

COWSHED

**Operation & Maintenance Manual
for SuDS Assets**

Elmridge Lane, Preston, PR3 2NY

CSH-BML-XX-XX-RP-C-0502

Tuesday, 25th July 2023

Contents Amendment Record

This report has been issued and amended as follows:

Revision	Description	Issued by	Checked by	Date
P01	First Issue for Planning Approval	K. Dean	A. Mavhunga	2023-07-25
P02	Slurry Tank Drainage Added	K. Dean	A Mavhunga	2023-08-17

Barnsley Marshall Limited have prepared this report in accordance with the instructions of their client, FI Construction Limited, for their sole and specific use. Any other persons who use any information contained herein do so at their own risk.

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APPENDIX A : SUDS DRAINAGE PROPOSALS

1. Introduction

1.1 Project Background

Barnsley Marshall Ltd was appointed by FI Construction Limited to provide a SuDS Drainage Strategy Layout for the proposed construction of a cowshed at Elmridge Lane, Preston, PR3 2NY.

This report provides recommended maintenance regimes for SuDS assets proposed as part of the surface water drainage for the development based on government and local authority guidance with regard to maintenance.

The report is based on currently available and preliminary discussions.

Proposals contained or forming part of this report represent the design intent and may be subject to alteration or adjustment in completing the detailed design for this project. Where such adjustments are undertaken as part of the detailed design and are deemed a material deviation from the intent contained in this document, prior approval shall be obtained from the relevant authority in advance of commencing such works.

Where the proposed works to which this report refers are undertaken more than twelve months following the issue of this report, Barnsley Marshall shall reserve the right to re-validate the findings and conclusions by undertaking appropriate further investigations at no cost to Barnsley Marshall.

1.2 Scope of O&M Manual

This manual is intended to give an overview of the operation and maintenance for the range of SuDS features included with the drainage strategy. Where proprietary products are specified the manufacturer's instructions and recommendations should be followed in priority to this document unless specifically noted otherwise due to project constraints.

The recommended maintenance regimes and frequencies are typical only and should be more frequent initially to ensure that there are no unforeseen issues with the operation of the proposed asset, and thereafter adjusted to suit the site requirements.

2. Flow Control Units

2.1 Location and Description

The location and details of the flow control unit is indicated on the SuDS Drainage Strategy Layout drawings and construction details, refer to **Appendix A**. The flow control device is specified as Hydro-brake or similar approved and is a proprietary product; therefore, the manufacturer's recommendations should also be taken into consideration.

2.2 Operation

The Hydro-brake is intended to be the main Surface Water Control Device from the site, limiting the outflow from the development to a maximum of 5.0 l/s for all storm events up to and including the 100-year + 40% CC storm event. When storms exceed the 100-year + 40% CC storm event, the flow control chamber will allow additional outflow from the site via the overflow pipe, and the Hydro-brake will be discharging greater than 5.0 l/s. The flow control chamber and Hydro-brake should be inspected every time after such an excessive storm.

2.3 Inspection and Maintenance Regime

Regular inspection and maintenance are important for the effective operation of the flow control unit.

Being part of private drainage, whole life cycle maintenance of the Hydro-brake chamber shall be the responsibility of FI Construction Limited. The responsible officer is John Lohan whose details are as below:

- ❖ jlohan@fi-construction.com
- ❖ Canal Mill, Botany Brow, Chorley, Lancashire, PR6 9AF

Table 2.1 gives the recommended maintenance regime for the asset.

Table 2.1: Recommended Maintenance Regime for Flow Control Chamber and Hydro-brake

Maintenance Schedule	Required Action		Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required)	Inspect inlets for blockages, and clear if required. If faults persist jetting and CCTV survey may be required.		Monthly and after large storms.
Regular maintenance/inspection	Inspect and identify any areas that are not operating correctly. If required, take remedial action.		Six-monthly
	Remove sediment and debris from flow control chambers.		Annually (or as required after heavy rainfall events).
Remedial actions	Repair/rehabilitation of inlets.		As required.

3. Storage Pond and Swales

3.1 Location and Description

The proposed storage pond and swale are shown on the Drainage Strategy Layout drawing in **Appendix A**. The grass seeding, flowers, shrubs, and plants within the pond area will be recommended by a Landscape Architect.

3.2 Operation

Run-off from each rain event is retained and treated in the pond. The retention time promotes pollutant removal through sedimentation and the opportunity for biological uptake mechanisms to reduce nutrient concentrations. This helps prevent pollutants from entering groundwater

3.3 Inspection and Maintenance Regime

Regular inspection and maintenance are important for the effective operation of the storage pond.

Being part of private drainage, whole life cycle maintenance of the Storage Pond and Swale shall be the responsibility of FI Construction Limited. The responsible officer is John Lohan whose details are as below:

- ❖ jlohan@fi-construction.com
- ❖ Canal Mill, Botany Brow, Chorley, Lancashire, PR6 9AF

Table 3.1 gives the recommended maintenance regime for the asset.

Table 3.1: Recommended Maintenance Regime for Storage Pond and Swales

Regular Maintenance	
Monthly	<ul style="list-style-type: none"> • Litter and debris removal • Mulching (where required) • Inspect/check all inlets, outlets, surface and overflow (where required) to ensure that they are in good condition, free from blockages and operating as designed. • Take action where required.
Six Monthly	<ul style="list-style-type: none"> • Remove nuisance and invasive vegetation
Annually	<ul style="list-style-type: none"> • Pruning and trimming of trees • Inspect and document the presence of wildlife • Check for poor vegetation growth due to lack of sunlight or dropping of leaf litter, and cut back adjacent vegetation where required
As Required	<ul style="list-style-type: none"> • Repair erosion or other damage by re-mulching or re-seeding • Re-seed areas of poor vegetation growth. Alter plant types to better suit conditions, if required • Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of the soil surface (typically every 60-month period) • Remove build-up of sediment, reinstate design levels (typically every 60-month period) • Remove and dispose of oils or petrol residues using safe standard practices
Remedial Actions: Significant storms may cause significant damage to SuDS. As such, a number of actions may be required following such events.	
Following all significant storm events	<ul style="list-style-type: none"> • Inspect and carry out essential recovery works to return the feature to full working order.

4. Filter Drains

5.1 Location and Description

The location of the Filter Drains is indicated on the SuDS Drainage Strategy Layout drawing in **Appendix A**. The proposed filter drains will have SHW Type B filter material (20-40mm stone) and be topped with 150mm top soil and lawn seeding to provide a pleasant aesthetic finish.

5.2 Operation

The proposed Filter Drains will allow Stormwater run-off to soakaway into a porous pipe at the bottom of the trench. The trench is filled with stone filter material. This stone fill collects particles and helps prevent pollutants from entering groundwater.

5.3 Inspection and Maintenance Regime

Regular inspection and maintenance are important for the effective operation of the Filter Drains.

Being part of private drainage, whole life cycle maintenance of Filter Drains shall be the responsibility of FI Construction Limited. The responsible officer is John Lohan whose details are as below:

- ❖ jlohan@fi-construction.com
- ❖ *Canal Mill, Botany Brow, Chorley, Lancashire, PR6 9AF*

Table 5.1 gives the recommended maintenance regime for the asset.

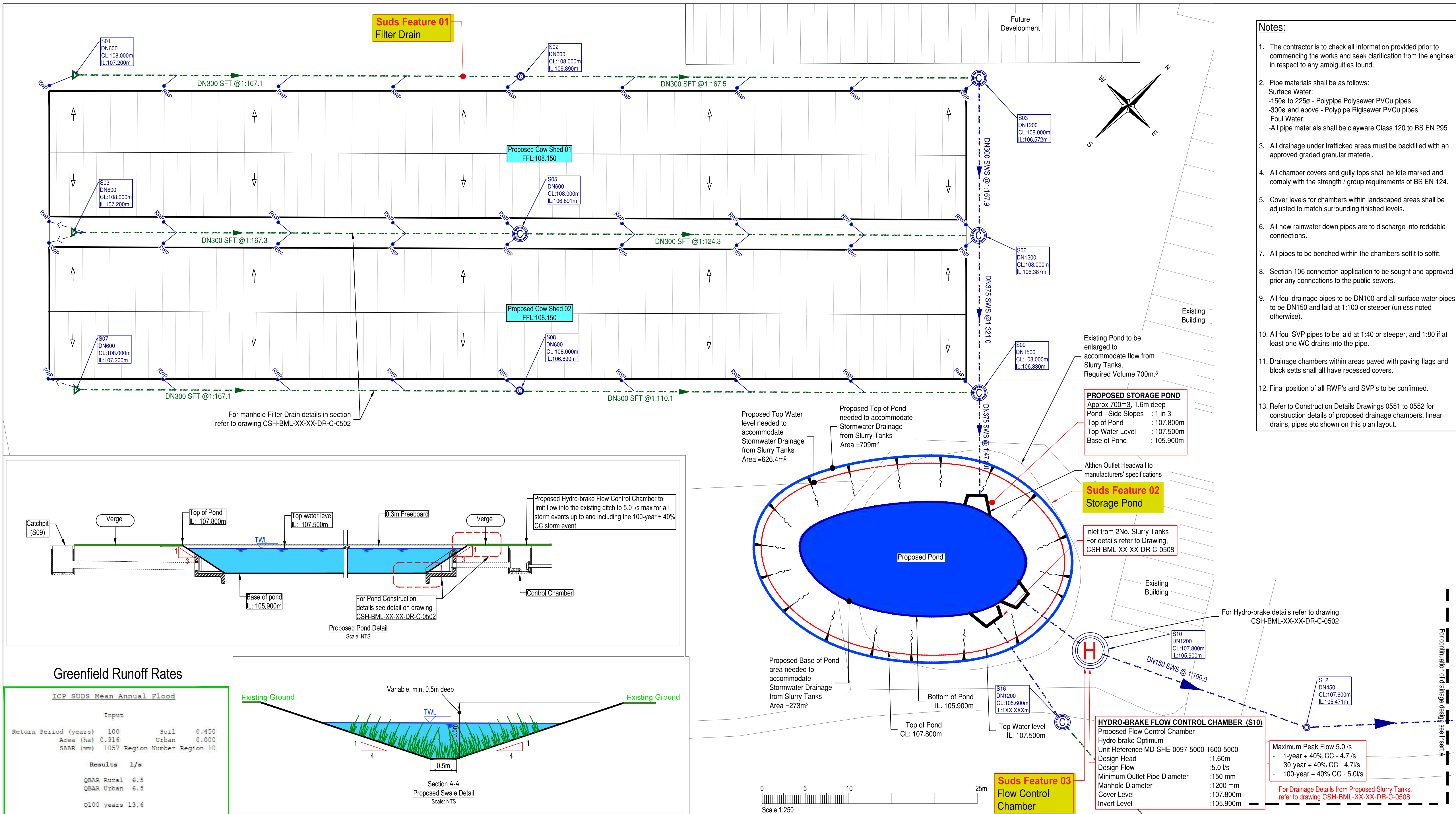
Table 5.1: Recommended Maintenance Regime for Filter Drains

Regular Maintenance	
Monthly	<ul style="list-style-type: none"> • Litter and debris removal • Mow grasses (where required to promote lateral runoff inflow and remove resultant clippings (during growing season only) • Remove nuisance and invasive vegetation (for 12 months following installation) • Inspect/check all inlets, outlets, surface and overflows (where required) to ensure that they are in good condition, free from blockages and operating as designed. Take action where required
Six Monthly	<ul style="list-style-type: none"> • Not applicable
Annually	<ul style="list-style-type: none"> • Not applicable
Annually	<ul style="list-style-type: none"> • Remove nuisance and invasive vegetation • Inspect and document the presence of wildlife
As Required	<ul style="list-style-type: none"> • Repair erosion or other damage by re-turfing, reseeding or replacing filter material • Re-level uneven surfaces and reinstate design levels (typically every 60-month period) • Remove and replace top 300 – 500mm of gravel, clean and replace where required (typically every 60-month period) • Remove and dispose of oils or petrol residues using safe standard practices
Remedial Actions: Significant storms may cause significant damage to SuDS. As such, a number of actions may be required following such events	
Following all significant storm events	<ul style="list-style-type: none"> • Inspect and carry out essential recovery works to return the feature to full working order

APPENDICES

Appendix A

SuDS Drainage Proposals



Safety, Health & Environmental Information:

In addition to the hazards and risks normally associated with the types of work detailed on this drawing, please note the significant hazards identified by symbols below.

