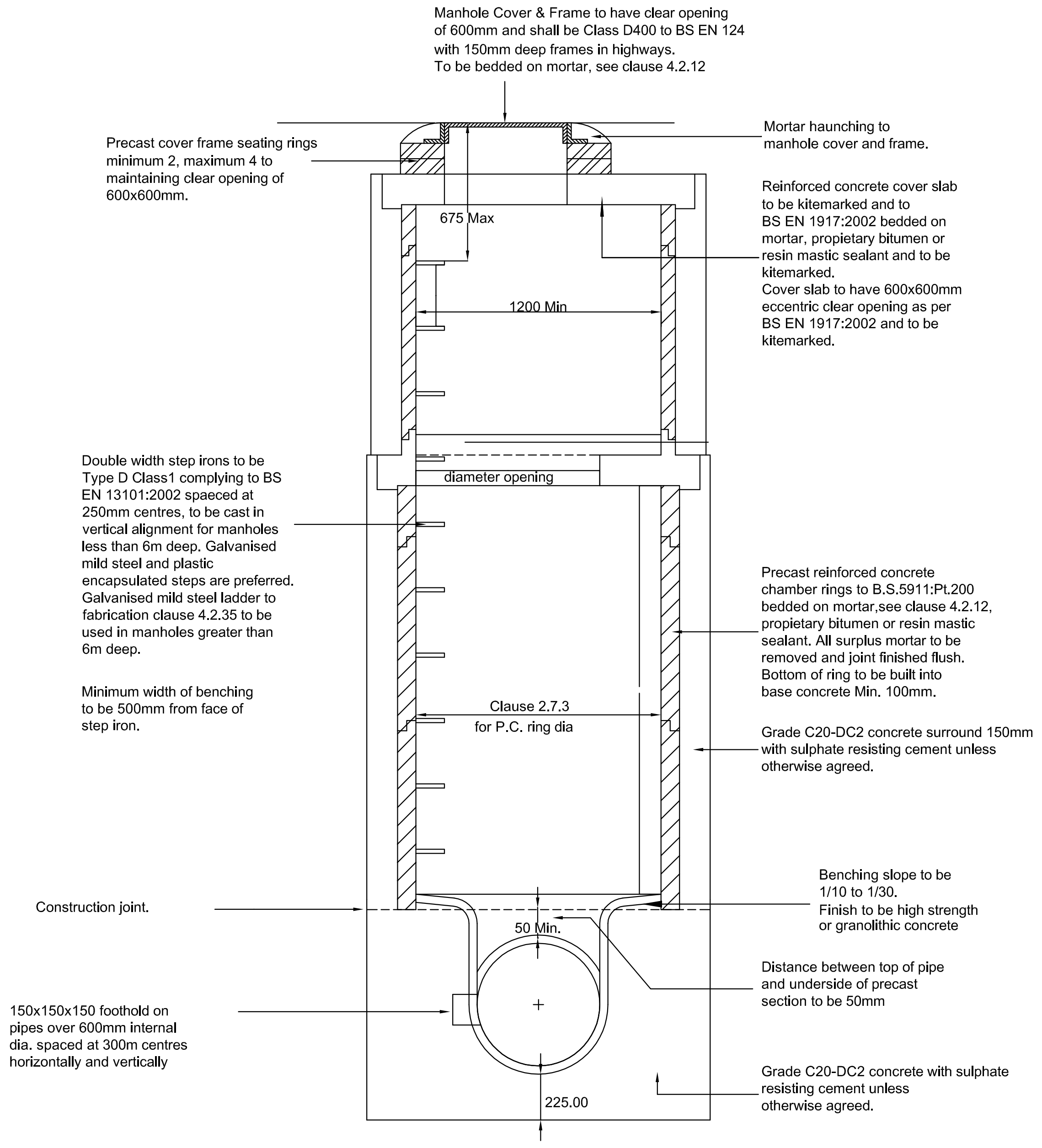
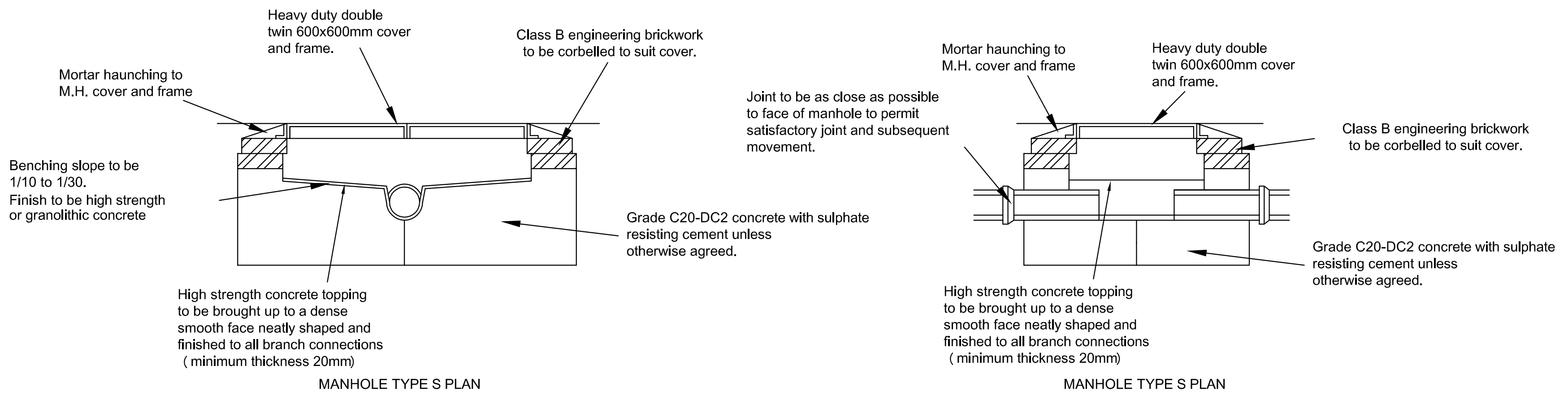

Manhole Cover & Frame to have clear opening of 600mm and shall be Class D400 to BS EN 124 with 150mm deep frames in highways. To be bedded on mortar, see clause 4.2.12
Precast cover frame seating rings minimum 2, maximum 4 to maintaining clear opening of 600x600mm.
Mortar haunching to manhole cover and frame.
675 Max
Reinforced concrete cover slab to be kitemarked and to BS EN 1917:2002 bedded on mortar, propietary bitumen or resin mastic sealant and to be kitemarked. Cover slab to have 600x600mm eccentric clear opening as per BS EN 1917:2002 and to be kitemarked.
1200 Min
diameter opening
Double width step irons to be Type D Class1 complying to BS EN 13101:2002 spaeced at 250mm centres, to be cast in vertical alignment for manholes less than 6m deep. Galvanised mild steel and plastic encapsulated steps are preferred. Galvanised mild steel ladder to fabrication clause 4.2.35 to be used in manholes greater than 6m deep.
Precast reinforced concrete chamber rings to B.S.5911:Pt.200 bedded on mortar,see clause 4.2.12, propietary bitumen or resin mastic sealant. All surplus mortar to be removed and joint finished flush. Bottom of ring to be built into base concrete Min. 100mm.
Minimum width of benching to be 500mm from face of step iron.
Clause 2.7.3 for P.C. ring dia
Grade C20-DC2 concrete surround 150mm with sulphate resisting cement unless otherwise agreed.
Construction joint.
Benching slope to be 1/10 to 1/30. Finish to be high strength or granolithic concrete
50 Min.
Distance between top of pipe and underside of precast section to be 50mm
150x150x150 foothold on pipes over 600mm internal dia. spaced at 300m centres horizontally and vertically
Grade C20-DC2 concrete with sulphate resisting cement unless otherwise agreed.
225.00

