DRAINAGE DETAILS

S.K.D.	Area	Discharge	Flow	Bedding Class	Length	Skew	Conc. Chutes	Reference Dwg	Side Inlet	Co-ordinates Y	Co-ordinates X	Grid Inlets	Co-ordinates Y	Co-ordinates X	Head Wall	Co-ordinates Y	Co-ordinates X	LHS/ RHS
38+340	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	-	-	-	-	-	RHS
38+551	DRIVEWAY ACCESS							C 35658	-	-	-	-	-	-	-	-	-	LHS
38+690	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	-	-	-	-	-	LHS
38+780	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	-	-	-	-	-	LHS
38+800	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	-	-	-	-	-	RHS
38+830	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	-	-	-	-	-	LHS
38+845	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	-	-	-	-	-	RHS
38+980	-	-	-	-	-	-	1	SD 0702/1	-	-	-	-	-	-	-	-	-	RHS
39+020	-	-	-	-	-	-	1	SD 0702/1	-	-	-	-	-	-	-	-	-	RHS
39+060	-	-	-	-	-	-	1	SD 0702/1	-	-	-	-	-	-	-	-	-	RHS
39+110	-	-	-	-	-	-	1	SD 0702/1	-	-	-	-	-	-	-	-	-	RHS
39+155	-	-	-	-	-	-	1	SD 0702/1	-	-	-	-	-	-	-	-	-	RHS
39+940	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	-	-	-	-	-	LHS
39+065	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	-	-	-	-	-	RHS
39+105	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	-	-	-	-	-	RHS
39+260	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	-	-	-	-	-	LHS

PIPE CROSSING DRAINAGE DETAILS (WGS)

S.K.D.	Type	Size (dia)	Class	Bedding Class	Length (m)	Skew	Grade	Area (ha)	Discharge (m^3/s)	Velocity (m/s)	Reference Dwg	Conc. Chutes	Side Inlet	Grid Inlet	Drop Inlets	Head Wall	LHS / RHS
38+396	C	900	100D	C	14.660	270	2	0.119	0.372	3.134	C 38655	-	-	-	-	2	LHS
39+095	C	600	100D	C	18.073	90	3.5	0.18	0.184	2.582	C 38655	-	-	-	-	2	LHS

SURFACE / SUB SURFACE DRAINAGE DETAILS

Legend	Type	LHS/RHS	Start Km	End Km	Length	Reference
	1000 VD	RHS	38+510	38+755	245m	SD 0601/2
	1000 VD	LHS	38+510	38+685	175m	SD 0601/2
	2400 VD	LHS	38+830	38+935	105m	SD 0601/4
	2400 VD	RHS	38+850	38+920	70m	SD 0601/4
TOE DRAIN						
	Toe Drain	RHS	38+300	38+340	40m	C 35658
	Toe Drain	LHS	38+690	39+750	60m	C 35658
	Toe Drain	LHS	38+780	39+830	50m	C 35658
	Toe Drain	RHS	38+800	39+840	40m	C 35658
	Toe Drain	LHS	38+935	39+295	360m	C 35658
KERB AND CHANNEL						
	500 K & C	RHS	38+980	39+040	60m	SD 0701/A
	500 K & C	RHS	39+055	39+165	110m	SD 0701/A

EXPROPRIATION RHS CO-ORDINATES (WGS)

Point	X - Coordinate	Y - Coordinate
R1	3 241 538.560	90 947.271
R2	3 241 523.566	90 893.892
R3	3 241 494.452	90 846.076
R4	3 241 415.822	90 795.960
R5	3 241 398.461	90 788.721
R6	3 241 343.356	90 781.818
R7	3 241 310.305	90 781.970
R8	3 241 199.999	90 769.853
R9	3 241 143.808	90 768.630
R10	3 241 095.749	90 777.158

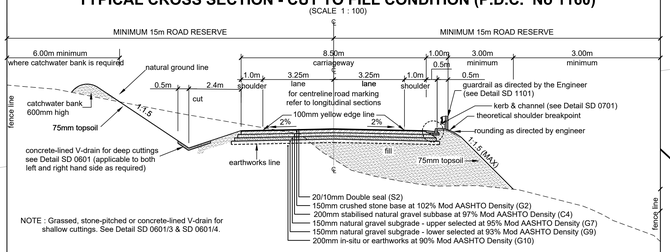
GUARDRAIL / BARRIER DETAILS

Legend	Type	LHS/RHS	Start Km	End Km	Length	Reference	End Treatment
	Single Guardrail	RHS	38+960	39+280	320m	SD 1101/A	Flared
	Single Guardrail	LHS	38+980	39+200	220m	SD 1101/A	Flared

P165 - DESIGN SPEED 80 km/hr

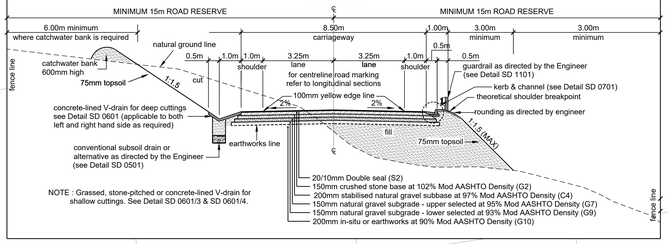
TYPICAL CROSS SECTION - CUT TO FILL CONDITION (P.D.C. No 1160)

(SCALE 1 : 100)



TYPICAL CROSS SECTION - CUT TO FILL CONDITION (P.D.C. No 1160)

(SCALE 1 : 100)



NOTATION

BC	BEGINNING OF CIRCULAR CURVE
EC	END OF CIRCULAR CURVE
PI	POINT OF INTERSECTION
R	RADIUS OF CIRCULAR CURVE
Δ	DEFLECTION ANGLE OF CIRCULAR CURVE
Lc	LENGTH OF CIRCULAR CURVE
TL	LENGTH OF CURVE TANGENT
BT	BEGINNING OF TAPER
ET	END OF TAPER
CL	CURVE LENGTH

ACCESS NO. 1

CENTRELINE CO-ORDINATES (WGS)

POINT	Y	X
START	90889.121	3240918.956
END	90867.028	3240905.736

HORIZONTAL ALIGNMENT SCHEDULE P165

Point	Chainage	Co-ordinates WG Lo.31° Y	Co-ordinates WG Lo.31° X	Curve Data
Start	38 295.000	90 988.642	3 241 533.648	
Curve No. 1				- - 150m
BCC 1	38 368.512	90 917.418	3 241 515.451	Δ - 69 23 42
PI 1		90 816.795	3 241 489.743	- - 103.855m
ECC 1	38 550.187	90 805.447	3 241 386.510	- - 181.675m
Curve No. 2				- - 250m
BCC 2	38 744.610	90 784.202	3 241 193.251	Δ - 37 09 35
PI 2		90 775.019	3 241 109.718	- - 84.036m
ECC 2	38 906.750	90 818.158	3 241 037.599	- - 162.140m
Curve No. 3				- - 2300m
BCC 3	39 040.881	90 887.013	3 240 922.489	Δ - 07 09 24
PI 3		90 960.845	3 240 799.058	- - 143.828m
ECC 3	39 328.163	91 018.725	3 240 667.390	- - 287.282m

GENERAL NOTES

1. ALL LEVELS, DIMENSIONS AND SETTING OUT DETAILS ARE TO BE VERIFIED BY THE ENGINEER AND CONTRACTOR ON SITE PRIOR TO CONSTRUCTION.
2. ALL EXISTING DRAINAGE CULVERTS ARE TO BE INSPECTED ON SITE AND ANY FOUND IN AN UNSERVICEABLE CONDITION ARE TO BE REPLACED ON INSTRUCTION BY THE ENGINEER
3. CULVERT INVERTS AND POSITIONS ARE TO BE VERIFIED BY THE ENGINEER ON SITE UNLESS SHOWN OTHERWISE. MIN COVER = 600mm. MIN SLOPE = 2%.
4. PIPE CULVERTS ARE TO BE LAID IN ACCORDANCE WITH SD 0401 WITH HEADWALLS AS PER SD 0402,SD 0403 OR SD 0406. MIN. DIA. = 450mm FOR MINOR ACCESS ROADS AND ACCESS BELLMOUTHS, AND MIN. DIA. = 600mm FOR MAJOR ROAD CROSS DRAINAGE.
5. FOR EROSION CONTROL GABION MATTRESSES ARE RECOMMENDED AT CULVERT INLETS AND OUTLETS. THE NEED FOR GABION MATRESSES TO BE VERIFIED BY THE ENGINEER
6. EARTH BERMS AND SHAPING ARE TO BE CONSTRUCTED AT CULVERT INLETS AND OUTLETS TO DIRECT STORMWATER WHERE NECESSARY.
7. SUBSOIL DRAINS AS PER SD 0501 ARE TO BE INSTALLED WITH 1000 V-DRAINS, OR WHERE HIGH WATER TABLES ARE ENCOUNTERED.
8. WHERE SURFACE RUNOFF IS TOWARDS THE ROAD, CATCHWATER BANKS ARE TO BE PROVIDED TO DIVERT STORMWATER TO MAJOR CROSS DRAINAGE STRUCTURES. ALL CATCHWATER BANKS TO BE CONCRETE LINED AS INSTRUCTED BY THE ENGINEER.
9. THE POSITIONS OF ACCESSES AND DRIVEWAYS ARE TO BE VERIFIED BY THE ENGINEER. DAYLIGHTING REQUIREMENTS ARE TO BE VERIFIED BY THE ENGINEER ON SITE. CONCRETE WEDGES AS PER SD 0303 MAY BE USED IN PLACE OF SURFACED BELLMOUTHS FOR ACCESSES SERVING SINGLE RESIDENTIAL PROPERTIES UNLESS SHOWN OTHERWISE. ACCESS CLOSURES ARE TO BE PHYSICALLY BARRICADED WITH GUARDRAILS WHERE ACCESS IS STILL POSSIBLE AFTER COMPLETION OF WORK.
10. GUARDRAILS ARE TO BE INSTALLED IN ACCORDANCE WITH SD 1101, SD 1102 AND SD 1103, WHERE FILL EMBANKMENTS EXCEED 3m IN HEIGHT OR WHERE HAZARDOUS OBSTRUCTIONS CANNOT BE REMOVED.
11. EXISTING ROAD SIGNS, SERVICES AND FENCING AFFECTED BY CONSTRUCTION ARE TO BE REMOVED / RELOCATED WHERE NECESSARY.
12. UNDERGROUND SERVICE CROSSINGS AND MARKERS ARE TO BE IN ACCORDANCE WITH SD 1003/B.
13. ALL NEW ROAD SIGNS AND ROAD MARKING REQUIREMENTS ARE TO CONFORM TO THE SOUTHERN AFRICAN DEVELOPMENT COMMUNITY ROAD TRAFFIC SIGNS MANUAL (SADC-RTSM).
14. ALL WORK IS TO BE CARRIED OUT IN ACCORDANCE WITH THE 'COLTO' SPECIFICATIONS FOR ROAD AND BRIDGE WORKS FOR STATE ROAD AUTHORITIES 1998 EDITION.
15. THE LETTERS L AND R DENOTE THE ROAD RESERVE BOUNDARY TO THE LEFT AND THE RIGHT OF THE ROAD RESPECTIVELY.
16. ROCK BOLSTERS ARE TO BE PLACED ACROSS THE INVERT OF DRAINS SUSCEPTIBLE TO EROSION FOR EVERY 2m VERTICAL DROP.
17. KERB AND CHANNEL DRAINS AS PER SD 0701 ARE TO BE PROVIDED WHERE FILL EMBANKMENTS EXCEED 3m IN HEIGHT.
18. ALL STOP SIGNS FOR TYPE B1 ACCESSES ARE TO BE POSITIONED 13m FROM THE CENTRE LINE OF P165.
    ALL STOP SIGNS FOR TYPE B3 ACCESSES ARE TO BE POSITIONED 8m FROM THE CENTRE LINE OF P165.
19. ALL DRAINAGE TO BE VERIFIED ON SITE BY THE ENGINEER
20. ALL PIPES ARE TO BE SPIGOT AND SOCKET TYPE PIPES ON CLASS C BEDDING.
21. SERVICE DUCT POSITIONS TO BE VERIFIED ON SITE BY THE ENGINEER
22. ALL OPEN CONCRETE LINED DRAIN POSITIONS TO BE VERIFIED BY THE ENGINEER ON SITE.
23. NEW FILLS AND EXPOSED CUTTINGS ARE TO BE TOP SOILED AND VEGETATED IMMEDIATELY AFTER CONSTRUCTION TO PREVENT EROSION.
24. ALL DRIVEWAYS AND ACCESS ROADS TO BE TIED INTO THE EXISTING INFRASTRUCTURE AS DIRECTED BY THE ENGINEER.
25. ALL ACCESS ROADS TO BE TIED IN WITH THE RELEVANT DRAINAGE AS INDICATED IN THE STANDARD DETAILS OR BY THE ENGINEER ON SITE.
26. ALL DRAINAGE FOR ACCESS ROADS ARE TO BE VERIFIED BY THE ENGINEER PRIOR TO CONSTRUCTION.

SYMBOL	DATE	DESCRIPTION	CHECKED	SIGNED
AMENDMENTS				

AS BUILT

SUPERVISING ENGINEER DATE

SUPERVISING AUTHORITY

CONTINUED FROM:

CONTINUED ON: C 38619

CROSS SECTION NO: C 38632 & C 38633

LONG SECTION NO: C 38627

NAIDU CONSULTING - CONSULTING ENGINEER
K. GOVENDER (Pr Eng 970276) SIGN : DATE :

DESIGNED BY: A. MABOSHEGO
CHECKED BY: S. POPIS
DRAWN BY: A. MABOSHEGO
CHECKED BY: M. NADASEN

Designed by:- NAIDU CONSULTING

Naidu Consulting no.:- D296/2000/T

transport
Department: Transport
Province of KwaZulu-Natal

MAIN ROAD 165 (HOWICK - MOOI RIVER)

STAKED KM DISTANCE: KM 37+800 - KM 38+920

SHEET 1 OF 9

TRANSPORTATION ENGINEERING: CHIEF ENGINEER

HEAD : TRANSPORT

PORTION
UPGRADING OF PORTION OF P165 : KM 38+295 - KM46+595
HOWICK TO MOOI RIVER
DESIGN / EXPROPRIATION PLAN

SCALE 1 : 1000

PLAN No. C 38618

C 38618

DRAINAGE DETAILS

S.K.D.	Area	Discharge	Flow	Bedding Class	Length	Skew	Conc. Chutes	Reference Dwg	Side Inlet	Co-ordinates Y	Co-ordinates X	Grid Inlets	Co-ordinates Y	Co-ordinates X	Head Wall	Co-ordinates Y	Co-ordinates X	LHS/ RHS
38+940	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	-	-	-	-	-	LHS
38+980	-	-	-	-	-	-	1	SD 0702/1	-	-	-	-	-	-	-	-	-	RHS
39+020	-	-	-	-	-	-	1	SD 0702/1	-	-	-	-	-	-	-	-	-	RHS
39+060	-	-	-	-	-	-	1	SD 0702/1	-	-	-	-	-	-	-	-	-	RHS
39+110	-	-	-	-	-	-	1	SD 0702/1	-	-	-	-	-	-	-	-	-	RHS
39+155	-	-	-	-	-	-	1	SD 0702/1	-	-	-	-	-	-	-	-	-	RHS
39+260	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	-	-	-	-	-	RHS
39+535	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	-	-	-	-	-	RHS
39+545	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	-	-	-	-	-	LHS
39+755	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	-	-	-	-	-	RHS
39+660	-	-	-	-	-	-	1	SD 0702/1	-	-	-	-	-	-	-	-	-	LHS
39+715	-	-	-	-	-	-	1	SD 0702/1	-	-	-	-	-	-	-	-	-	LHS
39+760	-	-	-	-	-	-	1	SD 0702/1	-	-	-	-	-	-	-	-	-	LHS
39+800	-	-	-	-	-	-	1	SD 0702/1	-	-	-	-	-	-	-	-	-	LHS
39+810	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	-	-	-	-	-	LHS
39+865	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	-	-	-	-	-	RHS

