Table

	No.	Size (mm)	Type	length (mm)	Amount	Total length (m)	Remarks	Shape code
WALLS	①	T12	300  220 4520~3790	4655	1190	5658.45	Varies	
	②	T10	200  11800	12000	460	5520		
	③	T10	 1000	1000	230	230		
	④	T12	300  220 4370	4890	258	1261.62		
	⑤	T10	200  11800	12000	148	1776		
	⑥	T10	 2900	2900	74	214.6		
	⑦	T12	300  220 3040	3560	252	897.12		
SLAB	⑧	T12	300  300 6520	7120	952	6778.24		
	⑨	T12	300  11800	12000	544	6528		
	⑩	T12	 1000	1000	272	272		
WALKWAY	⑪	T10	 12000	12000	16	192		
	⑫	T10	500  100 820	1420	238	337.96		
	⑬	T10	100  100 820	1020	357	364.14		
	⑭	T10	 12000	12000	30	360		
SETTLED WATER CHANNEL	⑮	T12	 1000 120 1000	2120	126	267.12		
	⑯	T12	 600 1200 120 1050	2970	126	374.22		
	⑰	T12	 600 1320 120 1050	3090	126	389.34		
	⑱	T10	200  11800	12000	28	336		
	⑲	T10	 2900	2900	14	40.6		
INLET CHANNEL	⑳	T12	300  300 6520	7120	112	797.44		
	㉑	T10	 120 1320	3280	128	419.84		
	㉒	T12	 600 1420 1200	2220	248	550.56		
SLUDGE COLLECTION SUMP	㉓	T12	 200 900 200 880	3080	10	30.8		
	㉔	T12	 200 1200 200 1320	4120	16	65.92		
	㉕	T12	 880 880	3920	6	23.52		
	㉖	T12	 1320 1320	5.68	6	34.08		

### NOTES:

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
- ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
- CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
- ABBREVIATIONS
  - R.C - REINFORCED CONCRETE
  - D.P.C - DAMP PROOF COURSE
  - E.G.L - EXISTING GROUND LEVEL
  - F.G.L - FINISHED GROUND LEVEL
  - F.F.L - FINISHED FLOOR LEVEL
  - P.C.C - PRECAST CONCRETE
  - G.C.I - GALVANIZED CORRUGATED IRON
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE

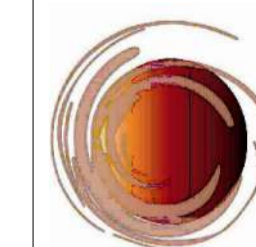
REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:



**NORTHERN WATER WORKS  
DEVELOPMENT AGENCY**  
P.O. BOX 495-70100  
GARISSA

REVIEWED BY:



**Interconsult Engineers Ltd**  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane.  
Tel. 4441648/4441651  
Nairobi.

DRAWING TITLE:

## MARALAL WATER SUPPLY PROJECT

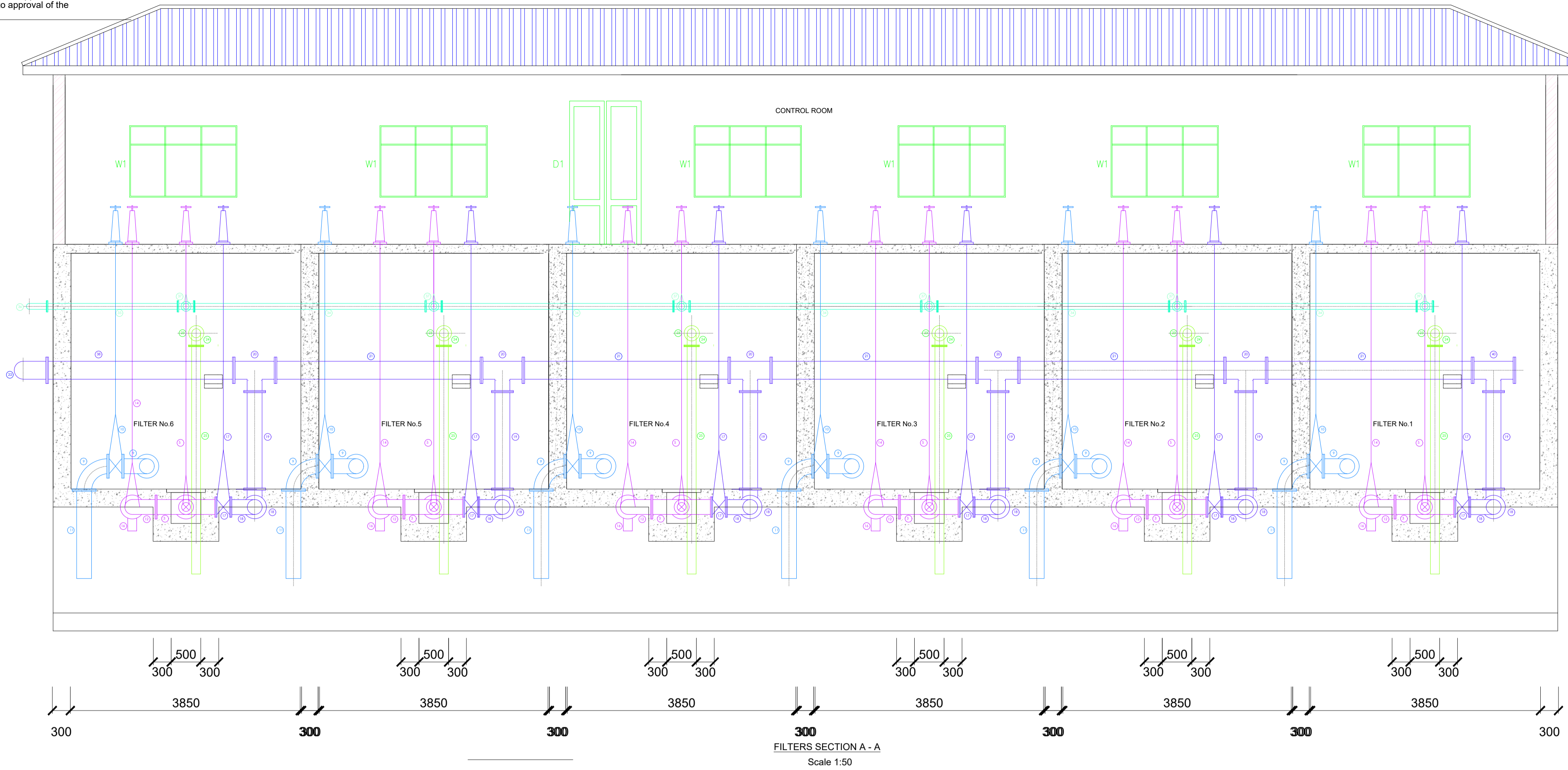
### SEDIMENTATION TANKS BAR BENDING SCHEDULE

Designed by:	N.M	Drawn by:	I.M.W
Checked by:	P.M.M	Approved by:	K.M
	1:50	Date:	FEBRUARY 2024
DRAWING No.	MWS/TW/ST-STR/02	REV.	0

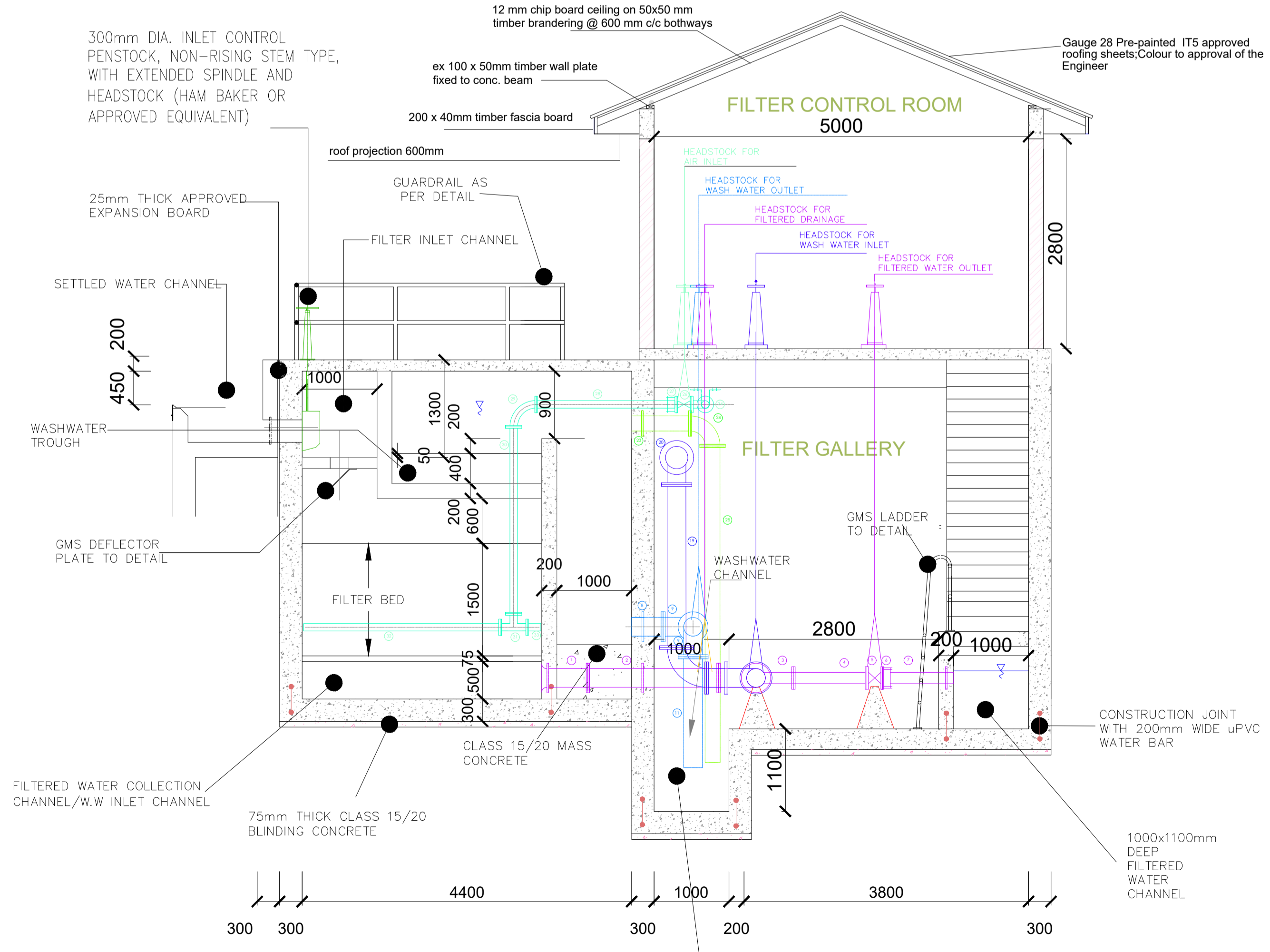


# **FILTERS**

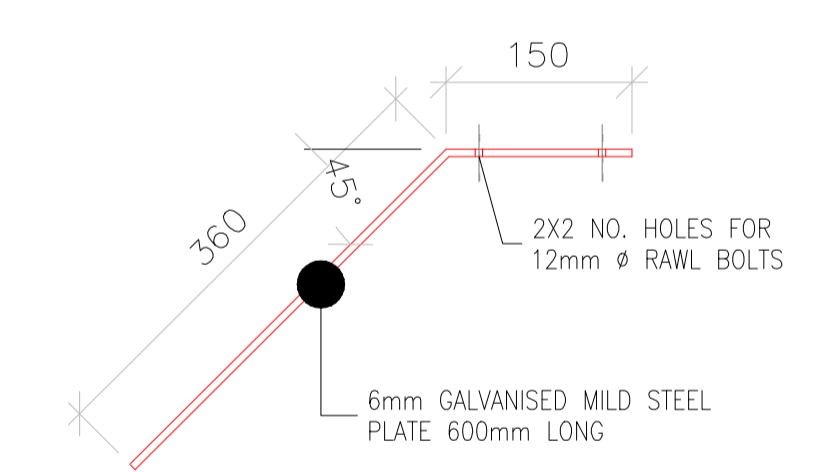
Gauge 28 Pre-painted IT5 approved roofing sheets, Colour to approval of the Engineer



FILTERS SECTION A - A  
Scale 1:50



SECTION C-C




DEFLECTOR PLATE  
(6 NO. PER FILTER)  
SCALE 1:10

- FILTER INLET PIPEWORK SCHEDULE:**  
(APPROVED CEMENT LINED INTERNALLY AND EPOXY COATED EXTERNALLY STEEL PIPES)
- 6 Nos. 300mm DIA. PLAIN ENDED PIPE, 525mm LONG WITH PUDDLE FLANGE AT 100mm FROM ONE END
  - 6 Nos. 300mm DIA. CIRCULAR PENSTOCK, NON-RISING STEM TYPE, WITH EXTENDED SPINDLE AND HEAD STOCK (HAMBAKER OR APPROVED EQUIVALENT)

**NOTES:**

1. DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
2. ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
3. ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
4. ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
5. CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
6. ABBREVIATIONS
  - R.C - REINFORCED CONCRETE
  - D.P.C - DAMP PROOF COURSE
  - E.G.L - EXISTING GROUND LEVEL
  - F.G.L - FINISHED GROUND LEVEL
  - F.F.L - FINISHED FLOOR LEVEL
  - P.C.C - PRECAST CONCRETE
  - G.C.I - GALVANIZED CORRUGATED IRON
7. EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE
8. FOR WINDOW SCHEDULE, SEE DRG. NO. MWS/SD/29
9. FOR DOOR SCHEDULE, SEE DRG. NO. MWS/SD/27-28

REVISION	DESCRIPTION	DATE

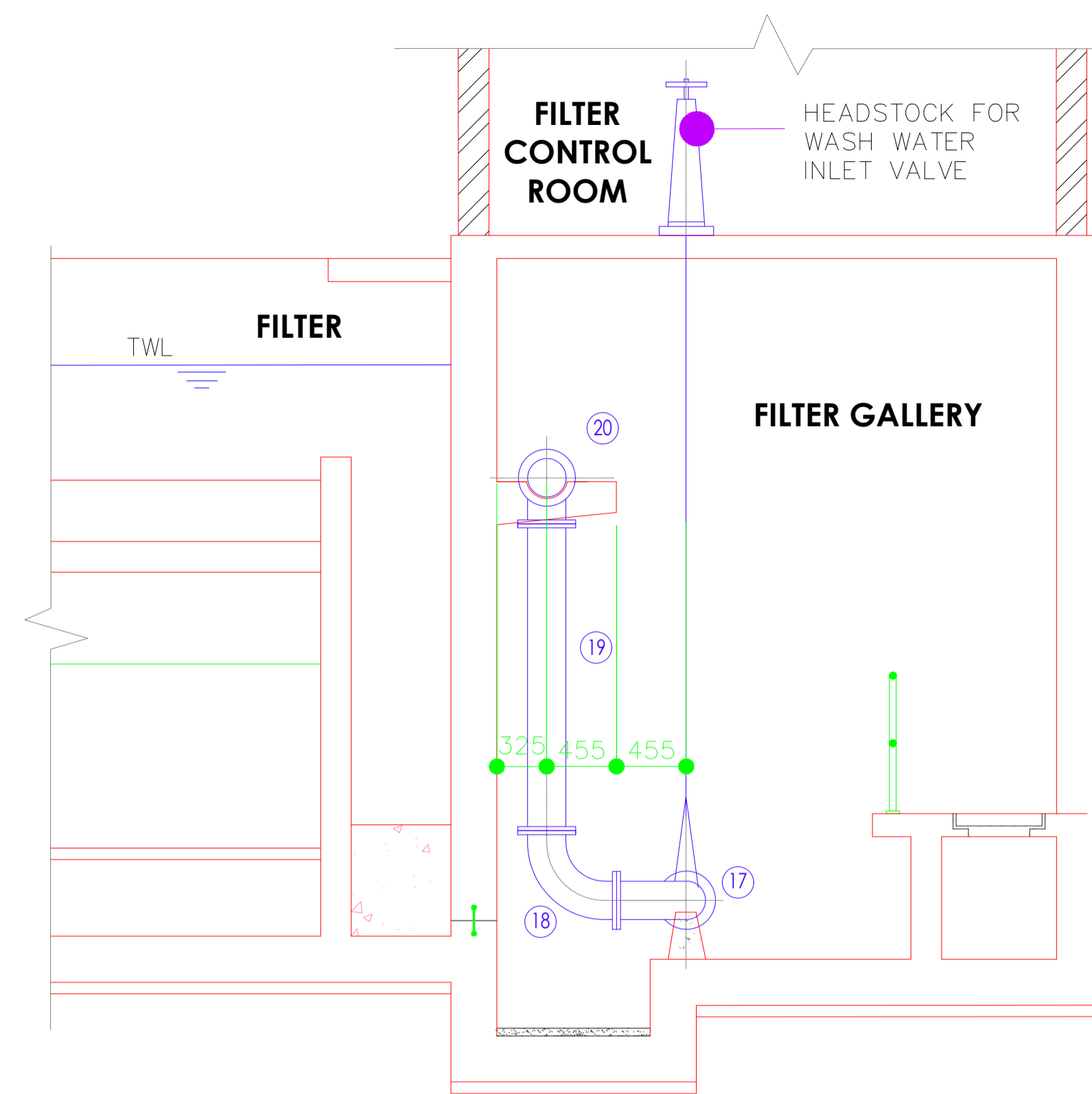
CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:  

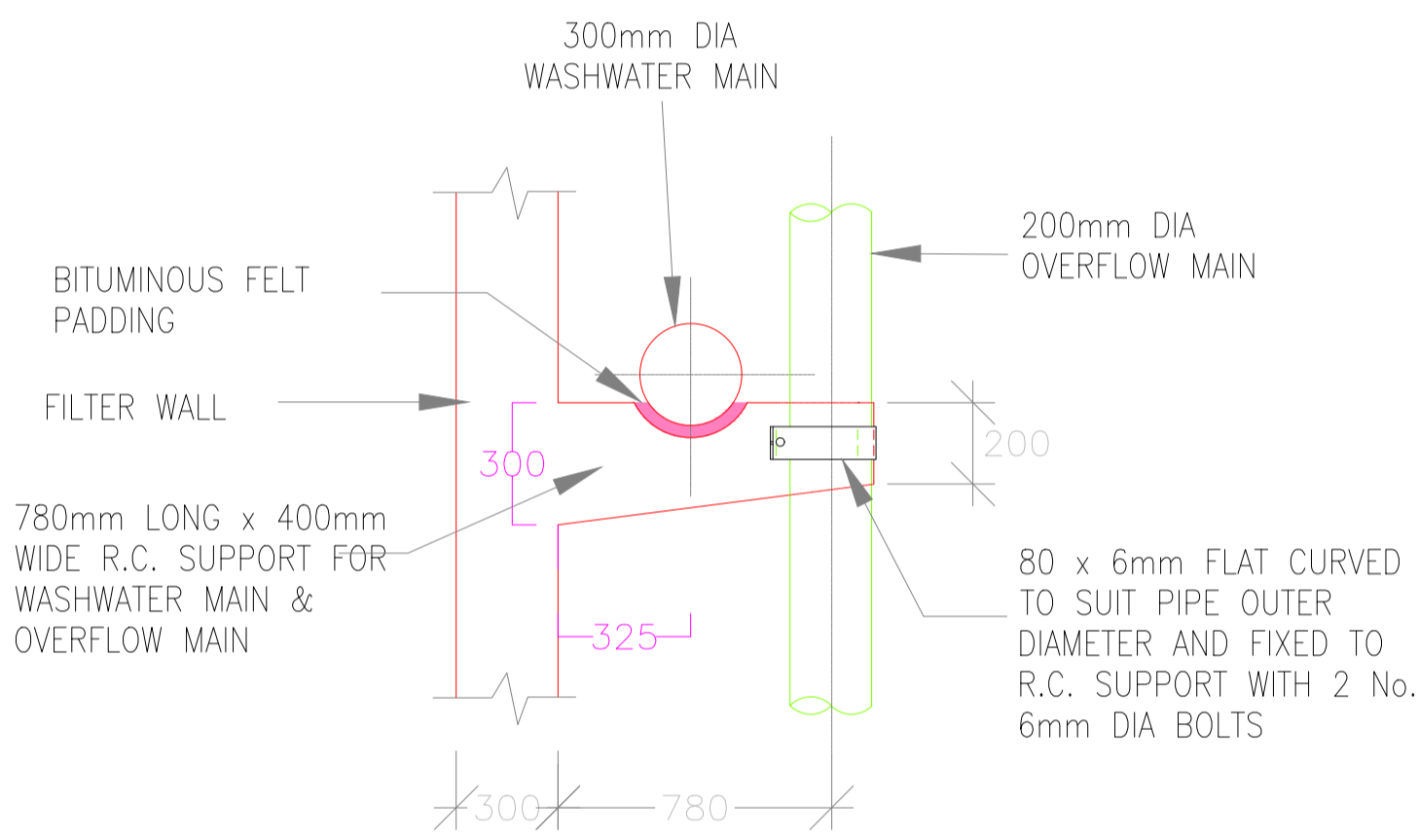
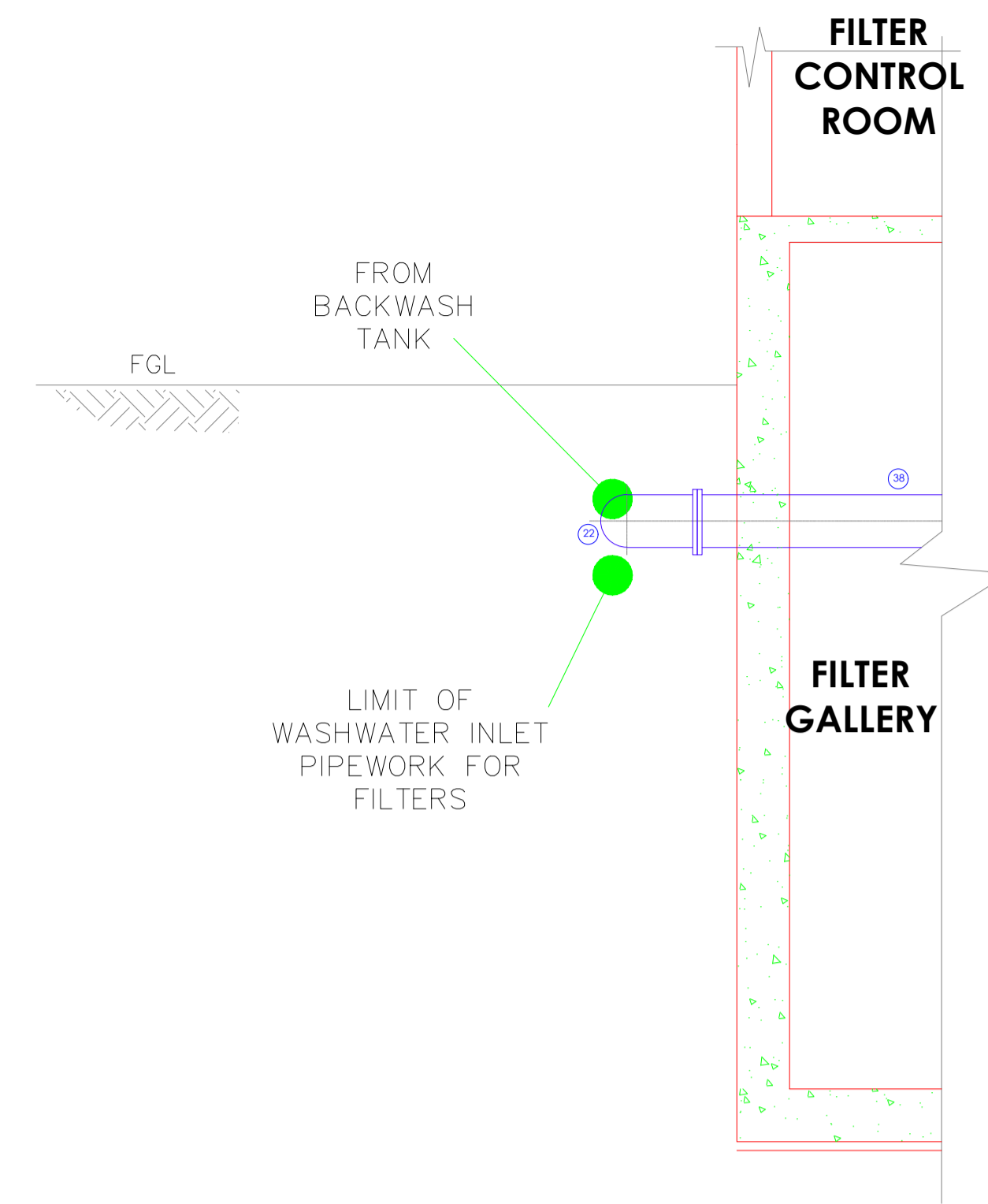
**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane.  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT**  
**FILTERS SECTIONS & DEFLECTOR PLATE DETAILS**

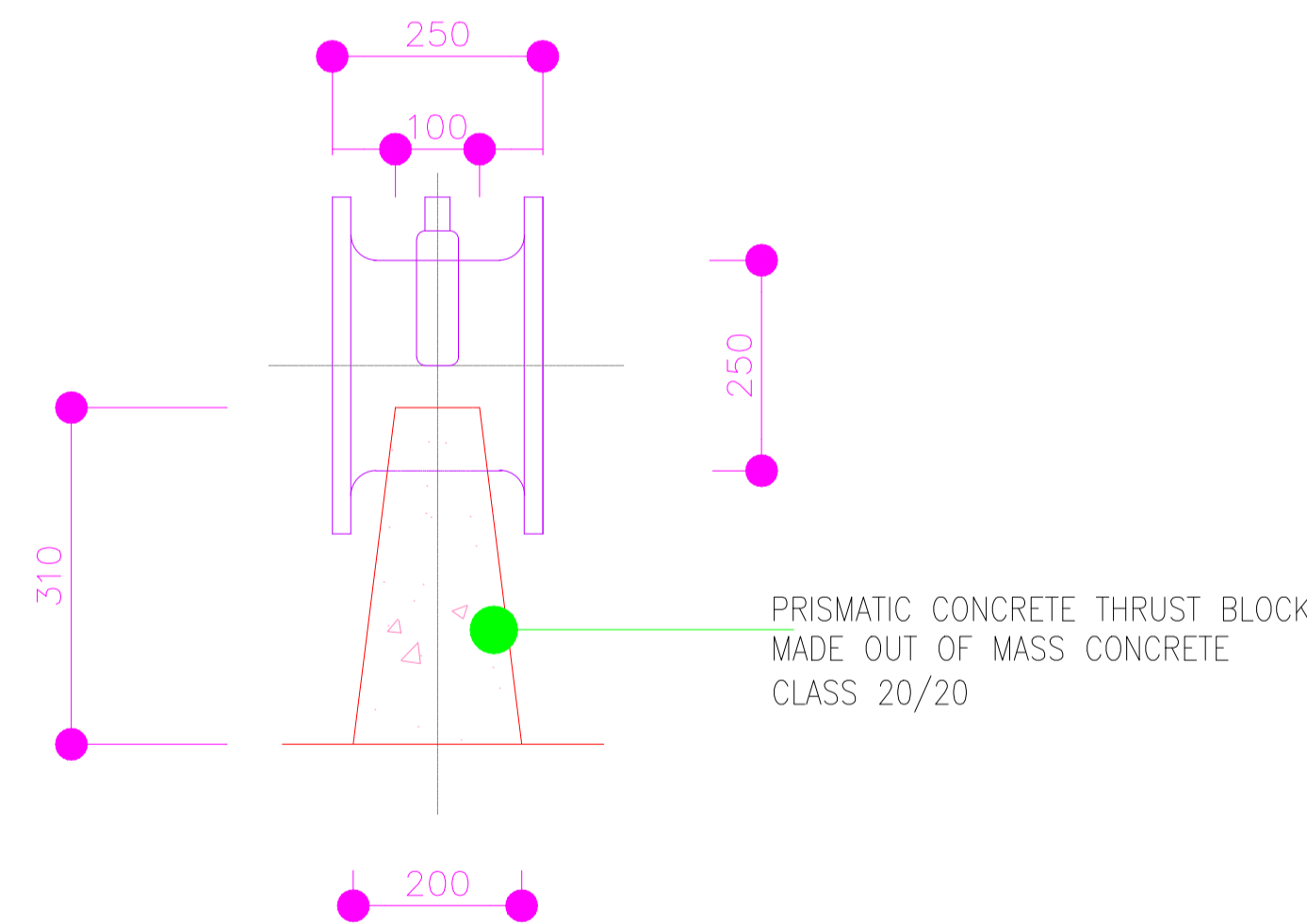
Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
1:50	Date: FEBRUARY 2024
DRAWING No. MWS/TW/F- 01	REV. 0



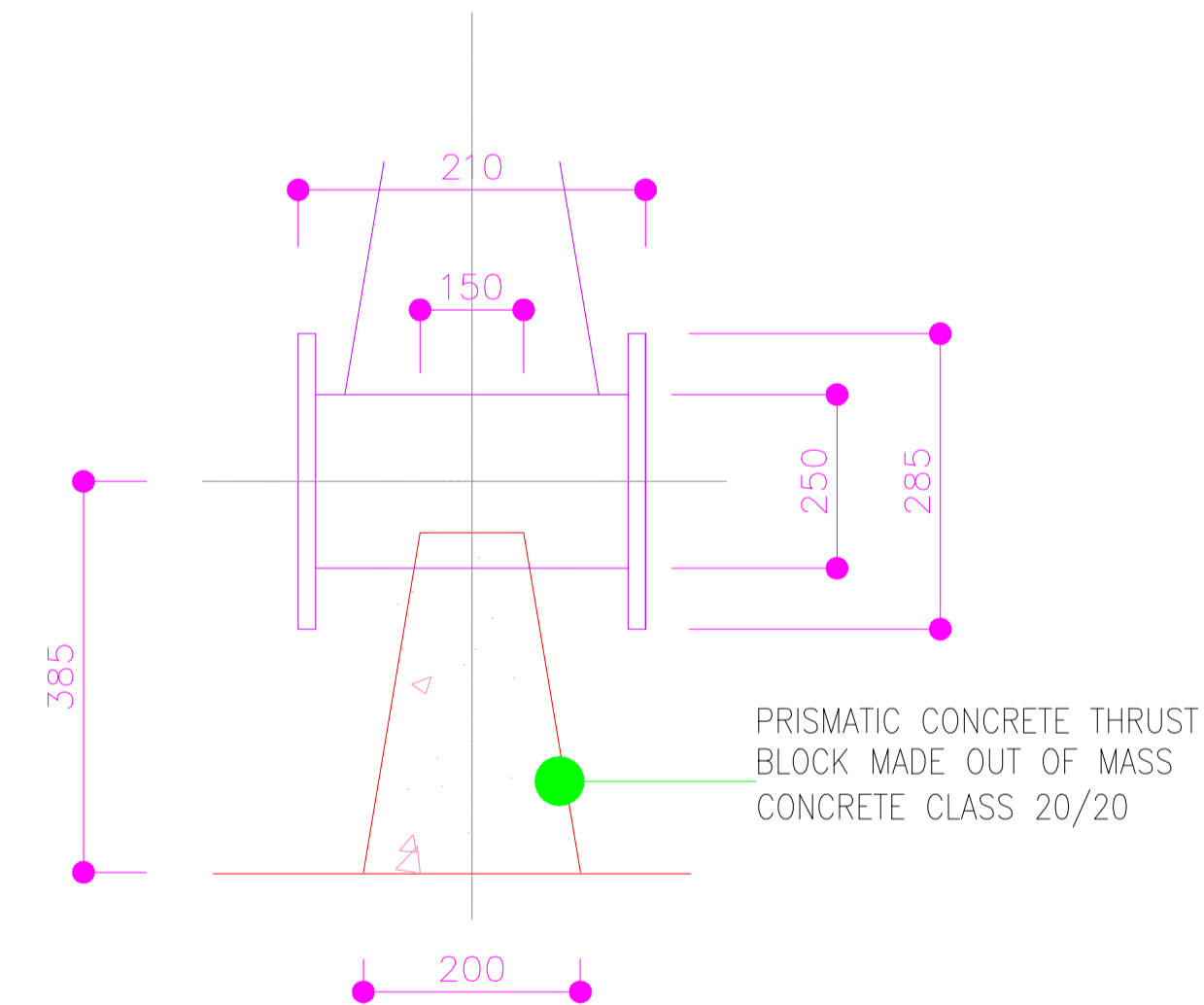
**SECTION A-A**  
SCALE 1:75



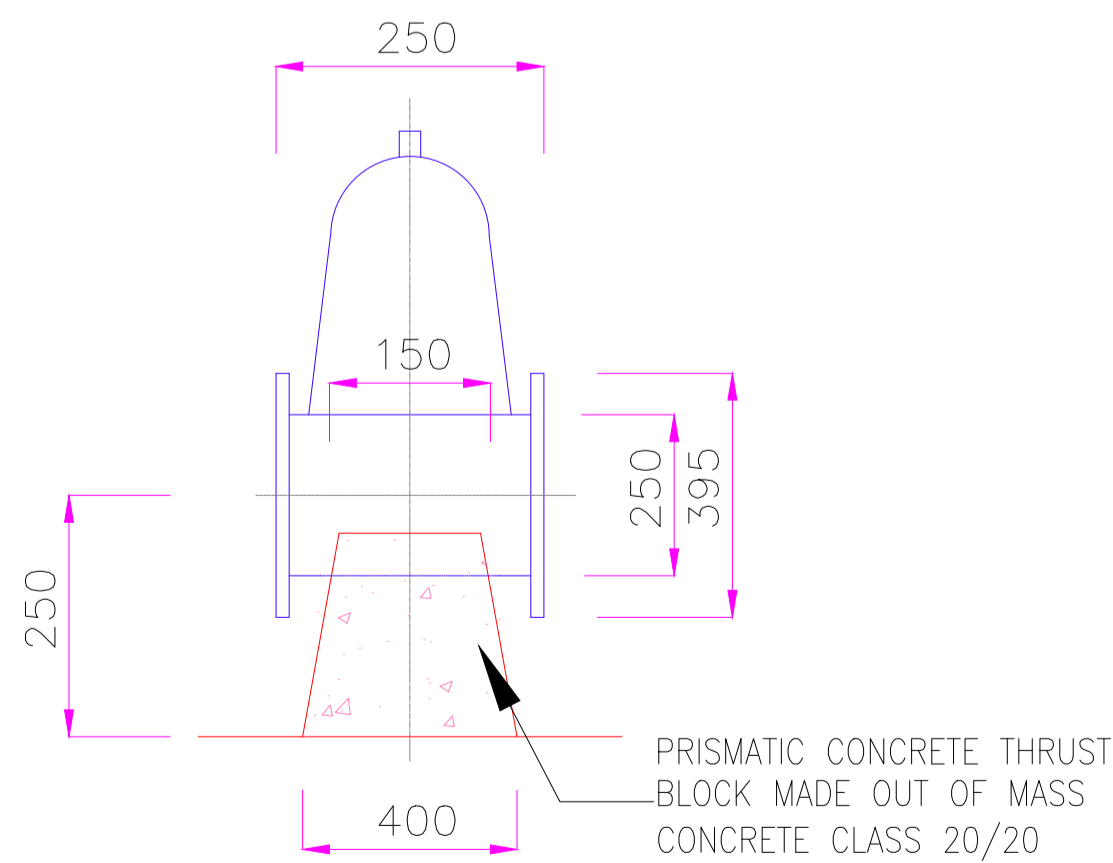
**DETAIL OF R.C. SUPPORT FOR WASHWATER & OVERFLOW MAINS (3 No.)**  
SCALE 1:40



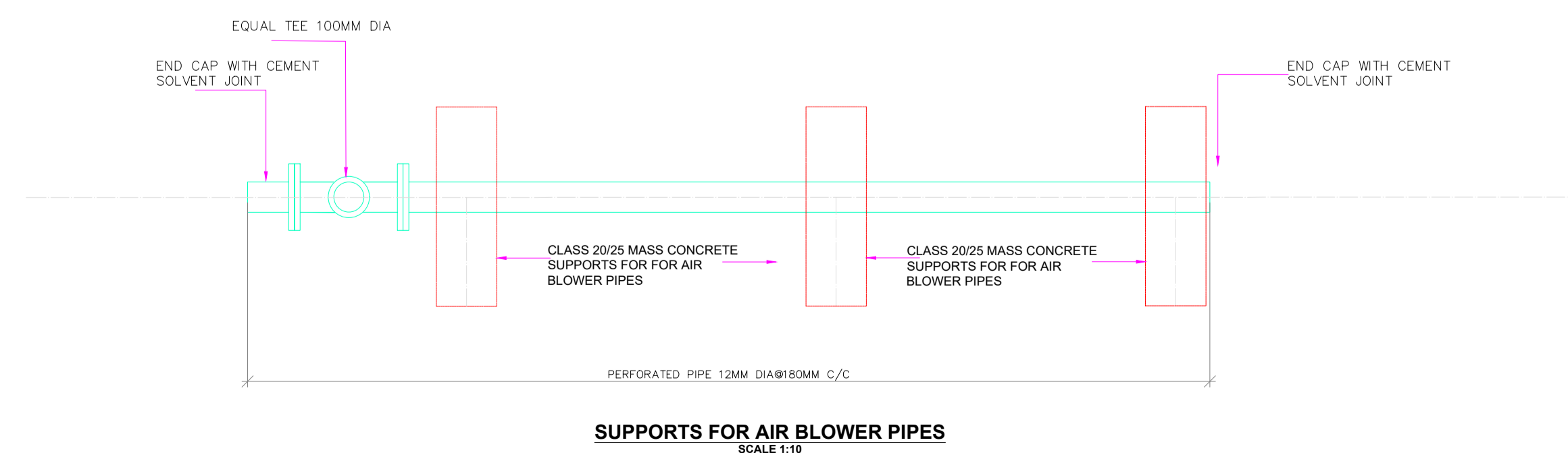
**SUPPORT FOR 150mm Ø BUTTERFLY VALVE**  
(NTS)



**SUPPORT FOR 250mm Ø GATE VALVE**  
(NTS)



**SUPPORT FOR 250mm DIA. GATE VALVE**  
(NTS)




**SUPPORTS FOR AIR BLOWER PIPES**  
SCALE 1:10

**NOTES:**

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
- ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
- CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
- ABBREVIATIONS
  - R.C - REINFORCED CONCRETE
  - D.P.C - DAMP PROOF COURSE
  - E.G.L - EXISTING GROUND LEVEL
  - F.G.L - FINISHED GROUND LEVEL
  - F.F.L - FINISHED FLOOR LEVEL
  - P.C.C - PRECAST CONCRETE
  - G.C.I - GALVANIZED CORRUGATED IRON
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE
- FOR WINDOW SCHEDULE, SEE DRG. NO. MWS/SD/29
- FOR DOOR SCHEDULE, SEE DRG. NO. MWS/SD/27-28

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:



**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
P.O. BOX 495-70100  
GARISSA

REVIEWED BY:



**Interconsult Engineers Ltd**  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane.  
Tel. 4441648/4441651  
Nairobi.

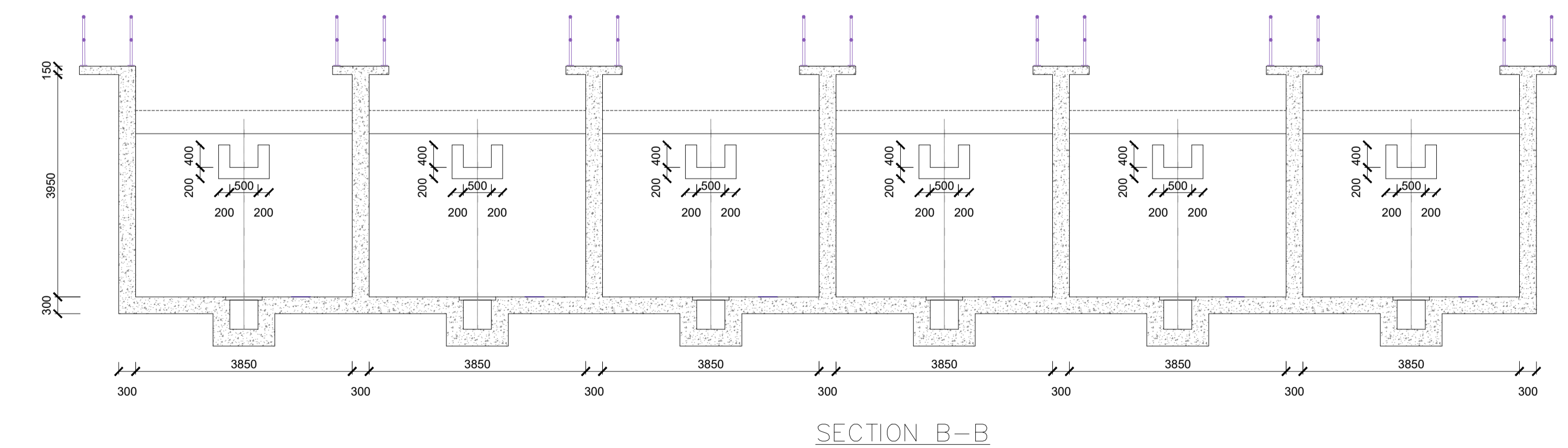
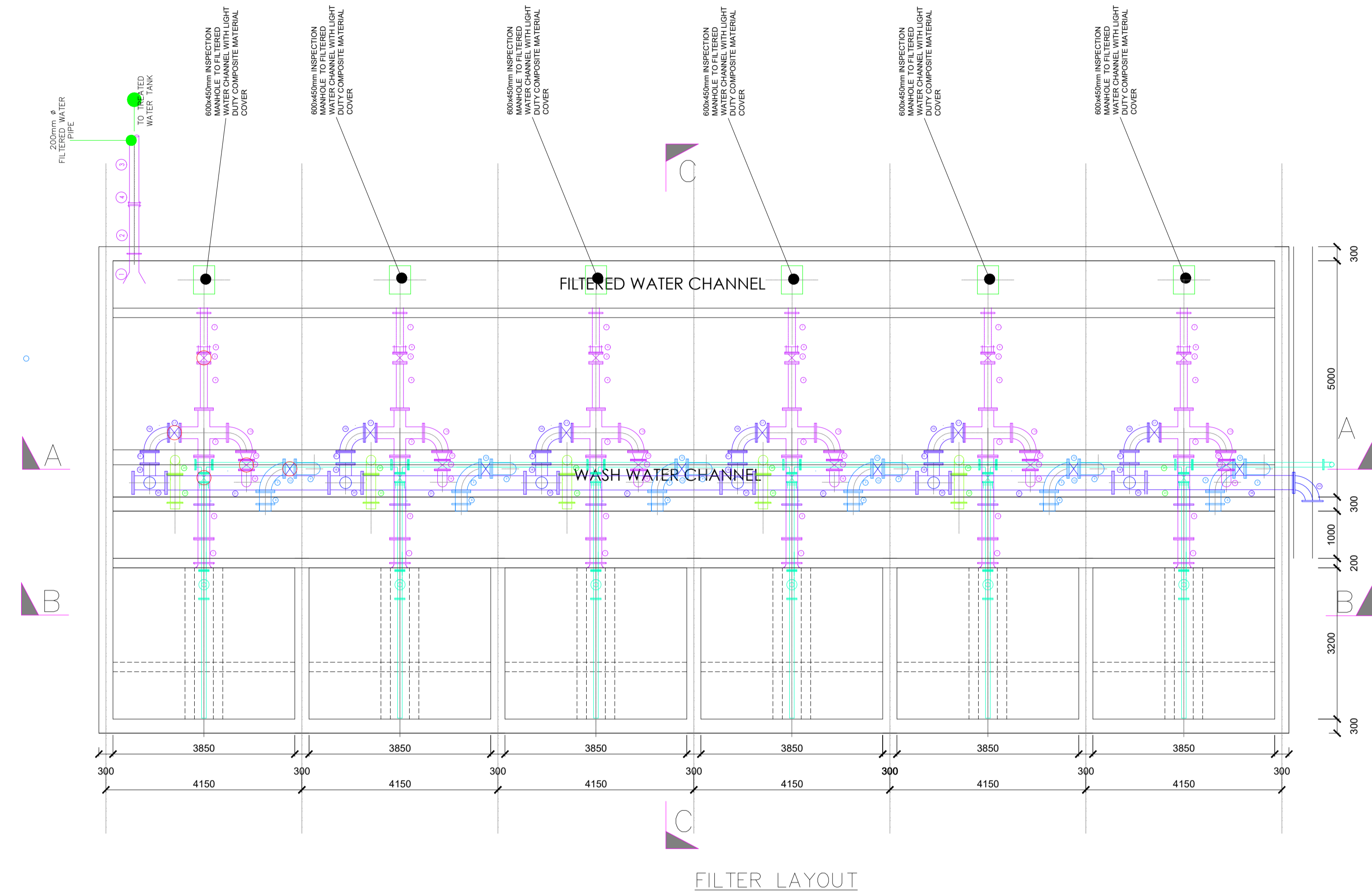
DRAWING TITLE:

**MARALAL WATER SUPPLY PROJECT  
FILTER PIPE WORK SUPPORT DETAILS**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
1:50	Date: FEBRUARY 2024
DRAWING No. MWS/TW/F/02	REV. 0

**FILTERED WATER OUTLET PIPEWORK SCHEDULE:  
(APPROVED CEMENT LINED INTERNALLY AND EPOXY  
COATED EXTERNALLY STEEL PIPES)**


ITEM No.	DESCRIPTION	DIA. (mm)	LENGTH (mm)	QUANTITY (No.)	ITEM No.	DESCRIPTION	DIA. (mm)	LENGTH (mm)	QUANTITY (No.)
1	SPECIAL FLANGED BELLMOUTH WITH PUDDLE FLANGE 100mm FROM BELLMOUTH END	250	615	6	38	DOUBLE FLANGED SPIGOT PIPE 3125MM LONG WITH A PUDDLE PIPE Ø300MM FROM ONE END	300	3125	1
2	DOUBLE FLANGED PIPE WITH PUDDLE FLANGE 720mm FROM ONE END	250	1745	6	39	ALL FLANGED EQUAL TEE BLANKED ON ONE END	1000	1000	1
3	ALL FLANGED CROSS WITH ONE REDUCING END	250	1500	6	40	ALL FLANGED WITH ONE REDUCING TEE BLANKED ON ONE END	3000	3000	1
4	DOUBLE FLANGED SPIGOT PIPE 150mm ø	150	150	6					
5	DOUBLE FLANGED GATE VALVE WITH EXTENSION SPINDLE, LENGTH 4.5m, AND HEADSTOCK WITH HANDWHEEL	150	150	6					
6	FLANGE ADAPTOR	150	150	6					
7	PLAIN SPIGOT PIPE WITH A PUDDLE FLANGE 150MM FROM ONE END	150	950	6					
8	FLANGED SPIGOT PIPE WITH A PUDDLE FLANGE 150MM FROM ONE END	250	420	6					
9	ALL FLANGED 90° BEND	250	400	12					
10	DOUBLE FLANGED GATE VALVE WITH EXTENSION SPINDLE, LENGTH 4.5m, AND HEADSTOCK WITH HANDWHEEL	250	250	6					
11	FLANGED SPIGOT	250	1480	3					
12	ALL FLANGED 90° BEND	250	400	6					
13	250mm x 150mm ø DOUBLE FLANGED CONCENTRIC TAPER	250	150	6					
14	DOUBLE FLANGED GATE VALVE WITH EXTENSION SPINDLE, LENGTH 4.5m, AND HEADSTOCK WITH HANDWHEEL	150	150	6					
15	DOUBLE FLANGED SPIGOT PIPE 250mm ø	250	250	6					
16	SINGLE FLANGED 90° BEND	150	400	6					
17	DOUBLE FLANGED GATE VALVE WITH EXTENSION SPINDLE, LENGTH 4.5m, AND HEADSTOCK WITH HANDWHEEL	250	250	6					
18	ALL FLANGED 90° BEND	250	400	12					
19	DOUBLE FLANGED SPIGOT PIPE 250mm ø	250	250	6					
20	ALL FLANGED TEE WITH ONE REDUCING END	300	360	6					
21	DOUBLE FLANGED SPIGOT PIPE 300mm ø	250	250	6					
22	ALL FLANGED 90° BEND	300	400	2					
23	FLANGED SPIGOT PIPE WITH A PUDDLE FLANGE 150MM FROM ONE END	200	780	6					
24	ALL FLANGED 90° BEND	200	300	6					
25	SINGLE FLANGED SPIGOT PIPE 200mm ø	200	2240	6					
26	DOUBLE FLANGED GATE VALVE WITH EXTENSION SPINDLE, LENGTH 0.6m, AND HEADSTOCK WITH HANDWHEEL	100	100	6					
27	FLANGE ADAPTOR	100	100	6					
28	DOUBLE FLANGED SPIGOT PIPE 100mm ø	100	100	6					
29	ALL FLANGED 90° BEND	100	100	6					
30	DOUBLE FLANGED SPIGOT PIPE 100mm ø	100	100	6					
31	ALL FLANGED EQUAL TEE	100	100	6					
32	SINGLE FLANGED SPIGOT PIPE 100mm ø WITH 12MM DIA HOLES Ø18MM C/C AND BLANKED END	100	100	6					
33	SINGLE FLANGED SPIGOT PIPE 100mm ø WITH 12MM DIA HOLES Ø18MM C/C AND BLANKED END	100	100	6					
34	DOUBLE FLANGED SPIGOT PIPE 100mm ø	100	100	5					
35	DOUBLE FLANGED SPIGOT PIPE 100mm ø	100	100	1					
36	ALL FLANGED 90° BEND	100	100	1					
37	ALL FLANGED EQUAL TEE	100	100	5					



**NOTES:**

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
- ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
- CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
- ABBREVIATIONS
  - R.C - REINFORCED CONCRETE
  - D.P.C - DAMP PROOF COURSE
  - E.G.L - EXISTING GROUND LEVEL
  - F.G.L - FINISHED GROUND LEVEL
  - F.F.L - FINISHED FLOOR LEVEL
  - P.C.C - PRECAST CONCRETE
  - G.C.I - GALVANIZED CORRUGATED IRON
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE
- FOR WINDOW SCHEDULE, SEE DRG. NO. MWS/SD/29
- FOR DOOR SCHEDULE, SEE DRG. NO. MWS/SD/27-28

REVISION	DESCRIPTION	DATE

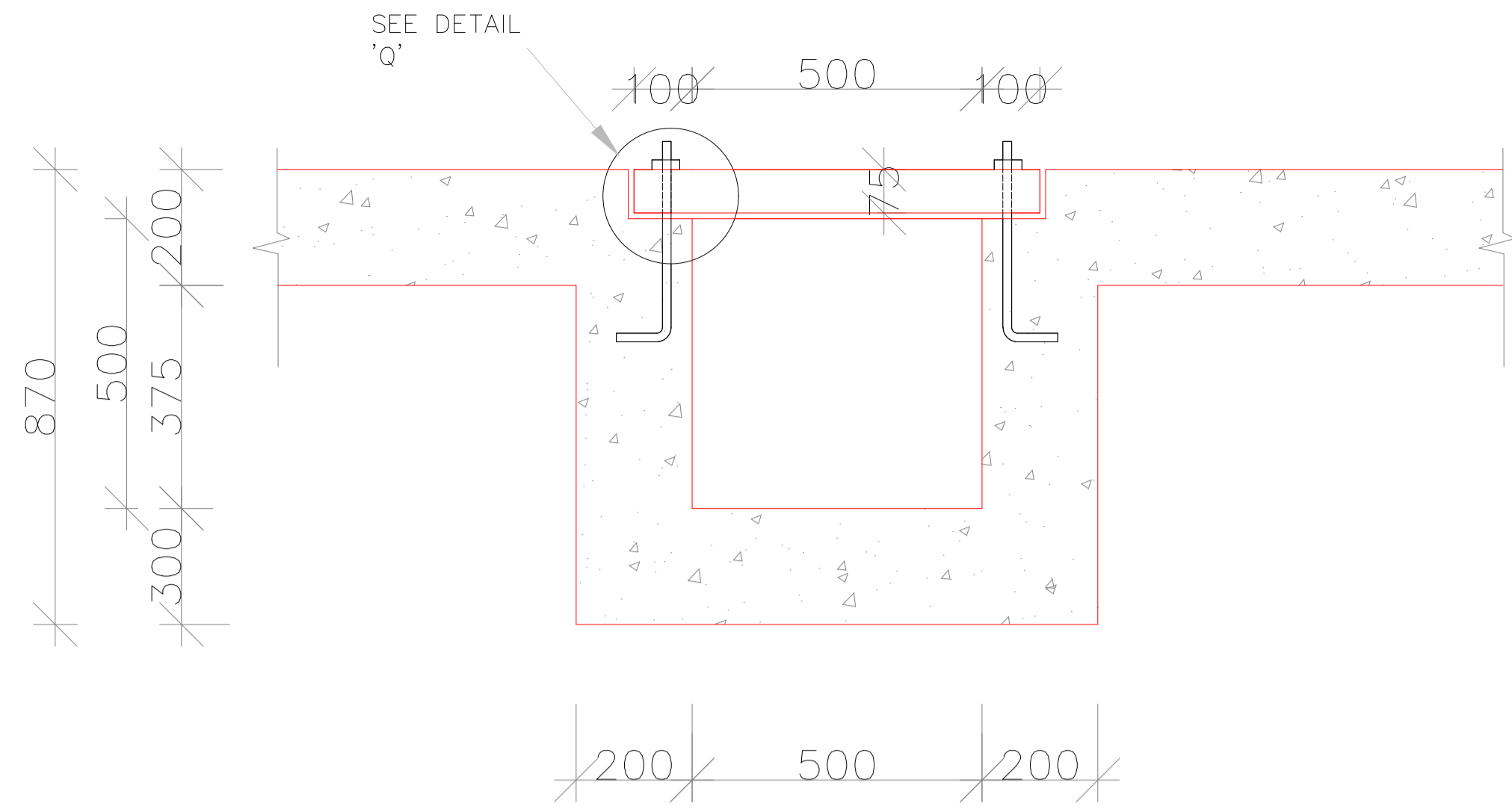
CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS  
DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:  

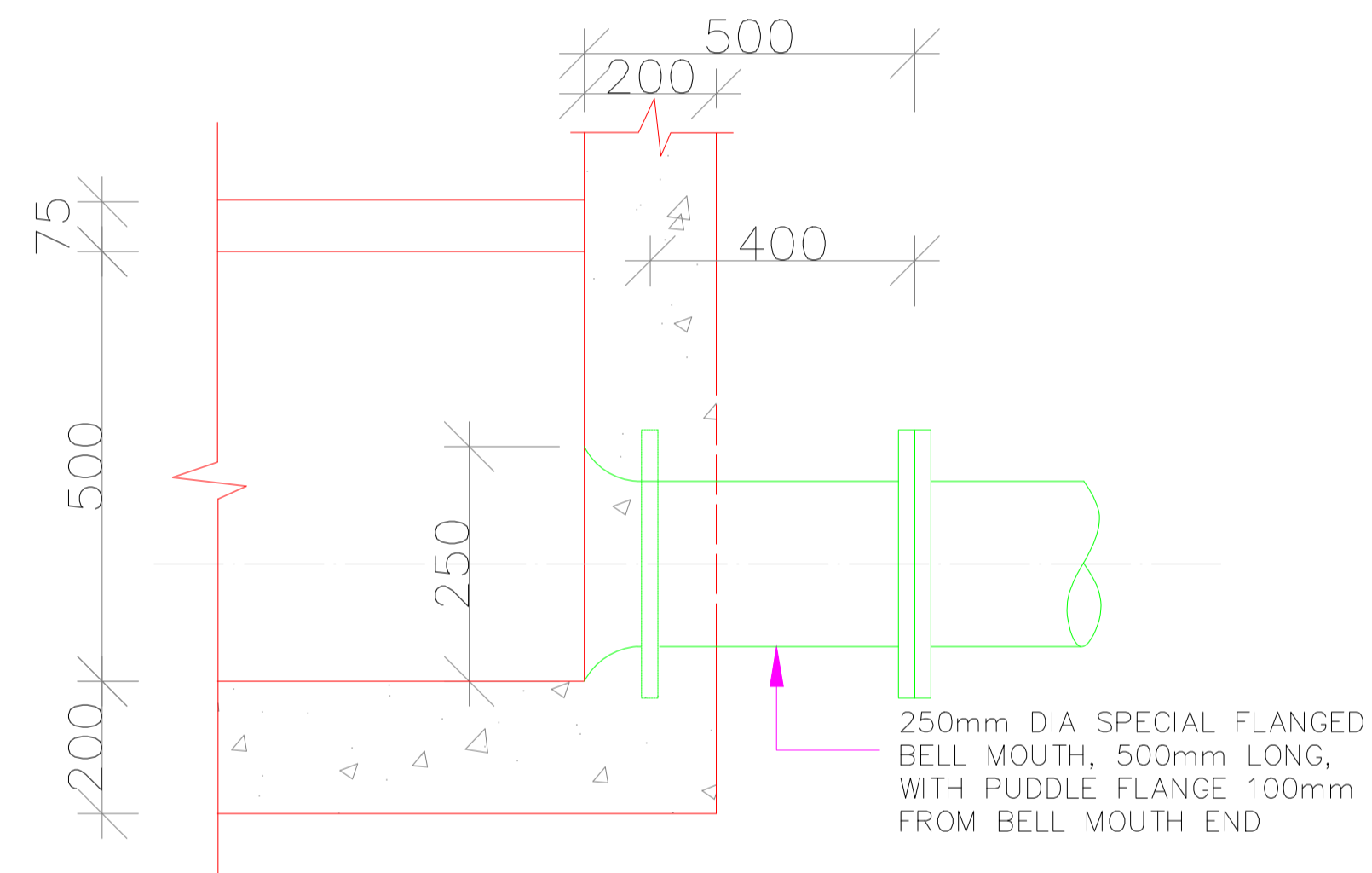
**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane.  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT  
FILTER LAYOUT & PIPE DETAILS**

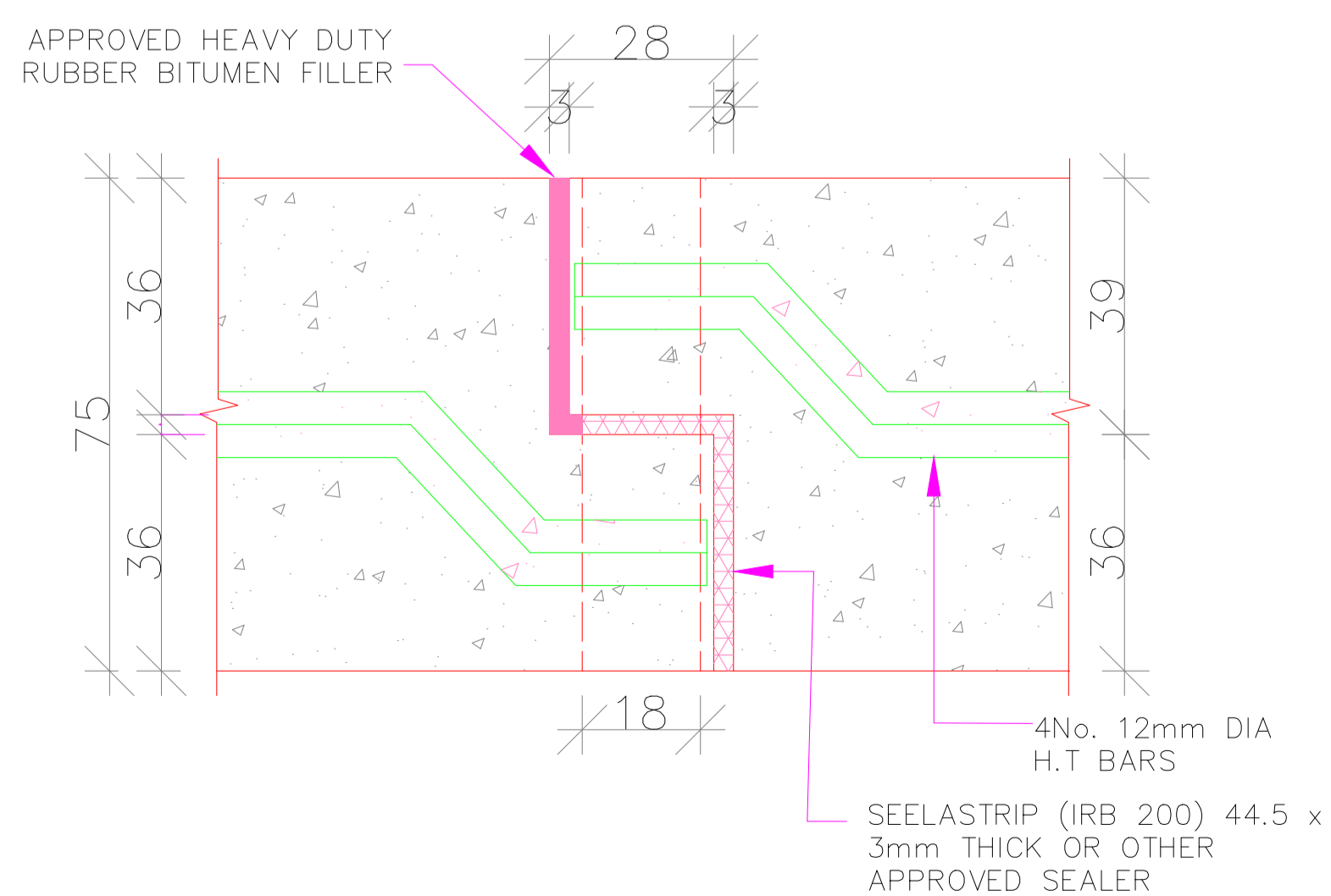
Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
1:50	Date: FEBRUARY 2024
DRAWING No. MWS/TW/F/03	REV. 0



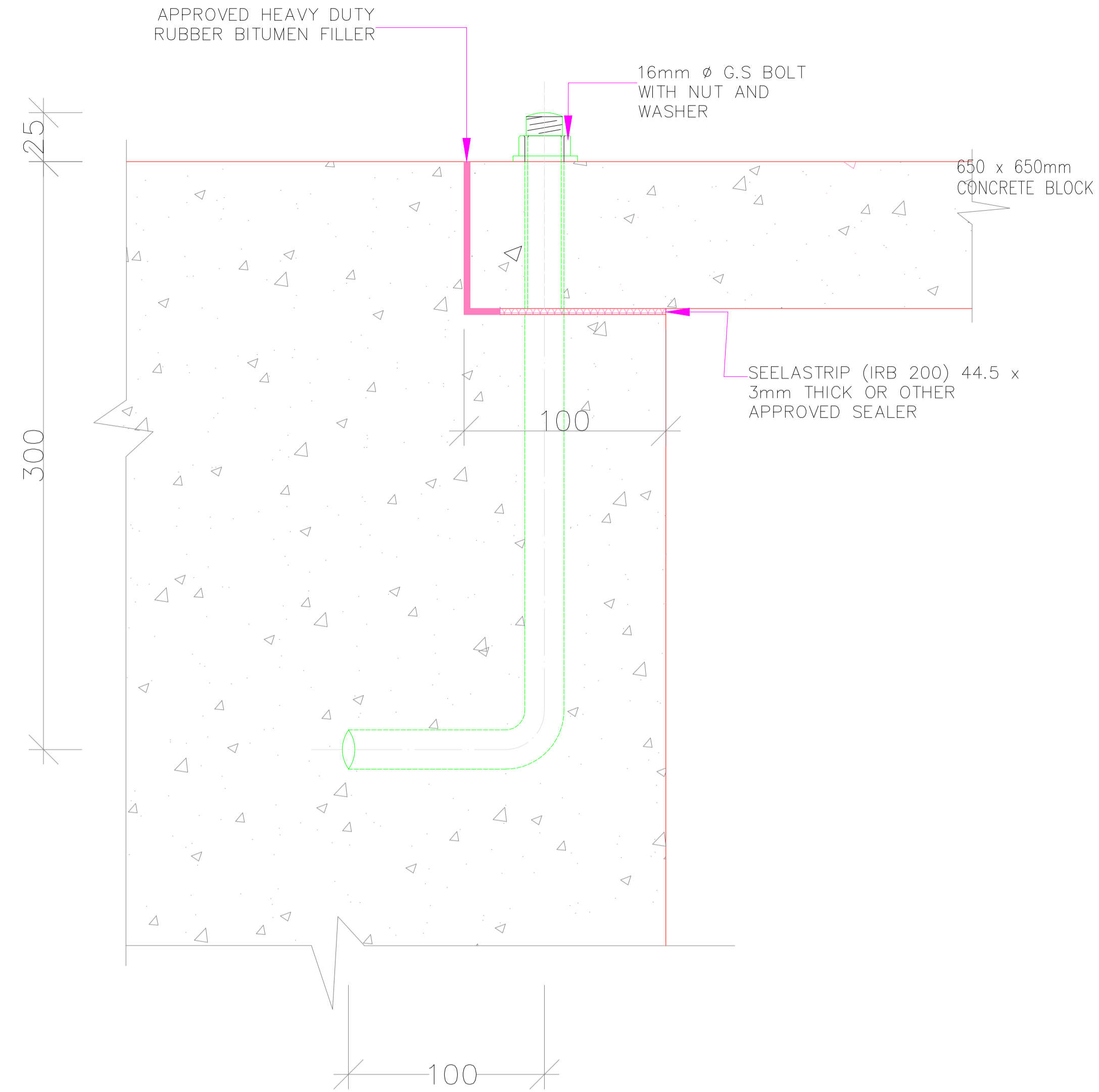
**SECTION A-A**  
SCALE 1:20



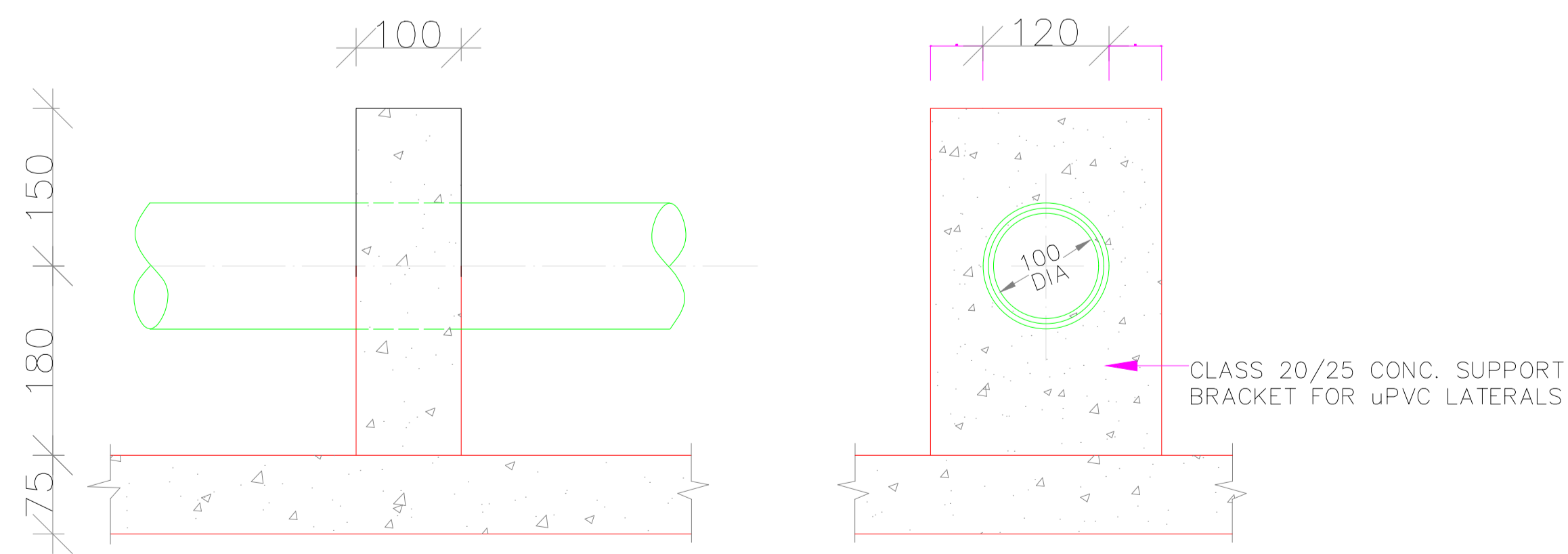
**SECTION B-B**  
SCALE 1:20



**DETAIL AT 'P'**  
SCALE 1:2



**DETAIL 'Q'**  
SCALE 1:4




**DETAIL OF SUPPORT BLOCK FOR UPVc LATERALS**  
SCALE 1:10

**NOTES:**

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
- ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
- ALL INTERNAL PLASTED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
- CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
- ABBREVIATIONS
  - R.C - REINFORCED CONCRETE
  - D.P.C - DAMP PROOF COURSE
  - E.G.L - EXISTING GROUND LEVEL
  - F.G.L - FINISHED GROUND LEVEL
  - F.F.L - FINISHED FLOOR LEVEL
  - P.C.C - PRECAST CONCRETE
  - G.C.I - GALVANIZED CORRUGATED IRON
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE
- FOR WINDOW SCHEDULE, SEE DRG. NO. MWS/SD/29
- FOR DOOR SCHEDULE, SEE DRG. NO. MWS/SD/27-28

REVISION	DESCRIPTION	DATE

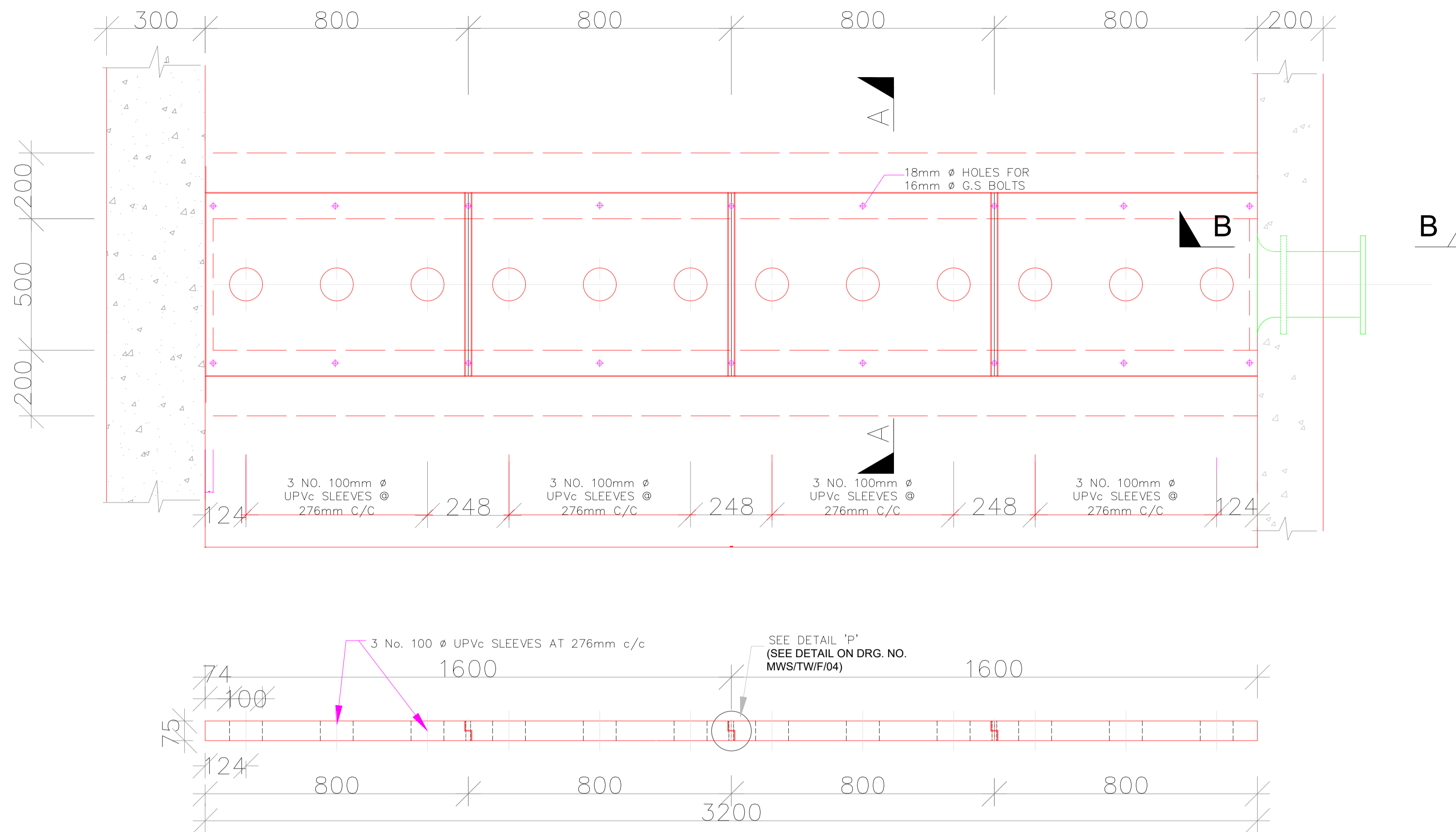
CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:  

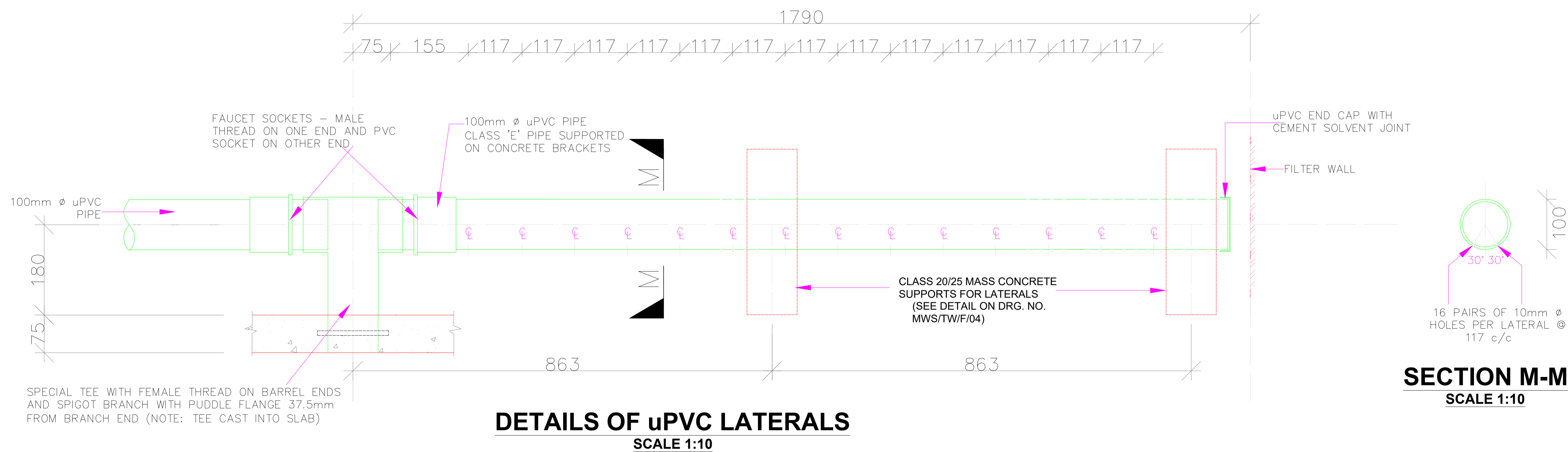
**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT**  
**FILTERED WATER COLLECTION & UPVc LATERALS SUPPORTING DETAILS**

Designed by:	N.M	Drawn by:	I.M.W
Checked by:	P.M.M	Approved by:	K.M
	1:50	Date:	FEBRUARY 2024
DRAWING No.	MWS/TW/F/04	REV.	0



**ARRANGEMENT OF COVER SLABS**  
SCALE 1:20




**DETAILS OF uPVC LATERALS**  
SCALE 1:10

**SECTION M-M**  
SCALE 1:10

**NOTES:**

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
- ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
- CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
- ABBREVIATIONS
  - R.C - REINFORCED CONCRETE
  - D.P.C - DAMP PROOF COURSE
  - E.G.L - EXISTING GROUND LEVEL
  - F.G.L - FINISHED GROUND LEVEL
  - F.F.L - FINISHED FLOOR LEVEL
  - P.C.C - PRECAST CONCRETE
  - G.C.I - GALVANIZED CORRUGATED IRON
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE
- FOR WINDOW SCHEDULE, SEE DRG. NO. MWS/SD/29
- FOR DOOR SCHEDULE, SEE DRG. NO. MWS/SD/27-28

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:  

**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

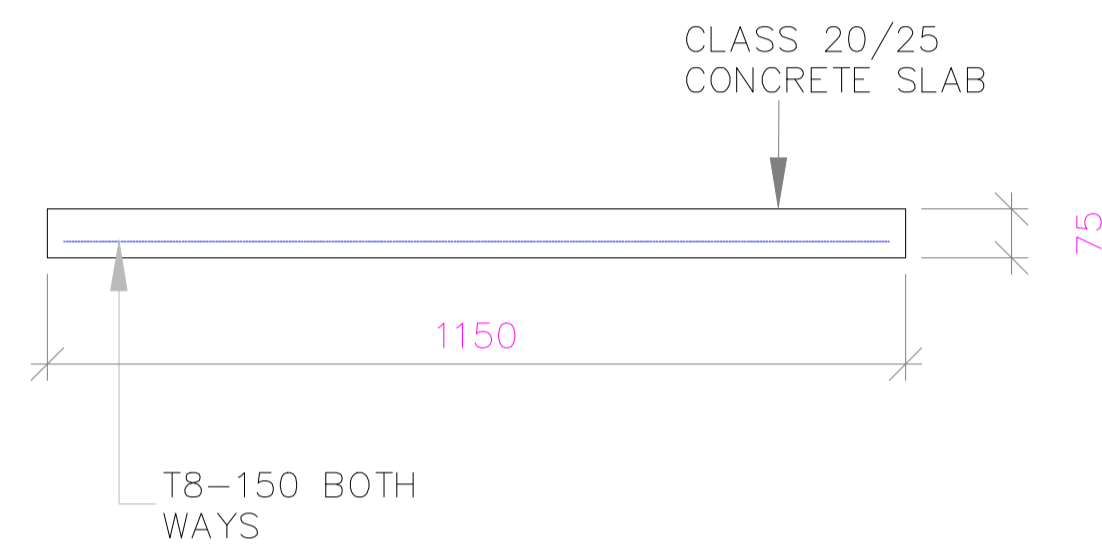
DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT**  
**FILTERED WATER COLLECTION COVER SLAB & LATERAL PIPE DETAILS**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
1:50	Date: FEBRUARY 2024
DRAWING No. MWS/TWF/05	REV. 0

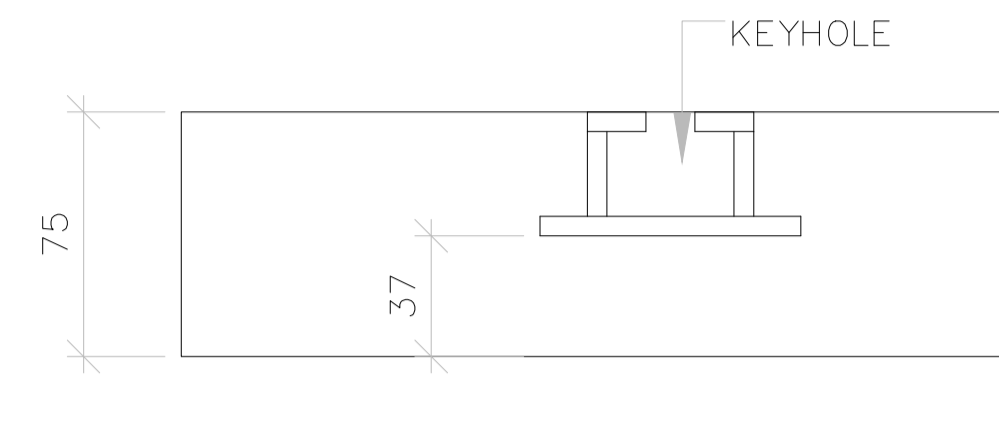
## DETAILS OF P.C.C COVER SLABS OVER FILTER INLET CHANNEL



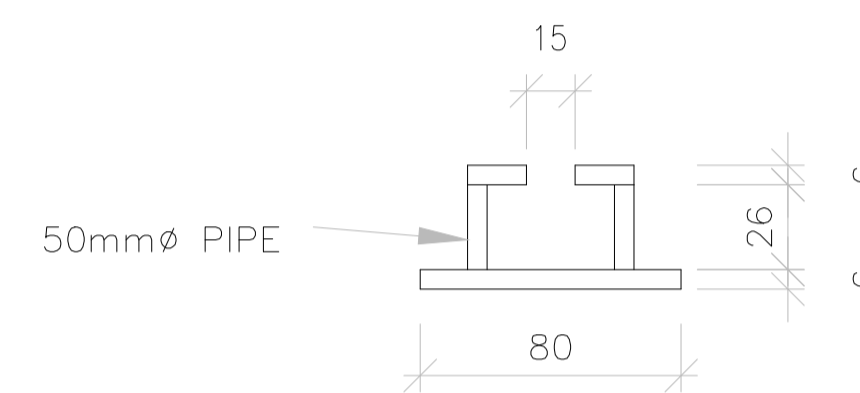
**P.C.C SLAB PLAN**  
NTS



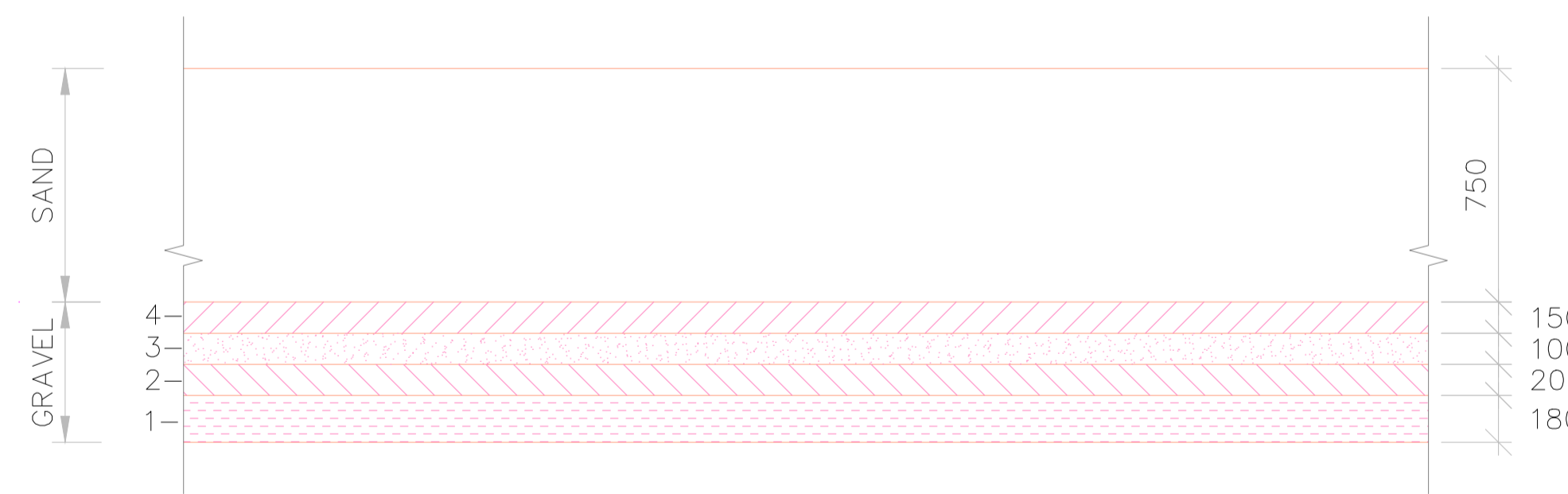
**SECTION X-X**  
SCALE 1:25



SCALE 1:5



**KEYHOLE DETAIL**  
SCALE 1:5



LAYER	1	2	3	4
DEPTH (mm)	150	100	200	180
PASSING SQUARE MESH	38mm (1 1/2")	20mm (3/4")	12mm (1/2")	5mm (3/16")
RETAINED	20mm (3/4")	12mm (1/2")	5mm (3/16")	2mm (3/32")

TOP SAND LAYER 750mm EFFECTIVE SIZE 0.7mm  
UNIFORMITY COEFFICIENT 1.5

**DETAILS OF FILTER MEDIA**  
NTS

### NOTES:

1. DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
2. ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
3. ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
4. ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
5. CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
6. ABBREVIATIONS
  - R.C - REINFORCED CONCRETE
  - D.P.C - DAMP PROOF COURSE
  - E.G.L - EXISTING GROUND LEVEL
  - F.G.L - FINISHED GROUND LEVEL
  - F.F.L - FINISHED FLOOR LEVEL
  - P.C.C - PRECAST CONCRETE
  - G.C.I - GALVANIZED CORRUGATED IRON
7. EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE
8. FOR WINDOW SCHEDULE, SEE DRG. NO. MWS/SD/29
9. FOR DOOR SCHEDULE, SEE DRG. NO. MWS/SD/27-28

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:



**NORTHERN WATER WORKS  
DEVELOPMENT AGENCY**  
P.O. BOX 495-70100  
GARISSA

REVIEWED BY:



**Interconsult Engineers Ltd**  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane.  
Tel. 4441648/4441651  
Nairobi.

DRAWING TITLE:

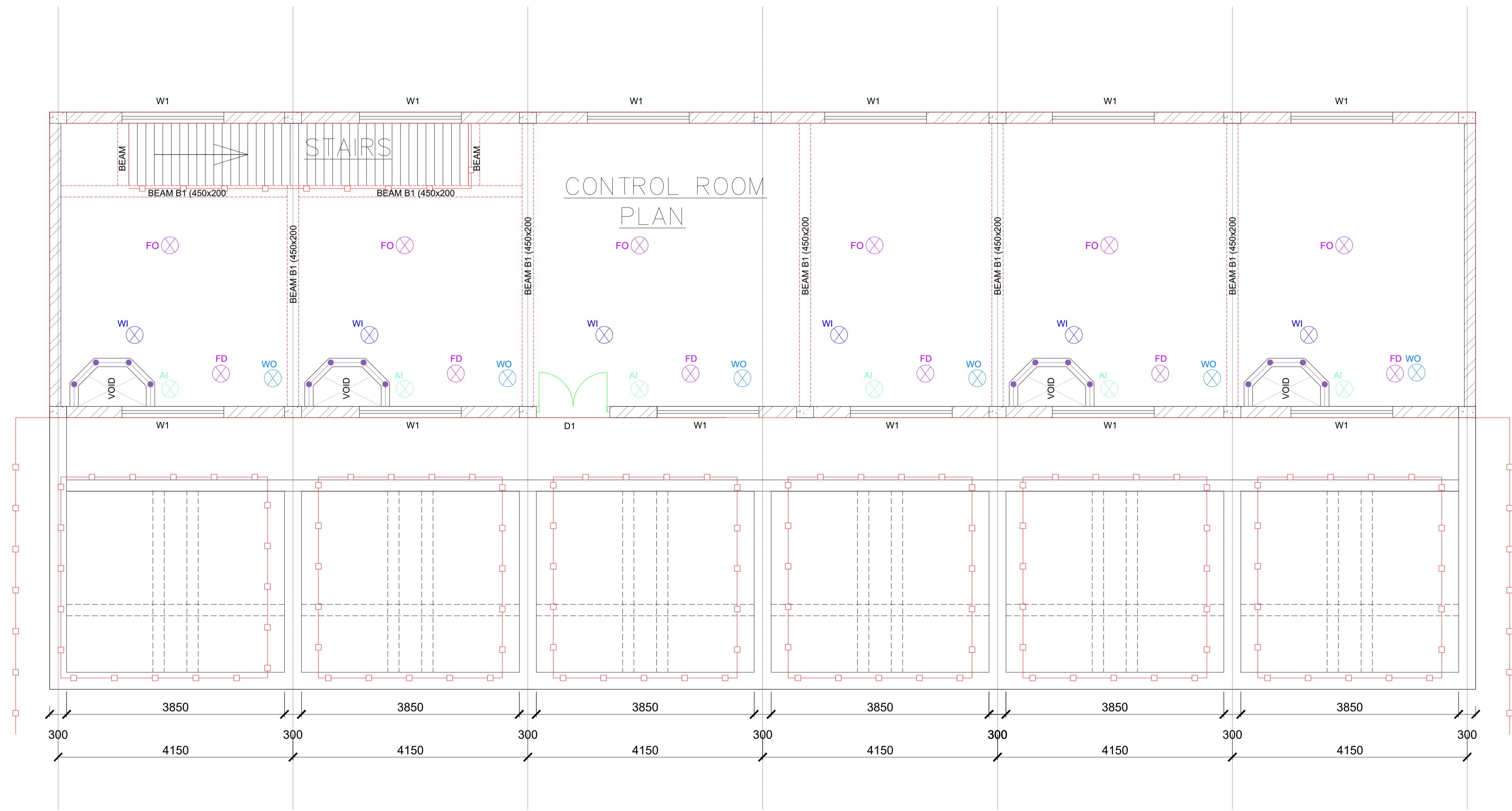
**MARALAL WATER SUPPLY PROJECT**

**FILTERS INLET CHANNEL & FILTER  
MEDIA DETAILS**

Designed by:	N.M	Drawn by:	I.M.W
Checked by:	P.M.M	Approved by:	K.M
	1:50	Date:	FEBRUARY 2024
DRAWING No.	MWS/TW/F- 06	REV.	0

**NOTES:**

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
- ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
- CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
- ABBREVIATIONS
  - R.C - REINFORCED CONCRETE
  - D.P.C - DAMP PROOF COURSE
  - E.G.L - EXISTING GROUND LEVEL
  - F.G.L - FINISHED GROUND LEVEL
  - F.F.L - FINISHED FLOOR LEVEL
  - P.C.C - PRECAST CONCRETE
  - G.C.I - GALVANIZED CORRUGATED IRON
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE
- FOR WINDOW SCHEDULE, SEE DRG. NO. MWS/SD/29
- FOR DOOR SCHEDULE, SEE DRG. NO. MWS/SD/27-28




**FLOOR PLAN OF FILTER CONTROL ROOM**

**LEGEND FOR VALVE HEADSTOCKS**

- FO ⊗ FILTERED WATER OUTLET
- FD ⊗ FILTER DRAINAGE
- WI ⊗ WASHWATER INLET
- WO ⊗ WASHWATER OUTLET
- AI ⊗ AIR INLET

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

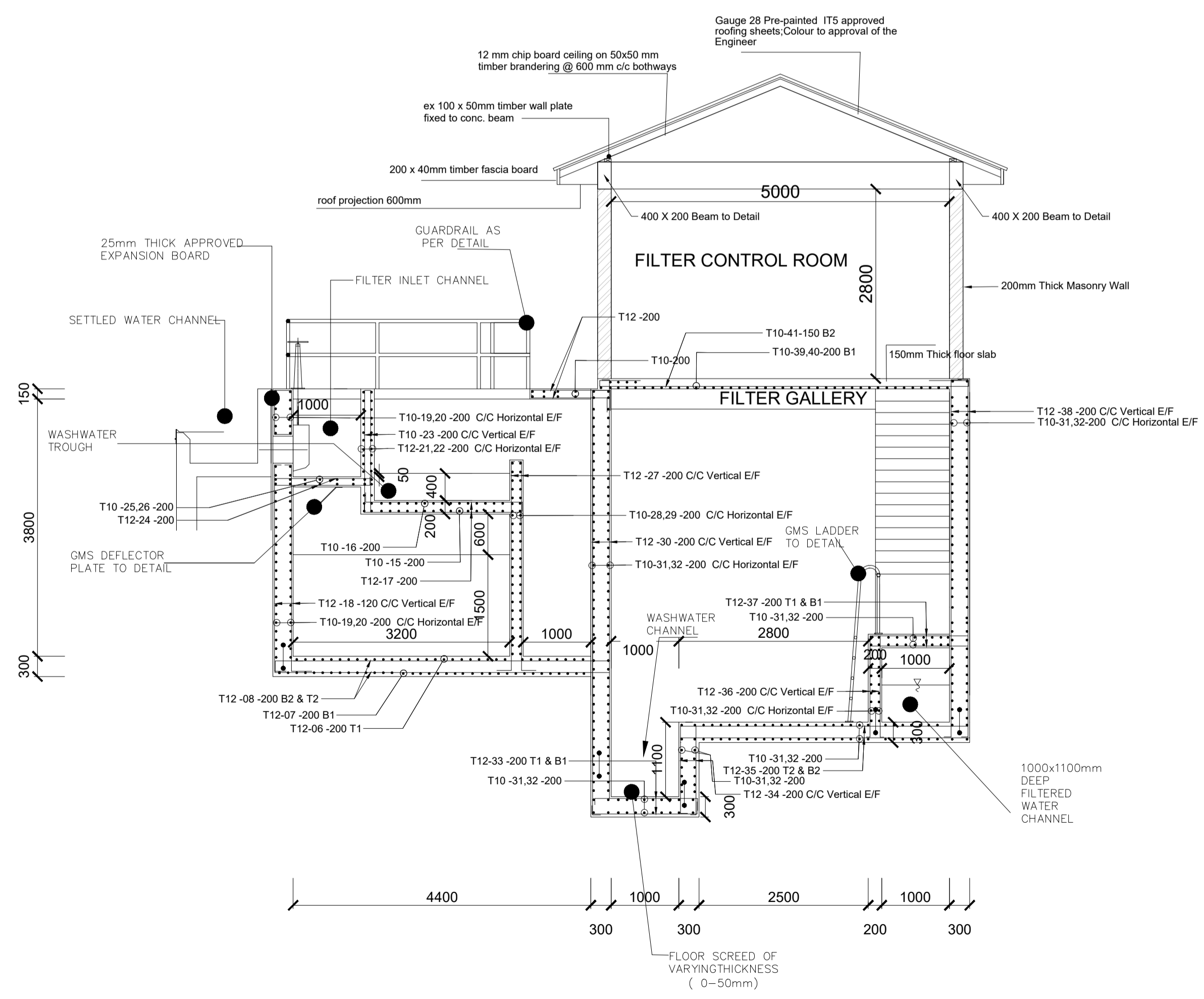
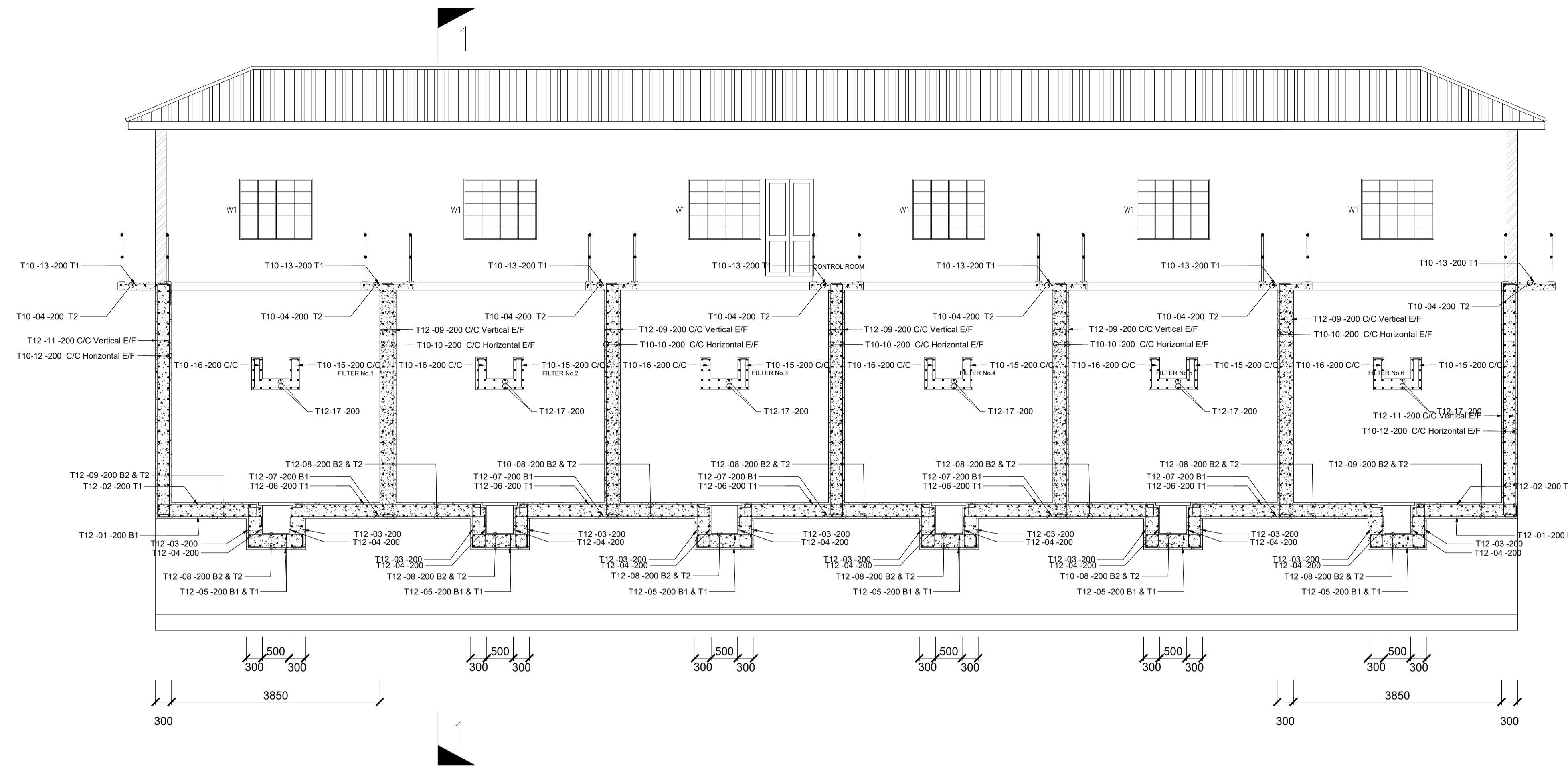
REVIEWED BY:  

**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane.  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT**  
**FILTERS CONTROL ROOM FLOOR PLAN**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
1:50	Date: FEBRUARY 2024
DRAWING No. MWS/TW/F- 07	REV. 0






**SECTION 1-1**

**NOTES:**

1. DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
2. ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
3. ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
4. ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
5. CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
6. ABBREVIATIONS  
 R.C - REINFORCED CONCRETE  
 D.P.C - DAMP PROOF COURSE  
 E.G.L - EXISTING GROUND LEVEL  
 F.G.L - FINISHED GROUND LEVEL  
 F.F.L - FINISHED FLOOR LEVEL  
 P.C.C - PRECAST CONCRETE  
 G.C.I - GALVANIZED CORRUGATED IRON
7. EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE
8. FOR WINDOW SCHEDULE, SEE DRG. NO. MWS/SD/29
9. FOR DOOR SCHEDULE, SEE DRG. NO. MWS/SD/27-28

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:



**NORTHERN WATER WORKS  
DEVELOPMENT AGENCY**  
P.O. BOX 495-70100  
GARISSA

REVIEWED BY:

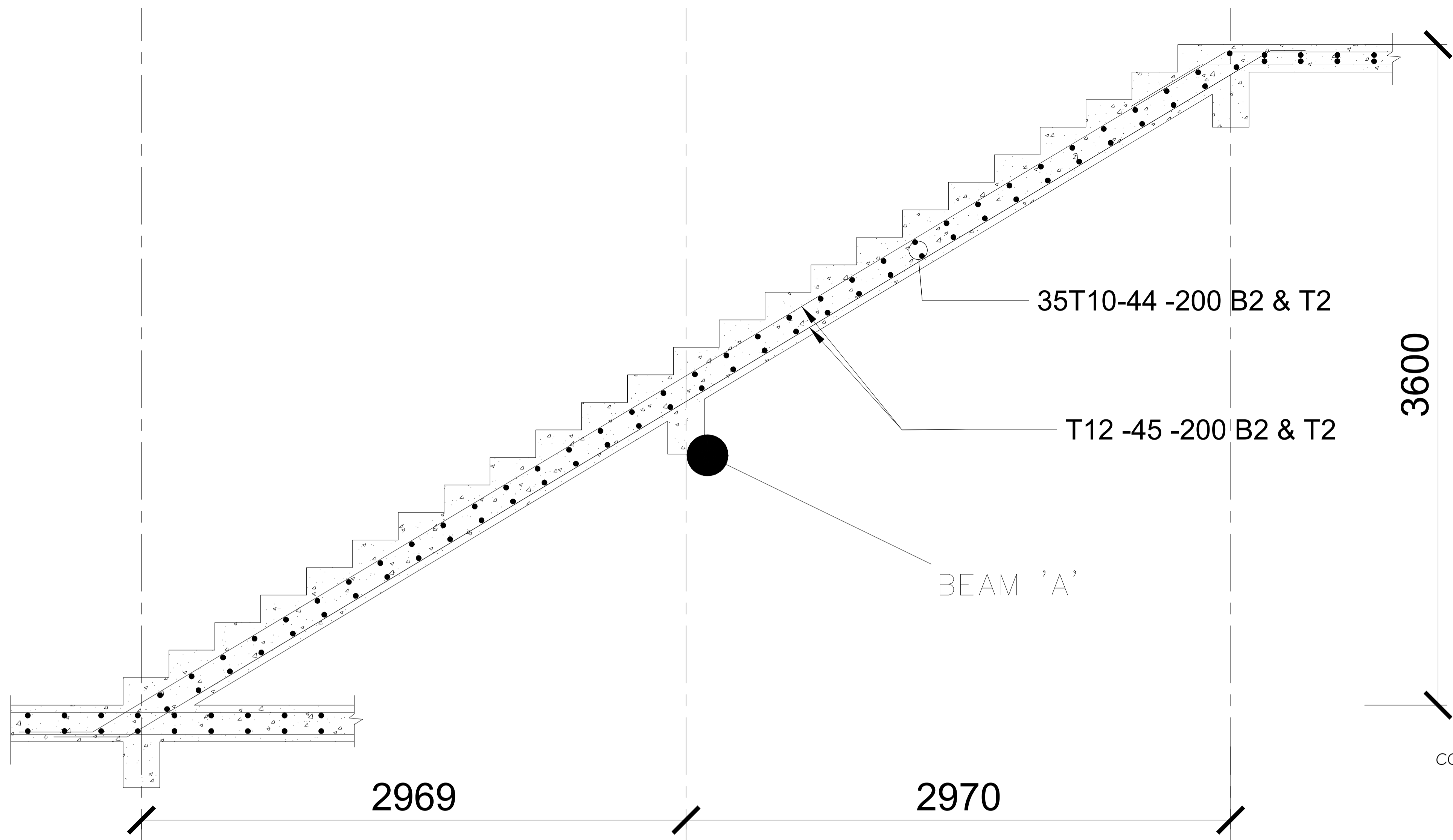


**Interconsult Engineers Ltd**  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane.  
Tel. 4441648/4441651  
Nairobi.

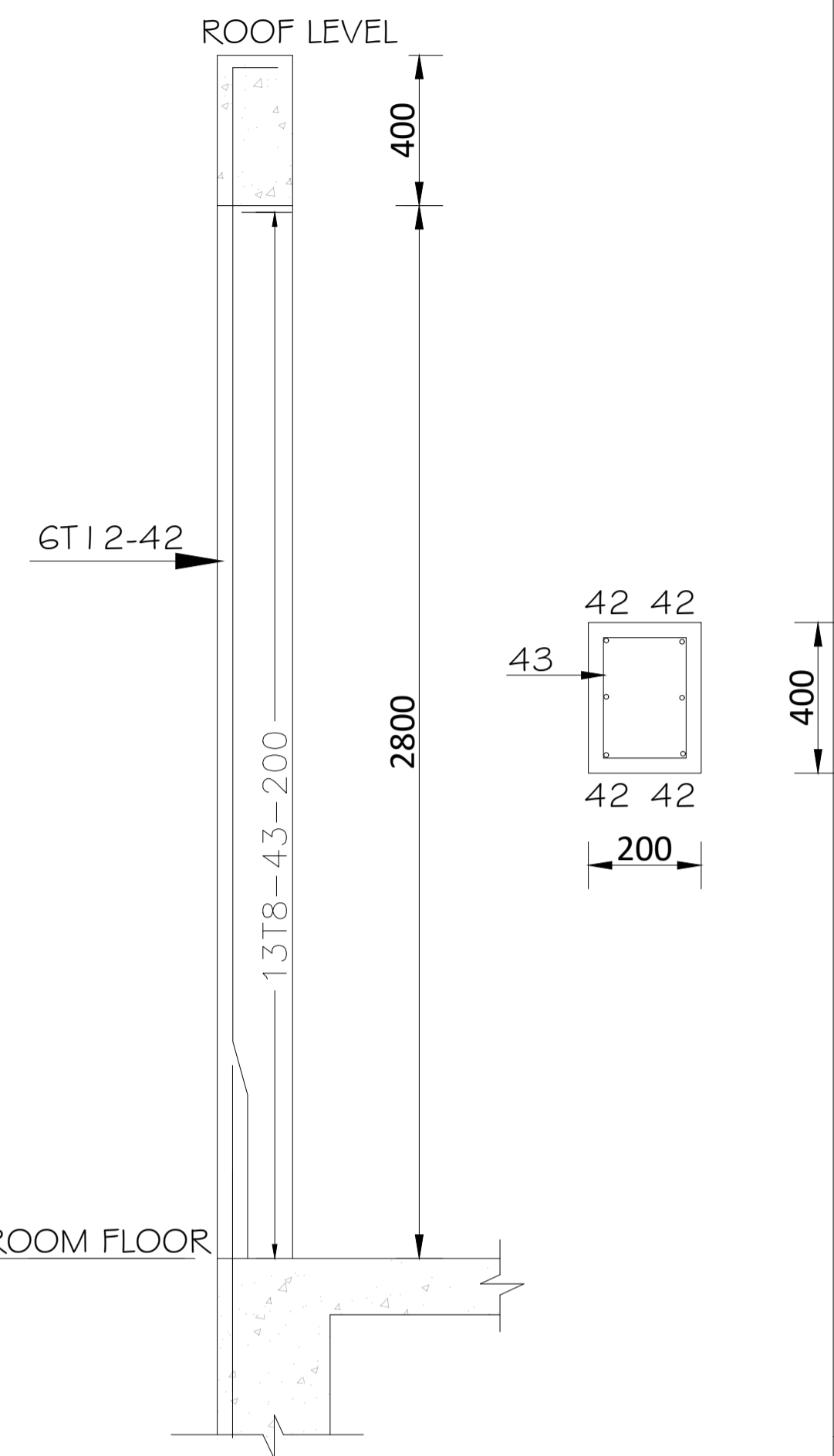
DRAWING TITLE:

**MARALAL WATER SUPPLY PROJECT**  
**FILTERS STRUCTURAL DETAILS**

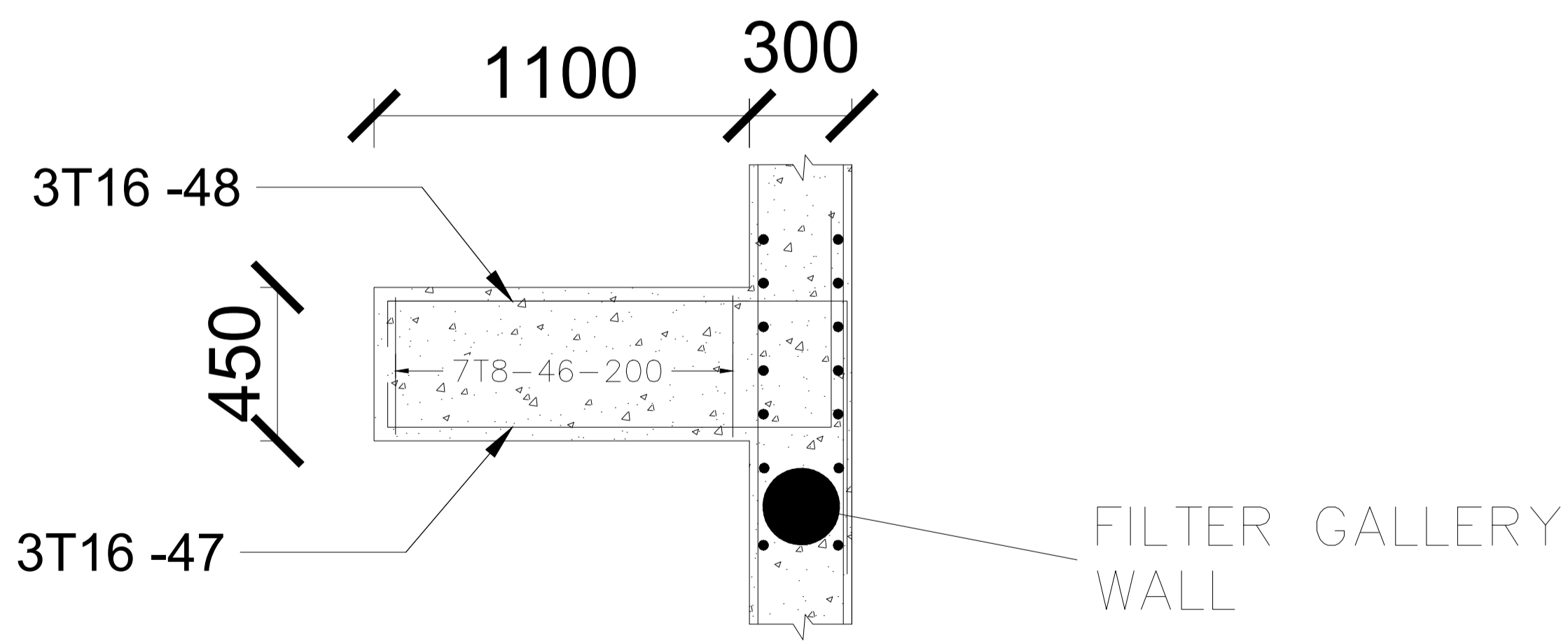
Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
1:50	Date: FEBRUARY 2024
DRAWING No. MWS/TW/F-STR/01	REV. 0



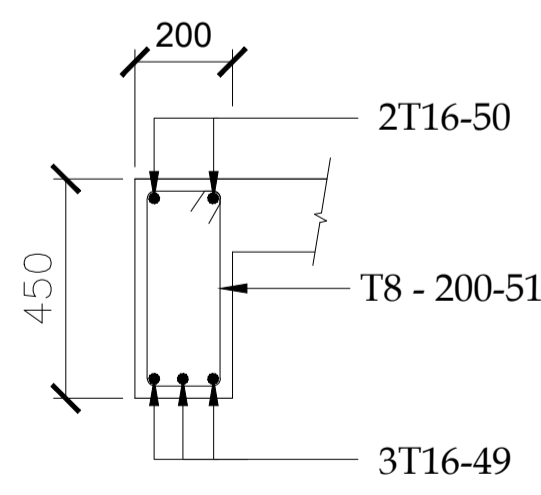
**STAIRCASE SECTION)**



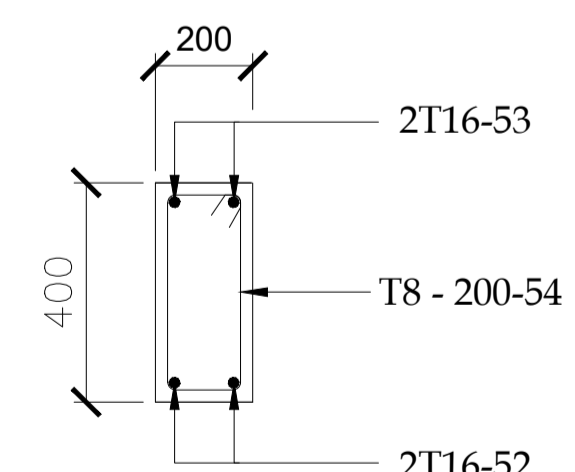
**FILTER CONTROL ROOM COLUMNS**



**STAIRCASE SUPPORT BEAM (BEAM 'A')**



**450 x 200 BM 01**  
SCALE 1:30




**400 x 200 LINTEL BEAM**  
SCALE 1:30

**NOTES:**

1. DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
2. ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
3. ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
4. ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
5. CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
6. ABBREVIATIONS  
 R.C - REINFORCED CONCRETE  
 D.P.C - DAMP PROOF COURSE  
 E.G.L - EXISTING GROUND LEVEL  
 F.G.L - FINISHED GROUND LEVEL  
 F.F.L - FINISHED FLOOR LEVEL  
 P.C.C - PRECAST CONCRETE  
 G.C.I - GALVANIZED CORRUGATED IRON
7. EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE
8. FOR WINDOW SCHEDULE, SEE DRG. NO. MWS/SD/29
9. FOR DOOR SCHEDULE, SEE DRG. NO. MWS/SD/27-28

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:  

**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane.  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT**  
**FILTERS STAIRCASE, FILTER CONTROL ROOM COLUMNS AND BEAMS AND STAIRCASE SUPPORT BEAM**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
1:50	Date: FEBRUARY 2024
DRAWING No. MWS/TW/F-STR/02	REV. 0

## The Steel Bar Table

No.	Size (mm)	Type	length (mm)	Amount	Total length (m)	Remarks	Shape code
①	T12	200┌┐200 1910	2310	34	78.54		
②	T12	200┌┐200 1835	2235	34	75.990		
③	T12	200┌┐200 795	1195	204	243.78		
④	T12	200┌┐200 795	1120	204	228.48		
⑤	T12	200┌┐200 1020	1420	204	289.68		
⑥	T12	200┌┐200 3450	3850	85	327.25		
⑦	T12	200┌┐200 3598	3998	85	339.83		
⑧	T12	200┌┐200 4920	5320	352	1872.64		
⑨	T12	400┌┐200 4320	4920	170	836.4		
⑩	T10	200┌┐200 3620	4020	210	844.2		
⑪	T12	400┌┐200 4320	4920	92	452.64		
⑫	T10	200┌┐200 4920	5320	84	446.88		
⑬	T10	100┌┐100 820	1020	140	142.8		
⑭	T10	200┌┐200 4200	4400	35	154		
⑮	T10	520┌┐520 820	1860	11	20.46		
⑯	T10	400┌┐400 580	1380	11	15.18		
⑰	T12	300┌┐300 2320	2920	20	58.4		
⑱	T12	400┌┐200 4320	4920	256	1259.5		
⑲	T10	200┌┐200 11800	12000	84	1008		
⑳	T10	┌┐2750	2750	42	115.5		
㉑	T12	200┌┐200 11800	12000	32	384		
㉒	T12	┌┐2750	2750	32	88		
㉓	T12	┌┐120 └┘1770	4180	125	522.5		
㉔	T12	200┌┐200 1420	1820	125	227.5		
㉕	T10	200┌┐200 11800	12000	10	120		
㉖	T10	┌┐2750	2750	10	27.5		
㉗	T12	400┌┐200 3120	3720	250	930		
㉘	T10	200┌┐200 11800	12000	84	1008		
㉙	T10	┌┐2750	2750	42	115.5		
㉚	T12	400┌┐200 6425	7025	250	1756.25		
㉛	T10	200┌┐200 11800	12000	184	2208		
㉜	T10	┌┐2750	2750	184	506		

⑳	T12	200┌┐200 1520	1920	250	480		
㉑	T12	200┌┐200 1320	1720	250	430		
㉒	T12	200┌┐200 4220	4620	250	1155		
㉓	T12	300┌┐200 1520	2020	250	505		
㉔	T12	200┌┐200 1420	1820	250	455		
㉕	T12	300┌┐200 5295	5795	250	1448.75		
㉖	T10	90┌┐600 11310	12000	64	768		
㉗	T10	┌┐3730	3730	32	119.36		
㉘	T10	90┌┐600┐600┐90 5320	6700	128	857.6		
㉙	T16	┌┐3800┐200	4000	90	360		
㉚	T8	┌┐140 └┘340	1060	195	206.7		
㉛	T10	90┌┐1040┐90	1220	70	85.4		
㉜	T12	600┌┐7200┐600	8400	14	117.6		
㉝	T8	┌┐140 └┘390	1160	7	81.2		
No.	Size (mm)	Type	length (mm)	Amount	Total length (m)	Remarks	Shape code
㉞	T16	200┌┐800 1320	2310	3	69.6		
㉟	T16	200┌┐800 1320	2310	3	69.6		
㊱	T16	┌┐37.25	37.25	3	111.75		
㊲	T16	┌┐37.25	37.25	2	74.5		
㊳	T8	┌┐140 └┘390	1060	188	199.28		
㊴	T16	┌┐61.2	61.2	2	122.4		
㊵	T16	┌┐61.2	61.2	2	122.4		
㊶	T8	┌┐140 └┘340	1060	307	324.36		

### NOTES:

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
- ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
- CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
- ABBREVIATIONS
  - R.C - REINFORCED CONCRETE
  - D.P.C - DAMP PROOF COURSE
  - E.G.L - EXISTING GROUND LEVEL
  - F.G.L - FINISHED GROUND LEVEL
  - F.F.L - FINISHED FLOOR LEVEL
  - P.C.C - PRECAST CONCRETE
  - G.C.I - GALVANIZED CORRUGATED IRON
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE
- FOR WINDOW SCHEDULE, SEE DRG. NO. MWS/SD/29
- FOR DOOR SCHEDULE, SEE DRG. NO. MWS/SD/27-28

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:

**NORTHERN WATER WORKS  
DEVELOPMENT AGENCY**  
P.O. BOX 495-70100  
GARISSA

REVIEWED BY:

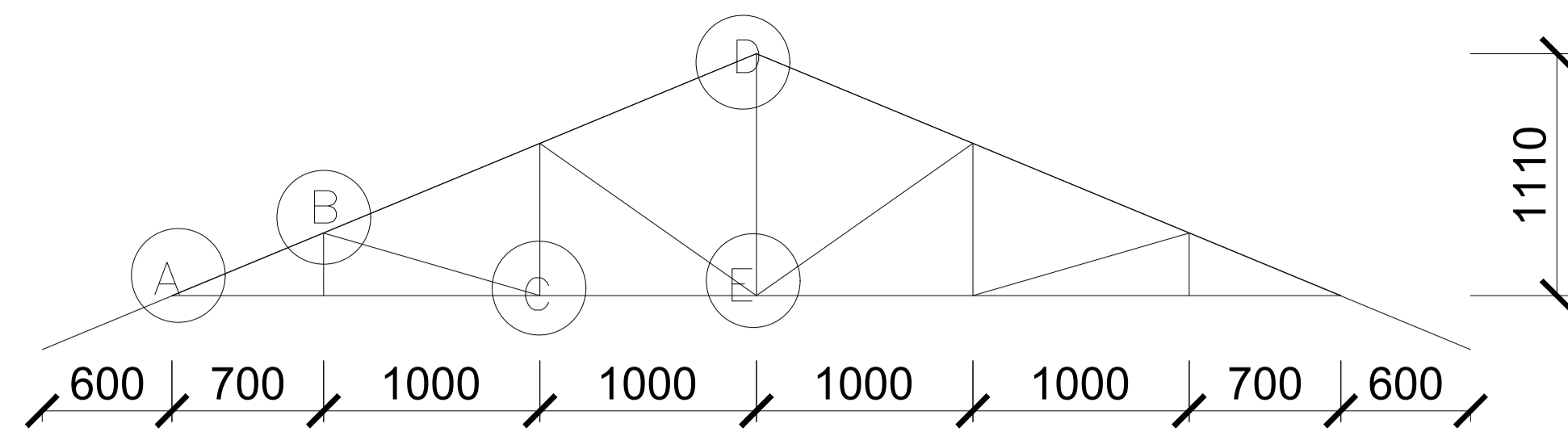
**Interconsult Engineers Ltd**  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane.  
Tel. 4441648/4441651  
Nairobi.

DRAWING TITLE:

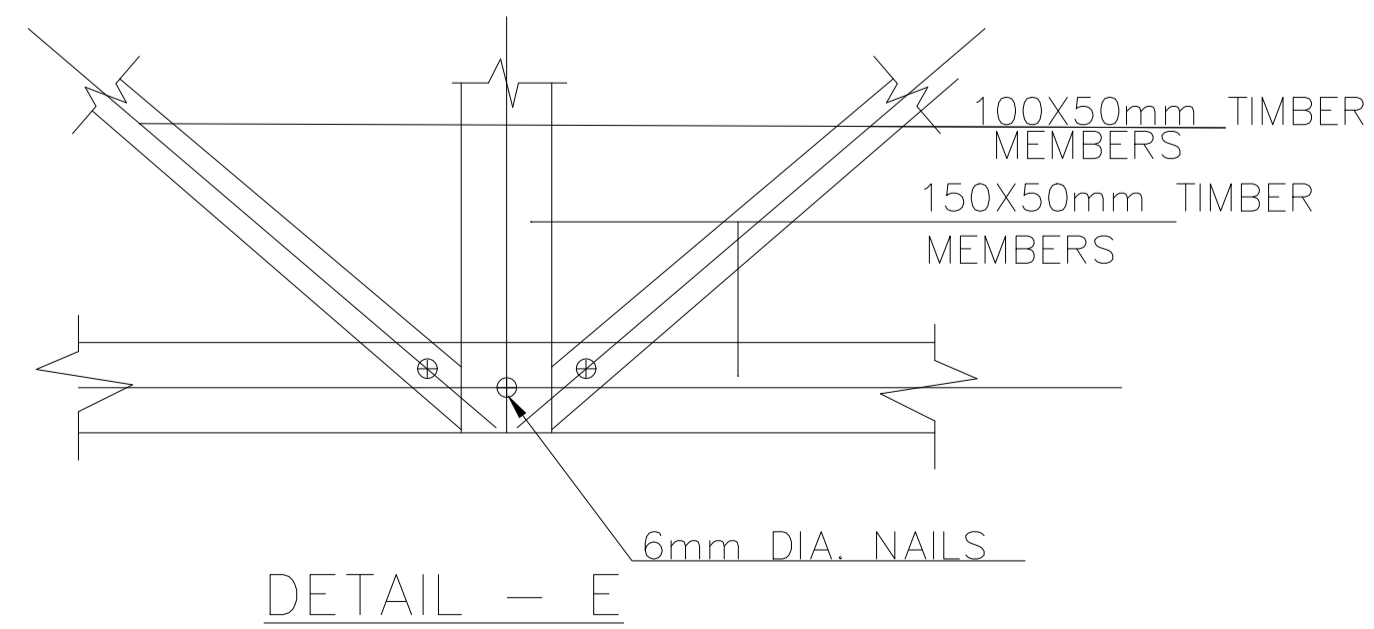
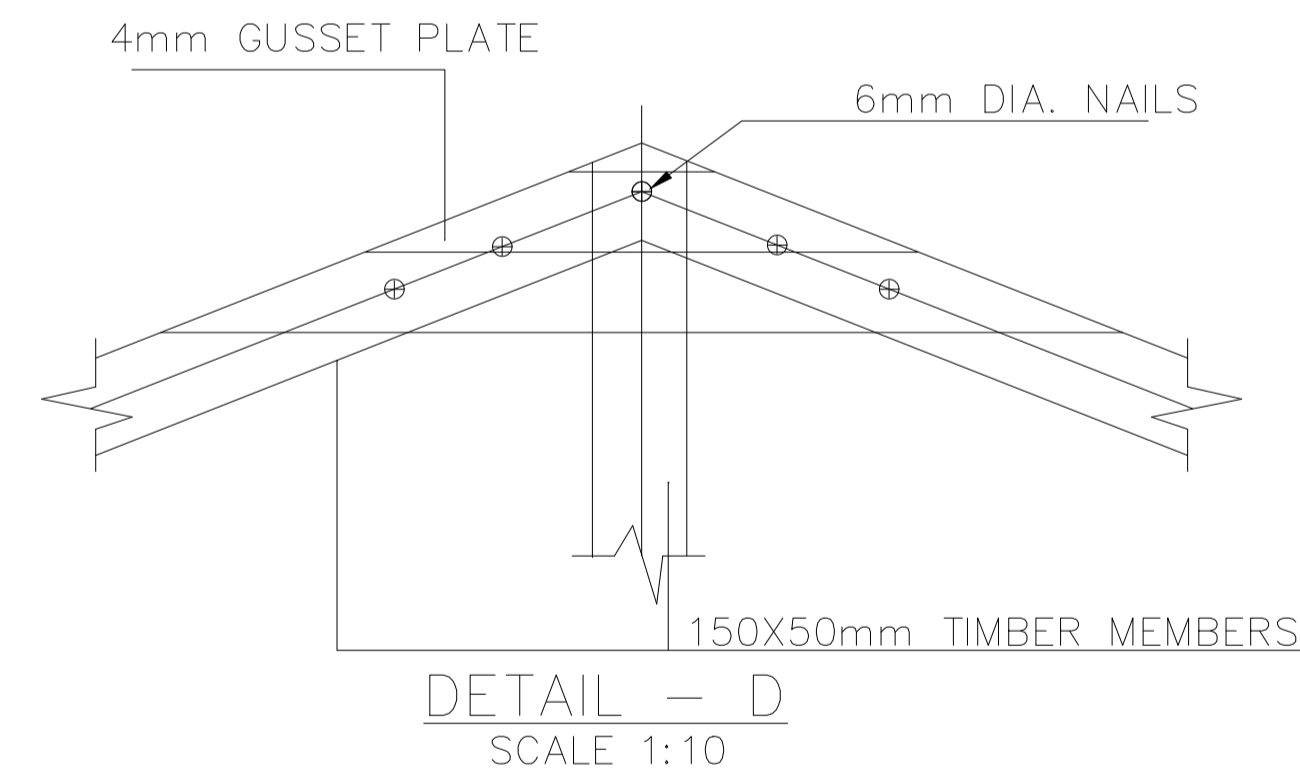
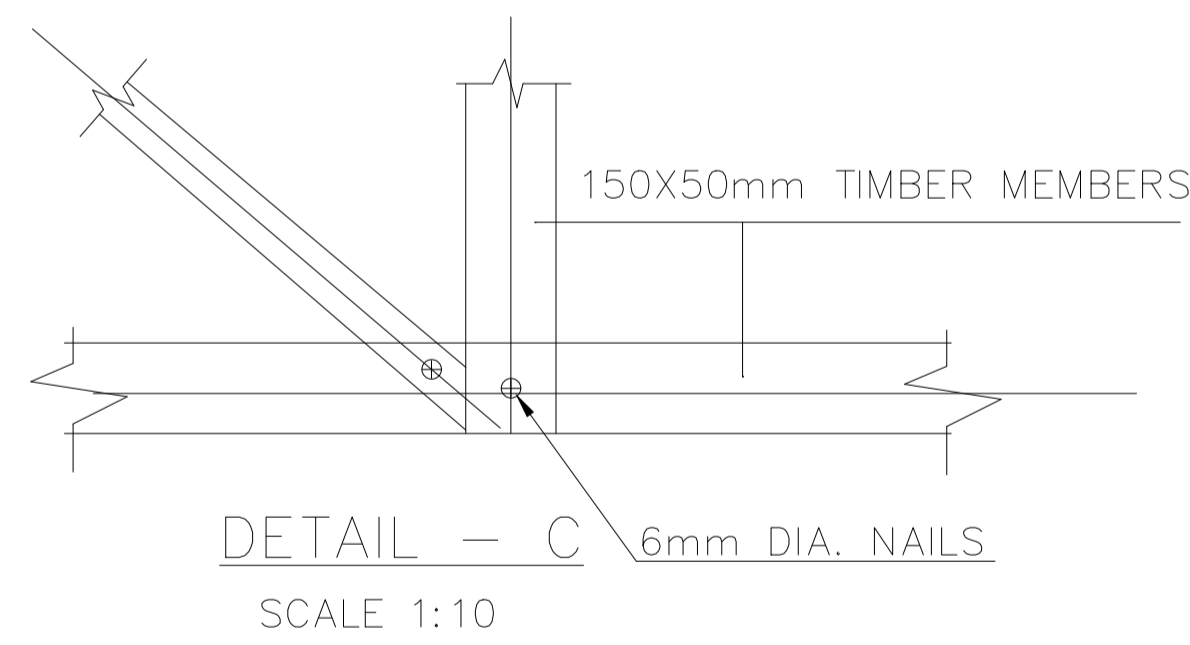
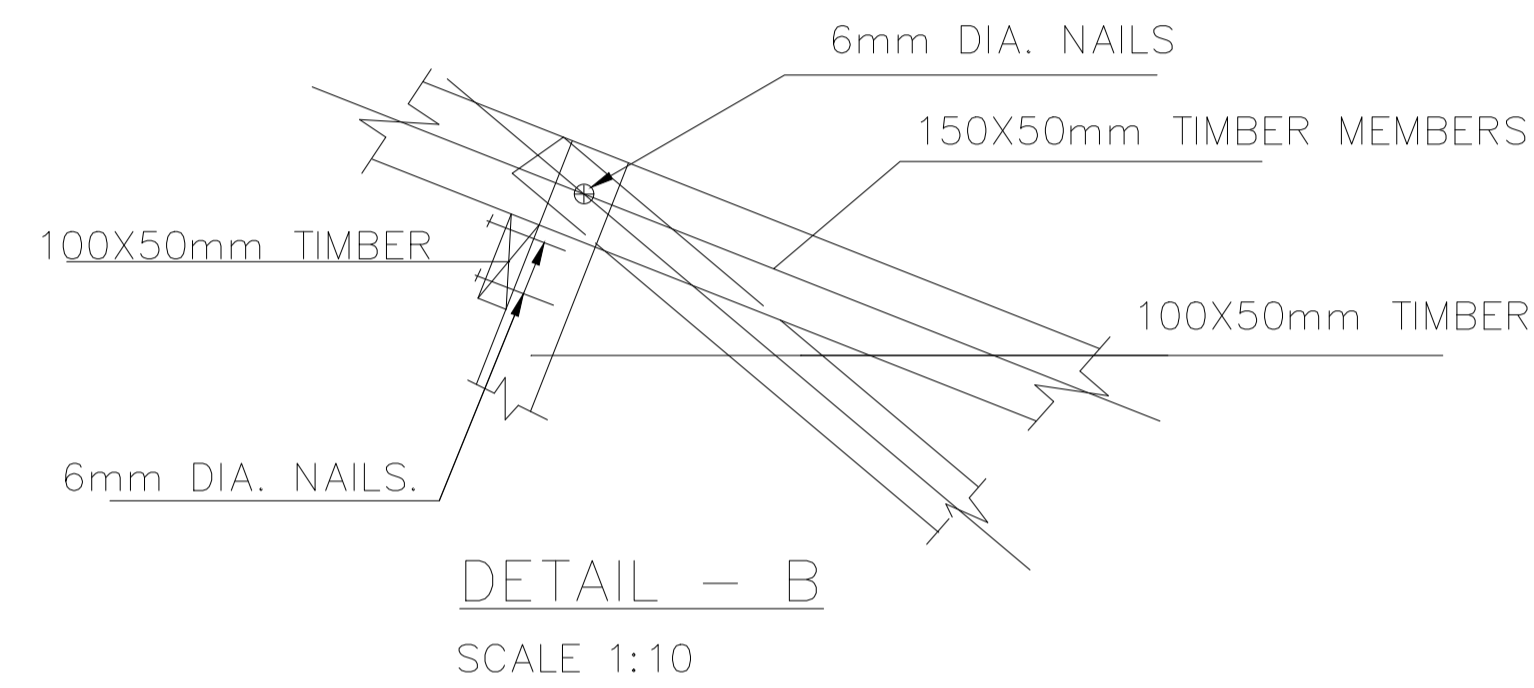
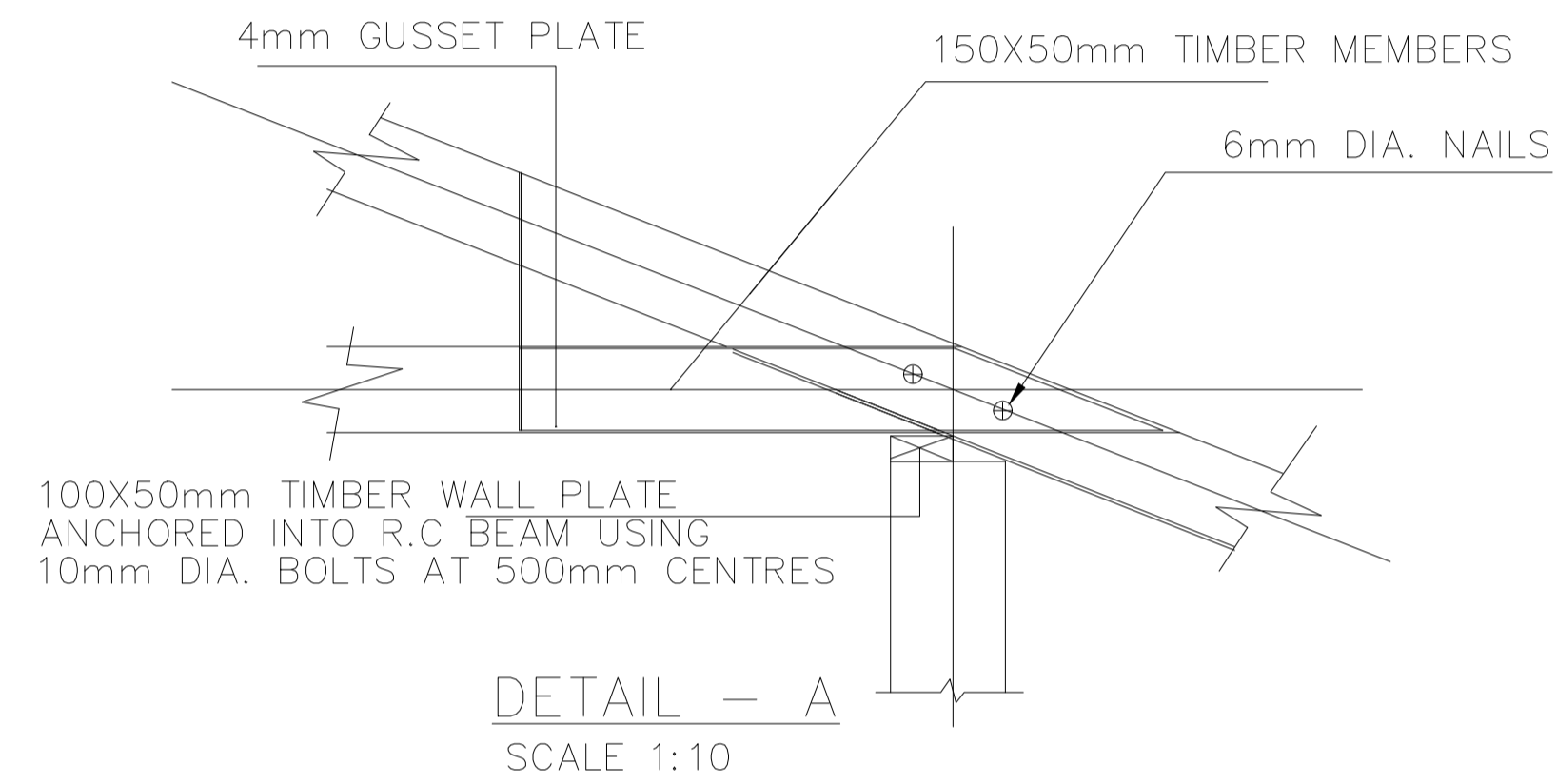
**MARALAL WATER SUPPLY PROJECT**

**FILTERS BAR BENDING SCHEDULE**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
1:50	Date: FEBRUARY 2024
DRAWING No. MWS/TW/F-STR/03	REV. 0



## TYPICAL FILTER CONTROL ROOM TRUSS



ROOF TRUSS DETAILS	
150X50 TIMBER	EXTERNAL MEMBERS
100X50 TIMBER	INTERNAL MEMBERS
150x75 TIMBER	PURLINS
150X50 TIMBER	RAFTERS

### NOTES:

1. DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
2. ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
3. ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
4. ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
5. CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
6. ABBREVIATIONS
  - R.C - REINFORCED CONCRETE
  - D.P.C - DAMP PROOF COURSE
  - E.G.L - EXISTING GROUND LEVEL
  - F.G.L - FINISHED GROUND LEVEL
  - F.F.L - FINISHED FLOOR LEVEL
  - P.C.C - PRECAST CONCRETE
  - G.C.I - GALVANIZED CORRUGATED IRON
7. EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE
8. FOR WINDOW SCHEDULE, SEE DRG. NO. MWS/SD/29
9. FOR DOOR SCHEDULE, SEE DRG. NO. MWS/SD/27-28

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:

**NORTHERN WATER WORKS  
DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:

**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadaia Place, 4th Floor,  
 Ngong Lane.  
 Tel. 4441648/4441651  
 Nairobi.

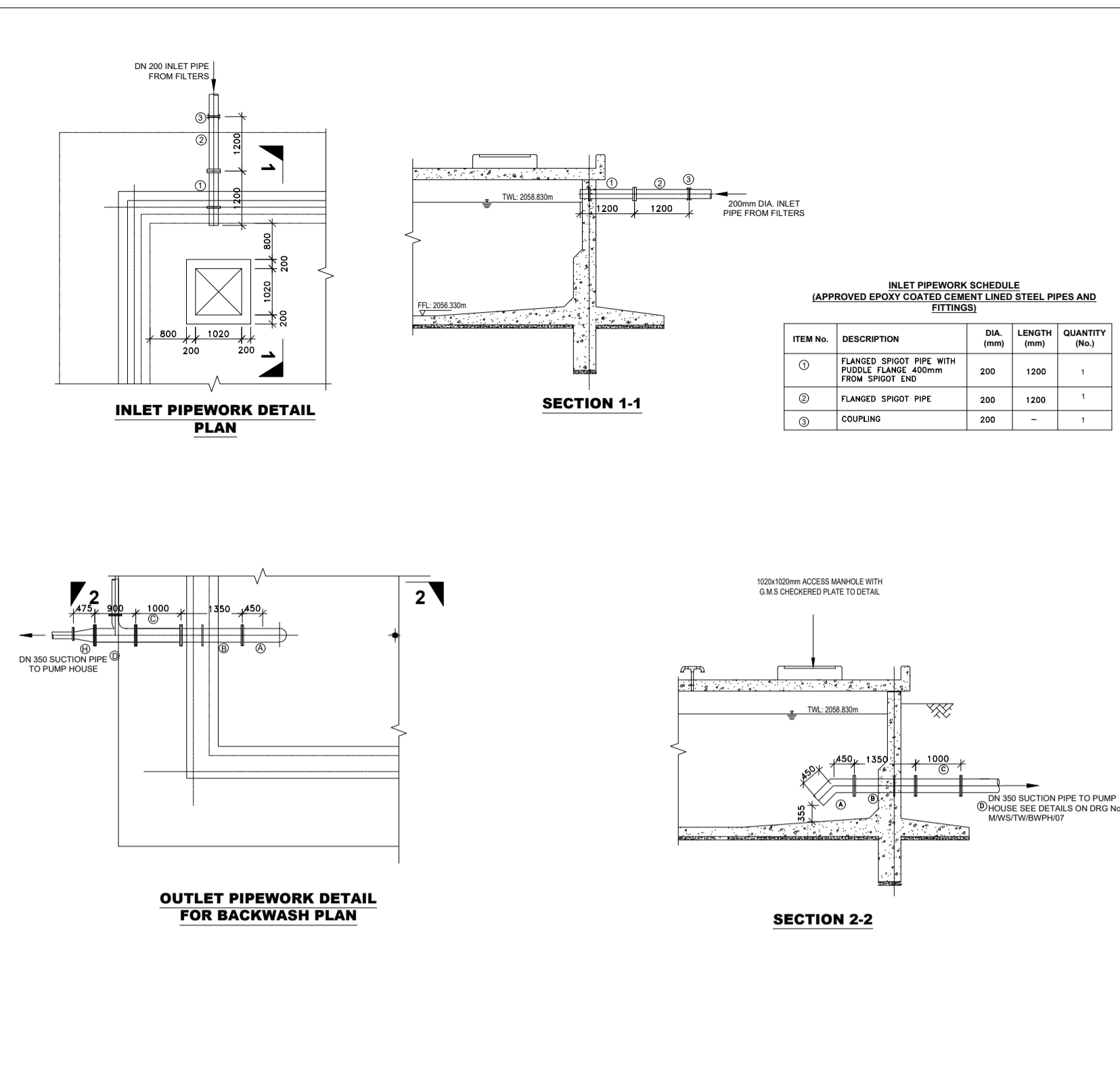
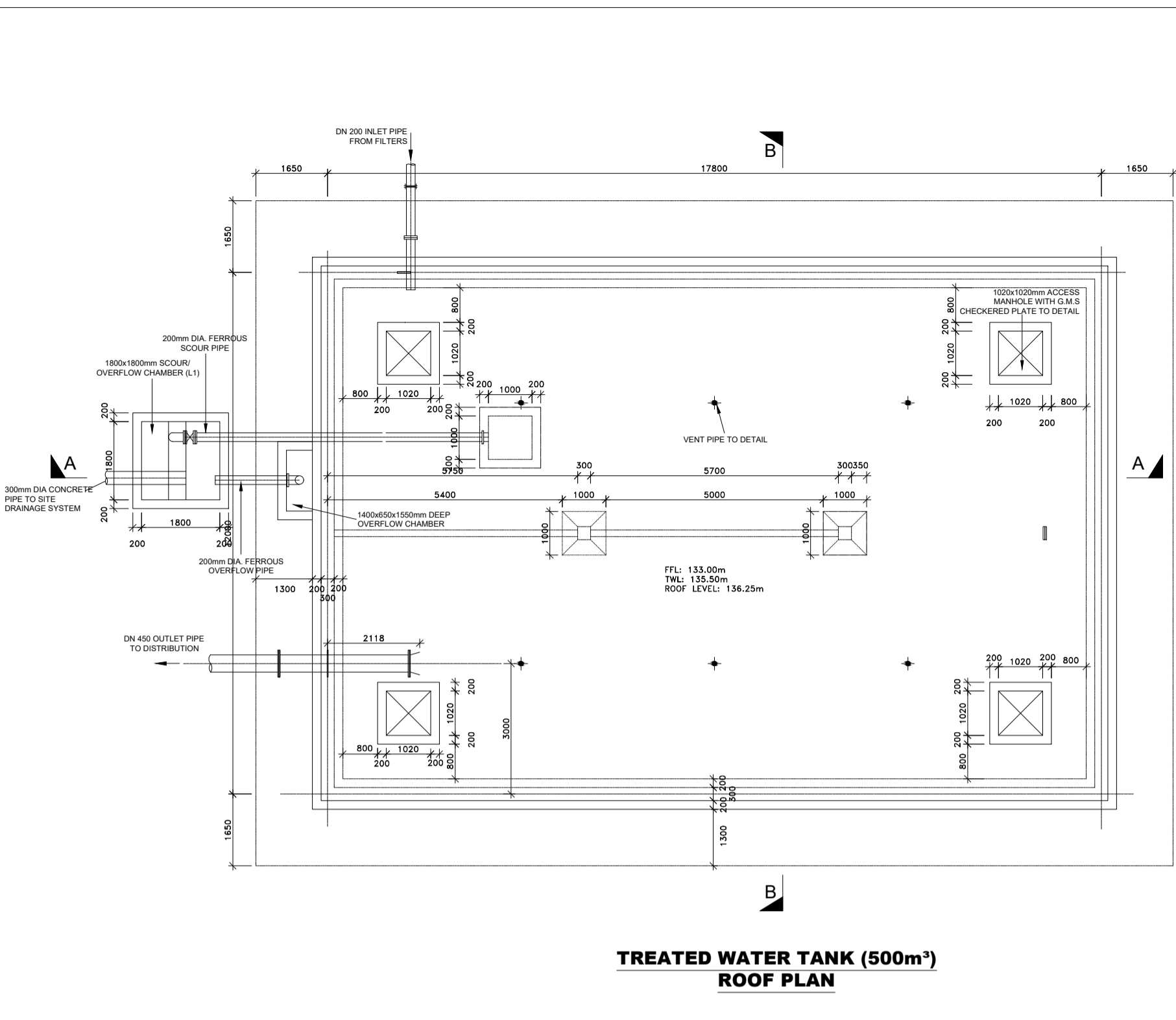
DRAWING TITLE:

**MARALAL WATER SUPPLY PROJECT**

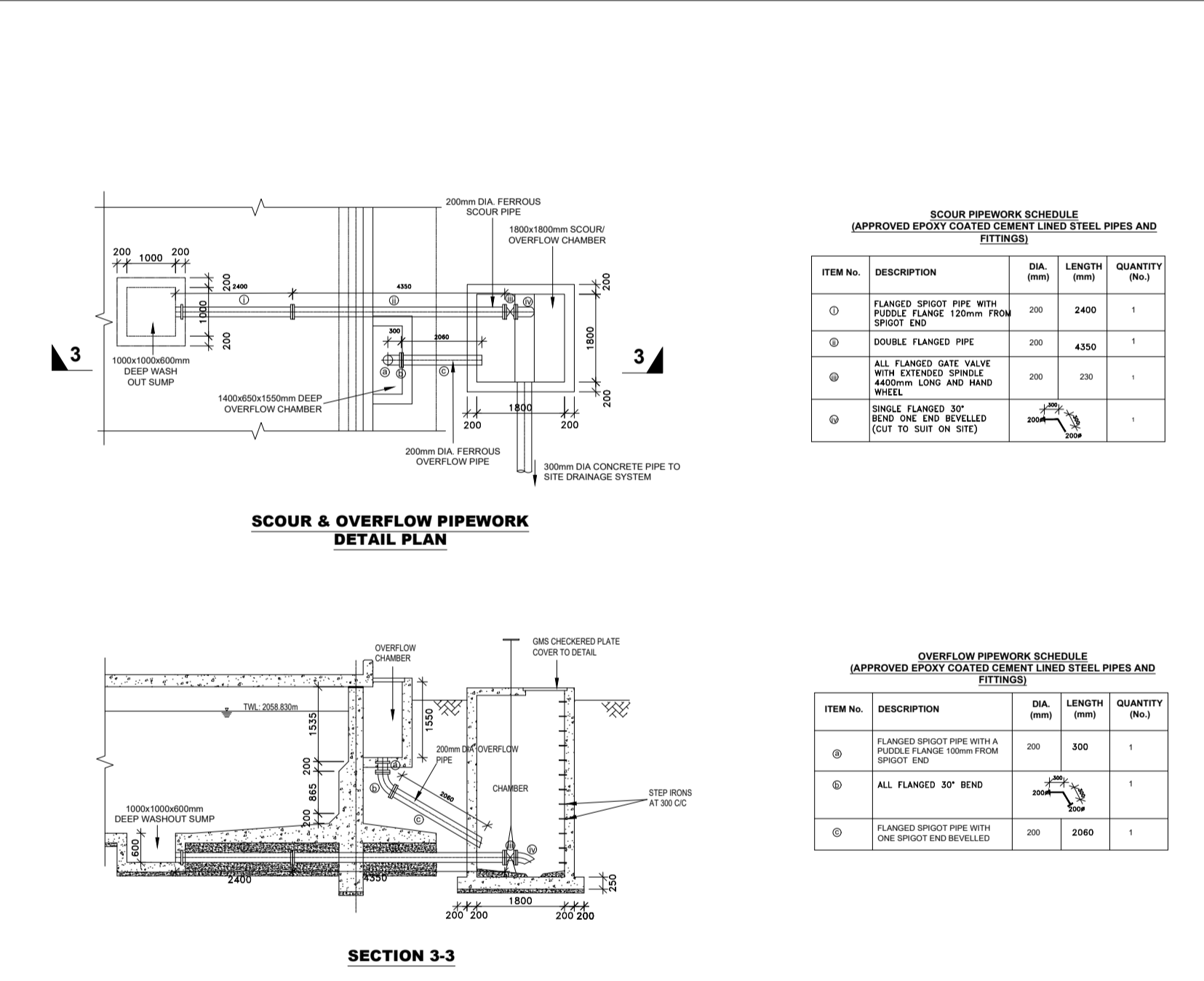
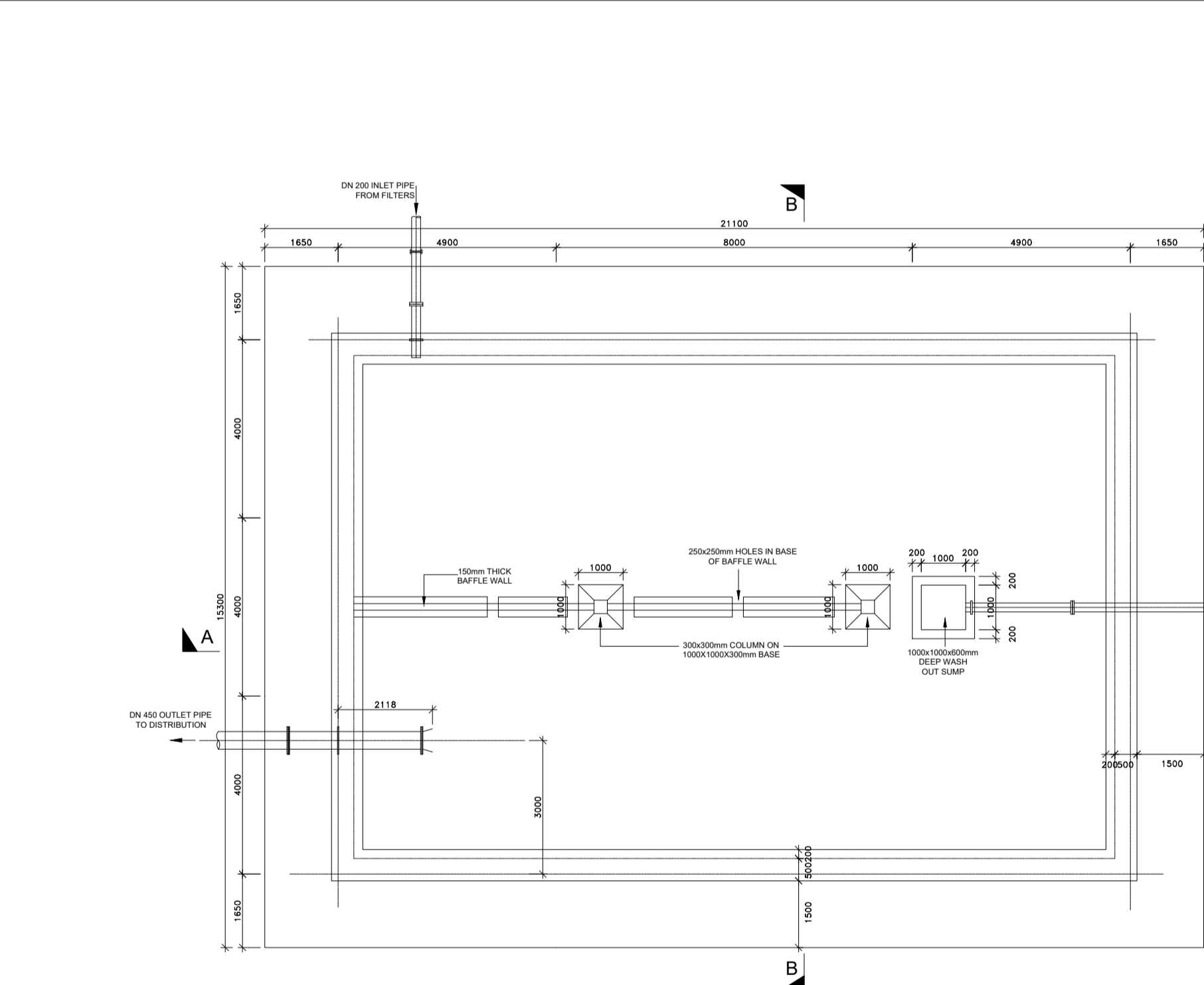
**FILTERS CONTROL ROOM TYPICAL TRUSS DETAILS**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
1:50	Date: FEBRUARY 2024
DRAWING No. MWS/TW/F-STR/04	REV. 0

**TREATED WATER TANK (500M3)**



- NOTES:**
- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
  - ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
  - ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
  - ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
  - CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
  - ABBREVIATIONS
    - R.C - REINFORCED CONCRETE
    - D.P.C - DAMP PROOF COURSE
    - E.G.L - EXISTING GROUND LEVEL
    - F.G.L - FINISHED GROUND LEVEL
    - F.F.L - FINISHED FLOOR LEVEL
    - P.C.C - PRECAST CONCRETE
    - G.C.I - GALVANIZED CORRUGATED IRON
  - EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE



REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
P.O. BOX 495-70100  
GARISSA

REVIEWED BY:

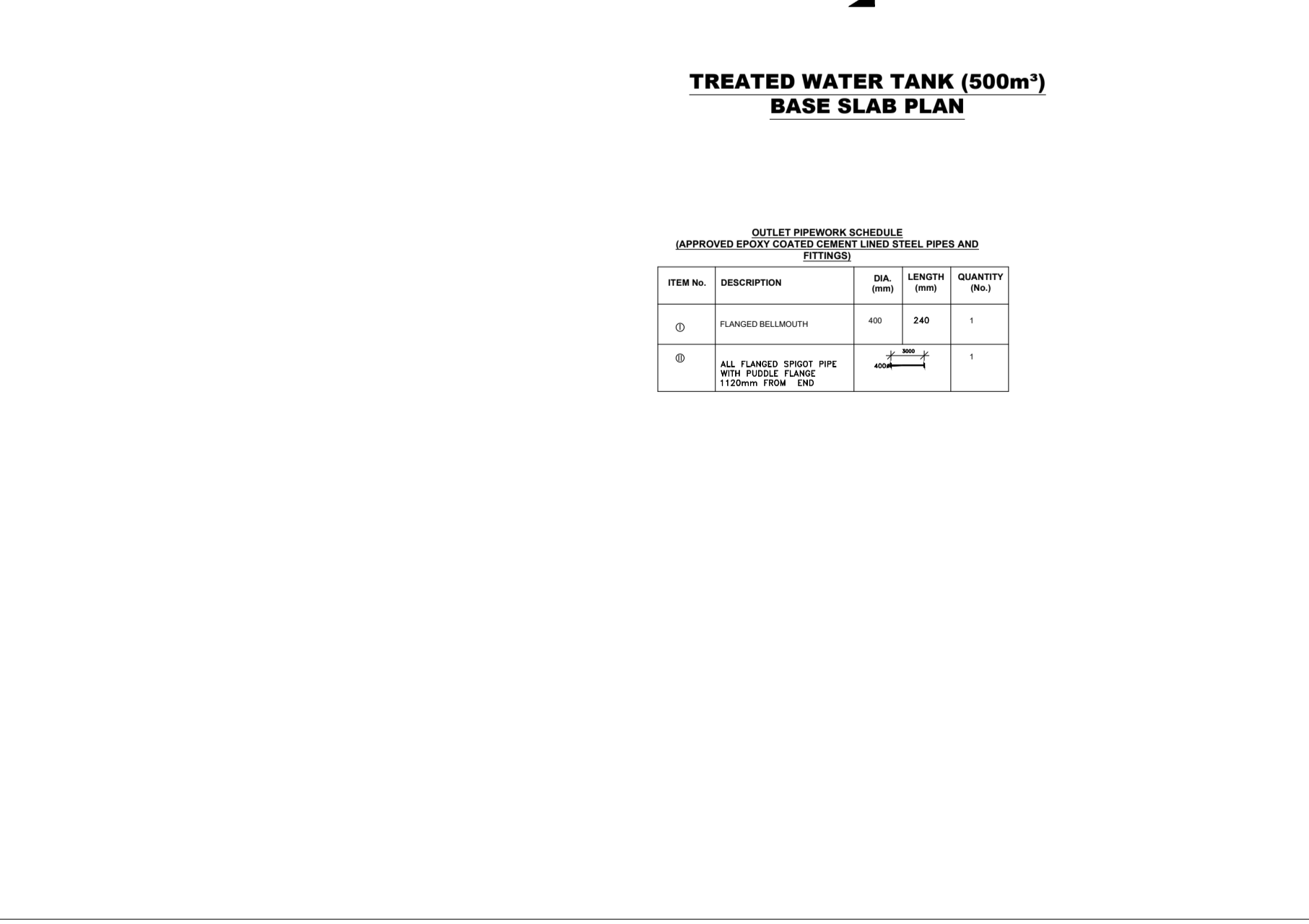
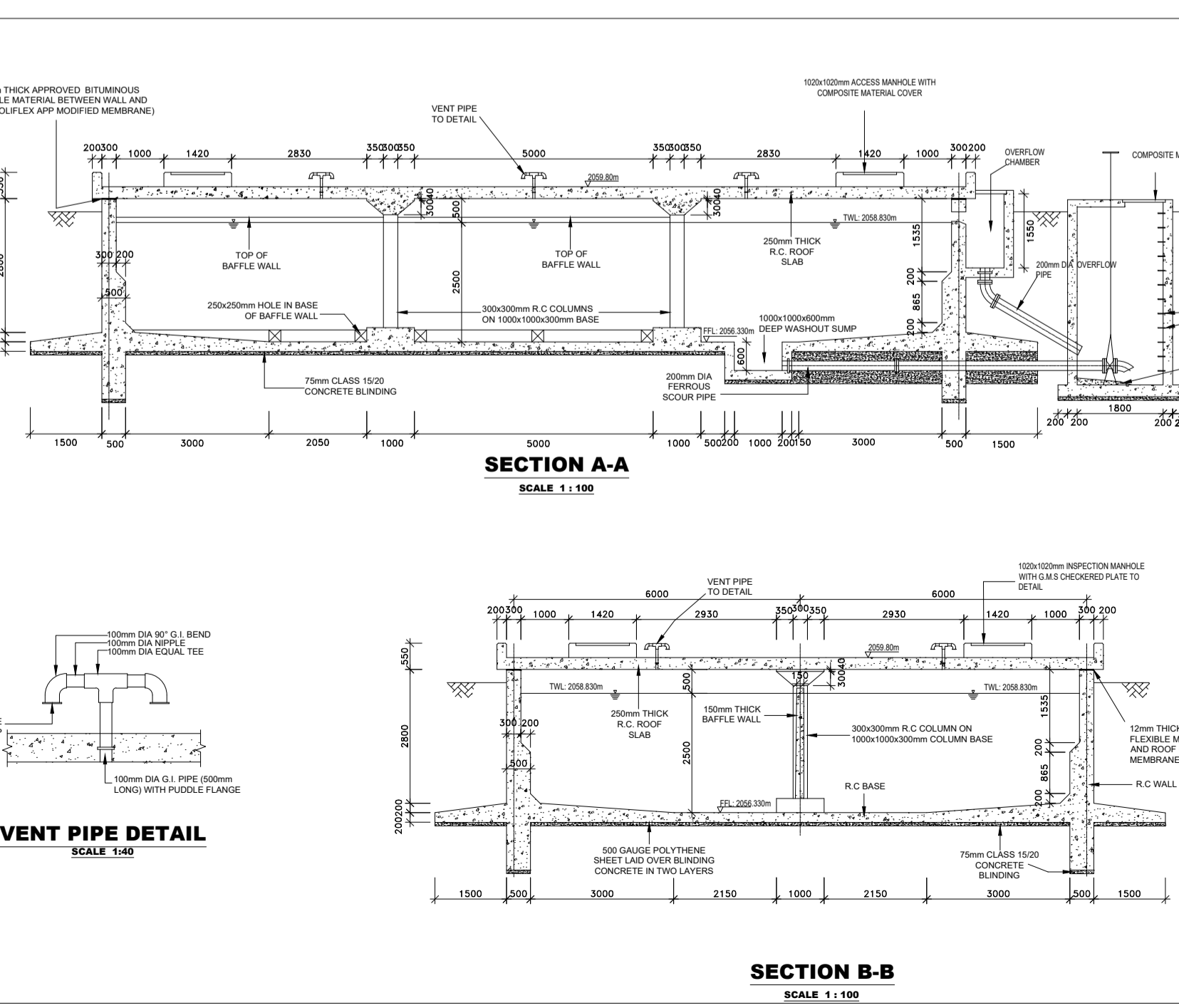
**Interconsult Engineers Ltd**  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane,  
Tel. 4441648/4441651  
Nairobi.

