

JONES HOMES

FOLDERS GROVE 2

**LAND REAR OF 96 FOLDERS LANE, BURGESS HILL,
WEST SUSSEX, RH15 0DX**

RESPONSE TO PLANNING CONDITION 22

**REPORT REF.
2501300-ACE-XX-XX-RP-C-TN02**

OCTOBER 2025

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Technical Note

SUBMISSION OF DISCHARGE OF CONDITIONS 22 PURSUANT TO APPLICATION

REF DM/23/0532

LAND TO THE REAR OF FOLDERS LANE, BURGESS HILL, WEST SUSSEX, RH15 0DX

This technical note has been produced by Ardent Consulting Engineers (Ardent) on behalf of Jones Homes for the development of the Land to the rear of Folders Lane, Burgess Hill, West Sussex, RH15 0DX and is to assist with the discharge of Planning Condition 22 as per the below:

Condition 22 is as follows:

Prior to commencement of development, in accordance with the submitted Flood Risk Assessment and Drainage Strategy 2104771-01C by Ardent, October 2024, Revision C and Dwg. 2104771-002 B Drainage Strategy, October 2024 detailed designs of a surface water drainage scheme incorporating the following measures shall be submitted to and agreed with the Local Planning Authority. The approved scheme will be implemented prior to the first occupation of the development. The scheme shall address the following matters:

I. Additional detailed infiltration testing in accordance with BRE Digest 365 (or equivalent) along the length and proposed depth of the proposed attenuation basin.

If infiltration is proven to be unfavourable then greenfield runoff rates will be attenuated to Q_{bar} 9.9 l/s as stated within section 6.7 of the FRA and Drainage Strategy.

II. Provision of surface water attenuation storage, sized and designed to accommodate the volume of water generated in all rainfall events up to and including the critical storm duration for the 3.33% and 1% annual probability rainfall events (both including allowances for climate change).

III. Detailed designs, modelling calculations using up to date parameters and plans of the of the drainage conveyance network in the:

- 3.33% annual probability critical rainfall event plus climate change to show no above ground flooding on any part of the site.*
- 1% annual probability critical rainfall plus climate change event to show, if any, the depth, volume and storage location of any above ground flooding from the drainage network ensuring that flooding does not occur in any part of a building or any utility plant susceptible to water (e.g. pumping station or electricity substation) within the development.*

IV. The design of the infiltration / attenuation basin will incorporate an emergency spillway and any drainage structures include appropriate freeboard allowances. Plans to be submitted showing the

routes for the management of exceedance surface water flow routes that minimise the risk to people and property during rainfall events in excess of 1% annual probability rainfall event.

V. Finished ground floor levels of properties are a minimum of 300mm above expected flood levels of all sources of flooding (including the ordinary watercourses, SuDS features and within any proposed drainage scheme) or 150mm above ground level, whichever is the more precautionary.

VI. Details of how all surface water management features to be designed in accordance with The SuDS Manual (CIRIA C753, 2015), including appropriate treatment stages for water quality prior to discharge.

The following information has been submitted in order to discharge this condition:

- Site Investigation – (**Appendix A**)
- 2501300-ACE-XX-XX-DR-C 1201 T01 Adoptable Drainage (Sheet 1) – (**Appendix B**)
- 2501300-ACE-XX-XX-DR-C 1202 T01 Adoptable Drainage (Sheet 2) – (**Appendix B**)
- 2501300-Hydraulic Calcs – (**Appendix C**)
- 2501300-ACE-XX-XX-DR-C 1221 T01 P2 DRY BASIN AND TYPICAL SECTIONS – (**Appendix D**)
- 2501300-ACE-XX-XX-DR-C 1241 T01 Adoptable Drainage Construction Details (Sheet 1) – (**Appendix E**)
- 2501300-ACE-XX-XX-DR-C 1241 T01 Adoptable Drainage Construction Details (Sheet 2) – (**Appendix E**)

Clause I

Jones Homes have undertaken Site Investigations on site, by Jomas Associates Ltd on 3rd April 2024, including water infiltration testing in accordance with BRE365. This testing shows that the site is impermeable and as such further testing is not required as the ground strata does not lend itself to infiltration. See the site investigations undertaken for the site within **Appendix A**. Based upon this it is proposed to use the Qbar greenfield attenuated runoff rate of 9.9 l/s for the proposed surface water discharge rate.

Clause II

Evidence of the site attenuation and surface water flow routes are demonstrated on the Drainage Layout Plan (**Appendix B**) with a Primary Dry Detention Basin as well as an area of permeable paving to the north to accommodate the apartments and associated car park area, with all surface water restricted to a discharge of 9.9l/s for up to a 1 in 100yr storm event with 45% climate change allowance. Further to this, hydraulic calculations have been provided in **Appendix C**. The suitable attenuation has been designed to allow for a 1 in 100yr event with 45% climate change condition as

well as a 1 in 30 year event. Hydraulic Calculations show there is to be no flooding on site due to surface water.

Clause III

Detailed drainage designs have been provided on the Drainage Layout Plan (**Appendix B**) and Hydraulic Calculations (**Appendix C**). These designs have been modelled using Causeway Flow software with a 3.3% (1 in 30yr) annual event + climate change, as well as a 1% (1 in 100yr) annual event + Climate Change. No above ground flooding occurs throughout the network based on the parameters used.

Clause IV

The detention basin has been sized to accommodate a 1 in 100yr event + 45% climate change allowance and a 300mm freeboard and to ensure that no flooding will occur. Further a small spillway has been allowed above the freeboard level to direct water during larger storm events above the 1 in 100yr event towards the adjacent road, for it to then travel along the road and to the ditch to the north of the site.

Ardent have undertaken the below calculations to determine the spillway width. Note that the top of basin level is designed to be a minimum of 60mm above the spillway level and for the spillway to discharge at the downstream hydro brake rate, 5.4 l/s, in case the hydro brake became blocked.

$$Q = C \cdot L \cdot H^{1.5}$$

Where:

Q = Flow m³/s = 5.4l/s = 0.0054m³/s

C = the coefficient for grass = 1.6

L = the spillway crest length (m)

H = the head above the spillway crest (m) = 0.06m

$$L = Q / C \cdot H^{1.5}$$

$$L = 0.0054 / 1.6 \times 0.06^{1.5}$$

L = 0.23m, this figure is too small to be either practical or safe and therefore we would recommend a minimum Spillway width of 500mm as demonstrated on drawing 2501300-ACE-XX-XX-DR-C-1221 (**Appendix D**).

The Drainage Layout Plan (**Appendix B**) and The P2 Dry Detention Basin Layout Drawing (**Appendix D**) also demonstrate that the surface water exceedance flow routes are to be contained within the carriageway and away from any residential dwelling.

Clause V

The surface water system has been designed in a way such that it does not flood in a 1 in 100 year + climate change event. Any adjacent watercourses to the site will need to be assessed on individual basis (on site) to ensure that FFLs are 300mm (min) above these levels.

Clause VI

Evidence that the SuDS manual (CIRIA C753, 2015) has been followed to design the SuDS features has been demonstrated on the provided construction details in **Appendix D and Appendix E** as well as in the original Flood Risk Assessment that was submitted previously – 2104771-01C Flood Risk Assessment.

Appendix A

GEO-ENVIRONMENTAL DESK STUDY / PRELIMINARY RISK ASSESSMENT REPORT

FOR

**FOLDERS LANE
(EASTERN PLOT)
BURGESS HILL
RH15 0DR**



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APPENDIX 5 – LOCAL AUTHORITY CORRESPONDENCE

EXECUTIVE SUMMARY

Emerson ('The client') commissioned Jomas Associates Ltd to undertake a geo-environmental desk study at Folders Lane (Eastern Plot), Burgess Hill, RH15 0DR. The principal objectives of the study were as follows:

- To determine the nature and where possible the extent of contaminants potentially present at the site;
- To establish the presence of significant contaminant linkages, in accordance with the procedures set out within the Environment Agency (EA) report R&D CLR11 and relevant guidance within the National Planning Policy Framework (NPPF);
- To assess whether the site is safe and suitable for the purpose for which it is intended, or can be made so by remedial action.
- To identify and assess potential geotechnical issues that may affect the site.

It should be noted that the table below is an executive summary of the findings of this report and is for briefing purposes only. Reference should be made to the main report for detailed information and analysis.

Desk Study	
Current Site Use	Undeveloped land.
Proposed Site Use	Assumed to be a new residential development with private gardens and associated roadways.
Site History	A review of historical maps indicates that the site on the earliest available plan (1874) consisted of undeveloped potentially agricultural land, with trees located along its perimeter. Two small buildings located in the north west corner of site developed in 1937 were later removed by 1974. No changes on site are noted to present day. A review of the historical site vicinity indicates that on the earliest available plan (1874) the surrounding area within 500m was predominantly undeveloped agricultural land, with small associated farm houses. A rail track is located 20m NE from site orientated NW to SE, this feature is in the same present day configuration. Industrial buildings area located directly NE of site is noted in 1937 as a textile factory, changing to a workshop in 1954, and a chapel in 1984. The surrounding area shows consistent minor residential development within 500m, with more larger scale developments noted in 1984 and 2010.
Site Setting	The British Geological Survey indicates that the site is directly underlain by solid deposits of the Weald Clay Formation. No artificial deposits are reported within the site boundary. There are no superficial deposits underlying the site. A Secondary (A) aquifer is located in the southern area of site within the solid deposits underlying the site. A review of the EnviroInsight Report indicates that there are no source protection zones within 500m of the site. There are no groundwater or potable water abstractions reported within 1km of the site. 2No surface water abstractions are reported, the nearest entry is located 350m west of site. There are no Environment Agency Zone 2 or 3 floodplains reported within 500m of the site.
Potential Sources	• Potential for Made Ground associated with previous development operations – on site (S1) • Current and previous industrial use – off site (S2)

Desk Study	
Potential Receptors	• Construction workers (R1) • Maintenance workers (R2) • Neighbouring site users (R3) • Future site users (R4) • Building foundations and on site buried services (water mains, electricity and sewer) (R5) • Controlled waters - secondary A aquifer (R6), surface waters
Preliminary Risk Assessment	The risk estimation matrix indicates a moderate to low risk as defined above. It is assumed that the proposed development comprises of the development of residential buildings with private gardens and associated roadways. A review of historical maps indicates that the site on the earliest available plan (1874) consisted of undeveloped potentially agricultural land, with trees located along its perimeter. Two small buildings located in the north west corner of site developed in 1937 were later removed by 1974. No changes on site are noted to present day. A review of the historical site vicinity indicates that on the earliest available plan (1874) the surrounding area within 500m was predominantly undeveloped agricultural land, with small associated farm houses. A rail track is located 20m NE from site orientated NW to SE, this feature is in the same present day configuration. Industrial buildings area located directly NE of site is noted in 1937 as a textile factory and laundry. Site use of the textile factory changes to a workshop in 1954, further changing to a chapel in 1984. The surrounding area shows consistent minor residential development within 500m, with more larger scale developments noted in 1984 and 2010. It is recommended that an intrusive investigation is undertaken to clarify potential risks to the identified receptors, and assess the extent of made ground soils present at the site. A preliminary investigation may comprise a series of window sampler holes or trial pits. No significant on and off-site sources of potential ground gases has been identified by the desk study, and therefore risks associated with ground gases are considered to be low. However, if significant thickness of made ground soils are encountered on site, ground gas monitoring may be required.
Potential Geological Hazards	The Groundsure data identifies moderate to low risks – for full details see Section 4 In addition, the GeoInsight report notes the following: 7No historical underground working features are reported within 1km of the site. No historical surface ground working features are reported within 1km of the site. No BGS Current Ground Working Features are reported within 1km of the site. A ground investigation is recommended.

1 INTRODUCTION

1.1 Terms of Reference

1.1.1 Emerson ("The Client") has commissioned Jomas Associates Ltd, to assess the risk of contamination posed by the ground conditions at a site referred to as the Folders Lane, (Eastern Plot), prior to redevelopment of the site.

1.1.2 To this end a desk based assessment has been undertaken in accordance with Jomas Associates Limited's email proposal dated 24th January 2018.

1.2 Proposed Development

1.2.1 Jomas Associates have not been provided with any proposed development plans. However, for the purpose of this report, the proposed development is assumed to be new residential properties with private gardens and associated roadways.

1.2.2 For the purposes of the contamination risk assessment, the proposed development is classified as 'Residential with plant uptake'.

1.2.3 For the purpose of geotechnical assessment, it is considered that the project could be classified as a Geotechnical Category (GC) 2 site in accordance with BS EN 1997 Part 1. GC 2 projects are defined as involving:

- Conventional structures.
- Quantitative investigation and analysis.
- Normal risk.
- No difficult soil and site conditions.
- No difficult loading conditions.
- Routine design and construction methods.

1.2.4 This will be reviewed at each stage of the project

1.3 Objectives

1.3.1 The objectives of Jomas Associates Limited's investigation were as follows:

- To present a description of the present site status, based upon the published geology, hydrogeology and hydrology of the site and surrounding area;
- To review readily available historical information (i.e., Ordnance Survey maps and database search information) for the site and surrounding areas, with respect to potentially contaminative land uses;
- To provide an assessment of the environmental sensitivity at the site and the surrounding area, in relation to any suspected or known contamination which may significantly affect the site and the proposed development;
- To assess the potential presence of significant pollutant linkages, in accordance with the procedures set out within Part IIA of the Environmental Protection Act 1990, associated statutory guidance and current best practice including the EA report R&D CLR 11;
- To identify and assess geotechnical issues that may affect the site.

1.4 Scope of Works

1.4.1 The following tasks were undertaken to achieve the objectives listed above:

- A walkover survey of the site;
- A desk study, which included the review of third party reports (attached in Appendix 2 and Appendix 3);
- The compilation of this report, which collects and discusses the above data, and presents an assessment of the site conditions, conclusions and recommendations.

1.5 Supplied Documentation

1.5.1 Jomas Associates were not supplied with any previously produced reports specifically for this site at the time of writing this report.

1.6 Limitations

1.6.1 Jomas Associates Ltd has prepared this report for the sole use of Emerson in accordance with the generally accepted consulting practices and for the intended purposes as stated in the agreement under which this work was completed. This report may not be relied upon by any other party without the explicit written agreement of Jomas Associates Limited. No other third party warranty, expressed or implied, is made as to the professional advice included in this report. This report must be used in its entirety.

1.6.2 The records search was limited to information available from public sources; this information is changing continually and frequently incomplete. Unless Jomas Associates Limited has actual knowledge to the contrary, information obtained from public sources or provided to Jomas Associates Limited by site personnel and other information sources, have been assumed to be correct. Jomas Associates Limited does not assume any liability for the misinterpretation of information or for items not visible, accessible or present on the subject property at the time of this study.

1.6.3 Whilst effort has been made to ensure the accuracy of the data supplied, and analysis derived from it, there may be conditions at the site that have not been disclosed by the investigation, and could not therefore be taken into account. As with any site, there may be differences in soil conditions between exploratory hole positions. Furthermore, it should be noted that groundwater conditions may vary due to seasonal and other effects and may at times be significantly different from those measured by the investigation. No liability can be accepted for any such variations in these conditions.

1.6.4 The GroundSure data referred to in the in the body of this report is associated with the land plot directly west of the site. Due to this, all referred to distances, locations and features identified within the site vicinity should be taken as approximates.

1.6.5 Any reports provided to Jomas Associates Limited have been reviewed in good faith. Jomas Associates Limited cannot be held liable for any errors or omissions in these reports, or for any incorrect interpretation contained within them.

1.6.6 This investigation and report has been carried out in accordance with the relevant standards and guidance in place at the time of the works. Future changes to these may require a re-assessment of the recommendations made within this report.

1.6.7 ***This report is not an engineering design and the figures and calculations contained in the report should be used by the Structural Engineer, taking note that variations may apply, depending on variations in design loading, in***

techniques used, and in site conditions. Our recommendations should therefore not supersede the Engineer's design.

2 SITE SETTING

2.1 Site Information

2.1.1 The site location plan is appended to this report in Appendix 1.

Table 2.1: Site Information

Name of Site	Folders Lane (Eastern Plot)
Address of Site	Folders Lane Burgess Hill RH15 0DR
Approx. National Grid Ref.	533000, 118000
Site Area (Approx)	0.50ha
Site Occupation	Undeveloped land / agricultural
Local Authority	Mid Sussex District Council
Proposed Site Use	Assumed residential with private gardens and associated roadways

2.2 Walkover Survey

2.2.1 A site walkover survey was undertaken by Jomas Associates on 3rd January 2018.

Table 2.2: Site Description

Area	Item	Details
On-site:	Current Uses:	Site consists of a medium-sized agricultural field currently kept as grass covered. No structures were observed on site. There is a public footpath adjacent to the western site boundary.
	Evidence of historic uses:	There was no evidence of historic uses of the site.
	Surfaces:	All of site is grass covered.
	Vegetation:	No trees are located within the site boundary, however numerous mature trees (Oak, Ash and Birch) are located along the perimeter of the site. All vegetation observed on site appeared in healthy condition, exhibiting no evidence of distress.
	Topography/Slope Stability:	Overall the site is flat. A slight downward slope to the south was observed.
	Drainage:	The ground appears to be slow draining, several 'boggy' areas with standing water observed at the surface.
	Services:	No services observed on site.
	Controlled waters:	No controlled waters observed on site.

Area	Item	Details
	Tanks:	No tanks observed on site.
Neighbouring land:	North:	Residential
	East:	Agricultural land
	South:	Residential and Winery
	West:	Agricultural land

2.2.2 Key features noted during the walkover are shown on a site walkover plan, together with site photos, in Appendix 1.

2.3 Anecdotal Information

2.3.1 Jomas Associates were not provided with any anecdotal information during site visit.

2.4 Historical Mapping Information

2.4.1 The historical development of the site and its surrounding areas was evaluated following the review of a number of Ordnance Survey historic maps, procured from GroundSure, and provided in Appendix 3 of this report.

2.4.2 The GroundSure data referred to in the historical development is associated with the land plot directly west of the site. Due to this, all referred to distances and locations for the following features within the site vicinity should be taken as approximates.

2.4.3 A summary produced from the review of the historical map is given in Table 2.3 below. Distances are taken from the site boundary.

Table 2.3: Historical Development

Dates and Scale of Map	Relevant Historical Information	
	On Site	Off Site
1874 – 1:2,500 1:10,560	Undeveloped land with trees located along the perimeter of site.	Rail track located 20m road NE orientated SE to NW. Small buildings located directly south in 'Fragbarrow' along with an associated well. Folders lane main road directly north of site orientated east to west. Majority of the surrounding area is undeveloped agricultural land within 500m, consisting of small farms and associates houses/buildings. The area of Burgess Hill is located 1km NW of site.
1897 – 1:2,500 1:10,560	No significant changes.	Small pond feature located directly south. Well previously located south no longer noted. No other significant changes noted within 500m.

Dates and Scale of Map	Relevant Historical Information	
	On Site	Off Site
1910/11 1:2,500 1:10,560	No significant changes.	Fishpond located 400m NE of site. Minor development of farmhouses within 500m, no other significant changes noted.
1937 – 1:2,500	Small building unit developed in north part of site.	Textile factory located directly east of site. Laundry located directly NE of site, other side of Burgess Hill main road. Two detached buildings with rear gardens developed in land plot directly east of site. Pond located 10m south of site in adjacent field. Large 'Barnside Farm' development 20m NW. Residential development along Burgess Hill main road, consisting of single detached buildings and associates gardens within 150m.
1954/62 – 1:2,500	Small building located in north has been removed.	Former textile factory now identified as a workshop . Identity of the laundry has changed to 'Folders Farm'. Development of buildings and ponds in 'Frag Barrow' directly south of site. Continued residential development along folders lane.
1974/78 – 1:2,500 1:10,000	No significant changes, site appears to be in current day configuration.	Minor residential development noted along Folders Lane. No other significant changes noted.
1984 – 1:10,000	No significant changes.	Very large residential development of Burgess Hill area between 250-750m NW of site boundary. Workshop is now identified as a chapel. No other significant changes noted.
2002/10/14 1:10,000	No significant changes.	Continued residential building development along folders lane west of site. Residential development of Sycamore drive directly north of site.

Potentially polluting/contaminating uses/activities shown in **bold**

- 2.4.4 An aerial photograph supplied as part of the GroundSure EnviroInsight report and taken in 2012 generally appears to confirm the comments made regarding the site and surrounding area for that period.

2.5 Industrial and Statutory Consents

- 2.5.1 The Groundsure EnviroInsight Report also provides information on various statutory and industrial consents on and in the vicinity of the site. The following section summarises the information collected from the available sources.

- 2.5.2 Where the identified features have appeared on more than one map they have been counted multiple times and therefore the reported numbers are higher than the actual count.

- 2.5.3 The GroundSure data referred to in the industrial and statutory consents is associated with the land plot directly west of the site. Due to this, all referred to distances and locations for the following features within the site vicinity should be taken as approximates.

Table 2.5: Industrial and Statutory Consents

Type of Consent/Authorisation	On site	Off-site (within 500m of site, unless stated otherwise)	Potential to Impact Site*
Discharge Consents.	None	15no reported, nearest entry 190m NW.	X
Water Industry Act Referrals	None	None reported within 500m of site.	X
Red List Discharges	None	None reported within 500m of site.	X
List 1 and List 2 Dangerous Substances	None	None reported within 500m of site.	X
Control of Major Accident Hazards (COMAH) and Notification of Installations Handling Hazardous Substances (NIHHS) Sites.	None	None reported within 500m of site.	X
Planning Hazardous Substance Consents	None	None reported within 500m of site.	X
Category 3 or 4 Radioactive substances Authorisations	None	None reported.	X
Pollution Incidents (List 2).	None	1No reported, atmospheric pollutants and effects (2003) located 207m east.	X
Pollution Incidents (List 1)	None	None reported within 500m of site.	X
Contaminated Land Register Entries and Notices.	None	None reported within 500m of site.	X
Registered Landfill Sites.	None	None reported within 500m of site.	X
Waste Treatment and/or Transfer Sites.	None	None reported within 500m of site.	X
Fuel Station Entries	None	None reported within 500m of site.	X
Current Industrial Site Data.	None	4No reported, nearest entry, tank (generic) located 90m south. Other entries include winery located 140m south.	X

* From a land contamination perspective

2.6 Previous Site Investigations

- 2.6.1 Jomas Associates are not aware of any previous site investigations undertaken at this site prior to this desk study.
- 2.6.2 Jomas Associates have recently undertaken an intrusive ground investigation at an adjacent site to the west. No significant ground contamination issues were identified.

2.7 Local Authority Information

2.7.1 Jomas have made a request to Mid Sussex District Council for information relating to contamination on the site and surrounding areas. A copy of the correspondence included in Appendix 6.

2.7.2 A response is pending.

2.8 Planning Information

2.8.1 A review of the local authority's planning portal was undertaken on 2nd February 2018 at <https://pa.midsussex.gov.uk/online-applications/>.

2.8.2 Although several applications were identified in the vicinity of site no documents containing useful information regarding ground conditions or potential contamination were identified.

2.9 Unexploded Ordnance

2.9.1 Publicly available information has been assessed regarding the risk of Unexploded Ordnance affecting the site.

2.9.2 The initial data indicates that there is a low risk. For obvious reasons no location can be given a "no" risk. No feature was identified during the historical map review that would suggest that the site or its surroundings had been subject to large scale high explosive or incendiary bombardment and would therefore not alter this assessment.

2.9.3 Nevertheless, a watching brief should be maintained during below ground works, with site personnel made aware that there remains a potential, if negligible, risk of unexploded ordnance, any suspicious item uncovered during site works should be reported immediately.

2.9.4 This does not comprise a full UXO risk assessment.

3 GEOLOGICAL & ENVIRONMENTAL SETTING

- 3.1.1 The following section summarises the principal environmental resources (geological, hydrogeological and hydrological) of the site and its surroundings.
- 3.1.2 The data discussed herein is generally based on the information given within the EnviroInsight Report and published information provided by the Environment Agency and British Geological Survey.
- 3.1.3 The GroundSure data referred to in the hydrogeology and hydrology is associated with the land plot directly west of the site. Due to this, all referred to distances and locations for the following features within the site vicinity should be taken as approximates.

3.2 Solid and Drift Geology

- 3.2.1 Information provided by the British Geological Survey indicates that the site is directly underlain by solid deposits of the Weald Clay Formation - mudstone.
- 3.2.2 The BGS describes the Weald Clay Formation as consisting of
"Dark grey thinly-bedded mudstones (shales) and mudstones with subordinate siltstones, fine- to medium-grained sandstones, including calcareous sandstone (e.g. Horsham Stone Member), shelly limestones (the so called "Paludina Limestones") and clay ironstones.
- 3.2.3 The BGS mapping also indicates that a band of sandstone (part of the Weald Clay Formation) outcrops across the southern end of the site.
- 3.2.4 Site investigations by Jomas at an adjacent site to the west has encountered a superficial thickness of topsoil and made ground overlying deposits of the Weald Clay, comprising clay and mudstone to a maximum depth of the investigation at 15m bgl.

3.3 British Geological Survey (BGS) Borehole Data

- 3.3.1 As part of the assessment, no publicly available BGS records for exploratory holes undertaken were reviewed, as none were located within 250m of the site boundary.

3.4 Hydrogeology & Hydrology

- 3.4.1 General information about the hydrogeology of the site was obtained from the EnviroInsight and/or Environment Agency website.

Groundwater Vulnerability

- 3.4.2 Since 1 April 2010, the EA's Groundwater Protection Policy uses aquifer designations that are consistent with the Water Framework Directive. This comprises;
- **Secondary A** - permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers;
 - **Secondary B** - predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.

- **Secondary Undifferentiated** - has been assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.
- **Principal Aquifer** – this is a formation with a high primary permeability, supplying large quantities of water for public supply abstraction.
- **Unproductive Strata** - These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

Source Protection Zones (SPZ)

3.4.3 In terms of aquifer protection, the EA generally adopts a three-fold classification of SPZs for public water supply abstraction wells.

- Zone I - or 'Inner Protection Zone' is located immediately adjacent to the groundwater source and is based on a 50-day travel time. It is designed to protect against the effects of human activity and biological/chemical contaminants that may have an immediate effect on the source.
- Zone II - or 'Outer Protection Zone' is defined by a 400-day travel time to the source. The travel time is designed to provide delay and attenuation of slowly degrading pollutants.
- Zone III - or 'Total Catchment' is the total area needed to support removal of water from the borehole, and to support any discharge from the borehole.

Hydrology

3.4.4 The hydrology of the site and the area covers water abstractions, rivers, streams, other water bodies and flooding.

3.4.5 The Environment Agency defines a floodplain as the area that would naturally be affected by flooding if a river rises above its banks, or high tides and stormy seas cause flooding in coastal areas.

3.4.6 There are two different kinds of area shown on the Flood Map for Planning. They can be described as follows:

Areas that could be affected by flooding, either from rivers or the sea, if there were no flood defences. This area could be flooded:

- from the sea by a flood that has a 0.5 per cent (1 in 200) or greater chance of happening each year;
- or from a river by a flood that has a 1 per cent (1 in 100) or greater chance of happening each year.

(For planning and development purposes, this is the same as Flood Zone 3, in England only.)

- The additional extent of an extreme flood from rivers or the sea. These outlying areas are likely to be affected by a major flood, with up to a 0.1 per cent (1 in 1000) chance of occurring each year.

(For planning and development purposes, this is the same as Flood Zone 2, in England only.)

- 3.4.7 These two areas show the extent of the natural floodplain if there were no flood defences or certain other manmade structures and channel improvements.
- 3.4.8 Outside of these areas flooding from rivers and the sea is very unlikely. There is less than a 0.1 per cent (1 in 1000) chance of flooding occurring each year. The majority of England and Wales falls within this area. (For planning and development purposes, this is the same as Flood Zone 1, in England only.)
- 3.4.9 Some areas benefit from flood defences and these are detailed on Environment Agency mapping.
- 3.4.10 Flood defences do not completely remove the chance of flooding, however, and can be overtopped or fail in extreme weather conditions.

Table 3.1: Summary of Hydrogeology & Hydrology

Feature		On Site	Off Site	Potential Receptor?
Aquifer	Superficial:	None	Secondary (A) and Secondary Undifferentiated 150m west of site.	X
	Solid:	Secondary (A) located in southern area of site – associated with sandstone band	Secondary (A) and Unproductive located within 400m of site.	✓
Source Protection Zone		None	None located within 500m of site.	X
Abstractions	Ground water	None	None located within 2km of site.	X
	Surface water	None	2No reported, nearest entry located 350m west.	X
	Potable	None	None located within 2km of site.	X
Surface Waters		Tertiary river located along northern and southern boundary of site.	Secondary and Tertiary rivers located within 250m of site. Primary river located 400m NW.	✓
Flood Risk	EA Flood Zone 2	No	None located within 500m of site.	X
	EA Flood Zone 3	No	None located within 500m of site.	X
	Flood Defences	There are no areas benefiting from Flood Defences within 250m of the study site.		-
	BGS	N/A		-

3.5 Sensitive Land Uses

- 3.5.1 The site is located within a Nitrate Vulnerable Zone as identified by DEFRA.
- 3.5.2 A Nitrate Vulnerable Zone (NVZ) is a conservation designation of the Environment Agency for areas of land that drain into nitrate polluted waters, or waters which could become polluted by nitrates. Nitrate Vulnerable Zones were introduced by the UK government in response to the EU mandate that all EU countries must reduce the nitrate in Drinking Water to a maximum of 50 mg/l.
- 3.5.3 The NVZs cover large areas of land that have been identified as exceeding or being at risk of exceeding 50 mg NO₃/l.
- 3.5.4 1No national park is located approximately 150m south of the site boundary, identified as the 'South Downs', data source Natural England.
- 3.5.5 1No Site of Special Scientific Interest (SSSI) is located 300m east, identified as 'Ditchling Common', data source Natural England.
- 3.5.6 No other sensitive land use was identified within 500m of the site.

3.6 Radon

- 3.6.1 As reported, the site is not within a Radon affected area, as less than 1% of properties are above the action level.
- 3.6.2 Consequently, no radon protective measures are necessary in the construction of new dwellings or extensions as described in publication BR211 (BRE, 2007).

4 POSSIBLE GEOLOGICAL HAZARDS

4.1 Database Information Review

4.1.1 The following are brief findings extracted from the GroundSure GeolInsight Report, that relate to factors that may have a potential impact upon the engineering of the proposed development.

4.1.2 The GroundSure data referred to in the geological hazards is associated with the land plot directly west of the site. Although the following details are not specific to site, the underlying geology is consistent with the adjacent land plot that the data has been derived from. Therefore, the following interpretations have been made.

Table 4.1: Geological Hazards

Potential Hazard	Site check Hazard Rating	Details	Further Action Required?
Shrink swell	Low	Ground conditions predominantly medium plasticity. Do not plant trees with high soil moisture demands near to buildings. For new build, consideration should be given to advice published by the National House Building Council (NHBC) and the Building Research Establishment (BRE). There is a possible increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a possible increase in insurance risk, especially during droughts or where vegetation with high moisture demands is present.	Yes
Landslides	Very low	Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.	No
Ground dissolution soluble rocks	Negligible	Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.	No
Compressible deposits	Negligible	No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.	No
Collapsible Rock	Very low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or	No

SECTION 4
POSSIBLE GEOLOGICAL HAZARDS



Potential Hazard	Site check Hazard Rating	Details	Further Action Required?
		increased financial risk due to potential problems with collapsible deposits.	
Running sand	Negligible	No indicators for running sand identified. No special actions required to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.	No
Coal mining	No	No coal mining areas reported within 75m of the study site.	No
Shallow mine workings	Low	Data searched within 150m of the study site.	No
Brine affected areas	No	No brine affected areas reported within 75m of the study site.	No

- 4.1.3 In addition, the GeolInsight report notes the following:
- 7 No. historical surface ground working features are reported within 250m of the site. Nearest reported, pond located 5m south. Other entries include cuttings 136m east.
 - No historical underground working features are reported within 1km of the site.
 - No BGS Current Ground Working Features are reported within 1km of the site.
- 4.1.4 Although soluble rocks are noted to exist beneath the site these are considered to be the underlying chalk and are not considered to pose a significant risk.
- 4.1.5 A geotechnical investigation is recommended to inform foundation design.

5 QUALITATIVE RISK ASSESSMENT

5.1 Legislative Framework

5.1.1 A qualitative risk assessment has been prepared for the site, based on the information collated. This highlights the potential sources, pathways and receptors. Intrusive investigations will be required to confirm the actual site conditions and risks.

5.1.2 Under Part IIA of the Environmental Protection Act 1990, the statutory definition of contaminated land is:

"land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that:

(a) significant harm is being caused or there is a significant possibility of such harm being caused; or

(b) significant pollution of controlled waters is being caused, or there is significant possibility of such pollution being caused."

5.1.3 The Statutory Guidance provided in the DEFRA Circular 04/2012 lists the following categories of significant harm to **human health**:

- death; life threatening diseases (e.g. cancers); other diseases likely to have serious impacts on health; serious injury; birth defects; and impairment of reproductive functions.

5.1.4 Other health effects may also be considered by the local authority to constitute significant harm with a wide range of conditions that may or may not constitute significant harm (alone or in combination) including: physical injury; gastrointestinal disturbances; respiratory tract effects; cardio-vascular effects; central nervous system effects; skin ailments; effects on organs such as the liver or kidneys; or a wide range of other health impacts.

5.1.5 In deciding whether or not land is contaminated land on grounds of significant possibility of significant harm to human health there are four categories to be considered. Categories 1 and 2 would encompass land which is capable of being determined as contaminated land on grounds of significant possibility of significant harm to human health. Categories 3 and 4 would encompass land which is not capable of being determined on such grounds.

5.1.6 For non-human receptors the following types of harm should be considered to be significant harm:

Ecological System Effects

- Harm which results in an irreversible adverse change, or in some other substantial adverse change, in the functioning of the ecological system within any substantial part of that location; or
- Harm which significantly affects any species of special interest within that location and which endangers the long-term maintenance of the population of that species at that location.
- In the case of European sites, harm should also be considered to be significant harm if it endangers the favourable conservation status of natural habitats at such locations or species typically found there. In deciding what constitutes such harm, the local authority should have regard to the advice of Natural England and to the requirements of the Conservation of Habitats and Species Regulations 2010.

Property Effects

- Crops: A substantial diminution in yield or other substantial loss in their value resulting from death, disease or other physical damage. For domestic pets, death, serious disease or serious physical damage. For other property in this category, a substantial loss in its value resulting from death, disease or other serious physical damage.
- Buildings: Structural failure, substantial damage or substantial interference with any right of occupation. The local authority should regard substantial damage or substantial interference as occurring when any part of the building ceases to be capable of being used for the purpose for which it is or was intended. In the case of a scheduled Ancient Monument, substantial damage should also be regarded as occurring when the damage significantly impairs the historic, architectural, traditional, artistic or archaeological interest by reason of which the monument was scheduled.

5.1.7 Contaminated land will only be identified when a 'pollutant linkage' has been established.

5.1.8 A 'pollutant linkage' is defined in Part IIA as:

"A linkage between a contaminant Source and a Receptor by means of a Pathway".

5.1.9 Therefore, this report presents an assessment of the potential pollutant linkages that may be associated with the site, in order to determine whether additional investigations are required to assess their significance.

5.1.10 In accordance with the National Planning Policy Framework, where development is proposed, the developer is responsible for ensuring that the development is safe and suitable for use for the purpose for which it is intended, or can be made so by remedial action. In particular, the developer should carry out an adequate investigation to inform a risk assessment to determine:

- whether the land in question is already affected by contamination through source – pathway – receptor pollutant linkages and how those linkages are represented in a conceptual model;
- whether the development proposed will create new linkages, e.g. new pathways by which existing contaminants might reach existing or proposed receptors and whether it will introduce new vulnerable receptors; and
- what action is needed to break those linkages and avoid new ones, deal with any unacceptable risks and enable development and future occupancy of the site and neighbouring land.

5.1.11 A potential developer will need to satisfy the Local Authority that unacceptable risk from contamination will be successfully addressed through remediation without undue environmental impact during and following the development.

5.2 Conceptual Site Model

5.2.1 On the basis of the information summarised above, a conceptual site model (CSM) has been developed for the site. The CSM is used to guide the investigation activities at the site and identifies potential contamination sources, receptors (both on and off-site) and exposure pathways that may be present. The identification of such potential "pollutant linkages" is a key aspect of the evaluation of potentially contaminated land.

5.2.2 The site investigation is then undertaken in order to prove or disprove the presence of these potential source-pathway-receptor linkages. Under current legislation an

environmental risk is only deemed to exist if there are proven linkages between all three elements (source, pathway and receptor).

5.2.3 This part of the report lists the potential sources, pathways and receptors at the site, and assesses based on current and future land use, whether pollution linkages are possible.

5.2.4 Potential pollutant linkages identified at the site are detailed below:

Table 5.1: Potential Sources, Pathways and Receptors

Source(s)	Pathway(s)	Receptor(s)
- Potential for Made Ground associated with previous development operations – on site (S1) - Current and previous industrial use – off site (S2)	- Ingestion and dermal contact with contaminated soil (P1) - Inhalation or contact with potentially contaminated dust and vapours (P2) - Leaching through permeable soils, migration within the vadose zone (i.e., unsaturated soil above the water table) and/or lateral migration within surface water, as a result of cracked hardstanding or via service pipe/corridors and surface water runoff. (P3) - Horizontal and vertical migration of contaminants within groundwater (P4) - Accumulation and Migration of Soil Gases (P5) - Permeation of water pipes and attack on concrete foundations by aggressive soil conditions (P6)	- Construction workers (R1) - Maintenance workers (R2) - Neighbouring site users (R3) - Future site users (R4) - Building foundations and on site buried services (water mains, electricity and sewer) (R5) - Controlled waters - secondary A aquifer (R6), surface waters

5.3 Qualitative Risk Estimation

5.3.1 Based on information previously presented in this report, a qualitative risk estimation was undertaken.

5.3.2 For each potential pollutant linkage identified in the conceptual model, the potential risk can be evaluated, based on the following principle:

Overall contamination risk = Probability of event occurring x Consequence of event occurring

5.3.3 In accordance with CIRIA C552, the consequence of a risk occurring has been classified into the following categories:

- Severe
- Medium
- Mild

- Minor

5.3.4 The probability of a risk occurring has been classified into the following categories:

- High Likelihood
- Likely
- Low Likelihood
- Unlikely

5.3.5 This relationship can be represented graphically as a matrix (Table 5.2).

Table 5.2: Overall Contamination Risk Matrix

		Consequence			
		Severe	Medium	Mild	Minor
Probability	High Likelihood	Very High Risk	High Risk	Moderate Risk	Low Risk
	Likely	High Risk	Moderate Risk	Moderate Risk	Low Risk
	Low Likelihood	Moderate Risk	Moderate Risk	Low Risk	Very Low Risk
	Unlikely	Low Risk	Low Risk	Very Low Risk	Very Low Risk

5.3.6 The risk assessment process is based on guidance provided in CIRIA C552 (2001) *Contaminated Land Risk Assessment – A Guide to Good Practice*. Further information including definitions of descriptive terms used in the risk assessment process is included in Appendix 4.

5.3.7 The degree of risk is based on a combination of the potential sources and the sensitivity of the environment. The risk classifications can be cross checked with reference to Table A4.4 in Appendix 4.

5.3.8 Hazard assessment was also carried out, the outcome of which could be:

- Urgent Action (UA) required to break existing source-pathway-receptor link.
- Ground Investigation (GI) required to gather more information
- Watching Brief there is no evidence of potential contamination but the possibility of it exists and so the site should be monitored for local and olfactory evidence of contamination.
- No action required (NA)

5.3.9 The preliminary risk assessment for the site is presented in Table 5.3 below.

SECTION 5
QUALITATIVE RISK ASSESSMENT



Table 5.3: Preliminary Risk Assessment for the Site

Sources	Pathways (P)	Receptors	Consequence of Impact	Probability of Impact	Risk Estimation	Hazard Assessment
- Potential for Made Ground associated with previous development operations – on site (S1) - Current and previous industrial use – off site (S2)	- Ingestion and dermal contact with contaminated soil (P1) - Inhalation or contact with potentially contaminated dust and vapours (P2) - Permeation of water pipes and attack on concrete foundations by aggressive soil conditions (P6)	- Construction workers (R1) - Maintenance workers (R2) - Neighbouring site users (R3) - Future site users (R4) - Building foundations and on site buried services (water mains, electricity and sewer) (R5)	Medium	Low likelihood	Moderate	GI – Ground Investigation
			Severe for Asbestos	Low for Asbestos	Moderate for Asbestos	
	Accumulation and migration of soil gases (P5)		Severe	Unlikely	Low	
	- Leaching through permeable soils, migration within the vadose zone (i.e., unsaturated soil above the water table) and/or lateral migration within surface water, as a result of cracked hardstanding or via service pipe/corridors and surface water runoff. (P3) - Horizontal and vertical migration of contaminants within groundwater (P4)	- Neighbouring site users (R3) - Controlled waters - secondary A aquifer (R6), surface waters - Building foundations and on site buried services (water mains, electricity and sewer) (R5)	Medium	Unlikely	Low	

- 5.3.10 It should be noted that the identification of potential pollutant linkages does not necessarily signify that the site is unsuitable for its current or proposed land use. It does however act as a way of focussing data collection at the site in accordance with regulatory guidance in CLR 11.

5.4 Outcome of Risk Assessment

- 5.4.1 The risk estimation matrix indicates a moderate to low risk as defined above.
- 5.4.2 It is assumed that the proposed development comprises of the development of residential buildings with private gardens and associated roadways.
- 5.4.3 A review of historical maps indicates that the site on the earliest available plan (1874) consisted of undeveloped potentially agricultural land, with trees located along it's perimeter. Two small buildings located in the north west corner of site developed in 1937 were later removed by 1974. No changes on site are noted to present day.
- 5.4.4 A review of the historical site vicinity indicates that on the earliest available plan (1874) the surrounding area within 500m was predominantly undeveloped agricultural land, with small associated farm houses. A rail track is located 20m NE from site orientated NW to SE, this feature is in the same present day configuration. Industrial buildings area located directly NE of site is noted in 1937 as a textile factory and laundry. Site use of the textile factory changes to a workshop in 1954, further changing to a chapel in 1984. The surrounding area shows consistent minor residential development within 500m, with more larger scale developments noted in 1984 and 2010.
- 5.4.5 It is recommended that an intrusive investigation is undertaken to clarify potential risks to the identified receptors, and assess the extent of made ground soils present at the site.
- 5.4.6 A preliminary investigation may comprise a series of window sampler holes or trial pits.
- 5.4.7 No significant on and off-site sources of potential ground gases has been identified by the desk study, and therefore risks associated with ground gases are considered to be low. However, if significant thickness of made ground soils are encountered on site, ground gas monitoring may be required.

5.5 List of Key Contaminants

- 5.5.1 The possible contamination implications for both on-site and off-site sources have been assessed based on the information presented in the report. This has been achieved using guidance publications by the Environment Agency, together with other sources.
- 5.5.2 In the case of the site uses identified as part of the desk study research, reference to DoE industry profiles would not indicate a specific use reference, although reference has been made to the miscellaneous industries profile
- 5.5.3 Based on recommendations within the guidance publications, an initial soil and water chemical testing suite would need to consider a range of contaminants as follows:
- *Metals*: cadmium, chromium, copper, lead, mercury, nickel, zinc;
 - *Semi-metals and non-metals*: arsenic, boron, sulphur;
 - *Inorganic chemicals*: cyanide, nitrate, sulphate and sulphide;

- *Organic chemicals*: aromatic hydrocarbons, aliphatic hydrocarbons, petroleum hydrocarbons, phenol, polyaromatic hydrocarbon;
- *Others*: pH, Asbestos

6 REFERENCES

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Code of Practice for Site Investigations BS5930: 2015

Investigation of Potentially Contaminated Sites – Code of Practice BS10175: 2011

APPENDICES

APPENDIX 1 – FIGURES

APPENDIX 2 – GROUNDSURE REPORTS

APPENDIX 3 – OS HISTORICAL MAPS

APPENDIX 4 – QUALITATIVE RISK ASSESSMENT METHODOLOGY

APPENDIX 5 – LOCAL AUTHORITY CORRESPONDENCE

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GEO-ENVIRONMENTAL & GEOTECHNICAL ASSESSMENT (GROUND INVESTIGATION) REPORT

Folder's Lane (Eastern Plot), Burgess Hill, RH15 0DX



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APPENDIX 5 – SOIL GAS MONITORING RESULTS

EXECUTIVE SUMMARY

Site Details	Site Address	Folders Lane (Eastern Plot), Burgess Hill, RH15 0DX
	National Grid	533000, 118000
	Site Area	0.50Ha (approx.)
	Proposed Development	It is understood that the proposed development will comprise the construction of residential dwellings with some communal/amenity soft landscaping, private gardens and associated roadways.
Encountered Conditions	Scope of Works	The assessment incorporated a desk study to determine the site's setting to inform a preliminary risk assessment followed by an intrusive investigation to confirm the ground and groundwater conditions and support the development of a geotechnical and geo-environmental assessment.
	Ground Conditions	The ground conditions encountered broadly consistent with those anticipated, and comprised Topsoil/Made Ground, to depths of up to 0.90m, underlain by sandy clay/sand of the Weald Clay Formation to the base of the boreholes (maximum depth of 4.00m).
	Groundwater	Groundwater seepages were encountered within WS4 and WS13 at depths of between 3.0m and 4.0mbgl during the intrusive investigation. In addition, combined groundwater and ground gas monitoring wells were installed within WS2, WS12, and WS17 to a maximum depth of 3.69mbgl which were monitored on 4No occasions in February 2024. Water was recorded between depths of 0.00m (ground level) -3.43mbgl during the return visits.
Geo-environmental Assessment Summary and Recommendations		Following generic risk assessments, elevated concentrations of lead were detected in soils in excess of generic assessment criteria for the protection of human health within a residential with plant uptake end-use scenario. These elevated concentrations were localised within an area proposed to contain communal landscaping only, and therefore is considered appropriate to utilise less stringent assessment criteria and therefore these soils are considered suitable to remain provided no private gardens are proposed within this area of site. No asbestos containing materials or fibres were detected in the Made Ground samples analysed in the laboratory. A significant risk to plant growth has not been identified. The risk to controlled waters from soils is considered negligible. Based on the calculated GSVs, and in consideration of the conceptual site model, the site is classified as Characteristic Situation 1 (CS1) and no formal gas protection measures are considered to be necessary. Upgraded potable water supply pipe materials are unlikely to be required. The water supply pipe requirements for this site should be discussed at an early stage with the relevant utility provider. Based on the existing proposed development plan, no formal remedial measures are considered necessary. This is on the basis that only communal soft landscaping is proposed within the north of the site, in the area as shown on Figure 5. If the proposed development changes, this assessment should be revised accordingly. As with any ground investigation, the presence of further hotspots between sampling points cannot be ruled out. Should any contamination be encountered, a suitably qualified environmental consultant should be informed immediately, so that adequate measures may be recommended. The above conclusions are made subject to approval by the statutory regulatory bodies.