SECTION

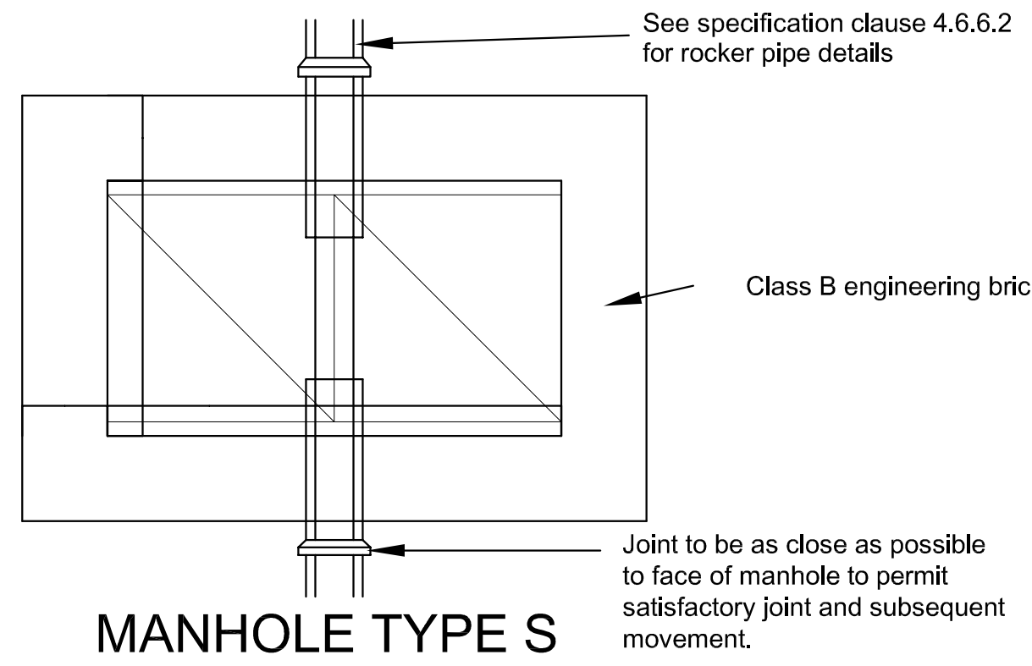
MANHOLE TYPE A.

Depth from Ground level to soffit of pipe >1.5m


Heavy duty double twin 600x600mm cover and frame.
Class B engineering brickwork to be corbelled to suit cover.
Mortar haunching to M.H. cover and frame
Benching slope to be 1/10 to 1/30. Finish to be high strength or granolithic concrete
Grade C20-DC2 concrete with sulphate resisting cement unless otherwise agreed.
High strength concrete topping to be brought up to a dense smooth face neatly shaped and finished to all branch connections (minimum thickness 20mm)
Joint to be as close as possible to face of manhole to permit satisfactory joint and subsequent movement.
Mortar haunching to M.H. cover and frame
Heavy duty double twin 600x600mm cover and frame.
Class B engineering brickwork to be corbelled to suit cover.
Grade C20-DC2 concrete with sulphate resisting cement unless otherwise agreed.
High strength concrete topping to be brought up to a dense smooth face neatly shaped and finished to all branch connections (minimum thickness 20mm)

MANHOLE TYPE S PLAN

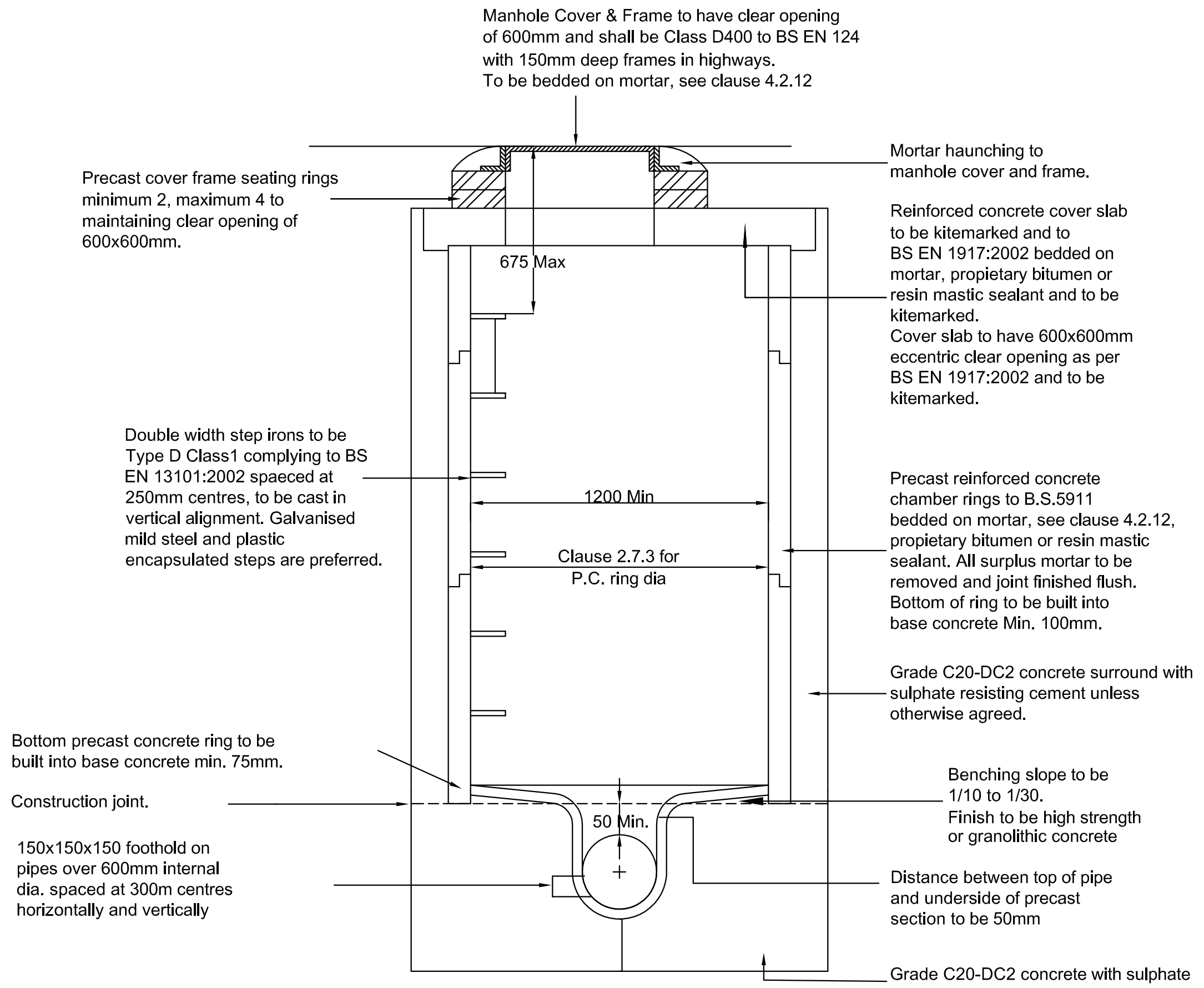
MANHOLE TYPE S PLAN


See specification clause 4.6.6.2 for rocker pipe details
Class B engineering brickwork
Joint to be as close as possible to face of manhole to permit satisfactory joint and subsequent movement.