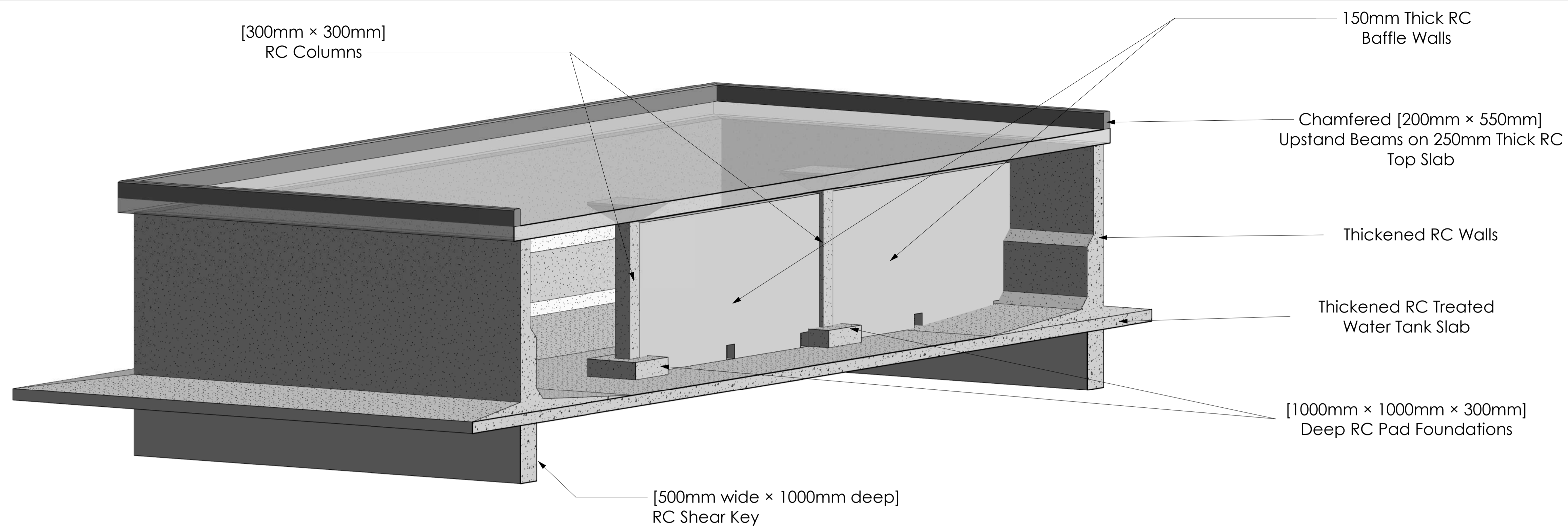
DRAWING TITLE:

**MARALAL WATER SUPPLY PROJECT**

**TREATED WATER TANK (500M3)**

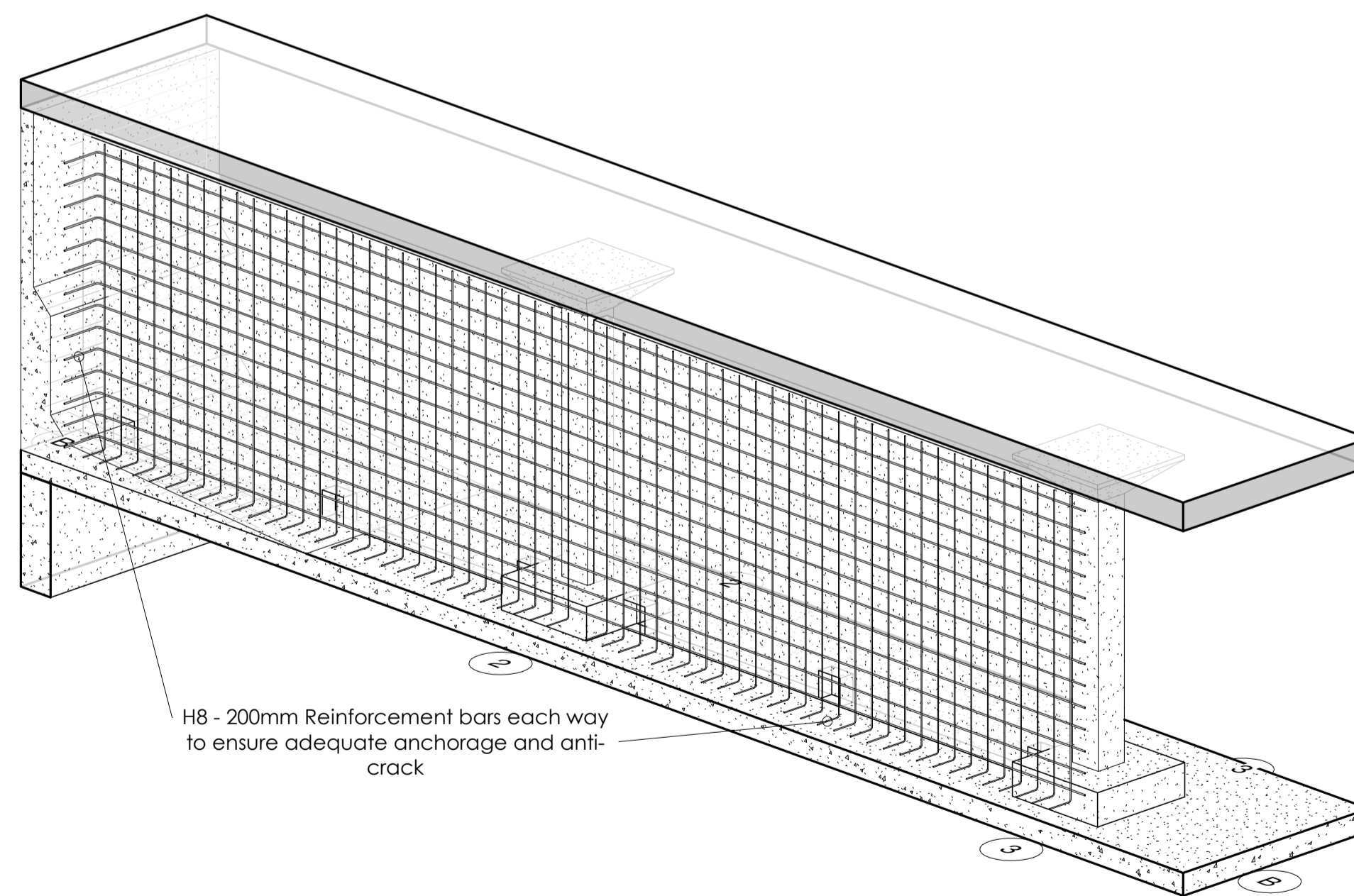
Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
1:50	Date: FEBRUARY 2024
DRAWING No. MWS/TW/TWT/01	REV. 0





**3D TREATED WATER TANKS STRUCTURAL MODEL**

SCALE 1:40



**3D BAFFLE WALL REINFORCEMENT DETAIL**


SCALE 1:40

**NOTES**

1. DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED.
2. ALL EXPOSED CONCRETE EDGES HAVE A 25mm x 25mm CHAMFER.
3. ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT.
4. ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING.
5. ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED.
6. ABBREVIATIONS:  
 RC - REINFORCED CONCRETE.  
 DPC - DAMP PROOF COURSE.  
 EGL - EXISTING GROUND LEVEL.  
 FGL - FINISHED GROUND LEVEL.  
 FFL - FINISHED FLOOR LEVEL.  
 PCC - PRECAST CONCRETE.  
 GCI - GALVANIZED CORRUGATED IRON.  
 H - HIGH YIELD DEFORMED BARS TO BS 4449:2005.
7. EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE.
8. FOR WINDOW SCHEDULES SEE DRG. NO. MWS/SD/29.
9. FOR DOOR SCHEDULES SEE DRG. NO. MWS/SD/27 & 28.

REVISION	DESCRIPTION	DATE

CLIENT



NORTHERN WATER WORKS DEVELOPMENT AGENCY  
 P.O. BOX 495 - 70100  
 GARISSA.

PROJECT

**MARALAL WATER SUPPLY PROJECT**

REVIEWED BY



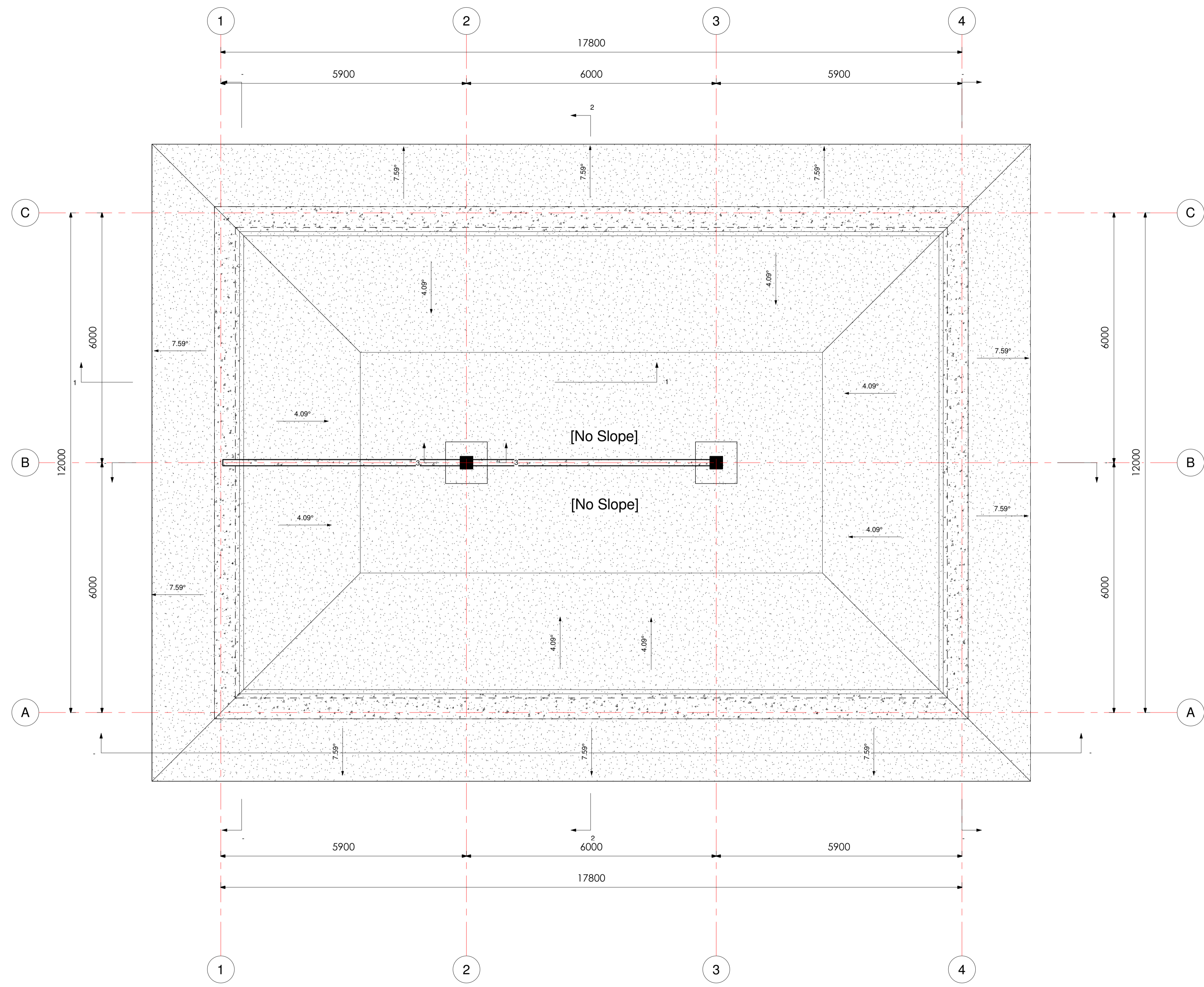
Interconsult Engineers Ltd  
 Consulting Engineers  
 Jadhala Place, 4th Floor,  
 Ngong Lane.  
 Tel. 4441648/4441651  
 NAIROBI.

DRAWING TITLE

**TREATED WATER TANK STRUCTURAL DETAILING**

3D STRUCTURAL MODELS OF THE WATER TANK AND BAFFLE WALLS

Designed By:	N.M.	Drawn By:	G.G.
Checked By:	P.M.M.	Approved By:	K.M.
Scale:	AS SHOWN	Date:	FEBRUARY 2024
DRAWING No.	MWS/TW/TWT - STR/01	REV.	0



**PLAN VIEW**  
SCALE 1:50

**NOTES**

1. DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED.
2. ALL EXPOSED CONCRETE EDGES HAVE A 25mm x 25mm CHAMFER.
3. ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT.
4. ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING.
5. ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED.
6. ABBREVIATIONS:  
RC - REINFORCED CONCRETE.  
DPC - DAMP PROOF COURSE.  
EGL - EXISTING GROUND LEVEL.  
FGL - FINISHED GROUND LEVEL.  
FFL - FINISHED FLOOR LEVEL.  
PCC - PRECAST CONCRETE.  
GCI - GALVANIZED CORRUGATED IRON.  
H - HIGH YIELD DEFORMED BARS TO BS 4449:2005.
7. EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE.
8. FOR WINDOW SCHEDULES SEE DRG. NO. MWS/SD/29.
9. FOR DOOR SCHEDULES SEE DRG. NO. MWS/SD/28.

REVISION	DESCRIPTION	DATE

CLIENT



NORTHERN WATER WORKS DEVELOPMENT AGENCY  
P.O. BOX 495 - 70100  
GARISSA.

PROJECT

**MARALAL WATER SUPPLY PROJECT**

REVIEWED BY



Interconsult Engineers Ltd  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane.  
Tel. 4441648/4441651  
NAIROBI.

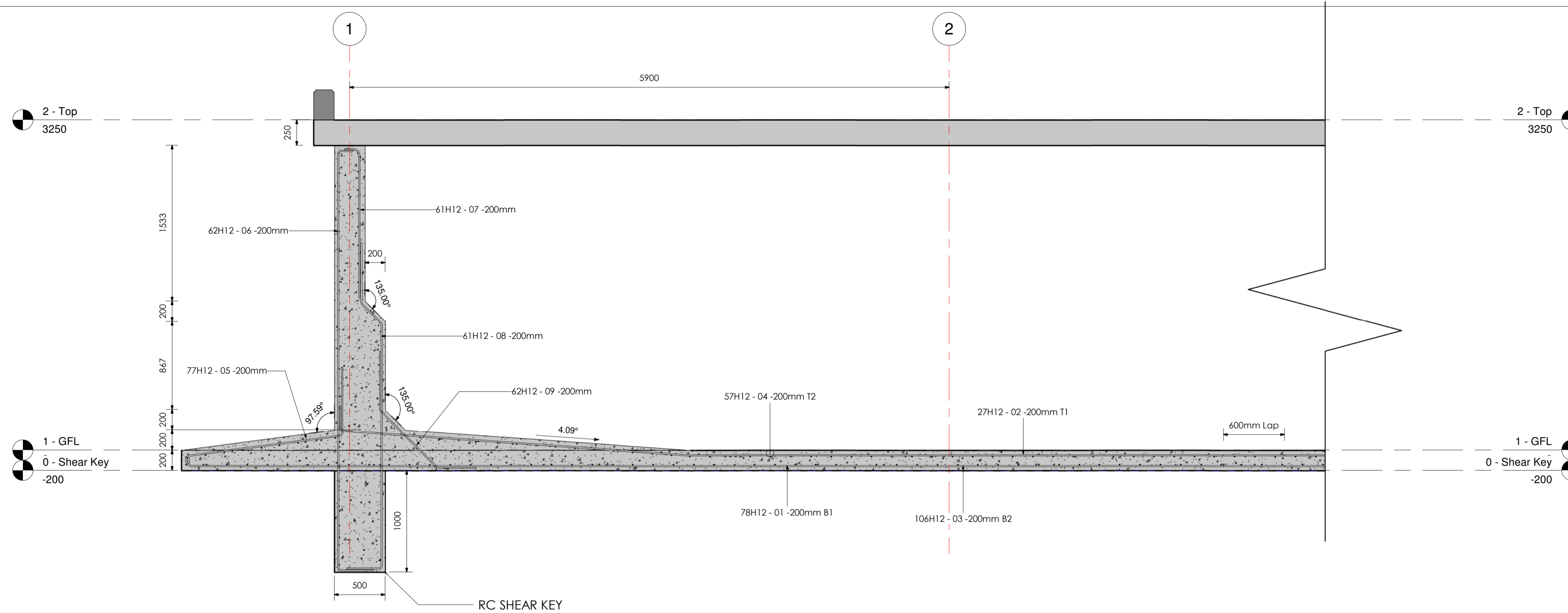
DRAWING TITLE

**TREATED WATER TANK STRUCTURAL DETAILING**

PLAN

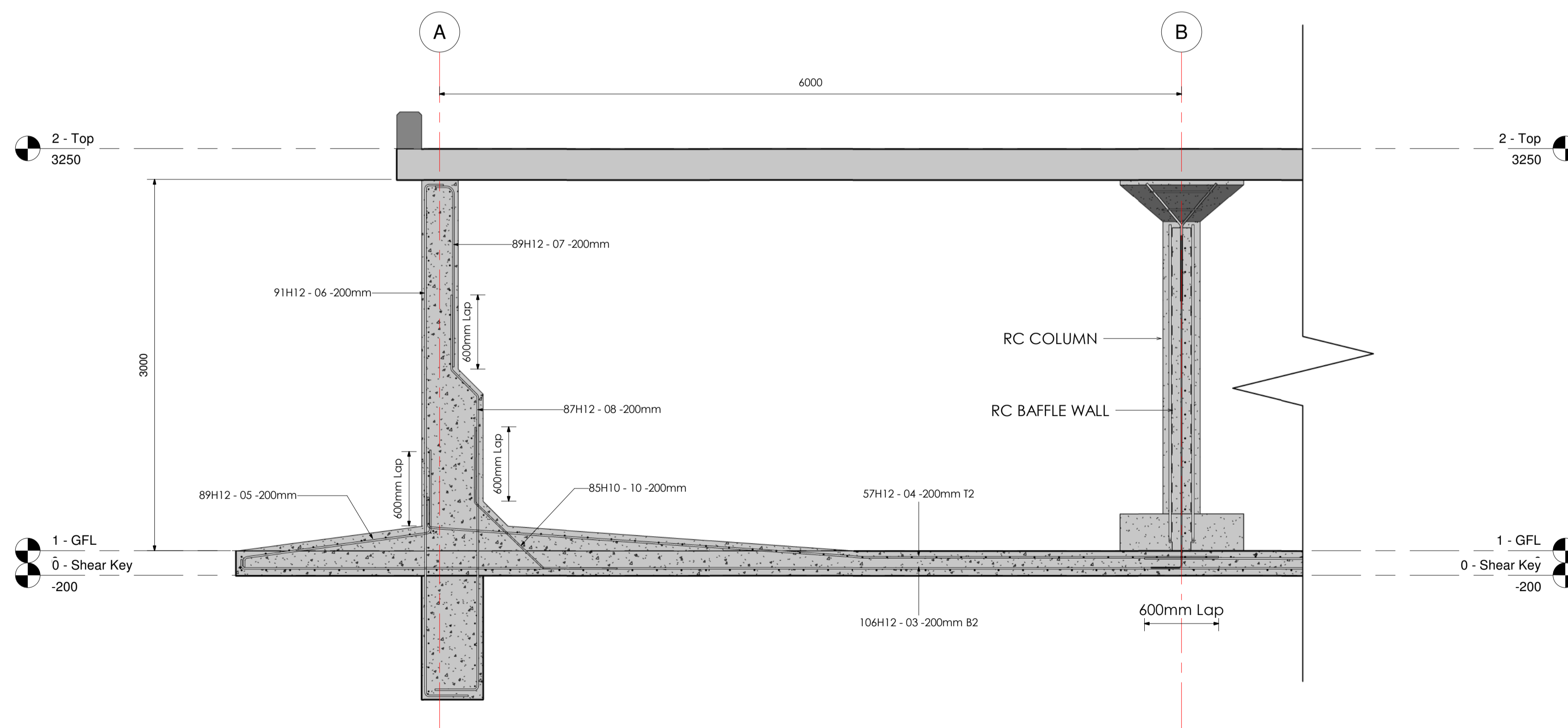
Designed By:	N.M.	Drawn By:	G.G.
Checked By:	P.M.M.	Approved By:	K.M.
Scale:	AS SHOWN	Date:	FEBRUARY 2024
DRAWING No.	MWS/TW/TWT - STR/02	REV.	0





**RC TAPERED MAIN WALL SECTION 1 - 1**

SCALE 1:25



**RC TAPERED MAIN WALL SECTION 2 - 2**


SCALE 1:25

**NOTES**

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED.
- ALL EXPOSED CONCRETE EDGES HAVE A 25mm x 25mm CHAMFER.
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT.
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING.
- ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED.
- ABBREVIATIONS:  
RC - REINFORCED CONCRETE.  
DPC - DAMP PROOF COURSE.  
EGL - EXISTING GROUND LEVEL.  
FGL - FINISHED GROUND LEVEL.  
FFL - FINISHED FLOOR LEVEL.  
PCC - PRECAST CONCRETE.  
GCI - GALVANIZED CORRUGATED IRON.  
H - HIGH YIELD DEFORMED BARS TO BS 4449:2005.
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 40 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE.
- FOR WINDOW SCHEDULES SEE DRG. NO. MWS/SD/29.
- FOR DOOR SCHEDULES SEE DRG. NO. MWS/SD/28.

REVISION	DESCRIPTION	DATE

CLIENT



NORTHERN WATER WORKS DEVELOPMENT AGENCY  
P.O. BOX 495 - 70100  
GARISSA.

PROJECT

**MARALAL WATER SUPPLY PROJECT**

REVIEWED BY



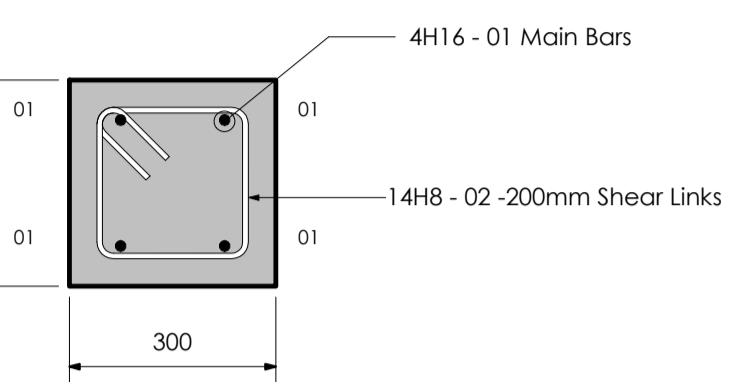
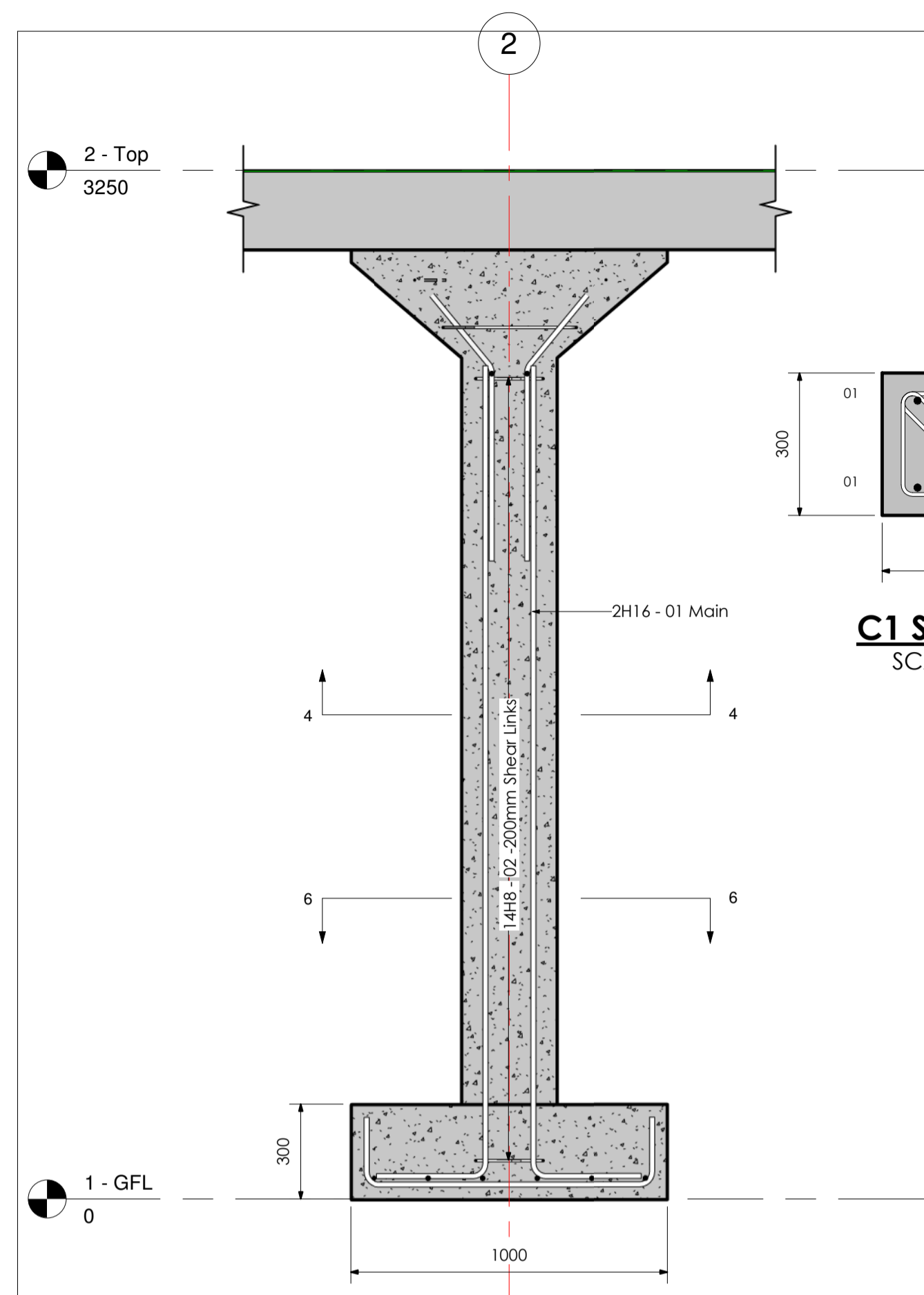
Interconsult Engineers Ltd  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane.  
Tel. 4441648/4441651  
NAIROBI.

DRAWING TITLE

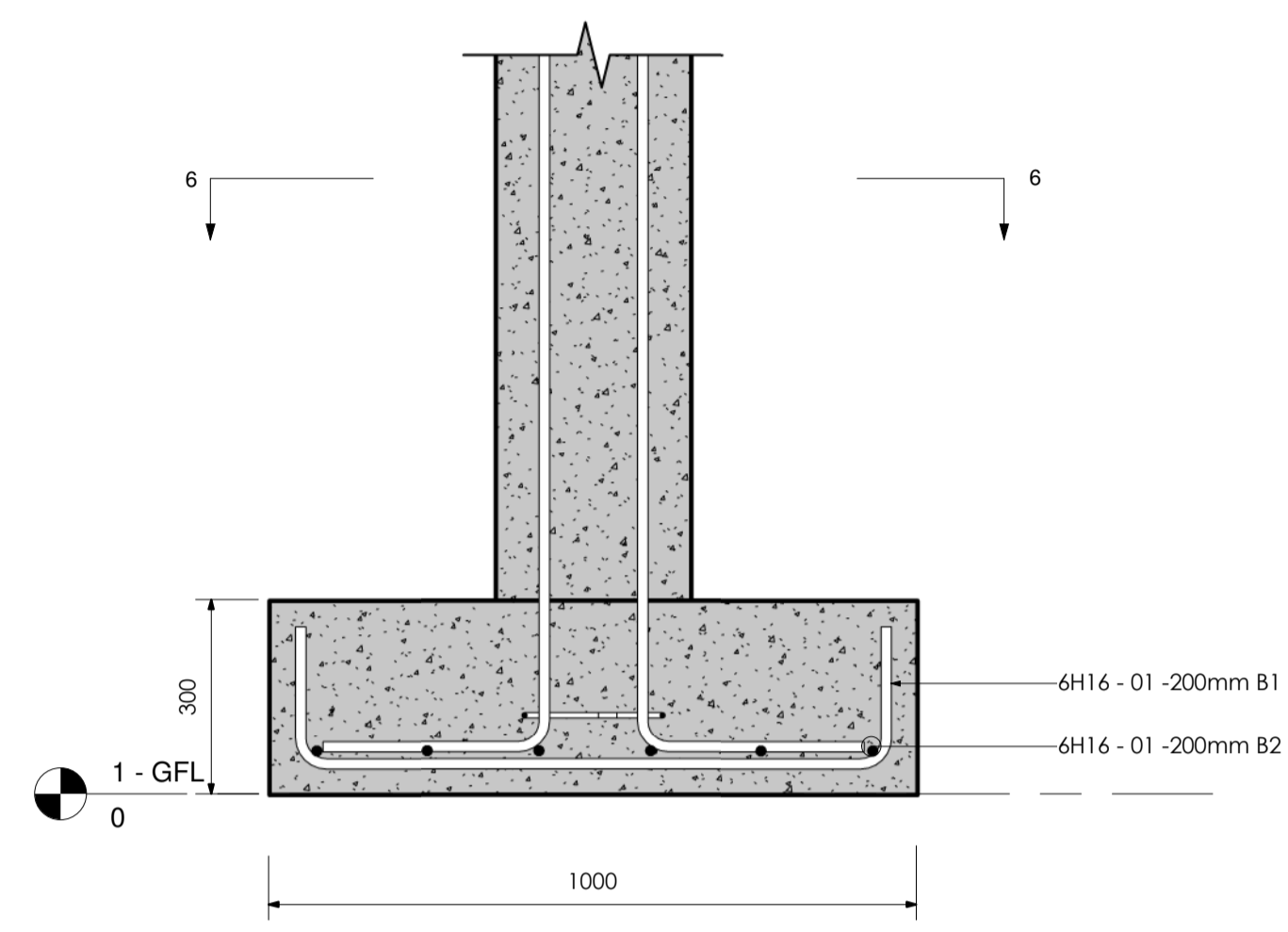
**TREATED WATER TANK STRUCTURAL DETAILING**

THICKENED MAIN WALL REINFORCEMENT DETAILS

Designed By:	N.M.	Drawn By:	G.G.
Checked By:	P.M.M.	Approved By:	K.M.
Scale:	AS SHOWN	Date:	FEBRUARY 2024
DRAWING No.	MWS/TW/TWT - STR/03	REV.	0

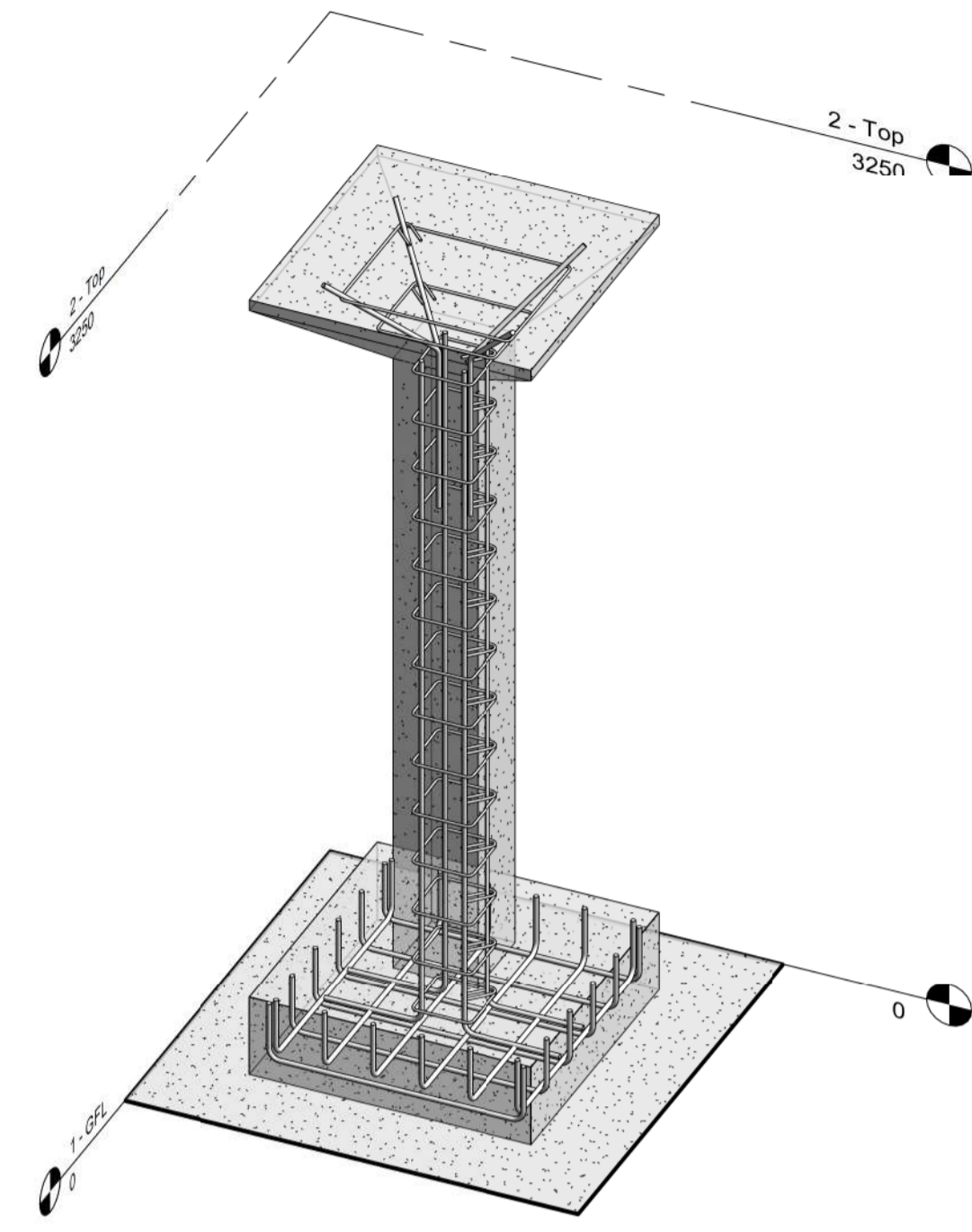


**C1 SECTION**  
SCALE 1:15



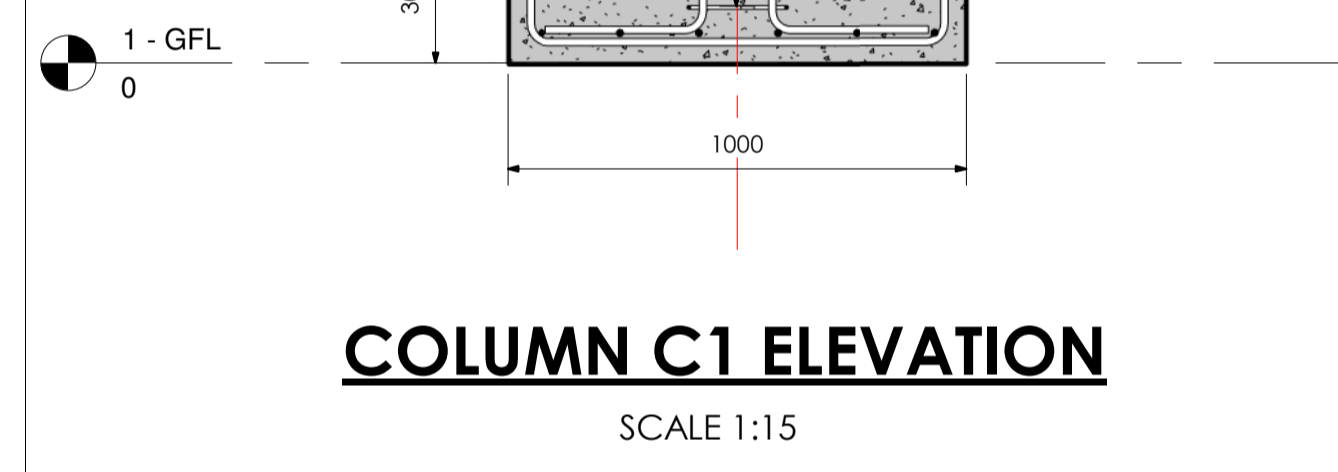
**BASE B1 ELEVATION DETAIL**

SCALE 1:15



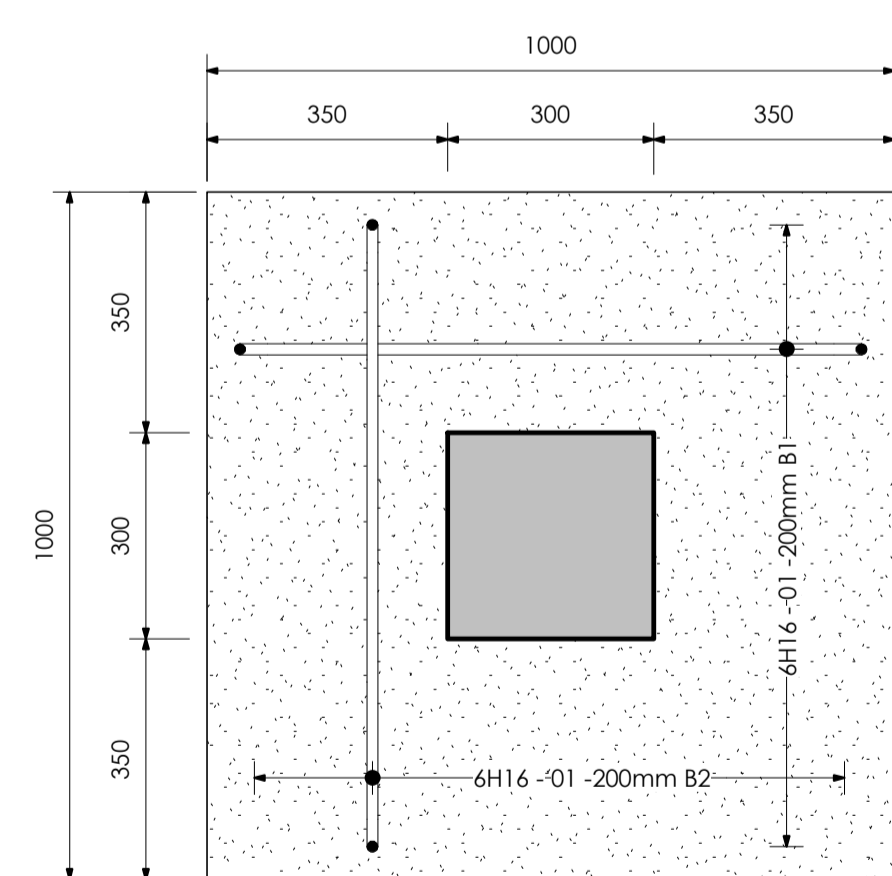
**3D MODEL OF RC COLUMN**

SCALE 1:20



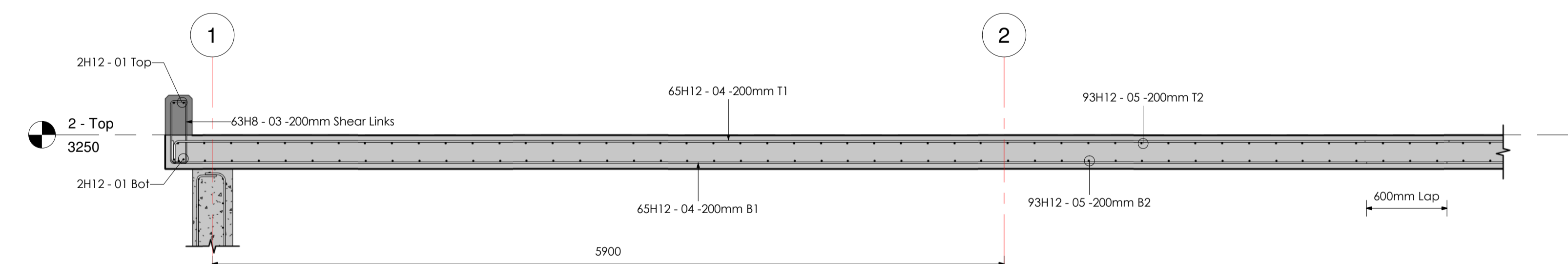
**COLUMN C1 ELEVATION**

SCALE 1:15



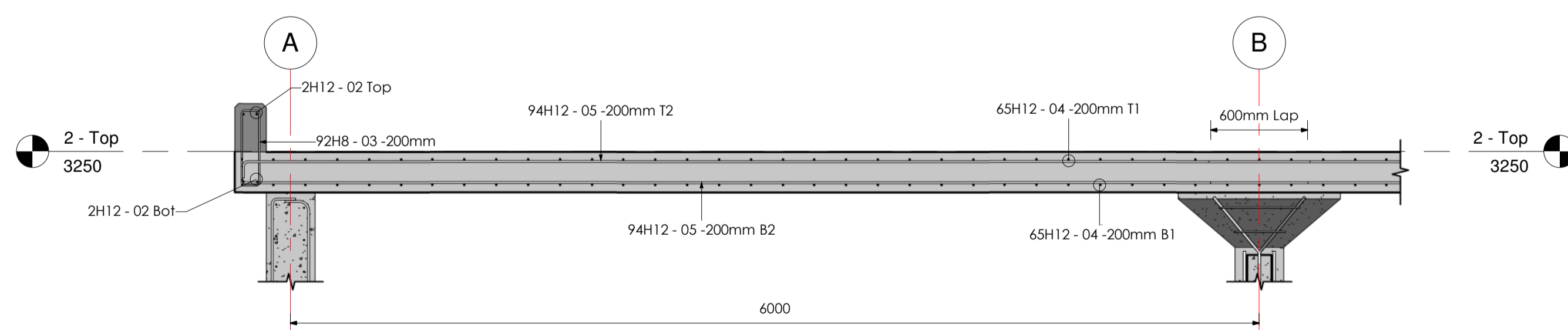
**BASE B1 PLAN DETAILS**

SCALE 1:15



**TOP SLAB SECTION 1 - 1 DETAILS**

SCALE 1:15



**TOP SLAB SECTION 2 - 2 DETAILS**


SCALE 1:15

**NOTES**

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED.
- ALL EXPOSED CONCRETE EDGES HAVE A 25mm x 25mm CHAMFER.
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT.
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING.
- ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED.
- ABBREVIATIONS:  
RC - REINFORCED CONCRETE.  
DPC - DAMP PROOF COURSE.  
EGL - EXISTING GROUND LEVEL.  
FGL - FINISHED GROUND LEVEL.  
FFL - FINISHED FLOOR LEVEL.  
PCC - PRECAST CONCRETE.  
GCI - GALVANIZED CORRUGATED IRON.  
H - HIGH YIELD DEFORMED BARS TO BS 4449:2005.
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 40 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE.
- FOR WINDOW SCHEDULES SEE DRG. NO. MWS/SD/29.
- FOR DOOR SCHEDULES SEE DRG. NO. MWS/SD/27 & 28.

REVISION	DESCRIPTION	DATE

CLIENT



NORTHERN WATER WORKS DEVELOPMENT AGENCY  
P.O. BOX 495 - 70100  
GARISSA.

PROJECT

**MARALAL WATER SUPPLY PROJECT**

REVIEWED BY



Interconsult Engineers Ltd  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane.  
Tel. 4441648/4441651  
NAIROBI.

DRAWING TITLE

**TREATED WATER TANK STRUCTURAL DETAILING**

TOP SLAB, COLUMNS, TOP BEAMS AND COLUMN BASE REINFORCEMENTS

Designed By:	N.M.	Drawn By:	G.G.
Checked By:	P.M.M.	Approved By:	K.M.
Scale:	AS SHOWN	Date:	FEBRUARY 2024
DRAWING No.	MWS/TW/TWT - STR/04	REV.	0

RC MAIN WALLS BBS														
STRUCTURAL ELEMENT	BAR SIZE	BAR MARK	BAR LENGTH	QUANTITY	TOTAL BAR LENGTH	SHAPE CODE	SHAPE IMAGE	A	B	C	D	E	REINFORCEMENT VOLUME	REBAR WEIGHT
MAIN WALL	H12	06	4600 mm	306	1407600 mm	21		150 mm	4140 mm	350 mm	0 mm	0 mm	159195.81 cm³	1312.17 kg
MAIN WALL	H12	07	1600 mm	122	195200 mm	12		150 mm	1465 mm	0 mm	0 mm	0 mm	22076.60 cm³	181.97 kg
MAIN WALL	H12	07	1600 mm	178	284800 mm	12		1465 mm	150 mm	0 mm	0 mm	0 mm	32210.12 cm³	265.49 kg
MAIN WALL	H12	08	3625 mm	174	630750 mm	34		2380 mm	300 mm	605 mm	220 mm	350 mm	71336.14 cm³	587.99 kg
MAIN WALL	H12	08	3625 mm	122	442250 mm	34		2420 mm	285 mm	600 mm	205 mm	350 mm	50017.30 cm³	412.27 kg
MAIN WALL	H12	09	1750 mm	124	217000 mm	24		575 mm	800 mm	375 mm	565 mm	565 mm	24542.12 cm³	202.29 kg
MAIN WALL	H10	10	1975 mm	170	335750 mm	24		610 mm	765 mm	600 mm	555 mm	525 mm	26369.74 cm³	217.35 kg
MAIN WALL	H10	11	6550 mm	88	576400 mm	11		6315 mm	250 mm	0 mm	0 mm	0 mm	45270.35 cm³	373.14 kg
MAIN WALL	H10	12	6375 mm	6	38250 mm	11		250 mm	6140 mm	0 mm	0 mm	0 mm	3004.15 cm³	24.76 kg
MAIN WALL	H10	12	6400 mm	60	384000 mm	11		250 mm	6150 mm	0 mm	0 mm	0 mm	30159.29 cm³	248.59 kg
MAIN WALL	H10	13	9350 mm	56	523600 mm	11		245 mm	9115 mm	0 mm	0 mm	0 mm	41123.45 cm³	338.96 kg
MAIN WALL	H10	13	9350 mm	2	18700 mm	11		250 mm	9105 mm	0 mm	0 mm	0 mm	1468.69 cm³	12.11 kg
MAIN WALL	H10	13	9350 mm	126	1178100 mm	11		250 mm	9115 mm	0 mm	0 mm	0 mm	92527.76 cm³	762.66 kg
TOTAL				1534	6232400 mm								599301.52 cm³	4939.74 kg

RAFT FOUNDATION BBS														
STRUCTURAL ELEMENT	BAR SIZE	BAR MARK	BAR LENGTH	QUANTITY	TOTAL BAR LENGTH	SHAPE CODE	SHAPE IMAGE	A	B	C	D	E	REINFORCEMENT VOLUME	REBAR WEIGHT
Raft	H12	01	10900 mm	192	2092800 mm	12		10810 mm	100 mm	0 mm	0 mm	0 mm	236690.10 cm³	1950.92 kg
Raft	H12	02	9550 mm	114	1088700 mm	24		250 mm	3425 mm	5880 mm	3415 mm	240 mm	123129.07 cm³	1014.89 kg
Raft	H12	03	7975 mm	248	1977800 mm	11		7905 mm	75 mm	0 mm	0 mm	0 mm	223683.91 cm³	1843.71 kg
Raft	H12	04	6650 mm	170	1130500 mm	24		250 mm	3525 mm	2880 mm	3515 mm	235 mm	127856.54 cm³	1053.86 kg
Raft	H12	05	2250 mm	332	747000 mm	26		670 mm	1530 mm	80 mm	1520 mm	0 mm	84483.71 cm³	696.36 kg
TOTAL				1056	7036800 mm								795843.33 cm³	6559.74 kg

BAFFLE WALLS BBS														
STRUCTURAL ELEMENT	BAR SIZE	BAR MARK	BAR LENGTH	QUANTITY	TOTAL BAR LENGTH	SHAPE CODE	SHAPE IMAGE	A	B	C	D	E	REINFORCEMENT VOLUME	REBAR WEIGHT
BAFFLE WALL	H8	01	2925 mm	29	169650 mm	11		250 mm	2685 mm	0 mm	0 mm	0 mm	8527.54 cm³	70.29 kg
BAFFLE WALL	H12	02	11975 mm	14	167650 mm	11		11600 mm	390 mm	0 mm	0 mm	0 mm	18960.77 cm³	156.28 kg
TOTAL					337300 mm								27488.31 cm³	226.57 kg

COLUMN BASE BBS														
STRUCTURAL ELEMENT	BAR SIZE	BAR MARK	BAR LENGTH	QUANTITY	TOTAL BAR LENGTH	SHAPE CODE	SHAPE IMAGE	A	B	C	STRUCTURAL ELEMENT	REBAR WEIGHT		
COLUMN BASE	H16	01	1300 mm	24	31200 mm	21		220 mm	920 mm	220 mm		51.71 kg		
TOTAL				24	31200 mm							51.71 kg		

FOUNDATION SLAB CONCRETE SCHEDULE		
STRUCTURAL ELEMENT	ELEMENT SIZE	CONCRETE VOLUME
RC FOUNDATION SLAB	200mm Thick	64.57 m³
TOTAL		64.57 m³

PAD FOOTING CONCRETE SCHEDULE			
STRUCTURAL ELEMENT	ELEMENT SIZE	NO. OF ELEMENTS	CONCRETE VOLUME
RC PAD FOOTING	[1000mm x 1000mm x 300mm]	2	0.60 m³
TOTAL			0.60 m³

RC SHEAR KEY CONCRETE SCHEDULE			
STRUCTURAL ELEMENT	ELEMENT SIZE	LENGTH IN MM	CONCRETE VOLUME
RC SHEAR KEY	[1000mm x 500mm]	23600	11.80 m³
RC SHEAR KEY	[1000mm x 500mm]	35200	17.60 m³
TOTAL		58800	29.40 m³

RC TOP SLAB CONCRETE SCHEDULE		
STRUCTURAL ELEMENT	ELEMENT SIZE	CONCRETE VOLUME
RC TOP SLAB	250mm Thick	58.74 m³
TOTAL		58.74 m³

STRUCTURAL COLUMN CONCRETE SCHEDULE			
STRUCTURAL ELEMENT	ELEMENT SIZE	LENGTH IN MM	CONCRETE VOLUME
RC COLUMN	[300mm x 300mm]	2360	0.39 m³
TOTAL			0.39 m³

TAPERED WALL CONCRETE SCHEDULE			
STRUCTURAL ELEMENT	ELEMENT SIZE	LENGTH IN MM	CONCRETE VOLUME
RC TANK WALL	TAPERED AND THICKENED	24000	38.27 m³
RC TANK WALL	TAPERED AND THICKENED	35600	57.57 m³
TOTAL		59600	95.84 m³


UPSTAND RC BEAM CONCRETE SCHEDULE			
STRUCTURAL ELEMENT	ELEMENT SIZE	LENGTH IN MM	CONCRETE VOLUME
UPSTAND BEAM	[550mm x 200mm]	25000	1.48 m³
UPSTAND BEAM	[550mm x 200mm]	36600	2.17 m³
TOTAL		61600	3.66 m³

## NOTES

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED.
- ALL EXPOSED CONCRETE EDGES HAVE A 25mm x 25mm CHAMFER.
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT.
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING.
- ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED.
- ABBREVIATIONS:
  - RC – REINFORCED CONCRETE.
  - DPC – DAMP PROOF COURSE.
  - EGL – EXISTING GROUND LEVEL.
  - FGL – FINISHED GROUND LEVEL.
  - FFL – FINISHED FLOOR LEVEL.
  - PCC – PRECAST CONCRETE.
  - GCI – GALVANIZED CORRUGATED IRON.
  - H – HIGH YIELD DEFORMED BARS TO BS 4449:2005.
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 x 40 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE.
- FOR WINDOW SCHEDULES SEE DRG. NO. MWS/SD/29.
- FOR DOOR SCHEDULES SEE DRG. NO. MWS/SD/28.

REVISION	DESCRIPTION	DATE

CLIENT



NORTHERN WATER WORKS DEVELOPMENT AGENCY  
P.O. BOX 495 - 70100  
GARISSA.

PROJECT

**MARALAL WATER SUPPLY PROJECT**

REVIEWED BY



Interconsult Engineers Ltd  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane.  
Tel. 4441648/4441651  
NAIROBI.

DRAWING TITLE

**TREATED WATER TANK STRUCTURAL DETAILING**

MATERIALS TAKE-OFFS AND BAR BENDING SCHEDULES [PART 1 OF 2]

Designed By:	N.M.	Drawn By:	G.G.
Checked By:	P.M.M.	Approved By:	K.M.
Scale:	AS SHOWN	Date:	FEBRUARY 2024
DRAWING No.	MWS/TW/TWT - STR/05	REV	0

COLUMNS BBS														
STRUCTURAL ELEMENT	BAR SIZE	BAR MARK	BAR LENGTH	QUANTITY	TOTAL BAR LENGTH	SHAPE CODE	SHAPE IMAGE	A	B	C	D	E	REINFORCEMENT VOLUME	REBAR WEIGHT
RC COLUMN	H16	01	2900 mm	8	23200 mm	11		2565 mm	350 mm	0 mm	0 mm	0 mm	4664.64 cm³	38.45 kg
RC COLUMN	H8	02	1075 mm	28	30100 mm	51		220 mm	220 mm	110 mm	110 mm	0 mm	1512.99 cm³	12.47 kg
RC COLUMN	H16	03	1150 mm	8	9200 mm	27		525 mm	610 mm	0 mm	400 mm	340 mm	1849.77 cm³	15.25 kg
RC COLUMN	H8	04	1675 mm	2	3350 mm	51		315 mm	425 mm	110 mm	110 mm	0 mm	168.39 cm³	1.39 kg
RC COLUMN	H8	05	2425 mm	2	4850 mm	51		500 mm	610 mm	110 mm	110 mm	0 mm	243.79 cm³	2.01 kg
TOTAL				48	70700 mm								8439.57 cm³	69.56 kg

UPSTAND BEAMS BBS														
STRUCTURAL ELEMENT	BAR SIZE	BAR MARK	BAR LENGTH	QUANTITY	TOTAL BAR LENGTH	SHAPE CODE	SHAPE IMAGE	A	B	C	D	E	REINFORCEMENT VOLUME	REBAR WEIGHT
UPSTAND BEAMS	H12	01	6750 mm	16	108000 mm	11		150 mm	6615 mm	0 mm	0 mm	0 mm	12214.51 cm³	100.68 kg
UPSTAND BEAMS	H12	02	9675 mm	16	154800 mm	11		9495 mm	200 mm	0 mm	0 mm	0 mm	17507.47 cm³	144.31 kg
UPSTAND BEAMS	H8	03	1350 mm	310	418500 mm	51		470 mm	120 mm	115 mm	115 mm	0 mm	21036.10 cm³	173.39 kg
TOTAL				342	681300 mm								50758.08 cm³	418.37 kg

RC TOP SLAB BBS												
STRUCTURAL ELEMENT	BAR SIZE	BAR MARK	BAR LENGTH	QUANTITY	TOTAL BAR LENGTH	SHAPE CODE	SHAPE IMAGE	A	B	REINFORCEMENT VOLUME	REBAR WEIGHT	
RC TOP SLAB	H12	04	9675 mm	260	2515500 mm	11		170 mm	9505 mm	284496.35 cm³	2344.96 kg	
RC TOP SLAB	H12	05	6700 mm	374	2505800 mm	11		6605 mm	105 mm	283399.30 cm³	2335.92 kg	
TOTAL				634	5021300 mm					567895.65 cm³	4680.88 kg	

CONCRETE VOLUME SUMMARY	
STRUCTURAL ELEMENT	CONCRETE VOLUME
RC BAFFLE WALL	4.41 m³
RC COLUMN	0.78 m³
RC FOUNDATION SLAB	64.57 m³
RC PAD FOOTING	0.60 m³
RC SHEAR KEY	29.40 m³
RC TANK WALL	95.84 m³
RC TOP SLAB	58.74 m³
TOTAL	254.34 m³

BBS SUMMARY		
BAR DIAMETER	Reinforcement Volume	REBAR WEIGHT
H8	31488.81 cm³	259.55 kg
H10	239923.43 cm³	1977.57 kg
H12	1771799.82 cm³	14604.06 kg
H16	12787.54 cm³	105.40 kg
TOTAL	2055999.60 cm³	16946.58 kg

## NOTES

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED.
- ALL EXPOSED CONCRETE EDGES HAVE A 25mm x 25mm CHAMFER.
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT.
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING.
- ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED.
- ABBREVIATIONS:
  - RC - REINFORCED CONCRETE.
  - DPC - DAMP PROOF COURSE.
  - EGL - EXISTING GROUND LEVEL.
  - FGL - FINISHED GROUND LEVEL.
  - FFL - FINISHED FLOOR LEVEL.
  - PCC - PRECAST CONCRETE.
  - GCI - GALVANIZED CORRUGATED IRON.
  - H - HIGH YIELD DEFORMED BARS TO BS 4449:2005.
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE.
- FOR WINDOW SCHEDULES SEE DRG. NO. MWS/SD/29.
- FOR DOOR SCHEDULES SEE DRG. NO. MWS/SD/28.

REVISION	DESCRIPTION	DATE

CLIENT



NORTHERN WATER WORKS DEVELOPMENT AGENCY  
P.O. BOX 495 - 70100  
GARISSA.

PROJECT

**MARALAL WATER SUPPLY PROJECT**

REVIEWED BY



Interconsult Engineers Ltd  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane.  
Tel. 4441648/4441651  
NAIROBI.

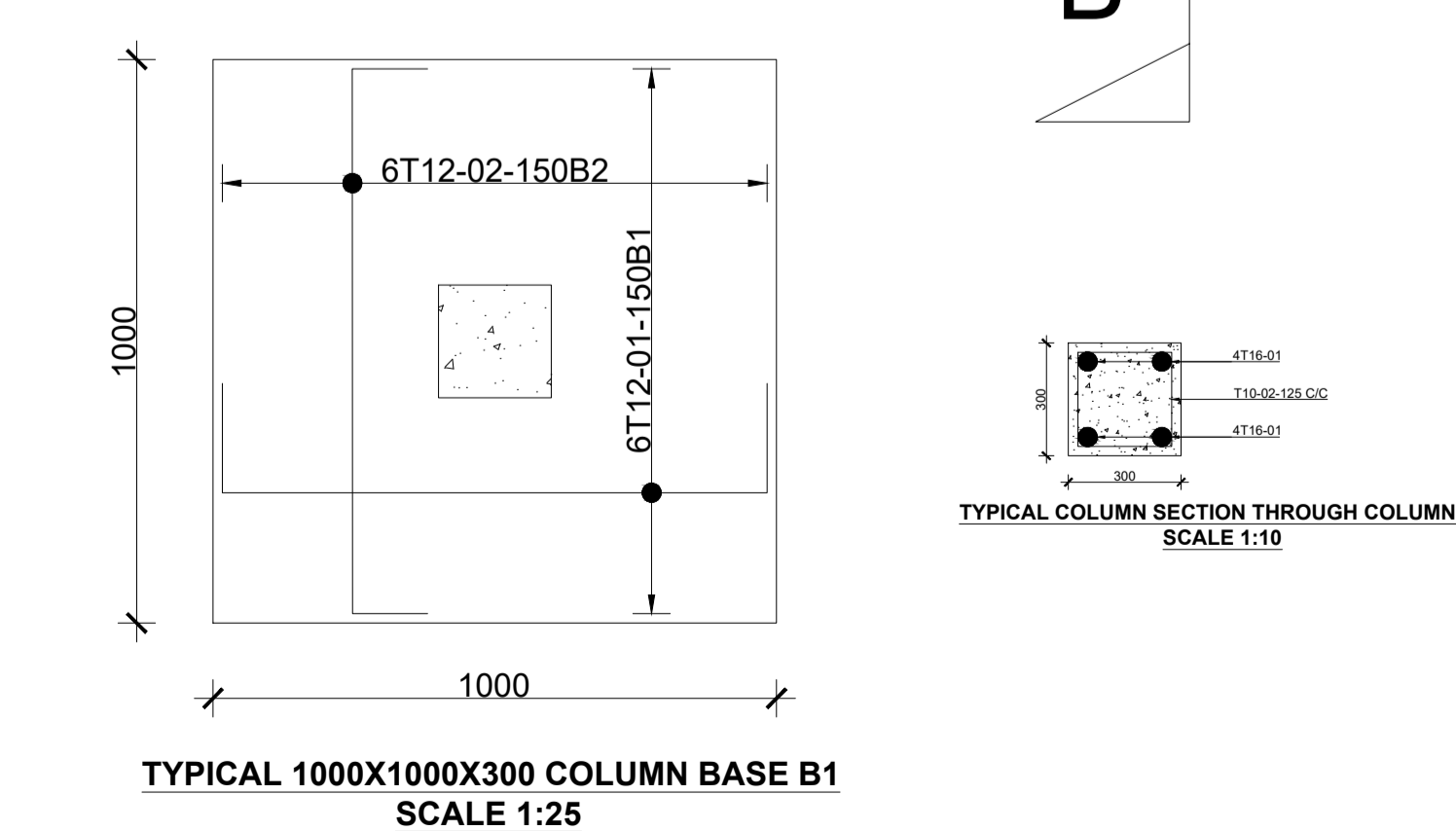
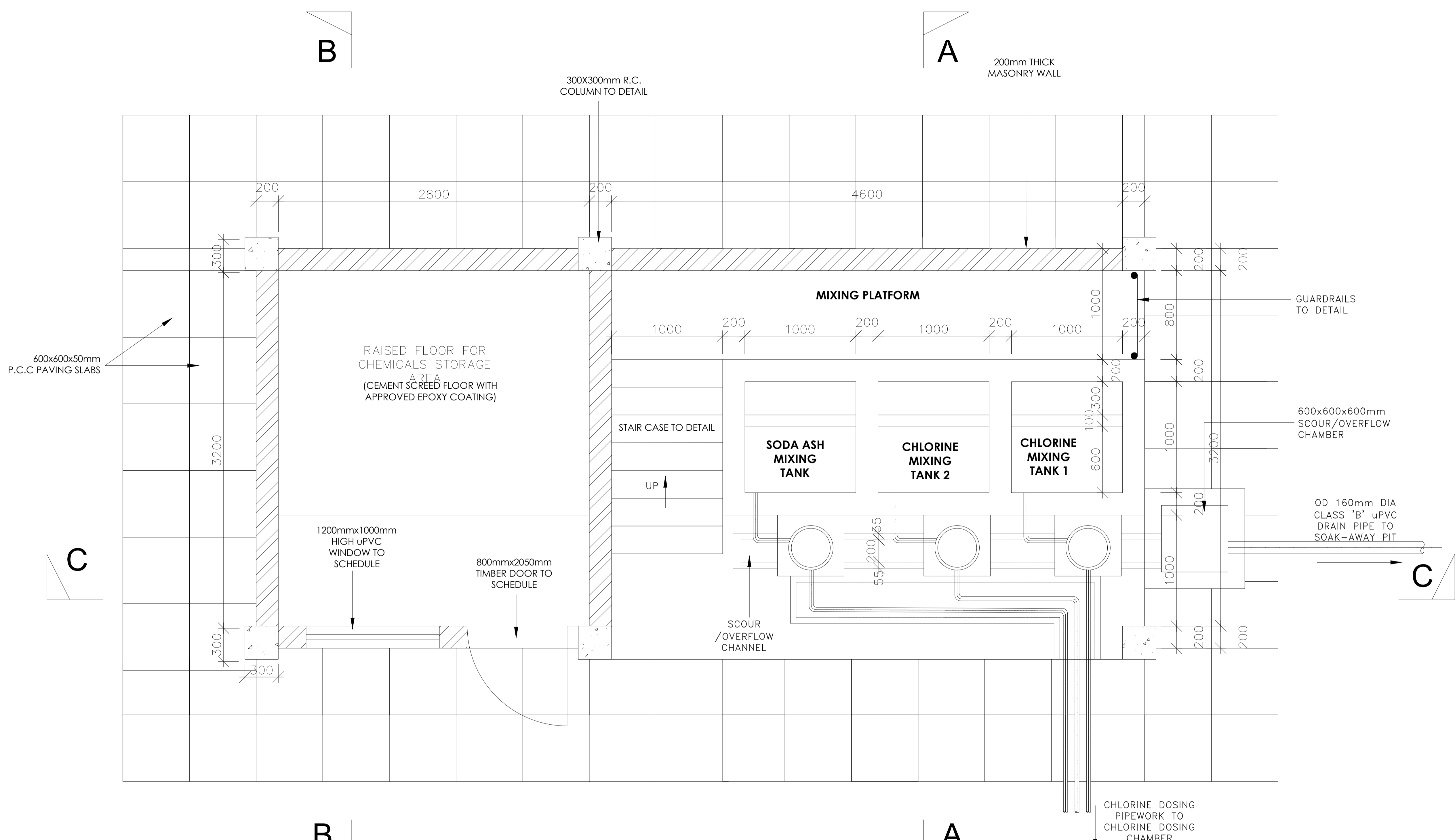
DRAWING TITLE

**TREATED WATER TANK STRUCTURAL DETAILING**

MATERIALS TAKE-OFFS AND BAR BENDING SCHEDULES [PART 2 OF 2]

Designed By:	N.M.	Drawn By:	G.G.
Checked By:	P.M.M.	Approved By:	K.M.
Scale:	AS SHOWN	Date:	FEBRUARY 2024
DRAWING No.	MWS/TW/TWT - STR/06	REV.	0

# **CHLORINE STORAGE, MIXING AND DOSING BUILDING**



**PLAN**

- NOTES:**
- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
  - ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
  - ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
  - ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
  - CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
  - ABBREVIATIONS
    - R.C - REINFORCED CONCRETE
    - D.P.C - DAMP PROOF COURSE
    - E.G.L - EXISTING GROUND LEVEL
    - F.G.L - FINISHED GROUND LEVEL
    - F.F.L - FINISHED FLOOR LEVEL
    - P.C.C - PRECAST CONCRETE
    - G.C.I - GALVANIZED CORRUGATED IRON
  - EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE
  - FOR WINDOW SCHEDULE, SEE DRG. NO. MWS/SD/29
  - FOR DOOR SCHEDULE, SEE DRG. NO. MWS/SD/27-28

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

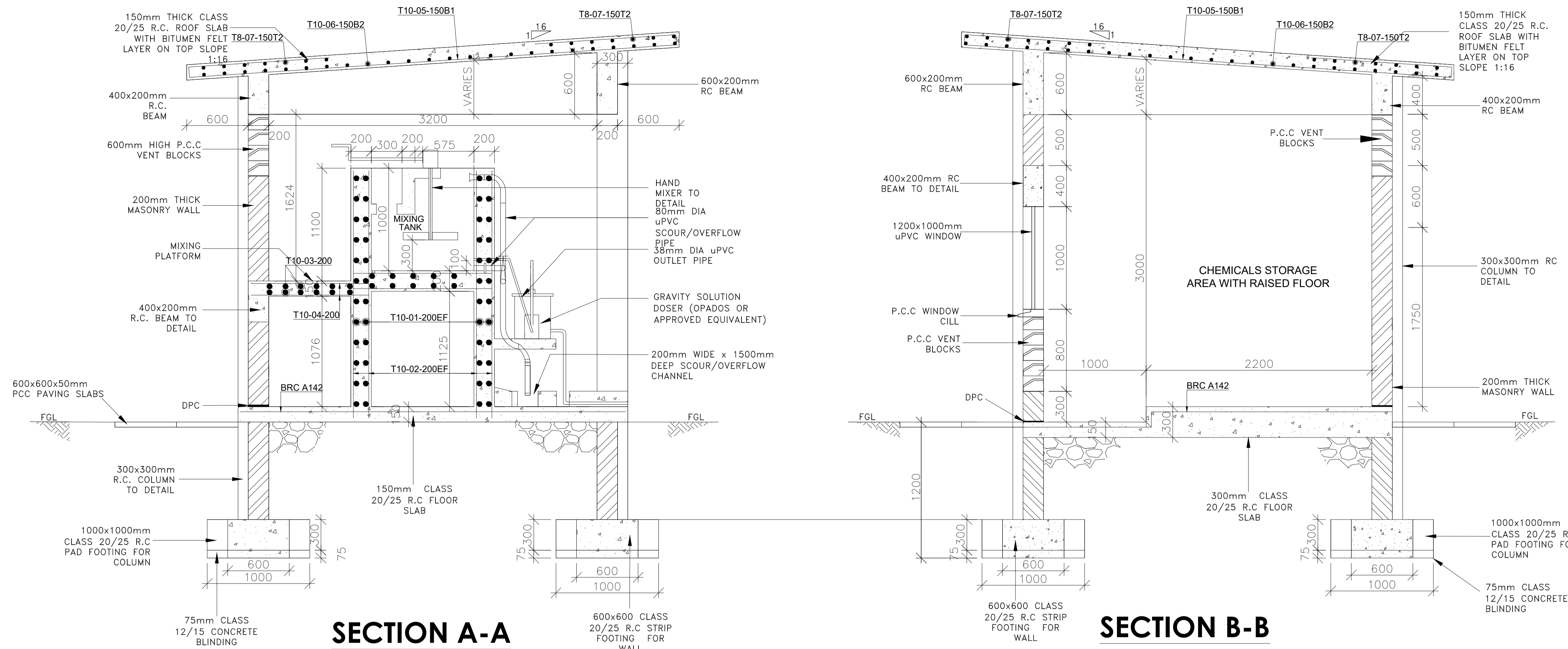
REVIEWED BY:

**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane.  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:

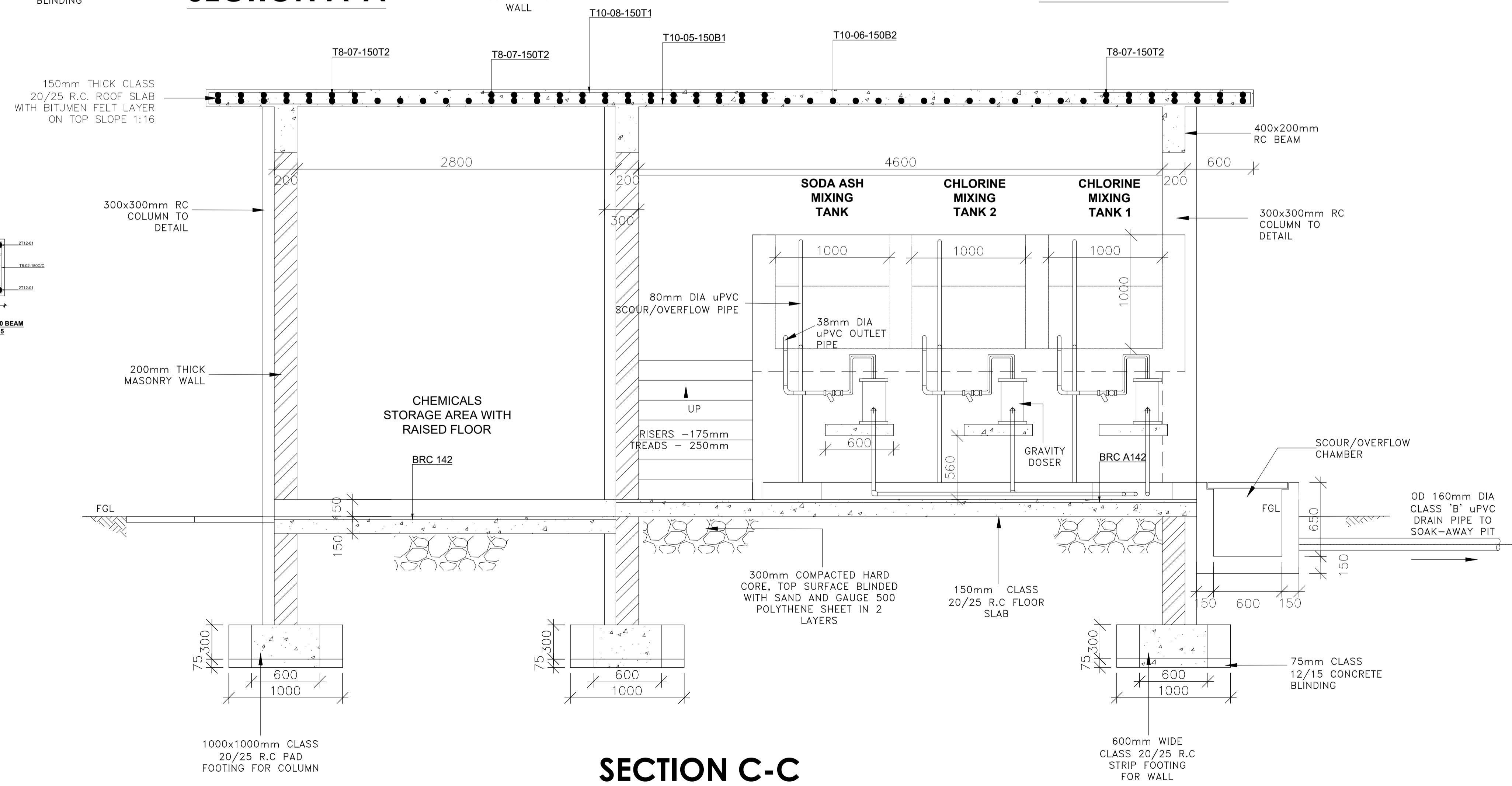
**MARALAL WATER SUPPLY PROJECT**  
**CHLORINE STORAGE, MIXING AND DOSING BUILDING PLAN**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
1:50	Date: FEBRUARY 2024
DRAWING No. <b>MWS/TW/CB/01</b>	REV. 0



**SECTION A-A**


**SECTION B-B**



**SECTION C-C**

- NOTES:**
- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
  - ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
  - ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
  - ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
  - CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
  - ABBREVIATIONS  
 R.C. - REINFORCED CONCRETE  
 D.P.C. - DAMP PROOF COURSE  
 E.G.L. - EXISTING GROUND LEVEL  
 F.G.L. - FINISHED GROUND LEVEL  
 F.F.L. - FINISHED FLOOR LEVEL  
 P.C.C. - PRECAST CONCRETE  
 G.C.I. - GALVANIZED CORRUGATED IRON
  - EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE
  - FOR WINDOW SCHEDULE, SEE DRG. NO. MWS/SD/29
  - FOR DOOR SCHEDULE SEE, DRG. NO. MWS/SD/27-28

REVISION	DESCRIPTION	DATE

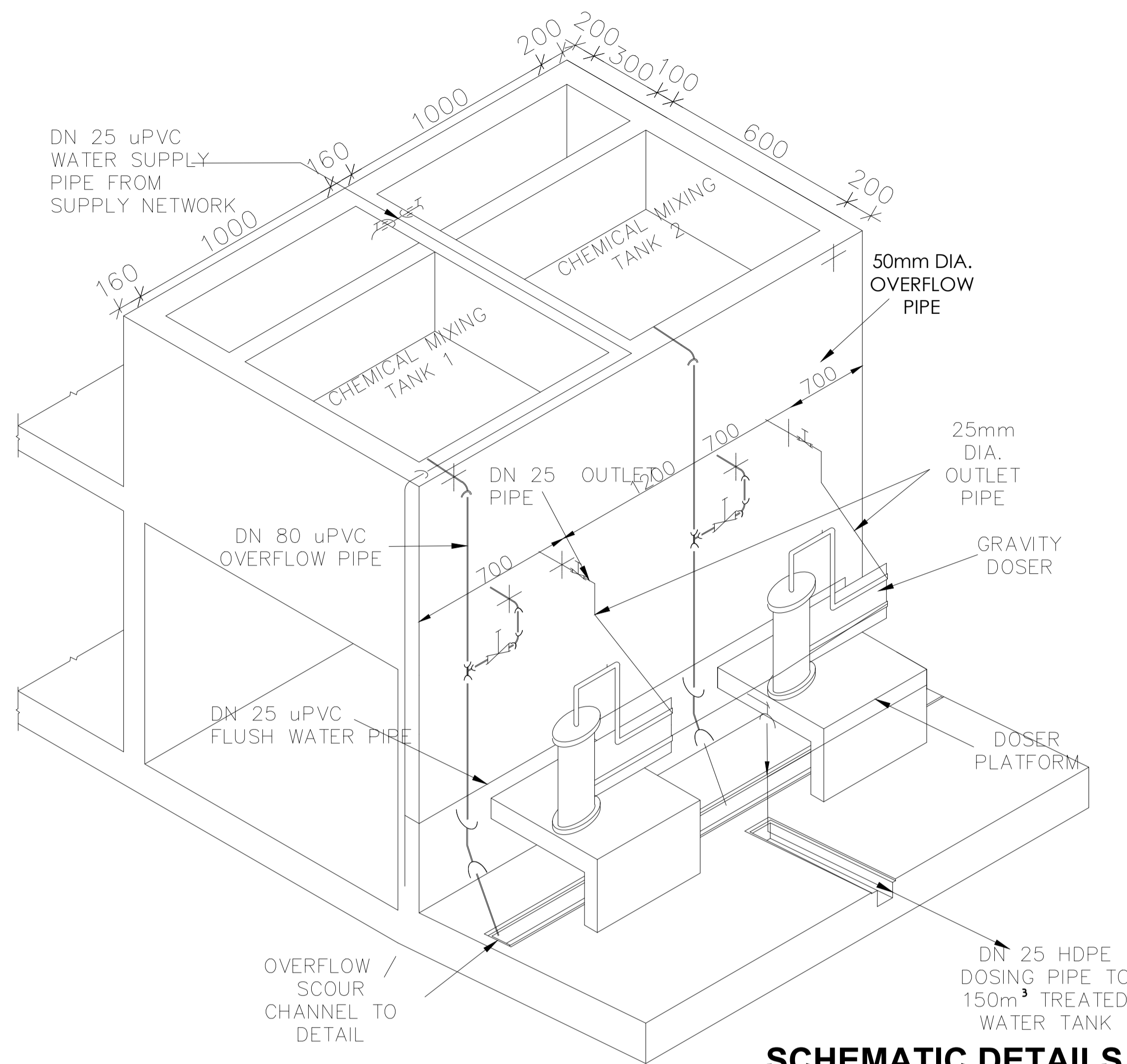
CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:  

**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

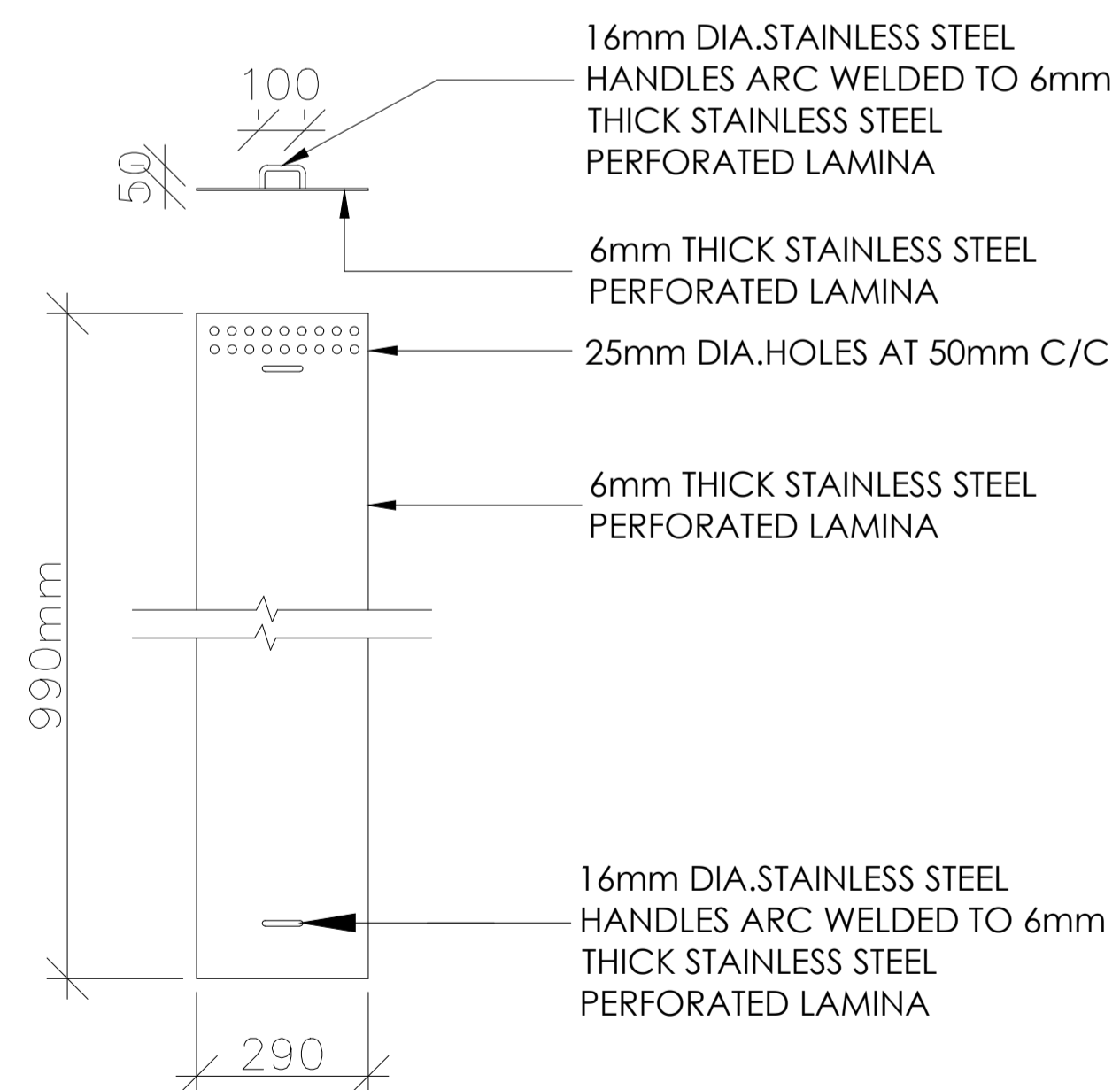
DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT**  
**CHLORINE STORAGE, MIXING AND DOSING BUILDING SECTIONS**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: 1:50	Date: FEBRUARY 2024
DRAWING No. <b>MWS/TW/CB/02</b>	REV. 0



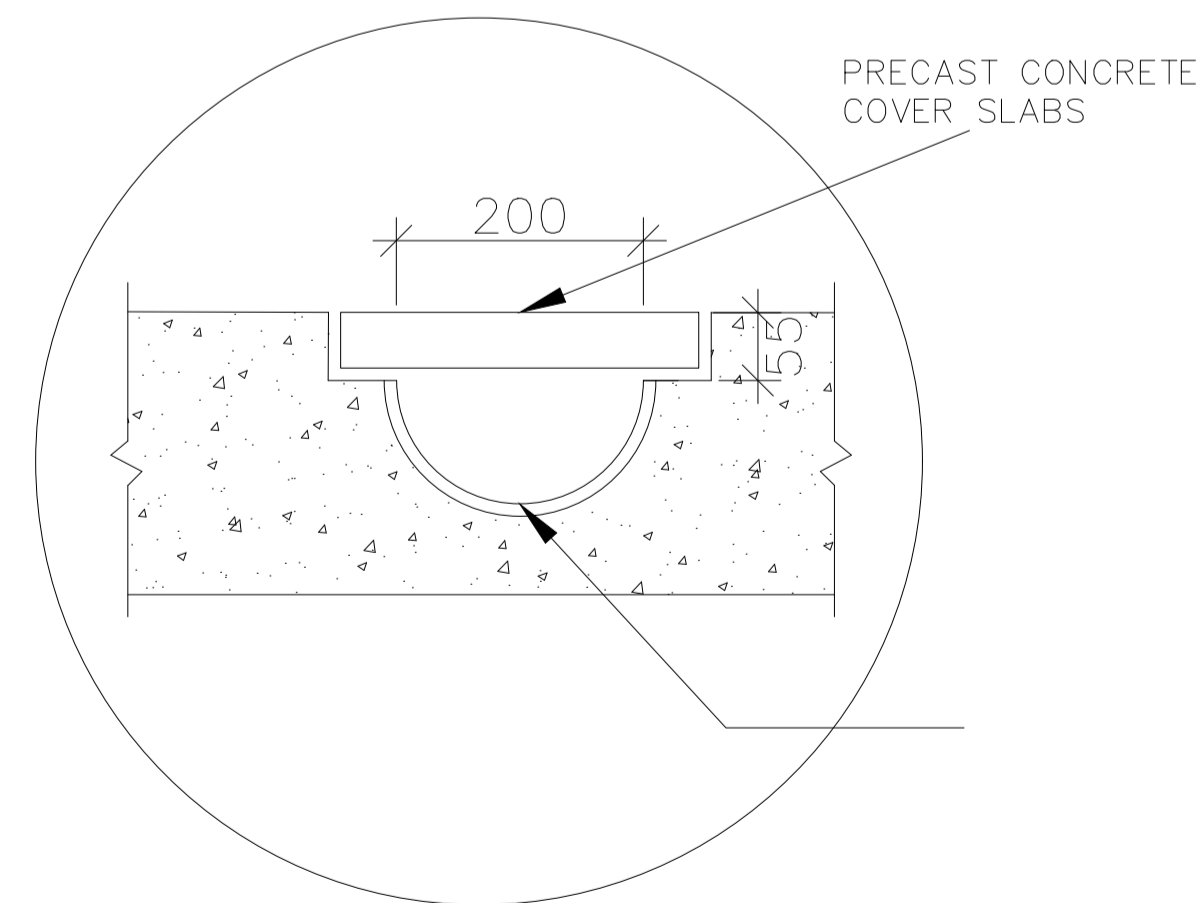
**SCHEMATIC DETAILS OF CHEMICAL DOSING PIPES AND CLEAR WATER SUPPLY TO MIXING TANKS**

NOT TO SCALE



**SECTION AND PLAN OF CHEMICAL MIXING TRAY**

NOT TO SCALE



**OVERFLOW / SCOUR CHANNEL DETAIL**

NOT TO SCALE

**NOTES:**

I. CHLORINE DOSING PIPES ARE HDPE

**LEGEND FOR ISOMETRIC DETAILS OF CLEAR WATER SUPPLY TO CHEMICAL MIXING TANKS**

- uPVC PIPE
- ⌋ uPVC SOCKETED TEE
- ⌋ uPVC SOCKETED BEND
- = SOCKET OR COUPLER
- ⌋ uPVC TAP

**LEGEND FOR ISOMETRIC DETAILS OF CHEMICAL DOSING PIPEWORK**

- uPVC PIPE
- ⌋ uPVC SOCKETED STOP VALVE
- ⌋ uPVC SOCKETED TEE
- ⌋ uPVC SOCKETED BEND WITH RODING EYE

**LEGEND FOR ISOMETRIC DETAILS OF OVERFLOW PIPEWORK**

- uPVC PIPE
- ⌋ uPVC SOCKETED BEND (90°)

**LEGEND FOR ISOMETRIC DETAILS OF SCOUR PIPEWORK**


- uPVC PIPE
- ⌋ uPVC SOCKETED STOP VALVE
- ⌋ uPVC SOCKETED BEND
- ⌋ uPVC SIGOT BEND WITH ONE END THREADED

**NOTES:**

1. DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
2. ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
3. ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
4. ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
5. CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
6. ABBREVIATIONS
  - R.C - REINFORCED CONCRETE
  - D.P.C - DAMP PROOF COURSE
  - E.G.L - EXISTING GROUND LEVEL
  - F.G.L - FINISHED GROUND LEVEL
  - F.F.L - FINISHED FLOOR LEVEL
  - P.C.C - PRECAST CONCRETE
  - G.C.I - GALVANIZED CORRUGATED IRON
7. EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE
8. FOR WINDOW SCHEDULE, SEE DRG. NO. MWS/SD/29
9. FOR DOOR SCHEDULE SEE, DRG. NO. MWS/SD/27-28

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:



**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
P.O. BOX 495-70100  
GARISSA

REVIEWED BY:



**Interconsult Engineers Ltd**  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane,  
Tel. 4441648/4441651  
Nairobi.

DRAWING TITLE:

**MARALAL WATER SUPPLY PROJECT**  
**CHLORINE STORAGE, MIXING AND DOSING BUILDING**  
**MISCELLANEOUS DETAILS**

Designed by:	N.M	Drawn by:	I.M.W
Checked by:	P.M.M	Approved by:	K.M
Scale:	1:50	Date:	FEBRUARY 2024
DRAWING No.	<b>MWS/TW/CB/03</b>	REV.	0

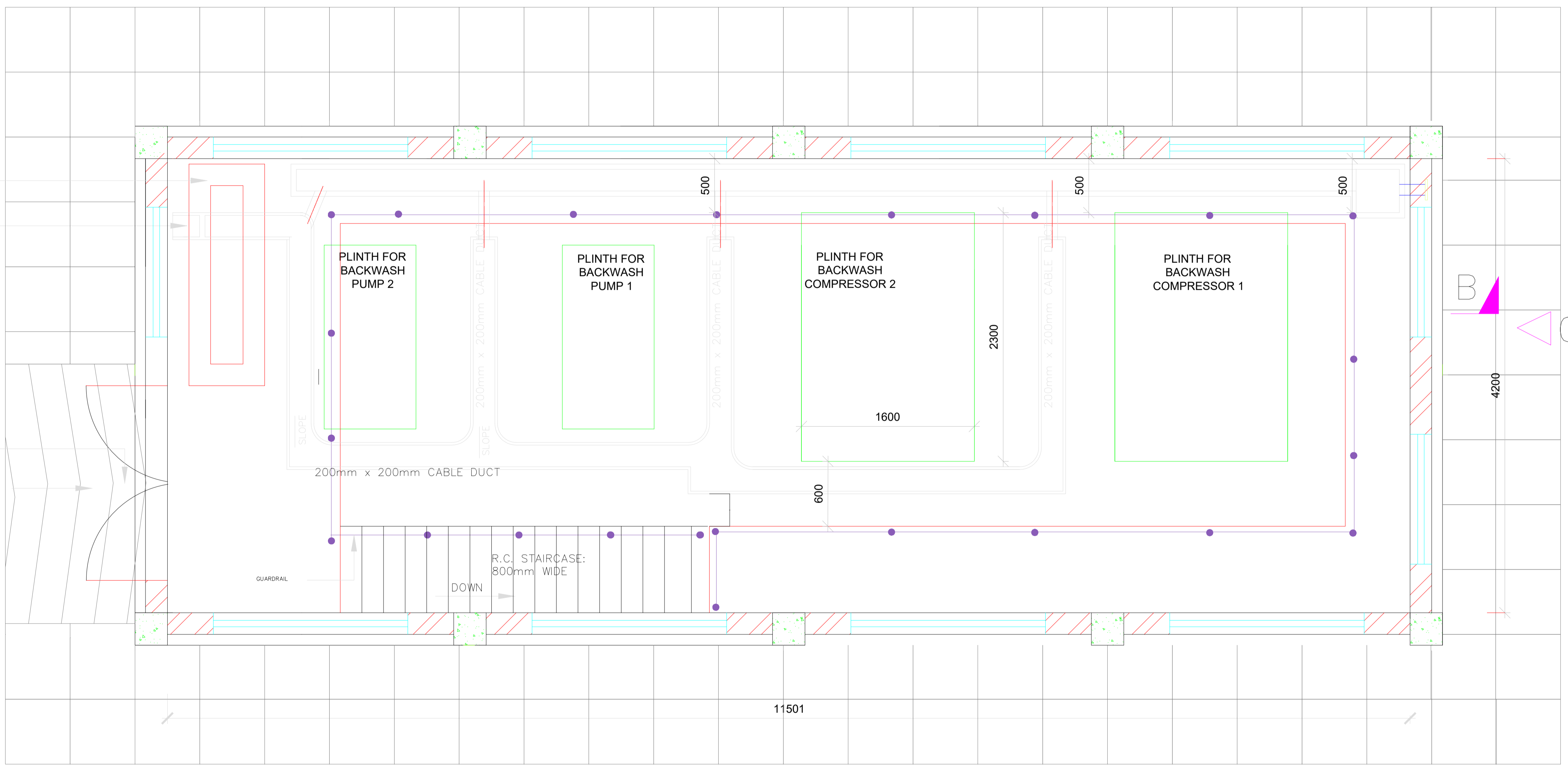


# **BACKWASH PUMP HOUSE**

03

300mm HIGH UPSTAND FOR CONTROL PANEL  
 CABLE TRAY ON WALL  
 01

UB 356x174x45 Kg/m GANTRY WITH 1000Kg CAPACITY CHAIN BLOCK




02

- NOTES:**
- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
  - ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
  - P.C.C WINDOW CILLS TO HAVE DRIPS
  - CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
  - ABBREVIATIONS
    - R.C – REINFORCED CONCRETE
    - D.P.C – DAMP PROOF COURSE
    - E.G.L – EXISTING GROUND LEVEL
    - F.G.L – FINISHED GROUND LEVEL
    - F.F.L – FINISHED FLOOR LEVEL
    - P.C.C – PRECAST CONCRETE
    - G.C.I – GALVANIZED CORRUGATED IRON
  - EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE
  - FOR WINDOW SCHEDULE SEE DRG. NO. MWS/SD/29
  - FOR DOOR SCHEDULE SEE DRG. NO. MWS/SD/27 & 28
  - ALL VENT BLOCKS UNDER WINDOWS TO BE PROVIDED WITH PVC GAUZE IN TIMBER FRAMING

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:

 **NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:

 **Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:

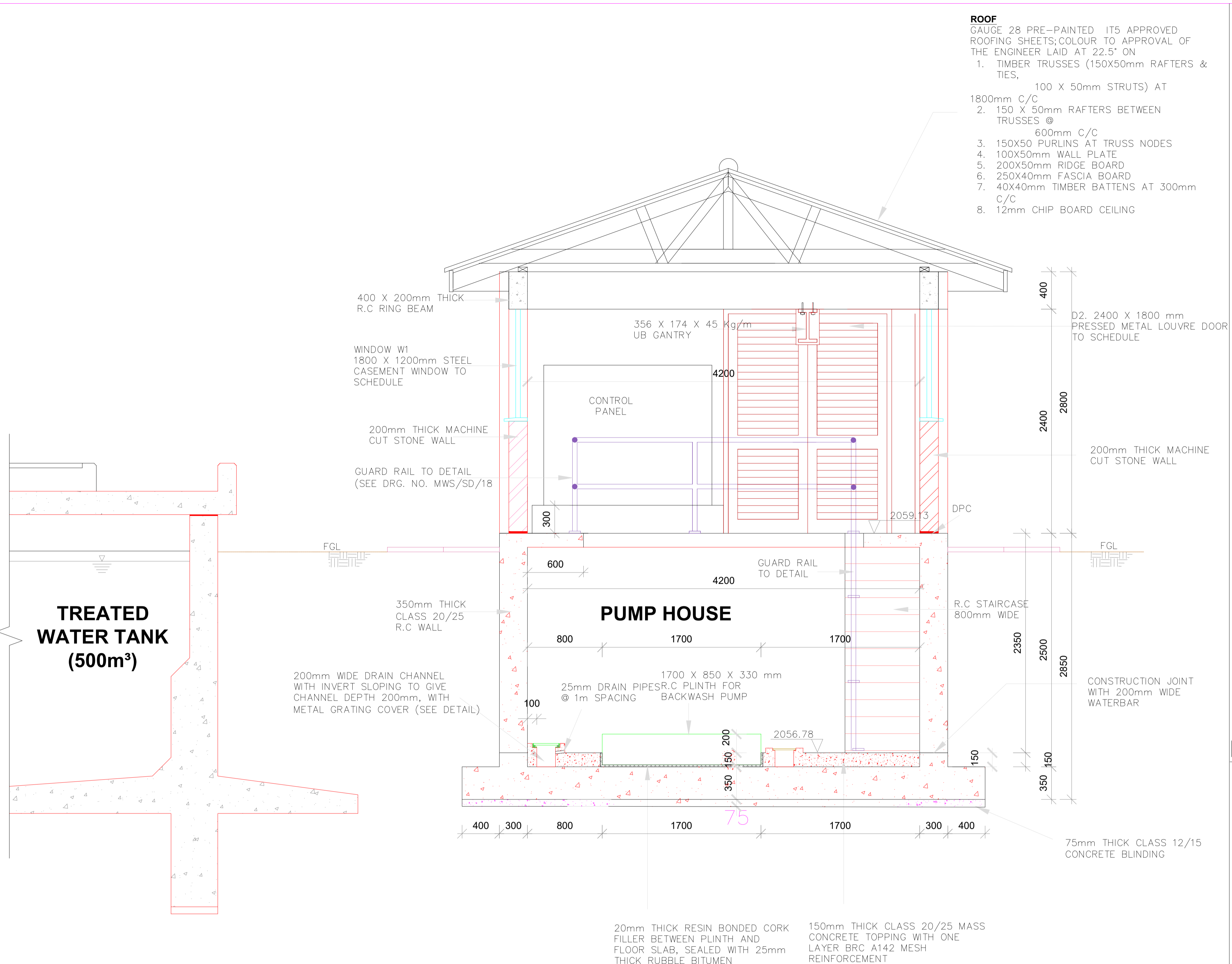
**MARALAL WATER SUPPLY PROJECT**

**BACKWASH PUMP HOUSE**  
**GENERAL LAYOUT**

**PUMP AND COMPRESSOR HOUSE**  
**GENERAL LAYOUT**

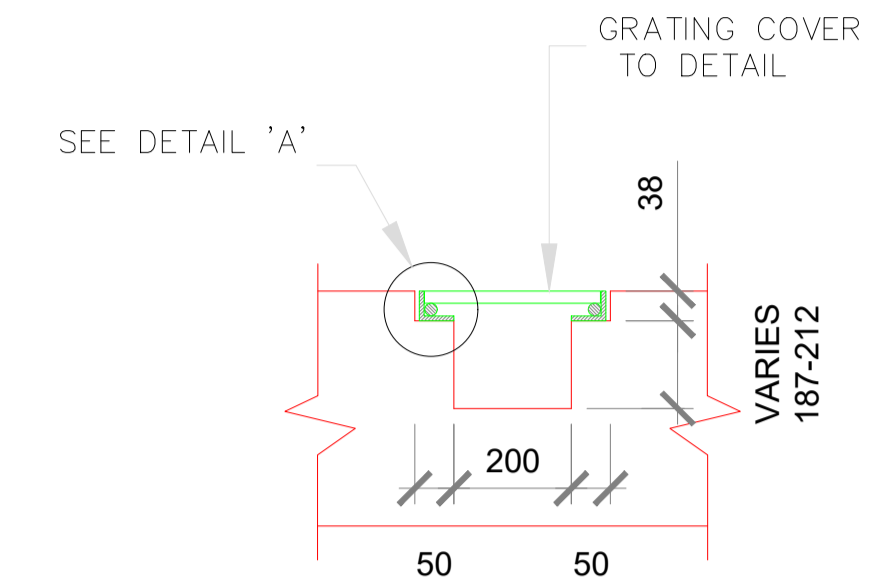
Designed by:	N.M	Drawn by:	I.M.W
Checked by:	P.M.M	Approved by:	K.M
Scale:	1:50	Date:	FEBRUARY 2024
DRAWING No.	<b>MWS/TW/BWPH/01</b>	REV.	0

- ROOF**  
GAUGE 28 PRE-PAINTED IT5 APPROVED ROOFING SHEETS; COLOUR TO APPROVAL OF THE ENGINEER LAID AT 22.5' ON
- TIMBER TRUSSES (150X50mm RAFTERS & TIES, 100 X 50mm STRUTS) AT 1800mm C/C
  - 150 X 50mm RAFTERS BETWEEN TRUSSES @ 600mm C/C
  - 150X50 PURLINS AT TRUSS NODES
  - 100X50mm WALL PLATE
  - 200X50mm RIDGE BOARD
  - 250X40mm FASCIA BOARD
  - 40X40mm TIMBER BATTENS AT 300mm C/C
  - 12mm CHIP BOARD CEILING

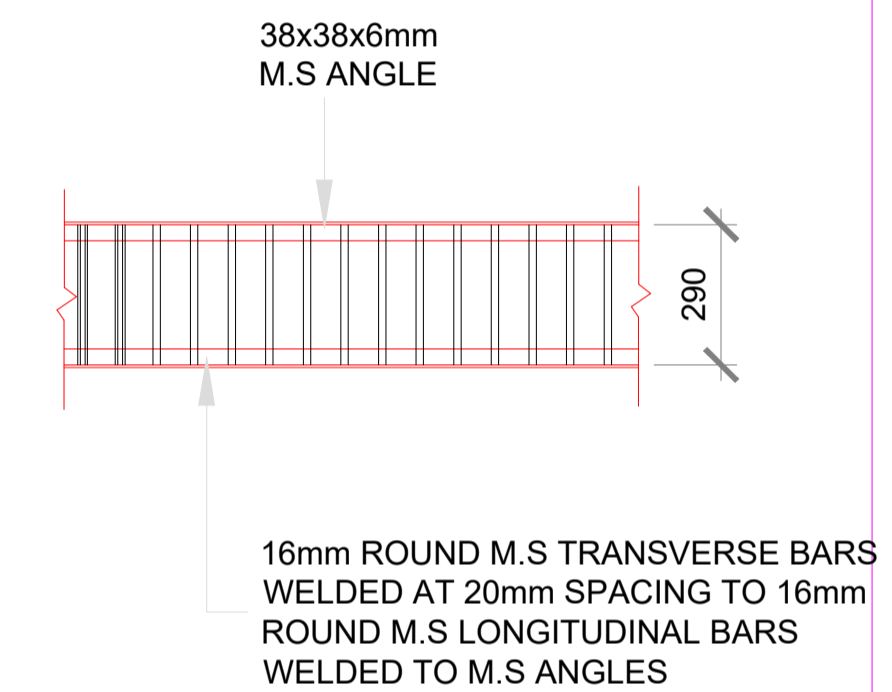


**SECTION A-A**  
SCALE 1:50

**DRAIN CHANNEL & COVER DETAILS**

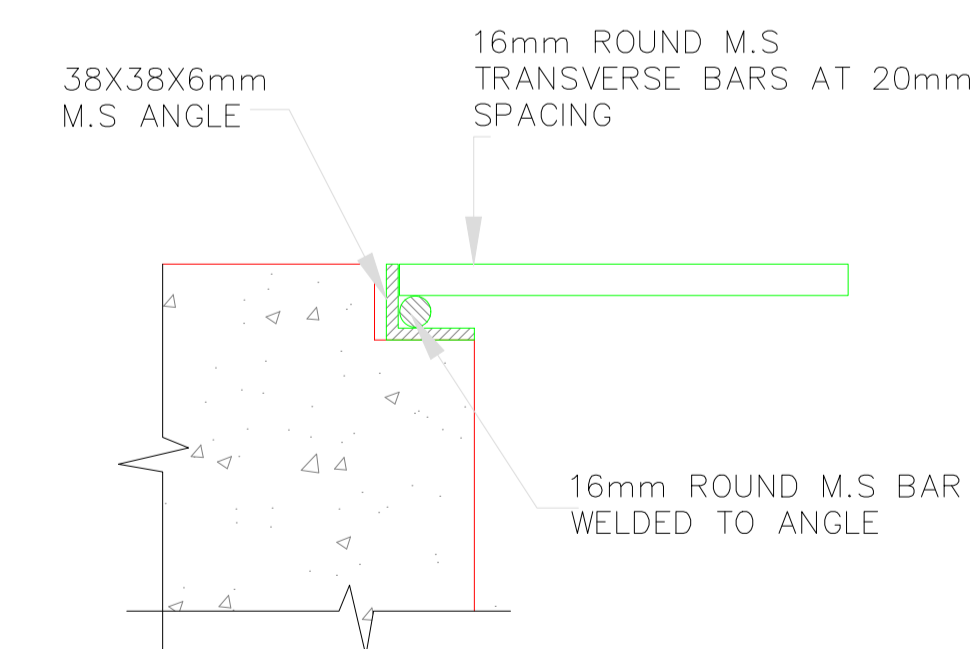


**SECTION THROUGH DRAIN CHANNEL**  
SCALE 1:20



NOTE: GRATING COVER FOR SUMP SIMILAR BUT SIZE 390x390

**PLAN OF DRAIN CHANNEL GRATING COVER:**  
(NTS)



**DETAIL 'A'**  
(NTS)

**NOTES:**

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
- ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
- P.C.C WINDOW CILLS TO HAVE DRIPS
- CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
- ABBREVIATIONS  
R.C – REINFORCED CONCRETE  
D.P.C – DAMP PROOF COURSE  
E.G.L – EXISTING GROUND LEVEL  
F.G.L – FINISHED GROUND LEVEL  
F.F.L – FINISHED FLOOR LEVEL  
P.C.C – PRECAST CONCRETE  
G.C.I – GALVANIZED CORRUGATED IRON
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE
- FOR WINDOW SCHEDULE SEE DRG. NO. MWS/SD/29
- FOR DOOR SCHEDULE SEE DRG. NO. MWS/SD/27 & 28
- ALL VENT BLOCKS UNDER WINDOWS TO BE PROVIDED WITH PVC GAUZE IN TIMBER FRAMING

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:



**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
P.O. BOX 495-70100  
GARISSA

REVIEWED BY:

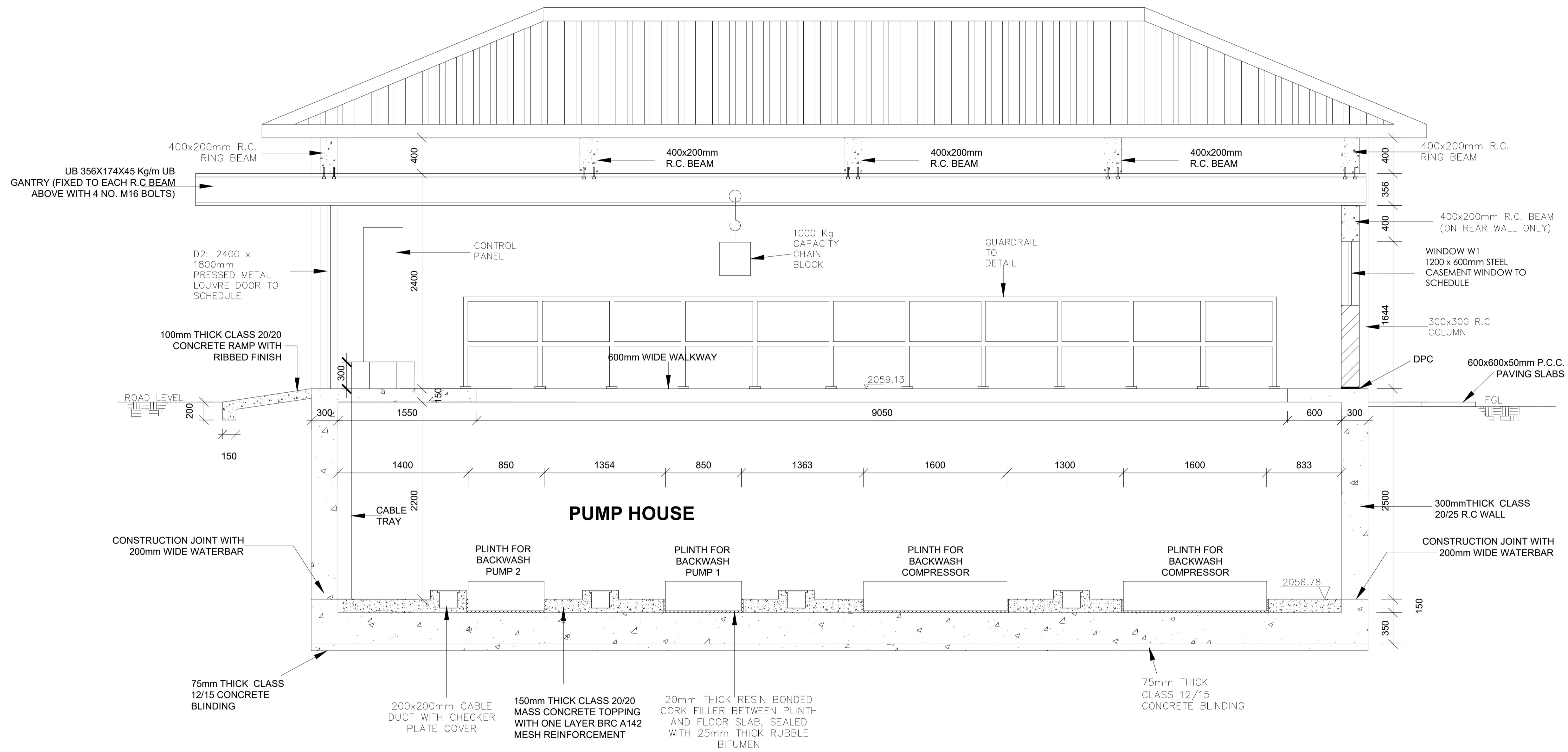


**Interconsult Engineers Ltd**  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane,  
Tel. 4441648/4441651  
Nairobi.

DRAWING TITLE:

**MARALAL WATER SUPPLY PROJECT**  
**BACKWASH PUMP HOUSE**  
**SECTION A - A**


Designed by:	N.M	Drawn by:	I.M.W
Checked by:	P.M.M	Approved by:	K.M
Scale:	1:50	Date:	FEBRUARY 2024
DRAWING No.	<b>MWS/TW/BWPH/02</b>	REV.	0



**NOTES:**

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
- ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
- P.C.C WINDOW CILLS TO HAVE DRIPS
- CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
- ABBREVIATIONS  
 R.C – REINFORCED CONCRETE  
 D.P.C – DAMP PROOF COURSE  
 E.G.L – EXISTING GROUND LEVEL  
 F.G.L – FINISHED GROUND LEVEL  
 F.F.L – FINISHED FLOOR LEVEL  
 P.C.C – PRECAST CONCRETE  
 G.C.I – GALVANIZED CORRUGATED IRON
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE
- FOR WINDOW SCHEDULE SEE DRG. NO. MWS/SD/29
- FOR DOOR SCHEDULE SEE DRG. NO. MWS/SD/27 & 28
- ALL VENT BLOCKS UNDER WINDOWS TO BE PROVIDED WITH PVC GAUZE IN TIMBER FRAMING

REVISION	DESCRIPTION	DATE

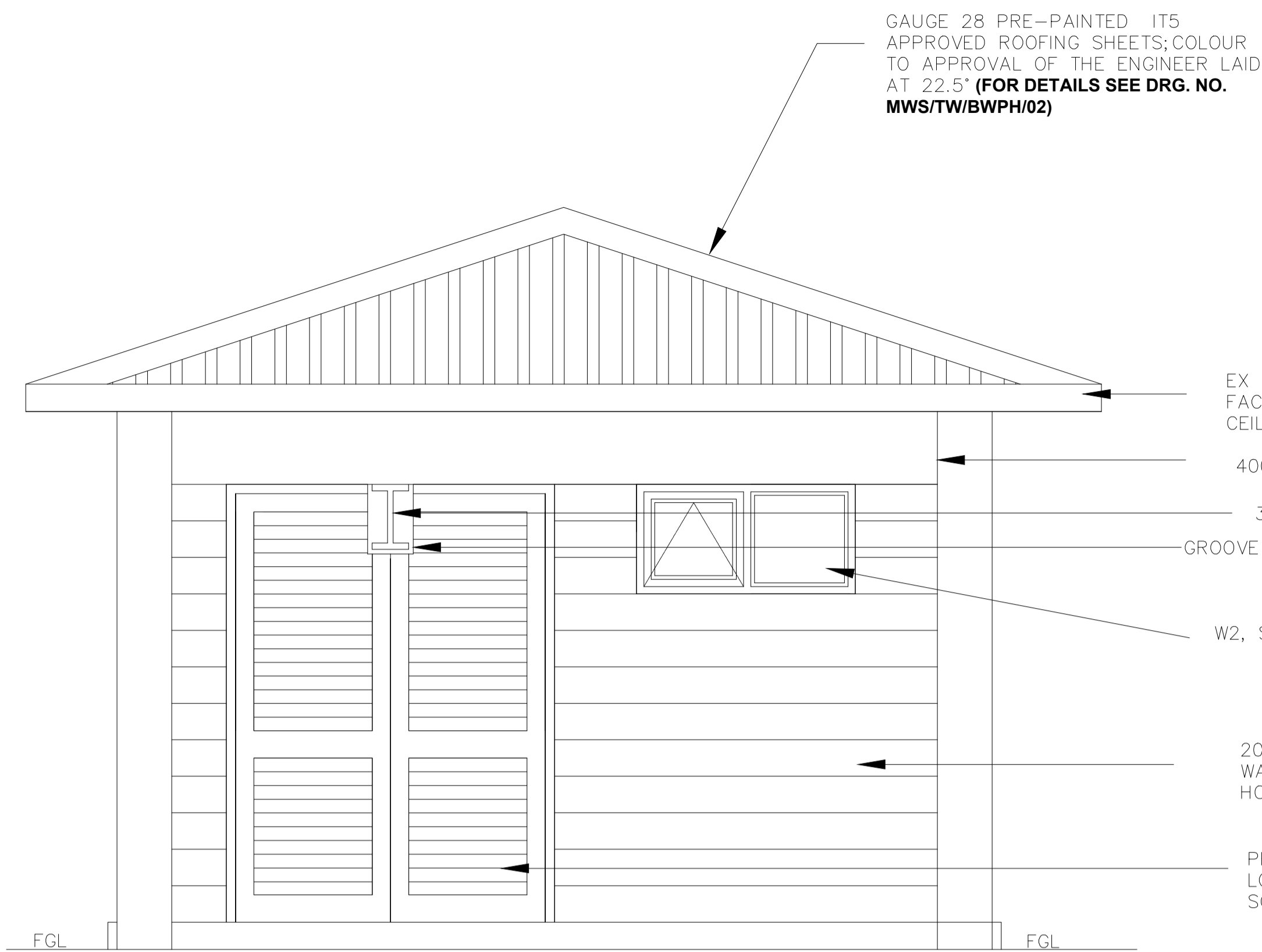
CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:  

**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane.  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT**  
**BACKWASH PUMP HOUSE**  
**SECTION B - B**

Designed by:	N.M	Drawn by:	I.M.W
Checked by:	P.M.M	Approved by:	K.M
Scale:	1:50	Date:	FEBRUARY 2024
DRAWING No.	<b>MWS/TW/BWPH/03</b>		REV. 0



GAUGE 28 PRE-PAINTED IT5 APPROVED ROOFING SHEETS; COLOUR TO APPROVAL OF THE ENGINEER LAID AT 22.5° (FOR DETAILS SEE DRG. NO. MWS/TW/BWPH/02)

EX 250 X40mm TIMBER FACIA AND CHIPBOARD CEILING

400X200mm RC RING BEAM

356X174X45 KG/M UB

GROOVE IN DOOR TO SUIT UB

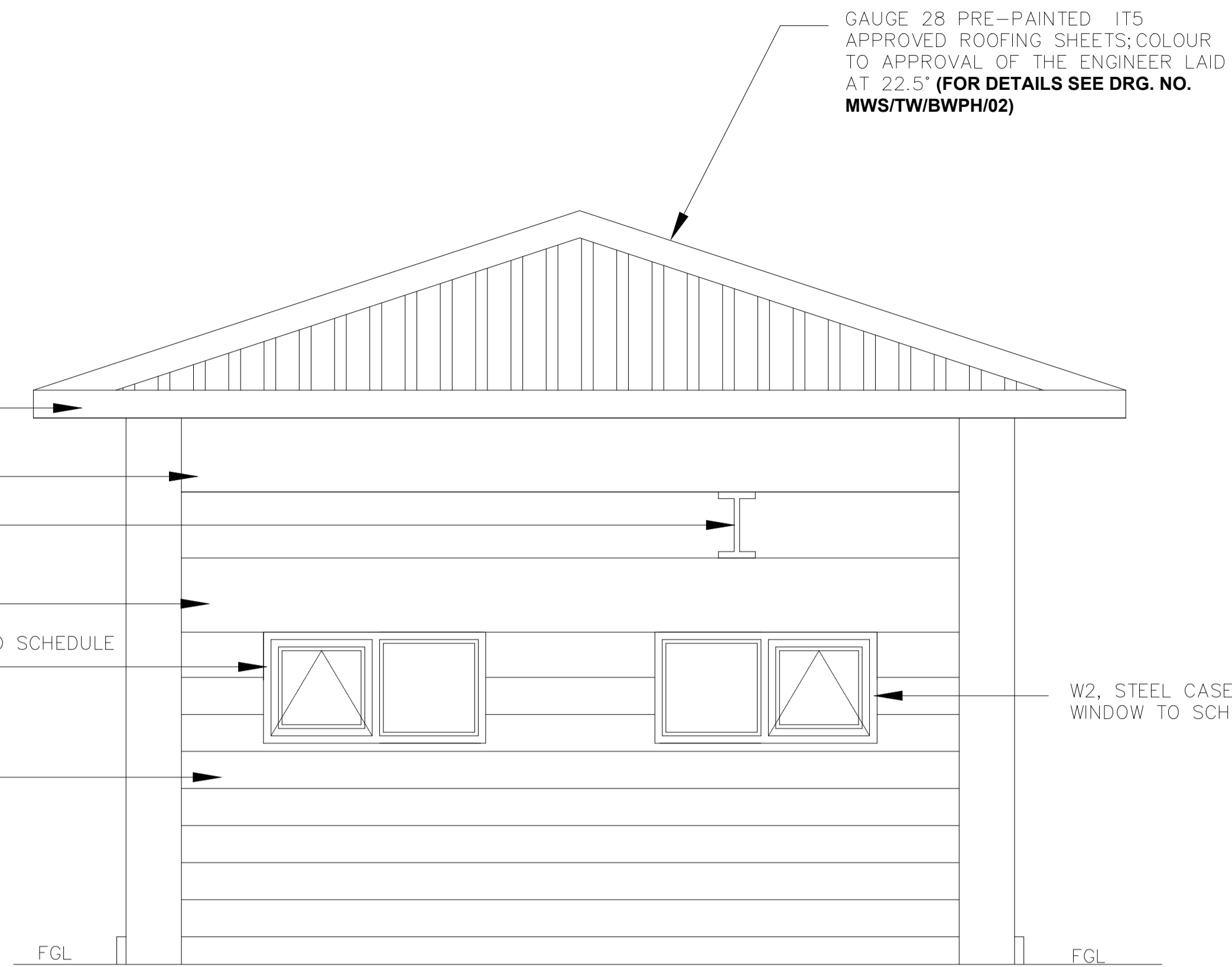
400X200mm RC BEAM

W2, STEEL CASEMENT WINDOW TO SCHEDULE

200mm MACHINE CUT STONE WALL WITH RECESSED HORIZONTAL JOINTS

PRESSED METAL LOUVRED DOOR TO SCHEDULE, D2

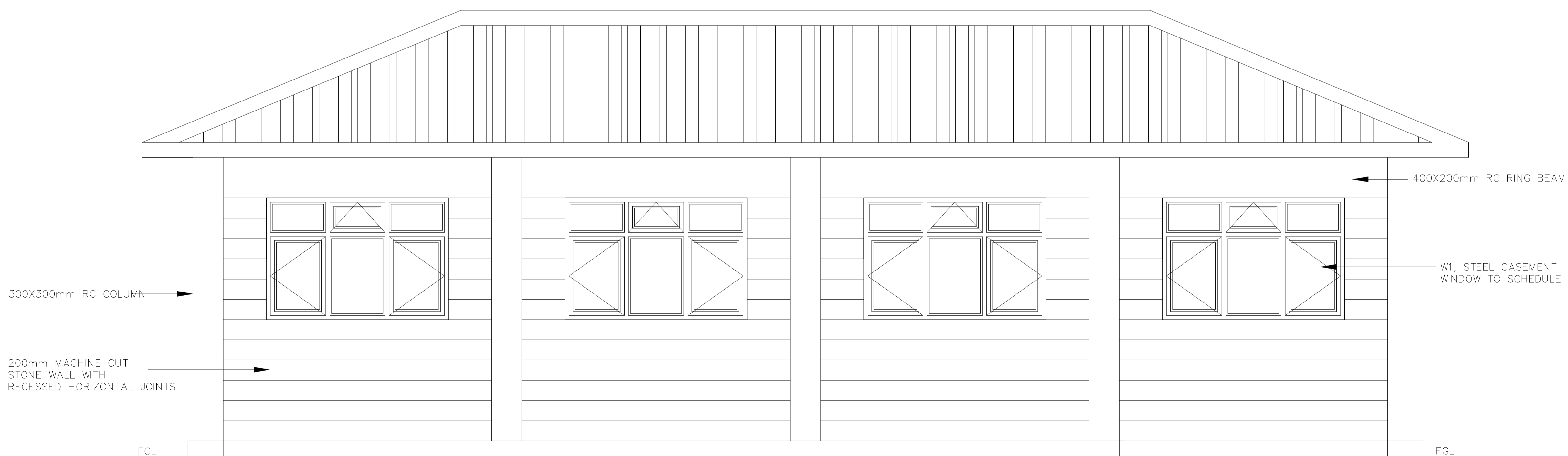
**FRONT ELEVATION 01**



GAUGE 28 PRE-PAINTED IT5 APPROVED ROOFING SHEETS; COLOUR TO APPROVAL OF THE ENGINEER LAID AT 22.5° (FOR DETAILS SEE DRG. NO. MWS/TW/BWPH/02)

W2, STEEL CASEMENT WINDOW TO SCHEDULE

**REAR ELEVATION 02**



300X300mm RC COLUMN

200mm MACHINE CUT STONE WALL WITH RECESSED HORIZONTAL JOINTS

400X200mm RC RING BEAM

W1, STEEL CASEMENT WINDOW TO SCHEDULE

**SIDE ELEVATION 03**

**NOTES:**

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
- ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
- P.C.C WINDOW CILLS TO HAVE DRIPS
- CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
- ABBREVIATIONS  
R.C – REINFORCED CONCRETE  
D.P.C – DAMP PROOF COURSE  
E.G.L – EXISTING GROUND LEVEL  
F.G.L – FINISHED GROUND LEVEL  
F.F.L – FINISHED FLOOR LEVEL  
P.C.C – PRECAST CONCRETE  
G.C.I – GALVANIZED CORRUGATED IRON
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE
- FOR WINDOW SCHEDULE SEE DRG. NO. MWS/SD/29
- FOR DOOR SCHEDULE SEE DRG. NO. MWS/SD/27 & 28
- ALL VENT BLOCKS UNDER WINDOWS TO BE PROVIDED WITH PVC GAUZE IN TIMBER FRAMING

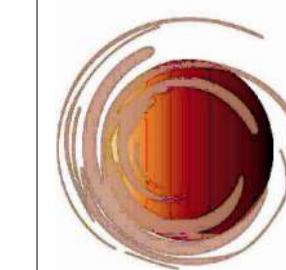
REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:



**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
P.O. BOX 495-70100  
GARISSA

REVIEWED BY:



**Interconsult Engineers Ltd**  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane,  
Tel. 4441648/4441651  
Nairobi.

DRAWING TITLE:

**MARALAL WATER SUPPLY PROJECT**

**BACKWASH PUMP HOUSE**

**ELEVATION 03**

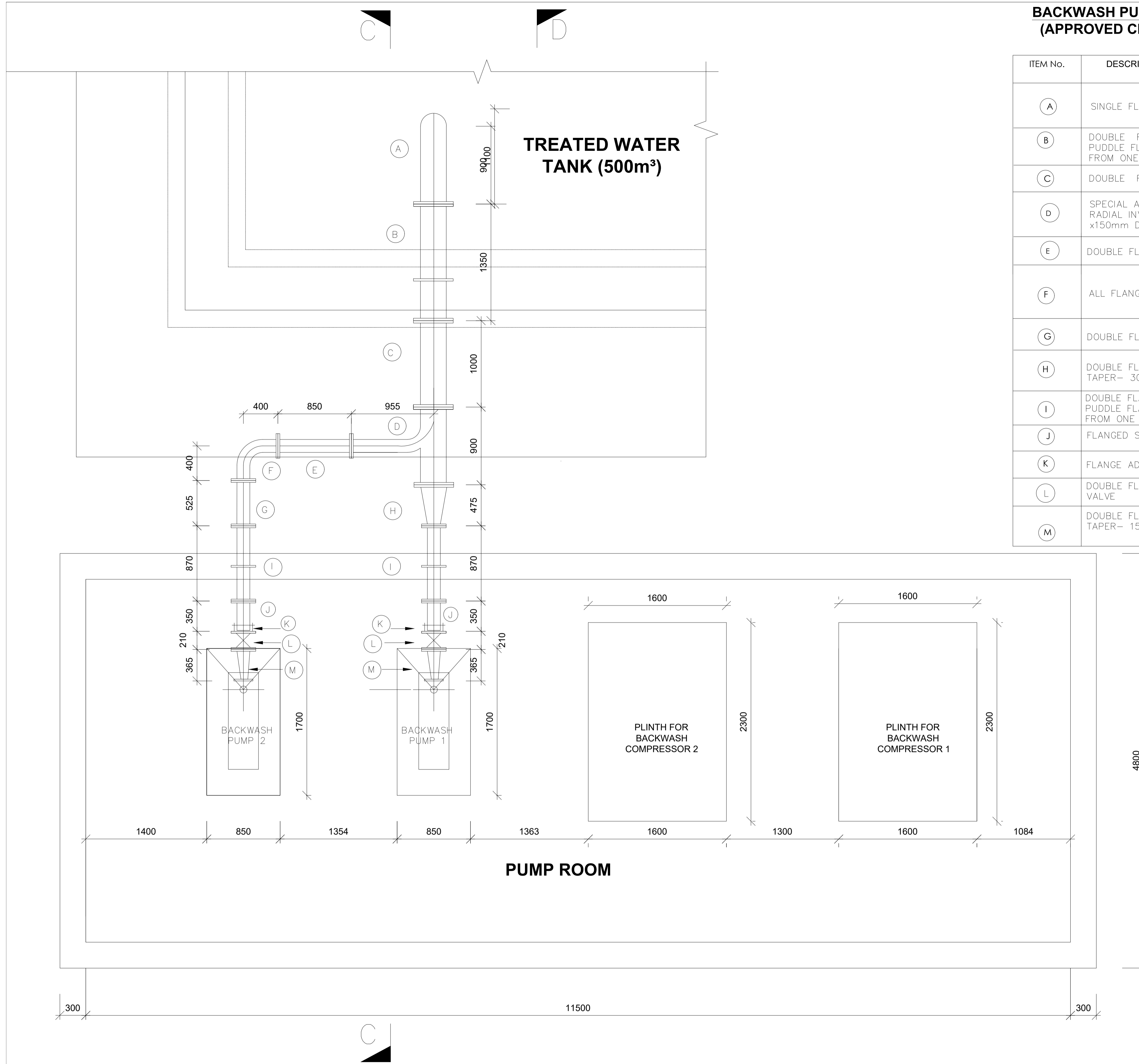
Designed by:	N.M	Drawn by:	I.M.W
Checked by:	P.M.M	Approved by:	K.M
Scale:	1:50	Date:	FEBRUARY 2024
DRAWING No.	<b>MWS/TW/BWPH/04</b>	REV.	0

**BACKWASH PUMPS DELIVERY PIPEWORK SCHEDULE  
(APPROVED CEMENT LINED EPOXY COATED STEEL PIPES)**

ITEM No.	DESCRIPTION	DIA. (mm)	LENGTH (mm)	QUANTITY (No.)
(A)	SINGLE FLANGED 45° BEND	300 $\phi$	450	1
(B)	DOUBLE FLANGED PIPE WITH PUDDLE FLANGE AT 475mm FROM ONE END	300	1350	1
(C)	DOUBLE FLANGED PIPE	300	1000	1
(D)	SPECIAL ALL FLANGED RADIAL INVERT TEE - 300 x150mm DIA	300 $\phi$	900	1
(E)	DOUBLE FLANGED PIPE	150	850	1
(F)	ALL FLANGED 90° BEND	150 $\phi$	400	1
(G)	DOUBLE FLANGED PIPE	150	525	1
(H)	DOUBLE FLANGED ECCENTRIC TAPER - 300x150mm DIA	300 $\phi$	475	1
(I)	DOUBLE FLANGED PIPE WITH PUDDLE FLANGE AT 400mm FROM ONE END	150	870	2
(J)	FLANGED SPIGOT PIPE	150	350	2
(K)	FLANGE ADAPTOR	150	-	2
(L)	DOUBLE FLANGED GATE VALVE	150	210	2
(M)	DOUBLE FLANGED ECCENTRIC TAPER - 150x80mm DIA	150 $\phi$	365	2


**NOTES:**

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
- ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
- CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
- ABBREVIATIONS  
 R.C - REINFORCED CONCRETE  
 D.P.C - DAMP PROOF COURSE  
 E.G.L - EXISTING GROUND LEVEL  
 F.G.L - FINISHED GROUND LEVEL  
 F.F.L - FINISHED FLOOR LEVEL  
 P.C.C - PRECAST CONCRETE  
 G.C.I - GALVANIZED CORRUGATED IRON
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE
- FOR WINDOW SCHEDULE, SEE DRG. NO. MWS/SD/29
- FOR DOOR SCHEDULE, SEE DRG. NO. MWS/SD/27-28



**SUCTION PIPEWORK PLAN**

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:  

**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**MARALAL WATER PROJECT**  
**BACKWASH PUMP HOUSE**

Designed by:	N.M	Drawn by:	I.M.W
Checked by:	P.M.M	Approved by:	K.M
Scale:	1:50	Date:	FEBRUARY 2024
DRAWING No.	<b>MWS/TW/BWPH/05</b>	REV.	0

**BACKWASH PUMPS DELIVERY PIPEWORK SCHEDULE  
(APPROVED CEMENT LINED EPOXY COATED STEEL  
PIPES)**

ITEM NO	DESCRIPTION	DIA (mm)	LENGTH (mm)	QUANTITY (No)
(a)	DOUBLE FLANGED CONCENTRIC TAPER – 100 x 65mm WITH 25mm Ø MALE THREADED TAPPING FOR PRESSURE GAUGE	1000	650	2
(b)	25mm DIA PRESSURE GAUGE – (PRESSURE CLASS UPTO 10 BARS) – HUNTER OR APPROVED EQUIVALENT	25	–	2
(c)	DOUBLE FLANGED 90° BEND	1000	300	3
(d)	DOUBLE FLANGED FREE ACTING CHECK VALVE (NON RETURN VALVE)	100	170	2
(e)	DOUBLE FLANGED GATE VALVE	100	190	2
(f)	FLANGE ADAPTOR	100	–	2
(g)	FLANGED SPIGOT PIPE	100	380	2
(h)	DOUBLE FLANGED PIPE WITH PUDDLE FLANGE AT 390mm FROM ONE END	100	800	2
(i)	DOUBLE FLANGED PIPE	100	1500	2
(j)	DOUBLE FLANGED PIPE	100	1475	1
(k)	ALL FLANGED RADIAL TEE – 100X100mm DIA	1000	600	1
(l)	DOUBLE FLANGED CONCENTRIC TAPER – 100 X 150mm DIA	1500	1000	1
(m)	FLANGED SPIGOT PIPE	150	–	1
(n)	COUPLING	150	–	1

**NOTES:**

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
- ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
- CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
- ABBREVIATIONS  
 R.C – REINFORCED CONCRETE  
 D.P.C – DAMP PROOF COURSE  
 E.G.L – EXISTING GROUND LEVEL  
 F.G.L – FINISHED GROUND LEVEL  
 F.F.L – FINISHED FLOOR LEVEL  
 P.C.C – PRECAST CONCRETE  
 G.C.I – GALVANIZED CORRUGATED IRON
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE
- FOR WINDOW SCHEDULE, SEE DRG. NO. MWS/SD/29
- FOR DOOR SCHEDULE, SEE DRG. NO. MWS/SD/27-28

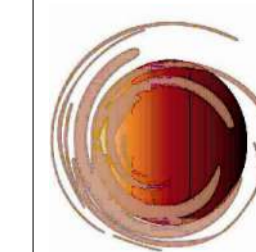
REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:



**NORTHERN WATER WORKS  
DEVELOPMENT AGENCY**  
P.O. BOX 495-70100  
GARISSA

REVIEWED BY:

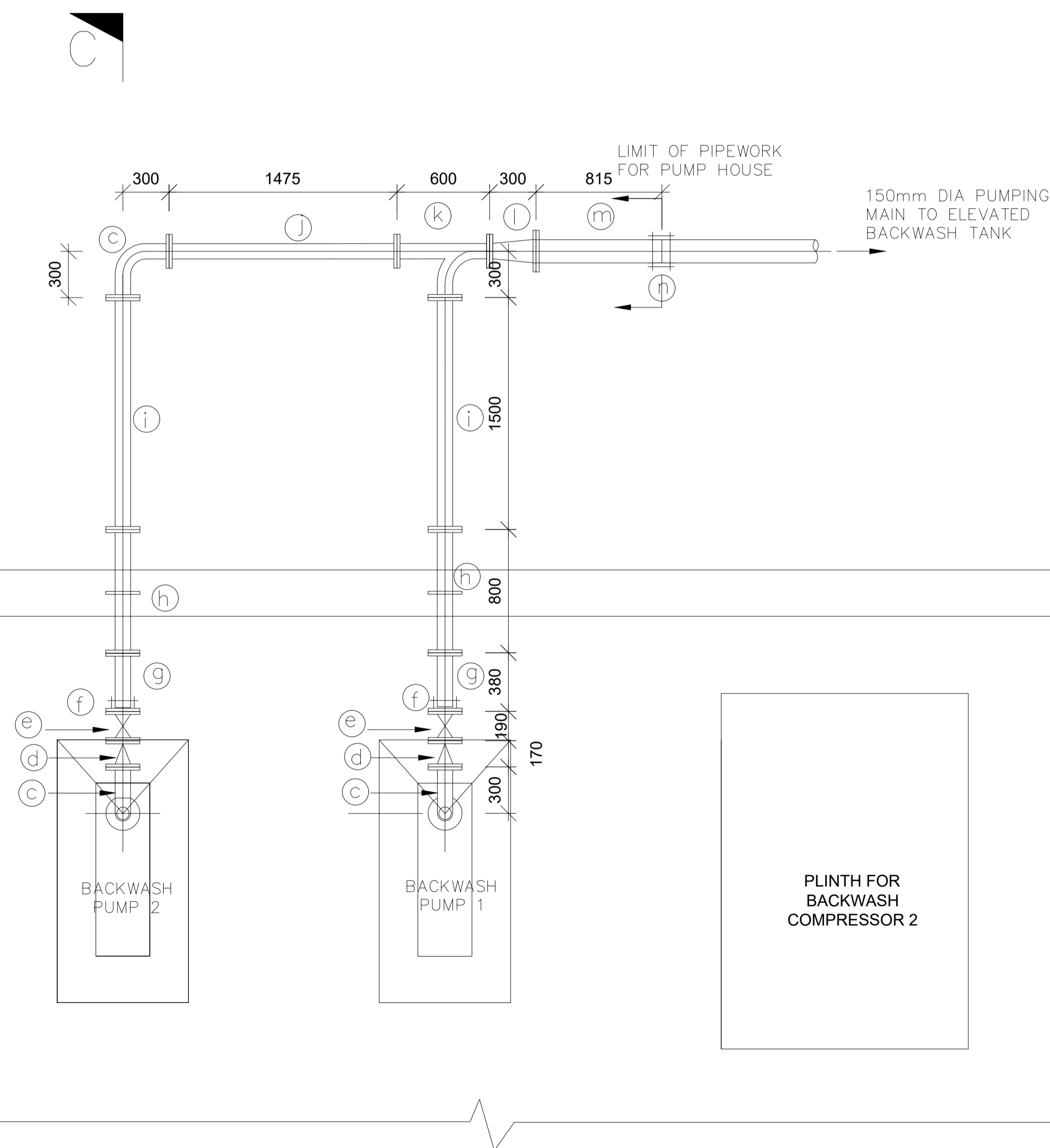


**Interconsult Engineers Ltd**  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane,  
Tel. 4441648/4441651  
Nairobi.

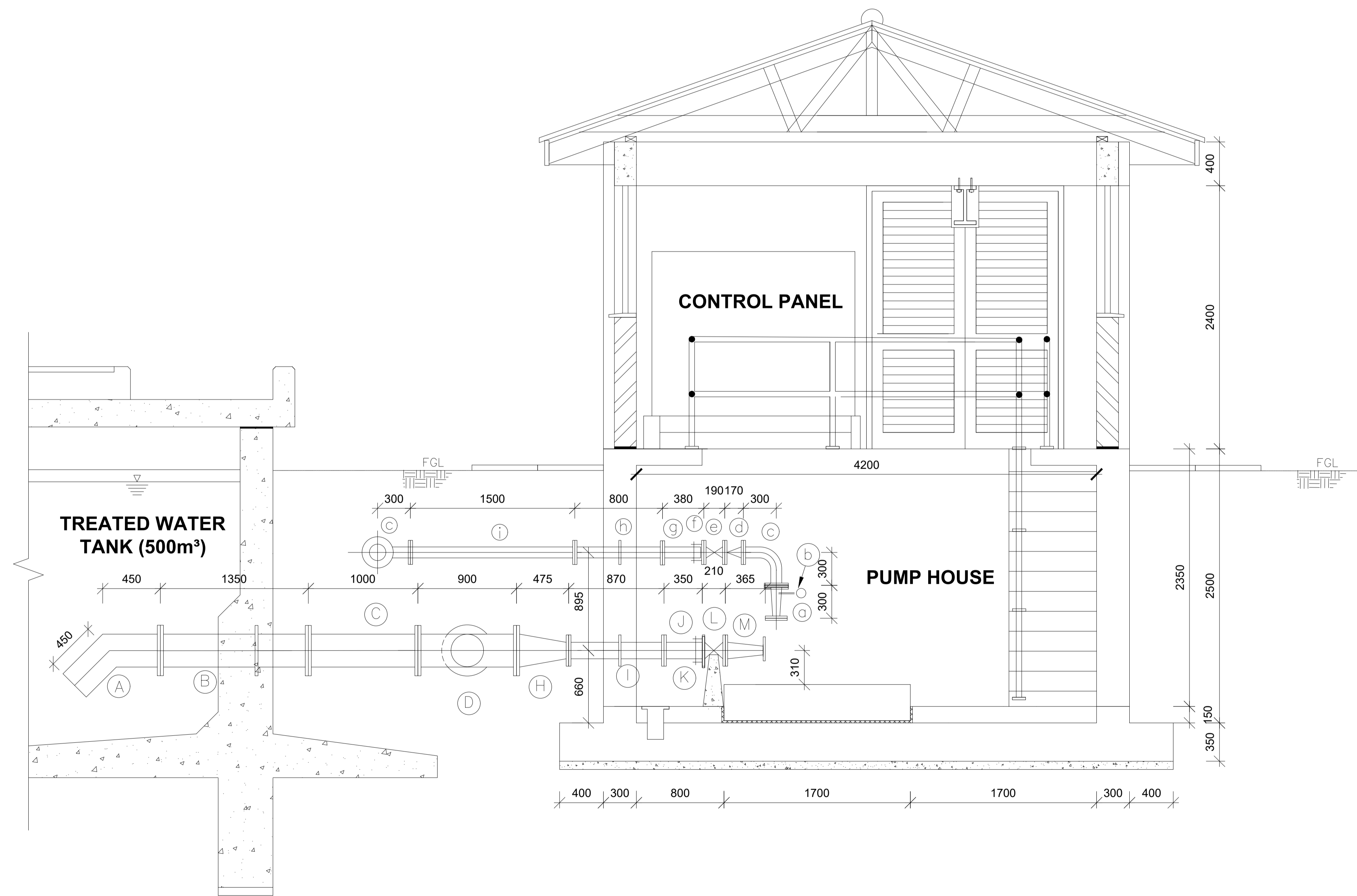
DRAWING TITLE:

**MARALAL WATER PROJECT  
BACKWASH PUMP HOUSE**

Designed by:	N.M	Drawn by:	I.M.W
Checked by:	P.M.M	Approved by:	K.M
Scale:	1:50	Date:	FEBRUARY 2024
DRAWING No.	<b>MWS/TW/BWPH/06</b>	REV.	0



**DELIVERY PIPEWORK  
PLAN**




**SECTION C - C  
BACKWASH WATER PUMPS SUCTION &  
DELIVERY PIPEWORK SECTION**

**NOTES:**

1. DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
2. ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
3. ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
4. ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
5. CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
6. ABBREVIATIONS  
  - R.C - REINFORCED CONCRETE
  - D.P.C - DAMP PROOF COURSE
  - E.G.L - EXISTING GROUND LEVEL
  - F.G.L - FINISHED GROUND LEVEL
  - F.F.L - FINISHED FLOOR LEVEL
  - P.C.C - PRECAST CONCRETE
  - G.C.I - GALVANIZED CORRUGATED IRON
7. EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE
8. FOR WINDOW SCHEDULE, SEE DRG. NO. MWS/SD/29
9. FOR DOOR SCHEDULE, SEE DRG. NO. MWS/SD/27-28

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

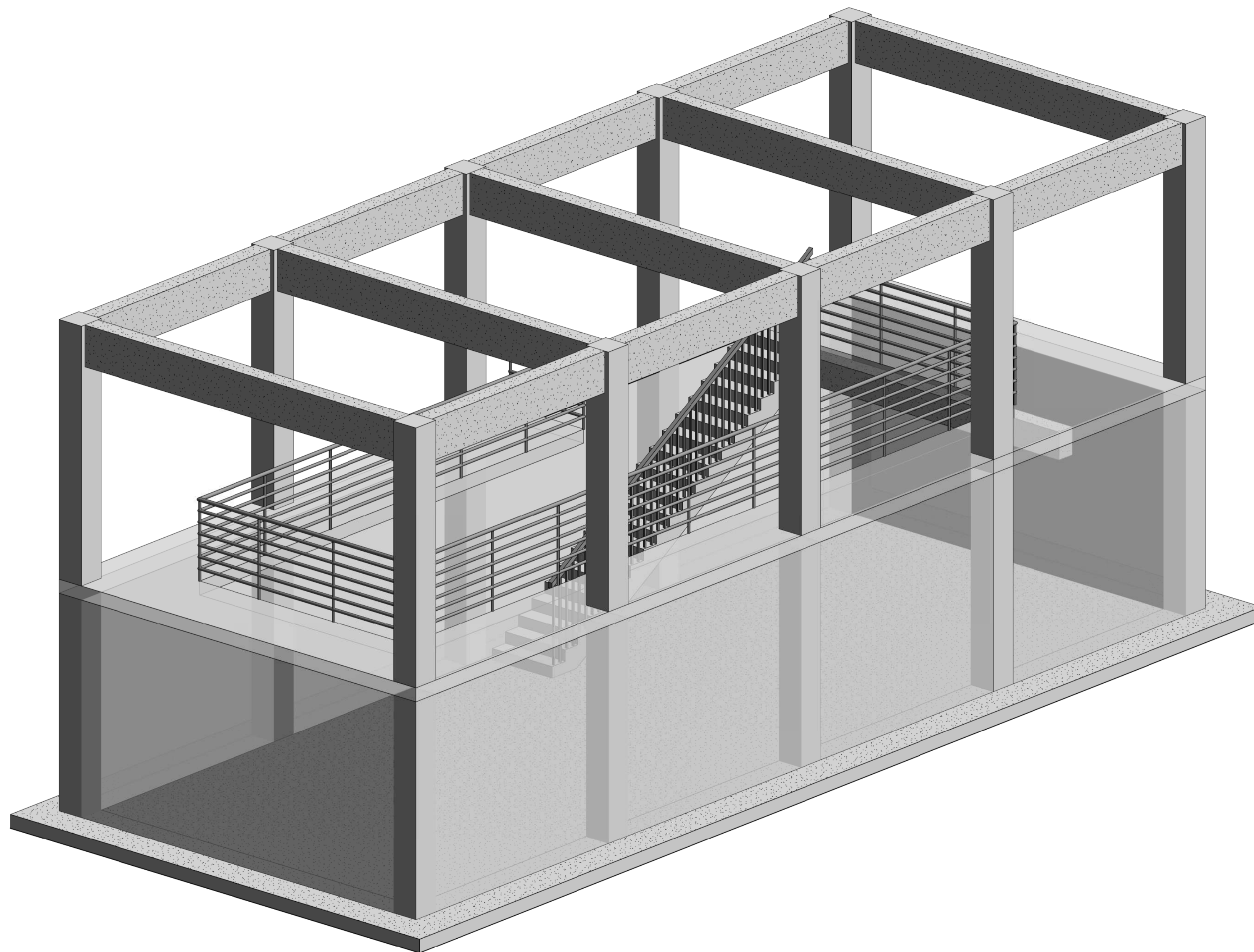
REVIEWED BY:  

**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane.  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**MARALAL WATER PROJECT**  
**BACKWASH PUMP HOUSE**

Designed by:	N.M	Drawn by:	I.M.W
Checked by:	P.M.M	Approved by:	K.M
Scale:	1:50	Date:	FEBRUARY 2024
DRAWING No.	<b>MWS/TW/BWPH/07</b>	REV.	0





**3D STRUCTURAL MODEL OF THE BACKWASH PUMP HOUSE**

SCALE 1:20

**NOTES**

1. DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED.
2. ALL EXPOSED CONCRETE EDGES HAVE A 25mm x 25mm CHAMFER.
3. ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT.
4. ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING.
5. ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED.
6. ABBREVIATIONS:
  - RC - REINFORCED CONCRETE.
  - DPC - DAMP PROOF COURSE.
  - EGL - EXISTING GROUND LEVEL.
  - FGL - FINISHED GROUND LEVEL.
  - FFL - FINISHED FLOOR LEVEL.
  - PCC - PRECAST CONCRETE.
  - GCI - GALVANIZED CORRUGATED IRON.
  - H - HIGH YIELD DEFORMED BARS TO BS 4449:2005.
7. EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 x 40 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE.
8. FOR WINDOW SCHEDULES SEE DRG. NO. MWS/SD/29.
9. FOR DOOR SCHEDULES SEE DRG. NO. MWS/SD/27 & 28.

REVISION	DESCRIPTION	DATE

CLIENT



NORTHERN WATER WORKS DEVELOPMENT AGENCY  
P.O. BOX 495 - 70100  
GARISSA.

PROJECT

**MARALAL WATER SUPPLY PROJECT**

REVIEWED BY



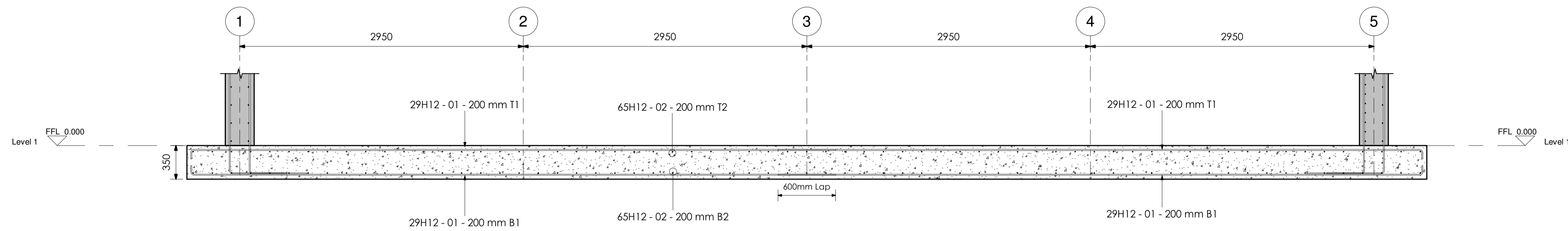
Interconsult Engineers Ltd  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane.  
Tel. 4441648/4441651  
NAIROBI.

DRAWING TITLE

**BACKWASH PUMP HOUSE STRUCTURAL DETAILING**

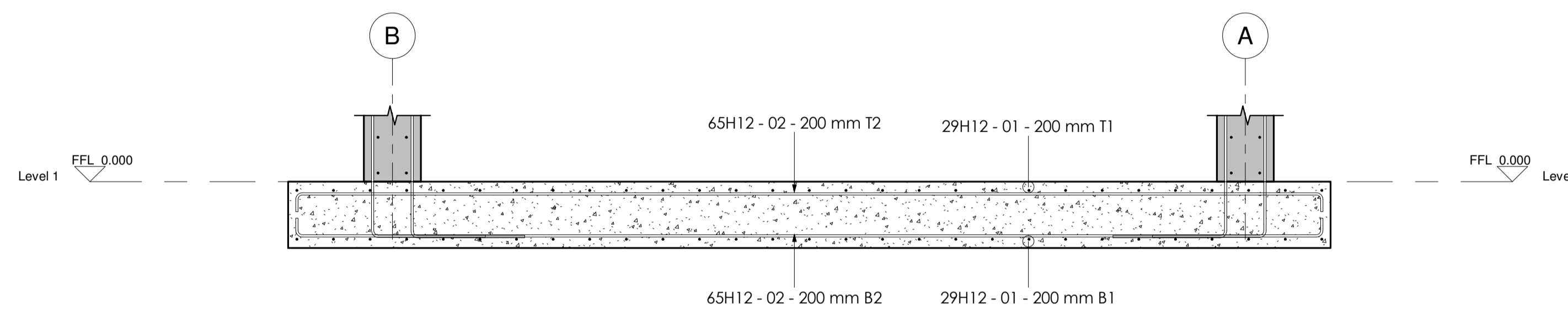
3D STRUCTURAL MODEL

Designed By:	N.M.	Drawn By:	G.G.
Checked By:	P.M.M.	Approved By:	K.M.
Scale:	AS SHOWN	Date:	FEBRUARY 2024
DRAWING No.	MWS/TW/BWPH - STR/01	REV.	0



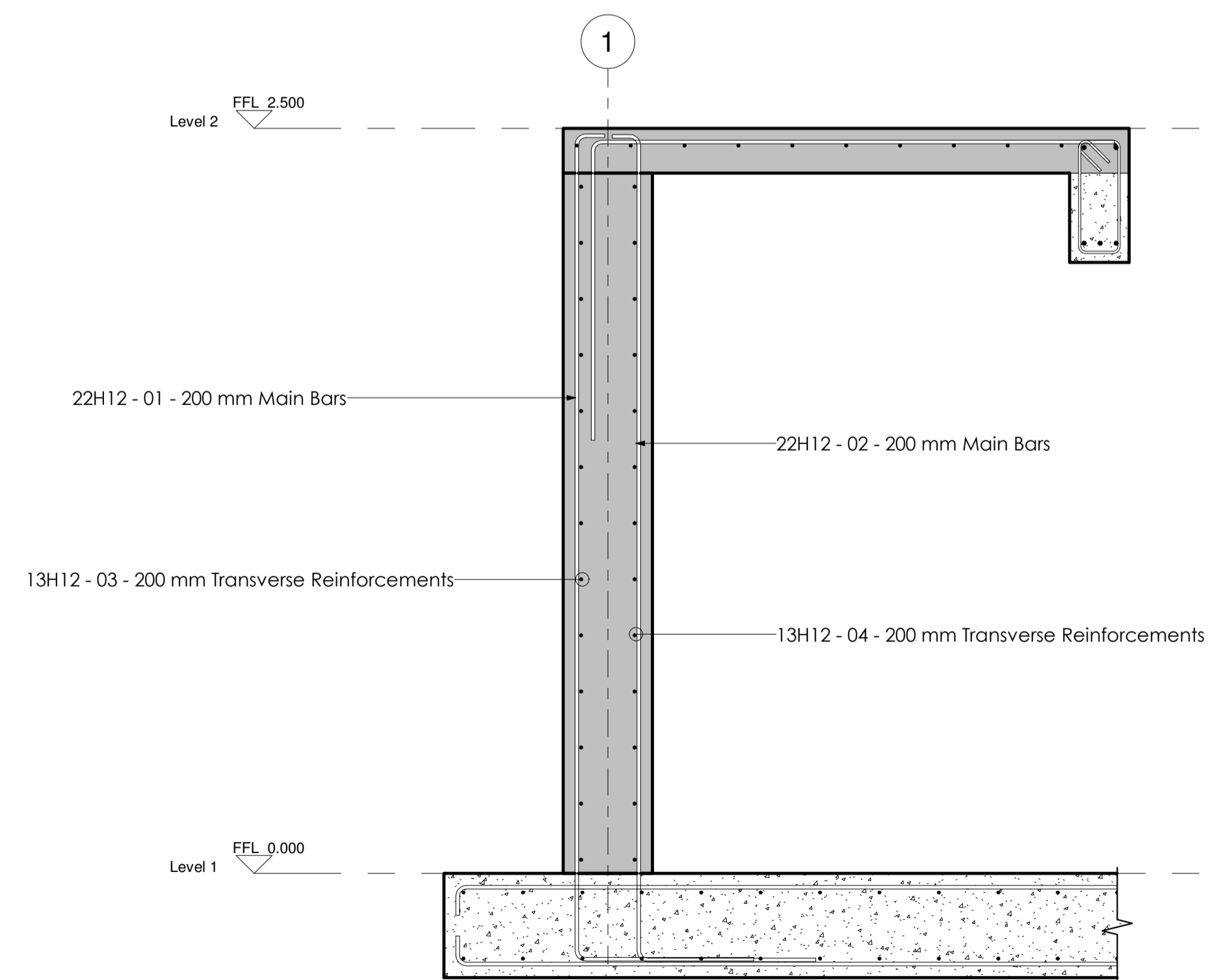
**FOUNDATION SLAB SECTION 1 - 1 REINFORCEMENT DETAIL**

SCALE 1:15



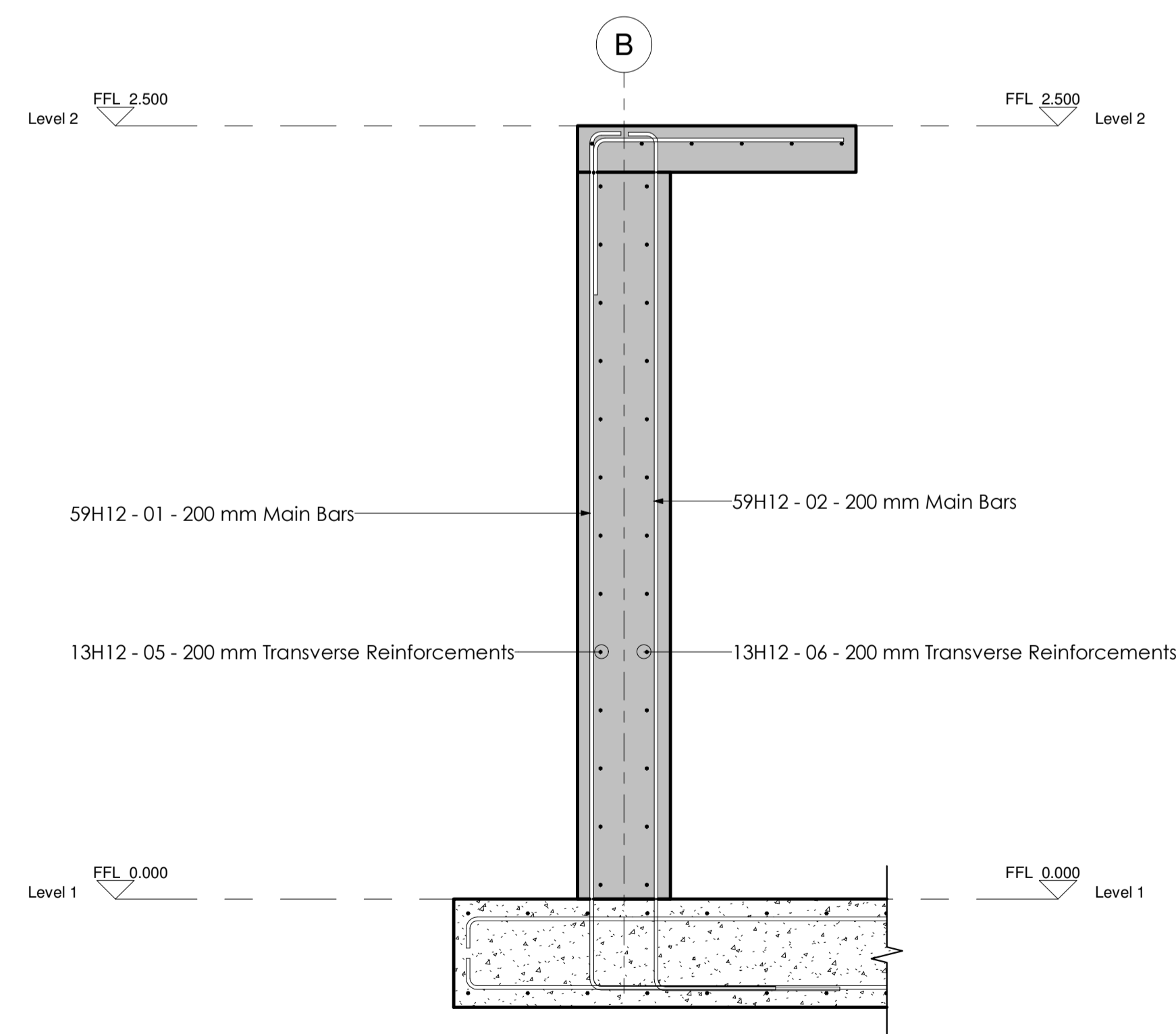
**FOUNDATION SLAB SECTION 2 - 2 REINFORCEMENT DETAIL**

SCALE 1:15



**MAIN WALL SECTION 1 - 1**

SCALE 1:15



**MAIN WALL SECTION 2 - 2**


SCALE 1:15

**NOTES**

1. DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED.
2. ALL EXPOSED CONCRETE EDGES HAVE A 25mm x 25mm CHAMFER.
3. ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT.
4. ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING.
5. ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED.
6. ABBREVIATIONS:  
 RC - REINFORCED CONCRETE.  
 DPC - DAMP PROOF COURSE.  
 EGL - EXISTING GROUND LEVEL.  
 FGL - FINISHED GROUND LEVEL.  
 FFL - FINISHED FLOOR LEVEL.  
 PCC - PRECAST CONCRETE.  
 GCI - GALVANIZED CORRUGATED IRON.  
 H - HIGH YIELD DEFORMED BARS TO BS 4449:2005.
7. EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE.
8. FOR WINDOW SCHEDULES SEE DRG. NO. MWS /SD/29.
9. FOR DOOR SCHEDULES SEE DRG. NO. MWS /SD/27 - 28.

REVISION	DESCRIPTION	DATE

CLIENT



NORTHERN WATER WORKS DEVELOPMENT AGENCY  
 P.O. BOX 495 - 70100  
 GARISSA.

PROJECT

**MARALAL WATER SUPPLY PROJECT**

REVIEWED BY



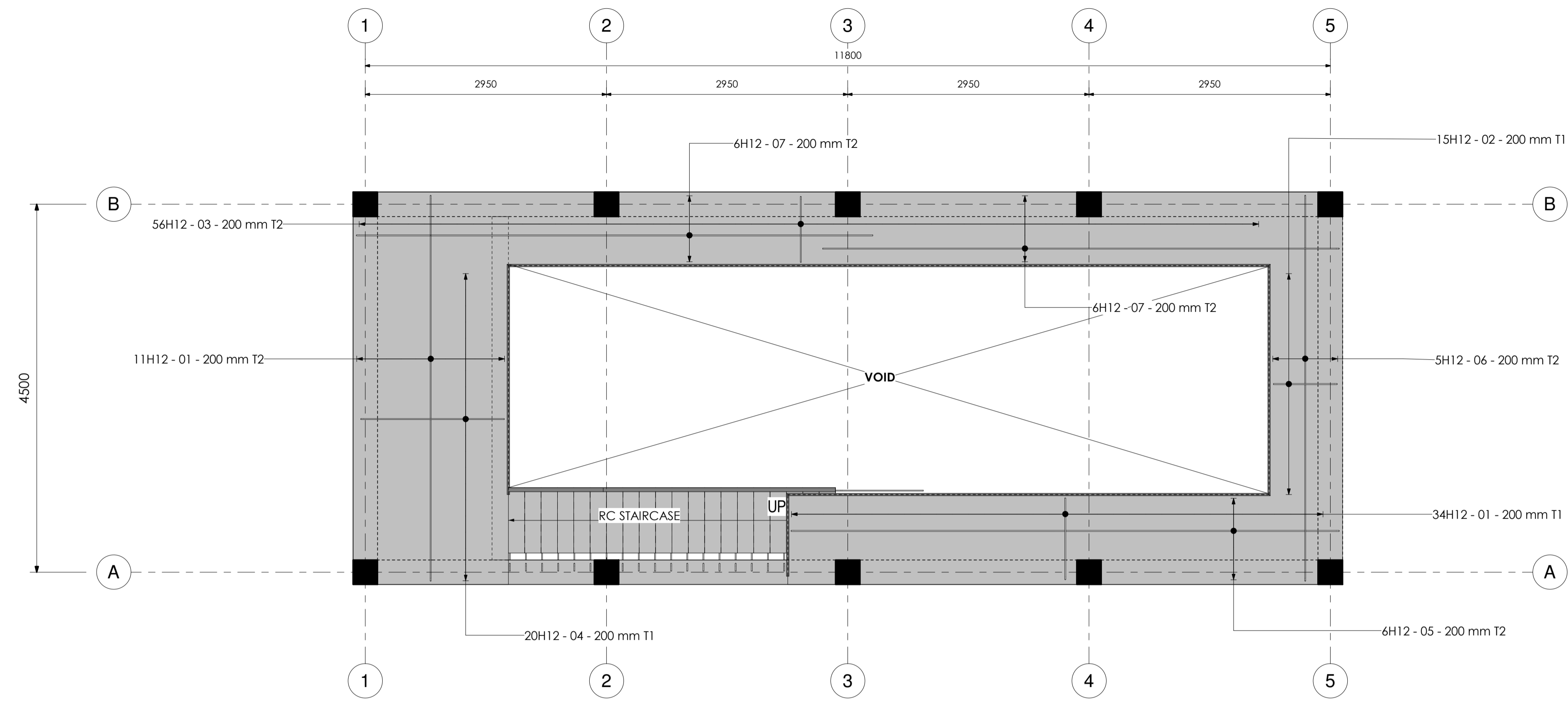
Interconsult Engineers Ltd  
 Consulting Engineers  
 Jadhala Place, 4th Floor,  
 Ngong Lane.  
 Tel. 4441648/4441651  
 NAIROBI.