Geotechnical Considerations	Foundations	Based on the ground and groundwater conditions encountered, traditional strip/trench-fill foundations up to 1m wide may be formed within the underlying Weald Clay Formation at a minimum depth of 2.0m for an allowable bearing capacity of 100kPa.
	Sulphates	Buried concrete for foundations should be designed to Class DS-1 (AC1).
	Ground Floor Slabs	Given the presence of shrinkable soils, it is recommended that suspended floor slabs are used with an adequate void designed according to NHBC Standards. As a guide, initial modelling indicates a requirement for a sub-floor void of at least 300mm due to the presence of shrinkable soils of “high” volume change potential.
	Excavations	Temporary excavations are unlikely to remain stable and some form of temporary support or battering back to a safe angle and dewatering are likely to be required. Subject to seasonal variations, surface water/groundwater encountered during site works could likely be dealt with by conventional pumping from a sump used to collate waters.
	Road Pavements	Preliminary CBR design values of 1% and 2.5% are recommended for pavements constructed within the Made Ground/near surface deposits of Weald Clay and the deeper Weald Clay Formation, respectively.
	Surface Water Drainage	Based on the results of in-situ testing, and ground conditions encountered, conventional soakaways are not likely to be suitable and an alternative drainage solution should be sought.
Recommended Further Work		The following works are recommended: • Submit chemical testing results to appropriate waste facility to confirm waste classification. • Seek approval of the Generic Quantitative Risk Assessment and Soil Gas Assessment from the Local Authority, NHBC and other relevant stakeholders. • Should the proposed development plan alter to include private soft landscaping in the north of the site, a Remediation Method Statement (RMS) should be prepared. • Seek confirmation of the water supply pipe requirements by the appropriate service provider.
<i>This Executive Summary is intended to provide a brief summary of the main findings and conclusions of the investigation. For detailed information, the reader is referred to the main report ref. P1215J553b.</i>		

1 INTRODUCTION

1.1 Terms of Reference

- 1.1.1 Jones Homes (Southern) Limited ("The Client") has commissioned Jomas Associates Ltd ('Jomas') to undertake an investigation of the geotechnical and geo-environmental factors pertaining to the proposed development at a site referred to as Folders Lane (Eastern Plot), Burgess Hill, RH15 0DX (herein referred to as 'the site'). The site's location is presented in Figure 1.
- 1.1.2 A Phase 1 Desk Study has been produced for the site and issued separately (detailed in Table 1.1 below), followed by an intrusive investigation (detailed in this report).
- 1.1.3 An intrusive investigation has been undertaken in accordance with Jomas' proposal dated 18th October 2023.

1.2 Proposed Development

- 1.2.1 The proposed development is to comprise the construction of a new residential scheme comprising 40No plots with private and communal gardens and associated roadways and infrastructure.
- 1.2.2 For the purpose of geo-environmental assessment and selection of generic assessment criteria, the development is considered "residential with plant uptake" as a conservative approach. Less sensitive areas may be zoned separately as part of the later assessments if necessary.
- 1.2.3 A plan of the proposed development is provided as Figure 4.
- 1.2.4 For the purpose of geotechnical assessment, it is considered that the project could be considered as a Geotechnical Category (GC) 2 site in accordance with BS EN 1997.

1.3 Objectives

- 1.3.1 The objectives of Jomas' investigation are as follows:
- To undertake an intrusive investigation, to determine the ground and groundwater conditions as well as to assess the nature and extent of contaminants (if any) potentially present at the site;
 - To establish the presence of significant pollutant linkages, in accordance with the procedures set out within Part IIA of the Environmental Protection Act 1990, associated statutory guidance and current best practice including the EA land contamination risk management (LCRM); and,
 - To determine soil properties to inform the preliminary geotechnical assessment for foundations, drainage, excavation stability, pavement design and buried concrete and recommendations for further action (if required).

1.4 Scope of Works

- 1.4.1 The following tasks were undertaken to achieve the objectives listed above:

- Intrusive ground investigation to determine shallow ground conditions, and potential for contamination to be present at the site;
- Undertaking of laboratory chemical and geotechnical testing upon samples obtained;
- Return ground gas/groundwater monitoring.
- The compilation of this report, which collects and discusses the above data, and presents an assessment of the site conditions, conclusions and recommendations.

1.5 Supplied Documentation

- 1.5.1 A number of relevant reports prepared by or supplied to Jomas Associates prior to the commencement of this investigation are detailed in Table 1.1:

Table 1.1: Previous/Supplied Reports

Title	Author	Reference	Date
Geo-environmental Desk Study /Preliminary Risk Assessment Report for Folders Lane (Eastern Plot)	Jomas Associates	P1215J553b	8 th February 2018

1.6 Limitations

- 1.6.1 Jomas has prepared this report for the sole use of Jones Homes (Southern) Limited, in accordance with the generally accepted consulting practices and for the intended purposes as stated in the agreement under which this work was completed. This report may not be relied upon by any other party without the explicit written agreement of Jomas. No other third party warranty, expressed or implied, is made as to the professional advice included in this report. This report must be used in its entirety.
- 1.6.2 The records search was limited to information available from public sources; this information is changing continually and frequently incomplete. Unless Jomas has actual knowledge to the contrary, information obtained from public sources or provided to Jomas by site personnel and other information sources, have been assumed to be correct. Jomas does not assume any liability for the misinterpretation of information or for items not visible, accessible or present on the subject property at the time of this study.
- 1.6.3 Whilst every effort has been made to ensure the accuracy of the data supplied, and any analysis derived from it, there may be conditions at the site that have not been disclosed by the investigation, and could not therefore be taken into account. As with any site, there may be differences in soil conditions between exploratory hole positions. Furthermore, it should be noted that groundwater conditions may vary due to seasonal and other effects and may at times be significantly different from those measured by the investigation. No liability can be accepted for any such variations in these conditions.
- 1.6.4 Any reports provided to Jomas have been reviewed in good faith. Jomas cannot be held liable for any errors or omissions in these reports, or for any incorrect interpretation contained within them.

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- 1.6.5 This investigation and report has been carried out in accordance with the relevant standards and guidance in place at the time of the works. Future changes to these may require a re-assessment of the recommendations made within this report.
- 1.6.6 **This report is not an engineering design and the figures and calculations contained in the report should be used by the Structural Engineer, taking note that variations may apply, depending on variations in design loading, in techniques used, and in site conditions. Our recommendations should therefore not supersede the Engineer's design.**

2 DESK STUDY SUMMARY

2.1 Site Information

2.1.1 The site location plan is appended to this report in Figure 1, Appendix 1.

Table 2.1: Site Information

Name of Site	Folders Lane (Eastern Plot)
Address of Site	Folders Lane Burgess Hill RH15 0DR
Approx. National Grid Ref.	533000 118000
Site Area (Approx)	0.50ha
Site Occupation	Undeveloped land/agricultural
Local Authority	Mid Sussex District Council
Proposed Site Use	Residential with private gardens and associated roadways

2.2 Site Walkover

2.2.1 A site walkover survey was undertaken by Jomas on the 26th January 2024.

Table 2.2: Site Description

Area	Item	Details
On-site:	Current Uses:	Site consists of a medium-sized agricultural field currently kept as grass pasture. No structures were observed on site. There is a public footpath adjacent to the western site boundary.
	Evidence of historic uses:	There was no evidence of historic uses of the site.
	Surfaces:	All of site is grass covered.
	Vegetation:	No trees are located within the site boundary, however numerous mature trees (oak, ash and birch) are located along the perimeter of the site. Site entirely covered by grass. All vegetation observed on site appeared in healthy condition, exhibiting no evidence of distress.
	Topography/Slope Stability:	A slight downward slope to the south was observed.
	Drainage:	The ground appears to be slow draining, several boggy areas with standing water observed at the surface.
	Services:	No services observed on site.
	Controlled waters:	No controlled waters were noted on site.
	Tanks:	No tanks observed on site.

Area	Item	Details
Neighbouring land:	North:	Residential
	East:	Agricultural land
	South:	Residential and Winery
	West:	Agricultural land

2.2.2 Site photographs taken during the site walkover can be found as Figure 2, in Appendix 1.

2.3 Summary of Preliminary Risk Assessment (Desk Study)

2.3.1 As detailed in Table 1.1, a Phase 1 Desk Study report has been produced for the site and issued separately (Jomas Associates – P1215J553b – February 2018). The findings of the Phase 1 Desk Study are presented in the following section. Reference should be made to the original reports and documents for further details. Comments made in the following section regarding possible ground conditions on the site and within the surrounding area are based purely on the desk study. Where appropriate, this information will be used in the later sections of this report as supplementary information to assist in the evaluation of the ground conditions and aid the identification of geotechnical and geochemical constraints and hazards that could impact on the scheme.

2.3.2 A review of historical Ordnance Survey maps indicates that the site originally (1870) comprised undeveloped potentially agricultural land, with trees located along its perimeter. Other than two small buildings located in the northwest corner of the site developed around 1937 and removed by 1974, the site is in its current configuration.

2.3.3 The surrounding area was predominantly agricultural land with small associated farmhouses from the earliest maps. A rail track is shown, located 200m northeast of site orientated northwest to southeast, this feature is in the same present-day configuration. Industrial buildings area located directly NE of site is noted in 1937 as a textile factory, changing to a workshop in 1954 and a chapel in 1984. The surrounding area shows consistent minor residential development within 500m, with more larger scale developments noted in 1984 and 2010.

2.3.4 Information provided by the British Geological Survey indicates that the site is directly underlain by solid deposits of the Weald Clay Formation. A band of sandstone is reported across the south of the site, also part of the Weald Clay Formation.

2.3.5 The sandstone deposit underlying the south of the site is a Secondary (A) aquifer.

2.3.6 A review of the EnvirolInsight report indicates that there are no Source Protection Zones within 500m of the site.

2.3.7 There are no groundwater or potable water abstractions reported within 1km of the site.

2.3.8 The nearest active surface water abstraction is reported 350m west of the site.

2.3.9 There are no Environment Agency Zone 2 or Zone 3 floodplains reported within 250m of the site.

- 2.3.10 A ground investigation was recommended comprising of a series of window sampler holes or trial pits. Gas/groundwater monitoring well installations were recommended if a significant thickness of made ground was encountered to allow for ground gases to be monitored.
- 2.3.11 The conceptual site model is reproduced in Table 2.3 overleaf.

Table 2.3: Preliminary Risk Assessment for the Site

Sources	Pathways (P)	Receptors	Consequence of Impact	Probability of Impact	Risk Estimation	Hazard Assessment
- Potential for Made Ground associated with previous development operations – on site (S1) - Current and previous industrial use – off site (S2)	- Ingestion and dermal contact with contaminated soil (P1) - Inhalation or contact with potentially contaminated dust and vapours (P2) - Permeation of water pipes and attack on concrete foundations by aggressive soil conditions (P6)	- Construction workers (R1) - Maintenance workers (R2) - Neighbouring site users (R3) - Future site users (R4) - Building foundations and on site buried services (water mains, electricity and sewer) (R5)	Medium	Low likelihood	Moderate	GI – Ground Investigation
			Severe for Asbestos	Low for Asbestos	Moderate for Asebestos	
	Accumulation and migration of soil gases (P5)		Severe	Unlikely	Low	
	- Leaching through permeable soils, migration within the vadose zone (i.e., unsaturated soil above the water table) and/or lateral migration within surface water, as a result of cracked hardstanding or via service pipe/corridors and surface water runoff (P3) - Horizontal and vertical migration of contaminants within groundwater (P4)	- Neighbouring site users (R3) - Building foundations and on site buried services (water mains, electricity and sewer) (R5) - Controlled Waters (Aquifer) (R6)	Medium	Unlikely	Low	

3 PREVIOUS GROUND INVESTIGATIONS

- 3.1.1 Jomas is not aware of any previous intrusive investigation works that have been undertaken on the site.

4 GROUND INVESTIGATION

4.1 Scope of Works

- 4.1.1 A ground investigation was undertaken on the 30th 31st January & 1st & 2nd February 2024.
- 4.1.2 A summary of the fieldwork carried out at the site, with justifications for exploratory hole positions, is presented in Table 4.1 below.

Table 4.1: Scope of Intrusive Investigation

Investigation Type	Number of Exploratory Holes Achieved	Exploratory Hole Designation	Depth Achieved	Justification
Windowless Sample Boreholes	20	WS1-20	Up to 5mbgl	Obtain shallow samples for laboratory chemical and geotechnical testing. To allow in-situ geotechnical testing. Boreholes were positioned across the site to provide a non-targeted sampling strategy, with consideration to physical constraints on the site.

- 4.1.3 The ground investigation was undertaken in accordance with British Standard BS5930:2015+A1:2020 "Code of practice for ground investigations", British Standard BS10175:2011+A2:2017 "Investigation of potentially contaminated sites - code of practice", NHBC Standards, Chapter 4.1 and AGS Guidelines for Good Practice in Site Investigations.

- 4.1.4 Exploratory hole positions are shown on the exploratory hole location plan presented in Figure 2, Appendix 1. The exploratory hole records are included in Appendix 2.

- 4.1.5 Where monitoring wells were not installed, the exploratory holes were backfilled with the arisings (in the reverse order in which they were drilled) and the ground surface was reinstated so that no depression was left.

4.2 In-situ Geotechnical Testing

- 4.2.1 In-situ geotechnical testing included Standard Penetration Tests. The determined 'N' values have been used to determine the relative density of granular materials and have been used with standard correlations to infer various other derived geotechnical parameters including the undrained shear strength of the cohesive strata. The results of the individual tests are on the appropriate exploratory hole logs in Appendix 2.

- 4.2.2 In-situ California Bearing Ratios (CBRs) were determined using a TRL dynamic cone penetrometer (DCP) and the methodology laid out in IAN 73/06. The CBR values have then been calculated using the methodology laid out in both IAN 73/06 and TRL 587. Copies of the test results and calculations are provided in Appendix 7.

- 4.2.3 The determination of permeability of the underlying ground was undertaken by carrying out in-situ falling head tests. These were carried out to conform with the methodology for falling head permeability test formerly outlined in BS: 5930 (1999) and recently in BS EN ISO 22282-2. Copies of the results and calculations are provided in Appendix 8.

4.3 Laboratory Analysis

4.3.1 A programme of laboratory testing, scheduled by Jomas Associates Limited, was carried out on selected samples of Made Ground and natural strata.

Chemical Testing

4.3.2 Chemical testing of soils was undertaken by Derwentside Environmental Testing Services Ltd (DETS), which holds UKAS and MCERTS accreditations for a wide range of determinands.

4.3.3 The samples were analysed for a wide range of contaminants as shown in Table 4.2 below:

Table 4.2: Chemical Tests Scheduled

Test Suite	No. of tests	
	Made Ground / Topsoil	Natural
Basic Suite 3	20	-
Waste Acceptance Criteria Testing	2	-
Total Organic Carbon	10	-
Jomas Modified BRE SD-1 Suite	4	8
Asbestos Screen & ID	15	-

4.3.4 The determinands contained in the Basic Suite 3 are as detailed in Table 4.3 below.

Table 4.3: Basic Suite of Determinands

DETERMINAND	LIMIT OF DETECTION (mg/kg)	UKAS ACCREDITATION	TECHNIQUE
Arsenic	2	Y (MCERTS)	ICP-EOS
Cadmium	0.2	Y (MCERTS)	ICP-EOS
Chromium	2	Y (MCERTS)	ICP-EOS
Chromium (Hexavalent)	4	N	ICP-EOS
Lead	3	Y (MCERTS)	ICP-EOS
Mercury	1	Y (MCERTS)	ICP-EOS
Nickel	3	Y (MCERTS)	ICP-EOS
Selenium	2	Y (MCERTS)	ICP-EOS
Copper	4	Y (MCERTS)	ICP-EOS
Zinc	3	Y (MCERTS)	ICP-EOS
Boron (Water Soluble)	0.1	N	ICP-EOS
pH Value	0.1 units	Y (MCERTS)	Electrometric Measurement
Sulphate (Water Soluble)	0.01g/l	Y (MCERTS)	Ion Chromatography/ICP-EOS
Total Cyanide	1	N	Distillation followed by Chromatography
Speciated/Total PAH	0.10/1.6	Y (MCERTS)	GC-MS
Phenols	2	N	Distillation followed by Colorimetry
Total Petroleum Hydrocarbons (banded)	6	N	GC-FID/Headspace GS-MS

4.3.5 To support the selection of appropriate tier 1 screening values, 10No. samples were analysed for total organic carbon.

4.3.6 The laboratory test results are included in Appendix 3.

Geotechnical Laboratory Testing

4.3.7 In addition to the contamination assessment, soil samples were submitted to the UKAS Accredited laboratory of K4 Soils Laboratory for a series of geotechnical analyses.

4.3.8 This testing was designed to classify the samples and to obtain parameters (either directly or sufficient to allow relevant correlations to be used) relevant to the technical objectives of the investigation.

4.3.9 The following laboratory geotechnical testing was carried out:

Table 4.4: Laboratory Geotechnical Analysis

Methodology	Test Description	Number of tests
BS1377:1990	Moisture Content Determination	18
BS1377:1990	Liquid and Plastic Limit Determination (Atterberg Limits)	18

4.3.10 In addition, 12No. soil samples were analysed by DETS for a modified BRE Special Digest 1 suite (acid and water soluble sulphate, total sulphur and pH) to assist with the ACEC classification for buried concrete.

4.3.11 The laboratory test results are included in Appendix 4.

5 GROUND CONDITIONS ENCOUNTERED

5.1 General

5.1.1 A factual record of the conditions encountered during the physical investigation of the site is presented in the following section.

5.2 Ground Conditions

5.2.1 The ground conditions encountered were broadly consistent with those anticipated, i.e. a thickness of Made Ground overlying Weald Clay Formation and are summarised in Table 5.1 below.

Table 5.1: Ground Conditions Encountered

Stratum and Description	Encountered from (mbgl)	Base of strata (mbgl)	Thickness range (m)
Grass over brown slightly sandy slightly gravelly clay. Sand is fine to coarse. Gravel consists of fine to medium sub-angular to sub-rounded flint. (MADE GROUND – TOPSOIL)	GL	0.10 – 0.90	0.10 – 0.90
Grass over brown slightly sandy slightly gravelly clay. Sand is fine to coarse. Gravel consists of fine to medium sub-angular to sub-rounded flint and occasional brick. (MADE GROUND) Only encountered in WS2 – WS9 inclusive	GL	0.20 – 0.50	0.20 – 0.50
Soft becoming firm to very stiff** consistency Orangish/reddish/yellowish brown mottled grey/purple sandy CLAY. Sand is fine to coarse. (WEALD CLAY FORMATION – COHESIVE)	0.10 - 0.90	>2.00 – >4.20	>1.65 – >3.70
Medium dense becoming very dense brownish yellow SAND. Sand is fine to coarse. (WEALD CLAY FORMATION – SANDSTONE) Only encountered in WS5, WS6 & WS9	2.90 – 3.00	>3.00 – >4.00	>0.10 – >1.00

**** Consistency estimated using semi-empirical correlations with SPT N Values, plasticity indices and published literature.**

5.2.2 Made Ground with gravel containing evidence of anthropogenic material was found to only be present in the northern half of site.

5.3 Groundwater

5.3.1 Recorded groundwater strikes are summarised below.

Table 5.2: Groundwater Strikes During Investigation

Exploratory Hole ID	Depth Encountered (mbgl)	Depth After 20mins (mbgl)	Stratum
WS4	3.0 – 4.0	-	Weald Clay Formation
WS13	3.1	-	Weald Clay Formation

- 5.3.2 4 No. Return groundwater monitoring visits were undertaken between the 9th and 28th Februsry 2024, the results are presented in Appendix 5 and are summarised below.

Table 5.3: Groundwater Monitoring Summary

Exploratory Hole ID	Depth Encountered (mbgl)	Well Response Zone as installed (top/bottom mbgl)	Depth to Base of Well – as gauged (mbgl)	Strata targeted by response zone
WS2	0.00 – 0.18	1.00 – 3.10	2.90 – 2.97	Weald Clay Formation
WS12	2.38 – 3.43	1.00 – 3.40	3.60 – 3.69	Weald Clay Formation
WS17	0.29 – 0.63	1.00 – 2.60	1.57 – 1.62	Weald Clay Formation

- 5.3.3 It should be noted that changes in groundwater levels can occur for a number of reasons including seasonal effects and variations in drainage. Such fluctuations may only be recorded by the measurement of the groundwater level within a standpipe or piezometer installed within appropriate response zones. Changes in groundwater level can have a direct effect on excavation stability and dewatering requirements, and cohesive soils can soften under rising or high groundwater levels.

5.4 Physical and Olfactory Evidence of Contamination

- 5.4.1 No visual or olfactory evidence of potential contamination was identified within the investigation positions.

5.5 Limitations

- 5.5.1 During the intrusive ground investigation, all of the boreholes were terminated prior to 5mbgl due to refusal of the sample barrel in hard natural ground, which was interpreted to be interbedded sandstone and mudstone of the Weald Clay Formation.

6 RISK ASSESSMENT – ANALYTICAL FRAMEWORK

6.1 Context and Objectives

6.1.1 This section seeks to evaluate the level of chronic risk pertaining to human health and the environment which may result from both the existing use and proposed future use of the site. It makes use of the ground investigation findings, as described in the previous sections, to evaluate further the potential pollutant linkages identified in the desk study. A combination of qualitative and quantitative techniques is used, as described below.

6.1.2 The purpose of generic quantitative risk assessment is to compare concentrations of contaminants found on site against generic assessment criteria (GAC) to establish whether there are actual or potential unacceptable risks. It also determines whether further detailed assessment is required. The approaches detailed all broadly fit within a tiered assessment structure in line with the framework set out in the Department of Environment, Food and Rural Affairs (DEFRA), EA and Institute for Environment and Health Publication, Guidelines for Environmental Risk Assessment and Management.

6.2 Analytical Framework – Soils

6.2.1 There is no single methodology that covers all the various aspects of the assessment of potentially contaminated land and groundwater. Therefore, the analytical framework adopted for this investigation is made up of a number of procedures, which are outlined below. All of these are based on a Risk Assessment methodology centred on the identification and analysis of Source – Pathway – Receptor linkages.

6.2.2 The soil analytical test results have been compared to Suitable 4 Use Levels (S4UL) published by the Chartered Institute of Environmental Health in order to assess the potential long-term risks to human health posed by contaminants in the soils. S4UL'S have been derived for a range of land uses and Soil Organic Matter contents. They represent the minimal or tolerable risk, above which further assessment of the risks or remedial action may be required.

6.2.3 In the absence of a S4UL recommended concentration, other available general assessment criteria (GAC), including the Category 4 Screening Levels (C4SL) published by DEFRA have been used. Site-specific assessments are undertaken wherever possible and/or applicable. All assessments are carried out in accordance with the CLEA protocol.

6.2.4 The assessment criteria used for the screening of determinands within soils are identified within Table 6.1.

Table 6.1: Selected Assessment Criteria - Contaminants in Soils

Substance Group	Determinand(s)	Assessment Criteria Selected
<u>Organic Substances</u>		
Non-halogenated Hydrocarbons	Total Petroleum Hydrocarbons (TPHCWG banded)	S4UL
	Total Phenols	S4UL
Polycyclic Aromatic Hydrocarbons (PAH-16)	Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(123-cd)pyrene, Dibenzo(ah)anthracene, Benzo(ghi)perylene	S4UL
Volatile Organic Compounds (VOCs/sVOCs).	Toluene, Ethylbenzene, Benzene, Xylenes	S4UL
<u>Inorganic Substances</u>		
Heavy Metals and Metalloids	Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Zinc	S4UL
	Copper, Zinc, Nickel	BS: 3882 (2015).
Cyanides	Free Cyanide	CLEA v1.06
Sulphates	Water Soluble Sulphate	BRE Special Digest 1:2005

- 6.2.5 It is understood that the site is to be converted to provide residential units with private gardens. As a result, the site has been assessed with regards to a “residential with plant uptake” end use scenario.
- 6.2.6 GAC have been selected with consideration to the Soil Organic Matter (SOM) content of the soil. From the soils analytical results, the average value for Total Organic Carbon for the Made Ground is 1.8 %, which gives an equivalent SOM of 3.1 %. Published GAC have been selected as those derived assuming a SOM of 1% to give a conservative assessment.
- 6.3 BRE**
- 6.3.1 The BRE Special Digest 1:2005, ‘Concrete in Aggressive Ground’ is used with soluble sulphate and pH results to assess the aggressive chemical environment of future underground concrete structures at the site.

7 GENERIC QUANTITATIVE RISK ASSESSMENT – SOIL DATA

7.1 Screening of Soil Chemical Analysis Results – Human Health Risk Assessment

7.1.1 Laboratory analysis for soils is summarised in Table 7.1 to 7.4. Raw laboratory data is included in Appendix 3.

7.1.2 Results have been screened against generic assessment criteria for a “residential with home grown produce” end use, assuming 1% soil organic matter.

Table 7.1: Soil Laboratory Test Results - Metals, Metalloids, Phenol, Cyanide

Determinand	Unit	No. samples tested	Screening Criteria	Min	Max	No. Exceeding
Arsenic	mg/kg	19	S4UL 37	10.0	18.0	0
Cadmium	mg/kg	19	S4UL 11	<0.2	<0.2	0
Chromium	mg/kg	19	S4UL 910	13.0	32.0	0
Lead	mg/kg	19	C4SL 200	13	264	2No: WS1@0.05mbgl, WS3@0.20mbgl.
Mercury	mg/kg	19	S4UL 40	<1	<1	0
Nickel	mg/kg	19	S4UL 180	4.0	12.0	0
Copper	mg/kg	19	S4UL 2400	9	27	0
Zinc	mg/kg	19	S4UL 3700	21	112	0
Total Cyanide ^A	mg/kg	19	CLEA v 1.06 33	<1	<1	0
Selenium	mg/kg	19	S4UL 250	<2	<2	0
Boron Water Soluble	mg/kg	19	S4UL 290	<1	<1	0
Phenols	mg/kg	19	S4UL 120	<2	<2	0

Notes: ^AGeneric assessment criteria derived for free inorganic cyanide.

Table 7.2: Soil Laboratory Test Results - Polycyclic Aromatic Hydrocarbons (PAHs)

Determinand	Unit	No. Samples Tested	Screening Criteria	Min	Max	No. Exceeding
Acenaphthene	mg/kg	19	S4UL 210	<0.1	<0.1	0
Acenaphthylene	mg/kg	19	S4UL 170	<0.1	<0.1	0
Anthracene	mg/kg	19	S4UL 2400	<0.1	<0.1	0
Benzo(a)anthracene	mg/kg	19	S4UL 7.2	<0.1	0.15	0
Benzo(a)pyrene	mg/kg	19	S4UL 2.2	<0.1	0.19	0
Benzo(b)fluoranthene	mg/kg	19	S4UL 2.6	<0.1	0.28	0
Benzo(ghi)perylene	mg/kg	19	S4UL 320	<0.1	<0.1	0

Determinand	Unit	No. Samples Tested	Screening Criteria		Min	Max	No. Exceeding
Benzo(k)fluoranthene	mg/kg	19	S4UL	77	<0.1	<0.1	0
Chrysene	mg/kg	19	S4UL	15	<0.1	0.25	0
Dibenzo(ah)anthracene	mg/kg	19	S4UL	0.24	<0.1	<0.1	0
Fluoranthene	mg/kg	19	S4UL	280	<0.1	0.5	0
Fluorene	mg/kg	19	S4UL	170	<0.1	<0.1	0
Indeno(123-cd)pyrene	mg/kg	19	S4UL	27	<0.1	<0.1	0
Naphthalene	mg/kg	19	S4UL	2.3	<0.1	<0.1	0
Phenanthrene	mg/kg	19	S4UL	95	<0.1	0.21	0
Pyrene	mg/kg	19	S4UL	620	<0.1	0.42	0
Total PAH	mg/kg	19	-	-	<1.6	2	-

Table 7.3: Soil Laboratory Test Results - Total Petroleum Hydrocarbons (TPH)

TPH Band	Unit	No. Samples Tested	Screening Criteria		Min	Max	No. Exceeding
C ₈ -C ₁₀	mg/kg	19	S4UL	27	<1	<1	0
>C ₁₀ -C ₁₂	mg/kg	19	S4UL	74	<1	<1	0
>C ₁₂ -C ₁₆	mg/kg	19	S4UL	330	<1	<1	0
>C ₁₆ -C ₂₁	mg/kg	19	S4UL	540	<1	<1	0
>C ₂₁ -C ₃₅	mg/kg	19	S4UL	1500	<6	<6	0
Total TPH	mg/kg	19	-	-	<6	<6	-

Note: *The lower value of guidelines for Aromatic/Aliphatics has been selected

7.2 Asbestos in Soil

7.2.1 14No samples of the Made Ground were screened in the laboratory for the presence of asbestos.

7.2.2 No asbestos containing materials (ACM) or fibres were reported in samples analysed in the laboratory.

7.3 Vapour Risk Assessment from a Soil Source

7.3.1 As outlined in Table 7.2 and Table 7.3, none of the polyaromatic hydrocarbons nor petroleum hydrocarbon fractions have been found in excess of their generic screening criteria for the protection of human health within a 'residential with homegrown produce' end-use scenario. The generic screening criteria considers all possible pathways between the source and the receptor, including vapour inhalation.

7.3.2 On this basis, a significant vapour risk is not considered to exist.

7.4 Discussion of Soil Analytical Results

7.4.1 As outlined above, 2No soil samples have been found to contain concentrations of lead above the threshold of 200mg/kg for use within a “residential with plant uptake” end use within WS1 and WS3. Both of these exploratory locations are found within the far north of the site, within an area understood to be proposed for development as flats with communal soft landscaping and no private soft landscaping. On this basis, it is considered appropriate to consider the results from this area against generic assessment criteria protective of human health within an “residential *without* plant uptake” end use which allows for lead concentrations up to 310mg/kg.

7.4.2 On the basis that the maximum lead concentration recorded in this area is 264mg/kg, the soils are considered suitable for use within this area of site, provided the end use does include private gardens.

7.4.3 A plan showing the site “zoning” is provided as Figure 5 in Appendix 1, showing the areas of site where private gardens can be accommodated without remedial measures.

7.5 Summary of Human Health Generic Quantitative Risk Assessment

7.5.1 In summary, concentrations of lead in excess of the GAC have been recorded in samples of Made Ground but not natural soils.

7.5.2 These elevated concentrations were localised within an area proposed to contain communal landscaping only, and therefore is considered appropriate to utilise less stringent assessment criteria and therefore these soils are considered suitable to remain provided no private gardens are proposed within this area of site.

7.6 Screening of Soil Chemical Analysis Results – Potential Risks to Plant Growth

7.6.1 Zinc, copper and nickel are phytotoxins and could therefore inhibit plant growth in soft landscaped areas. Concentrations measured in soil for these determinands have been compared with the pH dependent values given in BS:3882 (2015). This does not constitute a full BS:3882 topsoil test.

7.6.2 Table 7.4 shows the soil analytical results compared with the relevant screening values, adopting a pH value of greater than 7, as indicated by the results of the laboratory analysis.

Table 7.4: Soil Laboratory Analysis Results - Phytotoxic Determinands

Determinand	Threshold level (mg/kg)	Min (mg/kg)	Max (mg/kg)	No. Exceeding
Nickel	110	4	12	0
Copper	200	9	27	0
Zinc	300	21	112	0

7.6.3 None of the samples exceeded the threshold levels and a significant risk to plant growth has not been identified.

7.7 Screening for Water Pipes Materials

- 7.7.1 The results of the analysis have been assessed for potential impact upon water supply pipes. Table 7.5 below summarises the findings of the assessment:

Table 7.5: Screening Guide for Water Pipes

Determinand	No. of tests	Threshold for Polyethylene Pipes* (mg/kg)	Value for site data (mg/kg)		No of Exceedances
			Min	Max	
Total VOCs	0	0.5	N/A	N/A	N/A
BTEX	0	0.1	N/A	N/A	N/A
MTBE	0	0.1	N/A	N/A	N/A
EC5-EC10	19	1	<1	<1	0
EC10-EC16	19	10	<2	<2	0
EC16-EC40	19	500	<7	<7	0
Naphthalene	19	5	<0.1	<0.1	0
Phenols	19	2	<2	<2	0

* UK Water Industry Research (2010) Source Guidance for Selection of Water Supply Pipes to be Used in Brownfield Sites. Report No. 10/WM/03/21.

- 7.7.2 Determinands marked “N/A” were not analysed for as no evidence of their presence was obtained from the Desk Study.
- 7.7.3 The above suggests that upgraded pipe work is unlikely to be required.
- 7.7.4 The water supply pipe requirements for this site should be discussed at an early stage with the relevant utility provider.
- 7.8 Assessment of Soil Analytical Data with Respect to Controlled Waters**
- 7.8.1 At the Preliminary Risk Assessment (Desk Study) stage, risks to controlled waters were considered low.
- 7.8.2 The following controlled waters receptors were identified:
- Secondary A aquifer located in the southern area of site – associated with sandstone band within the Weald Clay Formation;
 - Surface waters – tertiary river located along the northern and southern boundary of site.
- 7.8.3 Pathways for migration of leachable/mobile contamination were considered to be potentially present within the underlying sandstone of Weald Clay Formation in the south of site.
- 7.8.4 Pathways for migration of leachable leachable/mobile contamination were not considered to be present within the underlying, relatively impermeable mudstone in the north of site.
- 7.8.5 The falling head tests undertaken in 8No boreholes across site to depths of 1.2mbgl indicated no drainage within the underlying Weald Clay Formation, indicating that potential pathways for migration of leachable/mobile contamination are not present. These tests are discussed in more detail in Section 11.7.

7.8.6 Reported concentration of polyaromatic and petroleum hydrocarbons were generally very low and commonly below laboratory detection limit. No evidence of potentially mobile contamination was encountered.

7.8.7 A pollutant linkage to controlled waters is not considered to exist and therefore, the risk to controlled waters is considered to be negligible.

7.9 Waste Characterisation

7.9.1 Waste soil must be classified using the characterisation assessment and analysis described by the WM3 technical guidance to determine whether soils may be treated as hazardous or non-hazardous prior to removal from site.

7.9.2 Preliminary waste classification has been carried out (see Appendix 6) and has resulted in the following:

- Made Ground is provisionally classified as non-hazardous waste.
- Made Ground - Topsoil is provisionally classified as non-hazardous waste.

7.9.3 Waste Acceptance Criteria testing results are summarised in Table 7.6 below.

Table 7.6: Waste Acceptance Criteria Testing Summary

Sample	Material Type	Exceeds "Inert Waste Landfill" Thresholds?	Notes
WS4 - 0.30m	Made Ground	X	Does not exceed thresholds for inert waste landfill.
WS14 - 0.15m	Made Ground – Topsoil	X	Does not exceed thresholds for inert waste landfill.

7.9.4 Waste Acceptance Criteria (WAC) testing indicates that the soils on site are likely to be suitable for disposal as "inert" waste.

7.9.5 Additional testing will be required by the landfill operator to confirm the above preliminary assessment during construction. Surplus Made Ground and natural soils should be segregated on excavation and placed in separate stockpiles underlain by polythene sheeting (to prevent potential cross-contamination of underlying soils) before further testing is carried out.

7.9.6 Any soils containing >0.1% asbestos or visible asbestos containing materials would be considered hazardous waste.

7.9.7 The above comments are given as guidance and should be confirmed by the waste disposal facility accepting the waste. The waste disposal facility may have their own classification methodology and are under no obligation to honour the comments given above.

7.9.8 Alternatively, if Made Ground soils are to be excavated and re-used on site, a Materials Management Plan (MMP) must be produced in accordance with CL:AIRE Definition of Waste: Development Industry Code of Practice (DoWCoP) and approved by a Qualified Person ahead of the commencement of any material movement

8 SOIL GAS RISK ASSESSMENT

8.1 Soil Gas Results

- 8.1.1 Four return monitoring visits have been undertaken between 9th February 2024 and 28th February 2024, to monitor wells installed within boreholes at the site for soil gas concentrations and groundwater levels.
- 8.1.2 During these visits atmospheric pressure ranged between 975mb and 1010mb.
- 8.1.3 The results of the monitoring undertaken are summarised in Table 8.8.1 below, with the monitoring records presented in Appendix 5.

Table 8.8.1: Summary of Gas Monitoring Data

Hole No.	Number of monitoring events	CH ₄ (%)	CO ₂ (%)	O ₂ (%)	VOCs (ppm)	Steady Flow Rate (l/hr)	Peak Flow Rate (l/hr)	Depth to water (mbgl)	Well Response Zone as installed (top/bottom) (mbgl)	Strata targeted by response zone
WS2	4	0.0 – 0.3	0.1 – 0.2	18.1 – 21.3	0.0 – 0.1	-0.4 – +0.3	-0.5 – +0.3	0.00 – 0.18	1.00 – 3.10	Weald Clay Formation
WS12	4	0.0 – 0.2	0.3 – 1.9	18.3 – 21.2	0.1 – 7.1	0.0 – +0.2	0.0 – +0.2	2.38 – 3.43	1.00 – 3.40	Weald Clay Formation
WS17	4	0.0 – 0.2	0.1 – 2.7	19.0 – 21.2	0.1 – 0.2	-0.3 – 0.0	-0.3 – 0.0	0.29 – 0.63	1.00 – 2.60	Weald Clay Formation

8.2 Screening of Results

- 8.2.1 As shown in Table 8.8.1, methane was reported to a maximum concentration of 0.3%. The concentrations of carbon dioxide ranged from 0.1 to 2.7% v/v. The maximum concentration of volatile organic compounds measured was 7.1ppm. The maximum gas flow rate recorded was 0.3l/hr.
- 8.2.2 In the assessment of risks posed by hazardous ground gases and selection of appropriate mitigation measures, BS8485 (2015) + A1 (2019) identifies four types of development, termed Type A to Type D.
- 8.2.3 Type A buildings are defined as
- “private ownership with no building management controls on alternations to the internal structure, the use of rooms, the ventilation of rooms or the structural fabric of the building. Some small rooms present. Probably conventional building construction (rather than civil engineering). Examples include private housing and some retail premises.”*
- 8.2.4 The soil gas assessment method is based on that proposed by Wilson & Card (1999), which was a development of a method proposed in CIRIA publication R149 (CIRIA, 1995). The method uses both gas concentrations and borehole flow rates to define a characteristic situation based on the limiting borehole gas volume flow for methane and carbon dioxide. In both these methods, the limiting borehole gas volume flow is renamed as the Gas Screening Value (GSV).

8.2.5 The Gas Screening Value (litres of gas per hour) is calculated by using the following equation

$$\text{GSV} = (\text{Concentration}/100) \times \text{Flow rate}$$

Where concentration is measured in percent (%)

and flow rate is measured in litres per hour (l/hr)

8.2.6 In accordance with CIRIA C665, worst case conditions are used in the calculation of GSVs for the site. These have been summarised below in Table 8.8.2.

8.2.7 The Characteristic Situation is then determined from Table 8.5 of CIRIA C665.

Table 8.8.2: Summary of Gas Monitoring Data and Gas Screening Value

Gas	Concentration (v/v %)	Peak Flow Rate (l/hr)	GSV (l/hr)	Characteristic Situation (after CIRIA C665)
CO ₂	2.7	0.3	0.0081	1
CH ₄	0.3	0.3	0.0009	1

8.2.8 Based on the calculated GSVs, and in consideration of the conceptual site model, the site is classified as Characteristic Situation 1 (CS1), and therefore no formal gas protection measures are considered to be necessary.

9 GEO-ENVIRONMENTAL ASSESSMENT SUMMARY AND RECOMMENDATIONS

9.1 Land Quality Impact Summary

9.1.1 Following the ground investigation, the following is noted:

- It is understood that the proposed development will comprise the construction of residential dwellings with some communal/amenity soft landscaping, private gardens and associated roadways.
- Following generic risk assessments, elevated concentrations of lead were detected in soils in excess of generic assessment criteria for the protection of human health within a residential with plant uptake end-use scenario. These elevated concentrations were localised within an area proposed to contain communal landscaping only, and therefore is considered appropriate to utilise less stringent assessment criteria and therefore these soils are considered suitable to remain provided no private gardens are proposed within this area of site.
- No asbestos containing materials or fibres were detected in the Made Ground samples analysed in the laboratory.
- A significant risk to plant growth has not been identified.
- The risk to controlled waters from soils is considered negligible.
- Based on the calculated GSVs, and in consideration of the conceptual site model, the site is classified as Characteristic Situation 1 (CS1) and no formal gas protection measures are considered to be necessary.
- Upgraded potable water supply pipe materials are unlikely to be required. The water supply pipe requirements for this site should be discussed at an early stage with the relevant utility provider.
- Based on the existing proposed development plan, no formal remedial measures are considered necessary. This is on the basis that only communal soft landscaping is proposed within the north of the site, in the area as shown on Figure 5. If the proposed development changes, this assessment should be revised accordingly.
- As with any ground investigation, the presence of further hotspots between sampling points cannot be ruled out. Should any contamination be encountered, a suitably qualified environmental consultant should be informed immediately, so that adequate measures may be recommended.

9.1.2 The above conclusions are made subject to approval by the statutory regulatory bodies.

9.2 Review of Pollutant Linkages Following Ground Investigation

9.2.1 The site CSM has been revised and updated from that suggested in the desk study in view of the ground investigation data, including soil laboratory analysis results. Table 9.9.1 highlights whether pollutant linkages identified in the original CSM are still relevant following the risk assessment, or whether pollutant linkages, not previously identified, exist.

SECTION 9
GEO-ENVIRONMENTAL ASSESSMENT SUMMARY AND
RECOMMENDATIONS

Table 9.9.1: Plausible Pollutants Linkages Summary (Pre-Remediation)

Potential Source (from desk study)	Pathway	Receptor	Relevant Pollutant Linkage?	Comment
- Potential for Made Ground associated with previous development operations – on site (S1) - Current and previous industrial use – off site (S2)	- Ingestion and dermal contact with contaminated soil (P1) - Inhalation or contact with potentially contaminated dust and vapours (P2) - Permeation of water pipes and attack on concrete foundations by aggressive soil conditions (P6)	- Construction workers (R1) - Maintenance workers (R2) - Neighbouring site users (R3) - Future site users (R4) - Building foundations and on site buried services (water mains, electricity and sewer) (R5)	X	No formal remedial measures required. See Section 9.1 above for details. The findings of this report should be included in the construction health and safety file, with adequate measures put in place for the protection of construction and maintenance workers. Contact should be made with relevant utility providers to confirm if upgraded materials are required. The concrete classification to protect buried concrete is discussed in Section 11.3
	Accumulation and migration of soil gases (P5)		N	Site has been characterised as CS1 and no gas protection measures are considered necessary.
	- Leaching through permeable soils, migration within the vadose zone (i.e., unsaturated soil above the water table) and/or lateral migration within surface water, as a result of cracked hardstanding or via service pipe/corridors and surface water runoff (P3) - Horizontal and vertical migration of contaminants within groundwater (P4)	- Neighbouring site users (R3) - Building foundations and on site buried services (water mains, electricity and sewer) (R5) - Controlled Waters (Aquifer) (R6)	N	A significant risk of impact to controlled waters has not been identified. The concrete classification to protect buried concrete is discussed in Section 11.3

10 DERIVATION OF GEOTECHNICAL PARAMETERS

10.1 Introduction

10.1.1 A summary of ground conditions obtained from the ground investigation and the derived geotechnical parameters is provided below.

