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T M Ventham
Practice

SUDS MAINTENANCE PLAN

FOR

**THE PROPOSED REFURBISHMENT OF
THE WESSEX GARAGES CAR SHOWROOMS
AND VALETING BAY
AT
1 MERCIA ROAD
GLOUCESTER
GL1 2SQ**

Ref: 10319

May 2022

Rev:

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Revisions

First Issue

May 2022

1.0 Introduction

- 1.1 We have been appointed by Wessex Garages to provide a SuDS Maintenance Plan (SMP) for the refurbishment works at their site at 1 Mercia Road Gloucester to enable the storm water drainage system to be maintained and operated as intended within the design.
- 1.2 The SMP has also been requested by Gloucester Council Flood Management Team as part of the Planning Application (Ref: 22/00047/FUL) process.

2.0 Proposed Storm Water Drainage System

- 2.1 The proposed storm water drainage system is as shown on T M Ventham Practice Drawing No's 10319-SK2 and SK3.
- 2.2 The additional storm water drainage system within the site has been designed to cater for a 100 year storm return period with a 40% allowance for climate change. On site storage/attenuation has been provided within the SuDS components.
- 2.3 The SuDS system aims to manage the rainfall and control the flow and volume of additional water leaving the development.
- 2.4 The prevention of pollution will be achieved by intercepting silt and cleaning runoff from hard surfaces.
- 2.5 The flood risks to the site have been ascertained within the Flood Risk Assessment dated February 2022 carried out by the T M Ventham Practice.
- 2.6 The property owners Wessex Garages employ maintenance staff to run and maintain their sites.

3.0 SuDS on this Development

- 3.1 During rainfall events storm water run-off from the additional building roofs will be collected by gutter and downpipe and conveyed through the site by underground pipework into a perforated pipe connected and cellular crate attenuation tank.
- 3.2 The additional run-off will be contained within the attenuation tank for storm events up to and including the 100 year event with an allowance of 40% for climate change.
- 3.3 The stored water is then released at a controlled rate of 0.5l/s via a hydro-brake flow control system into the existing surface water system via a new saddle connection.

4.0 Managing SuDS

- 4.1 The SuDS have been designed for easy maintenance to comprise:
- Regular day to day care – litter collection, regular gardening to control vegetation growth and checking inlets where water enters the SuDS feature.
 - Occasional tasks – checking the SuDS feature and removing any silt that builds up in the SuDS feature.
 - Remedial Work – repairing damage where necessary.

5.0 SuDS Scheme Checklist

- 5.1 The following lists the SuDS components and extra features which are found on site:
- The cellular crate attenuation tank, this will accept surface water run-off from the additional roof areas.
 - The flow control device - flows from the site will be restricted using a hydro-brake chamber which allows heavy rainfall to leave the site slowly and make its way through pipework to the existing surface water drainage system.
 - Class 1 By-pass Separators – the existing runoff pass through these prior to being discharged to the existing surface water system.
 - Manholes, Inspection Chambers and Rodding Eyes – these are used on bends or where pipes come together, they allow access and cleaning to the system if necessary.
 - Catch Pits are chambers that have an invert level lower than the incoming and outgoing pipework to enable any solids within the water flow to settle out and are used on the below ground pipe system before and after the connection to the attenuation tank, they allow cleaning of the system and removal of any silts deposited in the sump of the manhole.
 - Inlet Structures such as rain water down pipes, drainage gullies and channel drains - these should be free from obstruction at all times to allow free flow through the drainage network.
 - Below ground drainage pipes – these convey the water into and out of the SuDS, they should be free from obstruction at all times to allow free flow.

6.0 Sustainable Drainage Maintenance Specification

6.1 General Requirements

- Avoid use of weed-killers and pesticides to prevent chemical pollution
- Avoid de-icing agents wherever possible
- Protect all below ground drainage through careful selection and placement of hard and soft landscaping.

GENERAL REQUIREMENTS	
General Requirements	Frequency
Litter: Collect all litter or other debris and remove it from site at each visit.	Monthly

6.2 Cellular Crate Attenuation Systems

- Cellular crate attenuation systems are designed to provide storage upstream of a flow control device.

