



DR NKOSAZANA DLAMINI ZUMA MUNICIPALITY

BULWER ASPHALT SURFACING ROADS PHASE 8

NTOKOZWENI ROAD SECTION 3: WARD 10

CONTRACT N⁰ PWBS-B053/23/24

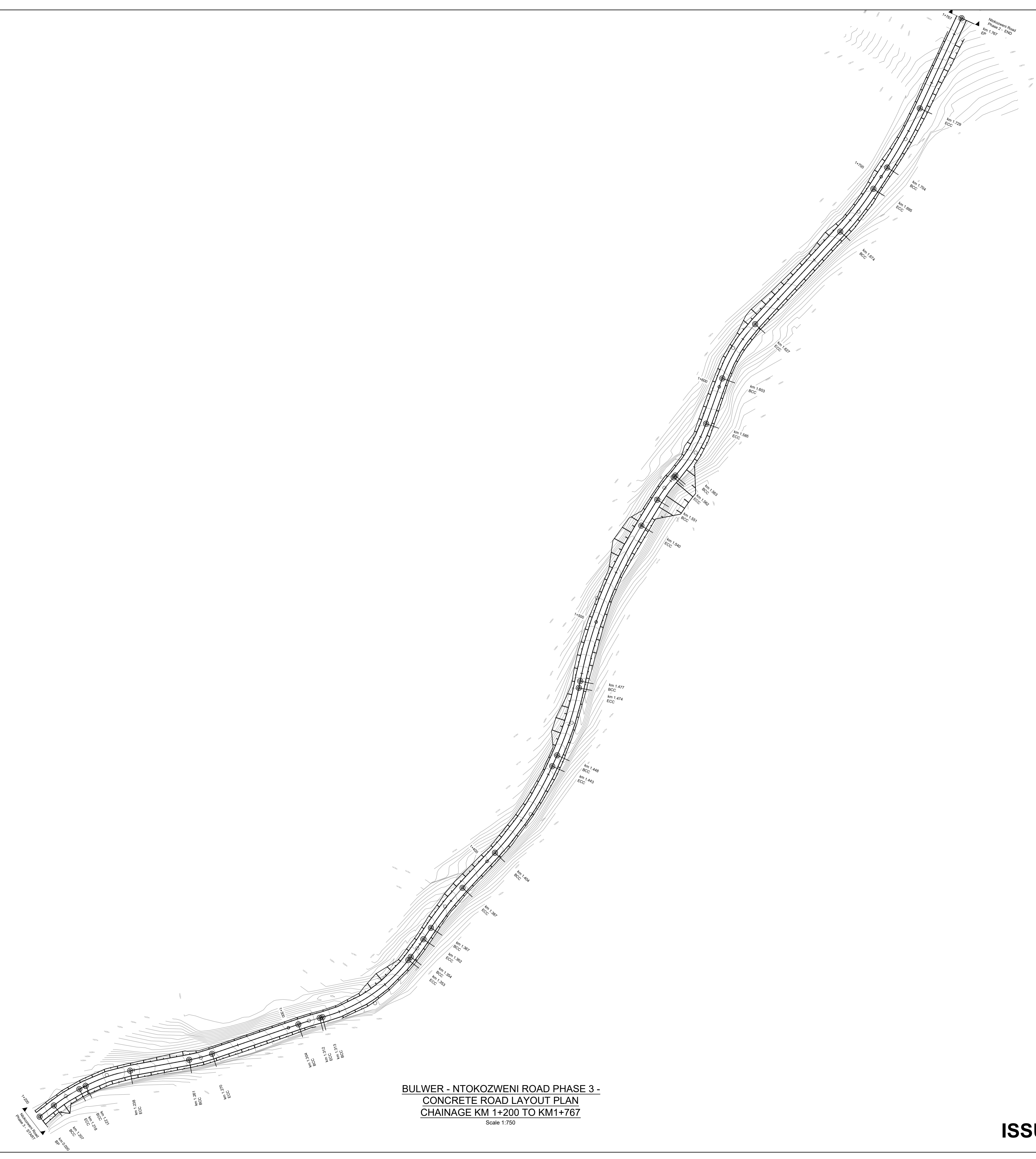
BOOK OF DRAWINGS

Prepared for:

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3263
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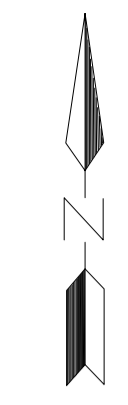
Prepared by:

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**BULWER - NTKOZWENI ROAD PHASE 3 -
CONCRETE ROAD LAYOUT PLAN
CHAINAGE KM 1+200 TO KM1+767**
Scale 1:750

ISSUED FOR TENDER ONLY



CLIENT:



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CONSULTANT:



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DRAWING REVISIONS

REV	DATE	DRAWN	CHECKED	DESCRIPTION

PROJECT NAME:

**UPGRADING OF ROADS IN
BULWER TO CONCRETE
ROADS**

DRAWING TITLE:

**GENERAL ROAD
LAYOUT PLAN:
NTKOZWENI ROAD -
KM 1+200 TO KM 1+767
(PHASE 3 - KM 1+200 TO KM 1+767)**

RESPONSIBLE PERSONNEL	SIGNATURE	DATE
DESIGNED	LH	10/10/2023
DRAWN	LH	10/10/2023
CHECKED	SS	10/10/2023
APPROVED	SS	10/10/2023

