

Key:

- Cover and frame shall be to BS EN 124 Class D 400 in carriageways, parking areas, hard shoulders, pedestrian streets and areas to be trafficked. Class C250 shall be used in verges, and non-contiguous car parks.. Frames shall have a minimum clear opening of 675mm x 675mm, closed keyways and be bedded on a minimum of 12mm of Mortar Designation (i) to Clause 2404 of the Specification.
- Mortar Designation (i) haunching to cover and frame to Clause 2404 of the Specification.
- 225mm Class B engineering brickwork to Clause 2406 of the Specification (4 courses.max. 2 courses min) or precast concrete cover frame seating rings.
- Precast concrete heavy duty slab with 600mm diameter access hole to comply with BS 5911: Part 200:1989 bedded on Mortar Designation (i) to Clause 2404 of the Specification.
- Precast concrete heavy duty reducing slab with 900mm diameter access hole to comply with BS 5911:Part 200:1989 bedded on Mortar Designation (i) to Clause 2404 of the Specification. On manholes less than 1.5m diameter, reducing slab not to be used and PC rings to continue up to cover slab.
- Precast concrete chamber sections to comply with BS 5911:Part 200:1989. All units shall be bedded on Mortar Designation (i) to Clause 2404 of the Specification, in accordance with the manufacturers instructions. Proprietary bitumen or resinastic sealant may be used as an alternative.
- 150mm thickness Mix ST4 concrete surround (to Clause 2602 of the Specification) to be fully vibrated. The void between chamber and excavation shall be completely filled in accordance with Clause 507 of the Specification.
- 25mm min. granolithic concrete rendering. The concrete to compose of 1 part cement, 3 parts of granolithic all-in aggregate (to BS 882:1992) by volume and mixed in an approved manner. The surface of the concrete benching is to be brushed free from dirt and thoroughly soaked with water. The rendering shall then be spread over the surface and screeded to a uniform surface, floated with a wooden float and trowelled with a steel trowel. Curing to be carried out for seven days. Fall to soffit of pipe to be not less than 1:30. All benching to be shaped according to orientation of pipe runs with side connections turned towards direction of flow.
- Mix ST4 concrete to Clause 2602 of the Specification foundation and benching. Gradient of benching to be not less than 1 in 30 and not steeper than 1:10.
- Channels for chambers shall be formed using preformed half circle channels with sides benched as described in note 8.
- Pipes built into chamber walls and rocker pipes to Clause 507.15 of the Specification. See Note e for lengths of rocker pipes.
- Galvanised mild steel ladder to BS 4211:1987. Minimum distance from wall to be 200mm
- Bottom chamber section to be built into base concrete a minimum of 75mm.
- Distance between top of pipe and underside of precast concrete chamber to be 100mm
- Construction joint.
- Self cleaning toe holes to be provided in channels of sewers greater than 450mm dia.
- Pipe joint with channel to be located a min. 100mm from inside face of chamber.

NOTES:

A. Chamber diameters are to be in accordance with the table below:-

Diameter of largest pipe in manhole (mm)	Chamber section diameter (mm)
Less than 375mm	1200
375 - 450	1350
450 - 700	1500
750 - 1050	1800
1125 - 1500	2100
>1500	Consult Scottish Water

B. Manhole covers and frames shall be marked with the following initials:-
 Foul manholes - FW.
 Surface water manholes - SW.
 Highway drainage manholes - HD.