PIPE CROSSING DRAINAGE DETAILS (WGS)

S.K.D.	Type	Size (dia)	Class	Bedding Class	Length (m)	Skew	Grade	Area (ha)	Discharge (m^3/s)	Velocity (m/s)	Reference Dwg	Conc. Chutes	Side Inlet	Grid Inlet	Drop Inlets	Head Wall	LHS / RHS
39+095	C	600	100D	C	18,073	90	3.5	0.180	0.184	2.582	C 38655	-	.	.	.	2	LHS
39+265	C	600	100D	C	15.193	56	2	0.071	0.184	2.582	C 38655	-	.	.	.	2	LHS
39+755	C	900	100D	C	13.160	27	2	0.114	0.442	3.882	C 38655	-	.	.	.	2	RHS

SURFACE / SUB SURFACE DRAINAGE DETAILS

Legend	Type	LHS/RHS	Start Km	End Km	Length	Reference
	2400 VD	LHS	38+830	38+935	105m	SD 0601/4
	2400 VD	RHS	38+850	38+920	70m	SD 0601/4
	2400 VD	LHS	39+300	39+340	40m	SD 0601/4
	2400 VD	RHS	39+300	39+530	230m	SD 0601/4
	2400 VD	LHS	39+380	39+540	160m	SD 0601/4
	2400 VD	RHS	39+875	40+370	495m	SD 0601/4
	2400 VD	LHS	39+890	40+400	510m	SD 0601/4
TOE DRAIN						
	Toe Drain	LHS	38+935	39+260	325m	C 38658
	Toe Drain	LHS	39+560	39+750	190m	C 38658
	Toe Drain	RHS	39+575	39+875	300m	C 38658
KERB AND CHANNEL						
	500 K & C	RHS	38+980	39+040	60m	SD 0701/A
	500 K & C	RHS	39+055	39+165	110m	SD 0701/A
	500 K & C	LHS	39+640	39+810	170m	SD 0701/A

GUARDRAIL / BARRIER DETAILS

Legend	Type	LHS/RHS	Start Km	End Km	Length	Reference	End Treatment
	Single Guardrail	RHS	39+920	39+940	20m	SD 1101/A	Flared
	Single Guardrail	LHS	38+980	39+255	275m	SD 1101/A	Flared
	Single Guardrail	LHS	39+620	39+825	205m	SD 1101/A	Flared
	Single Guardrail	RHS	39+675	39+815	140m	SD 1101/A	Flared
	Single Guardrail	RHS	39+050	39+160	160m	SD 1101/A	Flared

P165 - DESIGN SPEED 80 km/hr

GENERAL NOTES

1. ALL LEVELS, DIMENSIONS AND SETTING OUT DETAILS ARE TO BE VERIFIED BY THE ENGINEER AND CONTRACTOR ON SITE PRIOR TO CONSTRUCTION.
2. ALL EXISTING DRAINAGE CULVERTS ARE TO BE INSPECTED ON SITE AND ANY FOUND IN AN UNSERVICEABLE CONDITION ARE TO BE REPLACED ON INSTRUCTION BY THE ENGINEER
3. CULVERT INVERTS AND POSITIONS ARE TO BE VERIFIED BY THE ENGINEER ON SITE UNLESS SHOWN OTHERWISE. MIN COVER = 600mm. MIN SLOPE = 2%.
4. PIPE CULVERTS ARE TO BE LAID IN ACCORDANCE WITH SD 0401 WITH HEADWALLS AS PER SD 0402,SD 0403 OR SD 0406. MIN. DIA. = 450mm FOR MINOR ACCESS ROADS AND ACCESS BELLMOUTHS, AND MIN. DIA. = 600mm FOR MAJOR ROAD CROSS DRAINAGE.
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6. EARTH BERMS AND SHAPING ARE TO BE CONSTRUCTED AT CULVERT INLETS AND OUTLETS TO DIRECT STORMWATER WHERE NECESSARY.
7. SUBSOIL DRAINS AS PER SD 0501 ARE TO BE INSTALLED WITH 1000 V-DRAINS, OR WHERE HIGH WATER TABLES ARE ENCOUNTERED.
8. WHERE SURFACE RUNOFF IS TOWARDS THE ROAD, CATCHWATER BANKS ARE TO BE PROVIDED TO DIVERT STORMWATER TO MAJOR CROSS DRAINAGE STRUCTURES. ALL CATCHWATER BANKS TO BE CONCRETE LINED AS INSTRUCTED BY THE ENGINEER.
9. THE POSITIONS OF ACCESSES AND DRIVEWAYS ARE TO BE VERIFIED BY THE ENGINEER. DAYLIGHTING REQUIREMENTS ARE TO BE VERIFIED BY THE ENGINEER ON SITE. CONCRETE WEDGES AS PER SD 0303 MAY BE USED IN PLACE OF SURFACED BELLMOUTHS FOR ACCESSES SERVING SINGLE RESIDENTIAL PROPERTIES UNLESS SHOWN OTHERWISE. ACCESS CLOSURES ARE TO BE PHYSICALLY BARRICADED WITH GUARDRAILS WHERE ACCESS IS STILL POSSIBLE AFTER COMPLETION OF WORK.
10. GUARDRAILS ARE TO BE INSTALLED IN ACCORDANCE WITH SD 1101, SD 1102 AND SD 1103, WHERE FILL EMBANKMENTS EXCEED 3m IN HEIGHT OR WHERE HAZARDOUS OBSTRUCTIONS CANNOT BE REMOVED.
11. EXISTING ROAD SIGNS, SERVICES AND FENCING AFFECTED BY CONSTRUCTION ARE TO BE REMOVED / RELOCATED WHERE NECESSARY.
12. UNDERGROUND SERVICE CROSSINGS AND MARKERS ARE TO BE IN ACCORDANCE WITH SD 1003/B.
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14. ALL WORK IS TO BE CARRIED OUT IN ACCORDANCE WITH THE 'COLTO' SPECIFICATIONS FOR ROAD AND BRIDGE WORKS FOR STATE ROAD AUTHORITIES 1998 EDITION.
15. THE LETTERS L AND R DENOTE THE ROAD RESERVE BOUNDARY TO THE LEFT AND THE RIGHT OF THE ROAD RESPECTIVELY.
16. ROCK BOLSTERS ARE TO BE PLACED ACROSS THE INVERT OF DRAINS SUSCEPTIBLE TO EROSION FOR EVERY 2m VERTICAL DROP.
17. KERB AND CHANNEL DRAINS AS PER SD 0701 ARE TO BE PROVIDED WHERE FILL EMBANKMENTS EXCEED 3m IN HEIGHT.
18. ALL STOP SIGNS FOR TYPE B1 ACCESSES ARE TO BE POSITIONED 13m FROM THE CENTRE LINE OF P165.
    ALL STOP SIGNS FOR TYPE B3 ACCESSES ARE TO BE POSITIONED 8m FROM THE CENTRE LINE OF P165.
19. ALL DRAINAGE TO BE VERIFIED ON SITE BY THE ENGINEER
20. ALL PIPES ARE TO BE SPIGOT AND SOCKET TYPE PIPES ON CLASS C BEDDING.
21. SERVICE DUCT POSITIONS TO BE VERIFIED ON SITE BY THE ENGINEER
22. ALL OPEN CONCRETE LINED DRAIN POSITIONS TO BE VERIFIED BY THE ENGINEER ON SITE.
23. NEW FILLS AND EXPOSED CUTTINGS ARE TO BE TOP SOILED AND VEGETATED IMMEDIATELY AFTER CONSTRUCTION TO PREVENT EROSION.
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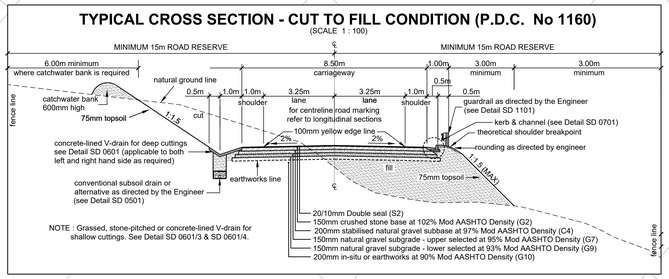
25. ALL ACCESS ROADS TO BE TIED IN WITH THE RELEVANT DRAINAGE AS INDICATED IN THE STANDARD DETAILS OR BY THE ENGINEER ON SITE.
26. ALL DRAINAGE FOR ACCESS ROADS ARE TO BE VERIFIED BY THE ENGINEER PRIOR TO CONSTRUCTION.

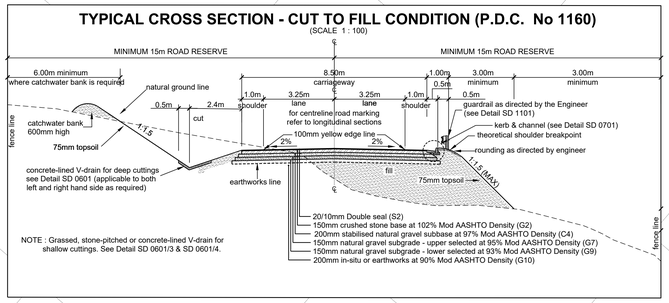
TYPICAL CROSS SECTION - CUT TO FILL CONDITION (P.D.C. No 1160)

(SCALE 1 : 100)



TYPICAL CROSS SECTION - CUT TO FILL CONDITION (P.D.C. No 1160)

(SCALE 1 : 100)



LEGEND

- 500 KERB AND CHANNEL (SD 0701) WITH CHUTE (SD 0702)
- 1000 KERB AND CHANNEL (SD 0701) WITH CHUTE (SD 0604)
- CONCRETE-LINED 1000 V-DRAIN (SD 0601) WITH CHUTE (SD 0603)
- CONCRETE TOE DRAIN
- GRASS-LINED V-DRAIN
- PIPE CROSSING WITH SIDE INLET (SD 0703) GRID INLET (SD 0602), 600mmØ PIPE AND HEADWALL (SD 0406)
- CATCHWATER BANK
- BULLNOSE/BURIED SINGLE GUARDRAIL (SD 0701)
- PROPOSED EXPROPRIATION ROAD RESERVE
- EXISTING FENCE LINES
- EXISTING ROAD RESERVE
- GUARDRAILS
- RENO MATTRESSES
- DAYLIGHTING
- RETAINING WALLS
- DRIVEWAY ACCESS (NO KERB AND CHANNEL) (C 38658- DETAIL C)

SERVICES LEGEND

- PETROLEUM PIPELINE
- SURVEY CABLE MARKER
- ELECTRIC POLE
- OVERHEAD ELECTRICAL MV CABLE
- OVERHEAD ELECTRICAL HV CABLE
- WATER SERVICES
- TELEPHONE POLE
- CABLE MANHOLE
- CADASTRAL BOUNDARY

ACCESS NO. 1

CENTRELINE CO-ORDINATES (WGS)

POINT	Y	X
START	90889.121	3240918.956
END	90867.028	3240905.736

NOTATION

BC	BEGINNING OF CIRCULAR CURVE
EC	END OF CIRCULAR CURVE
PI	POINT OF INTERSECTION
R	RADIUS OF CIRCULAR CURVE
△	DEFLECTION ANGLE OF CIRCULAR CURVE
Lc	LENGTH OF CIRCULAR CURVE
TL	LENGTH OF CURVE TANGENT
BT	BEGINNING OF TAPER
ET	END OF TAPER
CL	CURVE LENGTH

ACCESSES

ACCESS NO.	STAKED KM DISTANCE	LEFT OR RIGHT	DESCRIPTION	REMARKS
2	KM 39+045	RHS	TYPE B1 ACCESS	REFER TO SD 0303/C
3	KM 39+356	LHS	TYPE B3 ACCESS	REFER TO SD 0303/C

FOR APPROVAL

SYMBOL	DATE	DESCRIPTION	CHECKED	SIGNED
AMENDMENTS				

AS BUILT

SUPERVISING ENGINEER DATE

SUPERVISING AUTHORITY

CONTINUED FROM: C 38618
CONTINUED ON: C 38620
CROSS SECTION NO: C 38633 to C 38635
LONG SECTION NO: C 38627
DESIGNED BY: A. MABOSHEGO
CHECKED BY: S. POPIS
DRAWN BY: A. MABOSHEGO
CHECKED BY: M. NADASEN
NAIDU CONSULTING - CONSULTING ENGINEER
K. GOVENDER (Pr Eng 970276) SIGN : DATE :

Designed by:-
NAIDU CONSULTING
Naidu Consulting no.:- D296/2001/T

transport
Department: Transport
Province of KwaZulu-Natal

MAIN ROAD 165 (HOWICK - MOOI RIVER)

STAKED KM DISTANCE: KM 38+920 - KM 39+920

SHEET 2 OF 9

TRANSPORTATION ENGINEERING: CHIEF ENGINEER

HEAD : TRANSPORT

PORTION

UPGRADING OF PORTION OF P165 : KM 38+295 - KM46+595
HOWICK TO MOOI RIVER
DESIGN / EXPROPRIATION PLAN

SCALE 1 : 1000

PLAN No. C 38619

C 38619

DRAINAGE DETAILS

S.K.D.	Area	Discharge	Flow	Bedding Class	Length	Skew	Conc. Chutes	Reference Dwg	Side Inlet	Co-ordinates Y	Co-ordinates X	Grid Inlets	Co-ordinates Y	Co-ordinates X	Head Wall	Co-ordinates Y	Co-ordinates X	LHS/ RHS
40+370	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	·	·	-	·	·	RHS
40+405	-	-	-	-	-	-	1	SD 0303/C	-	-	-	-	·	·	-	·	·	LHS
40+630	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	·	·	-	·	·	LHS
40+670	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	·	·	-	·	·	RHS
40+787	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	·	·	-	·	·	LHS
40+895	-	-	-	-	-	-	1	SD 0702/1	-	-	-	-	·	·	-	·	·	LHS
40+950	-	-	-	-	-	-	1	SD 0702/1	-	-	-	-	·	·	-	·	·	LHS

PIPE CROSSING DRAINAGE DETAILS (WGS)

S.K.D.	Type	Size (dia)	Class	Bedding Class	Length (m)	Skew	Grade	Area (ha)	Discharge (m^3/s)	Velocity (m/s)	Reference Dwg	Conc. Chutes	Side Inlet	Grid Inlet	Drop Inlets	Head Wall	LHS / RHS
40+385	C	TBC	100D	C	16.386	-	2	-	-	-	C 38655	-	.	.	.	2	RHS
40+787	C	900	100D	C	16.386	270	2	0.071	0.125	0.955	C 38655	-	.	.	.	2	RHS
40+965	C	600	100D	C	16.386	90	2	0.015	0.025	0.855	C 38655	-	.	.	.	2	LHS

SURFACE / SUB SURFACE DRAINAGE DETAILS

Legend	Type	LHS/RHS	Start Km	End Km	Length	Reference
	2400 VD	RHS	39+875	40+390	515m	SD 0601/4
	2400 VD	LHS	39+890	40+400	510m	SD 0601/4
	2400 VD	RHS	40+540	40+670	130m	SD 0601/4
TOE DRAIN						
	Toe Drain	LHS	40+420	40+630	200m	C 38658
	Toe Drain	LHS	40+740	40+780	40m	C 38658
	Toe Drain	RHS	40+740	40+780	40m	C 38658
	Toe Drain	LHS	40+860	40+900	40m	C 38658
	Toe Drain	RHS	40+980	41+100	120m	C 38658
	500 K & C	LHS	40+855	41+100	245m	SD 0701/A

GUARDRAIL / BARRIER DETAILS

Legend	Type	LHS/RHS	Start Km	End Km	Length	Reference	End Treatment
	Single Guardrail	LHS	40+855	41+120	265m	SD 1101/A	Flared
	Single Guardrail	RHS	40+855	41+115	260m	SD 1101/A	Flared

EXPROPRIATION LHS CO-ORDINATES (WGS)

