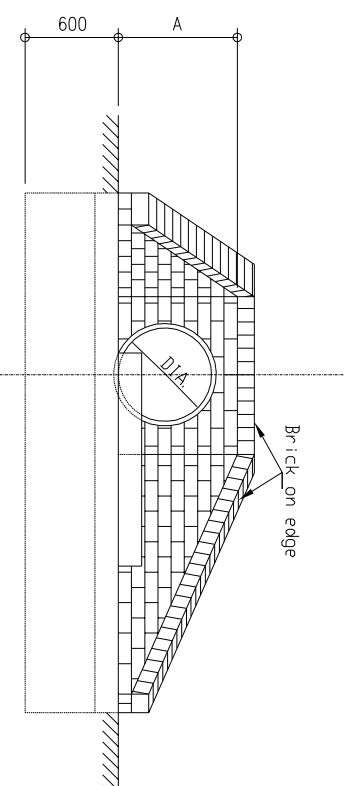
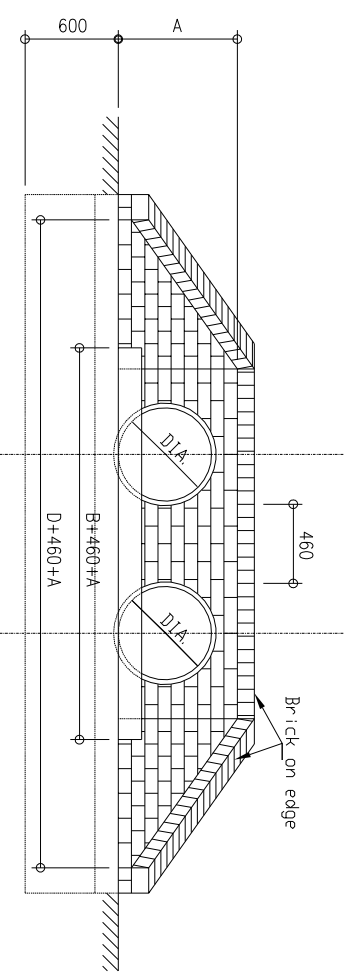


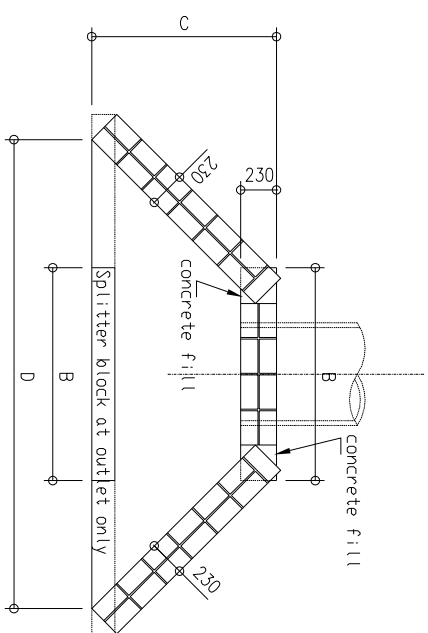
FRONT ELEVATION - SINGLE PIPE



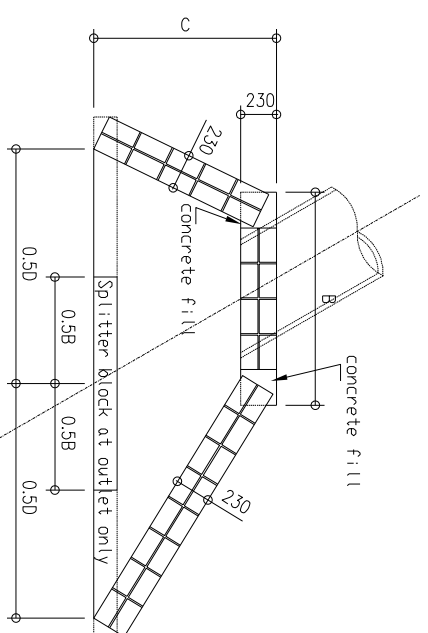
FRONT ELEVATION - SKEW PIPE



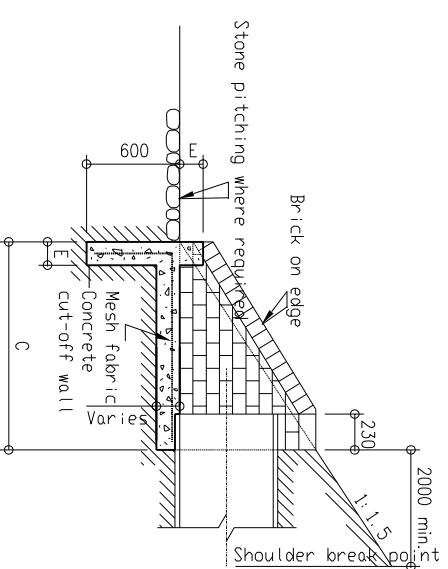
FRONT ELEVATION - DOUBLE PIPE



LAYOUT OF BRICKWORK



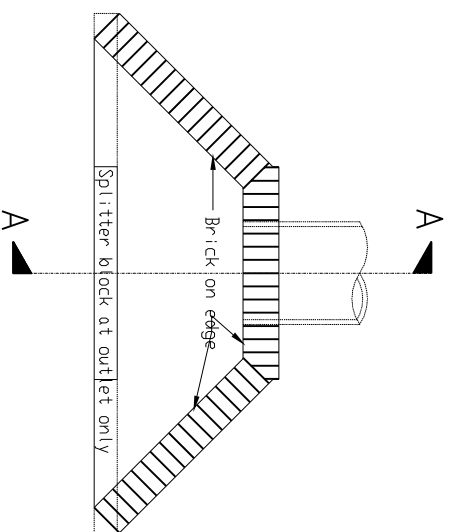
LAYOUT OF BRICKWORK



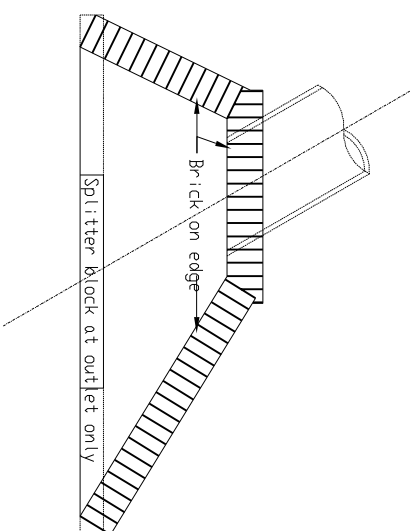
SECTION A-A

NOTES :

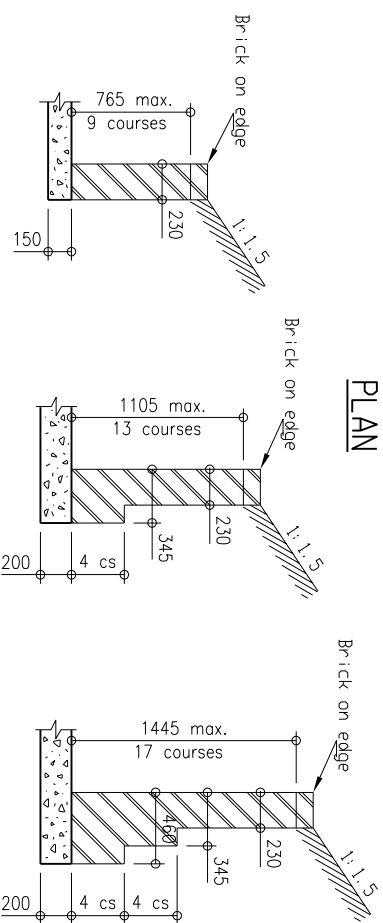
1. Splitter block and pitching to be provided at all outlets where erosion is likely to occur.
2. Splitter block may be omitted if discharge velocity is less than 0.9 m/s.
3. Cut-off walls may be omitted if structure is founded on rock.
4. For multiple pipe culverts increase dimensions 'E' and 'F' by $(n-1)(A+460)$ mm : Where n = number of pipes and A = nominal diameter of pipes
5. Pipes to be cut flush with headwall.
6. For skew pipe culverts the headwall shall be parallel to the centre line of the road.
7. If corrugated metal pipes are used 4x20mmx150mm long galvanised anchor bolts in the hollows of the corrugation one to be used.
8. All concrete is to be 20MPa.
9. 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.
10. 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.
11. Brickforce is to be placed every 4th course.
12. Jointing on all visible faces to be pointed
13. No in-fill shall be larger than a half standard brick size unless 15Mpa concrete is used.