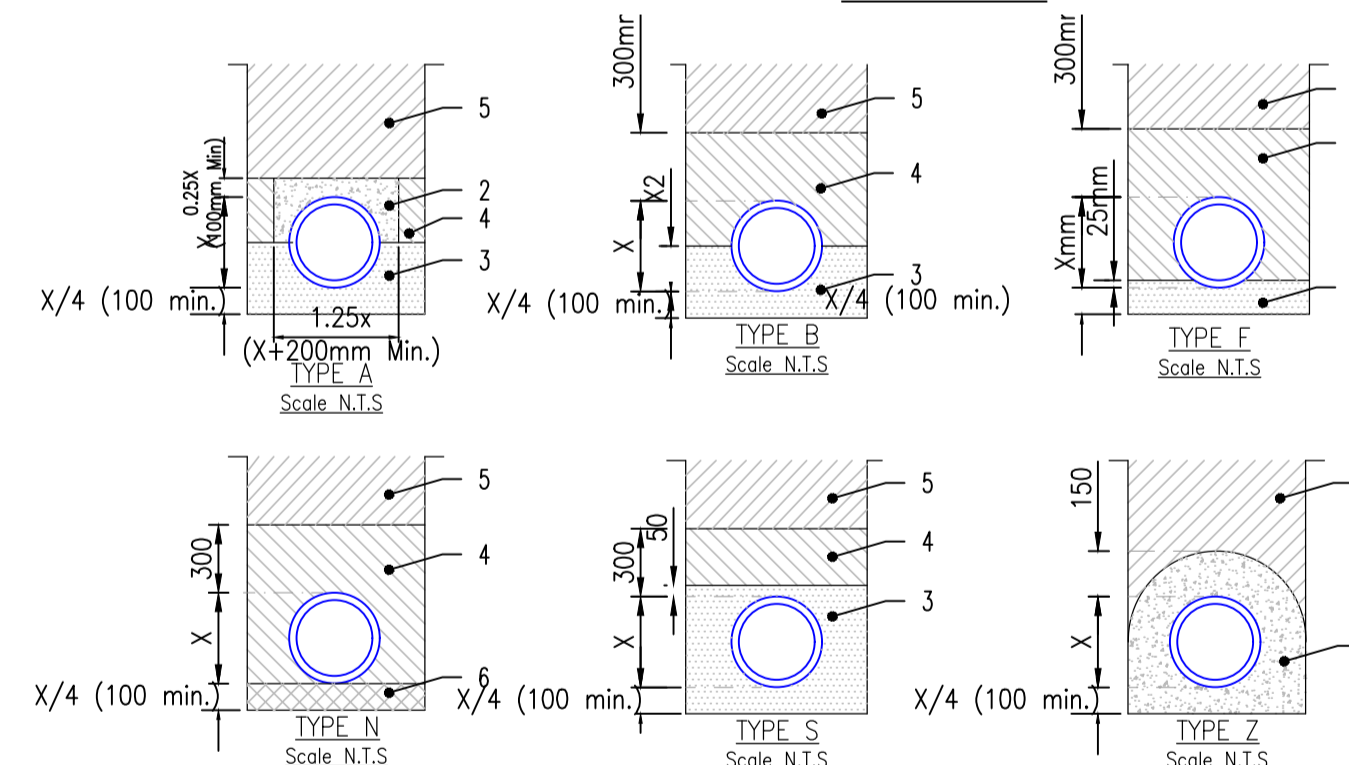
C. Where a backdrop is required to be constructed in conjunction with this manhole refer to Type B1 for construction details.

D. Chambers with outgoing pipes greater than 600mm dia. shall be fitted with removable safety chain.

E. The length of rocker pipes are to be in accordance with the table below:-

Nominal diameter (mm)	Effective Length (m)
150 to 600	0.6
675 to 750	1.0
Over 750	1.25

MANHOLE TYPE A
(DEPTH TO SOFFIT 3.0M TO 6.0M)
Scale N.T.S.