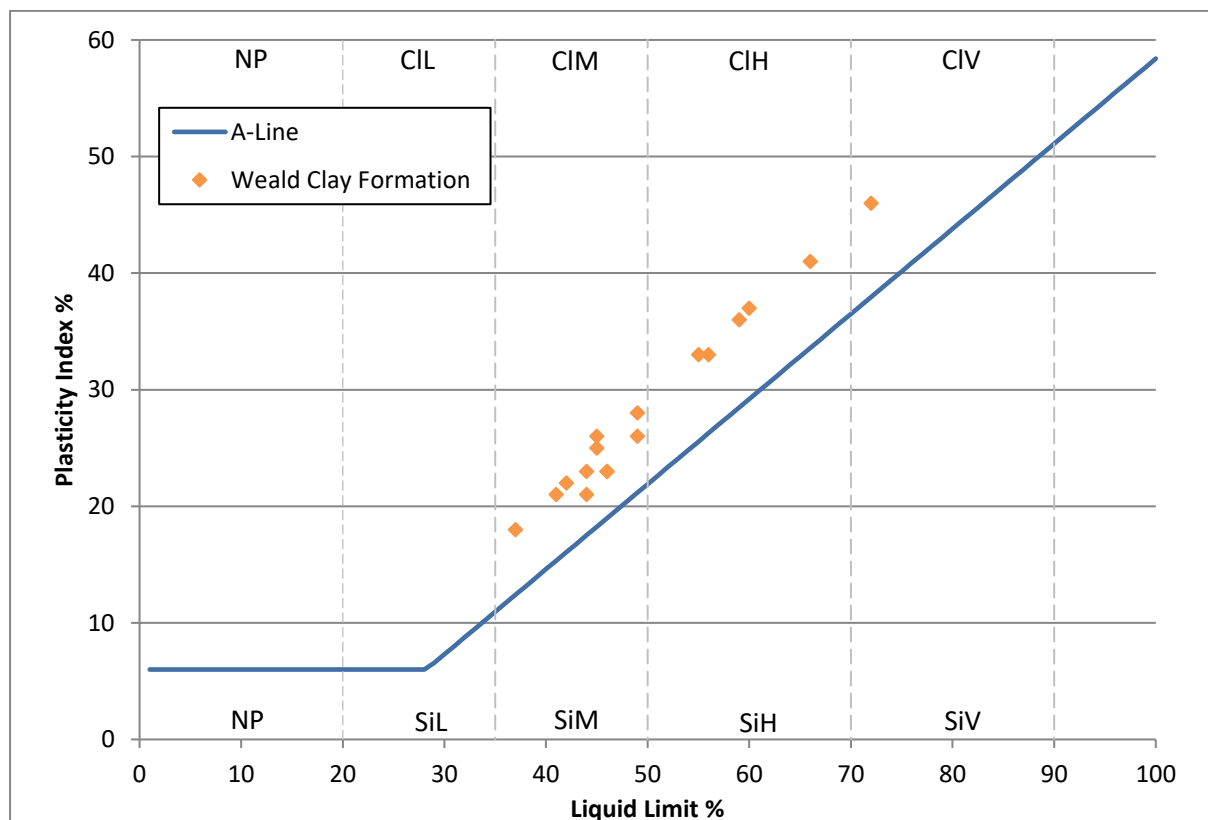
10.2 Plasticity of Cohesive Materials

10.2.1 Atterberg Limit determination was undertaken on 18No samples of Weald Clay Formation, at depths ranging from 0.40m to 3.60mbgl.

10.2.2 Plasticity Index values ranged from 18% to 46% and were indicative of “medium” to “high” plasticity, as illustrated in Figure 10.1 below. One sample was reported as being ‘non-plastic’ and the test was therefore aborted.

10.2.3 Modified Plasticity Index values ranged from 18% to 46%, indicating soils with “low” to “high” volume change potential.

Figure 10.1: Plasticity Chart

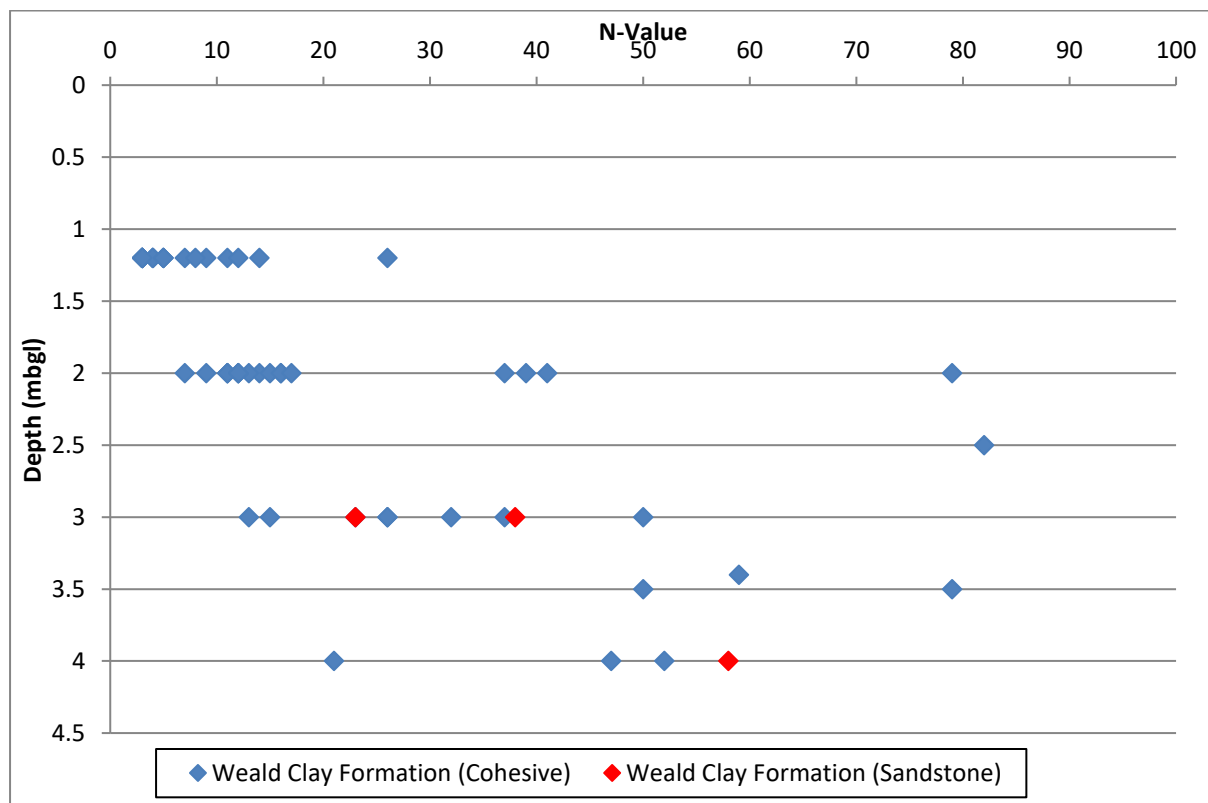


10.3 Standard Penetration Tests

10.3.1 Standard Penetration Tests were undertaken at regular intervals throughout the windowless sample boreholes. The results of the SPTs are plotted against depth in Figure 10.2 below.

- 10.3.2 The strata have been grouped into “Weald Clay Formation – Cohesive” and “Weald Clay Formation – Sandstone”.
- 10.3.3 N_{equi} results have been calculated for both strata where the SPT crossed strata boundaries or where the full 300mm of penetration could not be achieved for 50 or more blows.
- 10.3.4 Where only minimal penetration was achieved, the test was considered as a ‘refusal’, and no N_{equi} result was calculated.

Figure 10.2: SPT 'N' Value v Depth



- 10.3.5 Overall, there is a weak correlation of increasing SPT N-value with depth.
- 10.3.6 WS13 shows lower N-values at depth, attributed to a groundwater strike reported at 3.1mbgl.

10.4 Undrained Shear Strength

- 10.4.1 As discussed above, the N values recorded in the clay vary with depth, this infers that the undrained shear strength of the clay similarly varies. Figure 10.3 below shows the undrained shear strength inferred by the correlation suggested by Stroud (1974);

$c_u = f_1 \times N$ can be applied,

in which

c_u = mass shear strength (kN)

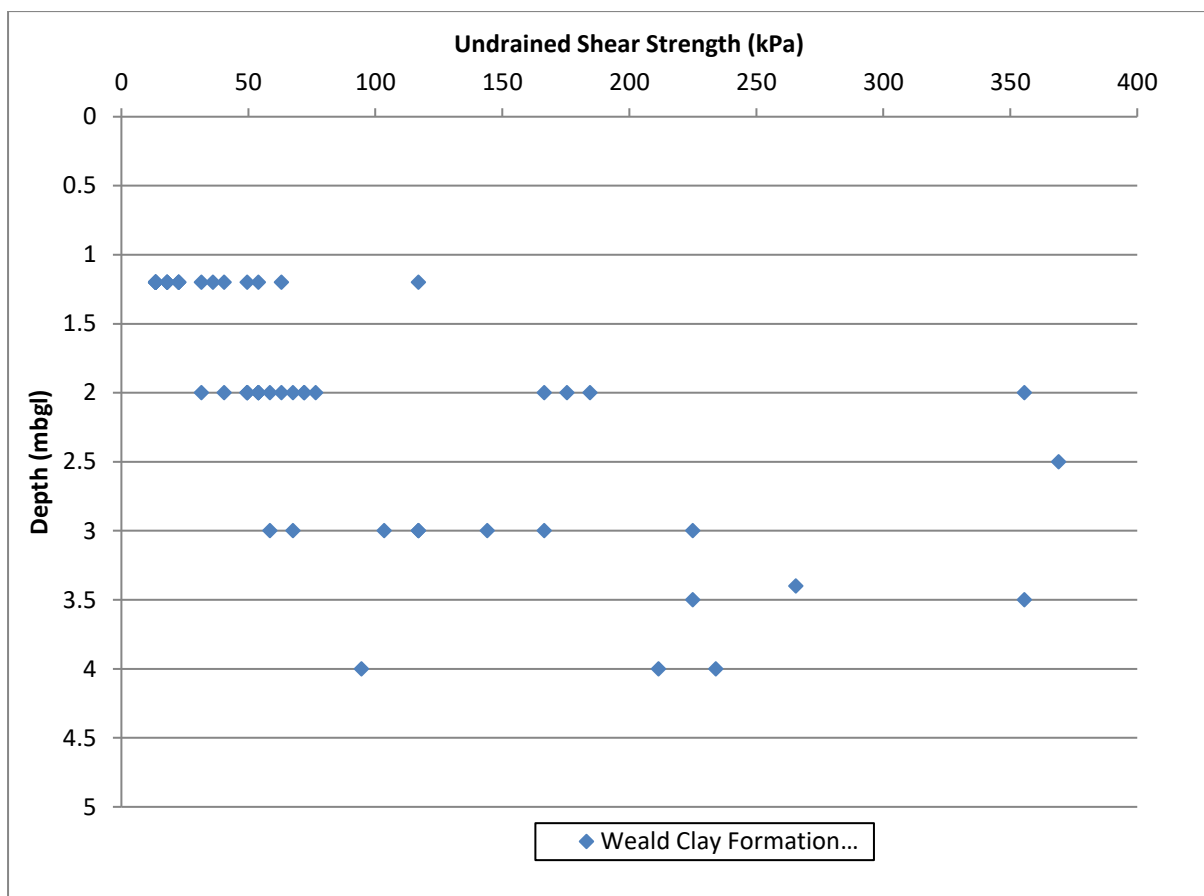
f_1 = constant

N = SPT Value achieved during boring operations

10.4.2 In the above equation f_1 is dependent on the plasticity of the material that the SPT is being carried out in. As the plasticity indices were shown to be greater than 25% a value for f_1 of 4.5 has been adopted after Tomlinson (2001).

10.4.3 The graph below shows the shear strength profile of the encountered cohesive materials at the site, based on the SPT to shear strength correlation described above.

Figure 10.3: Undrained Shear Strength v Depth



10.5 Coefficient of Compressibility

10.5.1 Stroud and Butler (1974) developed a relationship between the coefficient of compressibility (m_v) and SPT 'N' value.

$m_v = 1 / f_2 \times N$ can be applied,

in which

m_v = coefficient of compressibility (m^2/MN)

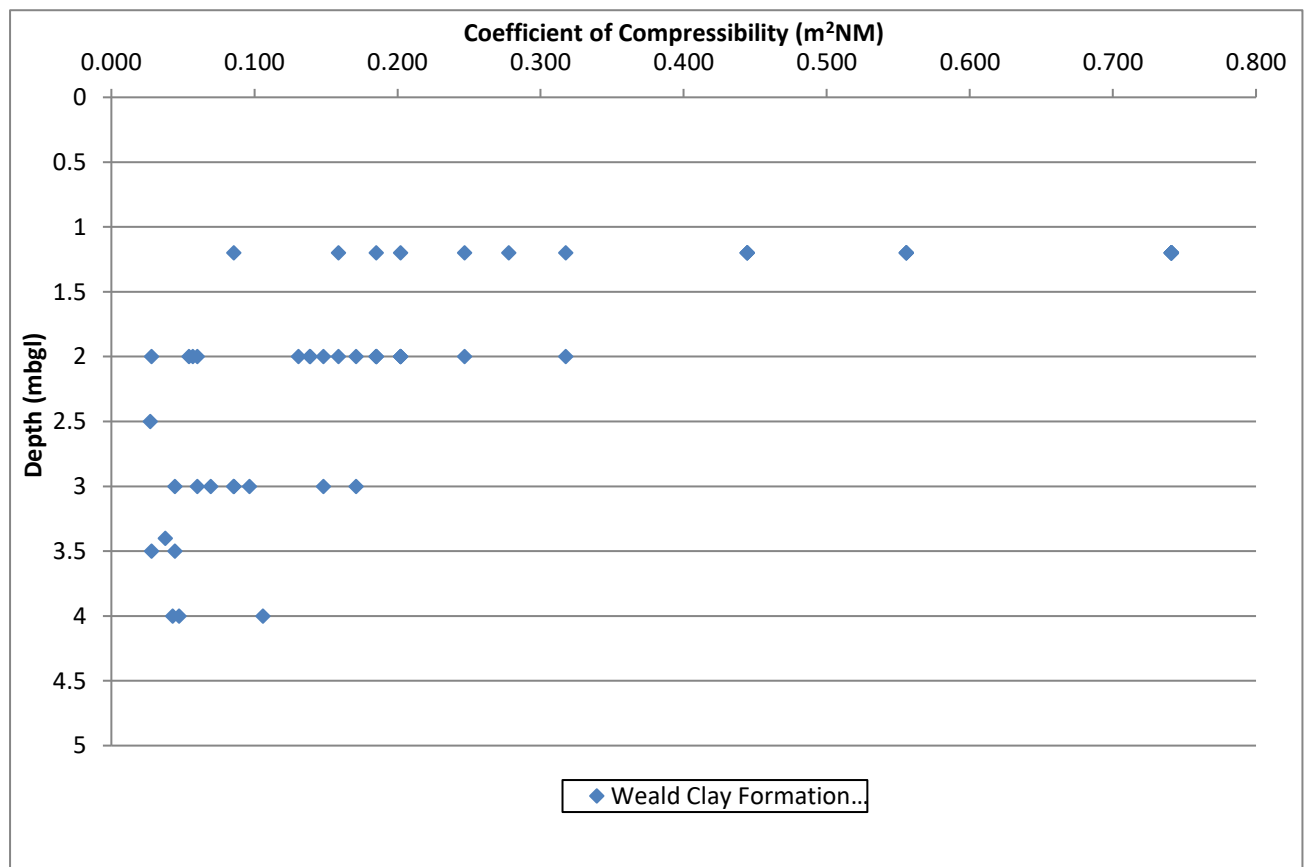
f_2 = constant dependent on the plasticity index

N = SPT Value achieved during boring operations

10.5.2 Using the plasticity indices obtained and the graphs provided in Tomlinson (2001) a value of f_2 of 0.45 has been taken and used with the SPT 'N' values to infer coefficient of compressibility (m_v).

10.5.3 Where the undrained shear strength of the clays was measured using the quick undrained triaxial methodology, the m_v value was calculated by rearranging the equations for f_1 and f_2 and substituting in the measured undrained shear strength.

Figure 10.4: Coefficient of Volume Compressibility (m_v) v Depth



10.5.4 As would be expected, the results reduce with depth as the clay increases in strength and the over burden increases, reducing the potential for compressibility.

10.5.5 The results from of the Weald Clay Formation are generally of "very low" to "medium" compressibility with near surface clays of "medium" to "high" compressibility.

- 10.5.6 This is considered to be due to the weathering and softening of near-surface deposits, combined with a lack of overburden pressure at shallow depth allowing the clays to relax and so compress when loaded.

10.6 Density

- 10.6.1 In the absence of geotechnical laboratory test results, the correlations and suggested values for both cohesive and granular materials given in BS8004:2015 have been used.

- 10.6.2 The derived Unit Weights are summarised below in Table 10.1.

Table 10.1: Derived Unit Weights

Strata	Unit Weight (kN/m ³)
Made Ground	17
Weald Clay Formation (Cohesive)	18
Weald Clay Formation (Sandstone)	19

10.7 Effective Angle of Shearing Resistance / Angle of Friction

- 10.7.1 In cohesive soils, the effective angle of shearing resistance can be derived from the plasticity index of the soil, using the following equation presented in BS8004:2015.

$$\phi' = 42 - (12.5 \times \text{LOG}_{10}(\text{PI}))$$

Where PI = Plasticity Index.

- 10.7.2 Values have been calculated for all available Plasticity Index results and are presented in Table 10.2.

Table 10.2 Derived Angles of Shearing Resistance

Sample	Stratum	Derived Angle of Shearing Resistance (°)
WS1 @ 0.4m	Weald Clay Formation (Cohesive)	23.0
WS2 @ 2.9m	Weald Clay Formation (Cohesive)	25.5
WS3 @ 1.5m	Weald Clay Formation (Cohesive)	24.3
WS4 @ 0.7m	Weald Clay Formation (Cohesive)	22.5
WS5 @ 1.5m	Weald Clay Formation (Cohesive)	22.4
WS6 @ 2.0m	Weald Clay Formation (Cohesive)	24.5
WS7 @ 2.5m	Weald Clay Formation (Cohesive)	25.0
WS8 @ 3.6m	Weald Clay Formation (Cohesive)	25.0
WS9 @ 0.6m	Weald Clay Formation (Cohesive)	21.2

Sample	Stratum	Derived Angle of Shearing Resistance (°)
WS10 @ 1.2m	Weald Clay Formation (Cohesive)	21.8
WS12 @ 1.4m	Weald Clay Formation (Cohesive)	24.3
WS13 @ 3.5m	Weald Clay Formation (Cohesive)	25.0
WS14 @ 0.7m	Weald Clay Formation (Cohesive)	26.3
WS15 @ 0.65m	Weald Clay Formation (Cohesive)	25.5
WS18 @ 1.6m	Weald Clay Formation (Cohesive)	23.9
WS18 @ 2.3m	Weald Clay Formation (Cohesive)	25.2
WS20 @ 3.0m	Weald Clay Formation (Cohesive)	23.0

- 10.7.3 In granular materials, the effective angle of friction can be derived directly from shear box testing, or indirectly using the methodology outlined in Table 1 of BS8004:2015, using a combination of the SPT N-Values, particle size distribution of the soil, and the field descriptions of angularity of the gravel fraction. This method assumes that the fines content of the material is less than 15%. An alternative method is to refer to the correlation between angle of friction and SPT N-values postulated by Peck *et al* (1967) and reproduced in Tomlinson (2001).

10.8 Stiffness Moduli

- 10.8.1 In cohesive materials, the undrained stiffness modulus (Young's Modulus) can be derived using the correlation with SPT N-Values, presented in CIRIA Report R143.

$$Eu = 1.2 * N$$

- 10.8.2 The drained Young's Modulus for cohesive material can also be derived from the SPT-N values, as follows:

$$E' = 0.9 * N$$

- 10.8.3 In granular materials, the drained Young's Modulus can be derived using the following correlation:

$$E' = N$$

10.9 Summary of Derived General Properties

- 10.9.1 Based on the analysis of the ground investigation data and past experience with similar deposits, the following derived general parameters are given in Table 10.3.

Table 10.3 Derived Geotechnical Parameters

Property	Weald Clay Formation (Cohesive)	Weald Clay Formation (Granular)
Unit Weight (kN/m ³) ¹⁾	18	19

Property	Weald Clay Formation (Cohesive)	Weald Clay Formation (Granular)
Drained Friction, ϕ' (°)	21.2 – 26.3 ²⁾	34 – 41 ³⁾
Drained Cohesion, c' (kPa)	0	-
SPT 'N' Value	3 – 82	23 – 58
Undrained Young's Modulus, E_u (MPa) ⁴⁾	3.6 – 90.2	-
Drained Young's Modulus E' (MPa)	2.7 – 73.8 ⁵⁾	23 – 58 ⁶⁾
Undrained Shear Strength, c_u (kPa) ⁷⁾	13.5 – 369	
Plasticity Index (%)	18 – 46	-
Modified Plasticity Index (%)	18 – 46	-
Volume Change Potential [NHBC]	Low to High	-
Modulus of Volume Compressibility, m_v (m ² /MN) ⁸⁾	0.027 – 0.741	-

¹⁾ Derived from Figures 1 and 2 of BS8004:2015.

²⁾ Calculated from: $\phi' = (42^\circ - 12.5 \log 10/I_p)$ for $5\% \leq I_p \leq 100\%$ Where, I_p is the soil's plasticity index (BS8004:2015).

³⁾ Correlation between N value and Φ (Relation of N-values and Friction Angle by Peck et al).

⁴⁾ Calculated from: $E_u = 1.2 N$ MPa, based on the guidance given in CIRIA Report 143.

⁵⁾ Calculated from: $E' = 0.9 N$ Mpa, based on the guidance given in CIRIA Report 143.

⁶⁾ Calculated from: $E' = 1.0 N$ Mpa, based on the guidance given in CIRIA Report 143.

⁷⁾ The undrained shear strength (c_u) of the cohesive soils was correlated to the SPT "N" values using Stroud (1974), where $c_u = f_1 N$ and f_1 is factor related to the Plasticity Index (PI) of the clay (a value of f_1 equal to 5.0 for $PI \leq 25\%$ and a value of f_1 value equal to 4.5 for $PI > 25\%$).

⁸⁾ Calculated from: $m_v = 1/f_2 N$ m²/MN, f_2 is a coefficient proposed by Stroud and Butler (1975) and varies with Plasticity Index (PI) as presented in Figure 27 of CIRIA Report 27 or $10/c_u$.

11 GEOTECHNICAL ENGINEERING RECOMMENDATIONS

11.1 General

11.1.1 Subsequent to intrusive investigation of the site and receipt of the laboratory test results, the following geotechnical assessments have been made.

11.2 Proposed Foundations

General

11.2.1 All topsoil is to be stripped from beneath proposed structures ahead of development.

11.2.2 The Made Ground and very soft near-surface Weald Clay is not considered to provide suitable bearing strata due to their low and variable bearing properties, and the unacceptable risk of total and differential settlement.

11.2.3 All foundations should be deepened beneath these deposits and any soft/loose soils encountered in order to found within underlying competent strata.

11.2.4 As soils of “high” volume change potential are present, heave precautions will be required against the side of foundations and ground beams in accordance with the requirements set out in NHBC Standards Chapter 4.2.

Conventional Foundations

11.2.5 It is considered that traditional strip/trench-fill foundations up to 1m wide may be formed within the underlying Weald Clay Formation at a minimum depth of 2.0m for an allowable bearing capacity of 100kPa. Alternatively, pad foundations with dimensions of 1.2m x 1.2m could be formed for an allowable bearing capacity of 130kPa. Total and differential settlements should be contained within tolerable limits.

11.2.6 This depth, however, does not take into account the depth of Made Ground or the distance to, and species of, any previous, existing, or proposed trees and foundations may need to be deepened further in accordance with NHBC requirements, for soils of “high” volume change potential.

11.2.7 Where foundations need to change levels as a result, the foundations should be stepped and reinforced. These steps should be no deeper than half of the width of the foundation and each step should not exceed 0.5m.

11.2.8 If foundations span different strata, e.g. sand and clay, they should either be deepened to terminate in a single soil stratum, or suitable reinforcement included (to be detailed by the structural engineer).

11.2.9 Foundations greater than 2.50m deep would require structure-specific design by a structural engineer. In this instance, consideration could be given to the use of piled foundations instead, which might be preferable in terms of economy and practicality.

11.2.10 Where any unexpected or soft ground conditions are encountered during the groundworks, works in that area should cease and the advice of a suitably qualified geotechnical engineer sought.

Raft Foundations

- 11.2.11 Alternatively, a raft foundation may be a suitable option.
- 11.2.12 Such a foundation should be formed on a suitable thickness of well-engineered granular sub-base, should provide an allowable bearing capacity of 50kN/m².
- 11.2.13 Prior to laying the suitable thickness of well-engineered granular sub-base, the formation level should be inspected by a suitably qualified and experienced specialist. Any loose or soft material should be removed to a suitable depth and replaced with well-graded, properly compacted granular fill or lean mix concrete. The formation should be blinded if left exposed for more than a few hours or if inclement weather is experienced.
- 11.2.14 In order to keep settlements within tolerable limits, the raft foundation should comprise a continuously well reinforced slab beneath the building.
- 11.2.15 In addition, reinforced concrete beams / thickening of the raft may be required beneath the structural walls or beneath lines of columns.
- 11.2.16 Any existing granular sub-base or granular Made Ground could potentially be lifted and re-engineered.

11.3 Aggressive Ground Conditions

- 11.3.1 Sulphate attack on building foundations occurs where sulphate solutions react with the various products of hydration in Ordinary Portland Cement (OPC) or converted High-Alumina Cement (HAC). The reaction is expansive, and therefore disruptive, not only due to the formation of minute cracks, but also due to loss of cohesion in the matrix.
- 11.3.2 In accordance with BRE Special Digest 1, the characteristic values of sulphate used to determine the concrete classification are determined using the methodology summarised in below.

Table 11.1: Concrete in the Ground Characteristic Value Determination

No Samples in the dataset	Method for determining the sulphate characteristic value
1 - 4	Highest value
5 - 9	Mean of the top 2No highest results
10 or greater	Mean of the top 20% highest results

- 11.3.3 summarises the analysis of the aggressive nature of the ground for each of the strata encountered within the ground investigation.

Table 11.2: Concrete in the Ground Class

Stratum	No Samples	pH range	Characteristic WS Sulphate (mg/l)	Characteristic Total Potential Sulphate (%) ¹⁾	Design Sulphate Class	ACEC Class
Made Ground	19	5.5 – 6.5	25	N/A	DS-1	AC-1

Weald Clay Formation	8	5.2 – 8.9	207	N/A	DS-1	AC-1
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1) Applies to soils containing more than 0.3% of Oxidisable Sulphides, calculated in accordance with BRE SD-1

11.3.4 Analysis of the results indicates that the underlying soils do not contain appreciable concentrations of oxidisable sulphates and therefore the Design Class is dependent on the soluble sulphate content and pH only.

11.3.5 The concrete structures, including foundations, will need to be designed in accordance with BS EN 1992-1-1:2004+A1:2014. It is recommended that the advice of this publication be taken for the design and specification of all sub-surface concrete.

11.4 Ground Floor Slabs

11.4.1 Given the presence of shrinkable soils, it is recommended that suspended floor slabs are used with an adequate void designed according to NHBC Standards. As a guide, initial modelling indicates a requirement for a sub-floor void of at least 300mm due to the presence of shrinkable soils of “high” volume change potential.

11.5 Excavations

11.5.1 Temporary excavations within the Made Ground and granular soils are unlikely to remain stable and some form of temporary support or battering back to a safe angle is likely to be required.

11.5.2 Temporary excavations within the cohesive soils are likely to remain relatively stable in the short term though some spalling may be anticipated.

11.5.3 Ground works should always be designed in such a manner to avoid entry into excavations by construction or maintenance personnel. However, in the event that such works cannot be avoided or designed out, they should only be undertaken in accordance with a safe system of work, following an appropriate risk assessment and in accordance with any legislative requirements, e.g. Confined Spaces Regulations.

11.6 Road Pavements

11.6.1 summarises the results of the in-situ CBR testing.

Table 11.3: Summary of CBR Test Results

Position	Depth Range (mm)	Stratum	IAN 73/06 CBR (%)	TRL 587 CBR (%)
WS1	100-600	Topsoil/Weald Clay Formation	0	0
	600-800	Weald Clay Formation	6.1	6.6
	800-1000	Weald Clay Formation	4.8	5.3
WS2	100-1000	Topsoil/Weald Clay Formation	0	0
WS4	100-400	Topsoil/Weald Clay Formation	0	0
	400-900	Weald Clay Formation	5.3	5.9

Position	Depth Range (mm)	Stratum	IAN 73/06 CBR (%)	TRL 587 CBR (%)
	900-1000	Weald Clay Formation	12.7	13.1
WS8	100-500	Topsoil/Weald Clay Formation	0	0
	500-1000	Weald Clay Formation	16.5	16.7
WS10	100-600	Topsoil/Weald Clay Formation	0	0
	600-700	Weald Clay Formation	7.4	7.9
	700-1000	Weald Clay Formation	13.6	14.0
WS11	100-900	Topsoil/Weald Clay Formation	0	0
	900-1000	Weald Clay Formation	10.1	10.5
WS13	100-600	Topsoil/Weald Clay Formation	0	0
	600-900	Weald Clay Formation	10.1	11.3
	900-1000	Weald Clay Formation	18.2	19.9
WS14	100-900	Topsoil/ Weald Clay Formation	0	0
	900-1000	Weald Clay Formation	12.7	13.1
WS17	100-400	Topsoil/ Weald Clay Formation	0	0
	400-500	Weald Clay Formation	12.7	13.1
	500-1000	Weald Clay Formation	2.9	3.4
WS18	100-1000	Topsoil/ Weald Clay Formation	0	0
WS20	100-900	Topsoil/ Weald Clay Formation	0	0
	900-1000	Weald Clay Formation	2.3	2.7

- 11.6.2 The engineering characteristics of Made Ground are variable and the results of in-situ testing do not predict the overall settlements that may occur. It would therefore be prudent to assume a CBR value of 1% for the preliminary design of pavements constructed upon Made Ground and near-surface deposits of the Weald Clay Formation.
- 11.6.3 In-situ CBR testing using a TRL DCP gives only a short-term estimated value, which may be influenced by seasonal variations in the moisture content of the soil or due to resistance against local granular inclusions.
- 11.6.4 Based on the test results, and with reference to the equilibrium suction-index CBR values provided in the Transport Road Research Laboratory (TRRL) Laboratory Report 1132 (1984), a preliminary CBR value of 2.5% is considered suitable for the Weald Clay Formation.
- 11.6.5 Given the low CBR value it is likely that either ground improvement, e.g. lime/cement stabilisation, increased capping, or geogrid reinforced sub-base construction will be required.
- 11.6.6 The near-surface soils are deemed to be of low permeability and should therefore be treated as being not frost susceptible.
- 11.6.7 Full calculations are provided in Appendix 6.

11.6.8 Additional CBR testing should be undertaken after detailed design is complete to confirm suitability.

11.7 Surface Water Drainage

Falling Head Permeability Tests

11.7.1 Falling head permeability tests were undertaken within the windowless sampler boreholes.. Each test was undertaken over a 1-hour period. summaries the falling head permeability test results:

Table 11.4: Summary of Soakage Test Results

Position	Depth Range of Test (m)	Results (m/s)
WS2	0.30 – 1.20	Insufficient drainage
WS4	0.30 – 1.20	Insufficient drainage
WS8	0.30 – 1.20	Insufficient drainage
WS10	0.30 – 1.20	Insufficient drainage
WS11	0.30 – 1.20	Insufficient drainage
WS14	0.30 – 1.20	Insufficient drainage
WS18	0.30 – 1.20	Insufficient drainage
WS20	0.30 – 1.20	Insufficient drainage

11.7.2 Based on the above results and ground conditions encountered, conventional soakaways are unlikely to be feasible. More favourable results may be obtained by undertaking additional tests in accordance with the requirements of BRE DG 365 (2016): Soakaway Design.

11.7.3 Full calculations are provided in Appendix 7.

11.8 Groundwater Control

11.8.1 During the investigation groundwater was reported within windowless sampler boreholes WS4, WS13 at 3.0m-4.0mbgl and 3.1mbgl depth, respectively. Groundwater was not reported within the remaining boreholes.

11.8.2 During return monitoring groundwater was reported at depths of between 0.00m (ground level) and 3.43mbgl. Such variance suggests the presence of perched water bodies and infilled surface water that is unable to drain through the impermeable soils, as opposed to the natural groundwater table.

11.8.3 Subject to seasonal variations, any groundwater encountered during site works could be readily dealt with by conventional pumping from a sump used to collate waters.

11.8.4 Surface water or rainfall ingress could be similarly dealt with.

12 REFERENCES

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APPENDICES

APPENDIX 1 – FIGURES

APPENDIX 2 – EXPLORATORY HOLE RECORDS

APPENDIX 3 – CHEMICAL LABORATORY TEST RESULTS

APPENDIX 4 – GEOTECHNICAL LABORATORY TEST RESULTS

APPENDIX 5 – SOIL GAS MONITORING RESULTS

APPENDIX 6 – PRELIMINARY WASTE CLASSIFICATION

APPENDIX 7 – CBR CALCULATIONS

APPENDIX 8 – FALLING HEAD TEST CALCULATORS

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Classification of sample: WS12-0.40-02/02/2024

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
WS12-0.40-02/02/2024	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.40 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
19.3%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 19.3% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	chromium in chromium(VI) compounds { chromium(VI) oxide }				<2 mg/kg	1.923	<3.846 mg/kg	<0.000385 %			<LOD
	024-001-00-0	215-607-8	1333-82-0								
2	monohydric phenols				<2 mg/kg		<2 mg/kg	<0.0002 %			<LOD
			P1186								
3	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %			<LOD
	006-007-00-5										
4	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				16 mg/kg	1.895	24.462 mg/kg	0.00245 %	✓		
	033-005-00-1										
5	cadmium { cadmium sulfate }				<0.2 mg/kg	1.855	<0.371 mg/kg	<0.0000371 %			<LOD
	048-009-00-9	233-331-6	10124-36-4								
6	copper { copper sulphate pentahydrate }				14 mg/kg	3.929	44.39 mg/kg	0.00444 %	✓		
	029-023-00-4	231-847-6	7758-99-8								
7	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	22 mg/kg		17.754 mg/kg	0.00178 %	✓		
	082-001-00-6										
8	mercury { mercury difulminate }				<1 mg/kg	1.419	<1.419 mg/kg	<0.000142 %			<LOD
	080-005-00-2	211-057-8	628-86-4								
9	nickel { nickel diiodide }				12 mg/kg	5.324	51.561 mg/kg	0.00516 %	✓		
	028-029-00-4	236-666-6	13462-90-3								
10	selenium { nickel selenate }				<2 mg/kg	2.554	<5.108 mg/kg	<0.000511 %			<LOD
	028-031-00-5	239-125-2	15060-62-5								
11	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				38 mg/kg	4.398	134.867 mg/kg	0.0135 %	✓		
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]								
12	pH				6.9 pH		6.9 pH	6.9 pH			
			PH								
13	boron { boric acid; [1] boric acid; [2] }				<1 mg/kg	5.719	<5.719 mg/kg	<0.000572 %			<LOD
	005-007-00-2	233-139-2 [1] 234-343-4 [2]	10043-35-3 [1] 11113-50-1 [2]								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
14	chrysene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-048-00-0	205-923-4	218-01-9							
15	benzo[b]fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-034-00-4	205-911-9	205-99-2							
16	benzo[k]fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-036-00-5	205-916-6	207-08-9							
17	benzo[a]pyrene; benzo[def]chrysene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-032-00-3	200-028-5	50-32-8							
18	indeno[123-cd]pyrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-893-2	193-39-5							
19	dibenz[a,h]anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-041-00-2	200-181-8	53-70-3							
20	benzo[ghi]perylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-883-8	191-24-2							
21	acenaphthylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8							
22	acenaphthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-469-6	83-32-9							
23	fluorene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-695-5	86-73-7							
24	phenanthrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-581-5	85-01-8							
25	anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		204-371-1	120-12-7							
26	fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-912-4	206-44-0							
27	pyrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		204-927-3	129-00-0							
28	benzo[a]anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-033-00-9	200-280-6	56-55-3							
29	naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
30	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				32 mg/kg	1.462	37.743 mg/kg	0.00377 %	✓	
		215-160-9	1308-38-9							
Total:								0.0333 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
•	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS17-0.20-02/02/2024

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
WS17-0.20-02/02/2024	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.20 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
20.7%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 20.7% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	chromium in chromium(VI) compounds { chromium(VI) oxide }				<2 mg/kg	1.923	<3.846 mg/kg	<0.000385 %			<LOD
	024-001-00-0	215-607-8	1333-82-0								
2	monohydric phenols				<2 mg/kg		<2 mg/kg	<0.0002 %			<LOD
			P1186								
3	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %			<LOD
	006-007-00-5										
4	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				13 mg/kg	1.895	19.531 mg/kg	0.00195 %	✓		
	033-005-00-1										
5	cadmium { cadmium sulfate }				<0.2 mg/kg	1.855	<0.371 mg/kg	<0.0000371 %			<LOD
	048-009-00-9	233-331-6	10124-36-4								
6	copper { copper sulphate pentahydrate }				18 mg/kg	3.929	56.083 mg/kg	0.00561 %	✓		
	029-023-00-4	231-847-6	7758-99-8								
7	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	40 mg/kg		31.72 mg/kg	0.00317 %	✓		
	082-001-00-6										
8	mercury { mercury difulminate }				<1 mg/kg	1.419	<1.419 mg/kg	<0.000142 %			<LOD
	080-005-00-2	211-057-8	628-86-4								
9	nickel { nickel diiodide }				7 mg/kg	5.324	29.555 mg/kg	0.00296 %	✓		
	028-029-00-4	236-666-6	13462-90-3								
10	selenium { nickel selenate }				<2 mg/kg	2.554	<5.108 mg/kg	<0.000511 %			<LOD
	028-031-00-5	239-125-2	15060-62-5								
11	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				55 mg/kg	4.398	191.816 mg/kg	0.0192 %	✓		
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]								
12	pH				5.9 pH		5.9 pH	5.9 pH			
			PH								
13	boron { boric acid; [1] boric acid; [2] }				<1 mg/kg	5.719	<5.719 mg/kg	<0.000572 %			<LOD
	005-007-00-2	233-139-2 [1] 234-343-4 [2]	10043-35-3 [1] 11113-50-1 [2]								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
14	chrysene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-048-00-0	205-923-4	218-01-9							
15	benzo[b]fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-034-00-4	205-911-9	205-99-2							
16	benzo[k]fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-036-00-5	205-916-6	207-08-9							
17	benzo[a]pyrene; benzo[def]chrysene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-032-00-3	200-028-5	50-32-8							
18	indeno[123-cd]pyrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-893-2	193-39-5							
19	dibenz[a,h]anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-041-00-2	200-181-8	53-70-3							
20	benzo[ghi]perylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-883-8	191-24-2							
21	acenaphthylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8							
22	acenaphthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-469-6	83-32-9							
23	fluorene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-695-5	86-73-7							
24	phenanthrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-581-5	85-01-8							
25	anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		204-371-1	120-12-7							
26	fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-912-4	206-44-0							
27	pyrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		204-927-3	129-00-0							
28	benzo[a]anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-033-00-9	200-280-6	56-55-3							
29	naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
30	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				19 mg/kg	1.462	22.021 mg/kg	0.0022 %	✓	
		215-160-9	1308-38-9							
Total:								0.0373 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
•	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS13-0.20-02/02/2024

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
WS13-0.20-02/02/2024	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.20 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
19.1%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 19.1% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	chromium in chromium(VI) compounds { chromium(VI) oxide }				<2 mg/kg	1.923	<3.846 mg/kg	<0.000385 %			<LOD
	024-001-00-0	215-607-8	1333-82-0								
2	monohydric phenols				<2 mg/kg		<2 mg/kg	<0.0002 %			<LOD
			P1186								
3	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %			<LOD
	006-007-00-5										
4	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				10 mg/kg	1.895	15.327 mg/kg	0.00153 %	✓		
	033-005-00-1										
5	cadmium { cadmium sulfate }				<0.2 mg/kg	1.855	<0.371 mg/kg	<0.0000371 %			<LOD
	048-009-00-9	233-331-6	10124-36-4								
6	copper { copper sulphate pentahydrate }				20 mg/kg	3.929	63.572 mg/kg	0.00636 %	✓		
	029-023-00-4	231-847-6	7758-99-8								
7	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	30 mg/kg		24.27 mg/kg	0.00243 %	✓		
	082-001-00-6										
8	mercury { mercury difulminate }				<1 mg/kg	1.419	<1.419 mg/kg	<0.000142 %			<LOD
	080-005-00-2	211-057-8	628-86-4								
9	nickel { nickel diiodide }				5 mg/kg	5.324	21.537 mg/kg	0.00215 %	✓		
	028-029-00-4	236-666-6	13462-90-3								
10	selenium { nickel selenate }				<2 mg/kg	2.554	<5.108 mg/kg	<0.000511 %			<LOD
	028-031-00-5	239-125-2	15060-62-5								
11	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				36 mg/kg	4.398	128.085 mg/kg	0.0128 %	✓		
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]								
12	pH				5.6 pH		5.6 pH	5.6 pH			
			PH								
13	boron { boric acid; [1] boric acid; [2] }				<1 mg/kg	5.719	<5.719 mg/kg	<0.000572 %			<LOD
	005-007-00-2	233-139-2 [1] 234-343-4 [2]	10043-35-3 [1] 11113-50-1 [2]								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
14	chrysene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-048-00-0	205-923-4	218-01-9							
15	benzo[b]fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-034-00-4	205-911-9	205-99-2							
16	benzo[k]fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-036-00-5	205-916-6	207-08-9							
17	benzo[a]pyrene; benzo[def]chrysene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-032-00-3	200-028-5	50-32-8							
18	indeno[123-cd]pyrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-893-2	193-39-5							
19	dibenz[a,h]anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-041-00-2	200-181-8	53-70-3							
20	benzo[ghi]perylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-883-8	191-24-2							
21	acenaphthylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8							
22	acenaphthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-469-6	83-32-9							
23	fluorene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-695-5	86-73-7							
24	phenanthrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-581-5	85-01-8							
25	anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		204-371-1	120-12-7							
26	fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-912-4	206-44-0							
27	pyrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		204-927-3	129-00-0							
28	benzo[a]anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-033-00-9	200-280-6	56-55-3							
29	naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
30	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				14 mg/kg	1.462	16.554 mg/kg	0.00166 %	✓	
		215-160-9	1308-38-9							
Total:								0.0291 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
•	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS15-0.10-02/02/2024

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
WS15-0.10-02/02/2024	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.10 m	
Moisture content:	
18.5%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 18.5% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	chromium in chromium(VI) compounds { chromium(VI) oxide }				<2 mg/kg	1.923	<3.846 mg/kg	<0.000385 %			<LOD
	024-001-00-0	215-607-8	1333-82-0								
2	monohydric phenols				<2 mg/kg		<2 mg/kg	<0.0002 %			<LOD
			P1186								
3	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %			<LOD
	006-007-00-5										
4	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				10 mg/kg	1.895	15.44 mg/kg	0.00154 %	✓		
	033-005-00-1										
5	cadmium { cadmium sulfate }				<0.2 mg/kg	1.855	<0.371 mg/kg	<0.0000371 %			<LOD
	048-009-00-9	233-331-6	10124-36-4								
6	copper { copper sulphate pentahydrate }				12 mg/kg	3.929	38.426 mg/kg	0.00384 %	✓		
	029-023-00-4	231-847-6	7758-99-8								
7	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	35 mg/kg		28.525 mg/kg	0.00285 %	✓		
	082-001-00-6										
8	mercury { mercury difulminate }				<1 mg/kg	1.419	<1.419 mg/kg	<0.000142 %			<LOD
	080-005-00-2	211-057-8	628-86-4								
9	nickel { nickel diiodide }				6 mg/kg	5.324	26.036 mg/kg	0.0026 %	✓		
	028-029-00-4	236-666-6	13462-90-3								
10	selenium { nickel selenate }				<2 mg/kg	2.554	<5.108 mg/kg	<0.000511 %			<LOD
	028-031-00-5	239-125-2	15060-62-5								
11	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				49 mg/kg	4.398	175.631 mg/kg	0.0176 %	✓		
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]								
12	pH				5.8 pH		5.8 pH	5.8 pH			
			PH								
13	boron { boric acid; [1] boric acid; [2] }				<1 mg/kg	5.719	<5.719 mg/kg	<0.000572 %			<LOD
	005-007-00-2	233-139-2 [1] 234-343-4 [2]	10043-35-3 [1] 11113-50-1 [2]								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
14	chrysene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-048-00-0	205-923-4	218-01-9							
15	benzo[b]fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-034-00-4	205-911-9	205-99-2							
16	benzo[k]fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-036-00-5	205-916-6	207-08-9							
17	benzo[a]pyrene; benzo[def]chrysene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-032-00-3	200-028-5	50-32-8							
18	indeno[123-cd]pyrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-893-2	193-39-5							
19	dibenz[a,h]anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-041-00-2	200-181-8	53-70-3							
20	benzo[ghi]perylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-883-8	191-24-2							
21	acenaphthylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8							
22	acenaphthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-469-6	83-32-9							
23	fluorene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-695-5	86-73-7							
24	phenanthrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-581-5	85-01-8							
25	anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		204-371-1	120-12-7							
26	fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-912-4	206-44-0							
27	pyrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		204-927-3	129-00-0							
28	benzo[a]anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-033-00-9	200-280-6	56-55-3							
29	naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
30	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				15 mg/kg	1.462	17.868 mg/kg	0.00179 %	✓	
		215-160-9	1308-38-9							
Total:								0.0324 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
•	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS16-0.25-02/02/2024

