VOLUME 2

SENQU LOCAL MUNICIPALITY

PROJECT MANAGEMENT OFFICE

PROJECT NO. **141/2023-2024T**

FOR

REHABILTATION OF ROADS & STORMWATER IN STERKSPRUIT WARD 10

VOLUME 2

TENDER DRAWINGS

NOVEMBER 2024

DRAWINGS COMPILED FOR:

THE MUNICIPAL MANAGER

SENQU LOCAL MUNICIPALITY
19 Murray Street
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DRAWINGS COMPILED BY:

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DRAWING LIST

NO. DESCRIPTION DRAWING NO.

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58 Brebner Road
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Tel: +27 (051) 430 1321
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PROFESSIONAL ENGINEER: L. MARAH
PROF. Reg.No: 920281
DATE: 2024-03-25
SIGNATURE:

DESIGN BY: D. RWAZEMBA
DRAWN BY: D. RWAZEMBA
CHECKED BY: L. MARAH
APPROVED BY: L. MARAH

REVISIONS

REV	DATE	DESCRIPTION	BY
0	2024-03-25	ISSUED FOR TENDER	L.M.

PROJECT NAME
REHABILITATION OF ROADS AND STORMWATER IN STERKSPRUIT WARD 10

TITLE
DRAWING LIST

PROJECT STATUS: TENDER

DATE	SCALE	SHEET	REV	
2024-03-25	N.T.S.	1 OF 1	0	A1

DWG NO
P-SM01-PMO-CE-S-00

LEGEND:

- : MANHOLE
- : KERB INLETS
- : STORMWATER PIPE
- : 1.2M OPEN CHANNEL
- : 1M OPEN CHANNEL
- : PIPE CULVERT
- : HEADWALL/FIELD INLET

Existing Inlet structure 3x480mm Ø
Chainage 811.004 Road 4
Invert. IL 1446.800
Outlet. IL 1446.588

Existing Inlet structure 2x480mm Ø
Chainage 542.038 Road 4
Inlet. IL 1446.801
Outlet. IL 1446.606

Road high point
Chainage 391.453 Road 4

Existing Inlet structure 480mm Ø
Chainage 709.312 Road 4
Inlet. IL 1447.024
Outlet. IL 1446.809

Existing Inlet structure 600mm Ø
Chainage 254.662 Road 4
Inlet. IL 1447.789
Outlet. IL 1446.973

Existing Inlet structure 600mm Ø
Chainage 302.592 Road 3
Inlet. IL 1463.506
Outlet. IL 1463.384

Type 2 Inlet structure 900mm Ø
Chainage 83.514 Road 3
Inlet. IL 1471.509
Outlet. IL 1471.387

4m mitre drain
Chainage 10.921 Road 2

Road high point
Chainage 100.790 Road 1

Field Inlet structure 600mm Ø
Chainage 222.958 Road 7
Inlet. IL 1471.23
Outlet IL 1471.00

Type 3 Inlet structure 800mm Ø
Chainage 198.530 Road 6
Inlet. IL 1448.64
Outlet. IL TBD on site

4m mitre drain
Chainage 341.384 Road 8

CLIENT:	19 Murray Street Lady Grey 9755 Tel: (051) 603 1449 Email: vanzyll@senqu.gov.za	CONSULTANT: THEWO & SMMMS - JV	59 Brebner Road Westdene Bloemfontein 9301 Tel: +27 (051) 430 1321 Email: pmo@thewo.co.za
PROFESSIONAL ENGINEER: L. MARAH PROF. Reg.No: 920281 DATE: SIGNATURE:	DESIGN BY: D RWAZEMBA DRAWN BY: D RWAZEMBA CHECKED BY: L. MARAH APPROVED BY: L. MARAH		

REVISIONS

REV	DATE	DESCRIPTION	BY

PROJECT NAME
REHABILITATION OF ROADS AND STORMWATER IN STERKSPRUIT - WARD 10

TITLE
ROAD 1 - 8 GENERAL LAYOUT

PROJECT STATUS: TENDER

DATE	SCALE	SHEET	REV	
2024-03-25	N.T.S	1 OF 1	A	A1

DWG NO
P-SM01-PMO-CE-S-01

LEGEND

- CENTRELINE
- ESKOM/TELKOM POLE
- EXISTING POWER LINE
- 2% → ROAD CROSS FALL
- STORMWATER CHANNEL
- MANHOLE
- EXISTING TREE
- CULVERT
- EXISTING TARMAC SURFACE

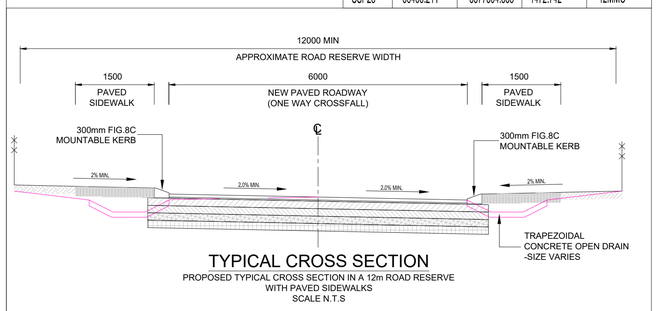
ABBREVIATIONS

N.G.L	NATURAL GROUND LEVEL
CL	CENTRELINE
m	METERS (UNIT)
HL	LEFT HAND
HR	RIGHT HAND
BCC	BEGINNING OF CURVE CENTRELINE
ECC	END OF CURVE CENTRELINE
BVC	BEGINNING OF VERTICAL CURVE
EVC	END OF VERTICAL CURVE
R	RADIUS
CH.	CHAINAGE
PI	POINT OF INTERSECTION

COORDINATE LIST

HARTEBEESHOEK WG27

Name	Y Coord	X Coord	Z Coord	DESC.
SSP1	-35435.594	3378604.370	1457.668	12MMPAVE
SSP2	-35389.339	3378655.412	1457.612	12MMC
SSP3	-35236.481	3378458.679	1461.556	12MMC
SSP4	-35342.052	3378354.777	1448.761	12MM/BTN
SSP5	-35159.407	3378214.416	1448.177	12MM/BTN
SSP6	-35034.270	3378002.262	1450.713	12MM/RS
SSP7	-34886.276	3378717.680	1476.458	HOLEC
SSP8	-35008.420	3378564.231	1475.151	10MM
SSP9	-34801.976	3378421.786	1479.364	12MM/C
SSP10	-35553.902	3378547.750	1451.133	12MM/RSB
SSP11	-35577.944	3378474.700	1445.550	12MM/PAVE
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SSP14	-35839.506	3378094.023	1461.586	12MMTAR
SSP15	-35722.022	3377923.822	1457.384	12MMTAR
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SSP26	-37000.224	3377871.184	1488.137	12MMC
SSP27	-36762.329	3377823.322	1475.157	HOLEC
SSP28	-36486.211	3377804.835	1472.742	12MMC



TYPICAL CROSS SECTION

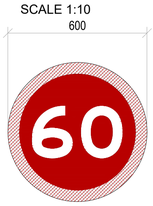
PROPOSED TYPICAL CROSS SECTION IN A 12m ROAD RESERVE WITH PAVED SIDEWALKS
SCALE N.T.S



RED REFLECTORISED
WHITE REFLECTORISED
LETTERS: SERIES C

STOP SIGN R1 (FIG.1)

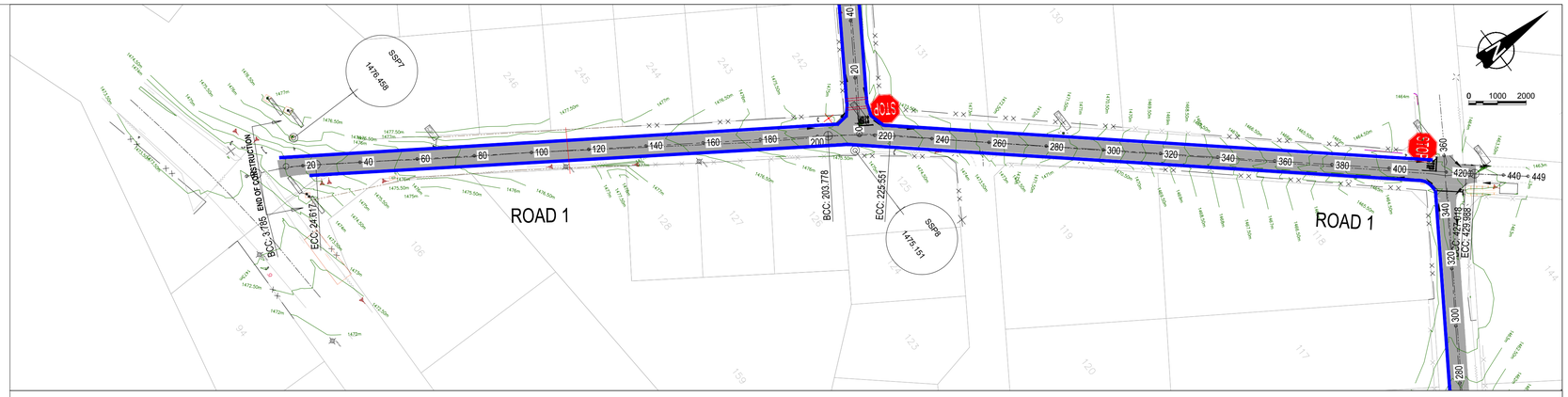
SCALE 1:10

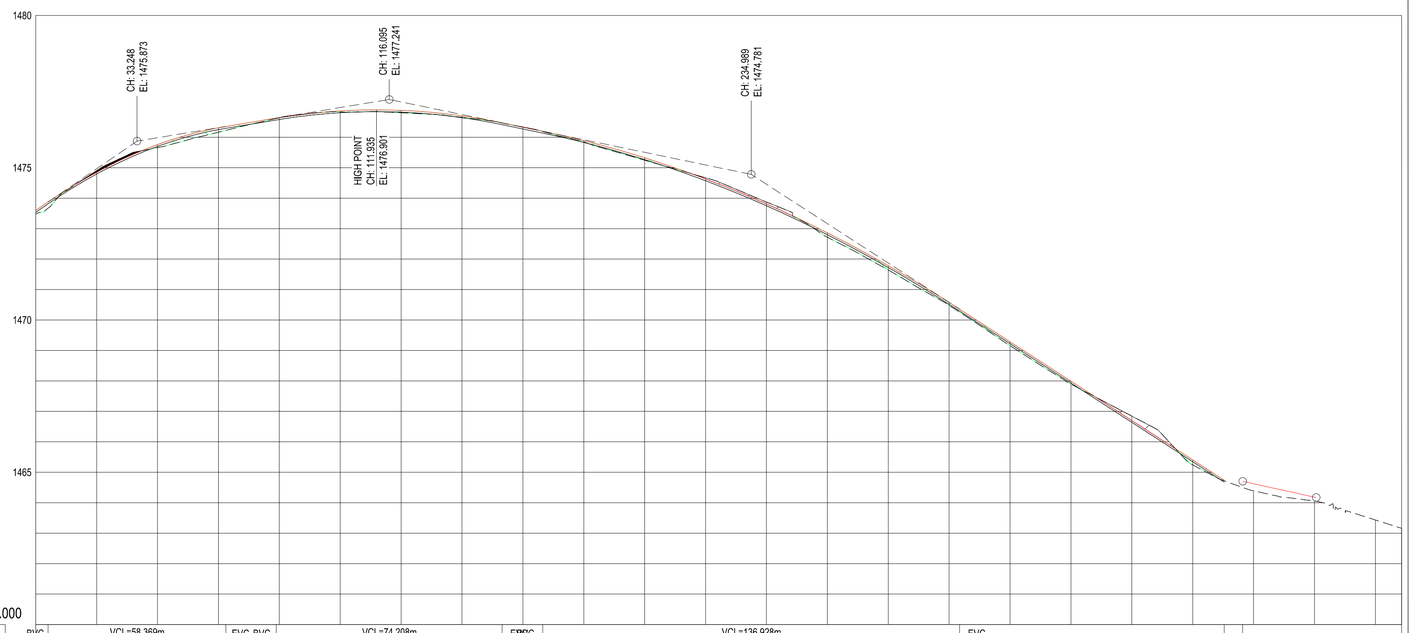


RED REFLECTORISED
BLUE SEMI-MATT
WHITE REFLECTORISED
FIGURES: SERIES E MODIFIED

SPEED LIMIT R14A (FIG.16)

SCALE 1:10





Datum 1460.000

| | | |

LEGEND

- CENTRELINE
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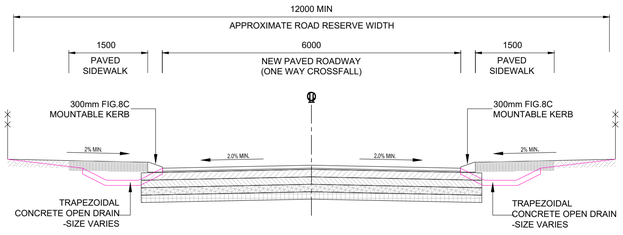
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TYPICAL CROSS SECTION

PROPOSED TYPICAL CROSS SECTION IN A 12m ROAD RESERVE
WITH PAVED SIDEWALKS
SCALE N.T.S



RED REFLECTORISED
WHITE REFLECTORISED
LETTERS: SERIES C

STOP SIGN R1 (FIG.1)

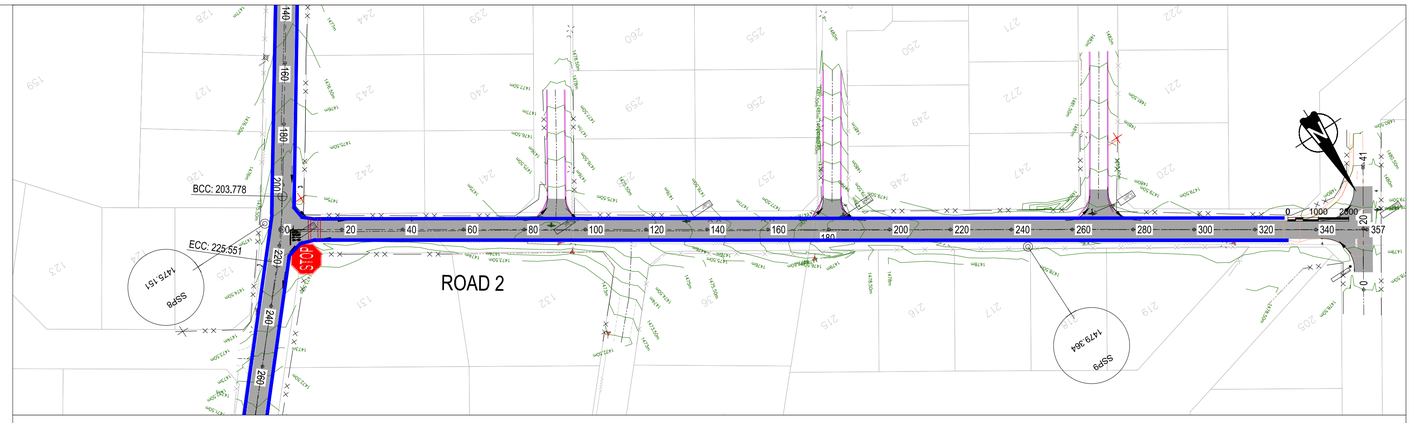
SCALE 1:10

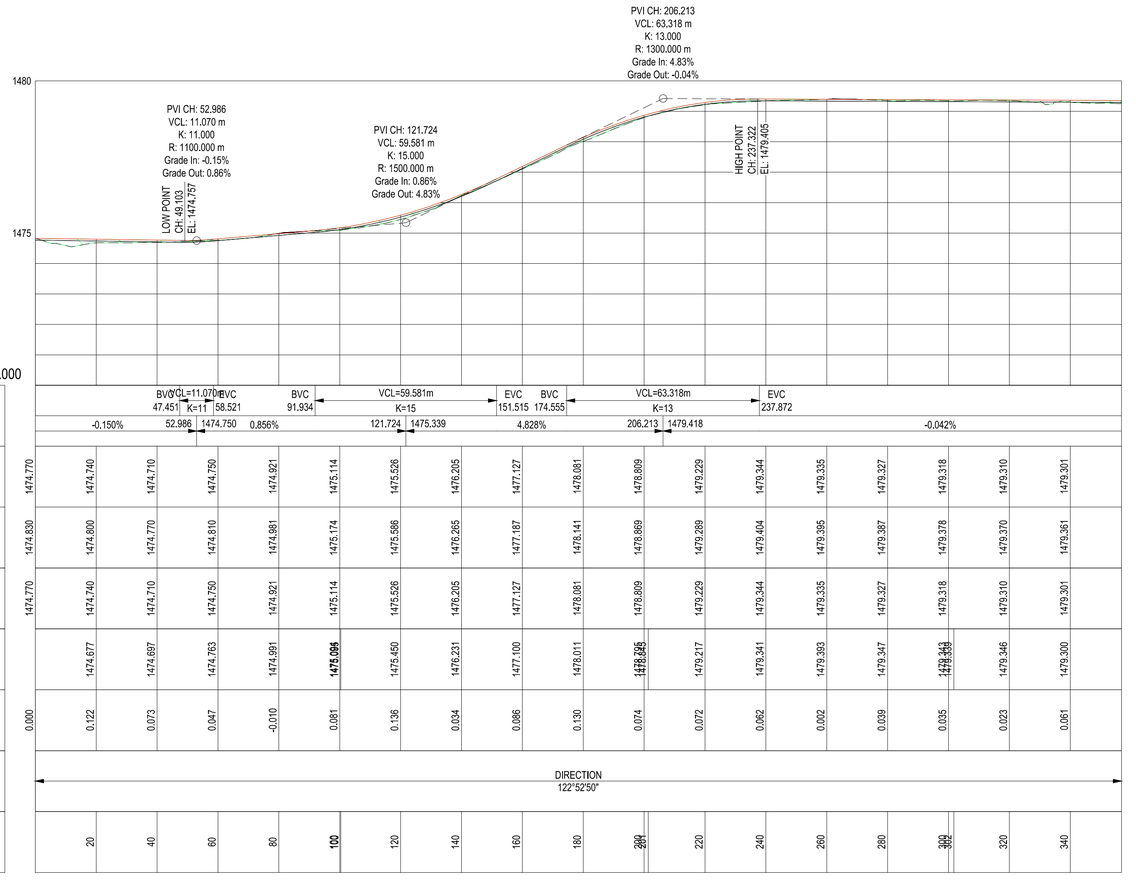


RED REFLECTORISED
BLUE SEMI-MATT
WHITE REFLECTORISED
FIGURES: SERIES E MODIFIED

SPEED LIMIT R14A (FIG.16)