PLAN

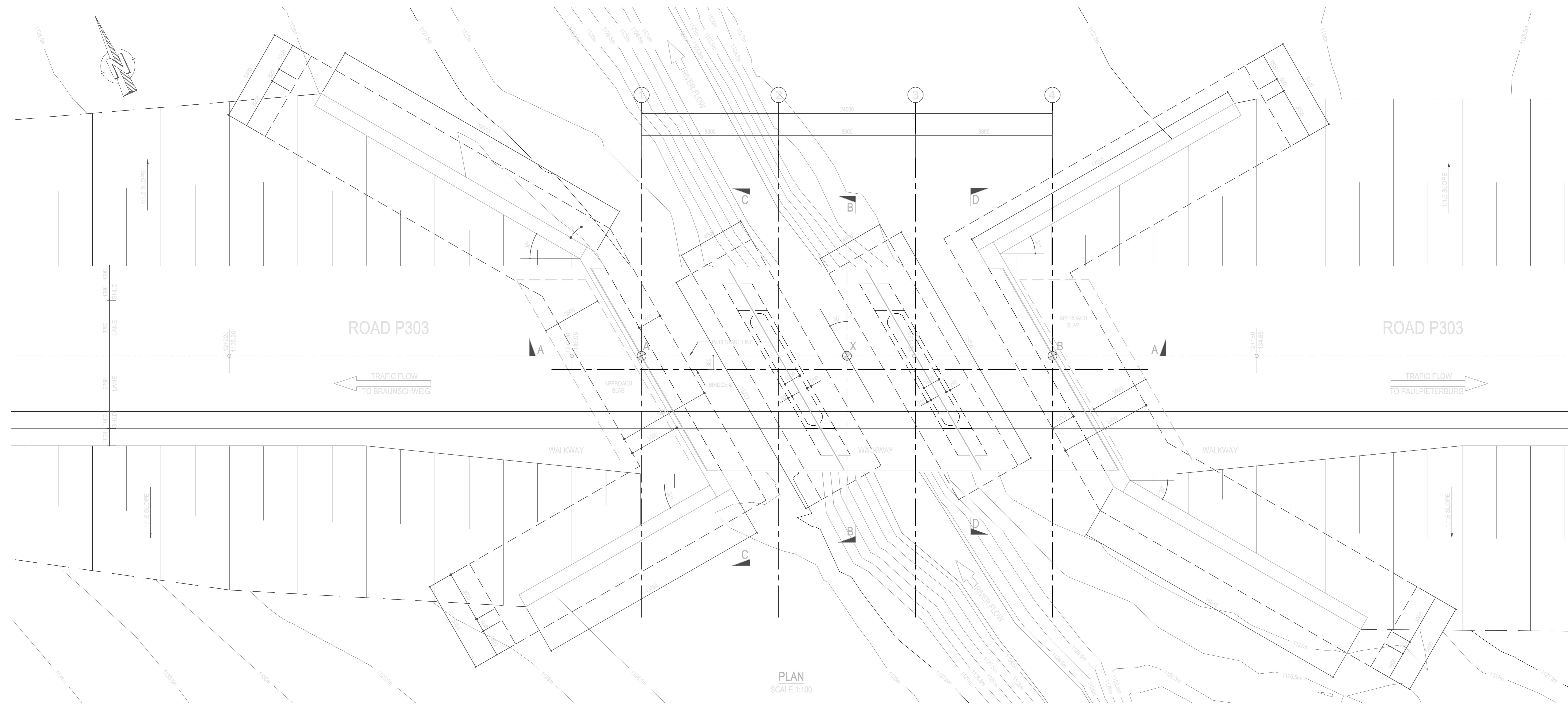


PLAN OF SKEW CULVERT

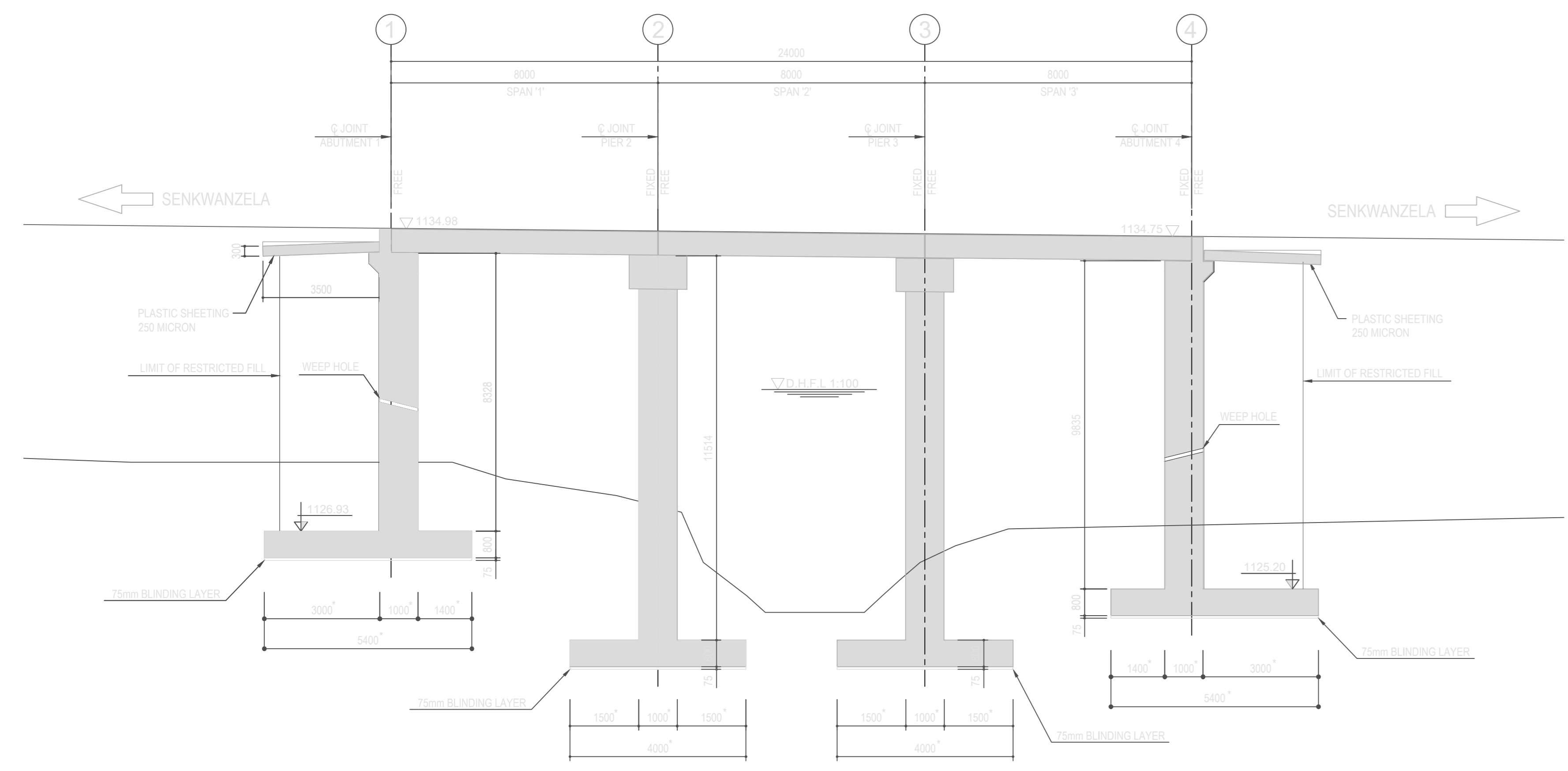


TYPICAL RETAINING WALL DETAILS

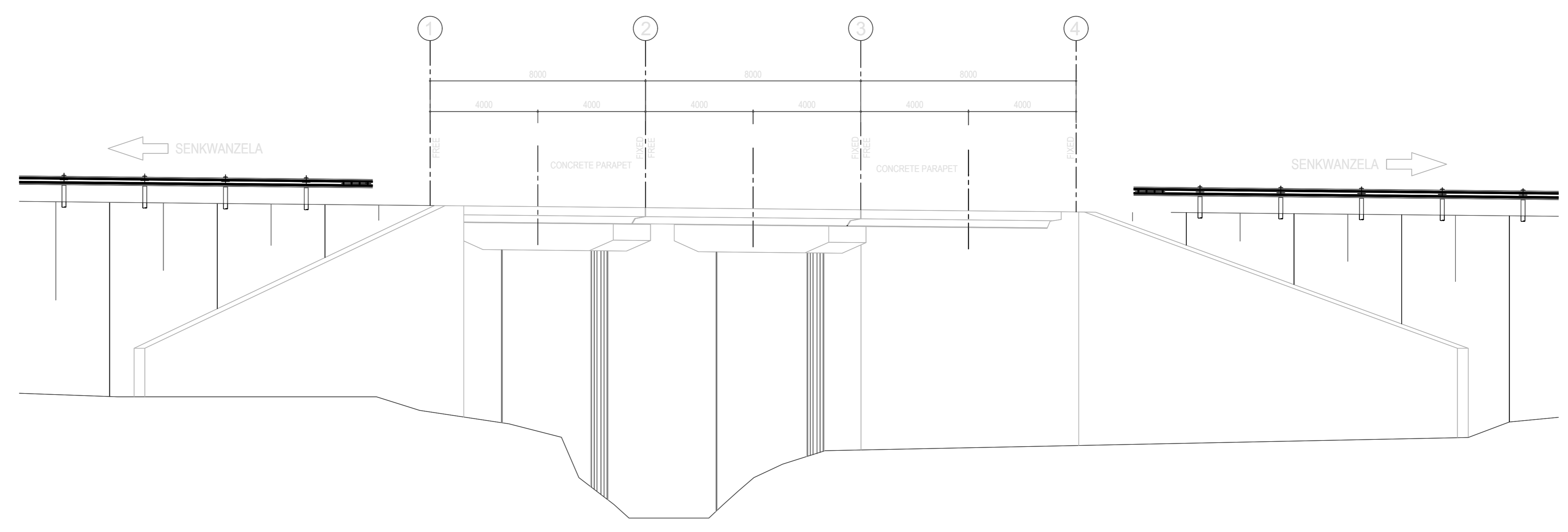
Nominal Dia.	Dimensions (mm)				
	A	B	C	D	E
450	595	1 150	1 050	2 700	150
600	765	1 380	1 200	3 000	150
750	935	1 610	1 350	3 300	150
900	1 105	1 840	1 500	3 600	230
1 050	1 275	2 070	1 750	3 900	230
1 200	1 445	2 300	1 900	4 200	230



PLAN
SCALE 1:100



SECTION A-A ALONG CENTRE LINE
SCALE 1:100
PREFER TO SQUARE DIMENSIONS



ELEVATION
SCALE 1:100

Symbol	Date	Description	Checked	Signed
AMENDMENTS				

Signature Engineer	Date
Signature Authority	Date

Continued from:	Designed by: X.XXXXXXX
Continued on:	Checked by: X.XXXXXXX
Cross Section on:	Drawn by: X.XXXXXXX
Longitudinal Section No.:	Checked by: X.XXXXXXX
Survey Plan No.:	File Reference: P303/6/1



PROVINCE OF KWAZULU-NATAL
DEPARTMENT OF TRANSPORT

Designed by:	Signature	Date
Bridge Engineer	Signature	Date
Head - Transport	Signature	Date

MAIN ROAD 303: (R33)MAKATEESKOP TO BRAUNSCHWEIG
PORTION
P303 RIVER VEHICLE BRIDGE
GENERAL ARRANGMENT '2'

Staked km distance 00° 00' 00.00" S 00° 00' 00.00" E	Scale: AS SHOWN	Sheet: 1 of: 0	Plan No: STC NUM
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- GENERAL NOTES**
- ALL LEVELS, DIMENSIONS AND SETTING OUT DETAILS TO BE VERIFIED BY CONTRACTORS ON SITE PRIOR TO CONSTRUCTION.
 - ALL EXISTING DRAINAGE CULVERTS ARE TO BE INSPECTED, AND ANY FOUND IN UNSERVICEABLE CONDITION ARE TO BE REPORTED TO THE ENGINEER. REPLACED UNLESS SHOWN OTHERWISE.
 - CULVERT INVERTS ARE TO BE DECIDED BY ENGINEER ON SITE UNLESS SHOWN MIN. COVER = 600mm.
 - MIN SLOPE = 2%
 - PIPE CULVERTS ARE TO BE LAID IN ACCORDANCE WITH SD 0401 WITH HEADWALLS AS ACCESS BELL-MOUTHS, AND MIN DIA = 600mm FOR MAJOR ROAD CROSS DRAINAGE AS PER SD 0401, SD 0403, SD 0406.
 - MIN DIA = 450mm FOR MINOR ACCESS ROADS
 - BOX CULVERTS < 1.8m HIGH ARE TO BE CONSTRUCTED IN ACCORDANCE WITH SD 0404 OR SD 0407. BOX CULVERTS > 1.8m HIGH ARE TO BE CONSTRUCTED AS PER THE STRUCTURAL ENGINEER'S DESIGN IN ACCORDANCE WITH KZN DOT STANDARDS
 - FOR EROSION CONTROL, GABION MATTRESSES ARE RECOMMENDED AT CULVERT INLETS AND OUTLETS.
 - EARTH BERMS ARE TO BE CONSTRUCTED AT CULVERT INLETS TO DIRECT STORM-WATER INTO CULVERTS WHERE NECESSARY
 - ROCK BOLSTERS ARE TO BE PLACED ACROSS THE INVERT OF DRAINS SUSCEPTIBLE TO EROSION FOR EVERY 2m VERTICAL DROP
 - GRASSED/CONCRETE LINED V-DRAINS AS PER SD 0601/3 & 4 ARE RECOMMENDED FOR SHALLOW CUTTINGS OF DEPTH LESS THAN 6m MEASURED AT A POINT 6m FROM EDGE OF CARRIAGEWAY. CONCRETE LINE 1500 V - DRAINS AS PER SD 0601/2 ARE RECOMMENDED FOR DEEP CUTTINGS OF DEPTH GREATER THAN 6m MEASURED AT A POINT 6m FROM EDGE OF CARRIAGEWAY.
 - SUBSOIL DRAINS AS PER SD 0501 ARE TO BE INSTALLED WITH 1500 V - DRAINS OR WHERE HIGH WATER TABLES ARE ENCOUNTERED.
 - KERB AND CHANNEL DRAINS AS PER 0701 ARE TO BE PROVIDED WHERE FILL EMBANKMENTS EXCEED 3m IN HEIGHT.
 - WHERE SURFACE RUNOFF IS TOWARD THE ROAD, CATCH-WATER BANKS ARE TO BE PROVIDED TO DIVERT STORMWATER TO MAJOR CROSS DRAINAGE STRUCTURES
 - THE POSITIONS OF ACCESSES ARE TO BE DETERMINED IN CONSULTATION WITH THE LOCAL COMMUNITY. DAYLIGHTING REQUIREMENTS ARE TO BE DECIDED BY THE ENGINEER ON SITE. CONCRETE WEDGES AS PER SD 0303 MAY BE USED IN PLACE OF SURFACE BELL-MOUTHS FOR ACCESSES SERVING SINGLE RESIDENTIAL PROPERTIES.
 - GUARDRAILS ARE TO BE INSTALLED IN ACCORDANCE WITH SD 1101 AND SD 1102 WHERE FILL EMBANKMENTS EXCEED 3m IN HEIGHT OR WHERE HAZARDOUS OBSTRUCTION CANNOT BE REMOVED.
 - EXISTING ROAD SIGNS, SERVICES AND FENCING AFFECTED BY CONSTRUCTION ARE TO BE REMOVED/RELOCATED WHERE NECESSARY
 - UNDERGROUND SERVICE CROSSINGS AND MARKERS ARE TO BE IN ACCORDANCE WITH SD 1001 - 3
 - ALL NEW ROAD SIGNS AND ROAD MARKING REQUIREMENTS ARE TO CONFORM TO THE SOUTHERN AFRICAN DEVELOPMENT COMMUNITY ROAD TRAFFIC SIGNS MANUAL (SADC - RTS/M)
 - ALL WORK IS TO BE CARRIED OUT IN ACCORDANCE WITH 'COLTO' SPECIFICATIONS FOR ROAD AND BRIDGE WORKS FOR STATE ROAD AUTHORITIES
 - ALL SURVEY AND SETTING OUT DATA PROVIDED ON (MSS 04)
 - NEW FILLS AND EXPOSED CUTTINGS ARE TO BE TOP-SOILED AND VEGETATED IMMEDIATELY AFTER CONSTRUCTION TO PREVENT EROSION.

ITEM NO	DISTANCE Km	SIZE (mm)	CLASS	BEDDING TYPE	FLOW VELOCITY	AREA	LENGTH m	SKEW	HEADWALLS	DROP INLET	REMARKS	
11	8+530	6000	C	750	0.015m ²	0.250m	0.053m	14.640m	0°	2	0	DEMOLISH EXISTING AND REPLACE WITH 6000 PIPE CULVERT
12	8+842	6000	C	750	2.310m ²	4.325m	0.390m	17.080m	30°	2	0	DEMOLISH EXISTING AND REPLACE WITH 6000 PIPE CULVERT(SKEW)
13	9+057	6000	C	750	1.290m ²	7.167m	0.180m	17.080m	30°	2	0	CONSTRUCT NEW 6000 PIPE CULVERT (SKEW)
14	9+580	9000	C	750	0.820m ²	6.357m	0.129m	17.080m	30°	2	0	DEMOLISH EXISTING AND REPLACE WITH 9000 PIPE CULVERT(SKEW)

SIGN POSTING SCHEDULE				
Left Hand Side	Sign	Right Hand Side	Sign	Size
Km Distance	8+530	W402	8+530	W402
	8+620	R201-80	8+842	W402
	8+842	W402	8+842	W402
	9+057	W402	9+057	W402
	9+543	W402	9+543	W402

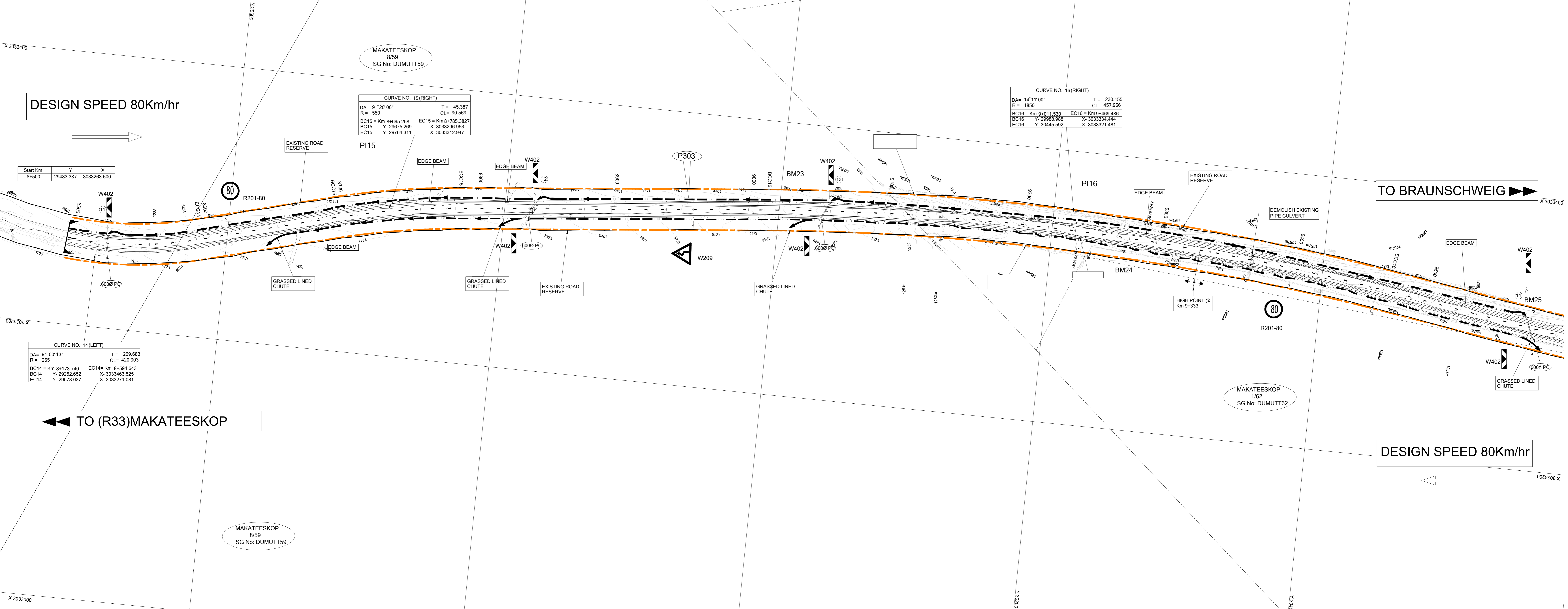
SIDE DRAIN SCHEDULE						
LEFT HAND SIDE			RIGHT HAND SIDE			COMMENTS
FROM Km	TO Km	LENGTH m	FROM Km	TO Km	LENGTH m	
8+600	9+580	980m				2.4 GRASSED LINED 'V' DRAIN (SD 0601/3)

