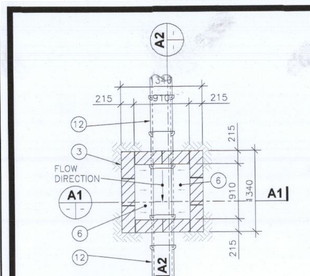
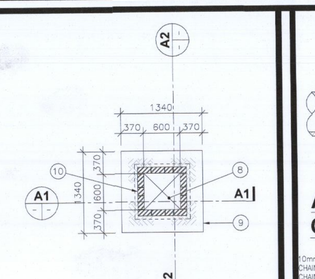
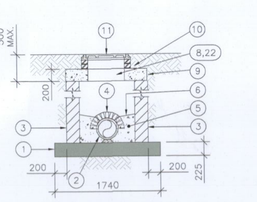


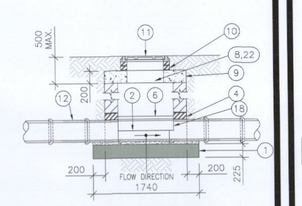

PLAN
SCALE 1:50




ROOF PLAN
SCALE 1:50



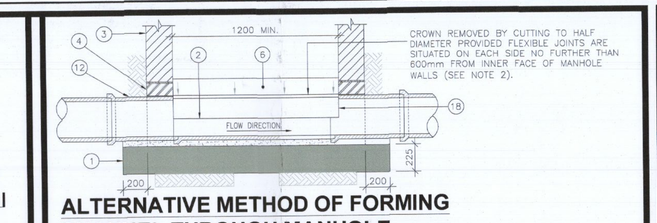

A1 SECTION
SCALE:- 1:50



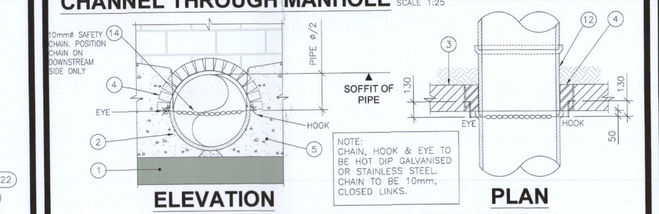

A2 SECTION
SCALE:- 1:50

## MANHOLE TYPE A
DEPTH TO INVERT < 1m

MANHOLE LENGTH:
ALSO SEE NOTE 39
REGARDING BRANCHES



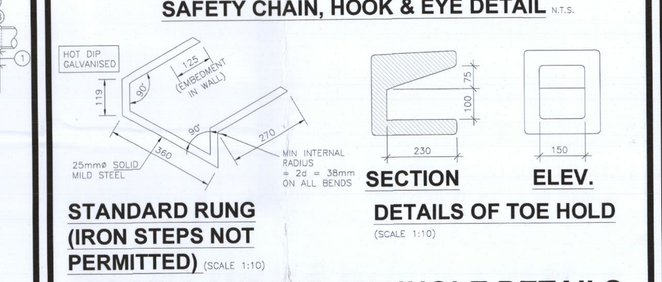

## ALTERNATIVE METHOD OF FORMING CHANNEL THROUGH MANHOLE
SCALE 1:25




ELEVATION

PLAN

## SAFETY CHAIN, HOOK & EYE DETAIL
N.T.S.



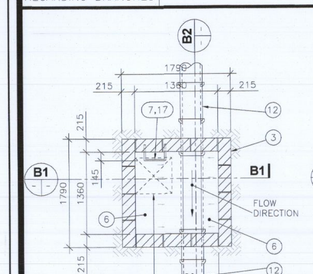

## STANDARD RUNG (IRON STEPS NOT PERMITTED)
(SCALE 1:10)

SECTION

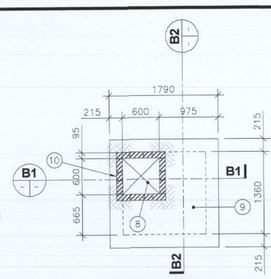
ELEV.