DRAWING TITLE

**BACKWASH PUMP HOUSE STRUCTURAL DETAILING**

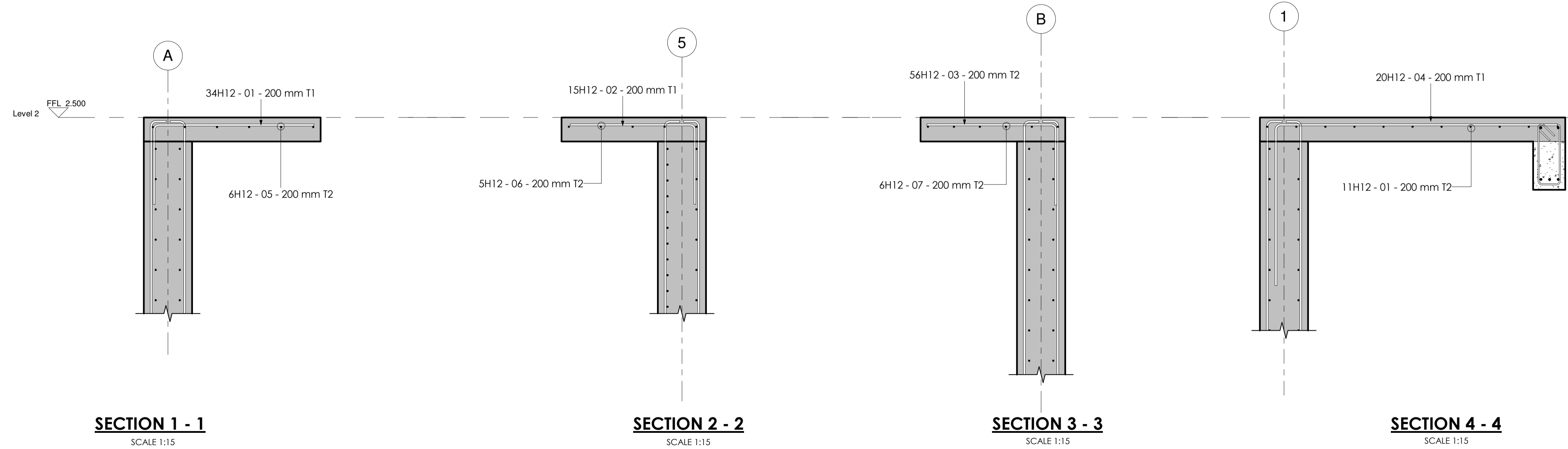
FOUNDATION SLAB & RC WALL REINFORCEMENT DETAILS

Designed By:	N.M.	Drawn By:	G.G.
Checked By:	P.M.M.	Approved By:	K.M.
Scale:	AS SHOWN	Date:	FEBRUARY 2024
DRAWING No.	MWS/TW/BWPH - STR/02	REV	0



**SUSPENDED SLAB PLAN REINFORCEMENT DETAIL**

SCALE 1:35




**NOTES**

1. DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED.
2. ALL EXPOSED CONCRETE EDGES HAVE A 25mm x 25mm CHAMFER.
3. ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT.
4. ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING.
5. ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED.
6. ABBREVIATIONS:  
 RC - REINFORCED CONCRETE.  
 DPC - DAMP PROOF COURSE.  
 EGL - EXISTING GROUND LEVEL.  
 FGL - FINISHED GROUND LEVEL.  
 FFL - FINISHED FLOOR LEVEL.  
 PCC - PRECAST CONCRETE.  
 GCI - GALVANIZED CORRUGATED IRON.  
 H - HIGH YIELD DEFORMED BARS TO BS 4449:2005.
7. EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE.
8. FOR WINDOW SCHEDULES SEE DRG. NO. MWS/SD/29.
9. FOR DOOR SCHEDULES SEE DRG. NO. MWS/SD/28.

REVISION	DESCRIPTION	DATE

CLIENT



NORTHERN WATER WORKS DEVELOPMENT AGENCY  
 P.O. BOX 495 - 70100  
 GARISSA.

PROJECT

**MARALAL WATER SUPPLY PROJECT**

REVIEWED BY



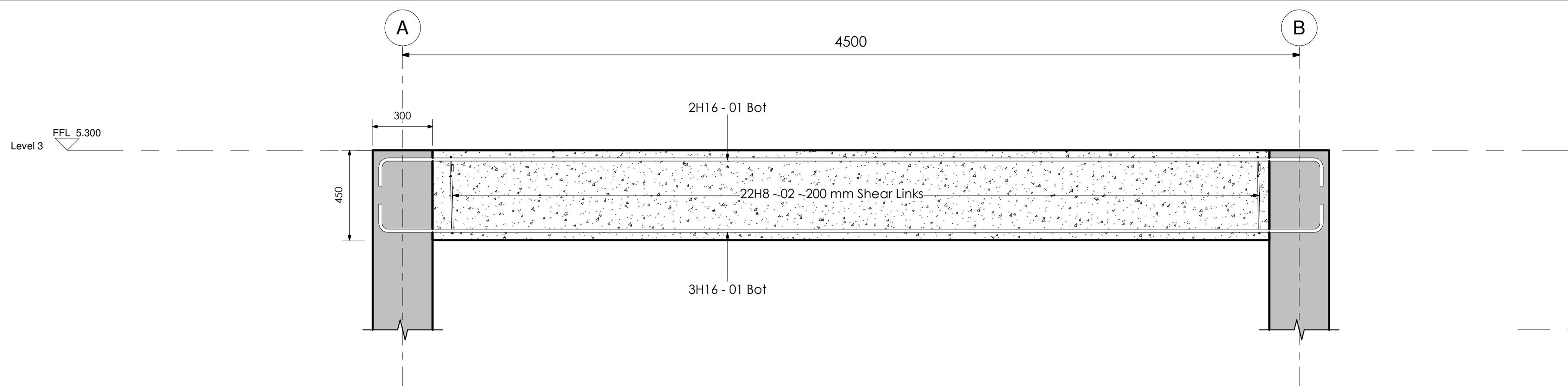
Interconsult Engineers Ltd  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane.  
 Tel. 4441648/4441651  
 NAIROBI.

DRAWING TITLE

**BACKWASH PUMP HOUSE STRUCTURAL DETAILING**

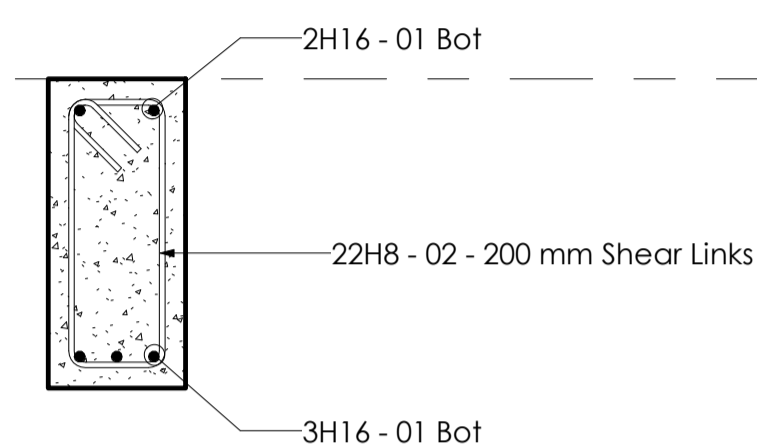
SUSPENDED SLAB REINFORCEMENT DETAILS

Designed By:	N.M.	Drawn By:	G.G.
Checked By:	P.M.M.	Approved By:	K.M.
Scale:	AS SHOWN	Date:	FEBRUARY 2024
DRAWING No.	MWS/TW/BWPH - STR/03	REV.	0



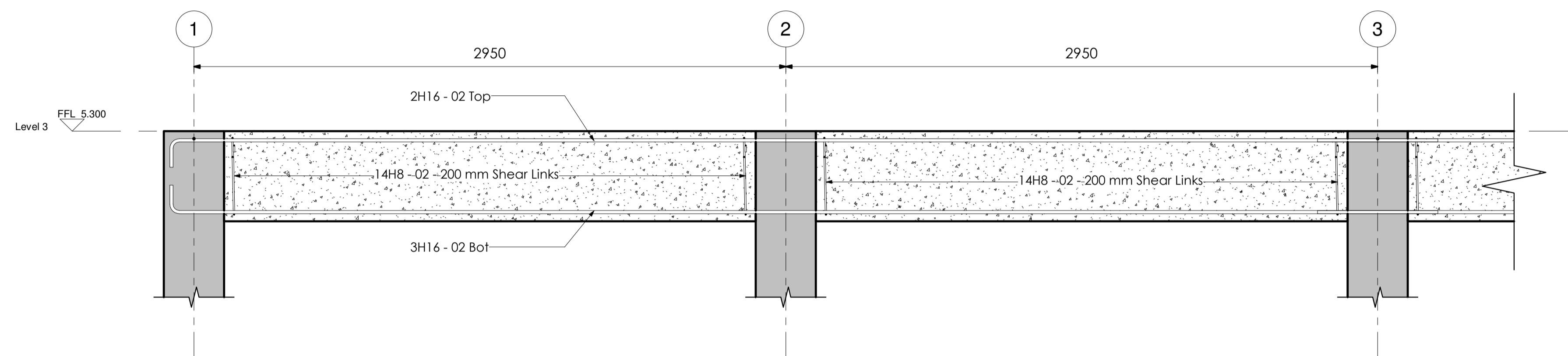
**RING BEAM Y - Y ELEVATION DETAIL**

SCALE 1:15



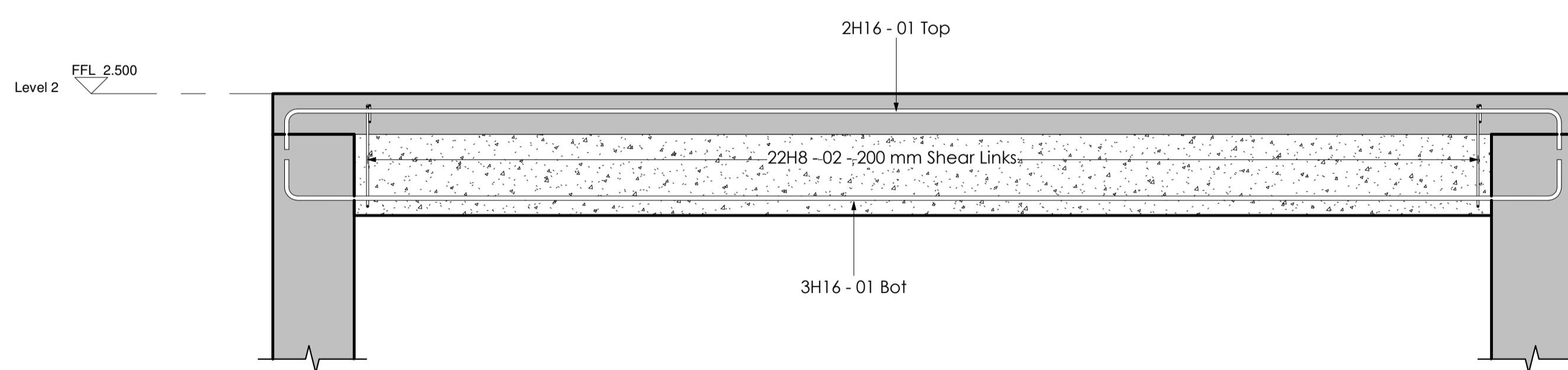
**RING BEAM SECTION DETAIL**

SCALE 1:10



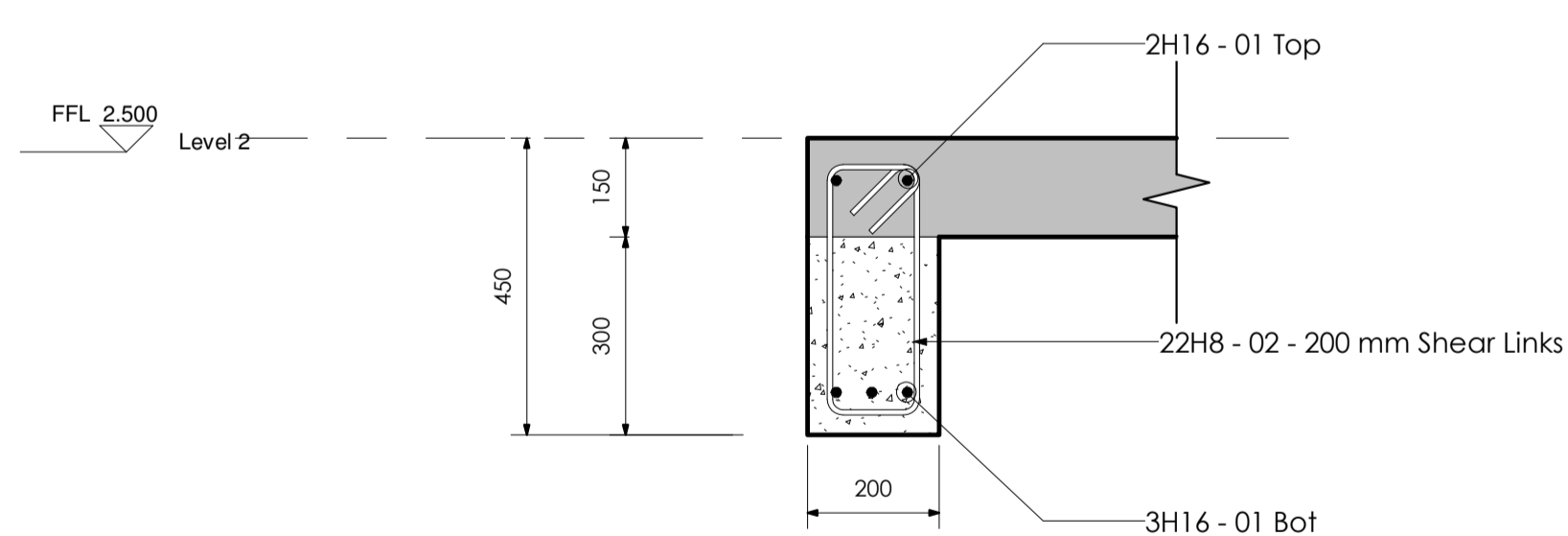
**RING BEAM X - X ELEVATION DETAIL**

SCALE 1:15



**RING BEAM X - X ELEVATION DETAIL**

SCALE 1:15



**LANDING BEAM SECTION DETAIL**


SCALE 1:10

**NOTES**

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED.
- ALL EXPOSED CONCRETE EDGES HAVE A 25mm x 25mm CHAMFER.
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT.
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING.
- ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED.
- ABBREVIATIONS:  
RC - REINFORCED CONCRETE.  
DPC - DAMP PROOF COURSE.  
EGL - EXISTING GROUND LEVEL.  
FGL - FINISHED GROUND LEVEL.  
FFL - FINISHED FLOOR LEVEL.  
PCC - PRECAST CONCRETE.  
GCI - GALVANIZED CORRUGATED IRON.  
H - HIGH YIELD DEFORMED BARS TO BS 4449:2005.
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 x 40 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE.
- FOR WINDOW SCHEDULES SEE DRG. NO. MWS/SD/29.
- FOR DOOR SCHEDULES SEE DRG. NO. MWS/SD/28.

REVISION	DESCRIPTION	DATE

CLIENT



NORTHERN WATER WORKS DEVELOPMENT AGENCY  
P.O. BOX 495 - 70100  
GARISSA.

PROJECT

**MARALAL WATER SUPPLY PROJECT**

REVIEWED BY



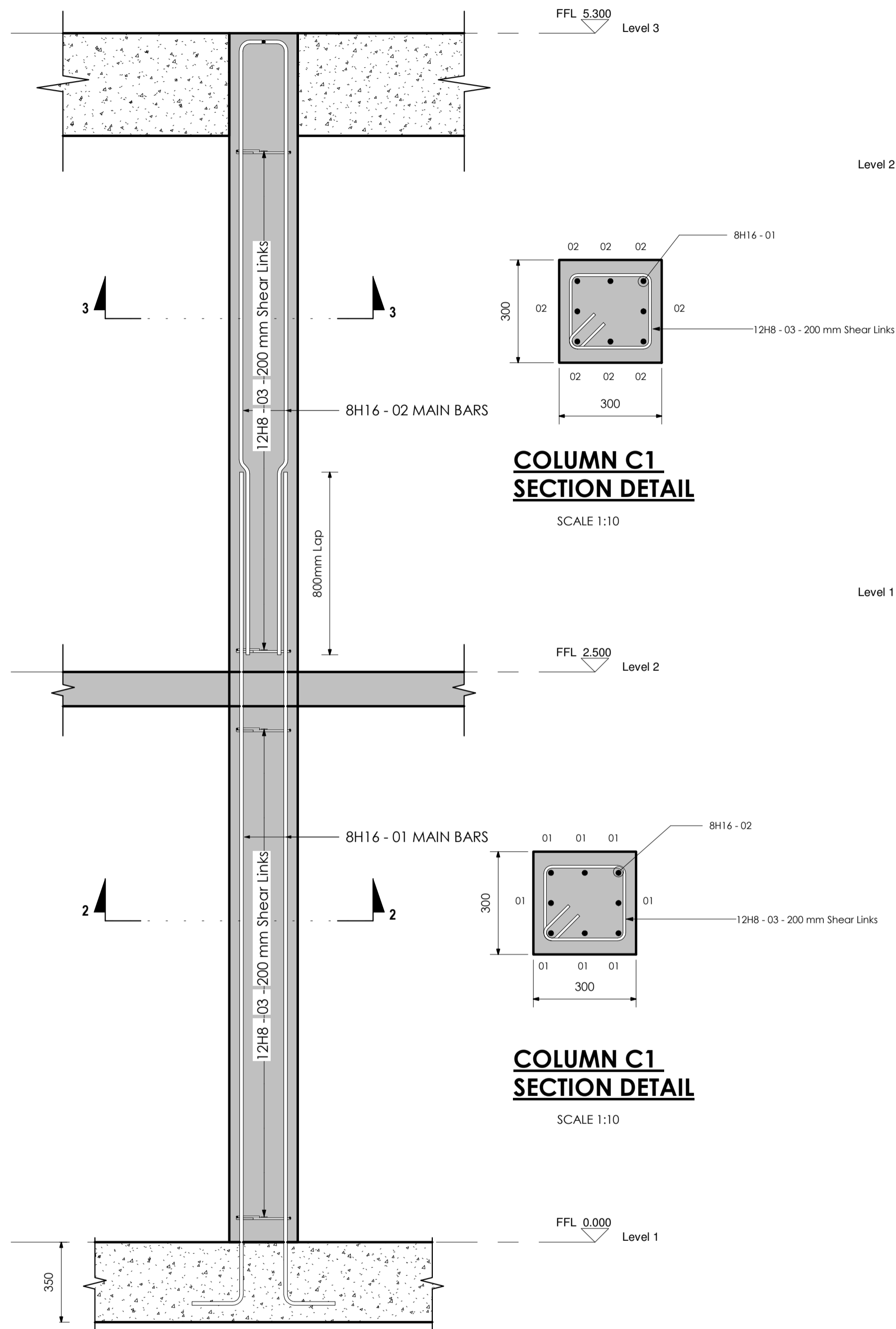
Interconsult Engineers Ltd  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane.  
Tel. 4441648/4441651  
NAIROBI.

DRAWING TITLE

**BACKWASH PUMP HOUSE STRUCTURAL DETAILING**

RC BEAM REINFORCEMENT DETAILS

Designed By:	N.M.	Drawn By:	G.G.
Checked By:	P.M.M.	Approved By:	K.M.
Scale:	AS SHOWN	Date:	FEBRUARY 2024
DRAWING No.	MWS/TW/BWPH - STR/04	REV.	0

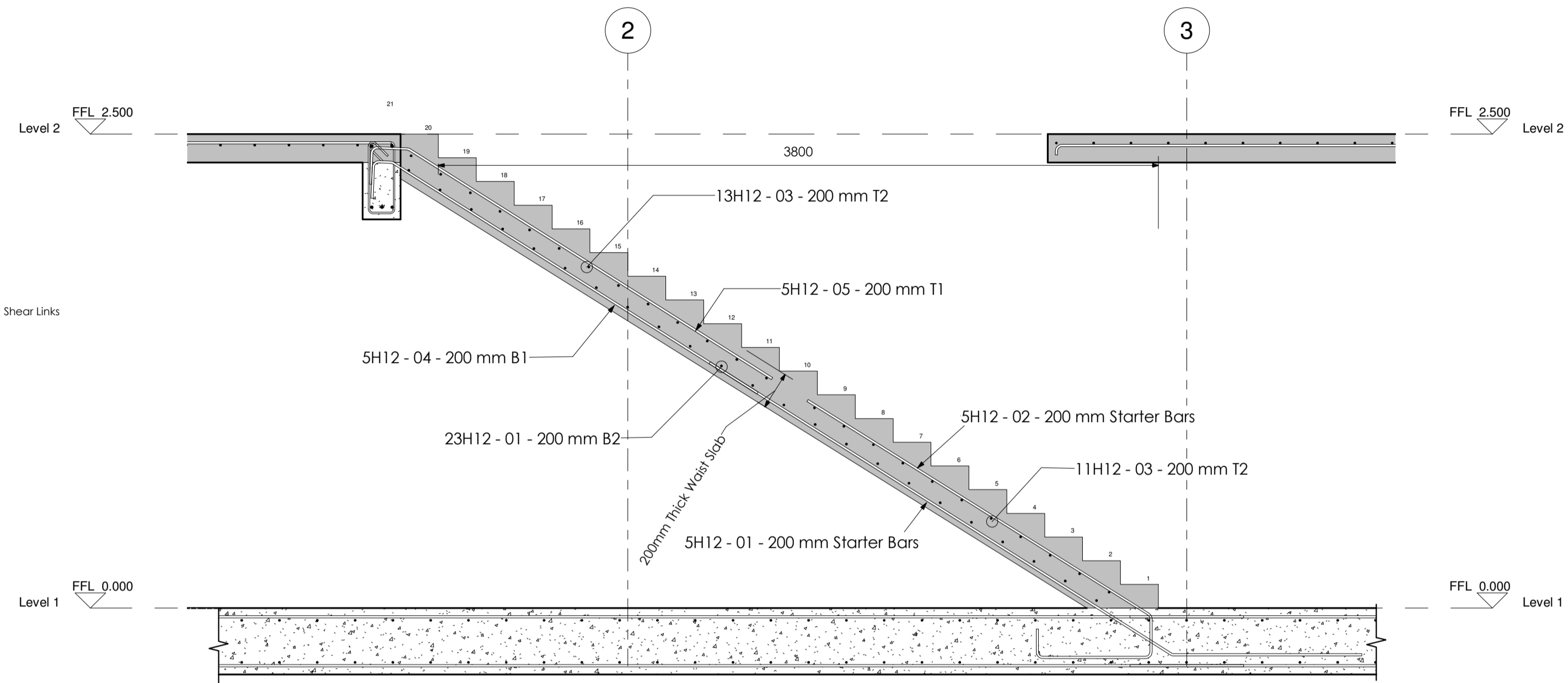


**COLUMN C1 SECTION DETAIL**  
SCALE 1:10

**COLUMN C1 SECTION DETAIL**  
SCALE 1:10

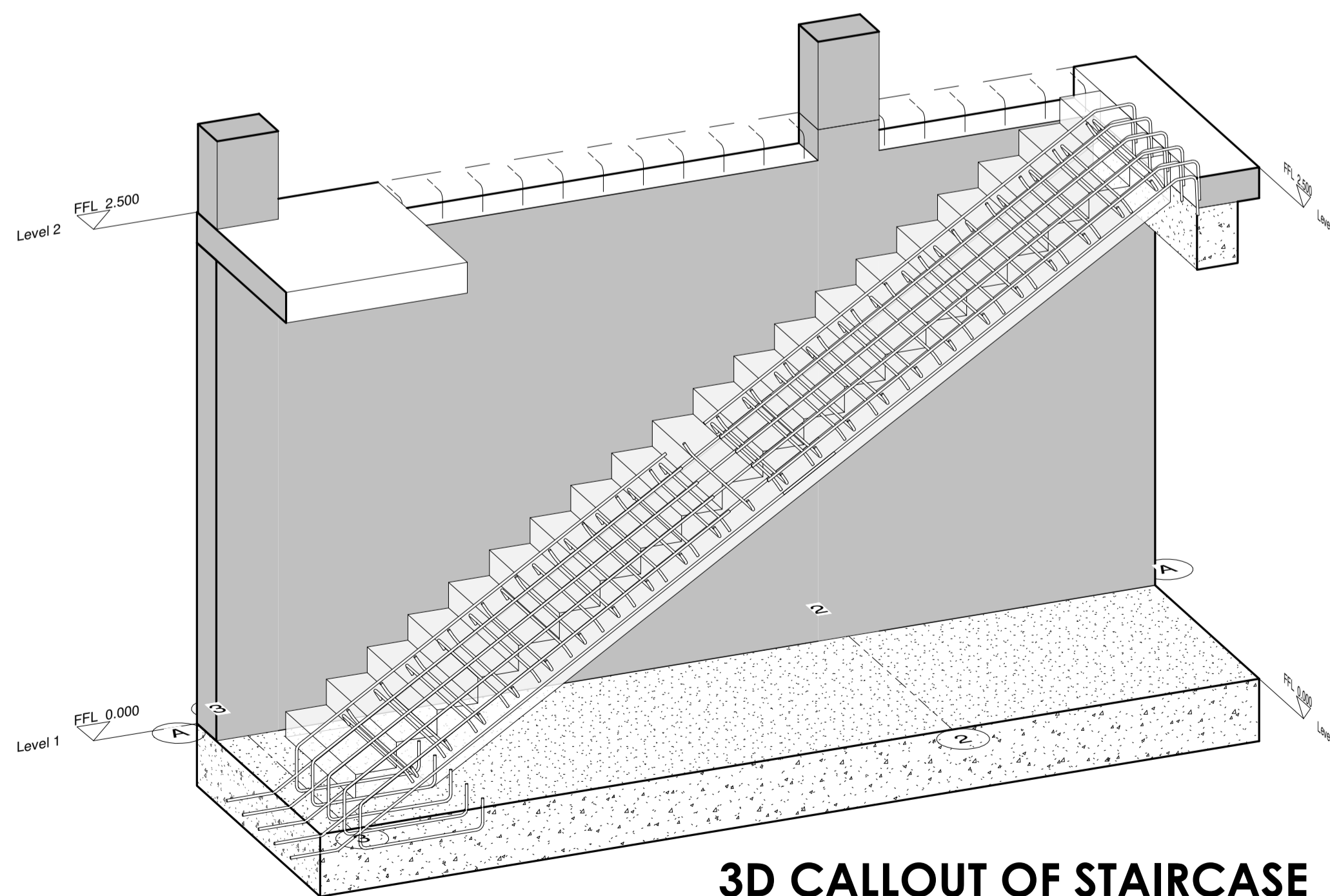
**COLUMN C1 ELEVATION DETAIL**

SCALE 1:15



**RC STAIRCASE ELEVATION DETAIL**

SCALE 1:15



**3D CALLOUT OF STAIRCASE**


SCALE 1:15

**NOTES**

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED.
- ALL EXPOSED CONCRETE EDGES HAVE A 25mm x 25mm CHAMFER.
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT.
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING.
- ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED.
- ABBREVIATIONS:  
RC - REINFORCED CONCRETE.  
DPC - DAMP PROOF COURSE.  
EGL - EXISTING GROUND LEVEL.  
FGL - FINISHED GROUND LEVEL.  
FFL - FINISHED FLOOR LEVEL.  
PCC - PRECAST CONCRETE.  
GCI - GALVANIZED CORRUGATED IRON.  
H - HIGH YIELD DEFORMED BARS TO BS 4449:2005.
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 40 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE.
- FOR WINDOW SCHEDULES SEE DRG. NO. MWS/SD/29.
- FOR DOOR SCHEDULES SEE DRG. NO. MWS/SD/28.

REVISION	DESCRIPTION	DATE

CLIENT



NORTHERN WATER WORKS DEVELOPMENT AGENCY  
P.O. BOX 495 - 70100  
GARISSA.

PROJECT

**MARALAL WATER SUPPLY PROJECT**

REVIEWED BY



Interconsult Engineers Ltd  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane.  
Tel. 4441648/4441651  
NAIROBI.

DRAWING TITLE

**BACKWASH PUMP HOUSE STRUCTURAL DETAILING**

STAIRCASE AND COLUMN REINFORCEMENT DETAILS

Designed By:	N.M.	Drawn By:	G.G.
Checked By:	P.M.M.	Approved By:	K.M.
Scale:	AS SHOWN	Date:	FEBRUARY 2024
DRAWING No.	MWS/TW/BWPH - STR/05	REV.	0

WALLS BBS															
STRUCTURAL ELEMENT	BAR SIZE	BAR MARK	BAR LENGTH	BAR PLACEMENT	QUANTITY	TOTAL BAR LENGTH	Shape	Shape Image	A	B	C	D	E	REINFORCEMENT VOLUME	REBAR WEIGHT
RC WALL	12 mm	01	3425 mm	Main Bars	162	554850 mm	21		100 mm	2775 mm	600 mm	0 mm	0 mm	62752.06 cm³	517.23 kg
RC WALL	12 mm	02	3421 mm	Main Bars	162	554202 mm	23		600 mm	2775 mm	96 mm	0 mm	0 mm	62678.77 cm³	516.63 kg
RC WALL	12 mm	03	5234 mm	Transverse Reinforcement	26	136084 mm	21		306 mm	4672 mm	306 mm	0 mm	0 mm	15390.74 cm³	126.86 kg
RC WALL	12 mm	04	5008 mm	Transverse Reinforcement	37	185296 mm	21		366 mm	4325 mm	366 mm	0 mm	0 mm	20956.48 cm³	172.73 kg
RC WALL	12 mm	05	6592 mm	Transverse Reinforcement	52	342784 mm	11		336 mm	6281 mm	0 mm	0 mm	0 mm	38767.96 cm³	319.54 kg
RC WALL	12 mm	06	6443 mm	Transverse Reinforcement	52	335036 mm	11		336 mm	6132 mm	0 mm	0 mm	0 mm	37891.68 cm³	312.32 kg
TOTAL					491	2108252 mm								238437.68 cm³	1965.32 kg

FOUNDATION SLAB BBS															
STRUCTURAL ELEMENT	BAR SIZE	BAR MARK	BAR LENGTH	BAR PLACEMENT	QUANTITY	TOTAL BAR LENGTH	Shape	Shape Image	A	B	C	D	E	REINFORCEMENT VOLUME	REBAR WEIGHT
FOUNDATION SLAB	12 mm	01	6785 mm	B1	58	393530 mm	11		6710 mm	100 mm	0 mm	0 mm	0 mm	44507.19 cm³	366.85 kg
FOUNDATION SLAB	12 mm	01	6785 mm	T1	58	393530 mm	11		6710 mm	100 mm	0 mm	0 mm	0 mm	44507.19 cm³	366.85 kg
FOUNDATION SLAB	12 mm	02	5570 mm	B2	65	362050 mm	21		100 mm	5420 mm	100 mm	0 mm	0 mm	40946.89 cm³	337.50 kg
FOUNDATION SLAB	12 mm	02	5570 mm	T2	65	362050 mm	21		100 mm	5420 mm	100 mm	0 mm	0 mm	40946.89 cm³	337.50 kg
TOTAL					246	1511160 mm								170908.17 cm³	1408.71 kg

COLUMNS BBS															
STRUCTURAL ELEMENT	BAR SIZE	BAR MARK	BAR LENGTH	BAR PLACEMENT	QUANTITY	TOTAL BAR LENGTH	Shape	Shape Image	A	B	C	D	E	REINFORCEMENT VOLUME	REBAR WEIGHT
COLUMN	16 mm	01	3844 mm	Main Bars	80	307520 mm	11		225 mm	3652 mm	0 mm	0 mm	0 mm	61830.56 cm³	509.64 kg
COLUMN	16 mm	02	2771 mm	Bot	20	55420 mm	34		1859 mm	52 mm	813 mm	46 mm	100 mm	11142.85 cm³	91.84 kg
COLUMN	16 mm	02	2771 mm	Main Bars	60	166260 mm	34		1859 mm	52 mm	813 mm	46 mm	100 mm	33428.56 cm³	275.53 kg
COLUMN	8 mm	03	1098 mm	Shear Links	240	263520 mm	Rebar Shape 9		220 mm	240 mm	114 mm	114 mm	0 mm	13245.96 cm³	109.18 kg
TOTAL					400	792720 mm								119647.93 cm³	986.20 kg

RING BEAMS BBS															
STRUCTURAL ELEMENT	BAR SIZE	BAR MARK	BAR LENGTH	BAR PLACEMENT	QUANTITY	TOTAL BAR LENGTH	Shape	Shape Image	A	B	C	D	E	REINFORCEMENT VOLUME	REBAR WEIGHT
RING BEAM	16 mm	01	4948 mm	Bot	5	24740 mm	21		142 mm	4730 mm	142 mm	0 mm	0 mm	4974.27 cm³	41.00 kg
RING BEAM	16 mm	01	4958 mm	Bot	20	99160 mm	21		142 mm	4740 mm	142 mm	0 mm	0 mm	19937.30 cm³	164.33 kg
RING BEAM	16 mm	02	6429 mm	Bot	6	38574 mm	11		142 mm	6320 mm	0 mm	0 mm	0 mm	7755.76 cm³	63.93 kg
RING BEAM	16 mm	02	6433 mm	Bot	6	38598 mm	11		142 mm	6324 mm	0 mm	0 mm	0 mm	7760.59 cm³	63.97 kg
RING BEAM	8 mm	02	1238 mm	Shear Links	222	274836 mm	Rebar Shape 9		390 mm	140 mm	114 mm	114 mm	0 mm	13814.76 cm³	113.87 kg
RING BEAM	16 mm	02	6429 mm	Top	4	25716 mm	11		142 mm	6320 mm	0 mm	0 mm	0 mm	5170.51 cm³	42.62 kg
RING BEAM	16 mm	02	6433 mm	Top	4	25732 mm	11		142 mm	6324 mm	0 mm	0 mm	0 mm	5173.73 cm³	42.64 kg
TOTAL					267	527356 mm								64586.92 cm³	532.36 kg

## NOTES

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED.
- ALL EXPOSED CONCRETE EDGES HAVE A 25mm x 25mm CHAMFER.
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT.
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING.
- ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED.
- ABBREVIATIONS:
  - RC - REINFORCED CONCRETE.
  - DPC - DAMP PROOF COURSE.
  - EGL - EXISTING GROUND LEVEL.
  - FGL - FINISHED GROUND LEVEL.
  - FFL - FINISHED FLOOR LEVEL.
  - PCC - PRECAST CONCRETE.
  - GCI - GALVANIZED CORRUGATED IRON.
  - H - HIGH YIELD DEFORMED BARS TO BS 4449:2005.

- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 x 40 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE.
- FOR WINDOW SCHEDULES SEE DRG. NO. MWS/SD/29.
- FOR DOOR SCHEDULES SEE DRG. NO. MWS/SD/28.

REVISION	DESCRIPTION	DATE

CLIENT
 <b>NORTHERN WATER WORKS DEVELOPMENT AGENCY</b> P.O. BOX 495 - 70100 GARISSA.

PROJECT
<b>MARALAL WATER SUPPLY PROJECT</b>

REVIEWED BY
 <b>Interconsult Engineers Ltd</b> Consulting Engineers Jadala Place, 4th Floor, Ngong Lane. Tel. 4441648/4441651 NAIROBI.

DRAWING TITLE
<b>BACKWASH PUMP HOUSE STRUCTURAL DETAILING</b>
<b>QUANTITIES AND TAKE-OFFS [PART 1 OF 2]</b>

Designed By: N.M.	Drawn By: G.G.
Checked By: P.M.M.	Approved By: K.M.
Scale: AS SHOWN	Date: FEBRUARY 2024
DRAWING No: MWS/TW/BWPH - STR/06	REV: 0

SUSPENDED SLAB BBS															
STRUCTURAL ELEMENT	BAR SIZE	BAR MARK	BAR LENGTH	BAR PLACEMENT	QUANTITY	TOTAL BAR LENGTH	Shape	Shape Image	A	B	C	D	E	REINFORCEMENT VOLUME	REBAR WEIGHT
RC SUSPENDED SLAB	12 mm	01	1475 mm	T1	34	50150 mm	11		1000 mm	500 mm	0 mm	0 mm	0 mm	5671.83 cm³	46.75 kg
RC SUSPENDED SLAB	12 mm	01	4770 mm	T2	11	52470 mm	21		50 mm	4720 mm	50 mm	0 mm	0 mm	5934.22 cm³	48.91 kg
RC SUSPENDED SLAB	12 mm	02	1256 mm	T1	15	18840 mm	11		500 mm	781 mm	0 mm	0 mm	0 mm	2130.75 cm³	17.56 kg
RC SUSPENDED SLAB	12 mm	03	1289 mm	T2	56	72184 mm	11		808 mm	506 mm	0 mm	0 mm	0 mm	8163.82 cm³	67.29 kg
RC SUSPENDED SLAB	12 mm	04	2737 mm	T1	20	54740 mm	11		1006 mm	1756 mm	0 mm	0 mm	0 mm	6190.95 cm³	51.03 kg
RC SUSPENDED SLAB	12 mm	05	6761 mm	T2	6	40566 mm	21		50 mm	6705 mm	56 mm	0 mm	0 mm	4587.91 cm³	37.82 kg
RC SUSPENDED SLAB	12 mm	06	4778 mm	T2	5	23890 mm	21		50 mm	4720 mm	58 mm	0 mm	0 mm	2701.90 cm³	22.27 kg
RC SUSPENDED SLAB	12 mm	07	6342 mm	T2	12	76104 mm	11		50 mm	6317 mm	0 mm	0 mm	0 mm	8607.16 cm³	70.94 kg
TOTAL					159	388944 mm								43988.53 cm³	362.58 kg

STAIRCASE BBS															
STRUCTURAL ELEMENT	BAR SIZE	BAR MARK	BAR LENGTH	BAR PLACEMENT	QUANTITY	TOTAL BAR LENGTH	Shape	Shape Image	A	B	C	D	E	REINFORCEMENT VOLUME	REBAR WEIGHT
STAIRCASE	12 mm	01	840 mm	B2	23	19320 mm	21		75 mm	740 mm	75 mm	0 mm	0 mm	2185.04 cm³	18.01 kg
STAIRCASE	12 mm	01	3887 mm	Starter Bars	5	19435 mm	Rebar Shape 4		1003 mm	2888 mm	0 mm	535 mm	848 mm	2198.05 cm³	18.12 kg
STAIRCASE	12 mm	02	3080 mm	Starter Bars	5	15400 mm	36		2142 mm	229 mm	612 mm	156 mm	1815 mm	1741.70 cm³	14.36 kg
STAIRCASE	12 mm	03	1680 mm	T2	24	20147 mm	21		75 mm	740 mm	75 mm	0 mm	0 mm	2278.57 cm³	18.78 kg
STAIRCASE	12 mm	04	2560 mm	B1	5	12800 mm	27		2282 mm	107 mm	200 mm	1141 mm	1976 mm	1447.65 cm³	11.93 kg
STAIRCASE	12 mm	05	2642 mm	T1	5	13210 mm	27		2270 mm	200 mm	200 mm	1135 mm	1966 mm	1494.02 cm³	12.31 kg
TOTAL			14689 mm		67	100312 mm								11345.02 cm³	93.51 kg

BEAMS CONCRETE SCHEDULE		
STRUCTURAL ELEMENT	ELEMENT SIZE	CONCRETE VOLUME
RC LANDING BEAM	[450mm x 200mm]	0.25 m³
RC RING BEAM	[450mm x 200mm]	3.80 m³
TOTALS		4.05 m³

FOUNDATION SLAB CONCRETE SCHEDULE		
STRUCTURAL ELEMENT	ELEMENT SIZE	CONCRETE VOLUME
RC FOUNDATION SLAB	350mm Thick	24.83 m³
TOTAL		24.83 m³

RC STAIRCASE CONCRETE SCHEDULE	
STRUCTURAL ELEMENT	CONCRETE VOLUME
RC STAIRCASE	0.92 m³

COLUMNS CONCRETE SCHEDULE			
STRUCTURAL ELEMENT	ELEMENT SIZE	LENGTH IN mm	CONCRETE VOLUME
RC COLUMN	[300mm x 300mm]	53000	4.66 m³
TOTAL		53000	4.66 m³

MAIN WALL CONCRETE SCHEDULE				
STRUCTURAL ELEMENT	ELEMENT SIZE	LENGTH IN mm	HEIGHT IN mm	CONCRETE VOLUME
RC MAIN WALL	300mm Thick RC Wall	21200	18800	14.95 m³
RC MAIN WALL	300mm Thick RC Wall	8400	4700	5.92 m³
TOTAL		29600	23500	20.87 m³

## NOTES

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED.
- ALL EXPOSED CONCRETE EDGES HAVE A 25mm x 25mm CHAMFER.
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT.
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING.
- ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED.
- ABBREVIATIONS:
  - RC - REINFORCED CONCRETE.
  - DPC - DAMP PROOF COURSE.
  - EGL - EXISTING GROUND LEVEL.
  - FGL - FINISHED GROUND LEVEL.
  - FFL - FINISHED FLOOR LEVEL.
  - PCC - PRECAST CONCRETE.
  - GCI - GALVANIZED CORRUGATED IRON.
  - H - HIGH YIELD DEFORMED BARS TO BS 4449:2005.
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE.
- FOR WINDOW SCHEDULES SEE DRG. NO. MWS/SD/29.
- FOR DOOR SCHEDULES SEE DRG. NO. MWS/SD/28.

REVISION	DESCRIPTION	DATE

CLIENT



NORTHERN WATER WORKS DEVELOPMENT AGENCY  
P.O. BOX 495 - 70100  
GARISSA.

PROJECT

**MARALAL WATER SUPPLY PROJECT**

REVIEWED BY



Interconsult Engineers Ltd  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane.  
Tel. 4441648/4441651  
NAIROBI.

DRAWING TITLE

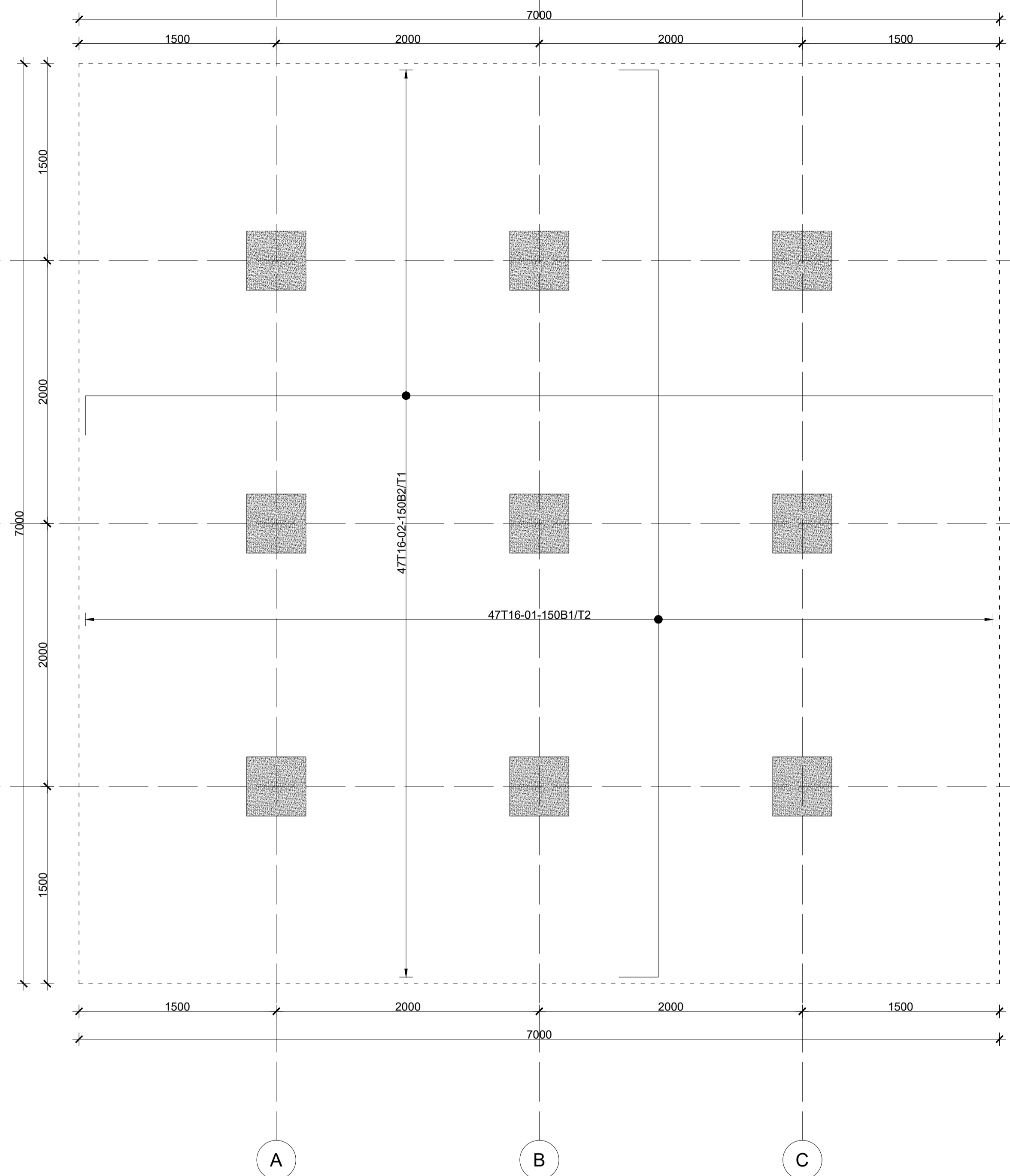
**BACKWASH PUMP HOUSE STRUCTURAL DETAILING**

QUANTITIES AND TAKE-OFFS [PART 2 OF 2]

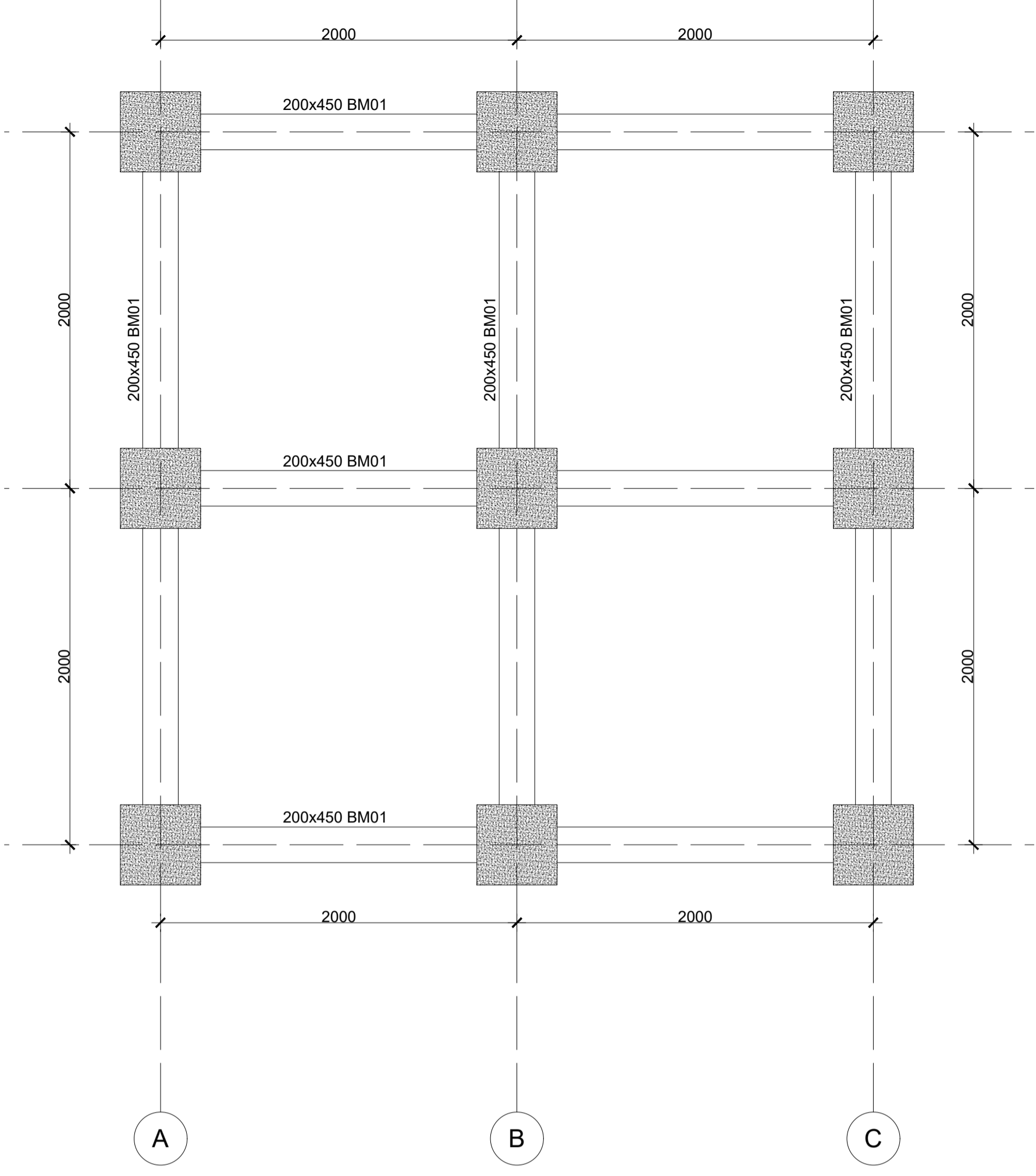
Designed By:	N.M.	Drawn By:	G.G.
Checked By:	P.M.M.	Approved By:	K.M.
Scale:	AS SHOWN	Date:	FEBRUARY 2024
DRAWING No.	MWS/TW/BWPH - STR/07	REV.	0

# **ELEVATED BACKWASH WATER TANK**

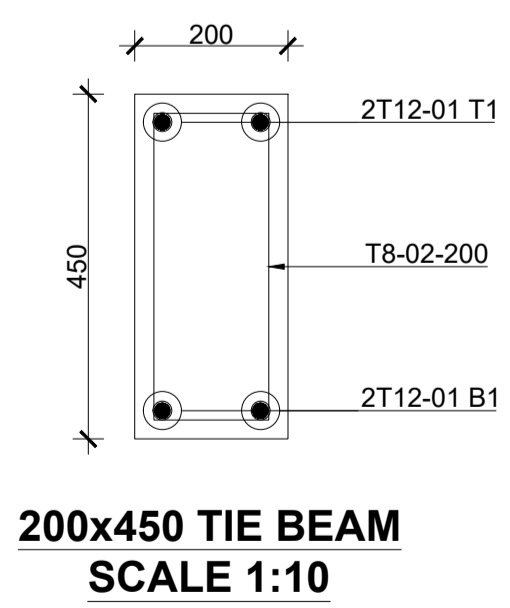




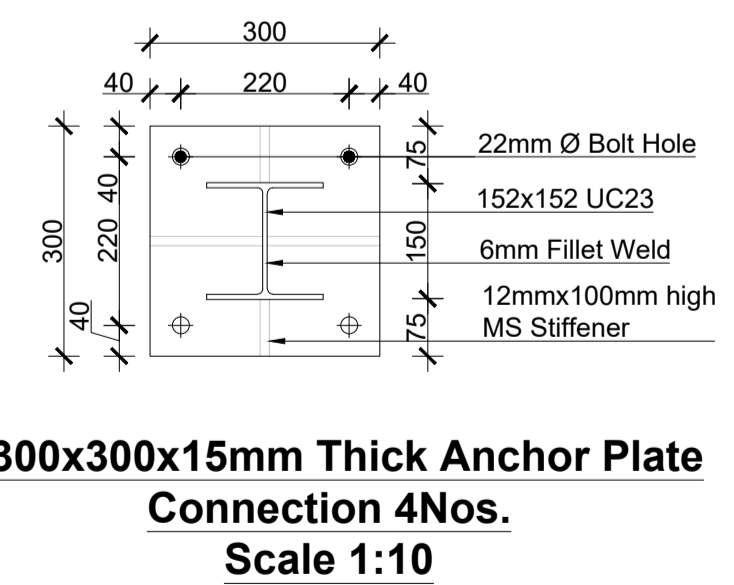
**700MM THICK ELEVATED BACKWASH WATER TOWER RAFT FOUNDATION LAYOUT**  
Scale 1:25



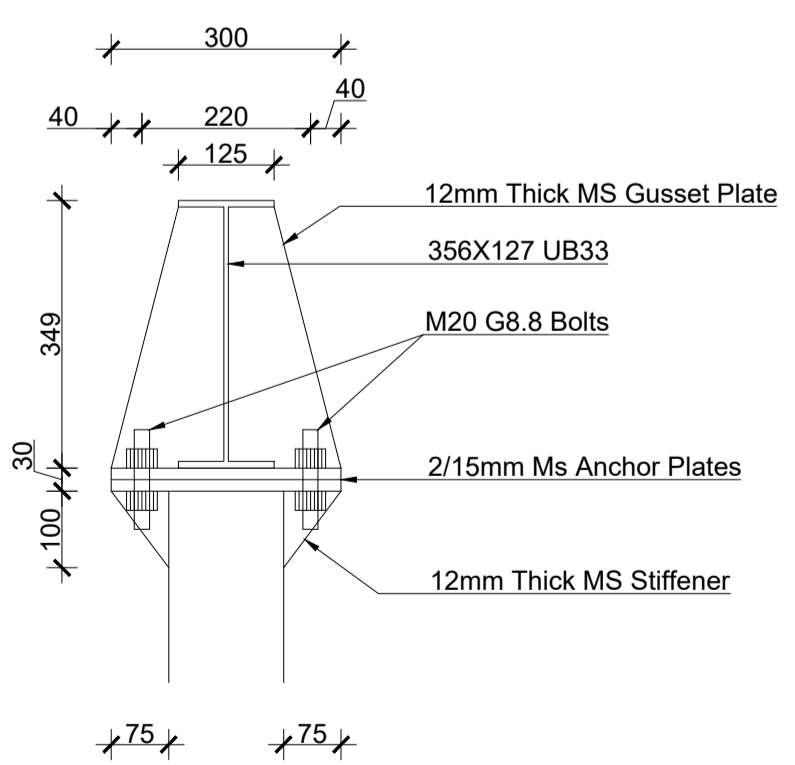
**ELEVATED BACKWASH WATER TOWER TIE BEAM LAYOUT**  
Scale 1:25



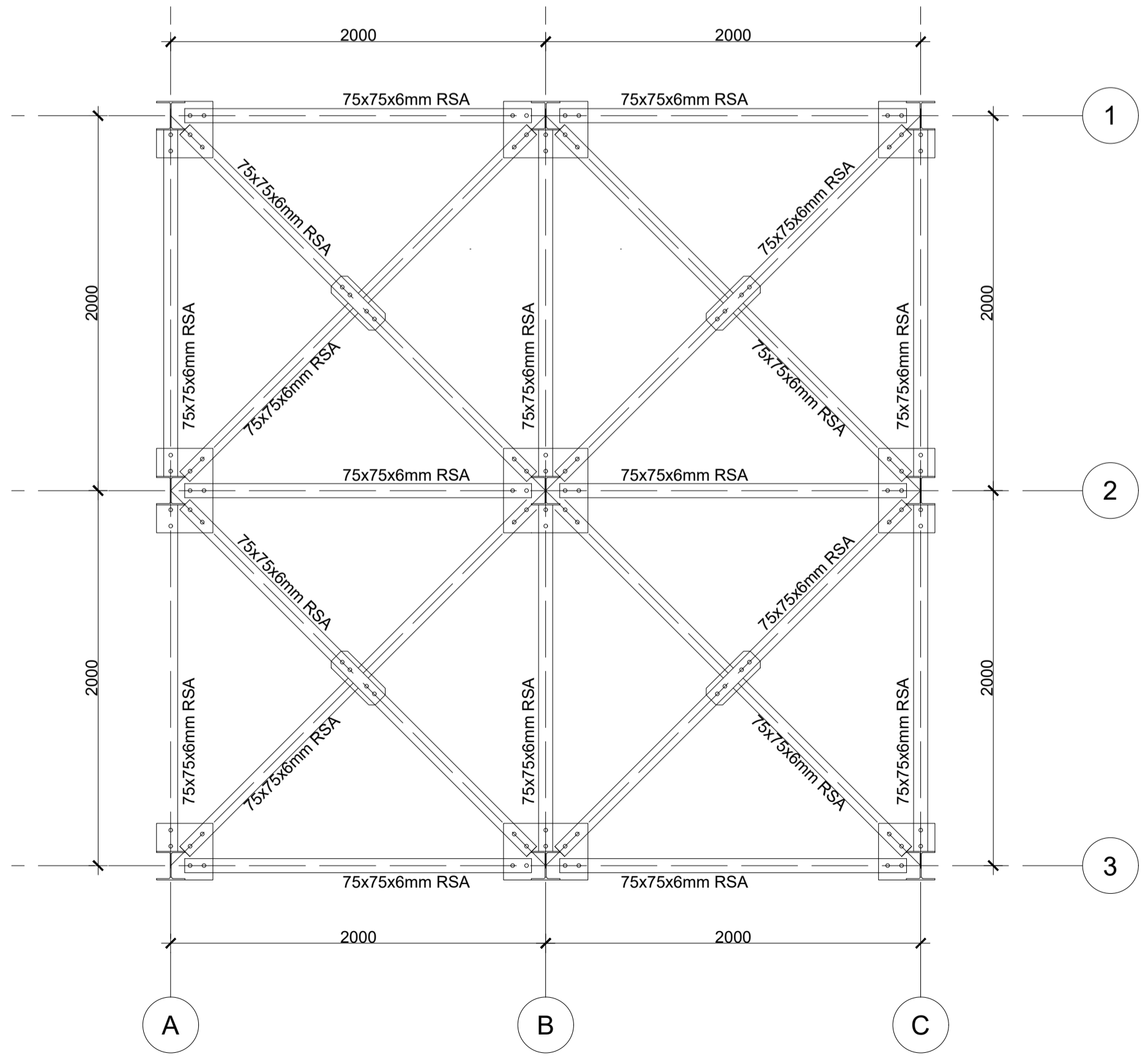
**200x450 TIE BEAM**  
SCALE 1:10



**2/300x300x15mm Thick Anchor Plate Connection 4Nos.**  
Scale 1:10




**300x300x15mm Thick Base Plate Connection 4Nos.**  
Scale 1:10



**SECTION THROUGH ELEVATED BACKWASH WATER TOWER HORIZONTAL BRACING**  
SCALE 1:25

- NOTES:**
- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
  - ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
  - ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
  - ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
  - CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
  - ABBREVIATIONS
    - R.C - REINFORCED CONCRETE
    - D.P.C - DAMP PROOF COURSE
    - E.G.L - EXISTING GROUND LEVEL
    - F.G.L - FINISHED GROUND LEVEL
    - F.F.L - FINISHED FLOOR LEVEL
    - P.C.C - PRECAST CONCRETE
    - G.C.I - GALVANIZED CORRUGATED IRON
  - EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE

REVISION	DESCRIPTION	DATE

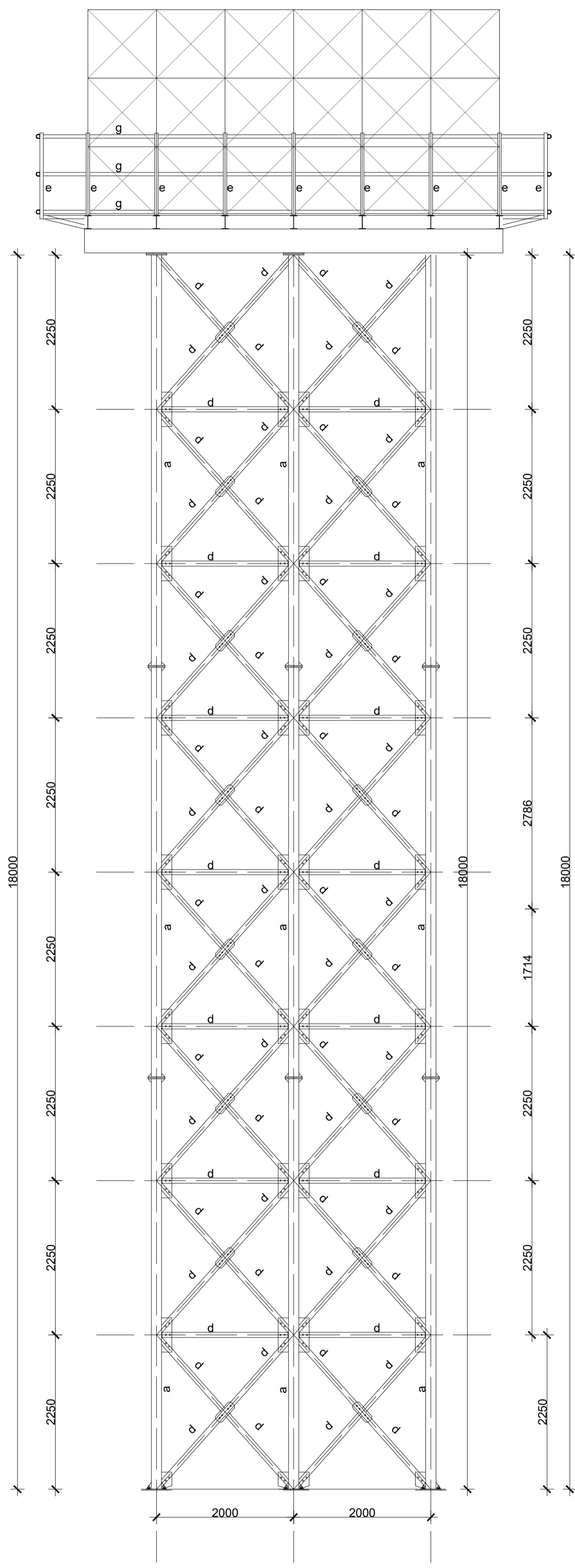
CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:  

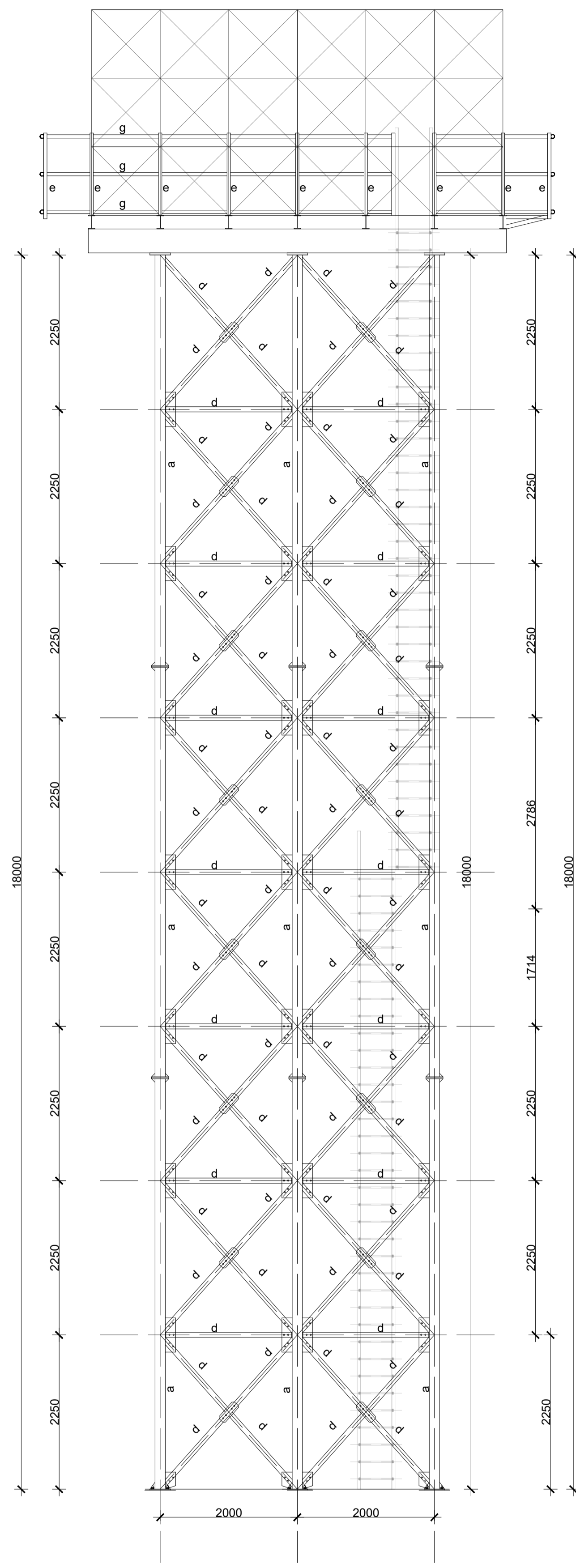
**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT**  
**ELEVATED BACKWASH TANK**  
**FOUNDATION DETAILS & SECTIONS**

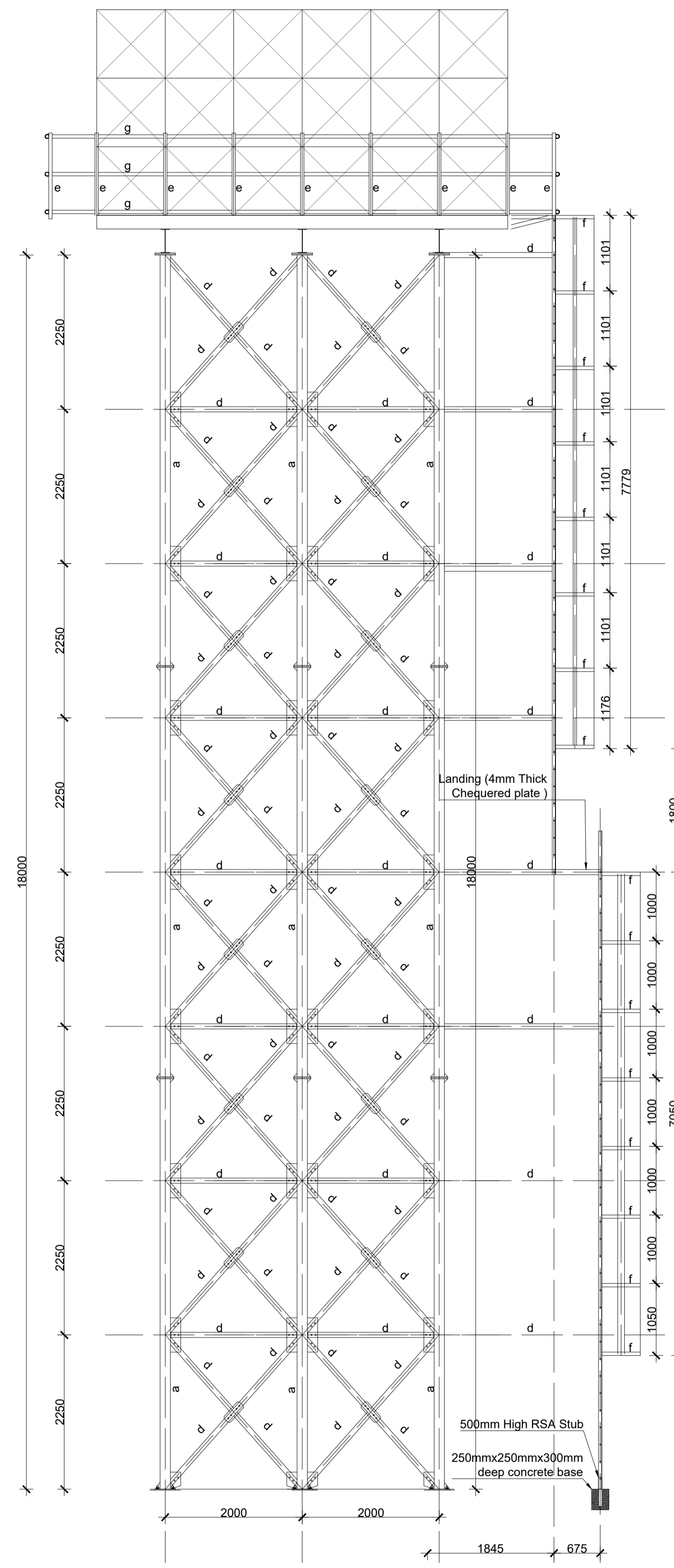
Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Checked by: As shown	Date: FEBRUARY 2024
DRAWING No. MWS/TW/BT/01	REV. 0



**WATER TOWER ELEVATION 02**  
SCALE 1:50



**WATER TOWER ELEVATION 04**  
SCALE 1:50




**WATER TOWER ELEVATION 01**  
SCALE 1:50

**NOTES:**

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
- ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
- CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
- ABBREVIATIONS
  - R.C - REINFORCED CONCRETE
  - D.P.C - DAMP PROOF COURSE
  - E.G.L - EXISTING GROUND LEVEL
  - F.G.L - FINISHED GROUND LEVEL
  - F.F.L - FINISHED FLOOR LEVEL
  - P.C.C - PRECAST CONCRETE
  - G.C.I - GALVANIZED CORRUGATED IRON
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE

LEGEND	
LABEL	ELEMENT
A	152x152 UC23
B	356x127 UB33
C	IPE 200
D	75x75x6mm RSA
E	50x50x6mm RSA
F	50x8mm FLAT
G	25x2mm CHS

REVISION	DESCRIPTION	DATE

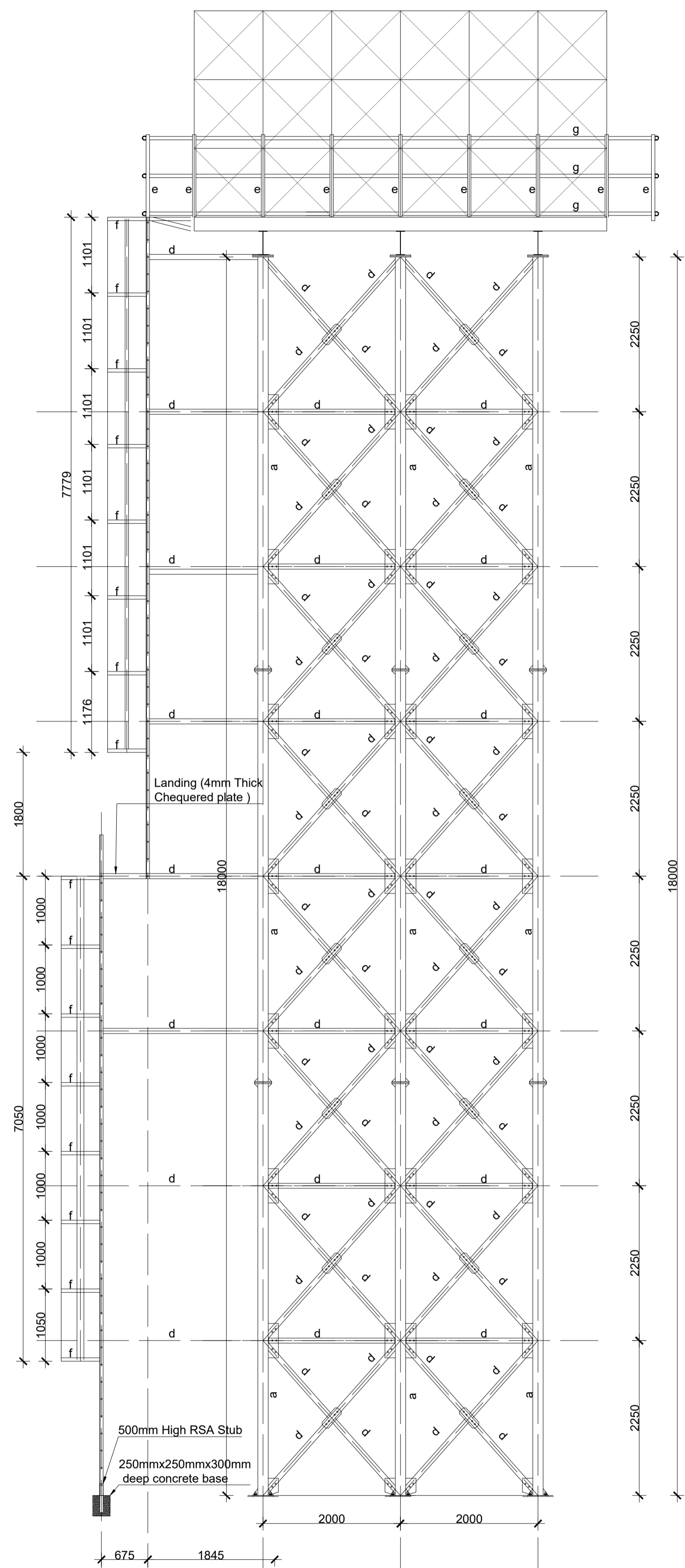
CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:  

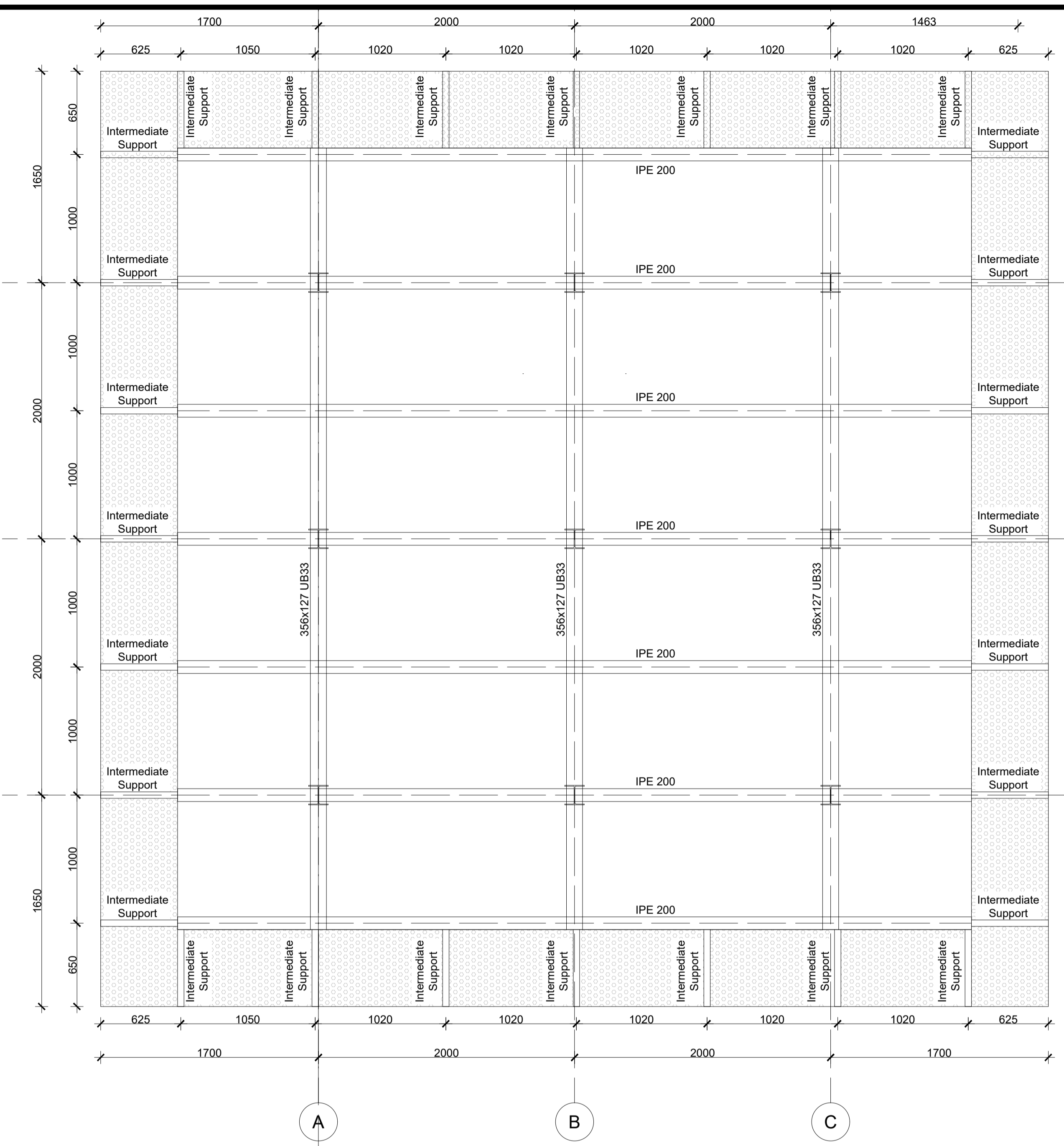
**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT**  
**ELEVATED BACKWASH TANK ELEVATIONS**

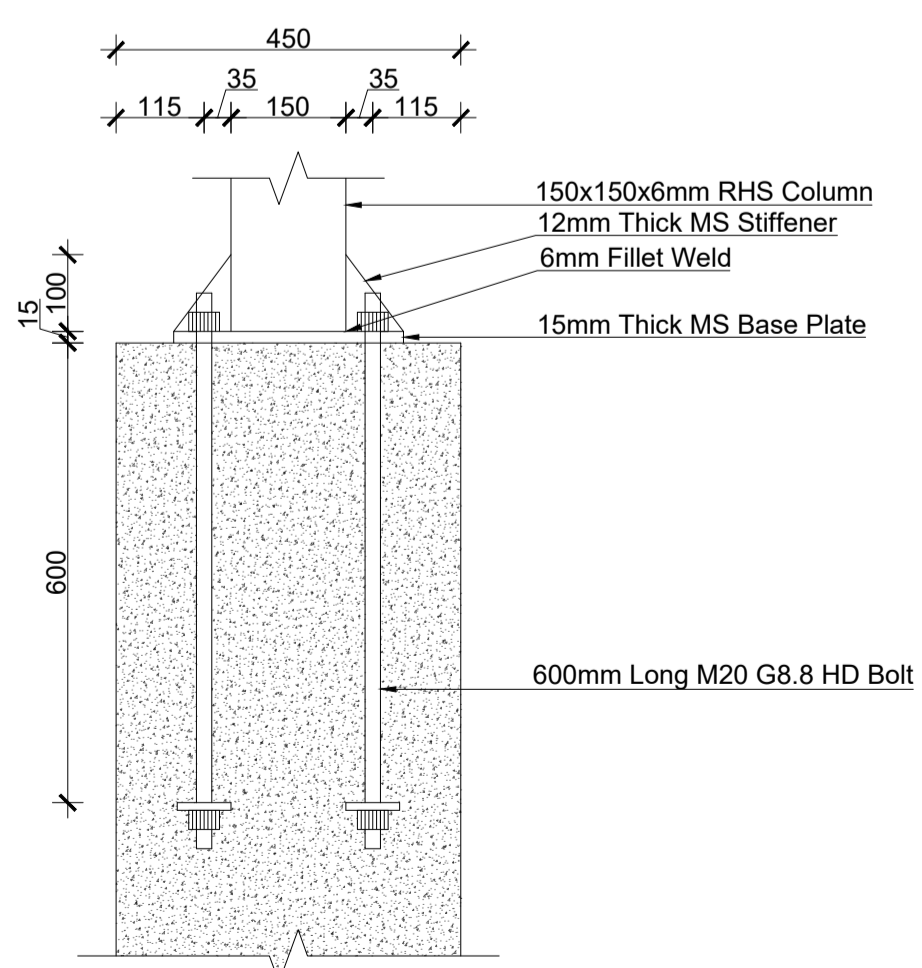
Designed by:	N.M	Drawn by:	I.M.W
Checked by:	P.M.M	Approved by:	K.M
Scale:	As shown	Date:	FEBRUARY 2024
DRAWING No.	MWS/TW/BT/02	REV.	0



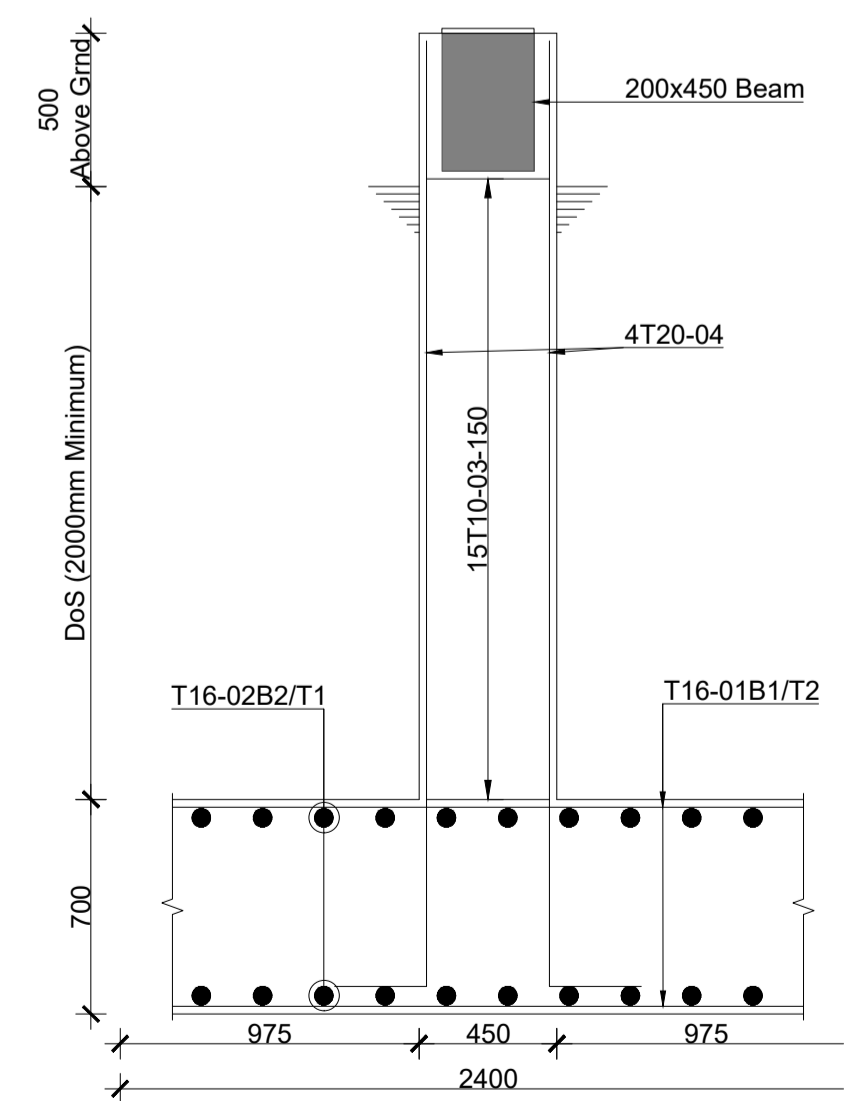
**WATER TOWER ELEVATION 03**  
SCALE 1:50



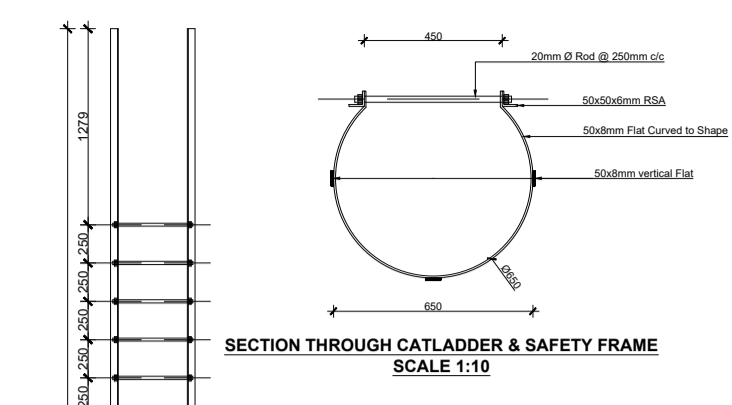
**ELEVATED BACKWASH WATER TOWER PLATFORM LAYOUT**  
SCALE 1:25



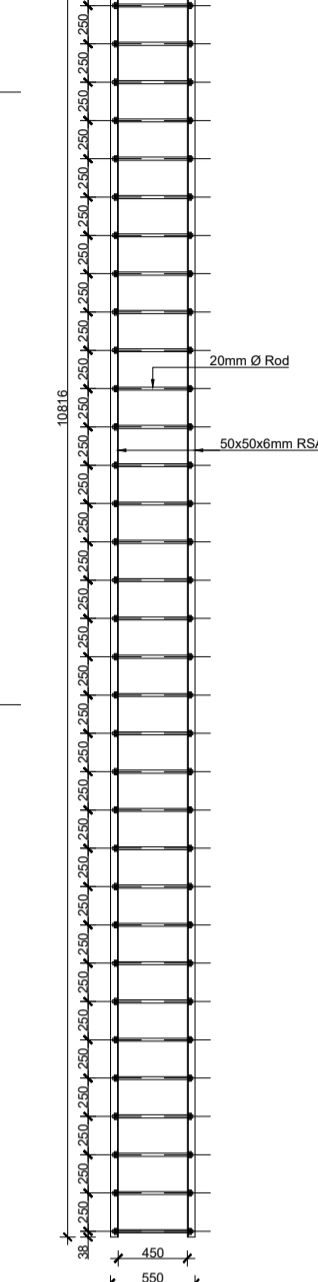
**Section Through Base Plate Connection**  
Scale 1:10



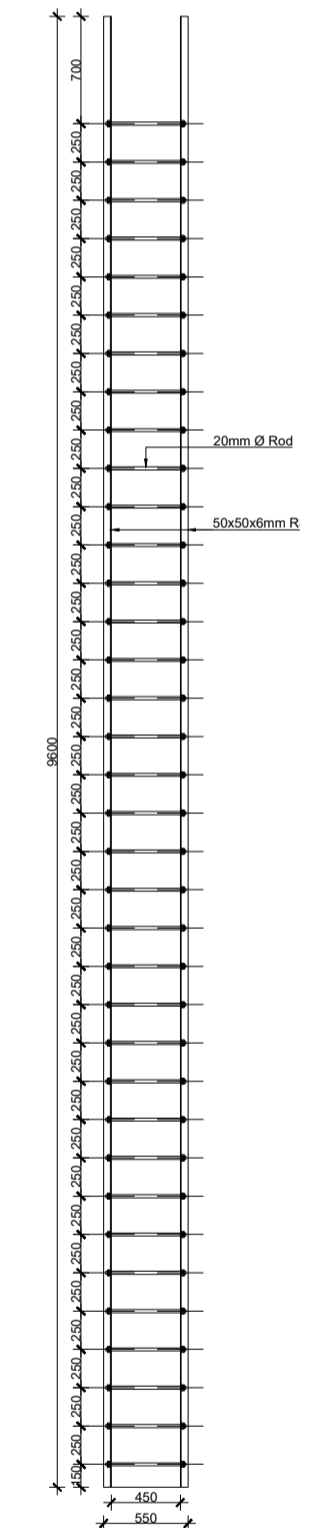
**450x450 STUB COLUMN 9Nos**  
Scale 1:25



**SECTION THROUGH CATLADDER & SAFETY FRAME**  
SCALE 1:10



**CATLADDER 2 LAYOUT**  
SCALE 1:25



**CATLADDER 1 LAYOUT**  
SCALE 1:25


**NOTES:**

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
- ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
- CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
- ABBREVIATIONS
  - R.C - REINFORCED CONCRETE
  - D.P.C - DAMP PROOF COURSE
  - E.G.L - EXISTING GROUND LEVEL
  - F.G.L - FINISHED GROUND LEVEL
  - F.F.L - FINISHED FLOOR LEVEL
  - P.C.C - PRECAST CONCRETE
  - G.C.I - GALVANIZED CORRUGATED IRON
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE

LEGEND	
LABEL	ELEMENT
A	152x152 UC23
B	356x127 UB33
C	IPE 200
D	75x75x6mm RSA
E	50x50x6mm RSA
F	50x8mm FLAT
G	25x2mm CHS

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:



**NORTHERN WATER WORKS  
DEVELOPMENT AGENCY**  
P.O. BOX 495-70100  
GARISSA

REVIEWED BY:

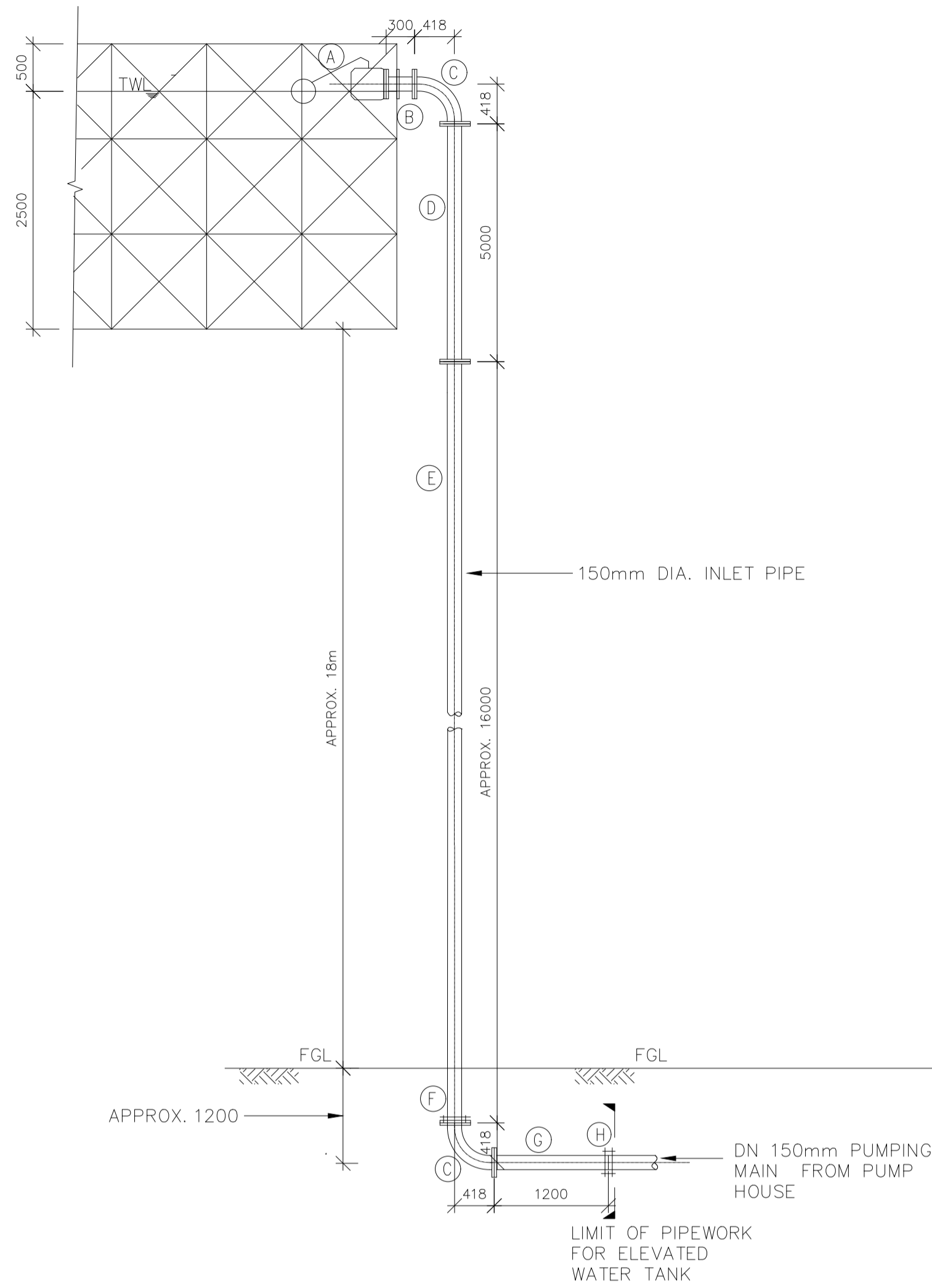


**Interconsult Engineers Ltd**  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane.  
Tel. 4441648/4441651  
Nairobi.

DRAWING TITLE:

**MARALAL WATER SUPPLY PROJECT**  
**ELEVATED BACKWASH TANK  
ELEVATION, PLATFORM DETAILS**

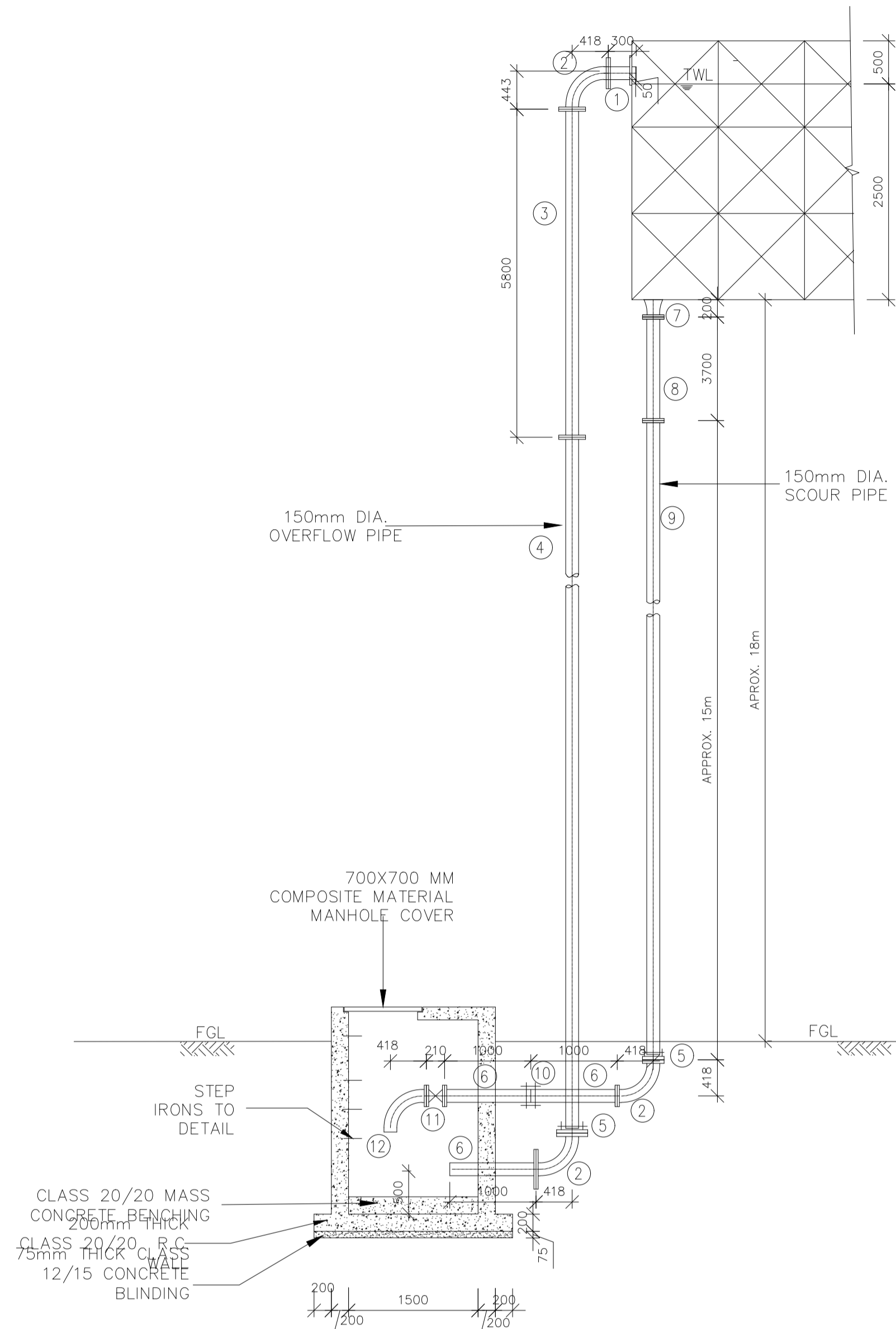
Designed by:	N.M	Drawn by:	I.M.W
Checked by:	P.M.M	Approved by:	K.M
Scale:	As shown	Date:	FEBRUARY 2024
DRAWING No.	MWS/TW/BT/03	REV.	0



### INLET PIPEWORK

INLET PIPEWORK SCHEDULE  
 APPROVED CEMENT LINED INTERNALLY & OPOXY  
 COATED EXTERNALLY STEEL PIPES AND FITTINGS

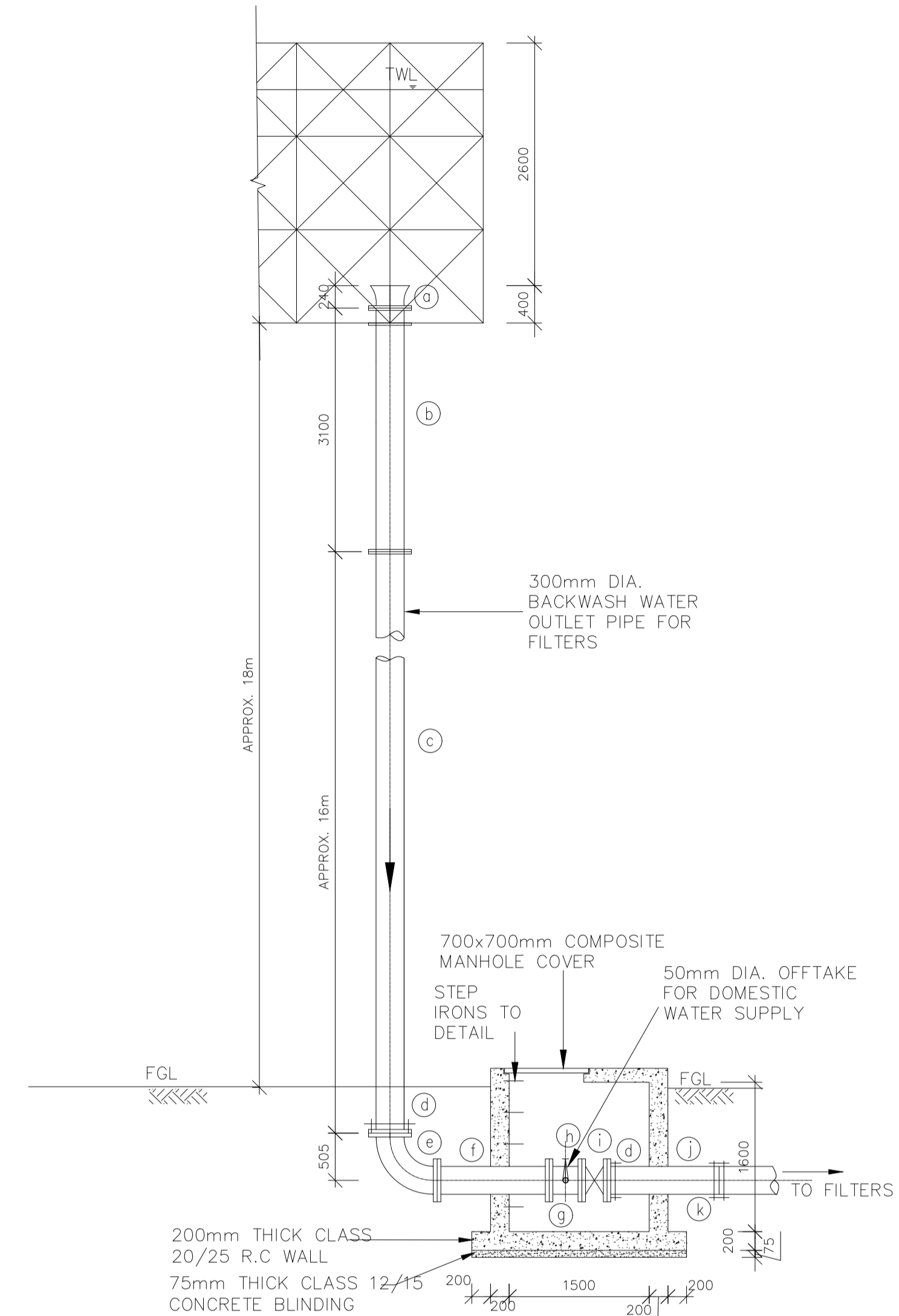
ITEM	DESCRIPTION	QTY
A	150mm DIA. FLANGED BALL FLOAT VALVE (SERIES 1048 BIWATER OR APPROVED EQUIVALENT).....	1Nr
B	150mm DIA. ALL FLANGED PIPE, 300mm LONG WITH PUDDLE FLANGE AT 125mm FROM ONE END (PUDDLE FLANGE WELDED TO TANK WALL PANEL).....	1Nr
C	150mm DIA. ALL FLANGED 90° BEND.....	2Nr
D	150mm DIA. ALL FLANGED PIPE 5000mm LONG.....	1Nr
E	150mm DIA. FLANGED SPIGOT PIPE 16m LONG (CUT TO SUIT ON SITE).....	1Nr
F	150mm DIA. FLANGE ADAPTOR.....	1Nr
G	150mm DIA. FLANGED SPIGOT PIPE 1200mm LONG.....	1Nr
H	150mm DIA. COUPLING.....	1Nr



### SCOUR & OVERFLOW PIPEWORK

SCOUR & OVERFLOW PIPEWORK SCHEDULE  
 APPROVED CEMENT LINED INTERNALLY & OPOXY  
 COATED EXTERNALLY STEEL PIPES AND FITTINGS

ITEM	DESCRIPTION	QTY
1	150mm DIA. FLANGED SPIGOT PIPE, LENGTH 300mm WITH PUDDLE FLANGE 60mm FROM SPIGOT END (PUDDLE FLANGE WELDED TO TANK PANEL).....	1Nr
2	150mm DIA. ALL FLANGED 90° BEND.....	3Nr
3	150mm DIA. ALL FLANGED PIPE 5800mm LONG.....	1Nr
4	150mm DIA. FLANGED SPIGOT PIPE 16m LONG (CUT TO SUIT ON SITE).....	1Nr
5	150mm DIA. FLANGE ADAPTOR.....	3Nr
6	150mm DIA. FLANGED SPIGOT PIPE 1000mm LONG.....	3Nr
7	150mm DIA. FLANGED BELLMOUTH (WELDED TO BASE OF TANK WITH WATER TIGHT JOINT).....	1Nr
8	150mm DIA. ALL FLANGED PIPE 3700mm LONG.....	1Nr
9	150mm DIA. FLANGED SPIGOT PIPE 10m LONG (CUT TO SUIT ON SITE).....	1Nr
10	150mm DIA. COUPLING.....	1Nr
11	150mm DIA. ALL FLANGED GATE VALVE.....	1Nr
12	150mm DIA. SINGLE FLANGED 90° BEND.....	1Nr



### OUTLET PIPEWORK DETAIL


OUTLET PIPEWORK SCHEDULE  
 APPROVED CEMENT LINED INTERNALLY & OPOXY  
 COATED EXTERNALLY STEEL PIPES AND FITTINGS

ITEM	DESCRIPTION	QTY
a	300mm DIA. FLANGED BELL MOUTH.....	1Nr
b	300mm DIA. ALL FLANGED PIPE 3100mm LONG, WITH PUDDLE FLANGE AT 160mm FROM ONE END (PUDDLE FLANGE WELDED TO TANK BASE PANEL).....	1Nr
c	300mm DIA. FLANGED SPIGOT PIPE 16m LONG (CUT TO SUIT ON SITE).....	1Nr
d	300mm DIA. FLANGE ADAPTOR.....	2Nr
e	300mm DIA. ALL FLANGED 90° BEND.....	1Nr
f	300mm DIA. ALL FLANGED PIPE 1200mm LONG.....	1Nr
g	300x50mm DIA. ALL FLANGED TEE.....	1Nr
h	50mm DIA. ALL FLANGED GATE VALVE.....	1Nr
i	300mm DIA. ALL FLANGED GATE VALVE.....	1Nr
j	300mm DIA. PLAIN ENDED PIPE, 1200mm LONG.....	1Nr
k	300mm DIA. COUPLING.....	1Nr

### NOTES

- ALL PIPE DIAMETERS AND VALVE DIAMETERS ARE NOMINAL DIAMETERS
- ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED
- ONLY FIGURED DIMENSIONS TO BE TAKEN FROM THIS DRAWING
- PIPE AND FITTINGS ARE BASED ON STEEL PIPES AND FITTINGS MADE BY ASP (K) LTD
- GATE VALVES TO EURO 20 SERIES, TYPE 23 (SHORT FACE TO FACE TYPE VALVES) AS MADE BY POINT-A-MOUSSON (SAINT GOBAIN PAM) OR APPROVED EQUIVALENT
- BALL FLOAT VALVES TO SERIES 1048, BIWATER OR APPROVED EQUIVALENT
- THIS DRAWING TO BE USED FOR PIPEWORK DETAILS ONLY
- CONTRACTOR TO PROVIDE SHOP DRAWING OF TANK AND TOWER DETAILS FROM AN APPROVED STEEL FABRICATOR FOR APPROVAL PRIOR TO FABRICATION AND DELIVERY

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:  

**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

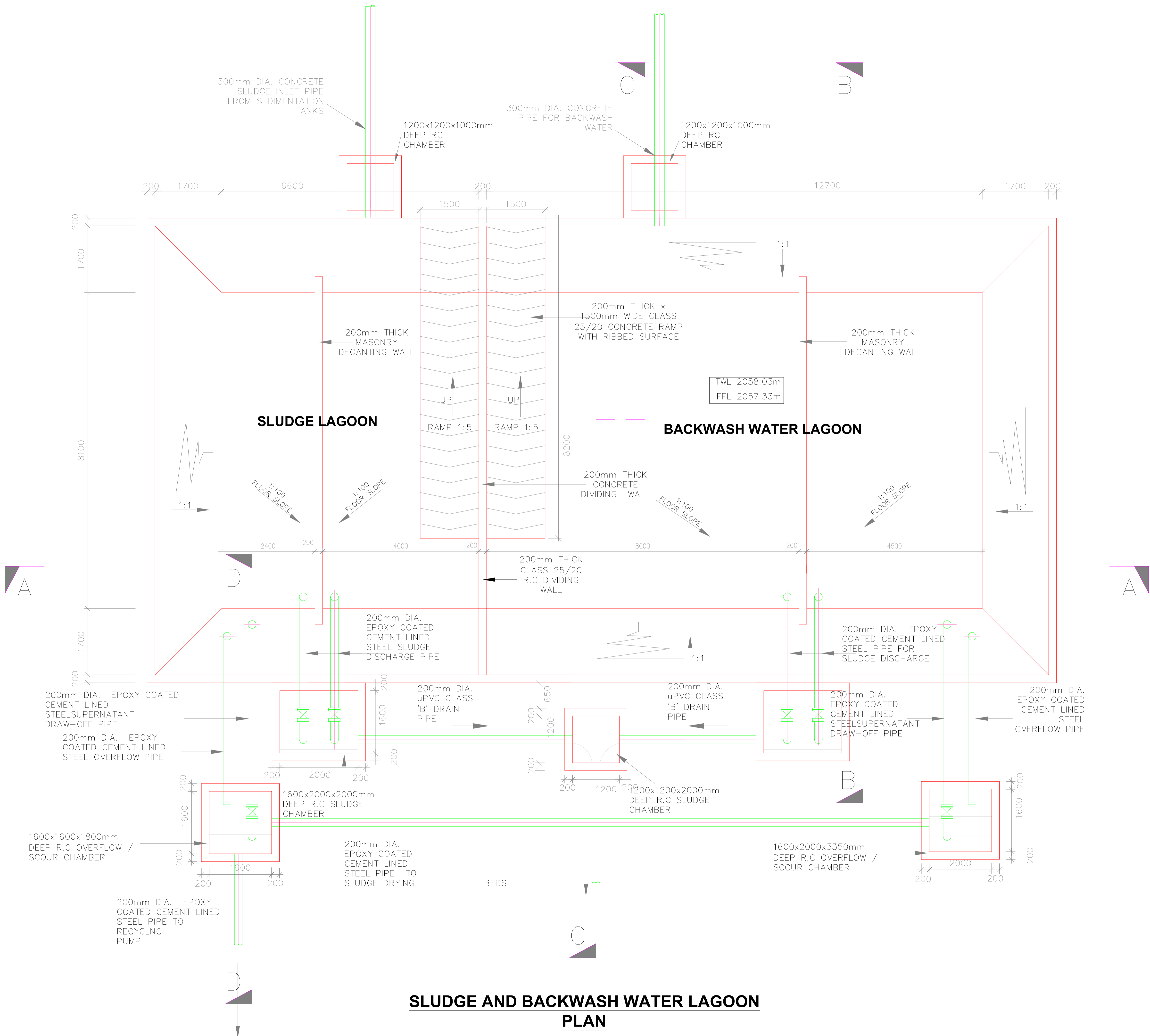
DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT  
 ELEVATED BACKWASH WATER TANK  
 PIPEWORK DETAILS**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: As shown	Date: FEBRUARY 2024
DRAWING No. MWS/TW/BT/04	REV. 0

# **SLUDGE AND BACKWASH WATER LAGOON**


**NOTES:**

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
- ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
- CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
- ABBREVIATIONS
  - R.C - REINFORCED CONCRETE
  - D.P.C - DAMP PROOF COURSE
  - E.G.L - EXISTING GROUND LEVEL
  - F.G.L - FINISHED GROUND LEVEL
  - F.F.L - FINISHED FLOOR LEVEL
  - P.C.C - PRECAST CONCRETE
  - G.C.I - GALVANIZED CORRUGATED IRON
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE



**SLUDGE AND BACKWASH WATER LAGOON PLAN**

REVISION	DESCRIPTION	DATE

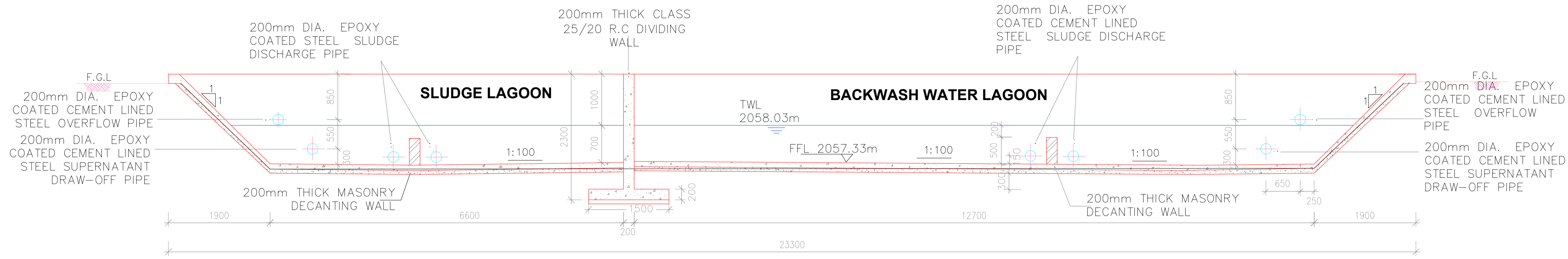
CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:  

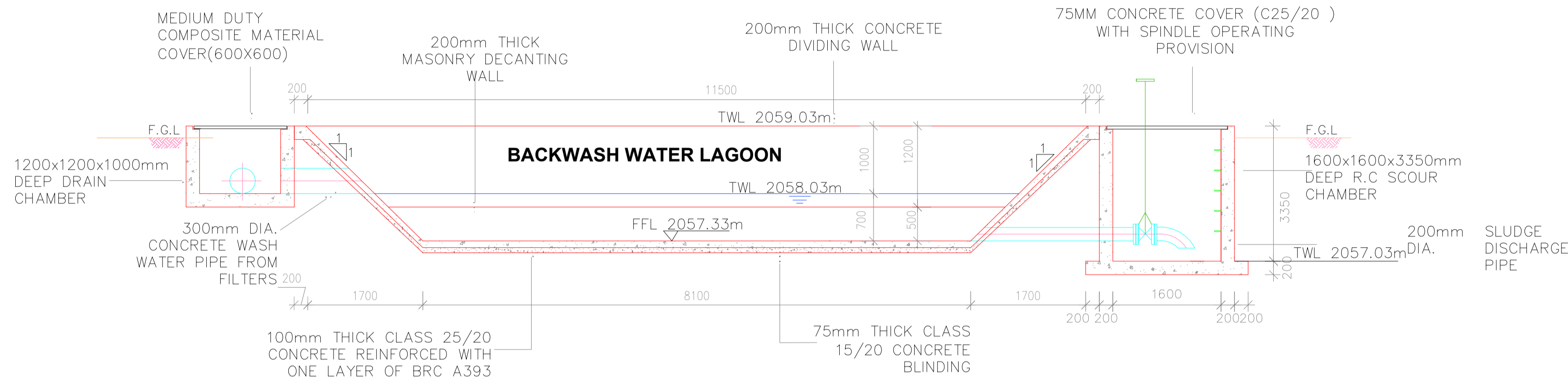
**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT**  
**WATER TREATMENT WORKS**  
**SLUDGE AND BACKWASH WATER LAGOON**  
**PLAN**

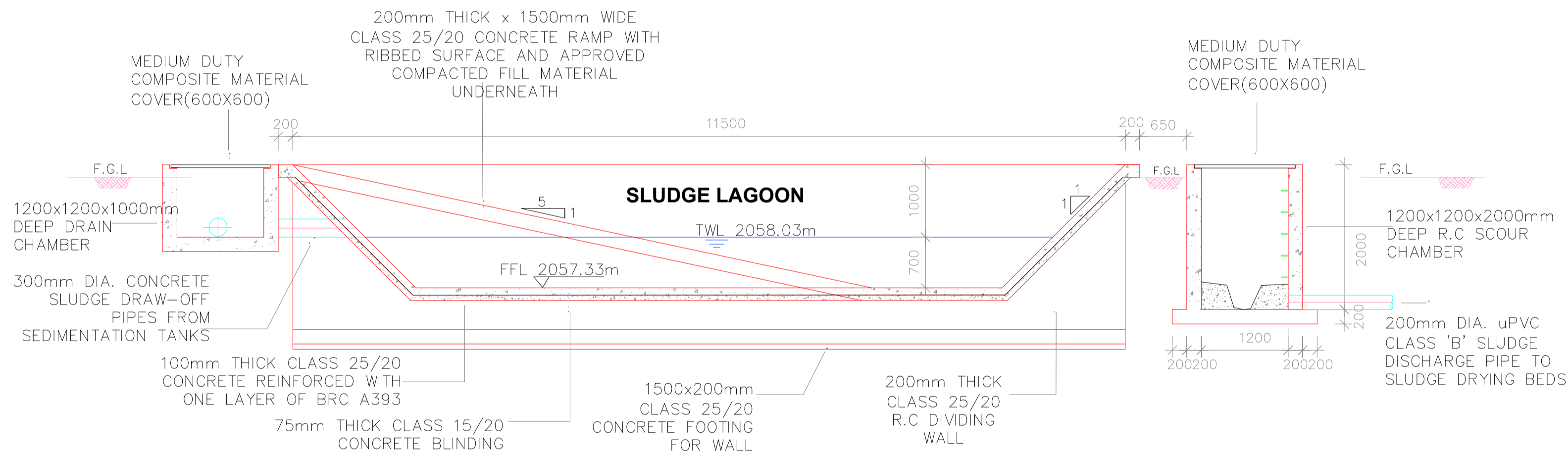
Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: 1:50	Date: FEBRUARY 2024
DRAWING No. M/WS/TW/SBWL/01	REV. 0



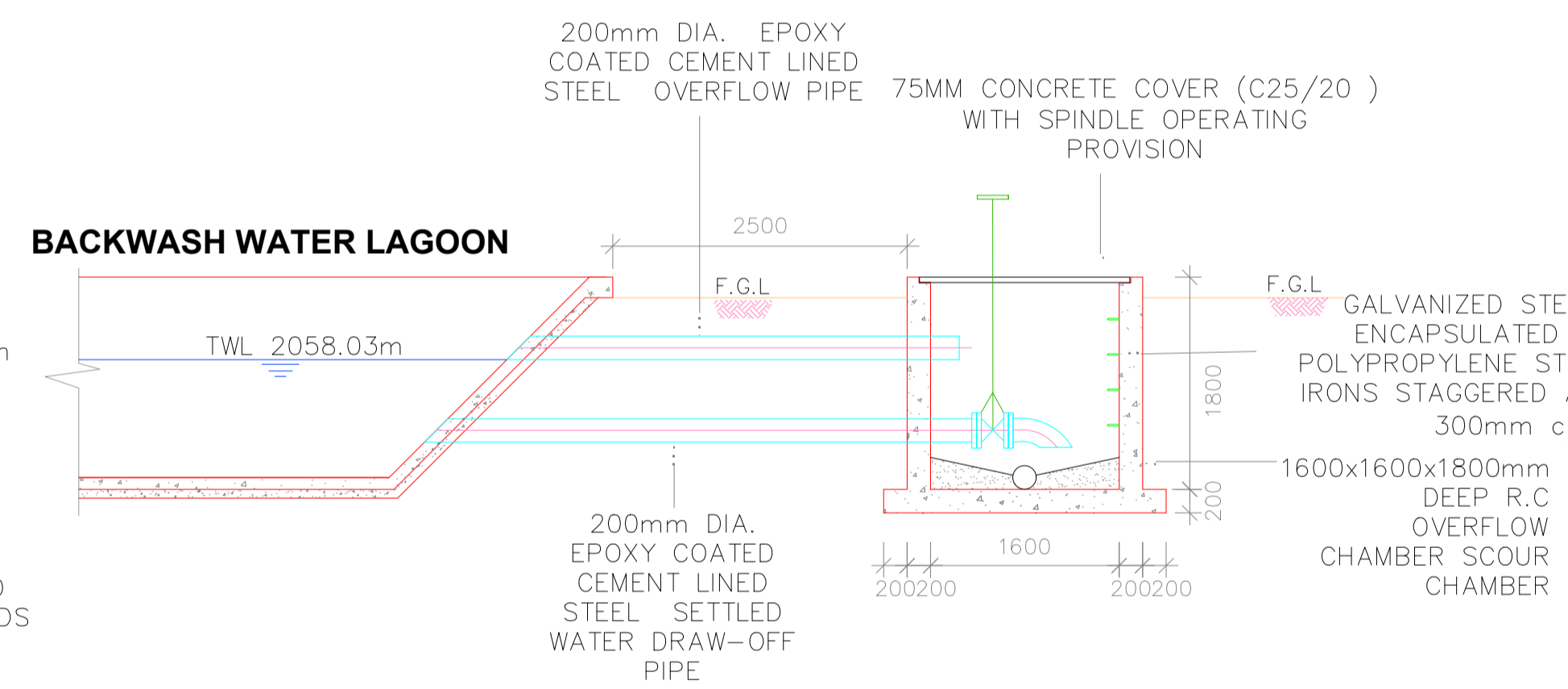
**SECTION A - A**



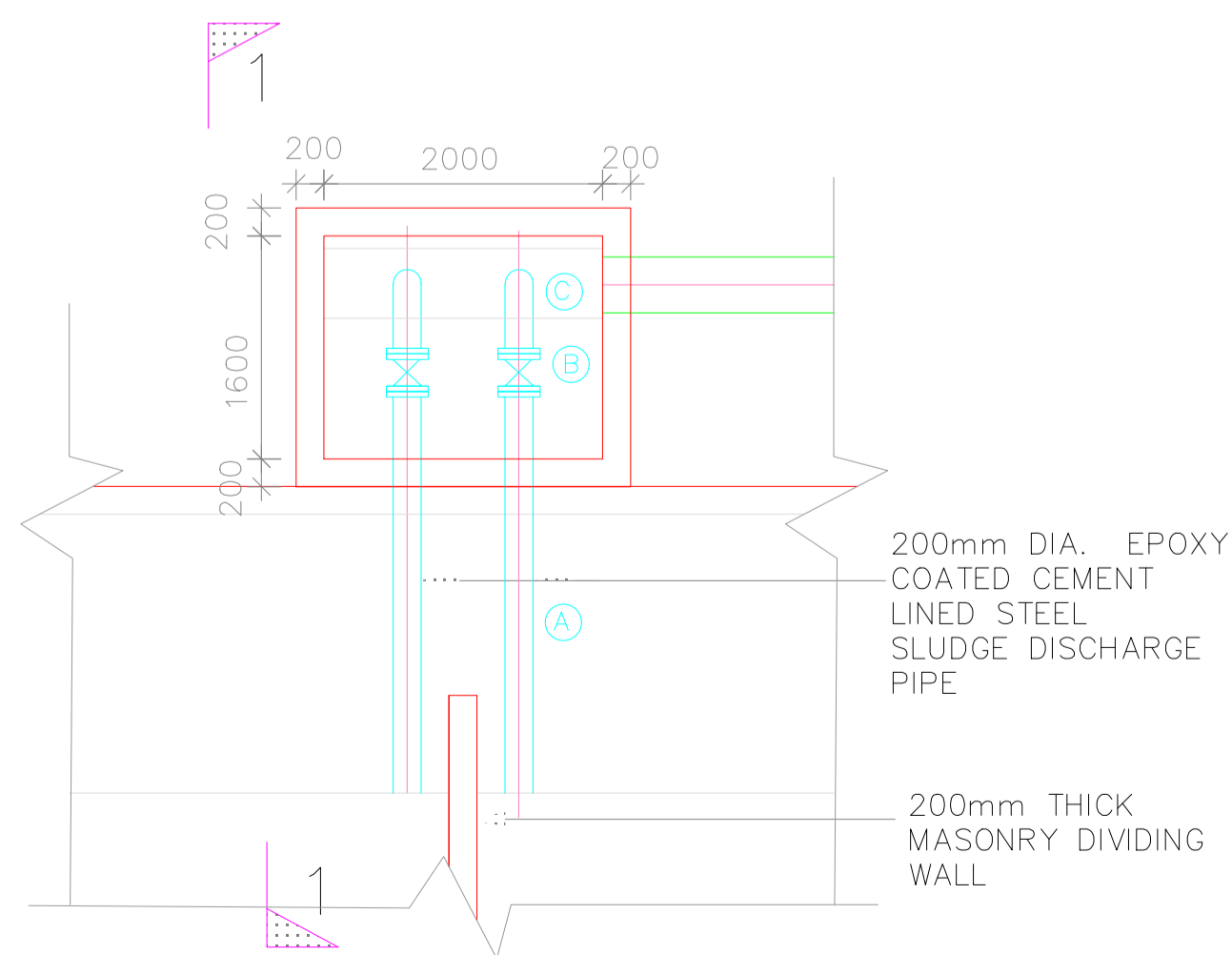
**SECTION B - B**



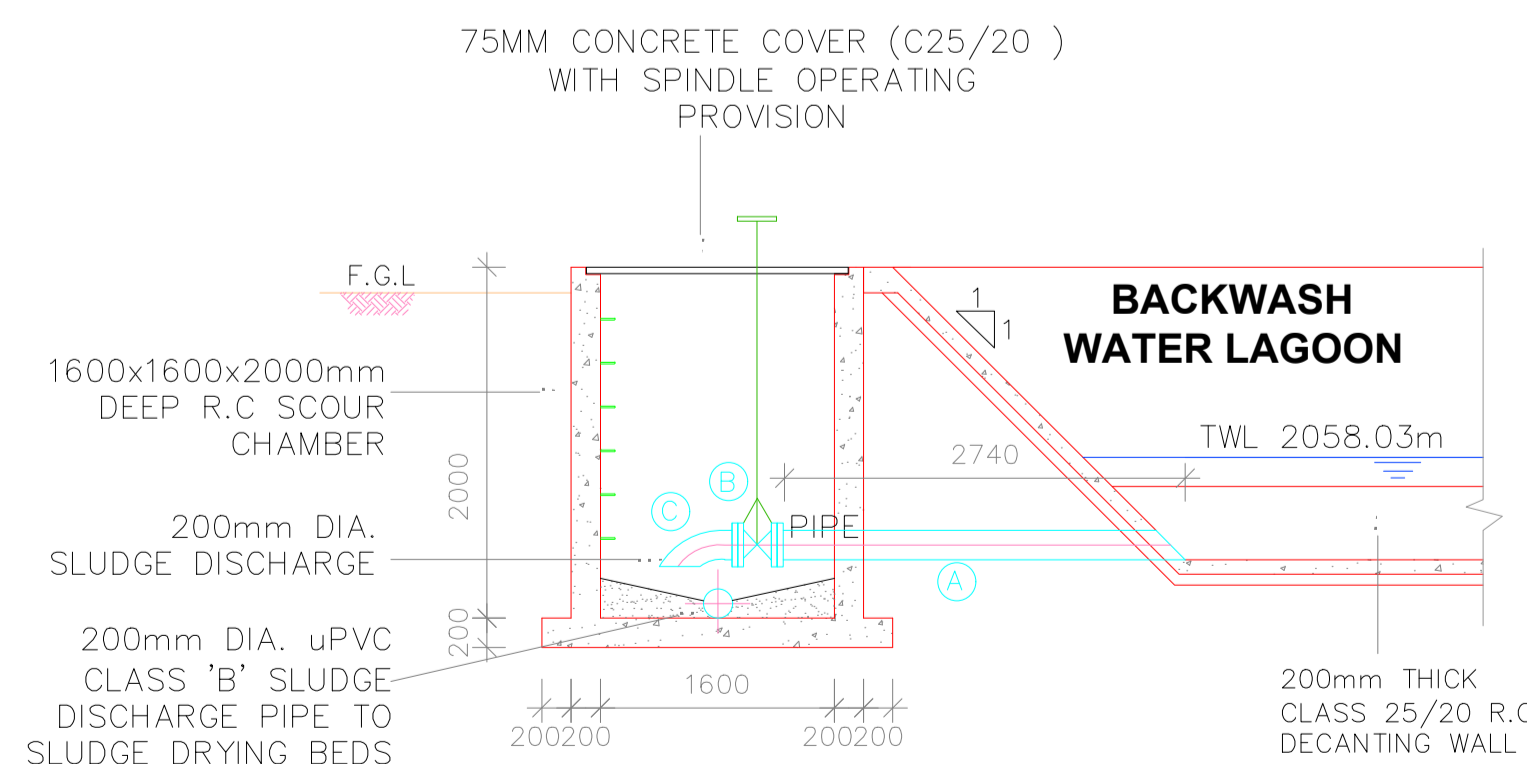
**SECTION C - C**



**SECTION D - D**



**SLUDGE DRAW-OFF PIPEWORK- PLAN (2nr)**



**SECTION 1 - 1**


**SLUDGE DRAW-OFF PIPEWORK SCHEDULE  
(APPROVED EPOXY COATED CEMENT LINED PIPES  
AND FITTINGS)**

ITEM No.	DESCRIPTION	DIA. (mm)	LENGTH (mm)	QUANTITY (No.)
(A)	FLANGED SPIGOT PIPE WITH SPIGOT END BEVELLED (CUT TO SUIT ON SITE)	200	3000	2
(B)	ALL FLANGED GATE VALVE WITH EXTENDED SPINDLE AND WHEEL	200	270	2
(C)	FLANGED SPIGOT 90° BEND	200	500	2

**NOTES:**

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
- ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
- CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
- ABBREVIATIONS
  - R.C - REINFORCED CONCRETE
  - D.P.C - DAMP PROOF COURSE
  - E.G.L - EXISTING GROUND LEVEL
  - F.G.L - FINISHED GROUND LEVEL
  - F.F.L - FINISHED FLOOR LEVEL
  - P.C.C - PRECAST CONCRETE
  - G.C.I - GALVANIZED CORRUGATED IRON
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE

REVISION	DESCRIPTION	DATE

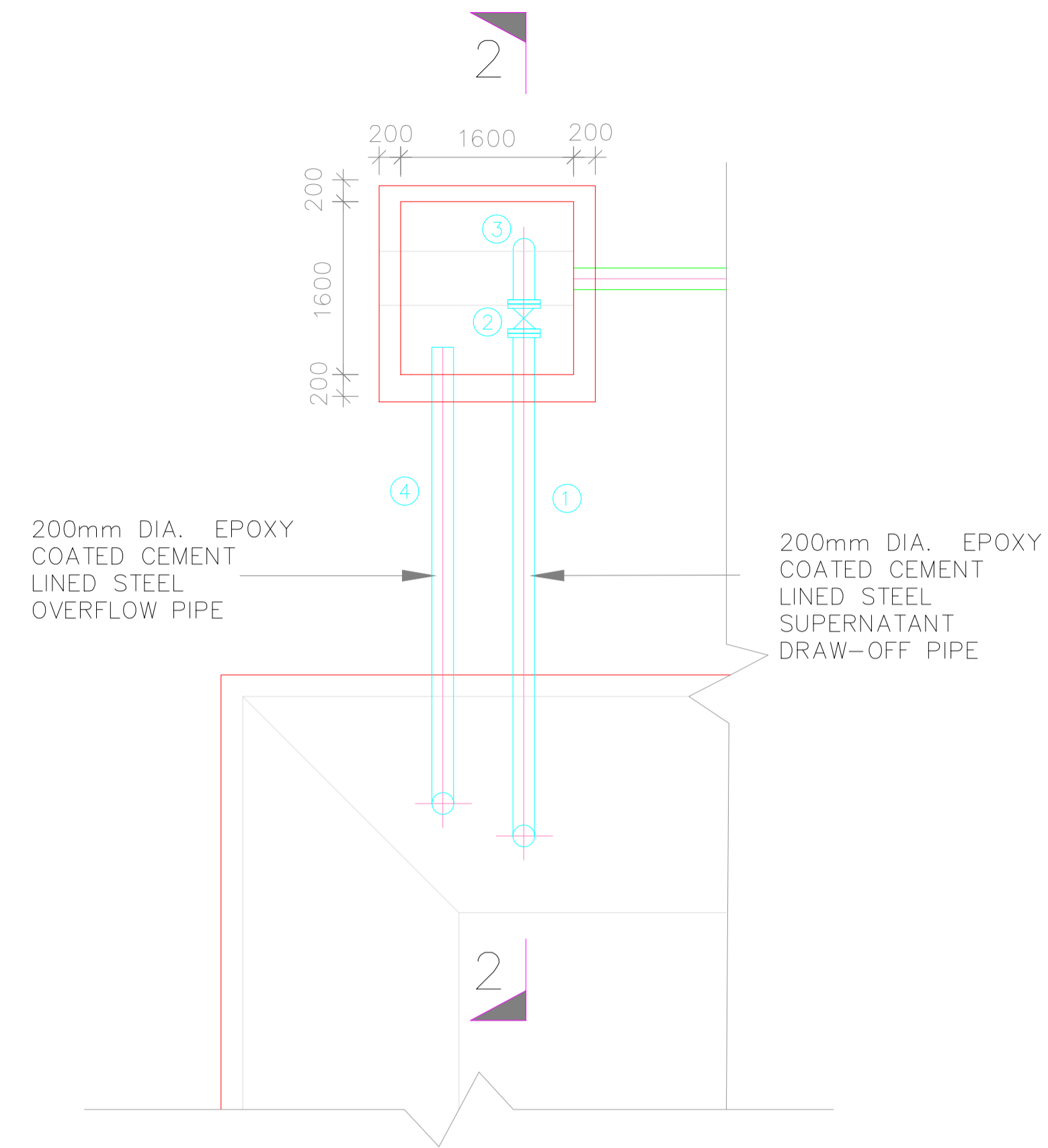
CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS  
DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:  

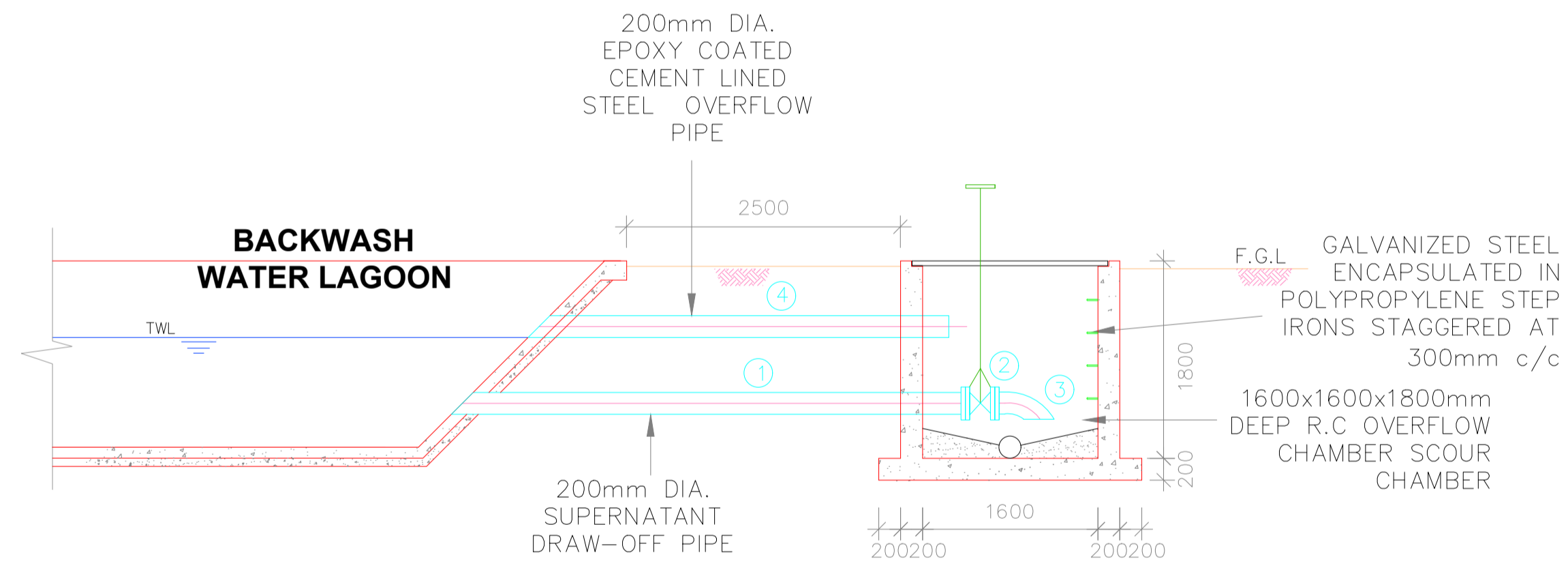
**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT**  
**WATER TREATMENT WORKS**  
**SLUDGE AND BACKWASH WATER**  
**LAGOON**  
**SECTIONS**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: 1:50	Date: FEBRUARY 2024
DRAWING No. M/WS/TW/SBWL/02	REV. 0



**OVERFLOW/SETTLED WATER DRAW-OFF PIPEWORK- PLAN (2nr)**



**SECTION 2 - 2**


**OVERFLOW/SETTLED WATER DRAW-OFF PIPEWORK SCHEDULE (APPROVED EPOXY COATED CEMENT LINED PIPES AND FITTINGS)**

ITEM No.	DESCRIPTION	DIA. (mm)	LENGTH (mm)	QUANTITY (No.)
(a)	FLANGED SPIGOT PIPE WITH SPIGOT END BEVELLED (CUT TO SUIT ON SITE)	200	5000	2
(b)	ALL FLANGED GATE VALVE WITH EXTENDED SPINDLE AND WHEEL	200	270	2
(c)	FLANGED 90° BEND	200	500	2
(d)	PLAIN ENDED PIPE WITH ONE END BEVELLED (CUT TO SUIT)	200	4500	2

**NOTES:**

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
- ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
- CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
- ABBREVIATIONS
  - R.C - REINFORCED CONCRETE
  - D.P.C - DAMP PROOF COURSE
  - E.G.L - EXISTING GROUND LEVEL
  - F.G.L - FINISHED GROUND LEVEL
  - F.F.L - FINISHED FLOOR LEVEL
  - P.C.C - PRECAST CONCRETE
  - G.C.I - GALVANIZED CORRUGATED IRON
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

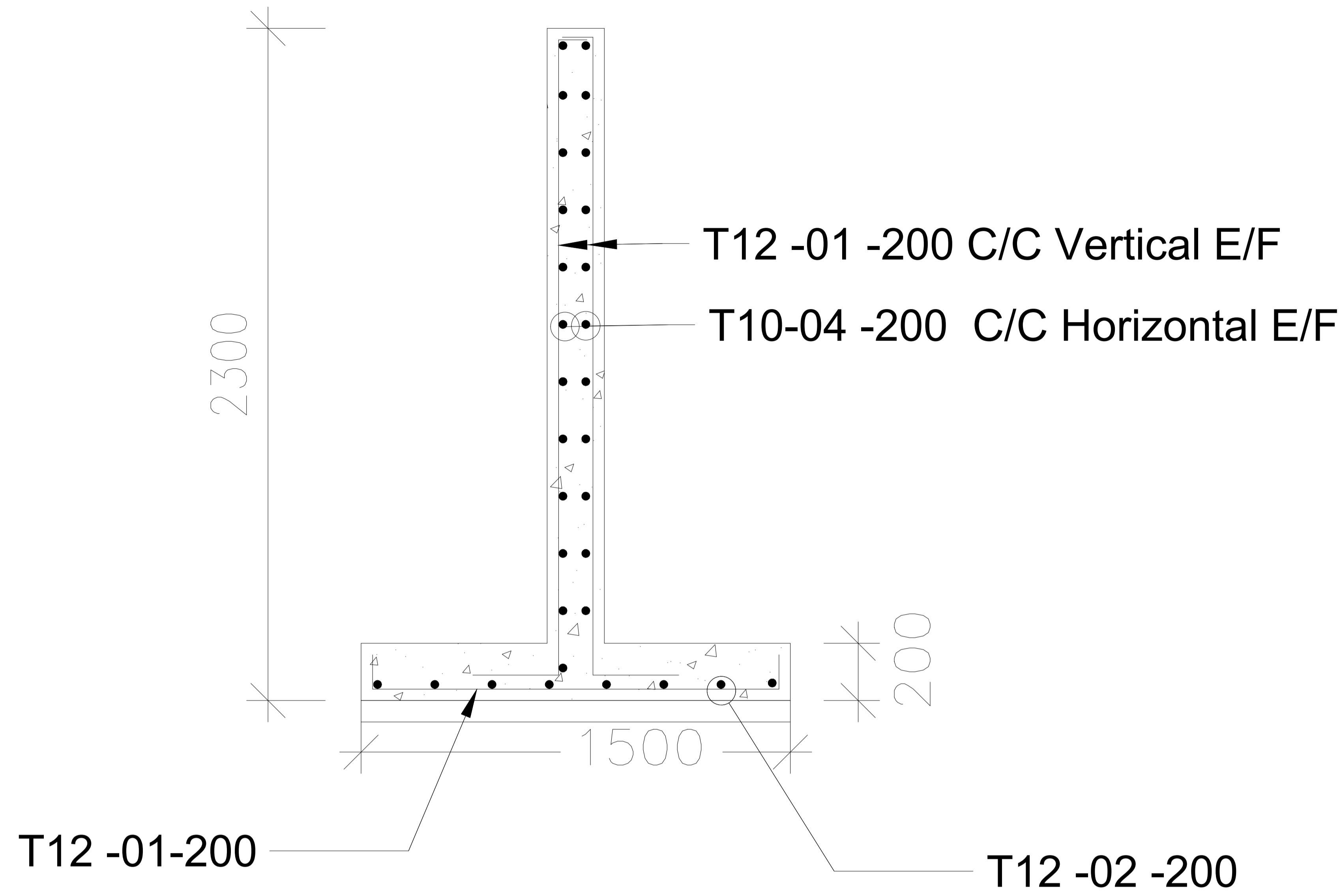
REVIEWED BY:  

**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane.  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT**  
**WATER TREATMENT WORKS**  
**SLUDGE AND BACKWASH WATER LAGOON**  
**OVERFLOW PIPEWORK**

Designed by:	N.M	Drawn by:	I.M.W
Checked by:	P.M.M	Approved by:	K.M
Scale:	1:50	Date:	FEBRUARY 2024
DRAWING No.	M/WS/TW/SBWL/03	REV.	0





The Steel Bar Table

WALLS	No.	Size (mm)	Type	length (mm)	Amount	Total length (m)	Remarks	Shape code
	①	T12	120   1420   120	1660	59	97.94		
	②	T12	120   11420   120	11660	9	104.94		
	③	T12	300   2220	2520	118	297.36		
	④	T10	120   11420   120	11660	24	279.84		

**NOTES:**

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
- ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
- CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
- ABBREVIATIONS
  - R.C - REINFORCED CONCRETE
  - D.P.C - DAMP PROOF COURSE
  - E.G.L - EXISTING GROUND LEVEL
  - F.G.L - FINISHED GROUND LEVEL
  - F.F.L - FINISHED FLOOR LEVEL
  - P.C.C - PRECAST CONCRETE
  - G.C.I - GALVANIZED CORRUGATED IRON
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE

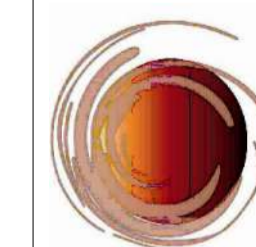
REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:



NORTHERN WATER WORKS  
DEVELOPMENT AGENCY  
P.O. BOX 495-70100  
GARISSA

REVIEWED BY:



Interconsult Engineers Ltd  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane.  
Tel. 4441648/4441651  
Nairobi.