Point	X - Coordinate	Y - Coordinate
L1	3 240 070.391	91 537.739
L2	3 240 006.450	91 609.404
L3	3 239 960.564	91 655.588
L4	3 239 907.755	91 701.573
L5	3 239 859.744	91 736.846

P165 - DESIGN SPEED 80 km/hr

GENERAL NOTES

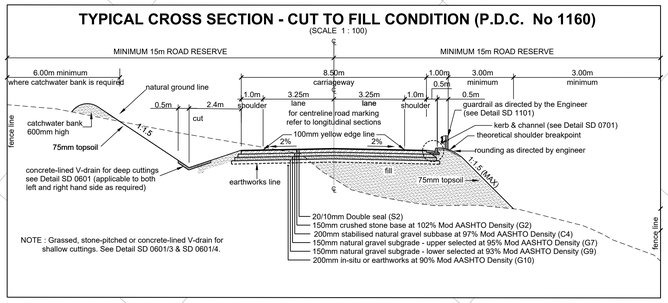
1. ALL LEVELS, DIMENSIONS AND SETTING OUT DETAILS ARE TO BE VERIFIED BY THE ENGINEER AND CONTRACTOR ON SITE PRIOR TO CONSTRUCTION.
2. ALL EXISTING DRAINAGE CULVERTS ARE TO BE INSPECTED ON SITE AND ANY FOUND IN AN UNSERVICEABLE CONDITION ARE TO BE REPLACED ON INSTRUCTION BY THE ENGINEER.
3. CULVERT INVERTS AND POSITIONS ARE TO BE VERIFIED BY THE ENGINEER ON SITE UNLESS SHOWN OTHERWISE. MIN COVER = 600mm, MIN SLOPE = 2%.
4. PIPE CULVERTS ARE TO BE LAID IN ACCORDANCE WITH SD 0401 WITH HEADWALLS AS PER SD 0402,SD 0403 OR SD 0406. MIN. DIA. = 450mm FOR MINOR ACCESS ROADS AND ACCESS BELLMOUTHS, AND MIN. DIA. = 600mm FOR MAJOR ROAD CROSS DRAINAGE.
5. FOR EROSION CONTROL GABION MATTRESSES ARE RECOMMENDED AT CULVERT INLETS AND OUTLETS. THE NEED FOR GABION MATRESSES TO BE VERIFIED BY THE ENGINEER
6. EARTH BERMS AND SHAPING ARE TO BE CONSTRUCTED AT CULVERT INLETS AND OUTLETS TO DIRECT STORMWATER WHERE NECESSARY.
7. SUBSOIL DRAINS AS PER SD 0501 ARE TO BE INSTALLED WITH 1000 V-DRAINS, OR WHERE HIGH WATER TABLES ARE ENCOUNTERED.
8. WHERE SURFACE RUNOFF IS TOWARDS THE ROAD, CATCHWATER BANKS ARE TO BE PROVIDED TO DIVERT STORMWATER TO MAJOR CROSS DRAINAGE STRUCTURES. ALL CATCHWATER BANKS TO BE CONCRETE LINED AS INSTRUCTED BY THE ENGINEER.
9. THE POSITIONS OF ACCESSES AND DRIVEWAYS ARE TO BE VERIFIED BY THE ENGINEER. DAYLIGHTING REQUIREMENTS ARE TO BE VERIFIED BY THE ENGINEER ON SITE. CONCRETE WEDGES AS PER SD 0303 MAY BE USED IN PLACE OF SURFACED BELLMOUTHS FOR ACCESSES SERVING SINGLE RESIDENTIAL PROPERTIES UNLESS SHOWN OTHERWISE. ACCESS CLOSURES ARE TO BE PHYSICALLY BARRICADED WITH GUARDRAILS WHERE ACCESS IS STILL POSSIBLE AFTER COMPLETION OF WORK.
10. GUARDRAILS ARE TO BE INSTALLED IN ACCORDANCE WITH SD 1101, SD 1102 AND SD 1103, WHERE FILL EMBANKMENTS EXCEED 3m IN HEIGHT OR WHERE HAZARDOUS OBSTRUCTIONS CANNOT BE REMOVED.
11. EXISTING ROAD SIGNS, SERVICES AND FENCING AFFECTED BY CONSTRUCTION ARE TO BE REMOVED / RELOCATED WHERE NECESSARY.
12. UNDERGROUND SERVICE CROSSINGS AND MARKERS ARE TO BE IN ACCORDANCE WITH SD 1003/B.
13. ALL NEW ROAD SIGNS AND ROAD MARKING REQUIREMENTS ARE TO CONFORM TO THE SOUTHERN AFRICAN DEVELOPMENT COMMUNITY ROAD TRAFFIC SIGNS MANUAL (SADC-RTSM).
14. ALL WORK IS TO BE CARRIED OUT IN ACCORDANCE WITH THE 'COLTO' SPECIFICATIONS FOR ROAD AND BRIDGE WORKS FOR STATE ROAD AUTHORITIES 1998 EDITION.
15. THE LETTERS L AND R DENOTE THE ROAD RESERVE BOUNDARY TO THE LEFT AND THE RIGHT OF THE ROAD RESPECTIVELY.
16. ROCK BOLSTERS ARE TO BE PLACED ACROSS THE INVERT OF DRAINS SUSCEPTIBLE TO EROSION FOR EVERY 2m VERTICAL DROP.
17. KERB AND CHANNEL DRAINS AS PER SD 0701 ARE TO BE PROVIDED WHERE FILL EMBANKMENTS EXCEED 3m IN HEIGHT.
18. ALL STOP SIGNS FOR TYPE B1 ACCESSES ARE TO BE POSITIONED 13m FROM THE CENTRE LINE OF P165.
    ALL STOP SIGNS FOR TYPE B3 ACCESSES ARE TO BE POSITIONED 8m FROM THE CENTRE LINE OF P165.
19. ALL DRAINAGE TO BE VERIFIED ON SITE BY THE ENGINEER
20. ALL PIPES ARE TO BE SPIGOT AND SOCKET TYPE PIPES ON CLASS C BEDDING.
21. SERVICE DUCT POSITIONS TO BE VERIFIED ON SITE BY THE ENGINEER
22. ALL OPEN CONCRETE LINED DRAIN POSITIONS TO BE VERIFIED BY THE ENGINEER ON SITE.
23. NEW FILLS AND EXPOSED CUTTINGS ARE TO BE TOP SOILED AND VEGETATED IMMEDIATELY AFTER CONSTRUCTION TO PREVENT EROSION.
24. ALL DRIVEWAYS AND ACCESS ROADS TO BE TIED INTO THE EXISTING INFRASTRUCTURE AS DIRECTED BY THE ENGINEER.
25. ALL ACCESS ROADS TO BE TIED IN WITH THE RELEVANT DRAINAGE AS INDICATED IN THE STANDARD DETAILS OR BY THE ENGINEER ON SITE.
26. ALL DRAINAGE FOR ACCESS ROADS ARE TO BE VERIFIED BY THE ENGINEER PRIOR TO CONSTRUCTION.

LEGEND

- 500 KERB AND CHANNEL (SD 0701) WITH CHUTE (SD 0702)
- 1000 KERB AND CHANNEL (SD 0701) WITH CHUTE (SD 0604)
- CONCRETE-LINED 1000 V-DRAIN (SD 0601) WITH CHUTE (SD 0603)
- CONCRETE TOE DRAIN
- GRASS-LINED V-DRAIN
- PIPE CROSSING WITH SIDE INLET (SD 0703) GRID INLET (SD 0602), 600mmØ PIPE AND HEADWALL (SD 0406)
- CATCHWATER BANK
- BULLNOSE/BURIED SINGLE GUARDRAIL (SD 0701)
- PROPOSED EXPROPRIATION ROAD RESERVE
- EXISTING FENCE LINES
- EXISTING ROAD RESERVE
- GUARDRAILS
- RENO MATTRESSES
- DAYLIGHTING
- RETAINING WALLS
- DRIVEWAY ACCESS (NO KERB AND CHANNEL) (C 38658- DETAIL C)

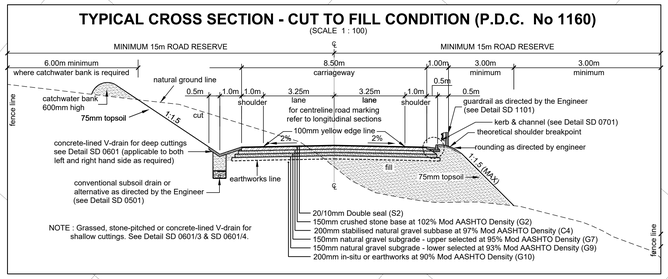
TYPICAL CROSS SECTION - CUT TO FILL CONDITION (P.D.C. No 1160)

(SCALE 1 : 100)



TYPICAL CROSS SECTION - CUT TO FILL CONDITION (P.D.C. No 1160)

(SCALE 1 : 100)

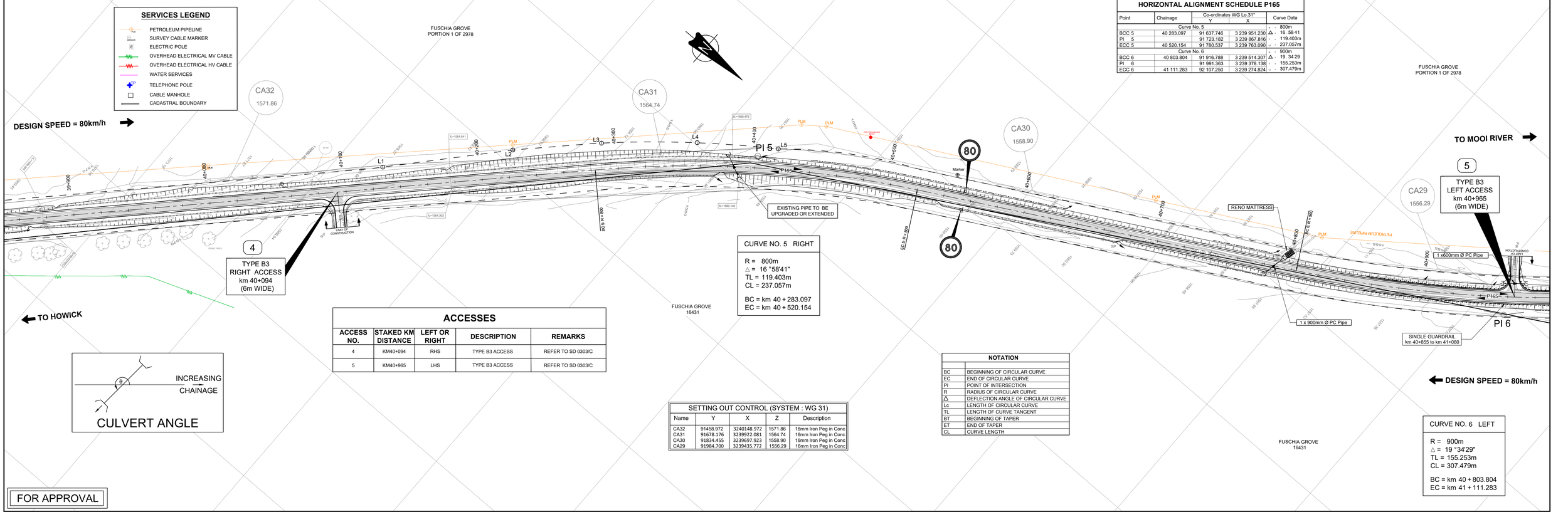


SERVICES LEGEND

- PETROLEUM PIPELINE
- SURVEY CABLE MARKER
- ELECTRIC POLE
- OVERHEAD ELECTRICAL MV CABLE
- OVERHEAD ELECTRICAL HV CABLE
- WATER SERVICES
- TELEPHONE POLE
- CABLE MANHOLE
- CADASTRAL BOUNDARY

HORIZONTAL ALIGNMENT SCHEDULE P165

Point	Chainage	Co-ordinates WG Lo.31° Y	Co-ordinates WG Lo.31° X	Curve Data
Curve No. 5				R = 800m
BCC 5	40 283.097	91 637.746	3 239 951.230	Δ = 16 ° 58 41
PI 5		91 723.182	3 239 867.816	TL = 119.403m
ECC 5	40 520.154	91 780.537	3 239 763.090	CL = 237.057m
Curve No. 6				R = 900m
BCC 6	40 803.804	91 916.788	3 239 514.307	Δ = 19 .34 29
PI 6		91 991.363	3 239 378.138	TL = 155.253m
ECC 6	41 111.283	92 107.250	3 239 274.824	CL = 307.479m



CURVE NO. 5 RIGHT

R = 800m
△ = 16 °58'41"
TL = 119.403m
CL = 237.057m

BC = km 40 + 283.097
EC = km 40 + 520.154

CURVE NO. 6 LEFT

R = 900m
△ = 19 °34'29"
TL = 155.253m
CL = 307.479m

BC = km 40 + 803.804
EC = km 41 + 111.283

ACCESSES

ACCESS NO.	STAKED KM DISTANCE	LEFT OR RIGHT	DESCRIPTION	REMARKS
4	KM40+094	RHS	TYPE B3 ACCESS	REFER TO SD 0303/C
5	KM40+965	LHS	TYPE B3 ACCESS	REFER TO SD 0303/C

INCREASING CHAINAGE

CULVERT ANGLE

SETTING OUT CONTROL (SYSTEM : WG 31)

Name	Y	X	Z	Description
CA32	91458.972	3240148.972	1571.86	16mm Iron Peg in Conc
CA31	91678.176	3239922.081	1564.74	16mm Iron Peg in Conc
CA30	91834.455	3239697.923	1558.90	16mm Iron Peg in Conc
CA29	91984.700	3239435.772	1556.29	16mm Iron Peg in Conc

NOTATION

BC	BEGINNING OF CIRCULAR CURVE
EC	END OF CIRCULAR CURVE
PI	POINT OF INTERSECTION
R	RADIUS OF CIRCULAR CURVE
△	DEFLECTION ANGLE OF CIRCULAR CURVE
Lc	LENGTH OF CIRCULAR CURVE
TL	LENGTH OF CURVE TANGENT
BT	BEGINNING OF TAPER
ET	END OF TAPER
CL	CURVE LENGTH

FOR APPROVAL

SYMBOL	DATE	DESCRIPTION	CHECKED	SIGNED
		AMENDMENTS		

AS BUILT

SUPERVISING ENGINEER DATE

SUPERVISING AUTHORITY

CONTINUED FROM: C 38619
CONTINUED ON: C 38621
CROSS SECTION NO: C 38635 & C 38636
LONG SECTION NO: C 38628
NAIDU CONSULTING - CONSULTING ENGINEER
K. GOVENDER (Pr Eng 970276) SIGN : DATE :

DESIGNED BY: A. MABOSHEGO
CHECKED BY: S. POPIS
DRAWN BY: A. MABOSHEGO
CHECKED BY: M. NADASEN

Designed by:- NAIDU CONSULTING
Naidu Consulting no.:- D296/2002/T

transport
Department: Transport
Province of KwaZulu-Natal

MAIN ROAD 165 (HOWICK - MOOI RIVER)

STAKED KM DISTANCE: KM 39+920 - KM 40+920

SHEET 3 OF 9

TRANSPORTATION ENGINEERING: CHIEF ENGINEER

HEAD : TRANSPORT

PORTION

UPGRADING OF PORTION OF P165 : KM 38+295 - KM46+595
HOWICK TO MOOI RIVER
DESIGN / EXPROPRIATION PLAN

SCALE 1 : 1000

PLAN No. C 38620

C 38620

DRAINAGE DETAILS

S.K.D.	Area	Discharge	Flow	Bedding Class	Length	Skew	Conc. Chutes	Reference Dwg	Side Inlet	Co-ordinates Y	Co-ordinates X	Grid Inlets	Co-ordinates Y	Co-ordinates X	Head Wall	Co-ordinates Y	Co-ordinates X	LHS/ RHS
41+000	-	-	-	-	-	-	1	SD 0702/C	-	-	-	-	-	-	-	-	-	LHS
41+050	-	-	-	-	-	-	1	SD 0702/C	-	-	-	-	-	-	-	-	-	LHS
41+100	-	-	-	-	-	-	1	SD 0702/1	-	-	-	-	-	-	-	-	-	LHS
41+495	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	-	-	-	-	-	LHS
41+495	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	-	-	-	-	-	RHS
41+500	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	-	-	-	-	-	RHS
41+860	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	-	-	-	-	-	RHS