## DETAILS OF TOE HOLD
(SCALE 1:10)

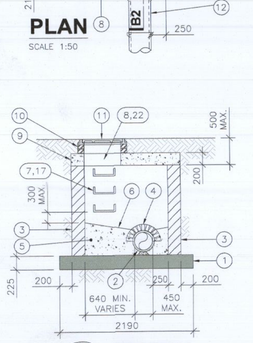
## MISCELLANEOUS MANHOLE DETAILS



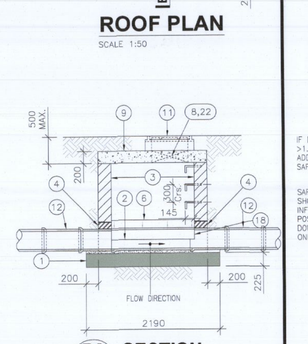

PLAN
SCALE 1:50




ROOF PLAN
SCALE 1:50



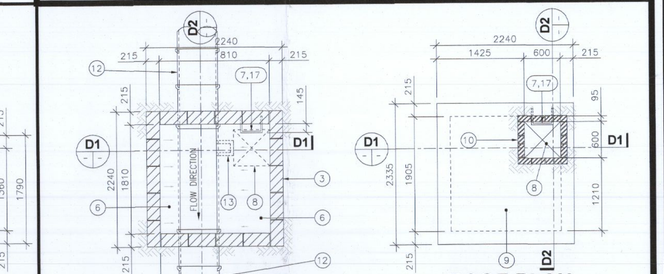

B1 SECTION
SCALE:- 1:50




B2 SECTION
SCALE:- 1:50

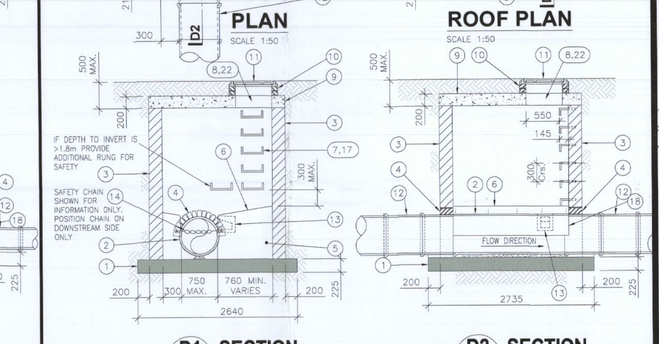
## MANHOLE TYPE B
1m ≤ DEPTH TO INVERT < 3m

MANHOLE LENGTH:
ALSO SEE NOTE 39
REGARDING BRANCHES




PLAN
SCALE 1:50

ROOF PLAN
SCALE 1:50

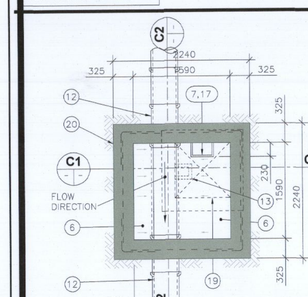



D1 SECTION
SCALE:- 1:50

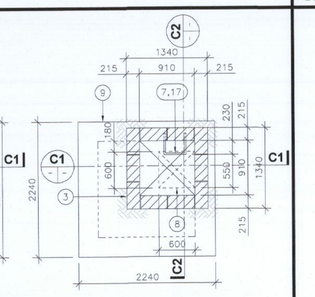
D2 SECTION
SCALE:- 1:50

## MANHOLE TYPE D
1m ≤ DEPTH TO INVERT < 3m

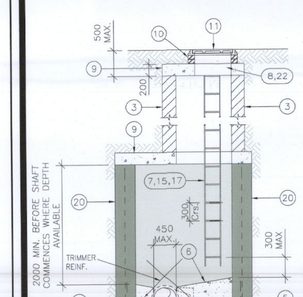
MANHOLE LENGTH:
ALSO SEE NOTE 39
REGARDING BRANCHES



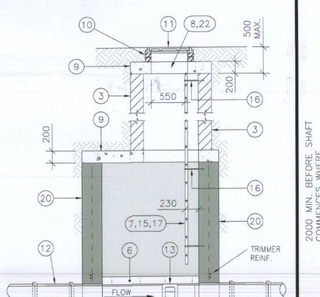

PLAN LOWER
SCALE 1:50




PLAN UPPER
SCALE 1:50



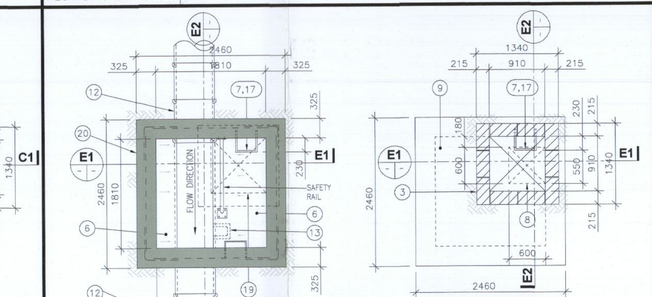

C1 SECTION
SCALE:- 1:50




C2 SECTION
SCALE:- 1:50

## MANHOLE TYPE C
3m ≤ DEPTH TO INVERT < 6m

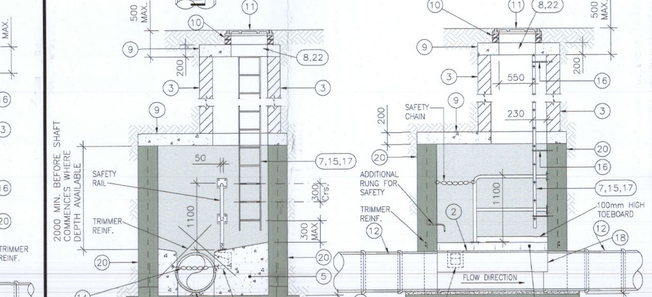
MANHOLE LENGTH:
ALSO SEE NOTE 39
REGARDING BRANCHES




