



RIDGE

BENDIX STREET, MANCHESTER

**REPORT TO DISCHARGE DRAINAGE
RELATED PLANNING CONDITION**

AUGUST 2021

Document Control Sheet

Project No: 3356

Project Title: Bendix Street, Manchester

Report Title: Report to Discharge Proposed Drainage Related Planning Condition

Report Reference: BST-RDG-00-ZZ-RP-C-0002

Issue: 1

Status: Final

Date: 10.08.21

Record of Issue

Issue	Status	Author	Approved	Date
1	Final	Eleanor Dale	Kris Clark	10.08.21



Table of Contents

1.0 Introduction..... 1

2.0 Drainage Strategy 2

 2.1 Surface Water Strategy 2

 2.2 Foul Water Strategy 3

3.0 Drainage Related Planning Condition and Ridge Response 4

1.0 Introduction

In 2019 a planning application (Ref: 125681/FO/2019) was submitted to Manchester City Council for the construction of a ground plus 12-storey residential building (Use Class C3) comprising 161 residential units, with ground floor commercial use (Use Class A1, A2, A3, B1, and/or D1 (excluding Places of Worship)) (160sqm) or ancillary residents lounge, disabled car parking, with highways, landscaping and other associated works following demolition of existing buildings.

The application was approved in April 2021 with planning conditions, including a number a related to drainage. This report has been prepared to discharge the pre-commencement conditions.

2.0 Drainage Strategy

2.1 Surface Water Strategy

The site is currently occupied by a locksmith business and an undrained car park. Therefore, the site should be classified as brownfield.

Site investigations confirmed that the site is underlain by Made Ground to depths of 2.45mbgl. Beneath the Made Ground was stiff to very stiff high strength clay to depths of 21.39mbgl. Groundwater was also recorded at depths of between 0.80mbgl and 2.80mbgl.

There are no watercourses in close proximity to the site. There has been the suggestion that the River Tib, a potentially hidden historic watercourse, may flow beneath sites in this area. However, there is no evidence of its existence from the drainage CCTV survey or any intrusive site investigations completed to date. Therefore, the proposal is to follow the same approach as agreed with Manchester City Council on adjacent schemes, which is to notify the Council should any evidence be found once construction works start.

There are no surface water sewers in close proximity to the site. There is a 760mm x 480mm brick combined water sewer running along Thompson Street from the southeast to the northwest. There is another combined sewer running along Bendix Street from southeast to northwest.

In accordance with the Manchester City Council Strategic Flood Risk Assessment, a 50% reduction in surface water runoff rates is recommended for brownfield sites up to a 1 in 100-year storm event, considering climate change. Table 1 below details these rates.

Table 1: Existing Brownfield Runoff Rate

	Impermeable Area (m ²)	Existing Discharge Rate - (Imp Area x 50mm/hr) ÷ 3600	Allowable Discharge Rate (50% Reduction from Existing)
Bendix Street	1130	15.7/s	7.8l/s

Based on the above, surface water from the development site will discharge into the combined sewer in Bendix Street to the southwest. United Utilities have requested a maximum discharge rate of **6l/s** which equates to a greater than 50% reduction on existing runoff rates. Surface water will be attenuated within below ground geo-cellular storage crates prior to controlled release.

In the case of this development, all surface water flows up to the 1 in 100 year event including an allowance for climate change will be retained below ground. The proposed drainage layout for the new development site will be designed in accordance with Building Regulations Part H guidance, i.e.

up to the 30-year storm return period criterion and tested for the extreme 100-year event to confirm no flood risk to the building.

2.2 Foul Water Strategy

A new foul water drainage network will collect foul flows from the new development and outfall unrestricted into the United Utilities Combined Water Sewers within both Bendix Street and Thompson Street.

3.0 Drainage Related Planning Condition and Ridge Response

3.1 Detailed below is each planning condition text in Blue with the Ridge response in Black beneath.

Planning Condition 4

Notwithstanding the details submitted on the Drainage report prepared by Scott Hughes stamped as received by the City Council, as Local Planning Authority, on the 23 December 2019, (a) the development shall not commence, other than demolition and enabling works, until a scheme for the drainage of surface water from that phase of the new development shall be submitted for approval in writing by the City Council as the Local Planning Authority. This shall include:

- *Consideration of alternative green SuDS solutions if practicable;*

The building covers the whole site and therefore there is no scope to use green SuDS. The external areas are all Manchester City Council adopted footpaths so they will be drained into the highway as per the existing scenario. There are too many existing services in the footway for tree pits to be suitable.

- *Details of surface water attenuation that offers a reduction in surface water runoff rate in line with the Manchester, Trafford and Salford Strategic Flood Risk Assessment i.e. at least a 50% reduction in runoff rate compared to the existing rates, as the site is located within a critical drainage area.*

United Utilities have requested the runoff rate be restricted to **6l/s**. This is a greater than 50% reduction in existing runoff rates. Correspondence of this request has been provided in Appendix C.

- *Runoff volume in the 1 in 100-year, 6-hour rainfall shall be constrained to a value as close as is reasonably practicable to the greenfield runoff volume for the same event, but never to exceed the runoff volume from the development site prior to redevelopment.*

The site investigation recorded groundwater at depths of between 0.80mbgl and 2.80mbgl. Therefore, there is no scope to use infiltration SuDS to reduce volumes. The existing site is also brownfield and in the redevelopment scenario there is a greater than 50% reduction on existing flow rates. It is not achievable to reduce the volume of runoff any further.

- *Evidence that the drainage system has been designed (unless an area is designed to hold and/or convey water as part of the design) so that flooding does not occur during a 1 in 100-year rainfall event with allowance for climate change in any part of a building.*

The proposed drainage layout has been designed in accordance with BS EN 752: 2008 and Building Regulations Part H guidance. All surface water flows up to the 1 in 100-year event including an allowance for climate change will be retained below ground.

- *Assessment of overland flow routes for extreme events that is diverted away from buildings (including basements). Overland flow routes need to be designed to convey the flood water in a safe manner in the event of a blockage or exceedance of the proposed drainage system capacity*

including inlet structures. A layout with overland flow routes needs to be presented with appreciation of these overland flow routes with regards to the properties on site and adjacent properties off site.

The proposed building covers the whole site, as such the surface water drainage has been designed with no exceedance flooding. In the event of a blockage, flood waters will be contained within the cycle storage which encompasses the majority of the below ground drainage networks. No habitable areas of the proposed development will be impacted. The FFL of the building is elevated in relation to the surrounding footway – no surface water from the footway is diverted towards the building.

- *Hydraulic calculation of the proposed drainage system.*

Hydraulic calculations have been provided in Appendix B.

- *Construction details of flow control and SuDS elements*

For construction details refer to drawings BST-RDG-00-ZZ-DR-C-0102 & 0103 in Appendix A.

(b) The phase shall then be constructed in accordance with the approved details, within an agreed timescale.

The regular management and maintenance of surface water and foul water drainage systems is essential to ensure that the system always operates at its maximum efficiency. The maintenance schedules below taken from CIRIA document C753 outlines the required programme of maintenance for the geocellular storage.

TABLE 21.3 Operation and maintenance requirements for attenuation storage tanks			
	Maintenance schedule	Required action	Typical frequency
	Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
		Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
		For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
		Remove sediment from pre-treatment structures and/or internal forebays	Annually, or as required
	Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
	Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
		Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

Appendix A – Ridge Design Drawings

CONTENTS	
Identifier	Name
BST-RDG-00-ZZ-DR-C-0101	Proposed Drainage GA
BST-RDG-00-ZZ-DR-C-0102 & 0103	Drainage Details
BST-RDG-00-ZZ-DR-C-0104	Manhole Schedule
BST-RDG-00-ZZ-DR-C-0105	Flood Route Plan

GENERAL NOTES

1. DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT SPECIFICATIONS, ENGINEERS, ARCHITECTS & SERVICES DRAWINGS, INCLUDING APPROVED BUILDERS WORK DRAWINGS. CONTRACTOR TO NOTIFY ENGINEER OF DISCREPANCIES BETWEEN STRUCTURAL DRAWINGS AND SPECIFICATIONS OR OTHER DRAWINGS.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
3. THE POSITION, SIZE AND LEVELS OF ALL EXISTING DRAINS ARE TO BE CONFIRMED ON SITE PRIOR TO THE COMMENCEMENT OF THE WORKS AND ANY DISCREPANCIES REPORTED IMMEDIATELY TO THE ENGINEER.
4. DO NOT SCALE FROM THIS DRAWING. WORK TO DIMENSIONS OR CO-ORDINATES PROVIDED. ALL LEVELS ARE IN METRES AND ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS OTHERWISE NOTED. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS, SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY.

DRAINAGE NOTES

1. THE CONTRACTOR SHALL ALLOW FOR THE PROTECTION, TEMPORARY AND PERMANENT SUPPORT AND DIVERSION WORKS AS NECESSARY, TO ALL EXISTING SERVICES TO THE SATISFACTION OF THE PUBLIC UTILITIES.
2. THE CONTRACTOR SHALL ALLOW FOR DEALING WITH SURFACE WATER RUN-OFF INTO EXCAVATIONS AND FROM GROUNDWATER BY MEANS OF SUMPS, PUMPING AND DE-WATERING AS APPROPRIATE, IN ORDER TO KEEP THE EXCAVATION AS REASONABLY DRY AS POSSIBLE DURING THE CONSTRUCTION OF THE WORKS.
3. ALL PRIVATE DRAINAGE WITHIN THE SITE IS TO COMPLY WITH THE REQUIREMENTS OF BSEN752 AND BUILDING REGULATIONS

PART H. WHERE APPROPRIATE, ALL ADOPTED DRAINAGE SHALL BE DESIGN AND CONSTRUCTED IN ACCORDANCE WITH SEWERS FOR ADOPTION 8th EDITION AND THE ADOPTING AUTHORITIES STANDARD REQUIREMENTS.

4. ALL PRIVATE DRAINAGE PIPES TO BE LAID IN TRENCHES BEDDED CLASS 'B' ON SINGLE SIZED AGGREGATE AND BACKFILLED WITH APPROVED SELECTED FILL (40mm DOWN) REUSED FROM EXCAVATED MATERIAL. UNDER BUILDINGS AND WHERE COVER TO INVERT IS LESS THAN 1200mm UNDER TRAFFICKED AREAS PIPES TO BE CAST IN CONCRETE (CLASS Z BEDDING). CLASS 'S' BED AND SURROUND MAY BE REQUIRED FOR SEWERS TO BE ADOPTED. REFER TO SPECIFIC DRAWINGS FOR FURTHER INFORMATION.
5. SELECTED BACKFILL MATERIAL SHALL CONSIST OF UNIFORM EXCAVATED MATERIAL, FREE FROM STONES LARGER THAN 40mm, CLAY LUMPS LARGER THAN 75mm, TREE ROOTS, CONTAMINATED MATERIAL. SELECTED BACKFILL MATERIAL IS TO BE PLACED IN LAYERS NOT EXCEEDING 150mm THICKNESS. THE MATERIAL SHALL BE COMPACTED TO ACHIEVE NOT LESS THAN 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED IN LABORATORY COMPACTION TESTS. SUFFICIENT TESTING SHALL BE CARRIED OUT, BY THE CONTRACTOR, TO DEMONSTRATE THIS IS ACHIEVED (NUMBER AND FREQUENCY OF TESTING TO BE AGREED WITH RIDGE). WHERE THE MOISTURE CONTENT OF THE MATERIAL PROHIBITS COMPLIANCE WITH THE ABOVE 6F1 OR SIMILAR IMPORTED MATERIAL SHALL BE USED.
6. CONCRETE PROTECTION TO PIPEWORK IS TO BE PROVIDED AS FOLLOWS:
 - a) ALL PIPEWORK WITHIN PEDESTRIAN/SOFT AREAS WITH LESS THAN 600mm COVER.
 - b) ALL PIPEWORK SUBJECT TO VEHICULAR OVERRUN WITH LESS THAN 1.2m COVER.
7. ALL PIPEWORK WITHIN MANHOLES ARE TO BE LAID SOFFIT TO SOFFIT (U.N.O). ALL CHAMBER INVERT LEVELS ARE FOR THE OUTGOING PIPE LEVELS. BACKDROP PIPEWORK SHALL BE CONNECTED AT SOFFIT TO SOFFIT WITH THE RODDING ACCESS LEVEL SPECIFIED.