PIPE CROSSING DRAINAGE DETAILS (WGS)

S.K.D.	Type	Size (dia)	Class	Bedding Class	Length (m)	Skew	Grade	Area (ha)	Discharge (m^3/s)	Velocity (m/s)	Reference Dwg	Conc. Chutes	Side Inlet	Grid Inlet	Drop Inlets	Head Wall	LHS / RHS
41+088	C	600	100D	C	16.721	270	10.5	0.109	0.33	3.035	C 38655	-	.	.	.	2	RHS
41+382	C	900	100D	C	12.739	89	4	0.012	0.33	1.215	C 38655	-	.	.	.	2	LHS

SURFACE / SUB SURFACE DRAINAGE DETAILS

Legend	Type	LHS/RHS	Start Km	End Km	Length	Reference
	2400 VD	RHS	41+500	41+840	340m	SD 0601/4
	2400 VD	LHS	41+495	42+070	575m	SD 0601/4
TOE DRAIN						
	Toe Drain	LHS	40+860	40+900	40m	C 38658
	Toe Drain	RHS	40+980	41+100	120m	C 38658
	Toe Drain	LHS	41+170	41+490	320m	C 38658
	Toe Drain	RHS	41+860	41+980	120m	C 38658
KERB AND CHANNEL						
	500 K & C	LHS	40+855	41+100	245m	SD 0701/A

GUARDRAIL / BARRIER DETAILS

Legend	Type	LHS/RHS	Start Km	End Km	Length	Reference	End Treatment
	Single Guardrail	LHS	40+855	41+120	265m	SD 1101/A	Flared
	Single Guardrail	RHS	40+855	41+115	260m	SD 1101/A	Flared

GENERAL NOTES

1. ALL LEVELS, DIMENSIONS AND SETTING OUT DETAILS ARE TO BE VERIFIED BY THE ENGINEER AND CONTRACTOR ON SITE PRIOR TO CONSTRUCTION.
2. ALL EXISTING DRAINAGE CULVERTS ARE TO BE INSPECTED ON SITE AND ANY FOUND IN AN UNSERVICEABLE CONDITION ARE TO BE REPLACED ON INSTRUCTION BY THE ENGINEER.
3. CULVERT INVERTS AND POSITIONS ARE TO BE VERIFIED BY THE ENGINEER ON SITE UNLESS SHOWN OTHERWISE. MIN COVER = 600mm. MIN SLOPE = 2%.
4. PIPE CULVERTS ARE TO BE LAID IN ACCORDANCE WITH SD 0401 WITH HEADWALLS AS PER SD 0402,SD 0403 OR SD 0406. MIN. DIA. = 450mm FOR MINOR ACCESS ROADS AND ACCESS BELLMOUTHS, AND MIN. DIA. = 600mm FOR MAJOR ROAD CROSS DRAINAGE.
5. FOR EROSION CONTROL GABION MATTRESSES ARE RECOMMENDED AT CULVERT INLETS AND OUTLETS. THE NEED FOR GABION MATRESSES TO BE VERIFIED BY THE ENGINEER
6. EARTH BERMS AND SHAPING ARE TO BE CONSTRUCTED AT CULVERT INLETS AND OUTLETS TO DIRECT STORMWATER WHERE NECESSARY.
7. SUBSOIL DRAINS AS PER SD 0501 ARE TO BE INSTALLED WITH 1000 V-DRAINS, OR WHERE HIGH WATER TABLES ARE ENCOUNTERED.
8. WHERE SURFACE RUNOFF IS TOWARDS THE ROAD, CATCHWATER BANKS ARE TO BE PROVIDED TO DIVERT STORMWATER TO MAJOR CROSS DRAINAGE STRUCTURES. ALL CATCHWATER BANKS TO BE CONCRETE LINED AS INSTRUCTED BY THE ENGINEER.
9. THE POSITIONS OF ACCESSES AND DRIVEWAYS ARE TO BE VERIFIED BY THE ENGINEER. DAYLIGHTING REQUIREMENTS ARE TO BE VERIFIED BY THE ENGINEER ON SITE. CONCRETE WEDGES AS PER SD 0303 MAY BE USED IN PLACE OF SURFACED BELLMOUTHS FOR ACCESSES SERVING SINGLE RESIDENTIAL PROPERTIES UNLESS SHOWN OTHERWISE. ACCESS CLOSURES ARE TO BE PHYSICALLY BARRICADED WITH GUARDRAILS WHERE ACCESS IS STILL POSSIBLE AFTER COMPLETION OF WORK.
10. GUARDRAILS ARE TO BE INSTALLED IN ACCORDANCE WITH SD 1101, SD 1102 AND SD 1103, WHERE FILL EMBANKMENTS EXCEED 3m IN HEIGHT OR WHERE HAZARDOUS OBSTRUCTIONS CANNOT BE REMOVED.
11. EXISTING ROAD SIGNS, SERVICES AND FENCING AFFECTED BY CONSTRUCTION ARE TO BE REMOVED / RELOCATED WHERE NECESSARY.
12. UNDERGROUND SERVICE CROSSINGS AND MARKERS ARE TO BE IN ACCORDANCE WITH SD 1003/B.
13. ALL NEW ROAD SIGNS AND ROAD MARKING REQUIREMENTS ARE TO CONFORM TO THE SOUTHERN AFRICAN DEVELOPMENT COMMUNITY ROAD TRAFFIC SIGNS MANUAL (SADC-RTSM).
14. ALL WORK IS TO BE CARRIED OUT IN ACCORDANCE WITH THE 'COLTO' SPECIFICATIONS FOR ROAD AND BRIDGE WORKS FOR STATE ROAD AUTHORITIES 1998 EDITION.
15. THE LETTERS L AND R DENOTE THE ROAD RESERVE BOUNDARY TO THE LEFT AND THE RIGHT OF THE ROAD RESPECTIVELY.
16. ROCK BOLSTERS ARE TO BE PLACED ACROSS THE INVERT OF DRAINS SUSCEPTIBLE TO EROSION FOR EVERY 2m VERTICAL DROP.
17. KERB AND CHANNEL DRAINS AS PER SD 0701 ARE TO BE PROVIDED WHERE FILL EMBANKMENTS EXCEED 3m IN HEIGHT.
18. ALL STOP SIGNS FOR TYPE B1 ACCESSES ARE TO BE POSITIONED 13m FROM THE CENTRE LINE OF P165.
    ALL STOP SIGNS FOR TYPE B3 ACCESSES ARE TO BE POSITIONED 8m FROM THE CENTRE LINE OF P165.
19. ALL DRAINAGE TO BE VERIFIED ON SITE BY THE ENGINEER
20. ALL PIPES ARE TO BE SPIGOT AND SOCKET TYPE PIPES ON CLASS C BEDDING.
21. SERVICE DUCT POSITIONS TO BE VERIFIED ON SITE BY THE ENGINEER
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23. NEW FILLS AND EXPOSED CUTTINGS ARE TO BE TOP SOILED AND VEGETATED IMMEDIATELY AFTER CONSTRUCTION TO PREVENT EROSION.
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25. ALL ACCESS ROADS TO BE TIED IN WITH THE RELEVANT DRAINAGE AS INDICATED IN THE STANDARD DETAILS OR BY THE ENGINEER ON SITE.
26. ALL DRAINAGE FOR ACCESS ROADS ARE TO BE VERIFIED BY THE ENGINEER PRIOR TO CONSTRUCTION.

LEGEND

- 500 KERB AND CHANNEL (SD 0701) WITH CHUTE (SD 0702)
- 1000 KERB AND CHANNEL (SD 0701) WITH CHUTE (SD 0604)
- CONCRETE-LINED 1000 V-DRAIN (SD 0601) WITH CHUTE (SD 0603)
- CONCRETE TOE DRAIN
- GRASS-LINED V-DRAIN
- PIPE CROSSING WITH SIDE INLET (SD 0703) GRID INLET (SD 0602), 600mmØ PIPE AND HEADWALL (SD 0406)
- CATCHWATER BANK
- BULLNOSE/BURIED SINGLE GUARDRAIL (SD 0701)
- PROPOSED EXPROPRIATION ROAD RESERVE
- EXISTING FENCE LINES
- EXISTING ROAD RESERVE
- GUARDRAILS
- RENO MATTRESSES
- DAYLIGHTING
- RETAINING WALLS
- DRIVEWAY ACCESS (NO KERB AND CHANNEL) (C 38658- DETAIL C)

SERVICES LEGEND

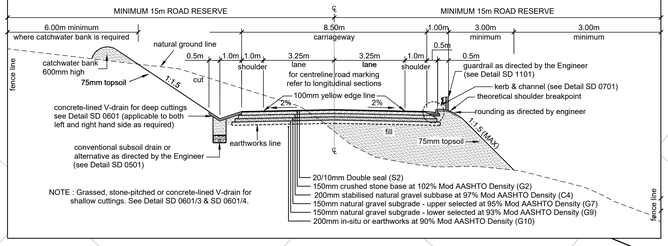
- PETROLEUM PIPELINE
- SURVEY CABLE MARKER
- ELECTRIC POLE
- OVERHEAD ELECTRICAL MV CABLE
- OVERHEAD ELECTRICAL HV CABLE
- WATER SERVICES
- TELEPHONE POLE
- CABLE MANHOLE
- CADASTRAL BOUNDARY

NOTATION

BC	BEGINNING OF CIRCULAR CURVE
EC	END OF CIRCULAR CURVE
PI	POINT OF INTERSECTION
R	RADIUS OF CIRCULAR CURVE
Δ	DEFLECTION ANGLE OF CIRCULAR CURVE
Lc	LENGTH OF CIRCULAR CURVE
TL	LENGTH OF CURVE TANGENT
BT	BEGINNING OF TAPER
ET	END OF TAPER
CL	CURVE LENGTH

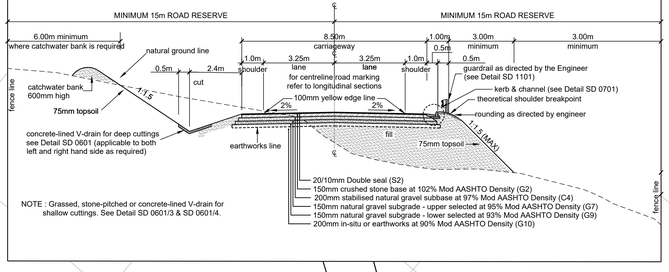
TYPICAL CROSS SECTION - CUT TO FILL CONDITION (P.D.C. No 1160)

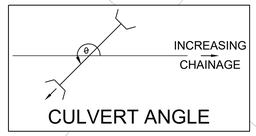
(SCALE 1 : 100)



TYPICAL CROSS SECTION - CUT TO FILL CONDITION (P.D.C. No 1160)

(SCALE 1 : 100)





P165 - DESIGN SPEED 80 km/hr

HONEYSUCKLE DALE
PORTION 10 OF 2975

FUSCHIA GROVE
2978

FUSCHIA GROVE
16431

RONDEROSCH
18303

ROBIN HOODS'S WELL
PORTION 5 OF 2973

DESIGN S

TYPE B3
LEFT ACCESS
km 40+965

SINGLE GUARDRAIL
km 40+855 to km 41+120

RENO MATTRESS

1 x 600mm Ø PC Pipe

1 x 900mm Ø PC Pipe

1 x600mm Ø PC Pipe

CA29
1556.29

CA28
1556.76

CA27
1558.76

PI 6

PI 7

PI 8

LOW POINT

TO HOWICK

TO MOOI RIVER

DESIGN SPEED = 80km/h

FOR APPROVAL

CURVE NO. 6 LEFT

R = 900m
△ = 19 °34'29"
TL = 155.253m
CL = 307.479m

BC = km 40 + 803.804
EC = km 41 + 111.283

CURVE NO. 7 RIGHT

R = 845m
△ = 10 °34'11"
TL = 78.163m
CL = 155.882m

BC = km 41 + 248.169
EC = km 41 + 404.051

CURVE NO. 8 RIGHT

R = 900m
△ = 15 °37'11"
TL = 123.442m
CL = 245.352m

BC = km 41 + 548.918
EC = km 41 + 794.271

CURVE NO. 9 LEFT

R = 600m
△ = 20 °22'47"
TL = 107.848m
CL = 213.417m

BC = km 41 + 879.523
EC = km 42 + 092.940

ACCESSES

ACCESS NO.	STAKED KM DISTANCE	LEFT OR RIGHT	DESCRIPTION	REMARKS
5	KM40+965	LHS	TYPE B3 ACCESS	REFER TO SD 0303/C

HORIZONTAL ALIGNMENT SCHEDULE P165

Point	Chainage	Co-ordinates WG Lo.31° Y	Co-ordinates WG Lo.31° X	Curve Data
Curve No. 6				900m
BCC 6	40 803.804	91 916.788	3 239 514.307	△ 19 34 29
PI 6		91 991.363	3 239 378.138	R 155.253m
ECC 6	41 111.283	92 107.250	3 239 274.824	L 307.479m
Curve No. 7				845m
BCC 7	41 248.169	92 209.426	3 239 183.734	△ 10 34 11
PI 7		92 267.770	3 239 131.720	R 78.163m
ECC 7	41 404.051	92 315.583	3 239 069.887	L 155.882m
Curve No. 8				900m
BCC 8	41 548.918	92 404.200	3 238 955.285	△ 15 37 11
PI 8		92 479.710	3 238 857.632	R 123.442m
ECC 8	41 794.271	92 526.139	3 238 743.255	L 245.352m
Curve No. 9				600m
BCC 9	41 879.523	92 558.204	3 238 664.262	△ 20 22 47
PI 9		92 598.768	3 238 564.333	R 107.848m
ECC 9	42 092.940	92 671.592	3 238 484.785	L 213.417m

SETTING OUT CONTROL (SYSTEM : WG 31)

Name	Y	X	Z	Description
CA29	91984.7	3239435.772	1556.29	16mm Iron Peg in Conc
CA28	92200.437	3239215.373	1564.74	16mm Iron Peg in Conc
CA27	92400.136	3238983.383	1558.90	16mm Iron Peg in Conc
CA26	93184.492	3238239.298	1556.29	16mm Iron Peg in Conc

SYMBOL	DATE	DESCRIPTION	CHECKED	SIGNED
AMENDMENTS				

AS BUILT

SUPERVISING ENGINEER DATE

SUPERVISING AUTHORITY

CONTINUED FROM:	C 38620	DESIGNED BY:	A. MABOSHEGO
CONTINUED ON:	C 38622	CHECKED BY:	S. POPIS
CROSS SECTION NO:	C 38636 to C 38638	DRAWN BY:	A. MABOSHEGO
LONG SECTION NO:	C 38628	CHECKED BY:	M. NADASEN

NAIDU CONSULTING - CONSULTING ENGINEER
K. GOVENDER (Pr Eng 970276) SIGN : DATE :

Designed by:-

NAIDU CONSULTING

Naidu Consulting no.:- D296/2003/T

transport

Department:
Transport
Province of KwaZulu-Natal

MAIN ROAD 165 (HOWICK - MOOI RIVER)

TRANSPORTATION ENGINEERING: CHIEF ENGINEER

HEAD : TRANSPORT

PORTION
UPGRADING OF PORTION OF P165 : KM 38+295 - KM46+595
HOWICK TO MOOI RIVER
DESIGN / EXPROPRIATION PLAN

STAKED KM DISTANCE: KM 40+920 - KM 41+920

SHEET 4 OF 9

SCALE: 1 : 1000

PLAN No.: C 38621

C 38621

DRAINAGE DETAILS

S.K.D.	Area	Discharge	Flow	Bedding Class	Length	Skew	Conc. Chutes	Reference Dwg	Side Inlet	Co-ordinates Y	Co-ordinates X	Grid Inlets	Co-ordinates Y	Co-ordinates X	Head Wall	Co-ordinates Y	Co-ordinates X	LHS/ RHS
41+860	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	·	·	-	·	·	RHS
42+280	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	·	·	-	·	·	LHS
42+405	-	-	-	-	-	-	1	SD 0303/C	-	-	-	-	·	·	-	·	·	RHS
42+760	-	-	-	-	-	-	1	SD 0303/C	-	-	-	-	·	·	-	·	·	RHS
42+790	-	-	-	-	-	-	1	SD 0303/C	-	-	-	-	·	·	-	·	·	LHS