PLAN LOWER
SCALE 1:50




PLAN UPPER
SCALE 1:50




E1 SECTION
SCALE:- 1:50




E2 SECTION
SCALE:- 1:50

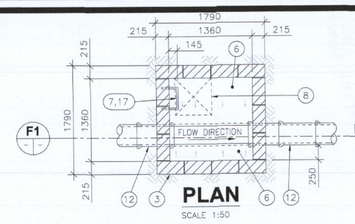
## MANHOLE TYPE E
3m ≤ DEPTH TO INVERT < 6m

MANHOLE LENGTH:
ALSO SEE NOTE 39
REGARDING BRANCHES

## FOR PIPE DIAMETERS 150, 225, 300, 375 & 450mm MANHOLES TYPE A, B, & C.

## FOR PIPE DIAMETERS 525, 600, 675, & 750mm MANHOLES TYPE D, & E.

# BLOCKWORK / IN-SITU CONCRETE MANHOLE DETAILS




PLAN
SCALE 1:50

F1 SECTION
SCALE:- 1:50

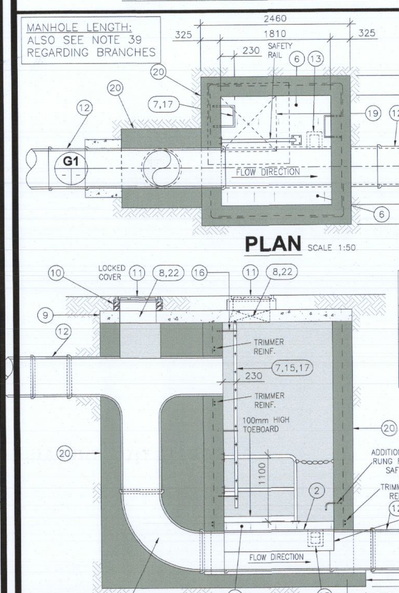
MANHOLE LENGTH:
ALSO SEE NOTE 39
REGARDING BRANCHES

## MANHOLE TYPE F
## RAMP MANHOLE

TABLE F

| INLET ø mm A | DEPTH (max) mm H |
|---|---|
| 225 | 600 |
| 300 | 600 |
| 375 | 750 |
| 450 | 750 |
| 525 | 750 |
| 600 | 750 |
| 750 | 750 |

WHEN THE DROP 'H' IS GREATER THAN THE MAX VALUE SHOWN USE BACKDROP MANHOLE

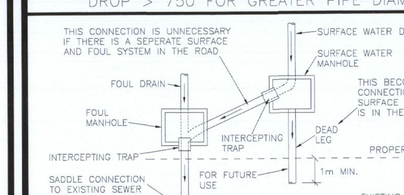



PLAN
SCALE 1:50

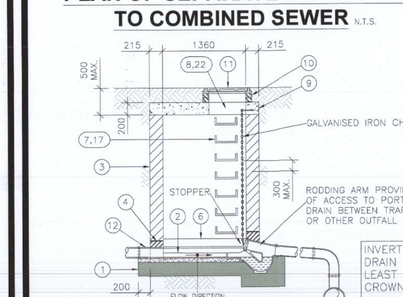
G1 SECTION
SCALE:- 1:50

| Inlet Dia. mm | Drop Dia. mm |
|---|---|
| 225 | 300 |
| 300 | 375 |
| 375 | 375 |
| 450 | 450 |
| 525 | 450 |
| 600 | 450 |
| 750 | 600 |

## MANHOLE TYPE G
## BACKDROP MANHOLE FOR ALL PIPE DIAMETERS
DROP > 600 FOR 225 & 300 PIPE DIAMETERS
DROP > 750 FOR GREATER PIPE DIAMETERS