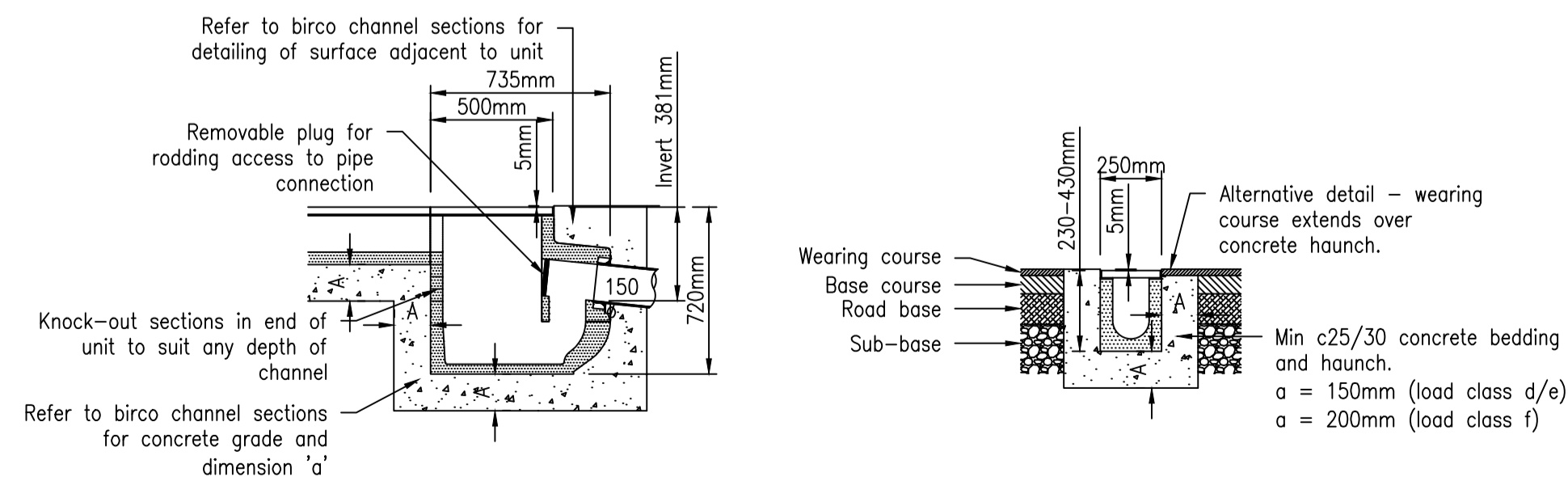
- Concrete mix ST4 to Clause 2602 of the Specification.
- Concrete mix ST2 to Clause 2602 of the Specification.
- Pipe bedding material to Clause 503.3(i) of the Specification evenly compacted.
- Class 8 lower trench fill to Clause 503.3(iv) of the Specification compacted by hand
- Acceptable material (Class 1,2 or 3) compacted to Clause 505 of the Specification unless specified otherwise.
- Pipe bedding material to Clause 503.3(ii) of the Specification.

NOTES:

- All dimensions are in millimetres.
- Dimension x is the external diameter of the pipe.
- The specified width of the concrete arch in bed Type A is not to be exceeded.
- For Type Z trench the concrete cover may be formed to a radius, batter or horizontal surface. Minimum cover of concrete shall be 150mm.
- For trench Types A and Z flexible construction joints are to be formed in the concrete to coincide with each pipe joint with preformed joint filler to Clause 1015 of the Specification. Thickness of filler board to be 25mm.
- The minimum and maximum trench widths are as follows:
 Minimum = x + 300
 Maximum = x + 600

For measurement purposes the volumes of hard breakout or imported backfill to trenches shall be calculated using the mean of the minimum and maximum trench widths.

TRENCH AND BEDDING DETAILS, SEWERS AND DRAINS
Scale N.T.S.



TYPICAL LINEAR CHANNEL OUTFALL
(MARSHALLS BIRCO 150 OR SIMILAR)
LOADING CLASS D TO F
(SCALE 1:20)

TYPICAL LINEAR CHANNEL SECTION
(MARSHALLS BIRCO 150 OR SIMILAR)
LOADING CLASS D TO F
(SCALE 1:20)

Notes for birco installation details:

- All loading applications are as defined in bs en 1433:2002 "drainage channels for vehicular and pedestrian areas - classification, design, testing requirements, marking and quality control".
- Birco outfall sections shall be jointed using marshalls' mflex sealant.
- The concrete grade and dimensions for bed, haunch and surround are shown in the birco section of the design guide.
- Where the concrete surround is taken to the surface, the concrete surround should have the appropriate freeze thaw resistance.
- For high loading applications with poor conditions, consideration may be given to the local thickening of the sub-base.
- Marshalls' vertical joint sealant, m-flex, shall be applied to all vertical joints of the channels.
- Birco gratings should be chosen to suit the appropriate loading application, taking into account both static and dynamic loading conditions.
- Movement joints details that fully isolate the birco system whilst maintaining restraint shall be provided adjacent to all concrete slabs even when the slab is covered by another material. The use of dowel bars in concrete slab joints is common and should be considered especially for higherloading applications.
- All grating bolts should be tightened to the appropriate torque shown in the birco section of the design guide.
- The top surface of the grating shall be between 5mm below the final pavement level.
- All dimensions are in millimetres.

Key:

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- Mortar Designation (i) haunching to cover and frame to Clause 2404 of the Specification
- 225mm Class B engineering brickwork to Clause 2406 of the Specification (4 courses.max.2 courses min) or precast concrete cover frame seating rings.
- Precast concrete heavy duty slab with 600mm diameter access hole to comply with BS 5911: Part 1:1989 bedded on Mortar Designation (i) to Clause 2404 of the Specification. Where the depth to soffit lies between 1.0m - 1.35m the clear opening shall be 1200 x 675mm.
- Precast concrete chamber sections to comply with BS 5911:Part 200:1989. All units shall be bedded on Mortar Designation (i) to Clause 2404 of the Specification in accordance with the manufacturers instructions. Proprietary bitumen or resin mastic sealant may be used as an alternative.
- 150mm thickness Mix ST4 concrete surround to be fully vibrated. The void between chamber and excavation shall be completely filled in accordance with Clause 507.
- 25mm min. granolithic concrete rendering. The concrete to compose of 1 part cement, 3 parts of granolithic all-in aggregate (to BS 882:1992) by volume and mixed in an approved manner. The surface of the concrete benching is to be brushed free from dirt and thoroughly soaked with water. The rendering shall then be spread over the surface and screeded to a uniform surface, floated with a wooden float and trowelled with a steel trowel. Curing to be carried out for seven days. Fall to soffit of pipe to be not less than 1:30. All benching to be shaped according to orientation of pipe runs with side connections turned towards direction of flow.
- Mix ST4 concrete to Clause 2602 of the Specification foundation and benching. Gradient of benching to be not less than 1 in 30 and not steeper than 1:10.
- Channels for chambers shall be formed using preformed half circle channels with sides benched as described in note 7.
- Pipes built into chamber walls and rocker pipes to Clause 507.15 of the Specification. See Note for lengths of rocker pipes.
- Step irons to Clause 507 of the Specification.
- Bottom chamber section to be built into base concrete a minimum of 75mm.
- Distance between top of pipe and underside of precast concrete chamber to be 100mm
- Pipe joint with channel to be located a min. 100mm from inside face of chamber.
- Self cleaning toe holes to be provided in channels of sewers greater than 450mm dia.
- Construction joint.
- Steel mesh to BS4483 reference A252, 40mm cover.

NOTES:

A. Chamber diameters are to be in accordance with the table below:-

Diameter of largest pipe in manhole (mm)	Chamber section diameter (mm)
Less than 375mm	1200
375 - 450	1350
450 - 700	1500
750 - 1050	1800
1125 - 1500	2100
>1500	Consult Scottish Water