⚠ INDICATES A RESIDUAL RISK AS A WARNING

i INDICATES A RESIDUAL RISK FOR INFORMATION

and described below:

Construction/Maintenance/Cleaning/Demolition
Refer to Drawing:

General Notes:

- Do not scale from this drawing.
- All dimensions are in millimetres (mm), all levels in metres (m) unless noted otherwise.
- Discrepancies or omissions are to be reported to the Engineer prior to work commencing.
- Materials and workmanship are to comply in all respects with current British Standard Specifications, Codes of Practice, and Building Regulations Approved Documents.
- The copyright of this drawing is vested in the Engineer and must not be copied or reproduced without written consent.
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- This drawing is to be read in conjunction with all relevant specifications and drawings issued by the Engineer, Architect and other Specialists.

Drainage Key:

DNXXX SWS @ 1:XXX	Proposed Stormwater
DNXXX SFT @ 1:XXX	Proposed Filter Drain
⊙	Proposed Stormwater Manhole
⊙	Proposed Ridgiform Separate Catchpit
⊙	Proposed Stormwater Hydro-brake
---	DN150 Gully / RWP Connector
RWP	Proposed Rain Water Pipe
---	Proposed Rodding Eye
FFL:XXX.XXX	Proposed Finish Floor Level
⊙	Proposed Pumping Station. Refer to drawing CSH-BML-XX-XX-DR-C-0503 for details.
DNXXX COMB	Proposed Rising Main
DNXXX FWS	Proposed Inspection Chamber with Grilled Cover. For details Refer to drawing CSH-BML-XX-XX-DR-C-0503
⊙	Proposed Diversion Chamber. Refer to drawing CSH-BML-XX-XX-DR-C-0503 for details.

Rev	By / Chkd	Date	Description
P03	DH/AM	10/08/23	Additional Drainage Information added
P02	DH/AM	21/07/23	Preliminary Issue
P01	RA/GM	05/04/23	For Discussion

PRELIMINARY DRAWING
This drawing is not to be used for construction



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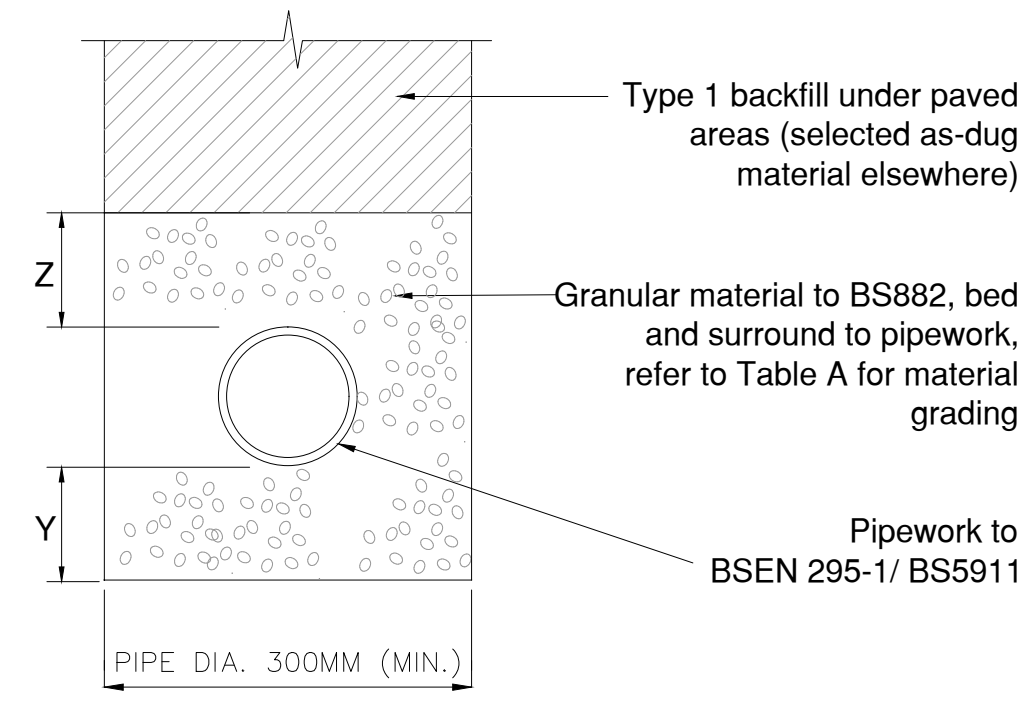
Project
Cow Shed
Elmridge Lane, Preston,
PR3 2NY

Drawing
Proposed Surface Water
Drainage Plan Layout 01
Main Site

By/Chkd	RA/GM	Date	05/04/2023
CSH-BML-XX-XX-DR-C-0500		Revision	P03
BML Job No.		Status	-
1000-05			
Drawing Scale at A1: As Shown			
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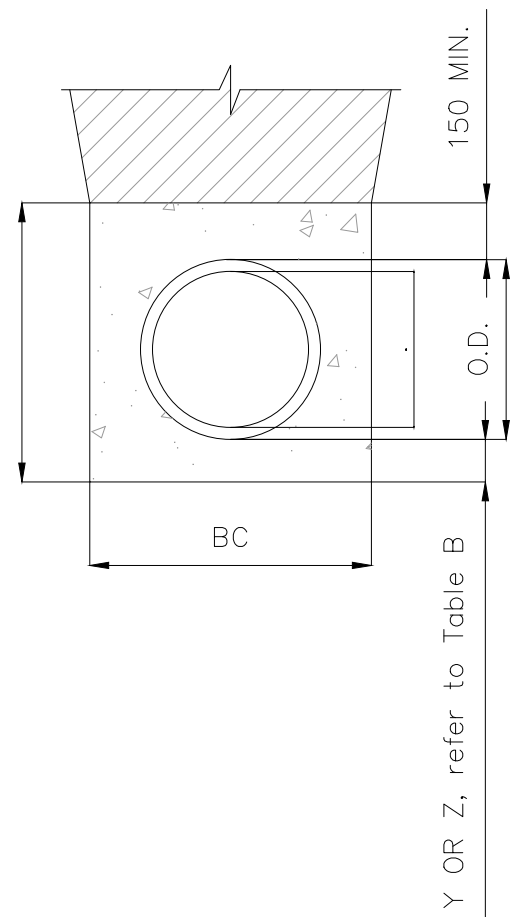
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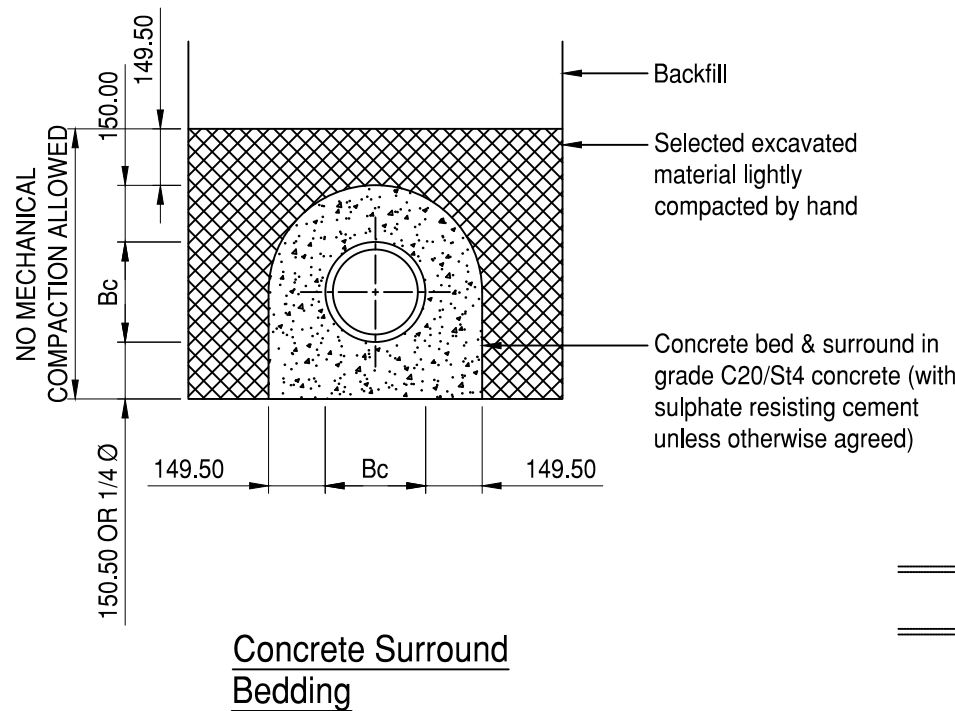


CLASS S PIPE BEDDING DETAIL

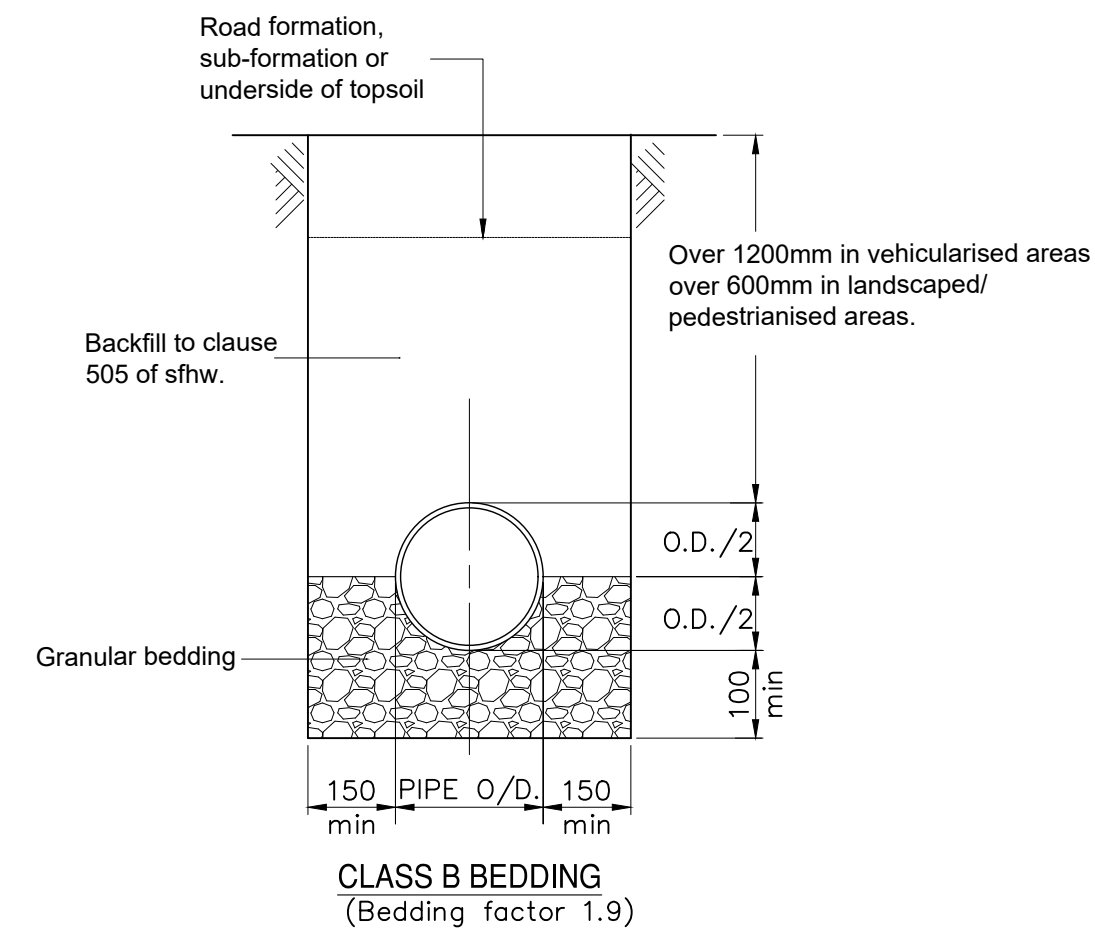
Granular Pipe Bedding Details for Flexible Pipes