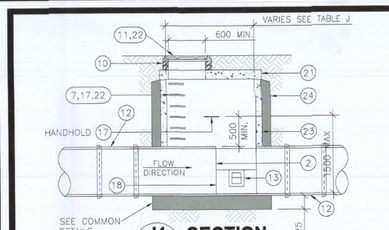

## PLAN OF SEPARATE CONNECTION TO COMBINED SEWER
N.T.S.




H1 SECTION
SCALE:- 1:50

## MANHOLE TYPE H
## INTERCEPTOR TRAP DETAILS
FOR OUTFALL MANHOLES AT SITE BOUNDARY PRIOR TO CONNECTING TO PUBLIC SYSTEM

# RAMP / BACKDROP / INTERCEPTOR TRAP DETAILS




## MANHOLE TYPE J
1m < DEPTH TO CROWN < 3m

TABLE J

| MAXIMUM PIPE DIAMETER A | CHAMBER INTERNAL DIAMETER B |
|---|---|
| 225 | 1200 |
| 300 | 1200 |
| 375 | 1200 |
| 525 | 1200 |
| 600 | 1200 |
| 675 | 1350 |
| 750 | 1500 |
| 900 | 1500 |
| 1050 | 2100 |
| 1200 | 2100 |

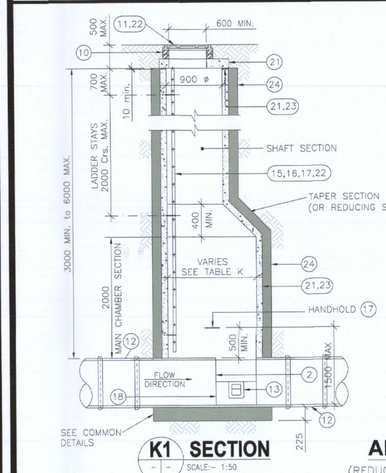
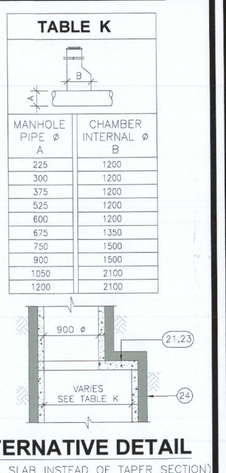



TABLE K

| MANHOLE PIPE ø A | CHAMBER INTERNAL ø B |
|---|---|
| 225 | 1200 |
| 300 | 1200 |
| 375 | 1200 |
| 525 | 1200 |
| 600 | 1200 |
| 675 | 1350 |
| 750 | 1500 |
| 900 | 1500 |
| 1050 | 2100 |
| 1200 | 2100 |




ALTERNATIVE DETAIL
(REDUCING SLAB INSTEAD OF TAPER SECTION)

## MANHOLE TYPE K
3m ≤ DEPTH TO INVERT < 6m

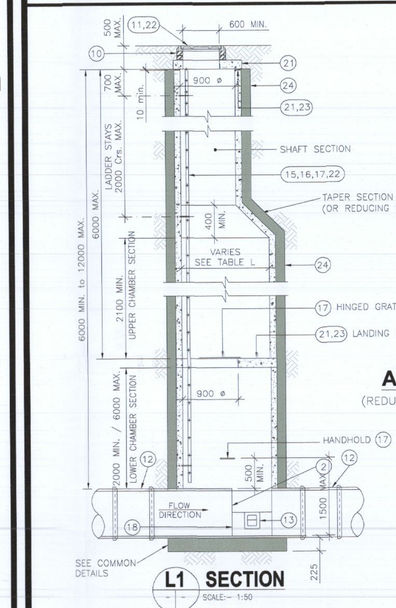
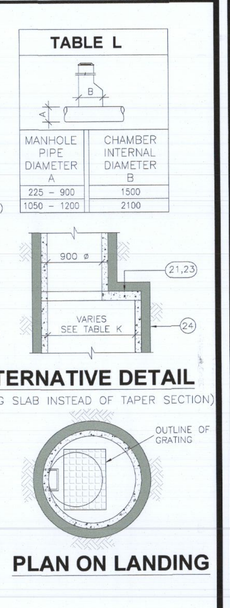



TABLE L

| MANHOLE PIPE DIAMETER A | CHAMBER INTERNAL DIAMETER B |
|---|---|
| 225 – 900 | 1500 |
| 1050 – 1200 | 2100 |

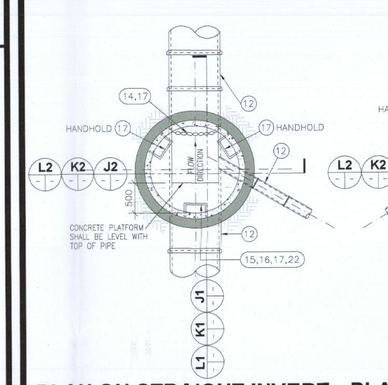



ALTERNATIVE DETAIL
(REDUCING SLAB INSTEAD OF TAPER SECTION)