SCALE: **AS SHOWN**

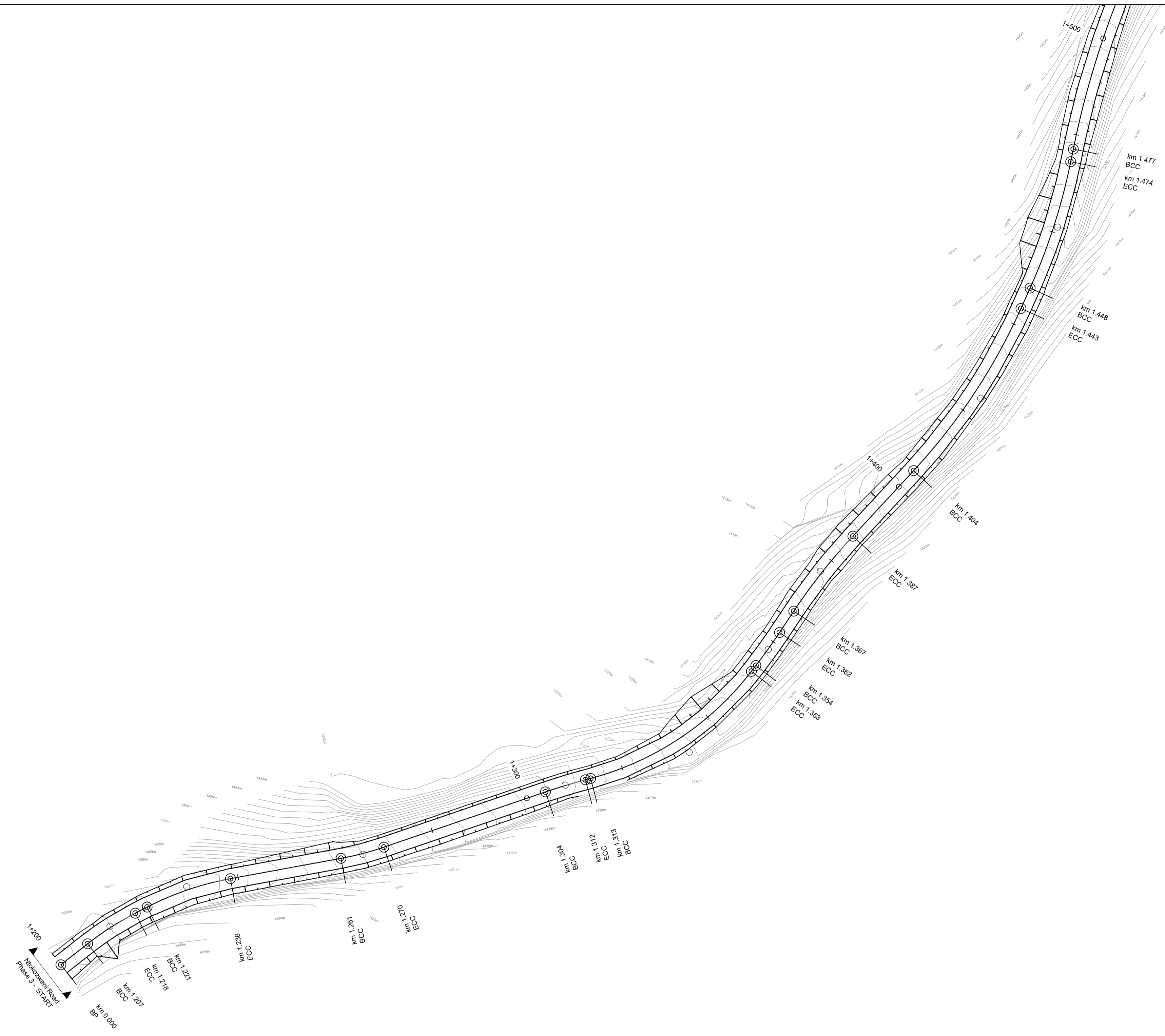
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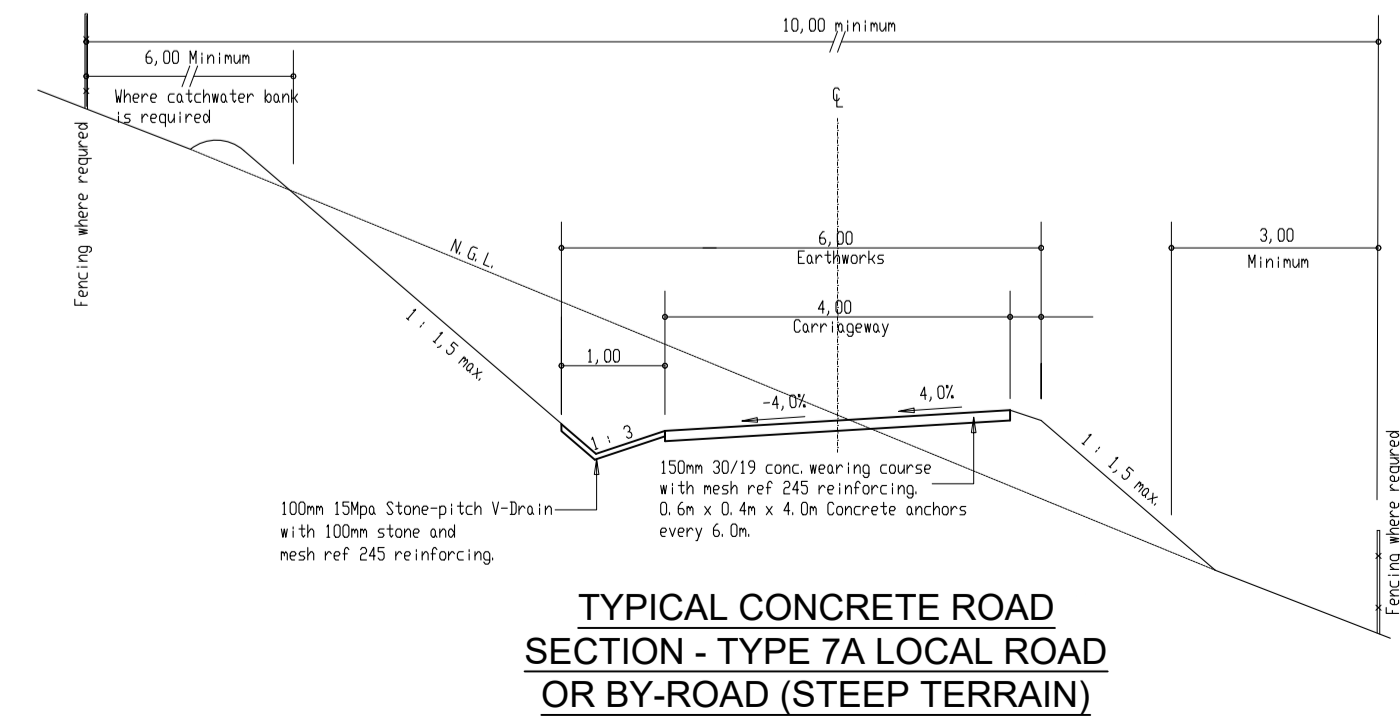
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STAGE	SHEET SIZE	SHEET NO.	REVISION
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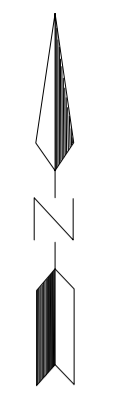



**BULWER - NTOKOZWENI ROAD PHASE 3 -
CONCRETE ROAD LAYOUT PLAN
CHAINAGE KM1+200 TO KM 1+500**
Scale 1:500



NOTES:

1. Phase 1 construction road is 500m, but the total road approximately 1.8KM in length and 600m has been designed
2. Carriageway will be 4m wide
3. All cut banks to include concrete V-drains
4. All V-drains chutes onto natural ground need to be stone pitched to avoid erosion
5. Drainage will be determined by Contractor and Engineer on site and agreed upon prior to construction. Approximately 7 crossings are to be allowed for under Phase 1 construction
6. Access road which ties into existing roads are to be a Type B1 or B3 as per standard details



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 LAYOUT PLAN:
 NTOKOZWENI ROAD -
 KM 1+200 TO KM 1+767
 (PHASE 3 - KM 1+200 TO KM 1+767)**

