



REPUBLIC OF KENYA



COAST WATER SERVICES BOARD



**MOMBASA WATER SUPPLY AND SANITATION
COMPANY LTD. (MOWASSCO)**

CONSTRUCTION OF LIKONI – MBUTA MOSQUE PIPELINE (LINE SC24)

TENDER No. [TO BE INSERTED]

BIDDING DOCUMENT

VOLUME II

CONTENTS

ENGINEERING DRAWINGS

Employer:

**The Chief Executive Officer
COAST WATER SERVICES BOARD
P.O. Box 90417 - 80100
Mombasa, Kenya
TEL: +254-041-2315230
E-mail: info@cwsb.go.ke**

Employer's Representative:

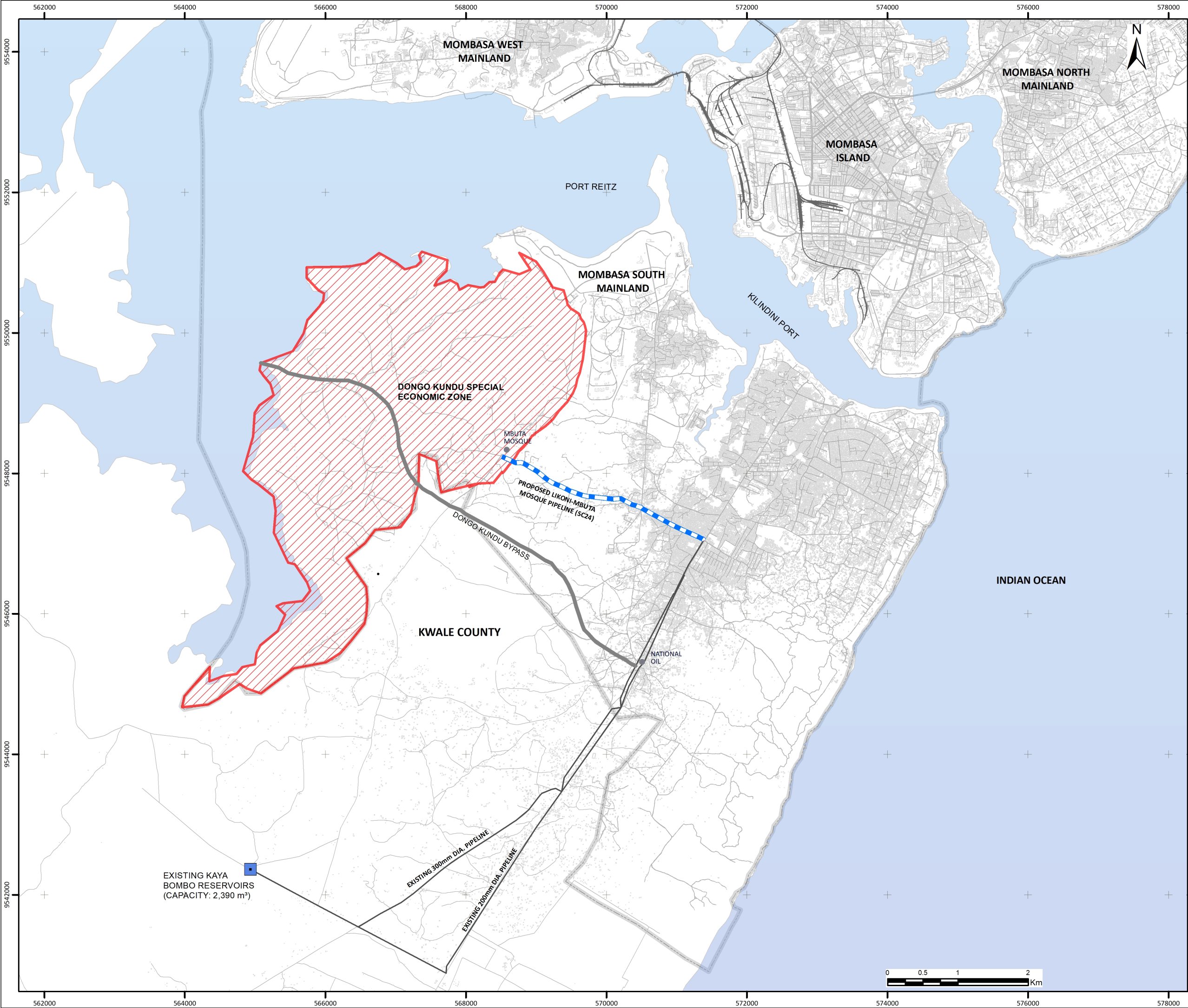
**The Technical Manager
COAST WATER SERVICES BOARD
P.O. Box 90417 - 80100
Mombasa, Kenya
TEL: +254-041-2315230
E-mail: info@cwsb.go.ke**

MAY 2019

CONSTRUCTION OF LIKONI - MBUTA MOSQUE PIPELINE (SC24)

SCHEDULE OF ENGINEERING DRAWINGS

[illegible]



LEGEND

GENERAL

- EXISTING RESERVOIR
- EXISTING WATER DISTRIBUTION PIPELINE
- DONGO KUNDU BYPASS
- ROADS
- BUILDINGS
- PROPOSED LIKONI-MBUTA MOSQUE PIPELINE (DN 800/700, 3.2km)
- OCEAN
- COUNTY BOUNDARY
- PROPOSED DONGO KUNDU SPECIAL ECONOMIC ZONE

REVISIONS		SIGN	DATE	APPROVED
	BY			
	CHECKED			
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	BY			
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	BY			
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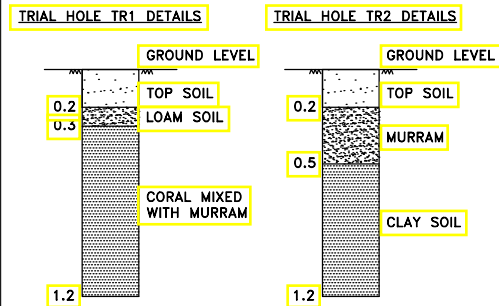
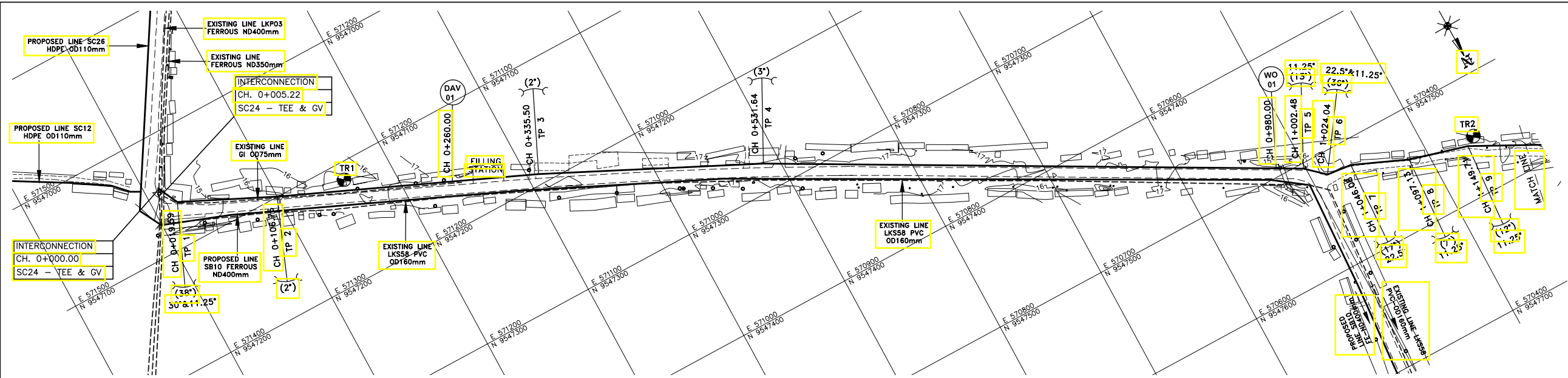
 **THE CHIEF EXECUTIVE OFFICER
COAST WATER SERVICES BOARD**
P.O. BOX 90417 - 80100
MOMBASA, KENYA

DESIGN CONSULTANT:
 **MANGAT I.B PATEL (MIBP) LIMITED**
P.O BOX 48674,00100-GPO,
NAIROBI, KENYA
E-MAIL: mibp.nairobi@mibpp.com
TEL: +254-2-2710500

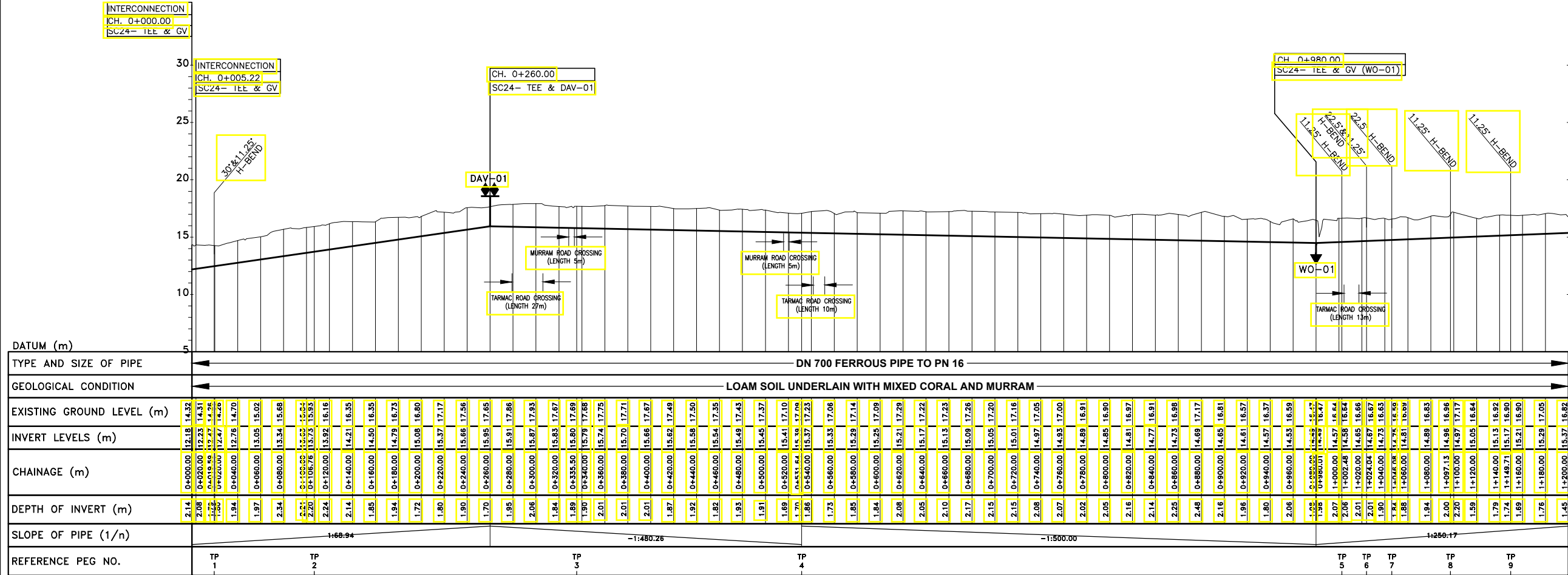
CONTRACT NAME:
CONSTRUCTION OF LIKONI - MBUTA MOSQUE PIPELINE (SC24)

DRAWING TITLE:
LOCATION AND LAYOUT PLAN OF PROPOSED LIKONI - MBUTA MOSQUE PIPELINE (LINE SC24)

Designed by:	O.J.O	Drawn by:	E.M.M
Checked by:	E.I.M	Approved by:	R.S.R
Scale:	As Shown	Date:	May 2019
DRG No:	M410/MO/SM/LP/01	Rev:	0



PLAN



LONGITUDINAL SECTION

- NOTES:**
1. CONTOUR LEVELS ARE IN METERS AT ONE METER INTERVALS
 2. GRID VALUES ARE IN METERS AT 100 METER INTERVALS
 3. GEOLOGICAL CONDITIONS INDICATED ON DRAWING ARE FOR GENERAL GUIDANCE ONLY
 4. MINIMUM PIPELINE SLOPES TO BE 1:500
 5. DRAWING TO BE READ IN CONJUNCTION WITH STANDARD DRAWINGS
 6. ALL PIPE FITTINGS TO BE CONFIRMED ON SITE DURING SETTING OUT
- LEGEND:**
- ROAD (TARMAC)
 - ROAD / TRACK (EARTH / MURRAM)
 - FENCE / HEDGE
 - CONTOURS, 1m INTERVAL
 - ELECTRIC POST
 - CULVERT
 - GATE
 - BUILDINGS
 - PROPOSED WATER MAIN
 - EXISTING WATER MAIN
 - TP10 TRAVERSE POINT & No.
 - TREES
 - TRIAL HOLE
 - HORIZONTAL BEND (H) OR VERTICAL BEND (V) WITH ANGLE INDICATED
 - GATE VALVE
 - WO-01 WASHOUT VALVE & No.
 - DAV-01 DOUBLE ORIFICE AIR VALVE & No.
 - PIPELINE GRADIENT WITH SLOPE DIRECTION (SLOPE MIN. OR 1 IN n)
 - PERIMETER WALL