SCALE 1:10





FINAL DESIGN ROAD LEVELS	LEFT EDGE (HL)	1474.770	1474.740	1474.710	1474.750	1474.921	1475.114	1475.526	1476.205	1477.127	1478.081	1478.809	1479.229	1479.344	1479.335	1479.327	1479.318	1479.310	1479.301
	CENTRE LINE (CL)	1474.830	1474.800	1474.770	1474.810	1474.981	1475.174	1475.586	1476.265	1477.187	1478.141	1478.869	1479.289	1479.404	1479.395	1479.387	1479.378	1479.370	1479.361
	RIGHT EDGE (HR)	1474.770	1474.740	1474.710	1474.750	1474.921	1475.114	1475.526	1476.205	1477.127	1478.081	1478.809	1479.229	1479.344	1479.335	1479.327	1479.318	1479.310	1479.301
GROUND LEVELS ON CL			1474.677	1474.697	1474.763	1474.991	1475.094	1475.450	1476.231	1477.100	1478.011	1478.295 1478.295	1479.217	1479.341	1479.393	1479.347	1479.343 1479.339	1479.346	1479.300
CUT / FILL		0.000	0.122	0.073	0.047	-0.010	0.081	0.136	0.034	0.086	0.130	0.074	0.072	0.062	0.002	0.039	0.035	0.023	0.061
HORIZONTAL ALIGNMENT			DIRECTION 122°52'50"																
DISTANCE (m)			20	40	60	80	100	120	140	160	180	200 202	220	240	260	280	300 302	320	340

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CONSULTANT:

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9301

PROFESSIONAL ENGINEER: L. MARAH
PROF. Reg.No: 920281
DATE:
SIGNATURE:

DESIGN BY: R DHLIWAYO
DRAWN BY: R DHLIWAYO
CHECKED BY: L. MARAH
APPROVED BY: L. MARAH

REVISIONS

REV	DATE	DESCRIPTION	BY

PROJECT NAME

REHABILITATION OF ROADS AND STORMWATER IN STERKSPRUIT WARD 10

TITLE

ROAD 2 LONGSECTION

PROJECT STATUS: TENDER

DATE	SCALE	SHEET	REV	
2024-03-25	N.T.S	1 OF 1	A	A1

DWG NO

P-SM01-PMO-CE-S-03

LEGEND

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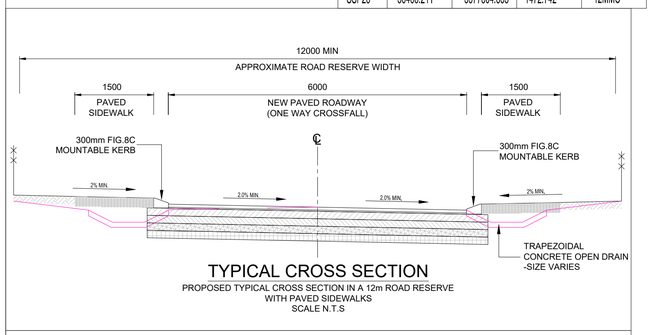
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SSP27	-36762.329	3377823.322	1475.157	HOLEC
SSP28	-36466.211	3377804.835	1472.742	12MMC



TYPICAL CROSS SECTION

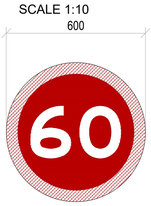
PROPOSED TYPICAL CROSS SECTION IN A 12m ROAD RESERVE WITH PAVED SIDEWALKS
SCALE N.T.S



RED REFLECTORISED
WHITE REFLECTORISED
LETTERS: SERIES C

STOP SIGN R1 (FIG.1)

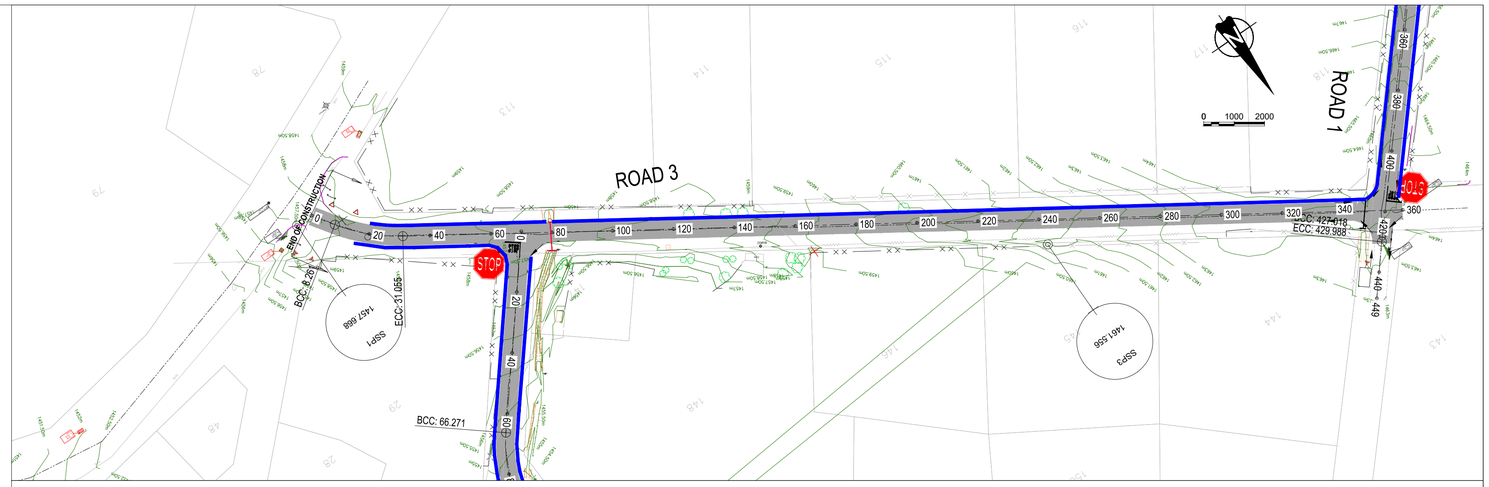
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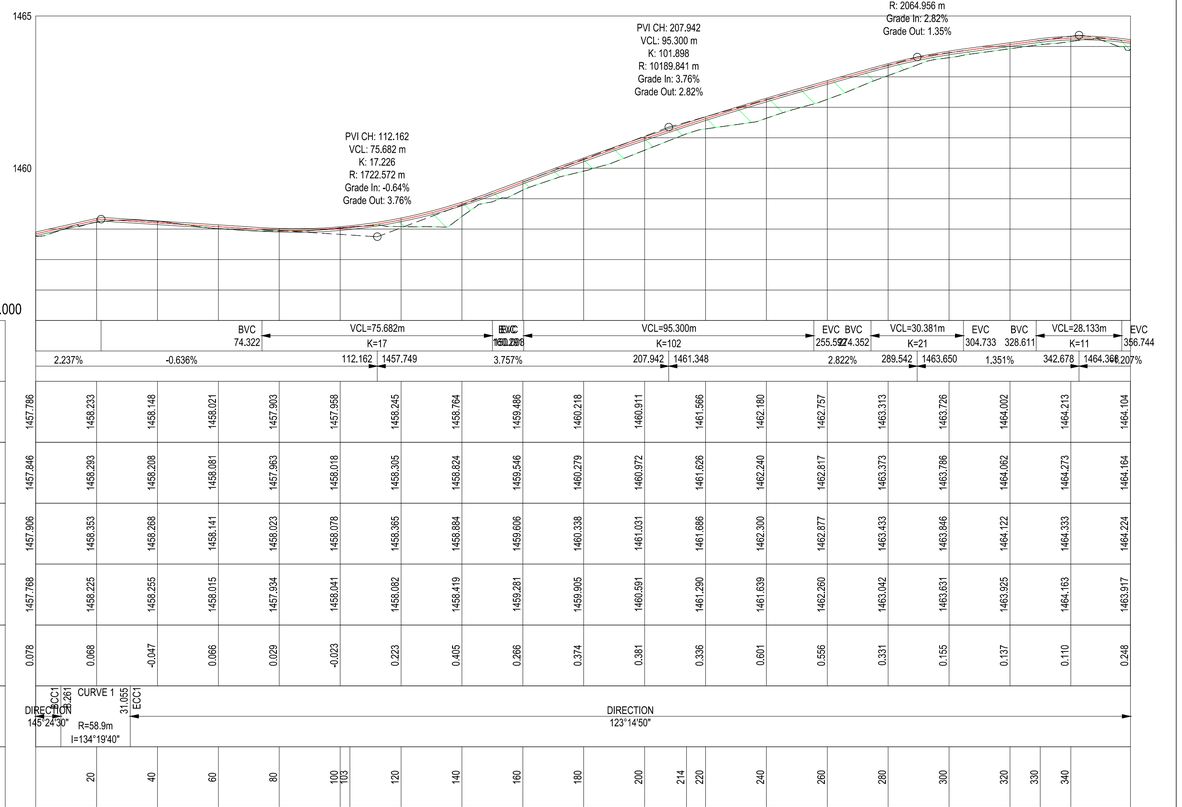


RED REFLECTORISED
BLUE SEMI-MATT
WHITE REFLECTORISED
FIGURES: SERIES E MODIFIED

SPEED LIMIT R14A (FIG.16)

SCALE 1:10





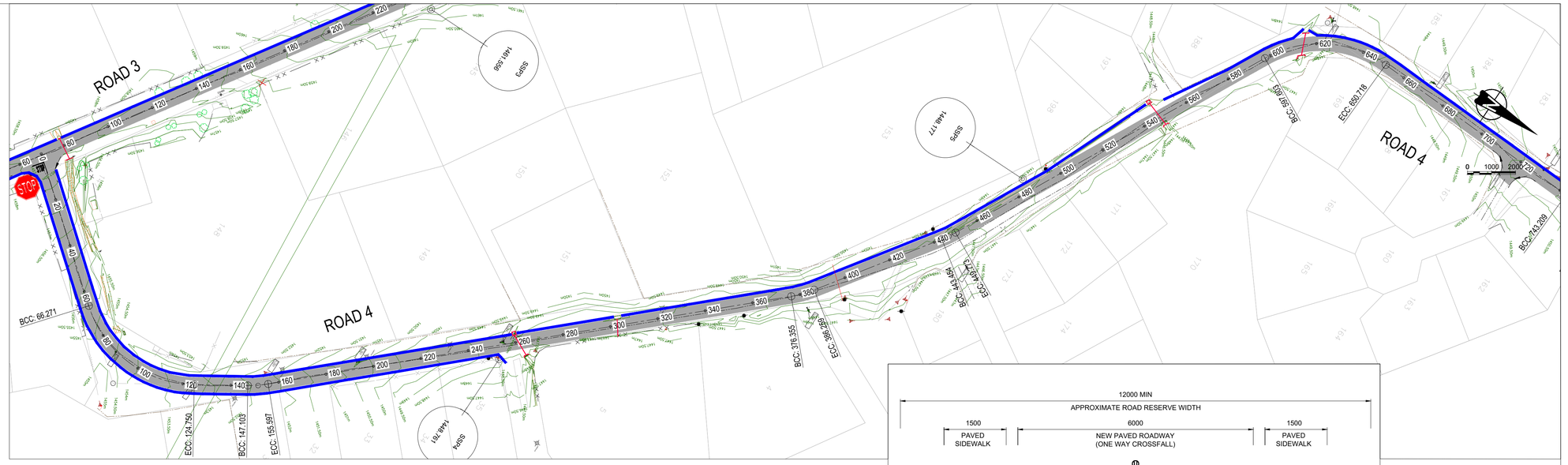
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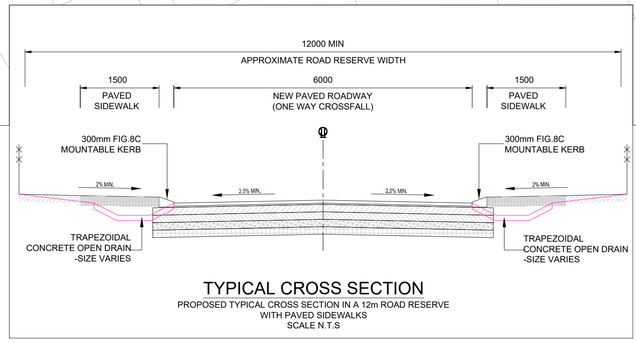
LEGEND

- CENTRELINE
- ESKOM/TELKOM POLE
- EXISTING POWER LINE
- 2% → ROAD CROSS FALL
- STORMWATER CHANNEL
- MANHOLE
- EXISTING TREE
- CULVERT
- EXISTING TARMAC SURFACE

ABBREVIATIONS

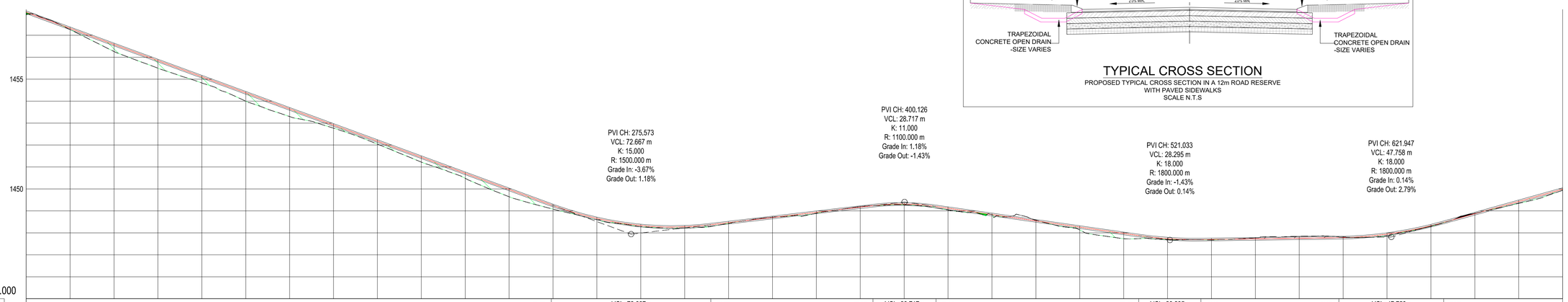
N.G.L	NATURAL GROUND LEVEL
CL	CENTRELINE
m	METERS (UNIT)
HL	LEFT HAND
HR	RIGHT HAND
BCC	BEGINNING OF CURVE CENTRELINE
ECC	END OF CURVE CENTRELINE
BVC	BEGINNING OF VERTICAL CURVE
EVC	END OF VERTICAL CURVE
R	RADIUS
CH.	CHAINAGE
PI	POINT OF INTERSECTION





TYPICAL CROSS SECTION

PROPOSED TYPICAL CROSS SECTION IN A 12m ROAD RESERVE
WITH PAVED SIDEWALKS
SCALE N.T.S



| | | |

LEGEND

- CENTRELINE
- ESKOM/TELKOM POLE
- EXISTING POWER LINE
- 2% ROAD CROSS FALL
- STORMWATER CHANNEL
- MANHOLE
- EXISTING TREE
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- EXISTING TARMAC SURFACE

ABBREVIATIONS

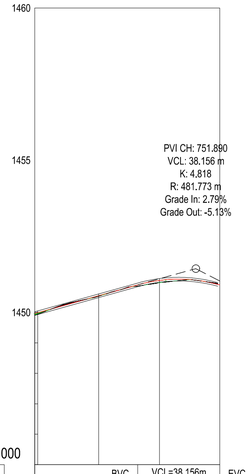
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CL	CENTRELINE
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BVC	BEGINNING OF VERTICAL CURVE
EVC	END OF VERTICAL CURVE
R	RADIUS
CH.	CHAINAGE
PI	POINT OF INTERSECTION

COORDINATE LIST

HARTEBEESHOEK WG27

Name	Y Coord	X Coord	Z Coord	DESC.
SSP1	-35435.594	3378604.370	1457.668	12MMPAVE
SSP2	-35389.339	3378555.412	1457.612	12MMC
SSP3	-35236.481	3378458.679	1461.556	12MMC
SSP4	-35342.052	3378354.777	1448.761	12MM/BTN
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SSP6	-35034.270	3378002.262	1450.713	12MM/RS
SSP7	-34886.276	3378717.680	1476.458	HOLEC
SSP8	-35008.420	3378564.231	1475.151	10MM
SSP9	-34801.976	3378421.786	1479.364	12MM/C
SSP10	-35553.902	3378547.750	1451.133	12MM/RSB
SSP11	-35577.944	3378474.700	1445.550	12MM/PAVE
SSP12	-35969.297	3378559.145	1436.743	12MMC
SSP13	-35773.249	3378344.171	1447.402	12MMC
SSP14	-35839.506	3378094.023	1461.586	12MMTAR
SSP15	-35722.022	3377923.822	1457.384	12MMTAR
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SSP17	-36675.760	3378434.899	1478.598	12MMC
SSP18	-36957.799	3378474.986	1493.638	12MMC
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SSP20	-37518.953	3378399.642	1505.031	12MMC
SSP21	-37698.894	3378391.237	1511.792	HYP/BTN
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SSP23	-37667.372	3378169.929	1502.641	12MMC
SSP24	-37486.881	3377992.656	1496.498	12MMC
SSP25	-37243.989	3377941.633	1495.738	12MMC
SSP26	-37000.224	3377871.184	1488.137	12MMC
SSP27	-36762.329	3377823.322	1475.157	HOLEC
SSP28	-36466.211	3377804.835	1472.742	12MMC





