



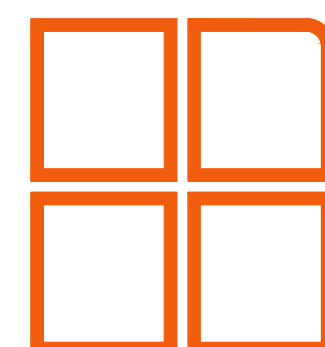
CLIMATE PROOFED ARID AND SEMI ARID RURAL ROADS, FINAL DESIGN OF GICHANINE MARIARA ROAD BATCH 2

MARCH 2025

EMPLOYER

**DIRECTOR GENERAL
KERRA
P.O BOX 48151-00100,
NAIROBI, Kenya**

CONSULTANT



Runji Consulting Group Ltd

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ENGINEER

**DIRECTOR
PLANNING, DESIGN & ENVIRONMENT
P.O BOX 48151-00100,
NAIROBI, Kenya**

	GICHANINE MARIARA ROAD BATCH 2 DRAWINGS
	COVER PAGE
	DRAWING LIST
	GENERAL DRAWINGS
CE1045/GD/GM/01	LOCATION MAP
CE1045/GD/GM/01	GICHANINE MARIARA SKETCH MAP
CE1045/GD/GM/01	GENERAL LAYOUT (SHEET 1 OF 2) CHAINAGE 5+960 - 10+100
CE1045/GD/GM/02	GENERAL LAYOUT (SHEET 2 OF 2) CHAINAGE 10+100 - 14+509
	TYPICAL CROSS-SECTION
CE1045/TD/GM/01	TYPICAL CROSS-SECTION
	TYPICAL CULVERT DRAWINGS
CE1045/CDS/GM/O1	HEADWALL TYPE 1 (HEADWALL AND WINGWALLS)
CE1045/CDS/GM/O2	HEADWALL TYPE 2 (DROP INLETS)
CE1045/CDS/GM/O3	HEADWALL TYPE 4 (FOR ACCESS CULVERT)
CE1045/CDS/GM/O4	BEDDING AND HAUNCH PROFILES TYPE III& IV
CE1045/CDS/GM/O5	CULVERT ROAD SIGNS
	STANDARD DRAWINGS
CE1045/SD/GM/01	STANDARD DRAWING - STANDARD - ROAD SIGNS
CE1045/SD/GM/02	STANDARD DRAWING - STANDARD - ROAD SIGNS INSTALLATION
CE1045/SD/GM/03	STANDARD DRAWING - STANDARD - TRAFFIC MANAGEMENT
CE1045/SD/GM/04	STANDARD DRAWING - PUBLICITY SIGN BOARD

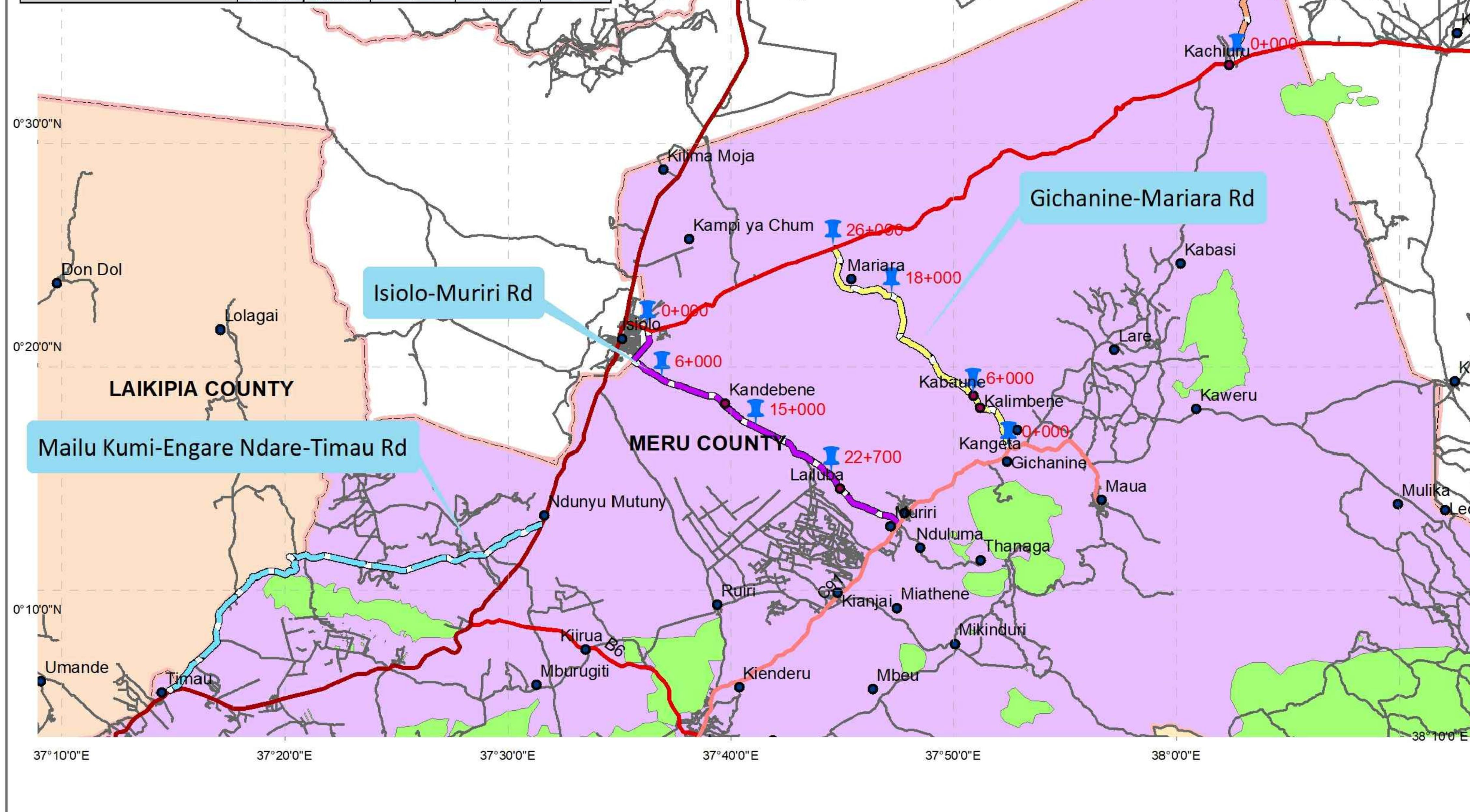
GENERAL DRAWINGS

0°50'0"N

CLIMATE PROOFED PROJECT ROADS IN MERU COUNTY

0°50'0"N

CLIMATE PROOF PROJECT ROADS IN MERU COUNTY					
Road Description	Chainage		Length (km)	Road Finish	Batch No.
	BOP	EOP			
C346 Kachiuru-Gotu	0+000	6+000	6	GRAVEL	1
	6+000	18+000	12	GRAVEL	2
	18+000	21+300	3.3	GRAVEL	3
Gichanine-Mariara	0+000	6+000	6	GRAVEL	1
	6+000	18+000	12	GRAVEL	2
	18+000	26+000	8	GRAVEL	3
Isiolo-Muriri	0+000	6+000	6	LVS	1
	6+000	15+000	9	LVS	2
	15+000	22+700	7.7	LVS	3
Mailu Kumi-Engare Ndare-Timau	0+000	6+000	6	LVS	2
	6+000	10+800	4.8	LVS	3
	10+800	23+800	13	GRAVEL	2



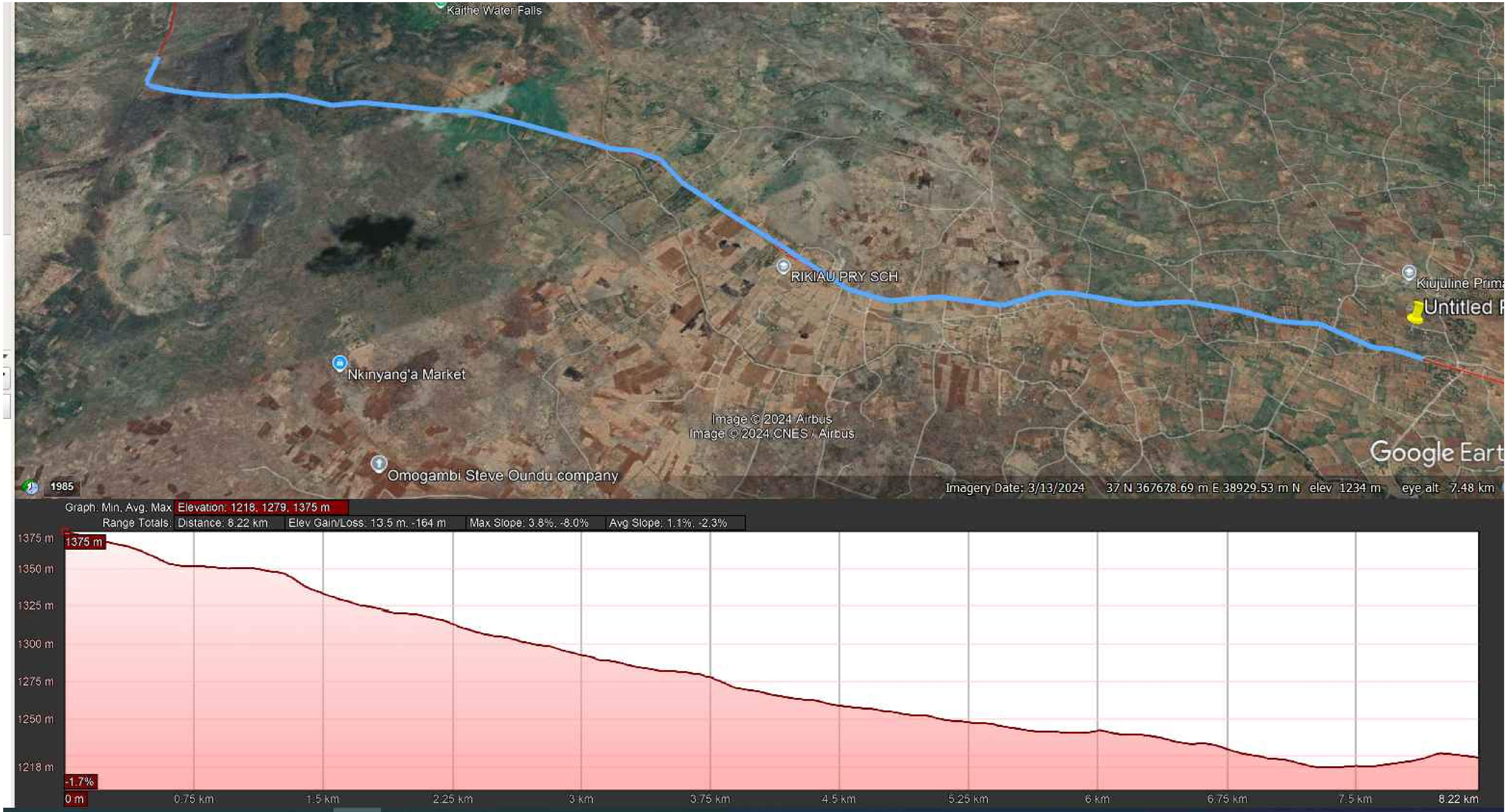
KENYA COUNTIES MAP

Legend

- Meru_County_Extent

Legend

- Trading_Centre
- Towns
- Project_Batch_Terminal
- Key_Towns
- Trunk_Rds
- Class_B_Rds
- Class_C_Rds
- Roads
- Isiolo_Muririri_Rd
- Gichanine_Mariara_Rd
- Kachiuru_Gotu_Rd
- Mailu_kumi_Timau_Rd
- Forests
- Meru_County
- Counties



