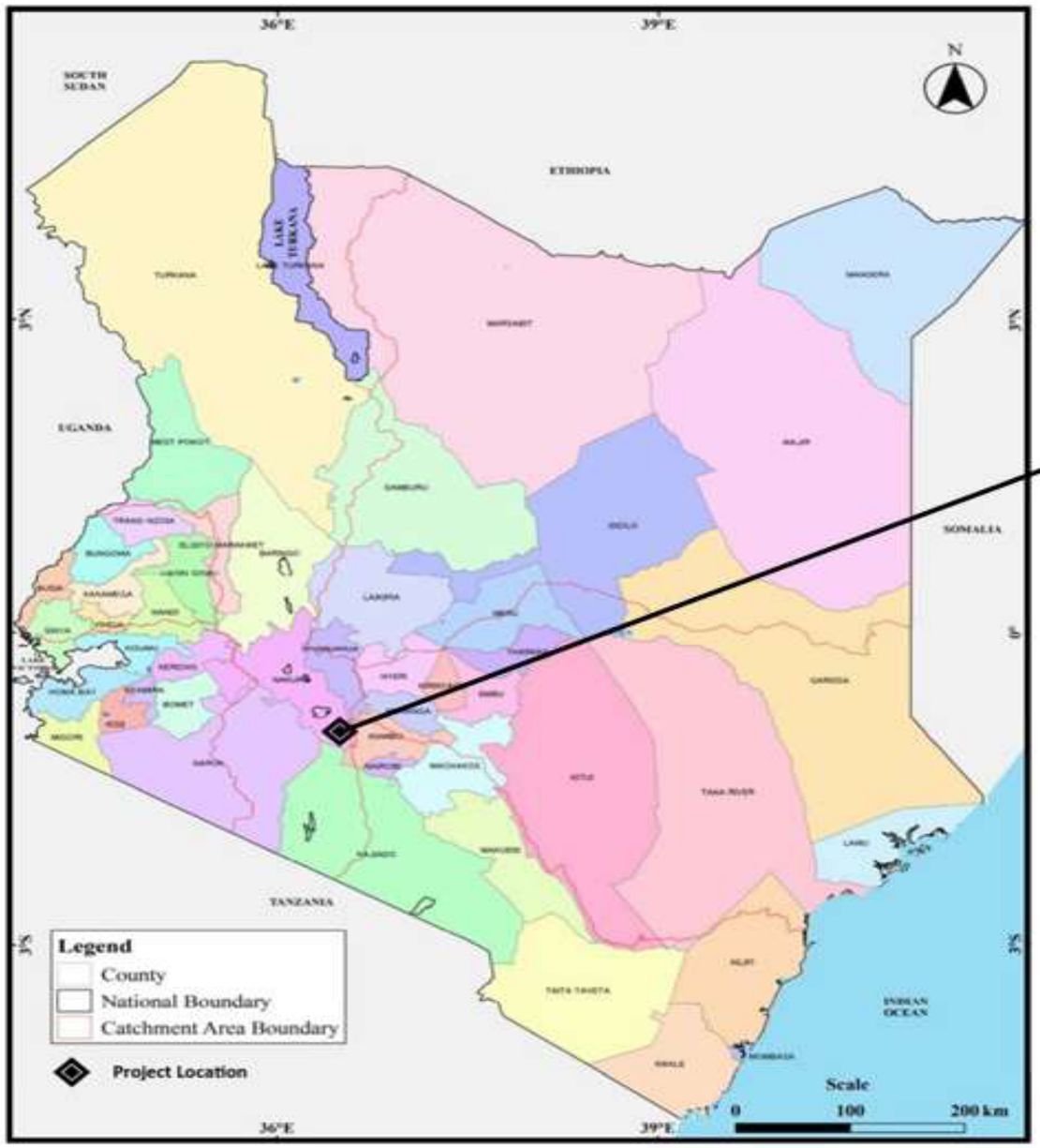
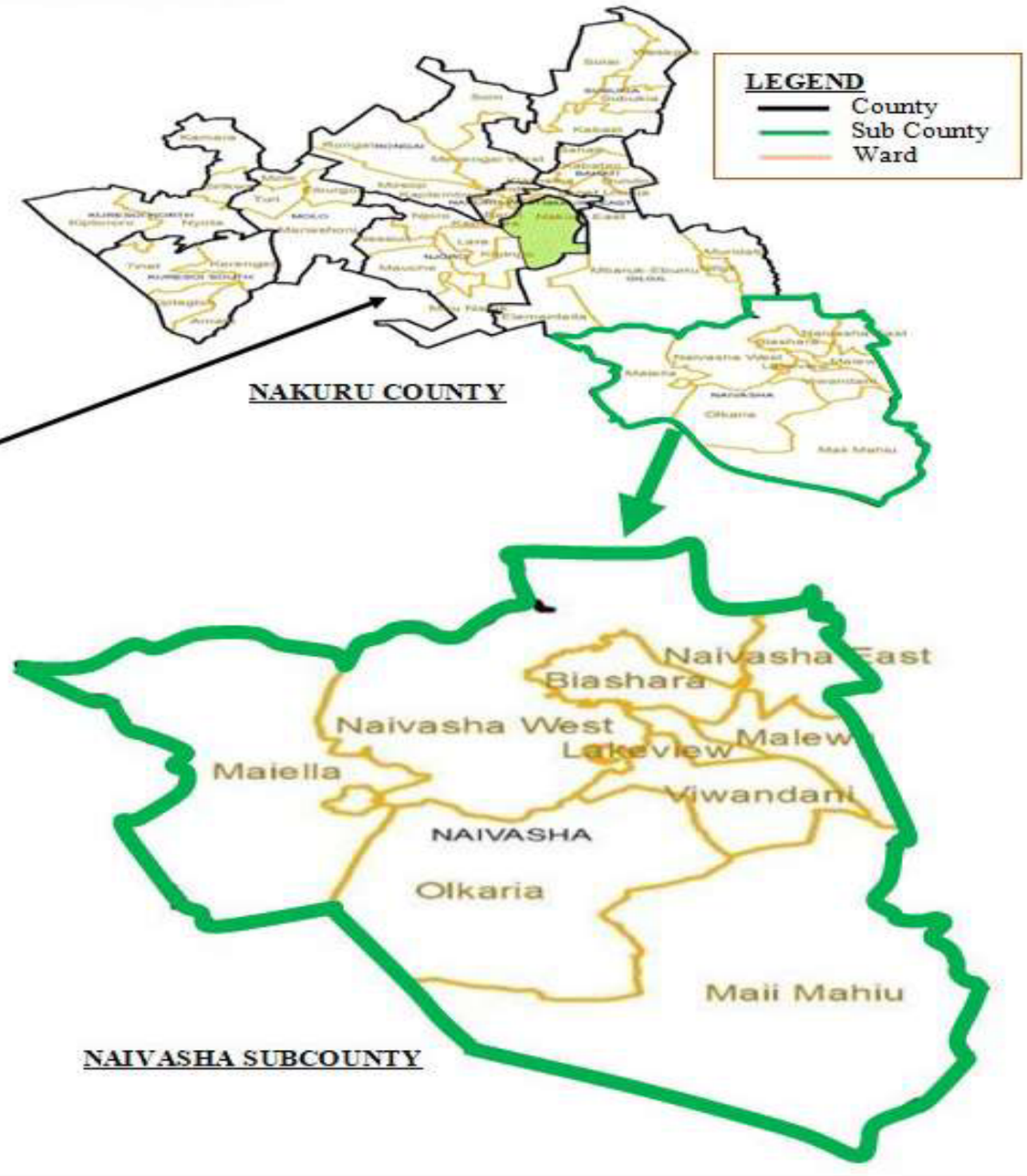
PROJECT LOCATION MAP





REV	Description	Sign	Date	Approved

REVISIONS

Firm Name and Address

NAIVASHA WATER, SEWERAGE & SANITATION COMPANY LTD.
P. O. Box 321
Naivasha Kenya
Email: naivashawater@gmail.com
Tel: 0705 877 770

SURVEYED BY:	F.MWAREMA	SIGN:_____	DATE: OCTOBER, 2024
DESIGNED BY:	F.MWAREMA	SIGN:_____	DATE: OCTOBER, 2024
DRAWN BY:	S.MWANGI	SIGN:_____	DATE: OCTOBER, 2024
APPROVED BY:	F.MWAREMA	SIGN:_____	DATE: OCTOBER, 2024

LEGEND:

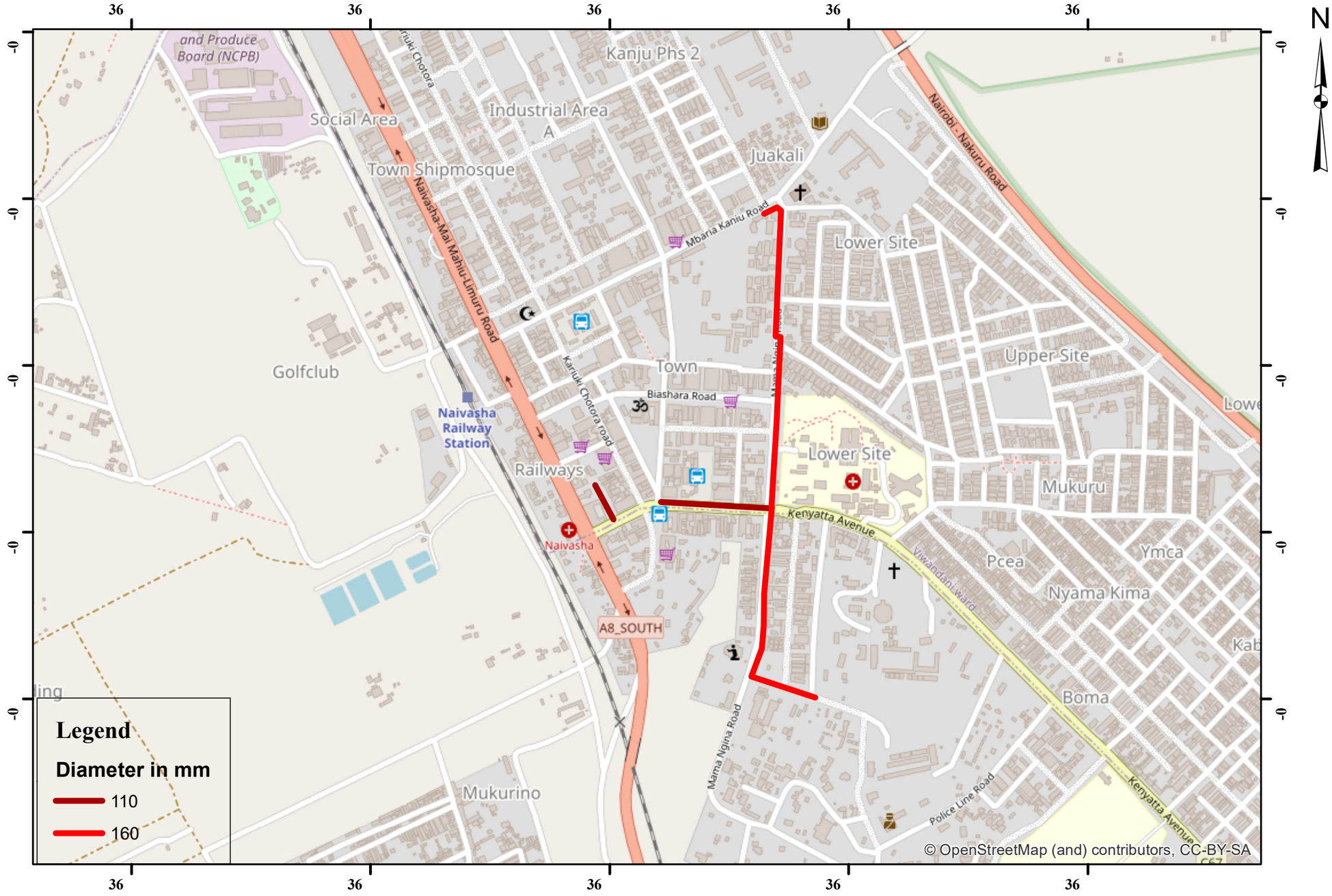
MC	METER CHAMBER	PVC	POLYVINYL CHLORIDE
	ROAD CROSSINGS	DIA	DIAMETER
DWC	DOUBLE WALL CORRUGATED		
HDPE	HIGH DENSITY POLYETHYLENE		