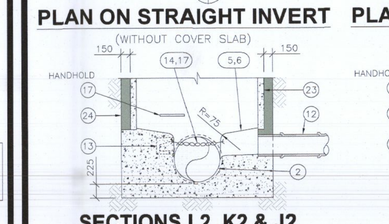
OUTLINE OF GRATING

PLAN ON LANDING

## MANHOLE TYPE L
6m < DEPTH TO INVERT < 12m

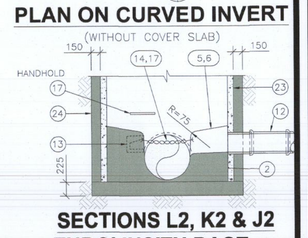



PLAN ON STRAIGHT INVERT
(WITHOUT COVER SLAB)




SECTIONS L2, K2 & J2 THRO' PRECAST BASE
1:50

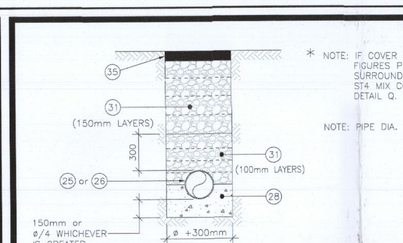
PLAN ON CURVED INVERT
(WITHOUT COVER SLAB)




SECTIONS L2, K2 & J2 THRO' INSITU BASE
1:50

## COMMON DETAILS

# PRECAST CONCRETE MANHOLE DETAILS

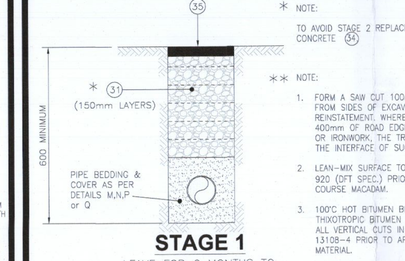



## UNDER ROADS / HARDSTANDINGS / FOOTPATHS
COVER ≥ 1.2m *
WHERE THE NEAREST POINT OF THE TRENCH IS WITHIN 1.0m OF A PAVED TRAFFICKED SURFACE

M DETAIL
SCALE:- 1:25

## UNDER LANDSCAPED AREAS
COVER ≥ 0.9m *
WHERE THE NEAREST POINT OF THE TRENCH IS > 1.0m FROM A PAVED TRAFFICKED SURFACE

## RIGID PIPES WITH CONCRETE BED




## UNDER ROADS / HARDSTANDINGS / FOOTPATHS
COVER ≥ 1.2m *
WHERE THE NEAREST POINT OF THE TRENCH IS WITHIN 1.0m OF A PAVED TRAFFICKED SURFACE

N DETAIL
SCALE:- 1:25

## UNDER LANDSCAPED AREAS
COVER ≥ 0.9m *
WHERE THE NEAREST POINT OF THE TRENCH IS > 1.0m FROM A PAVED TRAFFICKED SURFACE

## RIGID PIPES WITH GRANULAR BED

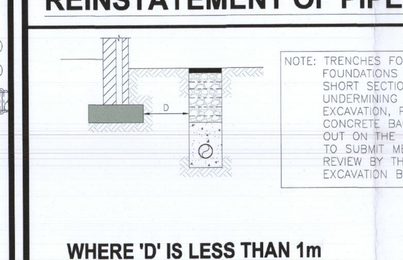



TABLE P

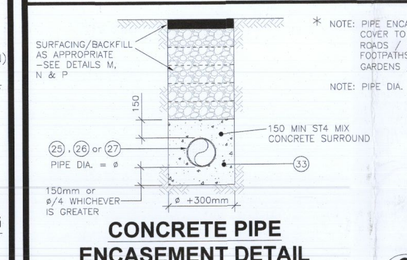
| PIPE SIZE (mm) | WIDTH OF TRENCH (mm) MIN. | MAX. |
|---|---|---|
| 110 | 450 | 600 |
| 160 | 450 | 600 |
| 200–250 | 600 | 700 |
| 315 | 700 | 850 |
| 355 | 750 | 900 |
| 400 | 800 | 950 |
| 450 | 850 | 1000 |

## UNDER ROADS / HARDSTANDINGS / FOOTPATHS
COVER ≥ 1.2m *
WHERE THE NEAREST POINT OF THE TRENCH IS WITHIN 1.0m OF A PAVED TRAFFICKED SURFACE

P DETAIL
SCALE:- 1:25

## UNDER LANDSCAPED AREAS
COVER ≥ 0.9m *
WHERE THE NEAREST POINT OF THE TRENCH IS > 1.0m FROM A PAVED TRAFFICKED SURFACE

## FLEXIBLE PIPES WITH GRANULAR BED & SURROUND




## CONCRETE PIPE ENCASEMENT DETAIL

Q DETAIL
SCALE:- 1:25

## JOINT IN CONCRETE SURROUND

## CONCRETE ENCASEMENT




## STAGE 1
LEAVE FOR 6 MONTHS TO CONSOLIDATE

## STAGE 2
DIG OUT SURFACING & TOP 220mm OF CLB04 MATERIAL 31 & REPLACE WITH NEW WIDER SURFACING ON 220mm LAYER OF LEAN–MIX CONCRETE 35