REVISIONS	No.	DATE	DESCRIPTION



Kenya Rural Roads Authority
Bara Bara Plaza,
P.O. Box 48151- 00100, Nairobi. Kenya

DIRECTOR GENERAL	
DIRECTOR (PLANNING , DESIGN &ENVIRONMENT)	

Consultant:



Runji Consulting Group Ltd
Engineering & Project Management.
3, Kindaruma Road (Off Ngong Road)
P. O. Box 68053-00200 Nairobi
Tel. (020) 2717213/4

PROJECT TITLE:
PRELIMINARYAND DETAILED ENGINEERING DESIGN OF GICHANINE MARIARA BATCH 2

DRAWING TITLE:
GICHANINE MARIARA SKETCH MAP

DRAWN BY: M.M DESIGNED BY: C.N.M CHECKED BY: M.J.N	Drg No. CE1045/GD/GM/01
Scale: 1:5000	Date : OCTOBER 2024



REVISIONS	No.	DATE	DESCRIPTION



Kenya Rural Roads Authority
Bara Bara Plaza,
P.O. Box 48151- 00100, Nairobi. Kenya

DIRECTOR GENERAL	
DIRECTOR (PLANNING , DESIGN &ENVIRONMENT)	

Consultant:



Runji Consulting Group Ltd
Engineering & Project Management.
3, Kindaruma Road (Off Ngong Road)
P. O. Box 68053-00200 Nairobi
Tel. (020) 2717213/4

PROJECT TITLE:
**PRELIMINARYAND DETAILED
ENGINEERING DESIGN OF
GICHANINE MARIARA BATCH 2**

DRAWING TITLE:
**GENERAL LAYOUT
SHEET 1 OF 2
CHAINAGE 5+960 -10+100**

DRAWN BY: M.M DESIGNED BY: C.N.M CHECKED BY: M.J.N	Drg No. CE1045/GD/GM/01
Scale: 1:5000	Date :OCTOBER 2024



REVISIONS	No.	DATE	DESCRIPTION



Kenya Rural Roads Authority
Bara Bara Plaza,
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DIRECTOR GENERAL	
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Runji Consulting Group Ltd
Engineering & Project Management.
3, Kindaruma Road (Off Ngong Road)
P. O. Box 68053-00200 Nairobi
Tel. (020) 2717213/4

PROJECT TITLE:

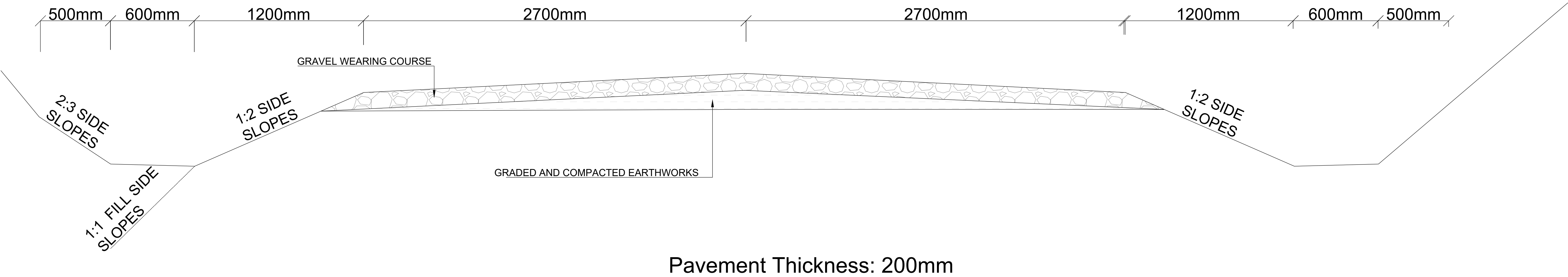
PRELIMINARYAND DETAILED
ENGINEERING DESIGN OF
GICHANINE MARIARA BATCH 2

DRAWING TITLE:

GENERAL LAYOUT
SHEET 2 OF 2
CHAINAGE 10+100 -14+509

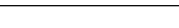
DRAWN BY: M.M DESIGNED BY: C.N.M CHECKED BY: M.J.N	Drg No. CE1045/GD/GM/02
Scale: 1:5000	Date :OCTOBER 2024

TYPICAL CROSS-SECTION



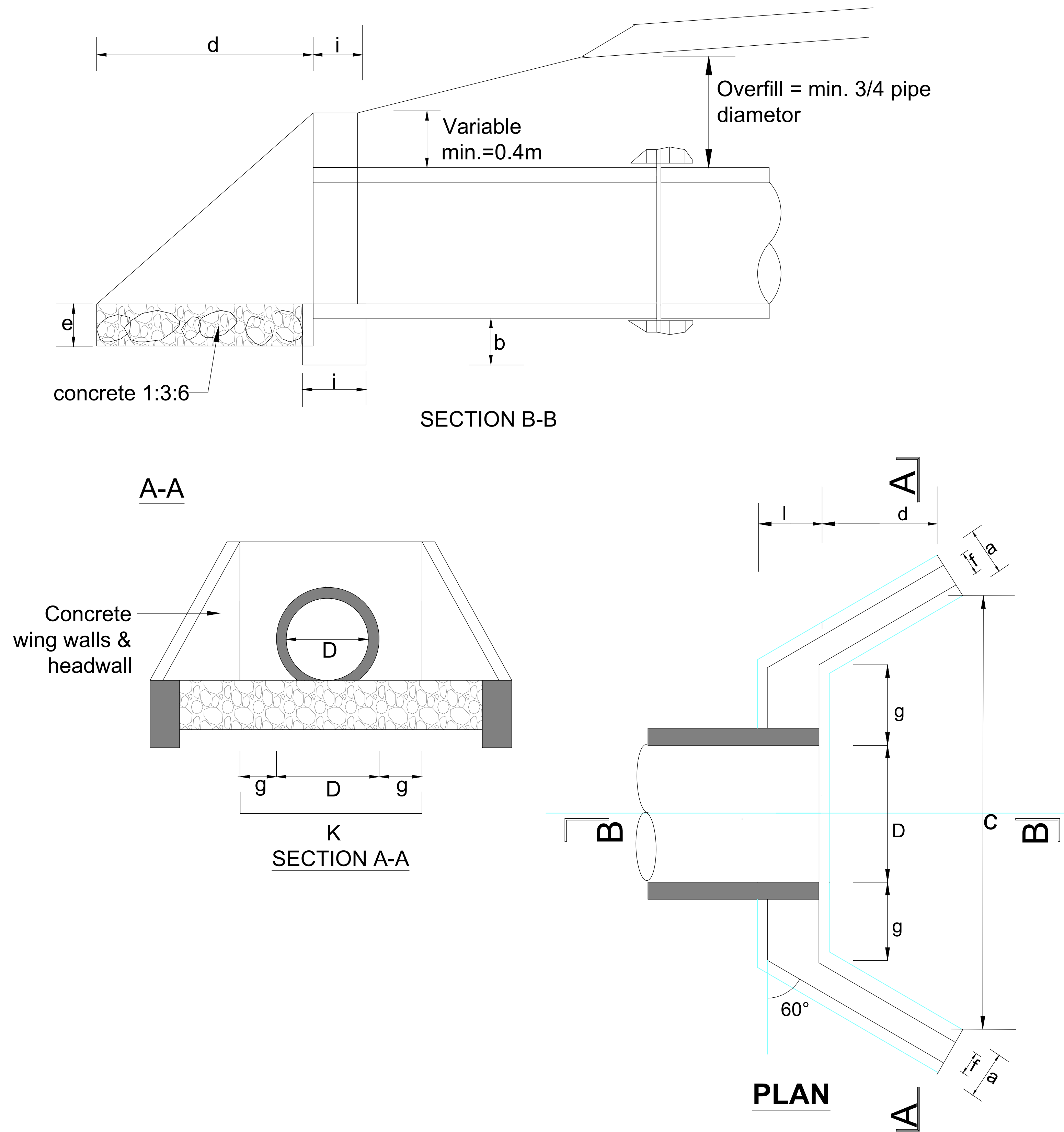
Slope benching details

- GENERAL NOTES:
1. Final fill slopes 1:1
 2. Cutting backslopes may be steepened as instructed at culvert locations to minimise pipe extensions.
 3. Cutting Backslopes 2:3
 4. Width of side ditches 600Mm or wider as instruted by the Engineer.

REVISIONS	No.	DATE	DESCRIPTION	 Kenya Rural Roads Authority Bara Bara Plaza, P.O. Box 48151- 00100, Nairobi. Kenya	DIRECTOR GENERAL		 Runji Consulting Group Ltd Engineering & Project Management. 3, Kindaruma Road (Off Ngong Road) P. O. Box 68053-00200 Nairobi Tel. (020) 2717213/4	PROJECT TITLE: DRAFT DETAILED ENGINEERING DESIGN OF GICHANINE MARIARA ROAD BATCH 2	DRAWING TITLE: TYPICAL CROSS-SECTION	DRAWN BY: M.M DESIGNED BY: C.N.M CHECKED BY: M.J.N		Drg No. CE1045/CDS/GM/O5	
					DIRECTOR (PLANNING , DESIGN &ENVIRONMENT)								
Scale: NTS										Date : DECEMBER 2024			