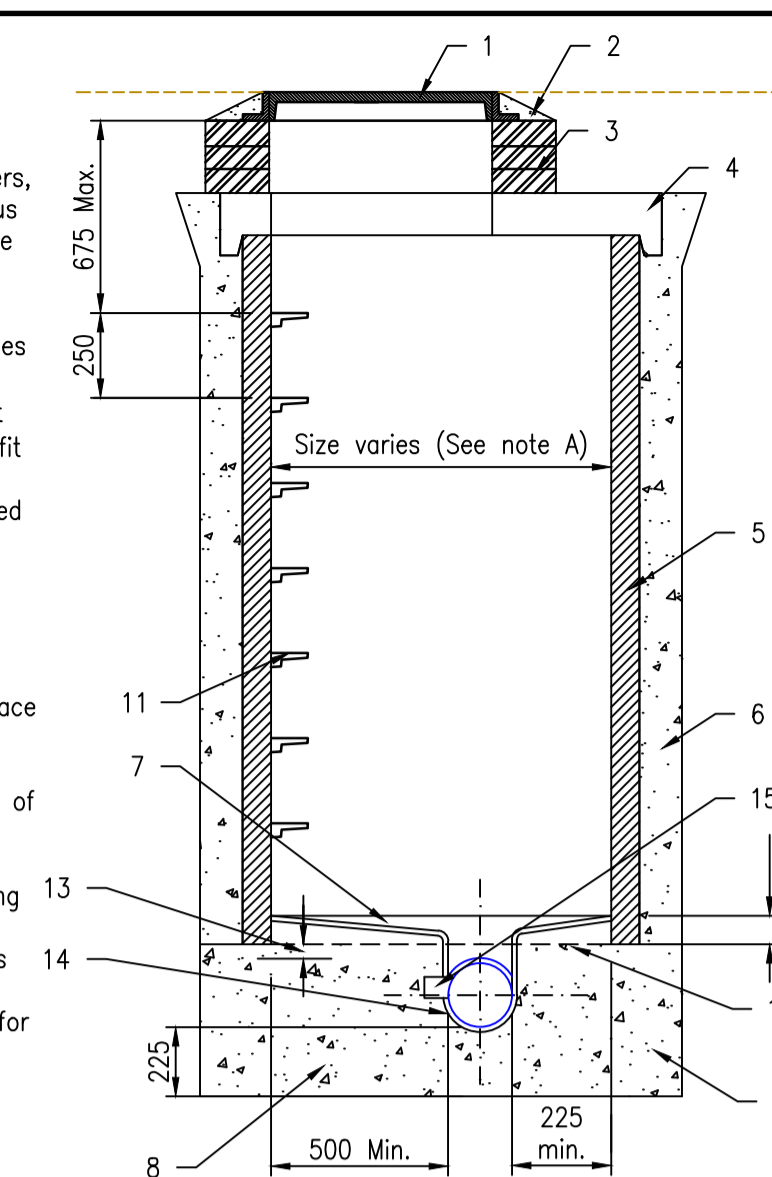
B. Manhole covers and frames shall be marked with the following initials:-
 Foul manholes - FW.
 Surface water manholes - SW.
 Highway drainage manholes - HD.

C. Where a backdrop is required to be constructed in conjunction with this manhole refer to Type B1 for construction details.