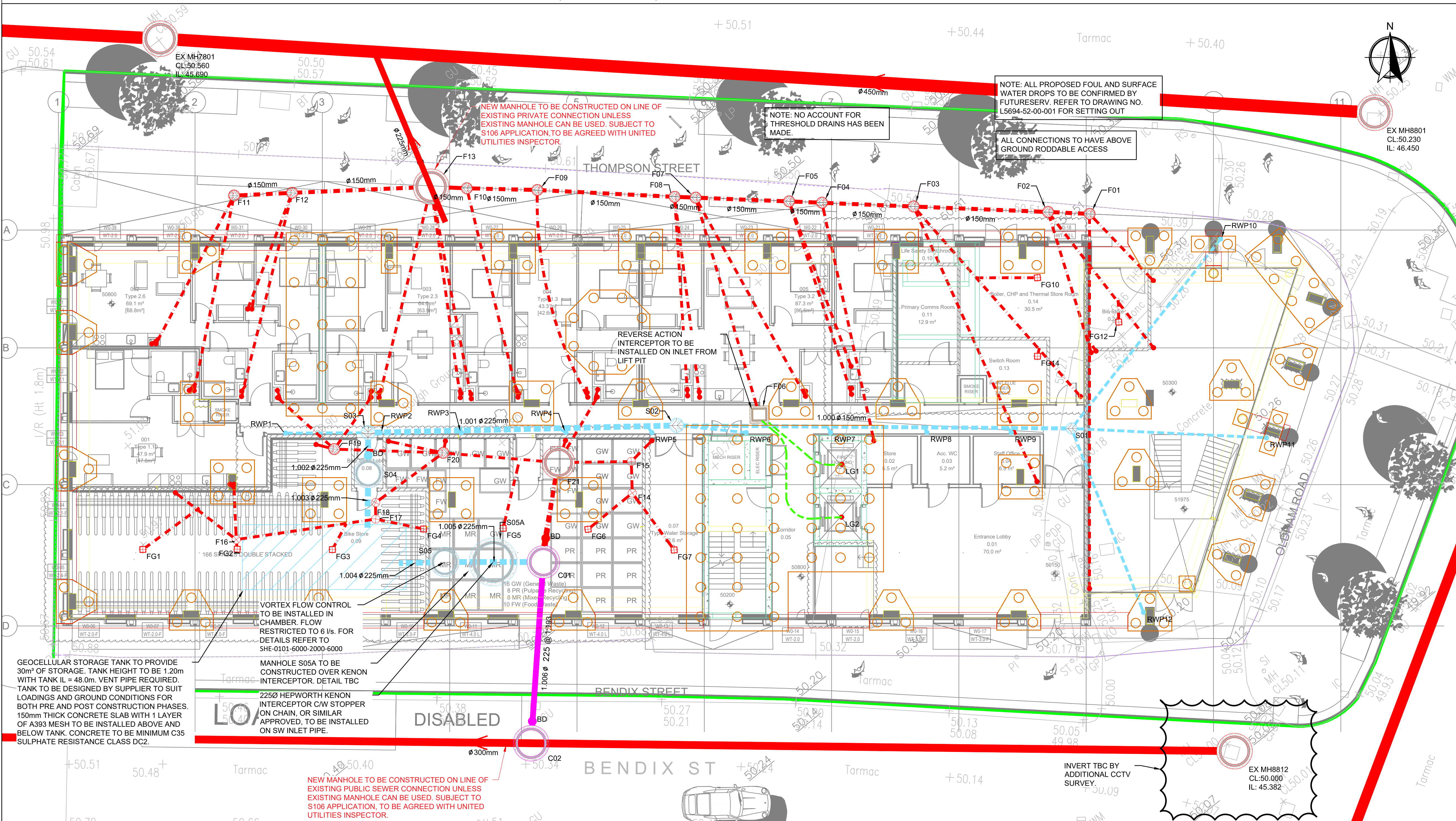
8. ALL DRAINS TO BE LAID ACCURATELY TO LINE AND LEVEL IN STRICT ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.
9. ANY GRADIENTS OF DRAINS INDICATED ARE INDICATIVE ONLY AND THE CONTRACTOR SHALL INSTALL THE DRAINS TO THE SPECIFIED LEVELS SHOWN FOR EACH MANHOLE (U.N.O). CATCHPIT INVERT LEVELS ARE FOR THE OUTGOING PIPE WITH THE SUMP LEVEL SPECIFIED SEPARATELY.
10. CO-ORDINATE SETTING OUT INFORMATION FOR MANHOLES IS TO THE INTERSECTION THE DRAINS AND NOT THE CENTRE OF THE MANHOLE.
11. COVER LEVELS OF THE MANHOLES ARE PROVISIONAL AND SUBJECT TO ADJUSTMENT ON SITE TO SUIT THE FINISHED GROUND LEVELS. ALL EXTERNAL WORKS CONSTRUCTION AREAS TO BE AS LOCATED BY THE ARCHITECT.
12. MANHOLE COVERS AND FRAMES ARE TO BE IN ACCORDANCE WITH BSEN124 AND THE FOLLOWING:
 - a) VEHICULAR AREAS: CLASS D400 (E600 IN VULNERABLE SERVICE YARD LOCATIONS), DOUBLE TRIANGULAR, 150mm DEEP DUCTILE IRON COVER AND FRAME WITH THREE POINT COVER SEATING, BADGED FW OR SW FOR FOUL OR SURFACE WATER DRAINAGE.
 - b) PEDESTRIAN AREAS: CLASS B125, 100mm DEEP, BADGED FW OR SW FOR FOUL OR SURFACE WATER DRAINAGE.
13. POSITIONS AND SIZES OF ABOVE GROUND FOUL AND SURFACE WATER DRAINAGE CONNECTIONS ARE TO BE CONFIRMED PRIOR TO CONSTRUCTION WITH THE ARCHITECT & M&E ENGINEER.
14. GULLY GRATINGS AND STEEL CHANNEL COVERS ARE TO BE IN ACCORDANCE WITH BSEN124 AS FOLLOWS:
 - a) AREAS SUBJECT TO VEHICULAR OVERRUN: CLASS D400 MINIMUM.
 - b) AREAS NOT SUBJECT TO REGULAR VEHICLE OVERRUN (ADJACENT TO KERBS ETC): CLASS C250.

- c) GULLY GRATES ADJACENT TO KERBS SHALL BE HINGED ON THE SIDE OF THE TRAFFIC DIRECTION (LEFT HAND SIDE).
15. ALL BRICKWORK IN CONNECTION WITH DRAINAGE IS TO BE SOLID CLASS B ENGINEERING BRICK TO BS3921.
16. ALL PRECAST CONCRETE PIPES, CHAMBER PRODUCTS AND ROAD GULLIES SHALL BE TO BS5911 AND BE KITEMARKED.
17. ALL DRAINAGE INSITU CONCRETE SHALL BE GEN3 (U.N.O).
18. ALL INSITU AND CONCRETE PRODUCTS SHALL COMPLY WITH THE REQUIREMENTS FOR SULPHATE EXPOSURE IN ACCORDANCE WITH BRE SPECIAL DIGEST 1, CONCRETE IN AGGRESSIVE GROUND (2001) PART 1: TABLE 2.
19. UPON COMPLETION OF THE WORKS THE CONTRACTOR SHALL CLEAN ALL DRAINAGE BY JETTING, REMOVING ALL DEBRIS FROM SITE. NO DEBRIS SHALL BE PERMITTED TO ENTER THE EXISTING DRAINAGE SYSTEM.
20. CONSTRUCTION JOINTS IN CONCRETE SURROUND MUST NOT BE WITHIN 150MM OF CHAMBER/SHAFT RING JOINTS.
21. ROCKER PIPES TO BE SURROUNDED WITH CONCRETE LOCATED 150mm MINIMUM 200mm MAXIMUM FROM THE FIRST FLEXIBLE JOINT TO THE MANHOLE WALL.
22. SOFT SPOTS IN THE TRENCH FORMATION SHALL BE REMOVED AND REPLACED WITH GRANULAR BEDDING UNLESS INSTRUCTED OTHERWISE.
23. LATERAL CONNECTIONS IN BETWEEN MANHOLE RUNS SHALL BE FORMED BY USING PURPOSE MADE JUNCTION FITTINGS. BEND FITTINGS SHALL BE PROVIDED WHERE APPROPRIATE TO DIRECT THE FLOW INTO MAIN RUNS.
24. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO LIAISE WITH BUILDING CONTROL FOR APPROVALS, INTERIM INSPECTION, SNAGGING AND FINAL INSPECTIONS OF THEIR WORK.

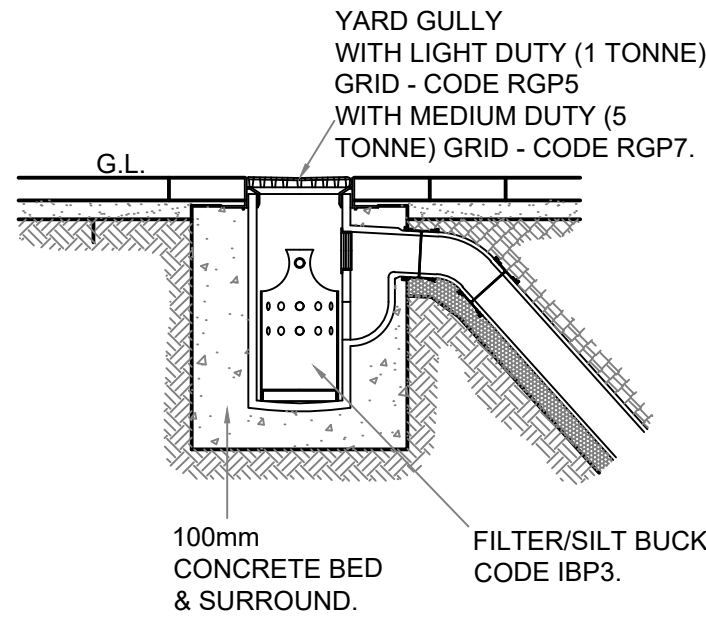
25. THE CONTRACTOR SHALL CONFIRM THE LOCATION OF ALL EXISTING STATUTORY UNDERTAKERS APPARATUS AND SERVICE CONNECTIONS ADJACENT TO AND CROSSING THE WORKS BY TRIAL PITS PRIOR TO COMMENCING MACHINE DIG.
26. AT THE CONCLUSION OF THE WORKS THE CONTRACTOR SHALL PROVIDE A MARKED UP DRAWING TO RECORD ANY AS BUILT VARIATIONS NOT SHOWN ON THE DRAWINGS.
27. THE DRAINAGE SYSTEM IS NOT DESIGNED TO ACCEPT UNTREATED EFFLUENT FROM A COMMERCIAL KITCHEN CONTAINING GREASE AND OILS. REMOVAL OF GREASE AND OIL SHOULD BE MADE AT SOURCE USING A FLOOR MOUNTED ABOVE GROUND GREASE REMOVAL SYSTEM. IT IS RECOMMENDED THAT A MECHANICAL GREASE REMOVAL SYSTEM BE EMPLOYED FOR THIS PURPOSE NOT A PASSIVE SYSTEM.
28. PIPEWORK TO BE OF THE FOLLOWING MANUFACTURER: 100 / 150 / 225MM DIAMETER HEPWORTH SUPERSLEEVE VITRIFIED CLAY PIPES (40kN/mm CRUSHING STRENGTH), 300mm + TO BE CONCRETE CLASS M. ALTERNATIVELY 'POLYSEWER' UPVC DRAINAGE SYSTEM BY POLYPIPE WHEN INSTALLED IN LINE WITH THE MANUFACTURERS RECOMMENDATIONS. FILTER DRAINAGE TO BE PERFORMED HDPE.
29. ALL RWP, WPC & GULLY CONNECTIONS TO BE 100mm DIA UNO & ARE RODDABLE AT LOCATIONS ABOVE GROUND LEVEL.
30. ALL INSPECTION CHAMBERS WITH A DEPTH GREATER THAN 1.2m TO HAVE A 350mm DIAMETER REDUCING PLATE LOCATED BENEATH COVER AND FRAME TO PREVENT ACCESS.

DRAINAGE KEY

- EXISTING CW DRAIN
- EXISTING CW MANHOLE
- PROPOSED CW DRAIN
- PROPOSED CW MANHOLE
- PROPOSED FW DRAIN
- PROPOSED FW MANHOLE
- PROPOSED SW DRAIN
- PROPOSED SW MANHOLE
- SITE BOUNDARY

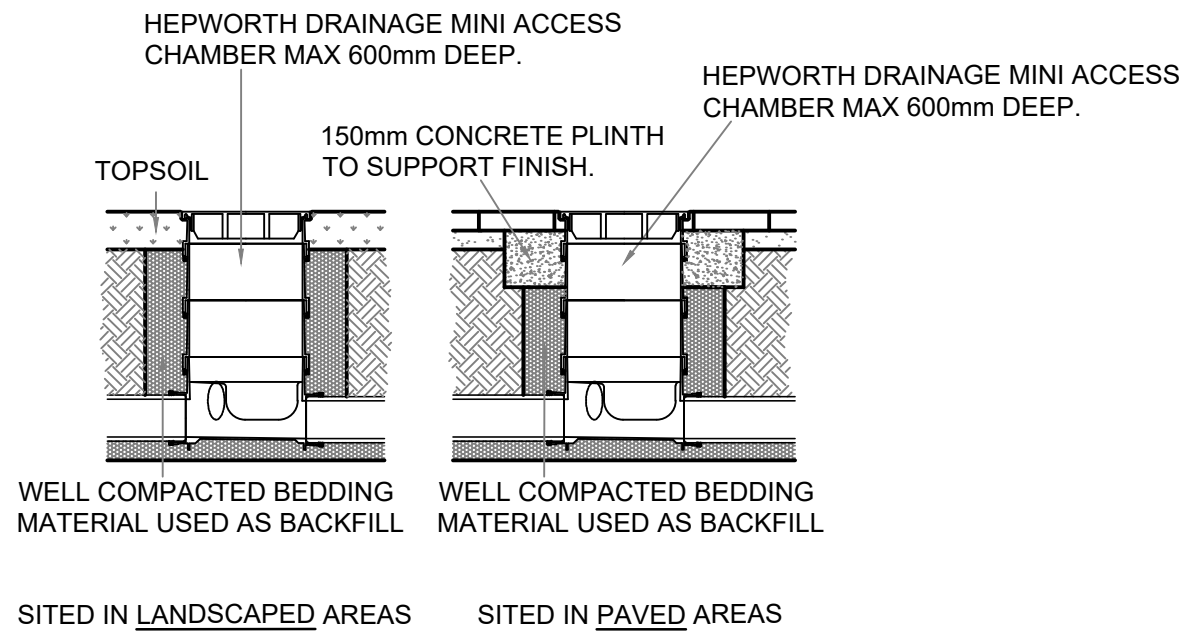


THE DEPTH OF THE GULLY CAN BE INCREASED BY UPTO 300mm BY FITTING A 225mm COUPLING CODE VC1/3 AND A 300mm HIGH RAISING PIECE CODE SIC3/1 BETWEEN THE FRAME AND THE GULLY BODY.