TYPICAL CULVERT DRAWINGS

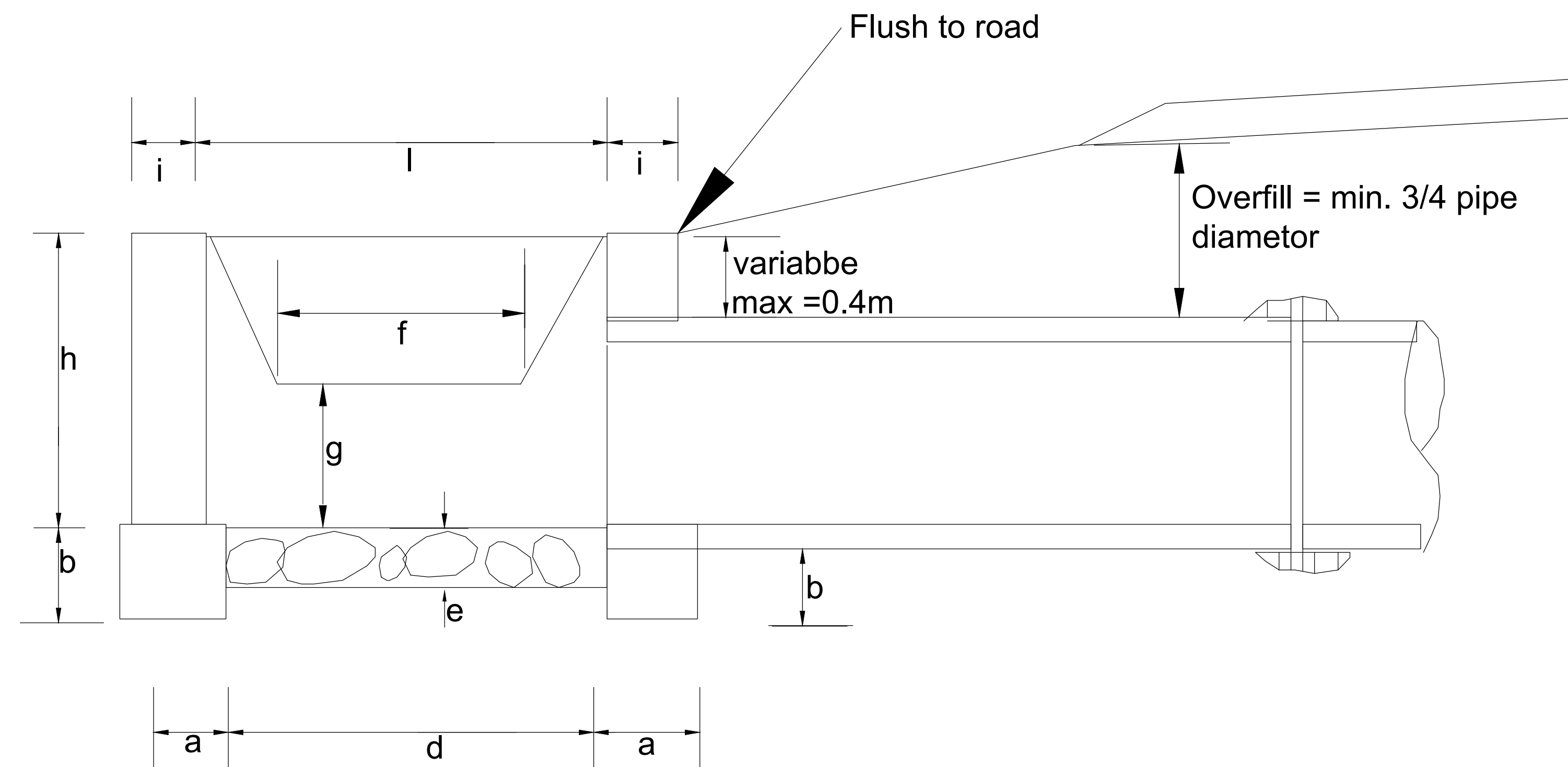
FIGURE H.8 - HEADWALL TYPE 1 (HEAD AND WINGWALLS)



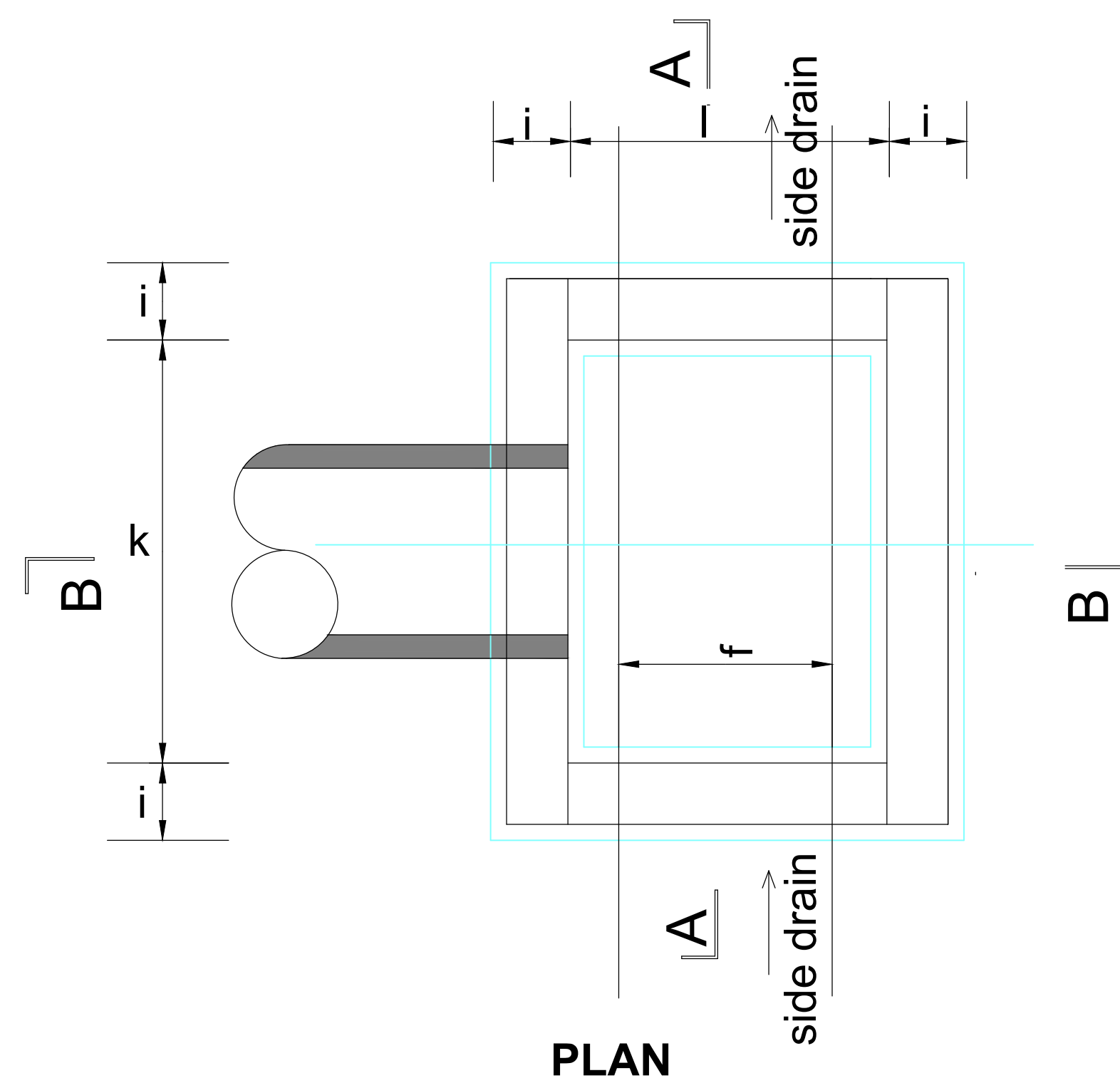
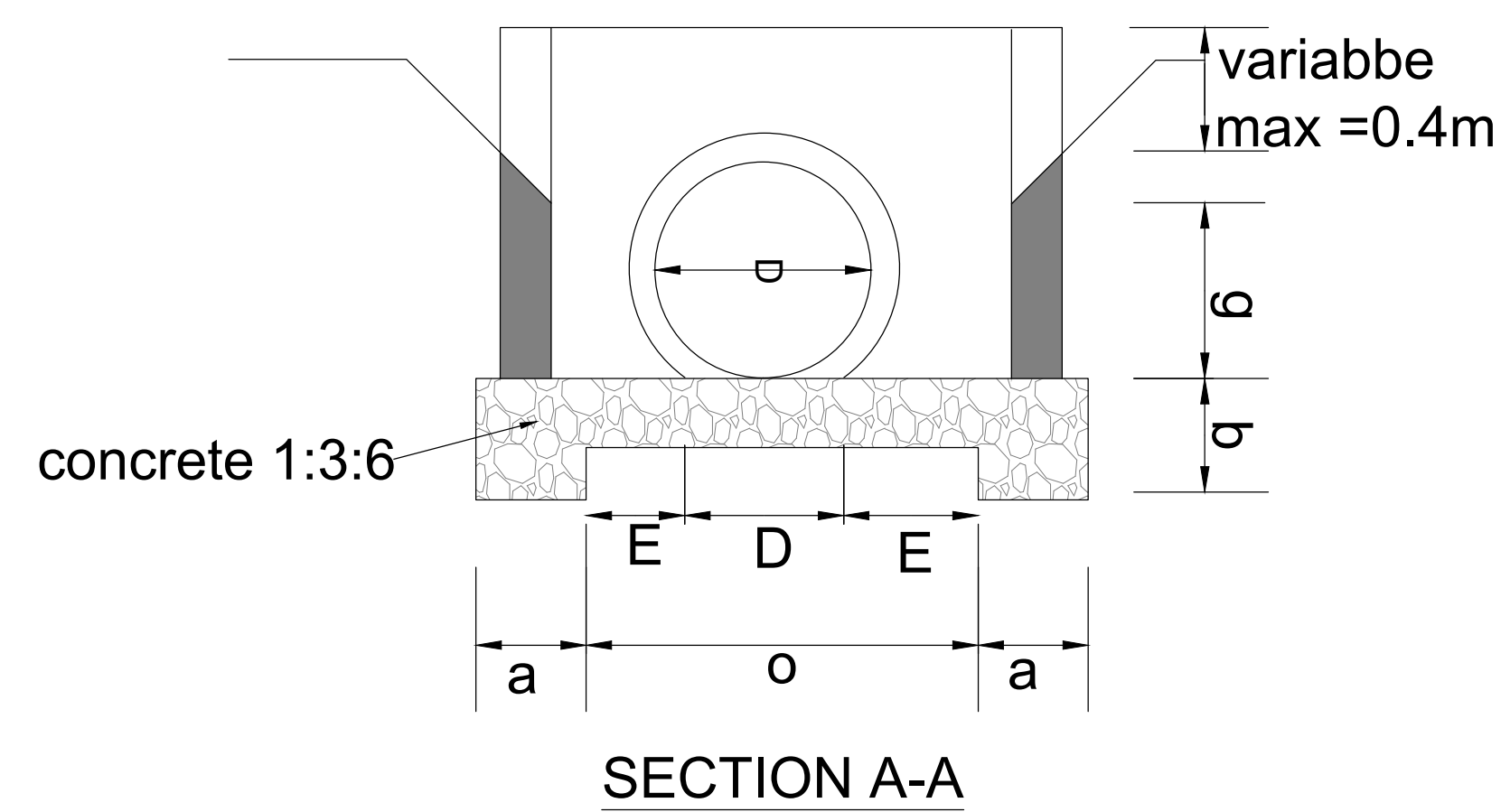
DIMENSIONS AND MATERIAL REQUIREMENTS

PIPE DIAMETER IN (M)			TYPE A			TYPE B		
			(CONCRETE BLOCKS)			(STONE MASONRY)		
			450	600	900	450	600	900
DIMENSION UNIT								
a	FOUNDATION	m	0.30	0.30	0.30	0.40	0.40	0.60
b	FOUNDATION	m	0.30	0.30	0.40	0.30	0.30	0.40
c	FOUNDATION		2.20	2.35	2.89	2.20	2.35	2.89
d	APRON	m	1.00	1.00	1.20	1.00	1.00	1.20
e	APRON	m	0.20	0.20	0.20	0.20	0.20	0.20
f	WALL	m	0.20	0.20	0.20	0.40	0.40	0.40
g	WALL	m	0.30	0.30	0.30	0.30	0.30	0.30
h	WALL	m	1.15	1.15	1.39	1.15	1.15	1.39
i	WALL	m	0.20	0.20	0.20	0.40	0.40	0.40
k	APRON	m	1.05	1.20	1.50	1.05	1.20	1.50
MATERIAL REQUIREMENT								
FOUNDATION								
	(Concrete)	m3	0.3	0.32	0.51	0.4	0.42	1.03
HEAD/WINGWALLS								
	(Concrete/)	m3	0.4	0.47	0.67	0.8	0.93	1.35
APRON								
	(Concrete)	m3	0.33	0.36	0.53	0.33	0.36	0.53

FIGURE H.9 - HEADWALL TYPE 2 (DROP INLETS)



