WATER AND SANITATION DEVELOPMENT PROJECT

COAST WATER WORKS DEVELOPMENT AGENCY

SECOND BARICHO – KAKUYUNI WATER PROJECT

LOT 1 – BARICHO - KAKUYUNI PIPELINE

VOLUME III - BOOK OF DRAWINGS

DATE

AUGUST 2021

SECOND BARICHO -KAKUYUNI WATER PROJECT		
SR. No.	TITLE	REMARKS
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	BARICHO- KAKUYUNI RAISING MAIN	
2	BARICHO -KAKUYUNI SHEET 1(0+00 - 1+720)	SHEET 1 OF 17
3	BARICHO -KAKUYUNI SHEET 2(1+720 - 3+480)	SHEET 2 OF17
4	BARICHO -KAKUYUNI SHEET 3(3+480 - 5+240)	SHEET 3 OF 17
5	BARICHO -KAKUYUNI SHEET 4(5+240 - 6+990)	SHEET 4 OF 17
6	BARICHO -KAKUYUNI SHEET 5(6+990 - 8+740)	SHEET 5 OF 17
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8	BARICHO -KAKUYUNI SHEET 7(10+490 - 12+250)	SHEET 7 OF 17
9	BARICHO -KAKUYUNI SHEET 8(12+250 - 14+000)	SHEET 8 OF 17
10	BARICHO -KAKUYUNI SHEET 9(14+000 - 15+750)	SHEET 9 OF 17
11	BARICHO -KAKUYUNI SHEET 10(15+750 -17+500)	SHEET 10 OF 17
12	BARICHO -KAKUYUNI SHEET 11(17+000 - 19+260)	SHEET 11 OF 17
13	BARICHO -KAKUYUNI SHEET 12(19+260 - 21+000)	SHEET 12 OF 17
14	BARICHO -KAKUYUNI SHEET 13(21+000 - 22+760)	SHEET 13 OF 17
15	BARICHO -KAKUYUNI SHEET 14(22+760 - 24+520)	SHEET 14 OF 17
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20	TANK ROOF PLAN	SHEET 1 OF 1
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SECOND BARICHO -KAKUYUNI WATER PROJECT

SR. No.	TITLE	REMARKS
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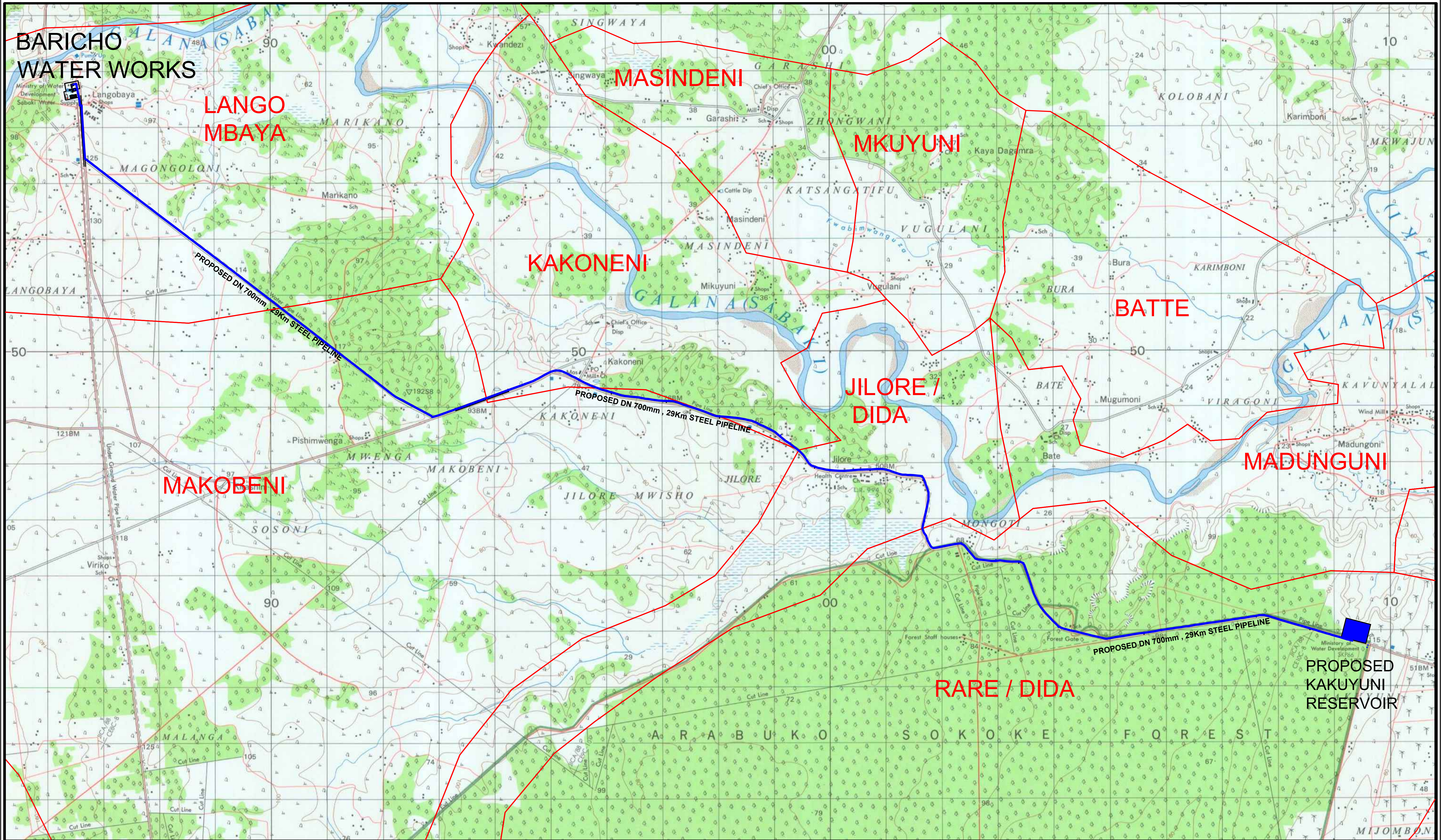


Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:
COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

CONSULTING ENGINEERS
SARI CONSULTING LTD IN JV WITH SGAPI S.R.I AND GATH CONSULTING ENGINEERING

Revisions:

REV.	DATE	REMARKS

Notes:

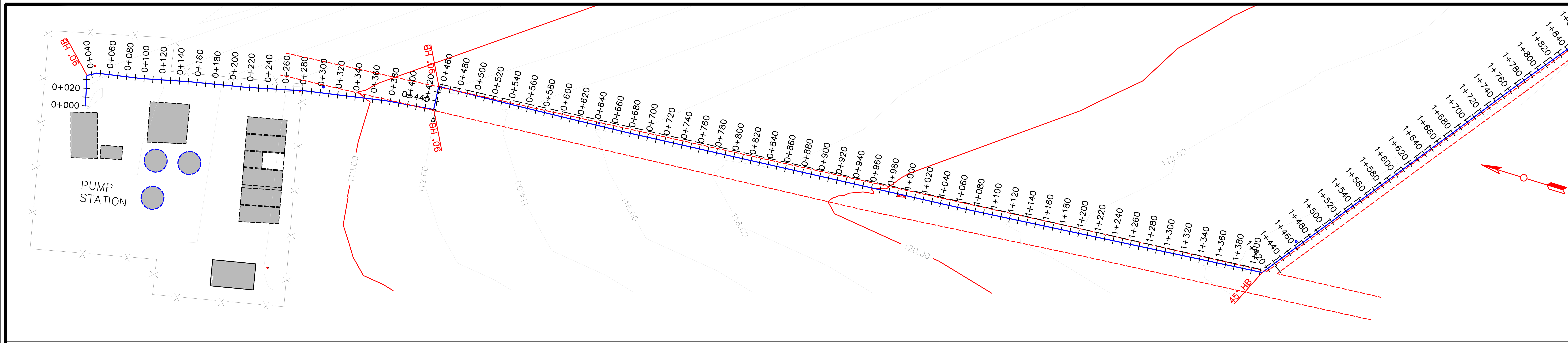
SURVEYED BY:	SN/JM
DESIGNED BY:	PKG/BK
DRAWN BY:	JM
CHECKED BY:	LB/PKG
APPROVED BY:	KNM

SCALE: HOR 1:1000 AND VERT 1:100

Project: SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title: BARICHO-KAKUYUNI PIPELINE -LAYOUT

Date: APR 2021 Drg. No. B-KA-L1

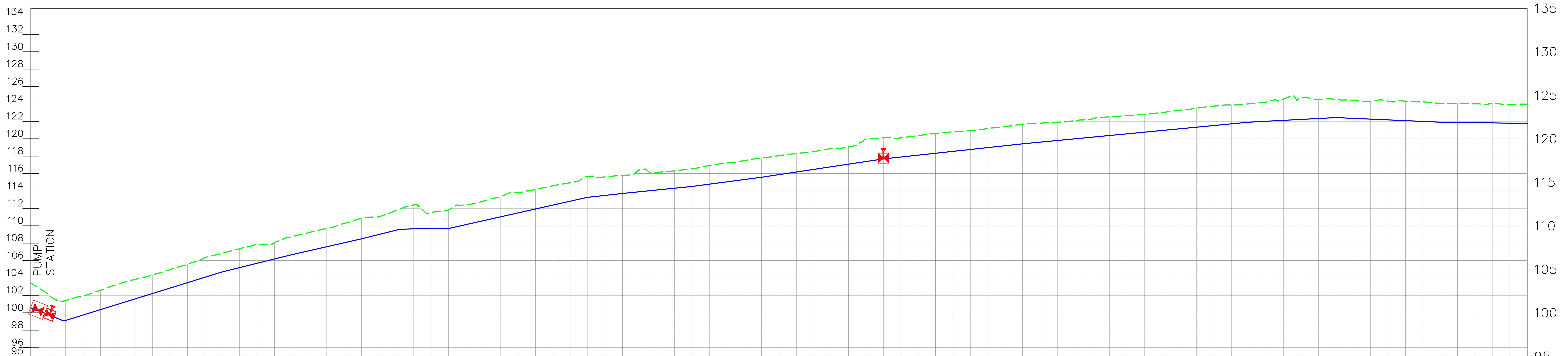


NOTES:-

1. INNER DIA OF SLEEVE PIPE FOR ROAD CROSSING = OUTER DIA OF WATER PIPE (CROSSING) + 100mm.

LEGEND

- GROUND PROFILE
- EXISTING PIPELINE
- PIPE INVERT
- EXISTING ROAD
- Node 1 — NODE NUMBER
- 90° HB — HORIZONTAL BEND
- AIR RELEASE VALVE
- WATER METER
- GATE VALVE
- WASH OUT VALVE
- PRESSURE RELEASE VALVE



CHAINAGE (Km+m)	GROUND LEVELS (Masl)	INVERT LEVELS (Masl)	EXCAVATION DEPTH (m)
0+000	103.42	100.57	2.84
0+020	102.13	99.78	2.35
0+040	101.43	99.12	2.31
0+060	101.93	99.74	2.18
0+080	102.59	100.36	2.23
0+100	103.28	100.98	2.30
0+120	103.83	101.60	2.23
0+140	104.36	102.22	2.14
0+160	104.96	102.84	2.13
0+180	105.56	103.46	2.10
0+200	106.33	104.08	2.26
0+220	106.83	104.69	2.14
0+240	107.36	105.19	2.17
0+260	107.85	105.69	2.17
0+280	108.08	106.18	1.89
0+300	108.75	106.68	2.07
0+320	109.23	107.13	2.09
0+340	109.70	107.59	2.11
0+360	110.26	108.04	2.22
0+380	110.84	108.50	2.34
0+400	111.03	109.00	2.03
0+420	111.77	109.50	2.27
0+440	112.40	109.65	2.75
0+460	111.51	109.66	1.84
0+480	111.82	109.68	2.15
0+500	112.42	110.13	2.29
0+520	112.83	110.57	2.25
0+540	113.33	111.02	2.30
0+560	113.82	111.47	2.35
0+580	114.17	111.92	2.25
0+600	114.59	112.37	2.22
0+620	114.94	112.82	2.12
0+640	115.66	113.27	2.39
0+660	115.62	113.49	2.13
0+680	115.77	113.71	2.06
0+700	116.42	113.91	2.51
0+720	116.15	114.11	2.04
0+740	116.31	114.31	2.00
0+760	116.53	114.52	2.02
0+780	116.93	114.78	2.15
0+800	117.21	115.05	2.17
0+820	117.49	115.31	2.18
0+840	117.79	115.58	2.21
0+860	118.06	115.88	2.18
0+880	118.31	116.18	2.13
0+900	118.53	116.48	2.05
0+920	118.85	116.78	2.07
0+940	119.07	117.08	1.98
0+960	119.97	117.38	2.58
0+980	120.13	117.68	2.44
1+000	120.11	117.90	2.21
1+020	120.35	118.12	2.23
1+040	120.60	118.33	2.26
1+060	120.80	118.55	2.25
1+080	120.94	118.77	2.18
1+100	121.18	118.98	2.19
1+120	121.41	119.20	2.20
1+140	121.68	119.42	2.26
1+160	121.79	119.61	2.19
1+180	121.91	119.80	2.11
1+200	122.09	119.99	2.10
1+220	122.28	120.18	2.10
1+240	122.53	120.37	2.15
1+260	122.66	120.56	2.09
1+280	122.82	120.75	2.07
1+300	123.01	120.95	2.07
1+320	123.27	121.14	2.14
1+340	123.51	121.33	2.18
1+360	123.75	121.52	2.23
1+380	123.89	121.71	2.18
1+400	124.01	121.90	2.11
1+420	124.23	122.01	2.22
1+440	124.57	122.12	2.46
1+460	124.77	122.22	2.55
1+480	124.54	122.33	2.21
1+500	124.52	122.44	2.08
1+520	124.43	122.35	2.08
1+540	124.28	122.26	2.02
1+560	124.33	122.17	2.16
1+580	124.33	122.08	2.25
1+600	124.24	121.99	2.25
1+620	124.08	121.90	2.18
1+640	124.06	121.87	2.19
1+660	124.02	121.85	2.18
1+680	124.06	121.82	2.24
1+700	123.92	121.79	2.13
1+720	123.98	121.77	2.21

SIZE/TYPE OF PIPE & HGL: DN 800mm STEEL

PIPE FITTINGS/STRUCTURES: 90° HB; 90° HB; 90° HB; 45° HB

SLOPE (%): 1.98%, 3.10%, 2.48%, 2.28%, 2.49%, 0.40%, 0.06%, 2.25%, 2.31%, 1.09%, 1.01%, 1.33%, 1.51%, 1.08%, 0.95%, 0.54%, -0.45%, -0.13%, -0.11%

LONGITUDINAL SECTION

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:

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Revisions:

REV.	DATE	REMARKS

Notes:

SURVEYED BY: SN/JM
DESIGNED BY: PKG/BK
DRAWN BY: JM
CHECKED BY: LB/PKG
APPROVED BY: KNM

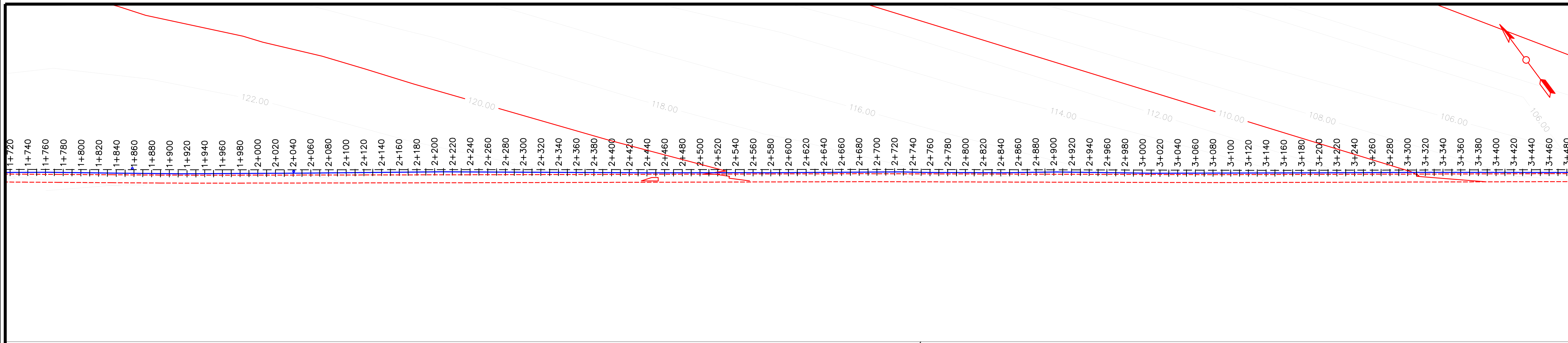
SCALE: HOR 1:2500 AND VERT 1:250

Project: SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title: BARICHO-KAKUYUNI PIPELINE - SHEET 1 (0+00 to 1+720)

Date: APRIL 2021

Drg. No. B-KA- PL1-01



NOTES:-

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LEGEND

- GROUND PROFILE
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- PIPE INVERT
- EXISTING ROAD
- Node 1 — NODE NUMBER
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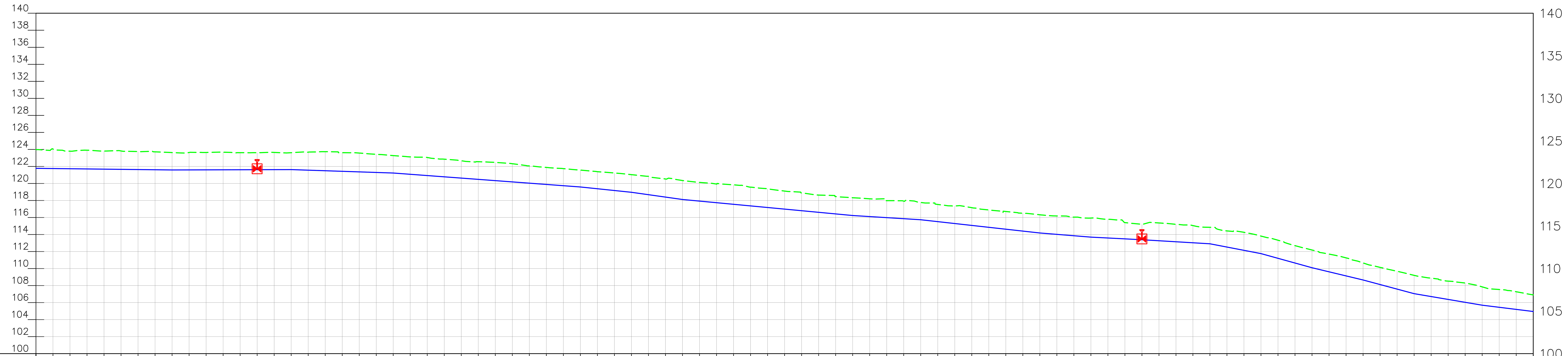

CHAINAGE (Km+m)	GROUND LEVELS (Masl)	INVERT LEVELS (Masl)	EXCAVATION DEPTH (m)
1+720	123.98	121.77	2.21
1+740	124.05	121.75	2.30
1+760	123.79	121.72	2.07
1+780	123.90	121.70	2.20
1+800	123.80	121.68	2.12
1+820	123.82	121.65	2.16
1+840	123.75	121.63	2.12
1+860	123.71	121.61	2.10
1+880	123.63	121.59	2.04
1+900	123.63	121.59	2.04
1+920	123.63	121.60	2.04
1+940	123.67	121.61	2.06
1+960	123.61	121.61	2.00
1+980	123.62	121.62	2.00
2+000	123.64	121.62	2.02
2+020	123.61	121.63	1.98
2+040	123.68	121.56	2.12
2+060	123.73	121.49	2.24
2+080	123.61	121.42	2.19
2+100	123.57	121.36	2.21
2+120	123.42	121.29	2.14
2+140	123.27	121.22	2.05
2+160	123.12	121.07	2.05
2+180	123.05	120.92	2.13
2+200	122.85	120.77	2.08
2+220	122.66	120.62	2.04
2+240	122.56	120.47	2.08
2+260	122.47	120.33	2.14
2+280	122.32	120.18	2.14
2+300	122.06	120.03	2.03
2+320	121.88	119.88	2.00
2+340	121.74	119.73	2.01
2+360	121.56	119.58	1.98
2+380	121.39	119.37	2.01
2+400	121.23	119.17	2.06
2+420	121.03	118.96	2.07
2+440	120.84	118.68	2.17
2+460	120.52	118.39	2.13
2+480	120.34	118.11	2.23
2+500	120.12	117.92	2.20
2+520	119.93	117.73	2.20
2+540	119.83	117.54	2.29
2+560	119.57	117.36	2.21
2+580	119.37	117.17	2.20
2+600	119.10	116.98	2.12
2+620	118.88	116.79	2.09
2+640	118.63	116.61	2.02
2+660	118.46	116.42	2.04
2+680	118.32	116.23	2.09
2+700	118.20	116.11	2.09
2+720	117.97	115.98	1.99
2+740	117.92	115.86	2.07
2+760	117.76	115.73	2.02
2+780	117.53	115.51	2.02
2+800	117.34	115.29	2.06
2+820	117.15	115.07	2.09
2+840	116.88	114.85	2.04
2+860	116.71	114.62	2.08
2+880	116.50	114.40	2.10
2+900	116.32	114.18	2.14
2+920	116.18	114.01	2.17
2+940	116.04	113.85	2.19
2+960	115.93	113.69	2.24
2+980	115.79	113.58	2.20
3+000	115.40	113.48	1.92
3+020	115.19	113.38	1.82
3+040	115.35	113.26	2.10
3+060	115.20	113.14	2.06
3+080	115.05	113.02	2.03
3+100	114.84	112.90	1.94
3+120	114.42	112.52	1.90
3+140	114.25	112.14	2.12
3+160	113.81	111.75	2.06
3+180	113.33	111.20	2.13
3+200	112.69	110.65	2.04
3+220	112.17	110.09	2.08
3+240	111.69	109.61	2.08
3+260	111.25	109.13	2.12
3+280	110.65	108.65	2.00
3+300	110.13	108.11	2.02
3+320	109.67	107.58	2.09
3+340	109.20	107.04	2.16
3+360	108.86	106.70	2.16
3+380	108.52	106.36	2.16
3+400	108.30	106.02	2.28
3+420	107.84	105.68	2.16
3+440	107.53	105.44	2.09
3+460	107.27	105.19	2.07
3+480	106.90	104.95	1.95

SIZE/TYPE OF PIPE & HGL: DN 800mm STEEL

PIPE FITTINGS/STRUCTURES:

SLOPE (%): -0.11% | 0.03% | -0.34% | -0.34% | -0.74% | -1.03% | -1.42% | -0.94% | -0.62% | -1.11% | -1.11% | -0.82% | -0.52% | -0.60% | -1.91% | -2.77% | -2.40% | -2.68% | -1.70% | -1.23% | -0.80%

LONGITUDINAL SECTION

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

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DRAWN BY:	JM
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APPROVED BY:	KNM

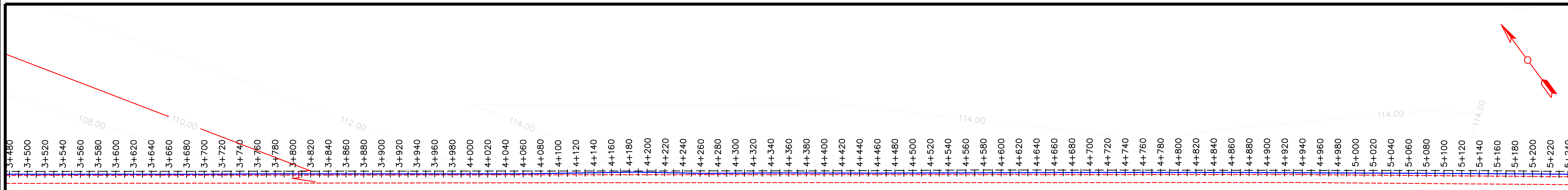
SCALE: HOR 1:2500 AND VERT 1:250

Project: SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title: BARICHO-KAKUYUNI PIPELINE - SHEET 2 (1+720 to 3+480)

Date: APRIL 2021

Drg. No. B-KA- PL1-02



NOTES:-

1. INNER DIA OF SLEEVE PIPE FOR ROAD CROSSING = OUTER DIA OF WATER PIPE (CROSSING) + 100mm.

LEGEND

- GROUND PROFILE
- EXISTING PIPELINE
- PIPE INVERT
- EXISTING ROAD
- Node 1 — NODE NUMBER
- 90° HB — HORIZONTAL BEND
- AIR RELEASE VALVE
- WATER METER
- GATE VALVE
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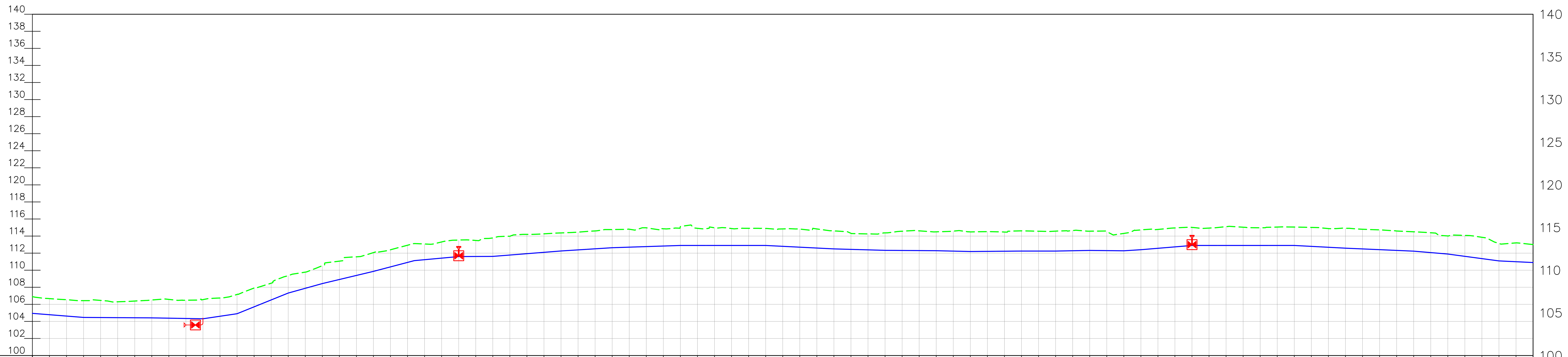
- PRESSURE RELEASE VALVE



CHAINAGE (Km+m)	3+480	3+500	3+520	3+540	3+560	3+580	3+600	3+620	3+640	3+660	3+680	3+700	3+720	3+740	3+760	3+780	3+800	3+820	3+840	3+860	3+880	3+900	3+920	3+940	3+960	3+980	4+000	4+020	4+040
GROUND LEVELS (Masl)	106.90	106.67	106.55	106.44	106.46	106.30	106.39	106.51	106.58	106.48	106.56	106.75	107.17	107.91	108.48	109.37	109.78	110.53	111.07	111.57	112.07	112.40	112.94	113.07	113.32	113.54	113.49	113.80	113.99
INVERT LEVELS (Masl)	104.95	104.79	104.63	104.47	104.46	104.44	104.43	104.42	104.38	104.35	104.32	104.61	104.90	105.71	106.52	107.32	107.88	108.44	108.91	109.39	109.87	110.39	110.92	111.24	111.42	111.60	111.61	111.62	111.78
EXCAVATION DEPTH (m)	1.95	1.88	1.92	1.98	2.01	1.86	1.96	2.09	2.20	2.13	2.24	2.14	2.27	2.21	1.97	2.05	1.90	2.09	2.16	2.18	2.20	2.00	2.02	1.84	1.90	1.94	1.88	2.18	2.21

CHAINAGE (Km+m)	4+060	4+080	4+100	4+120	4+140	4+160	4+180	4+200	4+220	4+240	4+260	4+280	4+300	4+320	4+340	4+360	4+380	4+400	4+420	4+440	4+460	4+480	4+500	4+520	4+540	4+560	4+580	4+600	4+620	4+640
GROUND LEVELS (Masl)	114.21	114.27	114.38	114.47	114.61	114.77	114.81	114.97	114.86	115.13	114.92	114.98	114.89	114.92	114.90	114.85	114.83	114.84	114.61	114.33	114.26	114.37	114.57	114.62	114.50	114.58	114.49	114.53	114.48	114.62
INVERT LEVELS (Masl)	111.94	112.10	112.26	112.39	112.51	112.64	112.70	112.77	112.83	112.90	112.90	112.90	112.90	112.90	112.90	112.80	112.70	112.60	112.51	112.45	112.39	112.33	112.32	112.30	112.29	112.24	112.19	112.21	112.23	112.25
EXCAVATION DEPTH (m)	2.27	2.17	2.12	2.08	2.10	2.13	2.10	2.20	2.02	2.23	2.02	2.08	1.99	2.02	2.00	2.05	2.13	2.24	2.10	1.88	1.87	2.05	2.26	2.31	2.21	2.34	2.30	2.32	2.25	2.37

CHAINAGE (Km+m)	4+660	4+680	4+700	4+720	4+740	4+760	4+780	4+800	4+820	4+840	4+860	4+880	4+900	4+920	4+940	4+960	4+980	5+000	5+020	5+040	5+060	5+080	5+100	5+120	5+140	5+160	5+180	5+200	5+220	5+240
GROUND LEVELS (Masl)	114.58	114.58	114.65	114.58	114.53	114.32	114.73	114.79	114.96	115.02	114.94	115.11	115.05	114.98	115.06	115.06	115.02	114.88	114.92	114.81	114.73	114.60	114.51	114.40	114.02	114.08	113.86	113.14	113.21	113.01
INVERT LEVELS (Masl)	112.25	112.25	112.28	112.32	112.30	112.28	112.40	112.57	112.73	112.90	112.90	112.90	112.90	112.90	112.90	112.90	112.80	112.69	112.59	112.50	112.41	112.33	112.24	112.07	111.90	111.63	111.36	111.09	111.00	110.90
EXCAVATION DEPTH (m)	2.33	2.34	2.37	2.26	2.22	2.03	2.32	2.22	2.22	2.12	2.04	2.21	2.15	2.08	2.16	2.16	2.22	2.19	2.33	2.31	2.32	2.27	2.27	2.32	2.12	2.45	2.50	2.05	2.22	2.11

SIZE/TYPE OF PIPE & HGL: DN 800mm STEEL

PIPE FITTINGS/STRUCTURES:

SLOPE (%): -1.23%, -0.80%, -0.06%, -0.17%, 1.46%, 4.04%, 2.78%, 2.39%, 2.63%, 0.90%, 0.06%, 0.80%, 0.63%, 0.33%, 0.00%, 0.00%, -0.49%, -0.30%, -0.06%, -0.25%, 0.10%, -0.02%, 0.20%, -0.10%, 0.59%, 0.83%, 0.00%, 0.00%, -0.52%, -0.43%, -0.85%, -1.35%, -0.48%, -1.09%

LONGITUDINAL SECTION

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:

COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

CONSULTING ENGINEERS

SARI CONSULTING LTD

SGAPI

gath CONSULTING ENGINEERS

SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:

REV.	DATE	REMARKS

Notes:

SURVEYED BY:	SN/JM
DESIGNED BY:	PKG/BK
DRAWN BY:	JM
CHECKED BY:	LB/PKG
APPROVED BY:	KNM

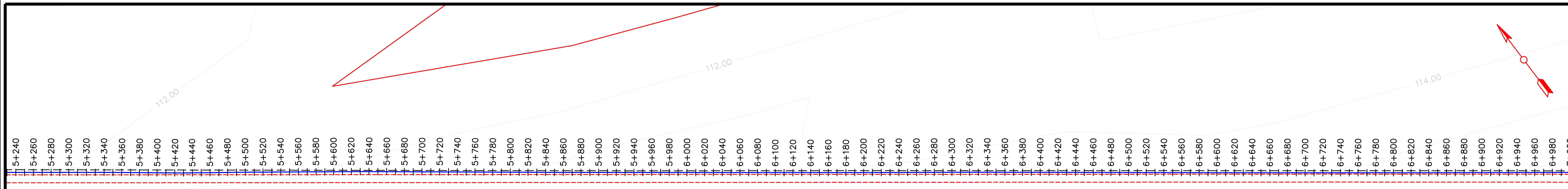
SCALE:
HOR 1:2500 AND VERT 1:250

Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title:
BARICHO-KAKUYUNI PIPELINE - SHEET 3 (3+480 to 5+240)

Date: APRIL 2021

Drg. No. B-KA- PL1-03

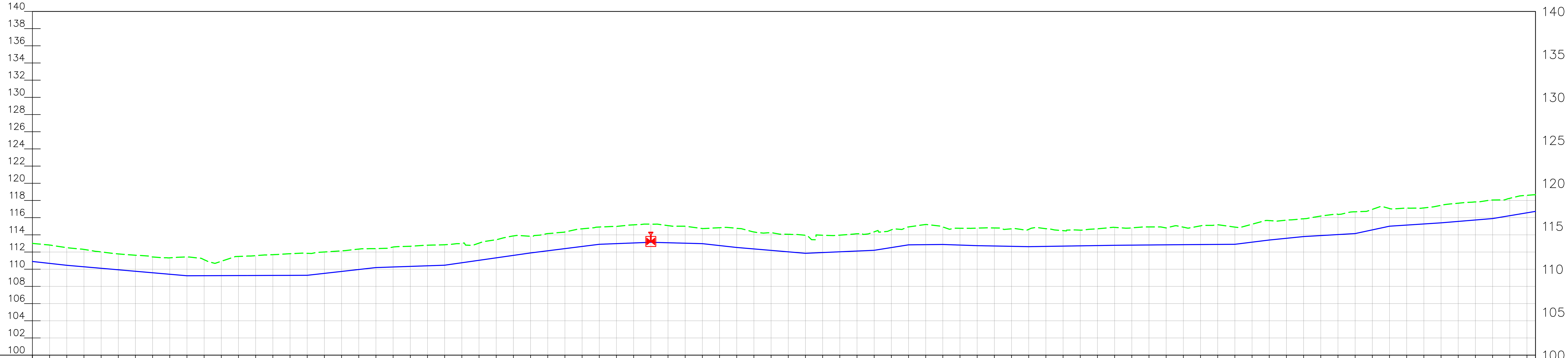


NOTES:-

1. INNER DIA OF SLEEVE PIPE FOR ROAD CROSSING = OUTER DIA OF WATER PIPE (CROSSING) + 100mm.

LEGEND

- GROUND PROFILE
- EXISTING PIPELINE
- PIPE INVERT
- EXISTING ROAD
- Node 1 — NODE NUMBER
- 90° HB — HORIZONTAL BEND
- AIR RELEASE VALVE
- WATER METER
- GATE VALVE
- WASH OUT VALVE
- PRESSURE RELEASE VALVE



CHAINAGE (Km+m)	GROUND LEVELS (Masl)	INVERT LEVELS (Masl)	EXCAVATION DEPTH (m)
5+240	113.01	110.90	2.11
5+260	112.82	110.68	2.13
5+280	112.51	110.46	2.05
5+300	112.31	110.29	2.02
5+320	112.02	110.12	1.90
5+340	111.79	109.94	1.85
5+360	111.63	109.77	1.86
5+380	111.43	109.59	1.84
5+400	111.33	109.42	1.91
5+420	111.43	109.25	2.18
5+440	111.11	109.25	1.86
5+460	110.93	109.26	1.67
5+480	111.49	109.27	2.22
5+500	111.58	109.28	2.31
5+520	111.69	109.28	2.41
5+540	111.80	109.29	2.51
5+560	111.86	109.30	2.56
5+580	112.01	109.52	2.49
5+600	112.14	109.75	2.40
5+620	112.35	109.97	2.38
5+640	112.39	110.19	2.20
5+660	112.59	110.26	2.32
5+680	112.67	110.33	2.34
5+700	112.80	110.40	2.40
5+720	112.85	110.47	2.38
5+740	113.01	110.76	2.26
5+760	113.04	111.04	2.00
5+780	113.44	111.33	2.11
5+800	113.88	111.61	2.27
5+820	113.84	111.90	1.94
5+840	114.15	112.15	2.00
5+860	114.34	112.40	1.94
5+880	114.71	112.65	2.06
5+900	114.91	112.90	2.01
5+920	114.99	112.98	2.01
5+940	115.17	113.05	2.11
5+960	115.25	113.13	2.11
5+980	115.08	113.08	2.00
6+000	115.01	113.03	1.97
6+020	114.74	112.98	1.76
6+040	114.83	112.76	2.08
6+060	114.76	112.53	2.23
6+080	114.34	112.36	1.98
6+100	114.23	112.20	2.03
6+120	114.07	112.03	2.04
6+140	113.95	111.86	2.09
6+160	113.96	111.95	2.01
6+180	113.97	112.03	1.94
6+200	114.13	112.12	2.01
6+220	114.35	112.20	2.15
6+240	114.58	112.52	2.06
6+260	114.93	112.84	2.09
6+280	115.21	112.86	2.35
6+300	114.92	112.88	2.04
6+320	114.77	112.81	1.96
6+340	114.78	112.74	2.04
6+360	114.81	112.70	2.11
6+380	114.71	112.66	2.04
6+400	114.65	112.62	2.02
6+420	114.72	112.66	2.06
6+440	114.49	112.69	1.81
6+460	114.55	112.72	1.83
6+480	114.71	112.75	1.96
6+500	114.87	112.79	2.09
6+520	114.81	112.80	2.01
6+540	114.92	112.82	2.10
6+560	114.81	112.84	1.97
6+580	114.90	112.86	2.04
6+600	115.05	112.87	2.18
6+620	115.18	112.89	2.29
6+640	114.91	112.90	2.01
6+660	115.24	113.15	2.09
6+680	115.67	113.40	2.26
6+700	115.71	113.60	2.11
6+720	115.87	113.81	2.07
6+740	116.19	113.92	2.26
6+760	116.38	114.04	2.34
6+780	116.69	114.16	2.53
6+800	116.97	114.58	2.39
6+820	117.06	115.01	2.05
6+840	117.12	115.14	1.98
6+860	117.14	115.27	1.87
6+880	117.44	115.40	2.04
6+900	117.69	115.57	2.12
6+920	117.84	115.73	2.10
6+940	118.05	115.90	2.15
6+960	118.25	116.23	2.02
6+980	118.60	116.57	2.04
6+990	118.69	116.73	1.96

SIZE/TYPE OF PIPE & HGL: DN 800mm STEEL

PIPE FITTINGS/STRUCTURES:

SLOPE (%): -0.48%, -1.09%, -0.87%, 0.04%, 1.12%, 0.34%, 1.43%, 1.25%, 0.39%, -0.25%, -1.12%, -0.84%, 0.43%, 1.59%, 0.11%, -0.35%, -0.20%, 0.16%, 0.09%, 0.08%, 1.25%, 1.02%, 0.58%, 2.13%, 0.65%, 0.83%, 1.67%

LONGITUDINAL SECTION

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:

COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

CONSULTING ENGINEERS

SARI CONSULTING LTD | SGAPI | gath CONSULTING ENGINEERS

SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:

REV.	DATE	REMARKS

Notes:

SURVEYED BY:	SN/JM
DESIGNED BY:	PKG/BK
DRAWN BY:	JM
CHECKED BY:	LB/PKG
APPROVED BY:	KNM

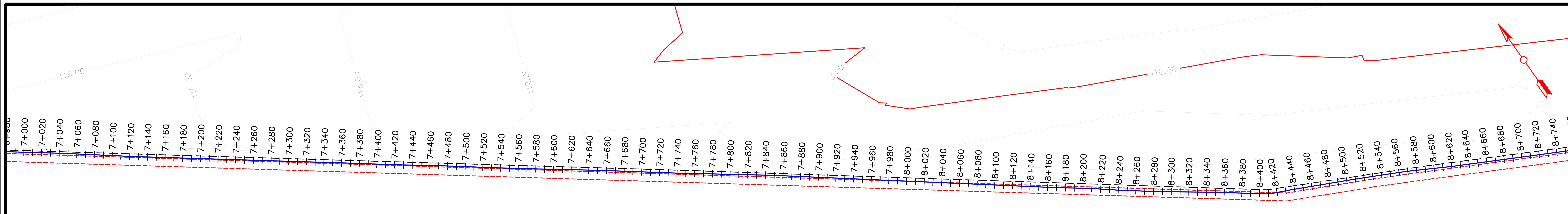
SCALE: HOR 1:2500 AND VERT 1:250

Project: SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title: BARICHO-KAKUYUNI PIPELINE - SHEET 4 (5+240 to 6+990)

Date: APRIL 2021

Drg. No. B-KA- PL1-04

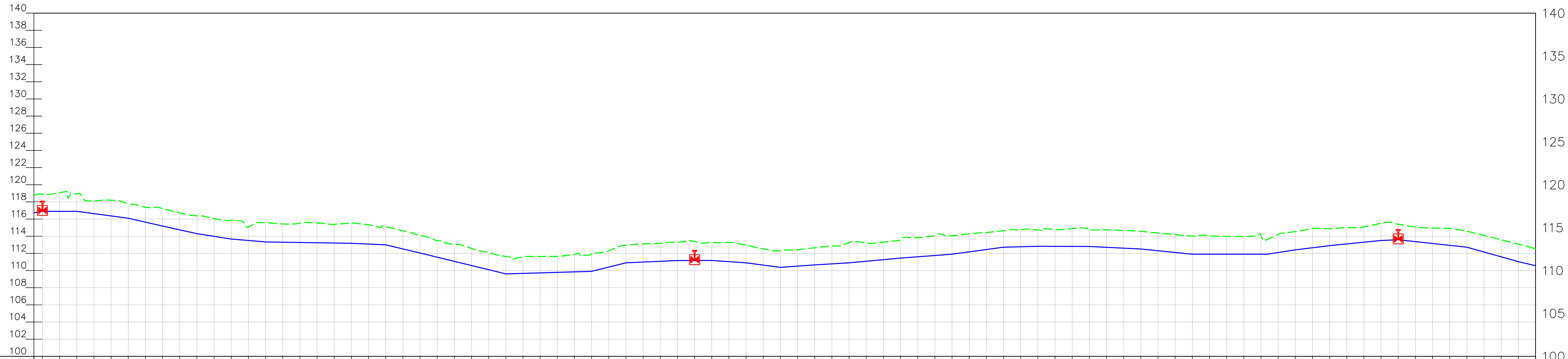


NOTES:-

1. INNER DIA OF SLEEVE PIPE FOR ROAD CROSSING = OUTER DIA OF WATER PIPE (CROSSING) + 100mm.

LEGEND

- GROUND PROFILE
- EXISTING PIPELINE
- PIPE INVERT
- EXISTING ROAD
- Node 1 — NODE NUMBER
- 90° HB — HORIZONTAL BEND
- AIR RELEASE VALVE
- WATER METER
- GATE VALVE
- WASH OUT VALVE
- PRESSURE RELEASE VALVE



CHAINAGE (Km+m)	GROUND LEVELS (Masl)	INVERT LEVELS (Masl)	EXCAVATION DEPTH (m)
6+990	118.69	116.73	1.96
7+000	118.90	116.90	2.00
7+020	119.08	116.90	2.18
7+040	118.96	116.90	2.06
7+060	118.11	116.63	1.48
7+080	118.20	116.36	1.83
7+100	117.78	116.09	1.68
7+120	117.39	115.64	1.75
7+140	117.23	115.18	2.05
7+160	116.72	114.74	1.98
7+180	116.39	114.30	2.09
7+200	116.06	113.99	2.08
7+220	115.87	113.67	2.20
7+240	115.07	113.50	1.57
7+260	115.57	113.33	2.23
7+280	115.44	113.30	2.13
7+300	115.53	113.27	2.26
7+320	115.53	113.24	2.29
7+340	115.39	113.21	2.18
7+360	115.54	113.18	2.36
7+380	115.35	113.08	2.27
7+400	115.11	112.99	2.12
7+420	114.64	112.52	2.12
7+440	114.10	112.04	2.05
7+460	113.49	111.55	1.94
7+480	113.05	111.07	1.98
7+500	112.58	110.58	2.00
7+520	112.12	110.10	2.02
7+540	111.65	109.61	2.04
7+560	111.58	109.67	1.91
7+580	111.63	109.73	1.90
7+600	111.65	109.78	1.87
7+620	111.88	109.84	2.04
7+640	111.96	109.90	2.06
7+660	112.30	110.40	1.90
7+680	112.95	110.90	2.05
7+700	113.11	110.99	2.12
7+720	113.18	111.08	2.10
7+740	113.30	111.16	2.14
7+760	113.38	111.17	2.22
7+780	113.25	111.17	2.08
7+800	113.26	111.04	2.22
7+820	112.97	110.90	2.07
7+840	112.54	110.63	1.91
7+860	112.31	110.37	1.94
7+880	112.42	110.51	1.91
7+900	112.65	110.66	2.00
7+920	112.86	110.78	2.08
7+940	113.26	110.90	2.36
7+960	113.21	111.08	2.13
7+980	113.31	111.27	2.04
8+000	113.60	111.45	2.15
8+020	113.84	111.60	2.24
8+040	114.11	111.75	2.35
8+060	114.05	111.90	2.15
8+080	114.28	112.17	2.10
8+100	114.43	112.45	1.98
8+120	114.65	112.72	1.93
8+140	114.75	112.77	1.98
8+160	114.73	112.82	1.90
8+180	114.80	112.82	1.98
8+200	114.89	112.81	2.08
8+220	114.73	112.80	1.93
8+240	114.75	112.70	2.04
8+260	114.67	112.60	2.06
8+280	114.57	112.51	2.06
8+300	114.37	112.30	2.07
8+320	114.21	112.10	2.11
8+340	114.02	111.90	2.12
8+360	114.05	111.90	2.15
8+380	113.98	111.90	2.08
8+400	113.98	111.90	2.08
8+420	114.10	111.90	2.20
8+440	114.21	112.10	2.11
8+460	114.54	112.42	2.12
8+480	114.91	112.66	2.25
8+500	114.87	112.90	1.97
8+520	114.99	113.10	1.89
8+540	115.09	113.30	1.79
8+560	115.54	113.50	2.04
8+580	115.40	113.59	1.81
8+600	115.08	113.37	1.71
8+620	114.96	113.16	1.80
8+640	114.90	112.94	1.96
8+660	114.57	112.72	1.85
8+680	114.09	112.16	1.93
8+700	113.58	111.60	1.99
8+720	113.08	111.03	2.05
8+740	112.53	110.56	1.97

SIZE/TYPE OF PIPE & HGL: DN 800mm STEEL

PIPE FITTINGS/STRUCTURES:

SLOPE (%): 1.67%, 0.00%, 0.00%, -1.35%, -2.27%, -2.21%, -1.57%, -0.86%, -0.15%, -0.17%, -0.46%, -2.37%, -2.44%, -2.42%, 0.29%, 2.50%, 0.44%, 0.03%, -0.69%, -1.33%, 0.72%, 0.61%, 0.92%, 0.74%, 1.36%, 0.26%, -0.04%, -0.49%, -1.01%, 0.00%, 0.00%, 1.59%, 1.21%, 1.01%, 0.41%, -1.08%, -2.82%, -2.36%

LONGITUDINAL SECTION

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:

COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

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SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:

REV.	DATE	REMARKS

Notes:

SURVEYED BY: SN/JM
DESIGNED BY: PKG/BK
DRAWN BY: JM
CHECKED BY: LB/PKG
APPROVED BY: KNM

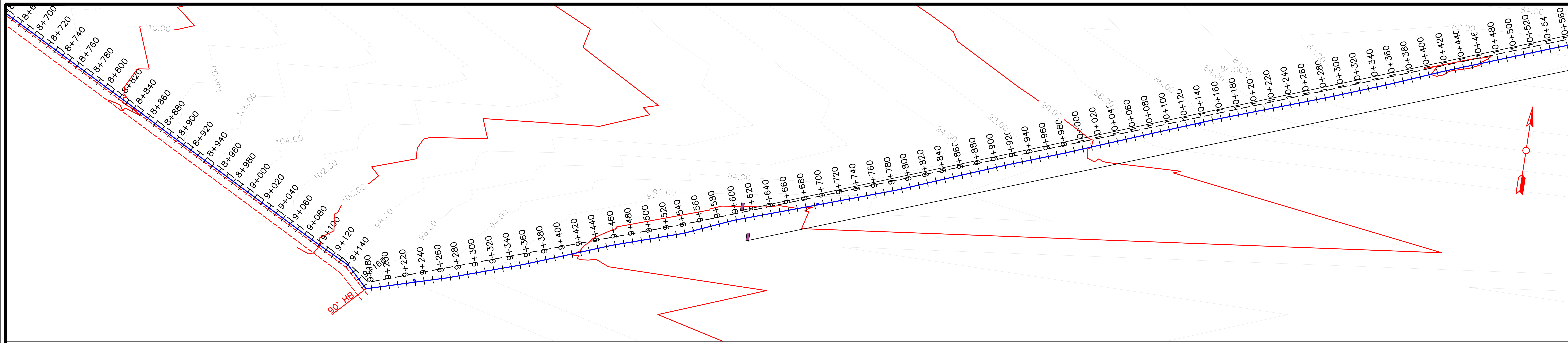
SCALE:
HOR 1:2500 AND VERT 1:250

Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title:
BARICHO-KAKUYUNI PIPELINE - SHEET 5 (6+990 to 8+740)

Date: APRIL 2021

Drg. No. B-KA- PL1-05

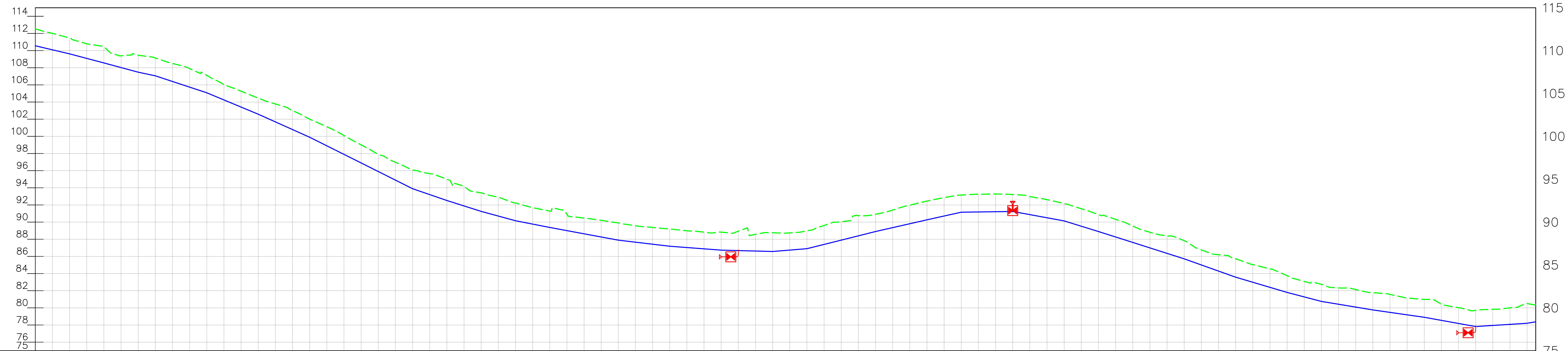


NOTES:-

1. INNER DIA OF SLEEVE PIPE FOR ROAD CROSSING = OUTER DIA OF WATER PIPE (CROSSING) + 100mm.

LEGEND

GROUND PROFILE	
EXISTING PIPELINE	
PIPE INVERT	
EXISTING ROAD	
Node 1	NODE NUMBER
90° HB	HORIZONTAL BEND
	AIR RELEASE VALVE
	WATER METER
	GATE VALVE
	WASH OUT VALVE
	PRESSURE RELEASE VALVE



CHAINAGE (Km+m)	8+740	8+760	8+780	8+800	8+820	8+840	8+860	8+880	8+900	8+920	8+940	8+960	8+980	9+000	9+020
GROUND LEVELS (Masl)	112.53	112.01	111.46	110.80	110.45	109.39	109.46	109.14	108.49	107.90	107.12	106.05	105.27	104.46	103.78
INVERT LEVELS (Masl)	110.56	110.09	109.62	109.09	108.57	108.03	107.48	107.06	106.40	105.74	105.08	104.25	103.42	102.59	101.69
EXCAVATION DEPTH (m)	1.97	1.92	1.84	1.71	1.88	1.37	1.98	2.08	2.09	2.16	2.04	1.81	1.85	1.88	2.09

CHAINAGE (Km+m)	9+040	9+060	9+080	9+100	9+120	9+140	9+160	9+180	9+200	9+220	9+240	9+260	9+280	9+300	9+320
GROUND LEVELS (Masl)	103.01	102.02	101.12	100.10	99.01	97.89	96.98	96.07	95.66	95.01	94.18	93.42	92.90	92.23	91.68
INVERT LEVELS (Masl)	100.80	99.90	98.90	97.90	96.90	95.90	94.90	93.90	93.21	92.52	91.89	91.25	90.70	90.16	89.77
EXCAVATION DEPTH (m)	2.21	2.12	2.22	2.20	2.11	1.99	2.08	2.17	2.45	2.48	2.30	2.16	2.19	2.07	1.91

CHAINAGE (Km+m)	9+340	9+360	9+380	9+400	9+420	9+440	9+460	9+480	9+500	9+520	9+540	9+560	9+580	9+600	9+620
GROUND LEVELS (Masl)	91.29	90.92	90.48	90.21	89.90	89.58	89.38	89.19	88.99	88.83	88.83	88.94	88.57	88.76	88.74
INVERT LEVELS (Masl)	89.38	89.01	88.64	88.27	87.90	87.66	87.42	87.18	87.03	86.88	86.73	86.68	86.63	86.57	86.74
EXCAVATION DEPTH (m)	1.91	1.91	1.84	1.94	2.00	1.92	1.96	2.01	1.95	1.94	2.09	2.26	1.95	2.19	2.01

CHAINAGE (Km+m)	9+640	9+660	9+680	9+700	9+720	9+740	9+760	9+780	9+800	9+820	9+840	9+860	9+880	9+900	9+920
GROUND LEVELS (Masl)	88.98	89.61	90.04	90.76	90.91	91.41	91.97	92.46	92.85	93.16	93.25	93.28	93.22	92.98	92.62
INVERT LEVELS (Masl)	86.90	87.40	87.90	88.40	88.90	89.35	89.81	90.26	90.71	91.15	91.18	91.21	91.24	90.87	90.51
EXCAVATION DEPTH (m)	2.08	2.21	2.14	2.36	2.01	2.05	2.16	2.19	2.14	2.01	2.07	2.07	1.98	2.10	2.11

CHAINAGE (Km+m)	9+940	9+960	9+980	10+000	10+020	10+040	10+060	10+080	10+100	10+120	10+140	10+160	10+180	10+200	10+220
GROUND LEVELS (Masl)	92.17	91.56	90.88	90.33	89.55	88.82	88.40	87.83	86.76	86.20	85.73	85.05	84.55	83.76	83.09
INVERT LEVELS (Masl)	90.14	89.52	88.90	88.27	87.64	87.00	86.36	85.72	85.00	84.29	83.58	82.98	82.39	81.80	81.27
EXCAVATION DEPTH (m)	2.03	2.04	1.98	2.06	1.91	1.83	2.04	2.12	1.76	1.91	2.15	2.07	2.16	1.97	1.81

CHAINAGE (Km+m)	10+240	10+260	10+280	10+300	10+320	10+340	10+360	10+380	10+400	10+420	10+440	10+460	10+480	10+490
GROUND LEVELS (Masl)	82.75	82.33	82.14	81.77	81.58	81.15	80.98	80.43	80.02	79.72	79.83	79.99	80.51	80.39
INVERT LEVELS (Masl)	80.75	80.42	80.09	79.76	79.48	79.19	78.90	78.54	78.18	77.83	77.95	78.08	78.20	78.37
EXCAVATION DEPTH (m)	2.00	1.90	2.04	2.01	2.10	1.97	2.08	1.89	1.84	1.89	1.88	1.92	2.31	2.01

SIZE/TYPE OF PIPE & HGL: DN 800mm STEEL

PIPE FITTINGS/STRUCTURES: 90° HB

SLOPE (%): -2.36% | -2.63% | -2.71% | -2.11% | -3.31% | -4.15% | -4.48% | -5.00% | -5.00% | -3.44% | -3.18% | -2.74% | -1.94% | -1.85% | -1.20% | -0.75% | -0.27% | 0.82% | 2.50% | 2.50% | 2.27% | 2.22% | 0.15% | -1.83% | -3.10% | -3.16% | -3.20% | -3.57% | -2.97% | -2.61% | -1.65% | -1.44% | -1.79% | 0.62% | 1.75%