PIPE CROSSING DRAINAGE DETAILS (WGS)

S.K.D.	Type	Size (dia)	Class	Bedding Class	Length (m)	Skew	Grade	Area (ha)	Discharge (m^3/s)	Velocity (m/s)	Reference Dwg	Conc. Chutes	Side Inlet	Grid Inlet	Drop Inlets	Head Wall	LHS / RHS
42+100	C	600	100D	C	13.751	60	2	0.012	1.40	1.215	C 38655	-	.	.	.	2	LHS
42+893	C	600	100D	C	13.987	89	2	0.056	0.131	2.340	C 38655	-	.	.	.	2	LHS

SURFACE / SUB SURFACE DRAINAGE DETAILS

Legend	Type	LHS/RHS	Start Km	End Km	Length	Reference
	2400 VD	LHS	41+495	42+070	575m	SD 0601/4
	2400 VD	RHS	41+500	41+840	340m	SD 0601/4
	2400 VD	RHS	41+985	42+060	75m	SD 0601/4
	1000 VD	LHS	42+285	42+790	505m	SD 0601/2
	1000 VD	RHS	42+415	42+760	345m	SD 0601/2
	2400 VD	RHS	42+960	43+100	140m	SD 0601/4
	2400 VD	LHS	42+960	43+100	140m	SD 0601/4

TOE DRAIN

Legend	Type	LHS/RHS	Start Km	End Km	Length	Reference
	Toe Drain	RHS	41+860	42+060	200m	C 38658
	Toe Drain	LHS	42+080	42+280	200m	C 38658
	Toe Drain	LHS	42+800	42+900	100m	C 38658
	Toe Drain	LHS	42+800	42+900	100m	C 38658

GUARDRAIL / BARRIER DETAILS

Legend	Type	LHS/RHS	Start Km	End Km	Length	Reference	End Treatment
	Single Guardrail	LHS	42+120	42+240	120m	SD 1101/A	Flared

EXPROPRIATION LHS CO-ORDINATES (WGS)

Point	X - Coordinate	Y - Coordinate
L6	3 238 341.332	92 824.568
L7	3 238 299.221	92 889.892
L8	3 238 280.803	92 961.884

GENERAL NOTES

1. ALL LEVELS, DIMENSIONS AND SETTING OUT DETAILS ARE TO BE VERIFIED BY THE ENGINEER AND CONTRACTOR ON SITE PRIOR TO CONSTRUCTION.
2. ALL EXISTING DRAINAGE CULVERTS ARE TO BE INSPECTED ON SITE AND ANY FOUND IN AN UNSERVICEABLE CONDITION ARE TO BE REPLACED ON INSTRUCTION BY THE ENGINEER
3. CULVERT INVERTS AND POSITIONS ARE TO BE VERIFIED BY THE ENGINEER ON SITE UNLESS SHOWN OTHERWISE. MIN COVER = 600mm. MIN SLOPE = 2%.
4. PIPE CULVERTS ARE TO BE LAID IN ACCORDANCE WITH SD 0401 WITH HEADWALLS AS PER SD 0402,SD 0403 OR SD 0406. MIN. DIA. = 450mm FOR MINOR ACCESS ROADS AND ACCESS BELLMOUTHS, AND MIN. DIA. = 600mm FOR MAJOR ROAD CROSS DRAINAGE.
5. FOR EROSION CONTROL GABION MATTRESSES ARE RECOMMENDED AT CULVERT INLETS AND OUTLETS. THE NEED FOR GABION MATRESSES TO BE VERIFIED BY THE ENGINEER
6. EARTH BERMS AND SHAPING ARE TO BE CONSTRUCTED AT CULVERT INLETS AND OUTLETS TO DIRECT STORMWATER WHERE NECESSARY.
7. SUBSOIL DRAINS AS PER SD 0501 ARE TO BE INSTALLED WITH 1000 V-DRAINS, OR WHERE HIGH WATER TABLES ARE ENCOUNTERED.
8. WHERE SURFACE RUNOFF IS TOWARDS THE ROAD, CATCHWATER BANKS ARE TO BE PROVIDED TO DIVERT STORMWATER TO MAJOR CROSS DRAINAGE STRUCTURES. ALL CATCHWATER BANKS TO BE CONCRETE LINED AS INSTRUCTED BY THE ENGINEER.
9. THE POSITIONS OF ACCESSES AND DRIVEWAYS ARE TO BE VERIFIED BY THE ENGINEER. DAYLIGHTING REQUIREMENTS ARE TO BE VERIFIED BY THE ENGINEER ON SITE. CONCRETE WEDGES AS PER SD 0303 MAY BE USED IN PLACE OF SURFACED BELLMOUTHS FOR ACCESSES SERVING SINGLE RESIDENTIAL PROPERTIES UNLESS SHOWN OTHERWISE. ACCESS CLOSURES ARE TO BE PHYSICALLY BARRICADED WITH GUARDRAILS WHERE ACCESS IS STILL POSSIBLE AFTER COMPLETION OF WORK.
10. GUARDRAILS ARE TO BE INSTALLED IN ACCORDANCE WITH SD 1101, SD 1102 AND SD 1103, WHERE FILL EMBANKMENTS EXCEED 3m IN HEIGHT OR WHERE HAZARDOUS OBSTRUCTIONS CANNOT BE REMOVED.
11. EXISTING ROAD SIGNS, SERVICES AND FENCING AFFECTED BY CONSTRUCTION ARE TO BE REMOVED / RELOCATED WHERE NECESSARY.
12. UNDERGROUND SERVICE CROSSINGS AND MARKERS ARE TO BE IN ACCORDANCE WITH SD 1003/B.
13. ALL NEW ROAD SIGNS AND ROAD MARKING REQUIREMENTS ARE TO CONFORM TO THE SOUTHERN AFRICAN DEVELOPMENT COMMUNITY ROAD TRAFFIC SIGNS MANUAL (SADC-RTSM).
14. ALL WORK IS TO BE CARRIED OUT IN ACCORDANCE WITH THE 'COLTO' SPECIFICATIONS FOR ROAD AND BRIDGE WORKS FOR STATE ROAD AUTHORITIES 1998 EDITION.
15. THE LETTERS L AND R DENOTE THE ROAD RESERVE BOUNDARY TO THE LEFT AND THE RIGHT OF THE ROAD RESPECTIVELY.
16. ROCK BOLSTERS ARE TO BE PLACED ACROSS THE INVERT OF DRAINS SUSCEPTIBLE TO EROSION FOR EVERY 2m VERTICAL DROP.
17. KERB AND CHANNEL DRAINS AS PER SD 0701 ARE TO BE PROVIDED WHERE FILL EMBANKMENTS EXCEED 3m IN HEIGHT.
18. ALL STOP SIGNS FOR TYPE B1 ACCESSES ARE TO BE POSITIONED 13m FROM THE CENTRE LINE OF P165.
    ALL STOP SIGNS FOR TYPE B3 ACCESSES ARE TO BE POSITIONED 8m FROM THE CENTRE LINE OF P165.
19. ALL DRAINAGE TO BE VERIFIED ON SITE BY THE ENGINEER
20. ALL PIPES ARE TO BE SPIGOT AND SOCKET TYPE PIPES ON CLASS C BEDDING.
21. SERVICE DUCT POSITIONS TO BE VERIFIED ON SITE BY THE ENGINEER
22. ALL OPEN CONCRETE LINED DRAIN POSITIONS TO BE VERIFIED BY THE ENGINEER ON SITE.
23. NEW FILLS AND EXPOSED CUTTINGS ARE TO BE TOP SOILED AND VEGETATED IMMEDIATELY AFTER CONSTRUCTION TO PREVENT EROSION.
24. ALL DRIVEWAYS AND ACCESS ROADS TO BE TIED INTO THE EXISTING INFRASTRUCTURE AS DIRECTED BY THE ENGINEER.
25. ALL ACCESS ROADS TO BE TIED IN WITH THE RELEVANT DRAINAGE AS INDICATED IN THE STANDARD DETAILS OR BY THE ENGINEER ON SITE.
26. ALL DRAINAGE FOR ACCESS ROADS ARE TO BE VERIFIED BY THE ENGINEER PRIOR TO CONSTRUCTION.

P165 - DESIGN SPEED 80 km/hr

LEGEND

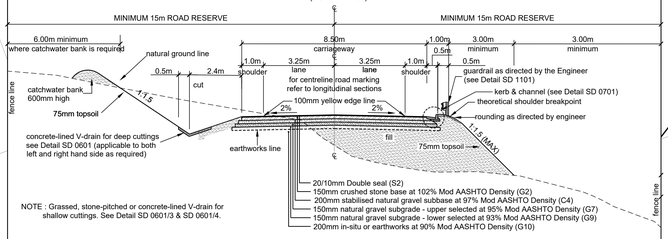
- 500 KERB AND CHANNEL (SD 0701) WITH CHUTE (SD 0702)
- 1000 KERB AND CHANNEL (SD 0701) WITH CHUTE (SD 0604)
- CONCRETE-LINED 1000 V-DRAIN (SD 0601) WITH CHUTE (SD 0603)
- CONCRETE TOE DRAIN
- GRASS-LINED V-DRAIN
- PIPE CROSSING WITH SIDE INLET (SD 0703) GRID INLET (SD 0602), 600mmØ PIPE AND HEADWALL (SD 0406)
- CATCHWATER BANK
- BULLNOSE/BURIED SINGLE GUARDRAIL (SD 0701)
- PROPOSED EXPROPRIATION ROAD RESERVE
- EXISTING FENCE LINES
- EXISTING ROAD RESERVE
- GUARDRAILS
- RENO MATTRESSES
- DAYLIGHTING
- RETAINING WALLS
- DRIVEWAY ACCESS (NO KERB AND CHANNEL) (C 38658- DETAIL C)

INCREASING CHAINAGE

CULVERT ANGLE

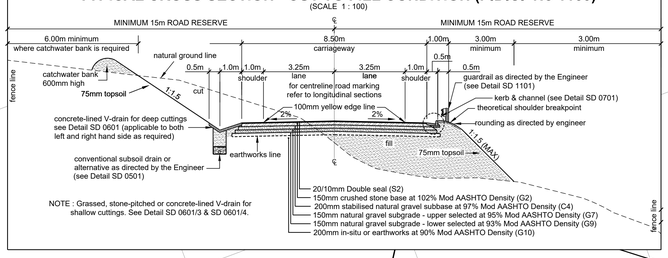
TYPICAL CROSS SECTION - CUT TO FILL CONDITION (P.D.C. No 1160)

(SCALE 1 : 100)



TYPICAL CROSS SECTION - CUT TO FILL CONDITION (P.D.C. No 1160)

(SCALE 1 : 100)



SERVICES LEGEND

- PETROLEUM PIPELINE
- SURVEY CABLE MARKER
- ELECTRIC POLE
- OVERHEAD ELECTRICAL MV CABLE
- OVERHEAD ELECTRICAL HV CABLE
- WATER SERVICES
- TELEPHONE POLE
- CABLE MANHOLE
- CADASTRAL BOUNDARY

DESIGN SPEED = 80km/h

TO HOWICK

TO MOOI RIVER

DESIGN SPEED = 80km/h

RONDEBOSCH 18303

DAVIES 18302

ROBIN HOOD'S WELL PORTION 5 OF 2973

ROBIN HOOD'S WELL PORTION 4 OF 2973

ROBIN HOOD'S WELL PORTION 4 OF 2973

1 x600mm Ø PC Pipe

CONTRACTOR TO CONFIRM EXISTING SERVICES PRIOR TO CONSTRUCTION

RENO MATTRESS

SINGLE GUARDRAIL km 42+120 to km 42+250

1 x600mm Ø PC Pipe

RENO MATTRESS

CURVE NO. 9 LEFT

R = 600m
△ = 20 °22'47"
TL = 107.848m
CL = 213.417m

BC = km 41 + 879.523
EC = km 42 + 092.940

CURVE NO. 10 LEFT

R = 250m
△ = 42 °25'23"
TL = 97.027m
CL = 185.106m

BC = km 41 + 280.748
EC = km 42 + 465.854

CURVE NO. 11 RIGHT

R = 740m
△ = 17 °11'54"
TL = 111.904m
CL = 222.124

BC = km 42 + 517.552
EC = km 42 + 739.676

PI 9
PI 10
PI 11

HIGH POINT

CA23
1607.85

6
TYPE B3
LEFT ACCESS
km 42+901
(6m WIDE)

7
TYPE B3
RIGHT ACCESS
km 42+915
(6m WIDE)

LIMIT OF CONSTRUCTION

HORIZONTAL ALIGNMENT SCHEDULE P165

Point	Chainage	Co-ordinates WG Lo.31° Y	Co-ordinates WG Lo.31° X	Curve Data
Curve No. 9				⌀ - 600m
BCC 9	41 879.523	92 558.204	3 238 664.262	△ - 20 °22'47"
PI 9		92 598.768	3 238 564.333	⌀ - 107.848m
ECC 9	42 092.940	92 671.592	3 238 484.785	⌀ - 213.417m
Curve No.10				⌀ - 250m
BCC 10	42 280.748	92 798.409	3 238 346.260	△ - 42 °25'23"
PI 10		92 863.926	3 238 274.694	⌀ - 97.027m
ECC 10	42 465.854	92 960.568	3 238 266.063	⌀ - 185.106m
Curve No.11				⌀ - 740m
BCC 11	42 517.552	93 012.061	3 238 261.464	△ - 17 °11'54"
PI 11		93 123.521	3 238 251.510	⌀ - 111.904m
ECC 11	42 739.676	93 227.054	3 238 209.044	⌀ - 222.124m

ACCESSES

ACCESS NO.	STAKED KM DISTANCE	LEFT OR RIGHT	DESCRIPTION	REMARKS
6	KM42+901	LHS	TYPE B3 ACCESS	REFER TO SD 0303/C
7	KM42+915	LHS	TYPE B3 ACCESS	REFER TO SD 0303/C

SETTING OUT CONTROL (SYSTEM : WG 31)

Name	Y	X	Z	Description
CA23	93184.492	3238239.298	1556.29	16mm Iron Peg in Conc

NOTATION

BC	BEGINNING OF CIRCULAR CURVE
EC	END OF CIRCULAR CURVE
PI	POINT OF INTERSECTION
R	RADIUS OF CIRCULAR CURVE
△	DEFLECTION ANGLE OF CIRCULAR CURVE
Lc	LENGTH OF CIRCULAR CURVE
TL	LENGTH OF CURVE TANGENT
BT	BEGINNING OF TAPER
ET	END OF TAPER
CL	CURVE LENGTH

FOR APPROVAL

SYMBOL	DATE	DESCRIPTION	CHECKED	SIGNED

AMENDMENTS

AS BUILT

SUPERVISING ENGINEER DATE

SUPERVISING AUTHORITY

CONTINUED FROM: C 38621
CONTINUED ON: C 38623
CROSS SECTION NO: C 38638 to C 38640
LONG SECTION NO: C 38629

DESIGNED BY: A. MABOSHEGO
CHECKED BY: S. POPIS
DRAWN BY: A. MABOSHEGO
CHECKED BY: M. NADASEN

NAIDU CONSULTING - CONSULTING ENGINEER
K. GOVENDER (Pr Eng 970276) SIGN : DATE :

Designed by:-

NAIDU CONSULTING

Naidu Consulting no.:- D296/2004/T

transport

Department:
Transport
Province of KwaZulu-Natal

TRANSPORTATION ENGINEERING: CHIEF ENGINEER

HEAD : TRANSPORT

MAIN ROAD 165 (HOWICK - MOOI RIVER)