Project: NAIVAWASCO CLSG PHASE 2 PROJECT

Drawing Title: CONSTRUCTION OF HDPE PIPELINES FOR SOUTHERN CBD AND LAKEVIEW ZONE

Scale: AS SHOWN (A3) | Sheet No: 1 OF 7 | Drawing No: NAIVAWASCO-CLSG -1

CONSTRUCTION OF HDPE PIPELINES FOR SOUTHERN CBD AND LAKE VIEW ZONE



Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree

NOTES

1. ALL LEVELS ARE IN METERS UNLESS STATED OTHERWISE .
2. POSITION OF EXISTING SERVICES WILL BE CONFIRMED DURING SETTING-OUT.
3. LOCATION AND DEPTH OF COVER OF ALL SERVICES MUST BE CHECKED ON SITE PRIOR TO EXCAVATION.
4. EXISTING SERVICES ARE TO BE PROTECTED AND DIVERTED AS APPROVED BY THE ENGINEER.
5. CONTOUR ELEVATION IN METERS .
6. THE ACTUAL ALIGNMENT WILL BE CONFIRMED DURING SETTING OUT.
7. FOR CROSSING DETAILS REFER TO STANDARD DRAWINGS
8. MINIMUM COVER TOP ALL PIPES TO BE 1.0M.
9. FOR THE TEMPORARY AND PERMANENT SURVEY BENCHMARK DETAILS USED IN THE DESIGN, PLEASE REFER TO THE SURVEY REPORTS.

LEGEND:

MC	METER CHAMBER
	ROAD CROSSINGS
DWC	DOUBLE WALL CORRUGATED
HDPE	HIGH DENSITY POLYETHYLENE
PVC	POLYVINYL CHLORIDE
DIA	DIAMETER
GV	GATE VALVE
AV	GATE VALVE

REV	Description	Sign	Date	Approved

REVISIONS

Firm Name and Address

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Email: naivashawater@gmail.com
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WaterFund
Financing the Water Sector

SURVEYED BY:	F.MWAREMA	SIGN:_____	DATE: OCTOBER, 2024
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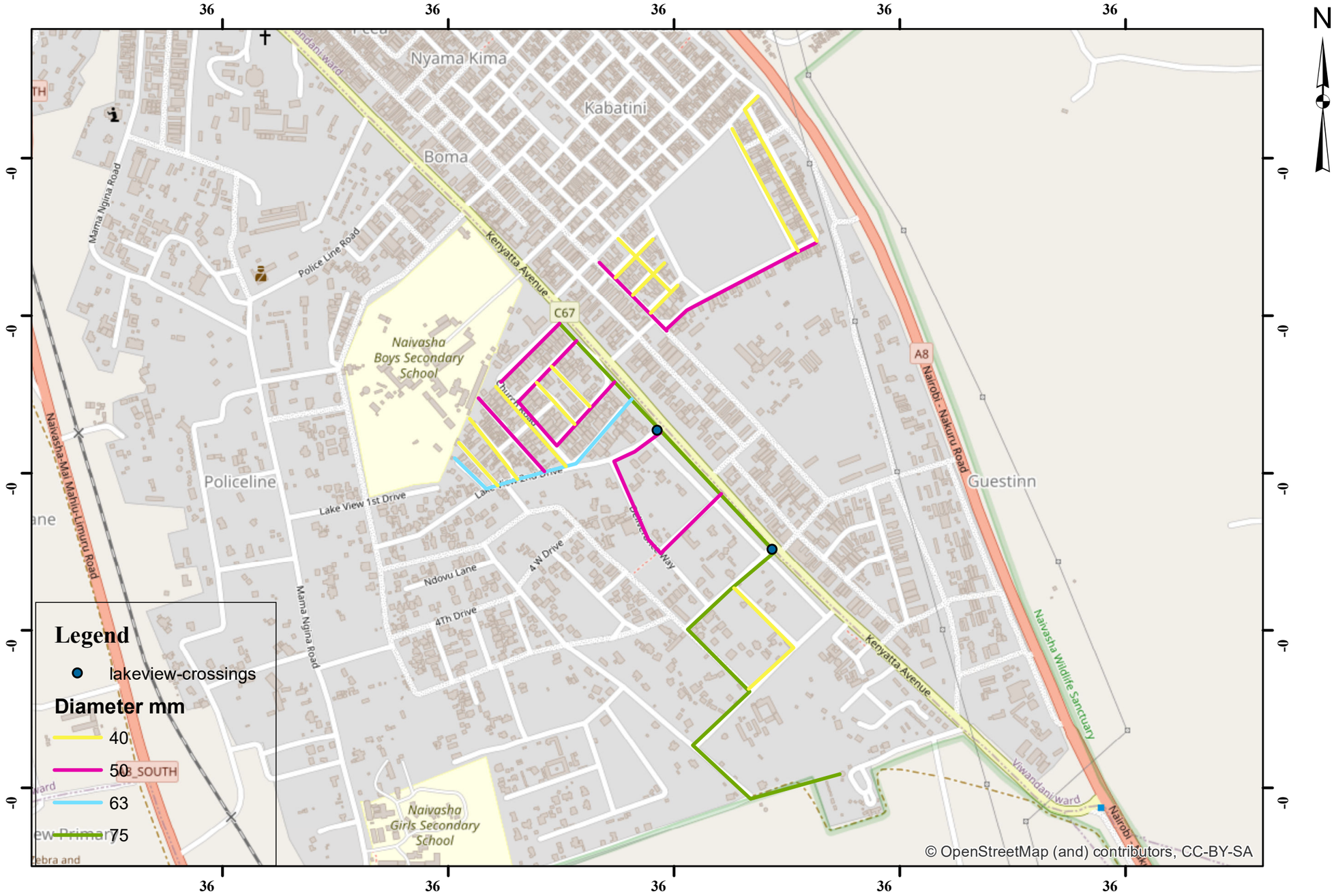
DRAWN BY:	S.MWANGI	SIGN:_____	DATE: OCTOBER, 2024
APPROVED BY:	F.MWAREMA	SIGN:_____	DATE: OCTOBER, 2024

Project: NAIVAWASCO CLSG PHASE 2 PROJECT

Drawing Title: CONSTRUCTION OF HDPE PIPELINES FOR SOUTHERN CBD AND LAKEVIEW ZONE

Scale: AS SHOWN (A3) | Sheet No: 2 OF 7 | Drawing No: NAIVAWASCO-CLSG -2

CONSTRUCTION OF HDPE PIPELINES FOR SOUTHERN CBD AND LAKE VIEW ZONE



0 0.275 0.55 1.1
Kilometers

Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree

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MC	METER CHAMBER
	ROAD CROSSINGS
DWC	DOUBLE WALL CORRUGATED
HDPE	HIGH DENSITY POLYETHYLENE
PVC	POLYVINYL CHLORIDE
DIA	DIAMETER
GV	GATE VALVE
AV	GATE VALVE

REV	Description	Sign	Date	Approved

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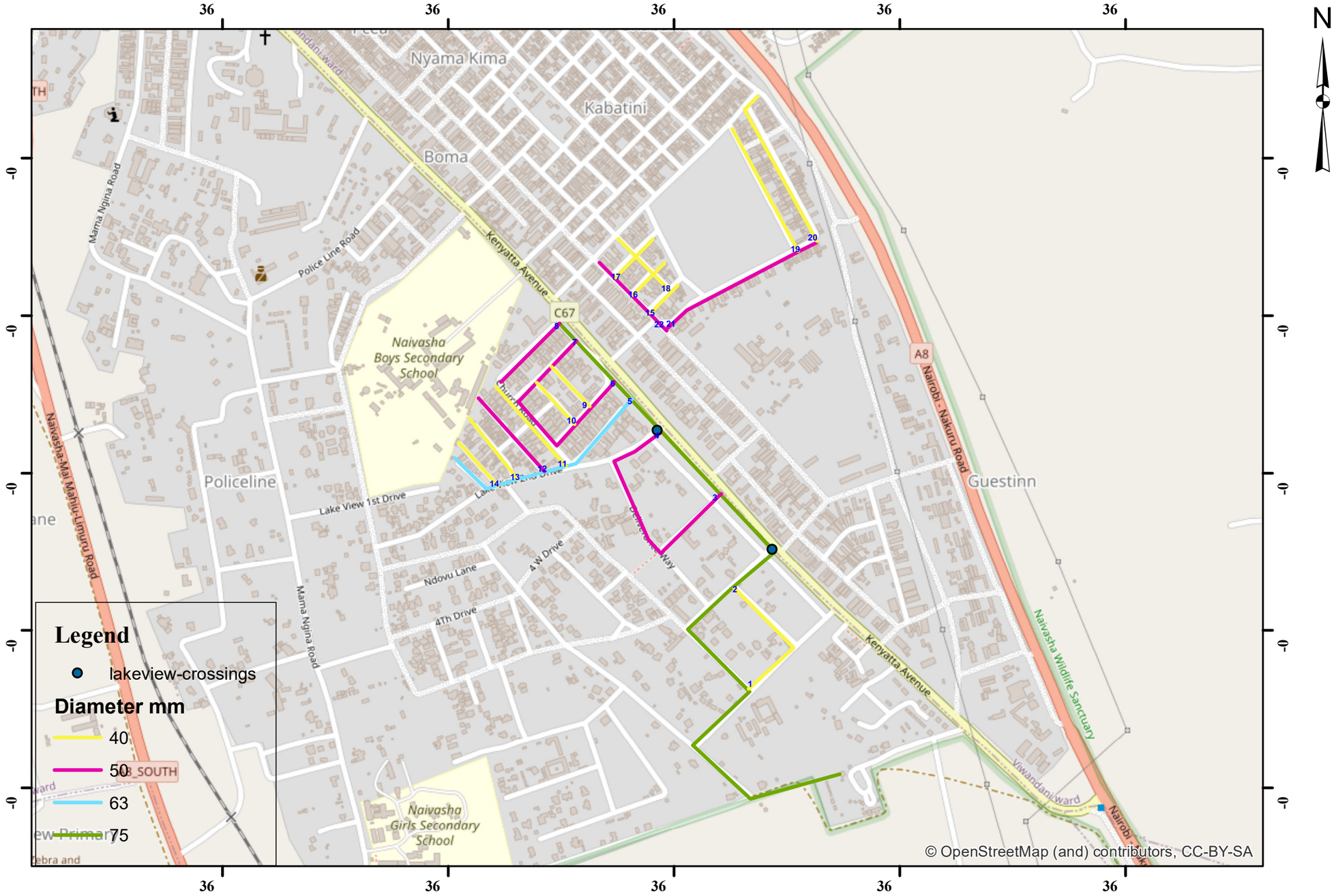
DRAWN BY:	S.MWANGI	SIGN:_____	DATE:	OCTOBER, 2024
APPROVED BY:	F.MWAREMA	SIGN:_____	DATE:	OCTOBER, 2024

