

(Conc.)
Typical Manhole Chamber Detail
NTS

Nominal Internal Diameter of Largest Pipe in Manhole (mm)	Minimum Nominal Internal Dimension of Manhole (mm)
Less than 375	1200
375 - 450	1350
500 - 700	1500
750 - 900	1800
Greater than 900	Pipe diameter + 900

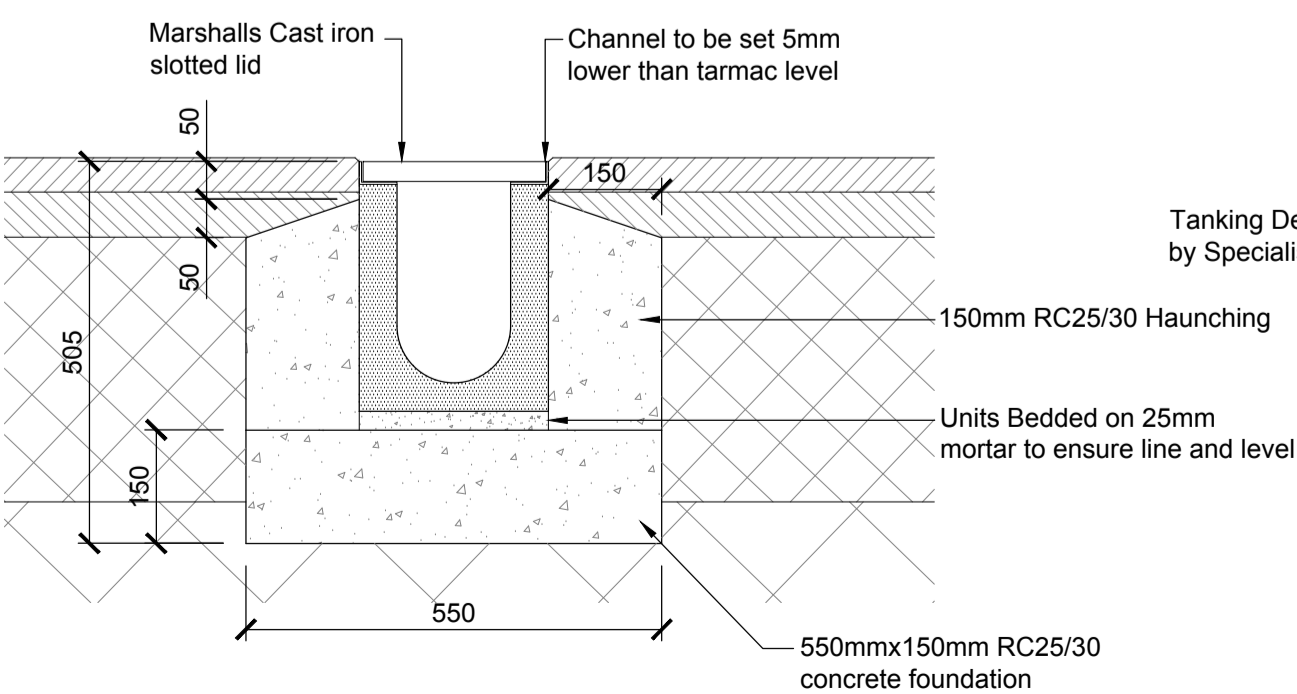
Table A - Manhole Diameters

Birco Installation Notes

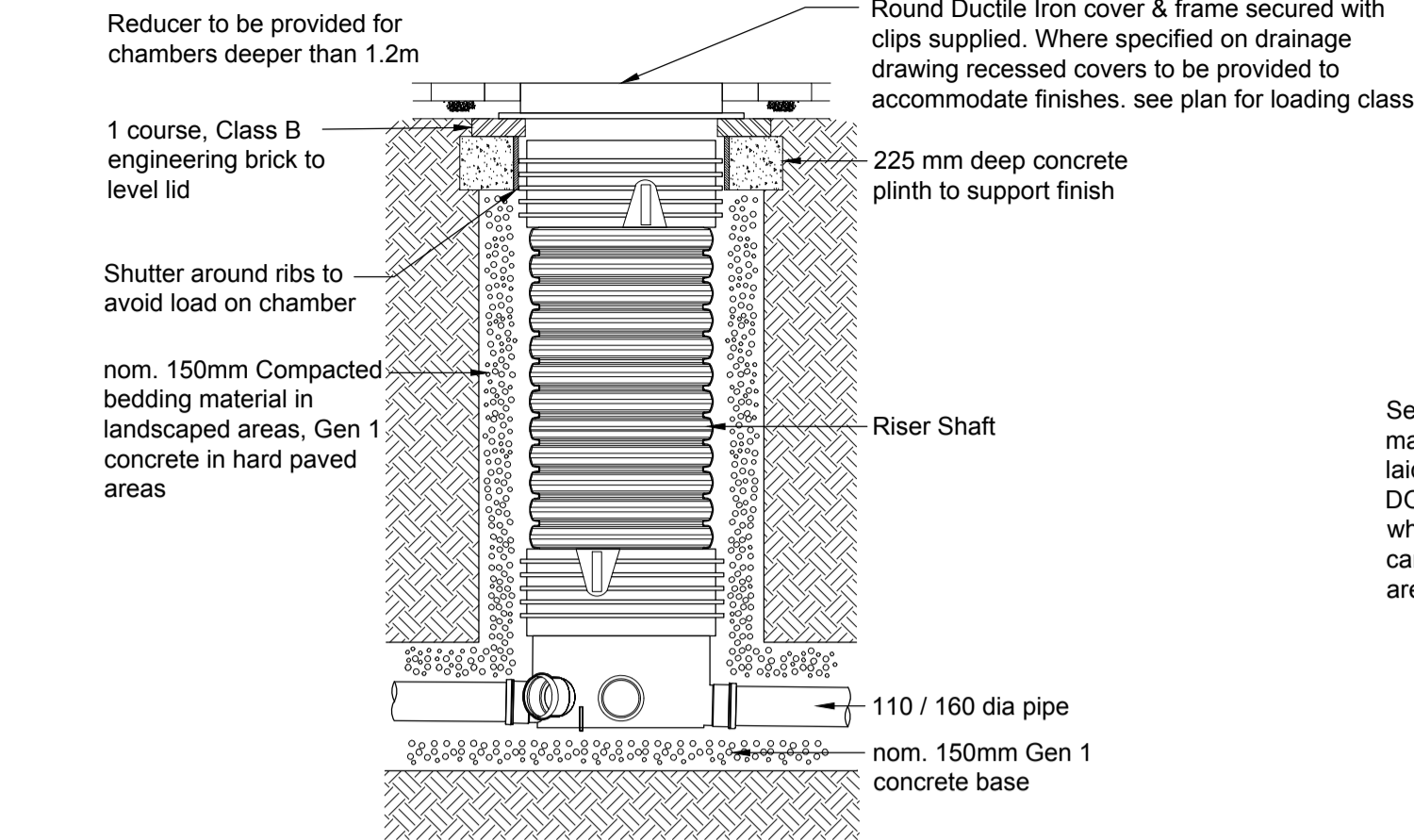
- Excavate out for foundation, material beneath to be compacted.
- cast 500mm wide x 150mm thick Concrete foundation and bed Birco units ensuring correct line and level.
- Haunch Birco units with concrete ensuring 150mm wide and stopping nominally 50mm from top to allow tarmac construction above
- where Birco units are adjacent Kerb, Haunching on kerb side is to be cast 190mm above foundation to allow installation of Kerb