LONGITUDINAL SECTION

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:

COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

CONSULTING ENGINEERS

SARI CONSULTING LTD

SGAPI

gath CONSULTING ENGINEERS

SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:

REV.	DATE	REMARKS

Notes:

SURVEYED BY:	SN/JM
DESIGNED BY:	PKG/BK
DRAWN BY:	JM
CHECKED BY:	LB/PKG
APPROVED BY:	KNM

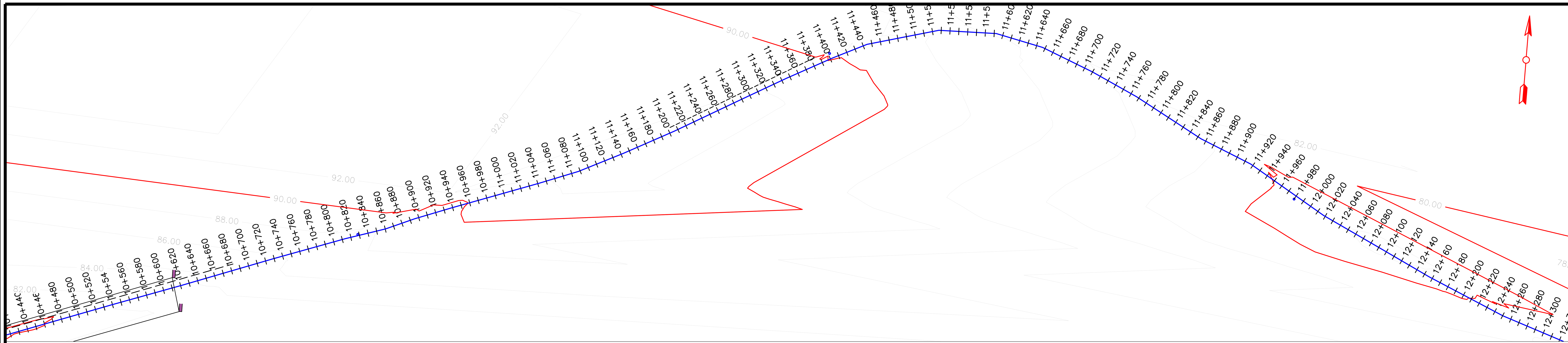
SCALE: HOR 1:2500 AND VERT 1:250

Project: SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title: BARICHO-KAKUYUNI PIPELINE - SHEET 6 (8+740 to 10+490)

Date: APRIL 2021

Drg. No. B-KA- PL1-06

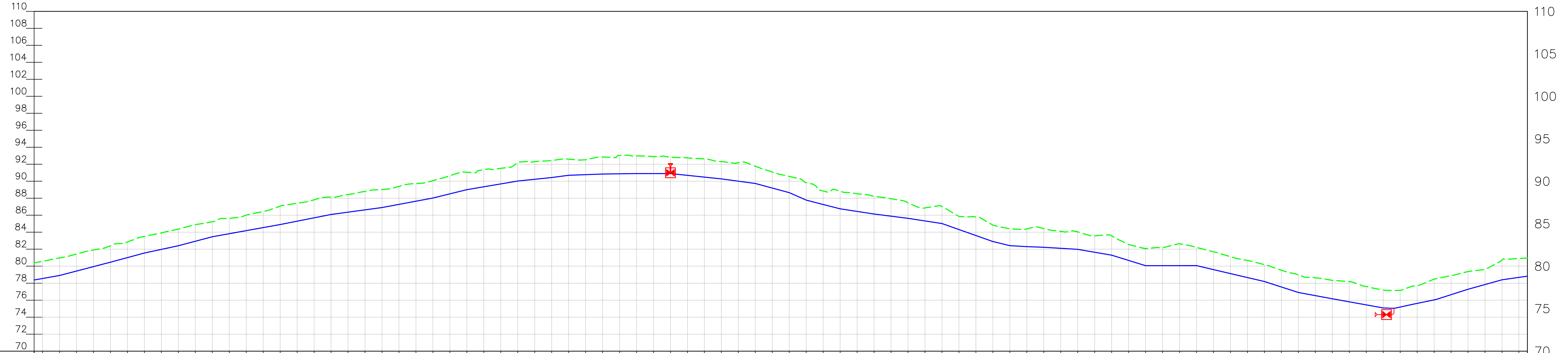


NOTES:-

1. INNER DIA OF SLEEVE PIPE FOR ROAD CROSSING = OUTER DIA OF WATER PIPE (CROSSING) + 100mm.

LEGEND

- GROUND PROFILE
- EXISTING PIPELINE
- PIPE INVERT
- EXISTING ROAD
- Node 1 — NODE NUMBER
- 90° HB — HORIZONTAL BEND
- AIR RELEASE VALVE
- WATER METER
- GATE VALVE
- WASH OUT VALVE
- PRESSURE RELEASE VALVE



CHAINAGE (Km+m)	GROUND LEVELS (Masl)	INVERT LEVELS (Masl)	EXCAVATION DEPTH (m)
10+490	80.39	78.37	2.01
10+500	80.58	78.55	2.03
10+520	80.97	78.90	2.07
10+540	81.43	79.42	2.01
10+560	81.91	79.95	1.96
10+580	82.41	80.47	1.94
10+600	82.86	81.01	1.85
10+620	83.51	81.55	1.96
10+640	83.93	81.98	1.95
10+660	84.36	82.41	1.95
10+680	84.89	82.94	1.95
10+700	85.23	83.47	1.76
10+720	85.62	83.83	1.79
10+740	86.02	84.18	1.84
10+760	86.44	84.54	1.90
10+780	87.07	84.90	2.17
10+800	87.41	85.30	2.11
10+820	87.82	85.70	2.12
10+840	88.13	86.09	2.03
10+860	88.44	86.36	2.08
10+880	88.81	86.63	2.18
10+900	89.04	86.90	2.14
10+920	89.39	87.27	2.12
10+940	89.73	87.65	2.08
10+960	90.07	88.02	2.04
10+980	90.65	88.52	2.14
11+000	91.07	89.01	2.06
11+020	91.36	89.35	2.01
11+040	91.52	89.69	1.83
11+060	92.20	90.03	2.17
11+080	92.31	90.24	2.08
11+100	92.44	90.44	2.00
11+120	92.61	90.70	1.91
11+140	92.54	90.78	1.76
11+160	92.86	90.85	2.01
11+180	93.04	90.87	2.16
11+200	92.99	90.90	2.09
11+220	92.91	90.90	2.01
11+240	92.83	90.90	1.93
11+260	92.77	90.69	2.07
11+280	92.64	90.49	2.15
11+300	92.31	90.28	2.03
11+320	92.19	90.01	2.18
11+340	91.77	89.74	2.03
11+360	91.09	89.20	1.89
11+380	90.58	88.66	1.92
11+400	89.84	87.78	2.06
11+420	88.85	87.27	1.58
11+440	88.82	86.76	2.06
11+460	88.53	86.45	2.08
11+480	88.24	86.14	2.09
11+500	87.94	85.89	2.05
11+520	87.45	85.63	1.82
11+540	86.87	85.33	1.54
11+560	87.03	85.02	2.00
11+580	85.88	84.32	1.57
11+600	85.80	83.61	2.20
11+620	84.84	82.90	1.94
11+640	84.41	82.42	1.99
11+660	84.39	82.30	2.09
11+680	84.43	82.23	2.20
11+700	84.11	82.10	2.01
11+720	84.04	81.98	2.06
11+740	83.57	81.64	1.93
11+760	83.58	81.30	2.28
11+780	82.56	80.68	1.88
11+800	82.09	80.06	2.03
11+820	82.17	80.06	2.10
11+840	82.63	80.07	2.57
11+860	82.22	80.07	2.15
11+880	81.70	79.60	2.10
11+900	81.12	79.12	2.00
11+920	80.67	78.66	2.01
11+940	80.18	78.19	1.99
11+960	79.53	77.55	1.98
11+980	78.99	76.90	2.09
12+000	78.64	76.53	2.10
12+020	78.34	76.17	2.17
12+040	78.19	75.81	2.39
12+060	77.61	75.45	2.16
12+080	77.19	75.08	2.11
12+100	77.16	75.19	1.97
12+120	77.72	75.62	2.11
12+140	78.47	76.03	2.45
12+160	78.87	76.64	2.22
12+180	79.37	77.28	2.09
12+200	79.61	77.84	1.76
12+220	80.73	78.40	2.33
12+240	80.91	78.68	2.23
12+250	80.96	78.82	2.14

SIZE/TYPE OF PIPE & HGL: DN 800mm STEEL

PIPE FITTINGS/STRUCTURES:

SLOPE (%): 1.75%, 2.62%, 2.68%, 2.17%, 2.64%, 1.79%, 1.99%, 1.34%, 1.87%, 2.46%, 1.70%, 1.03%, 1.31%, 0.36%, 0.13%, 0.00%, -1.03%, -1.35%, -2.70%, -4.39%, -2.58%, -2.54%, -1.54%, -1.28%, -1.52%, -3.54%, -2.41%, -0.60%, -0.35%, -0.63%, -1.70%, -3.11%, 0.02%, -2.37%, -2.32%, -3.23%, -1.83%, -1.81%, -1.82%, -0.40%, 2.16%, 2.06%, 3.20%, 2.78%, 1.42%, 1.35%

LONGITUDINAL SECTION

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:

COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

CONSULTING ENGINEERS

SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:

REV.	DATE	REMARKS

Notes:

SURVEYED BY: SN/JM
DESIGNED BY: PKG/BK
DRAWN BY: JM
CHECKED BY: LB/PKG
APPROVED BY: KNM

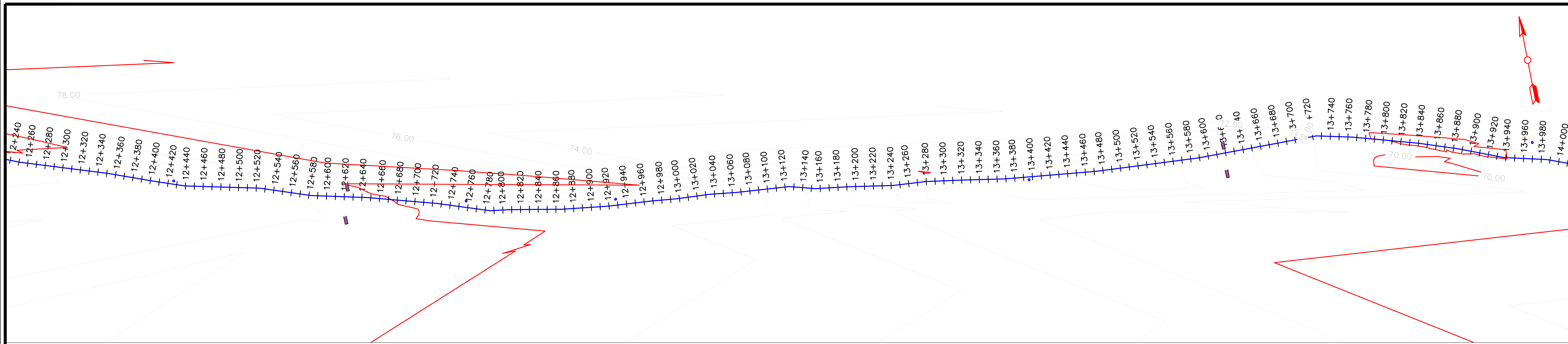
SCALE: HOR 1:2500 AND VERT 1:250

Project: SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title: BARICHO-KAKUYUNI PIPELINE - SHEET 7 (10+490 to 12+250)

Date: APRIL 2021

Drg. No. B-KA- PL1-07

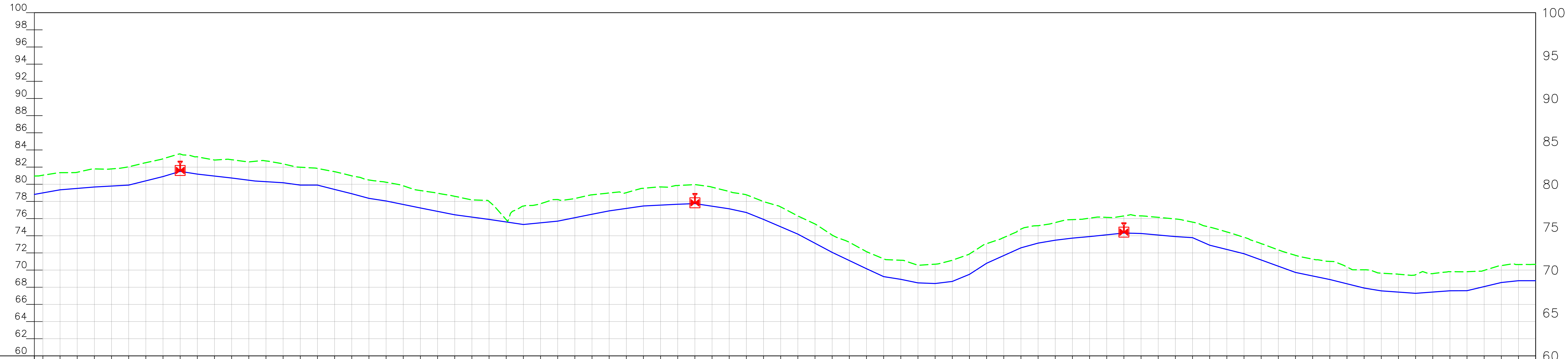


NOTES:-

1. INNER DIA OF SLEEVE PIPE FOR ROAD CROSSING = OUTER DIA OF WATER PIPE (CROSSING) + 100mm.

LEGEND

- - - (green)	GROUND PROFILE
- - -	EXISTING PIPELINE
—— (blue)	PIPE INVERT
- - - (red)	EXISTING ROAD
Node 1	NODE NUMBER
90° HB	HORIZONTAL BEND
	AIR RELEASE VALVE
	WATER METER
	GATE VALVE
	WASH OUT VALVE
	PRESSURE RELEASE VALVE



CHAINAGE (Km+m)	12+250	12+260	12+280	12+300	12+320	12+340	12+360	12+380	12+400	12+420	12+440	12+460	12+480	12+500	12+520	12+540	12+560	12+580	12+600
GROUND LEVELS (Masl)	80.96	81.06	81.35	81.39	81.79	81.79	82.04	82.51	82.97	83.53	83.20	82.83	82.86	82.61	82.72	82.38	81.98	81.85	81.47
INVERT LEVELS (Masl)	78.82	78.99	79.35	79.52	79.68	79.79	79.90	80.40	80.90	81.50	81.18	80.96	80.73	80.48	80.30	80.18	79.90	79.90	79.39
EXCAVATION DEPTH (m)	2.14	2.07	2.00	1.88	2.11	2.00	2.14	2.11	2.07	2.03	2.02	1.87	2.13	2.14	2.42	2.20	2.08	1.95	2.07

CHAINAGE (Km+m)	12+620	12+640	12+660	12+680	12+700	12+720	12+740	12+760	12+780	12+800	12+820	12+840	12+860	12+880	12+900	12+920	12+940	12+960
GROUND LEVELS (Masl)	80.98	80.50	80.23	79.82	79.27	78.95	78.60	78.18	78.00	75.88	77.45	77.73	78.22	78.34	78.77	78.99	79.02	79.53
INVERT LEVELS (Masl)	78.90	78.36	78.05	77.65	77.24	76.84	76.44	76.17	75.90	75.60	75.31	75.50	75.70	76.10	76.50	76.90	77.18	77.47
EXCAVATION DEPTH (m)	2.08	2.14	2.18	2.17	2.03	2.11	2.16	2.01	2.10	0.28	2.15	2.23	2.52	2.24	2.27	2.09	1.83	2.06

CHAINAGE (Km+m)	12+980	13+000	13+020	13+040	13+060	13+080	13+100	13+120	13+140	13+160	13+180	13+200	13+220	13+240	13+260	13+280	13+300	13+320
GROUND LEVELS (Masl)	79.69	79.86	79.96	79.66	79.16	78.77	77.98	77.35	76.30	75.37	74.07	73.23	72.15	71.31	71.14	70.55	70.68	71.14
INVERT LEVELS (Masl)	77.57	77.67	77.74	77.44	77.14	76.71	75.90	75.05	74.19	73.13	72.06	71.11	70.16	69.24	68.92	68.51	68.43	68.67
EXCAVATION DEPTH (m)	2.12	2.19	2.22	2.22	2.02	2.06	2.08	2.31	2.11	2.24	2.01	2.12	1.99	2.07	2.23	2.05	2.26	2.47

CHAINAGE (Km+m)	13+340	13+360	13+380	13+400	13+420	13+440	13+460	13+480	13+500	13+520	13+540	13+560	13+580	13+600	13+620	13+640	13+660	13+680
GROUND LEVELS (Masl)	71.88	73.07	73.80	74.77	75.17	75.53	75.88	76.05	76.14	76.31	76.31	76.15	75.95	75.59	75.01	74.44	73.82	73.08
INVERT LEVELS (Masl)	69.50	70.80	71.69	72.59	73.15	73.48	73.72	73.90	74.11	74.32	74.27	74.08	73.90	73.78	72.90	72.40	71.90	71.17
EXCAVATION DEPTH (m)	2.38	2.28	2.11	2.19	2.02	2.05	2.16	2.15	2.03	1.99	2.04	2.06	2.05	1.81	2.11	2.04	1.92	1.91

CHAINAGE (Km+m)	13+700	13+720	13+740	13+760	13+780	13+800	13+820	13+840	13+860	13+880	13+900	13+920	13+940	13+960	13+980	14+000
GROUND LEVELS (Masl)	72.35	71.71	71.27	71.01	70.36	70.03	69.63	69.52	69.46	69.59	69.81	69.81	69.96	70.53	70.64	70.66
INVERT LEVELS (Masl)	70.45	69.72	69.31	68.90	68.40	67.90	67.57	67.43	67.28	67.44	67.59	67.59	68.07	68.54	68.75	68.76
EXCAVATION DEPTH (m)	1.90	1.99	1.96	2.11	1.96	2.13	2.06	2.09	2.17	2.15	2.22	2.22	1.89	1.99	1.89	1.90

SIZE/TYPE OF PIPE & HGL: DN 800mm STEEL

PIPE FITTINGS/STRUCTURES:

SLOPE (%): 1.35% 1.78% 0.83% 0.54% 2.50% 3.02% -1.61% -1.12% -1.28% -0.62% -1.40% 0.00% -2.53% -2.47% -2.69% -1.54% -2.04% -1.99% -1.35% -1.48% 0.98% 2.01% 1.99% 1.42% 0.52% 0.32% -1.50% -2.16% -4.04% -4.27% -5.32% -4.76% -4.60% -1.62% -2.04% -0.40% 4.24% 4.12% 6.48% 4.48% 2.80% 1.69% 1.19% 0.89% 1.05% -0.26% -0.92% -0.62% -4.38% -2.50% -3.63% -2.06% -2.50% -1.65% -0.72% 0.76% 0.04% 2.38% 1.05% 0.03%

LONGITUDINAL SECTION

Project: **Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks**

Client:

COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

CONSULTING ENGINEERS

SARI CONSULTING LTD — SGAPI — gath CONSULTING ENGINEERS

SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:

REV.	DATE	REMARKS

Notes:

SURVEYED BY:	SN/JM
DESIGNED BY:	PKG/BK
DRAWN BY:	JM
CHECKED BY:	LB/PKG
APPROVED BY:	KNM

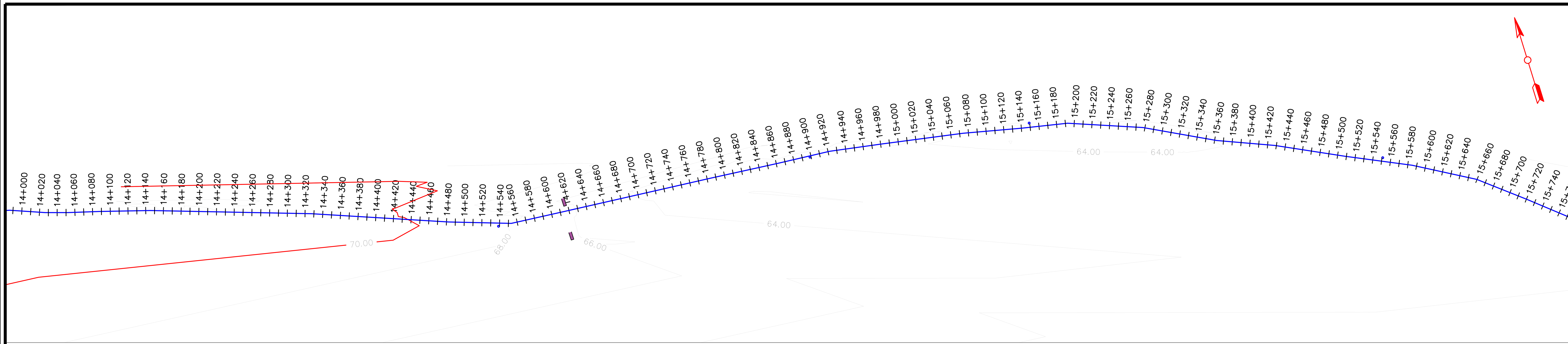
SCALE: HOR 1:2500 AND VERT 1:250

Project: SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title: BARICHO-KAKUYUNI PIPELINE - SHEET 8 (12+250 to 14+000)

Date: APRIL 2021

Drg. No. B-KA- PL1-08

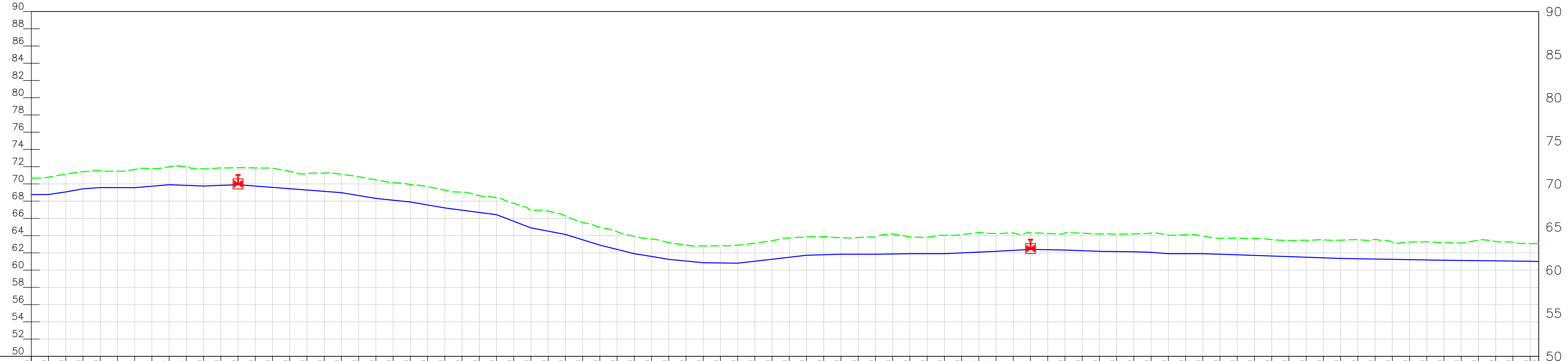


NOTES:-

1. INNER DIA OF SLEEVE PIPE FOR ROAD CROSSING = OUTER DIA OF WATER PIPE (CROSSING) + 100mm.

LEGEND

- GROUND PROFILE
- EXISTING PIPELINE
- PIPE INVERT
- EXISTING ROAD
- Node 1 — NODE NUMBER
- 90° HB — HORIZONTAL BEND
- AIR RELEASE VALVE
- WATER METER
- GATE VALVE
- WASH OUT VALVE
- PRESSURE RELEASE VALVE



CHAINAGE (Km+m)	GROUND LEVELS (Masl)	INVERT LEVELS (Masl)	EXCAVATION DEPTH (m)
14+000	70.66	68.76	1.90
14+020	70.79	68.77	2.02
14+040	71.14	69.07	2.07
14+060	71.42	69.43	1.99
14+080	71.52	69.57	1.95
14+100	71.47	69.57	1.90
14+120	71.69	69.57	2.12
14+140	71.79	69.73	2.06
14+160	71.99	69.90	2.09
14+180	72.02	69.83	2.20
14+200	71.75	69.75	1.99
14+220	71.86	69.83	2.03
14+240	71.88	69.90	1.98
14+260	71.85	69.75	2.11
14+280	71.82	69.60	2.22
14+300	71.44	69.44	2.00
14+320	71.19	69.29	1.90
14+340	71.26	69.14	2.12
14+360	71.12	68.98	2.14
14+380	70.83	68.65	2.19
14+400	70.47	68.32	2.15
14+420	70.14	68.11	2.03
14+440	69.94	67.90	2.04
14+460	69.67	67.56	2.11
14+480	69.29	67.22	2.07
14+500	69.04	66.95	2.08
14+520	68.64	66.69	1.95
14+540	68.39	66.43	1.96
14+560	67.74	65.67	2.08
14+580	66.95	64.90	2.05
14+600	66.84	64.52	2.33
14+620	66.29	64.13	2.16
14+640	65.55	63.52	2.04
14+660	64.98	62.90	2.08
14+680	64.45	62.40	2.05
14+700	63.93	61.90	2.03
14+720	63.61	61.59	2.02
14+740	63.21	61.24	1.97
14+760	62.91	61.05	1.86
14+780	62.81	60.86	1.95
14+800	62.82	60.83	1.99
14+820	62.90	60.80	2.10
14+840	63.12	61.03	2.09
14+860	63.41	61.26	2.15
14+880	63.73	61.49	2.24
14+900	63.86	61.72	2.13
14+920	63.88	61.78	2.10
14+940	63.76	61.84	1.93
14+960	63.78	61.84	1.94
14+980	63.86	61.84	2.02
15+000	64.19	61.87	2.31
15+020	63.87	61.90	1.97
15+040	63.83	61.90	1.93
15+060	64.04	61.90	2.14
15+080	64.12	61.99	2.12
15+100	64.36	62.09	2.27
15+120	64.26	62.18	2.08
15+140	64.30	62.29	2.01
15+160	64.34	62.40	1.95
15+180	64.26	62.36	1.90
15+200	64.33	62.33	2.00
15+220	64.29	62.25	2.04
15+240	64.19	62.17	2.02
15+260	64.17	62.15	2.02
15+280	64.20	62.12	2.08
15+300	64.29	62.06	2.23
15+320	64.06	61.90	2.16
15+340	64.10	61.90	2.20
15+360	63.96	61.90	2.06
15+380	63.70	61.84	1.86
15+400	63.70	61.78	1.92
15+420	63.68	61.71	1.97
15+440	63.54	61.64	1.90
15+460	63.43	61.57	1.86
15+480	63.46	61.50	1.96
15+500	63.51	61.43	2.08
15+520	63.47	61.36	2.11
15+540	63.53	61.32	2.21
15+560	63.55	61.29	2.27
15+580	63.26	61.25	2.01
15+600	63.24	61.22	2.03
15+620	63.29	61.18	2.11
15+640	63.18	61.14	2.03
15+660	63.14	61.12	2.02
15+680	63.47	61.10	2.38
15+700	63.32	61.07	2.25
15+720	63.24	61.05	2.19
15+740	63.08	61.02	2.06
15+750	63.10	60.99	2.11

SIZE/TYPE OF PIPE & HGL: DN 800mm STEEL

PIPE FITTINGS/STRUCTURES:

SLOPE (%): 0.03% | 1.50% | 1.82% | 0.71% | -0.01% | 0.83% | -0.36% | 0.36% | -0.75% | -0.77% | -1.66% | -1.04% | -1.71% | -1.32% | -1.29% | -3.83% | -1.92% | -3.08% | -2.50% | -1.55% | -1.73% | -0.96% | -0.14% | 1.14% | 1.16% | 0.29% | 0.02% | 0.14% | 0.00% | 0.47% | 0.54% | -0.17% | -0.39% | -0.13% | -0.33% | -0.79% | 0.00% | -0.30% | -0.35% | -0.18% | -0.12% | -0.30%

LONGITUDINAL SECTION

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:
COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

CONSULTING ENGINEERS
SARI CONSULTING LTD | SGAPI | gath CONSULTING ENGINEERS

SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:

REV.	DATE	REMARKS

Notes:

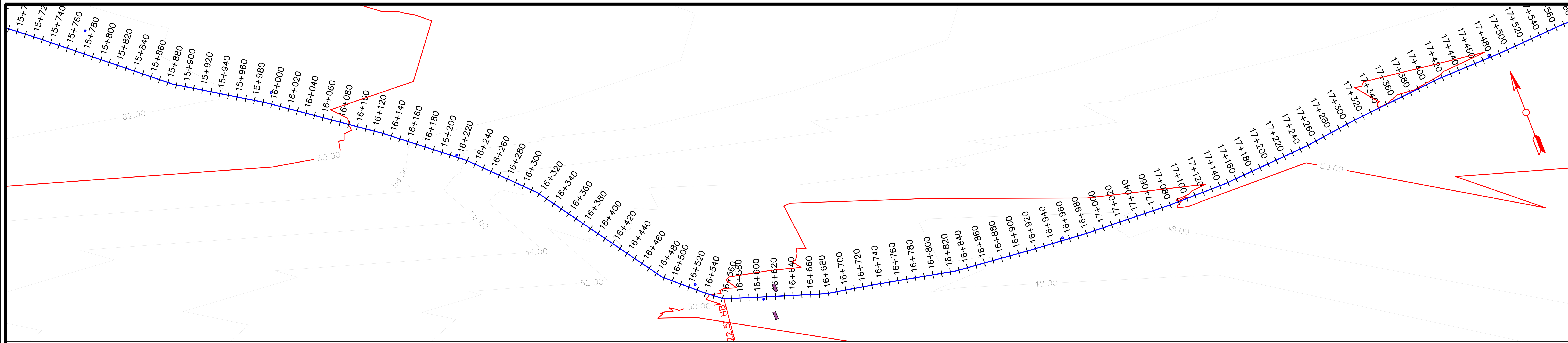
SURVEYED BY:	SN/JM
DESIGNED BY:	PKG/BK
DRAWN BY:	JM
CHECKED BY:	LB/PKG
APPROVED BY:	KNM

SCALE: HOR 1:2500 AND VERT 1:250

Project: SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title: BARICHO-KAKUYUNI PIPELINE - SHEET 9 (14+000 to 15+750)

Date: APRIL 2021 | Drg. No. B-KA- PL1-09

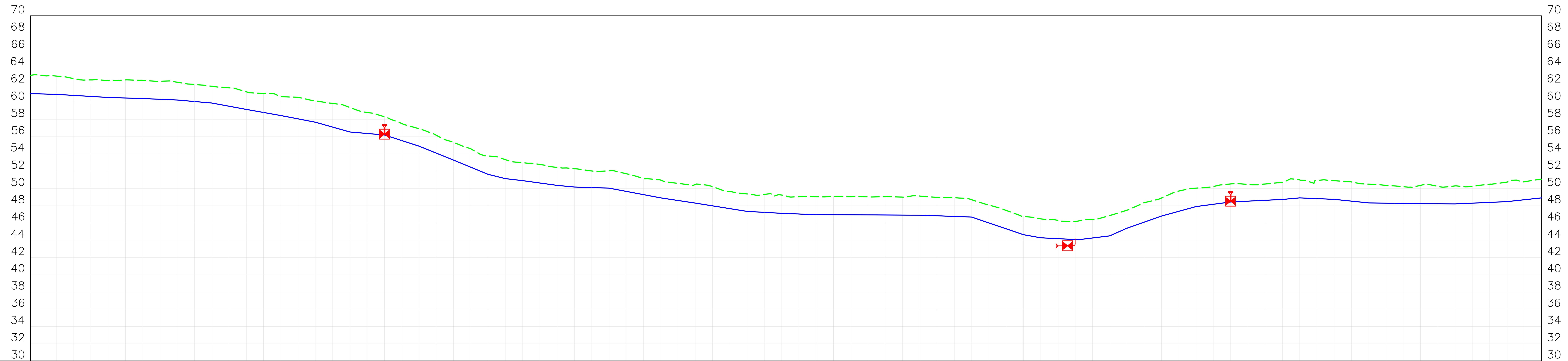


NOTES:-

1. INNER DIA OF SLEEVE PIPE FOR ROAD CROSSING = OUTER DIA OF WATER PIPE (CROSSING) + 100mm.

LEGEND

- GROUND PROFILE
- EXISTING PIPELINE
- PIPE INVERT
- EXISTING ROAD
- Node 1 — NODE NUMBER
- 90° HB — HORIZONTAL BEND
- AIR RELEASE VALVE
- WATER METER
- GATE VALVE
- WASH OUT VALVE
- PRESSURE RELEASE VALVE



CHAINAGE (Km+m)	GROUND LEVELS (Masl)	INVERT LEVELS (Masl)	EXCAVATION DEPTH (m)
15+750	63.10	60.99	2.11
15+760	63.13	60.96	2.17
15+780	63.02	60.90	2.12
15+800	62.73	60.78	1.95
15+820	62.57	60.66	1.91
15+840	62.53	60.55	1.98
15+860	62.58	60.48	2.10
15+880	62.53	60.42	2.11
15+900	62.41	60.33	2.08
15+920	62.31	60.24	2.06
15+940	62.05	60.07	1.97
15+960	61.84	59.90	1.94
15+980	61.66	59.53	2.13
16+000	61.20	59.16	2.04
16+020	61.02	58.80	2.21
16+040	60.64	58.45	2.19
16+060	60.55	58.06	2.49
16+080	60.14	57.67	2.46
16+100	59.85	57.11	2.75
16+120	59.38	56.54	2.84
16+140	58.80	56.37	2.43
16+160	58.29	56.19	2.10
16+180	57.52	55.55	1.97
16+200	56.91	54.90	2.01
16+220	56.16	54.09	2.07
16+240	55.34	53.28	2.05
16+260	54.59	52.46	2.13
16+280	53.76	51.64	2.12
16+300	53.33	51.13	2.20
16+320	52.98	50.90	2.08
16+340	52.78	50.63	2.15
16+360	52.43	50.36	2.08
16+380	52.28	50.16	2.12
16+400	52.02	50.10	1.93
16+420	52.05	50.03	2.02
16+440	51.71	49.65	2.05
16+460	51.13	49.28	1.85
16+480	50.96	48.90	2.06
16+500	50.58	48.60	1.98
16+520	50.45	48.30	2.15
16+540	50.20	47.98	2.22
16+560	49.63	47.66	1.97
16+580	49.36	47.33	2.02
16+600	49.31	47.23	2.08
16+620	49.24	47.12	2.12
16+640	49.04	47.03	2.01
16+660	49.04	46.95	2.09
16+680	49.07	46.94	2.13
16+700	49.04	46.93	2.11
16+720	49.02	46.93	2.10
16+740	49.05	46.92	2.13
16+760	48.99	46.91	2.08
16+780	49.11	46.90	2.21
16+800	48.96	46.83	2.14
16+820	48.92	46.75	2.17
16+840	48.69	46.68	2.01
16+860	48.07	46.00	2.07
16+880	47.45	45.32	2.13
16+900	46.76	44.63	2.12
16+920	46.47	44.27	2.20
16+940	46.29	44.18	2.12
16+960	46.17	44.08	2.09
16+980	46.41	44.26	2.15
17+000	46.86	44.50	2.36
17+020	47.47	45.39	2.08
17+040	48.35	46.09	2.26
17+060	48.89	46.80	2.10
17+080	49.69	47.35	2.34
17+100	50.03	47.90	2.13
17+120	50.22	48.16	2.05
17+140	50.52	48.43	2.09
17+160	50.47	48.52	1.94
17+180	50.51	48.62	1.89
17+200	50.71	48.72	2.00
17+220	50.98	48.90	2.08
17+240	50.91	48.82	2.09
17+260	50.90	48.73	2.16
17+280	50.75	48.53	2.22
17+300	50.49	48.32	2.17
17+320	50.34	48.29	2.06
17+340	50.20	48.25	1.94
17+360	50.36	48.22	2.13
17+380	50.24	48.21	2.03
17+400	50.29	48.20	2.09
17+420	50.24	48.29	1.96
17+440	50.49	48.38	2.11
17+460	50.73	48.46	2.26
17+480	50.77	48.68	2.08
17+500	51.07	48.90	2.17

SIZE/TYPE OF PIPE & HGL: DN 800mm STEEL

PIPE FITTINGS/STRUCTURES: 22.5° HB

SLOPE (%): -0.30%, -0.59%, -0.33%, -0.43%, -0.86%, -1.85%, -1.78%, -1.93%, -2.83%, -0.86%, -3.24%, -4.04%, -4.12%, -2.50%, -1.17%, -1.36%, -0.96%, -0.34%, -1.88%, -1.50%, -1.61%, -0.55%, -0.41%, -0.04%, -0.36%, -3.42%, -1.79%, -0.49%, 1.21%, 4.47%, 3.52%, 2.76%, 1.31%, 0.49%, 0.91%, -0.41%, -1.05%, -0.15%, -0.06%, 0.44%, 1.09%, 0.00%

LONGITUDINAL SECTION

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:

COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

CONSULTING ENGINEERS

SARI CONSULTING LTD

SGAPI

gath CONSULTING ENGINEERS

SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:

REV.	DATE	REMARKS

Notes:

SURVEYED BY:	SN/JM
DESIGNED BY:	PKG/BK
DRAWN BY:	JM
CHECKED BY:	LB/PKG
APPROVED BY:	KNM

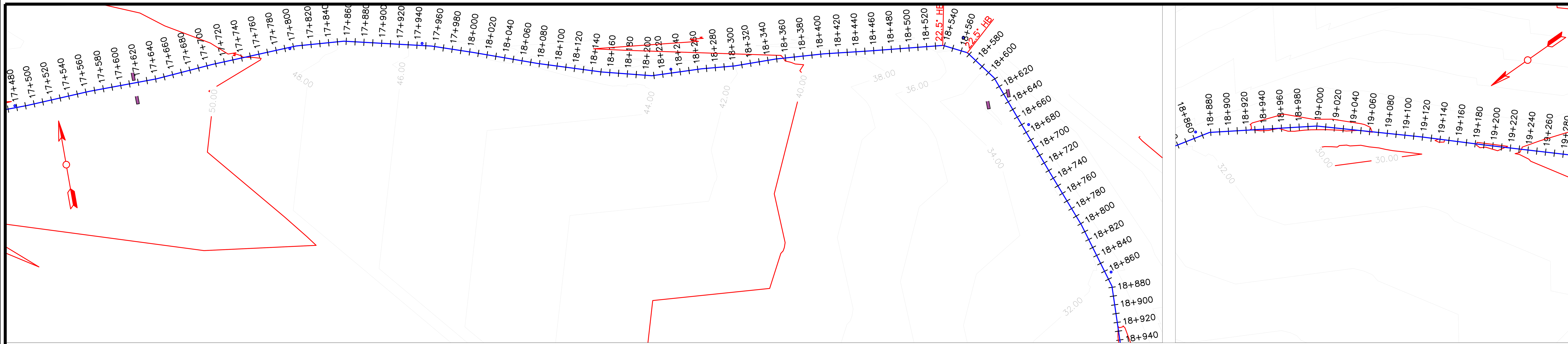
SCALE: HOR 1:2500 AND VERT 1:250

Project: SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title: BARICHO-KAKUYUNI PIPELINE - SHEET 10 (15+750 to 17+500)

Date: APRIL 2021

Drg. No. B-KA- PL1-10

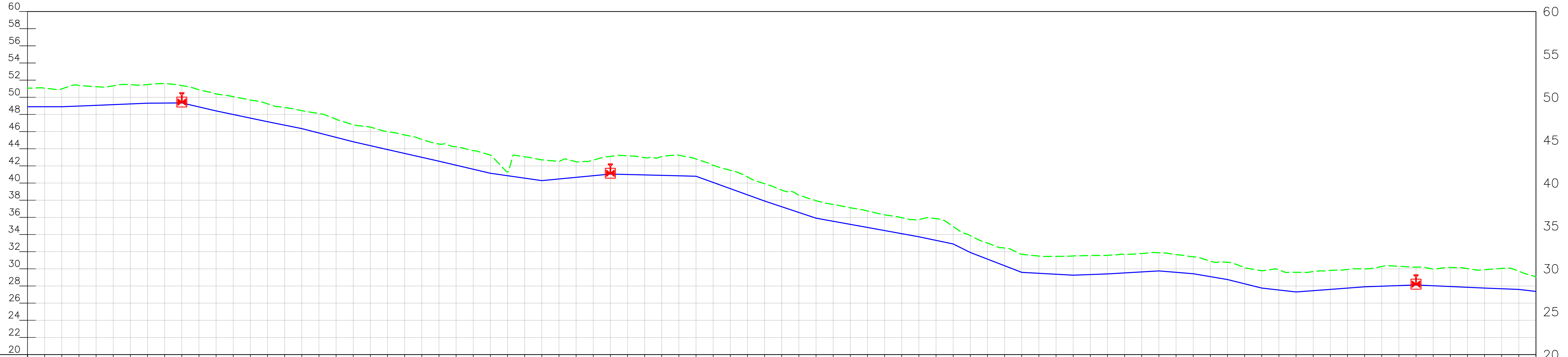


NOTES:-

1. INNER DIA OF SLEEVE PIPE FOR ROAD CROSSING = OUTER DIA OF WATER PIPE (CROSSING) + 100mm.

LEGEND

- - - - (green)	GROUND PROFILE
— — — —	EXISTING PIPELINE
—— (blue)	PIPE INVERT
- - - - (red, double)	EXISTING ROAD
Node 1	NODE NUMBER
90° HB	HORIZONTAL BEND
	AIR RELEASE VALVE
	WATER METER
	GATE VALVE
	WASH OUT VALVE
	PRESSURE RELEASE VALVE



CHAINAGE (Km+m)	17+500	17+520	17+540	17+560	17+580	17+600	17+620	17+640	17+660	17+680	17+700	17+720	17+740	17+760	17+780	17+800	17+820	17+840	17+860	17+880	17+900	17+920
GROUND LEVELS (Masl)	51.07	51.06	50.99	51.39	51.23	51.33	51.49	51.48	51.59	51.36	50.87	50.39	50.08	49.67	49.23	48.80	48.44	48.10	47.43	46.79	46.53	45.99
INVERT LEVELS (Masl)	48.90	48.90	48.90	48.98	49.05	49.14	49.22	49.31	49.32	49.34	48.87	48.41	47.99	47.57	47.15	46.75	46.35	45.83	45.32	44.81	44.35	43.90
EXCAVATION DEPTH (m)	2.17	2.16	2.09	2.42	2.18	2.19	2.26	2.17	2.26	2.02	2.00	1.98	2.09	2.10	2.08	2.05	2.10	2.27	2.11	1.98	2.18	2.09

CHAINAGE (Km+m)	17+940	17+960	17+980	18+000	18+020	18+040	18+060	18+080	18+100	18+120	18+140	18+160	18+180	18+200	18+220	18+240	18+260	18+280	18+300	18+320	18+340	18+360
GROUND LEVELS (Masl)	45.61	45.09	44.55	44.23	43.78	43.26	41.31	43.05	42.71	42.54	42.49	42.68	43.11	43.17	42.97	43.09	43.23	42.80	42.07	41.49	40.71	39.92
INVERT LEVELS (Masl)	43.45	43.00	42.55	42.08	41.61	41.13	40.85	40.56	40.28	40.47	40.66	40.85	41.04	41.00	40.95	40.90	40.84	40.79	40.07	39.34	38.62	37.90
EXCAVATION DEPTH (m)	2.16	2.09	2.00	2.15	2.18	2.12	0.46	2.49	2.43	2.07	1.83	1.82	2.06	2.18	2.02	2.19	2.39	2.01	2.01	2.14	2.08	2.02

CHAINAGE (Km+m)	18+380	18+400	18+420	18+440	18+460	18+480	18+500	18+520	18+540	18+560	18+580	18+600	18+620	18+640	18+660	18+680	18+700	18+720	18+740	18+760	18+780	18+800
GROUND LEVELS (Masl)	39.17	38.60	37.95	37.50	37.11	36.75	36.29	35.96	35.74	35.85	34.93	33.87	33.00	32.42	31.69	31.48	31.45	31.50	31.55	31.58	31.69	31.78
INVERT LEVELS (Masl)	37.23	36.57	35.90	35.54	35.18	34.82	34.46	34.09	33.73	33.32	32.90	31.90	31.13	30.35	29.58	29.47	29.37	29.26	29.33	29.40	29.52	29.63
EXCAVATION DEPTH (m)	1.94	2.03	2.05	1.96	1.93	1.93	1.83	1.87	2.01	2.53	2.03	1.97	1.88	2.07	2.11	2.01	2.08	2.24	2.22	2.18	2.17	2.15
PIPE FITTINGS/STRUCTURES										22.5° HB	22.5° HB											

CHAINAGE (Km+m)	18+820	18+840	18+860	18+880	18+900	18+920	18+940	18+960	18+980	19+000	19+020	19+040	19+060	19+080	19+100	19+120	19+140	19+160	19+180	19+200	19+220	19+240	19+260
GROUND LEVELS (Masl)	31.87	31.65	31.40	30.89	30.76	30.15	29.78	29.87	29.59	29.69	29.81	29.92	29.98	30.27	30.29	30.19	29.99	30.16	30.02	29.90	30.04	29.72	29.07
INVERT LEVELS (Masl)	29.75	29.59	29.43	29.09	28.75	28.25	27.75	27.53	27.30	27.45	27.60	27.75	27.90	27.97	28.04	28.11	28.02	27.93	27.84	27.75	27.68	27.60	27.36
EXCAVATION DEPTH (m)	2.12	2.07	1.98	1.81	2.01	1.90	2.03	2.35	2.29	2.23	2.21	2.17	2.08	2.30	2.25	2.08	1.97	2.23	2.18	2.15	2.37	2.12	1.70

SIZE/TYPE OF PIPE & HGL: DN 800mm STEEL

SLOPE (%): 1.09%, 0.00%, 0.38%, 0.43%, 0.07%, -2.32%, -2.10%, -2.02%, -2.57%, -2.27%, -2.25%, -2.36%, -1.43%, 0.96%, -0.24%, -0.28%, -3.61%, -3.33%, -1.80%, -1.82%, -2.08%, -5.00%, -3.87%, -3.85%, -0.53%, 0.35%, 0.58%, -0.81%, -1.69%, -2.50%, -1.12%, 0.75%, 0.35%, -0.45%, -0.39%, -1.17%

LONGITUDINAL SECTION

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:

COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

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SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:

REV.	DATE	REMARKS

Notes:

SURVEYED BY: SN/JM
DESIGNED BY: PKG/BK
DRAWN BY: JM
CHECKED BY: LB/PKG
APPROVED BY: KNM

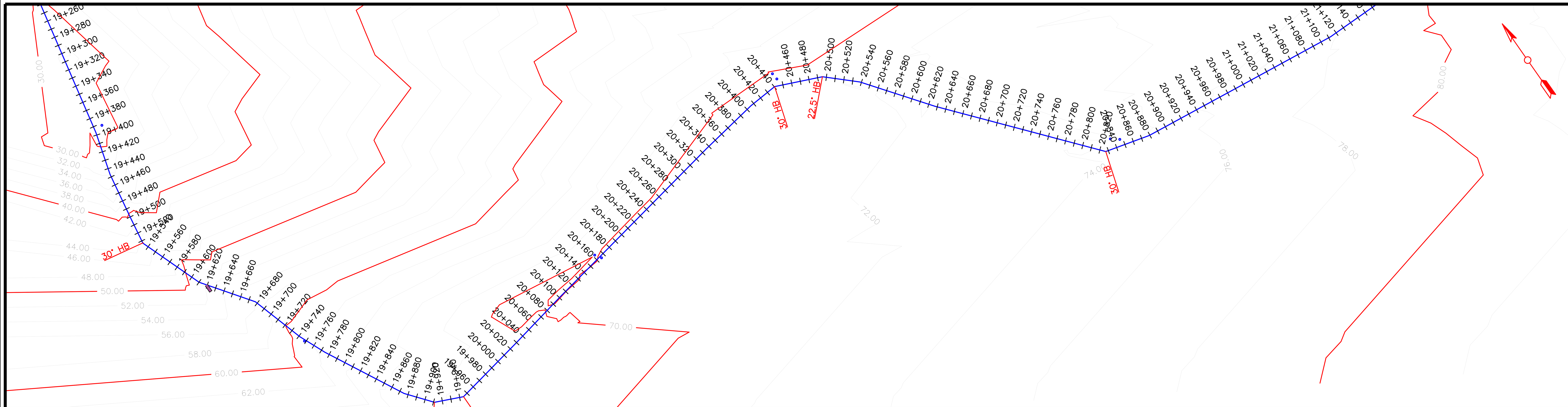
SCALE:
HOR 1:2500 AND VERT 1:250

Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title:
BARICHO-KAKUYUNI PIPELINE - SHEET 11 (17+000 to 19+260)

Date: APRIL 2021

Drg. No. B-KA- PL1-11

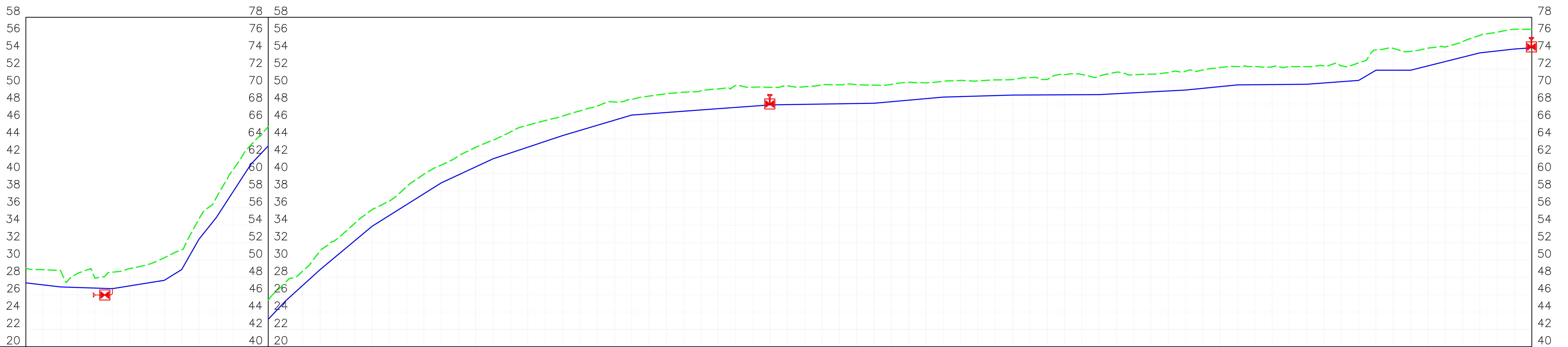


NOTES:-

1. INNER DIA OF SLEEVE PIPE FOR ROAD CROSSING = OUTER DIA OF WATER PIPE (CROSSING) + 100mm.

LEGEND

- GROUND PROFILE
- EXISTING PIPELINE
- PIPE INVERT
- EXISTING ROAD
- Node 1 — NODE NUMBER
- 90° HB — HORIZONTAL BEND
- AIR RELEASE VALVE
- WATER METER
- GATE VALVE
- WASH OUT VALVE
- PRESSURE RELEASE VALVE



CHAINAGE (Km+m)	19+260	19+280	19+300	19+320	19+340	19+360	19+380	19+400	19+420	19+440	19+460
GROUND LEVELS (Masl)	29.07	28.89	28.81	28.47	27.91	28.60	29.03	29.46	30.28	31.19	34.75
INVERT LEVELS (Masl)	27.36	27.13	26.90	26.83	26.77	26.70	27.02	27.34	27.66	28.90	32.40
EXCAVATION DEPTH (m)	1.70	1.76	1.91	1.63	1.15	1.90	2.01	2.12	2.62	2.29	2.35

CHAINAGE (Km+m)	19+480	19+500	19+520	19+540	19+560	19+580	19+600	19+620	19+640	19+660	19+680
GROUND LEVELS (Masl)	37.19	40.51	43.27	45.40	47.43	48.74	51.05	52.48	54.25	55.82	56.78
INVERT LEVELS (Masl)	34.90	37.98	41.05	43.16	45.28	47.09	48.90	50.57	52.23	53.90	55.15
EXCAVATION DEPTH (m)	2.29	2.54	2.22	2.24	2.15	1.65	2.15	1.91	2.01	1.92	1.63

CHAINAGE (Km+m)	19+700	19+720	19+740	19+760	19+780	19+800	19+820	19+840	19+860	19+880	19+900
GROUND LEVELS (Masl)	58.47	59.91	60.96	62.02	63.02	63.84	64.78	65.56	66.09	66.60	67.19
INVERT LEVELS (Masl)	56.40	57.65	58.90	59.83	60.75	61.68	62.35	63.01	63.68	64.35	64.94
EXCAVATION DEPTH (m)	2.07	2.26	2.06	2.19	2.26	2.16	2.43	2.54	2.41	2.25	2.25

CHAINAGE (Km+m)	19+920	19+940	19+960	19+980	20+000	20+020	20+040	20+060	20+080	20+100	20+120
GROUND LEVELS (Masl)	67.77	68.23	68.55	68.91	69.18	69.36	69.53	69.74	70.13	69.94	69.92
INVERT LEVELS (Masl)	65.53	66.13	66.72	66.87	67.02	67.17	67.32	67.46	67.61	67.75	67.90
EXCAVATION DEPTH (m)	2.23	2.11	1.83	2.05	2.17	2.20	2.21	2.28	2.52	2.19	2.02

CHAINAGE (Km+m)	20+140	20+160	20+180	20+200	20+220	20+240	20+260	20+280	20+300	20+320	20+340
GROUND LEVELS (Masl)	70.10	69.99	70.19	70.21	70.23	70.18	70.25	70.50	70.43	70.62	70.71
INVERT LEVELS (Masl)	67.93	67.96	68.00	68.03	68.06	68.09	68.27	68.44	68.62	68.80	68.85
EXCAVATION DEPTH (m)	2.17	2.02	2.20	2.18	2.17	2.09	1.98	2.06	1.81	1.82	1.86

CHAINAGE (Km+m)	20+360	20+380	20+400	20+420	20+440	20+460	20+480	20+500	20+520	20+540	20+560
GROUND LEVELS (Masl)	70.66	70.78	70.82	71.04	70.83	71.39	71.41	71.21	71.67	71.36	71.44
INVERT LEVELS (Masl)	68.91	68.97	69.03	69.04	69.05	69.06	69.07	69.08	69.19	69.30	69.40
EXCAVATION DEPTH (m)	1.75	1.81	1.79	2.00	1.78	2.33	2.33	2.12	2.48	2.07	2.04

CHAINAGE (Km+m)	20+580	20+600	20+620	20+640	20+660	20+680	20+700	20+720	20+740	20+760	20+780
GROUND LEVELS (Masl)	71.63	71.78	71.93	72.21	72.32	72.32	72.30	72.33	72.30	72.39	72.39
INVERT LEVELS (Masl)	69.51	69.61	69.81	70.01	70.20	70.22	70.24	70.26	70.28	70.43	70.57
EXCAVATION DEPTH (m)	2.12	2.17	2.12	2.20	2.11	2.10	2.06	2.06	2.02	1.97	1.82

CHAINAGE (Km+m)	20+800	20+820	20+840	20+860	20+880	20+900	20+920	20+940	20+960	20+980	21+000
GROUND LEVELS (Masl)	72.74	74.24	74.41	74.07	74.45	74.58	75.19	75.92	76.28	76.62	76.61
INVERT LEVELS (Masl)	70.72	71.90	71.90	71.90	72.40	72.90	73.40	73.90	74.12	74.34	74.48
EXCAVATION DEPTH (m)	2.03	2.34	2.51	2.17	2.05	1.68	1.79	2.02	2.16	2.27	2.13

SIZE/TYPE OF PIPE & HGL: DN 800mm STEEL

PIPE FITTINGS/STRUCTURES: 30° HB, 30° HB, 30° HB, 30° HB, 22.5° HB, 30° HB

SLOPE (%): -1.17%, -0.33%, 1.60%, 6.20%, 7.50%, 2.50%, 15.38%, 10.57%, 9.05%, 8.33%, 6.25%, 4.63%, 3.33%, 2.96%, 0.75%, 0.73%, 0.16%, 0.88%, 0.29%, 0.06%, 0.53%, 0.98%, 0.10%, 0.72%, 5.91%, 0.00%, 2.50%, 1.11%, 0.69%