R DETAIL
SCALE:- 1:25

## REINSTATEMENT OF PIPE TRENCH IN EXISTING ROAD




## WHERE 'D' IS LESS THAN 1m
CONCRETE FILL TO LEVEL OF FOUNDATION BOTTOM)

## WHERE 'D' IS 1m OR MORE
CONCRETE FILL TO WITHIN D–150mm OF LEVEL OF FOUNDATION BOTTOM

S DETAIL
SCALE:- 1:25

## CONCRETE PIPE LAID NEAR FOUNDATIONS

## DETAILS M, N, P, Q, R & S

# PIPE BEDDING DETAILS

## NOTES

1) 150mm THICK MIN. ST4 MIX CONCRETE BASE WITH A393 MESH REINFORCEMENT TAB.

2) PREFORMED HALF CIRCLE CHANNEL PIPES, THE SPIGOT MAY, WHERE PRACTICABLE, BE LAID SOMEWHAT OFFSET IN THE CROWN, CUT OUT TO HALF DIAMETER, PROVIDED FLEXIBLE JOINTS ARE SITUATED ON EACH SIDE NO FURTHER THAN 600mm FROM THE INNER FACE OF MANHOLE WALL.

NOTE: WHERE PIPE DIAMETER CHANGES AT A MANHOLE PIPE CROWNS TO LINE UP

3) MANHOLE CONSTRUCTION

MANHOLES ARE TO BE CONSTRUCTED TO THE REQUIREMENTS OF BS EN 752 AND BS EN 476.

a. FOR SURFACE WATER WITH MANHOLES USE HIGH–DENSITY BLOCKS COMPLYING WITH THE PARTICULAR REQUIREMENTS OF BS EN 771–3 OR INSITU ST4 MIX CONCRETE.

b. BLOCK WORK SHALL BE BEDDED & JOINTED USING DESIGNATION (i) MORTAR TO CLAUSE 2404 OF THE DFT SPECIFICATION FOR HIGHWAY WORKS. ALL VERTICAL JOINTS SHALL BE COMPLETELY FILLED WITH MORTAR AS THE BLOCKS ARE LAID.

c. JOINTS SHALL BE FLUSH POINTED AS THE WORK PROCEEDS.

d. ALL FOUL MANHOLES MUST BE FACED IN SOLID ENGINEERING BRICK (MIN. CLASS 'A' OR 'B'), OR INSITU CONCRETE FOR 1m ABOVE BENCHING LEVEL. BRICK TO BE BONDED TO BLOCK WORK USING ENGLISH GARDEN WALL BOND.

4) RELIEVING ARCH FORMED BY 215 x 103 x 65 SOLID ENGINEERING BRICK CLASS 'A' OR 'B', RELIEVING ARCHES USED IN BRICK OR BLOCK WORK MANHOLES EXTEND OVER FULL THICKNESS OF WALL.
A DOUBLE ARCH IS TO BE FORMED FOR PIPE DIAMETERS GREATER THAN 600mm.

5) BENCHING & PIPE CHANNEL PIPE SURROUND TO BE ST4 MIX CONCRETE.

6) BENCHING TO BE FINISHED IN 2:1 SAND:CEMENT MORTAR WITH A SMOOTH TROWEL FINISH, AT 1 in 30 SLOPE TOWARDS CHANNEL.

7) STANDARD RUNGS AT 300 C/C VERTICALLY & GALVANISED TO BSI 1481:2009. NOTE: STEP IRONS ARE NOT ACCEPTABLE.

8) CLEAR OPENING IN ROOF SLAB, FOR MANHOLES < 1.5m Dp. FORM 600x600 CLEAR OPENING, FOR MANHOLES > 1.5m Dp. < 3.0m Dp. FORM 800x600 CLEAR OPENING.

9) PRECAST R.C. ROOF SLAB SHALL BE 200mm THICK ST4 MIX CONCRETE, WITH 40mm COVER TO STEEL, DESIGNED TO BE #110 TO TAKE FULL TRAFFIC LOADING.

10) 1 TO 2 COURSES OF CLASS A SOLID ENGINEERING BRICK SET IN DESIGNATION (i) MORTAR TO CLAUSE 2404 OF THE DFT SPECIFICATION FOR HIGHWAY WORKS.

MANHOLE COVER & FRAME SHALL BE MANUFACTURED TO BS EN 124 AND CERTIFIED TO THE LOAD CASES SPECIFIED ON THE DRAWINGS AND AS DEFINED IN BS EN 14433:2002. FRAMES SHALL BE DESIGNED TO PREVENT COVERS FALLING INTO MANHOLE. FRAMES SHALL BE BEDDED ON APPROVED MORTAR TO MANUFACTURERS INSTRUCTIONS.