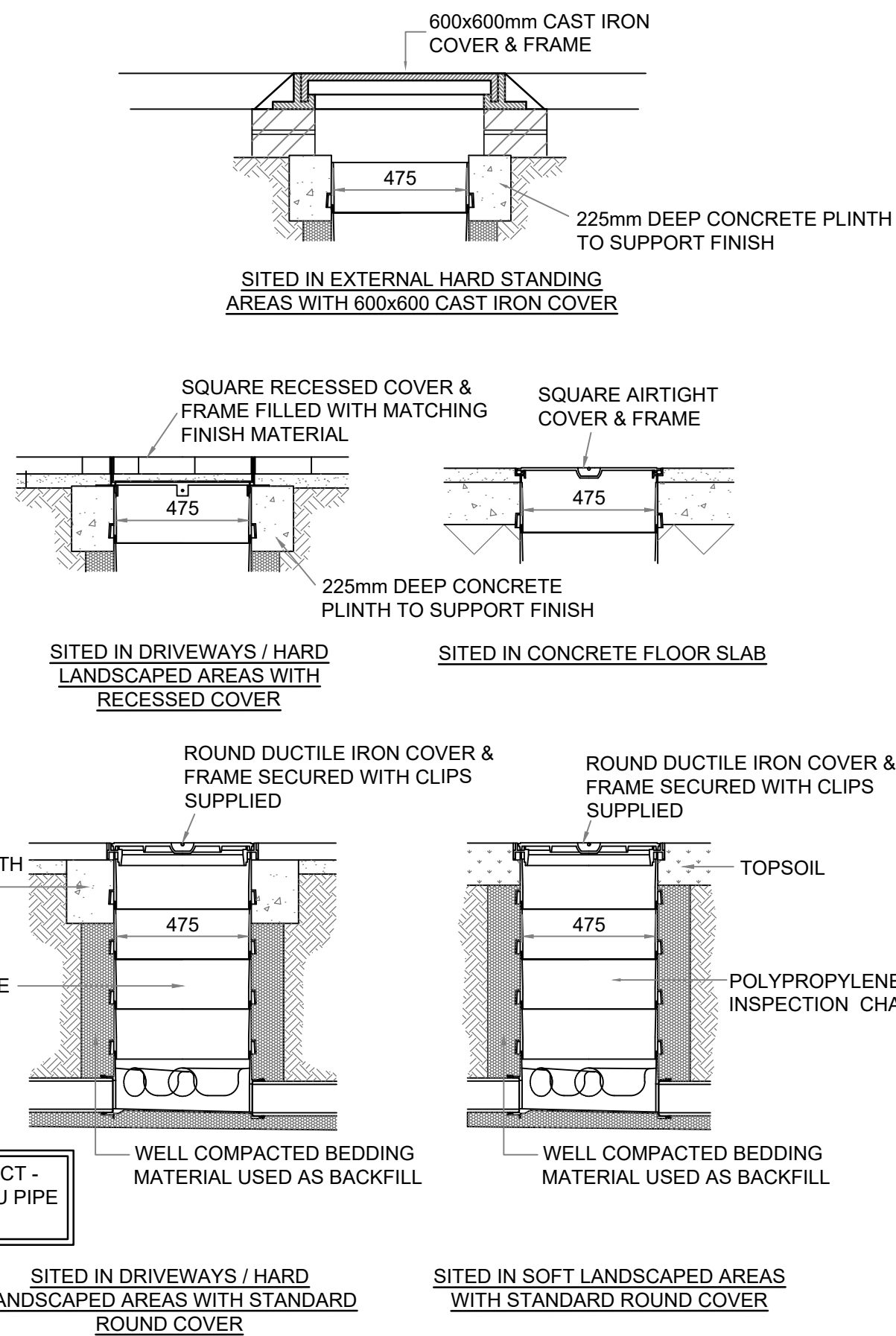


YARD GULLY

(SHOWN AS HEPWORTH PRODUCT BUT OTHER SIMILAR CAN BE USED)



MINI ACCESS CHAMBERS (600mm DEEP)

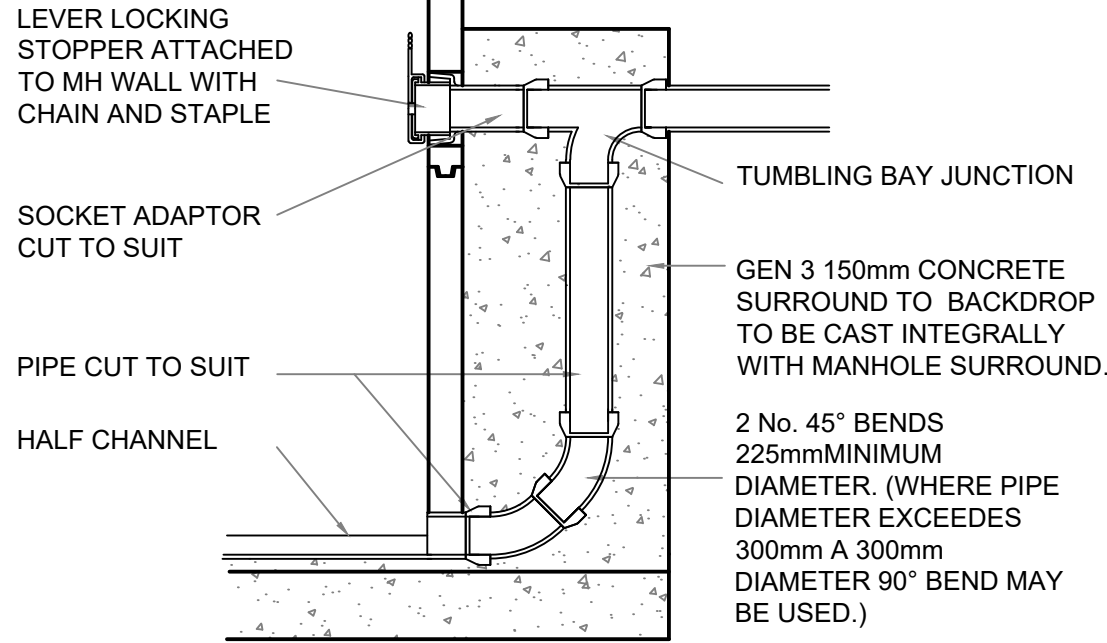


POLYPROPYLENE INSPECTION CHAMBER INSTALLATION DETAIL

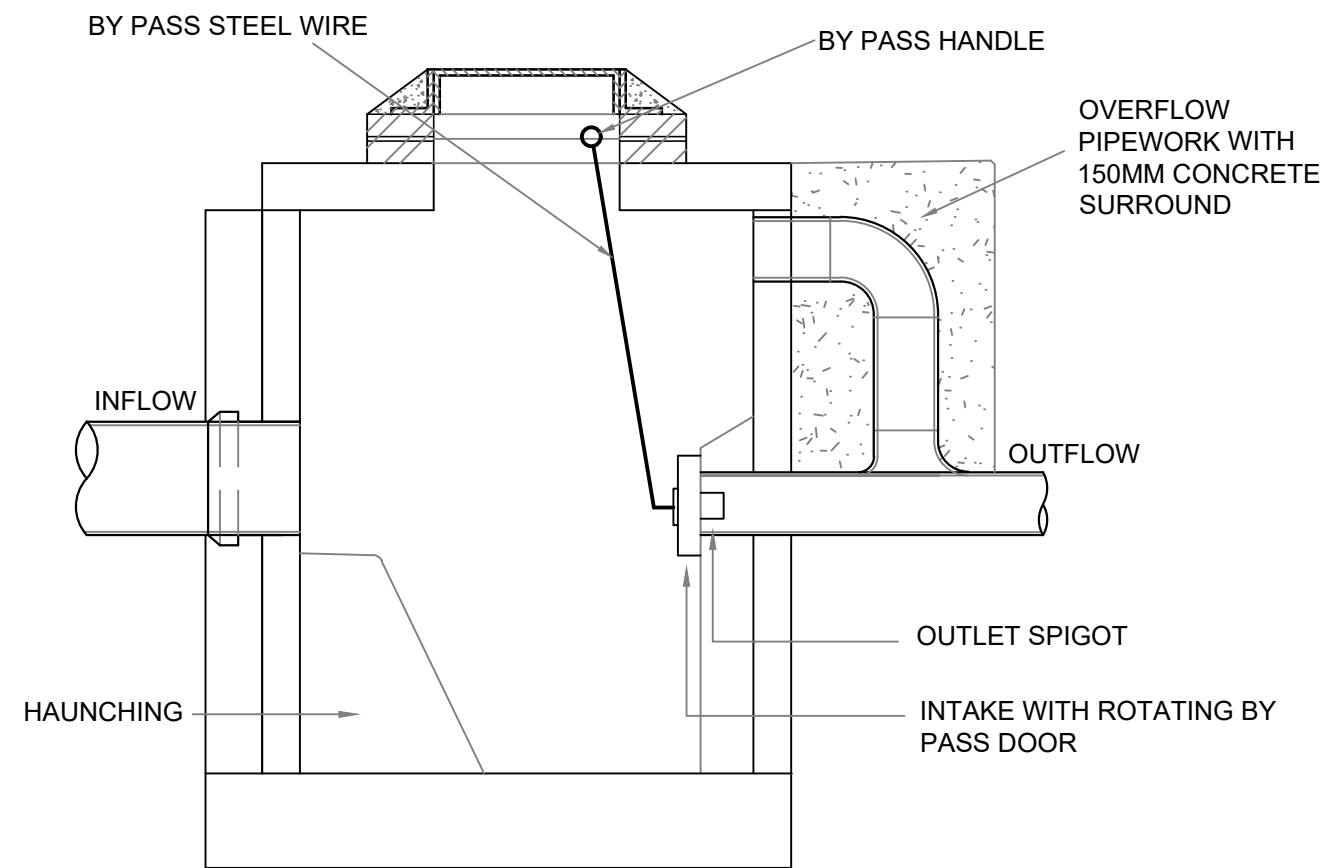
NOTES

- GULLY POTS: HIGHWAY GULLIES P.C.C. TO B.S. 5911 GULLY POT TO BE OF 100 LITRES CAPACITY.
- MAXIMUM TRENCH WIDTH FOR 150mm GULLY LEAD IS 600mm.
- NUMBER OF BENDS MAY VARY DUE TO SITE DIFFERENCES - SEE DRAINAGE SCHEDULE.
- CONCRETE SURROUND TO PIPES SHALL ALWAYS FINISH AT A JOINT.
- HEAVY DUTY, CAST IRON, LAMPHOLE TYPE COVER IN HARDSTANDING AND AREAS ACCESSIBLE TO VEHICULAR TRAFFIC, TO B.S. EN 124. 1994 CLASS D400, C250, OR B125 DEPENDANT ON LOCATION.
- COVER SLAB TO BE 200MM THICK GRADE C20 CONCRETE.

INVERT OF RODDING EYE TO BE NOT GREATER THAN 1.5m ABOVE TOP OF BENCHING. (UNLESS SPECIFIC MAN ACCESS REQUIREMENTS ARE PROVIDED.)

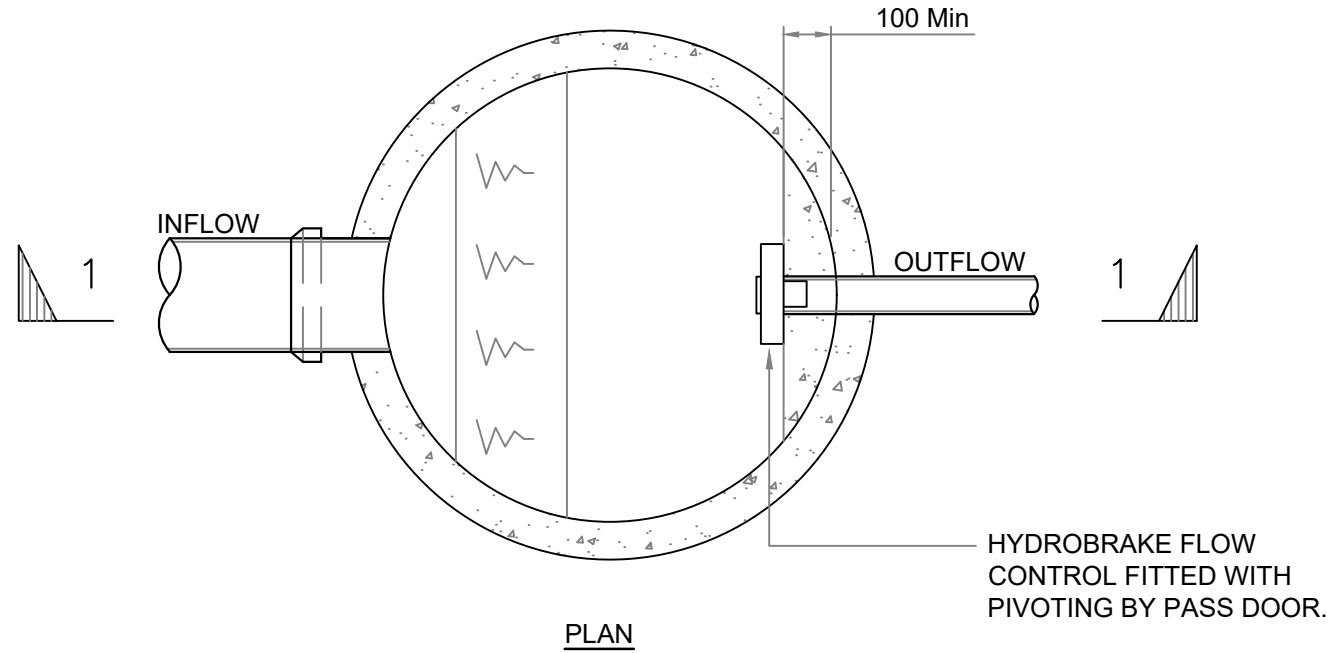


EXTERNAL VERTICAL BACKDROP



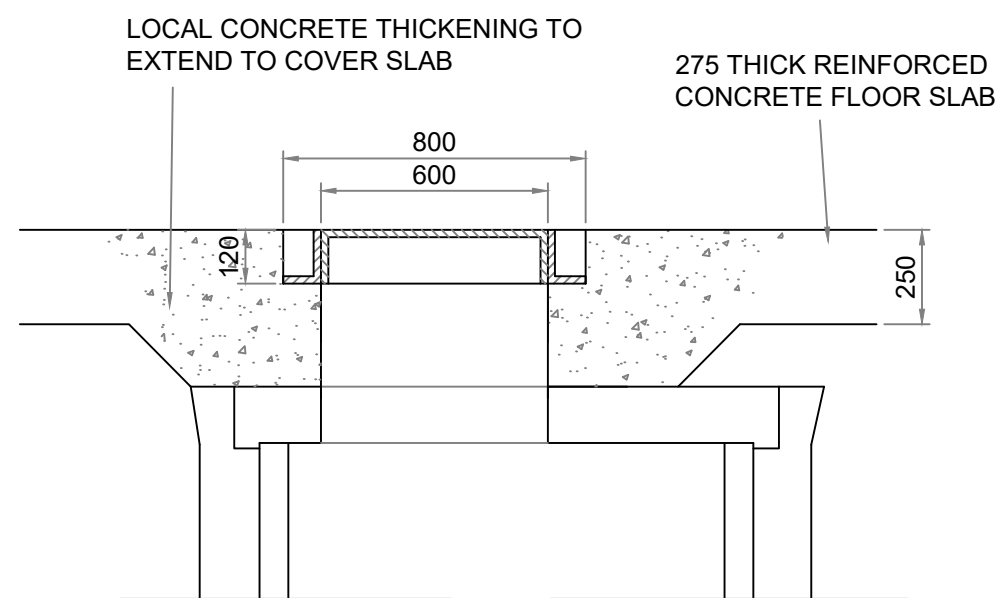
SECTION 1-1

NOTE: THIS DRAWING IS INDICATIVE ONLY. SEE MANUFACTURERS DRAWINGS AND SPECIFICATION FOR CONSTRUCTION DETAILS.