DRAWING TITLE:

**MARALAL WATER SUPPLY PROJECT**

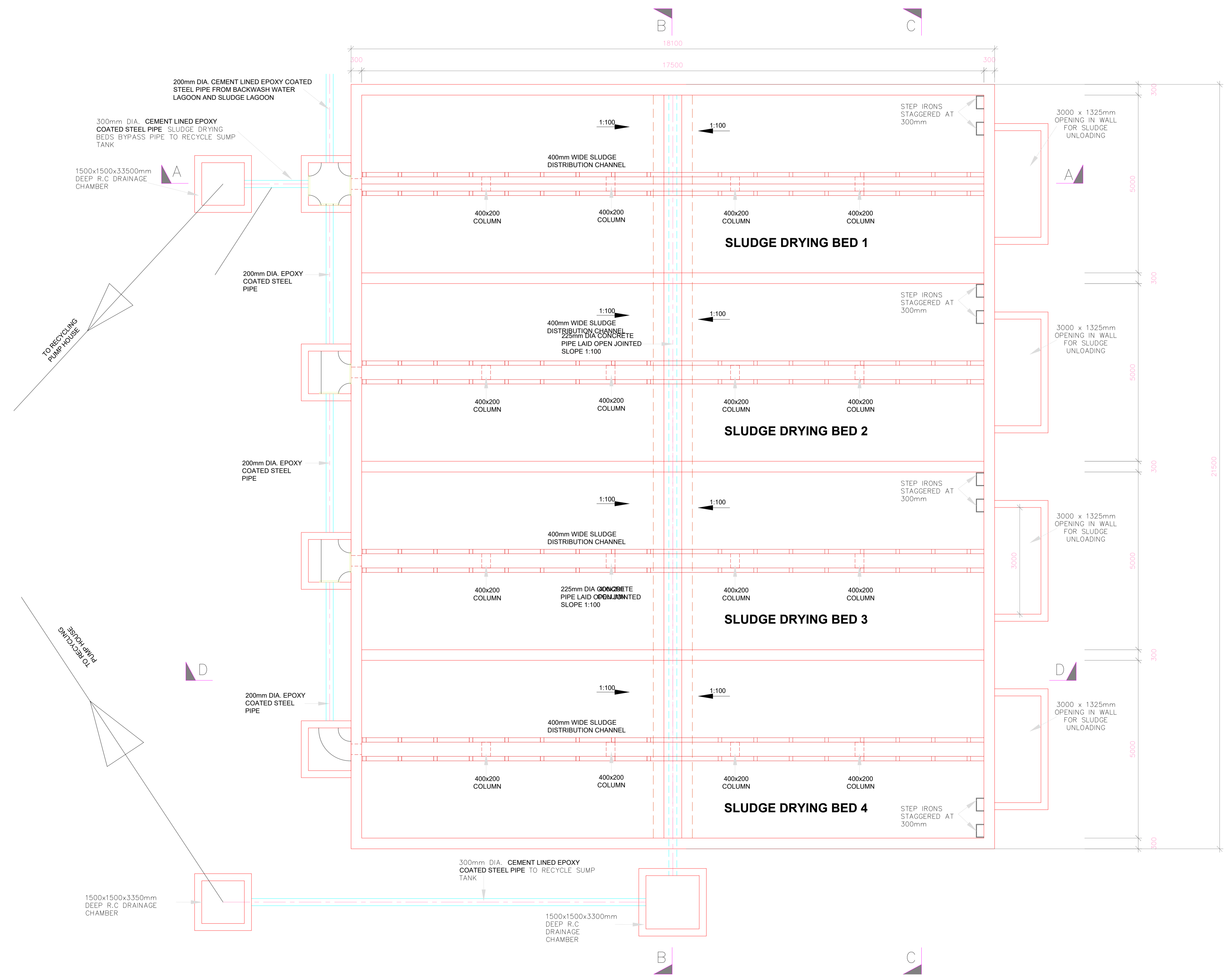
**SLUDGE AND BACKWASH WATER  
LAGOON DIVIDING WALL STRUCTURAL  
DETAILS AND BAR BENDING SCHEDULE**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
1:50	Date: FEBRUARY 2024
DRAWING No. MWS/TW/SBWL-STR/01	REV. 0

# **SLUDGE DRYING BEDS**


**NOTES:**

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
- ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
- CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
- ABBREVIATIONS
  - R.C - REINFORCED CONCRETE
  - D.P.C - DAMP PROOF COURSE
  - E.G.L - EXISTING GROUND LEVEL
  - F.G.L - FINISHED GROUND LEVEL
  - F.F.L - FINISHED FLOOR LEVEL
  - P.C.C - PRECAST CONCRETE
  - G.C.I - GALVANIZED CORRUGATED IRON
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE



REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:

 **NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

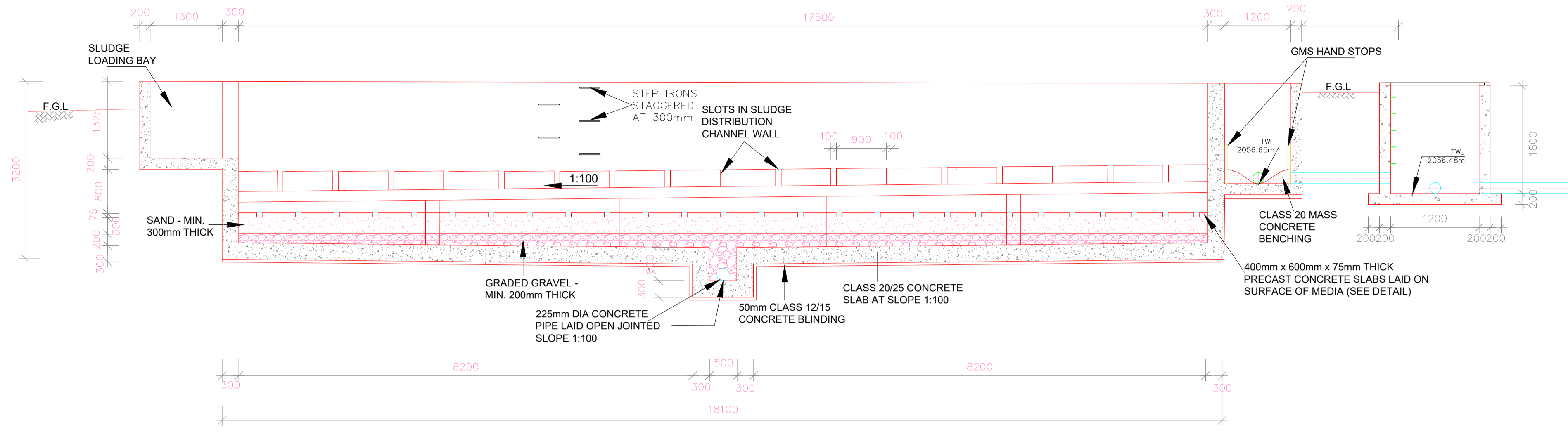
REVIEWED BY:

 **Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

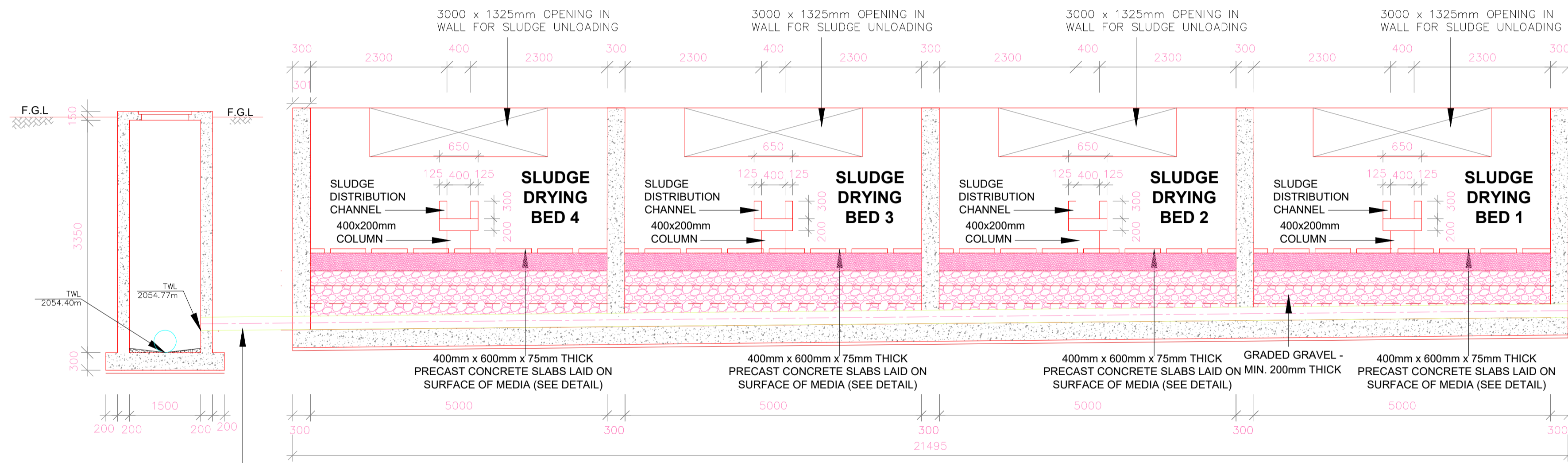
DRAWING TITLE:

**MARALAL WATER SUPPLY PROJECT**  
**WATER TREATMENT WORKS**  
**SLUDGE DRYING BEDS PLAN**

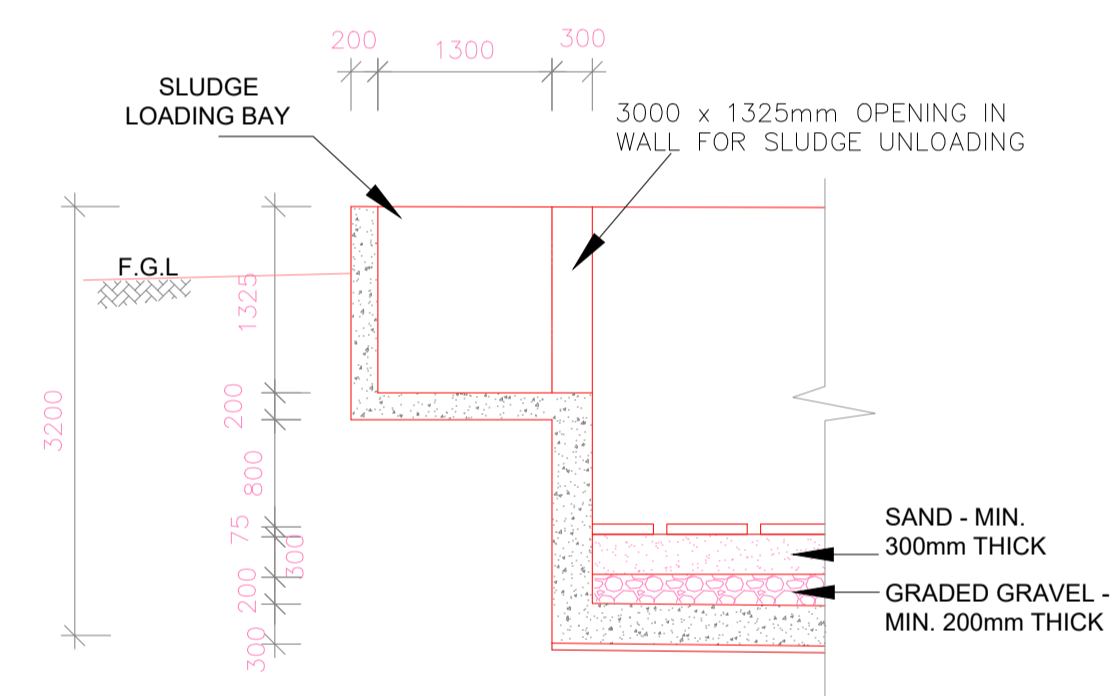
Designed by:	N.M	Drawn by:	I.M.W
Checked by:	P.M.M	Approved by:	K.M
Scale:	1:50	Date:	FEBRUARY 2024
DRAWING No.	MWS/TW/SDB/01	REV.	0



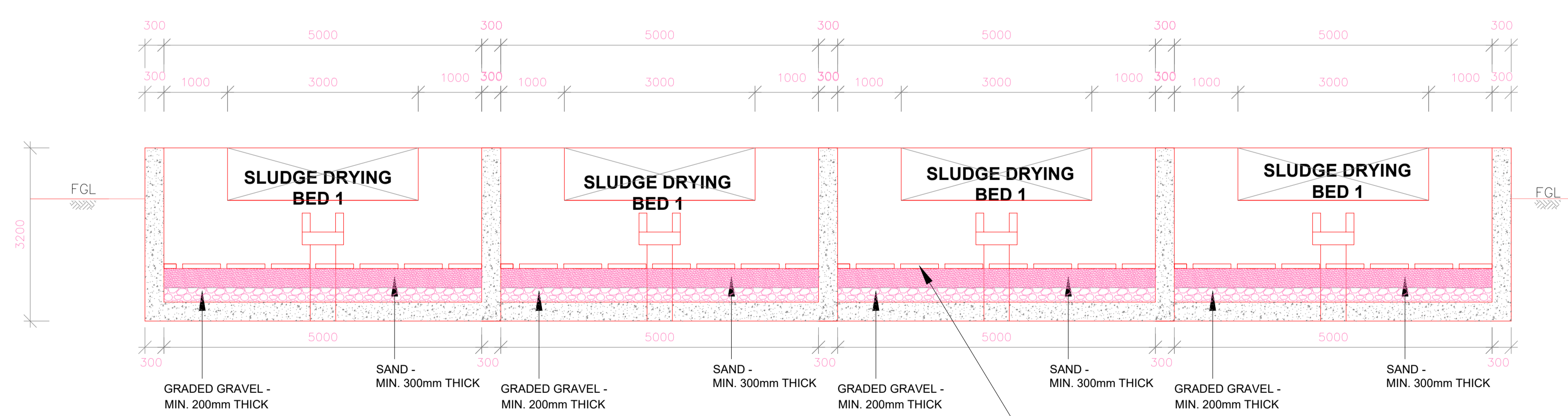
**SECTION A-A**  
SCALE 1:100



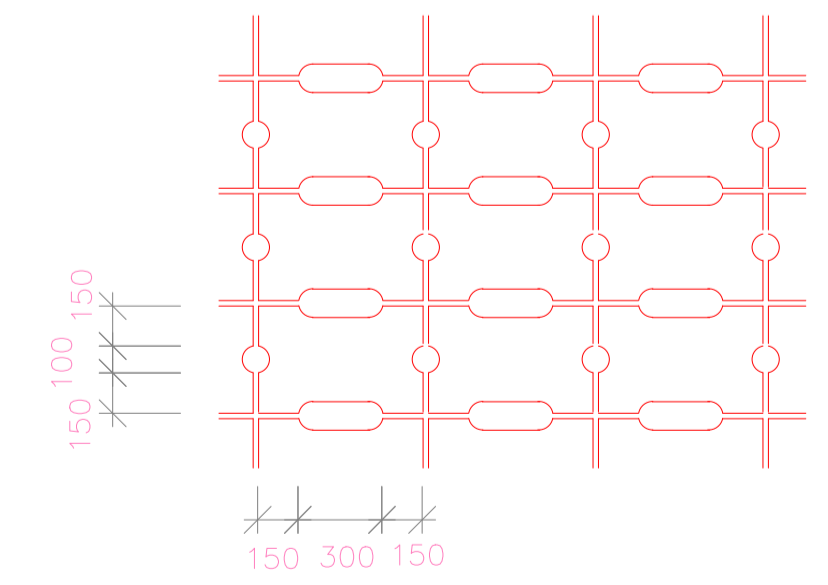
**SECTION B-B**  
SCALE 1:100



**SECTION D-D**  
SCALE 1:100



**SECTION C-C**  
SCALE 1:100




**400mm x 600mm x 75mm THICK  
PRECAST CONCRETE SLABS LAID ON  
SURFACE OF MEDIA**  
N.T.S

**NOTES:**

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
- ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
- CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
- ABBREVIATIONS  
  - R.C - REINFORCED CONCRETE
  - D.P.C - DAMP PROOF COURSE
  - E.G.L - EXISTING GROUND LEVEL
  - F.G.L - FINISHED GROUND LEVEL
  - F.F.L - FINISHED FLOOR LEVEL
  - P.C.C - PRECAST CONCRETE
  - G.C.I - GALVANIZED CORRUGATED IRON
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS  
DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:  

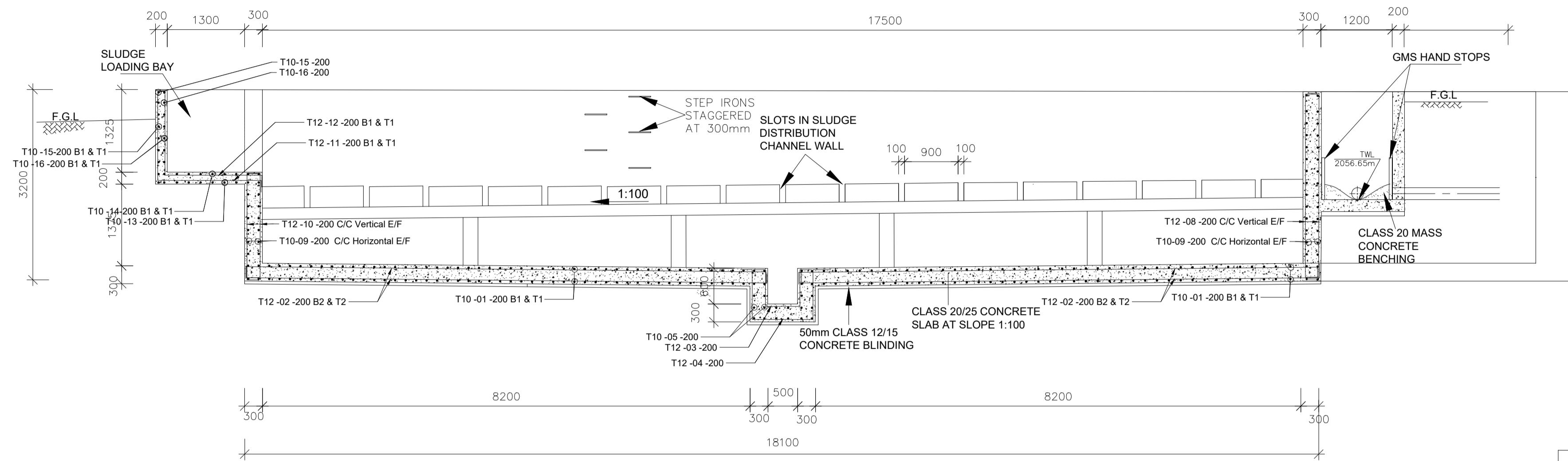
**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT  
WATER TREATMENT WORKS  
SLUDGE DRYING BEDS SECTIONS**

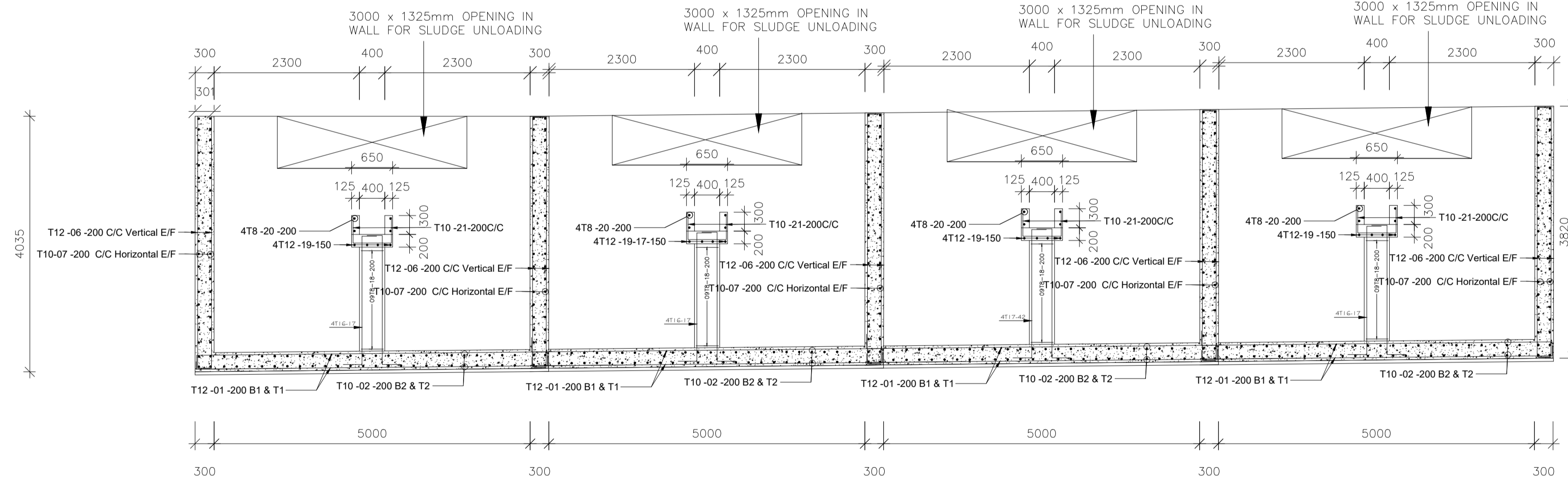
Designed by:	N.M	Drawn by:	I.M.W
Checked by:	P.M.M	Approved by:	K.M
Scale:	1:50	Date:	FEBRUARY 2024
DRAWING No.	MWS/TW/SDB/02	REV.	0

**NOTES:**

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
- ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
- CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
- ABBREVIATIONS
  - R.C - REINFORCED CONCRETE
  - D.P.C - DAMP PROOF COURSE
  - E.G.L - EXISTING GROUND LEVEL
  - F.G.L - FINISHED GROUND LEVEL
  - F.F.L - FINISHED FLOOR LEVEL
  - P.C.C - PRECAST CONCRETE
  - G.C.I - GALVANIZED CORRUGATED IRON
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE



**SECTION A-A**  
SCALE 1:100




**SECTION B-B**  
SCALE 1:100

The Steel Bar Table

No.	Size (mm)	Type	Length (mm)	Amount	Total Length (m)	Remarks	Shape Code
1	T12	300	5000	4320	89	544.88	
2	T12	300	8700	9320	432	4026.24	
3	T12	200	600	218	109	237.62	
4	T12	200	800	306	153	331.54	
5	T12	200	1070	109	40	436.4	
6	T12	300	3000	4348	920	4000.16	
7	T12	200	3950-3140	970	380	3889.8	
8	T10	300	920	4105	96	1247.92	
9	T10	300	3000	1140	104	1186.64	
10	T12	300	2995	2795	120	335.4	
11	T12	1440	1720	3885	64	248.64	
12	T12	120	1600	3645	64	233.28	
13	T12	1440	1445	6250	32	200	
14	T12	120	1445	6210	32	198.72	
15	T10	300	1720	7160	32	229.12	
16	T10	300	3000	6880	32	220.16	
17	T16	200	2200	2700	64	173	
18	T8	320	220	640	144	92.16	
19	T12	9300	9350	32	299.2		
20	T8	9300	9350	32	299.2		
21	T10	420	620	1460	344	502.4	

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

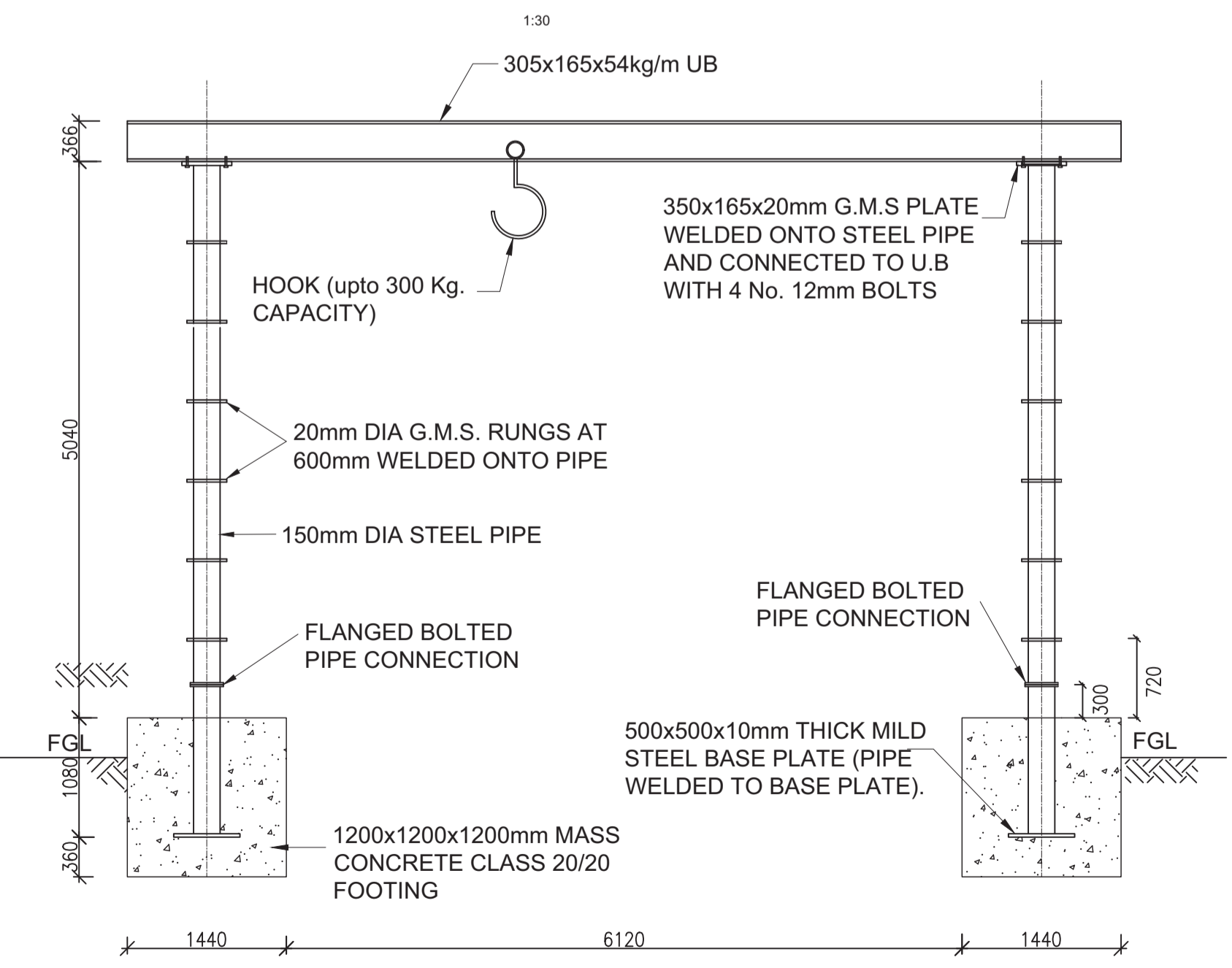
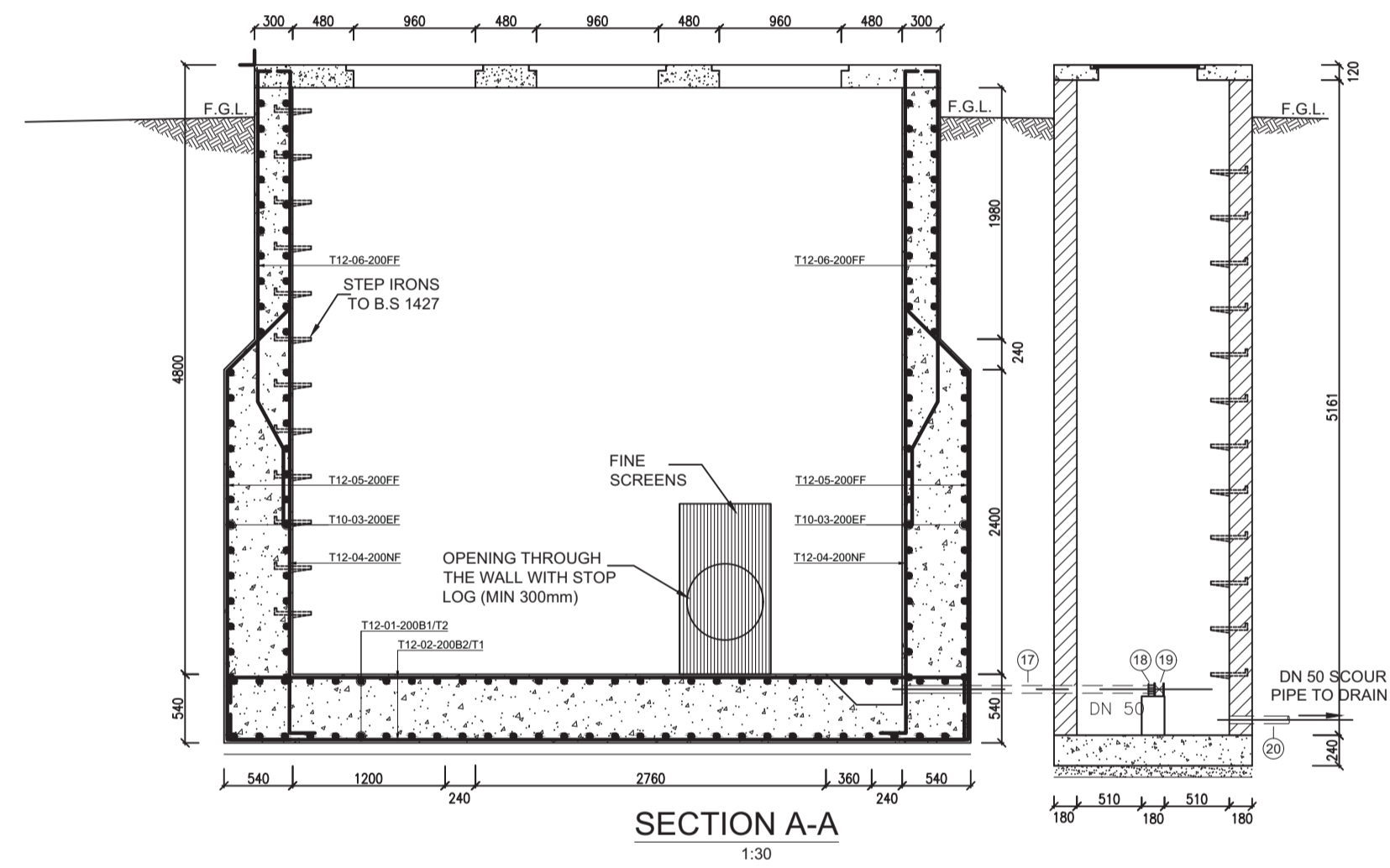
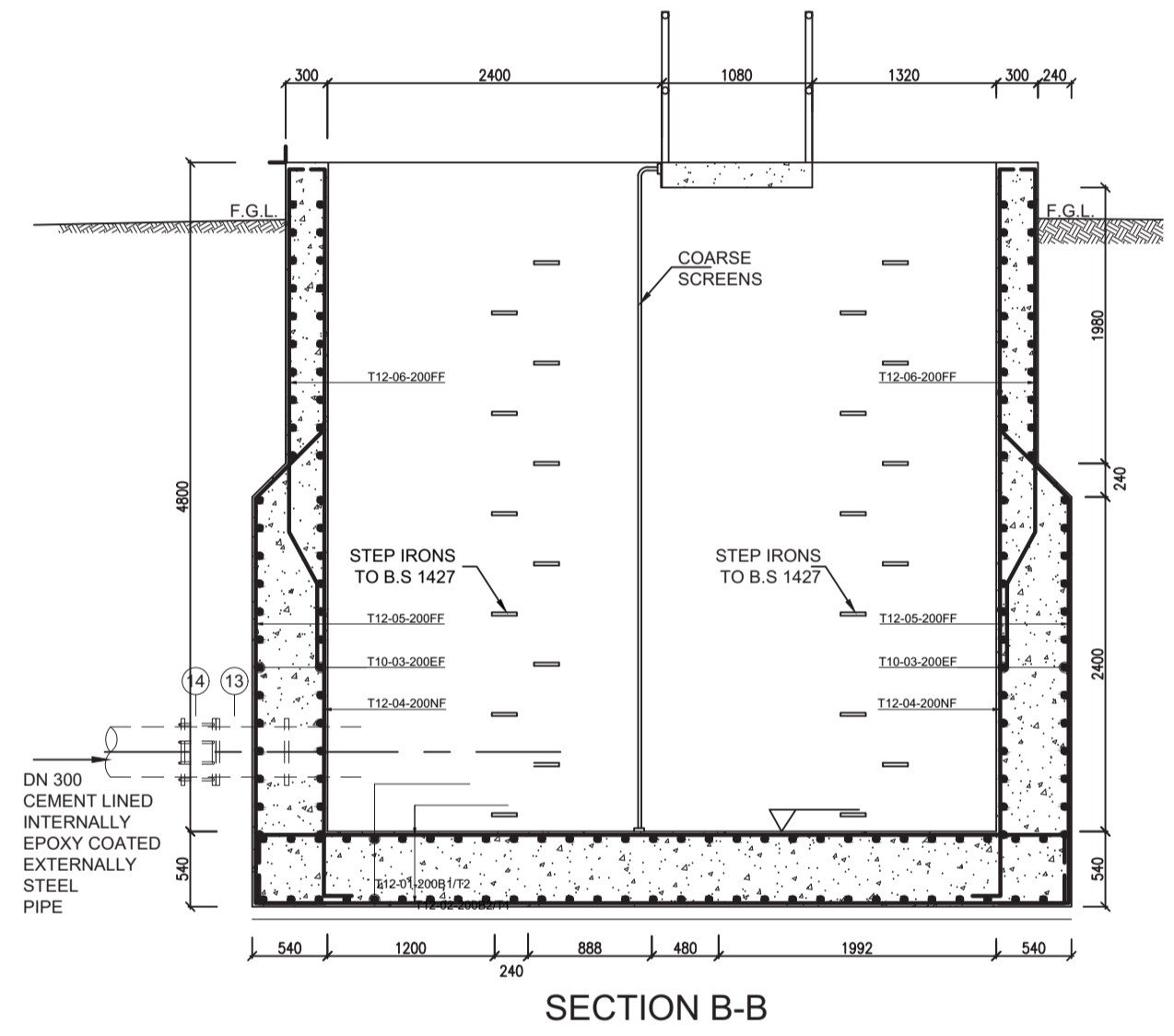
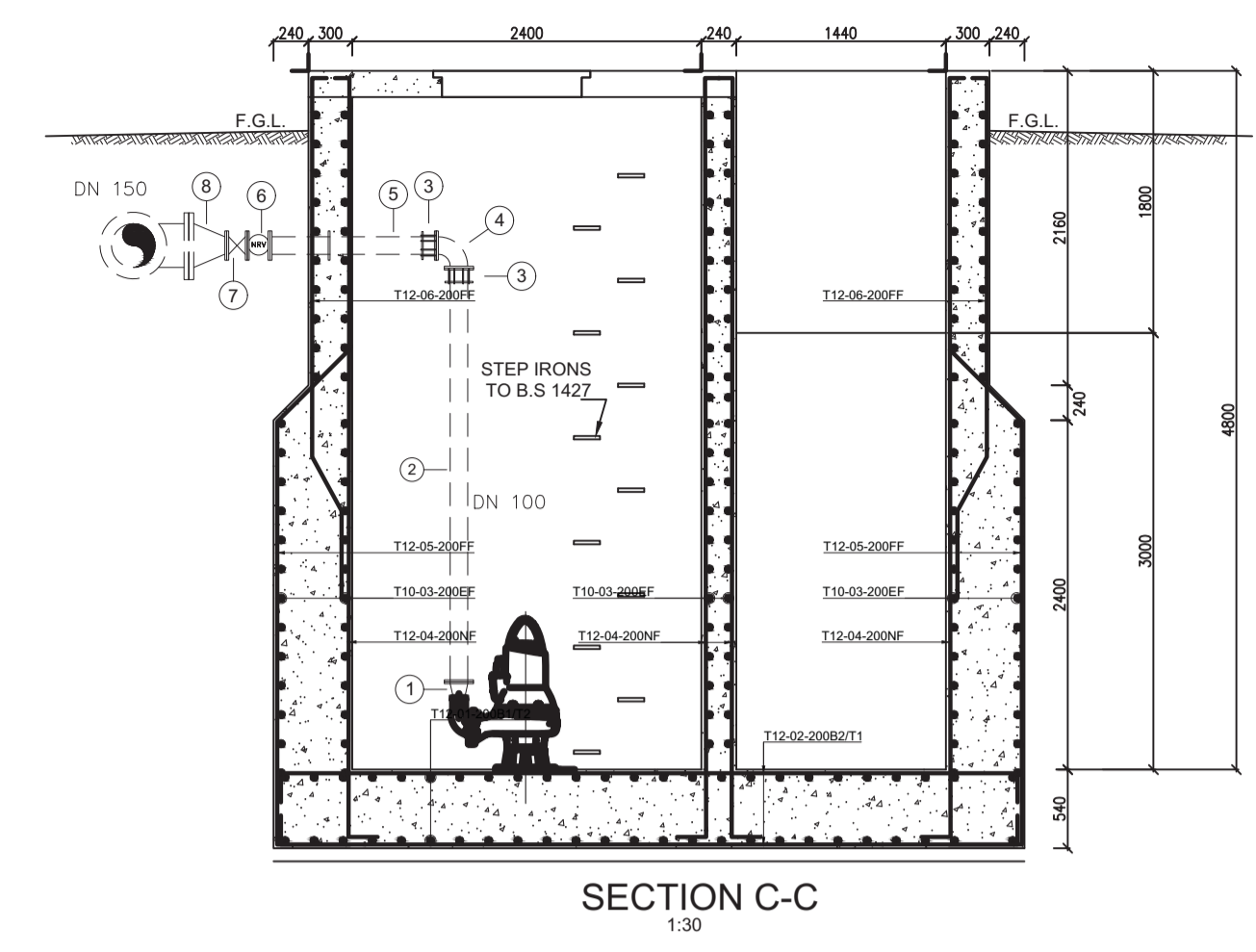
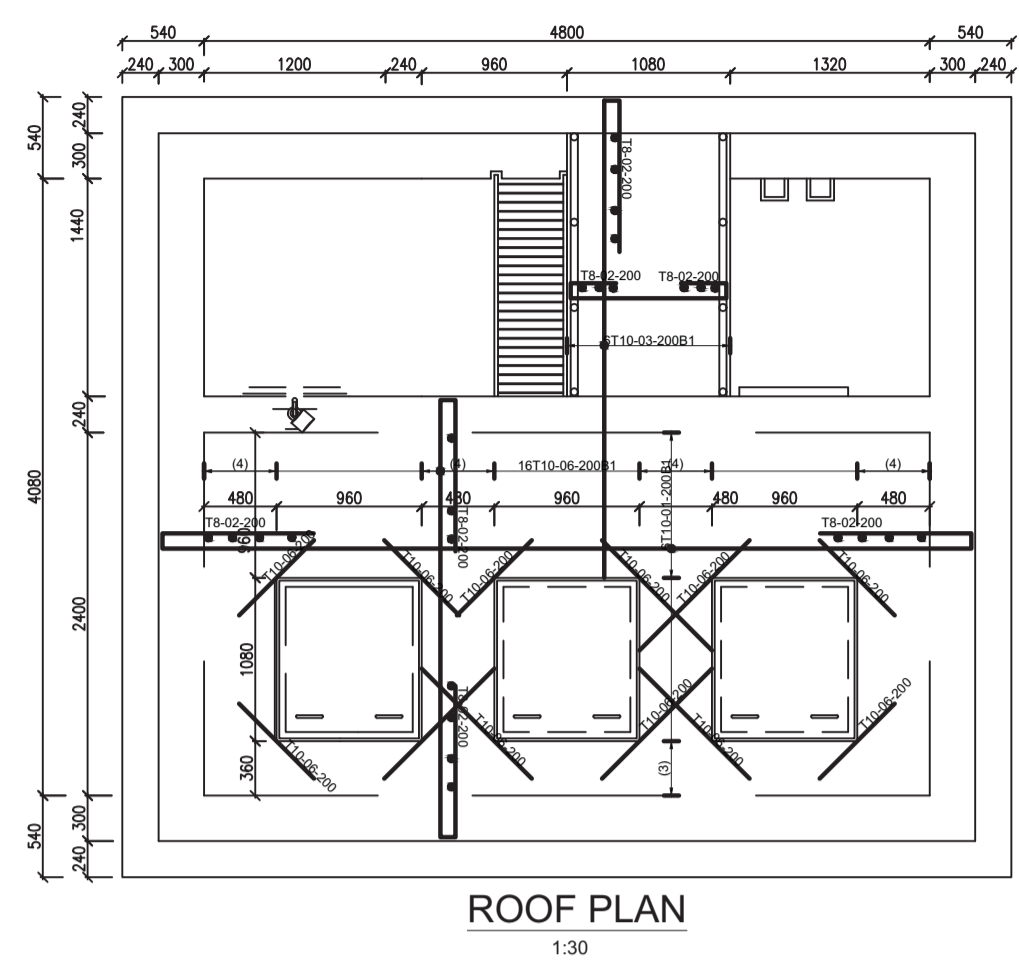
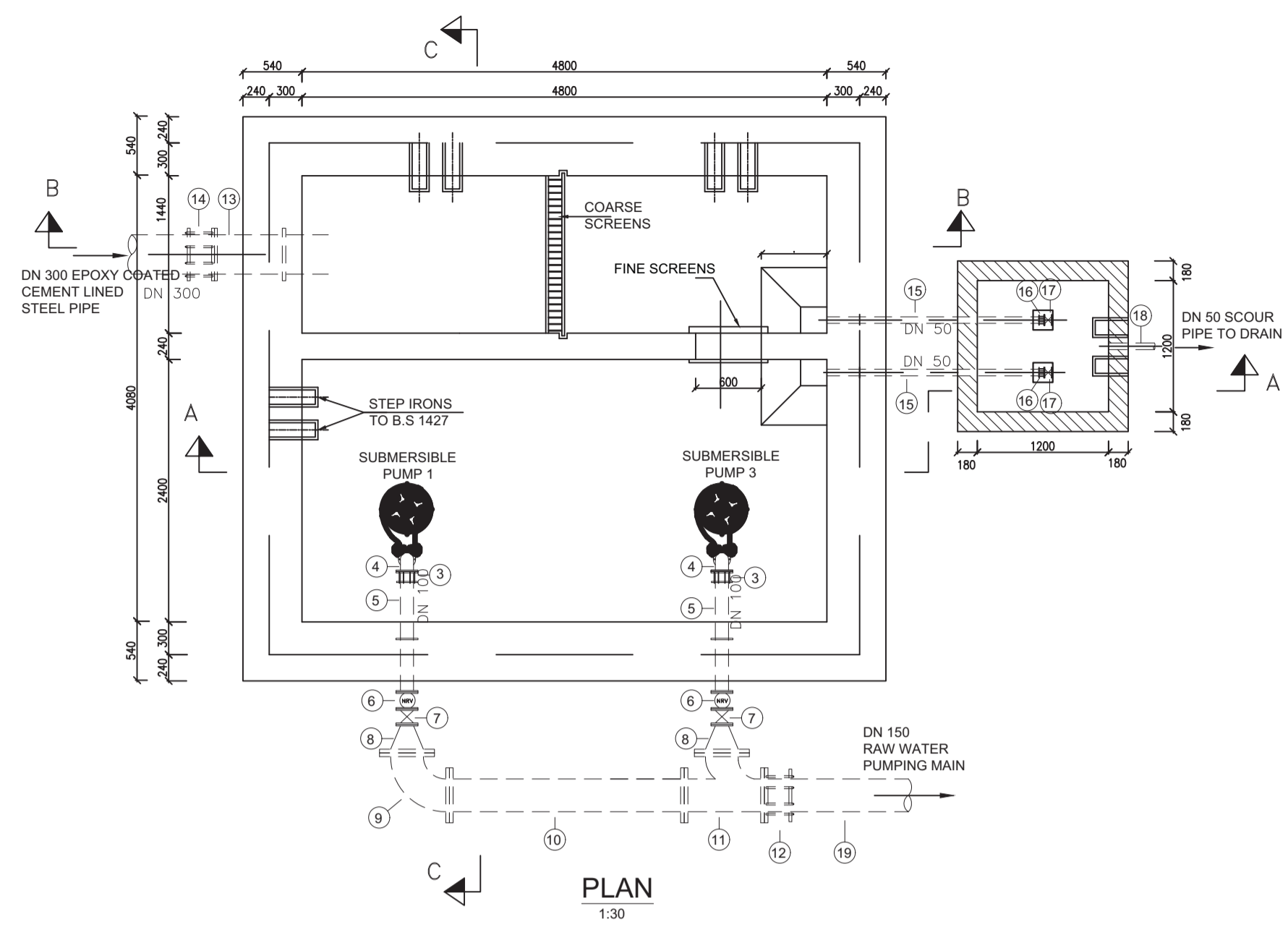
REVIEWED BY:  

**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT**  
**WATER TREATMENT WORKS**  
**SLUDGE DRYING BEDS**  
**STRUCTURAL SECTIONS**

Designed by:	N.M	Drawn by:	I.M.W
Checked by:	P.M.M	Approved by:	K.M
Scale:	1:50	Date:	FEBRUARY 2024
DRAWING No.	MWS/TW/SDB-STR/01	REV.	0

# **RECYCLED WATER PUMP HOUSE**




**SCHEDULE OF PIPEWORK & FITTINGS**

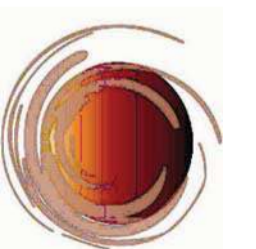
ITEM	DESCRIPTION	DIA.	No.
1	DOUBLE FLANGED CONCENTRIC TAPER	100/80	2
2	SINGLE FLANGED PIPE, L = 3500 'CUT TO SUIT'	100	2
3	FLANGE ADAPTOR	100	4
4	DOUBLE FLANGED 90° BEND	100	2
5	SINGLE FLANGED PIPE g/w CENTRAL PUDDLE FLANGE, L = 1000 'CUT TO SUIT'	100	2
6	NON RETURN VALVE	100	2
7	DOUBLE FLANGED GATE VALVE	100	2
8	DOUBLE FLANGED CONCENTRIC TAPER	150/100	2
9	DOUBLE FLANGED 90° BEND	150	1
10	DOUBLE FLANGED PIPE PIECE, LENGTH= n.a. 500mm	150	1
11	ALL FLANGED RADIAL TEE	150	1
12	FLANGE ADAPTOR	150	1
13	SINGLE FLANGED PIPE g/w CENTRAL PUDDLE FLANGE, L = 500	300	1
14	FLANGE ADAPTOR	300	1
15	PLAIN ENDED PIPE 'CUT TO SUIT'	50	2
16	FLANGE ADAPTOR	50	2
17	DOUBLE FLANGED GATE VALVE	50	2
18	PLAIN ENDED PIPE L = 4000 'CUT TO SUIT'	50	1
19	PLAIN ENDED PIPE 'CUT TO SUIT' L = 90m	150	1

**NOTES:**

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
- ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
- CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 25/20 EXCEPT WHERE OTHERWISE SPECIFIED
- ABBREVIATIONS
  - R.C - REINFORCED CONCRETE
  - D.P.C - DAMP PROOF COURSE
  - E.G.L - EXISTING GROUND LEVEL
  - F.G.L - FINISHED GROUND LEVEL
  - F.F.L - FINISHED FLOOR LEVEL
  - P.C.C - PRECAST CONCRETE
  - G.C.I - GALVANIZED CORRUGATED IRON
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

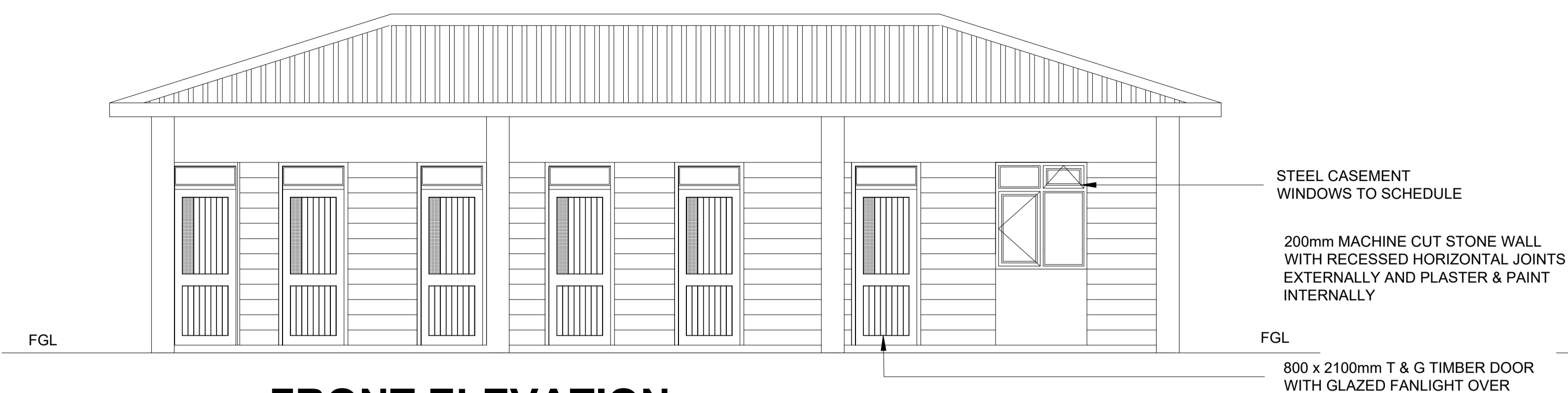
REVIEWED BY:  

**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT**  
**RECYCLED WATER PUMP HOUSE**

Designed by: I.M.W	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
1:50	Date: FEBRUARY 2024
DRAWING No. <b>MWS/TW/RWPH/01</b>	REV. 0

# **OPERATOR'S OFFICE, LABORATORY & STORE**



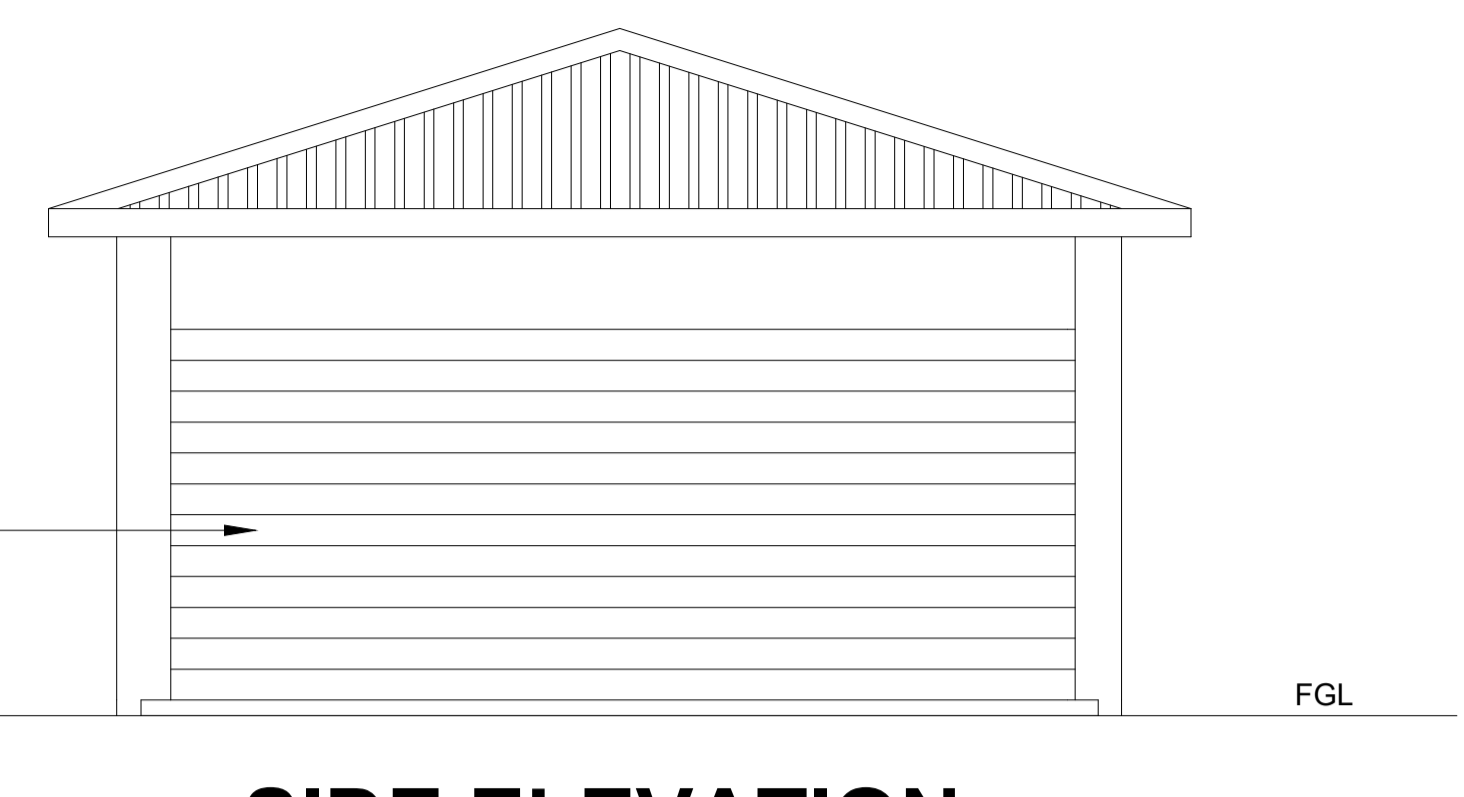


**FRONT ELEVATION**

STEEL CASEMENT WINDOWS TO SCHEDULE

200mm MACHINE CUT STONE WALL WITH RECESSED HORIZONTAL JOINTS EXTERNALLY AND PLASTER & PAINT INTERNALLY

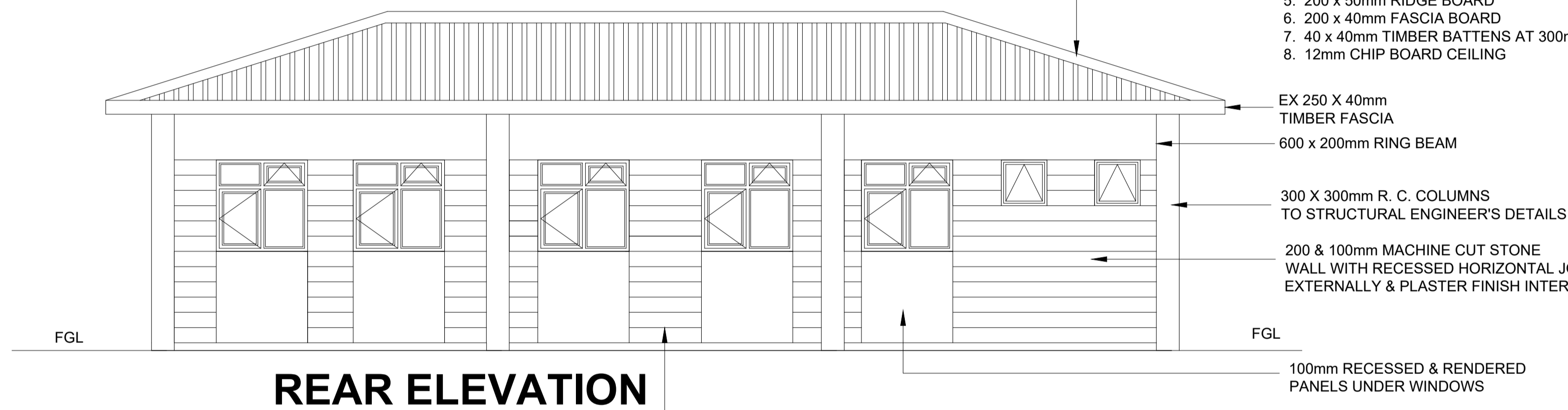
800 x 2100mm T & G TIMBER DOOR WITH GLAZED FANLIGHT OVER



**SIDE ELEVATION**

GAUGE 28 PRE-PAINTED ITS APPROVED ROOFING SHEETS, COLOUR TO APPROVAL OF THE ENGINEER LAID AT 22.5° ON

1. TIMBER TRUSSES (150 x 50mm RAFTER & TIES, 100 x 50mm STRUTS) AT 1800mm C/C
2. 150 x 50mm RAFTERS BETWEEN TRUSSES AT 600mm C/C
3. 150 x 50mm PURLINS AT TRUSS NODES
4. 100 x 50mm WALL PLATE
5. 200 x 50mm RIDGE BOARD
6. 200 x 40mm FASCIA BOARD
7. 40 x 40mm TIMBER BATTENS AT 300mm C/C
8. 12mm CHIP BOARD CEILING



**REAR ELEVATION**

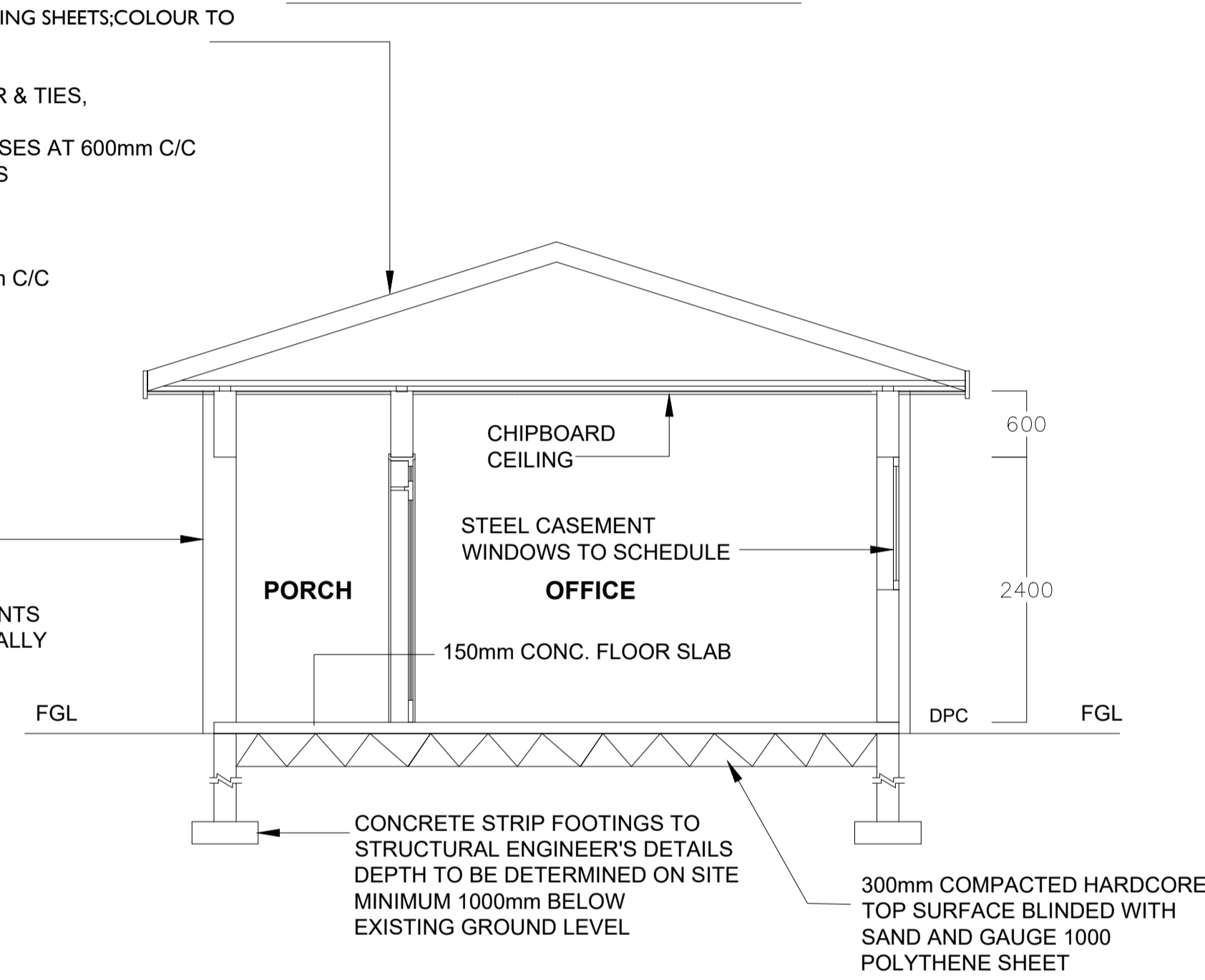
EX 250 X 40mm TIMBER FASCIA

600 x 200mm RING BEAM

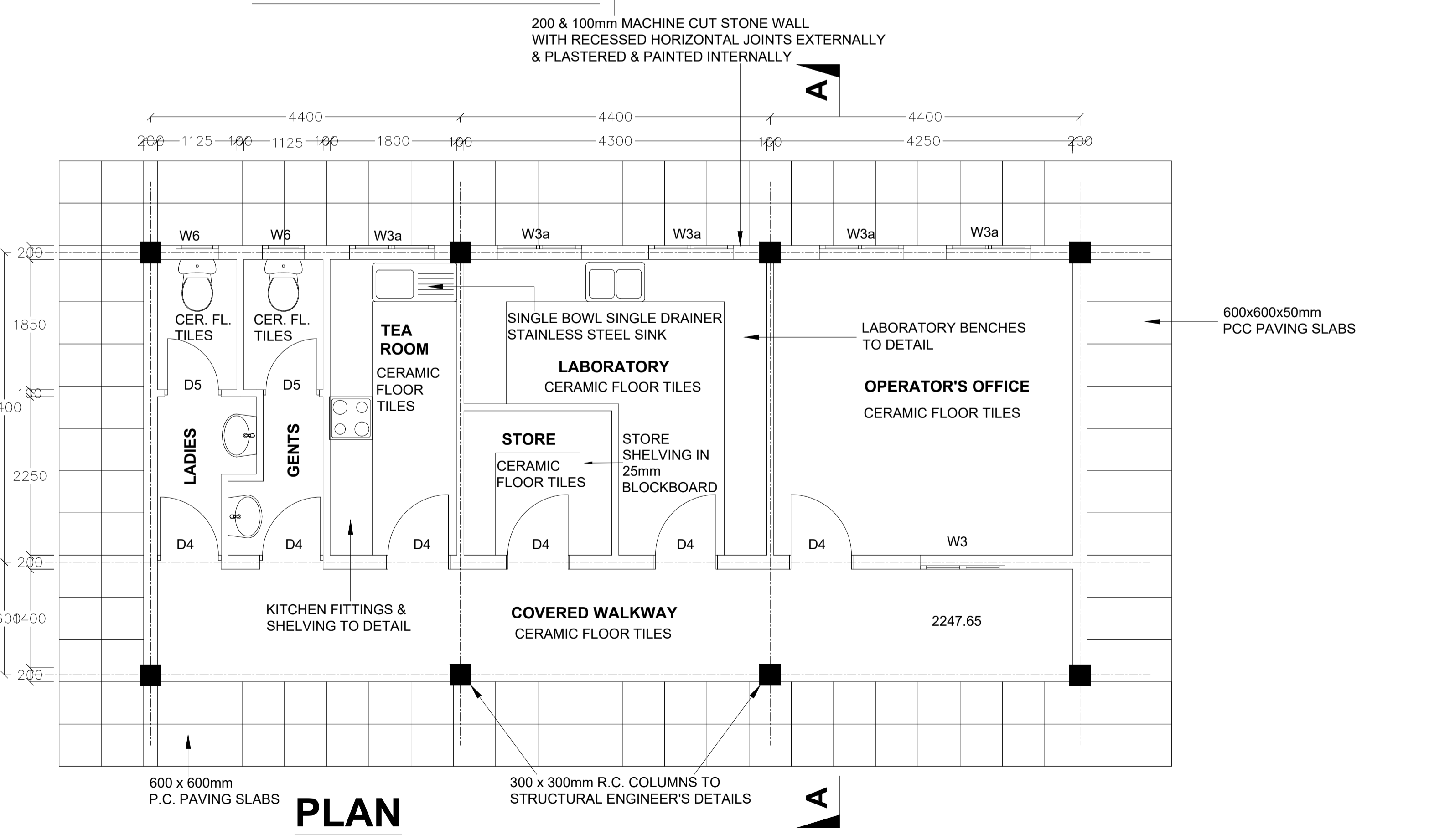
300 X 300mm R. C. COLUMNS TO STRUCTURAL ENGINEER'S DETAILS

200 & 100mm MACHINE CUT STONE WALL WITH RECESSED HORIZONTAL JOINTS EXTERNALLY & PLASTER FINISH INTERNALLY

100mm RECESSED & RENDERED PANELS UNDER WINDOWS



**CROSS SECTION A - A**

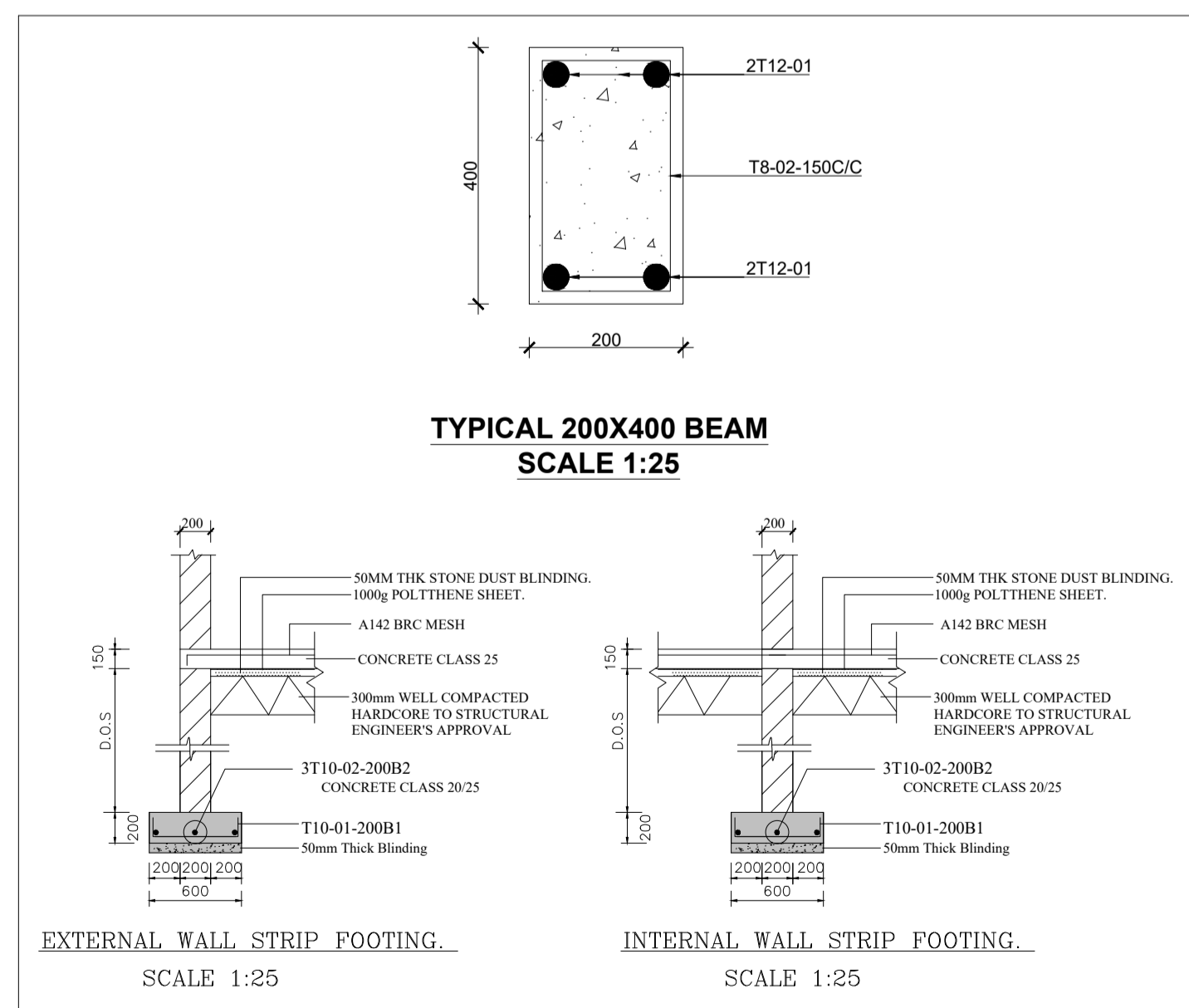


**PLAN**

200 & 100mm MACHINE CUT STONE WALL WITH RECESSED HORIZONTAL JOINTS EXTERNALLY & PLASTERED & PAINTED INTERNALLY

600x600x50mm PCC PAVING SLABS

300 x 300mm R.C. COLUMNS TO STRUCTURAL ENGINEER'S DETAILS



- NOTES**
- 1 ALL DIMENSIONS AND CONDITIONS MUST BE CHECKED ON SITE AND ANY DISCREPANCIES REFERRED TO THE ENGINEER
  - 2 ALL LEVELS TO BE CHECKED ON SITE BEFORE COMMENCEMENT OF WORKS.
  - 3 DEPTH OF FOUNDATION TO BE DETERMINED ON SITE. FOUNDATION TO BE CARRIED DOWN TO HARD BASE TO THE APPROVAL OF THE ENGINEER AND ALL SOILS TO BE EXCAVATED AND THE OPENING FILLED WITH HARD CORE.
  - 4 FIGURED DIMENSIONS TO BE TO BE TAKEN IN PREFERENCE TO SCALE.
  - 5 THREE PLY TROPICAL 'PLUVEK' BITUMINOUS FELT D.P.C. UNDER ALL WALLS TO BE RENDERED IN HOT BITUMEN.
  - 6 ALL WALLS TO BE REINFORCED WITH HEAVY GAUGE HOOP IRON AT EVERY ALTERNATIVE COURSE.
  - 7 P.V. DENOTES PERMANENT VENT TO BE PROVIDED TO ALL HABITABLE ROOMS AND AS SHOWN ON PLAN.
  - 8 ALL DRAIN PIPES TO ENGINEER'S SATISFACTION.
  - 9 WHERE DRAIN PASSES UNDER THE BUILDING OR DRIVEWAY IT SHALL BE OF CAST IRON AND ENCASED IN 150mm WEAK CONCRETE ALL ROUND.
  - 10 ALL SANITARY WORK TO BE CARRIED OUT IN ACCORDANCE TO THE RELEVANT AUTHORITIES' RULES AND REGULATIONS AND AS PER SPECIFICATIONS.
  - 11 MANHOLES IN DRIVEWAY TO HAVE HEAVY DUTY COVERS SET IN CART GREASE.
  - 12 ALL REINFORCED CONCRETE WORK TO STRUCTURAL ENGINEER'S DETAIL DRGS.
  - 13 ALL STEEL GLAZED WINDOWS TO HAVE BUGLAR PROOFING TO DETAIL.
  - 14 EXTERNAL DOORS (D,1) TO HAVE DRIPS.
  - 15 600X450mm MIRRORS OVER ALL W.H.B.s.
  - 16 CONCRETE WINDOW CILLS TO HAVE DRIPS.
  - 17 FOR ALL WINDOWS PROVIDE 150X150mm CYPRESS PELMET BOXES PAINTED AND WITH CURTAIN RAILS.
  - 18 ALL STEEL GLAZED WINDOWS TO HAVE BUILT-IN MOSQUITO PROOF 'GREENVAC' PERMANENT VENTS.
  - 19 ROOF EAVES SOFIT 50X25mm TIMBER BATTENS AND WIRE GAUZE WITH COFFEE TRAY WIRE.
  - 20 1000 GAUGE POLYTHENE SHEET BELOW FLOOR SLAB.
  - 21 B.R.C. IN FLOOR SLAB.
- FINISHES SCHEDULE**
- INTERNAL FINISHES**
- \*FLOOR- COLOURED GRANO
  - \*SKIRTINGS- COLOURED GRANO
  - \*WALLS- PLASTERED AND PAINTED
  - \*CEILING- CHIPBOARD PAINTED
  - \*CORNICES- TIMBER AND PAINTED
- EXTERNAL FINISHES**
- \*NATURAL STONE WITH HORIZONTAL JOINTS RAKED
  - \*WALLS BELOW WINDOWS, RING BEAMS AND GABLE WALLS TO BE RENDERED

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:

 **NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
P.O. BOX 495-70100  
GARISSA

REVIEWED BY:

 **Interconsult Engineers Ltd**  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane,  
Tel. 4441648/4441651  
Nairobi.

DRAWING TITLE:

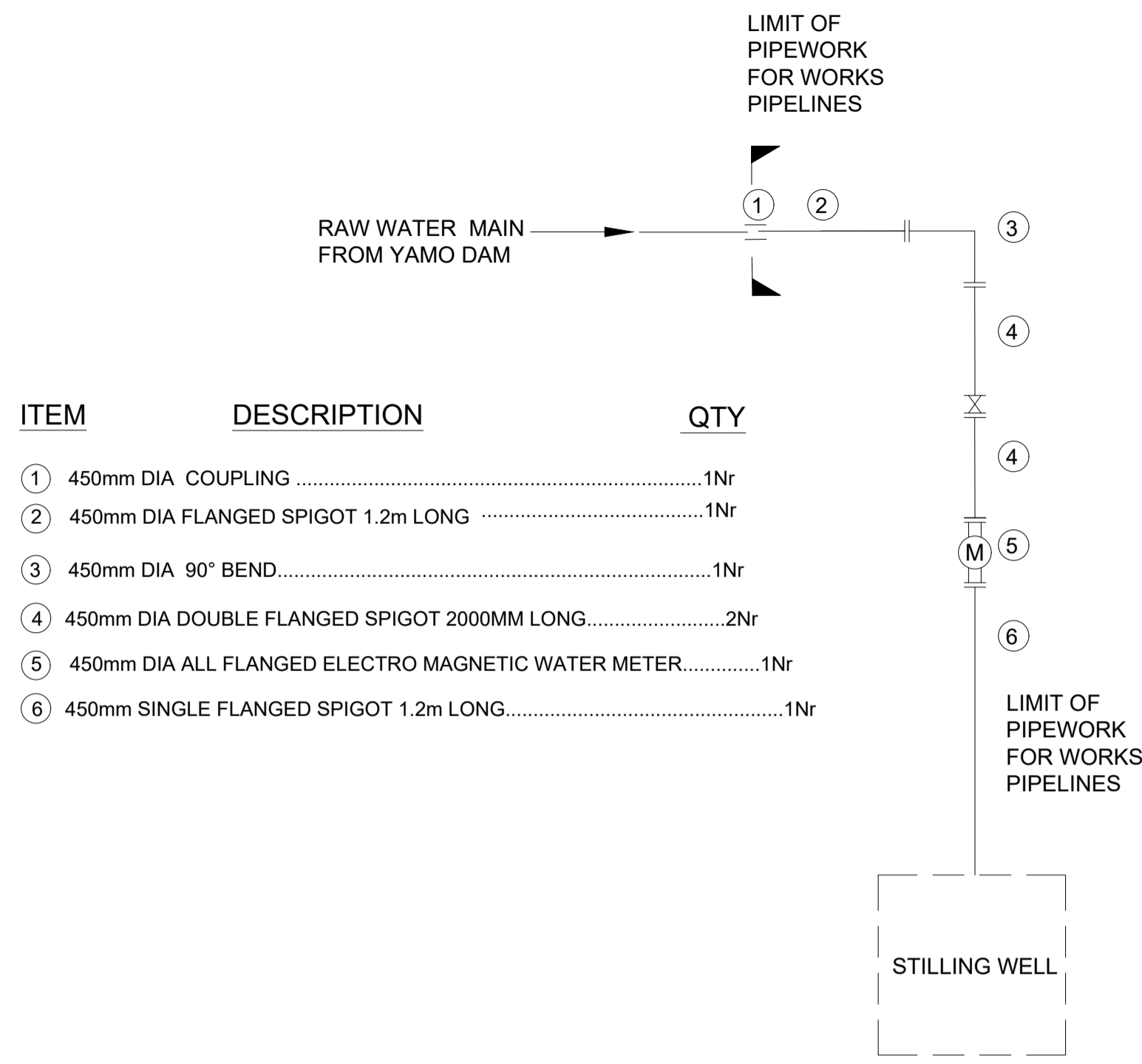
**MARALAL WATER SUPPLY PROJECT**

**OPERATOR'S OFFICE, LABORATORY & STORE**

**PLAN, ELEVATION AND SECTIONS**

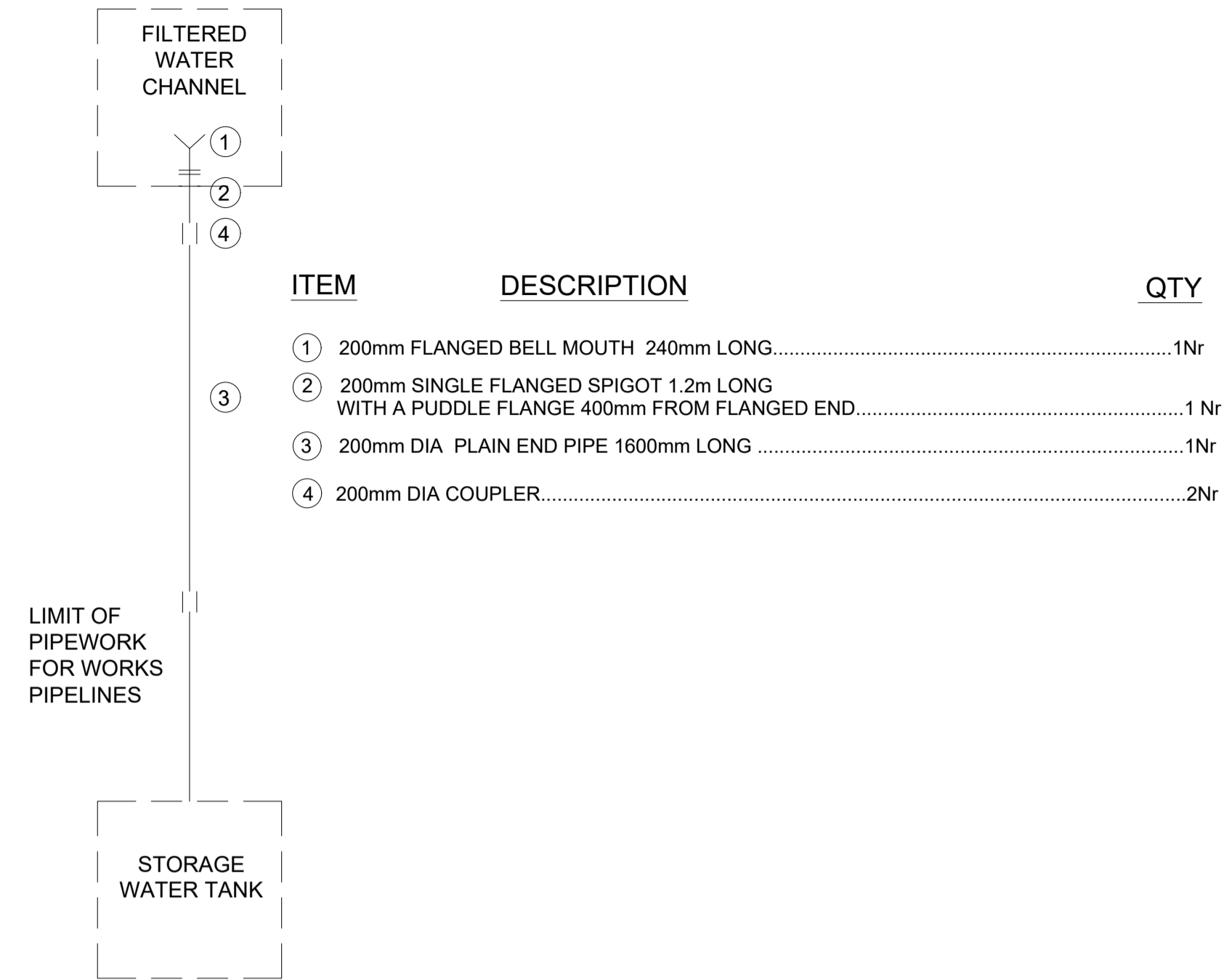
Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
1:50	Date: FEBRUARY 2024
DRAWING No. <b>MWS/TW/OP/01</b>	REV. 0

# **TREATMENT PLANT WORKS PIPELINES**



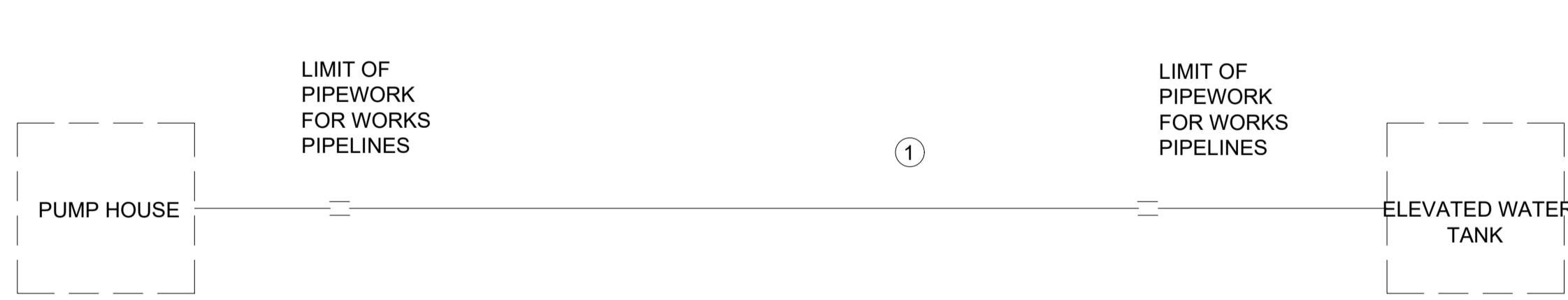
ITEM	DESCRIPTION	QTY
①	450mm DIA COUPLING .....	1Nr
②	450mm DIA FLANGED SPIGOT 1.2m LONG .....	1Nr
③	450mm DIA 90° BEND.....	1Nr
④	450mm DIA DOUBLE FLANGED SPIGOT 2000MM LONG.....	2Nr
⑤	450mm DIA ALL FLANGED ELECTRO MAGNETIC WATER METER.....	1Nr
⑥	450mm SINGLE FLANGED SPIGOT 1.2m LONG.....	1Nr

**PIPE 'A' - RAW WATER GRAVITY MAIN (450mm DIA. EPOXY COATED EXTERNALLY CEMENT LINED INTERNALLY STEEL PIPE)**



ITEM	DESCRIPTION	QTY
①	200mm FLANGED BELL MOUTH 240mm LONG.....	1Nr
②	200mm SINGLE FLANGED SPIGOT 1.2m LONG WITH A PUDDLE FLANGE 400mm FROM FLANGED END.....	1 Nr
③	200mm DIA PLAIN END PIPE 1600mm LONG .....	1Nr
④	200mm DIA COUPLER.....	2Nr

**PIPE 'B' - FILTERED WATER TO STORAGE WATER TANK(200mm DIA. EPOXY COATED EXTERNALLY CEMENT LINED INTERNALLY STEEL PIPE)**



ITEM	DESCRIPTION	QTY
①	150mm PLAIN END SPIGOT 12000mm LONG.....	1Nr

**PIPE 'C' - PUMP HOUSE TO ELEVATED WATER TANK(150mm DIA. EPOXY COATED EXTERNALLY CEMENT LINED INTERNALLY)**




ITEM	DESCRIPTION	QTY
①	300mm PLAIN END SPIGOT 16000mm LONG.....	1Nr
②	300mm COUPLER.....	1Nr
③	300mm SINGLE FLANGED SPIGOT 12000mm LONG.....	1Nr

**PIPE 'D' - ELEVATED WATER TANK TO FILTERS (300mm DIA. EPOXY COATED EXTERNALLY CEMENT LINED INTERNALLY)**

**NOTES:**

- DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED
- ALL EXPOSED CONCRETE EDGES TO HAVE A 25mm X 25mm CHAMFER
- ALL INTERNAL PLASTERED BLOCKWORK OR CONCRETE TO BE PAINTED WITH APPROVED HIGHLY CHEMICAL RESISTANT EPOXY PAINT
- ALL INTERNAL SURFACES OF MIXING TANKS TO BE LINED WITH 3 COATS OF APPROVED EPOXY LINING
- CONCRETE WORKS: ALL REINFORCED CONCRETE TO BE CLASS 20/25 EXCEPT WHERE OTHERWISE SPECIFIED
- ABBREVIATIONS
  - R.C - REINFORCED CONCRETE
  - D.P.C - DAMP PROOF COURSE
  - E.G.L - EXISTING GROUND LEVEL
  - F.G.L - FINISHED GROUND LEVEL
  - F.F.L - FINISHED FLOOR LEVEL
  - P.C.C - PRECAST CONCRETE
  - G.C.I - GALVANIZED CORRUGATED IRON
- EDGES OF TREADS AND RISERS IN CONCRETE STAIRCASE TO BE PROTECTED WITH 40 X 40 X 3mm M.S. ANGLE FIXED WITH FISH TAIL LUGS EMBEDDED IN CONCRETE
- FOR WINDOW SCHEDULE, SEE DRG. NO. PD/SD/29
- FOR DOOR SCHEDULE, SEE DRG. NO. PDLSD/27-28

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:  

**NORTHERN WATER SERVICE BOARD**  
 P.O. BOX 495-70100  
 GARISSA

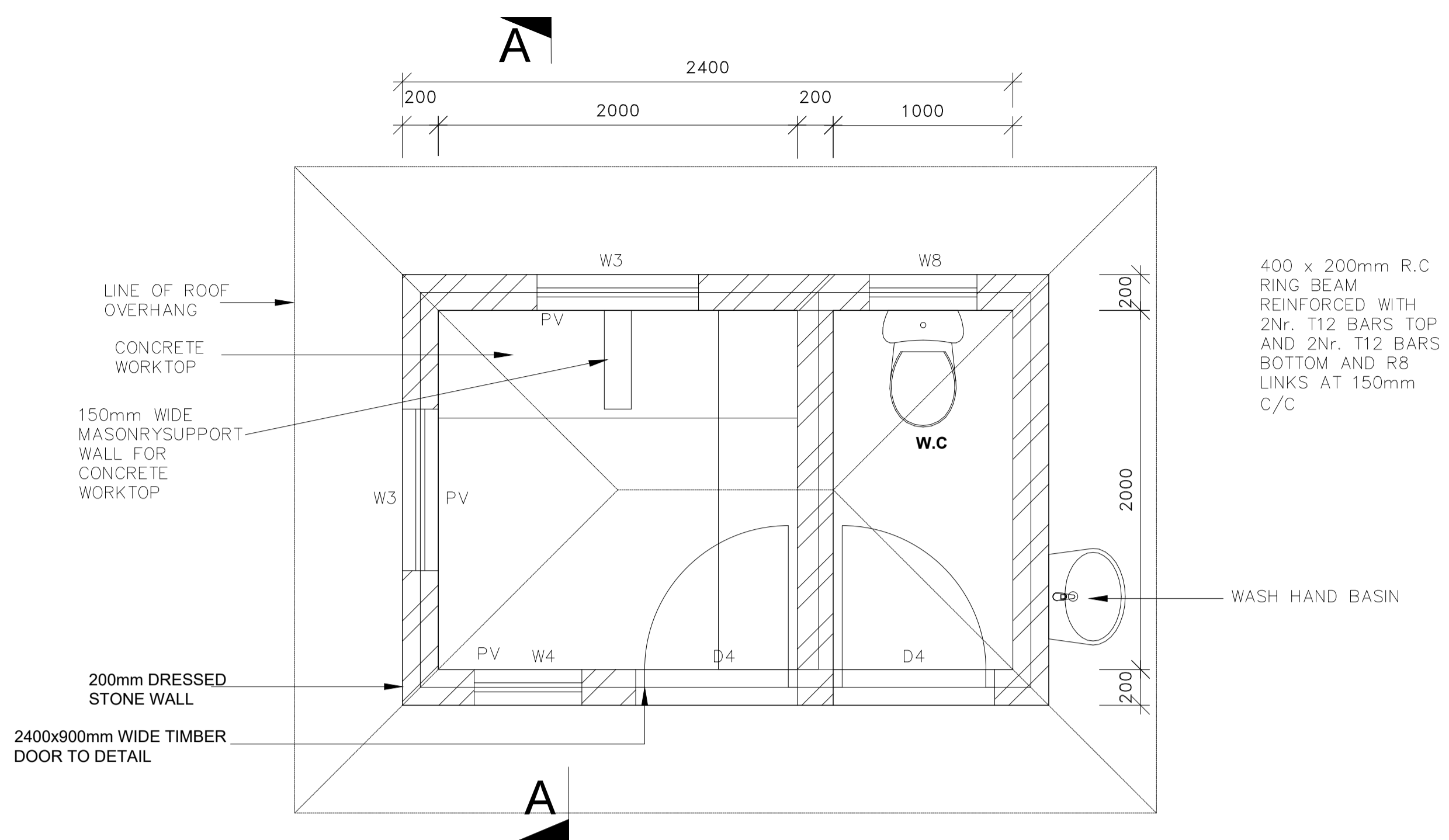
REVIEWED BY:  

**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

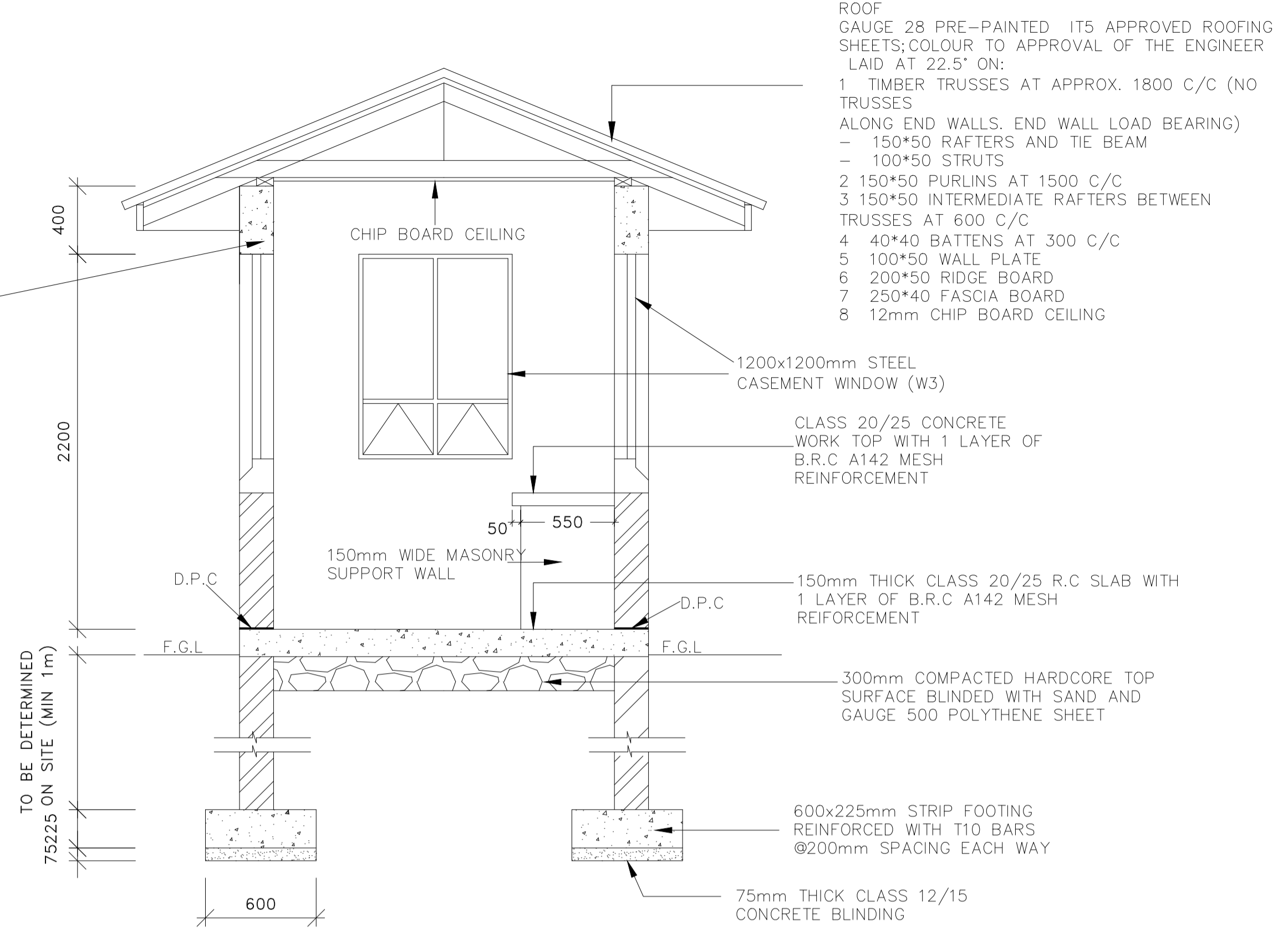
DRAWING TITLE:  
**MARALAL WATER PROJECT**  
**WORKS PIPELINES**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
1:50	Date: FEBRUARY 2024
DRAWING No. MWS/TW/WP/01	REV. 0

# **GUARD HOUSE**



**GUARD HOUSE (TYPE C)**  
**PLAN**  
SCALE 1:50



**SECTION A-A**  
SCALE 1:50

- ROOF**  
GAUGE 28 PRE-PAINTED, IT5 APPROVED ROOFING SHEETS; COLOUR TO APPROVAL OF THE ENGINEER LAID AT 22.5° ON:
- 1 TIMBER TRUSSES AT APPROX. 1800 C/C (NO TRUSSES ALONG END WALLS, END WALL LOAD BEARING)
    - 150\*50 RAFTERS AND TIE BEAM
    - 100\*50 STRUTS
  - 2 150\*50 PURLINS AT 1500 C/C
  - 3 150\*50 INTERMEDIATE RAFTERS BETWEEN TRUSSES AT 600 C/C
  - 4 40\*40 BATTENS AT 300 C/C
  - 5 100\*50 WALL PLATE
  - 6 200\*50 RIDGE BOARD
  - 7 250\*40 FASCIA BOARD
  - 8 12mm CHIP BOARD CEILING

**NOTES**

1. DIMENSIONS AND CONDITIONS MUST BE CHECKED ON SITE AND ANY DISCREPANCIES REFERRED TO ENGINEER. ALL DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED.
2. ALL LEVELS TO BE CHECKED ON SITE BEFORE COMMENCEMENT OF WORKS.
3. DEPTH OF FOUNDATION TO BE DETERMINED ON SITE. FOUNDATION TO BE CARRIED DOWN TO HARD BASE TO APPROVAL OF ENGINEER AND ALL UNSUITABLE SOILS TO BE EXCAVATED AND THE OPENINGS FILLED WITH HARD CORE.
4. THREE PLY TROPICAL 'PLUXEV' BITUMINOUS FELT D.P.C UNDER ALL WALLS TO BE RENDERED IN HOT BITUMEN.
5. ALL WALLS TO BE REINFORCED WITH HEAVY DUTY GAUGE HOOP IRON AT EVERY ALTERNATIVE COURSE AND JOINTED IN 1:3 CEMENT SAND MORTAR.
6. CONCRETE WINDOW CILLS HAVE DRIPS.
7. FOR ALL WINDOWS, PROVIDE 150x50mm CYPRESS PELMET BOXES PAINTED AND WITH CURTAIN RAILS.
8. ROOF EAVES SOFFITS 50x25mm TIMBER BATTENS AND WIRE GAUZE WITH COFFEE TRAY WIRE.
9. ALL TIMBER WORK TO HAVE PRIMER AND PAINTED WITH 3 COATS GLOSS PAINT.


**FINISHES SCHEDULE**

- INTERNAL FINISHES**
- FLOOR - 300x300 CERAMIC TILES
  - SKIRTINGS - CERAMIC TILES (150mm HIGH)
  - WALLS - PLASTERED WITH 12.5mm THICK CEMENT PLASTER AND PAINTED WITH THREE COATS OF PAINT.
  - CEILING - 12mm THICK CHIPBOARD
  - CORNICES - TIMBER AND PAINTED
- EXTERNAL FINISHES**
- NATURAL STONE WITH HORIZONTAL JOINTS RAKED
  - WALL BELOW WINDOWS, RING BEAM AND GABLE WALL TO BE RENDERED WITH 1:4 CEMENT SAND PLASTER.

**ABBREVIATIONS**

- R.C - REINFORCED CONCRETE
- D.P.C - DAMP PROOF COURSE
- E.G.L - EXISTING GROUND LEVEL
- F.G.L - FINISHED GROUND LEVEL
- F.F.L - FINISHED FLOOR LEVEL
- P.C.C - PRECAST CONCRETE

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:  

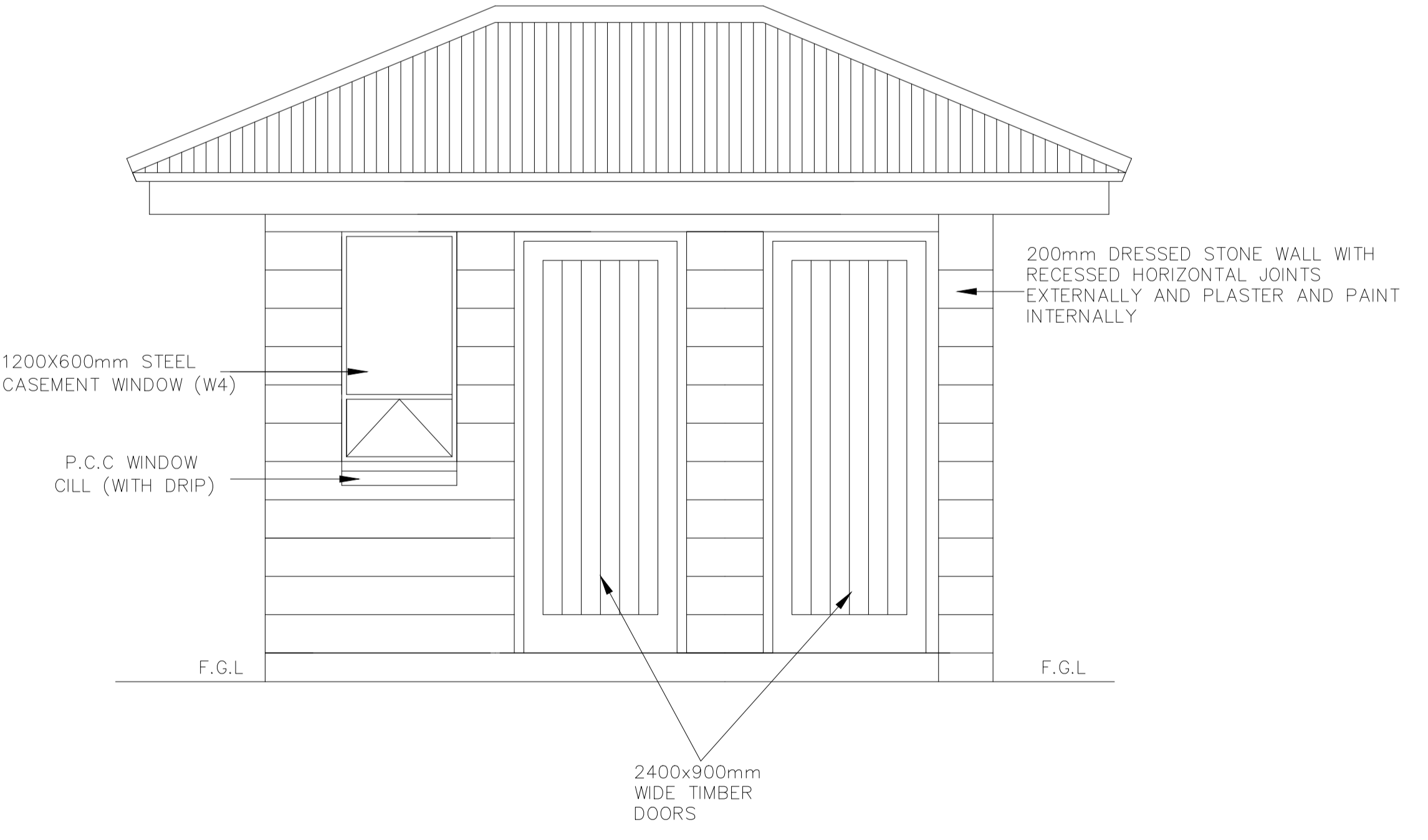
**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT**

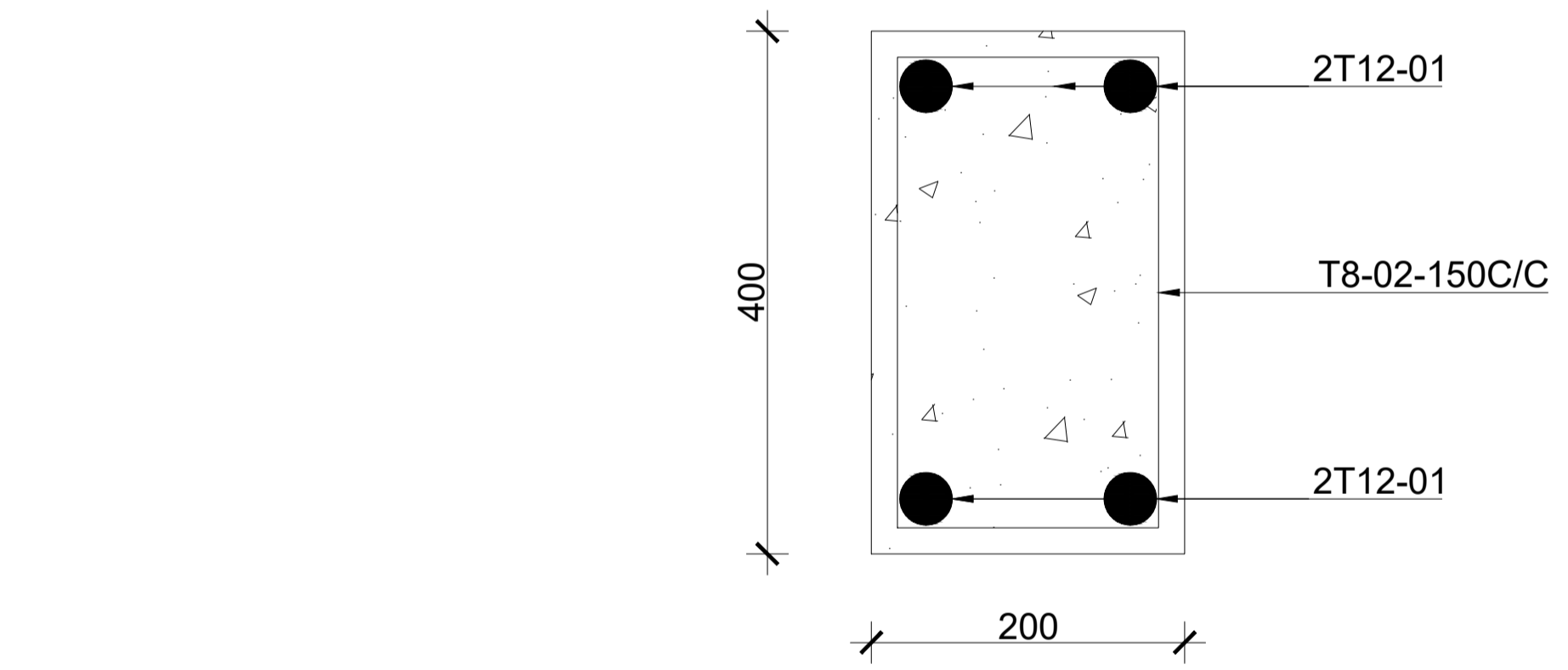
**GUARD HOUSE PLAN AND SECTION**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
1:50	Date: FEBRUARY 2024

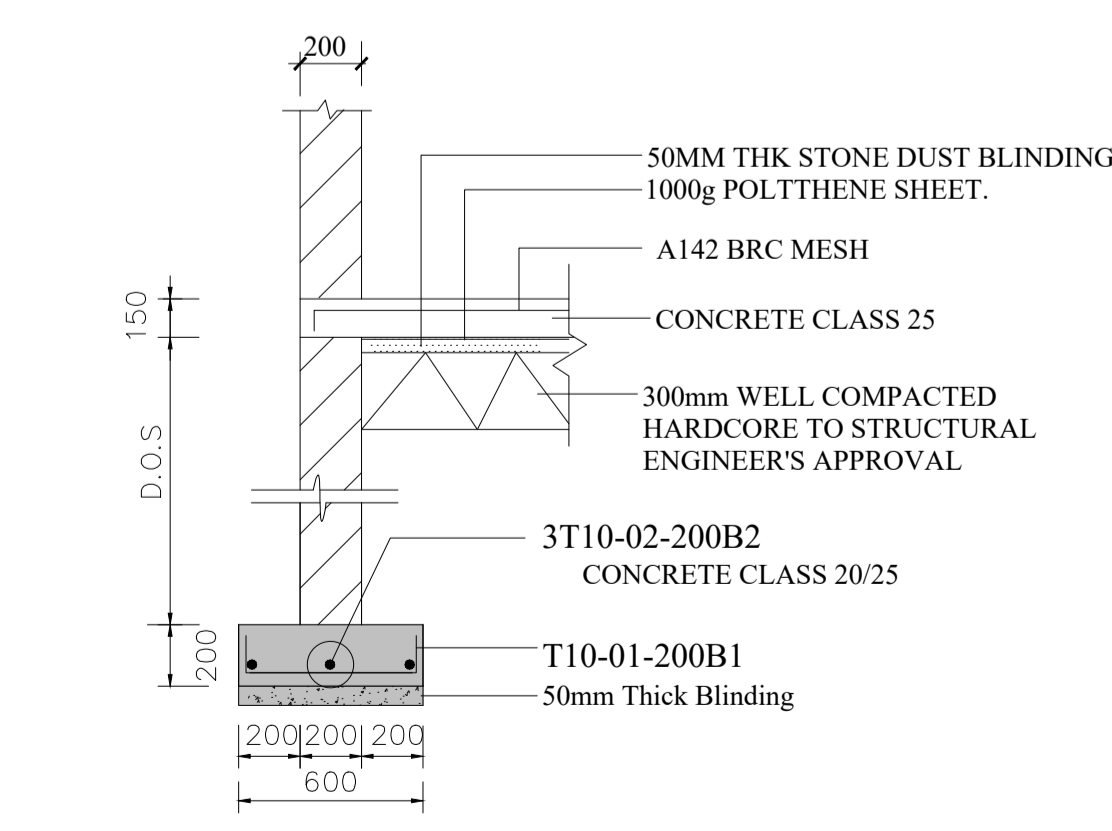
DRAWING No. **MWS/TW/GH/01** REV. 0



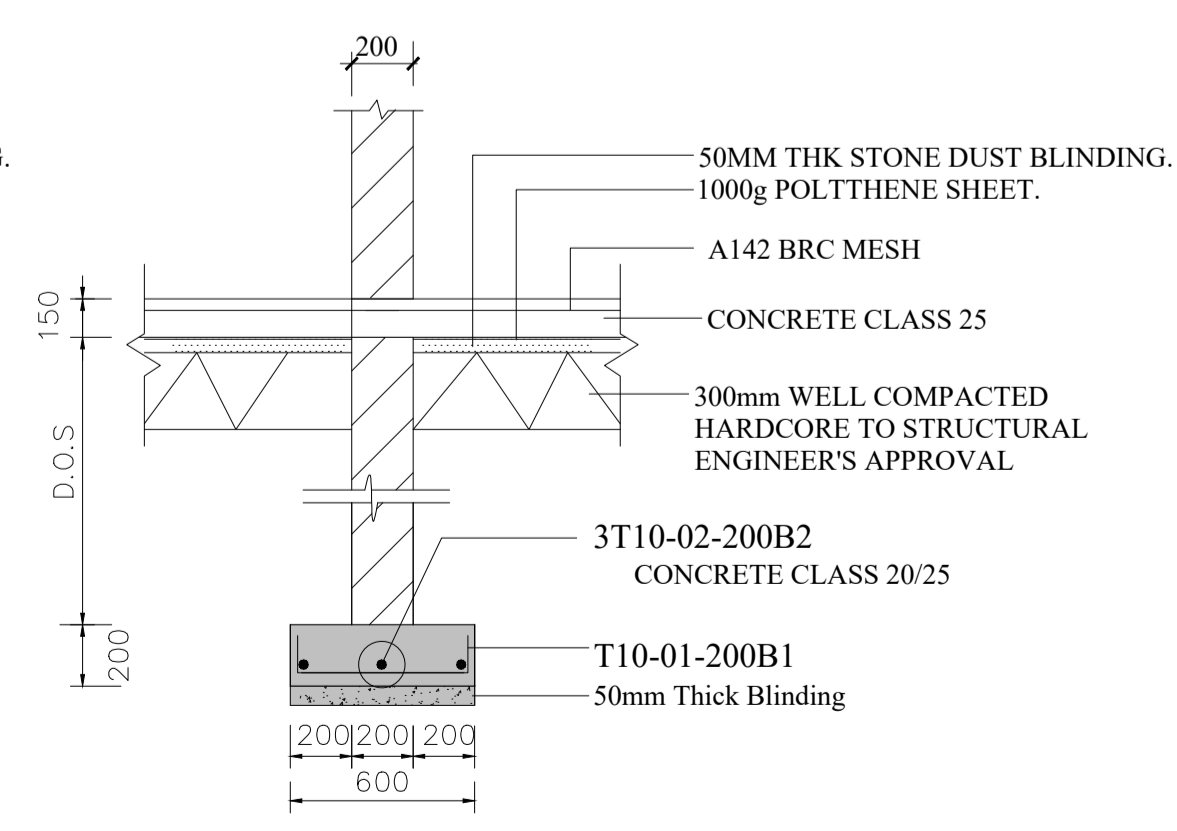
**ELEVATION**  
SCALE 1:50



**TYPICAL 200X400 BEAM**  
SCALE 1:25

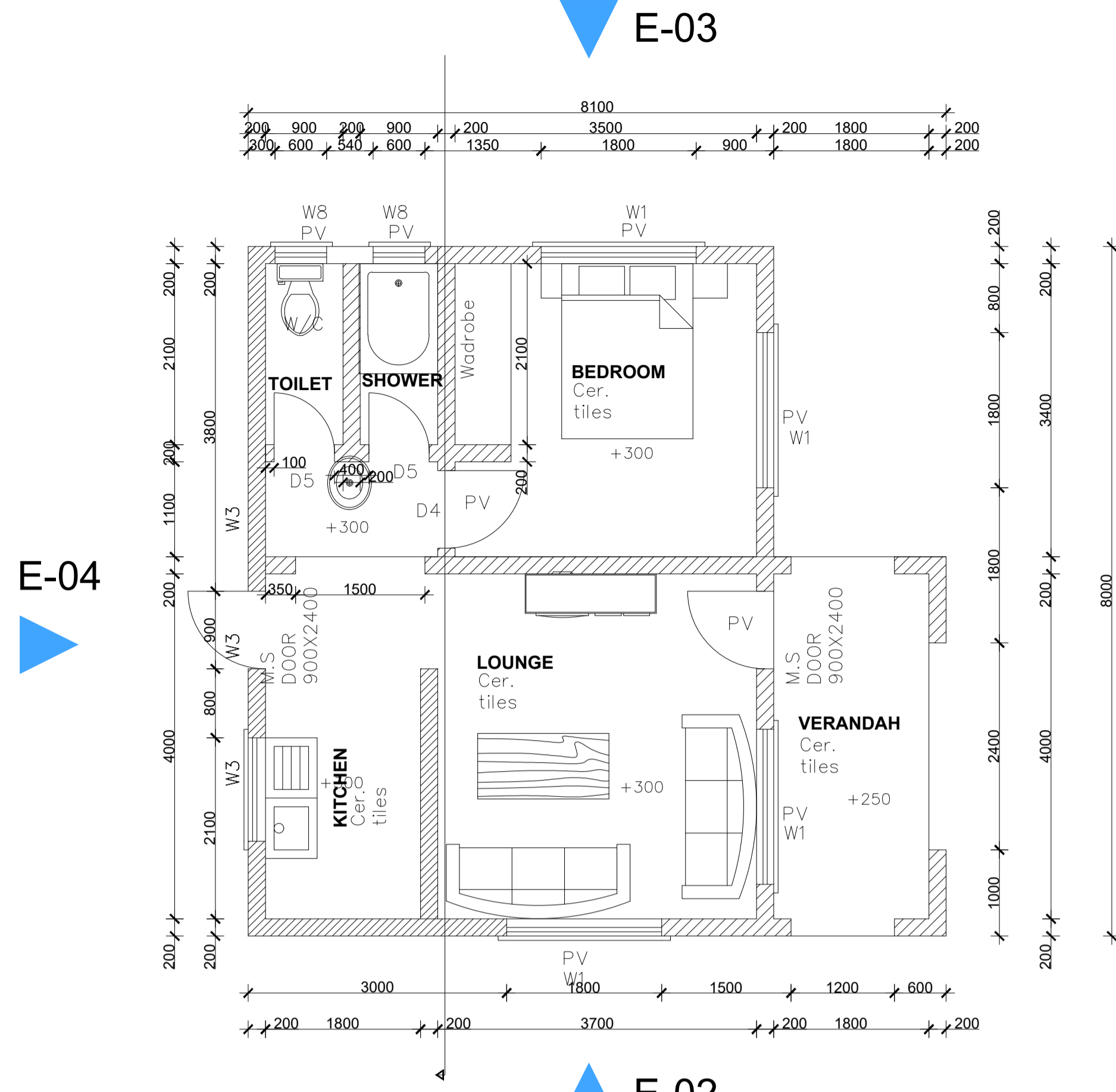


**EXTERNAL WALL STRIP FOOTING.**  
SCALE 1:25



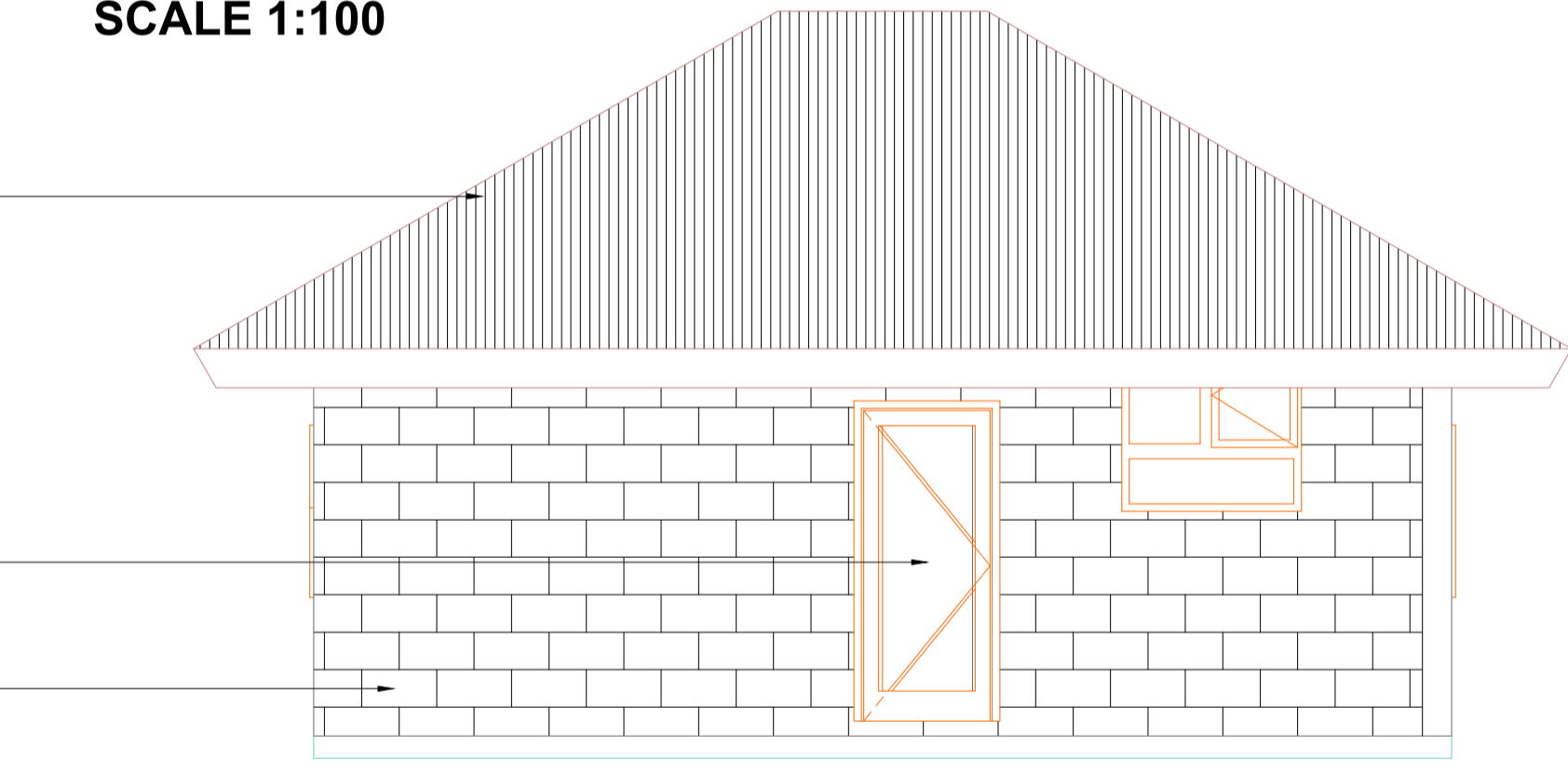
**INTERNAL WALL STRIP FOOTING.**  
SCALE 1:25

**STAFF HOUSE  
(ONE BEDROOM)**



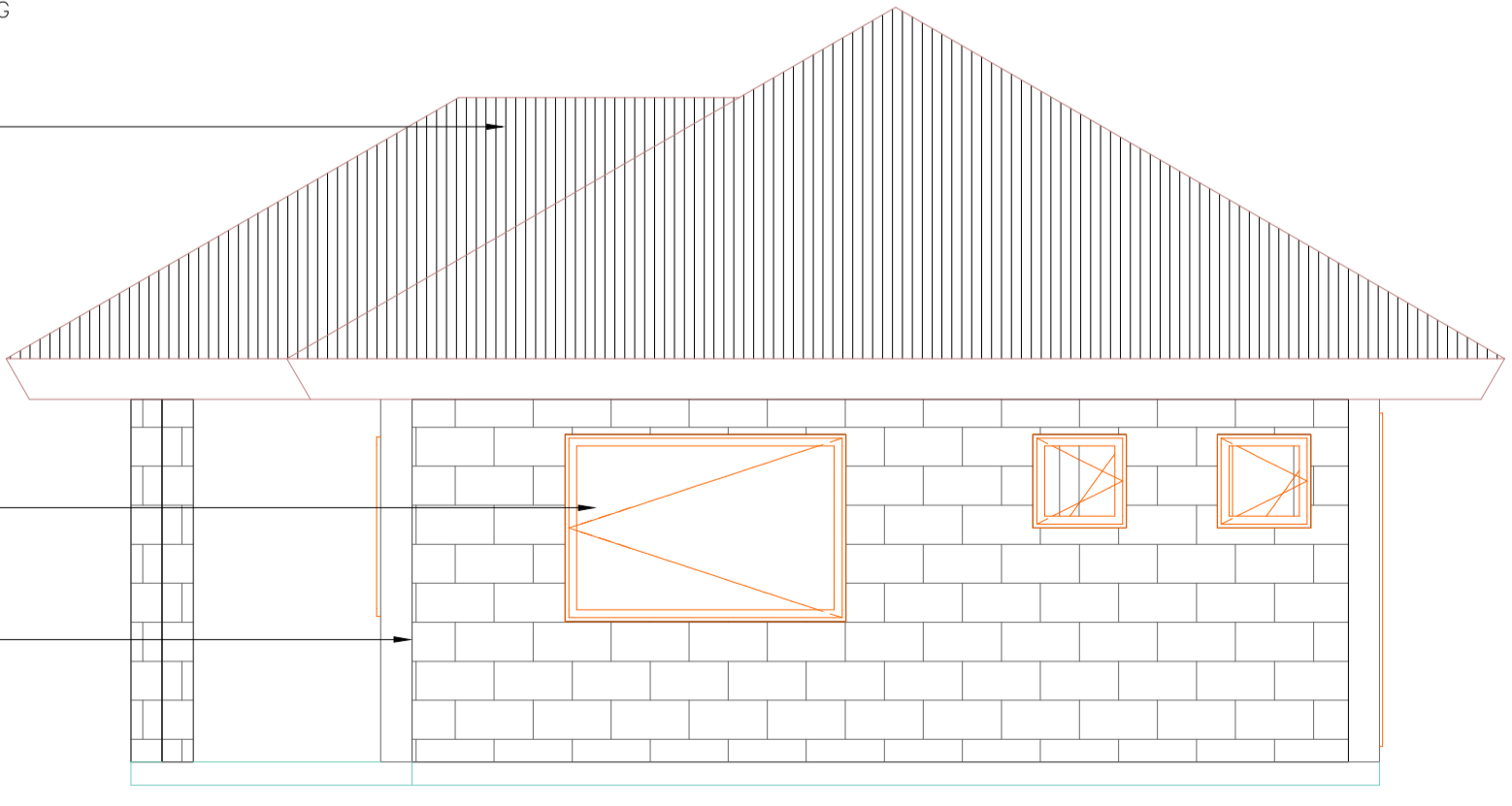
**1BR STAFF HOUSE  
GROUND FLOOR PLAN  
SCALE 1:100**

**ROOF**  
GAUGE 28 PRE-PAINTED ITS APPROVED ROOFING SHEETS; COLOUR TO APPROVAL OF THE ENGINEER LAID AT 22.5° LAID AT 22.5° ON:  
1 TIMBER TRUSSES AT APPROX. 1800 C/C (NO TRUSSES ALONG END WALLS, END WALL LOAD BEARING)  
- 150\*50 RAFTERS AND TIE BEAM  
- 100\*50 STRUTS  
2 150\*50 PURLINS AT 1500 C/C  
3 150\*50 INTERMEDIATE RAFTERS BETWEEN TRUSSES AT 600 C/C  
4 40\*40 BATTENS AT 300 C/C  
5 100\*50 WALL PLATE  
6 200\*50 RIDGE BOARD  
7 250\*40 FASCIA BOARD  
8 12mm CHIP BOARD CEILING

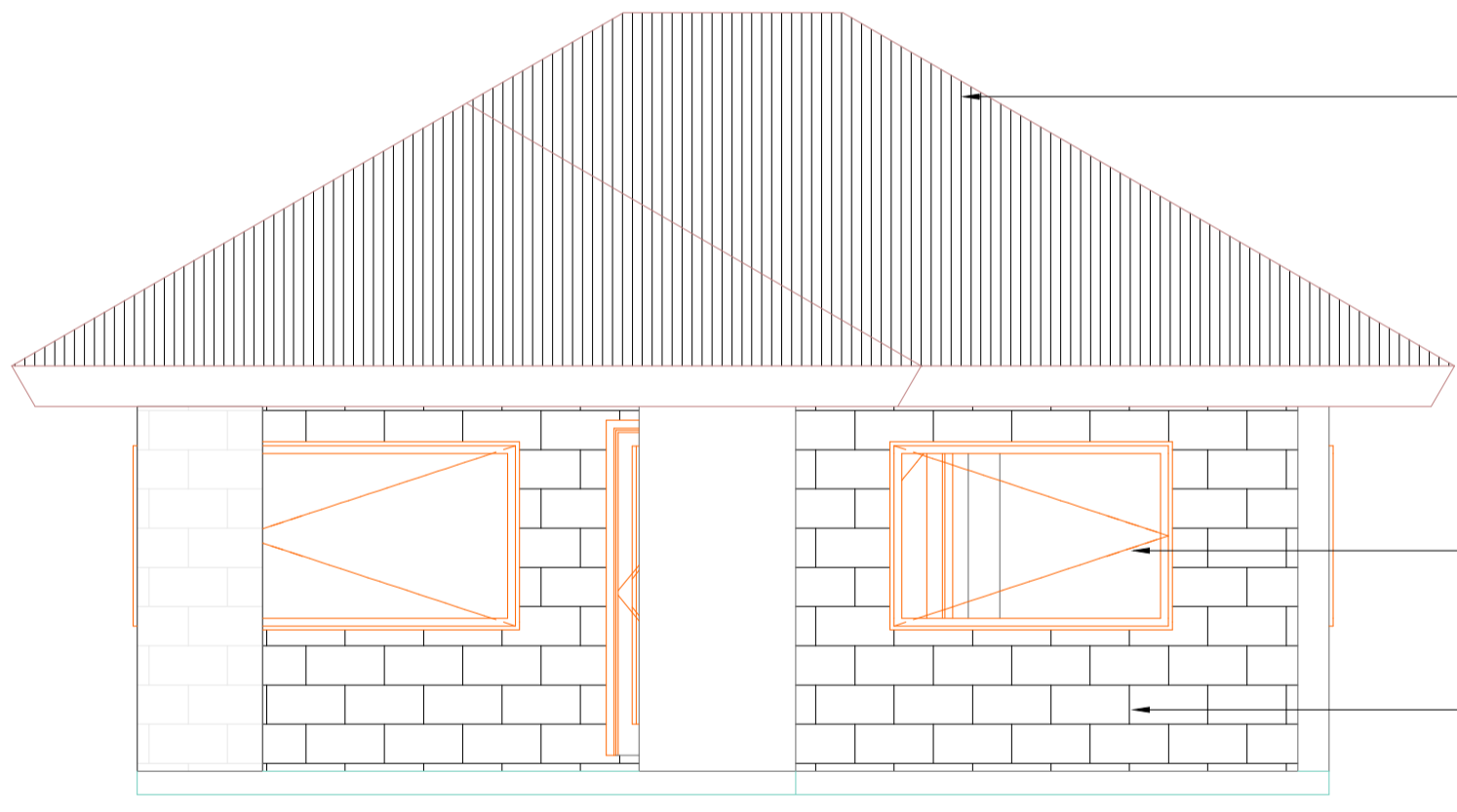


**ELEVATION 4  
SCALE 1:50**

**ROOF**  
GAUGE 28 PRE-PAINTED ITS APPROVED ROOFING SHEETS; COLOUR TO APPROVAL OF THE ENGINEER LAID AT 22.5° LAID AT 22.5° ON:  
1 TIMBER TRUSSES AT APPROX. 1800 C/C (NO TRUSSES ALONG END WALLS, END WALL LOAD BEARING)  
- 150\*50 RAFTERS AND TIE BEAM  
- 100\*50 STRUTS  
2 150\*50 PURLINS AT 1500 C/C  
3 150\*50 INTERMEDIATE RAFTERS BETWEEN TRUSSES AT 600 C/C  
4 40\*40 BATTENS AT 300 C/C  
5 100\*50 WALL PLATE  
6 200\*50 RIDGE BOARD  
7 250\*40 FASCIA BOARD  
8 12mm CHIP BOARD CEILING



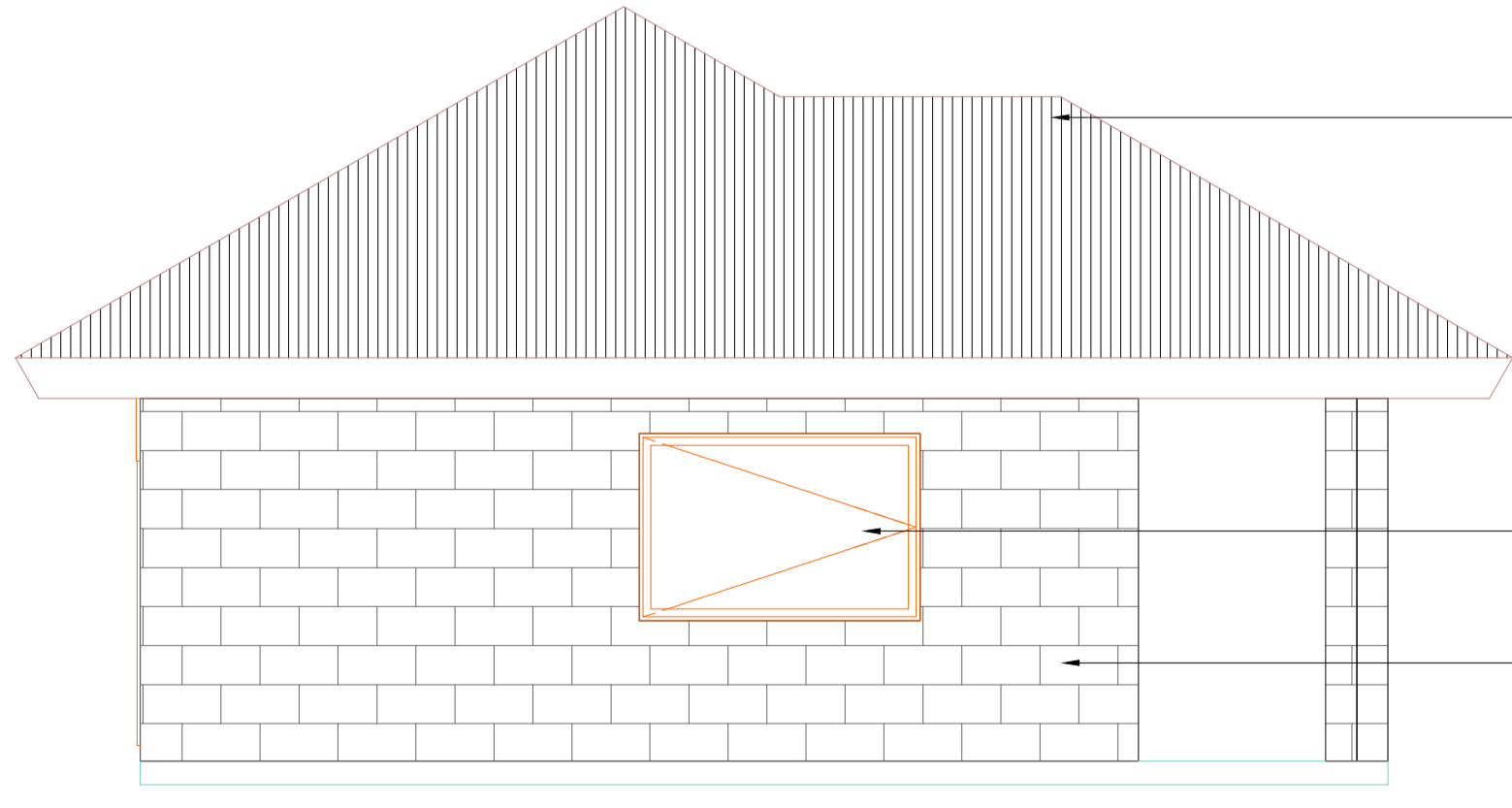
**ELEVATION 3  
SCALE 1:50**



**ELEVATION 1  
SCALE 1:50**

**ROOF**  
GAUGE 28 PRE-PAINTED ITS APPROVED ROOFING SHEETS; COLOUR TO APPROVAL OF THE ENGINEER LAID AT 22.5° LAID AT 22.5° ON:  
1 TIMBER TRUSSES AT APPROX. 1800 C/C (NO TRUSSES ALONG END WALLS, END WALL LOAD BEARING)  
- 150\*50 RAFTERS AND TIE BEAM  
- 100\*50 STRUTS  
2 150\*50 PURLINS AT 1500 C/C  
3 150\*50 INTERMEDIATE RAFTERS BETWEEN TRUSSES AT 600 C/C  
4 40\*40 BATTENS AT 300 C/C  
5 100\*50 WALL PLATE  
6 200\*50 RIDGE BOARD  
7 250\*40 FASCIA BOARD  
8 12mm CHIP BOARD CEILING

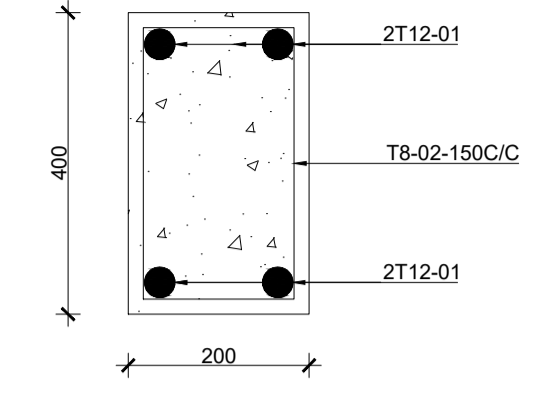
1200x1200mm STEEL CASEMENT WINDOW  
MACHINE CUT WALLING



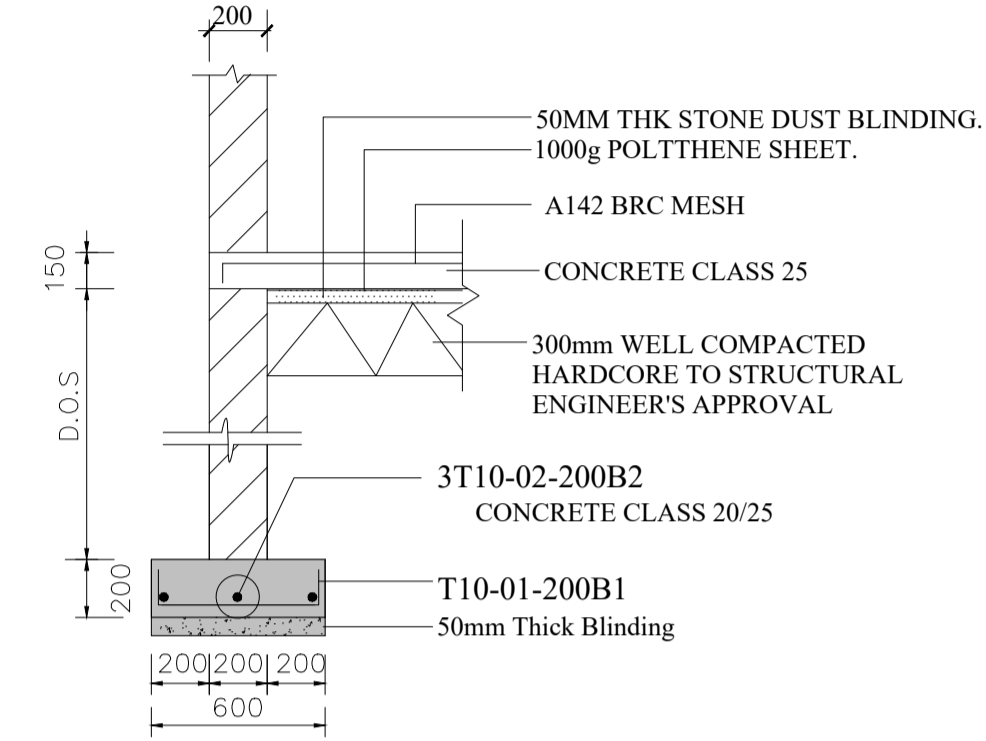
**ELEVATION 2  
SCALE 1:50**

**ROOF**  
GAUGE 28 PRE-PAINTED ITS APPROVED ROOFING SHEETS; COLOUR TO APPROVAL OF THE ENGINEER LAID AT 22.5° LAID AT 22.5° ON:  
1 TIMBER TRUSSES AT APPROX. 1800 C/C (NO TRUSSES ALONG END WALLS, END WALL LOAD BEARING)  
- 150\*50 RAFTERS AND TIE BEAM  
- 100\*50 STRUTS  
2 150\*50 PURLINS AT 1500 C/C  
3 150\*50 INTERMEDIATE RAFTERS BETWEEN TRUSSES AT 600 C/C  
4 40\*40 BATTENS AT 300 C/C  
5 100\*50 WALL PLATE  
6 200\*50 RIDGE BOARD  
7 250\*40 FASCIA BOARD  
8 12mm CHIP BOARD CEILING

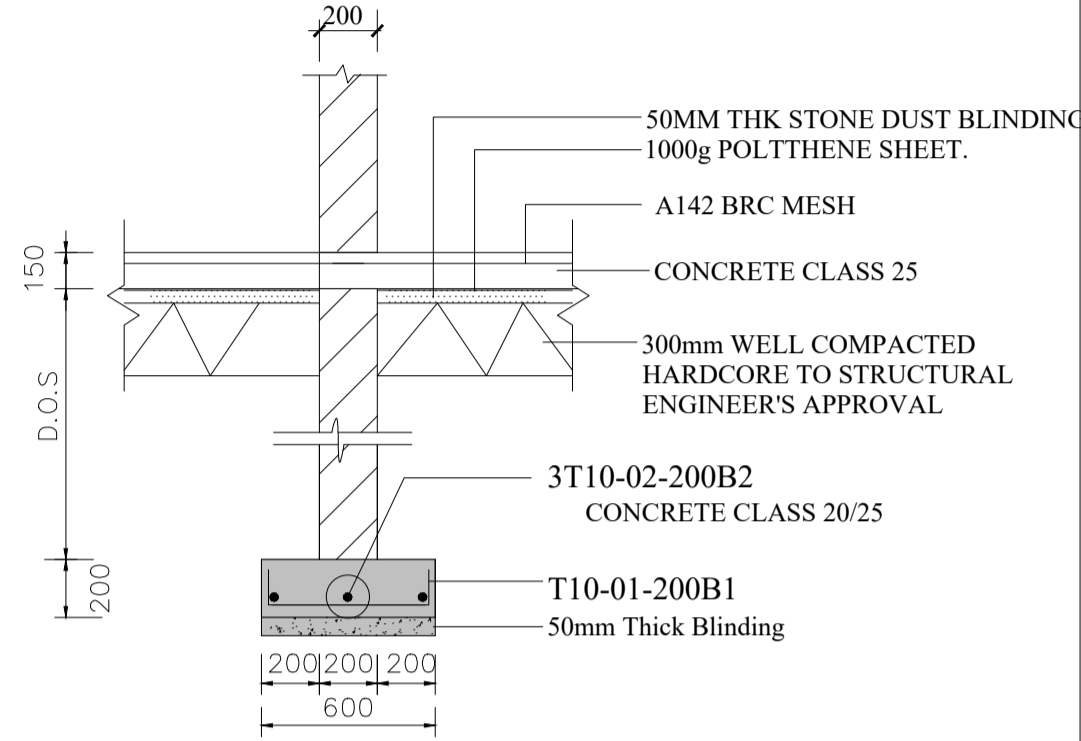
1200x1200mm STEEL CASEMENT WINDOW  
MACHINE CUT WALLING



**TYPICAL 200X400 BEAM  
SCALE 1:25**



**EXTERNAL WALL STRIP FOOTING.  
SCALE 1:25**



**INTERNAL WALL STRIP FOOTING.  
SCALE 1:25**

**NOTES**

- DIMENSIONS AND CONDITIONS MUST BE CHECKED ON SITE AND ANY DISCREPANCIES REFERED TO ENGINEER. ALL DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED.
- ALL LEVELS TO BE CHECKED ON SITE BEFORE COMMENCEMENT OF WORKS.
- DEPTH OF FOUNDATION TO BE DETERMINED ON SITE. FOUNDATION TO BE CARRIED DOWN TO HARD BASE TO APPROVAL OF ENGINEER AND ALL UNSUITABLE SOILS TO BE EXCAVATED AND THE OPENINGS FILLED WITH HARD CORE.
- THREE PLY TROPICAL "PLUVEX" BITUMINOUS FELT D.P.C UNDER ALL WALLS TO BE RENDERED IN HOT BITUMEN.
- ALL WALLS TO BE REINFORCED WITH HEAVY DUTY GAUGE HOOP IRON AT EVERY ALTERNATIVE COURSE AND JOINTED IN 1:3 CEMENT SAND MORTAR.
- CONCRETE WINDOW CILLS HAVE DRIPS.
- FOR ALL WINDOWS, PROVIDE 150x50mm CYPRESS PELMET BOXES PAINTED AND WITH CURTAIN RAILS.
- ROOF EAVES SOFFITS 50x25mm TIMBER BATTENS AND WIRE GAUZE WITH COFFEE TRAY WIRE.
- ALL TIMBER WORK TO HAVE PRIMER AND PAINTED WITH 3 COATS GLOSS PAINT.

**FINISHES SCHEDULE**

**INTERNAL FINISHES**

- FLOOR - 300x300 CERAMIC TILES
- SKIRTINGS - CERAMIC TILES (150mm HIGH)
- WALLS - PLASTERED WITH 12.5mm THICK CEMENT PLASTER AND PAINTED WITH THREE COATS OF PAINT.
- CEILING - 12mm THICK CHIPBOARD
- CORNICES - TIMBER AND PAINTED

**EXTERNAL FINISHES**

- NATURAL STONE WITH HORIZONTAL JOINTS RAKED
- WALL BELOW WINDOWS, RING BEAM AND GABLE WALL TO BE RENDERED WITH 1:4 CEMENT SAND PLASTER.

**ABBREVIATIONS**

- R.C - REINFORCED CONCRETE
- D.P.C - DAMP PROOF COURSE
- E.G.L - EXISTING GROUND LEVEL
- F.G.L - FINISHED GROUND LEVEL
- F.F.L - FINISHED FLOOR LEVEL
- P.C.C - PRECAST CONCRETE

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:



**NORTHERN WATER WORKS  
DEVELOPMENT AGENCY**  
P.O. BOX 495-70100  
GARISSA

REVIEWED BY:



**Interconsult Engineers Ltd**  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane,  
Tel. 4441648/4441651  
Nairobi.

DRAWING TITLE:

**MARALAL WATER SUPPLY PROJECT**

**STAFF HOUSE  
(ONE BEDROOM)**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
1:50	Date: FEBRUARY 2024
DRAWING No. MWS/TW/SH/01	REV. 0

# **ELECTRICAL DRAWINGS**



**NOTE**  
THIS DRAWING TO BE USED  
FOR ELECTRICAL WORKS ONLY


**POWER OUTLETS**

SYMBOL	DESCRIPTION
	1 GANG 1 WAY LIGHTING SWITCH
	1 GANG 1 WAY LIGHTING SWITCH (WEATHERPROOF)
	1 GANG 2 WAY LIGHTING SWITCH
	2 GANG 1 WAY LIGHTING SWITCH
	2 GANG 2 WAY LIGHTING SWITCH
	2 GANG 2 WAY LIGHTING SWITCH (WEATHERPROOF)
	1 GANG 2 WAY LIGHTING SWITCH (WEATHERPROOF)
	2 GANG 1 WAY LIGHTING SWITCH (WEATHERPROOF)
	13 AMP. SINGLE SWITCHED SOCKET OUTLET
	13 AMP. TWIN SWITCHED SOCKET OUTLET
	13 AMP. SINGLE SWITCHED SOCKET OUTLET (METALCLAD)
	15 AMP. SINGLE SWITCHED SOCKET OUTLET
	11KV SWITCHBOARD
	MV SWITCHBOARD - CONTROL PANEL FOR PUMP/MOTOR SETS
	3 PHASE MCB DISTRIBUTION BOARD WITH INTEGRAL ISOLATOR
	SINGLE PHASE MCB DISTRIBUTION BOARD WITH INTERGRAL ISOLATOR
	WATERTIGHT CABLE TERMINATION BOX COMPLETE WITH CONNECTOR BLOCKS
	CONTROL PANEL FOR MIXING MACHINES
	UNDERGROUND CABLE
	PROPOSED KPLC'S HIGH VOLTAGE UNDERGROUND CABLE
	2 x 100mm DIAMETER DUCTS
	3 x 100mm DIAMETER DUCTS
	4 x 100mm DIAMETER DUCTS

**LIGHT FITTINGS**

SYMBOL	DESCRIPTION
	18 WATT - 600mm SINGLE FLOURESCENT FITTING AS THORN CAT. NO. PP118 (HIGHER POWER FACTOR)
	58 WATT - 1500mm SINGLE FLOURESCENT FITTING AS THORN CAT. NO. PP158 (HPF)
	- DITTO- WITH BUILT IN EMERGENCY LIGHTING AS THORN CAT. NO. E3PP158
	2x58 WATT - 1500mm TWIN FLOURESCENT BATTEN FITTING AS THORN CAT. NO. PP258 (HPF)
	- DITTO- WITH BUILT IN EMERGENCY LIGHTING AS THORN CAT. NO. E3PP258 (HPF)
	2x58 WATT 1500mm TWIN CORROSION RESISTANT FLOURESCENT BATTEN FITTING AS THORN CAT. NO. LUES258 (HPF)
	BULKHEAD FITTING SUITABLE FOR INTERNAL AND EXTERNAL APPLICATION WITH LAMP 2D-16 WATT LONG LIFE AND LOW ENERGY CONSUMPTION AS THORN CAT. NO.FV02D16B
	300 WATTS TUNGSTEN FLOODLIGHT FOR OUTDOOR USE COMPLETE WITH ADJUSTABLE WALL BRACKET AS THORN CAT. NO.SUN500. THE WALL BRACKET SHALL BE APPROVED BY THE ENGINEER
	5.0 METRES SECURITY LIGHTING COLUMN FOR POST TOP LANTERN COMPLETE WITH 120W LED FLOOD LIGHT INCORPORATING CONTROL GEAR, LAMP AND REFLECTOR AS THORN CAT. NO. QG6NB1100.4 COMPLETE WITH LARGE CANOPY CAT. NO. QG6W WITH STOVE ENAMALLED EXTERIOR FINISHED BLACK COLOUR, WHITE INTERIOR WITH BLACK NYLON ACROSS RETAINING CAP
	PBS - PUSH BUTTON STATION - LOCAL
	GAMMA SIX - POST TOP LANTERN - 80W H.P. MERCURY, CLEAR BOWL LARGE CANOPY
	AREA FLOOD LIGHT - THORN MODEL AREA FLOOD 15, HPS - T 150W
	PHOTO CELL
	1200MM T8 LED TUBE AS LIPER
	120W LED AREA FLOOD LIGHT AS LIPER

REVISION	DESCRIPTION

CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
P.O. BOX 495-70100  
**GARISSA**

REVIEWED BY:  

**Interconsult Engineers Ltd**  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane.  
Tel. 4441648/4441651  
Nairobi.

DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT  
ELECTRICAL SYMBOLS**

Designed by: N.W	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: H 1:1000, V- 1:2000	Date: FEBRUARY 2024



- NOTES:**
1. CONTOUR LEVELS ARE IN METERS AT ONE METER INTERVALS
  2. MINIMUM PIPELINE SLOPES TO BE 1:500
  3. DRAWING TO BE READ IN CONJUNCTION WITH STANDARD DRAWINGS
  4. ALL PIPE FITTINGS TO BE CONFIRMED ON SITE DURING SETTING OUT


- LEGEND:**
- ROAD (TARMAC)
  - ROAD / TRACK (EARTH / MURRAM)
  - CHAINLINK FENCE
  - BARBED WIRE FENCE
  - FENCE / HEDGE
  - CONTOURS, 1m INTERVAL
  - ELECTRIC POST
  - CULVERT
  - GATE
  - ROCK OUTCROPS
  - PROPOSED WATER MAIN
  - EXISTING QUARRY FENCE
  - TP10 TRAVERSE POINT & No.
  - TREES
  - HORIZONTAL BEND (H) OR VERTICAL BEND (V) WITH ANGLE INDICATED
  - GATE VALVE
  - WATER METER
  - WASHOUT VALVE & No.
  - SINGLE ORIFICE AIR VALVE & No.
  - PIPELINE GRADIENT WITH SLOPE DIRECTION (SLOPE MIN. OR 1 IN n)
  - IBD DRAIN
  - UNDERGROUND CABLE
  - 5.0 METRES SECURITY LIGHTING COLUMN FOR POST TOP LANTERN
  - POWER MANHOLE

**CONTROL POINTS**

NORTHING	EASTING	ELEVATION	DESCRIPTION
124384.426	239789.916	2045.325	T8
123949.361	239976.187	2033.506	T9
123497.036	240289.493	2034.716	TP
123339.751	240355.639	2031.802	T10
123071.969	240456.581	2032.275	T12
124384.431	239789.924	2045.323	T7
125337.992	238710.623	2093.905	T2A
125087.118	238467.115	2097.308	T1
125067.303	238507.520	2094.498	T1A
122727.298	240629.864	2035.268	T13
120098.386	242787.045	1918.667	T16
122385.501	240923.306	1983.404	T14
121328.205	241975.695	2024.908	TP


REVISION	DESCRIPTION

CLIENT / EMPLOYER:



**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
P.O. BOX 495-70100  
GARISSA

REVIEWED BY:



**Interconsult Engineers Ltd**  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane,  
Tel. 4441648/4441651  
Nairobi.

DRAWING TITLE:

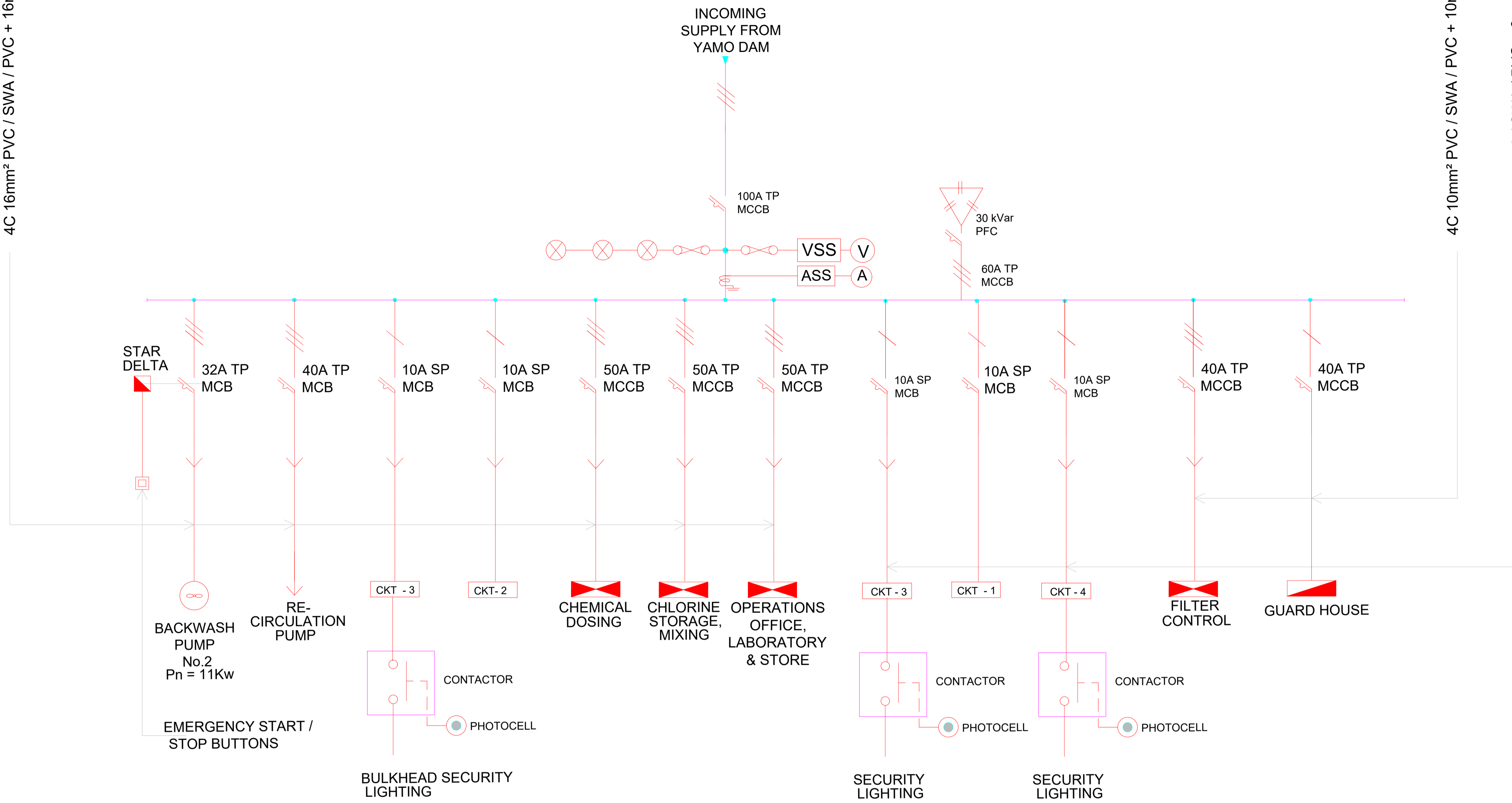
**MARALAL WATER SUPPLY PROJECT**  
**WATER TREATMENT WORKS**  
**LAYOUT**  
**ELECTRICAL WORKS**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: NTS	Date: FEBRUARY 2024
DRAWING No. <b>MWS/TW/E/02</b>	REV. <b>0</b>

4C 16mm<sup>2</sup> PVC / SWA / PVC + 16mm<sup>2</sup> PVC ECC

4C 10mm<sup>2</sup> PVC / SWA / PVC + 10mm<sup>2</sup> PVC ECC

2C 6mm<sup>2</sup> PVC / SWA / PVC + 6mm<sup>2</sup> PVC ECC



## MAIN DISTRIBUTION BOARD IN BACKWASH PUMP HOUSE

### 1. GENERAL

1. PANEL LABELS ARE 1" (MINIMUM) HIGH AND ARE SCREWED ON TO THE PANEL.
2. PANEL HAVE POCKET FOR DRAWINGS.

### 2. BACKWASH PUMPS:

- ONE DUTY ONE STAND-BY PUMP
- MANUAL ON / OFF OPERATION
- MANUAL AFTER TRIP RESET BUTTON
- DUTY SELECTOR SWITCH
- HOUR METER AND AMMETER
- RUN / STOP / TRIP LAMPS
- EMERGENCY START / STOP BUTTONS (REMOTE)
- UV/OV PHASE FAILURE RELAY
- PRESSURE SWITCH CUT - OFF (DELIVERY SIDE) ON EACH SIDE
- FLOAT SWITCH DRY RUN OPERATION

### NOTES:

1. THIS DRAWING TO BE USED FOR ELECTRICAL WORKS ONLY

### LEGEND

	U/G CABLE
	VOLT METER SELECTOR SWITCH
	VOLT METER
	AMETER SELECTOR SWITCH
	AMMETER
	PUMP
	PUSH BUTTON STATION

REVISION	DESCRIPTION

CLIENT / EMPLOYER:  
**NORTHERN WATER WORKS  
DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

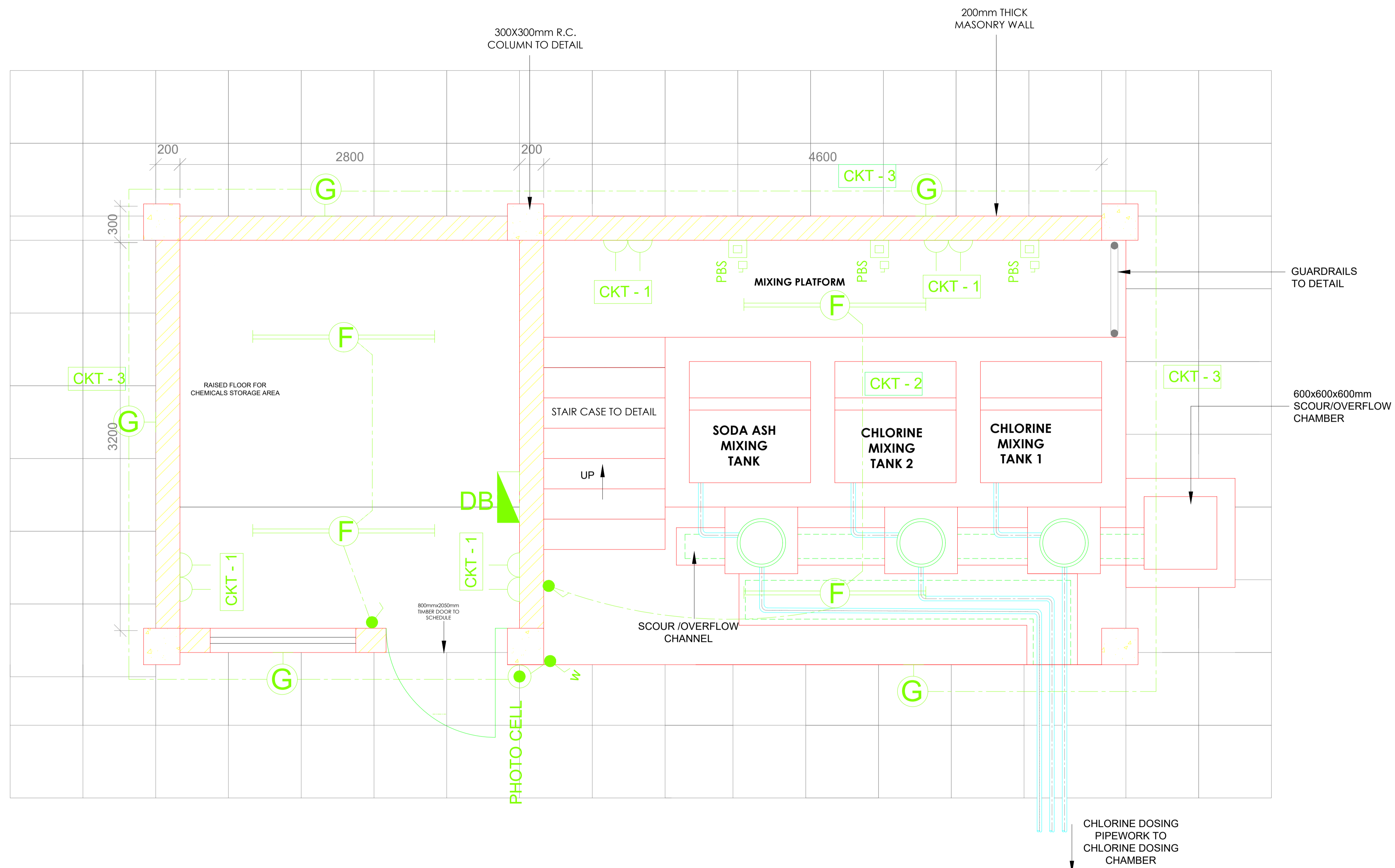
REVIEWED BY:  
**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT  
MAIN DISTRIBUTION BOARD**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: NTS	Date: FEBRUARY 2024


DRAWING No: **MWS/TW/E/03** REV. 0


- NOTES:
1. DIMENSIONS IN MM UNLESS OTHERWISE SPECIFIED
  2. THIS DRAWING TO BE USED TO BE USED FOR ELECTRICAL WORKS ONLY
  3. FOR LEGEND REFER DRAWING No. MWS/TW/E/01



**CHLORINE STORAGE, MIXING AND  
DOSING BUILDING  
ELECTRICAL SYSTEM LAYOUT**

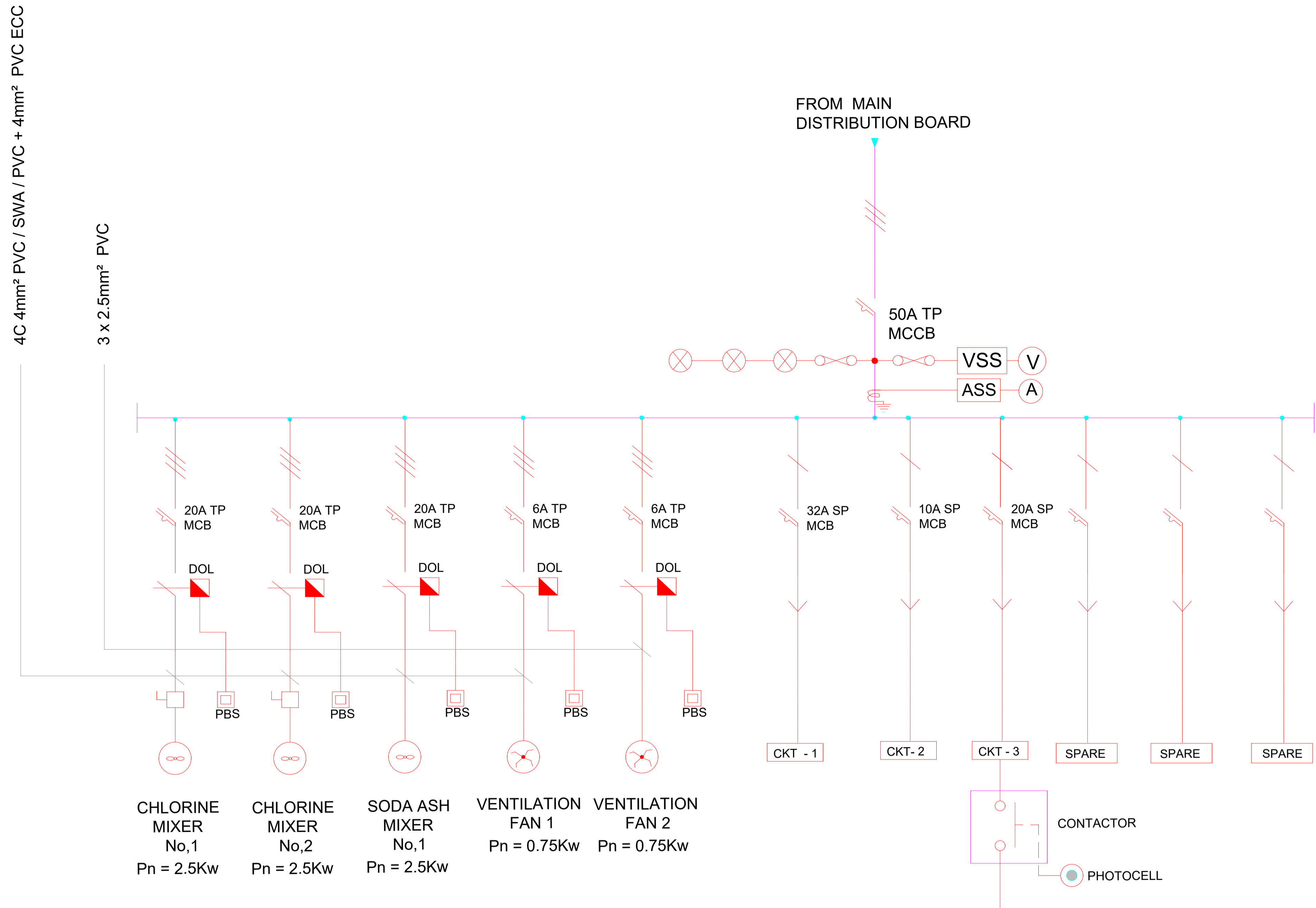
REVISION	DESCRIPTION

CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS  
DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:  

**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**MARALÁ WATER SUPPLY PROJECT  
 CHLORINE STORAGE, MIXING  
 AND DOSING BUILDING  
 ELECTRICAL SYSTEM LAYOUT**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: NTS	Date: FEBRUARY 2024
DRAWING No. <b>MWS/TW/E/04</b>	REV. 0



**CHLORINE STORAGE & MIXING BUILDING  
DISTRIBUTION BOARD AND MOTOR CONTROL CENTRE  
(PLASTIC DISTRIBUTION BOARD)**

**NOTES:**

1. THIS DRAWING TO BE USED FOR ELECTRICAL WORKS ONLY

**LEGEND**

- U/G CABLE
- VSS VOLT METER SELECTOR SWITCH
- V VOLT METER
- ASS AMETER SELECTOR SWITCH
- A AMMETER
- △ PUMP
- PBS PUSH BUTTON STATION

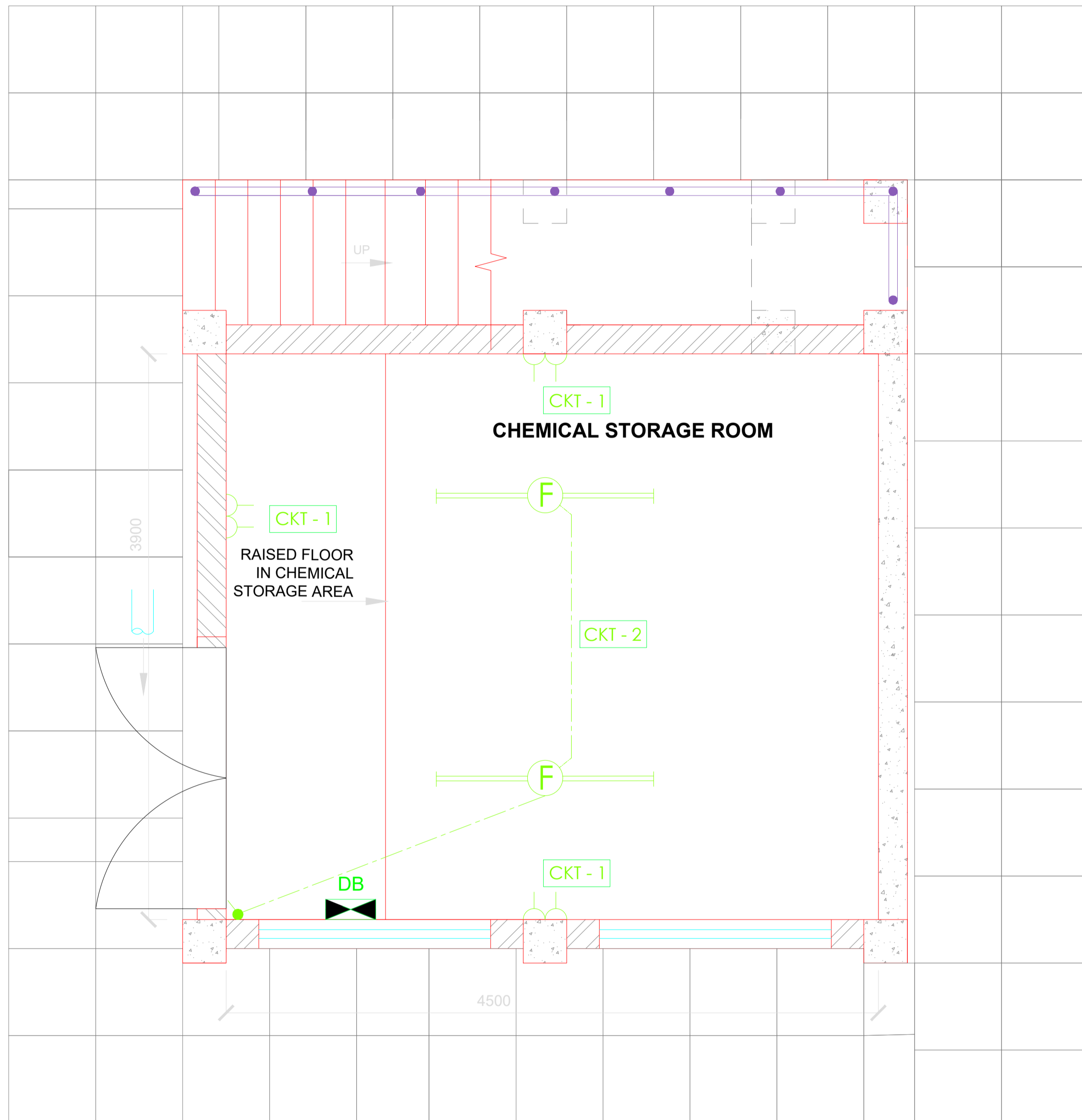
REVISION	DESCRIPTION

CLIENT / EMPLOYER:  
**NORTHERN WATER WORKS  
DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

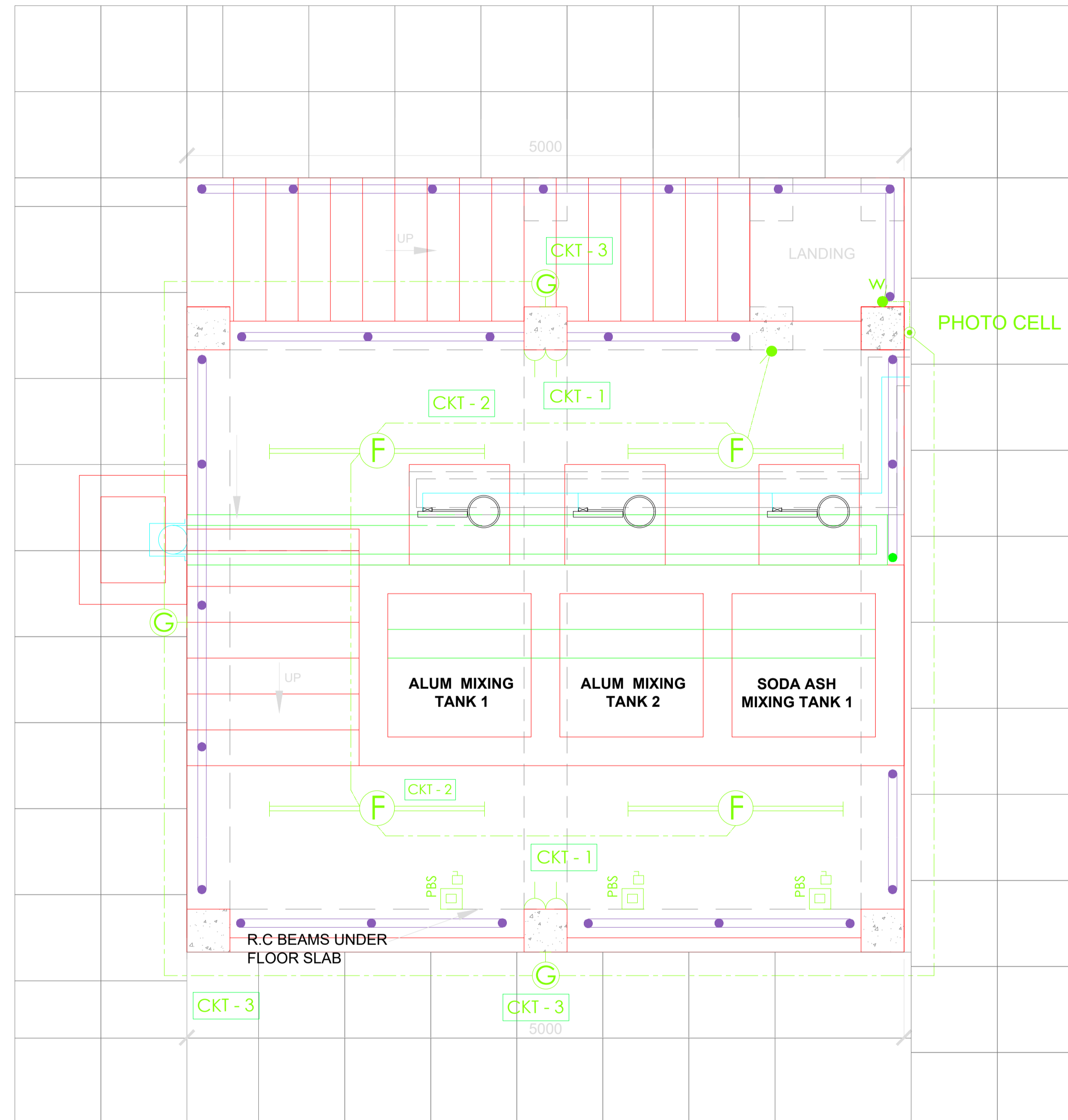
REVIEWED BY:  
**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT  
CHLORINE STORAGE & MIXING BUILDING  
DISTRIBUTION BOARD AND MOTOR  
CONTROL CENTRE**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: NTS	Date: FEBRUARY 2024




**CHEMICAL STORAGE, MIXING AND DOSING BUILDING  
GROUND FLOOR ELECTRICAL SYSTEM LAYOUT**



**CHEMICAL STORAGE, MIXING AND DOSING BUILDING  
FIRST FLOOR ELECTRICAL SYSTEM LAYOUT**

REVISION	DESCRIPTION

CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS  
DEVELOPMENT AGENCY**  
P.O. BOX 495-70100  
GARISSA

REVIEWED BY:  

Interconsult Engineers Ltd  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane,  
Tel. 4441648/4441651  
Nairobi.

