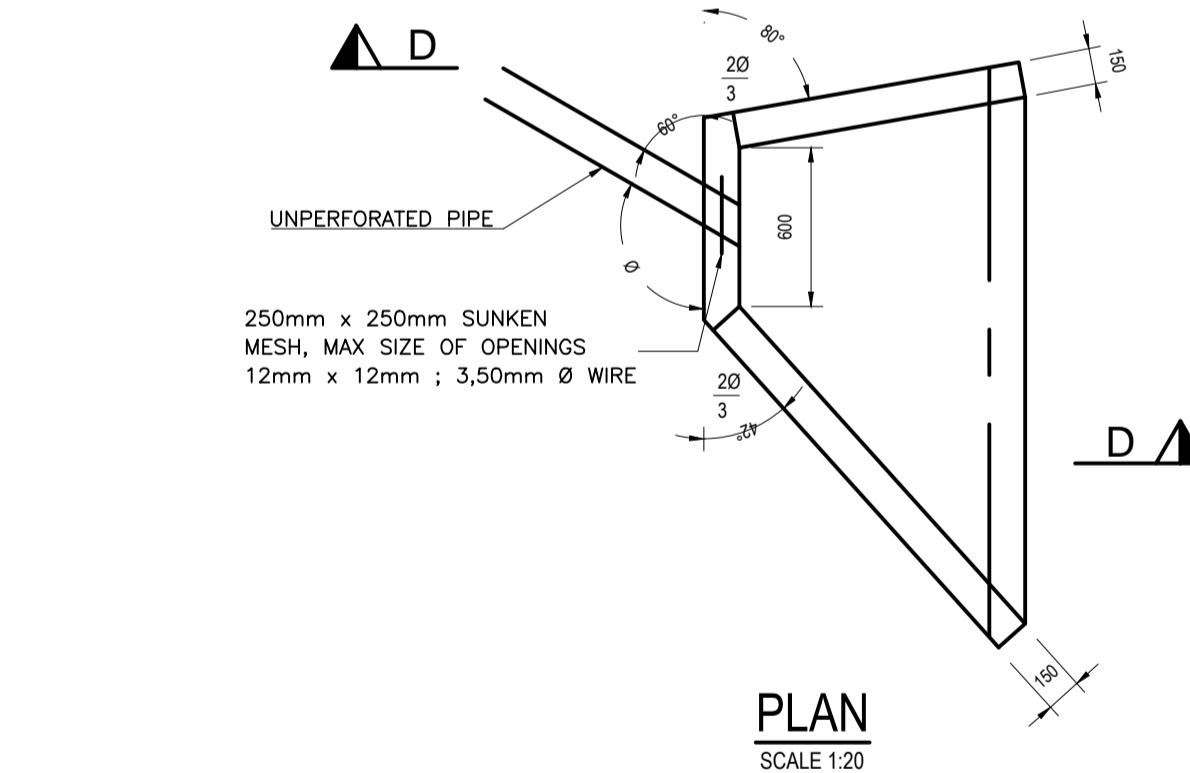
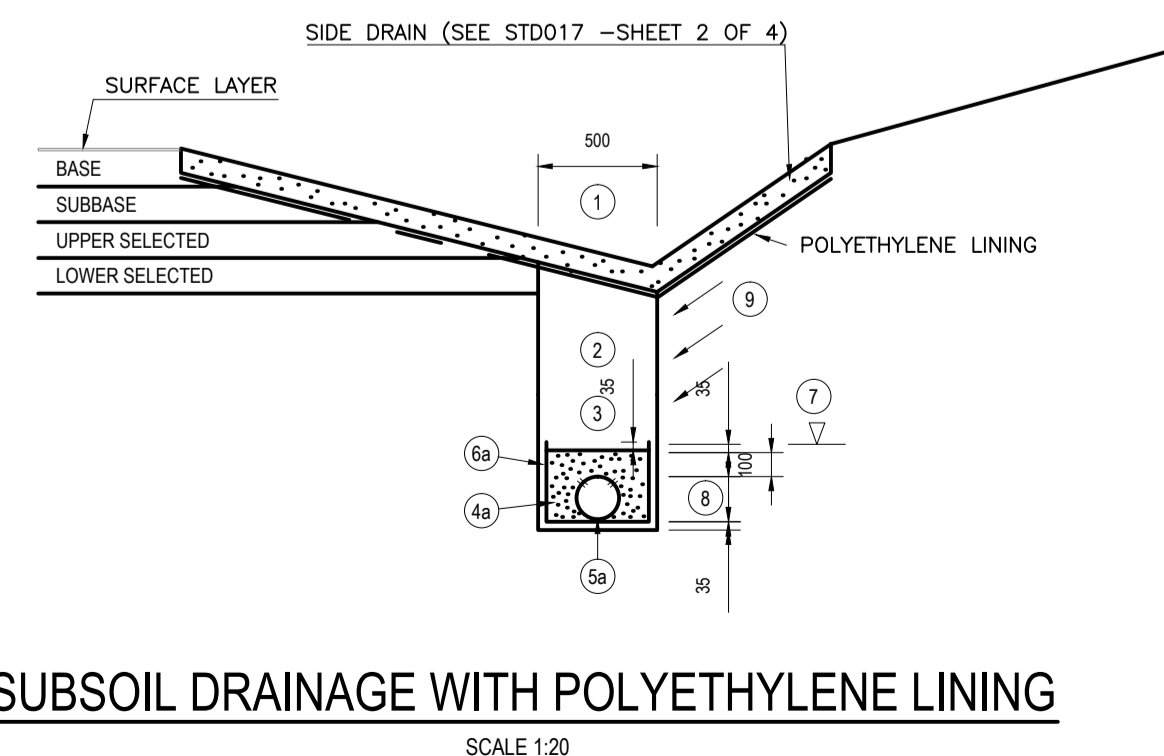
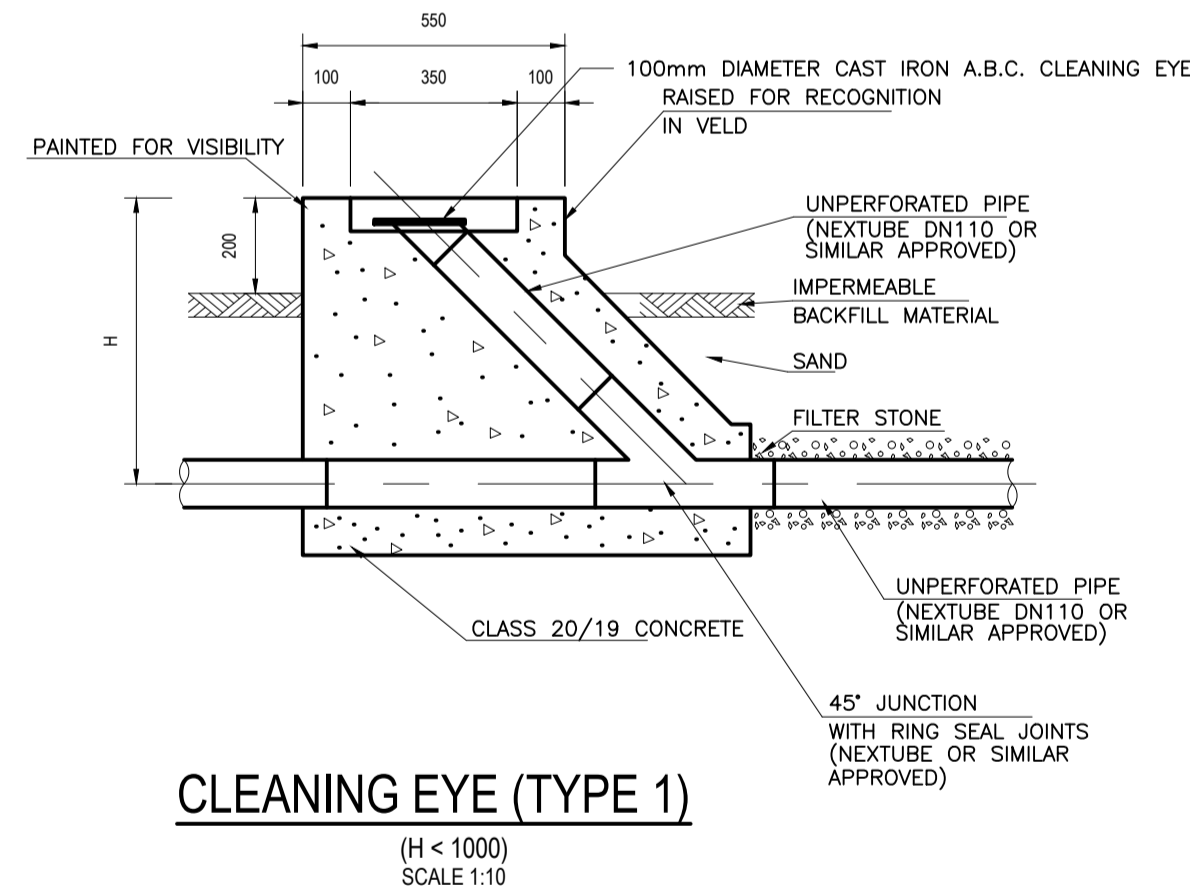
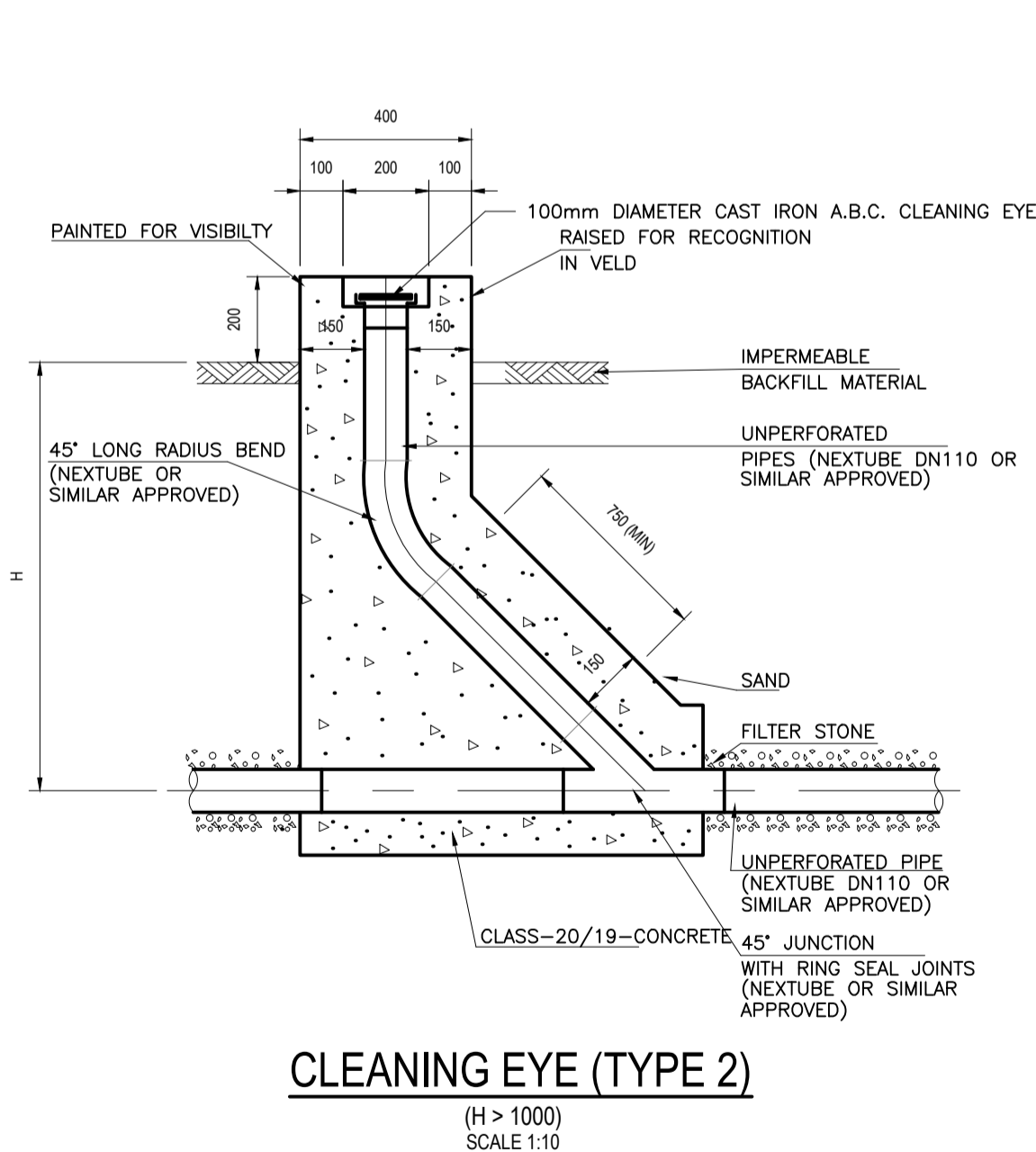
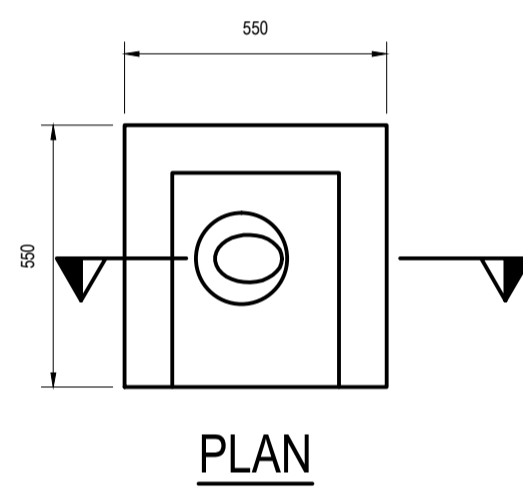