Birco Notes

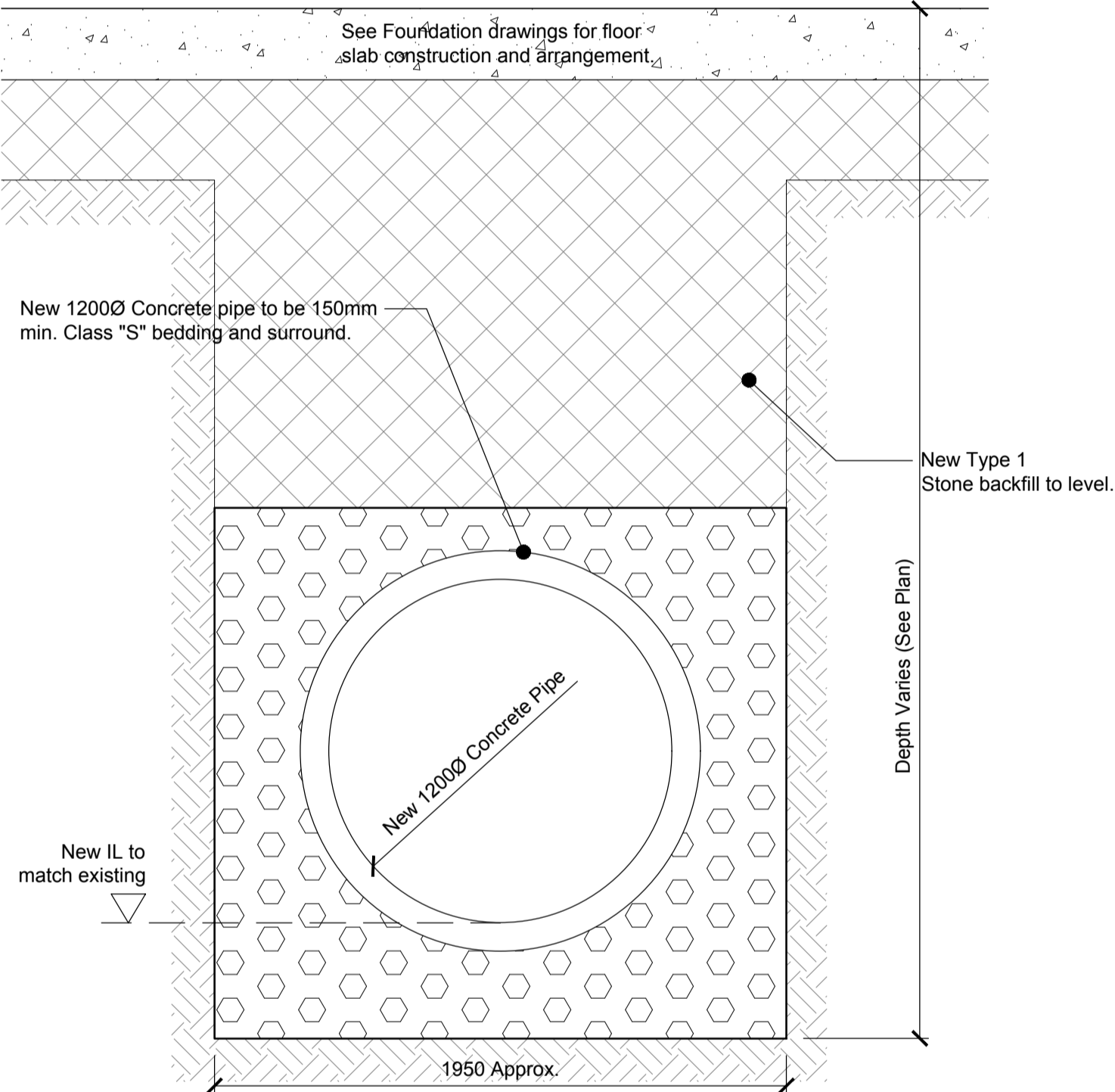
- All Joints between units to be sealed using Marshalls M-Flex Sealant
- Refer to Marshalls Guide for grating bolt torque settings
- the top surface of the Birco unit shall be 5mm below surface level