Datum 1445.000

VERTICAL PROFILE GRADES			BVC 732.812	VCL=38.156m K=5	EVC 770.968
			2.791%	751.890 | 1451.438	
FINAL DESIGN ROAD LEVELS	LEFT EDGE (HL)	1450.608	1451.112	1450.982	
	CENTRE LINE (CL)	1450.548	1451.053		
	RIGHT EDGE (HR)	1450.488	1450.992	1450.852	
GROUND LEVELS ON CL		1450.534	1450.972	1450.954	
CUT / FILL		0.014	0.080	-0.032	
HORIZONTAL ALIGNMENT		DIRECTION 182°13'40"	BCC 743.209 CURVE R=46.7m I=174°45'20" ECC 790.255	DIRECTION 177°17'00"	
DISTANCE (m)		720	740	760	



RED REFLECTORISED
WHITE REFLECTORISED
LETTERS: SERIES C

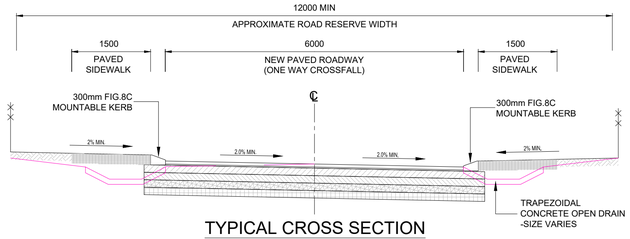
STOP SIGN R1 (FIG.1)

SCALE 1:10

RED REFLECTORISED
BLUE SEMI-MATT
WHITE REFLECTORISED
FIGURES: SERIES E MODIFIED

SPEED LIMIT R14A (FIG.16)

SCALE 1:10



TYPICAL CROSS SECTION

PROPOSED TYPICAL CROSS SECTION IN A 12m ROAD RESERVE
WITH PAVED SIDEWALKS
SCALE N.T.S

CLIENT:
19 Murray Street
Lady Grey
9755
Tel: (051) 603 1449
Email:
vanzyll@senqu.gov.za

CONSULTANT:
THEWO & SMMMS - JV
58 Brebner Road
Westdene
Bloemfontein
9301

PROFESSIONAL ENGINEER: L. MARAH
PROF. Reg.No: 920281
DATE:
SIGNATURE:

DESIGN BY: R DHLIWAYO
DRAWN BY: R DHLIWAYO
CHECKED BY: L. MARAH
APPROVED BY: L. MARAH

REVISIONS

REV	DATE	DESCRIPTION	BY

PROJECT NAME
REHABILITATION OF ROADS AND STORMWATER IN STERKSPRUIT WARD 10

TITLE
ROAD 4 LONGSECTION

PROJECT STATUS: TENDER

DATE	SCALE	SHEET	REV	
2024-03-25	N.T.S	2 OF 2	A	A1

DWG NO
P-SM01-PMO-CE-S-06

LEGEND

- CENTRELINE
- ESKOM/TELKOM POLE
- EXISTING POWER LINE
- 2% ROAD CROSS FALL
- STORMWATER CHANNEL
- MANHOLE
- EXISTING TREE
- CULVERT
- EXISTING TARMAC SURFACE

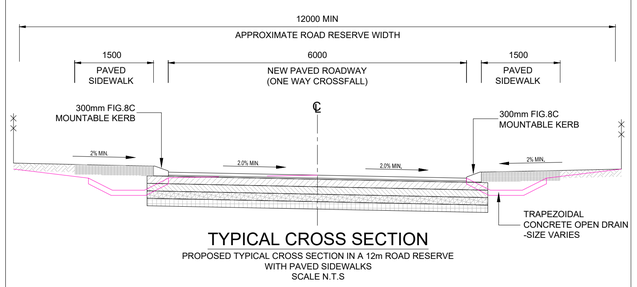
ABBREVIATIONS

N.G.L	NATURAL GROUND LEVEL
CL	CENTRELINE
m	METERS (UNIT)
HL	LEFT HAND
HR	RIGHT HAND
BCC	BEGINNING OF CURVE CENTRELINE
ECC	END OF CURVE CENTRELINE
BVC	BEGINNING OF VERTICAL CURVE
EVC	END OF VERTICAL CURVE
R	RADIUS
CH.	CHAINAGE
PI	POINT OF INTERSECTION

COORDINATE LIST

HARTEBEESHOEK WG27

Name	Y Coord	X Coord	Z Coord	DESC.
SSP1	-35435.594	3378604.370	1457.668	12MMPAVE
SSP2	-35389.339	3378555.412	1457.612	12MMC
SSP3	-35236.481	3378458.679	1461.566	12MMC
SSP4	-35342.052	3378354.777	1448.761	12MM/BTN
SSP5	-35159.407	3378214.416	1448.177	12MM/BTN
SSP6	-35034.270	3378002.262	1450.713	12MM/RS
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SSP8	-35008.420	3378564.231	1475.151	10MM
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SSP15	-35722.022	3377923.822	1457.384	12MMTAR
SSP16	-36447.989	3378349.098	1472.239	HOLEC
SSP17	-36675.760	3378434.899	1478.598	12MMC
SSP18	-36957.799	3378474.986	1493.638	12MMC
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SSP20	-37518.953	3378399.642	1505.031	12MMC
SSP21	-37698.894	3378391.237	1511.792	HYP/BTN
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SSP23	-37667.372	3378169.929	1502.641	12MMC
SSP24	-37486.881	3377992.656	1496.498	12MMC
SSP25	-37243.989	3377941.633	1495.738	12MMC
SSP26	-37000.224	3377871.184	1488.137	12MMC
SSP27	-36762.329	3377823.322	1475.157	HOLEC
SSP28	-36466.211	3377804.835	1472.742	12MMC



TYPICAL CROSS SECTION

PROPOSED TYPICAL CROSS SECTION IN A 12m ROAD RESERVE WITH PAVED SIDEWALKS
SCALE N.T.S



RED REFLECTORISED
WHITE REFLECTORISED
LETTERS: SERIES C

STOP SIGN R1 (FIG.1)

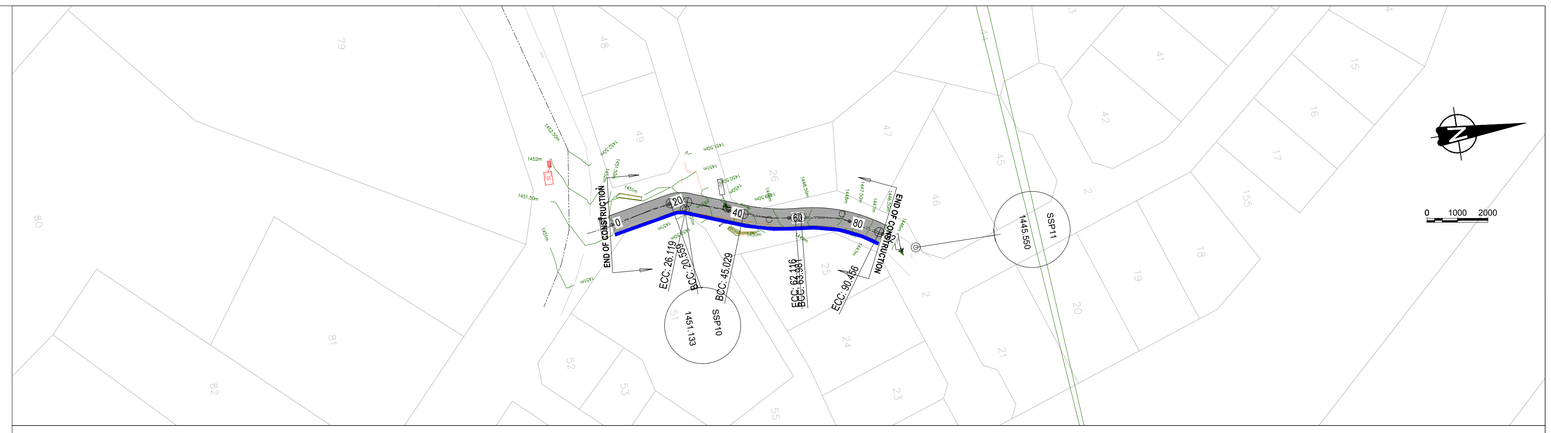
SCALE 1:10

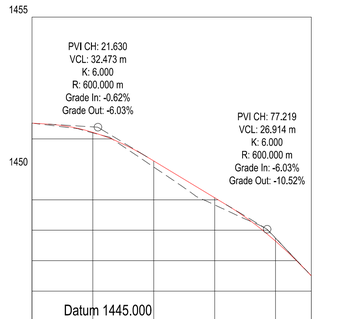


RED REFLECTORISED
BLUE SEMI-MATT
WHITE REFLECTORISED
FIGURES: SERIES E MODIFIED

SPEED LIMIT R14A (FIG.16)

SCALE 1:10





VERTICAL PROFILE GRADES										
		BVC 5.394	VCL=32.473m K=6		EVC 37.866	BVC 63.762	VCL=26.914m K=6		EVC 90.676	
		-0.618%	21.630	1451.383		-6.030%	77.219	1448.082		-10.516%
FINAL DESIGN ROAD LEVELS	LEFT EDGE (HL)	1451.660	1451.216	1450.276		1449.070		1447.644		
	CENTRE LINE (CL)		1451.317	1450.583		1449.455		1448.145		1447.377
	RIGHT EDGE (HR)		1451.216	1450.276		1449.070		1447.644		
GROUND LEVELS ON CL			1451.198	1450.076		1448.834		1447.745		
CUT / FILL			0.018	0.200		0.236		-0.101		
HORIZONTAL ALIGNMENT			DIRECTION 168°56'50"	CURVE 1 R=10.0m I=184°52'30"	DIRECTION 200°48'10"	CURVE 2 R=60.0m I=192°38'40"	DIRECTION 184°29'10"	CURVE 3 R=50.0m I=199°39'20"	DIRECTION 214°48'30"	
DISTANCE (m)		0	20	40	60		80		92	

CLIENT:	19 Murray Street Lady Grey 9755 Tel: (051) 603 1449 Email: vanzyll@senqu.gov.za	CONSULTANT:	THEWO & SMMMS - JV	58 Brebner Road Westdene Bloemfontein 9301	PROFESSIONAL ENGINEER: L. MARAH PROF. Reg.No: 920281 DATE: SIGNATURE:	DESIGN BY: R DHLIWAYO DRAWN BY: R DHLIWAYO CHECKED BY: L. MARAH APPROVED BY: L. MARAH	

REVISIONS

REV	DATE	DESCRIPTION	BY

PROJECT NAME
REHABILITATION OF ROADS AND STORMWATER IN STERKSPRUIT WARD 10

TITLE
ROAD 5 LONGSECTION

PROJECT STATUS: TENDER

DATE	SCALE	SHEET	REV	
2024-03-25	N.T.S	01 OF 01	A	A1

DWG NO
P-SM01-PMO-CE-S-07

LEGEND

- CENTRELINE
- ESKOM/TELKOM POLE
- EXISTING POWER LINE
- 2% → ROAD CROSS FALL
- STORMWATER CHANNEL
- MANHOLE
- EXISTING TREE
- CULVERT
- EXISTING TARMAC SURFACE

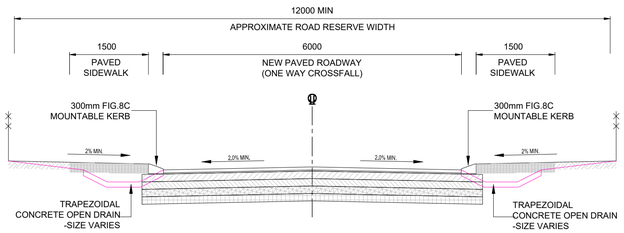
ABBREVIATIONS

N.G.L	NATURAL GROUND LEVEL
CL	CENTRELINE
m	METERS (UNIT)
HL	LEFT HAND
HR	RIGHT HAND
BCC	BEGINNING OF CURVE CENTRELINE
ECC	END OF CURVE CENTRELINE
BVC	BEGINNING OF VERTICAL CURVE
EVC	END OF VERTICAL CURVE
R	RADIUS
CH.	CHAINAGE
PI	POINT OF INTERSECTION

COORDINATE LIST

HARTEBEESHOEK WG27

Name	Y Coord	X Coord	Z Coord	DESC.
SSP1	-35435.594	3378604.370	1457.668	12MMPAVE
SSP2	-35389.339	3378555.412	1457.612	12MMC
SSP3	-35236.481	3378458.679	1461.556	12MMC
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SSP8	-35008.420	3378564.231	1475.151	10MM
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SSP10	-35553.902	3378547.750	1451.133	12MM/RSB
SSP11	-35577.944	3378474.700	1445.550	12MM/PAVE
SSP12	-35969.297	3378559.145	1436.743	12MMC
SSP13	-35773.249	3378344.171	1447.402	12MMC
SSP14	-35839.506	3378094.023	1461.586	12MMTAR
SSP15	-35722.022	3377923.822	1457.384	12MMTAR
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SSP26	-37000.224	3377871.184	1488.137	12MMC
SSP27	-36762.329	3377823.322	1475.157	HOLEC
SSP28	-36466.211	3377804.835	1472.742	12MMC



TYPICAL CROSS SECTION

PROPOSED TYPICAL CROSS SECTION IN A 12m ROAD RESERVE
WITH PAVED SIDEWALKS
SCALE N.T.S



RED REFLECTORISED
WHITE REFLECTORISED
LETTERS: SERIES C

STOP SIGN R1 (FIG.1)