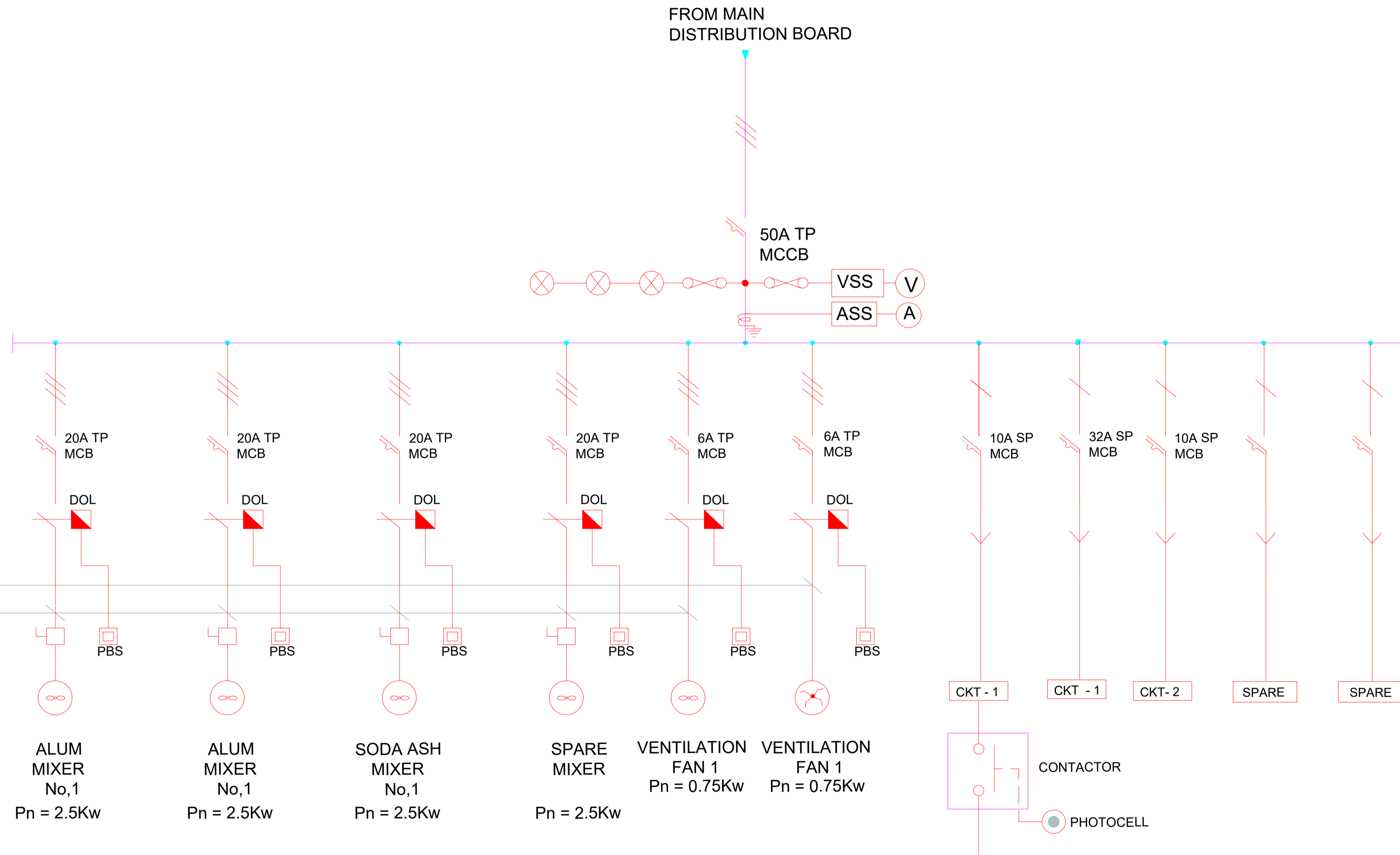
DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT  
CHEMICAL STORAGE, MIXING AND  
DOSING BUILDING  
ELECTRICAL SYSTEM LAYOUT**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: NTS	Date: FEBRUARY 2024

DRAWING No: **MWS/TW/E/06** REV. 0

4C 4mm<sup>2</sup> PVC / SWA / PVC + 4mm<sup>2</sup> PVC ECC

3 x 2.5mm<sup>2</sup> PVC



**CHEMICAL STORAGE & MIXING BUILDING  
DISTRIBUTION BOARD AND MOTOR CONTROL CENTRE  
(PLASTIC DISTRIBUTION BOARD)**


**NOTES:**

1. THIS DRAWING TO BE USED FOR ELECTRICAL WORKS ONLY

**LEGEND**

- U/G CABLE
- VSS VOLT METER SELECTOR SWITCH
- V VOLT METER
- ASS AMETER SELECTOR SWITCH
- A AMMETER
- △ PUMP
- PBS PUSH BUTTON STATION

REVISION	DESCRIPTION

CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS  
DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:  





**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

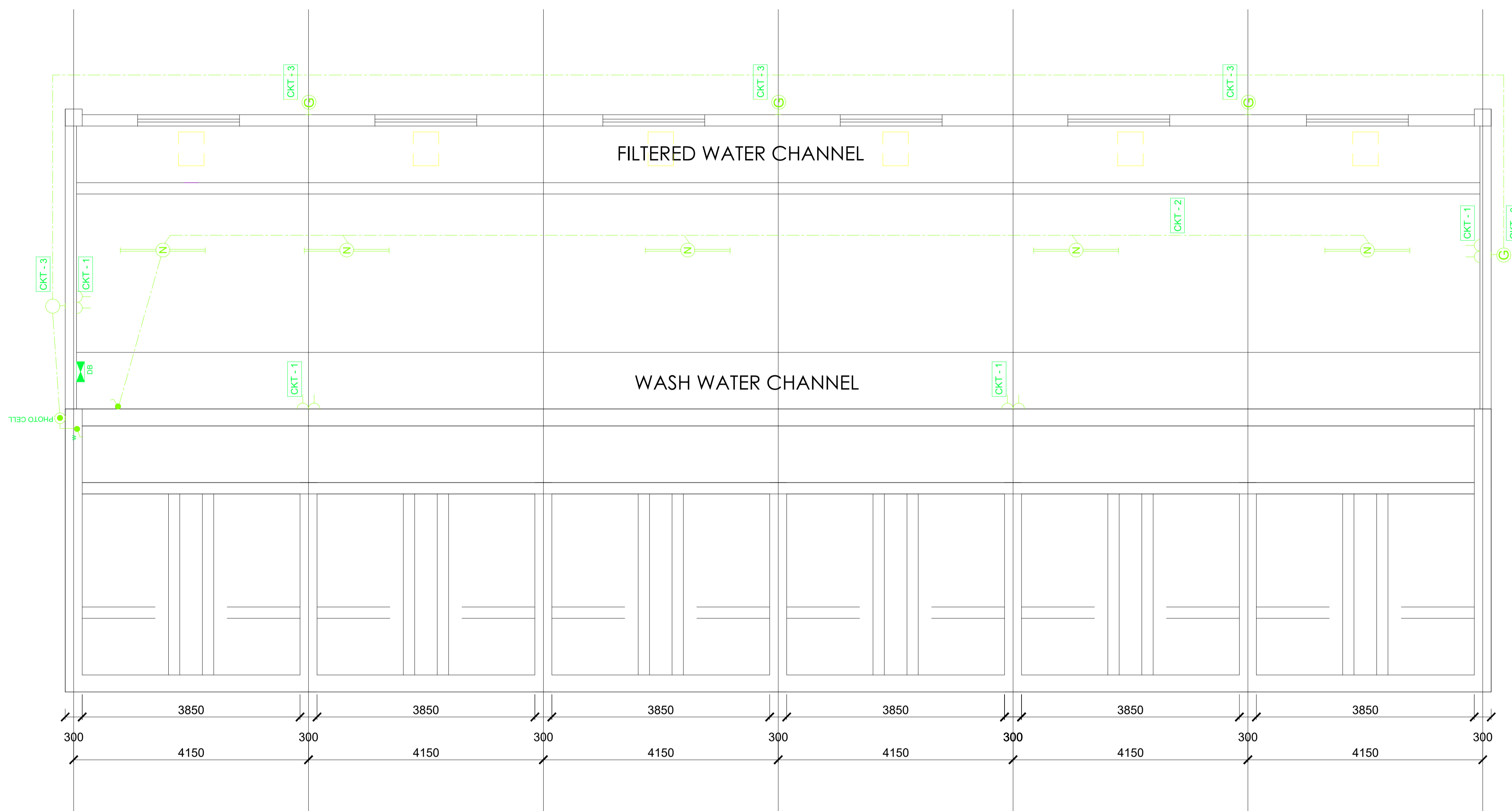
DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT**  
**CHEMICAL STORAGE & MIXING BUILDING  
DISTRIBUTION BOARD AND MOTOR  
CONTROL CENTRE**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: NTS	Date: FEBRUARY 2024
DRAWING No: <b>MWS/TW/E/07</b>	REV. 0

- NOTES:**
1. DIMENSIONS IN MM UNLESS OTHERWISE SPECIFIED
  2. THIS DRAWING TO BE USED TO BE USED FOR ELECTRICAL WORKS ONLY
  3. FOR LEGEND REFER DRAWING No. PD/TWE/01


**LEGEND FOR VALVE HEADSTOCKS**

- FO  FILTERED WATER OUTLET
- FD  FILTER DRAINAGE
- WI  WASHWATER INLET
- WO  WASHWATER OUTLET



REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:



**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:



**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:

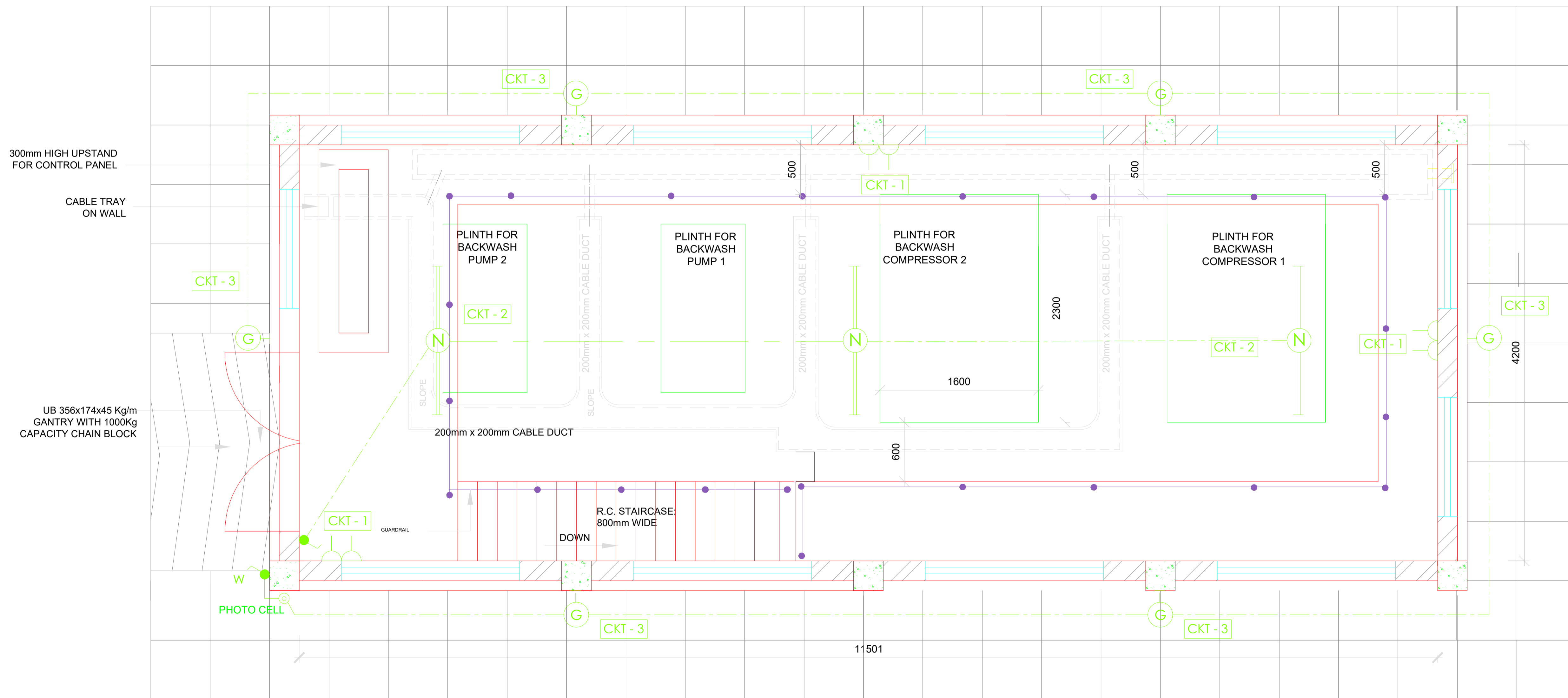
**MARALAL WATER SUPPLY PROJECT**

**FILTER GALLERY AND FILTER CONTROL ROOM ELECTRICAL SYSTEM LAYOUT**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: NTS	Date: FEBRUARY 2024



03 ▽




**PUMP AND COMPRESSOR HOUSE  
GENERAL LAYOUT**

**NOTES:**

1. DIMENSIONS IN MM UNLESS OTHERWISE SPECIFIED
2. THIS DRAWING TO BE USED TO BE USED FOR ELECTRICAL WORKS ONLY
3. FOR LEGEND REFER DRAWING No. MWS/TW/E/01

REVISION	DESCRIPTION

CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS  
DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:  

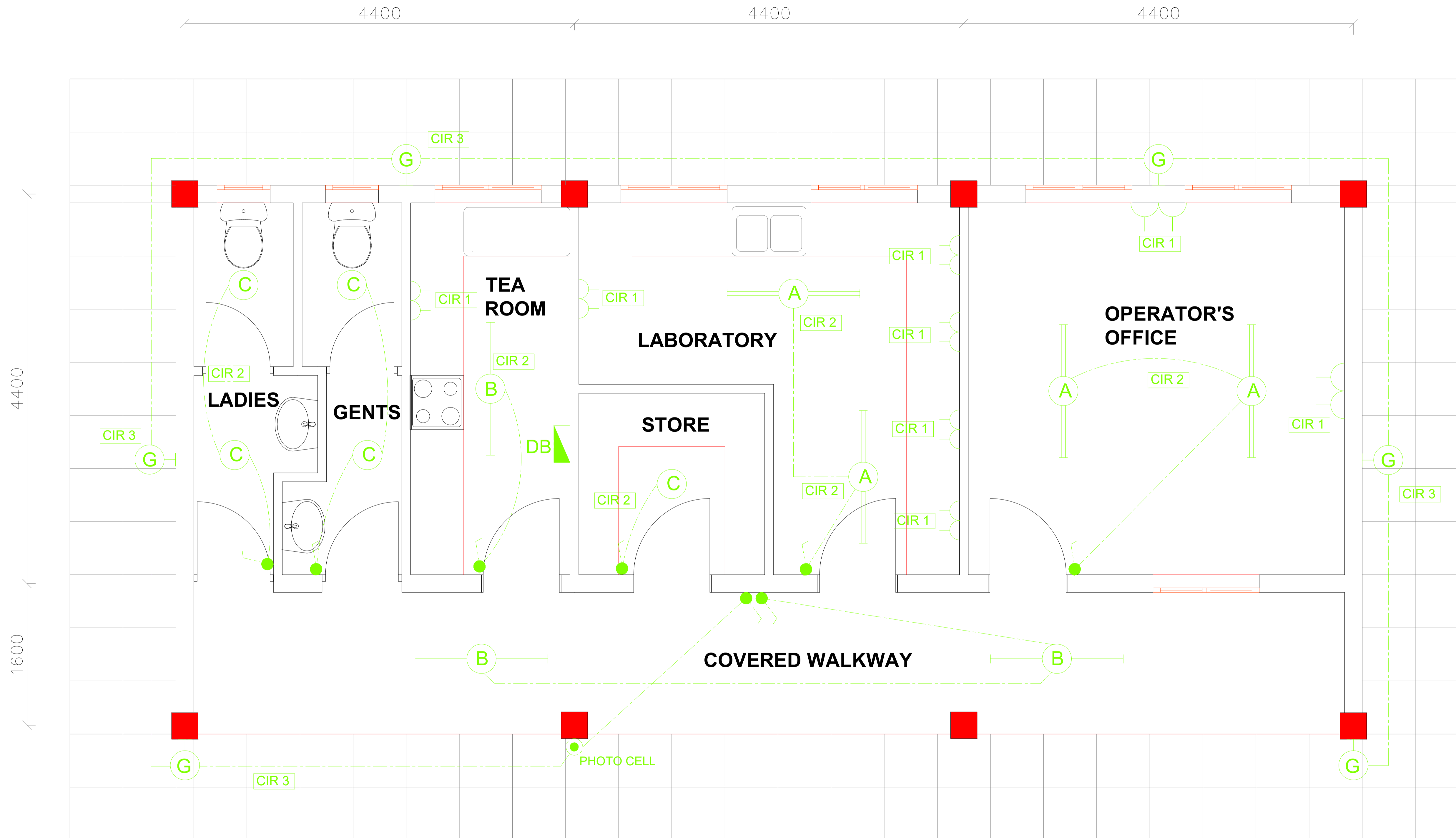
**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT  
WATER TREATMENT WORKS  
BACKWASH PUMP HOUSE  
ELECTRICAL SYSTEM LAYOUT**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: NTS	Date: FEBRUARY 2024
DRAWING No. <b>MWS/TW/E/09</b>	REV. <b>0</b>


**NOTES:**

1. DIMENSIONS IN MM UNLESS OTHERWISE SPECIFIED
2. THIS DRAWING TO BE USED TO BE USED FOR ELECTRICAL WORKS ONLY
3. FOR LEGEND REFER DRAWING No. MWS/TW/E/01



**PLAN**  
**ELECTRICAL SYSTEM LAYOUT**

REVISION	DESCRIPTION

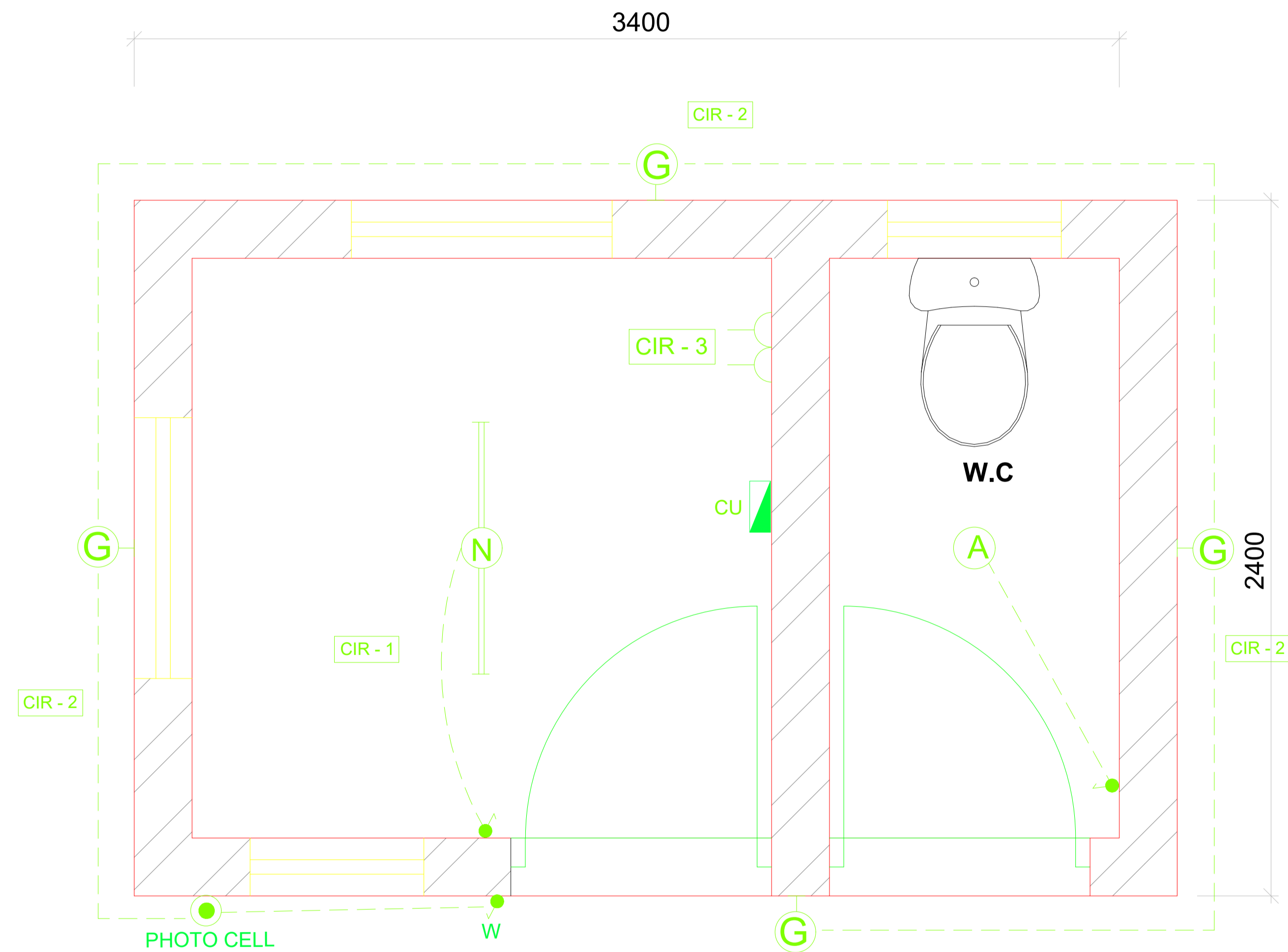
CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:  

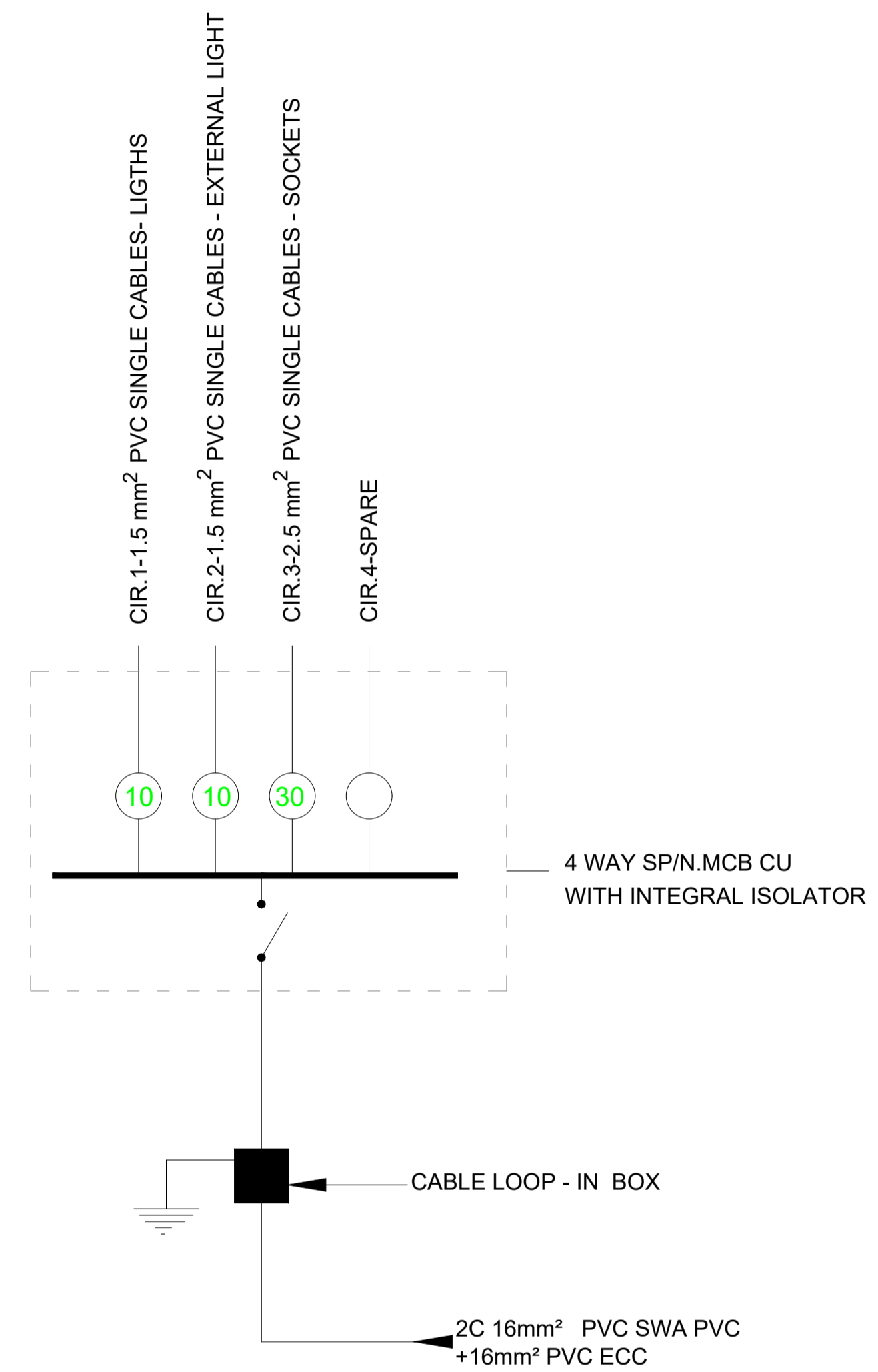
**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT**  
**WATER TREATMENT WORKS**  
**OPERATOR'S OFFICE, LABORATORY & STORE**  
**ELECTRICAL SYSTEM LAYOUT**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: NTS	Date: FEBRUARY 2024
DRAWING No: <b>MWS/TW/E/10</b>	REV. 0



**GUARD HOUSE TYPE C  
ELECTRICAL SYSTEM LAYOUT**  
SCALE 1:50




**ELECTRICAL WIRING DIAGRAM**

**NOTES:**

1. DIMENSIONS IN MM UNLESS OTHERWISE SPECIFIED
2. THIS DRAWING TO BE USED TO BE USED FOR ELECTRICAL WORKS ONLY
3. FOR LEGEND REFER DRAWING No. MWS/TW/E/01

REVISION	DESCRIPTION

CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS  
DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:  

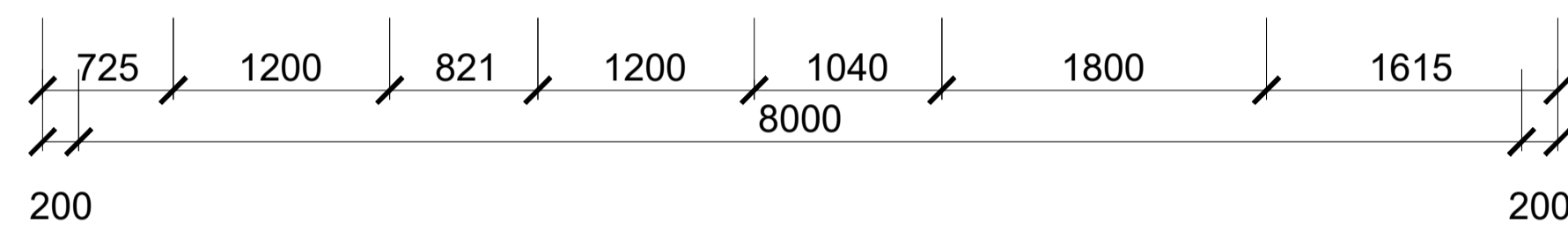
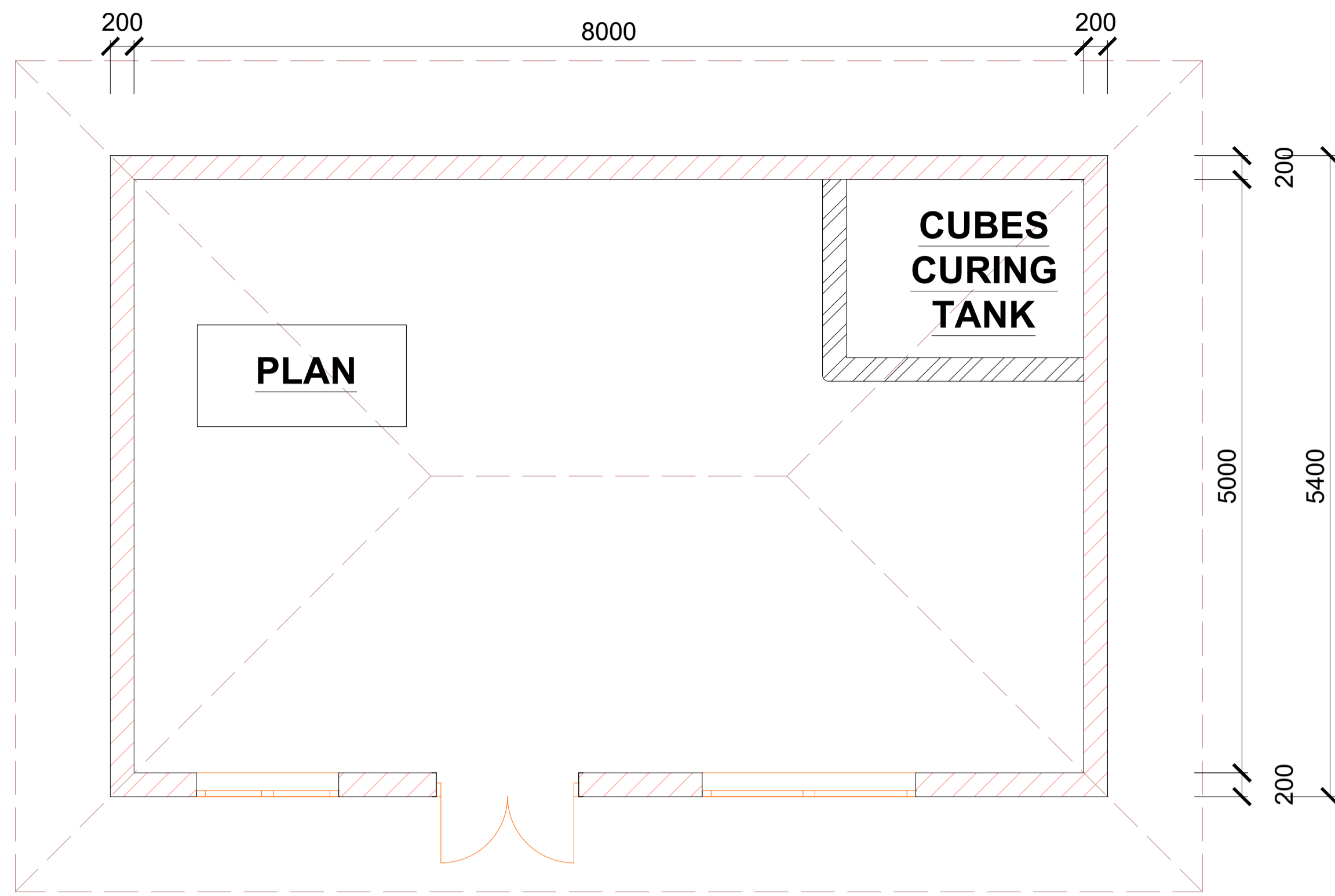
**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT  
WATER TREATMENT WORKS  
GUARD HOUSE - (TYPE C)  
ELECTRICAL SYSTEM**

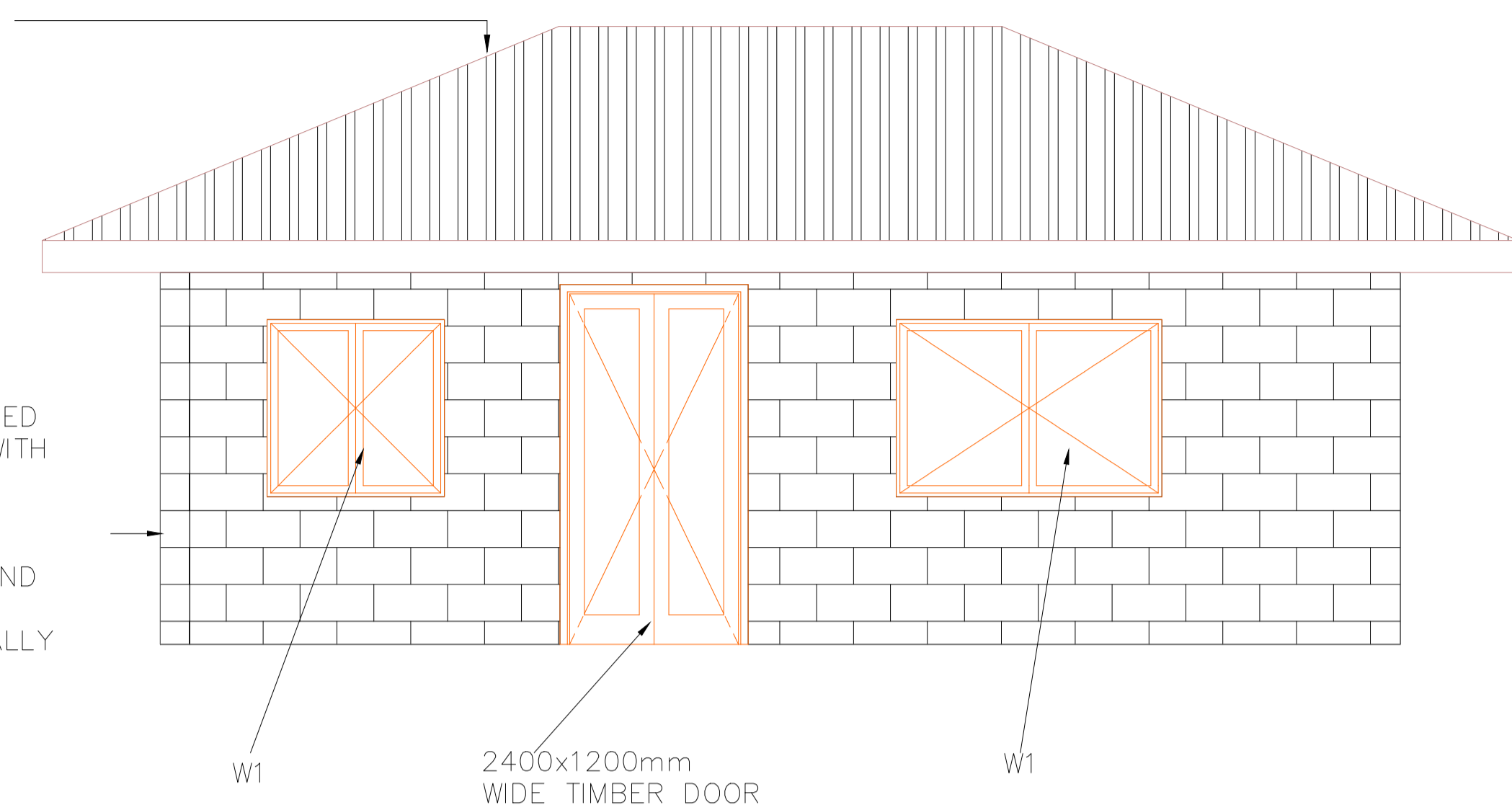
Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: NTS	Date: FEBRUARY 2024

DRAWING No. **MWS/TW/E/11** REV. 0

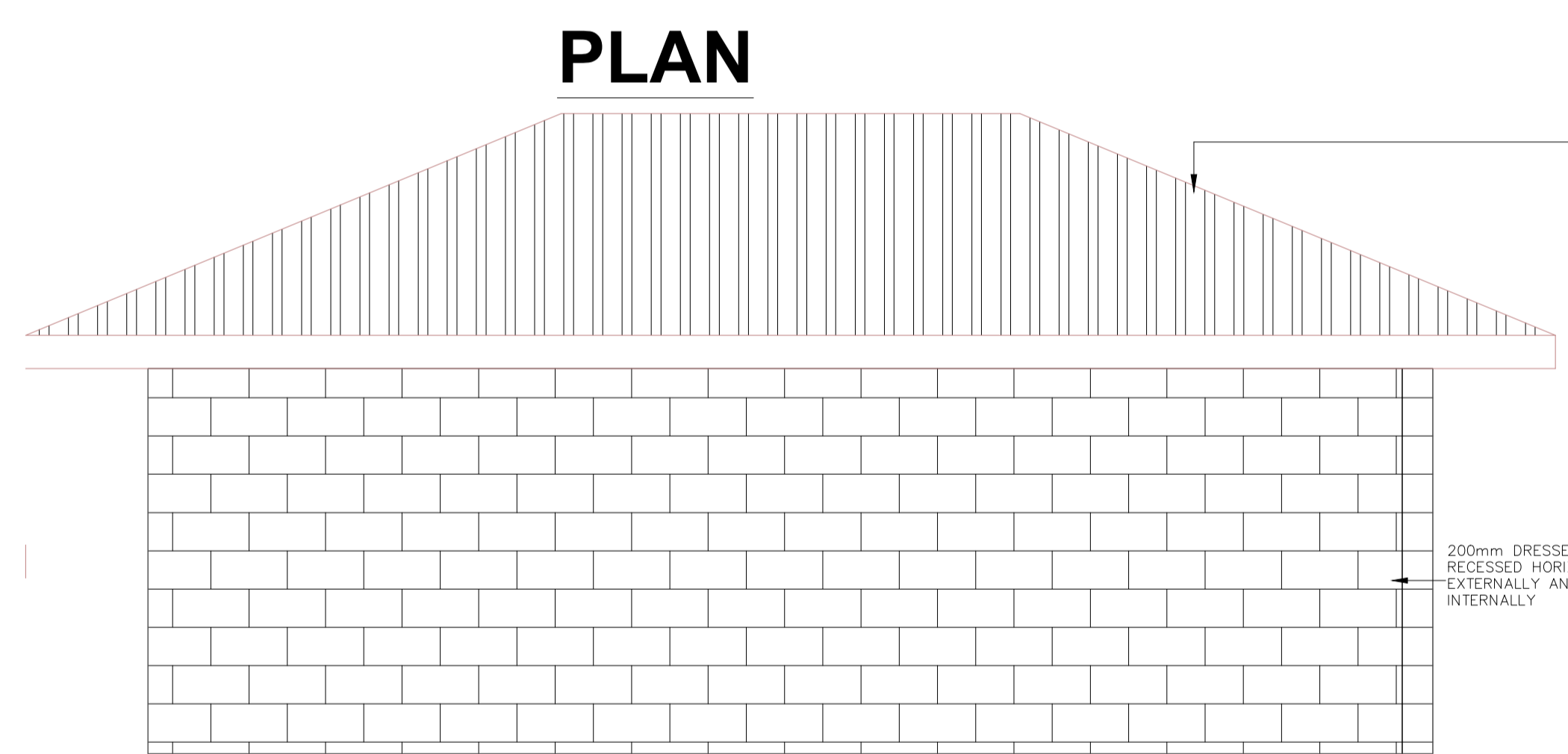
# **MATERIALS LAB**



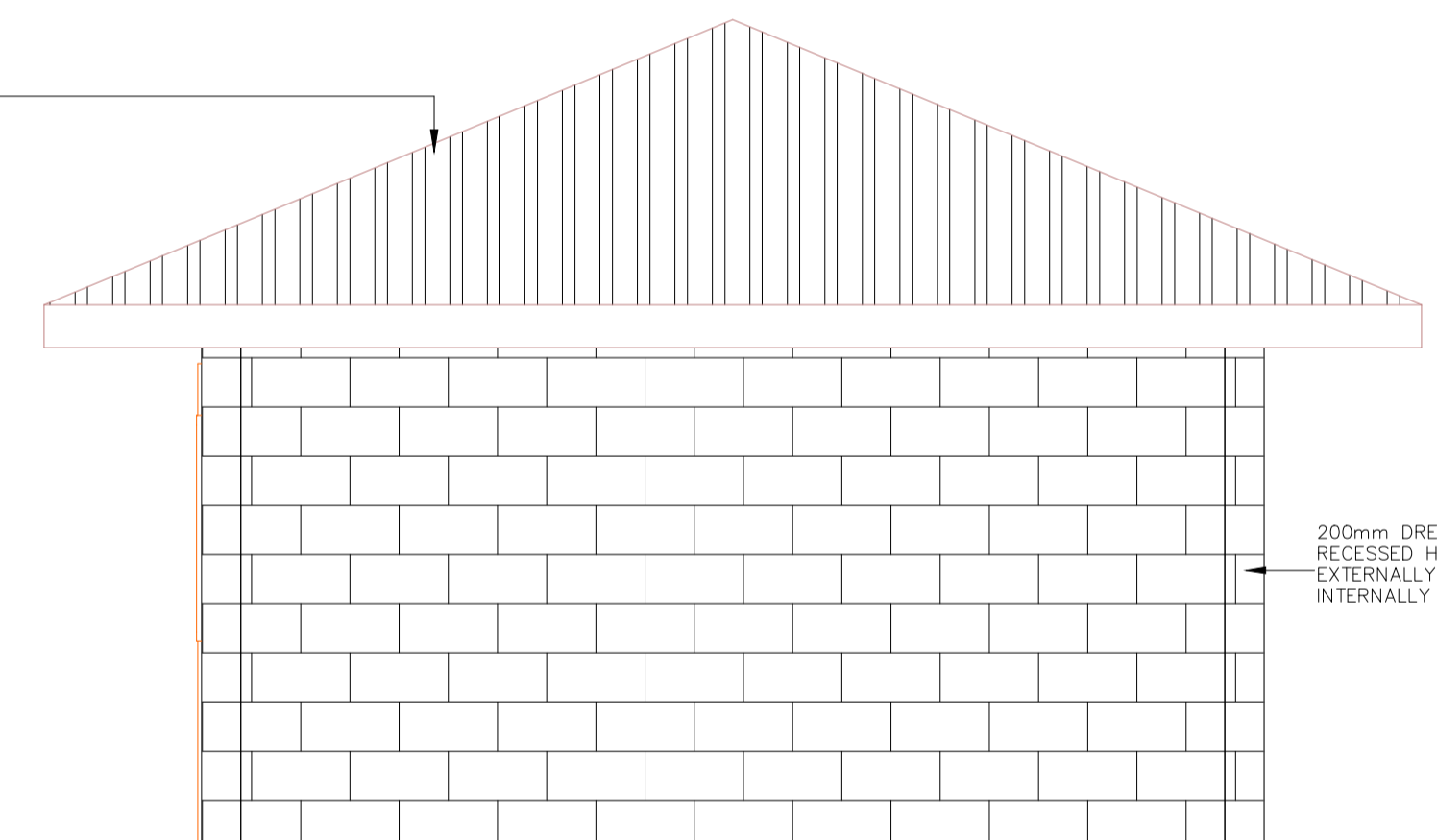
200mm DRESSED STONE WALL WITH RECESSED HORIZONTAL JOINTS EXTERNALLY AND PLASTER AND PAINT INTERNALLY



**FRONT ELEVATION**

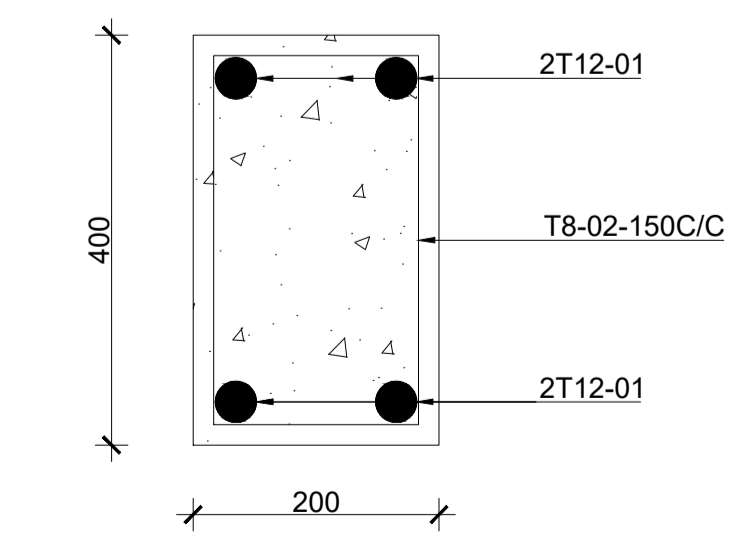


**REAR ELEVATION**

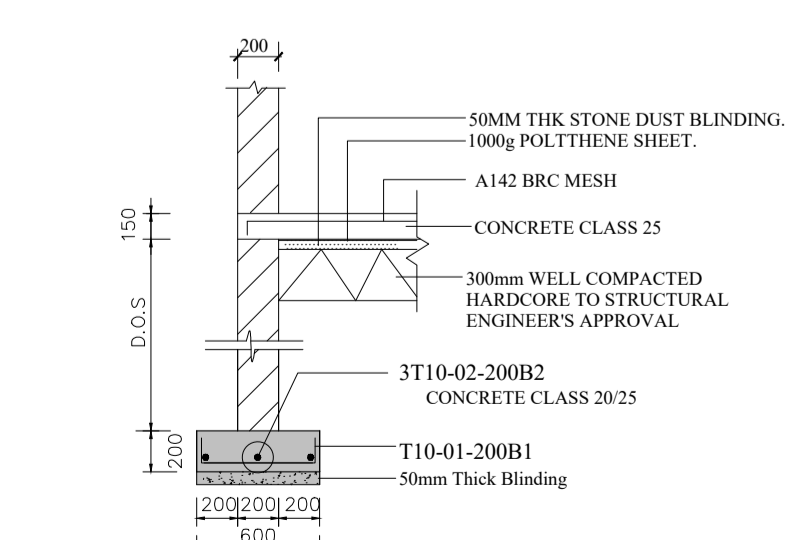


**SIDE ELEVATION**

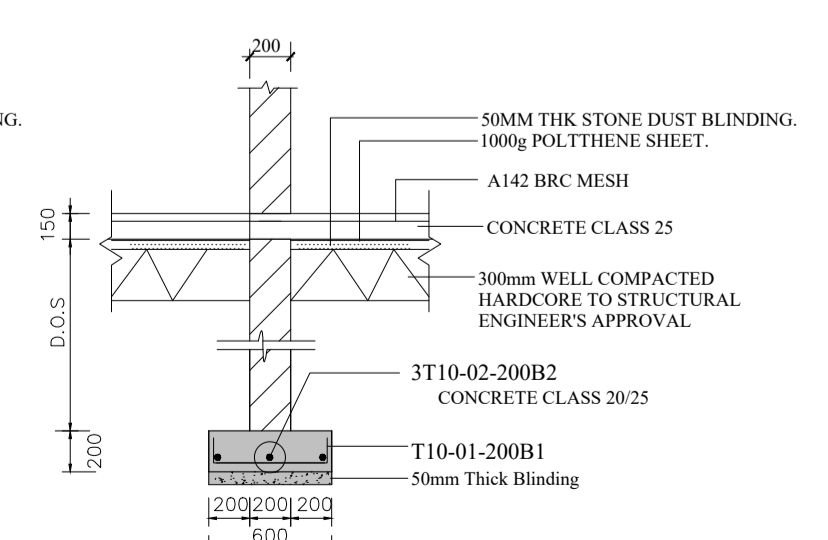
ROOF  
PRE-PAINTED GAUGE 28 ITS ROOFING SHEETS  
LAID AT 22.5°



**TYPICAL 200X400 BEAM  
SCALE 1:25**



**EXTERNAL WALL STRIP FOOTING  
SCALE 1:25**



**INTERNAL WALL STRIP FOOTING  
SCALE 1:25**


**NOTES**

- DIMENSIONS AND CONDITIONS MUST BE CHECKED ON SITE AND ANY DISCREPANCIES REFERED TO ENGINEER. ALL DIMENSIONS IN mm UNLESS OTHERWISE SPECIFIED.
- ALL LEVELS TO BE CHECKED ON SITE BEFORE COMMENCEMENT OF WORKS.
- DEPTH OF FOUNDATION TO BE DETERMINED ON SITE. FOUNDATION TO BE CARRIED DOWN TO HARD BASE TO APPROVAL OF ENGINEER AND ALL UNSUITABLE SOILS TO BE EXCAVATED AND THE OPENINGS FILLED WITH HARD CORE.
- THREE PLY TROPICAL 'PLUVEX' BITUMINOUS FELT D.P.C UNDER ALL WALLS TO BE RENDERED IN HOT BITUMEN.
- ALL WALLS TO BE REINFORCED WITH HEAVY DUTY GAUGE HOOP IRON AT EVERY ALTERNATIVE COURSE AND JOINTED IN 1:3 CEMENT SAND MORTAR.
- CONCRETE WINDOW CILLS HAVE DRIPS.
- FOR ALL WINDOWS, PROVIDE 150x50mm CYPRESS PELMET BOXES PAINTED AND WITH CURTAIN RAILS.
- ROOF EAVES SOFFITS 50x25mm TIMBER BATTENS AND WIRE GAUZE WITH COFFEE TRAY WIRE.
- ALL TIMBER WORK TO HAVE PRIMER AND PAINTED WITH 3 COATS GLOSS PAINT.

**FINISHES SCHEDULE**

- INTERNAL FINISHES**
- FLOOR - STEEL FLOAT FINISH
  - WALLS - PLASTERED WITH 12.5mm THICK CEMENT PLASTER AND PAINTED WITH THREE COATS OF PAINT.
  - CEILING - 12mm THICK CHIPBOARD (480 - 640Kg/m<sup>2</sup>) PAINTED
  - CORNICES - TIMBER AND PAINTED
- EXTERNAL FINISHES**
- NATURAL STONE WITH HORIZONTAL JOINTS RAKED
  - WALL BELOW WINDOWS, RING BEAM AND GABLE WALL TO BE RENDERED WITH 1:4 CEMENT SAND PLASTER.
- ABBREVIATIONS**
- R.C - REINFORCED CONCRETE
  - D.P.C - DAMP PROOF COURSE
  - E.G.L - EXISTING GROUND LEVEL
  - F.G.L - FINISHED GROUND LEVEL
  - F.F.L - FINISHED FLOOR LEVEL
  - P.C.C - PRECAST CONCRETE

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

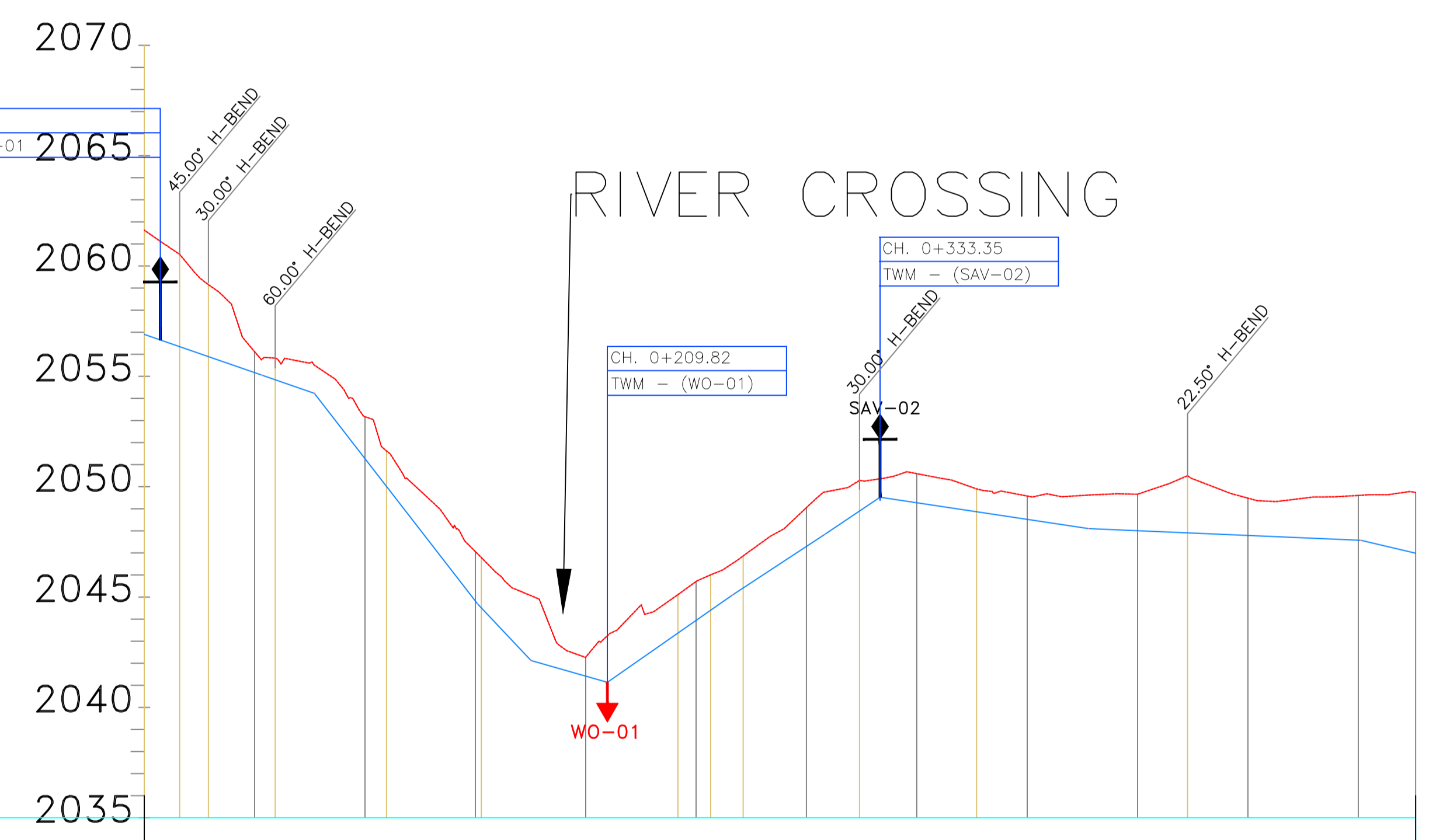
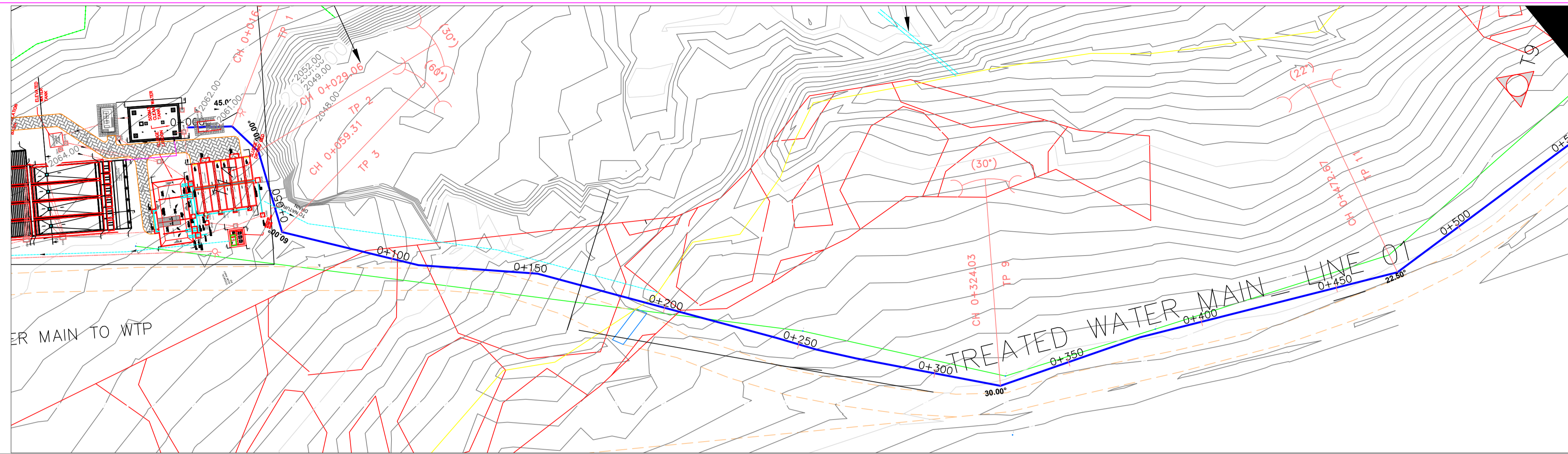
REVIEWED BY:  

**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane.  
 Tel. 4441648/4441651  
 Nairobi.

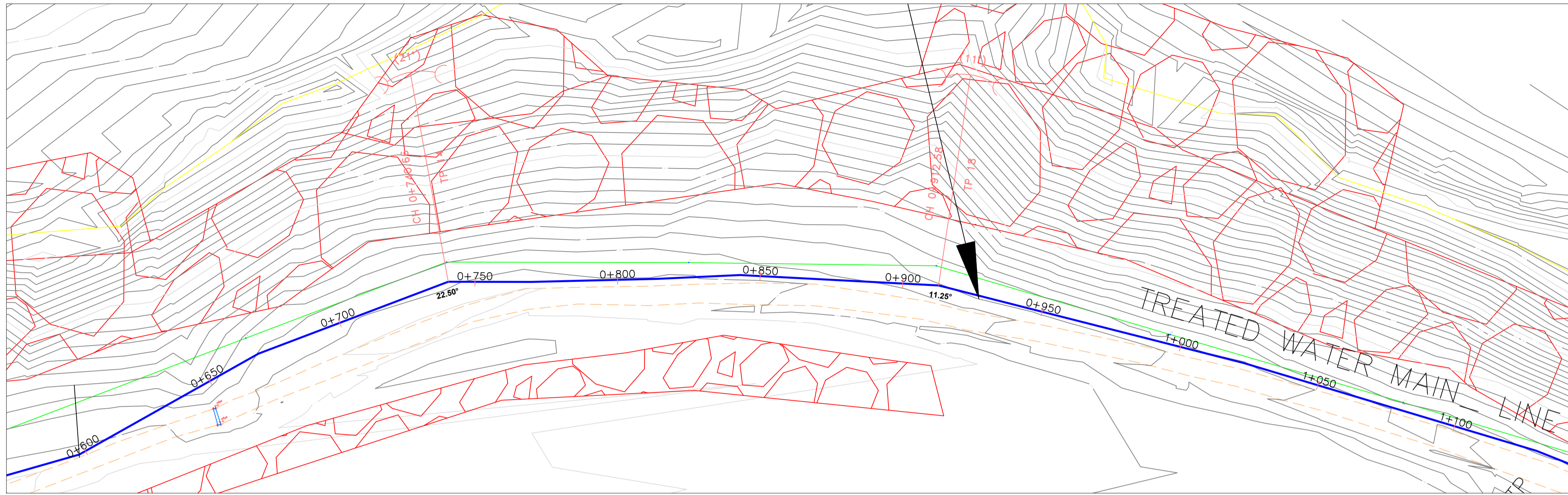
DRAWING TITLE:  
**MARALAL WATER PROJECT  
 PROPOSED MATERIALS  
 LAB BUILDING**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
1:50	Date: FEBRUARY 2024
DRAWING No. <b>MWS/TW/ML/01</b>	REV. 0

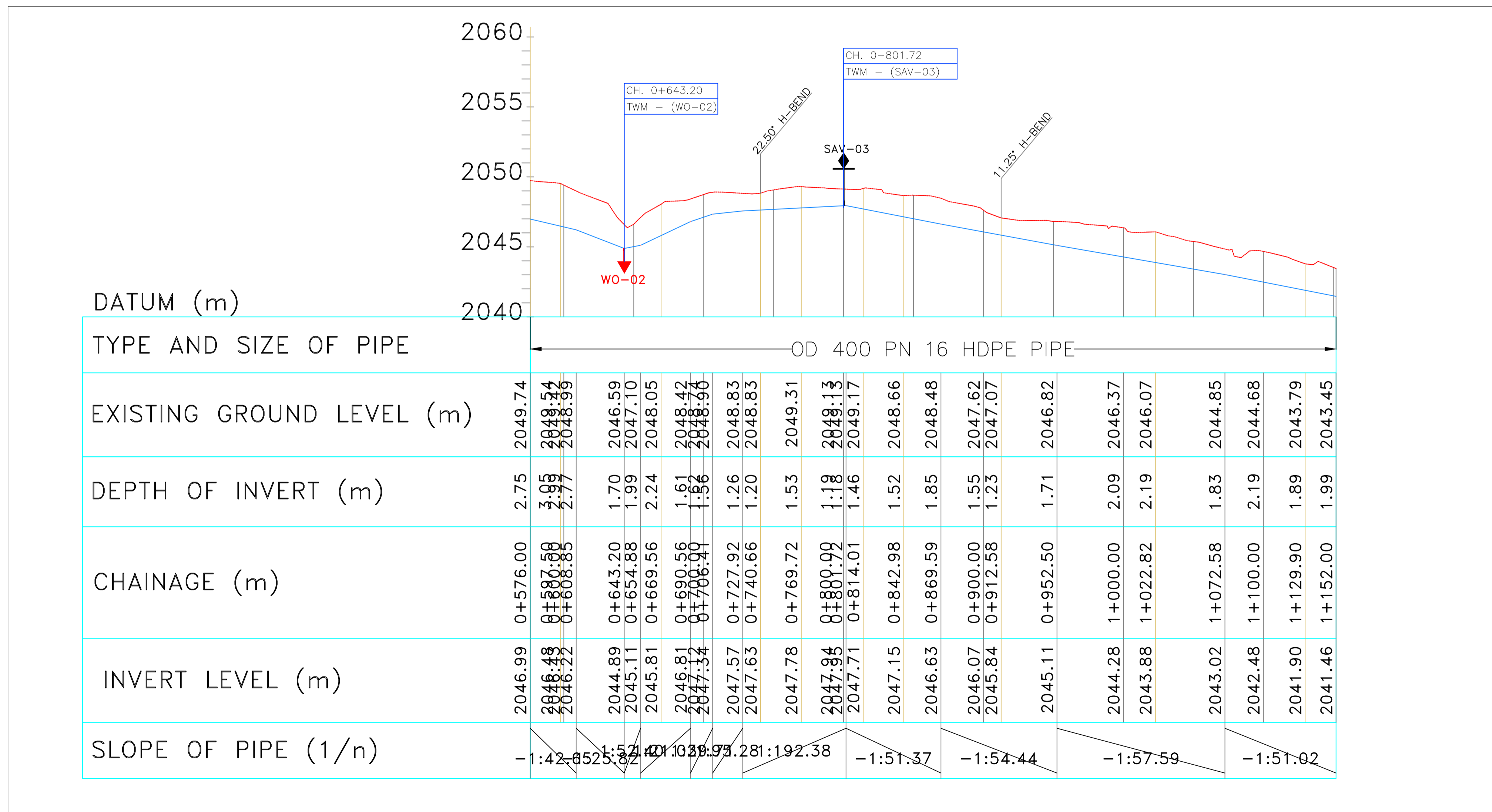
# **TREATED WATER MAIN**



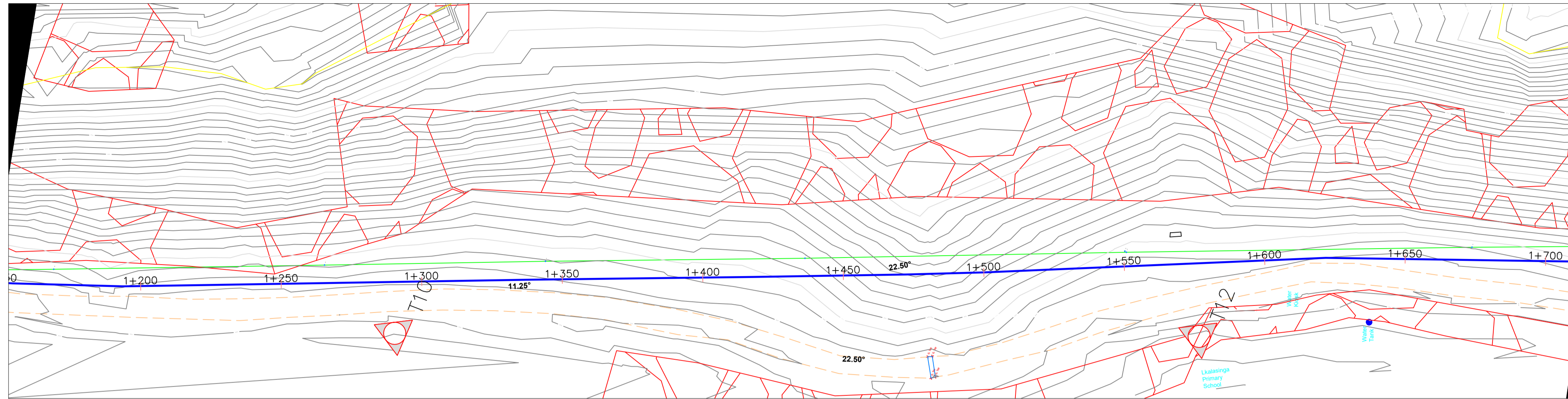
DATUM (m)	2035																									
TYPE AND SIZE OF PIPE	OD 400 PN 16 HDPE PIPE																									
EXISTING GROUND LEVEL (m)	2061.63	2060.53	2059.15	2055.73	2055.51	2053.17	2051.62	<b>2046.95</b>	2045.06	2042.28	2043.25	2045.11	2046.01	2046.52	2046.87	2049.05	2049.76	2050.29	2050.36	2049.90	2049.58	2049.62	2050.50	2049.48	2049.61	2049.74
DEPTH OF INVERT (m)	4.73	4.18	3.26	0.78	1.28	1.90	1.60	<b>2.23</b>	2.94	0.86	2.11	1.74	1.60	1.43	1.72	1.39	0.84	1.04	1.06	1.52	2.59	1.69	2.04	2.75		
CHAINAGE (m)	0+000.00	0+016.04	0+029.06	0+053.28	0+077.05	0+100.00	0+109.76	<b>0+152.07</b>	0+175.22	0+200.00	0+209.82	0+241.80	0+256.61	0+269.34	0+300.00	0+308.41	0+324.03	0+333.35	0+377.09	0+400.00	0+427.89	0+472.67	0+500.00	0+551.17	0+576.00	
INVERT LEVEL (m)	2056.90	2056.35	2055.90	2054.95	2054.23	2051.27	2050.01	<b>2044.68</b>	2042.12	2041.42	2041.14	2043.37	2044.40	2045.09	2047.29	2047.85	2048.90	2049.52	2048.87	2048.52	2048.10	2047.91	2047.79	2047.57	2046.99	
SLOPE OF PIPE (1/n)	-1:28.93	-1:28.77	-1:7.75	-1:9.42	-1:7.75	-1:9.42	-1:7.75	-1:9.42	-1:7.75	-1:9.42	-1:7.75	-1:14.32	-1:14.32	-1:14.32	-1:15.24	-1:14.87	-1:66.59	-1:66.59	-1:66.59	-1:66.59	-1:231.97	-1:231.97	-1:42.65	-1:42.65		



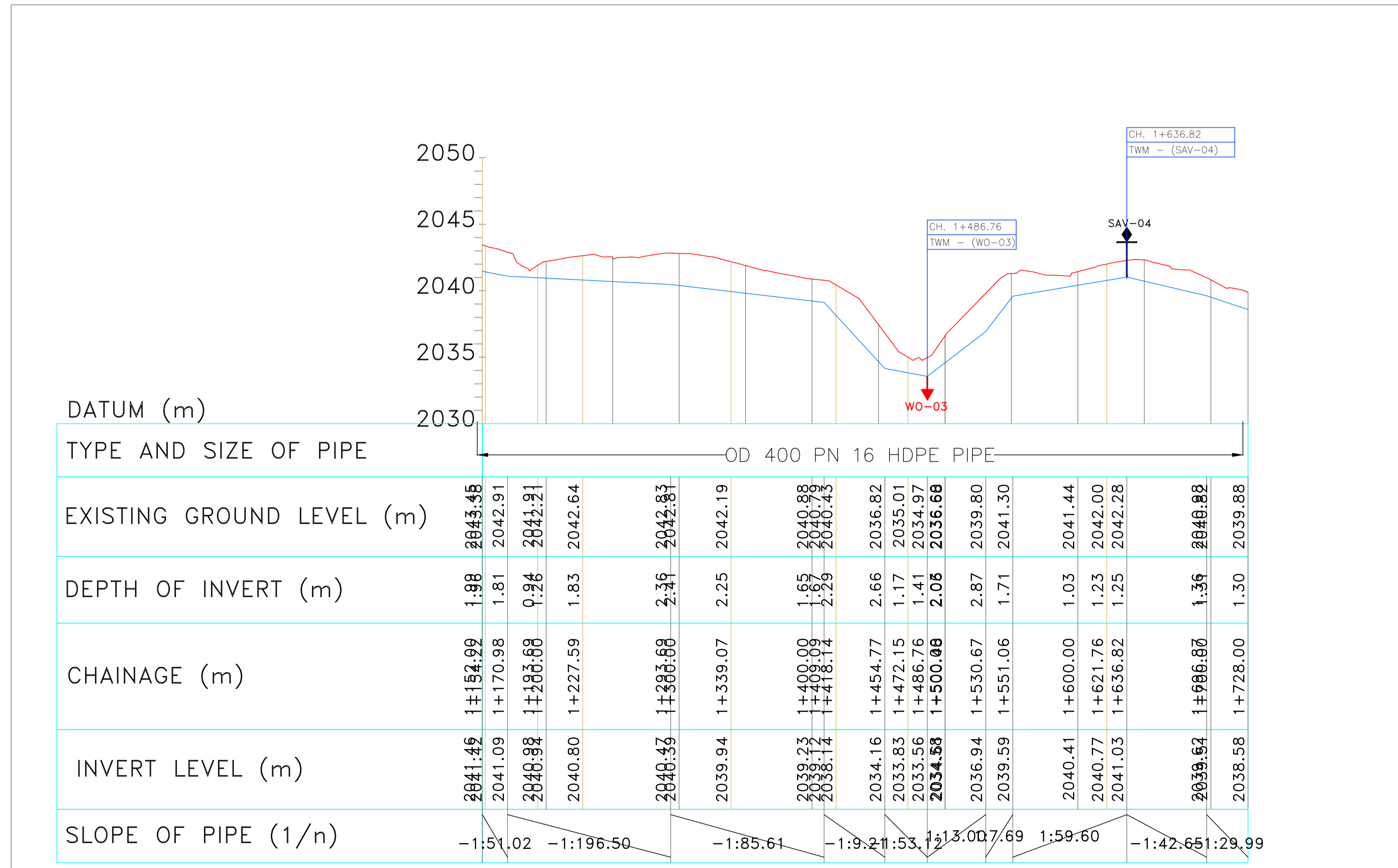
10

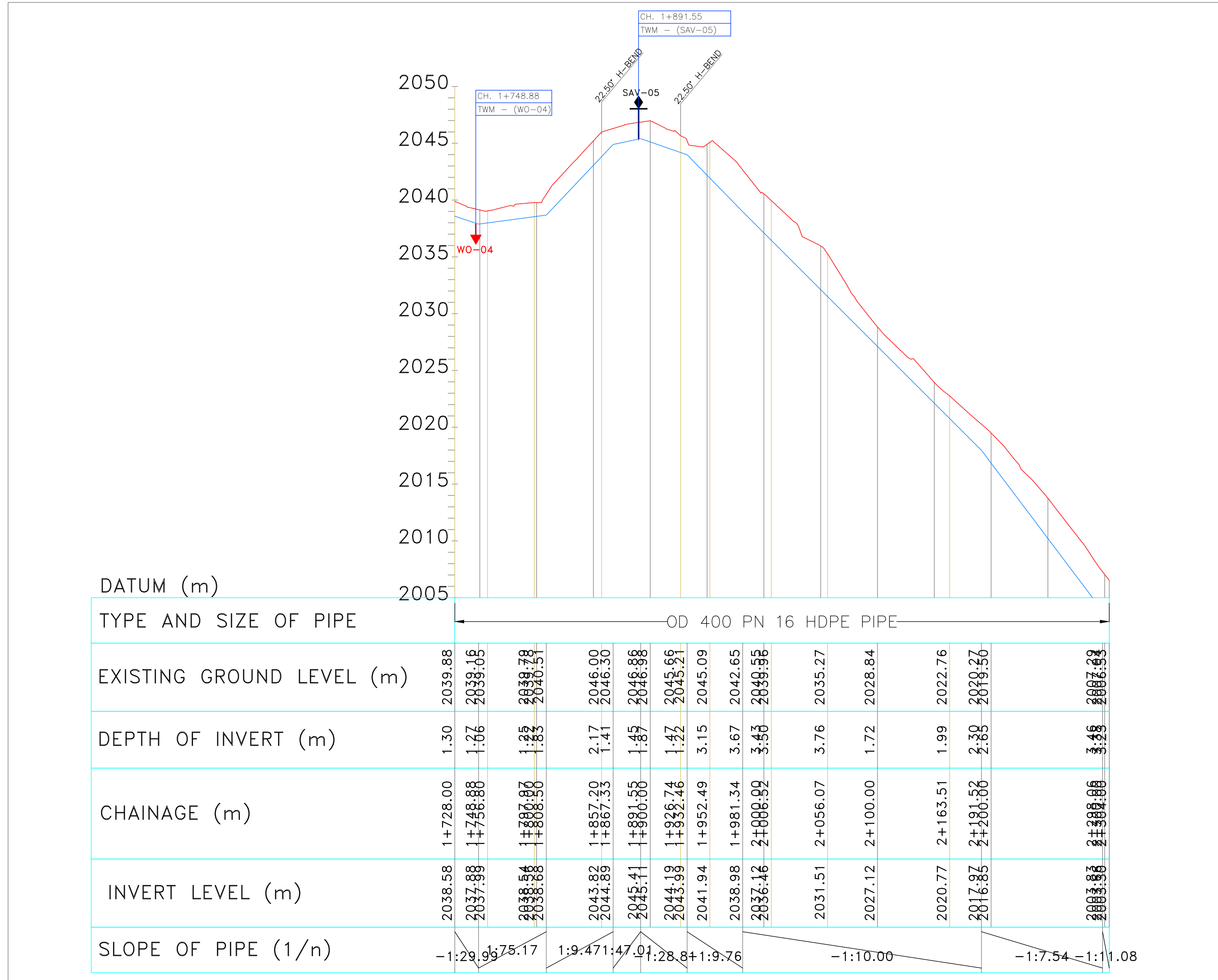
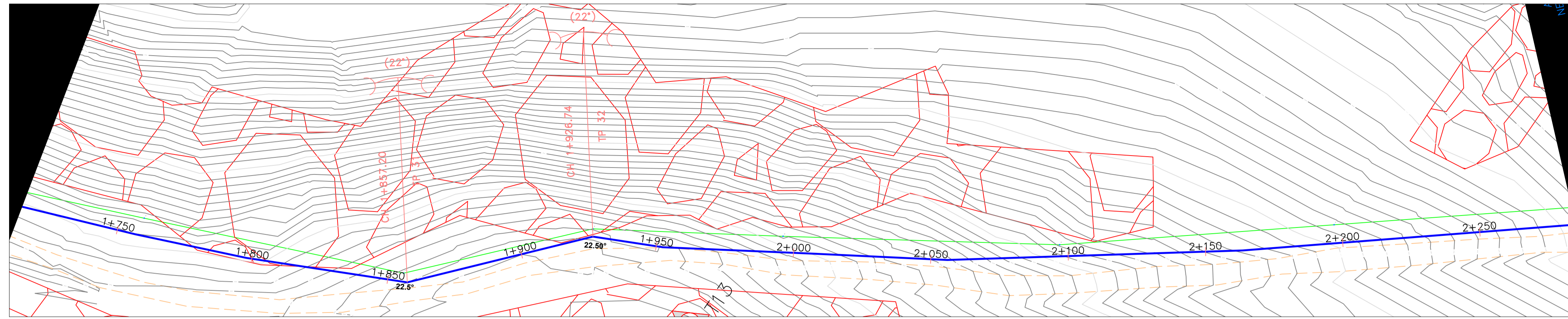


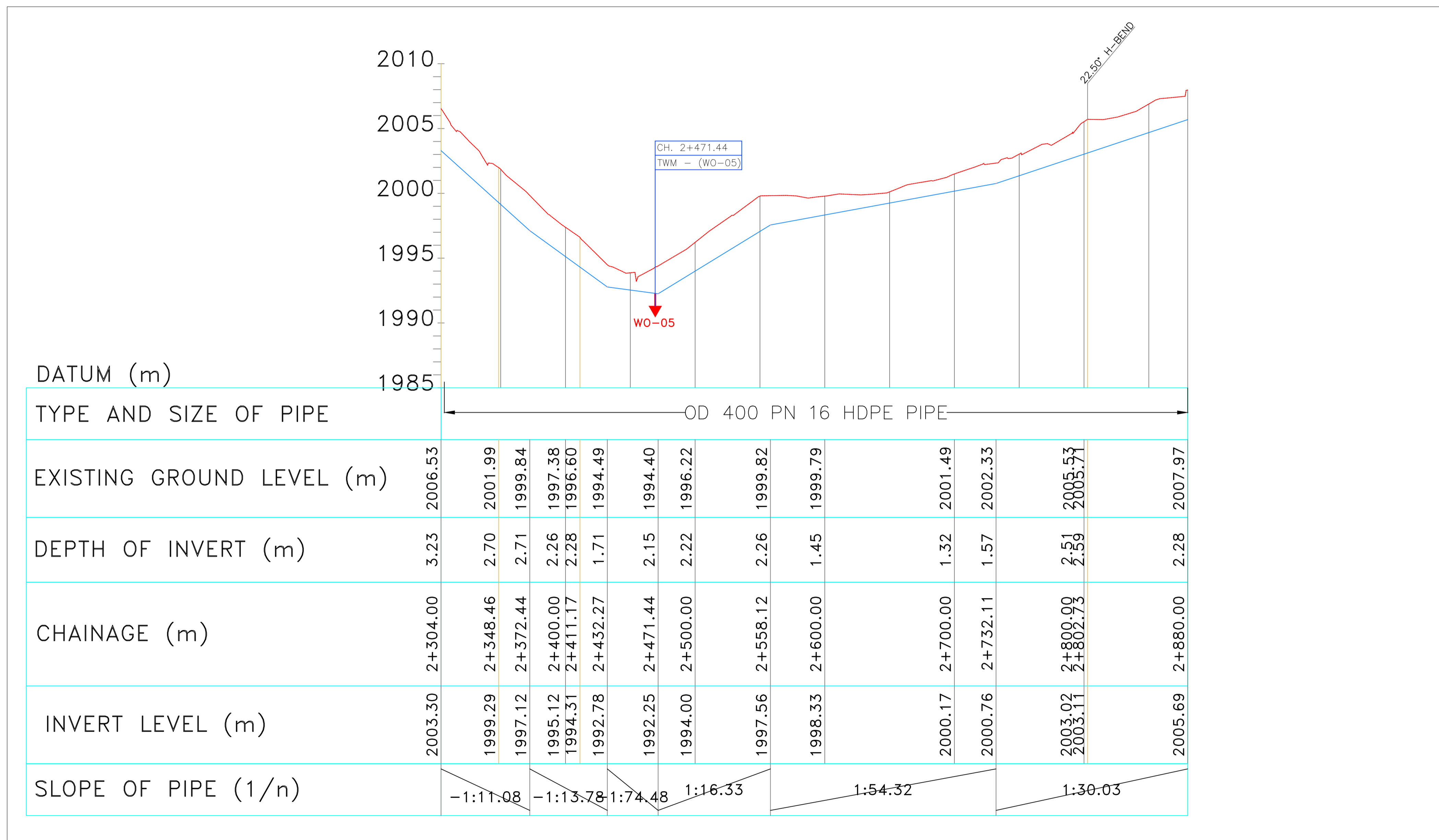
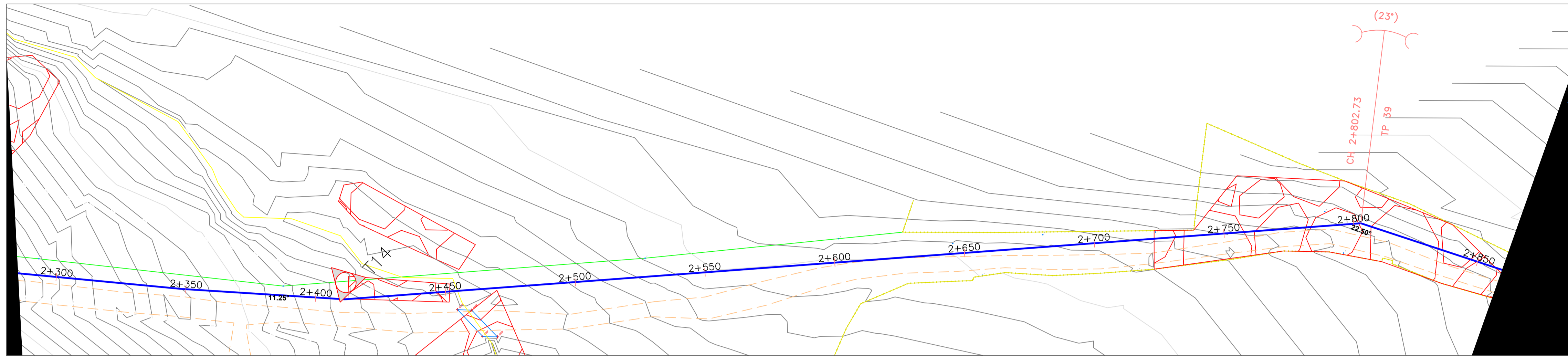


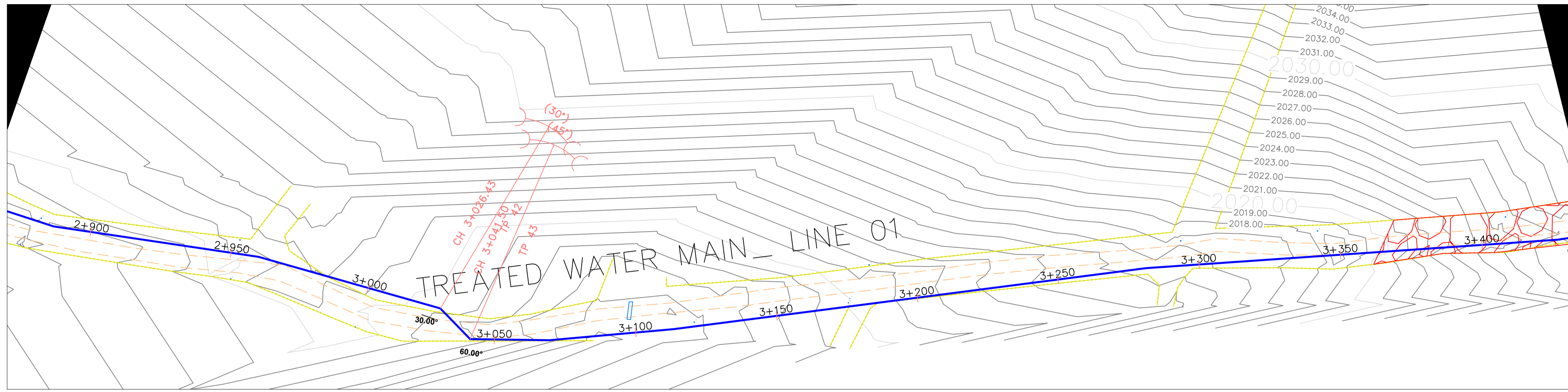


110

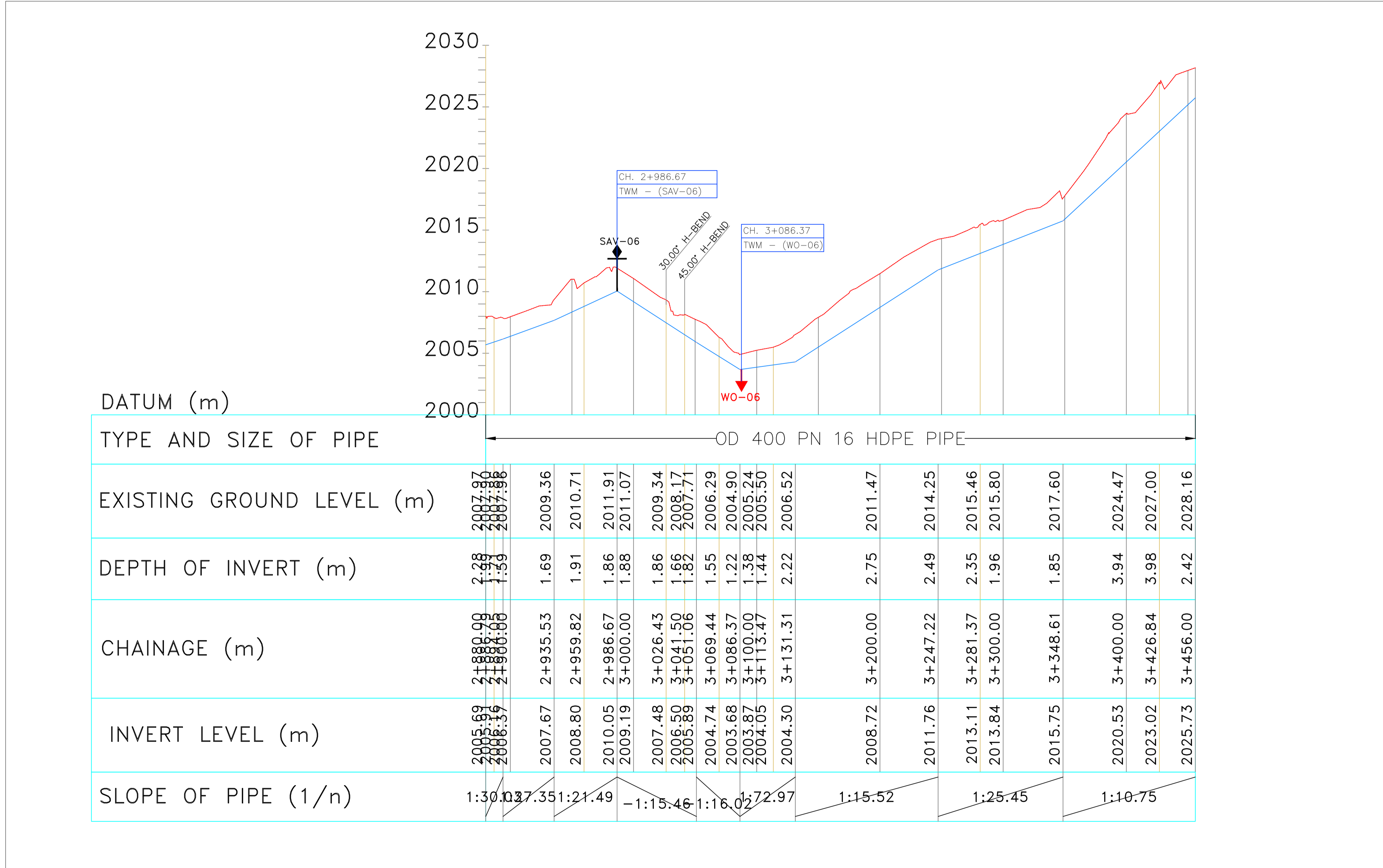


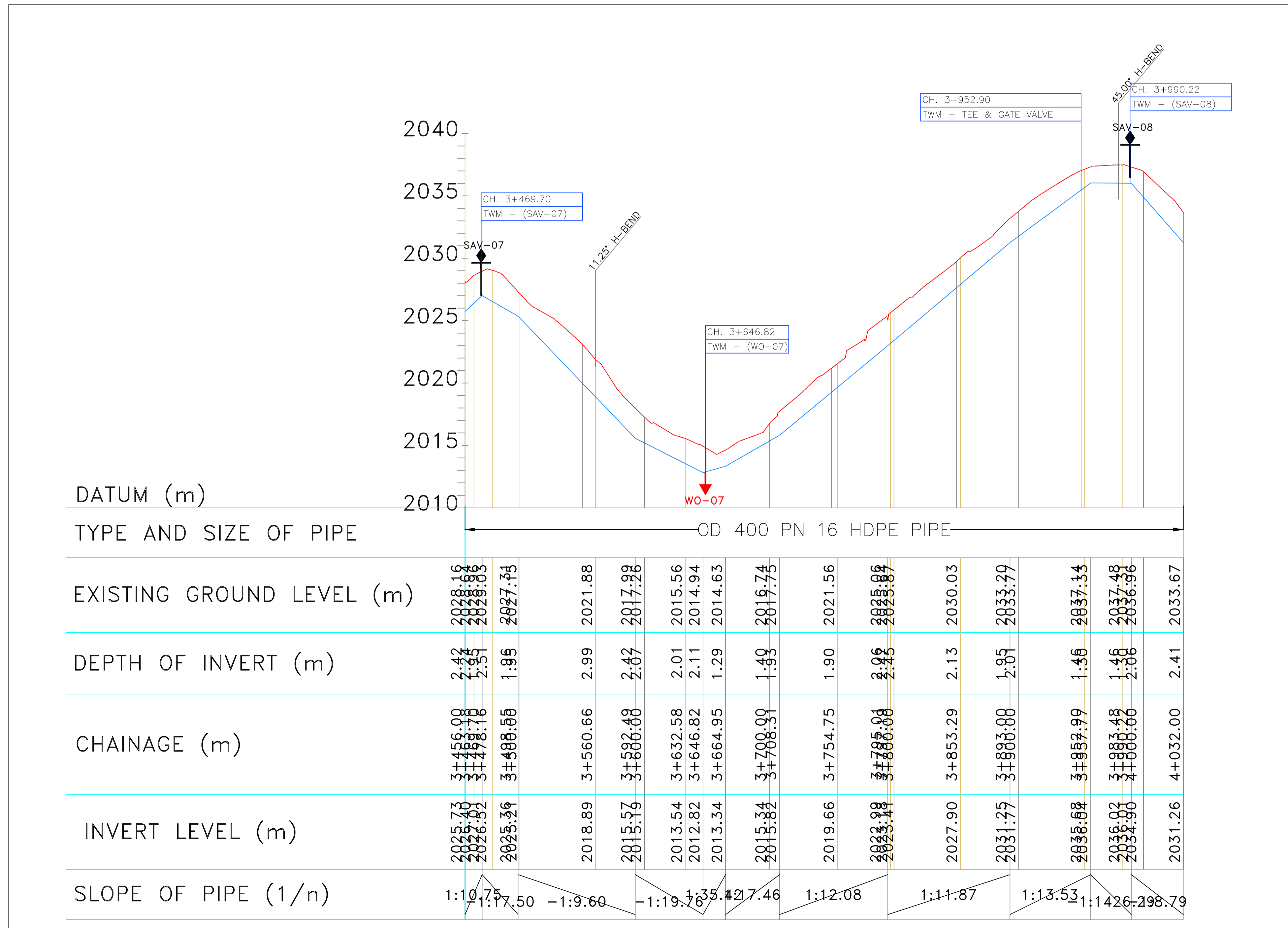
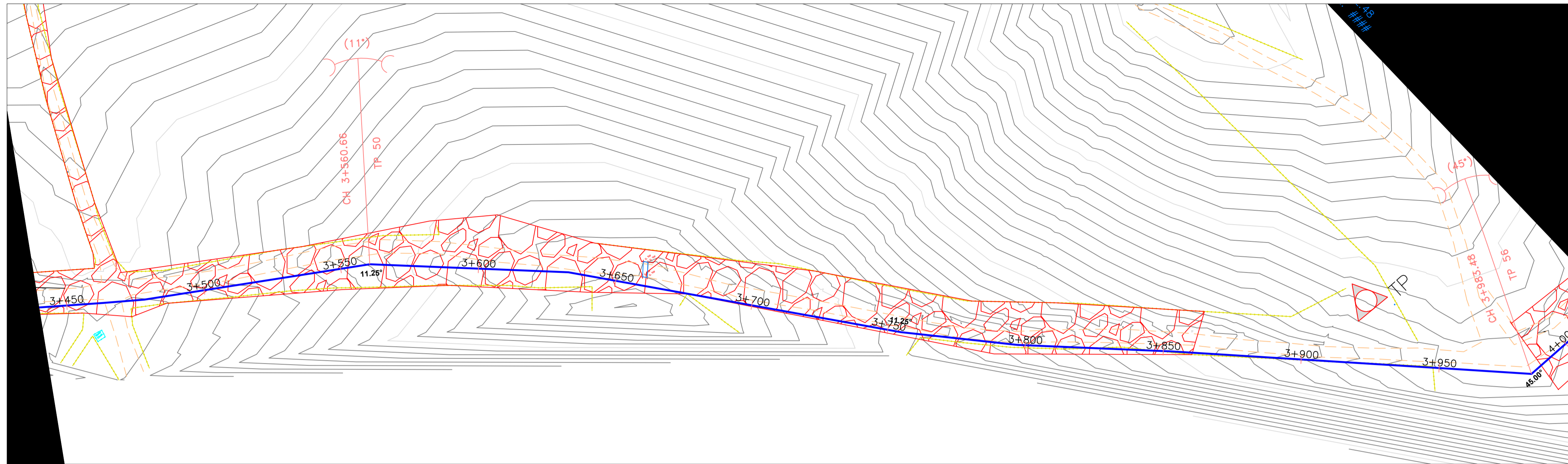


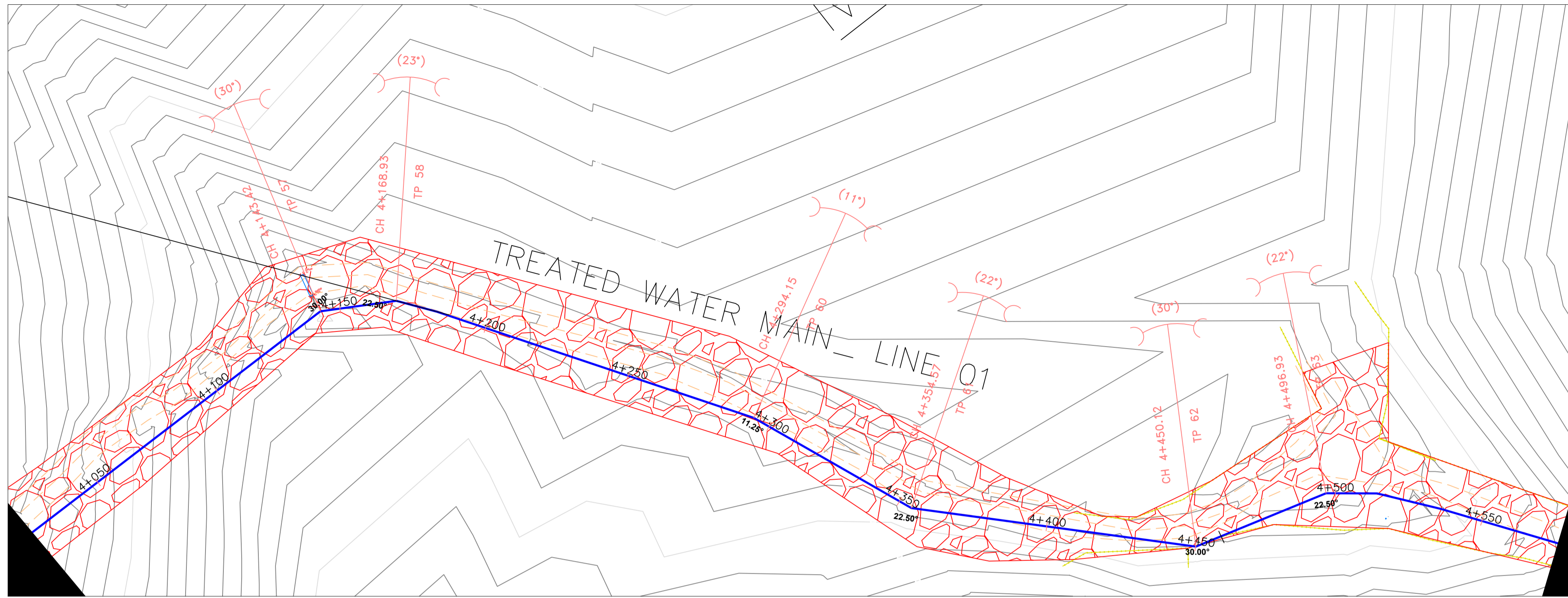




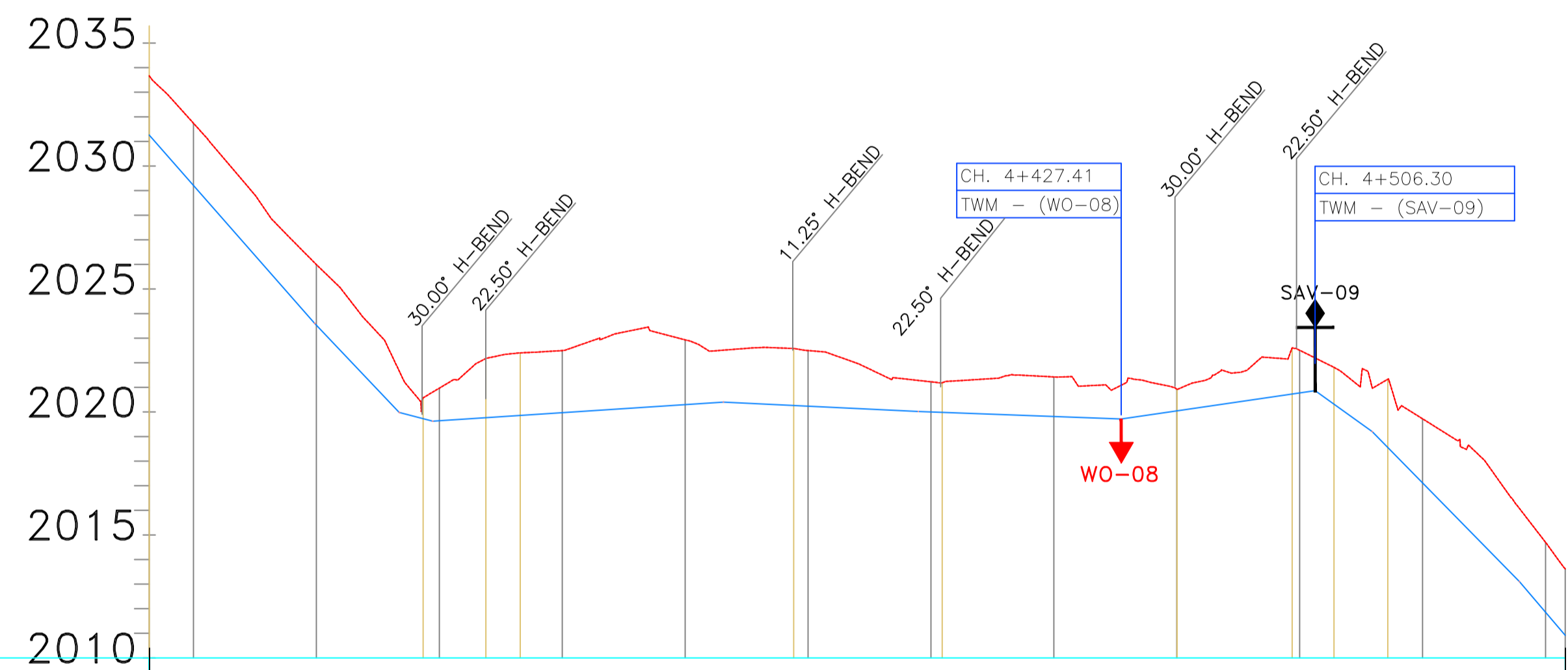
10







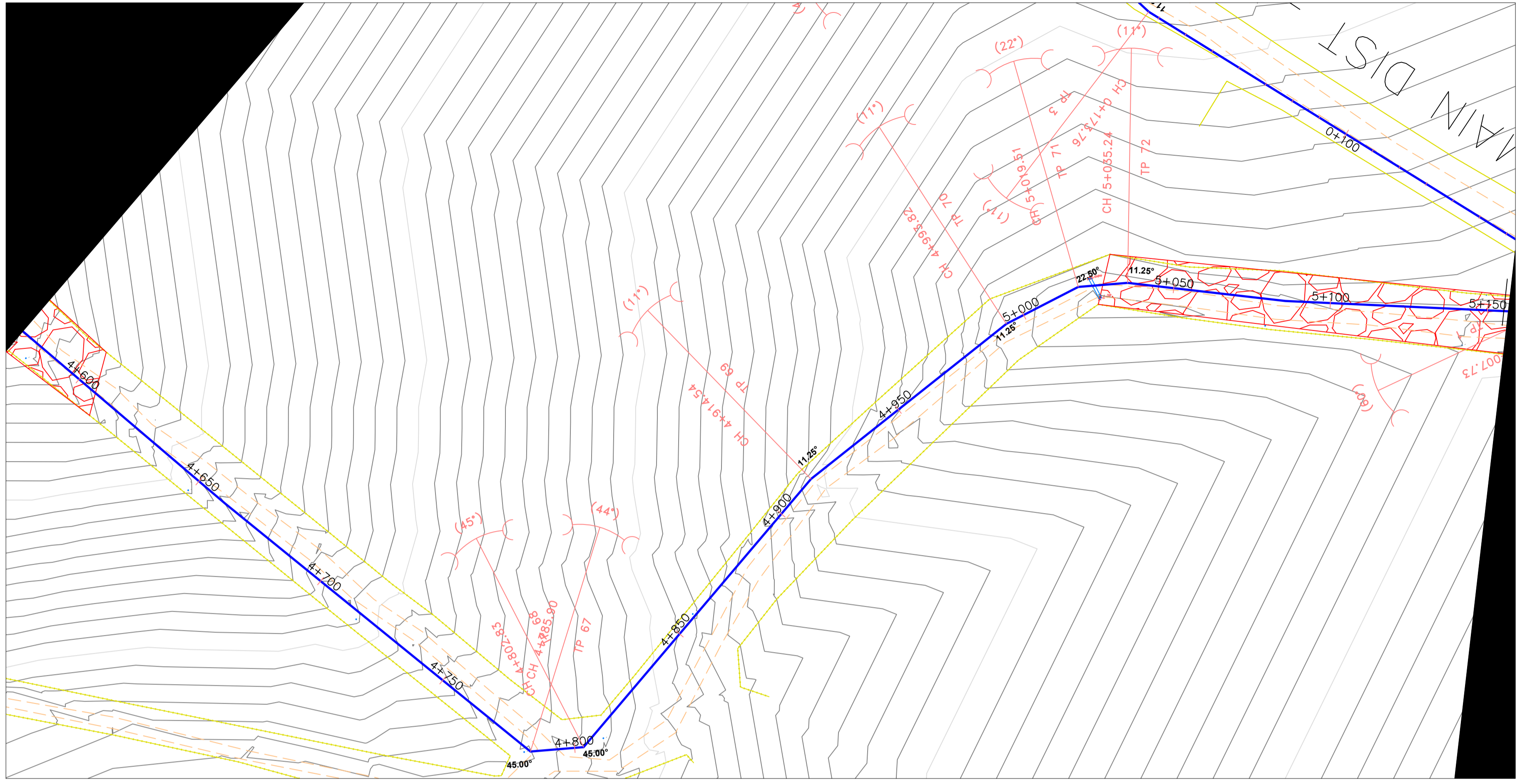
r/c

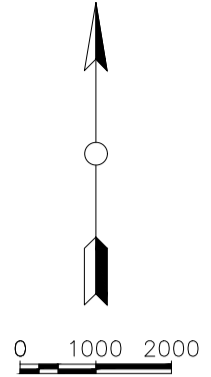
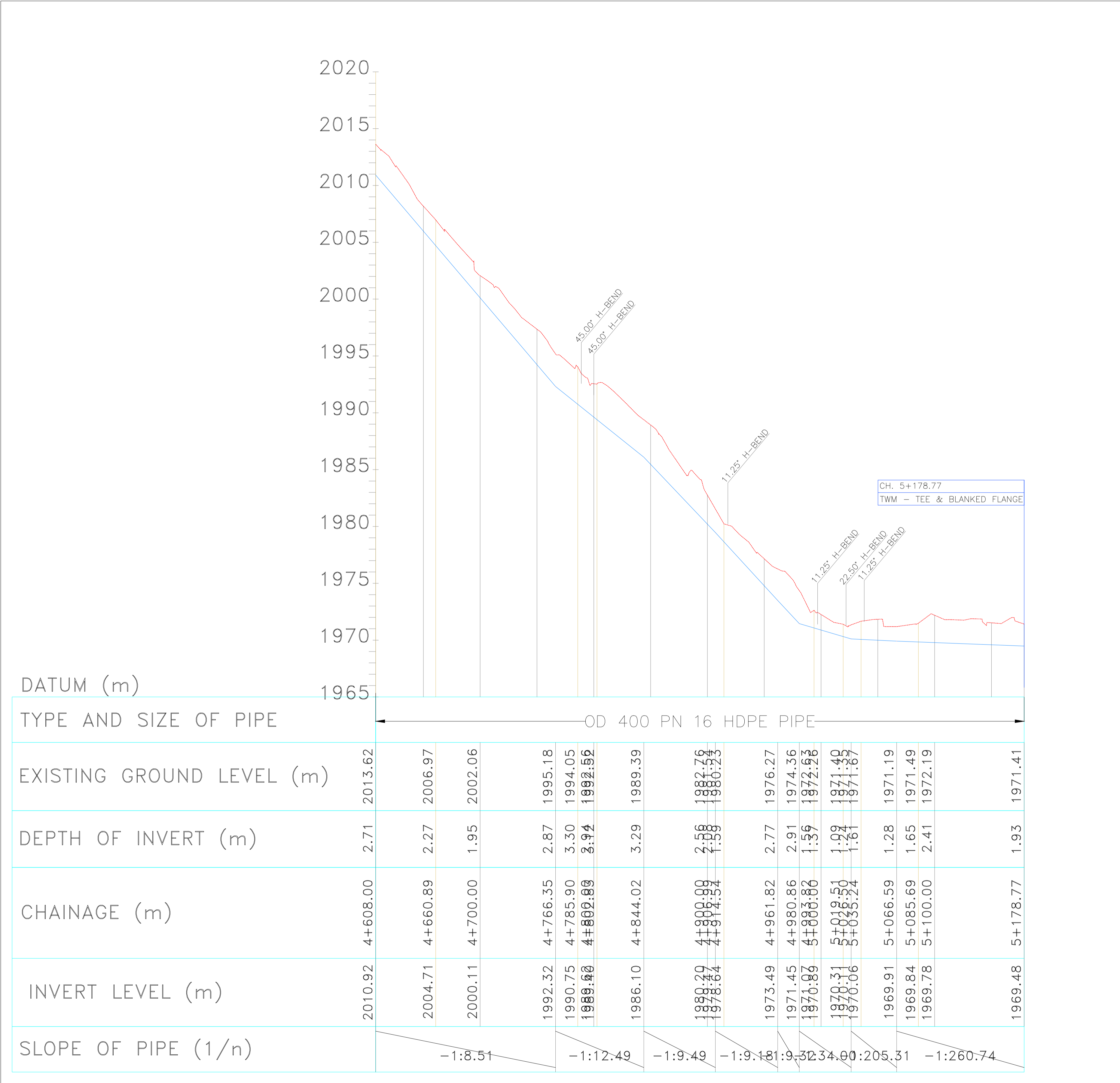


DATUM (m)

TYPE AND SIZE OF PIPE → OD 400 PN 16 HDPE PIPE

EXISTING GROUND LEVEL (m)	2033.67	<b>2026.00</b>	2021.67	<b>2020.68</b>	2022.18	2022.40	2022.50		2022.51	<b>2022.50</b>	2021.28	2021.19	2021.42	2021.09	2020.91	<b>2022.69</b>	<b>2022.69</b>	<b>2022.69</b>	2021.81	<b>2021.81</b>	2016.08	2013.62
DEPTH OF INVERT (m)	2.41	<b>2.46</b>	1.69	<b>0.85</b>	2.41	2.54	2.53		2.11	<b>2.36</b>	1.26	1.21	1.61	1.37	0.87	<b>1.83</b>	<b>1.50</b>	<b>1.50</b>	2.79	<b>2.79</b>	2.97	2.84
CHAINAGE (m)	4+032.00	<b>4+000.00</b>	4+133.67	<b>4+143.42</b>	4+168.93	4+182.90	4+200.00		4+265.59	<b>4+300.00</b>	4+344.87	4+354.57	4+400.00	4+427.41	4+450.12	<b>4+506.00</b>	<b>4+506.30</b>	<b>4+513.94</b>	<b>4+528.48</b>	<b>4+528.48</b>	4+589.39	4+608.00
INVERT LEVEL (m)	2031.26	<b>2023.53</b>	2019.98	<b>2019.83</b>	2019.77	2019.86	2019.97		2020.40	<b>2020.25</b>	2020.02	2019.98	2019.81	2019.71	2020.05	<b>2020.73</b>	<b>2020.52</b>	<b>2020.52</b>	2018.50	<b>2018.50</b>	2013.10	2010.92
SLOPE OF PIPE (1/n)		-1:8.79	-1:9.49	1:8.26	1:152.43				-1:207.05	-1:271.51	1:68.45				-1:13.92	1:9.83	1:8.51					





- NOTES:**
1. CONTOUR LEVELS ARE IN METERS AT ONE METER INTERVALS
  2. MINIMUM PIPELINE SLOPES TO BE 1:500
  3. DRAWING TO BE READ IN CONJUNCTION WITH STANDARD DRAWINGS
  4. ALL PIPE FITTINGS TO BE CONFIRMED ON SITE DURING SETTING OUT


- LEGEND:**
- ROAD (TARMAC)
  - ROAD / TRACK (EARTH / MURRAM)
  - CHAINLINK FENCE
  - BARBED WIRE FENCE
  - FENCE / HEDGE
  - 32 CONTOURS, 1m INTERVAL
  - ELECTRIC POST
  - CULVERT
  - GATE
  - ROCK OUTCROPS
  - PROPOSED WATER MAIN
  - EXISTING WATER MAIN
  - TP10 TRAVERSE POINT & No.
  - TREES
  - HORIZONTAL BEND (H) OR VERTICAL BEND (V) WITH ANGLE INDICATED
  - GV GATE VALVE
  - WM WATER METER
  - WO-01 WASHOUT VALVE & No.
  - SAV-01 SINGLE ORIFICE AIR VALVE & No.
  - PIPELINE GRADIENT WITH SLOPE DIRECTION (SLOPE MIN. OR 1 IN n)

**CONTROL POINT:**

NORTHING	EASTING	ELEVATION	DESCRIPTION
124384.426	239789.916	2045.325	T8
123949.361	239976.187	2033.506	T9
123497.036	240289.493	2034.716	TP
123339.751	240355.639	2031.802	T10
123071.969	240456.581	2032.275	T12
124384.431	239789.924	2045.323	T7
125337.992	238710.623	2093.905	T2A
125087.118	238467.115	2097.308	T1
125067.303	238507.520	2094.498	T1A
122727.298	240629.864	2035.268	T13
120098.386	242787.045	1918.667	T16
122385.501	240923.306	1983.404	T14
121328.205	241975.695	2024.908	TP

REVISION	DESCRIPTION

CLIENT / EMPLOYER:



NORTHERN WATER WORKS DEVELOPMENT AGENCY  
P.O. BOX 495-70100  
GARISSA

REVIEWED BY:



Interconsult Engineers Ltd  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane.  
Tel. 4441648/4441651  
Nairobi.

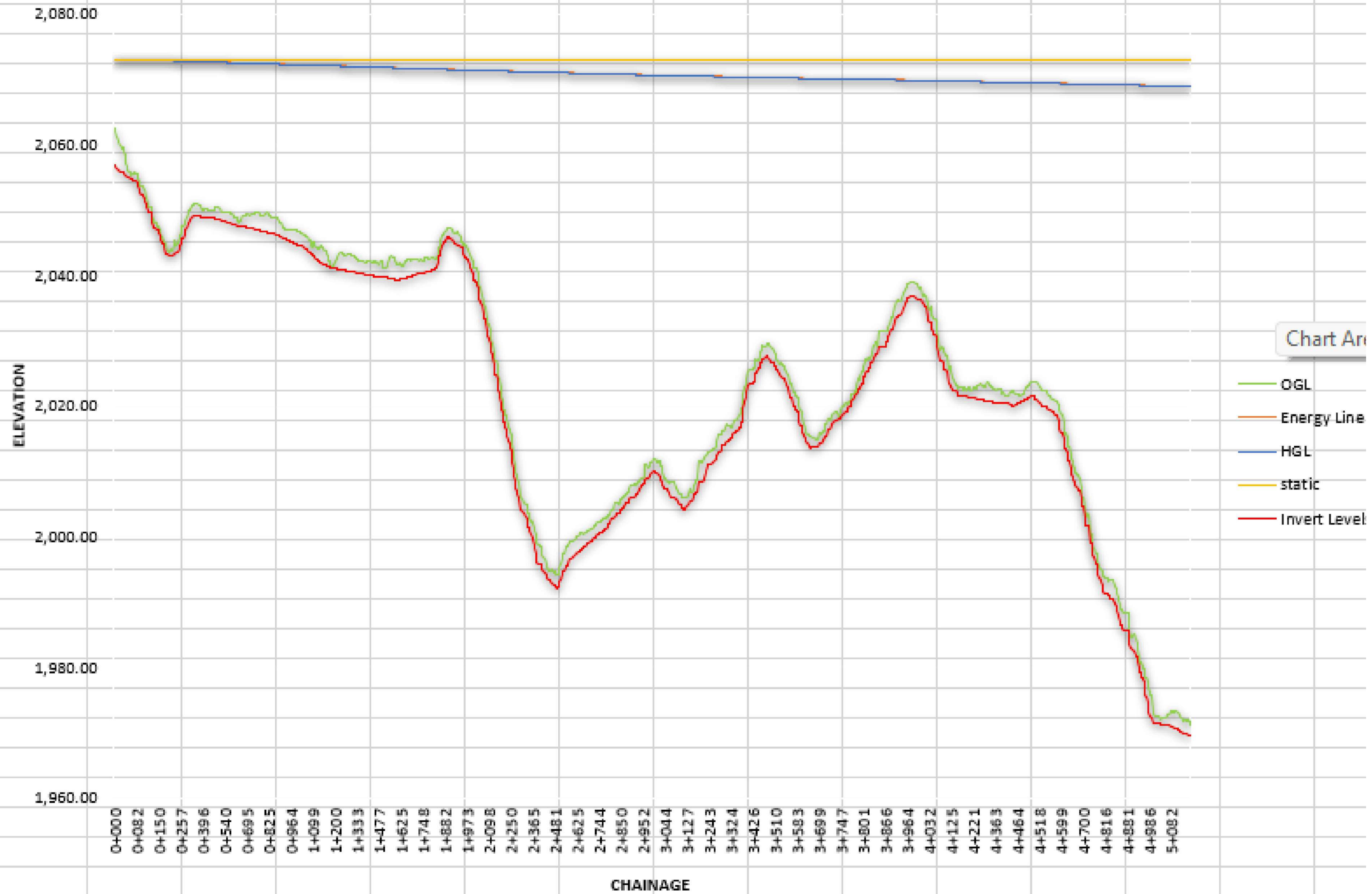
DRAWING TITLE:

**MARALAL WATER SUPPLY PROJECT  
PROFILE  
TREATED WATER MAIN  
CHAINAGE 4+608.00-5+184.00**

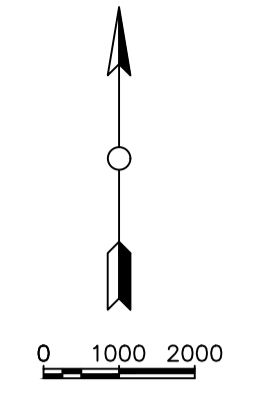
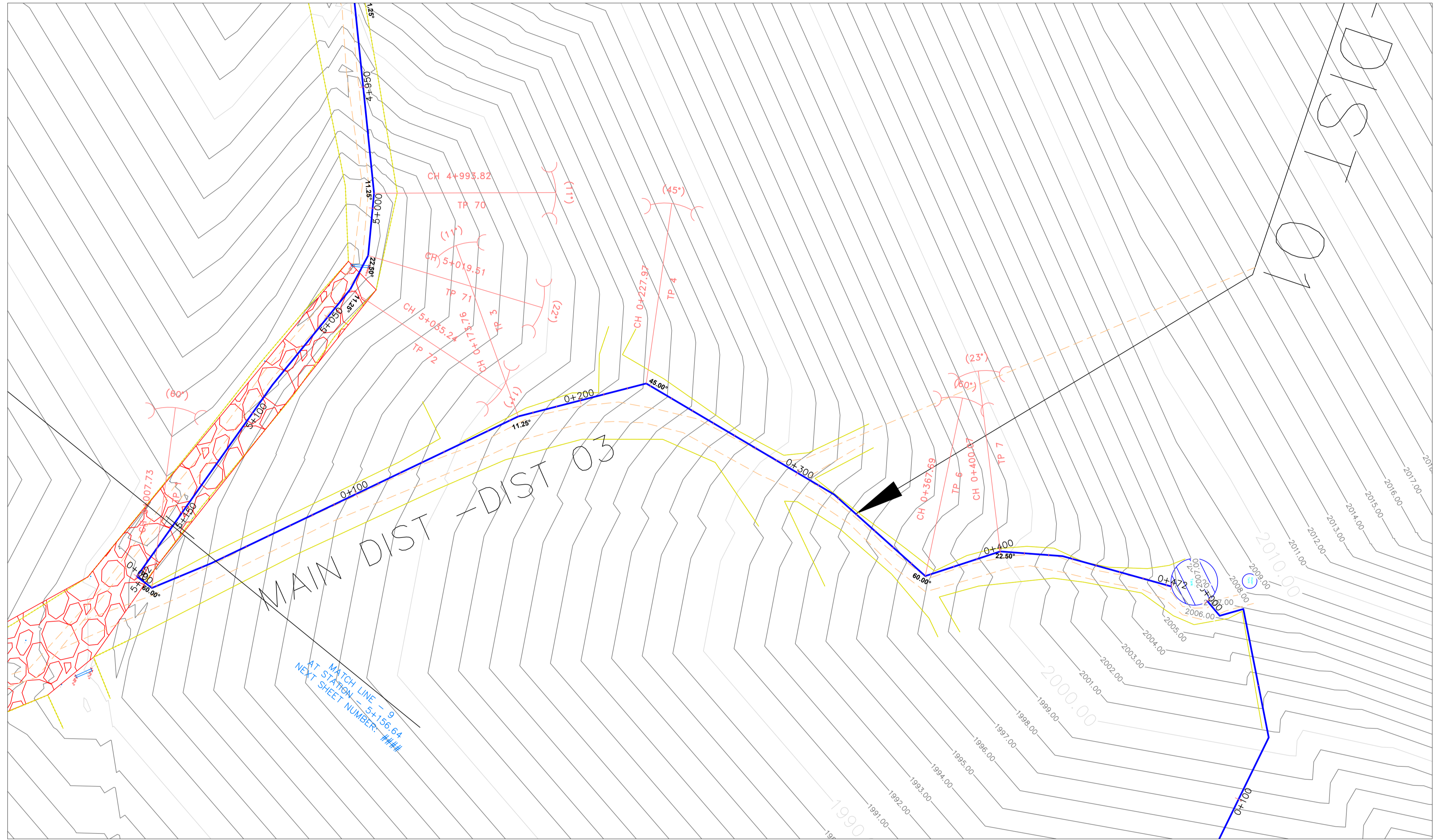
Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: H 1:1000, V 1:1250	Date: FEBRUARY 2024
DRAWING No. <b>MWS/TWM/10</b>	<b>REV. 0</b>

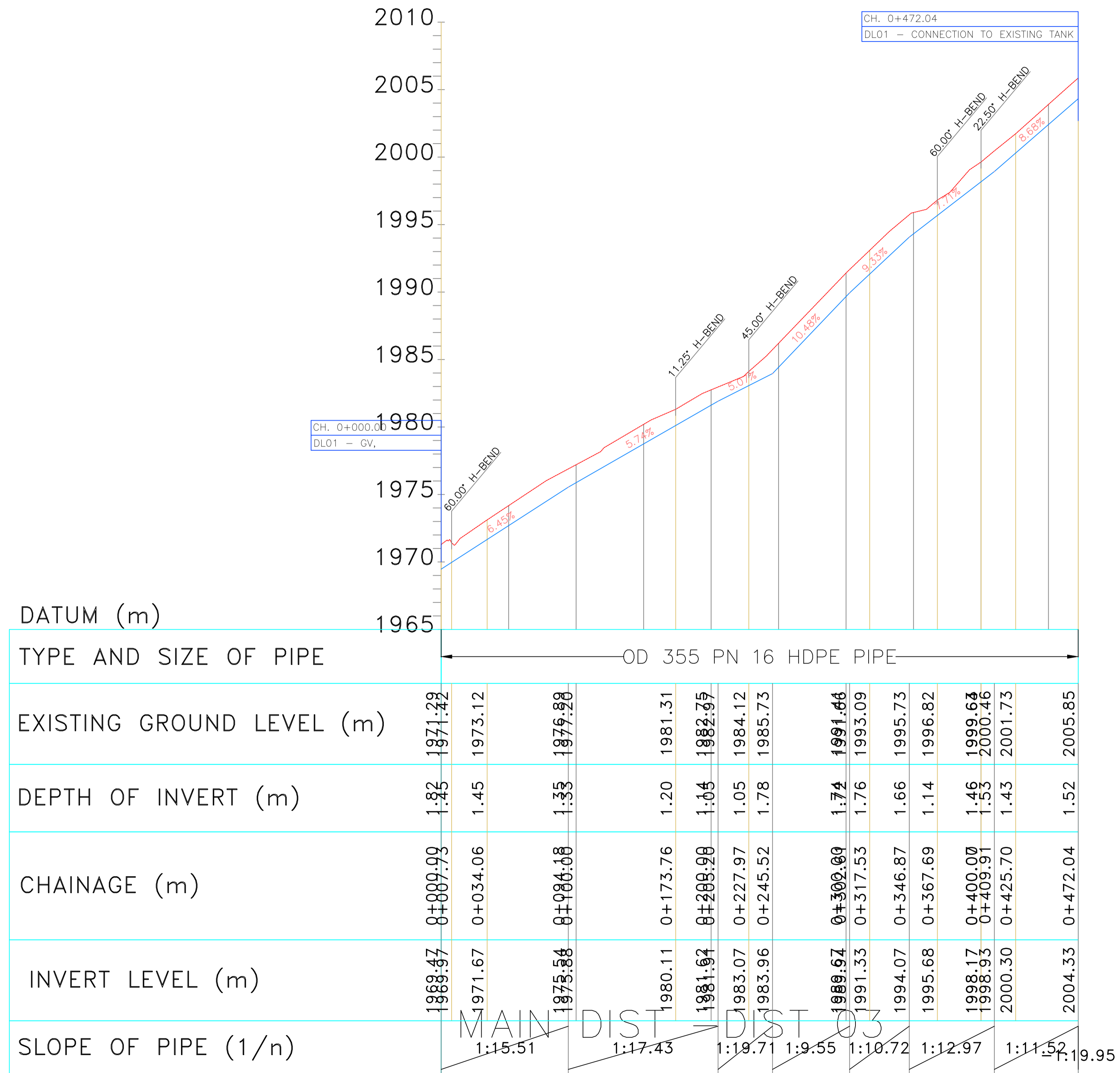


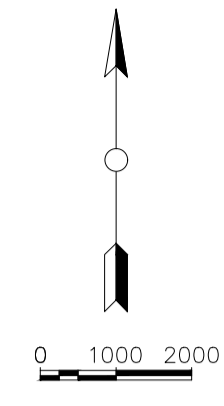
# TREATED WATER MAIN -HYDRAULIC ANALYSIS



# **DISTRIBUTION LINE 01**



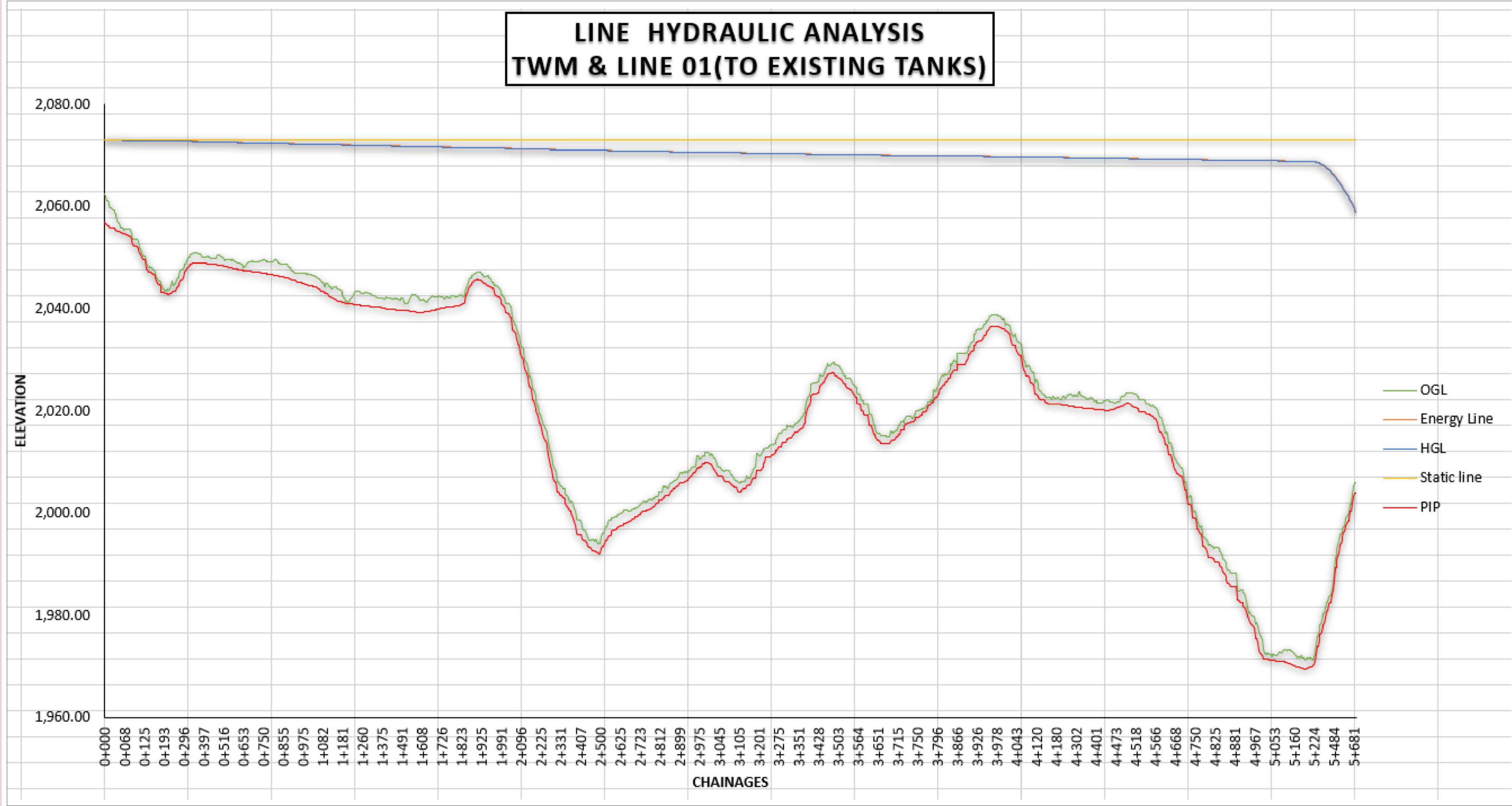




- NOTES:**
1. CONTOUR LEVELS ARE IN METERS AT ONE METER INTERVALS
  2. MINIMUM PIPELINE SLOPES TO BE 1:500
  3. DRAWING TO BE READ IN CONJUNCTION WITH STANDARD DRAWINGS
  4. ALL PIPE FITTINGS TO BE CONFIRMED ON SITE DURING SETTING OUT

- LEGEND:**
- ROAD (TARMAC)
  - ROAD / TRACK (EARTH / MURRAM)
  - CHAINLINK FENCE
  - BARBED WIRE FENCE
  - FENCE / HEDGE
  - 32 — CONTOURS, 1m INTERVAL
  - o ELECTRIC POST
  - CULVERT
  - GATE
  - x ROCK OUTCROPS
  - PROPOSED WATER MAIN
  - EXISTING WATER MAIN
  - △ TP10 TRAVERSE POINT & No.
  - o TREES
  - 30° HORIZONTAL BEND (H) OR VERTICAL BEND (V) WITH ANGLE INDICATED
  - GV GATE VALVE
  - WM WATER METER
  - WO-01 WASHOUT VALVE & No.
  - SAV-01 SINGLE ORIFICE AIR VALVE & No.
  - PIPELINE GRADIENT WITH SLOPE DIRECTION (SLOPE MIN. OR 1 IN n)

## LINE HYDRAULIC ANALYSIS TWM & LINE 01(TO EXISTING TANKS)



**CONTROL POINT:**

NORTHING	EASTING	ELEVATION	DESCRIPTION
124384.426	239789.916	2045.325	T8
123949.361	239976.187	2033.506	T9
123497.036	240289.493	2034.716	TP
123339.751	240355.639	2031.802	T10
123071.969	240456.581	2032.275	T12
124384.431	239789.924	2045.323	T7
125337.992	238710.623	2093.905	T2A
125087.118	238467.115	2097.308	T1
125067.303	238507.520	2094.498	T1A
122727.298	240629.864	2035.268	T13
120098.386	242787.045	1918.667	T16
122385.501	240923.306	1983.404	T14
121328.205	241975.695	2024.908	TP

REVISION	DESCRIPTION

CLIENT / EMPLOYER:

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
P.O. BOX 495-70100  
GARISSA

REVIEWED BY:

Interconsult Engineers Ltd  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane,  
Tel. 4441648/4441651  
Nairobi.

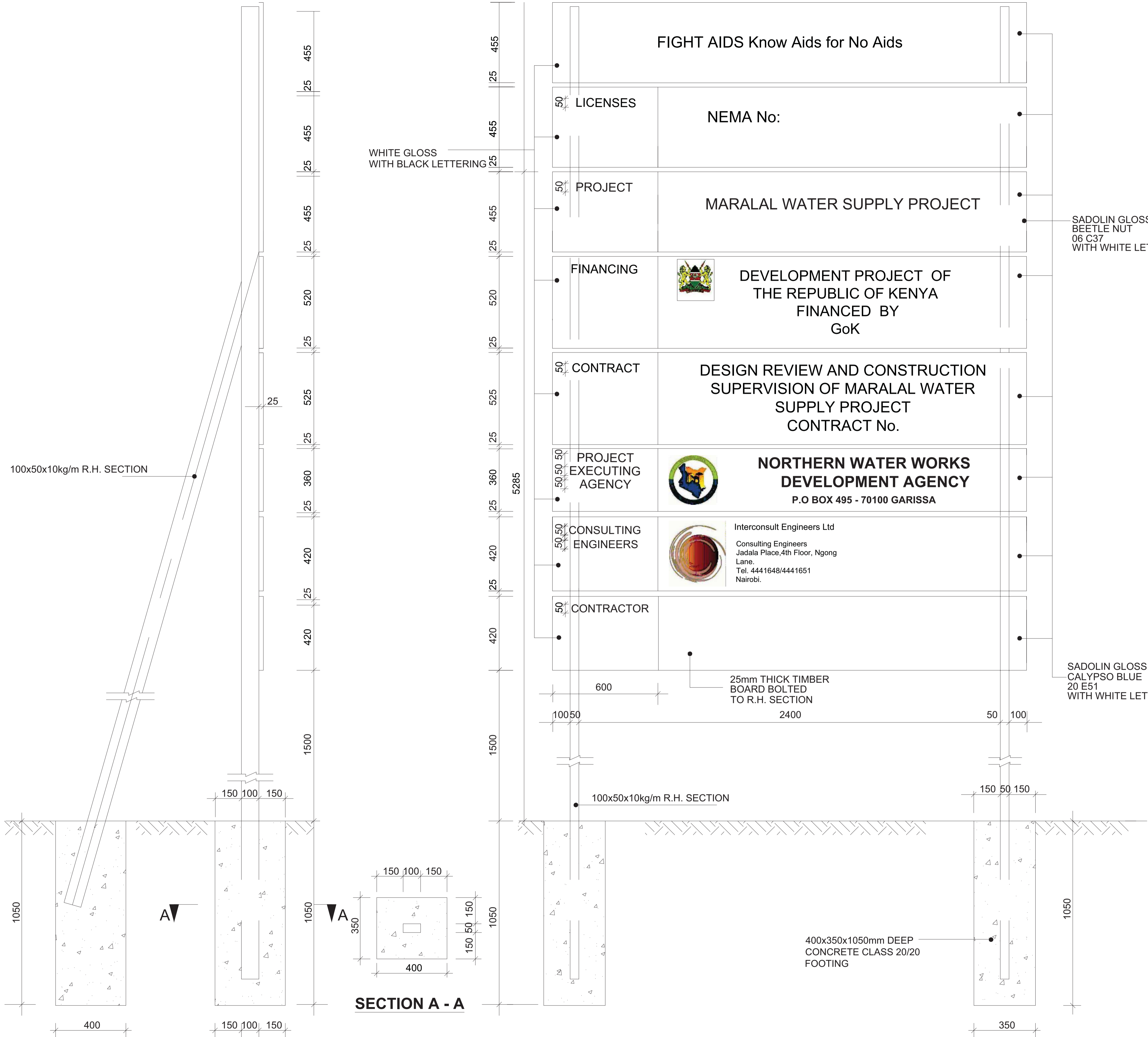
DRAWING TITLE:

**MARALAL WATER SUPPLY PROJECT  
HYDRAULIC GRADIENT LINE  
TREATED WATER LINE AND  
DISTRIBUTION LINE 1(TO EXISTING  
TANKS)  
CHAINAGE 0+000~5+681**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: H 1:1000, V 1:2000	Date: FEBRUARY 2024

# **STANDARD DRAWINGS**


- NOTES**
1. FINAL WORDING ON SIGN BOARD TO BE DECIDED AND APPROVED IN CONSULTATION WITH THE EMPLOYER PRIOR TO FABRICATION OF THE SIGN BOARD
  2. DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED




**FIGHT AIDS Know Aids for No Aids**


**LICENSES** NEMA No:

**PROJECT** MARALAL WATER SUPPLY PROJECT

**FINANCING**  DEVELOPMENT PROJECT OF THE REPUBLIC OF KENYA FINANCED BY GoK

**CONTRACT** DESIGN REVIEW AND CONSTRUCTION SUPERVISION OF MARALAL WATER SUPPLY PROJECT CONTRACT No.

**PROJECT EXECUTING AGENCY**  **NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
P.O BOX 495 - 70100 GARISSA

**CONSULTING ENGINEERS**  Interconsult Engineers Ltd  
Consulting Engineers  
Jadala Place, 4th Floor, Ngong Lane,  
Tel. 4441648/4441651  
Nairobi.

**CONTRACTOR**

WHITE GLOSS WITH BLACK LETTERING


SADOLIN GLOSS BEETLE NUT 06 C37 WITH WHITE LETTERING

SADOLIN GLOSS CALYPSO BLUE 20 E51 WITH WHITE LETTERING

25mm THICK TIMBER BOARD BOLTED TO R.H. SECTION

400x350x1050mm DEEP CONCRETE CLASS 20/20 FOOTING

REVISION	DESCRIPTION

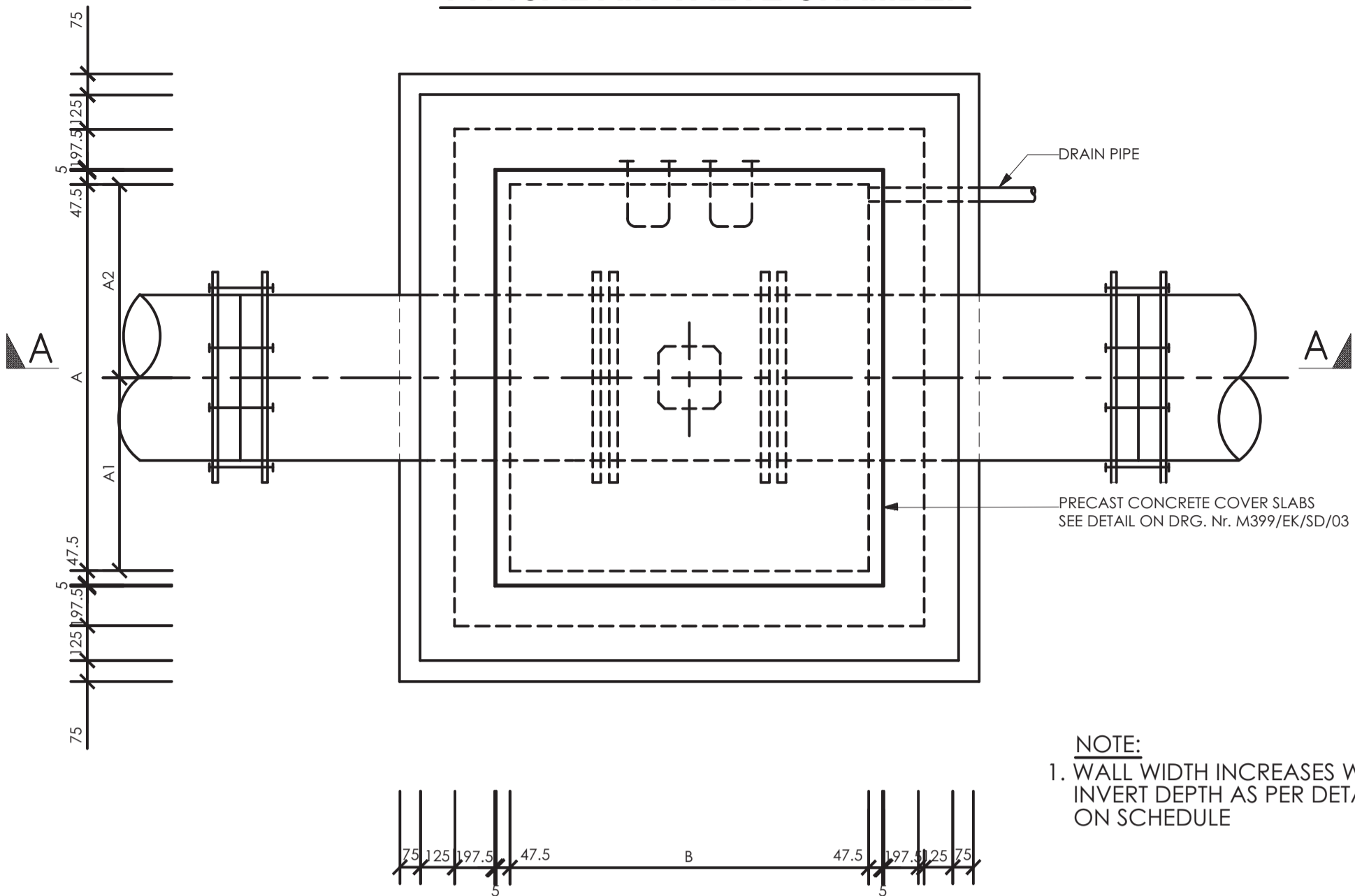
CLIENT / EMPLOYER:  
 NORTHERN WATER WORKS DEVELOPMENT AGENCY  
 P.O. BOX 495-70100 GARISSA

REVIEWED BY:  
 Interconsult Engineers Ltd  
 Consulting Engineers  
 Jadala Place, 4th Floor, Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**MARALAL WATER SUPPLY PROJECT SIGN BOARD**

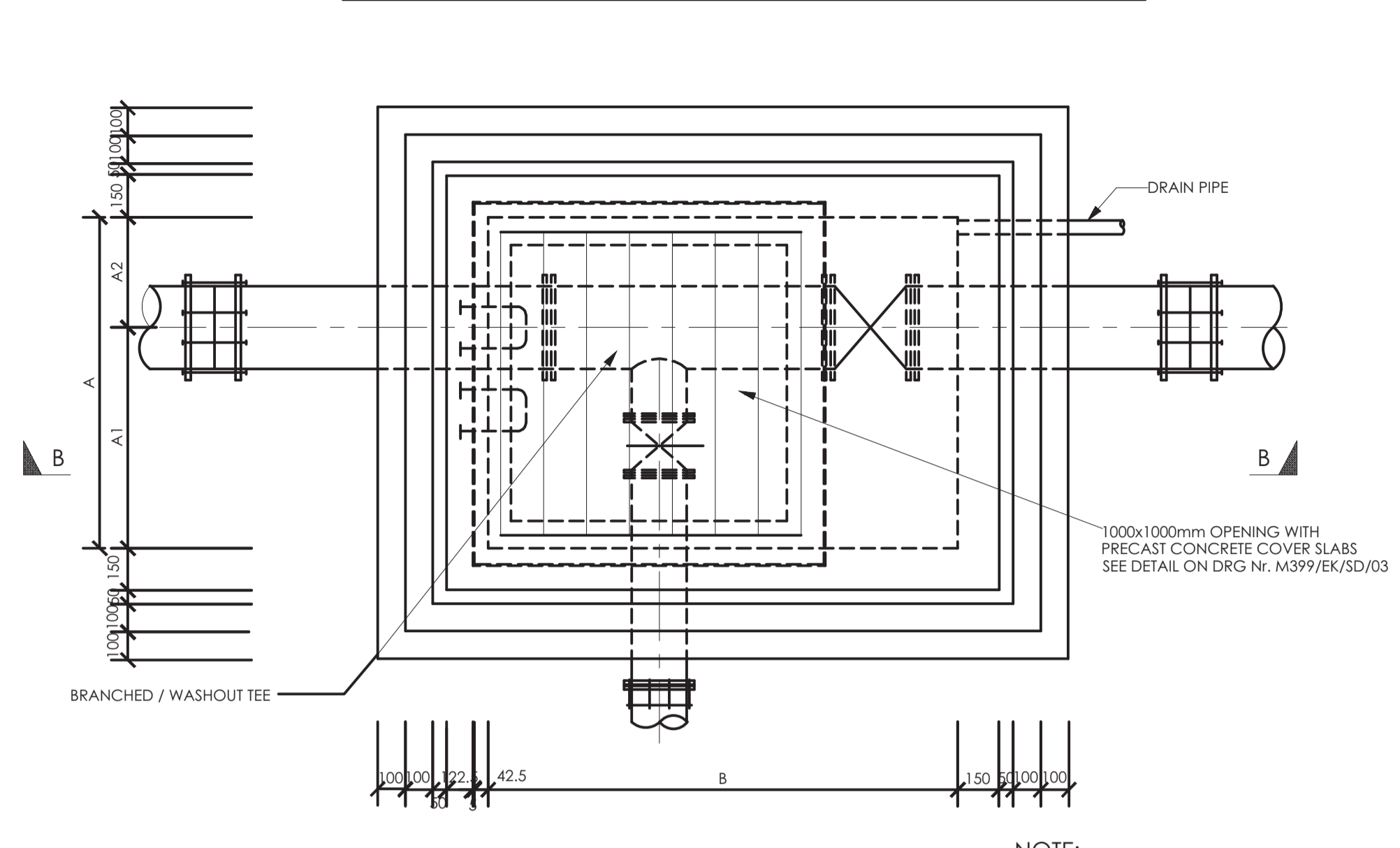
Designed by: I.M.W	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: 1:500	Date: FEBRUARY 2024
DRAWING No: <b>MWS/TW/GL/01</b>	REV. 0

**TYPICAL AIR VALVE CHAMBER**



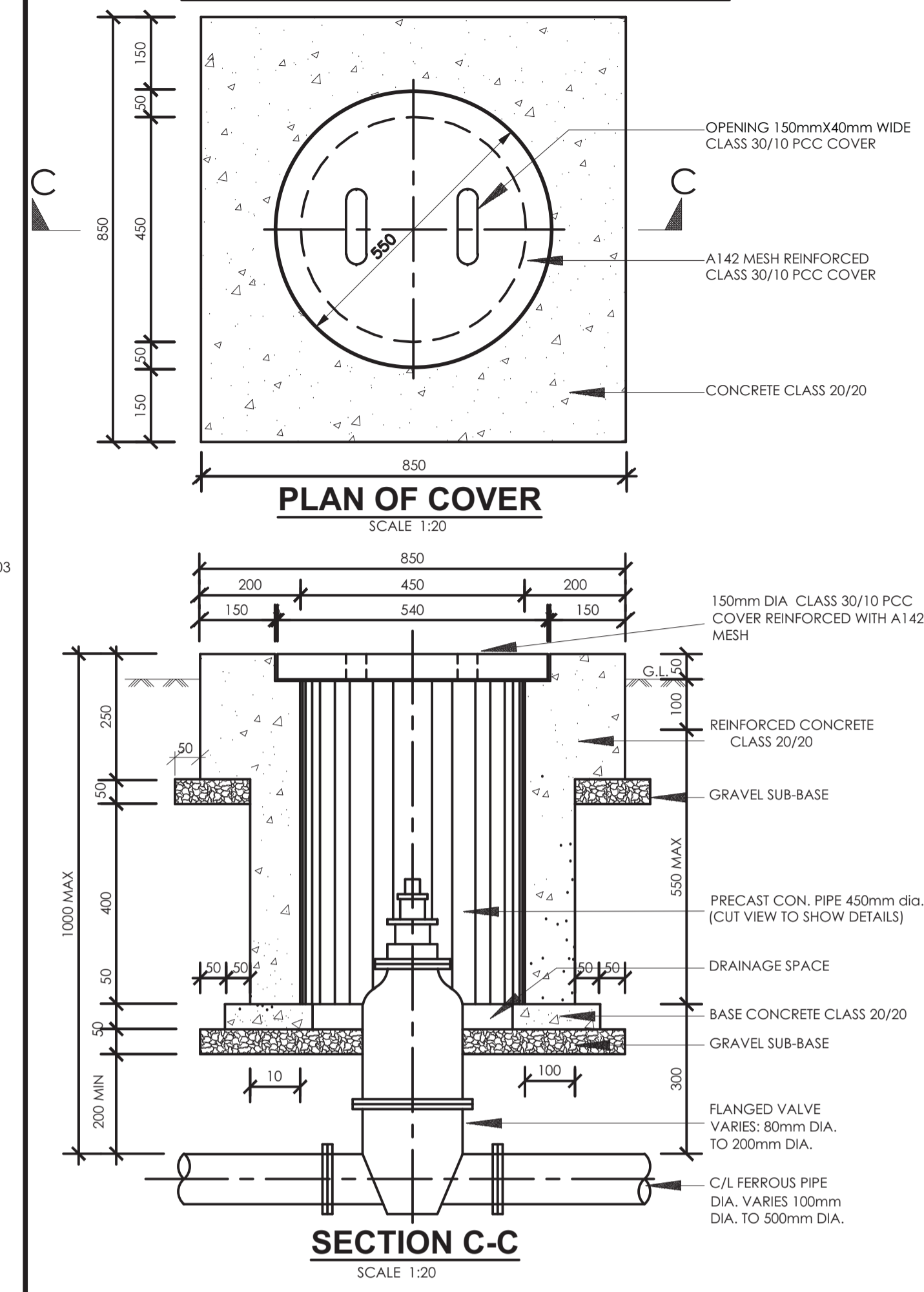
NOTE:  
1. WALL WIDTH INCREASES WITH INVERT DEPTH AS PER DETAIL ON SCHEDULE

**TYPICAL VALVE CHAMBER DETAILS AT JUNCTIONS / WASHOUT VALVE (DEPTH > 1.0m)**



NOTE:  
1. WALL WIDTH INCREASES WITH INVERT DEPTH AS PER DETAIL ON SCHEDULE

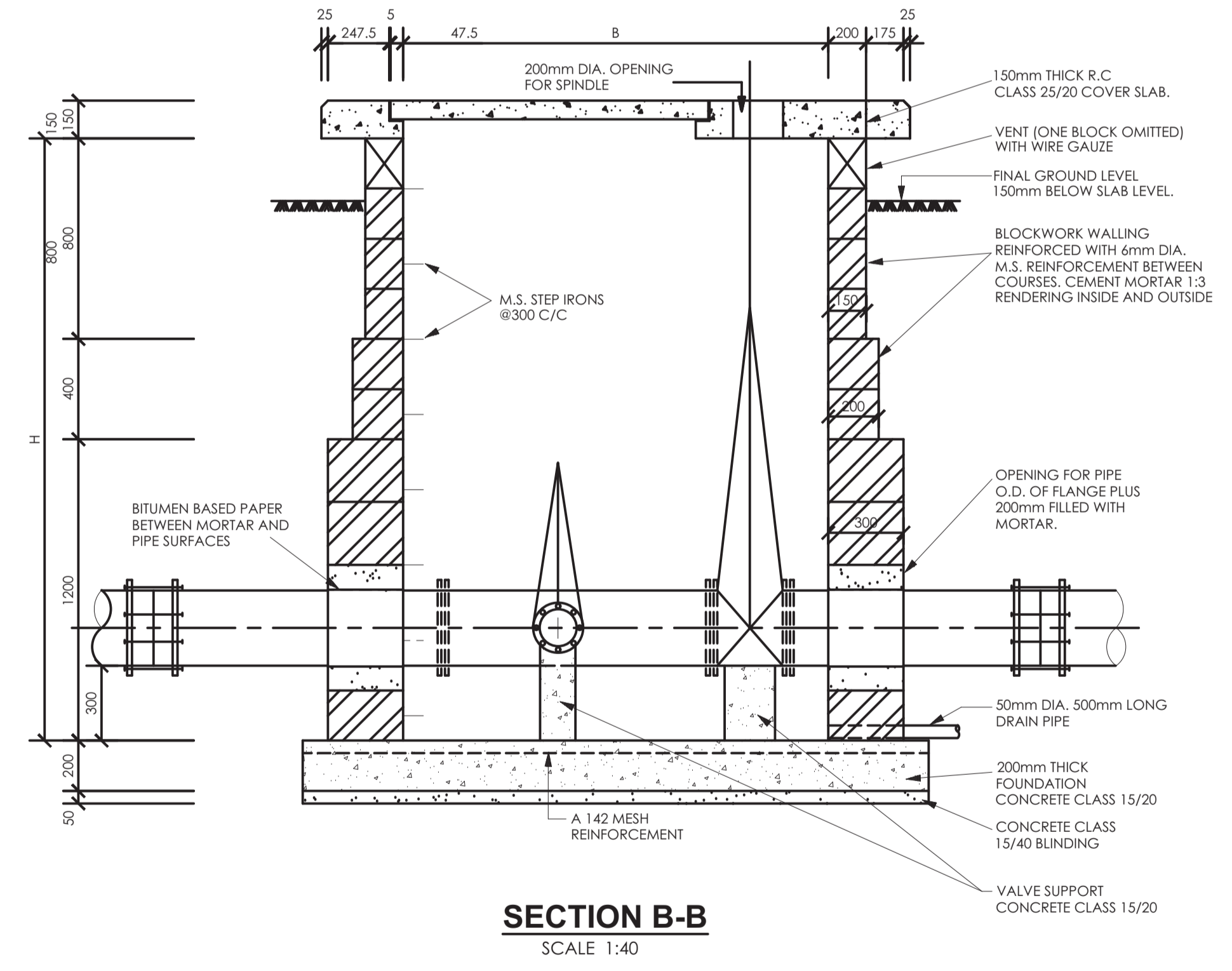
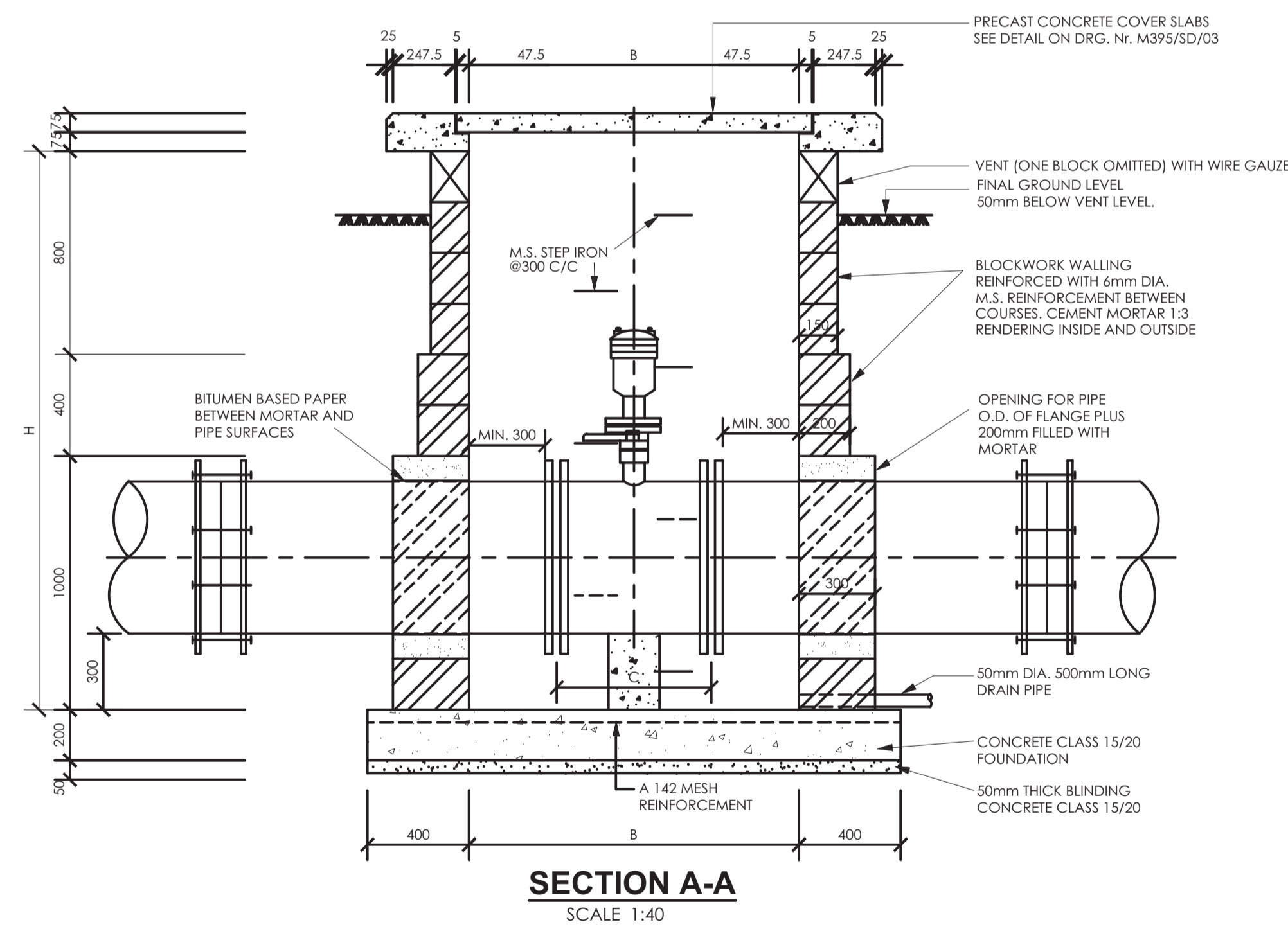
**TYPICAL VALVE BOX DETAIL FOR WASHOUT / VALVE (DEPTH ≤ 1.0m)**



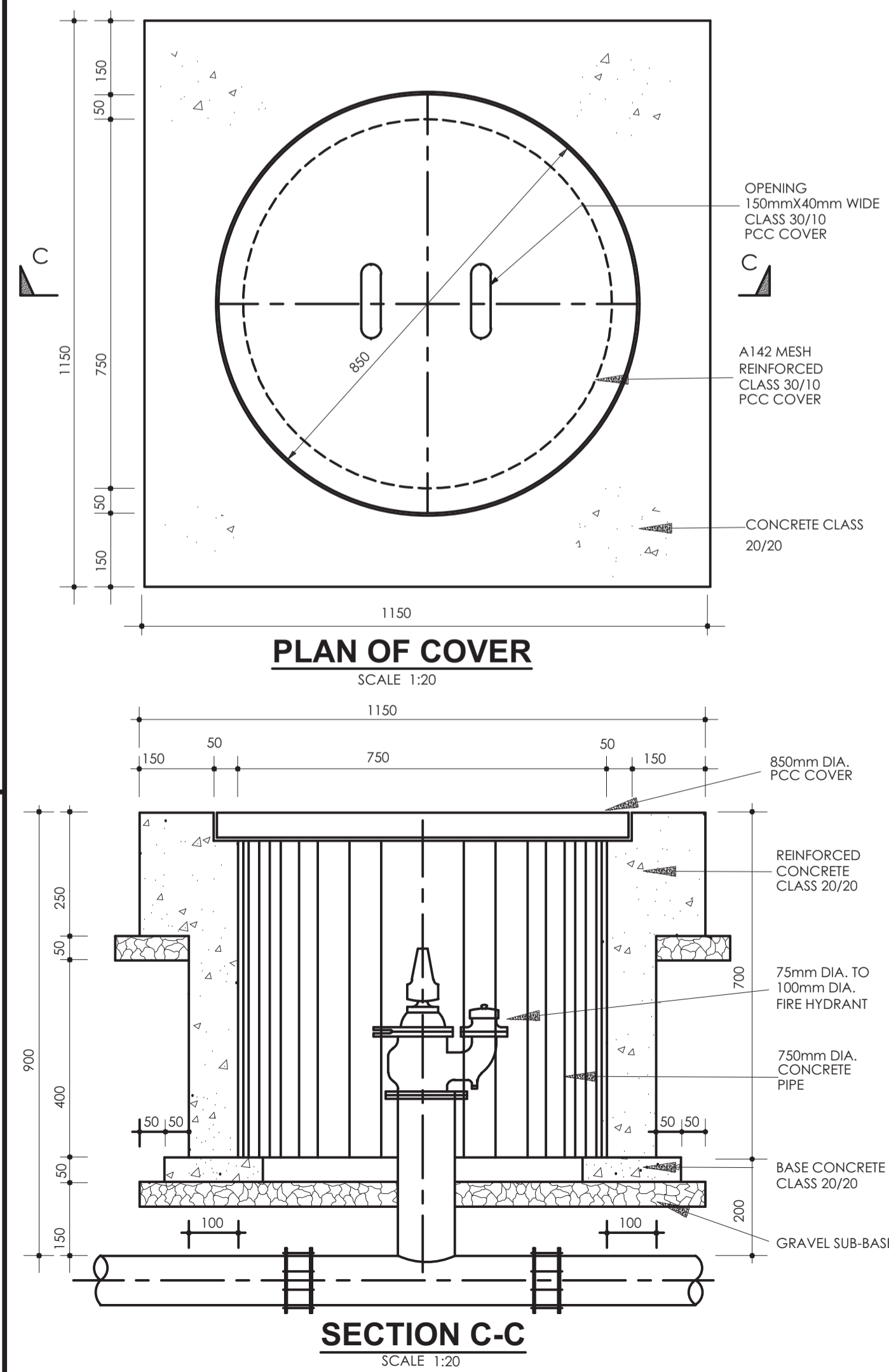
**NOTES**  
1. DIMENSIONS ARE SHOWN IN MILLIMETRES UNLESS OTHERWISE STATED

**ABBREVIATIONS**

- P.C.C. - PRECAST CONCRETE
- mm - MILLIMETRES
- O.D. - OUTSIDE DIAMETER
- M.S. - MILD STEEL
- DIA. - DIAMETER
- NO. - NUMBER
- R.C. - REINFORCED CONCRETE
- c/c - CENTRE TO CENTRE



**TYPICAL VALVE BOX DETAIL FOR FIRE HYDRANT**



**CONSTRUCTION DETAILS FOR VALVE CHAMBERS**

MAINS DIAMETER (mm)	PLAN SIZE OF CHAMBER (INTERNAL DIMENSIONS) A(mm) x B(mm)
100	1200 x 1200
150	1200 x 1200
200	1400 x 1200
250	1500 x 1200
300	1500 x 1200
350	1800 x 1200
400	1800 x 1200
450	1800 x 1400
500	1800 x 1400

INVERT DEPTHS (mm)	HEIGHT OF WALL (mm)	WALL WIDTH (mm)
0 - 800	800	150 - MASONRY WALL
800 - 1200	400	200 - MASONRY WALL
1200 - 2400	1200	300 - MASONRY WALL
2400 - 3000	600	350 - MASONRY WALL
DEPTH MORE THAN 3000	-	300mm REINFORCED CONCRETE (CLASS 25/20) WALL

**CHAMBER DEPTHS & WALL THICKNESS SCHEDULE**

**CHAMBER SIZE SCHEDULE FOR VARIOUS PIPE SIZES**

REVISION	DESCRIPTION	DATE

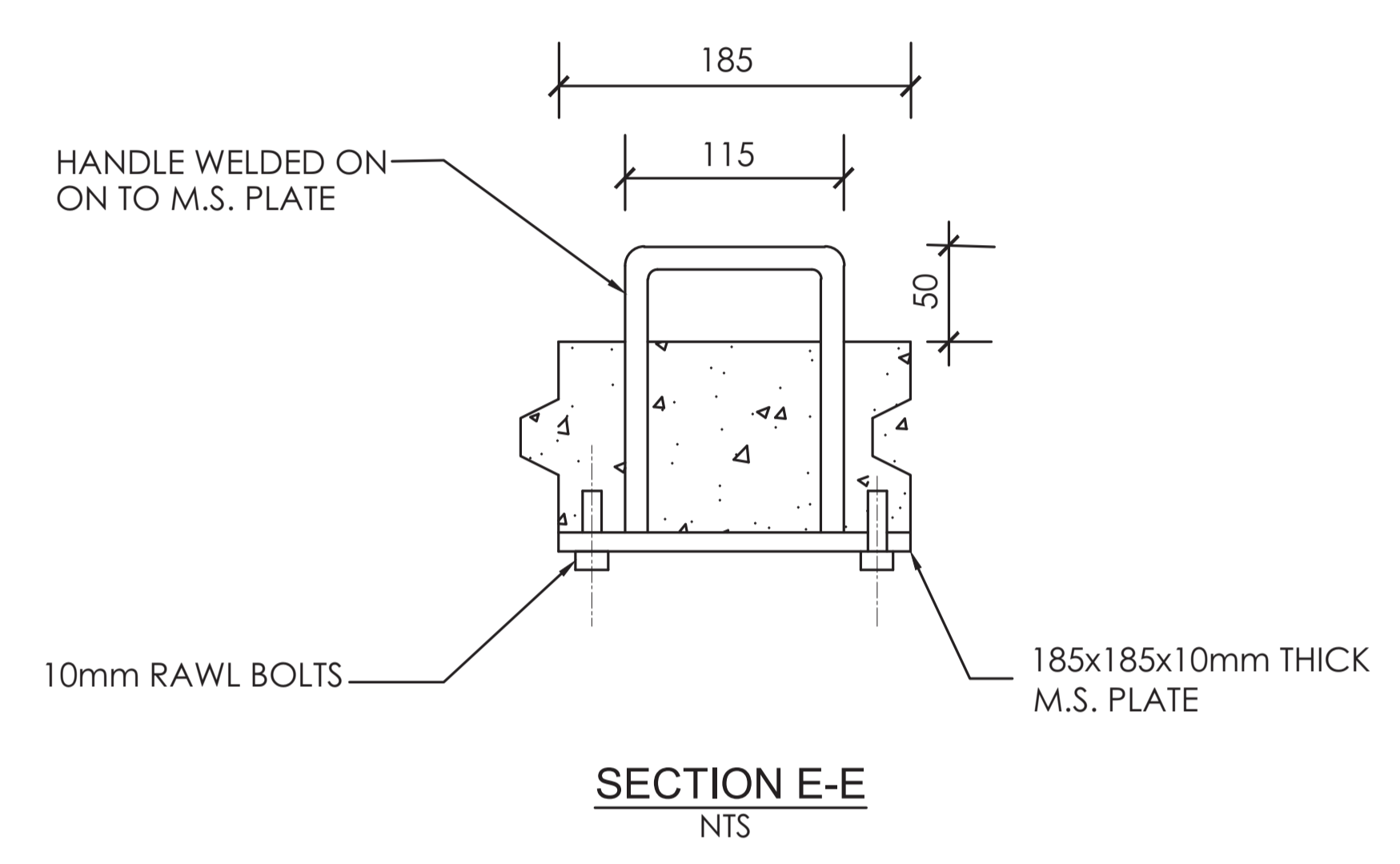
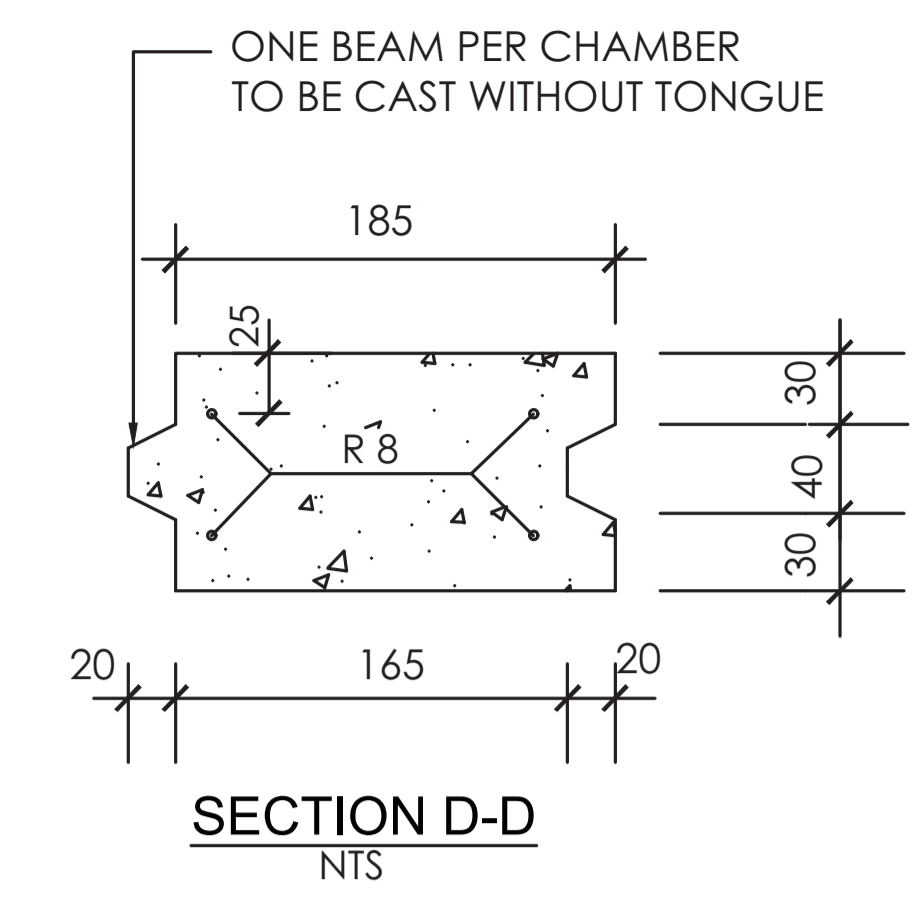
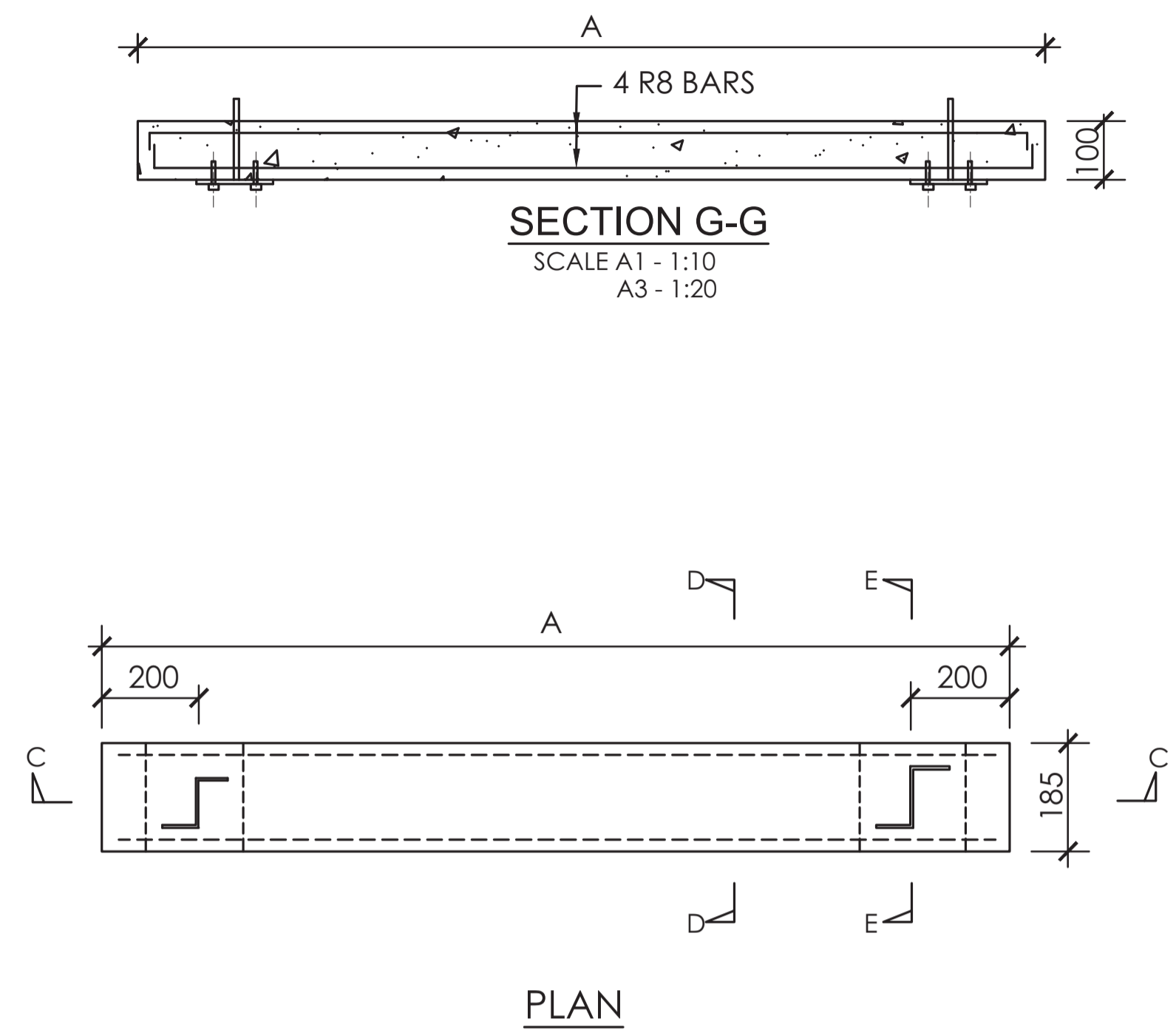
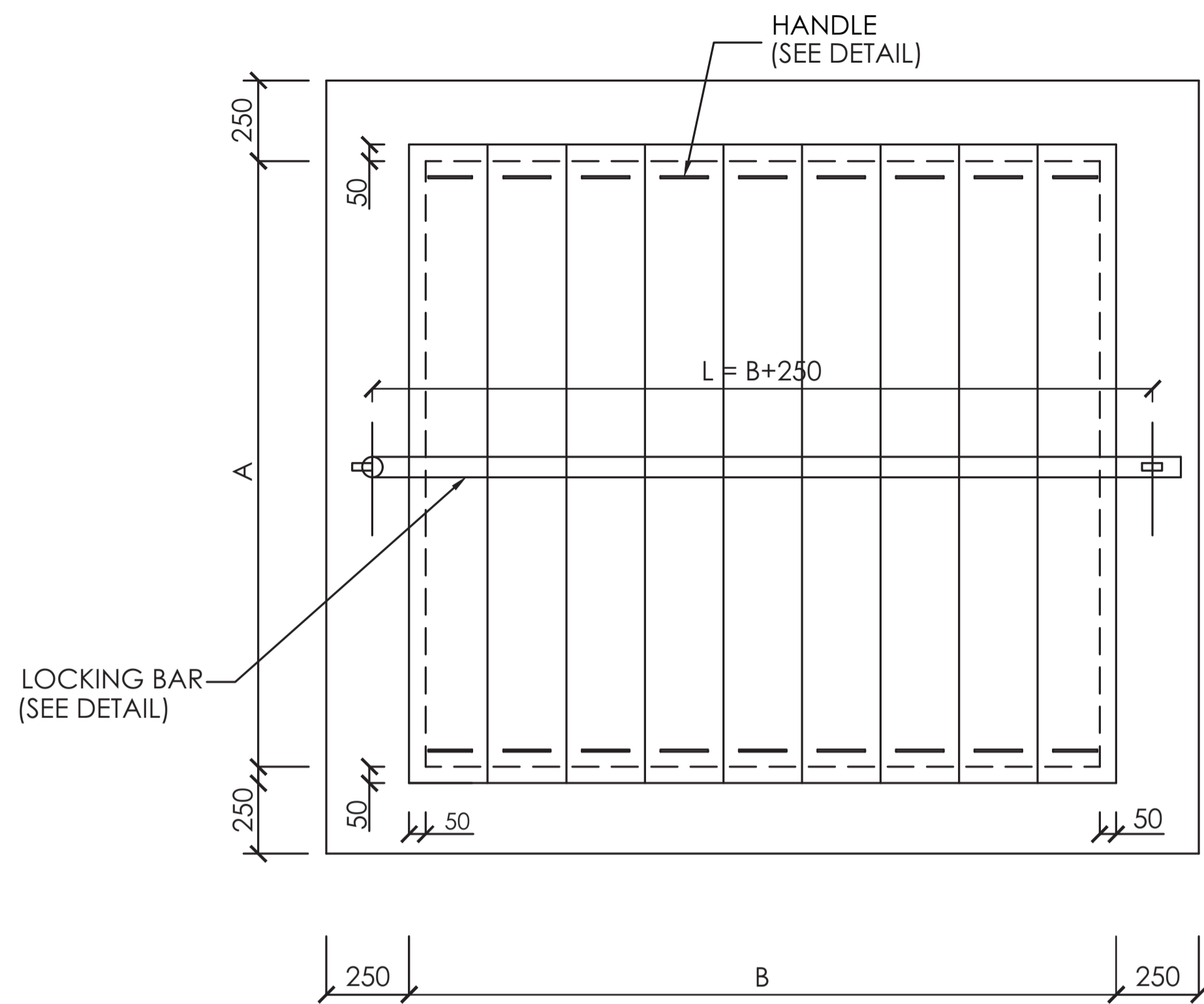
CLIENT / EMPLOYER:  
NORTHERN WATER WORKS DEVELOPMENT AGENCY  
P.O. BOX 495-70100  
GARISSA

REVIEWED BY:  
Interconsult Engineers Ltd  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane,  
Tel. 4441648/4441651  
Nairobi.