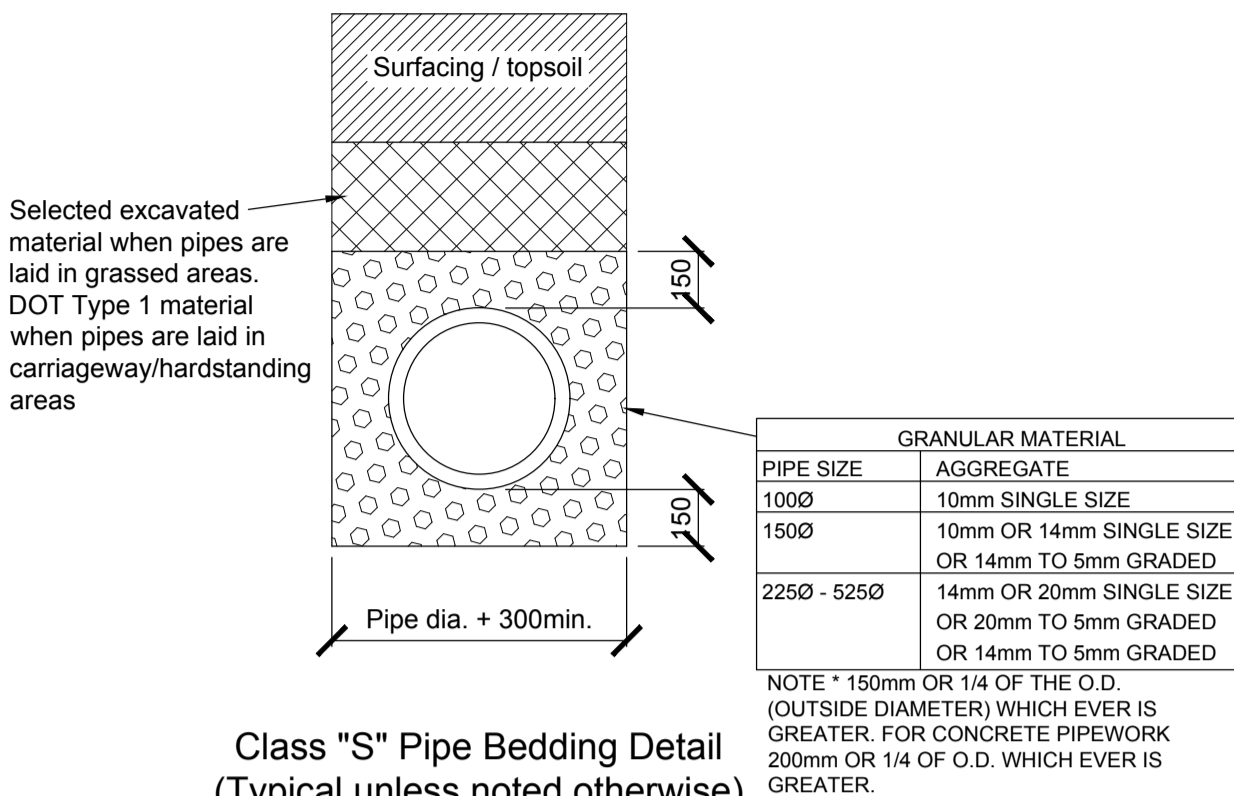
Typical Marshalls Birco 150 with 10/0 unit
Scale 1:10