SECTION B-B



DIMENSIONS AND MATERIAL REQUIREMENTS

PIPE DIAMETER IN (M)			TYPE A			TYPE B		
			(CONCRETE BLOCKS			(STONE MASONRY)		
			450	600	900	450	600	900
DIMENSION		UNIT						
a	FOUNDATION	m	0.30	0.30	0.30	0.40	0.40	0.40
b	FOUNDATION	m	0.30	0.30	0.30	0.30	0.30	0.30
c	FOUNDATION	m	1.10	1.10	1.40	1.20	1.20	1.50
d	APRON	m	0.90	0.90	0.90	1.00	1.00	1.00
e	APRON	m	0.20	0.20	0.20	0.20	0.20	0.20
f	DROP INLET	m	0.60	0.60	0.60	0.60	0.60	0.60
g	DROP INLET	m	0.30	0.40	0.60	0.30	0.40	0.60
h	DROP INLET	m	0.60	0.80	1.20	0.60	0.80	1.20
l	DROP INLET	m	0.20	0.20	0.20	0.40	0.40	0.40
k	DROP INLET	m	1.20	1.20	1.50	1.20	1.20	1.50
l	DROP INLET	m	1.00	1.00	1.00	1.00	1.00	1.00
m	DROP INLET	m	0.38	0.30	0.30	0.38	0.30	0.30
MATERIAL REQUIREMENT								
FOUNDATION								
	(Concrete)	m3	0.47	0.47	0.52	0.72	0.72	0.79
HEAD/WINGWALLS								
	(Concrete/Masonry)	m3	0.53	0.69	1.11	1.24	1.63	2.61
APRON								
	(Concrete)	m3	0.24	0.24	0.30	0.24	0.24	0.30

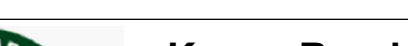
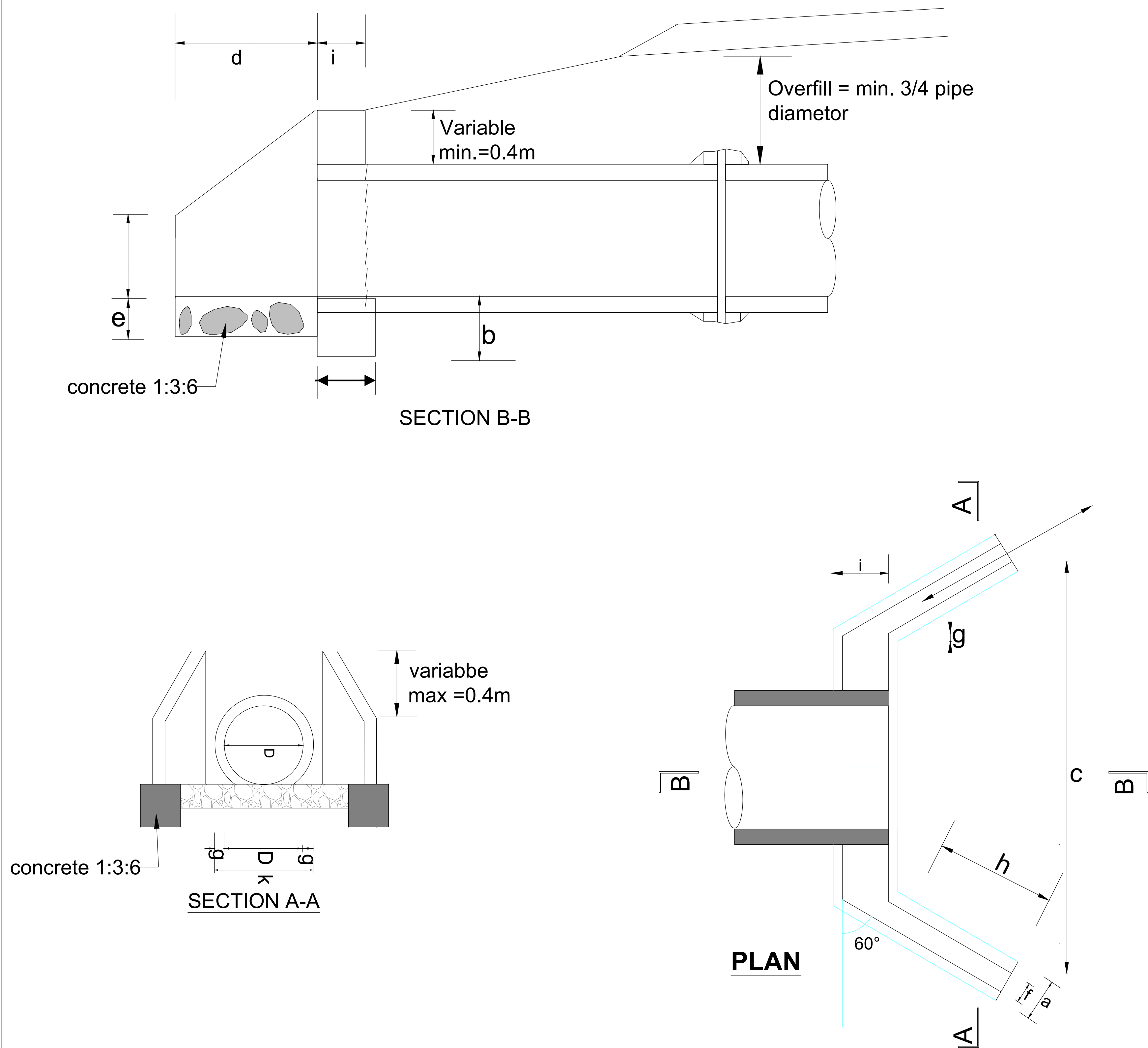
REVISIONS	No.	DATE	DESCRIPTION	 Kenya Rural Roads Authority Bara Bara Plaza, P.O. Box 48151- 00100, Nairobi. Kenya	DIRECTOR GENERAL	Consultant:  Runji Consulting Group Ltd Engineering & Project Management. 3, Kindaruma Road (Off Ngeng Road) P. O. Box 68053-00200 Nairobi Tel. (020) 2717213/4	PROJECT TITLE: DRAFT DETAILED ENGINEERING DESIGN OF GICHANINE MARIARA ROAD BATCH 2	DRAWING TITLE: HEADWALL TYPE 2 (DROP INLETS)	DRAWN BY: M.M DESIGNED BY: C.N.M CHECKED BY: M.J.N	Drg No. CE1045/CDS/GM/O2		
											Scale: NTS	Date : DECEMBER 2024

FIGURE H.12 - HEADWALL TYPE 4 (FOR ACCESS CULVERT)



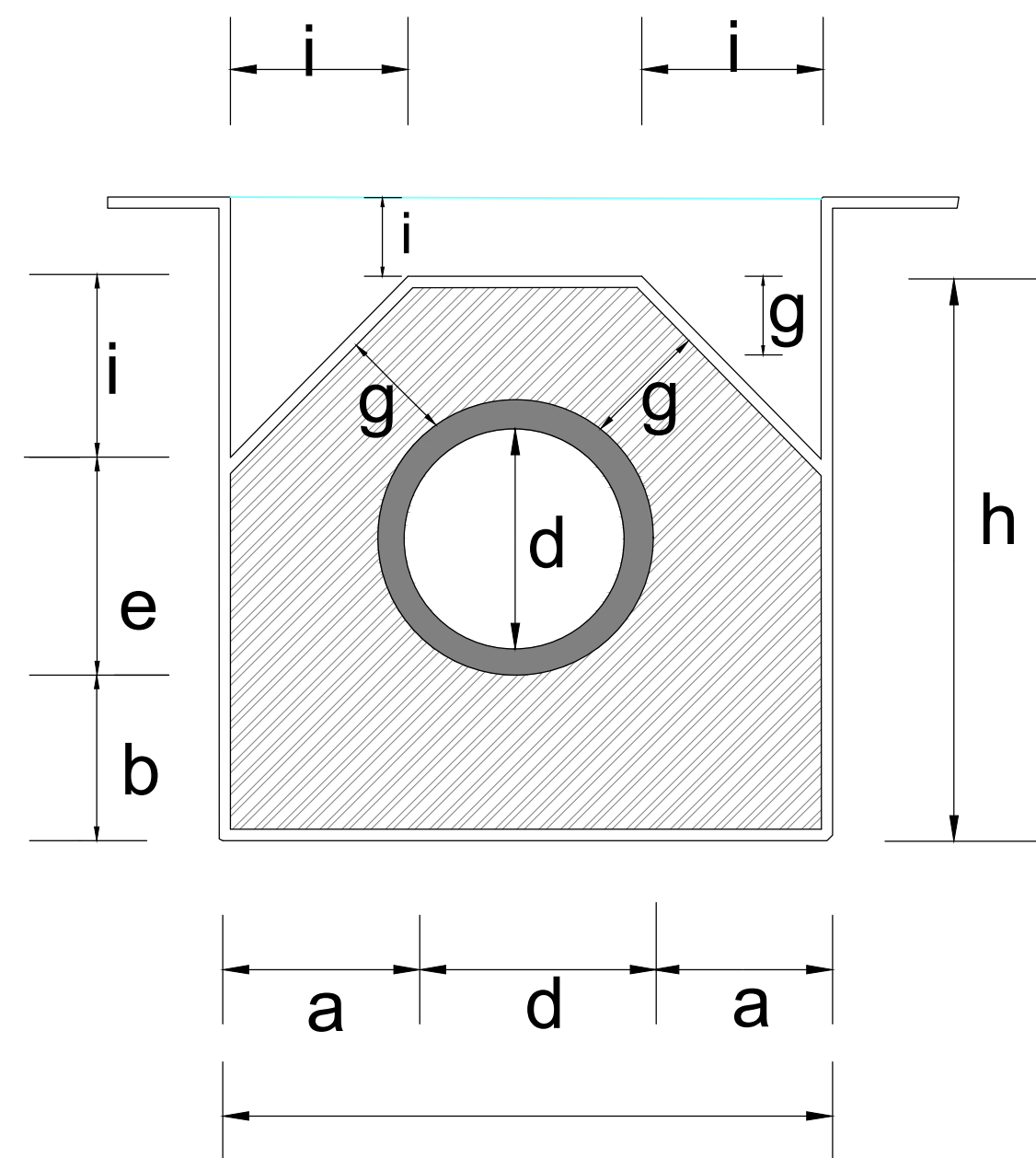
DIMENSIONS AND MATERIAL REQUIREMENTS

PIPE DIAMETER IN (M)		TYPE A (CONCRETE BLOCKS)			TYPE B (STONE MASONRY)		
		450	600	900	450	600	900
DIMENSION	UNIT						
a	FOUNDATION	m	0.30	0.30	0.40	0.40	
b	FOUNDATION	m	0.30	0.30	0.30	0.30	
c	APRON		1.34	1.49	1.34	1.49	
d	APRON	m	0.60	0.60	0.60	0.60	
e	APRON	m		0.20	0.20	0.20	
f	WINGWALLS	m	0.20	0.20	0.40	0.40	
g	WINGWALLS	m	0.10	0.10	0.10	0.10	
h	HEADWALLS	m	0.69	0.69	0.69	0.69	
i	HEADWALLS	m	0.20	0.20	0.40	0.40	
k	HEADWALLS	m	0.65	0.80	0.65	0.80	
l	HEADWALLS	m	0.40	0.40	0.40	0.40	
MATERIAL REQUIREMENT							
FOUNDATION							
(Concrete 1:2:4, 1:3:6)	m3	0.18	0.2		0.24	0.26	
HEAD/WINGWALLS							
(Concrete/Masonry)	m3	0.25	0.29		0.50	0.58	
APRON							
	m3	0.12	0.14		0.12	0.14	