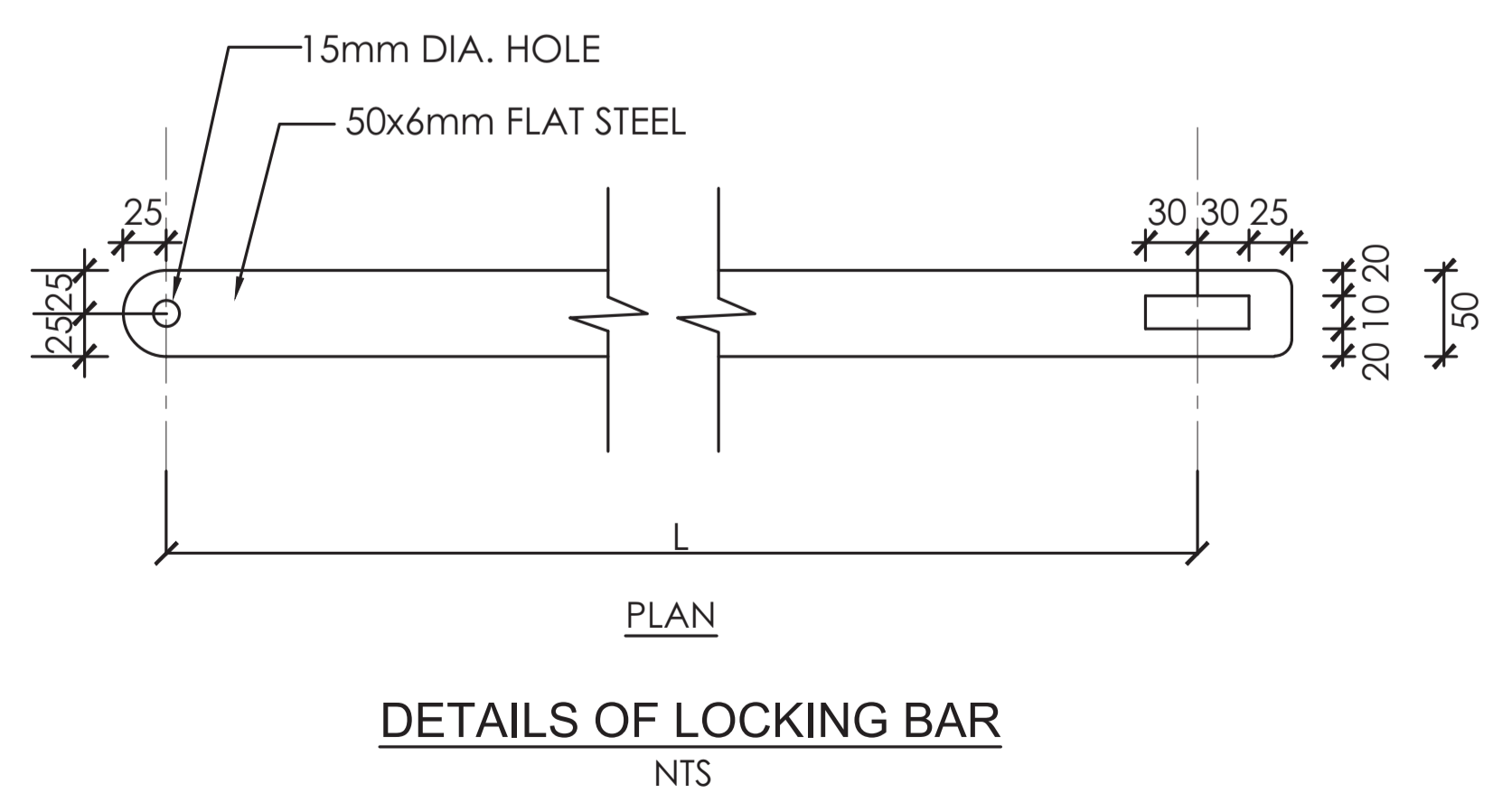
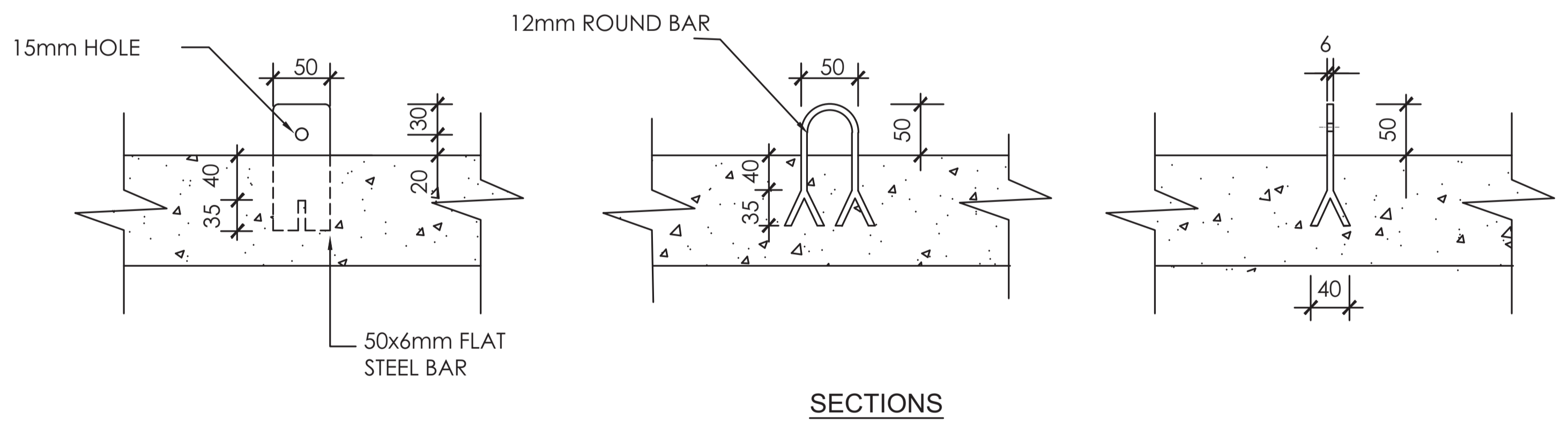
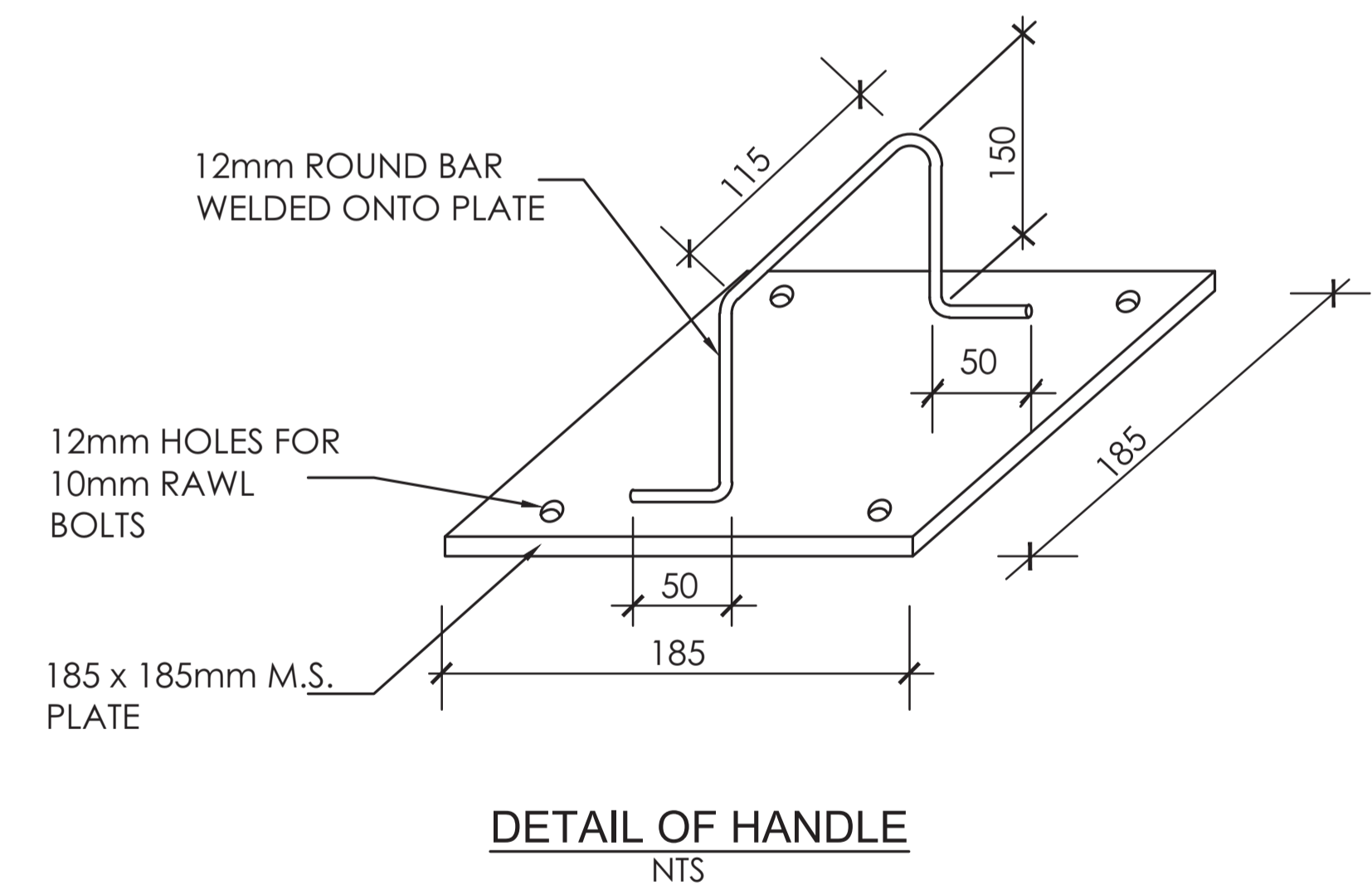
DRAWING TITLE:  
**STANDARD DETAILS**  
**DETAILS OF VALVE CHAMBERS**

Designed by: N.M      Drawn by: I.M.W  
Checked by: P.M.M      Approved by: K.M  
Scale: 1:500      Date: FEBRUARY 2024  
DRAWING No: **M/W/SD/02**      REV. 0





DETAIL OF PRECAST CONCRETE COVER SLAB



COVER SIZE SCHEDULE

CHAMBER INTERNAL DIMENSIONS (mm)	SIZE OF COVER A (mm) x B(mm)
1200 X 1200	1300 X 1300
1200 X 1200	1300 X 1300
1400 X 1200	1500 X 1500
1500 X 1200	1600 X 1300
1500 X 1200	1600 X 1300
1800 X 1200	1900 X 1300
1800 X 1200	1900 X 1300
1400 X 1400	1500 X 1500
1400 X 1200	1500 X 1300


**NOTES**

1. DIMENSIONS ARE SHOWN IN MILLIMETRES UNLESS OTHERWISE STATED

**ABBREVIATIONS**

- P.C.C. - PRECAST CONCRETE
- mm - MILLIMETRES
- O.D. - OUTSIDE DIAMETER
- M.S. - MILD STEEL
- DIA. - DIAMETER
- NO. - NUMBER
- R.C. - REINFORCED CONCRETE
- c/c - CENTRE TO CENTRE

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:  

 NORTHERN WATER WORKS DEVELOPMENT AGENCY  
 P.O. BOX 495-70100  
 GARISSA

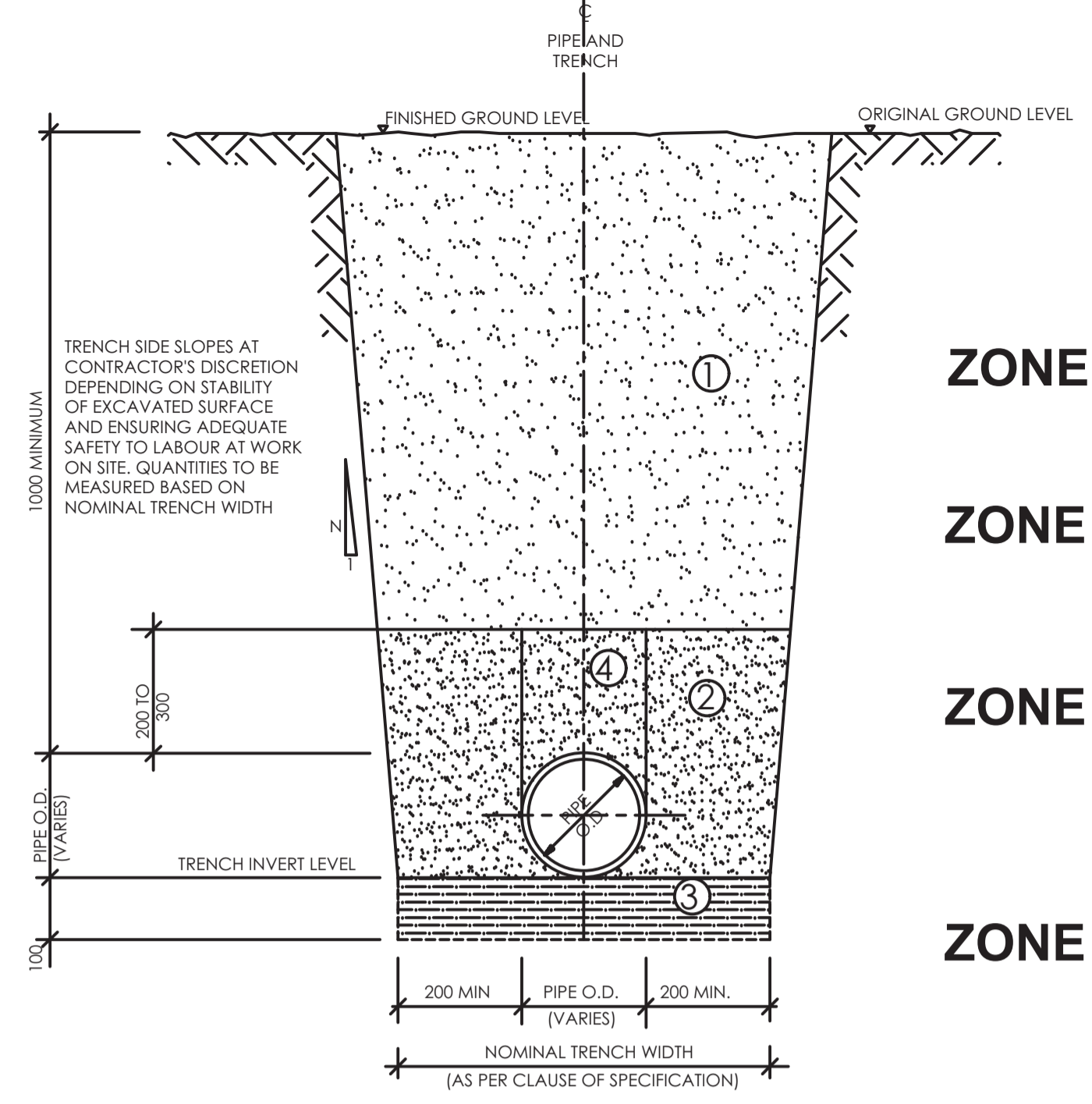
REVIEWED BY:  

 Interconsult Engineers Ltd  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**STANDARD DETAILS**

**DETAILS OF PRECAST CONCRETE COVERS FOR VALVE CHAMBERS**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: 1:500	Date: FEBRUARY 2024
DRAWING NO: <b>M/W/S/SD/03</b>	REV. 0



**NOTES**

- ZONE ①
- ZONE ②
- ZONE ③
- ZONE ④

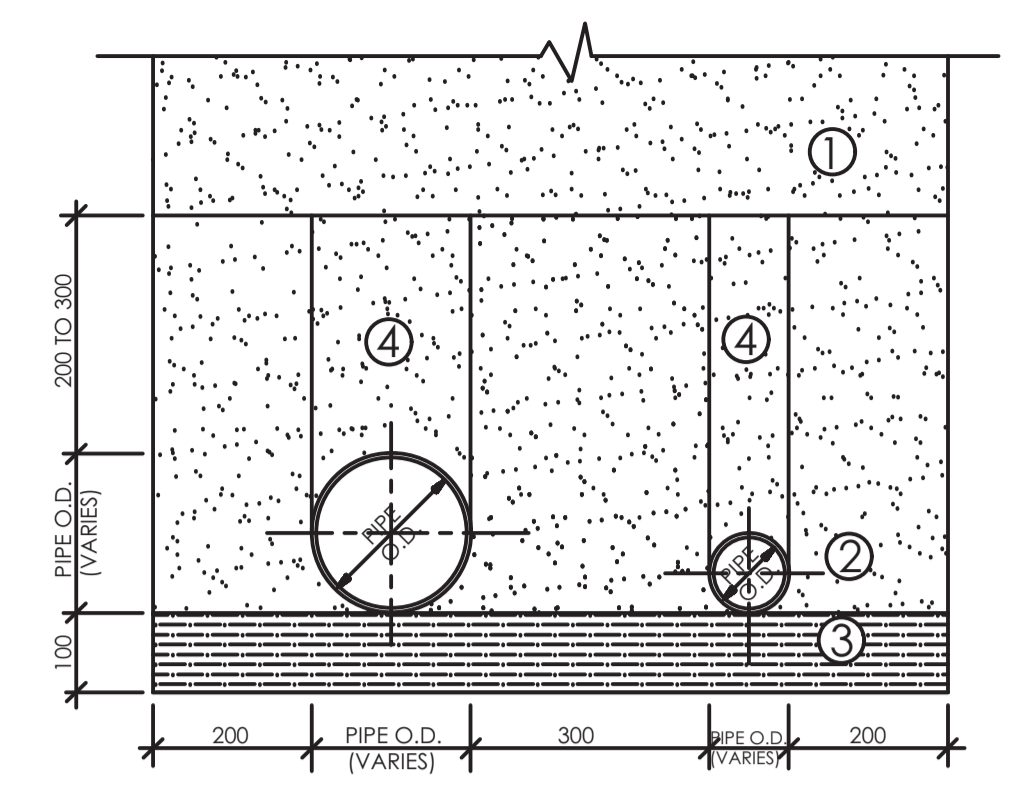
SOIL TO BE USED MAY INCLUDE FREE-DRAINING COARSE SAND, GRAVEL, LOAM AND SOIL OF A FRIABLE NATURE. PARTICAL SIZE NOT TO EXCEED 20mm.  
 BACKFILL IN LAYERS NOT EXCEEDING 300mm UPTO FINISHED GROUND LEVEL, EACH LAYER BEING WELL COMPACTED TO LIMIT VOIDS. MECHANICAL COMPACTION EQUIPMENT MAY BE USED IF APPROVED BY ENGINEER.

BACKFILL WITH SOIL APPROVED BY THE ENGINEER, IN LAYERS NOT EXCEEDING 200mm.  
 THOROUGHLY COMPACT SOIL, TAMPING EQUALLY ON EITHER SIDE AND ALONG LOWER EDGE OF PIPE.  
 ONLY HAND TAMPING TO BE USED

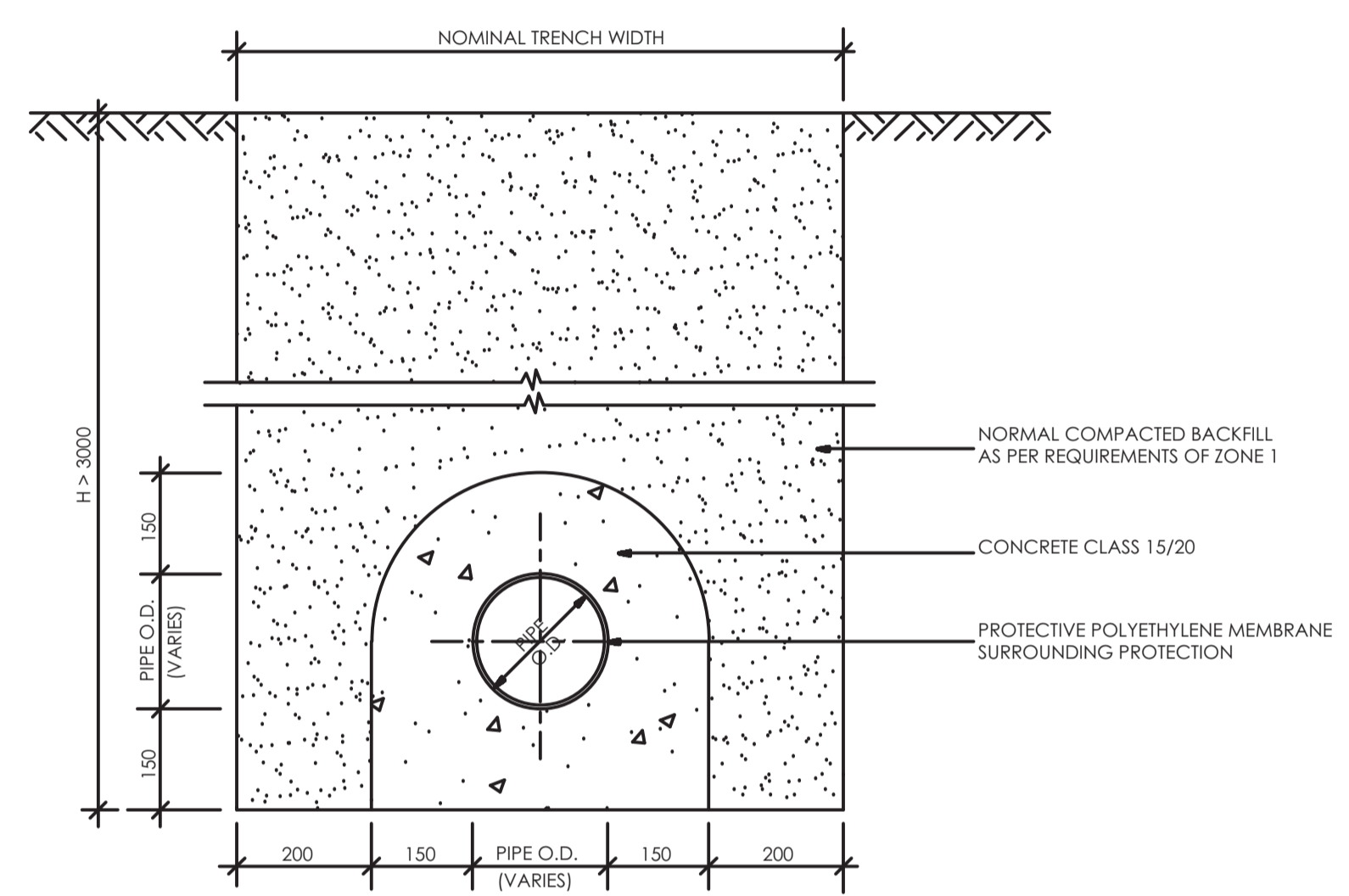
IF ROCK SHARP PROJECTIONS, TREE ROOTS OR OTHER UNSUITABLE MATERIAL IS ENCOUNTERED AT TRENCH INVERT LEVEL, A FURTHER 100mm DEPTH OF MATERIAL IS TO BE EXCAVATED.  
 BACKFILL WITH SOIL APPROVED BY THE ENGINEER UPTO TRENCH INVERT LEVEL.  
 THOROUGHLY COMPACT SOIL BY HAND TO GIVE A UNIFORM GRADIENT ALONG PIPE TRENCH, LEAVING RECESSES FOR PIPE JOINTS.

SIMILAR REQUIREMENTS TO ZONE 2 EXCEPT NO EXCESS TAMPING IS PERMITTED OVER PIPE.

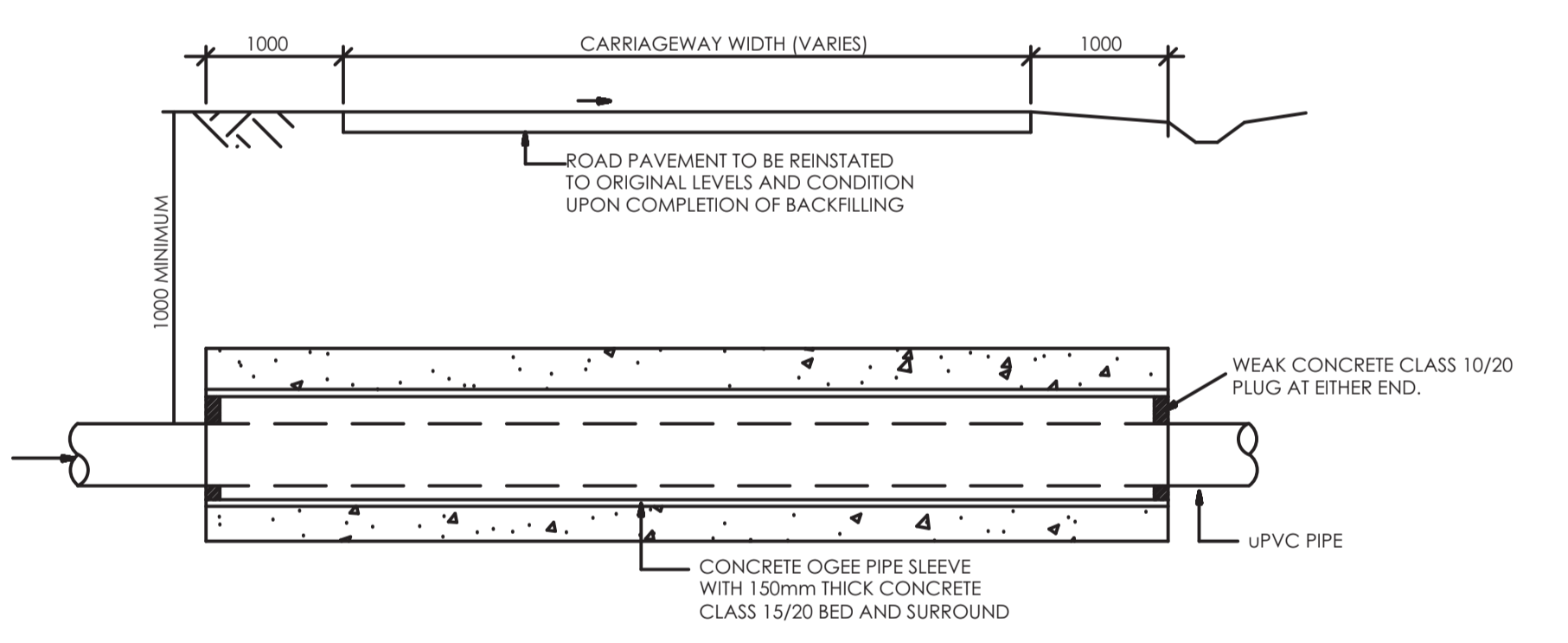
**TYPICAL TRENCH DETAIL FOR RETICULATION PIPES (uPVC OR C/L FERROUS PIPES)**  
 SCALE 1:100



**TWIN PIPES IN SINGLE TRENCH**  
 SCALE 1:20



**CONCRETE PROTECTION TO uPVC PIPES LAID AT DEPTHS GREATER THAN 3.0m**  
 SCALE 1:20



**TYPICAL ROAD PIPE CROSSING DETAIL FOR uPVC PIPES**  
 SCALE A1- 1:100

**PIPE DIAMETER SCHEDULES**

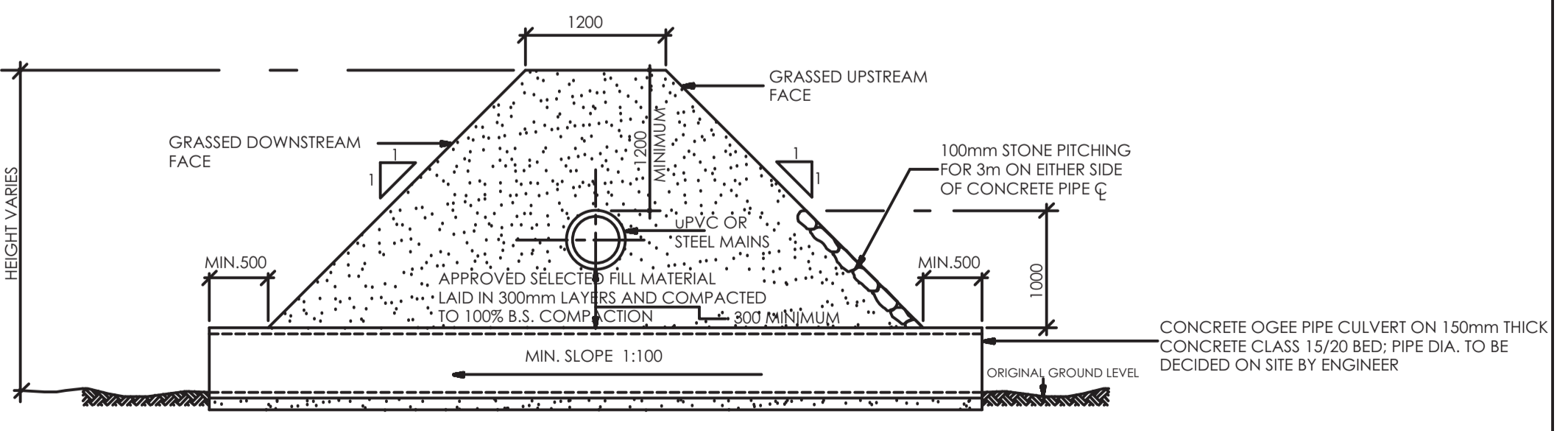
uPVC WATER PRESSURE PIPES TO KS. 06-149: PART 2, 2000			WALL THICKNESS (mm)							
NOMINAL OUTSIDE DIAMETER (mm)	CORRESPONDING OUTSIDE DIAMETER AS PER KS. 06-149: PART 2, 2000 (mm)		PN = 6 BAR		PN = 10 BAR		PN = 12.5 BAR		PN = 16 BAR	
	MIN.	MAX.	CLASS 'B'	CLASS 'C'	CLASS 'D'	CLASS 'E'	MIN.	MAX.	MIN.	MAX.
63	63	63.3	1.70	2.1	2.70	3.2	3.40	3.9	4.30	4.9
75	75	75.3	2.00	2.4	3.30	3.8	4.00	4.6	5.10	5.8
90	90	90.3	2.40	2.8	3.90	4.5	4.80	5.5	6.10	6.9
110	110	110.4	2.90	3.4	4.80	5.5	5.90	6.7	7.50	8.5
125	125	125.4	3.30	3.8	5.40	6.1	6.70	7.6	8.50	9.6
140	140	140.4	3.70	4.3	6.00	6.8	7.50	8.5	9.50	10.7
160	160	160.5	4.20	4.8	7.00	7.9	8.60	9.7	10.80	12.1
200	200	200.6	4.80	5.5	7.80	8.8	9.70	10.9	12.20	13.6
225	225	225.7	5.40	6.1	8.80	9.9	10.90	12.2	13.70	15.3
250	250	250.8	6.00	6.8	9.80	11.0	12.10	13.5	15.30	17.0
280	280	280.9	6.70	7.6	10.90	12.2	13.50	15.1	17.10	19.0
315	315	316.0	7.50	8.5	12.30	13.7	15.20	16.9	19.20	21.3

EPOXY COATED PIPES TO TO B.S. 534:1981	
NOMINAL INTERNAL DIAMETER (mm)	CORRESPONDING OUTSIDE PIPE DIAMETER AS PER B.S. 534: 1981 (mm)
50	60.3
65	76.1
80	88.9
100	114.3
125	139.7
150	168.3
175	193.7
200	219.1
225	244.5
250	273.0
300	323.9
350	355.6
400	406.4
450	457.0
500	508.0
550	559.0
600	610.0

HDPE PIPES - SDR 11	
EXTERNAL DIAMETER (mm)	INTERNAL DIAMETER (mm)
90	73.64
110	90
125	102.27
140	114.54
160	130.90
180	147.27
200	163.63
225	184.09
250	204.54
280	229.09
315	257.72
355	290.45
400	327.27
450	368.18

uPVC PIPE PRESSURE CLASSES			
CLASS 'B'	CLASS 'C'	CLASS 'D'	CLASS 'E'
6 BAR	10 BAR	12.5 BAR	16 BAR
60m HEAD OF WATER	90m HEAD OF WATER	120m HEAD OF WATER	150m HEAD OF WATER

PN = NOMINAL PRESSURE



**TYPICAL DETAIL OF PIPE CROSSING SEASONAL STREAM / DRAINAGE DITCH**  
 SCALE 1:100

**NOTE**  
 ALL DIMENSIONS SHOWN ABOVE ARE BASED ON THE CURRENT RELEVANT KENYAN OR BRITISH STANDARDS AND ARE FOR THE TENDERER'S INFORMATION. TENDERER'S ARE FREE TO QUOTE FOR PIPES TO ANY OTHER APPROVED EQUIVALENT SRN NUMBER. THE TENDERER'S ATTENTION IS ALSO DRAWN TO CLAUSE 36 OF PREAMBLE TO THE BILL OF QUANTITIES, REGARDING ALTERNATIVE PIPE AND JOINTING TYPES.

**NOTES**  
 1. DIMENSIONS ARE SHOWN IN MILLIMETRES UNLESS OTHERWISE STATED

**ABBREVIATIONS**  
 P.C.C. - PRECAST CONCRETE  
 mm - MILLIMETRES  
 O.D. - OUTSIDE DIAMETER  
 M.S. - MILD STEEL  
 DIA. - DIAMETER  
 NO. - NUMBER  
 R.C. - REINFORCED CONCRETE  
 c/c - CENTRE TO CENTRE

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:  

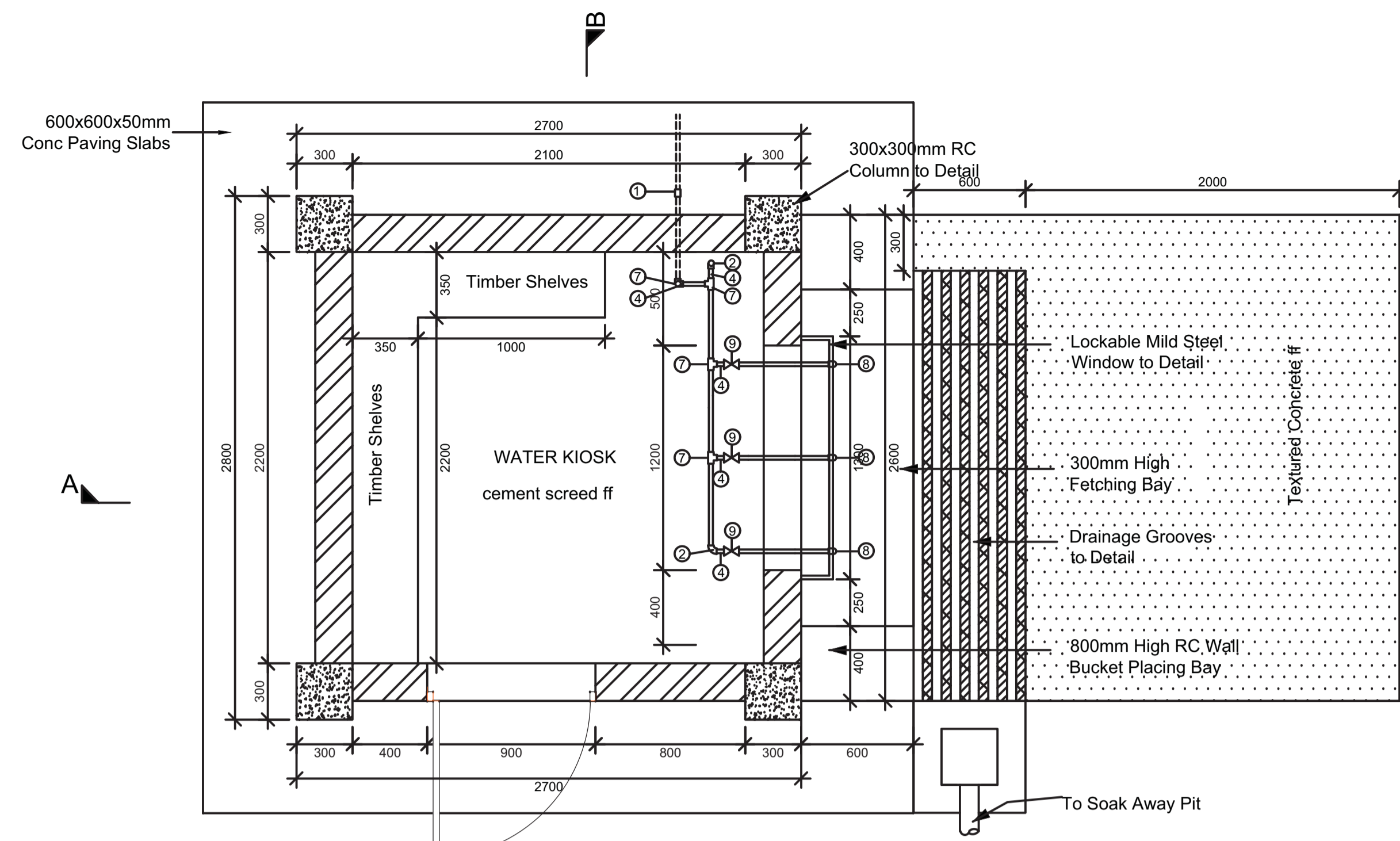
**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:  

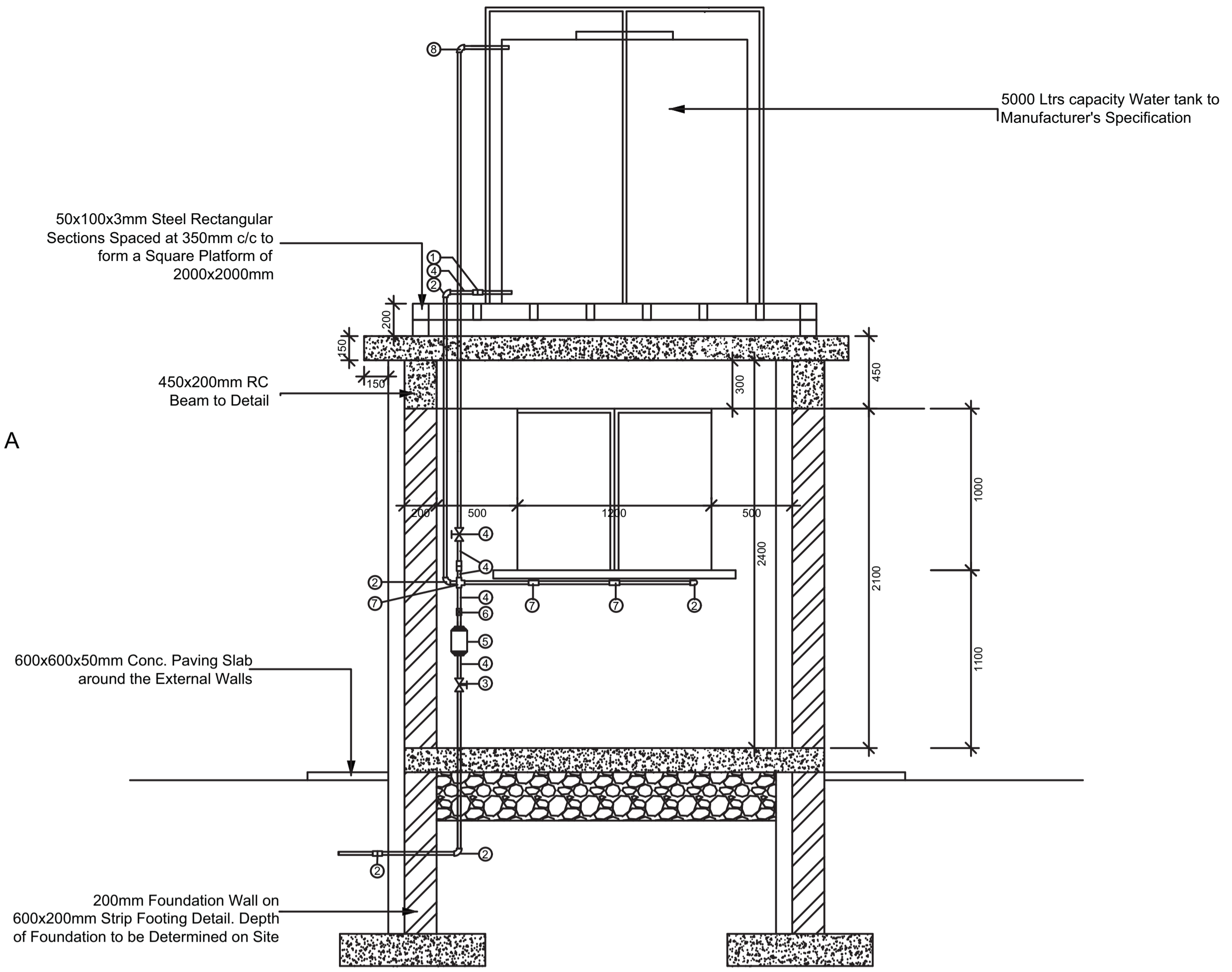
**Interoconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**STANDARD DRAWINGS**  
**DETAILS OF TRENCH AND PIPE CROSSINGS FOR WATER PIPES**

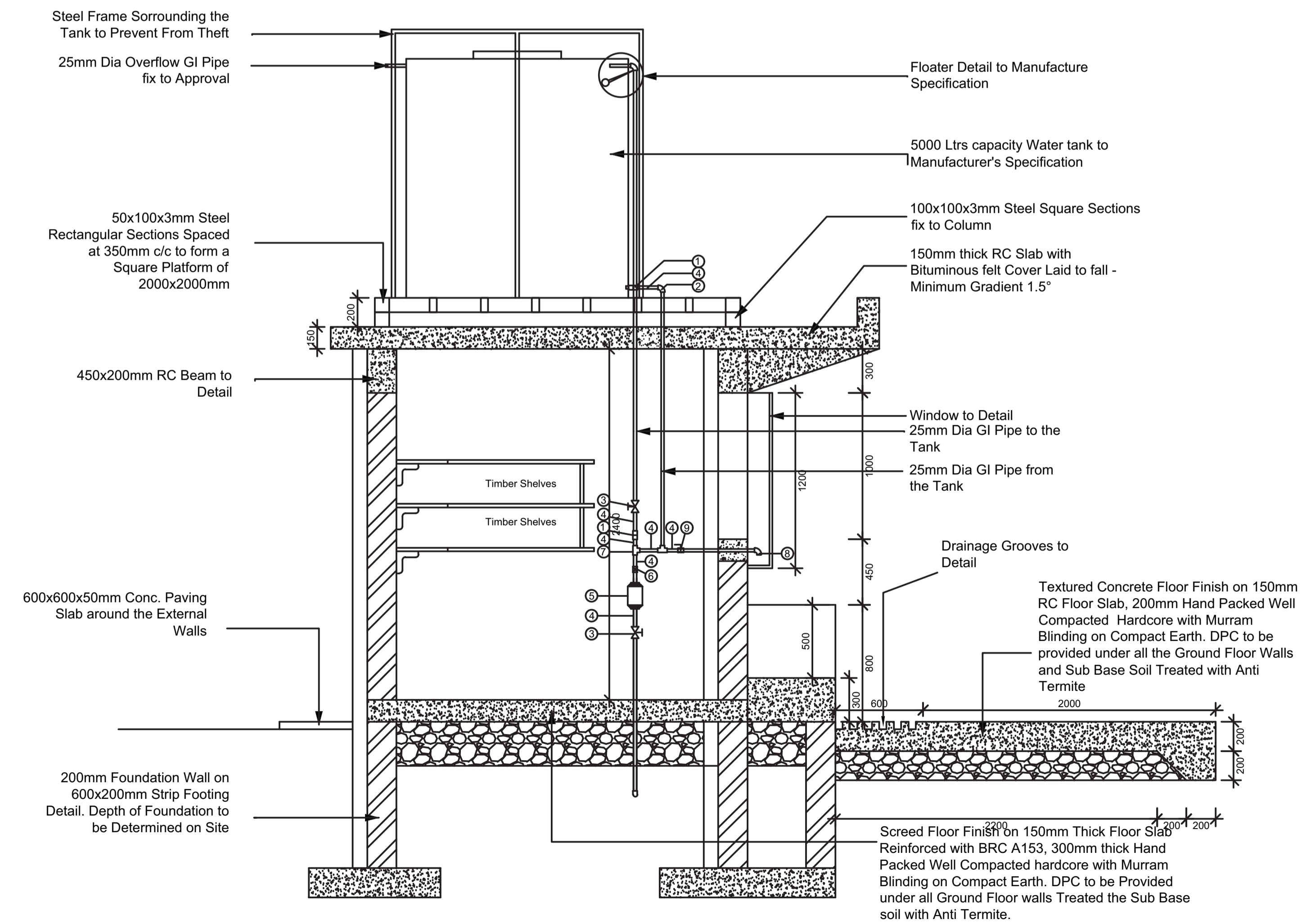
Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: 1:500	Date: FEBRUARY 2024
DRAWING No: M/W/SD/04	REV. 0



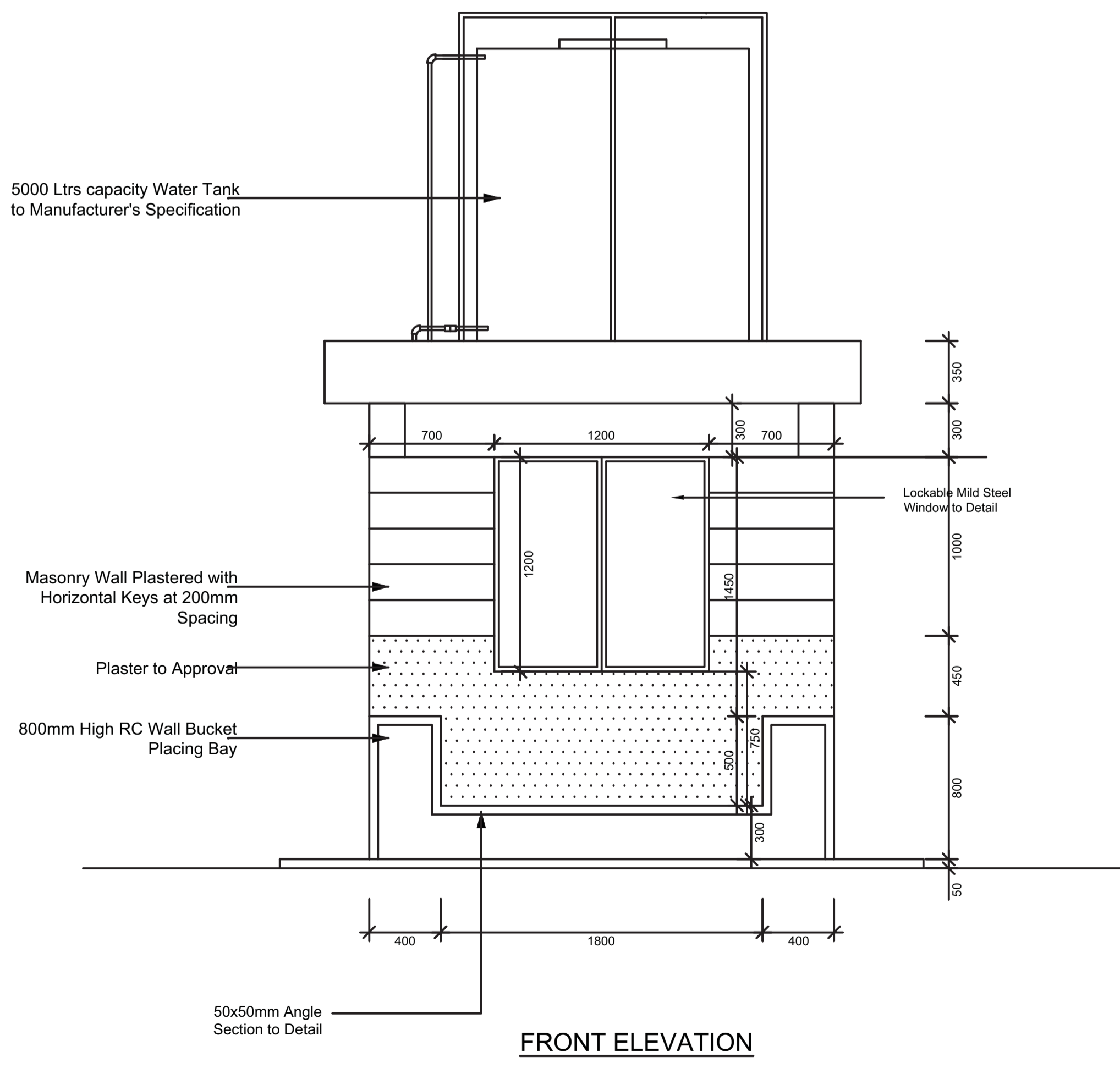
FLOOR PLAN



SECTION B-B



SECTION A-A




FRONT ELEVATION


NOTES

- OTHERWISE STATED
- ABBREVIATIONS**
- G.C.I. = GALVANISED CORRUGATED IRON
  - mm = MILIMETRES
  - Dia. = DIAMETER
  - MIN. = MINIMUM
  - No. = NUMBER
  - G.L. = GROUND LEVEL
  - G.I. = GALVANISED IRON
  - Y10 = REINFORCEMENT BAR 10mm DIAMETER
  - P.C.C. = PRECAST CEMENT CONCRETE
  - T&G = TONGUE AND GROOVE
  - G.S. = GALVANISED STEEL
  - C.I. = CAST IRON
  - ALT. = ALTERNATIVE
  - GV = GATE VALVE

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:

 **NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
P.O. BOX 495-70100  
GARISSA

REVIEWED BY:  **Interconsult Engineers Ltd**  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane,  
Tel. 4441648/4441651  
Nairobi.

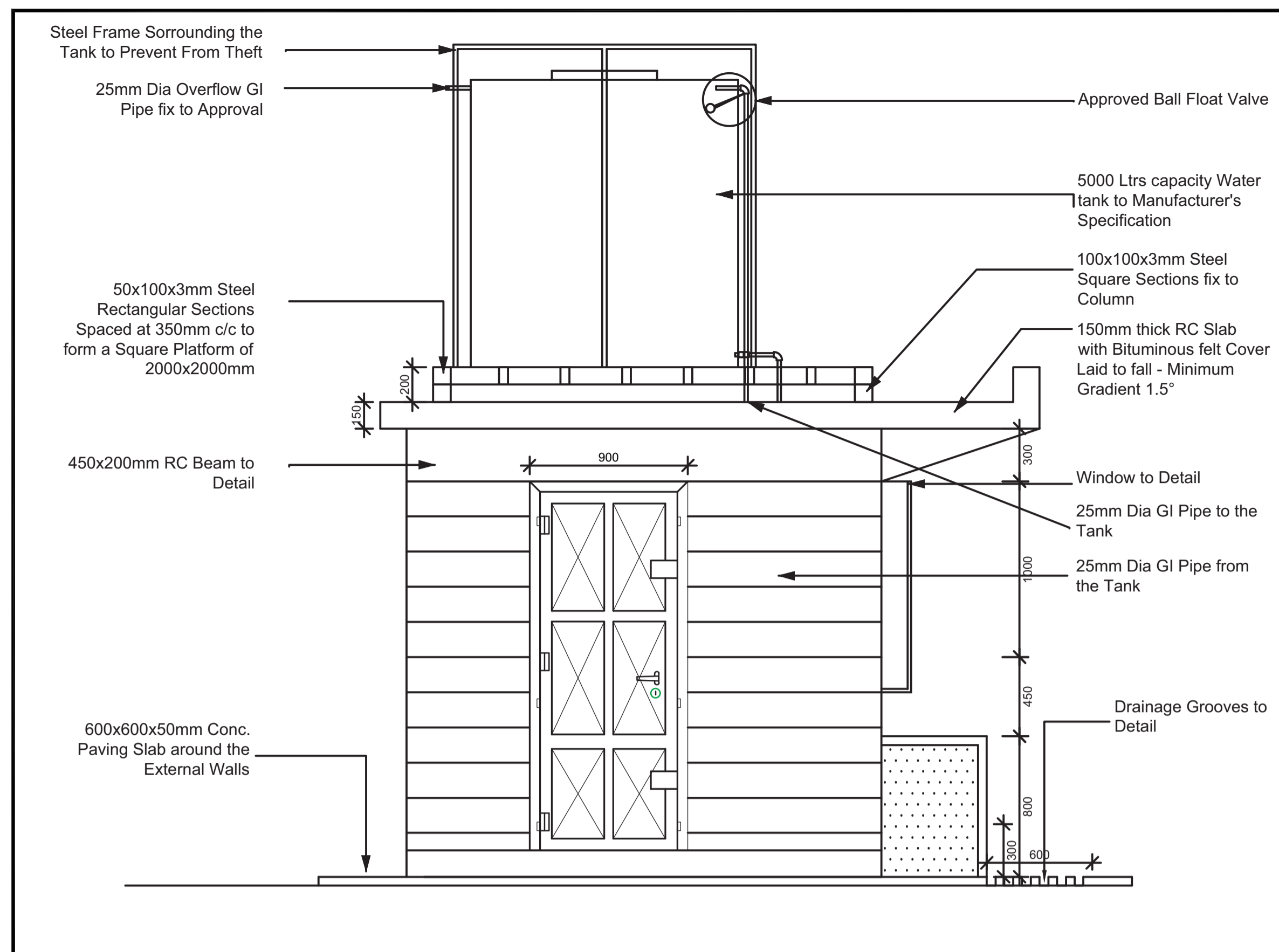
DRAWING TITLE:

**STANDARD DRAWINGS**

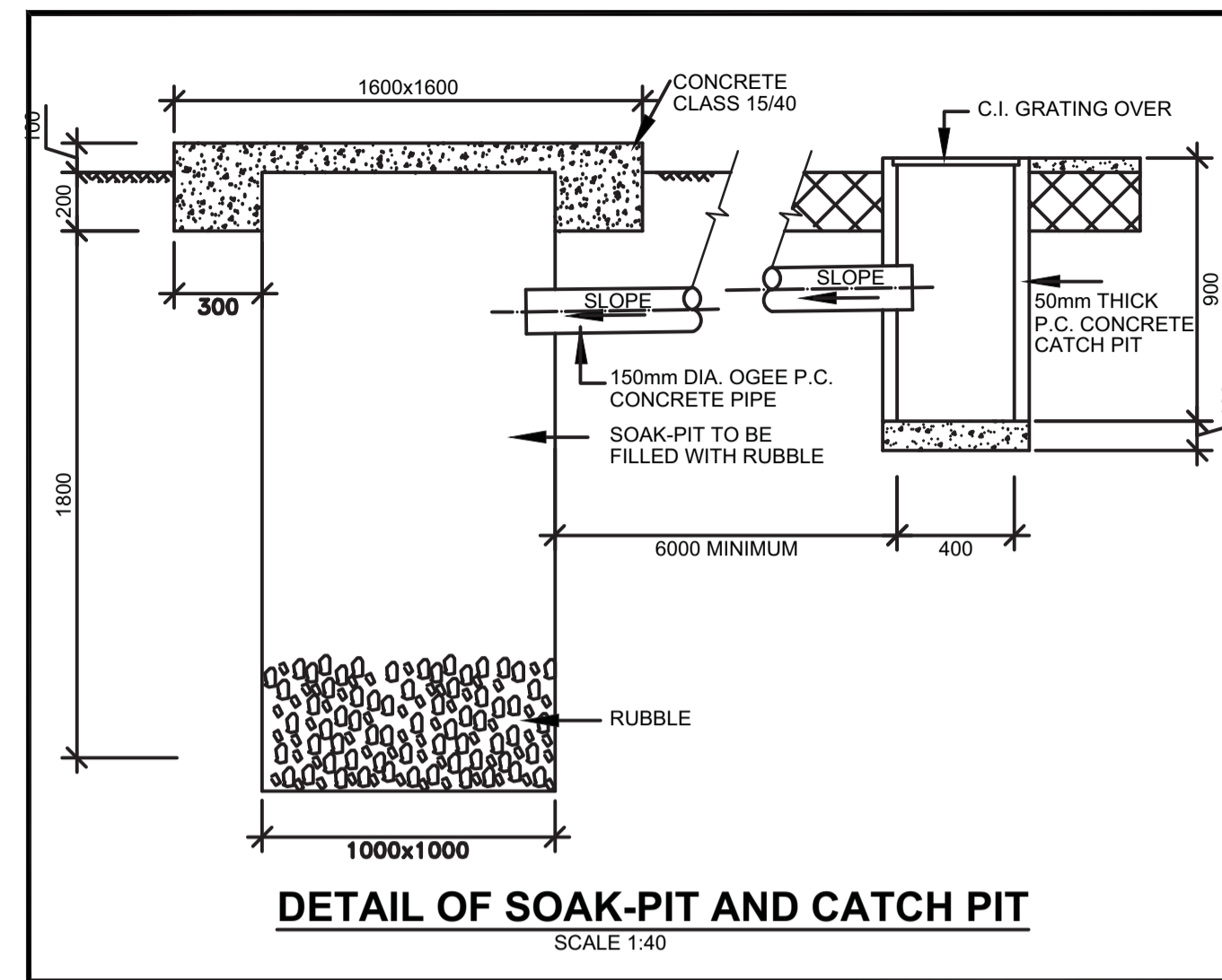
TYPICAL WATER KIOSK DETAILS

SHEET 1 OF 3

Designed by: N.M      Drawn by: I.M.W  
 Checked by: P.M.M      Approved by: K.M  
 Scale: 1:500      Date: FEBRUARY 2024  
 DRAWING NO: M/W/SD/05      REV. 0



**SIDE ELEVATION**



**SCHEDULE OF FITTINGS**

ITEM Nr	DESCRIPTION	UNIT	QUANTITY
1	25mm Dia GI Union	Nr	3
2	25mm Dia GI Elbow	Nr	3
3	25mm Dia Gate Valve (PEGLER)	Nr	2
4	25mm Dia GI Nipple	Nr	11
5	25mm Dia GI Water Meter (KENT)	Nr	1
6	25mm Dia Non Return Valve	Nr	1
7	25mm Dia GI Tee	Nr	5
8	25mm Dia GI Bend	Nr	4
9	25mm Dia Ball Cock Water Taps	Nr	3
10	25mm Dia GI Long Thraaded Nipple	Nr	2
11	25mm Dia GI Black Nut	Nr	4
12	25mm Dia GI Class B Pipe	Nr	4
13	Boss White 400g	Nr	3
14	Temp Thread	LM	2

**NOTES**

OTHERWISE STATED

**ABBREVIATIONS**

G.C.I. = GALVANISED CORRUGATED IRON

mm = MILIMETRES

Dia. = DIAMETER

MIN. = MINIMUM

No. = NUMBER

G.L. = GROUND LEVEL

G.I. = GALVANISED IRON

Y10 = REINFORCEMENT BAR 10mm DIAMETER

P.C.C. = PRECAST CEMENT CONCRETE

T&G = TONGUE AND GROOVE

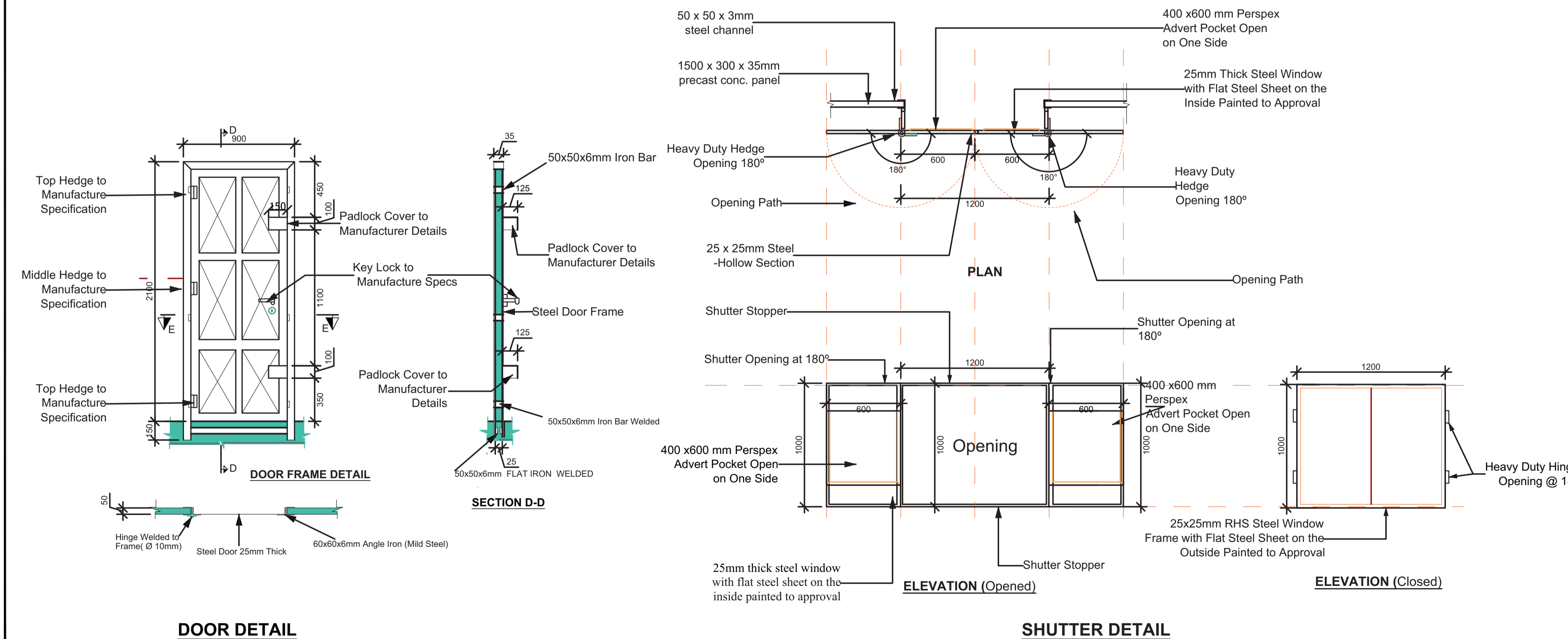
G.S. = GALVANISED STEEL

C.I. = CAST IRON

ALT. = ALTERNATIVE


GV = GATE VALVE

**DOOR AND SHUTTER DETAIL**



REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:

 NORTHERN WATER WORKS DEVELOPMENT AGENCY  
P.O. BOX 495-70100  
GARISSA

REVIEWED BY:

 Interconsult Engineers Ltd  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane,  
Tel. 4441648/4441651  
Nairobi.

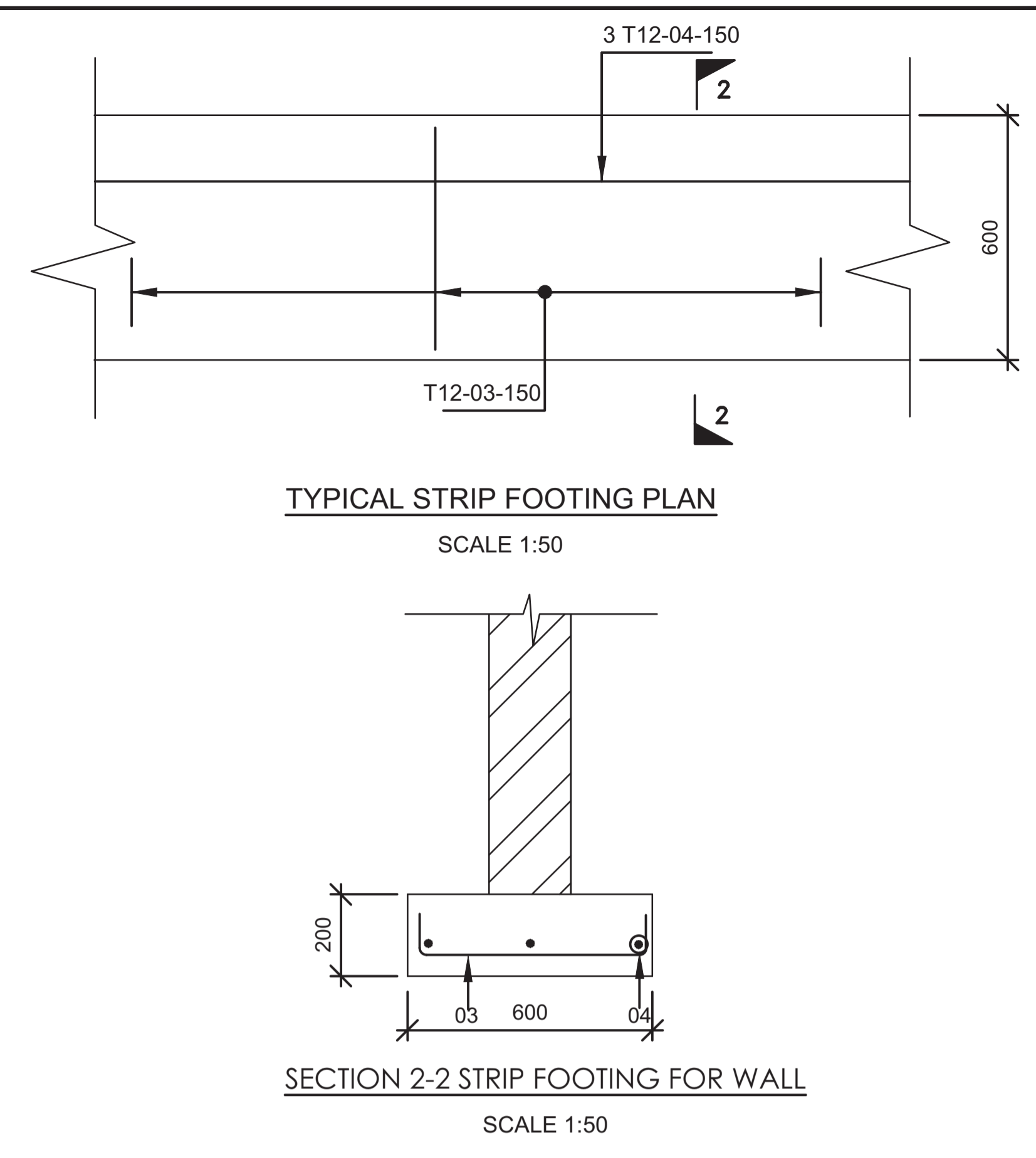
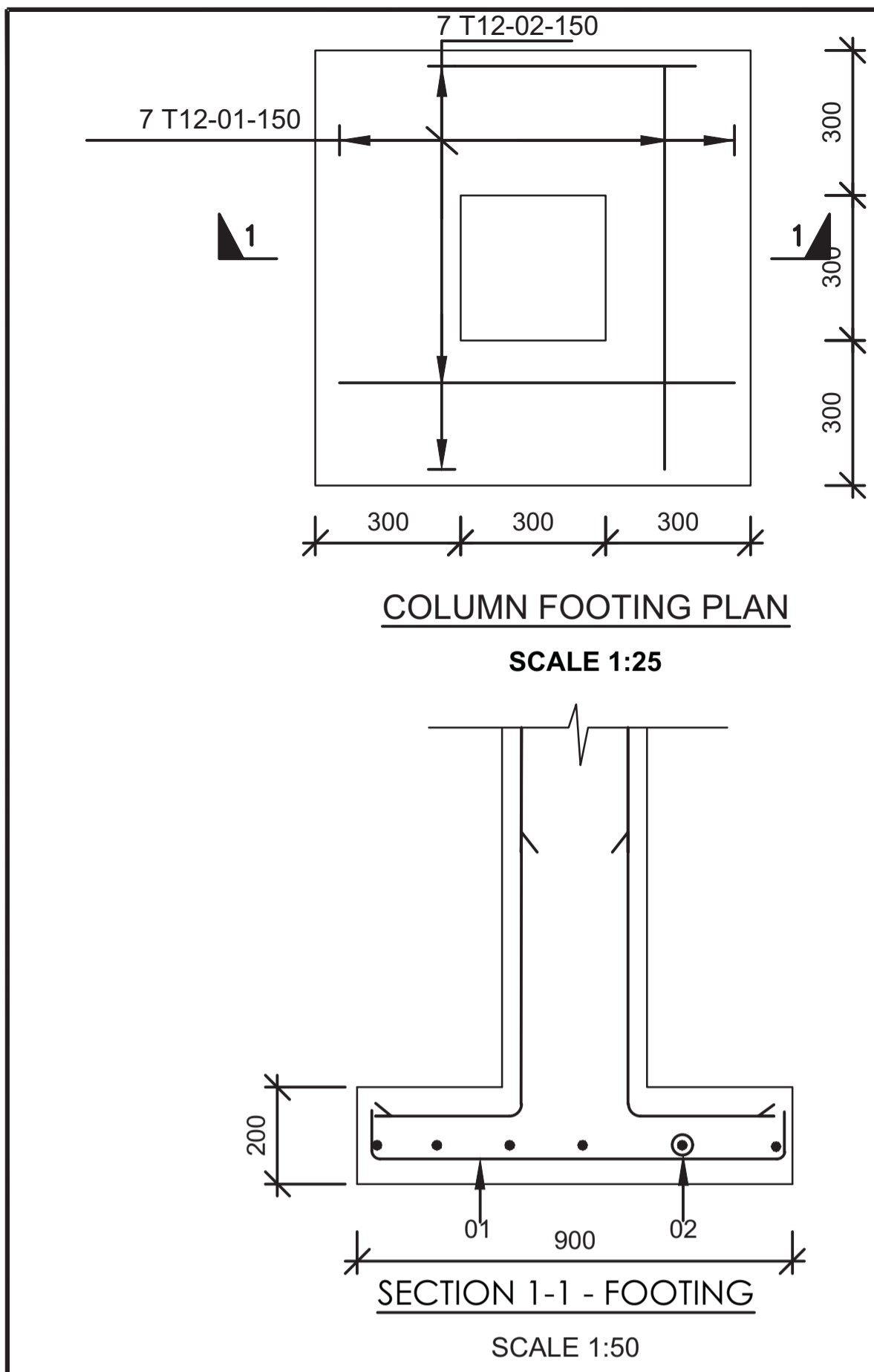
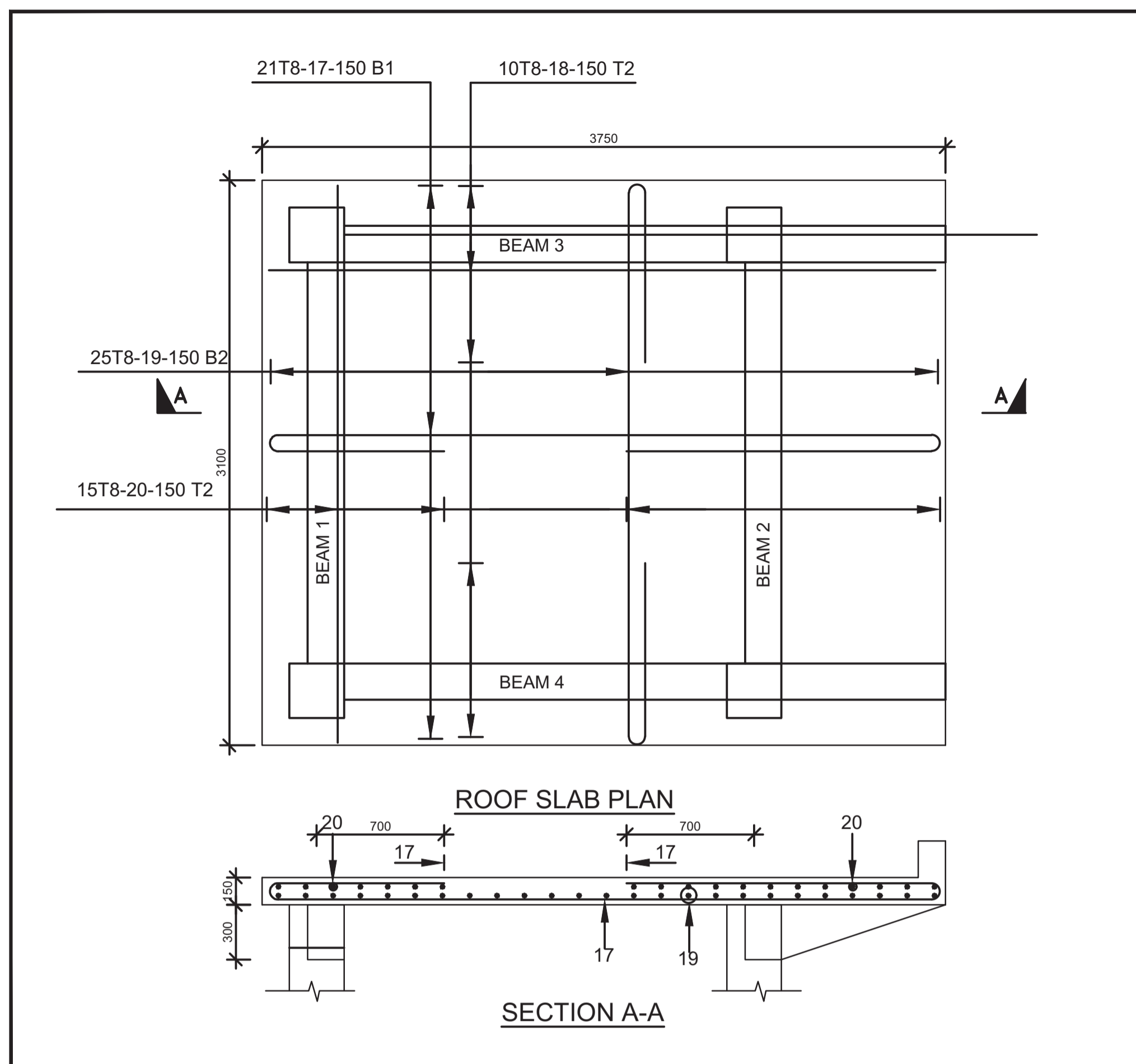
DRAWING TITLE:

**STANDARD DRAWINGS**

TYPICAL WATER KIOSK DETAILS

SHEET 2 OF 3

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: 1:500	Date: FEBRUARY 2024
DRAWING NO. M/W/S/SD/06	REV. 0

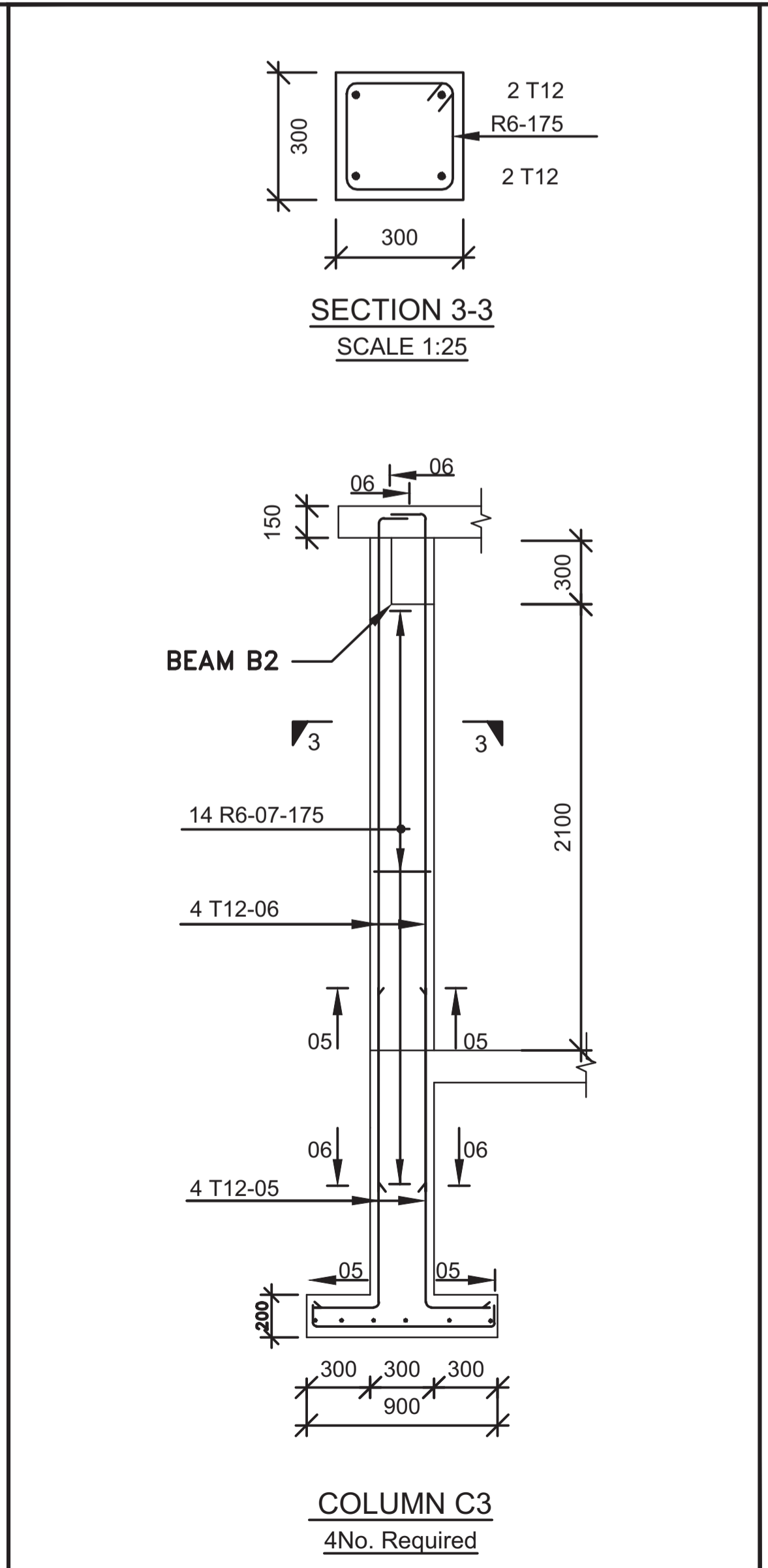
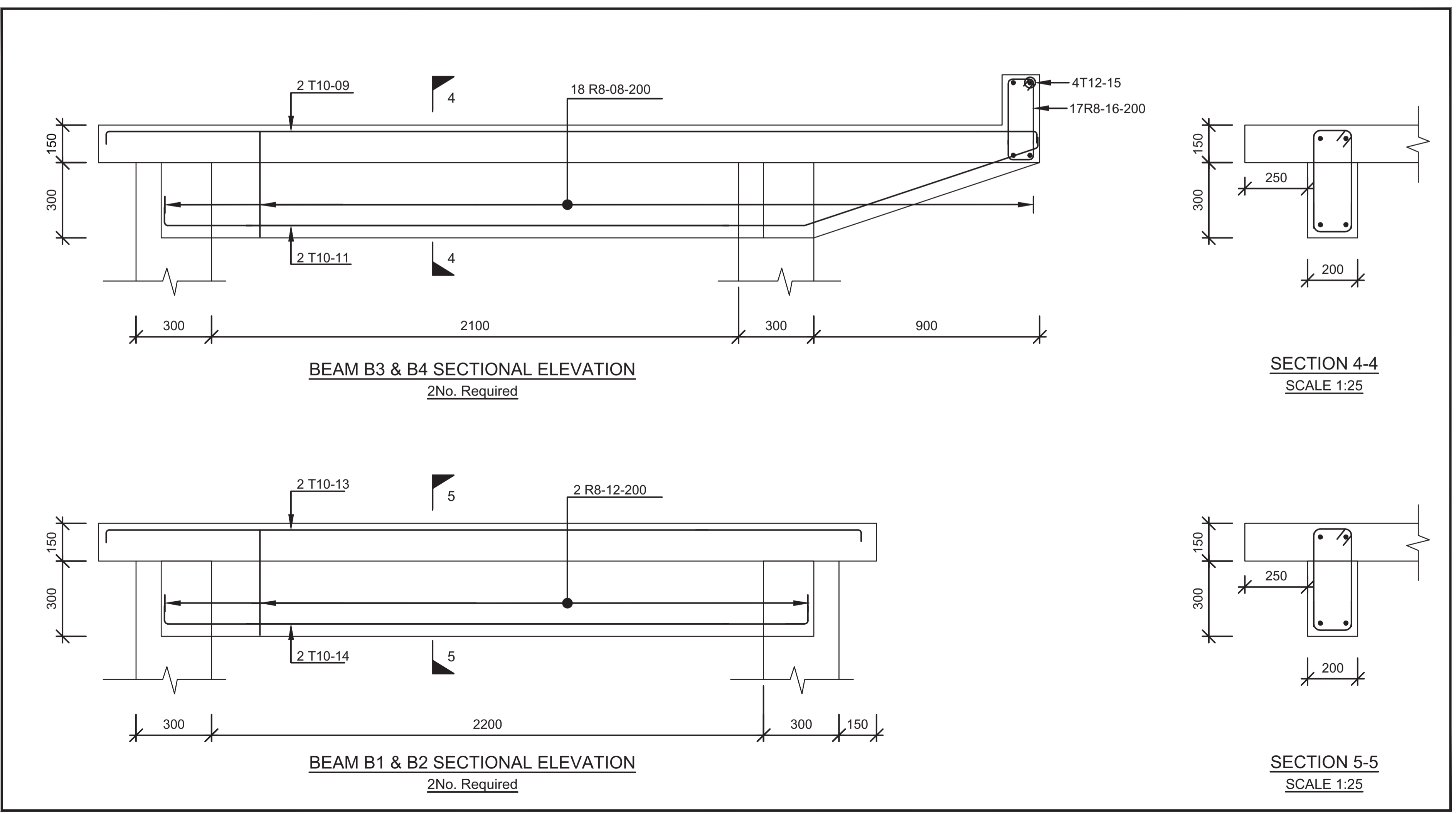


**NOTES**

OTHERWISE STATED

**ABBREVIATIONS**

G.C.I. = GALVANISED CORRUGATED IRON  
 mm = MILLIMETRES  
 Dia. = DIAMETER  
 MIN. = MINIMUM  
 No. = NUMBER  
 G.L. = GROUND LEVEL  
 G.I. = GALVANISED IRON  
 Y10 = REINFORCEMENT BAR 10mm DIAMETER  
 P.C.C. = PRECAST CEMENT CONCRETE  
 T&G = TONGUE AND GROOVE  
 G.S. = GALVANISED STEEL  
 C.I. = CAST IRON  
 ALT. = ALTERNATIVE  
 GV = GATE VALVE



REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:

 NORTHERN WATER WORKS DEVELOPMENT AGENCY  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:

 Interconsult Engineers Ltd  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:

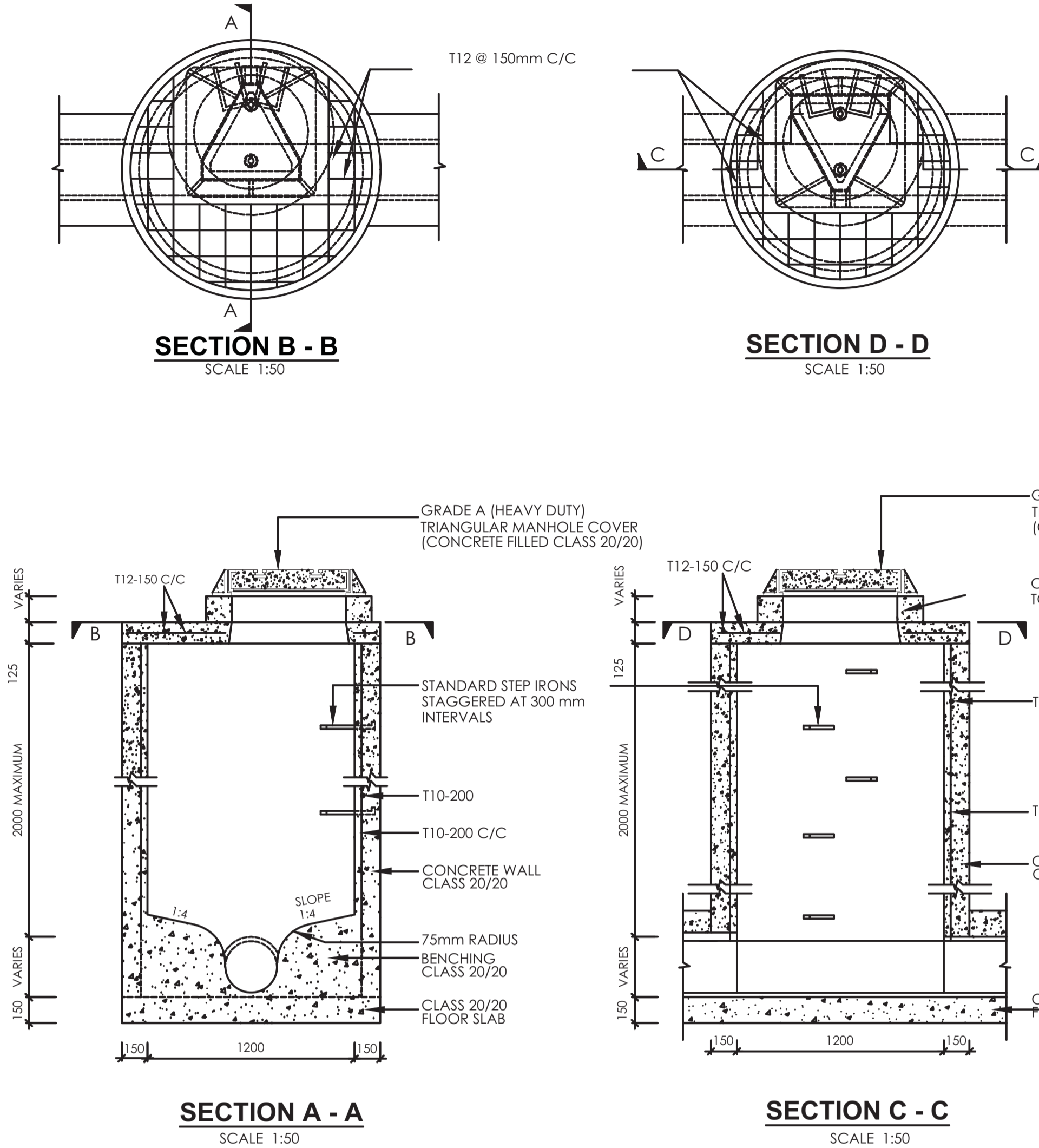
**STANDARD DRAWINGS**

**TYPICAL WATER KIOSK DETAILS**

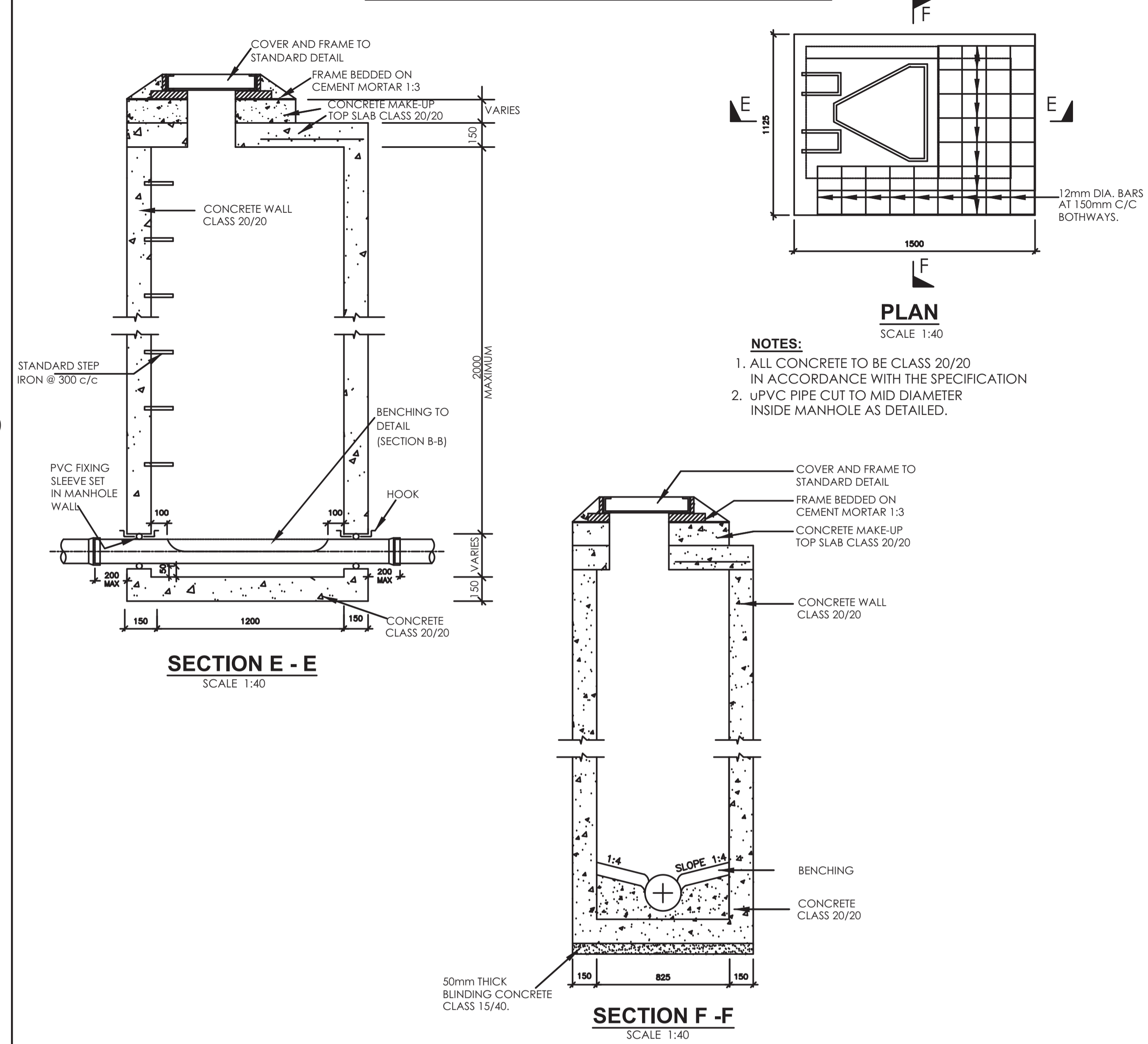
SHEET 3 OF 3

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: 1:500	Date: FEBRUARY 2024
DRAWING No: M/W/SD/07	REV. 0

**REINFORCED CONCRETE CIRCULAR MANHOLE & COVER**  
DEPTH n.e. 2.0m

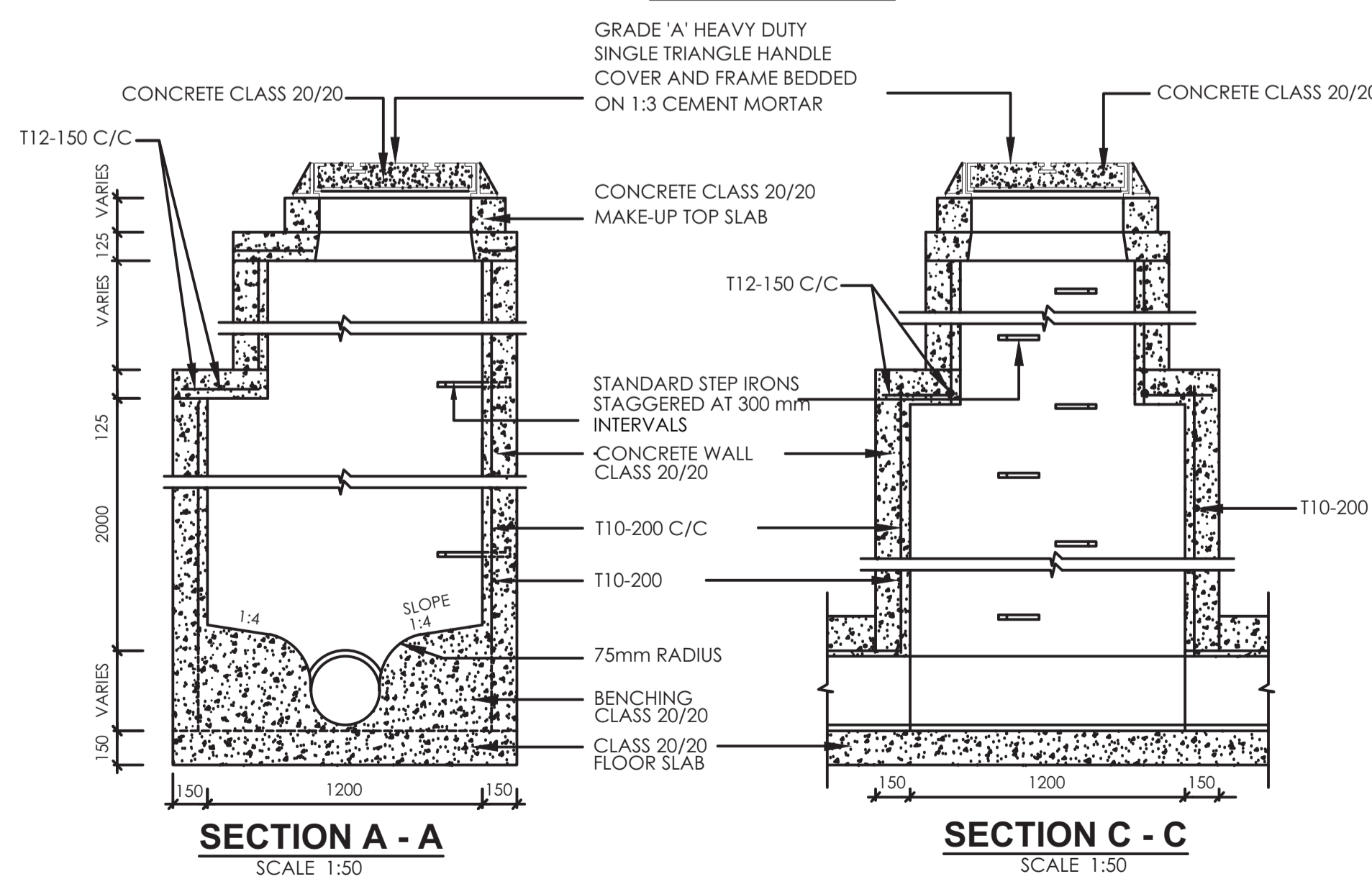


**RECTANGULAR MANHOLE FOR DEPTH < 2M**

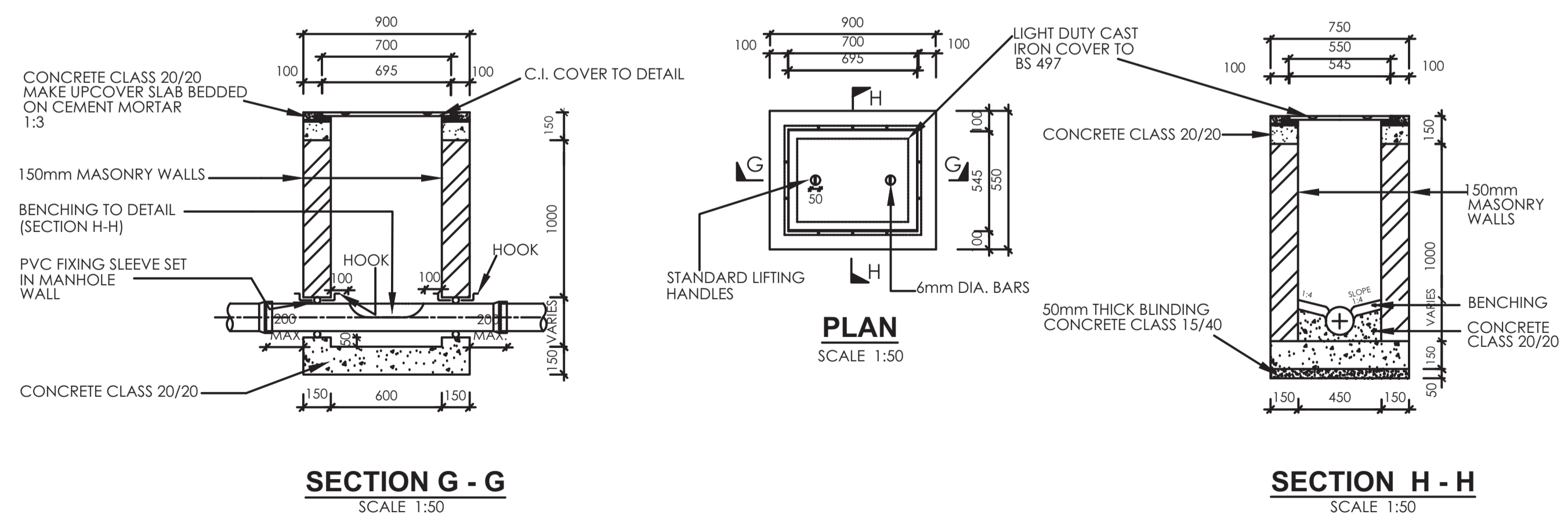


- NOTES:**
1. ALL CONCRETE TO BE CLASS 20/20 IN ACCORDANCE WITH THE SPECIFICATION
  2. uPVC PIPE CUT TO MID DIAMETER INSIDE MANHOLE AS DETAILED.

**REINFORCED CONCRETE MANHOLE & COVER**  
DEPTH > 2.0m



**INSPECTION CHAMBER DETAILS**



- NOTES:**
1. INSPECTION CHAMBER SHOULD BE SIZE 600x450mm UPTO DEPTH OF 1000mm
  2. FOR INSPECTION CHAMBER EXCEEDING DEPTH 1000mm SIZE SHOULD BE 850x1200mm
  3. WALLS OF INSPECTION CHAMBER TO BE OF MASONRY


**NOTES**

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED
2. ALL CONCRETE TO BE CLASS 20/20
3. ALL PRECAST CONCRETE UNITS TO BS 556
4. CONCRETE FILLING CLASS 20/25 VIBRATED AND CURED IN ACCORDANCE WITH THE APPROPRIATE SPECIFICATION CLAUSES.
5. TOLERANCE ON OVERALL SIZE 3mm
6. ALL HAUNCHES ARE CLASS 15/40 CONCRETE AS INDICATED ON THE SPECIFICATION OVER EXCAVATION TO BE MADE GOOD IN CONCRETE CLASS 15/40.

**ABBREVIATIONS**

- 1.n.e. - NOT EXCEEDING
2. c/c - CENTRE TO CENTRE
3. MIN - MINIMUM
4. G.L. - GROUND LEVEL
5. mm - MILLIMETER
6. m - METRE
7. EXT. DIA. - EXTERNAL DIAMETER
8. OD - OUTSIDE DIAMETER
9. ND - NOMINAL DIAMETER
10. RC - REINFORCED CONCRETE
11. T10 - TWISTED BAR 10mm SIZE
12. NTS - NOT TO SCALE
13. CU.M PER LIN. METER - CUBIC METER PER LINEAR METER
14. CI - CAST IRON

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

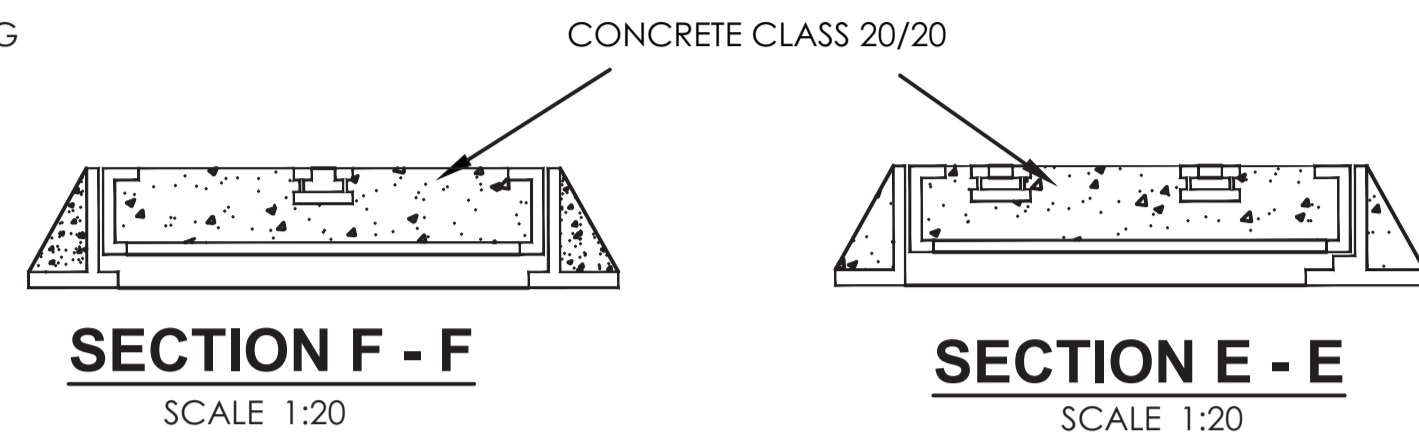
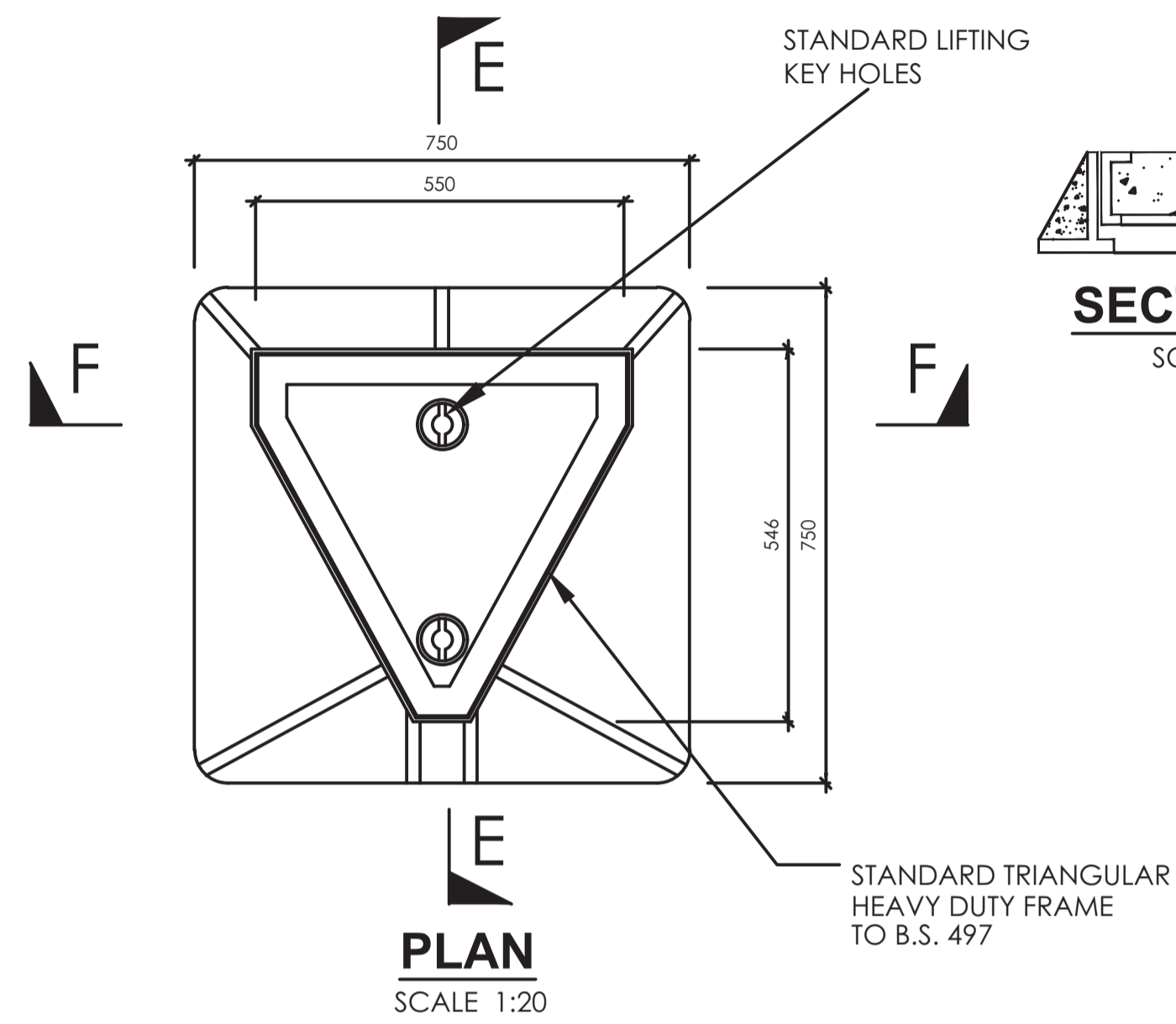
REVIEWED BY:  

**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**STANDARD DRAWINGS**  
**DETAILS OF MANHOLES AND**  
**INSPECTION CHAMBERS**  
**(SHEET 1 OF 2)**

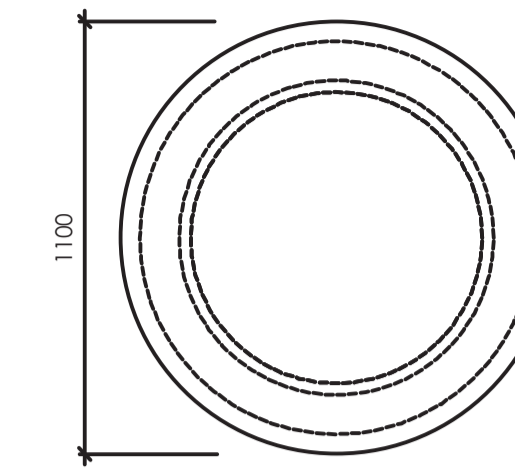
Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: 1:500	Date: FEBRUARY 2024
DRAWING NO: M/W/S/SD/08	REV. 0

**DETAILS OF TRIANGULAR CONCRETE FILLED MANHOLE COVER FOR FOUL SEWER**

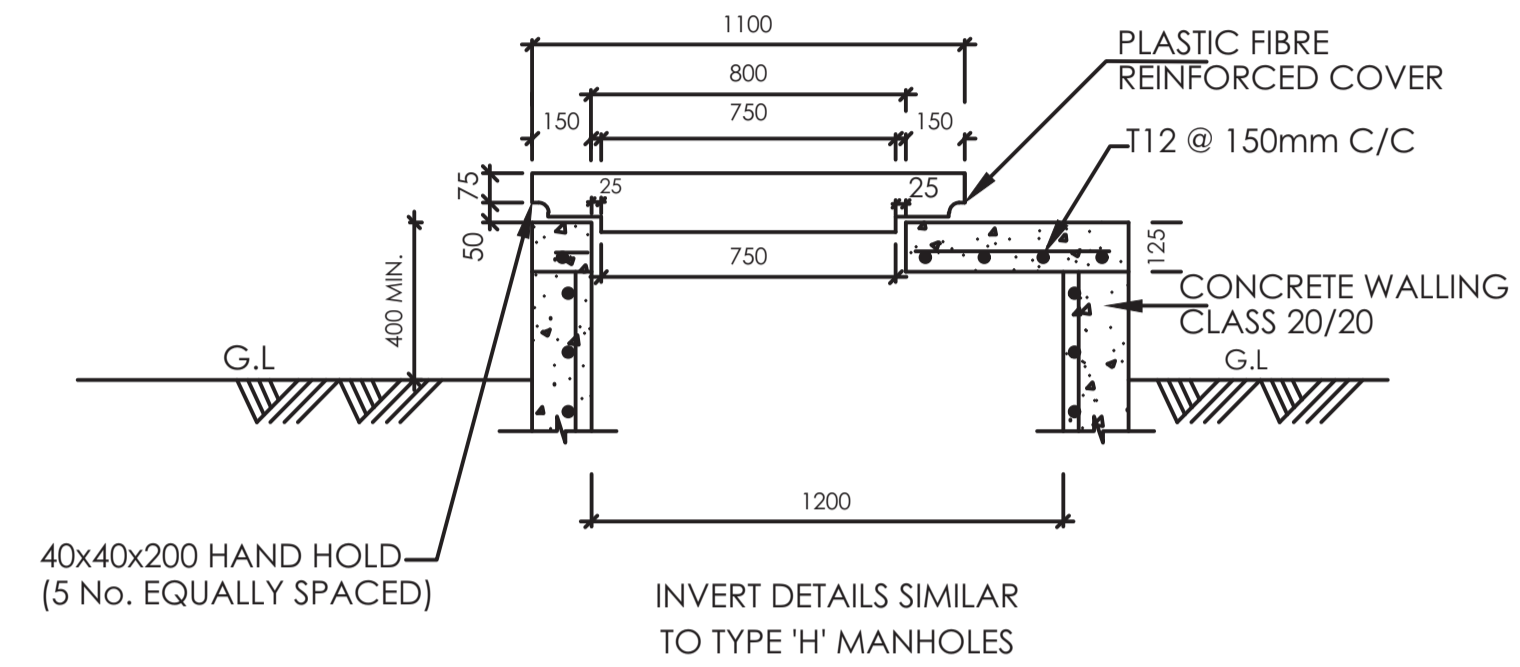


**NOTE**  
COVER FABRICATED FROM 6mm M.S. PLATE.

**PLASTIC FIBRE REINFORCED COVER FOR MANHOLES**



**SECTIONAL ELEVATION**  
SCALE 1:40



**PLASTIC FIBRE REINFORCED COVER - PLAN**  
SCALE 1:40

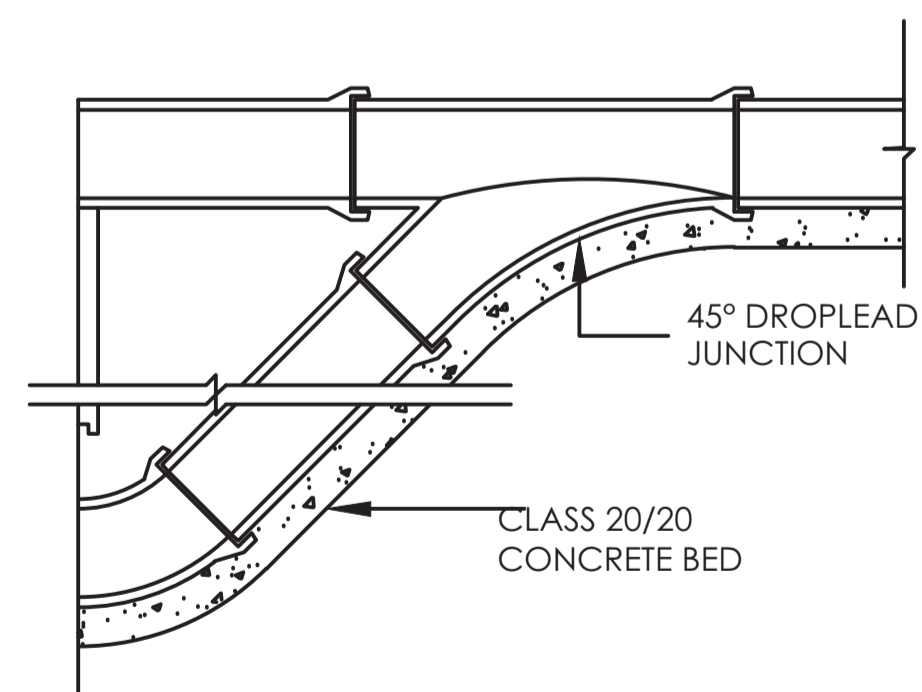
**NOTES**

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED
2. ALL CONCRETE TO BE CLASS 20/20
3. ALL PRECAST CONCRETE UNITS TO BS 556
4. CONCRETE FILLING CLASS 20/25 VIBRATED AND CURED IN ACCORDANCE WITH THE APPROPRIATE SPECIFICATION CLAUSES.
5. TOLERANCE ON OVERALL SIZE 3mm
6. ALL HAUNCHES ARE CLASS 15/40 CONCRETE AS INDICATED ON THE SPECIFICATION OVER EXCAVATION TO BE MADE GOOD IN CONCRETE CLASS 15/40.

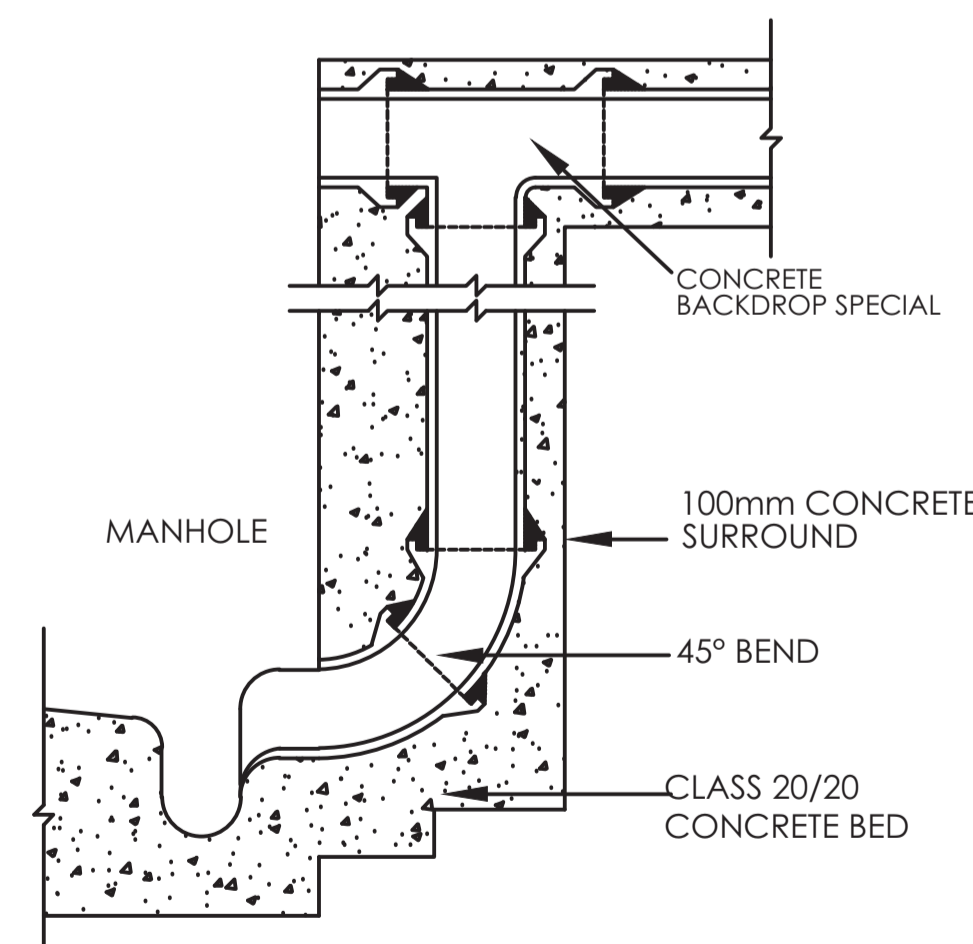
**ABBREVIATIONS**

- 1.n.e. - NOT EXCEEDING
2. c/c - CENTRE TO CENTRE
3. MIN - MINIMUM
4. G.L. - GROUND LEVEL
5. mm - MILLIMETER
6. m - METRE
7. EXT. DIA. - EXTERNAL DIAMETER
8. OD - OUTSIDE DIAMETER
9. ND - NOMINAL DIAMETER
10. RC - REINFORCED CONCRETE
11. T10 - TWISTED BAR 10mm SIZE
12. NTS - NOT TO SCALE
13. CU.M PER LIN. METER - CUBIC METER PER LINEAR METER
14. CI - CAST IRON

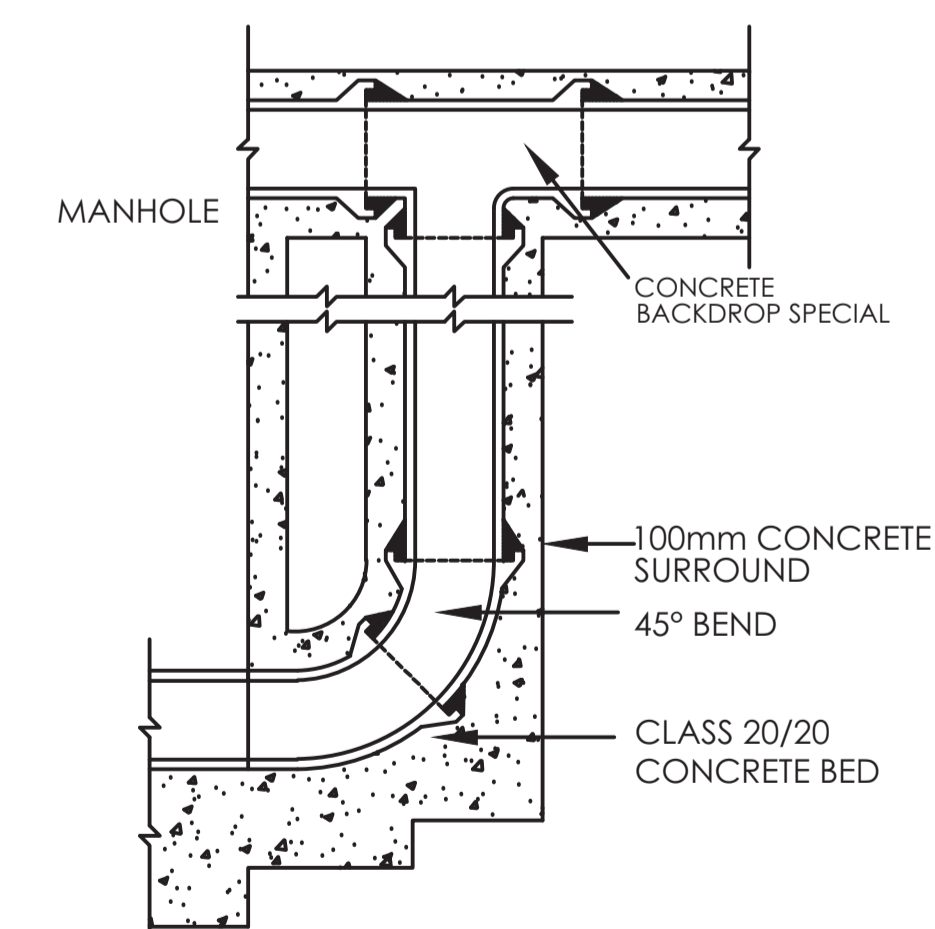
**DETAILS OF BACKDROPS FOR MANHOLES**



**MANHOLE DROPLEAD**  
SCALE 1:20




**SIDE ENTRANCE BACKDROP**  
SCALE 1:20



**END ENTRANCE BACKDROP**  
SCALE 1:20

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

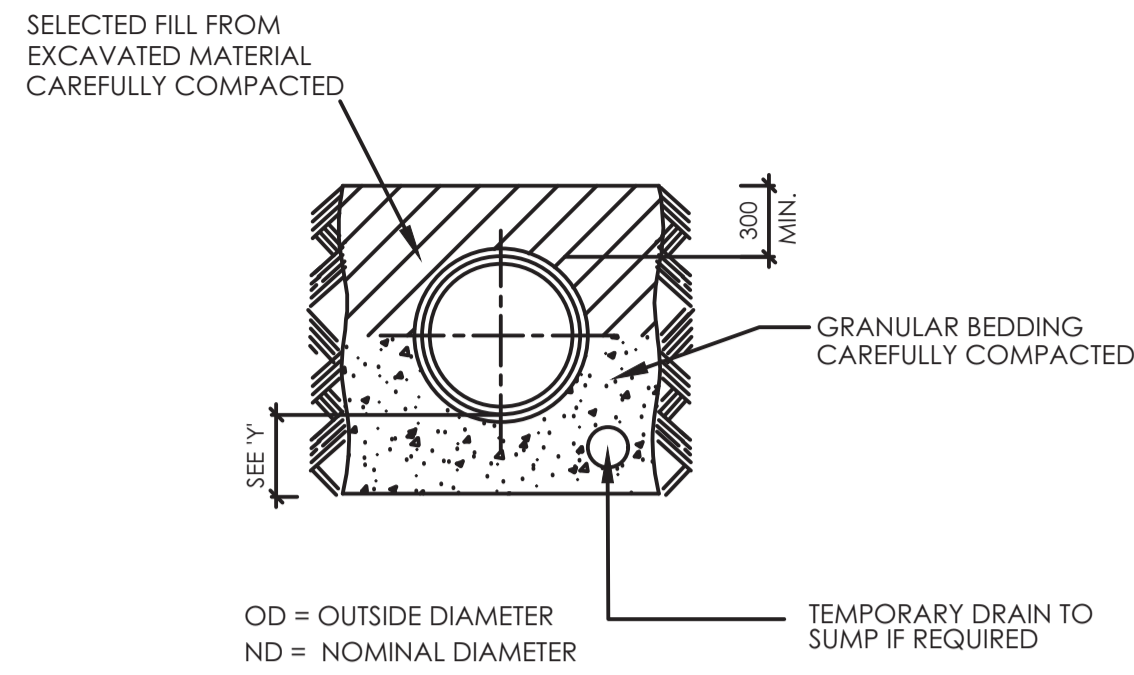
REVIEWED BY:  

**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**STANDARD DRAWINGS**  
 DETAILS OF MANHOLES AND  
 INSPECTION CHAMBERS  
 (SHEET 2 OF 2)

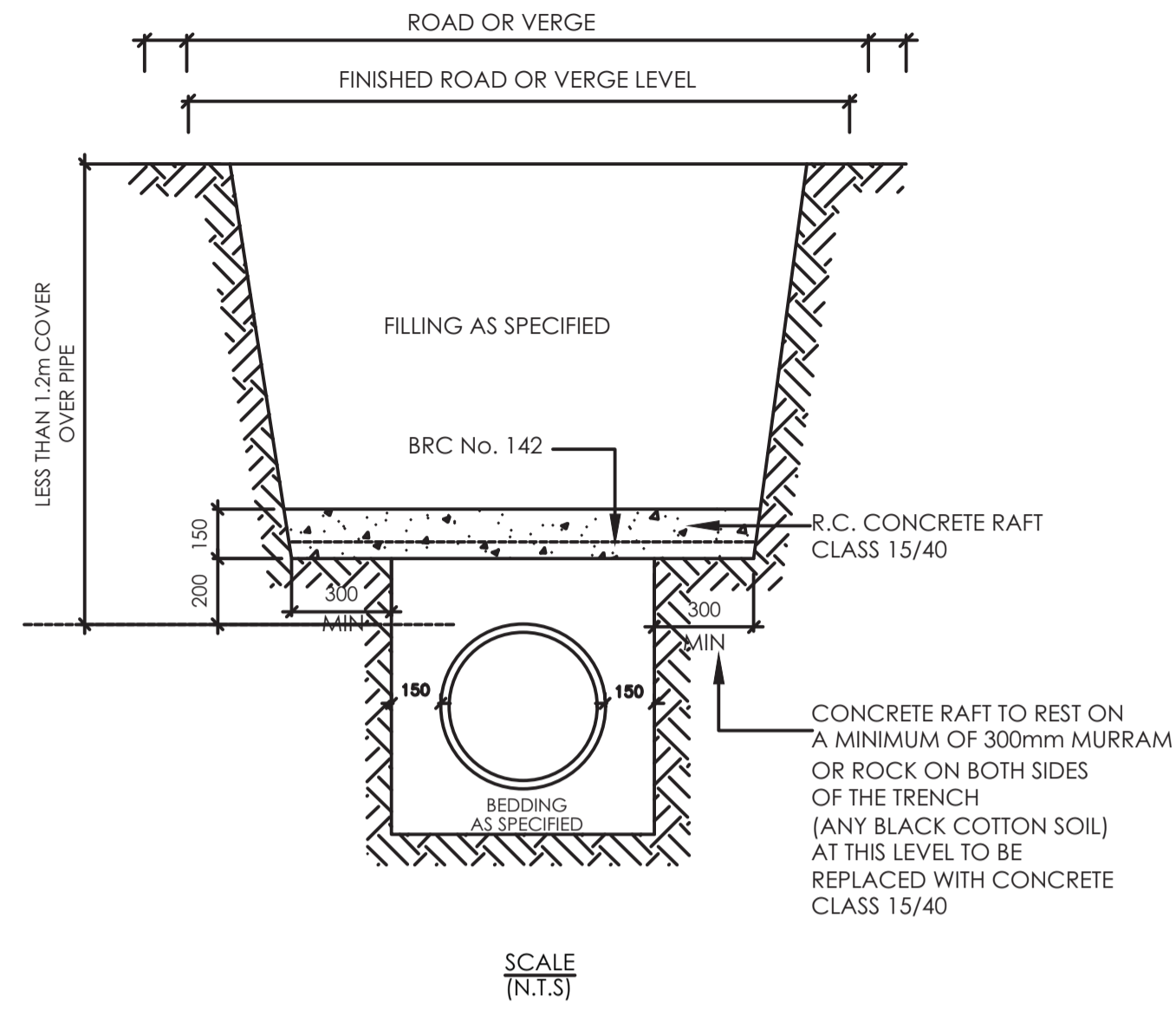
Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: 1:500	Date: FEBRUARY 2024
DRAWING No: M/W/S/SD/09	REV. 0

**BEDDING AND JOINTING OF FLEXIBLE JOINTED CONCRETE PIPES - TYPE 'BO'**

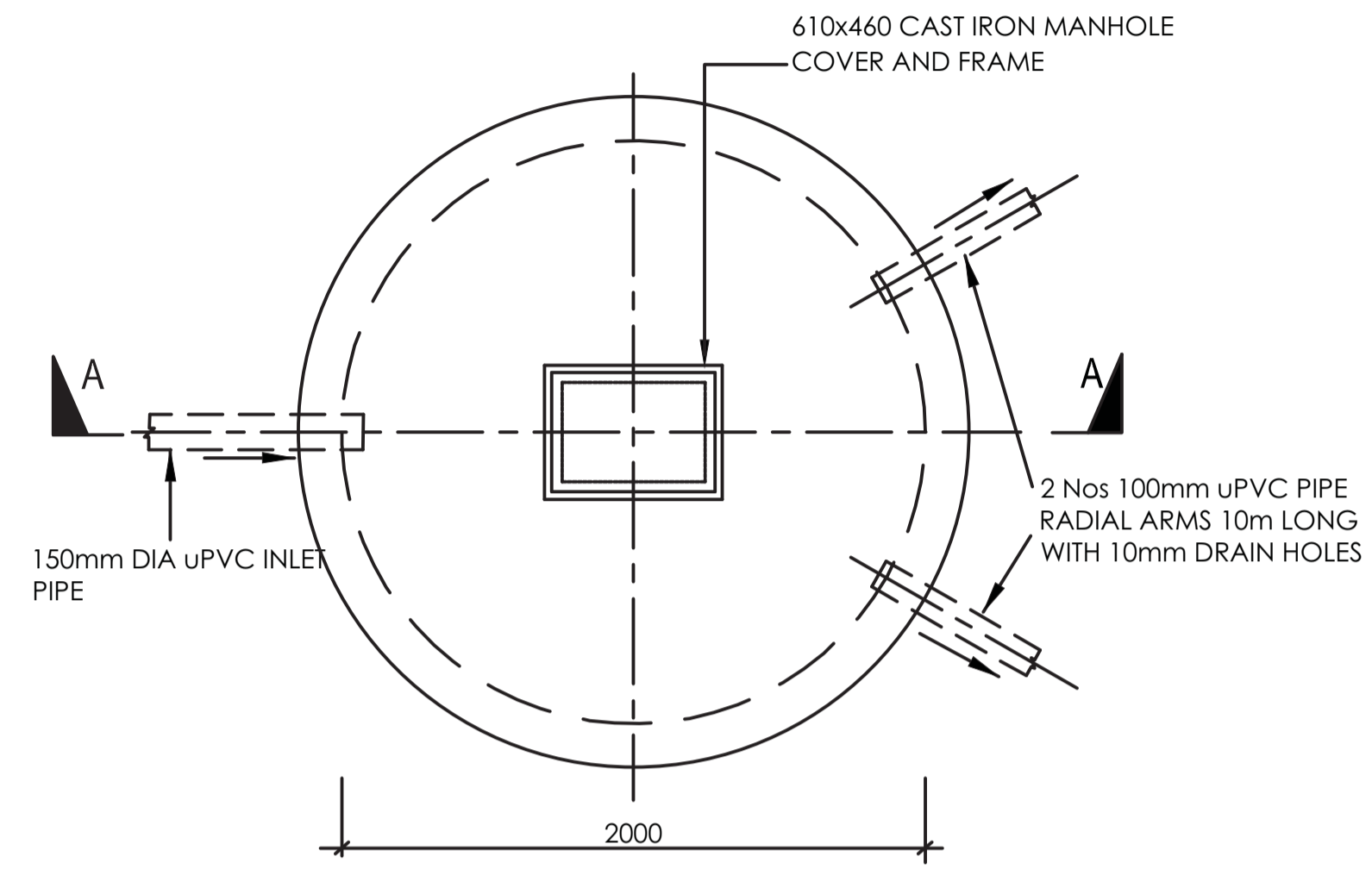


- NOTES:**
- DIMENSION 'Y' IN ROCK OR MIXED SOILS CONTAINING ROCK BANDS BOULDERS OR STONES OR OTHER IRREGULAR HARD SPOTS. Y = 1/4 OD UNDER BARRELS WITH MIN. 150mm (PLUS 12mm PER 300mm OF COVER IN EXCESS OF 4.85m) UNDER BOTH BARRELS AND SOCKETS IN MACHINE DUG UNIFORM SOILS Y = OD UNDER BARRELS WITH MIN. 100mm UNDER BOTH BARRELS AND SOCKETS
  - FOR GRANULAR BED AND SURROUND TO PIPES UNIFORMLY GRADED GRANULAR MATERIAL SUCH AS GRAVEL OR BROKEN STONE TO BE USED. IT SHOULD PASS 12mm SIEVE OR SHALL BE RETAINED ON 5mm SIEVE.
  - TRENCHES MUST BE KEPT TO DESIGN WIDTH

**FLEXIBLY JOINTED CONCRETE PIPES UNDER ROAD OR VERGE**

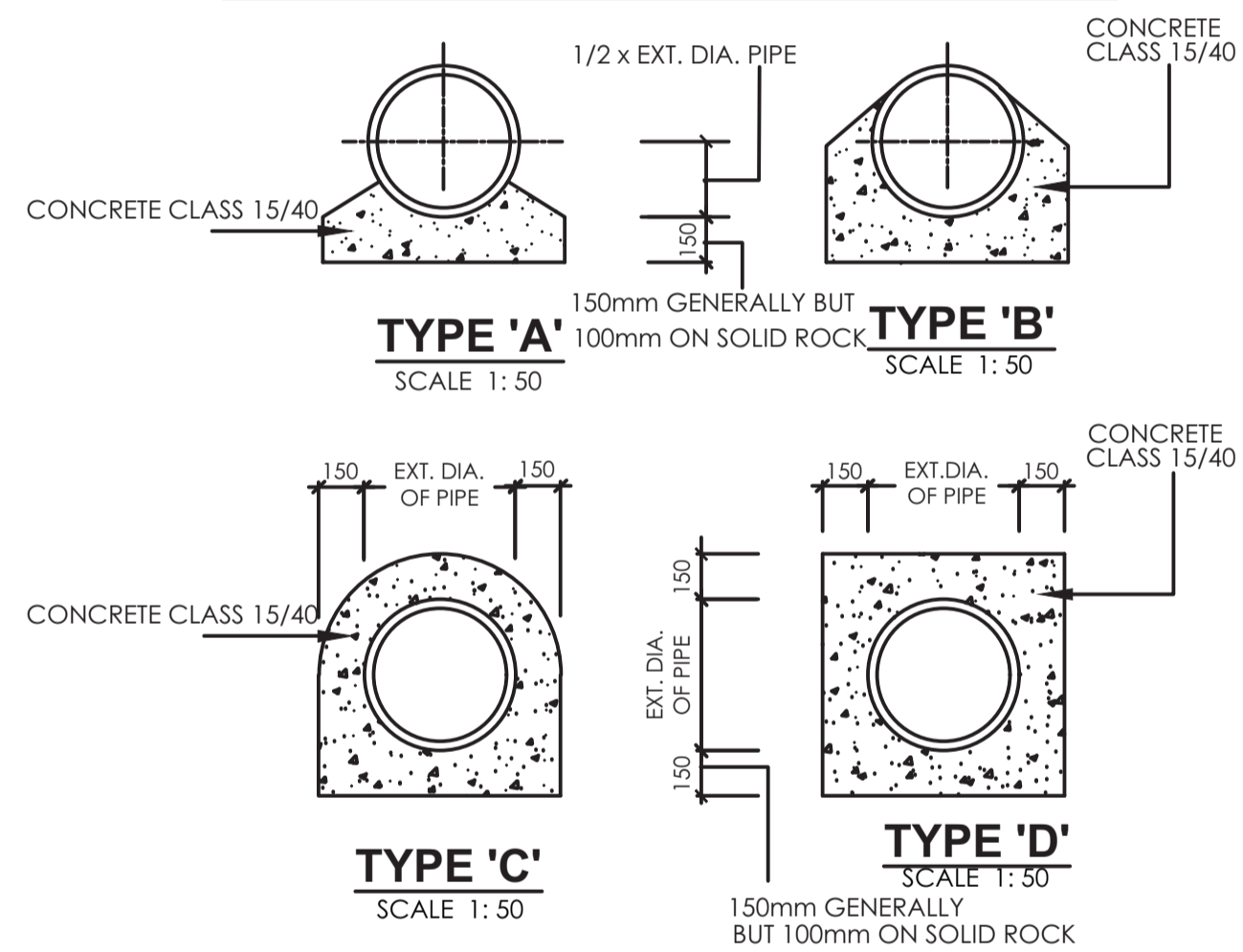


**DETAILS OF SOAK AWAY PIT**



**PLAN OF SOAK AWAY PIT**  
SCALE 1:50

**CONCRETE PIPE BEDS AND HAUNCHES**



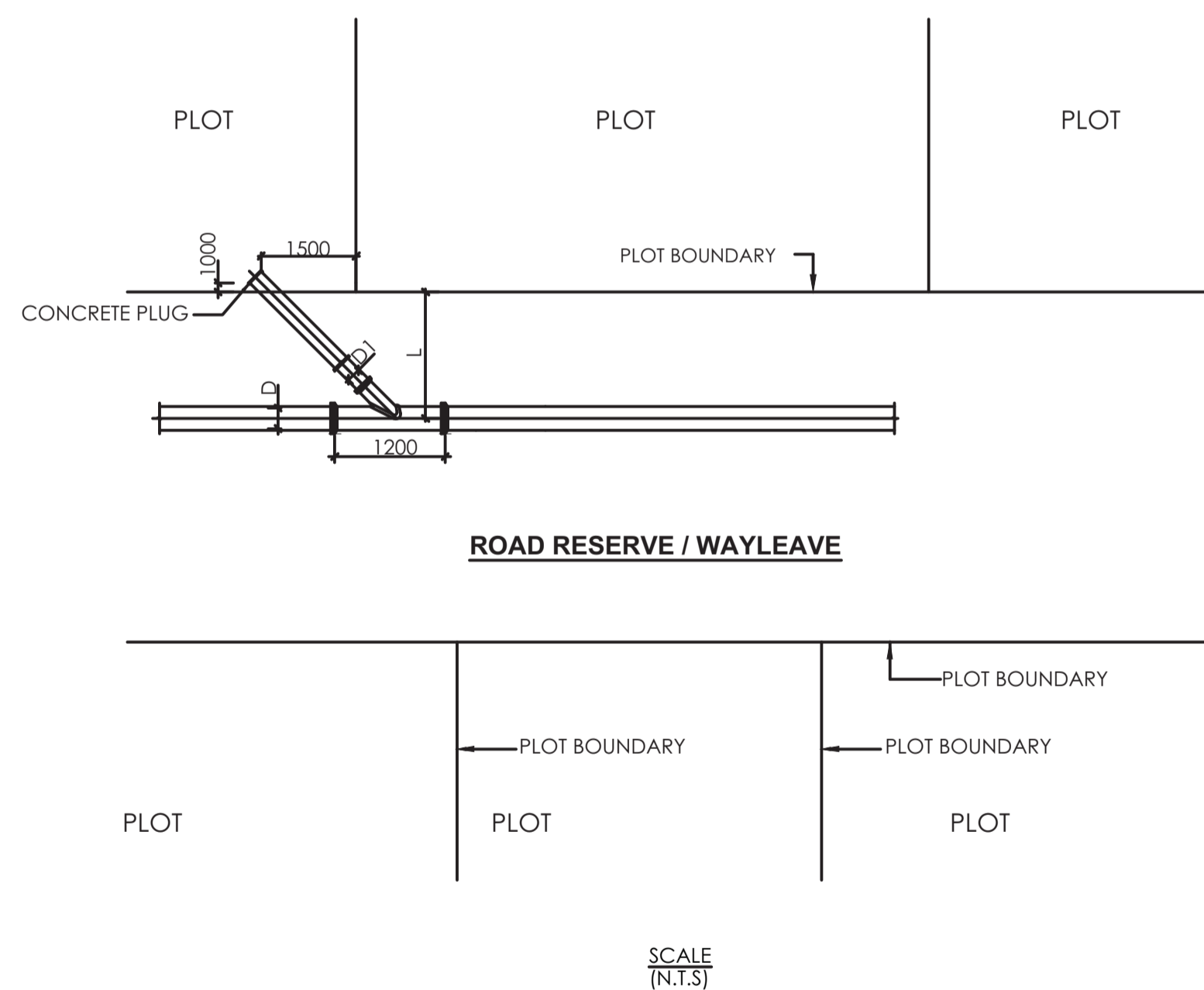
PIPE DIAMETER mm	PIPE WALL THICKNESS mm	HAUNCH TYPE							
		'A'		'B'		'C'		'D'	
		100mmBED	150mmBED	100mmBED	150mmBED	100mmBED	150mmBED	100mmBED	150mmBED
100	25.4	0.0556	0.0791	0.0799	0.1034	0.1431	0.1666	0.1653	0.1888
150	25.4	0.0642	0.0904	0.0845	0.1107	0.1706	0.1968	0.1981	0.2242
225	28.57	0.0783	0.1053	0.1262	0.1557	0.2155	0.2450	0.2525	0.2821
300	31.75	0.0929	0.1277	0.1557	0.1905	0.2617	0.2965	0.3100	0.3448
375	34.92	0.1080	0.1470	0.1864	0.2255	0.3094	0.3485	0.3702	0.4093
450	38.10	0.1253	0.1689	0.2208	0.2644	0.3623	0.4059	0.4382	0.4818
525	44.45	0.1433	0.1916	0.2564	0.3046	0.4169	0.4652	0.5052	0.5536
600	50.80	0.1619	0.2147	0.2943	0.3471	0.4731	0.5259	0.5844	0.6372
675	53.98	0.1804	0.2375	0.3310	0.3880	0.5270	0.5841	0.6570	0.7141
750	57.15	0.1986	0.2600	0.3582	0.4295	0.5823	0.6436	0.7325	0.7938
900	63.50	0.2378	0.3077	0.4479	0.5161	0.6973	0.7672	0.8922	0.9620
1050	69.85	0.2810	0.3605	0.4945	0.5741	0.8181	0.8977	1.0635	1.1431
1200	76.20	0.3291	0.4161	0.6230	0.7101	0.9448	1.0318	1.2466	1.3336

**CONCRETE QUANTITIES IN BED AND SURROUNDS FOR O. G. CONCRETE PIPES ( CU.M.PER LIN. METER)**

DEPTH TO THE TOP OF PIPE	PIPE DIAMETER IN mm								AS SPECIFIED BY ENGINEER
	150	225	300	375	450	525	600	675	
<1.25M IN ROADS <1.00M ELSEWHERE	TYPE 'C'								
<4.00M	TYPE 'A' (CONCRETE BED) MAY BE DELETED AT THE DISCRETION OF THE ENGINEER				TYPE 'B'				
>4.00M	TYPE 'B'								
>6.00M OR IN HEADING	TYPE 'C' OR 'D' AS DIRECTED								

**TYPE OF BED AND HAUNCH TO BE USED**

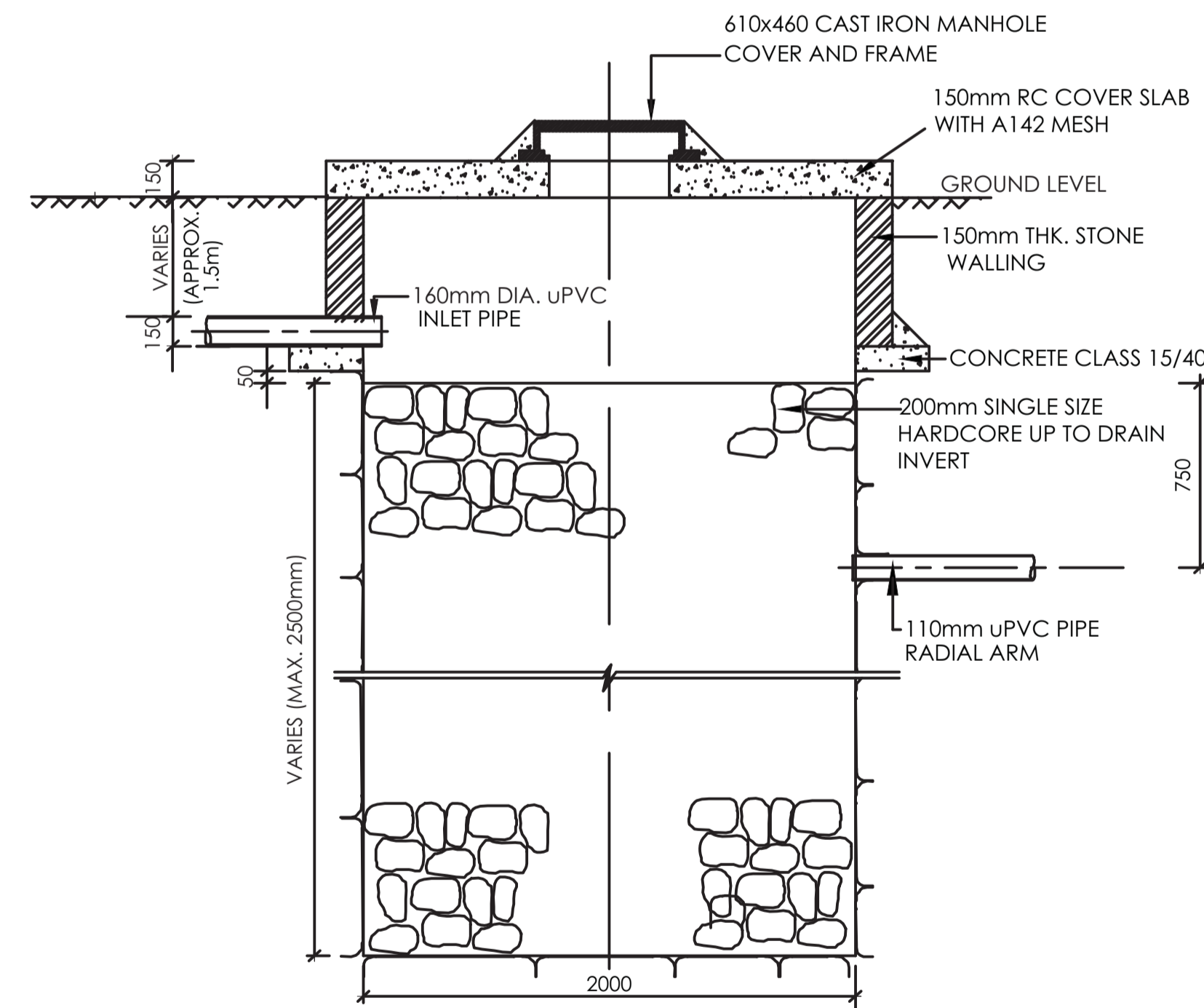
**Y - JUNCTION DETAILS**



**ROAD RESERVE / WAYLEAVE**

- NOTES:**
- L - TO BE DETERMINED ON SITE
  - D - VARIES BETWEEN 160 - 250mm
  - D1 - 160mm DIA uPVC SEWER PIPE

SCALE (N.T.S.)



**SECTION A-A**  
SCALE 1:50


**NOTES**

- ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED
- ALL CONCRETE TO BE CLASS 20/25 TO BS 556
- ALL PRECAST CONCRETE UNITS TO BS 556
- CONCRETE FILLING CLASS 20/25 VIBRATED AND CURED IN ACCORDANCE WITH THE APPROPRIATE SPECIFICATION CLAUSES.
- TOLERANCE ON OVERALL SIZE 3mm
- ALL HAUNCHES ARE CLASS 15/40 CONCRETE AS INDICATED ON THE SPECIFICATION OVER EXCAVATION TO BE MADE GOOD IN CONCRETE CLASS 15/40.