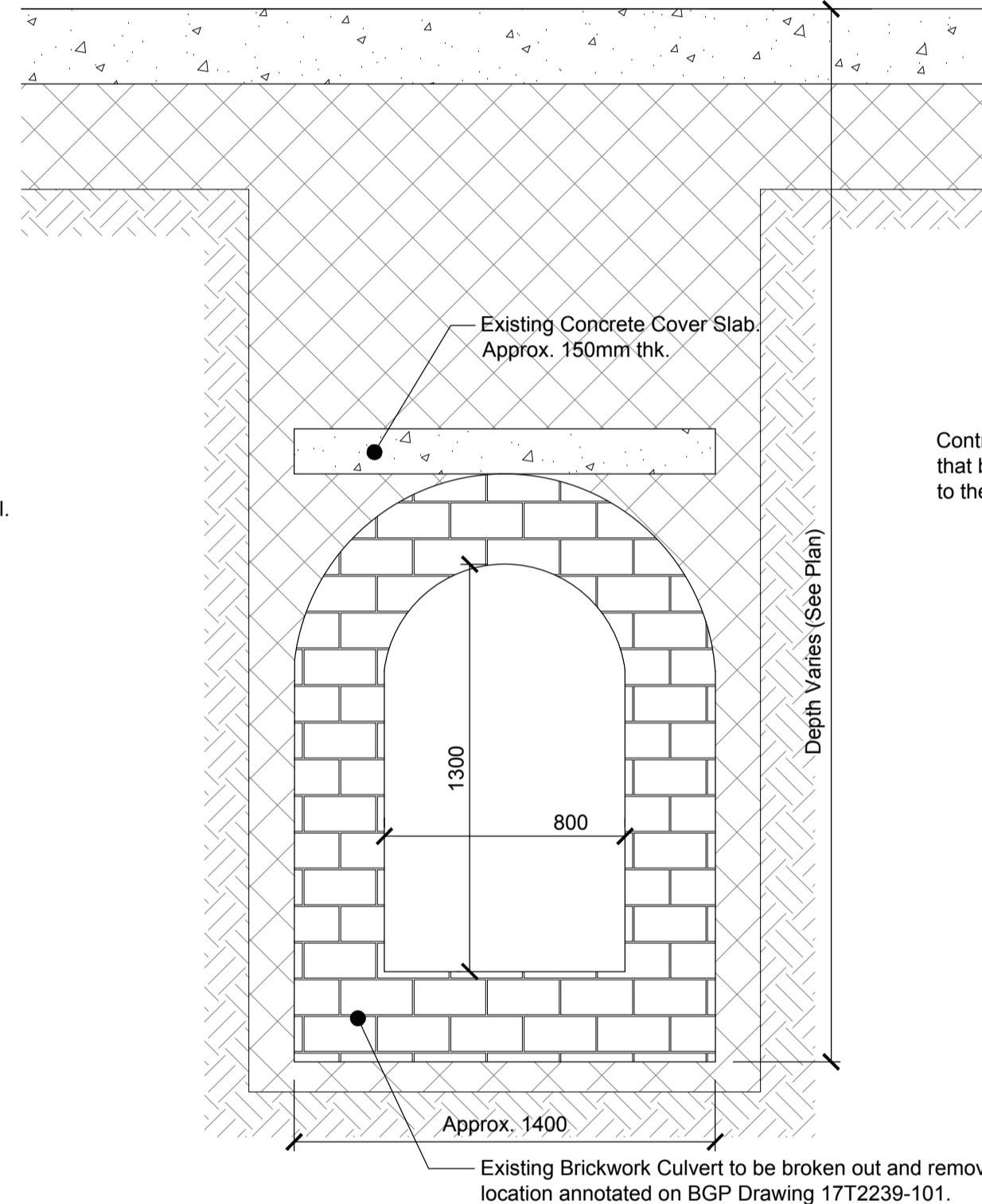
Details of 'UPVC' Manholes
(PPIC Inspection Chamber)
NTS



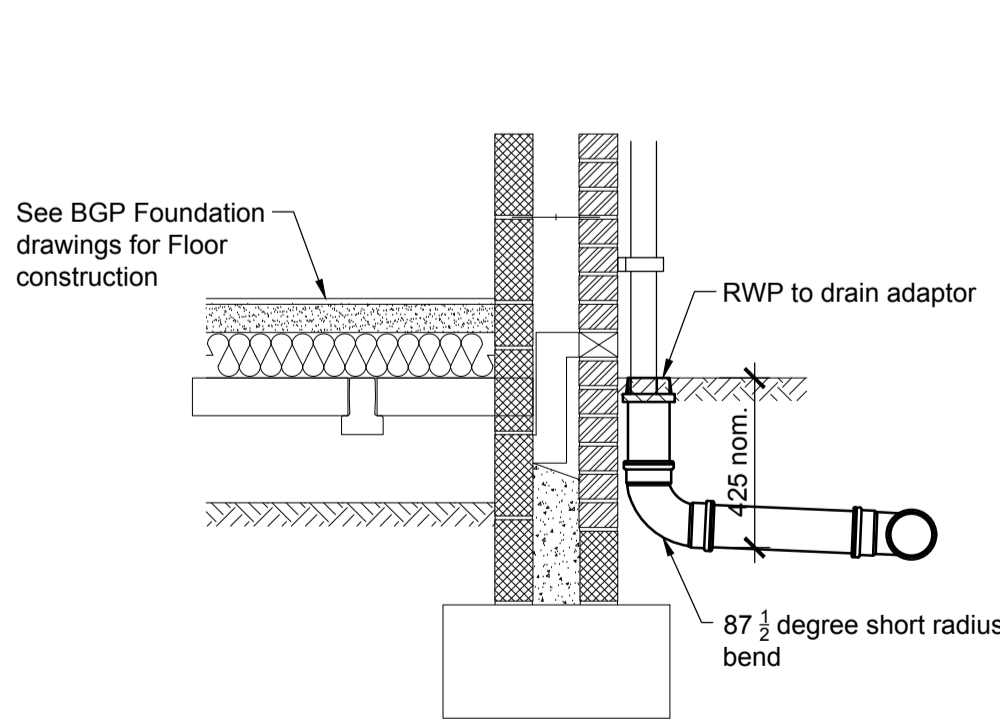
Typical Section through Proposed 1200Ø Pipe
Scale 1:10