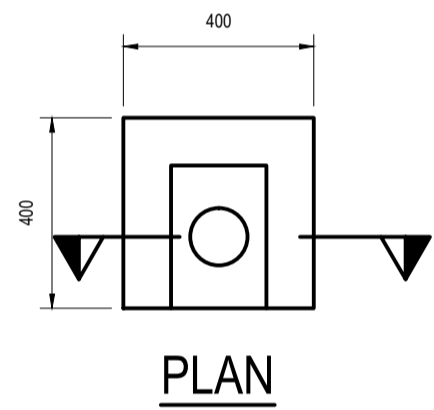
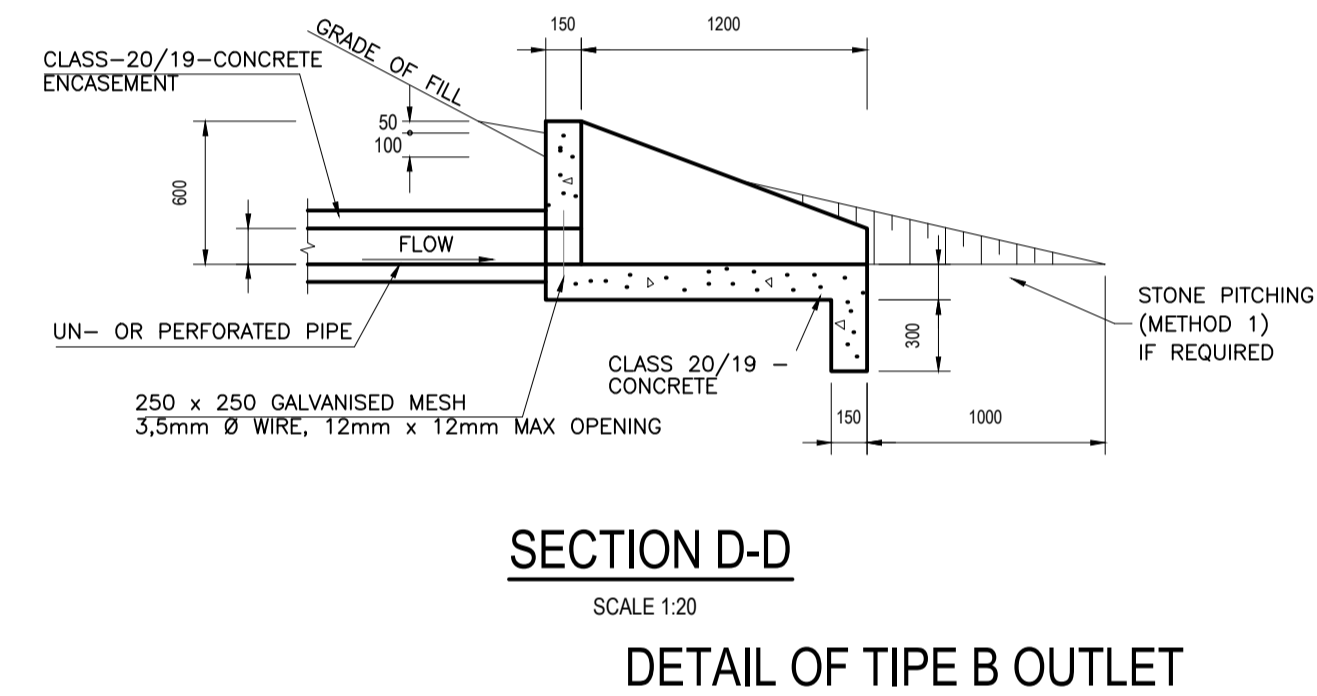
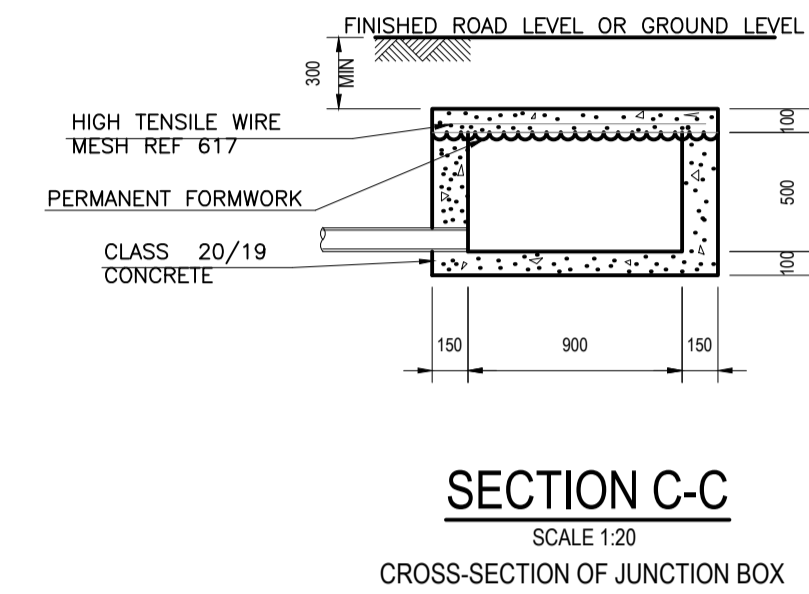
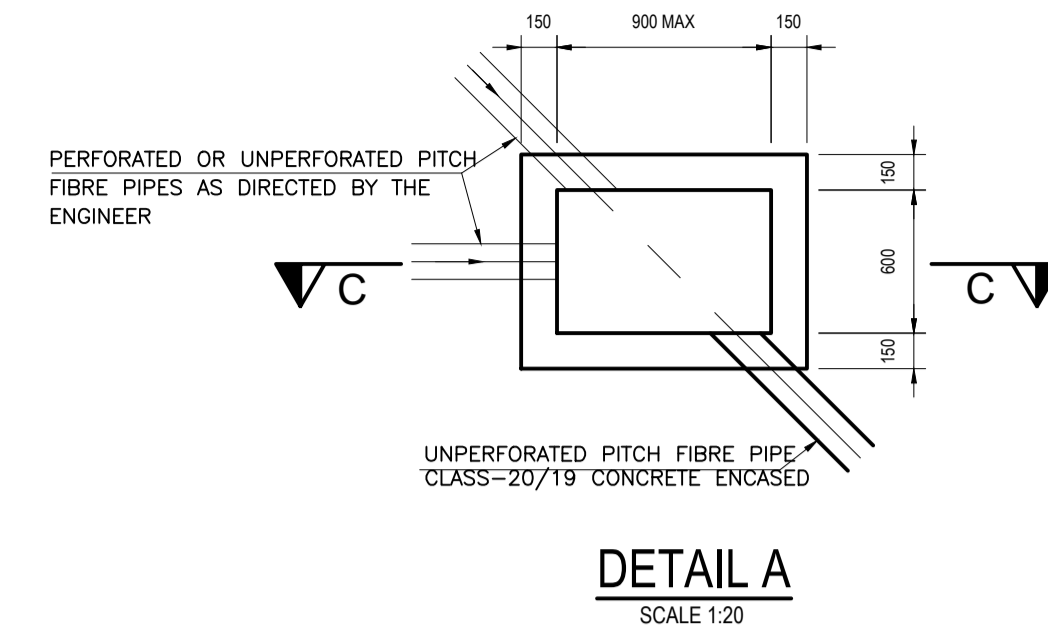
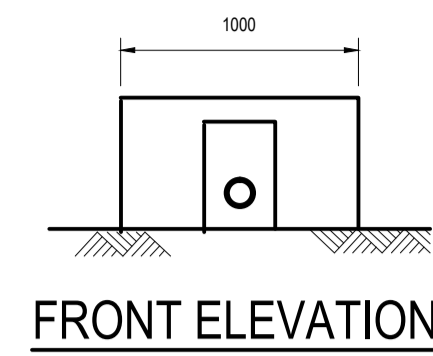