**ABBREVIATIONS**

- n.e. - NOT EXCEEDING
- c/c - CENTRE TO CENTRE
- MIN - MINIMUM
- G.L. - GROUND LEVEL
- mm - MILLIMETER
- m - METRE
- EXT. DIA. - EXTERNAL DIAMETER
- OD - OUTSIDE DIAMETER
- ND - NOMINAL DIAMETER
- RC - REINFORCED CONCRETE
- T10 - TWISTED BAR 10mm SIZE
- NTS - NOT TO SCALE
- CU.M PER LIN. METER - CUBIC METER PER LINEAR METER
- CI - CAST IRON

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

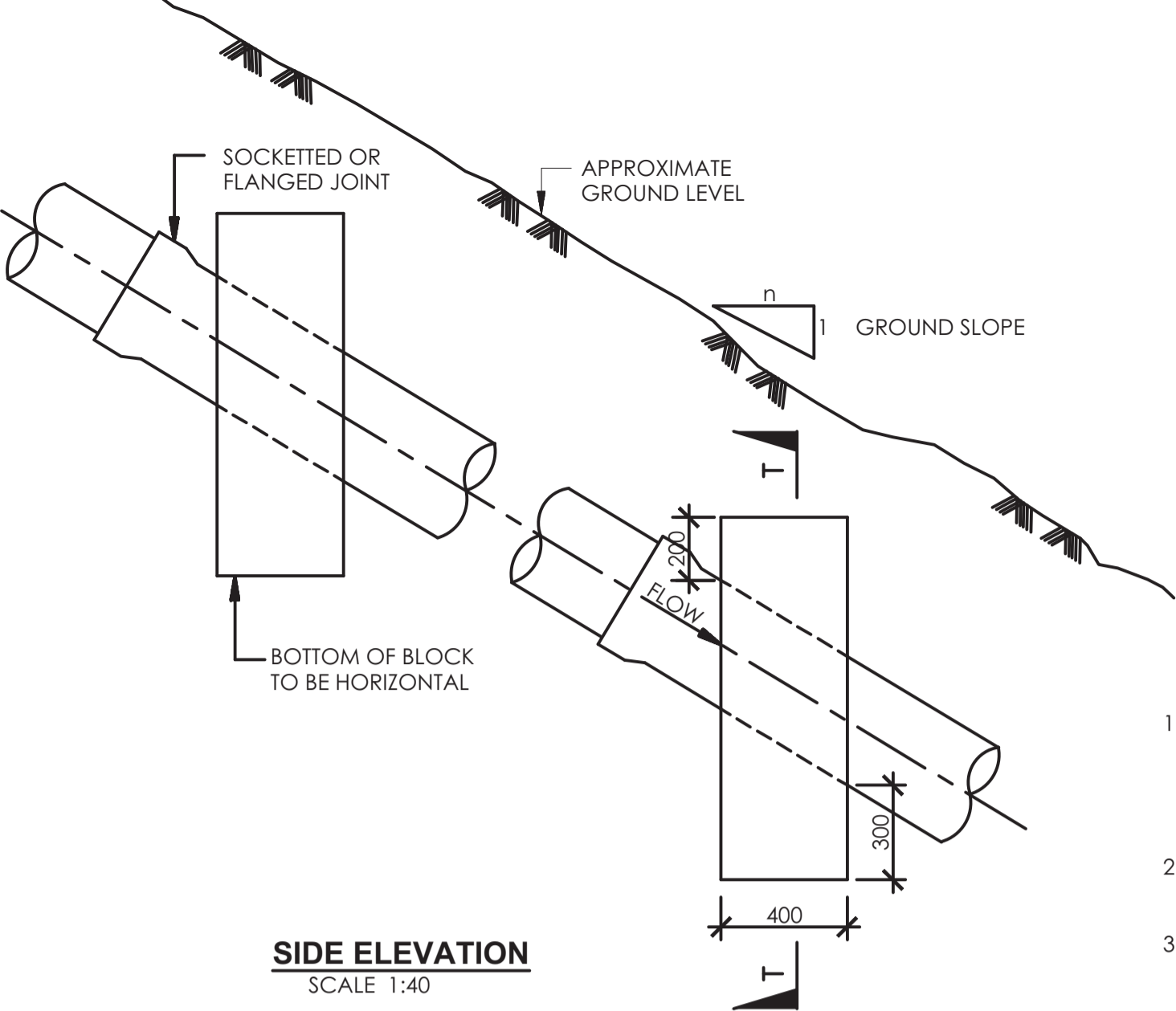
REVIEWED BY:  

 Interconsult Engineers Ltd  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

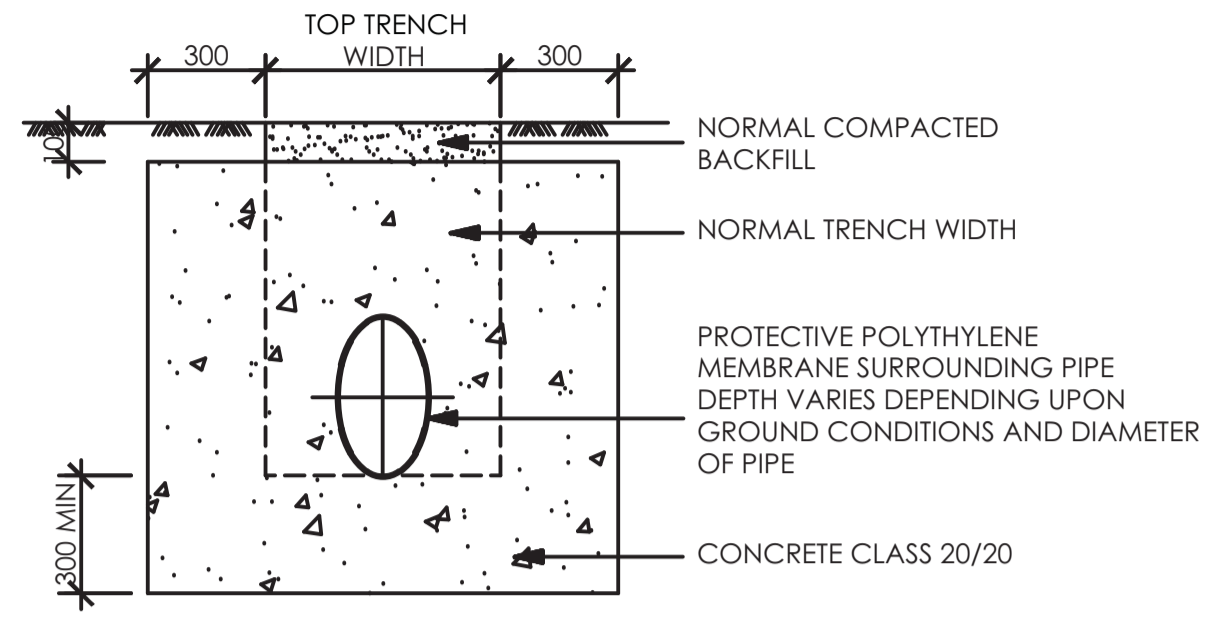
DRAWING TITLE:  
**STANDARD DRAWINGS**  
 DETAILS OF BEDDING AND HAUNCHES FOR PIPES, Y - JUNCTION DETAILS & SOAK AWAY PIT DETAILS

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: 1:500	Date: FEBRUARY 2024
DRAWING No: M/W/SD/10	REV. 0



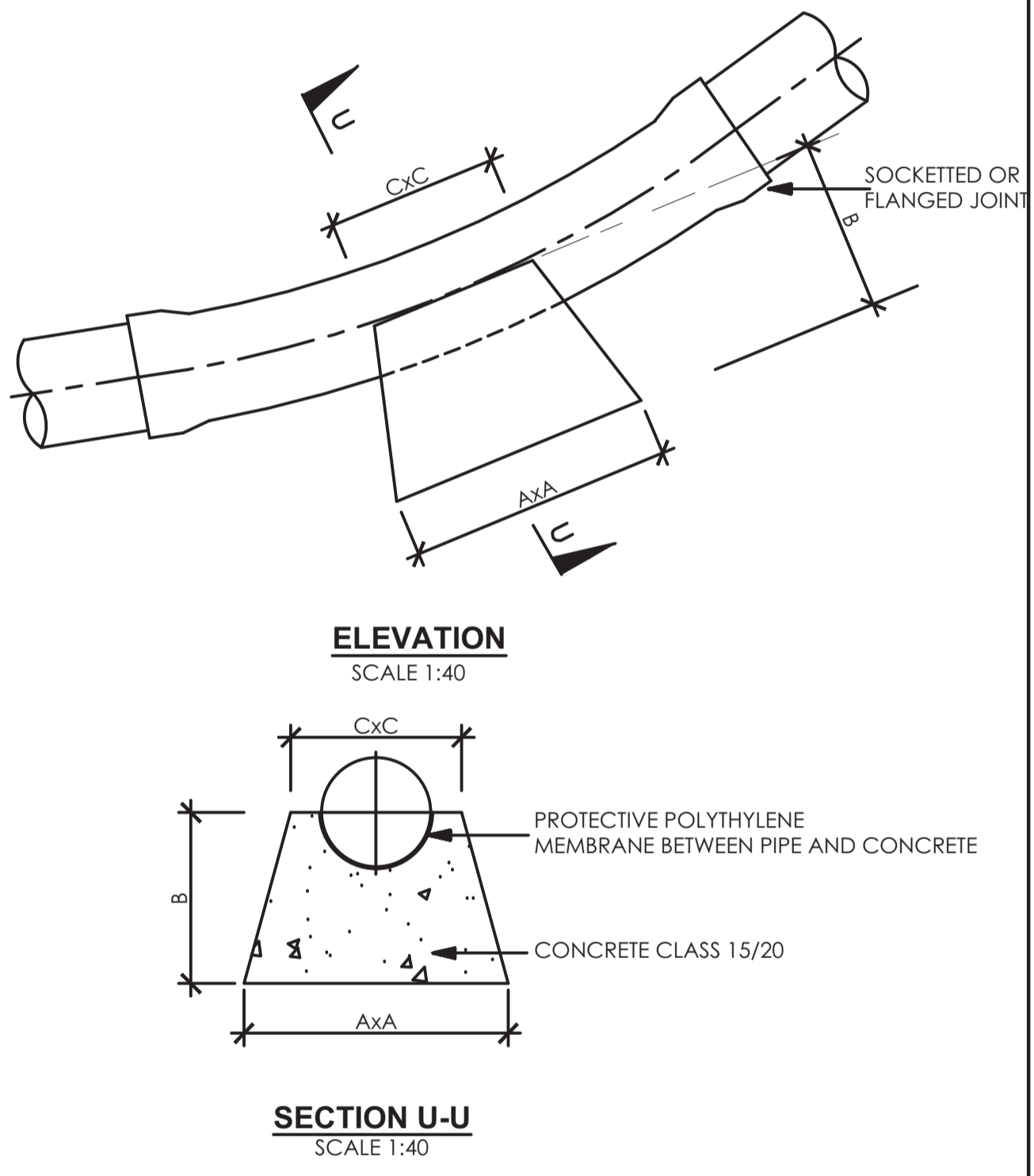


RANGE OF GROUND SLOPE (1:n)	MAXIMUM DISTANCE BETWEEN ANCHOR BLOCKS (m)
1:6 - 1:5	24
1:5 - 1:4	18
1:4 - 1:2	12
>1:2	EVERY PIPE LENGTH TO BE ANCHORED (BASED ON PIPE LENGTH OF 6m)

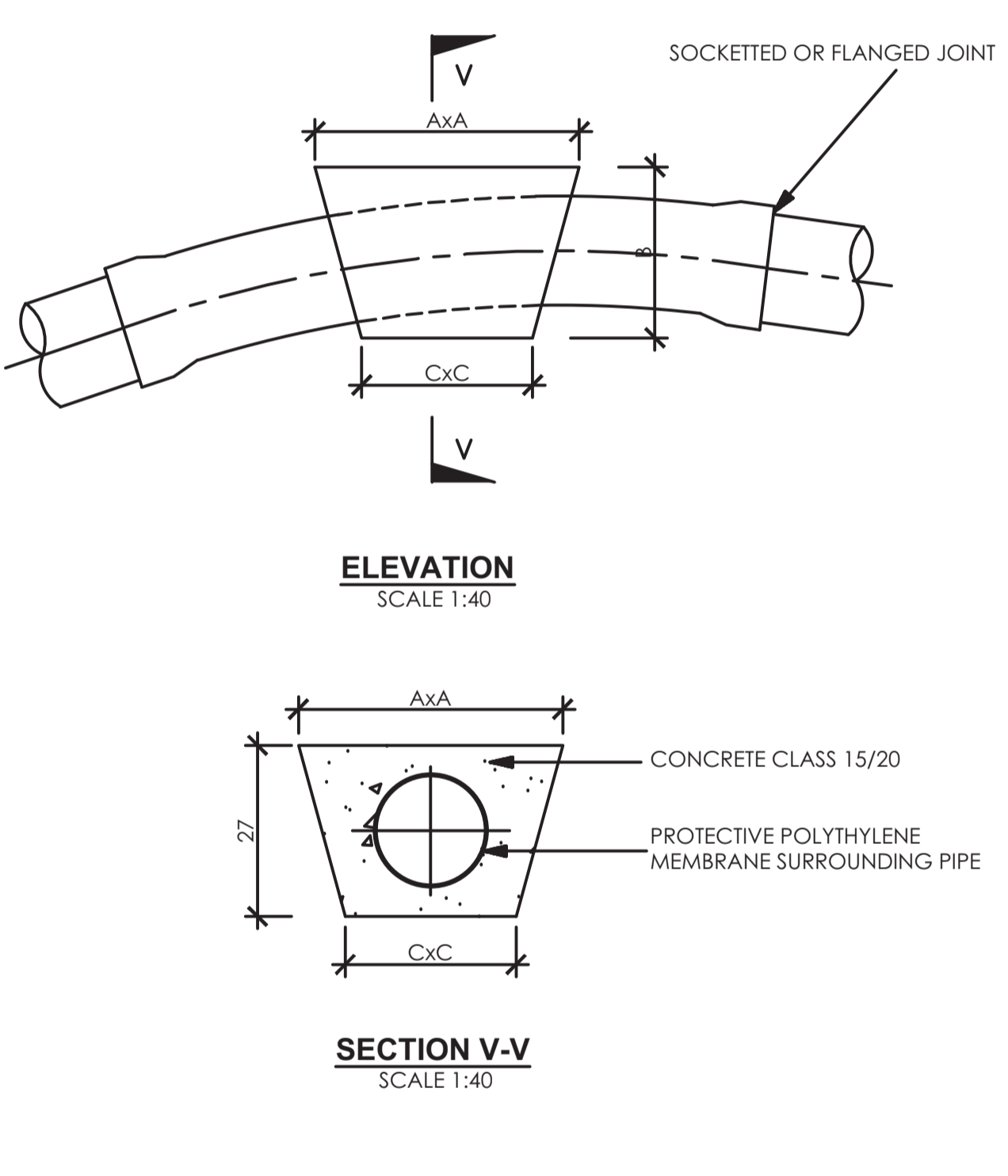


- NOTES**
- SAME ARRANGEMENT CAN BE USED AS SUPPORTS FOR PIPES LAID IN VERY SOFT GROUND BUT BLOCKS TO BE CAST ON SOUND ROCK OR HARD STRATUM
  - SOCKETTED JOINT TO BE LAID WITH SOCKET FACING UPSTREAM OF GRADE
  - ANCHOR BLOCK TO BE CONSTRUCTED ON LOWER SIDE OF JOINT

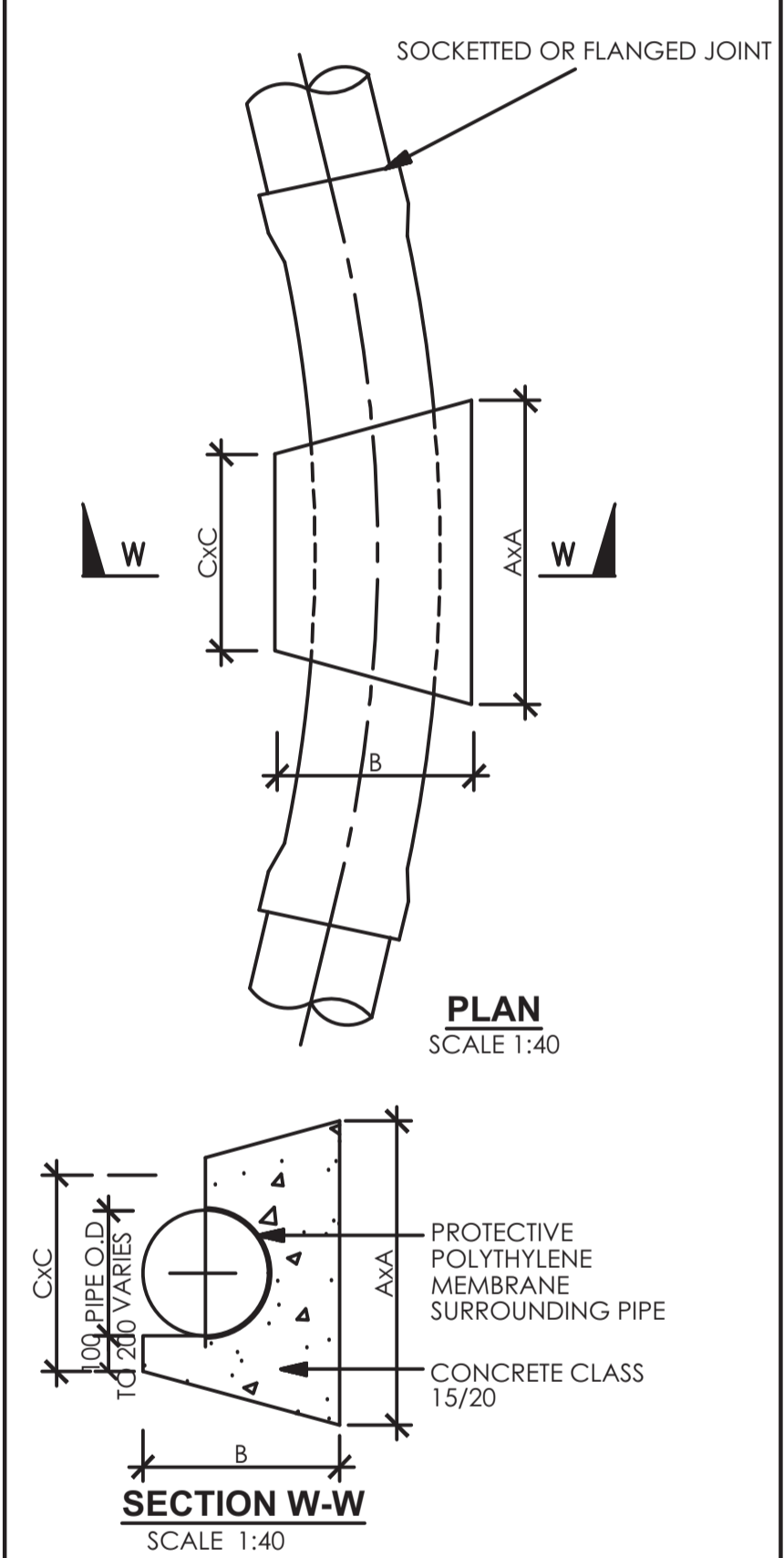
**ANCHOR BLOCK FOR STEEP GRADIENTS (SLOPES>1:6)**



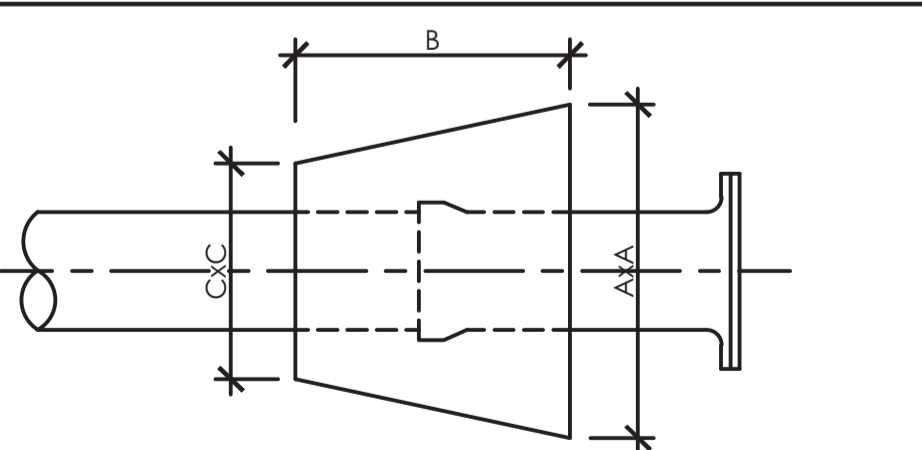
**THRUST BLOCKS ON VERTICAL BENDS (DOWN-THRUST)**



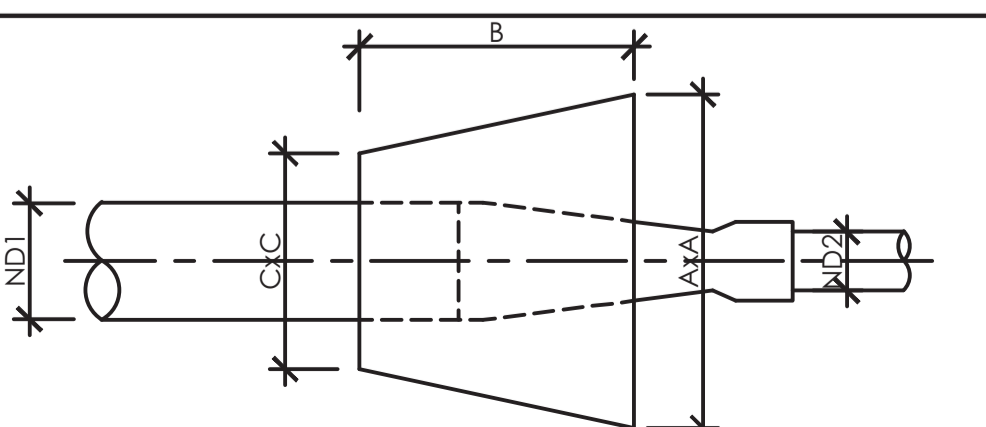
**THRUST BLOCKS ON VERTICAL BENDS (UP-THRUST)**



**THRUST BLOCK ON HORIZONTAL BENDS AND TEES**



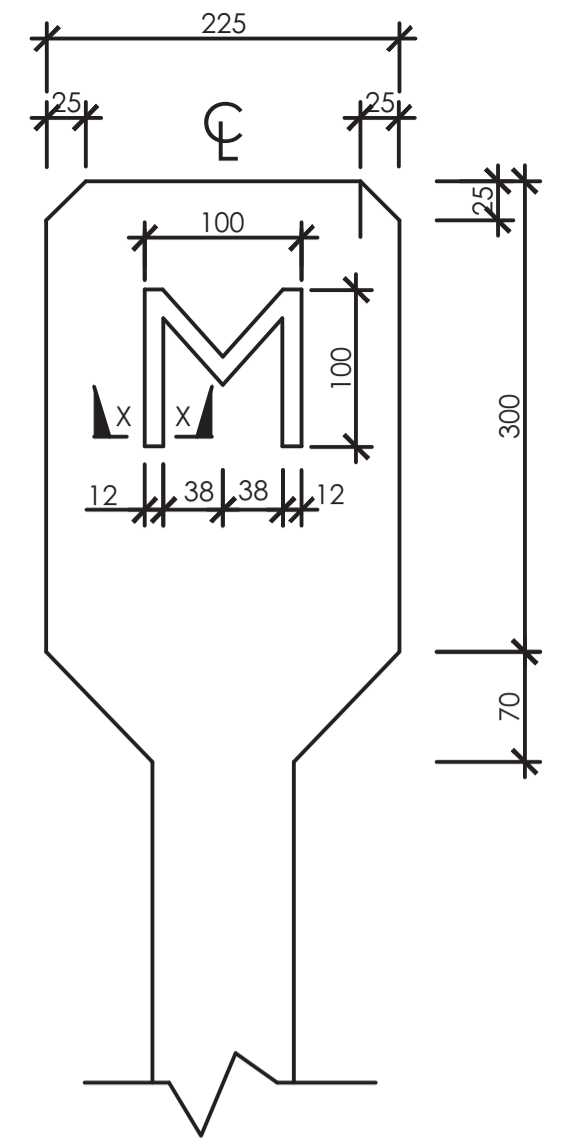
**THRUST BLOCK AT CAPPED ENDS**



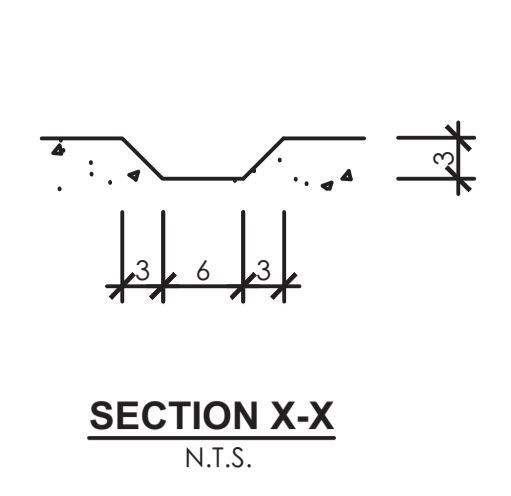
**THRUST BLOCK AT REDUCER**

(ND) NOMINAL DIAMETER (mm)	THRUST BLOCK DIMENSIONS AxBxC(m), CONCRETE VOLUME (m³)						
	11 1/4° BENDS	22 1/2° BENDS	30°BENDS	45°BENDS	CAPPED ENDS & 90°TEES	90°BENDS	REDUCERS ND=NDT-ND2
80	0.2x0.2x0.2 (0.01m³)	0.25x0.2x0.2 (0.01m³)	0.3x0.2x0.2 (0.01m³)	0.35x0.2x0.2 (0.02m³)	0.35x0.2x0.2 (0.02m³)	0.4x0.2x0.2 (0.02m³)	0.35x0.2x0.2 (0.02m³)
100	0.2x0.2x0.2 (0.01m³)	0.3x0.2x0.2 (0.02m³)	0.35x0.2x0.2 (0.02m³)	0.4x0.2x0.2 (0.02m³)	0.45x0.25x0.25 (0.04m³)	0.55x0.3x0.3 (0.06m³)	0.45x0.25x0.25 (0.04m³)
150	0.3x0.25x0.25 (0.02m³)	0.4x0.25x0.25 (0.03m³)	0.5x0.3x0.3 (0.05m³)	0.55x0.3x0.3 (0.06m³)	0.65x0.35x0.35 (0.10m³)	0.8x0.4x0.35 (0.16m³)	0.65x0.35x0.35 (0.10m³)
200	0.4x0.3x0.3 (0.04m³)	0.55x0.35x0.35 (0.08m³)	0.6x0.4x0.4 (0.11m³)	0.75x0.4x0.4 (0.15m³)	0.85x0.45x0.4 (0.20m³)	1.0x0.5x0.4 (0.29m³)	0.85x0.45x0.4 (0.20m³)
250	0.5x0.35x0.35 (0.07m³)	0.65x0.4x0.4 (0.12m³)	0.75x0.45x0.45 (0.18m³)	0.9x0.45x0.45 (0.23m³)	1.1x0.55x0.45 (0.39m³)	1.2x0.6x0.45 (0.50m³)	1.1x0.55x0.45 (0.39m³)
300	0.55x0.45x0.45 (0.12m³)	0.8x0.5x0.5 (0.23m³)	0.9x0.5x0.5 (0.27m³)	1.1x0.6x0.5 (0.44m³)	1.25x0.65x0.5 (0.59m³)	1.5x0.75x0.5 (0.94m³)	1.25x0.65x0.5 (0.59m³)
350	0.6x0.5x0.5 (0.16m³)	0.85x0.55x0.55 (0.29m³)	1.0x0.55x0.55 (0.36m³)	1.2x0.6x0.55 (0.53m³)	1.4x0.7x0.55 (0.80m³)	1.6x0.8x0.55 (1.20m³)	1.4x0.7x0.55 (0.80m³)
400	0.7x0.6x0.6 (0.26m³)	0.95x0.6x0.6 (0.38m³)	1.1x0.6x0.6 (0.47m³)	1.3x0.65x0.6 (0.67m³)	1.6x0.8x0.6 (1.20m³)	1.8x0.9x0.6 (1.60m³)	1.6x0.8x0.6 (1.20m³)
450	0.8x0.65x0.65 (0.35m³)	1.1x0.65x0.65 (0.53m³)	1.3x0.65x0.65 (0.69m³)	1.5x0.75x0.65 (1.0m³)	1.8x0.9x0.65 (1.7m³)	2.0x1.0x0.65 (2.2m³)	1.8x0.9x0.65 (1.7m³)
500	0.9x0.7x0.7 (0.46m³)	1.2x0.7x0.7 (0.68m³)	1.4x0.7x0.7 (0.86m³)	1.7x0.85x0.7 (1.5m³)	2.0x1.0x0.7 (2.3m³)	2.3x1.2x0.7 (3.5m³)	2.0x1.0x0.7 (2.3m³)
600	1.1x0.8x0.8 (0.74m³)	1.5x0.8x0.8 (1.2m³)	1.7x0.9x0.8 (1.6m³)	2.0x1.0x0.8 (2.3m³)	2.3x1.2x0.8 (3.6m³)	2.7x1.4x0.8 (5.6m³)	2.3x1.2x0.8 (3.6m³)

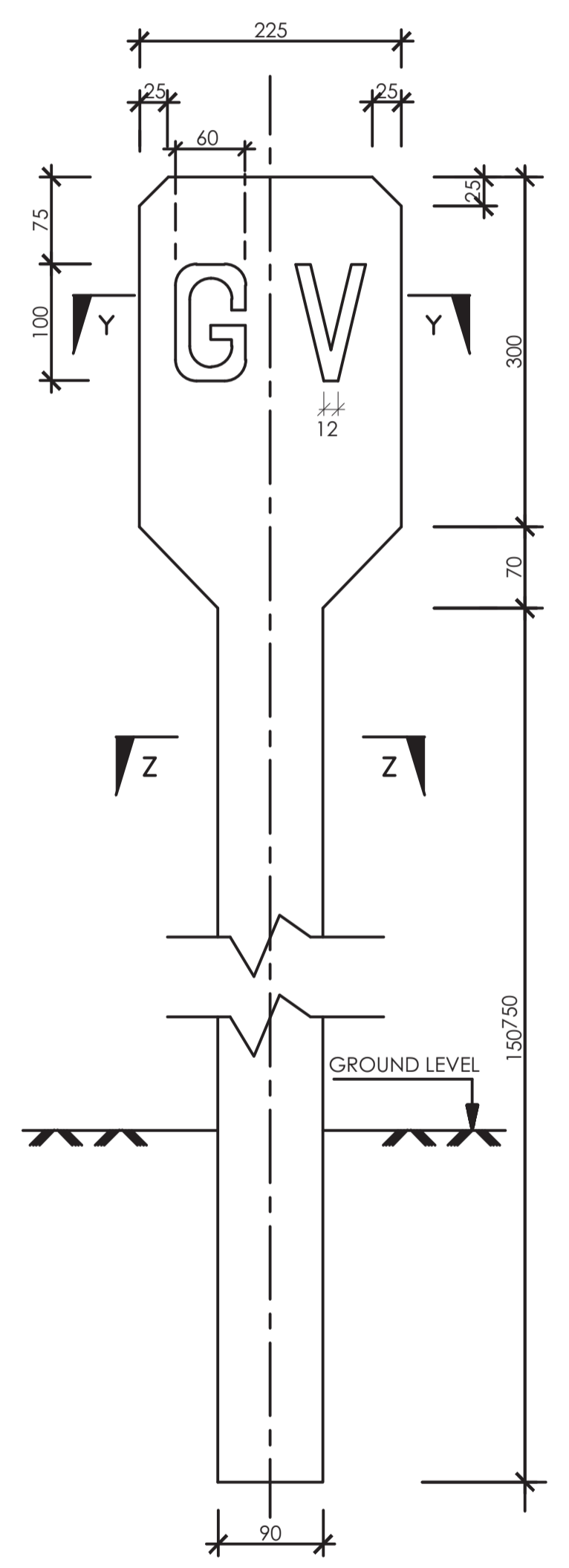
NOTE:- THE ABOVE VALUES APPLY FOR SOCKETTED uPVC AND FLANGED OR COUPLED LINED FERROUS PIPES SUBJECT TO A WORKING PRESSURE HEAD OF 16 BAR



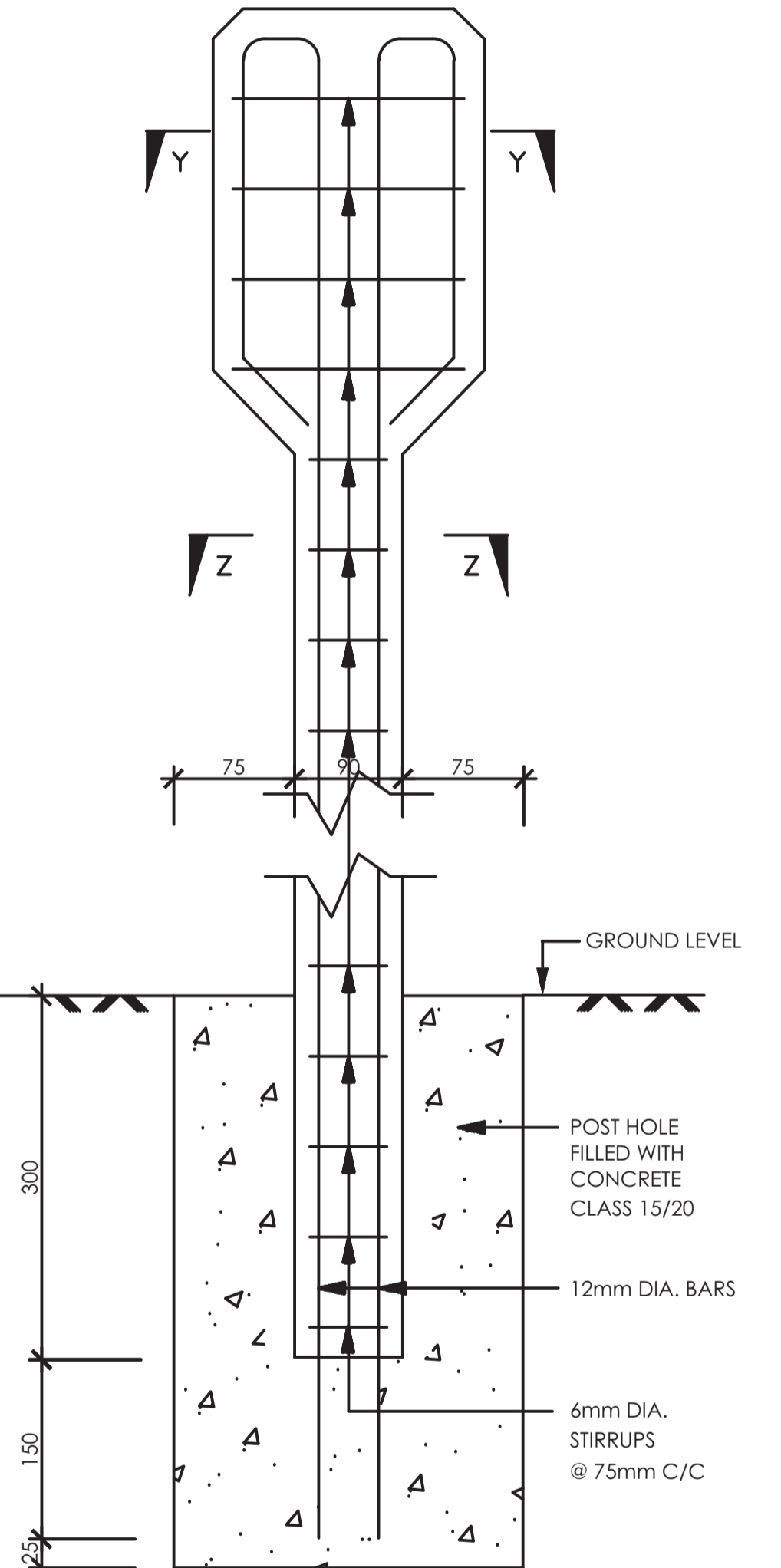
**BULK METER POST**



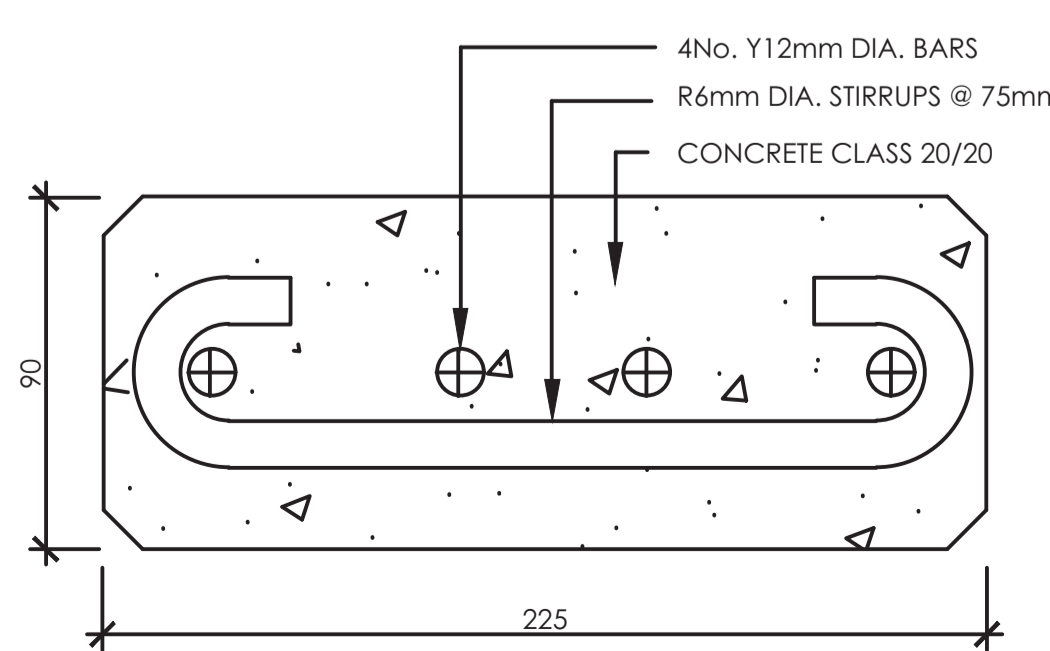
NOTE:- ALL DETAILS TO BE SAME AS GATE VALVE BUT THE SIGN TO BE CHANGED AS INDICATED



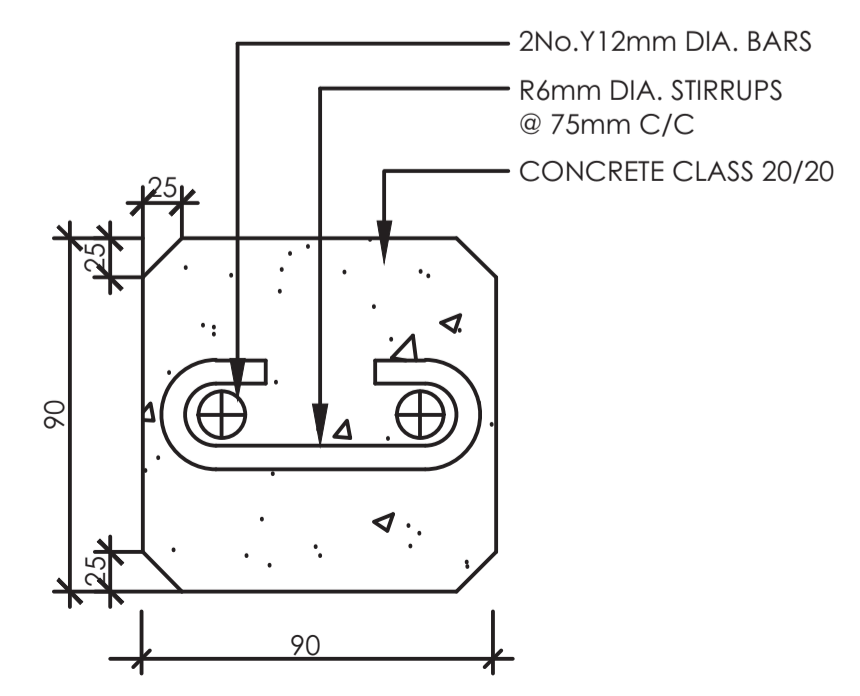
**GATE VALVE INDICATOR POST**



**INDICATOR POST REINFORCEMENT DETAILS**



**INDICATOR POST DETAILS**



**INDICATOR POST DETAILS**

- NOTES**
- ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED
  - ANCHOR BLOCKS TO BE INSTALLED FOR PIPES LAID AT SLOPES EXCEEDING 1:6 SLOPE
  - THRUST BLOCKS TO BE INSTALLED AT ALL HORIZONTAL AND VERTICAL BENDS, CAPPED ENDS, TEES, TAPERS AND GATE VALVES
  - DETAILS FOR ALL INDICATOR POSTS TO BE AS FOR GATE VALVE BUT LETTERING TO BE AS FOLLOWS:
- | FOR           | USE |
|---------------|-----|
| GATE VALVE    | GV  |
| AIR VALVE     | AV  |
| WASHOUT       | WO  |
| WATER MAIN    | WM  |
| BULK METER    | M   |
| 'Y'- JUNCTION | Y   |
- ALL INDICATOR POSTS TO BE PAINTED WITH 2 COATS BLUE OIL BASED PAINT AND WHITE LETTERING TO ENGINEER'S APPROVAL

- ABBREVIATIONS**
- mm - MILLIMETRES
  - OD - OUTSIDE DIAMETER
  - ND - NOMINAL DIAMETER
  - Dia - DIAMETER
  - c/c - CENTRE TO CENTRE
  - No. - NUMBER
  - uPVC - UNPLASTICISED POLYVINYL CHLORIDE
  - m - METRE
  - CL - CENTRE LINE
  - GV - GATE VALVE
  - AV - AIR VALVE
  - WO - WASH OUT
  - WM - WATER MAIN
  - M - BULK METER
  - m³ - CUBIC METER

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER: NORTHERN WATER WORKS DEVELOPMENT AGENCY P.O. BOX 495-70100 GARISSA

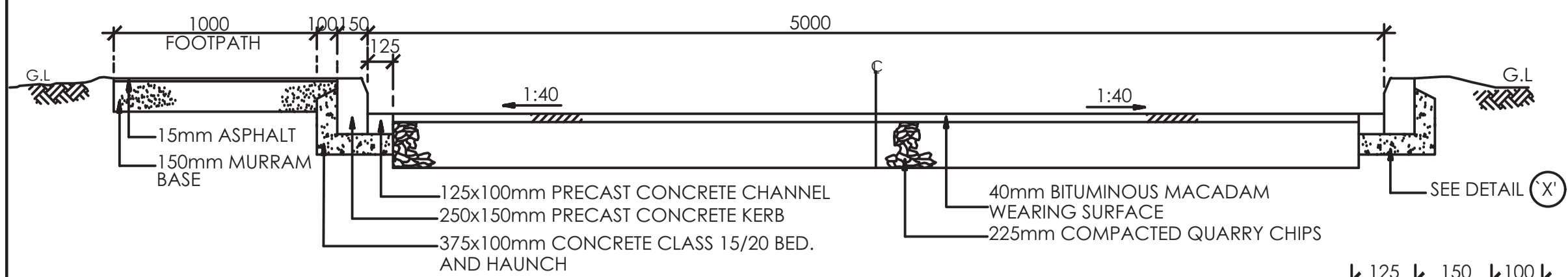
DESIGNED BY: Interconsult Engineers Ltd  
 CHECKED BY: P.M.M  
 SCALE: 1:500  
 DATE: FEBRUARY 2024

**STANDARD DRAWINGS**

**THRUST BLOCKS, ANCHOR BLOCKS AND INDICATOR POST DETAILS**

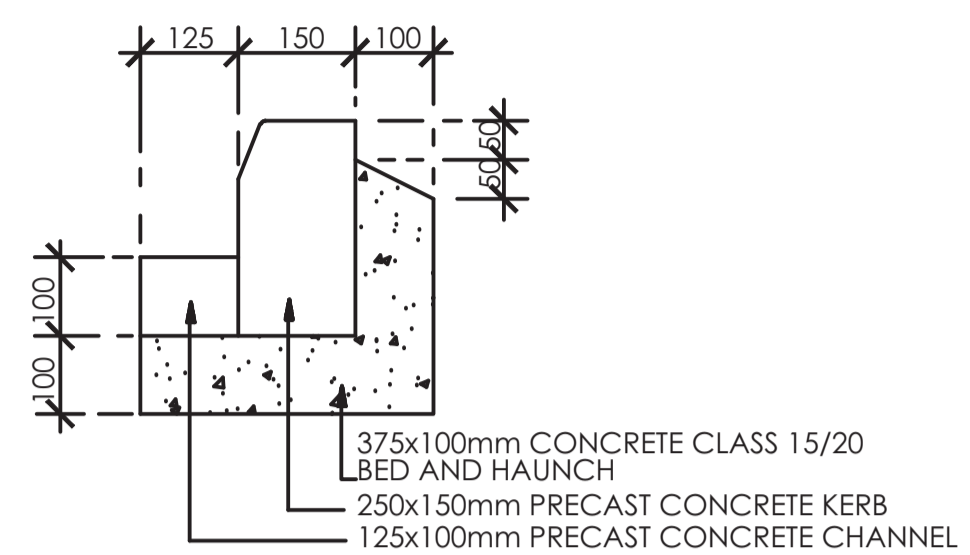
DESIGNED BY: N.M  
 DRAWN BY: I.M.W  
 CHECKED BY: P.M.M  
 APPROVED BY: K.M  
 SCALE: 1:500  
 DATE: FEBRUARY 2024  
 DRAWING NO: M/W/S/SD/11  
 REV. 0

**TYPICAL BITUMINOUS ROAD DETAILS**



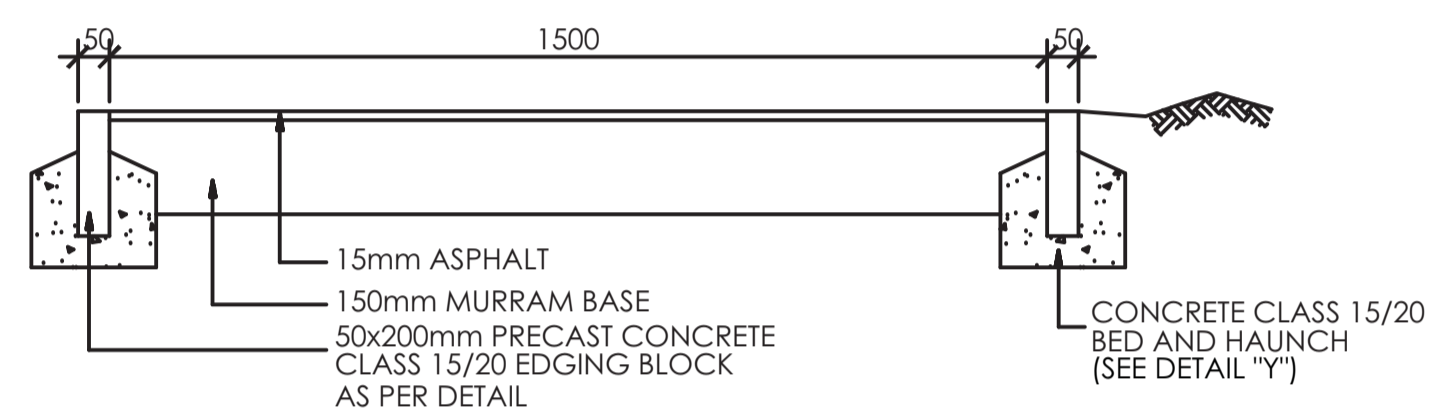
**TYPICAL SECTION OF BITUMINOUS ROAD**

SCALE 1:50



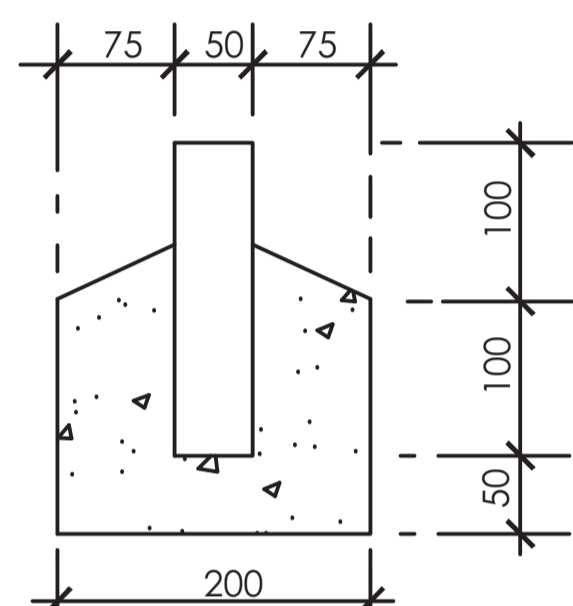
**DETAIL (X)**

SCALE 1:20



**TYPICAL SECTION OF FOOTPATH**

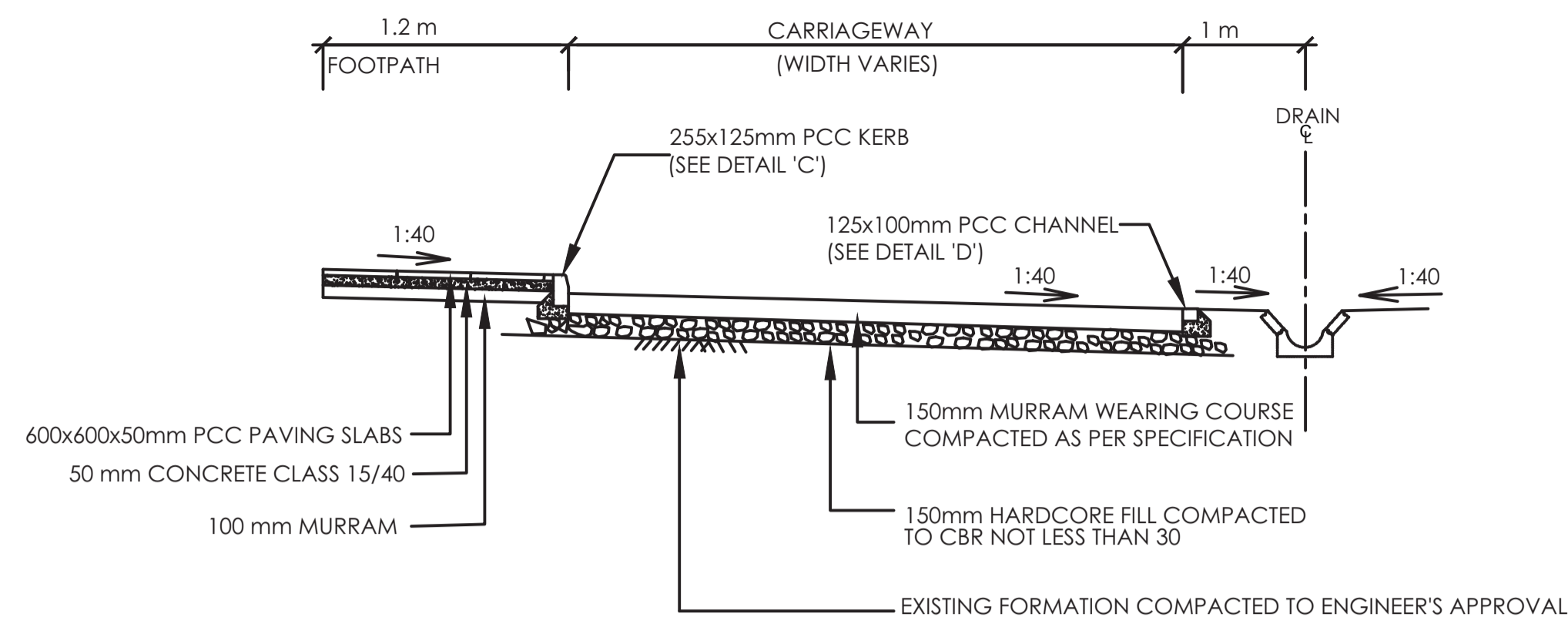
SCALE 1:25



**DETAIL (Y)**

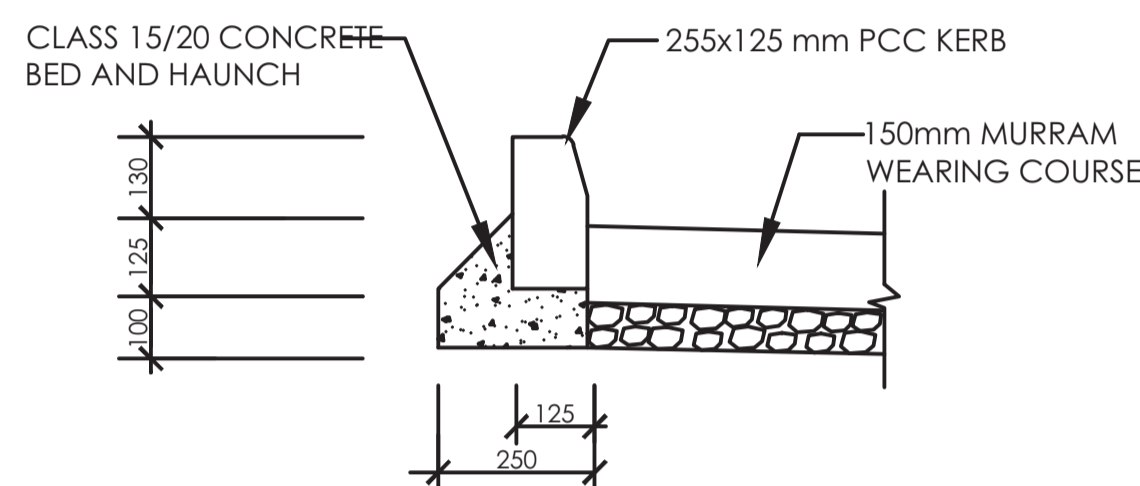
SCALE 1:10

**TYPICAL MURRAM ROAD DETAILS**



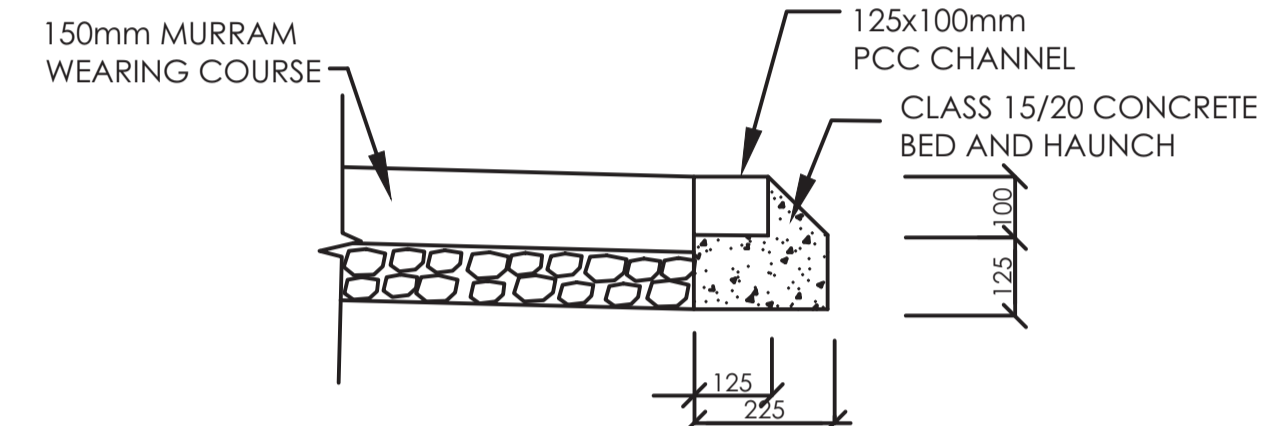
**TYPICAL SECTION OF MURRAM ROAD**

SCALE 1: 50



**DETAIL 'C'**  
**TYPICAL DETAIL OF KERB**

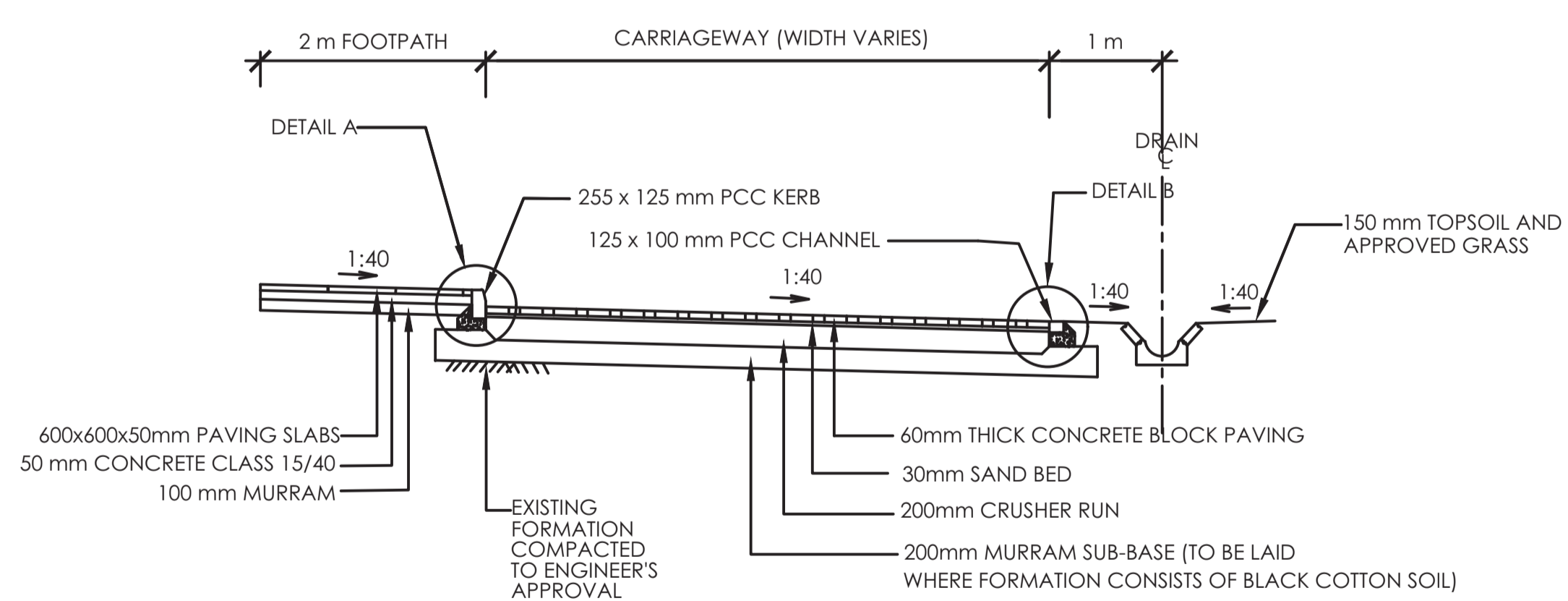
SCALE 1:25



**DETAIL 'D'**  
**TYPICAL DETAIL OF CHANNEL**

SCALE 1:25

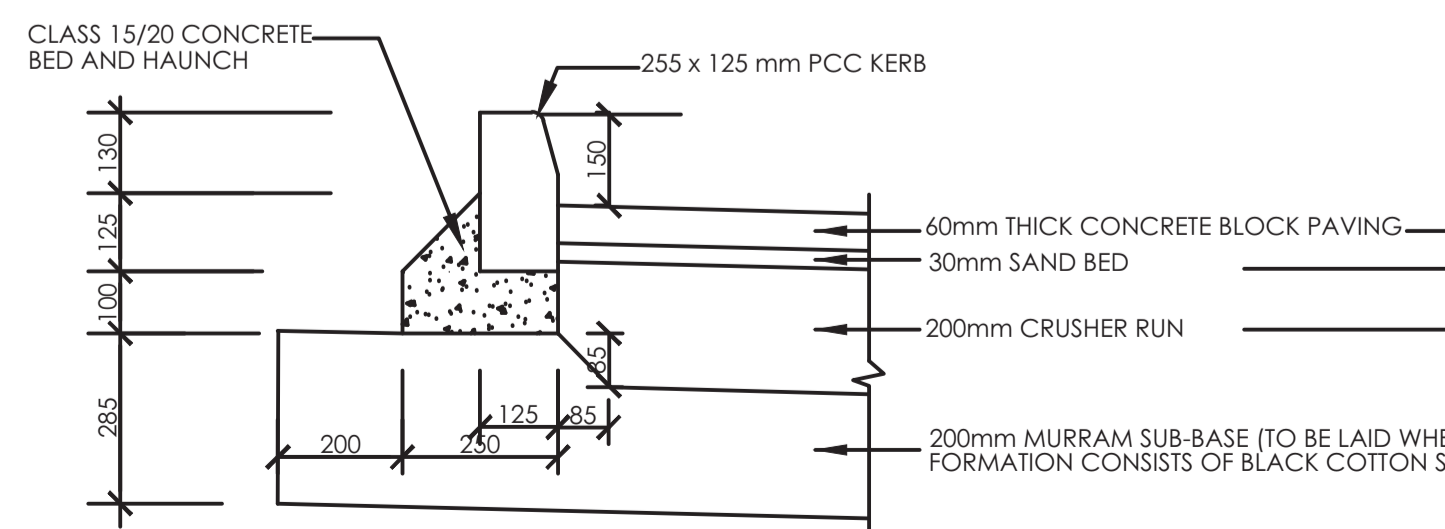
**TYPICAL CONCRETE BLOCKS SURFACE ROAD DETAILS**



**TYPICAL CROSS SECTION FOR CARRIAGEWAY IN CUT**

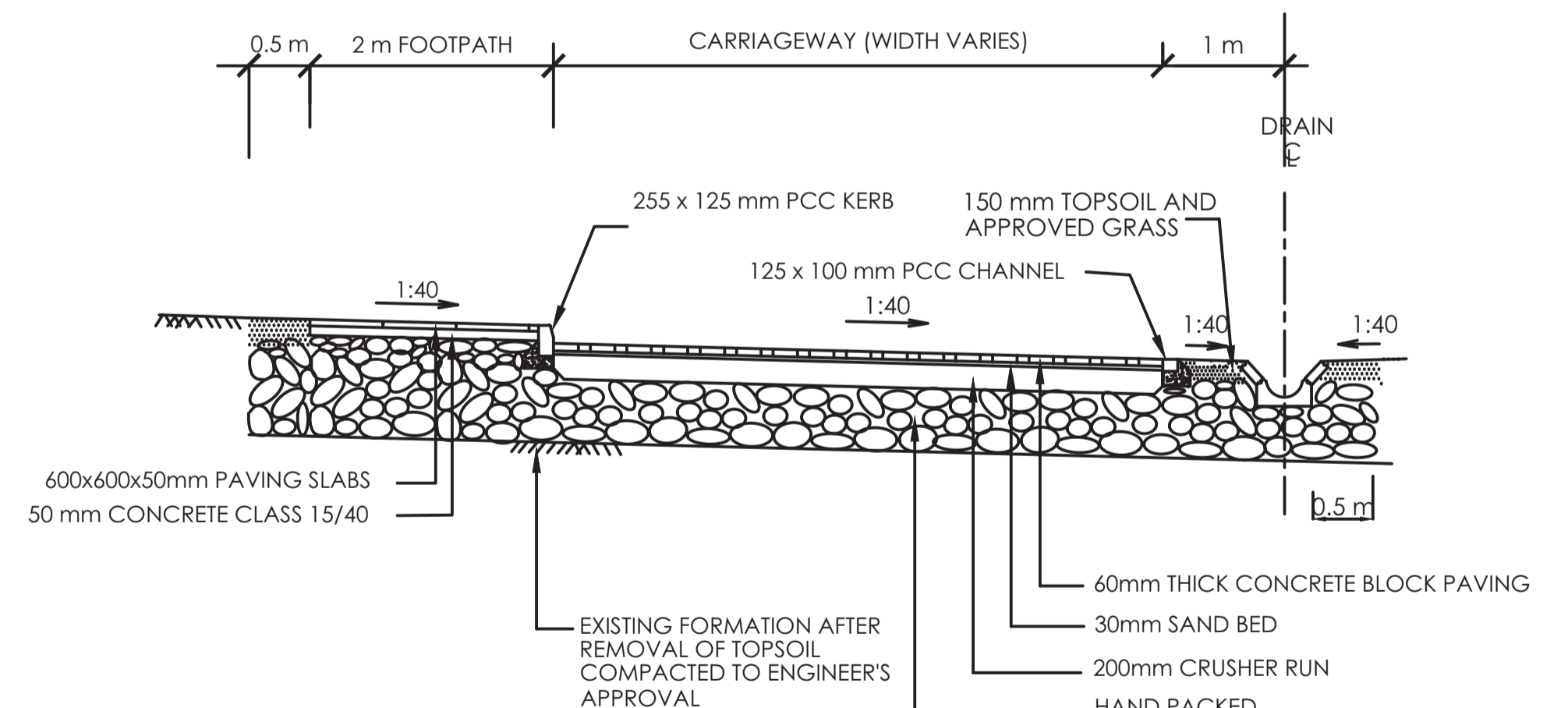
SCALE 1:100

**DETAIL A**



**DETAIL OF KERB**

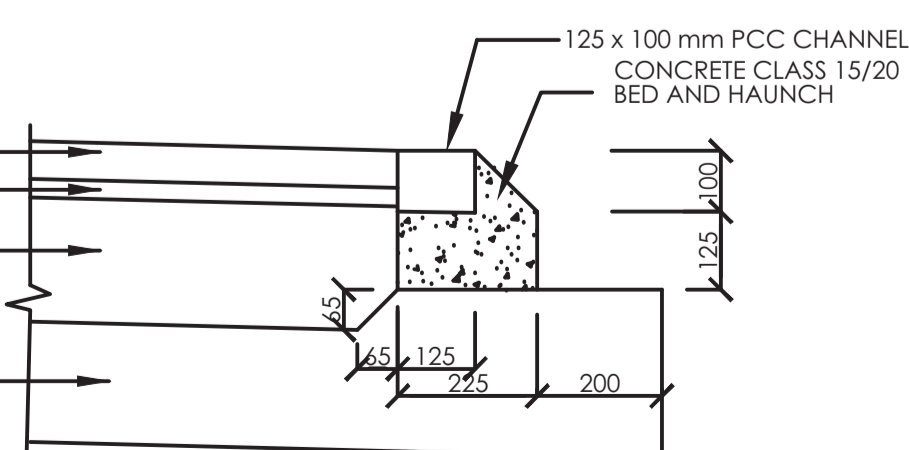
SCALE 1:25



**TYPICAL CROSS SECTION FOR CARRIAGEWAY ON FILL**

SCALE 1:100

**DETAIL B**



**DETAIL OF CHANNEL**

SCALE 1:25

**NOTES**

ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED

**ABBREVIATIONS**

- C - CENTRE LINE
- mm - MILLIMETER
- G.L. - GROUND LEVEL
- m - METER
- PCC - PRECAST CEMENT CONCRETE

REVISION	DESCRIPTION	DATE

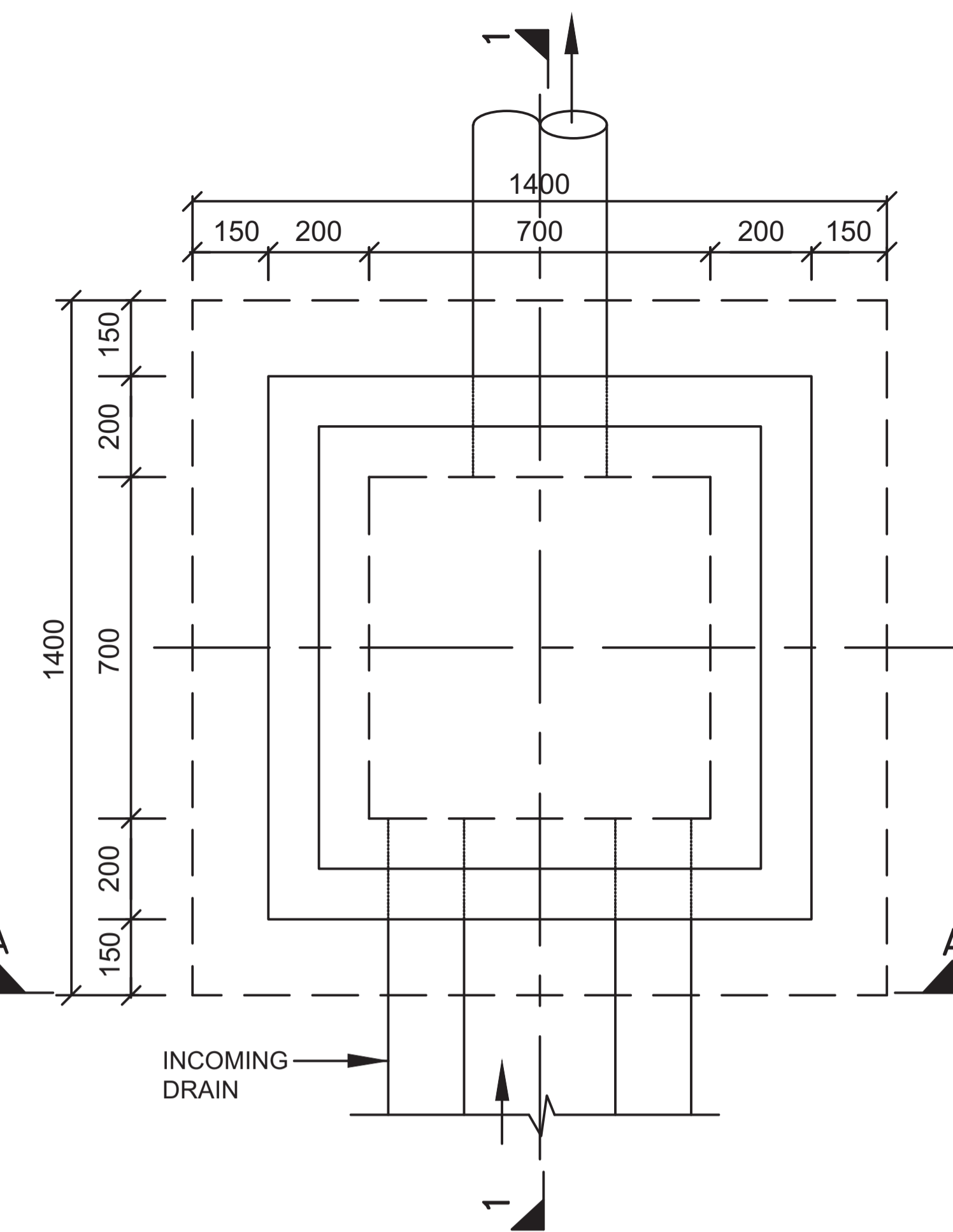
CLIENT / EMPLOYER:  
**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY: **Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

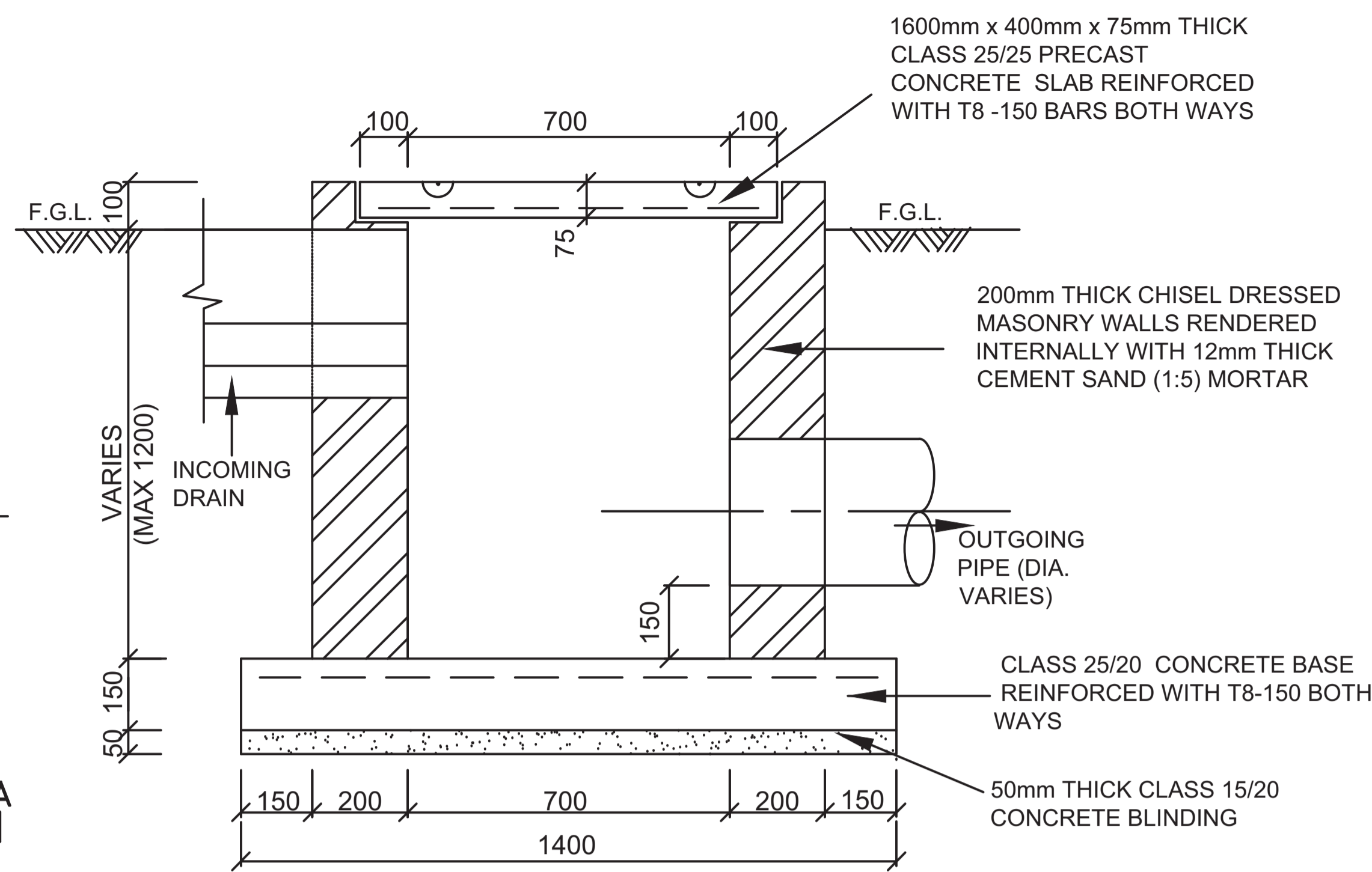
DRAWING TITLE:  
**STANDARD DRAWINGS**  
**TYPICAL ROAD CROSS SECTION DETAILS**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: 1:500	Date: FEBRUARY 2024
DRAWING NO: M/W/S/SD/12	REV. 0

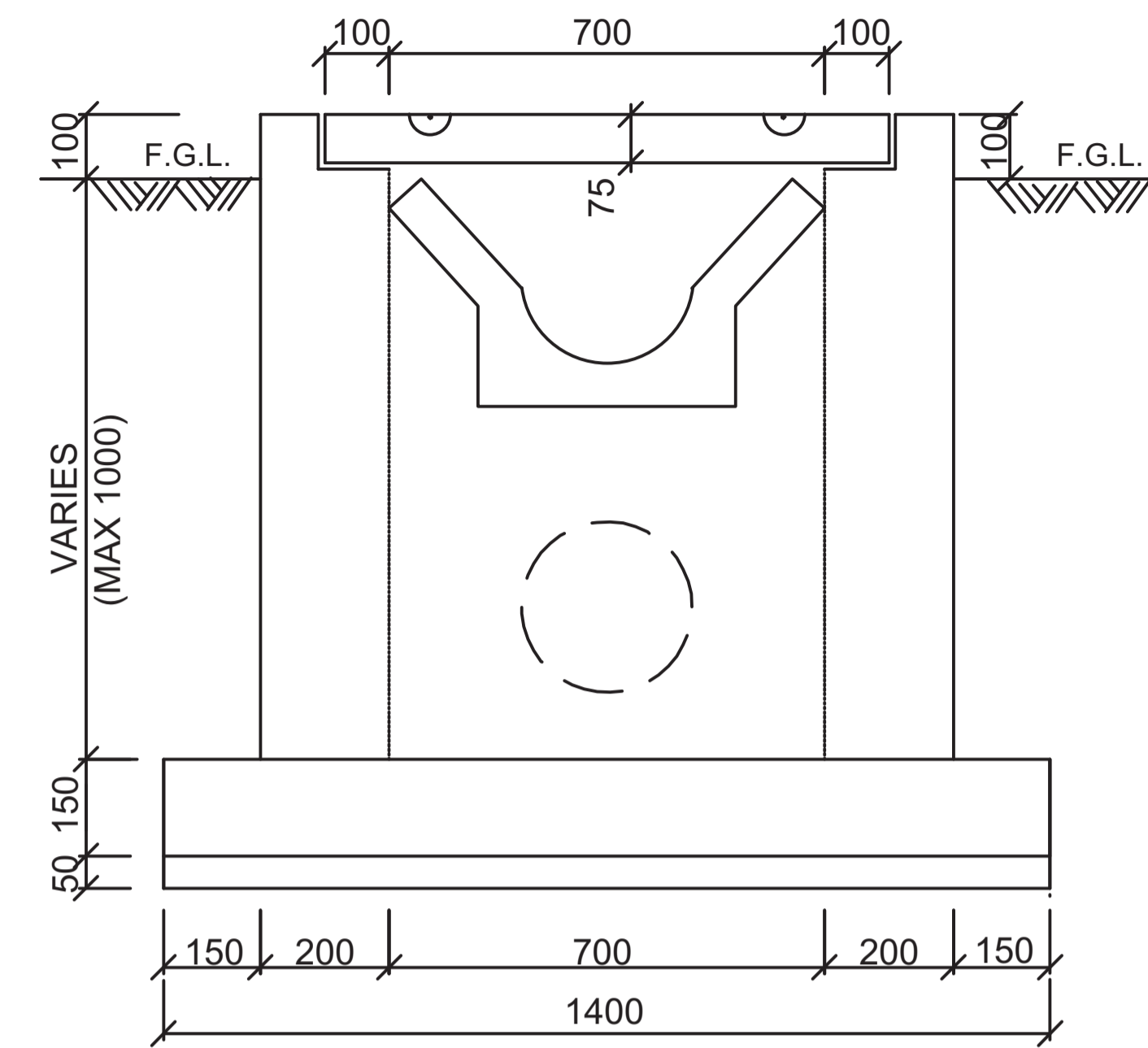
## DETAILS OF STORM WATER CATCHPIT



**PLAN**  
**TYPICAL STORM WATER CATCHPIT**  
SCALE 1:20



**SECTION 1-1**  
SCALE 1:20



**ELEVATION A-A**  
SCALE 1:20

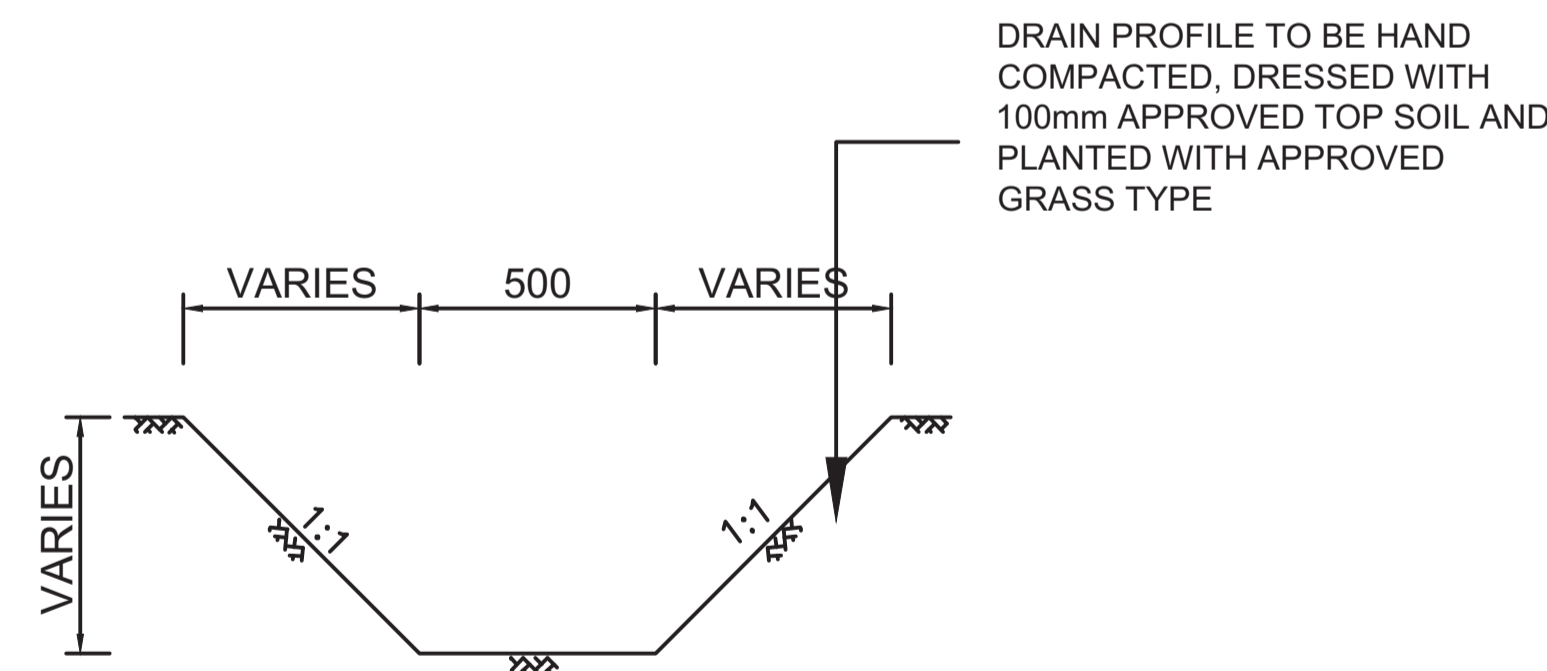
### NOTES

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED
2. LENGTH OF EACH CASCADE TO BE 1000mm

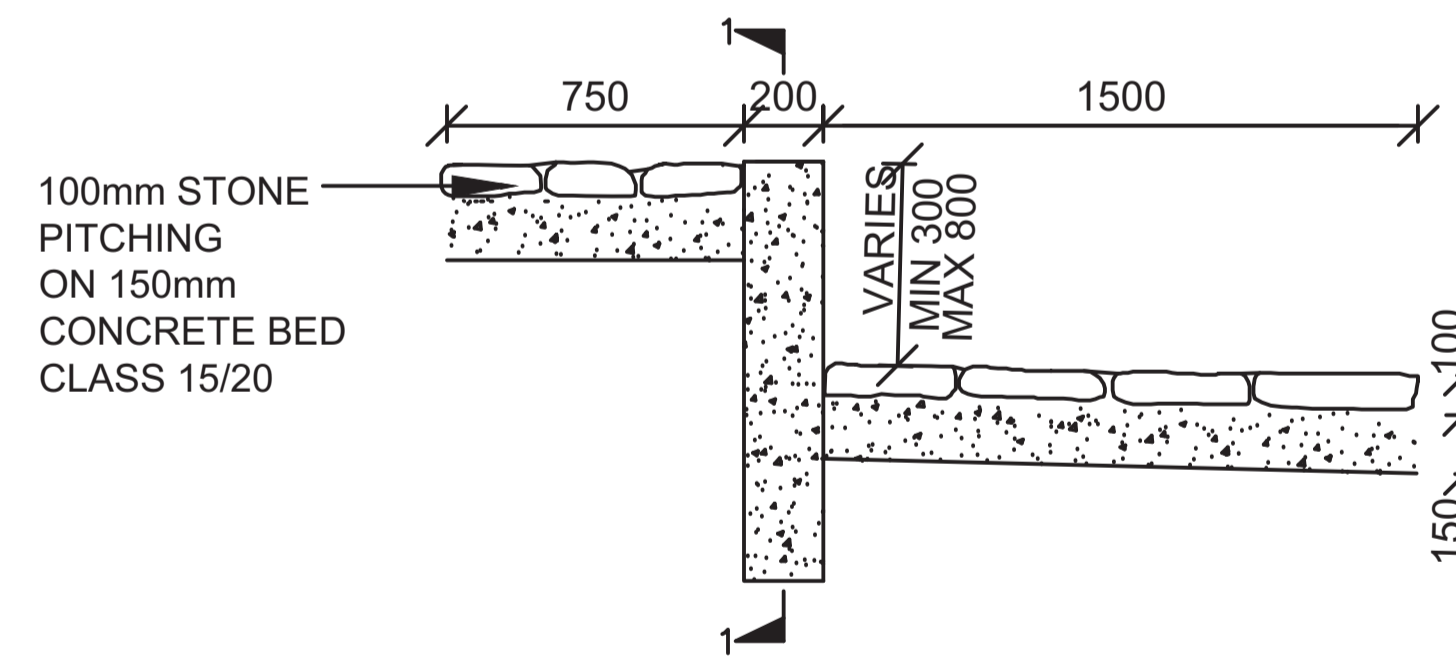
### ABBREVIATIONS

- I.B. - INVERT BLOCK
- I.B.D. - INVERT BLOCK DRAIN
- DIA - DIAMETER
- mm - MILLIMETER
- F.G.L. - FINISHED GROUND LEVEL

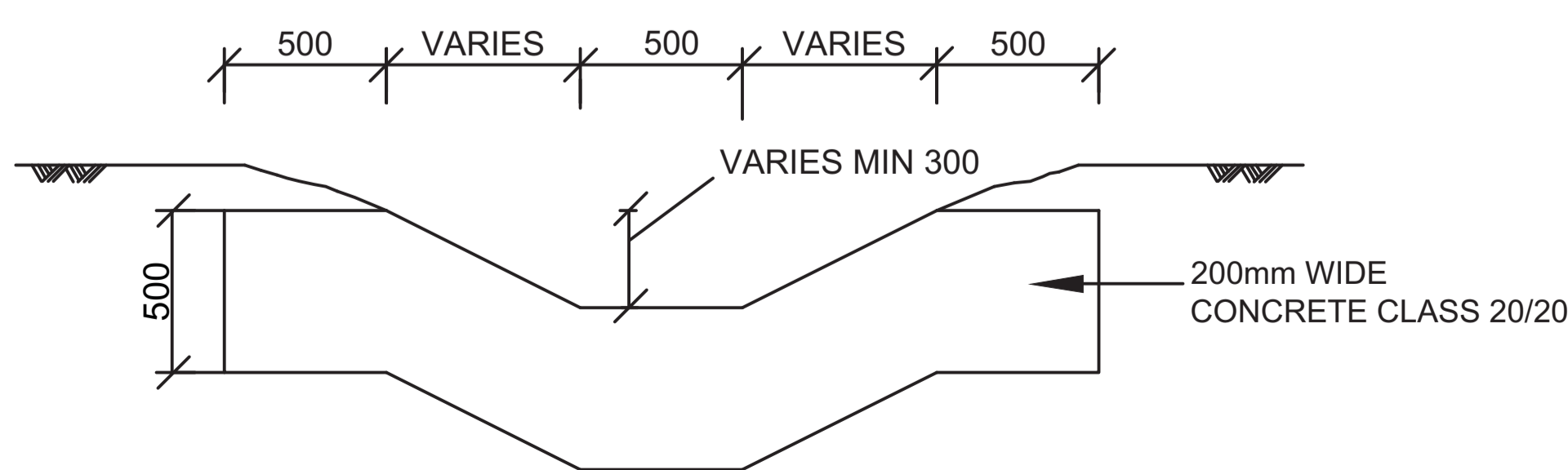
## DETAILS OF EARTH DRAIN TYPE '1'



**EARTH DRAIN TYPE 1**

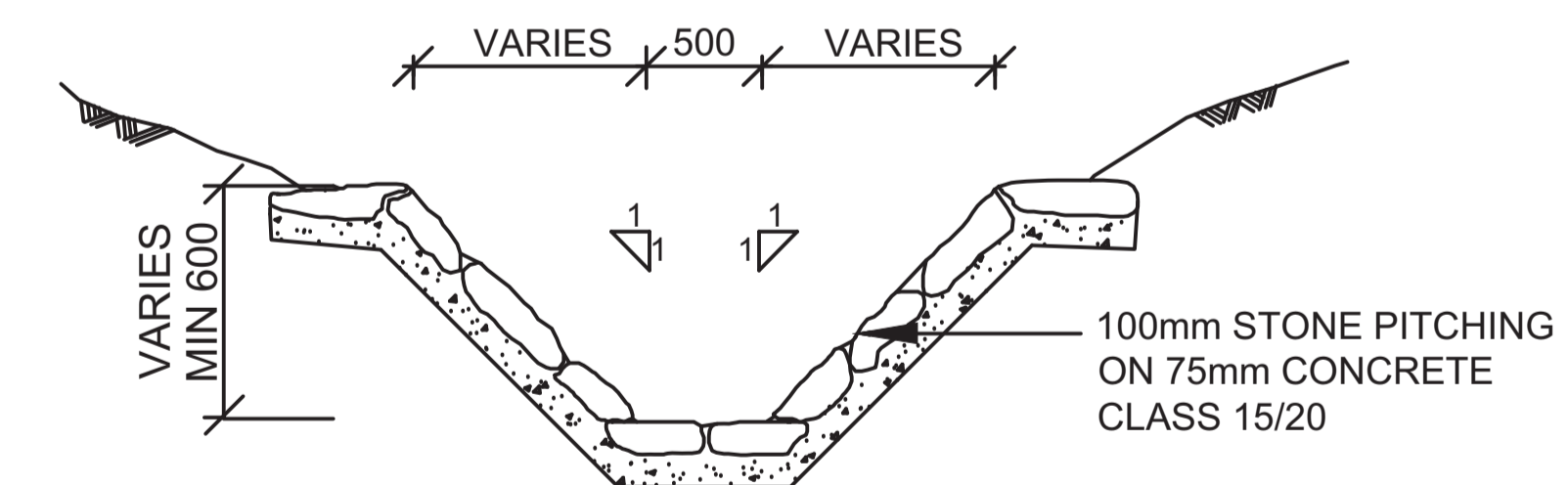


**SECTION**  
**SILL FOR DRAIN TYPE 1**



**ELEVATION 1-1**

## DETAILS OF DRAIN TYPE '2' (STONE PITCHED DRAIN)



**DRAIN TYPE 2**  
**(STONE PITCHED DRAIN)**

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:

**NORTHERN WATER WORKS  
DEVELOPMENT AGENCY**  
P.O. BOX 495-70100  
GARISSA

REVIEWED BY: **Interconsult Engineers Ltd**  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane,  
Tel. 4441648/4441651  
Nairobi.

DRAWING TITLE:

**STANDARD DRAWINGS**  
**DETAILS OF STORM WATER CATCH  
PIT AND EARTH DRAINS**

Designed by: N.M. Drawn by: I.M.W.

Checked by: P.M.M. Approved by: K.M.

Scale: 1:500 Date: FEBRUARY 2024

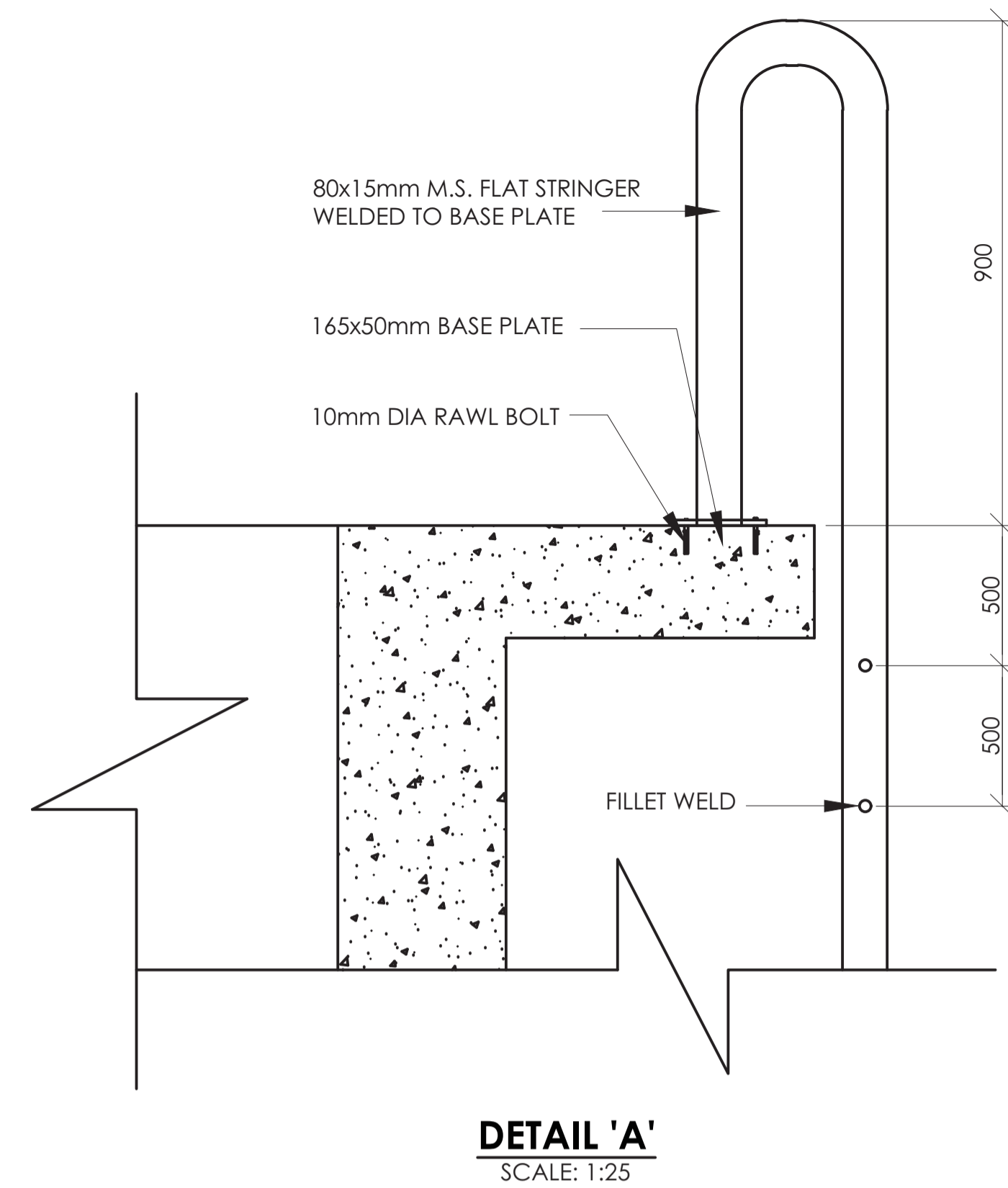
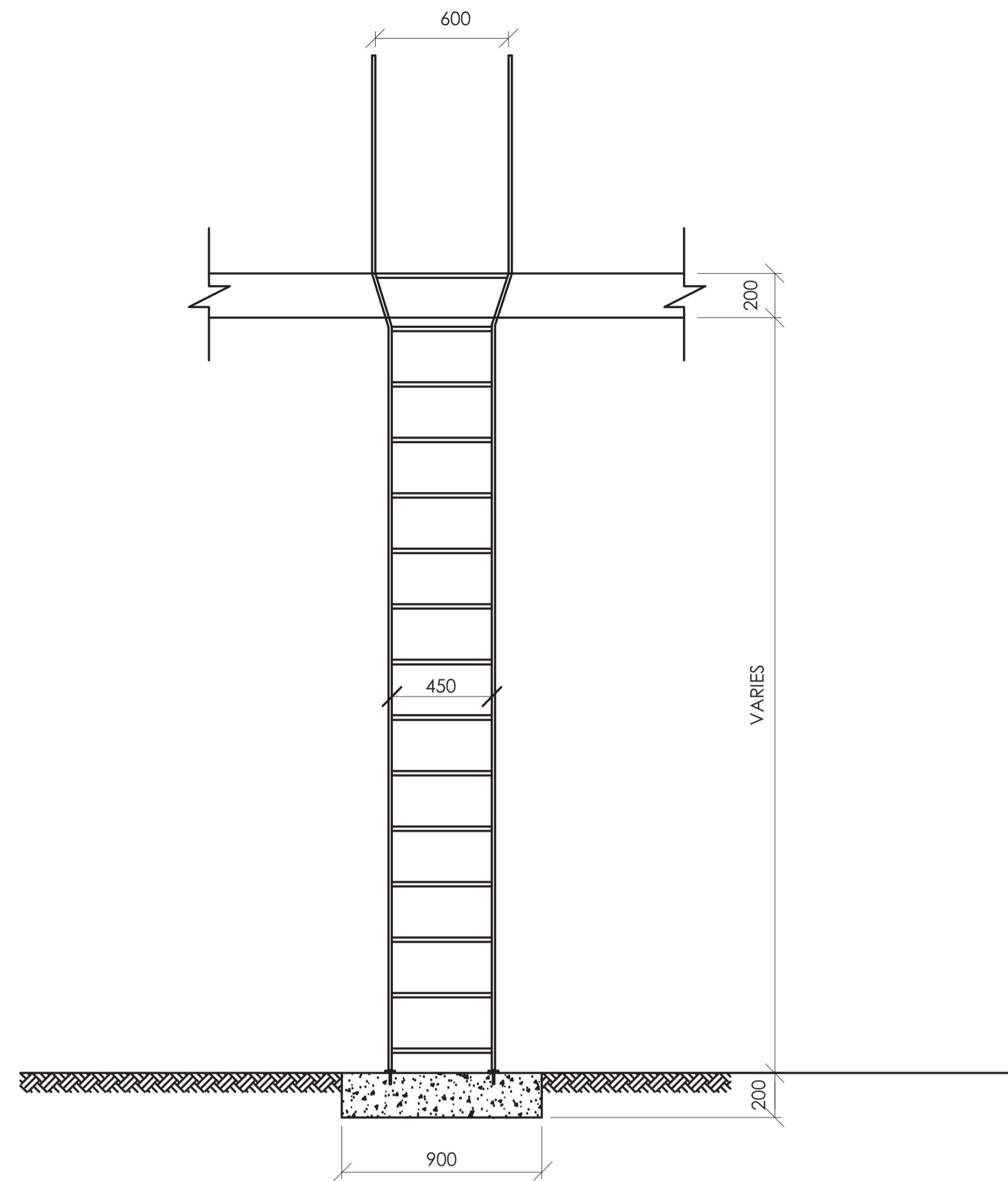
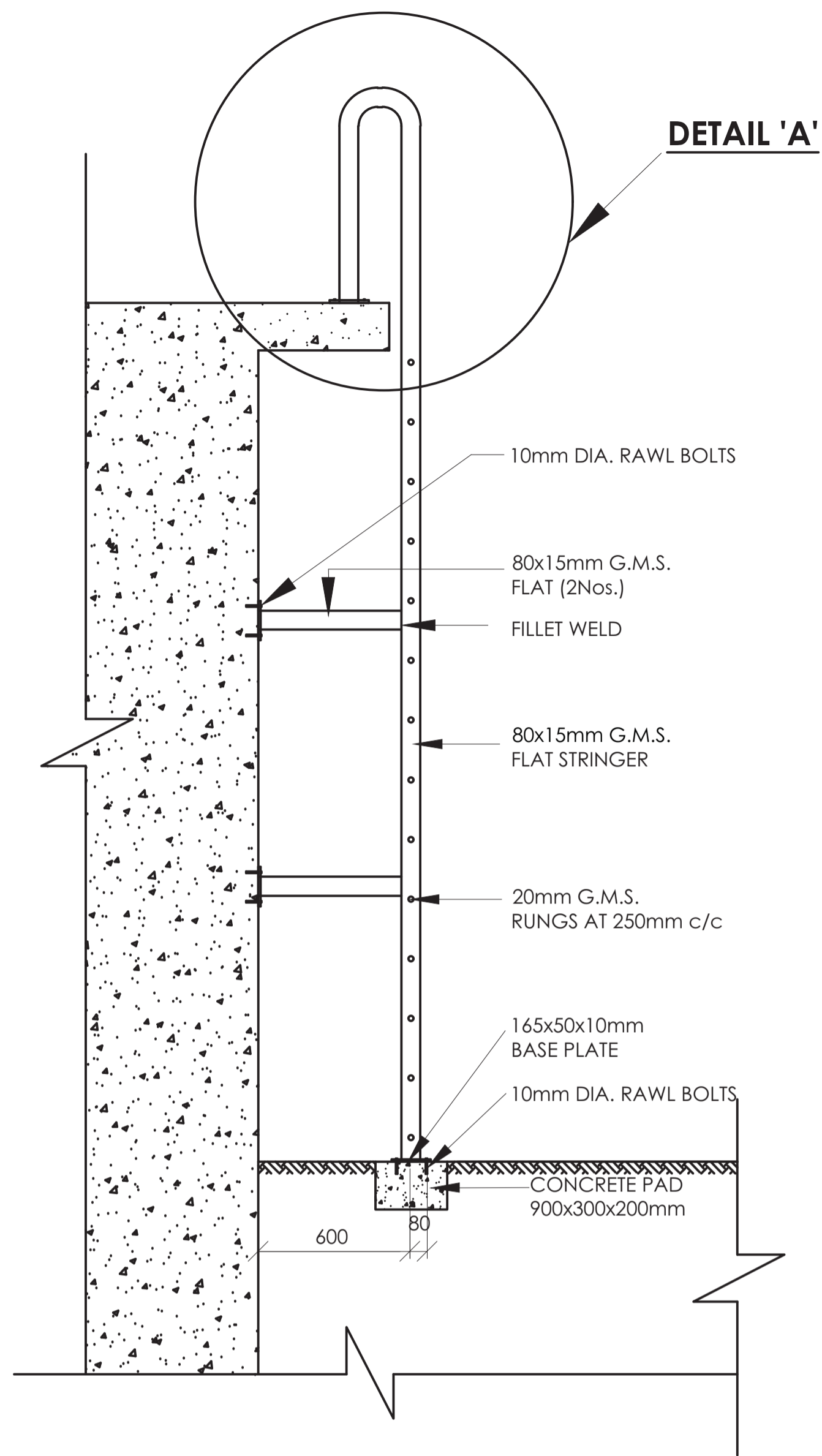
DRAWING No: M/W/S/SD/13 REV. 0

**NOTES**

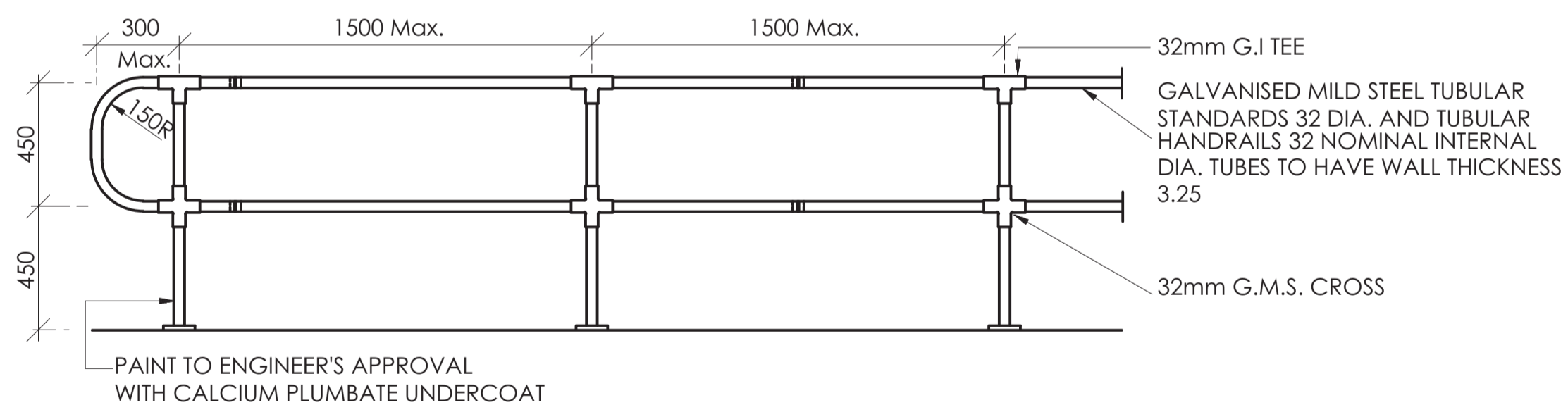
1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED

**ABBREVIATIONS**

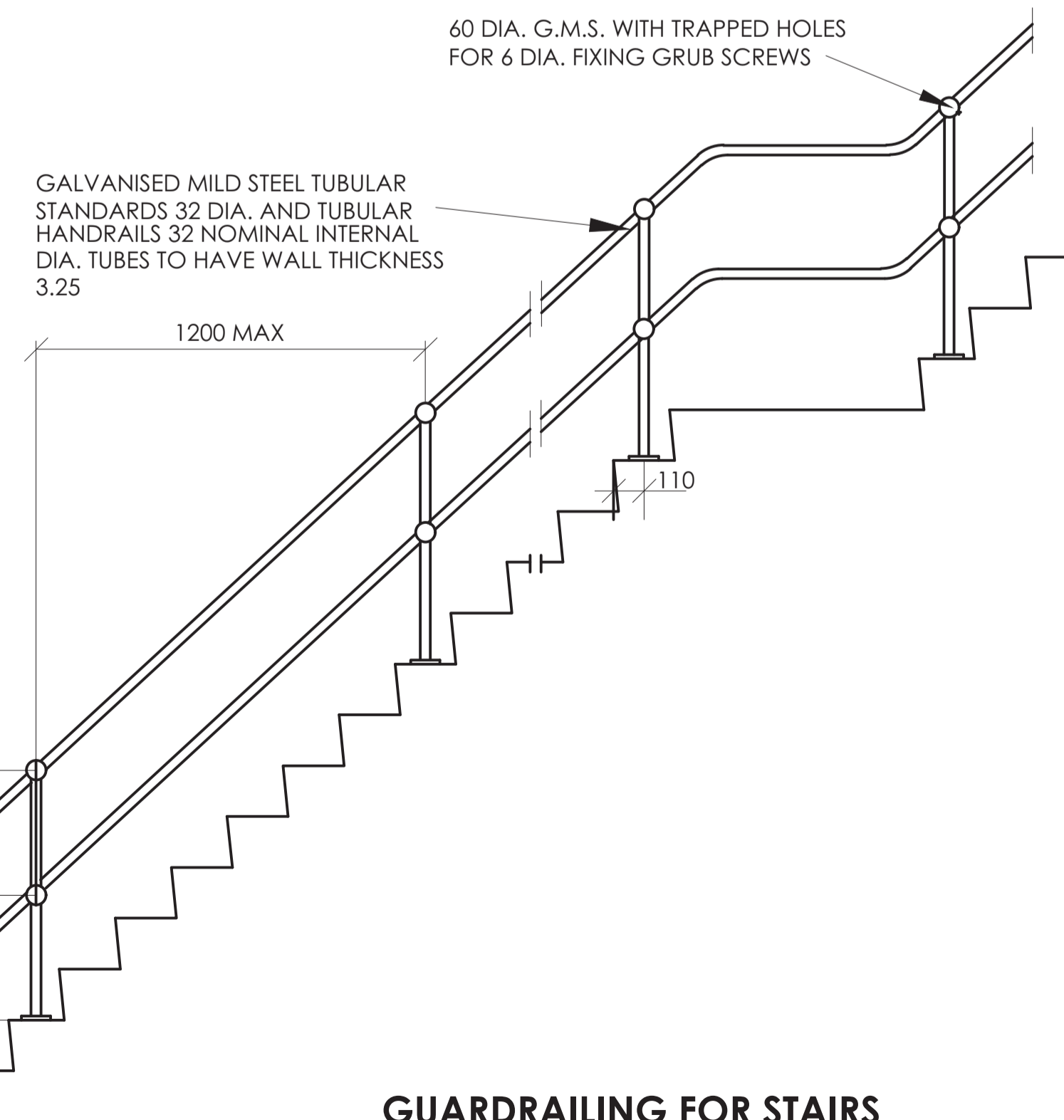
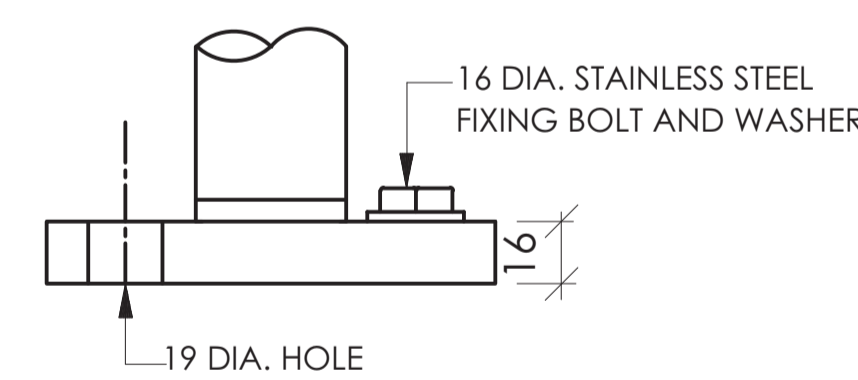
mm - MILLIMETRES  
 DIA - DIAMETER  
 G.M.S. - GALVANISED MILD STEEL  
 Nos. - NUMBERS  
 c/c - CENTRE TO CENTRE  
 Max - MAXIMUM  
 G.I. - GALVANISED IRON  
 M.S - MILD STEEL



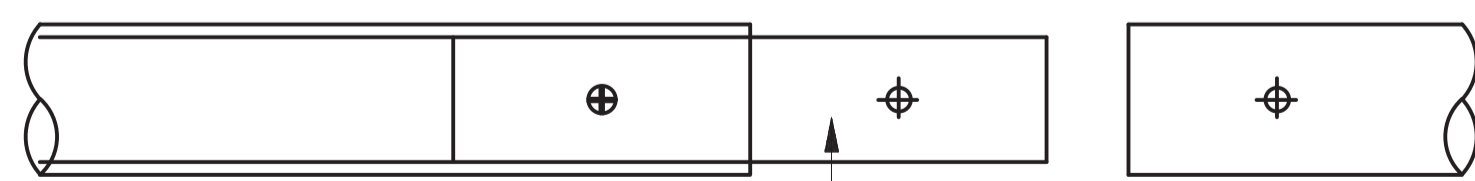
**DETAILS OF G.M.S. LADDER**  
 SCALE: 1: 50



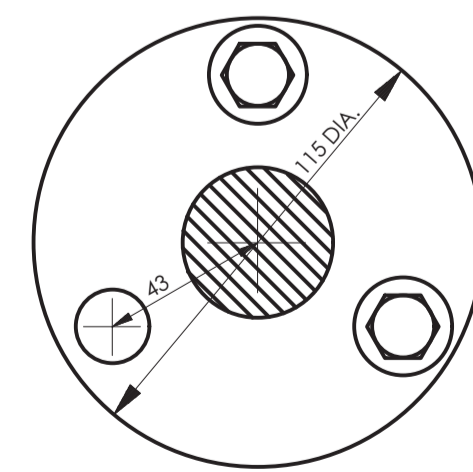
**GUARDRAILING**  
 SCALE: 1: 40



**GUARDRAILING FOR STAIRS**  
 SCALE: 1: 40




**TUBULAR GUARDRAILING JOINT**  
 SCALE: 1: 4



**ROUND BASE**  
 SCALE: 1: 4

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:  

 NORTHERN WATER WORKS DEVELOPMENT AGENCY  
 P.O. BOX 495-70100  
 GARISSA

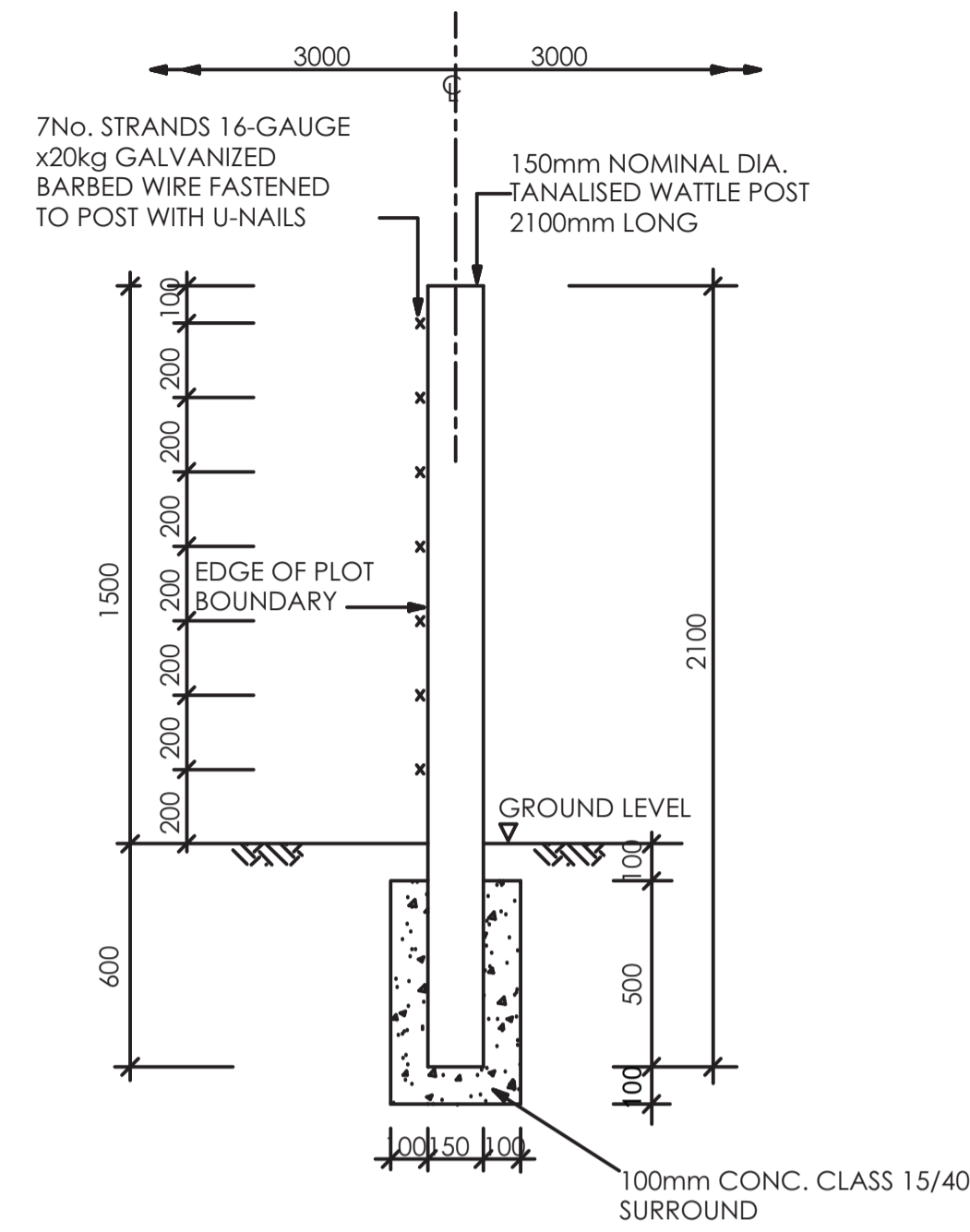
REVIEWED BY:  

 Interconsult Engineers Ltd  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**STANDARD DRAWINGS**  
 DETAILS OF G.M.S. LADDER AND GUARD RAILING

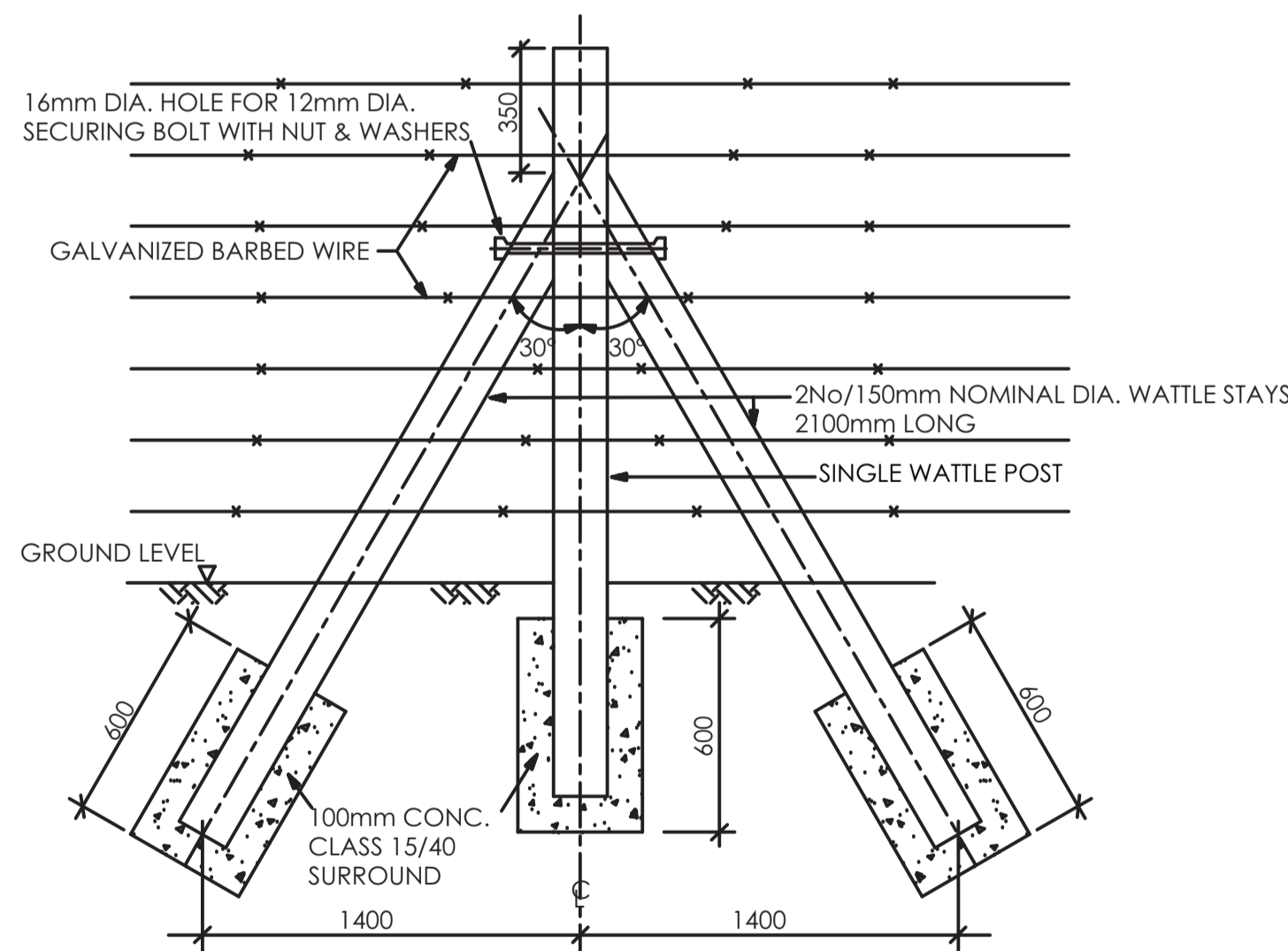
Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: 1:500	Date: FEBRUARY 2024
DRAWING No: M/W/S/SD/14	REV. 0

## DETAILS OF WATTLE POSTS FOR BARBED WIRE FENCE



**TYPICAL END ELEVATION - SINGLE POST**  
(TO BE AT 3.0m CENTRES)

(NTS)



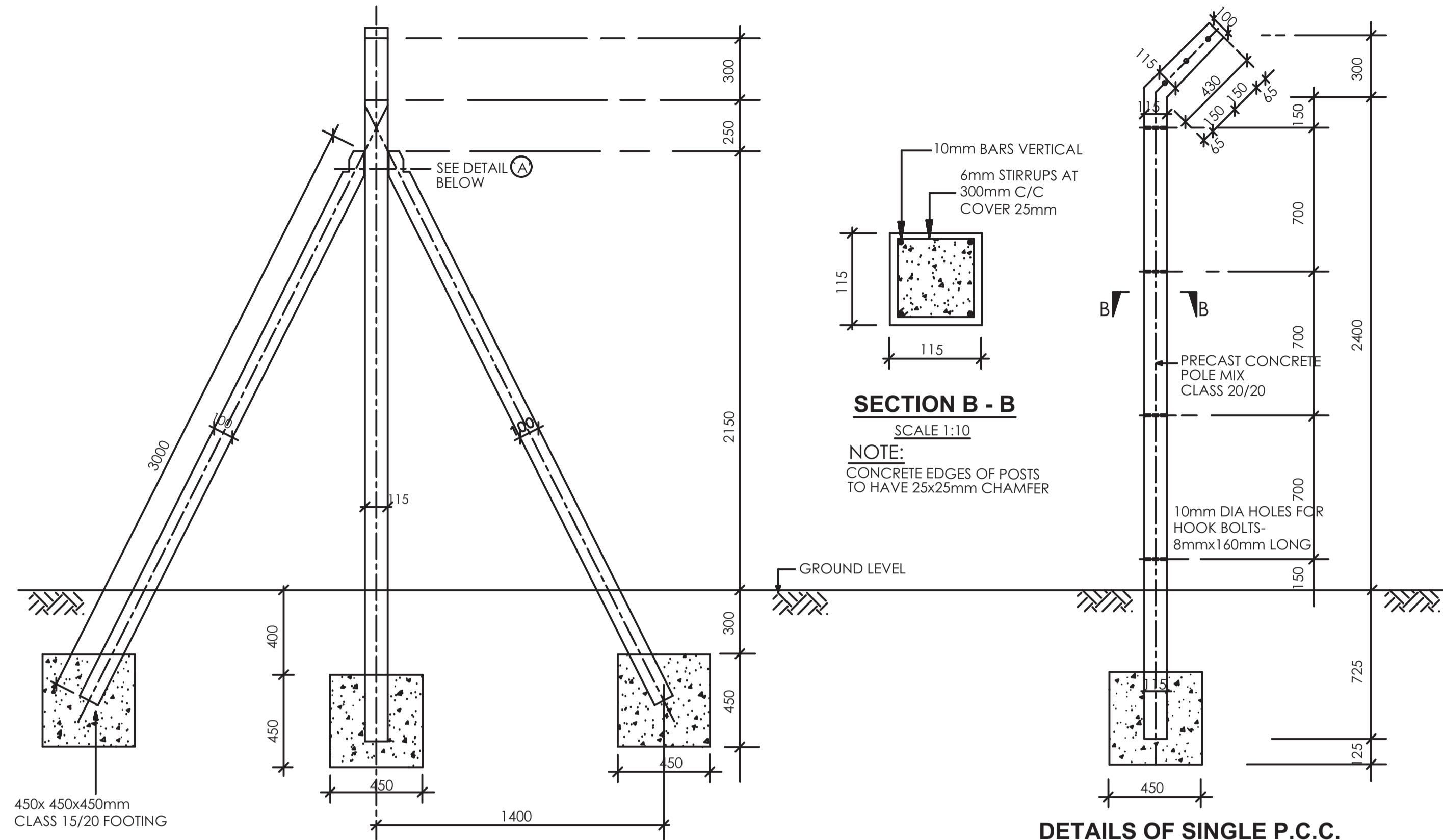
**TYPICAL FRONT ELEVATION - STAYED POST**  
(STAYS TO BE PROVIDED AT 30.0m c/c AND AT CORNERS)

(NTS)

### NOTES

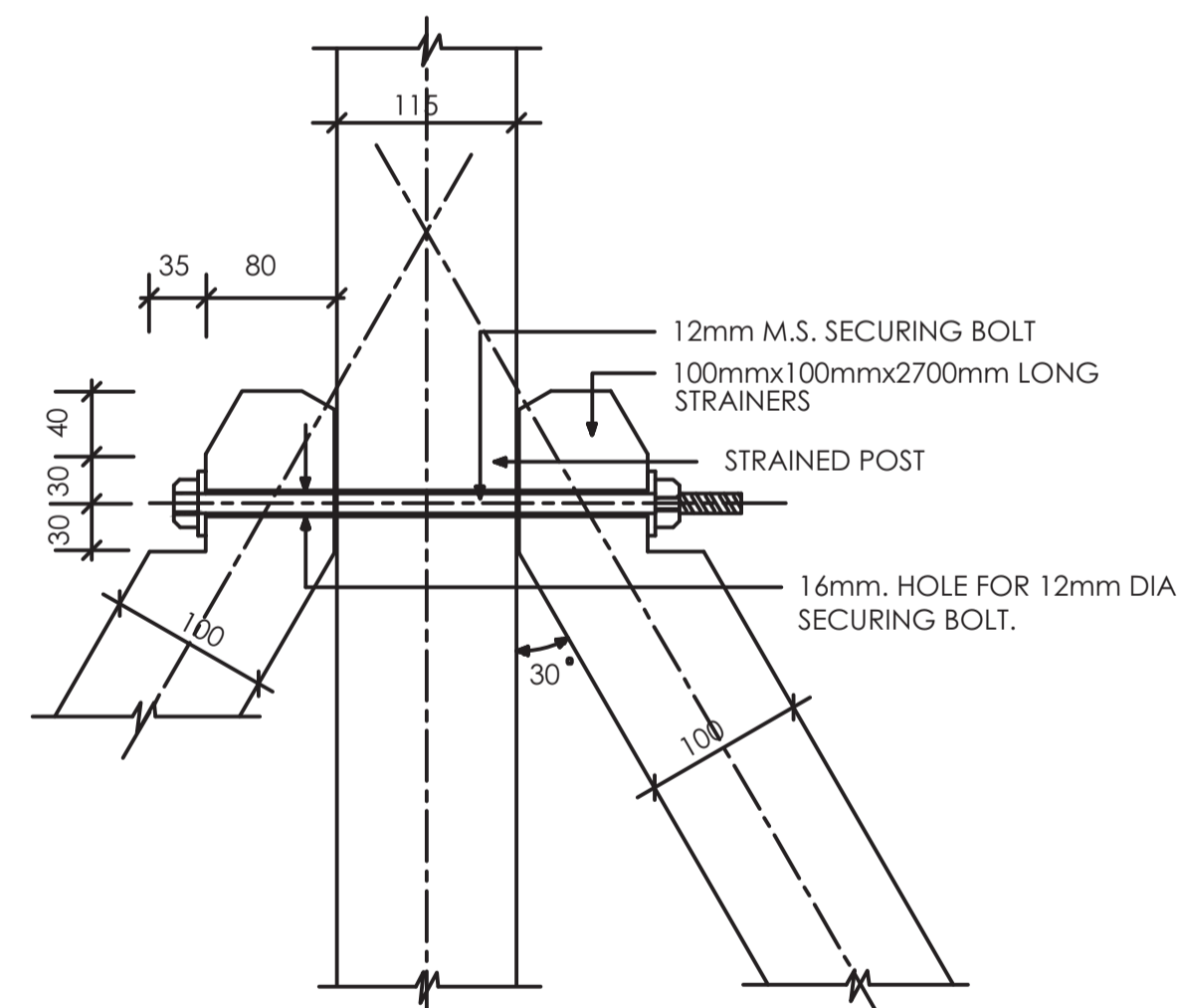
- ALL CORNER POSTS AND EVERY 10<sup>th</sup> SINGLE POST TO HAVE 2No. STAYS
- POSTS TO BE AT 3000mm CENTRES
- TOP OF ALL POSTS TO BE KEPT IN UNIFORM LINE
- EXTENT OF FENCING IS SHOWN ON THE LAYOUT PLAN
- N.T.S = NOT TO SCALE

## DETAILS OF PRECAST CONCRETE POSTS FOR CHAIN LINK FENCE



**DETAILS OF STRAINING POST FOR CHAIN LINK FENCE AT 33.3m Cts.**

SCALE 1:40

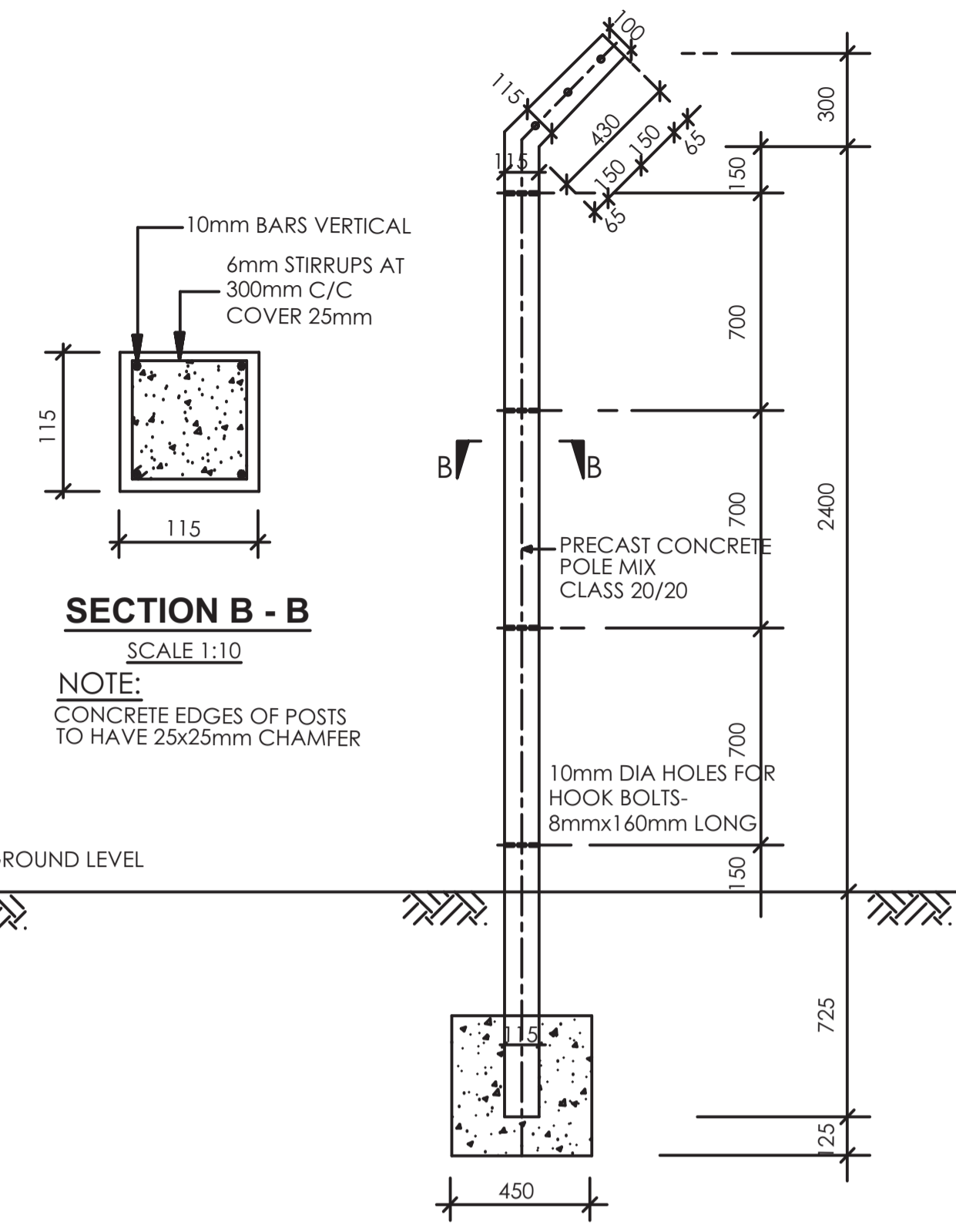


**DETAIL A**

SCALE 1:10

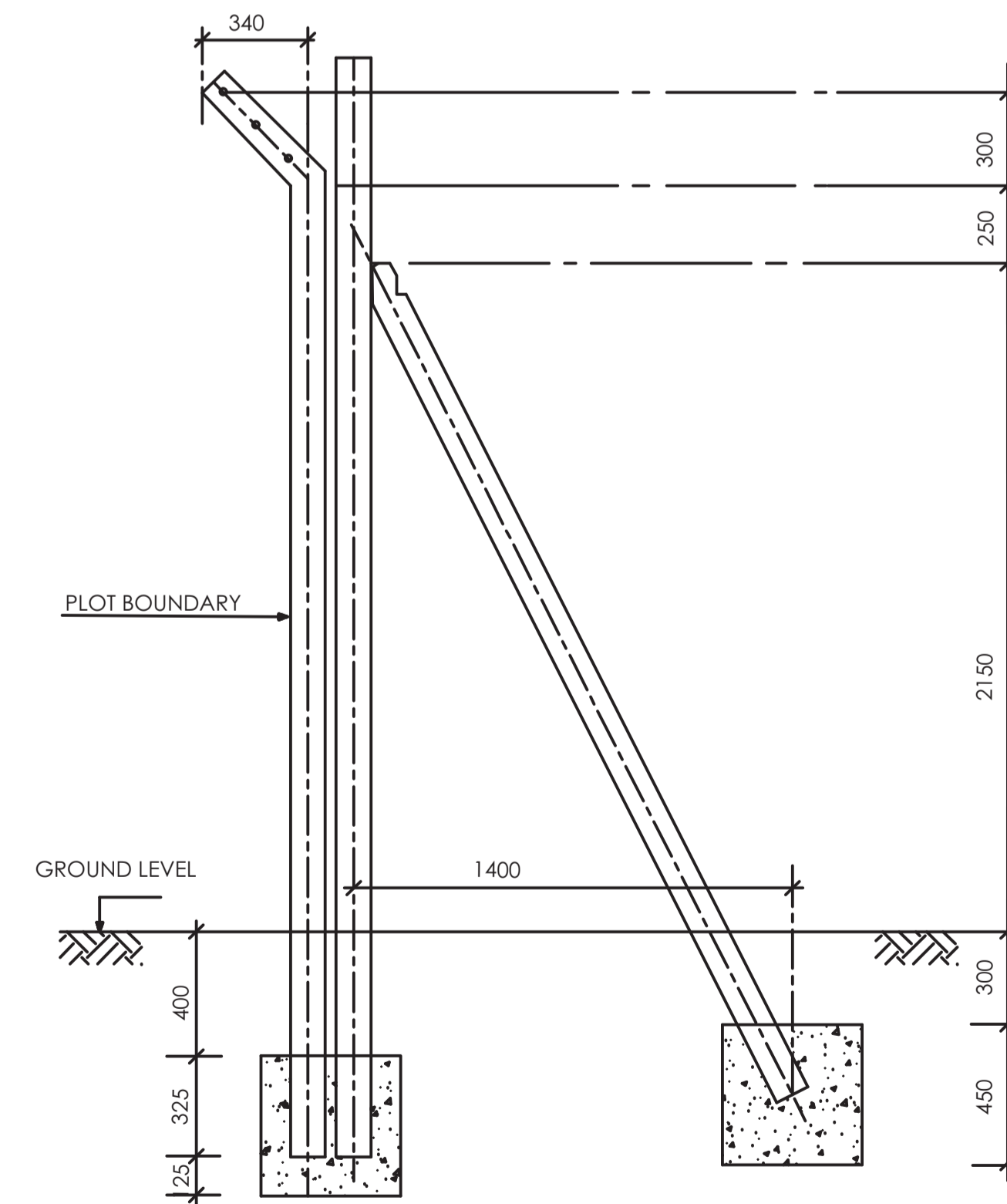
### NOTES

- APPROXIMATELY EVERY 10<sup>th</sup> POST AND ALL CORNER POST TO BE STRAINED
- POST TO BE AT 3300mm CENTRES
- TOP OF ALL POSTS TO BE KEPT IN UNIFORM LINE.



**DETAILS OF SINGLE P.C.C. POST AT 3.30m Cts.**

SCALE 1:40



**DETAILS OF CORNER POSTS**

SCALE 1:40

### NOTES

- CONCRETE MIXES TO BE AS FOLLOWS:
  - POSTS CLASS 20/20
  - STRAINER POSTS CLASS 20/20
  - FOUNDATION BLOCK CLASS 15/20 CONC.
- CHAIN LINK TO BE IN GAUGE 12 GALVANISED STEEL WIRE.
- STRAINING WIRES TO BE 12 GAUGE GALVANISED STEEL PLAIN WIRES.
- WIRES ON CRANK TO BE 12 GAUGE GALVANISED STEEL BARBED WIRE.
- ALL STRUCTURAL OPENING DIMENSIONS TO BE CONFIRMED ON SITE BEFORE COMMENCING ANY FABRICATION
- STRAINING WIRES TO BE FIXED TO POST WITH GALVANIZED HOOK BOLTS 8mm DIA. x 60mm LONG
- WHERE THE POST ENCLOSES PRIVATE LAND THE FENCE SHOULD BE ERECTED WITH CRANK POINTING INTO THE SITE.
- ALL DIMENSIONS ARE IN mm. UNLESS OTHERWISE STATED.
- ALL EXPOSED CONCRETE EDGES OF POSTS TO HAVE 25x25mm CHAMFER

### ABBREVIATIONS

- C/C = CENTRE TO CENTRE.  
 Cts. = CENTRES.  
 M.S. = MILD STEEL.  
 P.C.C = PRECAST CEMENT CONCRETE.  
 CONC. = CONCRETE  
 mm - MILLIMETER  
 uPVC - UNPLASTICISED POLYVINYL CHLORIDE  
 Dia. - DIAMETER  
 Kg - KILOGRAMME  
 C - CENTRE LINE  
 m - METRE  
 NTS - NOT TO SCALE  
 Nr. - NUMBER

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:

NORTHERN WATER WORKS  
DEVELOPMENT AGENCY  
P.O. BOX 495-70100  
GARISSA

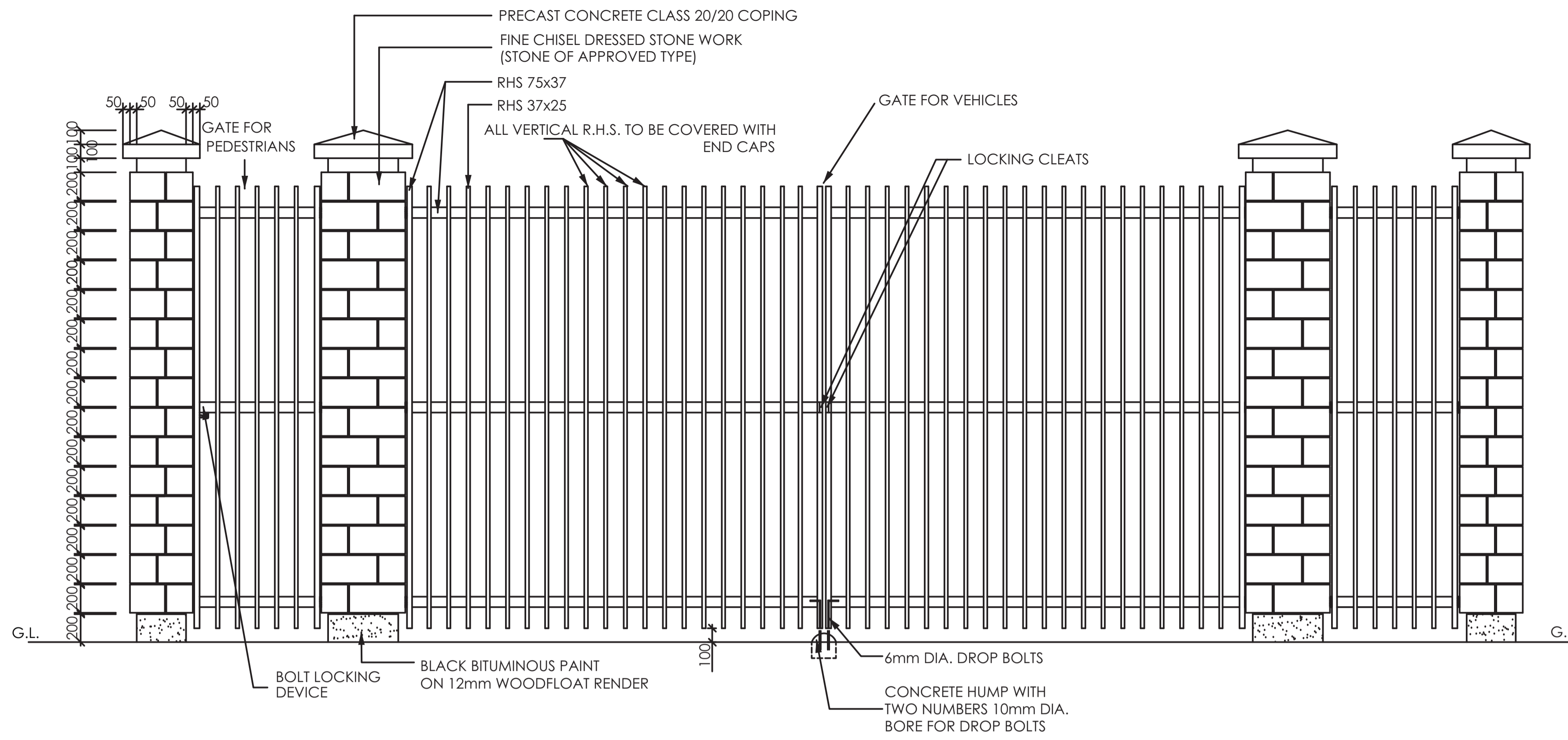
REVIEWED BY: Interconsult Engineers Ltd  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane,  
Tel. 4441648/4441651  
Nairobi.

DRAWING TITLE:

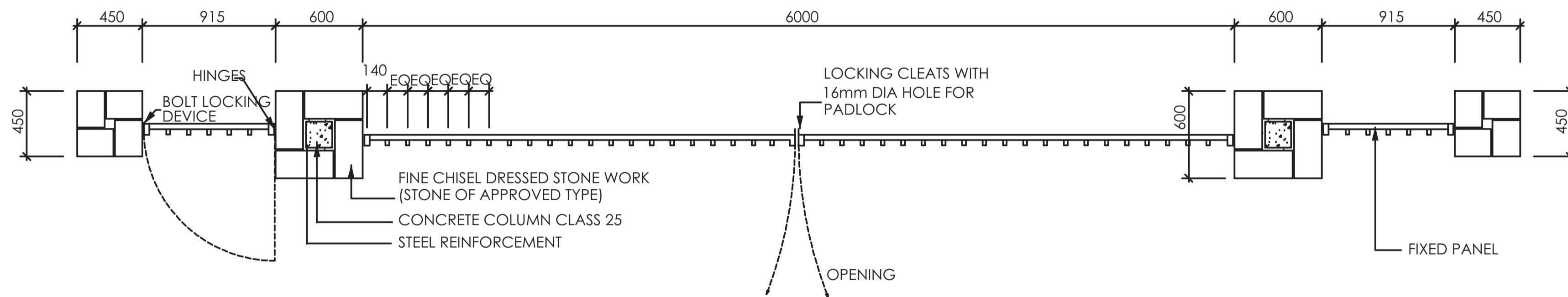
**STANDARD DRAWINGS**

**DETAILS OF FENCING POSTS**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: 1:500	Date: FEBRUARY 2024
DRAWING No: M/W/SD/15	REV. 0

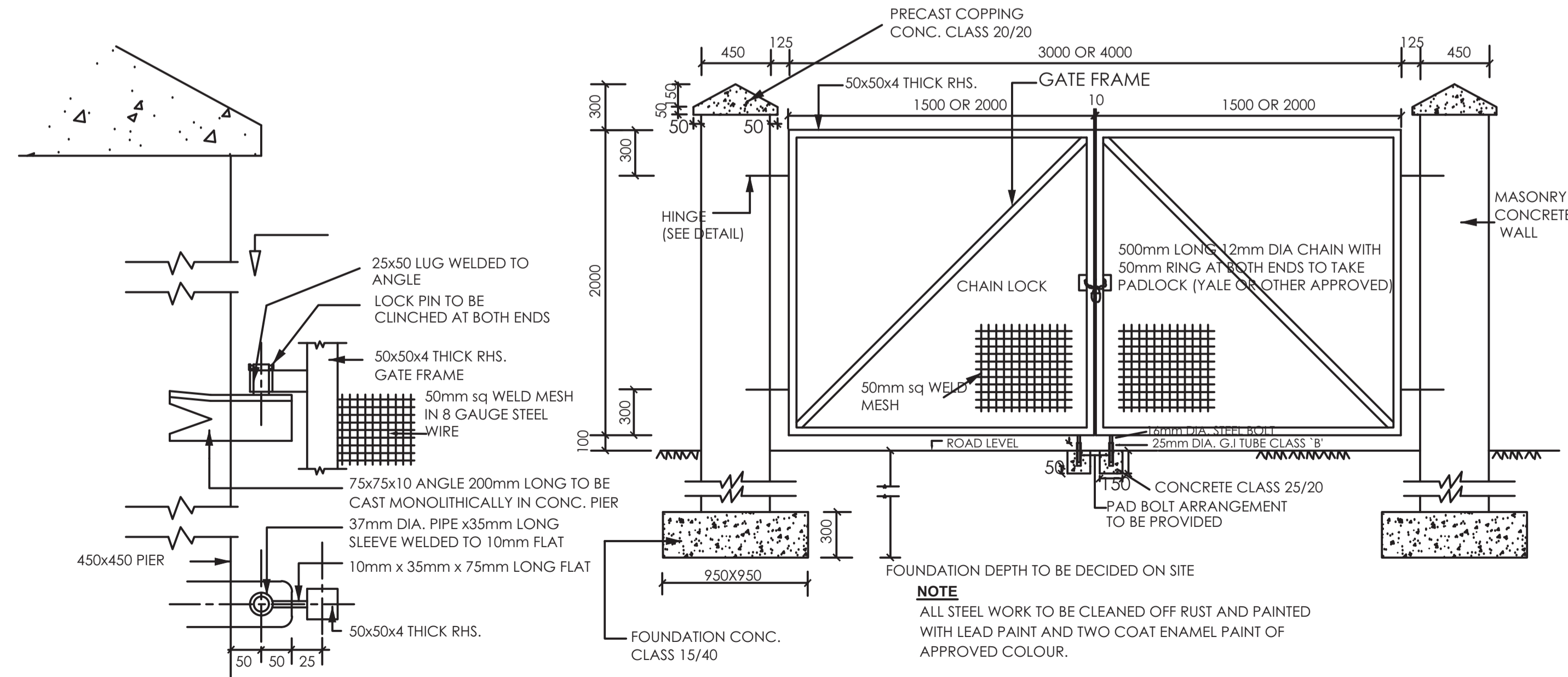


**ELEVATION**  
SCALE: 1: 50



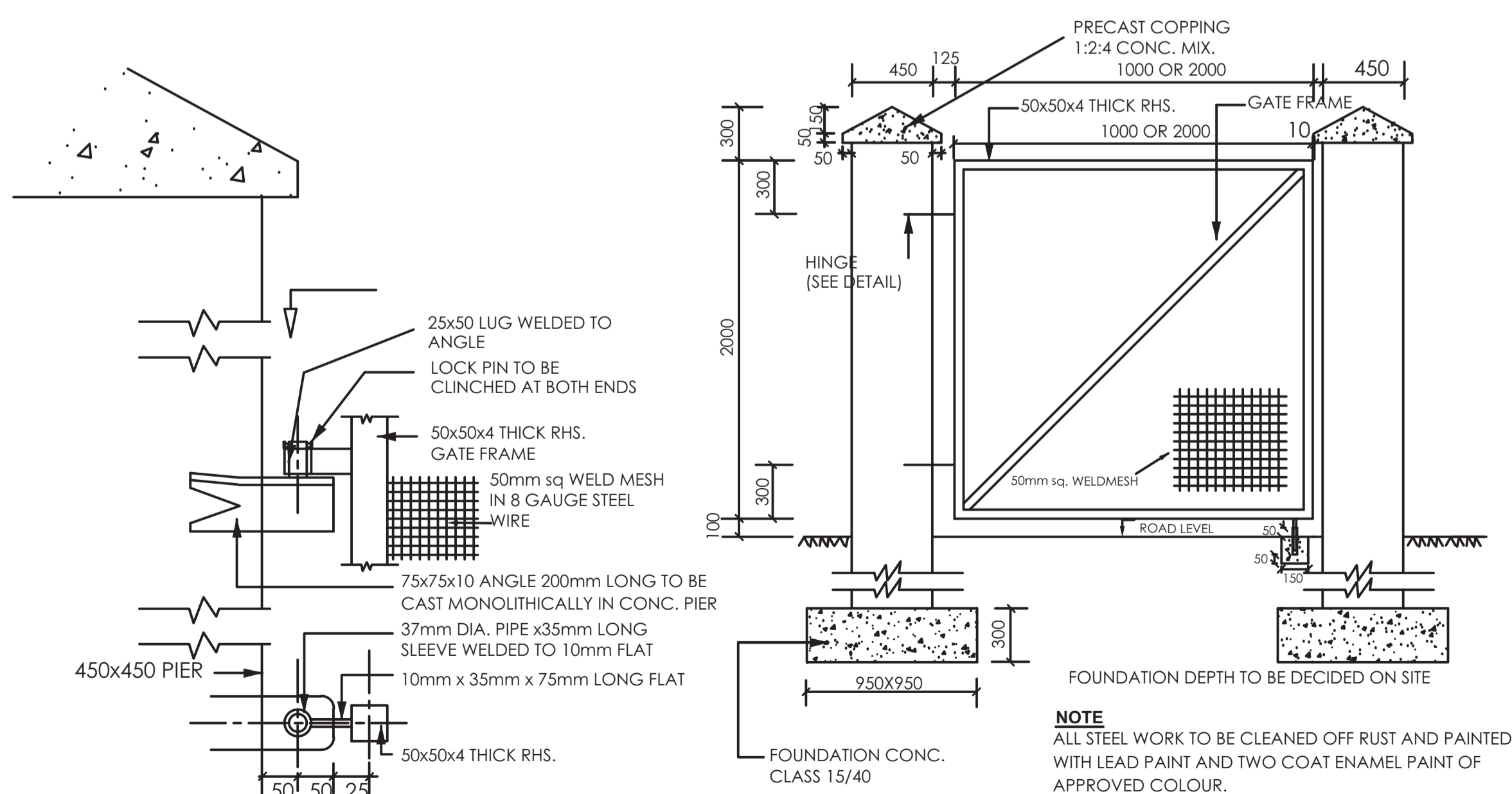
**PLAN**  
SCALE: 1: 50

**DETAILS OF 6m WIDE GATE**



**ELEVATION**  
SCALE 1:20

**DETAILS OF 3m & 4m WIDE GATE**



**ELEVATION**

**DETAILS OF 1m WIDE & 2m WIDE GATE**



**DETAILS OF HINGE (VIEW AT Y - Y)**  
SCALE 1:5




**DETAILS OF HINGE (VIEW AT Y - Y)**  
SCALE 1:5

**NOTES**  
1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED

**ABBREVIATIONS**  
mm - MILIMETER  
DIA. - DIAMETER  
G.L. - GROUND LEVEL  
E.Q. - EQUAL  
sq - SQUARE  
CONC. - CONCRETE

REVISION	DESCRIPTION	DATE

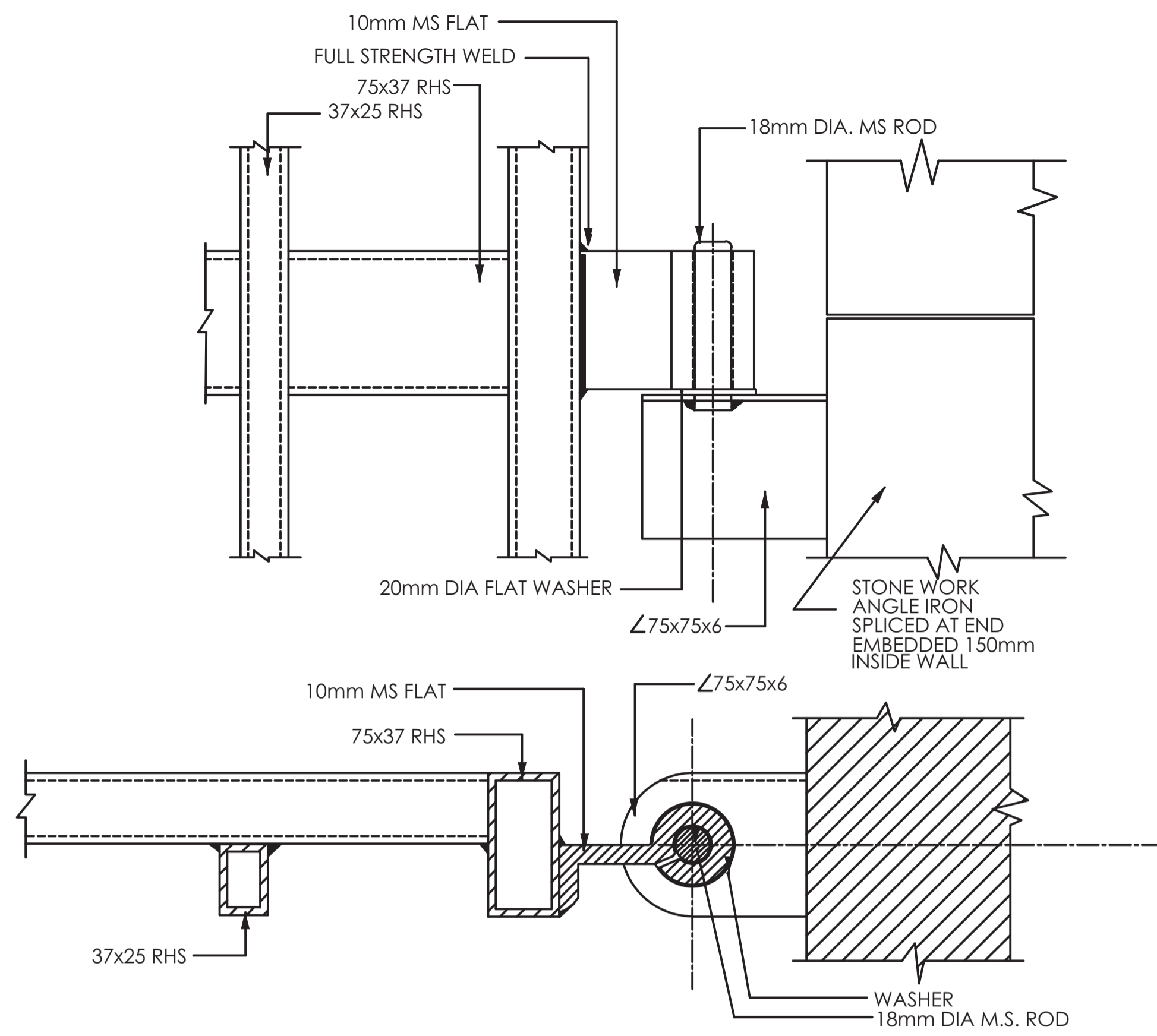
CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:  

**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

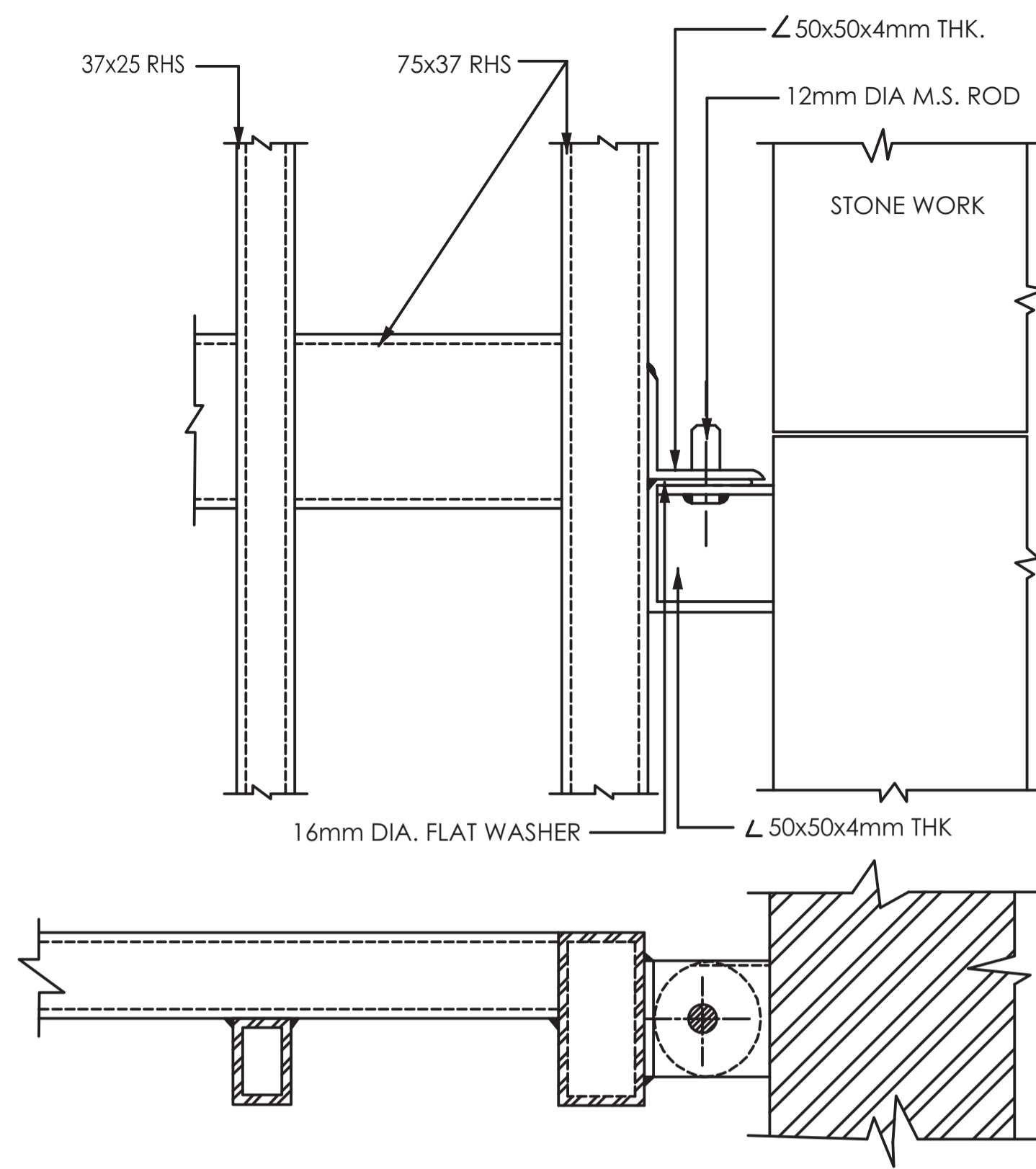
**STANDARD DRAWINGS**  
**DETAILS OF GATES**  
**(SHEET 1 OF 2)**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: 1:500	Date: FEBRUARY 2024
DRAWING No: M/W/S/SD/16	REV. 0



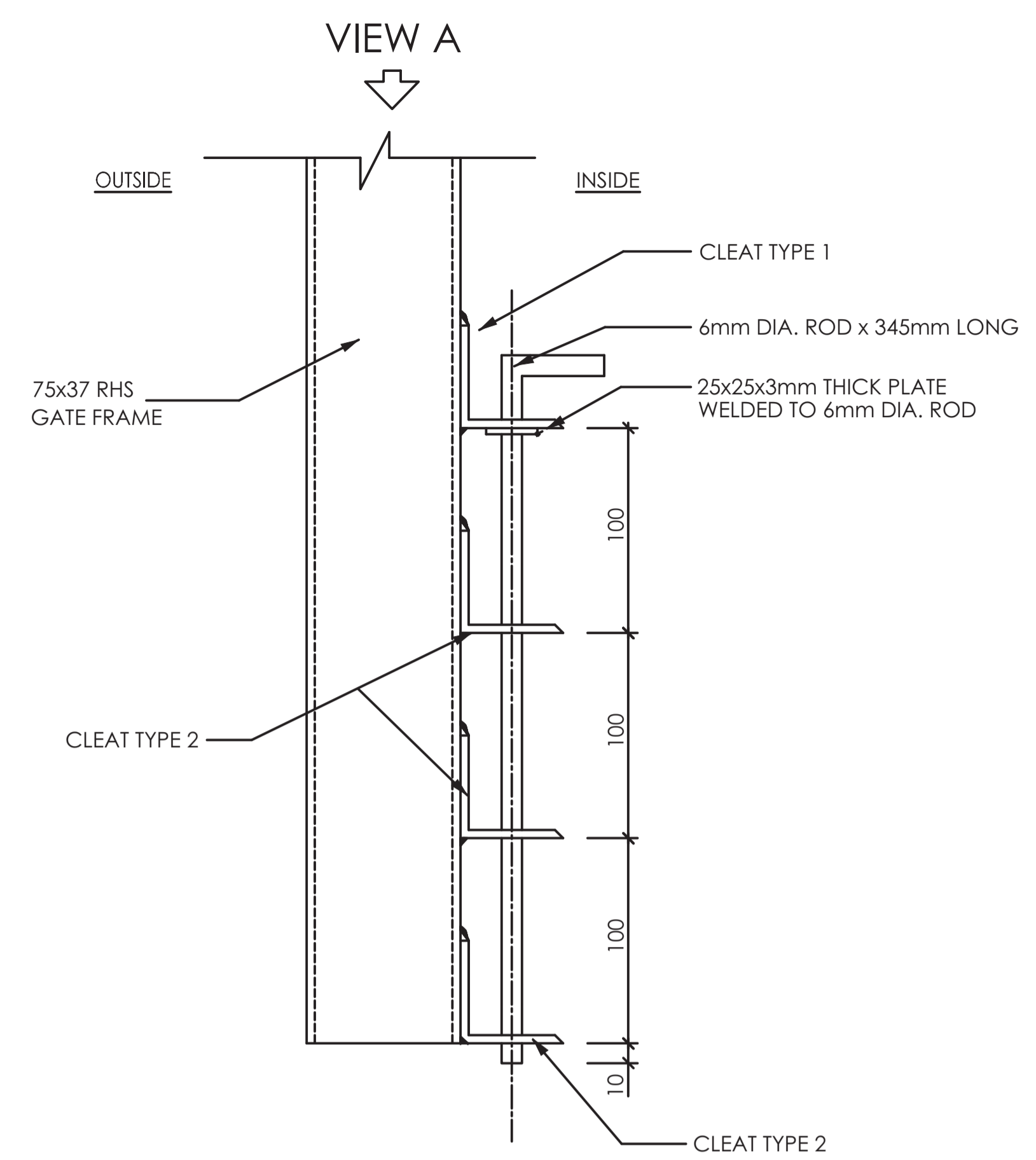
**DETAIL OF HINGE FOR LARGE GATE**

SCALE: 1:5



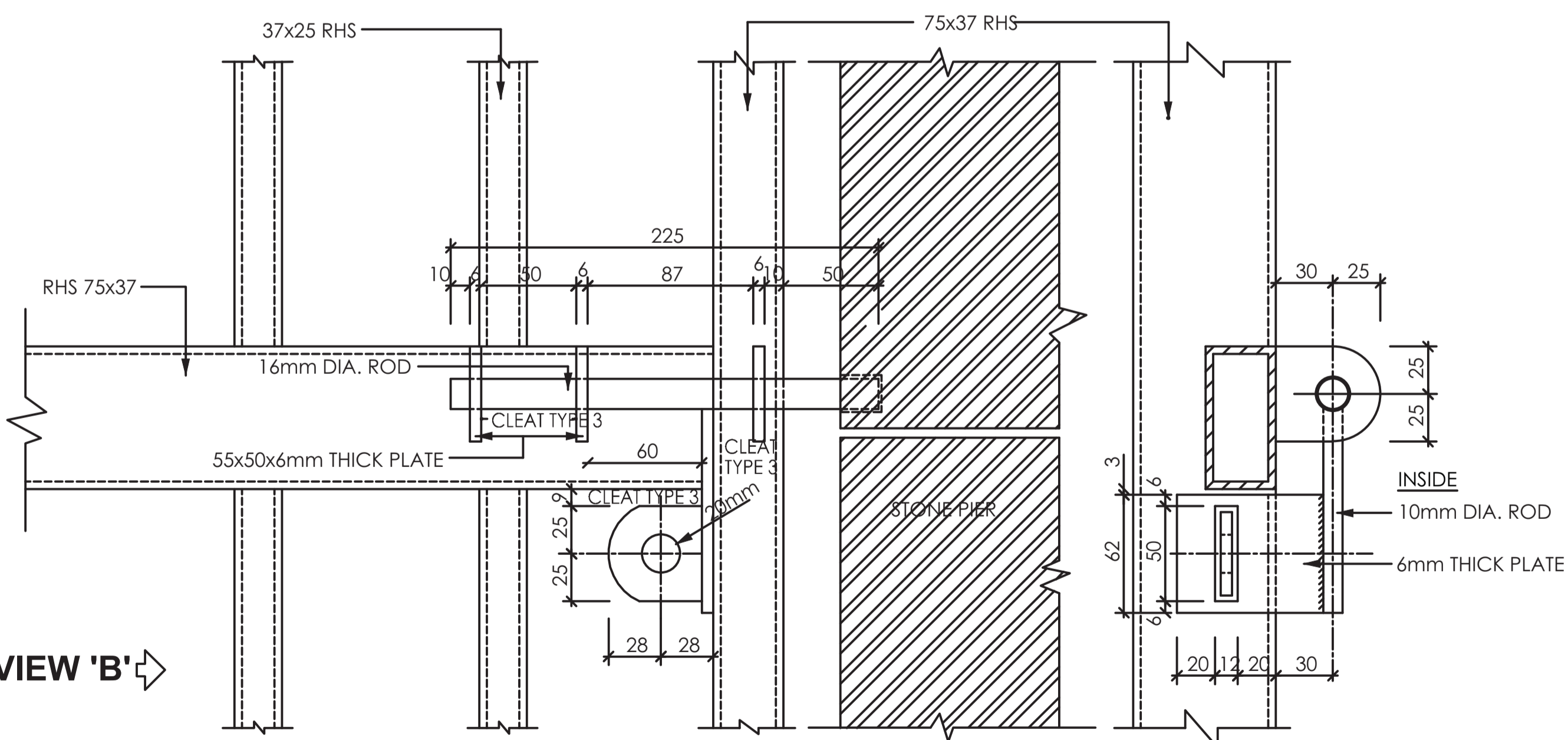
**DETAIL OF HINGE FOR SMALL GATE**

SCALE: 1:5



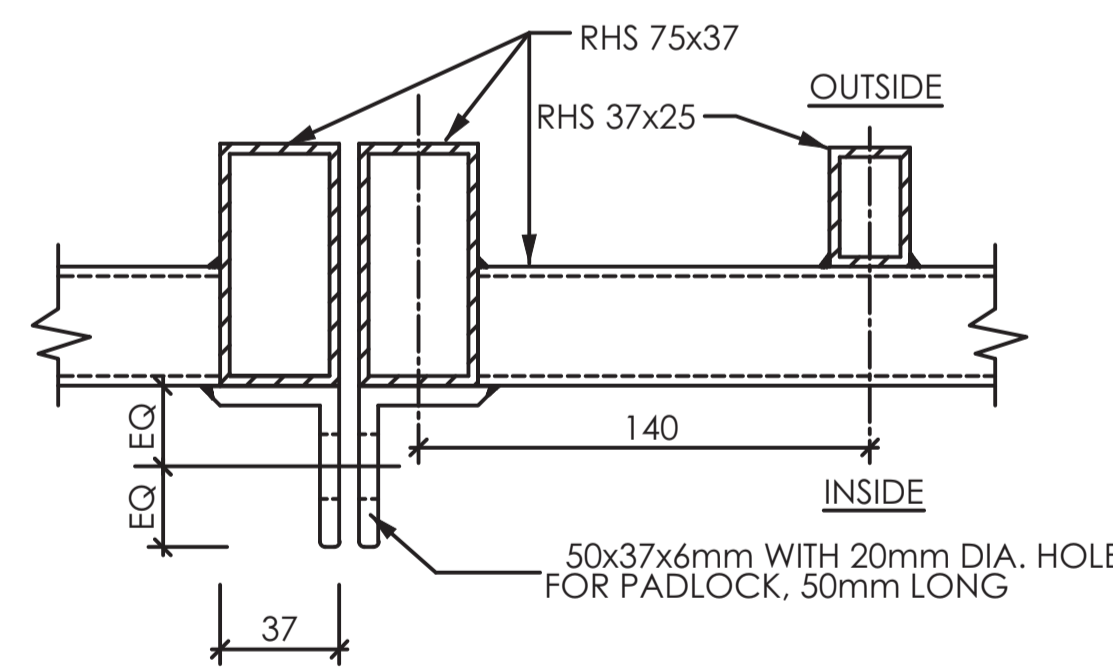
**DETAIL OF DROP BOLT FOR LARGE GATE**

SCALE: 1:5



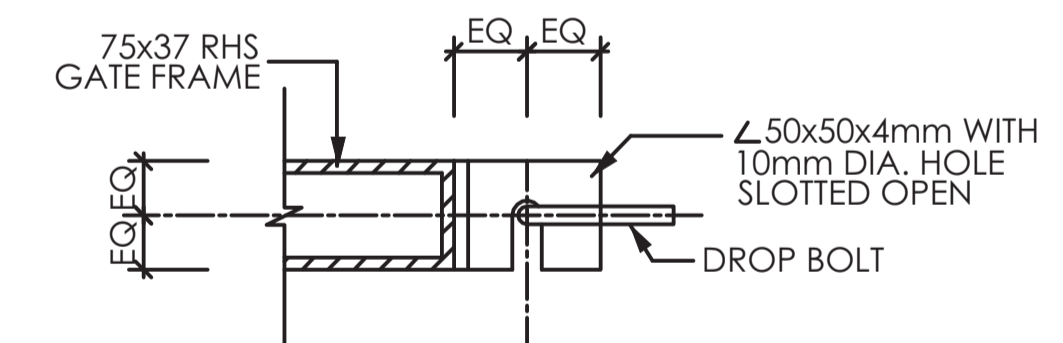
**DETAIL OF LOCKING BOLT FOR SMALL GATE**