PORTION

UPGRADING OF PORTION OF P165 : KM 38+295 - KM46+595
HOWICK TO MOOI RIVER
DESIGN / EXPROPRIATION PLAN

STAKED KM DISTANCE: KM 41+920 - KM 42+920

SHEET 5 OF 9

SCALE: 1 : 1000

PLAN No.: C 38622

C 38622

DRAINAGE DETAILS

S.K.D.	Area	Discharge	Flow	Bedding Class	Length	Skew	Conc. Chutes	Reference Dwg	Side Inlet	Co-ordinates Y	Co-ordinates X	Grid Inlets	Co-ordinates Y	Co-ordinates X	Head Wall	Co-ordinates Y	Co-ordinates X	LHS/ RHS
43+105	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	-	-	-	-	-	RHS
43+105	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	-	-	-	-	-	LHS
42+350	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	-	-	-	-	-	RHS
43+600	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	-	-	-	-	-	LHS

PIPE CROSSING DRAINAGE DETAILS (WGS)

S.K.D.	Type	Size (dia)	Class	Bedding Class	Length (m)	Skew	Grade	Area (ha)	Discharge (m^3/s)	Velocity (m/s)	Reference Dwg	Conc. Chutes	Side Inlet	Grid Inlet	Drop Inlets	Head Wall	LHS / RHS
43+175	C	900	100D	C	13.253	67	5	0.080	0.217	2.703	C 38655	-	-	-	-	2	LHS
43+515	C	600	100D	C	14.464	59	2	0.078	0.21	2.678	C 38655	-	-	-	-	2	LHS

SURFACE / SUB SURFACE DRAINAGE DETAILS

Legend	Type	LHS/RHS	Start Km	End Km	Length	Reference
	2400 VD	RHS	42+960	43+100	140m	SD 0601/4
	2400 VD	LHS	42+960	43+100	140m	SD 0601/4
	2400 VD	LHS	43+635	43+905	270m	SD 0601/4
	2400 VD	RHS	43+745	44+345	600m	SD 0601/4
TOE DRAIN						
	Toe Drain	LHS	42+800	42+900	100m	C38658
	Toe Drain	LHS	43+120	43+600	480m	C 38658
	Toe Drain	RHS	43+380	43+440	60m	C 38658
KERB AND CHANNEL						
	500 K & C	RHS	43+215	43+265	50m	SD 0701/A

GUARDRAIL / BARRIER DETAILS

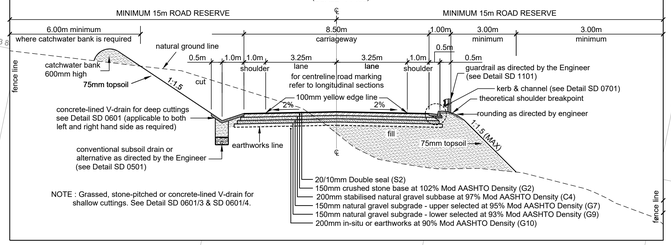
Legend	Type	LHS/RHS	Start Km	End Km	Length	Reference	End Treatment
	Single Guardrail	RHS	43+195	43+295	100m	SD 1101/A	Flared

EXPROPRIATION RHS CO-ORDINATES (WGS)

Point	X - Coordinate	Y - Coordinate
R9	3 237 932.256	93 751.797
R10	3 238 023.880	93 635.964

TYPICAL CROSS SECTION - CUT TO FILL CONDITION (P.D.C. No 1160)

(SCALE 1 : 100)



NOTE : Grassed, stone-pitched or concrete-lined V-drain for shallow cuttings. See Detail SD 0601/3 & SD 0601/4.

P165 - DESIGN SPEED 80 km/hr

DESIGN SPEED = 80km/h

DESIGN SPEED = 80km/h

TO MOOI RIVER

TO HOWICK

PI 12

PI 13

1 x600mm Ø PC Pipe

1 x900mm Ø PC Pipe

RENO MATTRESS

SINGLE GUARDRAIL km 43+195 to km 43+295

km 43+050 to km 43+110

CONTRACTOR TO CONFIRM EXISTING SERVICES PRIOR TO CONSTRUCTION

R9

R10

DAVIES 18302

ROBIN HOOD'S WELL PORTION 3 OF 2973

ROBIN HOOD'S WELL PORTION 4 OF 2973

ROBIN HOOD'S WELL PORTION 3 OF 2973

CURVE NO. 12 RIGHT

R = 370m
△ = 70 °32'54"
TL = 261.725m
CL = 455.582m

BC = km 43 + 162.796
EC = km 43 + 618.377

CURVE NO. 13 LEFT

R = 525m
△ = 16 °32'26"
TL = 76.311m
CL = 151.561m

BC = km 43 + 689.411
EC = km 43 + 840.971

NOTATION

BC	BEGINNING OF CIRCULAR CURVE
EC	END OF CIRCULAR CURVE
PI	POINT OF INTERSECTION
R	RADIUS OF CIRCULAR CURVE
△	DEFLECTION ANGLE OF CIRCULAR CURVE
Lc	LENGTH OF CIRCULAR CURVE
TL	LENGTH OF CURVE TANGENT
BT	BEGINNING OF TAPER
ET	END OF TAPER
CL	CURVE LENGTH

LEGEND

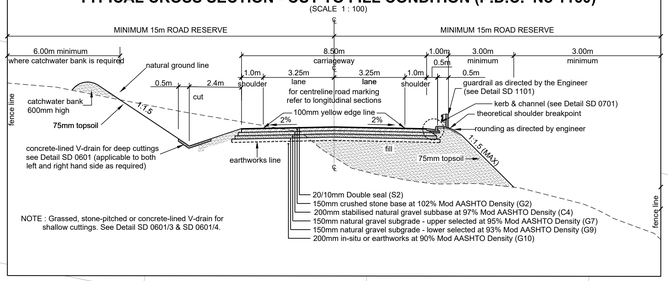
- 500 KERB AND CHANNEL (SD 0701) WITH CHUTE (SD 0702)
- 1000 KERB AND CHANNEL (SD 0701) WITH CHUTE (SD 0604)
- CONCRETE-LINED 1000 V-DRAIN (SD 0601) WITH CHUTE (SD 0603)
- CONCRETE TOE DRAIN
- GRASS-LINED V-DRAIN
- PIPE CROSSING WITH SIDE INLET (SD 0703) GRID INLET (SD 0602), 600mmØ PIPE AND HEADWALL (SD 0406)
- CATCHWATER BANK
- BULLNOSE/BURIED SINGLE GUARDRAIL (SD 0701)
- PROPOSED EXPROPRIATION ROAD RESERVE
- EXISTING FENCE LINES
- EXISTING ROAD RESERVE
- GUARDRAILS
- RENO MATTRESSES
- DAYLIGHTING
- RETAINING WALLS
- DRIVEWAY ACCESS (NO KERB AND CHANNEL) (C 38658- DETAIL C)

SERVICES LEGEND

- PETROLEUM PIPELINE
- SURVEY CABLE MARKER
- ELECTRIC POLE
- OVERHEAD ELECTRICAL MV CABLE
- OVERHEAD ELECTRICAL HV CABLE
- WATER SERVICES
- TELEPHONE POLE
- CABLE MANHOLE
- CADASTRAL BOUNDARY

TYPICAL CROSS SECTION - CUT TO FILL CONDITION (P.D.C. No 1160)

(SCALE 1 : 100)



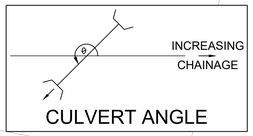
NOTE : Grassed, stone-pitched or concrete-lined V-drain for shallow cuttings. See Detail SD 0601/3 & SD 0601/4.

ACCESSES

ACCESS NO.	STAKED KM DISTANCE	LEFT OR RIGHT	DESCRIPTION	REMARKS
6	KM42+901	LHS	TYPE B3 ACCESS	REFER TO SD 0303/C
7	KM42+915	LHS	TYPE B3 ACCESS	REFER TO SD 0303/C

GENERAL NOTES

1. ALL LEVELS, DIMENSIONS AND SETTING OUT DETAILS ARE TO BE VERIFIED BY THE ENGINEER AND CONTRACTOR ON SITE PRIOR TO CONSTRUCTION.
2. ALL EXISTING DRAINAGE CULVERTS ARE TO BE INSPECTED ON SITE AND ANY FOUND IN AN UNSERVICEABLE CONDITION ARE TO BE REPLACED ON INSTRUCTION BY THE ENGINEER.
3. CULVERT INVERTS AND POSITIONS ARE TO BE VERIFIED BY THE ENGINEER ON SITE UNLESS SHOWN OTHERWISE. MIN COVER = 600mm, MIN SLOPE = 2%.
4. PIPE CULVERTS ARE TO BE LAID IN ACCORDANCE WITH SD 0401 WITH HEADWALLS AS PER SD 0402,SD 0403 OR SD 0406. MIN. DIA. = 450mm FOR MINOR ACCESS ROADS AND ACCESS BELLMOUTHS, AND MIN. DIA. = 600mm FOR MAJOR ROAD CROSS DRAINAGE.
5. FOR EROSION CONTROL GABION MATTRESSES ARE RECOMMENDED AT CULVERT INLETS AND OUTLETS. THE NEED FOR GABION MATRESSES TO BE VERIFIED BY THE ENGINEER
6. EARTH BERMS AND SHAPING ARE TO BE CONSTRUCTED AT CULVERT INLETS AND OUTLETS TO DIRECT STORMWATER WHERE NECESSARY.
7. SUBSOIL DRAINS AS PER SD 0501 ARE TO BE INSTALLED WITH 1000 V-DRAINS, OR WHERE HIGH WATER TABLES ARE ENCOUNTERED.
8. WHERE SURFACE RUNOFF IS TOWARDS THE ROAD, CATCHWATER BANKS ARE TO BE PROVIDED TO DIVERT STORMWATER TO MAJOR CROSS DRAINAGE STRUCTURES. ALL CATCHWATER BANKS TO BE CONCRETE LINED AS INSTRUCTED BY THE ENGINEER.
9. THE POSITIONS OF ACCESSES AND DRIVEWAYS ARE TO BE VERIFIED BY THE ENGINEER. DAYLIGHTING REQUIREMENTS ARE TO BE VERIFIED BY THE ENGINEER ON SITE. CONCRETE WEDGES AS PER SD 0303 MAY BE USED IN PLACE OF SURFACED BELLMOUTHS FOR ACCESSES SERVING SINGLE RESIDENTIAL PROPERTIES UNLESS SHOWN OTHERWISE. ACCESS CLOSURES ARE TO BE PHYSICALLY BARRICADED WITH GUARDRAILS WHERE ACCESS IS STILL POSSIBLE AFTER COMPLETION OF WORK.
10. GUARDRAILS ARE TO BE INSTALLED IN ACCORDANCE WITH SD 1101, SD 1102 AND SD 1103, WHERE FILL EMBANKMENTS EXCEED 3m IN HEIGHT OR WHERE HAZARDOUS OBSTRUCTIONS CANNOT BE REMOVED.
11. EXISTING ROAD SIGNS, SERVICES AND FENCING AFFECTED BY CONSTRUCTION ARE TO BE REMOVED / RELOCATED WHERE NECESSARY.
12. UNDERGROUND SERVICE CROSSINGS AND MARKERS ARE TO BE IN ACCORDANCE WITH SD 1003/B.
13. ALL NEW ROAD SIGNS AND ROAD MARKING REQUIREMENTS ARE TO CONFORM TO THE SOUTHERN AFRICAN DEVELOPMENT COMMUNITY ROAD TRAFFIC SIGNS MANUAL (SADC-RTSM) .
14. ALL WORK IS TO BE CARRIED OUT IN ACCORDANCE WITH THE 'COLTO' SPECIFICATIONS FOR ROAD AND BRIDGE WORKS FOR STATE ROAD AUTHORITIES 1998 EDITION.
15. THE LETTERS L AND R DENOTE THE ROAD RESERVE BOUNDARY TO THE LEFT AND THE RIGHT OF THE ROAD RESPECTIVELY.
16. ROCK BOLSTERS ARE TO BE PLACED ACROSS THE INVERT OF DRAINS SUSCEPTIBLE TO EROSION FOR EVERY 2m VERTICAL DROP.
17. KERB AND CHANNEL DRAINS AS PER SD 0701 ARE TO BE PROVIDED WHERE FILL EMBANKMENTS EXCEED 3m IN HEIGHT.
18. ALL STOP SIGNS FOR TYPE B1 ACCESSES ARE TO BE POSITIONED 13m FROM THE CENTRE LINE OF P165.
    ALL STOP SIGNS FOR TYPE B3 ACCESSES ARE TO BE POSITIONED 8m FROM THE CENTRE LINE OF P165.
19. ALL DRAINAGE TO BE VERIFIED ON SITE BY THE ENGINEER
20. ALL PIPES ARE TO BE SPIGOT AND SOCKET TYPE PIPES ON CLASS C BEDDING.
21. SERVICE DUCT POSITIONS TO BE VERIFIED ON SITE BY THE ENGINEER
22. ALL OPEN CONCRETE LINED DRAIN POSITIONS TO BE VERIFIED BY THE ENGINEER ON SITE.
23. NEW FILLS AND EXPOSED CUTTINGS ARE TO BE TOP SOILED AND VEGETATED IMMEDIATELY AFTER CONSTRUCTION TO PREVENT EROSION.
24. ALL DRIVEWAYS AND ACCESS ROADS TO BE TIED INTO THE EXISTING INFRASTRUCTURE AS DIRECTED BY THE ENGINEER.
25. ALL ACCESS ROADS TO BE TIED IN WITH THE RELEVANT DRAINAGE AS INDICATED IN THE STANDARD DETAILS OR BY THE ENGINEER ON SITE.
26. ALL DRAINAGE FOR ACCESS ROADS ARE TO BE VERIFIED BY THE ENGINEER PRIOR TO CONSTRUCTION.