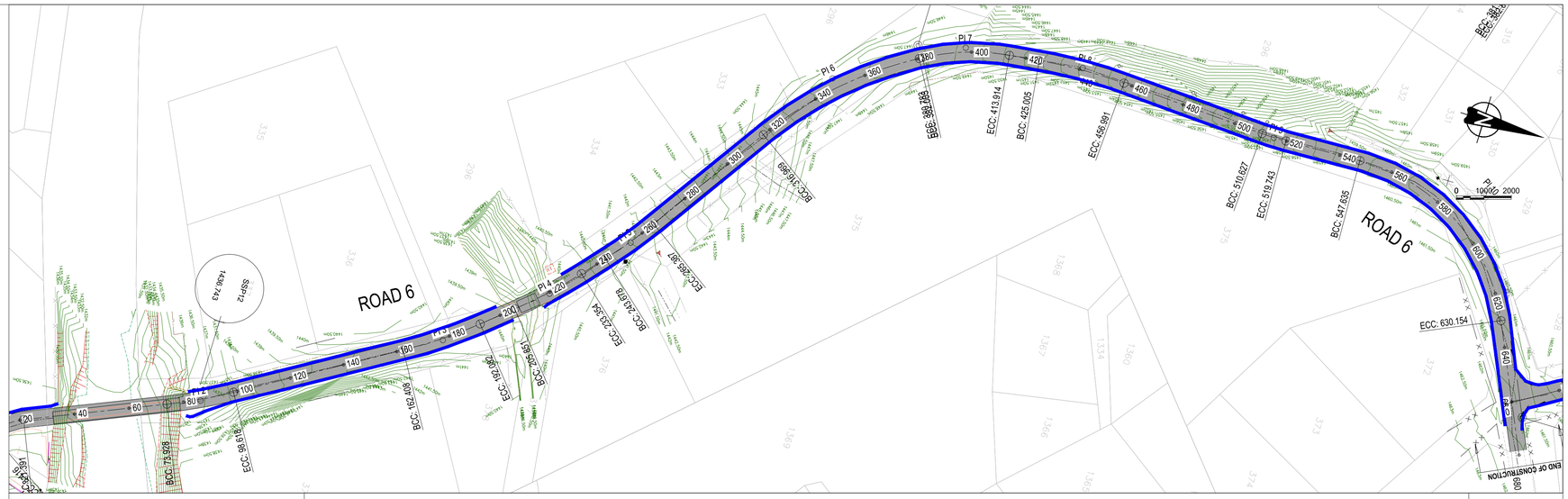
SCALE 1:10



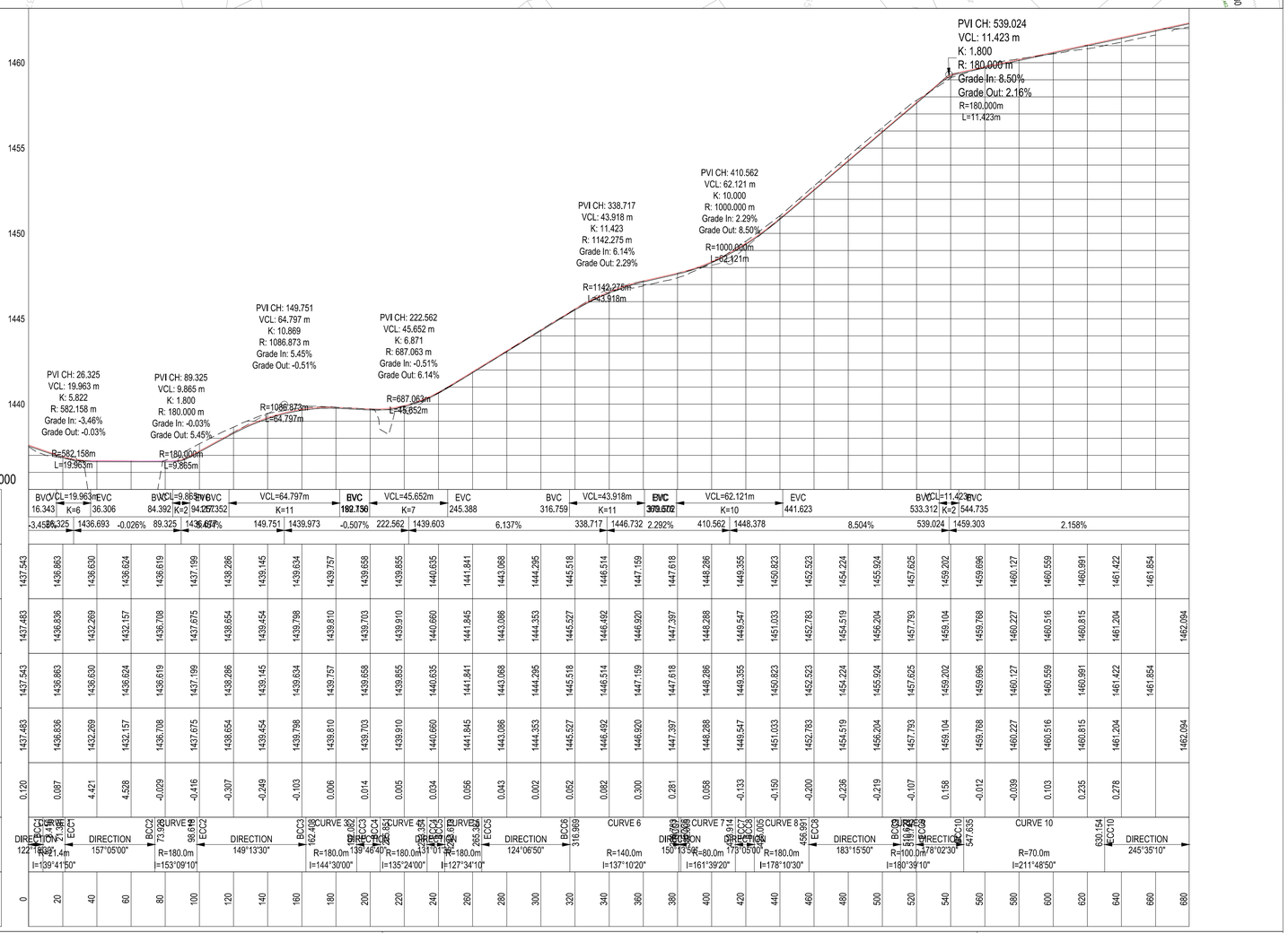
RED REFLECTORISED
BLUE SEMI-MATT
WHITE REFLECTORISED
FIGURES: SERIES E MODIFIED

SPEED LIMIT R14A (FIG.16)

SCALE 1:10



Datum 1435.000



| | | |

LEGEND

- CENTRELINE
- ESKOM/TELKOM POLE
- EXISTING POWER LINE
- 2% → ROAD CROSS FALL
- STORMWATER CHANNEL
- MANHOLE
- EXISTING TREE
- CULVERT
- EXISTING TARMAC SURFACE

ABBREVIATIONS

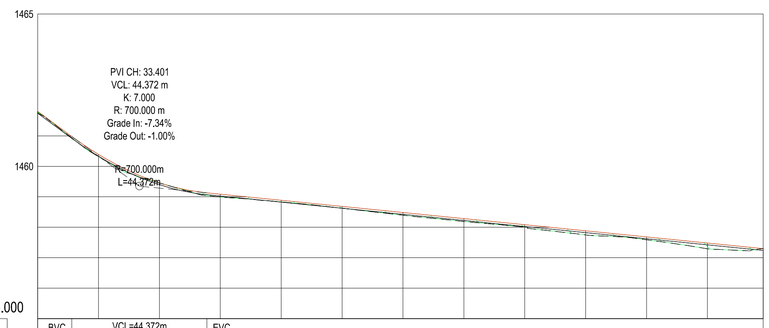
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EVC	END OF VERTICAL CURVE
R	RADIUS
CH.	CHAINAGE
PI	POINT OF INTERSECTION

COORDINATE LIST

HARTEBEESHOEK — WG27

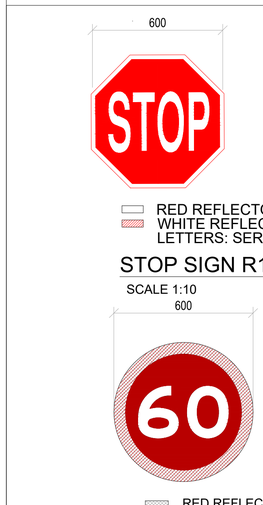
Name	Y Coord	X Coord	Z Coord	DESC.
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SSP4	-35342.052	3378354.777	1448.761	12MM/BTN
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SSP27	-36762.329	3377823.322	1475.157	HOLEC
SSP28	-36466.211	3377804.835	1472.742	12MMC





Datum 1455.000

VERTICAL PROFILE GRADES		BVC 11.215	VCL=44.372m K=7								EVC 55.587		
		-7.341%		33.401	1459.350						-1.002%		
FINAL DESIGN ROAD LEVELS	LEFT EDGE (HL)	1461.742	1460.330	1459.398	1459.024	1458.824	1458.623	1458.423	1458.223	1458.022	1457.822	1457.621	1457.421	1457.237
	CENTRE LINE (CL)	1461.802	1460.389	1459.458	1459.084	1458.884	1458.683	1458.483	1458.282	1458.082	1457.882	1457.681	1457.481	1457.297
	RIGHT EDGE (HR)	1461.747	1460.320	1459.454	1458.992	1458.831	1458.624	1458.393	1458.187	1458.007	1457.747	1457.587	1457.295	1457.297
GROUND LEVELS ON CL			1460.320	1459.454	1458.992	1458.831	1458.624	1458.393	1458.187	1458.007	1457.747	1457.587	1457.295	1457.224
CUT / FILL		0.056	0.069	0.004	0.092	0.053	0.048	0.059	0.090	0.095	0.075	0.134	0.094	0.186	0.000
HORIZONTAL ALIGNMENT			DIRECTION 148°49'20"								DIRECTION 147°33'10"				
DISTANCE (m)			20	40	60	80	100	120	140	160	180	200	220	234	

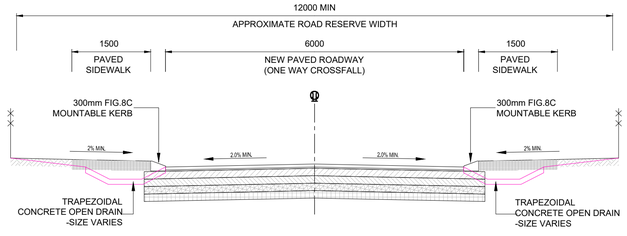


STOP SIGN R1 (FIG.1)

SCALE 1:10

SPEED LIMIT R14A (FIG.16)

SCALE 1:10



TYPICAL CROSS SECTION

PROPOSED TYPICAL CROSS SECTION IN A 12m ROAD RESERVE WITH PAVED SIDEWALKS
SCALE N.T.S

CLIENT:

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CONSULTANT:

THEWO & SMMMS - JV

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Bloemfontein
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PROFESSIONAL ENGINEER:	L. MARAH
PROF. Reg.No:	920281
DATE:	
SIGNATURE:	
DESIGN BY:	R DHLIWAYO
DRAWN BY:	R DHLIWAYO
CHECKED BY:	L. MARAH
APPROVED BY:	L. MARAH

REVISIONS

REV	DATE	DESCRIPTION	BY

PROJECT NAME

REHABILITATION OF ROADS AND STORMWATER IN STERKSPRUIT WARD 10

TITLE

ROAD 7 LONGSECTION

PROJECT STATUS: TENDER

DATE	SCALE	SHEET	REV	
2024-03-25	N.T.S	1 OF 1	A	A1

DWG NO

P-SM01-PMO-CE-S-08

LEGEND

- CENTRELINE
- ESKOM/TELKOM POLE
- EXISTING POWER LINE
- 2% → ROAD CROSS FALL
- STORMWATER CHANNEL
- MANHOLE
- EXISTING TREE
- CULVERT
- EXISTING TARMAC SURFACE

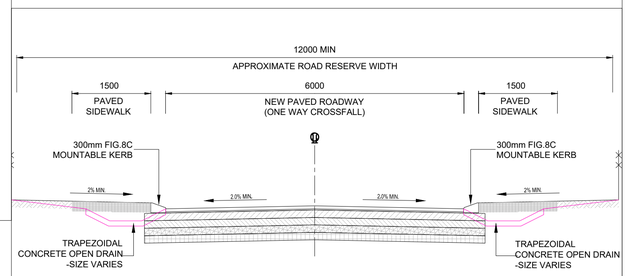
ABBREVIATIONS

N.G.L	NATURAL GROUND LEVEL
CL	CENTRELINE
m	METERS (UNIT)
HL	LEFT HAND
HR	RIGHT HAND
BCC	BEGINNING OF CURVE CENTRELINE
ECC	END OF CURVE CENTRELINE
BVC	BEGINNING OF VERTICAL CURVE
EVC	END OF VERTICAL CURVE
R	RADIUS
CH.	CHAINAGE
PI	POINT OF INTERSECTION

COORDINATE LIST

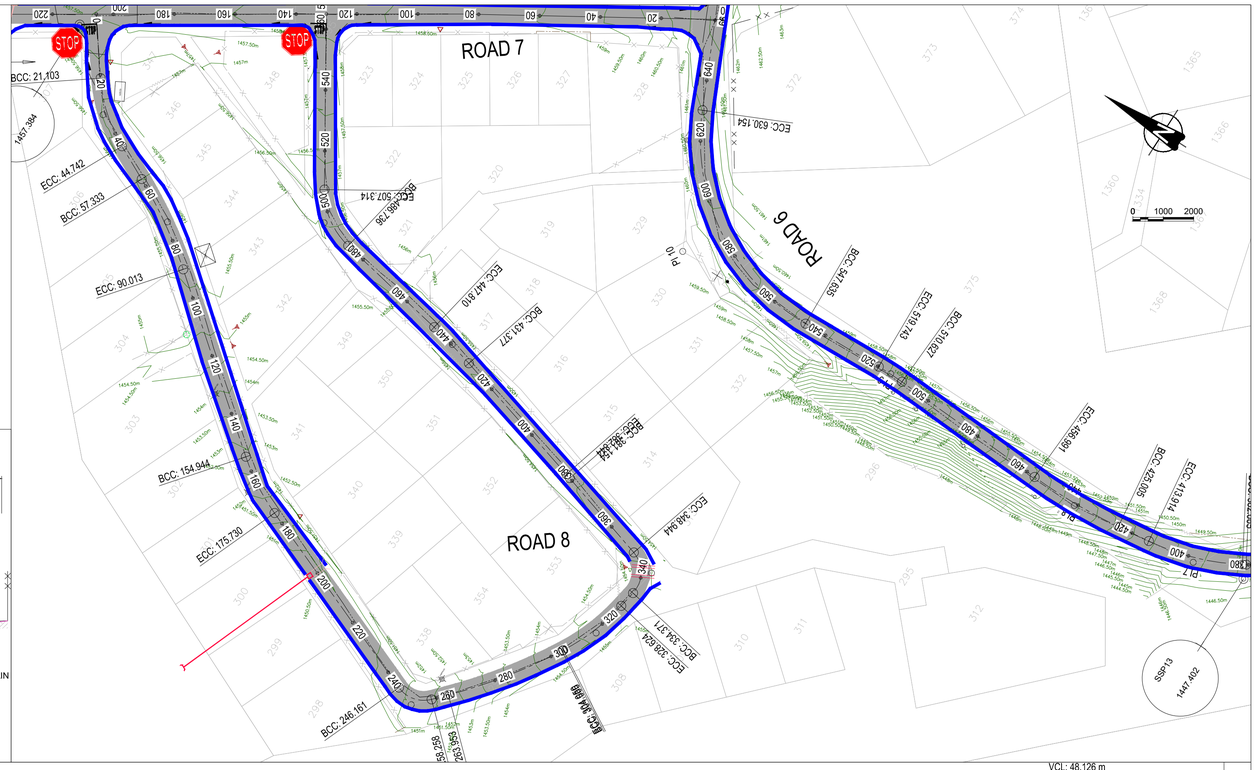
HARTEBEESHOEK WG27

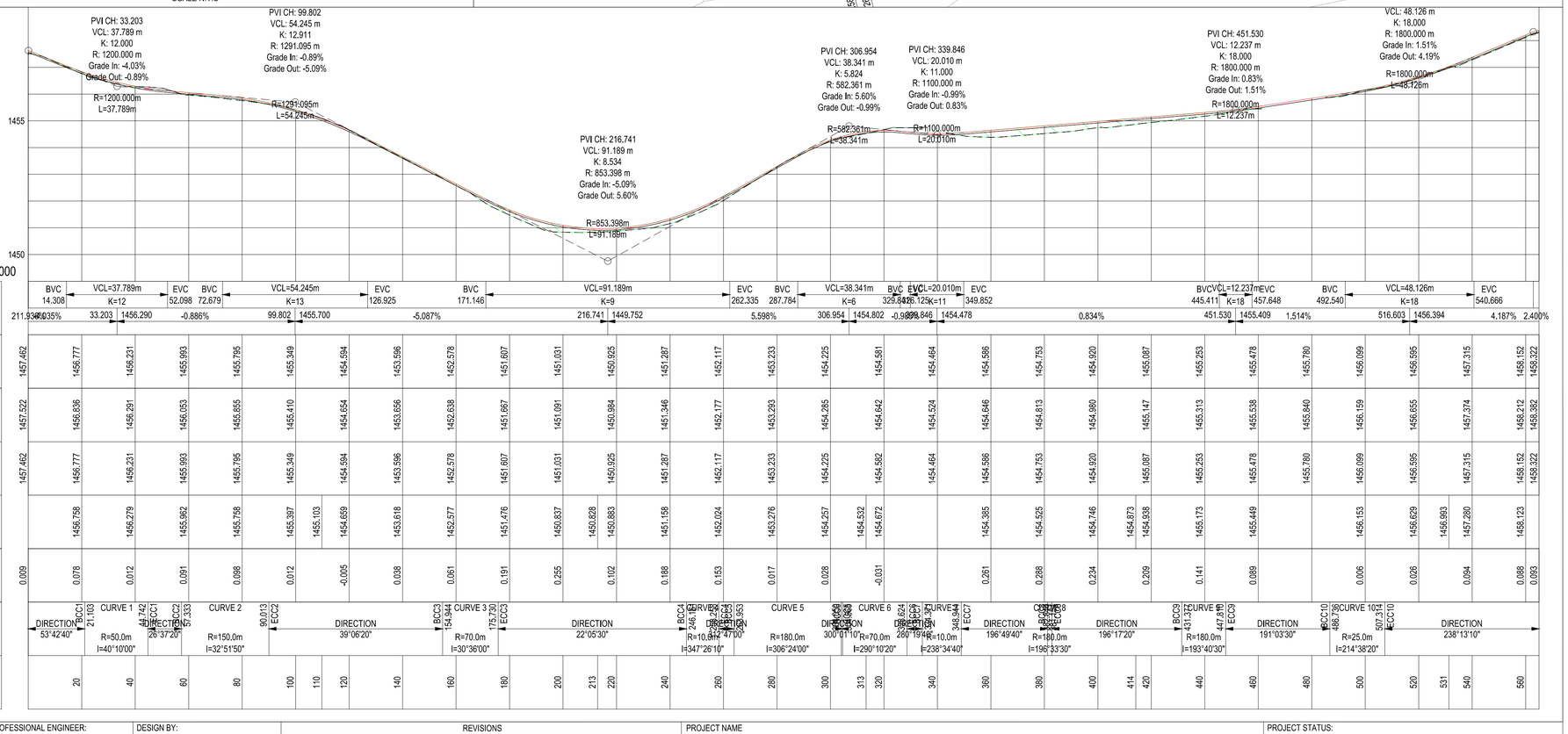
Name	Y Coord	X Coord	Z Coord	DESC.
SSP1	-35435.594	3378604.370	1457.668	12MMPAVE
SSP2	-35389.339	3378555.412	1457.612	12MMC
SSP3	-35236.481	3378458.679	1461.556	12MMC
SSP4	-35342.052	3378354.777	1448.761	12MM/BTN
SSP5	-35159.407	3378214.416	1448.177	12MM/BTN
SSP6	-35034.270	3378002.262	1450.713	12MM/RS
SSP7	-34886.276	3378717.680	1476.458	HOLEC
SSP8	-35008.420	3378564.231	1475.151	10MM
SSP9	-34801.976	3378421.786	1479.364	12MM/C
SSP10	-35553.902	3378547.750	1451.133	12MM/RSB
SSP11	-35577.944	3378474.700	1445.550	12MM/PAVE
SSP12	-35969.297	3378559.145	1436.743	12MMC
SSP13	-35773.249	3378344.171	1447.402	12MMC
SSP14	-35839.506	3378094.023	1461.566	12MMTAR
SSP15	-35722.022	3377923.822	1457.384	12MMTAR
SSP16	-36447.989	3378349.098	1472.239	HOLEC
SSP17	-36675.760	3378434.899	1478.598	12MMC
SSP18	-36957.799	3378474.986	1493.638	12MMC
SSP19	-37233.294	3378447.763	1496.879	12MMC
SSP20	-37518.953	3378399.642	1505.031	12MMC
SSP21	-37698.894	3378391.237	1511.792	HYP/BTN
SSP22	-37908.993	3378416.255	1509.601	HOLEC
SSP23	-37667.372	3378169.929	1502.641	12MMC
SSP24	-37486.881	3377992.656	1496.498	12MMC
SSP25	-37243.989	3377941.633	1495.738	12MMC
SSP26	-37000.224	3377871.184	1488.137	12MMC
SSP27	-36762.329	3377823.322	1475.157	HOLEC
SSP28	-36466.211	3377804.835	1472.742	12MMC