LONGITUDINAL SECTION

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:

COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

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SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:

REV.	DATE	REMARKS

Notes:

SURVEYED BY:	SN/JM
DESIGNED BY:	PKG/BK
DRAWN BY:	JM
CHECKED BY:	LB/PKG
APPROVED BY:	KNM

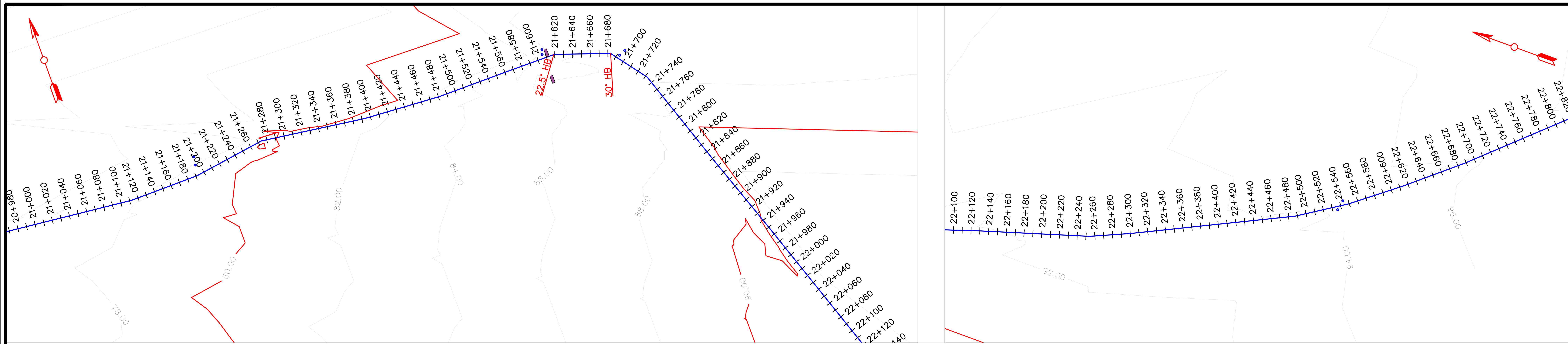
SCALE:
HOR 1:2500 AND VERT 1:250

Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title:
BARICHO-KAKUYUNI PIPELINE - SHEET 12 (19+260 to 21+000)

Date: APRIL 2021

Drg. No. B-KA- PL1-12

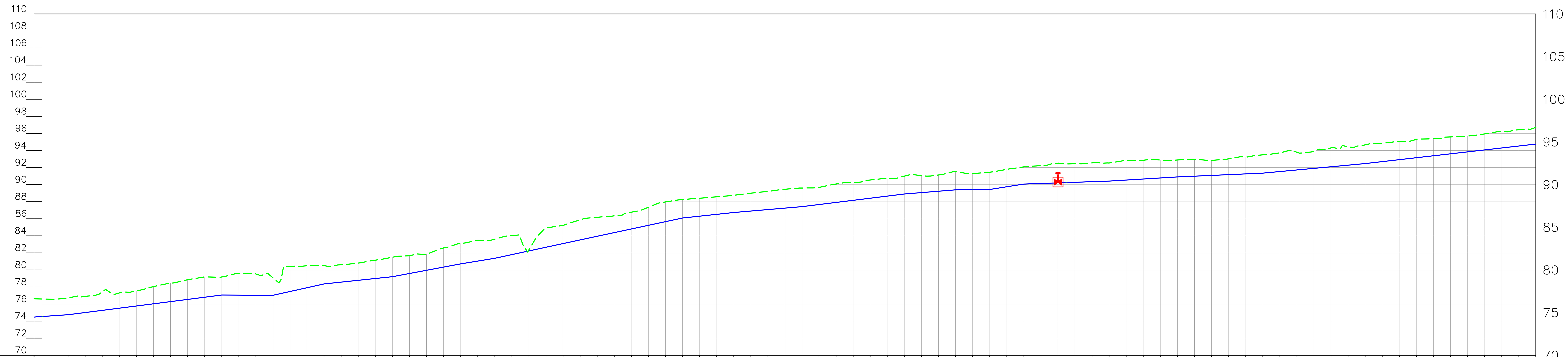


NOTES:-

1. INNER DIA OF SLEEVE PIPE FOR ROAD CROSSING = OUTER DIA OF WATER PIPE (CROSSING) + 100mm.

LEGEND

- GROUND PROFILE
- EXISTING PIPELINE
- PIPE INVERT
- EXISTING ROAD
- Node 1 — NODE NUMBER
- 90° HB — HORIZONTAL BEND
- AIR RELEASE VALVE
- WATER METER
- GATE VALVE
- WASH OUT VALVE
- PRESSURE RELEASE VALVE



CHAINAGE (Km+m)	GROUND LEVELS (Masl)	INVERT LEVELS (Masl)	EXCAVATION DEPTH (m)
21+000	76.61	74.48	2.13
21+020	76.57	74.62	1.95
21+040	76.68	74.76	1.93
21+060	76.92	75.01	1.91
21+080	77.43	75.26	2.17
21+100	77.31	75.52	1.79
21+120	77.55	75.77	1.77
21+140	78.04	76.03	2.01
21+160	78.45	76.29	2.17
21+180	78.86	76.54	2.31
21+200	79.19	76.80	2.39
21+220	79.18	77.06	2.12
21+240	79.58	77.05	2.53
21+260	79.53	77.04	2.49
21+280	79.08	77.03	2.05
21+300	80.42	77.47	2.94
21+320	80.49	77.92	2.58
21+340	80.51	78.36	2.15
21+360	80.61	78.57	2.04
21+380	80.81	78.79	2.02
21+400	81.15	79.00	2.15
21+420	81.49	79.21	2.28
21+440	81.67	79.59	2.09
21+460	81.87	79.96	1.91
21+480	82.58	80.34	2.24
21+500	83.11	80.71	2.40
21+520	83.45	81.04	2.41
21+540	83.61	81.37	2.24
21+560	84.03	81.80	2.23
21+580	82.36	82.23	0.13
21+600	84.90	82.66	2.24
21+620	85.22	83.09	2.13
21+640	85.88	83.52	2.36
21+660	86.18	83.95	2.23
21+680	86.34	84.38	1.96
21+700	86.78	84.81	1.97
21+720	87.35	85.24	2.11
21+740	87.97	85.66	2.31
21+760	88.25	86.09	2.15
21+780	88.40	86.31	2.09
21+800	88.57	86.52	2.05
21+820	88.75	86.74	2.01
21+840	89.00	86.91	2.09
21+860	89.20	87.08	2.12
21+880	89.47	87.25	2.22
21+900	89.60	87.42	2.18
21+920	89.68	87.67	2.02
21+940	90.08	87.91	2.16
21+960	90.24	88.16	2.08
21+980	90.54	88.41	2.14
22+000	90.71	88.65	2.05
22+020	91.00	88.90	2.10
22+040	91.06	89.06	2.00
22+060	91.13	89.23	1.90
22+080	91.52	89.39	2.13
22+100	91.32	89.42	1.90
22+120	91.46	89.44	2.02
22+140	91.79	89.75	2.04
22+160	92.08	90.07	2.01
22+180	92.26	90.14	2.12
22+200	92.52	90.21	2.31
22+220	92.45	90.28	2.17
22+240	92.55	90.34	2.21
22+260	92.53	90.41	2.12
22+280	92.81	90.54	2.27
22+300	92.86	90.66	2.21
22+320	92.88	90.78	2.10
22+340	92.89	90.90	1.99
22+360	92.96	90.99	1.97
22+380	92.85	91.08	1.77
22+400	93.04	91.17	1.87
22+420	93.25	91.26	1.99
22+440	93.49	91.35	2.14
22+460	93.73	91.54	2.19
22+480	93.79	91.72	2.07
22+500	93.90	91.91	1.98
22+520	94.31	92.10	2.21
22+540	94.41	92.29	2.13
22+560	94.66	92.47	2.19
22+580	94.87	92.70	2.17
22+600	95.02	92.93	2.09
22+620	95.32	93.16	2.16
22+640	95.37	93.39	1.98
22+660	95.59	93.62	1.97
22+680	95.69	93.84	1.85
22+700	95.94	94.07	1.87
22+720	96.22	94.30	1.92
22+740	96.43	94.52	1.91
22+760	96.71	94.75	1.96

SIZE/TYPE OF PIPE & HGL: DN 800mm STEEL

PIPE FITTINGS/STRUCTURES: 22.5° HB (at 22+620/22+640); 30° HB (at 22+680/22+700)

SLOPE (%): 0.69%, 1.26%, 1.28%, 1.29%, -0.05%, 2.22%, 1.06%, 1.88%, 1.64%, 2.15%, 2.14%, 1.07%, 0.85%, 1.23%, 0.82%, 0.11%, 1.57%, 0.35%, 0.61%, 0.45%, 0.94%, 1.14%, 1.13%, 1.66%

LONGITUDINAL SECTION

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:
COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

CONSULTING ENGINEERS
SARI CONSULTING LTD
SGAPI
gath CONSULTING ENGINEERS
SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:

REV.	DATE	REMARKS

Notes:

SURVEYED BY:	SN/JM
DESIGNED BY:	PKG/BK
DRAWN BY:	JM
CHECKED BY:	LB/PKG
APPROVED BY:	KNM

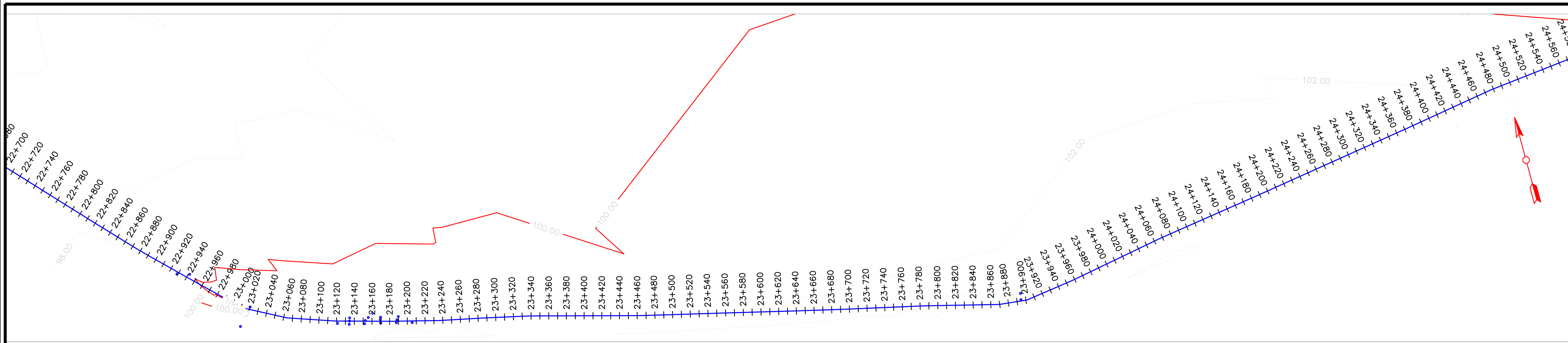
SCALE: HOR 1:2500 AND VERT 1:250

Project: SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title: BARICHO-KAKUYUNI PIPELINE - SHEET 13(21+000 to 22+760)

Date: APRIL 2021

Drg. No. B-KA- PL1-13

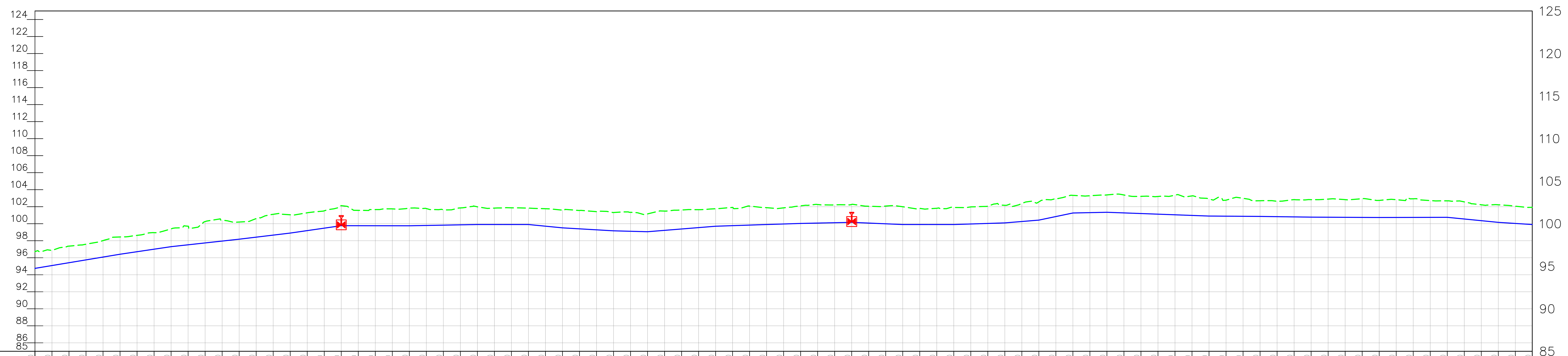


NOTES:-

1. INNER DIA OF SLEEVE PIPE FOR ROAD CROSSING = OUTER DIA OF WATER PIPE (CROSSING) + 100mm.

LEGEND

- GROUND PROFILE
- EXISTING PIPELINE
- PIPE INVERT
- EXISTING ROAD
- Node 1 — NODE NUMBER
- 90° HB — HORIZONTAL BEND
- AIR RELEASE VALVE
- WATER METER
- GATE VALVE
- WASH OUT VALVE
- PRESSURE RELEASE VALVE



CHAINAGE (Km+m)	GROUND LEVELS (Masl)	INVERT LEVELS (Masl)	EXCAVATION DEPTH (m)
22+760	96.71	94.75	1.96
22+780	96.87	95.08	1.78
22+800	97.36	95.42	1.95
22+820	97.59	95.75	1.84
22+840	98.01	96.08	1.93
22+860	98.44	96.41	2.03
22+880	98.63	96.71	1.92
22+900	98.95	97.01	1.94
22+920	99.40	97.30	2.09
22+940	99.70	97.52	2.18
22+960	100.25	97.74	2.51
22+980	100.41	97.96	2.45
23+000	100.20	98.18	2.02
23+020	100.60	98.42	2.18
23+040	101.10	98.66	2.44
23+060	101.04	98.90	2.14
23+080	101.28	99.19	2.10
23+100	101.52	99.48	2.04
23+120	102.12	99.77	2.36
23+140	101.57	99.76	1.80
23+160	101.66	99.76	1.90
23+180	101.74	99.76	1.98
23+200	101.82	99.76	2.07
23+220	101.78	99.79	1.99
23+240	101.64	99.83	1.81
23+260	101.85	99.86	1.99
23+280	101.98	99.90	2.08
23+300	101.83	99.90	1.93
23+320	101.87	99.90	1.97
23+340	101.83	99.90	1.93
23+360	101.76	99.70	2.05
23+380	101.59	99.51	2.09
23+400	101.56	99.39	2.17
23+420	101.42	99.28	2.14
23+440	101.31	99.16	2.15
23+460	101.34	99.11	2.22
23+480	101.15	99.06	2.09
23+500	101.48	99.22	2.26
23+520	101.61	99.38	2.23
23+540	101.65	99.54	2.11
23+560	101.77	99.70	2.06
23+580	101.91	99.77	2.14
23+600	102.08	99.83	2.24
23+620	101.88	99.90	1.98
23+640	101.86	99.96	1.90
23+660	102.10	100.03	2.07
23+680	102.25	100.07	2.18
23+700	102.21	100.11	2.10
23+720	102.26	100.15	2.11
23+740	102.05	100.07	1.98
23+760	102.07	99.98	2.08
23+780	101.99	99.90	2.09
23+800	101.81	99.90	1.91
23+820	101.81	99.90	1.91
23+840	101.91	99.90	2.01
23+860	101.97	99.96	2.01
23+880	102.07	100.03	2.04
23+900	102.16	100.09	2.07
23+920	102.37	100.26	2.11
23+940	102.56	100.43	2.14
23+960	102.95	100.84	2.11
23+980	103.33	101.26	2.08
24+000	103.28	101.30	1.99
24+020	103.38	101.34	2.04
24+040	103.37	101.27	2.10
24+060	103.22	101.20	2.02
24+080	103.20	101.12	2.08
24+100	103.35	101.05	2.30
24+120	103.27	100.97	2.29
24+140	102.91	100.90	2.01
24+160	102.76	100.89	1.88
24+180	102.98	100.87	2.11
24+200	102.70	100.86	1.84
24+220	102.64	100.83	1.81
24+240	102.83	100.80	2.03
24+260	102.83	100.77	2.06
24+280	102.89	100.76	2.14
24+300	102.83	100.75	2.08
24+320	102.94	100.73	2.20
24+340	102.74	100.72	2.01
24+360	102.82	100.73	2.09
24+380	102.93	100.73	2.20
24+400	102.71	100.74	1.97
24+420	102.69	100.74	1.95
24+440	102.56	100.55	2.01
24+460	102.22	100.35	1.87
24+480	102.22	100.16	2.07
24+500	102.06	100.03	2.03
24+520	101.92	99.90	2.02

SIZE/TYPE OF PIPE & HGL: DN 800mm STEEL

PIPE FITTINGS/STRUCTURES

SLOPE (%): 1.13%, 1.66%, 1.48%, 1.10%, 1.20%, 1.44%, -0.01%, 0.18%, 0.00%, -0.98%, -0.57%, -0.26%, 0.80%, 0.33%, 0.32%, 0.21%, -0.42%, 0.00%, 0.32%, 0.83%, 2.08%, 0.21%, -0.36%, -0.37%, -0.07%, -0.15%, -0.06%, 0.03%, -0.98%, -0.64%, -1.25%

LONGITUDINAL SECTION

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:

COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

CONSULTING ENGINEERS

SARI CONSULTING LTD

SGAPI

gath CONSULTING ENGINEERS

SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:

REV.	DATE	REMARKS

Notes:

SURVEYED BY: SN/JM
DESIGNED BY: PKG/BK
DRAWN BY: JM
CHECKED BY: LB/PKG
APPROVED BY: KNM

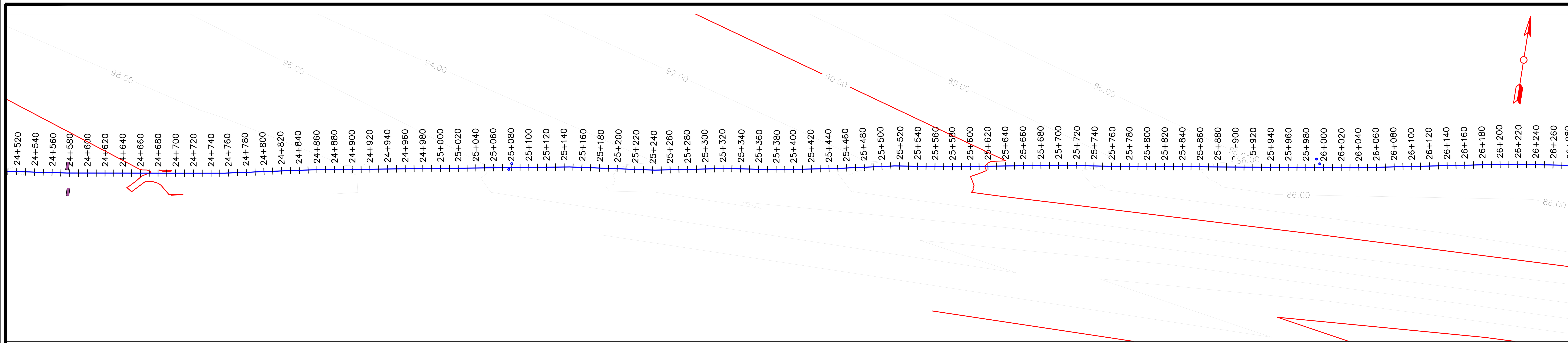
SCALE: HOR 1:2500 AND VERT 1:250

Project: SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title: BARICHO-KAKUYUNI PIPELINE - SHEET 14 (22+760 to 24+520)

Date: APRIL 2021

Drg. No. B-KA- PL1-14

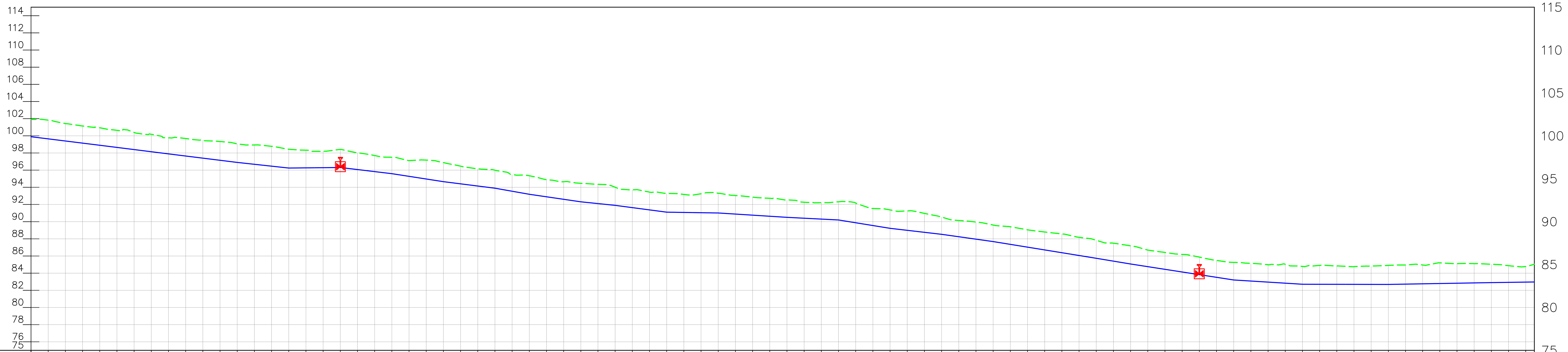


NOTES:-

1. INNER DIA OF SLEEVE PIPE FOR ROAD CROSSING = OUTER DIA OF WATER PIPE (CROSSING) + 100mm.

LEGEND

- GROUND PROFILE
- EXISTING PIPELINE
- PIPE INVERT
- EXISTING ROAD
- Node 1 — NODE NUMBER
- 90° HB — HORIZONTAL BEND
- AIR RELEASE VALVE
- WATER METER
- GATE VALVE
- WASH OUT VALVE
- PRESSURE RELEASE VALVE



CHAINAGE (Km+m)	24+520	24+540	24+560	24+580	24+600	24+620	24+640	24+660	24+680	24+700	24+720	24+740	24+760	24+780	24+800
GROUND LEVELS (Masl)	101.92	101.83	101.43	101.16	100.94	100.65	100.40	100.19	99.77	99.69	99.49	99.34	99.06	98.94	98.79
INVERT LEVELS (Masl)	99.90	99.65	99.40	99.15	98.90	98.65	98.40	98.15	97.90	97.65	97.40	97.15	96.90	96.68	96.47
EXCAVATION DEPTH (m)	2.02	2.18	2.03	2.01	2.04	2.00	2.00	2.04	1.87	2.04	2.09	2.19	2.16	2.26	2.32

CHAINAGE (Km+m)	24+820	24+840	24+860	24+880	24+900	24+920	24+940	24+960	24+980	25+000	25+020	25+040	25+060	25+080	25+100
GROUND LEVELS (Masl)	98.44	98.33	98.21	98.42	98.03	97.70	97.50	97.12	97.17	96.88	96.47	96.16	96.00	95.48	95.35
INVERT LEVELS (Masl)	96.25	96.27	96.29	96.31	96.07	95.83	95.60	95.29	94.97	94.66	94.41	94.15	93.90	93.55	93.19
EXCAVATION DEPTH (m)	2.19	2.06	1.92	2.11	1.96	1.87	1.91	1.83	2.20	2.21	2.06	2.00	2.10	1.94	2.16

CHAINAGE (Km+m)	25+120	25+140	25+160	25+180	25+200	25+220	25+240	25+260	25+280	25+300	25+320	25+340	25+360	25+380	25+400
GROUND LEVELS (Masl)	94.90	94.66	94.47	94.35	94.01	93.70	93.44	93.29	93.17	93.25	93.31	93.05	92.85	92.73	92.53
INVERT LEVELS (Masl)	92.90	92.61	92.31	92.11	91.90	91.63	91.37	91.10	91.07	91.04	91.02	90.89	90.76	90.63	90.50
EXCAVATION DEPTH (m)	2.00	2.05	2.16	2.25	2.11	2.07	2.07	2.19	2.10	2.21	2.30	2.16	2.10	2.09	2.03

CHAINAGE (Km+m)	25+420	25+440	25+460	25+480	25+500	25+520	25+540	25+560	25+580	25+600	25+620	25+640	25+660	25+680	25+700
GROUND LEVELS (Masl)	92.26	92.21	92.32	92.17	91.53	91.37	91.25	90.96	90.53	90.13	89.96	89.60	89.41	89.04	88.79
INVERT LEVELS (Masl)	90.40	90.29	90.19	89.87	89.55	89.22	88.99	88.75	88.52	88.24	87.96	87.68	87.35	87.03	86.70
EXCAVATION DEPTH (m)	1.86	1.91	2.13	2.30	1.99	2.14	2.26	2.21	2.01	1.89	2.00	1.92	2.05	2.01	2.09

CHAINAGE (Km+m)	25+720	25+740	25+760	25+780	25+800	25+820	25+840	25+860	25+880	25+900	25+920	25+940	25+960	25+980	26+000
GROUND LEVELS (Masl)	88.57	88.17	87.83	87.49	87.18	86.69	86.41	86.18	85.87	85.48	85.25	85.14	84.98	85.03	84.79
INVERT LEVELS (Masl)	86.38	86.05	85.73	85.40	85.07	84.76	84.44	84.13	83.82	83.51	83.20	83.08	82.96	82.83	82.71
EXCAVATION DEPTH (m)	2.19	2.12	2.10	2.09	2.11	1.94	1.97	2.05	2.05	1.96	2.05	2.06	2.02	2.20	2.08

CHAINAGE (Km+m)	26+020	26+040	26+060	26+080	26+100	26+120	26+140	26+160	26+180	26+200	26+220	26+240	26+260	26+270
GROUND LEVELS (Masl)	84.90	84.84	84.76	84.82	84.90	84.95	84.95	85.20	85.11	85.11	85.03	84.87	84.77	85.05
INVERT LEVELS (Masl)	82.70	82.70	82.69	82.69	82.69	82.72	82.76	82.79	82.83	82.86	82.90	82.93	82.96	82.97
EXCAVATION DEPTH (m)	2.20	2.14	2.06	2.13	2.21	2.23	2.19	2.40	2.28	2.24	2.13	1.94	1.82	2.07

SIZE/TYPE OF PIPE & HGL	DN 800mm STEEL
PIPE FITTINGS/STRUCTURES	
SLOPE (%)	-0.64%, -1.25%, -1.25%, -1.25%, -1.08%, 0.09%, -1.19%, -1.55%, -1.27%, -1.77%, -1.47%, -1.03%, -1.33%, -0.15%, -0.64%, -0.52%, -1.61%, -1.17%, -1.40%, -1.63%, -1.63%, -1.65%, -1.56%, -1.55%, -0.62%, -0.02%, 0.18%, 0.14%

LONGITUDINAL SECTION

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:

COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

CONSULTING ENGINEERS

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SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:		
REV.	DATE	REMARKS

Notes:

SURVEYED BY:	SN/JM
DESIGNED BY:	PKG/BK
DRAWN BY:	JM
CHECKED BY:	LB/PKG
APPROVED BY:	KNM

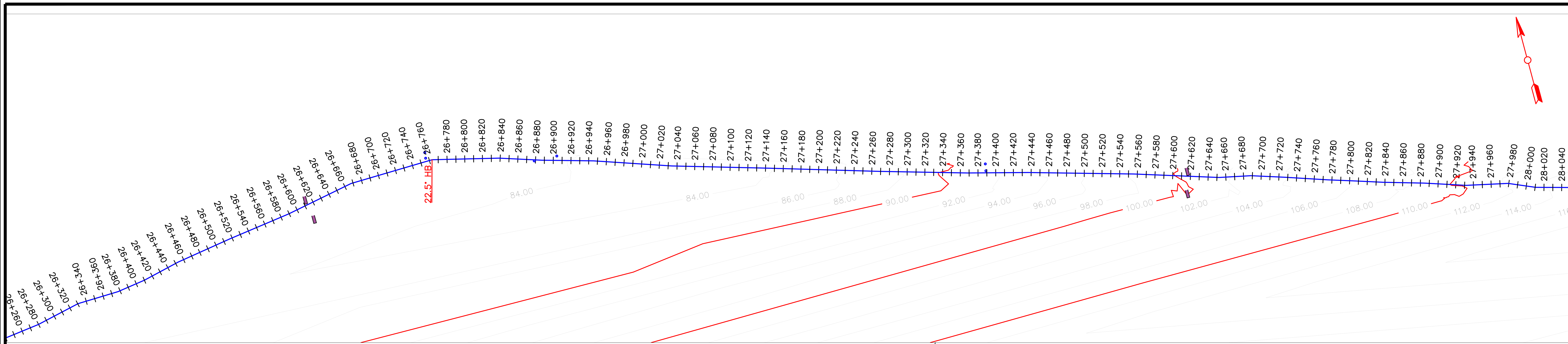
SCALE:
HOR 1:2500 AND VERT 1:250

Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title:
BARICHO-KAKUYUNI PIPELINE - SHEET 15 (24+520 to 26+270)

Date: APRIL 2021

Drg. No. B-KA- PL1-15

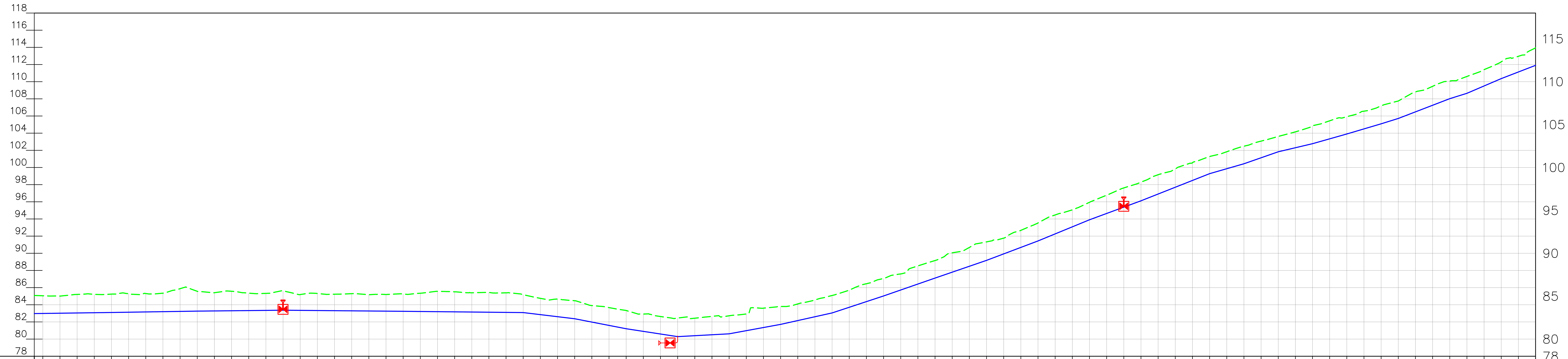


NOTES:-

1. INNER DIA OF SLEEVE PIPE FOR ROAD CROSSING = OUTER DIA OF WATER PIPE (CROSSING) + 100mm.

LEGEND

- GROUND PROFILE
- EXISTING PIPELINE
- PIPE INVERT
- EXISTING ROAD
- Node 1 — NODE NUMBER
- 90° HB — HORIZONTAL BEND
- AIR RELEASE VALVE
- WATER METER
- GATE VALVE
- WASH OUT VALVE
- PRESSURE RELEASE VALVE



CHAINAGE (Km+m)	GROUND LEVELS (Masl)	INVERT LEVELS (Masl)	EXCAVATION DEPTH (m)
26+270	85.05	82.97	2.07
26+280	85.05	82.99	2.06
26+300	85.02	83.01	2.00
26+320	85.20	83.04	2.16
26+340	85.21	83.07	2.14
26+360	85.24	83.10	2.14
26+380	85.29	83.13	2.16
26+400	85.31	83.16	2.14
26+420	85.35	83.20	2.15
26+440	85.87	83.23	2.65
26+460	85.57	83.26	2.31
26+480	85.41	83.28	2.13
26+500	85.57	83.30	2.27
26+520	85.36	83.32	2.03
26+540	85.32	83.35	1.98
26+560	85.62	83.37	2.25
26+580	85.19	83.35	1.85
26+600	85.32	83.33	1.99
26+620	85.23	83.31	1.92
26+640	85.29	83.29	2.00
26+660	85.17	83.27	1.90
26+680	85.20	83.25	1.94
26+700	85.26	83.23	2.02
26+720	85.35	83.21	2.13
26+740	85.57	83.19	2.37
26+760	85.51	83.17	2.34
26+780	85.40	83.15	2.25
26+800	85.44	83.13	2.31
26+820	85.39	83.11	2.29
26+840	85.17	83.09	2.09
26+860	84.75	82.85	1.90
26+880	84.66	82.61	2.05
26+900	84.47	82.37	2.09
26+920	83.91	81.98	1.93
26+940	83.67	81.59	2.08
26+960	83.33	81.20	2.13
26+980	82.92	80.89	2.03
27+000	82.63	80.59	2.05
27+020	82.45	80.28	2.17
27+040	82.43	80.39	2.04
27+060	82.65	80.50	2.15
27+080	82.72	80.61	2.11
27+100	82.93	80.98	1.95
27+120	83.61	81.34	2.26
27+140	83.80	81.71	2.09
27+160	84.10	82.16	1.94
27+180	84.55	82.60	1.95
27+200	85.08	83.05	2.03
27+220	85.70	83.71	1.99
27+240	86.45	84.36	2.09
27+260	87.06	85.02	2.04
27+280	87.60	85.72	1.88
27+300	88.52	86.41	2.11
27+320	89.15	87.11	2.04
27+340	90.06	87.80	2.26
27+360	90.68	88.48	2.19
27+380	91.33	89.17	2.16
27+400	91.76	89.93	1.83
27+420	92.67	90.68	1.99
27+440	93.54	91.44	2.10
27+460	94.47	92.26	2.21
27+480	95.06	93.08	1.98
27+500	95.94	93.90	2.04
27+520	96.78	94.64	2.14
27+540	97.62	95.38	2.24
27+560	98.28	96.11	2.17
27+580	99.15	96.91	2.25
27+600	99.84	97.70	2.15
27+620	100.55	98.49	2.06
27+640	101.29	99.28	2.00
27+660	101.83	99.86	1.98
27+680	102.49	100.43	2.05
27+700	103.07	101.13	1.94
27+720	103.61	101.83	1.78
27+740	104.15	102.30	1.85
27+760	104.87	102.77	2.10
27+780	105.44	103.33	2.11
27+800	105.92	103.90	2.02
27+820	106.56	104.50	2.07
27+840	107.18	105.09	2.09
27+860	107.75	105.71	2.04
27+880	108.81	106.48	2.32
27+900	109.46	107.25	2.21
27+920	110.08	108.02	2.06
27+940	110.61	108.65	1.96
27+960	111.41	109.50	1.91
27+980	112.32	110.36	1.96
28+000	112.96	111.13	1.83
28+020	113.94	111.90	2.04

SIZE/TYPE OF PIPE & HGL: DN 800mm STEEL

PIPE FITTINGS/STRUCTURES: 22.5° HB

SLOPE (%): 0.14% | 0.16% | 0.11% | -0.10% | -0.11% | -1.18% | -1.96% | -1.54% | 0.55% | 1.83% | 2.23% | 3.29% | 3.48% | 3.44% | 3.78% | 4.10% | 3.69% | 3.96% | 2.87% | 3.50% | 2.34% | 2.83% | 2.98% | 3.11% | 3.85% | 3.14% | 4.27% | 3.86% | 4.09%

LONGITUDINAL SECTION

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:

COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

CONSULTING ENGINEERS

SARI CONSULTING LTD

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gath CONSULTING ENGINEERS

SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:		
REV.	DATE	REMARKS

Notes:

SURVEYED BY:	SN/JM
DESIGNED BY:	PKG/BK
DRAWN BY:	JM
CHECKED BY:	LB/PKG
APPROVED BY:	KNM

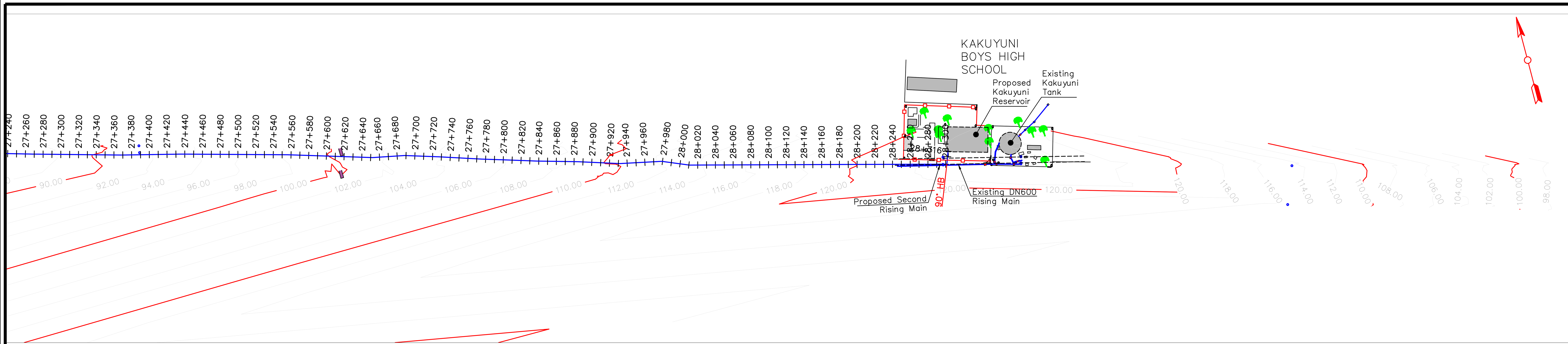
SCALE: HOR 1:2500 AND VERT 1:250

Project: SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title: BARICHO-KAKUYUNI PIPELINE - SHEET 16 (26+270 to 28+020)

Date: APRIL 2021

Drg. No. B-KA- PL1-16

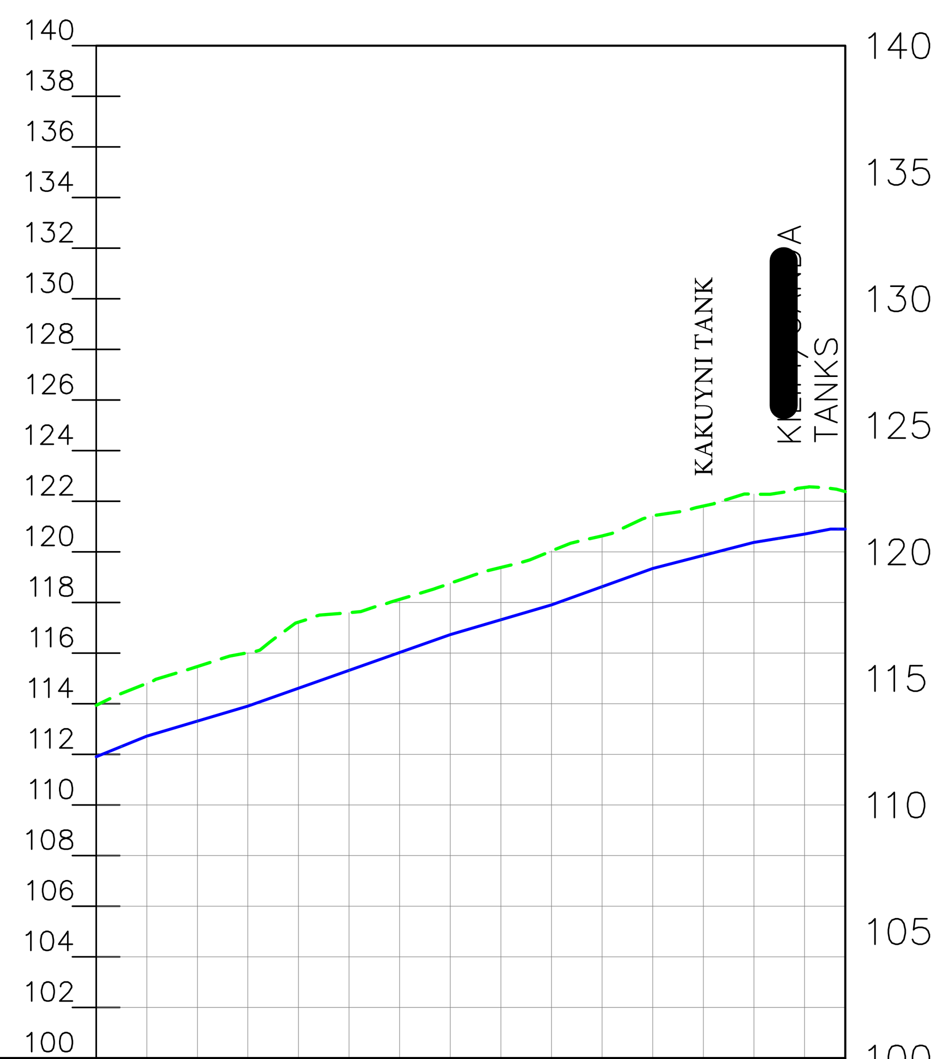


NOTES:-

1. INNER DIA OF SLEEVE PIPE FOR ROAD CROSSING = OUTER DIA OF WATER PIPE (CROSSING) + 100mm.

LEGEND

- GROUND PROFILE
- EXISTING PIPELINE
- PIPE INVERT
- EXISTING ROAD
- Node 1 — NODE NUMBER
- 90° HB — HORIZONTAL BEND
- AIR RELEASE VALVE
- WATER METER
- GATE VALVE
- WASH OUT VALVE
- PRESSURE RELEASE VALVE



CHAINAGE (Km+m)	28+020	28+040	28+060	28+080	28+100	28+120	28+140	28+160	28+180	28+200	28+220	28+240	28+260	28+280	28+300	28+316
GROUND LEVELS (Masl)	113.94	114.81	115.47	116.01	117.22	117.60	118.12	118.76	119.38	120.04	120.63	121.41	121.81	122.28	122.55	122.38
INVERT LEVELS (Masl)	111.90	112.72	113.31	113.90	114.61	115.31	116.02	116.73	117.31	117.90	118.62	119.34	119.86	120.38	120.70	120.90
EXCAVATION DEPTH (m)	2.04	2.09	2.16	2.11	2.62	2.29	2.10	2.03	2.07	2.14	2.01	2.08	1.96	1.91	1.85	1.48
SIZE/TYPE OF PIPE & HGL	DN 800mm STEEL															
PIPE FITTINGS/STRUCTURES															90°	HB
SLOPE (%)	3.86% 4.09%	2.96%		3.53%				2.93%		3.60%		2.60%		1.63%	1.92%	0.00%

LONGITUDINAL SECTION

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:

COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

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SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:

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Notes:

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DRAWN BY:	JM
CHECKED BY:	LB/PKG
APPROVED BY:	KNM

SCALE:
HOR 1:2500 AND VERT 1:250

Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title:
BARICHO-KAKUYUNI PIPELINE - SHEET 17 (28+020 to 28+400)

Date: APRIL 2021

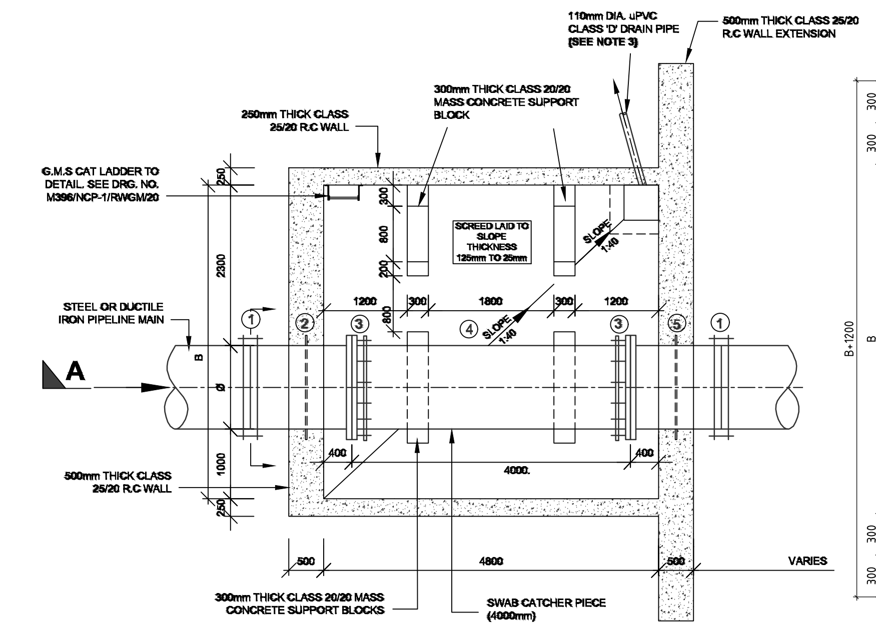
Drg. No. B-KA- PL1-17

NOTES

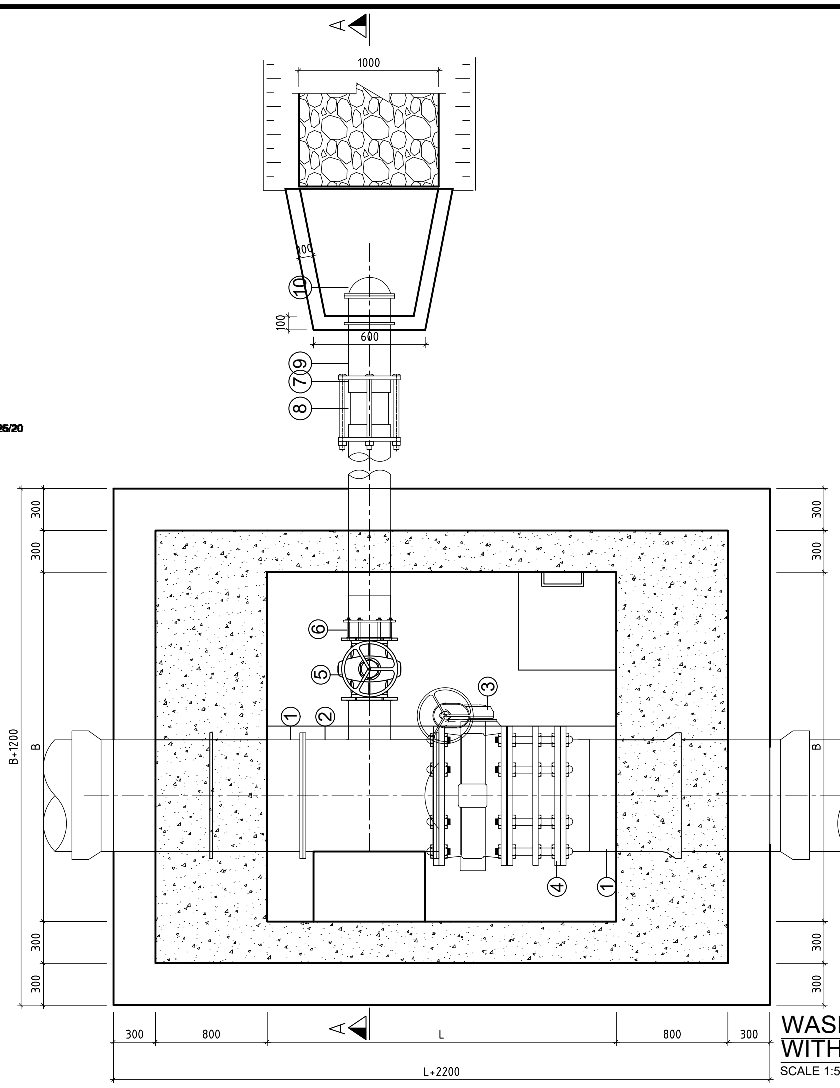
1. ALL DIMENSIONS IN mm UNLESS OTHERWISE STATED
2. ALL VALVES AND FITTINGS SHALL BE AS PER SPECIFICATIONS
3. 110mm DIA. uPVC CHAMBER DRAIN PIPES SHALL DRAIN INTO A 1m³ SOAKAWAY PIT FILLED WITH LOOSE AGGREGATE OR AS DIRECTED BY THE ENGINEER ON SITE.
4. ALL REINFORCED CONCRETE TO BE CLASS 25/20 UNLESS OTHERWISE STATED
5. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRG. No. M396/NCP-1/RWGM/20 AND M396/NCP-1/RWGM/21 FOR ACCESS LADDER AND COVER DETAILS RESPECTIVELY
6. FOR ROOF DETAILS, SWAB FITTINGS AND PIPE FITTINGS SCHEDULE, SEE DRG. No. M396/NCP-1/RWGM/19
7. ALL EXPOSED CONCRETE EDGES TO HAVE 25x25mm CHAMFER
8. ALL DISTURBED AREAS AROUND PIPELINE AND CHAMBERS TO BE BACKFILLED AND COMPACTED TO ENGINEER'S APPROVAL WITH 150mm LAYER OF TOP SOIL AND GRASSING
9. ALL PIPEWORK AND FITTINGS TO BE TO PN16 PRESSURE RATING
10. PIPEWORK MATERIAL TO BE EITHER STEEL OR DUCTILE IRON TO SPECIFICATIONS

ABBREVIATIONS

mm	-	MILLIMETRES
FGL	-	FINISHED GROUND LEVEL
PIL	-	PIPE INVERT LEVEL
DIA	-	DIAMETER
Ø	-	DIAMETER
R.C.	-	REINFORCED CONCRETE
M.S.	-	MILD STEEL
c/c	-	CENTER TO CENTRE
No.	-	NUMBER
L	-	LENGTH

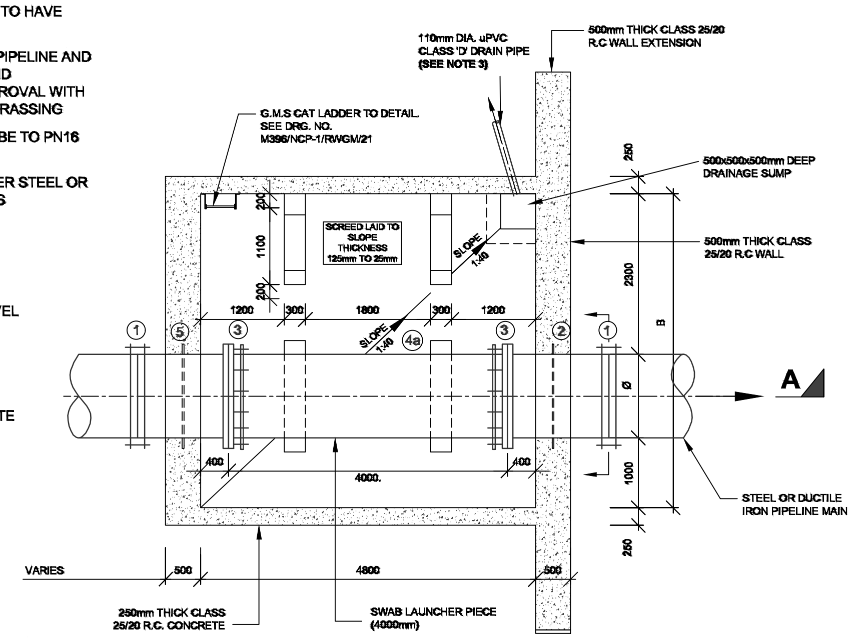


SWAB CATCHER CHAMBER

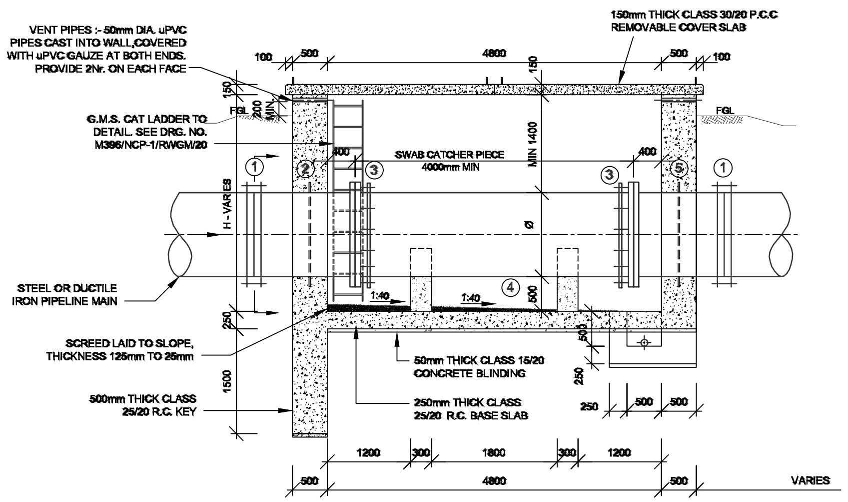


WASHOUT SECTIONAL PLAN WITH SECTION VALVE

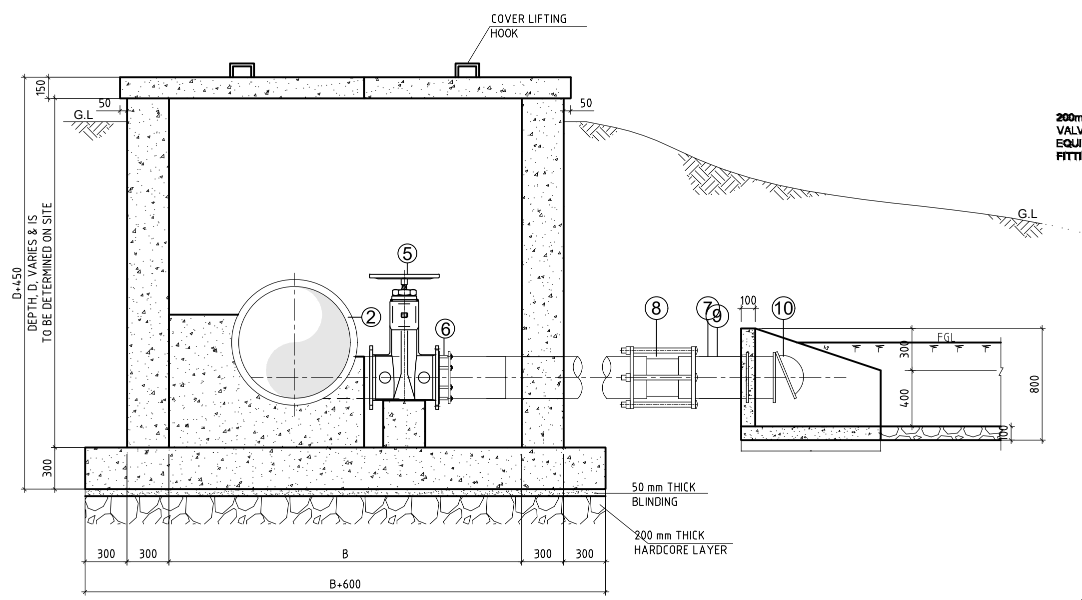
SCALE 1:50



SWAB LAUNCHER CHAMBER

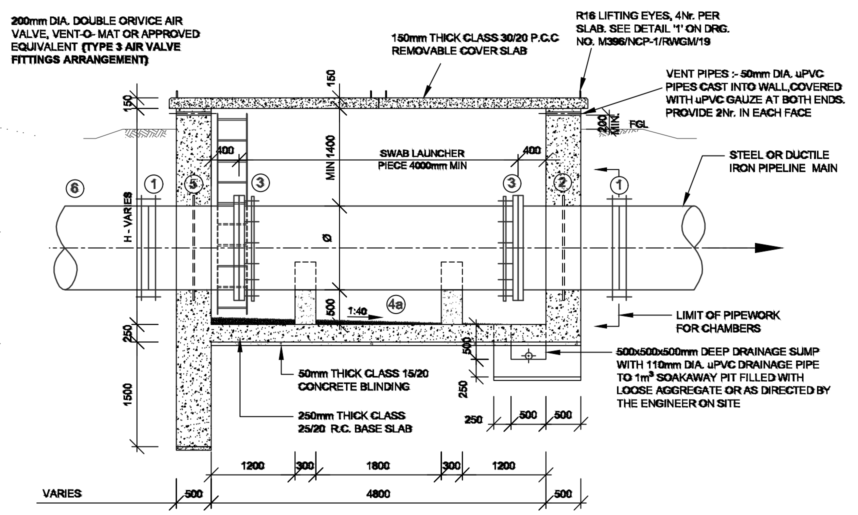


SWAB CATCHER CHAMBER



SECTION A-A

SCALE 1:50



SWAB LAUNCHER CHAMBER

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:
COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
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Revisions:

REV.	DATE	REMARKS

Notes:

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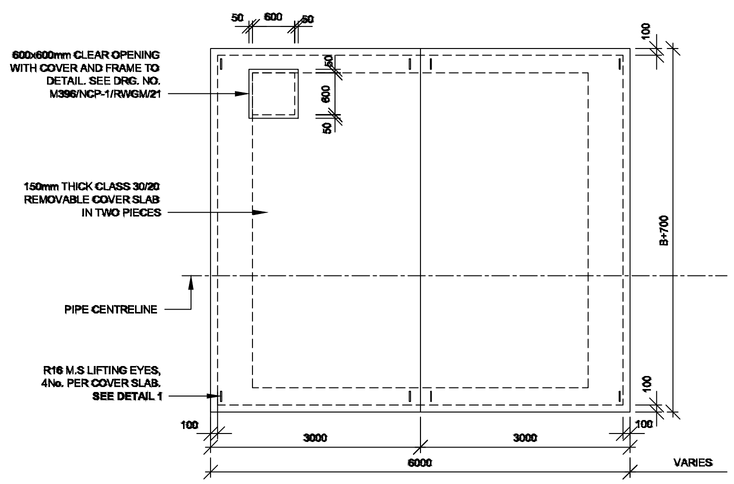
DESIGNED	BY:	PKG/BK
DRAWN	BY:	JGG
CHECKED	BY:	LB/PKG
APPROVED	BY:	KNM

AS SHOWN (AT A1)

Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title:
STANDARD DRAWING
PROPOSED SWAB LAUNCH AND CATCHER
PLAN AND SECTIONS

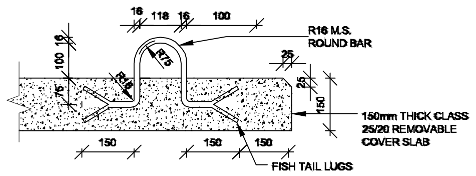
Date: JUNE 2021
Drg. No. B-KA/STANDARD/SWAB/01



TYPICAL SWAB CHAMBER

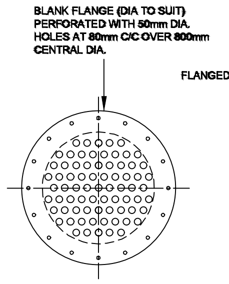
ROOF DETAIL

SCALE 1:100



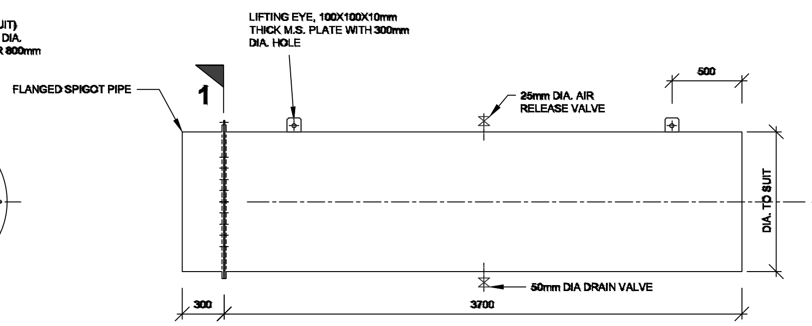
DETAIL '1'
LIFTING EYE DETAIL

SCALE 1:20



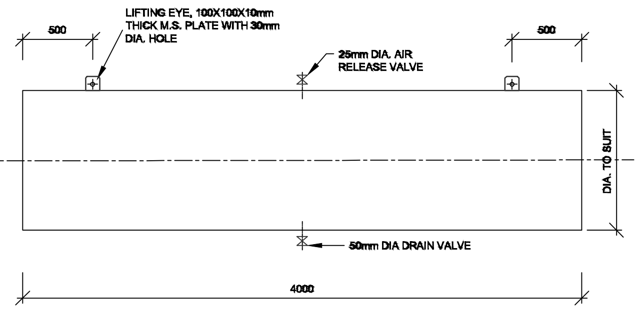
SECTION 1-1

SCALE 1:50



SWAB LAUNCHER/ CATCHER PIPE

SCALE 1:50



SWABBING DUMMY PIPE

SCALE 1:50

SCHEDULE OF CHAMBER DIMENSIONS

TRUNK MAIN DIA. (Ø) mm	LINE VALVE CHAMBER DIMENSIONS			SWABBING CHAMBER DIMENSIONS (LAUNCHER AND CATCHER)		
	LENGTH (A) mm	WIDTH (B) mm	Min. DEPTH (H) mm	LENGTH (A) mm	WIDTH (B) mm	Min. DEPTH (H) mm
1400	5800	4500	3100	4800	4500	3100
1200	5500	4500	3100	4800	4500	3100
1000	5200	4300	2900	4800	4300	2900

SCHEDULE OF CHAMBER ARRANGEMENT

CHAINAGE	PIPE DIA. Ø (mm)	SCHEDULE OF FITTINGS/ CHAMBERS
0+005	1400	LINE VALVE
0+195	1200	LINE VALVE & SWAB LAUNCHER
5+475	1200	SWAB CATCHER & LINE VALVE

FITTINGS SCHEDULE

S/Nr.	DESCRIPTION	DIMENSIONS (mm) Ø=1400	Ø=1200	Ø=1000	Nr.
1	COUPLING	-	-	-	4
2	FLANGED SPIGOT PIPE WITH PUDDLE FLANGE AT 800mm FROM ONE END	L=1450	L=1450	L=1450	1
3	FLANGE ADAPTOR	Ø1400	Ø1200	Ø1000	5
4/ 4a	PLAIN ENDED PIPE	L=4000	L=4000	L=4000	3
5	FLANGED SPIGOT PIPE WITH PUDDLE FLANGE AT 650mm FROM FLANGED END	L=1300	L=1300	L=1300	3
6	PLAIN ENDED PIPE (CUT TO SUIT ON SITE)	L=6000	L=6000	L=6000	1
7	ALL FLANGED TEE (Øx200mm)	Ø200, 800, 850	Ø200, 800, 750	Ø200, 800, 650	4
8	BLANK FLANGE (200Ø)	-	-	-	1
9	ALL FLANGED GATE VALVE	Ø200 L=230	Ø200 L=230	Ø200 L=230	3
10	FLANGED DOUBLE ORIFICE AIR VALVE. VENT-O-MAT OR APPROVED EQUIVALENT	Ø200 L=610	Ø200 L=610	Ø200 L=610	1
11	ALL FLANGED BUTTERFLY VALVE	Ø1400 L=710	Ø1200 L=630	Ø1000 L=550	1
12	FLANGED SPIGOT PIPE (CUT TO SUIT ON SITE)	L=800	L=800	L=550	1
13	ALL FLANGED PIPE (Ø200)	L=315	L=415	L=515	1
14	200x200mm ALL FLANGED TEE	Ø200, 230, 460	Ø200, 230, 460	Ø200, 230, 460	1
15	ALL FLANGED PIPE (Ø200)	L=200	L=200	L=300	1
16	ALL FLANGED 90° BEND (Ø200)	443, 443	443, 443	443, 443	1
17	FLANGED SPIGOT PIPE (CUT TO SUIT ON SITE) (Ø200)	L=1400	L=1300	L=1300	1
18	FLANGE ADAPTOR (Ø200)	Ø200	Ø200	Ø200	2
19	FLANGED SPIGOT PIPE (Ø200)	L=800	L=800	L=800	1
20	FLANGED SPIGOT PIPE (Ø200) WITH PUDDLE FLANGE AT 370mm FROM FLANGED END	L=1200	L=1200	L=1200	1
21	COUPLING	Ø200	Ø200	Ø200	1

Project: **Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks**

Client:
COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
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SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:

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Notes:

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DRAWN	BY:	JGG
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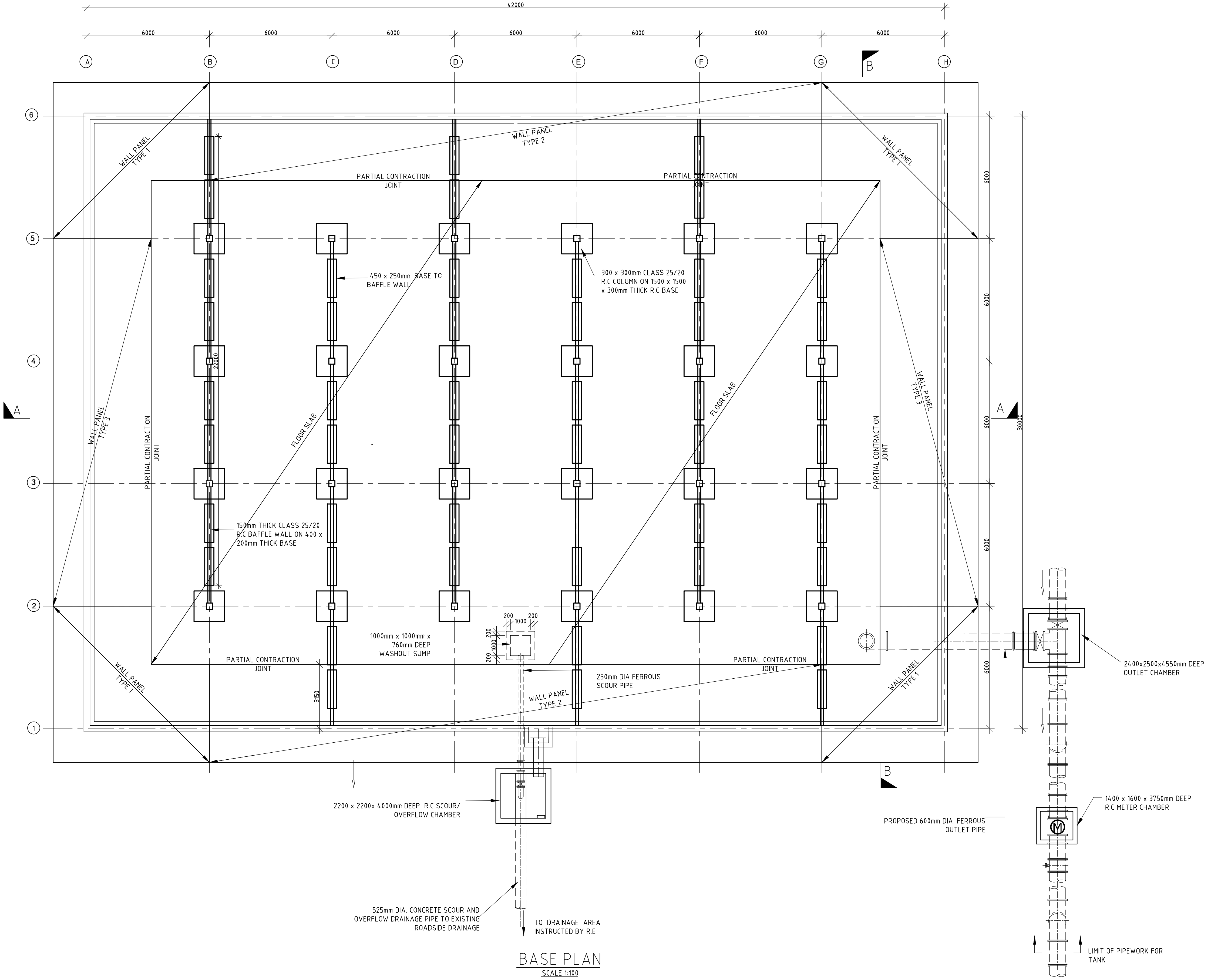
AS SHOWN (AT A1)

Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title:
STANDARD DRAWING
PROPOSED SWAB LAUNCH AND CATCHER DETAILS

Date: JUNE 2021 | Drg. No. B-KA/STANDARD/SWAB/02



BASE PLAN

SCALE 1:100

1. DIMENSIONS IN mm UNLESS OTHERWISE STATED
2. VALVES AND FITTINGS SHALL BE AS PER SPECIFICATIONS
3. FOR CHAMBER COVER DETAILS, SEE STANDARD DRAWINGS
4. ALL REINFORCED CONCRETE TO BE IN CLASS 25/20 UNLESS OTHERWISE STATED
5. ALL EXPOSED CONCRETE EDGES TO HAVE A 25x25mm CHAMFER
6. ALL DISTURBED AREAS AROUND TANK, PIPELINE AND CHAMBERS TO BE BACKFILLED AND COMPACTED TO ENGINEER'S APPROVAL, WITH 150mm LAYER OF TOP SOIL AND GRASSING
7. ALL TRENCHES BELOW LOOSE SLAB TO BE FILLED WITH CLASS 20/20 MASS CONCRETE TO FORMATION LEVEL OF BASE SLAB
9. ALL JOINTS BETWEEN BASE AND WALL TO HAVE A BENCHING NOT EXCEEDING 200mm TO SMOOTHEN SHARP EDGES
10. ABBREVIATIONS:

G.M.S	- GALVANIZED MILD STEEL
R.C	- REINFORCED CONCRETE
P.C.C	- PRECAST CONCRETE
DIA.	- DIAMETER

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:

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APPROVED	BY:	KNM

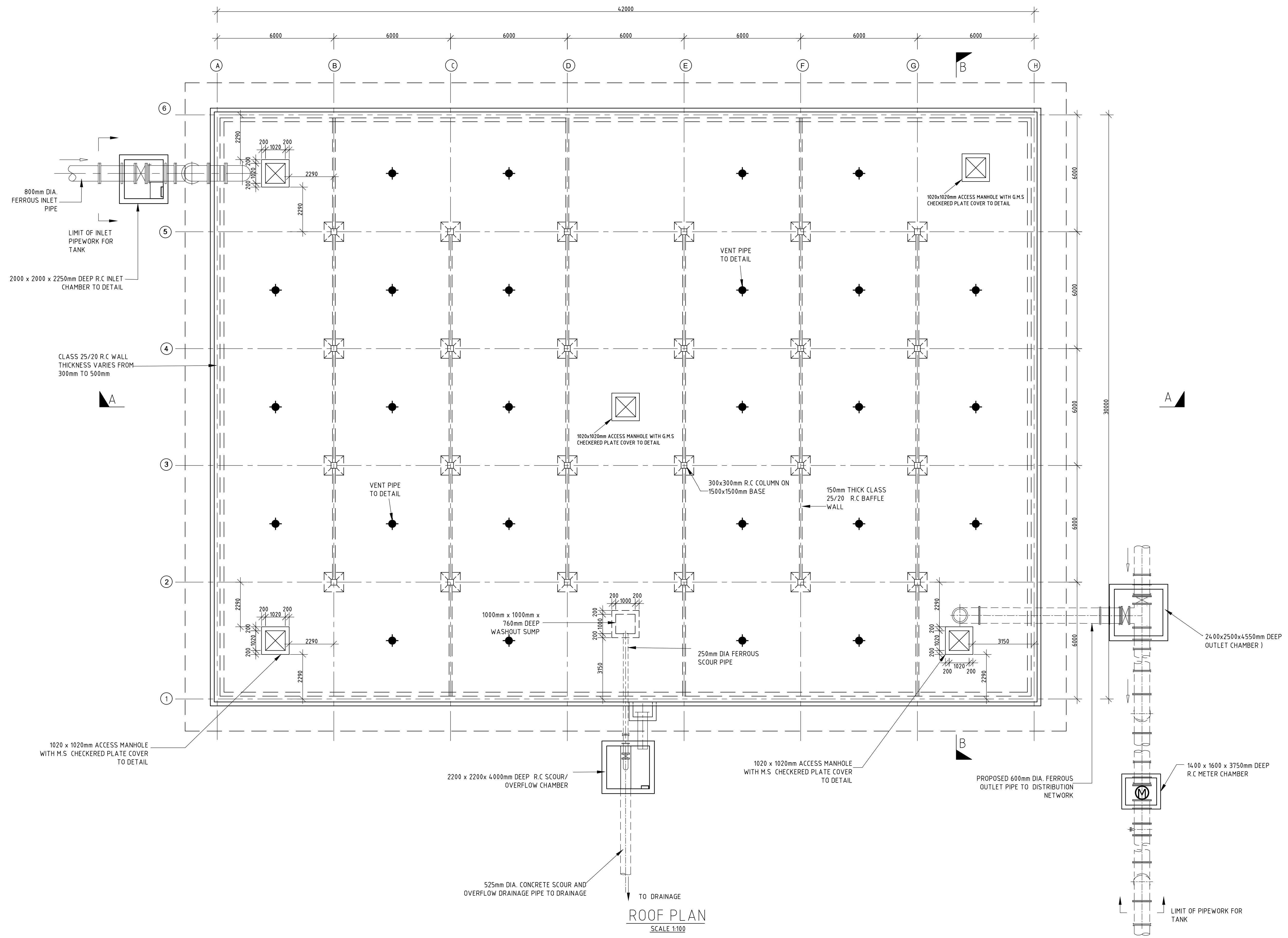
AS SHOWN (AT A1)

Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title:
PROPOSED NEW KAKUYUNI STORAGE RESERVOIR (5,000m³)
BASE PLAN

Date: APRIL 2021

Drg. No. B-KA/TANK/01



ROOF PLAN
SCALE 1:100

NOTES:

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2. VALVES AND FITTINGS SHALL BE AS PER SPECIFICATIONS
3. FOR CHAMBER COVER DETAILS, SEE STANDARD DRAWINGS
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5. ALL EXPOSED CONCRETE EDGES TO HAVE A 25x25mm CHAMFER
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Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:
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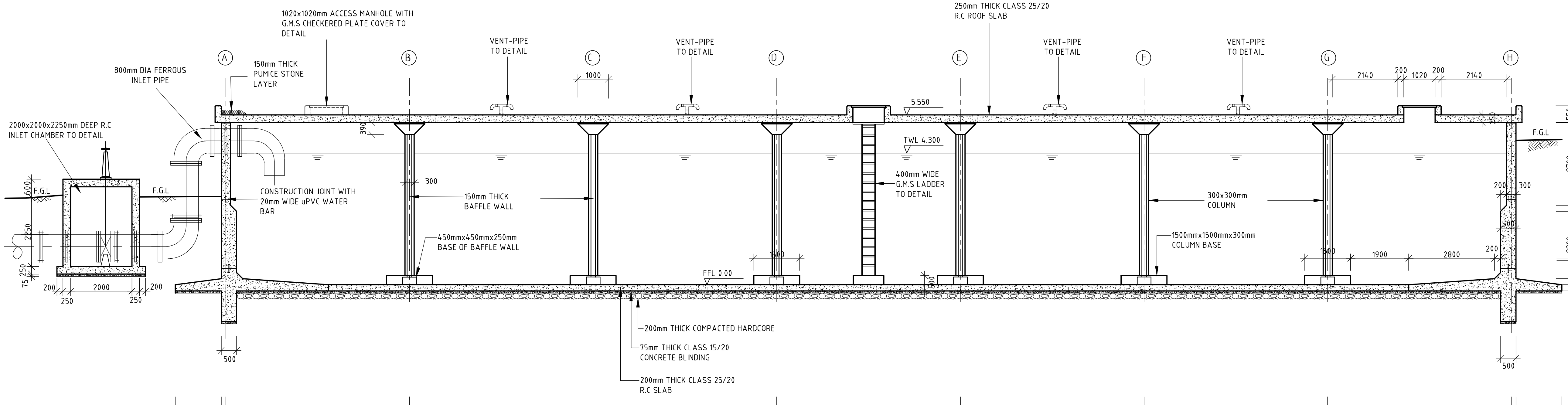
AS SHOWN (AT A1)

Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

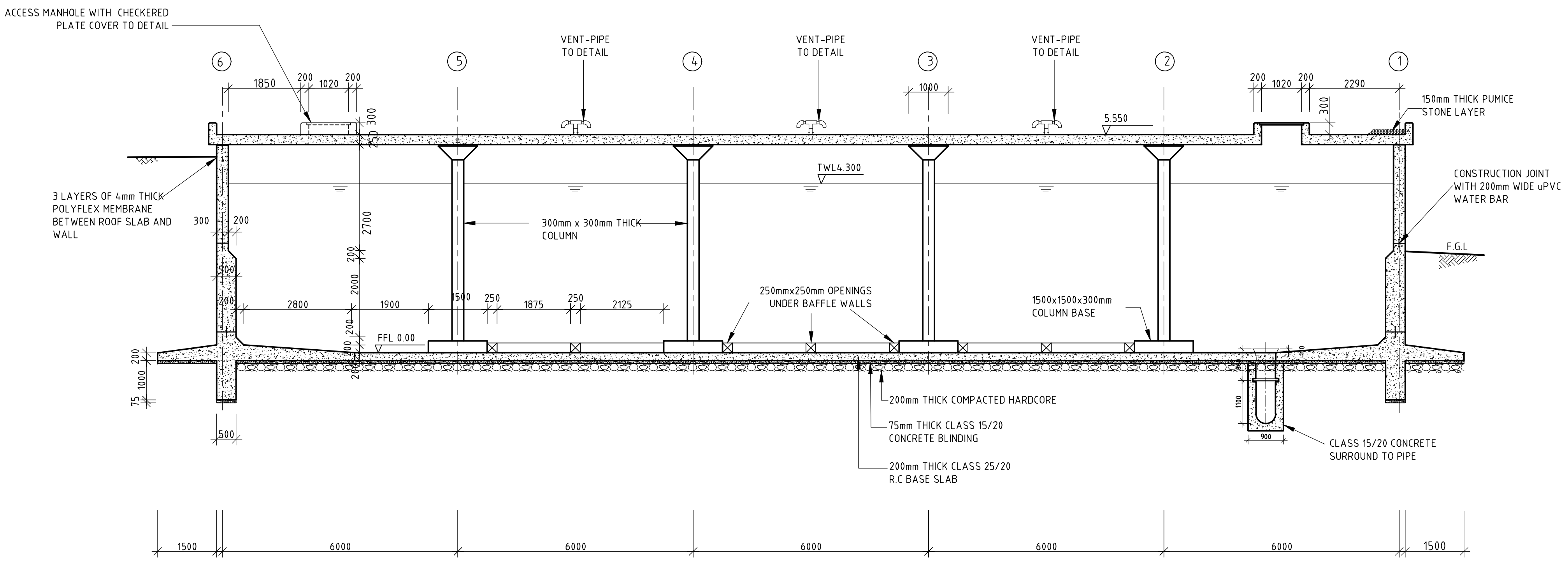
Drawing Title:
PROPOSED NEW KAKUYUNI STORAGE RESERVOIR (5,000m³)
ROOF PLAN

Date: APRIL 2021
Drg. No. B-KA/TANK/02



SECTION A-A

SCALE 1:75



SECTION B-B

SCALE 1:75

NOTES:

1. DIMENSIONS IN mm UNLESS OTHERWISE STATED
2. VALVES AND FITTINGS SHALL BE AS PER SPECIFICATIONS
3. FOR CHAMBER COVER DETAILS, SEE STANDARD DRAWINGS
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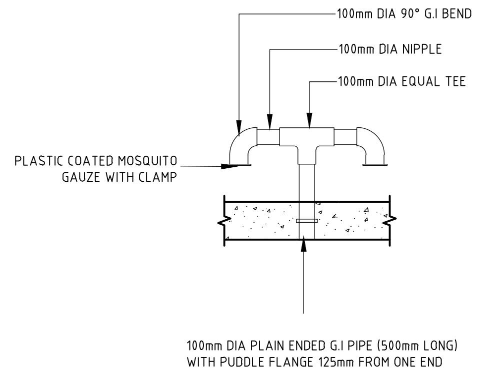

VENT PIPE DETAIL

SCALE 1:25

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:

COAST WATER WORKS DEVELOPMENT AGENCY
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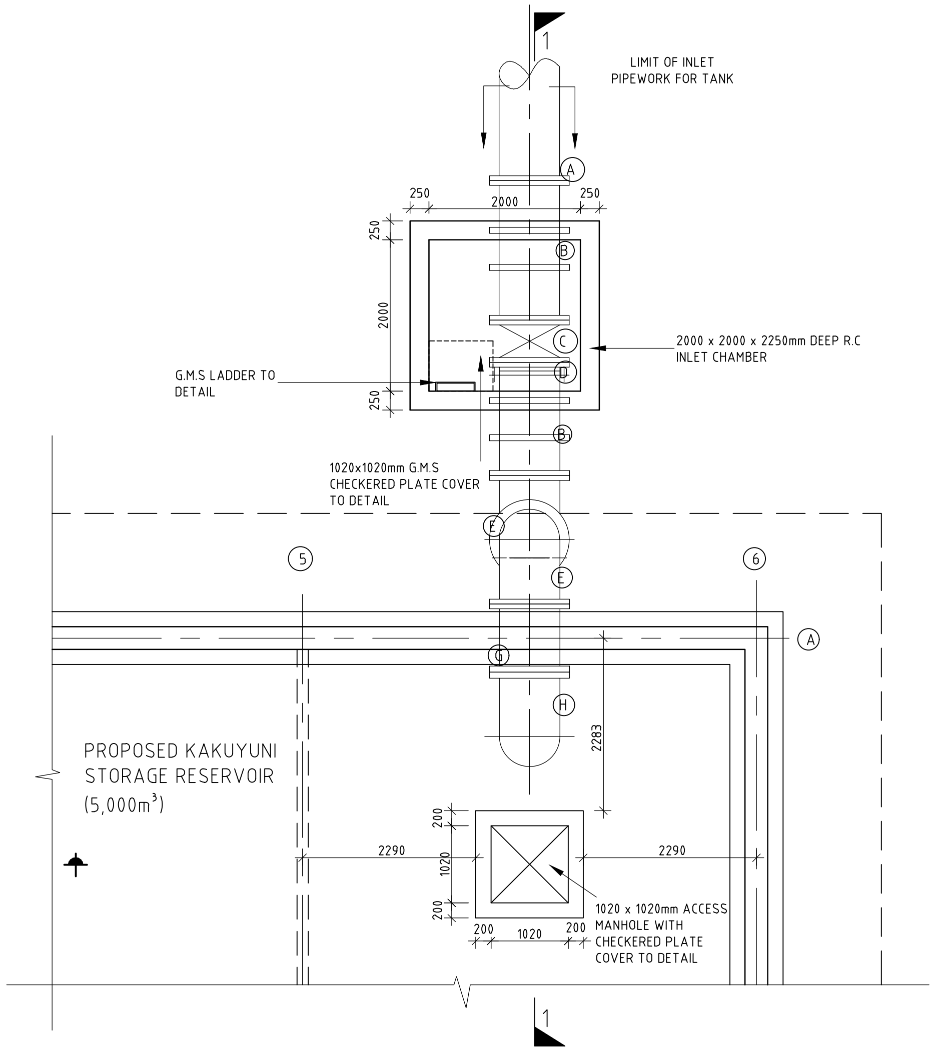
AS SHOWN (AT A1)

Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

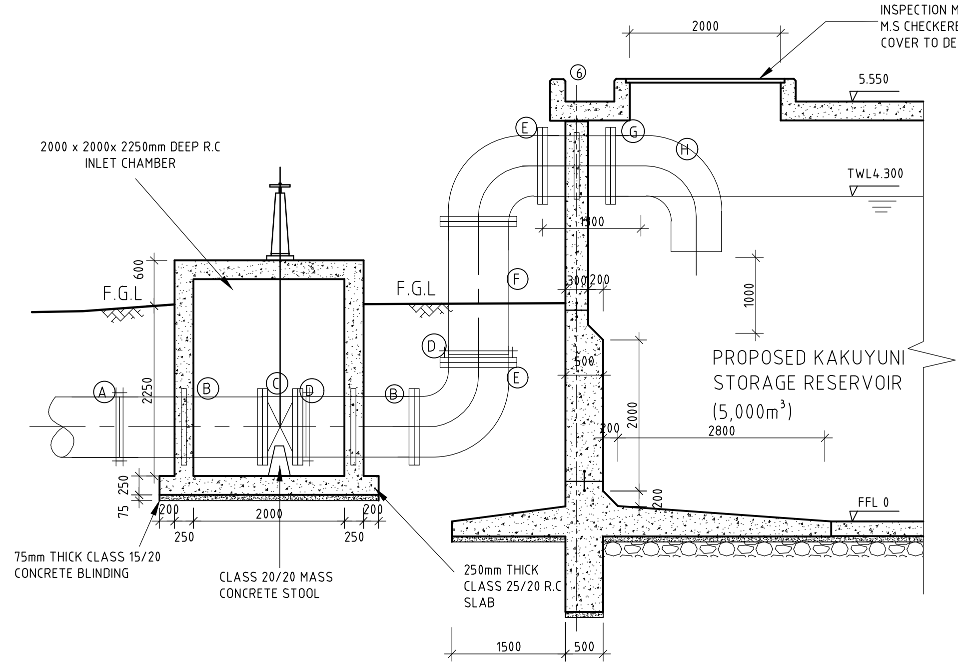
Drawing Title:
PROPOSED NEW KAKUYUNI STORAGE RESERVOIR (5,000m³)
SECTIONS

Date: APRIL 2021 | Drg. No. B-KA/TANK/03



INLET PIPEWORK DETAIL PLAN

SCALE 1:50



SECTION 1-1

SCALE 1:50

NOTES:

1. ALL PIPE, FITTINGS AND VALVE DIAMETERS ARE NOMINAL DIAMETERS
2. ALL DIMENSIONS ARE IN mm .
3. ONLY FIGURED DIMENSIONS TO BE TAKEN FROM THIS DRAWING
4. PIPE AND FITTINGS DIMENSIONS ARE BASED ON STEEL PIPES AND FITTINGS AS MADE BY ASP(K) LTD.
5. VALVES DIMENSIONS ARE BASED ON EURO 20 SERIES, TYPE 23 (SHORT FACE TO FACE TYPE VALVES) AS MADE BY PONT-A-MOUSSON (SAINT GOBAIN PAM).
6. ABBREVIATIONS:
   - TWL - TOP WATER LEVEL
   - FFL - FINISHED FLOOR LEVEL
   - DIA. - DIAMETER
   - R.C - REINFORCED CONCRETE
7. THIS DRAWING TO BE USED FOR PIPES AND FITTINGS DETAILS ONLY.

INLET PIPEWORK SCHEDULE (APPROVED LINED FERROUS PIPES AND FITTINGS)

ITEM No.	DESCRIPTION	DIA. (mm)	LENGTH (mm)	QUANTITY (No.)
A	COUPLING	800	-	1
B	FLANGED SPIGOT PIPE WITH PUDDLE FLANGE AT 625mm FROM PLAIN END	800	1200	2
C	ALL FLANGED GATE VALVE WITH AN EXTENDED SPINDLE 1800mm LONG, HEAD STOCK AND HAND WHEEL	800	350	1
D	FLANGE ADAPTOR	800	-	2
E	ALL FLANGED SHORT RADIUS 90° BEND	807, 800ø, 500ø, 807		2
F	FLANGED SPIGOT PIPE (CUT TO SUIT ON SITE)	800	3000	1
G	ALL FLANGED PIPE WITH A PUDDLE FLANGE 450mm FROM ONE END	800	900	1
H	SINGLE FLANGED SHORT RADIUS 90° BEND	807, 800ø, 807		1

Project: **Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks**

Client:

COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

CONSULTING ENGINEERS

SARI CONSULTING LTD

SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:		
REV.	DATE	REMARKS

Notes:

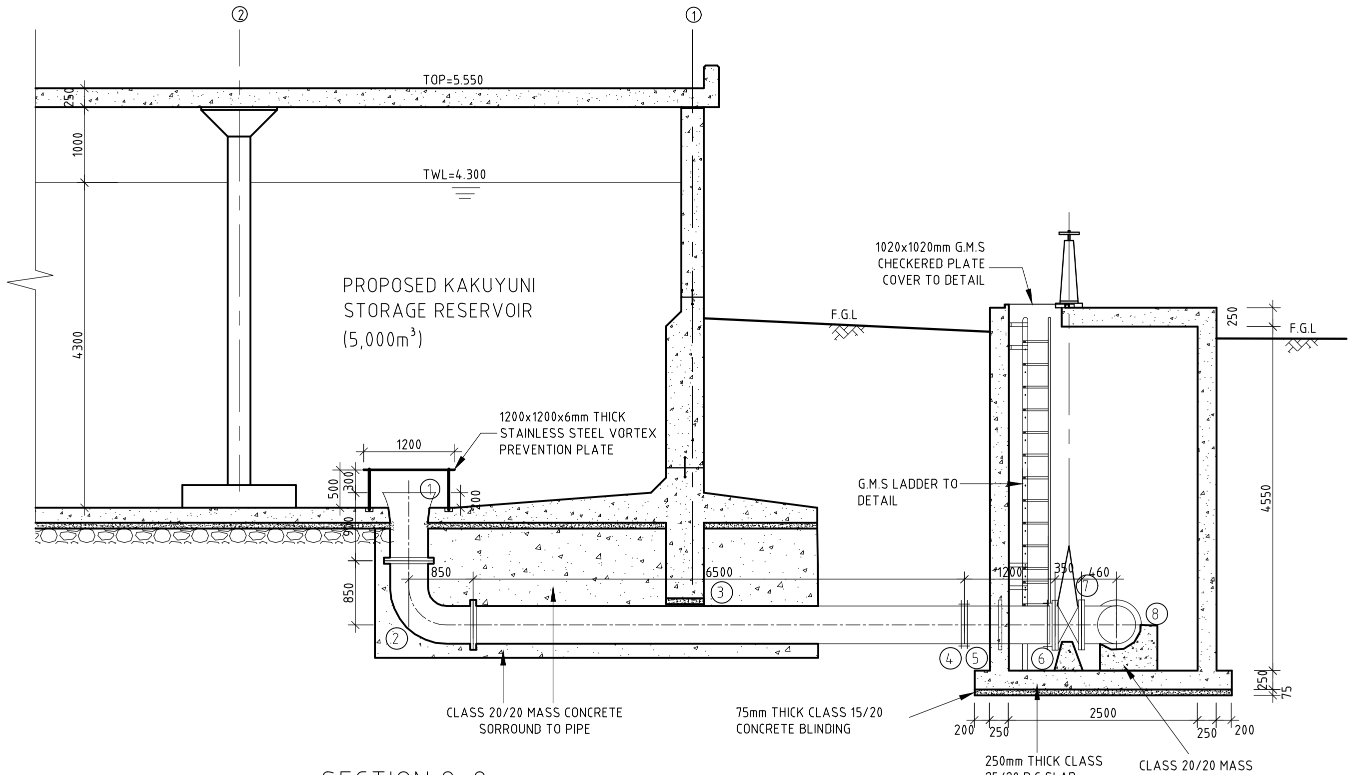
SURVEYED	BY:	SN/JM
DESIGNED	BY:	PKG/BK
DRAWN	BY:	JGG
CHECKED	BY:	LB/PKG
APPROVED	BY:	KNM

AS SHOWN (AT A1)

Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

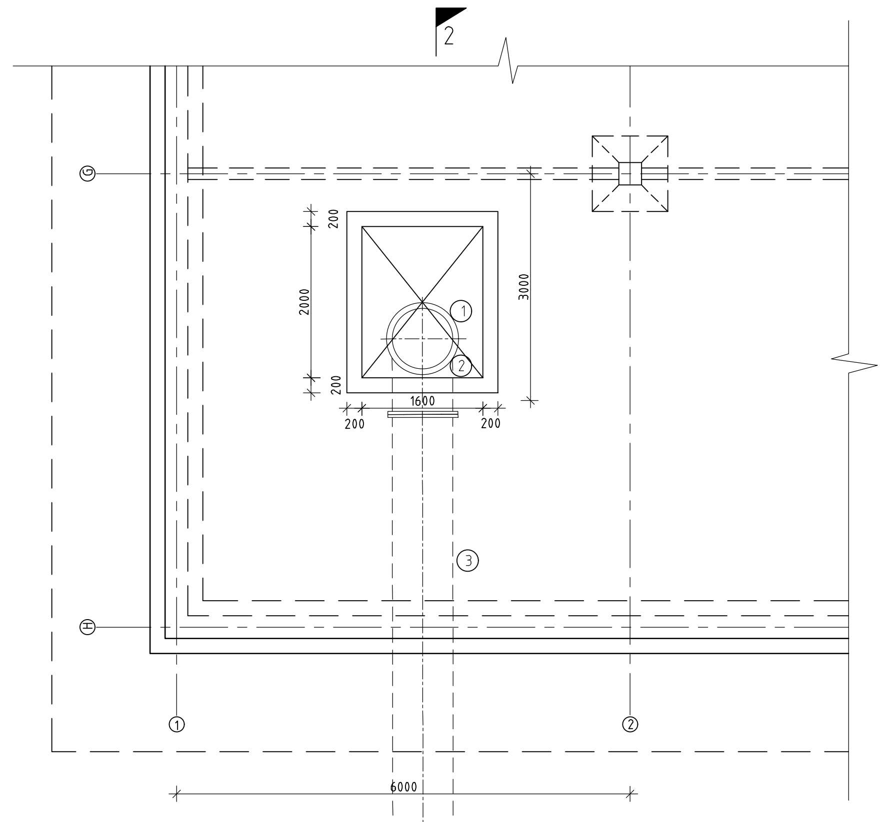
Drawing Title:
PROPOSED NEW KAKUYUNI STORAGE RESERVOIR (5,000m³)
INLET PIPEWORK DETAILS

Date: APRIL 2021 | Drg. No. B-KA/TANK/04



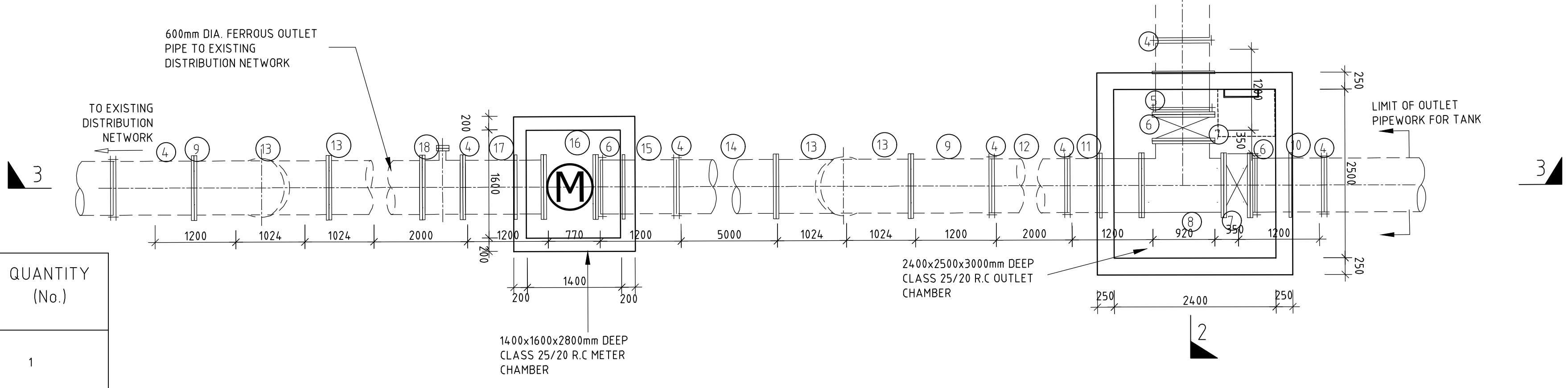
SECTION 2-2

SCALE 1:50



NOTES:

1. ALL PIPE, FITTINGS AND VALVE DIAMETERS ARE NOMINAL DIAMETERS
2. ALL DIMENSIONS ARE IN mm .
3. ONLY FIGURED DIMENSIONS TO BE TAKEN FROM THIS DRAWING
4. PIPE AND FITTINGS DIMENSIONS ARE BASED ON STEEL PIPES AND FITTINGS AS MADE BY ASP(K) LTD.
5. VALVES DIMENSIONS ARE BASED ON EURO 20 SERIES, TYPE 23 (SHORT FACE TO FACE TYPE VALVES) AS MADE BY PONT-A-MOUSSON (SAINT GOBAIN PAM).
6. ABBREVIATIONS:
   - TWL -TOP WATER LEVEL
   - FFL - FINISHED FLOOR LEVEL
   - Ø - DIAMETER
   - R.C - REINFORCED CONCRETE
7. THIS DRAWING TO BE USED FOR PIPES AND FITTINGS DETAILS ONLY.



OUTLET PIPEWORK DETAIL

PLAN

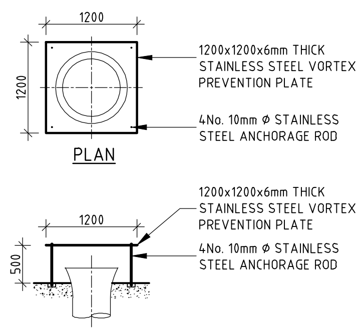
SCALE 1:50

OUTLET PIPEWORK SCHEDULE

(APPROVED LINED FERROUS PIPES AND FITTINGS)

ITEM No.	DESCRIPTION	DIA. (mm)	LENGTH (mm)	QUANTITY (No.)
1	SPECIAL FLANGED BELLMOUTH WITH PUDDLE FLANGE 600mm FROM FLANGED END	600	800	1
2	ALL FLANGED 90° BEND	1209; 600Ø; 600Ø; 1209		1
3	FLANGED SPIGOT PIPE	600	6500	1
4	COUPLING	600	-	7
5	PLAIN ENDED PIPE WITH A PUDDLE FLANGE AT 725mm FROM ONE END	600	1200	1
6	FLANGE ADAPTOR	600	-	3
7	ALL FLANGED GATE VALVE WITH EXTENDED SPINDLE 2200mm LONG, HEADSTOCK AND HANDWHEEL	600	350	2
8	ALL FLANGED TEE	1360; 600Ø; 600Ø; 600Ø; 680		1

NOTE: SCHEDULE CONTINUED ON DRG No. MWSP/KSR/06



VORTEX PREVENTION PLATE DETAIL

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client: COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

CONSULTING ENGINEERS
SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:		
REV.	DATE	REMARKS

Notes:

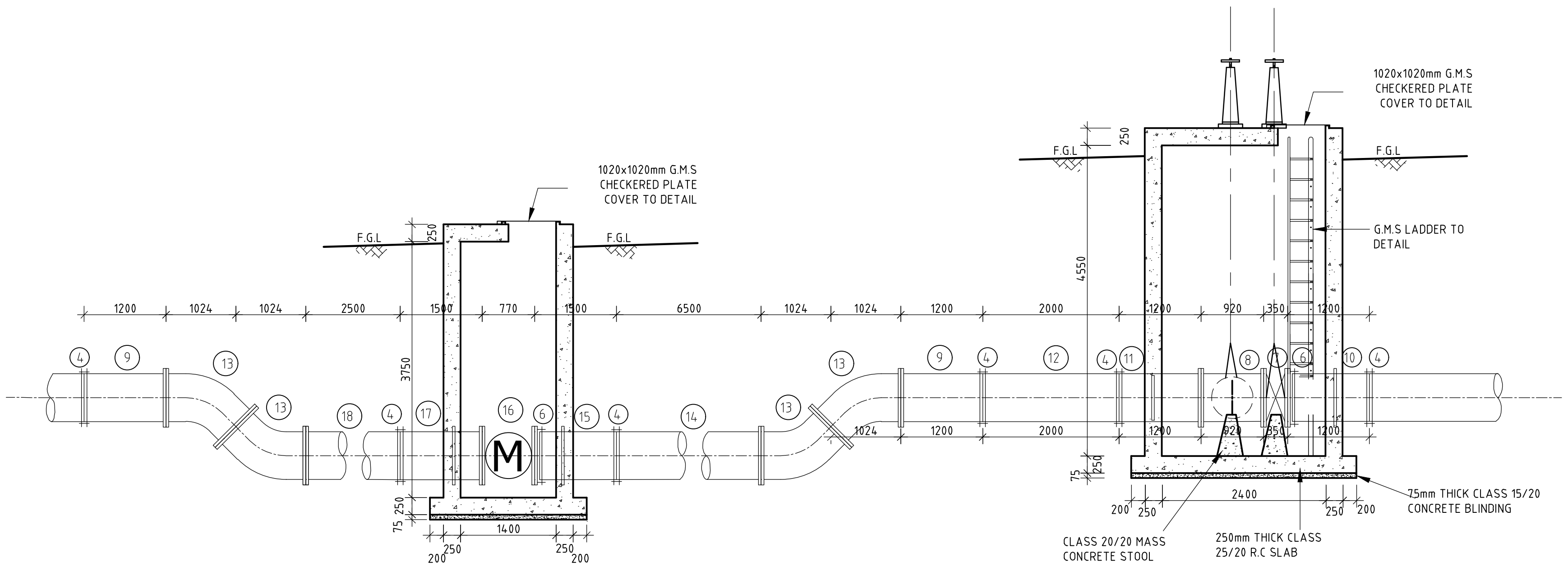
SURVEYED	BY:	SN/JM
DESIGNED	BY:	PKG/BK
DRAWN	BY:	JGG
CHECKED	BY:	LB/PKG
APPROVED	BY:	KNM

AS SHOWN (AT A1)

Project: SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title: PROPOSED NEW KAKUYUNI STORAGE RESERVOIR (5,000m³) OUTLET PIPEWORK DETAILS - SHEET 1 OF 2

Date: APRIL 2021 | Drg. No. B-KA/TANK/05



SECTION 3-3

SCALE 1:50

NOTES:

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6. ABBREVIATIONS:

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   FFL - FINISHED FLOOR LEVEL
   φ - DIAMETER
   R.C - REINFORCED CONCRETE
7. THIS DRAWING TO BE USED FOR PIPES AND FITTINGS DETAILS ONLY.
8. FOR DETAILS OF G.M.S CHECKERED PLATE COVER, SEE DRG No. M401/SD/20-21

OUTLET PIPEWORK SCHEDULE - CONTINUED FROM DRG No. MWSP/KSR/05
(APPROVED LINED FERROUS PIPES AND FITTINGS)

ITEM No.	DESCRIPTION	DIA. (mm)	LENGTH (mm)	QUANTITY (No.)
9	FLANGED SPIGOT PIPE	600	1200	2
10	PLAIN ENDED PIPE WITH PUDDLE FLANGE AT 500mm FROM ONE END	600	1200	1
11	FLANGED SPIGOT PIPE WITH PUDDLE FLANGE 500mm FROM THE PLAIN END	600	1200	1
12	PLAIN ENDED PIPE	600	2000	1
13	ALL FLANGED 45° BEND	708 708 600φ 600φ		4
14	FLANGED SPIGOT PIPE	600	5000	1
15	PLAIN ENDED PIPE WITH PUDDLE FLANGE AT 450mm FROM ONE END	600	1200	1
16	ALL FLANGED ELECTROMAGNETIC METER	600	768	1
17	FLANGED SPIGOT PIPE WITH PUDDLE FLANGE 450mm FROM THE FLANGED END	600	1200	1
18	FLANGED SPIGOT PIPE	600	2000	1

Project: **Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks**

Client:

COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

CONSULTING ENGINEERS

SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:

REV.	DATE	REMARKS

Notes:

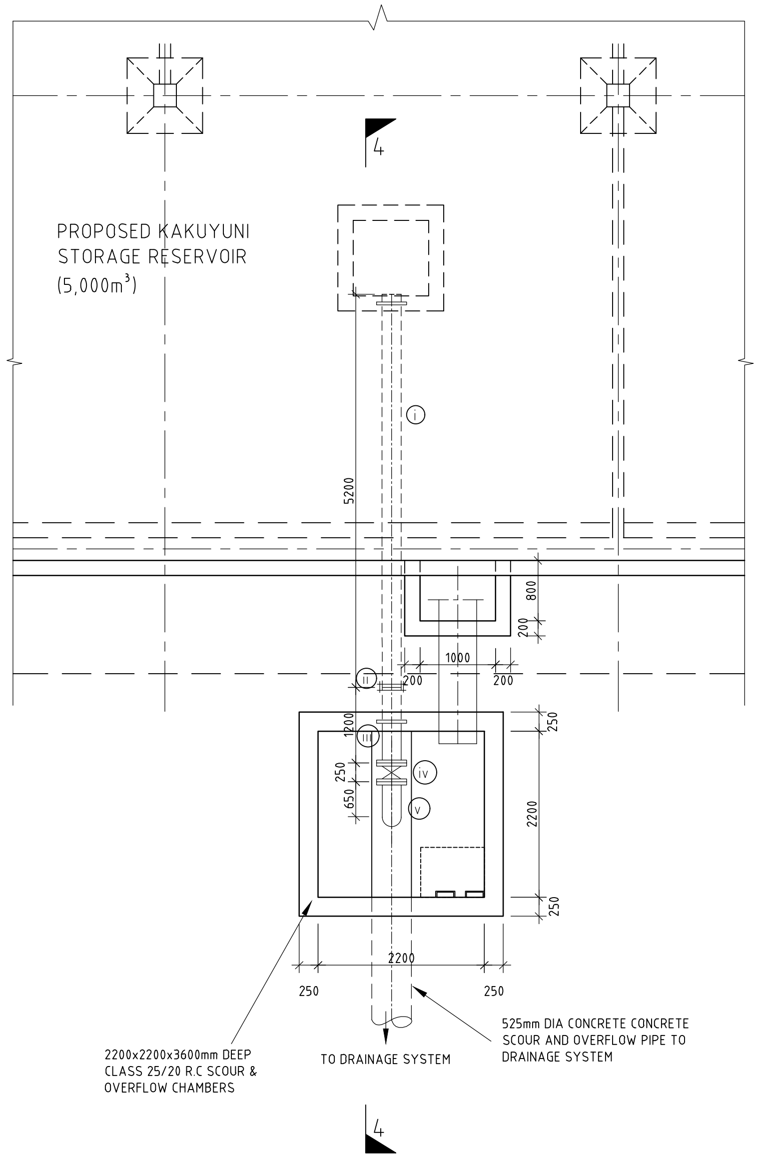
SURVEYED	BY:	SN/JM
DESIGNED	BY:	PKG/BK
DRAWN	BY:	JGG
CHECKED	BY:	LB/PKG
APPROVED	BY:	KNM

AS SHOWN (AT A1)

Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title:
PROPOSED NEW KAKUYUNI STORAGE RESERVOIR (5,000m³)
OUTLET PIPEWORK DETAILS - SHEET 2 OF 2

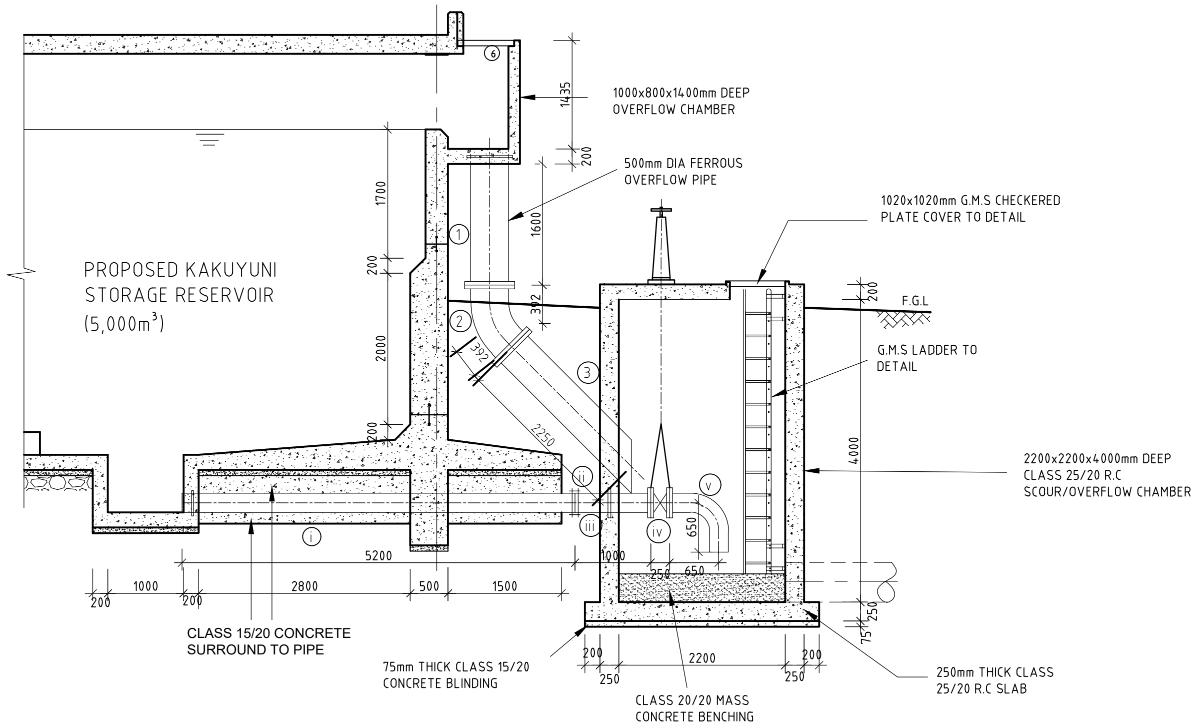
Date: APRIL 2021 | Drg. No. B-KA/TANK/06



SCOUR AND OVERFLOW PIPEWORK DETAILS

PLAN

SCALE 1:100



SECTION 4-4

SCALE 1:50

NOTES:

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6. ABBREVIATIONS:
   - TWL - TOP WATER LEVEL
   - FFL - FINISHED FLOOR LEVEL
   - DIA. - DIAMETER
   - P.C.C - PRECAST CONCRETE
   - R.C - REINFORCED CONCRETE
7. THIS DRAWING TO BE USED FOR PIPES AND FITTINGS DETAILS ONLY.