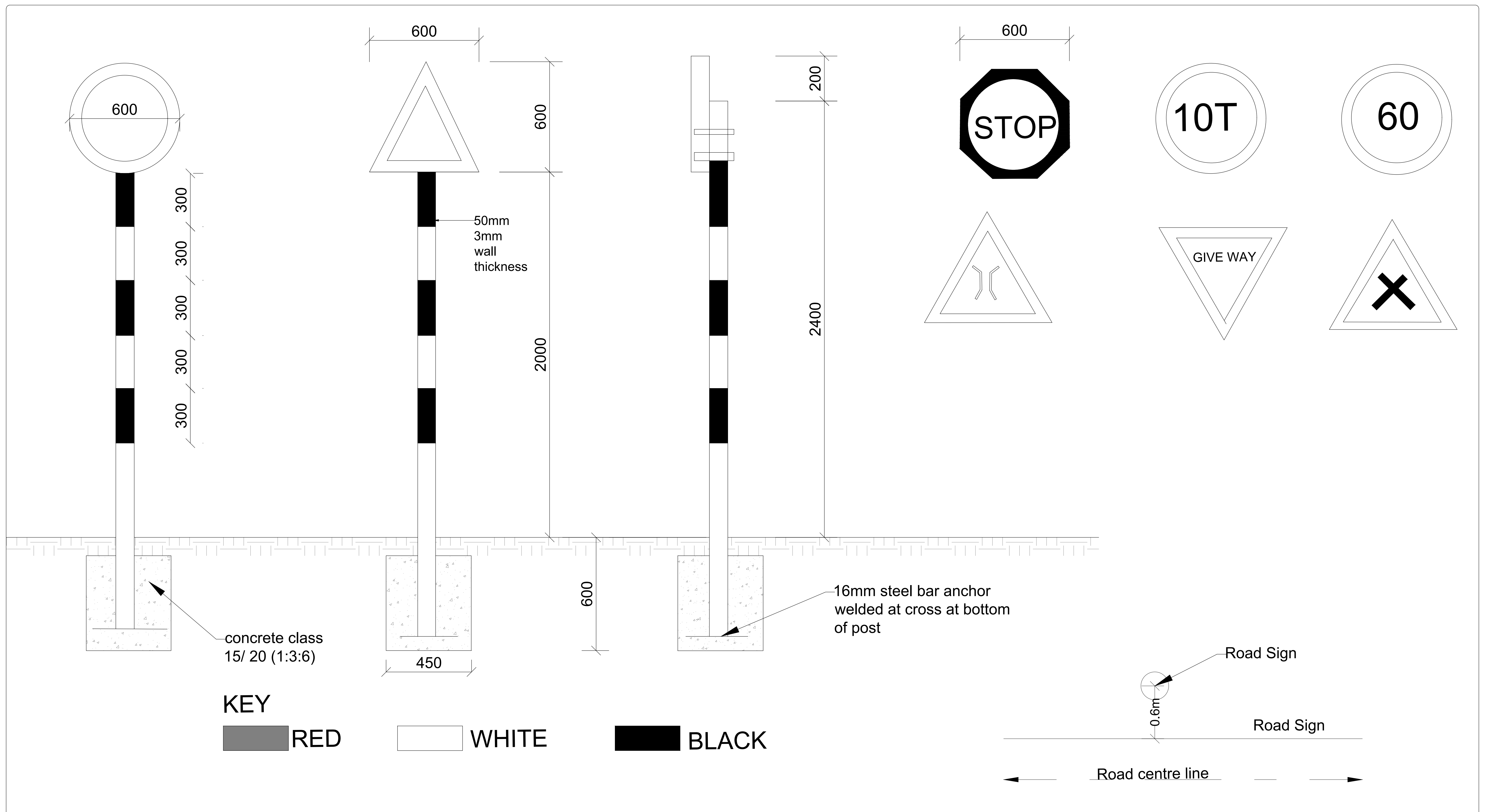
FIGURE H.14-BEDDING AND HAUNCH PROFILES TYPE III& IV

PROFILE IV

(CONCRETE)



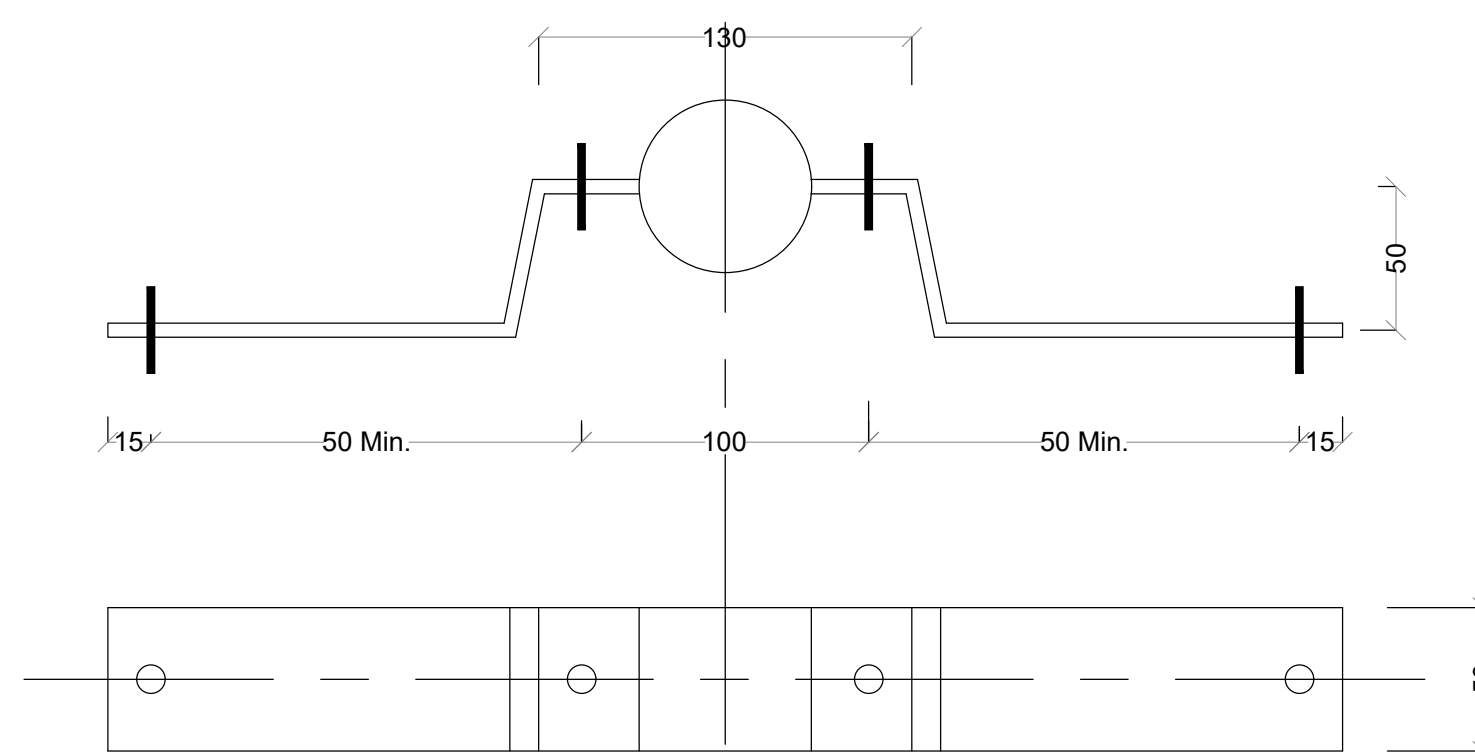
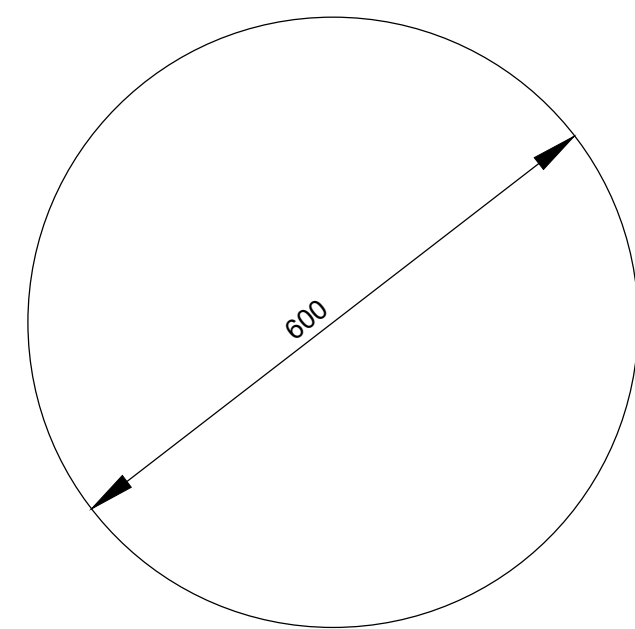
450 (mm)	600 (mm)	900 (mm)
Dimensions in (m)		
0.15	0.2	0.2
0.15	0.15	0.15
0.86	0.15	1.48
0.56	0.72	1.08
0.46	0.15	0.78
0.15	0.15	0.15
0.15	0.15	0.15
0.81	1.02	1.38
0.28	0.35	0.45
volume in (m3/m)		
0.37	0.61	0.92
-fair to poor subgrade condition -overfill >³/₄ Dia; -Seasonal waterflow only. -Use gravel material for. -backfill/overfill.		