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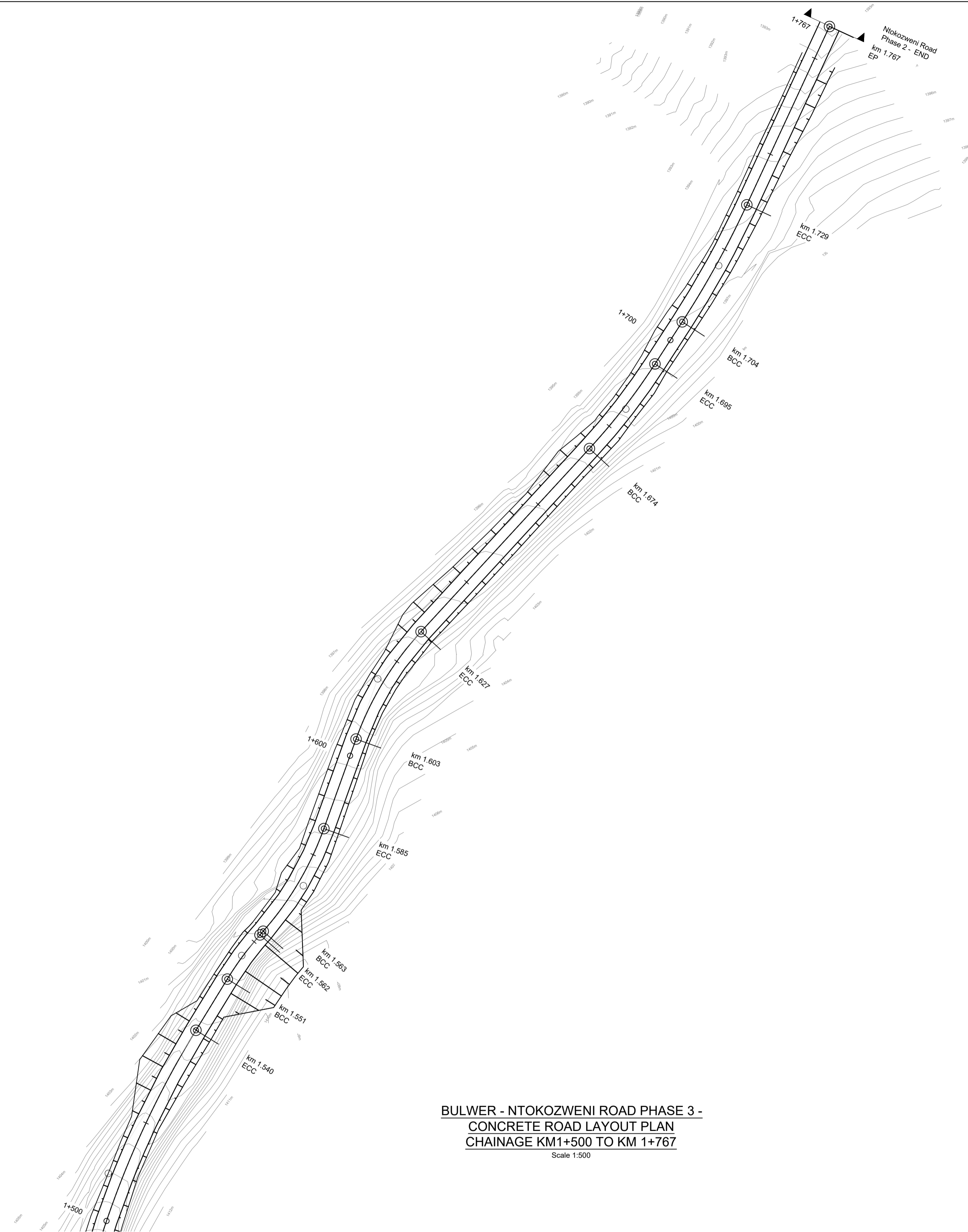
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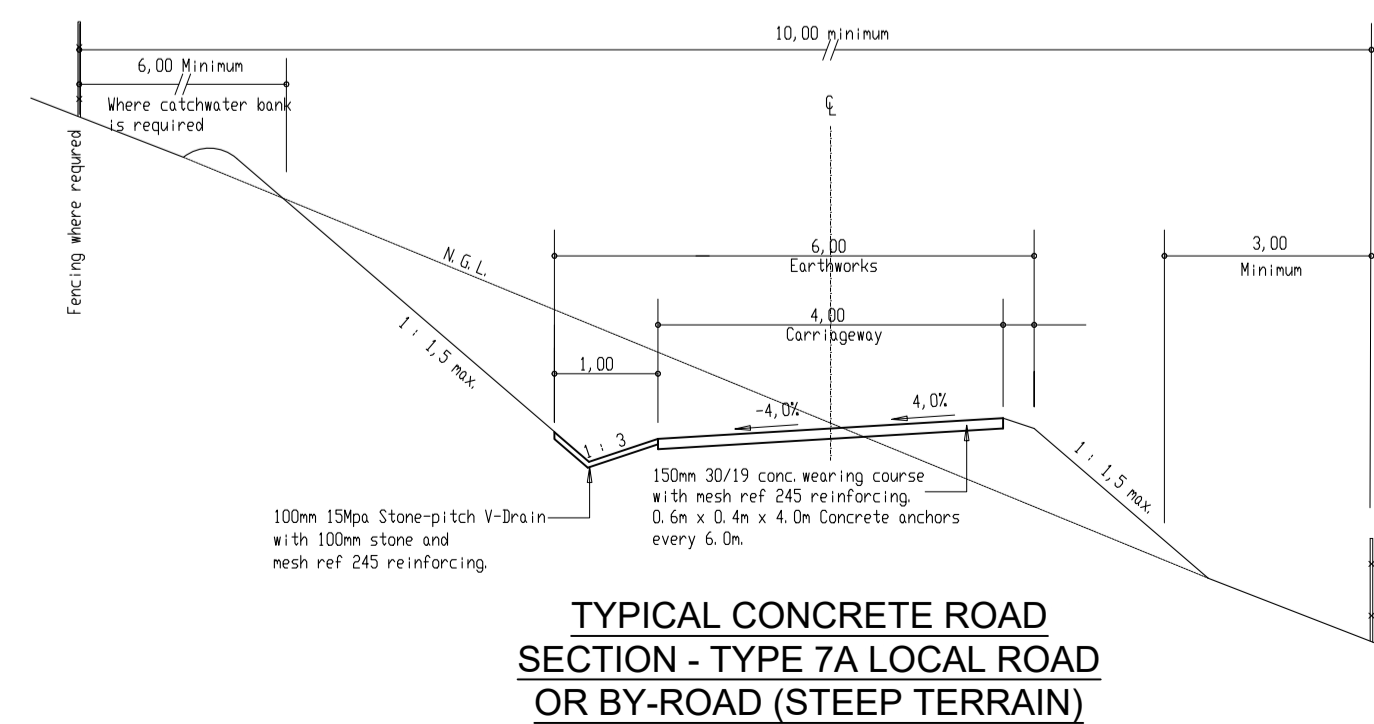
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**BULWER - NTKOZWENI ROAD PHASE 3 -
CONCRETE ROAD LAYOUT PLAN
CHAINAGE KM1+500 TO KM 1+767**
Scale 1:500



**TYPICAL CONCRETE ROAD
SECTION - TYPE 7A LOCAL ROAD
OR BY-ROAD (STEEP TERRAIN)**

NOTES:

1. Phase 1 construction road is 500m, but the total road approximately 1.8KM in length and 600m has been designed
2. Carriageway will be 4m wide
3. All cut banks to include concrete V-drains
4. All V-drains chutes onto natural ground need to be stone pitched to avoid erosion
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LAYOUT PLAN:
NTKOZWENI ROAD -
KM 1+200 TO KM 1+767
(PHASE 3 - KM 1+200 TO KM 1+767)**