CELLULAR CRATE ATTENUATION SYSTEMS	
Regular Maintenance	Frequency
Inspect and identify any areas that are not operating correctly. Remove debris from the catchment surface (where it may cause risk to performance). Remove sediment from inlet structures and inspection chambers. Maintain vegetation to designed limits within the vicinity of below ground tanked systems to avoid damage to the system.	Monthly or as required.
Remedial work	Frequency
Repair physical damage if necessary.	As required.
Monitoring	Frequency
Inspect all inlets, outlets and vents to ensure that they are in good condition and operating as designed.	Annually.

6.3 Flow Control Device

- A Flow Control Device controls the flow of water leaving the site, on this development this is achieved by means of a hydro-brake flow control chamber.

FLOW CONTROL DEVICE – HYDRO-BRAKE	
Regular Maintenance	Frequency
Carry out chamber clean removing all debris and scale. If required take remedial action.	Annually or after large storms
Remedial work	Frequency
Repair physical damage if necessary	As required

6.4 Class 1 By-pass Separators

- Class 1 By-pass separators are a trap used to filter out hydrocarbon pollutants from rainwater runoff.

CLASS 1 BY-PASS SEPARATOR	
Regular Maintenance	Frequency
Inspect and identify any areas that are not operating correctly. If required take remedial action.	Every 6 months
Clean out any oil & silt from Interceptor.	Audio Visual Alarm
Remedial Work	Frequency
Repair physical damage if necessary	As required

6.5 Inlet structures and Inspection Chambers

- Inlet Structures such as rain water down pipes, road gullies and channel drains should be free from obstruction at all times to allow free flow through the SuDS.
- Manholes, Inspection Chambers and rodding eyes are used on bends or where pipes come together, they allow access and cleaning to the system if necessary.

INLET STRUCTURES AND INSPECTION CHAMBERS	
Regular Maintenance	Frequency
Inlet Structures Inspect rainwater down pipes, gullies and drainage channels removing obstructions and silt as necessary. Check there is no physical damage.	Monthly Monthly
Manholes, Inspection Chambers and Rodding Eyes. Remove cover and inspect, ensuring that the water is flowing freely and that the exit route for water is unobstructed. Remove debris and silt. Undertake inspection after leaf fall in Autumn	Annually or after large storms
Remedial work	Frequency
Repair physical damage if necessary	As required

6.6 Catch pits

- Catch Pits are chambers that have an invert level lower than the incoming and outgoing pipework to enable any solids within the water flow to settle out.
- Catch pits are used on the below ground pipe system before and after the connection to the attenuation tank, they allow cleaning of the system and removal of any silts deposited in the sump of the manhole.

CATCH PITS	
Regular Maintenance	Frequency
Remove cover and inspect, ensuring that the water is flowing freely and that the exit route for water is unobstructed. Remove debris and silt from the manhole sump. Undertake inspection after leaf fall in Autumn	Annually or after large storms
Remedial work	Frequency
Repair physical damage if necessary	As required