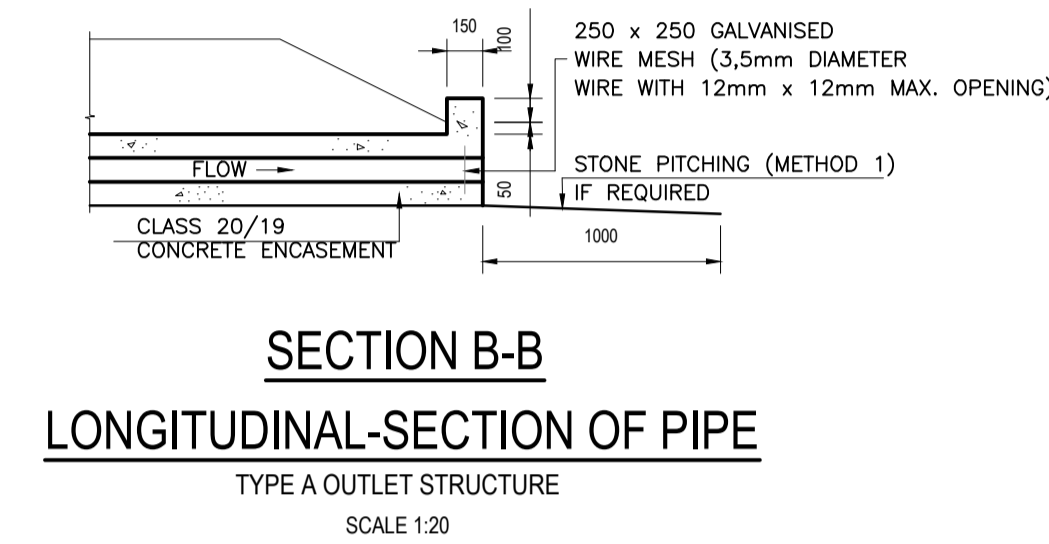
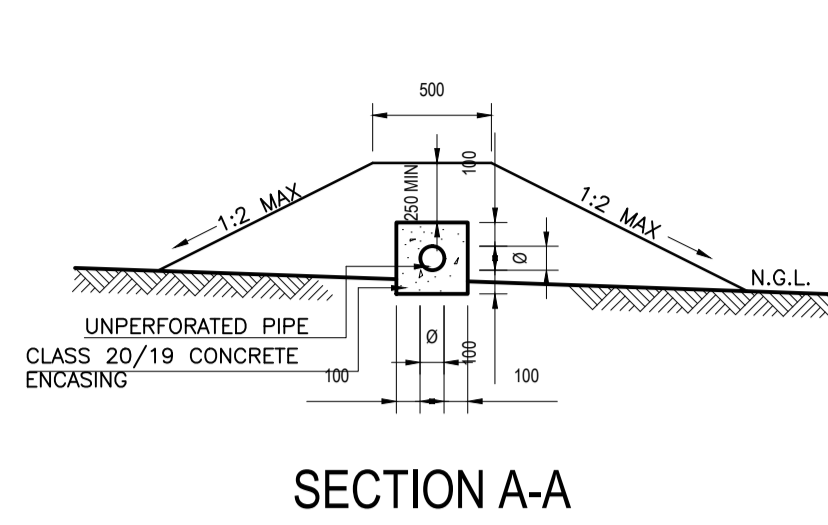
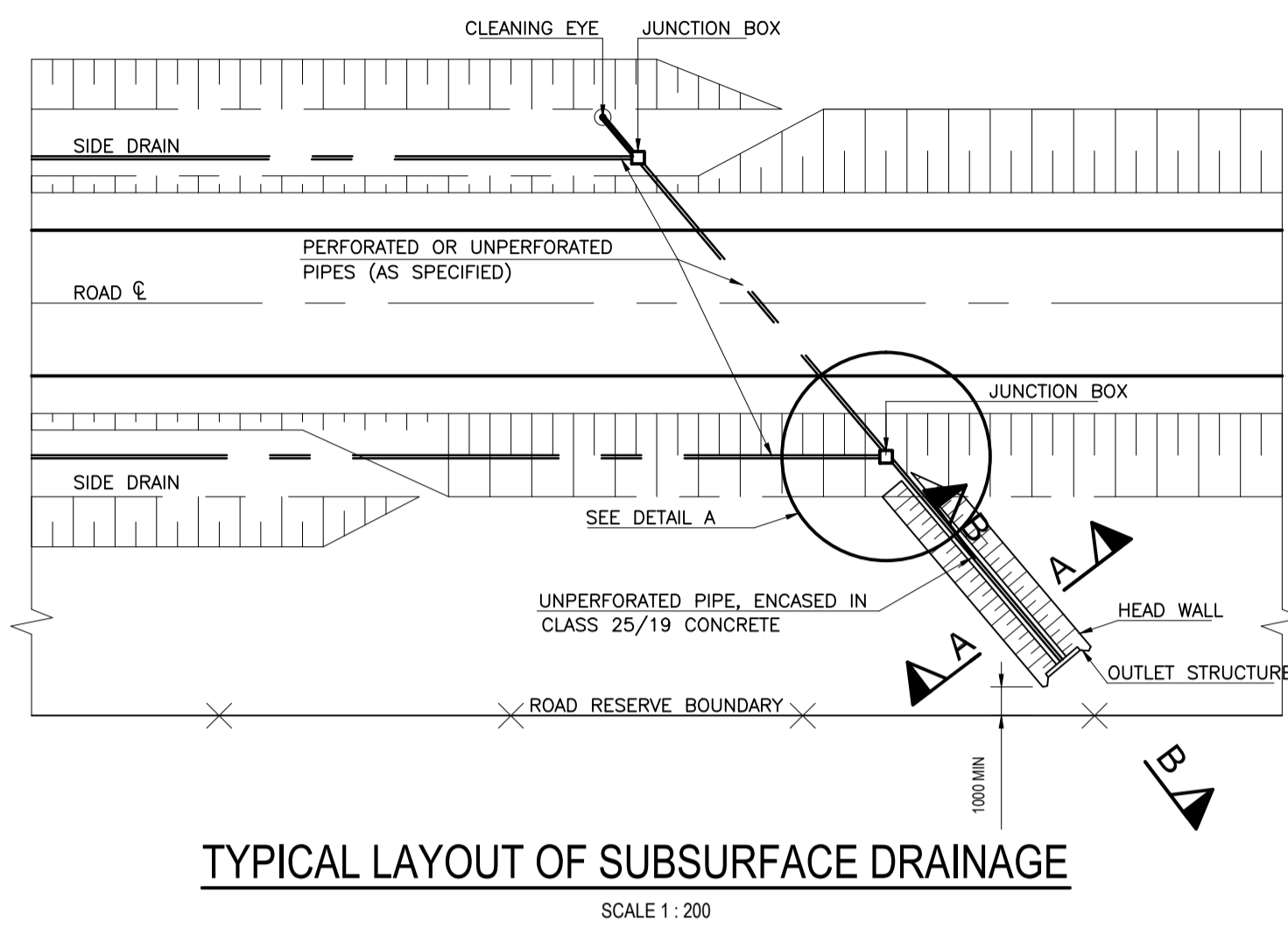


NOTES AND SPECIFICATIONS

No.	DESCRIPTION
1	THE CONDITION MAY BE REDUCED TO A MIN. OF THE PIPE