Project: NAIVAWASCO CLSG PHASE 2 PROJECT

Drawing Title: CONSTRUCTION OF HDPE PIPELINES FOR SOUTHERN CBD AND LAKEVIEW ZONE

Scale: AS SHOWN (A3) | Sheet No: 3 OF 7 | Drawing No: NAIVAWASCO-CLSG -3

CONSTRUCTION OF HDPE PIPELINES FOR SOUTHERN CBD AND LAKE VIEW ZONE



0 0.275 0.55 1.1
Kilometers

Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree

NOTES

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LEGEND:

MC	METER CHAMBER
	ROAD CROSSINGS
DWC	DOUBLE WALL CORRUGATED
HDPE	HIGH DENSITY POLYETHYLENE
PVC	POLYVINYL CHLORIDE
DIA	DIAMETER
GV	GATE VALVE
AV	GATE VALVE

REV	Description	Sign	Date	Approved

REVISIONS

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Financing the Water Sector

SURVEYED BY:	F.MWAREMA	SIGN:_____	DATE: OCTOBER, 2024
DESIGNED BY:	F.MWAREMA	SIGN:_____	DATE: OCTOBER, 2024
DRAWN BY:	S.MWANGI	SIGN:_____	DATE: OCTOBER, 2024
APPROVED BY:	F.MWAREMA	SIGN:_____	DATE: OCTOBER, 2024

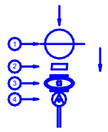
Project: NAIVAWASCO CLSG PHASE 2 PROJECT

Drawing Title: PIPE FITTINGS OF HDPE PIPELINES FOR SOUTHERN CBD AND LAKEVIEW ZONE

Scale: AS SHOWN (A3) | Sheet No: 3A OF 7 | Drawing No: NAIVAWASCO-CLSG -3A

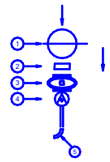
SN.	SPECIFICATIONS	No.
1.	75mm X 1.25" Saddle Clamp	1
2.	1.25" Hex Nipple	1
3.	1.25" Gate Valve	1
4.	40mm HDPE Male Adaptor	1
5.	Sluice Valve Chamber (1200x800x1200mm)	1

Pipe 1



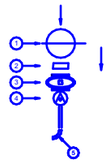
SN.	SPECIFICATIONS	No.
1.	75mm X 1.25" Saddle Clamp	1
2.	1.25" Hex Nipple	1
3.	1.25" Gate Valve	1
4.	40mm HDPE Male Adaptor	1
5.	40mm HDPE Compressed Elbow	1

Pipe 2



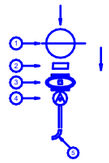
SN.	SPECIFICATIONS	No.
1.	75mm*1.5" Saddle clamp	1
2.	1.5" Hex Nipple	1
3.	1.5" Gate Valve	1
4.	50mm HDPE Male Adaptor	1
5.	50mm HDPE Compressed Elbow	1
6.	Sluice Valve Chamber (1200x800x1200mm)	

Pipe 3



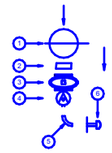
SN.	SPECIFICATIONS	No.
1.	75mm*1.5" Saddle clamp	1
2.	1.5" Hex Nipple	1
3.	1.5" Gate Valve	1
4.	50mm HDPE Male Adaptor	1
5.	50mm HDPE Compressed Elbow	1

Pipe 4



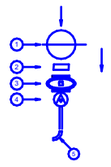
SN.	SPECIFICATIONS	No
1.	75mm*2" Saddle clamp	1
2.	2" Hex Nipple	1
3.	2" Gate Valve	1
4.	63mm HDPE Male Adaptor	1
5.	63mm HDPE Compressed Elbow	1
6.	63mm HDPE Compressed End Coupler	1
7.	Sluice Valve Chamber (1200x800x1200mm)	1

Pipe 5



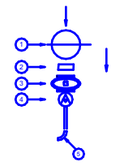
SN.	SPECIFICATIONS	No.
1.	75mm*1.5" Saddle clamp	1
2.	1.5" Hex Nipple	1
3.	1.5" Gate Valve	1
4.	50mm HDPE Male Adaptor	1
5.	50mm HDPE Compressed Elbow	1
6.	Sluice Valve Chamber (1200x800x1200mm)	

Pipe 6



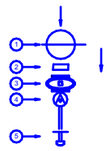
SN.	SPECIFICATIONS	No.
1.	75mm*1.5" Saddle clamp	1
2.	1.5" Hex Nipple	1
3.	1.5" Gate Valve	1
4.	50mm HDPE Male Adaptor	1
5.	50mm HDPE Compressed Elbow	1

Pipe 7



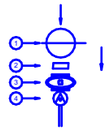
SN.	SPECIFICATIONS	No.
1.	75mm*1.5" Saddle clamp	1
2.	1.5" Hex Nipple	1
3.	1.5" Gate Valve	1
4.	50mm HDPE Male Adaptor	1
5.	50mm HDPE Compressed End Coupler	1
6.	Sluice Valve Chamber (1200x800x1200mm)	

Pipe 8



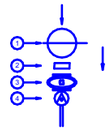
SN.	SPECIFICATIONS	No.
1.	50mm X 1.25" Saddle Clamp	2
2.	1.25" Hex Nipple	2
3.	1.25" Gate Valve	2
4.	40mm HDPE Male Adaptor	2

Pipe 9



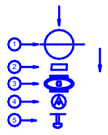
SN.	SPECIFICATIONS	No.
1.	50mm X 1.25" Saddle Clamp	2
2.	1.25" Hex Nipple	2
3.	1.25" Gate Valve	2
4.	40mm HDPE Male Adaptor	2

Pipe 10



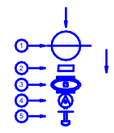
SN.	SPECIFICATIONS	No.
1.	63mm x 1.25" Saddle Clamp	1
2.	1.25" Hex Nipple	1
3.	1.25" Gate Valve	1
4.	40mm HDPE Male Adaptor	1
5.	40mm HDPE Compressed End Coupler	1

Pipe 11



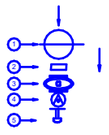
SN.	SPECIFICATIONS	No.
1.	63mm*1.5" Saddle clamp	1
2.	1.5" Hex Nipple	1
3.	1.5" Gate Valve	1
4.	50mm HDPE Male Adaptor	1
5.	50mm HDPE Compressed End Coupler	1

Pipe 12



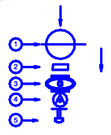
SN.	SPECIFICATIONS	
1.	63mm x 1.25" Saddle Clamp	1
2.	1.25" Hex Nipple	1
3.	1.25" Gate Valve	1
4.	40mm HDPE Male Adaptor	1
5.	40mm HDPE Compressed End Coupler	1

Pipe 13 & 14



SN.	SPECIFICATIONS	No.
1.	**50mm x 1.25" Saddle Clamp**	**1**
2.	**1.25" Hex Nipple**	**1**
3.	**1.25" Gate Valve**	**1**
4.	**40mm HDPE Male Adaptor**	**1**
5.	**40mm HDPE Compressed End Coupler**	**1**

Pipe 15,16 & 17

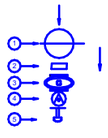


SN.	SPECIFICATIONS	No.
1	40mm HDPE Compressed Tee	1
2	40mm HDPE Male Adaptor	1
3	1.25" Gate Valve	1
4	40mm HDPE Male Adaptor	1
5	40mm HDPE Compressed Tee	4
6	40mm HDPE Compressed End Coupler	1

Pipe 18

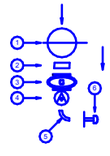
SN.	SPECIFICATIONS	
1.	50mm x 1.25" Saddle Clamp	1
2.	1.25" Hex Nipple	1
3.	1.25" Gate Valve	1
4.	40mm HDPE Male Adaptor	1
5.	40mm HDPE Compressed End Coupler	1

Pipe 19



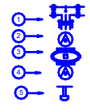
SN.	SPECIFICATIONS	
1.	50mm x 1.25" Saddle Clamp	1
2.	1.25" Hex Nipple	1
3.	1.25" Gate Valve	1
4.	40mm HDPE Male Adaptor	1
5.	40mm HDPE Compressed Elbow	1
6.	40mm HDPE Compressed End Coupler	1

Pipe 20



SN.	SPECIFICATIONS	No.
1.	50 mm HDPE Compressed Tee	1
2.	50mm HDPE Male Adaptor	1
3.	1.5" Gate Valve	1
4.	50mm HDPE Male Adaptor	1
5.	50mm HDPE Compressed End Coupler	1
6.	Sluice Valve Chamber (1200x800x1200mm)	

Pipe 21



SN.	SPECIFICATIONS	No.
1.	50mm HDPE Male Adaptor	1
2.	1.5" Gate Valve	1
3.	50mm HDPE Male Adaptor	1
4.	50mm HDPE Compressed End Coupler	1
5.	Sluice Valve Chamber (1200x800x1200mm)	

Pipe 22

NOTES

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LEGEND:

MC	METER CHAMBER
	ROAD CROSSINGS
DWC	DOUBLE WALL CORRUGATED
HDPE	HIGH DENSITY POLYETHYLENE
PVC	POLYVINYL CHLORIDE
DIA	DIAMETER
GV	GATE VALVE
AV	GATE VALVE

REV	Description	Sign	Date	Approved

REVISIONS

Firm Name and Address

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WaterFund
Financing the Water Sector

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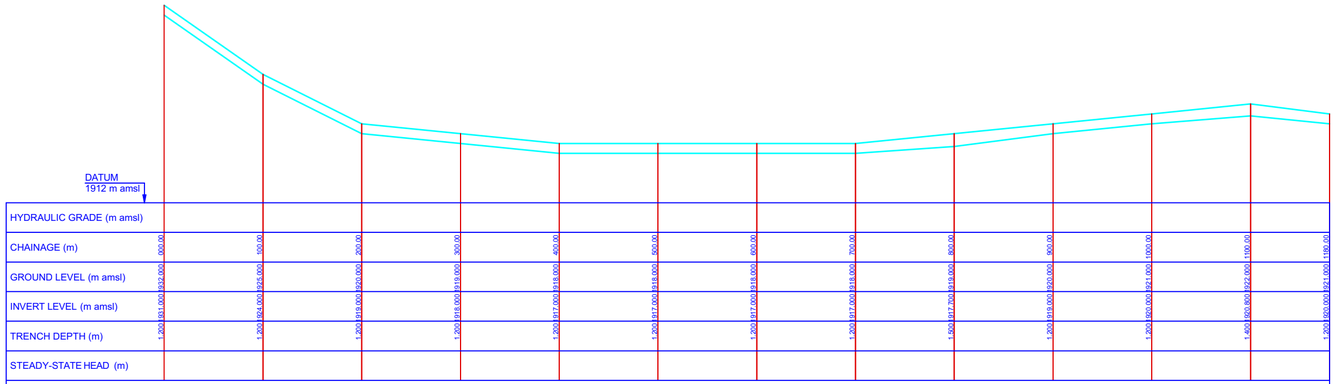
DRAWN BY:	S.MWANGI	SIGN:_____	DATE: OCTOBER, 2024
APPROVED BY:	F.MWAREMA	SIGN:_____	DATE: OCTOBER, 2024