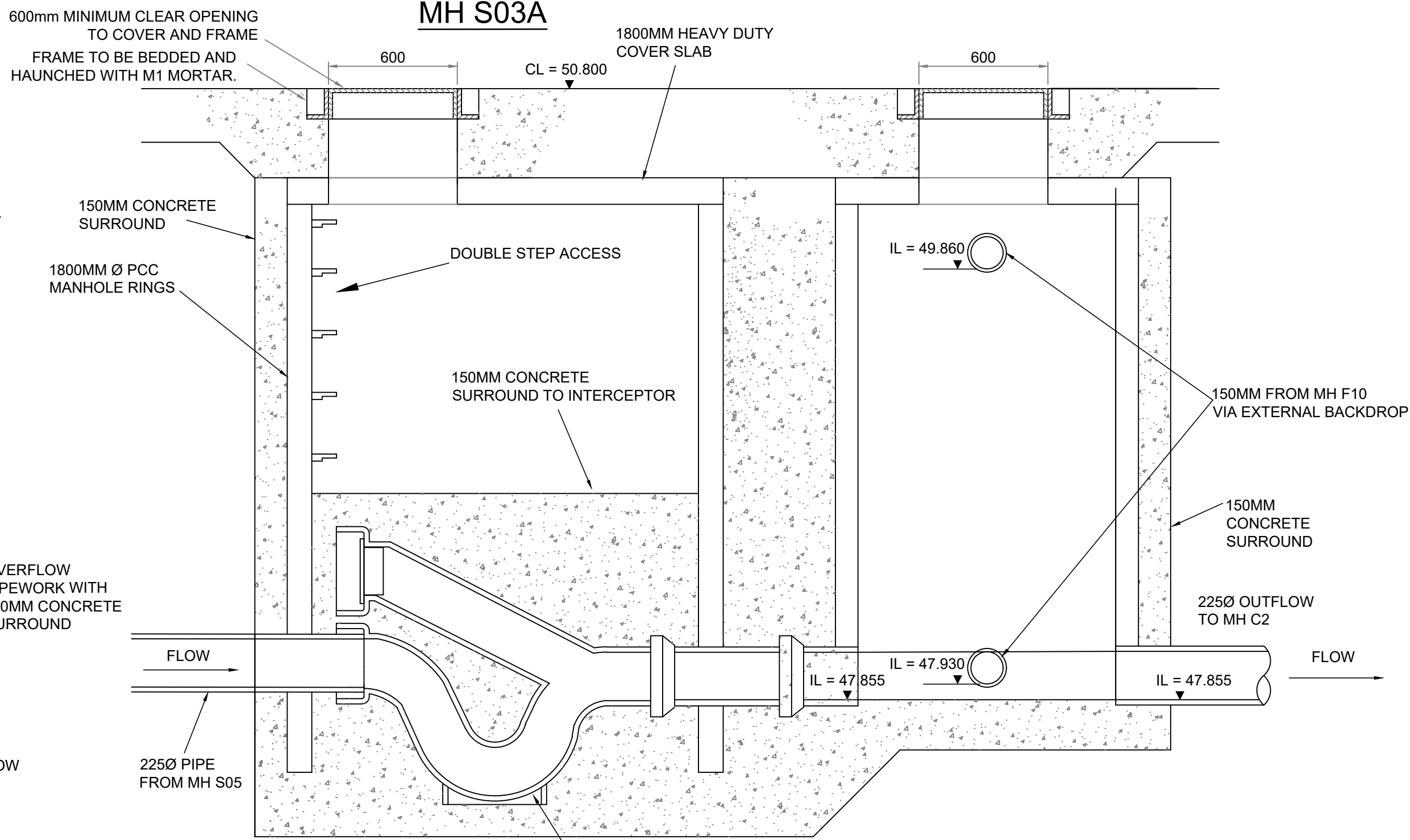


PLAN

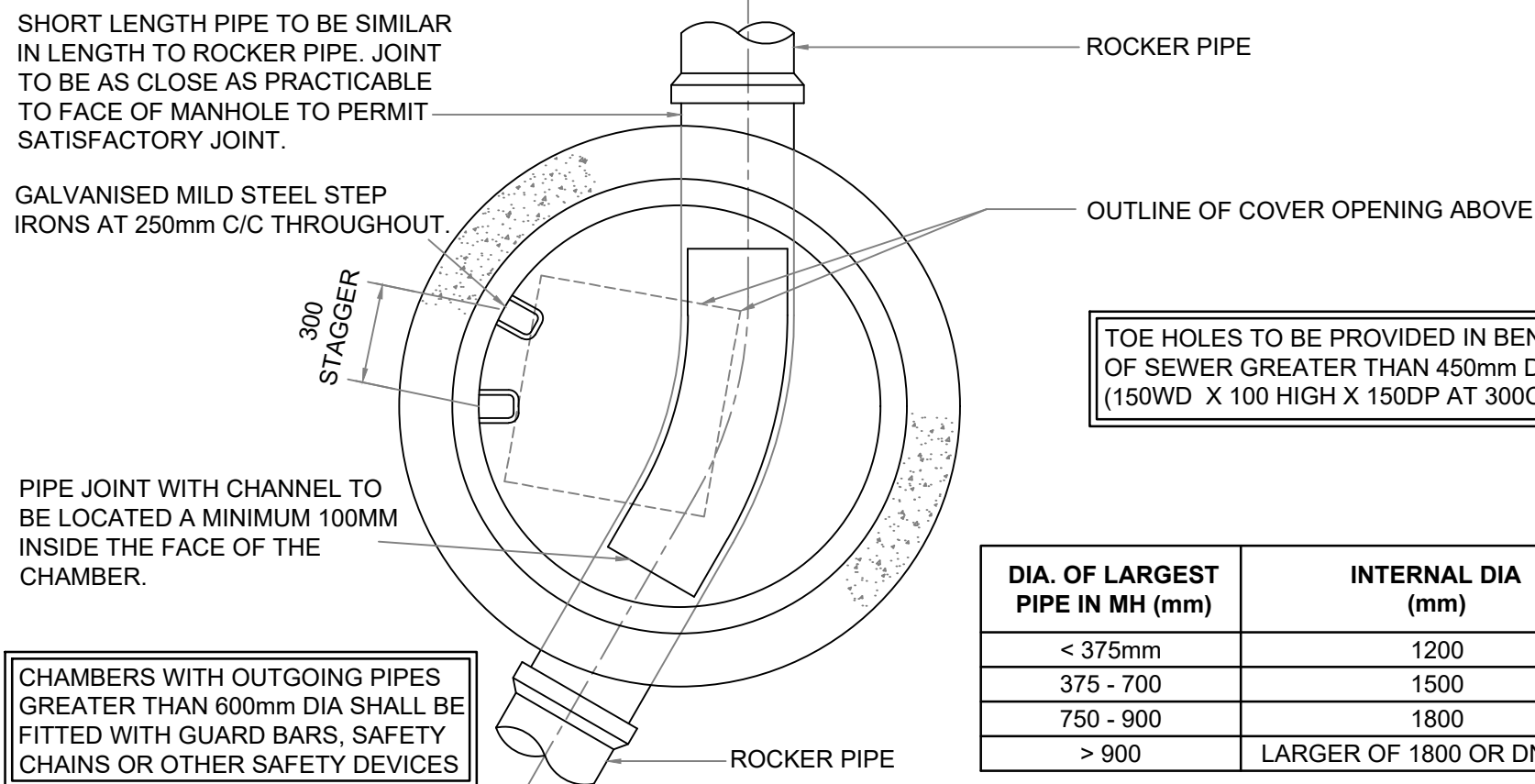
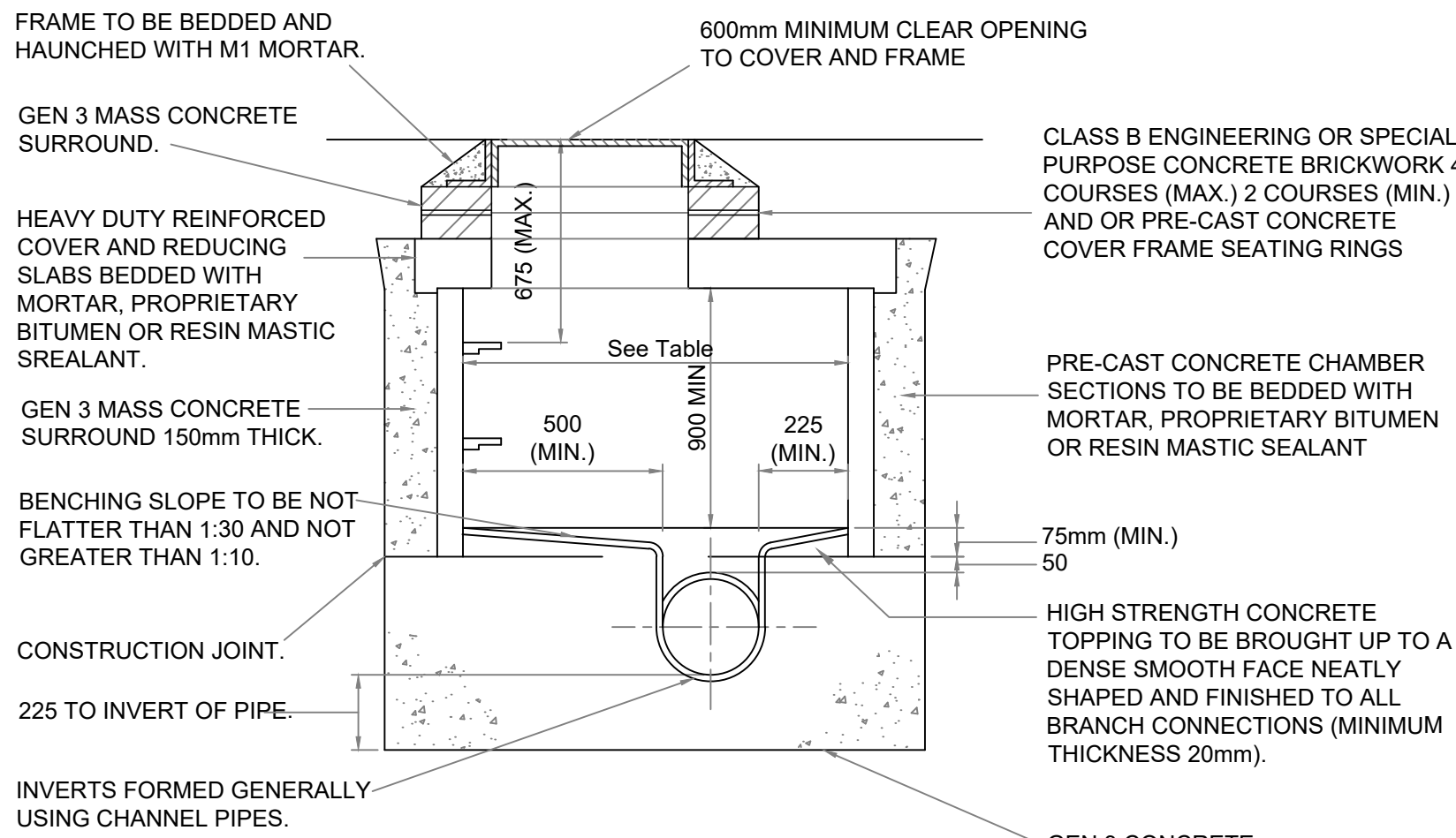
VORTEX CONTROL CHAMBER



COVER DETAIL FOR MANHOLE TYPE B LOCATED IN CONCRETE FLOOR SLAB



SECTION THROUGH MH S05A TO MH C1



DIA. OF LARGEST PIPE IN MH (mm)	INTERNAL DIA (mm)
< 375mm	1200
375 - 700	1500
750 - 900	1800
> 900	LARGER OF 1800 OR DN + 900

(1.5-3m DEEP, COVER LEVEL TO PIPE SOFFIT)