REVISIONS				SIGN	DATE	APPROVED
	BY	CHECKED				
	BY	CHECKED				
	BY	CHECKED				
	BY	CHECKED				
	BY	CHECKED				

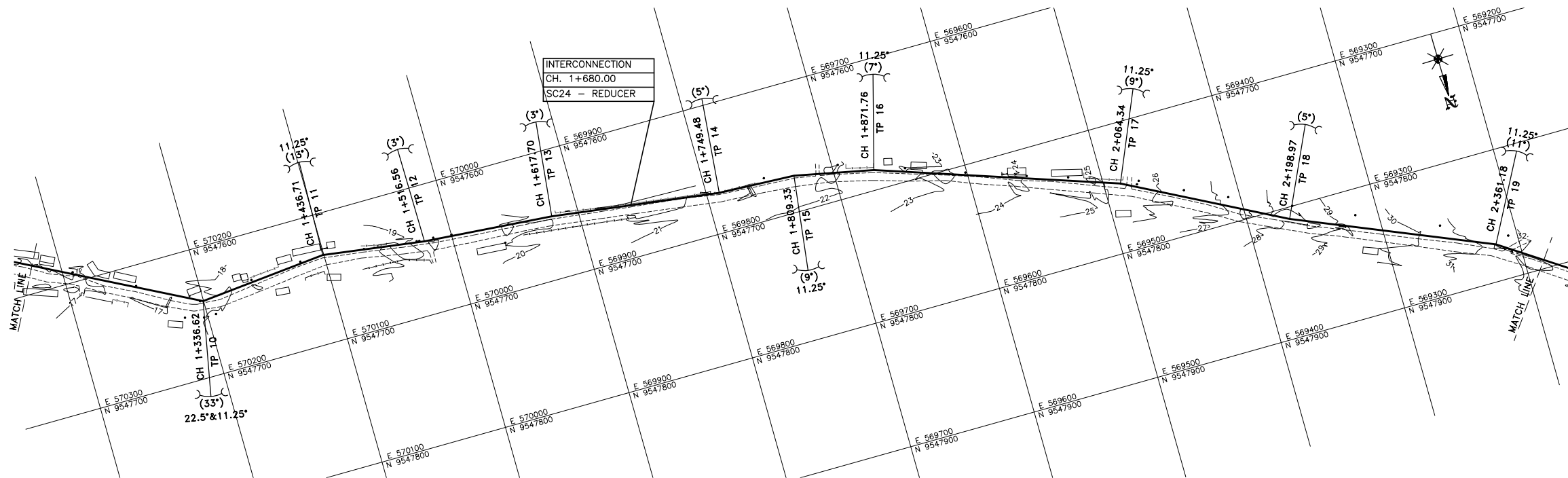
THE CHIEF EXECUTIVE OFFICER
COAST WATER SERVICES BOARD
P.O. BOX 90417 - 80100
MOMBASA, KENYA

DESIGN CONSULTANT:
MIBP MANGAT I.B. PATEL (MIBP) LIMITED
P.O. BOX 48674, 00100-GPO,
NAIROBI, KENYA
E-MAIL: mibp.nairobi@mibpp.com
TEL: +254-2-2710500

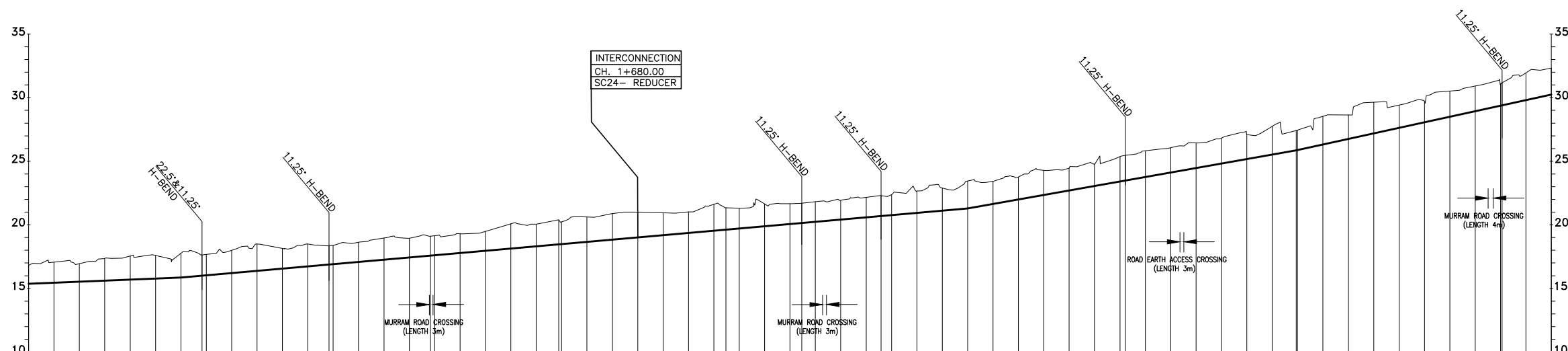
CONTRACT NAME:
CONSTRUCTION OF LIKONI - MBUTA MOSQUE PIPELINE (SC24)

DRAWING TITLE:
LIKONI - MBUTA MOSQUE PIPELINE (LINE SC24)
PLAN & LONGITUDINAL SECTION
(CH 0+000.00 - 1+200.00)
SHEET 1 OF 4

Designed by: O.J.O. Drawn by: A.M.I.
Checked by: E.I.M. Approved by: R.S.R.
Scale: H: 1:4000, V: 1:400 Date: MAY 2019
DRG No. M410/MO/SM/SC24/01 REV. 0



PLAN



DATUM (m)	10																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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LONGITUDINAL SECTION

NOTES:

1. CONTOUR LEVELS ARE IN METERS AT ONE METER INTERVALS
2. GRID VALUES ARE IN METERS AT 100 METER INTERVALS
3. GEOLOGICAL CONDITIONS INDICATED ON DRAWING ARE FOR GENERAL GUIDANCE ONLY
4. MINIMUM PIPELINE SLOPES TO BE 1:500
5. DRAWING TO BE READ IN CONJUNCTION WITH STANDARD DRAWINGS
6. ALL PIPE FITTINGS TO BE CONFIRMED ON SITE DURING SETTING OUT

LEGEND:

- ROAD (TARMAC)
- ROAD / TRACK (EARTH / MURRAM)
- FENCE / HEDGE
- CONTOURS, 1m INTERVAL
- ELECTRIC POST
- CULVERT
- GATE
- BUILDINGS
- PROPOSED WATER MAIN
- EXISTING WATER MAIN
- TP10 TRAVERSE POINT & No.
- TREES
- TRIAL HOLE
- HORIZONTAL BEND (H) OR VERTICAL BEND (V) WITH ANGLE INDICATED
- GV GATE VALVE
- WO-01 WASHOUT VALVE & No.
- DAV-01 DOUBLE ORIFICE AIR VALVE & No.
- PIPELINE GRADIENT WITH SLOPE DIRECTION (SLOPE MIN. OR 1 IN n)
- PERIMETER WALL

REVISIONS		SIGN	DATE	APPROVED
	BY	CHECKED		
	BY	CHECKED		
	BY	CHECKED		
	BY	CHECKED		
	BY	CHECKED		

THE CHIEF EXECUTIVE OFFICER
COAST WATER SERVICES BOARD
P.O. BOX 90417 - 80100
MOMBASA, KENYA

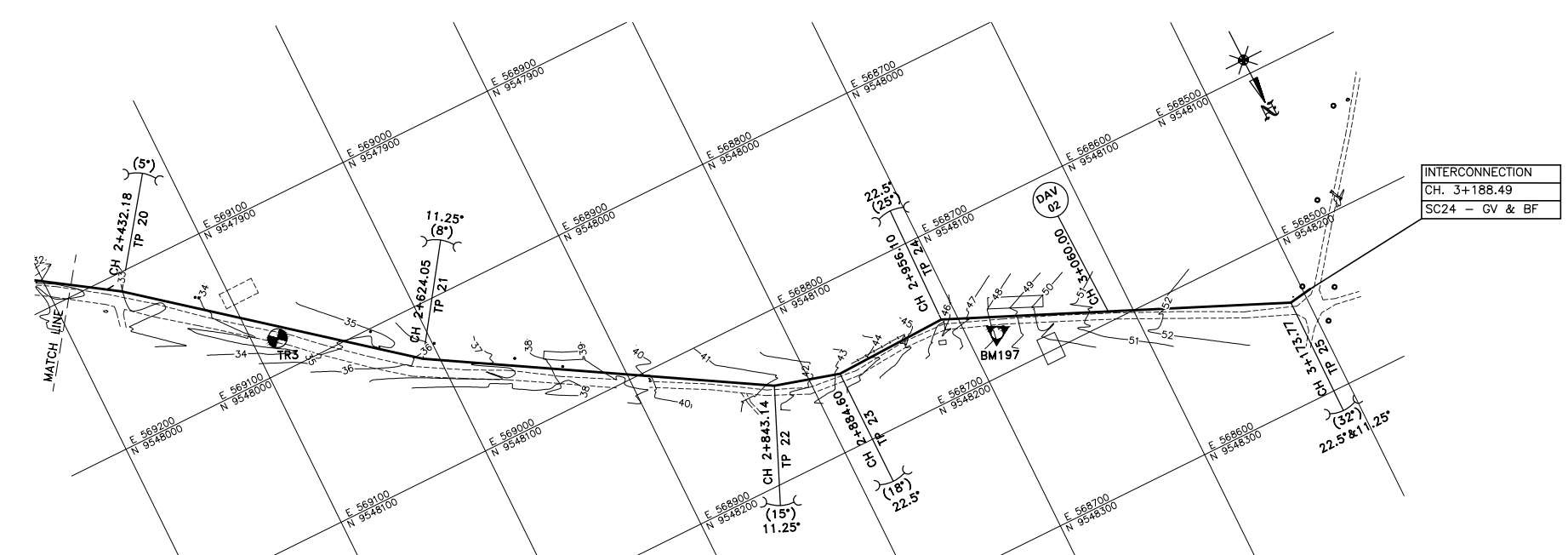
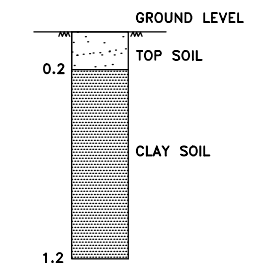
DESIGN CONSULTANT:
MIBP MANGAT I.B. PATEL (MIBP) LIMITED
P.O. BOX 48674, 00100-GPO,
NAIROBI, KENYA
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CONTRACT NAME:
CONSTRUCTION OF LIKONI - MBUTA MOSQUE PIPELINE (SC24)

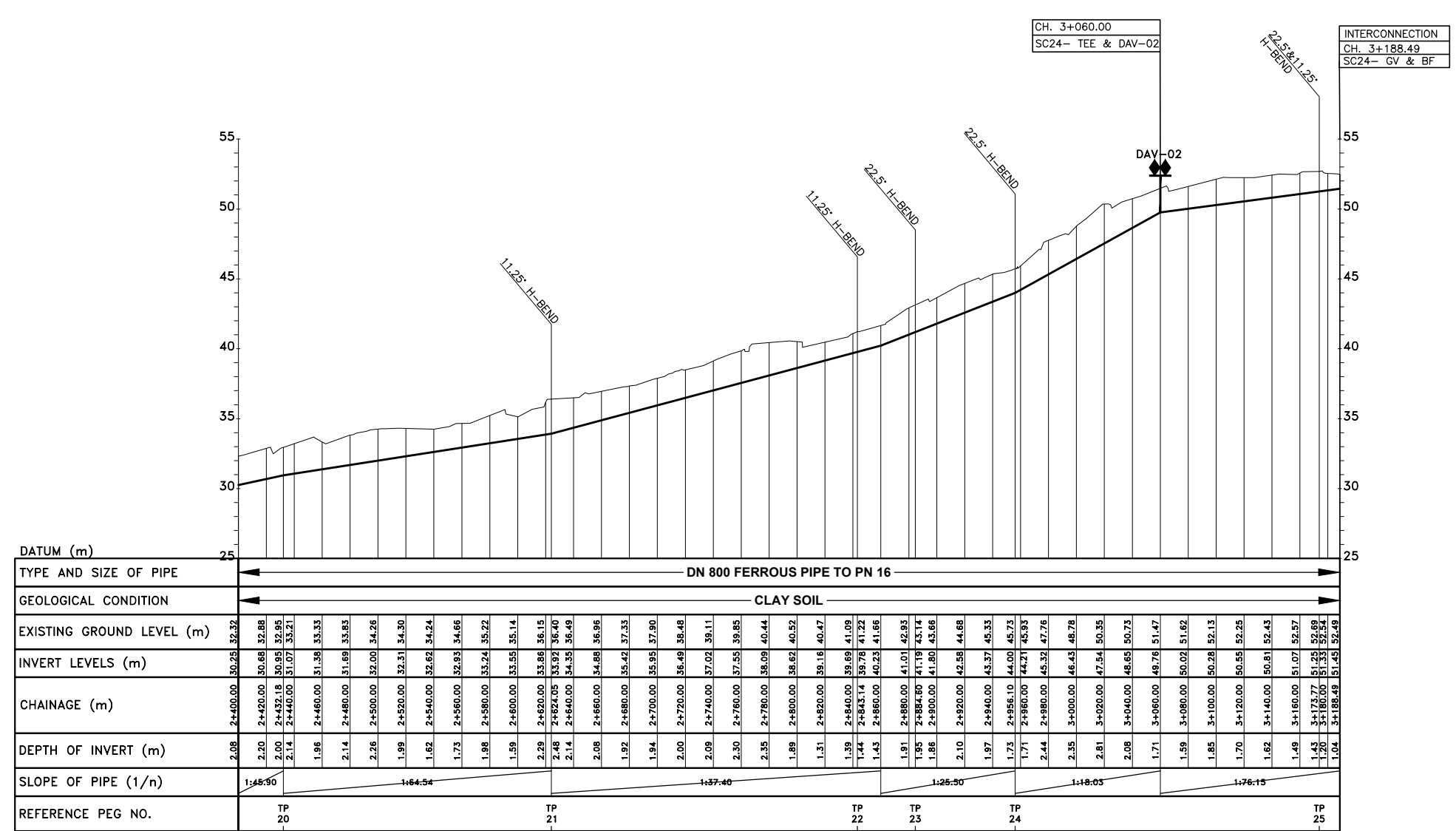
DRAWING TITLE:
LIKONI - MBUTA MOSQUE PIPELINE (LINE SC24)
PLAN & LONGITUDINAL SECTION
(CH 1+200.00 - 2+400.00)
SHEET 2 OF 4