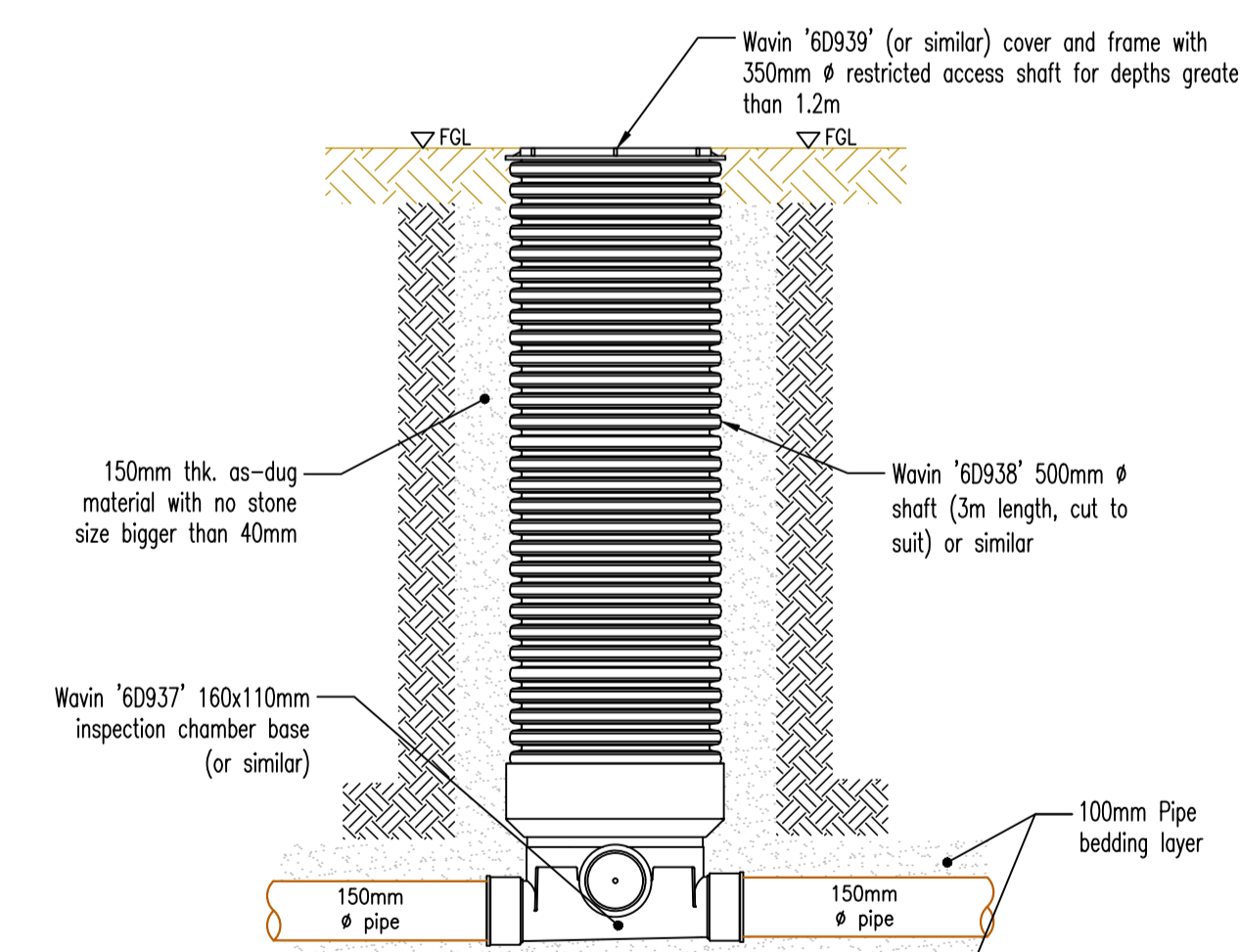
D. Chambers with outgoing pipes greater than 600mm dia. shall be fitted with removable safety chain.