TYPICAL TRENCH SECTION

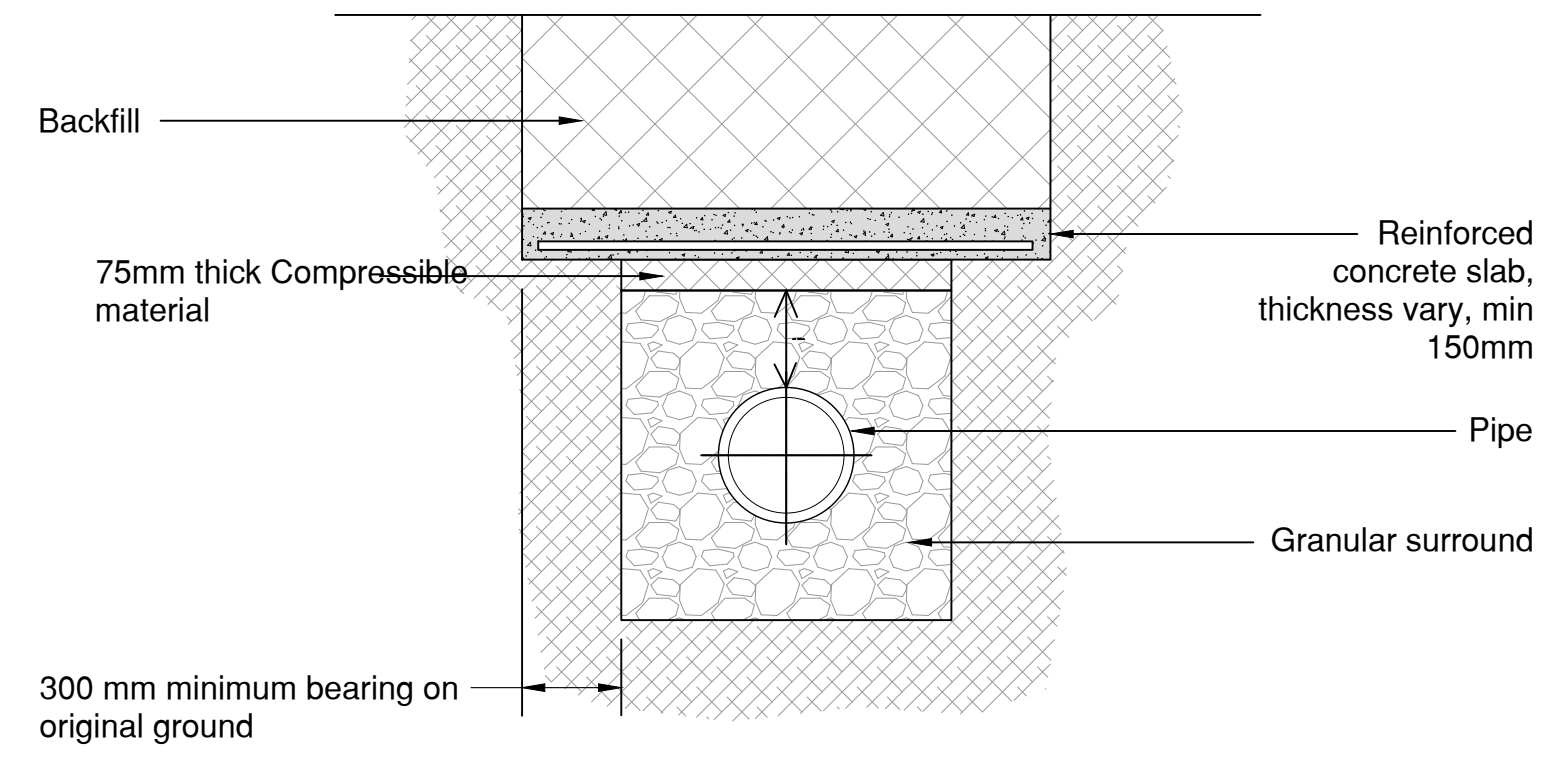


ALTERNATIVE PROTECTION OF PIPES LAID AT SHALLOW DEPTHS

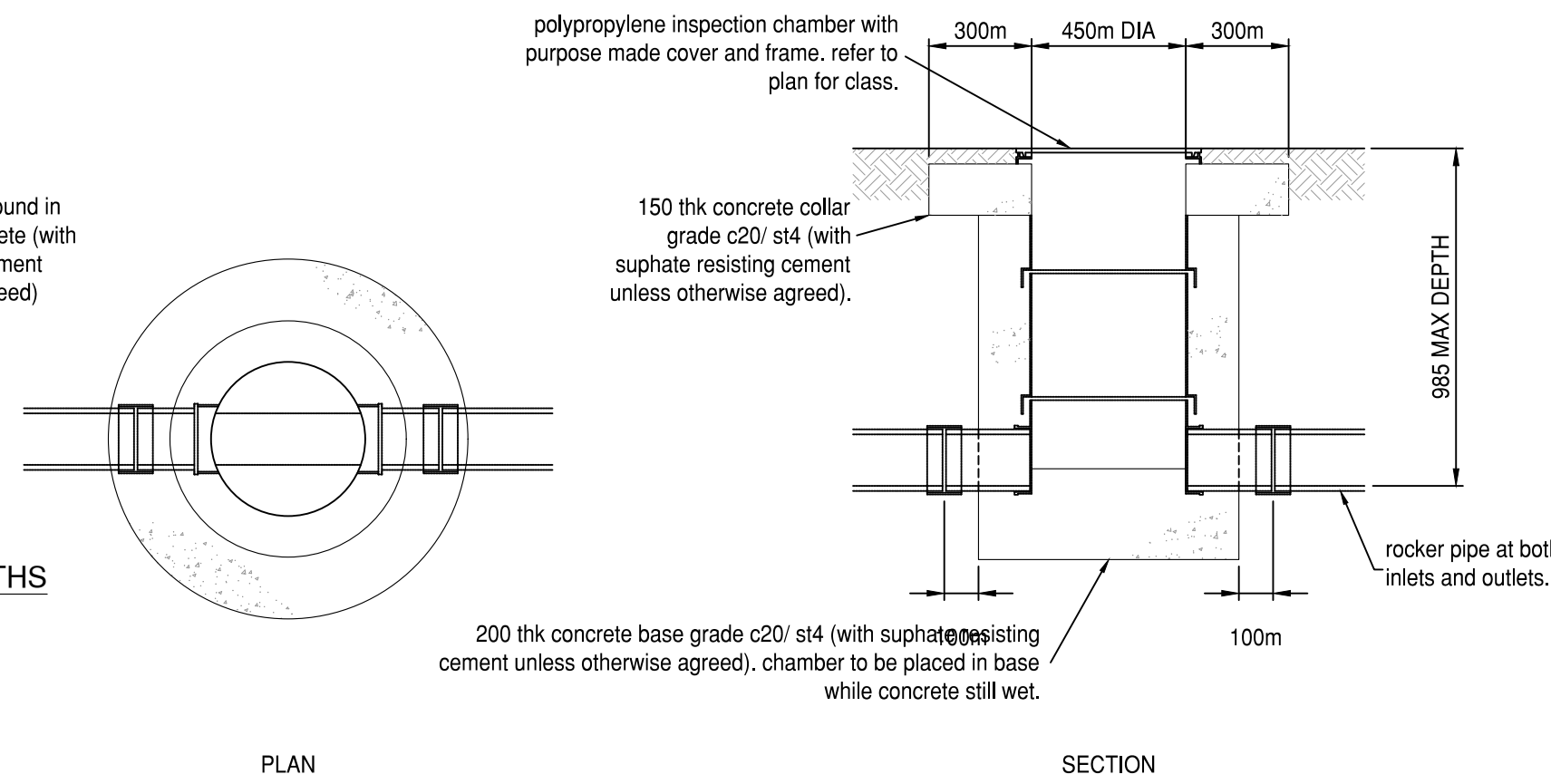


Granular Pipe Bedding Details for Rigid Pipes

Bedding beneath and at the sides of the pipe to be well compacted the first 300mm of fill above the crown of the pipe is to be lightly tamped by hand. Mechanical compaction may be used only above this level. Geotextiles may be used where directed or approved by the engineer to contain bedding material in certain soils e.g. running sand in very wet conditions, where directed or approved by the engineer a temporary land drain may be laid within the granular bed.