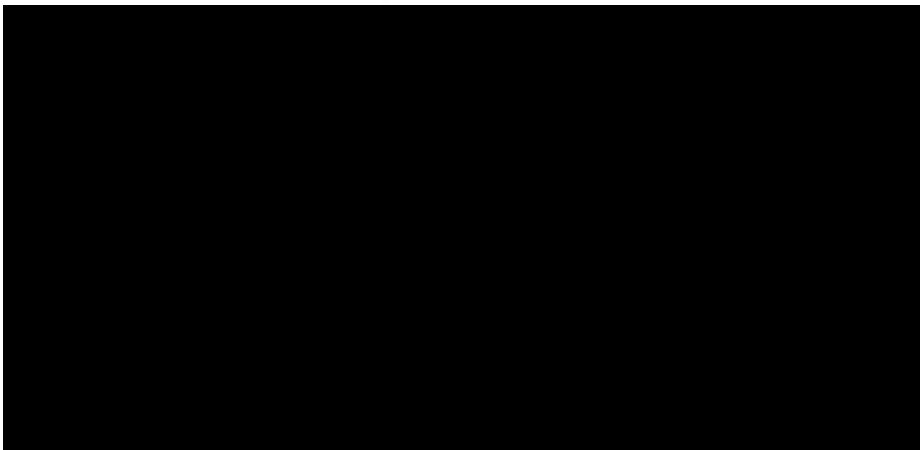
6.7 Below ground drainage pipes

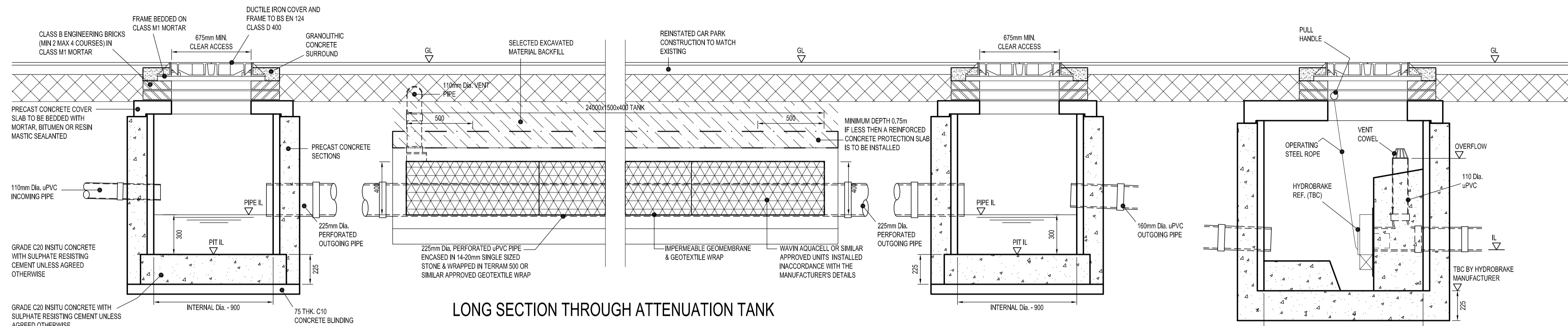
- Below ground drainage pipes convey water to and from the SuDS system, they should be free from obstruction at all times to allow free flow.

BELOW GROUND DRAINAGE PIPES	
Regular Maintenance	Frequency
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
Remove sediment from pre-treatment inlet structures and inspection chambers.	Annually or as required
Maintain vegetation to designed limits within the vicinity of below ground drainage pipes and tanks to avoid damage to system.	Monthly or as required
Remedial work	Frequency
Repair physical damage if necessary	As required
Monitoring	Frequency
Inspect all inlets, outlets and vents to ensure that they are in good condition and operating as designed.	Annually
Survey inside of pipe runs for sediment build up and remove if necessary.	Every 5 years or as required

6.8 Spillage – Emergency Action

- Most spillages on development are of compounds that do not pose a serious risk to the environment if they enter the drainage in a slow and controlled manner with time available for natural breakdown in a treatment system. Therefore, small spillages of oil, milk or other known organic substances should be removed where possible using soak mats as recommended by the Environment Agency, with residual spillage allowed to bioremediate in the drainage system.
- In the event of a serious spillage, either by volume or of unknown or toxic compounds, then the spillage should be isolated with soil, turf or fabric and outlet pipes from chamber(s) blocked downstream of the spillage with a bung(s). (A bung for blocking pipes may be made by wrapping soil or turf in a plastic sheet or closely woven fabric.). The Environment Agency should be contacted immediately with details of the spillage.





CATCH PIT

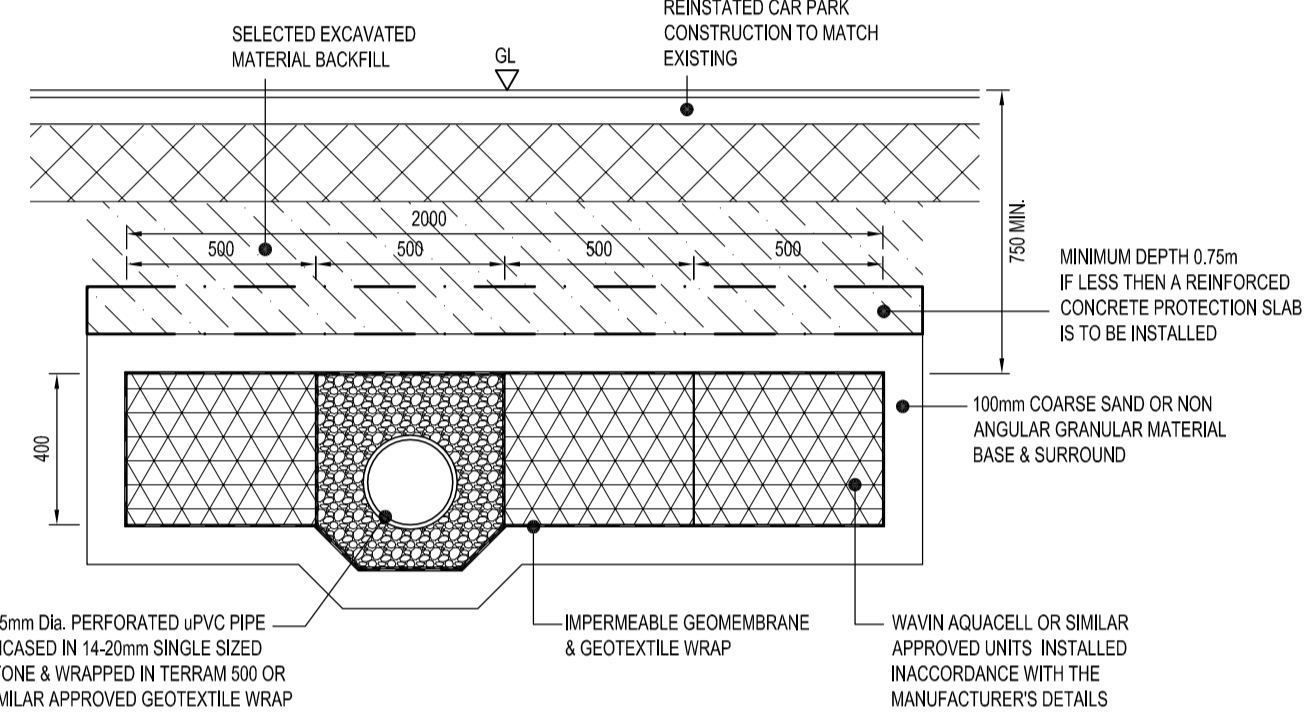
LONG SECTION THROUGH ATTENUATION TANK

CATCH PIT

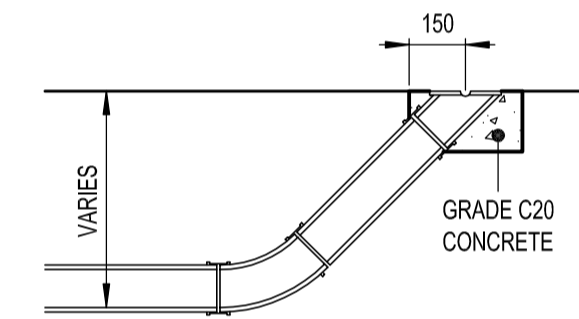
HYDROBRAKE FLOW CONTROL

HYDROBRAKE TO ALLOW 0.5 L/S DISCHARGE RATE

FOR MANHOLE CONSTRUCTION SEE TYPE B MANHOLE



CROSS SECTION THROUGH ATTENUATION TANK



RODDING EYE DETAIL

PIPES LAID IN AS DUG SUBSOIL SUITABLE AS BEDDING MATERIAL

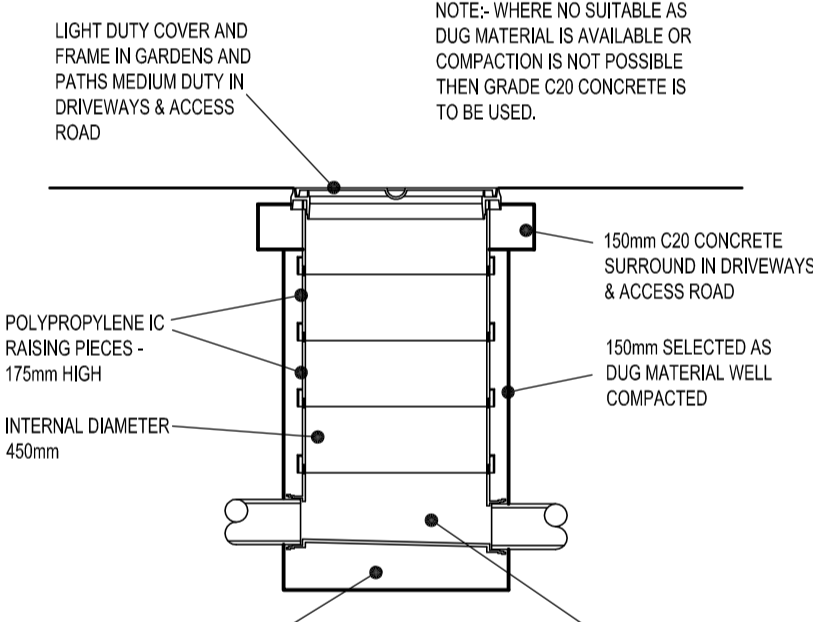
PIPES LAID IN SUBSOIL UNSUITABLE AS BEDDING MATERIAL WHICH DOES NOT PUDDLE WHEN WALKED ON 110 & 160mm Dia. ONLY

PIPES LAID IN SUBSOIL UNSUITABLE AS BEDDING MATERIAL

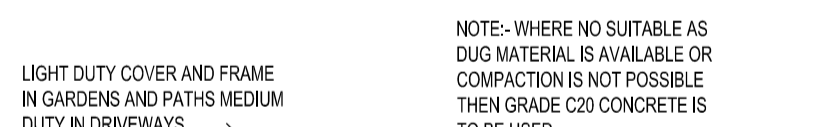
DIAMETER OF LARGEST PIPE	CHAMBER DIAMETER A
Less than 375mm	1200mm
375 - 450mm	1350mm
500 - 700mm	1500mm
750 - 900mm	1800mm

PIPE DIAMETER	ROCKER PIPE LENGTH
150 - 600mm	600mm
675 - 750mm	1000mm
925mm OR OVER	1250mm

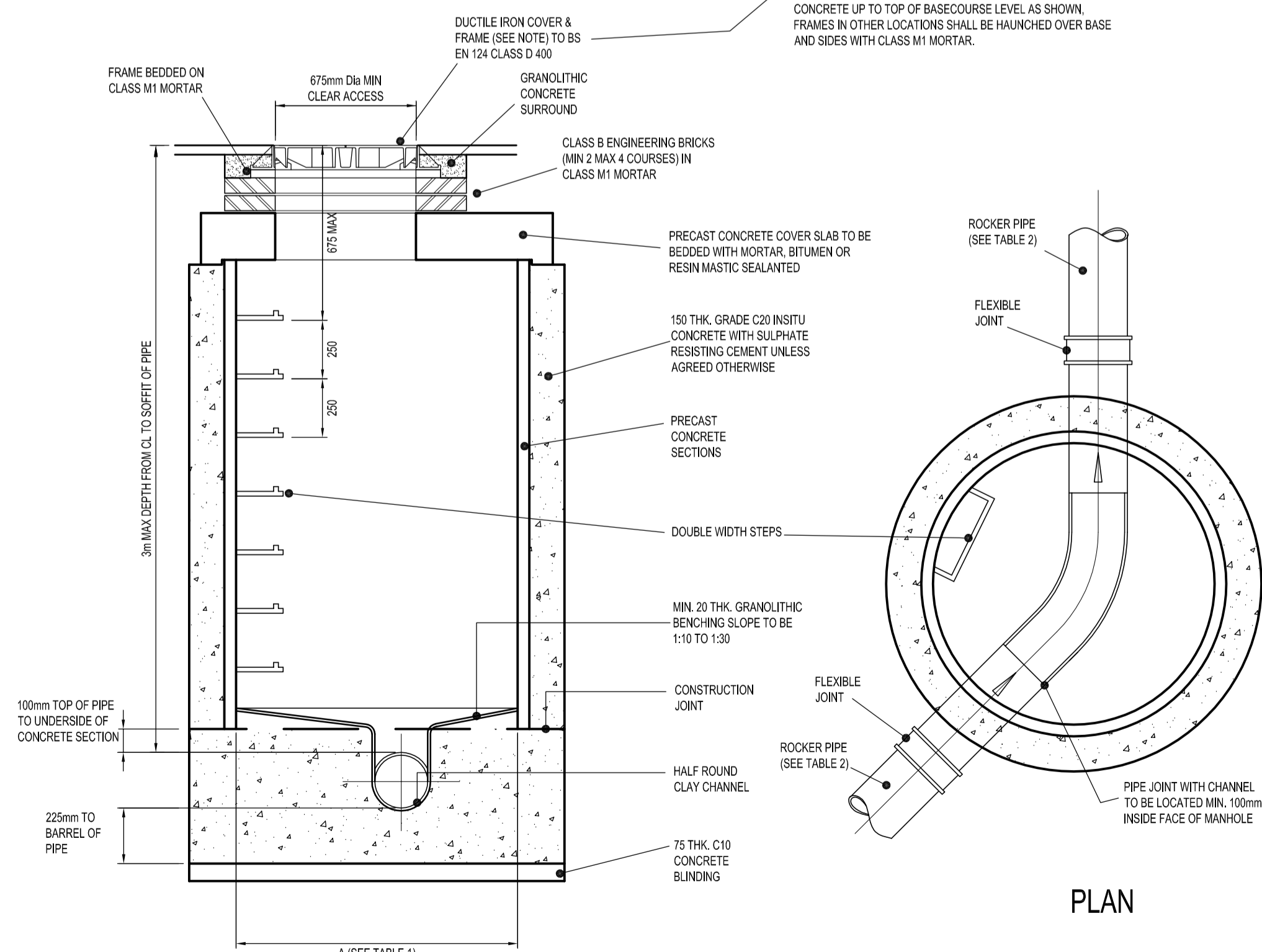
MANHOLE COVERS TO BE GRADE A HEAVY DUTY IN ROADS, MEDIUM DUTY ELSEWHERE. MIN. COVER AND FRAME BEDDED ON CLASS M1 MORTAR ON AT LEAST TWO & NOT MORE THAN FOUR COURSES OF CLASS B ENGINEERING BRICKWORK, EXCEPT WHERE THE COVER LEVEL IS SET ABOVE EXISTING GROUND LEVEL. WHERE THE MAXIMUM NUMBER OF COURSES WILL BE INCREASED ACCORDINGLY WITH A MINIMUM OF TWO COURSES BETWEEN COVER SLAB AND EXISTING GROUND LEVEL. THE BRICKWORK SHALL BE SHAPED TO SUIT OPENING IN COVER. FRAMES IN ROADS SHALL BE SURROUNDED WITH GRANULITHIC CONCRETE UP TO TOP OF BASECOURSE LEVEL AS SHOWN. FRAMES IN OTHER LOCATIONS SHALL BE HAUNCHED OVER BASE AND SIDES WITH CLASS M1 MORTAR.



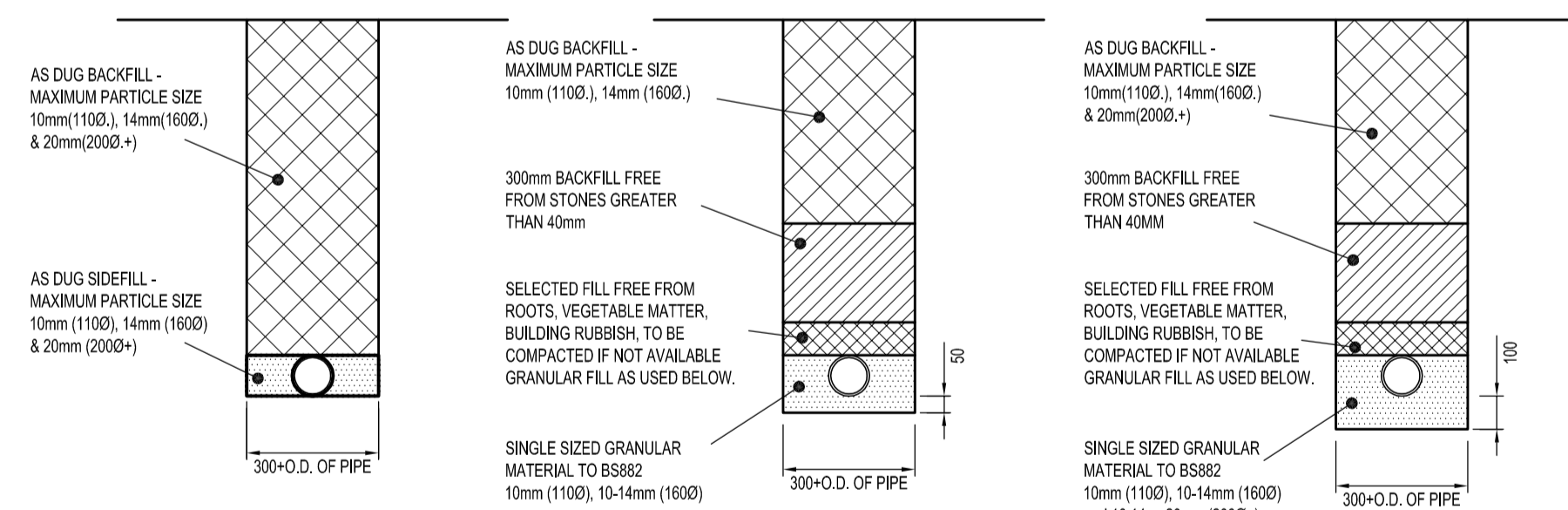
POLYPROPYLENE MANHOLE DETAIL (PPMH) FOR DEPTHS OF SEWERS UPTO 1.2m DEEP



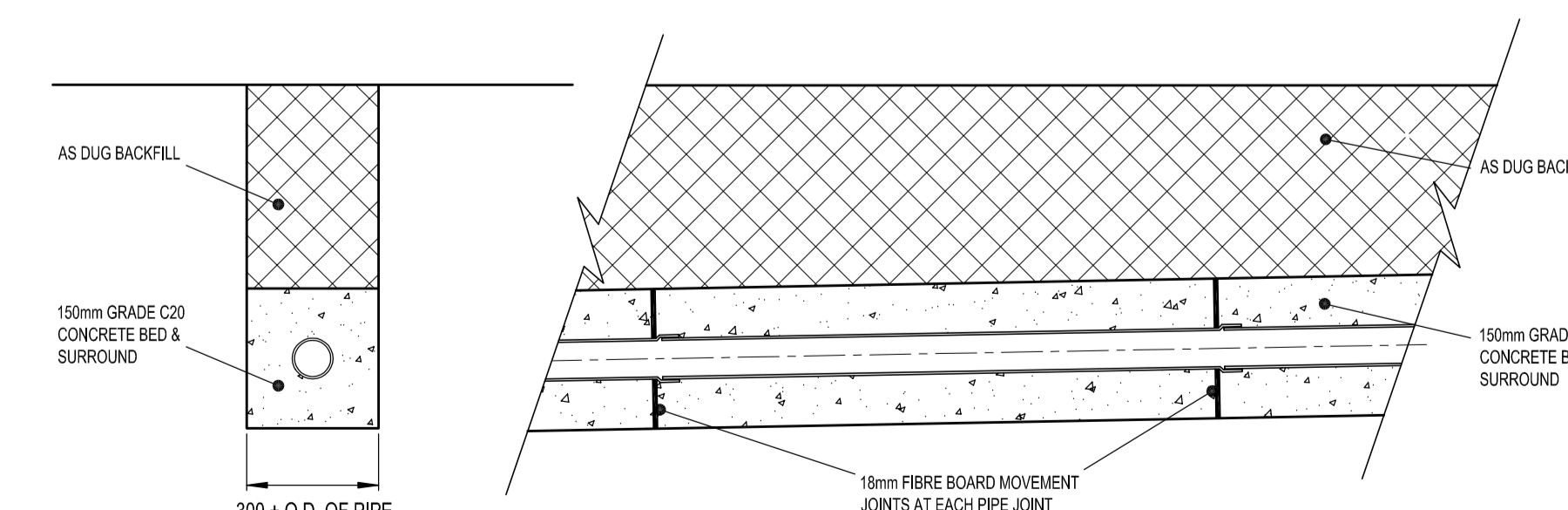
REDUCED ACCESS TELESCOPIC POLYPROPYLENE MANHOLE DETAIL (RAT-PPMH) FOR DEPTHS OF SEWERS FROM 1.2m TO 3.0m DEEP



TYPICAL MANHOLE DETAIL - TYPE B MAX. DEPTH FROM GROUND LEVEL TO SOFFIT OF PIPE 3.0m



PIPES LAID AT DEPTHS GREATER THAN 1200mm COVER IN ROADS 900mm IN DRIVEWAYS & 600mm IN GARDENS



PIPES LAID AT DEPTHS LESS THAN 1200mm COVER IN ROADS 900mm IN DRIVEWAYS & 600mm IN GARDENS

NOTES :-
 GENERAL :-
 THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS & SPECIFICATIONS.
 RESPONSIBILITY IS NOT ACCEPTED FOR ERRORS MADE BY OTHERS IN SCALING FROM THIS DRAWING. ALL CONSTRUCTION INFORMATION SHOULD BE TAKEN FROM FIGURED DIMENSIONS ONLY.
 DRAINAGE :-
 ALL PRIVATE DRAINS TO BE 110mm Dia. uPVC EXCEPT WHERE NOTED OTHERWISE
 ALL LEVELS AND DIMENSIONS ARE TO BE VERIFIED ON SITE PRIOR TO THE COMMENCEMENT OF ANY WORKS. ANY DISCREPANCIES SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER.
 ALL PIPES TO BE LAID WITH SOFFITS LEVEL. ALL INVERT LEVELS SHOWN ARE TO THE OUTLET PIPE (U.N.O.) ALL PIPE RUNS TO BE LAID TO INVERT LEVELS SHOWN. PIPE GRADIENTS WHERE SHOWN ARE APPROXIMATE.
 THE LOCATION, SIZE AND DEPTH OF ALL EXISTING DRAINS WHICH ARE RELATED TO THE NEW DEVELOPMENT SHALL BE ESTABLISHED BY THE CONTRACTOR PRIOR TO COMMENCEMENT OF WORKS. ANY DISCREPANCIES FROM THAT SHOWN TO BE IMMEDIATELY REPORTED TO THE ENGINEER.
 ALL ADOPTABLE DRAINAGE MANHOLES & ASSOCIATED PIPEWORK & PIPE BEDDING TO BE CONSTRUCTED IN ACCORDANCE WITH THE LATEST EDITION OF THE DESIGN & CONSTRUCTION GUIDANCE FOR FOUL & SURFACE WATER SEWERS.

no.	revision	by	chk'd	date
-	FIRST ISSUE	TJB	TMV	17.05.22

project
WESSEX GARAGES
 1 MERCIA ROAD
 GLOUCESTER
 GL1 2SQ

drawing title
DRAINAGE DETAILS

status
FOR APPROVAL

date
MAY 2022
 Structural Engineers
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Job :

Structural Engineers

Wessex Garages
1 Mercia Road
Gloucester
GL1 2SQ

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Job number Sheet date
10319 101A 17/05/22

T M Ventham
Practice

Attenuation Tank Design Return Period 100 Years + 40%

Location England and Wales

Ratio of 60 minute to 2 day rainfalls of 5 year return period (BRE digest 365-fig 1) r = 0.35

Impermeable area (sq.m.) 247.4

Outflow from tank in litres/second 0.5

Depth of tank (m) 0.4

Duration	M5 rainfalls	Growth factor Z2	Return Period rainfall	Inflow m3	Outflow m3	Storage required m3
5mins	7.10	1.86	13.22	4.58	0.15	4.43
10mins	10.10	1.93	19.45	6.74	0.30	6.44
15mins	12.30	1.96	24.08	8.34	0.45	7.89
30mins	15.70	2.00	31.37	10.86	0.90	9.96
1 hour	20.00	2.03	40.60	14.06	1.80	12.26
2 hour	24.40	2.01	49.04	16.99	3.60	13.39
4 hour	29.90	1.97	58.90	20.40	7.20	13.20
6 hour	33.80	1.94	65.50	22.69	10.80	11.89
10 hour	38.90	1.90	73.83	25.57	18.00	7.57
24 hour	49.60	1.81	89.78	31.09	43.20	-12.11

Note:- If Orifice plate used then only 50% of outflow rate used

Max storage required = 13.39 cubic metres

$\sqrt{(\text{Max storage required}/\text{tank depth})}$ 5.79 Square Tank required

Use Hydrobrake at 0.5 Litres / Second

Use 6.0 x 6.0 x 0.4m deep Tank or equivalent rectangular
24.0 x 1.5 x 0.4m deep x 95% voids
13.68 cubic metres capacity