11) 600mm LENGTH OF ROCKER PIPE & PITC JOINT EXTERNAL TO MANHOLE TO BE NOT FURTHER THAN 600mm FROM THE INNER FACE OF MANHOLE WALL.

12) TIDE HOLES OF 230mm MINIMUM DEPTH & GALVANISED STEEL SAFETY RAILINGS TO BE PROVIDED IN BENCHING OF SEWERS GREATER THAN 525mm# & DEPTH TO INVERT >3m FOR ACCESS TO INVERT.

13) A SAFETY CHAIN IS TO BE PROVIDED ON PIPES THAT EXCEED 450mm IN DIAMETER. MILD STEEL SAFETY CHAIN SHALL BE 10mm NOMINAL SIZE OVAL LINKS WITH NON–CALIBRATED CHAIN, TYPE 1, COMPLYING WITH BS EN 818–1.

14) WHEN DEPTH OF MANHOLES TO INVERT IS GREATER THAN 3.0m LADDERS SHALL BE USED INSTEAD OF RUNGS TO BS EN 14396 EXCEPT THAT STRINGERS SHOULD BE NOT LESS THAN 65 x 12mm IN SECTION & RUNGS 20mm IN DIAMETER.
FIXED LADDERS SHOULD MEET THE DIMENSIONAL REQUIREMENTS OF BS EN 14396. DISTANCE FROM THE TOP RUNG OF THE LADDER TO GROUND LEVEL SHOULD NOT EXCEED 500mm.

15) LADDER STRINGERS SHOULD BE ADEQUATELY SUPPORTED FROM THE MANHOLE WALL AT INTERVALS OF NOT MORE THAN 2.0m. STRINGERS SHOULD BE MOULDED TO CLEATS TO FACILITATE REVISAL.

16) ALL LADDERS, RUNGS, HANDRAILS, SAFETY CHAINS ETC. SHALL BE HOT DIP GALVANISED TO ISO 1461:2009 OR EQUIVALENT.

17) PIPE SHOULD BE CUT FLUSH WITH THE INSIDE SURFACE OF THE MANHOLE WALL SO THAT THE CHANNEL EXTENDS THE FULL LENGTH OF THE MANHOLE (EXCEPT FOR PRECAST MANHOLES).

18) FOR MANHOLES > 3m Dp. PROVIDE AN INTERMEDIATE ROOF SLAB WITH A 900# OR 910x910mm SQUARE OPENING.

19) a. ALL MANHOLES SHALL BE WATERTIGHT TO THE SATISFACTION OF THE ENGINEER.

b. FORMWORK TO REINFORCED CONCRETE & MASS CONCRETE SHALL COMPLY WITH CLASS 2, SECTION 6.2.7, BS 8110:PART 1:1997.

c. FINISH TO THE TOP OF SLABS SHALL COMPLY WITH TYPE 'X', SECTION 6.2.7, B.S.8110:PART 1:1997.

d. PLAN DIMENSIONS OF MANHOLES ARE BASED ON BLOCK WORK HAVING A CO–ORDINATING SIZE OF 450 x 225 x 103. FOR PIPE DIAMETER >750mm USE MANHOLE WITH INTERNAL DIAMETER SIZE=PIPE SIZE + 1.0m +300mm

e. MANHOLES DESIGNED TO BS EN 752 & WALL THICKNESS TO BS EN 1996 DESIGN OF MASONRY STRUCTURES TAKING GRANULAR FILL PRESSURE & H.B. SURCHARGE.

f. REINFORCEMENT TO SLABS TO ENGINEERS DETAILS.

20) FOR MANHOLES >3m DEPTH TO INVERT USE 30N/20mm INSITU CONCRETE, REINFORCING MESH A393 TO BE FIXED AT MID POINT OF WALL. ADDITIONAL REINFORCEMENT TO BE SUPPLIED OVER PIPE CROWN.

21) PRECAST MANHOLES, CHAMBER WALLS & COVER SLAB TO BE CONSTRUCTED TO BS EN 1917.

22) MANHOLE OPENINGS TO BE SITUATED FURTHEST FROM THE NEAREST CARRIAGEWAY. MANHOLE COVERS ACCESS TO BE POSITIONED TO ALLOW VIEWING OF ONCOMING TRAFFIC.

23) FOR BEDDING & SEALING OF CHAMBER RINGS, THE TOP RING (TO PRECAST COVER SLAB) & BOTTOM RING TO BE BEDDED WITH CEMENT MORTAR. FOR INTERMEDIATE RINGS, JOINTS TO BE SEALED WITH APPROVED PRE–FORMED JOINTING STRIP.