Designed by: O.J.O	Drawn by: A.M.I
Checked by: E.I.M	Approved by: R.S.R
Scale: H- 1:4000, V- 1:400	Date: MAY 2019
DRG No. M410/MO/SM/SC24/02	REV. 0

TRIAL HOLE TR3 DETAILS



PLAN



LONGITUDINAL SECTION

- NOTES:**
- CONTOUR LEVELS ARE IN METERS AT ONE METER INTERVALS
 - GRID VALUES ARE IN METERS AT 100 METER INTERVALS
 - GEOLOGICAL CONDITIONS INDICATED ON DRAWING ARE FOR GENERAL GUIDANCE ONLY
 - MINIMUM PIPELINE SLOPES TO BE 1:500
 - DRAWING TO BE READ IN CONJUNCTION WITH STANDARD DRAWINGS
 - ALL PIPE FITTINGS TO BE CONFIRMED ON SITE DURING SETTING OUT
 - THE SURVEY WAS BASED ON THE DATUM BM197 WITH THE FOLLOWING COORDINATES AND ELEVATION.
- | BENCHMARK | COORDINATES | | |
|-----------|-------------|--------------|-----------|
| REF No. | EASTING | NORTHING | ELEVATION |
| BM197 | 568,680.30 | 9,548,173.30 | 48.16 |

- LEGEND:**
- ROAD (TARMAC)
 - ROAD / TRACK (EARTH / MURRAM)
 - FENCE / HEDGE
 - CONTOURS, 1m INTERVAL
 - ELECTRIC POST
 - CULVERT
 - GATE
 - BUILDINGS
 - PROPOSED WATER MAIN
 - EXISTING WATER MAIN
 - TP10 TRAVERSE POINT & No.
 - TREES
 - TRIAL HOLE
 - HORIZONTAL BEND (H) OR VERTICAL BEND (V) WITH ANGLE INDICATED
 - GV GATE VALVE
 - DAV-01 DOUBLE ORIFICE AIR VALVE & No.
 - PIPELINE GRADIENT WITH SLOPE DIRECTION (SLOPE MIN. OR 1 IN n)
 - PERIMETER WALL
 - BENCHMARK (CONCRETE WITH IRON PIN)

REVISIONS		SIGN	DATE	APPROVED
	BY			
	CHECKED			
	BY			
	CHECKED			
	BY			
	CHECKED			
	BY			
	CHECKED			

THE CHIEF EXECUTIVE OFFICER
COAST WATER SERVICES BOARD
P.O. BOX 90417 - 80100
MOMBASA, KENYA

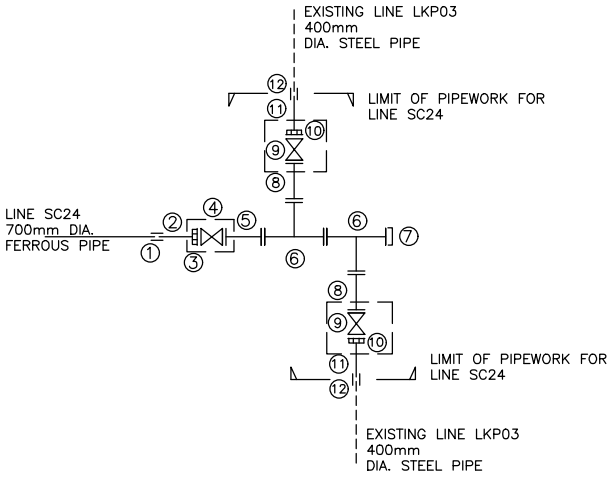
DESIGN CONSULTANT:
MIBP MANGAT I.B. PATEL (MIBP) LIMITED
P.O. BOX 48674, 00100-GPO,
NAIROBI, KENYA
E-MAIL: mibp.nairobi@mibpp.com
TEL: +254-2-2710500

CONTRACT NAME:
CONSTRUCTION OF LIKONI - MBUTA MOSQUE PIPELINE (SC24)

DRAWING TITLE:
LIKONI - MBUTA MOSQUE PIPELINE (LINE SC24)
PLAN & LONGITUDINAL SECTION
(CH 2+400.00 - 3+188.49)
SHEET 3 OF 4

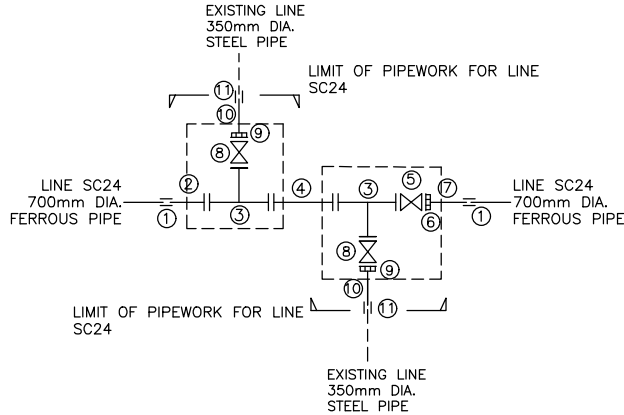
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Checked by: E.I.M	Approved by: R.S.R
Scale: H- 1:4000, V- 1:400	Date: MAY 2019
DRG No. M410/MO/SM/SC24/03	REV. 0

DETAIL CH. 0+000.00
SC24 - INTERCONNECTION



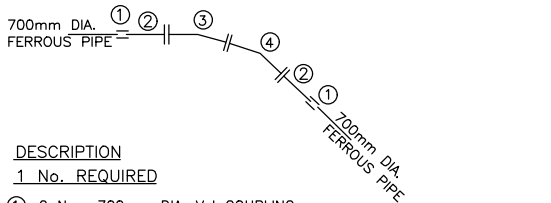
- DESCRIPTION
1 No. REQUIRED
- 1 1 No. 700mm DIA. V.J COUPLING
 - 2 1 No. 700mm DIA. PLAIN ENDED FERROUS PIPE 1200mm LONG
 - 3 1 No. 700mm DIA. V.J FLANGE ADAPTOR
 - 4 1 No. 700mm DIA. ALL FLANGED GATE VALVE
 - 5 1 No. 700mm DIA. ALL FLANGED FERROUS PIPE 2000mm LONG
 - 6 2 Nos. 700x400mm DIA. ALL FLANGED FERROUS TEE
 - 7 1 No. 700mm DIA. BLANK FLANGE
 - 8 2 Nos. 400mm DIA. ALL FLANGED FERROUS PIPE 2000mm LONG
 - 9 2 Nos. 400mm DIA. ALL FLANGED GATE VALVE
 - 10 2 Nos. 400mm DIA. V.J FLANGE ADAPTOR
 - 11 2 Nos. 400mm DIA. PLAIN ENDED FERROUS PIPE 1200mm LONG
 - 12 2 Nos. 400mm DIA. V.J COUPLING

DETAIL CH. 0+005.22
LINE SC24- INTERCONNECTION



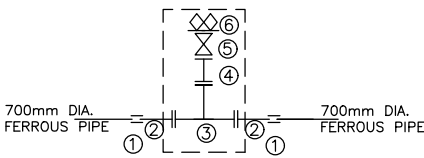
- DESCRIPTION
1 No. REQUIRED
- 1 2 Nos. 700mm DIA. V.J. COUPLING
 - 2 1 No. 700mm DIA. FLANGED SPIGOT FERROUS PIPE 1200mm LONG
 - 3 2 Nos. 700x350mm DIA. ALL FLANGED FERROUS TEE
 - 4 1 No. 700mm DIA. ALL FLANGED FERROUS PIPE 2000mm LONG
 - 5 1 No. 700mm DIA. ALL FLANGED GATE VALVE
 - 6 1 No. 700mm DIA. V.J FLANGE ADAPTOR
 - 7 1 No. 700mm DIA. PLAIN ENDED FERROUS PIPE 1200mm LONG
 - 8 2 Nos. 350mm DIA. ALL FALNGED GATE VALVE
 - 9 2 Nos. 350mm DIA. V.J FLANGE ADAPTOR
 - 10 2 Nos. 350mm DIA. PLAIN ENDED FERROUS PIPE 1200mm LONG
 - 11 2 Nos. 350mm DIA. V.J COUPLING

DETAIL CH. 0+019.59
LINE SC24 - 30° & 11.25° BEND



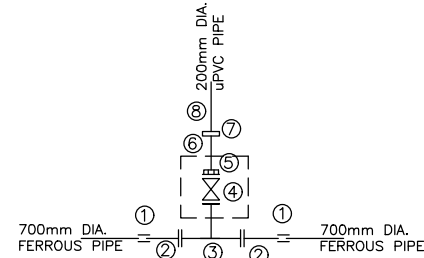
- DESCRIPTION
1 No. REQUIRED
- 1 2 Nos. 700mm DIA. V.J COUPLING
 - 2 2 Nos. 700mm DIA. FLANGED SPIGOT FERROUS PIPE 1200mm LONG
 - 3 1 No. 700mm DIA. 30° ALL FLANGED FERROUS BEND
 - 4 1 No. 700mm DIA. 11.25° ALL FLANGED FERROUS BEND

DETAIL CH. 0+260.00
LINE SC24 -TEE & DAV- 01



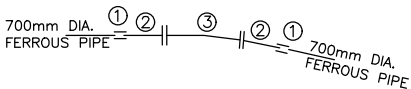
- DESCRIPTION
1 No. REQUIRED
- 1 2 Nos. 700mm DIA. V.J COUPLING
 - 2 2 Nos. 700mm DIA. FLANGED SPIGOT FERROUS PIPE 1200mm LONG
 - 3 1 No. 700x350mm DIA. ALL FLANGED FERROUS TEE
 - 4 1 No. 150mm DIA. SPECIAL ALL FLANGED PIPE 325mm LONG WITH FLANGE TO SUIT 350mm DIA. TEE ON ONE END AND NORMAL FLANGE ON THE OTHER END
 - 5 1 No. 150mm DIA. ALL FLANGED GATE VALVE WITH BUILT IN ISOLATING VALVE
 - 6 1 No. 150mm DIA. DOUBLE ORIFICE AIR VALVE

DETAIL CH. 0+980.00
LINE SC24 -TEE & GV (WO-01)



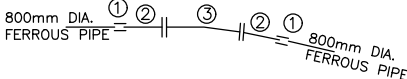
- DESCRIPTION
1 No. REQUIRED
- 1 2 Nos. 700mm DIA. V.J COUPLING
 - 2 2 Nos. 700mm DIA. FLANGED SPIGOT FERROUS PIPE 1200mm LONG
 - 3 1 No. 700x200mm DIA. ALL FLANGED FERROUS INVERTED TEE
 - 4 1 No. 200mm DIA. ALL FLANGED GATE VALVE
 - 5 1 No. 200mm DIA. V.J FLANGE ADAPTER
 - 6 1 No. 200mm DIA. PLAIN ENDED FERROUS PIPE 1200mm LONG
 - 7 1 No. 200mm DIA. V.J. STEPPED COUPLING
 - 8 1 No. 200mm DIA. uPVC CLASS "B" PIPE (LENGTH TO SUIT ON SITE)

DETAIL CH. 1+002.48, 1+097.13, 1+149.71 & 1+436.71
LINE SC24 - 11.25° H.BEND



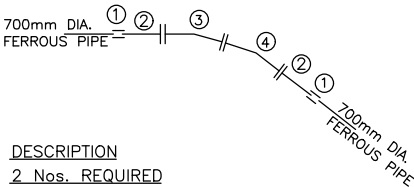
- DESCRIPTION
4 Nos. REQUIRED
- 1 2 Nos. 700mm DIA. V.J COUPLING
 - 2 2 Nos. 700mm DIA. FLANGED SPIGOT FERROUS PIPE 1200mm LONG
 - 3 1 No. 700mm DIA. 11.25° ALL FLANGED FERROUS BEND

DETAIL CH. 1+809.33, 1+871.76, 2+064.34, 2+361.18, 2+624.05 & 2+843.14
LINE SC24 - 11.25° H.BEND



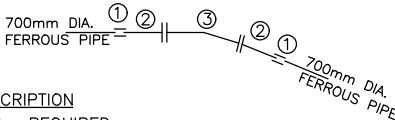
- DESCRIPTION
6 Nos. REQUIRED
- 1 2 Nos. 800mm DIA. V.J COUPLING
 - 2 2 Nos. 800mm DIA. FLANGED SPIGOT FERROUS PIPE 1200mm LONG
 - 3 1 No. 800mm DIA. 11.25° ALL FLANGED FERROUS BEND

DETAIL CH. 1+024.04 & 1+336.62
LINE SC24 - 22.5° & 11.25° BEND



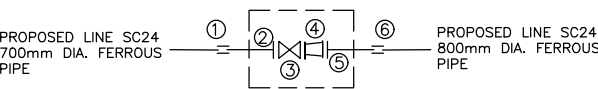
- DESCRIPTION
2 Nos. REQUIRED
- 1 2 Nos. 700mm DIA. V.J COUPLING
 - 2 2 Nos. 700mm DIA. FLANGED SPIGOT FERROUS PIPE 1200mm LONG
 - 3 1 No. 700mm DIA. 22.5° ALL FLANGED FERROUS BEND
 - 4 1 No. 700mm DIA. 11.25° ALL FLANGED FERROUS BEND

DETAIL CH. 1+046.08
LINE SC24 - 22.5° BEND



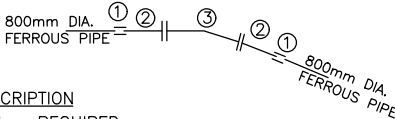
- DESCRIPTION
1 No. REQUIRED
- 1 2 Nos. 700mm DIA. V.J COUPLING
 - 2 2 Nos. 700mm DIA. FLANGED SPIGOT FERROUS PIPE 1200mm LONG
 - 3 1 No. 700mm DIA. 22.5° ALL FLANGED FERROUS BEND