Project: NAIVAWASCO CLSG PHASE 2 PROJECT

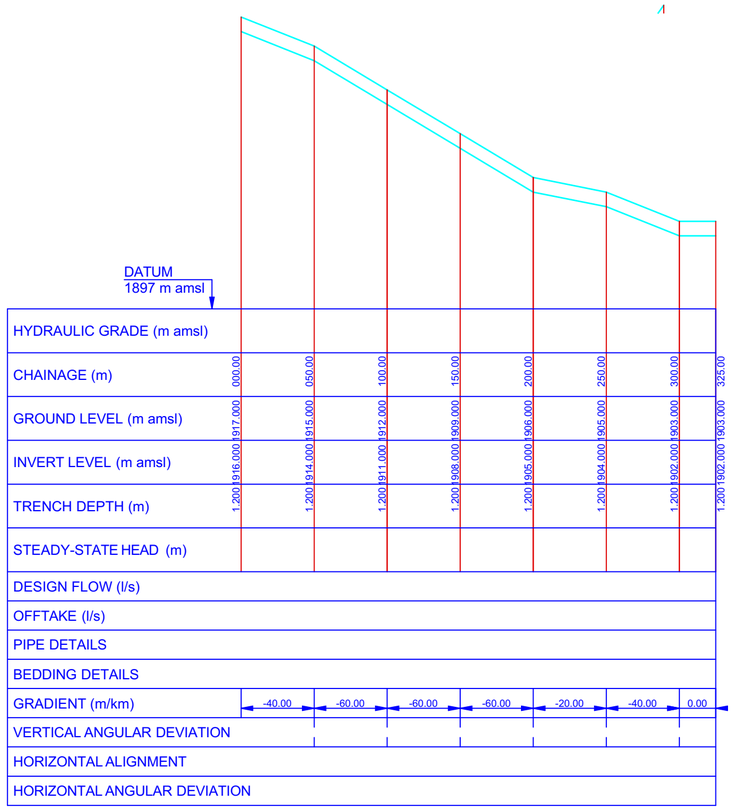
Drawing Title: PIPE FITTINGS OF HDPE PIPELINES FOR SOUTHERN CBD AND LAKEVIEW ZONE

Scale: AS SHOWN (A3) | Sheet No: 3B OF 7 | Drawing No: NAIVAWASCO-CLSG -3B

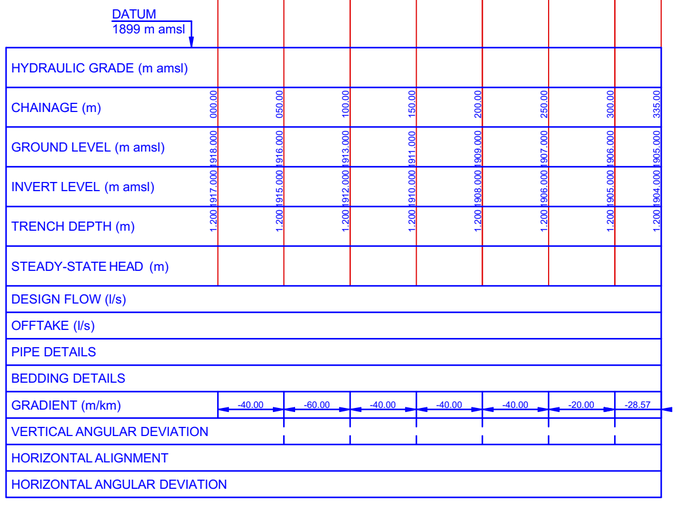
NAIVAWASCO CLSG PHASE 2 PROJECT



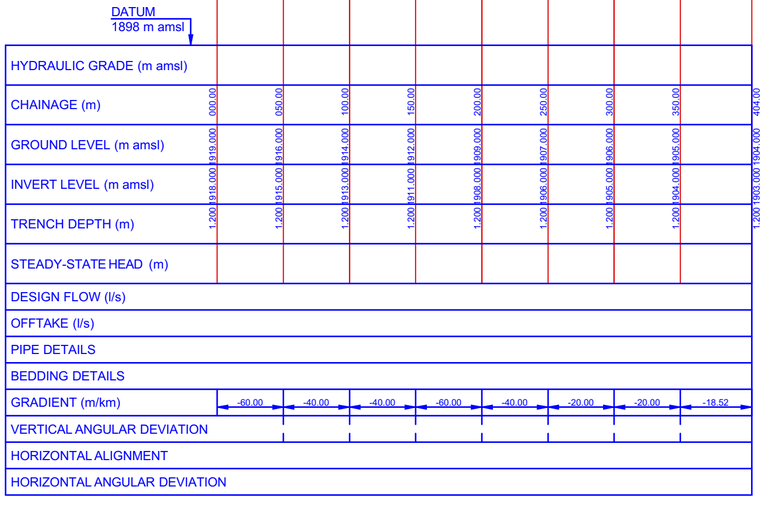
LONGITUDINAL PROFILE
160mm LINE (0-1180m)



LONGITUDINAL PROFILE
90mm LINE (0-325m)



LONGITUDINAL PROFILE
110mm LINE (0-335m)



LONGITUDINAL PROFILE
90mm LINE (0-404m)

NOTES

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5. CONTOUR ELEVATION IN METERS .
6. THE ACTUAL ALIGNMENT WILL BE CONFIRMED DURING SETTING OUT.
7. FOR CROSSING DETAILS REFER TO STANDARD DRAWINGS
8. MINIMUM COVER TOP ALL PIPES TO BE 1.0M.
9. FOR THE TEMPORARY AND PERMANENT SURVEY BENCHMARK DETAILS USED IN THE DESIGN, PLEASE REFER TO THE SURVEY REPORTS.

LEGEND:

MC	METER CHAMBER
●	ROAD CROSSINGS
DWC	DOUBLE WALL CORRUGATED
HDPE	HIGH DENSITY POLYETHYLENE
PVC	POLYVINYL CHLORIDE
DIA	DIAMETER
GV	GATE VALVE
AV	AIR VALVE

REV	Description	Sign	Date	Approved

REVISIONS

Firm Name and Address

NAIVASHA WATER, SEWERAGE & SANITATION COMPANY LTD.
P. O. Box 321
Naivasha Kenya
Email:
naivashawater@gmail.com
Tel: 0705 877 770

WaterFund
Financing the Water Sector

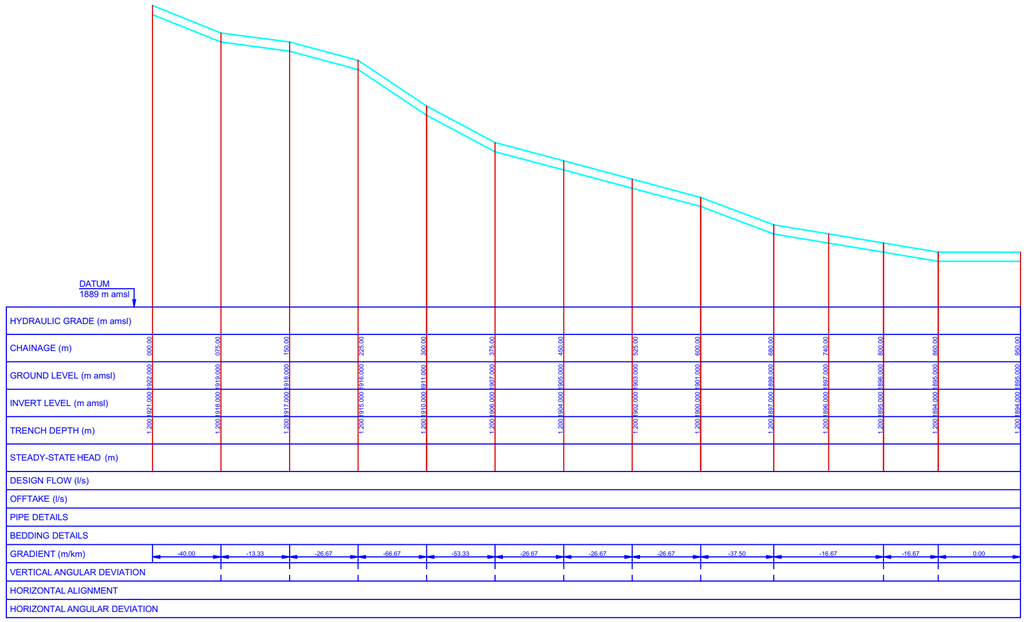
SURVEYED BY:	F.MWAREMA	SIGN:_____	DATE: OCTOBER, 2024
DESIGNED BY:	F.MWAREMA	SIGN:_____	DATE: OCTOBER, 2024
DRAWN BY:	S.MWANGI	SIGN:_____	DATE: OCTOBER, 2024
APPROVED BY:	F.MWAREMA	SIGN:_____	DATE: OCTOBER, 2024

Project: NAIVAWASCO CLSG PHASE 2 PROJECT

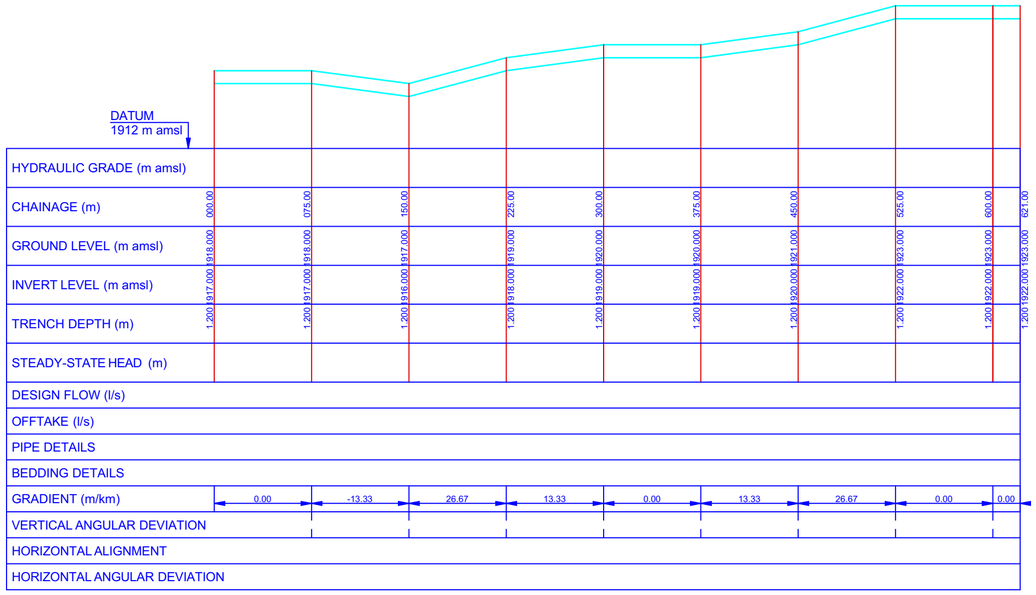
Drawing Title: CONSTRUCTION OF HDPE PIPELINES FOR SOUTHERN CBD AND LAKEVIEW ZONE (PROFILE LAYOUT)