MANHOLE TYPE S

PLAN

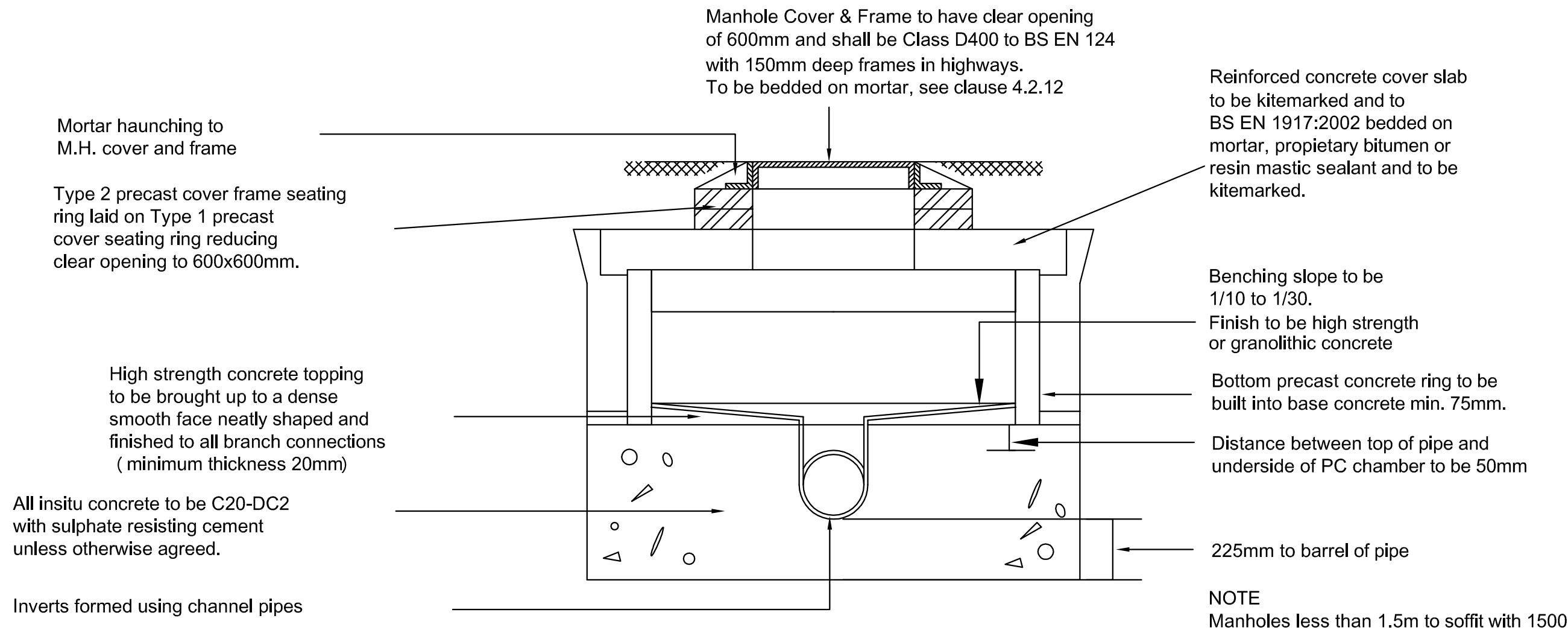
Depth from ground level to soffit of pipe <1.0m


Manhole Cover & Frame to have clear opening of 600mm and shall be Class D400 to BS EN 124 with 150mm deep frames in highways. To be bedded on mortar, see clause 4.2.12
Precast cover frame seating rings minimum 2, maximum 4 to maintaining clear opening of 600x600mm.
Mortar haunching to manhole cover and frame.
675 Max
Reinforced concrete cover slab to be kitemarked and to BS EN 1917:2002 bedded on mortar, propietary bitumen or resin mastic sealant and to be kitemarked. Cover slab to have 600x600mm eccentric clear opening as per BS EN 1917:2002 and to be kitemarked.
Double width step irons to be Type D Class1 complying to BS EN 13101:2002 spaeced at 250mm centres, to be cast in vertical alignment. Galvanised mild steel and plastic encapsulated steps are preferred.
1200 Min
Clause 2.7.3 for P.C. ring dia
Precast reinforced concrete chamber rings to B.S.5911 bedded on mortar, see clause 4.2.12, propietary bitumen or resin mastic sealant. All surplus mortar to be removed and joint finished flush. Bottom of ring to be built into base concrete Min. 100mm.
Grade C20-DC2 concrete surround with sulphate resisting cement unless otherwise agreed.
Bottom precast concrete ring to be built into base concrete min. 75mm.
Construction joint.
Benching slope to be 1/10 to 1/30. Finish to be high strength or granolithic concrete
50 Min.
150x150x150 foothold on pipes over 600mm internal dia. spaced at 300m centres horizontally and vertically
Distance between top of pipe and underside of precast section to be 50mm
Grade C20-DC2 concrete with sulphate resisting cement unless otherwise agreed.

SECTION

MANHOLE TYPE B.

Depth from Ground level to soffit of pipe less between 1.5 and 3m


Manhole Cover & Frame to have clear opening of 600mm and shall be Class D400 to BS EN 124 with 150mm deep frames in highways. To be bedded on mortar, see clause 4.2.12
Mortar haunching to M.H. cover and frame
Type 2 precast cover frame seating ring laid on Type 1 precast cover seating ring reducing clear opening to 600x600mm.
Reinforced concrete cover slab to be kitemarked and to BS EN 1917:2002 bedded on mortar, propietary bitumen or resin mastic sealant and to be kitemarked.
Benching slope to be 1/10 to 1/30. Finish to be high strength or granolithic concrete
High strength concrete topping to be brought up to a dense smooth face neatly shaped and finished to all branch connections (minimum thickness 20mm)
Bottom precast concrete ring to be built into base concrete min. 75mm.
Distance between top of pipe and underside of PC chamber to be 50mm
All insitu concrete to be C20-DC2 with sulphate resisting cement unless otherwise agreed.
225mm to barrel of pipe
Inverts formed using channel pipes

NOTE
Manholes less than 1.5m to soffit with 1500mm∅ chamber size or larger should have a 1200x675mm opening (central or eccentric) sited over channel with double twin 600x600mm covers.

MANHOLE TYPE B1 / E

Depth from Ground level to soffit of pipe less than 1.5m

Note
All Drainage works and materials to conform with 'Sewers For Adoption' 6th Edition.