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
WS16-0.25-02/02/2024	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.25 m	
Moisture content:	
17.9%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 17.9% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	chromium in chromium(VI) compounds { chromium(VI) oxide }				<2 mg/kg	1.923	<3.846 mg/kg	<0.000385 %			<LOD
	024-001-00-0	215-607-8	1333-82-0								
2	monohydric phenols				<2 mg/kg		<2 mg/kg	<0.0002 %			<LOD
			P1186								
3	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %			<LOD
	006-007-00-5										
4	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				10 mg/kg	1.895	15.554 mg/kg	0.00156 %	✓		
	033-005-00-1										
5	cadmium { cadmium sulfate }				<0.2 mg/kg	1.855	<0.371 mg/kg	<0.0000371 %			<LOD
	048-009-00-9	233-331-6	10124-36-4								
6	copper { copper sulphate pentahydrate }				11 mg/kg	3.929	35.483 mg/kg	0.00355 %	✓		
	029-023-00-4	231-847-6	7758-99-8								
7	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	20 mg/kg		16.42 mg/kg	0.00164 %	✓		
	082-001-00-6										
8	mercury { mercury difulminate }				<1 mg/kg	1.419	<1.419 mg/kg	<0.000142 %			<LOD
	080-005-00-2	211-057-8	628-86-4								
9	nickel { nickel diiodide }				6 mg/kg	5.324	26.228 mg/kg	0.00262 %	✓		
	028-029-00-4	236-666-6	13462-90-3								
10	selenium { nickel selenate }				<2 mg/kg	2.554	<5.108 mg/kg	<0.000511 %			<LOD
	028-031-00-5	239-125-2	15060-62-5								
11	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				33 mg/kg	4.398	119.153 mg/kg	0.0119 %	✓		
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]								
12	pH				6 pH		6 pH	6pH			
			PH								
13	boron { boric acid; [1] boric acid; [2] }				<1 mg/kg	5.719	<5.719 mg/kg	<0.000572 %			<LOD
	005-007-00-2	233-139-2 [1] 234-343-4 [2]	10043-35-3 [1] 11113-50-1 [2]								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
14	chrysene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-048-00-0	205-923-4	218-01-9							
15	benzo[b]fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-034-00-4	205-911-9	205-99-2							
16	benzo[k]fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-036-00-5	205-916-6	207-08-9							
17	benzo[a]pyrene; benzo[def]chrysene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-032-00-3	200-028-5	50-32-8							
18	indeno[123-cd]pyrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-893-2	193-39-5							
19	dibenz[a,h]anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-041-00-2	200-181-8	53-70-3							
20	benzo[ghi]perylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-883-8	191-24-2							
21	acenaphthylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8							
22	acenaphthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-469-6	83-32-9							
23	fluorene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-695-5	86-73-7							
24	phenanthrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-581-5	85-01-8							
25	anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		204-371-1	120-12-7							
26	fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-912-4	206-44-0							
27	pyrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		204-927-3	129-00-0							
28	benzo[a]anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-033-00-9	200-280-6	56-55-3							
29	naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
30	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				15 mg/kg	1.462	17.999 mg/kg	0.0018 %	✓	
		215-160-9	1308-38-9							
Total:								0.0253 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
•	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS18-0.25-02/02/2024

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
WS18-0.25-02/02/2024	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.25 m	
Moisture content:	
18.9%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 18.9% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	chromium in chromium(VI) compounds { chromium(VI) oxide }				<2 mg/kg	1.923	<3.846 mg/kg	<0.000385 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
2	monohydric phenols				<2 mg/kg		<2 mg/kg	<0.0002 %		<LOD
			P1186							
3	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
	006-007-00-5									
4	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				12 mg/kg	1.895	18.438 mg/kg	0.00184 %	✓	
	033-005-00-1									
5	cadmium { cadmium sulfate }				<0.2 mg/kg	1.855	<0.371 mg/kg	<0.0000371 %		<LOD
	048-009-00-9	233-331-6	10124-36-4							
6	copper { copper sulphate pentahydrate }				15 mg/kg	3.929	47.797 mg/kg	0.00478 %	✓	
	029-023-00-4	231-847-6	7758-99-8							
7	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	34 mg/kg		27.574 mg/kg	0.00276 %	✓	
	082-001-00-6									
8	mercury { mercury difulminate }				<1 mg/kg	1.419	<1.419 mg/kg	<0.000142 %		<LOD
	080-005-00-2	211-057-8	628-86-4							
9	nickel { nickel diiodide }				7 mg/kg	5.324	30.226 mg/kg	0.00302 %	✓	
	028-029-00-4	236-666-6	13462-90-3							
10	selenium { nickel selenate }				<2 mg/kg	2.554	<5.108 mg/kg	<0.000511 %		<LOD
	028-031-00-5	239-125-2	15060-62-5							
11	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				43 mg/kg	4.398	153.369 mg/kg	0.0153 %	✓	
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]							
12	pH				5.6 pH		5.6 pH	5.6 pH		
			PH							
13	boron { boric acid; [1] boric acid; [2] }				<1 mg/kg	5.719	<5.719 mg/kg	<0.000572 %		<LOD
	005-007-00-2	233-139-2 [1] 234-343-4 [2]	10043-35-3 [1] 11113-50-1 [2]							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
14	chrysene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-048-00-0	205-923-4	218-01-9							
15	benzo[b]fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-034-00-4	205-911-9	205-99-2							
16	benzo[k]fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-036-00-5	205-916-6	207-08-9							
17	benzo[a]pyrene; benzo[def]chrysene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-032-00-3	200-028-5	50-32-8							
18	indeno[123-cd]pyrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-893-2	193-39-5							
19	dibenz[a,h]anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-041-00-2	200-181-8	53-70-3							
20	benzo[ghi]perylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-883-8	191-24-2							
21	acenaphthylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8							
22	acenaphthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-469-6	83-32-9							
23	fluorene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-695-5	86-73-7							
24	phenanthrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-581-5	85-01-8							
25	anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		204-371-1	120-12-7							
26	fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-912-4	206-44-0							
27	pyrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		204-927-3	129-00-0							
28	benzo[a]anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-033-00-9	200-280-6	56-55-3							
29	naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
30	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				19 mg/kg	1.462	22.521 mg/kg	0.00225 %	✓	
		215-160-9	1308-38-9							
Total:								0.0322 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
•	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS19-0.20-02/02/2024

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
WS19-0.20-02/02/2024	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.20 m	
Moisture content:	
28%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 28% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	chromium in chromium(VI) compounds { chromium(VI) oxide }				<2 mg/kg	1.923	<3.846 mg/kg	<0.000385 %			<LOD
	024-001-00-0	215-607-8	1333-82-0								
2	monohydric phenols				<2 mg/kg		<2 mg/kg	<0.0002 %			<LOD
			P1186								
3	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %			<LOD
	006-007-00-5										
4	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				12 mg/kg	1.895	16.369 mg/kg	0.00164 %	✓		
	033-005-00-1										
5	cadmium { cadmium sulfate }				<0.2 mg/kg	1.855	<0.371 mg/kg	<0.0000371 %			<LOD
	048-009-00-9	233-331-6	10124-36-4								
6	copper { copper sulphate pentahydrate }				18 mg/kg	3.929	50.921 mg/kg	0.00509 %	✓		
	029-023-00-4	231-847-6	7758-99-8								
7	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	53 mg/kg		38.16 mg/kg	0.00382 %	✓		
	082-001-00-6										
8	mercury { mercury difulminate }				<1 mg/kg	1.419	<1.419 mg/kg	<0.000142 %			<LOD
	080-005-00-2	211-057-8	628-86-4								
9	nickel { nickel diiodide }				7 mg/kg	5.324	26.834 mg/kg	0.00268 %	✓		
	028-029-00-4	236-666-6	13462-90-3								
10	selenium { nickel selenate }				<2 mg/kg	2.554	<5.108 mg/kg	<0.000511 %			<LOD
	028-031-00-5	239-125-2	15060-62-5								
11	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				83 mg/kg	4.398	262.82 mg/kg	0.0263 %	✓		
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]								
12	pH				6.1 pH		6.1 pH	6.1 pH			
			PH								
13	boron { boric acid; [1] boric acid; [2] }				<1 mg/kg	5.719	<5.719 mg/kg	<0.000572 %			<LOD
	005-007-00-2	233-139-2 [1] 234-343-4 [2]	10043-35-3 [1] 11113-50-1 [2]								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
14	chrysene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-048-00-0	205-923-4	218-01-9							
15	benzo[b]fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-034-00-4	205-911-9	205-99-2							
16	benzo[k]fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-036-00-5	205-916-6	207-08-9							
17	benzo[a]pyrene; benzo[def]chrysene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-032-00-3	200-028-5	50-32-8							
18	indeno[123-cd]pyrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-893-2	193-39-5							
19	dibenz[a,h]anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-041-00-2	200-181-8	53-70-3							
20	benzo[ghi]perylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-883-8	191-24-2							
21	acenaphthylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8							
22	acenaphthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-469-6	83-32-9							
23	fluorene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-695-5	86-73-7							
24	phenanthrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-581-5	85-01-8							
25	anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		204-371-1	120-12-7							
26	fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-912-4	206-44-0							
27	pyrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		204-927-3	129-00-0							
28	benzo[a]anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-033-00-9	200-280-6	56-55-3							
29	naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
30	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				25 mg/kg	1.462	26.308 mg/kg	0.00263 %	✓	
		215-160-9	1308-38-9							
Total:								0.0443 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
•	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS20-0.10-02/02/2024

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
WS20-0.10-02/02/2024	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.10 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
22%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 22% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	chromium in chromium(VI) compounds { chromium(VI) oxide }				<2 mg/kg	1.923	<3.846 mg/kg	<0.000385 %			<LOD
	024-001-00-0	215-607-8	1333-82-0								
2	monohydric phenols				<2 mg/kg		<2 mg/kg	<0.0002 %			<LOD
			P1186								
3	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %			<LOD
	006-007-00-5										
4	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				12 mg/kg	1.895	17.733 mg/kg	0.00177 %	✓		
	033-005-00-1										
5	cadmium { cadmium sulfate }				<0.2 mg/kg	1.855	<0.371 mg/kg	<0.0000371 %			<LOD
	048-009-00-9	233-331-6	10124-36-4								
6	copper { copper sulphate pentahydrate }				21 mg/kg	3.929	64.358 mg/kg	0.00644 %	✓		
	029-023-00-4	231-847-6	7758-99-8								
7	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	85 mg/kg		66.3 mg/kg	0.00663 %	✓		
	082-001-00-6										
8	mercury { mercury difulminate }				<1 mg/kg	1.419	<1.419 mg/kg	<0.000142 %			<LOD
	080-005-00-2	211-057-8	628-86-4								
9	nickel { nickel diiodide }				9 mg/kg	5.324	37.377 mg/kg	0.00374 %	✓		
	028-029-00-4	236-666-6	13462-90-3								
10	selenium { nickel selenate }				<2 mg/kg	2.554	<5.108 mg/kg	<0.000511 %			<LOD
	028-031-00-5	239-125-2	15060-62-5								
11	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				112 mg/kg	4.398	384.203 mg/kg	0.0384 %	✓		
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]								
12	pH				6 pH		6 pH	6pH			
			PH								
13	boron { boric acid; [1] boric acid; [2] }				<1 mg/kg	5.719	<5.719 mg/kg	<0.000572 %			<LOD
	005-007-00-2	233-139-2 [1] 234-343-4 [2]	10043-35-3 [1] 11113-50-1 [2]								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
14	chrysene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-048-00-0	205-923-4	218-01-9							
15	benzo[b]fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-034-00-4	205-911-9	205-99-2							
16	benzo[k]fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-036-00-5	205-916-6	207-08-9							
17	benzo[a]pyrene; benzo[def]chrysene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-032-00-3	200-028-5	50-32-8							
18	indeno[123-cd]pyrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-893-2	193-39-5							
19	dibenz[a,h]anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-041-00-2	200-181-8	53-70-3							
20	benzo[ghi]perylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-883-8	191-24-2							
21	acenaphthylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8							
22	acenaphthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-469-6	83-32-9							
23	fluorene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-695-5	86-73-7							
24	phenanthrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-581-5	85-01-8							
25	anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		204-371-1	120-12-7							
26	fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-912-4	206-44-0							
27	pyrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		204-927-3	129-00-0							
28	benzo[a]anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-033-00-9	200-280-6	56-55-3							
29	naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
30	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				21 mg/kg	1.462	23.94 mg/kg	0.00239 %	✓	
		215-160-9	1308-38-9							
Total:								0.0616 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
•	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Appendix A: Classifier defined and non GB MCL determinands

▪ monohydric phenols (CAS Number: P1186)

Description/Comments: Combined hazards statements from harmonised entries in CLP for phenol, cresols and xylenols (604-001-00-2, 604-004-00-9, 604-006-00-X)

Data source: CLP combined data

Data source date: 26 Mar 2019

Hazard Statements: Muta. 2; H341 , Acute Tox. 3; H331 , Acute Tox. 3; H311 , Acute Tox. 3; H301 , STOT RE 2; H373 , Skin Corr. 1B; H314 , Skin Corr. 1B; H314 >= 3 % , Skin Irrit. 2; H315 1 <= conc. < 3 % , Eye Irrit. 2; H319 1 <= conc. < 3 % , Aquatic Chronic 2; H411

▪ salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex

GB MCL index number: 006-007-00-5

Description/Comments: Conversion factor based on a worst case compound: sodium cyanide

Additional Hazard Statement(s): EUH032 >= 0.2 %

Reason for additional Hazards Statement(s):

20 Nov 2021 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

▪ lead compounds with the exception of those specified elsewhere in this Annex (worst case)

GB MCL index number: 082-001-00-6

Description/Comments: Worst Case: IARC considers lead compounds Group 2A; Probably carcinogenic to humans; Lead REACH Consortium, following MCL protocols, considers lead compounds from smelting industries, flue dust and similar to be Carcinogenic category 1A

Additional Hazard Statement(s): Carc. 1A; H350

Reason for additional Hazards Statement(s):

20 Nov 2021 - Carc. 1A; H350 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html (worst case lead compounds). Review date 29/09/2015

▪ pH (CAS Number: PH)

Description/Comments: Appendix C4

Data source: WM3 1st Edition 2015

Data source date: 25 May 2015

Hazard Statements: None.

▪ indeno[123-cd]pyrene (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

Hazard Statements: Carc. 2; H351

▪ benzo[ghi]perylene (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 23 Jul 2015

Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

▪ acenaphthylene (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 1; H330 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

▪ acenaphthene (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Aquatic Chronic 2; H411

▪ fluorene (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• **phenanthrene** (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

Hazard Statements: Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Skin Irrit. 2; H315

• **anthracene** (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 21 Aug 2015

Hazard Statements: Acute Tox. 4; H302 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 21 Aug 2015

Hazard Statements: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• **chromium(III) oxide (worst case)** (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from C&L Inventory Database

Data source: <https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806>

Data source date: 17 Jul 2015

Hazard Statements: Acute Tox. 4; H332 , Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Resp. Sens. 1; H334 , Skin Sens. 1; H317 , Repr. 1B; H360FD , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

Appendix B: Rationale for selection of metal species

chromium in chromium(VI) compounds {chromium(VI) oxide}

Insufficient CrVI

cyanides {salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex}

Worst-case

arsenic {arsenic acid and its salts with the exception of those specified elsewhere in this Annex}

Worst case.

cadmium {cadmium sulfate}

Worst-case

copper {copper sulphate pentahydrate}

Worst-case

lead {lead compounds with the exception of those specified elsewhere in this Annex (worst case)}

Worst-case

mercury {mercury difulminate}

Worst-case

nickel {nickel diiodide}

Worst-case

selenium {nickel selenate}

Worst-case.

zinc {zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2]}

In sufficient Cr(VI), next worst case.

boron {boric acid; [1] boric acid; [2]}

Boron tribromide/trichloride react violently with water and unlikely to be present. Next worst case.

chromium in chromium(III) compounds {chromium(III) oxide (worst case)}

Worst-case

Appendix C: Version

HazWasteOnline Classification Engine: **WM3 1st Edition v1.2.GB - Oct 2021**

HazWasteOnline Classification Engine Version: 2024.80.5988.11077 (20 Mar 2024)

HazWasteOnline Database: 2024.80.5988.11077 (20 Mar 2024)

This classification utilises the following guidance and legislation:

WM3 v1.2.GB - Waste Classification - 1st Edition v1.2.GB - Oct 2021

CLP Regulation - Regulation 1272/2008/EC of 16 December 2008

1st ATP - Regulation 790/2009/EC of 10 August 2009

2nd ATP - Regulation 286/2011/EC of 10 March 2011

3rd ATP - Regulation 618/2012/EU of 10 July 2012

4th ATP - Regulation 487/2013/EU of 8 May 2013

Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013

5th ATP - Regulation 944/2013/EU of 2 October 2013

6th ATP - Regulation 605/2014/EU of 5 June 2014

WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014

Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014

7th ATP - Regulation 2015/1221/EU of 24 July 2015

8th ATP - Regulation (EU) 2016/918 of 19 May 2016

9th ATP - Regulation (EU) 2016/1179 of 19 July 2016

10th ATP - Regulation (EU) 2017/776 of 4 May 2017

HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017

13th ATP - Regulation (EU) 2018/1480 of 4 October 2018

14th ATP - Regulation (EU) 2020/217 of 4 October 2019

15th ATP - Regulation (EU) 2020/1182 of 19 May 2020

The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit)

Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020

The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020

GB MCL List - version 1.1 of 09 June 2021

GB MCL List v2.0 - version 2.0 of 20th October 2023

GB MCL List v4.0 - version 4.0 of 2nd March 2024

APPENDIX 7 – CBR CALCULATIONS

CBR Calculation

Jomas Job: Folders Lane
Jomas Job No.: P1215J553b

Test Location: WS1
Date of Test: 30/01/2024

Depth (mm) **Nr Blow** **Cumulative blows**

Calculating Engineer: KJF
Approved by: TE

Date: 06/02/2024
Date: 28/03/2024

100 0 0
200 0 0
300 0 0
400 0 0
500 0 0
600 0 0
700 2 2
800 3 5
900 2 7
1000 2 9

Test	Initial Depth (mm)	Final Depth (mm)	mm / blow	CBR (%)		E (MPa)
				IAN 73/06	TRL 587	
WS1-Test 1	600	800	40.0	6.1	6.6	55.99
WS1-Test 2	800	1000	50.0	4.8	5.3	48.03

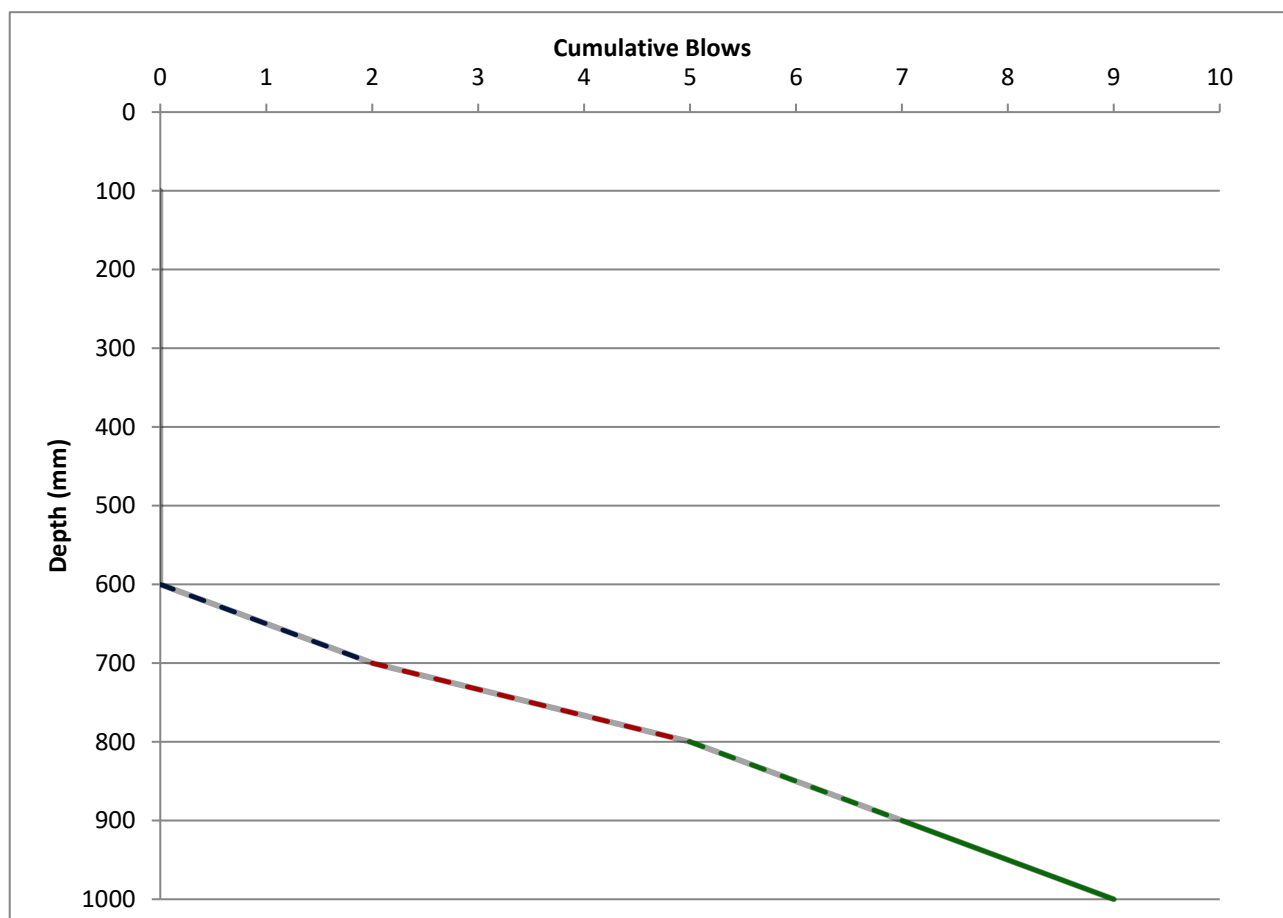
Test Notes:

Test carried out using a TRL Dynamic Cone Penetrometer consisting of a 8 kg free fall hammer lifted and dropped through a height of 575mm.

Colour of text refers to the modelled gradient on graph below.

CBR's calculated using methodologies outlined in IAN 73/06 and in TRL 587.

Characteristic MC% ? N



CBR Calculation

Jomas Job: Folders Lane
Jomas Job No.: P1215J553b

Test Location: WS2
Date of Test: 30/01/2024

Depth (mm)	Nr Blow	Cumulative blows
100	0	0
200	0	0
300	0	0
400	0	0
500	0	0
600	0	0
700	0	0
800	0	0
900	0	0
1000	0	0

Calculating Engineer: KJF
Approved by: TE

Date: 06/02/2024
Date: 28/03/2024

Test	Initial Depth (mm)	Final Depth (mm)	mm / blow	CBR (%)		E (MPa)
				IAN 73/06	TRL 587	

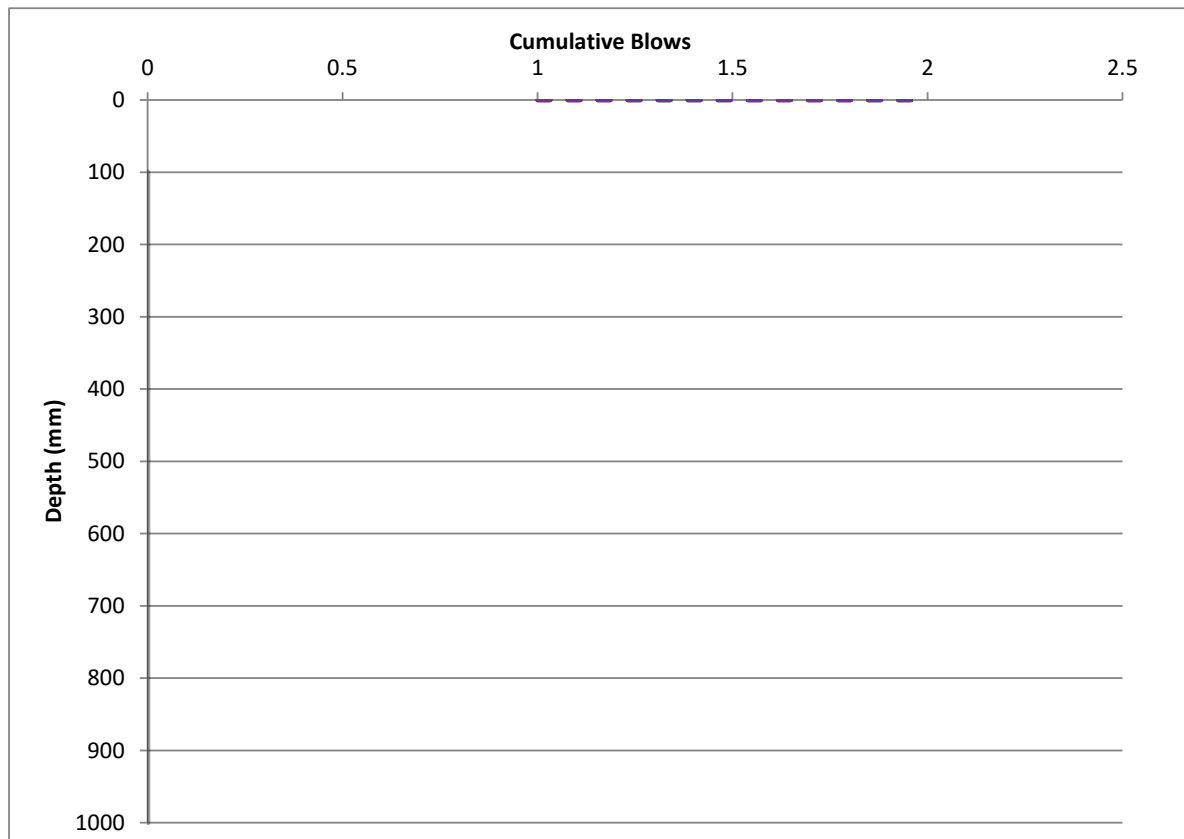
Test Notes:

Test carried out using a TRL Dynamic Cone Penetrometer consisting of a 8 kg free fall hammer lifted and dropped through a height of 575mm.

Colour of text refers to the modelled gradient on graph below.

CBR's calculated using methodologies outlined in IAN 73/06 and in TRL 587.

Characteristic MC% ? N



CBR Calculation

Jomas Job: Folders Lane
Jomas Job No.: P1215J553b

Test Location: WS4
Date of Test: 30/01/2024

Depth (mm)	Nr Blow	Cumulative blows
100	0	0
200	0	0
300	0	0
400	0	0
500	2	2
600	3	5
700	2	7
800	2	9
900	2	11
1000	5	16

Calculating Engineer: KJF
Approved by: TE

Date: 06/02/2024
Date: 28/03/2024

Test	Initial Depth (mm)	Final Depth (mm)	mm / blow	CBR (%)		E (MPa)
				IAN 73/06	TRL 587	
WS4-Test 1	400	900	45.5	5.3	5.9	51.17
WS4-Test 2	900	1000	20.0	12.7	13.1	89.53

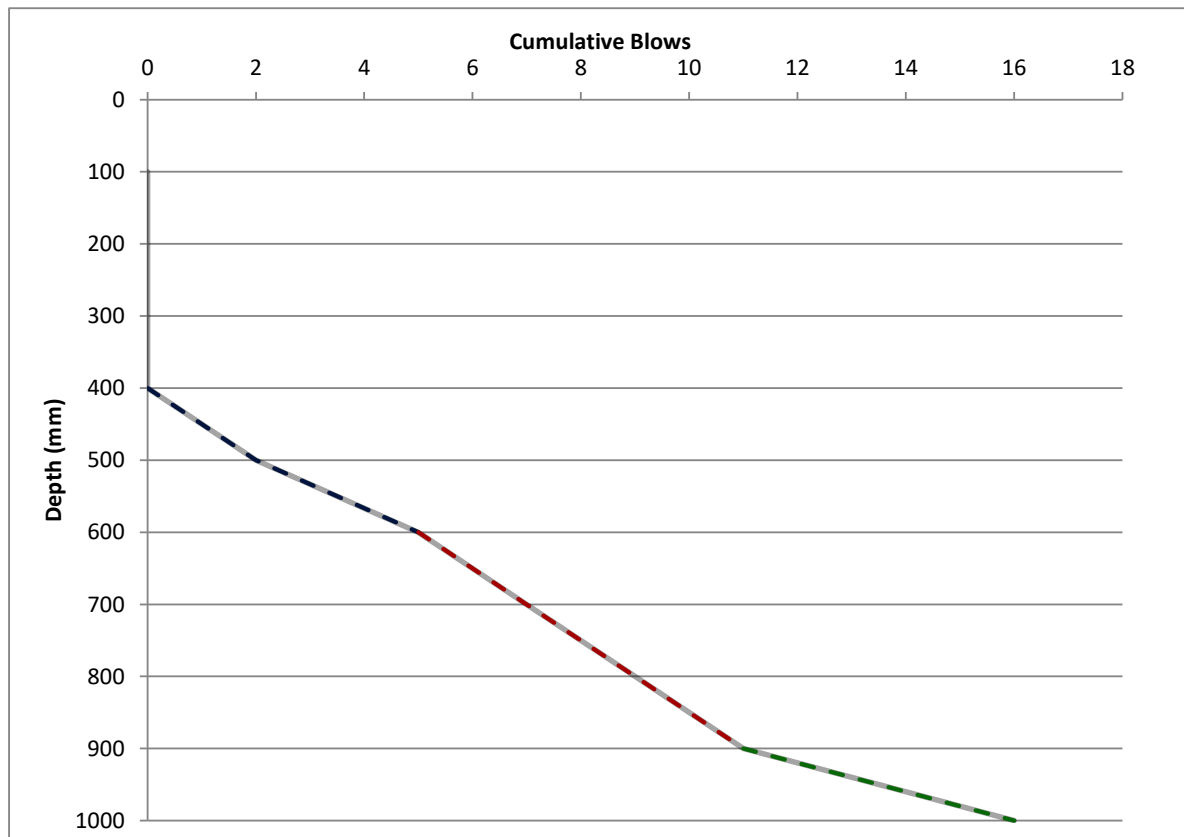
Test Notes:

Test carried out using a TRL Dynamic Cone Penetrometer consisting of a 8 kg free fall hammer lifted and dropped through a height of 575mm.

Colour of text refers to the modelled gradient on graph below.

CBR's calculated using methodologies outlined in IAN 73/06 and in TRL 587.

Characteristic MC% ? N



CBR Calculation

Jomas Job: Folders Lane
Jomas Job No.: P1215J553b

Test Location: WS8
Date of Test: 30/01/2024

Depth (mm)	Nr Blow	Cumulative blows
100	0	0
200	0	0
300	0	0
400	0	0
500	0	0
600	5	5
700	7	12
800	5	17
900	7	24
1000	8	32

Calculating Engineer: KJF
Approved by: TE

Date: 06/02/2024
Date: 28/03/2024

Test	Initial Depth (mm)	Final Depth (mm)	mm / blow	CBR (%)		E (MPa)
				IAN 73/06	TRL 587	
WS8-Test 1	500	1000	15.6	16.5	16.7	105.85

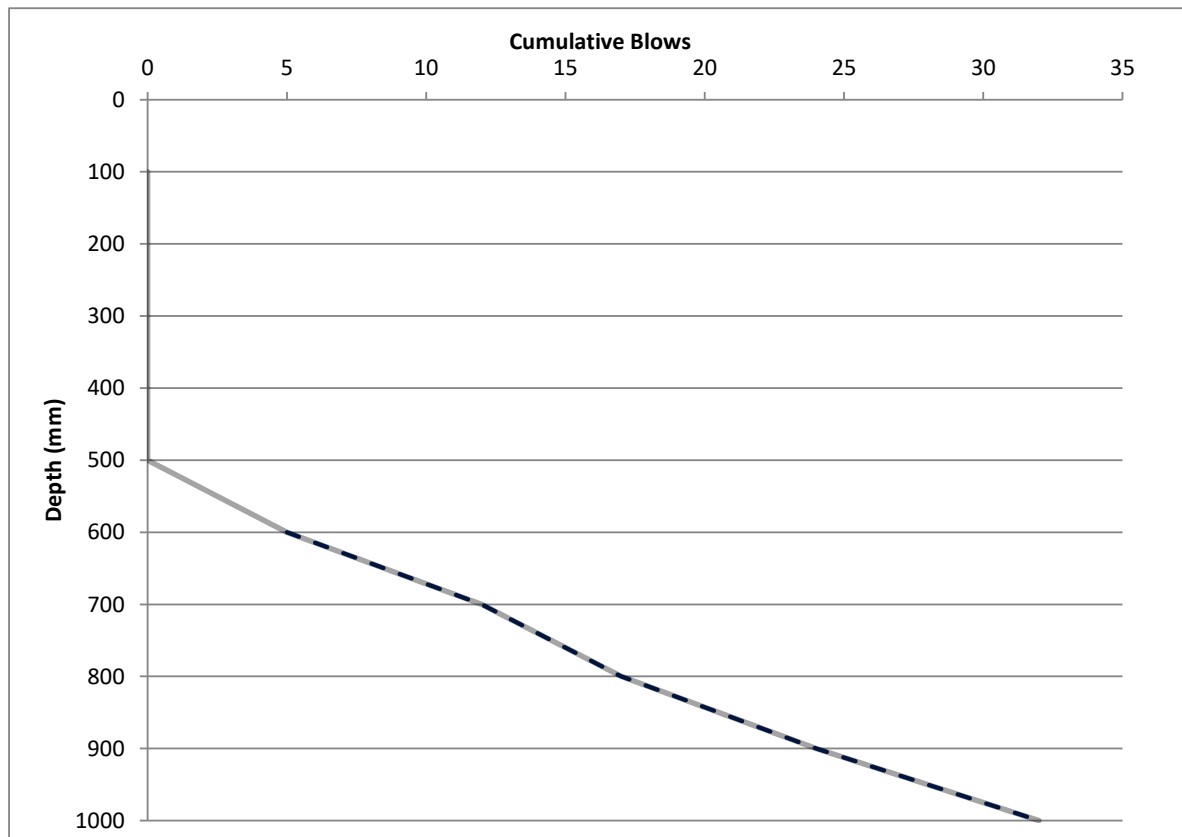
Test Notes:

Test carried out using a TRL Dynamic Cone Penetrometer consisting of a 8 kg free fall hammer lifted and dropped through a height of 575mm.

Colour of text refers to the modelled gradient on graph below.

CBR's calculated using methodologies outlined in IAN 73/06 and in TRL 587.

Characteristic MC% ? N



CBR Calculation

Jomas Job: Folders Lane
Jomas Job No.: P1215J553b

Test Location: WS10
Date of Test: 30/01/2024

Depth (mm)	Nr Blow	Cumulative blows
100	0	0
200	0	0
300	0	0
400	0	0
500	0	0
600	0	0
700	3	3
800	5	8
900	6	14
1000	5	19

Calculating Engineer: KJF
Approved by: TE

Date: 06/02/2024
Date: 28/03/2024

Test	Initial Depth (mm)	Final Depth (mm)	mm / blow	CBR (%)		E (MPa)
				IAN 73/06	TRL 587	
WS10-Test 1	600	700	33.3	7.4	7.9	63.36
WS10-Test 2	700	1000	18.8	13.6	14.0	93.54

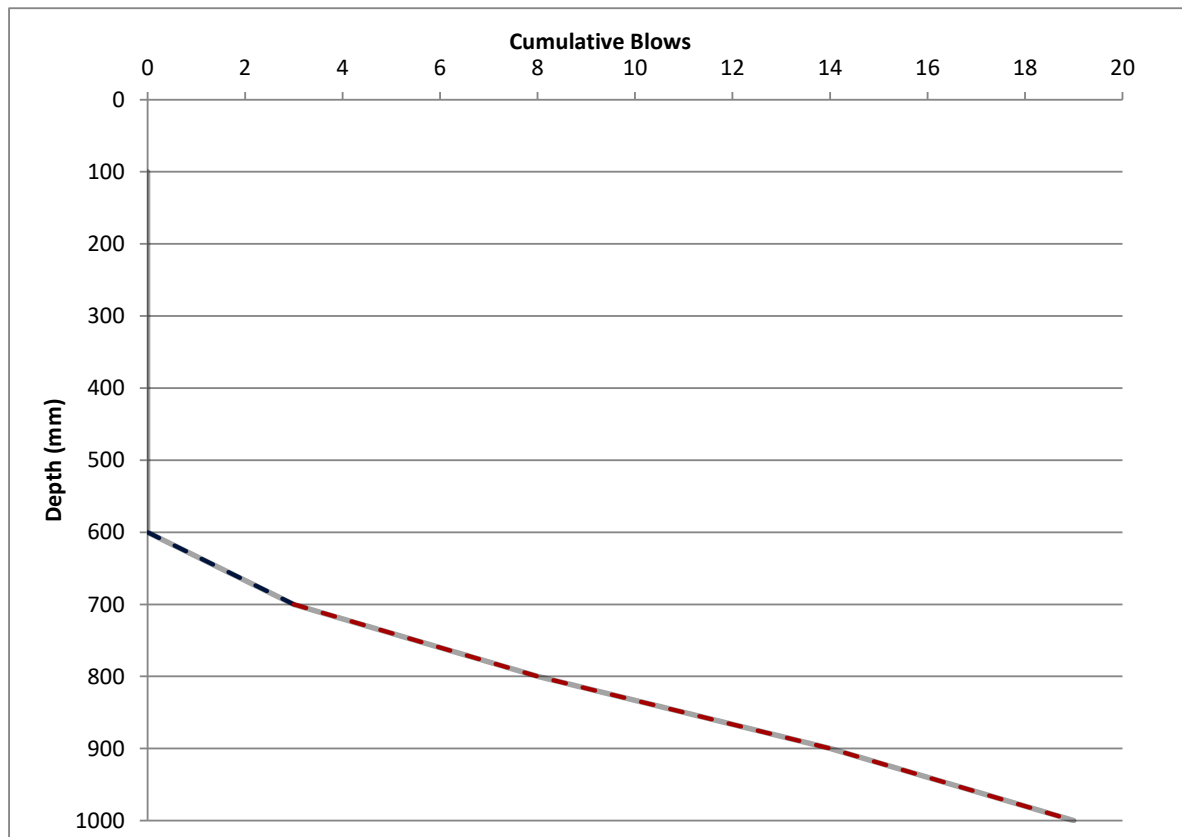
Test Notes:

Test carried out using a TRL Dynamic Cone Penetrometer consisting of a 8 kg free fall hammer lifted and dropped through a height of 575mm.

Colour of text refers to the modelled gradient on graph below.

CBR's calculated using methodologies outlined in IAN 73/06 and in TRL 587.

Characteristic MC% ? N



CBR Calculation

Jomas Job: Folders Lane
Jomas Job No.: P1215J553b

Test Location: WS11
Date of Test: 30/01/2024

Depth (mm)	Nr Blow	Cumulative blows
100	0	0
200	0	0
300	0	0
400	0	0
500	0	0
600	0	0
700	0	0
800	0	0
900	0	0
1000	4	4

Calculating Engineer: KJF
Approved by: TE

Date: 06/02/2024
Date: 28/03/2024

Test	Initial Depth (mm)	Final Depth (mm)	mm / blow	CBR (%)		E (MPa)
				IAN 73/06	TRL 587	
WS11-Test 1	900	1000	25.0	10.1	10.5	77.32

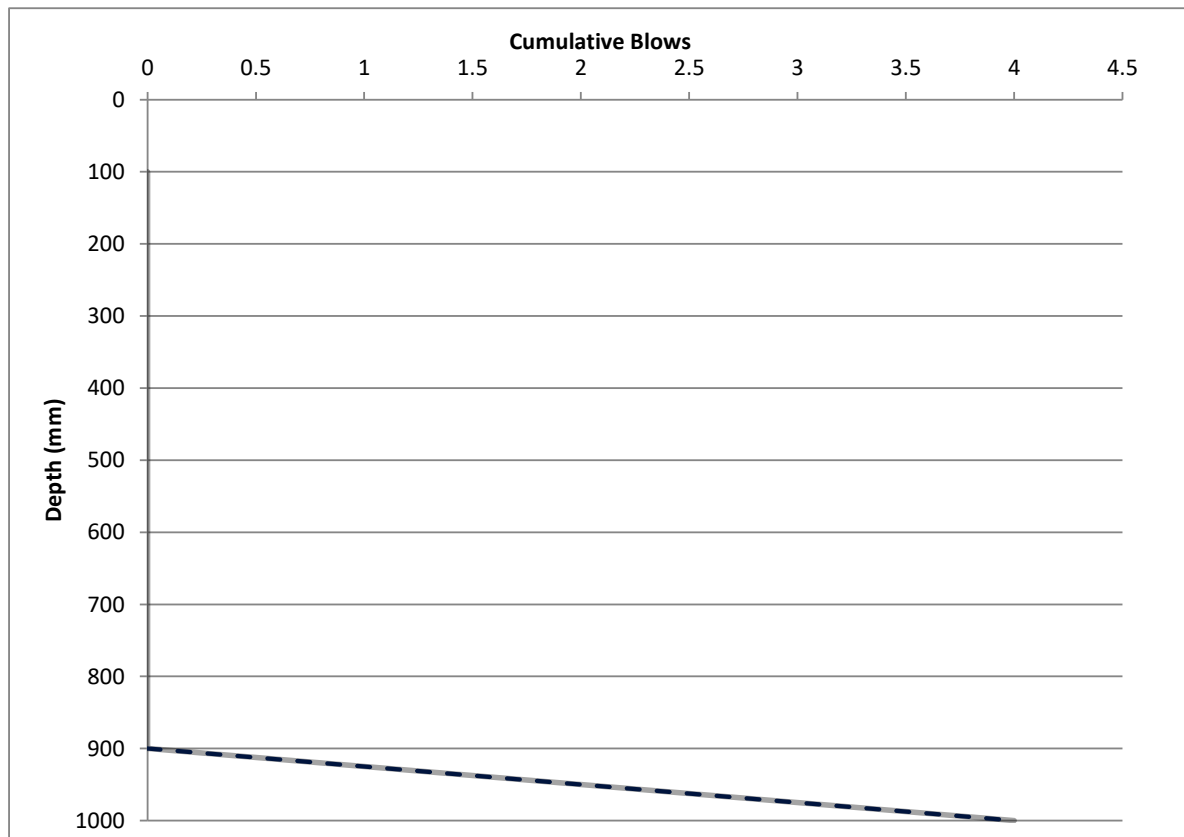
Test Notes:

Test carried out using a TRL Dynamic Cone Penetrometer consisting of a 8 kg free fall hammer lifted and dropped through a height of 575mm.

Colour of text refers to the modelled gradient on graph below.

CBR's calculated using methodologies outlined in IAN 73/06 and in TRL 587.

Characteristic MC% ? N



CBR Calculation

Jomas Job: Folders Lane
Jomas Job No.: P1215J553b

Test Location: WS17
Date of Test: 30/01/2024

Depth (mm)	Nr Blow	Cumulative blows
100	0	0
200	0	0
300	0	0
400	0	0
500	5	5
600	3	8
700	5	13
800	3	16
900	4	20
1000	5	25

Calculating Engineer: KJF
Approved by: TE

Date: 06/02/2024
Date: 28/03/2024

Test	Initial Depth (mm)	Final Depth (mm)	mm / blow	CBR (%)		E (MPa)
				IAN 73/06	TRL 587	
WS17-Test 1	400	500	20.0	12.7	13.1	89.53
WS17-Test 2	500	100	80.0	2.9	3.4	34.79

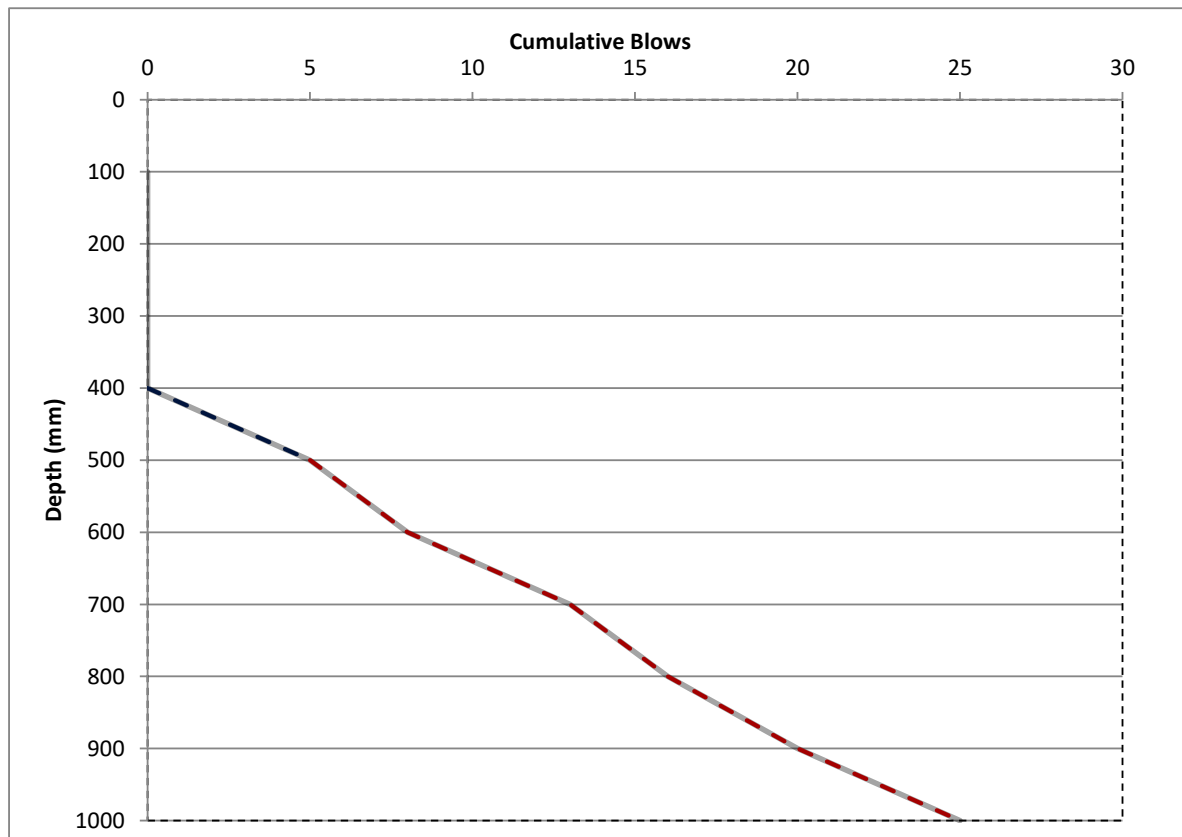
Test Notes:

Test carried out using a TRL Dynamic Cone Penetrometer consisting of a 8 kg free fall hammer lifted and dropped through a height of 575mm.