OVERFLOW PIPEWORK SCHEDULE
(APPROVED LINED FERROUS PIPES AND FITTINGS)

ITEM No.	DESCRIPTION	DIA. (mm)	LENGTH (mm)	QUANTITY (No.)
1	FLANGED SPIGOT PIPE WITH PUDDLE FLANGE AT 100mm FROM SPIGOT END	500	1600	1
2	ALL FLANGED 45° BEND	392, 392, 500ø, 500ø		1
3	FLANGED SPIGOT PIPE WITH SPIGOT END BEVELLED	500	2250	1

SCOUR PIPEWORK SCHEDULE
(APPROVED LINED FERROUS PIPES AND FITTINGS)

ITEM No.	DESCRIPTION	DIA. (mm)	LENGTH (mm)	QUANTITY (No.)
i	PLAIN ENDED PIPE WITH PUDDLE FLANGE AT 100mm FROM ONE END	250	5200	1
ii	COUPLING	250	-	1
iii	FLANGED SPIGOT PIPE WITH PUDDLE FLANGE AT 655mm FROM FLANGED END	250	1200	1
iv	ALL FLANGED GATE VALVE WITH AN EXTENDED SPINDLE 2000mm, HEAD STOCK AND HAND WHEEL	250	250	1
v	SINGLE FLANGED 90° BEND	505, 250ø, 250ø, 505		1

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:
COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

CONSULTING ENGINEERS
SARI CONSULTING LTD
SGAPI
gath CONSULTING ENGINEERS
SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:

REV.	DATE	REMARKS

Notes:

SURVEYED	BY:	SN/JM
DESIGNED	BY:	PKG/BK
DRAWN	BY:	JGG
CHECKED	BY:	LB/PKG
APPROVED	BY:	KNM

AS SHOWN (AT A1)

Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title:
PROPOSED NEW KAKUYUNI STORAGE RESERVOIR (5,000m³)
SCOUR AND OVERFLOW DETAILS

Date: APRIL 2021 | Drg. No. B-KA/TANK/07

EXISTING LAYOUT (Scale 1:50)

Project: **Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks**

Client:

COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

CONSULTING ENGINEERS

SARI CONSULTING LTD

SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:		
REV.	DATE	REMARKS

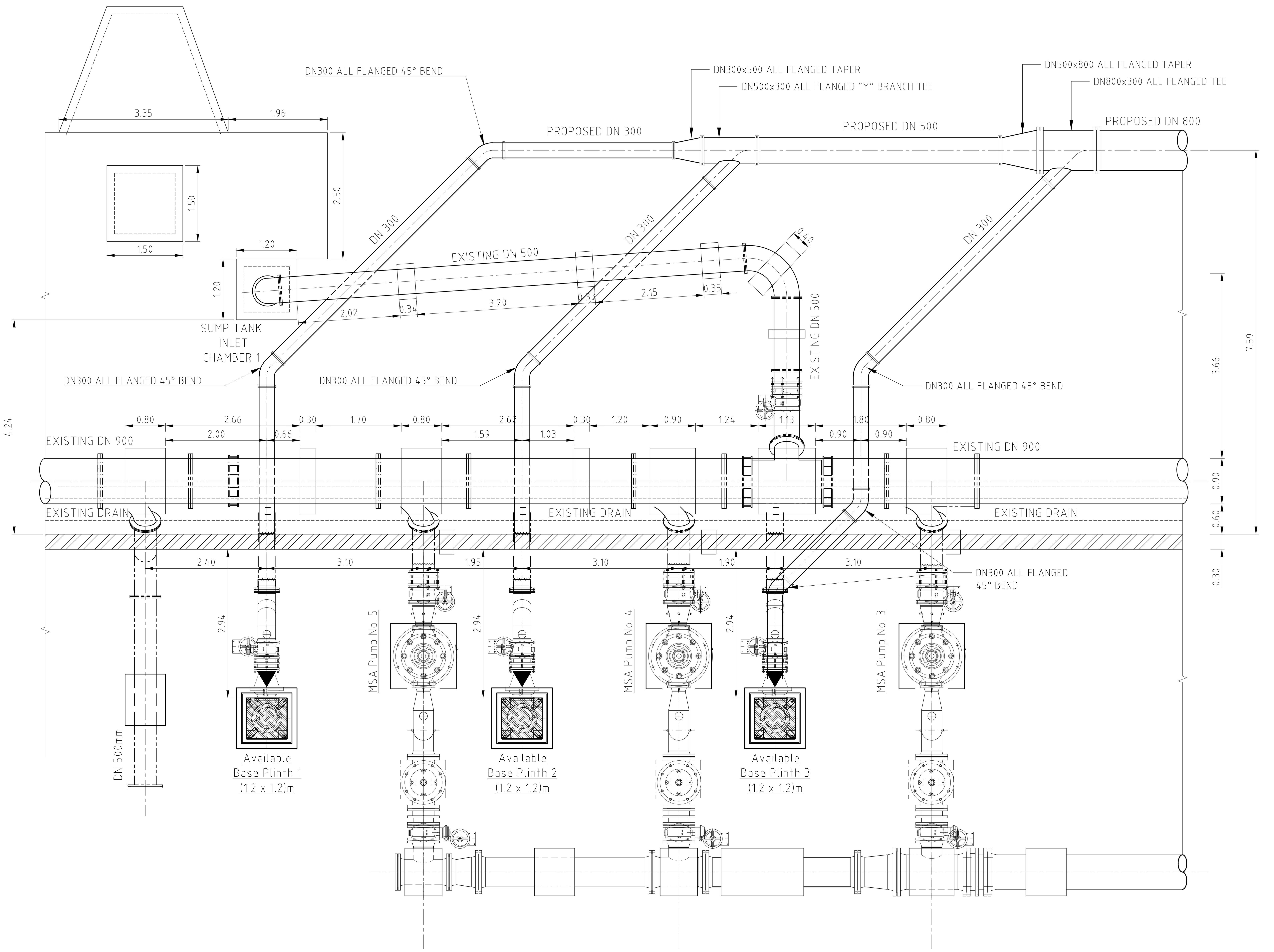
Notes:

DESIGNED	BY:	PKG/BK
DRAWN	BY:	JGG
CHECKED	BY:	LB/PKG
APPROVED	BY:	KNM
SCALE:		AS SHOWN (AT A1)

Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title:
EXISTING PUMP HOUSE - GENERAL LAYOUT

Date: MAY 2021 | Drg. No. B-KA-L-01



PROPOSED LAYOUT (Scale 1:50)

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:
COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

CONSULTING ENGINEERS
SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions: REV. DATE REMARKS

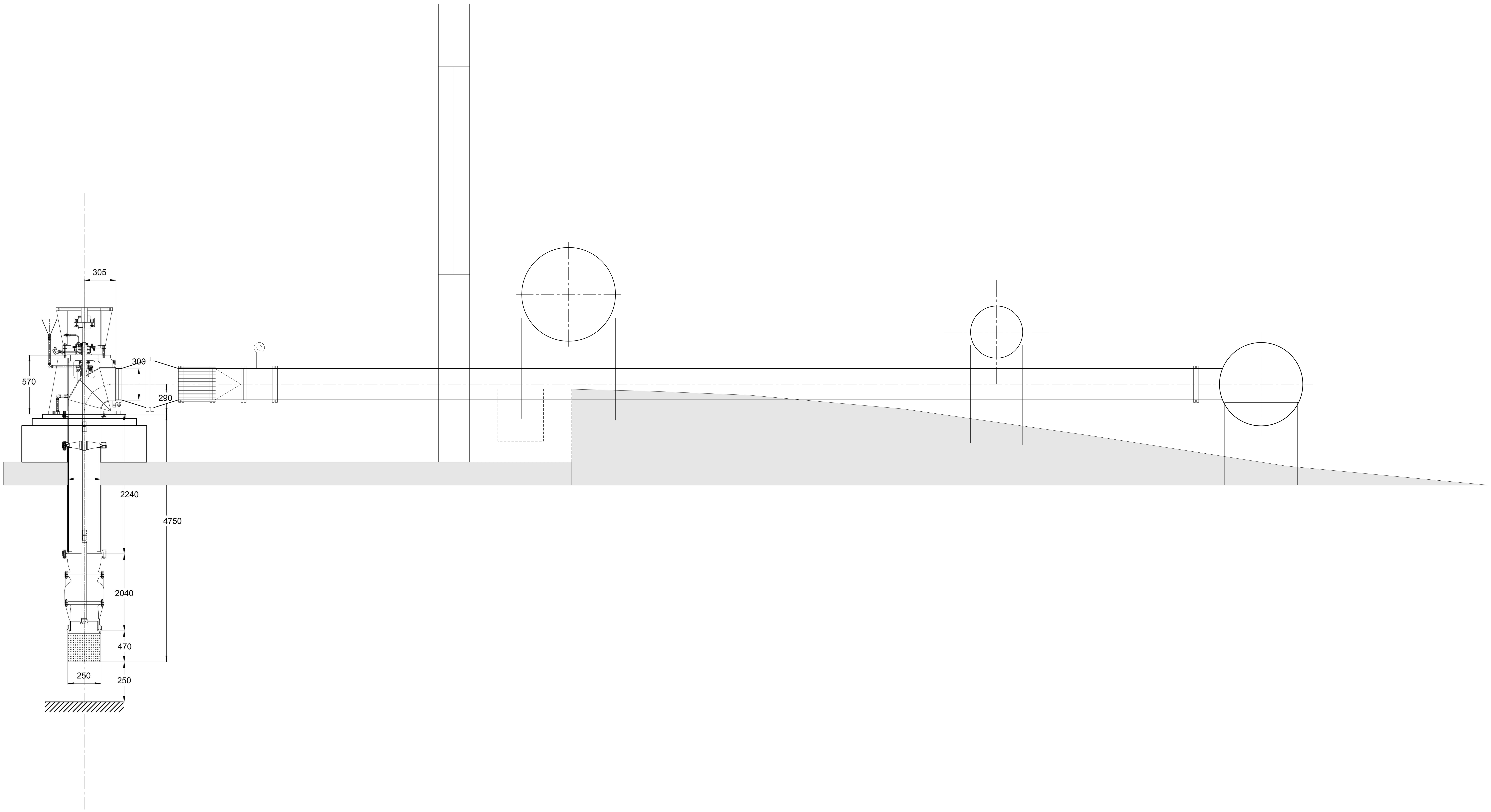
Notes:

DESIGNED BY: PKG/BK
DRAWN BY: JGG
CHECKED BY: LB/PKG
APPROVED BY: KNM
SCALE: AS SHOWN (AT A1)

Project: SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title: EXISTING PUMP HOUSE - PROPOSED LAYOUT (OPTION 2)

Date: MAY 2021 Drg. No. B-KA-L-02



Project: **Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks**

Client:

COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

CONSULTING ENGINEERS

SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:

REV.	DATE	REMARKS

Notes:

DESIGNED	BY:	PKG/BK
DRAWN	BY:	JGG
CHECKED	BY:	LB/PKG
APPROVED	BY:	KNM

SCALE:
AS SHOWN (AT A1)

Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title:
EXISTING PUMP HOUSE - TYPICAL SECTION

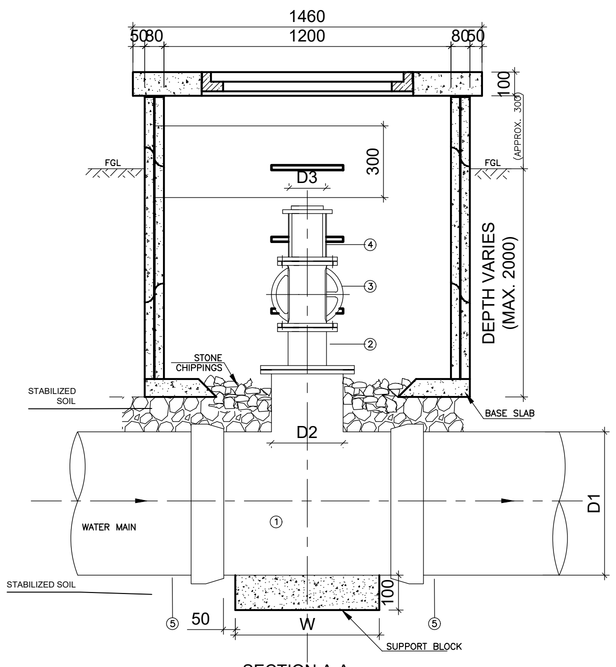
Date: MAY 2021

Drg. No. B-KA-L-02

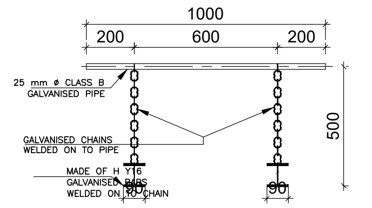
D1	D2	D3
400	250	80
500	250	80
600	300	100

SCHEDULE OF PIPEWORK & FITTINGS

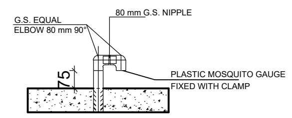
ITEM	DESCRIPTION	DIAMETER	No.
1	MAIN PLAIN ENDED TEE WITH FLANGED BRANCH	D1/D2	1
2	DOUBLE FLANGED REDUCER	D2/D3	1
3	DOUBLE FLANGED GATE VALVE	D3	1
4	TRIPPLE ACTION ANTI-SHOCK ANTI- SURGE AIR VALVE	D3	1

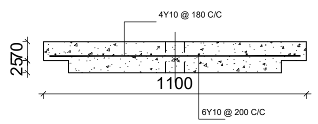


SECTION A-A
COUPLING CONNECTION FOR PIPES ≤ 600
SCALE 1:20



CHAMBER COVER LIFTING APPARATUS
SCALE 1:20

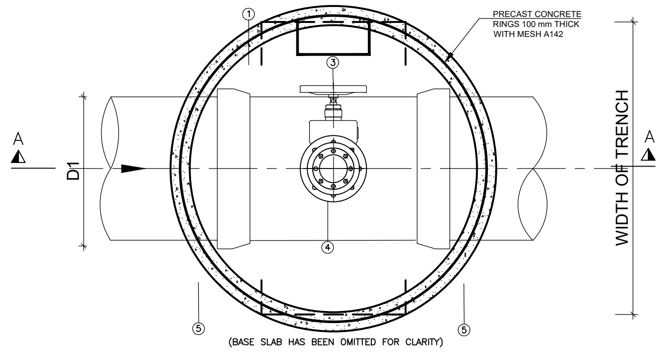




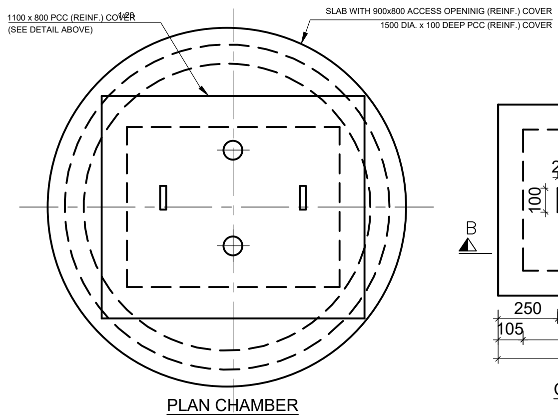
SECTION B-B
SCALE 1:20

OF AIR

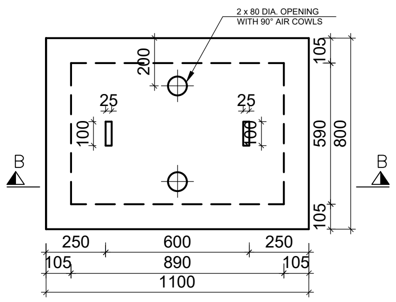
IN CHAMBER



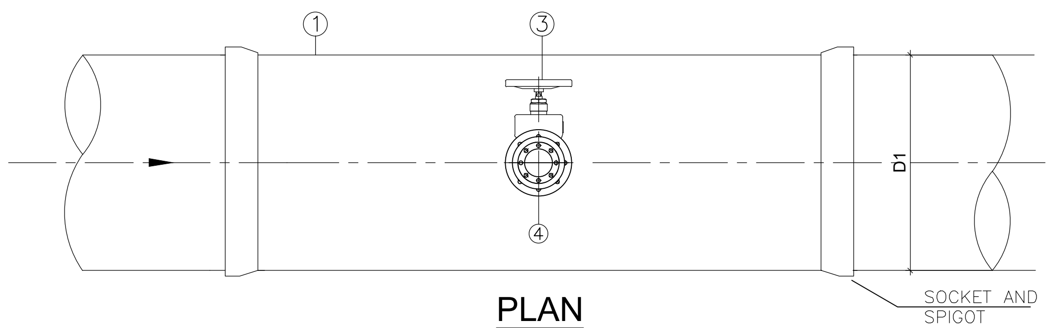
SECTIONAL PLAN
COUPLING CONNECTION
SCALE 1:20



PLAN CHAMBER
SCALE 1:10



COVER SLAB PLAN
SCALE 1:20



PLAN
BUTT WELD CONNECTION FOR PIPES ≥700
SCALE 1:40

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:

COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

CONSULTING ENGINEERS

SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:

REV.	DATE	REMARKS

Notes:

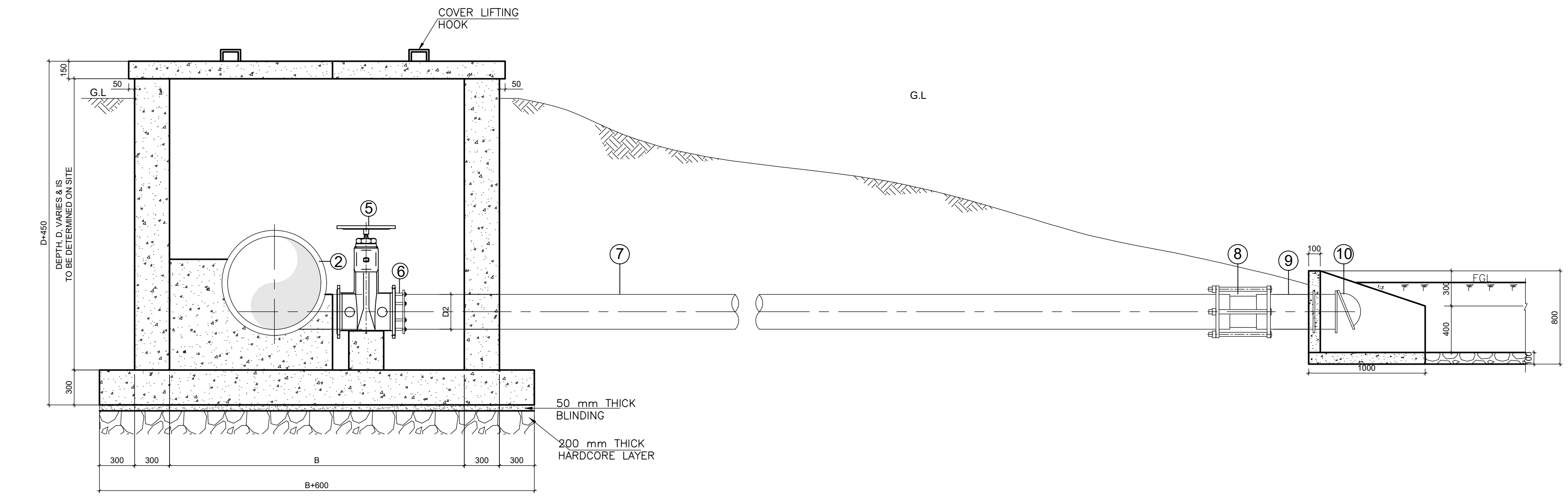
DESIGNED BY: PKG/BK
DRAWN BY: JGG
CHECKED BY: LB/PKG
APPROVED BY: KNM

AS SHOWN (AT A1)

Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title:
AIR VALVE CHAMBER DETAILS

Date: APRIL 2021 | Drg. No. B-KA/STD/AIR VALVE/01



SECTION A-A
SCALE 1:50

SCHEDULE OF PIPEWORK & FITTINGS

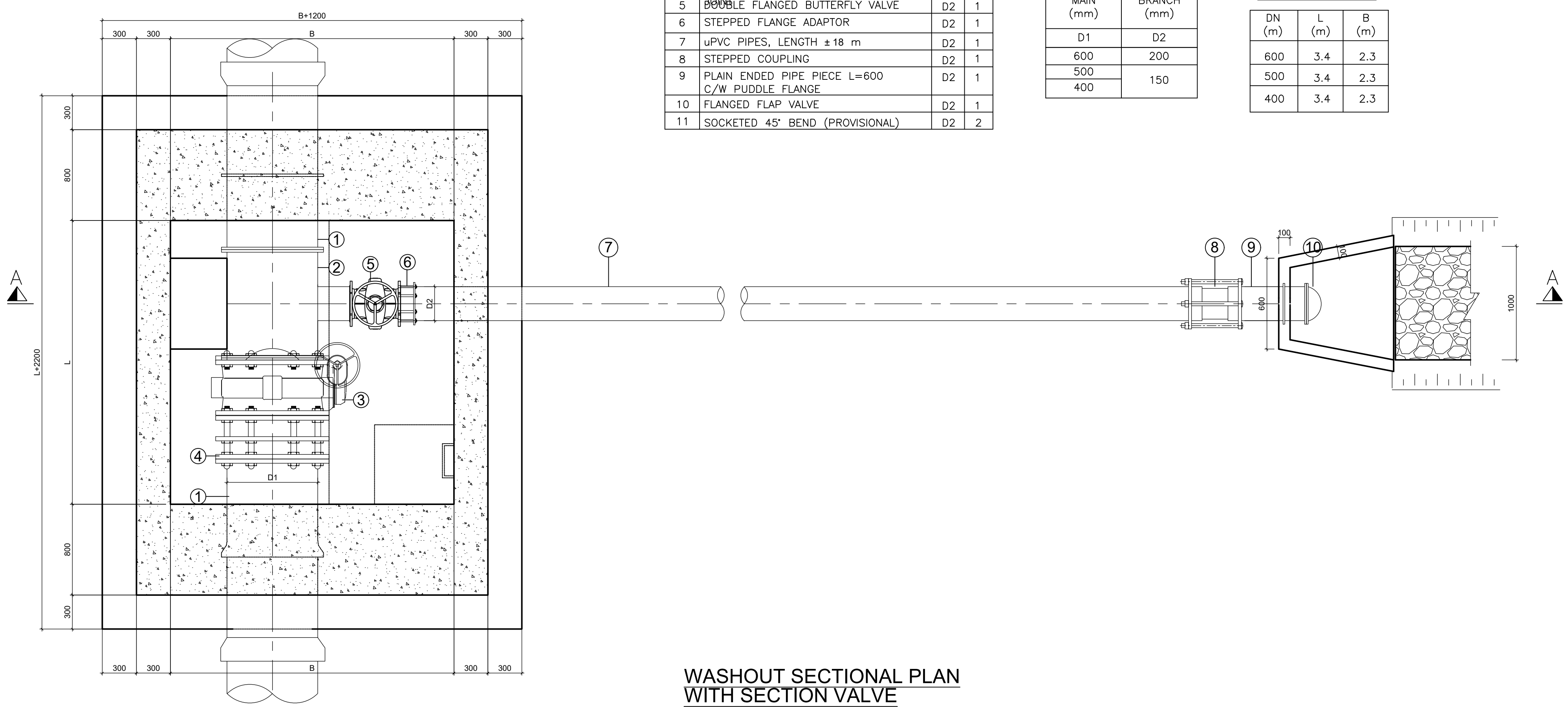
ITEM No.	DESCRIPTION	DIA	No.
1	SINGLE FLANGED PIPE PIECE C/W PUDDLE FLANGE L= 1500	D1	2
2	ALL FLANGE INVERT LEVEL TEE	D1/D2	1
3	DOUBLE FLANGED BUTTERFLY VALVE	D1	1
4	DOUBLE FLANGED DISMANTLING JOINT	D2	1
5	DOUBLE FLANGED BUTTERFLY VALVE	D2	1
6	STEPPED FLANGE ADAPTOR	D2	1
7	uPVC PIPES, LENGTH ±18 m	D2	1
8	STEPPED COUPLING	D2	1
9	PLAIN ENDED PIPE PIECE L=600 C/W PUDDLE FLANGE	D2	1
10	FLANGED FLAP VALVE	D2	1
11	SOCKETED 45° BEND (PROVISIONAL)	D2	2

SCHEDULE OF WASHOUTS

DIAMETER MAIN (mm)	DIAMETER BRANCH (mm)
D1	D2
600	200
500	150
400	

CHAMBER SIZE

DN (m)	L (m)	B (m)
600	3.4	2.3
500	3.4	2.3
400	3.4	2.3



WASHOUT SECTIONAL PLAN WITH SECTION VALVE
SCALE 1:50

Project: **Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks**

Client:
COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

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Revisions:

REV.	DATE	REMARKS

Notes:

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DRAWN BY: JGG
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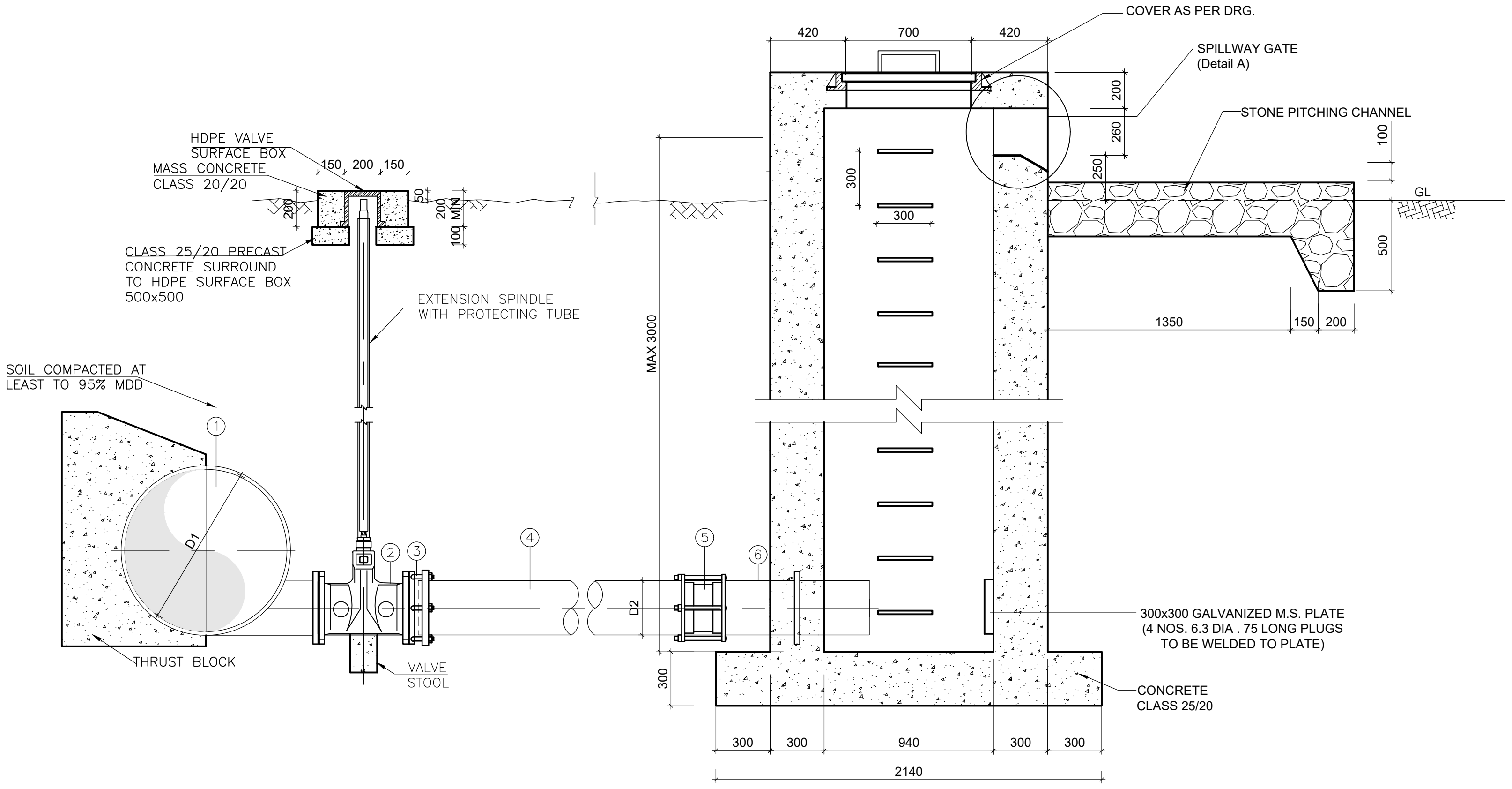
APPROVED BY: KNM

AS SHOWN (AT A1)

Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

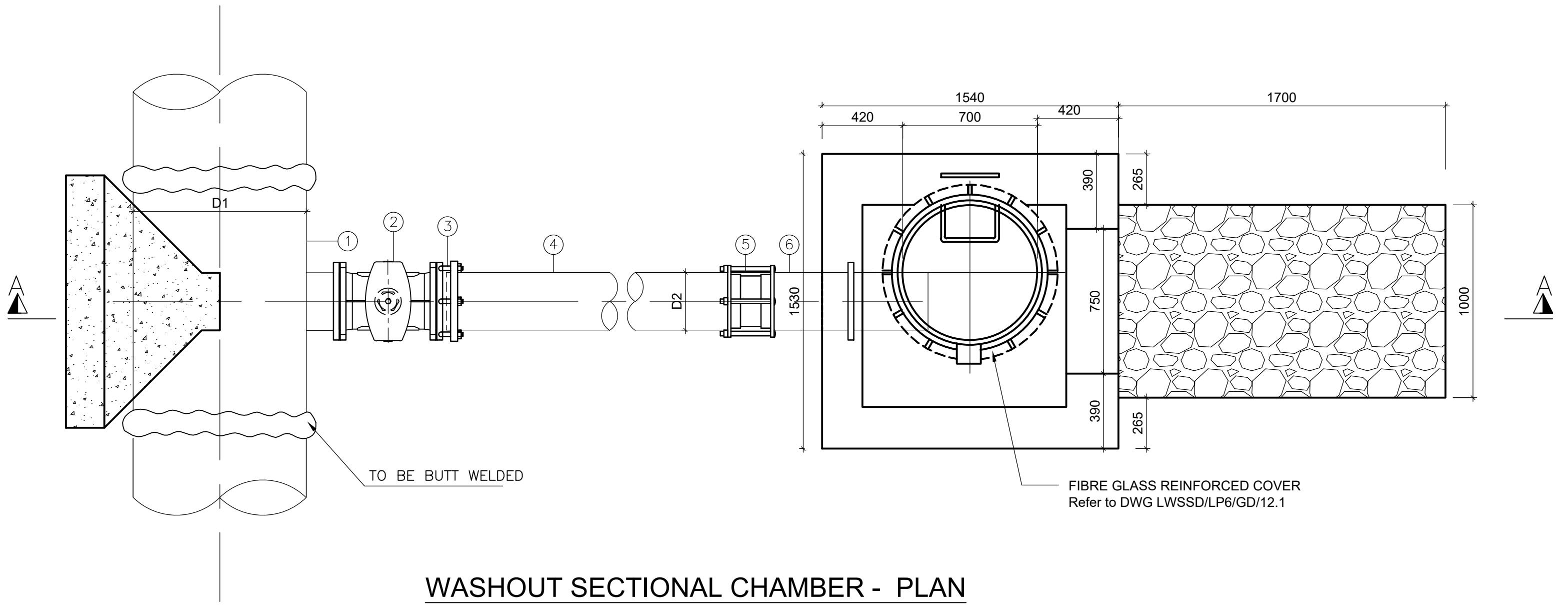
Drawing Title:
WASHOUT CHAMBER DETAILS
TYPE A

Date: APRIL 2021
Drg. No. B-KA/STD/WASHOUT/1



SECTION A-A

SCALE 1:40



WASHOUT SECTIONAL CHAMBER - PLAN

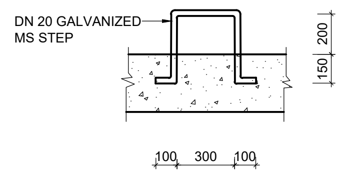
SCALE 1:40

SCHEDULE OF WASHOUTS

DIAMETER MAIN (mm)	DIAMETER BRANCH (mm)
D1	D2
600	250
500	200
400	

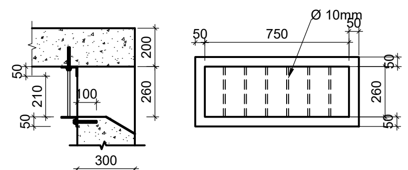
SCHEDULE OF PIPEWORK & FITTINGS

ITEM No.	DESCRIPTION	DIAMETER	QTY
1	PLAIN ENDED INVERT TEE WITH FLANGED BRANCH	D1/D2	1
2	DOUBLE FLANGED SLUICE VALVE	D2	1
3	FLANGED STEPPED ADAPTOR TO SUIT uPVC	D2	1
4	uPVC PIPES, LENGTH ± 18 m	D2	–
5	COUPLING TO SUIT FERROUS/uPVC	D2	1
6	PLAIN ENDED PIPE PIECE WITH CENTERED PUDDLE FLANGE, LENGTH = 800mm	D2	1



DETAILS OF MS STEPS

SCALE 1:40



DETAIL A - SPILLWAY GATE

SCALE 1:40

Project: **Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks**

Client:
COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

CONSULTING ENGINEERS

SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:		
REV.	DATE	REMARKS

Notes:

DESIGNED BY: PKG/BK
DRAWN BY: JGG
CHECKED BY: LB/PKG
APPROVED BY: KNM

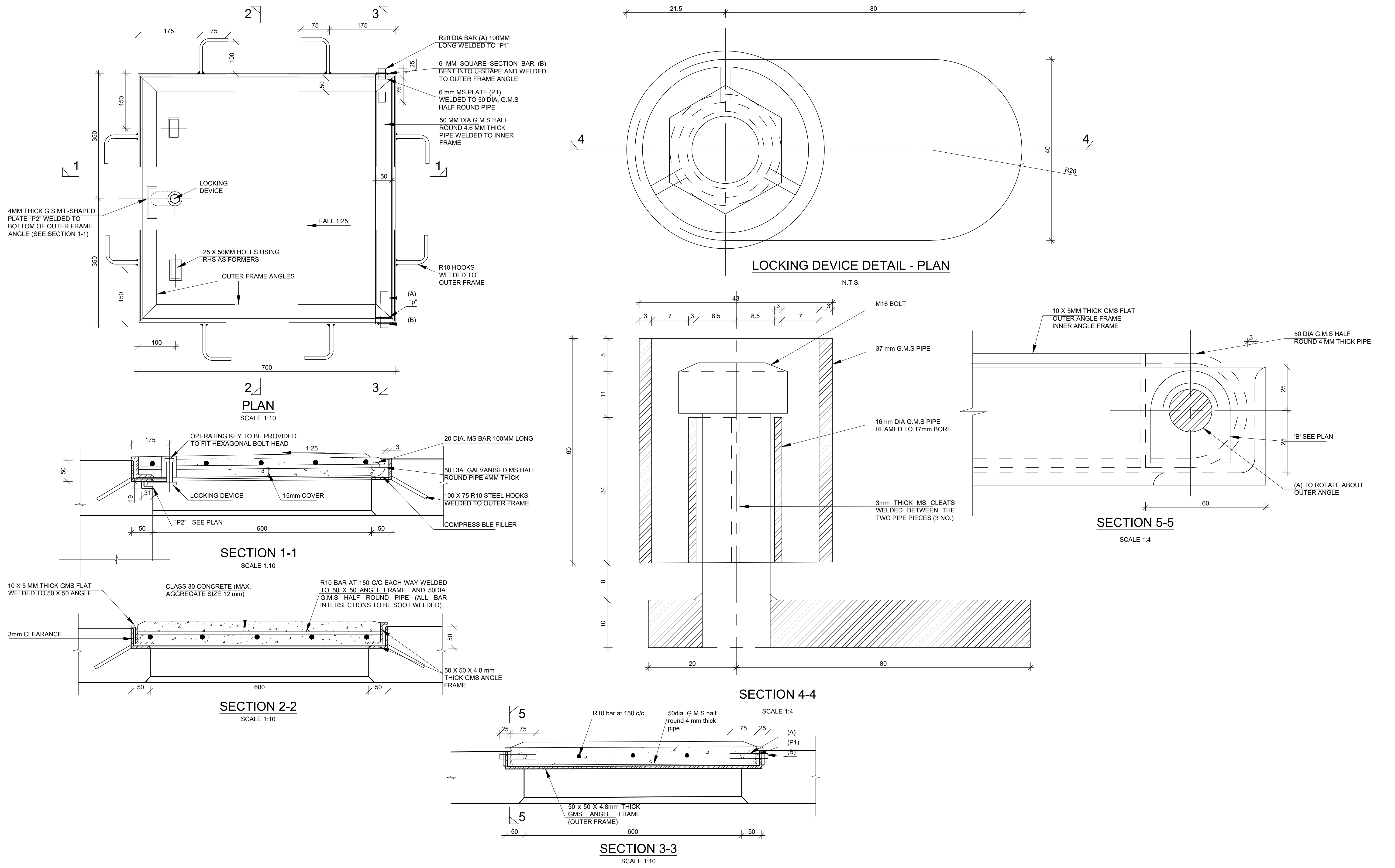
AS SHOWN (AT A1)

Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title:
WASHOUT CHAMBER DETAILS
TYPE B

Date: APRIL 2021

Drg. No. B-KA/STD/WASHOUT/2



Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:

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SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:

REV.	DATE	REMARKS

Notes:

DESIGNED BY: PKG/BK
DRAWN BY: JGG
CHECKED BY: LB/PKG
APPROVED BY: KNM

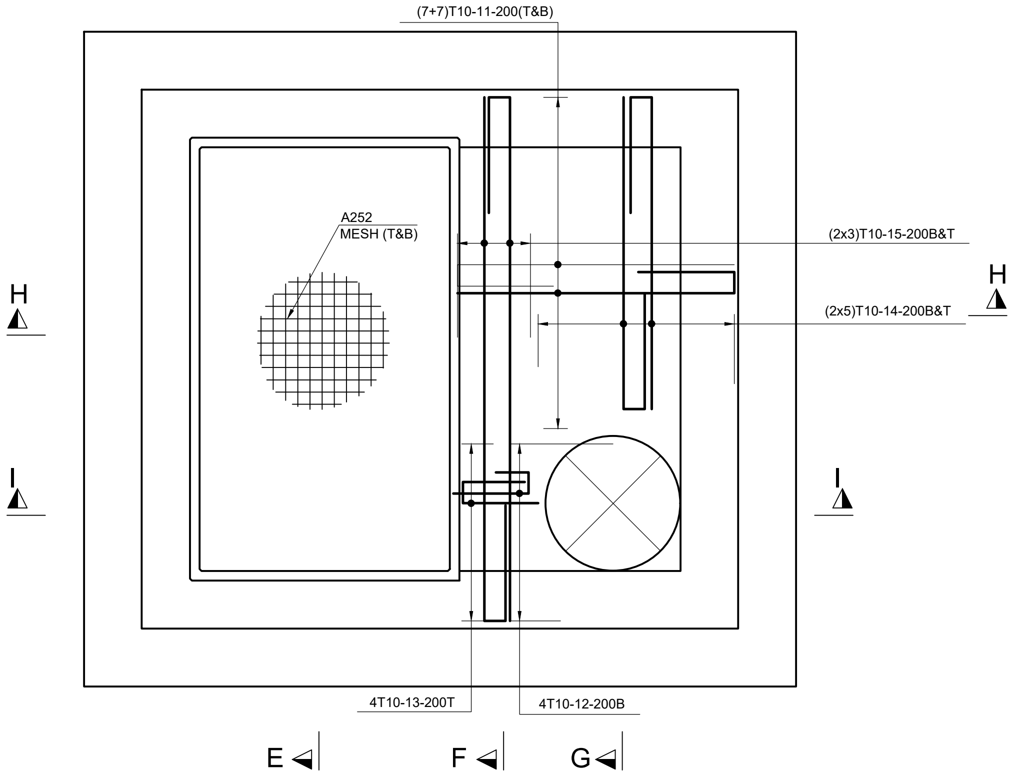
AS SHOWN (AT A1)

Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

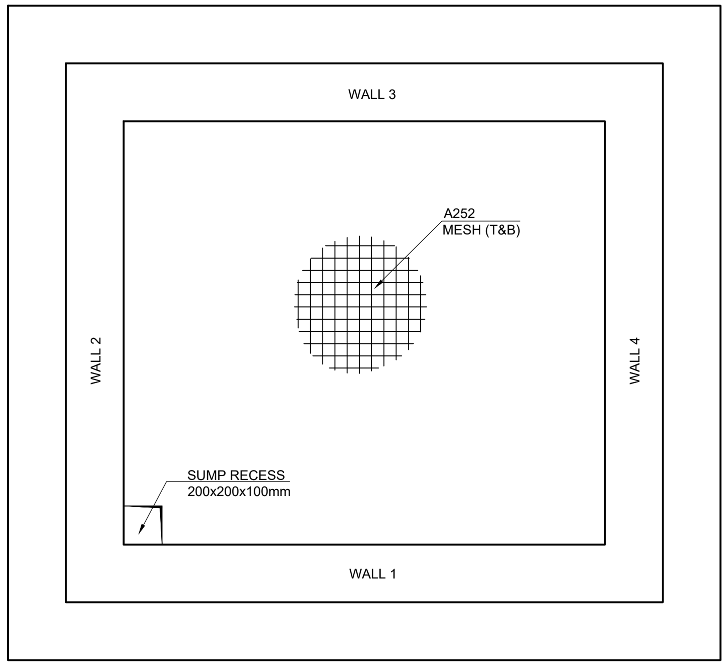
Drawing Title:
MANHOLE COVER AND FRAME DETAILS

Date: APRIL 2021

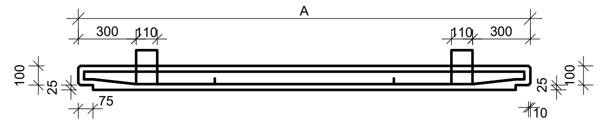
Drg. No. B-KA/STD/MANHOLE/1



ROOF PLAN
SCALE 1:40



BASE PLAN
SCALE 1:40



SECTION C-C
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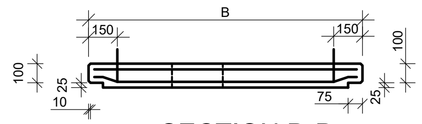

SECTION D-D
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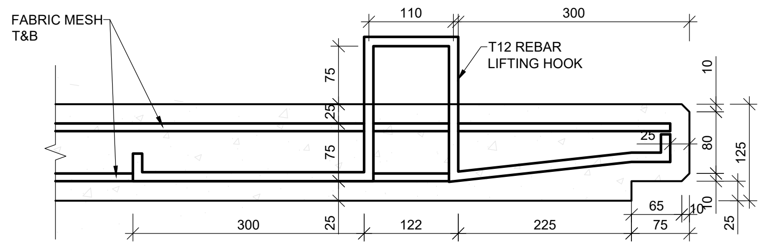
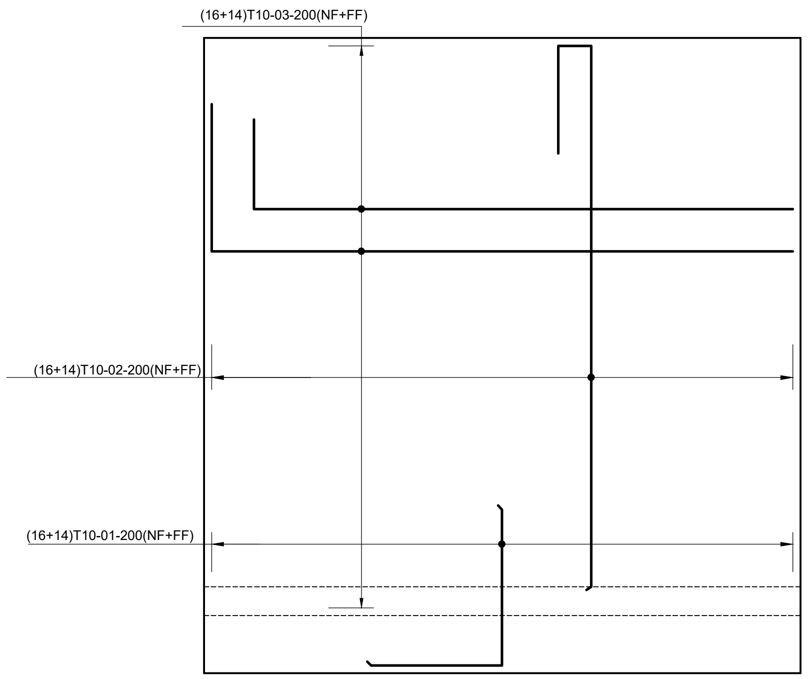
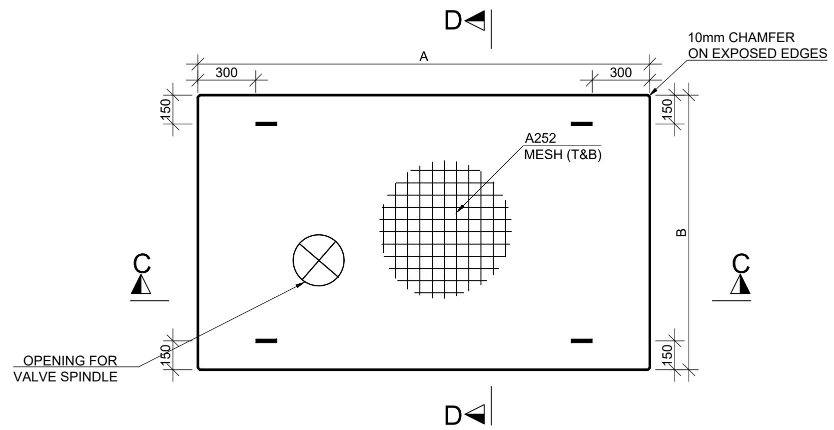


LIFTING HOOK DETAILS
SCALE 1:10



WALL 1 & WALL 3
SCALE 1:40



CONCRETE COVER DETAIL
SCALE 1:40

NOTES

1. HEIGHT OF THE CHAMBER "H" DEPENDS ON PIPE DEPTH DIMENSION "H" TO BE DETERMINED BY THE CONTRACTOR ON THE SITE AND APPROVED BY THE ENGINEER.
2. DIMENSIONS "L" AND "W" DEPENDS ON PIPE DIAMETER DIMENSIONS "L" GIVEN ON THE TABLE TO BE APPROVED BY THE ENGINEER.
3. PIPEWORK AND VALVE SUPPORT TO BE CONSTRUCTED AS INSTRUCTED BY THE ENGINEER.
4. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS STATED OTHERWISE.

LEGEND
DN - NOMINAL DIAMETER

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:
COAST WATER WORKS DEVELOPMENT AGENCY
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MOMBASA, KENYA

CONSULTING ENGINEERS

SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:

REV.	DATE	REMARKS

Notes:

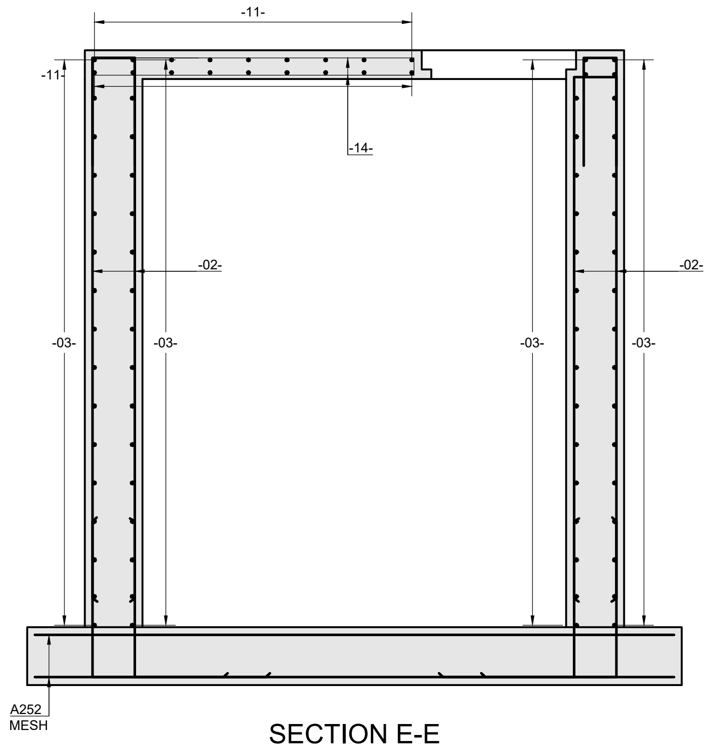
DESIGNED BY: PKG/BK
DRAWN BY: JGG
CHECKED BY: LB/PKG
APPROVED BY: KNM

AS SHOWN (AT A1)

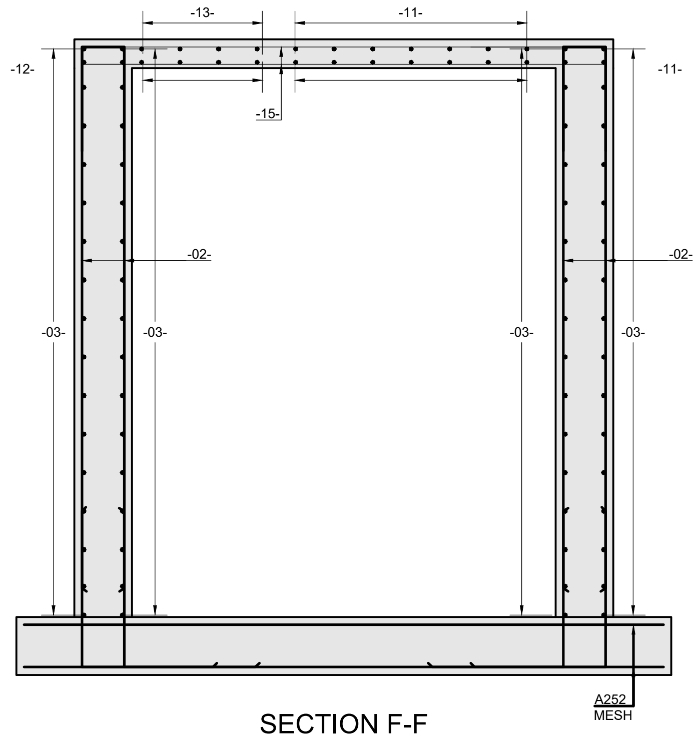
Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title:
VALVE CHAMBER - COVER DETAILS
REINFORCEMENT DETAILS - 1

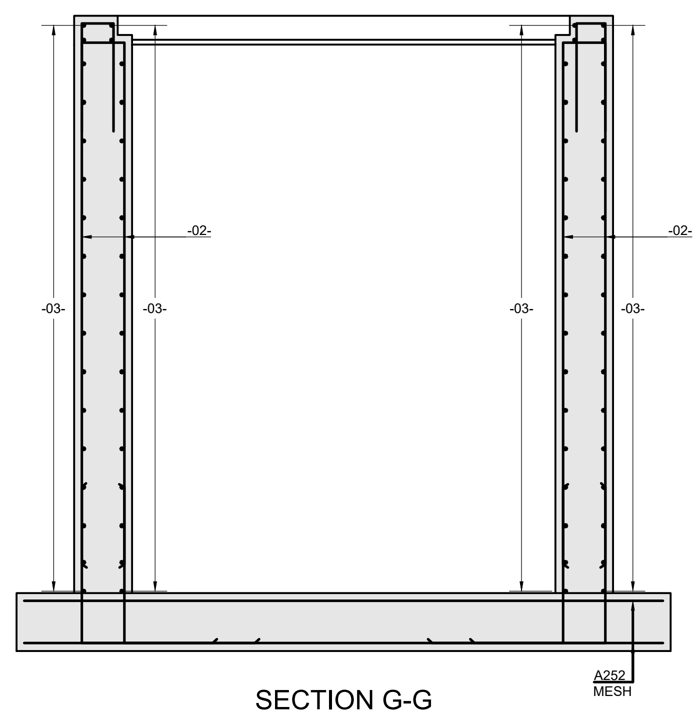
Date: APRIL 2021
Drg. No. B-KA/STD/VALVE CHAMBER/1



SECTION E-E
SCALE 1:40



SECTION F-F
SCALE 1:40



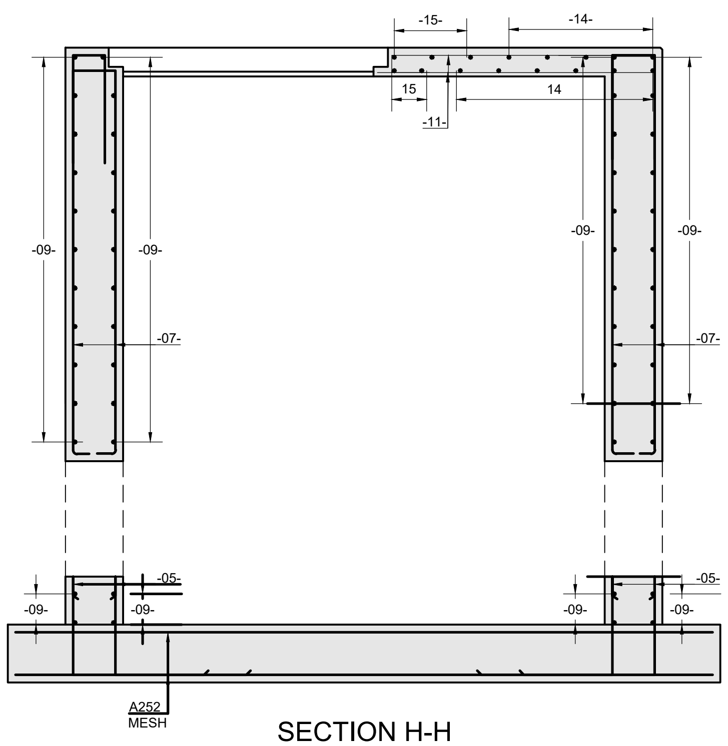
SECTION G-G
SCALE 1:40

NOTES

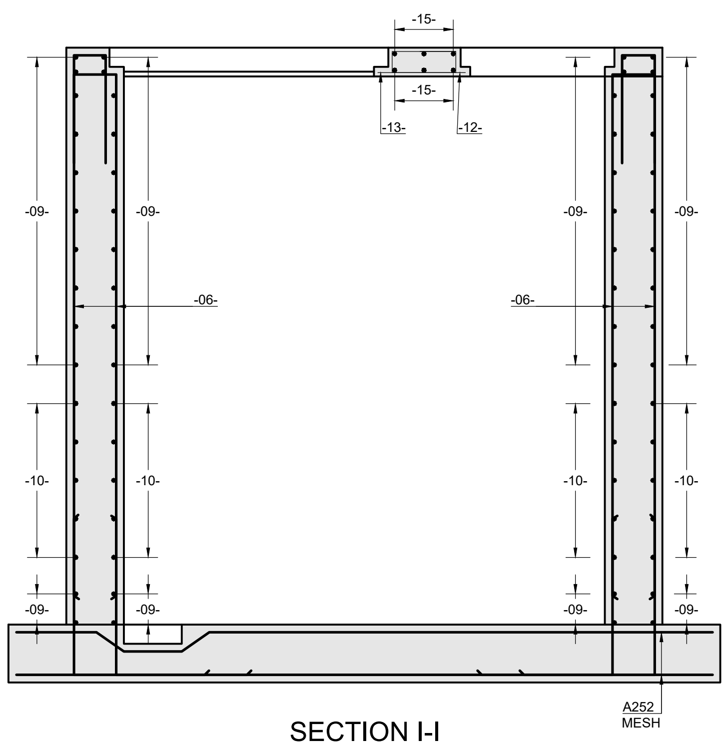
1. HEIGHT OF THE CHAMBER "H" DEPENDS ON PIPE DEPTH DIMENSION "H" TO BE DETERMINED BY THE CONTRACTOR ON THE SITE AND APPROVED BY THE ENGINEER.
2. DIMENSIONS "L" AND "W" DEPENDS ON PIPE DIAMETER DIMENSIONS "L" GIVEN ON THE TABLE TO BE APPROVED BY THE ENGINEER.
3. PIPEWORK AND VALVE SUPPORT TO BE CONSTRUCTED AS INSTRUCTED BY THE ENGINEER.
4. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS STATED OTHERWISE.