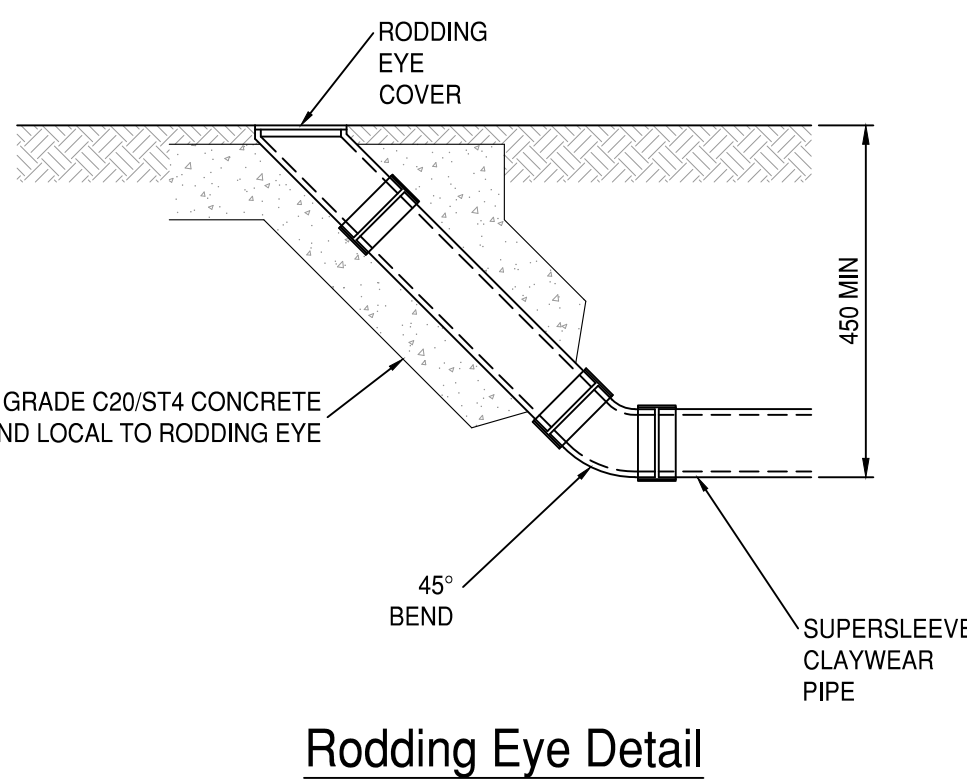


PROTECTION OF PIPES LAID AT SHALLOW DEPTHS

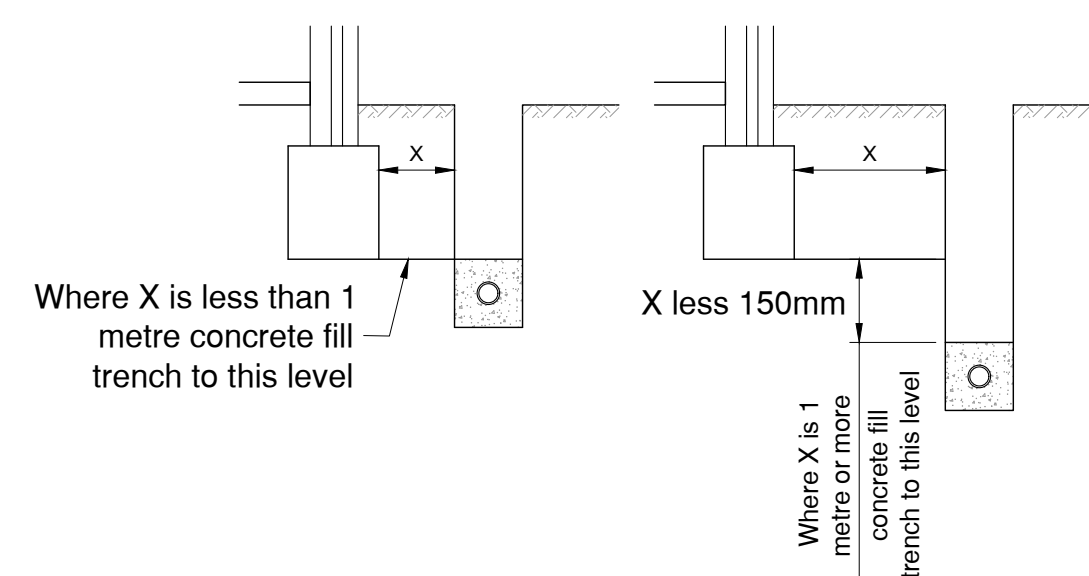


Polypropylene Manhole

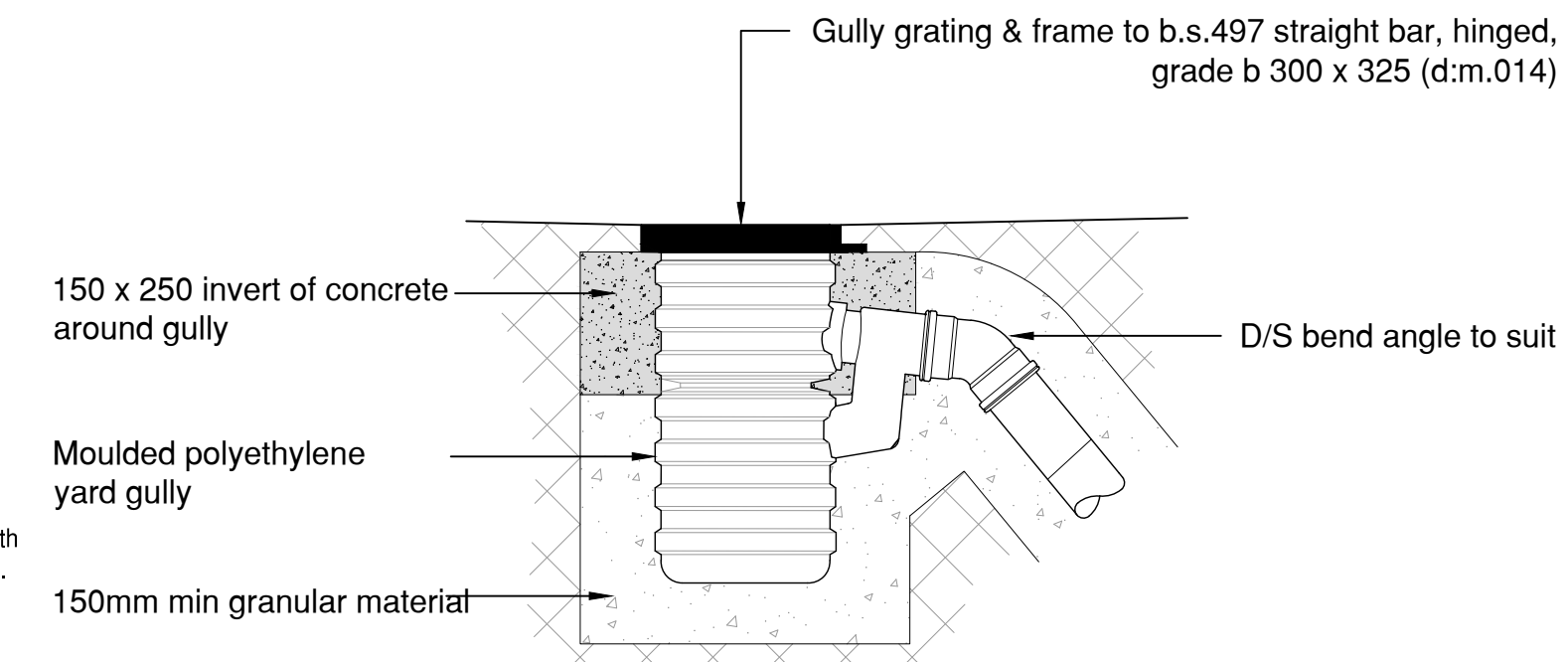
Scale 1:20
Depth from ground level to invert of pipe up to 985mm



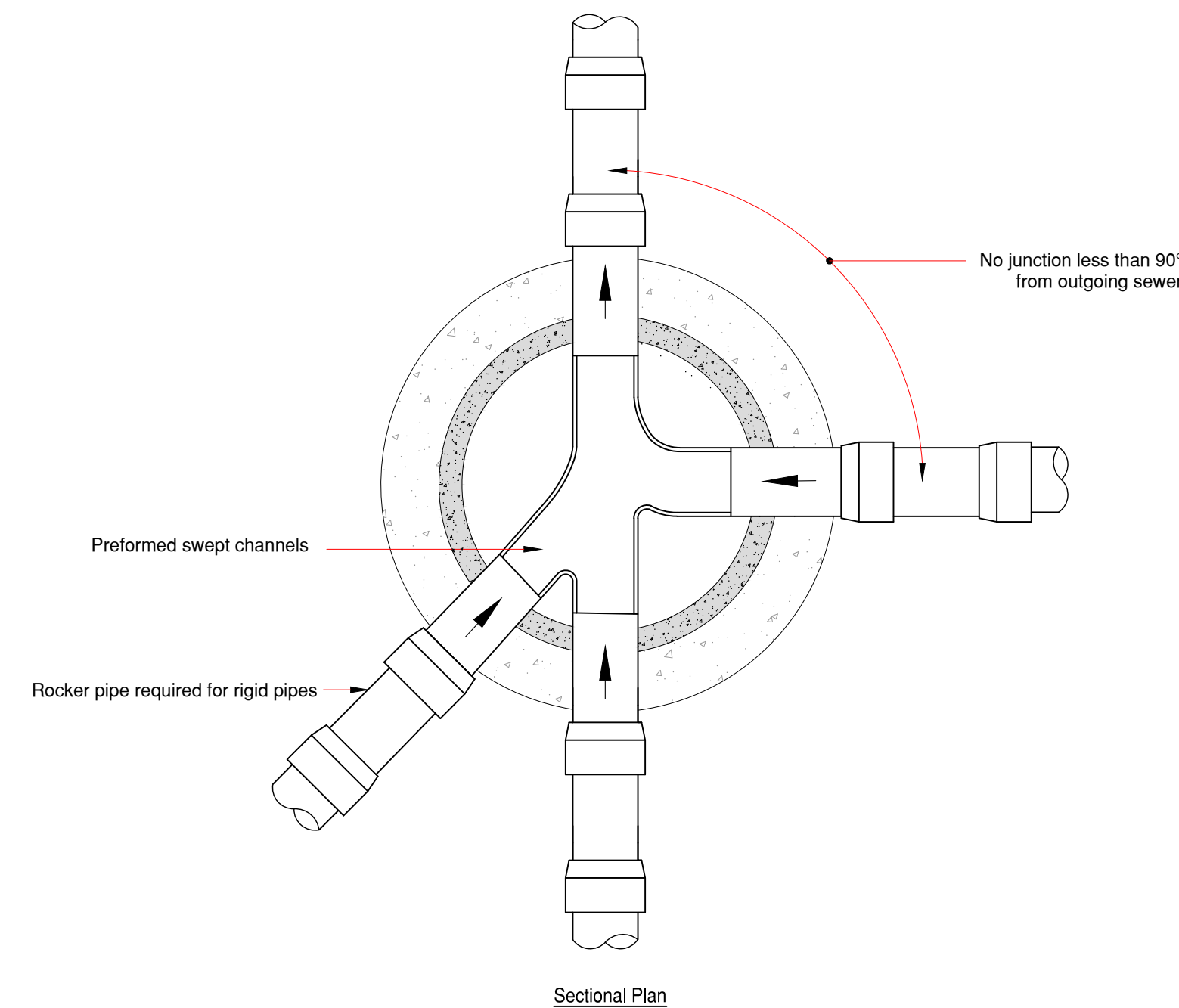
Rodding Eye Detail



TYPICAL DETAILS WHERE DRAINAGE TRENCH IS DEEPER THAN FOUNDATIONS



GULLY DETAIL - NON-KERBED AREAS



Sectional Plan

Rigid pipes built into manhole should have a flexible joint as close as feasible to the external face of the structure and the length of the next rocker pipe should be as shown.

Nominal diameter (mm)	Maximum effective length (m)
150 - 600	0.6
601 - 750	1.00
over 750	1.25

All pipes entering the bottom of the manhole to have soffits level.

Provision of Rocker Pipes at Manhole Locations for Rigid Pipes

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- For drainage plans refer to drawing:
- RCF-BML-ERD-ZZ-DR-C-0550 Combined Drainage Layout

Pipe dia. (mm)	Aggregate size.	
	Graded (mm)	Single sized (mm)
100	-	10
150	14 - 5	10 OR 14
225 - 300	14 - 5 OR 20 - 5	10,14 OR 20
375 - 525	14 - 5 OR 20 - 5	10,14 OR 20
EXCEEDING 525	14 - 5 OR 20 - 5 OR 40 - 5	10,14,20 OR 40

TABLE A
GRANULAR PIPE BEDDING MATERIAL TYPE 'S'

PIPE DIA.(MM)	WIDTH BC		Y		Z
	MAX.	MIN.	Y1 (UNIFORM SOIL)	Y2 (ROCK) *	MIN.
100	550	450	100	200	100
150	600	490	100	200	100
225	700	580	150	200	100
300	750	680	150	200	100
375	1050	950	150	200	100
450	1150	1030	150	200	150
525	1200	1120	150	200	150
600	1350	1240	150	200	150
675	1450	1330	150	200	225
750	1500	1400	150	200	225
825	1600	1490	150	225	225
900	2100	1900	150	225	225
975	2150	1950	175	250	300
1050	2250	2050	175	275	300
1200	2500	2250	200	300	300
OVER 1200	O.D. + 1000	O.D. + 800	I.D./6	I.D./4	400

TABLE B
TRENCH WIDTHS AND OTHER DIMENSIONS

Rev	By	Chkd	Date	Description
P03	DH	AM	16/08/23	Details Updated
P02	DH	AM	21/07/23	Details Updated
P01	RA	GM	13/04/23	Preliminary

PRELIMINARY DRAWING
This drawing is not to be used for construction

Client

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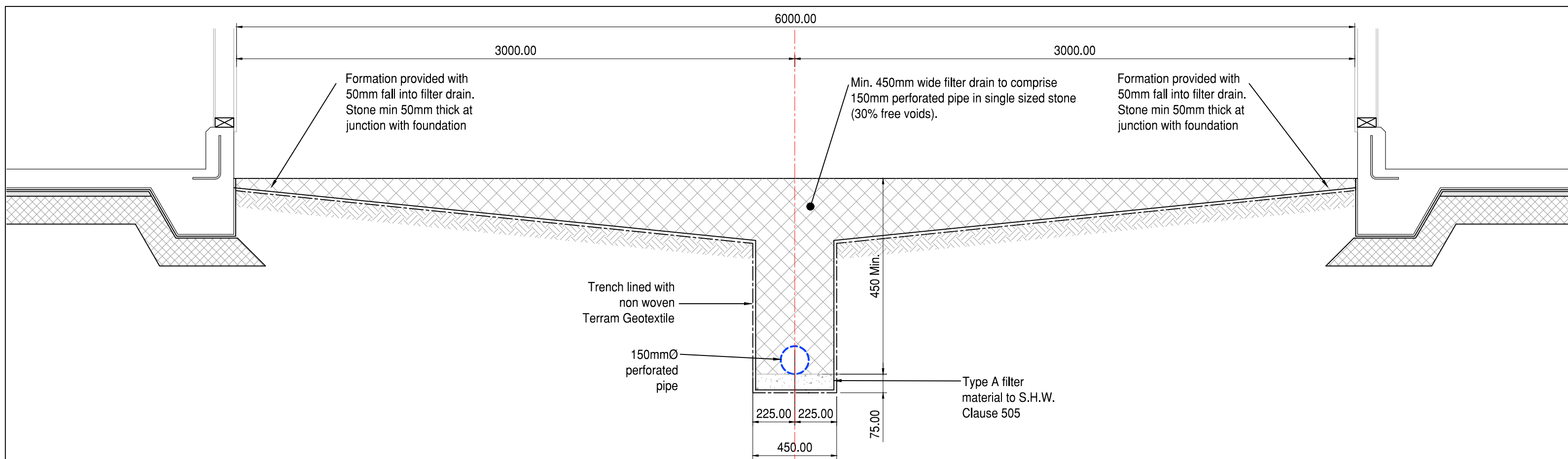
Project
Cow Shed
Elmridge Lane, Preston,
PR3 2NY