Colour of text refers to the modelled gradient on graph below.

CBR's calculated using methodologies outlined in IAN 73/06 and in TRL 587.

Characteristic MC% ? N



CBR Calculation

Jomas Job: Folders Lane
Jomas Job No.: P1215J553b

Test Location: WS13
Date of Test: 30/01/2024

Depth (mm)	Nr Blow	Cumulative blows
100	0	0
200	0	0
300	0	0
400	0	0
500	0	0
600	0	0
700	3	3
800	5	8
900	4	12
1000	7	19

Calculating Engineer: KJF
Approved by: TE

Date: 06/02/2024
Date: 28/03/2024

Test	Initial Depth (mm)	Final Depth (mm)	mm / blow	CBR (%)		E (MPa)
				IAN 73/06	TRL 587	
WS13-Test 1	600	900	25.0	10.1	11.3	77.32
WS13-Test 2	900	1000	14.3	18.2	19.9	112.71

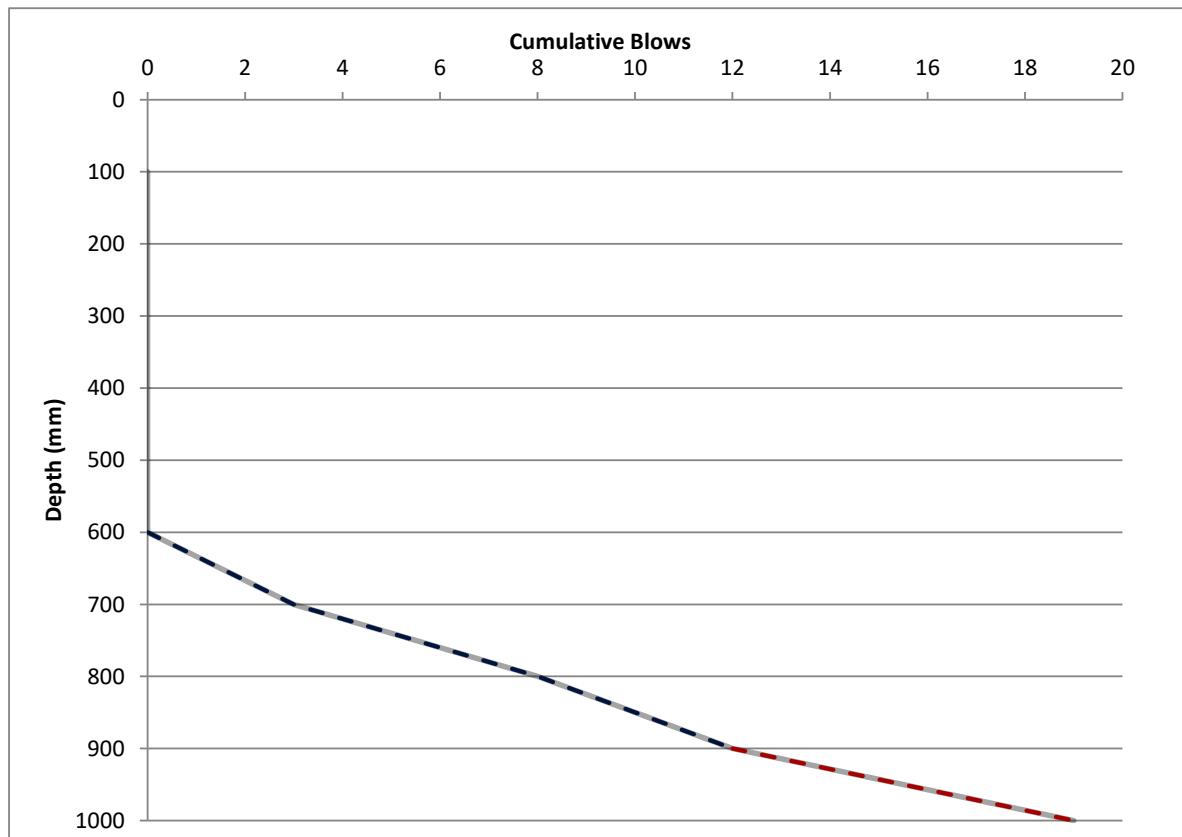
Test Notes:

Test carried out using a TRL Dynamic Cone Penetrometer consisting of a 8 kg free fall hammer lifted and dropped through a height of 575mm.

Colour of text refers to the modelled gradient on graph below.

CBR's calculated using methodologies outlined in IAN 73/06 and in TRL 587.

Characteristic MC% ? Y 20 %



CBR Calculation

Jomas Job: Folders Lane
Jomas Job No.: P1215J553b

Test Location: WS14
Date of Test: 30/01/2024

Depth (mm)	Nr Blow	Cumulative blows
100	0	0
200	0	0
300	0	0
400	0	0
500	0	0
600	0	0
700	0	0
800	0	0
900	0	0
1000	5	5

Calculating Engineer: KJF
Approved by: TE

Date: 06/02/2024
Date: 28/03/2024

Test	Initial Depth (mm)	Final Depth (mm)	mm / blow	CBR (%)		E (MPa)
				IAN 73/06	TRL 587	
WS14-Test 1	900	1000	20.0	12.7	13.1	89.53

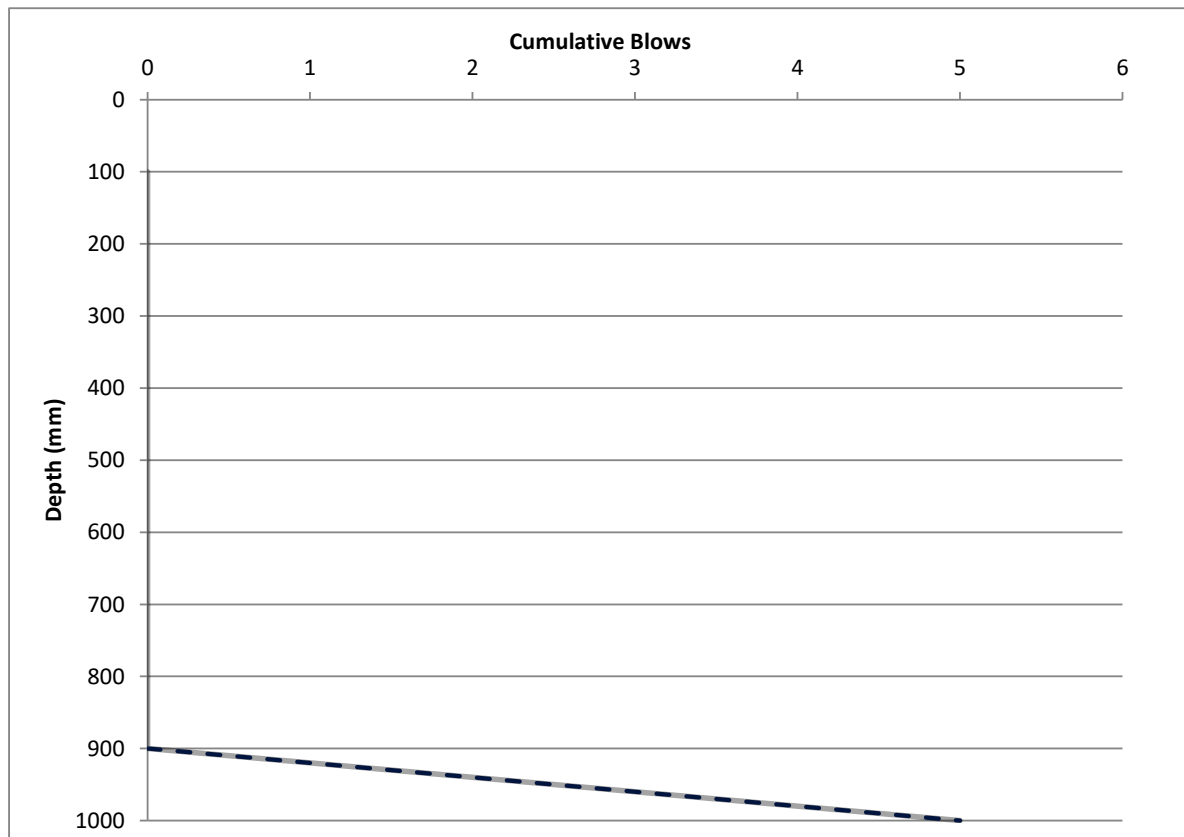
Test Notes:

Test carried out using a TRL Dynamic Cone Penetrometer consisting of a 8 kg free fall hammer lifted and dropped through a height of 575mm.

Colour of text refers to the modelled gradient on graph below.

CBR's calculated using methodologies outlined in IAN 73/06 and in TRL 587.

Characteristic MC% ? N



CBR Calculation

Jomas Job: Folders Lane
Jomas Job No.: P1215J553b

Test Location: WS18
Date of Test: 30/01/2024

Depth (mm)	Nr Blow	Cumulative blows
100	0	0
200	0	0
300	0	0
400	0	0
500	0	0
600	0	0
700	0	0
800	0	0
900	0	0
1000	0	0

Calculating Engineer: KJF
Approved by: TE

Date: 06/02/2024
Date: 28/03/2024

Test	Initial Depth (mm)	Final Depth (mm)	mm / blow	CBR (%)		E (MPa)
				IAN 73/06	TRL 587	

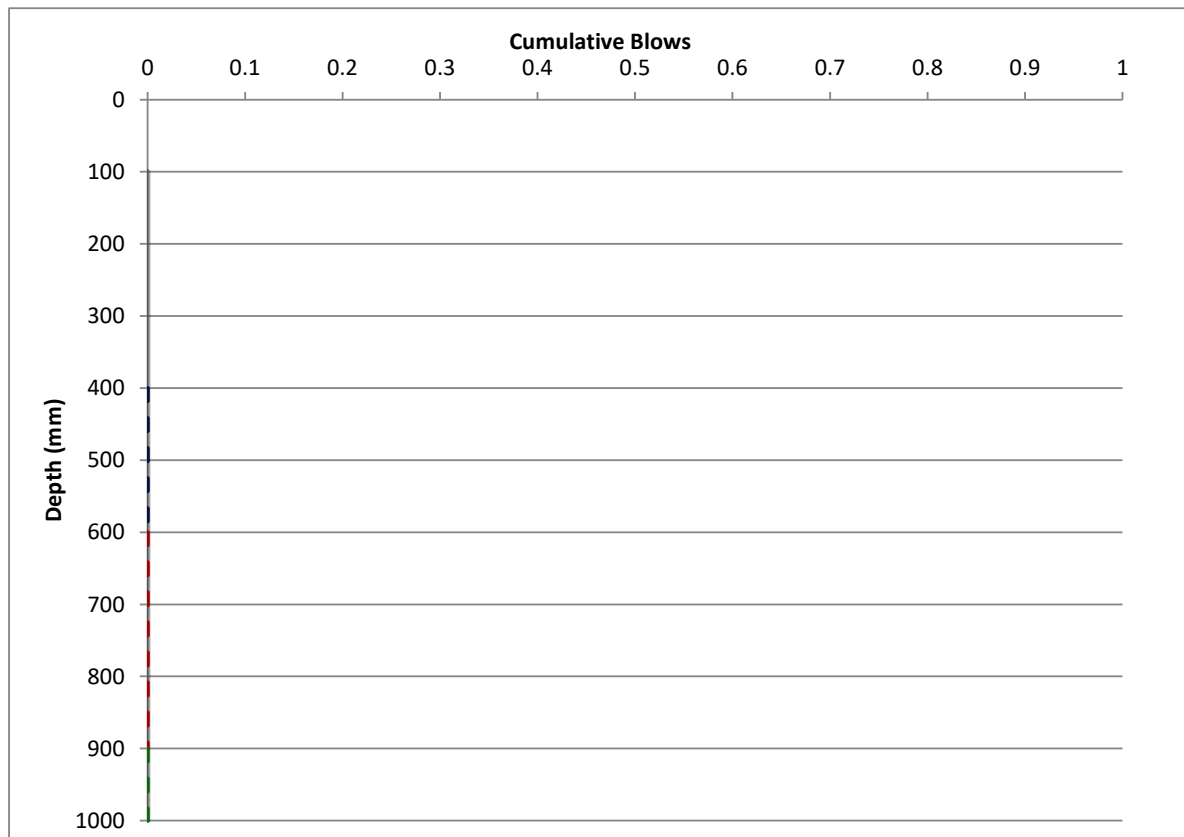
Test Notes:

Test carried out using a TRL Dynamic Cone Penetrometer consisting of a 8 kg free fall hammer lifted and dropped through a height of 575mm.

Colour of text refers to the modelled gradient on graph below.

CBR's calculated using methodologies outlined in IAN 73/06 and in TRL 587.

Characteristic MC% ? N



CBR Calculation

Jomas Job: Folders Lane
Jomas Job No.: P1215J553b

Test Location: WS20
Date of Test: 30/01/2024

Depth (mm)	Nr Blow	Cumulative blows
100	0	0
200	0	0
300	0	0
400	0	0
500	0	0
600	0	0
700	0	0
800	0	0
900	0	0
1000	1	1

Calculating Engineer: KJF
Approved by: TE

Date: 06/02/2024
Date: 28/03/2024

Test	Initial Depth (mm)	Final Depth (mm)	mm / blow	CBR (%)		E (MPa)
				IAN 73/06	TRL 587	
WS20-Test 1	900	1000	100.0	2.3	2.7	29.99

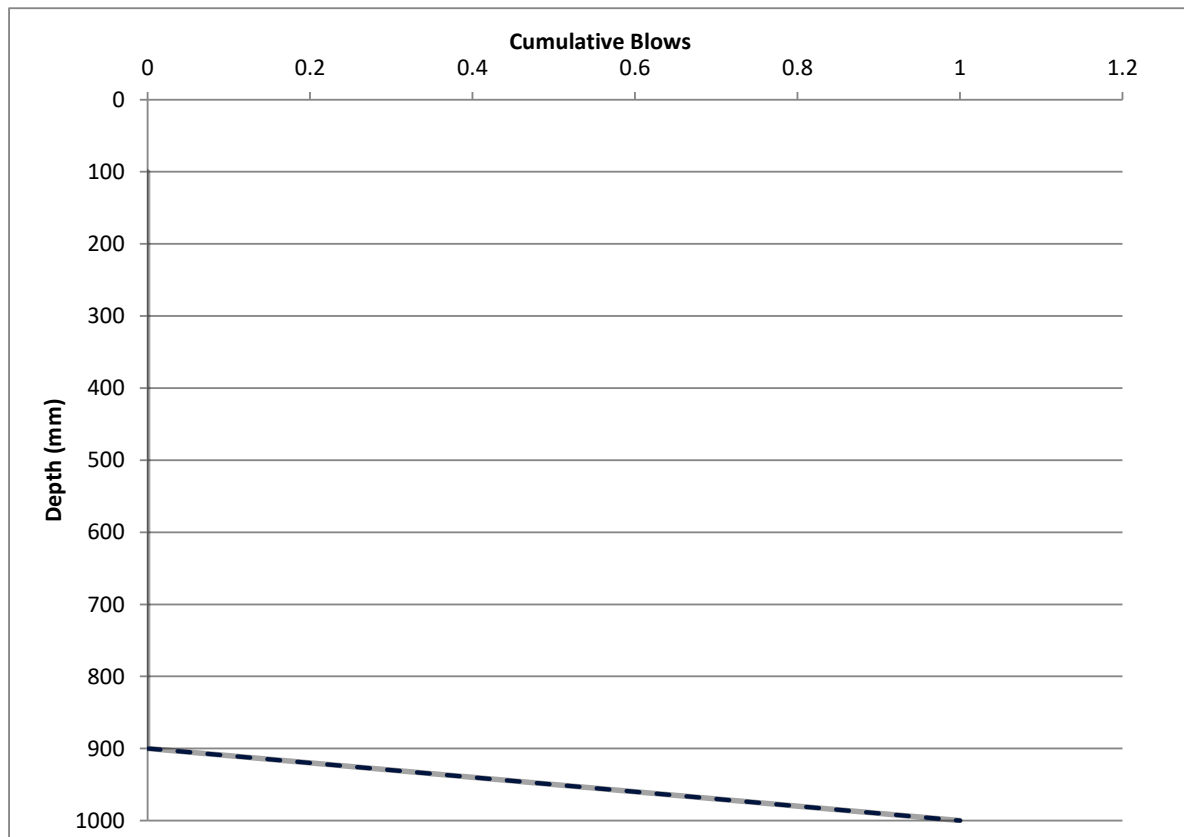
Test Notes:

Test carried out using a TRL Dynamic Cone Penetrometer consisting of a 8 kg free fall hammer lifted and dropped through a height of 575mm.

Colour of text refers to the modelled gradient on graph below.

CBR's calculated using methodologies outlined in IAN 73/06 and in TRL 587.

Characteristic MC% ? N

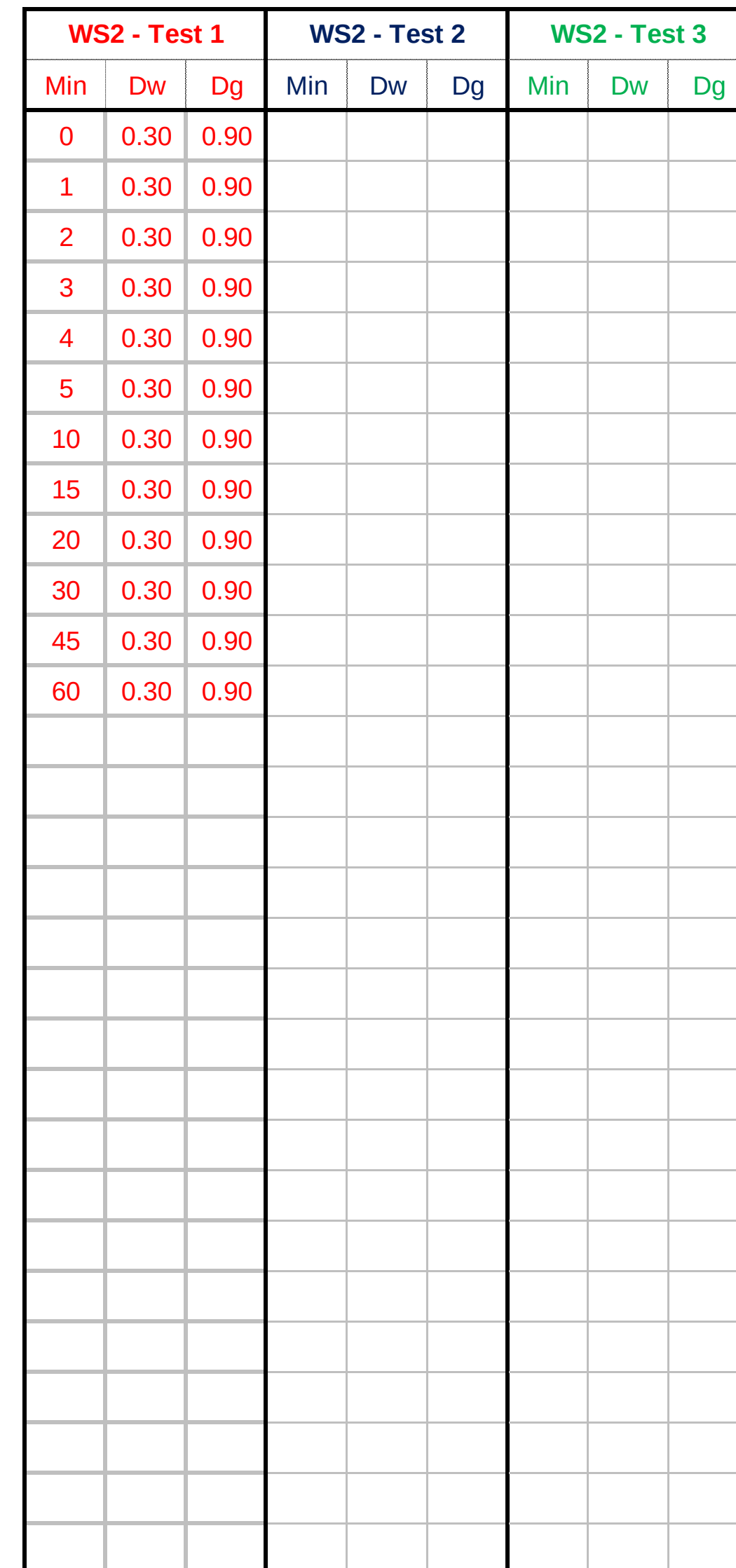


APPENDIX 8 – FALLING HEAD TEST CALCULATORS

DATE: 06 February 2024

DATE: 28 March 2024

	WS2 - Test 1	WS2 - Test 2	WS2 - Test 3
t1 (min):	0		
t2 (min):	60		
t2-t1 (min):	60		
t2-t1 (sec):	3600		
h1 (m):	0.90		
h2 (m):	0.90		
Permeability (m/sec):	0.00E+00		
Permeability Description:	#DIV/0!		
Drainage Condtions:	#DIV/0!		

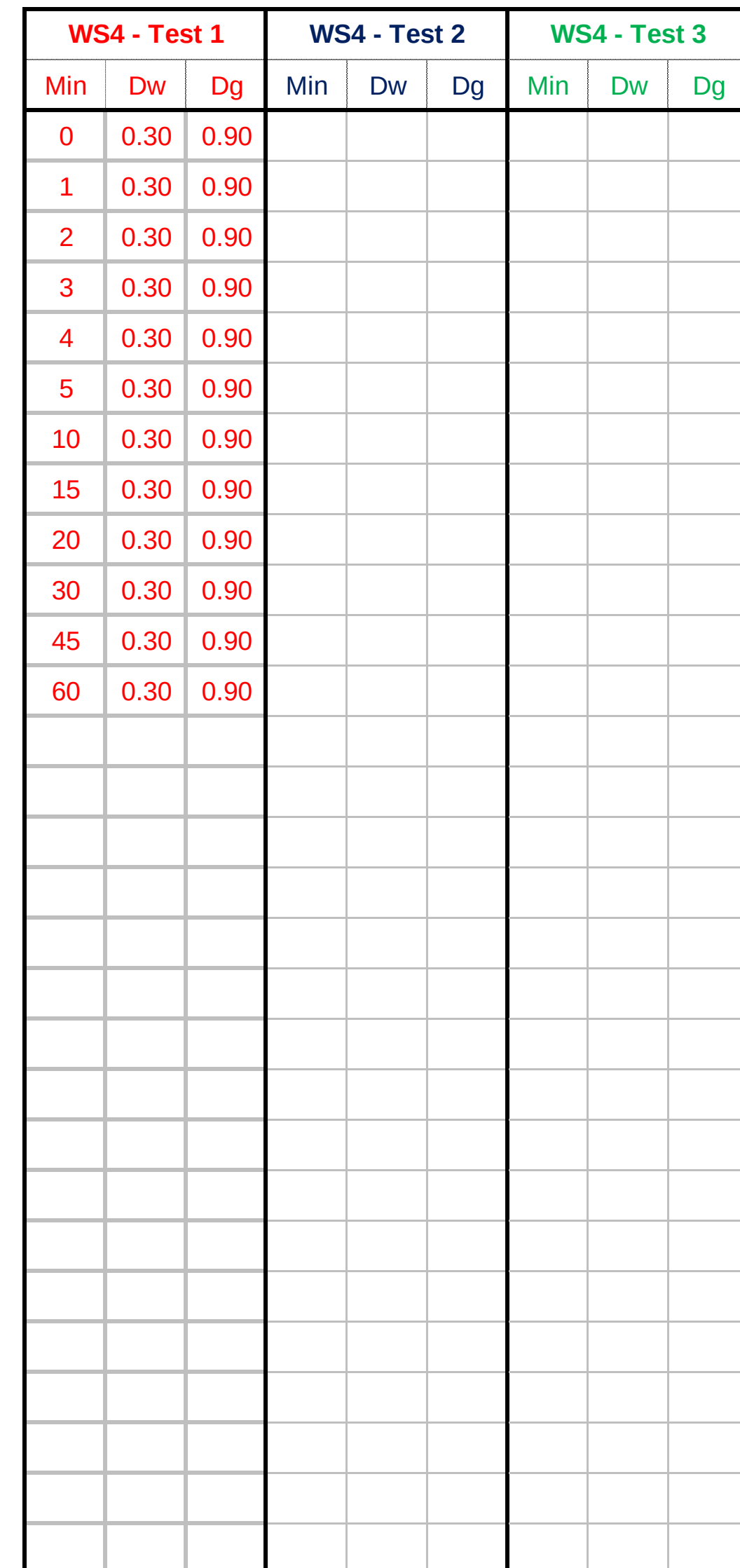


D_g = head of water in the exploratory hole

DATE: 06 February 2024

DATE: 28 March 2024

WS4 - Test 3



D_g = head of water in the exploratory hole

DATE: 06 February 2024

DATE: 28 March 2024

#DIV/0!



Notes:

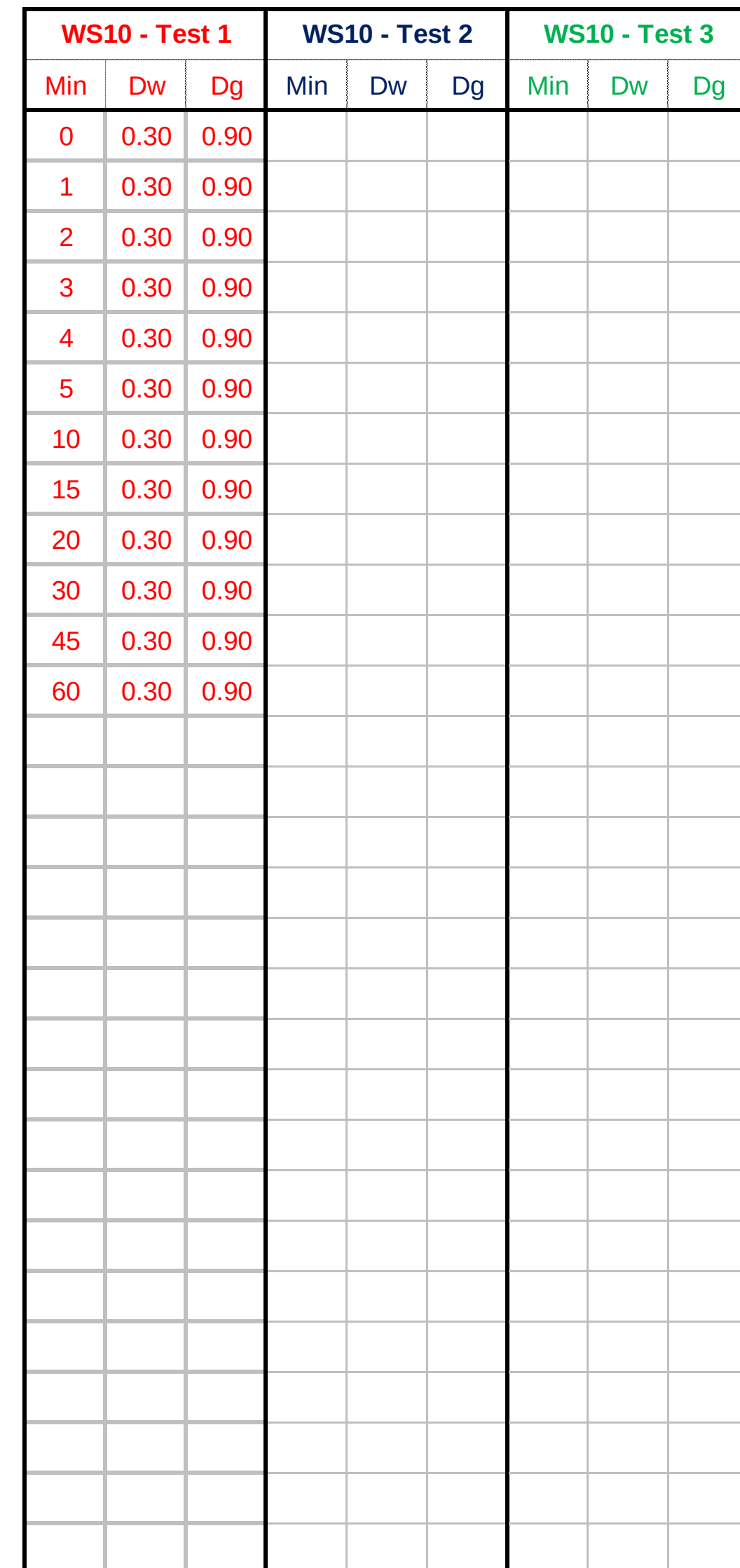
Dw = depth to water

Dg = head of water in the exploratory hole

DATE: 06 February 2024

DATE: 28 March 2024

t1 (min):	0
t2 (min):	60
t2-t1 (min):	60
t2-t1 (sec):	3600
h1 (m):	0.90
h2 (m):	0.90
Permeability (m/sec):	0.00E+00
Permeability Description:	#DIV/0!
Drainage Conditions:	#DIV/0!



D_g = head of water in the exploratory hole

DATE: 06 February 2024

DATE: 28 March 2024

BOREHOLE INFORMATION

WS11 - Test 3

60

60

3600

0.90

0.90

00E+0

DIV/0

DIV/0

[illegible]

D_g = head of water in the exploratory hole

DATE: 06 February 2024

DATE: 28 March 2024

#DIV/0!



D_g = head of water in the exploratory hole

DATE: 06 February 2024

DATE: 28 March 2024

#DIV/0!



D_g = head of water in the exploratory hole

DATE: 06 February 2024

DATE: 28 March 2024

#DIV/0!

[illegible]

D_g = head of water in the exploratory hole

WE LISTEN, WE PLAN, WE DELIVER

Geotechnical Engineering and Environmental Services across the UK



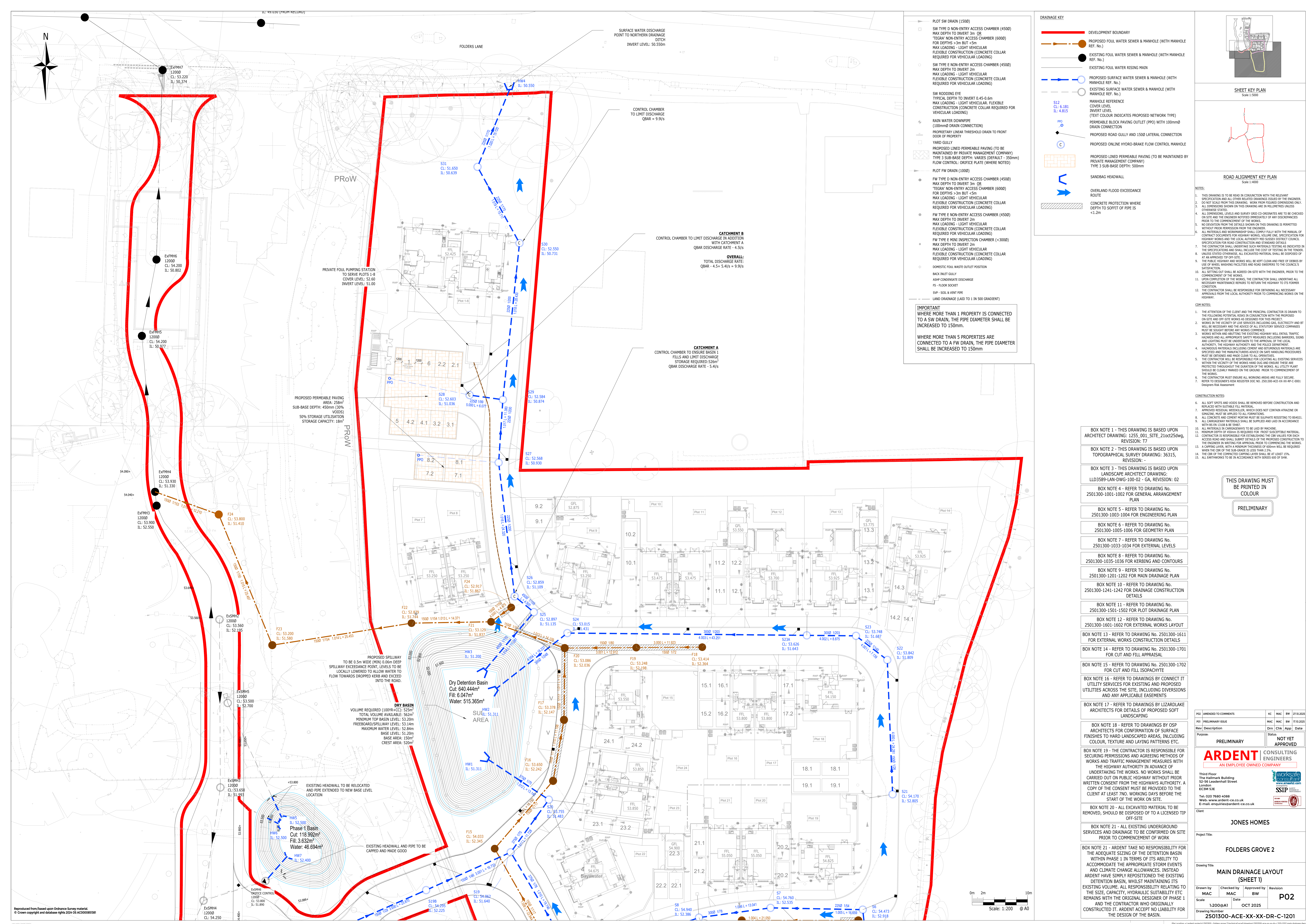
JOMAS ASSOCIATES LTD

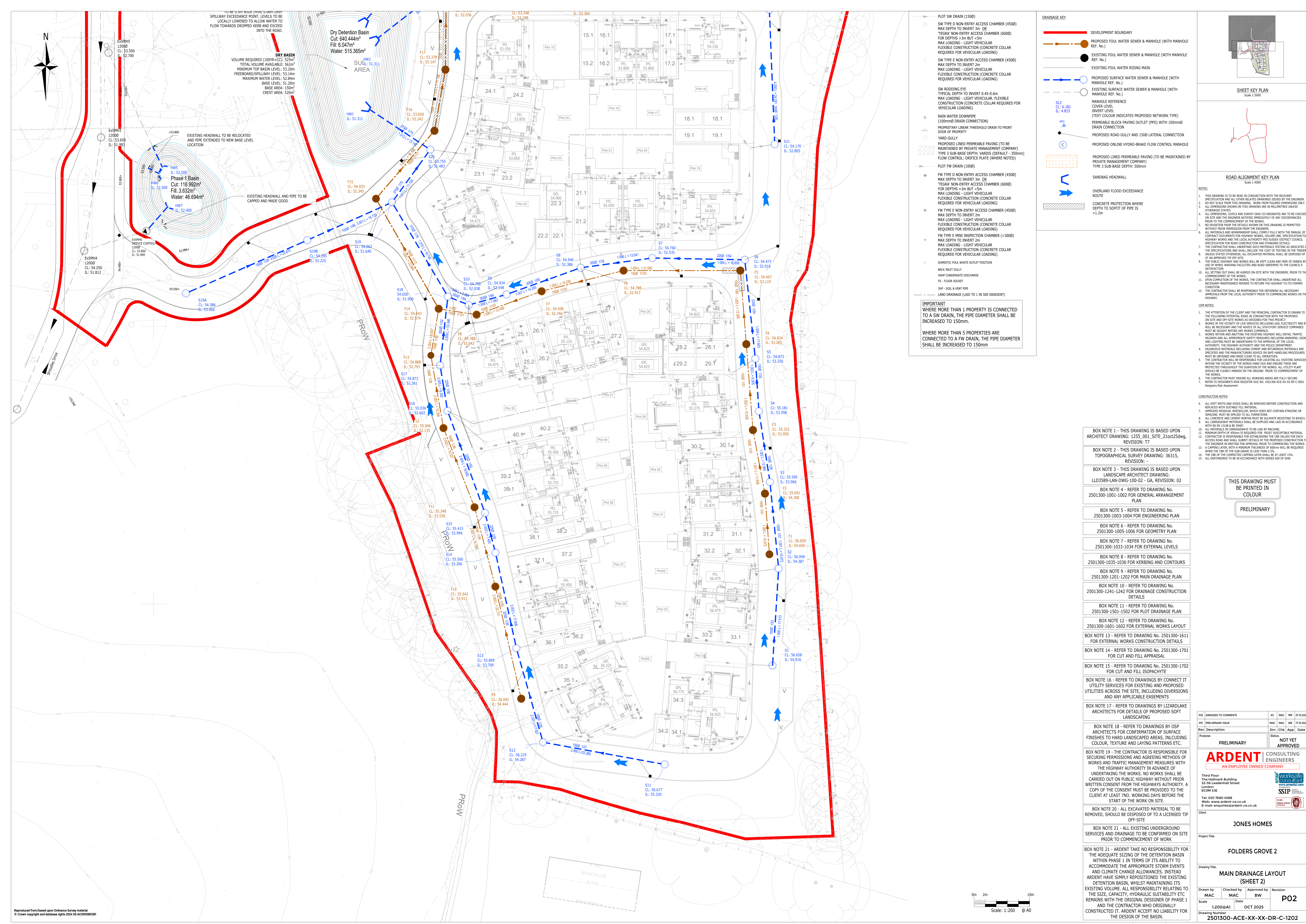
Unit 24 Sarum Complex
Salisbury Road
Uxbridge
UB8 2RZ

CONTACT US

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Tel: 0333 305 9054
Email: info@jomasassociates.com

Appendix B





DRAINAGE KEY

DEVELOPMENT BOUNDARY

PROPOSED FOUL WATER SEWER & MANHOLE (WITH MANHOLE REF. No.)

EXISTING FOUL WATER SEWER & MANHOLE (WITH MANHOLE REF. No.)

EXISTING FOUL WATER RISING MAIN

PROPOSED SURFACE WATER SEWER & MANHOLE (WITH MANHOLE REF. No.)

EXISTING SURFACE WATER SEWER & MANHOLE (WITH MANHOLE REF. No.)

MANHOLE REFERENCE

COVER LEVEL

INVERT LEVEL

(TEXT COLOUR INDICATES PROPOSED NETWORK TYPE)

PERMEABLE BLOCK PAVING OUTLET (PRO) WITH 100mm DRAIN CONNECTION

PROPOSED ROAD GULLY AND 1500 LATERAL CONNECTION

PROPOSED ONLINE HYDRO-BRAKE FLOW CONTROL MANHOLE

PROPOSED LINED PERMEABLE PAVING (TO BE MAINTAINED BY PRIVATE MANAGEMENT COMPANY)

SANDBAG HEADWALL

OVERLAND FLOOD EXCEEDANCE ROUTE

CONCRETE PROTECTION WHERE DEPTH TO SOFFIT OF PIPE IS <1.2m

- PLOT SW DRAIN (1500)**
- SW TYPE D NON-ENTRY ACCESS CHAMBER (4500) MAX DEPTH TO INVERT 3m OR TEGRA NON-ENTRY ACCESS CHAMBER (6000) FOR DEPTHS >3m BUT <5m MAX LOADING - LIGHT VEHICULAR FLEXIBLE CONSTRUCTION (CONCRETE COLLAR REQUIRED FOR VEHICULAR LOADING)
 - SW TYPE E NON-ENTRY ACCESS CHAMBER (4500) MAX DEPTH TO INVERT 2m MAX LOADING - LIGHT VEHICULAR FLEXIBLE CONSTRUCTION (CONCRETE COLLAR REQUIRED FOR VEHICULAR LOADING)
- SW RIDDING EYE**
- TYPICAL DEPTH TO INVERT 0.45-0.6m
 - MAX LOADING - LIGHT VEHICULAR FLEXIBLE CONSTRUCTION (CONCRETE COLLAR REQUIRED FOR VEHICULAR LOADING)
- RAIN WATER DOWNPIPE**
- 100mmHD DRAIN CONNECTION
 - PROPRIETARY LINEAR THRESHOLD DRAIN TO FRONT DOOR OF PROPERTY
 - YARD GULLY
 - PROPOSED LINED PERMEABLE PAVING (TO BE MAINTAINED BY PRIVATE MANAGEMENT COMPANY) TYPE 3 SUB-BASE DEPTH: VARIES (DEFAULT - 350mm) FLOW CONTROL: ORIFICE PLATE (WHERE NOTED)
- PLOT FW DRAIN (1000)**
- FW TYPE D NON-ENTRY ACCESS CHAMBER (4500) MAX DEPTH TO INVERT 3m OR TEGRA NON-ENTRY ACCESS CHAMBER (6000) FOR DEPTHS >3m BUT <5m MAX LOADING - LIGHT VEHICULAR FLEXIBLE CONSTRUCTION (CONCRETE COLLAR REQUIRED FOR VEHICULAR LOADING)
 - FW TYPE E NON-ENTRY ACCESS CHAMBER (4500) MAX DEPTH TO INVERT 2m MAX LOADING - LIGHT VEHICULAR FLEXIBLE CONSTRUCTION (CONCRETE COLLAR REQUIRED FOR VEHICULAR LOADING)
 - FW TYPE E MINI INSPECTION CHAMBER (<3000) MAX DEPTH TO INVERT 2m MAX LOADING - LIGHT VEHICULAR FLEXIBLE CONSTRUCTION (CONCRETE COLLAR REQUIRED FOR VEHICULAR LOADING)
 - DOMESTIC FOUL WASTE OUTLET POSITION
 - BACK INLET GULLY
 - ASHW CONDENSATE DISCHARGE
 - FS - FLOOR SOCKET
 - SVP - SOIL & VENT PIPE
 - LAND DRAINAGE (AID TO 1 IN 500 GRADIENT)
- IMPORTANT**
- WHERE MORE THAN 1 PROPERTY IS CONNECTED TO A SW DRAIN, THE PIPE DIAMETER SHALL BE INCREASED TO 150mm.
- WHERE MORE THAN 5 PROPERTIES ARE CONNECTED TO A FW DRAIN, THE PIPE DIAMETER SHALL BE INCREASED TO 150mm

SHEET KEY PLAN

Scale 1:5000

ROAD ALIGNMENT KEY PLAN

Scale 1:5000

- NOTES:**
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE RELEVANT SPECIFICATION AND ALL OTHER RELATED DRAWINGS ISSUED BY THE ENGINEER.
 - DO NOT SCALE FROM THIS DRAWING. WORK FROM TYPED DIMENSIONS ONLY.
 - ALL DIMENSIONS SHOWN ON THIS DRAWING ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
 - ALL DIMENSIONS, LEVELS AND SURVEY GRID CO-ORDINATES ARE TO BE CHECKED ON SITE AND THE ENGINEER NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES PRIOR TO THE COMMENCEMENT OF THE WORKS.
 - NO DEVIATION FROM THE DETAILS SHOWN ON THIS DRAWING IS PERMITTED WITHOUT PRIOR PERMISSION FROM THE ENGINEER.
 - ALL MATERIALS AND WORKMANSHIP SHALL CONFORM FULLY WITH THE MANUAL OF CONTRACT DOCUMENTS FOR HIGHWAY WORKS, VOLUME ONE. SPECIFICATION FOR HIGHWAY WORKS AND THE LOCAL AUTHORITY HIGHWAYS DISTRICT COUNCIL SPECIFICATION FOR ROAD CONSTRUCTION AND STANDARD DETAILS.
 - THE CONTRACTOR SHALL UNDERTAKE SUCH MATERIALS TESTING AS INDICATED IN THE SPECIFICATIONS AND SHALL INCLUDE THE COST OF TESTING IN THE TENDER.
 - UNLESS STATED OTHERWISE, ALL EXCAVATED MATERIAL SHALL BE DISPOSED OF AT AN APPROVED TIP OFF-SITE.
 - THE PUBLIC HIGHWAY AND WORKS SHALL BE KEPT CLEAN AND FREE OF DEBRIS BY USE OF WHEEL WASHING FACILITIES AND ROAD SWEEPERS TO THE COUNCIL'S SATISFACTION.
 - ALL SETTING OUT SHALL BE AGREED ON SITE WITH THE ENGINEER, PRIOR TO THE COMMENCEMENT OF THE WORKS.
 - UPON COMPLETION OF THE WORKS, THE CONTRACTOR SHALL UNDERTAKE ALL NECESSARY MAINTENANCE REPAIRS TO RETURN THE HIGHWAY TO ITS FORMER CONDITION.
 - APPROVALS FROM THE LOCAL AUTHORITY PRIOR TO COMMENCING WORKS ON THE HIGHWAY.

- CONSTRUCTION NOTES:**
- THE ATTENTION OF THE CLIENT AND THE PRINCIPAL CONTRACTOR IS DRAWN TO THE FOLLOWING POTENTIAL ISSUES IN CONJUNCTION WITH THE PROPOSED ON-SITE AND OFF-SITE WORKS AS DESIGNED FOR THIS PROJECT.
 - WORKS IN THE VICINITY OF LIVE SERVICES INCLUDING GAS, ELECTRICITY AND BT WILL BE NECESSARY AND THE ADVICE OF ALL STATUTORY SERVICE COMPANIES MUST BE SOUGHT BEFORE ANY WORKS COMMENCE.
 - WORKS WITHIN AND ADJUTING THE EXISTING HIGHWAY WILL DETAIL TRAFFIC MANAGES AND ALL APPROPRIATE SAFETY MEASURES INCLUDING BARRIERS, SIGNS AND LIGHTING MUST BE UNDERTAKEN TO THE APPROVAL OF THE LOCAL AUTHORITY, THE HIGHWAY AUTHORITY AND THE POLICE DEPARTMENT.
 - HAZARDOUS MATERIALS INCLUDING CEMENT AND BITUMINOUS MATERIALS ARE SPECIFIED AND THE MANUFACTURERS ADVICE ON SAFE HANDLING PROCEDURES MUST BE OBTAINED AND MADE CLEAR TO ALL OPERATIVES.
 - THE CONTRACTOR WILL BE RESPONSIBLE FOR DETAILING ALL EXISTING SERVICES WITHIN THE VICINITY OF THE WORKS HAND DIG AND ENSURE THESE ARE PROTECTED THROUGHOUT THE DURATION OF THE WORKS. ALL UTILITY PLANT SHOULD BE CLEARLY MARKED ON THE GROUND PRIOR TO COMMENCEMENT OF THE WORKS.
 - THE CONTRACTOR MUST ENSURE ALL WORKING AREAS ARE FULLY SECURE.
 - REFER TO DESIGNERS RISK REGISTER DOC NO. 2501300-ACE-XX-XX-DR-C-0001 Designers Risk Assessment

- BOX NOTE 1 - THIS DRAWING IS BASED UPON ARCHITECT DRAWING: 1255_001_SITE_21oct25dwg, REVISION: T7
- BOX NOTE 2 - THIS DRAWING IS BASED UPON TOPOGRAPHICAL SURVEY DRAWING: 36315, REVISION: -
- BOX NOTE 3 - THIS DRAWING IS BASED UPON LANDSCAPE ARCHITECT DRAWING: LLD3589-LAN-DWG-100-02 - GA, REVISION: 02
- BOX NOTE 4 - REFER TO DRAWING No. 2501300-1001-1002 FOR GENERAL ARRANGEMENT PLAN
- BOX NOTE 5 - REFER TO DRAWING No. 2501300-1003-1004 FOR ENGINEERING PLAN
- BOX NOTE 6 - REFER TO DRAWING No. 2501300-1005-1006 FOR GEOMETRY PLAN
- BOX NOTE 7 - REFER TO DRAWING No. 2501300-1033-1034 FOR EXTERNAL LEVELS
- BOX NOTE 8 - REFER TO DRAWING No. 2501300-1035-1036 FOR KERBING AND CONTOURS
- BOX NOTE 9 - REFER TO DRAWING No. 2501300-1201-1202 FOR MAIN DRAINAGE PLAN
- BOX NOTE 10 - REFER TO DRAWING No. 2501300-1241-1242 FOR DRAINAGE CONSTRUCTION DETAILS
- BOX NOTE 11 - REFER TO DRAWING No. 2501300-1501-1502 FOR PLOT DRAINAGE PLAN
- BOX NOTE 12 - REFER TO DRAWING No. 2501300-1601-1602 FOR EXTERNAL WORKS LAYOUT
- BOX NOTE 13 - REFER TO DRAWING No. 2501300-1611 FOR EXTERNAL WORKS CONSTRUCTION DETAILS
- BOX NOTE 14 - REFER TO DRAWING No. 2501300-1701 FOR CUT AND FILL APPRAISAL
- BOX NOTE 15 - REFER TO DRAWING No. 2501300-1702 FOR CUT AND FILL ISOPACHYTE
- BOX NOTE 16 - REFER TO DRAWINGS BY CONNECT IT UTILITY SERVICES FOR EXISTING AND PROPOSED UTILITIES ACROSS THE SITE, INCLUDING DIVERSIONS AND ANY APPLICABLE EASEMENTS
- BOX NOTE 17 - REFER TO DRAWINGS BY LIZARDLAKE ARCHITECTS FOR DETAILS OF PROPOSED SOFT LANDSCAPING
- BOX NOTE 18 - REFER TO DRAWINGS BY OSP ARCHITECTS FOR CONFIRMATION OF SURFACE FINISHES TO HARD LANDSCAPED AREAS, INCLUDING COLOUR, TEXTURE AND LAYING PATTERNS ETC.
- BOX NOTE 19 - THE CONTRACTOR IS RESPONSIBLE FOR SECURING PERMISSIONS AND AGREEING METHODS OF WORKS AND TRAFFIC MANAGEMENT MEASURES WITH THE HIGHWAY AUTHORITY IN ADVANCE OF UNDERTAKING THE WORKS. NO WORKS SHALL BE CARRIED OUT ON PUBLIC HIGHWAY WITHOUT PRIOR WRITTEN CONSENT FROM THE HIGHWAYS AUTHORITY. A COPY OF THE CONSENT MUST BE PROVIDED TO THE CLIENT AT LEAST 7NO. WORKING DAYS BEFORE THE START OF THE WORK ON SITE.
- BOX NOTE 20 - ALL EXCAVATED MATERIAL TO BE REMOVED, SHOULD BE DISPOSED OF TO A LICENSED TIP OFF-SITE
- BOX NOTE 21 - ALL EXISTING UNDERGROUND SERVICES AND DRAINAGE TO BE CONFIRMED ON SITE PRIOR TO COMMENCEMENT OF WORK
- BOX NOTE 21 - ARDENT TAKE NO RESPONSIBILITY FOR THE ADEQUATE SIZING OF THE DETENTION BASIN WITHIN PHASE 1 IN TERMS OF ITS ABILITY TO ACCOMMODATE THE APPROPRIATE STORM EVENTS AND CLIMATE CHANGE ALLOWANCES. INSTEAD ARDENT HAVE SIMPLY REPOSITIONED THE EXISTING DETENTION BASIN, WHILST MAINTAINING ITS EXISTING VOLUME. ALL RESPONSIBILITY RELATING TO THE SIZE, CAPACITY, HYDRAULIC SUITABILITY ETC REMAINS WITH THE ORIGINAL DESIGNER OF PHASE 1 AND THE CONTRACTOR WHO ORIGINALLY CONSTRUCTED IT. ARDENT ACCEPT NO LIABILITY FOR THE DESIGN OF THE BASIN.

THIS DRAWING MUST BE PRINTED IN COLOUR

PRELIMINARY

PO2	AMENDED TO COMMENTS	KC	MAC	BW	27.10.2025
PO1	PRELIMINARY ISSUE	MAC <td>MAC<td>BW<td>17.10.2025</td></td></td>	MAC <td>BW<td>17.10.2025</td></td>	BW <td>17.10.2025</td>	17.10.2025
Rev	Description	Drm	Chk	App	Date
Purpose:	PRELIMINARY	Status:	NOT YET APPROVED		
ARDENT CONSULTING ENGINEERS AN EMPLOYEE OWNED COMPANY					
Third Floor The Halmark Building 52-56 Leadenhall Street London EC3M 5JG Tel: 020 7680 4088 Web: www.ardent-ce.co.uk E-mail: enquiries@ardent-ce.co.uk					
Client: JONES HOMES					
Project Title: FOLDERS GROVE 2					

Drawing Title: **MAIN DRAINAGE LAYOUT (SHEET 2)**

Drawn by	Checked by	Approved by	Revision
MAC	MAC	BW	P02
Scale	Date		
1:200@A1	OCT 2025		
Drawing No: 2501300-ACE-XX-XX-DR-C-1202			

Appendix C

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	45	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	1.000
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	1.000	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Adoptable Manhole Type

Max Width (mm)	Diameter (mm)	Max Width (mm)	Diameter (mm)
374	1200	749	1500
499	1350	900	1800

>900 Link+900 mm

Max Depth (m)	Diameter (mm)	Max Depth (m)	Diameter (mm)
1.500	1050	99.999	1200

Circular Link Type

Shape	Circular	Auto Increment (mm)	75
Barrels	1	Follow Ground	x

Available Diameters (mm)

100 | 150

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S1	0.016	5.00	56.658	1200	533011.593	117838.900	1.742
S2	0.032	5.00	56.062	1200	533012.689	117856.378	1.675
S3	0.000		55.613	1200	533011.124	117871.973	1.647
S4	0.013	5.00	55.209	1350	533009.145	117884.714	1.611
S5	0.057	5.00	54.904	1350	533008.485	117894.196	1.654
S6	0.027	5.00	54.471	1350	533006.588	117912.019	1.553
S7	0.015	5.00	54.758	1200	532989.933	117912.341	2.223
S8	0.047	5.00	54.936	1200	532977.011	117910.585	2.568
S9	0.000		54.940	1200	532963.643	117905.779	2.792
S10	0.026	5.00	54.798	1200	532956.843	117903.873	2.760
S11	0.008	5.00	56.706	1350	532992.140	117821.069	1.350
S12	0.025	5.00	56.228	1200	532970.223	117825.067	1.941
S13	0.034	5.00	55.904	1200	532965.423	117842.022	2.195
S14	0.000		55.563	1200	532961.656	117859.222	2.357
S15	0.014	5.00	55.418	1200	532959.763	117866.396	2.424
S16	0.029	5.00	55.037	1200	532953.015	117884.798	2.435
S17	0.018	5.00	54.876	1200	532951.675	117892.983	2.515
S18	0.013	5.00	54.647	1350	532953.074	117905.394	2.822
S19A	0.029	5.00	54.408	1350	532905.867	117905.986	1.348
S19B	0.016	5.00	54.285	1200	532927.738	117915.549	2.060
S19	0.017	5.00	54.014	1350	532943.011	117922.383	2.374
S20	0.046	5.00	53.718	1350	532949.897	117931.877	2.235

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
HW1	0.000		53.400	1350	532938.943	117939.138	2.093
S21	0.023	5.00	54.164	1350	533011.982	117932.847	1.359
S22	0.010	5.00	53.855	1200	533011.021	117957.109	2.046
S23	0.060	5.00	53.751	1200	533005.365	117961.465	2.064
S23A	0.056	5.00	53.626	1350	532996.490	117961.550	1.983
S24	0.035	5.00	53.021	1350	532953.241	117961.966	1.590
HW2	0.000		53.400	1350	532941.757	117950.486	2.035
HW3	0.000		53.400	1350	532939.959	117957.349	2.204
S25	0.033	5.00	52.903	1500	532947.193	117965.743	1.903
S26	0.028	5.00	52.864	1500	532943.721	117968.602	1.909
S27	0.019	5.00	52.650	1500	532940.832	117992.750	1.800
S28	0.041	5.00	52.314	1350	532935.576	118004.942	1.464
S29	0.010	5.00	52.584	1500	532941.822	118004.371	1.824
S30	0.000	5.00	52.550	1500	532944.597	118032.376	1.875
S31	0.000	5.00	51.650	1500	532937.017	118046.144	1.040
HW4	0.000		51.000	1350	532942.813	118060.109	0.450

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)
1.000	18.506	35.0	150	Circular	56.658	54.916	1.592	56.062	54.387	1.525
1.001	14.747	35.0	150	Circular	56.062	54.387	1.525	55.613	53.966	1.497
1.002	12.864	35.0	150	Circular	55.613	53.966	1.497	55.209	53.598	1.461
1.003	9.552	35.0	150	Circular	55.209	53.598	1.461	54.904	53.325	1.429
1.004	17.928	54.0	225	Circular	54.904	53.250	1.429	54.471	52.918	1.328
1.005	16.659	54.1	225	Circular	54.471	52.918	1.328	54.758	52.610	1.923
1.006	13.041	78.1	300	Circular	54.758	52.535	1.923	54.936	52.368	2.268
1.007	14.205	64.6	300	Circular	54.936	52.368	2.268	54.940	52.148	2.492
1.008	7.063	64.2	300	Circular	54.940	52.148	2.492	54.798	52.038	2.460
1.009	4.064	64.5	300	Circular	54.798	52.038	2.460	54.647	51.975	2.372
2.000	24.304	22.7	150	Circular	56.706	55.356	1.200	56.228	54.287	1.791
2.001	17.621	35.0	150	Circular	56.228	54.287	1.791	55.904	53.784	1.970
2.002	17.608	35.0	225	Circular	55.904	53.709	1.970	55.563	53.206	2.132
2.003	7.420	35.0	225	Circular	55.563	53.206	2.132	55.418	52.994	2.199

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S1	1200	Manhole	Adoptable	S2	1200	Manhole	Adoptable
1.001	S2	1200	Manhole	Adoptable	S3	1200	Manhole	Adoptable
1.002	S3	1200	Manhole	Adoptable	S4	1350	Manhole	Adoptable
1.003	S4	1350	Manhole	Adoptable	S5	1350	Manhole	Adoptable
1.004	S5	1350	Manhole	Adoptable	S6	1350	Manhole	Adoptable
1.005	S6	1350	Manhole	Adoptable	S7	1200	Manhole	Adoptable
1.006	S7	1200	Manhole	Adoptable	S8	1200	Manhole	Adoptable
1.007	S8	1200	Manhole	Adoptable	S9	1200	Manhole	Adoptable
1.008	S9	1200	Manhole	Adoptable	S10	1200	Manhole	Adoptable
1.009	S10	1200	Manhole	Adoptable	S18	1350	Manhole	Adoptable
2.000	S11	1350	Manhole	Adoptable	S12	1200	Manhole	Adoptable
2.001	S12	1200	Manhole	Adoptable	S13	1200	Manhole	Adoptable
2.002	S13	1200	Manhole	Adoptable	S14	1200	Manhole	Adoptable
2.003	S14	1200	Manhole	Adoptable	S15	1200	Manhole	Adoptable

Pipeline Schedule

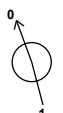
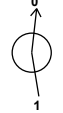
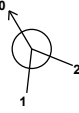
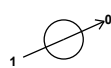
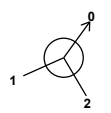
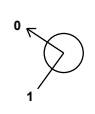
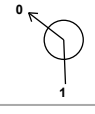
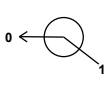
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
2.004	19.600	50.0	225	Circular	55.418	52.994	2.199	55.037	52.602	2.210
2.005	8.294	50.0	225	Circular	55.037	52.602	2.210	54.876	52.436	2.215
2.006	12.489	27.1	300	Circular	54.876	52.361	2.215	54.647	51.900	2.447
1.010	19.746	106.7	375	Circular	54.647	51.825	2.447	54.014	51.640	1.999
3.000	23.870	28.6	150	Circular	54.408	53.060	1.198	54.285	52.225	1.910
3.001	16.732	46.5	150	Circular	54.285	52.225	1.910	54.014	51.865	1.999
1.011	11.728	74.7	375	Circular	54.014	51.640	1.999	53.718	51.483	1.860
1.012	13.142	130.1	375	Circular	53.718	51.483	1.860	53.400	51.382	1.643
1.013	18.239	164.3	450	Circular	53.400	51.307	1.643	53.400	51.196	1.754
4.000	24.168	26.2	150	Circular	54.164	52.805	1.209	53.855	51.884	1.821
4.001	6.926	147.4	225	Circular	53.855	51.809	1.821	53.751	51.762	1.764
4.002	8.875	201.7	300	Circular	53.751	51.687	1.764	53.626	51.643	1.683
4.003	43.251	204.0	300	Circular	53.626	51.643	1.683	53.021	51.431	1.290
4.004	16.237	246.0	300	Circular	53.021	51.431	1.290	53.400	51.365	1.735
4.005	7.095	42.0	300	Circular	53.400	51.365	1.735	53.400	51.196	1.904
1.014	11.081	56.5	450	Circular	53.400	51.196	1.754	52.903	51.000	1.453
1.015	4.498	100.0	300	Circular	52.903	51.000	1.603	52.864	50.955	1.609
1.016	26.099	248.6	300	Circular	52.864	50.955	1.609	52.650	50.850	1.500
1.017	19.484	216.5	300	Circular	52.650	50.850	1.500	52.584	50.760	1.524
5.000	5.100	56.7	225	Circular	52.314	50.850	1.239	52.584	50.760	1.599
1.018	28.142	331.1	300	Circular	52.584	50.760	1.524	52.550	50.675	1.575
1.020	15.717	241.8	225	Circular	52.550	50.675	1.650	51.650	50.610	0.815
1.021	15.120	252.0	225	Circular	51.650	50.610	0.815	51.000	50.550	0.225

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
2.004	S15	1200	Manhole	Adoptable	S16	1200	Manhole	Adoptable
2.005	S16	1200	Manhole	Adoptable	S17	1200	Manhole	Adoptable
2.006	S17	1200	Manhole	Adoptable	S18	1350	Manhole	Adoptable
1.010	S18	1350	Manhole	Adoptable	S19	1350	Manhole	Adoptable
3.000	S19A	1350	Manhole	Adoptable	S19B	1200	Manhole	Adoptable
3.001	S19B	1200	Manhole	Adoptable	S19	1350	Manhole	Adoptable
1.011	S19	1350	Manhole	Adoptable	S20	1350	Manhole	Adoptable
1.012	S20	1350	Manhole	Adoptable	HW1	1350	Manhole	Adoptable
1.013	HW1	1350	Manhole	Adoptable	HW3	1350	Manhole	Adoptable
4.000	S21	1350	Manhole	Adoptable	S22	1200	Manhole	Adoptable
4.001	S22	1200	Manhole	Adoptable	S23	1200	Manhole	Adoptable
4.002	S23	1200	Manhole	Adoptable	S23A	1350	Manhole	Adoptable
4.003	S23A	1350	Manhole	Adoptable	S24	1350	Manhole	Adoptable
4.004	S24	1350	Manhole	Adoptable	HW2	1350	Manhole	Adoptable
4.005	HW2	1350	Manhole	Adoptable	HW3	1350	Manhole	Adoptable
1.014	HW3	1350	Manhole	Adoptable	S25	1500	Manhole	Adoptable
1.015	S25	1500	Manhole	Adoptable	S26	1500	Manhole	Adoptable
1.016	S26	1500	Manhole	Adoptable	S27	1500	Manhole	Adoptable
1.017	S27	1500	Manhole	Adoptable	S29	1500	Manhole	Adoptable
5.000	S28	1350	Manhole	Adoptable	S29	1500	Manhole	Adoptable
1.018	S29	1500	Manhole	Adoptable	S30	1500	Manhole	Adoptable
1.020	S30	1500	Manhole	Adoptable	S31	1500	Manhole	Adoptable
1.021	S31	1500	Manhole	Adoptable	HW4	1350	Manhole	Adoptable

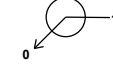
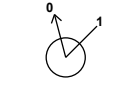
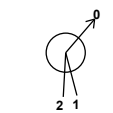
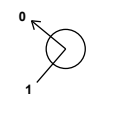
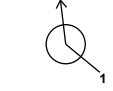
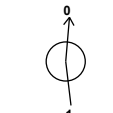
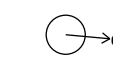
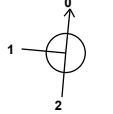
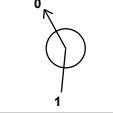
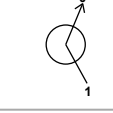
Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
S1	533011.593	117838.900	56.658	1.742	1200	0 1				
						0	1.000	54.916	150	
S2	533012.689	117856.378	56.062	1.675	1200	0 1	1	1.000	54.387	150
						0	1.001	54.387	150	
S3	533011.124	117871.973	55.613	1.647	1200	0 1	1	1.001	53.966	150
						0	1.002	53.966	150	
S4	533009.145	117884.714	55.209	1.611	1350	0 1	1	1.002	53.598	150
						0	1.003	53.598	150	
S5	533008.485	117894.196	54.904	1.654	1350	0 1	1	1.003	53.325	150
						0	1.004	53.250	225	
S6	533006.588	117912.019	54.471	1.553	1350	0 1	1	1.004	52.918	225
						0	1.005	52.918	225	
S7	532989.933	117912.341	54.758	2.223	1200	0 1	1	1.005	52.610	225
						0	1.006	52.535	300	
S8	532977.011	117910.585	54.936	2.568	1200	0 1	1	1.006	52.368	300
						0	1.007	52.368	300	
S9	532963.643	117905.779	54.940	2.792	1200	0 1	1	1.007	52.148	300
						0	1.008	52.148	300	
S10	532956.843	117903.873	54.798	2.760	1200	0 1	1	1.008	52.038	300
						0	1.009	52.038	300	
S11	532992.140	117821.069	56.706	1.350	1350	0 1				
						0	2.000	55.356	150	
S12	532970.223	117825.067	56.228	1.941	1200	0 1	1	2.000	54.287	150
						0	2.001	54.287	150	
S13	532965.423	117842.022	55.904	2.195	1200	0 1	1	2.001	53.784	150
						0	2.002	53.709	225	

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
S14	532961.656	117859.222	55.563	2.357	1200		1	2.002	53.206	225
							0	2.003	53.206	225
S15	532959.763	117866.396	55.418	2.424	1200		1	2.003	52.994	225
							0	2.004	52.994	225
S16	532953.015	117884.798	55.037	2.435	1200		1	2.004	52.602	225
							0	2.005	52.602	225
S17	532951.675	117892.983	54.876	2.515	1200		1	2.005	52.436	225
							0	2.006	52.361	300
S18	532953.074	117905.394	54.647	2.822	1350		1	2.006	51.900	300
							2	1.009	51.975	300
							0	1.010	51.825	375
S19A	532905.867	117905.986	54.408	1.348	1350		0	3.000	53.060	150
S19B	532927.738	117915.549	54.285	2.060	1200		1	3.000	52.225	150
							0	3.001	52.225	150
S19	532943.011	117922.383	54.014	2.374	1350		1	3.001	51.865	150
							2	1.010	51.640	375
							0	1.011	51.640	375
S20	532949.897	117931.877	53.718	2.235	1350		1	1.011	51.483	375
							0	1.012	51.483	375
HW1	532938.943	117939.138	53.400	2.093	1350		1	1.012	51.382	375
							0	1.013	51.307	450
S21	533011.982	117932.847	54.164	1.359	1350		0	4.000	52.805	150
S22	533011.021	117957.109	53.855	2.046	1200		1	4.000	51.884	150
							0	4.001	51.809	225
S23	533005.365	117961.465	53.751	2.064	1200		1	4.001	51.762	225
							0	4.002	51.687	300

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
S23A	532996.490	117961.550	53.626	1.983	1350		1	4.002	51.643	300
							0	4.003	51.643	300
S24	532953.241	117961.966	53.021	1.590	1350		1	4.003	51.431	300
							0	4.004	51.431	300
HW2	532941.757	117950.486	53.400	2.035	1350		1	4.004	51.365	300
							0	4.005	51.365	300
HW3	532939.959	117957.349	53.400	2.204	1350		1	4.005	51.196	300
							2	1.013	51.196	450
							0	1.014	51.196	450
S25	532947.193	117965.743	52.903	1.903	1500		1	1.014	51.000	450
							0	1.015	51.000	300
S26	532943.721	117968.602	52.864	1.909	1500		1	1.015	50.955	300
							0	1.016	50.955	300
S27	532940.832	117992.750	52.650	1.800	1500		1	1.016	50.850	300
							0	1.017	50.850	300
S28	532935.576	118004.942	52.314	1.464	1350					
							0	5.000	50.850	225
S29	532941.822	118004.371	52.584	1.824	1500		1	5.000	50.760	225
							2	1.017	50.760	300
							0	1.018	50.760	300
S30	532944.597	118032.376	52.550	1.875	1500		1	1.018	50.675	300
							0	1.020	50.675	225
S31	532937.017	118046.144	51.650	1.040	1500		1	1.020	50.610	225
							0	1.021	50.610	225
HW4	532942.813	118060.109	51.000	0.450	1350		1	1.021	50.550	225

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	20.000	Drain Down Time (mins)	1440
Ratio-R	0.400	Additional Storage (m ³ /ha)	0.0
Summer CV	1.000	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

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
2	0	0	0
30	30	0	0
100	45	0	0

Node S25 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Downstream Link	1.015	Sump Available	✓
Replaces Downstream Link	✓	Product Number	CTL-SHE-0104-5400-1400-5400
Invert Level (m)	51.109	Min Outlet Diameter (m)	0.150
Design Depth (m)	1.400	Min Node Diameter (mm)	1200
Design Flow (l/s)	5.4		

Node S30 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	50.675	Product Number	CTL-SHE-0133-9900-1850-9900
Design Depth (m)	1.850	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	9.9	Min Node Diameter (mm)	1500

Node S28 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	50.850	Product Number	CTL-SHE-0088-4500-1900-4500
Design Depth (m)	1.900	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	4.5	Min Node Diameter (mm)	1200

Node HW3 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	51.196
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	560

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	129.6	0.0	0.500	220.2	0.0	1.000	329.0	0.0	1.500	455.5	0.0
0.100	146.0	0.0	0.600	240.5	0.0	1.100	352.9	0.0	1.600	483.0	0.0
0.200	163.5	0.0	0.700	261.6	0.0	1.200	377.5	0.0	1.700	511.1	0.0
0.300	181.7	0.0	0.800	283.3	0.0	1.300	402.8	0.0	1.800	537.9	0.0
0.400	200.6	0.0	0.900	305.8	0.0	1.400	428.8	0.0	1.900	565.1	0.0

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
2.000	593.0	0.0									

Node S28 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	51.864	Slope (1:X)	500.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	72	Depth (m)	
Safety Factor	2.0	Width (m)	26.200	Inf Depth (m)	
Porosity	1.00	Length (m)	10.000		

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.62%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	54.947	0.031	2.9	0.0353	0.0000	OK
15 minute summer	S2	10	54.444	0.057	8.6	0.0640	0.0000	OK
15 minute summer	S3	10	54.021	0.055	8.5	0.0620	0.0000	OK
15 minute summer	S4	11	53.664	0.066	10.7	0.0945	0.0000	OK
15 minute summer	S5	10	53.336	0.086	20.7	0.1224	0.0000	OK
15 minute summer	S6	11	53.017	0.099	25.4	0.1410	0.0000	OK
15 minute summer	S7	11	52.638	0.103	27.9	0.1164	0.0000	OK
15 minute summer	S8	11	52.480	0.112	36.0	0.1264	0.0000	OK
15 minute summer	S9	11	52.271	0.123	36.2	0.1387	0.0000	OK
15 minute summer	S10	11	52.172	0.134	40.7	0.1519	0.0000	OK
15 minute summer	S11	11	55.376	0.020	1.4	0.0285	0.0000	OK
15 minute summer	S12	10	54.333	0.046	5.9	0.0519	0.0000	OK
15 minute summer	S13	10	53.766	0.057	11.9	0.0645	0.0000	OK
15 minute summer	S14	10	53.264	0.058	11.8	0.0660	0.0000	OK
15 minute summer	S15	11	53.061	0.067	14.2	0.0752	0.0000	OK
15 minute summer	S16	11	52.688	0.086	19.3	0.0972	0.0000	OK
15 minute summer	S17	10	52.427	0.066	22.3	0.0742	0.0000	OK
15 minute summer	S18	11	51.988	0.163	65.3	0.2335	0.0000	OK
15 minute summer	S19A	10	53.100	0.040	5.2	0.0570	0.0000	OK
15 minute summer	S19B	10	52.284	0.058	8.0	0.0662	0.0000	OK
15 minute summer	S19	11	51.815	0.175	76.2	0.2499	0.0000	OK
15 minute summer	S20	11	51.687	0.204	84.1	0.2913	0.0000	OK
180 minute summer	HW1	152	51.613	0.306	28.9	0.4382	0.0000	OK
15 minute summer	S21	10	52.840	0.035	4.1	0.0501	0.0000	OK
15 minute summer	S22	10	51.868	0.059	5.8	0.0670	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1	1.000	S2	2.9	0.666	0.095	0.0808	
15 minute summer	S2	1.001	S3	8.5	1.423	0.281	0.0878	
15 minute summer	S3	1.002	S4	8.4	1.270	0.278	0.0853	
15 minute summer	S4	1.003	S5	10.7	1.497	0.354	0.0682	
15 minute summer	S5	1.004	S6	20.6	1.354	0.290	0.2728	
15 minute summer	S6	1.005	S7	25.3	1.580	0.357	0.2668	
15 minute summer	S7	1.006	S8	28.0	1.237	0.222	0.2952	
15 minute summer	S8	1.007	S9	36.2	1.419	0.261	0.3621	
15 minute summer	S9	1.008	S10	36.3	1.260	0.261	0.2034	
15 minute summer	S10	1.009	S18	40.8	1.510	0.294	0.1098	
15 minute summer	S11	2.000	S12	1.4	0.494	0.037	0.0721	
15 minute summer	S12	2.001	S13	5.8	1.297	0.192	0.0787	
15 minute summer	S13	2.002	S14	11.8	1.474	0.134	0.1412	
15 minute summer	S14	2.003	S15	11.7	1.309	0.133	0.0664	
15 minute summer	S15	2.004	S16	14.2	1.198	0.192	0.2325	
15 minute summer	S16	2.005	S17	19.2	1.472	0.261	0.1084	
15 minute summer	S17	2.006	S18	22.4	1.688	0.104	0.1784	
15 minute summer	S18	1.010	S19	65.5	1.362	0.338	0.9501	
15 minute summer	S19A	3.000	S19B	5.1	1.025	0.154	0.1205	
15 minute summer	S19B	3.001	S19	7.8	1.268	0.299	0.1036	
15 minute summer	S19	1.011	S20	76.3	1.371	0.329	0.6529	
15 minute summer	S20	1.012	HW1	84.0	1.483	0.480	0.7446	
180 minute summer	HW1	1.013	HW3	28.2	0.889	0.112	2.4462	
15 minute summer	S21	4.000	S22	4.0	1.306	0.116	0.0745	
15 minute summer	S22	4.001	S23	5.8	0.725	0.135	0.0551	

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.62%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S23	10	51.793	0.106	16.4	0.1200	0.0000	OK
15 minute summer	S23A	10	51.763	0.120	26.3	0.1720	0.0000	OK
180 minute summer	S24	152	51.613	0.182	11.1	0.2609	0.0000	OK
180 minute summer	HW2	148	51.616	0.251	28.5	0.3593	0.0000	OK
180 minute summer	HW3	148	51.613	0.417	52.3	69.7336	0.0000	OK
180 minute summer	S25	148	51.613	0.613	24.4	1.0836	0.0000	SURCHARGED
60 minute summer	S26	41	51.099	0.144	8.7	0.2544	0.0000	OK
60 minute summer	S27	41	51.096	0.246	11.0	0.4355	0.0000	OK
15 minute summer	S28	13	51.572	0.722	7.3	1.0330	0.0000	SURCHARGED
60 minute summer	S29	42	51.095	0.335	12.9	0.5924	0.0000	SURCHARGED
60 minute summer	S30	42	51.093	0.418	10.1	0.7386	0.0000	SURCHARGED
60 minute summer	S31	42	50.696	0.086	9.5	0.1527	0.0000	OK
60 minute summer	HW4	42	50.629	0.079	9.5	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S23	4.002	S23A	16.3	0.671	0.209	0.2158	
15 minute summer	S23A	4.003	S24	26.1	0.883	0.337	1.2806	
180 minute summer	S24	4.004	HW2	12.0	0.938	0.170	0.8751	
180 minute summer	HW2	4.005	HW3	24.1	1.063	0.140	0.4734	
180 minute summer	HW3	1.014	S25	22.4	0.221	0.052	1.7276	
180 minute summer	S25	Hydro-Brake®	S26	5.4				
60 minute summer	S26	1.016	S27	8.7	0.618	0.124	1.2442	
60 minute summer	S27	1.017	S29	8.5	0.548	0.113	1.2893	
15 minute summer	S28	Hydro-Brake®	S29	3.7				
60 minute summer	S29	1.018	S30	10.1	0.360	0.166	1.9817	
60 minute summer	S30	1.020	S31	9.5	0.678	0.285	0.2195	
60 minute summer	S31	1.021	HW4	9.5	0.714	0.291	0.2007	101.5

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.62%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	54.951	0.035	3.7	0.0400	0.0000	OK
15 minute summer	S2	10	54.452	0.065	11.1	0.0741	0.0000	OK
15 minute summer	S3	10	54.030	0.064	11.0	0.0718	0.0000	OK
15 minute summer	S4	11	53.675	0.077	13.9	0.1106	0.0000	OK
15 minute summer	S5	10	53.350	0.100	26.9	0.1425	0.0000	OK
15 minute summer	S6	11	53.033	0.115	32.9	0.1651	0.0000	OK
15 minute summer	S7	11	52.655	0.120	36.1	0.1356	0.0000	OK
15 minute summer	S8	11	52.499	0.131	46.6	0.1478	0.0000	OK
15 minute summer	S9	11	52.293	0.145	46.9	0.1643	0.0000	OK
15 minute summer	S10	11	52.195	0.157	52.7	0.1778	0.0000	OK
15 minute summer	S11	11	55.378	0.022	1.8	0.0321	0.0000	OK
15 minute summer	S12	10	54.340	0.053	7.6	0.0595	0.0000	OK
15 minute summer	S13	10	53.774	0.065	15.4	0.0737	0.0000	OK
15 minute summer	S14	10	53.273	0.067	15.3	0.0762	0.0000	OK
15 minute summer	S15	10	53.070	0.076	18.3	0.0863	0.0000	OK
15 minute summer	S16	11	52.702	0.100	24.9	0.1133	0.0000	OK
15 minute summer	S17	11	52.435	0.074	28.9	0.0836	0.0000	OK
15 minute summer	S18	11	52.018	0.193	84.7	0.2763	0.0000	OK
15 minute summer	S19A	10	53.105	0.045	6.7	0.0650	0.0000	OK
15 minute summer	S19B	10	52.293	0.068	10.3	0.0767	0.0000	OK
15 minute summer	S19	11	51.850	0.210	98.7	0.2999	0.0000	OK
180 minute summer	S20	148	51.745	0.262	35.9	0.3750	0.0000	OK
180 minute summer	HW1	148	51.734	0.427	35.6	0.6115	0.0000	OK
15 minute summer	S21	10	52.845	0.040	5.3	0.0573	0.0000	OK
15 minute summer	S22	10	51.877	0.068	7.5	0.0771	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1	1.000	S2	3.7	0.705	0.121	0.0976	
15 minute summer	S2	1.001	S3	11.0	1.514	0.363	0.1068	
15 minute summer	S3	1.002	S4	10.9	1.343	0.360	0.1042	
15 minute summer	S4	1.003	S5	13.8	1.592	0.459	0.0831	
15 minute summer	S5	1.004	S6	26.7	1.433	0.377	0.3347	
15 minute summer	S6	1.005	S7	32.8	1.682	0.463	0.3253	
15 minute summer	S7	1.006	S8	36.2	1.301	0.288	0.3634	
15 minute summer	S8	1.007	S9	46.9	1.482	0.338	0.4493	
15 minute summer	S9	1.008	S10	47.0	1.321	0.338	0.2513	
15 minute summer	S10	1.009	S18	52.8	1.607	0.381	0.1336	
15 minute summer	S11	2.000	S12	1.8	0.528	0.048	0.0868	
15 minute summer	S12	2.001	S13	7.5	1.388	0.248	0.0948	
15 minute summer	S13	2.002	S14	15.3	1.569	0.173	0.1716	
15 minute summer	S14	2.003	S15	15.1	1.391	0.172	0.0809	
15 minute summer	S15	2.004	S16	18.3	1.270	0.248	0.2830	
15 minute summer	S16	2.005	S17	24.9	1.567	0.337	0.1318	
15 minute summer	S17	2.006	S18	28.9	1.732	0.135	0.2448	
15 minute summer	S18	1.010	S19	84.9	1.409	0.439	1.1896	
15 minute summer	S19A	3.000	S19B	6.6	1.093	0.199	0.1459	
15 minute summer	S19B	3.001	S19	10.1	1.354	0.388	0.1256	
15 minute summer	S19	1.011	S20	98.9	1.432	0.427	0.8092	
180 minute summer	S20	1.012	HW1	35.6	1.181	0.203	1.2475	
180 minute summer	HW1	1.013	HW3	33.0	0.905	0.131	2.8632	
15 minute summer	S21	4.000	S22	5.2	1.407	0.150	0.0899	
15 minute summer	S22	4.001	S23	7.5	0.777	0.175	0.0666	

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.62%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S23	10	51.812	0.125	21.4	0.1416	0.0000	OK
15 minute summer	S23A	10	51.783	0.140	34.1	0.2005	0.0000	OK
180 minute summer	S24	168	51.720	0.289	13.7	0.4142	0.0000	OK
180 minute summer	HW2	164	51.720	0.355	32.5	0.5085	0.0000	SURCHARGED
180 minute summer	HW3	164	51.720	0.524	43.3	92.8540	0.0000	SURCHARGED
180 minute summer	S25	164	51.720	0.720	23.7	1.2730	0.0000	SURCHARGED
60 minute summer	S26	44	51.250	0.295	9.7	0.5211	0.0000	OK
60 minute summer	S27	44	51.249	0.399	12.4	0.7046	0.0000	SURCHARGED
15 minute summer	S28	14	51.871	1.021	9.5	1.8109	0.0000	SURCHARGED
60 minute summer	S29	44	51.247	0.487	13.7	0.8614	0.0000	SURCHARGED
60 minute summer	S30	44	51.245	0.570	10.7	1.0077	0.0000	SURCHARGED
60 minute summer	S31	45	50.698	0.088	9.9	0.1561	0.0000	OK
60 minute summer	HW4	45	50.631	0.081	9.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S23	4.002	S23A	21.2	0.706	0.272	0.2667	
15 minute summer	S23A	4.003	S24	33.8	0.942	0.436	1.5514	
180 minute summer	S24	4.004	HW2	17.8	0.947	0.252	1.1373	
180 minute summer	HW2	4.005	HW3	-14.7	1.129	-0.085	0.4996	
180 minute summer	HW3	1.014	S25	22.0	0.327	0.051	1.7557	
180 minute summer	S25	Hydro-Brake®	S26	5.4				
60 minute summer	S26	1.016	S27	9.5	0.616	0.136	1.8344	
60 minute summer	S27	1.017	S29	8.6	0.551	0.115	1.3720	
15 minute summer	S28	Hydro-Brake®	S29	3.7				
60 minute summer	S29	1.018	S30	10.7	0.389	0.176	1.9817	
60 minute summer	S30	1.020	S31	9.9	0.685	0.297	0.2264	
60 minute summer	S31	1.021	HW4	9.9	0.722	0.303	0.2066	128.6

Results for 30 year +30% CC Critical Storm Duration. Lowest mass balance: 99.62%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	54.972	0.056	9.1	0.0637	0.0000	OK
15 minute summer	S2	12	54.556	0.169	27.3	0.1914	0.0000	SURCHARGED
15 minute summer	S3	12	54.260	0.294	27.1	0.3328	0.0000	SURCHARGED
15 minute summer	S4	12	53.996	0.398	31.1	0.5694	0.0000	SURCHARGED
15 minute summer	S5	12	53.661	0.411	62.5	0.5879	0.0000	SURCHARGED
15 minute summer	S6	12	53.399	0.481	72.8	0.6888	0.0000	SURCHARGED
15 minute summer	S7	12	53.022	0.487	79.3	0.5504	0.0000	SURCHARGED
15 minute summer	S8	12	52.929	0.561	100.3	0.6346	0.0000	SURCHARGED
15 minute summer	S9	12	52.768	0.620	98.7	0.7015	0.0000	SURCHARGED
15 minute summer	S10	12	52.663	0.625	111.4	0.7070	0.0000	SURCHARGED
15 minute summer	S11	10	55.391	0.035	4.6	0.0507	0.0000	OK
15 minute summer	S12	10	54.377	0.090	18.9	0.1023	0.0000	OK
15 minute summer	S13	10	53.817	0.108	38.0	0.1222	0.0000	OK
15 minute summer	S14	10	53.324	0.118	37.8	0.1331	0.0000	OK
15 minute summer	S15	10	53.128	0.134	45.5	0.1519	0.0000	OK
15 minute summer	S16	11	52.792	0.190	61.7	0.2143	0.0000	OK
15 minute summer	S17	12	52.605	0.244	71.3	0.2757	0.0000	OK
15 minute summer	S18	12	52.561	0.736	185.8	1.0534	0.0000	SURCHARGED
15 minute summer	S19A	10	53.134	0.074	16.5	0.1063	0.0000	OK
15 minute summer	S19B	12	52.633	0.408	25.5	0.4611	0.0000	SURCHARGED
360 minute summer	S19	360	52.404	0.764	46.4	1.0932	0.0000	SURCHARGED
360 minute summer	S20	360	52.404	0.921	50.3	1.3186	0.0000	SURCHARGED
360 minute summer	HW1	360	52.404	1.097	50.1	1.5697	0.0000	SURCHARGED
15 minute summer	S21	10	52.869	0.064	13.1	0.0914	0.0000	OK
360 minute summer	S22	360	52.404	0.595	3.7	0.6733	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1	1.000	S2	9.0	0.833	0.300	0.2118	
15 minute summer	S2	1.001	S3	27.1	1.764	0.900	0.2596	
15 minute summer	S3	1.002	S4	24.0	1.491	0.795	0.2265	
15 minute summer	S4	1.003	S5	31.6	1.835	1.047	0.1682	
15 minute summer	S5	1.004	S6	58.1	1.596	0.820	0.7130	
15 minute summer	S6	1.005	S7	70.7	1.898	0.997	0.6625	
15 minute summer	S7	1.006	S8	75.8	1.389	0.602	0.9183	
15 minute summer	S8	1.007	S9	98.7	1.618	0.713	1.0003	
15 minute summer	S9	1.008	S10	97.5	1.462	0.702	0.4974	
15 minute summer	S10	1.009	S18	110.1	1.723	0.794	0.2862	
15 minute summer	S11	2.000	S12	4.6	0.651	0.122	0.1733	
15 minute summer	S12	2.001	S13	18.6	1.735	0.616	0.1886	
15 minute summer	S13	2.002	S14	37.8	1.898	0.429	0.3507	
15 minute summer	S14	2.003	S15	37.5	1.646	0.426	0.1696	
15 minute summer	S15	2.004	S16	45.2	1.481	0.613	0.5911	
15 minute summer	S16	2.005	S17	61.5	1.882	0.834	0.2694	
15 minute summer	S17	2.006	S18	68.6	1.717	0.320	0.8227	
15 minute summer	S18	1.010	S19	183.7	1.666	0.949	2.1779	
15 minute summer	S19A	3.000	S19B	16.4	1.303	0.491	0.3138	
15 minute summer	S19B	3.001	S19	22.2	1.500	0.847	0.2946	
360 minute summer	S19	1.011	S20	45.6	1.112	0.197	1.2936	
360 minute summer	S20	1.012	HW1	50.1	0.935	0.286	1.4495	
360 minute summer	HW1	1.013	HW3	50.0	1.046	0.198	2.8899	
15 minute summer	S21	4.000	S22	13.2	1.754	0.377	0.2963	
360 minute summer	S22	4.001	S23	3.2	0.580	0.074	0.2755	

Results for 30 year +30% CC Critical Storm Duration. Lowest mass balance: 99.62%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute summer	S23	360	52.404	0.717	9.4	0.8113	0.0000	SURCHARGED
360 minute summer	S23A	360	52.404	0.761	14.9	1.0895	0.0000	SURCHARGED
360 minute summer	S24	360	52.404	0.973	18.5	1.3930	0.0000	SURCHARGED
360 minute summer	HW2	360	52.404	1.039	18.2	1.4875	0.0000	SURCHARGED
360 minute summer	HW3	360	52.404	1.208	67.8	298.8050	0.0000	SURCHARGED
360 minute summer	S25	360	52.404	1.404	17.7	2.4816	0.0000	SURCHARGED
60 minute summer	S26	38	52.033	1.078	15.0	1.9050	0.0000	SURCHARGED
60 minute summer	S27	38	52.033	1.182	18.0	2.0895	0.0000	SURCHARGED
120 minute summer	S28	110	51.923	1.073	10.6	14.3671	0.0000	SURCHARGED
60 minute summer	S29	38	52.031	1.271	20.4	2.2455	0.0000	SURCHARGED
60 minute summer	S30	38	52.029	1.354	15.6	2.3927	0.0000	SURCHARGED
15 minute winter	S31	47	50.699	0.089	9.9	0.1564	0.0000	OK
15 minute summer	HW4	61	50.631	0.081	9.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
360 minute summer	S23	4.002	S23A	8.6	0.560	0.111	0.6250	
360 minute summer	S23A	4.003	S24	14.6	0.550	0.188	3.0457	
360 minute summer	S24	4.004	HW2	18.2	0.692	0.258	1.1434	
360 minute summer	HW2	4.005	HW3	19.8	1.088	0.115	0.4996	
360 minute summer	HW3	1.014	S25	17.2	0.209	0.040	1.7557	
360 minute summer	S25	Hydro-Brake®	S26	5.4				
60 minute summer	S26	1.016	S27	11.2	0.611	0.160	1.8379	
60 minute summer	S27	1.017	S29	13.5	0.552	0.180	1.3720	
120 minute summer	S28	Hydro-Brake®	S29	3.7				
60 minute summer	S29	1.018	S30	15.6	0.461	0.257	1.9817	
60 minute summer	S30	1.020	S31	9.9	0.686	0.298	0.2269	
15 minute winter	S31	1.021	HW4	9.9	0.723	0.304	0.2071	164.7

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.62%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	13	55.635	0.719	13.2	0.8130	0.0000	SURCHARGED
15 minute summer	S2	13	55.585	1.198	37.5	1.3548	0.0000	SURCHARGED
15 minute summer	S3	13	55.277	1.311	27.8	1.4829	0.0000	SURCHARGED
15 minute summer	S4	13	54.974	1.376	33.8	1.9685	0.0000	FLOOD RISK
15 minute summer	S5	12	54.665	1.415	70.0	2.0245	0.0000	FLOOD RISK
15 minute summer	S6	12	54.336	1.418	82.5	2.0296	0.0000	FLOOD RISK
15 minute summer	S7	12	53.843	1.308	88.2	1.4793	0.0000	SURCHARGED
15 minute summer	S8	12	53.720	1.352	120.8	1.5290	0.0000	SURCHARGED
15 minute summer	S9	12	53.487	1.339	116.7	1.5148	0.0000	SURCHARGED
15 minute summer	S10	12	53.338	1.300	133.1	1.4708	0.0000	SURCHARGED
15 minute summer	S11	10	55.399	0.043	6.6	0.0608	0.0000	OK
15 minute summer	S12	10	54.407	0.120	27.1	0.1361	0.0000	OK
15 minute summer	S13	12	54.023	0.314	54.8	0.3550	0.0000	SURCHARGED
15 minute summer	S14	12	53.861	0.655	53.3	0.7412	0.0000	SURCHARGED
15 minute summer	S15	12	53.776	0.782	59.8	0.8850	0.0000	SURCHARGED
15 minute summer	S16	12	53.528	0.926	78.9	1.0471	0.0000	SURCHARGED
15 minute summer	S17	12	53.292	0.931	88.4	1.0529	0.0000	SURCHARGED
15 minute summer	S18	12	53.190	1.365	220.7	1.9534	0.0000	SURCHARGED
15 minute summer	S19A	12	53.620	0.560	23.9	0.8015	0.0000	SURCHARGED
15 minute summer	S19B	12	53.334	1.109	33.3	1.2545	0.0000	SURCHARGED
30 minute summer	S19	20	52.880	1.240	242.3	1.7751	0.0000	SURCHARGED
480 minute summer	S20	488	52.840	1.357	58.4	1.9417	0.0000	SURCHARGED
480 minute summer	HW1	480	52.838	1.531	58.0	2.1903	0.0000	SURCHARGED
15 minute summer	S21	12	53.032	0.227	19.0	0.3242	0.0000	SURCHARGED
480 minute summer	S22	480	52.838	1.029	4.2	1.1634	0.0000	SURCHARGED

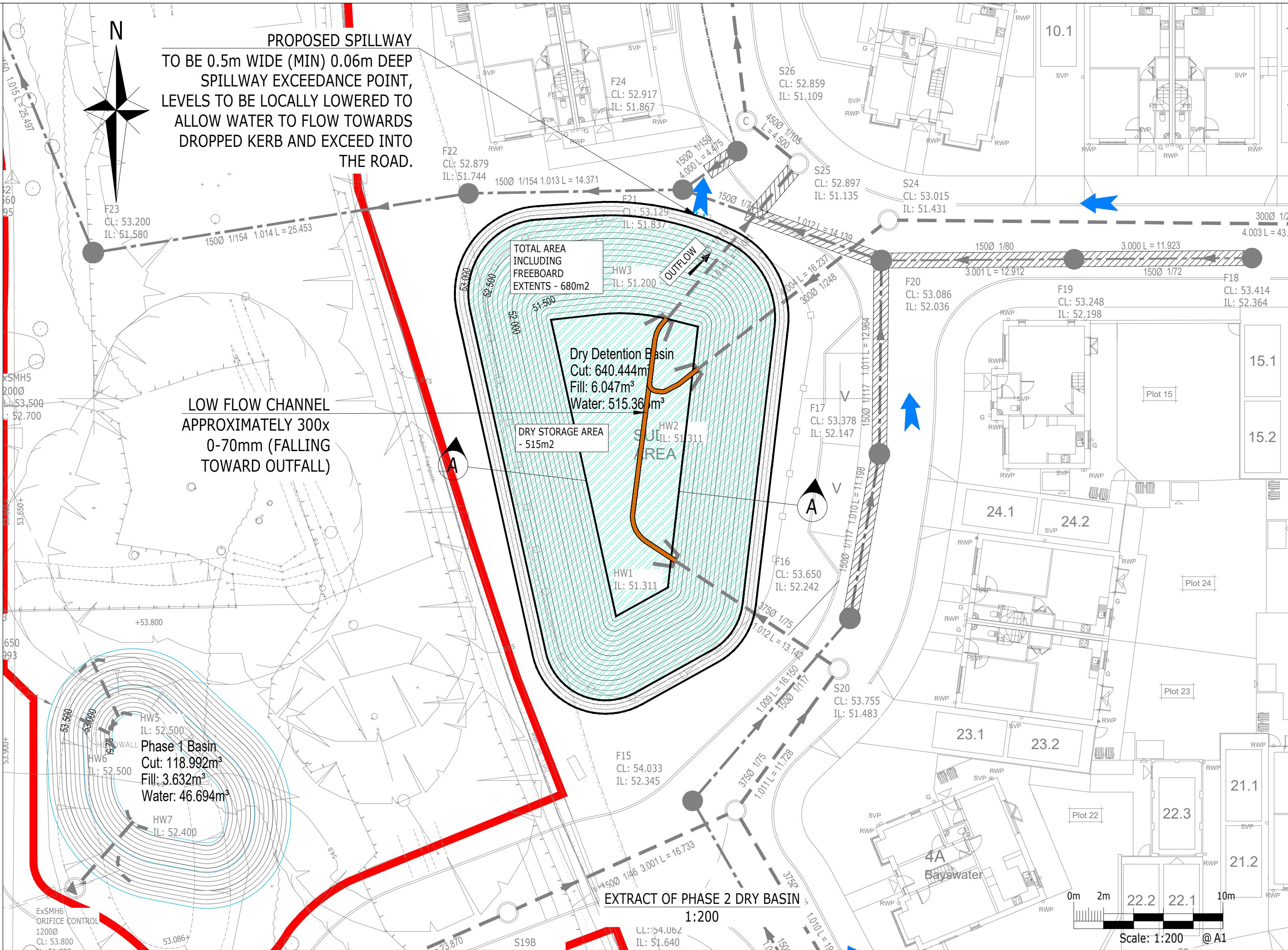
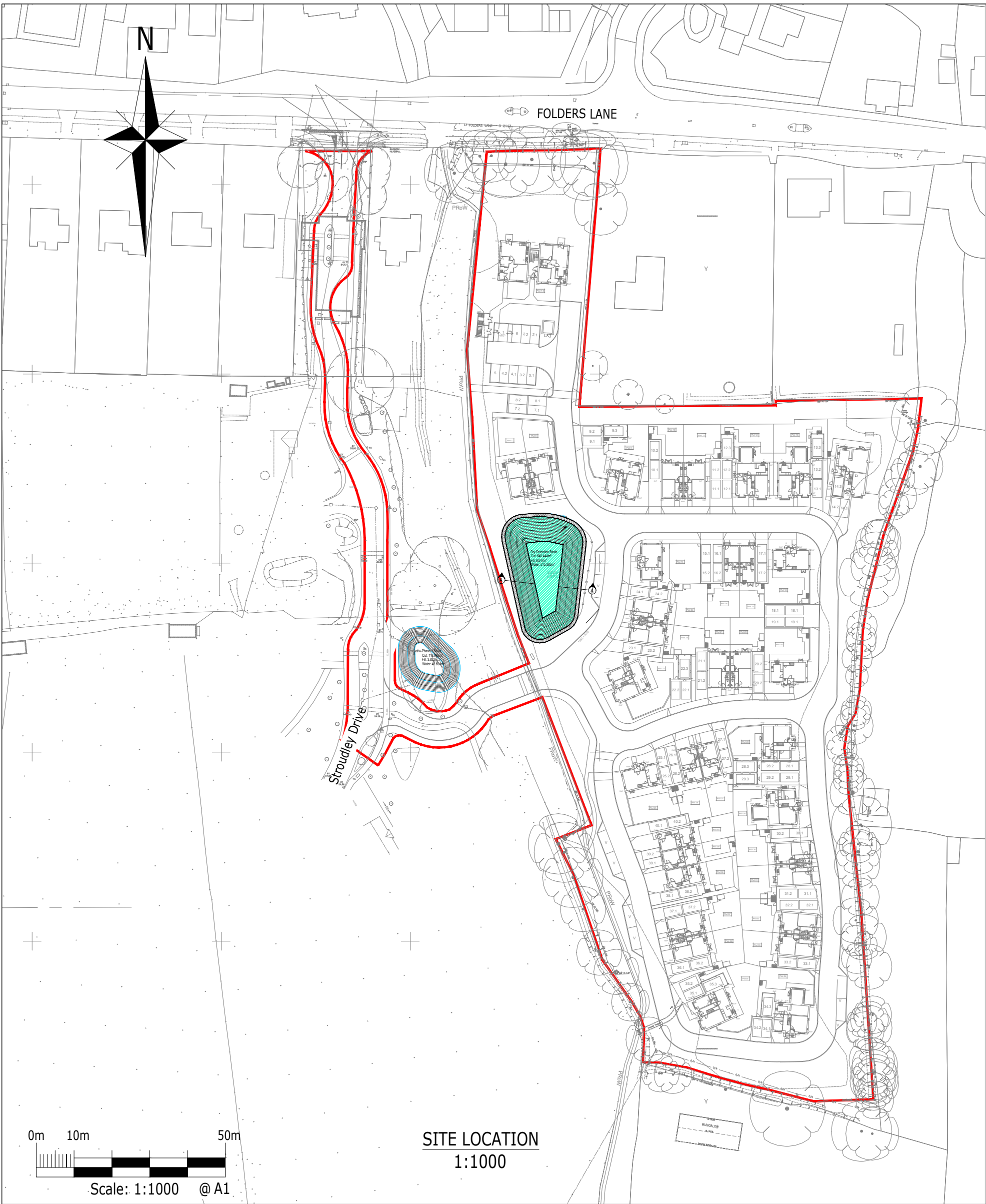
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1	1.000	S2	12.3	0.846	0.409	0.3258	
15 minute summer	S2	1.001	S3	27.8	1.776	0.922	0.2596	
15 minute summer	S3	1.002	S4	28.1	1.598	0.932	0.2265	
15 minute summer	S4	1.003	S5	38.1	2.165	1.263	0.1682	
15 minute summer	S5	1.004	S6	62.4	1.613	0.880	0.7130	
15 minute summer	S6	1.005	S7	78.1	1.964	1.102	0.6625	
15 minute summer	S7	1.006	S8	87.6	1.372	0.696	0.9183	
15 minute summer	S8	1.007	S9	116.7	1.657	0.842	1.0003	
15 minute summer	S9	1.008	S10	115.8	1.644	0.834	0.4974	
15 minute summer	S10	1.009	S18	131.6	1.869	0.950	0.2862	
15 minute summer	S11	2.000	S12	6.5	0.680	0.175	0.2339	
15 minute summer	S12	2.001	S13	26.7	1.841	0.884	0.2712	
15 minute summer	S13	2.002	S14	53.3	1.982	0.604	0.7003	
15 minute summer	S14	2.003	S15	48.8	1.649	0.553	0.2951	
15 minute summer	S15	2.004	S16	56.1	1.458	0.761	0.7795	
15 minute summer	S16	2.005	S17	74.2	1.866	1.007	0.3299	
15 minute summer	S17	2.006	S18	81.1	1.694	0.378	0.8795	
15 minute summer	S18	1.010	S19	219.4	1.989	1.133	2.1779	
15 minute summer	S19A	3.000	S19B	20.8	1.354	0.621	0.4202	
15 minute summer	S19B	3.001	S19	27.3	1.553	1.046	0.2946	
30 minute summer	S19	1.011	S20	239.7	2.174	1.035	1.2936	
480 minute summer	S20	1.012	HW1	58.0	0.835	0.331	1.4495	
480 minute summer	HW1	1.013	HW3	57.6	1.067	0.229	2.8899	
15 minute summer	S21	4.000	S22	17.6	1.801	0.505	0.4255	
480 minute summer	S22	4.001	S23	3.8	0.560	0.088	0.2755	

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.62%

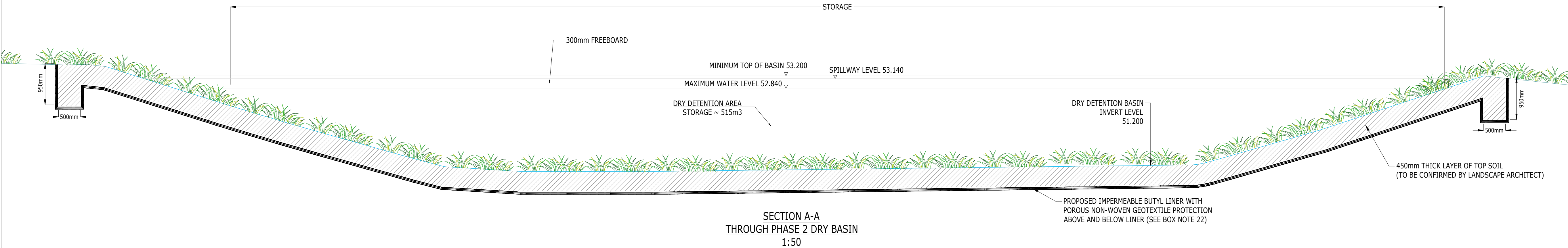
Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
480 minute summer	S23	480	52.837	1.150	11.4	1.3007	0.0000	SURCHARGED
480 minute summer	S23A	480	52.837	1.194	18.2	1.7092	0.0000	SURCHARGED
480 minute summer	S24	480	52.838	1.407	22.3	2.0132	0.0000	FLOOD RISK
480 minute summer	HW2	480	52.838	1.473	22.0	2.1075	0.0000	SURCHARGED
480 minute summer	HW3	480	52.838	1.642	79.0	488.2680	0.0000	SURCHARGED
480 minute summer	S25	480	52.838	1.838	20.7	3.2469	0.0000	FLOOD RISK
60 minute summer	S26	37	52.493	1.538	15.5	2.7168	0.0000	SURCHARGED
60 minute summer	S27	37	52.493	1.643	17.6	2.9024	0.0000	FLOOD RISK
180 minute summer	S28	152	51.977	1.127	14.4	28.6424	0.0000	SURCHARGED
60 minute summer	S29	37	52.491	1.731	20.2	3.0582	0.0000	FLOOD RISK
60 minute summer	S30	37	52.489	1.814	14.9	3.2045	0.0000	FLOOD RISK
180 minute summer	S31	264	50.699	0.089	9.9	0.1564	0.0000	OK
180 minute summer	HW4	264	50.631	0.081	9.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
480 minute summer	S23	4.002	S23A	11.1	0.499	0.142	0.6250	
480 minute summer	S23A	4.003	S24	17.9	0.490	0.231	3.0457	
480 minute summer	S24	4.004	HW2	22.0	0.651	0.312	1.1434	
480 minute summer	HW2	4.005	HW3	21.7	1.107	0.126	0.4996	
480 minute summer	HW3	1.014	S25	20.3	0.365	0.047	1.7557	
480 minute summer	S25	Hydro-Brake®	S26	5.9				
60 minute summer	S26	1.016	S27	10.3	0.615	0.147	1.8379	
60 minute summer	S27	1.017	S29	13.8	0.552	0.184	1.3720	
180 minute summer	S28	Hydro-Brake®	S29	3.7				
60 minute summer	S29	1.018	S30	14.9	0.488	0.245	1.9817	
60 minute summer	S30	1.020	S31	9.9	0.686	0.298	0.2269	
180 minute summer	S31	1.021	HW4	9.9	0.723	0.304	0.2071	558.5

Appendix D



- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE RELEVANT SPECIFICATION, INCL. RISK ASSESSMENTS (SEE CDM NOTES BELOW) AND ALL OTHER RELATED DRAWINGS ISSUED BY THE ENGINEER.
 - DO NOT SCALE FROM THIS DRAWING. WORK FROM FIGURED DIMENSIONS ONLY.
 - ALL DIMENSIONS SHOWN ON THIS DRAWING ARE IN METRES, UNLESS OTHERWISE STATED.
 - ALL DIMENSIONS, LEVELS AND SURVEY GRID CO-ORDINATES ARE TO BE CHECKED ON SITE AND THE ENGINEER NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES PRIOR TO THE COMMENCEMENT OF THE WORKS.
 - NO DEVIATION FROM THE DETAILS SHOWN ON THIS DRAWING IS PERMITTED WITHOUT PRIOR PERMISSION FROM THE ENGINEER.
 - THIS DRAWING HAS BEEN BASED UPON TOPOGRAPHICAL SURVEY PROVIDED BY THREE SIXTY MAPPING DATED 11.04.2018 DRAWING NUMBER ENZ/05EA/001
 - ALL OUTFALL INVERT LEVELS TO BE CHECKED PRIOR TO COMMENCEMENT OF WORKS AND ANY DISCREPANCIES REPORTED TO THE ENGINEER IMMEDIATELY.
 - THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT THE DRAINAGE WORKS FOR THE DURATION OF THE CONTRACT.
 - ALL ADOPTABLE SEWER PIPES UP TO 300mm IN DIAMETER TO BE VITRIFIED CLAY TO BS 65 AND BS EN 295 AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
 - ALL CONCRETE AND CONCRETE PRODUCTS BELOW GROUND LEVEL SHALL BE SULPHATE RESISTING PORTLAND CEMENT. THE DESIGN SULPHATE (DS) CLASS IS DS1 AND AGGRESSIVE CHEMICAL ENVIRONMENT (ACE) IS AC-1.
 - ALL MANHOLE COVERS AND FRAMES IN ROADS OR TRAFFICATED AREAS TO BE CLASS D400 IN ACCORDANCE WITH BS EN 124. ALL CHAMBER COVERS WITHIN LANDSCAPED AREAS TO BE CLASS B125.
 - ALL PIPE CONNECTIONS SHALL BE MADE SOFFIT TO SOFFIT EXCEPT IN HYDROBRAKE CHAMBERS OR WHERE NOTED OTHERWISE.
 - ALL PIPES SHALL HAVE FLEXIBLE JOINTS.
 - STATED COVER LEVELS ARE FOR GUIDANCE ONLY AND SHALL BE SET TO THE FINISH LEVEL OF THE CARRIAGEWAY/SOFT LANDSCAPED AREAS.
 - ALL PIPE SIZES STATED ARE NOMINAL INTERNAL DIAMETERS IN MILLIMETRES.
- CDM NOTES:**
- THE ATTENTION OF THE CLIENT, PRINCIPAL DESIGNER, PRINCIPAL CONTRACTOR, DESIGNERS AND CONTRACTORS IS DRAWN TO THE FOLLOWING POTENTIAL RISKS IN CONJUNCTION WITH THE PROPOSED ON-SITE AND OFF-SITE WORKS AS DESIGNED FOR THIS PROJECT.
- WORKS IN THE VICINITY OF LIVE SERVICES INCLUDING GAS, ELECTRICITY AND BT WILL BE NECESSARY AND THE ADVICE OF ALL STATUTORY SERVICE COMPANIES MUST BE SOUGHT BEFORE ANY WORKS COMMENCE.
 - WORKS WITHIN AND ABUTTING THE EXISTING HIGHWAY WILL ENTAIL TRAFFIC HAZARDS AND ALL APPROPRIATE SAFETY MEASURES INCLUDING BARRIERS, SIGNS AND LIGHTING MUST BE UNDERTAKEN TO THE APPROVAL OF THE LOCAL AUTHORITY, THE HIGHWAY AUTHORITY AND THE POLICE DEPARTMENT.
 - HAZARDOUS MATERIALS INCLUDING CEMENT AND BITUMINOUS MATERIALS ARE SPECIFIED AND THE MANUFACTURERS ADVICE ON SAFE HANDLING PROCEDURES MUST BE OBTAINED AND MADE CLEAR TO ALL OPERATIVES.
 - THE CONTRACTOR WILL BE RESPONSIBLE FOR LOCATING ALL EXISTING SERVICES WITHIN THE VICINITY OF THE WORKS HAND DUG AND ENSURE THESE ARE PROTECTED THROUGHOUT THE DURATION OF THE WORKS. ALL UTILITY PLANT SHOULD BE CLEARLY MARKED ON THE GROUND PRIOR TO COMMENCEMENT OF THE WORKS.
 - THE CONTRACTOR MUST ENSURE ALL WORKING AREAS ARE FULLY SECURE.
 - THIS DRAWING IS TO BE READ IN CONJUNCTION WITH DESIGNER'S RISK ASSESSMENT 2404170-ACE-XX-XX-DR-C-0011



BOX NOTE 1 - THIS DRAWING IS BASED UPON ARCHITECT DRAWING: 1255_001_SITE_21oct25dwg, REVISION: T7

BOX NOTE 2 - THIS DRAWING IS BASED UPON TOPOGRAPHICAL SURVEY DRAWING: 36315, REVISION: -

BOX NOTE 3 - THIS DRAWING IS BASED UPON LANDSCAPE ARCHITECT DRAWING: LLD3589-LAN-DWG-100-02 - GA, REVISION: 02

BOX NOTE 4 - REFER TO DRAWING No. 2501300-1001-1002 FOR GENERAL ARRANGEMENT PLAN

BOX NOTE 5 - REFER TO DRAWING No. 2501300-1003-1004 FOR ENGINEERING PLAN

BOX NOTE 6 - REFER TO DRAWING No. 2501300-1005-1006 FOR GEOMETRY PLAN

BOX NOTE 7 - REFER TO DRAWING No. 2501300-1033-1034 FOR EXTERNAL LEVELS

BOX NOTE 8 - REFER TO DRAWING No. 2501300-1035-1036 FOR KERBING AND CONTOURS

BOX NOTE 9 - REFER TO DRAWING No. 2501300-1201-1202 FOR MAIN DRAINAGE PLAN

BOX NOTE 10 - REFER TO DRAWING No. 2501300-1241-1242 FOR DRAINAGE CONSTRUCTION DETAILS

BOX NOTE 11 - REFER TO DRAWING No. 2501300-1501-1502 FOR PLOT DRAINAGE PLAN

BOX NOTE 12 - REFER TO DRAWING No. 2501300-1601-1602 FOR EXTERNAL WORKS LAYOUT

BOX NOTE 13 - REFER TO DRAWING No. 2501300-1611 FOR EXTERNAL WORKS CONSTRUCTION DETAILS

BOX NOTE 14 - REFER TO DRAWING No. 2501300-1701 FOR CUT AND FILL APPRAISAL

BOX NOTE 15 - REFER TO DRAWING No. 2501300-1702 FOR CUT AND FILL ISOPACHYTE

BOX NOTE 16 - REFER TO DRAWINGS BY CONNECT IT UTILITY SERVICES FOR EXISTING AND PROPOSED UTILITIES ACROSS THE SITE, INCLUDING DIVERSIONS AND ANY APPLICABLE EASEMENTS

BOX NOTE 17 - REFER TO DRAWINGS BY LIZARDLAKE ARCHITECTS FOR DETAILS OF PROPOSED SOFT LANDSCAPING

BOX NOTE 18 - REFER TO DRAWINGS BY OSP ARCHITECTS FOR CONFIRMATION OF SURFACE FINISHES TO HARD LANDSCAPED AREAS, INCLUDING COLOUR, TEXTURE AND LAYING PATTERNS ETC.

BOX NOTE 19 - THE CONTRACTOR IS RESPONSIBLE FOR SECURING PERMISSIONS AND AGREEING METHODS OF WORKS AND TRAFFIC MANAGEMENT MEASURES WITH THE HIGHWAY AUTHORITY IN ADVANCE OF UNDERTAKING THE WORKS. NO WORKS SHALL BE CARRIED OUT ON PUBLIC HIGHWAY WITHOUT PRIOR WRITTEN CONSENT FROM THE HIGHWAYS AUTHORITY. A COPY OF THE CONSENT MUST BE PROVIDED TO THE CLIENT AT LEAST 7NO. WORKING DAYS BEFORE THE START OF THE WORK ON SITE.

BOX NOTE 20 - ALL EXCAVATED MATERIAL TO BE REMOVED, SHOULD BE DISPOSED OF TO A LICENSED TIP OFF-SITE

BOX NOTE 21 - ALL EXISTING UNDERGROUND SERVICES AND DRAINAGE TO BE CONFIRMED ON SITE PRIOR TO COMMENCEMENT OF WORK

BOX NOTE 22 - ALL EXISTING UNDERGROUND SERVICES AND DRAINAGE TO BE CONFIRMED ON SITE PRIOR TO COMMENCEMENT OF WORK

BOX NOTE 23 - BUTYL LINER SHALL BE 1mm THICK LOW DENSITY POLYETHYLENE LANDFLEX PE-LL (BY BUTYL PRODUCTS GROUP) OR SIMILAR APPROVED. THIS SHOULD BE PROTECTED WITH GEOTEXTILE LAYERS AT THE TOP AND BOTTOM. GEOTEXTILE LAYERS TO BE LANDFLEX G3000 OR SIMILAR APPROVED. INSTALLATION TO BE STRICTLY IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS AND THE MINIMUM WIDTH OF OVERLAP FOR WELDING BETWEEN ROLLS SHALL BE 150mm.

* ALTERNATIVELY, A BENTONITE (CLAY) LINER MAY BE USED, SUBJECT TO PRIOR AGREEMENT WITH ENGINEER, BEFORE INSTALLATION

BOX NOTE 24 - APPOINTED GROUNDWORKER TO MAKE ADEQUATE ALLOWANCE IN HIS TENDER SUM FOR ANY REQUIRED DEWATERING THROUGHOUT THE DURATION OF THE WORKS.

ANY NECESSARY DEWATERING DURING CONSTRUCTION MUST BE LIMITED AT A CONTROLLED RATE EQUAL TO THE ALLOWABLE DISCHARGE RATE OF SURFACE WATER FROM THE FINISHED DEVELOPMENT (9.9l/s) AS STATED WITHIN THE APPROVED FRA, OR AS OTHERWISE AGREED WITH THE LEAD LOCAL FLOOD AUTHORITY

IMPORTANT NOTE REGARDING FILL MATERIAL TO BE USED UNDER THE INFILTRATION BASIN CONSTRUCTION (TO BE READ IN CONJUNCTION WITH THE RSK EARTHWORKS SPECIFICATION AND MATERIAL MANAGEMENT PLAN)

THE CONTRACTOR SHALL REFER TO RSK'S EARTHWORKS SPECIFICATION AND MATERIALS MANAGEMENT PLAN FOR THE EARTHWORKS.

SITE WON MATERIAL
SITE WON MATERIAL MUST BE TESTED TO CONFIRM ITS CLASSIFICATION IN TERMS OF TABLE 6/1, SERIES 600 OF MCHW1

THE FOLLOWING RECOMMENDATIONS ARE BASED UPON THE ASSUMPTION THAT SITE WON MATERIAL WILL CONFORM TO THE REQUIREMENTS OF CLASS 1. THIS IS TO BE VALIDATED IN ACCORDANCE WITH RSK EARTHWORKS SPECIFICATION.

IN ACCORDANCE WITH THE RSK EARTHWORKS SPECIFICATION EACH LAYER OF GENERAL FILL PLACED SHALL BE VALIDATED ON 25m x 25m GRID TO SHOW COMPLIANCE WITH THE END PRODUCT REQUIREMENTS BELOW AND 100% COMPLIANCE IS REQUIRED BENEATH ADOPTED ROADS.

CLASS 1 MATERIALS

- MINIMUM 95% OF THE MAXIMUM DRY DENSITY (MDD);
- ≥10% CBR AT THE FORMATION LEVEL OF ALL PAVEMENTS;

IN-SITU CBR TESTING TO BS1377 IS REQUIRED AT 25m INTERVALS ALONG THE COMPLETED ROAD FORMATION TO CONFIRM THAT A MINIMUM CBR VALUE OF 10.0% HAS BEEN ACHIEVED.

IT IS IMPERATIVE THAT ALL TESTING IS CARRIED OUT TO THE SATISFACTION OF THE ENGINEER WITH ALL TEST RESULTS SUBMITTED FOR APPROVAL PRIOR TO CONTINUATION OF THE WORKS

P02	AMENDED TO COMMENTS	KC	MAC	BW	27.10.25
P01	PRELIMINARY ISSUE	MAC	MAC	BW	17.10.25
Rev	Description	Drn	Chk	App	Date

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Client

JONES HOMES

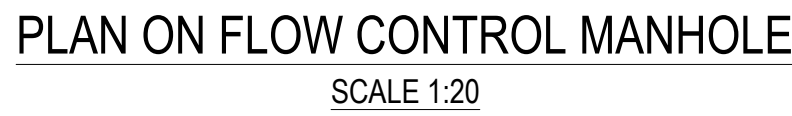
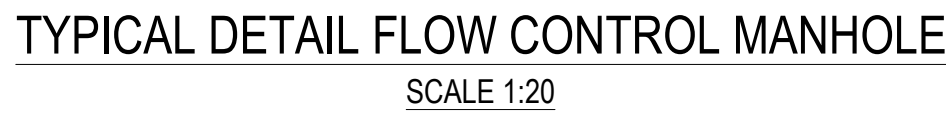
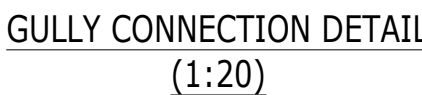
Project Title:

FOLDERS GROVE 2

Drawing Title:
PHASE 2 DRY BASIN AND TYPICAL SECTIONS

Drawn by	Checked by	Approved by
MAC	MAC	BW
A1 Scale	Date	Revision
1:200@A0	OCT 2025	P02
Drawing Number 2501300-ACE-XX-XX-DR-C-1221		

Appendix E

HYDRO-BRAKE DIMENSION TABLE - (ALL DIMENSIONS IN mm)

THE CONCRETE SURROUND TO OUTLET PIPE MAYBE CONTINUOUS AT PIPE JOINTS PROVIDED THAT FILLER IS PROVIDED AT JOINTS NOT EXCEEDING 5.0m CENTRES. FILLER TO BE 18mm THICK EXPANDED POLYSTYRENE CUT TO SHAPE OF BED & SURROUND. SURROUND TO EXTEND TO CONNECTION WITH SW SEWER. ALL CONCRETE SHALL TO BE MCHW CLAUSE 2602

BOX NOTE 2: ALL PIPES ENTERING OR LEAVING
MANHOLES SHALL HAVE A FLEXIBLE JOINT WITHIN
600mm - 1200mm OF THE INSIDE FACE OF THE MANHOLE
(DEPENDING ON PIPE SIZE, SEE TABLE 2 ON DRAWING
2408140-ACE-XX-XX-DR-C-1241).

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE RELEVANT SPECIFICATION AND ALL OTHER RELATED DRAWINGS ISSUED BY THE ENGINEER.
2. DO NOT SCALE FROM THIS DRAWING. WORK FROM FIGURED DIMENSIONS ONLY.
3. ALL DIMENSIONS SHOWN ON THIS DRAWING ARE IN METRES, UNLESS OTHERWISE STATED.
4. ALL DIMENSIONS, LEVELS AND SURVEY GRID CO-ORDINATES ARE TO BE CHECKED ON SITE AND THE ENGINEER NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES PRIOR TO THE COMMENCEMENT OF THE WORKS.
5. NO DEVIATION FROM THE DETAILS SHOWN ON THIS DRAWING IS PERMITTED WITHOUT PRIOR PERMISSION FROM THE ENGINEER.
6. ALL WORKS OUTSIDE RED SITE BOUNDARY ARE FOR INFORMATION PURPOSES ONLY. UNLESS SPECIFICALLY NOTED, ALL WORKS OUTSIDE THE SITE BOUNDARY WILL BE UNDERTAKEN BY OTHERS UNDER A SEPARATE CONTRACT.

CDM NOTES

THE ATTENTION OF THE CLIENT, PRINCIPAL DESIGNER, PRINCIPAL CONTRACTOR, DESIGNERS AND CONTRACTORS IS DRAWN TO THE FOLLOWING POTENTIAL RISKS IN CONJUNCTION WITH THE PROPOSED ON-SITE AND OFF-SITE WORKS AS DESIGNED FOR THIS PROJECT:

1. WORKS IN THE VICINITY OF LIVE SERVICES INCLUDING GAS, ELECTRICITY AND STEAM WILL BE NECESSARY AND THE ADVICE OF THE RELEVANT SERVICE COMPANIES MUST BE SOUGHT BEFORE ANY WORKS COMMENCE.
2. WORKS WITHIN AND ABOUT THE EXISTING HIGHWAY WILL entail TRAFFIC HAZARDS AND ALL APPROPRIATE SAFETY MEASURES MUST BE TAKEN. THE CONTRACTOR MUST BE UNDERTAKEN TO THE APPROVAL OF THE LOCAL AUTHORITY, THE HIGHWAY AUTHORITY AND THE POLICE DEPARTMENT.
3. HAZARDOUS MATERIALS INCLUDING CEMENT AND BITUMINOUS MATERIALS ARE SPECIFIED AND THE MANUFACTURERS ADVICE MUST BE OBTAINED PRIOR TO WORKS. MUST BE OBTAINED AND MADE CLEAR TO ALL OPERATIVES.
4. THE CONTRACTOR WILL BE RESPONSIBLE FOR LOCATING ALL EXISTING SERVICES WITHIN THE VICINITY OF THE WORKS AND FOR ENSURING THAT THE WORKS DO NOT INTERFERE WITH THE DURATION OF THE WORKS. ALL UTILITY PLAT should BE CLEARLY MARKED ON THE GROUND PRIOR TO COMMENCEMENT OF THE WORKS.
5. THE CONTRACTOR MUST ENSURE ALL WORKING AREAS ARE FULLY SECURE.

"DCG" MANHOLE REFERENCES
 TYPE A - REFER TO TYPE A, FIGURE B0
 TYPE B - REFER TO TYPE B, FIGURE B10
 TYPE C - REFER TO TYPE C, FIGURE B15

ALL COVER TO BE D400 UNLESS
NOTED OTHERWISE

P02	AMENDED TO COMMENTS	KC	MAC	BW	27.10.
P01	PRELIMINARY ISSUE	MAC	MAC	BW	17.10.
Rev	Description	Drn	Chk	App	Dat

Purpose:	PRELIMINARY	Status:	NOT YET APPROVED
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Client

JONES HOMES

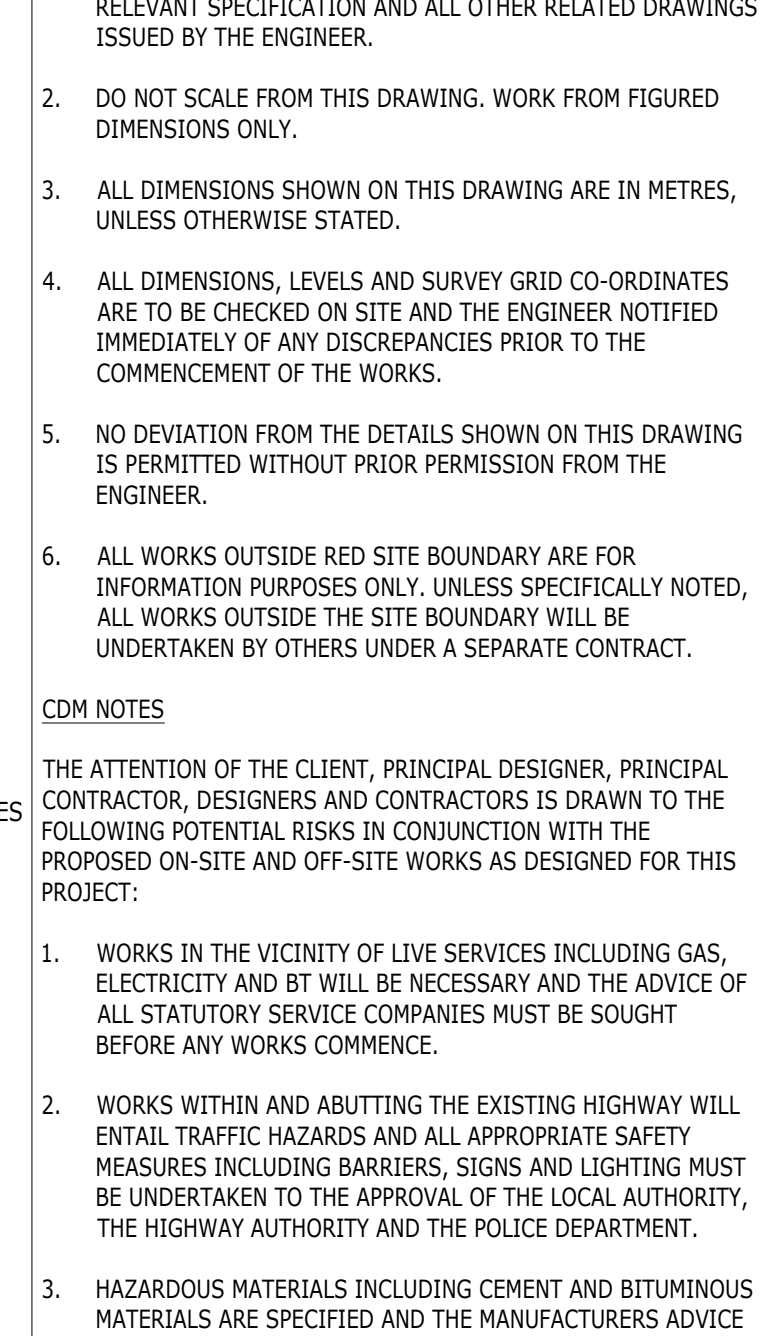
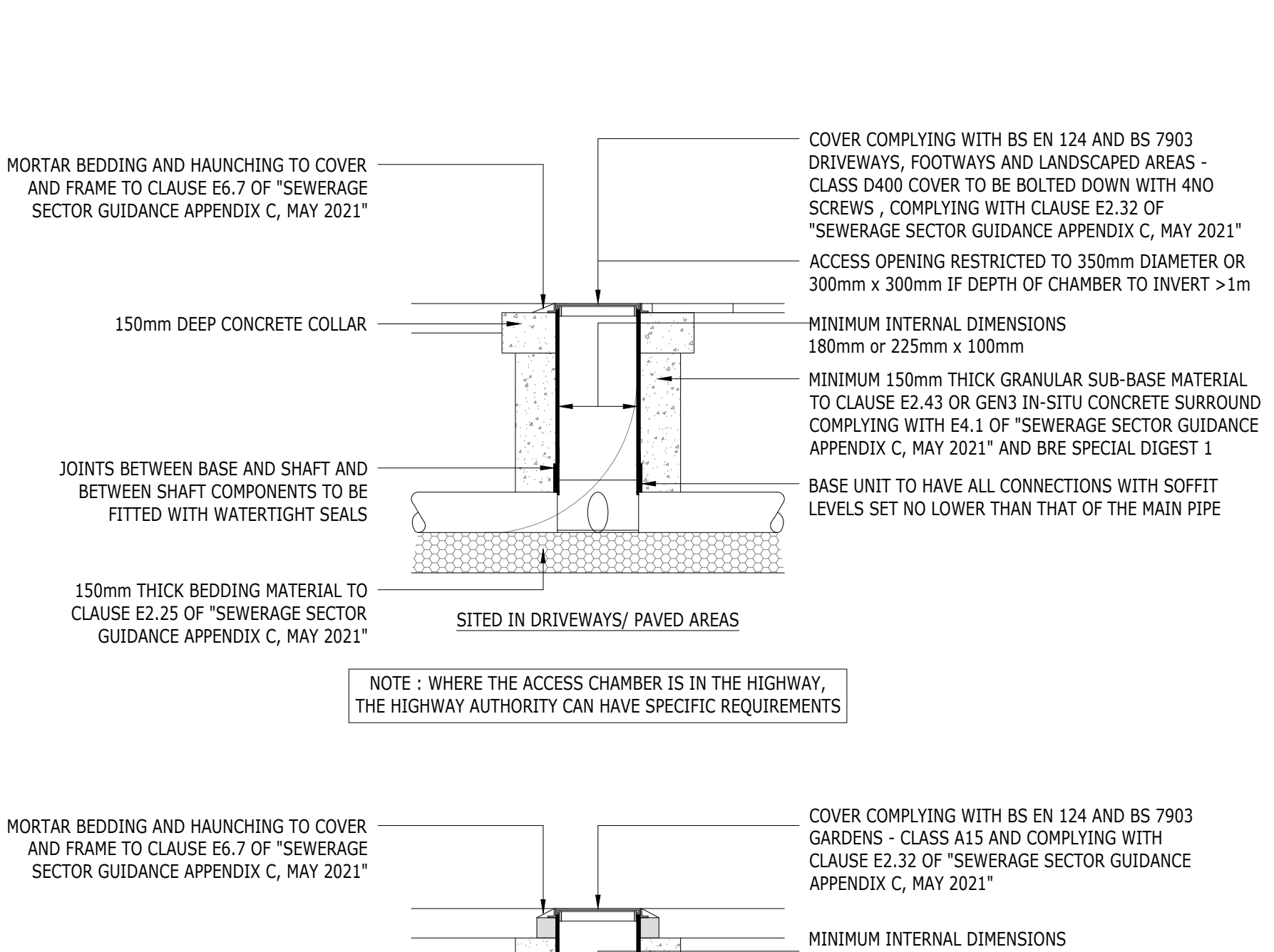
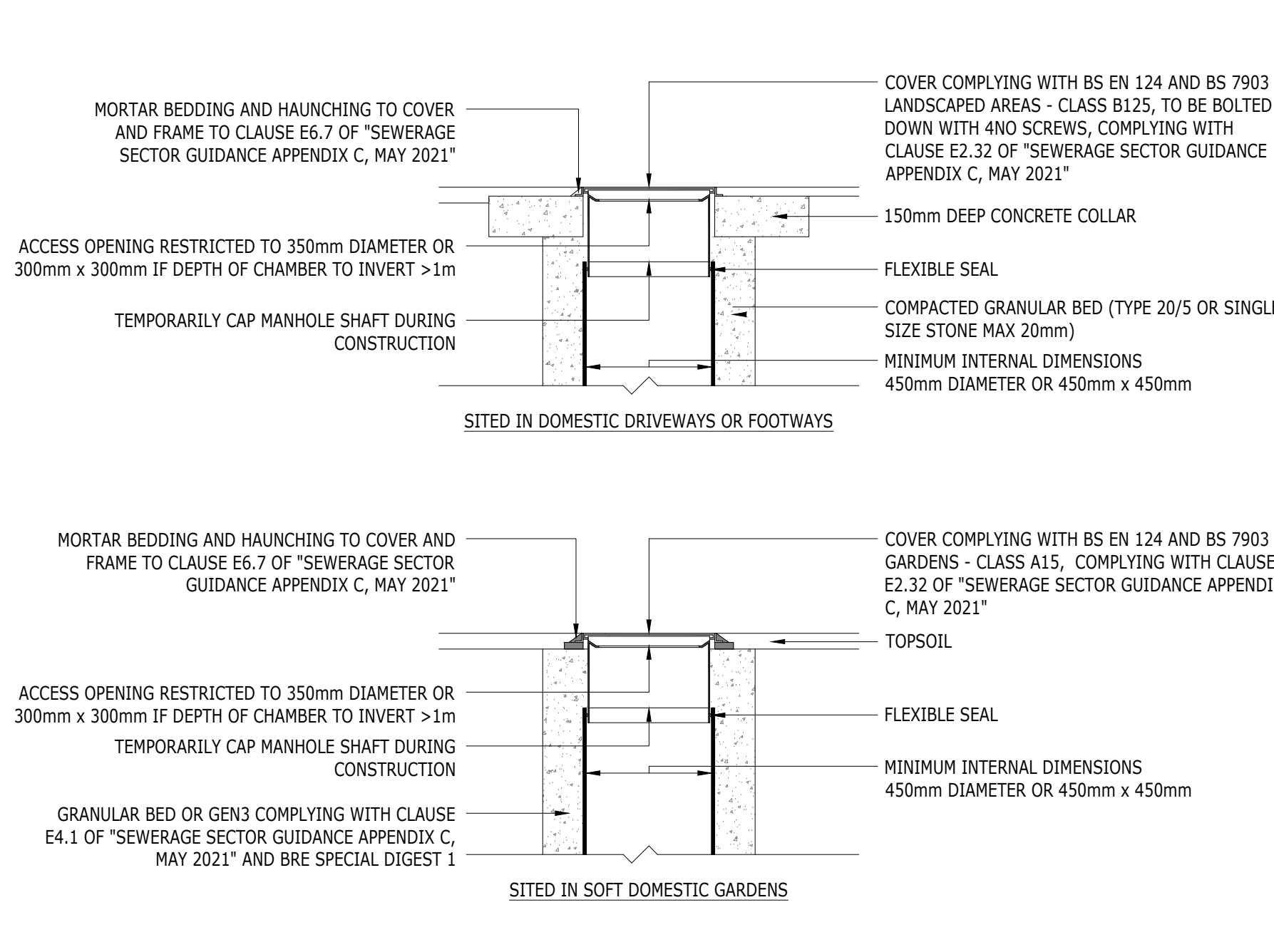
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FOLDERS GROVE 2

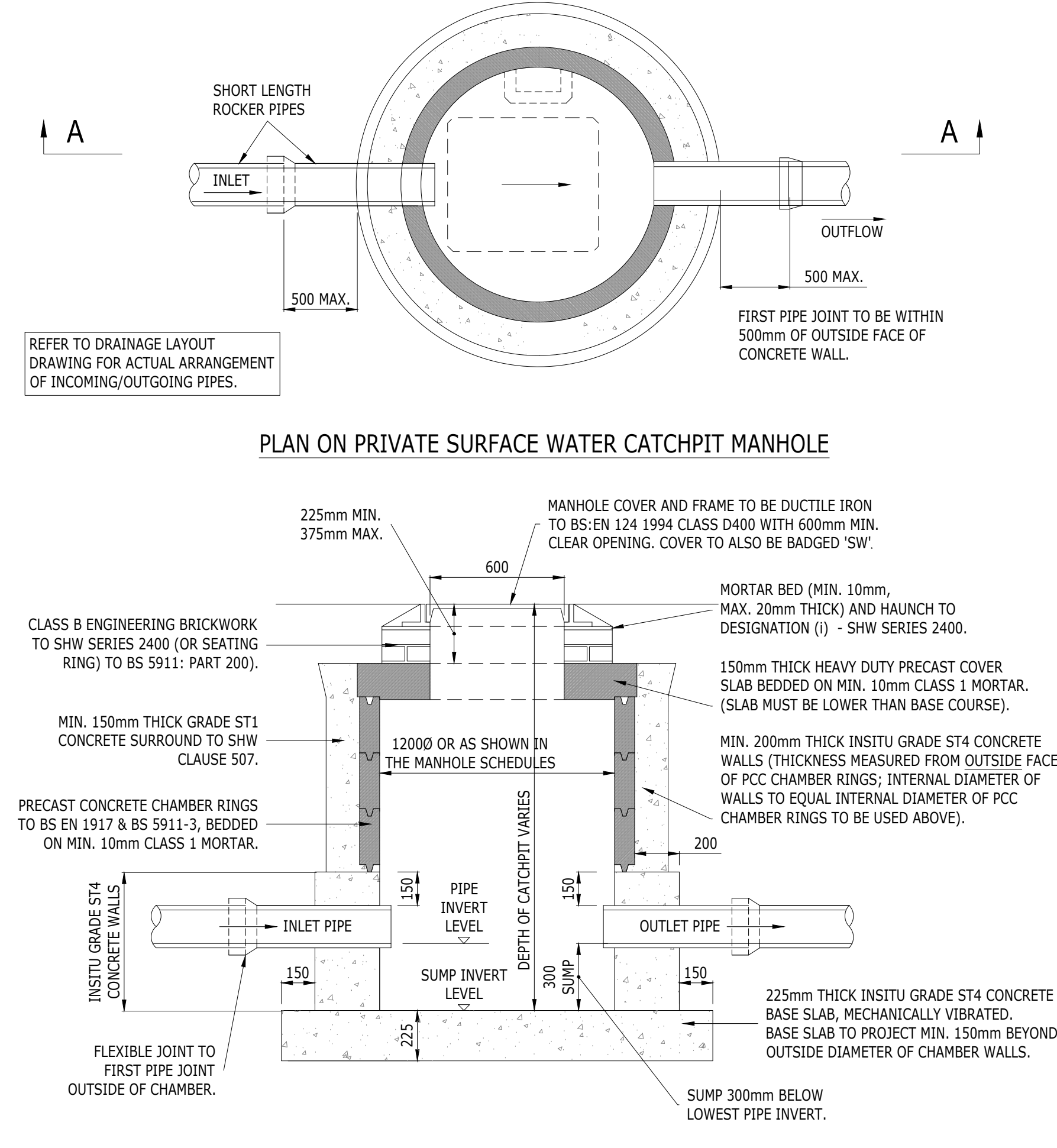
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DRAINAGE CONSTRUCTION DETAILS
(SHEET 2 OF 4)