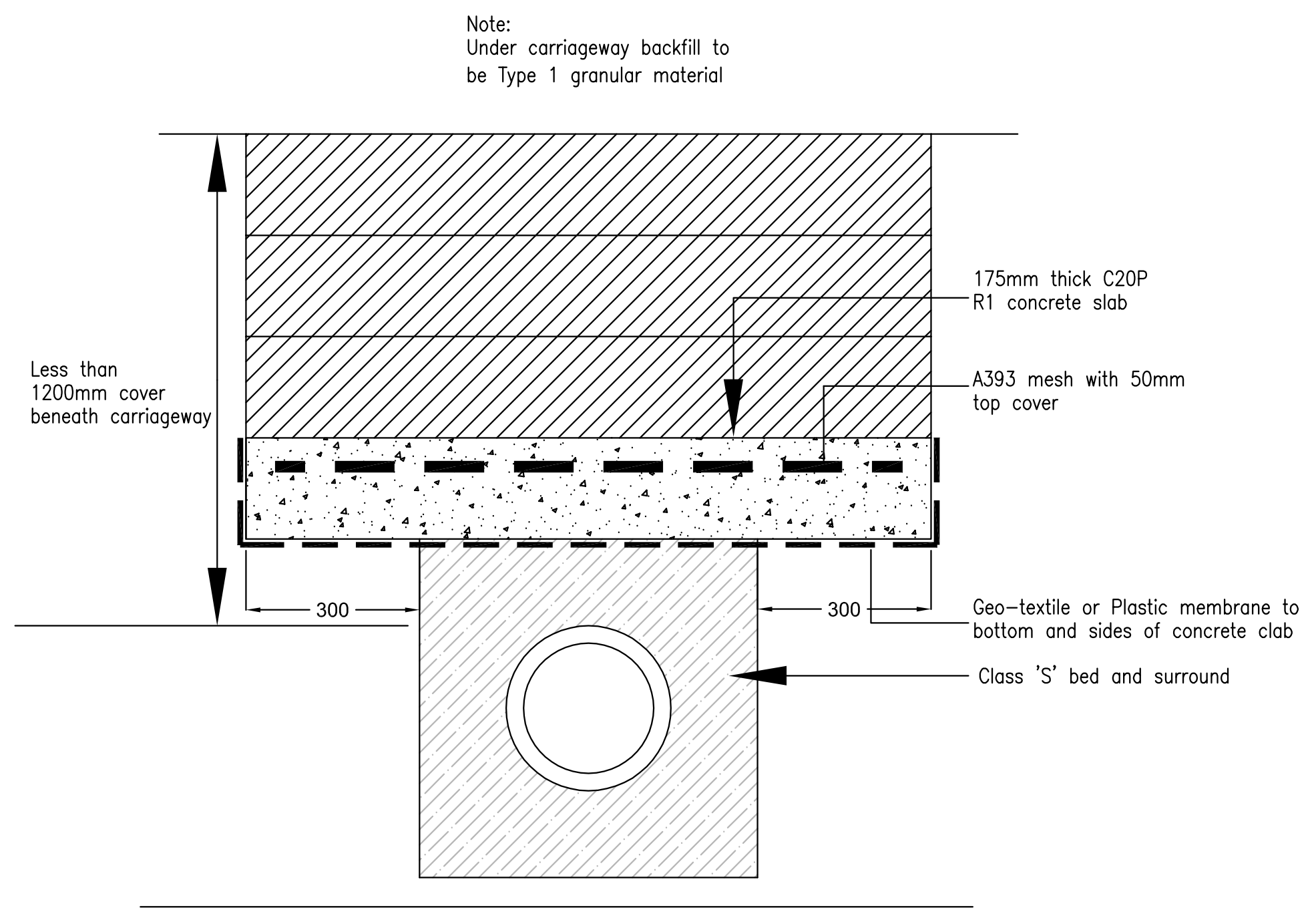
Chambers
Type C, D, E & F are non preferred chambers. For type 'B' chambers less than 1.2m from top of benching to the underside of the cover slab, shall have the cover fixed in the centre of the slab and the channels intersecting beneath the cover.

Covers
The minimum size for manhole covers is 600mm by 600mm. Manhole covers to be class D400 and have 150mm deep frames where located in the highway.

Step Irons / Ladders
All step irons shall be double rung and complying clause 4.2.31.
Step irons are required for all manholes, up to 6 metres deep.

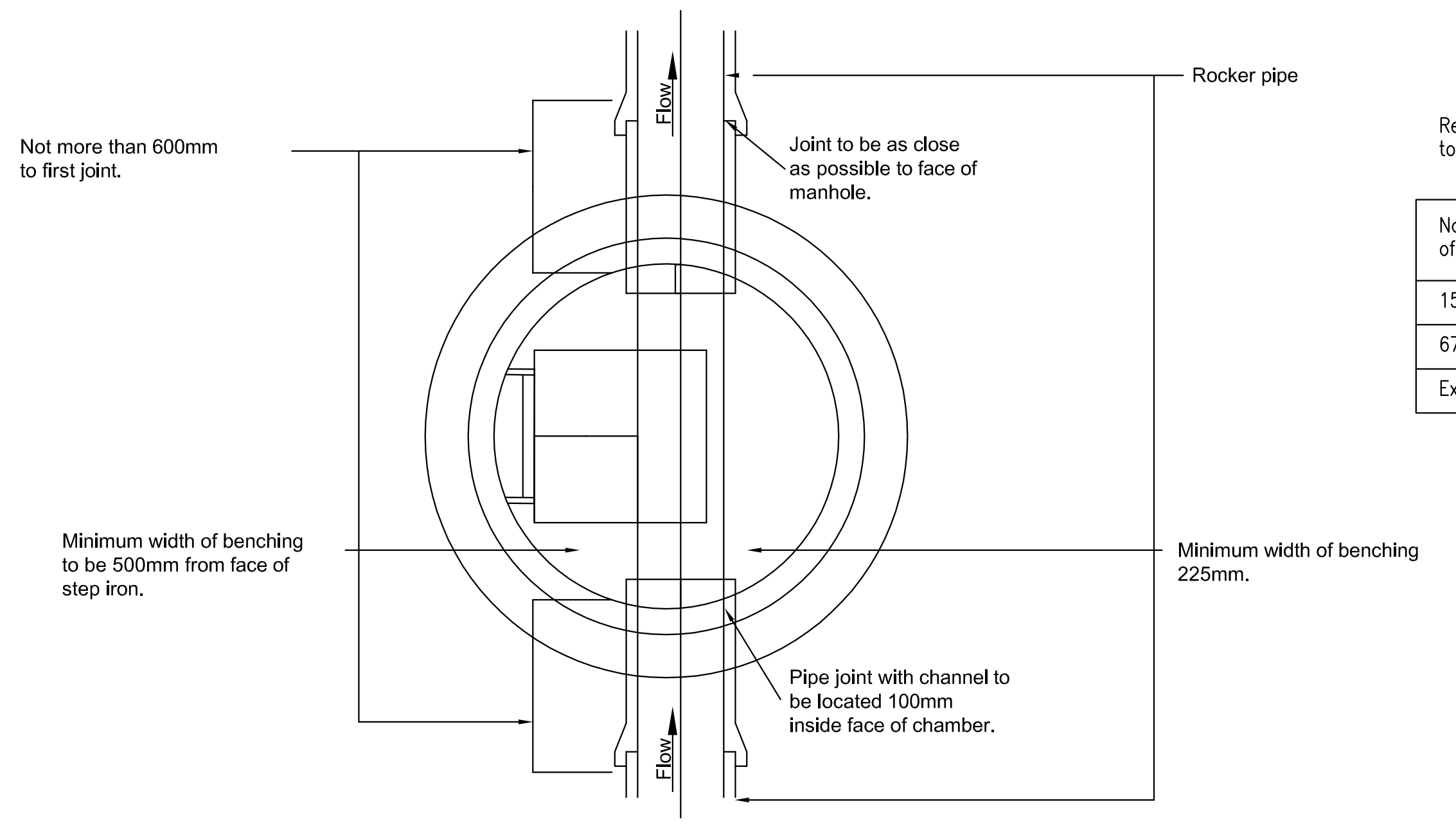
Brickwork
All brickwork to be constructed using class B engineering solids.