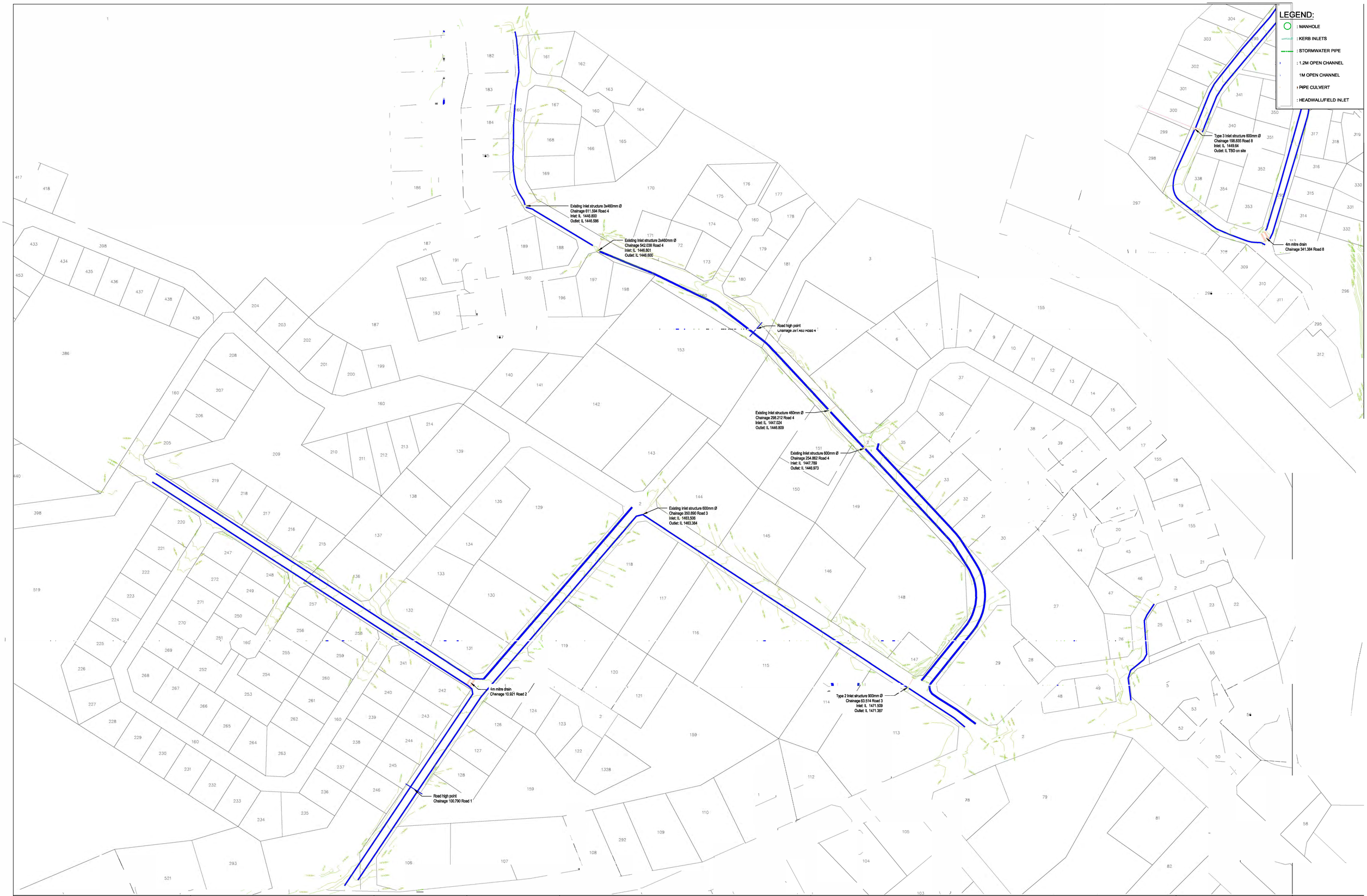
TYPICAL CROSS SECTION

PROPOSED TYPICAL CROSS SECTION IN A 12m ROAD RESERVE WITH PAVED SIDEWALKS
SCALE N.T.S





| | | |



CLIENT:

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PROF. Reg.No: 920281

DATE:

SIGNATURE:

DESIGN BY: D RWAZEMBA

DRAWN BY: D RWAZEMBA

CHECKED BY: L. MARAH

APPROVED BY: L. MARAH

REVISIONS

REV	DATE	DESCRIPTION	BY

PROJECT NAME

REHABILITATION OF ROADS AND STORMWATER IN STERKSPRUIT - WARD 10

TITLE

ROAD 9 STORMWATER LAYOUT

PROJECT STATUS: TENDER

DATE	SCALE	SHEET	REV	
2024-03-25	N.T.S	1 OF 2	A	A1

DWG NO: P-SM01-PMO-CE-S-06



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PROFESSIONAL ENGINEER: L. MARAH
PROF. Reg.No: 920281
DATE:
SIGNATURE:

DESIGN BY: D RWAZEMBA
DRAWN BY: D RWAZEMBA
CHECKED BY: L. MARAH
APPROVED BY: L. MARAH

REVISIONS

REV	DATE	DESCRIPTION	BY

PROJECT NAME

REHABILITATION OF ROADS AND STORMWATER IN STERKSPRUIT - WARD 10

TITLE

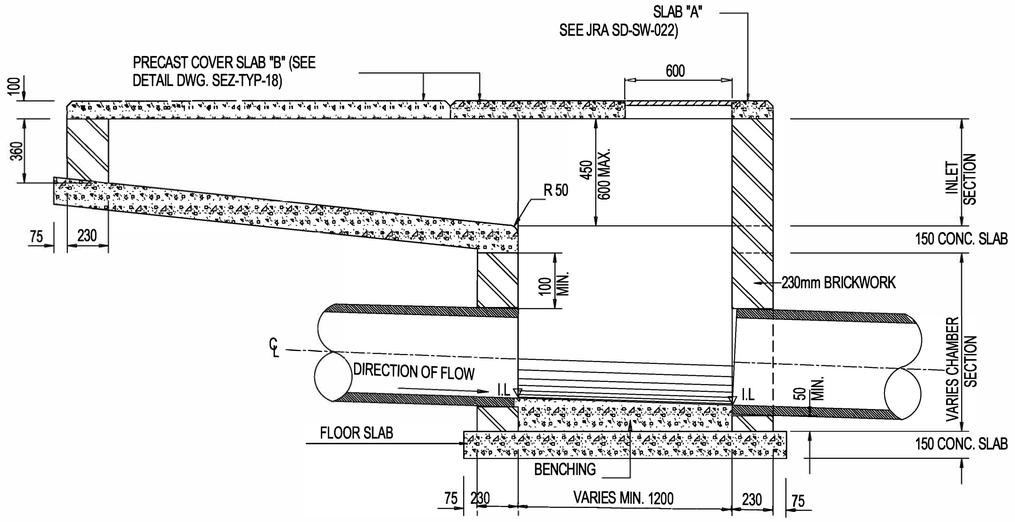
ROAD 6, 7 & 8 STORMWATER LAYOUT

PROJECT STATUS: TENDER

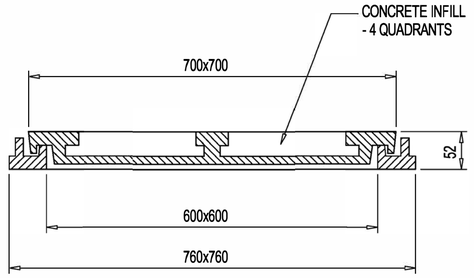
DATE	SCALE	SHEET	REV	
2024-03-25	N.T.S	2 OF 2	A	A1

DWG NO

P-SM01-PMO-CE-S-06



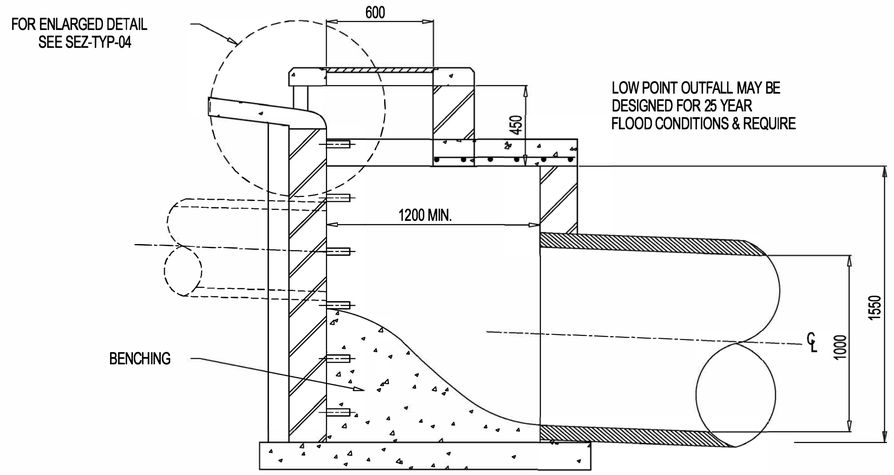
SECTION A-A



TYPICAL SQUARE MANHOLE COVER
AND FRAME FOR KERB INLETS

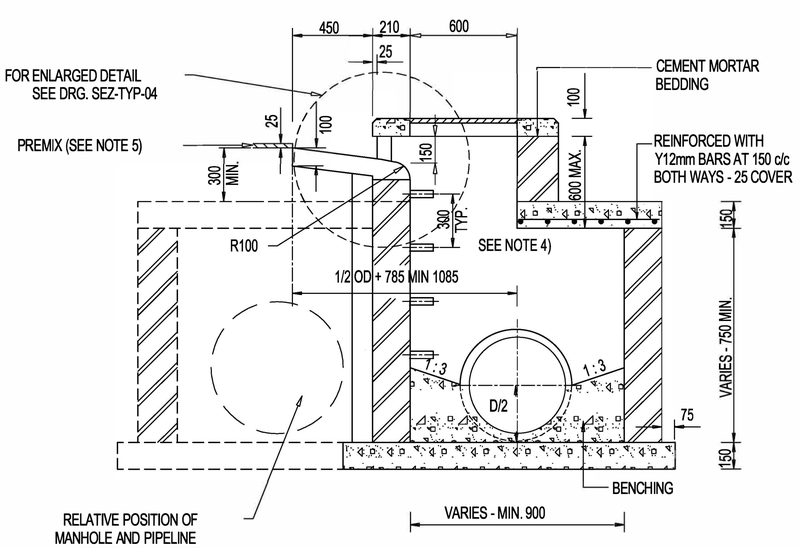
NOTES

1. SEE DRG SEZ-TYP-15 FOR PLAN AND SECTION POSITIONS OF KERB INLET.
2. CONCRETE STRENGTH TO BE AS FOLLOWS:
   a) MANHOLE SURROUNDS AND BENCHING: CLASS 15/19
   b) CAST IN-SITU DECK SLABS & FOUNDATIONS: CLASS 20/19
   c) PRECAST COVER SLABS & OTHER ITEMS: CLASS 25/19.
   d) CAST IN-SITU KERBS, APRONS ETC: CLASS 25/19
3. ALL FLOORS AND BENCHING TO BE STEEL TROWELLED WITH A SMOOTH RADIUS.
4. MANHOLE & KERB INLET INTERNAL WIDTHS AND DEPTHS:
   a) WIDTH
   - 750mm PIPES AND LESS - 900mm
   - 825mm PIPES AND MORE - 1200mm
   SOME MANHOLE SIZES TO BE DETERMINED ON SITE
   b) DEPTH - THE DEPTH INDICATED SHOULD BE INCREASED IF NECESSARY FOR MANHOLES TO PERMIT SUFFICIENT DISCHARGE HEAD TO DEVELOP.
   c) MANHOLE DEPTH > 1.75m WIDTH OF BRICKWORK TO BE INCREASED TO 345mm
   d) BELOW 3m SPECIAL ENGINEERING DESIGN REQUIRED FOR BRICKWORK
5. NO BACKFILL TO BE DONE UNTIL MORTAR IS SEVEN DAYS OLD.
6. PROVIDE STEP IRONS WHEN DEPTH > 1,2m
7. PIPES AT INLET AND OUTLET TO BE LAID SOFFIT TO SOFFIT.
8. SHOULD THERE BE A CHANGE IN PIPE DIAMETER, THE GREATER OF THE TWO SHOULD BE USED TO DETERMINE THE POSITIONING OF THE PIPES.
9. ALL ROADSWORKS TO COMPLY WITH THA SANS 1200 SPECIFICATIONS.
10. ALL BRICKS TO BE OF QUALITY FBSE30 TO SANS 227-2007 WITH WATER ABSORPTION <14% AND EFFLORESCENE <10.
11. ALL BRICKWORK TO BE IN ENGLISH BOND.
12. SECTION L-L ILLUSTRATES VARIATIONS TO SECTION B-B REQUIRED AT A LOW POINT KERB INLET.



BENCHING AND INTERNAL HEIGHT DICTATED BY OUTFALL PIPE

SECTION L-L
(SEE SEZ-TYP-16)



SECTION B-B

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PROFESSIONAL ENGINEER:		DESIGN BY:	
L. MARAH		D RWAZEMBA	
PROF. Reg.No: 920281		DRAWN BY: D RWAZEMBA	
DATE:		CHECKED BY: L. MARAH	
SIGNATURE:		APPROVED BY: L. MARAH	

REVISIONS			
REV	DATE	DESCRIPTION	BY

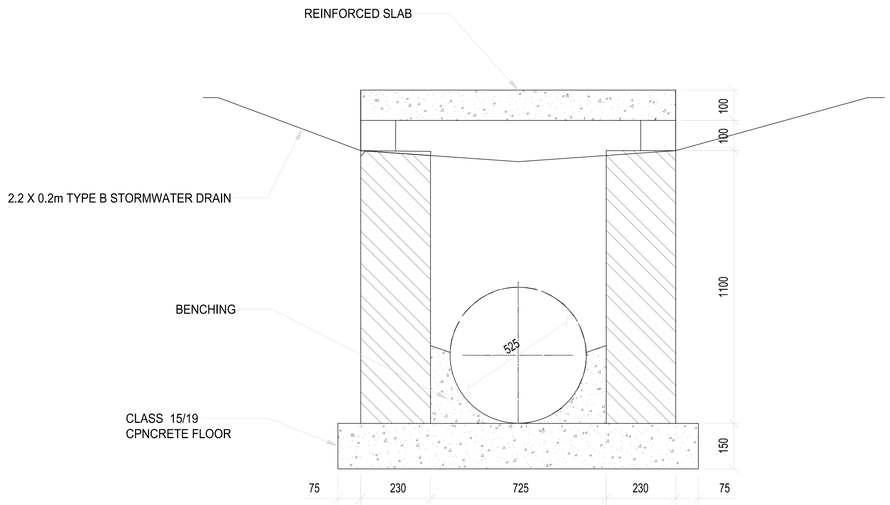
PROJECT NAME
REHABILITATION OF ROADS AND STORMWATER IN STERKSPRUIT - WARD 10

TITLE
KERB INLET SECTION

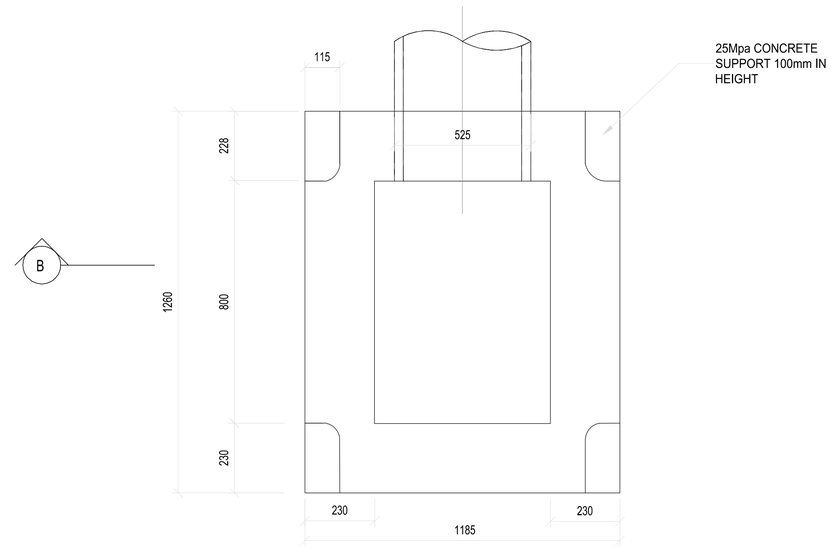
PROJECT STATUS:
TENDER

DATE	SCALE	SHEET	REV	
2024-03-25	N.T.S	1 OF 1	A	A1

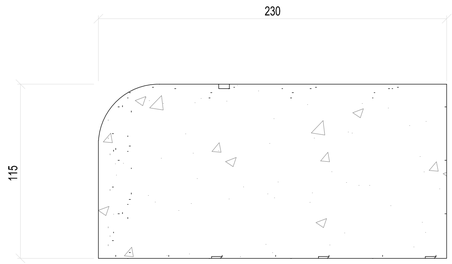
DWG NO
P-SM01-PMO-CE-S-100



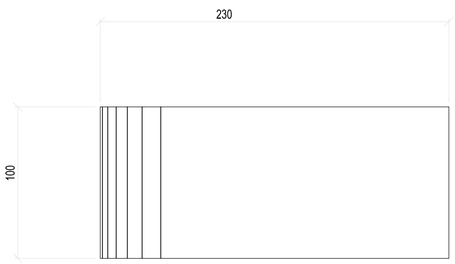
SECTION B-B
SCALE 1:10



FIELD INLET PLAN
SCALE 1:10



PLAN :SECTIONS OF SUPPORT
SCALE 1:2



ELEVATION :SECTIONS OF SUPPORT
SCALE 1:2

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PROFESSIONAL ENGINEER: L. MARAH
PROF. Reg.No: 920281
DATE:
SIGNATURE:

DESIGN BY: D.RWAZEMBA
DRAWN BY: D.RWAZEMBA
CHECKED BY: L. MARAH
APPROVED BY: L. MARAH

REVISIONS			
REV	DATE	DESCRIPTION	BY

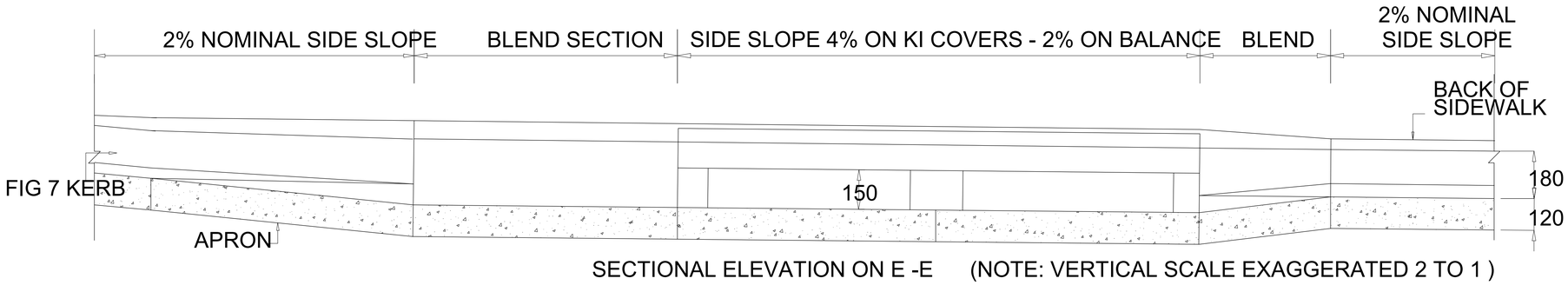
PROJECT NAME: REHABILITATION OF ROADS AND STORMWATER IN STERKSPRUIT - WARD 10

TITLE: FIELD INLET DETAIL

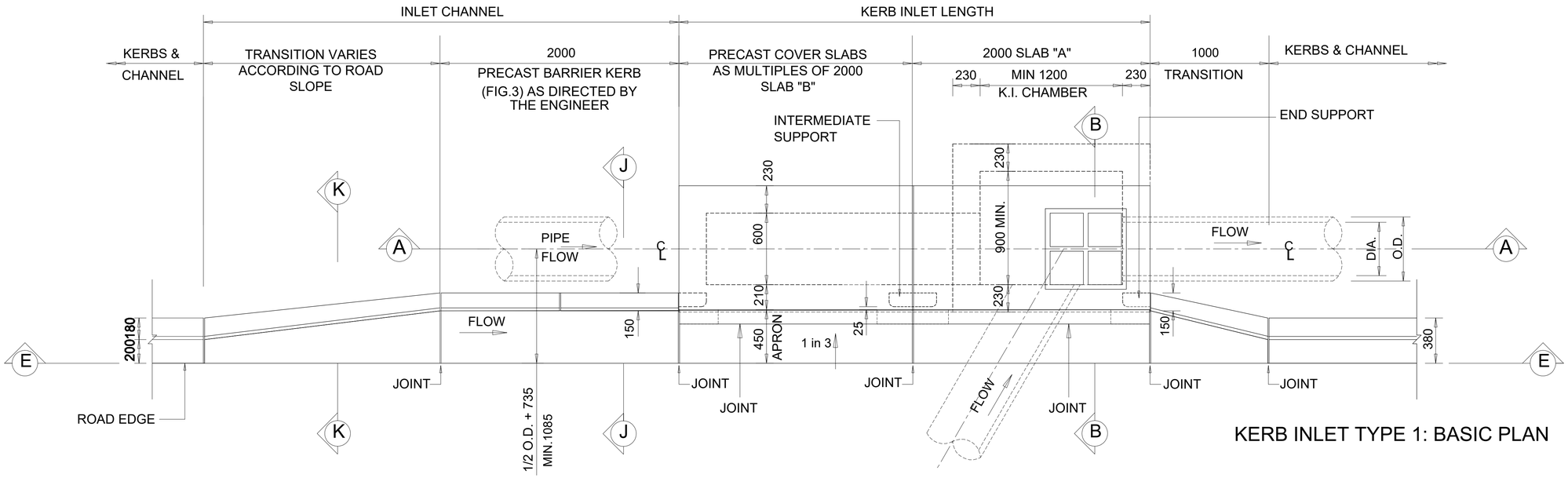
PROJECT STATUS: TENDER

DATE	SCALE	SHEET	REV	
2024-03-25	N.T.S	1 OF 1	A	A1

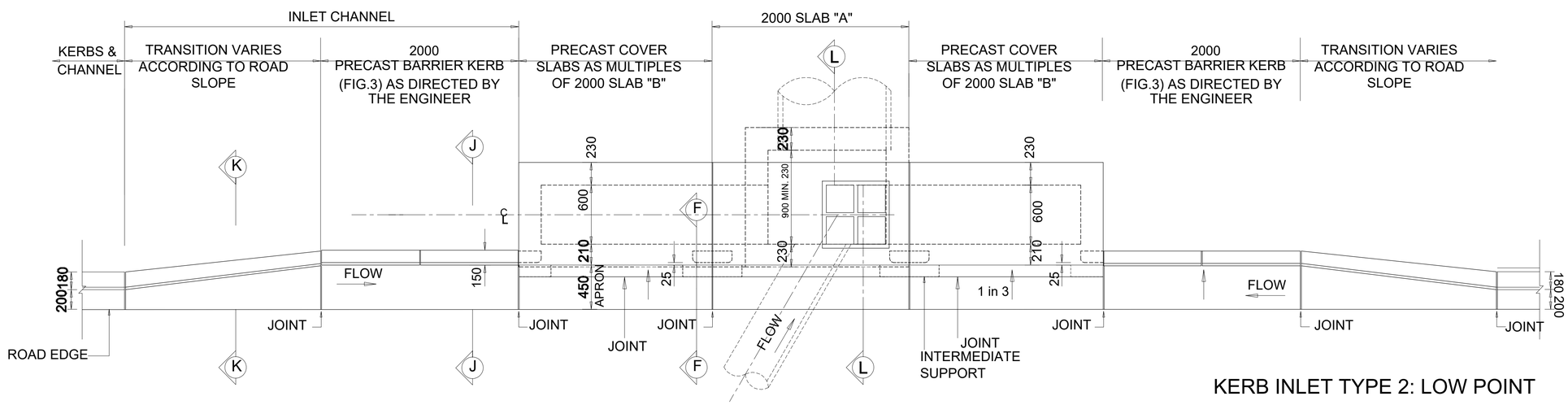
DWG NO: P-SM01-PMO-CE-S-101



SECTIONAL ELEVATION ON E -E (NOTE: VERTICAL SCALE EXAGGERATED 2 TO 1)

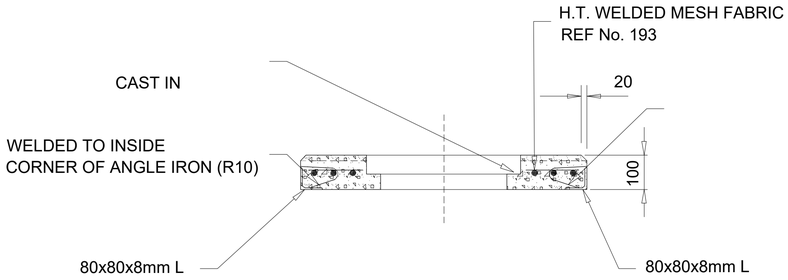


KERB INLET TYPE 1: BASIC PLAN

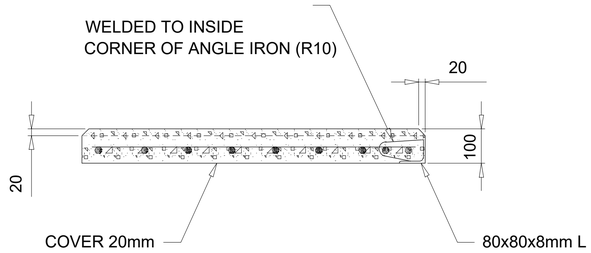


KERB INLET TYPE 2: LOW POINT

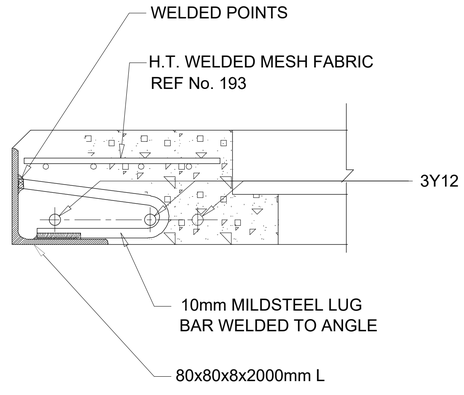
CLIENT:	CONSULTANT:	PROFESSIONAL ENGINEER:	DESIGN BY:	REVISIONS			
19 Murray Street Lady Grey 9755 Tel: (051) 603 1449 Email: varzyll@senqu.gov.za	THEWO & SMMMS - JV 58 Brebner Road Westdene Bloemfontein 9301 Tel: +27 (051) 430 1321 Email: pmo@thewo.co.za	L. MARAH PROF. Reg.No: 920281 DATE: SIGNATURE:	D RWAZEMBA DRAWN BY: D RWAZEMBA CHECKED BY: L. MARAH APPROVED BY: L. MARAH	REV	DATE	DESCRIPTION	BY
PROJECT NAME: REHABILITATION OF ROADS AND STORMWATER IN STERKSPRUIT - WARD 10							
TITLE: KERB INLET TYPES							
PROJECT STATUS: TENDER							
DATE: 2024-03-25	SCALE: N.T.S	SHEET: 1 OF 1	REV: A	A1			
DWG NO: P-SM01-PMO-CE-S-102							



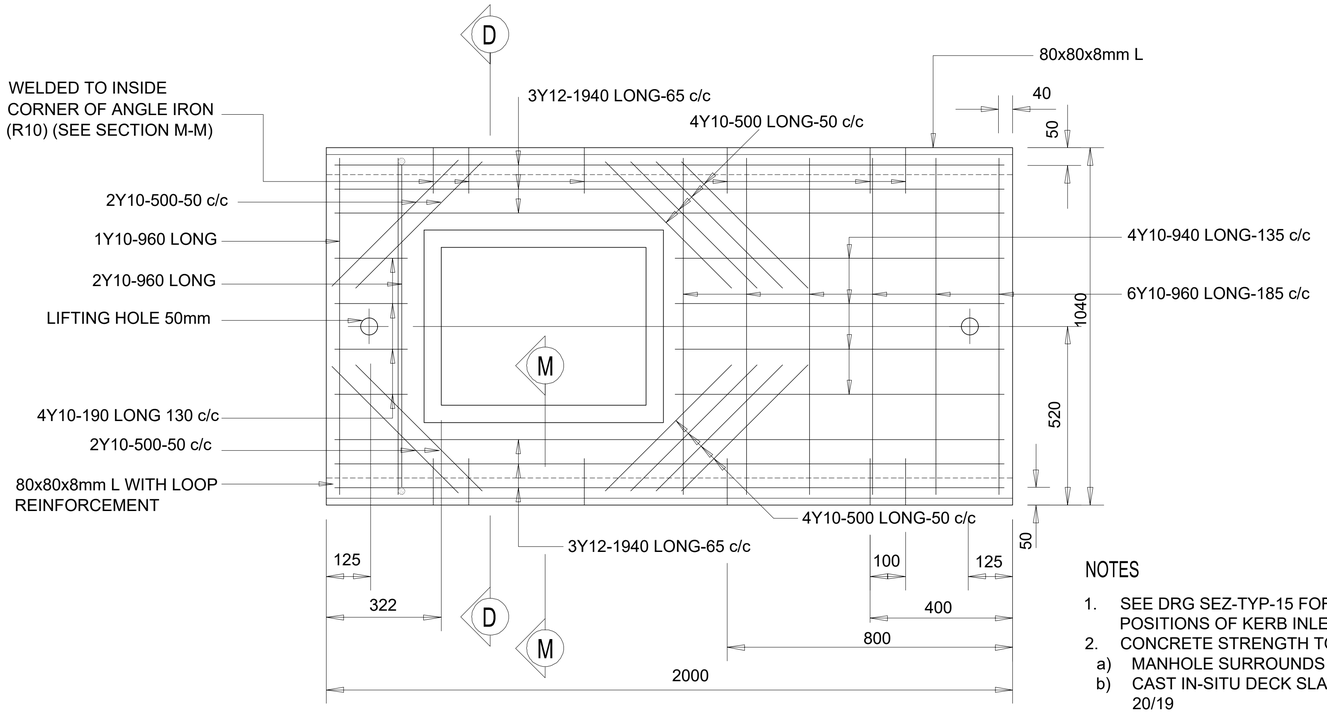
SECTION D-D



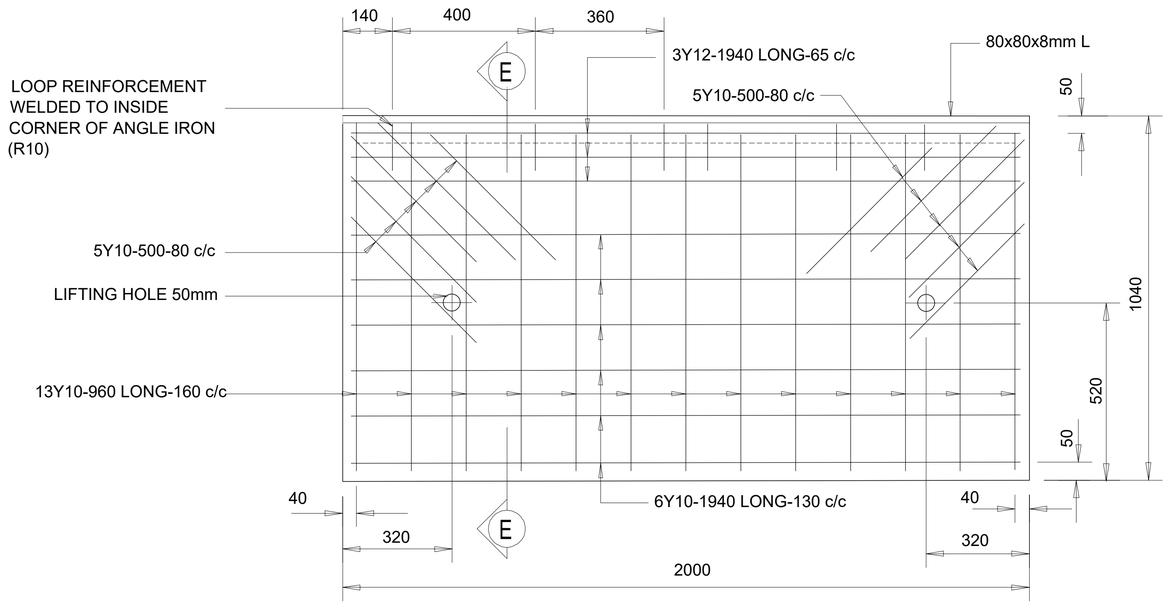
SECTION E-E



SECTION M-M



SLAB "A"



SLAB "B"

NOTES

1. SEE DRG SEZ-TYP-15 FOR PLAN AND SECTION POSITIONS OF KERB INLET.
2. CONCRETE STRENGTH TO BE AS FOLLOWS:
   a) MANHOLE SURROUNDS AND BENCHING: CLASS 15/19
   b) CAST IN-SITU DECK SLABS & FOUNDATIONS: CLASS 20/19
   c) PRECAST COVER SLABS & OTHER ITEMS: CLASS 25/19.
   d) CAST IN-SITU KERBS, APRONS ETC: CLASS 25/19
3. ALL FLOORS AND BENCHING TO BE STEEL TROWELLED WITH A SMOOTH RADIUS.
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   c) MANHOLE DEPTH > 1.75m WIDTH OF BRICKWORK TO BE INCREASED TO 345mm
   d) BELOW 3m SPECIAL ENGINEERING DESIGN REQUIRED FOR BRICKWORK
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9. ALL ROADSWORKS TO COMPLY WITH THA SANS 1200 SPECIFICATIONS.
10. ALL BRICKS TO BE OF QUALITY FBSE30 TO SANS 227-2007 WITH WATER ABSORPTION <14% AND EFFLORESCENE <10.
11. ALL BRICKWORK TO BE IN ENGLISH BOND.
12. SECTION L-L ILLUSTRATES VARIATIONS TO SECTION B-B REQUIRED AT A LOW POINT KERB INLET.

