

Structural
Civil
Geo-Environmental



consulting engineers

Barrington Road, Bedlington

**Flood Risk
Assessment**

for

Mr Harjit Singh Deol



Report Ref	Issue	Prepared by	Date	Reviewed by	Date
P21-484-3E-ZZ-XX-RP-C-9000	1	J Foster	22.04.22	M Pearse	22.04.22

Barrington Road, Bedlington

Drainage Statement including Flood Risk Assessment

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1 INTRODUCTION

1.1 3e Consulting Engineers Ltd (3e) were commissioned by George F White on behalf of Mr Harjit Singh Deol to carry out a Flood Risk Assessment for a proposed development north of Barrington Road, Bedlington, which includes the construction of 12 properties as indicated on the site layout plan included in **Appendix C**.

1.2 The objective of this assessment is to identify any potential risk of flooding to the proposed site and adjacent properties as a result of the development in accordance with the requirements of the current National Planning Policy Framework (NPPF) and Northumberland County Council's requirements. It will also assess the proposed surface water and foul water drainage proposals in order that the proposed development does not exacerbate flooding elsewhere. It will also provide comments on proposed options for Sustainable Urban Drainage (SUD's) techniques in line with current Ciria guidance.

1.3 This report is based on information received from Northumbrian Water together with the review of the Environment Agency's (EA) online flood maps and Northumberland County Council's SFRA. A topographical survey has also been provided and a Phase 2 Geo-Environmental Assessment has also been undertaken by ERGO Environmental LTD.

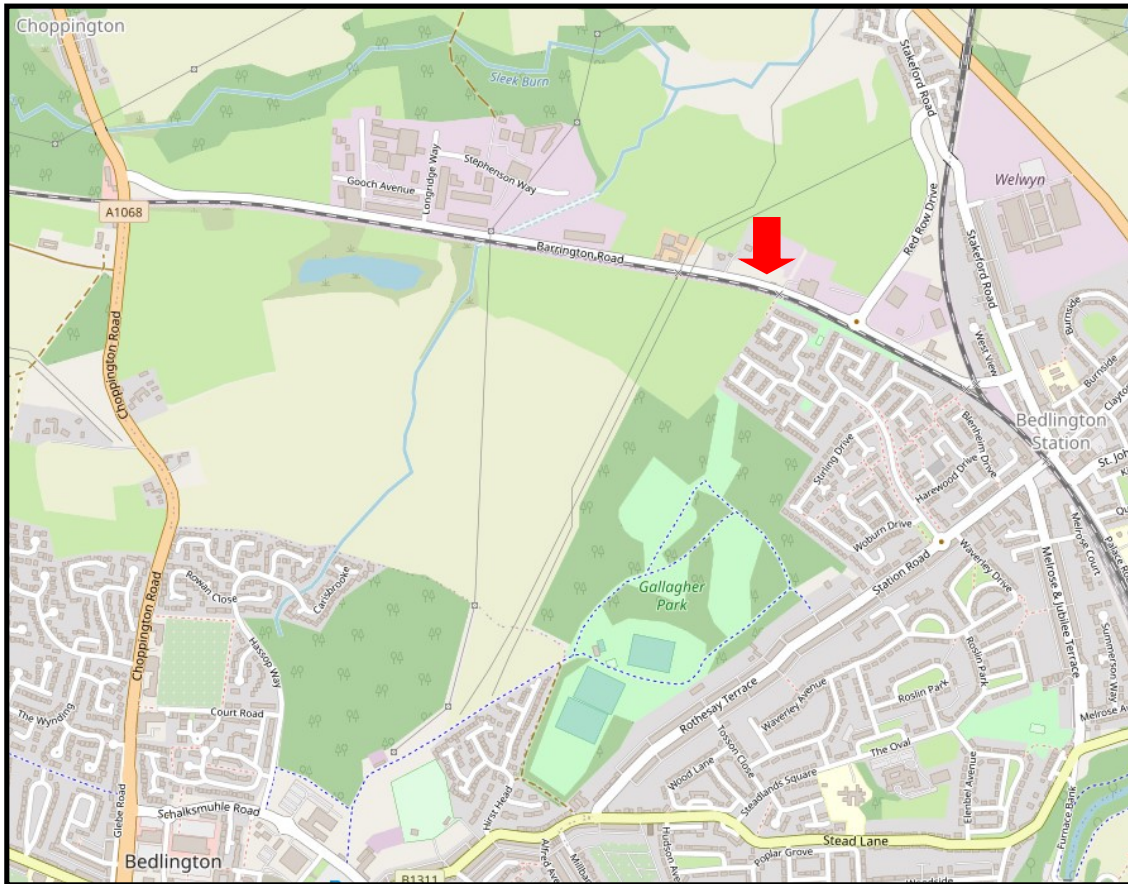
1.4 This report presents the factual information available during this appraisal, interpretation of the data obtained and recommendations relevant to the scope of works.

1.5 This report has been prepared for the sole use of Mr Harjit Singh Deol and their appointed consultants. No other third party may rely upon or reproduce the contents of this report without the written approval of 3e. If any unauthorised third party comes into possession of this report, they rely on it entirely at their own risk and 3e do not owe them any Duty of Care or Skill.

2 THE SITE

Location and Description

2.1 The site, centred on National Grid Reference 426975, 583351, is located north of Bedlington and east of Choppington, Northumberland and is accessed via Barrington Road. A site location plan is included as **Appendix A**.



Site Location

2.2 The site is currently greenfield land and falls northerly from Barrington Road.

2.3 The adjacent land use is as follows:

- North: Car breaker/scrapyard
- South: Barrington Road
- East: Car breaker/scrapyard
- West: Access road to two residential properties

2.4 A topographical survey has been undertaken which shows that levels vary across the site with a high point of 27.360mAOD at the south eastern corner of the site boundary, and a low point of 25.025mAOD on the north-eastern corner of the site boundary. Within Barrington Road, there is a high point of 27.454mAOD along the southern edge, the road itself is cambered, with relation to the site approximately $\frac{3}{4}$ falls from east to west, with the other $\frac{1}{4}$ falling in the opposite direction.

2.5 A copy of the topographical survey is attached in **Appendix B**.

3 EXISTING WATERCOURSES AND DRAINAGE

3.1 The nearest watercourse to the site is an unnamed watercourse approximately 100m west of the site, just west of Barrington Cottage. This ultimately connects to Sleek Burn, which is located approximately 440m north of the site. Sleek Burn flows east under the A1147 and ultimately discharges into River Blyth approximately 3.15km east of the site.

3.2 A 225mm diameter public combined sewer is shown to be located within the site, running from east to west, before heading north. This is shown as approximately 2.28m depth at this location.

3.3 For copies of the NWL sewer record plans see **Appendix E**.

4 FLOOD FLOW PATHS AND ZONES

Fluvial Flooding

4.1 Online flood maps, provided by the Environment Agency (EA), have been reviewed and these indicate that both the unnamed watercourse to the west, as well as Sleek Burn to the north are subject to fluvial flooding. However these do not affect the proposed development.

4.2 It is therefore considered that the site is at low risk of fluvial flooding.

Coastal Flooding

4.3 EA's online Coastal Flood Risk Maps have been reviewed and these show that the site is not at risk from coastal waters.

Pluvial Flooding

4.4 The EA 'Surface Water Flood Risk Maps' have been reviewed online. These maps are undertaken to highlight potential areas at risk of flooding from surface water flows running across land which cannot enter the ground or drainage systems.

4.5 These maps show an area of surface water flooding risk at the western boundary of the site, as well as in the north-eastern boundary of the site. However, from review of the topographical survey information it is considered the areas shown is due to the localised low lying areas within the site, that will be designed out with the proposed level design.

4.6 A positive drainage system is being provided and controlled therefore reducing the potential risk of overland flows within and beyond the development site. An overland flow route plan has been provided, see **Appendix D**.

4.7 Permeable paving has been shown to assist with SuDS on the site, the flow routes are to be directed over the private permeable shared drives.

4.8 The new surface water drainage system within the site will be designed to accommodate a 1 in 100 year +40%CC storm event within the drainage network below ground. Any flooding occurring from a storm event in excess of this will be retained where possible with no flooding occurring to any of the proposed buildings.

4.9 It is considered that the site is at low risk of Pluvial flooding.

Flooding from Artificial Sources

4.10 Online ordnance survey data maps have been reviewed to determine whether there are any artificial sources such as reservoirs or canals in the vicinity of the site which if failed could affect the proposed development site.

4.11 This review confirmed there are no such sources which could impact the site.

Ground Water Flooding

4.12 Another potential risk of flooding to be considered is from rising groundwater within the underlying strata. A Phase 2 Geo-Environmental Assessment has been undertaken on site.

4.13 The Geo-Environmental Assessment which utilised groundwater monitoring to complete their assessment has found water in 1 out of 5 trial pits, 0 of 3 boreholes, and 2 out of 5 window samples. Water was encountered at depths of: 1.9m (Seepage), and 3m (Seepage), 5m (Strike).

4.14 It is considered there is low risk to the development as a result of ground water flooding.

Overland Flow Routes

4.15 As this is a greenfield site, the level design has been undertaken in order to best maintain the existing topography and flow routes. The site access from Barrington Road initially rises in level in order to keep Barrington Road's overland flows from entering the site.

4.16 OS mapping has been reviewed for area adjacent land beyond the extent of the topographical survey. This shows contours that fall away from the site. It is considered there is low risk of overland flow entering the site from neighbouring areas.

Sewer Flooding

4.17 Northumbrian Water has been consulted to obtain a copy of their sewer records.

4.18 An existing 225mm diameter public combined sewer is located within the site, running from east to west, before heading northwards off-site. This sewer will be diverted within the development.

4.19 The new surface water drainage system within the site will be designed to accommodate a 1 in 100 year +40%CC storm event within the drainage network below ground. Any flooding occurring from a storm event in excess of this will be retained on site where possible with no flooding occurring to any of the proposed buildings.

4.20 It is considered there is low risk to the development as a result of sewer flooding.

4.21 Northumbrian Waters sewer records are included in **Appendix E**.

SURFACE WATER AND FOUL WATER DRAINAGE

Surface Water Drainage

4.22 The proposed surface water drainage scheme should seek to meet the current National Planning Policy Framework (NPPF) and North Tyneside Council's requirements.

4.23 Consideration should be given firstly to infiltration techniques (to ground), to watercourse and then to sewer. Sustainable Urban Drainage Systems (SuDS) should also be used wherever possible to mimic as far as practicable the natural run-off regime, improve water quality and attenuate peak flows. These should be designed in accordance with the current guidance Ciria C753 'The SuDs Manual' Version 1.

4.24 In line with the current National Planning Policy Framework (NPPF), the implementation of SuDS to restrict flows and improve water quality has been considered. It is proposed to utilise porous paving within the parking bays. The porous surface and granular stone sub base under the parking bays will provide 2 levels of treatment.

4.25 The results from the Geo-Environmental site investigation and infiltration tests indicated the cohesive drift deposits have poor soakage potential and failed to soakaway. Due to the significant volumes of low permeability clay on the site, it was concluded that soakaway drainage is not suitable for the proposed development.

4.26 A pre-development enquiry has been submitted to NWL and their response dated 7th January 2022, states that surface water flows should discharge to directly to the watercourse to the west of Barrington Cottage. Due to the complications highlighted above, we shall go back to NWL seeking an agreed discharge rate and connection. See **Appendix E**.

4.27 The nearest watercourse to the site is an unnamed watercourse approximately 100m west of the site, just west of Barrington Cottage that ultimately connects to Sleek Burn. However, connection to this existing watercourse would cut across 3 different land ownerships and as a result has been ruled out.

4.28 An existing public surface water sewer is shown inland to the south of the site and currently connects to the aforementioned watercourse was also identified as a possible option. However, connection to this sewer would require going below both an adopted road and an active railway line, which would require a bored connection in coordination with the railway

authority. Due to the significant complexity in achieving this connection and land ownership issues, this option was ruled out.

4.29 It has therefore been proposed to go back to NWL seeking agreement on discharging surface water flows to the existing public combined sewer.

4.30 It is proposed that surface water drainage will connect to the diverted public combined sewer, before connecting to the existing public combined manhole 9304 west of the site.

4.31 The IH124 Method has been used to calculate the anticipated Q_{bar} greenfield flow rate from the site using HR Wallingford, see **Appendix D**. The proposed drained impermeable area of the site will be in the order of 0.267ha which will result in a proposed greenfield flow rate for the development of 1.21 l/s.

4.32 Due to the size of the proposed development and to achieve the minimum acceptable orifice size of 75mm, it is proposed to restrict surface water flows from development to a maximum discharge rate of 3.4 l/s. This is for maintenance issues with any smaller sized orifices required to meet lower discharge rates. This results in attenuation being required within the site. The attenuation will be accommodated within oversized pipes.

4.33 The drainage will be designed to accommodate a 1 in 100 year + 40% climate change storm with no flooding.

Shared and private driveways (Pollution Hazard Level – Medium)

4.34 The shared and private driveways have been classified as individual property driveways in accordance with Table 26.2 of the SuDS Manual (C753). This states the pollution hazard indices as follows:

Pollution Hazard	Total Suspended Solids(TSS)	Metals	Hydro carbons
Low	0.5	0.4	0.4

4.35 The shared and private driveways will drain via porous paving with underlying filtration stone and will be collected via a perforated under drain. In line with Table 26.3 of the SuDS manual (C753) this will provide the following mitigation indices.

Type of SuDS component	TSS	Metals	Hydro carbons
Permeable Pavement	0.7	0.6	0.7

4.36 These indices meet the requirements of the pollution hazard indices and therefore provide sufficient treatment from driveways/shared driveways.

4.37 A preliminary drainage layout has been included within **Appendix D**.

4.38 Details of the porous paving has been included within **Appendix D**.

4.39 For copies of the proposed surface water calculations refer to **Appendix D**.

4.40 All private surface water drainage should be designed in accordance with the current Building Regulation. All private drainage will be maintained by the occupier in accordance with the maintenance schedule attached in **Appendix D**.

Foul Water Drainage

5.23 A pre development enquiry has been submitted to Northumbrian Water to determine the proposed connection point for foul water drainage from the site. Their response dated 7th January 2022 confirms that foul water flows from the site can discharge to the public sewer.

4.41 It is proposed that foul water drainage will connect to the diverted public combined sewer, before connecting to existing public combined manhole 9304 west of the site.

5.24 All private foul water drainage should be designed in accordance with the current Building Regulation. All private drainage will be maintained by the occupier in accordance with the maintenance schedule attached in **Appendix D**.

5.25 A preliminary drainage layout plan has been included within **Appendix D**.

CONCLUSIONS AND RECOMMENDATIONS

6.1 The site has been reviewed in relation to all potential sources of flooding and it is considered that the site is at low risk of flooding from all sources.

6.2 Pluvial flooding across the development isn't an existing issue, a flood flow path has been provided through the site over permeable paving.

6.3 The proposed development will therefore not exacerbate flooding elsewhere.

6.4 Existing public combined sewer to be diverted within development.

6.5 Surface water from the site will discharge to the diverted public combined sewer, before connecting to existing public combined manhole 9304 west of the site in accordance with NWL's requirements. Flows are to be restricted to a maximum flow rate of 3.4 l/s with attenuation being provided using oversized pipes.

6.6 Sustainable Urban Drainage techniques have been considered to improve the water quality of the discharge of surface water flows from the development. This will be in the form of porous paving.

6.7 Foul water flows from the site will discharge to the diverted public combined sewer, before connecting to existing public combined manhole 9304 west of site.


Appendix A



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Date	Revision	Checked	Rev.

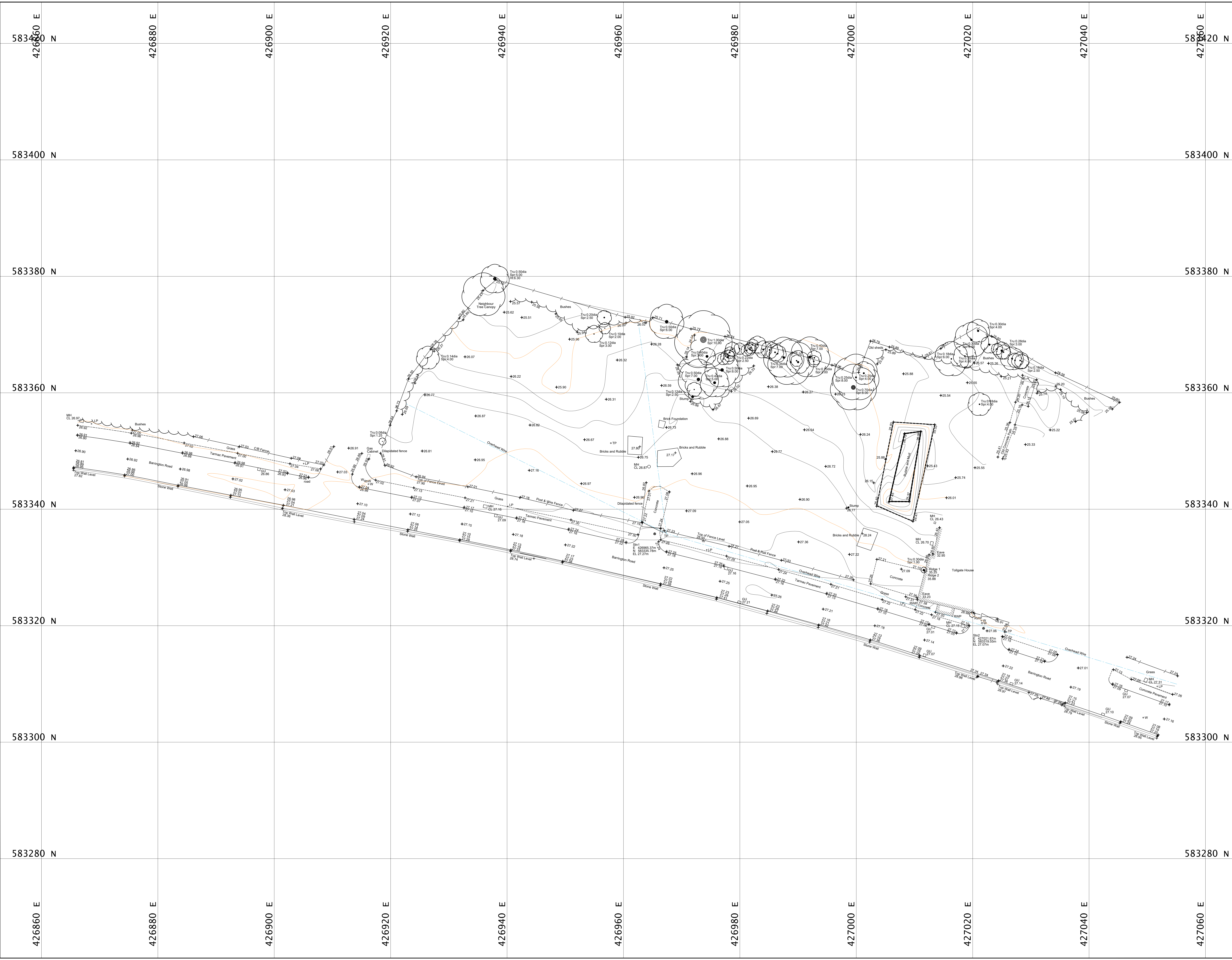
Project	BARRINGTON ROAD, BEDLINGTON for MR HARJIT SINGH DEOL		
Title	SITE LOCATION PLAN		
Scale	Drawn	Checked	Date
NTS	JF	MP	18.01.22
Job No	Drawing No.		Rev
P21-484	G001		0



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Appendix B



LEGEND

- Kerb / Hard Edge
- Change of Surface
- Wall
- Retaining Wall
- Security Fence
- Fence
- Building
- Overhead Feature
- Top of Embankment
- Bottom of Embankment
- Hedge
- Vegetation / Tree Canopy

Tree

- AB 35.30 Air Brick Level
- 435.30 Level
- 435.30 Level
- CL 35.30 Cover Level
- IL 35.30 Invert Level
- TL 35.30 Threshold Level
- 435.30 Top of Kerb
- TW 35.30 Top of Wall Level

Gate

- Outfall
- Tree Stump

Utilities

- British Telecom
- BT Overhead
- Cable TV
- Closed Circuit TV
- Combined Services Drainage Route
- Communications
- Electric
- Electric Overhead
- Field Drain
- Foul Water Drainage Route
- Gas
- Street Lighting
- Surface Water Drainage Route
- Water
- Multi-Service Route
- Empty Ducting
- GPR Anomaly Possible Utility
- Unknown Drainage Route
- Unknown Utility

Assumed

- Assumed BT
- Assumed Cable
- Assumed Electric
- Assumed Gas
- Assumed Street Lighting
- Assumed Unknown
- Assumed Water

BT - Taken from Records

- Cable - Taken from Records
- Electric - Taken from Records
- Gas - Taken from Records
- Street Lighting - Taken from Records
- Water - Taken from Records
- Survey Extents

Other Symbols

- B Bollard
- BH Bench Mark
- BS Bus Stop
- BT Telecom cover
- CT Cable TV cover
- EP Electric pole
- ER Earthing rod
- FH Fire Hydrant
- FS Flagstaff
- G Gas Cover
- S Survey station
- GU Gully
- IC Inspect. cover
- KO Kerb Outlet
- LP Lamp Post
- MH Manhole
- HK Marker
- OF Outfall
- P Post
- RE Rodding Eye
- RS Road Sign
- TP Telecom pole
- W Water cover

All below ground details shown have been identified from above ground without excavation. Spatial Geomatics use electro-magnetic and/or ground penetrating radar (GPR) methods to identify and locate services and features. Results using these methods are not infallible and are recommended trial excavations are carried out to confirm any identifications, positions and depths.

Any areas on the drawing where services or features have not been shown are not necessary clear of services or features but are an indication that no items have been identified during our investigation. All reasonable care and normal good practice should still be employed during design and construction.

Custom types of services such as plastic or concrete pipes, some conduit and ducting where direct access cannot be achieved for tracing may not be shown and alternative tracing methods should be used.

Spatial Geomatics has used all reasonable care to research available services records but completeness or use of the services records supplied to or by Spatial Geomatics cannot be guaranteed. Therefore Spatial Geomatics cannot be held responsible for any features annotated as 'Taken from Records'.

Depths obtained using electro-magnetic or GPR are affected by ground conditions and should be treated as indicative only. Electro-magnetic depths to utilities and services are generally taken to the centre of a feature. GPR depths to the top of a feature and drainage depth shown to trees, unless otherwise indicated.

Drainage pipe sizes will be obtained without entering the chamber and therefore should be treated as approximate. Pipe dimensions which have not been obtained visually will be taken from record when available.

All services, drainage and utility routes are assumed straight between access points, unless otherwise stated. The number of cables in runs will be shown unless specifically requested. All services are below ground unless indicated.

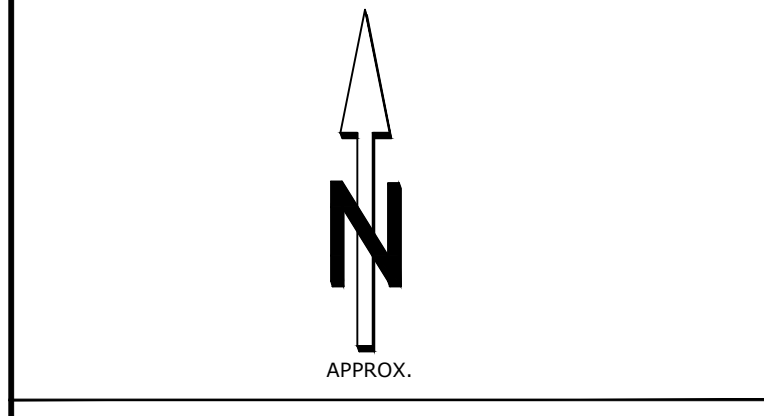
Services, utilities and features may not have been surveyed if obstructed or not reasonably visible or accessible at time of survey.

All critical dimensions and measurements should be checked and verified with any other or dimensions notified to Spatial Geomatics immediately. The accuracy of the digital data is the same as the plotting scale implies. All dimensions are in metres unless otherwise stated.

The contractor must check and verify all site and building dimensions, levels, utilities and drainage detail and connections prior to commencing work.

USE ONLY FOR THE PURPOSE INDICATED BELOW

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REV. DETAILS BY DATE

GRID DATUM ESTABLISHED USING GPS SURVEY OBSERVED IN-SITU

Section 1: Established using GPS Established using GPS

Spatial Geomatics
 2 Point Park
 Ponteland
 Newcastle upon Tyne
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 TEL: 01661 823000 FAX: 01661 896137
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CLIENT: **George F White**
 4-6 Market Street
 Alnwick
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PROJECT TITLE: **Barrington Road**
 Bedlington

DRAWING TITLE: **Topographical Survey**

DRAWN BY: BA CHECKED BY: BA QA APPROVED: GT

SCALE: 1:200 (A0) SURVEY DATE: October 2021

DRAWING NUMBER: 2223200.dwg SHEET NUMBER: 1 REV: A

Appendix C



Proposed Site Plan
1 : 200

Notes:

- This drawing is subject to copyright laws and the use of this drawing is licensed by GFW for use on this project only.
- In the event of any discrepancies being found these are to be brought to the attention of GFW architectural team prior to commencement of works.
- This drawing is to be used solely for the information titled.
- Construction staff and operatives must ensure the main contractor has provided accurate information on all H&S aspects relating to the designs identified on the drawing, including review of designers / contractors risk assessments, method statements, permits to work and pre construction information.
- The proposed layouts are subject to the following, although not exhaustive:
 - Structural and Drainage Engineers requirements.
 - Mechanical and Electrical Engineers requirements.
 - Planning, Listed Building and Building Control approvals as appropriate.
- Use only written dimensions for constructional purposes. Any discrepancies to be reported to the project manager prior to commencement of works.
- Where proposed layouts are based on third party survey information. The accuracy is not underwritten by GFW.

Date	Rev	Description	Chkd
20/03/2022	PO 03	Layout altered	PE
20/01/2021	PO 02	Parking altered	PE
01/11/2021	PO 01	Initial Issue	PE

Date	Rev	Description	Chkd

Client
Mr H S Deol

Project
Tollgate House, Bedlington

Status	
Planning	
Drawing Title	
Proposed Site Plan	
Date	Drwn/Chkd
November 2021	PE AP
Scale	1 : 200

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www.georgefwhite.co.uk

Project Number	Dwg No.	Revision
NCL400628	1100	P03

Appendix D

Calculated by:

Site name:

Site location:

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Runoff estimation approach

Site characteristics

Total site area (ha):

Methodology

Q_{BAR} estimation method:

SPR estimation method:

Soil characteristics

	Default	Edited
SOIL type:	<input type="text" value="4"/>	<input type="text" value="4"/>
HOST class:	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>
SPR/SPRHOST:	<input type="text" value="0.47"/>	<input type="text" value="0.47"/>

Hydrological characteristics

	Default	Edited
SAAR (mm):	<input type="text" value="666"/>	<input type="text" value="666"/>
Hydrological region:	<input type="text" value="3"/>	<input type="text" value="3"/>
Growth curve factor 1 year:	<input type="text" value="0.86"/>	<input type="text" value="0.86"/>
Growth curve factor 30 years:	<input type="text" value="1.75"/>	<input type="text" value="1.75"/>
Growth curve factor 100 years:	<input type="text" value="2.08"/>	<input type="text" value="2.08"/>
Growth curve factor 200 years:	<input type="text" value="2.37"/>	<input type="text" value="2.37"/>

Greenfield runoff rates

	Default	Edited
Q_{BAR} (l/s):	<input type="text" value="1.21"/>	<input type="text" value="1.21"/>
1 in 1 year (l/s):	<input type="text" value="1.04"/>	<input type="text" value="1.04"/>
1 in 30 years (l/s):	<input type="text" value="2.12"/>	<input type="text" value="2.12"/>
1 in 100 year (l/s):	<input type="text" value="2.52"/>	<input type="text" value="2.52"/>
1 in 200 years (l/s):	<input type="text" value="2.88"/>	<input type="text" value="2.88"/>

Site Details

Latitude:

Longitude:

Reference:

Date:

Notes

(1) Is $Q_{BAR} < 2.0$ l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is $SPR/SPRHOST \leq 0.3$?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	17.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.300	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
2	0.091	5.00	26.965	1200	426951.996	583351.894	1.350
1	0.104	5.00	26.470	2400	426991.512	583357.595	3.250
3			26.100	2400	426955.589	583366.457	2.955
4	0.044	5.00	25.860	2400	426943.453	583369.451	2.740
C3			26.000	1500	426929.476	583375.098	2.970
9304			25.480	1200	426925.683	583382.778	2.505
0302		5.00	27.100	1200	427012.972	583334.143	1.425
C1			26.360	1200	427010.277	583353.648	1.925
C2			26.450	1200	426989.186	583360.368	2.150

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
2.000	1	3	37.000	0.600	23.220	23.145	0.075	493.3	1500	5.32	39.4
2.001	3	4	12.500	0.600	23.145	23.120	0.025	500.0	1500	5.43	39.1
2.002	4	C3	15.075	0.600	23.120	23.030	0.090	167.5	225	5.68	38.3
3.000	2	3	15.000	0.600	25.615	24.495	1.120	13.4	150	5.09	40.1
1.003	C3	9304	8.566	0.600	23.030	22.975	0.055	155.7	225	6.14	37.1
1.000	0302	C1	19.690	0.600	25.675	24.435	1.240	15.9	225	5.10	40.0
1.001	C1	C2	22.136	0.600	24.435	24.300	0.135	164.0	225	5.46	39.0
1.002	C2	C3	61.500	0.600	24.300	23.030	1.270	48.4	225	6.01	37.5

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
2.000	1.924	3400.0	11.1	1.750	1.455	0.104	0.0	60	0.462
2.001	1.911	3377.1	20.7	1.455	1.240	0.195	0.0	82	0.556
2.002	1.007	40.0	24.9	2.515	2.745	0.240	0.0	129	1.061
3.000	2.767	48.9	9.9	1.200	1.455	0.091	0.0	46	2.184
1.003	1.045	41.5	24.1	2.745	2.280	0.240	0.0	123	1.084
1.000	3.300	131.2	0.0	1.200	1.700	0.000	0.0	0	0.000
1.001	1.018	40.5	0.0	1.700	1.925	0.000	0.0	0	0.000
1.002	1.884	74.9	0.0	1.925	2.745	0.000	0.0	0	0.000

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
2.000	37.000	493.3	1500	Circular	26.470	23.220	1.750	26.100	23.145	1.455
2.001	12.500	500.0	1500	Circular	26.100	23.145	1.455	25.860	23.120	1.240
2.002	15.075	167.5	225	Circular	25.860	23.120	2.515	26.000	23.030	2.745
3.000	15.000	13.4	150	Circular	26.965	25.615	1.200	26.100	24.495	1.455
1.003	8.566	155.7	225	Circular	26.000	23.030	2.745	25.480	22.975	2.280
1.000	19.690	15.9	225	Circular	27.100	25.675	1.200	26.360	24.435	1.700
1.001	22.136	164.0	225	Circular	26.360	24.435	1.700	26.450	24.300	1.925
1.002	61.500	48.4	225	Circular	26.450	24.300	1.925	26.000	23.030	2.745

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
2.000	1	2400	Manhole	Adoptable	3	2400	Manhole	Adoptable
2.001	3	2400	Manhole	Adoptable	4	2400	Manhole	Adoptable
2.002	4	2400	Manhole	Adoptable	C3	1500	Manhole	Adoptable
3.000	2	1200	Manhole	Adoptable	3	2400	Manhole	Adoptable
1.003	C3	1500	Manhole	Adoptable	9304	1200	Manhole	Adoptable
1.000	0302	1200	Manhole	Adoptable	C1	1200	Manhole	Adoptable
1.001	C1	1200	Manhole	Adoptable	C2	1200	Manhole	Adoptable
1.002	C2	1200	Manhole	Adoptable	C3	1500	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
2	426951.996	583351.894	26.965	1.350	1200		0	3.000	25.615	150
1	426991.512	583357.595	26.470	3.250	2400		0	2.000	23.220	1500
3	426955.589	583366.457	26.100	2.955	2400		1	3.000	24.495	150
							2	2.000	23.145	1500
							0	2.001	23.145	1500
4	426943.453	583369.451	25.860	2.740	2400		1	2.001	23.120	1500
							0	2.002	23.120	225
C3	426929.476	583375.098	26.000	2.970	1500		1	2.002	23.030	225
							2	1.002	23.030	225
							0	1.003	23.030	225
9304	426925.683	583382.778	25.480	2.505	1200		1	1.003	22.975	225
0302	427012.972	583334.143	27.100	1.425	1200		0	1.000	25.675	225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
C1	427010.277	583353.648	26.360	1.925	1200		1.000	24.435	225
C2	426989.186	583360.368	26.450	2.150	1200		1.001	24.300	225

Simulation Settings

Rainfall Methodology	FSR	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	17.000	Additional Storage (m ³ /ha)	20.0
Ratio-R	0.300	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x
Analysis Speed	Detailed		

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	40	0	0
100	40	0	0

Node 4 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Downstream Link	2.002	Sump Available	✓
Replaces Downstream Link	✓	Product Number	CTL-SHE-0075-3400-2000-3400
Invert Level (m)	23.120	Min Outlet Diameter (m)	0.100
Design Depth (m)	2.000	Min Node Diameter (mm)	1200
Design Flow (l/s)	3.4		

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.48%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
15 minute winter	2	10	25.662	0.047	9.9	0.1172	0.0000	OK
120 minute winter	1	90	23.447	0.227	4.2	1.1747	0.0000	OK
120 minute winter	3	94	23.448	0.303	6.1	1.3687	0.0000	OK
120 minute winter	4	94	23.448	0.328	4.0	1.5878	0.0000	SURCHARGED
120 minute winter	C3	94	23.069	0.039	2.6	0.0692	0.0000	OK
120 minute winter	9304	94	23.013	0.038	2.6	0.0000	0.0000	OK
15 minute winter	0302	1	25.675	0.000	0.0	0.0000	0.0000	OK
15 minute winter	C1	1	24.435	0.000	0.0	0.0000	0.0000	OK
15 minute winter	C2	1	24.300	0.000	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)	Discharge Vol (m ³)
15 minute winter	2	3.000	3	9.8	2.115	0.200	0.0694	
120 minute winter	1	2.000	3	2.6	0.168	0.001	7.7798	
120 minute winter	3	2.001	4	2.5	0.150	0.001	3.3540	
120 minute winter	4	Hydro-Brake®	C3	2.6				
120 minute winter	C3	1.003	9304	2.6	0.571	0.062	0.0384	28.1
15 minute winter	0302	1.000	C1	0.0	0.000	0.000	0.0000	
15 minute winter	C1	1.001	C2	0.0	0.000	0.000	0.0000	
15 minute winter	C2	1.002	C3	0.0	0.000	0.000	0.1405	

Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 99.48%

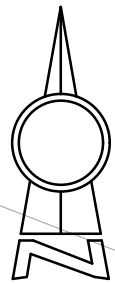
Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
15 minute winter	2	10	25.714	0.099	33.7	0.2452	0.0000	OK
240 minute winter	1	232	24.272	1.052	8.9	5.4338	0.0000	OK
240 minute winter	3	232	24.272	1.127	10.2	5.0987	0.0000	OK
240 minute winter	4	232	24.272	1.152	5.2	5.5838	0.0000	SURCHARGED
240 minute winter	C3	232	23.070	0.040	2.6	0.0702	0.0000	OK
240 minute winter	9304	232	23.013	0.038	2.6	0.0000	0.0000	OK
15 minute winter	0302	1	25.675	0.000	0.0	0.0000	0.0000	OK
15 minute winter	C1	1	24.435	0.000	0.0	0.0000	0.0000	OK
15 minute winter	C2	1	24.300	0.000	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)	Discharge Vol (m ³)
15 minute winter	2	3.000	3	33.4	2.844	0.683	0.1760	
240 minute winter	1	2.000	3	2.4	0.177	0.001	50.6867	
240 minute winter	3	2.001	4	2.4	0.157	0.001	17.9465	
240 minute winter	4	Hydro-Brake®	C3	2.6				
240 minute winter	C3	1.003	9304	2.6	0.576	0.064	0.0393	67.1
15 minute winter	0302	1.000	C1	0.0	0.000	0.000	0.0000	
15 minute winter	C1	1.001	C2	0.0	0.000	0.000	0.0000	
15 minute winter	C2	1.002	C3	0.0	0.000	0.000	0.1417	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.48%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
15 minute winter	2	10	25.737	0.122	43.4	0.3040	0.0000	OK
240 minute winter	1	232	25.166	1.946	11.6	10.0496	0.0000	SURCHARGED
240 minute winter	3	232	25.167	2.022	13.8	9.1455	0.0000	SURCHARGED
240 minute winter	4	232	25.167	2.047	6.4	9.9201	0.0000	SURCHARGED
240 minute winter	C3	232	23.075	0.045	3.4	0.0803	0.0000	OK
240 minute winter	9304	232	23.018	0.043	3.4	0.0000	0.0000	OK
15 minute winter	0302	1	25.675	0.000	0.0	0.0000	0.0000	OK
15 minute winter	C1	1	24.435	0.000	0.0	0.0000	0.0000	OK
15 minute winter	C2	1	24.300	0.000	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)	Discharge Vol (m ³)
15 minute winter	2	3.000	3	42.8	2.941	0.876	0.2181	
240 minute winter	1	2.000	3	3.6	0.189	0.001	65.1379	
240 minute winter	3	2.001	4	4.1	0.158	0.001	22.0060	
240 minute winter	4	Hydro-Brake [®]	C3	3.4				
240 minute winter	C3	1.003	9304	3.4	0.621	0.083	0.0474	77.4
15 minute winter	0302	1.000	C1	0.0	0.000	0.000	0.0000	
15 minute winter	C1	1.001	C2	0.0	0.000	0.000	0.0000	
15 minute winter	C2	1.002	C3	0.0	0.000	0.000	0.1416	



A1 - Do Not Scale

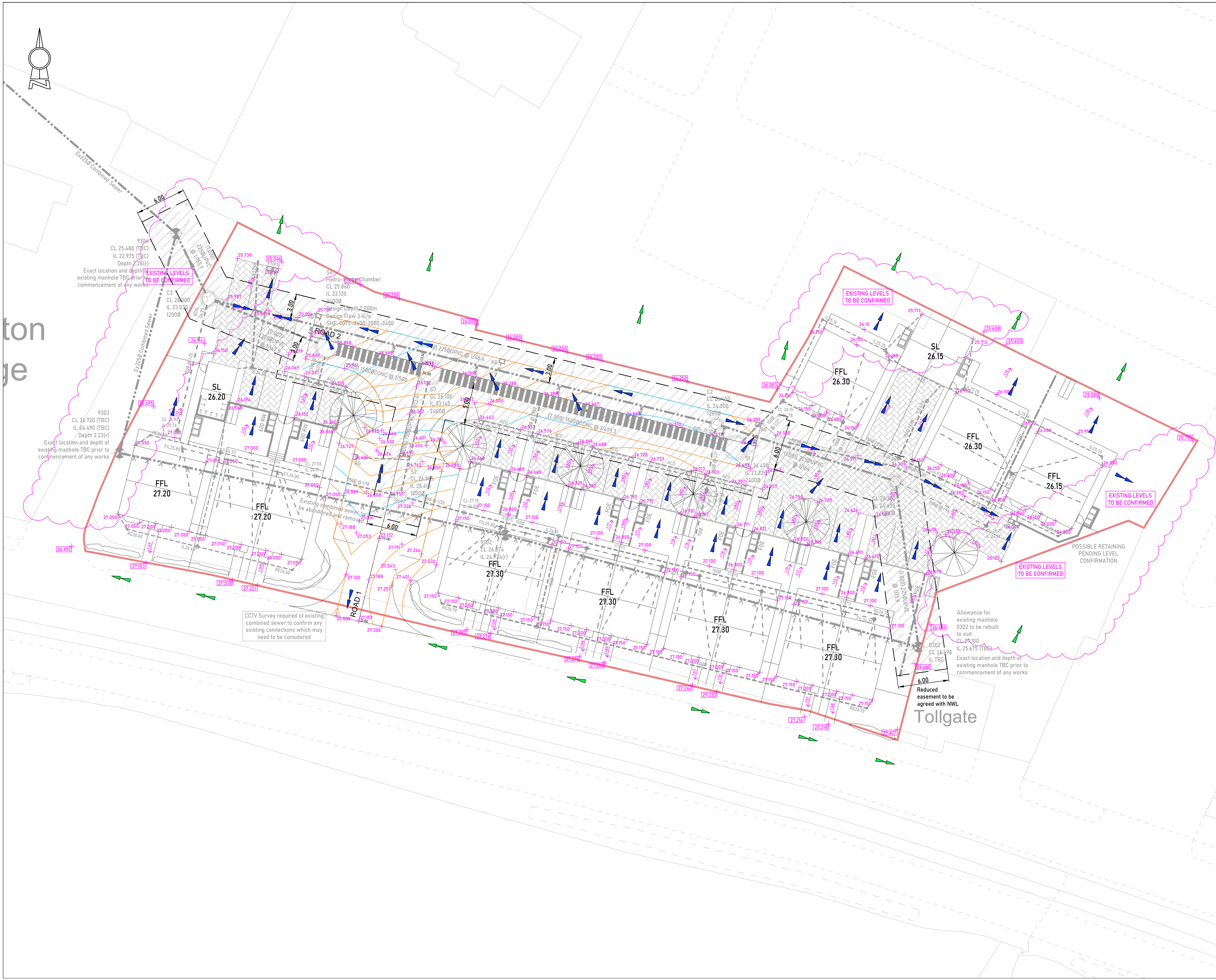
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Contractors should refer to the residual risks contained in the CDM Pre Construction Information before carrying out any site operations and should not issue parts of this drawing without including the CDM notes and references.
This information will include details of the SIGNIFICANT risks which 3E have considered beyond that which a competent contractor should be aware.

- HEALTH & SAFETY**
- CONTRACTOR SHOULD BE AWARE OF GENERAL CONSTRUCTION RISKS TO PREVENT SLIPS, TRIPS AND FALLS AND TAKE NECESSARY PRECAUTIONS WITHOUT SPECIAL INSTRUCTION.
 - CONTRACTOR TO PROVIDE TRENCH SUPPORTS AS APPROPRIATE AND ENSURE THAT PLANT REMAINS A SAFE DISTANCE FROM TRENCHES PRIOR TO INSTALLING DRAINAGE.
 - THE TIME THAT EXCAVATIONS ARE OPEN ON SITE SHOULD BE KEPT TO A MINIMUM AND ALL TRENCHES SHOULD BE SURROUNDED BY A BARRIER.
 - CONNECTIONS TO EXISTING SEWERS TO BE MADE BY NWL APPROVED CONTRACTOR ONLY.
 - CONTRACTOR TO MAKE OPERATIVES AWARE OF ASSOCIATED DANGERS TO HEALTH SUCH AS LEPTOSPIRIS (WELLS DISEASE) AND RECOMMENDED PRECAUTIONS. ADEQUATE WELFARE FACILITIES AND PROTECTIVE CLOTHING TO BE PROVIDED AS REQUIRED.
 - UNFINISHED MANHOLES MUST BE COVERED WITH LOAD BEARING MATERIALS AND SURROUNDED WITH BARRIER.
 - PIPES & CABLES
 - SERVICE RECORDS TO BE REFERRED TO PRIOR TO WORK COMMENCING. CONTRACTOR TO PROCEED WITH CAUTION AND SERVICES TO BE LOCATED BY HAND DIG AND PROTECTED ACCORDINGLY.
 - CONTRACTOR TO ENSURE RELEVANT MEASURES ARE TAKEN TO KEEP PLANT AND PEOPLE A SAFE DISTANCE FROM STEEP SLOPES DURING THE WORKS.
 - CONTRACTOR TO ENSURE THAT PROCEDURES ARE IN PLACE TO KEEP PEOPLE A SAFE DISTANCE FROM WORKING PLANT WHERE NECESSARY.
 - CONTRACTOR TO REFER TO GROUND INVESTIGATION REPORT FOR CONTAMINATION TESTS AND TO PROVIDE ADEQUATE WELFARE FACILITIES AND PROTECTIVE CLOTHING AS REQUIRED.

- KEY**
- FLOOD FLOW PATH
 - EXISTING FLOOD FLOW PATH



ton
ge

CCTV Survey required of existing combined sewer to confirm any existing connections which may need to be considered

Allowance for existing manhole 0302 to be rebuilt to suit CL 27.100 IL 25.675 (TBC)
Exact location and depth of existing manhole TBC prior to commencement of any works

Reduced easement to be agreed with NWL

22/04/22	UPDATED TO SUIT REVISED LAYOUT	JF	P2
25/01/22	PRELIMINARY ISSUE	JF	P1

Date	Revisions	Drawn	Rev

Purpose of Issue: **PRELIMINARY** Drawing Status: -

6 Benton Office Park
Bennett Avenue
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Wakefield
WF4 5BA

2 Esh Plaza
Sir Bobby Robson Way
Great Park
Newcastle upon Tyne
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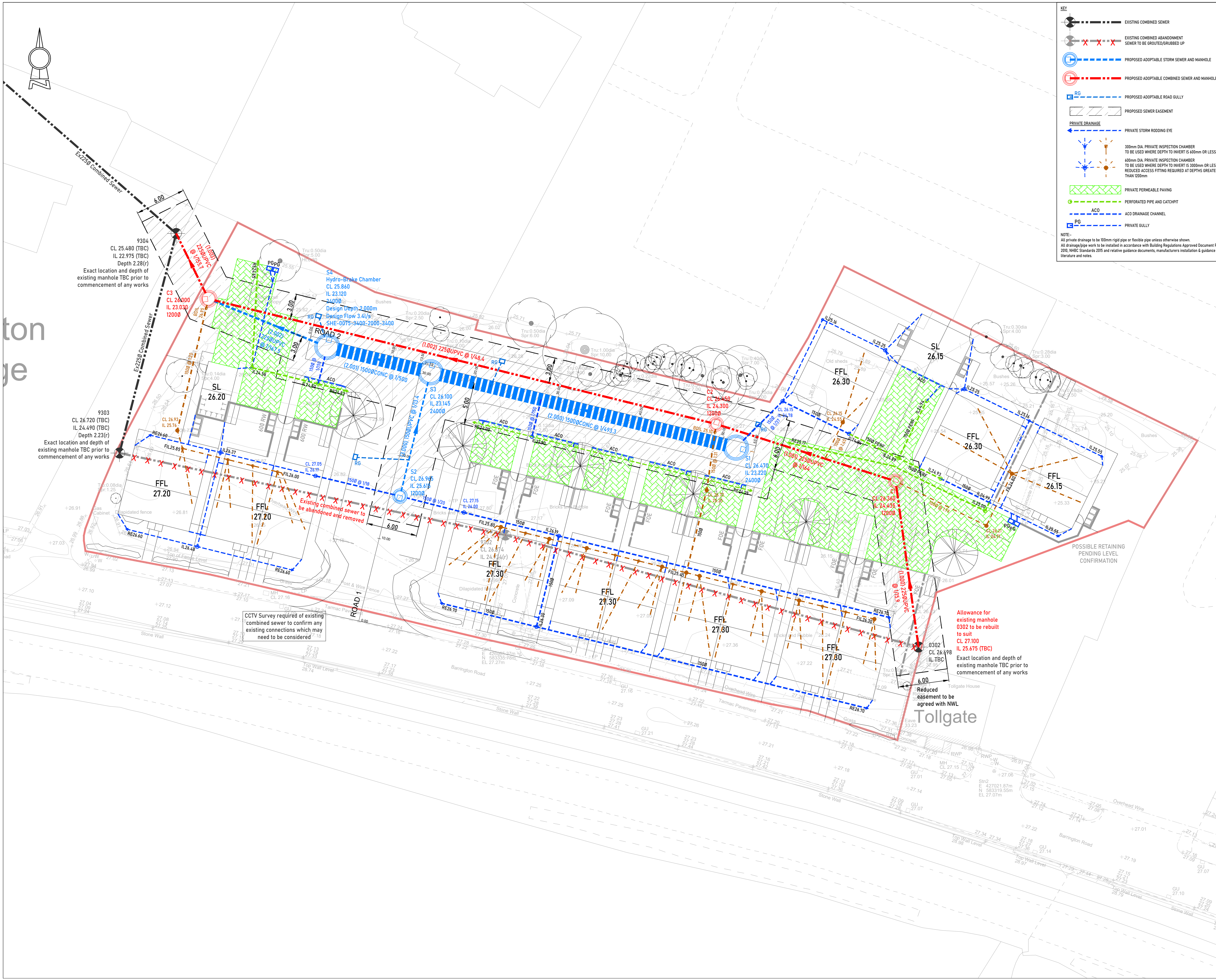
Client: **MR HARJIT SINGH DEOL**

Project: **BARRINGTON ROAD
BEDLINGTON**

Title: **FLOOD FLOW PATHS**

Scale: 1:200	Author: JF	Checked: MP	Date: JAN 2022
Job Number	Originator	Zone	Level
	Type	Role	Drawing No. Rev

P21-484-3E-ZZ-XX-DR-C-0001-P2



KEY

- EXISTING COMBINED SEWER
- EXISTING COMBINED ABANDONMENT SEWER TO BE GROUDED/RUBBED UP
- PROPOSED ADAPTABLE STORM SEWER AND MANHOLE
- PROPOSED ADAPTABLE COMBINED SEWER AND MANHOLE
- PROPOSED ADAPTABLE ROAD GULLY
- PROPOSED SEWER EASEMENT
- PRIVATE DRAINAGE
 - PRIVATE STORM ROOFING EYE
 - 300mm DIA. PRIVATE INSPECTION CHAMBER TO BE USED WHERE DEPTH TO INVERT IS 400mm OR LESS
 - 400mm DIA. PRIVATE INSPECTION CHAMBER TO BE USED WHERE DEPTH TO INVERT IS 300mm OR LESS REDUCED ACCESS FITTING REQUIRED AT DEPTHS GREATER THAN 1200mm
- PRIVATE PERMEABLE PAVING
- PERFORATED PIPE AND CATCHPIPS
- ACO DRAINAGE CHANNEL
- PRIVATE GULLY

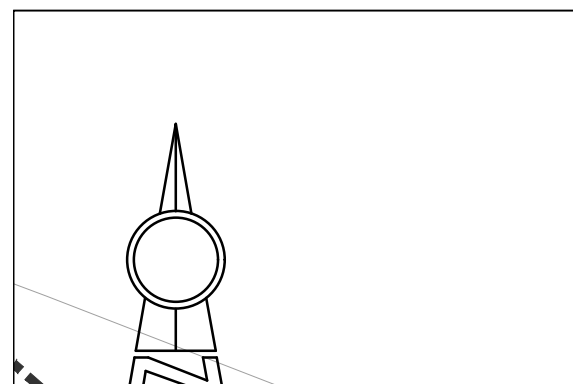
NOTE:
 All private drainage to be 100mm rigid pipe or flexible pipe unless otherwise shown.
 All drainage/pipe work to be installed in accordance with Building Regulations Approved Document Part H 2010, NHBC Standards 2015 and relative guidance documents, manufacturers installation & guidance literature and notes.

A1 - Do Not Scale

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- NOTES**
- ALL ADAPTABLE SEWER WORKS AND MATERIALS TO BE IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION GUIDELINES FOR FUL AND SURFACE WATER OFFERED FOR ADOPTION, THE RELEVANT BRITISH EUROPEAN AND NORTHUMBRIAN WATER STANDARDS REQUIREMENTS.
 - CONTRACTOR TO ESTABLISH POSITION SIZE AND DEPTH OF ALL EXISTING SEWERS AND SERVICES PRIOR TO COMMENCEMENT OF SITE.
 - THE CONTRACTOR SHALL ALLOW FOR THE PROTECTION, TEMPORARY AND PERMANENT SUPPORT, AND TEMPORARY AND PERMANENT DIVERSION WORKS, AS NECESSARY TO ALL EXISTING SERVICES.
 - THE CONTRACTOR SHALL ALLOW FOR ALL TRAFFIC MANAGEMENT IN CONNECTION WITH ROAD AND SEWER WORKS.
 - THE CONTRACTOR SHALL ALLOW FOR KEEPING SEWER TRENCHES AND EXCAVATIONS AS DRY AS PRACTICABLE BY PUMPING FROM TEMPORARY SUMPS AND DE WATERING AS APPROPRIATE. THE POINT AND METHOD OF DISCHARGE TO BE AGREED WITH THE DRAINAGE AUTHORITY.
 - PIPES UP TO AND INCLUDING 300mm TO BE TWIN WALLED PLASTIC PIPES. PIPES 375mm AND GREATER TO BE CONCRETE CLASS H.
 - THE ADAPTABLE SEWERS SHOULD BE A MINIMUM OF 1m AND MANHOLES 0.5m FROM KERBS FACES AND SERVICE MARGINS.
 - SEWERS MUST HAVE 5 METERS CLEARANCE FROM TREES AND HEDGES
 - ALL PIPE WORK TO BE 100mm DIAMETER UNLESS NOTED OTHERWISE.
 - COVER SLABS MUST CARRY THE SITE MARK OR WILL BE REJECTED BY DRAINAGE INSPECTOR. WHERE THE CLEAR OPENING OF THE MARKED PRODUCT IS DIFFERENT TO THAT OF THE COVER AND FRAME A LOAD BEARING SLAB SHOULD BE FITTED ABOVE THE COVER SLAB TO BRING THE SIZE DOWN TO 475mmx75mm FOR THE NORTHUMBRIAN WATER SPECIFIED COVER SIZE. PLEASE REFER TO CONCRETE PIPE SYSTEMS ASSOCIATIONS TECHNICAL BULLETIN ISSUED AUTUMN 2004 FOR KITE MARKED COVER SLAB OPENING SIZES.
 - SULPHATE RESISTING CEMENT (SR3-02) AND PRECAST CONCRETE PRODUCTS MUST BE USED OR A LABORATORY REPORT PROVIDED PROVING THAT SUCH PRECAUTIONS ARE NOT NECESSARY.
 - GULLY GRATES AND FRAMES SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN124 AND BE OF A NON-ROCKING DESIGN WITH CAPTIVE HINGE ACCESS AND BE KITE MARKED. LOAD CLASS D400 FOR ROADS REGULARLY CARRYING FAST MOVING HEAVY VEHICLES. CLASS C250 TO BE USED IN LESSER TRAFFICKED AREAS eg. ESTATE ROADS, CUL-DE-SACS, RESIDENTIAL CAR PARKING AREAS ETC.
 - SEWERS TO BE LAD IN CLASS 'S' BEDDING (50MM GRANULAR BED AND SURROUND WHERE DEPTH OF COVER TO TOP OF THE SEWER IS LESS THAN 2m IN HIGHWAYS AND VERGES FOR LESS THAN 0.9m IN NON VEHICULAR ACCESS AREAS) THEN A CONCRETE SLAB SHALL BE PROVIDED ABOVE THE GRANULAR BED AND SURROUND.
 - BACKFILLING AND REINSTATEMENT TO TRENCHES IN PUBLIC HIGHWAYS SHALL BE TYPE 1 GRANULAR MATERIAL IN ACCORDANCE WITH THE REQUIREMENTS AND SPECIFICATIONS OF THE ADOPTING AUTHORITY OR, IN THE ABSENCE OF SUCH, IN ACCORDANCE WITH THE REQUIREMENTS OF 'THE STREET WORKS REGULATIONS 1992' AND RELEVANT PROVISIONS OF H.A.U.C. 'SPECIFICATION FOR THE REINSTATEMENT OF OPENINGS IN HIGHWAYS' JUNE 1992, BOTH UNDER SECTION 11 OF THE NEW ROADS AND STREET WORKS ACT 1991.
 - BEDDING AND BACKFILL MATERIAL TO CONFORM TO THE REQUIREMENTS OF WATER INDUSTRY SPECIFICATION 4-28-01TABLE A2
 - ALL ROAD GULLIES ARE TO BE TRAPPED GULLIES. ALL GULLY LEADS TO BE 150mm DIAMETER.
 - ALL REDUNDANT EXISTING DRAINAGE TO BE GROUDED UP OR GROUDED, ANY EXISTING LIVE DRAINAGE SHOULD BE REPORTED TO THE ENGINEER AND RECONNECTED.
 - ALL ROAD GULLIES & LEADS TO BE CLEARED OF DEBRIS UPON COMPLETION OF WORKS.
 - THE CONTRACTOR MUST ENSURE THAT ANY OF THE EXISTING DRAINAGE WHICH IS LIVE IS KEPT CLEAR OF DEBRIS AND SHOULD ALLOW FOR JETTING THROUGH THE NEW & EXISTING DRAINAGE UPON COMPLETION.
 - CONTRACTOR TO TAKE MEASURES TO PROTECT HIS OPERATIVES WITH RESPECT TO THE PRESENCE OF GAS IN SEWER TRENCHES AND MANHOLES THROUGH THE USE OF GAS MONITORING EQUIPMENT AND BREATHING APPARATUS AS REQUIRED.
 - CONTRACTOR TO APPLY FOR SEWER PERMITS AND ROAD OPENING PERMITS AS NECESSARY FROM THE APPROPRIATE AUTHORITIES, PRIOR TO COMMENCING WORKS.
 - FILLED GROUND MUST BE FILLED AND CONSOLIDATED UNDER THE SUPERVISION AND TO THE SATISFACTION OF WORKSHIRE WATER BEFORE ANY SEWER WORKS ARE CARRIED OUT.

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9304
 CL 25.480 (TBC)
 IL 22.975 (TBC)
 Depth 2.28(r)
 Exact location and depth of existing manhole TBC prior to commencement of any works

9303
 CL 26.720 (TBC)
 IL 24.490 (TBC)
 Depth 2.23(r)
 Exact location and depth of existing manhole TBC prior to commencement of any works

CCTV Survey required of existing combined sewer to confirm any existing connections which may need to be considered

Allowance for existing manhole 0302 to be rebuilt to suit CL 27.100 IL 25.675 (TBC)
 Exact location and depth of existing manhole TBC prior to commencement of any works

Reduced easement to be agreed with NWL

22/04/22	UPDATED TO SUIT REVISED LAYOUT	JF	P2
25/01/22	PRELIMINARY ISSUE	JF	P1

PRELIMINARY

6 Benton Office Park
 Bennett Avenue
 Horbury
 Wakefield
 WF6 5BA

2 Esh Plaza
 Sir Bobby Robson Way
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 NE13 9BA

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 wakefield@3econult.com

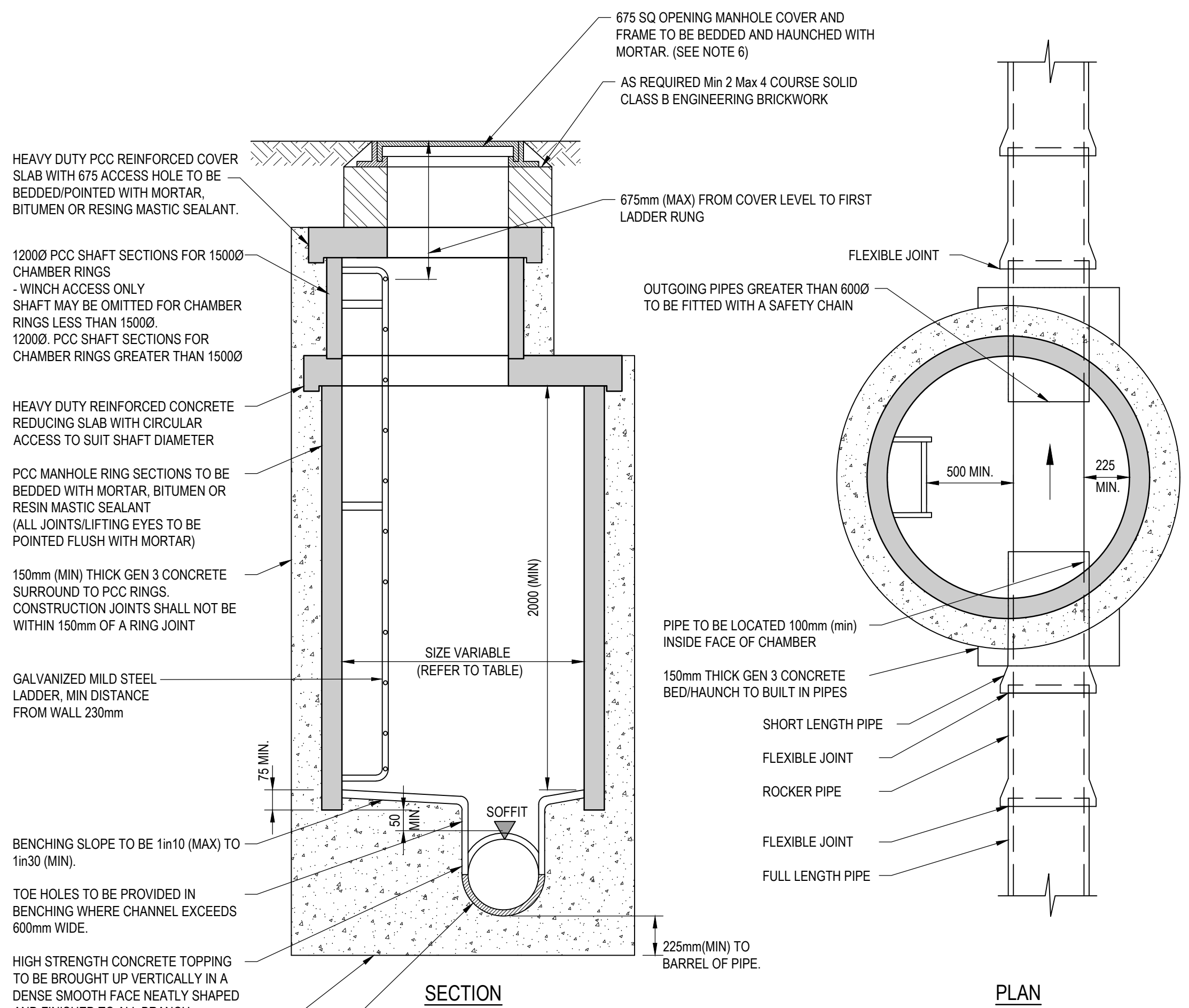
1 0191 230 2993
 newcastle@3econult.com

Client: **MR HARJIT SINGH DEOL**
 Project: **BARRINGTON ROAD BEDLINGTON**

Title: **PROPOSED DRAINAGE**

Scale	1:200	Author	JF	Checked	MP	Date	JAN 2022
Job Number	Originator	Zone	Level	Type	Role	Drawing No.	Rev

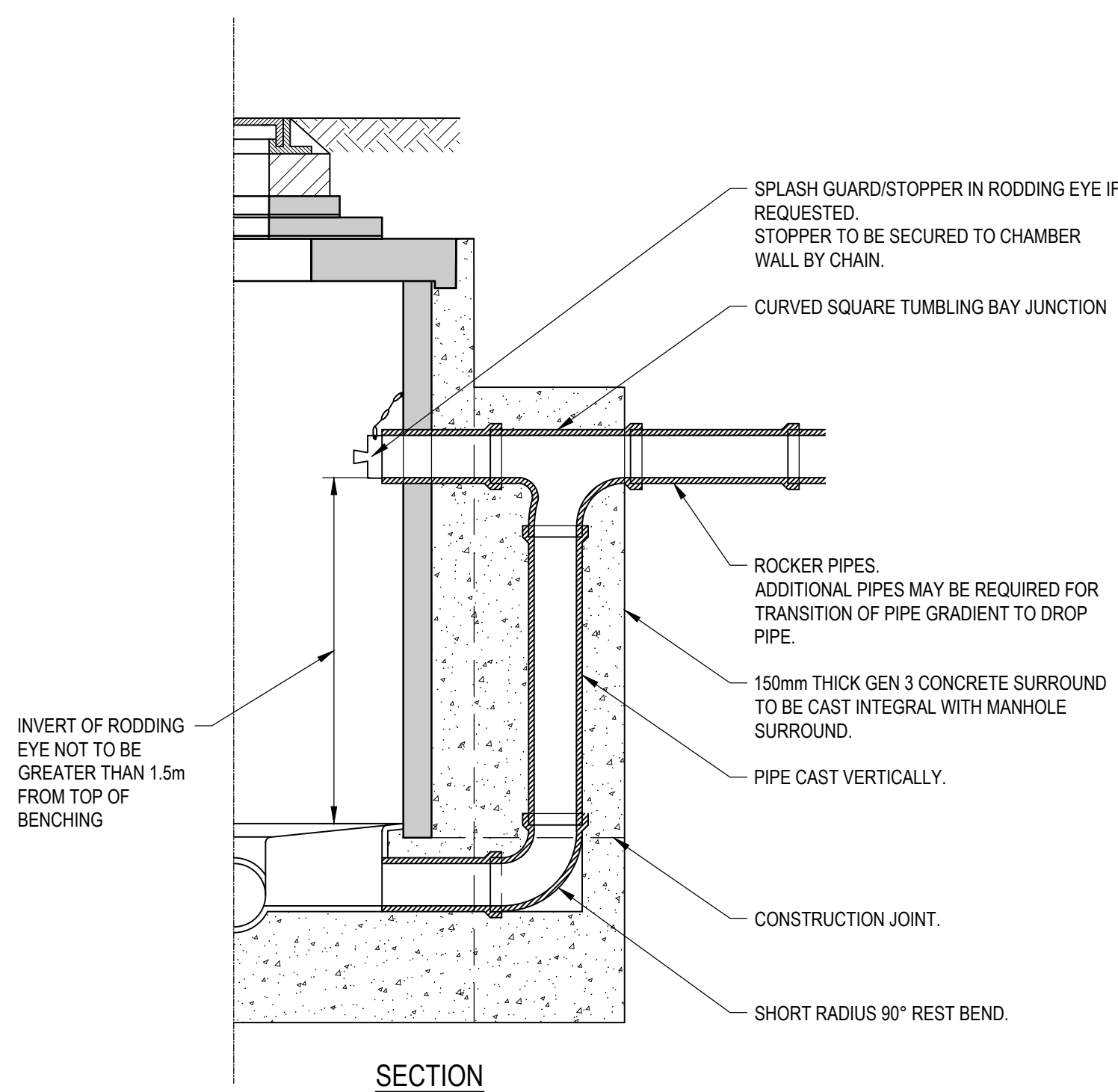
P21-484-3E-ZZ-XX-DR-C-1000-P2



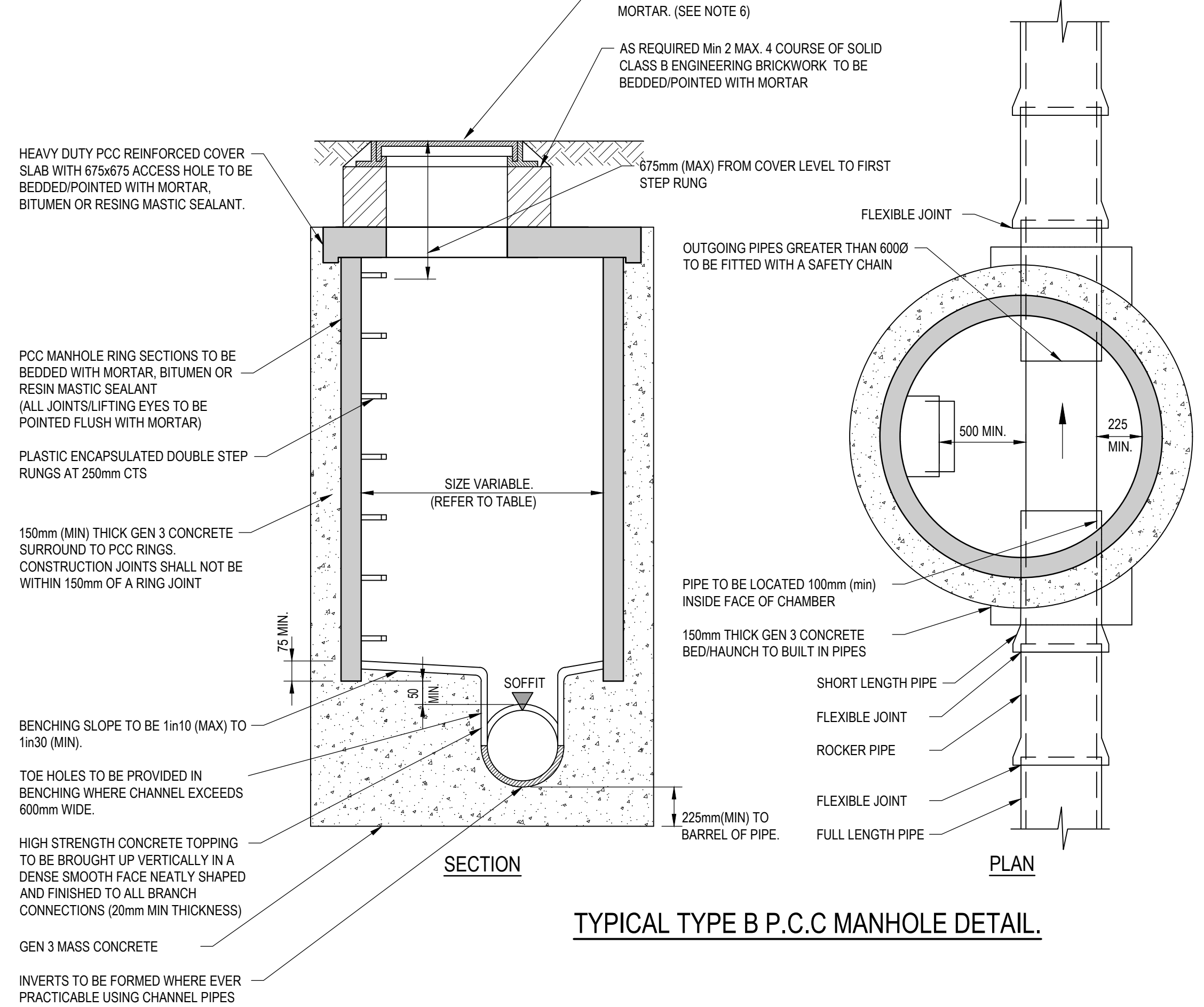
TYPICAL TYPE A P.C.C. MANHOLE DETAIL
DEPTH TO SOFFIT OF PIPE 3000mm TO 6000mm

DIA. OF LARGEST PIPE IN M.H.	CHAMBER SECTION INT. DIA. (mm)
LESS THAN 375mm	1200
375 TO 700	1500
750 TO 900	1800
GREATER THAN 900	CONSULT UNDERTAKER

TABLE APPLICABLE TO P.C.C. MANHOLE TYPES - WITH LADDERS
(CHAMBER SIZES ARE MINIMUM REQUIRED)



TYPICAL VERTICAL BACKDROP MANHOLE DETAIL
(NOTE: CONSTRUCTION DETAILS AS STANDARD PPC MANHOLE.)



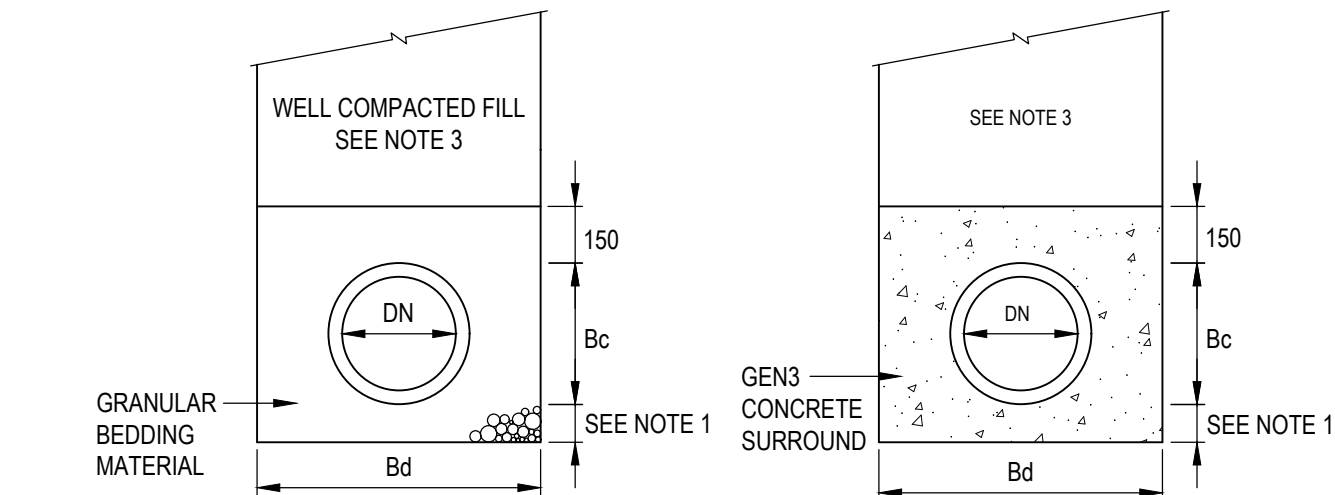
TYPICAL TYPE B P.C.C. MANHOLE DETAIL.

NOMINAL SIZE	EFFECTIVE LENGTH (mm)
150 TO 600	600
675 TO 750	1000
750 TO 900	1250
825 AND ABOVE	1250

SHORT AND ROCKER PIPE LENGTHS TABLE
APPLICABLE TO ALL MANHOLE TYPES

DIA. OF LARGEST PIPE IN M.H.	CHAMBER SECTION INT. DIA. (mm)
LESS THAN 375mm	1200
375 TO 700	1500
750 TO 900	1800
GREATER THAN 900	CONSULT UNDERTAKER

TABLE APPLICABLE TO P.C.C. MANHOLE TYPES - WITH DOUBLE STEP RUNGS
(CHAMBER SIZES ARE MINIMUM REQUIRED)

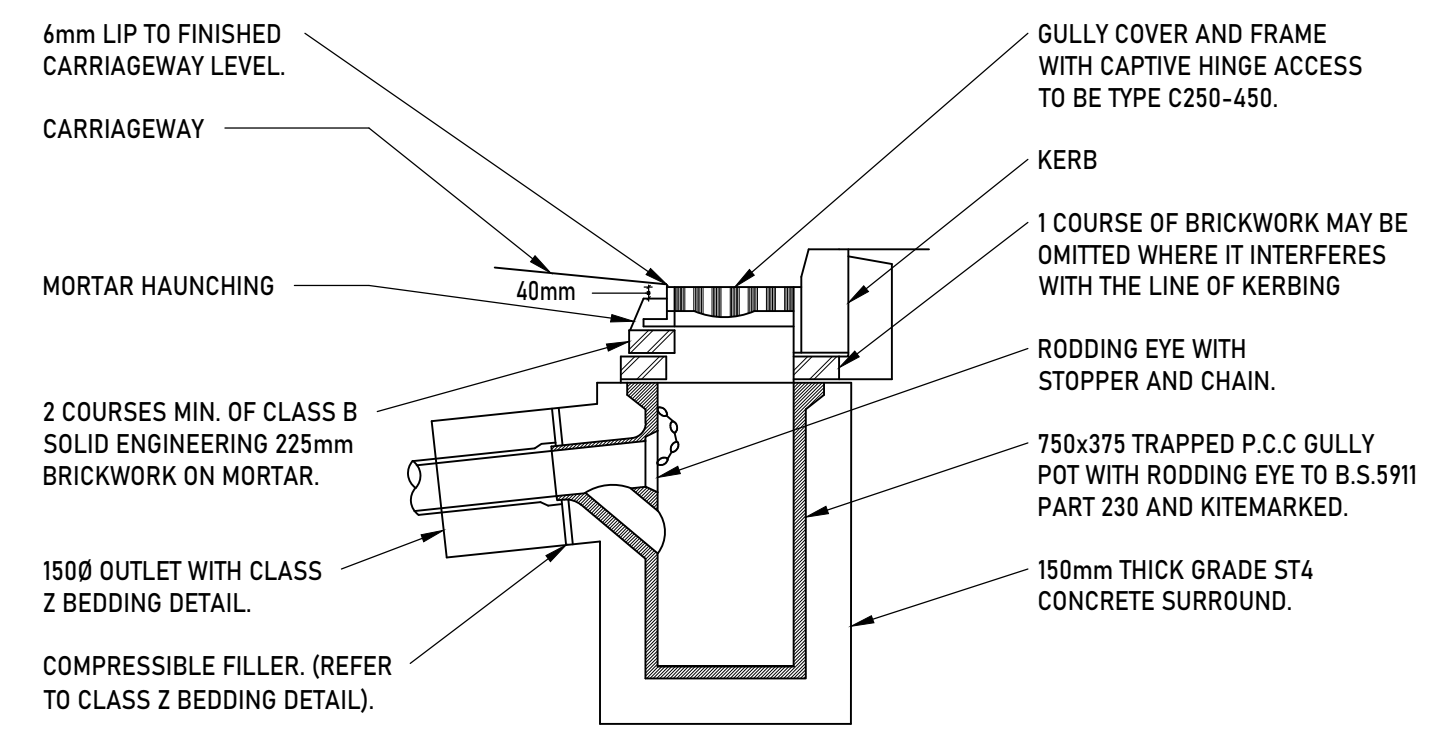


- THIS DIMENSION TO BE 1/6 Bc OR 150mm WHICHEVER IS THE GREATER, OR IN THE CASE OF ROCK, OR WHERE IRREGULAR HARD SPOTS MAY OCCUR, THE DIMENSION IS TO BE 1/4 Bc OR 200mm WHICHEVER IS THE GREATER, BUT IN ANY CASE NOT LESS THAN 50mm UNDER THE SOCKETS.
- SELECTED BACKFILL IS TO BE FREE FROM VEGETABLE MATTER, RUBBISH AND FROZEN SOIL, AND IS TO EXCLUDE STONES AND LUMPS RETAINED ON A 40mm SIEVE, HAND COMPACTED IN LAYERS NOT EXCEEDING 150mm.
- PIPELINE FLEXIBILITY IS TO BE RETAINED BY INTERRUPTING THE CONCRETE SURROUND OVER ITS FULL CROSS-SECTION AT EVERY JOINT BY A COMPRESSIBLE FILLER WHICH IS TO COINCIDE WITH PIPE JOINTS.

WHERE PIPELINES RUN UNDER PAVED/TRAFFICKED AREAS, BACKFILL TO THE TRENCH TO BE D.O.T. TYPE 1 SUB-BASE, CONSOLIDATED IN 150mm LAYERS UP TO THE UNDERSIDE OF THE PAVEMENT CONSTRUCTION.

NOMINAL SIZE OF PIPE DN(mm)	RECOMMENDED OVERALL TRENCH WIDTH Bd(m)	PIPE BEDDING REQUIREMENT (mm)
150	0.60	10 OR 14 NOM. SINGLE SIZE OR 14 TO 5 GRADED
225	0.70	10, 14 OR 20 NOM. SINGLE SIZE OR 14 TO 5 GRADED OR 20 TO 5 GRADED
300	0.85	10, 14 OR 20 NOM. SINGLE SIZE OR 14 TO 5 GRADED OR 20 TO 5 GRADED

Bd IS THE TRENCH WIDTH AT THE CROWN OF THE PIPE



TYPICAL ROAD GULLY DETAIL
(375 x 750mm)

A1 - Do Not Scale
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This information will include details of the SIGNIFICANT risks which 3E have considered beyond that which a competent contractor should be aware.

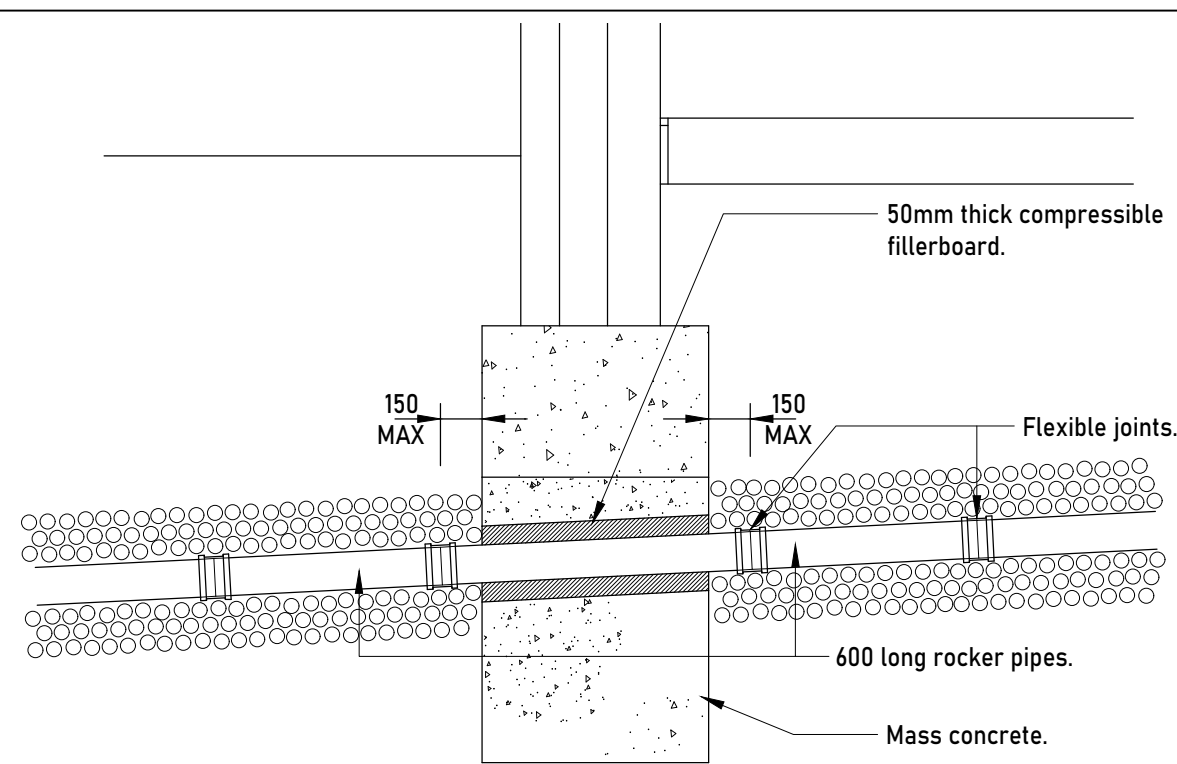
- HEALTH & SAFETY**
1. CONTRACTOR SHOULD BE AWARE OF GENERAL CONSTRUCTION RISKS TO PREVENT SLIPS, TRIPS AND FALLS AND TAKE NECESSARY PRECAUTIONS WITHOUT SPECIAL INSTRUCTION.
ROADS & DRAINAGE
2. CONTRACTOR TO PROVIDE TRENCH SUPPORTS AS APPROPRIATE AND ENSURE THAT PLANT REMAINS A SAFE DISTANCE FROM TRENCHES PRIOR TO INSTALLING DRAINAGE.
3. THE TIME THAT EXCAVATIONS ARE OPEN ON SITE SHOULD BE KEPT TO A MINIMUM AND ALL TRENCHES SHOULD BE SURROUNDED BY A BARRIER.
4. CONNECTIONS TO EXISTING SEWERS TO BE MADE BY M/I APPROVED CONTRACTOR ONLY.
5. CONTRACTOR TO MAKE OPERATIVES AWARE OF ASSOCIATED DANGERS TO HEALTH SUCH AS LEPTOSPIROSIS (WELLS DISEASE) AND RECOMMENDED PRECAUTIONS, ADEQUATE WELFARE FACILITIES AND PROTECTIVE CLOTHING TO BE PROVIDED AS REQUIRED.
6. UNFINISHED MANHOLES MUST BE COVERED WITH LOAD BEARING MATERIALS AND SURROUNDED WITH BARRIERS.
PIPES & CABLES
7. SERVICE RECORDS TO BE REFERRED TO PRIOR TO WORK COMMENCING. CONTRACTOR TO PROCEED WITH CAUTION AND SERVICES TO BE LOCATED BY HAND DIG AND PROTECTED ACCORDINGLY.
EXCAVATION/FILL
8. CONTRACTOR TO ENSURE RELEVANT MEASURES ARE TAKEN TO KEEP PLANT AND PEOPLE A SAFE DISTANCE FROM STEEP SLOPES DURING THE WORKS.
9. CONTRACTOR TO ENSURE THAT PROCEDURES ARE IN PLACE TO KEEP PEOPLE A SAFE DISTANCE FROM WORKING PLANT WHERE NECESSARY.
10. CONTRACTOR TO REFER TO GROUND INVESTIGATION REPORT FOR CONTAMINATION TESTS AND TO PROVIDE ADEQUATE WELFARE FACILITIES AND PROTECTIVE CLOTHING AS REQUIRED.

- NOTES:-**
1. ALL DRAINAGE WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE WATER SERVICES ASSOCIATION 'SEWERS FOR ADOPTION'- 4TH EDITION AND ADOPTING WATER AUTHORITY/SEWERAGE AGENCY REQUIREMENTS AND SPECIFICATIONS.
ALL PRIVATE DRAINAGE WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH BUILDING REGULATIONS 2002 EDITION.
2. CONTRACTOR TO ESTABLISH POSITION SIZE AND DEPTH OF ALL EXISTING SEWERS AND SERVICES PRIOR TO COMMENCEMENT ON SITE.
3. THE CONTRACTOR SHALL ALLOW FOR THE PROTECTION, TEMPORARY AND PERMANENT SUPPORT AND TEMPORARY AND PERMANENT DIVERSION WORKS, AS NECESSARY TO ALL EXISTING SERVICES.
4. THE CONTRACTOR SHALL ALLOW FOR ALL TRAFFIC MANAGEMENT IN CONNECTION WITH ROAD AND SEWER WORKS.
5. THE CONTRACTOR SHALL ALLOW FOR KEEPING SEWER TRENCHES AND EXCAVATIONS AS DRY AS PRACTICABLE BY PUMPING FROM TEMPORARY SLUMPS AND DEWATERING AS APPROPRIATE. THE POINT AND METHOD OF DISCHARGE TO BE AGREED WITH THE DRAINAGE AUTHORITY.
6. PIPES UP TO AND INCLUDING 300mm TO BE UNPLASTICISED PVC. PIPES 375mm AND GREATER TO BE CONCRETE CLASS H.
7. IN-SITU AND PRECAST CONCRETE UNITS SHALL HAVE SULPHATE RESISTING PORTLAND CEMENT TO BS 4027, UNLESS AGREED OTHERWISE WITH THE ADOPTING AUTHORITY.
8. PRECAST CONCRETE PRODUCTS SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS 5911 AND BE KITEMARKED.
9. MANHOLE COVERS AND FRAMES SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN124. HAVE MINIMUM 675 x 675 CLEAR OPENINGS WITH 150 DEEP FRAMES UNLESS OTHERWISE SPECIFIED. MANHOLE COVERS AND FRAMES TO BE OF A NON-ROCKING DESIGN WITHOUT CUSHION INSERTS AND BE KITEMARKED. LOAD CLASS D400 IN VEHICULAR TRAFFICKED AREAS AND LOAD CLASS B125 IN FOOTWAYS AND PEDESTRIAN AREAS.
10. GULLY GRATES AND FRAMES SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN124 AND BE OF A NON-ROCKING DESIGN WITH CAPTIVE HINGE ACCESS AND BE KITEMARKED. LOAD CLASS D400 FOR REGULARLY CARRYING FAST MOVING HEAVY VEHICLES. CLASS C250 TO BE USED IN LESSER TRAFFICKED AREAS eg. ESTATE ROADS, CUL-DE-SACS, RESIDENTIAL CAR PARKING AREAS ETC.

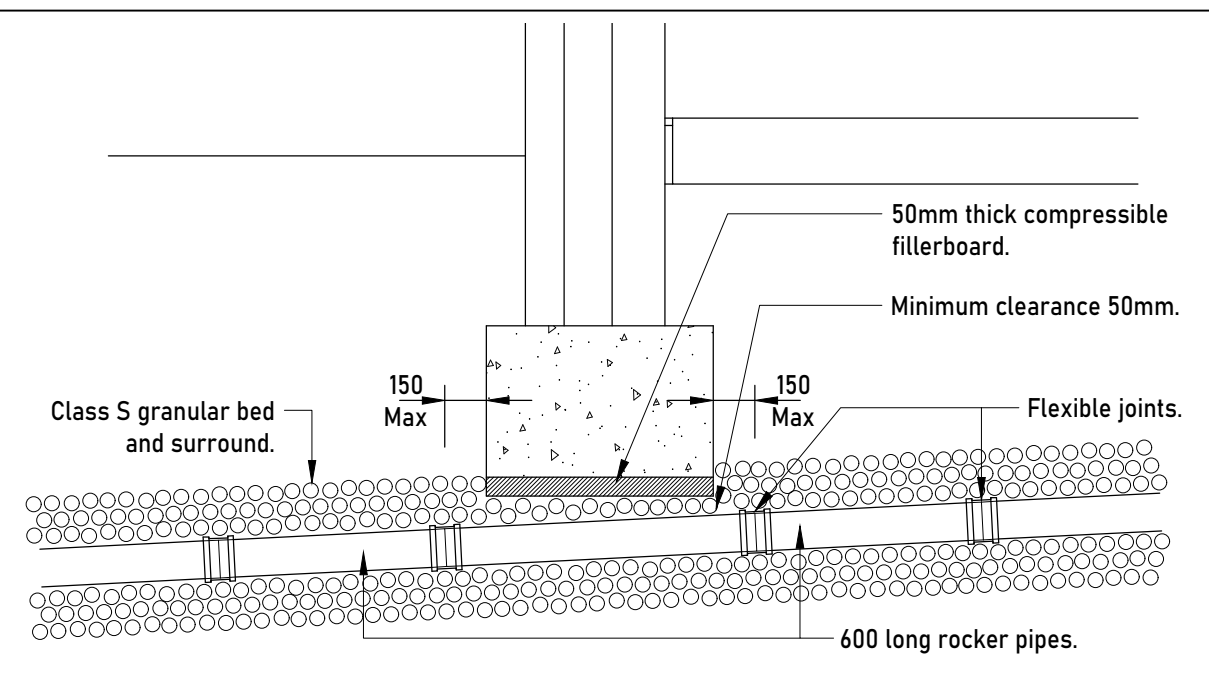
- CLASS 2 BEDDING DETAIL SHALL BE PROVIDED WHERE COVER TO THE PIPE BARREL IS LESS THAN 1.2m IN VEHICULAR TRAFFICKED AREAS AND 0.9m ELSEWHERE. TO ALL ROAD GULLY CONNECTIONS AND WITHIN AREAS OF DEEP ROOTING VEGETATION.
- WHERE CLASS 2 TRENCH BEDDING DETAIL IS USED, THE CONCRETE BED AND SURROUND SHALL BE DISCONTINUED AT EACH PIPE JOINT OVER THE FULL CROSS SECTION BY MEANS OF A SHAPED COMPRESSIBLE FILLER.
- SELECTED BACKFILL MATERIAL SHALL CONSIST OF UNIFORM MATERIAL FREE FROM STONES LARGER THAN 40mm, CLAY LUMPS LARGER THAN 75mm, TREE ROOTS, ORGANIC MATTER AND FROZEN SOIL. SELECTED BACKFILL MATERIAL SHALL BE PLACED IN LAYERS NOT EXCEEDING 225mm, EACH LAYER COMPACTED TO FORM A STABLE TRENCH BACKFILL.
- GENERAL BACKFILL MATERIAL TO BE FREE FROM STONES LARGER THAN 40mm. GENERAL BACKFILL MATERIAL IS TO BE PLACED IN LAYERS NOT EXCEEDING 150mm THICKNESS AND EACH LAYER COMPACTED BY HAND. NO MECHANICAL COMPACTION OF FILL MATERIAL SHALL BE PERMITTED WITHIN 300mm ABOVE THE CROWN/BARREL OF THE PIPE.
- BACKFILL AND REINSTATEMENT TO TRENCHES IN PUBLIC HIGHWAYS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS AND SPECIFICATIONS OF THE ADOPTING AUTHORITY, OR IN THE ABSENCE OF SUCH, IN ACCORDANCE WITH THE REQUIREMENTS OF 'THE STREET WORKS REGULATIONS 1997' AND RELEVANT PROVISIONS OF H.A.U.C. 'SPECIFICATION FOR THE REINSTATEMENT OF OPENINGS IN HIGHWAYS' JUNE 1992, BOTH UNDER SECTION 11 OF THE NEW ROADS AND STREET WORKS ACT 1991.
- BACKFILL TO DRAINAGE TRENCHES IN HARD PAVED AREAS SHALL BE G.S.B. TYPE 1.
- ALL REDUNDANT EXISTING DRAINAGE TO BE GRUBBED UP OR GROUTED. ANY EXISTING LIVE DRAINAGE SHOULD BE REPORTED TO THE ENGINEER AND RECONNECTED.
- ALL ROAD GULLIES & LEADS TO BE CLEARED OF DEBRIS UPON COMPLETION OF WORKS.
- ANY EXISTING DRAINAGE WHICH BECOMES UNDER TRAFFICKED AREAS IN THE NEW SCHEME SHOULD BE SUBJECT TO THE FOLLOWING REMEDIAL PROVISIONS, WHERE DEPTH OF COVER IS LESS THAN 150mm, THE EXISTING PIPEWORK SHALL BE EXPOSED & SURROUNDED WITH 150MM CONCRETE AS CLASS '2' BEDDING, WHERE THE EXISTING MANHOLE COVER & FRAME IS NOT AS MANHOLE DETAIL A OR B, OR TO BS497 GRADE A, OR EN124 CLASS D, THEN IT SHOULD BE CHANGED FOR SUCH.
- THE CONTRACTOR MUST ENSURE THAT ANY OF THE EXISTING DRAINAGE WHICH IS LIVE IS KEPT CLEAR OF DEBRIS AND SHOULD ALLOW FOR JETTING THROUGH THE EXISTING DRAINAGE UPON COMPLETION.
- CONTRACTOR TO TAKE MEASURES TO PROTECT HIS OPERATIVES WITH RESPECT TO THE PRESENCE OF GAS IN SEWER TRENCHES AND MANHOLES THROUGH THE USE OF GAS MONITORING EQUIPMENT AND BREATHING APPARATUS AS REQUIRED.
- CONTRACTOR TO APPLY FOR SEWER PERMITS AND ROAD OPENING PERMITS AS NECESSARY FROM THE APPROPRIATE AUTHORITIES, PRIOR TO COMMENCING WORKS.
- CONTRACTOR TO CCTV SURVEY ALL NEW DRAINAGE ON COMPLETION OF WORKS.

25/01/22	PRELIMINARY ISSUE	JF	P1
Date	Revisions	Drawn	Rev.
Purpose of Issue			
PRELIMINARY			
6 Benton Office Park Barnett Ave, Horbury, Wakfield t: 01924 240 420 wakfield@3econconsult.com		2 Esh Plaza Sir Bobby Robson Way Great Park Newcastle upon Tyne NE13 9BA t: 0191 230 2995 newcastle@3econconsult.com	
3E consulting engineers www.3econconsult.com			

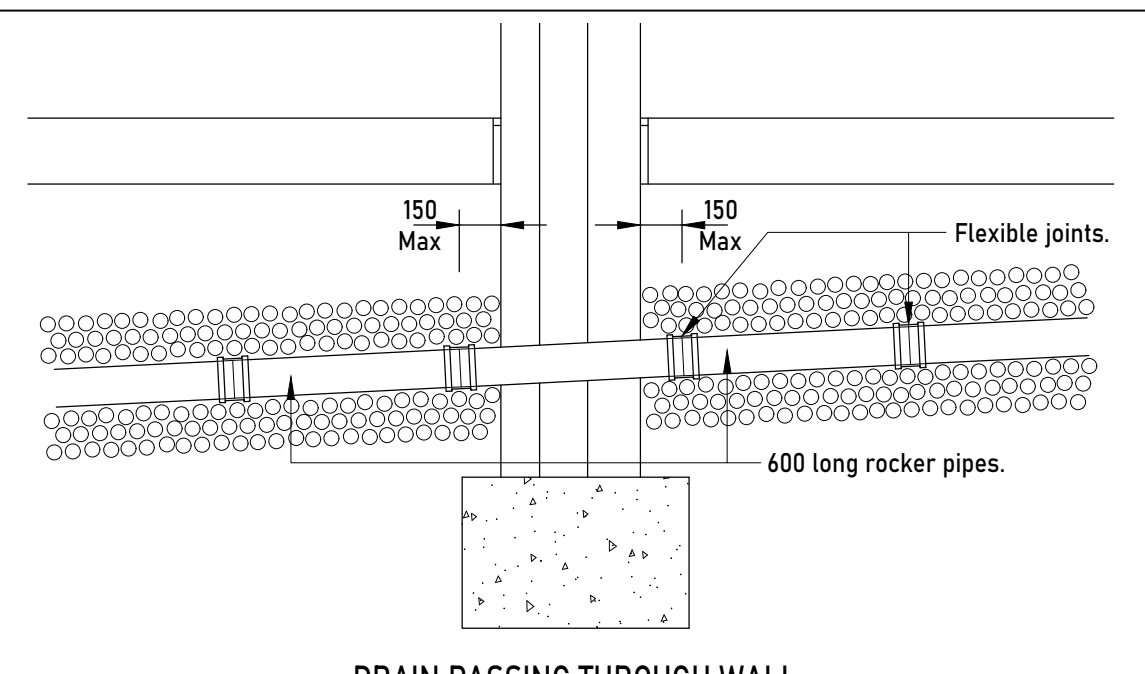
Client	MR HARJIT SINGH DEOL
Project	BARRINGTON ROAD BEDLINGTON
Title	ADOPTED DRAINAGE CONSTRUCTION DETAILS
Scale	1:20
Author	JF
Checked	MP
Date	JAN 2022
Job Number	Originator Zone Level Type Role Drawing No. Rev
P21-484-3E-ZZ-XX-DR-C-1200-P1	



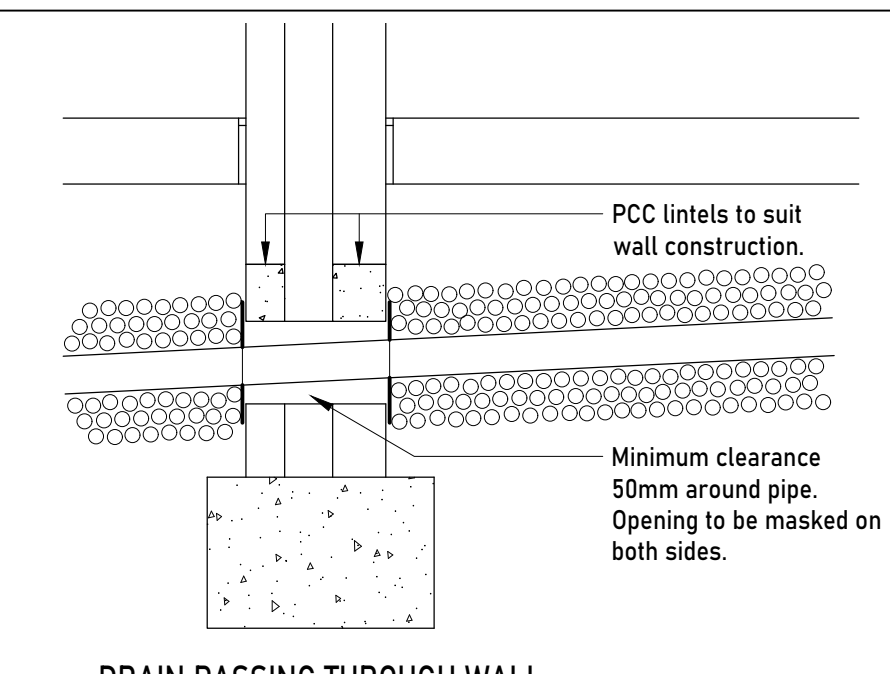
DRAIN PASSING UNDER FOUNDATION THROUGH MASS CONCRETE FILL



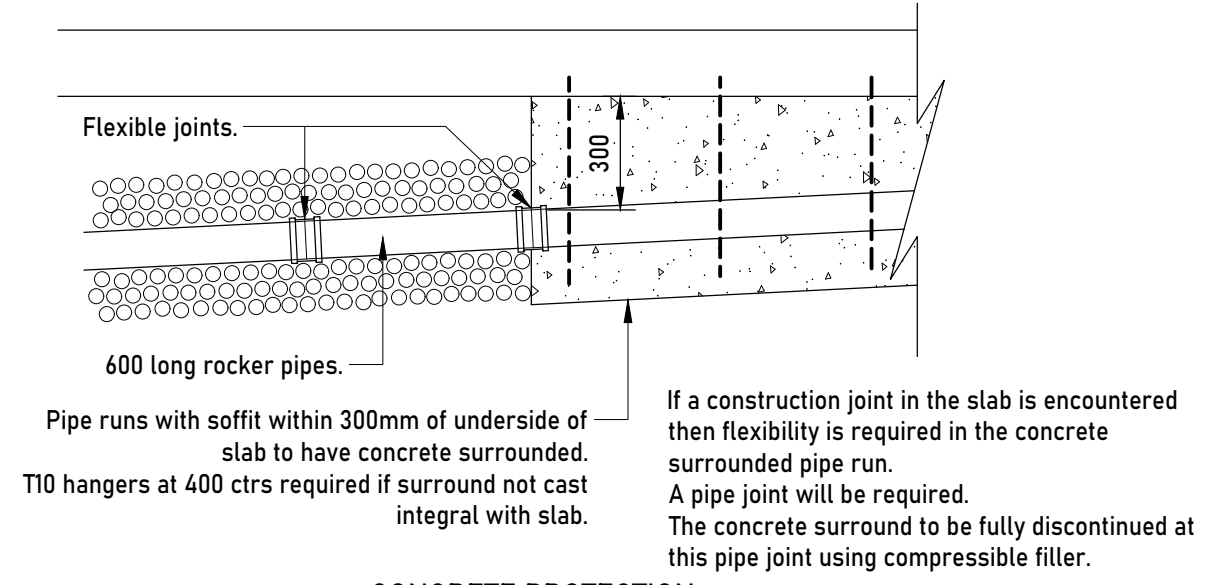
DRAIN PASSING UNDER FOUNDATION FILLERBOARD PROTECTION DETAIL



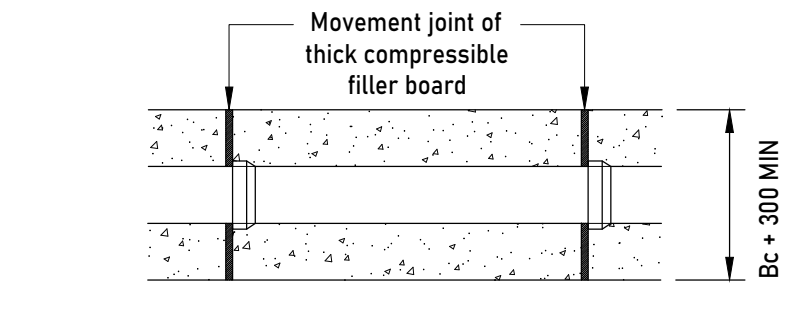
DRAIN PASSING THROUGH WALL BUILT IN DETAIL



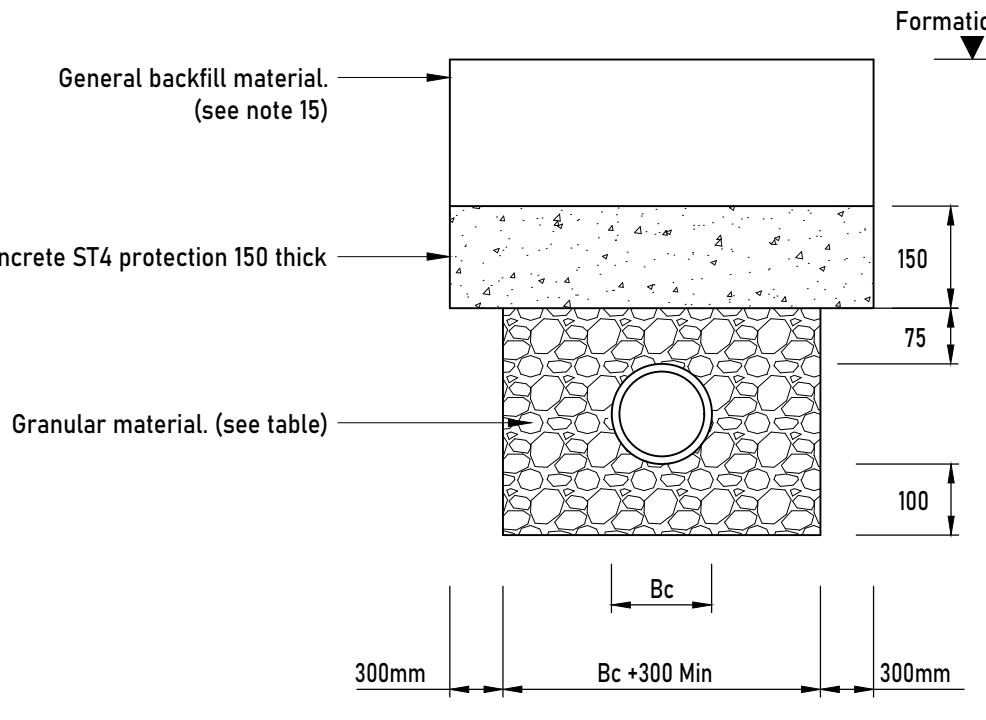
DRAIN PASSING THROUGH WALL NOT BUILT IN DETAIL



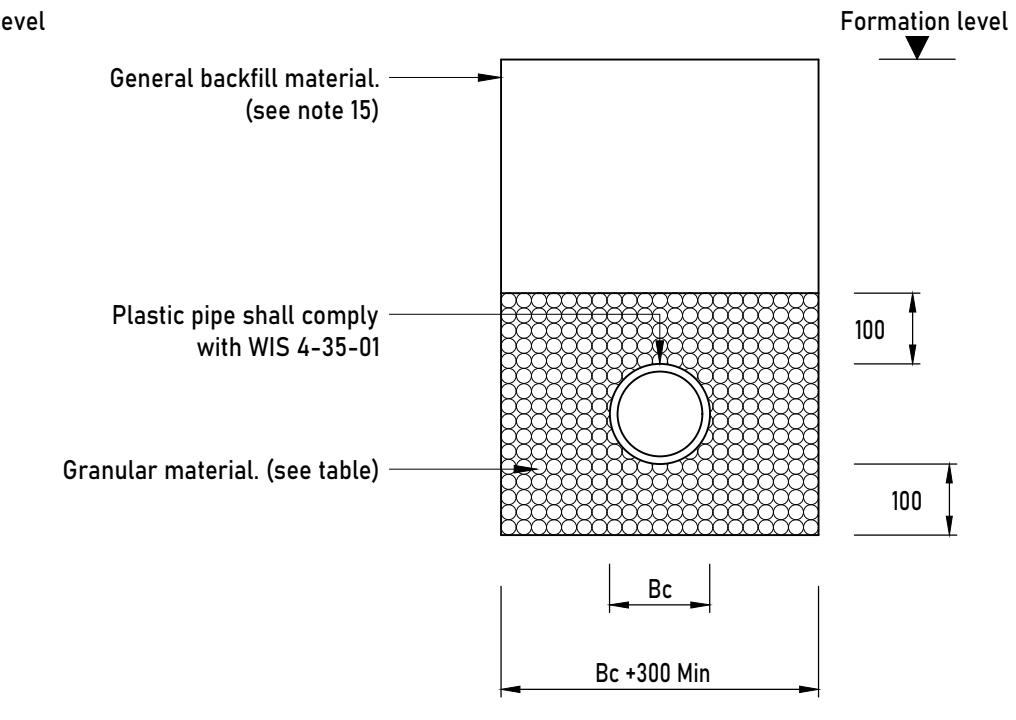
CONCRETE PROTECTION TIEING IN DETAIL



JOINTS FOR CONCRETE ENCASED PIPES



CLASS Q DETAIL (where cover to pipe less than 1.2m)



CLASS T DETAIL

(plastic pipes shall comply with WIS 4-35-01 and shall be kitemarked)

NOMINAL PIPE DIA (mm)	SINGLE SIZED (mm)	GRADED (mm)
100	10	Not permitted
110 to 150	10 or 14	14 to 5 graded
160 to 300	10, 14 or 20	Either 20 to 5 graded or 14 to 5 graded
310 to 500	14 or 20	Either 20 to 5 graded or 14 to 5 graded
Over 550	14, 20 or 40	Either 40 to 5 graded or 20 to 5 graded or 14 to 5 graded

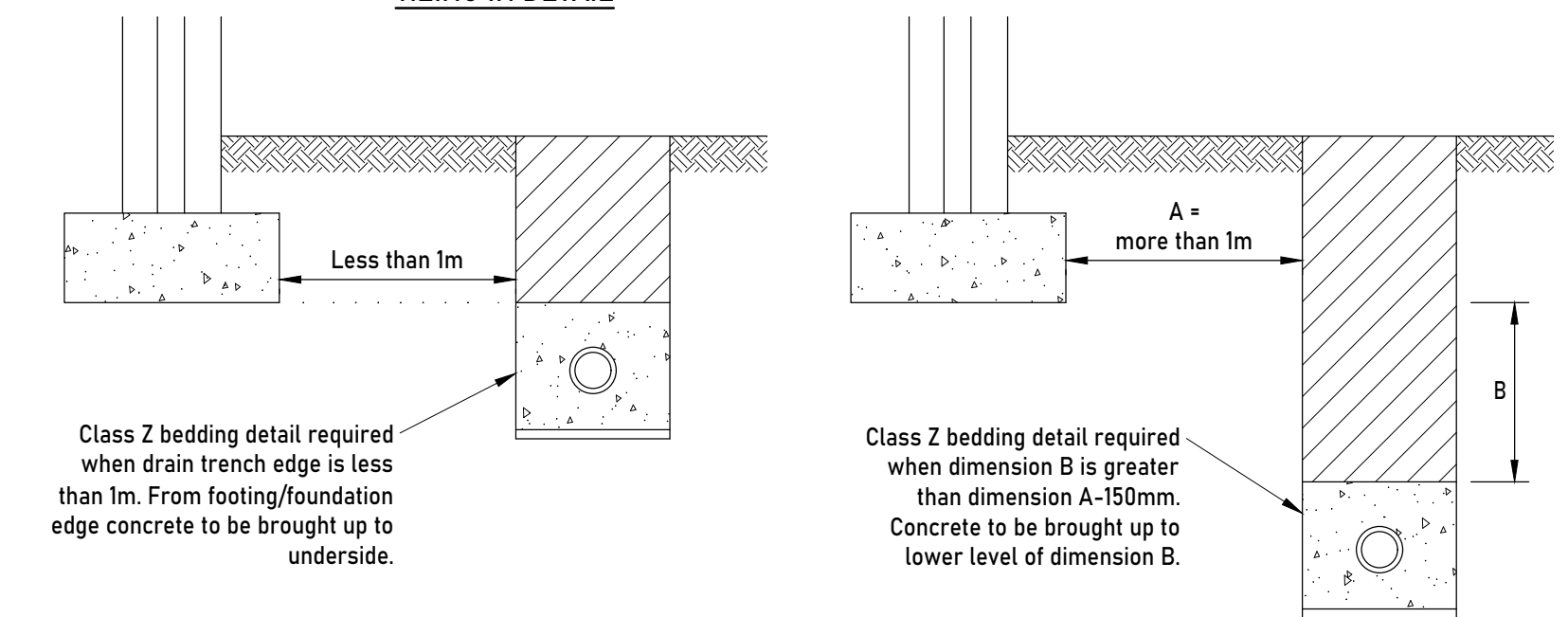
MINIMUM RECOMMENDED TRENCH WIDTHS FOR PIPES IN POOR GROUND CONDITIONS	
NOM PIPE DIA (mm)	MIN TRENCH WIDTH (mm)
150	450
225	525
300	Two times nom. diameter
And above	

THE FOLLOWING UPVC PIPES ARE ACCEPTABLE FOR USE	
UPONOR ULTRA DRAIN	110 & 160 (O.D.)
HEPWORTH PLASTIDRAIN	110 & 160 (O.D.)
WAVIN OSMA DRAIN	110 & 160 (O.D.)
WAVIN OSMA ULTRA RIB	150 & 225 (I.D.)
MARLEY SOLID WALL	110 & 160 (O.D.)
MARLEY QUANTUM	150 & 225 (I.D.)
POLYPIPE RIDISEWER	150 & 225 (I.D.)
POLYPIPE UNDERGROUND DRAIN	110 & 160 (O.D.)

GRANULAR BEDDING MATERIAL

Extract from Table A2 WIS 4-08-02 (all aggregates to table 4 of BS 882:1983)

PLASTIC PIPE (u-PVC) TRENCH BEDDING DETAILS

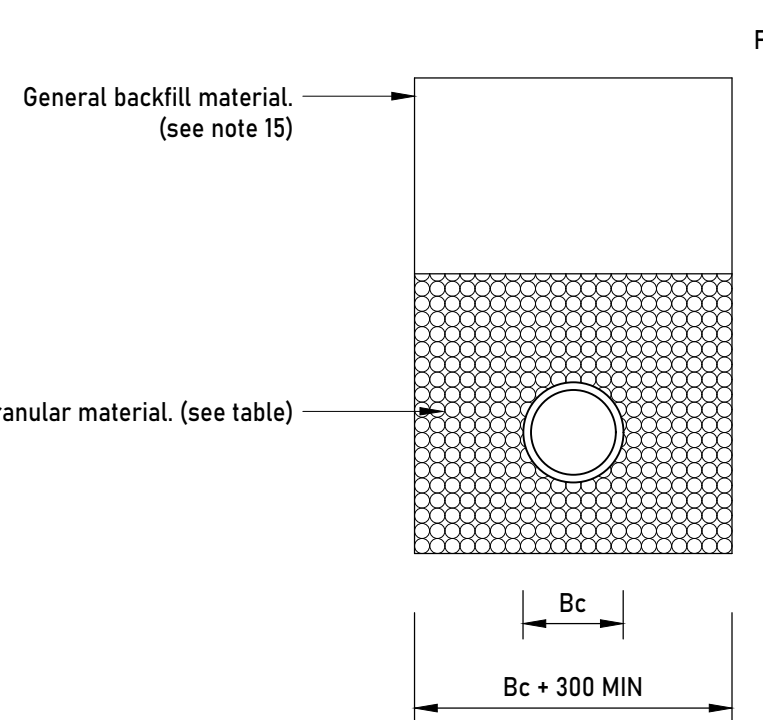


DRAIN TRENCH EDGE LESS THAN 1m FROM FOOTING/FOUNDATION EDGE

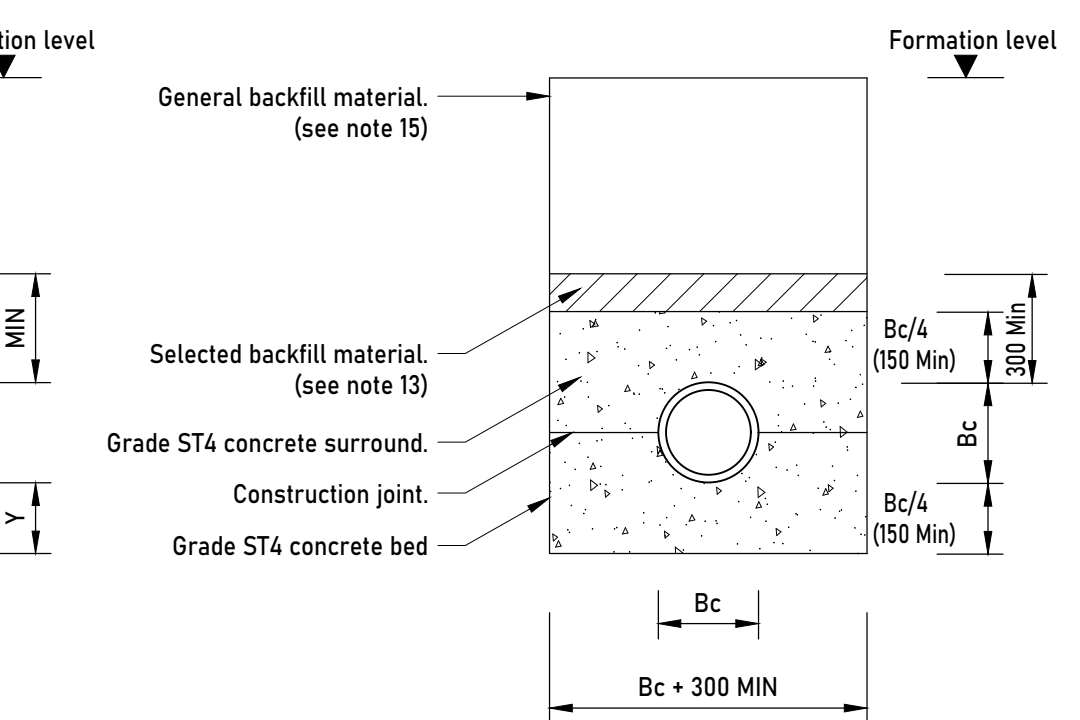
DRAIN TRENCH EDGE MORE THAN 1m FROM FOOTING/FOUNDATION EDGE

BEDDING DETAIL IN VICINITY OF FOOTINGS/FOUNDATIONS

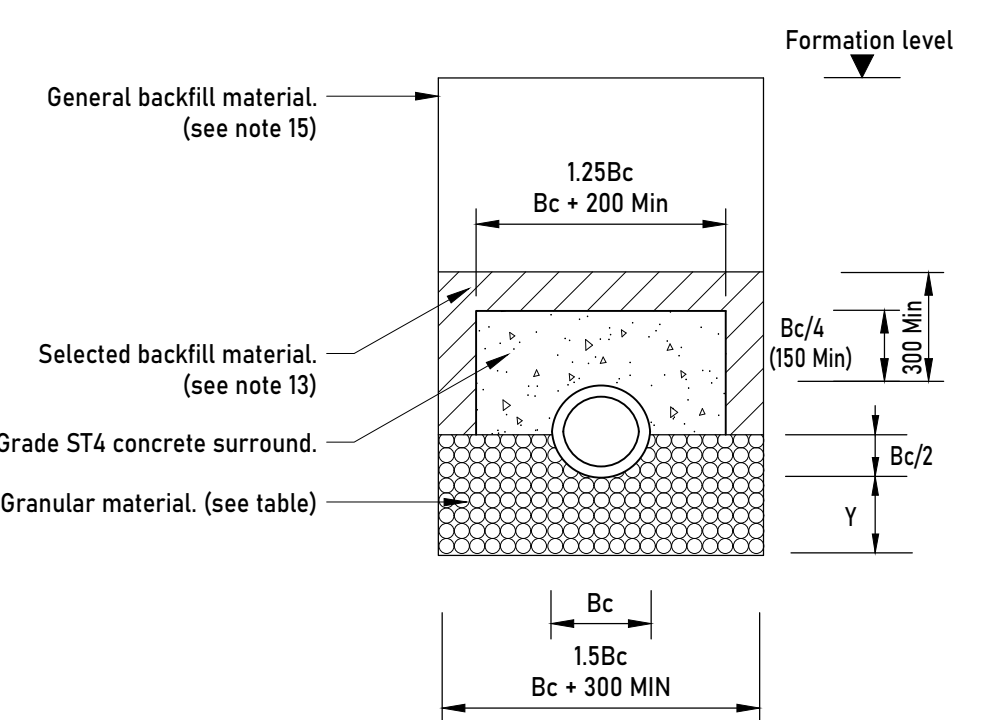
NOTE:- THIS IS A TYPICAL DETAIL TO BE CROSS REFERENCED WITH 3E STRUCTURAL DRAWINGS



CLASS S DETAIL (see notes 13 & 15)



CLASS Z DETAIL (see notes 11, 13 & 15)



CLASS A DETAIL (see notes 11, 13 & 15)

PIPE I.D.	OVERALL TRENCH WIDTH
100	550
150	600
225	700
300	850
375	1050
450	1150
525	1200
600	1350
675	1450
750	1500
825	1600
900	1900
1050	2100
1200	2300
1350	2500
1500	2700
1800	3100

NOMINAL PIPE DIA (mm)	SINGLE SIZED (mm)	GRADED (mm)
150	10 or 14	14 to 5
200 to 300	10, 14 or 20	14 to 5, 20 to 5
375 to 525	14 or 20	14 to 5, 20 to 5
Greater than 525	14, 20 or 40	14 to 5, 20 to 5 or 40 to 5

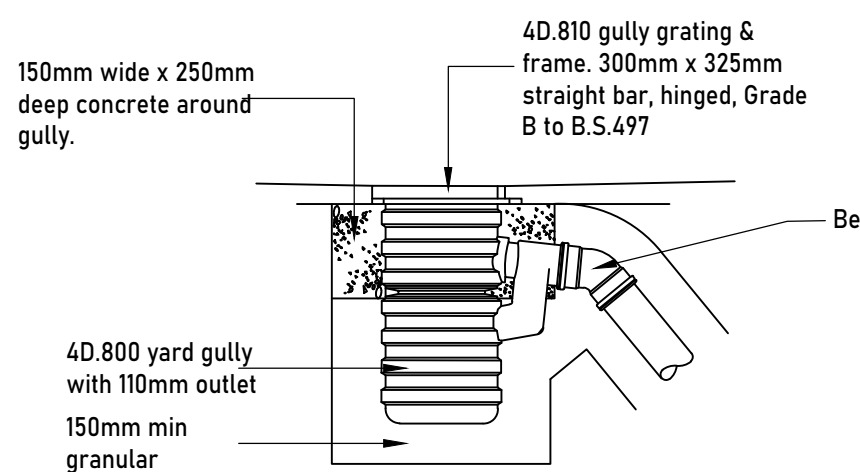
GRANULAR BEDDING MATERIAL (all aggregates to table 4 of BS 882:1983)

Notes
 A) Bc = outside diameter of pipe barrel.
 B) Y = for uniform soils:
 Sleeve jointed pipes, min. 50mm or 1/6Bc, whichever is the greater. Socketed pipe, min. 100mm or 1/6Bc, whichever is the greater under barrels and not less than 50mm under sockets. For rock or mixed soils containing rock bands, boulders, stones or other irregular hard spots:
 Sleeve jointed pipes, min. 150mm or 1/4Bc, whichever is the greater. Socketed pipe, min. 200mm or 1/4Bc, whichever is the greater under barrels and not less than 150mm under sockets.

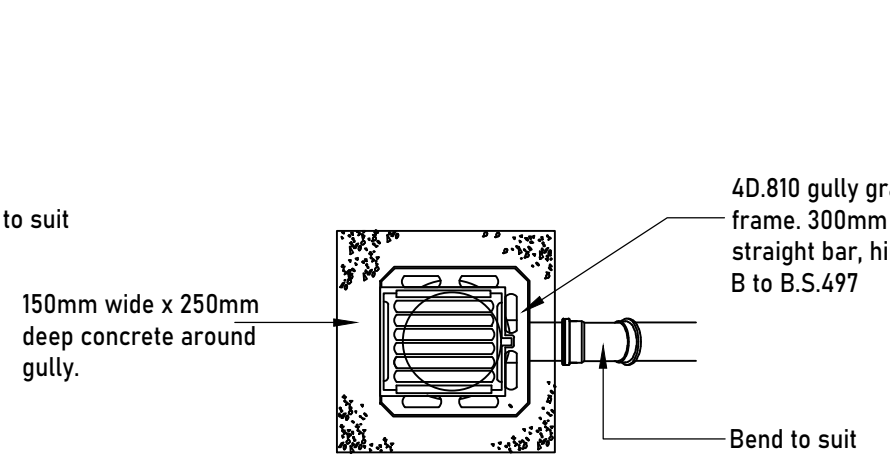
RIGID PIPE TRENCH BEDDING DETAILS

NOMINAL PIPE DIA (mm)	THICKNESS OF COMPRESSIBLE FILLER (mm)
Less than 450	18
450 to 1200	36
Greater than 1200	54

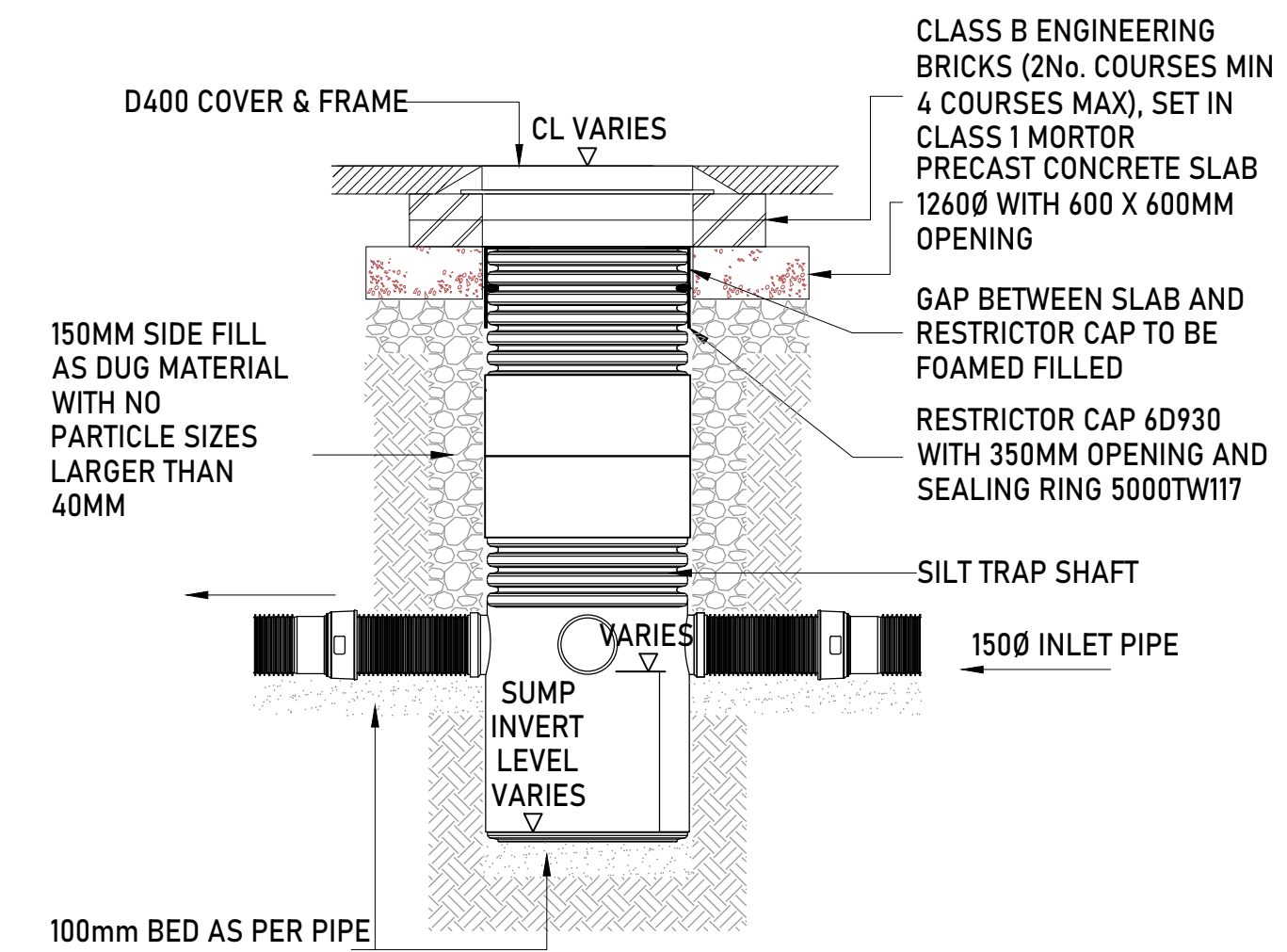
COMPRESSIBLE FILLER TABLE (bitumen impregnated insulating board to BS 1142: Part 3)



SECTION THROUGH WAVIN 4D.800 YARD GULLY WITH 110mm Ø OUTLET FOR USE IN PRIVATE / SHARED DRIVES



PLAN OF WAVIN 4D.810 GULLY GRATING & FRAME FOR USE IN PRIVATE / SHARED DRIVES



TYPICAL SILT TRAP / SUMP MANHOLE DETAIL

NOTES - CONT....

- Where two pipelines cross with less than 300mm cover, surround each pipe with a full concrete bed and surround (class 2 detail) for not less than 1m centered on the crossing and extended as required to within 150mm of the nearest flexible joint.
- Selected backfill material shall consist of uniform soil, 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. Should the excavated material be unsuitable or weather conditions affect the materials stability, then a suitable hard granular material shall be used.
- No mechanical compaction of fill material shall be permitted within 300mm above the barrel/crown of the pipe.
- General backfill to drainage trenches in vehicular trafficked areas above the pipe bedding detail, shall be suitably selected material (in accordance with BS: 8301 clause 5.7.6.1) and be placed in layers not exceeding 225mm, each layer compacted to form a stable trench backfill, should the material be unsuitable or weather conditions affect the materials stability, then a hard granular material shall be used up to formation level.
- All separators shall be in accordance with the environment agency document PPG3.
- All below ground plastic/grp tanks shall be installed in accordance with the manufacturers instructions. They shall be provided with sufficient concrete surround to counter floatation and shall have a wall thickness adequate to resist the highest ground water level which could be encountered at their location.
- All excavations in areas of high water tables and granular materials with high sand/silt contents shall be wrapped with a suitable geotechnical filter membrane to prevent migration of sands/silts. Full height clay stanks across trenches and/or at manhole locations at 25m intervals to restrict water movement along the excavation shall be provided.
- Where utility/land drainage trenches etc cross over drainage trenches, the contractor shall construct an impermeable barrier to prevent groundwater infiltrating into the drainage trench.
- Non-man entry access chambers shall comply with the relevant provisions of BS:EN 752-3.

A1 - Do Not Scale

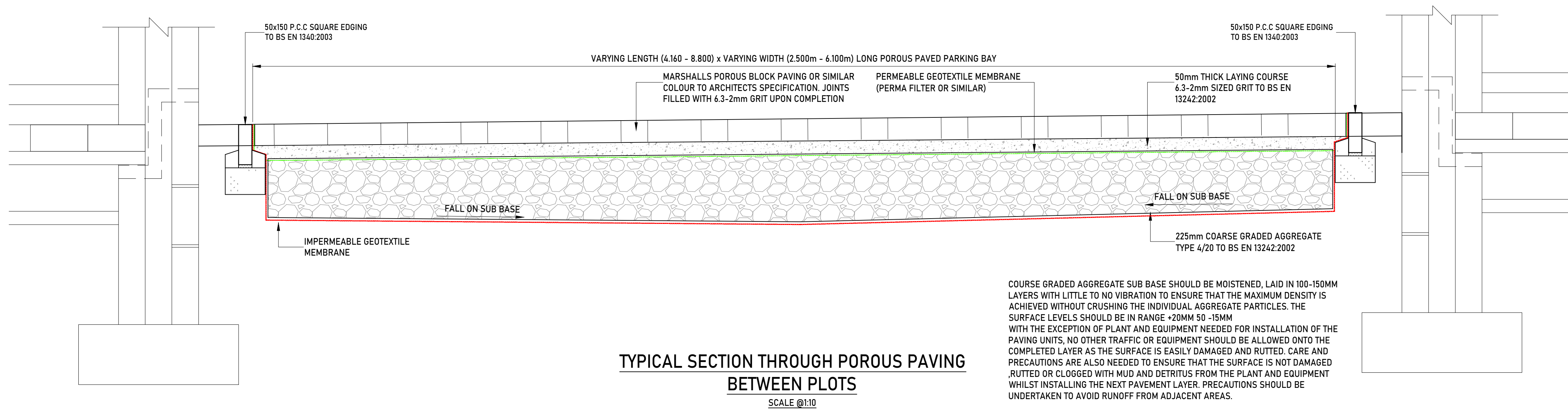
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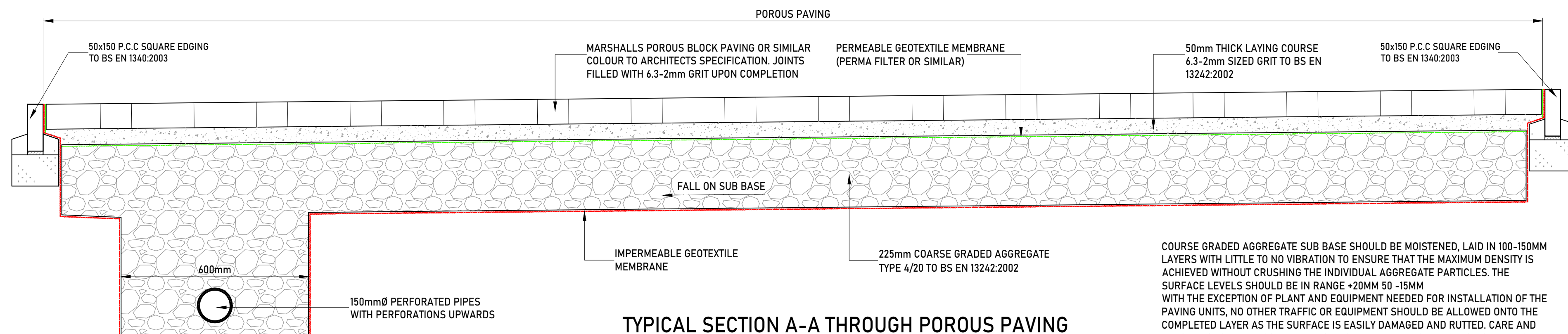
- NOTES -**
- This drawing is to be read in conjunction with all relevant 3E, architect and M&E consultants drawings and project specifications.
 - All building drainage works shall be carried out in accordance with the relevant parts of BS EN752 'Drains and Sewer Systems Outside Buildings', the current building regulations and the local authority building control specifications and requirements.
 - All in situ and precast concrete products shall comply with class D51 requirements for sulphate exposure in accordance with BRE Special Digest 1, Concrete in Aggressive Ground (2001) Part 1: Table 2.
 - All precast concrete products shall comply with the relevant provisions of BS:EN124 and be Kitemarked. All precast concrete pipes shall be class 120 and comply with the requirements of note 3 above.
 - All vitrified clay pipes and fittings shall comply with the relevant provisions of BS EN:295 and BS 65 respectively and be Kitemarked, all pipes shall be extra strength to BS 65 or equivalent BS EN:295 pipe crushing strength and be of a sleeved system.
 - All u-PVC pipes and fittings shall comply with WIS 4-35-01 and shall be Kitemarked.
 - Manhole covers and frames shall comply with the relevant provisions of BS EN:124 and be of non-rocking design with cushion inserts and be Kitemarked. Load class D400 in trafficked areas and load class B125 in footways, landscaped and pedestrian areas. where required, covers shall be recessed to receive the architects specified finish.
 - Gully grates and frames shall comply with the relevant provisions of BS EN:124 and be of non-rocking design with captive hinge access and be Kitemarked. Load class D400 in industrial estate roads and areas carrying regular heavy traffic and load class C250 in estate roads and car parking areas. In all road locations, the grate shall be hinged on the side of the traffic direction (left hand opening).
 - All external rigid pipework shall be laid with a class S pipe bedding detail with 1.2m minimum cover to the pipe barrel under vehicular trafficked areas, 0.9m cover under fields and 0.6m cover under footways/gardens. Where cover is less than that stated, a class A pipe bedding detail shall be used on pipes 225dia and larger, for pipes less than 225dia use a class Z pipe bedding detail. Under buildings a class S pipe bedding detail shall be used. Where there is less than 300mm between the barrel of the pipe and the underside of the structural floor slab, the pipe shall be cast integral with the floor slab with 150mm minimum concrete surround with vertical reinforcement tied into the slab.
 - All u-PVC pipework shall be laid with a class T pipe bedding detail with 1.2m minimum cover to the pipe barrel under vehicular trafficked areas, 0.9m cover under fields and 0.6m cover under footways/gardens. Where cover is less than that stated a class Q pipe bedding detail shall be used.
 - Where concrete protection is required to pipework, the concrete shall be discontinued at each pipe joint over the full cross section of the concrete by means of a shaped compressible filler.

Date	Revisions	PRELIMINARY ISSUE	JF	P1
Purpose of Issue		PRELIMINARY	Drawing Status	
6 Benton Office Park Bennett Ave, Horbury, Wakfield t: 01924 240 420 wakfield@3econsult.com		2 Esh Plaza Robson Way Great Park Newcastle upon Tyne NE13 9BA t: 0191 230 2995 newcastle@3econsult.com		
Client		MR HARJIT SINGH DEOL		
Project		BARRINGTON ROAD BEDLINGTON		
Title		PRIVATE DRAINAGE CONSTRUCTION DETAILS		
Scale	Author	Checked	Date	
1:20	JF	MP	JAN 2022	
Job Number	Originator	Zone	Level	Type
P16-001-3E-ZZ-XX-DR-C-1201-P1				



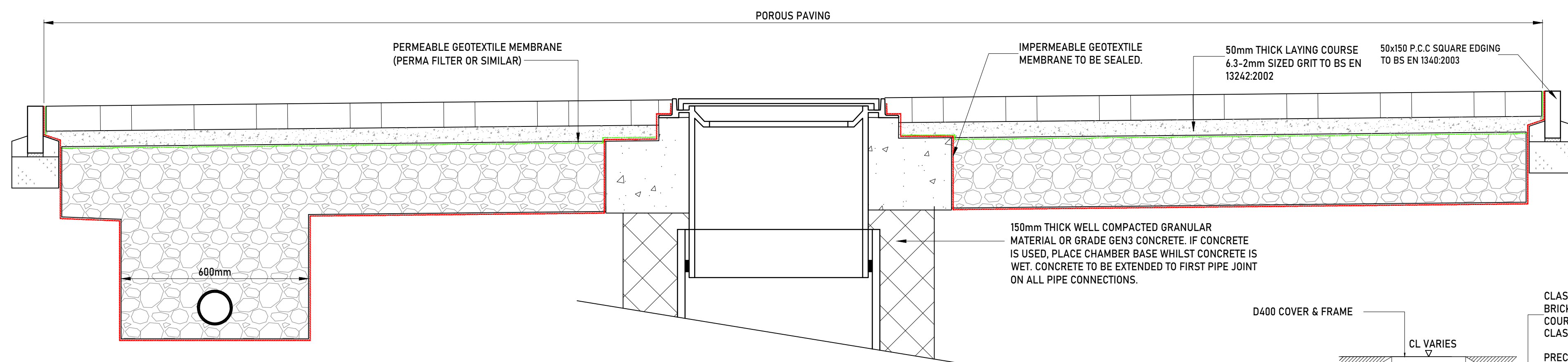
TYPICAL SECTION THROUGH POROUS PAVING BETWEEN PLOTS
SCALE @1:10

COURSE GRADED AGGREGATE SUB BASE SHOULD BE MOISTENED, LAID IN 100-150MM LAYERS WITH LITTLE TO NO VIBRATION TO ENSURE THAT THE MAXIMUM DENSITY IS ACHIEVED WITHOUT CRUSHING THE INDIVIDUAL AGGREGATE PARTICLES. THE SURFACE LEVELS SHOULD BE IN RANGE +20MM 50 -15MM WITH THE EXCEPTION OF PLANT AND EQUIPMENT NEEDED FOR INSTALLATION OF THE PAVING UNITS, NO OTHER TRAFFIC OR EQUIPMENT SHOULD BE ALLOWED ONTO THE COMPLETED LAYER AS THE SURFACE IS EASILY DAMAGED AND RUTTED. CARE AND PRECAUTIONS ARE ALSO NEEDED TO ENSURE THAT THE SURFACE IS NOT DAMAGED ,RUTTED OR CLOGGED WITH MUD AND DETRITUS FROM THE PLANT AND EQUIPMENT WHILST INSTALLING THE NEXT PAVEMENT LAYER. PRECAUTIONS SHOULD BE UNDERTAKEN TO AVOID RUNOFF FROM ADJACENT AREAS.

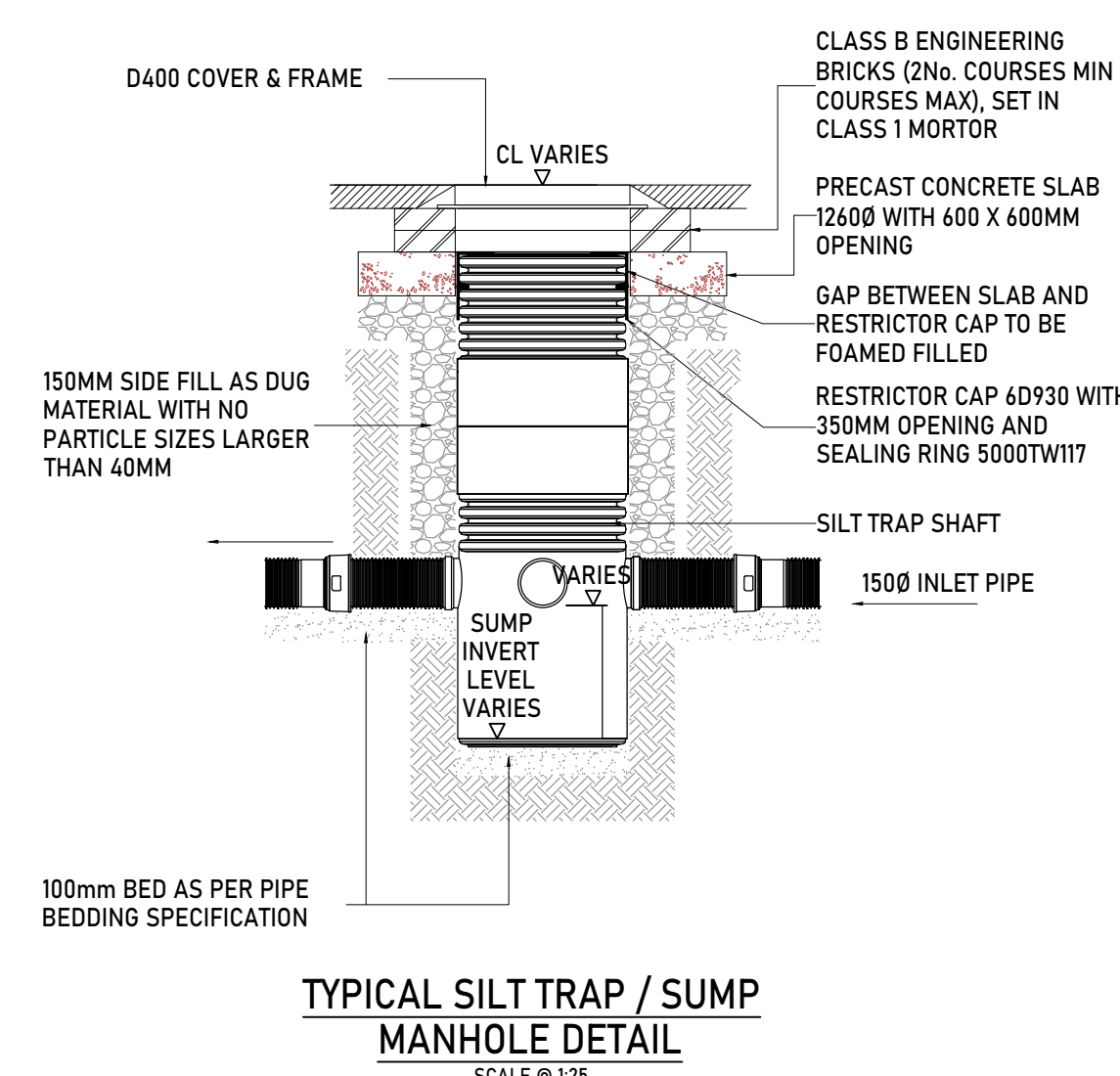


TYPICAL SECTION A-A THROUGH POROUS PAVING
SCALE @1:10

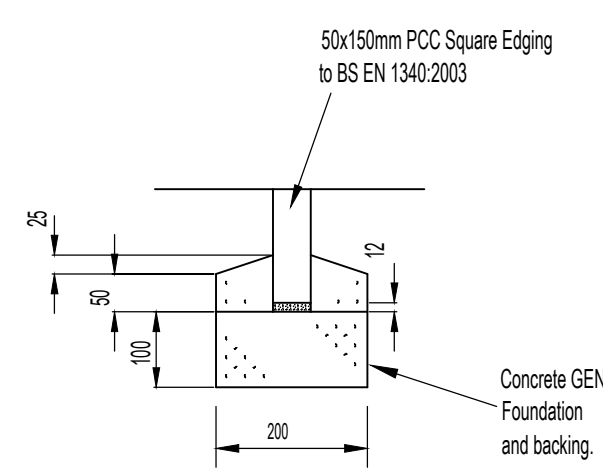
COURSE GRADED AGGREGATE SUB BASE SHOULD BE MOISTENED, LAID IN 100-150MM LAYERS WITH LITTLE TO NO VIBRATION TO ENSURE THAT THE MAXIMUM DENSITY IS ACHIEVED WITHOUT CRUSHING THE INDIVIDUAL AGGREGATE PARTICLES. THE SURFACE LEVELS SHOULD BE IN RANGE +20MM 50 -15MM WITH THE EXCEPTION OF PLANT AND EQUIPMENT NEEDED FOR INSTALLATION OF THE PAVING UNITS, NO OTHER TRAFFIC OR EQUIPMENT SHOULD BE ALLOWED ONTO THE COMPLETED LAYER AS THE SURFACE IS EASILY DAMAGED AND RUTTED. CARE AND PRECAUTIONS ARE ALSO NEEDED TO ENSURE THAT THE SURFACE IS NOT DAMAGED ,RUTTED OR CLOGGED WITH MUD AND DETRITUS FROM THE PLANT AND EQUIPMENT WHILST INSTALLING THE NEXT PAVEMENT LAYER. PRECAUTIONS SHOULD BE UNDERTAKEN TO AVOID RUNOFF FROM ADJACENT AREAS.



TYPICAL SECTION THROUGH MANHOLE WITHIN POROUS PAVING
SCALE @1:10



TYPICAL SILT TRAP / SUMP MANHOLE DETAIL
SCALE @1:25



TYPICAL PATH EDGING
TYPE E1
Scale 1:10

NOTES -CONT...

- Where concrete protection is required to pipework, the concrete shall be discontinued at each pipe joint over the full cross section of the concrete by means of a shaped compressible filler.
- Where two pipelines cross with less than 300mm cover, surround each pipe with a full concrete bed and surround (class Z detail) for not less than 1m centered on the crossing and extended as required to within 150mm of the nearest flexible joint.
- Selected backfill material shall consist of uniform soil, 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. Should the excavated material be unsuitable or weather conditions affect the materials stability, then a suitable hard granular material shall be used.
- No mechanical compaction of fill material shall be permitted within 300mm above the barrel/crown of the pipe.
- General backfill to drainage trenches in vehicular trafficked areas above the pipe bedding detail, shall be suitably selected material (in accordance with BS 8301 clause 5.7.6.1.) and be placed in layers not exceeding 225mm, each layer compacted to form a stable trench backfill, should the material be unsuitable or weather conditions affect the materials stability, then a hard granular material shall be used up to formation level.
- All separators shall be in accordance with the environment agency document PPG3.
- All below ground plastic/grp tanks shall be installed in accordance with the manufacturers instructions. They shall be provided with sufficient concrete surround to counter floatation and shall have a wall thickness adequate to resist the highest ground water level which could be encountered at their location.
- All excavations in areas of high water tables and granular materials with high sand/silt contents shall be wrapped with a suitable geotechnical filter membrane to prevent migration of sands/silts. Full height clay slanks across trenches and/or at manhole locations at 25m intervals to restrict water movement along the excavation shall be provided.
- Where utility/land drainage trenches etc cross over drainage trenches, the contractor shall construct an impermeable barrier to prevent groundwater infiltrating into the drainage trench.
- Non-man entry access chambers shall comply with the relevant provisions of BS EN-752-3.

A1 - Do Not Scale

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Contractors should refer to the residual risks contained in the CDM Pre Construction Information before carrying out any site operations and should not issue parts of this drawing without including the CDM notes and references.
This information will include details of the SIGNIFICANT risks which 3E have considered beyond that which a competent contractor should be aware.

NOTES -

- This drawing is to be read in conjunction with all relevant 3E, architect and M&E consultants drawings and project specifications.
- All building drainage works shall be carried out in accordance with the relevant parts of BS EN:752 Drains and Sewer Systems Outside Buildings', the current building regulations and the local authority building control specifications and requirements.
- All in situ and precast concrete products shall comply with class DS1 requirements for sulphate exposure in accordance with BRE Special Digest 1, Concrete in Aggressive Ground (2001) Part 1: Table 2.
- All precast concrete products shall comply with the relevant provisions of BS 5911 and be Kitemarked. All precast concrete pipes shall be class 120 and comply with the requirements of note 3 above.
- All vitrified clay pipes and fittings shall comply with the relevant provisions of BS EN:295 and BS 65 respectively and be Kitemarked, all pipes shall be extra strength to BS 65 or equivalent BS EN:295 pipe crushing strength and be of a sleeved system.
- All u-PVC pipes and fittings shall comply with WIS 4-35-01 and shall be Kitemarked.
- Manhole covers and frames shall comply with the relevant provisions of BS EN:124, have 675x675 clear openings unless otherwise specified and be of non-rocking design without cushion inserts and be Kitemarked. Load class D400 in trafficked areas and load class B125 in footways, landscaped and pedestrian areas, where required, covers shall be recessed to receive the architects specified finish.
- Gully grates and frames shall comply with the relevant provisions of BS EN:124 and be of non-rocking design with captive hinge access and be Kitemarked. Load class D400 in industrial estate roads and areas carrying regular heavy traffic and load class C250 in estate roads and car parking areas. In all road locations, the grate shall be hinged on the side of the traffic direction (left hand opening). All grates to have pedestrian covers.
- All external rigid pipework shall be laid with a class S pipe bedding detail with 1.2m minimum cover to the pipe barrel under vehicular trafficked areas, 0.9m cover under fields and 0.6m cover under footways/gardens. Where cover is less than that stated, a class A pipe bedding detail shall be used on pipes 225dia and larger, for pipes less than 225dia use a class Z pipe bedding detail. Under buildings a class S pipe bedding detail shall be used. Where there is less than 300mm between the barrel of the pipe and the underside of the structural floor slab, the pipe shall be cast integral with the floor slab with 150mm minimum concrete surround with vertical reinforcement tied into the slab.
- All u-PVC pipework shall be laid with a class T pipe bedding detail with 1.2m minimum cover to the pipe barrel under vehicular trafficked areas, 0.9m cover under fields and 0.6m cover under footways/gardens. Where cover is less than that stated a class Q pipe bedding detail shall be used.

BS SIEVE SIZE (mm)	PERCENTAGE PASSING
14	100
10	90-100
6.3	80-99
2.0	0-20
1.0	0-5

THE MATERIAL SHOULD ALSO MEET DURABILITY REQUIREMENTS IN BS 7533-13:2009

SIEVE SIZE (mm)	PERCENT PASSING
80	-
63	-
40	100
31.5	98-100
20	90-99
10	25-70
4	0-15
2	0-5
1	-

25/01/22	PRELIMINARY ISSUE	JF	P1
Date	Revisions	Drawn	Rev
Purpose of Issue		Drawing Status	
PRELIMINARY		-	
6 Benton Office Park Bennett Ave, Horbury, Wakefield t: 01924 240 420 wakefield@3econult.com		2 Esh Plaza Robson Way Great Park Newcastle upon Tyne NE 13 9BA t: 0191 230 2995 newcastle@3econult.com	
Sir Bobby Robson Way		Great Park	
Newcastle upon Tyne		NE 13 9BA	
www.3econult.com		consulting engineers www.3econult.com	
Client		MR HARJIT SINGH DEOL	
Project		BARRINGTON ROAD BEDLINGTON	
Title		PERMEABLE PAVING CONSTRUCTION DETAILS	
Scale	Author	Checked	Date
1:20	JF	MP	JAN 2022
Job Number	Originator	Zone	Level
P21-484-3E-ZZ-XX-DR-C-1202-P1			

Appendix E

Ext: 96646
Direct Line: 0191 419 6646
Email: developmentenquiries@nwl.co.uk
Our Ref: 212811410054

Friday, 07 January 2022

3E Consulting Engineers
2 Esh Plaza
Sir Bobby Robson Way
Great Park
Newcastle upon Tyne
NE13 9BA

Dear Matthew,

Re: Pre-Planning Enquiry – Barrington Road, Choppington, Northumberland NE22 7AP

Further to the Point of Connection Application for the above site, received January 4th 2022, we are now able to provide the following response.

We have based our response on the information in your application and accompanying correspondence. Therefore, should any of the information now be different, then you must ensure that you inform us of any changes as further Network Modelling may be required and our response may also change, leading to this response being invalid.

Northumbrian Water assesses the impact of the proposed development on our assets and assesses the capacity within our network's to accommodate and treat the anticipated flows arising from the development. We do not therefore offer comment on aspects of planning applications that are outside of our area of control.

Enclosed in this response is a scaled plan showing the **approximate** position of the water and sewerage networks within the vicinity of this site.

We have changed the way contractors and developers can access our assets.

Historically only our own staff and framework contractors could access our sewerage network. As of 1st January 2018, we are allowing third party contractors to access our sewer network on a site by site basis, subject to certain conditions.

Further information (including how to apply) is available from our web site - <https://www.nwl.co.uk/services/developers/developer-sewerage-services/>

Also enclosed is our extract showing locations within the approximate vicinity of this site that have, from our records, experienced flooding. This has been provided to demonstrate the known flood risks within the vicinity which have been considered as part of our assessment on this enquiry.

We have also carried out a review of your application and can confirm the following:

Sewerage and Sewage Treatment

Northumbrian Water would ask that you please separate the foul and surface water flows in accordance with Part H of the Building Regulations prior to the final connection to the public sewer.

All new connections to the public sewerage system must first be approved through the Section 106 of the Water Industry Act 1991 process prior to construction.

Should you decide to proceed with this development, a fully completed Sewer Connection application form will be required. These are available to download from the following link:

<https://www.nwl.co.uk/services/developers/developer-sewerage-services/new-sewer-connections-s106/>

- Foul Water Discharge

The foul flows can discharge without restriction into the **225mm** diameter **combined** public sewer to the western boundary of the site via manhole **9303**.

- Surface Water Discharge

No surface water flow from the proposed development will be allowed to connect into the existing public sewerage system unless it is proven that the alternative options which are listed within Part H of the Building Regulations 2003 are not available:

Rainwater from a system provided pursuant to sub-paragraphs (1) or (2) shall discharge to one of the following, listed in order of priority –

(a) an adequate soakaway or some other adequate infiltration system; or, where that is not reasonably practicable,

(b) a watercourse; or, where that is not reasonably practicable,

(c) a sewer.

In this instance we have identified that the surface water flow should discharge directly to the watercourse to the west of Barrington Cottage. We therefore suggest that you contact either the Environment Agency or Lead Local Flood Authority, as appropriate, to discuss this in further detail.

Written approval for all individual connections (direct or indirect) to the public sewerage system should be obtained through the Section 106 process, following completion of the detailed drainage design and before the commencement of any drainage works on site.

- Protection of Existing Sewerage Assets

We wish to draw your attention to the existing sewer which passes through the site. This sewer could be diverted, protected or accommodated within your site layout with an appropriate easement.

Part H of the Building Regulations also details the reasons why Northumbrian Water does not permit buildings to be built over or near to its sewerage network:

- Undue risk in the event of failure of the drain or sewer
- Maintaining access
- Protection of the drain or sewer during construction
- Protection from settlement
- Protection against piling

To discuss the diversion of this asset in further detail, please contact:

Graeme Telford
0191 419 6620
graeme.telford@nwl.co.uk

To discuss the protection of this asset in further detail, please contact:

Niki Mather
0191 419 6603
07764 359220

- Sewage Treatment Capacity

The Sewage Treatment Works to which this development finally discharges to is able to accept the additional flows.

Please note that this response is valid for 1 year only and you should resubmit your proposals should this period lapse prior to your development beginning.

Should you require any further assistance or information, then please do not hesitate to contact me at developmentenquiries@nwl.co.uk or alternatively on 0191 419 6646, please quote our reference number above in any future correspondence.

Yours sincerely,

L. Roberts

Laura Roberts
Technical Support Advisor
Developer Services



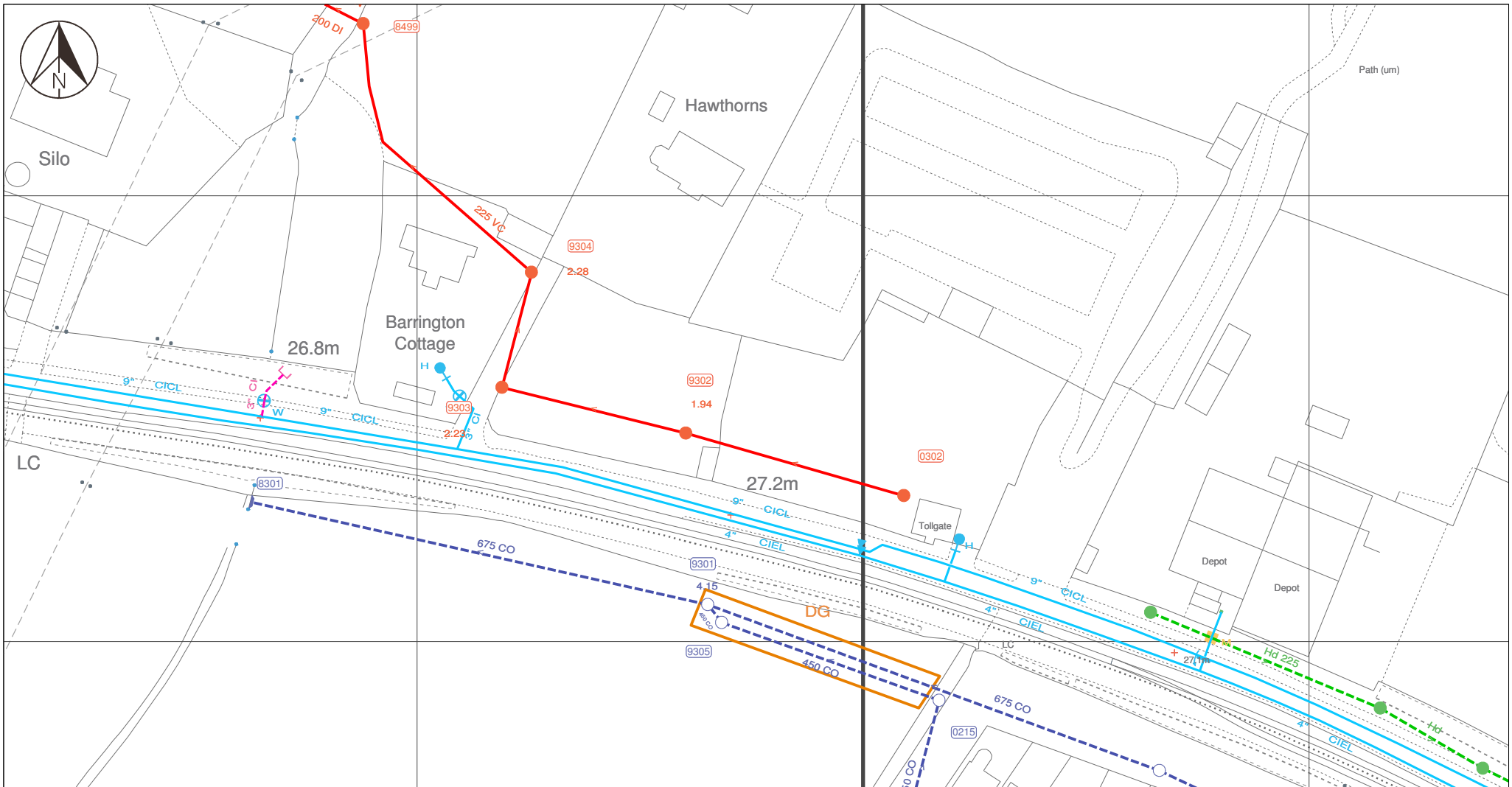
Waste Water -		NWL Responsibility		Private/Non NWL		Proposed		Water Network -		Network Types		AB Asbestos	
Combined	—	Combined	—	Combined	—	Combined	—	Distribution	—	AB Asbestos	—	AB Asbestos	—
Foul	—	Foul	—	Foul	—	Foul	—	Treated	—	Abandoned	—	Abandoned	—
Surface	—	Surface	—	Surface	—	Surface	—	Raw	—	Out of Comm	—	Out of Comm	—
Treated Eff	—	Treated Eff	—	Trade Eff	—	Trade Eff	—	Fire	—	Proposed	—	Proposed	—
Untreated Eff	—	Trade Eff	—	Watercourse	—	Watercourse	—	Supply	—				
Overflow	—	Watercourse	—					Private	—				

User : BOWMS
Title :

Date : 16/12/2021 14:28:04
Centre Point : 426976,583355

Map Sheet : NZ2683
Paper / Scale : A3@1:5015

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Waste Water -		NWL Responsibility		Private/Non NWL		Proposed		Water Network -		Network Types		AB Asbestos	
Combined	—	Combined	—	Combined	—	Combined	—	Distribution	—	Asbestos	—	Asbestos	—
Foul	—	Foul	—	Foul	—	Foul	—	Treated	—	Abandoned	—	Abandoned	—
Surface	—	Surface	—	Surface	—	Surface	—	Raw	—	Out of Comm	—	Out of Comm	—
Treated Eff	—	Treated Eff	—	Treated Eff	—	Treated Eff	—	Fire	—	Proposed	—	Proposed	—
Untreated Eff	—	Trade Eff	—	Trade Eff	—	Trade Eff	—	Supply	—				
Overflow	—	Watercourse	—	Watercourse	—	Watercourse	—	Private	—				



User : BOWMS

Date : 16/12/2021 14:27:26

Map Sheet : NZ2683SE

Title :

Centre Point : 426976,583355

Paper / Scale : A4@1:1250

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