Note:
Under carriageway backfill to be Type 1 granular material


Less than 1200mm cover beneath carriageway
175mm thick C20P R1 concrete slab
A393 mesh with 50mm top cover
300
300
Geo-textile or Plastic membrane to bottom and sides of concrete slab
Class 'S' bed and surround

CONCRETE PIPE PROTECTION

NOTE
Double width step irons required
to all manholes up to 6m deep.

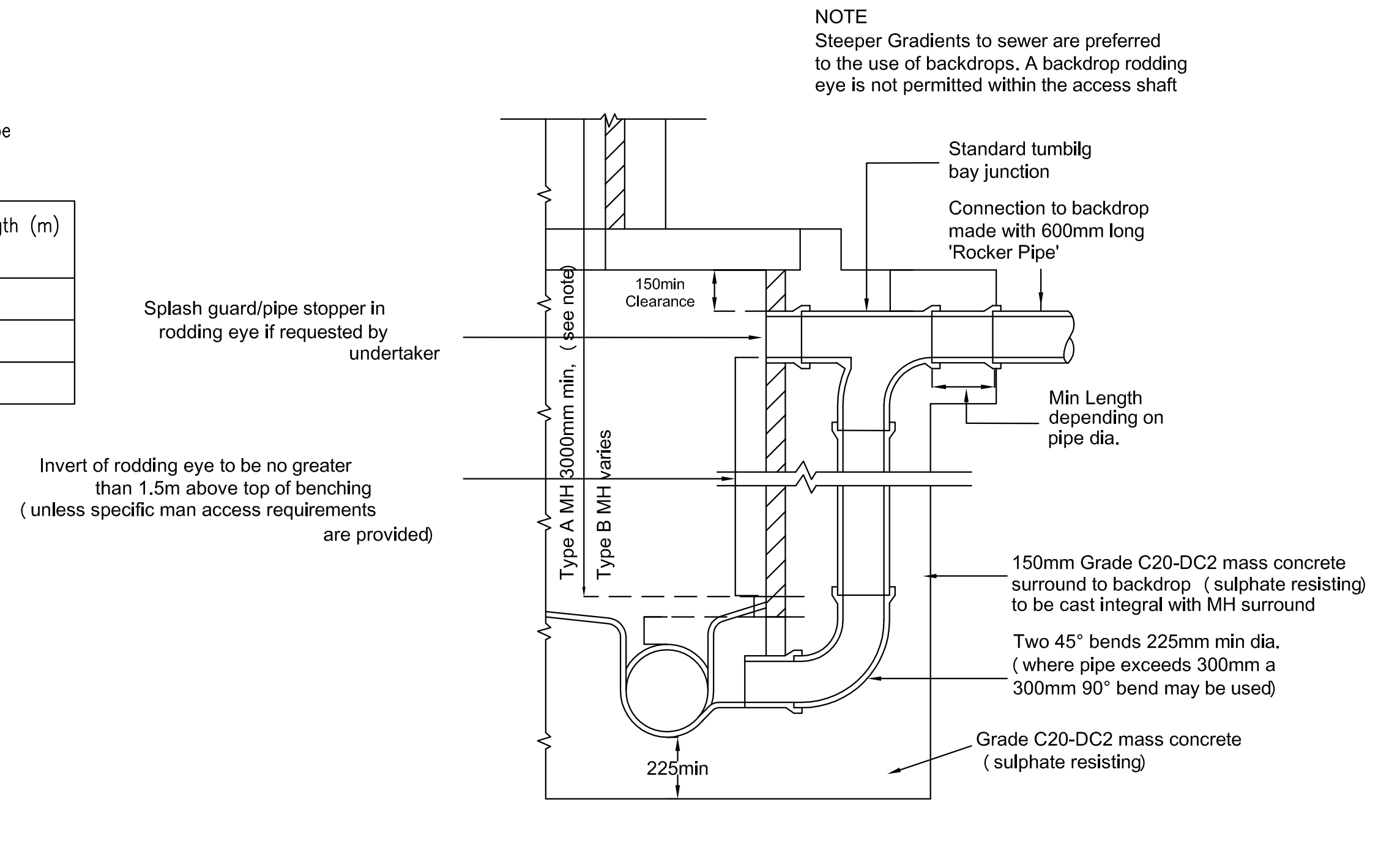

Rocker pipe
Flow
Not more than 600mm to first joint.
Joint to be as close as possible to face of manhole.
Minimum width of benching to be 500mm from face of step iron.
Minimum width of benching 225mm.
Pipe joint with channel to be located 100mm inside face of chamber.
Flow

PLAN OF TYPE A & B
TYPICAL MANHOLE DETAIL
DEPTH TO CROWN < 3.0m (CHAMBER HEIGHT NOT LESS THAN 900mm)
TYPE 1 OR TYPE B IN W.A.A.
SEWERS FOR ADOPTION