MANHOLE TYPE B

GENERAL NOTES

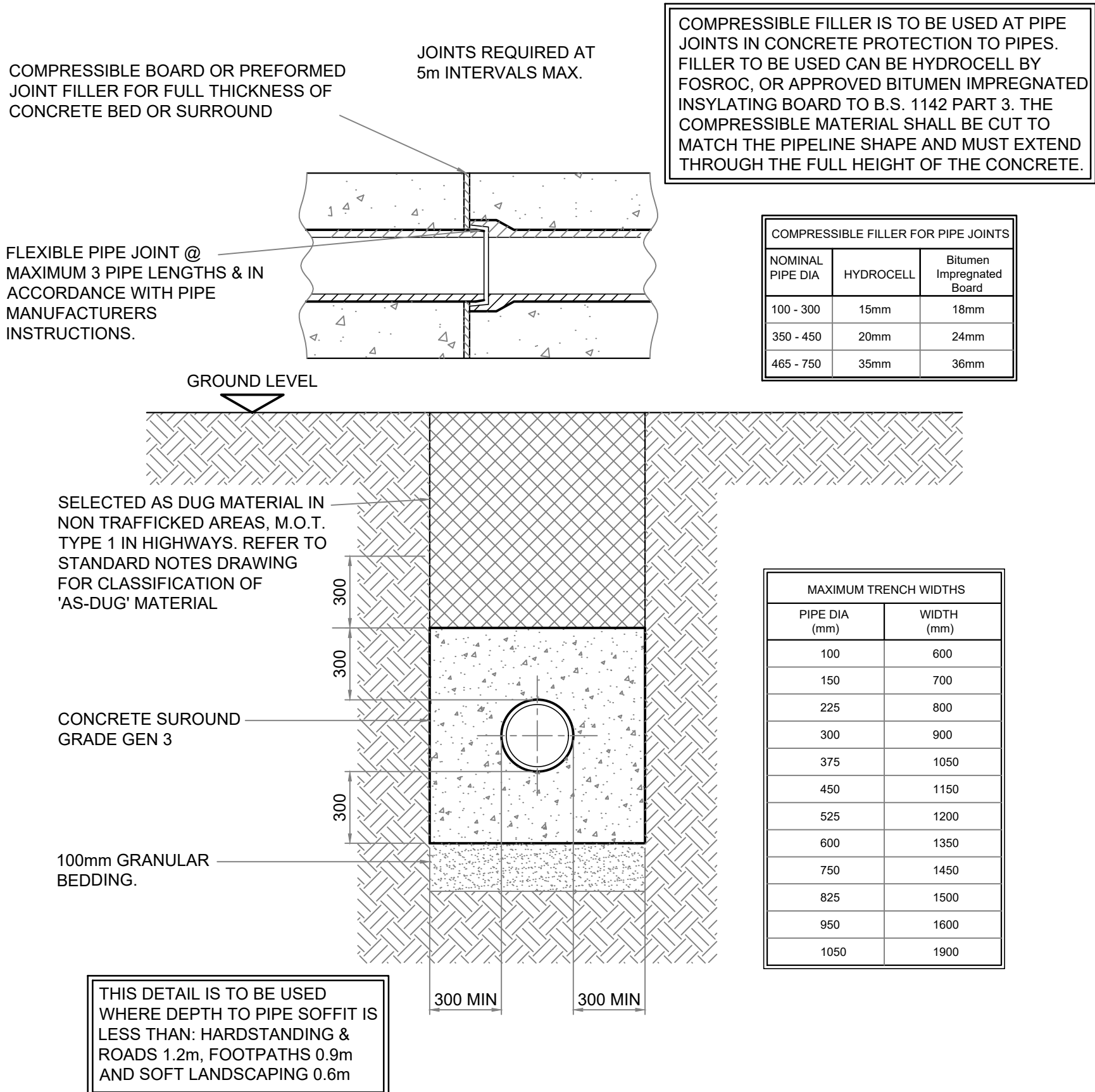
- DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT SPECIFICATIONS, ENGINEERS, ARCHITECTS & SERVICES DRAWINGS, INCLUDING APPROVED BUILDERS WORK DRAWINGS. CONTRACTOR TO NOTIFY ENGINEER OF DISCREPANCIES BETWEEN STRUCTURAL DRAWINGS AND SPECIFICATIONS OR OTHER DRAWINGS.
- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
- THE POSITION, SIZE AND LEVELS OF ALL EXISTING DRAINS ARE TO BE CONFIRMED ON SITE PRIOR TO THE COMMENCEMENT OF THE WORKS AND ANY DISCREPANCIES REPORTED IMMEDIATELY TO THE ENGINEER.
- DO NOT SCALE FROM THIS DRAWING. WORK TO DIMENSIONS OR CO-ORDINATES PROVIDED. ALL LEVELS ARE IN METRES AND ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS OTHERWISE NOTED. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS, SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY.

P2	18.06.21	AS	PG	ISSUED FOR COSTING
P1	22.09.20	AS	PG	ISSUED FOR TENDER
No	DATE	DRAWN	REV'D ENG.	AMENDMENT

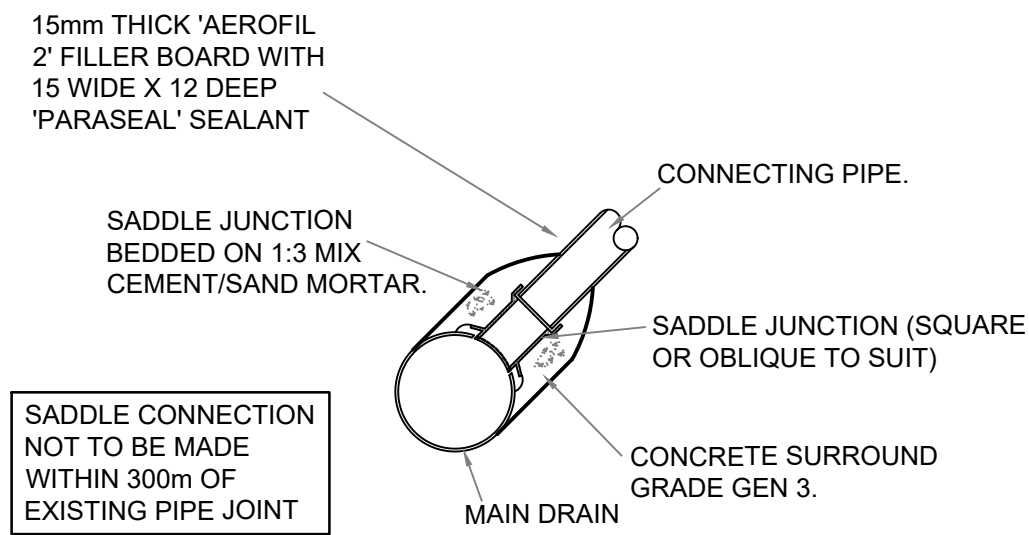
STATUS	PURPOSE OF ISSUE
D1	FOR COSTING

COPYRIGHT:
The concepts and the information contained in this document are the copyright of Ridge and Partners LLP. Use or copying of the document in whole or in part without written permission of Ridge and Partners LLP constitutes an infringement of copyright.

RIDGE			
CLIENT	MULBURY HOMES Ltd		
PROJECT	BENDIX STREET, NEW CROSS, MANCHESTER		
DRAFTER	AS	ENGINEER	PG
TITLE	DRAINAGE DETAILS SHEET 1		
SCALE	NTS	SHEET A1	DRAWING No BST-RDG-00-ZZ-DR-C-0102
			REV P2

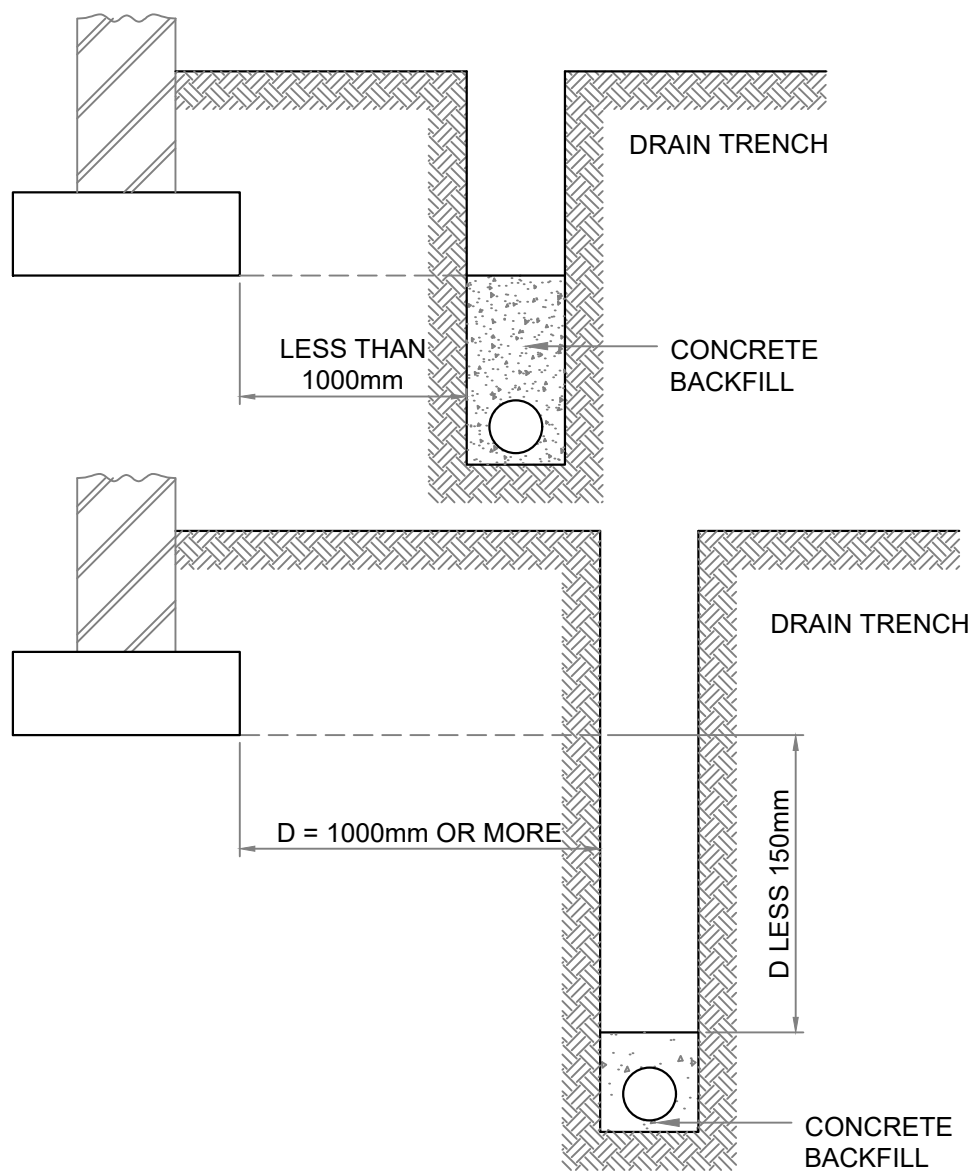


CLASS 'Z' PIPE BEDDING



SADDLE CONNECTION DETAIL

(DIAMETER OF MAIN DRAIN TO BE A MINIMUM OF DOUBLE THE SIZE OF THE CONNECTING PIPE. IN ALL OTHER CASES A PRE-FORMED JUNCTION IS TO BE USED.)



PIPE RUNS ADJACENT TO BUILDING

NOTES

- CONCRETE TO BE GRADE GEN 3
- JOINTS TO BE PROVIDED IN CONCRETE SURROUND AT NOT GREATER THAN 5.0m CENTRES. BUILDING REGULATIONS PART H1 PARA A11
- WHERE THE TRENCH IS WITHIN 1m OF THE BUILDING THE TRENCH SHALL BE FILLED WITH CONCRETE UP TO THE LOWEST LEVEL OF THE FOUNDATIONS. WHERE THE TRENCH IS FURTHER THAN 1000mm FROM THE BUILDING, THE TRENCH SHALL BE FILLED WITH CONCRETE UP TO A LEVEL, BELOW THE LOWEST LEVEL OF THE FOUNDATION, EQUAL TO THE DISTANCE FROM THE BUILDING LESS 150mm.

BS EN 1610:1997 Annex B Table B.15 Coarse Aggregate - Pipe Bedding						
Sieve Size (mm)	Graded Aggregate (mm)	20 to 5	14 to 5	40	20	14
40 to 5	20 to 5	14 to 5	40	20	14	10
50.0	100	-----	-----	100	-----	-----
37.5	90 - 100	100	-----	85 - 100	100	-----
20.0	35 - 70	90 - 100	100	0 - 25	85 - 100	100
14.0	-----	-----	90 - 100	-----	85 - 100	100
10.0	10 - 40	30 - 60	50 - 85	0 - 5	0 - 25	0 - 50
5.0	0 - 5	0 - 10	0 - 10	-----	0 - 5	0 - 10
2.36	-----	-----	-----	-----	-----	0 - 5

RIGID PIPES BEDDING GRADING

BASED ON BS EN 1610 : 1997 TABLE B.15 FOR RIGID PIPES THE BEDDING SHOULD BE SINGLE SIZE MATERIAL OR GRADED MATERIAL FROM 5MM UP TO A MAX SIZE OF 10MM FOR 100MM PIPES; 14MM FOR 150MM PIPES; 20MM FOR 225MM TO 600MM PIPES; 40MM FOR OVER 675MM PIPES

SELECTED AS DUG MATERIAL IN NON TRAFFICKED AREAS, M.O.T. TYPE 1 IN HIGHWAYS.