DETAIL CH. 1+680.00
LINE SC24 - REDUCER



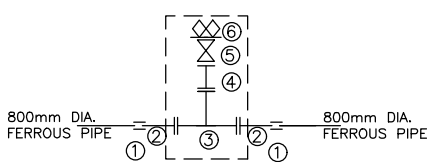
- DESCRIPTION
1 No. REQUIRED
- 1 1 No. 700mm DIA. V.J. COUPLING
 - 2 1 No. 700mm DIA. FLANGED SPIGOT FERROUS PIPE 1200mm LONG
 - 3 1 No. 700mm DIA. ALL FLANGED GATE VALVE
 - 4 1 No. 800x700mm DIA. ALL FLANGED CONCENTRIC TAPER
 - 5 1 No. 800mm DIA. FLANGED SPIGOT FERROUS PIPE 1200mm LONG
 - 6 1 No. 800mm DIA. V.J. COUPLING

DETAIL CH. 2+884.60 & 2+956.10
LINE SC24 - 22.5° BEND



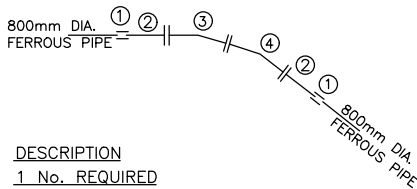
- DESCRIPTION
2 Nos. REQUIRED
- 1 2 Nos. 800mm DIA. V.J COUPLING
 - 2 2 Nos. 800mm DIA. FLANGED SPIGOT FERROUS PIPE 1200mm LONG
 - 3 1 No. 800mm DIA. 22.5° ALL FLANGED FERROUS BEND

DETAIL CH. 3+060.00
LINE SC24 -TEE & DAV- 02



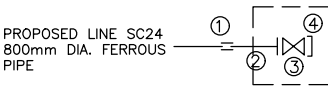
- DESCRIPTION
1 No. REQUIRED
- 1 2 Nos. 800mm DIA. V.J COUPLING
 - 2 2 Nos. 800mm DIA. FLANGED SPIGOT FERROUS PIPE 1200mm LONG
 - 3 1 No. 800x400mm DIA. ALL FLANGED FERROUS TEE
 - 4 1 No. 150mm DIA. SPECIAL ALL FLANGED PIPE 325mm LONG WITH FLANGE TO SUIT 400mm DIA. TEE ON ONE END AND NORMAL FLANGE ON THE OTHER END
 - 5 1 No. 150mm DIA. ALL FLANGED GATE VALVE WITH BUILT IN ISOLATING VALVE
 - 6 1 No. 150mm DIA. DOUBLE ORIFICE AIR VALVE

DETAIL CH. 3+173.77
LINE SC24 - 22.5° & 11.25° BEND



- DESCRIPTION
1 No. REQUIRED
- 1 2 Nos. 800mm DIA. V.J COUPLING
 - 2 2 Nos. 800mm DIA. FLANGED SPIGOT FERROUS PIPE 1200mm LONG
 - 3 1 No. 800mm DIA. 22.5° ALL FLANGED FERROUS BEND
 - 4 1 No. 800mm DIA. 11.25° ALL FLANGED FERROUS BEND

DETAIL CH. 3+188.49
LINE SC24 - GV & BF



- DESCRIPTION
1 No. REQUIRED
- 1 1 No. 800mm DIA. V.J COUPLING
 - 2 1 No. 800mm DIA. FLANGED SPIGOT FERROUS PIPE 1200mm LONG
 - 3 1 No. 800mm DIA. ALL FLANGED GATE VALVE
 - 4 1 No. 800mm DIA. BLANK FLANGE

- NOTES:
1. CONTOUR LEVELS ARE IN METERS AT ONE METER INTERVALS
 2. GRID VALUES ARE IN METERS AT 100 METER INTERVALS
 3. GEOLOGICAL CONDITIONS INDICATED ON DRAWING ARE FOR GENERAL GUIDANCE ONLY
 4. MINIMUM PIPELINE SLOPES TO BE 1:500
 5. DRAWING TO BE READ IN CONJUNCTION WITH STANDARD DRAWINGS
 6. ALL PIPE FITTINGS TO BE CONFIRMED ON SITE DURING SETTING OUT

- LEGEND:
- | | |
|--------|--------------------------------|
| V.J. | VIKING JOHNSON |
| GV | GATE VALVE |
| FH | FIRE HYDRANT |
| WO-01 | WASHOUT VALVE & No. |
| DAV-01 | DOUBLE ORIFICE AIR VALVE & No. |
| WM | WATER METER |
| [] | PROPOSED MASONRY CHAMBER |

R E V I S I O N S		SIGN	DATE	APPROVED
	BY			
	CHECKED			
	BY			
	CHECKED			
	BY			
	CHECKED			
	BY			
	CHECKED			

 **THE CHIEF EXECUTIVE OFFICER
COAST WATER SERVICES BOARD**
P.O. BOX 90417 - 80100
MOMBASA, KENYA

DESIGN CONSULTANT:
 **MANGAT I.B PATEL (MIBP) LIMITED**
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NAIROBI, KENYA
E-MAIL: mibp.nairobi@mibpp.com
TEL: +254-2-2710500

CONTRACT NAME:
**CONSTRUCTION OF LIKONI - MBUTA
MOSQUE PIPELINE (SC24)**

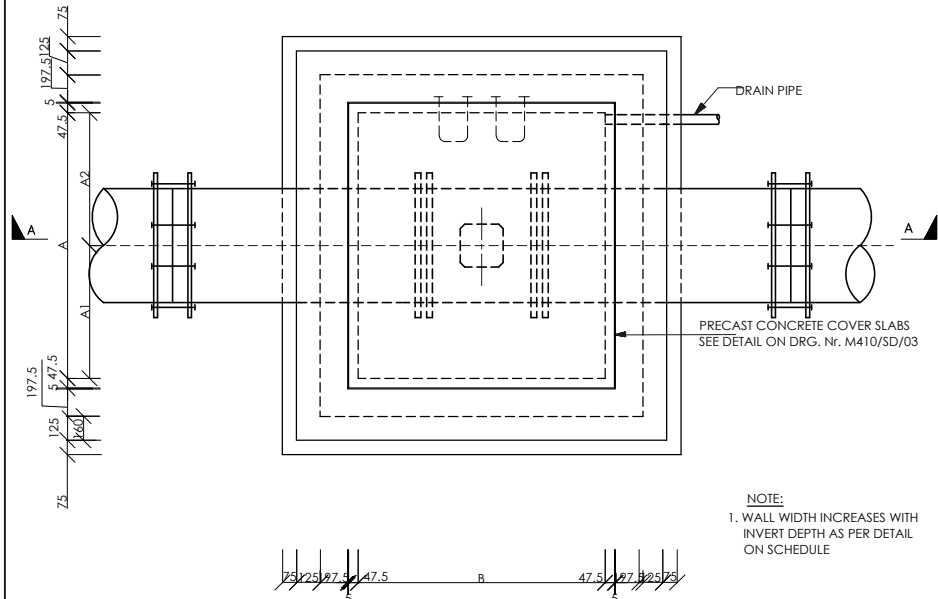
DRAWING TITLE:
**LIKONI - MBUTA MOSQUE PIPELINE (LINE SC24)
FITTING DETAILS
SHEET 4 OF 4**

Designed by: O.J.O	Drawn by: A.M.I
Checked by: E.I.M	Approved by: R.S.R
Scale: H- 1:4000, V- 1:400	Date: MAY 2019
DRG No. M410/MO/SM/SC24/04	REV. 0

STANDARD DRAWINGS

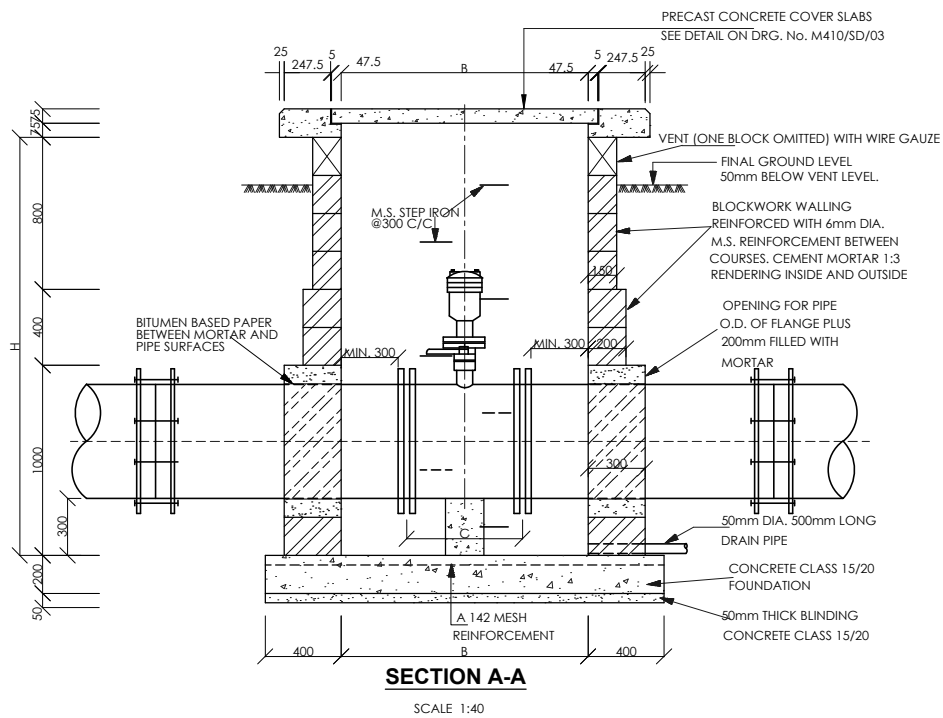


TYPICAL AIR VALVE CHAMBER

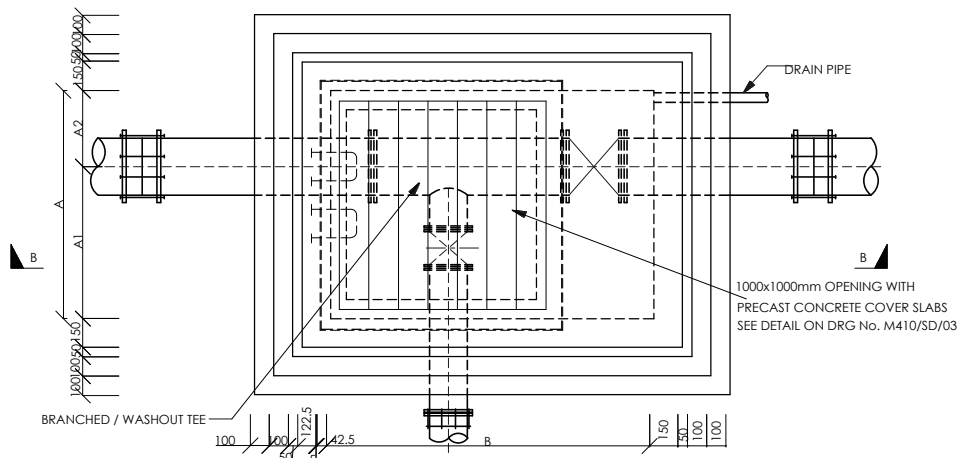


PLAN OF CHAMBER

SCALE 1:40

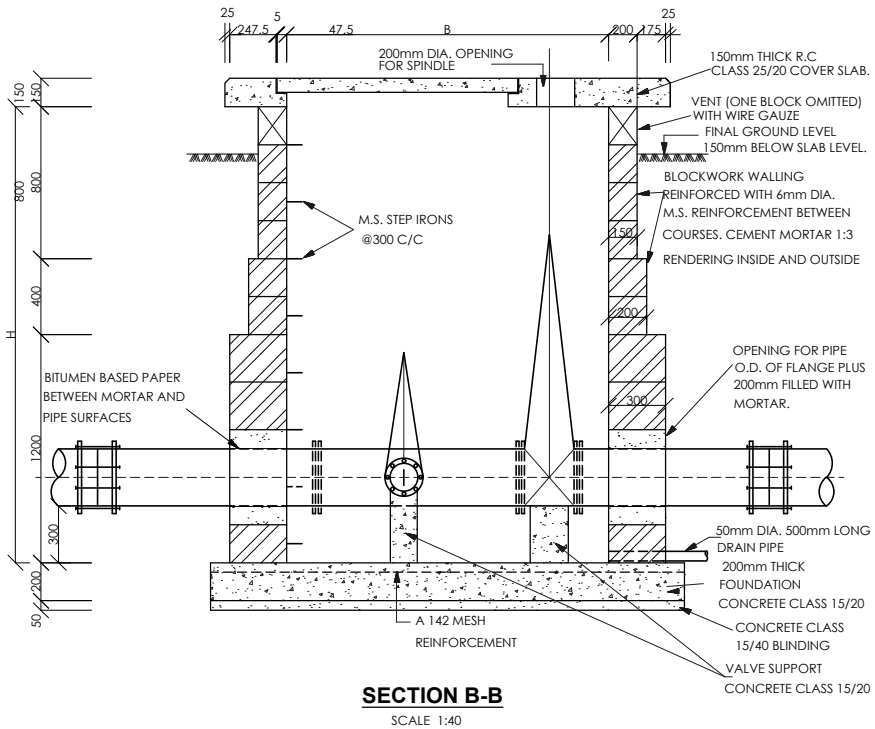


TYPICAL VALVE CHAMBER DETAILS AT JUNCTIONS / WASHOUT VALVE (DEPTH > 1.0m)