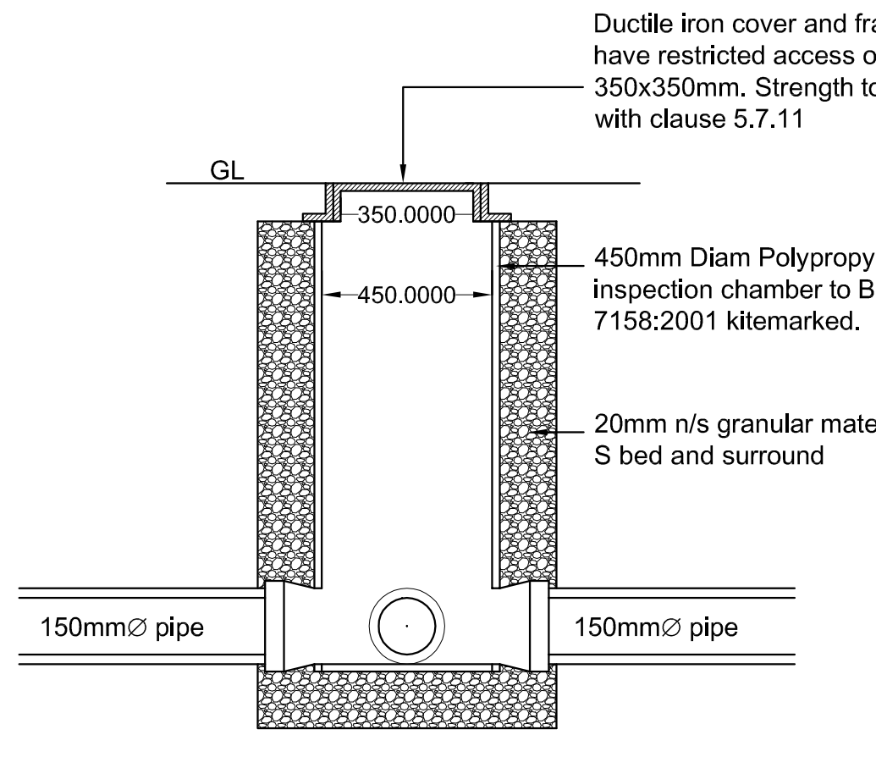
Recommended length of rocker pipe to be as shown in table below

Nominal bore of pipe (mm)	Effective Length (m)
150 – 600	0.6
675 – 750	1.0
Exceeding 750	1.25

NOTE
Steeper Gradients to sewer are preferred to the use of backdrops. A backdrop rodding eye is not permitted within the access shaft

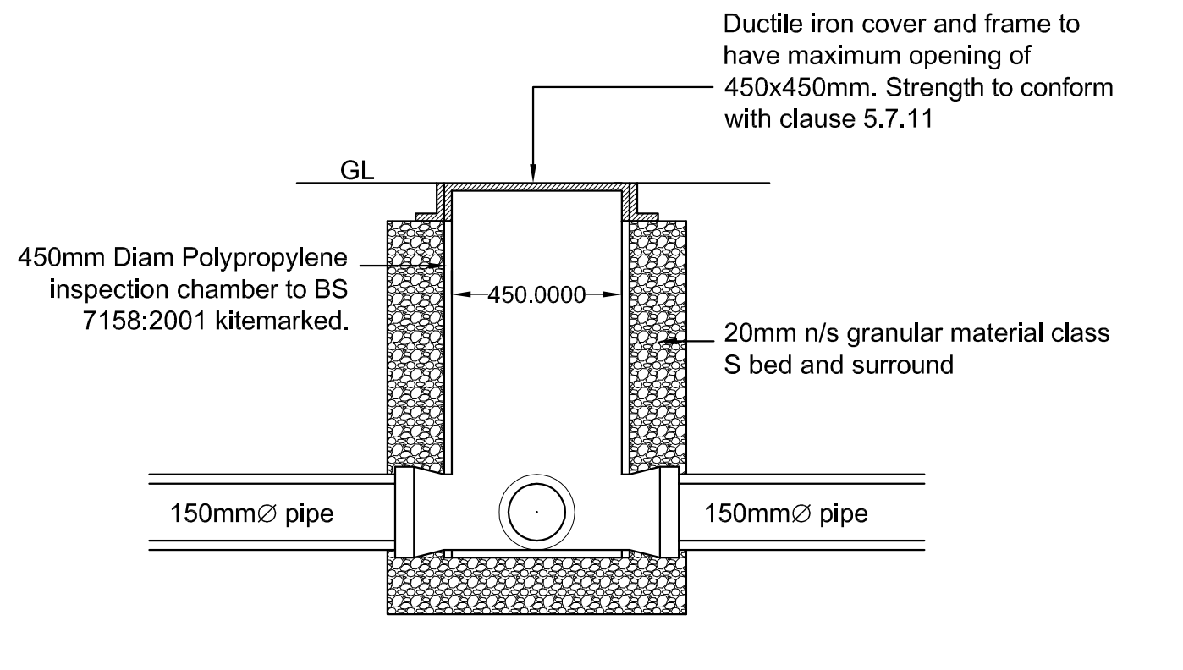

Standard tumbilg bay junction
Connection to backdrop made with 600mm long 'Rocker Pipe'
Splash guard/pipe stopper in rodding eye if requested by undertaker
150min Clearance
Type A MH 3000mm min, (see note)
Type B MH varies
Min Length depending on pipe dia.
Invert of rodding eye to be no greater than 1.5m above top of benching (unless specific man access requirements are provided)
150mm Grade C20-DC2 mass concrete surround to backdrop (sulphate resisting) to be cast integral with MH surround
Two 45° bends 225mm min dia. (where pipe exceeds 300mm a 300mm 90° bend may be used)
Grade C20-DC2 mass concrete (sulphate resisting)
225min

BACKDROP TO MANHOLE


Ductile iron cover and frame to have restricted access opening of 350x350mm. Strength to conform with clause 5.7.11
GL
350.0000
450.0000
450mm Diam Polypropylene inspection chamber to BS 7158:2001 kitemarked.
20mm n/s granular material class S bed and surround
150mm∅ pipe
150mm∅ pipe

DEMARCATION CHAMBER DETAIL

Depth from cover level to invert level of pipe chamber greater than 1.2m.
Maximum lateral drain diam 150mm


Ductile iron cover and frame to have maximum opening of 450x450mm. Strength to conform with clause 5.7.11
GL
450mm Diam Polypropylene inspection chamber to BS 7158:2001 kitemarked.
450.0000
20mm n/s granular material class S bed and surround
150mm∅ pipe
150mm∅ pipe

DEMARCATION CHAMBER DETAIL

Depth from cover level to invert level of pipe chamber less than 1.2m.
Maximum lateral drain diam 150mm

Minimum depth of Lateral drains

Location	Minimum Depth (m)
Gardens	0.9
Agricultural/Open spaces	0.9
Highways (inc footways)	1.2

Demarcation chamber covers & frames

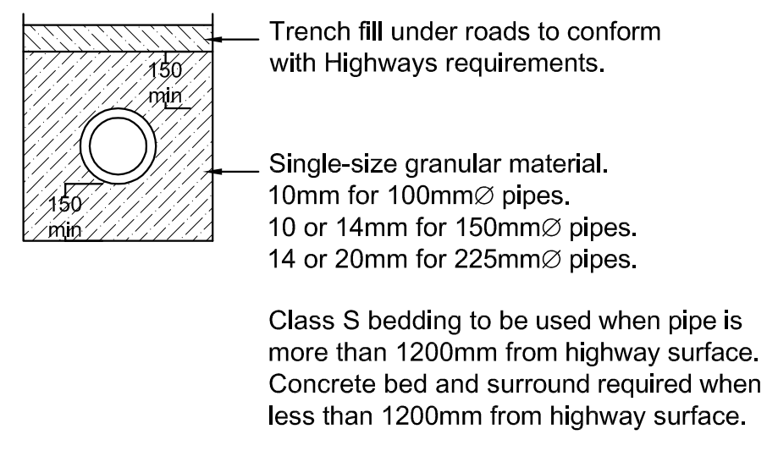
Surface	Class (Loading in kN)	Loading
Road	D400	Vehicle Impact
Footway & Driveway	B125	Occasional vehicle loading
Gardens	A15	Pedestrian/cyclist

Pipes

Diameter (mm)	Gradient	
	Foul	S.W.
100	1:80	1:100
150	1:80	1:150
225	1:125	1:225

Vitrified clay pipes to BS EN 295 kitemarked.
Unplasticised PVC pipes to BS 4660:200 & BS EN 1401-1 kitemarked.
Structured Wall Unplasticisd PVC pipes to WIS 4-35-01 kitemarked.