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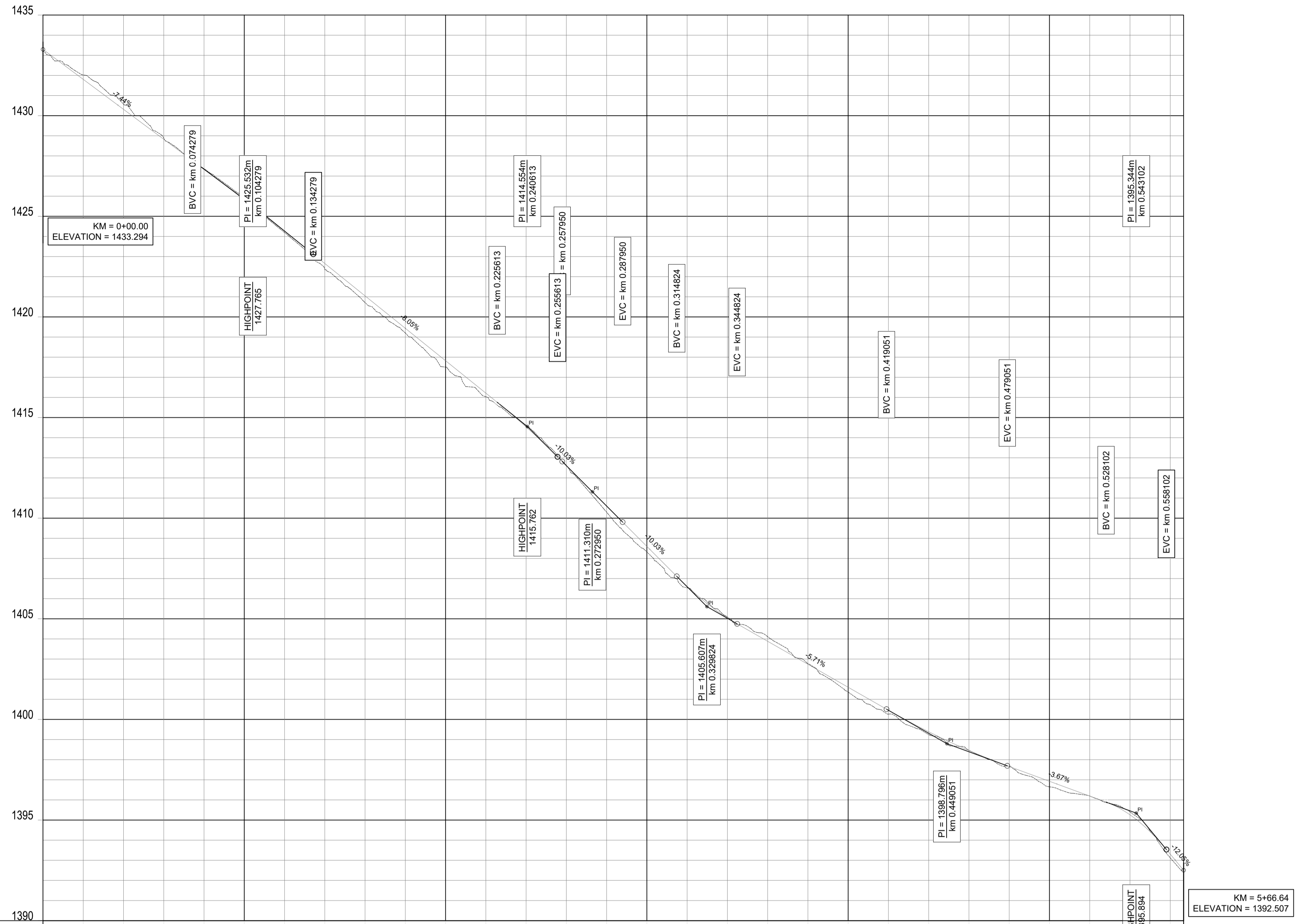
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PROJECT NUMBER	DRAWING NUMBER
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STAGE	SHEET NO.	SHEET TOTAL	REVISION
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Chainage Distance (km)	Earthworks Quantities			Vertical Alignment			C/L Ground Levels	Horizontal Alignment
	Cut Depth (m)	Cut / Fill	Fill Depth (m)	Grades %	Vertical Curves	Final Road Levels		
1.200	0.000		0.000	-7.443%	VCL=60 m K=98.4	Left Edge: 1433.374 Centre Line: 1433.214 Right Edge: 1433.214	1433.294	6.791
1.220	0.221	0.297	0.254	-7.443%	VCL=60 m K=98.4	Left Edge: 1431.885 Centre Line: 1431.725 Right Edge: 1431.725	1431.805	6.791
1.240	0.057	0.004	0.030	-7.443%	VCL=60 m K=98.4	Left Edge: 1428.908 Centre Line: 1428.748 Right Edge: 1428.748	1428.885	6.791
1.260	0.069	0.069	0.069	-7.443%	VCL=60 m K=98.4	Left Edge: 1427.418 Centre Line: 1427.258 Right Edge: 1427.258	1427.338	6.791
1.280	0.069	0.069	0.069	-7.443%	VCL=60 m K=98.4	Left Edge: 1425.897 Centre Line: 1425.737 Right Edge: 1425.737	1425.817	6.791
1.300	0.064	0.064	0.064	-7.443%	VCL=60 m K=98.4	Left Edge: 1424.336 Centre Line: 1424.176 Right Edge: 1424.176	1424.256	6.791
1.320	0.289	0.333	0.229	-8.052%	VCL=60 m K=98.4	Left Edge: 1422.736 Centre Line: 1422.576 Right Edge: 1422.576	1422.656	6.791
1.340	0.333	0.229	0.317	-8.052%	VCL=60 m K=98.4	Left Edge: 1421.125 Centre Line: 1420.965 Right Edge: 1420.965	1421.045	6.791
1.360	0.194	0.194	0.194	-8.052%	VCL=60 m K=98.4	Left Edge: 1419.515 Centre Line: 1419.355 Right Edge: 1419.355	1419.435	6.791
1.380	0.179	0.135	0.179	-8.052%	VCL=60 m K=98.4	Left Edge: 1417.904 Centre Line: 1417.744 Right Edge: 1417.744	1417.824	6.791
1.400	0.038	0.038	0.038	-8.052%	VCL=60 m K=98.4	Left Edge: 1416.294 Centre Line: 1416.134 Right Edge: 1416.134	1416.214	6.791
1.420	0.011	0.011	0.011	-8.052%	VCL=60 m K=98.4	Left Edge: 1414.684 Centre Line: 1414.524 Right Edge: 1414.524	1414.544	6.791
1.440	0.011	0.011	0.011	-8.052%	VCL=60 m K=98.4	Left Edge: 1413.074 Centre Line: 1412.914 Right Edge: 1412.914	1412.934	6.791
1.460	0.011	0.011	0.011	-8.052%	VCL=60 m K=98.4	Left Edge: 1411.464 Centre Line: 1411.304 Right Edge: 1411.304	1411.264	6.791
1.480	0.011	0.011	0.011	-8.052%	VCL=60 m K=98.4	Left Edge: 1409.854 Centre Line: 1409.694 Right Edge: 1409.694	1409.654	6.791
1.500	0.011	0.011	0.011	-8.052%	VCL=60 m K=98.4	Left Edge: 1408.244 Centre Line: 1408.084 Right Edge: 1408.084	1408.044	6.791
1.520	0.011	0.011	0.011	-8.052%	VCL=60 m K=98.4	Left Edge: 1406.634 Centre Line: 1406.474 Right Edge: 1406.474	1406.374	6.791
1.540	0.042	0.229	0.274	-10.031%	VCL=30 m K=15.2	Left Edge: 1405.024 Centre Line: 1404.864 Right Edge: 1404.864	1404.824	3.993
1.560	0.042	0.229	0.274	-10.031%	VCL=30 m K=15.2	Left Edge: 1403.414 Centre Line: 1403.254 Right Edge: 1403.254	1403.214	3.993
1.580	0.042	0.229	0.274	-10.031%	VCL=30 m K=15.2	Left Edge: 1401.804 Centre Line: 1401.644 Right Edge: 1401.644	1401.604	3.993
1.600	0.042	0.229	0.274	-10.031%	VCL=30 m K=15.2	Left Edge: 1400.194 Centre Line: 1400.034 Right Edge: 1400.034	1400.034	3.993
1.620	0.042	0.229	0.274	-10.031%	VCL=30 m K=15.2	Left Edge: 1398.584 Centre Line: 1398.424 Right Edge: 1398.424	1398.364	3.993
1.640	0.042	0.229	0.274	-10.031%	VCL=30 m K=15.2	Left Edge: 1396.974 Centre Line: 1396.814 Right Edge: 1396.814	1396.754	3.993
1.660	0.042	0.229	0.274	-10.031%	VCL=30 m K=15.2	Left Edge: 1395.364 Centre Line: 1395.204 Right Edge: 1395.204	1395.144	3.993
1.680	0.042	0.229	0.274	-10.031%	VCL=30 m K=15.2	Left Edge: 1393.754 Centre Line: 1393.594 Right Edge: 1393.594	1393.534	3.993
1.700	0.042	0.229	0.274	-10.031%	VCL=30 m K=15.2	Left Edge: 1392.144 Centre Line: 1391.984 Right Edge: 1391.984	1391.964	3.993
1.720	0.042	0.229	0.274	-10.031%	VCL=30 m K=15.2	Left Edge: 1390.534 Centre Line: 1390.374 Right Edge: 1390.374	1390.314	3.993
1.740	0.042	0.229	0.274	-10.031%	VCL=30 m K=15.2	Left Edge: 1388.924 Centre Line: 1388.764 Right Edge: 1388.764	1388.744	3.993
1.760	0.042	0.229	0.274	-10.031%	VCL=30 m K=15.2	Left Edge: 1387.314 Centre Line: 1387.154 Right Edge: 1387.154	1387.134	3.993
1.767	0.184	0.184	0.184	-12.053%	VCL=30 m K=3.6	Left Edge: 1385.704 Centre Line: 1385.544 Right Edge: 1385.544	1385.524	3.993

BULWER - NTOKOZWENI ROAD PHASE 3 - CONCRETE ROAD LONG-SECTION CHAINAGE KM1+200 TO KM 1+767

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DRAWING REVISIONS

REV	DATE	DRAWN	CHECKED	DESCRIPTION

PROJECT NAME: **UPGRADING OF ROADS IN BULWER TO CONCRETE ROADS**

DRAWING TITLE: **LONG-SECTION**
 NTOKOZWENI ROAD - KM 1+200 TO KM 1+767 (PHASE 3 - KM 1+200 TO KM 1+767)