DIAMETER - 20mm, PROVIDED THAT THE SECTIONAL AREA IS ADEQUATE. REFER CLAUSE 2104 (B) OF THE STANDARD SPECIFICATIONS.
2	IMPERMEABLE BACKFILL MATERIAL, MIN 150mm THICK, TAKEN TO TOP OF WATER BEARING LAYER OR CONCRETE LAYER.
3	FILTER SAND OF APPROVED SOURCE/NATURAL PERMEABLE MATERIAL AND GRADE.
4	FILTER STONE - FREE OR COARSE OF APPROVED SOURCE AND GRADE AS REQUIRED (SEE CLAUSE 2104 (B) OF THE STANDARD SPECIFICATIONS).
5	PERFORATED SUBSURFACE PIPES (NEXTUBE DN110 OR SIMILAR APPROVED).
6	BEAM BA FILTER MATERIAL OR SIMILAR APPROVED TYPE.
7	SYNTHETIC FIBRE FILTER FABRIC (GRADE 2 CLASS A (BEAM BA OR APPROVED EQUIVALENT)).
8	LEVEL TO WHICH SURROUNDING AREA IS TO BE DRAINED.
9	EXTERNAL PIPE DIAMETER.
10	WATER BEARING STRATA.

1. SUBSURFACE DRAINS
- REFER TO 2011 OF THE STANDARD SPECIFICATIONS FOR MUNICIPAL ENGINEERING WORKS, 3RD EDITION, 2005.