LATERAL DRAIN BEDDING DETAIL



Trench fill under roads to conform with Highways requirements.

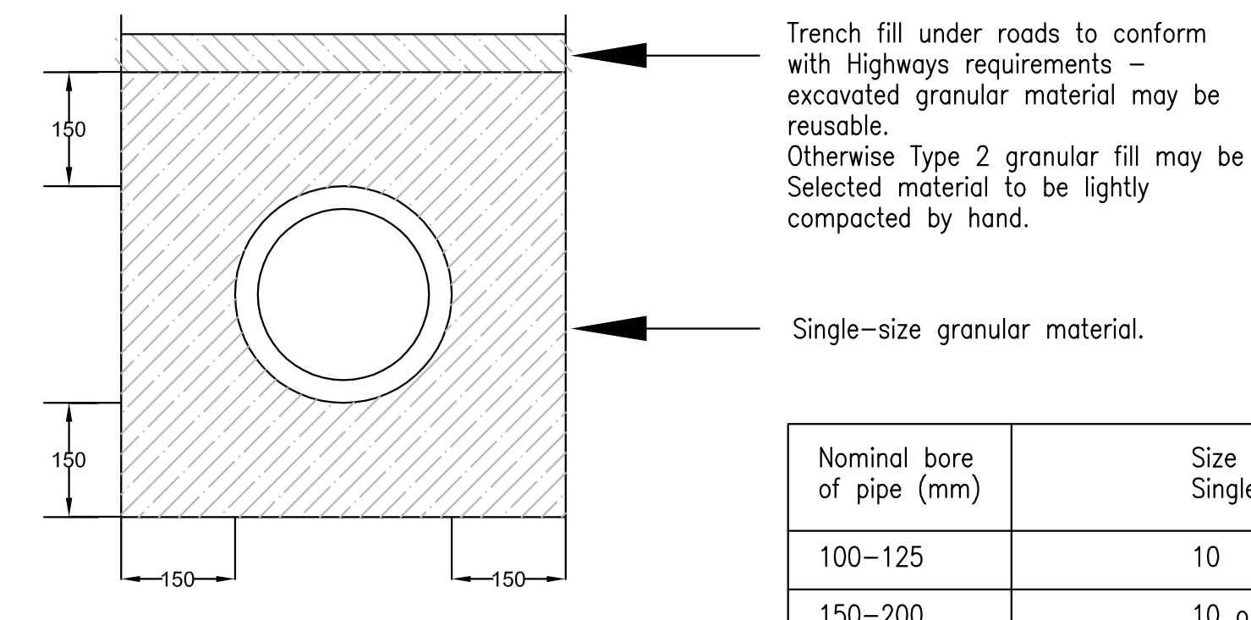
Single-size granular material.
10mm for 100mm∅ pipes.
10 or 14mm for 150mm∅ pipes.
14 or 20mm for 225mm∅ pipes.

Class S bedding to be used when pipe is more than 1200mm from highway surface. Concrete bed and surround required when less than 1200mm from highway surface.

ALL PIPEWORK 300mm DIAM OR LESS TO BE VITRIFIED CLAY CONFORMING WITH BS 65. MINIMUM CRUSHING STRENGTHS TO BE AS FOLLOWS: 100mm DIA. 40kN/m, 150mm DIA 40kN/m, 225mm DIA 45kN/m, 300mm DIA 72kN/m.
ALL PIPEWORK 375mm DIAM OR GREATER TO BE CONCRETE CLASS 120, 54kN/m MINIMUM CRUSHING STRENGTH.
ADOPTABLE SEWERS TO BE LAID IN CLASS 'S' GRANULAR BED & SURROUND.

1. ALL ADOPTABLE SEWER WORKS AND MATERIAL TO BE IN ACCORDANCE WITH "SEWERS FOR ADOPTION" 6th EDITION, YORKSHIRE WATER AND KITEMARKED.
2. MANHOLE COVERS SHALL/MUST HAVE A CLEAR OPENING OF 600mm AND SHALL BE CLASS D400 TO BS EN 124 WITH 150mm DEEP FRAMES IN HIGHWAYS OR CLASS B 125 IN FOOTWAYS, PEDESTRIAN AREAS AND COMPARABLE LOCATIONS.
3. FILLED GROUND MUST BE FILLED AND CONSOLIDATED UNDER THE SUPERVISION AND TO THE SATISFACTION OF YORKSHIRE WATER BEFORE ANY SEWER WORKS ARE CARRIED OUT.
4. YORKSHIRE WATER IS **NOT** OBLIGED TO ACCEPT FILTER DRAIN/LAND DRAINAGE RUNOFF INTO THE PUBLIC SEWER NETWORK OR ADOPTABLE DRAINAGE SYSTEM (DIRECTLY OR INDIRECTLY) . AN ALTERNATIVE METHOD OF DISPOSAL OF THE LAND DRAINAGE RUNOFF WILL THEREFORE BE REQUIRED AND YOU WILL HAVE TO LIAISE WITH THE LOCAL AUTHORITY, LAND DRAINAGE SECTION WITH REGARD TO THE DISPOSAL OF THE FILTER DRAIN/LAND DRAINAGE RUNOFF.
5. COVER SLABS MUST CARRY THE BSI KITEMARK OR WILL BE REJECTED BY YORKSHIRE WATER INSPECTOR. WHERE THE CLEAR OPENING OF THE KITEMARKED PRODUCT IS DIFFERENT TO THAT OF THE COVER AND FRAME, A LOADING BEARING SLAB SHOULD BE FITTED ABOVE THE COVER SLAB TO BRING THE SIZE DOWN TO 600x600mm FOR THE YORKSHIRE WATER SPECIFIED COVER SIZE. PLEASE REFER TO CONCRETE PIPE SYSTEMS ASSOCIATION (CPSA) , 'TECHNICAL BULLETIN' ISSUED AUTUMN 2004 FOR KITEMARKED COVER SLAB OPENING SIZES.
6. SULPHATE RESISTANT CEMENT AND PRECAST CONCRETE PRODUCTS MUST BE USED OR A LABORATORY REPORT PROVIDED PROVING THAT SUCH PRECAUTIONS ARE NOT NECESSARY.
7. THE ADOPTABLE SEWERS SHOULD BE A MINIMUM OF 1m AND MANHOLES 0.5m FROM KERB FACES AND SERVICE MARGINS.
8. SEWERS MUST HAVE 5m CLEARANCE FROM TREES AND HEDGES.
9. SEWERS TO BE LAID IN CLASS "S" BEDDING (150mm GRANULAR BED AND SURROUND) . WHERE DEPTH OF COVER TO TOP OF THE SEWER IS LESS THAN 1.2m IN HIGHWAYS AND VERGES (OR LESS THAN 900mm IN NONE VEHICULAR ACCESS AREAS) THEN A 175mm CONCRETECOVER SLAB WILL BE PROVIDED ABOVE GRANULAR BED AND SURROUND.
10. ALL PIPEWORK 300mm DIAM. OR LESS TO BE VITRIFIED CLAY CONFORMING WITH BS 65. MINIMUM CRUSHING STRENGTHS TO BE AS FOLLOWS: 150mm DIA 40kN/m,
225mm DIA 45kN/m, 300mm DIA. 72kN/m.
11. ALL PIPEWORK 375mm DIAM. OR GREATER TO BE CONCRETE CLASS 120, 54kN/m MINIMUM CRUSHING STRENGTH.
12. THE CHAMBER SIZE OF MANHOLES WITH MORE THAN ONE CONNECTION IN THEM MAY NEED TO BE INCREASED AN INCREMENT TO ACCOMMODATE THE CONNECTIONS AND BENDS.
13. YORKSHIRE WATER POLICY IS NOT TO ACCEPT TYPE "C" BRICK MANHOLES AND 1050mm DIAM. MANHOLE RINGS. INSTEAD IT IS PREFERRED THAT YOU USE A TYPE "B" MANHOLE WITH 1200mm DIAM. OR 1500mm DIAM. RINGS, WITH THE OPENING SIGHTED OVER THE CHANNEL WHERE DEPTH OF COVER TO PIPE SOFFIT IS 1-1.5m.
14. ALL HIGHWAY WORKS AND MATERIAL TO CONFORM WITH SOUTH YORKSHIRE SPECIFICATION.
15. GULLY COVER AND FRAMES SHALL BE D400 DUCTILE IRON AND COMPLY WITH EUROPEAN STANDARD BS EN 124. THOSE SIGHTED IN ACCESSWAYS AND MEWS COURTS MUST BE SUITABLE FOR USE IN PEDESTRIAN AREAS.
16. SULPHATE RESISTANT CEMENT (C20-DC2) AND PRECAST CONCRETE PRODUCTS MUST BE USED OR A LABORATORY REPORT PROVIDED PROVING THAT SUCH PRECAUTIONS ARE NOT NECESSARY.