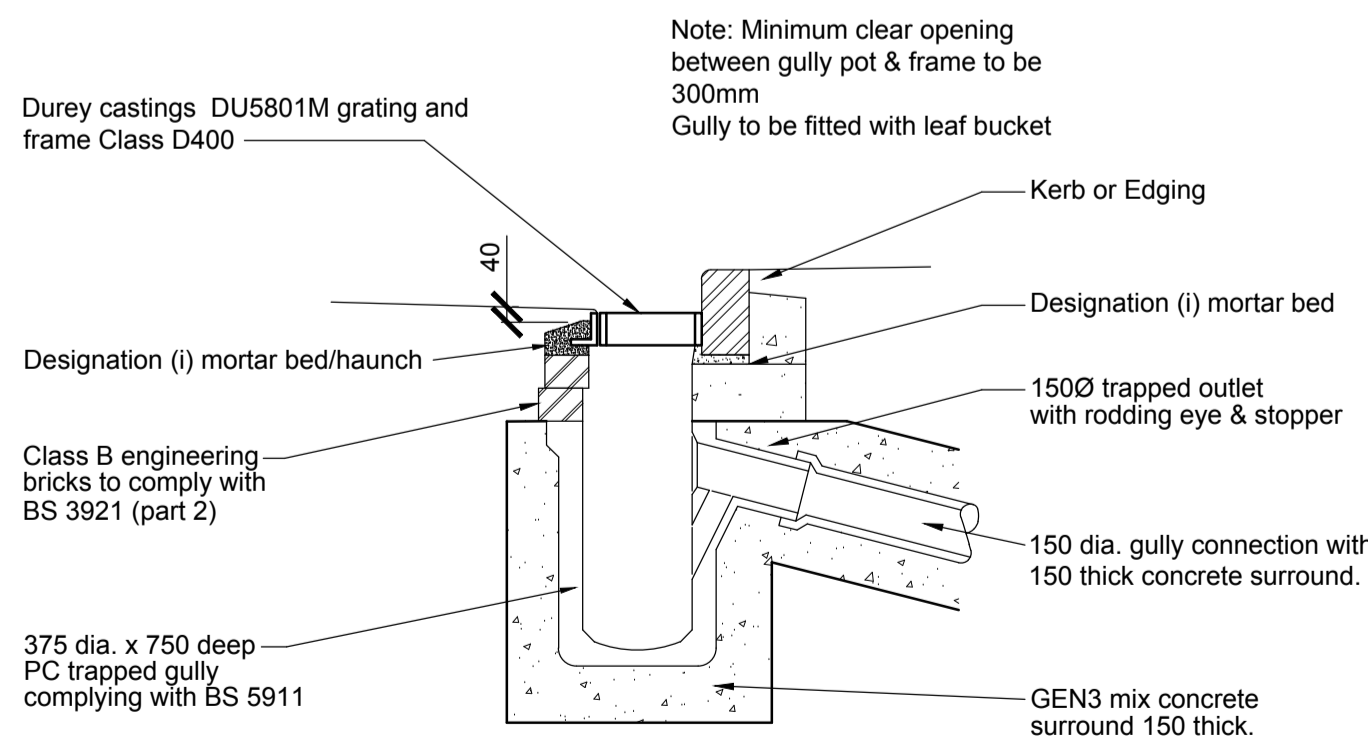
Class "S" Pipe Bedding Detail
(Typical unless noted otherwise)
Scale 1:20



Typical Section through Existing Brick Culvert
to be broken out and removed
Scale 1:10



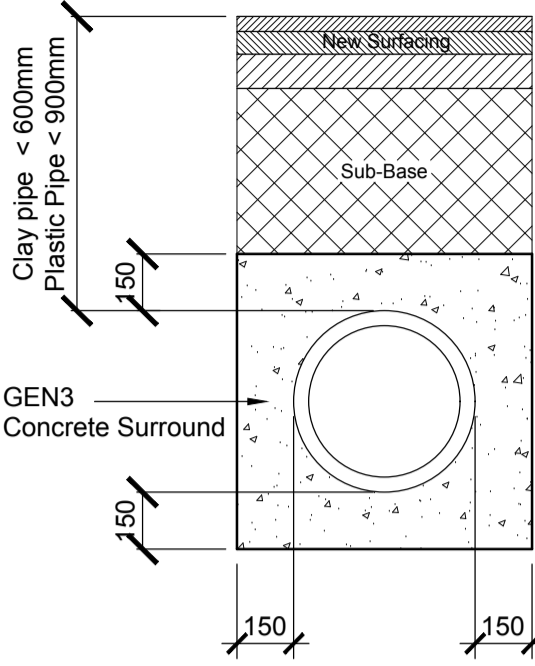
Typical Detail through RWP
Scale 1:20



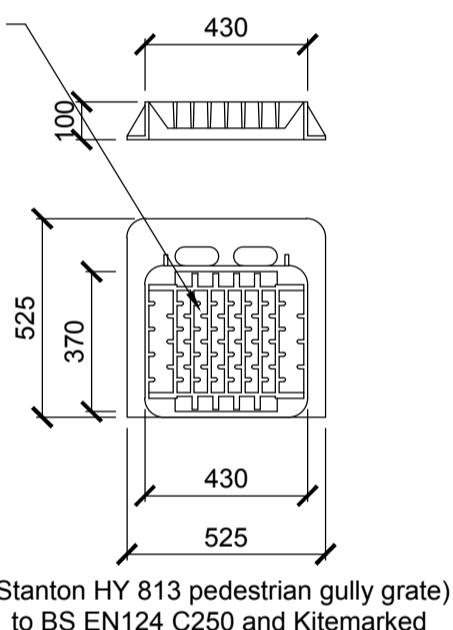
Carriageway Gully Detail
NTS

Reference Drawings

- 17T2239-100 - External Works Plan
- 17T2239-101 - Drainage Plan
- 17T2239-102 - Drainage Diversion Plan
- 17T2239-103 - External Works Details
- 17T2239-104 - Drainage Details
- 17T2239-105 - Site Specific Manholes S1 & S2



Concrete Surround Detail
(Hardstanding areas)
("Flexcell" compressible board to be used at all pipe joint locations)
Scale 1:20