Scale: AS SHOWN (A2) | Sheet No: 4 OF 7 | Drawing No: NAIVAWASCO-CLSG -4

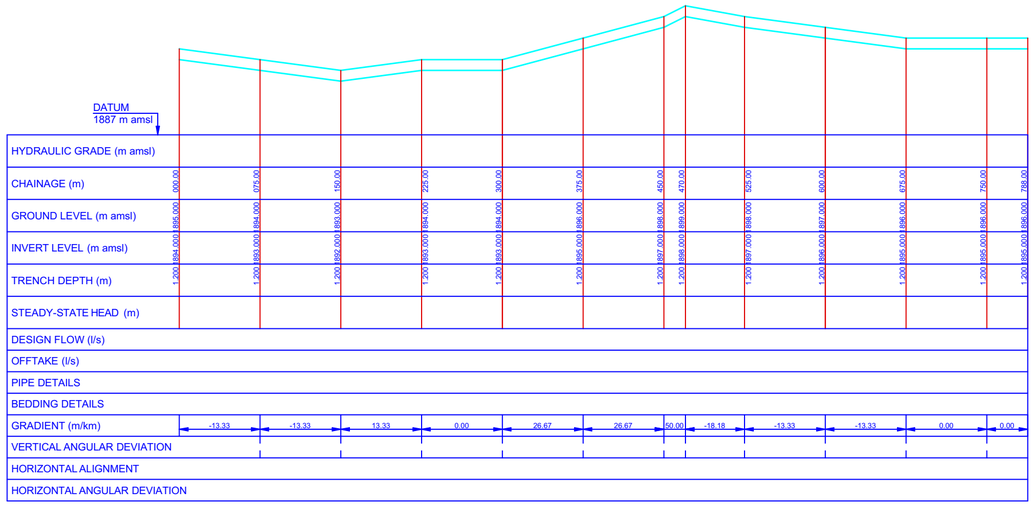
NAIVAWASCO CLSG PHASE 2 PROJECT



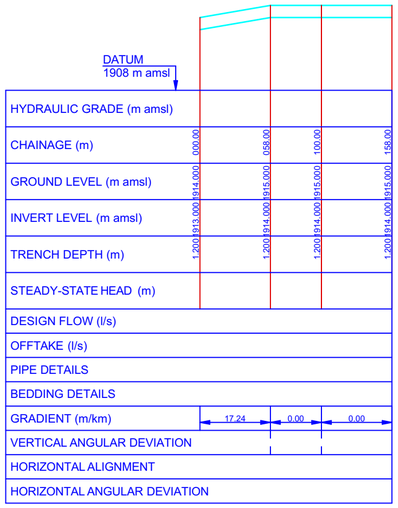
LONGITUDINAL PROFILE
75mm LINE (0-950m)



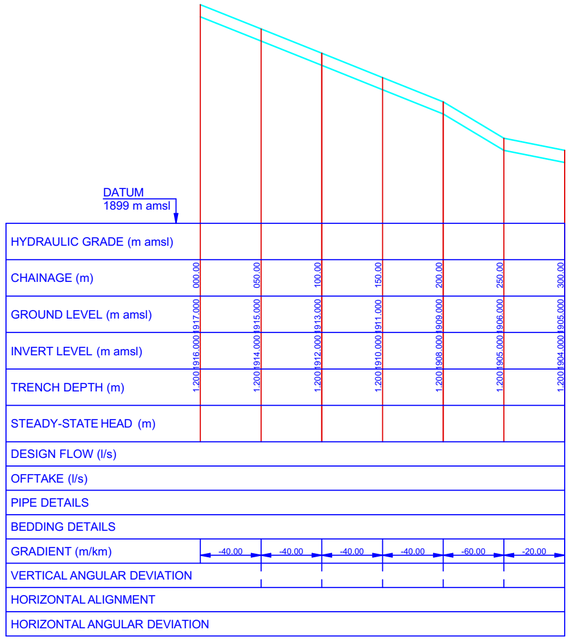
LONGITUDINAL PROFILE
63mm LINE (0-621m)



LONGITUDINAL PROFILE
63mm LINE (0-788m)



LONGITUDINAL PROFILE
63mm LINE (0-158m)



LONGITUDINAL PROFILE
63mm LINE (0-300m)

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HDPE	HIGH DENSITY POLYETHYLENE
PVC	POLYVINYL CHLORIDE
DIA	DIAMETER
GV	GATE VALVE
AV	GATE VALVE

REV	Description	Sign	Date	Approved

REVISIONS

Firm Name and Address
NAIVASHA WATER, SEWERAGE & SANITATION COMPANY LTD.
P. O. Box 321
Naivasha Kenya
Email:
naivashawater@gmail.com
Tel: 0705 877 770

WaterFund
Financing the Water Sector

SURVEYED BY:	F.MWAREMA	SIGN:_____	DATE: OCTOBER, 2024
DESIGNED BY:	F.MWAREMA	SIGN:_____	DATE: OCTOBER, 2024
DRAWN BY:	S.MWANGI	SIGN:_____	DATE: OCTOBER, 2024
APPROVED BY:	F.MWAREMA	SIGN:_____	DATE: OCTOBER, 2024

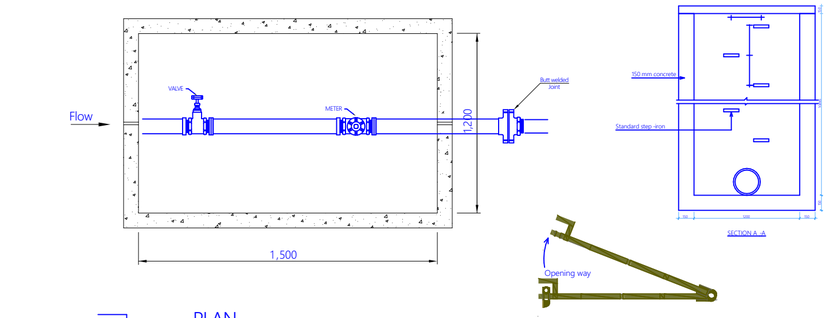
Project:
NAIVAWASCO CLSG PHASE 2 PROJECT

Drawing Title:
CONSTRUCTION OF HDPE PIPELINES FOR SOUTHERN CBD AND LAKEVIEW ZONE (PROFILE LAYOUT)

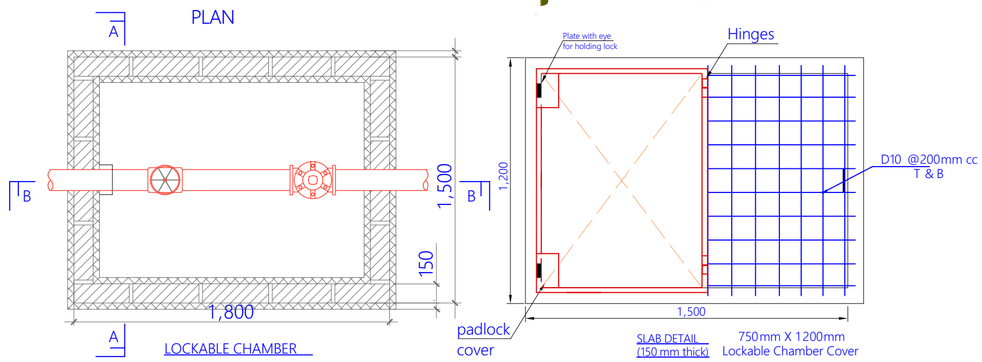
Scale: AS SHOWN (A2) | Sheet No: 5 OF 7 | Drawing No: NAIVAWASCO-CLSG -5

NAIVASHA CLSG PHASE 2 PROJECT

METER CHAMBER



PLAN



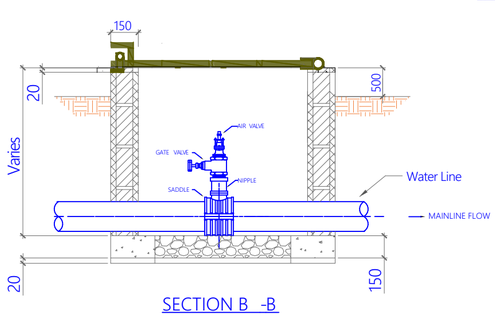
LOCKABLE CHAMBER

SLAB DETAIL (150 mm thick)

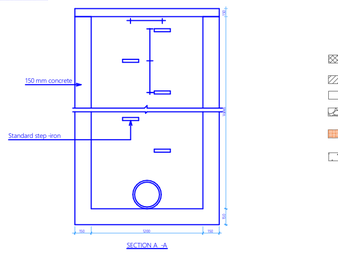
750mm X 1200mm Lockable Chamber Cover

LOCKABLE COVER

VALVE CHAMBER

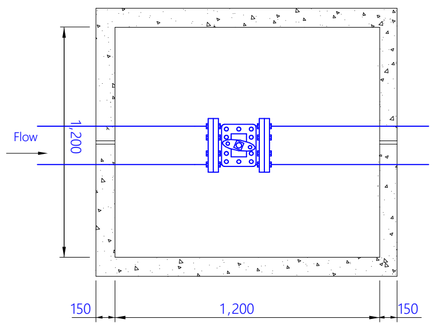


SECTION B -B

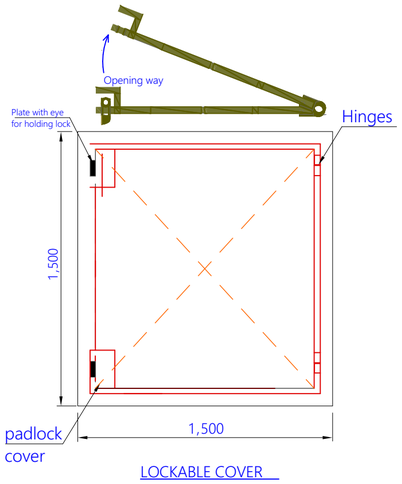


LEGEND

- Concrete finishing
- Building Stones
- Blinding
- Packed Gravel
- Earth
- Reinforced Concrete



AIR VALVE CHAMBER

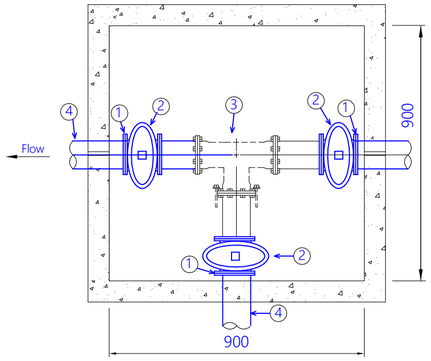


LOCKABLE COVER

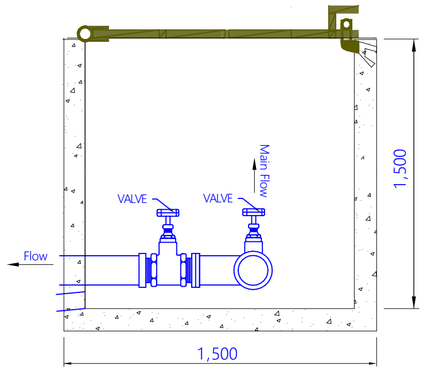
WO

SN.	SPECIFICATIONS	No.
①	HDPE Butt -fused Stub + Flange	3
②	Sluice Valve , AVK ype	3
③	Fabricated Steel Flanged Equal Tee	1
④	HDPE Pipe	

WASH OUT PLAN



WASH OUT SECTION



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GV	GATE VALVE
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REV	Description	Sign	Date	Approved

REVISIONS

Firm Name and Address

NAIVASHA WATER, SEWERAGE & SANITATION COMPANY LTD.
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Naivasha Kenya
Email: naivashawater@gmail.com
Tel: 0705 877 770

SURVEYED BY:	F.MWAREMA	SIGN:_____	DATE: OCTOBER, 2024
DESIGNED BY:	F.MWAREMA	SIGN:_____	DATE: OCTOBER, 2024
DRAWN BY:	S.MWANGI	SIGN:_____	DATE: OCTOBER, 2024
APPROVED BY:	F.MWAREMA	SIGN:_____	DATE: OCTOBER, 2024

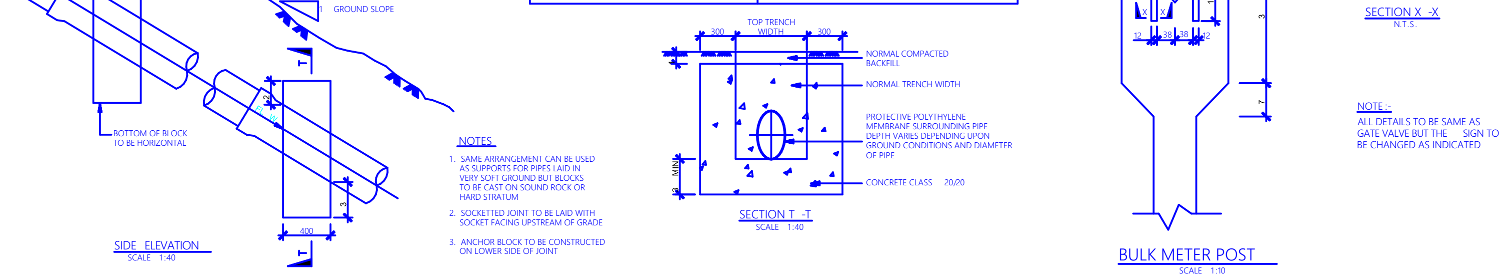
Project: NAIVAWASCO CLSG PHASE 2 PROJECT