DESIGNED	SIGNATURE	DATE
LH		10/10/2023
DRAWN	LH	10/10/2023
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APPROVED	SS	10/10/2023

SCALE: **AS SHOWN**

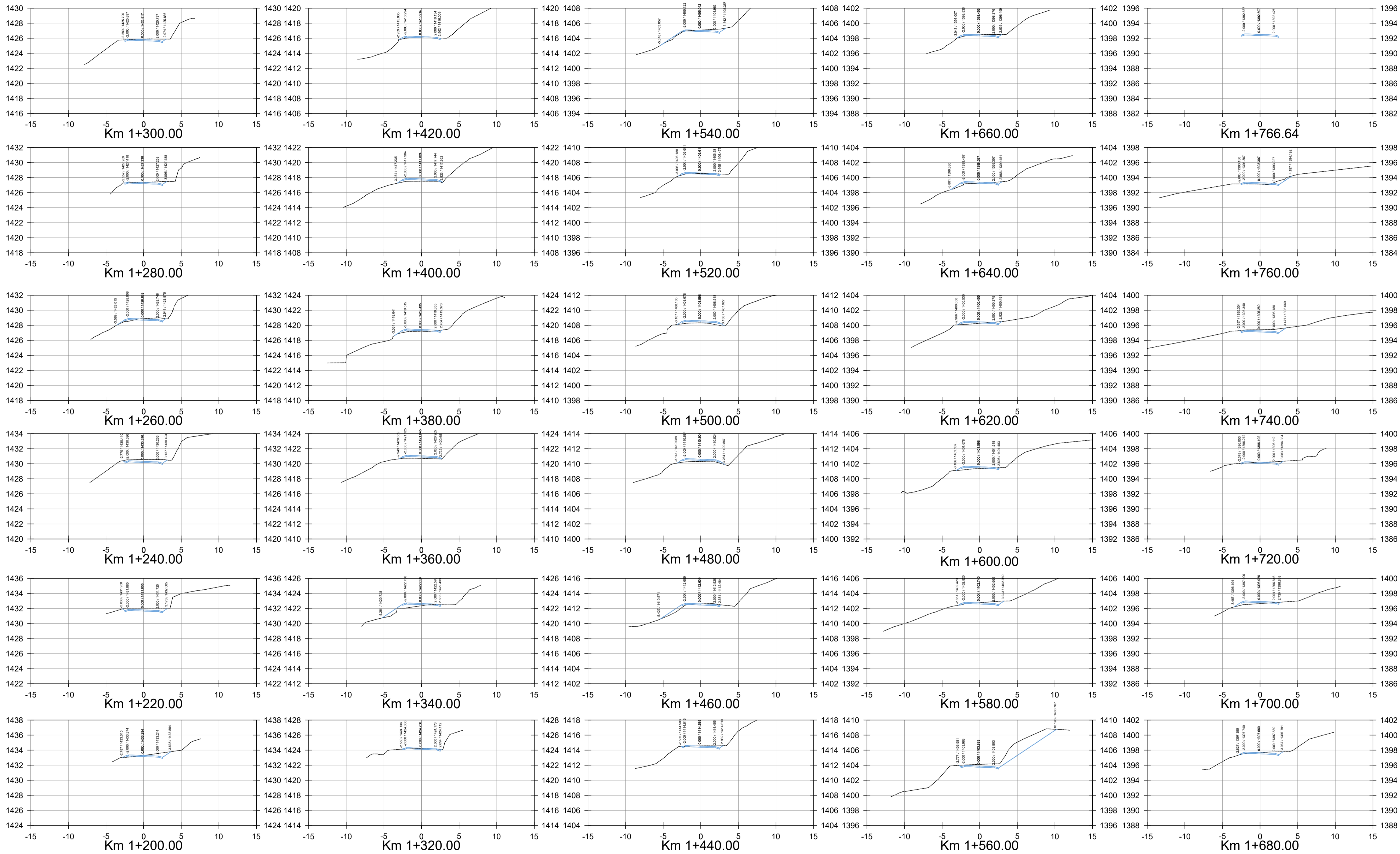
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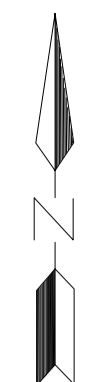
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STAGE: **DESIGN** SHEET NO: **A1** SHEET TOTAL: **4 of 6** REVISION: **-**

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**BULWER - NTOKOZWENI ROAD PHASE 3 -
CROSS-SECTIONS
CHAINAGE KM1+200 TO KM 1+767**





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**UPGRADING OF ROADS IN
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ROADS**

DRAWING TITLE:

CROSS SECTIONS

NTOKOZWENI ROAD -
KM 1+200 TO KM 1+767
(PHASE 3 - KM 1+200 TO KM 1+767)

RESPONSIBLE PERSONNEL	SIGNATURE	DATE
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APPROVED - CLIENT

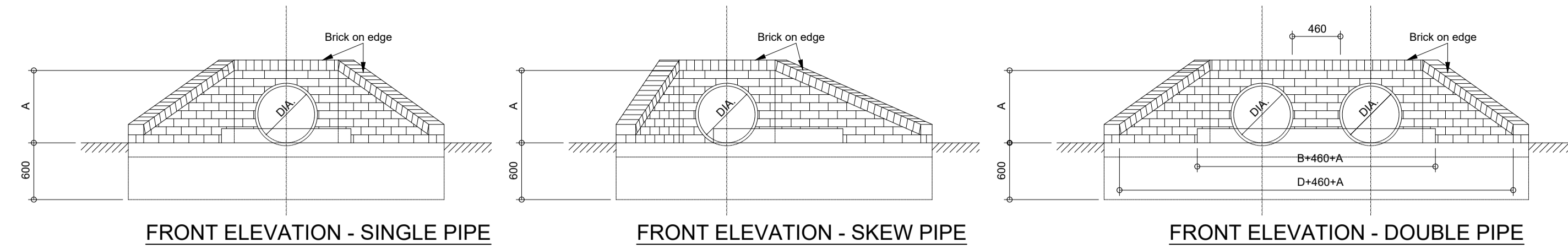
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PROJECT NUMBER	DRAWING NUMBER
BA1220/01	BA1220-01-005-SEC-T-00

STAGE	SHEET NO.	SHEET TOTAL	REVISION
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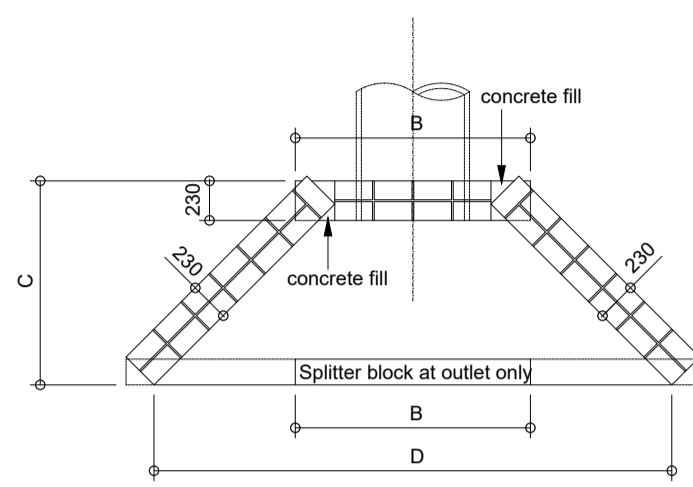
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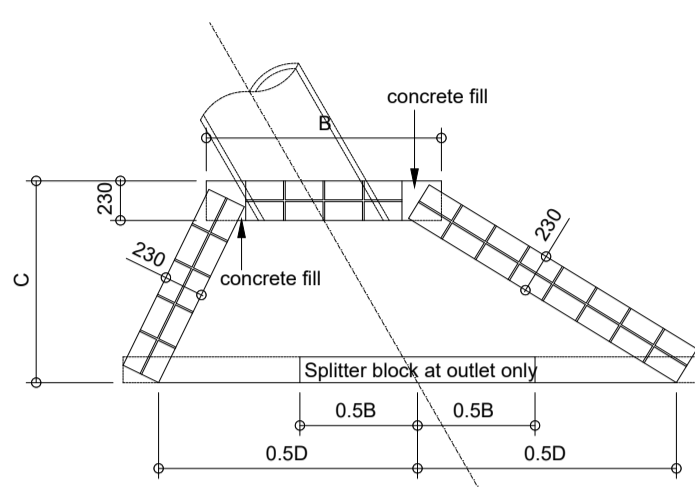
FRONT ELEVATION - SINGLE PIPE