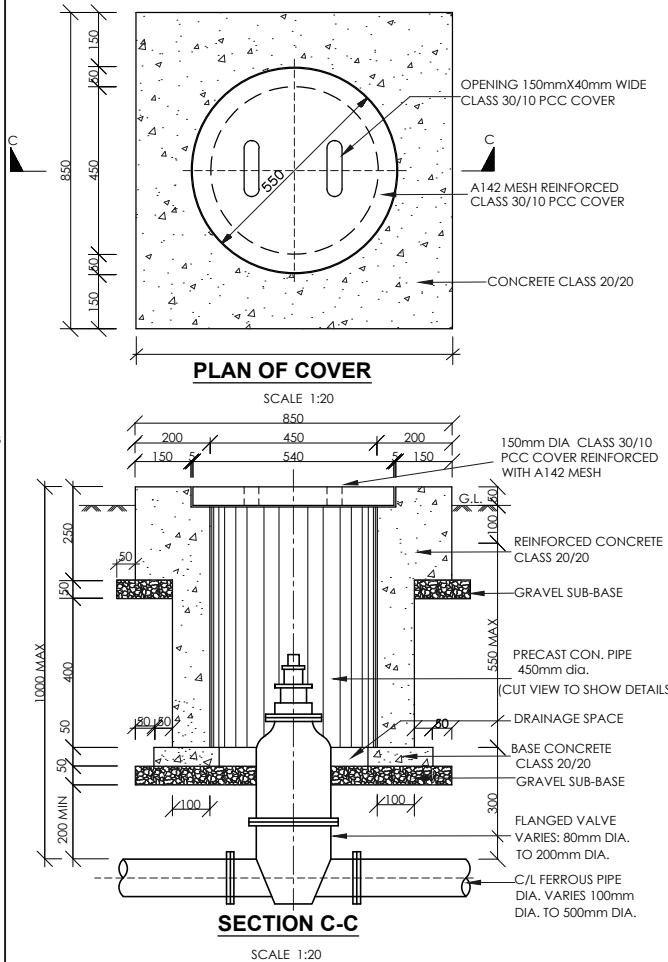


PLAN OF CHAMBER

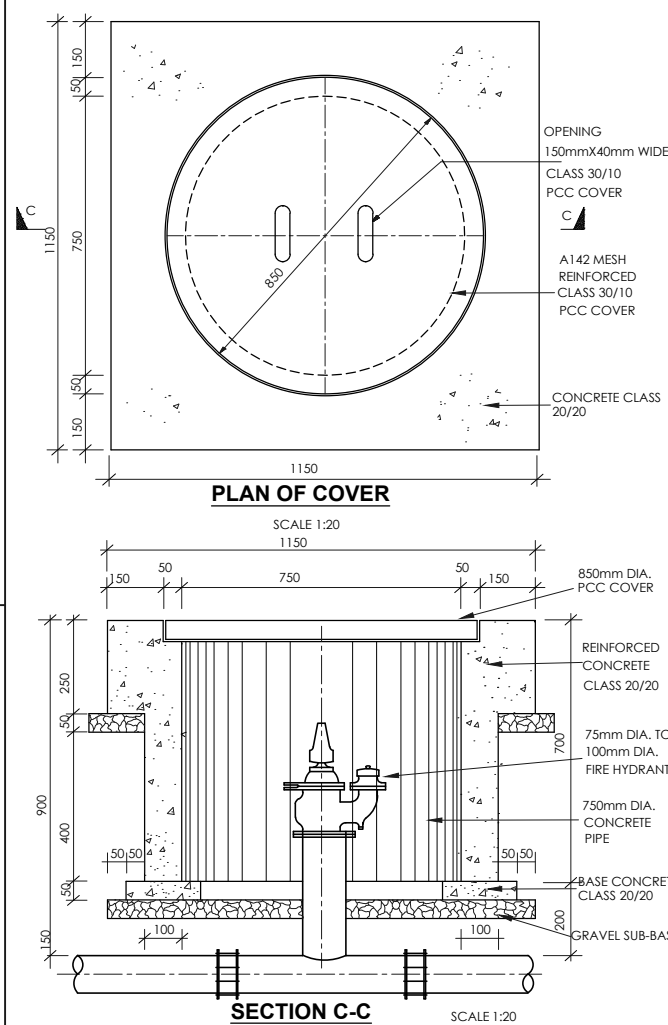
SCALE 1:40



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



TYPICAL VALVE BOX DETAIL FOR FIRE HYDRANT



NOTES

1. DIMENSIONS ARE SHOWN IN MILLIMETERS UNLESS OTHERWISE STATED

ABBREVIATIONS

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

CONSTRUCTION DETAILS FOR VALVE CHAMBERS

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

CHAMBER SIZE SCHEDULE FOR VARIOUS PIPE SIZES

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

CHAMBER DEPTHS & WALL THICKNESS SCHEDULE

REVISIONS	SIGN	DATE	APPROVED
BY	CHECKED		
BY	CHECKED		
BY	CHECKED		
BY	CHECKED		

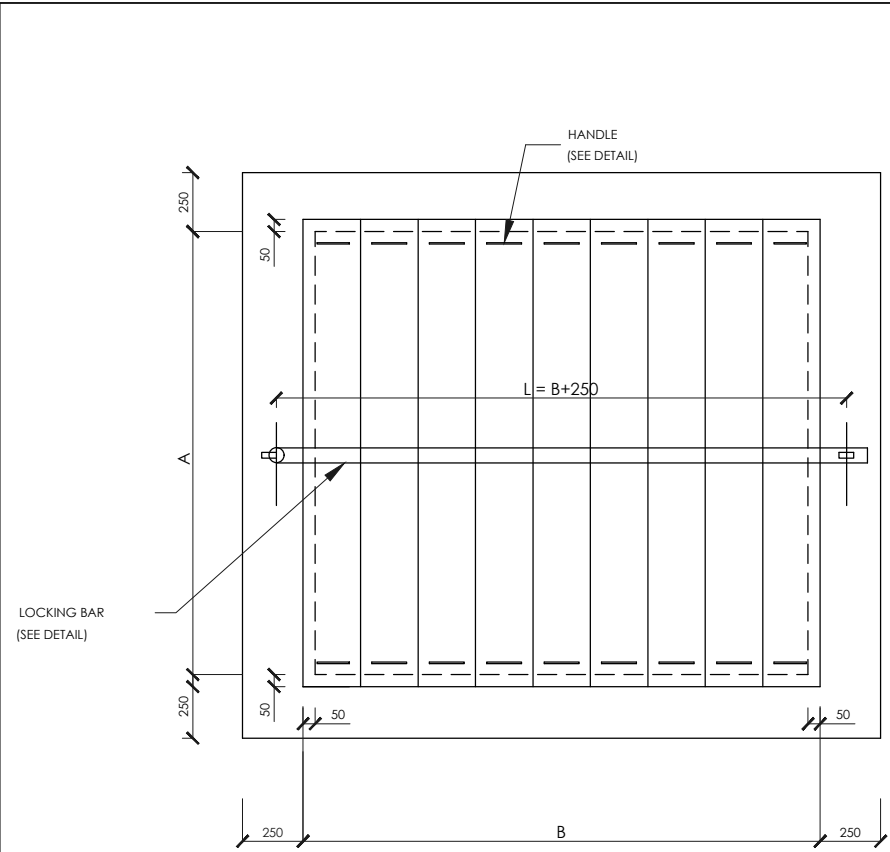
THE CHIEF EXECUTIVE OFFICER
COAST WATER SERVICES BOARD
P.O. BOX 90417 - 80100
MOMBASA, KENYA

DESIGN CONSULTANT:
MIBP MANGAT I.B. PATEL (MIBP) LIMITED
P.O. BOX 48674, 00100-GPO,
NAIROBI, KENYA
E-MAIL: mibp.nairobi@mibpp.com
TEL: +254-2-2710500

CONTRACT NAME:
CONSTRUCTION OF LIKONI - MBUTA
MOSQUE PIPELINE (SC24)

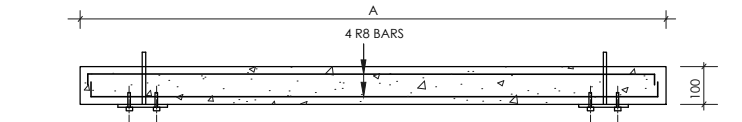
DRAWING TITLE:
STANDARD DRAWING
DETAILS OF VALVE CHAMBER

Designed by: S.C.K	Drawn by: P.G.M
Checked by: E.I.M	Approved by: R.S.R
Scale: AS INDICATED	Date: MAY 2019
DRG No. M410/SD/02	REV. 0



COVER FOR AIR VALVE CHAMBERS

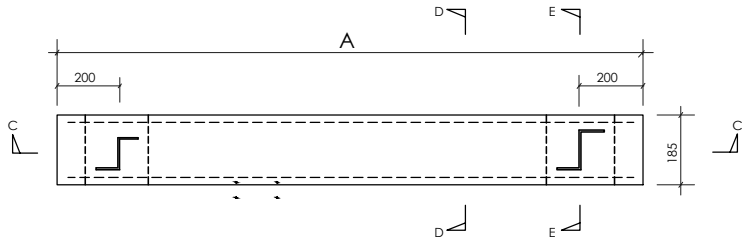
SCALE A1 - 1:10
A3 - 1:20



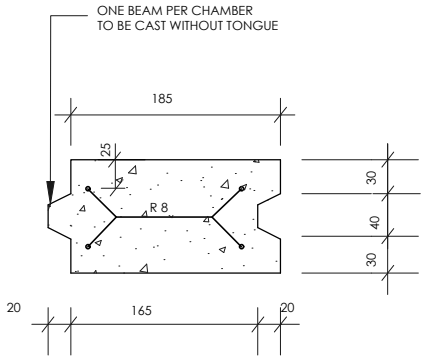
SECTION C-C

SCALE A1 - 1:10

A3 - 1:20

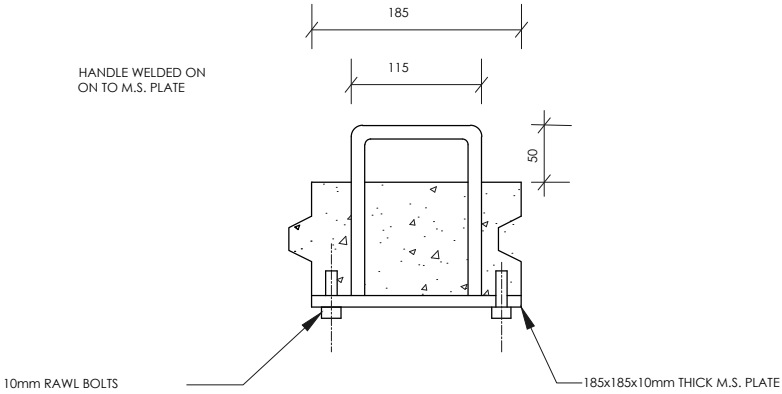


PLAN



SECTION D-D

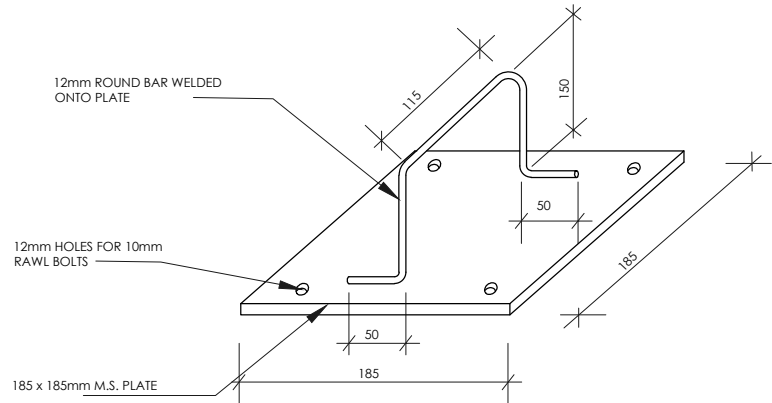
NTS



SECTION E-E

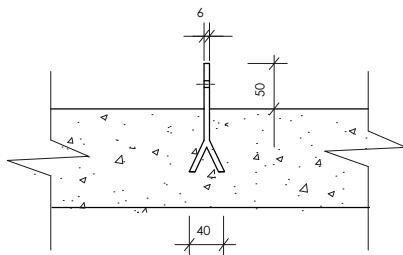
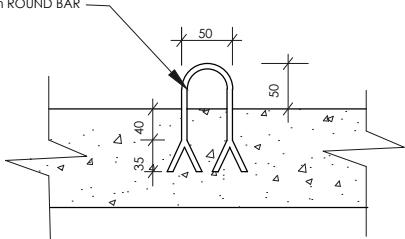
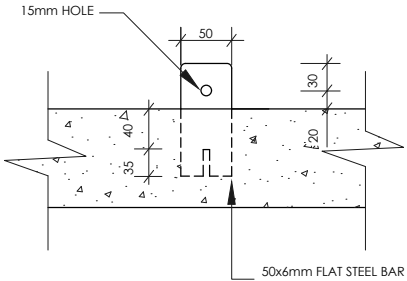
NTS

DETAIL OF PRECAST CONCRETE COVER SLAB

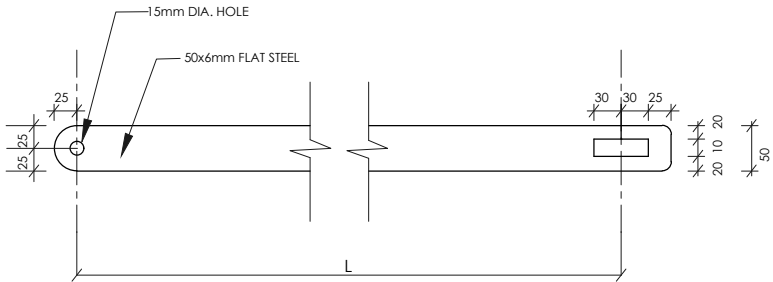


DETAIL OF HANDLE

NTS



SECTIONS



PLAN

DETAILS OF LOCKING BAR

NTS

COVER SIZE SCHDULE

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

NOTES

1. ALL DIMENSIONS ARE IN mm. UNLESS OTHERWISE STATED.

ABBREVIATIONS

M.S. = MILD STEEL.