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PROFESSIONAL ENGINEER: L. MARAH
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PROJECT NAME: REHABILITATION OF ROADS AND STORMWATER IN STERKSPRUIT - WARD 10

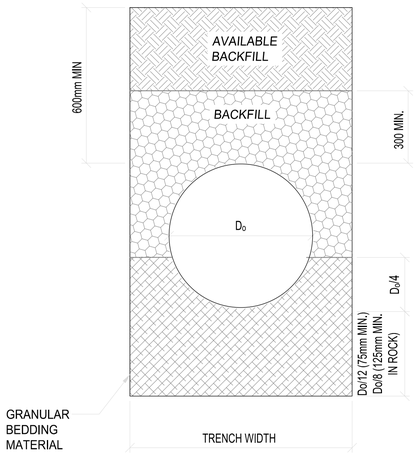
TITLE: SLAB REINFORCEMENT

PROJECT STATUS: TENDER

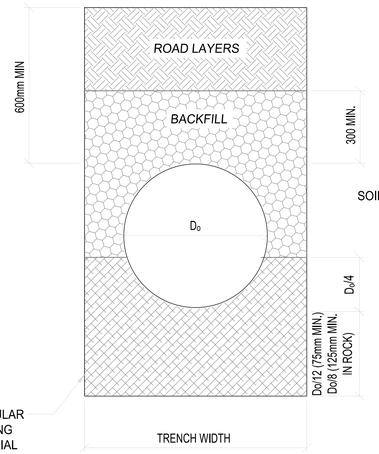
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2024-03-25	N.T.S	1 OF 1	A	A1

DWG NO: P-SM01-PMO-CE-S-103

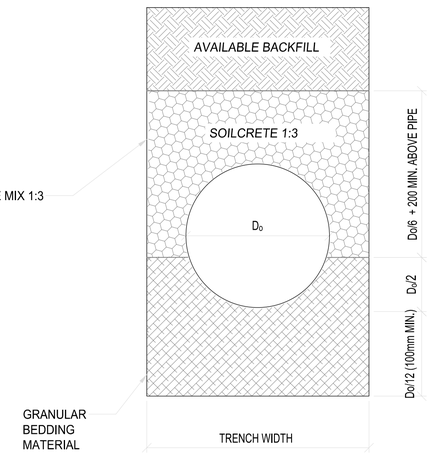
DETAIL 1



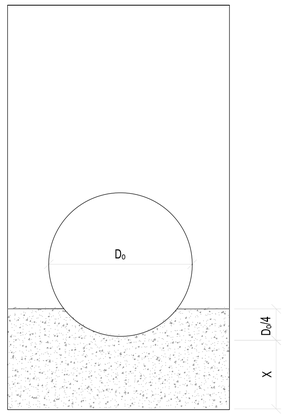
DETAIL 2



DETAIL 3



DETAIL 4



X=Do/4 WHEN TRENCH ID GRAVEL SOIL
X=Do/8 WHEN TRENCH IS IN ROCK

NOTES

ALL PIPES BELOW SIDEWALKS & OPEN AREAS TO BE CLASS 100 'D'

THE CONTRACTOR SHALL AT ALL TIMES ADHERE TO THE SAFETY PRECAUTIONS AS SET OUT IN SANS 1200 D-1988.

BEDDING:
a. **NORMAL BEDDING** ACCORDING TO DETAIL 1.
b. **BEDDING ACCORDING TO** DETAIL 2.
c. **CONCRETE SLAB OVER PIPE** ACCORDING TO DETAIL 3.
d. **CONCRETE BEDDING** ACCORDING TO DETAIL 4.

BEDDING MATERIAL:
THE MATERIAL USED CONSISTS OF SELECTED GRAVEL WITH PI ≤ 6, MUST BE FREE OF STONES LARGER THAN 20mm, ORGANIC MATERIAL AND CLAY LUMPS. THE BEDDING MATERIAL AT THE SIDES OF THE PIPE MUST BE COMPACTED TO 90% .MOD. AASHTO DENSITY AFTER THE PIPE HAS BEEN LAID.

BACKFILL TYPE A:
THE MATERIAL USED MUST BE UNIFORM AND MUST BE COMPACTED TO 90% MOD AASHTO DENSITY IN LAYERS NOT MORE THAN 100mm AND MUST BE FREE OF:
a. **ROOTS OF TREES, BUILDING** RUBBLE AND ORGANIC MATERIAL.
b. **CLAY LUMPS LARGER THAN** 75mm.
c. **STONES LARGER THAN 20mm.**

BACKFILL TYPE B:
MINIMUM G9 MATERIAL ACCORDING TO TRH14 CLASSIFICATION COMPACTED TO A MIN. OF 90% MOD. AASHTO DENSITY IN LAYERS NOT MORE THAN 150mm.

MINIMUM PIPE SIZETO BE 450mm DIAMETER.

STORMWATER PIPES UNDER SIDEWALK
SCALE 1:25

STORMWATER PIPES UNDER ROAD
SCALE 1:25

STORMWATER PIPES WHERE SOILCRETE IS REQUIRED
SCALE 1:25

STORMWATER PIPES WITH CONCRETE BEDDING
SCALE 1:25

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PROFESSIONAL ENGINEER: L. MARAH
PROF. Reg.No: 920281
DATE:
SIGNATURE:

DESIGN BY: D RWAZEMBA
DRAWN BY: D RWAZEMBA
CHECKED BY: L. MARAH
APPROVED BY: L. MARAH

REVISIONS			
REV	DATE	DESCRIPTION	BY

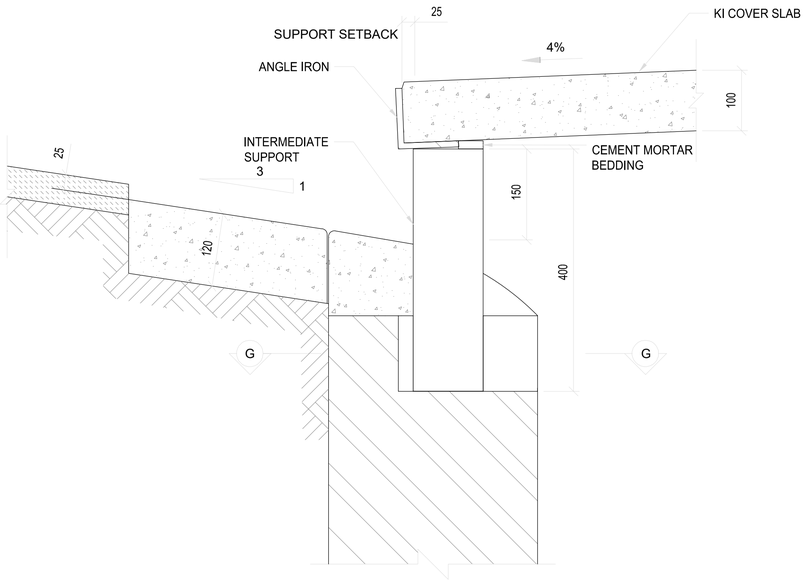
PROJECT NAME
REHABILITATION OF ROADS AND STORMWATER IN STERKSPRUIT - WARD 10

TITLE
PIPE BEDDING

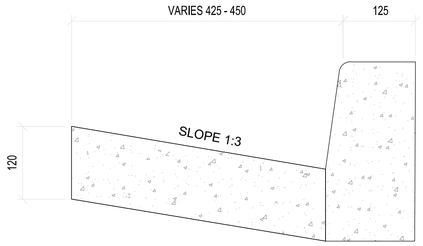
PROJECT STATUS: TENDER

DATE	SCALE	SHEET	REV	
2024-03-25	N.T.S	1 OF 1	A	A1

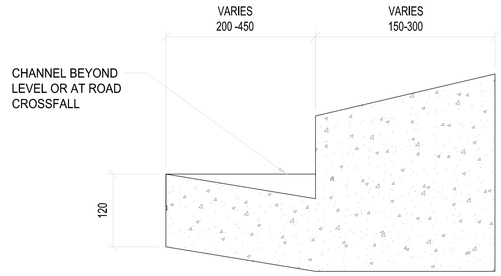
DWG NO
P-SM01-PMO-CE-S-104



SECTION F-F THROUGH KI APRON & SUPPORT
SCALE 1:5



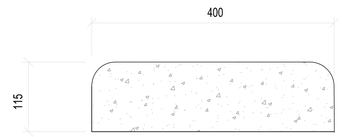
SECTION J-J
SCALE 1:5



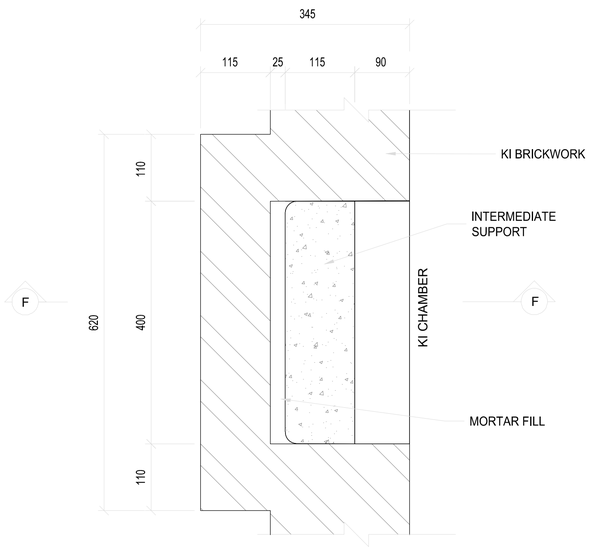
SECTION K-K
SCALE 1:5



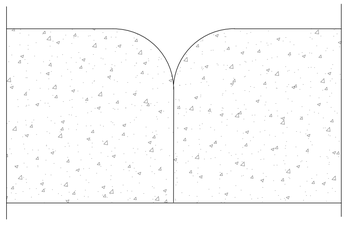
END SUPPPORT FOR COVER SLAB
SCALE 1:5



INTERMEDIATE SUPPPORT FOR COVER SLAB
SCALE 1:5



SECTION G-G THROUGH KI SUPPORT
SCALE 1:5



DETAIL OF JOINT IN APRON
SCALE 1:5

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PROFESSIONAL ENGINEER: L. MARAH
PROF. Reg.No: 920281
DATE:
SIGNATURE:

DESIGN BY: D RWAZEMBA
DRAWN BY: D RWAZEMBA
CHECKED BY: L MARAH
APPROVED BY: L MARAH

REVISIONS			
REV	DATE	DESCRIPTION	BY

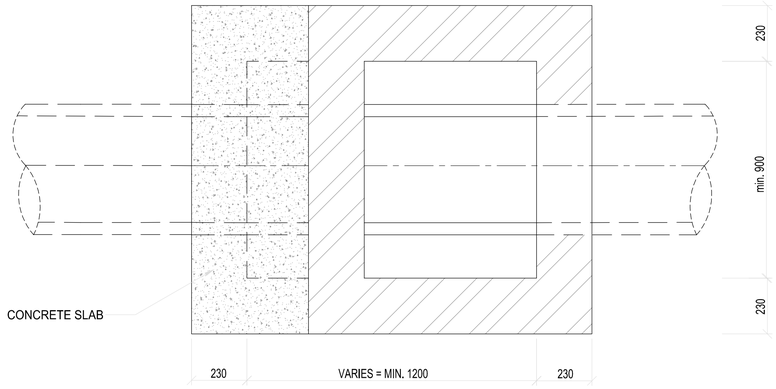
PROJECT NAME: REHABILITATION OF ROADS AND STORMWATER IN STERKSPRUIT - WARD 10

TITLE: KERB APRON & SUPPORT DETAILS

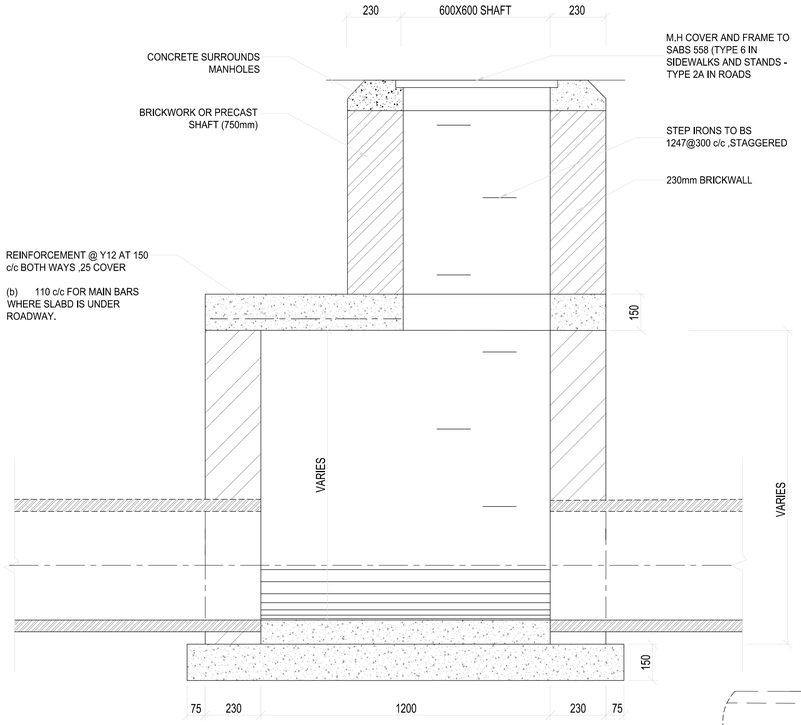
PROJECT STATUS: TENDER

DATE	SCALE	SHEET	REV	
2024-03-25	N.T.S	1 OF 1	A	A1

DWG NO: P-SM01-PMO-CE-S-105



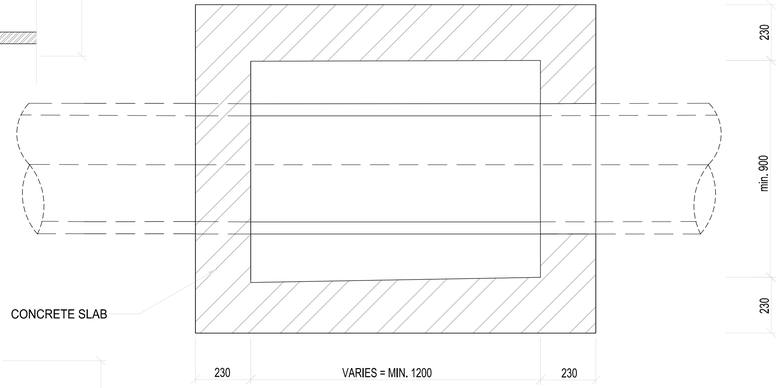
TYPE A SECTIONAL PLAN
SCALE 1:10



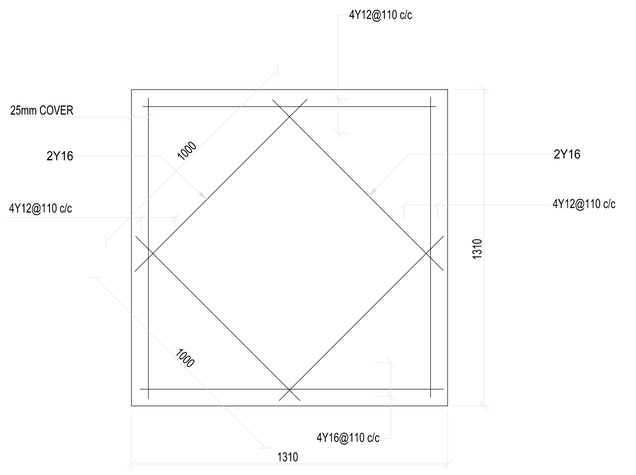
TYPE A JUNCTION FOR 1.5m - 2m Depth
SCALE 1:10

NOTES

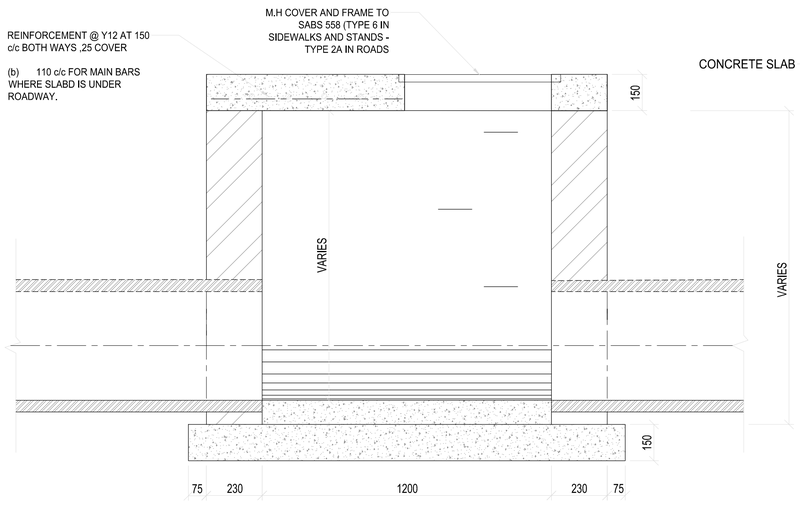
1. CONCRETE STRENGTH TO BE AS FOLLOWS:
   a) MANHOLE SURROUNDS AND BENCHING: CLASS 15/19
   b) CAST IN-SITU DECK SLABS & FOUNDATION: CLASS 20/19
   c) PRECAST COVER SLABS & OTHER ITEMS: CLASS 25/19
   d) CAST IN-SITU KERBS, APRONS ETC.: CLASS 25/19
2. ALL FLOORS AND BENCHING TO BE STEEL TROWELLED WITH A SMOOTH RADIUS
3. ALL BRICKS TO BE OF QUALITY FBSE30 TO SANS 227-1986 WITH WATER ABSORTION <14% AND EFFLORESCENE < 10.1
4. ALL BRICKWORK TO BE IN ENGLISH BOND.
5. MANHOLE & KERB INLET WIDTHS AND DEPTHS:
   a) WIDTH-750mm PIPES AND LESS - 900mm
   825mm PIPES AND MORE - 1200mm
   SOME JUNCTION MANHOLE SIZES TO BE DETERMINED ON SITE
   b) SOME JUNCTION MANHOLE SIZES TO BE DETERMINED ON SITE
   c) DEPTH - THE DEPTH INDICATED SHOULD BE INCREASED IF NECESSARY FOR MANHOLES TO PERMIT SUFFICIENT DISCHARGED HEAD TO DEVELOP
   d) MANHOLE DEPTH > 1.75m, WIDTH OF BRICKWORK TO BE INCREASED TO 330mm.



