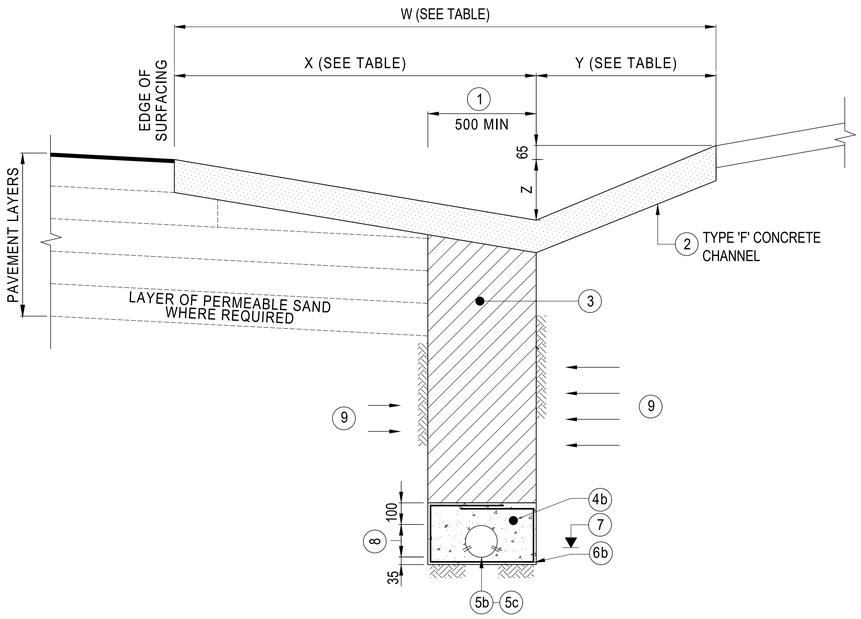
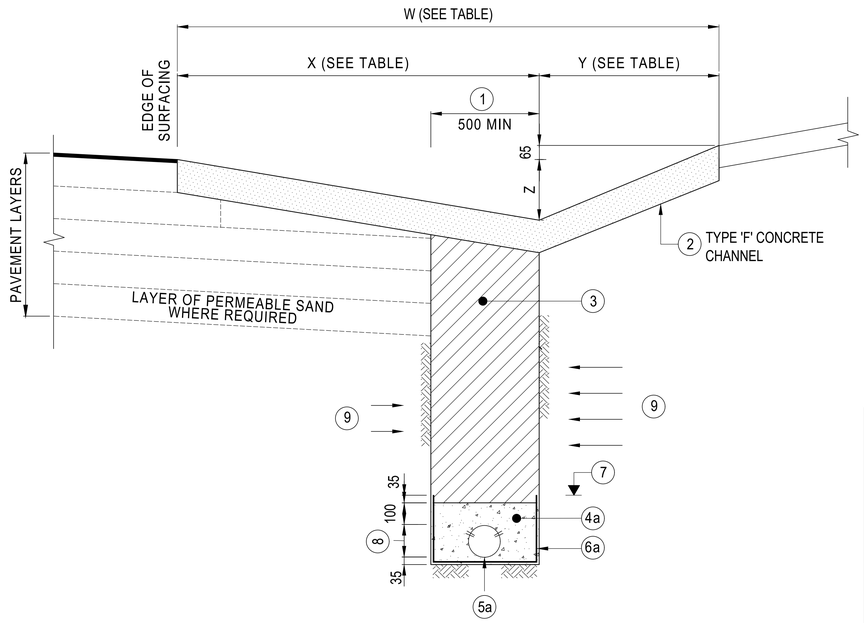


SUBSOIL DRAIN WITH SYNTHETIC FIBRE FILTER FABRIC

SCALE 1:10



SUBSOIL DRAIN WITH POLYETHYLENE LINING

SCALE 1:10

W	X	Y	Z	D UNREINFORCED	D REINFORCED
1000	670	330	110	125	100
1500	1000	500	170	125	100
2000	1330	670	220	150	100
2500	1670	830	280	150	100

DIMENSIONS OF TYPE 'F' CONCRETE CHANNEL

No	DESCRIPTION
1	THIS DIMENSION MAY BE REDUCED TO A MINIMUM OF PIPE DIAMETER + 200mm PROVIDED THAT THE CROSS-SECTIONAL AREA IS ADEQUATE (SEE SUBCLAUSE 2104(b) OF THE STANDARD SPECIFICATIONS).
2	IMPERMEABLE BACKFILL MATERIAL. (MIN 150mm THICK) TAKEN TO TOP OF WATER BEARING LAYER IN CASES WHERE NO CONCRETE SIDE DRAIN IS PROVIDED.
3	FILTER SAND OF APPROVED SOURCE AND GRADE.
4a 4b	FILTER STONE: FINE OR COARSE GRADE AS REQUIRED. (SEE SUBCLAUSE 2104(a)(ii) OF THE STANDARD SPECIFICATIONS).
5a 5b 5c	PERFORATED / SLOTTED SUBSOIL DRAINAGE PIPES. (POSITION OF PERFORATIONS INDICATED).
6a	POLYETHYLENE 0.15mm THICKNESS.
6b	SYNTHETIC FIBRE FILTER FABRIC WITH 200mm OVERLAP (GRADE 2 OR APPROVED EQUIVALENT).
7	LEVEL TO WHICH SURROUNDING AREA IS TO BE DRAINED.
8	INTERNAL PIPE DIAMETER: 110mm OR 150mm.
9	WATER BEARING STRATA.

NOTES:

1. ALL CRITERIA ASSUMES THAT FILTER SAND AND FILTER STONE ARE CONTINUOUSLY GRADED FROM COARSE TO FINE.
2. USE THE ENVELOPE CURVES FOR THE WATER BEARING STRATA, FILTER SAND AND FILTER STONE GRADINGS AND APPLY TO MOST CRITICAL COMBINATIONS.
3. IF REQUIRED BY THE ENGINEER, SUBSOIL DRAINAGE MUST ALSO BE PROVIDED ON THE INSIDE OF BENCHING, WHERE USED.
4. WHERE SUBSOIL DRAINAGE IS INSTALLED IN SOLID ROCK THE POLYETHYLENE LINING MAY BE OMITTED.
5. TYPE A OUTLET PREFERABLY TO BE USED WHERE THE NATURAL GROUND LEVELS ALLOW IT. OUTLETS MAY ALSO BE COMBINED WITH CULVERT IN- OR OUTLETS.
6. ALL CONCRETE SHALL BE CLASS 20/19.
7. SPACING OF CLEANING EYES TO BE AS FOLLOWS:
   (a) 100m MAX ON STRAIGHT SECTIONS.
   (b) AT ALL BENDS.
   (c) OR AS DIRECTED BY THE ENGINEER.
8. TRANSVERSE SUBSOIL DRAINAGE TO BE PROVIDED AT ALL CUT TO FILL TRANSITIONS.
9. PLATE WITH THE INSCRIPTION "CLEANING EYE FOR SUBSOIL DRAIN". STAMPED ON TO BE AFFIXED TO CONCRETE COVER.
10. LETTER SIZE ON PLATE: 10mm SERIES C, CAPITAL LETTERS.
11. SYNTHETIC FIBRE FILTER FABRIC TO BE REPLACED WITH POLYETHYLENE LINING IN THE FOLLOWING INSTANCES:
    (a) WHERE THE SURROUNDING SOIL IS VERY PERMIOUS.
    (b) WHERE THE SURROUNDING SOIL HAS A HIGH FINES CONTENT WHICH COULD LEAD TO CLOGGING OF FILTER FABRICS.
12. STEEL PLATE TO BE FIXED TO TOP PORTION OF FENCE LINE OPPOSITE THE SUBSOIL OUTLET STRUCTURE.
13. BACKGROUND : MATT-WHITE
    TEXT : DIN A, MATT-BLACK

FILTER CRITERIA

A. "D x" IS THE SIZE OF SIEVE THROUGH WHICH x % OF THE FILTER MATERIAL WILL PASS.
0 ^{50}(GF) = AVERAGE SIZE OF THE OPENINGS OF THE SYNTHETIC FIBRE FILTER FABRIC.

B. FILTER SAND (FS) IN RELATION TO WATER BEARING STRATA (WS)

1. FOR D ^{85}(WS) > 0.05mm:
   (a) TO PREVENT BLOCKING OF FILTER SAND:
   D ^{15}(FS) < 5 x D ^{85}(WS)
   D ^{50}(FS) < 25 x D ^{50}(WS)
   (b) FOR PERMEABILITY OF FILTER SAND:
   D ^{15}(FS) > 5 x D ^{15}(WS)
2. FOR D ^{85}(WS) < 0.05mm:
   (a) TO PREVENT BLOCKING OF FILTER SAND:
   D ^{15}(FS) < 0.25mm
   D ^{05}(FS) > 0.075mm
   (b) PERMEABILITY REQUIREMENTS NOT NECESSARY

C. FILTER STONE (FSN) IN RELATION TO FILTER SAND (FS)

(a) TO PREVENT BLOCKING OF FILTER STONE:
D ^{15}(FSN) < 5 x D ^{85}(FS)
D ^{50}(FSN) < 25 x D ^{50}(FS)
(b) PERMEABILITY: FILTER STONE MUST BE COARSER THAN SAND AT ALL PERCENTAGES

D. FILTER STONE (FSN) IN RELATION TO PERFORATIONS IN PIPES

TO PREVENT BLOCKING OF PERFORATIONS IN PIPES:
D ^{85}(FSN) > 1.2 x DIAMETER OF ROUND PERFORATIONS
D ^{85}(FSN) > 1.2 x WIDTH OF SLOTS

E. SYNTHETIC FIBRE FILTER FABRIC (SF) IN RELATION TO FILTER SAND (FS)

(a) TO PREVENT CLOGGING OF SYNTHETIC FIBRE FILTER FABRIC:
O ^{50}(SF) < D ^{85}(FS)
(b) FOR PERMEABILITY OF SYNTHETIC FIBRE FILTER FABRIC:
O ^{50}(SF) > D ^{15}(FS)

No.	DATE	REVISION
V1	08/03/2024	ORIGINAL VERSION

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SANRAL
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BUILDING SOUTH AFRICA THROUGH BETTER ROADS

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ACCEPTANCE

THIS ACCEPTANCE IS FOR PROCEDURAL AND ADMINISTRATIVE REVIEW PURPOSES ONLY AND DOES NOT ATTRACT LEGAL LIABILITY OR LIABILITY OF ANY KIND FROM WHATSOEVER CAUSE OR HOWEVER ARISING

for the SA NATIONAL ROADS AGENCY SOC LTD.
Date:

PROJECT DESCRIPTION
THE CAPACITY IMPROVEMENT OF NATIONAL ROUTE 1 SECTION 1 FROM OLD OAK INTERCHANGE (KM 18.90) TO KOELENHOF INTERCHANGE (KM 33.00)

SUBSURFACE DRAINAGE
SHEET 1 OF 3

SCALE @ A0: AS SHOWN | SHEET 1 OF 3

PROJECT NUMBER	N001-010-2021/1	
DRAWING LOCATION DATA	START	END
ROUTE	N01	N01
SECTION	01	01
DRAWING km DISTANCE	18.900	33.000
DRAWING TYPE	DRAINAGE - SUBSURFACE DRAINAGE	
BRIDGE/STRUCTURE No.	N/A	
CONSULTANT DRAWING No.	312-00827-01-TD77	VER
SANRAL DOCUMENT #	XXXXXX	V1

312-00827-01-TD77