mm - MILIMETER

Dia. - DIAMETER

NTS - NOT TO SCALE

Nr. - NUMBER

REVISIONS		SIGN	DATE	APPROVED
	BY			
	CHECKED			
	BY			
	CHECKED			
	BY			
	CHECKED			
	BY			
	CHECKED			

THE CHIEF EXECUTIVE OFFICER
COAST WATER SERVICES BOARD
P.O. BOX 90417 - 80100
MOMBASA, KENYA

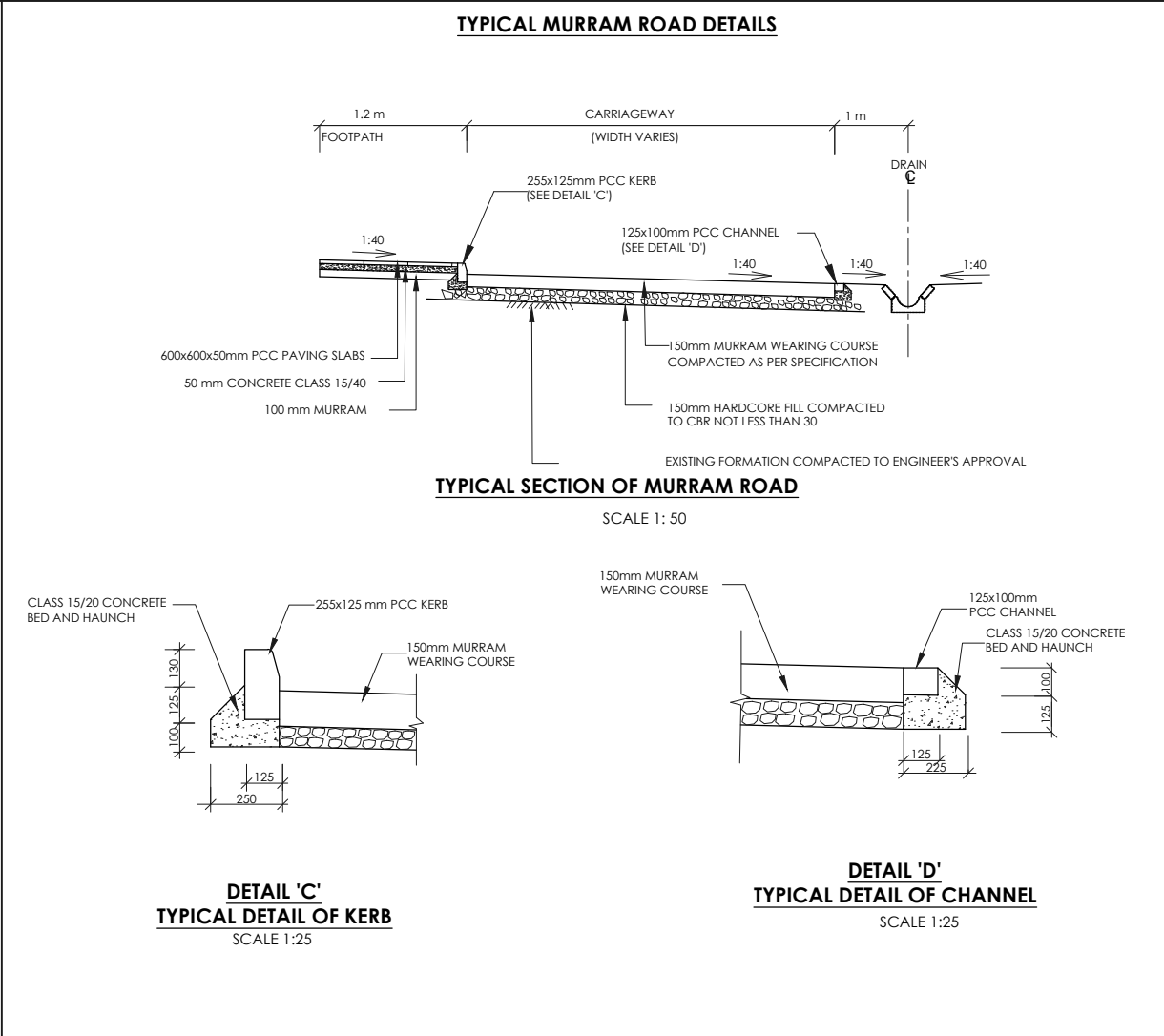
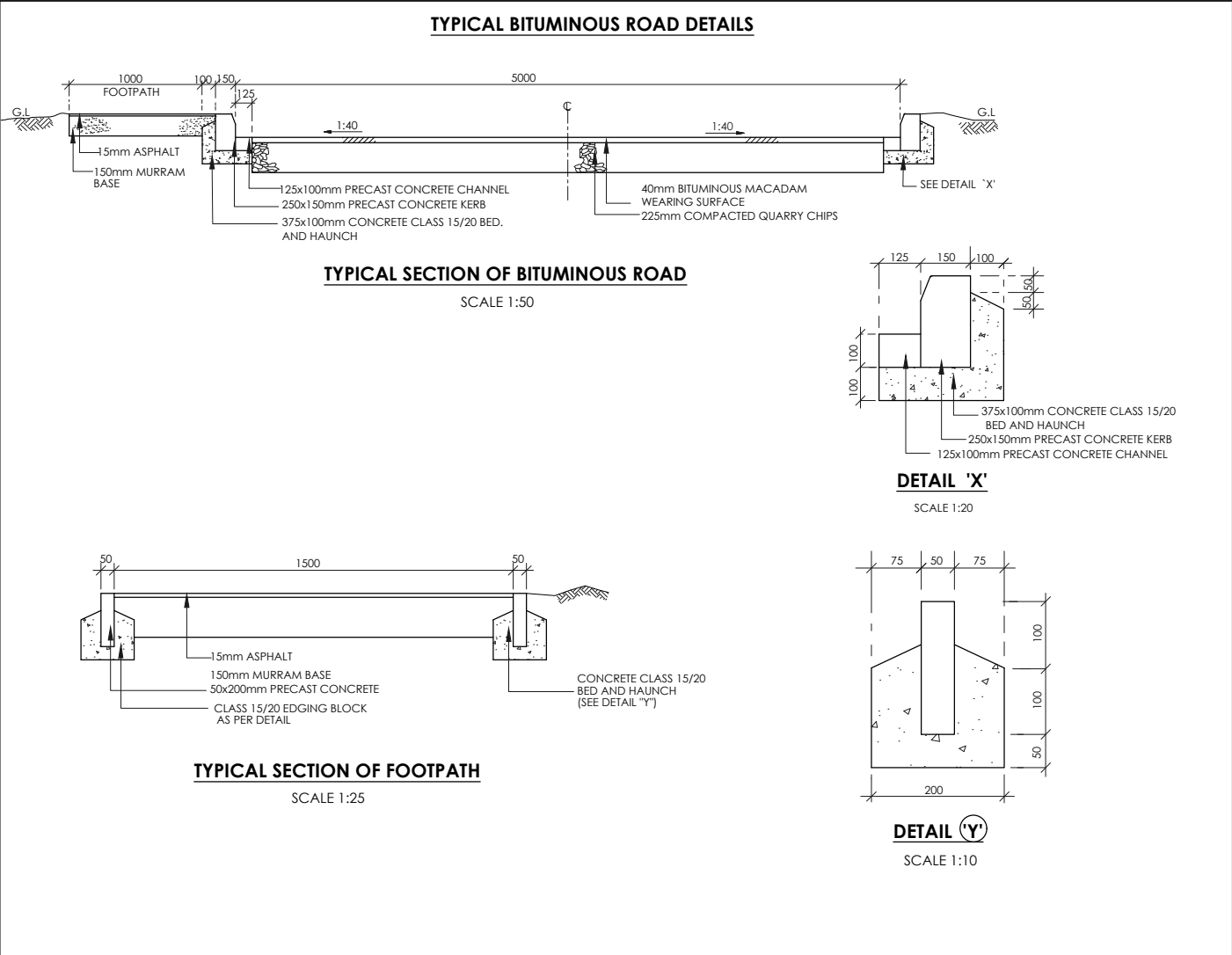
DESIGN CONSULTANT:
MIBP MANGAT LB PATEL (MIBP) LIMITED
P.O BOX 48674,00100-GPO,
NAIROBI, KENYA
E-MAIL: mibp.nairobi@mibpp.com
TEL: +254-2-2710500

CONTRACT NAME:
CONSTRUCTION OF LIKONI - MBUTA
MOSQUE PIPELINE (SC24)

DRAWING TITLE:
STANDARD DRAWING
DETAILS OF PRECAST
CONCRETE COVERS FOR VALVE
CHAMBERS

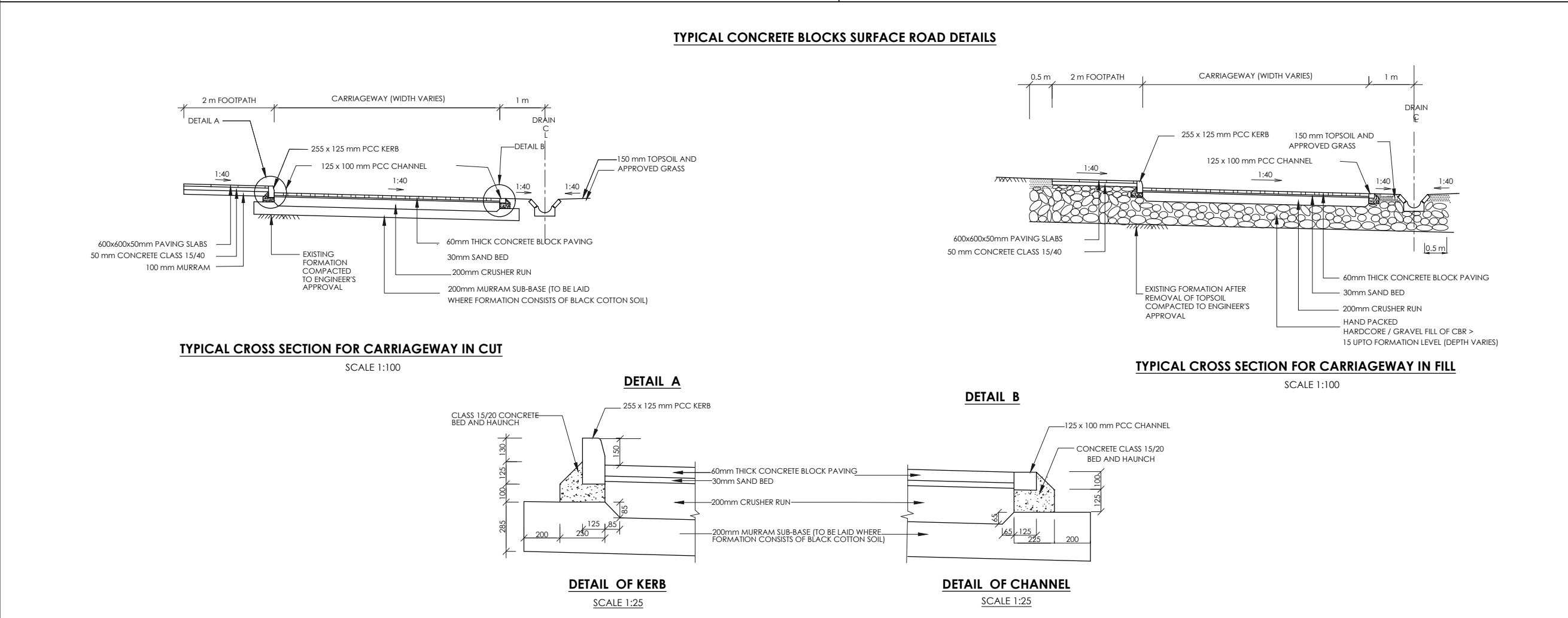
Designed by: S.C.K	Drawn by: P.G.M
Checked by: E.I.M	Approved by: R.S.R
Scale: AS INDICATED	Date: MAY 2019

DRG No. M410/SD/03 REV. 0



NOTE
1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED

ABBREVIATIONS
CL - CENTRE LINE
mm - MILLIMETER
G.L. - GROUND LEVEL
m - METER
PCC - PRECAST CEMENT CONCRETE



REVISIONS		SIGN	DATE	APPROVED
	BY			
	CHECKED			
	BY			
	CHECKED			
	BY			
	CHECKED			
	BY			
	CHECKED			

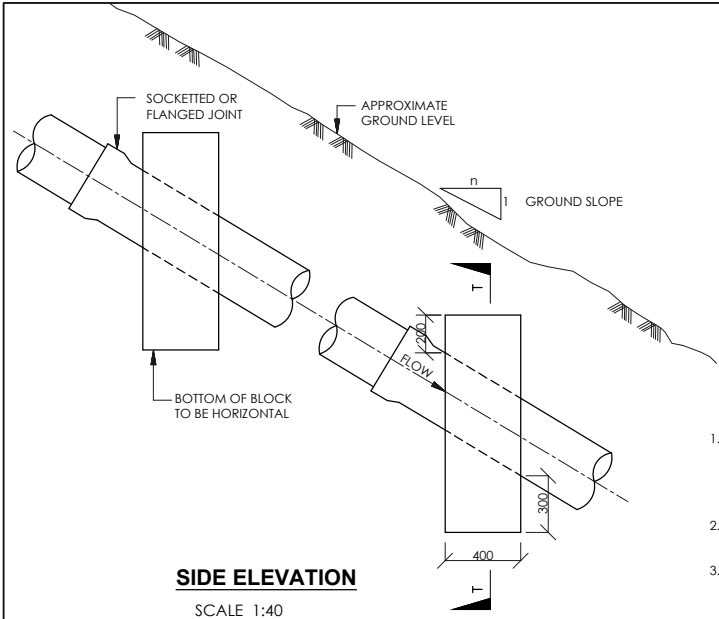
THE CHIEF EXECUTIVE OFFICER
COAST WATER SERVICES BOARD
P.O. BOX 90417 - 80100
MOMBASA, KENYA