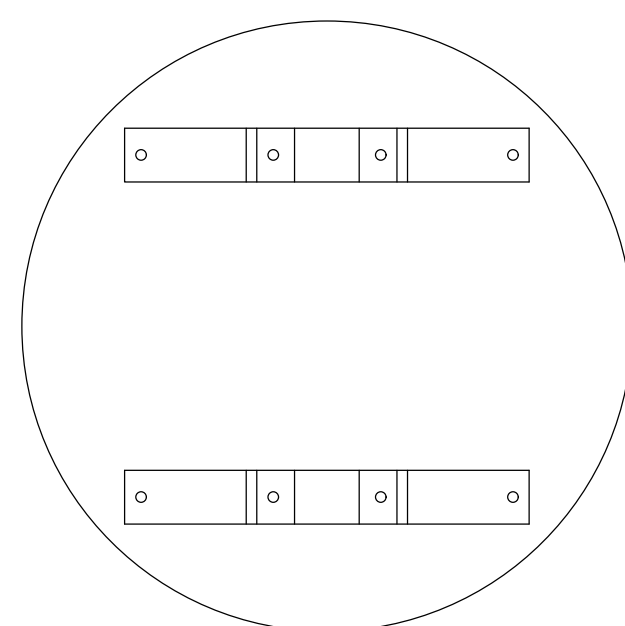
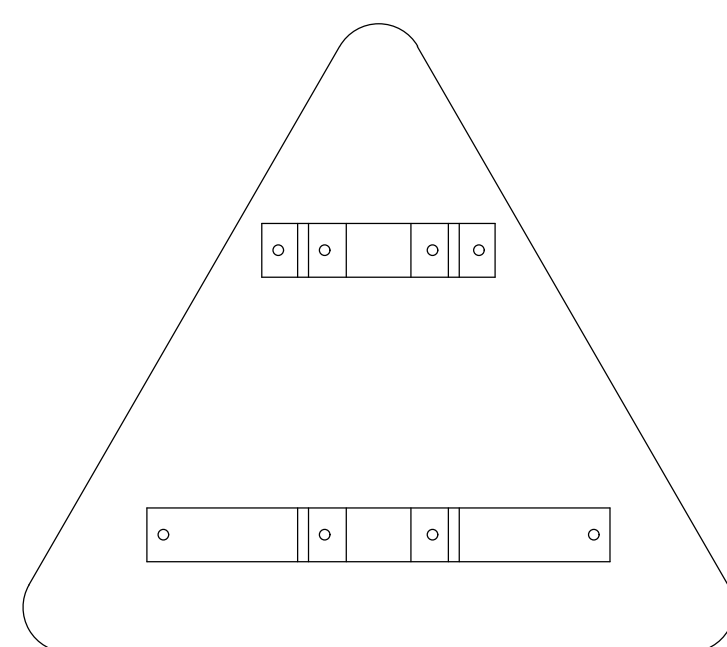
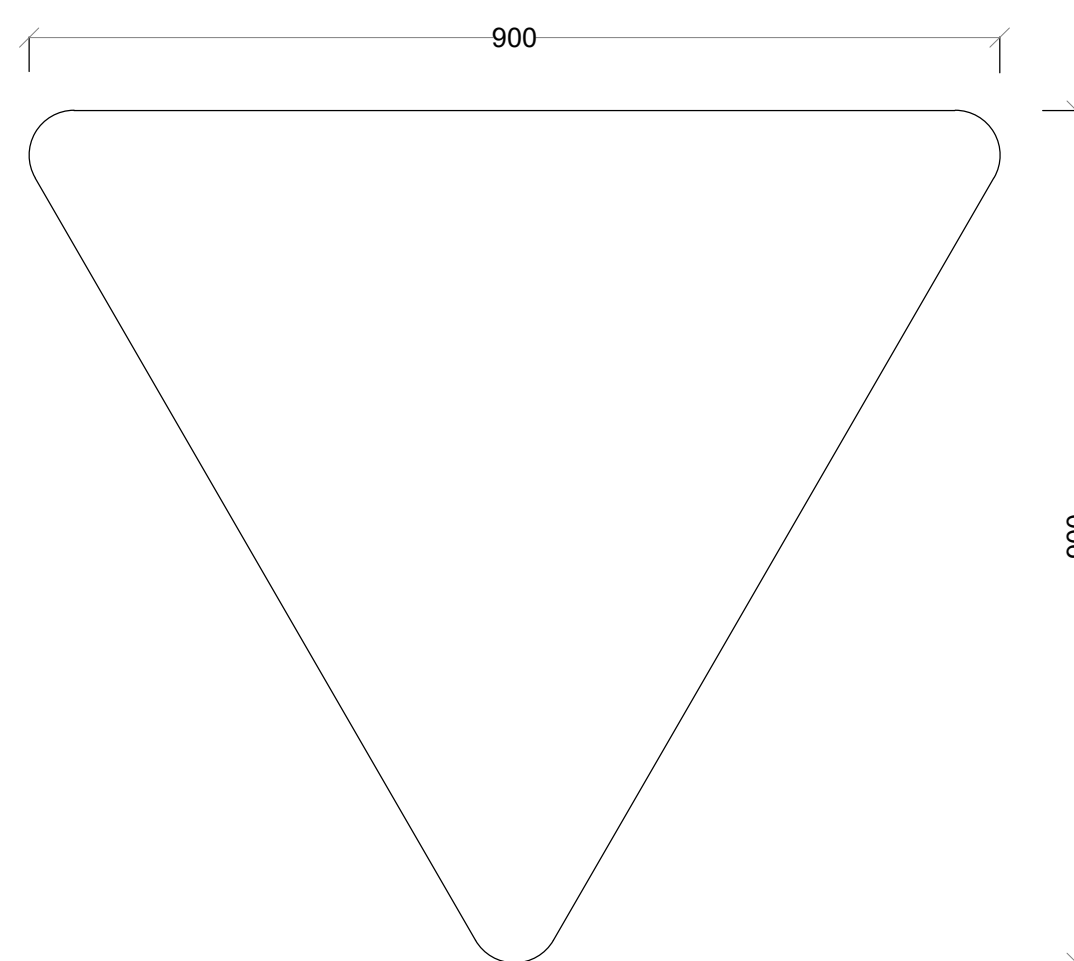
- 1.The type of sign required and their location shall de shown as road plan or as directed by engineer
- 2.signs plate to be 2mm thick mild steel plate
- 3.sign post to be 50mm fixing clamp/brackets
- 4.Sign plate to be fixed to steel tube by \$Nos M10 bolts and 50mm fixing clamp/brackets
- 5,Sign paints shall be reflective
- 6.The sign plate and post shall be treated by applying two coats of lead red oxide paint before applying a priming and two finish coats of approved paints. Paints used shall have a hard,durable and glossy finish.

REVISIONS	No.	DATE	DESCRIPTION	 Kenya Rural Roads Authority Bara Bara Plaza, P.O. Box 48151- 00100, Nairobi. Kenya	DIRECTOR GENERAL		Consultant:  Runji Consulting Group Ltd Engineering & Project Management. 3, Kindaruma Road (Off Ngong Road) P. O. Box 68053-00200 Nairobi Tel. (020) 2717213/4	PROJECT TITLE: DRAFT DETAILEDENGINEERING DESIGN OF GICHANINE MARIARA ROAD BATCH 2	DRAWING TITLE: CULVERT ROAD SIGNS	DRAWN BY: M.M DESIGNED BY: C.N.M CHECKED BY: M.J.N Scale: NTS	Drg No. CE1045/CDS/GM/O5 Date : DECEMBER 2024

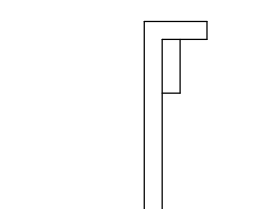
STANDARD DRAWINGS



A diagram showing a square with side length 900. Inside the square, an octagon is inscribed by connecting the midpoints of the square's sides. The horizontal distance from the left edge of the square to the leftmost vertex of the octagon is labeled 900. Similarly, the vertical distance from the bottom edge of the square to the bottommost vertex of the octagon is labeled 900.



PREFORMED FLANGE



PLASTIC CAP TO SEAL TUBE

60mm DIA. GALVANISED STEEL TUBE

2000

1500mm Min.

4% : SHOULDER

EDGE OF CARRIAGEWAY

600

12

450

SOIL/SOULDER MATERIAL

CLASS 20/20 CONCRETE

STEEL PIN FOR BASE PLATE AT FOOT OF POST

300

[illegible]

DIRECTOR GENERAL
DIRECTOR (PLANNING , DESIGN &ENVIRONMENT

44

FINAL DETAILED
ENGINEERING DESIGN OF
GICHANINE MARIARA (ROAD) BATCH 2

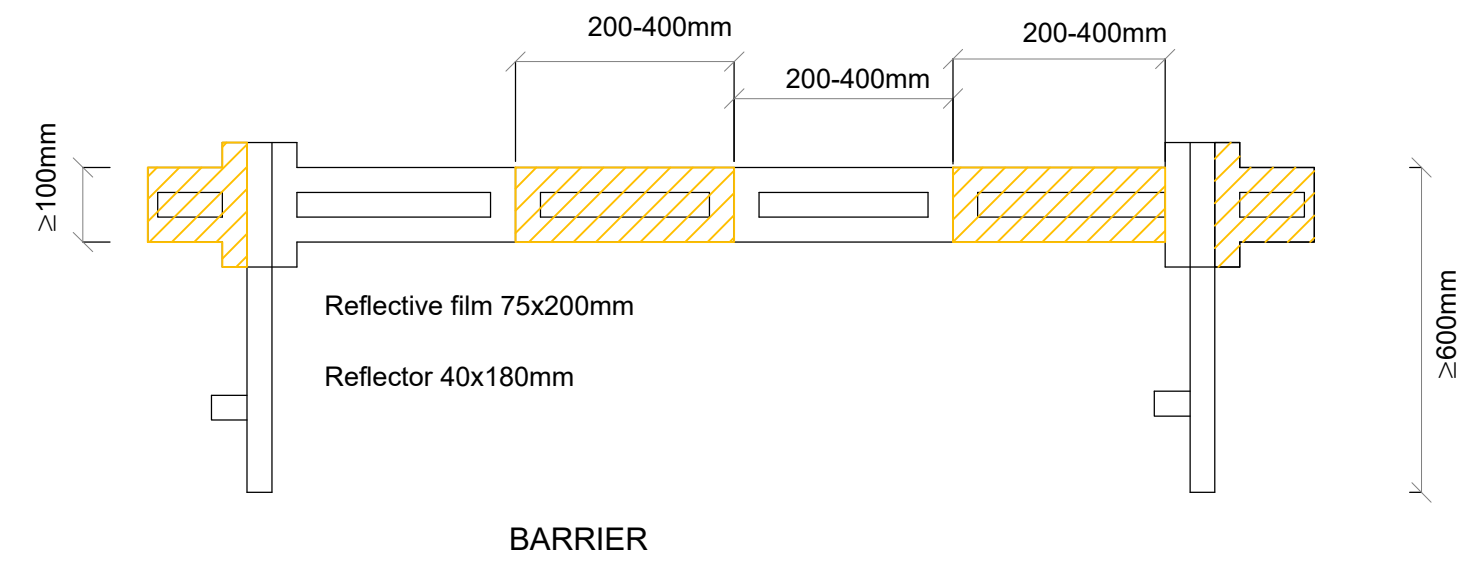
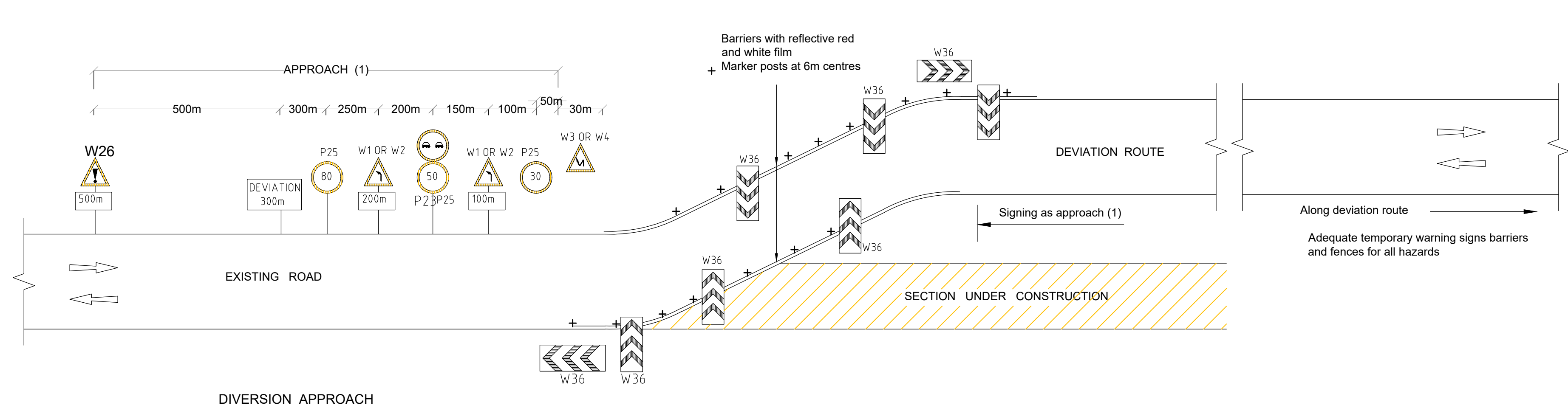
STANDARD DRAWING -
STANDARD - ROAD SIGNS