LEGEND

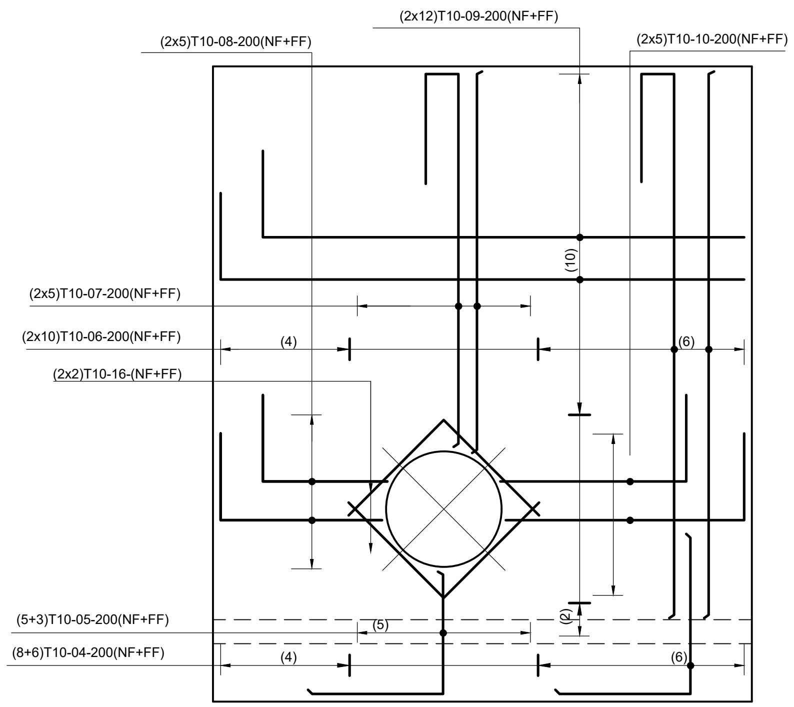
DN - NOMINAL DIAMETER



SECTION H-H
SCALE 1:40



SECTION I-I
SCALE 1:40



WALL 2 & WALL 4
SCALE 1:40

Project: **Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks**

Client:

COAST WATER WORKS DEVELOPMENT AGENCY
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SGAPI

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SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:

REV.	DATE	REMARKS

Notes:

DESIGNED BY:	PKG/BK
DRAWN BY:	JGG
CHECKED BY:	LB/PKG
APPROVED BY:	KNM

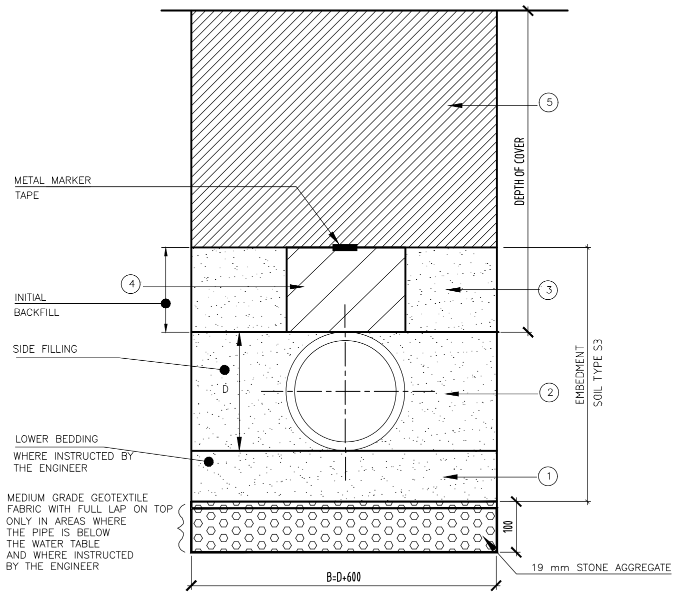
AS SHOWN (AT A1)

Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

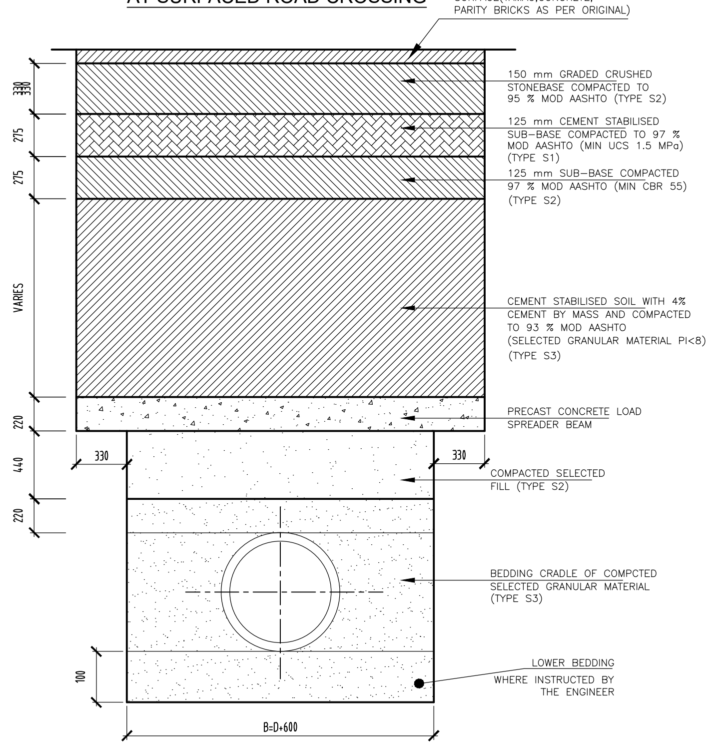
Drawing Title:
VALVE CHAMBER - COVER DETAILS
REINFORCEMENT DETAILS - 2

Date: APRIL 2021
Drg. No. B-KA/STD/VALVE CHAMBER/2

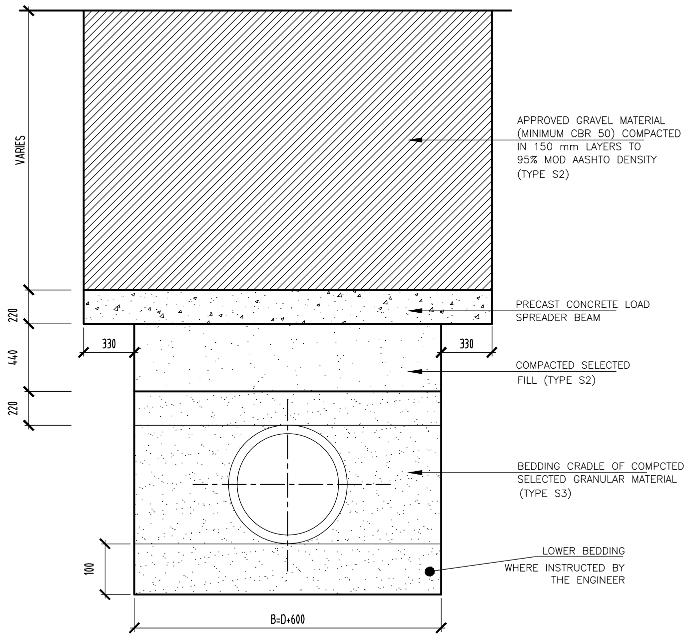
TYPICAL TRENCH EXCAVATION AND BACKFILLING FOR PE/uPVC PIPES



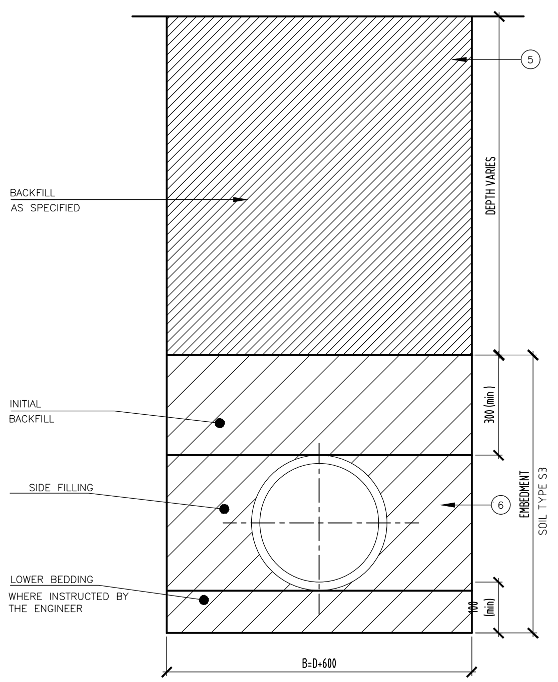
PIPE PROTECTION AT SURFACED ROAD CROSSING



PIPE PROTECTION AT UNSURFACED ROAD CROSSING



TYPICAL TRENCH EXCAVATION AND BACKFILLING FOR FERROUS PIPES



TYPICAL TRENCH WIDTHS FOR PIPES

NOMINAL DIAMETER D (mm)	80	100	160	200	250	300	600
WIDTH OF TRENCH B (m)	0.70	0.70	0.76	0.80	0.85	0.90	1.20

B = D + 0.6 m (LIMITED TO A MINIMUM OF 0.6 m)

TABLE 1 : MATERIAL DESCRIPTION CHART

SOIL TYPE	DESCRIPTION	GROUP SYMBOL
S1	GRAVEL - SINGLE SIZE	GW
S2	GRAVEL - GRADED	GP
S3	SAND AND COARSE GRAINED SOILS WITH LESS THAN 12% FINES.	GF

NOTE

INSTEAD OF A CONCRETE SPREADER BEAM, A CONCRETE OR STEEL PIPE WITH SUFFICIENT INTERNAL BORE TO FACILITATE INSERTION OF PIPES SHOULD BE USED IF INSTRUCTED BY THE ENGINEER.

LEGEND :

D PIPE OUTSIDE DIAMETER

B TRENCH WIDTH (SEE TABLE)

1 LOWER BEDDING COMPRISING OF APPROVED GRANULAR BEDDING MATERIAL (SAND) COMPACTED TO 90 % MPD IN 50 mm LAYERS TO A THICKNESS OF 100 mm (min.) OR AS DIRECTED BY THE ENGINEER'S REPRESENTATIVE.

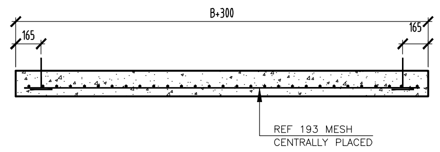
2 APPROVED GRANULAR BEDDING MATERIAL TYPE S3 COMPACTED IN LAYERS AS PER NOTE 2. CAREFUL TAMPING ON EITHER SIDE OF THE PIPE SHOULD BE MAINTAINED TO ENSURE EQUAL PRESSURE ON BOTH SIDES OF THE PIPE.

3 APPROVED GRANULAR BEDDING MATERIAL TYPE S3 COMPACTED IN SHALLOW LAYERS TO A MAXIMUM OF 150 mm THICK.

4 AS IN 3 ABOVE, BUT EXCESSIVE TAMPING TO BE AVOIDED.

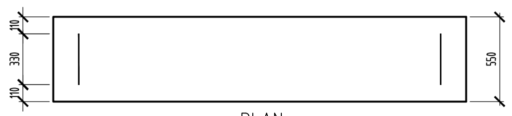
5 NORMAL BACKFILL MATERIAL PROPERLY RAMMED IN LAYERS. NOT EXCEEDING 150 mm THICK.

PRECAST CONCRETE LOAD SPREADER BEAM



SECTION THROUGH SPREADER BEAM

1:10



PLAN

1:10

TABLE 2 : COMPACTION CHART GUIDE

% MPD	SOIL TYPE	COMPACTION METHOD	
		THICKNESS OF LAYER (max.)	No. OF PASSES
90	S1 S2 S3	150 150 50	1 2 2

NOTES:

1. MINIMUM TRENCH WIDTH TO BE NORMAL PIPE DIAMETER PLUS 600 mm.
2. THE LOWER BEDDING AND THE SIDE FILL SHALL BE COMPACTED IN LAYERS WHOSE DEPTH SHALL NOT EXCEED 50 mm NOR HALF THE NOMINAL PIPE DIAMETER WHICHEVER IS THE LESSER.
3. IN GENERAL, THE METHOD OF ATTAINING THE REQUIRED COMPACTION WILL BE ASCERTAINED AS FOLLOWS :
   (i) THE ENGINEER'S REPRESENTATIVE WILL IDENTIFY, CLASSIFY AND AGREE THE SOIL TYPE OF EMBEDMENT MATERIAL AVAILABLE FROM THE TRENCH.
   (ii) THE SITE SOIL TYPE WILL BE COMPARED WITH THOSE ON THE MATERIAL DESCRIPTION CHART [SEE TABLE 1]
   (iii) THE COMPACTION METHOD REQUIRED IS THEN SELECTED FROM THE COMPACTION CHART FOR THE APPROPRIATE SOIL TYPE AND CLASS OF EMBEDMENT [SEE TABLE 2]
4. NOT ALL SOILS ARE GIVEN IN TABLE 1. IT SHOULD BE NOTED THAT :
   (i) FINED GRAINED SOILS WITH HIGH PLASTICITY MAY NOT BE USED AS BACKFILL.
   (ii) FINED GRAINED SOILS WITH LOW PLASTICITY MAY BE CONDEMNED FOR USE AS BACKFILL IF THE CONTRACTOR HAS DIFFICULTY IN ATTAINING THE REQUIRED COMPACTION.
5. WHERE SITE MATERIAL IS CONDEMNED, IMPORTED MATERIAL SHALL BE USED. THIS SHALL BE A WELL GRADED SOIL FROM FINES UPTO 20 mm GRAVEL OR AS APPROVED BY THE ENGINEER'S REPRESENTATIVE.
6. WHERE SOME DOUBT EXISTS AS TO THE COMPACTIBILITY OF THE SOIL AS DEFINED ABOVE, RECOURSE SHALL BE MADE TO THE MODIFIED PROCTOR DENSITY TEST. THE SITE AND LABORATORY TESTS SHALL BE CARRIED OUT TO TESTS 14 B AND 12 RESPECTIVELY TO SSRN 601.
7. IF STONES OR ROCK ARE PRESENT, IMPORTED BEDDING MATERIAL OF MIN. 150 mm THICK SHALL BE REQUIRED AS APPROVED BY THE ENGINEER'S REPRESENTATIVE. AT DESIGNATED ROAD CROSSINGS, THE BEDDING SHALL HAVE A MINIMUM THICKNESS OF 150 mm.
8. THE BACKFILL SHALL BE PLACED IN LAYERS AS DEFINED ABOVE, EACH LAYER SHALL BE RAMMED WITH A SMALL VIBRATORY RAMMER. THE LIKELY REQUIRED NUMBER OF PASSES OF THE RAMMER IS GIVEN IN TABLE 2. HOWEVER 90% MPD SHALL BE ACHIEVED AT ALL TIMES.
9. ONLY WHEN THERE IS 300 mm COVER OVER THE PIPE MAY HEAVIER COMPACTING EQUIPMENT BE USED. THE REMAINDER OF THE BACKFILL SHALL BE SUITABLY COMPACTED IN KEEPING WITH THE REINSTATEMENT OF THE GROUND TO BE CARRIED OUT. THIS SHALL BE AGREED UPON WITH THE ENGINEER'S REPRESENTATIVE.

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SGAPI
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Revisions:

REV.	DATE	REMARKS

Notes:

DESIGNED	BY:	PKG/BK
DRAWN	BY:	JGG
CHECKED	BY:	LB/PKG
APPROVED	BY:	KNM

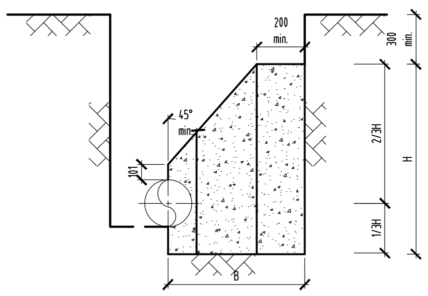
AS SHOWN (AT A1)

Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

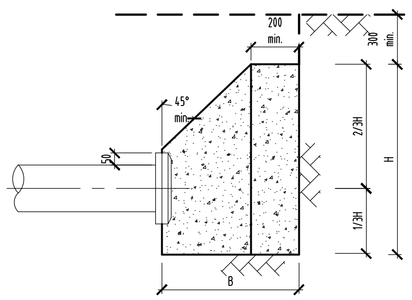
Drawing Title:
TYPICAL PIPE BEDDING DETAILS

Date: APRIL 2021

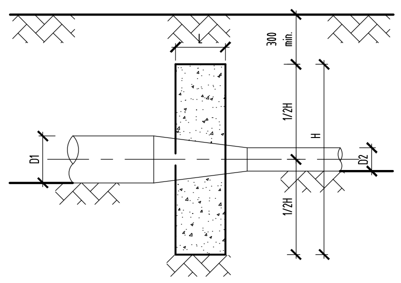
Drg. No. B-KA/STD/BEDDING DETAILS/1



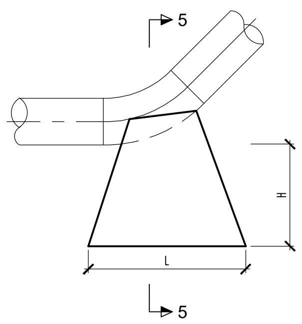
SECTION 1 - 1



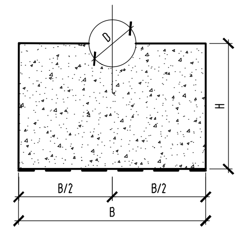
SECTION 3 - 3



SECTION 4 - 4



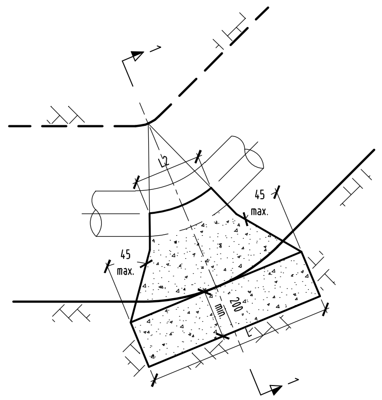
ELEVATION



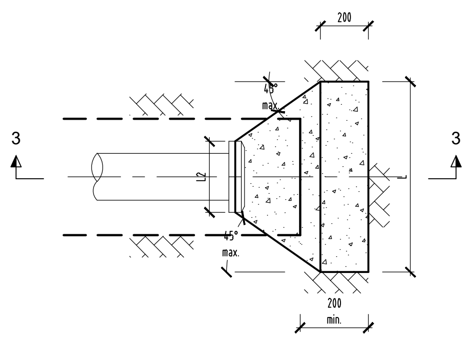
SECTION 5 - 5

NOTE.

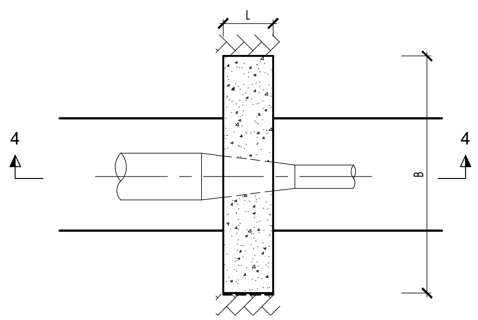
1. ANCHOR BLOCKS CONSTRUCTED FROM UNREINFORED CONCRETE CLASS 20
2. CONCRETE CAST AGAINST UNDISTURBED GROUND. WHERE DISTURBED, THE SOIL AROUND ANCHOR BLOCK WAS REMOVED AND FILLED WITH CONCRETE BEFORE THE PIPE WAS PRESSURE TESTED OR COMPACTED TO NOT LESS THAN 95% MAX. DRY DENSITY BEFORE THE MAIN WAS PRESSURE TESTED.
3. BENDS LESS THAN 6° TAKEN UP BY THE FLEXIBLE PIPE JOINTS WHERE PRACTICABLE.
4. 11¼° BENDS WERE USED FOR BENDS GREATER THAN OR EQUAL TO 6° AND LESS THAN OR EQUAL TO 16°.
5. ALL ANCHOR BLOCKS CAST LEAVING ALL PIPE JOINTS FREE.
6. DIAMETERS GIVEN ON THE TABLES ARE PIPE NOMINAL BORE SIZES.
7. REFER TO DRAWING No.......... FOR TABLES OF DIMENSIONS FOR ANCHOR BLOCKS TYPES HB, RD, TV, CV AND DV.
8. ALL DIMENSIONS SHOWN ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
9. ALL BENDS/TAPERS TEES WRAPPED WITH POLYTHENE SHEET GAUGE 500



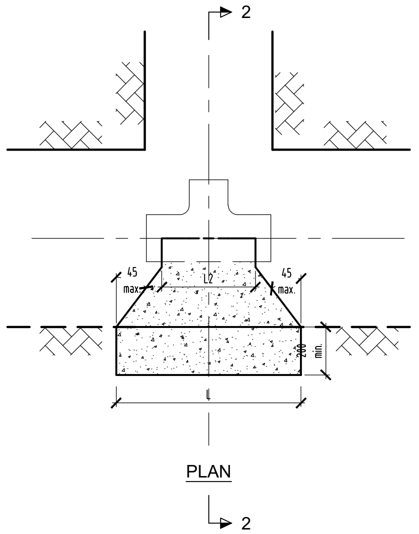
PLAN



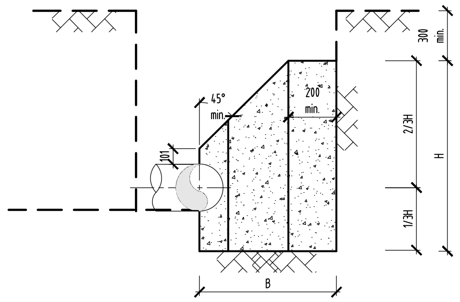
PLAN



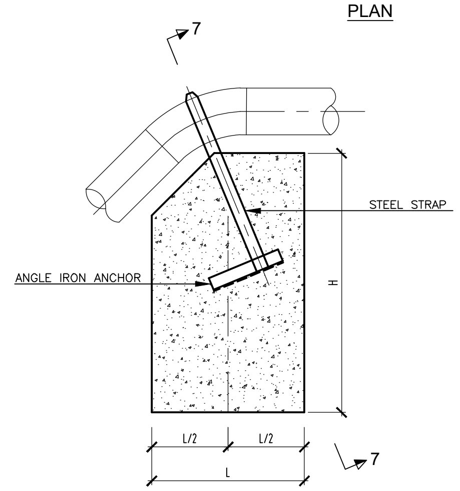
PLAN



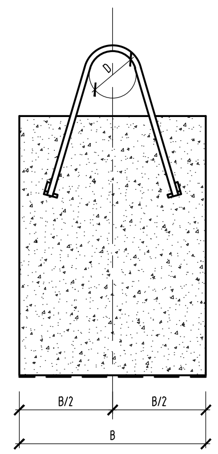
PLAN



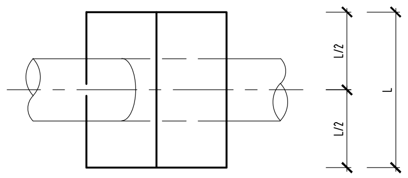
SECTION 2 - 2



ELEVATION



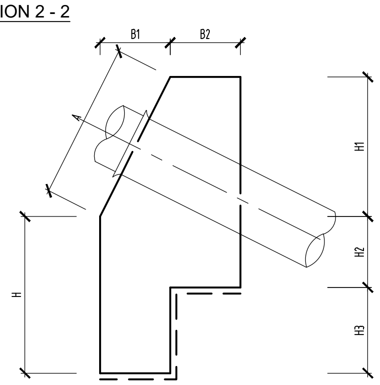
SECTION 7- 7



PLAN

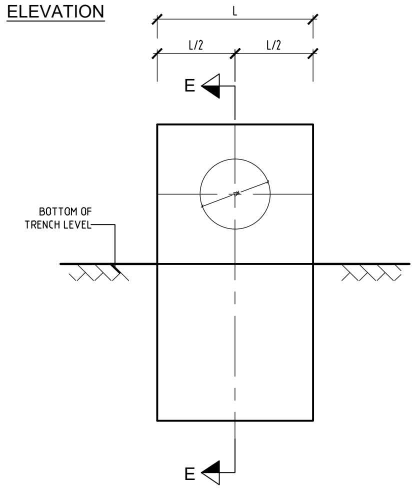
NOTE

1. ANCHOR BLOCK TO BE POSITIONED BEHIND COLLAR AS SHOWN



SECTION E - E

ANCHOR BLOCKS ON GRADIENTS (TYPE GD)



FRONT VIEW

GRADIENT	SPACING OF ANCHOR BLOCKS (m)
1 IN 2	5.5
1 IN 3	11.0
1 IN 4	11.0
1 IN 5	16.5
1 IN 6	22.0
1 IN 7 – 10	27.5

PIPE DIAMETER DN (mm)	DIMENSIONS (m)							
	A	L	H	H1	H2	H3	B1	B2
200	0.8	0.8	0.8	0.7	0.35	0.45	0.35	0.35
300	0.9	1.0	1.0	0.8	0.4	0.6	0.4	0.4
400	1.0	1.0	1.0	0.9	0.45	0.55	0.45	0.45
500	1.1	1.2	1.2	1.0	0.5	0.7	0.5	0.5
600	1.2	1.2	1.2	1.1	0.55	0.65	0.55	0.55
800	1.4	1.4	1.4	1.3	0.65	0.75	0.65	0.65

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:

COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

CONSULTING ENGINEERS

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SGAPI

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SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:

REV.	DATE	REMARKS

Notes:

DESIGNED BY: PKG/BK
DRAWN BY: JGG
CHECKED BY: LB/PKG
APPROVED BY: KNM

AS SHOWN (AT A1)

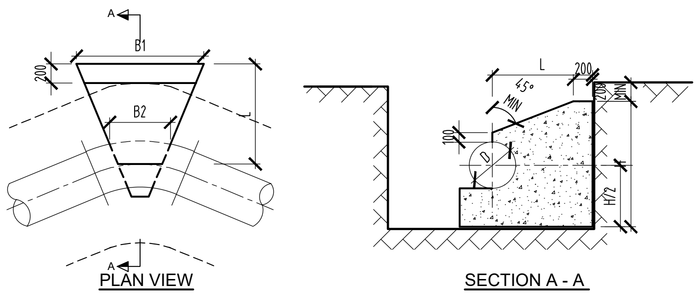
Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title:
THRUST BLOCK DETAILS - SHEET 1 OF 3

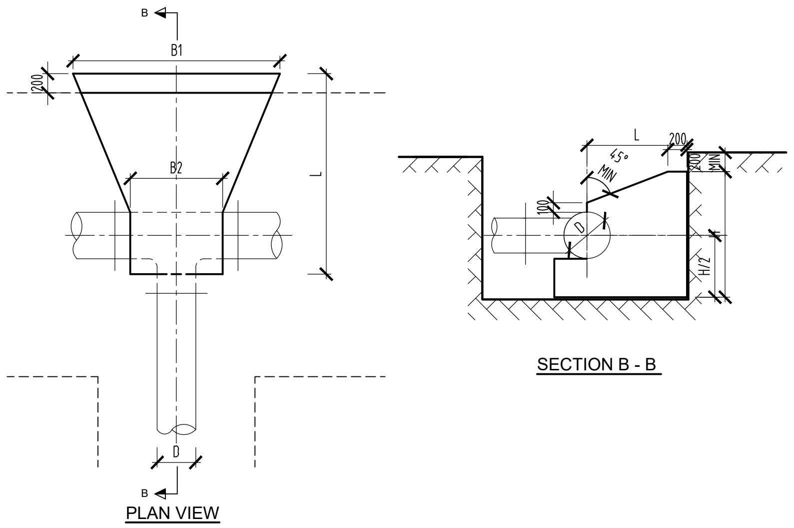
Date: APRIL 2021

Drg. No. B-KA/STD/THRUST BLOCKS/1

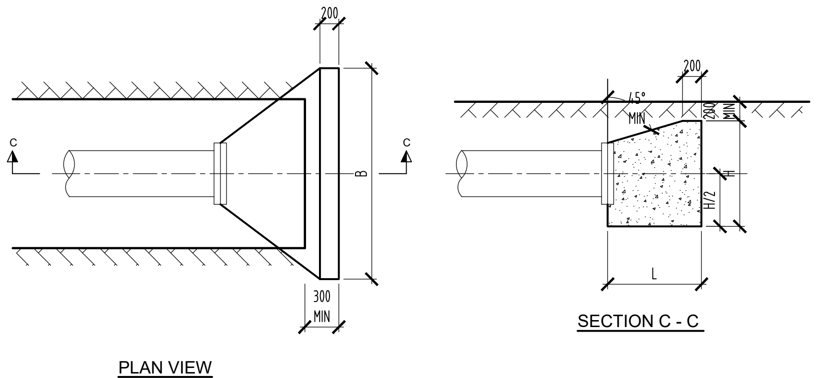
ANCHOR BLOCKS FOR BURIED SERVICES



ANCHOR BLOCKS AT HORIZONTAL BENDS (TYPE HB)



ANCHOR BLOCKS AT TEES (TYPE TY)

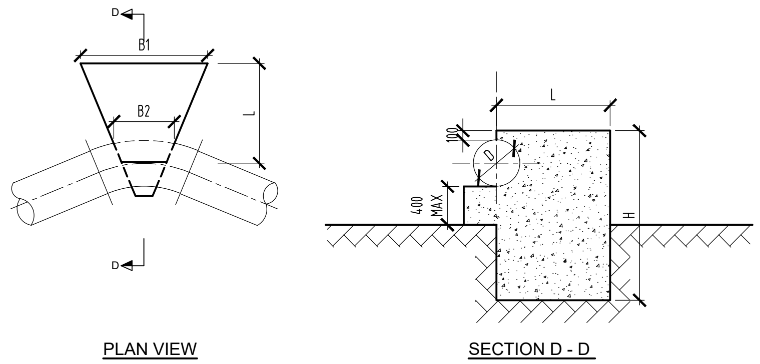


ANCHOR BLOCKS AT END CAPS (TYPE EC)

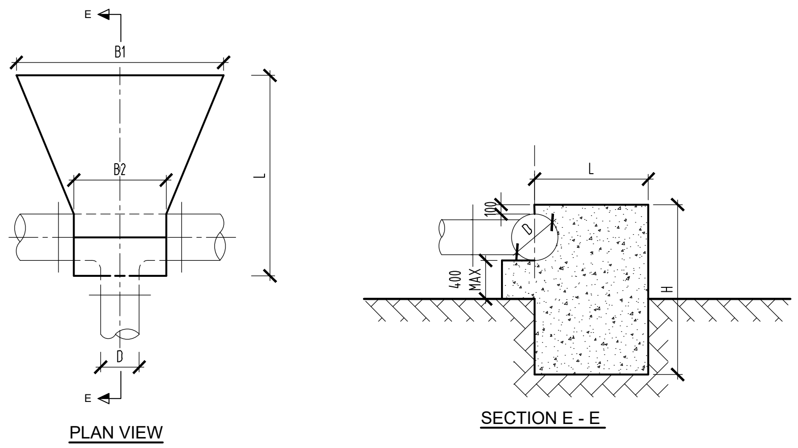
DIMENSIONS OF ANCHOR BLOCKS FOR BURIED SERVICES						
PIPE DIAMETRE (mm)	OPERATING PRESSURE (BAR)	TEST PRESSURE (BAR)	H (m)	B1 (m)	B2 (m)	L (m)
BENDS (TYPE HB) - 90°						
350	16	24	1.6	3.5	0.6	1.8
	25	37.5	2.0	4.0	0.6	1.8
BENDS (TYPE HB) - 60°						
350	16	24	1.5	2.8	0.45	1.6
	25	37.5	1.8	3.4	0.45	1.8
BENDS (TYPE HB) - 45°						
350	16	24	1.3	2.6	0.45	1.4
	25	37.5	1.7	3.0	0.45	1.7
BENDS (TYPE HB) - 22.5°						
350	16	24	1.2	1.5	0.2	1.2
	25	37.5	1.4	2.0	0.2	1.4
BENDS TYPE HB - 11.25°						
350	16	24	0.9	1.0	0.2	1.2
	25	37.5	1.2	1.2	0.2	1.2
TEE (TYPE TY)						
350	16	24	1.5	2.8	0.45	1.6
	25	37.5	1.8	3.4	0.45	1.8
END CAPS (TYPE EC)						
350	16	24	1.5	2.8	-	1.6
	25	37.5	1.8	3.4	-	1.8

DIMENSIONS OF ANCHOR BLOCKS FOR ABOVE GROUND SERVICES						
PIPE DIAMETRE (mm)	OPERATING PRESSURE (BAR)	TEST PRESSURE (BAR)	H (m)	B1 (m)	B2 (m)	L (m)
BENDS (TYPE AHB) - 90°						
350	16	24	3.0	3.0	0.6	3.5
	25	37.5	3.5	3.5	0.6	4.0
BENDS (TYPE AHB) - 60°						
350	16	24	3.0	2.5	0.45	3.0
	25	37.5	3.0	3.5	0.45	3.5
BENDS (TYPE AHB) - 45°						
350	16	24	2.5	2.5	0.45	3.0
	25	37.5	3.0	3.0	0.45	3.0
BENDS (TYPE AHB) - 22.5°						
350	16	24	2.0	2.0	0.2	2.5
	25	37.5	2.5	2.5	0.2	2.5
TEES (TYPE ATY)						
350	16	24	3.0	2.5	0.45	3.0
	25	37.5	3.0	3.5	0.45	3.5

ANCHOR BLOCKS FOR ABOVE GROUND SERVICES



ANCHOR BLOCKS AT HORIZONTAL BENDS (TYPE AHB)



ANCHOR BLOCKS AT TEES (TYPE ATY)

NOTES

1. ANCHOR BLOCKS TO BE CONSTRUCTED FROM CONCRETE CLASS 15
2. CONCRETE TO BE CAST AGAINST UNDISTURBED GROUND. WHERE DISTURBED THE SOIL AROUND ANCHOR BLOCK IS TO BE REMOVED AND FILLED WITH CONCRETE BEFORE THE PIPE IS PRESSURE TESTED.
3. WHERE ACCURATE SOIL INFORMATION IS AVAILABLE ANCHOR BLOCKS MAY BE INDIVIDUALLY DESIGNED.
4. SHUTTERED SURFACES TO BE CLASS F1
5. POLYTHENE SHALL BE USED TO PREVENT INGRESS OF FOREIGN MATTER INTO THE CONCRETE.
6. ANCHOR BLOCKS SHALL BE CAST TO LEAVE ALL PIPE JOINTS FREE.

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

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SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:

REV.	DATE	REMARKS

Notes:

DESIGNED BY: PKG/BK
DRAWN BY: JGG
CHECKED BY: LB/PKG
APPROVED BY: KNM

AS SHOWN (AT A1)

Project: SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title: THRUST BLOCK DETAILS - SHEET 2 OF 3

Date: APRIL 2021

Drg. No. B-KA/STD/THRUST BLOCKS/2

VERTICAL BENDS (TYPE DV) - DEPRESSIONS (dimensions in metres)

Pipe Diameter (mm)	Test Pressure (m)	45 deg H (m)	45 deg L (m)	45 deg B (m)	45 deg L2 (m)	45 deg Vol (m^3)	22.5 deg H (m)	22.5 deg L (m)	22.5 deg B (m)	22.5 deg L2 (m)	22.5 deg Vol (m^3)	11.25 deg H (m)	11.25 deg L (m)	11.25 deg B (m)	11.25 deg L2 (m)	11.25 deg Vol (m^3)
80	90	0.50	0.40	0.30	0.10	0.04	0.50	0.40	0.30	0.10	0.04	0.50	0.40	0.20	0.10	0.03
	150	0.50	0.40	0.30	0.10	0.04	0.50	0.40	0.30	0.10	0.04	0.50	0.40	0.20	0.10	0.03
	240	0.50	0.40	0.30	0.10	0.04	0.50	0.40	0.30	0.10	0.04	0.50	0.40	0.20	0.10	0.03
100	90	0.50	0.40	0.30	0.15	0.05	0.50	0.40	0.30	0.10	0.04	0.50	0.40	0.20	0.10	0.03
	150	0.50	0.40	0.30	0.15	0.05	0.50	0.40	0.30	0.10	0.04	0.50	0.40	0.20	0.10	0.03
	240	0.50	0.40	0.30	0.15	0.05	0.50	0.40	0.30	0.10	0.04	0.50	0.40	0.20	0.10	0.03
150	90	0.55	0.60	0.30	0.30	0.08	0.55	0.40	0.30	0.14	0.05	0.55	0.40	0.30	0.13	0.05
	150	0.55	0.70	0.40	0.30	0.11	0.55	0.50	0.30	0.14	0.06	0.55	0.50	0.30	0.13	0.06
	240	0.55	0.80	0.40	0.30	0.13	0.55	0.70	0.30	0.14	0.07	0.55	0.50	0.30	0.13	0.06
200	90	0.60	0.80	0.40	0.35	0.14	0.60	0.70	0.30	0.14	0.08	0.60	0.50	0.30	0.13	0.06
	150	0.60	0.90	0.40	0.35	0.15	0.60	0.70	0.30	0.14	0.08	0.60	0.50	0.30	0.13	0.06
	240	0.60	1.10	0.60	0.35	0.27	0.60	0.80	0.40	0.14	0.12	0.60	0.60	0.40	0.13	0.09
250	90	0.65	0.80	0.50	0.40	0.20	0.65	0.70	0.40	0.15	0.12	0.65	0.60	0.40	0.14	0.10
	150	0.65	1.00	0.70	0.40	0.32	0.65	0.80	0.50	0.15	0.16	0.65	0.60	0.40	0.14	0.10
	240	0.65	1.20	0.70	0.40	0.37	0.65	1.00	0.50	0.15	0.19	0.65	0.70	0.50	0.14	0.14
300	90	0.70	1.00	0.50	0.40	0.25	0.70	0.80	0.40	0.16	0.14	0.70	0.60	0.40	0.15	0.11
	150	0.70	1.20	0.70	0.40	0.40	0.70	1.00	0.50	0.16	0.21	0.70	0.70	0.40	0.15	0.12
	240	0.70	1.50	1.00	0.40	0.67	0.70	1.20	0.70	0.16	0.34	0.70	0.80	0.40	0.15	0.14

VERTICAL BENDS (TYPE CV) - CREST (dimensions in metres)

Pipe Diameter (mm)	Test Pressure (m)	45 deg H (m)	45 deg L (m)	45 deg B (m)	45 deg Strap (mm)	45 deg Vol (m^3)	22.5 deg H (m)	22.5 deg L (m)	22.5 deg B (m)	22.5 deg Strap (mm)	22.5 deg Vol (m^3)	11.25 deg H (m)	11.25 deg L (m)	11.25 deg B (m)	11.25 deg Strap (mm)	11.25 deg Vol (m^3)
80	90	0.60	0.80	0.70	30x4	0.28	0.50	0.50	0.50	30x4	0.12	0.40	0.40	0.40	30x4	0.07
	150	0.80	0.90	0.70	30x4	0.44	0.60	0.70	0.50	30x4	0.20	0.50	0.50	0.40	30x4	0.10
	240	0.90	1.20	0.80	30x4	0.72	0.80	0.90	0.50	30x4	0.34	0.60	0.70	0.40	30x4	0.17
100	90	0.80	1.20	0.70	30x4	0.55	0.60	0.60	0.70	30x4	0.24	0.40	0.50	0.70	30x4	0.14
	150	0.80	1.20	0.70	30x4	0.55	0.80	0.80	0.70	30x4	0.43	0.60	0.60	0.70	30x4	0.25
	240	0.90	1.40	0.80	30x4	0.82	0.80	1.20	0.70	30x4	0.62	0.70	0.70	0.70	30x4	0.34
150	90	0.80	1.20	1.00	30x4	0.78	0.70	0.90	0.80	30x4	0.48	0.60	0.70	0.70	30x4	0.29
	150	0.80	1.50	1.10	30x4	1.02	0.80	1.10	0.80	30x4	0.66	0.70	1.00	0.70	30x4	0.48
	240	0.80	1.70	1.10	30x4	1.10	0.80	1.30	0.90	30x4	0.86	0.80	1.00	0.80	30x4	0.63
200	90	0.80	1.60	1.40	40x4	1.35	0.70	1.50	0.90	30x4	0.85	0.60	1.00	0.80	30x4	0.47
	150	0.95	1.80	1.60	40x4	2.09	0.90	1.50	1.20	30x4	1.49	0.70	1.20	1.00	30x4	0.81
	240	1.00	2.00	2.00	40x6	3.00	1.00	1.60	1.60	30x4	2.35	0.80	1.40	1.20	30x4	1.29
250	90	1.10	1.60	1.20	40x4	1.73	0.80	1.30	1.10	30x4	1.05	0.60	1.20	0.90	30x4	0.62
	150	1.30	1.80	1.40	40x6	2.71	0.80	1.60	1.30	30x4	1.50	0.90	1.20	1.00	30x4	1.05
	240	1.30	2.20	1.80	60x6	4.06	1.00	1.70	1.60	40x6	2.49	0.90	1.50	1.20	40x4	1.56
300	90	1.20	1.80	1.40	60x6	2.46	1.00	1.50	1.20	60x4	1.67	0.80	1.20	1.00	60x4	0.93
	150	1.40	2.20	1.60	60x6	3.96	1.00	1.70	1.40	60x4	2.18	1.00	1.50	1.20	60x4	1.74
	240	1.60	2.50	2.20	100x6	7.09	1.20	2.00	1.80	80x4	3.95	1.00	1.70	1.20	60x4	1.96

REDUCERS- TYPE RD
(dimensions in metres)

Pipe Diameter (mm)	Test Pressure (m)	L (m)	B (m)	H (m)	Vol (m^3)
100/80	90	0.35	0.50	0.40	0.07
	150	0.35	0.55	0.45	0.09
	240	0.35	0.60	0.55	0.12
150/80	90	0.40	0.50	0.40	0.08
	150	0.40	0.60	0.40	0.10
	240	0.40	0.75	0.55	0.17
150/100	90	0.40	0.50	0.40	0.08
	150	0.40	0.60	0.40	0.10
	240	0.40	0.70	0.45	0.13
200/100	90	0.40	0.70	0.50	0.14
	150	0.40	0.80	0.70	0.22
	240	0.40	1.00	0.80	0.32
200/150	90	0.40	0.60	0.40	0.09
	150	0.40	0.65	0.40	0.10
	240	0.40	0.75	0.50	0.15
250/100	90	0.40	0.80	0.60	0.18
	150	0.40	0.90	0.70	0.24
	240	0.40	1.00	0.80	0.31
250/150	90	0.40	0.80	0.60	0.18
	150	0.40	0.85	0.70	0.23
	240	0.40	0.95	0.85	0.32
250/200	90	0.40	0.70	0.60	0.16
	150	0.40	0.75	0.70	0.20
	240	0.40	0.90	0.80	0.28
300/100	90	0.40	1.00	0.70	0.27
	150	0.40	1.30	0.90	0.46
	240	0.40	1.50	1.00	0.59
300/150	90	0.40	1.00	0.70	0.27
	150	0.40	1.25	0.80	0.39
	240	0.40	1.50	1.00	0.59
300/200	90	0.40	1.00	0.70	0.27
	150	0.40	1.00	0.80	0.31
	240	0.40	1.20	1.00	0.47
300/250	90	0.40	1.00	0.70	0.26
	150	0.40	1.00	0.80	0.30
	240	0.40	1.10	1.00	0.42

HORIZONTAL BENDS - TYPE HB (dimensions in metres)

Pipe Diameter (mm)	Test Pressure (m)	90 deg H (m)	90 deg L (m)	90 deg B (m)	90 deg L2 (m)	90 deg Vol (m^3)	45 deg H (m)	45 deg L (m)	45 deg B (m)	45 deg L2 (m)	45 deg Vol (m^3)	22.5 deg H (m)	22.5 deg L (m)	22.5 deg B (m)	22.5 deg L2 (m)	22.5 deg Vol (m^3)	11.25 deg H (m)	11.25 deg L (m)	11.25 deg B (m)	11.25 deg L2 (m)	11.25 deg Vol (m^3)
65	90	0.30	0.30	0.60	0.10	0.04	0.20	0.21	0.60	0.10	0.02										
	150	0.39	0.40	0.60	0.10	0.06	0.28	0.28	0.60	0.10	0.03										
	240	0.50	0.51	0.60	0.10	0.10	0.36	0.37	0.60	0.10	0.05	0.24	0.25	0.60	0.10	0.03					
80	90	0.32	0.32	0.60	0.10	0.04	0.22	0.22	0.60	0.10	0.02										
	150	0.42	0.43	0.60	0.10	0.07	0.30	0.30	0.60	0.10	0.04	0.19	0.20	0.60	0.10	0.02					
	240	0.54	0.54	0.60	0.10	0.11	0.39	0.39	0.60	0.10	0.06	0.26	0.27	0.60	0.10	0.03	0.17	0.17	0.60	0.10	0.01
100	90	0.46	0.46	0.65	0.15	0.09	0.33	0.33	0.65	0.15	0.05	0.22	0.23	0.65	0.10	0.02					
	150	0.60	0.60	0.65	0.15	0.15	0.43	0.44	0.65	0.15	0.08	0.30	0.31	0.65	0.10	0.04	0.20	0.20	0.65	0.10	0.02
	240	0.76	0.76	0.65	0.15	0.23	0.55	0.56	0.65	0.15	0.13	0.39	0.40	0.65	0.10	0.07	0.26	0.27	0.65	0.10	0.03
150	90	0.67	0.67	0.65	0.30	0.19	0.49	0.50	0.65	0.20	0.10	0.34	0.35	0.65	0.14	0.05	0.22	0.23	0.65	0.13	0.03
	150	0.86	0.87	0.65	0.30	0.30	0.64	0.64	0.65	0.20	0.17	0.45	0.46	0.65	0.14	0.09	0.31	0.31	0.65	0.13	0.04
	240	1.01	1.18	0.65	0.30	0.46	0.81	0.81	0.65	0.20	0.26	0.58	0.58	0.65	0.14	0.13	0.40	0.41	0.65	0.13	0.07
200	90	0.87	0.87	0.70	0.35	0.32	0.64	0.65	0.70	0.20	0.18	0.46	0.46	0.70	0.14	0.09	0.31	0.32	0.70	0.13	0.05
	150	1.05	1.19	0.70	0.35	0.51	0.83	0.83	0.70	0.20	0.28	0.59	0.60	0.70	0.14	0.15	0.41	0.42	0.70	0.13	0.08
	240	1.05	1.91	0.70	0.35	0.79	1.04	1.05	0.70	0.20	0.43	0.75	0.76	0.70	0.14	0.23	0.53	0.54	0.70	0.13	0.12
250	90	1.05	1.06	0.70	0.40	0.45	0.78	0.79	0.70	0.25	0.24	0.56	0.57	0.70	0.15	0.13	0.39	0.39	0.70	0.14	0.07
	150	1.09	1.70	0.70	0.40	0.72	1.00	1.01	0.70	0.25	0.40	0.73	0.73	0.70	0.15	0.21	0.51	0.52	0.70	0.14	0.11
	240	1.09	2.74	0.70	0.40	1.13	1.09	1.48	0.70	0.25	0.62	0.91	0.92	0.70	0.15	0.32	0.65	0.66	0.70	0.14	0.17
300	90	1.13	1.49	0.75	0.40	0.69	0.96	0.97	0.75	0.25	0.38	0.69	0.70	0.75	0.16	0.20	0.48	0.49	0.75	0.15	0.10
	150	1.13	2.50	0.75	0.40	1.12	1.13	1.35	0.75	0.25	0.61	0.89	0.89	0.75	0.16	0.32	0.63	0.64	0.75	0.15	0.17
	240	1.13	4.01	0.75	0.40	1.76	1.13	2.17	0.75	0.25	0.96	1.11	1.12	0.75	0.16	0.49	0.80	0.81	0.75	0.15	0.26

TEES AND ENDS - TYPE TY
(dimensions in metres)

Branch Diameter (mm)	Test Pressure (m)	Tees and Ends H (m)	L (m)	B * (m)	L2 (m)	Vol (m^3)
65	90	0.24	0.25	0.60	0.07	0.03
	150	0.33	0.33	0.60	0.07	0.04
	240	0.42	0.43	0.60	0.07	0.07
80	90	0.26	0.26	0.60	0.08	0.03
	150	0.35	0.35	0.60	0.08	0.05
	240	0.45	0.46	0.60	0.08	0.08
100	90	0.39	0.39	0.65	0.10	0.07
	150	0.50	0.51	0.65	0.10	0.10
	240	0.64	0.64	0.65	0.10	0.16
150	90	0.57	0.57	0.65	0.15	0.13
	150	0.73	0.74	0.65	0.15	0.21
	240	0.92	0.93	0.65	0.15	0.33
200	90	0.74	0.74	0.70	0.20	0.24
	150	0.94	0.95	0.70	0.20	0.37
	240	1.05	1.36	0.70	0.20	0.57
250	90	0.89	0.90	0.70	0.25	0.34
	150	1.09	1.21	0.70	0.25	0.53
	240	1.09	1.94	0.70	0.25	0.82
300	90	1.09	1.10	0.75	0.30	0.52
	150	1.13	1.77	0.75	0.30	0.82
	240	1.13	2.83	0.75	0.30	1.27

NOTES

1. DIAMETERS GIVEN ON THE TABLES ARE PIPE NOMINAL BORE SIZES.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WTH DRG. No. ....

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:
COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
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CONSULTING ENGINEERS
SARI CONSULTING LTD
SGAPI
gath CONSULTING ENGINEERS
SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:
REV. | DATE | REMARKS

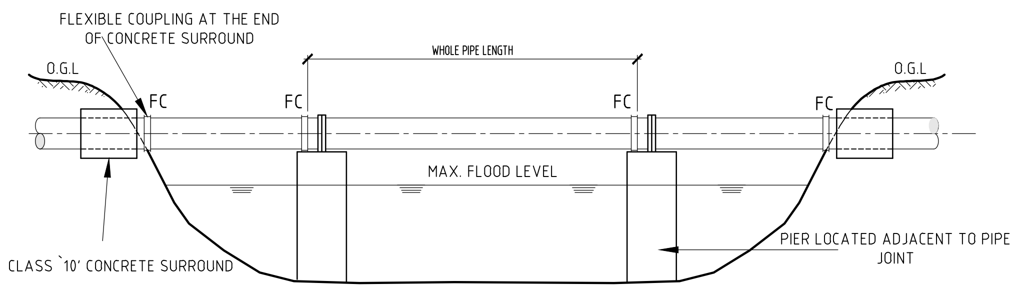
Notes:

DESIGNED BY: PKG/BK
DRAWN BY: JGG
CHECKED BY: LB/PKG
APPROVED BY: KNM
AS SHOWN (AT A1)

Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

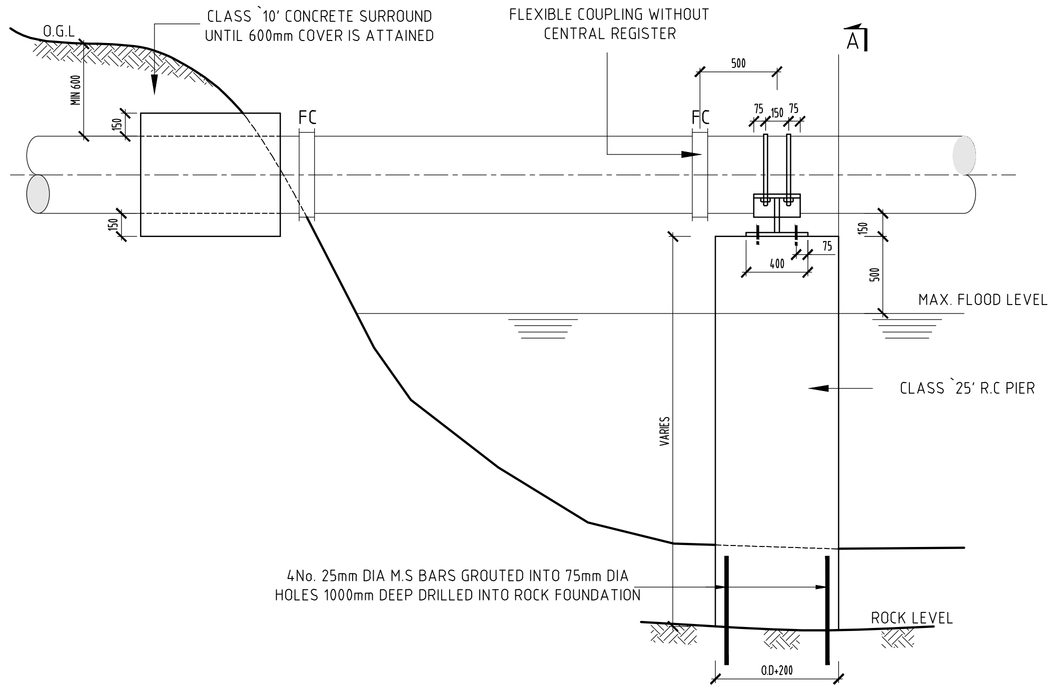
Drawing Title:
THRUST BLOCK DETAILS - SHEET 3 OF 3

Date: APRIL 2021
Drg. No. B-KA/STD/THRUST BLOCKS/3



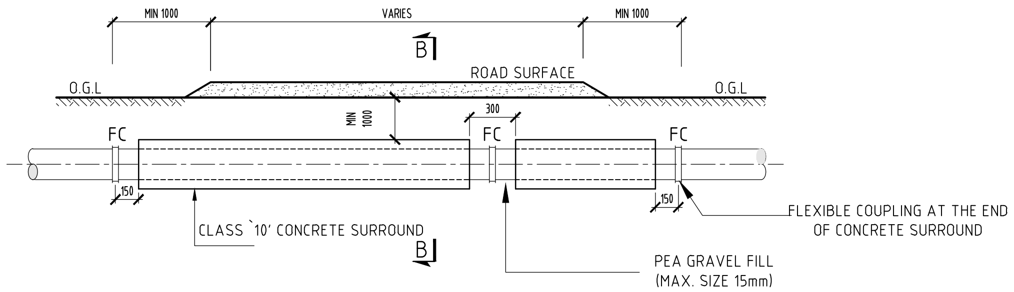
TYPICAL RIVER OVERCROSSING

N.T.S



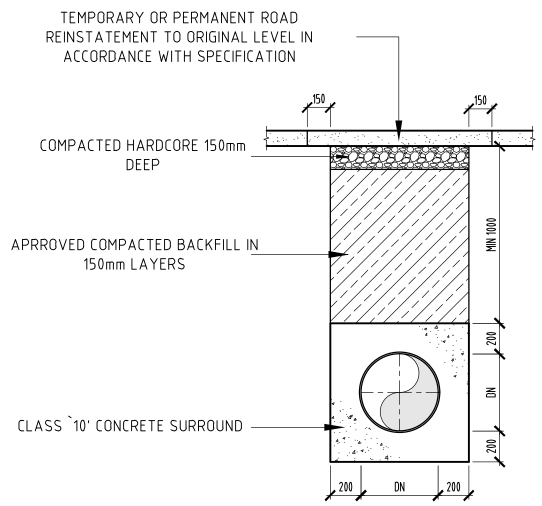
TYPICAL RIVER OVERCROSSING - DETAILS

N.T.S



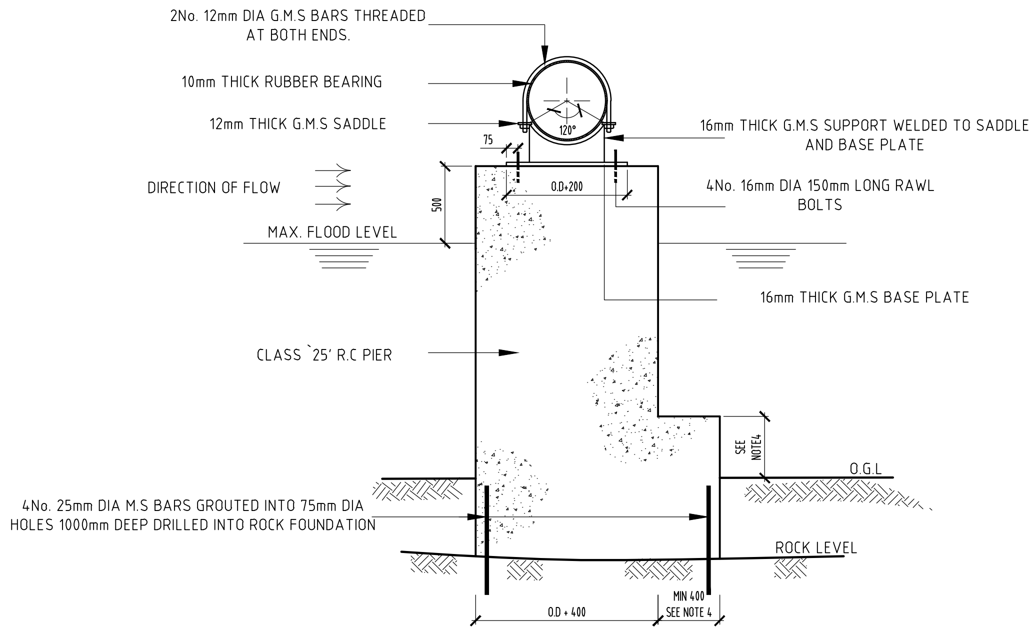
TYPICAL ROAD CROSSING

N.T.S



SECTION B-B

N.T.S



SECTION N A-A

N.T.S

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:

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Revisions:		
REV.	DATE	REMARKS

Notes:

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APPROVED	BY:	KNM

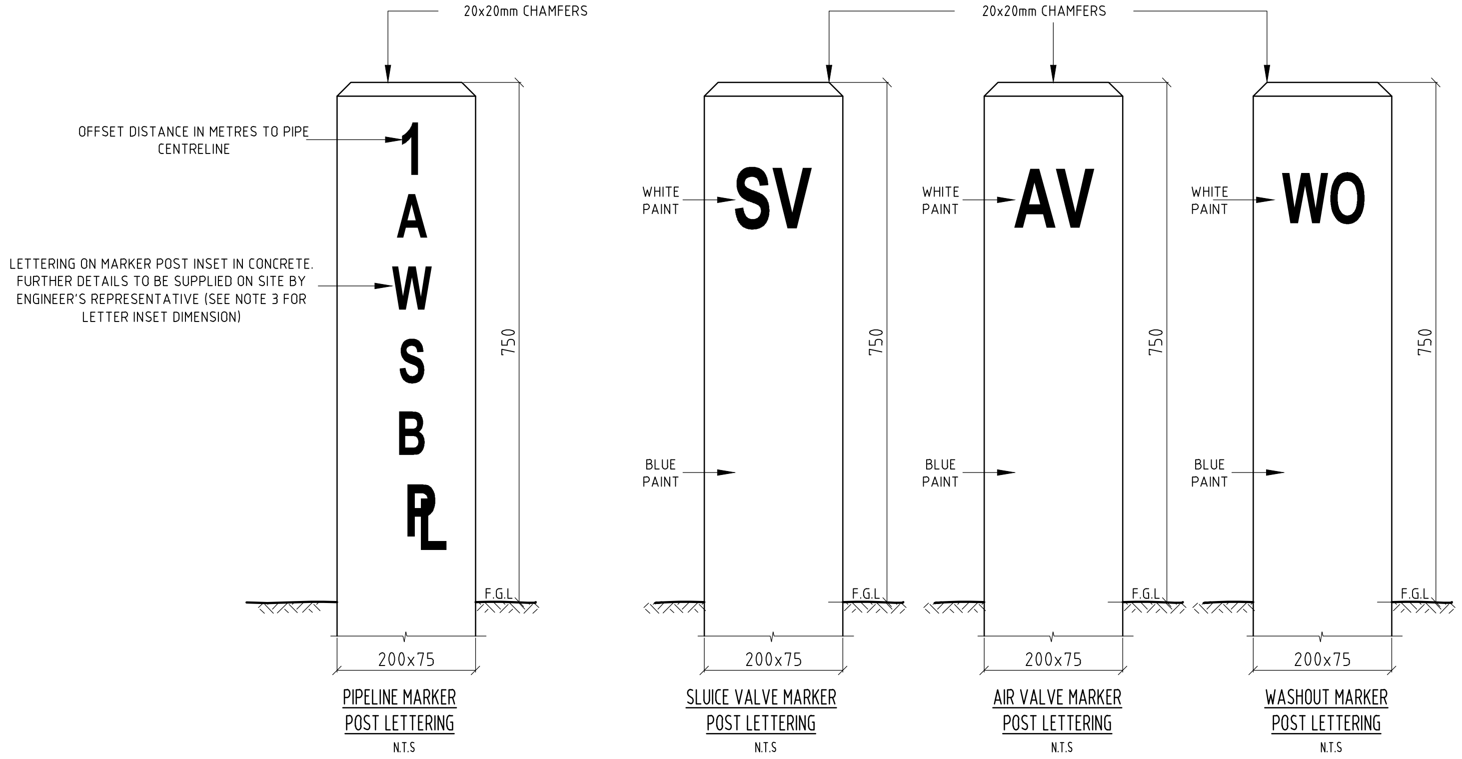
AS SHOWN (AT A1)

Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title:
TYPICAL STREAM/RIVER CROSSING DETAILS

Date: APRIL 2021

Drg. No. B-KA/STD/CROSSINGS/1



PIPELINE MARKER POST LETTERING
N.T.S

SLUICE VALVE MARKER POST LETTERING
N.T.S

AIR VALVE MARKER POST LETTERING
N.T.S

WASHOUT MARKER POST LETTERING
N.T.S

MARKER POST ELEVATIONS
(SECTION SIMILAR TO MARKER POST FOR PIPELINE)

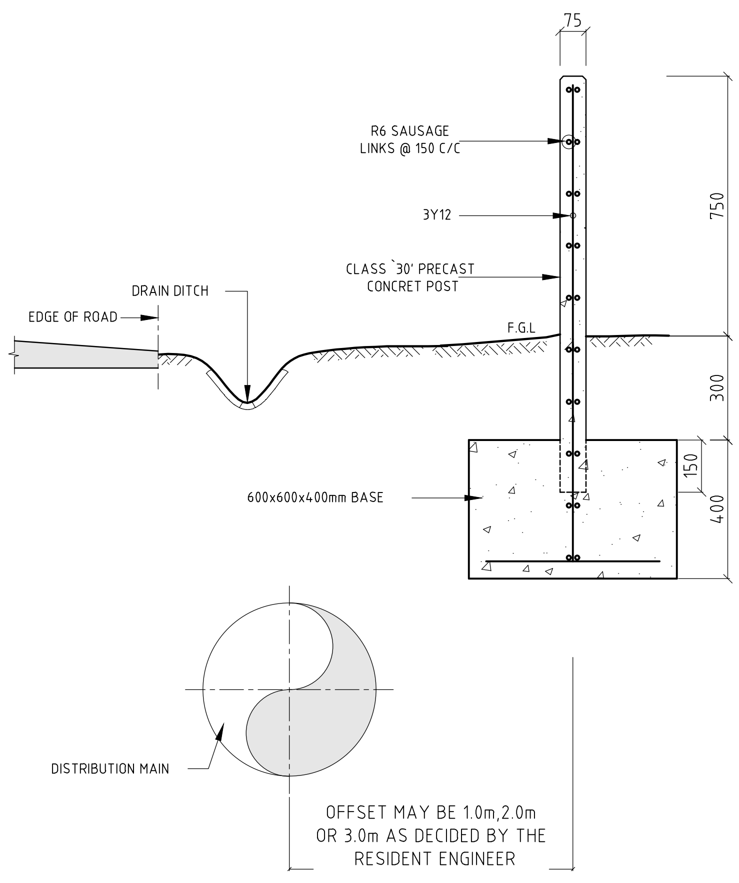
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.