DESIGN CONSULTANT:
MIBP MANGAT I.B PATEL (MIBP) LIMITED
P.O BOX 48674,00100-GPO,
NAIROBI, KENYA
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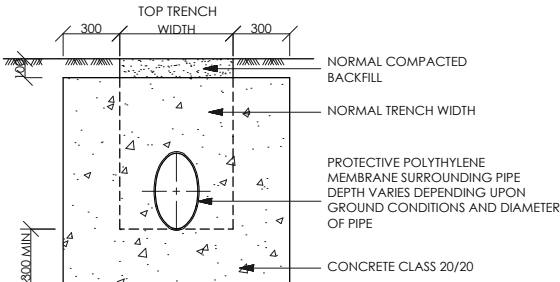
CONTRACT NAME:
**CONSTRUCTION OF LIKONI - MBUTA
MOSQUE PIPELINE (SC24)**

DRAWING TITLE:
**STANDARD DRAWING
TYPICAL ROAD CROSS SECTION
DETAILS**

Designed by: S.C.K	Drawn by: P.G.M
Checked by: E.I.M	Approved by: R.S.R
Scale: AS INDICATED	Date: MAY 2019
DRG	No.M410/SD/04
REV. 0	



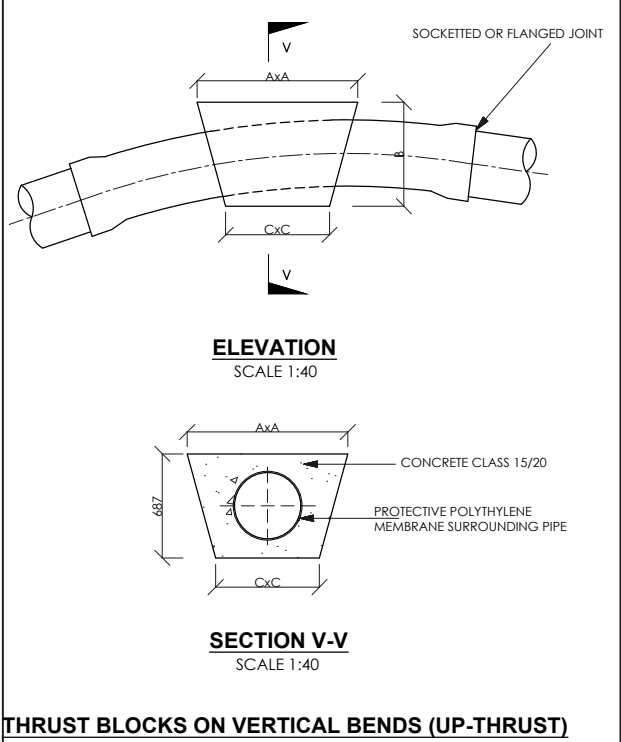
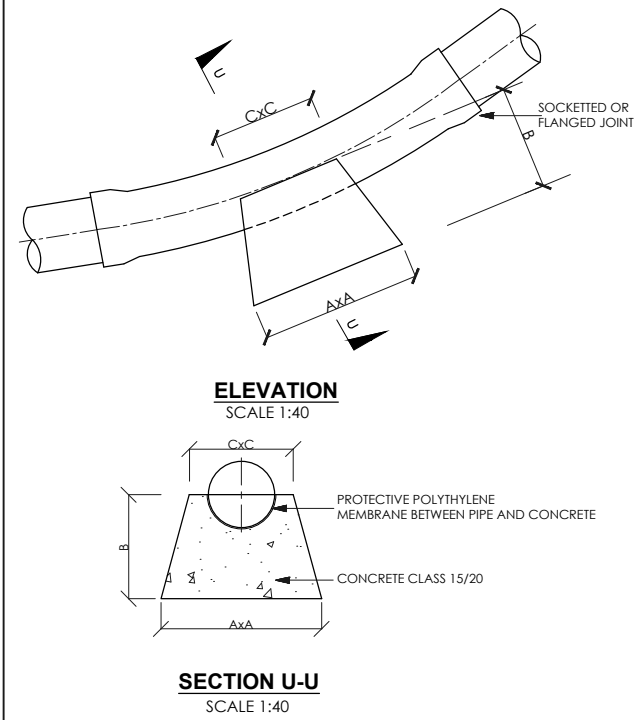
RANGE OF GROUND SLOPE (1:n)	MAXIMUM DISTANCE BETWEEN ANCHOR BLOCKS (m)
1:8 - 1:6	36
1:6 - 1:5	24
1:5 - 1:4	18
1:4 - 1:2	12
>1:2	EVERY PIPE LENGTH TO BE ANCHORED (BASED ON PIPE LENGTH OF 6m)



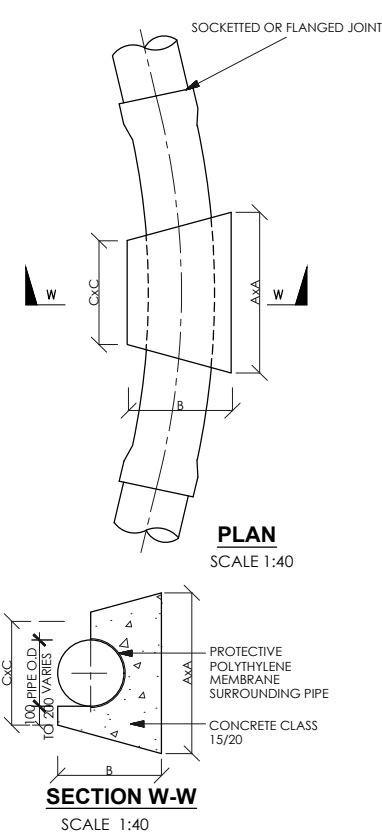
- NOTES**
1. SAME ARRANGEMENT CAN BE USED AS SUPPORTS FOR PIPES LAID IN VERY SOFT GROUND BUT BLOCKS TO BE CAST ON SOUND ROCK OR HARD STRATUM
 2. SOCKETTED JOINT TO BE LAID WITH SOCKET FACING UPSTREAM OF GRADE
 3. ANCHOR BLOCK TO BE CONSTRUCTED ON LOWER SIDE OF JOINT

SECTION T-T
SCALE 1:40

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



THRUST BLOCKS ON VERTICAL BENDS (UP-THRUST)



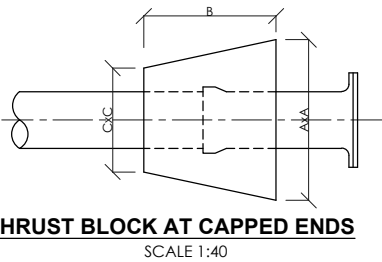
SECTION W-W
SCALE 1:40

THRUST BLOCKS ON VERTICAL BENDS (DOWN-THRUST)

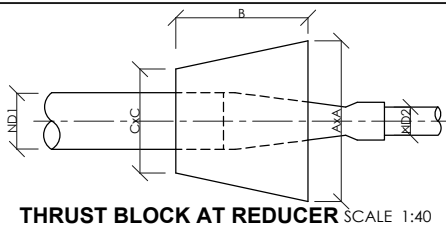
(ND) NOMINAL DIAMETER (mm)	THRUST BLOCK DIMENSIONS AxBxC(m), CONCRETE VOLUME (m³)						
	11 1/4° BENDS	22 1/2° BENDS	30°BENDS	45°BENDS	CAPPED ENDS & 90°TEES	90°BENDS	REDUCERS ND=√ND1·ND2°
80	0.2x0.2x0.2 (0.01m³)	0.25x0.2x0.2 (0.01m³)	0.25x0.2x0.2 (0.01m³)	0.3x0.2x0.2 (0.02m³)	0.35x0.2x0.2 (0.02m³)	0.4x0.2x0.2 (0.02m³)	0.35x0.2x0.2 (0.02m³)
100	0.2x0.2x0.2 (0.01m³)	0.3x0.2x0.2 (0.02m³)	0.35x0.2x0.2 (0.02m³)	0.4x0.2x0.2 (0.02m³)	0.45x0.25x0.25 (0.04m³)	0.55x0.3x0.3 (0.06m³)	0.45x0.25x0.25 (0.04m³)
150	0.3x0.25x0.25 (0.02m³)	0.4x0.25x0.25 (0.03m³)	0.5x0.3x0.3 (0.05m³)	0.55x0.3x0.3 (0.06m³)	0.65x0.35x0.35 (0.10m³)	0.8x0.4x0.35 (0.16m³)	0.65x0.35x0.35 (0.10m³)
200	0.4x0.3x0.3 (0.04m³)	0.55x0.35x0.35 (0.08m³)	0.6x0.4x0.4 (0.11m³)	0.75x0.4x0.4 (0.15m³)	0.85x0.45x0.4 (0.20m³)	1.0x0.5x0.4 (0.29m³)	0.85x0.45x0.4 (0.20m³)
250	0.5x0.35x0.35 (0.07m³)	0.65x0.4x0.4 (0.12m³)	0.75x0.45x0.45 (0.18m³)	0.9x0.45x0.45 (0.23m³)	1.1x0.55x0.45 (0.39m³)	1.2x0.6x0.45 (0.50m³)	1.1x0.55x0.45 (0.39m³)
300	0.55x0.45x0.45 (0.12m³)	0.8x0.5x0.5 (0.23m³)	0.9x0.5x0.5 (0.27m³)	1.1x0.6x0.5 (0.44m³)	1.25x0.65x0.5 (0.59m³)	1.5x0.75x0.5 (0.94m³)	1.25x0.65x0.5 (0.59m³)
350	0.6x0.5x0.5 (0.16m³)	0.85x0.55x0.55 (0.29m³)	1.0x0.55x0.55 (0.36m³)	1.2x0.6x0.55 (0.53m³)	1.4x0.7x0.55 (0.80m³)	1.6x0.8x0.55 (1.20m³)	1.4x0.7x0.55 (0.80m³)
400	0.7x0.6x0.6 (0.26m³)	0.95x0.6x0.6 (0.38m³)	1.1x0.6x0.6 (0.47m³)	1.3x0.65x0.6 (0.67m³)	1.6x0.8x0.6 (1.20m³)	1.8x0.9x0.6 (1.60m³)	1.6x0.8x0.6 (1.20m³)
450	0.8x0.65x0.65 (0.35m³)	1.1x0.65x0.65 (0.53m³)	1.3x0.65x0.65 (0.69m³)	1.5x0.75x0.65 (1.0m³)	1.8x0.9x0.65 (1.7m³)	2.0x1.0x0.65 (2.2m³)	1.8x0.9x0.65 (1.7m³)
500	0.9x0.7x0.7 (0.46m³)	1.2x0.7x0.7 (0.68m³)	1.4x0.7x0.7 (0.86m³)	1.7x0.85x0.7 (1.5m³)	2.0x1.0x0.7 (2.3m³)	2.3x1.2x0.7 (2.3m³)	2.0x1.0x0.7 (2.3m³)
600	1.1x0.8x0.8 (0.74m³)	1.5x0.8x0.8 (1.2m³)	1.7x0.9x0.8 (1.6m³)	2.0x1.0x0.8 (2.3m³)	2.3x1.2x0.8 (3.6m³)	2.7x1.4x0.8 (5.6m³)	2.3x1.2x0.8 (3.6m³)

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

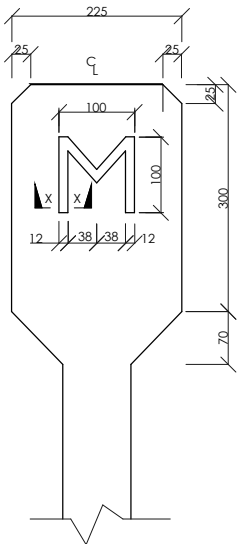
THRUST BLOCK ON HORIZONTAL BENDS AND TEES



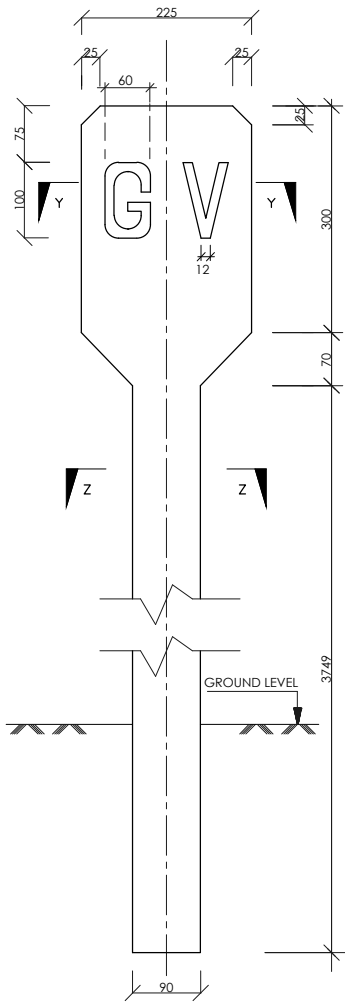
THRUST BLOCK AT CAPPED ENDS



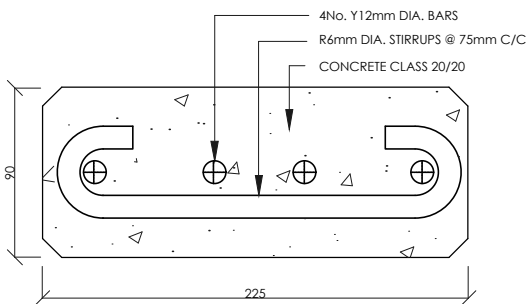
THRUST BLOCK AT REDUCER SCALE 1:40



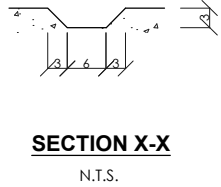
BULK METER POST
SCALE 1:10



GATE VALVE INDICATOR POST
SCALE 1:10



SECTION Y-Y
SCALE 1:4 INDICATOR POST DETAILS

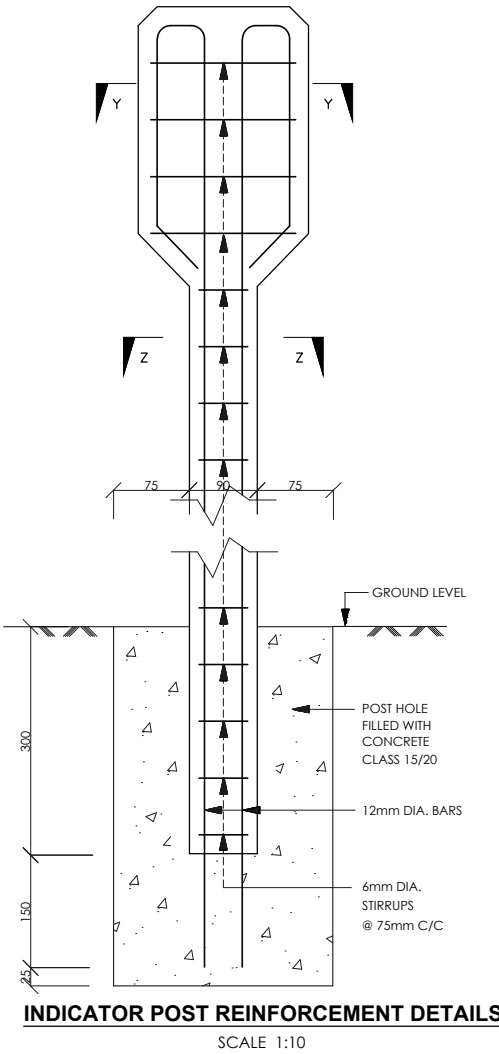


SECTION X-X

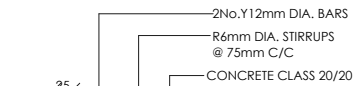
N.T.S.

NOTE:-

ALL DETAILS TO BE SAME AS GATE VALVE BUT THE SIGN TO BE CHANGED AS INDICATED



INDICATOR POST REINFORCEMENT DETAILS
SCALE 1:10



SECTION Z-Z
SCALE 1:4 INDICATOR POST DETAILS

NOTES

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED
2. ANCHOR BLOCKS TO BE INSTALLED FOR PIPES LAID AT SLOPES EXCEEDING 1:6 SLOPE
3. THRUST BLOCKS TO BE INSTALLED AT ALL HORIZONTAL AND VERTICAL BENDSCAPPED ENDS, TEES, TAPERS AND, GATE VALVES
4. DETAILS FOR ALL INDICATOR POSTS TO BE AS FOR GATE VALVE BUT LETTERING TO BE AS FOLLOWS:

FOR	USE
GATE VALVE	GV
AIR VALVE	AV
WASHOUT	WO
WATER MAIN	WM
BULK METER	M
Y'- JUNCTION	Y

5. ALL INDICATOR POSTS TO BE PAINTED WITH 2 COATS BLUE OIL BASED PAINT AND WHITE LETTERING TO ENGINEER'S APPROVAL

ABBREVIATIONS

MM - MILLIMETERS
ND - NOMINAL DIAMETR
Dia - DIAMETER
c/c - CENTRE TO CENTRE
No. - NUMBER
OD - OUTSIDE DIAMETER
uPVC - UNPLASTICISED POLYVINYL CHLORIDE
m - METRE
CL - CENTRE LINE
GV - GATE VALVE
AV - AIR VALVE
WO - WASH OUT
WM - WATER MAIN
M - BULK METER
m³ - CUBIC METER

REVISIONS		SIGN	DATE	APPROVED
	BY			
	CHECKED			
	BY			
	CHECKED			
	BY			
	CHECKED			
	BY			
	CHECKED			



THE CHIEF EXECUTIVE OFFICER
COAST WATER SERVICES BOARD
P.O. BOX 90417 - 80100
MOMBASA, KENYA

DESIGN CONSULTANT:

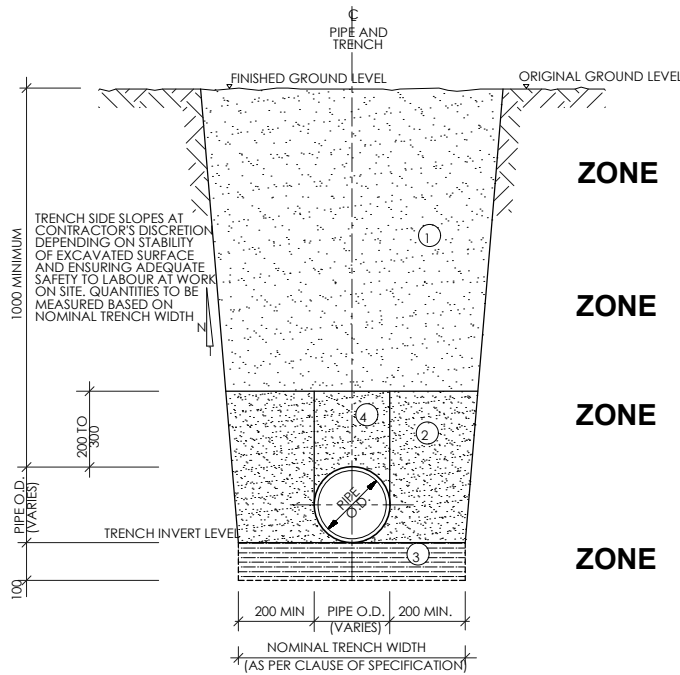
MIBP MANGAT I.B PATEL (MIBP) LIMITED
P.O BOX 48674,00100-GPO,
NAIROBI, KENYA
E-MAIL: mibp.nairobi@mibpp.com
TEL: +254-2-2710500

CONTRACT NAME:
CONSTRUCTION OF LIKONI - MBUTA
MOSQUE PIPELINE (SC24)

DRAWING TITLE:

STANDARD DRAWINGS
THRUST BLOCKS , ANCHOR BLOCKS
AND INDICATOR POST DETAILS

Designed by: S.C.K	Drawn by: P.G.M
Checked by: E.I.M	Approved by: R.S.R
Scale: AS INDICATED	Date: MAY 2019
DRG No. M410/SD/05	REV. 0



TYPICAL TRENCH DETAIL FOR RETICULATION PIPES
(uPVC OR C/L FERROUS PIPES)

SCALE 1:100

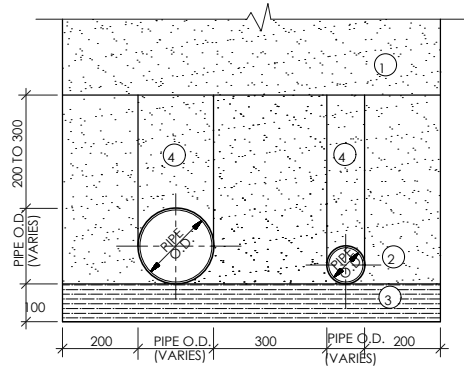
NOTES

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

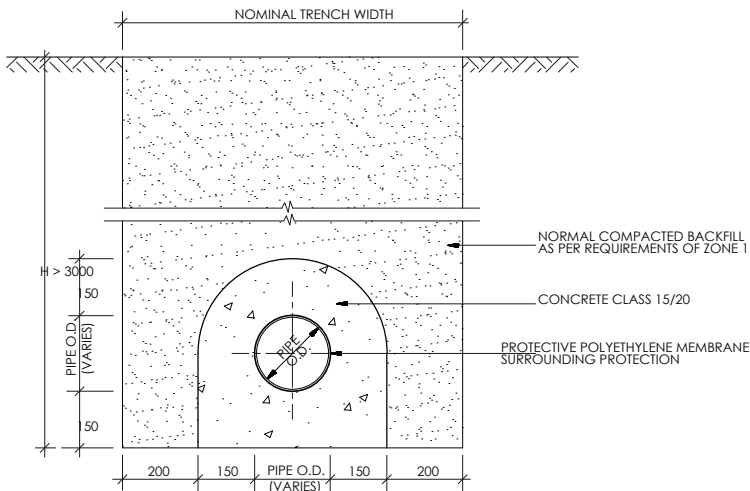
BACKFILL WITH SOIL APPROVED BY THE ENGINEER, IN LAYERS NOT EXCEEDING 200mm.
THOROUGHLY COMPACT SOIL, TAMPING EQUALLY ON EITHER SIDE AND ALONG LOWER EDGE OF PIPE.
ONLY HAND TAMPING TO BE USED

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

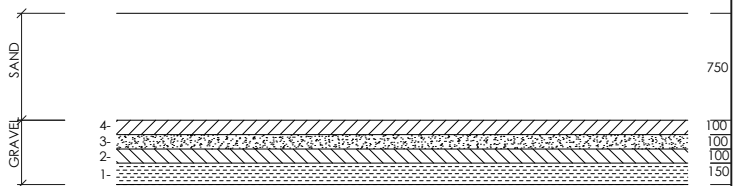
SIMILAR REQUIREMENTS TO ZONE 2 EXCEPT NO EXCESS TAMPING IS PERMITTED OVER PIPE.



TWIN PIPES IN SINGLE TRENCH
 SCALE 1:20



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



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

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

DETAILS OF FILTER MEDIA IN RAPID SAND FILTERS
 NTS

PIPE DIAMETER SCHEDULES

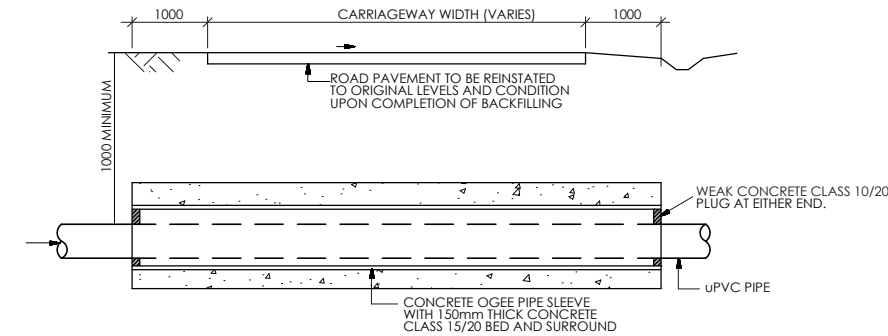
HDPE WATER PRESSURE PIPES TO KS. 06-149: PART 2, 2000				WALL THICKNESS (mm)									
NOMINAL OUTSIDE DIAMETER (mm)	CORRESPONDING OUTSIDE DIAMETER AS PER KS. 06-149: PART 2, 2000 (mm)			PN = 6 BAR		PN = 10 BAR		PN = 12.5 BAR		PN = 16 BAR			
	MIN.	MAX.		CLASS 'B'		CLASS 'C'		CLASS 'D'		CLASS 'E'			
				MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.		
63	63	63.3		1.70	2.1	2.70	3.2	3.40	3.9	4.30	4.9		
75	75	75.3		2.00	2.4	3.30	3.8	4.00	4.6	5.10	5.8		
90	90	90.3		2.40	2.8	3.90	4.5	4.80	5.5	6.10	6.9		
110	110	110.4		2.90	3.4	4.80	5.5	5.90	6.7	7.50	8.5		
125	125	125.4		3.30	3.8	5.40	6.1	6.70	7.6	8.50	9.6		
140	140	140.4		3.70	4.3	6.00	6.8	7.50	8.5	9.50	10.7		
160	160	160.5		4.20	4.8	7.00	7.9	8.60	9.7	10.80	12.1		
200	200	200.6		4.80	5.5	7.80	8.8	9.70	10.9	12.20	13.6		
225	225	225.7		5.40	6.1	8.80	9.9	10.90	12.2	13.70	15.3		
250	250	250.8		6.00	6.8	9.80	11.0	12.10	13.5	15.30	17.0		
280	280	280.9		6.70	7.6	10.90	12.2	13.50	15.1	17.10	19.0		
315	315	316.0		7.50	8.5	12.30	13.7	15.20	16.9	19.20	21.3		
uPVC PIPE PRESSURE CLASSES													
CLASS 'B'		CLASS 'C'		CLASS 'D'		CLASS 'E'							
6 BAR		10 BAR		12.5 BAR		16 BAR							
60m HEAD OF WATER		90m HEAD OF WATER		20m HEAD OF WATER		50m HEAD OF WATER							

PN = NOMINAL PRESSURE

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

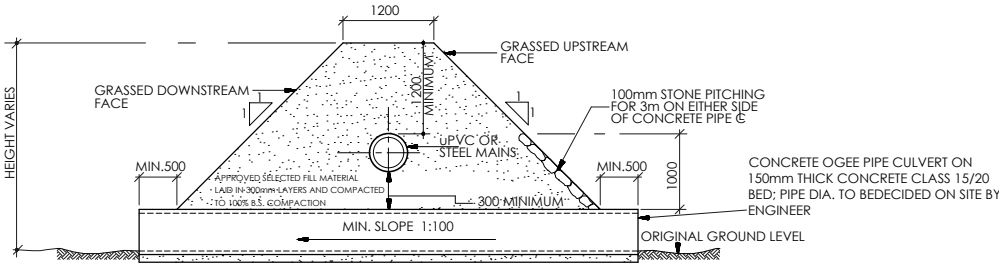
DUCTILE IRON PIPES TO B.S. 4772:1980	
NOMINAL INTERNAL DIAMETER (mm)	CORRESPONDING OUTSIDE PIPE DIAMETER AS PER B.S. 477: 1980(mm)
50 *	66 *
65 *	82 *
80	98
100	118
125 *	144 *
150	170
200	222
250	274
300	326
350	378
400	429
450	480
500	532
600	635

* NOT IN B.S. 4772: DATA FROM
HALBERGER HUTTE TABLES



TYPICAL ROAD PIPE CROSSING DETAIL FOR HDPE PIPES

SCALE A1- 1: 100



TYPICAL DETAIL OF PIPE CROSSING SEASONAL
STREAM / DRAINAGE DITCH

SCALE 1 : 100

NOTE

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

NOTES

ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED

ABBREVIATIONS

O.D. - Outside Diameter
uPVC - Unplasticised Polyvynil Chloride
C/L - Centre line
mm - Milimeter
m - Meter
> - Greater Than
KS - Kenya Standard
B.S. - British Standard
SRN - Standard Reference Number
MIN - Minimum