Drawing Title: UTILITY CHAMBERS IN PIPELINES INFRASTRUCTURE FOR SOUTHERN CBD AND LAKEVIEW ZONE

Scale: AS SHOWN (A2) | Sheet No: 6 OF 7 | Drawing No: NAIVAWASCO-CLSG -6

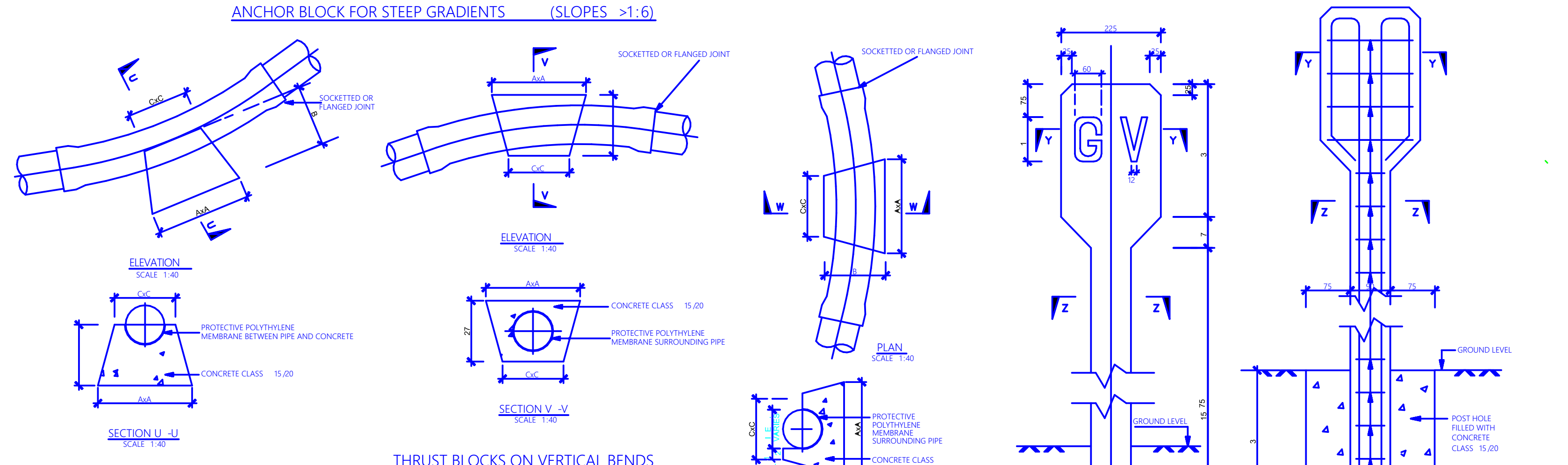
NAIVASHA CLSG PHASE 2 PROJECT

RANGE OF GROUND SLOPE (1:n)	MAXIMUM DISTANCE BETWEEN ANCHOR BLOCKS (m)
1:6 - 1:5	24
1:5 - 1:4	18
1:4 - 1:2	12
>1:2	EVERY PIPE LENGTH TO BE ANCHORED (BASED ON PIPE LENGTH OF 6m)



NOTES
1. SAME ARRANGEMENT CAN BE USED AS SUPPORTS FOR PIPES LAID IN VERY SOFT GROUND BUT BLOCKS TO BE CAST ON SOUND ROCK OR HARD STRATUM
2. SOCKETTED JOINT TO BE LAID WITH SOCKET FACING UPSTREAM OF GRADE
3. ANCHOR BLOCK TO BE CONSTRUCTED ON LOWER SIDE OF JOINT

ANCHOR BLOCK FOR STEEP GRADIENTS (SLOPES >1:6)



THRUST BLOCKS ON VERTICAL BENDS (DOWN-THRUST)

THRUST BLOCKS ON VERTICAL BENDS (UP -THRUST)

THRUST BLOCK ON HORIZONTAL BENDS AND TEES

THRUST BLOCK AT CAPPED ENDS

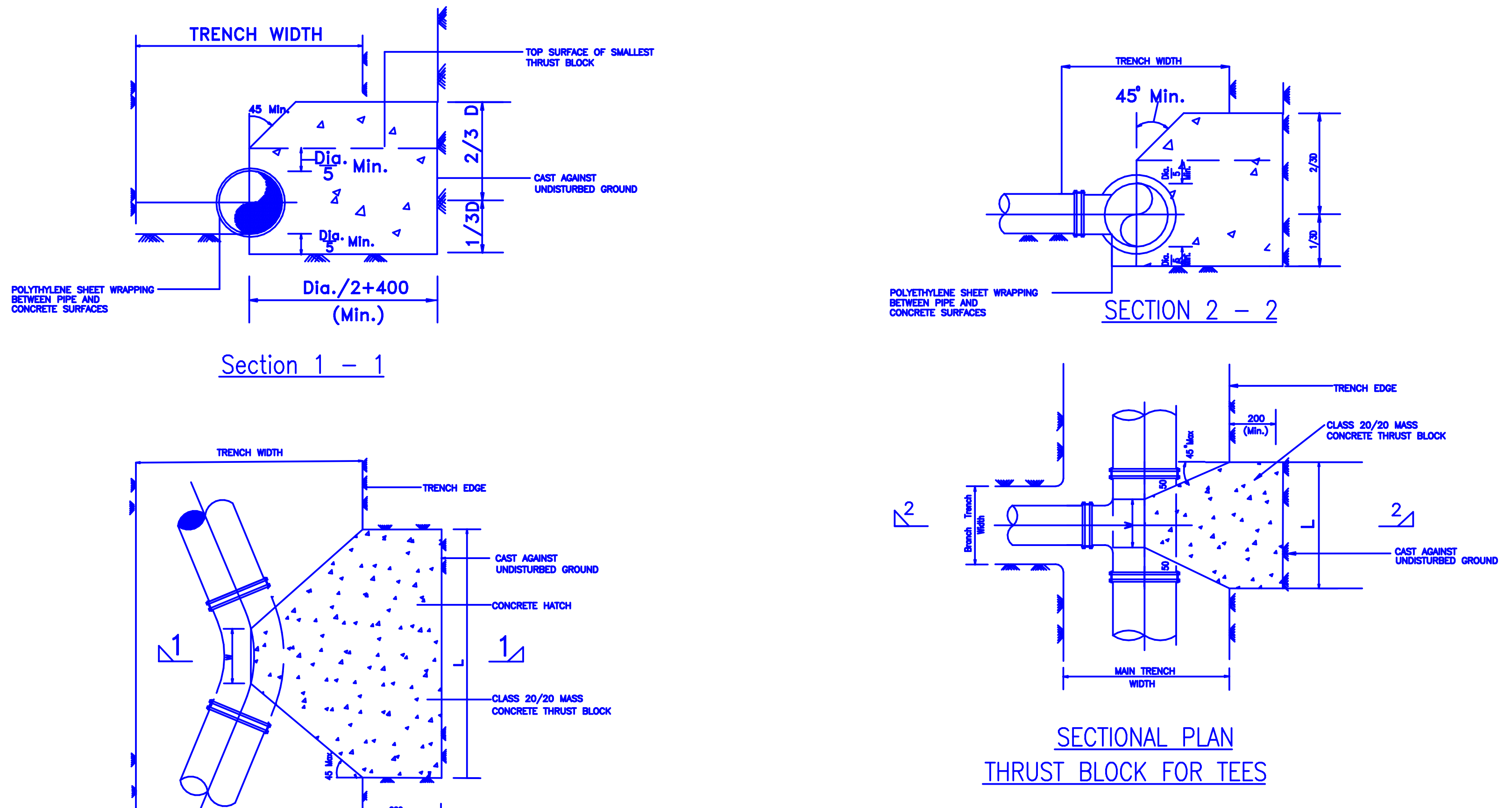
THRUST BLOCK AT REDUCER

SCALE 1:40

INDICATOR POST DETAILS

(ND) NOMINAL DIAMETER (mm)	11 1 BENDS	22 1 BENDS			CAPPED ENDS		REDUCERS ND=√ND1²-ND2²
80	0.2x0.2x0.2	0.25x0.2x0.2	0.25x0.2x0.2	0.3x0.2x0.2	0.35x0.2x0.2	0.4x0.2x0.2	0.35x0.2x0.2
100	0.2x0.2x0.2	0.3x0.2x0.2	0.35x0.2x0.2	0.4x0.2x0.2	0.45x0.25x0.25	0.55x0.3x0.3	0.45x0.25x0.25
150	0.3x0.25x0.25	0.4x0.25x0.25	0.5x0.3x0.3	0.55x0.3x0.3	0.65x0.35x0.35	0.8x0.4x0.35	0.65x0.35x0.35
200	0.4x0.3x0.3	0.55x0.35x0.35	0.6x0.4x0.4	0.75x0.4x0.4	0.85x0.45x0.4	1.0x0.5x0.4	0.85x0.45x0.4
250	0.5x0.35x0.35	0.65x0.4x0.4	0.75x0.45x0.45	0.9x0.45x0.45	1.1x0.55x0.45	1.2x0.6x0.45	1.1x0.55x0.45
300	0.55x0.45x0.45	0.8x0.5x0.5	0.9x0.5x0.5	1.1x0.6x0.5	1.25x0.65x0.5	1.5x0.75x0.5	1.25x0.65x0.5
350	0.6x0.5x0.5	0.85x0.55x0.55	1.0x0.55x0.55	1.2x0.6x0.55	1.4x0.7x0.55	1.6x0.8x0.55	1.4x0.7x0.55
400	0.7x0.6x0.6	0.95x0.6x0.6	1.1x0.6x0.6	1.3x0.65x0.6	1.6x0.8x0.6	1.8x0.9x0.6	1.6x0.8x0.6
450	0.8x0.65x0.65	1.1x0.65x0.65	1.3x0.65x0.65	1.5x0.75x0.65	1.8x0.9x0.65	2.0x1.0x0.65	1.8x0.9x0.65
500	0.9x0.7x0.7	1.2x0.7x0.7	1.4x0.7x0.7	1.7x0.85x0.7	2.0x1.0x0.7	2.3x1.2x0.7	2.0x1.0x0.7
600	1.1x0.8x0.8	1.5x0.8x0.8	1.7x0.9x0.8	2.0x1.0x0.8	2.3x1.2x0.8	2.7x1.4x0.8	2.3x1.2x0.8

NOTE :- THE ABOVE VALUES APPLY FOR SOCKETTED uPVC AND FLANGED OR COUPLED LINED STEEL PIPES SUBJECT TO A WORKING PRESSURE HEAD OF 12 BAR