24) PRECAST MANHOLES TO BE SURROUNDED WITH A MINIMUM OF 150mm THICK ST4 MIX CONCRETE.

25) CONCRETE SEWER PIPES WITH SPIGOT & SOCKET JOINTS & RUBBER RING FITTINGS TO COMPLY WITH BS EN 1916 – CLASS H OR CLASS N.

26) VITRIFIED CLAY PIPES & FITTINGS TO COMPLY WITH THE REQUIREMENTS OF BS EN 295–1/2/3 – CLASS 160 OR CLASS 200.

27) UNPLASTICISED POLYVINYLCHLORIDE (UPVC) PIPES & FITTINGS TO BE IN ACCORDANCE WITH THE REQUIREMENTS OF BS EN 1401.

28) CONCRETE BED & SURROUND TO BE A MINIMUM 150mm THICK IN–SITU ST4 MIX CONCRETE AND HAUNCHED HALF WAY UP THE BARREL OF THE PIPE.

29) GRANULAR BEDDING, SURROUND & COVER FOR RIGID PIPES TO BE TO CLAUSE 503 OF DFT SPECIFICATION FOR HIGHWAY WORKS AND HAUNCHED HALF WAY UP THE BARREL OF THE PIPE.

30) GRANULAR BEDDING, SURROUND & COVER FOR FLEXIBLE PIPES TO BE TO CLAUSE 503 OF DFT SPECIFICATION FOR HIGHWAY WORKS. GRANULAR SIDE FILL AND COVER TO BE PLACED UNIFORMLY ON BOTH SIDES OF THE PIPE IN LAYERS NOT EXCEEDING 150mm, WITH EACH LAYER BEING COMPACTED BY HAND TAMPING UNTIL THE PIPE HAS A MINIMUM 150mm COMPACTED COVER.

31) GRANULAR BACKFILL MATERIAL SHALL BE IN COMPLIANCE WITH CLAUSE 804 (TYPE 2 GRANULAR MATERIAL) OF THE DFT SPECIFICATION FOR HIGHWAY WORKS. GRANULAR BACKFILL SHOULD BE PLACED UNIFORMLY ON EITHER SIDE OF THE PIPE IN LAYERS NOT EXCEEDING 150mm, EACH LAYER BEING COMPACTED BY HAND TAMPING UNTIL THE PIPE HAS A MINIMUM 150mm COMPACTED COVER. IT IS IMPORTANT THAT NO PROCESS OF COMPACTION DOES NOT COMPACT THE PIPE FROM ITS CORRECT LINE & LEVEL. SUBSEQUENT LAYERS OF GRANULAR FILL TO BE PLACED AND COMPACTED AS ABOVE TO THE REQUIREMENTS OF THE 600 SERIES OF THE DFT SPECIFICATION FOR HIGHWAY WORKS. MECHANICAL COMPACTION EQUIPMENT SHOULD NOT BE USED UNTIL THERE IS A MINIMUM OF 450mm COMPACTED COVER OVER THE CROWN OF THE PIPE.

32) MATERIAL SUITABLE FOR BACKFILL ABOVE GRANULAR FILL MATERIAL SHALL BE CLASS 2C MATERIAL, TO TABLE 6/1, SERIES 600 OF THE DFT SPECIFICATION FOR HIGHWAY WORKS AND SHOULD BE FREE FROM BOULDERS, LUMPS OF CONCRETE, TIMBER & VEGETABLE OR FOREIGN / CONTAMINATED MATTER. GENERAL BACKFILL SHOULD BE PLACED IN LAYERS NOT EXCEEDING 300mm. EACH LAYER BEING COMPACTED TO THE REQUIREMENTS OF THE 600 SERIES OF THE DFT SPECIFICATION FOR HIGHWAY WORKS. MECHANICAL COMPACTION EQUIPMENT SHOULD NOT BE USED UNTIL THERE IS A MINIMUM OF 600mm COMPACTED COVER OVER THE CROWN OF THE PIPE.

33) PIPES WITH INADEQUATE COVER TO BE FULLY SURROUNDED IN 150mm THICK ST4 MIX CONCRETE.

34) LEAN–MIX BACKFILL TO TRENCHES IN EXISTING ROAD, WHERE REQUIRED BY THE LOCAL AUTHORITY TO BE ST4 MIX CONCRETE.

35) SURFACE REINSTATEMENT

CONCRETE FOOTPATH – 100mm MINIMUM DEPTH OF GRADE C30 CONCRETE, TO C1/10E OF DFT SPECIFICATION FOR HIGHWAY WORKS AND FINISHED TO MATCH EXISTING SURFACE. SAW CUT AND REINSTATE TO 100mm FROM EDGE OF TRENCH EXCAVATION.

ASPHALT CONCRETE FOOTPATH – 60mm MIN TH