SCALE: 1:5

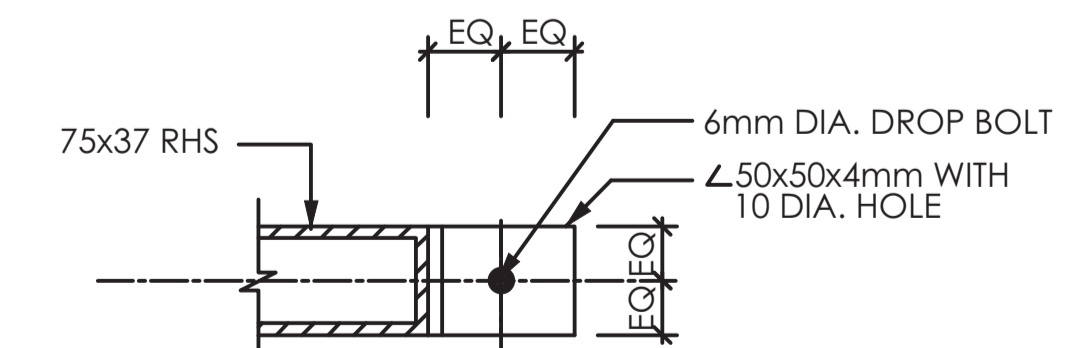


**DETAIL OF LOCKING CLEATS FOR LARGE GATE**

SCALE: 1:5



**CLEAT TYPE 1**



**CLEAT TYPE 2**

**DETAIL OF LOCKING BOLT FOR LARGE GATE**

VIEW A

SCALE: 1:5


**NOTES**

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED

**ABBREVIATIONS**

- mm - MILLIMETER
- DIA. - DIAMETER
- M.S. - MILD STEEL
- E.Q. - EQUAL
- L - ANGLE IRON
- THK. - CONCRETE

REVISION	DESCRIPTION	DATE

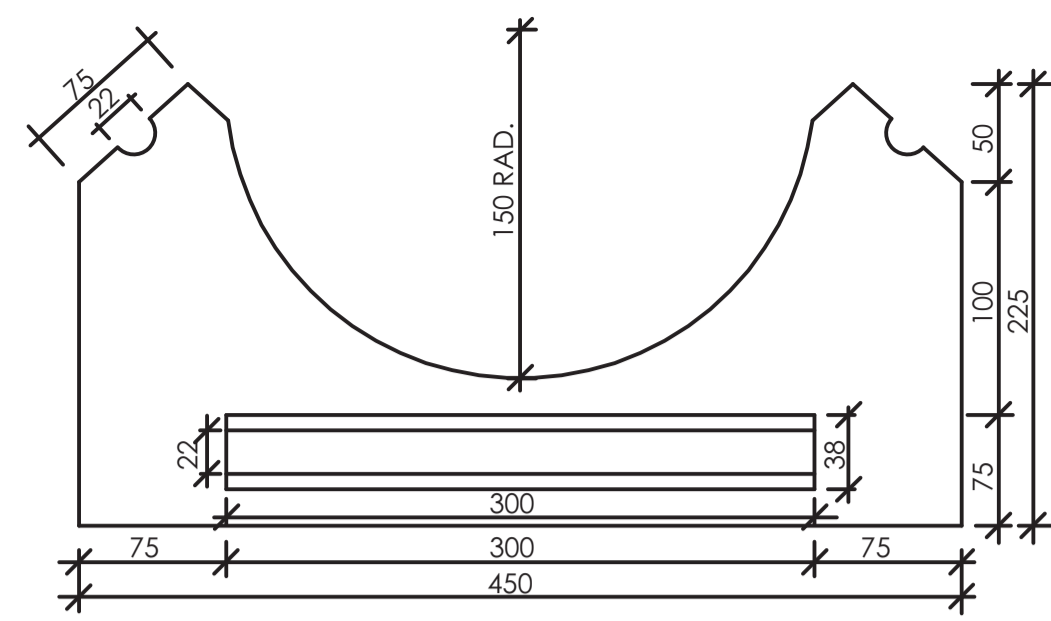
CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:  

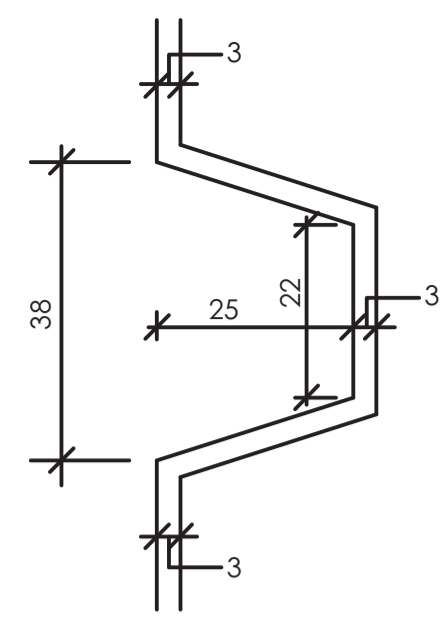
**Interoconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**STANDARD DRAWINGS**  
**DETAILS OF GATES**  
**(SHEET 2 OF 2)**

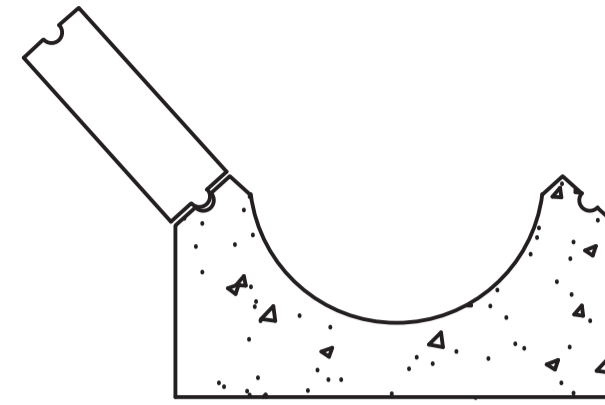
Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: 1:500	Date: FEBRUARY 2024
DRAWING NO: M/W/S/SD/17	REV. 0



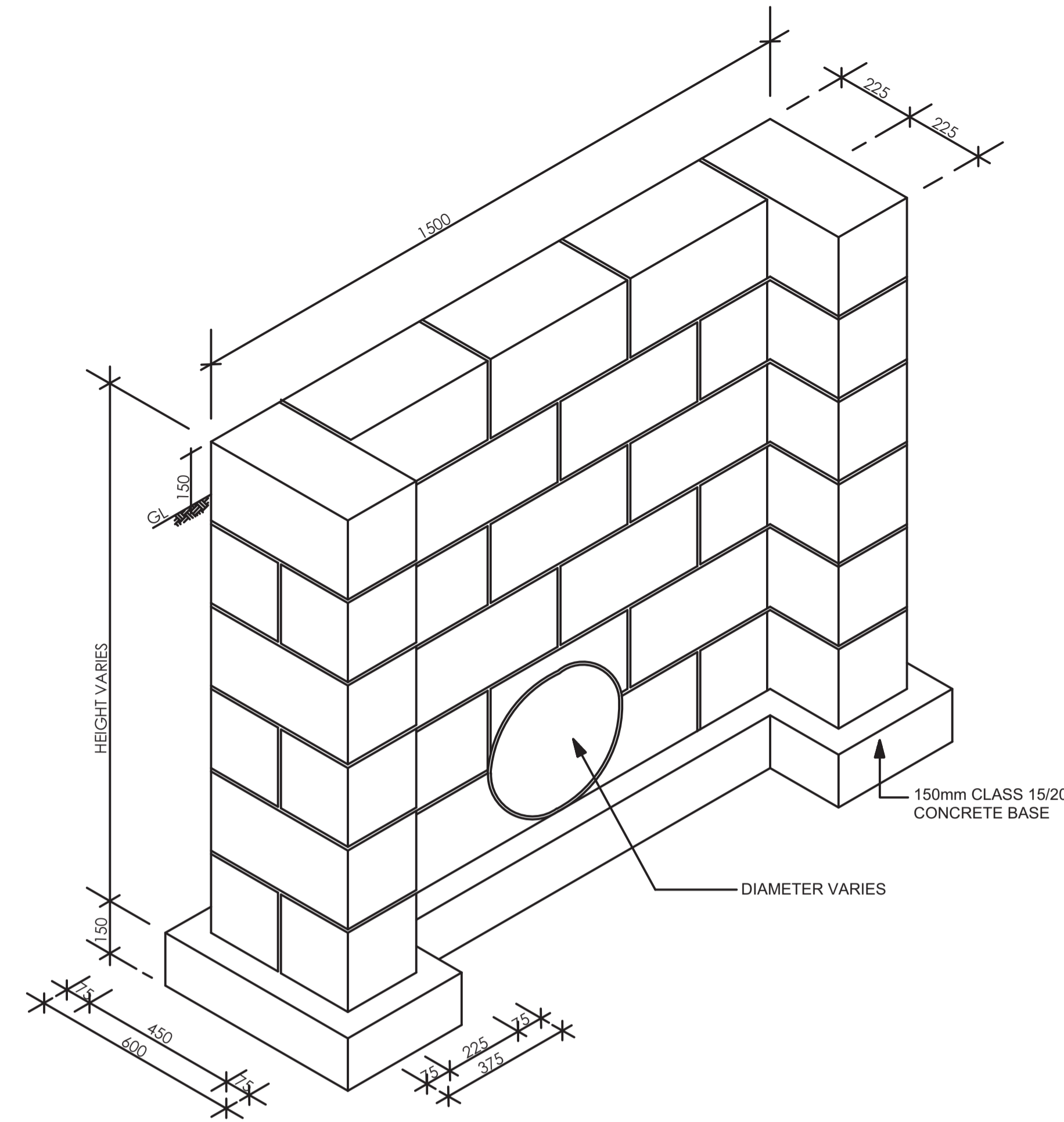
**PRECAST CONCRETE  
TYPE 'A' INVERT BLOCK**  
SCALE 1:4



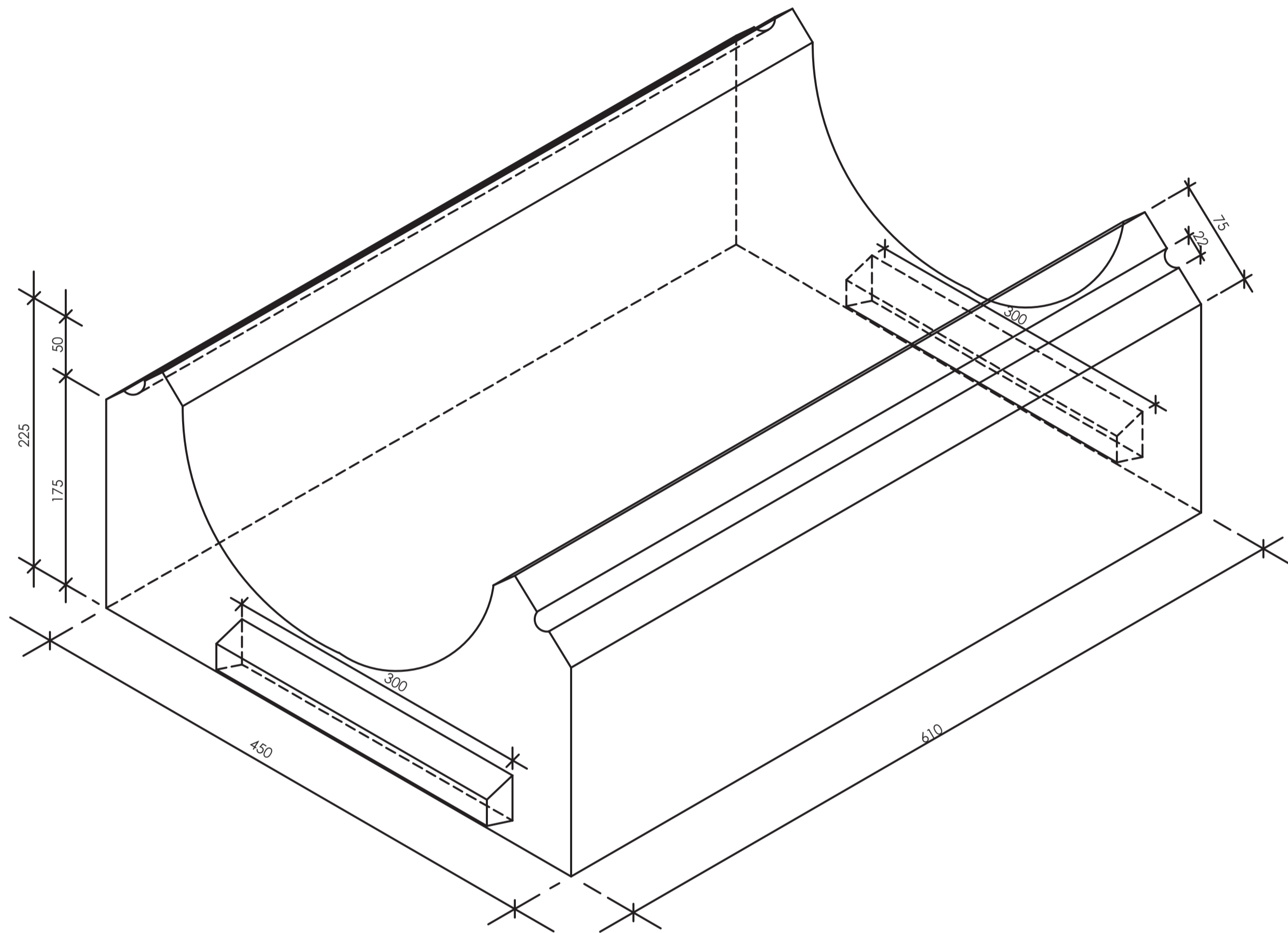
**DETAIL OF JOINT**  
SCALE: 1:1



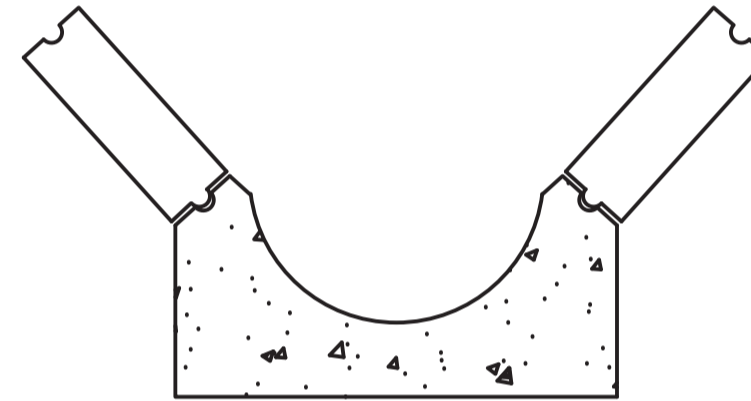
**TYPE 'A' INVERT BLOCK  
AND ONE COURSE**  
SCALE 1:8



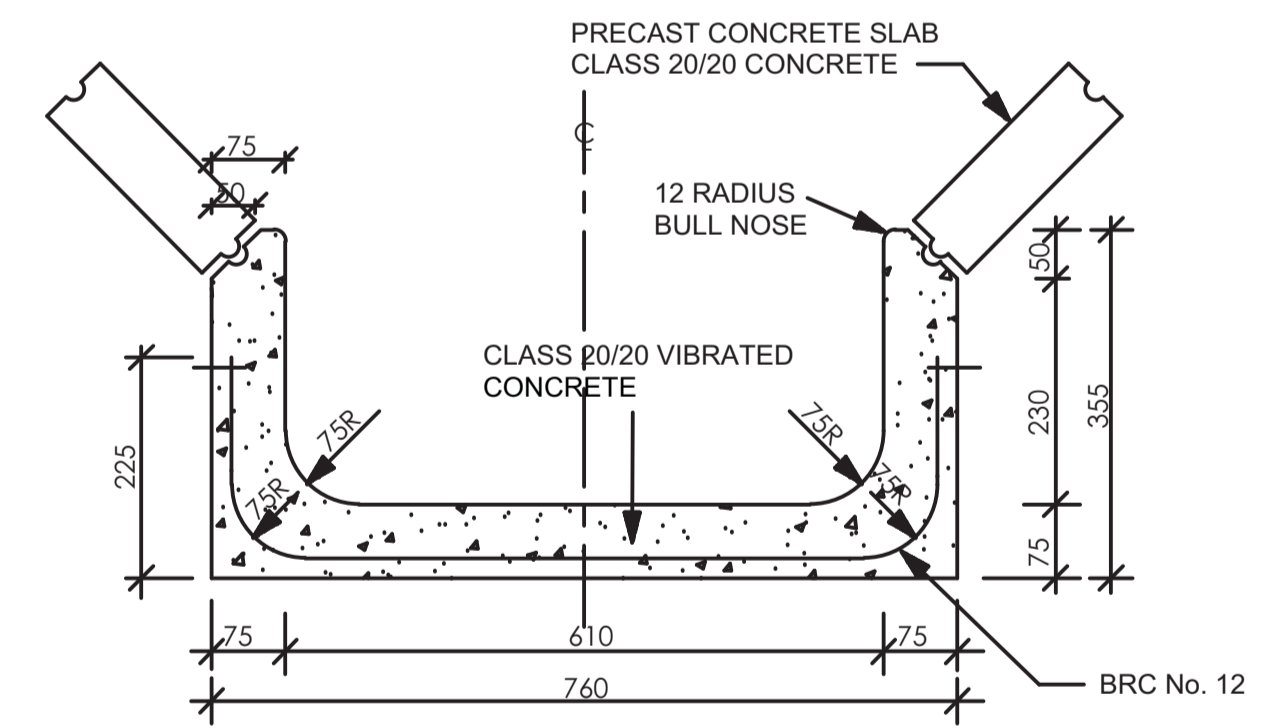
**DETAIL OF HEAD WALL**  
SCALE 1:30



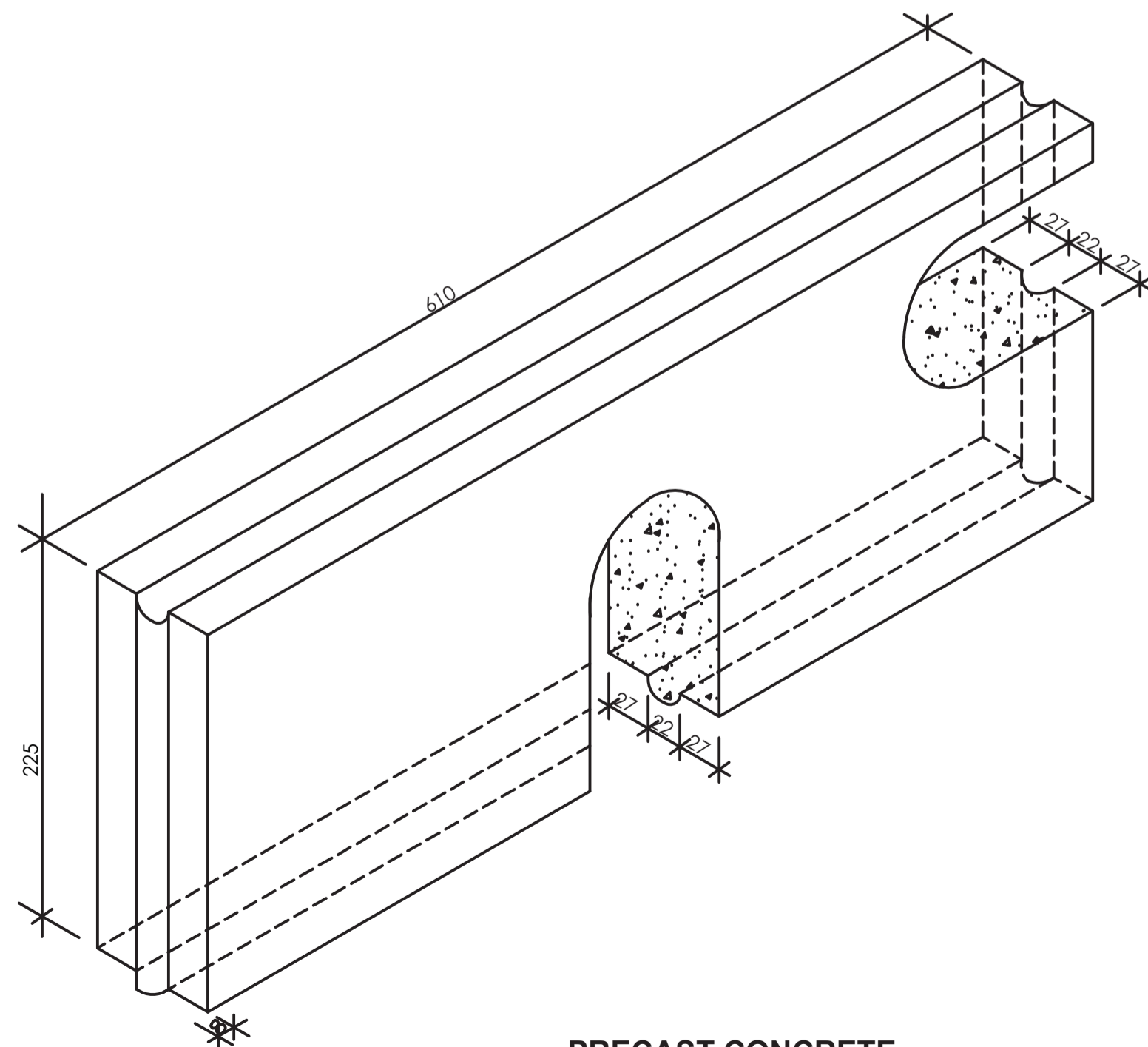
**ISOMETRIC VIEW OF INVERT BLOCK TYPE 'A'**  
NTS



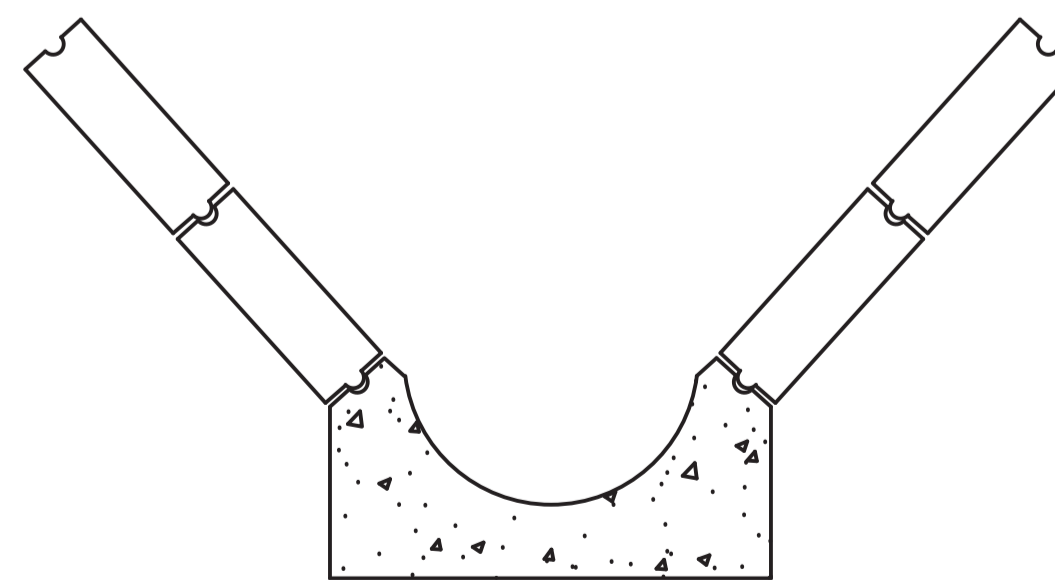
**INVERT BLOCK TYPE 'A'  
AND TWO COURSES**  
SCALE 1:8



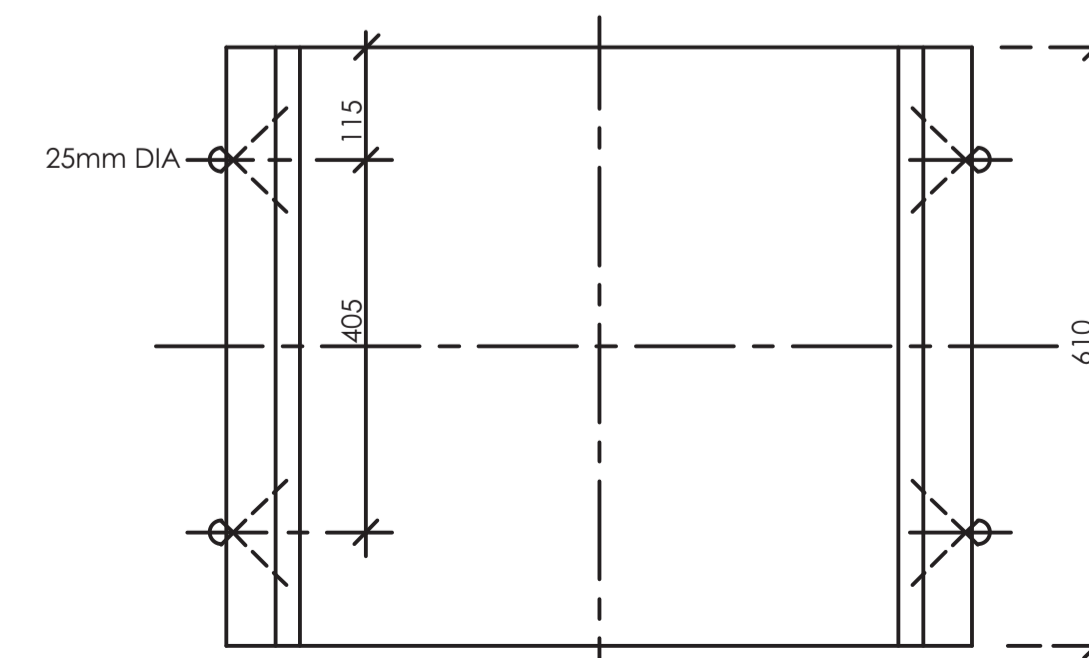
**SECTION - I.B.D. TYPE 'B'**  
SCALE 1:8



**PRECAST CONCRETE  
SLAB DETAIL**  
NTS



**INVERT BLOCK TYPE 'A'  
AND FOUR COURSES**  
SCALE 1:16




**PLAN  
DETAILS OF INVERT BLOCK TYPE 'B'**  
SCALE 1:8


**NOTES**  
ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED

**ABBREVIATIONS**

RAD - Radius  
G.L. - Ground Level  
mm - Millimetres  
R - Radius

REVISION	DESCRIPTION	DATE

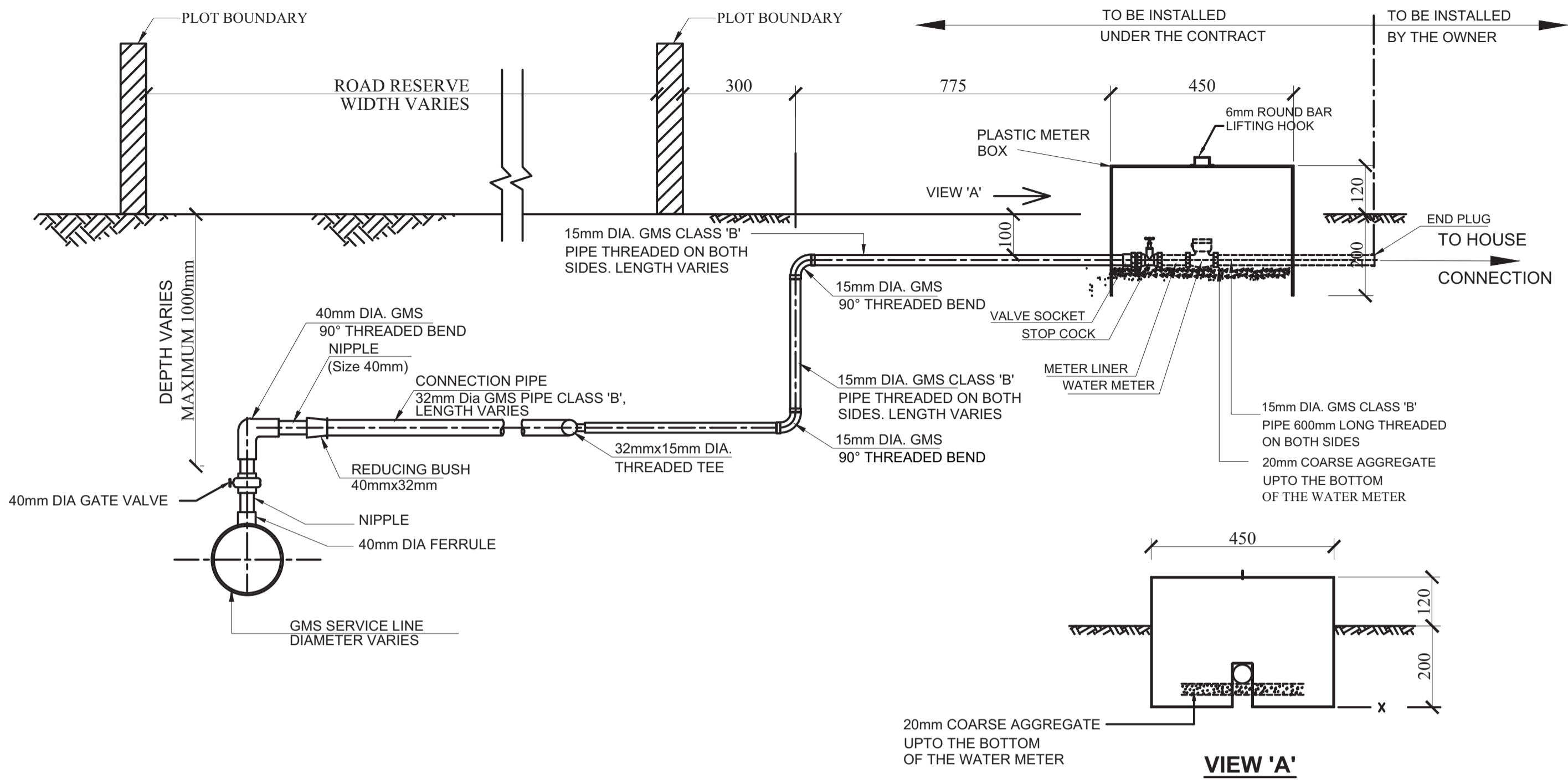
CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS  
DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:  

**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

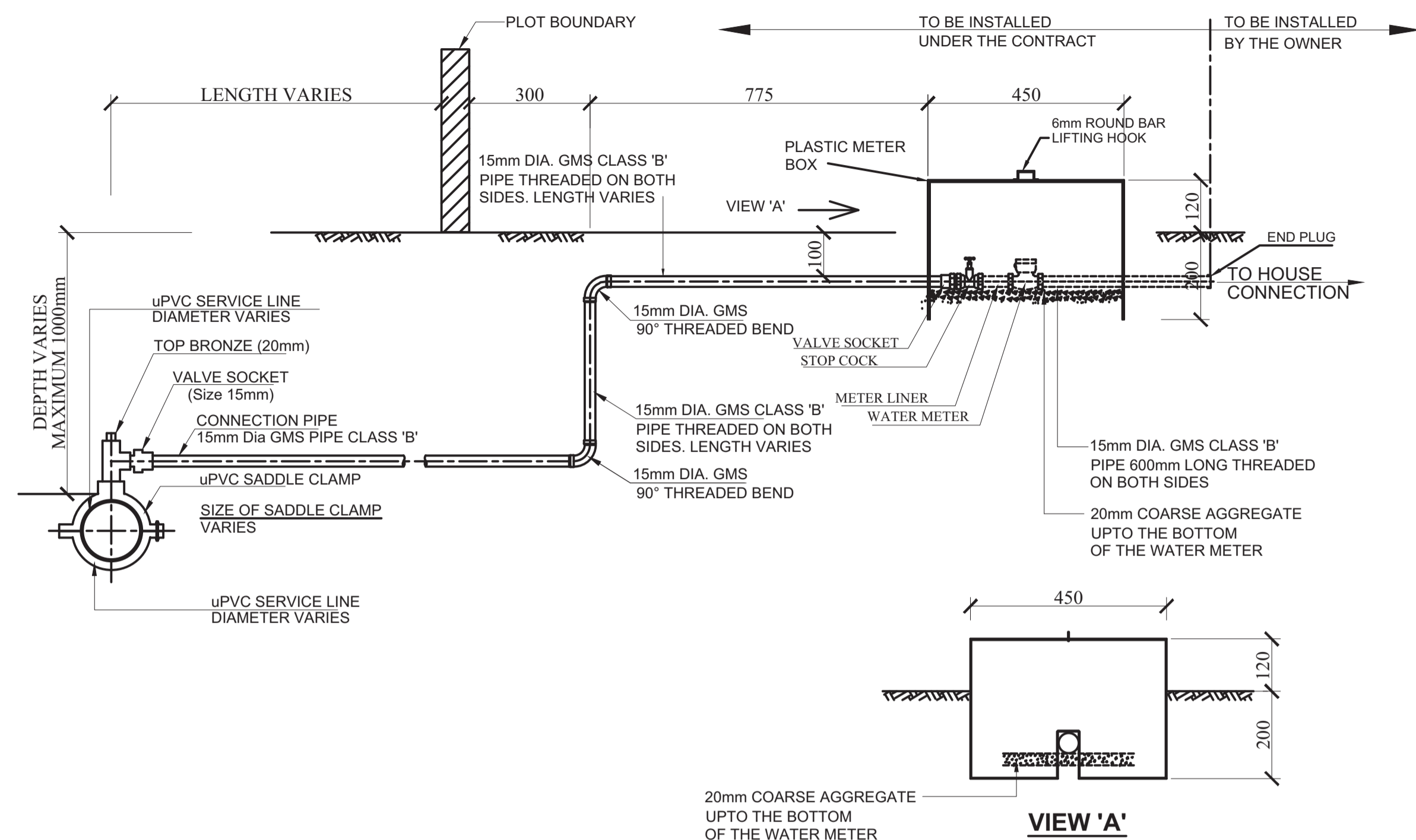
DRAWING TITLE:  
**STANDARD DRAWINGS**  
**DETAILS OF INVERT BLOCK  
DRAINS AND HEADWALL**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: 1:500	Date: FEBRUARY 2024
DRAWING No. M/W/S/SD/18	REV. 0

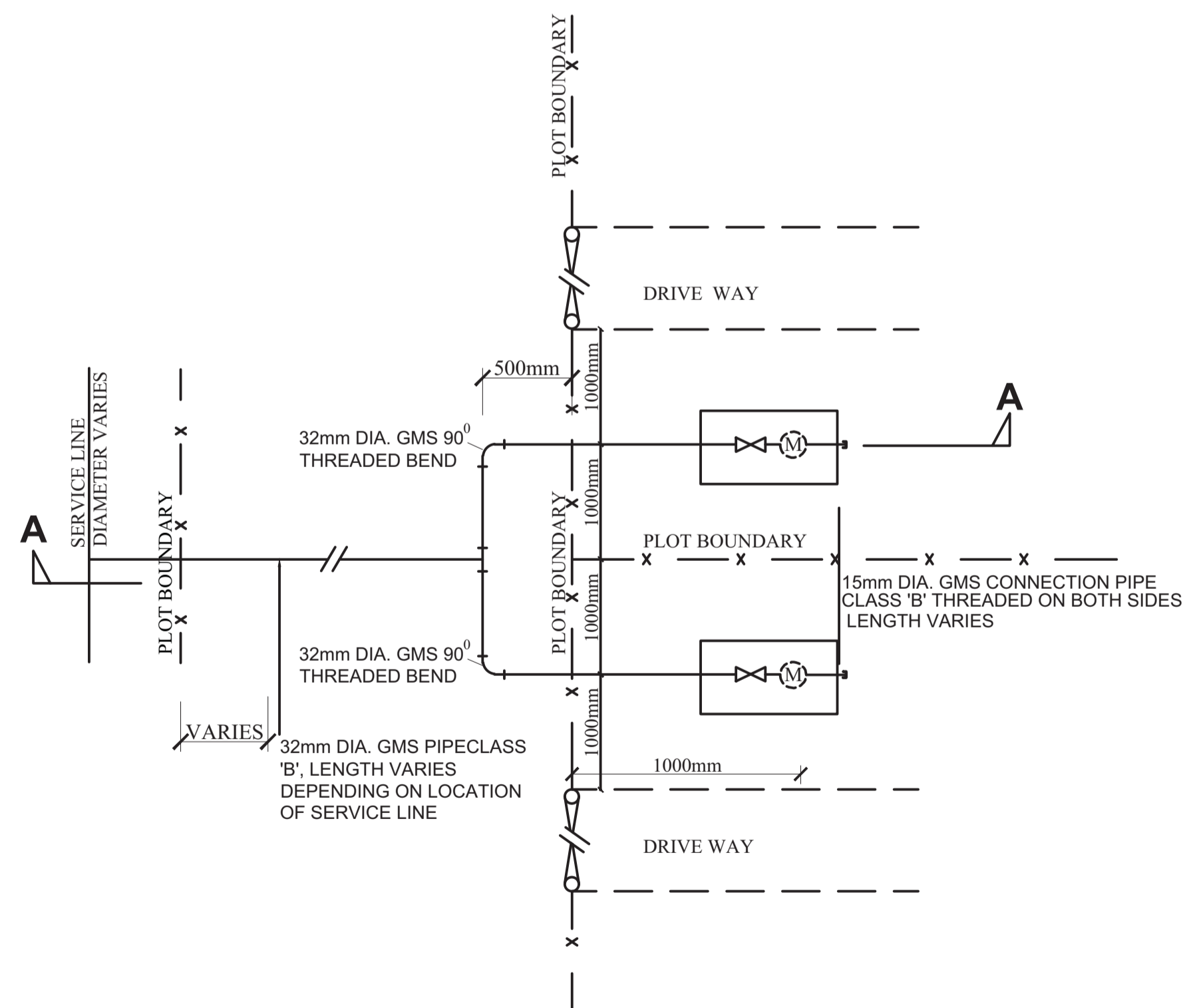




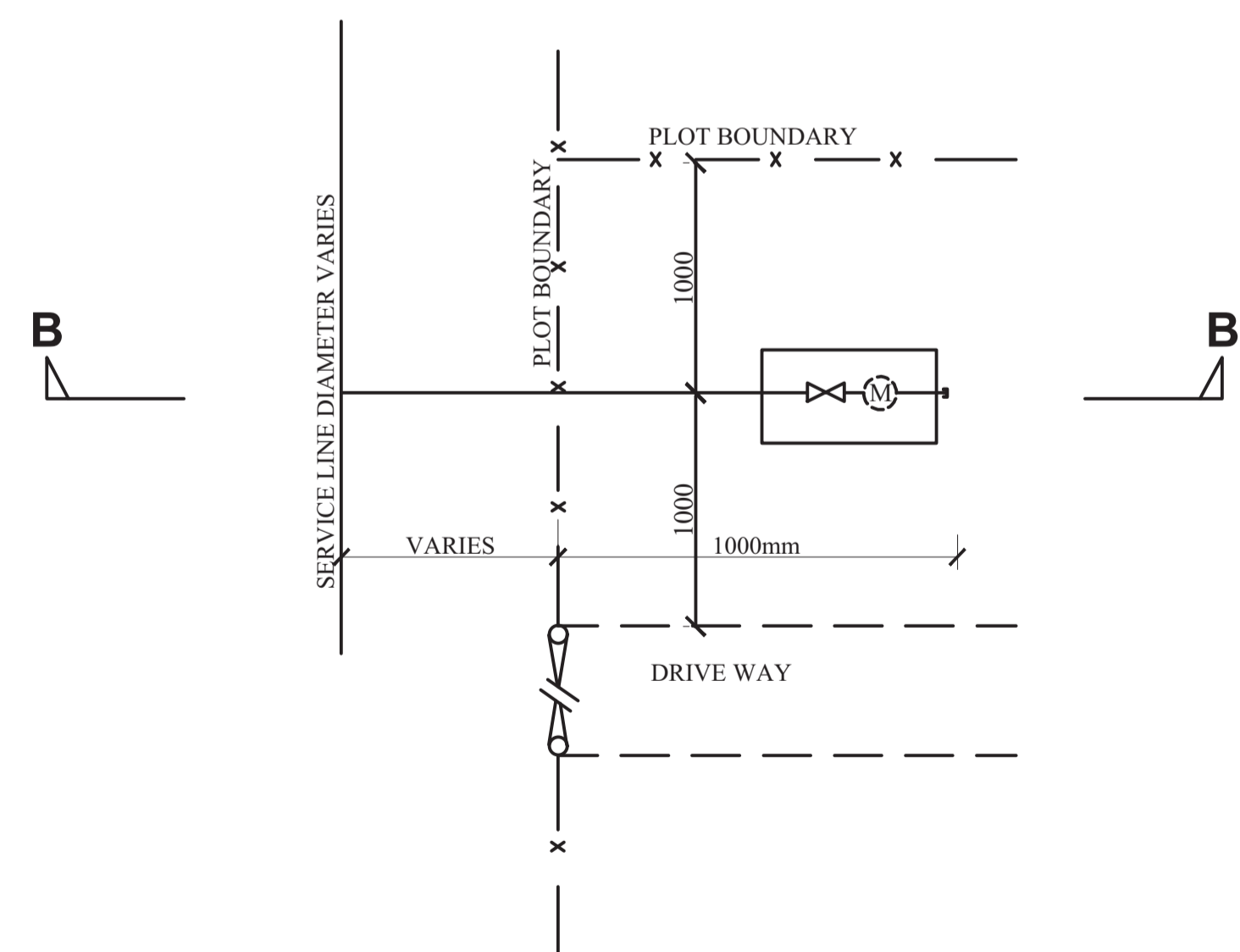
**SECTION A-A**  
NTS



**SECTION B-B**  
NTS




**PLAN**  
**TYPICAL CONSUMER CONNECTION**  
**ACROSS CARRIAGE WAY FOR TWO**  
**HOUSEHOLDS ON A GMS SERVICE LINE**  
NTS



**PLAN**  
**TYPICAL CONSUMER CONNECTION**  
**FOR ONE HOUSEHOLD ON A uPVC**  
**SERVICE LINE**  
NTS

REVISION	DESCRIPTION	DATE

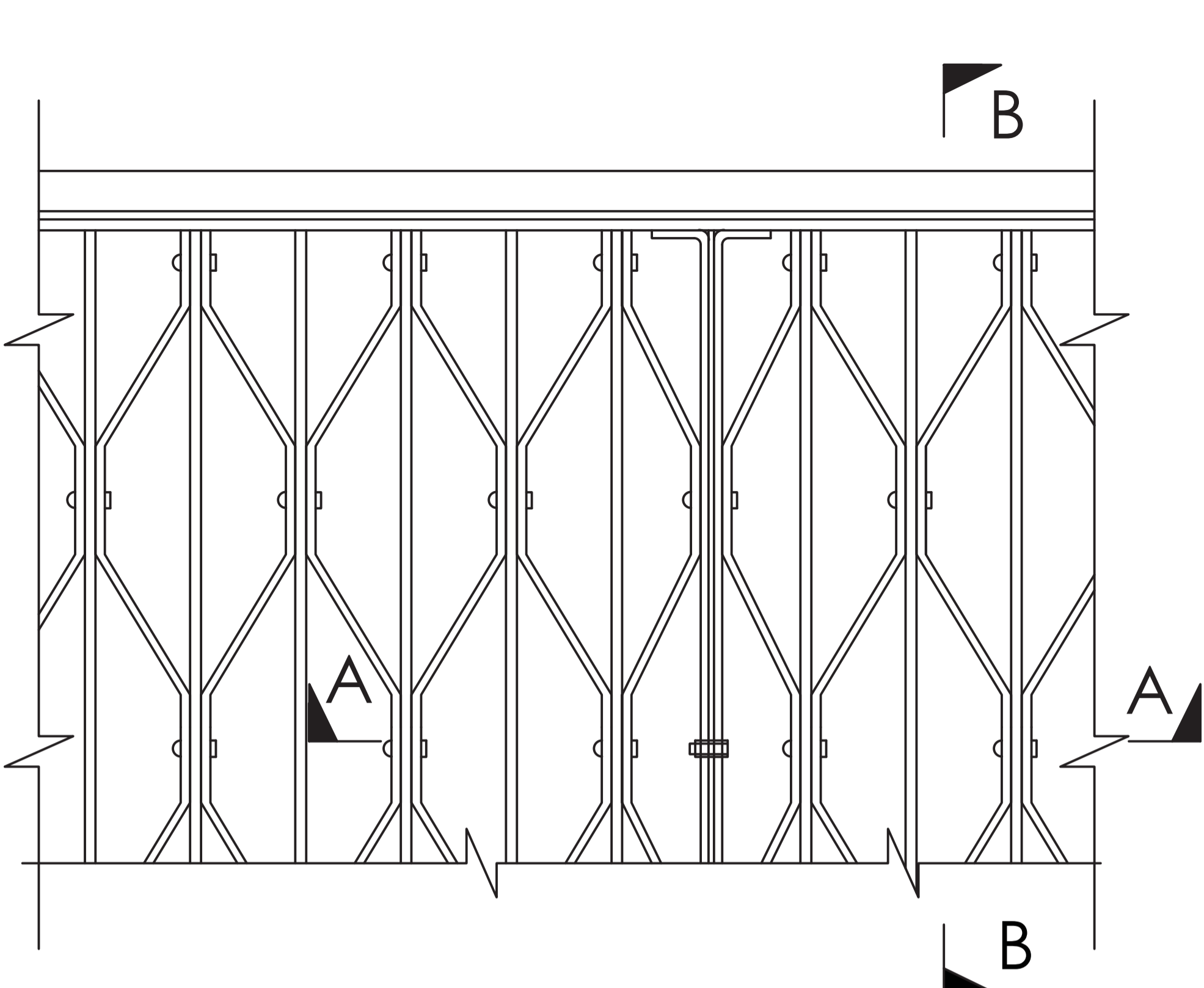
CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS**  
 DEVELOPMENT AGENCY  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:  

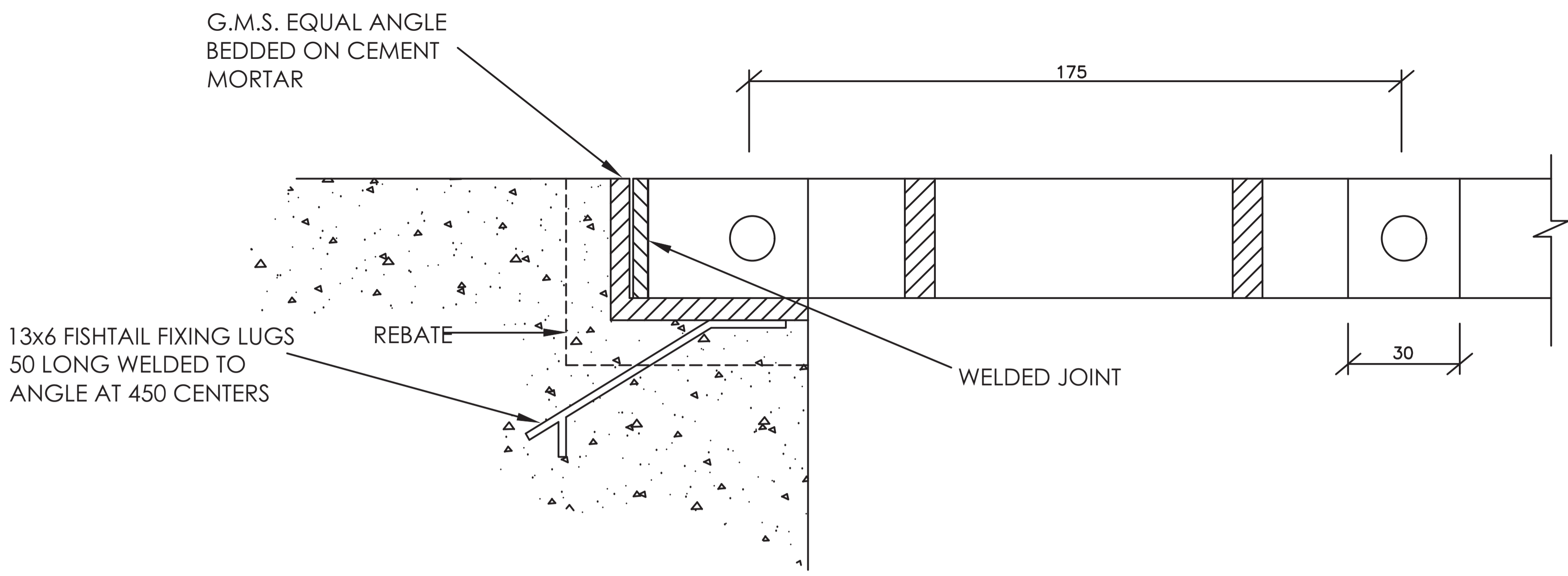
 Interconsult Engineers Ltd  
 Consulting Engineers  
 Jadalala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**STANDARD DRAWINGS**  
 TYPICAL DETAILS OF CONSUMER  
 WATER METER INSTALLATION ON  
 A SERVICE LINE

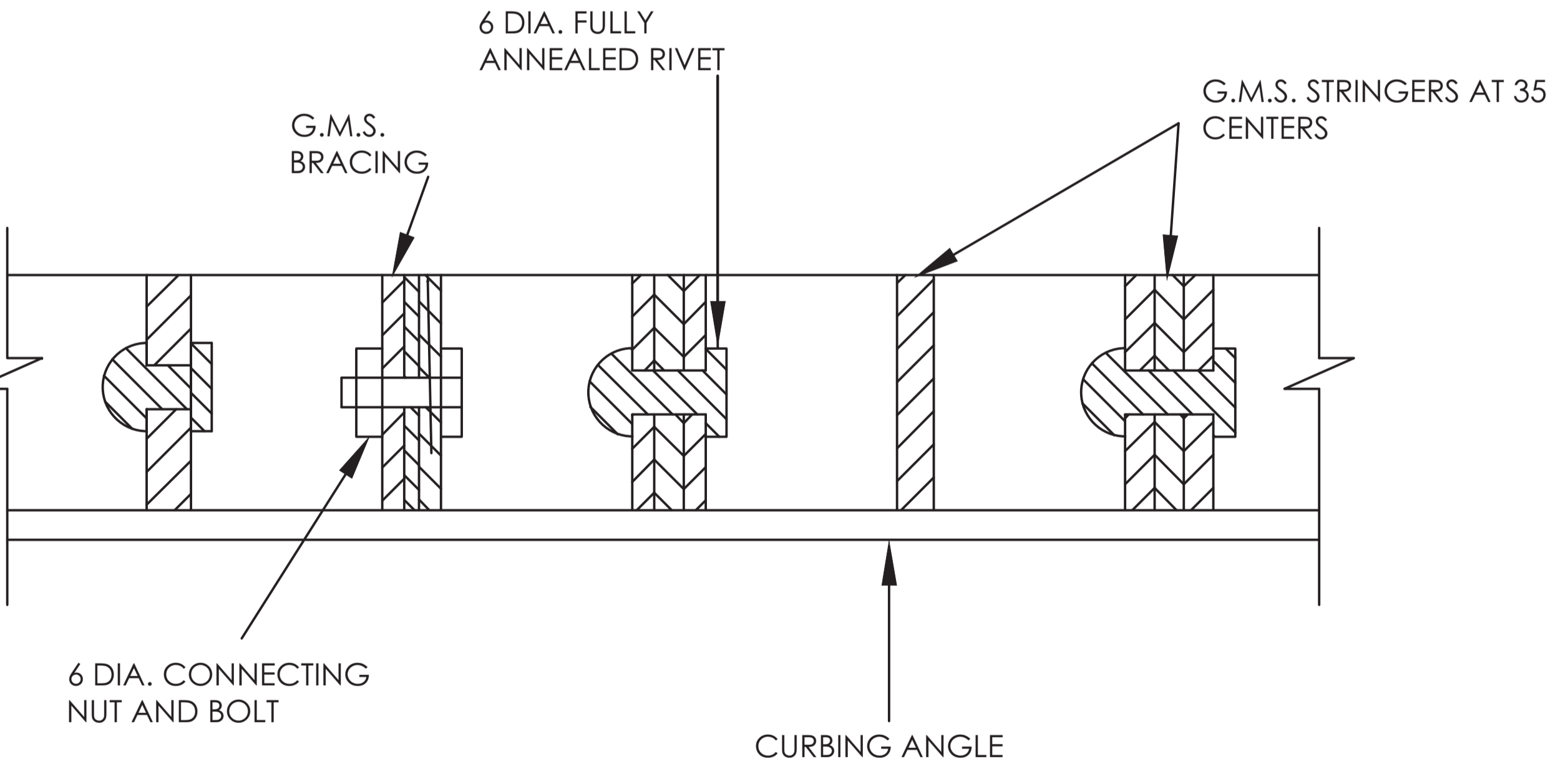
Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: 1:500	Date: FEBRUARY 2024
DRAWING No: M/W/S/SD/19	REV. 0



**GALVANISED MILD STEEL OPEN MESH FLOORING**  
SCALE 1:2



**SECTION B-B**  
SCALE 1:2



**SECTION A-A**  
SCALE 1:1

TYPE	MAXIMUM SPAN	STRINGERS	BRACING	EDGING	CURBING	MAXIMUM PANEL WIDTH	REBATE DIMENSIONS
A	1100	25x3	25x3	25x5	31x31x6	1800	50x50
B	1600	35x3	35x3	35x5	51x51x6	1000	50x50
C	2000	40x5	40x3	40x5	46x46x6	750	65x65

**NOTES**

- All mild steel components shall be hot dipped galvanized after fabrication
- All flooring, curbing, framing etc is to be fabricated from mild steel to B.S 4592 : 1970
- All flooring panel dimensions are to be checked against as constructed site dimensions before fabrication
- For all spans in excess of those shown on standard details flooring shall be designed to take distributed load at 50KN/m<sup>2</sup>
- Maximum weight of panel 40kg.
- Dimensions in mm unless otherwise specified
- G.M.S. = Galvanized Mild Steel

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:  

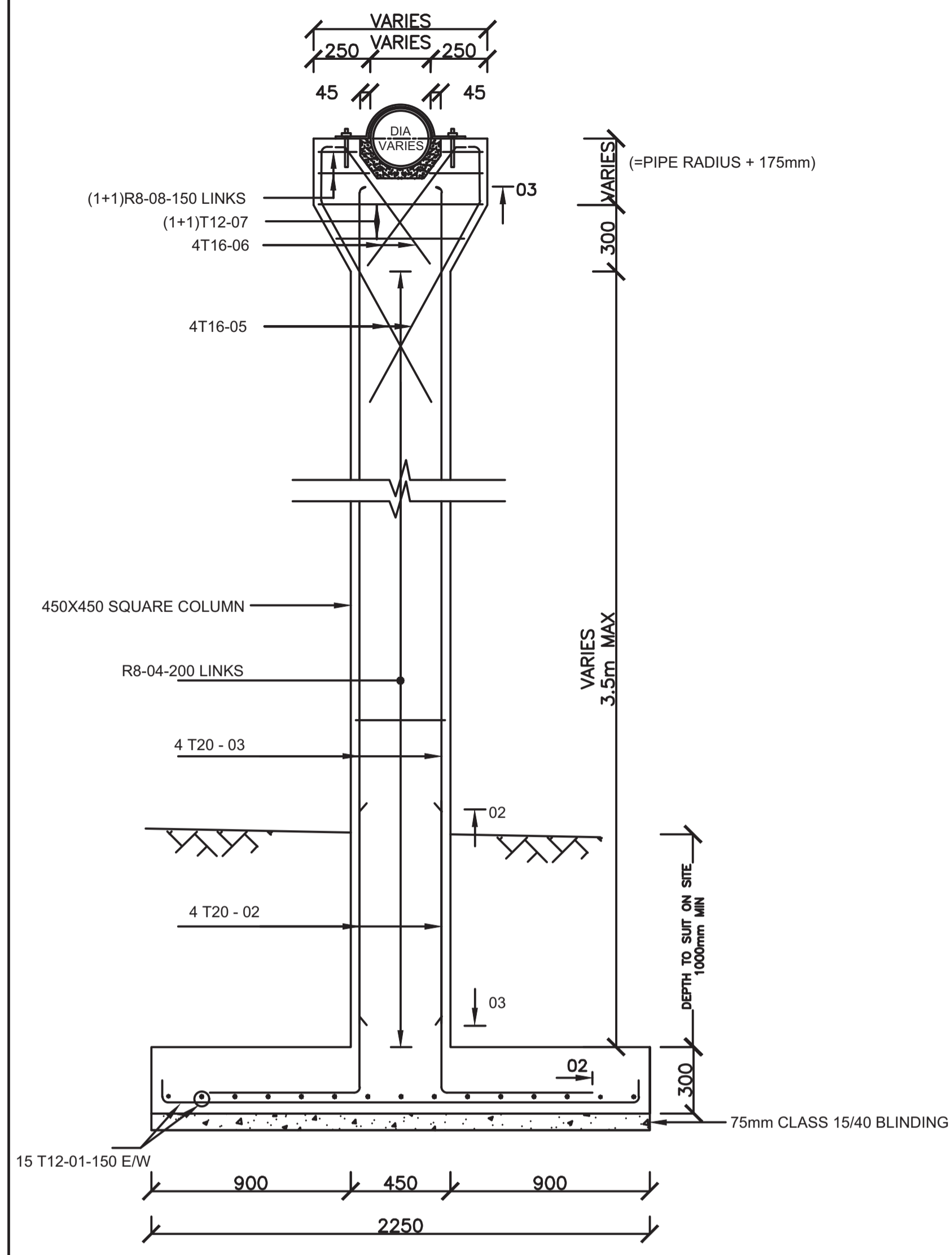
**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:  

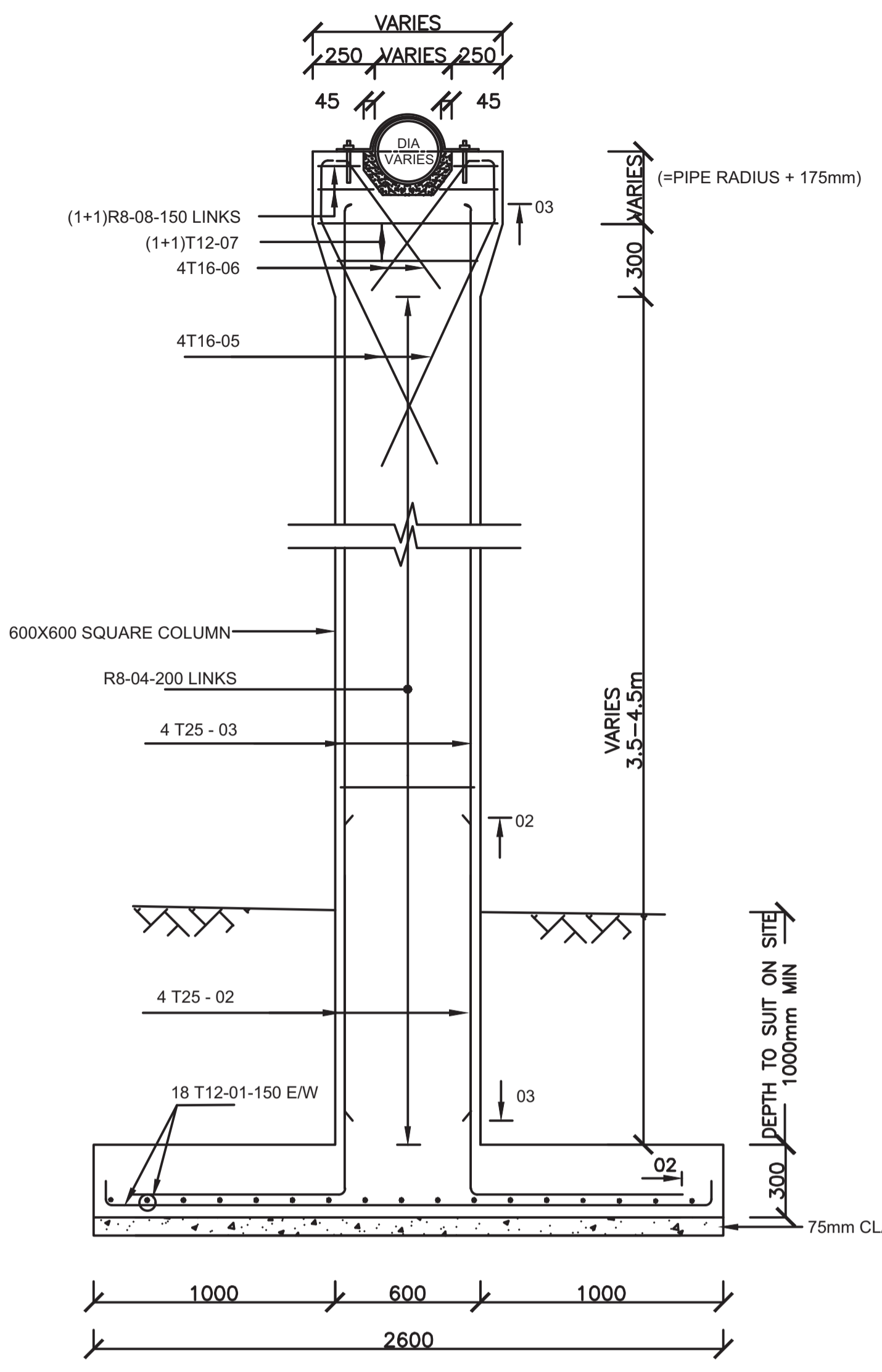
**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

**STANDARD DRAWINGS**  
**DETAILS OF OPEN MESH FLOORING**

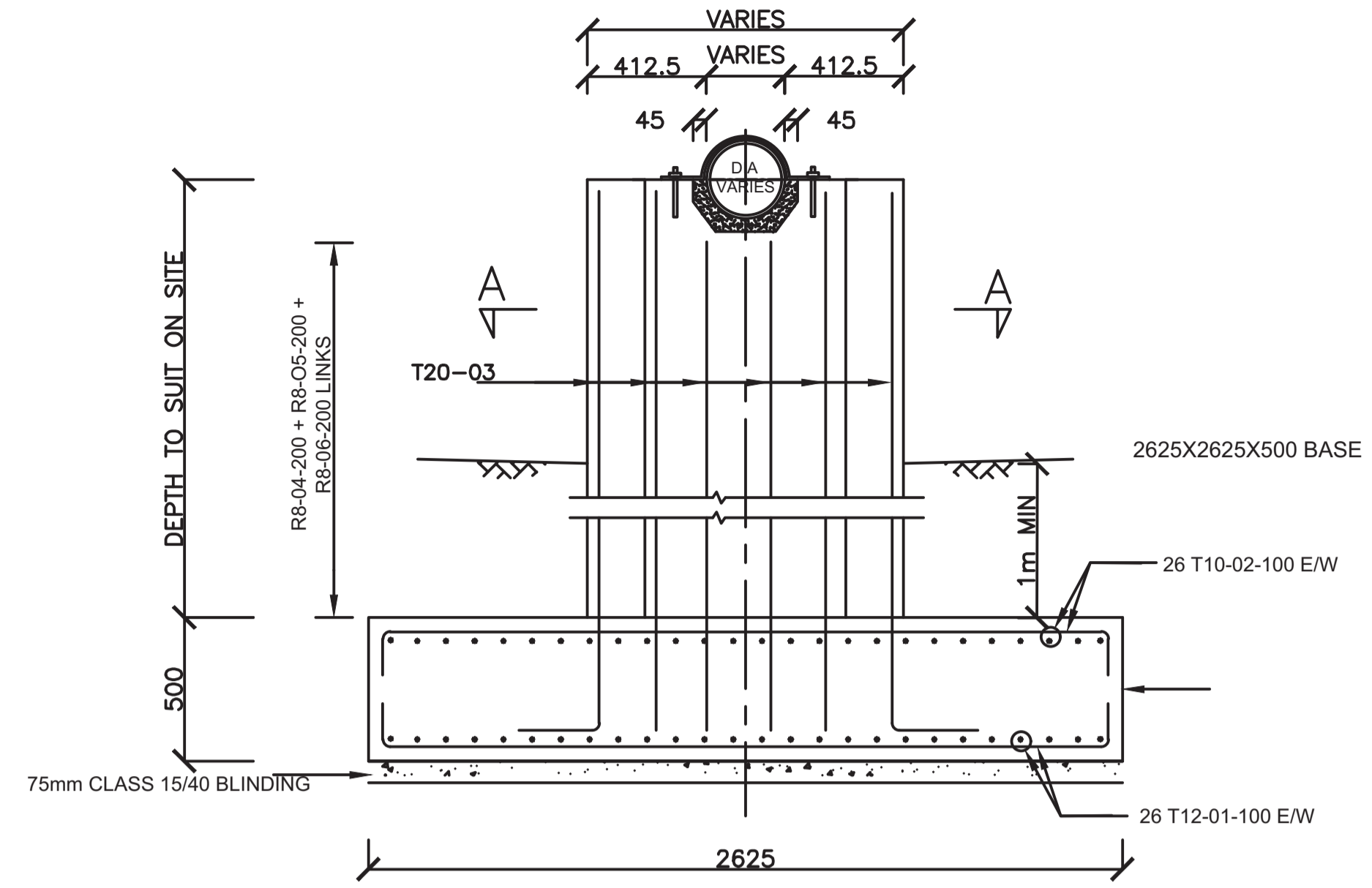
Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: 1:500	Date: FEBRUARY 2024
DRAWING No. M/W/S/SD/20	REV. 0



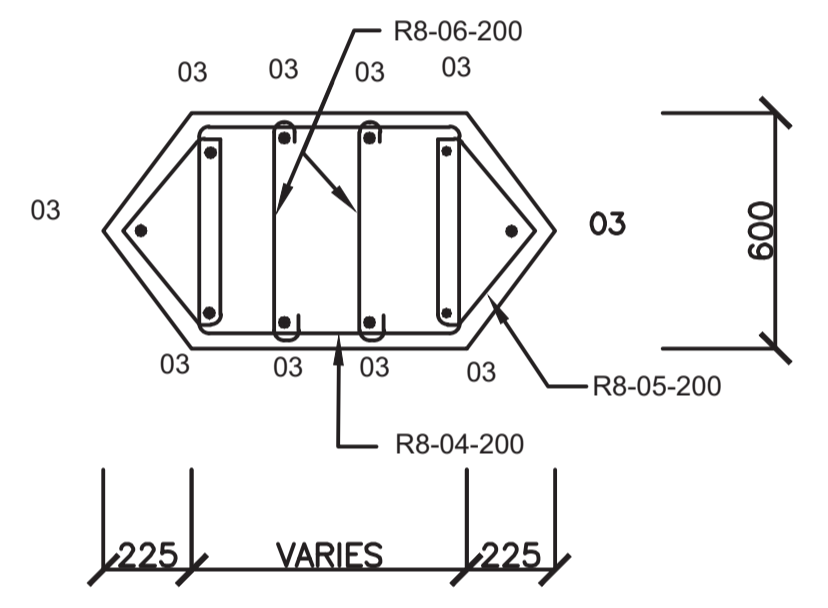
**PIER TYPE 'A'**  
(HEIGHT UPTO 3.5m)  
SCALE 1:40



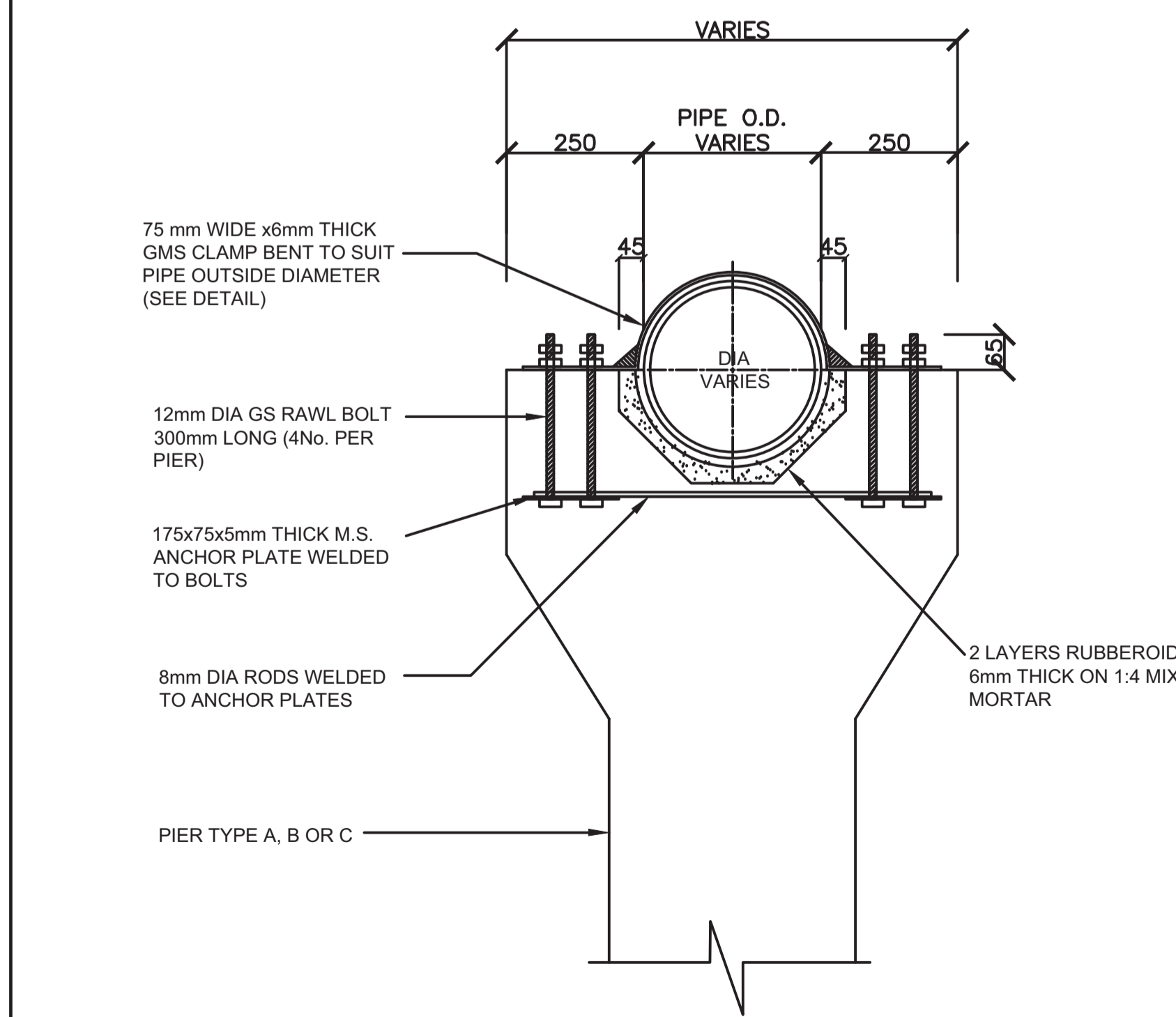
**PIER TYPE 'B'**  
(HEIGHT 3.5-4.5m)  
SCALE 1:40



**PIER TYPE 'C' (4m HIGH MAX)**  
(TO BE USED AT RIVER CROSSINGS)  
SCALE 1:40

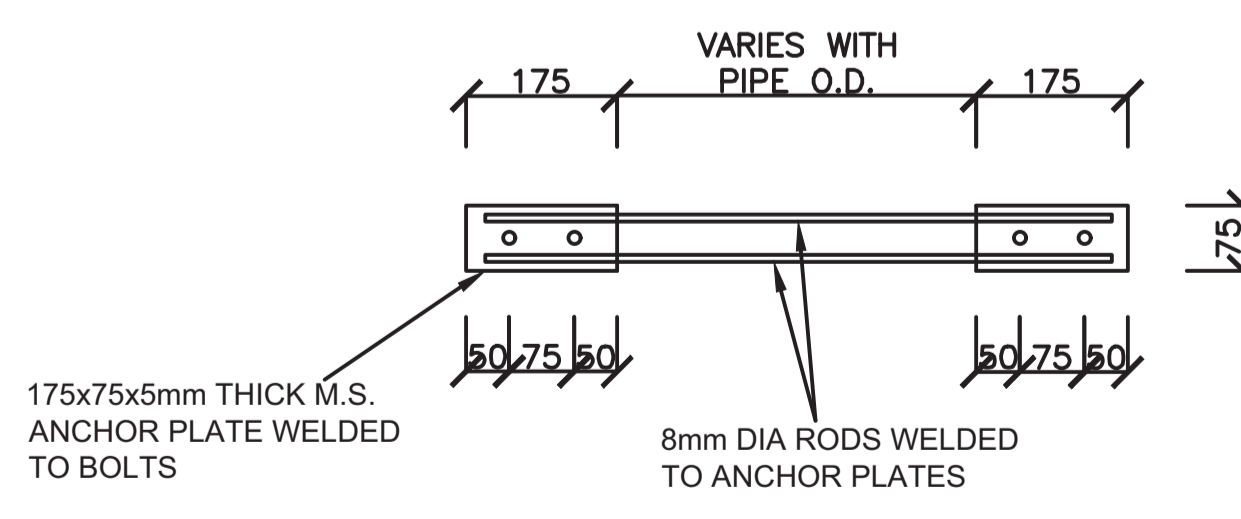


**SECTION A-A**  
**PIER TYPE 'C' (4m HIGH MAX)**  
(TO BE USED AT RIVER CROSSINGS)  
SCALE 1:40

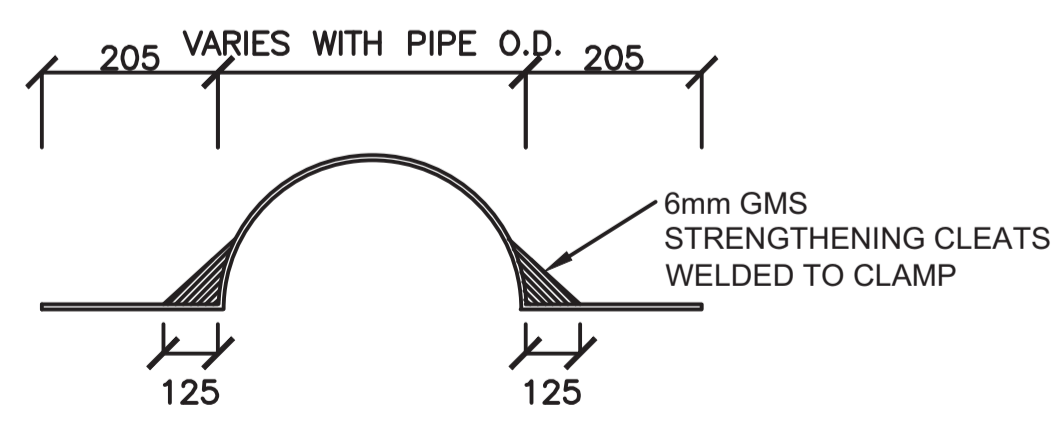


**TYPICAL PIPE FIXING**  
**DETAIL ON COLUMN HEAD**  
SCALE 1:20

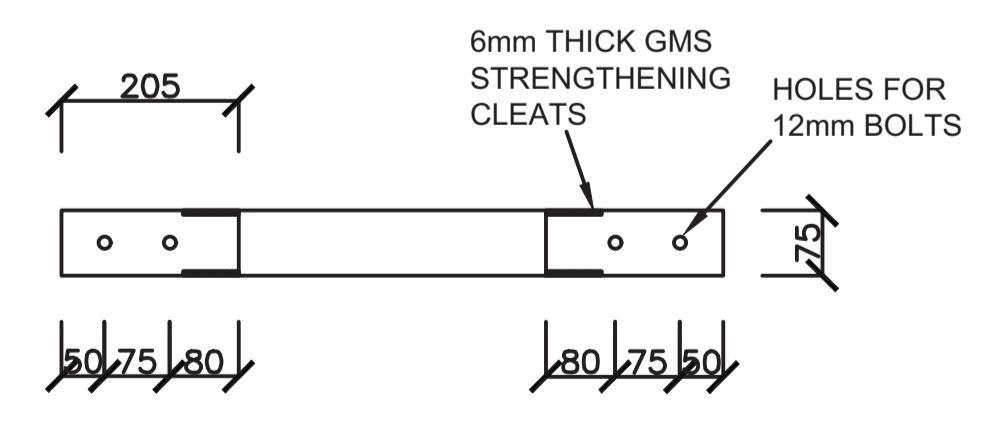
**ANCHOR PLATES & GMS CLAMP DETAILS**



**ANCHOR PLATE DETAIL**  
(N.T.S.)




**GMS CLAMP - ELEVATION**  
(N.T.S.)



**GMS CLAMP - PLAN**  
(N.T.S.)

- NOTES**
- PROGRAMME, METHOD OF CONSTRUCTION AND SETTING OUT OF WORK TO BE APPROVED BY THE ENGINEER BEFORE COMMENCEMENT OF WORK
  - DESIGN CRITERIA:**
    - DESIGN CODES B.S. 8007 & B.S. 8110
    - UNIFORM NON-COMPRESSIBLE FOUNDATION WITH BEARING CAPACITY 80kN/m<sup>2</sup>
  - CONCRETE:**
    - CEMENT TO BE ORDINARY PORTLAND CEMENT TO B.S. 12
    - CONCRETE AGGREGATE TO COMPLY WITH B.S. 882
    - WATER IN CONCRETE MIXES TO B.S. 3148
    - CONCRETE CLASSES TO BE AS FOLLOWS:-  
MASS CONCRETE FILL AND BLINDING MIX, CLASS 15/40  
REINFORCED CONCRETE, CLASS 25/20
    - MINIMUM COVER TO ALL REINFORCEMENT TO BE 40mm UNLESS AS SPECIFIED BELOW FOR BUILDINGS MEMBERS OF BUILDINGS:  
- SLABS - 20 mm  
- BEAMS - 25 mm  
- COLUMNS - 40 mm  
- FOUNDATIONS & FOOTINGS - 50 mm
    - WALLS/COLUMNS SHOULD BE POURED, IF POSSIBLE, IN A FULL HEIGHT POUR AS SOON AS POSSIBLE AFTER THE BASE HAS BEEN CONCRETED (2 TO 3 DAYS)
  - REINFORCEMENT:**
    - REINFORCEMENT TO BE HIGH YIELD SQUARE TWISTED BARS TO B.S. 4461
    - BENDING DIMENSIONS TO B.S. 4466
    - THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL SPACER BLOCKS, CHAIRS AND TYING WIRE
    - EXAMPLE: 16 T12 - 07 - 150 SIGNIFIES 16 No. HIGH TENSILE 12mm DIA. BARS IDENTIFICATION MARK 07 AT 150mm CENTRE TO CENTRE SPACING
  - JOINTS:**
    - THE POSITION AND NUMBER OF INTERMEDIATE JOINTS TO BE AS DIRECTED BY THE ENGINEER OR AS SHOWN IN THE DRAWINGS. BEFORE PLACING FRESH CONCRETE THE OLD SURFACE SHALL BE ROUGHENED AND ALL LAITANCE AND LOOSE MATERIAL REMOVED. THE SURFACE SHALL BE THOROUGHLY WETTED BUT EXCESS WATER SHOULD BE REMOVED SO THAT THE CONSTRUCTION JOINTS ARE IN A SATURATED BUT SURFACE DRY CONDITION
    - ALL WALL/COLUMN BASE CONNECTIONS SHOULD HAVE 100mm KICKER UNLESS OTHERWISE SPECIFIED
    - THE uPVC WATER STOP SHALL BE 200mm WIDE UNLESS OTHERWISE SPECIFIED
    - JOINT FILLER TO B.S. 5292 AND TO BE APPROVED BY THE ENGINEER

REVISION	DESCRIPTION	DATE

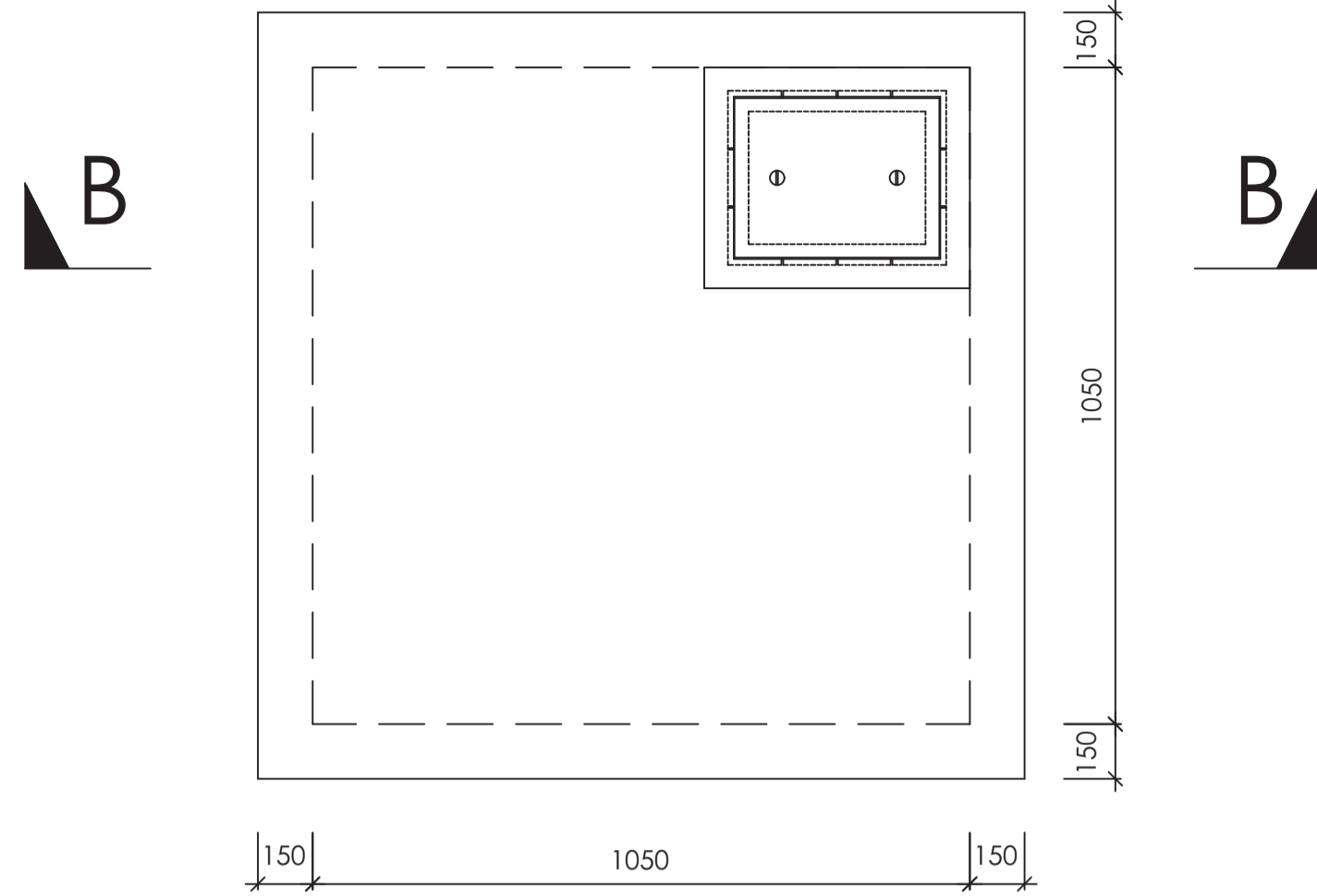
CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:  

**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

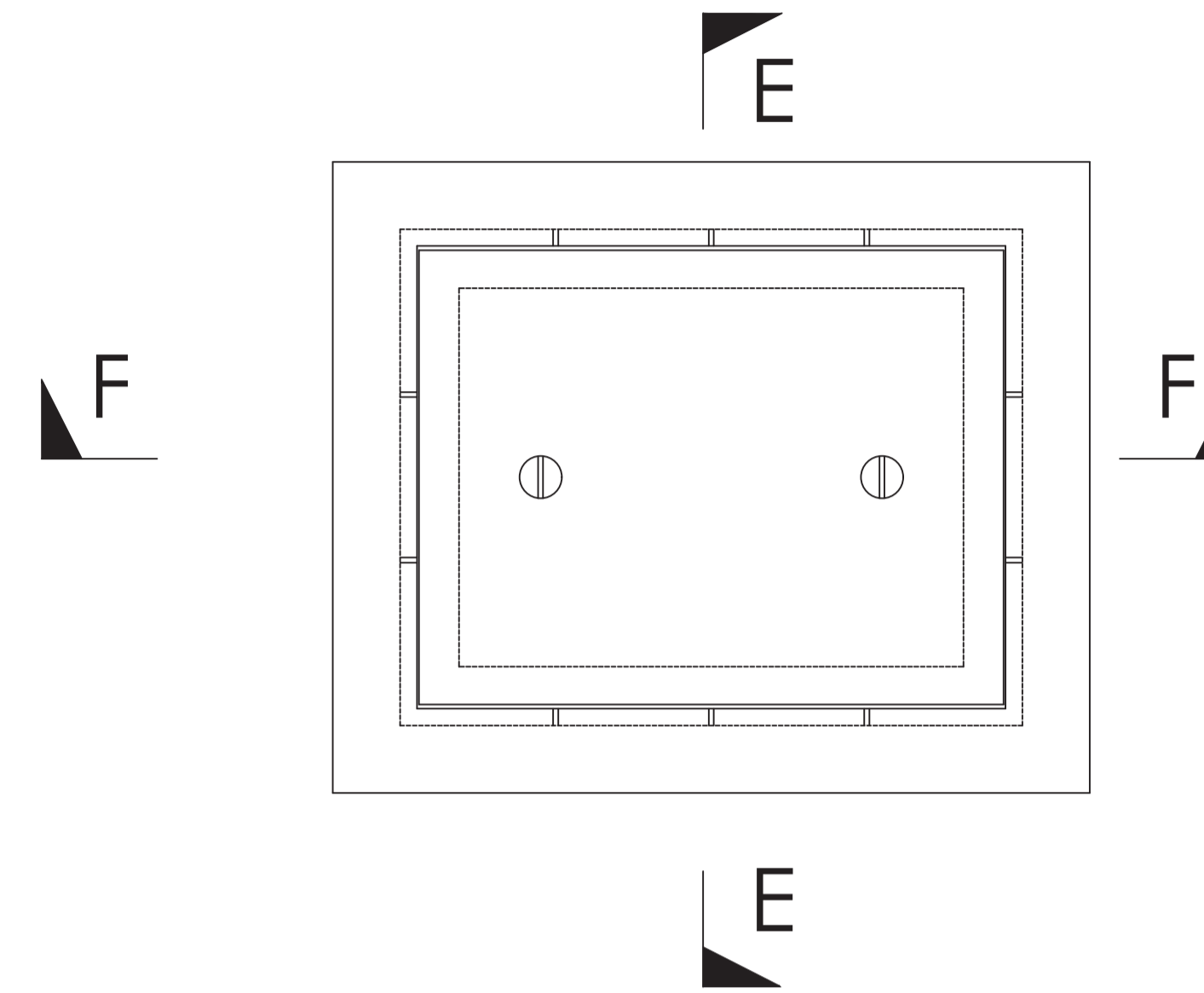
DRAWING TITLE:  
**STANDARD DRAWINGS**  
**DETAILS OF PIERS FOR PIPE AERIAL CROSSINGS**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: 1:500	Date: FEBRUARY 2024
DRAWING No: M/W/SD/21	REV. 0



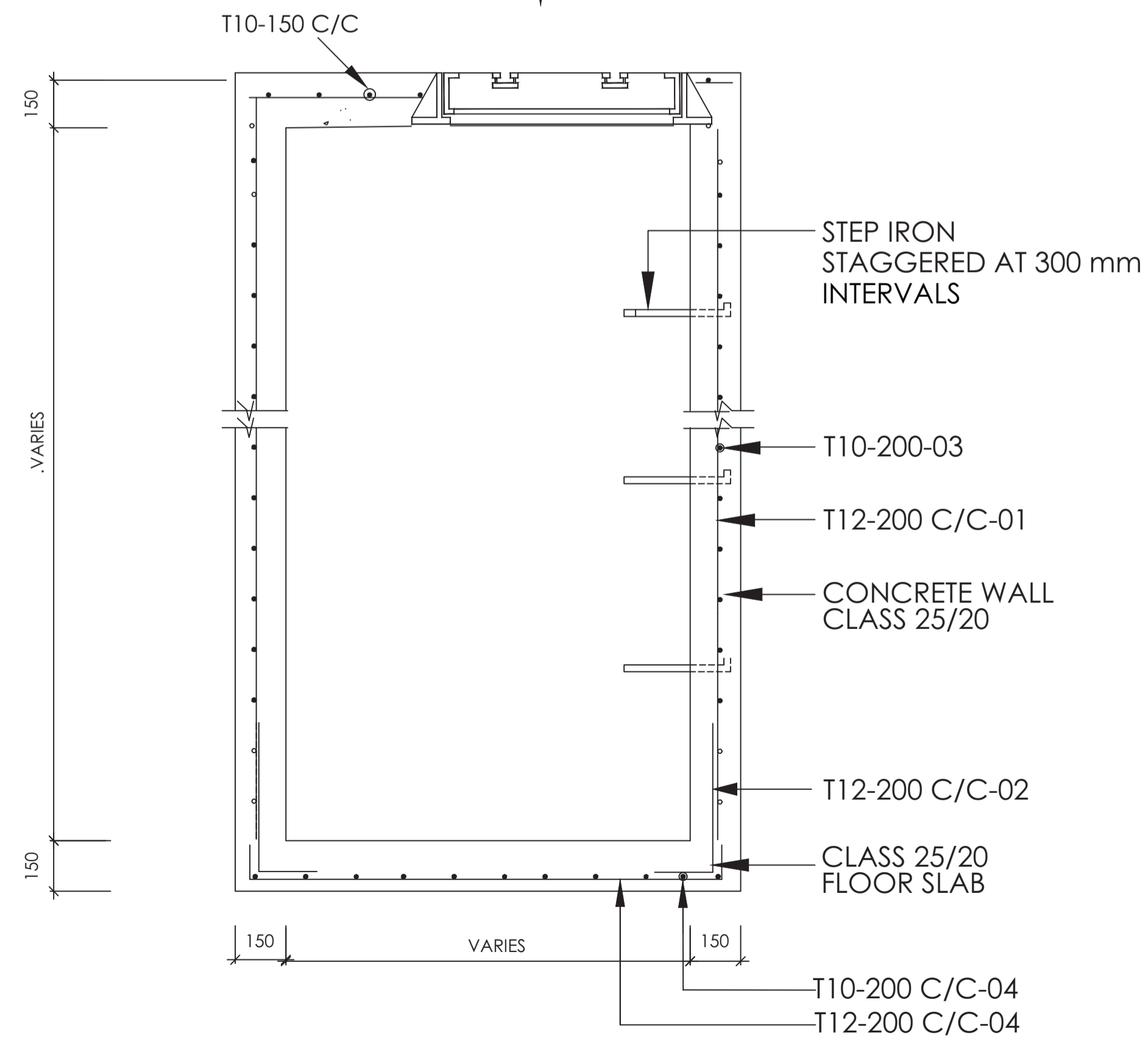
**PLAN VIEW**  
SCALE 1:50

**DETAILS OF RECTANGULAR HEAVY DUTY COMPOSITE MANHOLE COVER**

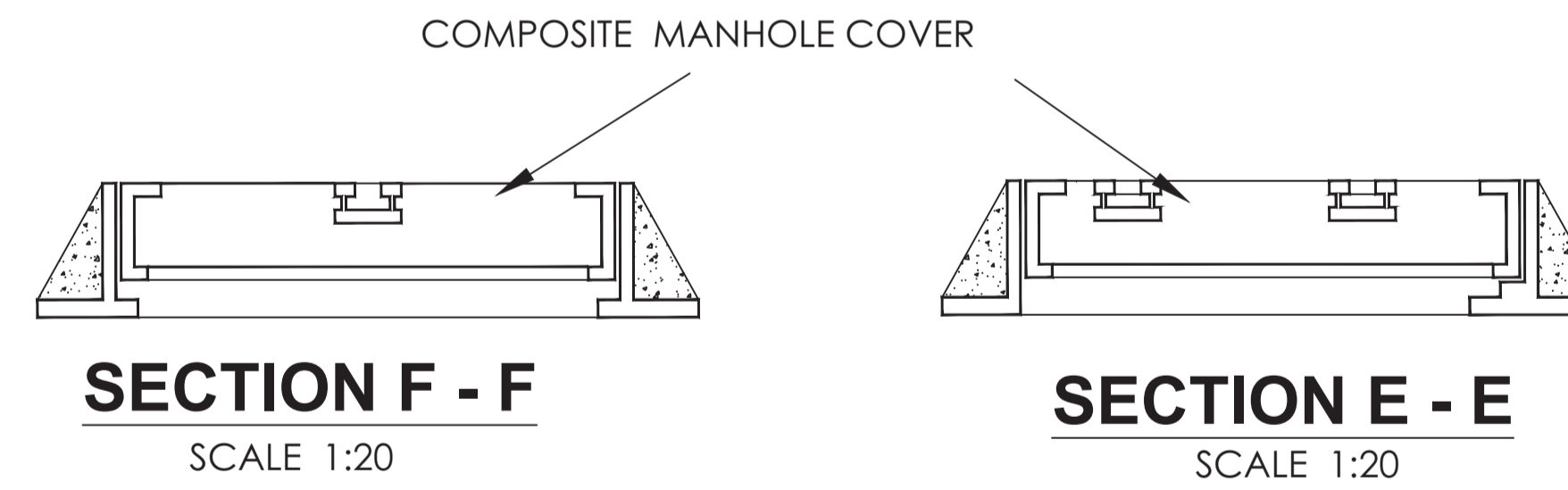


SCALE 1:50

RECTANGULAR COMPOSITE MANHOLE COVER



**SECTION B - B**  
SCALE 1:50




**NOTES**


1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED
2. LENGTH OF EACH CASCADE TO BE 1000mm

**ABBREVIATIONS**

- I.B. - INVERT BLOCK
- I.B.D. - INVERT BLOCK DRAIN
- DIA - DIAMETER
- mm - MILIMETER
- F.G.L. - FINISHED GROUND LEVEL

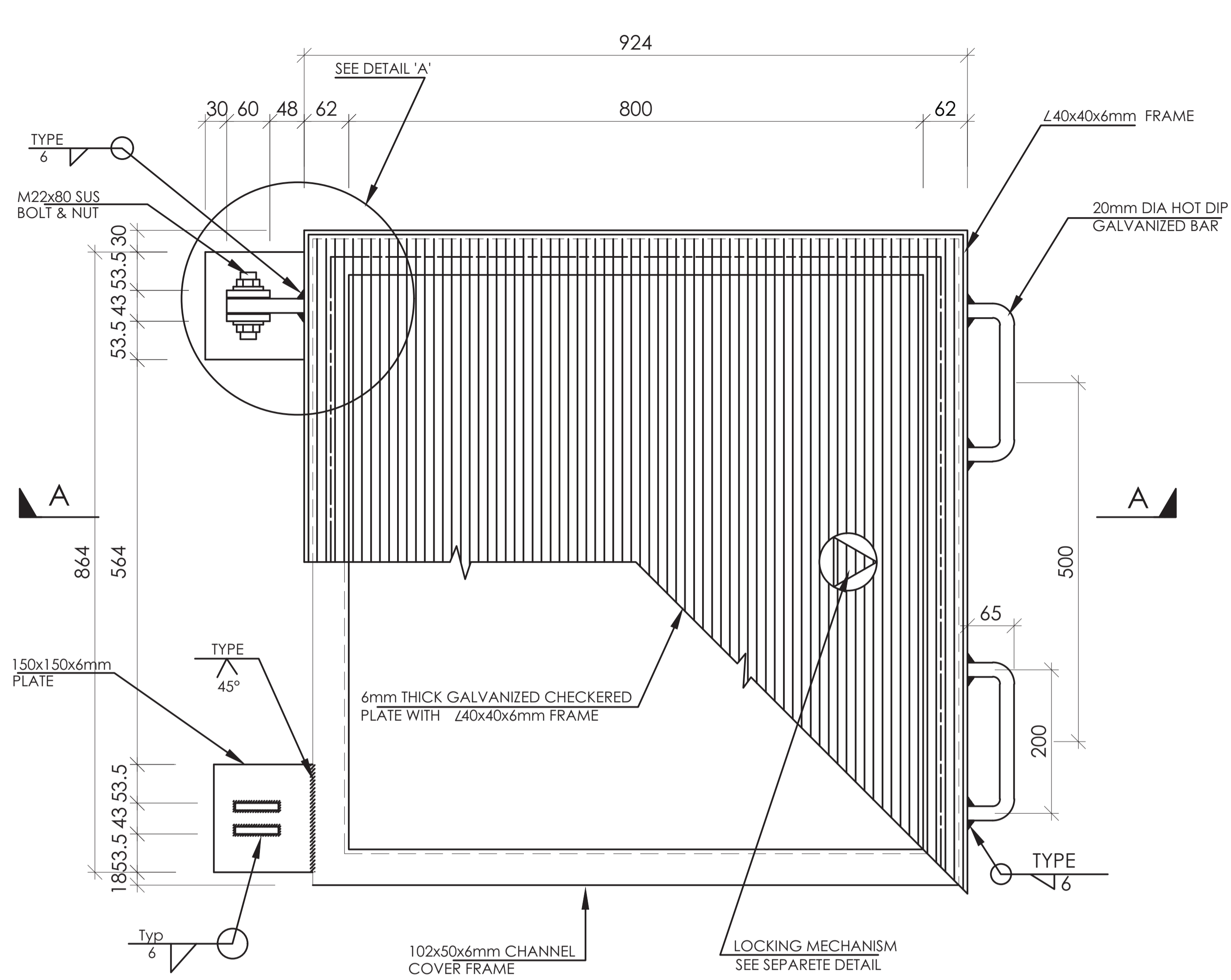
REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:  

**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadalala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

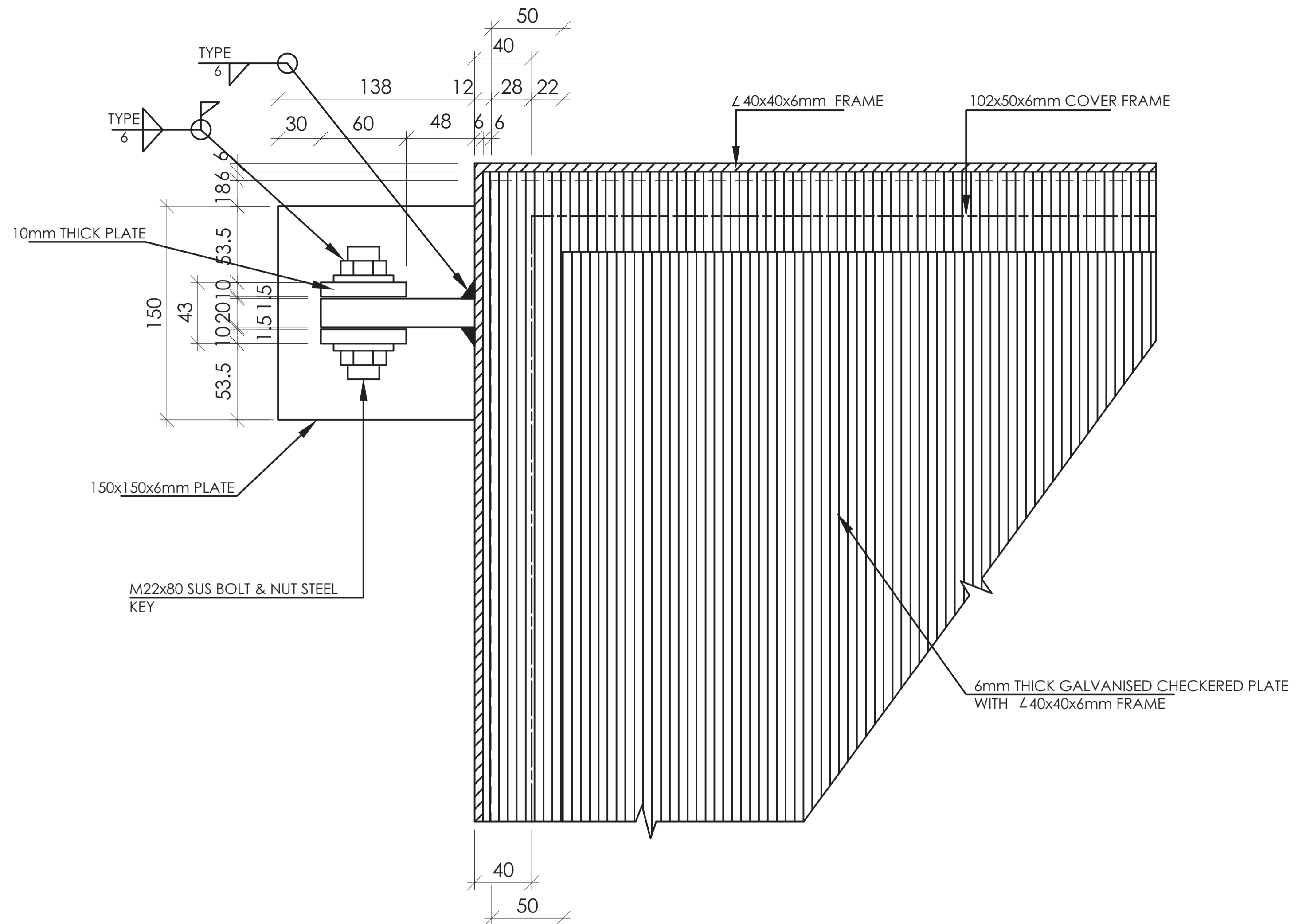
DRAWING TITLE:  
**STANDARD DRAWINGS**  
**DETAILS OF REINFORCED CHAMBER**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: 1:500	Date: FEBRUARY 2024
DRAWING No: M/W/S/SD/22	REV. 0

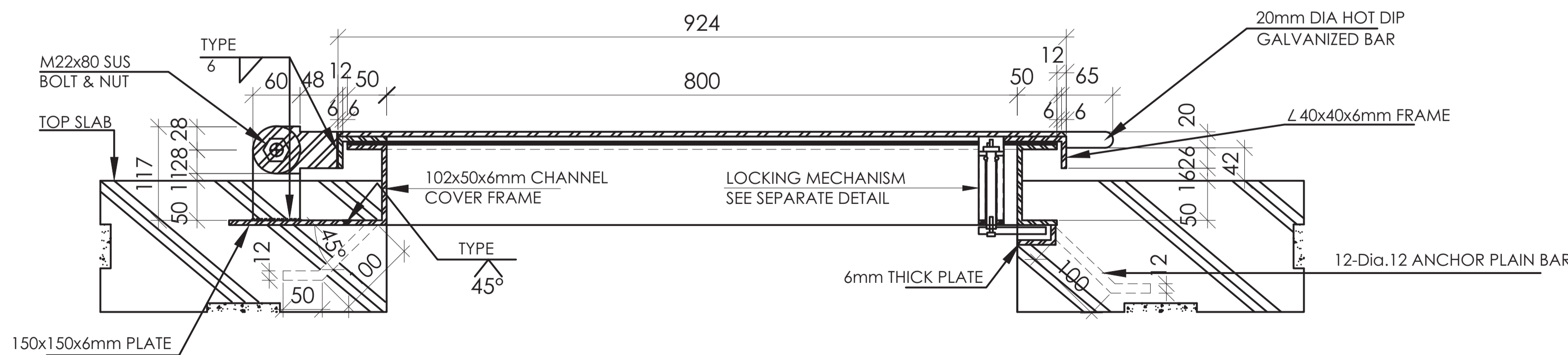


**PLAN OF CHECKERED PLATE COVER FOR CHAMBERS**

SCALE 1:10



**DETAIL 'A'**  
SCALE 1:5



**SECTION A-A**  
SCALE 1:10

**NOTES**

ALL DIMENSIONS ARE IN MILLIMETRES (mm) UNLESS OTHERWISE STATED

**ABBREVIATIONS**

- SUS - Stainless Steel
- thk - thick
- Typ - Type
- Dia. - Diameter
- ∟ - Angle Iron

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:  

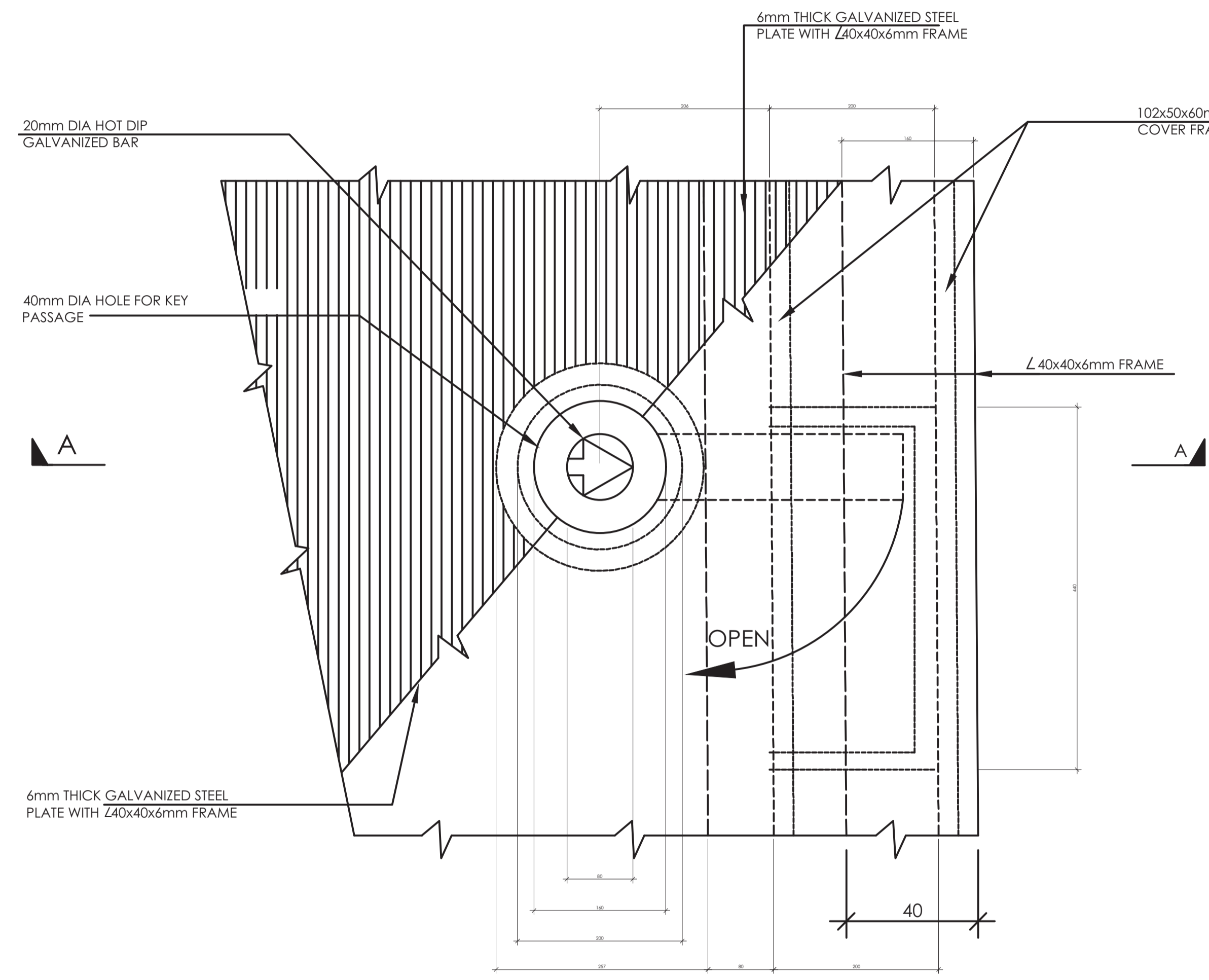
**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:  

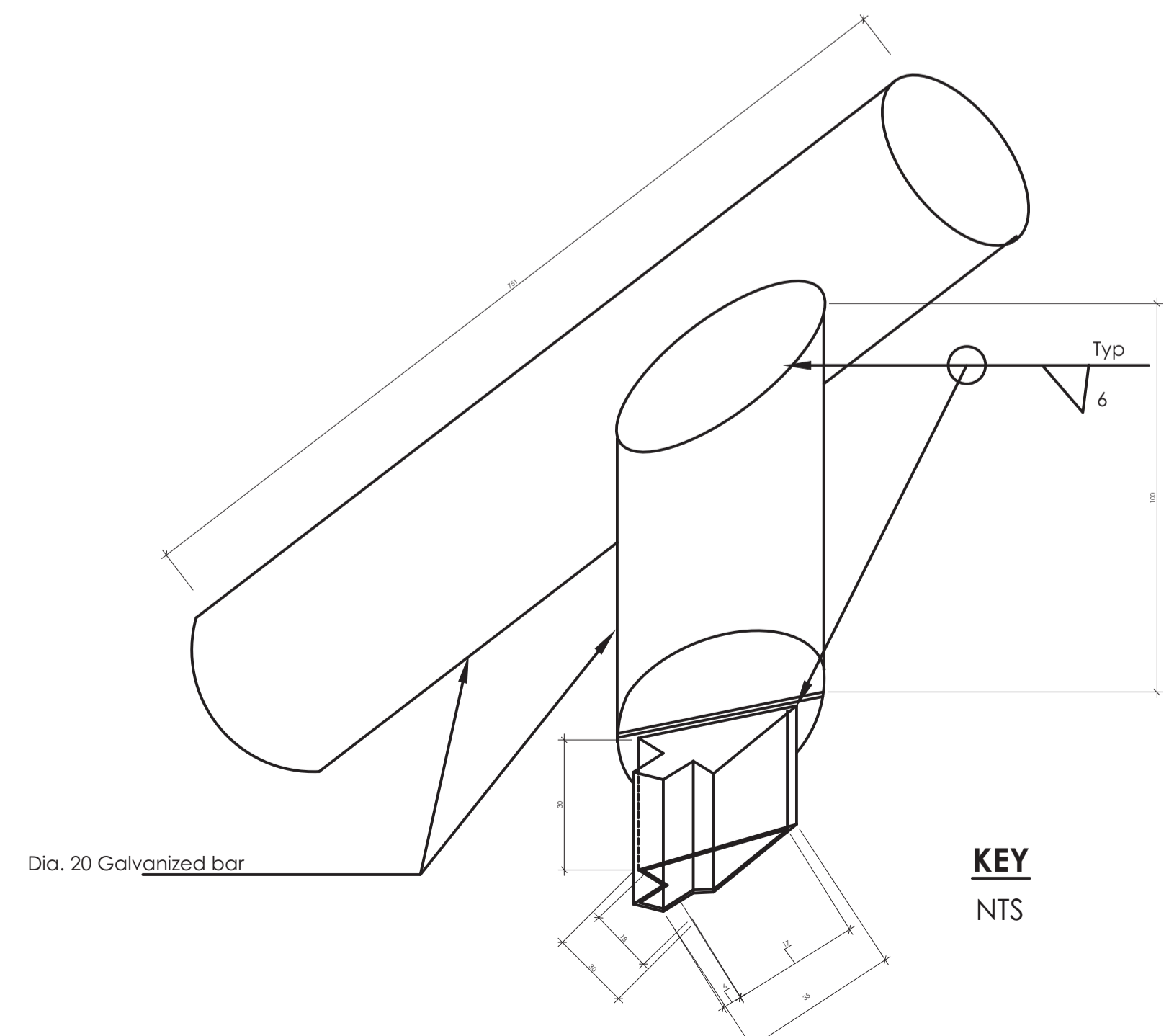
**Interconsult Engineers Ltd**  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:  
**STANDARD DRAWINGS**  
**DETAILS OF CHECKERED PLATE COVERS FOR CHAMBERS**  
**(SHEET 1 OF 2)**

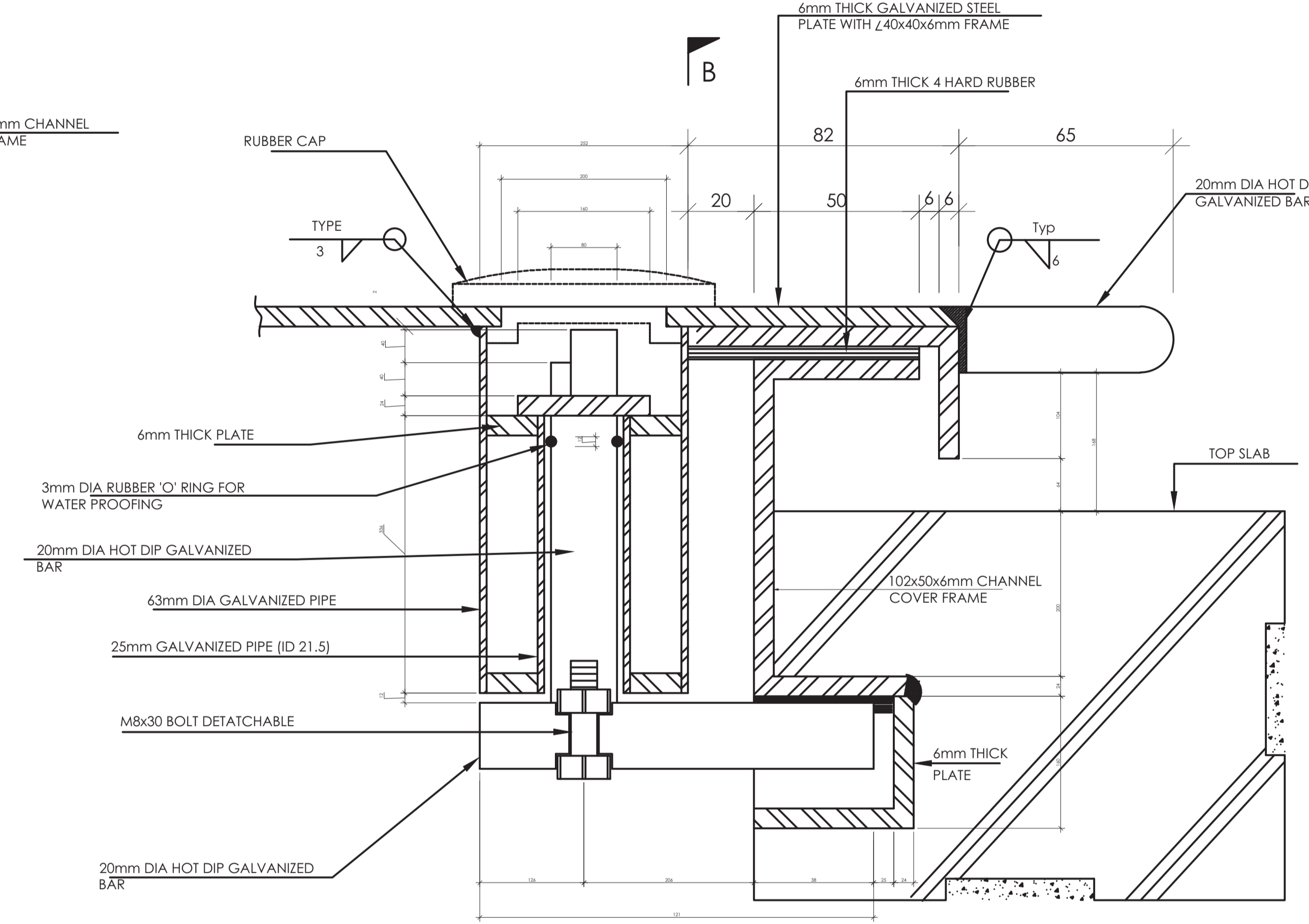
Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: 1:500	Date: FEBRUARY 2024
DRAWING No: MWS/SD/23	REV. 0



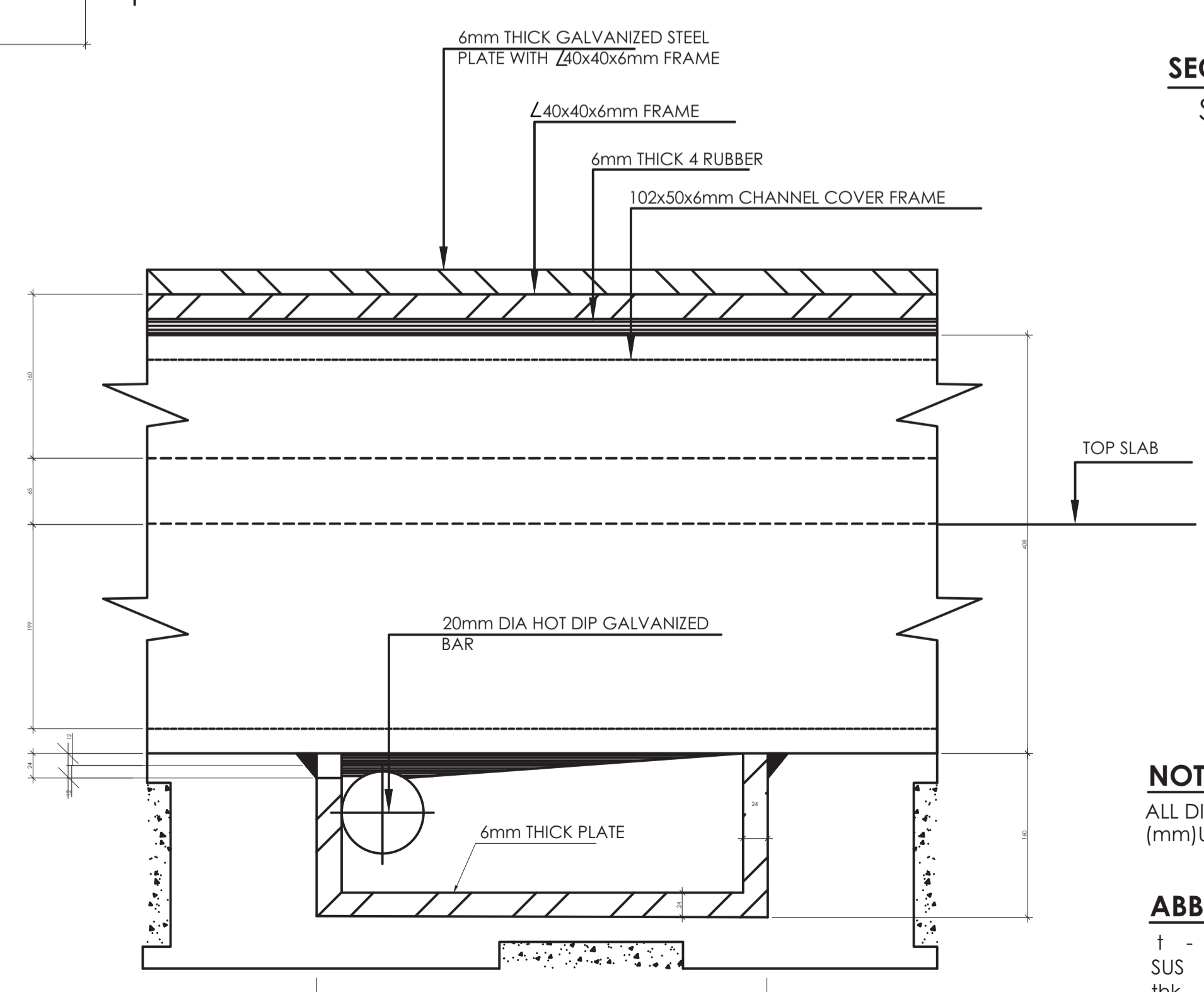
**PLAN OF LOCKING MECHANISM**  
SCALE 1:2



**KEY**  
NTS



**SECTION A - A**  
SCALE 1:2




**SECTION B - B**  
SCALE 1:2

**NOTES**  
ALL DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE STATED

**ABBREVIATIONS**

- t - Thick
- SUS - STAINLESS STEEL
- thk - Thick
- Typ - Type
- L - Angle Iron
- Ø - Diameter

REVISION	DESCRIPTION	DATE

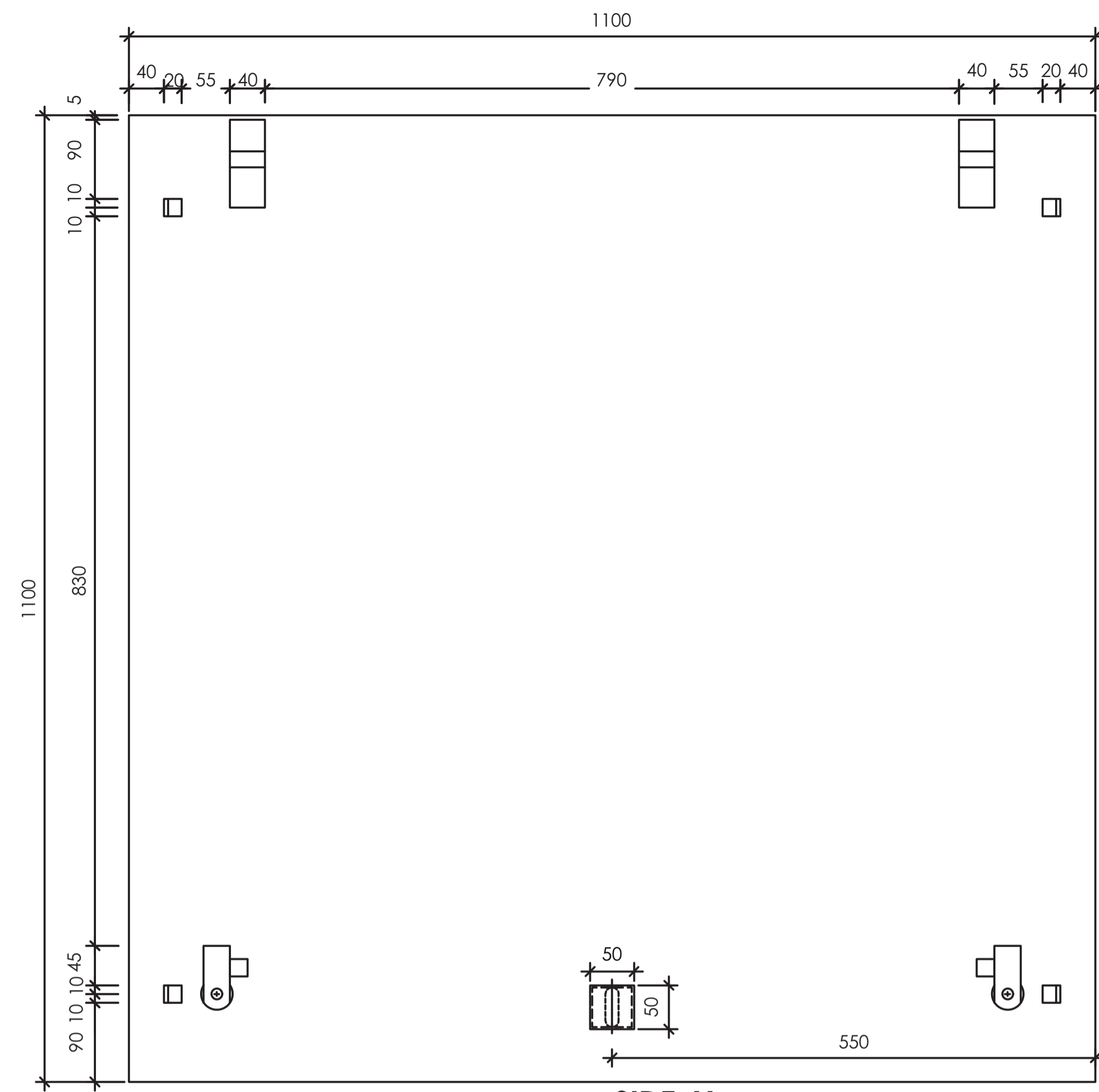
CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:  Interconsult Engineers Ltd  
 Consulting Engineers  
 Jadala Place, 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

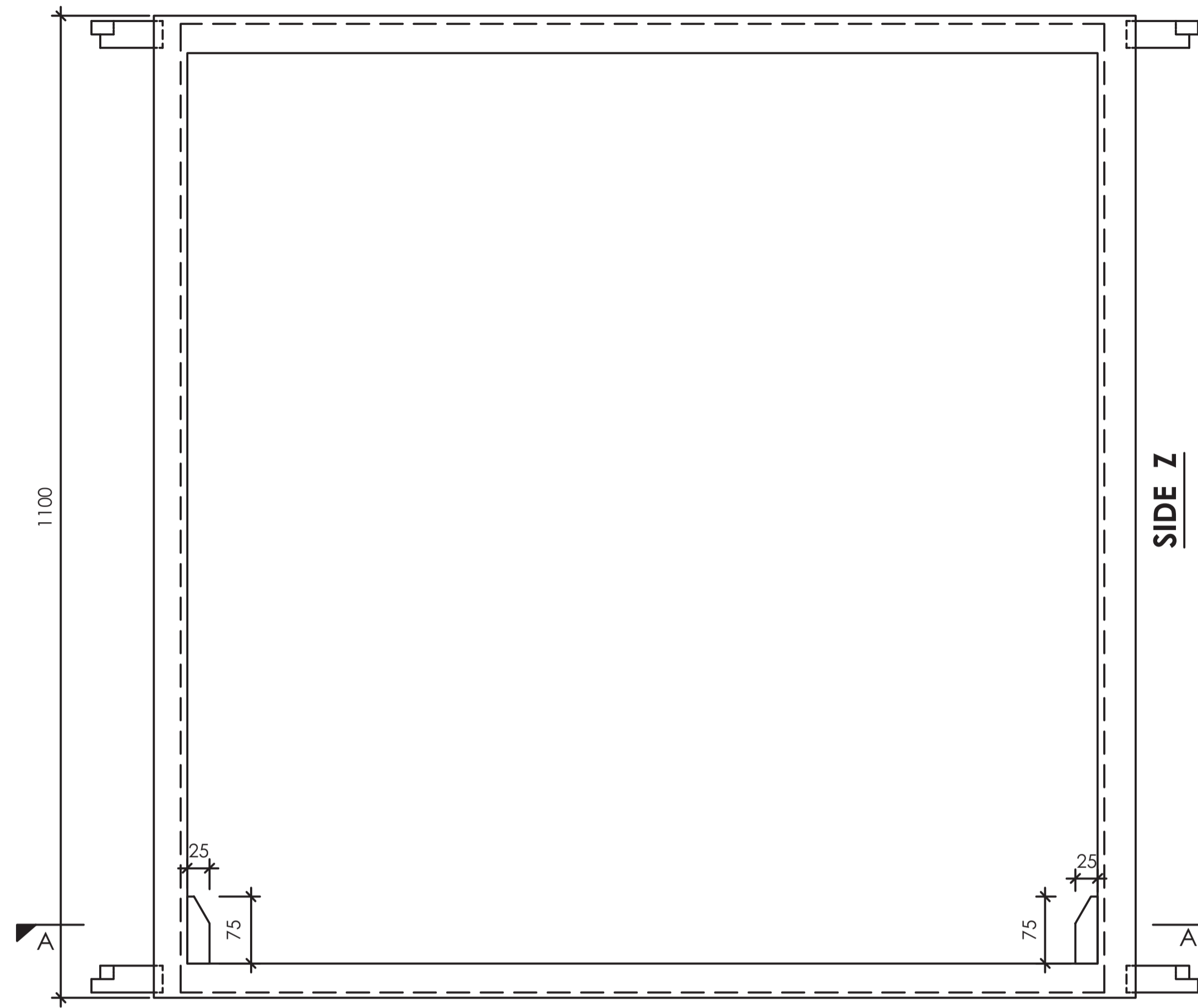
DRAWING TITLE:  
**STANDARD DRAWINGS**  
**DETAILS OF CHECKERED PLATE**  
**COVERS FOR CHAMBERS**  
**(SHEET 1 OF 2)**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: 1:500	Date: FEBRUARY 2024
DRAWING No: M/W/S/SD/24	REV. 0

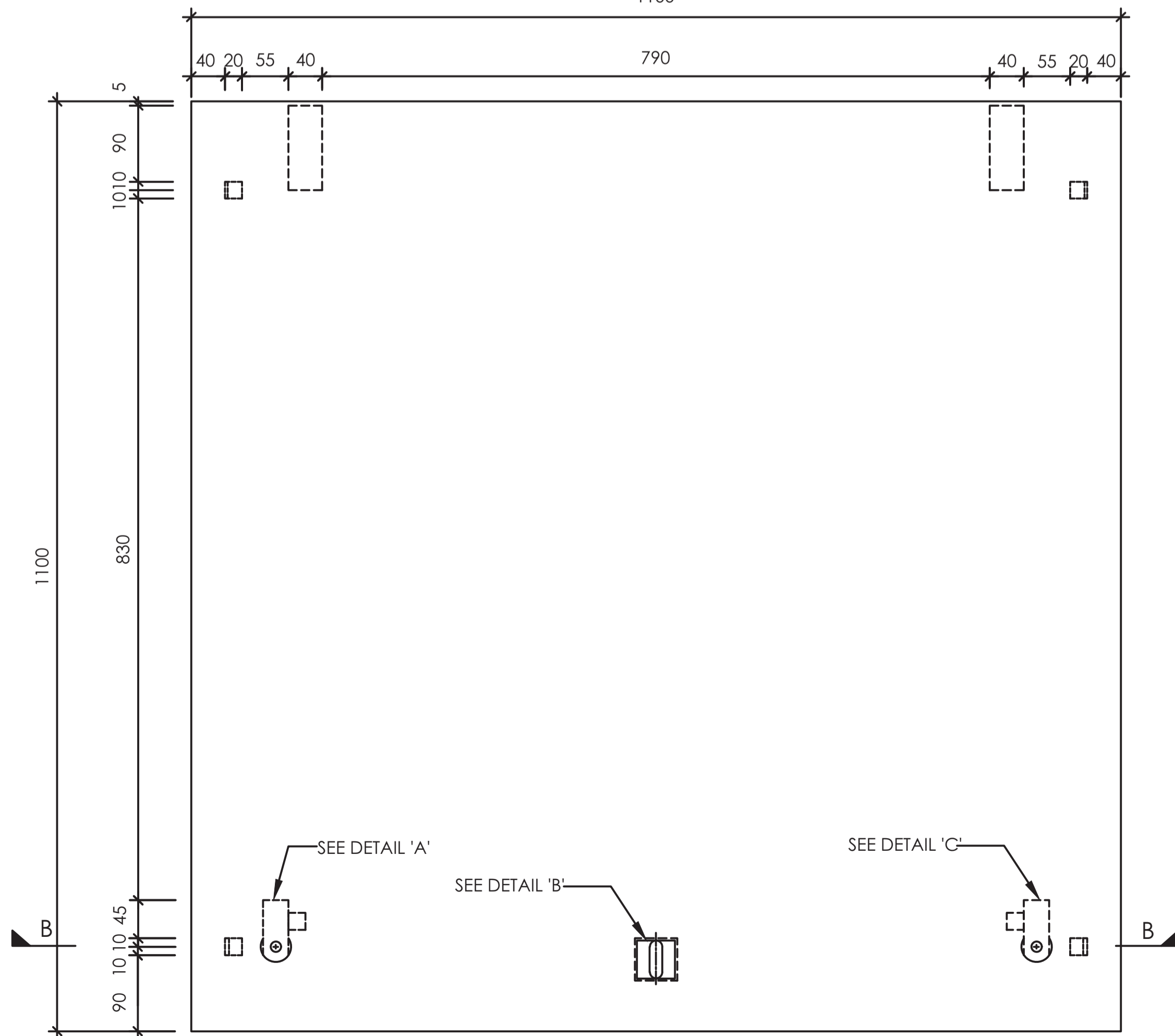




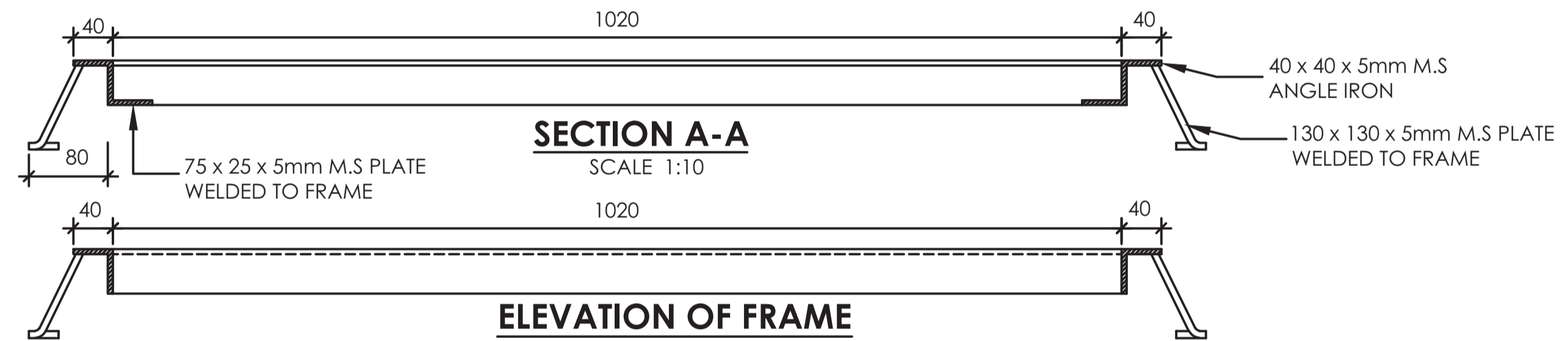
**SIDE X  
PLAN - UNDERSIDE OF COVER**  
SCALE 1:10



**SIDE Y  
PLAN OF FRAME**  
SCALE 1:10



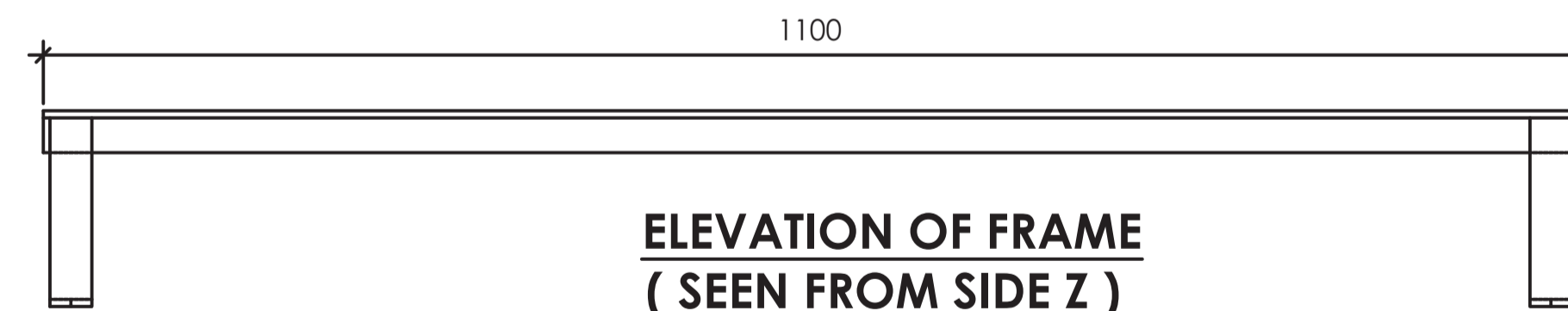
**PLAN - OF COVER**  
SCALE 1:10



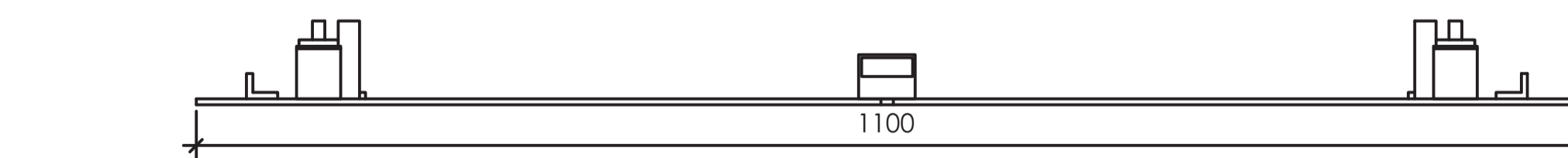
**SECTION A-A**  
SCALE 1:10



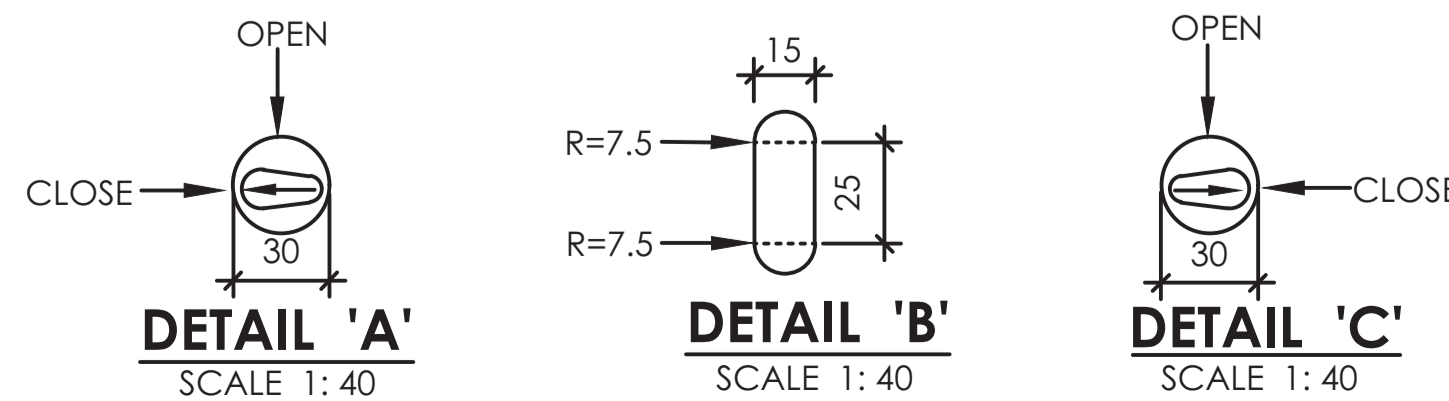
**ELEVATION OF FRAME  
( SEEN FROM SIDE Y )**  
SCALE 1:10



**ELEVATION OF FRAME  
( SEEN FROM SIDE Z )**  
SCALE 1:10



**ELEVATION OF COVER  
( SEEN FROM SIDE X )**  
SCALE 1:10



**DETAIL 'A'**  
SCALE 1:40


**DETAIL 'B'**  
SCALE 1:40

**DETAIL 'C'**  
SCALE 1:40

**NOTES**

1. ALL DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE STATED
2. M.S - MILD STEEL
3. mm - Millimeter

REVISION	DESCRIPTION	DATE

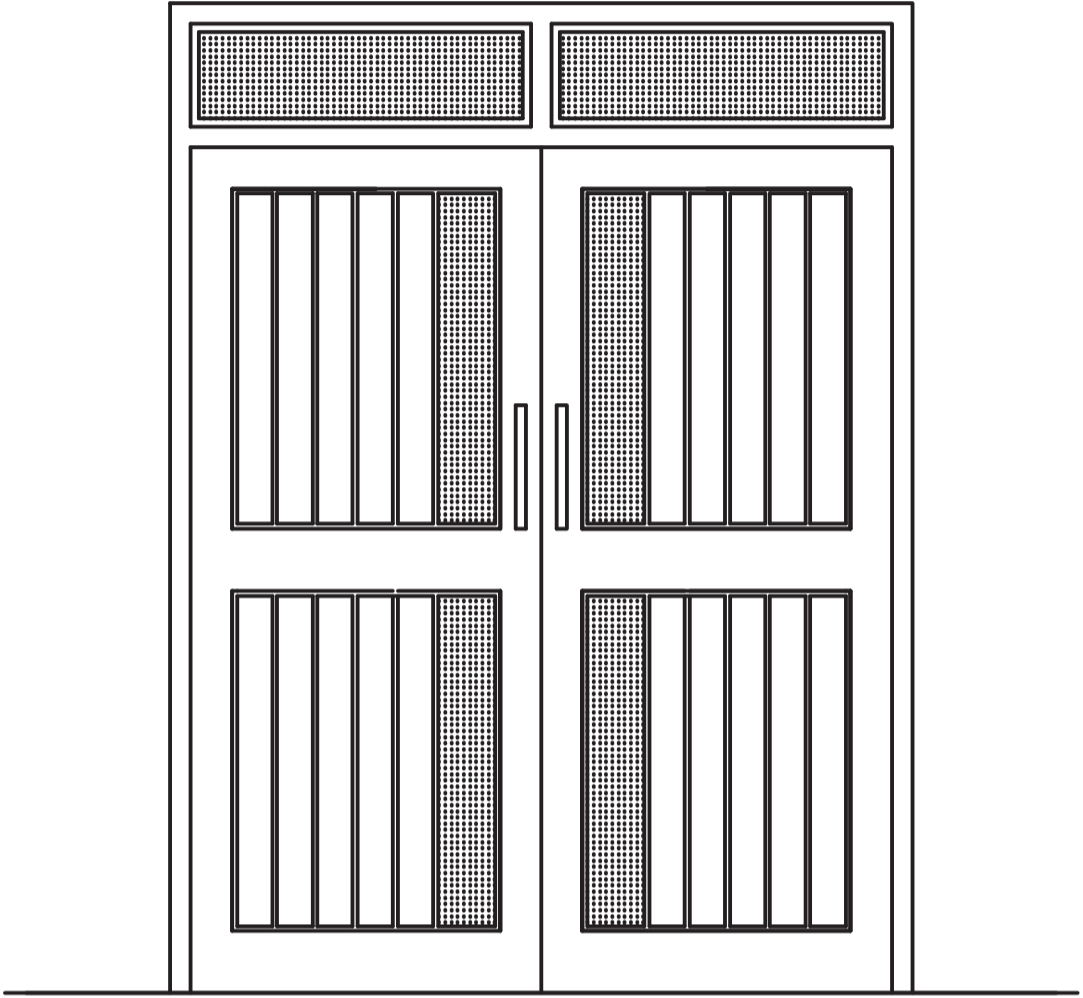
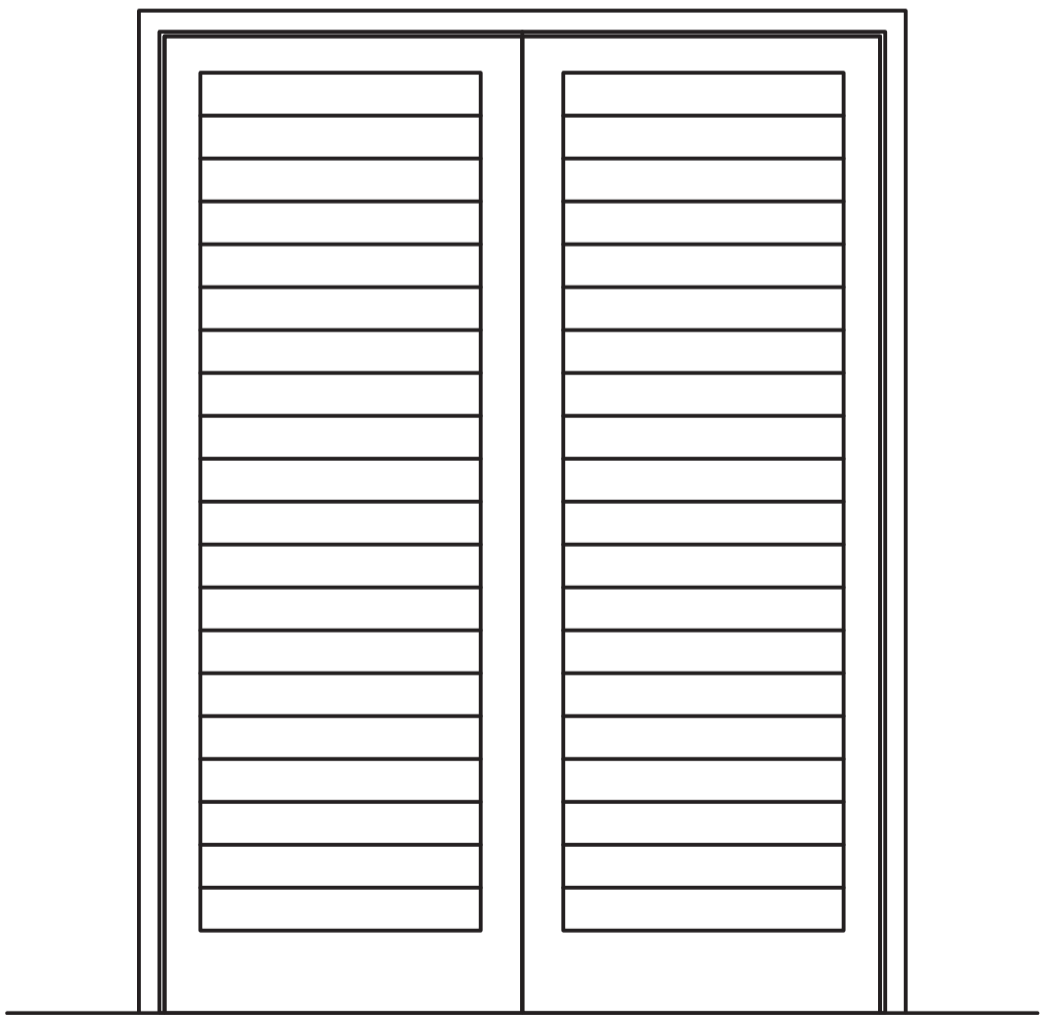
CLIENT / EMPLOYER:  

**NORTHERN WATER WORKS  
DEVELOPMENT AGENCY**  
P.O. BOX 495-70100  
GARISSA

REVIEWED BY:  Interconsult Engineers Ltd  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane,  
Tel. 4441648/4441651  
Nairobi.

DRAWING TITLE:  
**STANDARD DRAWINGS**  
**DETAILS OF MILD STEEL SHEET**  
**METAL COVER FOR CHAMBERS**  
(SHEET 2 OF 2)


Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: 1:500	Date: FEBRUARY 2024
DRAWING No: M/W/S/SD/26	REV. 0



DOOR TYPES	DESCRIPTION	STRUCTURAL OPENING
 <p style="text-align: center;"><b>D 1/ D 1a</b></p>	<p>1800 x 2030 mm timber double door with ex 100 x 50 mm stiles and top rails, ex 150 x 50 mm middle and bottom rails, and infill panels in ex 100 x 50 mm t &amp; g battens, all in prime grade cypress.</p> <p>Door Type D 1a similar, but to be single door size 900 x 2400mm.</p>	<p>1800 x 2400 mm</p> <p>900 x 2400 mm</p>
 <p style="text-align: center;"><b>D 2 / D 2a / D 2b</b></p>	<p>1800 x 2400 mm pressed metal louvre double door</p> <p>Door Type D 2a similar, but door size to be 1200 x 2400 mm.</p> <p>Door Type D 2b similar, but to be single Door Size 900 x 2400 mm.</p>	<p>1800 x 2400 mm</p> <p>1200 x 2400 mm</p> <p>900 x 2400 mm</p>

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:



NORTHERN WATER WORKS  
DEVELOPMENT AGENCY  
P.O. BOX 495-70100  
GARISSA

REVIEWED BY:

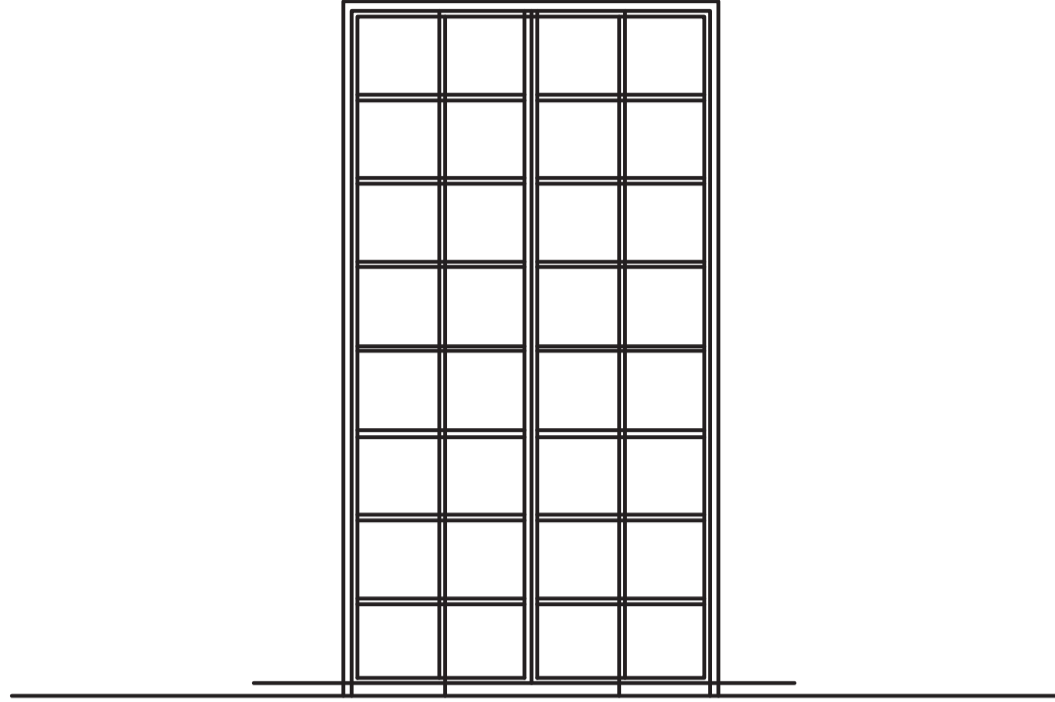
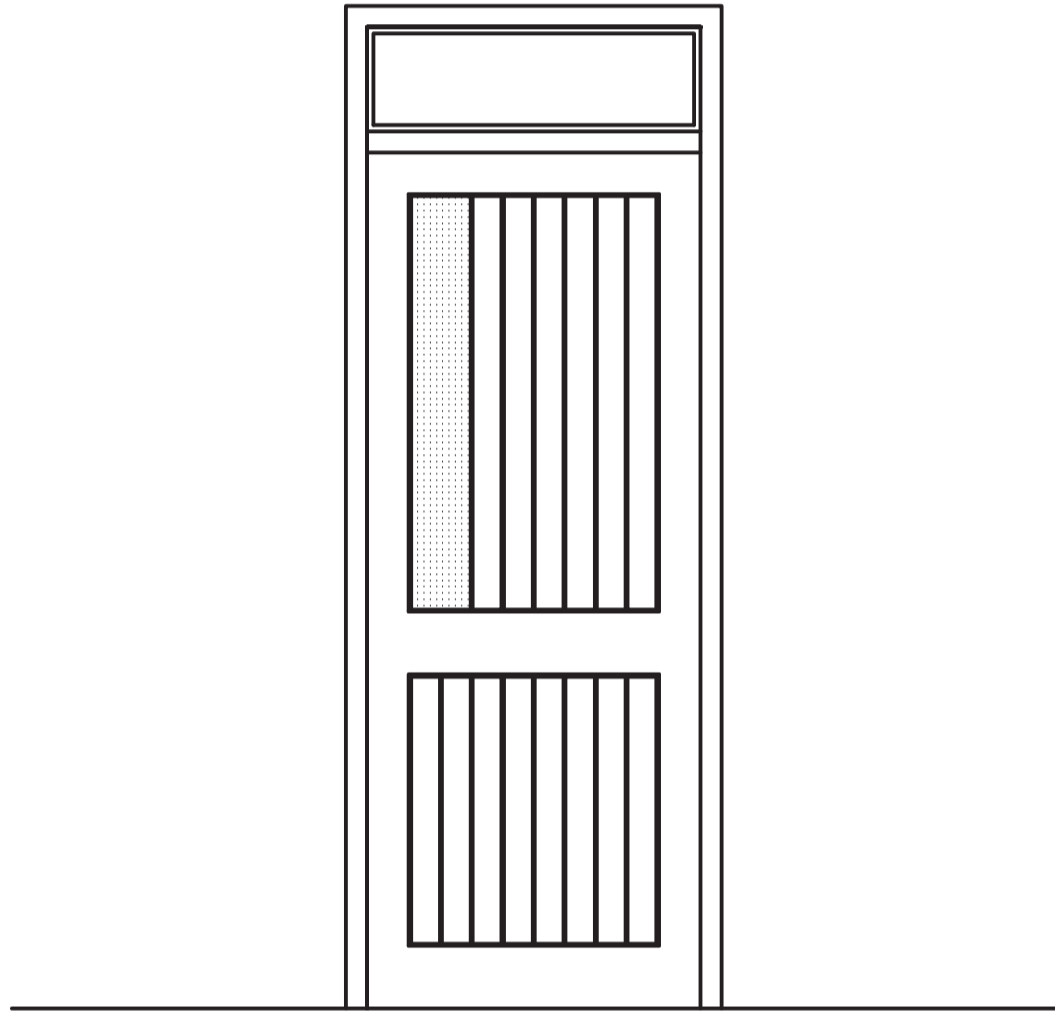
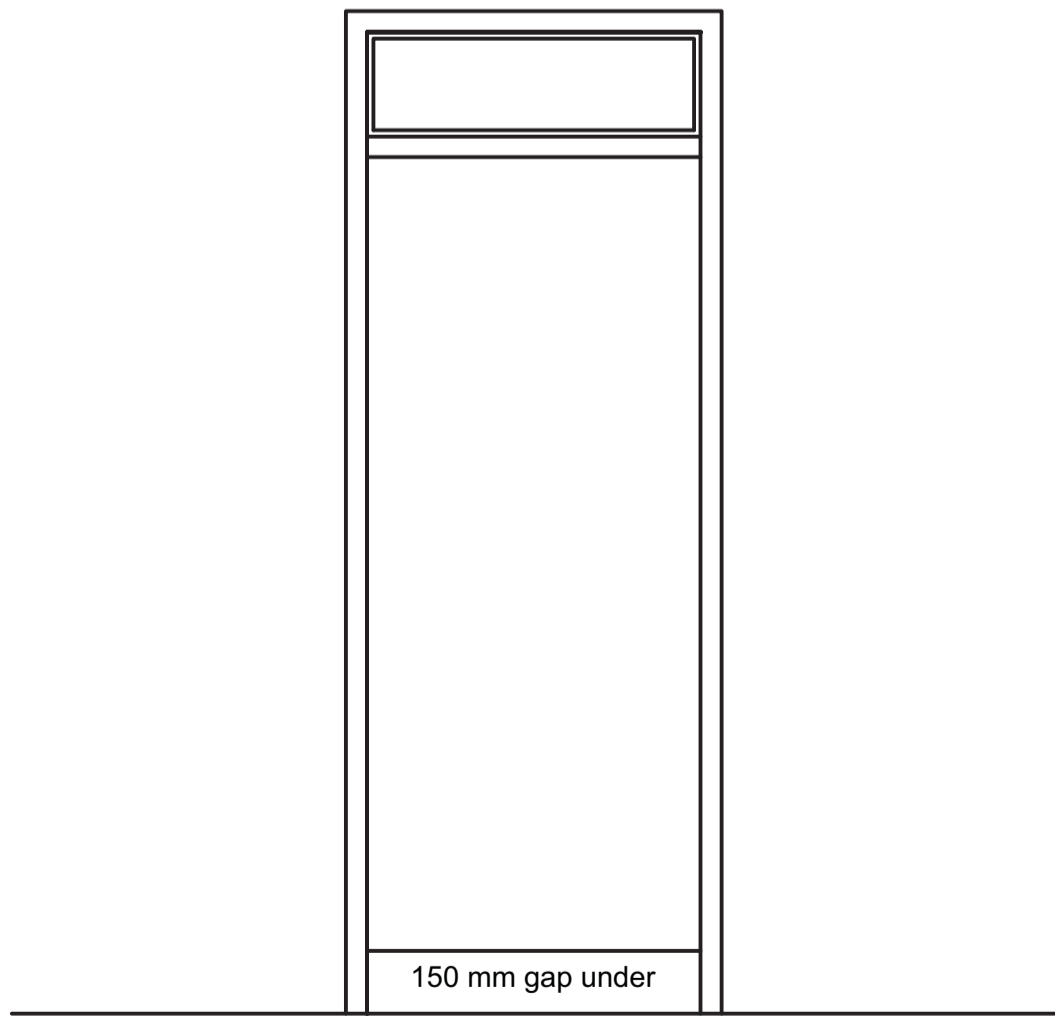


Interconsult Engineers Ltd  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane,  
Tel. 4441648/4441651  
Nairobi.

DRAWING TITLE:


**STANDARD DRAWINGS**  
**DOOR SCHEDULE**  
**SHEET 1 OF 2**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: 1:500	Date: FEBRUARY 2024
DRAWING No: M/W/S/SD/□ REV. 0	

DOOR TYPES	DESCRIPTION	STRUCTURAL OPENING
 <p style="text-align: center;"><b>D 3</b></p>	<p>1200 x 2397mm side hung standard section steel casement door in two equal panels</p>	<p>1300 x 2400 mm</p>
 <p style="text-align: center;"><b>D 4 / D 4a</b></p>	<p>800 x 2030 mm timber door with ex 100 x 50 mm stiles and top rails, ex 150 x 50 mm middle and bottom rails, and infill panels in ex 100 x 50 mm t &amp; g battens, all in prime grade cypress.</p> <p>990 x 140 mm georgian wired clear glass panel in upper half, and glazed fanlight over.</p> <p>D 4a similar, but without georgian wired glass panel &amp; fanlight over.</p>	<p>900 x 2400 mm</p> <p>900 x 2200 mm</p>
 <p style="text-align: center;"><b>D 5 / D 5a</b></p>	<p>800 x 2030 mm semi - solid core flush door with hardwood lipping all round, painted. Glazed fanlight over ex 125 x 50 mm prime grade cypress door frame.</p> <p>Door Type D 5a similar, but door size to be 800 x 1880 mm.</p>	<p>900 x 2400 mm</p> <p>800 x 2400 mm</p>

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:



NORTHERN WATER WORKS  
DEVELOPMENT AGENCY  
P.O. BOX 495-70100  
GARISSA

REVIEWED BY:

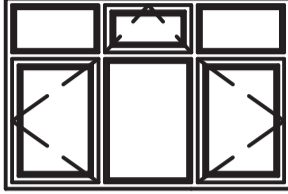

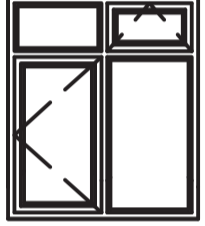







Interconsult Engineers Ltd  
Consulting Engineers  
Jadala Place, 4th Floor,  
Ngong Lane,  
Tel. 4441648/4441651  
Nairobi.

DRAWING TITLE:

**STANDARD DRAWINGS**  
**DOOR SCHEDULE**  
**SHEET 2 OF 2**

Designed by: N.M	Drawn by: I.M.W
Checked by: P.M.M	Approved by: K.M
Scale: 1:500	Date: FEBRUARY 2024
DRAWING No: M/W/SD/2	
REV. 0	


WINDOW TYPES	DESCRIPTION	STRUCTURAL OPENING
 <b>W 1</b>	1797 X 1197 mm steel casement window in 3 equal panels, with upper part having 2 no. fixed and 1 no. top - hung ventilator, and lower half having 2 no. side-hung panels opening outwards, and 1 no. fixed panel.	1800 x 1200 mm
 <b>W 2 / W 2a / W 2b</b>	1597 X 1197 mm PVC window in 3 equal panels, with upper part having 2 no. fixed and 1 no. top - hung ventilator, and lower half having 2 no. side-hung panels opening outwards, and 1 no. fixed panel.  Window 2a Similar but window size 1597 x 1197mm. Window 2b Similar but window size 1197 x 197mm.	1800 x 1200 mm  1600 x 1200 mm 1200 x 1200 mm
 <b>W 3 / W 3a</b>	1397 X 1197 mm steel casement window in 2 equal panels, with upper part having 1 no. fixed and 1 no. top - hung ventilator, and lower half having 1 no. side-hung casement opening outwards, and 1 no. fixed panel with coupling mullions.  Window 3a Similar but window size 1197 x 1197mm.	1400 x 1200 mm  1200 x 1200 mm
 <b>W 4</b>	597 X 1197 mm steel casement window, with upper part having 1 no. top - hung ventilator, and lower half having 1 no. side-hung panel opening outwards.	600 x 1200 mm
 <b>W 5 / W 5a</b>	1797 x 597 mm steel casement window in 3 equal panels with 1 no. fixed and 2 no. top-hung panel opening outwards.  Window 5a similar but to be uPVC casement Window.	1800 x 600 mm
 <b>W 6 / W 6a</b>	1797 x 597 mm steel casement window in 3 equal panels with 1 no. fixed and 2 no. top-hung panel opening outwards.  Window type W 6a similar, but to be uPVC casement window.	1600 x 600 mm
 <b>W 7 / W 7a</b>	1197 X 597 mm steel casement window in 2 equal panels, with 1 no. fixed and 1 no. top - hung ventilator.  Window type W 7a similar, but to be uPVC casement window.	1200 x 600 mm
 <b>W 8</b>	597 X 597 mm steel casement window panel, with 1no. top - hung ventilator.	600 x 600 mm

**NOTES:**

- All windows to be fitted with burglar proofing grille fabricated from 12x12mm m.s. square bars at 150mm c/c vertically and 200mm c/c horizontally, and fixed internally to surrounding wall with 12mm m.s. fish tail lugs at centres not exceeding 600mm.

REVISION	DESCRIPTION	DATE

CLIENT / EMPLOYER:


 NORTHERN WATER WORKS  
 DEVELOPMENT AGENCY  
 P.O. BOX 495-70100  
 GARISSA

REVIEWED BY:


 Interconsult Engineers Ltd  
 Consulting Engineers  
 Jadata Place 4th Floor,  
 Ngong Lane,  
 Tel. 4441648/4441651  
 Nairobi.

DRAWING TITLE:

**STANDARD DRAWINGS**  
**WINDOW SCHEDULE**

Designed by: N.M      Drawn by: I.M.W

Checked by: P.M.M      Approved by: K.M

Scale: 1:500      Date: FEBRUARY 2024

DRAWING No: M/W/SD-111      REV. 0