Drawing
Drainage Details 01

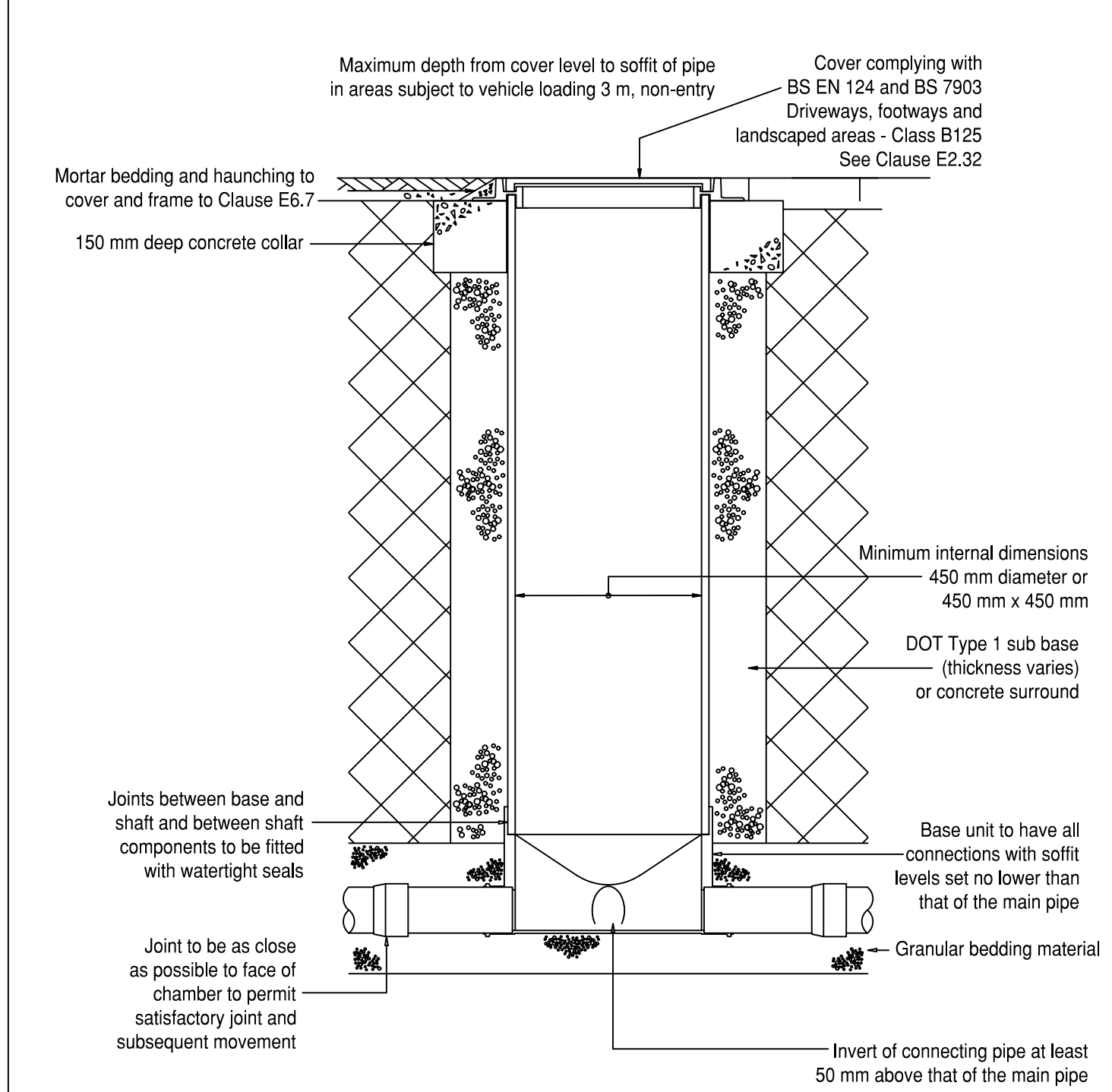
Drawn by	Date
Checked by RA/GM	Date 05/04/2023

Drawing No.	Revision
C5H-BML-XX-XX-DR-C-0501	P03
BML Job No.	
1000-05	

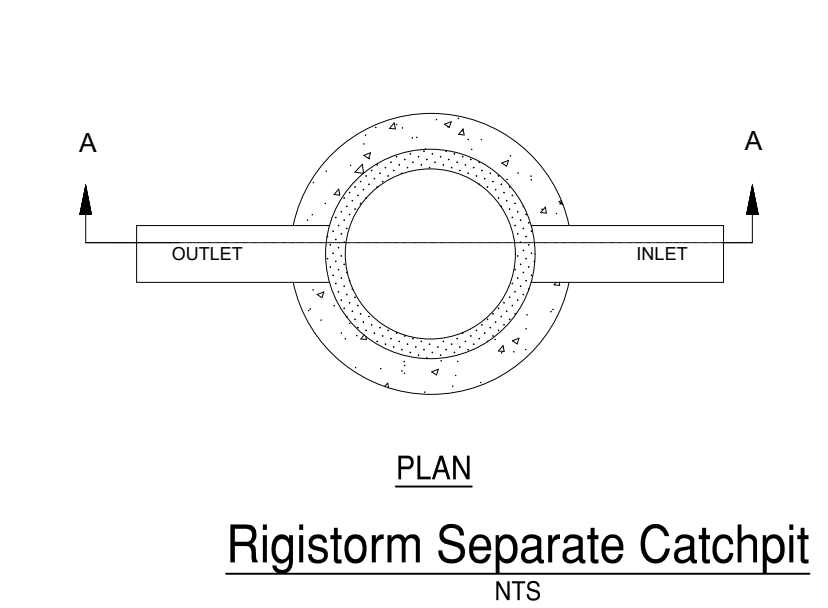
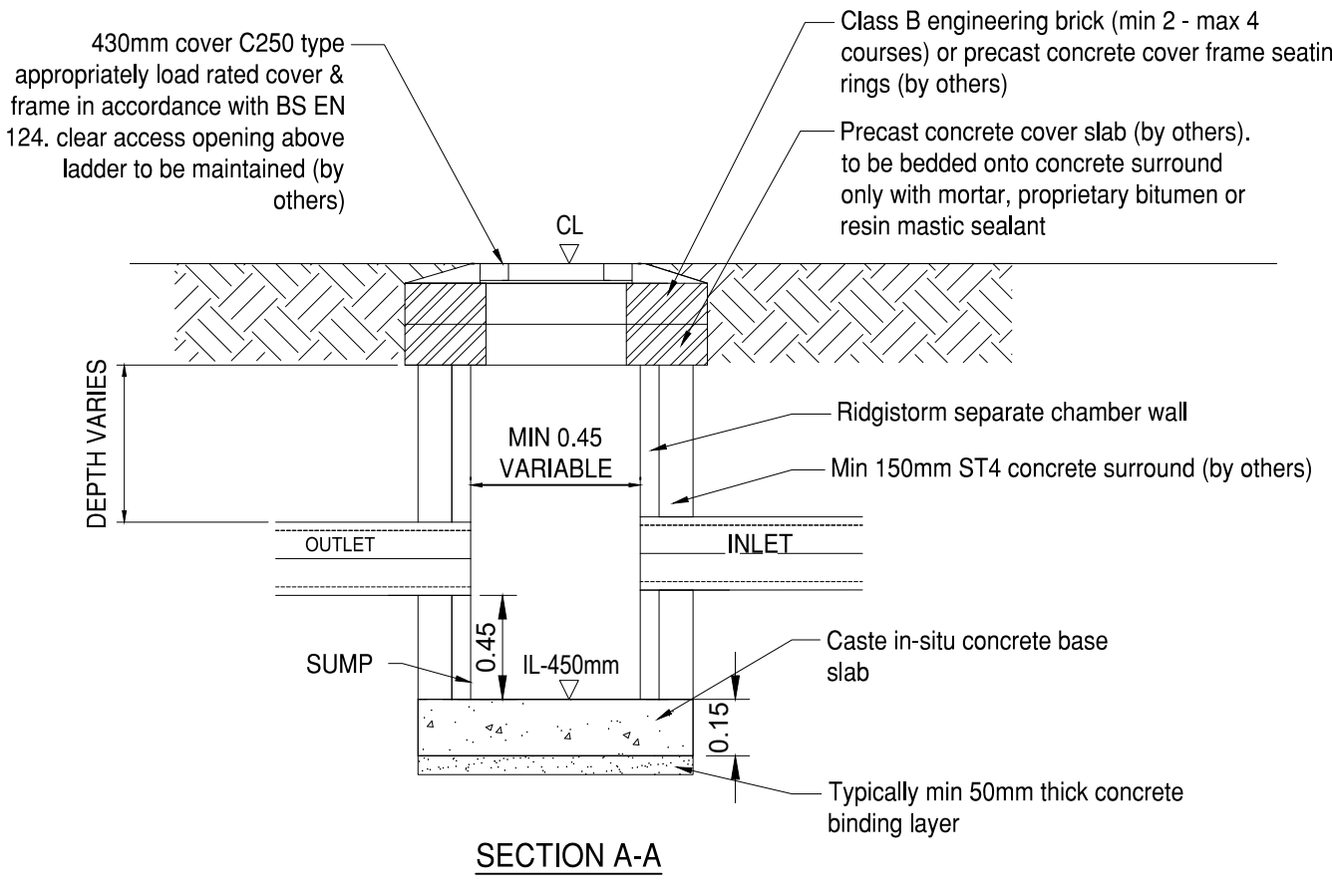
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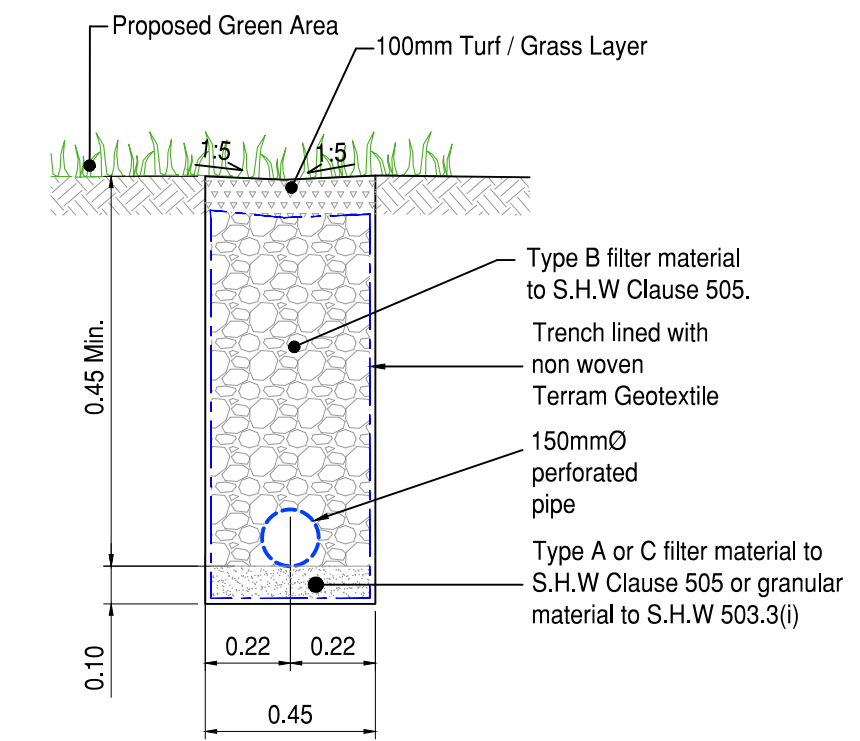
Typical Section Thro' Filter Drain (Section A-A)
Scale 1:20