SELECTED AS DUG MATERIAL. REFER TO STANDARD NOTES DRAWING FOR CLASSIFICATION OF 'AS DUG' MATERIAL

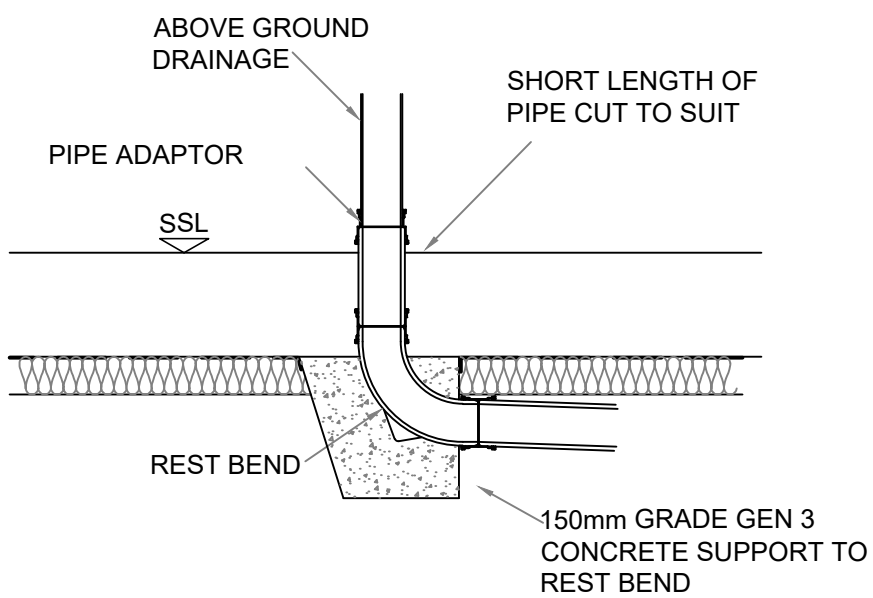
FOR GRANULAR BEDDING REFER TO TABLE

Y VALUE (BELOW PIPE):
HARD SPOTS/IRREGULAR TRENCH BOTTOM BC/4 (200mm MIN)
EVEN TRENCH BOTTOM BC/6 (100mm MIN)

BC = OUTSIDE DIAMETER

PIPE BEDDING CLASS B

BEDDING FACTOR 1.9



TYPICAL DETAIL OF CONNECTION OF INTERNAL DRAINAGE TO BELOW GROUND DRAINAGE

BACKFILL OPTIONS ABOVE THE MODULAR UNIT FOR FIRST 100mm :

- MIN 100mm THICK SELECTED EXCAVATED MATERIAL IF SEEN SUITABLE BY THE SITE ENGINEER.
- 100 mm THICK COARSE SAND OR CLASS 6H SELECTED GRANULAR MATERIAL.
- BACKERBOARD HD (IS A PREMOULDED BOARD FOR USE AS PROTECTION AGAINST BACKFILL)

BACKFILL MATERIAL WITHIN 300mm OF THE TANK TO BE FREE FROM PARTICLES EXCEEDING 40mm IN DIAMETER, IN ACCORDANCE WITH CLASS 8 MATERIAL TO SERIES 600, VOLUME 1, MCHW. BACKFILLING TO BE CARRIED OUT IN ACCORDANCE WITH THE MANUFACTURER'S GUIDANCE.

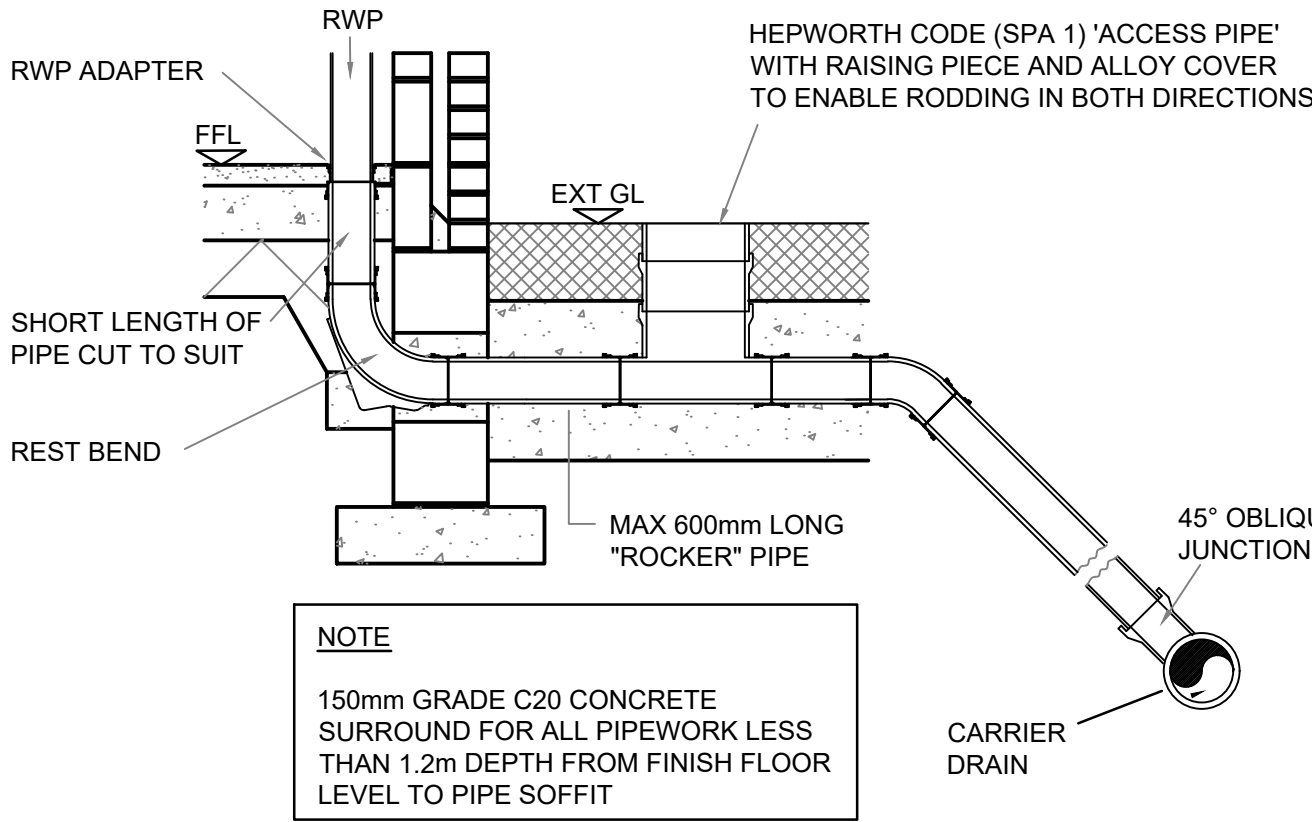
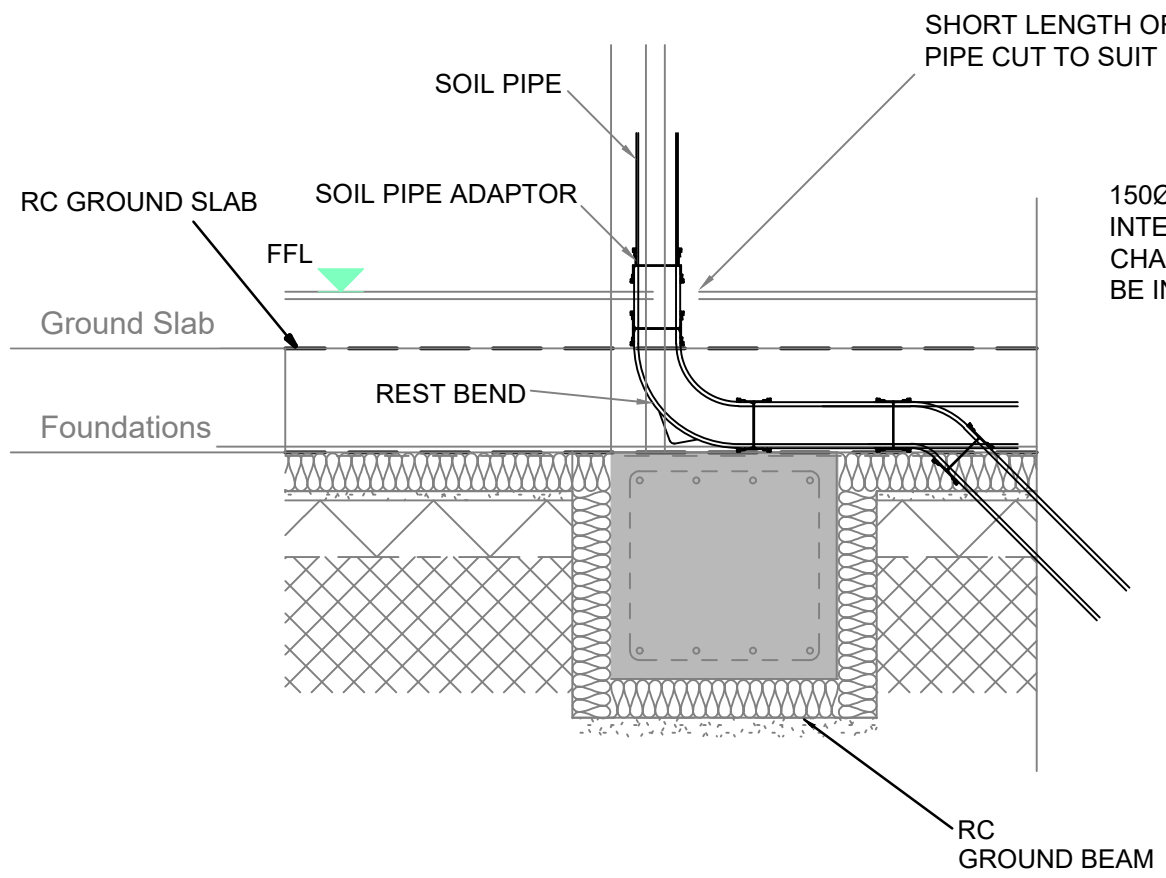
TO PROTECT THE WATERPROOF TUFLEX GEOMEMBRANE DURING BACKFILLING OPERATION, OVERLAY THE TOP AND SIDES WITH GEOTEX 300 PP NEEDLE PUNCHED NON-WOVEN PROTECTION GEOTEXTILE WITH A LAPPED JOINTS (AS SUPPLIED BY ALDERBURGH LIMITED).

BACKFILL OPTIONS AROUND THE SIDES OF MODULAR UNIT:

- 100mm THICK SELECTED EXCAVATED MATERIAL IF SEEN SUITABLE BY THE SITE ENGINEER.
- BACKERBOARD HD (IS A PREMOULDED BOARD FOR USE AS PROTECTION AGAINST BACKFILL)

INLET/OUTLET PIPES MUST BE SUPPORTED WITH CONCRETE TO PROTECT IT DURING BACKFILLING

MODULES REQUIRE 450 mm MINIMUM BACKFILL COVER BEFORE DRIVING OVER WITH SMALL EXCAVATORS OR BOBCAT

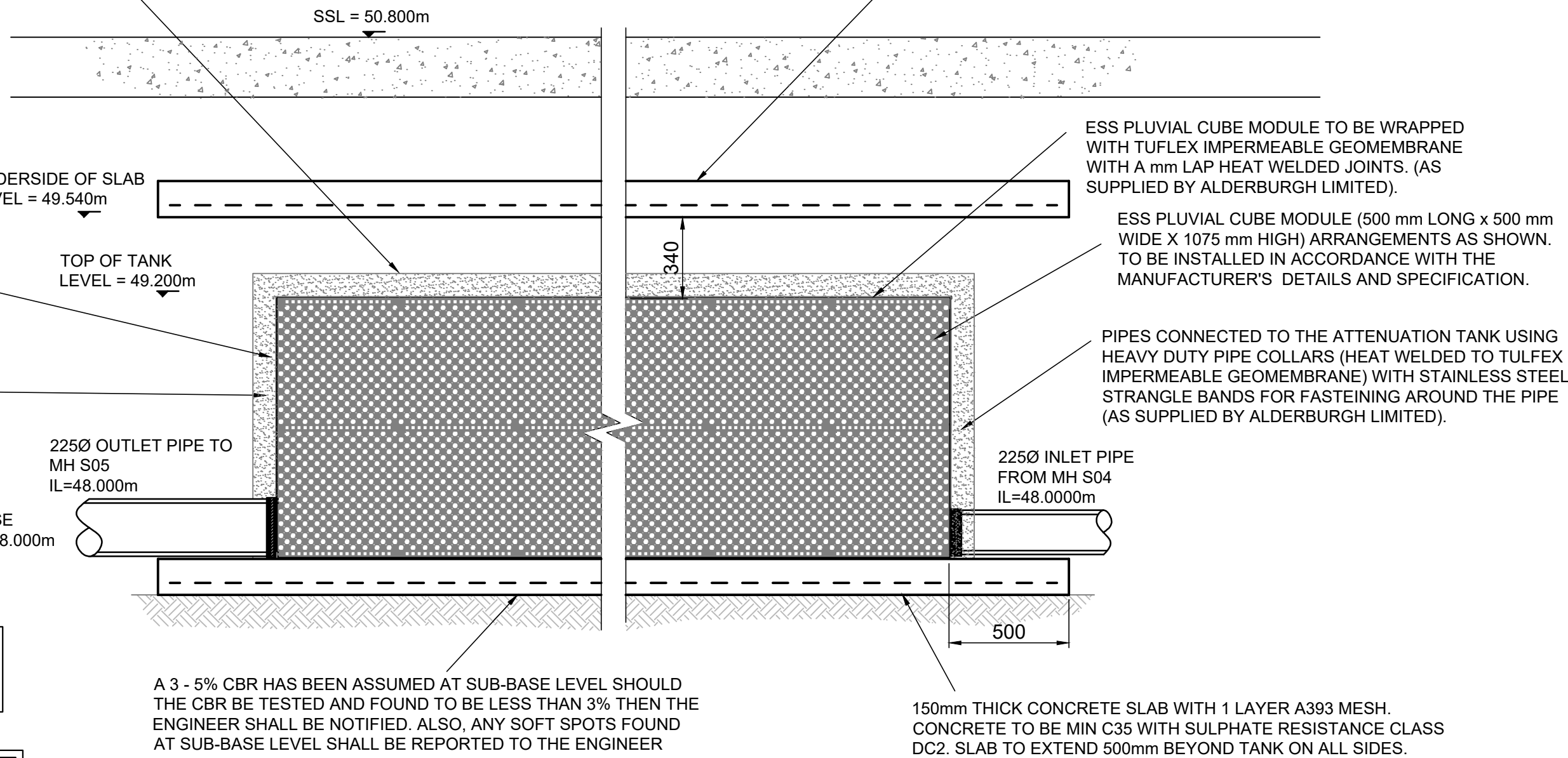


RWP CONNECTION DETAIL

SETTING OUT OF TANK TO SUIT TANK MANUFACTURER'S FINAL DESIGN

THE CONTRACTOR SHALL AVOID THE MOVEMENT OF CONSTRUCTION PLANT ACROSS THE STORAGE TANK WHERE POSSIBLE . WHERE THIS IS NOT POSSIBLE, CONSTRUCTION TRAFFIC TRAVELLING ACROSS THE TANK SHOULD BE RESTRICTED TO A MAXIMUM WEIGHT OF 32 TONNES PROVIDED THAT THE CONCRETE PROTECTION SLABS ARE IN PLACE AND THERE IS A MINIMUM BACKFILL COVER OF 1.0m. THE CONTRACTOR SHALL PROHIBIT THE STOCKPILING OF MATERIALS OVER THE TANK.

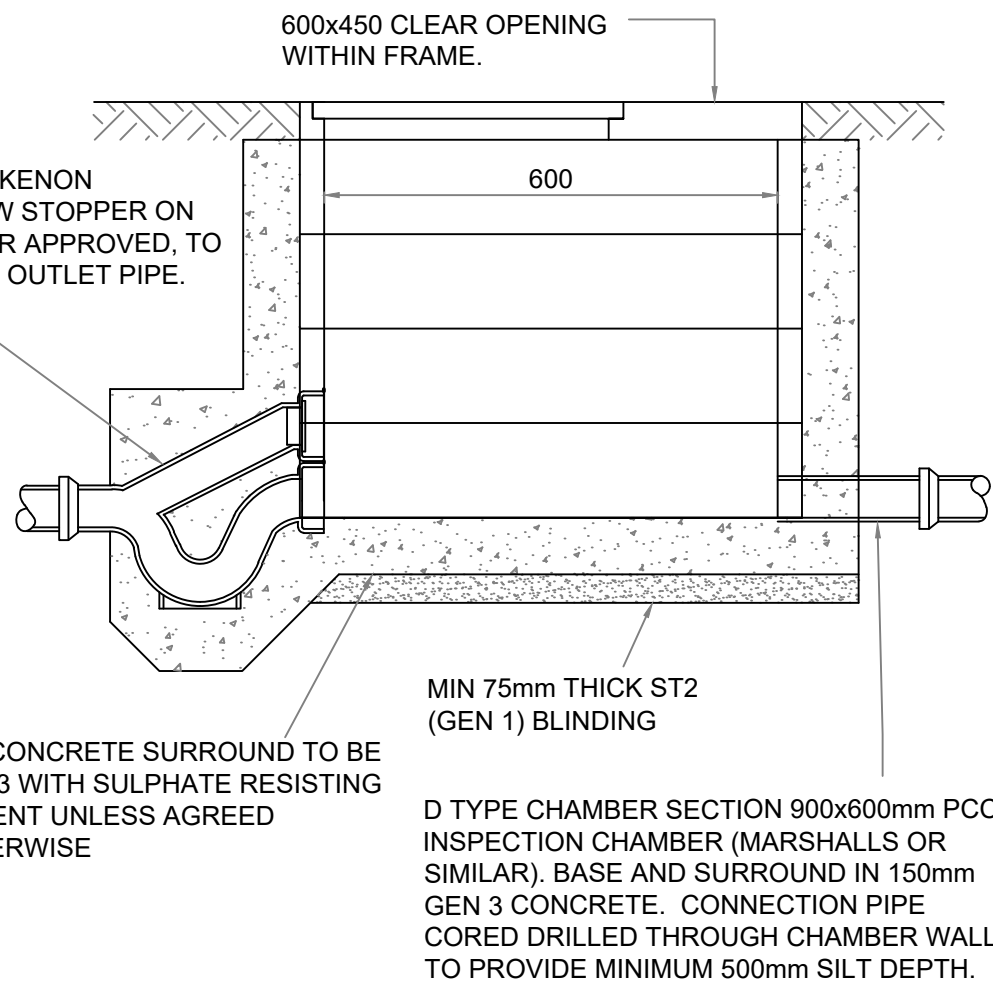
150mm THICK CONCRETE SLAB WITH 1 LAYER A393 MESH. CONCRETE TO BE MIN C35 WITH SULPHATE RESISTANCE CLASS DC2. SLAB TO EXTEND 500mm BEYOND TANK ON ALL SIDES. MAX 340mm FROM TOP OF TANK TO UNDERSIDE OF SLAB.



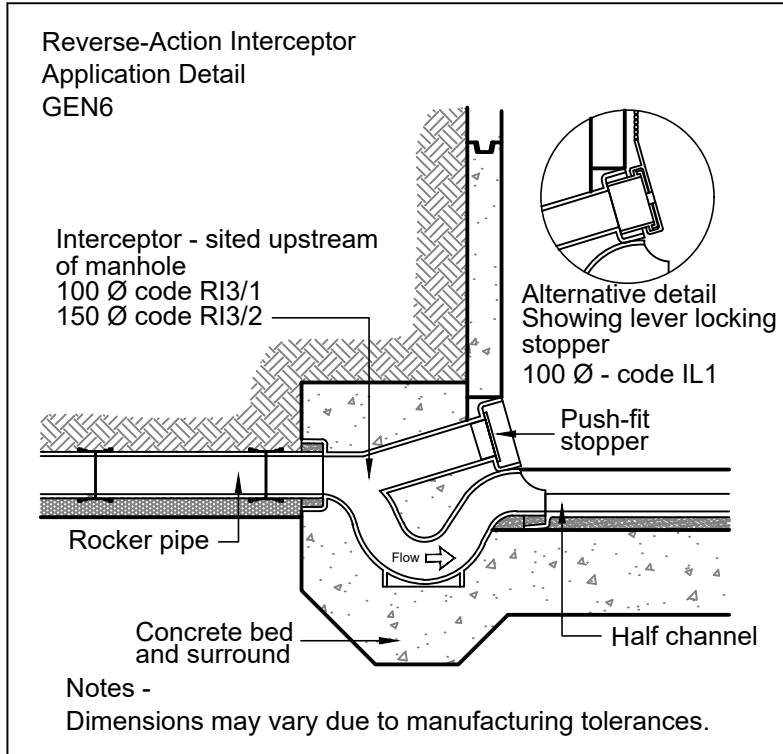
TYPICAL DETAILS OF ATTENUATION TANK BASED ON ALDERBURGH PLUVIAL CUBE MODULE UNITS

GENERAL NOTES

- DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT SPECIFICATIONS, ENGINEERS, ARCHITECTS & SERVICES DRAWINGS, INCLUDING APPROVED BUILDERS WORK DRAWINGS. CONTRACTOR TO NOTIFY ENGINEER OF DISCREPANCIES BETWEEN STRUCTURAL DRAWINGS AND SPECIFICATIONS OR OTHER DRAWINGS.
- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
- THE POSITION, SIZE AND LEVELS OF ALL EXISTING DRAINS ARE TO BE CONFIRMED ON SITE PRIOR TO THE COMMENCEMENT OF THE WORKS AND ANY DISCREPANCIES REPORTED IMMEDIATELY TO THE ENGINEER.
- DO NOT SCALE FROM THIS DRAWING. WORK TO DIMENSIONS OR CO-ORDINATES PROVIDED. ALL LEVELS ARE IN METRES AND ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS OTHERWISE NOTED. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS, SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY.



INTERCEPTOR



No	DATE	DRAWN	REV'D ENG.	AMENDMENT
P3	10.08.21	AS	EJD	TANK DETAIL UPDATED
P2	18.06.21	AS	PG	ISSUED FOR COSTING
P1	???.09.20	AS	PG	ISSUED FOR TENDER

STATUS	PURPOSE OF ISSUE
D1	FOR COSTING

COPYRIGHT:
The concepts and the information contained in this document are the copyright of Ridge and Partners LLP. Use or copying of the document in whole or in part without written permission of Ridge and Partners LLP constitutes an infringement of copyright.

RIDGE			
CLIENT	MULBURY HOMES Ltd		
PROJECT	BENDIX STREET, NEW CROSS, MANCHESTER		
DRAFTER	AS	ENGINEER	PG
TITLE	PROJECT REFERENCE: DRAINAGE DETAILS SHEET 2		
SCALE	NTS	SHEET	A1
DRAWING No	BST-RDG-00-ZR-DR-C-0103		REV
		P3	

MANHOLE SCHEDULE									
MANHOLE NO.	MANHOLE CO-ORDINATES	COVER LEVEL (m)	DEPTH TO INVERT (m)	MANHOLE SIZE	MANHOLE TYPE	PIPE IN NAME, INVERT LEVEL (m) & DIA	PIPE OUT NAME, INVERT LEVEL (m) & DIA	COVER SIZE (mm) & GRADE	COMMENTS
F01	E:384820.839 N:398859.868	50.510	0.945	450	IC	From MH183, IL=49.565, 100mmØ From CSV P1, IL=49.565, 100mmØ	To F02, IL=49.565, 150mmØ	450 B125	
F02	E:384819.360 N:398861.187	50.510	0.965	450	IC	From CSV P3, IL=49.545, 100mmØ From SVP20, IL=49.545, 100mmØ From F01, IL=49.545, 150mmØ	To F03, IL=49.545, 150mmØ	450 B125	
F03	E:384814.536 N:398865.422	50.510	1.085	450	IC	From F02, IL=49.475, 150mmØ From SVP29, IL=49.475, 100mmØ From SVP19, IL=49.475, 100mmØ	To F04, IL=49.425, 150mmØ	450 B125	
F04	E:384811.250 N:398868.313	50.510	1.105	450	IC	From F03, IL=49.405, 150mmØ From SVP32, IL=49.405, 100mmØ	To F05, IL=49.405, 150mmØ	450 B125	
F05	E:384810.069 N:398869.350	50.510	1.125	450	IC	From SVP17, IL=49.385, 100mmØ From SVP18, IL=49.385, 100mmØ From F04, IL=49.385, 150mmØ	To F07, IL=49.385, 150mmØ	450 B125	
F06	E:384802.568 N:398862.340	50.800	1.413	600 x 750	RECTANGULAR PCC IC	From , IL=49.387, 75mmØ	To F07, IL=49.789, 100mmØ	600 x 600 A15	RECESSED COVER
F07	E:384806.714 N:398872.296	50.550	1.240	450	IC	From F05, IL=49.310, 150mmØ From F06, IL=49.310, 100mmØ From SVP16, IL=49.310, 100mmØ	To F08, IL=49.310, 150mmØ	450 B125	
F08	E:384805.960 N:398872.956	50.640	1.345	450	IC	From F07, IL=49.295, 150mmØ From SVP14, IL=49.295, 100mmØ From SVP15, IL=49.295, 100mmØ	To F09, IL=49.295, 150mmØ	450 B125	
F09	E:384801.071 N:398877.330	50.640	1.420	450	IC	From SVP12, IL=49.220, 100mmØ From F08, IL=49.220, 150mmØ	To F10, IL=49.220, 150mmØ	450 B125	
F10	E:384798.506 N:398879.511	50.640	1.460	450	IC	From SVP11, IL=49.180, 100mmØ From F09, IL=49.180, 150mmØ	To F13, IL=49.180, 150mmØ	450 B125	
F11	E:384789.654 N:398886.225	50.680	1.380	450	IC	From SVP05, IL=49.300, 100mmØ From SVP1, IL=49.300, 100mmØ	To F12, IL=49.300, 150mmØ	450 B125	
F12	E:384791.887 N:398884.585	50.690	1.445	450	IC	From SVP2, IL=49.245, 100mmØ From SVP03, IL=49.245, 100mmØ From F11, IL=49.245, 150mmØ	To F13, IL=49.245, 150mmØ	450 B125	
F13	E:384797.226 N:398880.635	50.640	1.490	1,200	TYPE B	From F12, IL=49.180, 150mmØ From SVP08, IL=49.200, 100mmØ From F10, IL=49.150, 150mmØ From SVP09, IL=49.200, 100mmØ From SVP10, IL=49.200, 100mmØ		600x600 D400	
F14	E:384795.501 N:398863.240	50.800	0.620	300	Mini IC	From FG7, IL=50.180, 100mmØ From FG6, IL=50.180, 100mmØ	To F15, IL=50.180, 100mmØ	450x450 A15	RECESSED COVER
F15	E:384796.412 N:398864.440	50.800	0.640	300	Mini IC	From SVP33, IL=50.160, 100mmØ From F14, IL=50.160, 100mmØ	To F21, IL=50.160, 100mmØ	450x450 A15	RECESSED COVER
F16	E:384779.412 N:398873.401	50.800	0.640	300	Mini IC	From FG2, IL=50.160, 100mmØ From SVP38, IL=50.210, 100mmØ From SVP06, IL=50.160, 100mmØ	To F17, IL=50.160, 100mmØ	450x450 A15	RECESSED COVER
F17	E:384785.199 N:398869.978	50.800	0.710	300	Mini IC	From FG4, IL=50.090, 100mmØ From F16, IL=50.090, 100mmØ	To F18, IL=50.090, 100mmØ	450x450 A15	RECESSED COVER
F18	E:384785.695 N:398870.592	50.800	0.745	300	Mini IC	From F17, IL=50.055, 100mmØ	To F20, IL=50.215, 100mmØ	450x450 A15	RECESSED COVER
F19	E:384785.763 N:398873.815	50.800	0.585	450	IC	From SVP04, IL=50.215, 100mmØ From SVP07, IL=50.215, 100mmØ From SVP37, IL=50.215, 100mmØ	To F20, IL=50.215, 100mmØ	450x450 A15	RECESSED COVER
F20	E:384789.698 N:398870.401	50.800	0.745	450	IC	From F18, IL=50.055, 100mmØ From SVP36, IL=50.055, 100mmØ From F19, IL=50.055, 100mmØ From SVP35, IL=50.215, 100mmØ	To F21, IL=50.055, 100mmØ	450x450 A15	RECESSED COVER
F21	E:384793.673 N:398866.587	50.800	0.890	1,050	TYPE B	From F20, IL=49.960, 100mmØ From F15, IL=49.960, 100mmØ From SVP13, IL=50.100, 100mmØ From SVP34A, IL=50.160, 100mmØ	To C01, IL=49.910, 150mmØ	600x600 B125	RECESSED COVER

MANHOLE SCHEDULE									
MANHOLE NO.	MANHOLE CO-ORDINATES	COVER LEVEL (m)	DEPTH TO INVERT (m)	MANHOLE SIZE	MANHOLE TYPE	PIPE IN NAME, INVERT LEVEL (m) & DIA	PIPE OUT NAME, INVERT LEVEL (m) & DIA	COVER SIZE (mm) & GRADE	COMMENTS
S01	E:384813.735 N:398852.450	50.150	0.650	450	IC	From RWP10, IL=49.500, 100mmØ From RWP12, IL=49.500, 100mmØ From RWP11, IL=49.500, 100mmØ	To S02, IL=49.500, 150mmØ		
S02	E:384799.170 N:398864.419	50.800	1.613	600	IC	From S01, IL=49.187, 150mmØ From RWP6, IL=49.187, 100mmØ	To S03, IL=49.187, 225mmØ		
S03	E:384787.508 N:398873.408	50.800	1.760	600	IC	From S02, IL=49.040, 225mmØ From RWP1, IL=49.040, 100mmØ	To S04, IL=49.040, 225mmØ		
S04	E:384786.292 N:398871.892	50.800	2.765	900	TYPE B	From S03, IL=49.019, 225mmØ	To ATT, IL=48.035, 225mmØ	600x600 B125	RECESSED COVER
S05	E:384786.476 N:398866.313	50.800	2.820	900	TYPE B	From ATT(1), IL=47.980, 225mmØ	To C01, IL=47.980, 225mmØ	600x600 B125	RECESSED COVER
S05A	E:384788.273 N:398864.859	50.800	1.400	1,800	TYPE B			600x600 B125	MH OVER INTERCEPTOR, RECESSED COVER

MANHOLE SCHEDULE									
MANHOLE NO.	MANHOLE CO-ORDINATES	COVER LEVEL (m)	DEPTH TO INVERT (m)	MANHOLE SIZE	MANHOLE TYPE	PIPE IN NAME, INVERT LEVEL (m) & DIA	PIPE OUT NAME, INVERT LEVEL (m) & DIA	COVER SIZE (mm) & GRADE	COMMENTS
C01	E:384790.133 N:398863.353	50.800	2.845	1,050	TYPE B	From S05, IL=47.955, 225mmØ From F22, IL=49.860, 150mmØ	To C02, IL=47.955, 225mmØ	600x600 B125	
C02	E:384784.239 N:398856.996	50.340	2.430	1,200	TYPE B	From C01, IL=47.910, 225mmØ		600x600 D400	

GENERAL NOTES

1. DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT SPECIFICATIONS, ENGINEERS, ARCHITECTS & SERVICES DRAWINGS, INCLUDING APPROVED BUILDERS WORK DRAWINGS. CONTRACTOR TO NOTIFY ENGINEER OF DISCREPANCIES BETWEEN STRUCTURAL DRAWINGS AND SPECIFICATIONS OR OTHER DRAWINGS.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
3. THE POSITION, SIZE AND LEVELS OF ALL EXISTING DRAINS ARE TO BE CONFIRMED ON SITE PRIOR TO THE COMMENCEMENT OF THE WORKS AND ANY DISCREPANCIES REPORTED IMMEDIATELY TO THE ENGINEER.
4. DO NOT SCALE FROM THIS DRAWING. WORK TO DIMENSIONS OR CO-ORDINATES PROVIDED. ALL LEVELS ARE IN METRES AND ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS OTHERWISE NOTED. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS, SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY.

P3	10.08.21	AS	EJD	GENERAL UPDATES
P2	18.06.21	AS	ED	ISSUED FOR COSTING
P1	22.09.20	AS	PG	ISSUED FOR TENDER
No	DATE	DRAWN	REV'D ENG.	AMENDMENT

STATUS	PURPOSE OF ISSUE
D1	FOR COSTING

COPYRIGHT:
The concepts and the information contained in this document are the copyright of Ridge and Partners LLP. Use or copying of the document in whole or in part without written permission of Ridge and Partners LLP constitutes an infringement of copyright.

RIDGE

CLIENT
MULBURY HOMES Ltd

PROJECT
BENDIX STREET,
NEW CROSS,MANCHESTER

DRAFTER
AS

ENGINEER
PG

TITLE
MANHOLE SCHEDULE

PROJECT REFERENCE:

SCALE
NTS

SHEET
A1

DRAWING No
BST-RDG-00-ZZ-DR-C-0104

REV
P3

1. DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT SPECIFICATIONS, ENGINEERS, ARCHITECTS & SERVICES DRAWINGS, INCLUDING APPROVED BUILDERS WORK DRAWINGS. CONTRACTOR TO NOTIFY ENGINEER OF DISCREPANCIES BETWEEN STRUCTURAL DRAWINGS AND SPECIFICATIONS OR OTHER DRAWINGS.

3. DO NOT SCALE FROM THIS DRAWING. WORK TO DIMENSIONS OR CO-ORDINATES PROVIDED. ALL LEVELS ARE IN METRES AND ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS OTHERWISE NOTED. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS, SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY.

[illegible]

P1	10.08.21	AS	EJD	PRELIMINARY ISSUE
No	DATE	DRAWN	REV'D ENG.	AMENDMENT

STATUS	PURPOSE OF ISSUE
S2	FOR INFORMATION

COPYRIGHT:
The concepts and the information contained in this document are the copyright of Ridge and Partners LLP. Use or copying of the document in whole or in part without written permission of Ridge and Partners LLP constitutes an infringement of copyright.

RIDGE

PROJECT
BENDIX STREET,
NEW CROSS, MANCHESTER

DRAFTER	AS	ENGINEER	EJD
---------	----	----------	-----

TITLE	PROJECT REFERENCE
FLOOD ROUTE PLAN	

SCALE	SHEET	DRAWING No	REV
1:100	A1	BST-RDG-00-ZZ-DR-C-0105	P1

Appendix B – Hydraulic Calculations

Outputs from the Microdrainage software for the surface water drainage networks serving the development are provided. Pipe references from the hydraulic models can be located on the drainage layout plan.

Scott Hughes Design Ltd		Page 1
The Flint Glass Works 64 Jersey Street Manchester M4 6JW	Bendix Street Surface Water Calcs	
Date 10/08/2021 File Full SW Drainage Networ...	Designed by EJD Checked by PB	
Micro Drainage	Network 2018.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	18.000	Add Flow / Climate Change (%)	0
Ratio R	0.361	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	18.826	0.313	60.1	0.042	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	14.734	0.147	100.2	0.040	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	2.136	0.021	100.0	0.031	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.003	2.580	0.026	99.2	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.004	2.183	0.020	109.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.005	4.705	0.034	138.4	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	E I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.24	49.500	0.042	0.0	0.0	0.0	1.30	23.0	5.7
1.001	50.00	5.43	49.187	0.082	0.0	0.0	0.0	1.31	51.9	11.1
1.002	50.00	5.46	49.040	0.113	0.0	0.0	0.0	1.31	52.0	15.3
1.003	50.00	5.49	48.035	0.113	0.0	0.0	0.0	1.31	52.2	15.3
1.004	50.00	5.52	48.000	0.113	0.0	0.0	0.0	1.25	49.8	15.3
1.005	50.00	5.59	47.980	0.113	0.0	0.0	0.0	1.11	44.1	15.3

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Offline Controls	0
Number of Online Controls	1	Number of Storage Structures	1

Scott Hughes Design Ltd		Page 2
The Flint Glass Works 64 Jersey Street Manchester M4 6JW	Bendix Street Surface Water Calcs	
Date 10/08/2021 File Full SW Drainage Networ...	Designed by EJD Checked by PB	
Micro Drainage	Network 2018.1	

Simulation Criteria for Storm

Number of Time/Area Diagrams 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	30
Ratio R	0.361		

Scott Hughes Design Ltd		Page 3
The Flint Glass Works 64 Jersey Street Manchester M4 6JW	Bendix Street Surface Water Calcs	
Date 10/08/2021 File Full SW Drainage Networ...	Designed by EJD Checked by PB	
Micro Drainage	Network 2018.1	

Online Controls for Storm

Hydro-Brake® Optimum Manhole: S05, DS/PN: 1.005, Volume (m³): 1.8

Unit Reference	MD-SHE-0101-6000-2000-6000
Design Head (m)	2.000
Design Flow (l/s)	6.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	101
Invert Level (m)	47.980
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.000	6.0
Flush-Flo™	0.438	5.2
Kick-Flo®	0.900	4.1
Mean Flow over Head Range	-	4.8

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.3	1.200	4.7	3.000	7.3	7.000	10.8
0.200	4.7	1.400	5.1	3.500	7.8	7.500	11.2
0.300	5.1	1.600	5.4	4.000	8.3	8.000	11.5
0.400	5.2	1.800	5.7	4.500	8.8	8.500	11.9
0.500	5.2	2.000	6.0	5.000	9.2	9.000	12.2
0.600	5.1	2.200	6.3	5.500	9.7	9.500	12.5
0.800	4.7	2.400	6.5	6.000	10.1		
1.000	4.3	2.600	6.8	6.500	10.5		

Scott Hughes Design Ltd		Page 4
The Flint Glass Works 64 Jersey Street Manchester M4 6JW	Bendix Street Surface Water Calcs	
Date 10/08/2021	Designed by EJD	
File Full SW Drainage Networ...	Checked by PB	
Micro Drainage	Network 2018.1	

Storage Structures for Storm

Cellular Storage Manhole: TANK, DS/PN: 1.004

Invert Level (m) 48.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	25.0	25.0	1.201	0.0	49.0
1.200	25.0	49.0			

Scott Hughes Design Ltd							Page 6	
The Flint Glass Works 64 Jersey Street Manchester M4 6JW				Bendix Street Surface Water Calcs				
Date 10/08/2021 File Full SW Drainage Networ...				Designed by EJD Checked by PB				
Micro Drainage				Network 2018.1				
<u>30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for Storm</u>								
<u>Simulation Criteria</u>								
Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000								
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000								
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800								
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000								
Foul Sewage per hectare (l/s) 0.000								
Number of Input Hydrographs 0 Number of Storage Structures 1								
Number of Online Controls 1 Number of Time/Area Diagrams 0								
Number of Offline Controls 0 Number of Real Time Controls 0								
<u>Synthetic Rainfall Details</u>								
Rainfall Model FSR Ratio R 0.362								
Region England and Wales Cv (Summer) 0.750								
M5-60 (mm) 18.000 Cv (Winter) 0.840								
Margin for Flood Risk Warning (mm) 300.0								
Analysis Timestep 2.5 Second Increment (Extended)								
DTS Status OFF								
DVD Status ON								
Inertia Status ON								
Profile(s) Summer and Winter								
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440								
Return Period(s) (years) 1, 30, 100								
Climate Change (%) 0, 0, 40								

Appendix C – United Utilities Correspondence

Eleanor Dale

From: O'Brien, Neil <Neil.O'Brien@uuplc.co.uk>
Sent: 05 July 2018 10:00
To: Paul Graveney
Cc: Wastewater Developer Services
Subject: RE: PDE CA28 Thompson Street M4 5FY - 4200021408

Dear Customer

We have carried out an assessment of your application which is based on the information provided; this pre development advice will be valid for 12 months

Foul will be allowed to drain to the public combined sewer network at an unrestricted rate. The connection(s) to the public sewer can be at a point(s) convenient to yourself

Surface water should drain to the 375mm surface water pipe in Oldham Road at a pass forward flow of 6 l/s

If you require any further guidance please follow <http://www.unitedutilities.com/builders-developers.aspx>

If you need a make further enquiry relating to this matter please send your enquiry to WastewaterDeveloperServices@uuplc.co.uk Please quote your DEXXXX/42XXXXXXX/GEXXXX reference number

Please Note:- enquiries sent to any other United Utilities e-mail address will be deleted.

Connection Application

Although we may discuss and agree discharge points & rates in principle, please be aware that you will have to apply for a formal sewer connection. This is so that we can assess the method of construction, Health & Safety requirements and to ultimately inspect the connection when it is made. Details of the application process and the form itself can be obtained from our website by following the link below

<http://www.unitedutilities.com/connecting-public-sewer.aspx>

Please be aware that on site drainage must be designed in accordance with Building Regulations, National Planning Policy, Planning Conditions and local flood authority guidelines, we would recommend that you liaise and make suitable agreements with the relevant statutory bodies.

Regards

Neil O'Brien

Developer Engineer
Developer Services and Planning

EMGateway3.uuplc.co.uk made the following annotations

The information contained in this e-mail is intended only for the individual to whom it is addressed. It may contain legally privileged or confidential information or otherwise be exempt from disclosure. If you have received this Message in error or there are any problems, please notify the sender immediately and delete the message from your computer. You must not use, disclose, copy or alter this message for any unauthorised purpose. Neither United Utilities Group PLC nor any of its subsidiaries will be liable for any direct, special, indirect or consequential damages as a result of any virus being passed on, or arising from the alteration of the contents of this message by a third party.

United Utilities Group PLC, Haweswater House, Lingley Mere
Business Park, Lingley Green Avenue, Great Sankey,
Warrington, WA5 3LP
Registered in England and Wales. Registered No 6559020

www.unitedutilities.com
www.unitedutilities.com/subsidiaries