 - WHERE THE SUBSURFACE DRAINS ARE PLACED IN SOLID ROCK THE POLYETHYLENE LINING IS UNNECESSARY.
 - THE FINAL POSITIONS OF SUBSURFACE DRAINS WILL BE VERIFIED BY THE ENGINEER ON SITE AND ALTERED IF NECESSARY.
2. FILTER CRITERIA
- 10' IS THE SIDE SIZE WHERE n_v OF THE FILTER MATERIAL WILL GO THROUGH.
 - $D_{10} \leq 1/10$ AVERAGE SIZE OR RANGE OF OPENING IN THE SYNTHETIC FIBRE FILTER FABRIC.
 - FILTER SAND (FS) IN RELATION TO WATER BEARING STRATA (WB):
 - 1. $n_{v(FS)} \leq 0.25 n_{v(WB)}$
 - 2. $n_{v(FS)} \leq 0.5 n_{v(WB)}$ (BEFORE PERMEABILITY OF SAND)
 - 3. $n_{v(FS)} \leq 0.5 n_{v(WB)}$
 2. $n_{v(FS)} \leq 0.25 n_{v(WB)}$
 - 1. $n_{v(FS)} \leq 0.25 n_{v(WB)}$
 - 2. $n_{v(FS)} \leq 0.25 n_{v(WB)}$
 - PERMEABILITY REQUIREMENTS UNNECESSARY.
 - FILTER STONE (FS) IN RELATION TO FILTER SAND (FS):
 - 1. $n_{v(FS)} \leq 0.25 n_{v(FS)}$
 - 2. $n_{v(FS)} \leq 0.25 n_{v(FS)}$
 - 3. $n_{v(FS)} \leq 0.25 n_{v(FS)}$
 - PERMEABILITY: FILTER STONE MUST BE COARSER THAN SAND IN ALL PERCENTAGES.
 - FILTER STONE (FS) IN RELATION TO PERFORATIONS IN PIPE:
 - $D_{10} \leq 1/12$ DIAMETER OF ROUND PERFORATIONS
 - $D_{10} \leq 1/12$ WIDTH OF SLOTS
 - SYNTHETIC FIBRE FILTER FABRIC (FF) IN RELATION TO FILTER SAND (FS):
 - 1. $n_{v(FF)} \leq 0.25 n_{v(FS)}$
 - 2. $n_{v(FF)} \leq 0.25 n_{v(FS)}$
 - 3. $n_{v(FF)} \leq 0.25 n_{v(FS)}$
3. CAST IN SITU CONCRETE
- CONCRETE TO BE CLASS 20/19.
 - CONCRETE TO BE CURED FOR A MINIMUM OF 7 DAYS.
 - ALL FORMED SURFACES SHALL HAVE A CLASS 3 SURFACE FINISH.
 - ALL UNFORMED SURFACES SHALL HAVE A CLASS 2 SURFACE FINISH.



AMENDMENTS				
NR.	DATE	APPROVED	DESCRIPTION	PAR.

DESIGNED J.J. WESSELS PR. ENG.	DATE	DRAWN S. AUDIE	DATE
DESIGN CHECKED BY J.J. WESSELS PR. ENG.	DATE	INFRASTRUCTURE TECHNICAL INFORMATION MANAGEMENT D.J. CHALMERS	DATE

CITY OF TSHWANE
ROADS AND TRANSPORT DEPARTMENT

GROUP HEAD
Mr. Lebethe M.T. (Tshabo)
P.O. BOX 1409
PRETORIA 0001

ACTING DIVISIONAL HEAD
Mr. Lebethe M.T. (Tshabo)
P.O. BOX 1409
PRETORIA 0001

APPROVED BY ACTING EXECUTIVE DIRECTOR
Mr. Lebethe M.T. (Tshabo)

LOCATION OF PROJECT:

TYPICAL STANDARD DETAILS

DESCRIPTION OF PROJECT:

DETAIL OF SUB-SURFACE DRAINS

CONTRACT No.:	PROJECT No.:	
DATE:	SCALE:	ORIGINAL PAPER SIZE:
FEBRUARY 2017	AS SHOWN	A1
DRAWING NO. STD022	SHEET NO. 1 OF 1	REVISION