DRAWN BY: M.M
DESIGNED BY: C.N.M
CHECKED BY: M.J.N

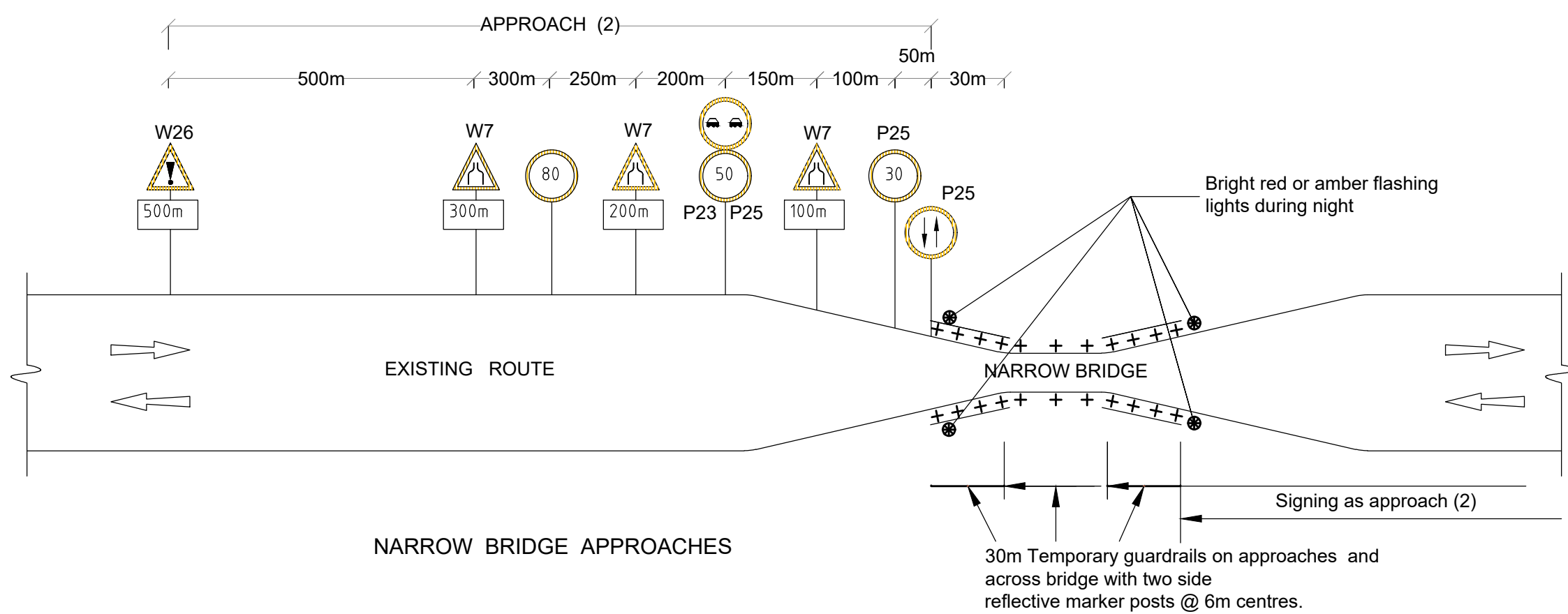
Scale: AS SHOWN

Drg No.	CE1045/SD/GM/01
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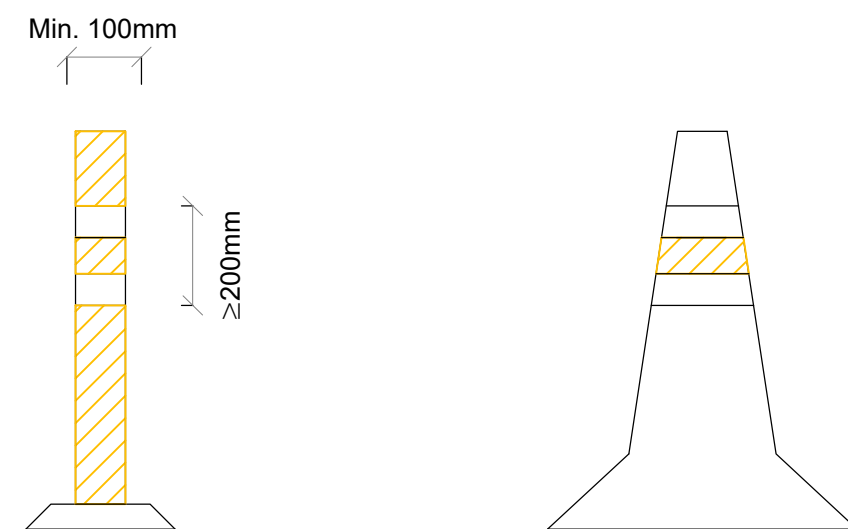
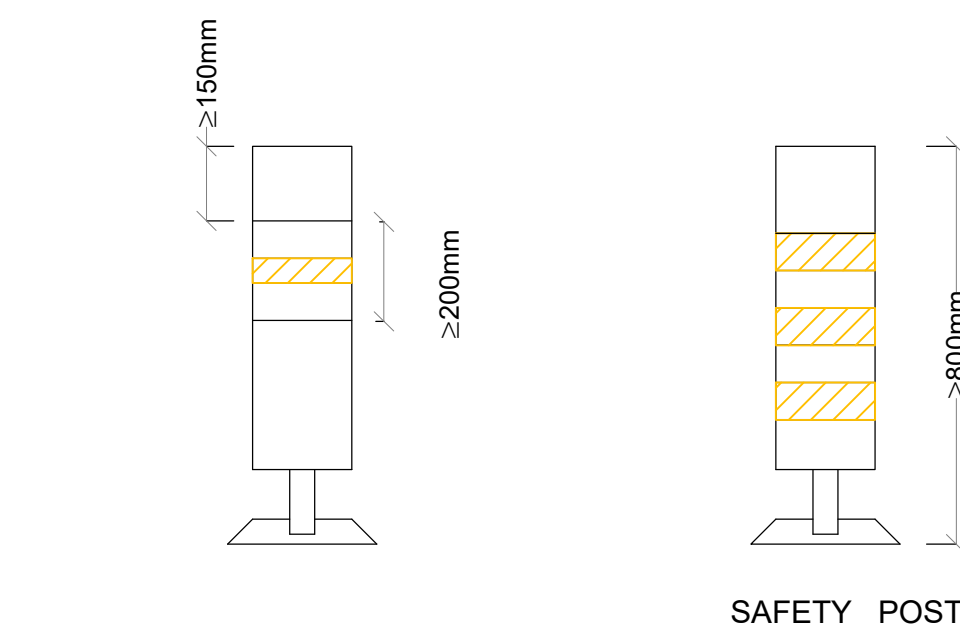
Date :OCTOBER 2024



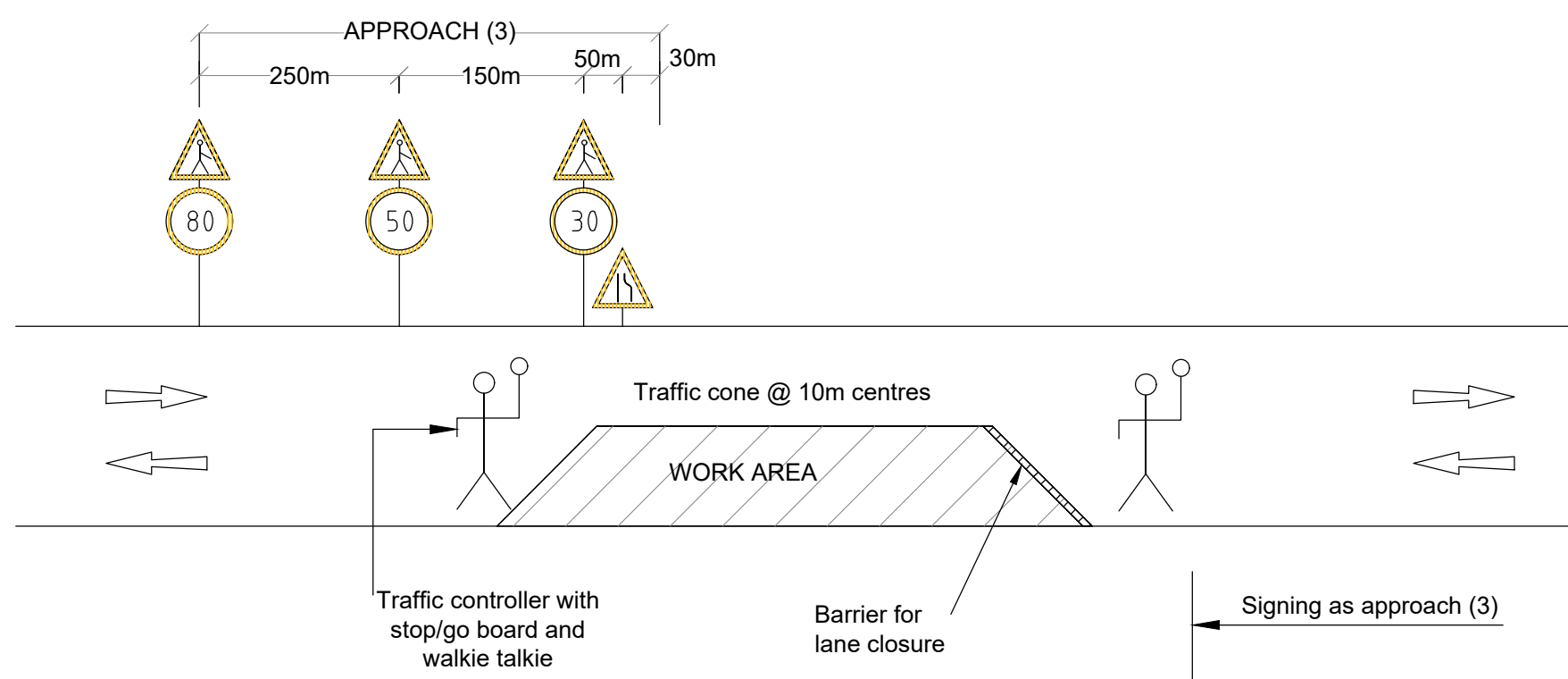
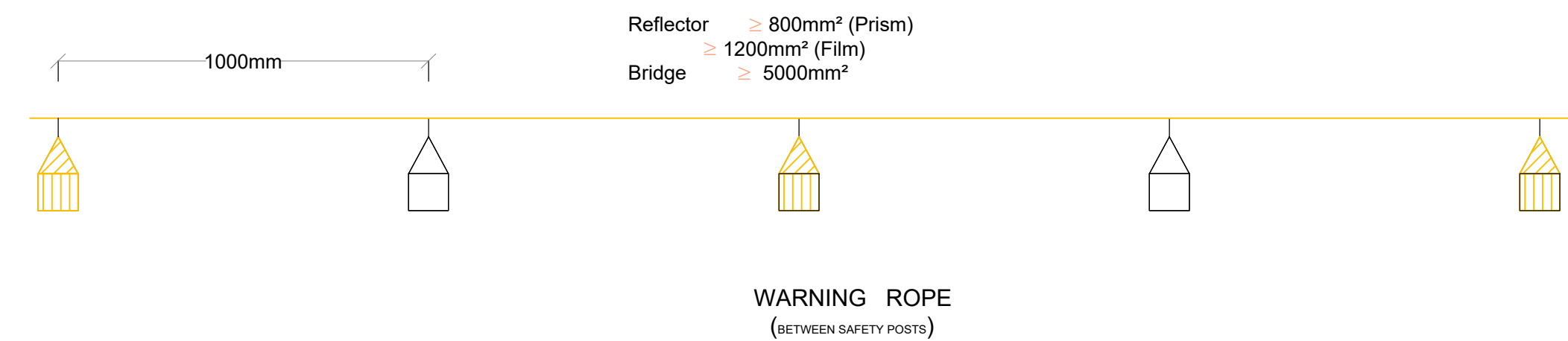
DIVERSION APPROACH