NOTATION	
BCC	BEGINNING OF CIRCULAR CURVE
ECC	END OF CIRCULAR CURVE
PI	POINT OF INTERSECTION
R	RADIUS OF CIRCULAR CURVE
Δ	DEFLECTION ANGLE OF CIRCULAR CURVE
Lc	LENGTH OF CURVE
T	LENGTH OF CURVE TANGENT
BT	BEGINNING OF TAPER
ET	END OF TAPER

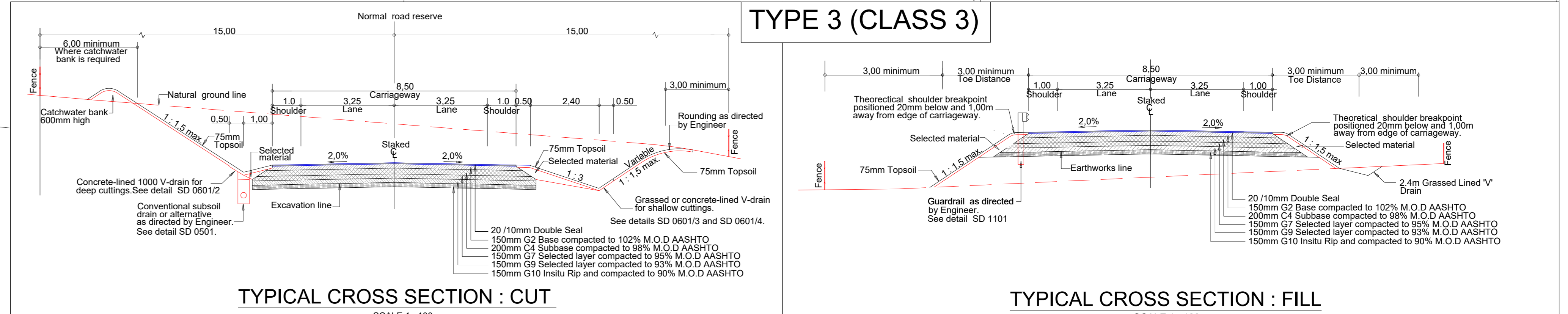
LEGEND:	
SYMBOL	DESCRIPTION
	PIPE CULVERT WITH HEADWALLS
	ROAD CENTRELINE
	DIRECTION OF FLOW
	2400 GRASS LINED 'V' DRAIN (SD0601/3)
	CHUTE - REFER TO SD 0605/A
	LIMIT OF CONSTRUCTION
	NEW ROAD RESERVE
	EXISTING ROAD RESERVE
	EXISTING FENCE LINE

HORIZONTAL ALIGNMENT			
POINT	CO-ORDINATE SYSTEM: WG84/31	Y	X
START		29483.387	3033263.500
PI15		29719.130	3033308.624
PI16		30218.096	3033356.365

BENCH MARKS:			
POINT	Y	X	BM LEVEL (mMSL)
BM23	30013.850	3033350.086	1250.327
BM24	30253.654	3033330.708	1256.208
BM25	30556.574	3033317.095	1254.268



CURVE NO. 14 (LEFT)				
DA=	91°00'13"	T=	269.683	
R=	265	CL=	420.903	
BC14 = Km	8+173.740	EC14 = Km	8+594.643	
BC14	Y: 29525.654	X:	3033463.525	
EC14	Y: 29578.037	X:	3033271.081	



AS BUILT				
Symbol	Date	Description	Checked	Signed
02	15-02-2018	SECOND SUBMISSION - ISSUED FOR APPROVAL	G.K	
01	06-11-2017	ISSUED FOR APPROVAL	G.K	

Continued from:-	C38383	Designed by:-	N.MOONSAMY
Continued on:-	C38385	Checked by:-	G.KENDAL
Cross Section No:-	C38388	Drawn by:-	M.DEEPANARAIN
Longitudinal Section No:-	C38394,C38395,C38396	Checked by:-	G.KENDAL
Survey Plan No:-		File Reference:-	

PROVINCE OF KWAZULU-NATAL
DEPARTMENT OF TRANSPORT

Designed by:-
TRANSPORTATION ENGINEERING CHIEF ENGINEER
Head: Transport

MAIN ROAD 303: (R33) MAKATEESKOP TO BRAUNSCHWEIG
UPGRADE OF A PORTION OF MAIN ROAD 303 FROM Km 8+500 - Km 14+240
DESIGN/SERVICES PLANS

Staked Km distance: (Km) 8+500 - Km 8+840
Scale: 1:1000
Sheet: 6 of 6
Plan No: C38384

C38384

- GENERAL NOTES**
- ALL LEVELS, DIMENSIONS AND SETTING OUT DETAILS TO BE VERIFIED BY CONTRACTORS ON SITE PRIOR TO CONSTRUCTION.
 - ALL EXISTING DRAINAGE CULVERTS ARE TO BE INSPECTED, AND ANY FOUND IN UNSERVICEABLE CONDITION ARE TO BE REPORTED TO THE ENGINEER REPLACED UNLESS SHOWN OTHERWISE.
 - CULVERT INVERTS ARE TO BE DECIDED BY ENGINEER ON SITE UNLESS SHOWN MIN. COVER = 600mm, MIN SLOPE = 2%.
 - PIPE CULVERTS ARE TO BE LAID IN ACCORDANCE WITH SD 0401 WITH HEADWALLS AS ACCESS BELL-MOUTHS, AND MIN DIA +600mm FOR MAJOR ROAD CROSS DRAINAGE AS PER SD 0401, SD 0403, SD 0406.
 - MIN DIA = 450mm FOR MINOR ACCESS ROADS.
 - BOX CULVERTS < 1.8m HIGH ARE TO BE CONSTRUCTED IN ACCORDANCE WITH SD 0404 OR SD 0407. BOX CULVERTS > 1.8m HIGH ARE TO BE CONSTRUCTED AS PER THE STRUCTURAL ENGINEER'S DESIGN IN ACCORDANCE WITH KZN DOT STANDARDS.
 - FOR EROSION CONTROL, GABION MATTRESSES ARE RECOMMENDED AT CULVERT INLETS AND OUTLETS.
 - EARTH BERMS ARE TO BE CONSTRUCTED AT CULVERT INLETS TO DIRECT STORM-WATER INTO CULVERTS WHERE NECESSARY.
 - ROCK BOLSTERS ARE TO BE PLACED ACROSS THE INVERT OF DRAINS SUSCEPTIBLE TO EROSION FOR EVERY 2m VERTICAL DROP.
 - GRASSES/CONCRETE LINED V-DRAINS AS PER SD 0601/3 & 4 ARE RECOMMENDED FOR SHALLOW CUTTINGS OF DEPTH LESS THAN 6m MEASURED AT A POINT 6m FROM EDGE OF CARRIAGEWAY. CONCRETE LINE 1500 V - DRAINS AS PER SD 0601/2 ARE RECOMMENDED FOR DEEP CUTTINGS OF DEPTH GREATER THAN 6m MEASURED AT A POINT 6m FROM EDGE OF CARRIAGEWAY.
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 - KERB AND CHANNEL DRAINS AS PER 0701 ARE TO BE PROVIDED WHERE FILL EMBANKMENTS EXCEED 3m IN HEIGHT.
 - WHERE SURFACE RUNOFF IS TOWARD THE ROAD, CATCH-WATER BANKS ARE TO BE PROVIDED TO DIVERT STORMWATER TO MAJOR CROSS DRAINAGE STRUCTURES.
 - THE POSITIONS OF ACCESS ARE TO BE DETERMINED IN CONSULTATION WITH THE LOCAL COMMUNITY. DAYLIGHTING REQUIREMENTS ARE TO BE DECIDED BY THE ENGINEER ON SITE. CONCRETE WEDGES AS PER SD 0303 MAY BE USED IN PLACE OF SURFACE BELL-MOUTHS FOR ACCESS SERVING SINGLE RESIDENTIAL PROPERTIES.
 - GUARDRAILS ARE TO BE INSTALLED IN ACCORDANCE WITH SD 1101 AND SD 1102 WHERE FILL EMBANKMENTS EXCEED 3m IN HEIGHT OR WHERE HAZARDOUS OBSTRUCTION CANNOT BE REMOVED.
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 - UNDERGROUND SERVICE CROSSINGS AND MARKERS ARE TO BE IN ACCORDANCE WITH SD 1001 - 3.
 - ALL NEW ROAD SIGNS AND ROAD MARKING REQUIREMENTS ARE TO CONFORM TO THE SOUTHERN AFRICAN DEVELOPMENT COMMUNITY ROAD TRAFFIC SIGNS MANUAL (SADC - RTS/M).
 - ALL WORK IS TO BE CARRIED OUT IN ACCORDANCE WITH "COLD" SPECIFICATIONS FOR ROAD AND BRIDGE WORKS FOR STATE ROAD AUTHORITIES."
 - ALL SURVEY AND SETTING OUT DATA PROVIDED ON (MSS 84)
 - NEW FILLS AND EXPOSED CUTTINGS ARE TO BE TOP-SOILED AND VEGETATED IMMEDIATELY AFTER CONSTRUCTION TO PREVENT EROSION.

ITEM NO	DISTANCE Km	SIZE (mm)	CLASS	BEDDING TYPE	FLOW	VELOCITY	AREA	LENGTH m	SKEW	HEADWALLS	DROP INLET	REMARKS
15	9+580	9000	C	750	0.820m³	6.357m	0.129m²	17.080m	30°	2	0	SKEW - DEMOLISH EXISTING AND REPLACE WITH 9000 PIPE CULVERT
16	9+650	6000	C	750	0.290m³	8.529m	0.034m²	17.080m	30°	2	0	SKEW - CONSTRUCT NEW 6000 PIPE CULVERT
17	10+071	12000	750	C	2.310m³	4.833m	0.478m²	17.080m	0°	2	0	DEMOLISH EXISTING PIPE CULVERT AND REPLACE WITH NEW 12000 PIPE CULVERT
18	10+545	9000	750	C	1.290m³	7.167m	0.180m²	17.080m	30°	2	0	SKEW - DEMOLISH EXISTING PIPE CULVERT AND REPLACE WITH NEW 9000 PIPE CULVERT