2. ALL CORNERS OF PRECAST UNITS TO HAVE A CHAMFER OF 20mm

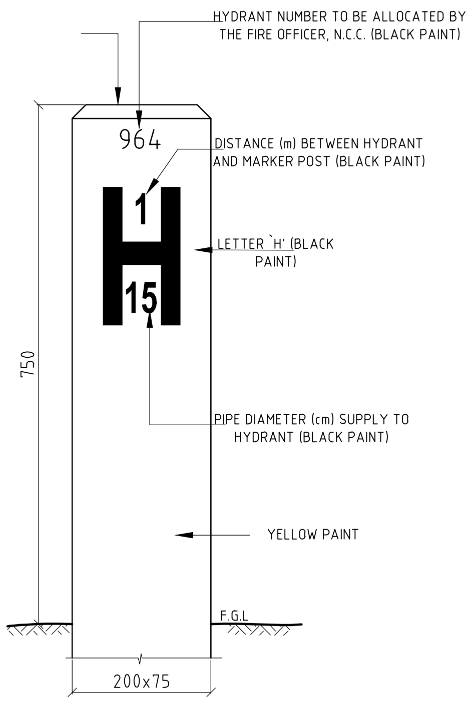
3. LETTERING ON MARKER POSTS TO BE ENGRAVED ABOUT 8mm IN CONCRETE

4. MARKER POSTS TO BE POSITIONED IN SAFE LOCATIONS WHERE POSSIBLE AGAINST BOUNDARY OF ROAD RESERVE

5. QUARRY DUST SHALL NOT HAVE ANY GRAINS OF DIAMETER GREATER THAN 5mm AND FINES OF DIAMETER LESS THAN 0.05mm SHALL NOT EXCEED 15%



MARKER POST (FOR PIPELINE) TYPICAL SECTION
N.T.S



FIRE HYDRANT MARKER POST LETTERING
N.T.S

LEGEND:

F.G.L	-FINISHED GROUND LEVEL
DN	-NOMINAL DIAMETER

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

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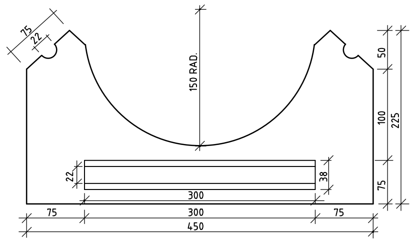
AS SHOWN (AT A1)

Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

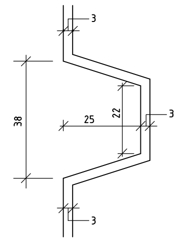
Drawing Title:
TYPICAL MARKER POSTS

Date: APRIL 2021

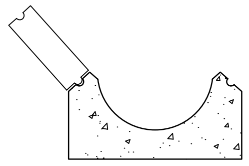
Drg. No. B-KA/STD/MARKER POSTS/1



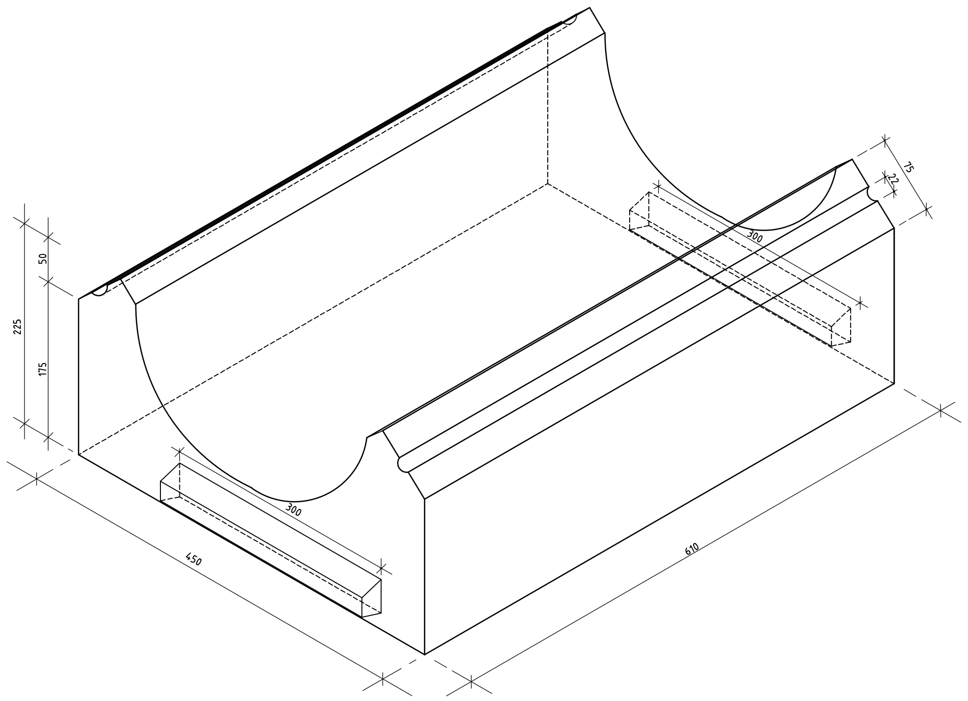
PRECAST CONCRETE
TYPE 'A' INVERT BLOCK
NTS



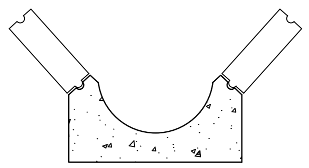
DETAIL OF JOINT
NTS



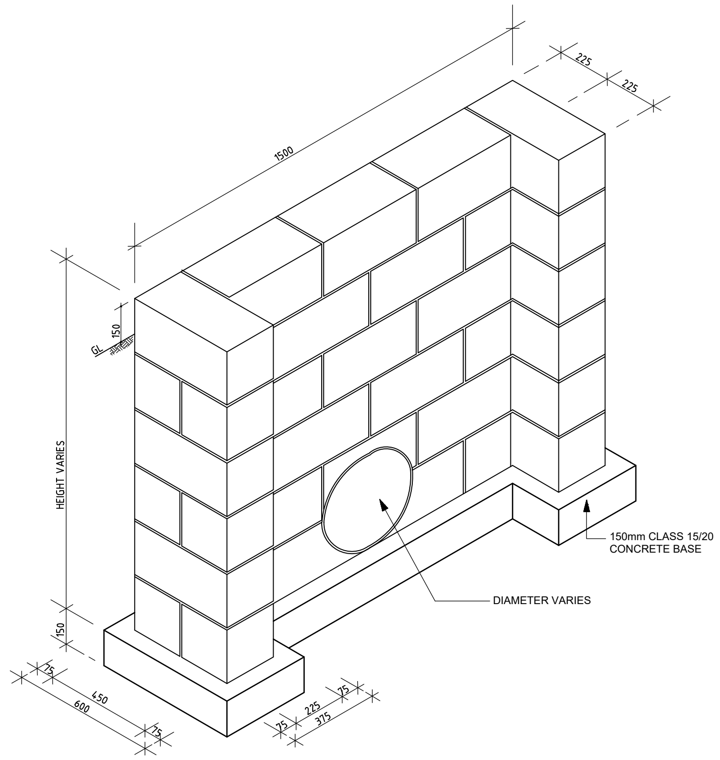
TYPE 'A' INVERT BLOCK
AND ONE COURSE
NTS



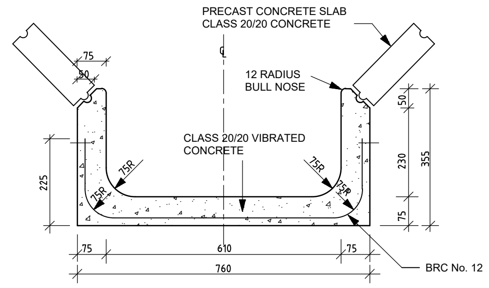
ISOMETRIC VIEW OF INVERT BLOCK TYPE 'A'
NTS



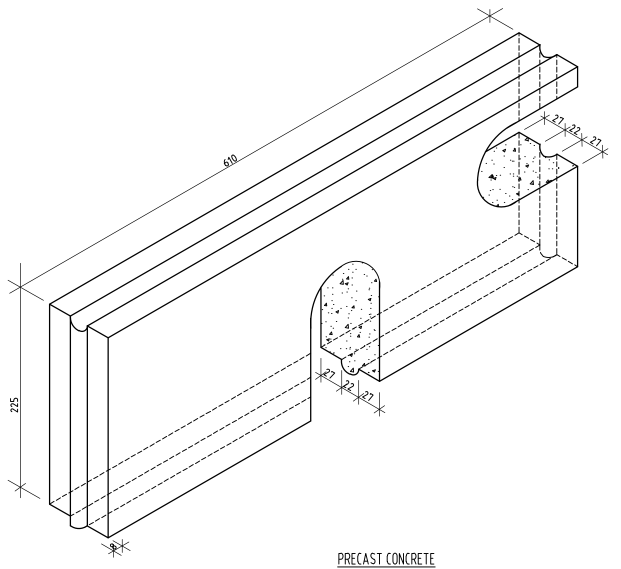
INVERT BLOCK TYPE 'A'
AND TWO COURSES
NTS



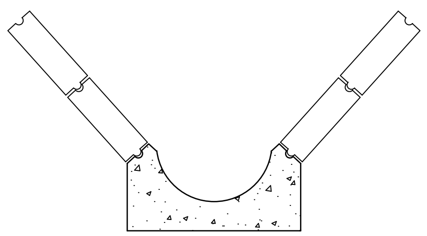
DETAIL OF HEAD WALL
NTS



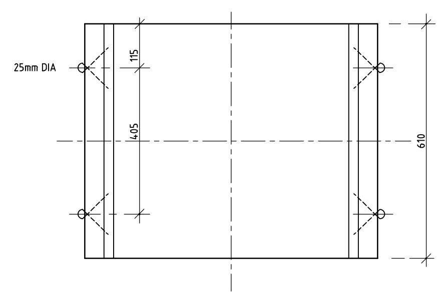
SECTION - I.B.D. TYPE 'B'
NTS



PRECAST CONCRETE
SLAB DETAIL
NTS



INVERT BLOCK TYPE 'A'
AND FOUR COURSES
NTS



PLAN
DETAILS OF INVERT BLOCK TYPE 'B'
NTS

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:

COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

CONSULTING ENGINEERS

SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:		
REV.	DATE	REMARKS

Notes:

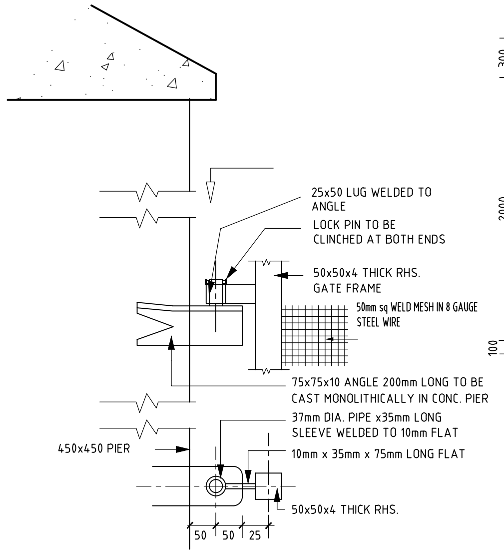
	BY:	
DESIGNED	BY:	PKG/BK
DRAWN	BY:	JGG
CHECKED	BY:	LB/PKG
APPROVED	BY:	KNM

AS SHOWN (AT A1)

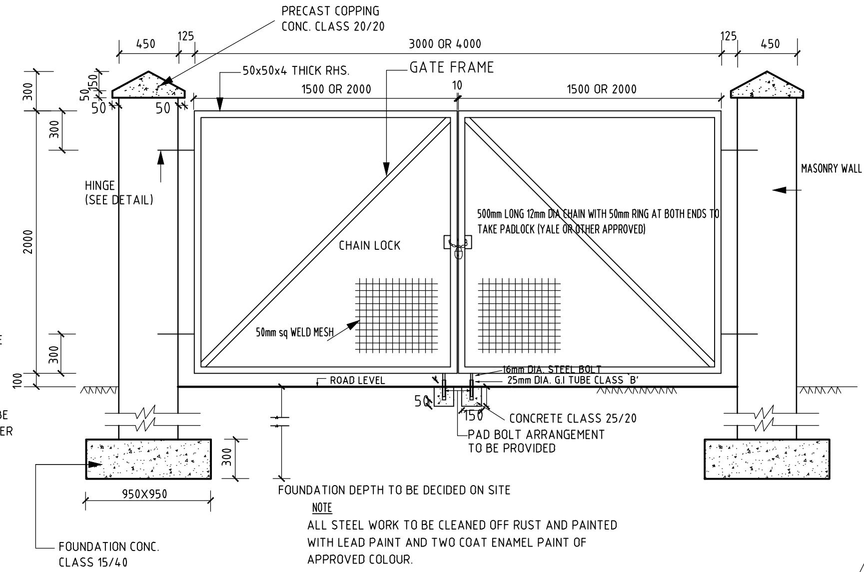
Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title:
THRUST BLOCK DRAIN AND HEAD WALL DETAILS

Date: APRIL 2021 | Drg. No. B-KA/STD/DRAINS/1



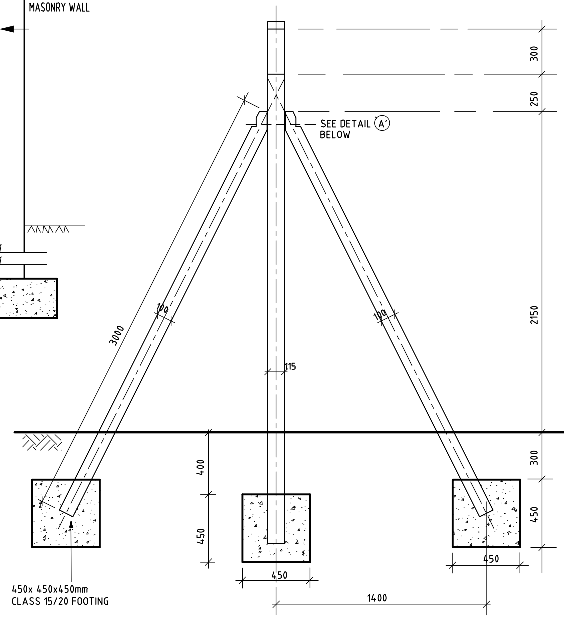
DETAILS OF HINGE
(VIEW AT Y - Y)
NTS



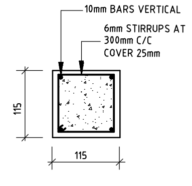
ELEVATION
NTS

DETAILS OF 3m & 4m WIDE GATE

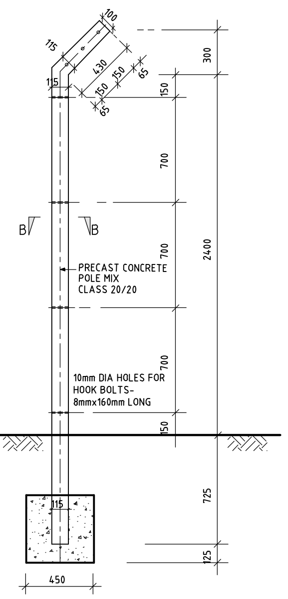
DETAILS OF PRECAST CONCRETE POSTS FOR CHAIN LINK FENCE



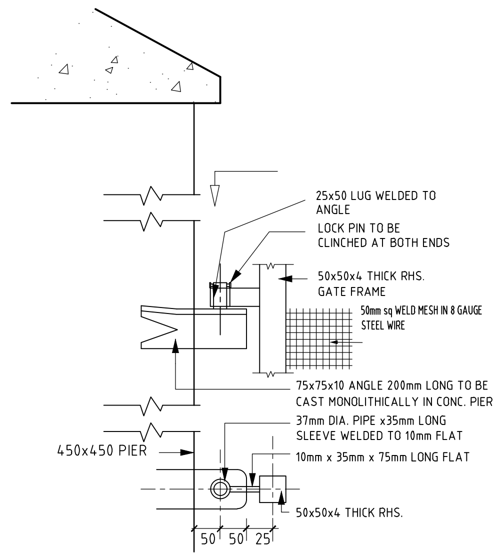
DETAILS OF STRAINING POST FOR CHAIN LINK FENCE AT 33.3m C/s.
NTS



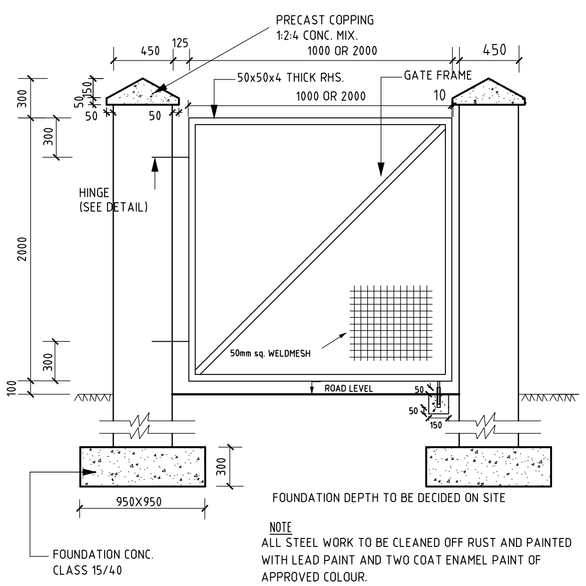
SECTION B - B
SCALE 1:10
NOTE:
CONCRETE EDGES OF POSTS TO HAVE 25x25mm CHAMFER



DETAILS OF SINGLE P.C.C. POST AT 3.30m C/s.
NTS

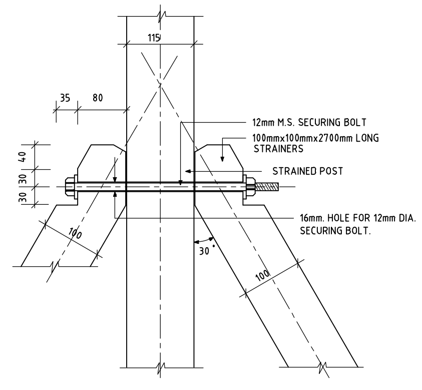


DETAILS OF HINGE
(VIEW AT Y - Y)
NTS



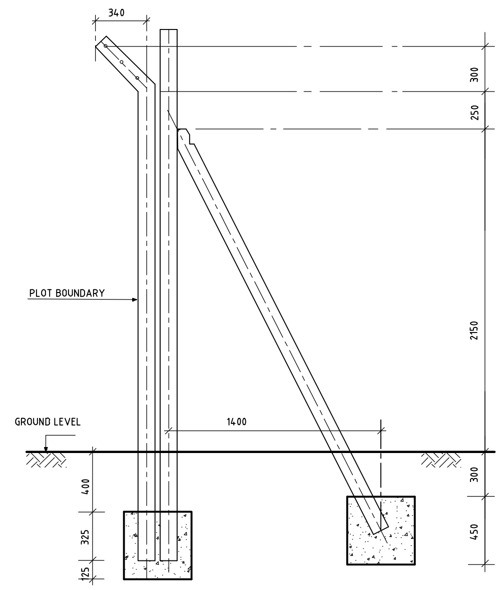
ELEVATION
NTS

DETAILS OF 1m WIDE & 2m WIDE GATE



DETAIL 'A'
NTS

NOTES
a) APPROXIMATELLY EVERY 10th POST AND ALL CORNER POST TO BE STRAINED
b) POST TO BE AT 3300mm CENTRES
c) TOP OF ALL POSTS TO BE KEPT IN UNIFORM LINE.



DETAILS OF CORNER POSTS
NTS

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:
COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
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SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:

REV.	DATE	REMARKS

Notes:

DESIGNED	BY:	PKG/BK
DRAWN	BY:	JGG
CHECKED	BY:	LB/PKG
APPROVED	BY:	KNM

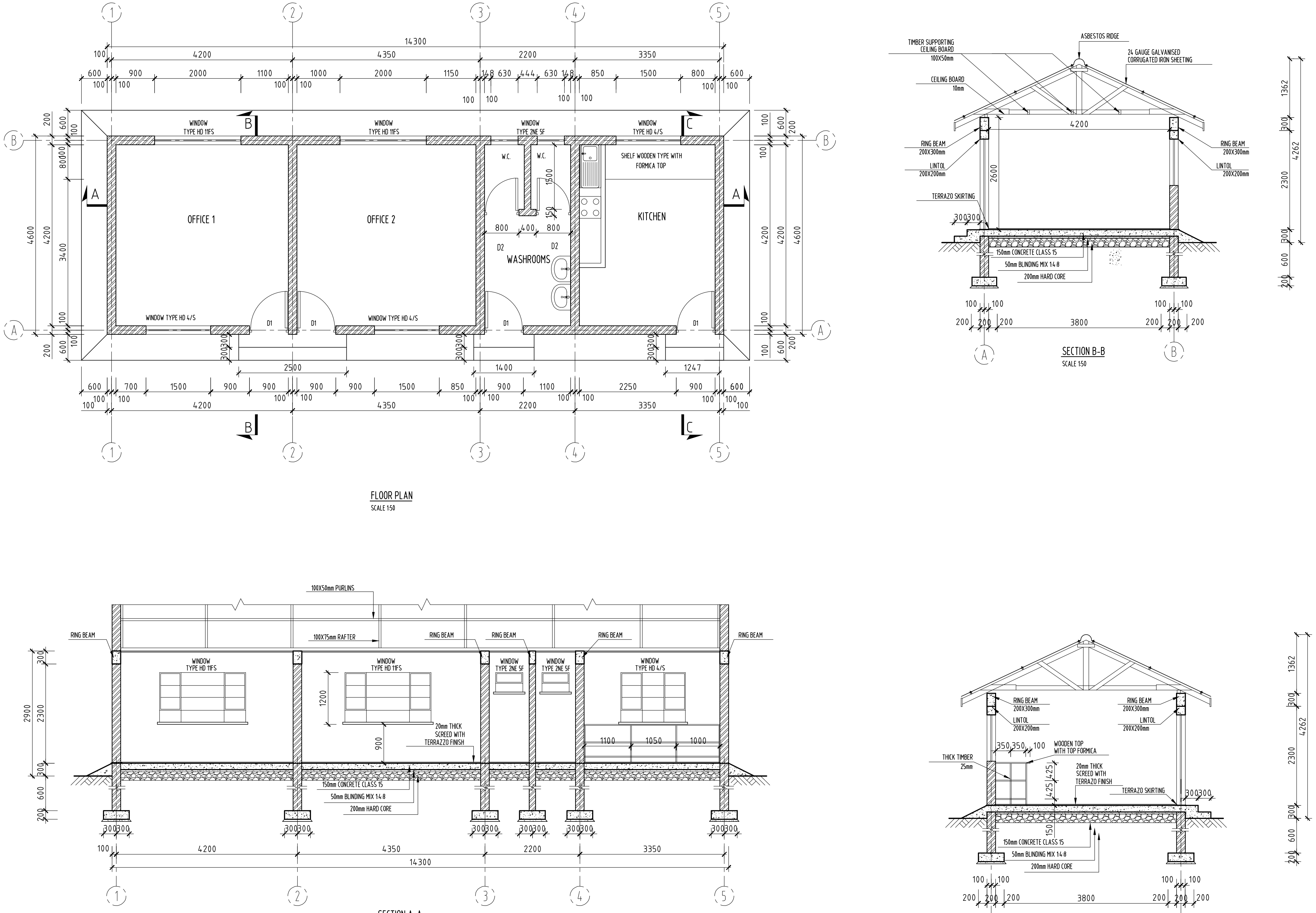
AS SHOWN (AT A1)

Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title:
GATE AND FENCING POSTS DETAILS

Date: APRIL 2021
Drg. No. B-KA/STD/GATE AND FENCE/1

NOTES
1. All dimensions are in millimeters unless otherwise stated.



FLOOR PLAN
SCALE 1:50

SECTION B-B
SCALE 1:50

SECTION A-A
SCALE 1:50

SECTION C-C
SCALE 1:50

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:
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Revisions:		
REV.	DATE	REMARKS

Notes:

SURVEYED	BY:	SN/JM
DESIGNED	BY:	PKG/BK
DRAWN	BY:	JGG
CHECKED	BY:	LB/PKG
APPROVED	BY:	KNM

AS SHOWN (AT A1)

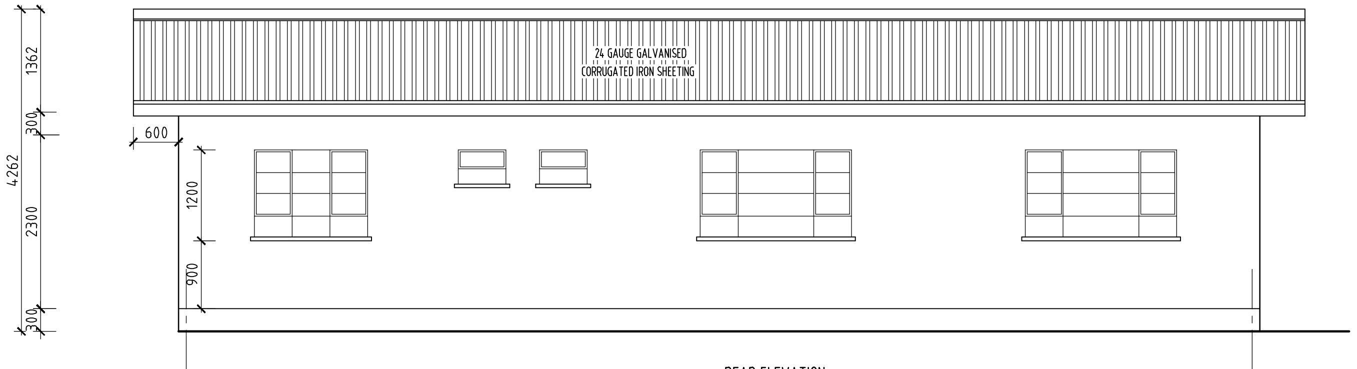
Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title:
PROPOSED OFFICE BLOCK
PLAN AND SECTIONS

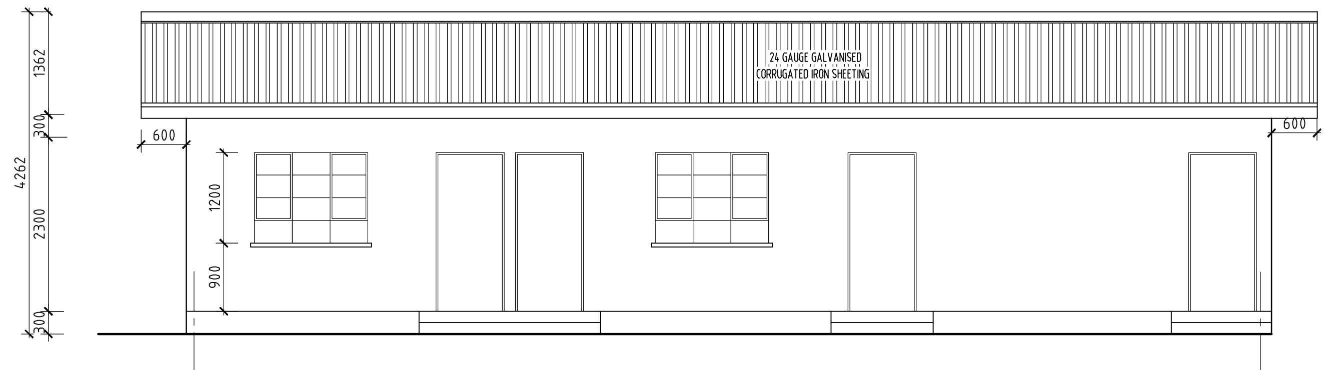
Date: APRIL 2021
Drg. No. B-KA/OFFICE BLOCK/01

NOTES

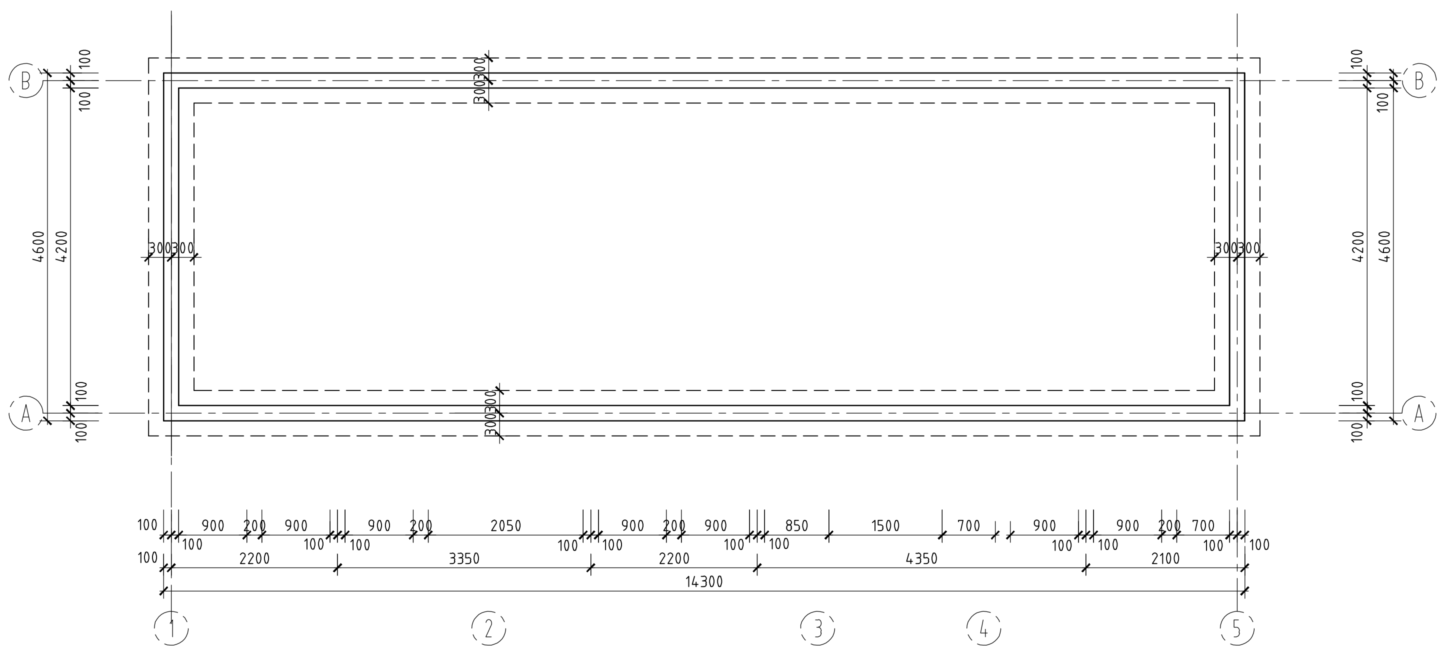
1. All dimensions are in millimeters unless otherwise stated.



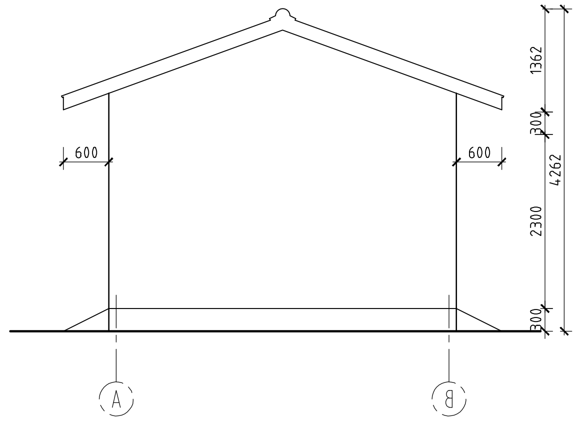
REAR ELEVATION
SCALE 1:50



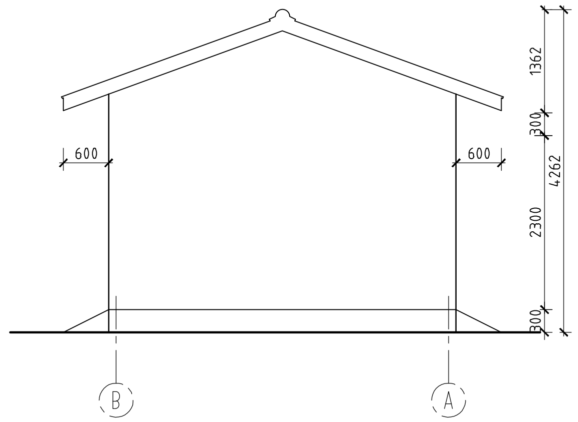
FRONT ELEVATION
SCALE 1:50



STRIP FOUNDATION PLAN
SCALE 1:50



LEFT HAND ELEVATION
SCALE 1:50



RIGHT HAND ELEVATION

Project: **Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks**

Client:

COAST WATER WORKS DEVELOPMENT AGENCY
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Revisions:

REV.	DATE	REMARKS

Notes:

SURVEYED	BY:	SN/JM
DESIGNED	BY:	PKG/BK
DRAWN	BY:	JGG
CHECKED	BY:	LB/PKG
APPROVED	BY:	KNM

AS SHOWN (AT A1)

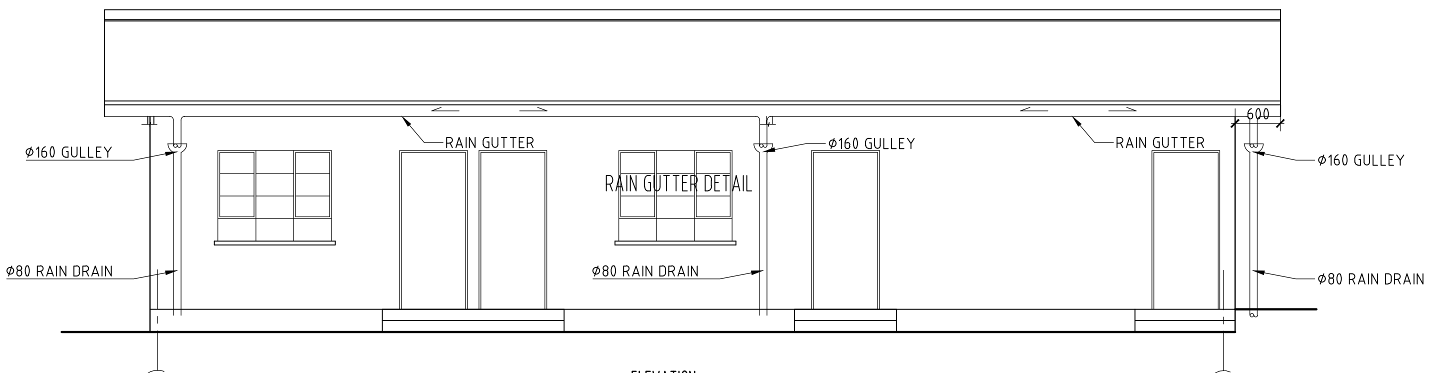
Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title:
PROPOSED OFFICE BLOCK
FOUNDATION PLAN AND ELEVATIONS

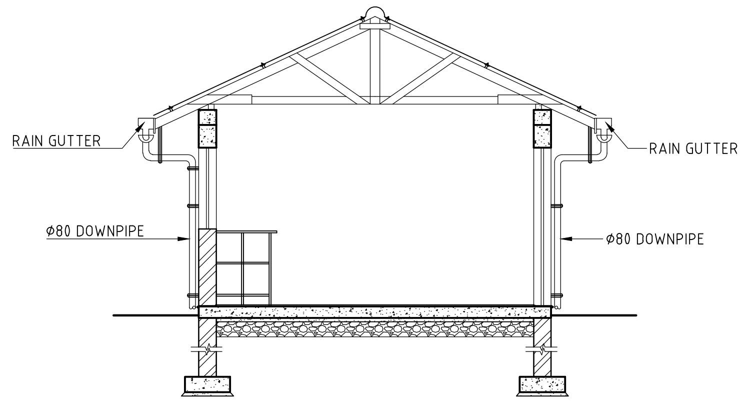
Date: APRIL 2021 | Drg. No. B-KA/OFFICE BLOCK/02

NOTES

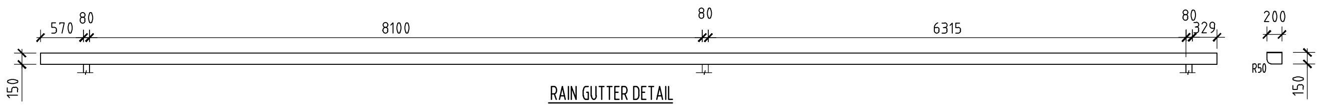
1. All dimensions are in millimeters unless otherwise stated.



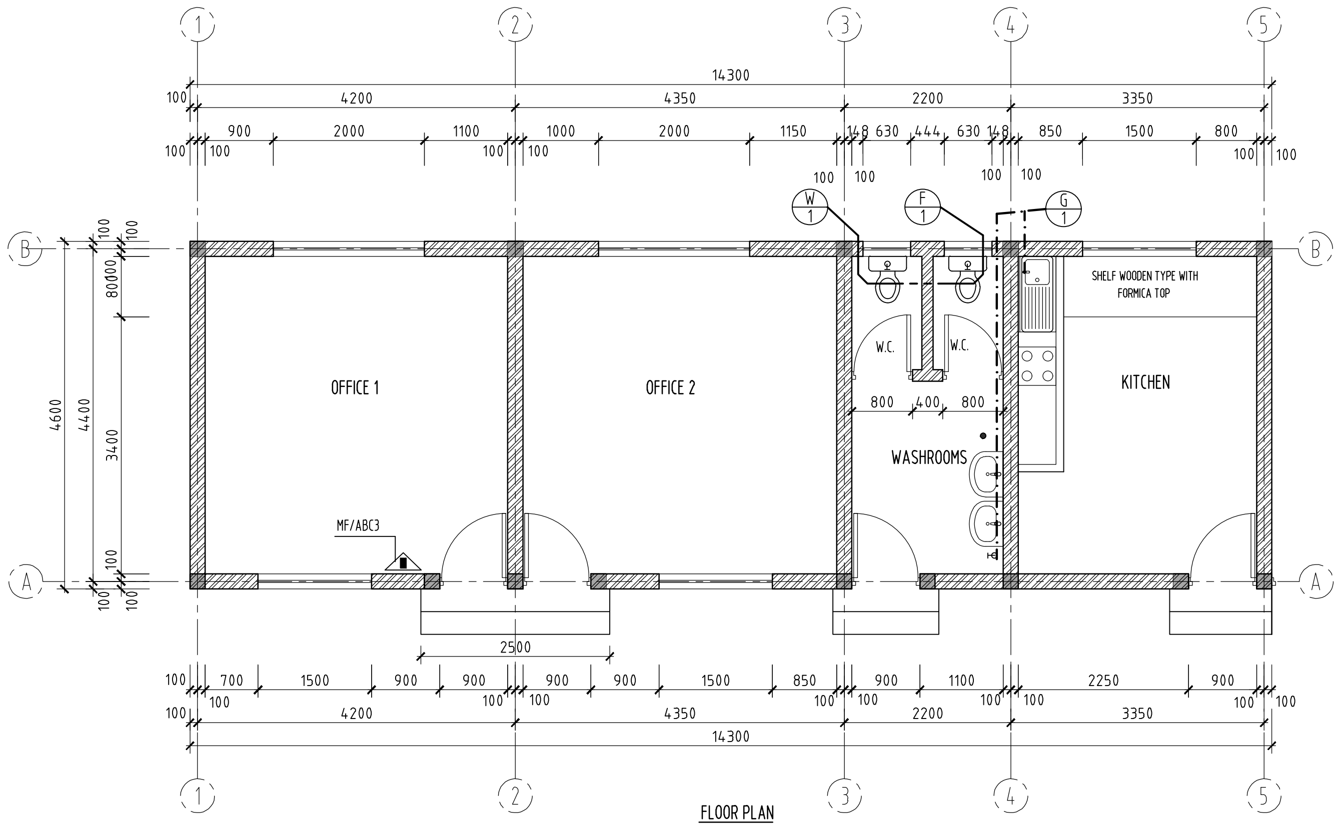
ELEVATION
SCALE 1:50



RAINWATER DOWN PIPE PROFILE
SCALE 1:50



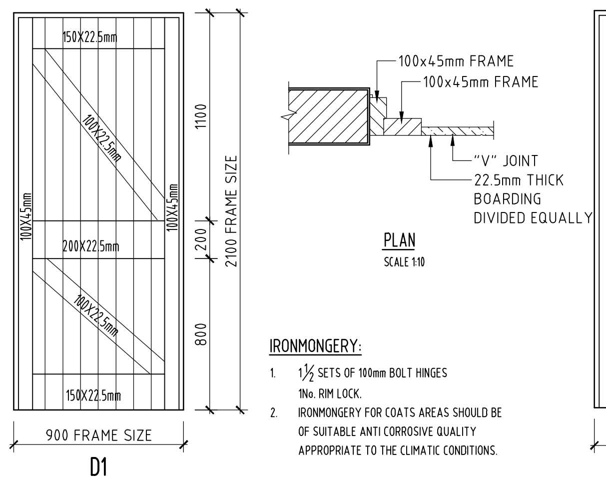
RAIN GUTTER DETAIL
SCALE 1:50



FLOOR PLAN
SCALE 1:50

DOOR DETAILS

FRAMED LEDGED AND BRACED DOOR
GLOSS PAINT FINISH



D1

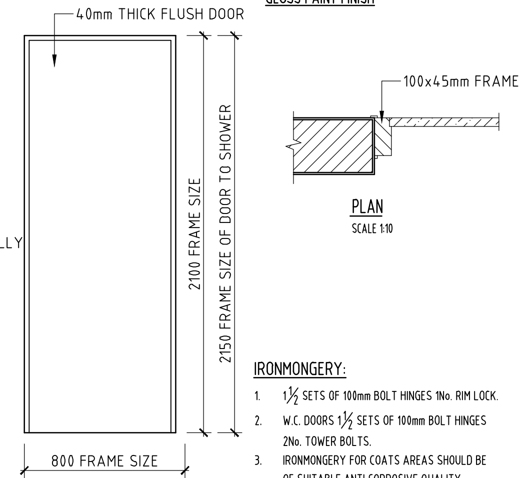
ELEVATION
SCALE 1:20

PLAN
SCALE 1:10

IRONMONGERY:

1. 1½ SETS OF 100mm BOLT HINGES 1No. RIM LOCK.
2. IRONMONGERY FOR COATS AREAS SHOULD BE OF SUITABLE ANTI CORROSIVE QUALITY APPROPRIATE TO THE CLIMATIC CONDITIONS.

FLUSH DOOR
GLOSS PAINT FINISH



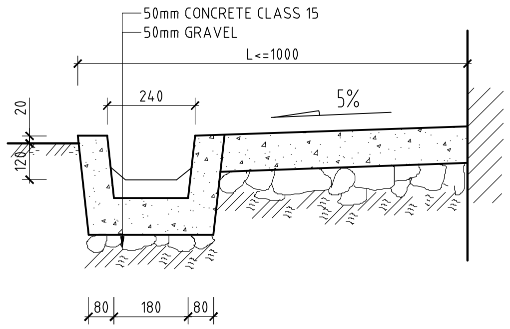
D2

ELEVATION
SCALE 1:20

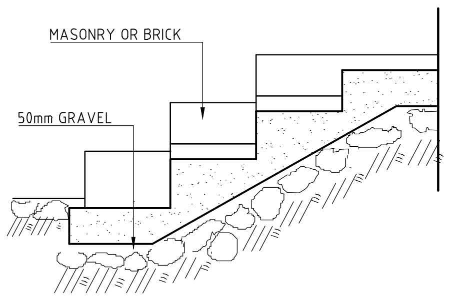
PLAN
SCALE 1:10

IRONMONGERY:

1. 1½ SETS OF 100mm BOLT HINGES 1No. RIM LOCK.
2. W.C. DOORS 1½ SETS OF 100mm BOLT HINGES 2No. TOWER BOLTS.
3. IRONMONGERY FOR COATS AREAS SHOULD BE OF SUITABLE ANTI CORROSIVE QUALITY APPROPRIATE TO THE CLIMATIC CONDITIONS.



SLAB AND DRAIN SLOPE
SCALE 1:10



STEP DETAIL
SCALE 1:10

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:
COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

CONSULTING ENGINEERS
SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:		
REV.	DATE	REMARKS

Notes:

SURVEYED	BY:	SN/JM
DESIGNED	BY:	PKG/BK
DRAWN	BY:	JGG
CHECKED	BY:	LB/PKG
APPROVED	BY:	KNM

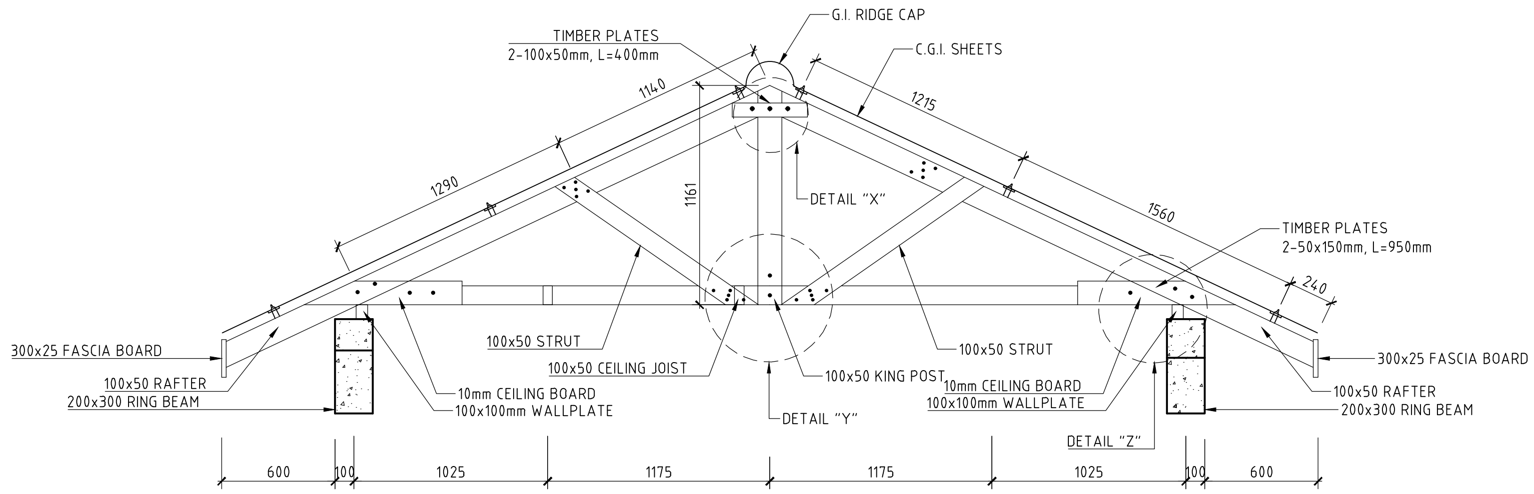
AS SHOWN (AT A1)

Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

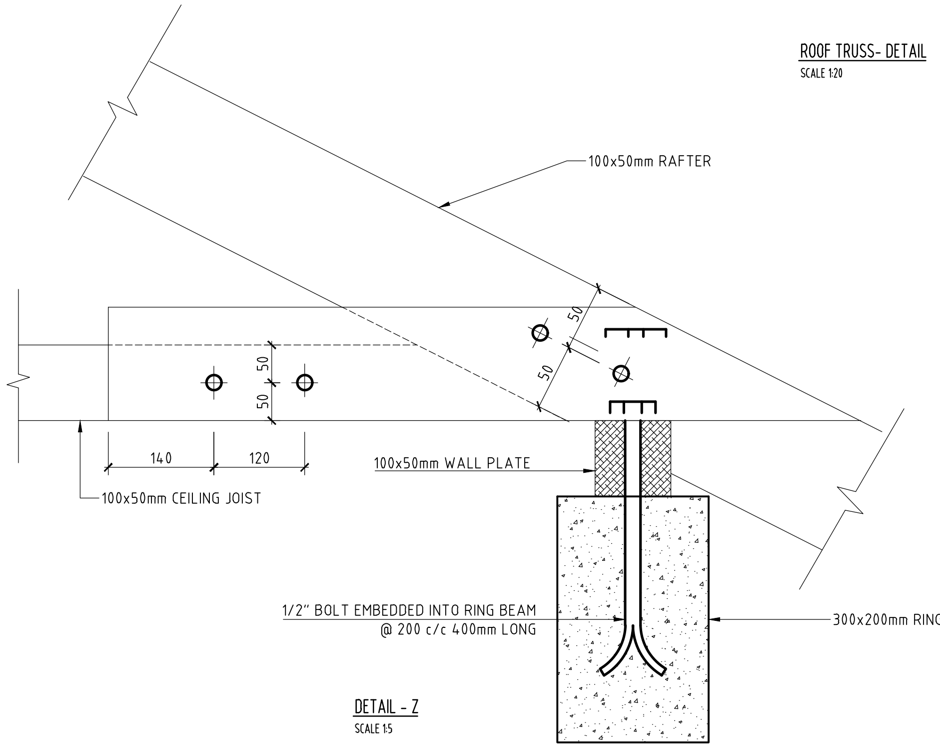
Drawing Title:
PROPOSED OFFICE BLOCK
RAIN WATER/DOOR/DRAIN/STEP DETAILS

Date: APRIL 2021 | Drg. No. B-KA/OFFICE BLOCK/03

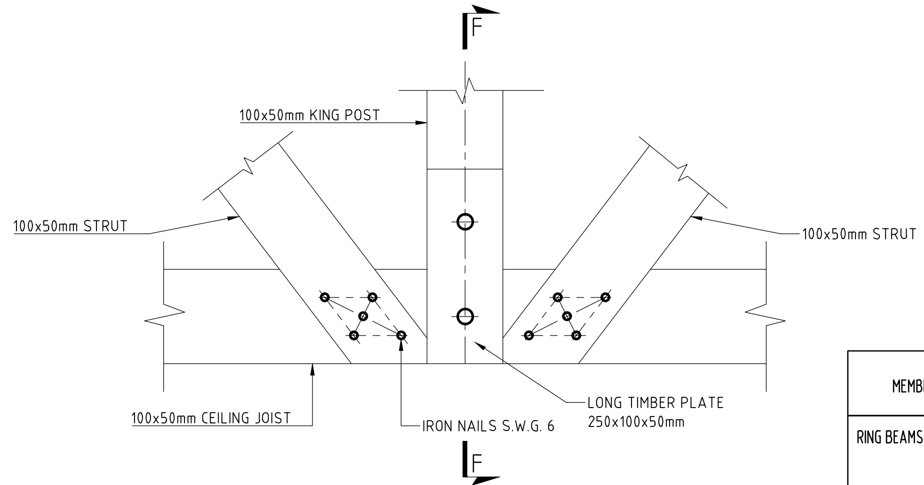
NOTES
1. All dimensions are in millimeters unless otherwise stated.