SECTIONAL PLAN

THRUST BLOCK FOR HORIZONTAL BENDS

SECTIONAL PLAN

THRUST BLOCK FOR TEES

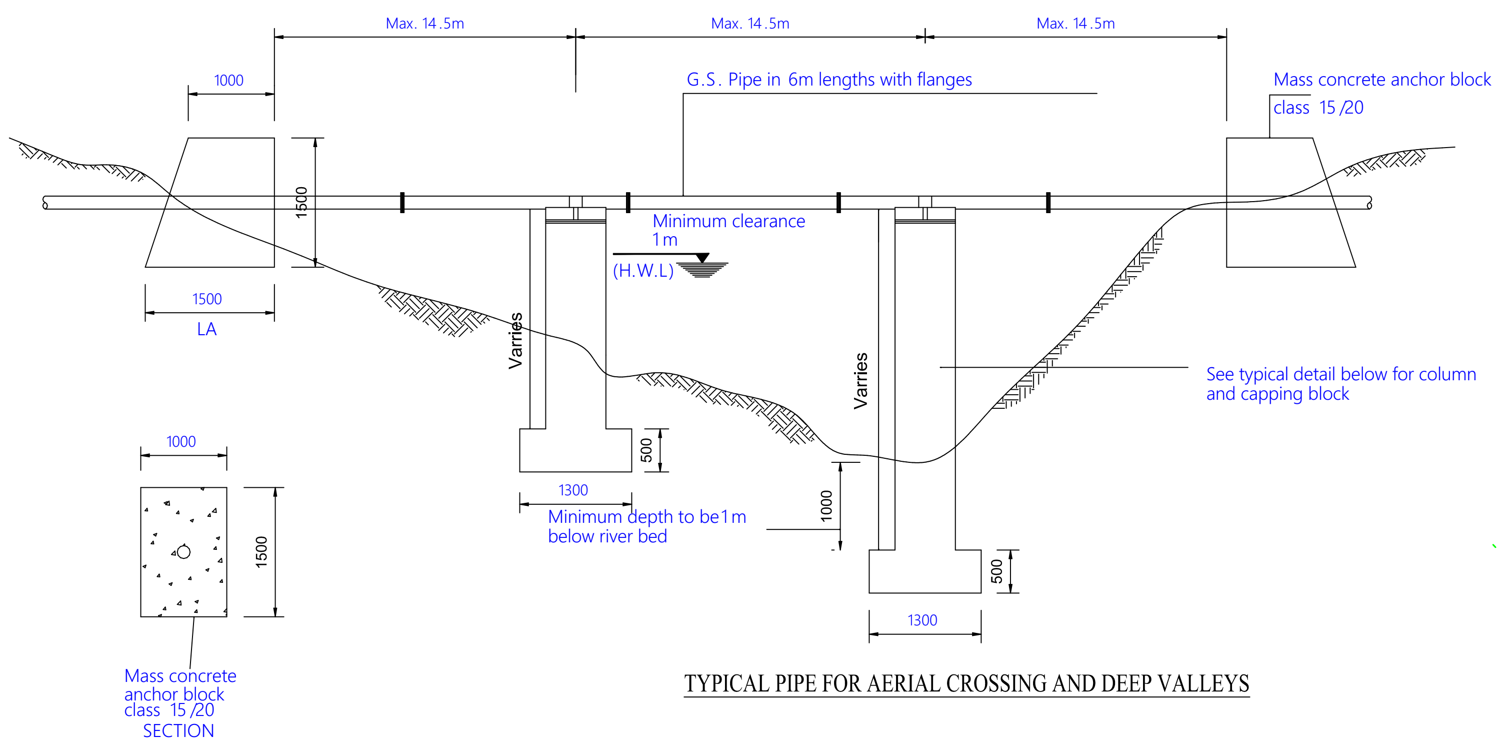
TEST HEAD (m)	BEND	DIMENSIONS (D)m x (L)m x V(m³) SIZE OF BEND DN (mm) 800	700	600	500	450	400	350	300	250	200	150/100
100 SEE NOTE 8	11¼°	1.8X0.8X0.7	1.6X0.8X0.6	1.4X0.7X0.4	1.2X0.6X0.3	1.1X0.5X0.2	1.0X0.5X0.2	0.9X0.4X0.1	0.8X0.4X0.1	0.7X0.3X0.1	0.5X0.3X0.1	0.5X0.3X0.1
	22½°	1.8X1.6X1.4	1.6X1.6X1.2	1.4X1.3X0.8	1.2X1.2X0.6	1.1X1.0X0.5	1.1X0.8X0.4	1.0X0.7X0.3	0.8X0.7X0.2	0.8X0.5X0.1	0.8X0.3X0.1	0.5X0.3X0.1
	30°	1.8X2.1X1.9	1.6X2.0X1.5	1.4X1.8X1.1	1.2X1.5X0.8	1.1X1.3X0.6	1.1X1.1X0.5	1.0X0.9X0.3	0.9X0.8X0.3	0.8X0.7X0.2	0.8X0.4X0.1	0.5X0.4X0.1
	45°	1.8X3.2X2.9	1.6X3.2X2.4	1.6X2.2X1.6	1.4X1.8X1.1	1.1X2.0X0.9	1.2X1.5X0.7	1.0X1.4X0.5	1.0X1.0X0.4	0.8X1.0X0.3	0.8X0.6X0.2	0.6X0.5X0.1
	90°	2.4X4.0X4.8	2.0X3.8X3.6	1.8X3.5X2.8	1.6X2.7X1.8	1.4X2.6X1.5	1.2X2.5X1.2	1.2X2.0X0.9	1.2X1.5X0.7	1.0X1.4X0.5	1.0X0.8X0.3	0.6X0.9X0.2

Table of Thrust Blocks for Horizontal Bends

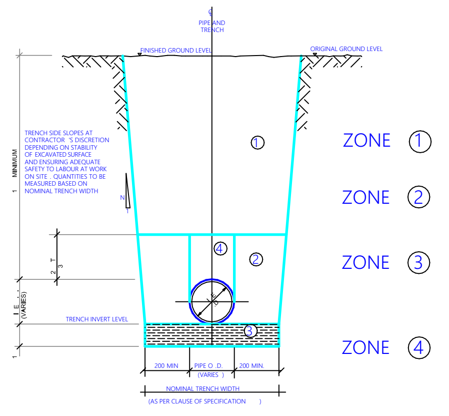
TABLE OF THRUST BLOCKS FOR TEES

TEST HEAD (m)	MAIN SIZE (mm)	DIMENSIONS (D)m x (L)m x V (m3) BRANCH SIZE (mm) 800	700	600	500	450	400	350	300	250	200	150/100
100 SEE NOTE No. 8	800	2.0x3.5x3.5	1.8x3.2x2.7	1.6x2.7x1.9	1.6x2.0x1.4	1.6x1.6x1.1	1.6x1.2x0.8	1.6x1.0x0.6	1.6x0.7x0.4	1.6x0.5x0.3	1.6x0.3x0.2	1.6x0.3x0.2
	700		1.6x3.6x2.7	1.6x2.7x1.9	1.5x2.1x1.4	1.5x1.7x1.1	1.5x1.3x0.8	1.5x1.0x0.6	1.5x0.8x0.5	1.4x0.6x0.3	1.4x0.4x0.2	1.4x0.3x0.2
	600			1.5x3.0x2.0	1.5x2.1x1.4	1.5x1.7x1.1	1.2x1.8x0.9	1.2x1.4x0.7	1.2x1.0x0.5	1.2x0.7x0.3	1.2x0.5x0.2	1.2x0.3x0.1
	500			—	1.4x2.3x1.4	1.3x2.0x1.1	1.2x1.8x0.9	1.2x1.4x0.7	1.2x1.0x0.5	1.1x0.8x0.3	1.1x0.5x0.2	1.1x0.3x0.1
	450			—	—	1.2x2.3x1.1	1.2x1.8x0.9	1.1x1.6x0.7	1.1x1.2x0.5	1.1x0.8x0.3	1.0x0.6x0.2	1.0x0.4x0.1
	400			—	—	—	1.0x1.3x0.9	1.0x1.8x0.7	1.0x1.3x0.5	1.0x0.9x0.3	1.0x0.6x0.2	1.0x0.4x0.1
	350			—	—	—	—	1.0x1.8x0.7	1.0x1.3x0.5	1.0x0.9x0.3	1.0x0.5x0.2	1.0x0.4x0.1
	300			—	—	—	—	—	0.8x1.7x0.5	0.8x1.2x0.3	0.8x0.8x0.2	0.8x0.5x0.1
	250			—	—	—	—	—	—	0.8x1.2x0.3	0.8x0.8x0.2	0.8x0.5x0.1
	200			—	—	—	—	—	—	—	0.6x1.1x0.2	0.6x0.7x0.1
	150			—	—	—	—	—	—	—	—	0.5x0.8x0.1

Table of Thrust Blocks for Tees
(CLASS '20/20' CONCRETE)



TYPICAL PIPE FOR AERIAL CROSSING AND DEEP VALLEYS



TYPICAL TRENCH DETAIL FOR RETICULATION PIPES (uPVC OR C .I. FERROUS PIPES)

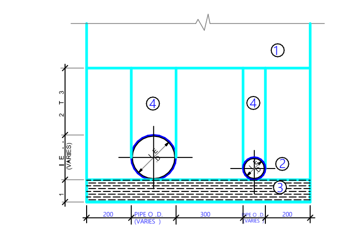
NOTES

ZONE ① SOIL TO BE USED MAY INCLUDE FREE -DRAINING COARSE SAND , GRAVEL , LOAM AND SOIL OF A FRIABLE NATURE . PARTICAL SIZE NOT TO EXCEED 20mm. BACKFILL IN LAYERS NOT EXCEEDING 300mm UPTO FINISHED GROUND LEVEL , EACH LAYER BEING WELL COMPACTED TO LIMIT VOIDS . MECHANICAL COMPACTION EQUIPMENT MAY BE USED IF APPROVED BY ENGINEER .

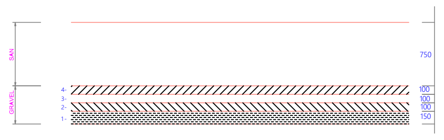
ZONE ② BACKFILL WITH SOIL APPROVED BY THE ENGINEER , IN LAYERS NOT EXCEEDING 200mm. THOROUGHLY COMPACT SOIL , TAMPING EQUALLY ON EITHER SIDE AND ALONG LOWER EDGE OF PIPE . ONLY HAND TAMPING TO BE USED

ZONE ③ IF ROCK SHARP PROJECTIONS , TREE ROOTS OR OTHER UNSUITABLE MATERIAL IS ENCOUNTERED AT TRENCH INVERT LEVEL , A FURTHER 100 mm DEPTH OF MATERIAL IS TO BE EXCAVATED . BACKFILL WITH SOIL APPROVED BY THE ENGINEER UPTO TRENCH INVERT LEVEL . THOROUGHLY COMPACT SOIL BY HAND TO GIVE A UNIFORM GRADIENT ALONG PIPE TRENCH , LEAVING RECESSES FOR PIPE JOINTS .

ZONE ④ SIMILAR REQUIREMENTS TO ZONE 2 EXCEPT NO EXCESS TAMPING IS PERMITTED OVER PIPE .