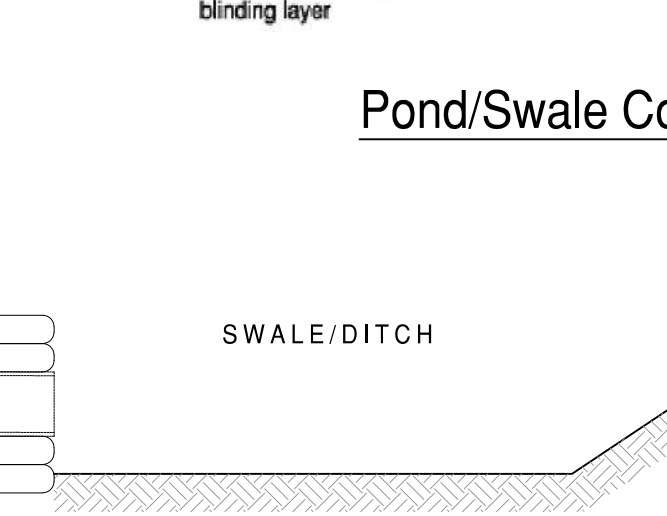
Typical Inspection Chamber Detail (Flecible Material Detail)
NTS



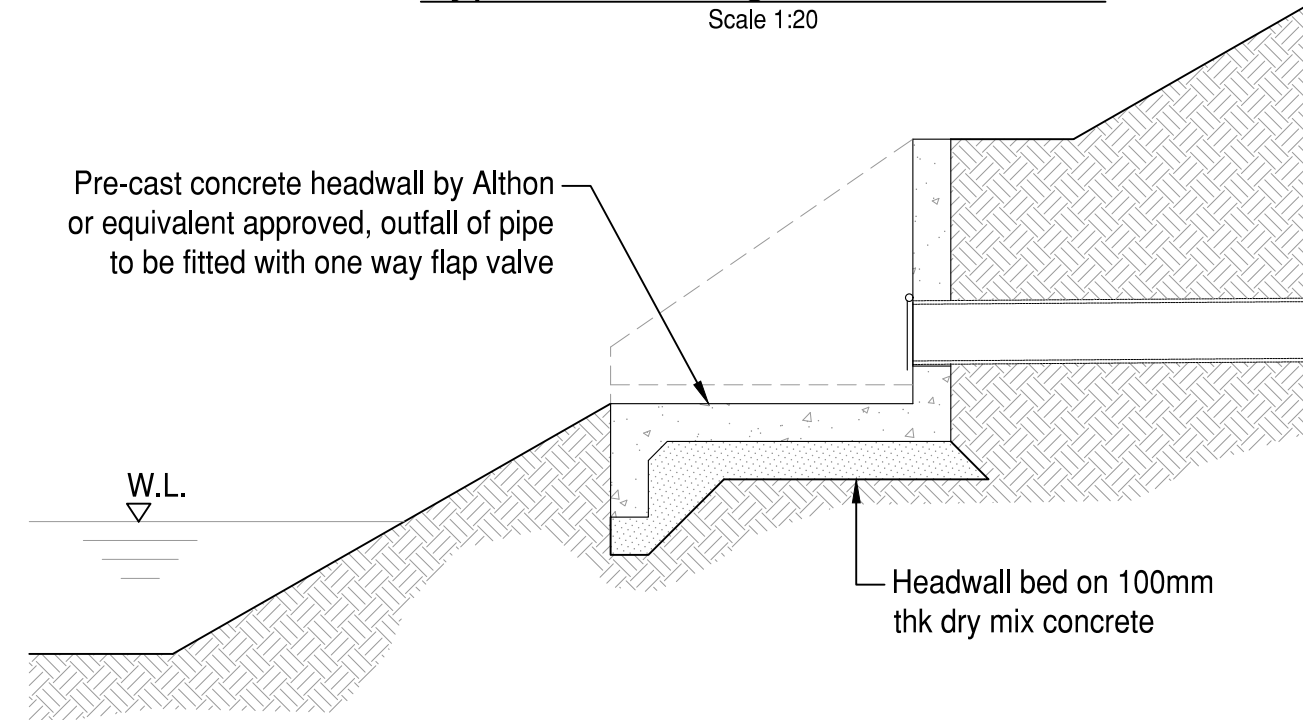
Ridgstorm Separate Catchpit
NTS



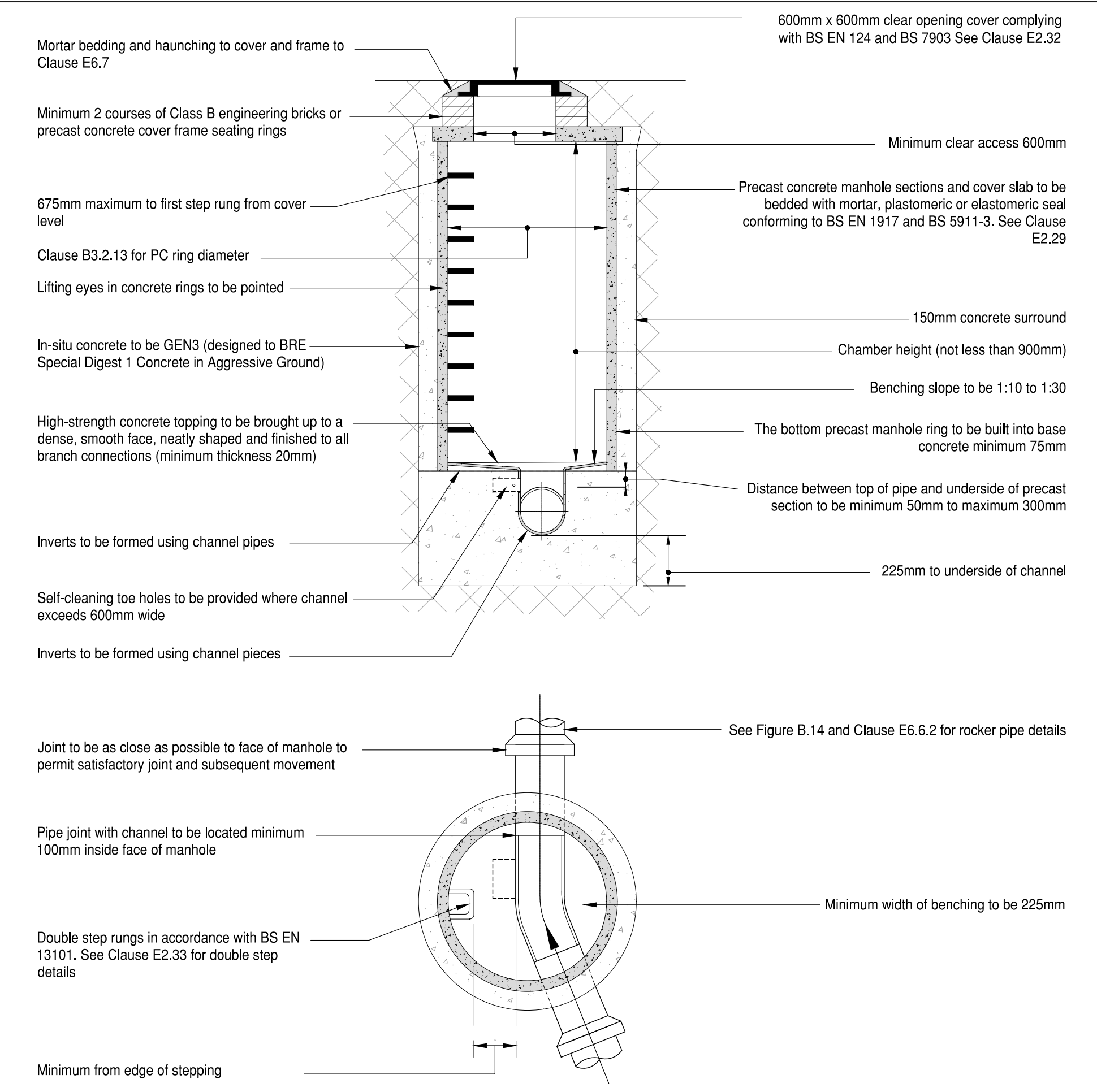
Typical Filter Drain Detail
Scale 1:20



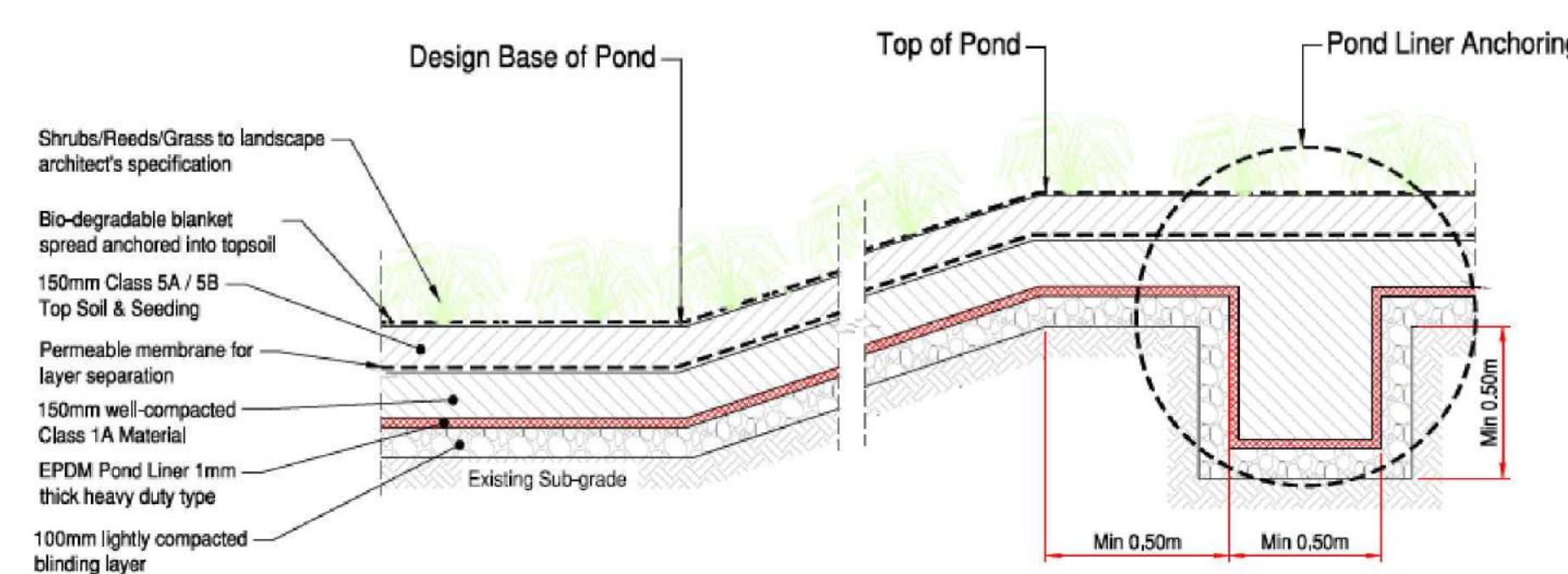
Typical Sandbag Headwall Detail
Scale 1:20