FRONT ELEVATION - SKEW PIPE

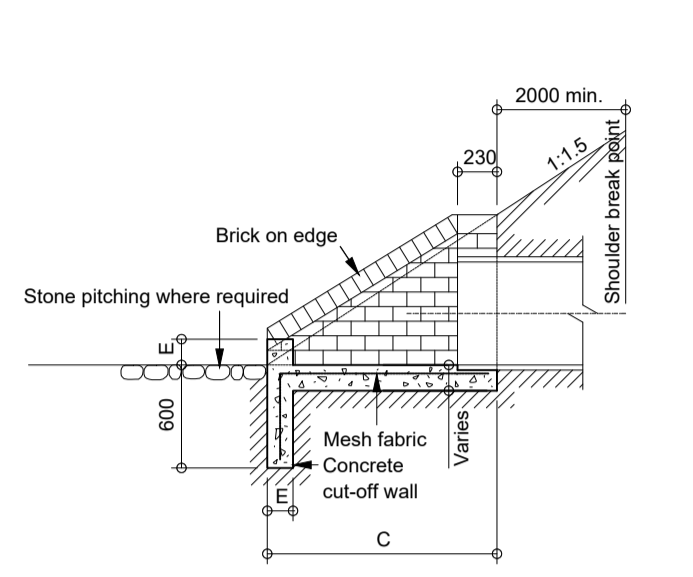
FRONT ELEVATION - DOUBLE PIPE



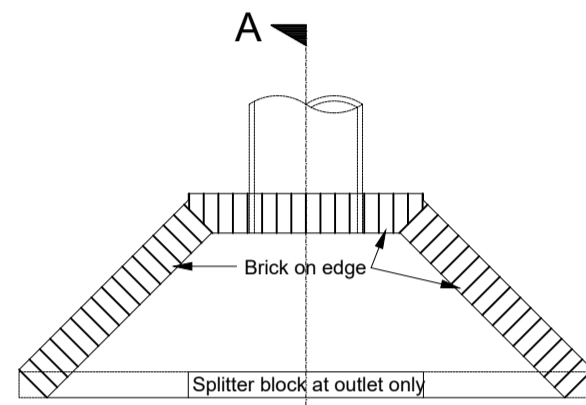
LAYOUT OF BRICKWORK



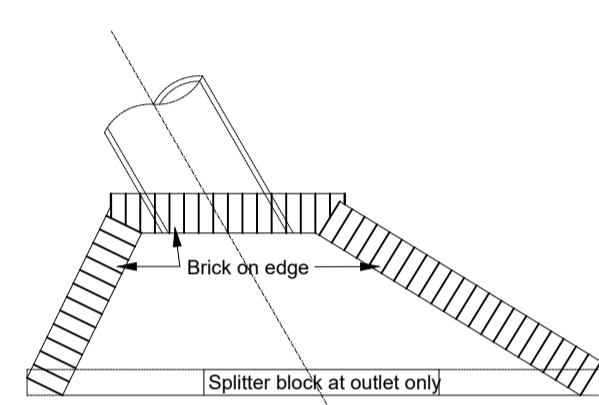
LAYOUT OF BRICKWORK



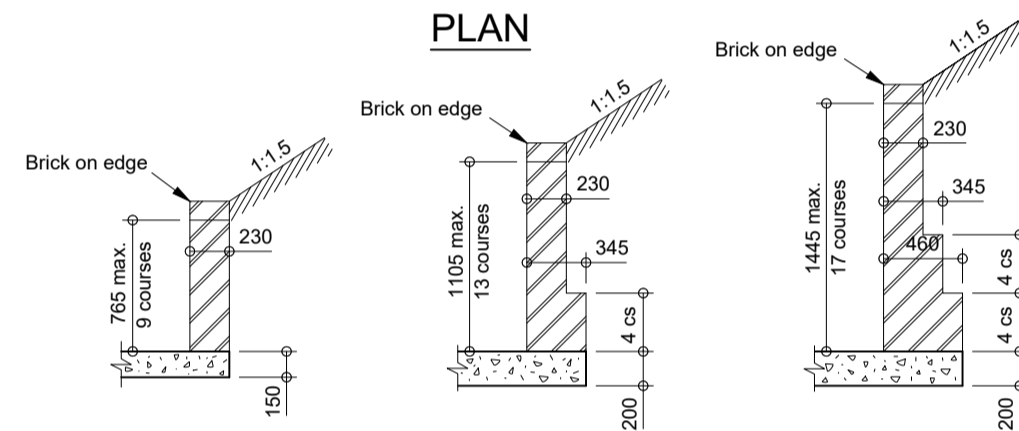
SECTION A-A



PLAN



PLAN OF SKEW CULVERT

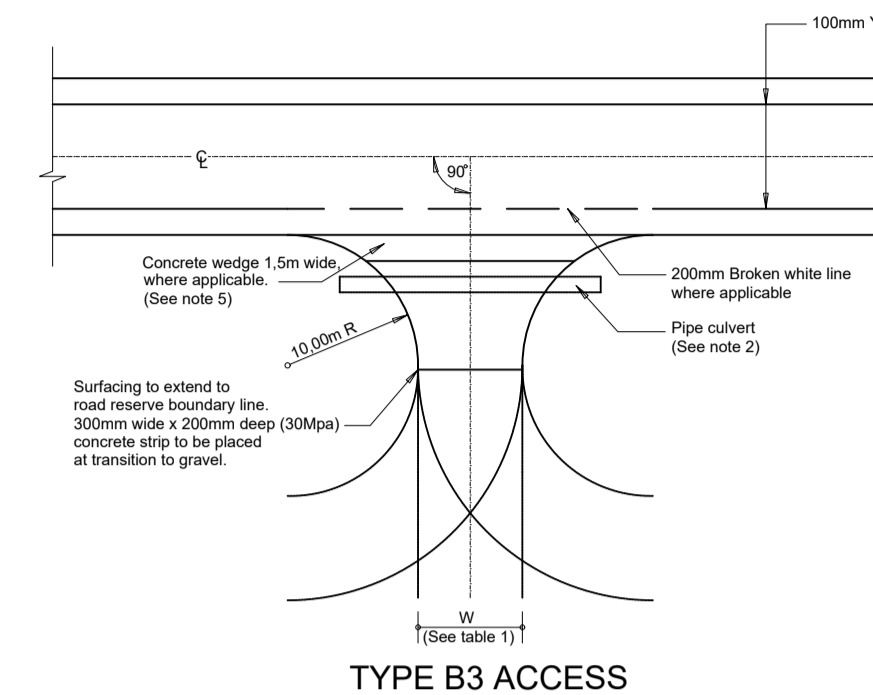


TYPICAL RETAINING WALL DETAILS

Nominal Dia.	Dimensions (mm)				
	A	B	C	D	E
450	595	1 150	1 050	2 700	150
600	765	1 380	1 200	3 000	150
750	935	1 610	1 350	3 300	150
900	1 105	1 840	1 500	3 600	230
1 050	1 275	2 070	1 750	3 900	230
1 200	1 445	2 300	1 900	4 200	230

NOTES:

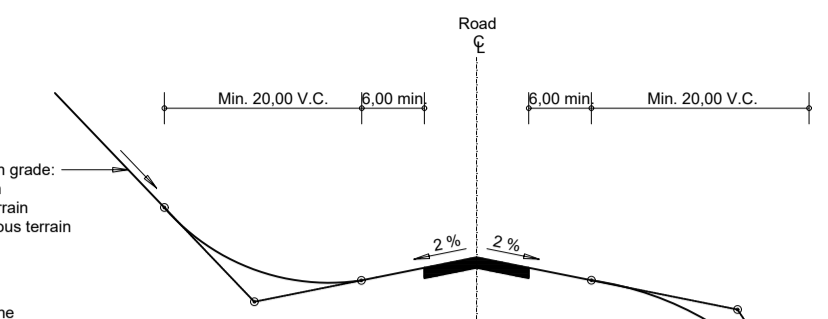
- Splitter block and pitching to be provided at all outlets where erosion is likely to occur.
- Splitter block may be omitted if discharge velocity is less than 0.9 m/s.
- Cut-off walls may be omitted if structure is founded on rock.
- For multiple pipe culverts increase dimensions 'E' and 'F' by (n-1)(A+460)mm : Where n = number of pipes and A = nominal diameter of pipes
- Pipes to be cut flush with headwall.
- For skew pipe culverts the headwall shall be parallel to the centre line of the road.
- If corrugated metal pipes are used 4x20mmx150mm long galvanised anchor bolts in the hollows of the corrugation are to be used.
- All concrete is to be 20MPa.
- Square mesh fabric (Reference S.M.F.193) is to be placed 50mm from top in all apron slabs and centrally in cut-off walls.
- Brickwork is to consist of good quality burnt clay common bricks in accordance with SABS 227 Specification, or cement bricks in accordance with SABS 987 Specification, uniform in size and shape laid in stretcher bond style with the skins tied together with galvanised crimped wire wall ties.
- Brickforce is to be placed every 4th course.
- Jointing on all visible faces to be pointed.
- No in-fill shall be larger than a half standard brick size unless 15MPa concrete is used.
- Pipe crossings to be verified on site.



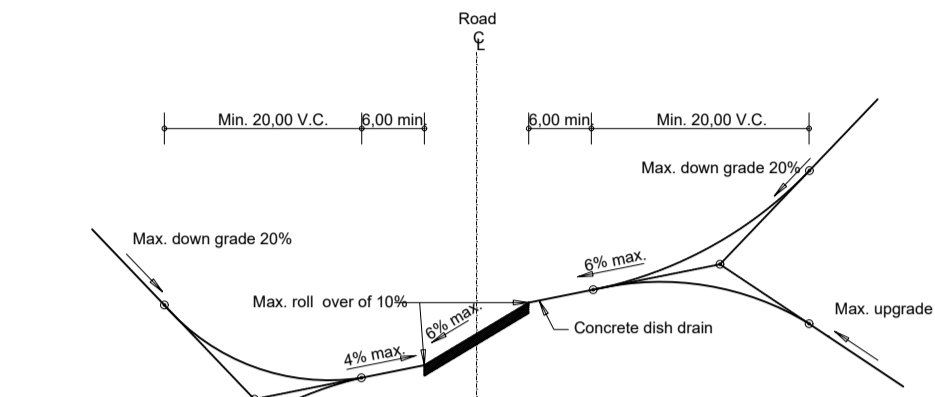
TYPE B3 ACCESS

USAGE	MIN. WIDTH (W)	DESIRABLE WIDTH (W)
Predominantly light vehicles < 10tpd.	3,00	5,00
Predominantly light vehicles > 10 vpd.	5,00	7,00
Predominantly heavy vehicles < 10tpd.	5,00	8,00
Predominantly heavy vehicles > 10tpd.	7,00	10,00

TABLE 1: DESIRABLE USAGE AND DIMENSIONS FOR TYPE B1/B3 ACCESS



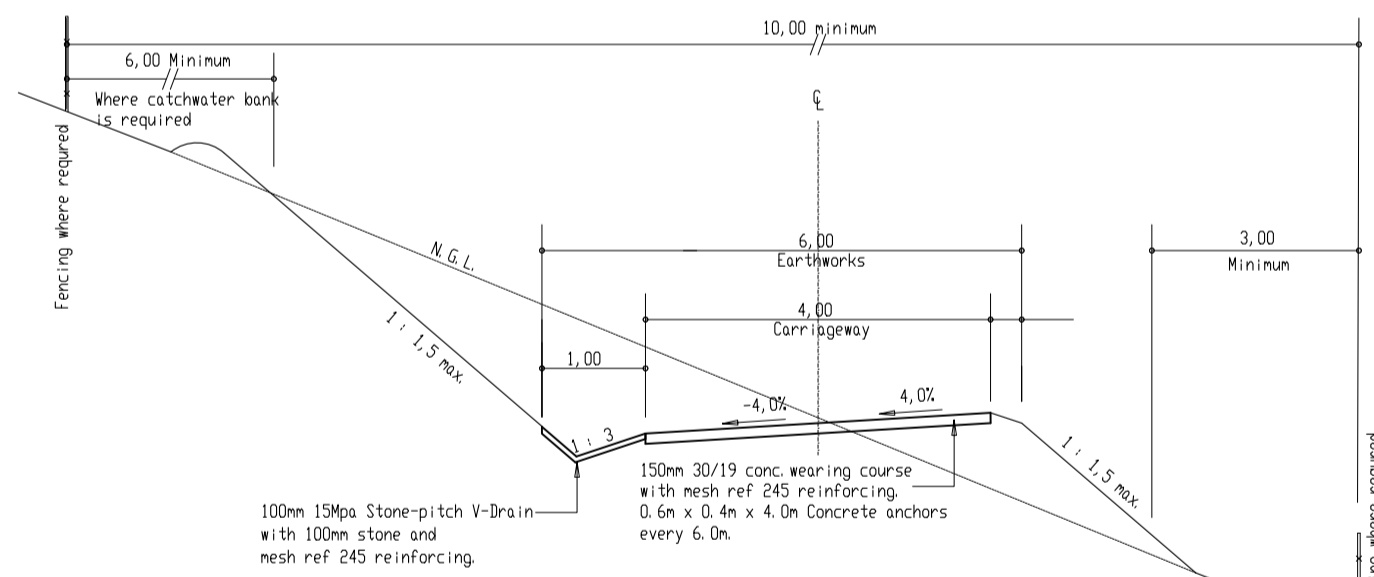
DESIRABLE GRADE REQUIREMENTS



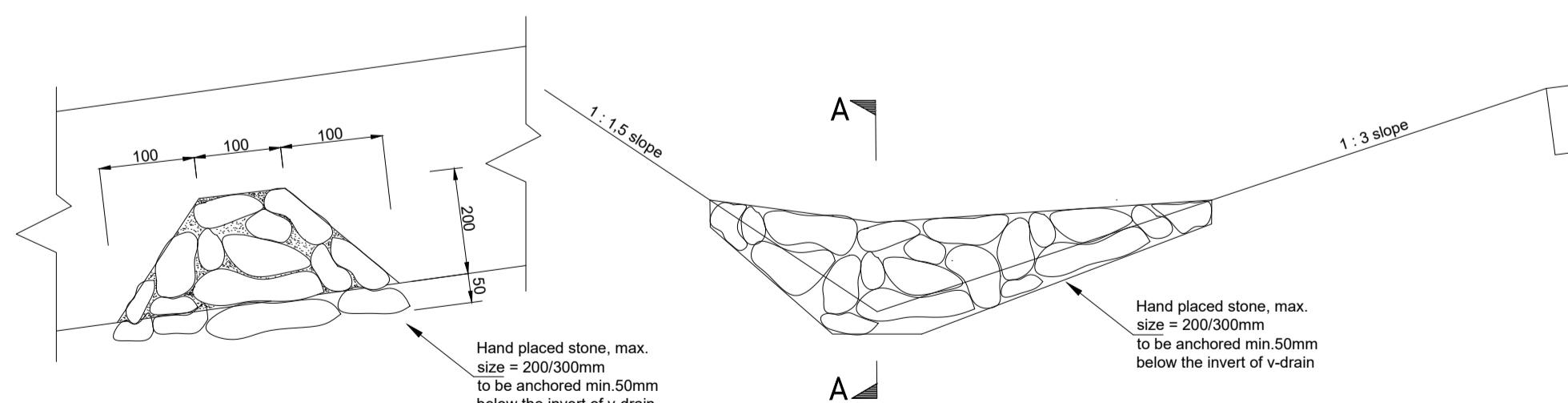
MAXIMUM ACCESS GRADES

NOTES:

- Type B access are recommended for secondary and tertiary road intersections and roads serving minor developments.
- Pipe culverts are to be provided when necessary to maintain longitudinal drainage. The pipe shall be manufactured of concrete or galvanised metal with a minimum diameter of 450mm. The pipe shall be sufficiently long to clear the fill slopes.
- The access bellmouth shall be designed and constructed such that stormwater from the access will not run onto or across the road surface.
- The pavement layers shall be constructed as directed by the Engineer.
- Overl surfacing is only permitted in isolated areas where the cost of surfacing would be unreasonably high. A concrete wedge 1.5m wide shall then be provided to protect the pavement edge.
- Where two roads intersect, the numerical difference of the gradients (roll over) should not exceed 10% with a maximum super of 6% on the main road.
- Maximum approach gradient to be 4% upgrade and 6% down grade.