CULVERT ANGLE

FOR APPROVAL

SYMBOL	DATE	DESCRIPTION	CHECKED	SIGNED

AMENDMENTS

AS BUILT

SUPERVISING ENGINEER DATE

SUPERVISING AUTHORITY

CONTINUED FROM: C 38622
CONTINUED ON: C 38624
CROSS SECTION NO: C 38640 & C 38641
LONG SECTION NO: C 38629

DESIGNED BY: A. MABOSHEGO
CHECKED BY: S. POPIS
DRAWN BY: A. MABOSHEGO
CHECKED BY: M. NADASEN

NAIDU CONSULTING - CONSULTING ENGINEER
K. GOVENDER (Pr Eng 970276) SIGN : DATE :

Designed by:-

NAIDU CONSULTING

Naidu Consulting no.:- D296/2005/T

transport

Department:
Transport
Province of KwaZulu-Natal

MAIN ROAD 165 (HOWICK - MOOI RIVER)

STAKED KM DISTANCE: KM 42+920 - KM 43+920

SHEET 6 OF 9

TRANSPORTATION ENGINEERING: CHIEF ENGINEER

HEAD : TRANSPORT

PORTION

UPGRADING OF PORTION OF P165 : KM 38+295 - KM46+595
HOWICK TO MOOI RIVER
DESIGN / EXPROPRIATION PLAN

SCALE 1 : 1000

PLAN No. C 38623

C 38623

DRAINAGE DETAILS

S.K.D.	Area	Discharge	Flow	Bedding Class	Length	Skew	Conc. Chutes	Reference Dwg	Side Inlet	Co-ordinates Y	Co-ordinates X	Grid Inlets	Co-ordinates Y	Co-ordinates X	Head Wall	Co-ordinates Y	Co-ordinates X	LHS/ RHS
48+900	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	-	-	-	-	-	LHS
44+320	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	-	-	-	-	-	LHS
44+345	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	-	-	-	-	-	RHS
44+950	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	-	-	-	-	-	LHS

PIPE CROSSING DRAINAGE DETAILS (WGS)

	Type	Size (dia)	Class	Bedding Class	Length (m)	Skew	Grade	Area (ha)	Discharge (m^3/s)	Velocity (m/s)	Reference Dwg	Conc. Chutes	Side Inlet	Grid Inlet	Drop Inlets	Head Wall	LHS / RHS
43+980	C	600	100D	C	13.034	296	2	0.078	0.211	2.678	C 38655	-	.	.	.	2	RHS
44+435	C	600	100D	C	14.757	60	2	0.049	0.11	2.226	C 38655	-	.	.	.	2	LHS

SURFACE / SUB SURFACE DRAINAGE DETAILS

Legend	Type	LHS/RHS	Start Km	End Km	Length	Reference
—·◄·—	2400 VD	LHS	43+635	43+905	270m	SD 0601/4
—·◄·—	2400 VD	RHS	43+745	44+340	595m	SD 0601/4
—·◄·—	2400 VD	LHS	44+150	44+325	175m	SD 0601/4
—·◄·—	2400 VD	LHS	44+565	44+940	375m	SD 0601/4
—·◄·—	2400 VD	RHS	44+650	44+960	310m	SD 0601/4

TOE DRAIN

—·◄·—	Toe Drain	LHS	44+400	44+560	160m	C 38658

GENERAL NOTES

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LEGEND

- 500 KERB AND CHANNEL (SD 0701) WITH CHUTE (SD 0702)
- 1000 KERB AND CHANNEL (SD 0701) WITH CHUTE (SD 0604)
- CONCRETE-LINED 1000 V-DRAIN (SD 0601) WITH CHUTE (SD 0603)
- CONCRETE TOE DRAIN
- GRASS-LINED V-DRAIN
- PIPE CROSSING WITH SIDE INLET (SD 0703) GRID INLET (SD 0602), 600mmØ PIPE AND HEADWALL (SD 0406)
- CATCHWATER BANK
- BULLNOSE/BURIED SINGLE GUARDRAIL (SD 0701)
- PROPOSED EXPROPRIATION ROAD RESERVE
- EXISTING FENCE LINES
- EXISTING ROAD RESERVE
- GUARDRAILS
- RENO MATTRESSES
- DAYLIGHTING
- RETAINING WALLS
- DRIVEWAY ACCESS (NO KERB AND CHANNEL) (C 38658- DETAIL C)

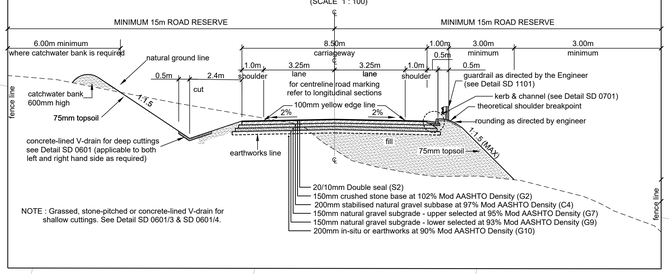
SERVICES LEGEND

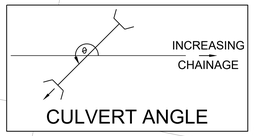
- PETROLEUM PIPELINE
- SURVEY CABLE MARKER
- ELECTRIC POLE
- OVERHEAD ELECTRICAL MV CABLE
- OVERHEAD ELECTRICAL HV CABLE
- WATER SERVICES
- TELEPHONE POLE
- CABLE MANHOLE
- CADASTRAL BOUNDARY

P165 - DESIGN SPEED 80 km/hr

TYPICAL CROSS SECTION - CUT TO FILL CONDITION (P.D.C. No 1160)

(SCALE 1 : 100)





NOTATION

BC	BEGINNING OF CIRCULAR CURVE
EC	END OF CIRCULAR CURVE
PI	POINT OF INTERSECTION
R	RADIUS OF CIRCULAR CURVE
Δ	DEFLECTION ANGLE OF CIRCULAR CURVE
Lc	LENGTH OF CIRCULAR CURVE
TL	LENGTH OF CURVE TANGENT
BT	BEGINNING OF TAPER
ET	END OF TAPER
CL	CURVE LENGTH

SETTING OUT CONTROL (SYSTEM : WG 31)

Name	Y	X	Z	Description
CA17	94017.957	3236872.474	1556.29	16mm Iron Peg in Conc
CA16	94064.859	3236557.717	1564.74	16mm Iron Peg in Conc

ACCESSES

ACCESS NO.	STAKED KM DISTANCE	LEFT OR RIGHT	DESCRIPTION	REMARKS
8	KM44+385	RHS	TYPE B3 ACCESS	REFER TO SD 0303/C
9	KM44+743	RHS	TYPE B3 ACCESS	REFER TO SD 0303/C
10	KM44+805	LHS	TYPE B3 ACCESS	REFER TO SD 0303/C

TYPICAL CROSS SECTION - CUT TO FILL CONDITION (P.D.C. No 1160)

(SCALE 1 : 100)

FOR APPROVAL

SYMBOL	DATE	DESCRIPTION	CHECKED	SIGNED
AMENDMENTS				

AS BUILT

SUPERVISING ENGINEER DATE

SUPERVISING AUTHORITY

CONTINUED FROM:	C 38623	DESIGNED BY:	A. MABOSHEGO
CONTINUED ON:	C 38625	CHECKED BY:	S. POPIS
CROSS SECTION NO:	C 38641 to C 38643	DRAWN BY:	A. MABOSHEGO
LONG SECTION NO:	C 38630	CHECKED BY:	M. NADASEN

NAIDU CONSULTING - CONSULTING ENGINEER
K. GOVENDER (Pr Eng 970276) SIGN : DATE :

Designed by:- NAIDU CONSULTING

Naidu Consulting no.:- D296/2006/T

transport

Department: Transport
Province of KwaZulu-Natal

TRANSPORTATION ENGINEERING: CHIEF ENGINEER

HEAD : TRANSPORT

MAIN ROAD 165 (HOWICK - MOOI RIVER)

PORTION

UPGRADING OF PORTION OF P165 : KM 38+295 - KM46+595
HOWICK TO MOOI RIVER
DESIGN / EXPROPRIATION PLAN

STAKED KM DISTANCE: KM 43+920 - KM 44+920

SHEET 7 OF 9

SCALE: 1 : 1000

PLAN No.: C 38624

C 38624

DRAINAGE DETAILS

S.K.D.	Area	Discharge	Flow	Bedding Class	Length	Skew	Conc. Chutes	Reference Dwg	Side Inlet	Co-ordinates Y	Co-ordinates X	Grid Inlets	Co-ordinates Y	Co-ordinates X	Head Wall	Co-ordinates Y	Co-ordinates X	LHS/ RHS
44+955	-	-	-	-	-	-	1	SD 0702/1	-	-	-	-	.	.	-	.	.	LHS
45+045	-	-	-	-	-	-	1	SD 0702/1	-	-	-	-	.	.	-	.	.	LHS
45+095	-	-	-	-	-	-	1	SD 0702/1	-	-	-	-	.	.	-	.	.	LHS
45+145	-	-	-	-	-	-	1	SD 0702/1	-	-	-	-	.	.	-	.	.	LHS
45+195	-	-	-	-	-	-	1	SD 0702/1	-	-	-	-	.	.	-	.	.	LHS
45+245	-	-	-	-	-	-	1	SD 0702/1	-	-	-	-	.	.	-	.	.	LHS
45+280	-	-	-	-	-	-	1	SD 0702/1	-	-	-	-	.	.	-	.	.	LHS
45+325	-	-	-	-	-	-	1	SD 0702/1	-	-	-	-	.	.	-	.	.	LHS
45+380	-	-	-	-	-	-	1	SD 0702/1	-	-	-	-	.	.	-	.	.	LHS
45+480	-	-	-	-	-	-	1	SD 0702/1	-	-	-	-	.	.	-	.	.	LHS
45+420	-	-	-	-	-	-	1	SD 0303/C	-	-	-	-	.	.	-	.	.	RHS
45+555	-	-	-	-	-	-	1	SD 0303/C	-	-	-	-	.	.	-	.	.	RHS
45+605	-	-	-	-	-	-	1	SD 0303/C	-	-	-	-	.	.	-	.	.	RHS

PIPE CROSSING DRAINAGE DETAILS (WGS)

S.K.D.	Type	Size (dia)	Class	Bedding Class	Length (m)	Skew	Grade	Area (ha)	Discharge (m^3/s)	Velocity (m/s)	Reference Dwg	Conc. Chutes	Side Inlet	Grid Inlet	Drop Inlets	Head Wall	LHS / RHS
44+970	C	600	100D	C	14.378	60	2	0.121	0.383	3.156	C 38655	-	.	.	.	2	RHS
45+270	C	900	100D	C	13.205	90	2	0.050	0.115	2.236	C 38655	-	.	1	.	2	RHS
45+468	C	600	100D	C	13.379	90	2	-	-	-	C 38655	-	.	.	.	2	LHS
45+500	C	600	100D	C	13.379	120	4	0.128	0.414	3.220	C 38655	-	.	.	.	2	LHS

SURFACE / SUB SURFACE DRAINAGE DETAILS

Legend	Type	LHS/RHS	Start Km	End Km	Length	Reference
	2400 VD	LHS	44+565	44+940	375m	SD 0601/4
	2400 VD	RHS	44+650	44+960	310m	SD 0601/4
	2400 VD	RHS	45+550	45+930	380m	SD 0601/4
	2400 VD	LHS	45+610	45+930	320m	SD 0601/4

TOE DRAIN

Legend	Type	LHS/RHS	Start Km	End Km	Length	Reference
	Toe Drain	RHS	44+980	45+450	470m	C 38658
	Toe Drain	RHS	45+480	45+520	40m	CC 38658
	Toe Drain	LHS	45+940	46+040	100m	C 38658

GUARDRAIL / BARRIER DETAILS

Legend	Type	LHS/RHS	Start Km	End Km	Length	Reference	End Treatment
	Single Guardrail	LHS	44+980	45+480	500m	SD 1101/A	Flared

P165 - DESIGN SPEED 80 km/hr

LEGEND

- 500 KERB AND CHANNEL (SD 0701) WITH CHUTE (SD 0702)
- 1000 KERB AND CHANNEL (SD 0701) WITH CHUTE (SD 0604)
- CONCRETE-LINED 1000 V-DRAIN (SD 0601) WITH CHUTE (SD 0603)
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- DRIVEWAY ACCESS (NO KERB AND CHANNEL) (C 38658- DETAIL C)

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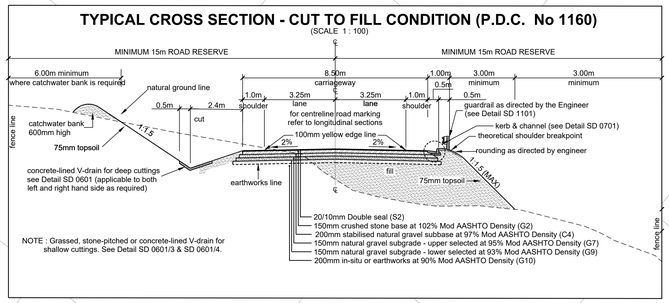
- ELECTRIC POLE
- OVERHEAD ELECTRICAL MV CABLE
- OVERHEAD ELECTRICAL HV CABLE
- WATER SERVICES
- TELEPHONE POLE
- CABLE MANHOLE
- CADASTRAL BOUNDARY

TYPICAL CROSS SECTION - CUT TO FILL CONDITION (P.D.C. No 1160)

(SCALE 1 : 100)



NOTE : Grassed, stone-pitched or concrete-lined V-drain for shallow cuttings. See Detail SD 0601/3 & SD 0601/4.

NOTATION

BC	BEGINNING OF CIRCULAR CURVE
EC	END OF CIRCULAR CURVE
PI	POINT OF INTERSECTION
R	RADIUS OF CIRCULAR CURVE
Δ	DEFLECTION ANGLE OF CIRCULAR CURVE
Lc	LENGTH OF CIRCULAR CURVE
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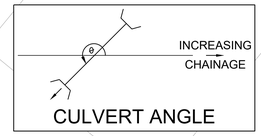

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17. KERB AND CHANNEL DRAINS AS PER SD 0701 ARE TO BE PROVIDED WHERE FILL EMBANKMENTS EXCEED 3m IN HEIGHT.
18. ALL STOP SIGNS FOR TYPE B1 ACCESSES ARE TO BE POSITIONED 13m FROM THE CENTRE LINE OF P165.
    ALL STOP SIGNS FOR TYPE B3 ACCESSES ARE TO BE POSITIONED 8m FROM THE CENTRE LINE OF P165.
19. ALL DRAINAGE TO BE VERIFIED ON SITE BY THE ENGINEER
20. ALL PIPES ARE TO BE SPIGOT AND SOCKET TYPE PIPES ON CLASS C BEDDING.
21. SERVICE DUCT POSITIONS TO BE VERIFIED ON SITE BY THE ENGINEER
22. ALL OPEN CONCRETE LINED DRAIN POSITIONS TO BE VERIFIED BY THE ENGINEER ON SITE.
23. NEW FILLS AND EXPOSED CUTTINGS ARE TO BE TOP SOILED AND VEGETATED IMMEDIATELY AFTER CONSTRUCTION TO PREVENT EROSION.
24. ALL DRIVEWAYS AND ACCESS ROADS TO BE TIED INTO THE EXISTING INFRASTRUCTURE AS DIRECTED BY THE ENGINEER.
25. ALL ACCESS ROADS TO BE TIED IN WITH THE RELEVANT DRAINAGE AS INDICATED IN THE STANDARD DETAILS OR BY THE ENGINEER ON SITE.
26. ALL DRAINAGE FOR ACCESS ROADS ARE TO BE VERIFIED BY THE ENGINEER PRIOR TO CONSTRUCTION.