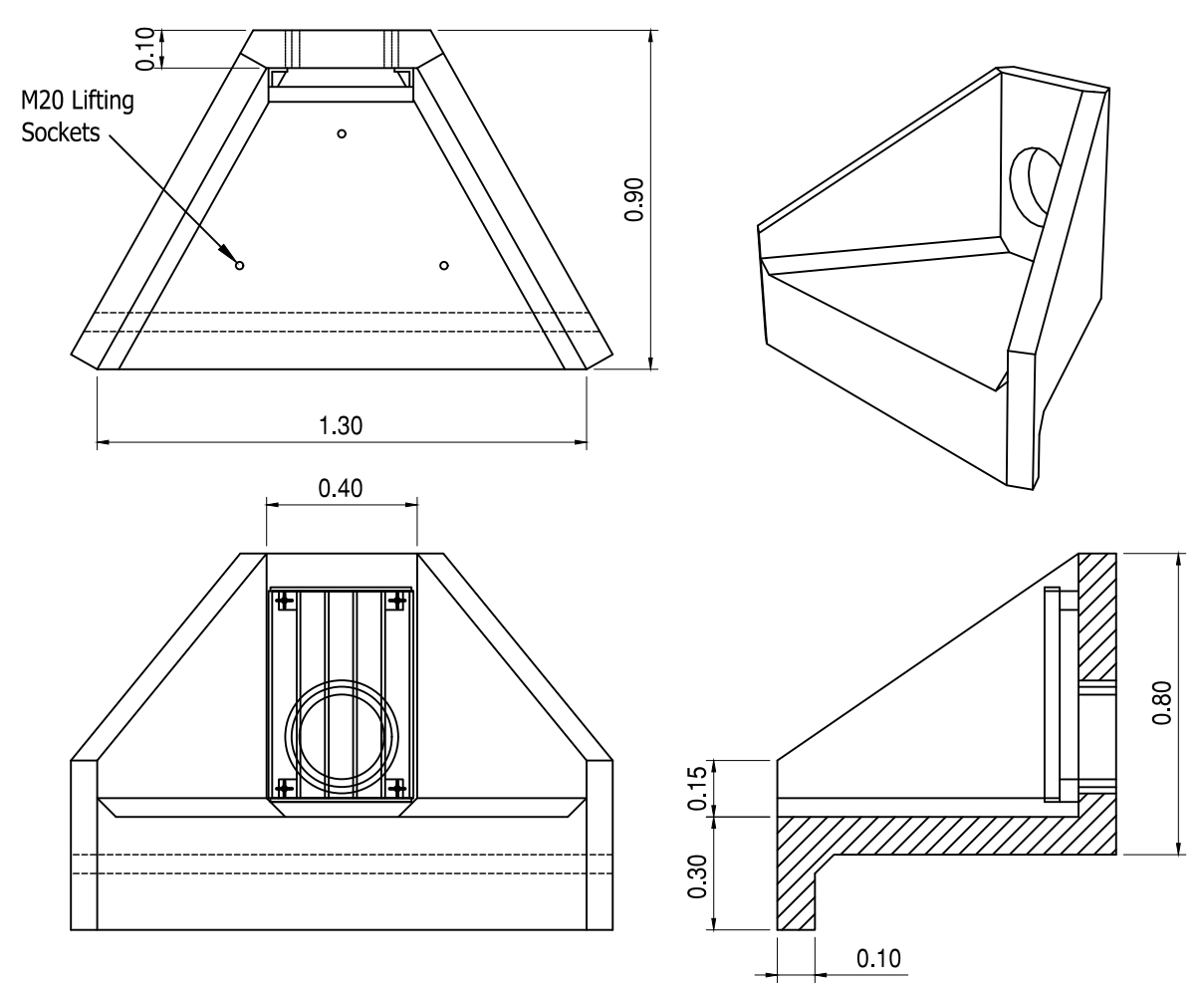
Typical Concrete Headwall Detail
Scale 1:20



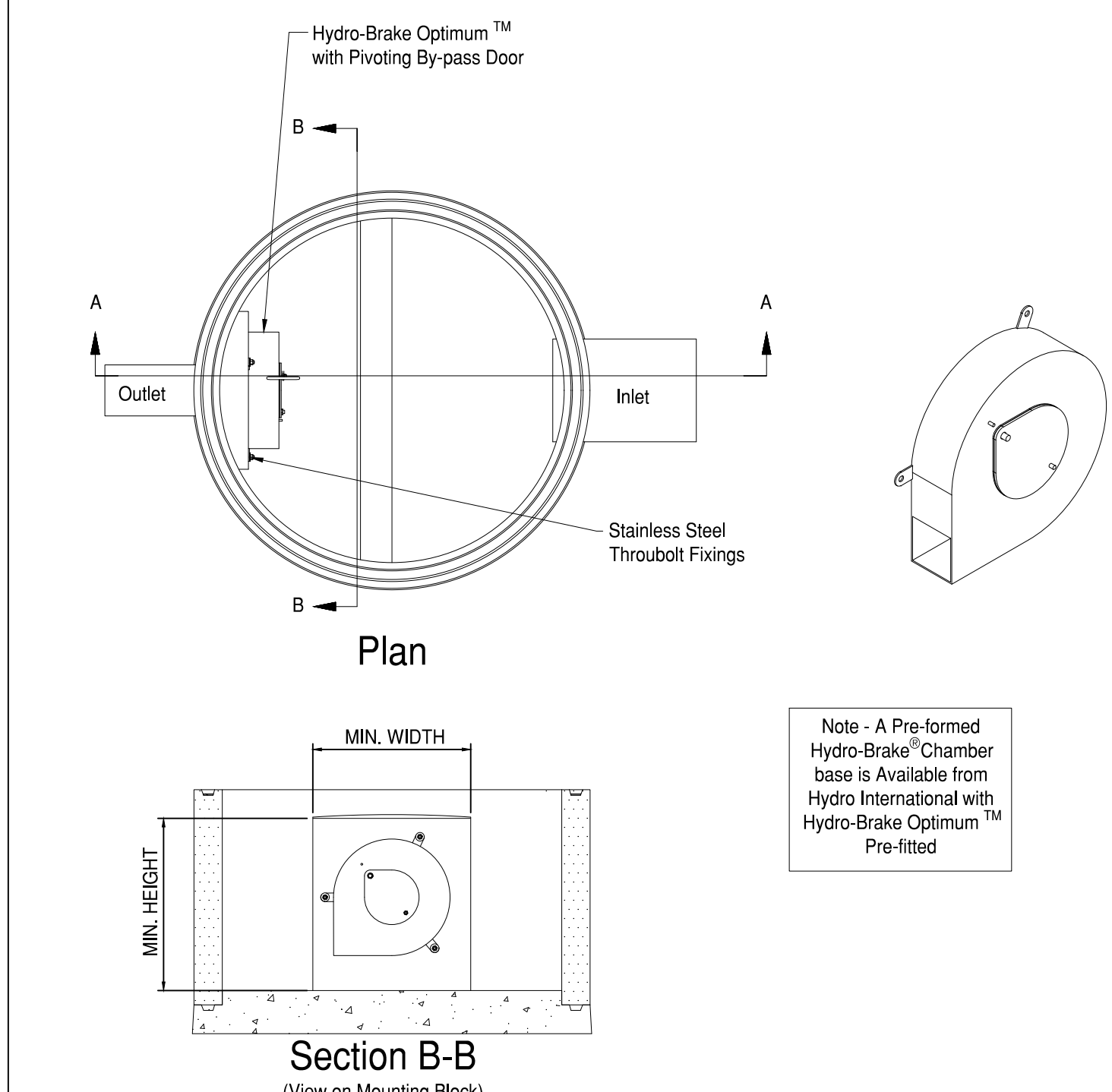
Typical Manhole Detail (Max depth from cover to soffit of pipe 3.0m)
Scale 1:20



Pond/Swale Construction Build Up (to be confirmed by Landscape Architects)
NTS



Headwall Outlet - Athlon H3C Headwall (Up to DN300)
Scale 1:20



Typical Hydrobrake Chamber Detail With Overflow Pipe
Scale 1:20

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 - For drainage plans refer to drawing:
- RCF-BML-ERD-ZZ-DR-C-0550 Combined Drainage Layout

PRELIMINARY DRAWING
This drawing is not to be used for construction

Rev	By	Chkd	Date	Description
P03	DH	AM	15/08/23	Details Updated
P02	DH	AM	2/07/23	Details Updated
P01	RA	GM	13/04/23	Preliminary

Client

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BarnsleyMarshall

Project
Cow Shed
Elmridge Lane, Preston,
PR3 2NY

Drawing
Drainage Details 02

Drawn by	Date
Checked by RA/GM	Date 05/04/2023


Drawing No.	Revision
CSH-BML-XX-XX-DR-C-0502	P03


BML Job No.
1000-05

Drawing Scale at A1: NTS
CAD Filename:

Safety, Health & Environmental Information:

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General Notes:

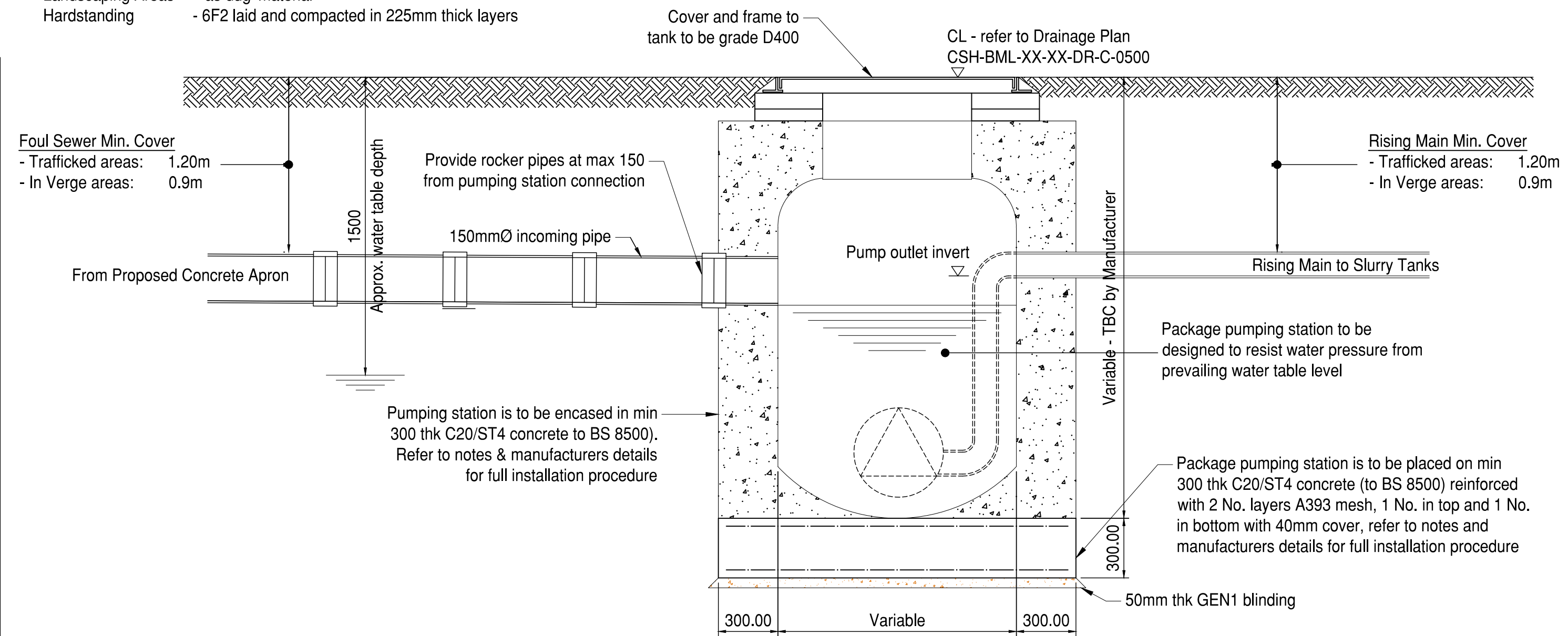
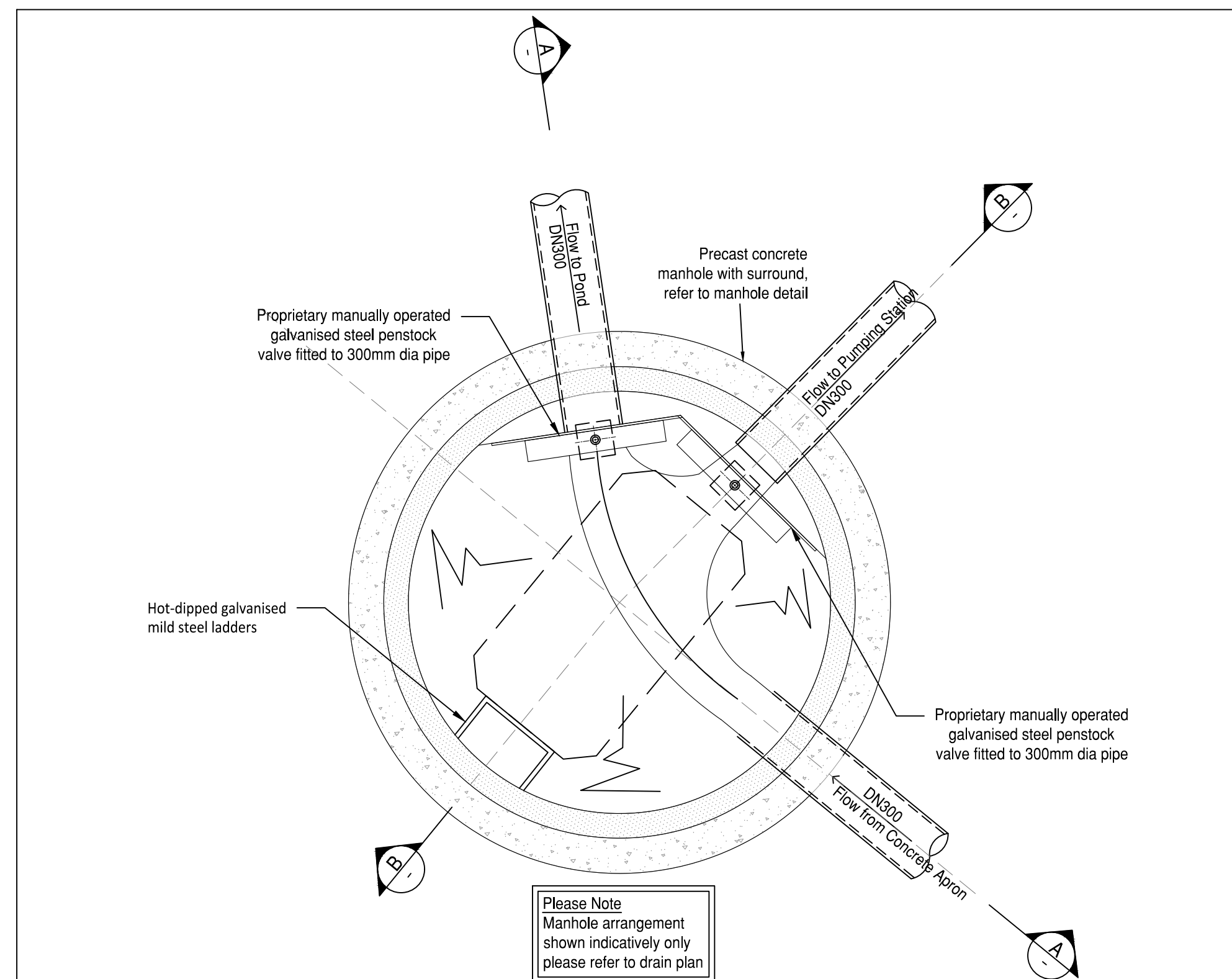
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- For drainage plans refer to drawing:
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Pumping Station / Chamber Notes:

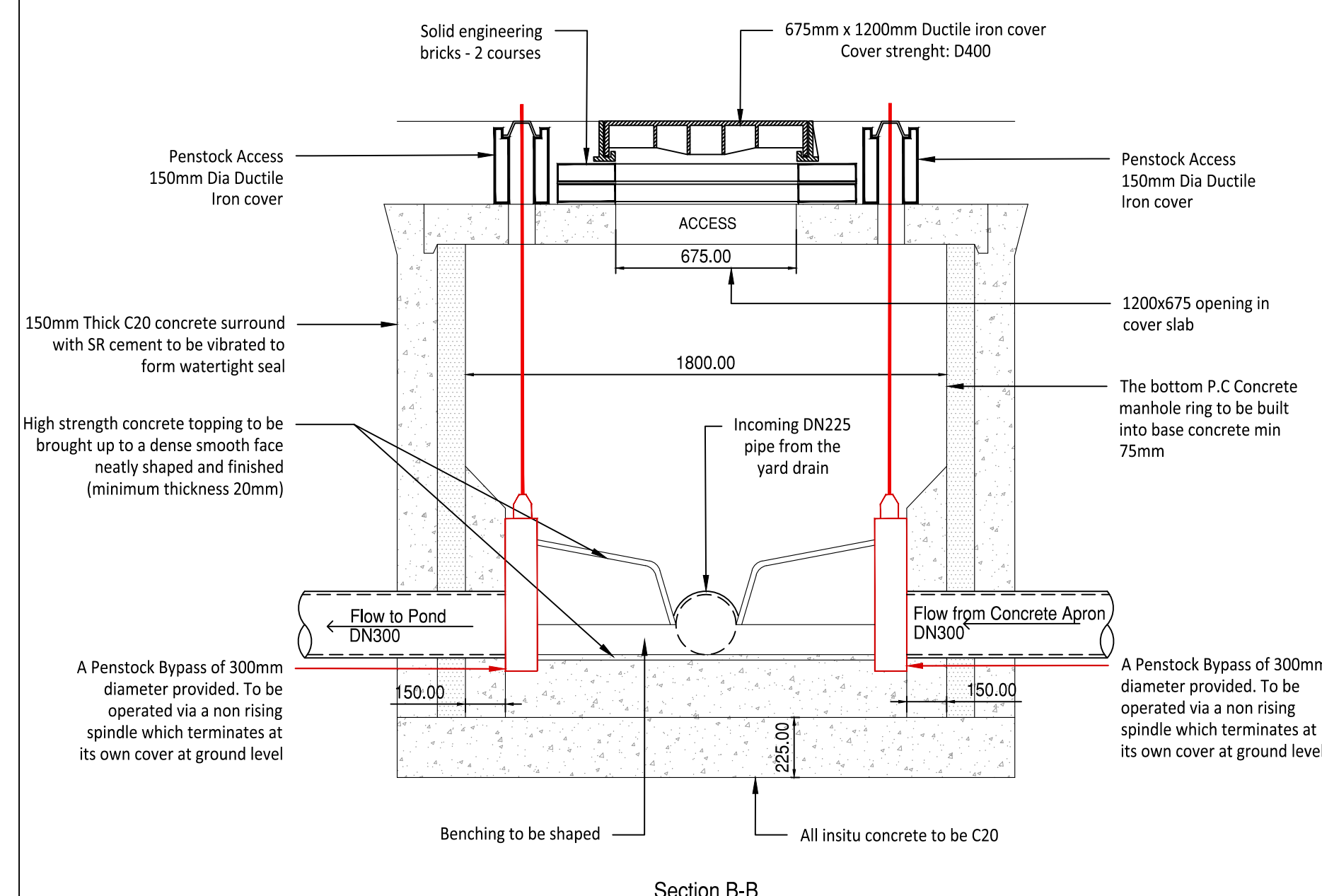
- The package pumping station should be visually inspected on site by the Contractor for any cracks or damage prior to installation.
- The contractor is responsible for ensuring the stability of all excavations and any necessary health and safety requirements.
- The excavation is to remain dry throughout the construction sequence until the concrete has cured. The contractor is responsible for the design and installation of any temporary works relating to ground water issues.
- The contractor is to ensure that the station has water fill and concrete encasement provided in lifts strictly in accordance with the manufacturers installation guidance.
- The contractor must ensure that no distortions to the tank occur.
- After completion of concrete encasement to the tank and turret has cured, the excavation is to be back filled as follows:

Landscaping Areas - 'as dug' material
Hardstanding - 6F2 laid and compacted in 225mm thick layers

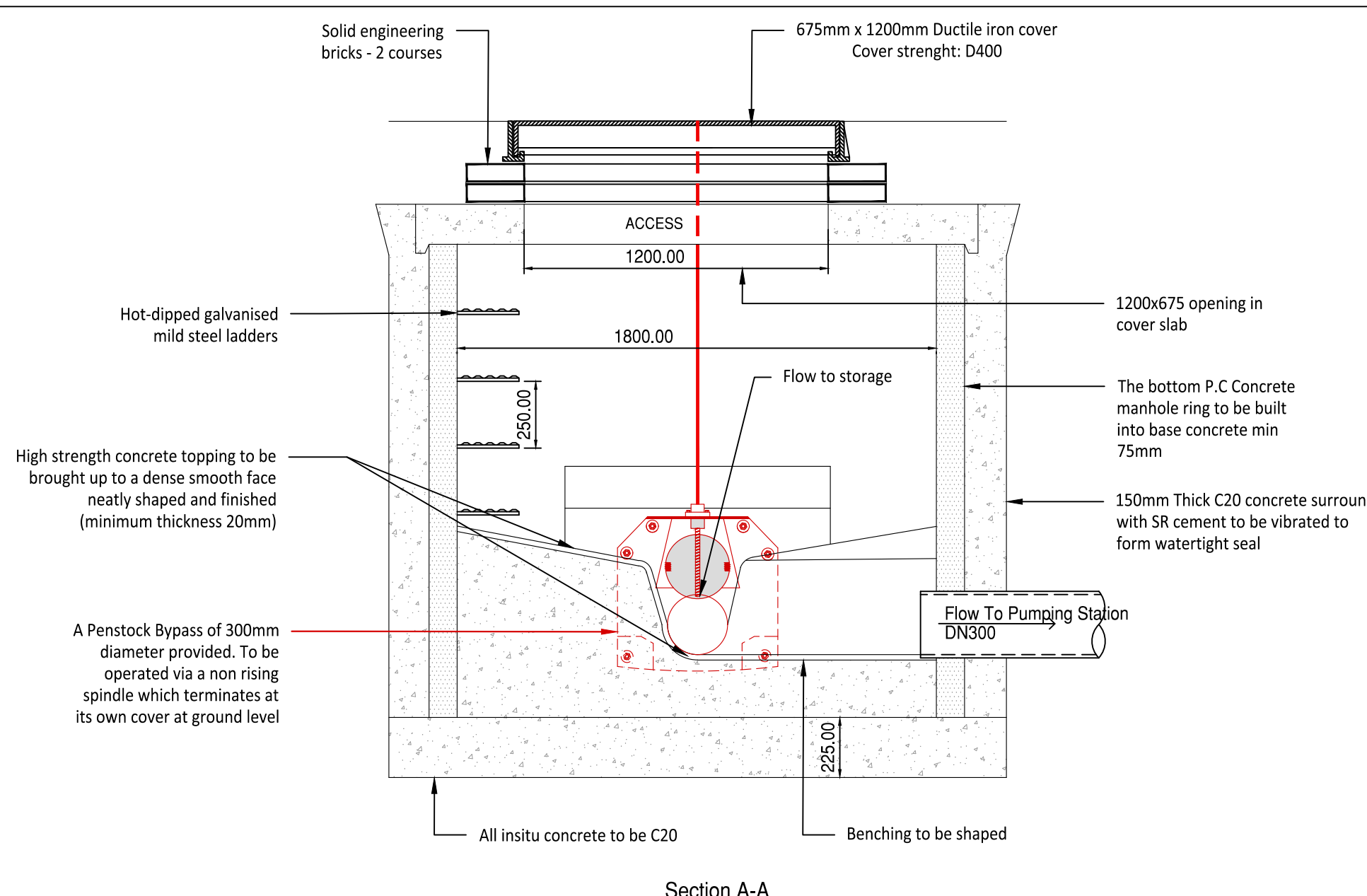
Health and Safety Note:
Contractor to Provide all necessary temporary shoring to trench, and to take special note of prevailing ground conditions and high water table



Typical Section through Pumping Station with Wet Well
Scale 1:25



Diversion Chamber
Scale 1:20



PRELIMINARY DRAWING
This drawing is not to be used for construction

P01	DH	AM	17/08/23	Preliminary Issue
Rev	By	Chkd	Date	Description

Client



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Project
Cow Shed
Elmridge Lane, Preston,
PR3 2NY

Drawing
Drainage Details 03

Checked by	RA/GM	Date	05/04/2023	Revision
Drawing No.	CSH-BML-XX-XX-DR-C-0503	P01		

BML Job No.
1000-05

Drawing Scale at A1: NTS
CAD Filename: