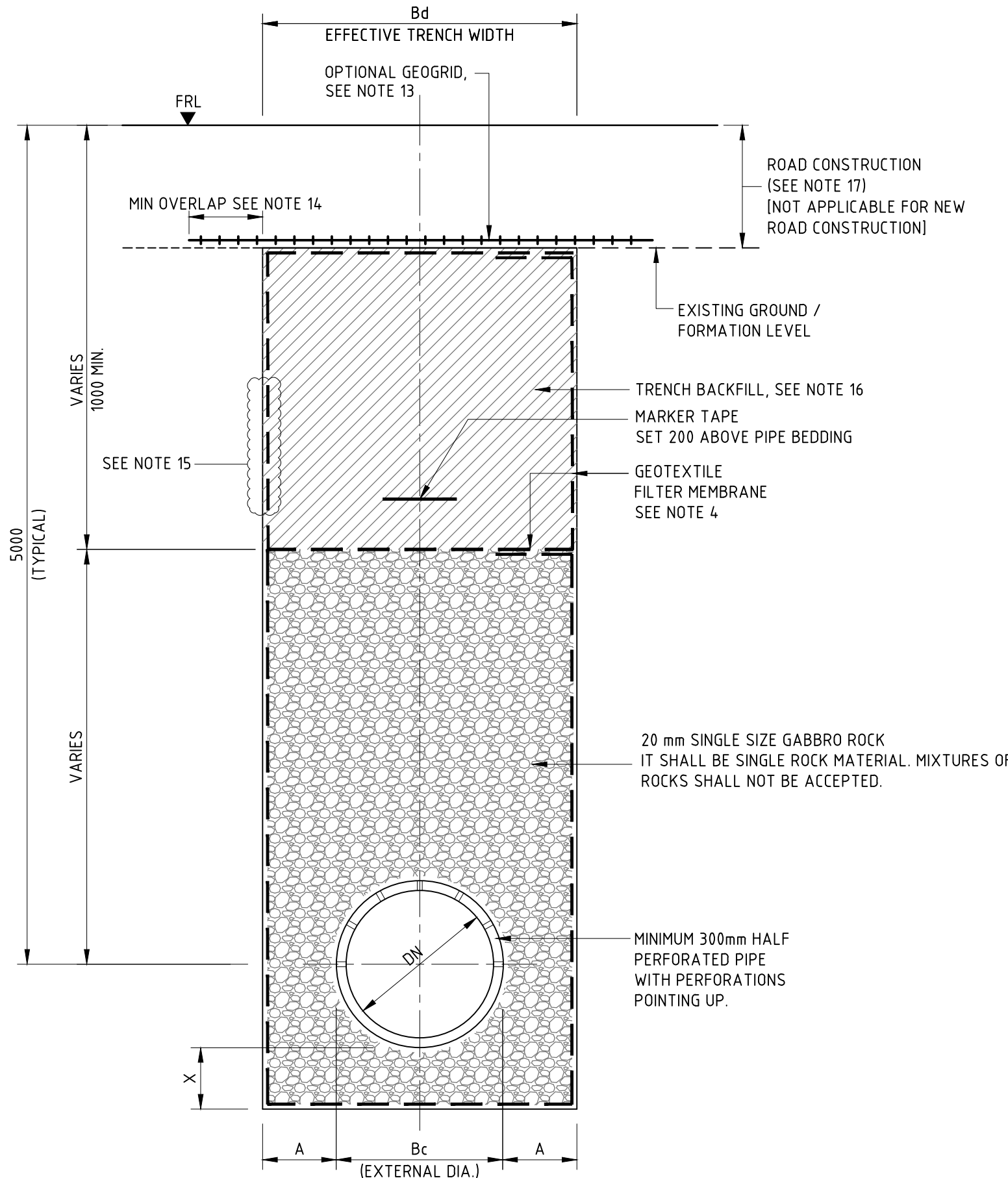
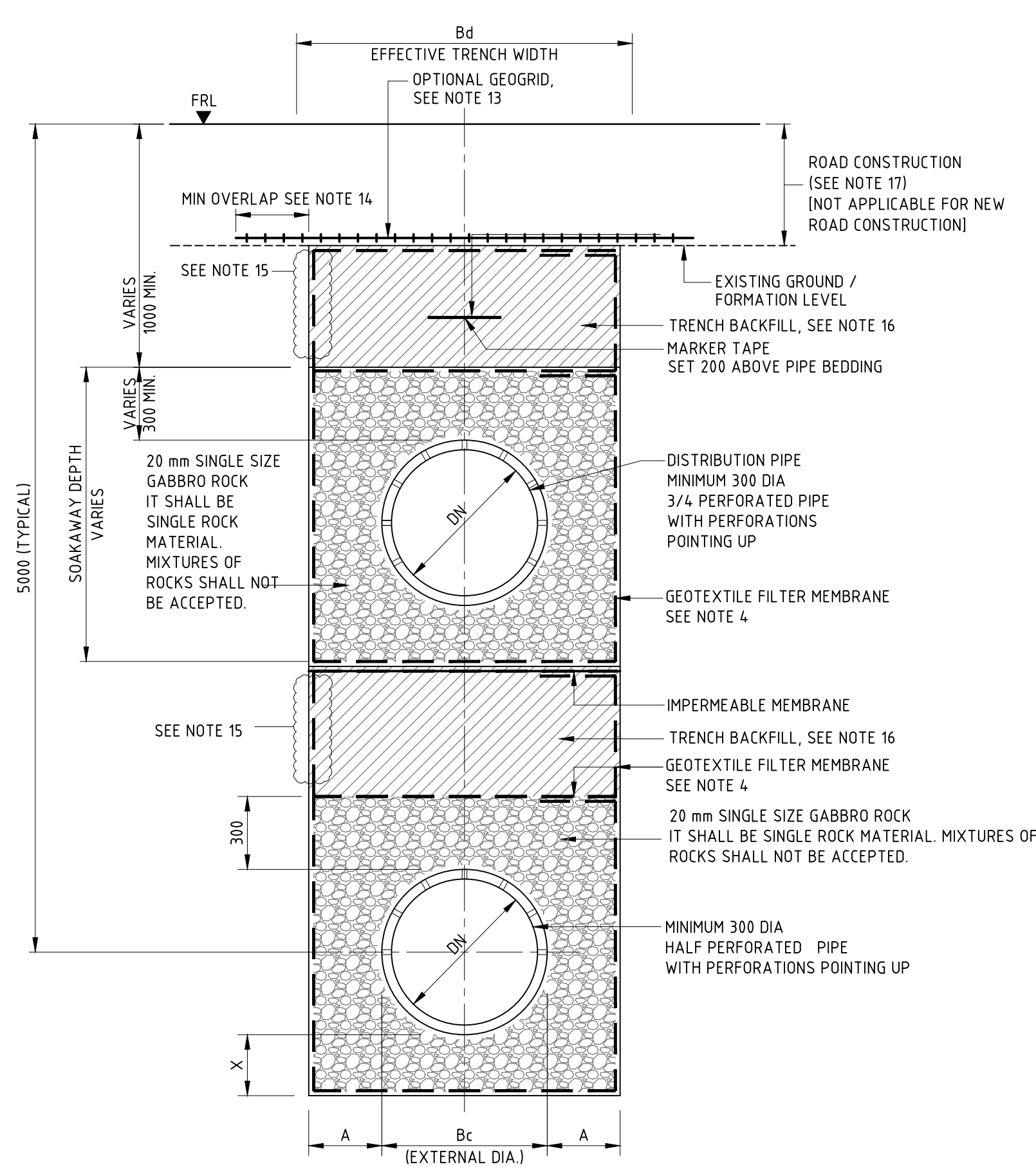


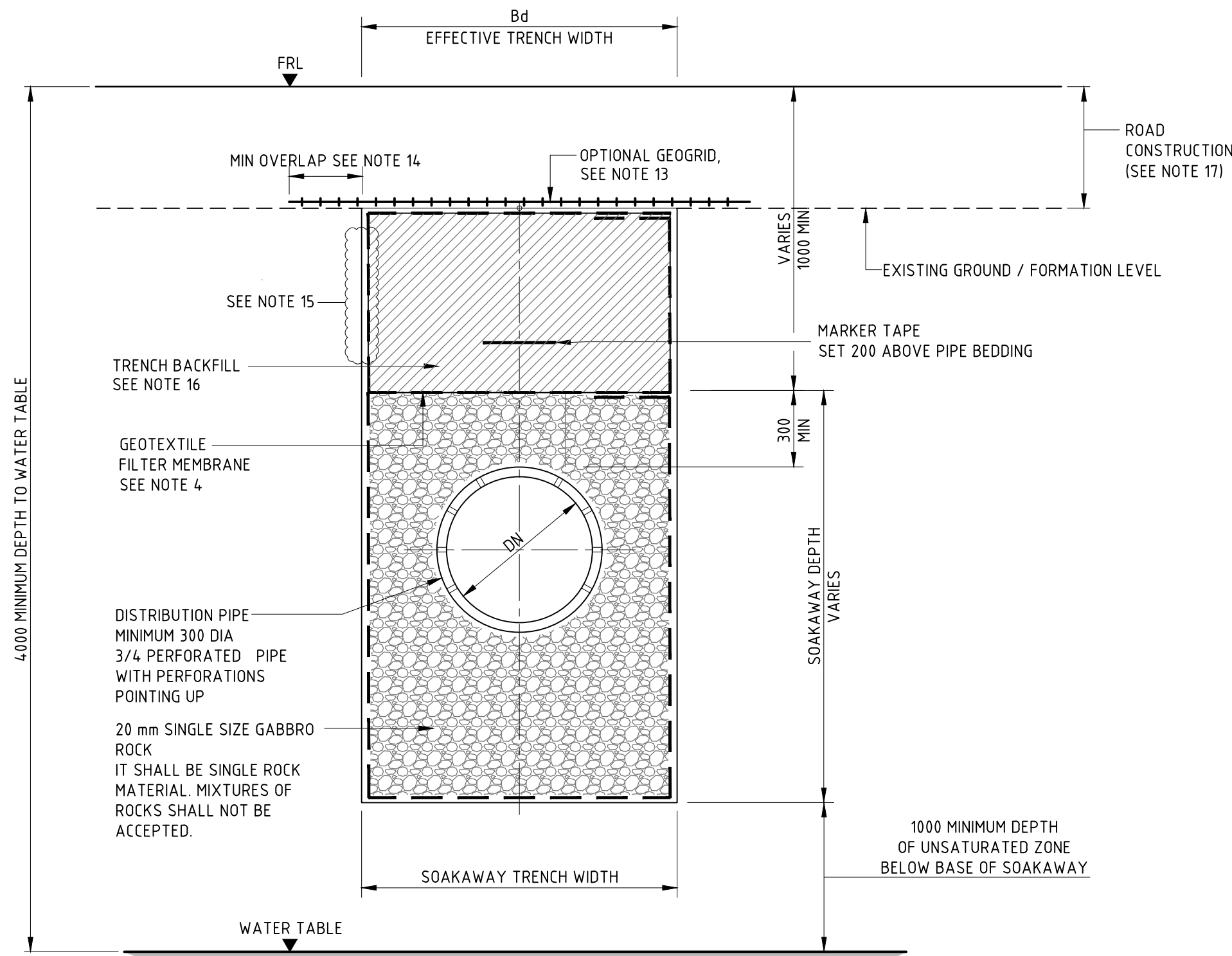
DETAIL 1
LAND DRAIN



DETAIL 2
LAND DRAIN / CONVEYANCE / STORM WATER ATTENUATION TRENCH STORAGE



DETAIL 3
COMBINED SOAKAWAY / LAND DRAIN TRENCH (PASSIVE SYSTEM)



DETAIL 4
TRENCH SOAKAWAY

TABLE 1:
LIMITS OF PHYSICAL, CHEMICAL AND MECHANICAL PROPERTIES FOR SINGLE SIZED AGGREGATE

ITEM No.	REQUIREMENT	TEST METHOD		PERMISSIBLE LIMITS
		BS/EN	ASTM	
1	GRADING	933	C136	TABLE 2
2	CLAY LUMPS AND FRIABLE PARTICLES		C142	1% MAX
3	LIGHTWEIGHT PIECES		C123	0.5% MAX
4	WATER ABSORPTION (SATURATED SURFACE DRY)	1097-6	C128/127	2% MAX
5	SHELL CONTENT	933-7		3% MAX
6	SOUNDNESS LOSS BY MAGNESIUM SULPHATE (5 CYCLES) OR SODIUM SULPHATE		C88	15% MAX
7	MECHANICAL STRENGTH			
	LOSS BY LOS ANGELES ABRASION	1097-2	C131/C535	30% MAX
8	ACID SOLUBLE CHLORIDE CONTENT	BS 1377 PART 3		0.03% MAX
9	ACID SOLUBLE SULPHATE CONTENT	BS 1377 PART 3/ASTM C1580-15		0.3% MAX
10	ORGANIC MATTER	BS 1377 PART 3		2% MAX

TABLE 3:
MATERIAL TESTING FREQUENCIES

MATERIAL TYPE	TYPE OF TEST	MINIMUM TESTING FREQUENCY
20mm AGGREGATE	ITEM 1 AS PER TABLE 1 AND TABLE 2	1 PER 1,000m ³ OR CHANGE OF SOURCE
20mm AGGREGATE	1 COMPLETE SET OF TESTS AS PER TABLE 1 EXCEPT ITEM 1	1 PER 2,000m ³ OR CHANGE OF SOURCE
TRENCH BACKFILL	ITEM 1 TO 5 AS PER TABLE 3	1 PER 1,000m ³ OR CHANGE OF SOURCE
TRENCH BACKFILL	IN-SITU FIELD DENSITY TEST	1 TEST PER EVERY 50 LINEAR METRES (m) ON EVERY LAYER
TRENCH BACKFILL	ITEM 7 TO 9 AS PER TABLE 3	1 PER 3,000m ³

NOTE: AGGREGATE IMPACT VALUE (AIV) TEST CAN BE USED AS AN ALTERNATIVE TO THE LOS ANGELES TEST BUT A CORRELATION WITH THE LOS ANGELES TEST SHOULD FIRST BE ESTABLISHED TO AVOID DOUBLE TESTING AND ENSURE MUTUAL RECOGNITION OF RESULTS. THE LOS ANGELES TEST (REFERENCE METHOD) SHOULD BE USED IN CASE OF DISPUTE.

TABLE 2:
SINGLE SIZED AGGREGATE GRADING LIMITS

SIEVE SIZE (mm)	REQUIRED % PASSING BEDDING TYPE
37.5	100
20	60-90
14	5-30
10	2-10
5	0-2

TABLE 4:
TABLE OF DIMENSIONS FOR PIPE BEDDING & SURROUND

PIPE DIA	MAXIMUM PERMISSIBLE TRENCH WIDTH	X			A (MIN)
		UNIFORM SOIL	MACHINE DUG	ROCK	
DN	AT 300MM ABOVE CROWN OF PIPE				
300	900	150	200	250	150
400	1000	150	200	250	200
500	1250	150	200	250	200
600	1350	175	225	275	300
800	1550	175	225	275	300
1000	2000	200	250	300	450
1200	2300	200	250	300	450
1400	2500	200	250	300	450
1500	2700	200	250	300	450

TABLE ASSUMES PIPE FOR SIZES 300 TO 1000 AND CONCRETE PIPE >1000 SEE SPECIFICATIONS FOR PIPE BEDDING AND PIPE SURROUND MATERIALS. FOR LAND DRAIN & TRENCH SOAK AWAY, PIPE BEDDING AND SURROUND TO BE 20mm. SEE NOTE 11 FOR DUAL SYSTEM AND SOAKAWAYS.

NOTES:

- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
- ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE CURRENT Q.C.S. UNLESS OTHERWISE AGREED WITH THE ENGINEER.
- WHERE THERE IS A DISCREPANCY BETWEEN THE REQUIREMENTS IN THE SPECIFICATION AND THOSE SHOWN ON THIS DRAWING THE SPECIFICATION SHALL TAKE PRECEDENCE.
- GEOTEXTILE SHALL BE NONWOVEN NEEDLE-PUNCHED GEOTEXTILE MANUFACTURED FOR SUBSURFACE DRAINAGE APPLICATION AS PER QCS 2014, SECTION 6, PART 18, CLAUSE 18.2.2.
- PIPE MATERIAL AND STRENGTH TO BE SPECIFIED BY THE DESIGNER AND STATED ON THE LONGITUDINAL SECTIONS.
- FOR PIPE BEDDING DETAILS FOR COMBINED SERVICES REFER TO STANDARD DRAWING SD 8-2-303.
- IF THE CONTRACTOR'S TRENCH EXCAVATION WIDTH EXCEEDS THE PERMISSIBLE VALUE IN THE TABLE ON THIS DRAWING, HE WILL BE REQUIRED TO PRESENT A REVISED SET OF PIPE BEDDING CALCULATIONS AND PROVIDE THE REQUIRED PIPE BEDDING TO SUIT THE REVISED CALCULATIONS ALL AT HIS OWN EXPENSE.
- WATER SHALL NOT BE PERMITTED IN TRENCH DURING CONSTRUCTION.
- 20mm SINGLE SIZE IGNEOUS OR METAMORPHIC ROCK TO PROVIDE 30% VOIDS. MATERIAL TO BE LIGHTLY COMPACTED IN 300mm LAYERS, MANUALLY USING HAND ROLLERS OR PLATE COMPACTORS TO AVOID CRUSHING AND REDUCING IT TO FINES.
- FOR DUAL SYSTEMS, PASSIVE SOAKAWAYS, THE TRENCH WIDTH WILL BE DICTATED BY THE STORAGE VOLUME REQUIRED WITHIN THE PIPE AND GRANULAR MATERIAL. THE DESIGNER SHALL DETERMINE THE PIPE STRENGTH REQUIRED.
- TRENCH BACKFILL FOR SOAKAWAY TRENCH SHALL MEET THE MINIMUM REQUIREMENTS AND TESTING FREQUENCIES FOR FILL MATERIAL AS PER QCS.
- TRENCH BACKFILL SHALL BE PLACED IN LAYERS NOT EXCEEDING 150mm THICKNESS AND COMPACTED TO 95% STANDARD PROCTOR MAXIMUM DRY DENSITY (SPMD). FLOWABLE CONCRETE FILL MAY BE USED AS AN ALTERNATIVE TRENCH BACKFILL IF THE PIPE LINE IS IN THE CARRIAGEWAY. POLYTHENE SHEETING SHALL BE USED TO PREVENT THE FLOWABLE FILL ENTERING THE GABBRO MATERIAL.
- GEOTEXTILE TO BE PLACED BETWEEN MODIFIED SELECT FILL AND SUB-BASE WHEN TRAFFIC LOADS EXCEED 20 MILLION ESAL'S. GEOTEXTILE TO BE USED SHOULD BE AS PER QCS SECTION 6, PART 18 AND AS DIRECTED BY THE ENGINEER IF REQUIRED.
- PROVIDE MINIMUM OVERLAP AS PER MANUFACTURER'S RECOMMENDATIONS AND AS APPROVED BY THE ENGINEER.
- ANY LOOSE ROCK FRAGMENTS/OVERHANDS AND/OR PROTRUDING/UNEVEN ROCK FACE SHALL BE EXCAVATED REMOVED/SCALED-OFF, PRIOR TO BACKFILLING. THE BACKFILL SHALL BE PLACED IN LAYERS AND PROPERLY BENCHED INTO THE EXISTING GROUND/ROCK TO COMPLETELY FILL ALL VOIDS.
- TRENCH BACKFILL (SELECTED FILL) SHALL BE AS PER QCS 2014, SECTION 08, PART 02, CLAUSE 2.3.4.
- SEE REINSTATEMENT DETAILS DRG Nos. SD 6-1-201 TO SD 6-1-205 FOR CONSTRUCTION IN EXISTING PAVEMENT.
- CUT-OFF WALLS SHALL BE CONSTRUCTED AS PER QCS 2014 REQUIREMENTS. FOR DETAILS OF CUT-OFF WALL REFER TO SECTION A-A ON STANDARD DRAWING SD 8-2-308.

10	JULY 24	REPLACE IGNEOUS AND METAMORPHIC WITH GABBRO	
9	JAN 22	NOTE 18 ADDED FOR CUT OFF WALLS	
8	MAR 21	TABLE 1 MODIFIED, NOTE 16 & 17	
7	MAR 20	NOTE ON GEOTEXTILE & TRENCH BACKFILL	
6	APR 19	ISSUED FOR USE	
5	01 MAR 19	UPDATED ISSUE	
4	20 JUNE 17	ISSUED FOR USE	
3	01 MAY 16	ISSUED FOR USE	
2	15 SEP 15	ISSUED FOR USE	
1	19 AUG 15	ISSUED FOR USE	
0	22 JUN 15	ISSUED FOR USE	
Rev.	Date	Revision Details	Appd.

هيئة الأشغال العامة
Public Works Authority

P.O.Box: 22188
Tel.: 00974 44950000
Fax: 00974 44950999

قطر تستحق الأفضل
Qatar Deserves The Best
www.ashghal.gov.qa

QCS Section:
Section 8 - Drainage Works
Part 2 - Earthworks

Drawing Title:
SURFACE WATER LAND DRAIN AND SOAKAWAY DETAILS

Approved:	Sheet No: 1 OF 1
Date: MARCH 2020	Scale: 1:20 on A1
Drawing Number: SD 8-2-307	Revision: 10