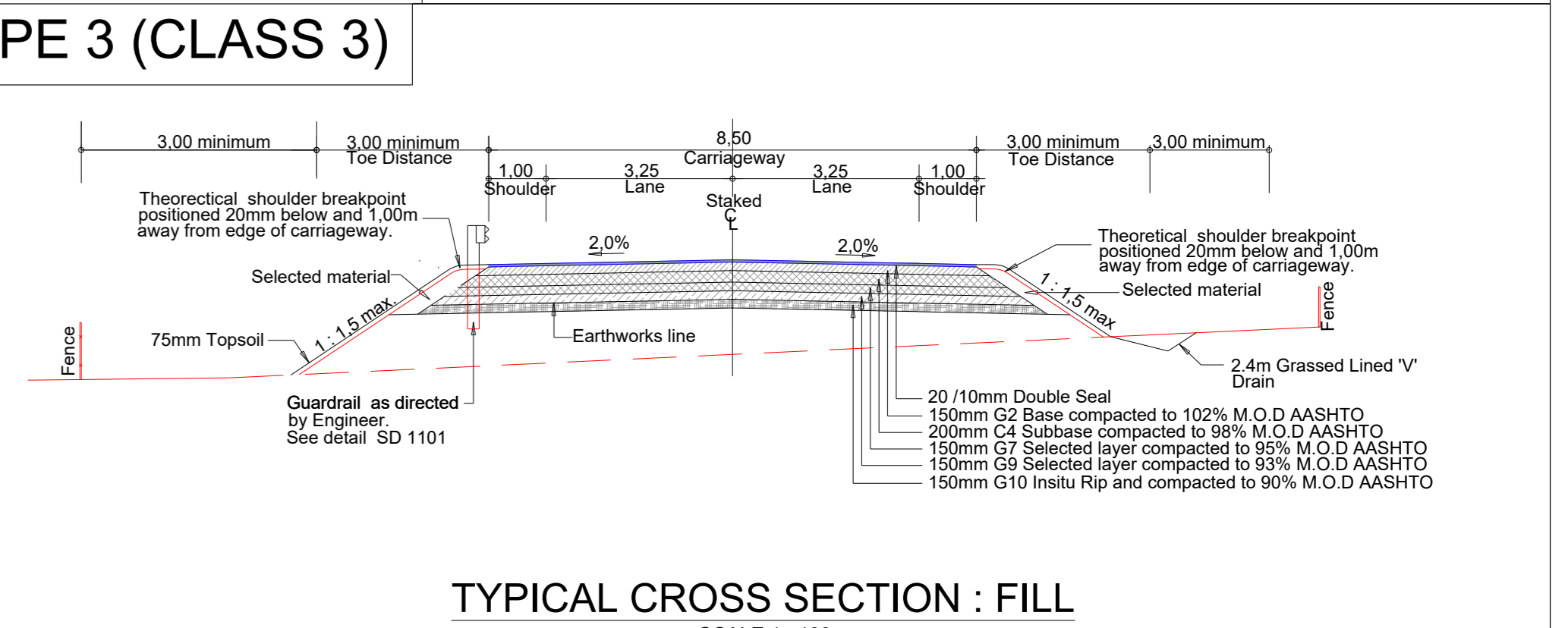
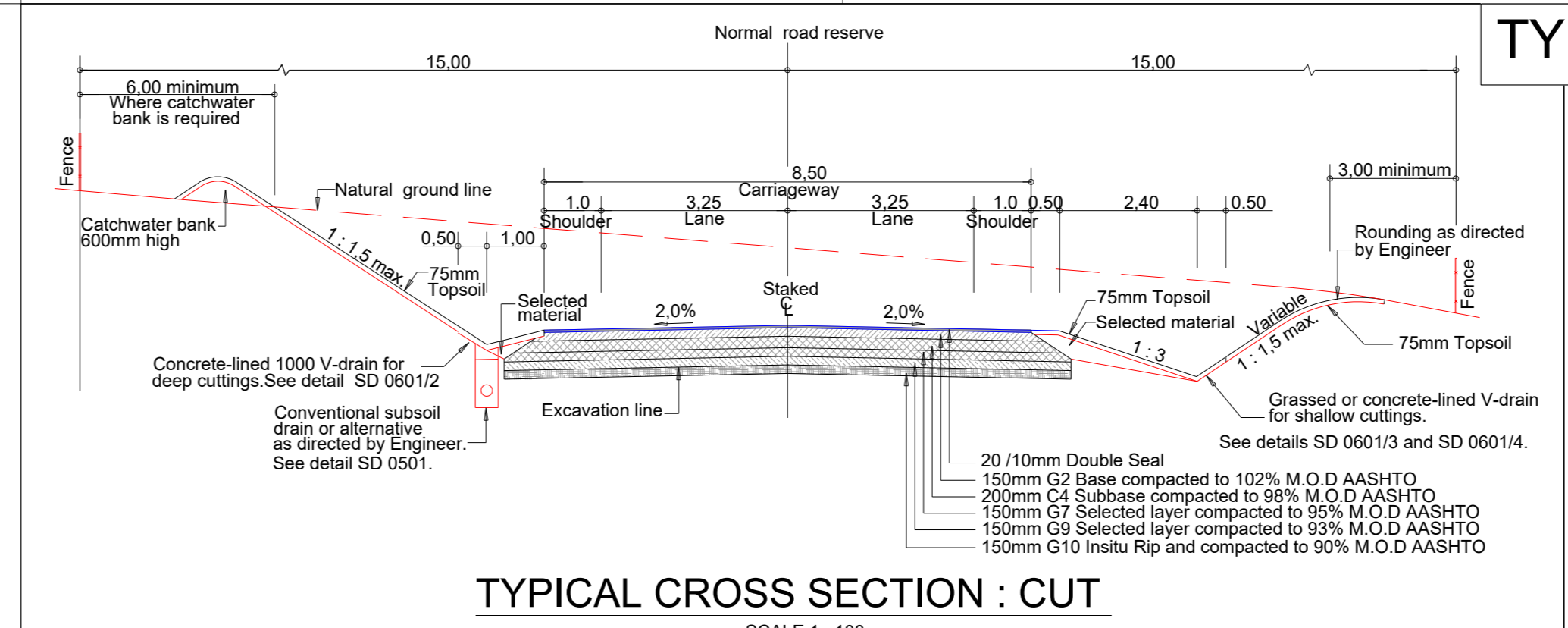
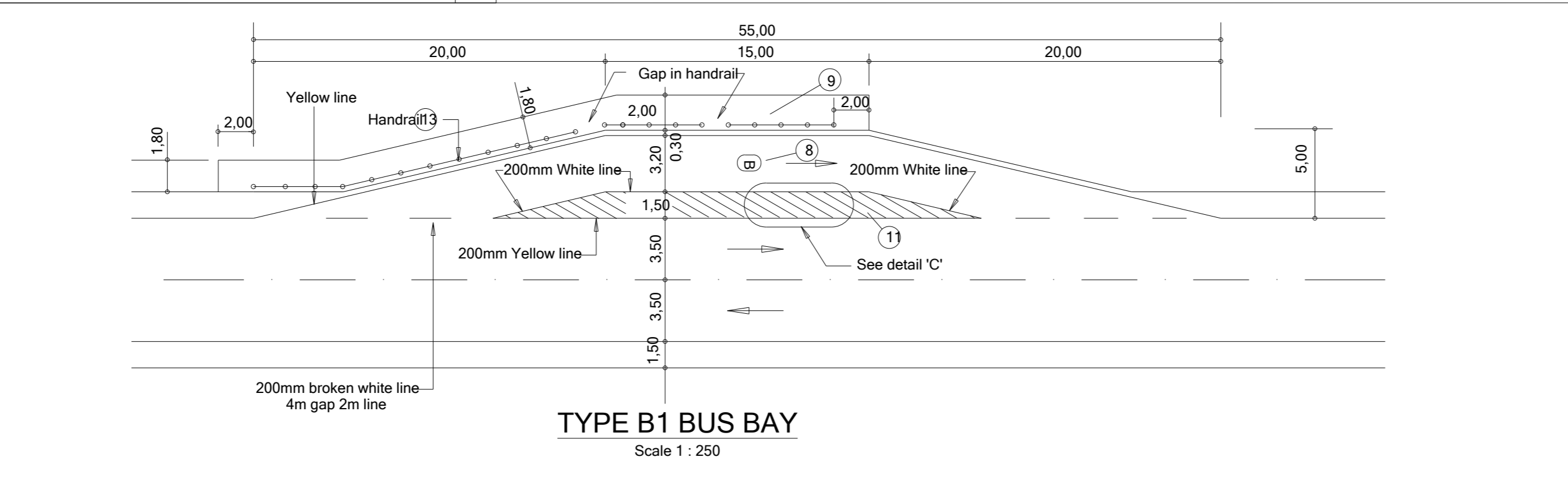
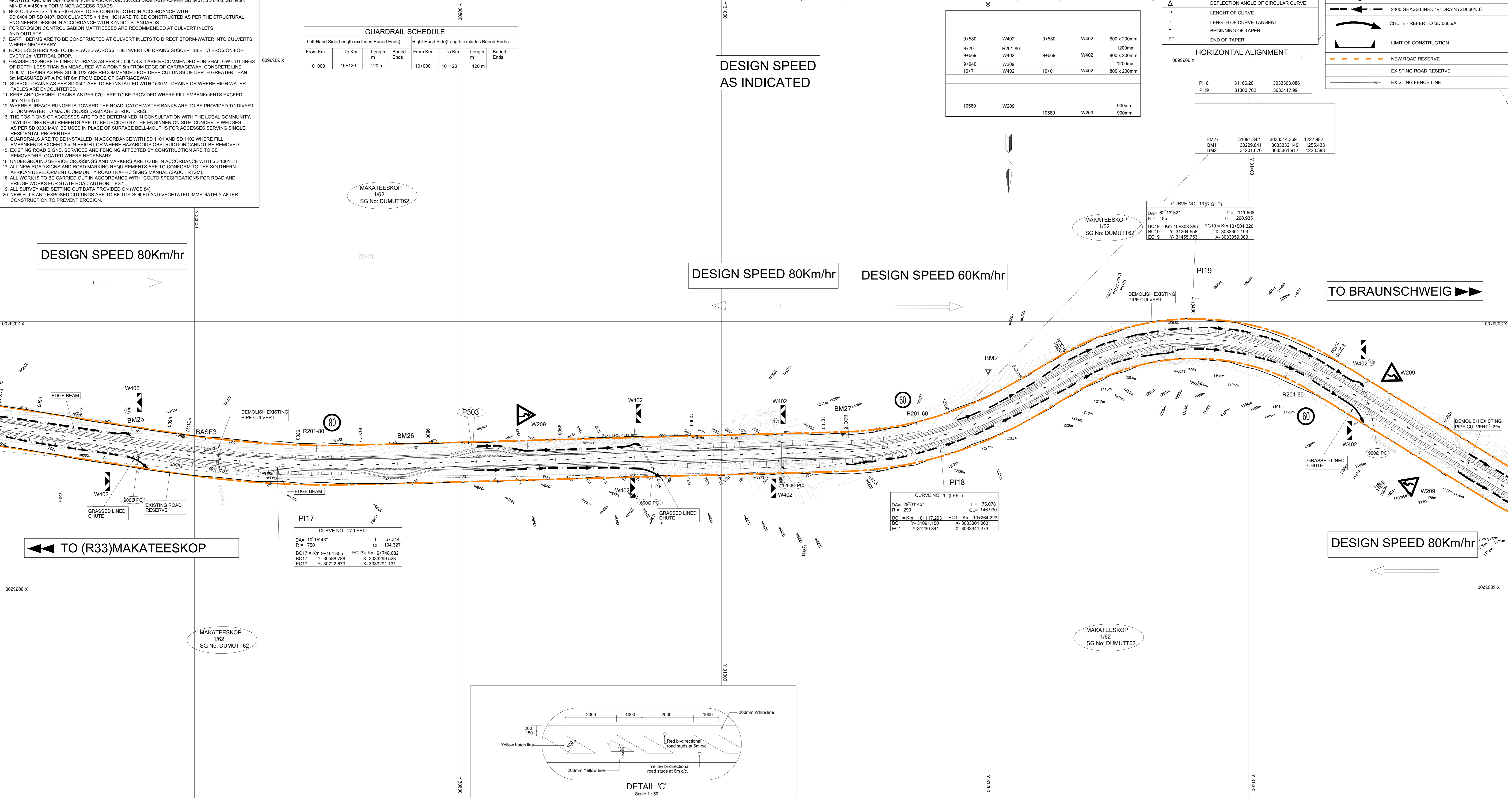
GUARDRAIL SCHEDULE							
Left Hand Side (Length excludes Buried Ends)				Right Hand Side (Length excludes Buried Ends)			
From Km	To Km	Length m	Buried Ends	From Km	To Km	Length m	Buried Ends
10+000	10+120	120 m		10+000	10+120	120 m	

LEFT HAND SIDE						RIGHT HAND SIDE						COMMENTS	
FROM Km	TO Km	LENGTH m	FROM Km	TO Km	LENGTH m	FROM Km	TO Km	LENGTH m	FROM Km	TO Km	LENGTH m		
9+500	9+580	80m	9+500	9+580	80m	9+840	9+960	120m	9+840	9+960	120m	2.4 GRASSED LINED V DRAIN (SD 0601/3)	
9+840	9+960	120m	9+840	9+960	120m	10+210	10+540	330m	10+210	10+540	330m	2.4 GRASSED LINED V DRAIN (SD 0601/3)	
10+210	10+540	330m	10+210	10+540	330m	10+640	10+660	20m	10+640	10+660	20m	2.4 GRASSED LINED V DRAIN (SD 0601/3)	

SYMBOL	DESCRIPTION
BCC	BEGINNING OF CIRCULAR CURVE
ECC	END OF CIRCULAR CURVE
PI	POINT OF INTERSECTION
R	RADIUS OF CIRCULAR CURVE
Δ	DEFLECTION ANGLE OF CIRCULAR CURVE
L	LENGTH OF CURVE
T	LENGTH OF CURVE TANGENT
BT	BEGINNING OF TAPER
ET	END OF TAPER

SYMBOL	DESCRIPTION
	PIPE CULVERT WITH HEADWALLS
	ROAD CENTRELINE
	DIRECTION OF FLOW
	2400 GRASS LINED "V" DRAIN (SD0601/3)
	CHUTE - REFER TO SD 0605/A
	LIMIT OF CONSTRUCTION
	NEW ROAD RESERVE
	EXISTING ROAD RESERVE
	EXISTING FENCE LINE

HORIZONTAL ALIGNMENT			
P118	31166.201	3033303.086	
P119	31360.702	3033417.991	



AS BUILT				
Symbol	Date	Description	Checked	Signed
02	15-02-2018	SECOND SUBMISSION - ISSUED FOR APPROVAL	G.K	
01	06-11-2017	ISSUED FOR APPROVAL	G.K	

Continued from:- C38384	Designed by:- N.MOONSAMY
Continued on:- C38386	Checked by:- G.KENDAL
Cross Section No:- C38388,C38389	Drawn by:- M.DEEPANARAIN
Longitudinal Section No:- C38396,C38397,C38398	Checked by:- G.KENDAL
Survey Plan No:-	File Reference:-

Designed by:-

 596 Peter Mokaba (Ridge)
 Durban, 4091
 Tel: 031 207 8121
 Fax: 031 207 8722

TRANSPORTATION ENGINEERING CHIEF ENGINEER

Head: Transport

MAIN ROAD 303: (R33)MAKATEESKOP TO BRAUNSCHWEIG		Staked Km distance	Sheet
UPGRADE OF A PORTION OF MAIN ROAD 303 FROM Km 8+500 - Km 14+240 DESIGN/SERVICES PLANS		(Km 8+760 - Km 9+880) of-	6
PORTION		Scale	Plan No.
		1:1000	C38385