TYPE B SECTIONAL PLAN
SCALE 1:10



COVER SLAB REINFORCENENT
SCALE 1:10



TYPE B JUNCTION FOR 0m -1.5m Depth
SCALE 1:10

CLIENT:	CONSULTANT:	PROFESSIONAL ENGINEER: L. MARAH PROF. Reg.No: 920281 DATE: SIGNATURE:	DESIGN BY: - DRAWN BY: D RWAZEMBA CHECKED BY: L. MARAH APPROVED BY: L. MARAH

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REVISIONS			
REV	DATE	DESCRIPTION	BY

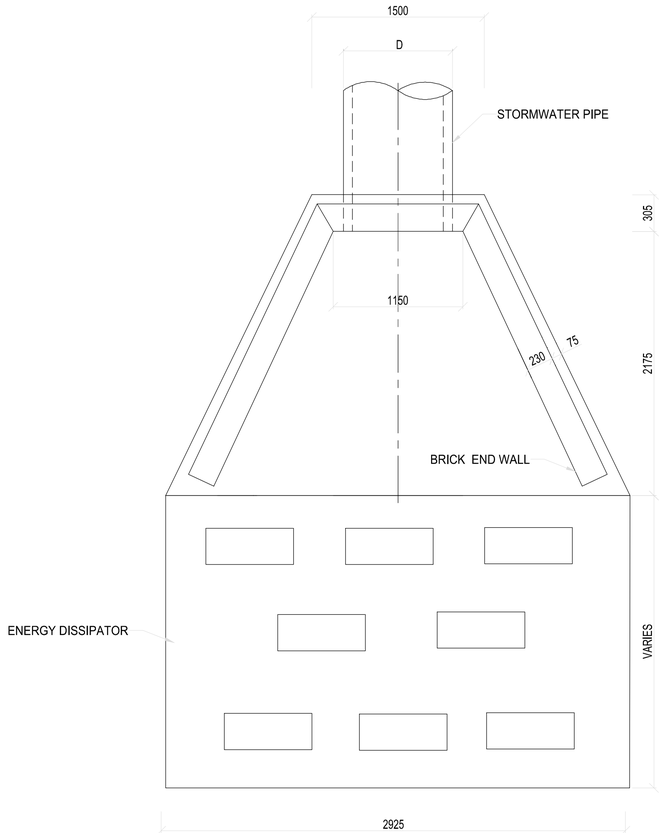
PROJECT NAME: REHABILITATION OF ROADS AND STORMWATER IN STERKSPRUIT - WARD 10

TITLE: JUNCTION BOX DETAIL

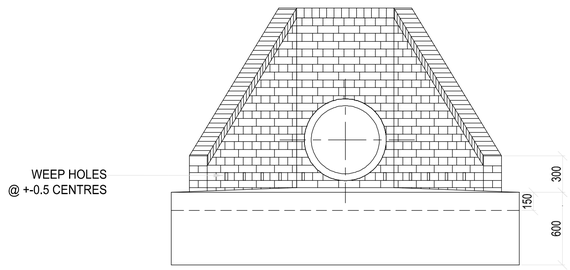
PROJECT STATUS: TENDER

DATE	SCALE	SHEET	REV	
2024-03-25	N.T.S	1 OF 1	A	A1

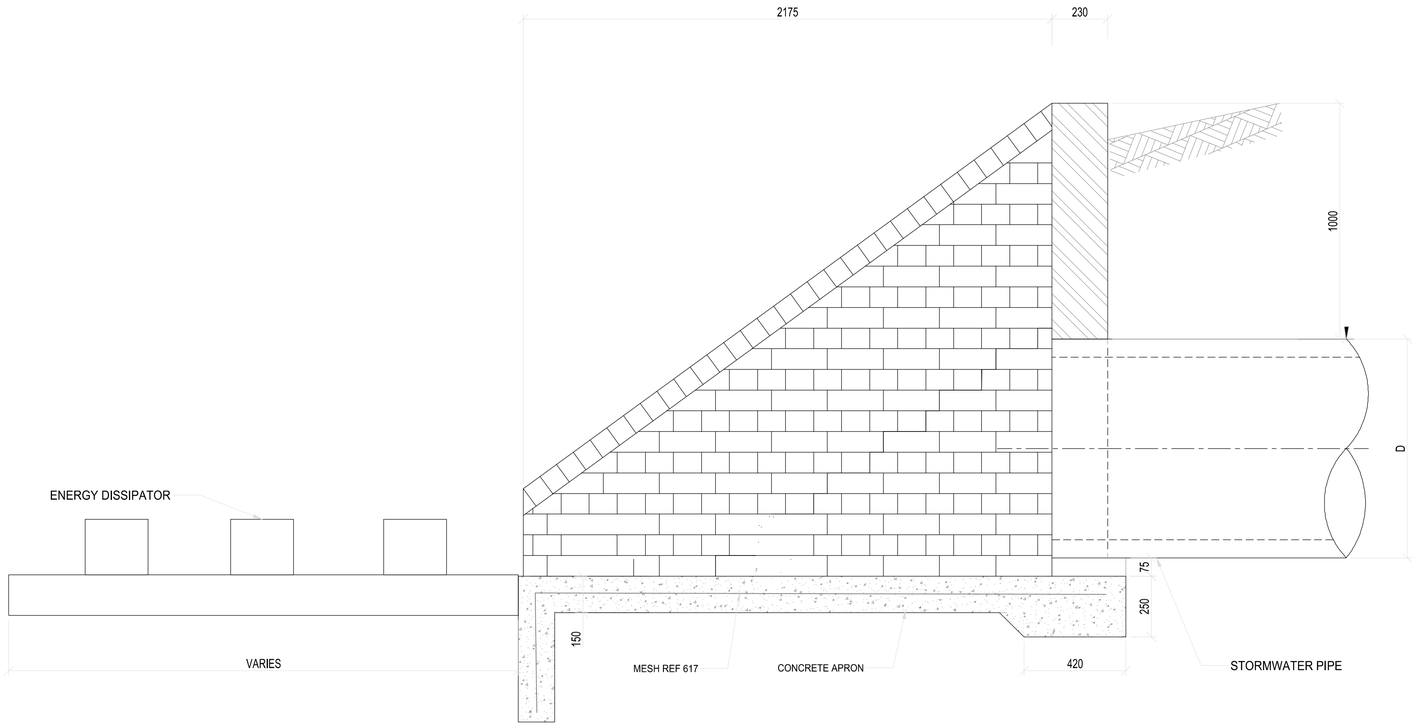
DWG NO: P-SM01-PMO-CE-S-106



OUTLET PLAN
SCALE 1:25



FRONT ELEVATION
SCALE 1:25



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PROFESSIONAL ENGINEER: L. MARAH
PROF. Reg.No: 920281
DATE:
SIGNATURE:

DESIGN BY: D RWAZEMBA
DRAWN BY: D RWAZEMBA
CHECKED BY: L. MARAH
APPROVED BY: L. MARAH

REVISIONS			
REV	DATE	DESCRIPTION	BY

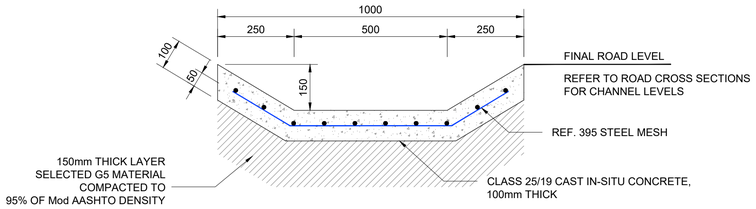
PROJECT NAME: REHABILITATION OF ROADS AND STORMWATER IN STERKSPRUIT - WARD 10

TITLE: HEADWALL OR OUTLET DETAIL

PROJECT STATUS: TENDER

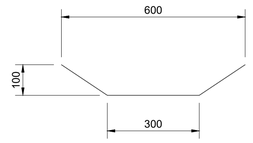
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DWG NO: P-SM01-PMO-CE-S-107

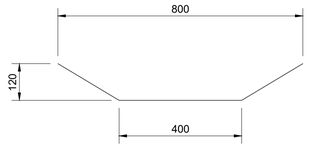


TYPICAL CHANNEL DETAIL

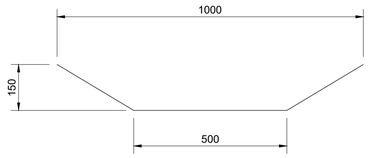
SCALE 1:10



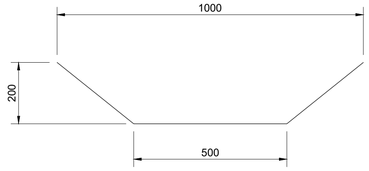
CHANNEL TYPE A



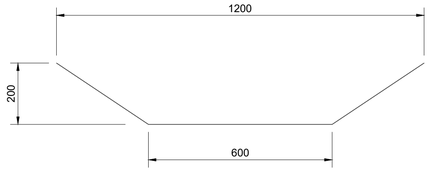
CHANNEL TYPE B



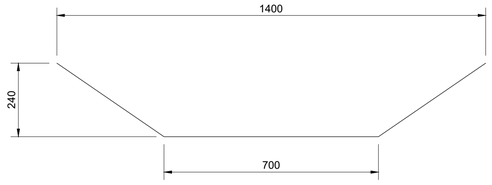
CHANNEL TYPE C



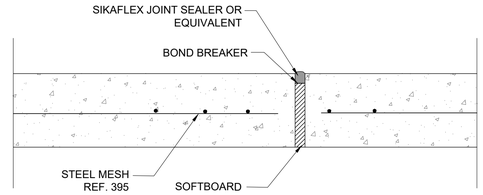
CHANNEL TYPE D



CHANNEL TYPE E



CHANNEL TYPE F



CHANNEL CONSTRUCTION JOINT DETAIL @ 2500mm INTERVALS

SCALE 1:5

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PROFESSIONAL ENGINEER: L. MARAH

PROF. Reg.No: 920281

DATE: 2024-03-25

SIGNATURE:

DESIGN BY:

DRAWN BY:

CHECKED BY: L. MARAH

APPROVED BY: L. MARAH

REVISIONS

REV	DATE	DESCRIPTION	BY
a	2024-03-25	ISSUED FOR TENDER	L.M

PROJECT NAME

REHABILITATION OF ROADS AND STORMWATER IN STERKSPRUIT WARD 10

TITLE

TRAPEZOIDAL CONCRETE DRAIN DETAILS

PROJECT STATUS: TENDER

DATE	SCALE	SHEET	REV	
2024-03-25	N.T.S	1 OF 1	a	A1

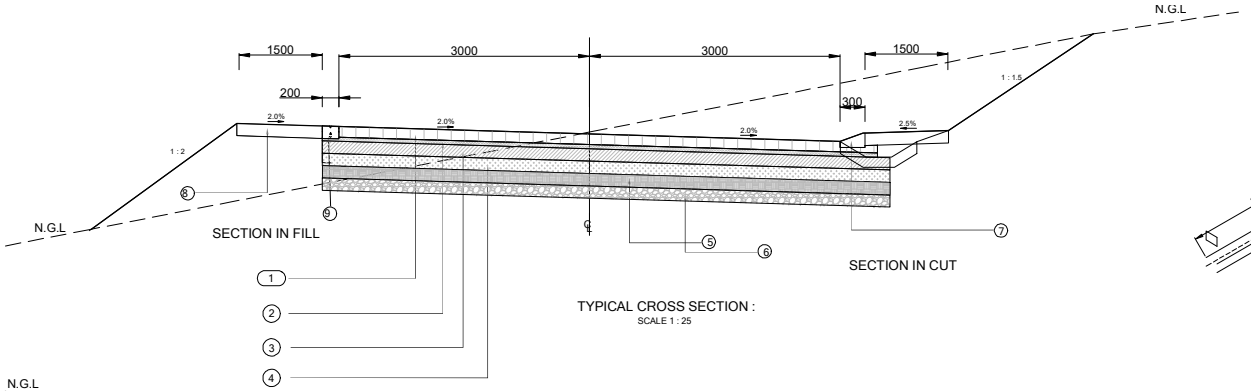
DWG NO

P-SM01-PMO-CE-S-109

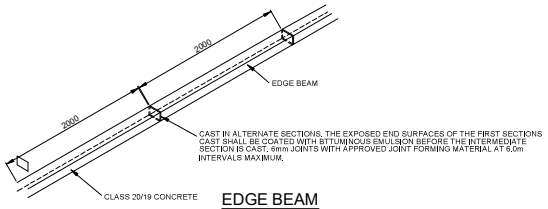
MATERIAL REQUIREMENTS

LAYER	LAYER No	THICKNESS (mm)	DESCRIPTION	TRH 14 MATERIAL AND/OR COLTO CLASSIFICATION	COLTO SPECIFICATION	Min COMPACTION REQUIREMENT	PLASTICITY INDEX	GRADING MODULUS (MIN)	CBR @ % OF Mod AASHTO Denstity	UCS @ 100% Mod AASHTO DENSITY (Mpa)	ITS @ 100% Mod AASHTO DENSITY (kPa)	MAX CBR SWELL @ 100 Mod AASHTO
SURFACING	1	80	INTERLOCKING CONCRETE BLOCKS	S-A	7300	--	--	--	--	--	--	--
BEDDING SAND	2	25	BEDDING SAND LAYER	SND	7300	--	--	--	--	--	--	--
BASE	3	150	CEMENTED NATURAL GRAVEL (G5)	C3	3400 & 3500	97%	6 MAX	1.2	25 @ 95%	1.5 MIN	250 MIN	0.5%
SUB BASE	4	150	NATURAL GRAVEL	G6	3400	96%	12 MAX	1.2	25 @ 93%	--	--	1.0%
SELECTED FILL	5	150	IMPORTED SELECTED LAYER	G7/G8/G9	3400	93%	--	--	15/10/7 @ 93%	--	--	1.5%
ROCKFILL	6	150	ROCKFILL LAYER	--	3200	--	--	--	--	--	--	--
KERB	7	1000 X 300 X 200	FIGURE 8C MOUNTABLE KERB	--	2300	--	--	--	--	--	--	--
PAVED SIDEWALK	8	150	PAVED SIDEWALK	G6	3400	90%	12 MAX	1.2	25 @ 93%	--	--	1.0%
EDGE BEAM	9	200 X 150	CONCRETE EDGE BEAM	--	2300	--	--	--	--	--	--	--
OPEN DRAIN	10	SIZE VARIES	CLASS 30/19 CONCRETE V-DRAIN	--	2300	--	--	--	--	--	--	--

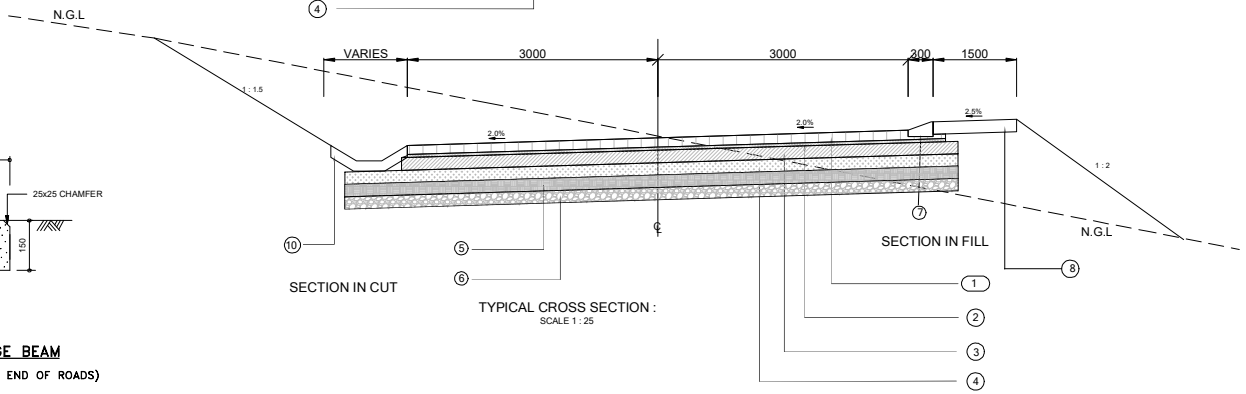
NOTES: VIM - DESIGN VOIDS IN MIX
ARD - APPARENT RELATIVE DENSITY



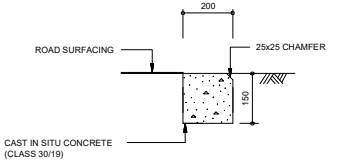
TYPICAL CROSS SECTION :
SCALE 1 : 25



EDGE BEAM

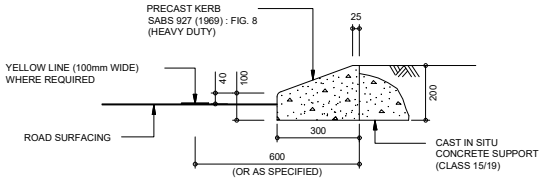


TYPICAL CROSS SECTION :
SCALE 1 : 25



CONCRETE EDGE BEAM

(AT ROAD JUNCTIONS AND END OF ROADS)



MOUNTABLE KERB TYPE 8

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Bloemfontein
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PROFESSIONAL ENGINEER: L. MARAH
PROF. Reg.No: 920281
DATE: 2024-03-25
SIGNATURE:

DESIGN BY:
DRAWN BY:
CHECKED BY: L. MARAH
APPROVED BY: L. MARAH

REVISIONS

REV	DATE	DESCRIPTION	BY
0	2024-03-25	ISSUED FOR TENDER	L.M.

PROJECT NAME
REHABILTATION OF ROADS & STORMWATER IN STERKSPRUIT WARD 10

TITLE
TYPICAL CROSS SECTION AND PAVEMENT DESIGN

PROJECT STATUS: TENDER

DATE	SCALE	SHEET	REV	
2024-03-25	AS SHOWN	1 OF 1	0	A1

DWG NO
P-SM01-PMO-CE-S-108