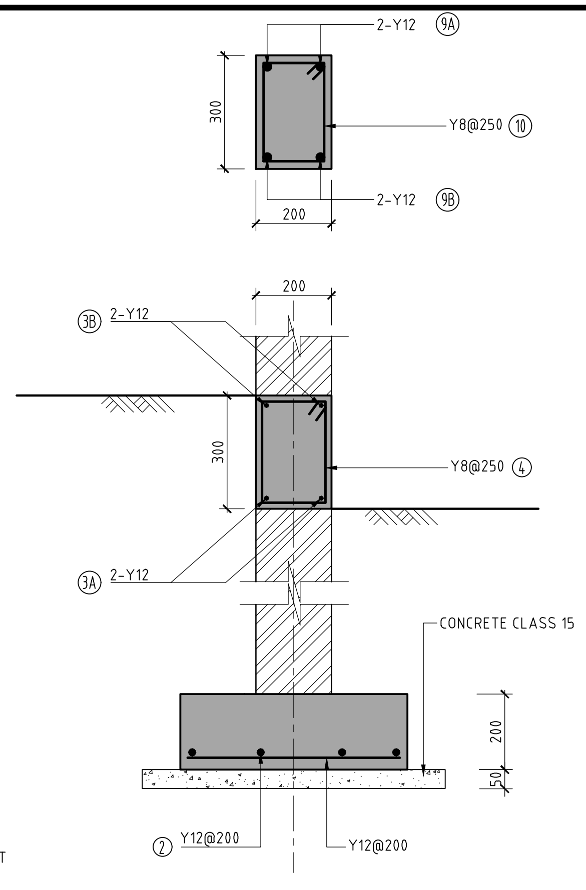
ROOF TRUSS- DETAIL
SCALE 1:20



DETAIL - Z
SCALE 1:5

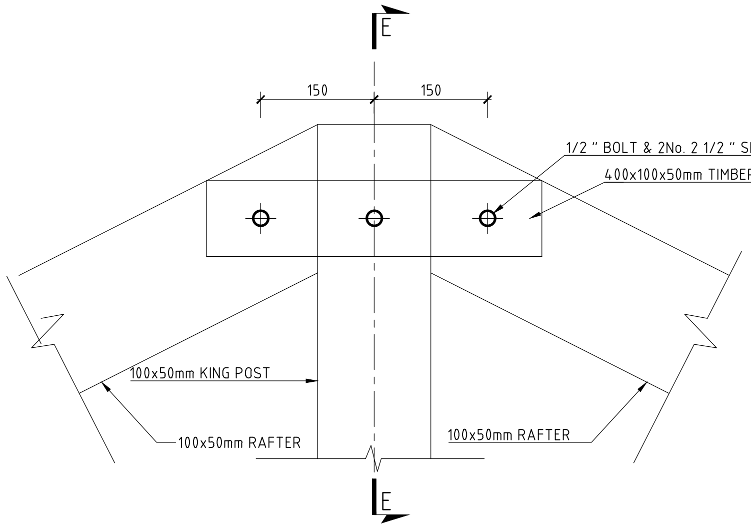


DETAIL - Y
SCALE 1:5

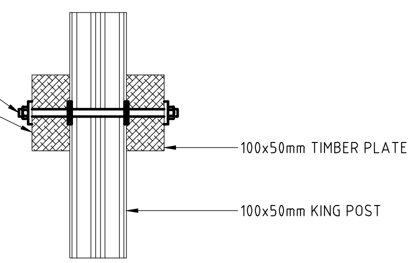


RING BEAM DETAIL
SCALE 1:10

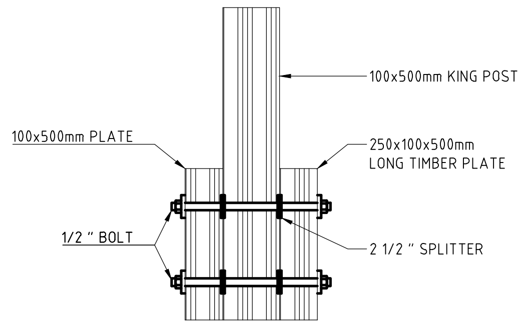
MEMBER	BAR MARK	TYPE AND SIZE	No. OF MEMBERS	No. OF BARS IN EACH	TOTAL No.	LENGTH OF EACH BAR (mm)	SHAPE	WEIGHT (Kg)
RING BEAMS (B-B & A-A)	9A	Y12	2	2	4	16530	16530	58.715
	9B	Y12	2	2	4	16530	16530	58.715
	10	Y8	2	66	132	820	230 130	42.755
RING BEAMS (A-B & B-A)	9A	Y12	2	2	4	4530	4530	16.091
	9B	Y12	2	2	4	4530	4530	16.091
	10	Y8	2	18	36	820	230 130	11.660
TOTAL WEIGHT								913.780



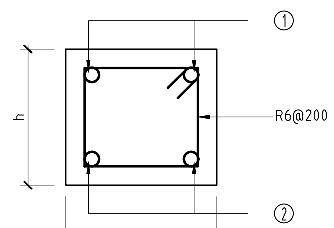
DETAIL - X
SCALE 1:5



SECTION E-E
SCALE 1:5



SECTION F-F
SCALE 1:5



L=Lo+500mm

Lo	≤1200	≤1500	≤1800	≤2400
h	120	150	180	180
1	2-Y8	2-Y8	2-Y8	2-Y8
2	2-Y12 2-Y10x	2-Y12 2-Y12x	2-Y16 2-Y12x	2-Y16 2-Y16x

"x" : 100mm WALL

TYPICAL LINTELS FOR WINDOWS AND DOORS
SCALE 1:5

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:
COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

CONSULTING ENGINEERS
SARI CONSULTING LTD
SGAPI
gath CONSULTING ENGINEERS
SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:

REV.	DATE	REMARKS

Notes:

SURVEYED	BY:	SN/JM
DESIGNED	BY:	PKG/BK
DRAWN	BY:	JGG
CHECKED	BY:	LB/PKG
APPROVED	BY:	KNM

AS SHOWN (AT A1)

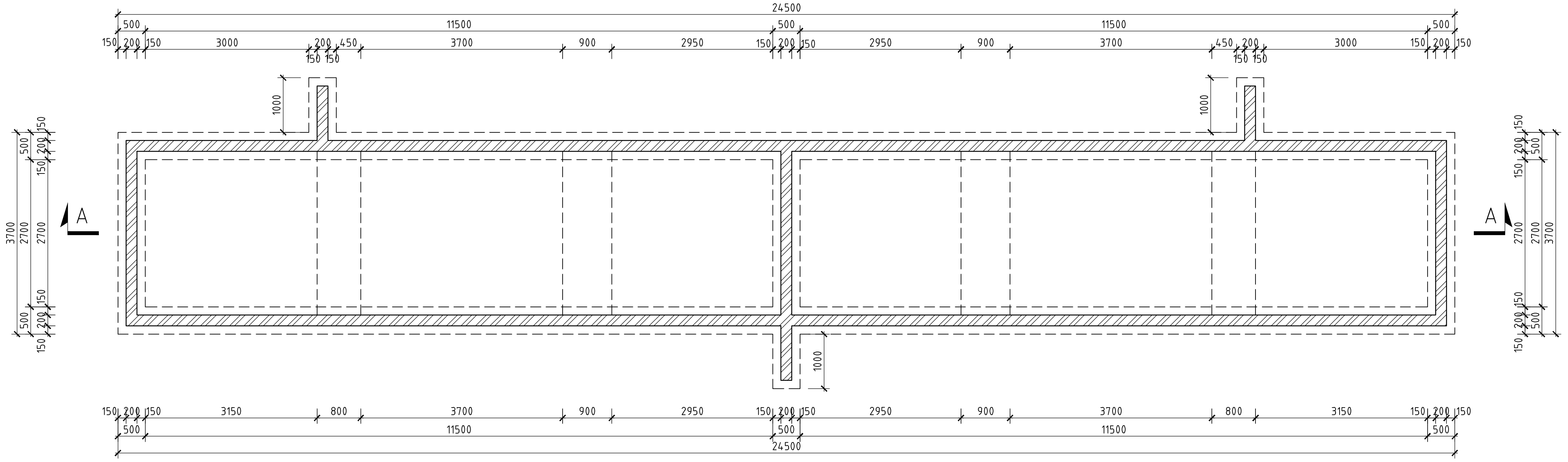
Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title:
PROPOSED OFFICE BLOCK
ROOF, RING BEAM AND LINTEL DETAILS

Date: APRIL 2021
Drg. No. B-KA/OFFICE BLOCK/04

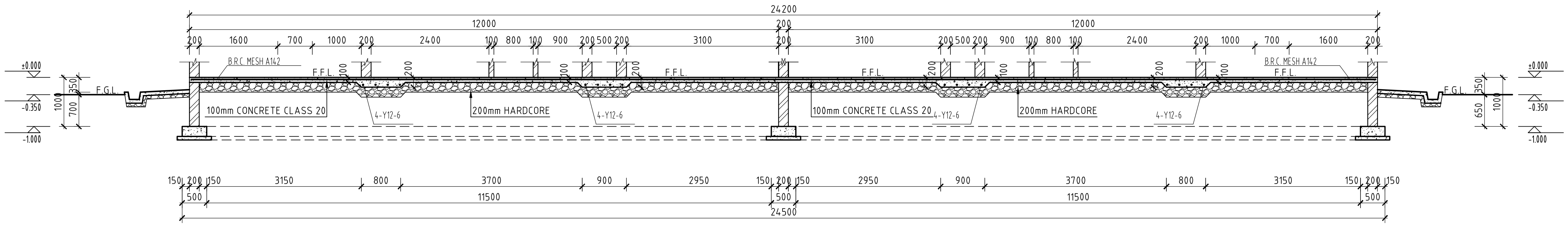
NOTES

1. All dimensions are in millimeters unless otherwise stated.



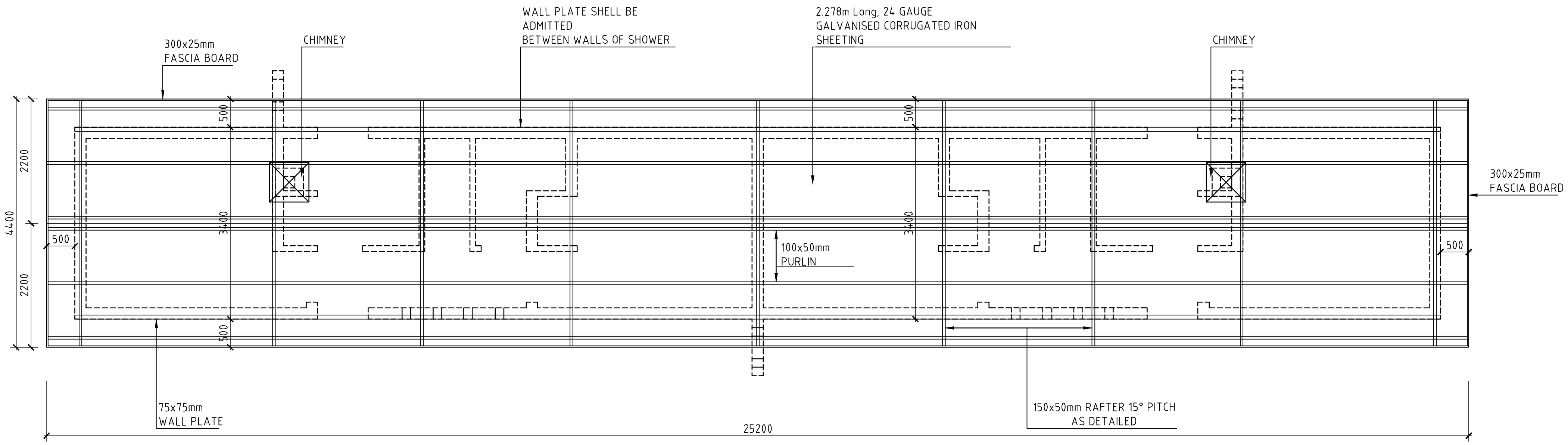
FOUNDATION PLAN

SCALE 1:50



SECTION A-A

SCALE 1:50



ROOF PLAN

SCALE 1:50

Project: **Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks**

Client:

COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

CONSULTING ENGINEERS

SARI CONSULTING LTD

SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:		
REV.	DATE	REMARKS

Notes:

SURVEYED	BY:	SN/JM
DESIGNED	BY:	PKG/BK
DRAWN	BY:	JGG
CHECKED	BY:	LB/PKG
APPROVED	BY:	KNM

AS SHOWN (AT A1)

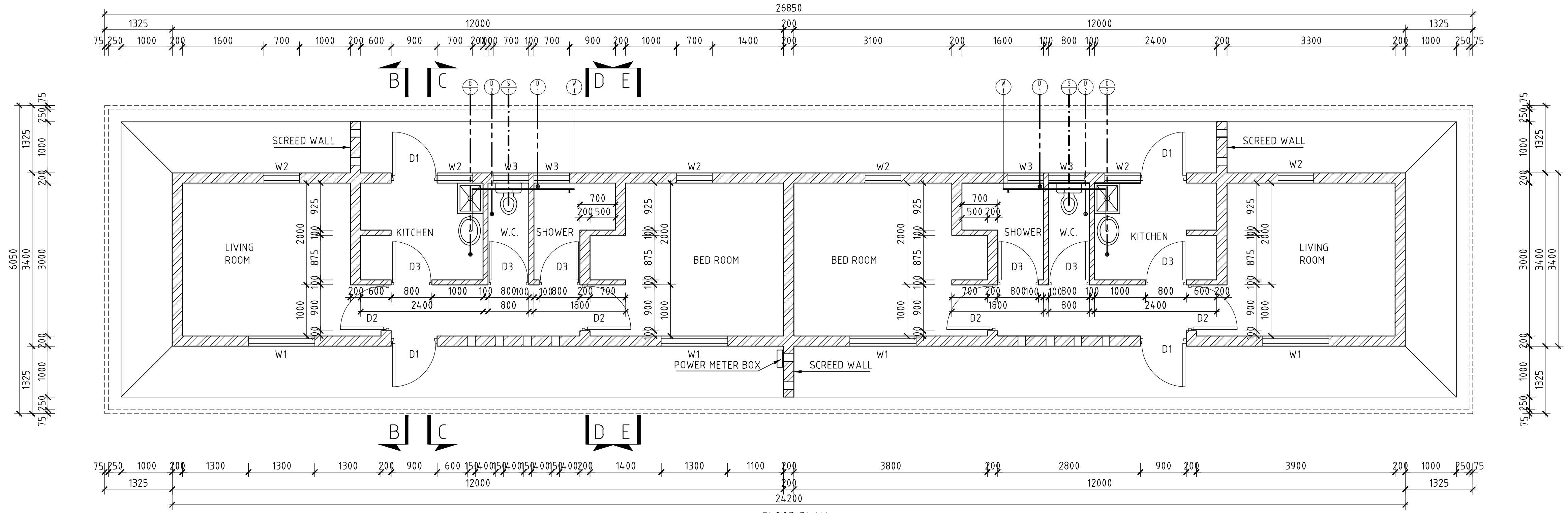
Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title:
PROPOSED STAFF HOUSE
FOUNDATION PLAN, ROOF PLAN AND SECTION

Date: APRIL 2021 | Drg. No. B-KA/STAFF HOUSE/01

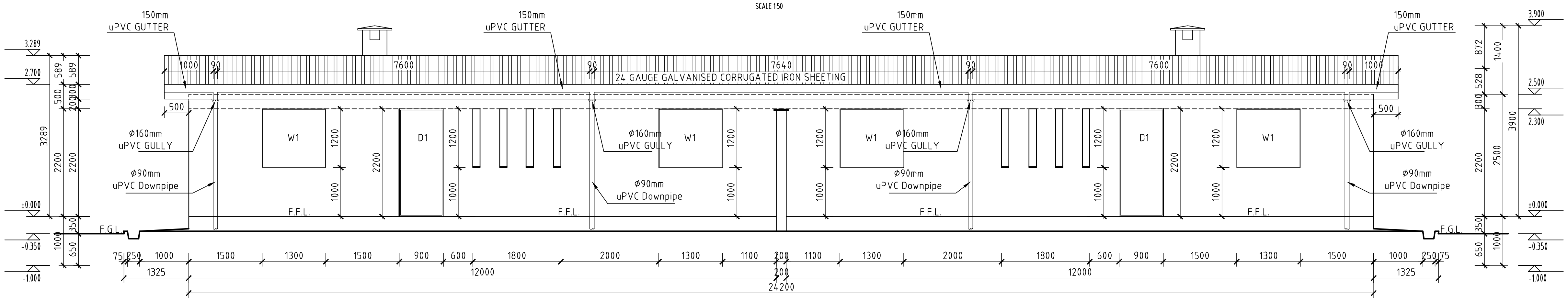
NOTES

1. All dimensions are in millimeters unless otherwise stated.



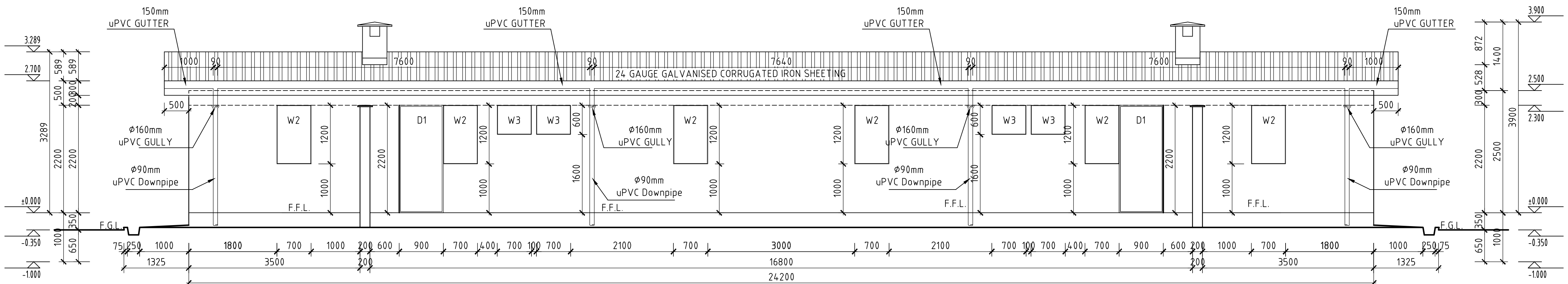
FLOOR PLAN

SCALE 1:50



FRONT VIEW

SCALE 1:50



REAR VIEW

SCALE 1:50

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:

COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

CONSULTING ENGINEERS

SARI CONSULTING LTD

SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:		
REV.	DATE	REMARKS

Notes:

SURVEYED	BY:	SN/JM
DESIGNED	BY:	PKG/BK
DRAWN	BY:	JGG
CHECKED	BY:	LB/PKG
APPROVED	BY:	KNM

AS SHOWN (AT A1)

Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

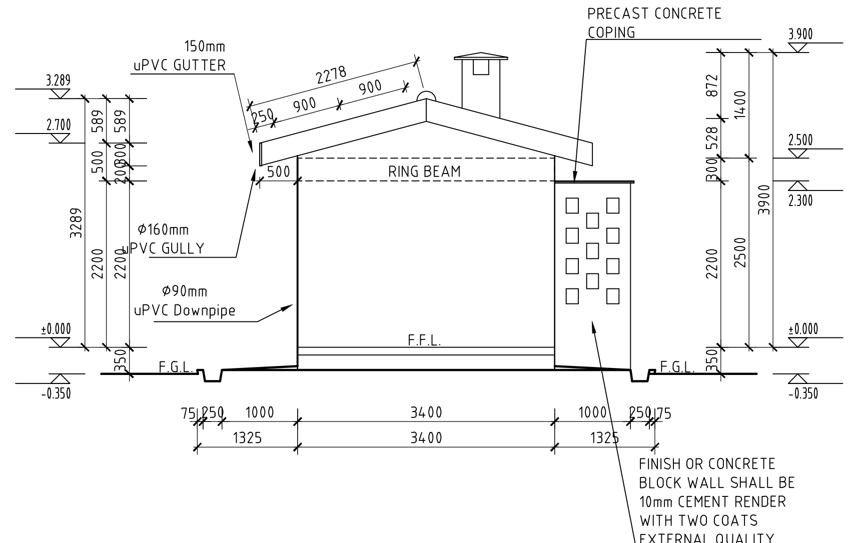
Drawing Title:
PROPOSED STAFF HOUSE
FLOOR PLAN, FRONT VIEW AND REAR VIEW

Date: APRIL 2021

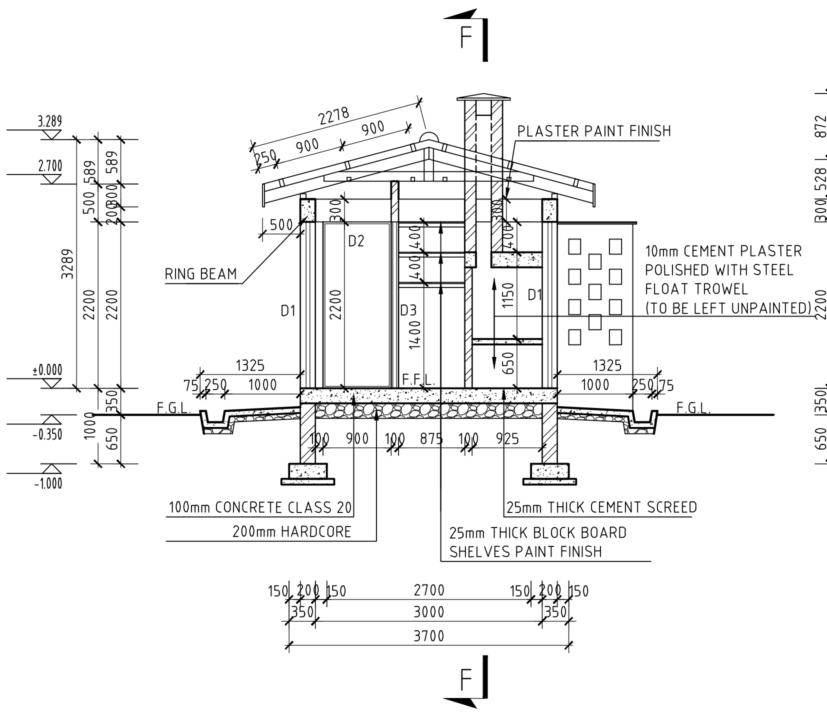
Drg. No. B-KA/STAFF HOUSE/02

NOTES

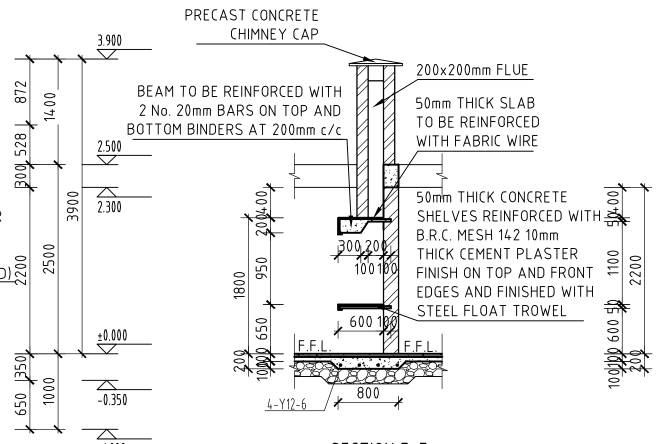
1. All dimensions are in millimeters unless otherwise stated.



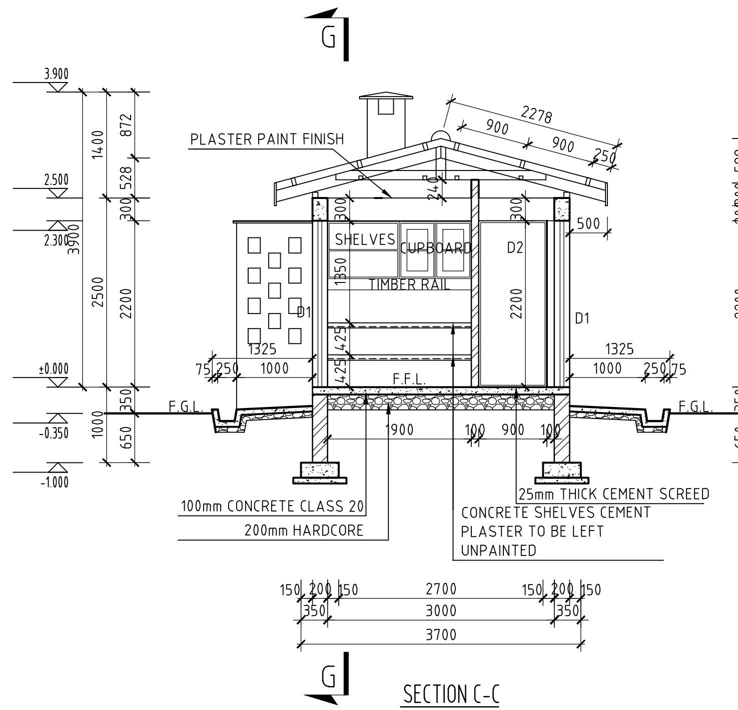
SIDE VIEW
SCALE 1:50



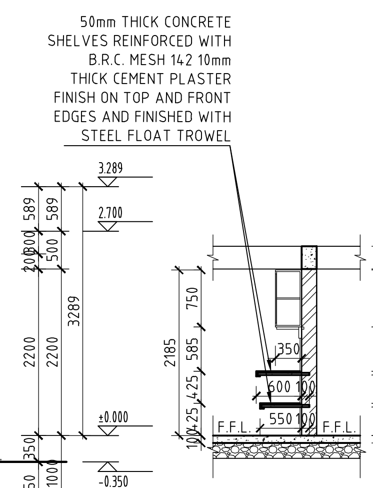
SECTION B-B
SCALE 1:50



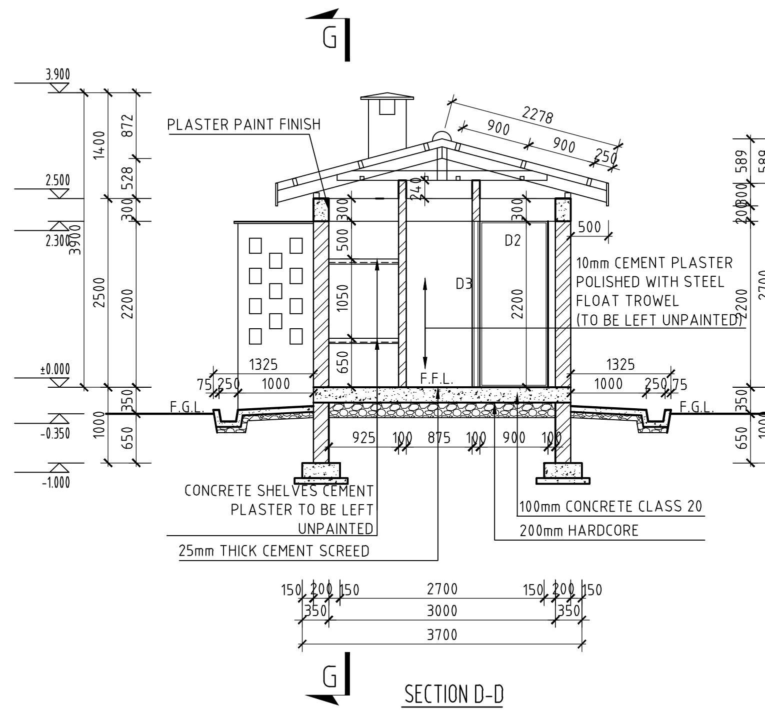
SECTION F-F
SCALE 1:50



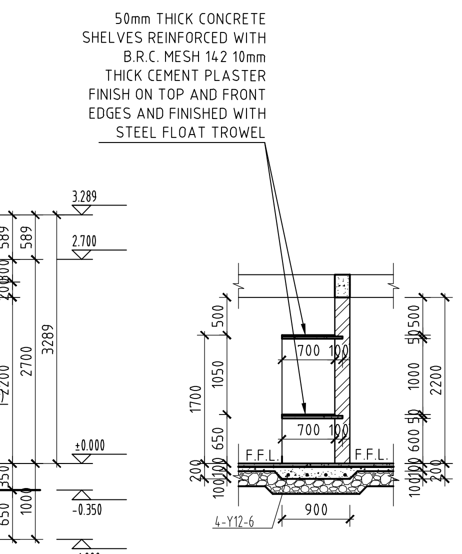
SECTION C-C
SCALE 1:50



SECTION G-G
SCALE 1:50



SECTION D-D
SCALE 1:50



SECTION G-G
SCALE 1:50

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:
COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

CONSULTING ENGINEERS

SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:		
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Notes:

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DESIGNED	BY:	PKG/BK
DRAWN	BY:	JGG
CHECKED	BY:	LB/PKG
APPROVED	BY:	KNM

AS SHOWN (AT A1)

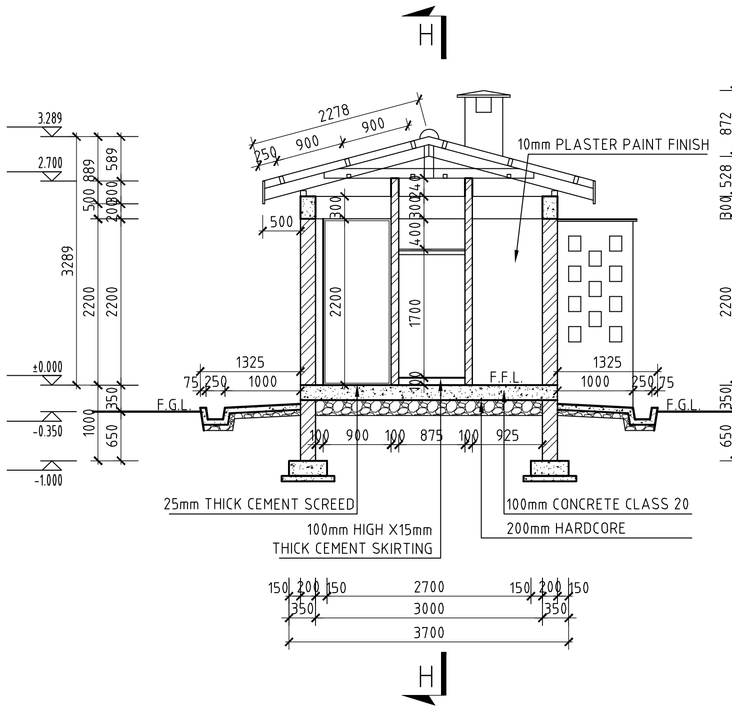
Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title:
PROPOSED STAFF HOUSE
SIDE VIEW AND SECTIONS

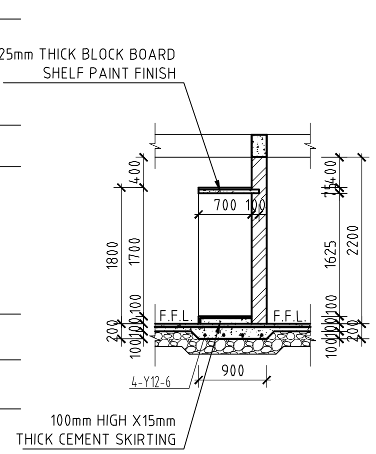
Date: APRIL 2021 | Drg. No. B-KA/STAFF HOUSE/03

NOTES

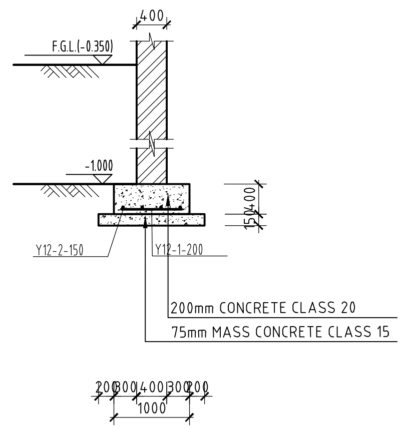
1. All dimensions are in millimeters unless otherwise stated.



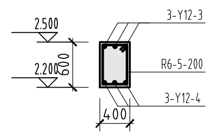
SECTION E-E
SCALE 150



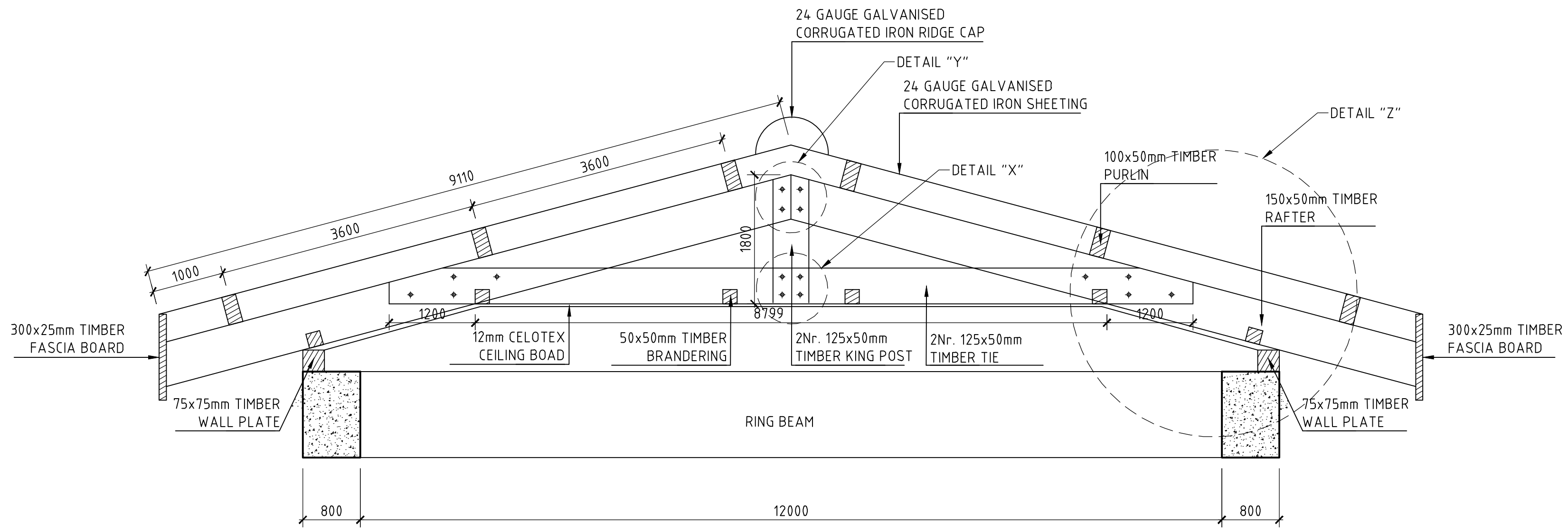
SECTION H-H
SCALE 150



STRIP FOUNDATION REINFORCEMENT
SCALE 1:25



RING BEAM REINFORCEMENT
SCALE 1:25



ROOFING DETAIL
SCALE 150

Project: **Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks**

Client:

COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

CONSULTING ENGINEERS

SARI CONSULTING LTD

SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:

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DRAWN	BY:	JGG
CHECKED	BY:	LB/PKG
APPROVED	BY:	KNM

AS SHOWN (AT A1)

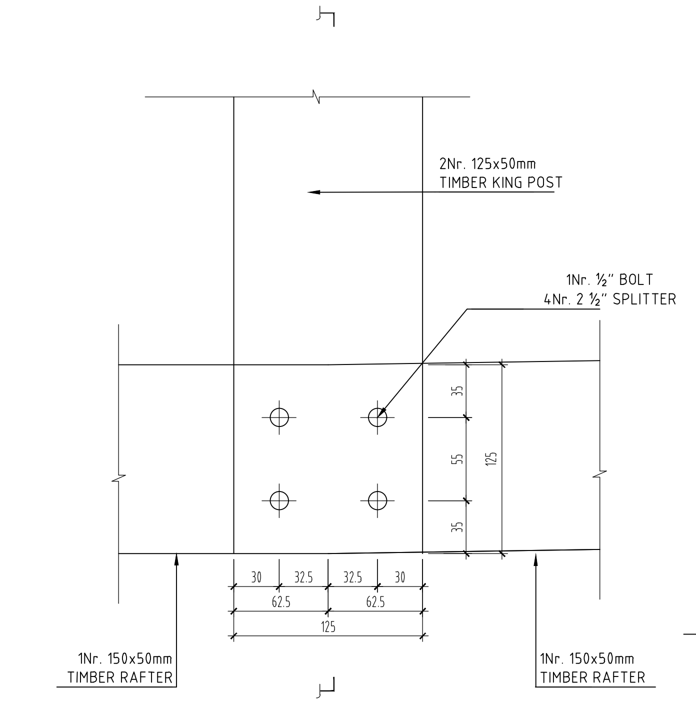
Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title:
PROPOSED STAFF HOUSE
SECTIONS, REINFORCEMENT AND ROOFING

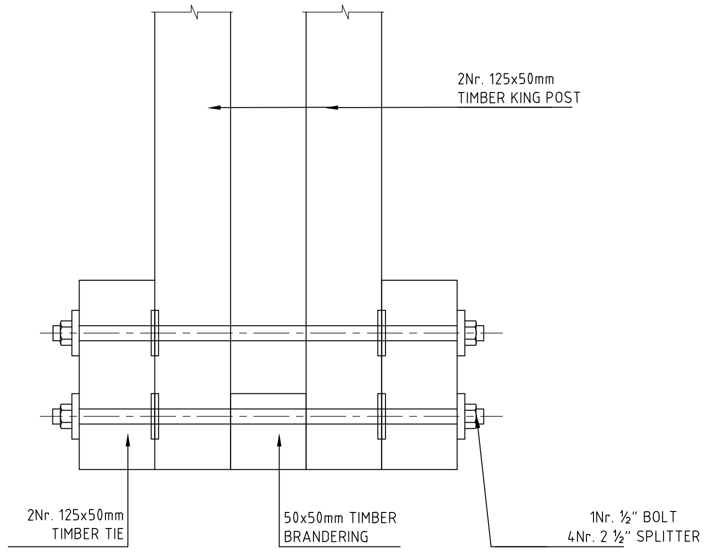
Date: APRIL 2021

Drg. No. B-KA/STAFF HOUSE/04

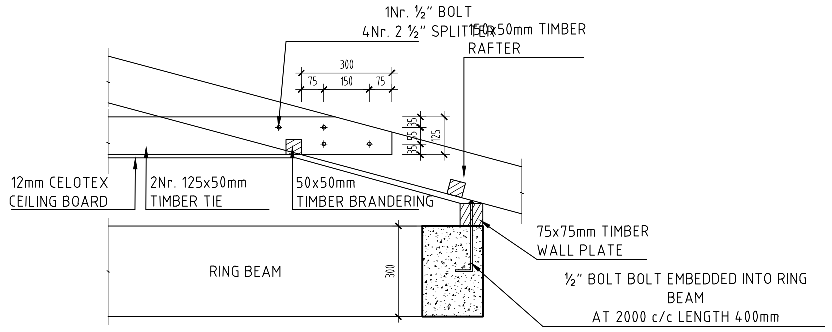
NOTES
1. All dimensions are in millimeters unless otherwise stated.



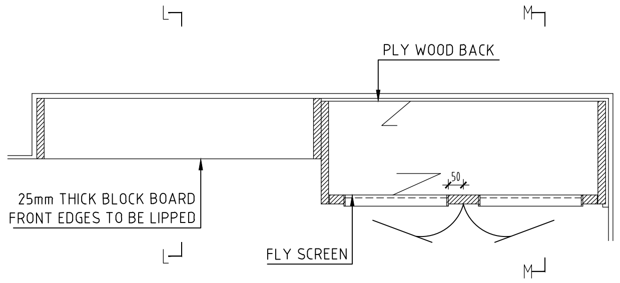
DETAIL "X"
SCALE 1:20



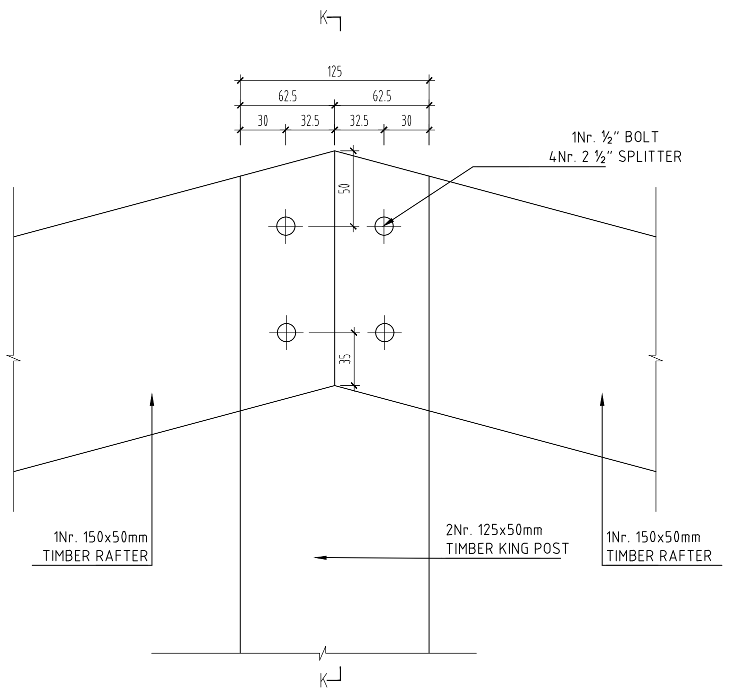
SECTION J-J
SCALE 1:20



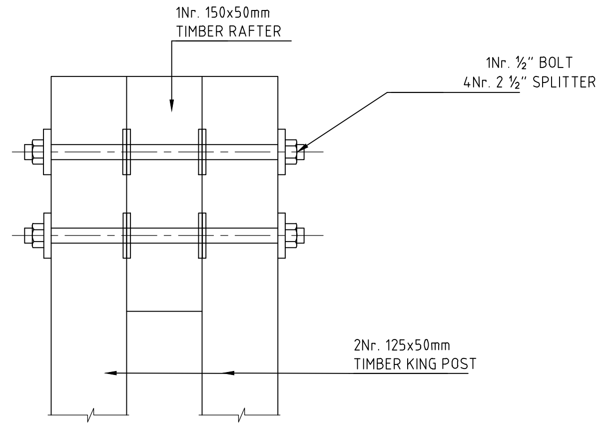
DETAIL "Z"
SCALE 1:4



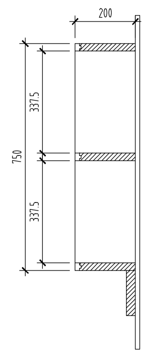
KITCHEN CUPBOARD
AND SHELVES - PLAN
SCALE 1:4



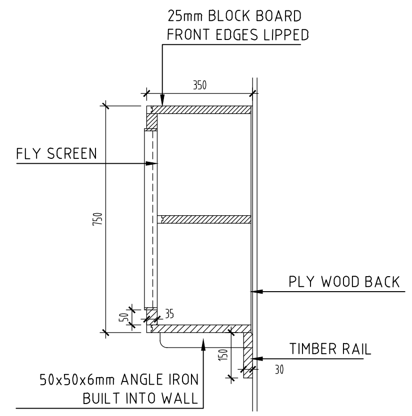
DETAIL "Y"
SCALE 1:20



SECTION K-K
SCALE 1:20



SECTION L-L
SCALE 1:10



SECTION M-M
SCALE 1:10

NOTE:-
CUPBOARD AND SHELVES SHALL HAVE A GLOSS PAINT FINISH

IRONMONGERY:-
1SET CUPBOARD BUTTS
2Nr. BALL CATCHES
3Nr. GRIP HANDLES

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:
COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

CONSULTING ENGINEERS
SARI CONSULTING LTD
SGAPI
gath CONSULTING ENGINEERS
SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:		
REV.	DATE	REMARKS

Notes:

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DESIGNED	BY:	PKG/BK
DRAWN	BY:	JGG
CHECKED	BY:	LB/PKG
APPROVED	BY:	KNM

AS SHOWN (AT A1)

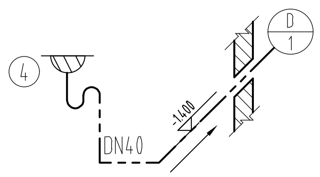
Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title:
PROPOSED STAFF HOUSE
DETAILS OF ROOFING, SHELVES AND CUPBOARD

Date: APRIL 2021
Drg. No. B-KA/STAFF HOUSE/05

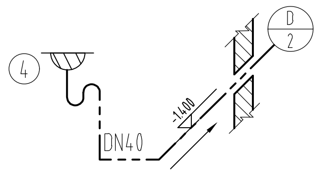
NOTES

1. All dimensions are in millimeters unless otherwise stated.



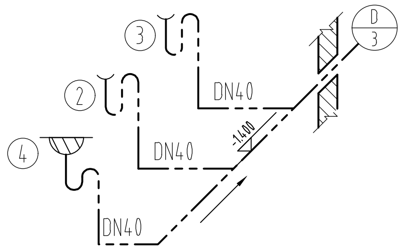
D 1 SHOWER WASTEWATER SYSTEM DIAGRAM

NTS



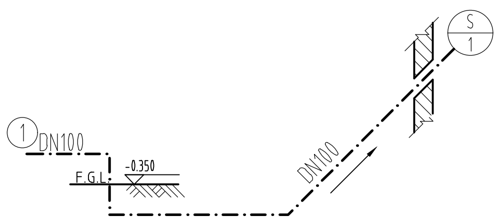
D 2 TOILET WASTEWATER SYSTEM DIAGRAM

NTS



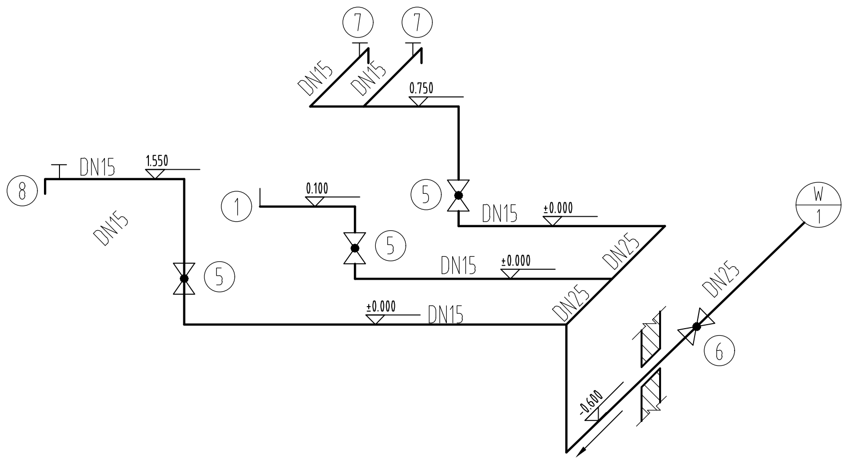
D 3 KITCHEN WASTEWATER SYSTEM DIAGRAM

NTS



S 1 TOILET SEWAGE SYSTEM DIAGRAM

NTS



W 1 BUILDING WATER SUPPLY SYSTEM DIAGRAM

NTS

KEY:

WATER SUPPLY PIPE

WASTE WATER PIPE

SEWER PIPE

LIST OF MATERIAL

CODE No.	SKETCH	DESCRIPTION	DIA. (mm)	UNIT	Q'TY	REMARK
1		CHINA LAVATORY		SET	2	
2		CHINA WASH BASIN		SET	2	
3		STAINLESS STEEL SINK		SET	2	
4	or	PVC FLOOR DRAIN	40	Nr.	6	
5		BRASS BALL VALVE	15	Nr.	6	
6		BRASS BALL VALVE	25	Nr.	2	
7		STAINLESS STEEL WATER TAP	15	Nr.	4	
8		SHOWER	15	Nr.	2	
9		G.S. PIPE, PN10	15	M	12	OTHER ACCESSORIES
10		G.S. PIPE, PN10	25	M	3	OTHER ACCESSORIES
11		uPVC WASTE PIPE, PN6	40	M	12	OTHER ACCESSORIES
12		uPVC WASTE PIPE, PN6	100	M	3	OTHER ACCESSORIES

Project: **Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks**

Client:

COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

CONSULTING ENGINEERS

SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:

REV.	DATE	REMARKS

Notes:

SURVEYED	BY:	SN/JM
DESIGNED	BY:	PKG/BK
DRAWN	BY:	JGG
CHECKED	BY:	LB/PKG
APPROVED	BY:	KNM

AS SHOWN (AT A1)

Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title:
PROPOSED STAFF HOUSE
PLUMBING WORKS AND LIST OF MATERIALS

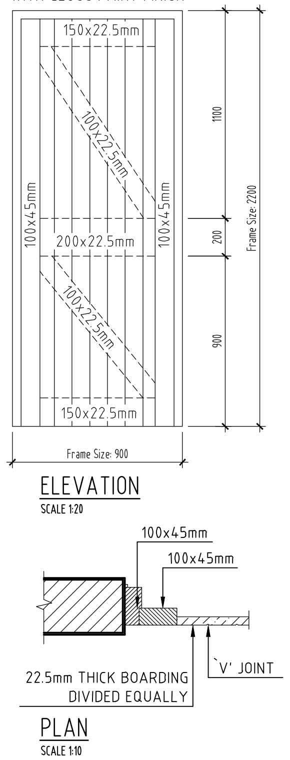
Date: APRIL 2021

Drg. No. B-KA/STAFF HOUSE/06

NOTES
1. All dimensions are in millimeters unless otherwise stated.

DETAIL OF D1

FRAMED, LEDGED AND BRACED DOOR
WITH GLOSS PAINT FINISH

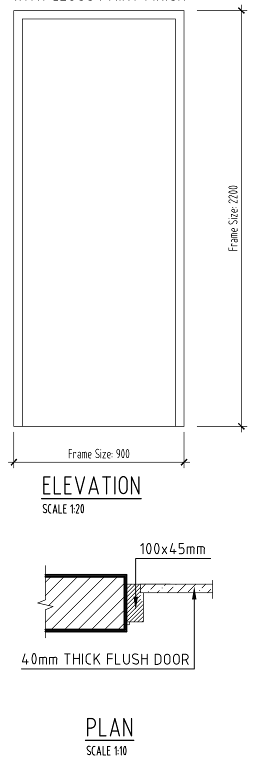


IRONMONGERY:-
1. 1½ SETS OF 100mm BOLT HINGES
2. 1Nr. RIM LOCK

NOTE:-
IRONMONGERY FOR COATS AREAS SHOULD BE OF SUITABLE ANTI CORROSIVE QUALITY APPROPRIATE TO THE CLIMATIC CONDITIONS.

DETAIL OF D2

FLUSH DOOR
WITH GLOSS PAINT FINISH

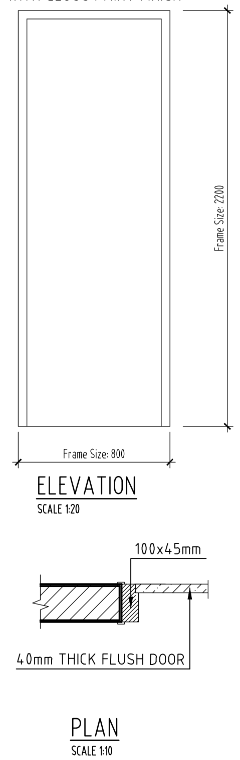


IRONMONGERY:-
1. 1½ SETS OF 100mm BOLT HINGES
2. 1Nr. RIM LOCK

NOTE:-
IRONMONGERY FOR COATS AREAS SHOULD BE OF SUITABLE ANTI CORROSIVE QUALITY APPROPRIATE TO THE CLIMATIC CONDITIONS.

DETAIL OF D3

FLUSH DOOR
WITH GLOSS PAINT FINISH

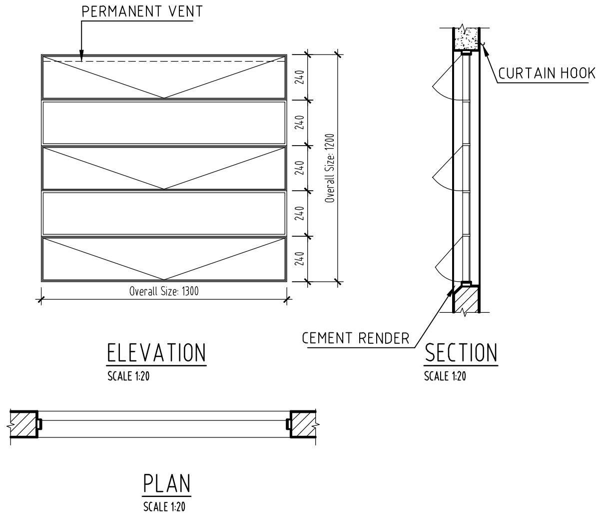


IRONMONGERY:-
1. 1½ SETS OF 100mm BOLT HINGES
2. 2No. TOWER BOLTS

NOTE:-
IRONMONGERY FOR COATS AREAS SHOULD BE OF SUITABLE ANTI CORROSIVE QUALITY APPROPRIATE TO THE CLIMATIC CONDITIONS.

DETAIL OF W1

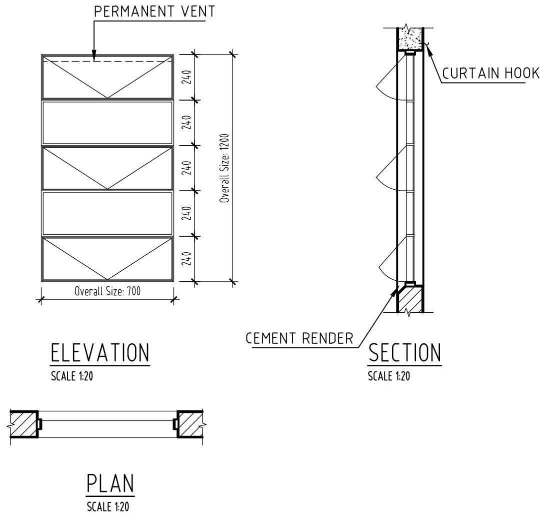
LOUVERED WINDOW
WITH GLOSS PAINT FINISH



NOTE:-
1. LIVING AND BED ROOM WINDOWS SHALL BE FITTED WITH MOSQUITOS GAUZE IF REQUIRED.
2. MOSQUITO GAUZE SHALL BE GALVANIZED IRON WIRE GAUZE.
3. METAL JAMBS SHALL BE GALVANIZED STEEL.
4. GLASS LOUVERS BLADE SHALL BE 162mm WIDE AND 4.7mm THICK.

DETAIL OF W2

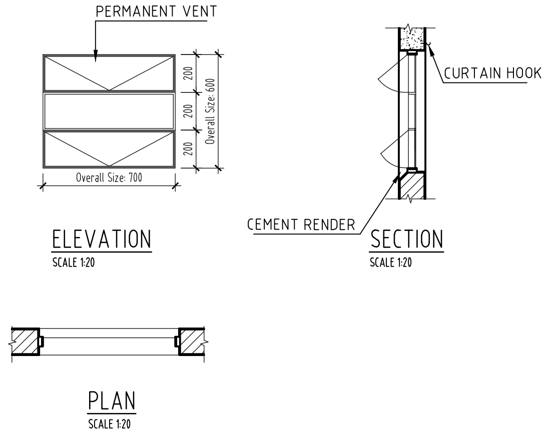
LOUVERED WINDOW
WITH GLOSS PAINT FINISH



NOTE:-
1. LIVING AND BED ROOM WINDOWS SHALL BE FITTED WITH MOSQUITOS GAUZE IF REQUIRED.
2. MOSQUITO GAUZE SHALL BE GALVANIZED IRON WIRE GAUZE.
3. METAL JAMBS SHALL BE GALVANIZED STEEL.
4. GLASS LOUVERS BLADE SHALL BE 162mm WIDE AND 4.7mm THICK.

DETAIL OF W3

LOUVERED WINDOW
WITH GLOSS PAINT FINISH



NOTE:-
1. LIVING AND BED ROOM WINDOWS SHALL BE FITTED WITH MOSQUITOS GAUZE IF REQUIRED.
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3. METAL JAMBS SHALL BE GALVANIZED STEEL.
4. GLASS LOUVERS BLADE SHALL BE 162mm WIDE AND 4.7mm THICK.

Project: Second Baricho -Kakuyuni Water Pipeline & Transmission Pipelines To Kilifi And Ganda Tanks

Client:
COAST WATER WORKS DEVELOPMENT AGENCY
P.O.BOX 90417-80100
MOMBASA, KENYA

CONSULTING ENGINEERS
SARI CONSULTING LTD
SGAPI
gath CONSULTING ENGINEERS
SARI CONSULTING LTD IN JOINT VENTURE WITH SGAPI AND GATH ENGINEERING CONSULTANTS

Revisions:

REV.	DATE	REMARKS

Notes:

SURVEYED	BY:	SN/JM
DESIGNED	BY:	PKG/BK
DRAWN	BY:	JGG
CHECKED	BY:	LB/PKG
APPROVED	BY:	KNM

AS SHOWN (AT A1)

Project:
SECOND BARICHO -KAKUYUNI WATER PIPELINE AND TRANSMISSION PIPELINES TO KILIFI AND GANDA TANKS

Drawing Title:
PROPOSED STAFF HOUSE
DETAILS OF DOORS AND WINDOWS

Date: APRIL 2021
Drg. No. B-KA/STAFF HOUSE/07