E. The length of rocker pipes are to be in accordance with the table below:-

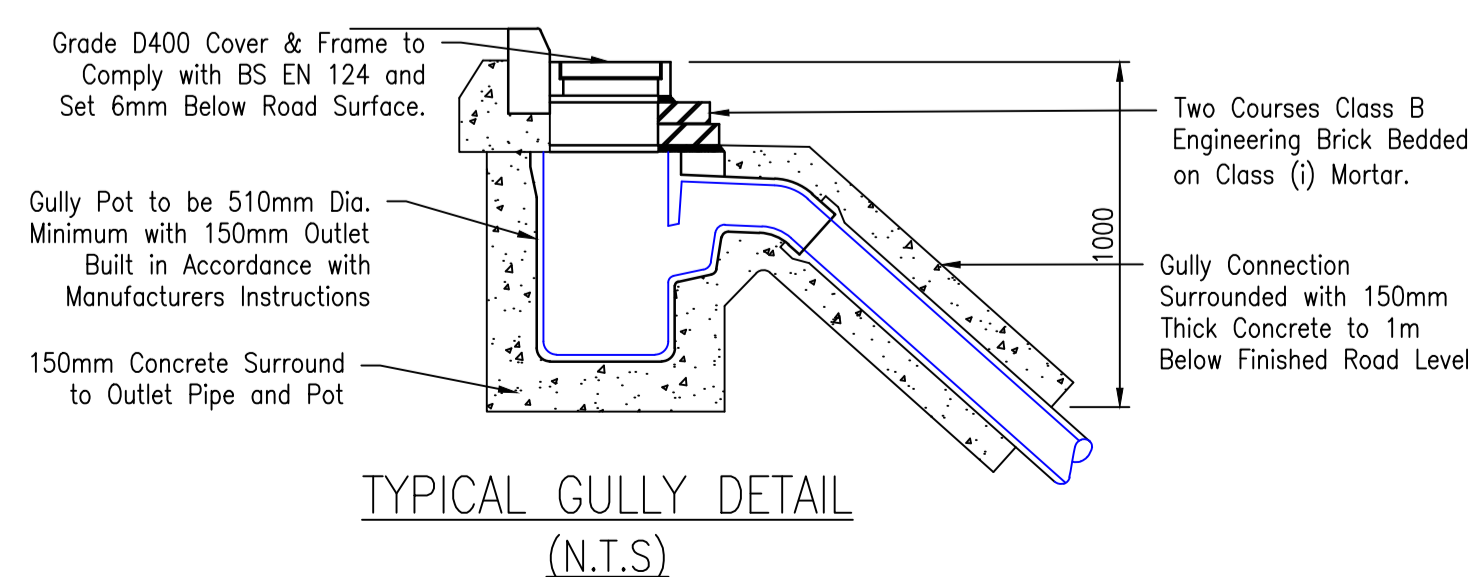
Nominal diameter (mm)	Effective Length (m)
150 to 600	0.6
675 to 750	1.0
Over 750	1.25



MANHOLE TYPE B
(DEPTH TO SOFFIT 1.0M TO 3.0M)
Scale N.T.S.



TYPICAL NON-ENTRY INSPECTION CHAMBER DETAIL
Scale 1:20



TYPICAL GULLY DETAIL
(N.T.S.)

Do not scale from this drawing.

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION	
IN ADDITION TO THE HAZARD/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING RISKS AND INFORMATION.	
RISKS LISTED HERE ARE NOT EXHAUSTIVE. REFER TO DESIGN ASSESSMENT FORM NO.	
CONSTRUCTION 250mm Ø SCOTTISH WATER ASBESTOS CEMENT WATER MAIN ADJACENT TO NORTH EAST SITE BOUNDARY. INUNDATION OF CANAL WATER TO CONSTRUCTION SITE DUE TO CANAL LOCK FAILURE.	
DEMOLITION NONE THAT COULD NOT BE FORESEEN BY A COMPETENT CONTRACTOR.	
FOR INFORMATION RELATING TO USE, CLEANING AND MAINTENANCE SEE THE HEALTH AND SAFETY FILE	
IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT.	

- Notes:**
- Do not scale from this drawing
 - All dimensions are in meters unless specified otherwise.
 - All sewers and manholes to be laid and constructed in accordance with "SEWERS FOR SCOTLAND 4TH EDITION".
 - Refer to Fairhurst drawing 149592/2200 & 2201 for drainage layout plan sheets 1 & 2.
 - Refer to Fairhurst drawing 149592/2202 & 2204 for drainage longitudinal sections
 - Refer to fairhurst drawing 149592/2207 for infiltration basin construction details

Rev.	Date	Description	Drawn	Chkd.	Appd.
FAIRHURST					
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The Highland Council Comhairle na Gàidhealtachd					

Project Title:
NEW HOUSING TORVEAN NORTH

Drawing Title:
DRAINAGE CONSTRUCTION DETAILS PHASE 1

Scale of A1:	AS SHOWN	Status:	For Approval
Drawn:	SM	Checked:	RMS
Date:	11/03/24	Approved:	J.P.
Drawn No.:		Date:	13/03/24
		Date:	15/03/24
		Revision:	

149592/2206 -