NARROW BRIDGE APPROACHES



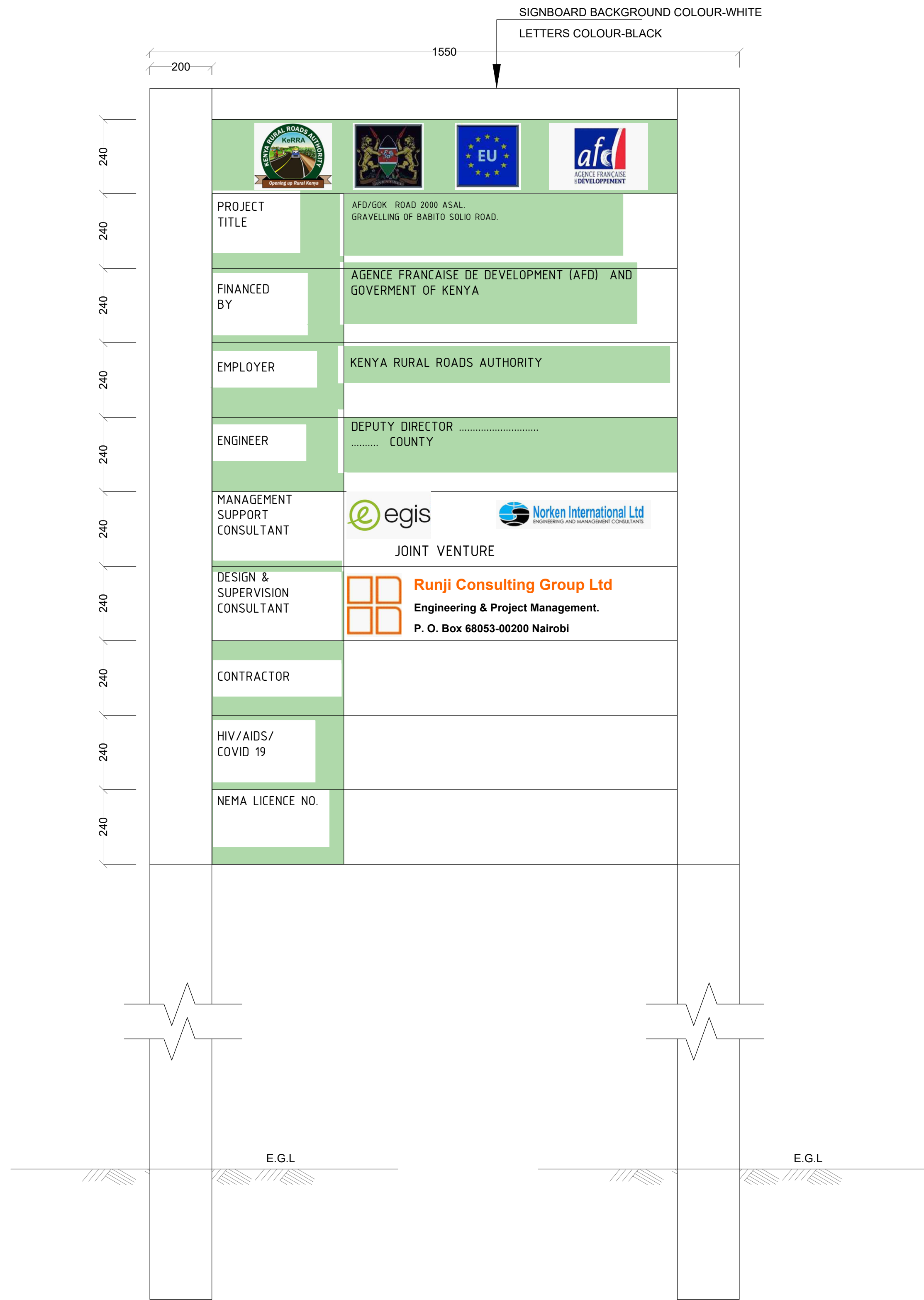
TRAFFIC CONE



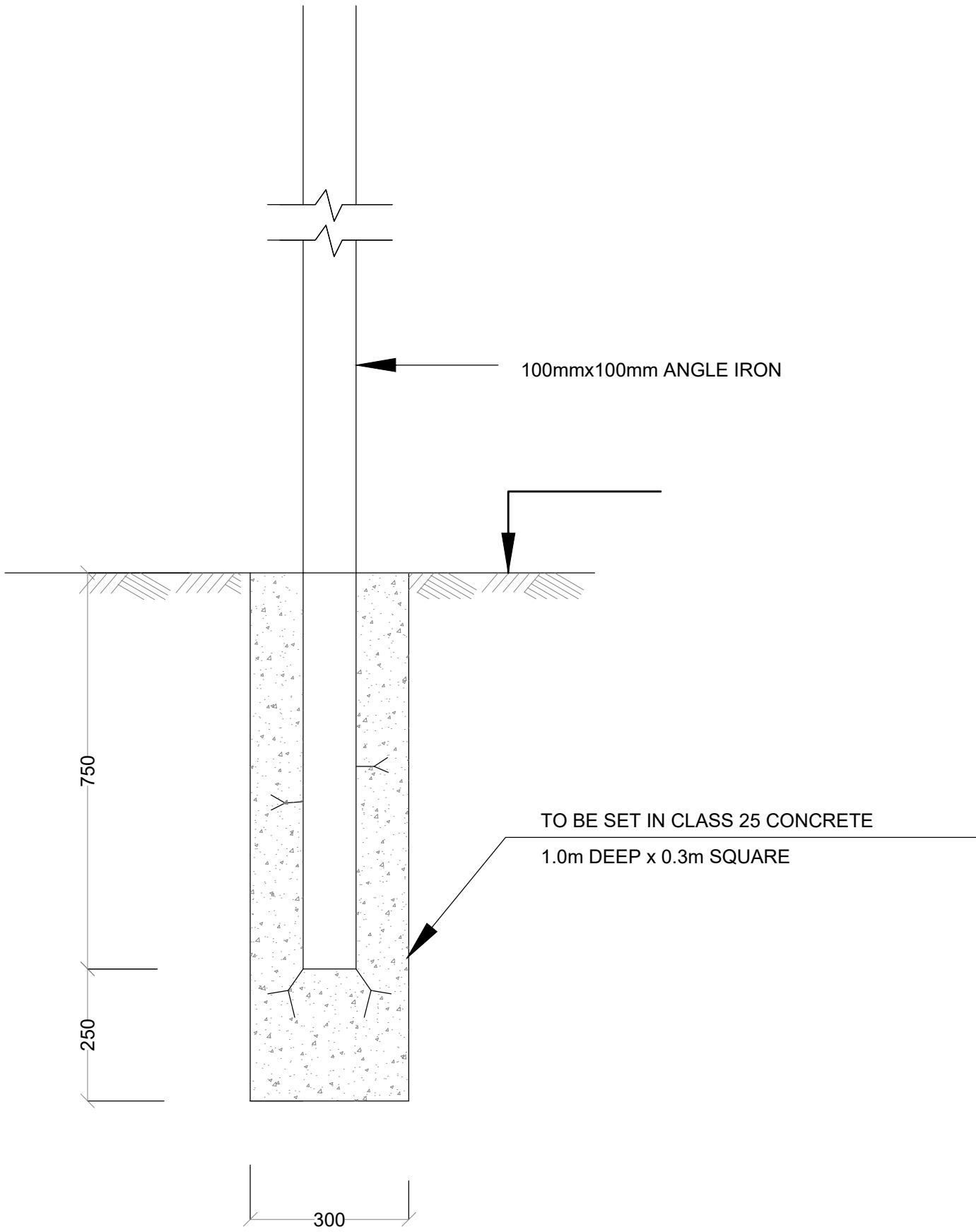
TEMPORARY LANE CLOSURES

- NOTES:**
- All temporary signs must be retro-reflective
 - Numbers, lettering and colours to be in accordance with the Manual of Traffic Signs in Kenya Part II (JUNE 1975)
 - Marker posts to be unbreakable plastic or glass fibre vergemaster or similar
 - All signs must be kept clean and visible at all times.
 - Sketches shown on this drawing are the minimum requirements, signs may be varied or adjusted as directed by the Resident Engineer to suit each particular site
 - Fences and barriers shall be provided as directed by the Resident Engineer to separate pedestrians and traffic where they will need to use road or deviation for access
 - All works and temporary signs are to comply with the requirements of Section 9 of the Standard Specification

REVISIONS	No.	DATE	DESCRIPTION	 Kenya Rural Roads Authority Bara Bara Plaza, P.O. Box 48151- 00100, Nairobi. Kenya	DIRECTOR GENERAL		Consultant:  Runji Consulting Group Ltd Engineering & Project Management. 3, Kindaruma Road (Off Ngong Road) P. O. Box 68053-00200 Nairobi Tel. (020) 2717213/4	PROJECT TITLE: FINAL DETAILED ENGINEERING DESIGN OF GICHANINE MARIARA (ROAD) BATCH 2	DRAWING TITLE: STANDARD DRAWING - TRAFFIC MANAGEMENT	DRAWN BY: M.M DESIGNED BY: C.N.M CHECKED BY: M.J.N Scale: AS SHOWN	Drg No. CE1045/SD/GM/03				



- NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
 2. SPACING BETWEEN LINES TO BE 50mm.
 3. SPACING BETWEEN EDGE AND LINE TO BE 50mm.
 4. ALL STEEL POSTS TO BE TO BS 3049 CLASS 'A' (HOT ROLLED).
 5. THE FINISH TO BE HOT DIP GALVANIZED TO BS 729.
 6. ALL BOLTS SHALL BE BUTTON-HEADED AND GALVANISED.



SIGNBOARD FIXING DETAIL
SCALE: 1:100

REVISIONS	No.	DATE	DESCRIPTION	 Kenya Rural Roads Authority Bara Bara Plaza, P.O. Box 48151- 00100, Nairobi. Kenya	DIRECTOR GENERAL		Consultant:  Runji Consulting Group Ltd Engineering & Project Management. 3, Kindaruma Road (Off Ngong Road) P. O. Box 68053-00200 Nairobi Tel. (020) 2717213/4	PROJECT TITLE: FINAL DETAILED ENGINEERING DESIGN OF GICHANINE MARIARA (ROAD) BATCH 2	DRAWING TITLE: STANDARD DRAWING - PUBLICITY SIGN BOARD	DRAWN BY: M.M DESIGNED BY: C.N.M CHECKED BY: M.J.N Scale: AS SHOWN	Drg No. CE1045/SD/GM/04 Date : OCTOBER 2024