RISK ASSESSMENT: SIGNIFICANT RISKS THAT CANNOT BE DESIGNED OUT		
RISK	LEVEL OF RISK (H/M)	SUGGESTED ACTION
DEEP EXCAVATIONS ASSOCIATED WITH NEW DRAINAGE WORKS	HIGH	ENSURE ALL EXCAVATIONS HAVE ADEQUATE TRENCH SUPPORTS
HANDLING LARGE DIAMETER MANHOLE RINGS AND CIRCULAR PIPES	HIGH	USE CORRECT LIFTING EQUIPMENT AND ENSURE OPERATIVES WEAR APPROPRIATE PROTECTIVE CLOTHING/HARD HATS/CORRECT PPE.
CONTACT WITH SEWAGE	MED	OPERATIVES TO USE CORRECT BREATHING EQUIPMENT/CORRECT PPE
NOISE	MED	OPERATIVES TO USE CORRECT EAR PROTECTION/CORRECT PPE
DRAINAGE EXCAVATIONS ADJACENT EXISTING BOUNDARY STRUCTURES	HIGH	ENSURE CORRECT SUPPORTS ARE PROVIDED TO TRENCHES AND BUILDINGS WHERE REQUIRED
DRAINAGE EXCAVATION IN PUBLIC HIGHWAY	HIGH	ENSURE CORRECT USE OF TRENCH SUPPORTS IN EXCAVATION AND SCREEN BARRIERS TO PROTECT MEMBERS OF THE PUBLIC
MAINTAIN ACCESS TO ADJACENT PROPERTIES AND OCCUPIERS	HIGH	ENSURE WORKS ARE PROTECTED WITH BARRIERS AND SIGNS TO GUIDE THE PUBLIC AWAY FROM THE WORKS
DRAINAGE EXCAVATIONS NEAR TO EXISTING SERVICES	HIGH	ENSURE WORKS ARE PROTECTED WITH BARRIERS AND SIGNS TO GUIDE MEMBERS OF THE PUBLIC AWAY FROM THE AREA
WORKING IN CONFINED SPACES. WORKING IN DRAINS AND MANHOLES	HIGH	CONFINED SPACES WORKING TRAINED PERSONNEL ONLY TO CARRY OUT WORKS UNDER A PERMIT TO WORK SCHEME IMPLEMENTED BY CONTRACTOR. GAS TESTING TO TAKE PLACE BEFORE ALL ENTRIES TO CONFINED SPACES.
WORKING IN HIGHWAYS / RISKS FROM VEHICLE AND PLANT	HIGH	ALL WORKS TO BE SIGNED AND FENCED FROM NORMAL VEHICULAR TRAFFIC. ALL WORKERS TO WEAR HIGH VISIBILITY CLOTHING. ALL PLANT TO HAVE VISUAL AND AUDIBLE WARNING SYSTEMS.
ROAD AND DRAINAGE CONSTRUCTION	HIGH	ALL EXCAVATIONS TO BE ADEQUATELY FENCED OFF AND SUPPORTED DURING CONSTRUCTION. ALL OPERATIVES TO BE TRAINED IN CORRECT METHODS OF LIFTING AND WORK IN ACCORDANCE WITH LOLER REGS
IT IS ASSUMED THAT WORKS ASSOCCIATED WITH THIS DESIGN WILL BE UNDERTAKEN BY A PERSON OR PERSONS WHO ARE COMPETANT AND HAVE THE REQUIRED LEVEL OF EXPERIENCE AND EXPERTISE		



Trench fill under roads to conform with Highways requirements – excavated granular material may be reusable.
Otherwise Type 2 granular fill may be used.
Selected material to be lightly compacted by hand.

Single-size granular material.

Class S Bedding Factor 2.5
Scale 1:10

Nominal bore of pipe (mm)	Size mm Single sized	Size mm Graded
100–125	10	–
150–200	10 or 14	14 to 5
225–300	10, 14 or 20	14 to 5 or 20 to 5
375–500	14 or 20	14 to 5 or 20 to 5
Exceeding 500	14, 20 or 40	14 to 5, 20 to 5 or 40 to 5
All granular material to be single sized or graded in accordance with BS 882: 1983, sintered pulverized–fuel ash to BS 3797: Part 2: 1976 and air–cooled blast furnace slags to BS 1047: 1983 are suitable.		

Rev A Proposed details approved by BMBC. 'Preliminary Issue' removed. 31.01.17 HH

Haigh Huddleston & Associates
Civil Structural Engineering Consultants
Firth Buildings, 99 - 101 Leeds Rd, Dewsbury, WF12 7BU t 01924 464342 f 01924 450662
e trevor.haigh@haighhuddleston.co.uk

Client
BARRATT DAVID WILSON HOMES

Project
LOW BARUGH

Detail
STANDARD MANHOLE DETAILS
(located near Millers Inn, Dearne Hall Road)

Dwn	Chkd	Date	Scale	Dwg No.
HH		Oct-15	1:20 @ A0	E14/6120/033-09A