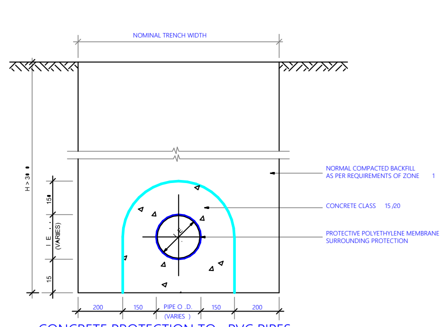
TWIN PIPES IN SINGLE TRENCH



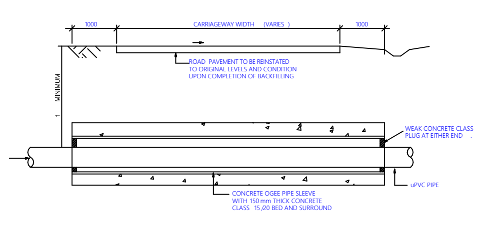
LAYER	1	2	3	4
DEPTH (mm)	150	100	100	100
PASSING SQUARE MESH	38mm (11 /2")	20mm (3/4")	12 mm (1 /2")	5mm (3/16 ")
RETAINED	20mm (3/4")	12 mm (1 /2")	5mm (3/16 ")	2mm (3/32")

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

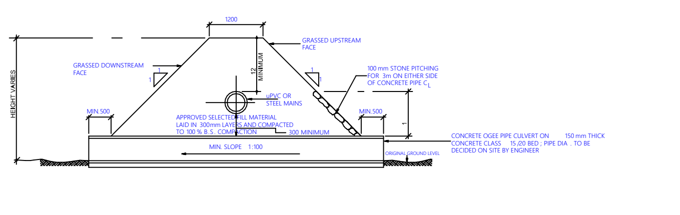
DETAILS OF FILTER MEDIA IN RAPID SAND FILTERS
NTS



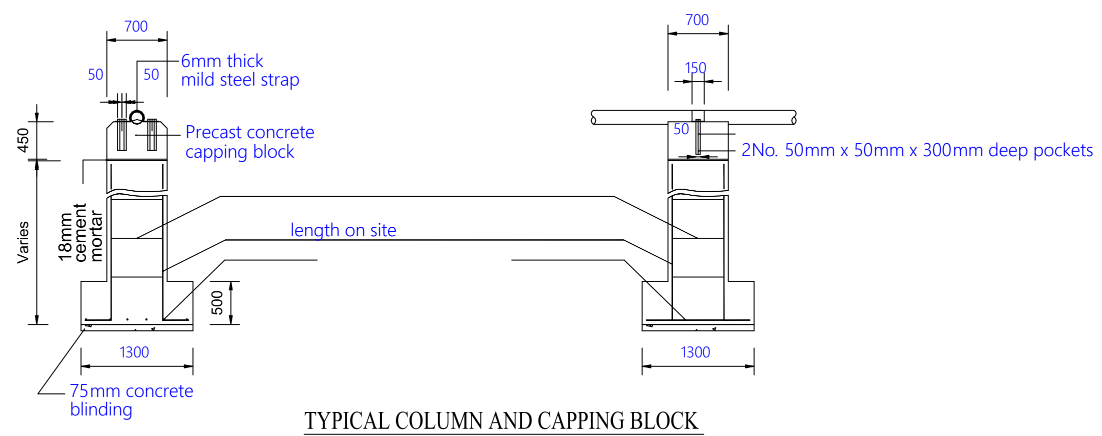
CONCRETE PROTECTION TO uPVC PIPES LAID AT DEPTHS GREATER THAN 3.0m



TYPICAL ROAD PIPE CROSSING DETAIL FOR uPVC PIPES



TYPICAL DETAIL OF PIPE CROSSING SEASONAL STREAM / DRAINAGE DITCH



TYPICAL COLUMN AND CAPPING BLOCK

NOTE
Minimum cover to reinforcement 25mm

NOTES

1. ALL LEVELS ARE IN METERS UNLESS STATED OTHERWISE .
2. POSITION OF EXISTING SERVICES WILL BE CONFIRMED DURING SETTING-OUT.
3. LOCATION AND DEPTH OF COVER OF ALL SERVICES MUST BE CHECKED ON SITE PRIOR TO EXCAVATION.
4. EXISTING SERVICES ARE TO BE PROTECTED AND DIVERTED AS APPROVED BY THE ENGINEER.
5. CONTOUR ELEVATION IN METERS .
6. THE ACTUAL ALIGNMENT WILL BE CONFIRMED DURING SETTING OUT.
7. FOR CROSSING DETAILS REFER TO STANDARD DRAWINGS
8. MINIMUM COVER TOP ALL PIPES TO BE 1.0M.
9. FOR THE TEMPORARY AND PERMANENT SURVEY BENCHMARK DETAILS USED IN THE DESIGN, PLEASE REFER TO THE SURVEY REPORTS.

LEGEND:

MC	METER CHAMBER
●	ROAD CROSSINGS
DWC	DOUBLE WALL CORRUGATED
HDPE	HIGH DENSITY POLYETHYLENE
PVC	POLYVINYL CHLORIDE
DIA	DIAMETER
GV	GATE VALVE
AV	GATE VALVE

REV	Description	Sign	Date	Approved

REVISIONS

Firm Name and Address

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SURVEYED BY:	F.MWAREMA	SIGN:________	DATE:	OCTOBER, 2024
DESIGNED BY:	F.MWAREMA	SIGN:________	DATE:	OCTOBER, 2024
DRAWN BY:	S.MWANGI	SIGN:________	DATE:	OCTOBER, 2024
APPROVED BY:	F.MWAREMA	SIGN:________	DATE:	OCTOBER, 2024

Project: NAIVAWASCO CLSG PHASE 2 PROJECT

Drawing Title: PIPE IDENTIFICATION & SUPPORT SYSTEM OF PIPELINES FOR SOUTHERN CBD AND LAKEVIEW ZONE

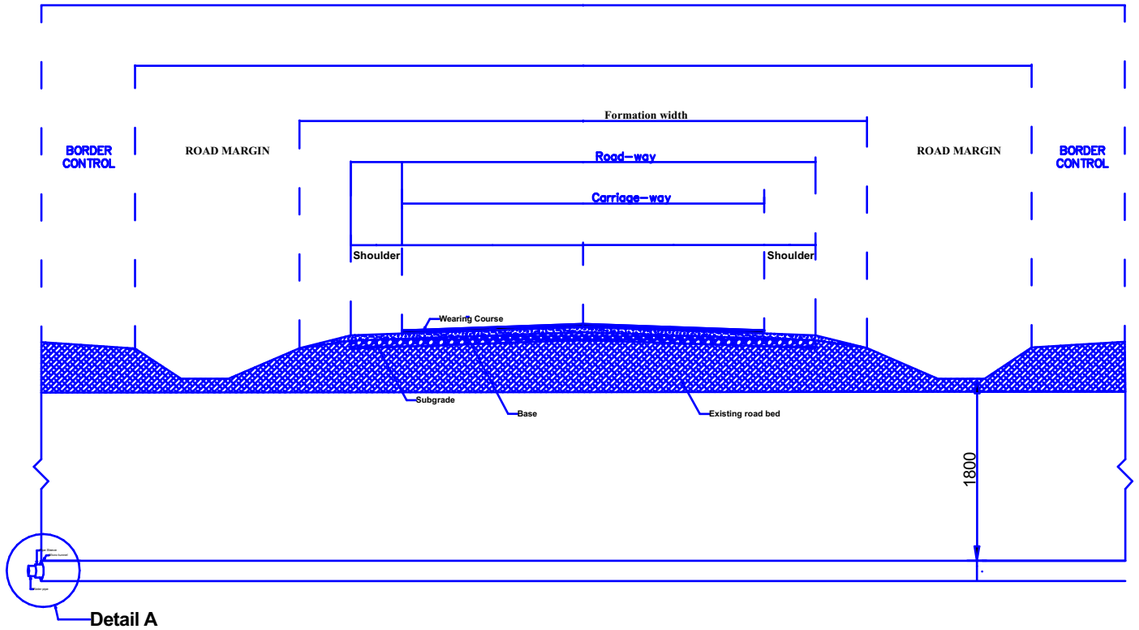
Scale: AS SHOWN (A2) | Sheet No: 7 OF 7 | Drawing No: NAIVAWASCO-CLSG -7

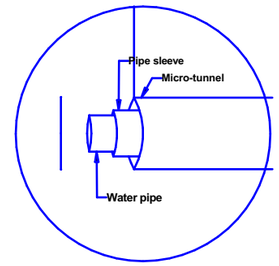
NAIVAWASCO

NAIVASHA CLSG PHASE 2 PROJECT

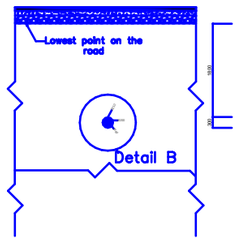
KENYATTA AVENUE ROAD MICRO TUNNELING CORDINATES

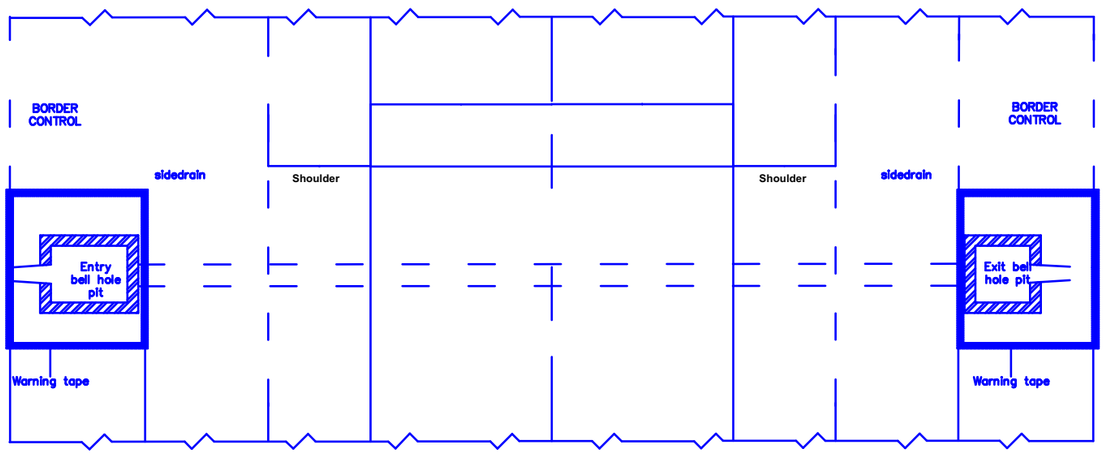
Sn	Description	Co-ordinates in DD	
		X- Coordinates	Y- Coordinates
1	Start Point A	-0.718990°	36.436455°
2	End Point B	-0.718860°	36.436475°

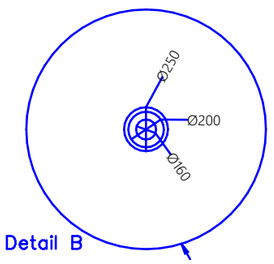




Detail A







Detail B

FLOOR PLAN

NOTES

safety meacures shall be taken into consideration
Installation of warning signs, reflective signs and visible at a distannce
Excavated materials shall be disposed in accordance to environmental standar
Water should be protected from entering the tunnel
Proper installation of casing pipe to avoid settlement
Excavation should be done within the shortest time possible
Backfilling of end pit and receiving pit to be approved by qualified authority of personel

REV	Description	Sign	Date	Approved

REVISIONS

Firm Name and Address

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Naivasha Kenya
Email: naivashawater@gmail.com
Tel: 0705 877 770

SURVEYED BY:	F.MWAREMA	SIGN:_____	DATE: OCTOBER, 2024
DESIGNED BY:	F.MWAREMA	SIGN:_____	DATE: OCTOBER, 2024
DRAWN BY:	S.MWANGI	SIGN:_____	DATE: OCTOBER, 2024
APPROVED BY:	F.MWAREMA	SIGN:_____	DATE: OCTOBER, 2024

LEGEND:

MC	METER CHAMBER	PVC	POLYVINYL CHLORIDE
	ROAD CROSSINGS	DIA	DIAMETER
DWC	DOUBLE WALL CORRUGATED		
HDPE	HIGH DENSITY POLYETHYLENE		

Project: NAIVAWASCO CLSG PHASE 2 PROJECT

Drawing Title: CO-ORDINATES OF HDPE PIPELINES FOR SOUTHERN CBD AND LAKEVIEW ZONE

Scale: AS SHOWN (A3) | Sheet No: 7A | Drawing No: NAIVAWASCO-CLSG -7A