DESIGN SPEED = 60km/h

TO HOWICK

TO MOOI RIVER

DESIGN SPEED = 80km/h

KETHRO 15969

ROBIN HOOD'S WELL PORTION 2 OF 2973

WESTON TRAINING SCHOOL 13981

R13

1 x600mm Ø PC Pipe

1 x 900mm Ø PC Pipe

RENO MATRESS

SINGLE GUARDRAIL km 44+980 to km 45+420

LOW POINT

HIGH POINT

CA15 1524.02

CA14 1522.59

CA13 1529.23

CA12 1526.90

PI 14

HORIZONTAL ALIGNMENT SCHEDULE P165

Point	Chainage	Co-ordinates WG Lo.31° Y	Co-ordinates WG Lo.31° X	Curve Data
Curve No.14				R - 860m
BCC 14	45 227.291	94 186.497	3 236 119.518	Δ - 31 ·47 08
PI 14		94 244.449	3 235 881.614	- 244.860m
ECC 14	45 704.387	94 419.024	3 235 709.916	- 477.096m

CURVE NO. 14 LEFT

R = 860m
△ = 31 °47'08"
TL = 244.860m
CL = 477.096m

BC = km 45 + 227.291
EC = km 45 + 704.387

SETTING OUT CONTROL (SYSTEM : WG 31)

Name	Y	X	Z	Description
CA15	94130.918	3236283.714	1524.02	16mm Iron Peg in Conc
CA14	94211.354	3235992.704	1522.59	16mm Iron Peg in Conc
CA13	94386.733	3235717.982	1529.23	16mm Iron Peg in Conc
CA12	94577.587	3235573.379	1526.90	16mm Iron Peg in Conc

ACCESSES

ACCESS NO.	STAKED KM DISTANCE	LEFT OR RIGHT	DESCRIPTION	REMARKS
11	KM 45+468	LHS	TYPE B3 ACCESS	REFER TO SD 0303/C
12	KM 45+787	LHS	TYPE B2 ACCESS	REFER TO SD 0303/C

11
TYPE B3 LEFT ACCESS km 45+468 (6m WIDE)

12
TYPE B3 LEFT ACCESS km 45+787 (6m WIDE)

ACCESS NO. 12

CENTRELINE CO-ORDINATES (WGS)

POINT	Y	X
START	94477.828	3235652.080
PI 1	94492.441	3235666.938
BC 1	94485.822	3235660.208
EC 1	94501.856	3235667.613
END	94506.339	3235667.935

FOR APPROVAL

SYMBOL	DATE	DESCRIPTION	CHECKED	SIGNED
		AMENDMENTS		

AS BUILT

SUPERVISING ENGINEER DATE

SUPERVISING AUTHORITY

CONTINUED FROM: C 38624
CONTINUED ON: C 38626
CROSS SECTION NO: C 38643 to C 38645
LONG SECTION NO: C 38630

DESIGNED BY: A. MABOSHEGO
CHECKED BY: S. POPIS
DRAWN BY: A. MABOSHEGO
CHECKED BY: M. NADASEN

NAIDU CONSULTING - CONSULTING ENGINEER
K. GOVENDER (Pr Eng 970276) SIGN : DATE :

Designed by:-

NAIDU CONSULTING

Naidu Consulting no.:- D296/2007/T

transport
Department: Transport
Province of KwaZulu-Natal

MAIN ROAD 165 (HOWICK - MOOI RIVER)

STAKED KM DISTANCE: KM 44+920 - KM 45+920

SHEET 8 OF 9

TRANSPORTATION ENGINEERING: CHIEF ENGINEER

HEAD : TRANSPORT

PORTION
UPGRADING OF PORTION OF P165 : KM 38+295 - KM46+595
HOWICK TO MOOI RIVER
DESIGN / EXPROPRIATION PLAN

SCALE 1 : 1000

PLAN No. C 38625

C 38625

DRAINAGE DETAILS

S.K.D.	Area	Discharge	Flow	Bedding Class	Length	Skew	Conc. Chutes	Reference Dwg	Side Inlet	Co-ordinates Y	Co-ordinates X	Grid Inlets	Co-ordinates Y	Co-ordinates X	Head Wall	Co-ordinates Y	Co-ordinates X	LHS/ RHS
45+935	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	.	.	-	.	.	LHS
45+935	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	.	.	-	.	.	RHS
46+460	-	-	-	-	-	-	1	SD 0603/1	-	-	-	-	.	.	-	.	.	RHS

PIPE CROSSING DRAINAGE DETAILS (WGS)

S.K.D.	Type	Size (dia)	Class	Bedding Class	Length (m)	Skew	Grade	Area (ha)	Discharge (m^3/s)	Velocity (m/s)	Reference Dwg	Conc. Chutes	Side Inlet	Grid Inlet	Drop Inlets	Head Wall	LHS / RHS
46+039	C	900	100D	C	14.373	300	2	0.036	0.112	3.087	C 38655	-	.	.	.	2	LHS
46+315	C	900	100D	C	12.141	270	2	0.053	0.1201	2.286	C 38655	-	.	.	.	2	LHS

SURFACE / SUB SURFACE DRAINAGE DETAILS

Legend	Type	LHS/RHS	Start Km	End Km	Length	Reference
	2400 VD	RHS	45+550	45+930	380m	SD 0601/4
	2400 VD	LHS	45+610	45+930	320m	SD 0601/4
	2400 VD	LHS	46+070	46+180	110m	SD 0601/4
	2400 VD	RHS	46+090	46+180	90m	SD 0601/4
	2400 VD	RHS	46+430	46+595	165m	SD 0601/4
	2400 VD	LHS	46+450	46+595	145m	SD 0601/4

TOE DRAIN

	Toe Drain	LHS	45+940	46+040	100m	C 38658
	Toe Drain	RHS	46+240	46+400	160m	C 38658

GENERAL NOTES

1. ALL LEVELS, DIMENSIONS AND SETTING OUT DETAILS ARE TO BE VERIFIED BY THE ENGINEER AND CONTRACTOR ON SITE PRIOR TO CONSTRUCTION.
2. ALL EXISTING DRAINAGE CULVERTS ARE TO BE INSPECTED ON SITE AND ANY FOUND IN AN UNSERVICEABLE CONDITION ARE TO BE REPLACED ON INSTRUCTION BY THE ENGINEER.
3. CULVERT INVERTS AND POSITIONS ARE TO BE VERIFIED BY THE ENGINEER ON SITE UNLESS SHOWN OTHERWISE. MIN COVER = 600mm. MIN SLOPE = 2%.
4. PIPE CULVERTS ARE TO BE LAID IN ACCORDANCE WITH SD 0401 WITH HEADWALLS AS PER SD 0402,SD 0403 OR SD 0406. MIN. DIA. = 450mm FOR MINOR ACCESS ROADS AND ACCESS BELLMOUTHS, AND MIN. DIA. = 600mm FOR MAJOR ROAD CROSS DRAINAGE.
5. FOR EROSION CONTROL GABION MATTRESSES ARE RECOMMENDED AT CULVERT INLETS AND OUTLETS. THE NEED FOR GABION MATRESSES TO BE VERIFIED BY THE ENGINEER
6. EARTH BERMS AND SHAPING ARE TO BE CONSTRUCTED AT CULVERT INLETS AND OUTLETS TO DIRECT STORMWATER WHERE NECESSARY.
7. SUBSOIL DRAINS AS PER SD 0501 ARE TO BE INSTALLED WITH 1000 V-DRAINS, OR WHERE HIGH WATER TABLES ARE ENCOUNTERED.
8. WHERE SURFACE RUNOFF IS TOWARDS THE ROAD, CATCHWATER BANKS ARE TO BE PROVIDED TO DIVERT STORMWATER TO MAJOR CROSS DRAINAGE STRUCTURES. ALL CATCHWATER BANKS TO BE CONCRETE LINED AS INSTRUCTED BY THE ENGINEER.
9. THE POSITIONS OF ACCESSES AND DRIVEWAYS ARE TO BE VERIFIED BY THE ENGINEER. DAYLIGHTING REQUIREMENTS ARE TO BE VERIFIED BY THE ENGINEER ON SITE. CONCRETE WEDGES AS PER SD 0303 MAY BE USED IN PLACE OF SURFACED BELLMOUTHS FOR ACCESSES SERVING SINGLE RESIDENTIAL PROPERTIES UNLESS SHOWN OTHERWISE. ACCESS CLOSURES ARE TO BE PHYSICALLY BARRICADED WITH GUARDRAILS WHERE ACCESS IS STILL POSSIBLE AFTER COMPLETION OF WORK.
10. GUARDRAILS ARE TO BE INSTALLED IN ACCORDANCE WITH SD 1101, SD 1102 AND SD 1103, WHERE FILL EMBANKMENTS EXCEED 3m IN HEIGHT OR WHERE HAZARDOUS OBSTRUCTIONS CANNOT BE REMOVED.
11. EXISTING ROAD SIGNS, SERVICES AND FENCING AFFECTED BY CONSTRUCTION ARE TO BE REMOVED / RELOCATED WHERE NECESSARY.
12. UNDERGROUND SERVICE CROSSINGS AND MARKERS ARE TO BE IN ACCORDANCE WITH SD 1003/B.
13. ALL NEW ROAD SIGNS AND ROAD MARKING REQUIREMENTS ARE TO CONFORM TO THE SOUTHERN AFRICAN DEVELOPMENT COMMUNITY ROAD TRAFFIC SIGNS MANUAL (SADC-RTSM).
14. ALL WORK IS TO BE CARRIED OUT IN ACCORDANCE WITH THE 'COLTO' SPECIFICATIONS FOR ROAD AND BRIDGE WORKS FOR STATE ROAD AUTHORITIES 1998 EDITION.
15. THE LETTERS L AND R DENOTE THE ROAD RESERVE BOUNDARY TO THE LEFT AND THE RIGHT OF THE ROAD RESPECTIVELY.
16. ROCK BOLSTERS ARE TO BE PLACED ACROSS THE INVERT OF DRAINS SUSCEPTIBLE TO EROSION FOR EVERY 2m VERTICAL DROP.
17. KERB AND CHANNEL DRAINS AS PER SD 0701 ARE TO BE PROVIDED WHERE FILL EMBANKMENTS EXCEED 3m IN HEIGHT.
18. ALL STOP SIGNS FOR TYPE B1 ACCESSES ARE TO BE POSITIONED 13m FROM THE CENTRE LINE OF P165.
    ALL STOP SIGNS FOR TYPE B3 ACCESSES ARE TO BE POSITIONED 8m FROM THE CENTRE LINE OF P165.
19. ALL DRAINAGE TO BE VERIFIED ON SITE BY THE ENGINEER
20. ALL PIPES ARE TO BE SPIGOT AND SOCKET TYPE PIPES ON CLASS C BEDDING.
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22. ALL OPEN CONCRETE LINED DRAIN POSITIONS TO BE VERIFIED BY THE ENGINEER ON SITE.
23. NEW FILLS AND EXPOSED CUTTINGS ARE TO BE TOP SOILED AND VEGETATED IMMEDIATELY AFTER CONSTRUCTION TO PREVENT EROSION.
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25. ALL ACCESS ROADS TO BE TIED IN WITH THE RELEVANT DRAINAGE AS INDICATED IN THE STANDARD DETAILS OR BY THE ENGINEER ON SITE.
26. ALL DRAINAGE FOR ACCESS ROADS ARE TO BE VERIFIED BY THE ENGINEER PRIOR TO CONSTRUCTION.

LEGEND

- 500 KERB AND CHANNEL (SD 0701) WITH CHUTE (SD 0702)
- 1000 KERB AND CHANNEL (SD 0701) WITH CHUTE (SD 0604)
- CONCRETE-LINED 1000 V-DRAIN (SD 0601) WITH CHUTE (SD 0603)
- CONCRETE TOE DRAIN
- GRASS-LINED V-DRAIN
- PIPE CROSSING WITH SIDE INLET (SD 0703) GRID INLET (SD 0602), 600mmØ PIPE AND HEADWALL (SD 0406)
- CATCHWATER BANK
- BULLNOSE/BURIED SINGLE GUARDRAIL (SD 0701)
- PROPOSED EXPROPRIATION ROAD RESERVE
- EXISTING FENCE LINES
- EXISTING ROAD RESERVE
- GUARDRAILS
- RENO MATTRESSES
- DAYLIGHTING
- RETAINING WALLS
- DRIVEWAY ACCESS (NO KERB AND CHANNEL) (C 38658- DETAIL C)

SERVICES LEGEND

- PETROLEUM PIPELINE
- SURVEY CABLE MARKER
- ELECTRIC POLE
- OVERHEAD ELECTRICAL MV CABLE
- OVERHEAD ELECTRICAL HV CABLE
- WATER SERVICES
- TELEPHONE POLE
- CABLE MANHOLE
- CADASTRAL BOUNDARY

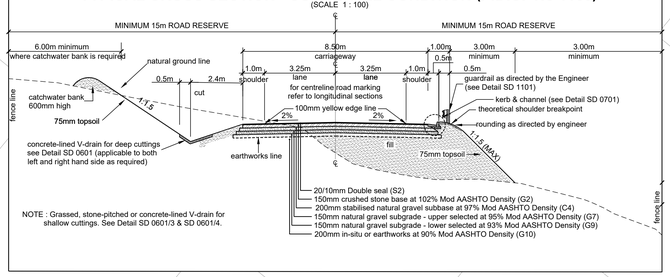
P165 - DESIGN SPEED 80 km/hr

INCREASING CHAINAGE

CULVERT ANGLE

TYPICAL CROSS SECTION - CUT TO FILL CONDITION (P.D.C. No 1160)

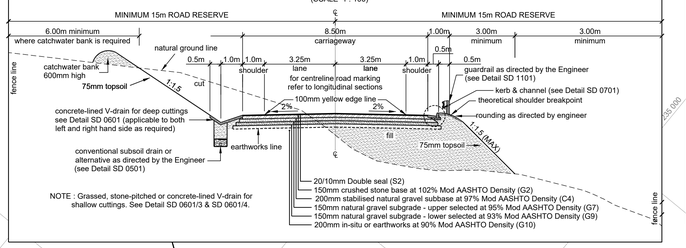
(SCALE 1 : 100)



NOTE : Grassed, stone-pitched or concrete-lined V-drain for shallow cuttings. See Detail SD 0601/3 & SD 0601/4.

TYPICAL CROSS SECTION - CUT TO FILL CONDITION (P.D.C. No 1160)

(SCALE 1 : 100)



NOTE : Grassed, stone-pitched or concrete-lined V-drain for shallow cuttings. See Detail SD 0601/3 & SD 0601/4.

MPOFANA FOREST 18352

WESTON TRAINING SCHOOL 13981

DESIGN SPEED = 80km/h

TO HOWICK

TO MOOI RIVER

80km/h 60km/h Residential Area Ahead

CA12 1526.90

CA11 1516.57

CA10 1518 - 65

CA09 1513 - 85

PI 15

PI 16

PI 17

1 x600mm Ø PC Pipe

1 x900mm Ø PC Pipe

RENO MATRESS

LOW POINT

HIGH POINT

EC 15 R = 710

BC 16 R = 600

EC 16 R = 600

BC 17 R = 1000

EC 17 R = 1000

TIE INTO EXISTING ROAD KM 46+595

CURVE NO. 15 RIGHT

R = 710m
△ = 12 °15'17"
TL = 76.220m
CL = 151.858m

BC = km 45 + 998.259
EC = km 46 + 150.117

CURVE NO. 16 RIGHT

R = 600m
△ = 19 °51'56"
TL = 105.070m
CL = 208.031m

BC = km 46 + 295.875
EC = km 46 + 503.906

CURVE NO. 17 RIGHT

R = 1000m
△ = 9 °06'35"
TL = 79.666m
CL = 158.996m

BC = km 46 + 555.507
EC = km 46 + 714.503

NOTATION

BC	BEGINNING OF CIRCULAR CURVE
EC	END OF CIRCULAR CURVE
PI	POINT OF INTERSECTION
R	RADIUS OF CIRCULAR CURVE
△	DEFLECTION ANGLE OF CIRCULAR CURVE
Lc	LENGTH OF CIRCULAR CURVE
TL	LENGTH OF CURVE TANGENT
BT	BEGINNING OF TAPER
ET	END OF TAPER
CL	CURVE LENGTH

HORIZONTAL ALIGNMENT SCHEDULE P165

Point	Chainage	Co-ordinates WG Lo.31° Y	Co-ordinates WG Lo.31° X	Curve Data
Curve No.15				△ - 710m
BCC 15	45 998.259	94 628.542	3 235 503.850	△ - 12 15.17
PI 15		94 682.883	3 235 450.404	' - 76.220m
ECC 15	46 150.117	94 724.642	3 235 386.641	" - 151.858m
Curve No.16				' - 600m
BCC 16	46 295.875	94 804.499	3 235 264.706	△ - 19 51.56
PI 16		94 862.064	3 235 176.808	' - 105.070m
ECC 16	46 503.906	94 886.335	3 235 074.580	" - 208.031m
End	46 595.000	94 907.382	3 234 985.929	

FOR APPROVAL

SYMBOL	DATE	DESCRIPTION	CHECKED	SIGNED

AMENDMENTS

AS BUILT

SUPERVISING ENGINEER DATE

SUPERVISING AUTHORITY

CONTINUED FROM: C 38625
CONTINUED ON: .
CROSS SECTION NO: C 38645
LONG SECTION NO: C 38631
NAIDU CONSULTING - CONSULTING ENGINEER
K. GOVENDER (Pr Eng 970276) SIGN : DATE :

DESIGNED BY: A. MABOSHEGO
CHECKED BY: S. POPIS
DRAWN BY: A. MABOSHEGO
CHECKED BY: M. NADASEN

Designed by:-

NAIDU CONSULTING

Naidu Consulting no.:- D296/2008/T

transport

Department:
Transport
Province of KwaZulu-Natal

MAIN ROAD 165 (HOWICK - MOOI RIVER)

STAKED KM DISTANCE: KM 45+920 - KM 46+920

SHEET 9 OF 9

TRANSPORTATION ENGINEERING: CHIEF ENGINEER

HEAD : TRANSPORT

PORTION

UPGRADING OF PORTION OF P165 : KM 38+295 - KM46+595
HOWICK TO MOOI RIVER
DESIGN / EXPROPRIATION PLAN

SCALE 1 : 1000

PLAN No. C 38626

C 38626