C38385

- GENERAL NOTES**
- ALL LEVELS DIMENSIONS AND SETTING OUT DETAILS TO BE VERIFIED BY CONTRACTORS ON SITE PRIOR TO CONSTRUCTION.
 - ALL EXISTING DRAINAGE CULVERTS ARE TO BE INSPECTED, AND ANY FOUND IN UNSERVICEABLE CONDITION ARE TO BE REPORTED TO THE ENGINEER REPLACED UNLESS SHOWN OTHERWISE.
 - CULVERT INVERTS ARE TO BE DECIDED BY ENGINEER ON SITE UNLESS SHOWN MIN. COVER = 600mm.
 - PIPE CULVERTS ARE TO BE LAID IN ACCORDANCE WITH SD 0401 WITH HEADWALLS AS ACCESS BELL-MOUTHS, AND MIN DIA = 600mm FOR MAJOR ROAD CROSS DRAINAGE AS PER SD 0401, SD 0403, SD 0406. MIN DIA = 450mm FOR MINOR ACCESS ROADS.
 - BOX CULVERTS < 1.8m HIGH ARE TO BE CONSTRUCTED IN ACCORDANCE WITH SD 0404 OR SD 0407. BOX CULVERTS > 1.8m HIGH ARE TO BE CONSTRUCTED AS PER THE STRUCTURAL ENGINEER'S DESIGN IN ACCORDANCE WITH KZN DOT STANDARDS.
 - FOR EROSION CONTROL GABION MATRESSES ARE RECOMMENDED AT CULVERT INLETS AND OUTLETS.
 - EARTH BERMS ARE TO BE CONSTRUCTED AT CULVERT INLETS TO DIRECT STORM-WATER INTO CULVERTS WHERE NECESSARY.
 - ROCK BOLSTERS ARE TO BE PLACED ACROSS THE INVERT OF DRAINS SUSCEPTIBLE TO EROSION FOR EVERY 2m VERTICAL DROP.
 - GRASSED/CONCRETE LINED V-DRAINS AS PER SD 0601/3 & 4 ARE RECOMMENDED FOR SHALLOW CUTTINGS OF DEPTH LESS THAN 6m MEASURED AT A POINT 6m FROM EDGE OF CARRIAGEWAY. CONCRETE LINE 1500 V-DRAINS AS PER SD 0601/2 ARE RECOMMENDED FOR DEEP CUTTINGS OF DEPTH GREATER THAN 6m MEASURED AT A POINT 6m FROM EDGE OF CARRIAGEWAY.
 - SUBSOIL DRAINS AS PER SD 0501 ARE TO BE INSTALLED WITH 1500 V-DRAINS OR WHERE HIGH WATER TABLES ARE ENCOUNTERED.
 - KERB AND CHANNEL DRAINS AS PER 0701 ARE TO BE PROVIDED WHERE FILL EMBANKMENTS EXCEED 3m IN HEIGHT.
 - WHERE SURFACE RUNOFF IS TOWARD THE ROAD, CATCH-WATER BANKS ARE TO BE PROVIDED TO DIVERT STORM-WATER TO MAJOR CROSS DRAINAGE STRUCTURES.
 - THE POSITIONS OF ACCESS ARE TO BE DETERMINED IN CONSULTATION WITH THE LOCAL COMMUNITY. DAYLIGHTING REQUIREMENTS ARE TO BE DECIDED BY THE ENGINEER ON SITE. CONCRETE VEDGES AS PER SD 0303 MAY BE USED IN PLACE OF SURFACE BELL-MOUTHS FOR ACCESS SERVING SINGLE RESIDENTIAL PROPERTIES.
 - GUARDRAILS ARE TO BE INSTALLED IN ACCORDANCE WITH SD 1101 AND SD 1102 WHERE FILL EMBANKMENTS EXCEED 3m IN HEIGHT OR WHERE HAZARDOUS OBSTRUCTION CANNOT BE REMOVED.
 - EXISTING ROAD SIGNS, SERVICES AND FENCING AFFECTED BY CONSTRUCTION ARE TO BE REMOVED/RELOCATED WHERE NECESSARY.
 - UNDERGROUND SERVICE CROSSINGS AND MARKERS ARE TO BE IN ACCORDANCE WITH SD 1001-3.
 - ALL NEW ROAD MARKING REQUIREMENTS ARE TO CONFORM TO THE SOUTHERN AFRICAN DEVELOPMENT COMMUNITY ROAD TRAFFIC SIGNS MANUAL (SADC - RTSM).
 - ALL WORK IS TO BE CARRIED OUT IN ACCORDANCE WITH "COLTO SPECIFICATIONS FOR ROAD AND BRIDGE WORKS FOR STATE ROAD AUTHORITIES".
 - ALL SURVEY AND SETTING OUT DATA PROVIDED ON (WGS 84).
 - NEW FILLS AND EXPOSED CUTTINGS ARE TO BE TOP-SOILED AND VEGETATED IMMEDIATELY AFTER CONSTRUCTION TO PREVENT EROSION.

PIPE AND BOX CULVERT SCHEDULE

ITEM NO	DISTANCE Km	SIZE (mm)	CLASS	BEDDING TYPE	FLOW VELOCITY	AREA	LENGTH m	SKREW	HEADWALLS	DROP INLET	REMARKS	
19	10 + 730	6000	750	C	0.820m³	6.357m²	0.129m²	17.080m	30'	2	0	SKREW - DEMOLISH EXISTING PIPE CULVERT AND REPLACE WITH NEW 6000 PIPE CULVERT
20	10 + 878	9000	750	C	0.290m³	8.529m²	0.034m²	14.640m	0'	2	0	DEMOLISH EXISTING PIPE CULVERT AND REPLACE WITH NEW 9000 PIPE CULVERT
21	11 + 019	12000	750	C			14.640m	0'	2	0	0	DEMOLISH EXISTING PIPE CULVERT AND REPLACE WITH NEW 12000 PIPE CULVERT
22	11 + 098	9000	750	C			14.640m	0'	2	1	1	DEMOLISH EXISTING PIPE CULVERT AND REPLACE WITH NEW 9000 PIPE CULVERT
23	11 + 120	6000	750	C			14.640m	0'	2	0	0	TYPE B1 - CONSTRUCT NEW 6000 PIPE CULVERT
24	11 + 232	6000	750	C			14.640m	0'	2	0	0	DEMOLISH EXISTING PIPE CULVERT AND REPLACE WITH NEW 6000 PIPE CULVERT
25	11 + 540	6000	750	C			14.640m	0'	2	0	0	DEMOLISH EXISTING PIPE CULVERT AND REPLACE WITH NEW 6000 PIPE CULVERT

SIDE DRAIN SCHEDULE

LEFT HAND SIDE			RIGHT HAND SIDE			COMMENTS	
FROM Km	TO Km	LENGTH m	FROM Km	TO Km	LENGTH m		
10+640	10+730	90m	10+640	10+730	90m	2.4 GRASSED LINED 'V' DRAIN (SD 0601/3)	
11+075	11+400	325m	11+075	11+400	325m	2.4 GRASSED LINED 'V' DRAIN (SD 0601/3)	
10 + 950	11 + 340	390m				KERB AND CHANNEL	
11+560	11+640	80m	11+640	11+740	70m	2.4 GRASSED LINED 'V' DRAIN (SD 0601/3)	

NOTATION

SYMBOL	DESCRIPTION
BCC	BEGINNING OF CIRCULAR CURVE
ECC	END OF CIRCULAR CURVE
PI	POINT OF INTERSECTION
R	RADIUS OF CIRCULAR CURVE
Δ	DEFLECTION ANGLE OF CIRCULAR CURVE
Lc	LENGTH OF CURVE
T	LENGTH OF CURVE TANGENT
BT	BEGINNING OF TAPER
ET	END OF TAPER

LEGEND

SYMBOL	DESCRIPTION
	PIPE CULVERT WITH HEADWALLS
	ROAD CENTRELINE
	DIRECTION OF FLOW
	1000 CONCRETE 'V' DRAIN
	2400 GRASSED LINED 'V' DRAIN (SD0601/3)
	GUARD RAILS
	KERB AND CHANNEL
	1.0m SIDEWALKS
	CHUTE - REFER TO SD 0605/A
	LIMIT OF CONSTRUCTION
	NEW ROAD RESERVE
	EXISTING ROAD RESERVE
	EXISTING FENCE LINE

HORIZONTAL ALIGNMENT

POINT	CO-ORDINATE SYSTEM: WG84/31
	Y X
PI20	31665.864 3033229.829
PI21	31928.517 3033422.166
PI22	32193.223 3033272.305

BENCH MARKS:

POINT	Y	X	BM LEVEL (m MSL)
BM3	31639.280	3033299.604	1184.206
BM4	32246.917	3033277.176	1154.578

SIGN POSTING SCHEDULE

Left Hand Side		Right Hand Side		Size
Km Distance	Sign	Km Distance	Sign	
10+660	W107			900mm
10+730	W402	10+730	W402	600 x 150mm
10+798	W409			900mm
10+840	R201-80			900mm
10+878	W402	10+878	W402	600 x 150mm
10+940	W209	10+900	W108	900mm
10+960	W107			900mm
11+000	W308			900mm
11+019	W402	11+020	W402	600 x 150mm
11+098	W402	11+098	W402	600 x 150mm
11+120	W402			600 x 150mm
11+130	W402	11+120	W409	900mm
11+232	W402	11+232	W402	600 x 150mm
		11+220	W108	900mm
		11+280	W209	900mm
		11+360	W306-900	900mm
		11+400	R201-60	900mm
		11+460	W308	900mm
11+540	W402	11+540	W402	800 x 200mm
11+620	R201-80	11+720	R201-60	1200mm

SIGN POSTING SCHEDULE OF INTERSECTIONS

Left Hand Side			Right Hand Side		
Ch of Intersection	Sign	Offset Distance from Centreline (m)	Ch of Intersection	Sign	Offset Distance from Centreline
11+120	R1				

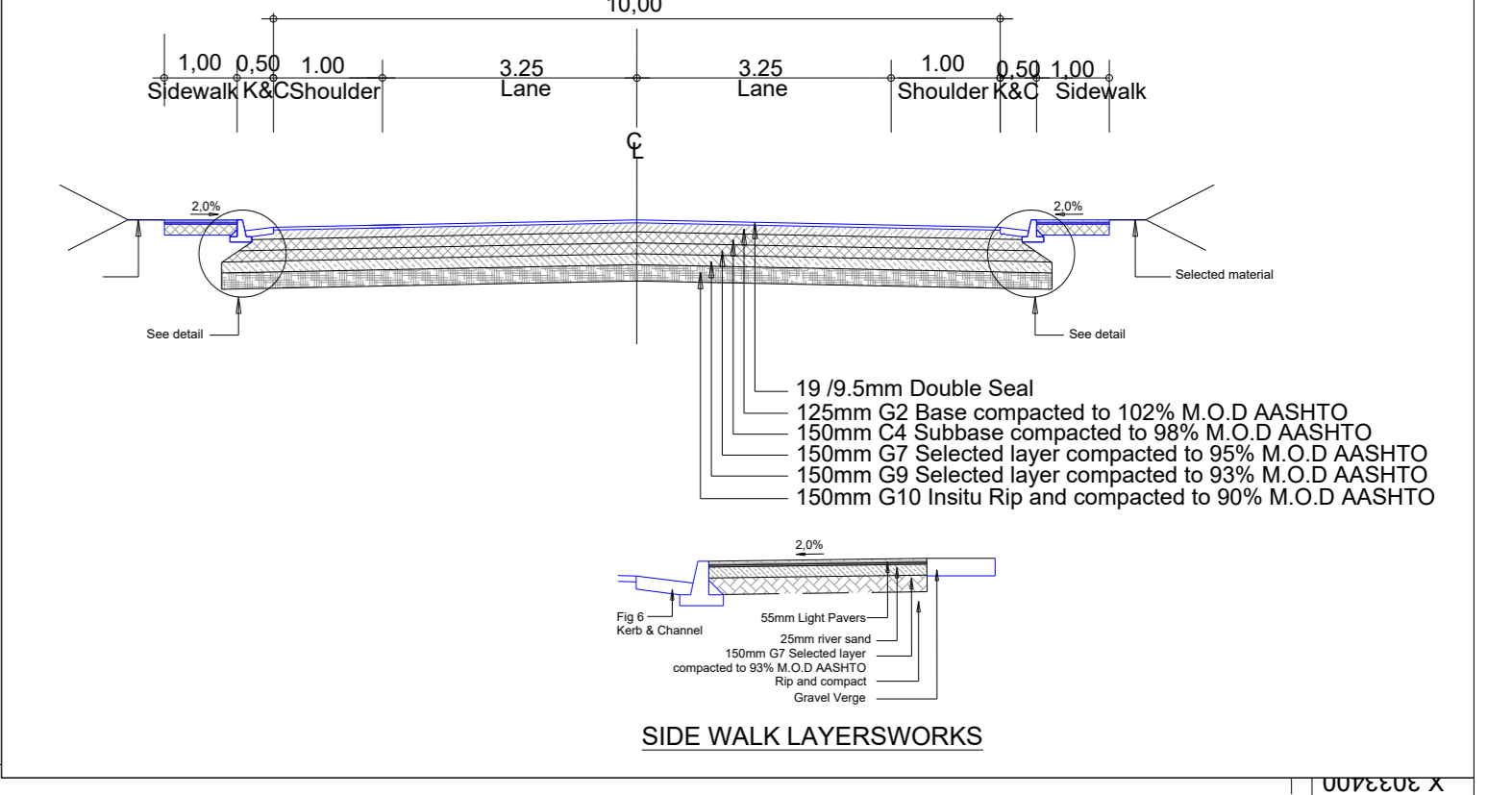
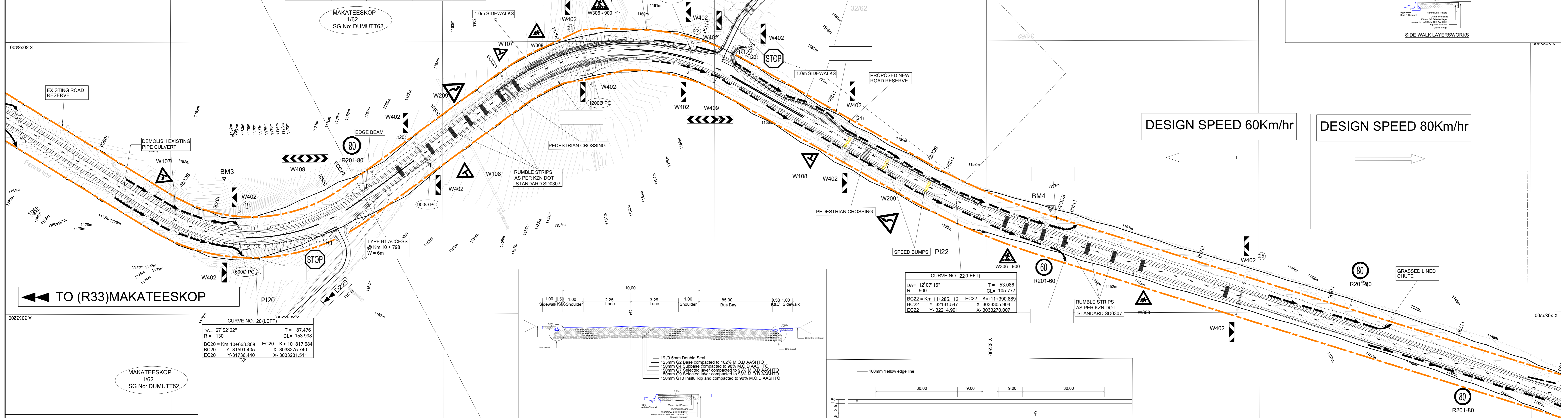
DESIGN SPEED AS INDICATED

GUARDRAIL SCHEDULE

Left Hand Side (Length excludes Buried Ends)				Right Hand Side (Length excludes Buried Ends)			
From Km	To Km	Length m	Buried Ends	From Km	To Km	Length m	Buried Ends
10+970	11+050	80m		10+715	10+770	55m	
				10+810	10+880	70m	
				10+940	11+050	110m	

GABION SCHEDULE

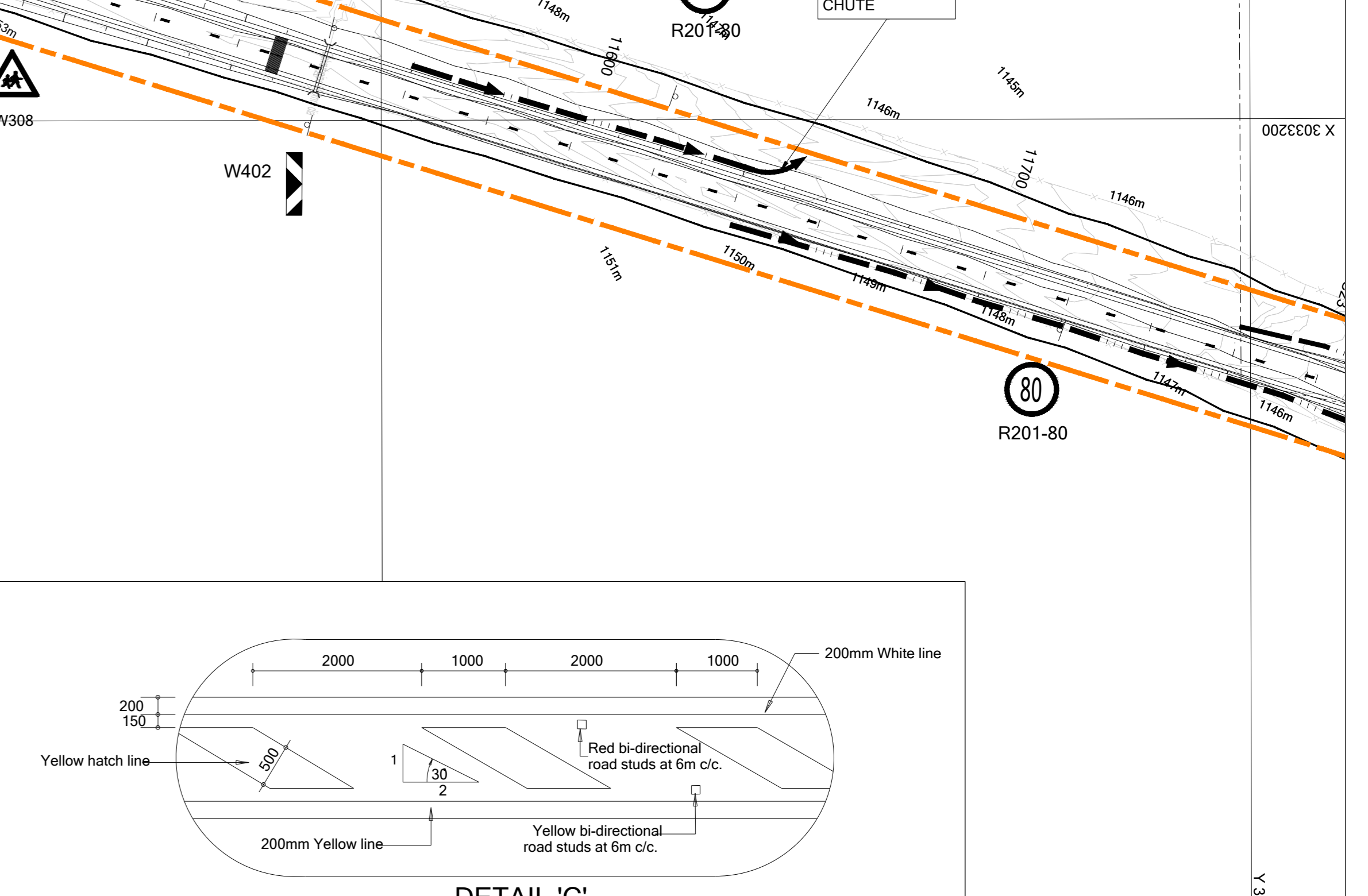
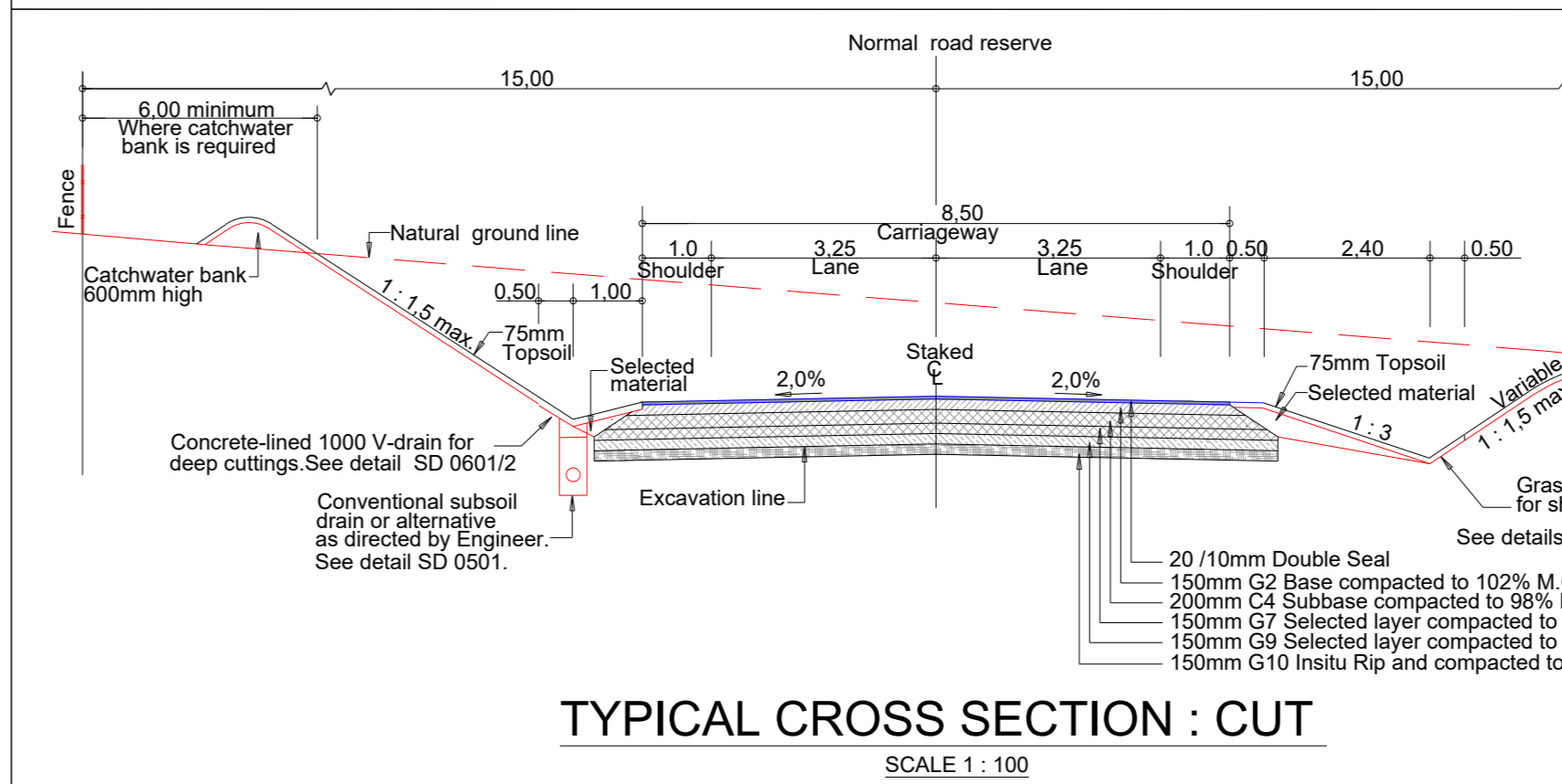
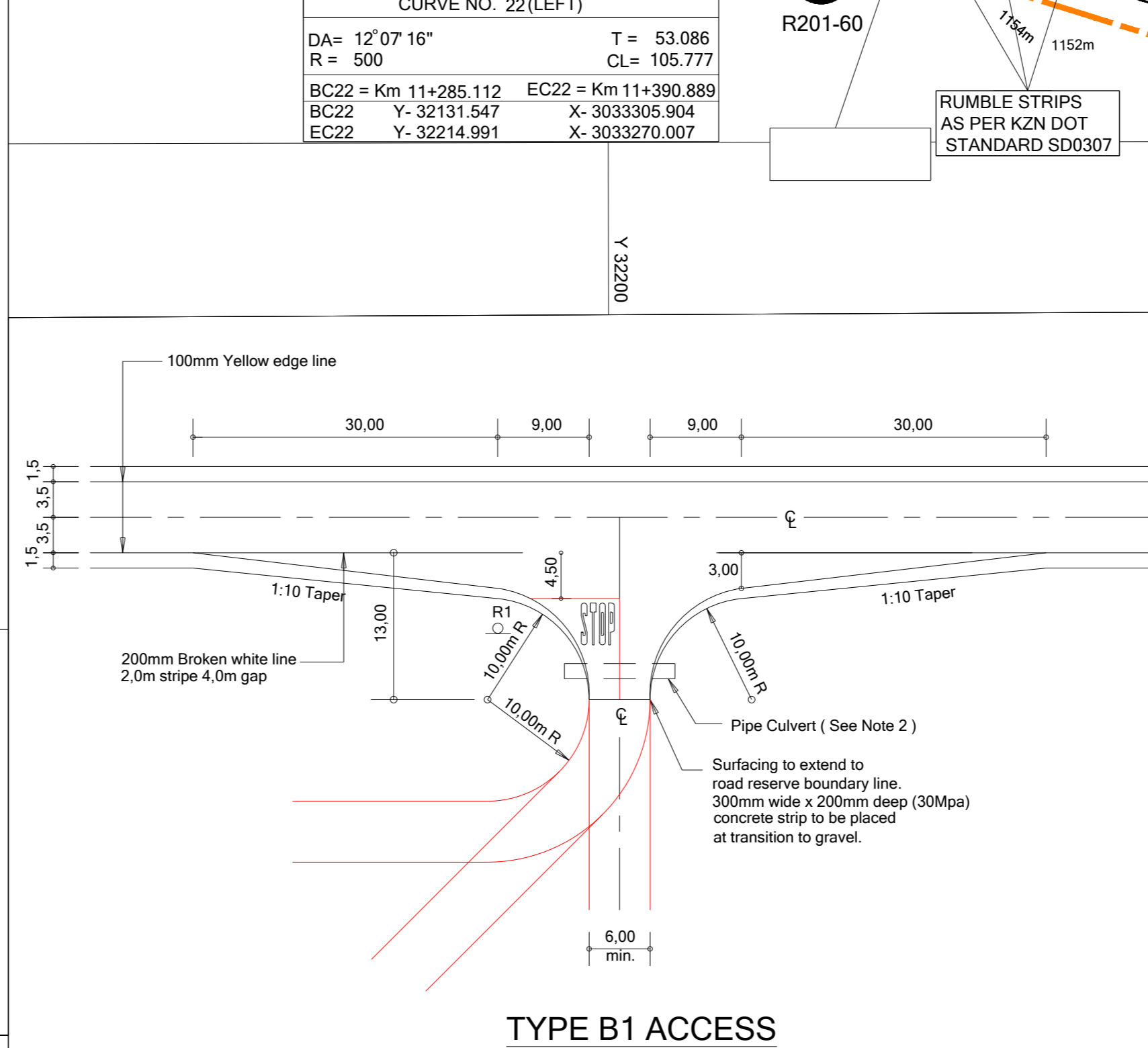
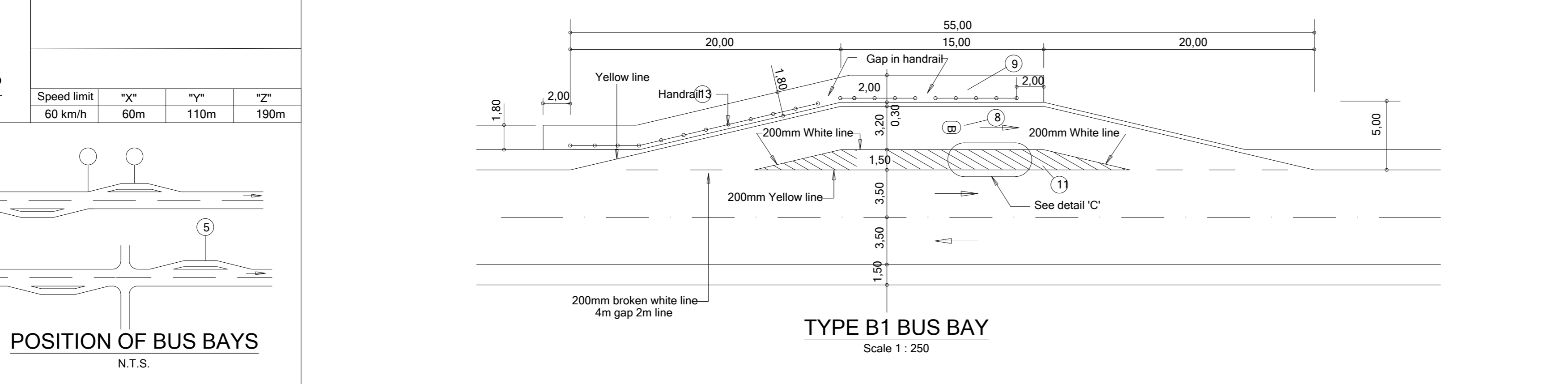
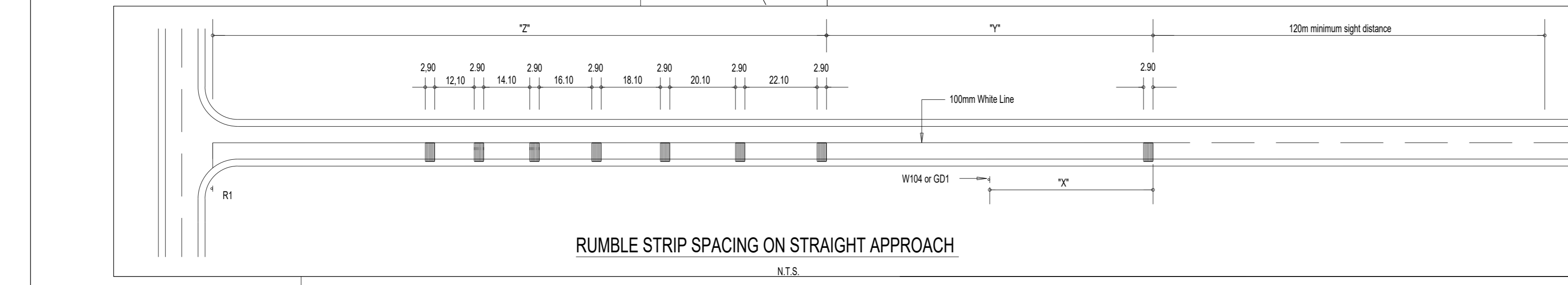
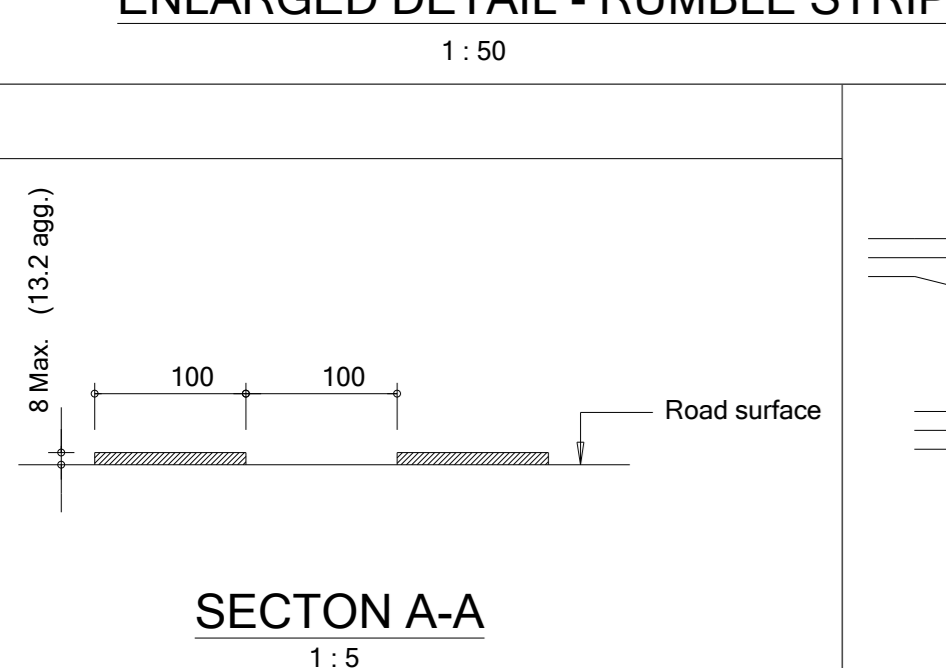
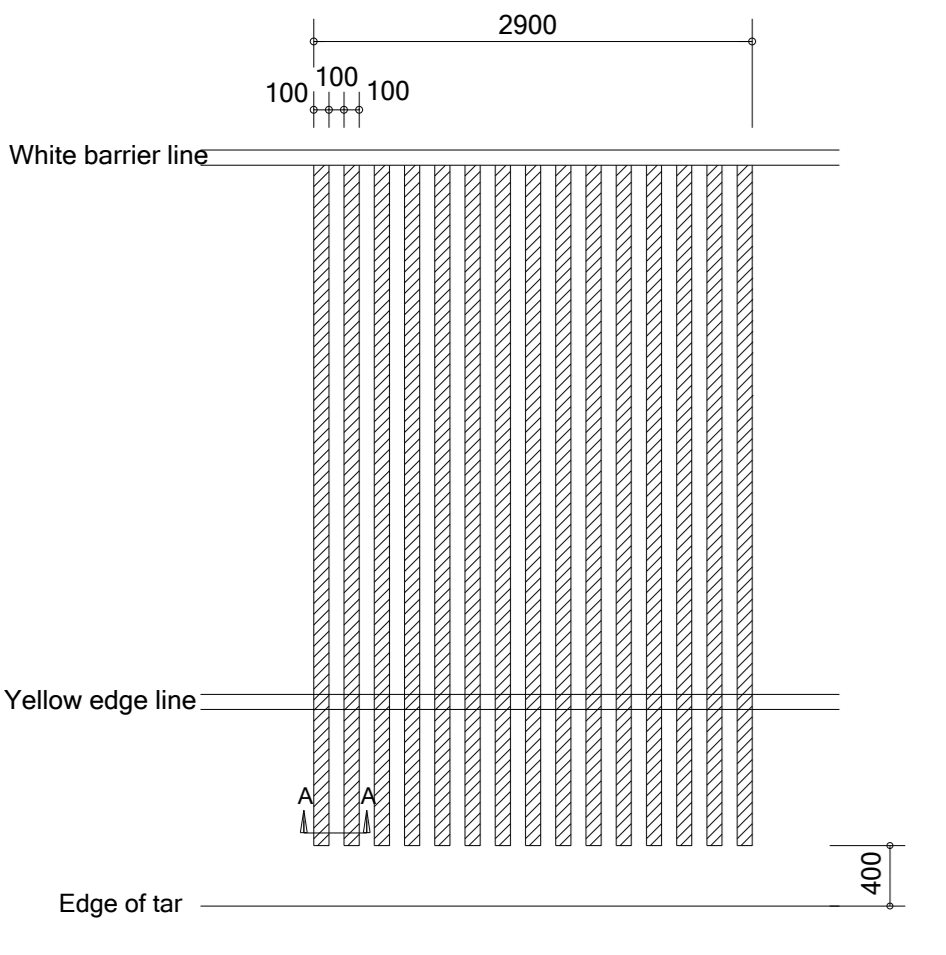
Left Hand Side				Right Hand Side			
From Km	To Km	Length m	Size	From Km	To Km	Length m	Size
10+725	10+770	45m	2m x 1m x 1m	10+970	11+050	80m	2m x 1m x 1m
10+978	11+050	72m	2m x 1m x 1m				



TO (R33) MAKATEESKOP

DESIGN SPEED 60Km/hr

DESIGN SPEED 80Km/hr



AS BUILT

Symbol	Date	Description	Checked	Signed
02	15-02-2018	SECOND SUBMISSION - ISSUED FOR APPROVAL	G.K	
01	06-11-2017	ISSUED FOR APPROVAL	G.K	

Supervising Engineer

Continued from:-	Designed by:- N. MOONSAMY
Continued on:-	Checked by:- G. KENDAL
Cross Section No:-	Drawn by:- M. DEEPNARAIN
Longitudinal Section No:-	Checked by:- G. KENDAL
Survey Plan No:-	File Reference:-

Province of Kwazulu-Natal
 Department of Transport

Designed by:-
 586 Peter Mokaba (Ridge)
 Durban, 4091
 Tele: 031 207 8121
 Fax: 031 207 8722

MAIN ROAD 303: (R33) MAKATEESKOP TO BRAUNSCHWEIG
 UPGRADE OF A PORTION OF MAIN ROAD 303 FROM Km 8+500 - Km 14+240
 DESIGN/SERVICES PLANS

Staked Km distance: (Km 9+880 - Km 10+120) of-
 Scale: 1:1000
 Sheet: 3 of 6
 Plan No: C39944

- GENERAL NOTES**
- ALL LEVELS, DIMENSIONS AND SETTING OUT DETAILS TO BE VERIFIED BY CONTRACTORS ON SITE PRIOR TO CONSTRUCTION.
 - ALL EXISTING DRAINAGE CULVERTS ARE TO BE INSPECTED, AND ANY FOUND IN UNSERVICEABLE CONDITION ARE TO BE REPORTED TO THE ENGINEER REPLACED UNLESS SHOWN OTHERWISE.
 - CULVERT INVERTS ARE TO BE DECIDED BY ENGINEER ON SITE UNLESS SHOWN MIN. COVER = 600mm, MIN SLOPE = 2%.
 - PIPE CULVERTS ARE TO BE LAID IN ACCORDANCE WITH SD 0401 WITH HEADWALLS AS ACCESS BELL-MOUTHS, AND MIN DIA = 600mm FOR MAJOR ROAD CROSS DRAINAGE AS PER SD 0401, SD 0403, SD 0406.
 - BOX CULVERTS < 1.8m HIGH ARE TO BE CONSTRUCTED IN ACCORDANCE WITH SD 0404 OR SD 0407. BOX CULVERTS > 1.8m HIGH ARE TO BE CONSTRUCTED AS PER THE STRUCTURAL ENGINEER'S DESIGN IN ACCORDANCE WITH KZN DOT STANDARDS.
 - FOR EROSION CONTROL, GABION MATTRESSES ARE RECOMMENDED AT CULVERT INLETS AND OUTLETS.
 - EARTH BERMS ARE TO BE CONSTRUCTED AT CULVERT INLETS TO DIRECT STORM-WATER INTO CULVERTS WHERE NECESSARY.
 - ROCK BOLSTERS ARE TO BE PLACED ACROSS THE INVERT OF DRAINS SUSCEPTIBLE TO EROSION FOR EVERY 2m VERTICAL DROP.
 - GRASSED/CONCRETE LINED V-DRAINS AS PER SD 0601/3 & 4 ARE RECOMMENDED FOR SHALLOW CUTTINGS OF DEPTH LESS THAN 6m MEASURED AT A POINT 6m FROM EDGE OF CARRIAGEWAY. CONCRETE LINE 1500 V - DRAINS AS PER SD 0601/2 ARE RECOMMENDED FOR DEEP CUTTINGS OF DEPTH GREATER THAN 6m MEASURED AT A POINT 6m FROM EDGE OF CARRIAGEWAY.
 - SUBSOIL DRAINS AS PER SD 0501 ARE TO BE INSTALLED WITH 1500 V - DRAINS OR WHERE HIGH WATER TABLES ARE ENCOUNTERED.
 - KERB AND CHANNEL DRAINS AS PER 0701 ARE TO BE PROVIDED WHERE FILL EMBANKMENTS EXCEED 3m IN HEIGHT.
 - WHERE SURFACE RUNOFF IS TOWARD THE ROAD, CATCH-WATER BANS ARE TO BE PROVIDED TO DIVERT STORMWATER TO MAJOR CROSS DRAINAGE STRUCTURES.
 - THE POSITIONS OF ACCESSES ARE TO BE DETERMINED IN CONSULTATION WITH THE LOCAL COMMUNITY. DAYLIGHTING REQUIREMENTS ARE TO BE DECIDED BY THE ENGINEER ON SITE. CONCRETE WEDGES AS PER SD 0303 MAY BE USED IN PLACE OF SURFACE BELL-MOUTHS FOR ACCESS SERVING SINGLE RESIDENTIAL PROPERTIES.
 - GUARDRAILS ARE TO BE INSTALLED IN ACCORDANCE WITH SD 1101 AND SD 1102 WHERE FILL EMBANKMENTS EXCEED 3m IN HEIGHT OR WHERE HAZARDOUS OBSTRUCTION CANNOT BE REMOVED.
 - EXISTING ROAD SIGNS, SERVICES AND FENCING AFFECTED BY CONSTRUCTION ARE TO BE REMOVED/RELOCATED WHERE NECESSARY.
 - UNDERGROUND SERVICE CROSSINGS AND MARKERS ARE TO BE IN ACCORDANCE WITH SD 1001 - 3.
 - ALL NEW ROAD SIGNS AND ROAD MARKING REQUIREMENTS ARE TO CONFORM TO THE SOUTHERN AFRICAN DEVELOPMENT COMMUNITY ROAD TRAFFIC SIGNS MANUAL (SADC - RTSM).
 - ALL WORK IS TO BE CARRIED OUT IN ACCORDANCE WITH 'COLD' SPECIFICATIONS FOR ROAD AND BRIDGE WORKS FOR STATE ROAD AUTHORITIES.
 - ALL SURVEY AND SETTING OUT DATA PROVIDED ON (MSS 04).
 - NEW FILLS AND EXPOSED CUTTINGS ARE TO BE TOP-SOILED AND VEGETATED IMMEDIATELY AFTER CONSTRUCTION TO PREVENT EROSION.

ITEM NO	DISTANCE Km	SIZE (mm)	CLASS	BEDDING TYPE	ESTIMATED LENGTH m	SKREW	HEADWALLS	DROP INLET	REMARKS
26	11 + 879	6000	750	C	17.080m	30°	2	0	SKREW - CONSTRUCT NEW 6000 PIPE CULVERT
27	12 + 400	9000	750	C	17.080m	30°	2	0	SKREW - DEMOLISH EXISTING PIPE CULVERT AND REPLACE WITH NEW 9000 PIPE CULVERT
28	12 + 700	6000	750	C	14.640m	0°	2	0	SKREW - DEMOLISH EXISTING PIPE CULVERT AND REPLACE WITH NEW 6000 PIPE CULVERT

LEFT HAND SIDE			RIGHT HAND SIDE			COMMENTS
FROM Km	TO Km	LENGTH m	FROM Km	TO Km	LENGTH m	
11 + 760	12 + 080	300m	11 + 640	12 + 080	321m	2.4 GRASSED LINED 'V' DRAIN (SD 0601/3)
12 + 400	12 + 700	160m	12 + 400	12 + 700	163m	1.0 CONCRETE 'V' DRAIN (SD 0601/2)
12 + 700	12 + 780	42m				2.4 GRASSED LINED 'V' DRAIN (SD 0601/3)

From Km	To Km	Length m	Size	From Km	To Km	Length m	Size
12+480	12+680	45 m	2m x 1m x 1m	12+440	12+620	80 m	2m x 1m x 1m

Left Hand Side (Length excludes Buried Ends)				Right Hand Side (Length excludes Buried Ends)			
From Km	To Km	Length m	Buried Ends	From Km	To Km	Length m	Buried Ends
12+060	12+080	20 m		12+060	12+080	20 m	
12+140	12+220	80 m		12+140	12+220	80 m	

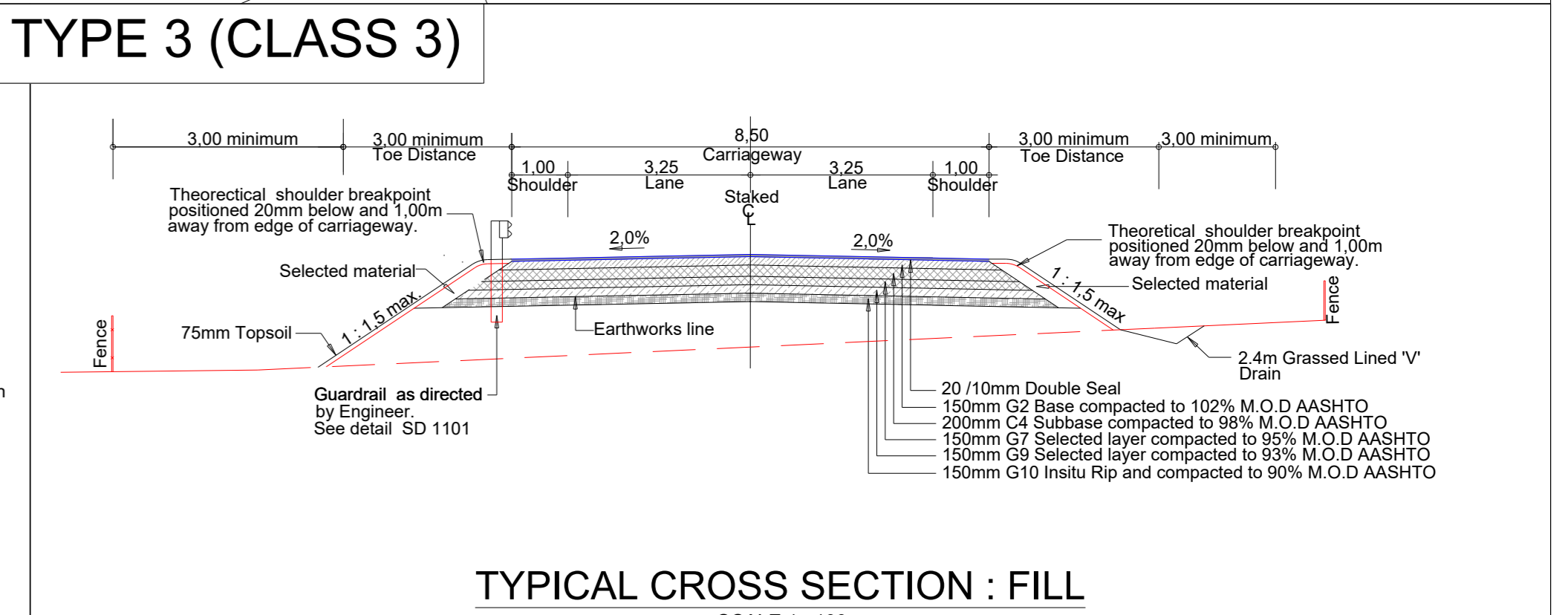
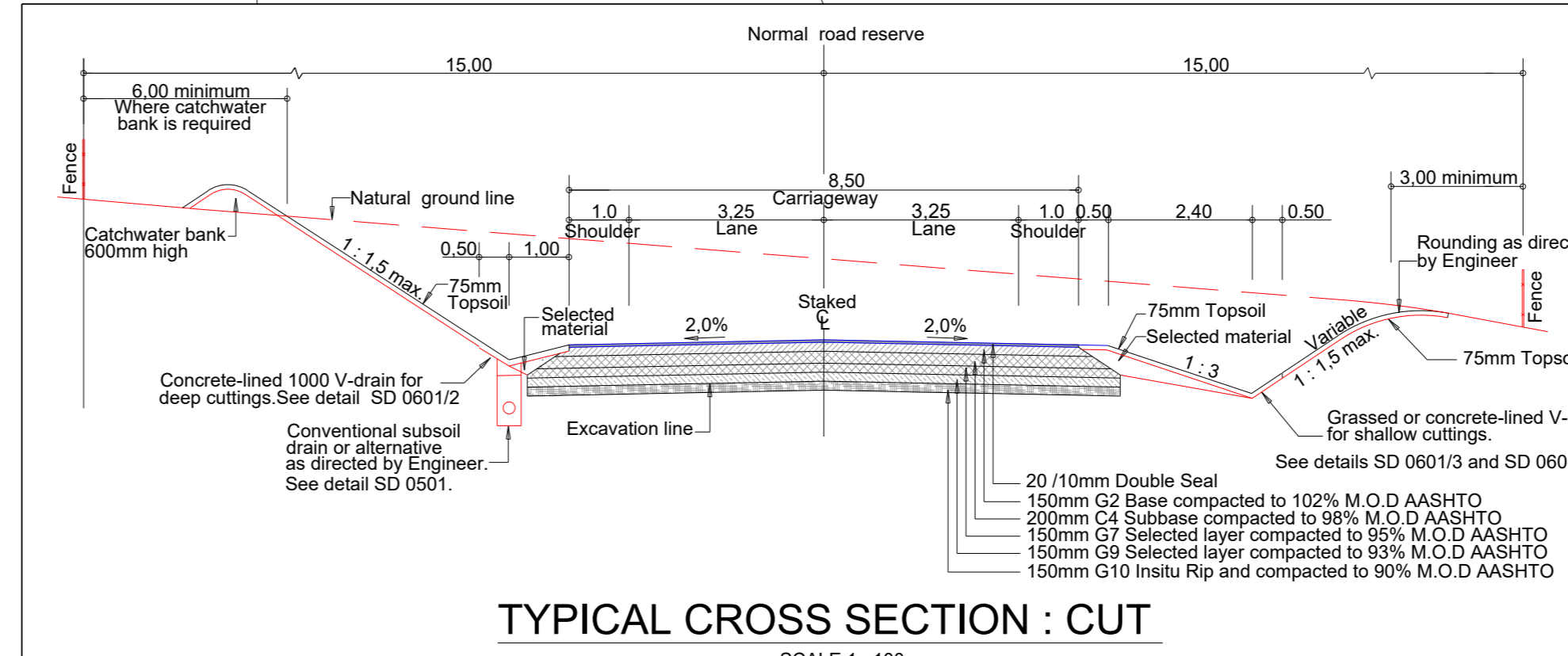
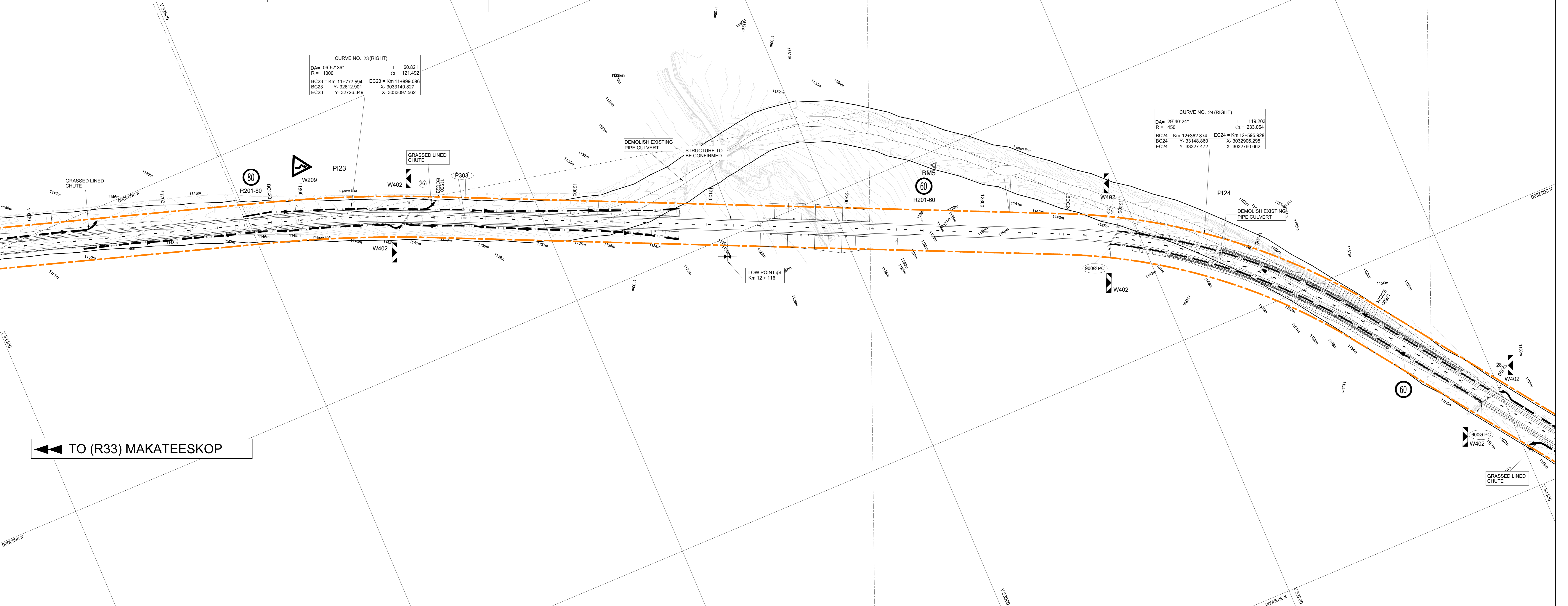
Left Hand Side		Right Hand Side		Size
Km Distance	Sign	Km Distance	Sign	
11+740	R201-80			1200mm
11+800	W209			1200mm
11+879	W402	11+879	W402	800 x 200mm
12+260	R201-60			900mm
		12+360	W209	900mm
12+400	W402	12+400	W402	600 x 150mm
		12+680	R201-60	900mm
12+700	W402	12+700	W402	600 x 150mm

BCC	BEGINNING OF CIRCULAR CURVE
ECC	END OF CIRCULAR CURVE
PI	POINT OF INTERSECTION
R	RADIUS OF CIRCULAR CURVE
Δ	DEFLECTION ANGLE OF CIRCULAR CURVE
Lc	LENGTH OF CURVE
T	LENGTH OF TANGENT
BT	BEGINNING OF TAPER
ET	END OF TAPER

SYMBOL	DESCRIPTION
	PIPE CULVERT WITH HEADWALLS
	PIPE CULVERT, HEADWALL AND DROP INLET SIDE INLET
	SKREW - PIPE CULVERT WITH HEADWALLS
	ROAD CENTRELINE
	DIRECTION OF FLOW
	2400 GRASS LINED 'V' DRAIN (SD0601/3)
	1000 CONCRETE 'V' DRAIN (SD0601/2)
	500 KERB AND CHANNEL (SD 0701/4)
	CHUTE - REFER TO SD 0605/A
	LIMIT OF CONSTRUCTION
	NEW ROAD RESERVE
	EXISTING ROAD RESERVE
	EXISTING FENCE LINE

POINT	CO-ORDINATE SYSTEM: WGS84/31		
	Y	X	
PI23	32670.941	303327.645	
PI24	33257.455	303287.135	

POINT	Y	X	BM LEVEL (m MSL)
BMS	32246.917	303327.176	1154.579
BMS	33081.175	303289.844	1135.958



Symbol	Date	Description	Checked	Signed
02	15-02-2018	SECOND SUBMISSION - ISSUED FOR APPROVAL	G.K	
01	06-11-2017	ISSUED FOR APPROVAL	G.K	

AS BUILT		Continued from:-	Designed by:-
Supervising Engineer	Date		N.MOONSAMY
		Continued on:-	Checked by:- G.KENDAL
		Cross Section No:-	Drawn by:- M. DEEPNARAIN
		Longitudinal Section No:-	Checked by:- G.KENDAL
		Survey Plan No:-	File Reference:-

PROVINCE OF KWAZULU-NATAL
DEPARTMENT OF TRANSPORT

Designed by:-

596 Peter Mokaba (Ridge)
Durban, 4091
Tel: 031 207 8121
Fax: 031 207 8722

TRANSPORTATION ENGINEERING CHIEF ENGINEER

Head: Transport

MAIN ROAD 303: (R33) MAKATEESKOP TO BRAUNSCHWEIG

UPGRADE OF A PORTION OF MAIN ROAD 303
FROM Km 8+500 - Km 14+240
DESIGN/SERVICES PLANS

Staked Ch distance: (Km 10 + 1200 - Km 11 + 320) of- 6

Scale: 1:1000

Plan No: C39945

C39945