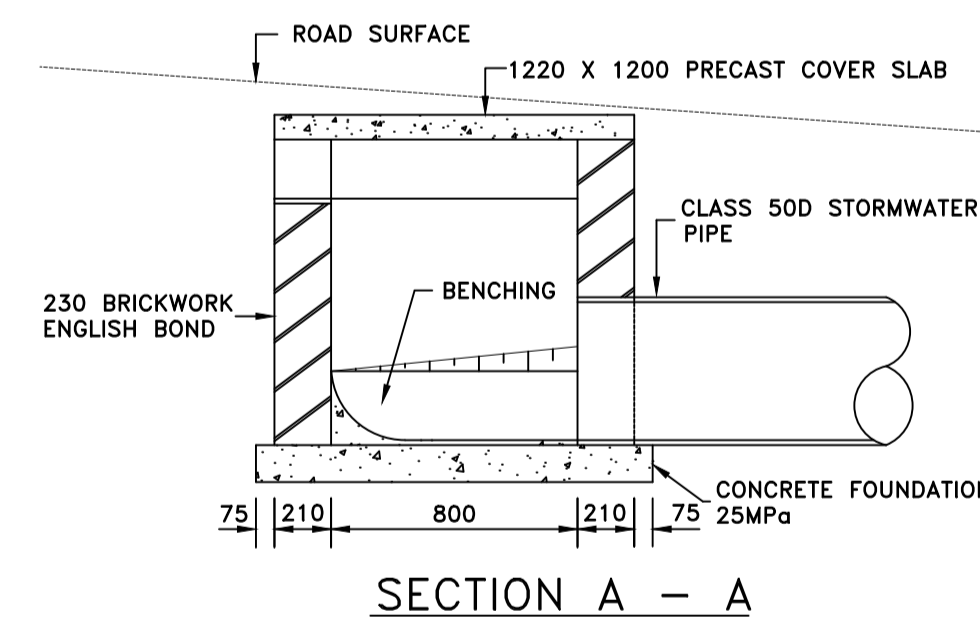


TYPICAL CONCRETE ROAD SECTION - TYPE 7A LOCAL ROAD OR BY-ROAD (STEEP TERRAIN)

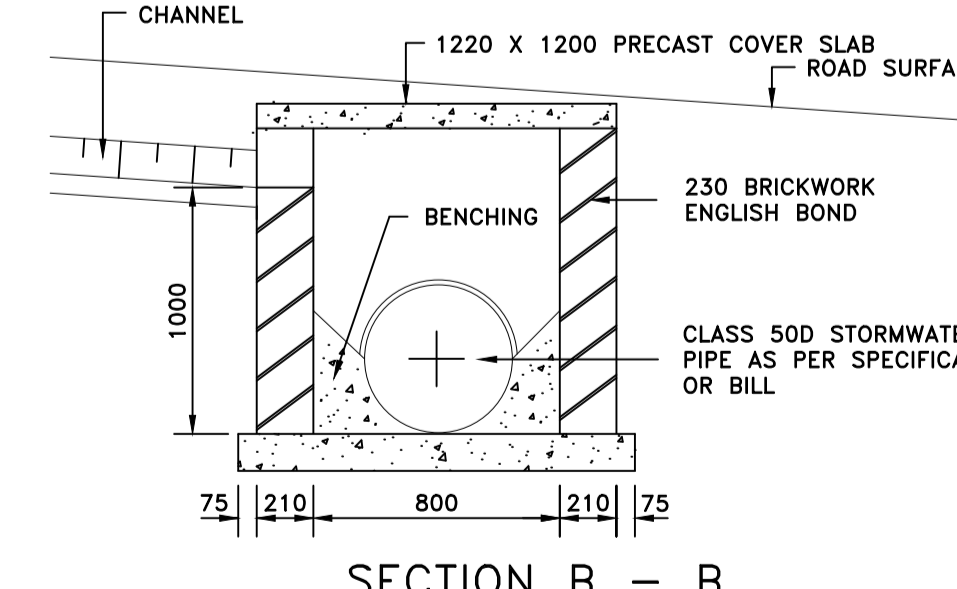


SECTION A-A N.T.S.

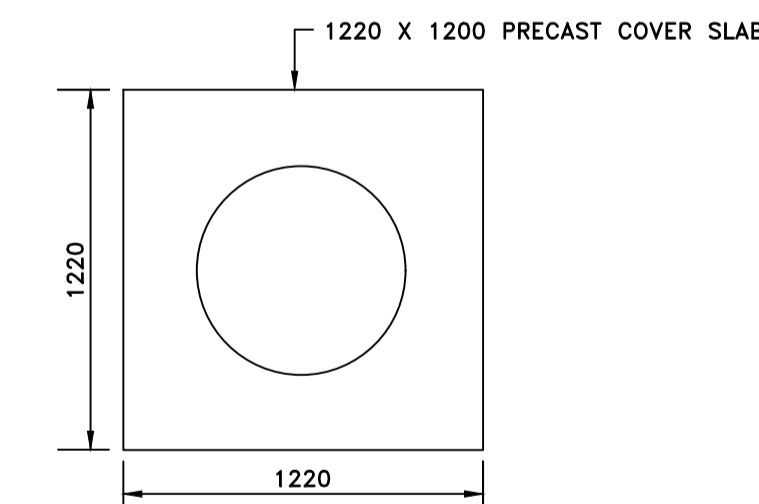
BOLSTERS DETAIL N.T.S.



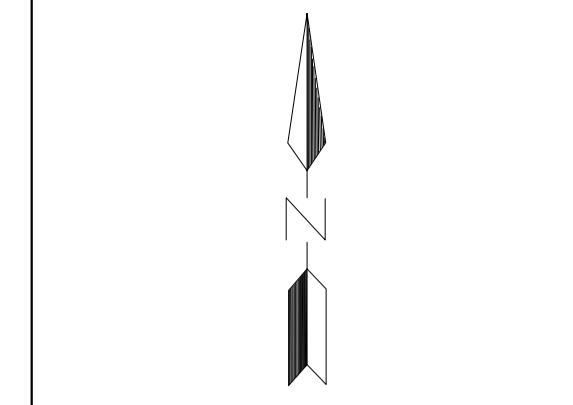
SECTION A - A



SECTION B - B



HEAVY DUTY PRECAST MANHOLE COVER



CLIENT:

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DRAWING REVISIONS

REV	DATE	DRAWN	CHECKED	DESCRIPTION

PROJECT NAME:

UPGRADING OF ROADS IN BULWER TO CONCRETE ROADS

DRAWING TITLE:

STANDARD DETAILS

RESPONSIBLE PERSONNEL	SIGNATURE	DATE
DESIGNED	LH	10/10/2023
DRAWN	LH	10/10/2023
CHECKED	SS	10/10/2023
APPROVED	SS	10/10/2023
SCALE	NTS	

APPROVED - CLIENT

SIGNATURE _____ DATE _____

PROJECT NUMBER	DRAWING NUMBER		
BA1220/01	BA1220-01-006-DET-A-00		
STAGE	SHEET SIZE	SHEET NO.	REVISION
DESIGN	A1	6 of 6	-

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