Road Gully Grating
NTS

DO NOT SCALE

- For clauses refer to Sewers for Adoption 6th Edition.
- The developer should take all necessary precautions to avoid causing any damage to, or interference with flow in existing sewers and shall ensure that debris, silt, mud etc. do not enter the sewer.
- Where works are to be carried out on sewers, the contractor must carry out their works in accordance with "The classification and management of confined spaces" published by Water UK, they must also comply with all other relevant health and safety legislation/documentation.
- All materials are to be stored in such a manner as to preserve their quality as to the standard specified in the specification.
- All concrete to be produced on site must be mixed with only potable water, to ensure that it is clean from dirt and contaminants.
- Aggregates for concretes shall comply with the relevant provisions of BS EN 12620 and PD 6682-1.
- Sands for mortar and grouts shall be washed sand, complying with BS EN 13139 and PD 6682-3. All other sands are to comply with BS EN 12620 and PD 6682-1 or BS EN 13139 and PD 6682-3.
- Pulverised-fuel ash (PFA) for use as a component material in emmentitious grout our non structural concrete shall comply with BS 3892-2 & 3.
- Vertified clay pipes and fittings for sewers shall have flexible mechanical joints. Pipes for foul sewers and surface water sewers shall comply with the relevant requirements of BS EN295 and BS65 (Surface water pipes only).
- Pre-cast concrete manhole units of circular cross section for manholes, chambers and wet wells shall comply with the relevant provisions of BS EN 1917 and BS 5911-3.
- Ladders for manholes in a vertical plane are to be mild steel and comply with BS4211, Class A and PD 970.
- GRP ladders shall be manufactured in accordance with BS EN 131, and from glass-reinforced polyester using an appropriate resin for the ladder location. Unidirection reinforcement shall be provided in the GRP matrix to maximise strength.
- Manhole covers and frames shall comply with the relevant provisions of BS EN 124, BS 7903 and Highways Agency guidance document HA 104/02. They shall be of a non-rocking design which do not rely on the use of cushion inserts. Manhole covers shall/must have a clear opening of 600mm x 600mm and shall be Class D400 to BS EN 124 with 150mm deep frames.
- Clay bricks to be used within manholes are to be solid, Class B Engineering bricks complying to BS 3921.
- All bricks shall be frost resistant category F.
- Standard concrete mixes should be in accordance with BS EN 206-1 and BS 8500 and shall be used with a 20mm nominal maximum size of aggregate and a slump class of S2 for a target of 70mm.
- GEN1 concrete to be used for; fillings, blindings, soft spots and drainage slumps. GEN3 concrete to be used for; all other applications. U.N.O.
- Admixtures (including calcium chloride and pigments) shall not be used in the production of concrete.
- High strength concrete topping shall be produced, laid and finished in accordance with the relevant provisions of BS 8204: part 2 and the following approximate mix proportions shall be used: 1part cement, 1part natural sand and 2parts single-sized coarse aggregate.
- All mortar mixes shall be in accordance with BS 5628-1:2005.
- All pipes to be either extra strength VC to BS 65 or PVC to BS 4660 or BS 6481 "UPONOR ULTRARIB". The minimum strength for clay pipes should be as follows: 100mm dia. 40kN/m, 150mm dia. 40kN/m, 225mm dia. 45kN/m and 300mm dia. 72kN/m.
- The minimum crushing strength for concrete pipes should be Class 120 to EN 1916/BS 5911-1 : 2002.
- Plastic pipe class should be certified to WIS 4-35-01 and BS EN 13476.

Issued for Construction	SR	C2	NB	18.12.2019
Issued for Construction	SR	C1	NB	19.07.2019
Issued for Tender	JJH	T1	NB	28.11.2018
Issued for Comment	JJH	P1	NB	29.10.2018
AMENDMENT	BY	REV	CHK	DATE
Rev P = Preliminary T = Tender C = Construction LCI = Last Construction Issue				

In instances where this drawing completes or partly completes a contract, Billingham George & Partners will consider that it's product has been validated, unless in a period not exceeding 90 working days, the client advises to the contrary.

Client
Energy Coast

Project
BEC Innovation Warehouse

Drawing Title
Proposed Drainage Details

Drawn	J. Herbert	Date	October 2018
Checked	N. Baines	Date	October 2018
Scale	As Noted	Original Size	A1

bgp Billingham George & Partners
CIVIL & STRUCTURAL ENGINEERS
BUILDING SURVEYORS
1st Floor, Wellington House, Wellington Court,
Stockton-on-Tees, TS18 3TA
T 01642 876 470 @BGPconsulting
E consulting@bgp-teeside.co.uk - W www.bgp-consulting.co.uk

Drg. No. **17T2239-104** Rev. **C2**