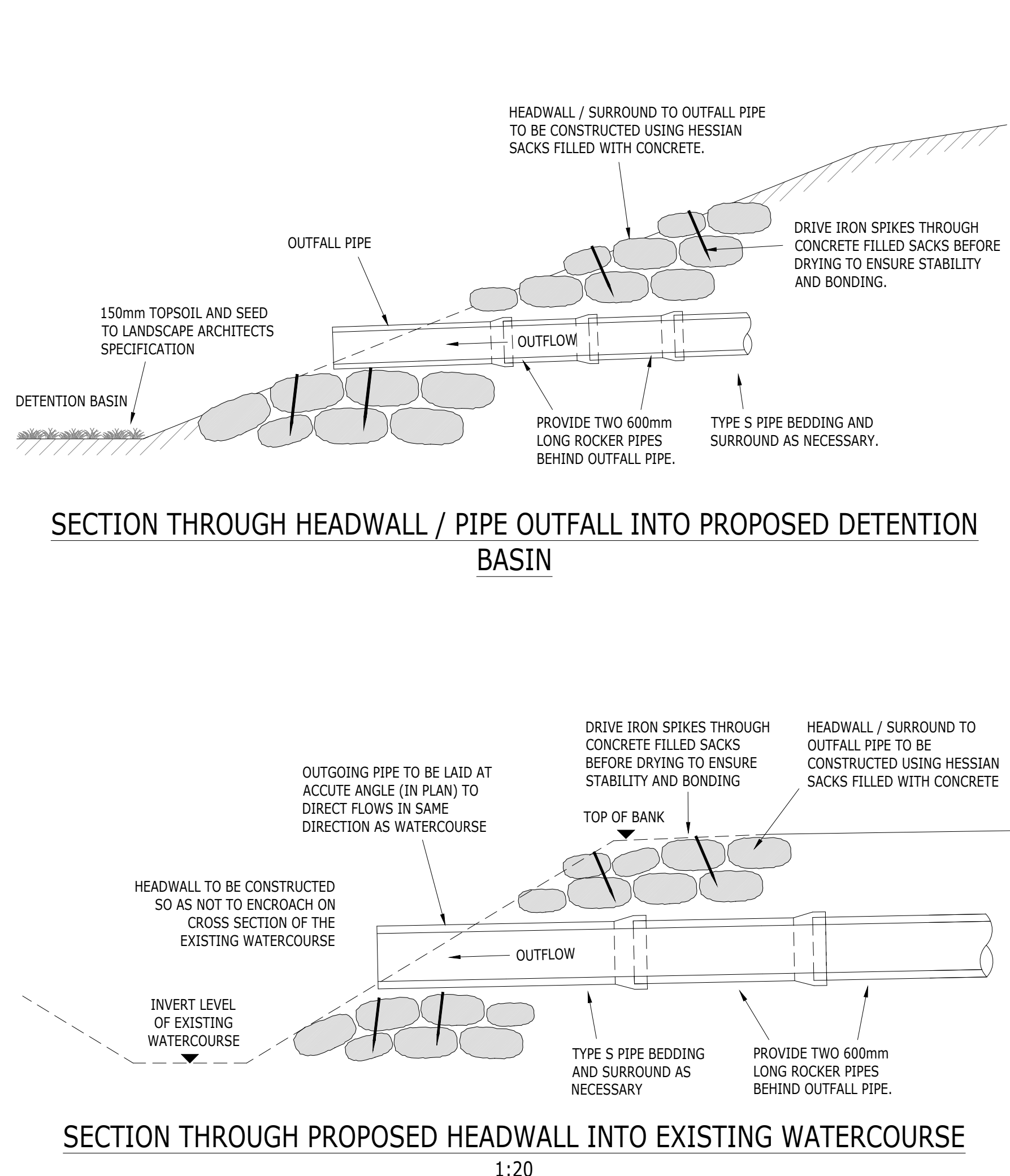
Drawn by MAC	Checked by MAC	Approved by BW	Revision P02
Scale AS SHOWN		Date OCT 2025	
Drawing Number 21-0016-ACE-XX-XX-DB-G-1212			



TYPICAL 'Y' JUNCTION CONNECTION



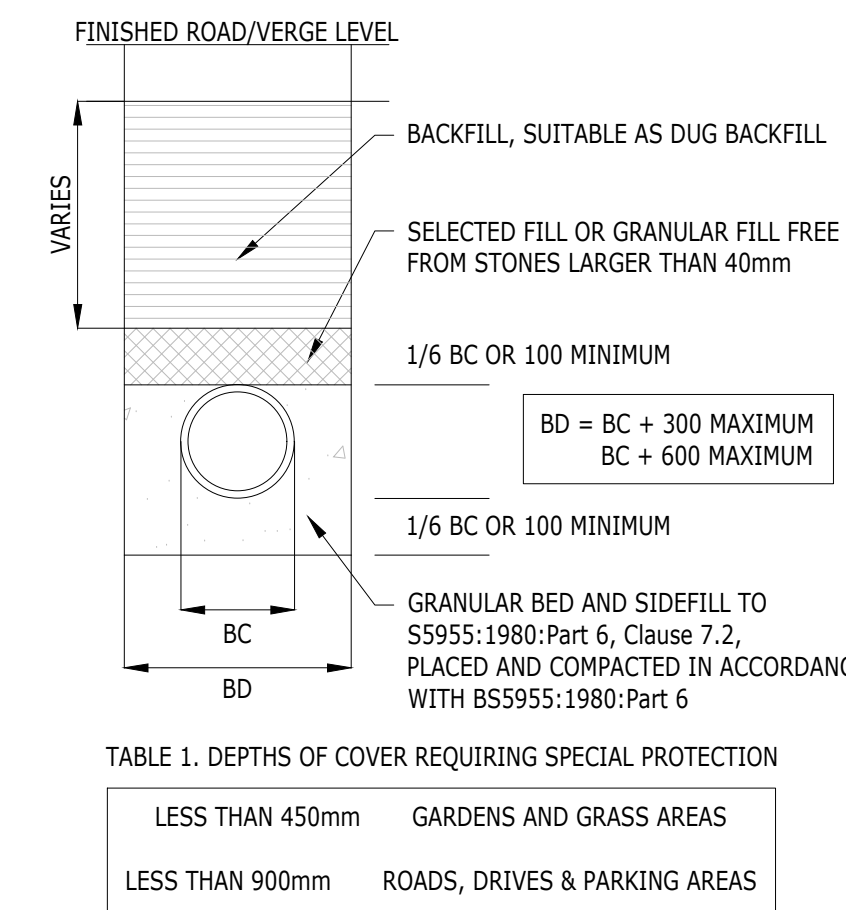
SECTION A-A PRIVATE SURFACE WATER CATCHPIT MANHOLE



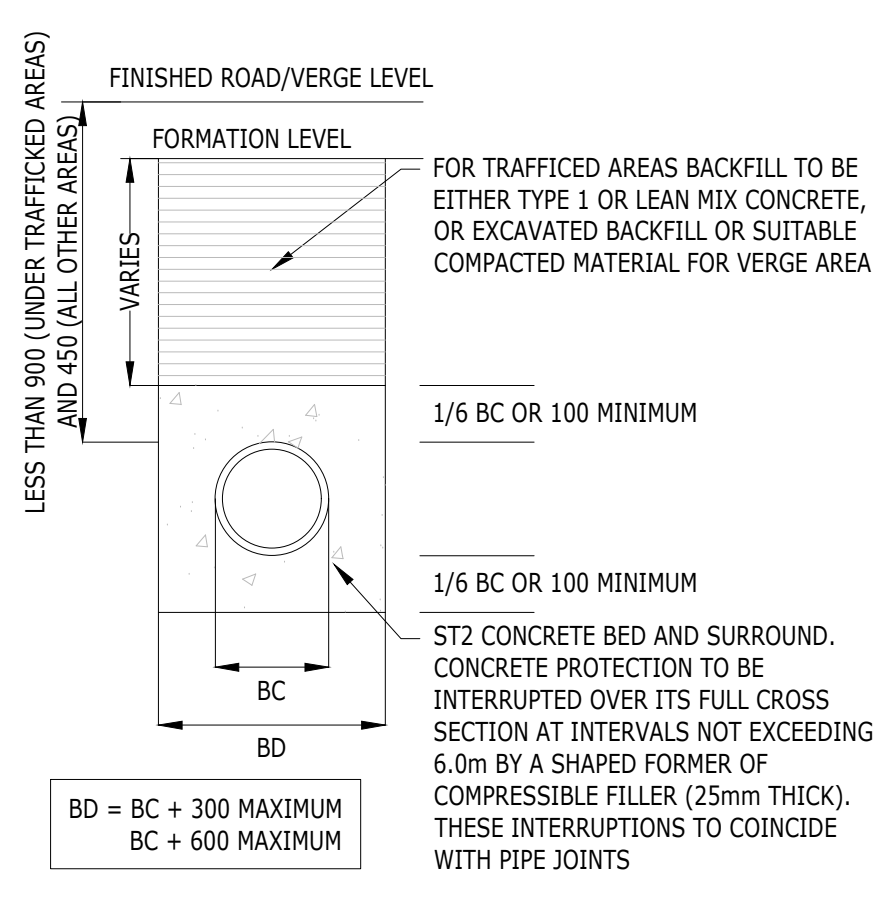
SECTION THROUGH PROPOSED HEADWALL INTO EXISTING WATERCOURSE

FRONT ELEVATION OF WATERCOURSE HEADWALL

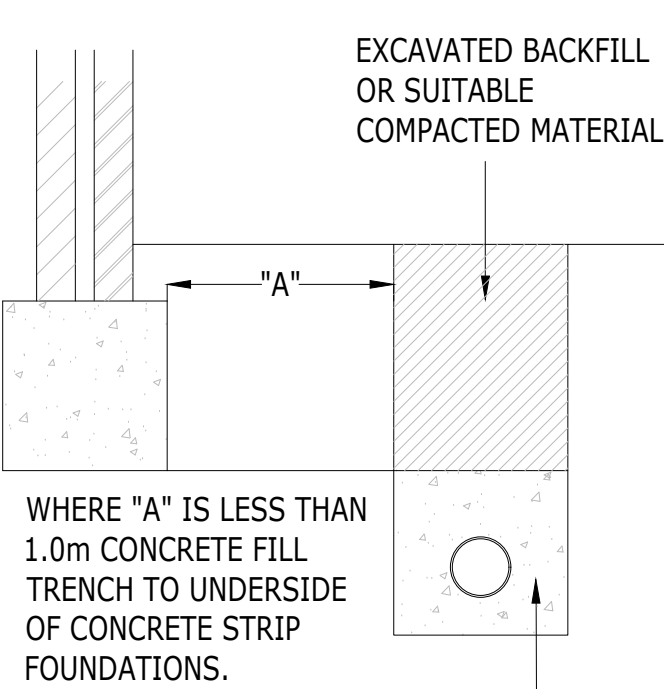
BOX NOTE 2: ALL PIPES ENTERING OR LEAVING
MANHOLES SHALL HAVE A FLEXIBLE JOINT WITHIN
600mm - 1200mm OF THE INSIDE FACE OF THE MANHOLE
(DEPENDENT ON PIPE SIZE, SEE TABLE 2 ON DRAWING
2408140-ACE-XX-XX-DR-C-1241).



TYPICAL TRENCH DETAIL

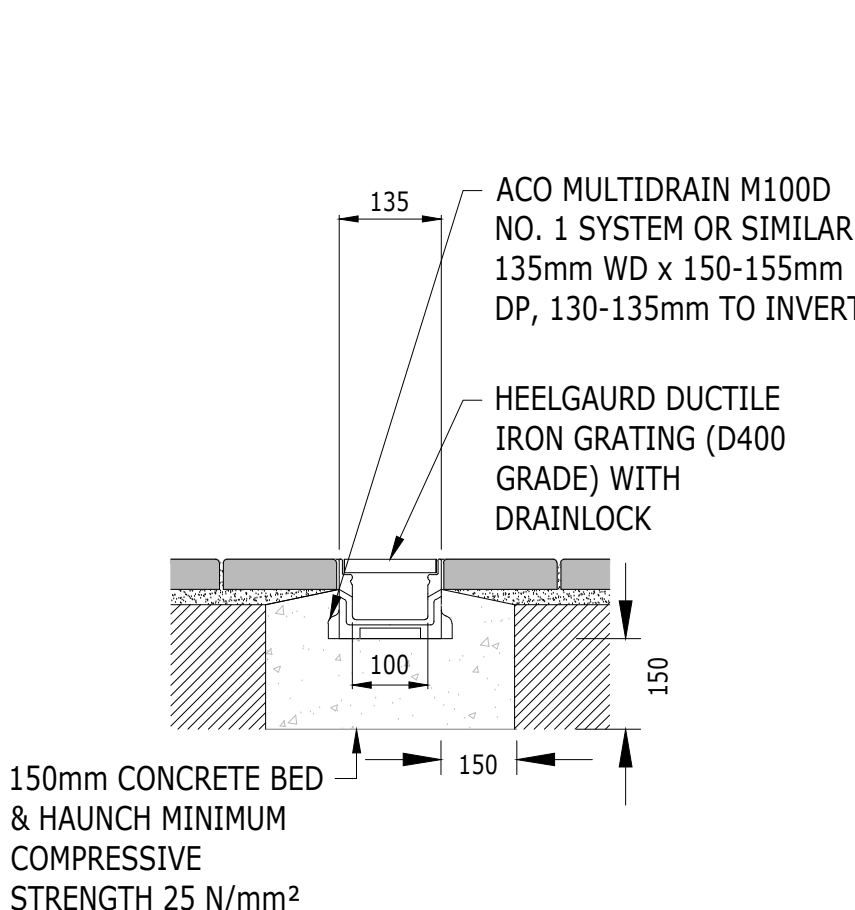
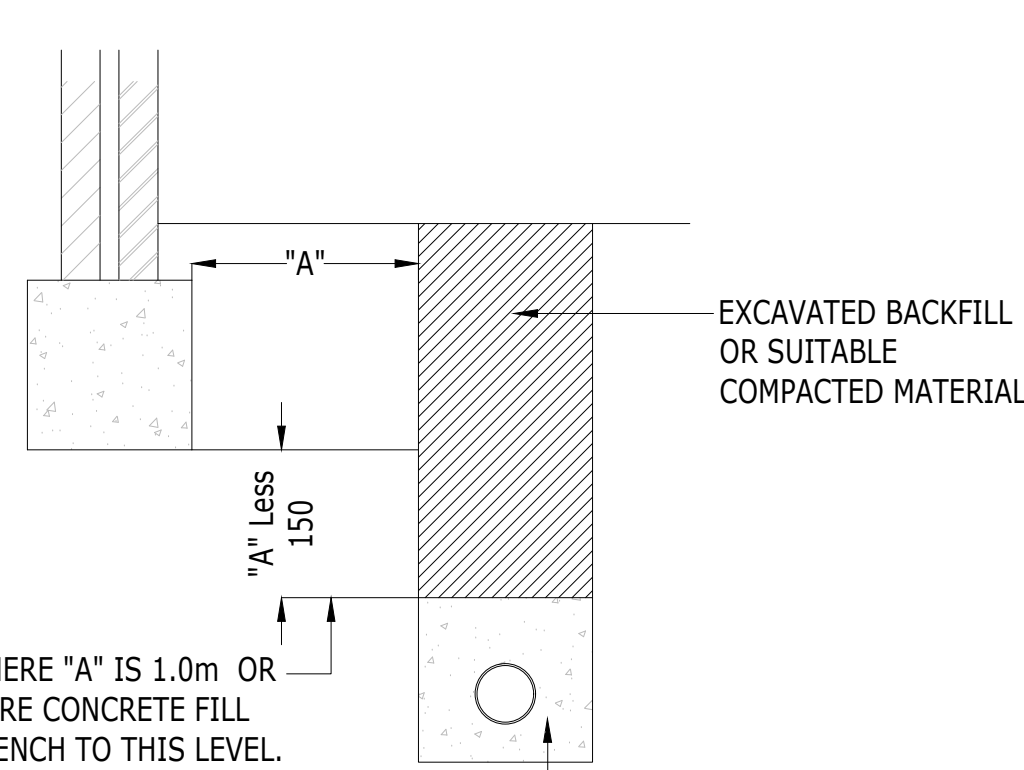


SHALLOW TRENCH DETAIL

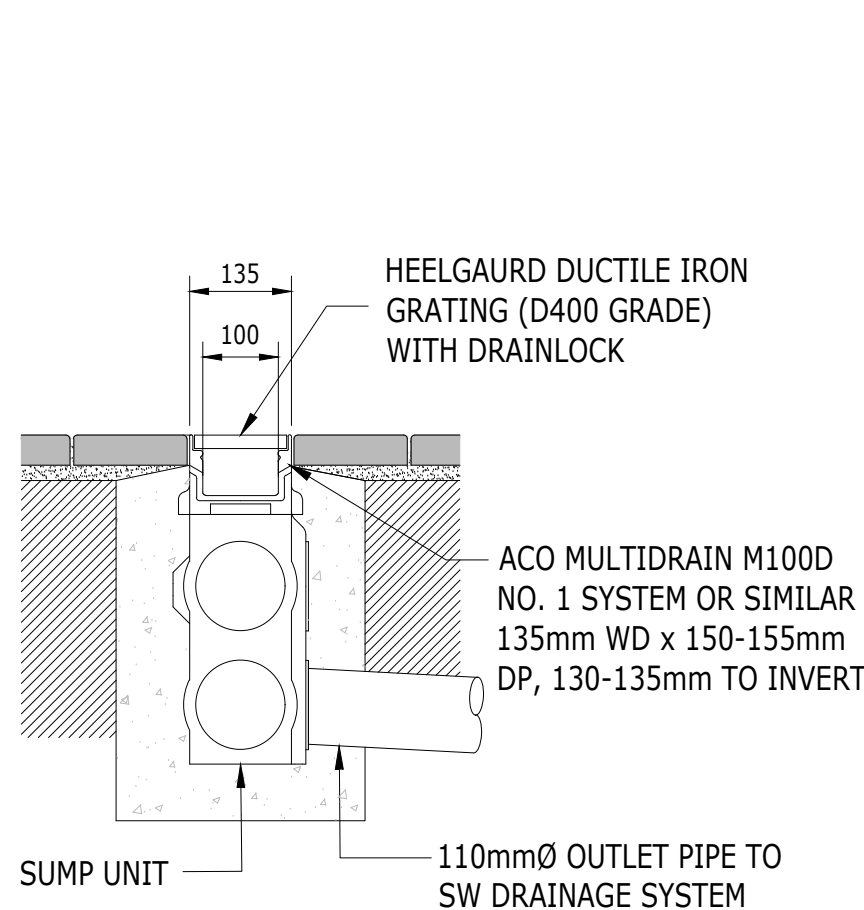


ST2 CONCRETE BED AND SURROUND. CONCRETE PROTECTION TO BE INTERRUPTED OVER ITS FULL CROSS SECTION AT INTERVALS NOT EXCEEDING 6.0m BY A SHAPED FORMER OF COMPRESSIBLE FILLER (25mm THICK). THESE INTERRUPTIONS TO COINCIDE WITH PIPE JOINTS.

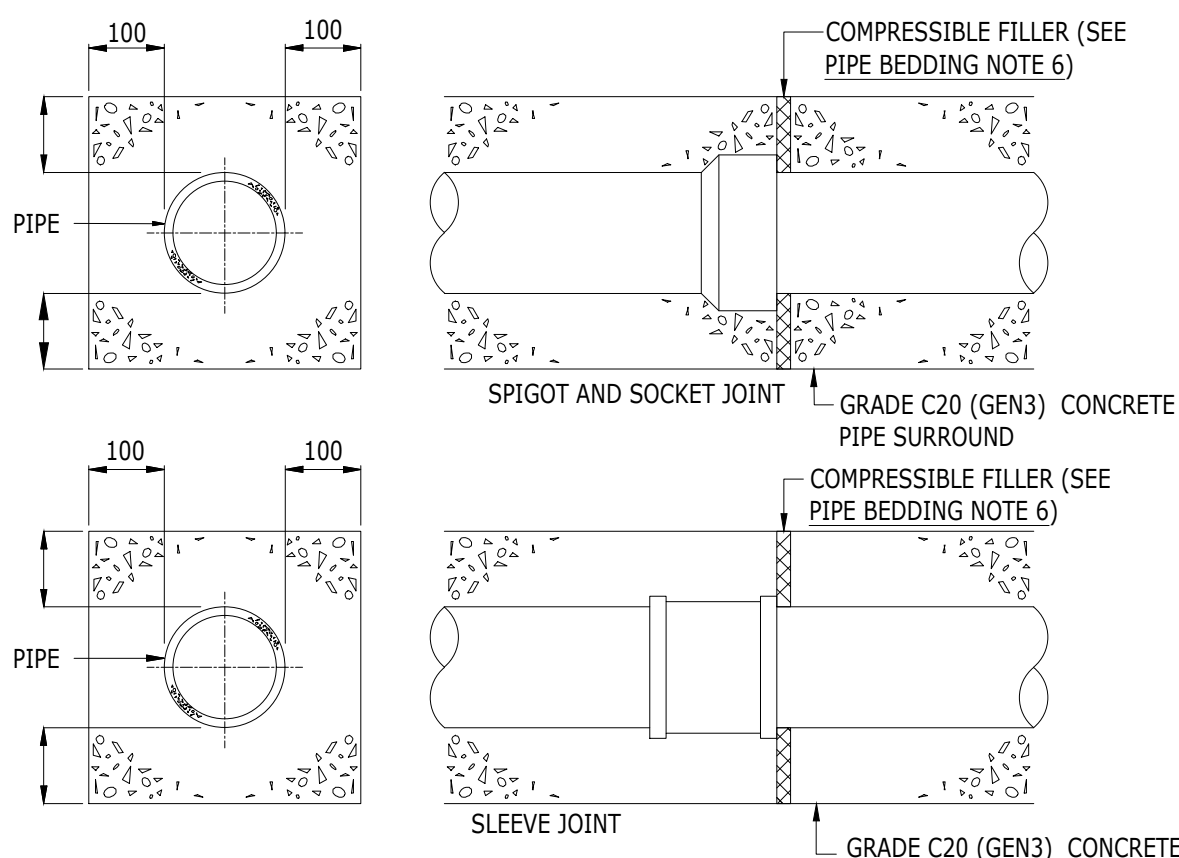
PIPE RUNS NEAR BUILDINGS



ACO DRAINAGE CHANNEL BEDDING DETAIL



ACO DRAINAGE CHANNEL SUMP/OUTFALL PIPE DETAIL

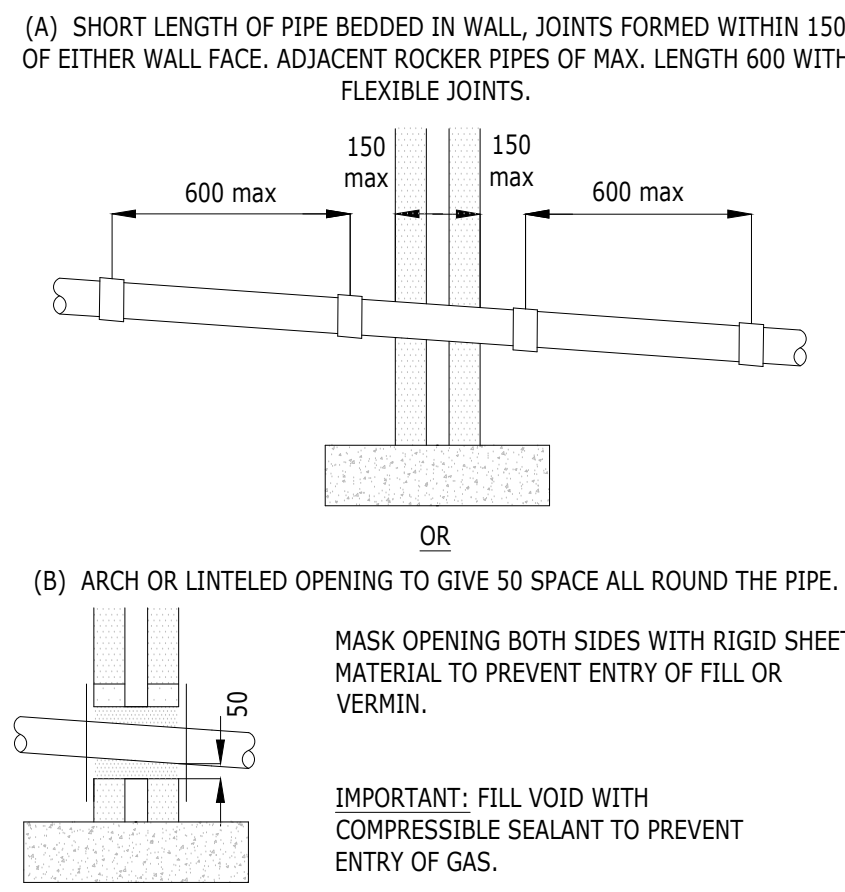


PIPE CONCRETE BEDDING & SURROUND DETAIL
SCALE 1:10

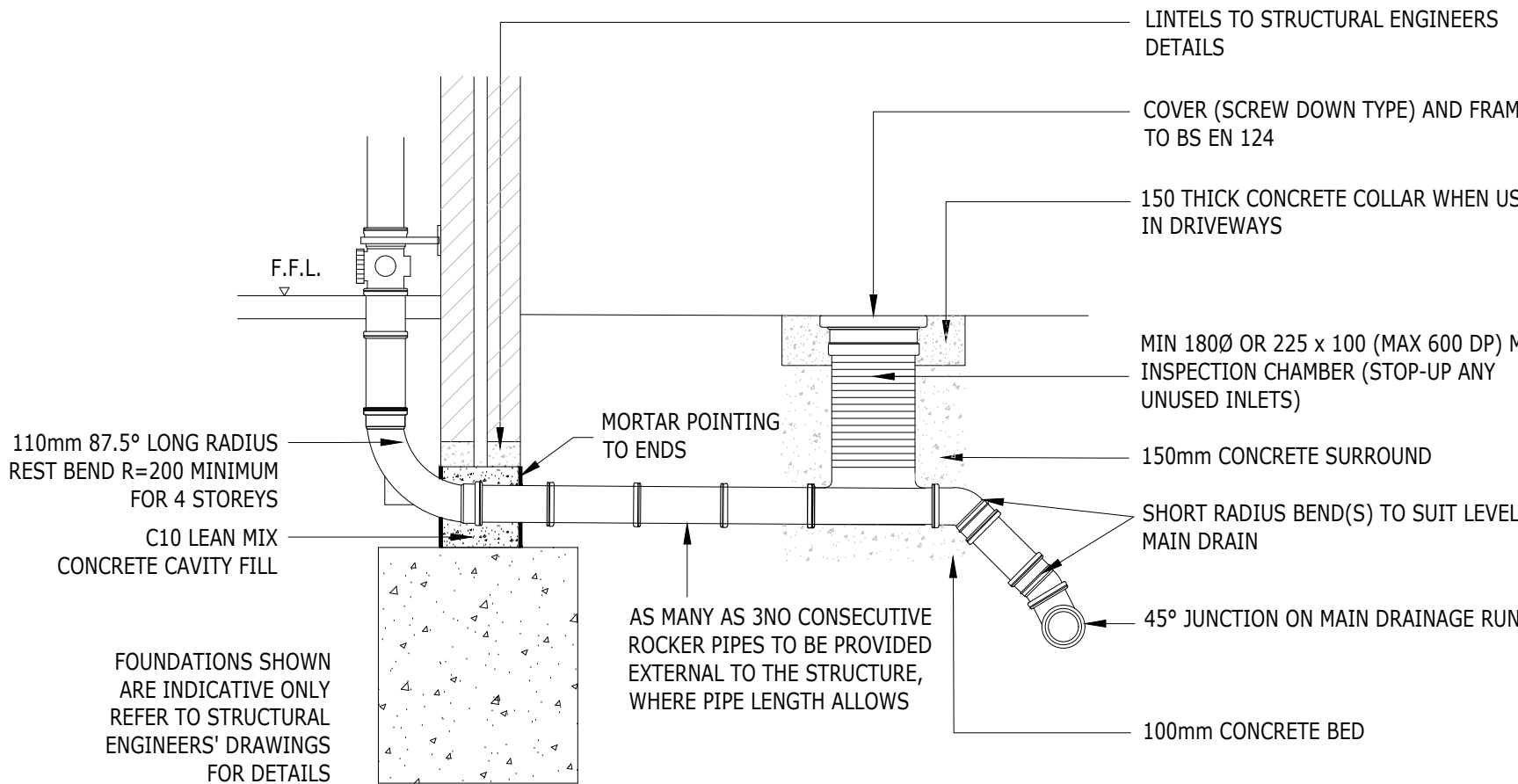
GRANULAR BEDDING AND SIDEFILL MATERIALS FOR FLEXIBLE PIPES	
PIPE DIA. (mm)	GRADING
150	10 OR 14 SINGLE SIZE OR 14 TO 5mm GRADED
225	10, 14 OR 20mm SINGLE SIZE OF 14 TO 5mm GRADED OR 20 TO 5mm GRADED
375	14 OR 20mm SINGLE SIZE OF 14 TO 5mm GRADED OR 20 TO 5mm GRADED
450	
525	
GREATER THAN 600	14, 20 OR 40mm SINGLE SIZE OF 14 TO 5mm GRADED OR 20 TO 5mm GRADED OR 40 TO 5mm GRADED

PIPE CONCRETE BEDDING NOTES:

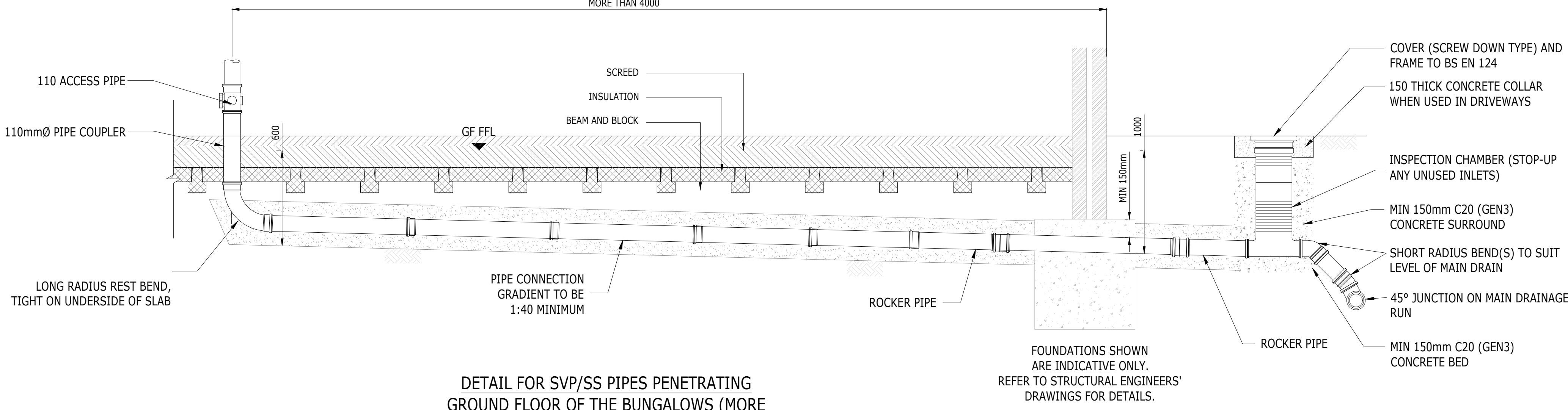
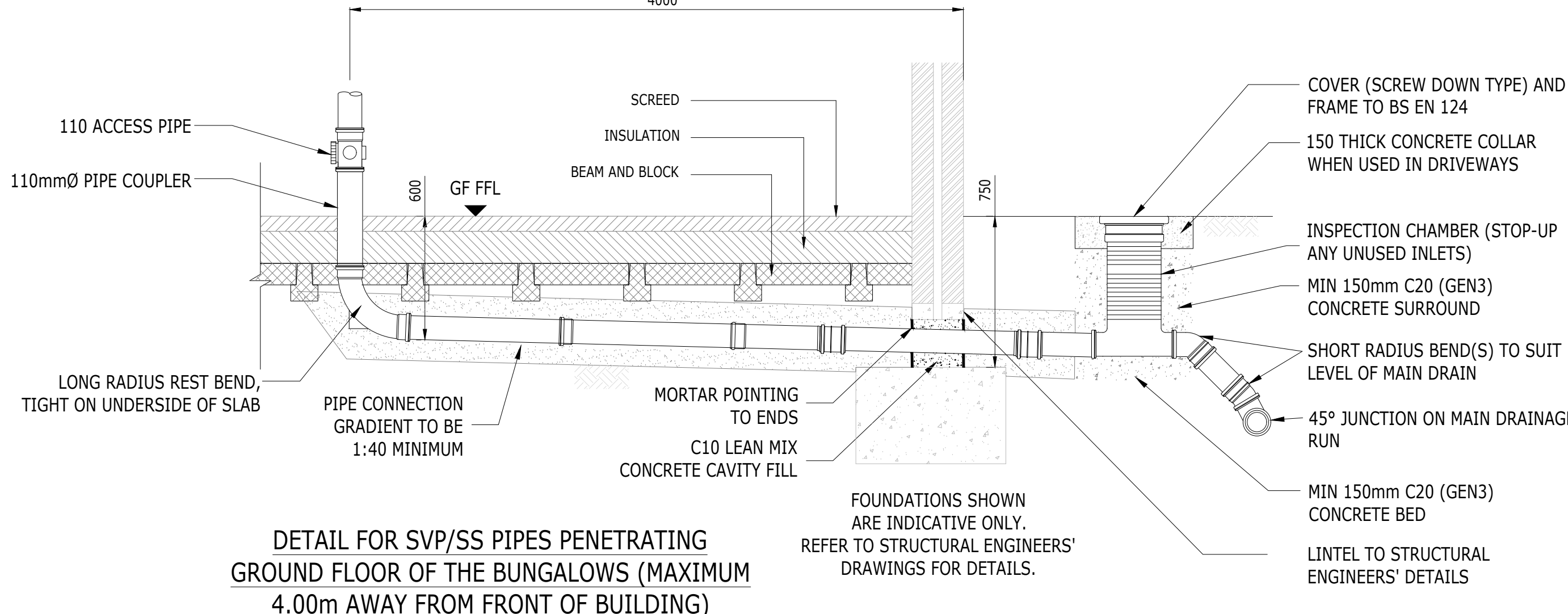
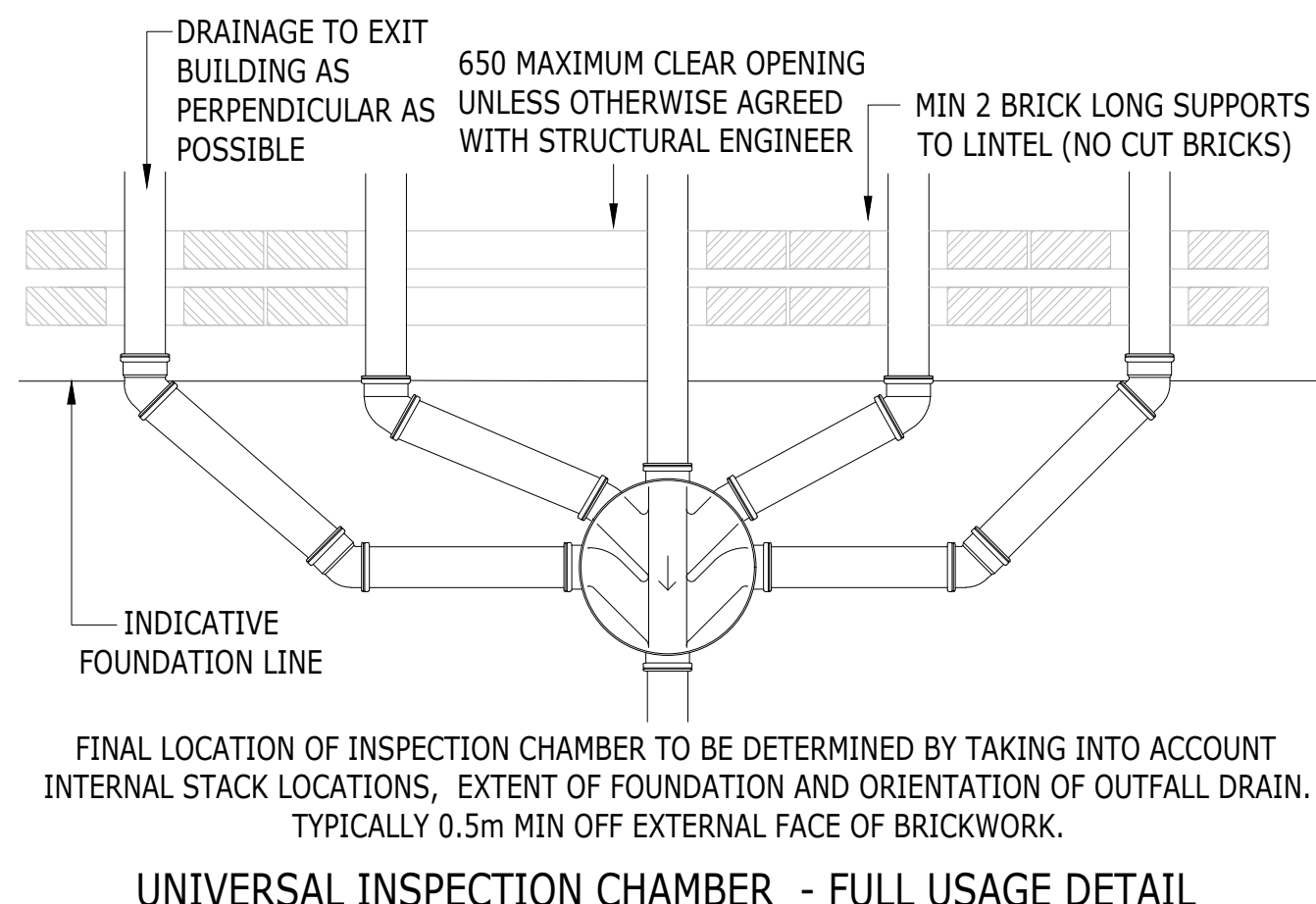
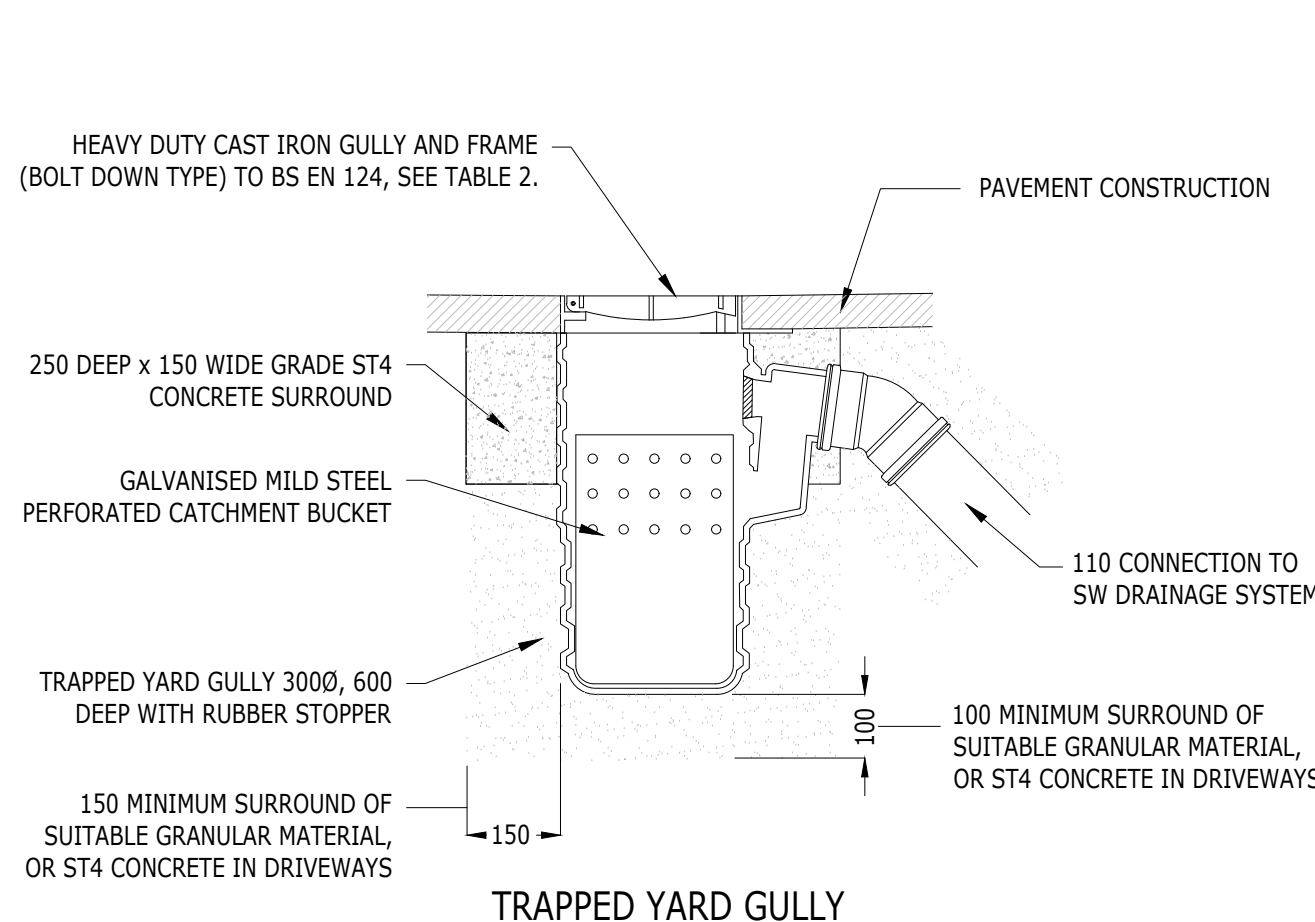
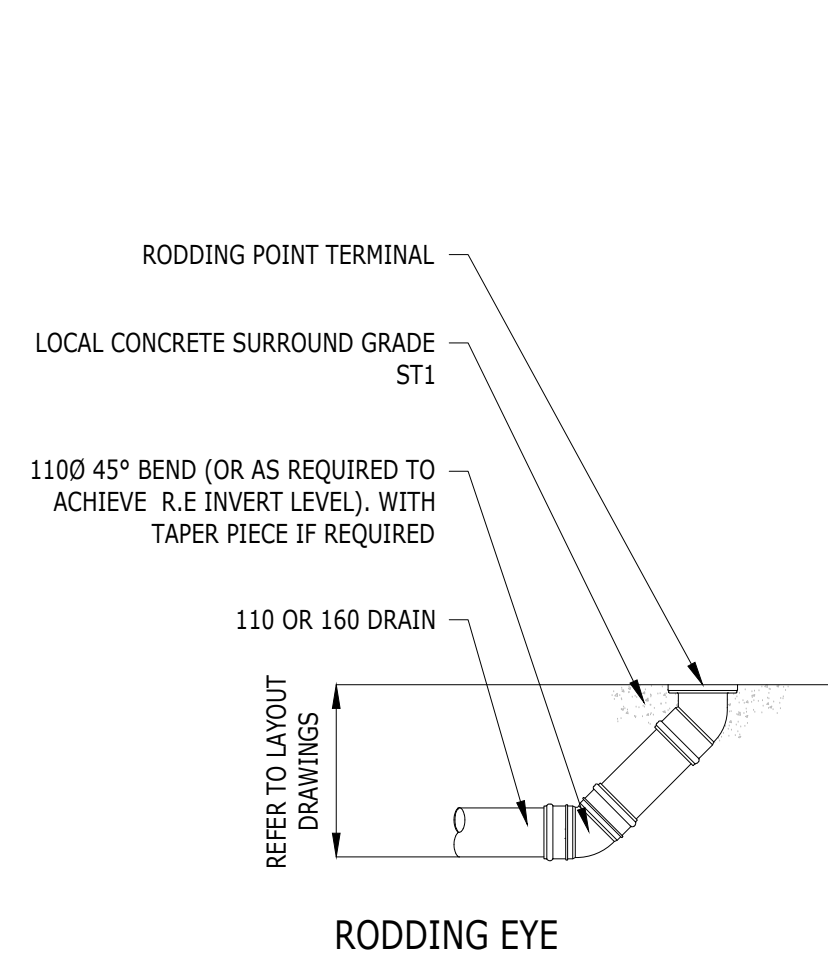
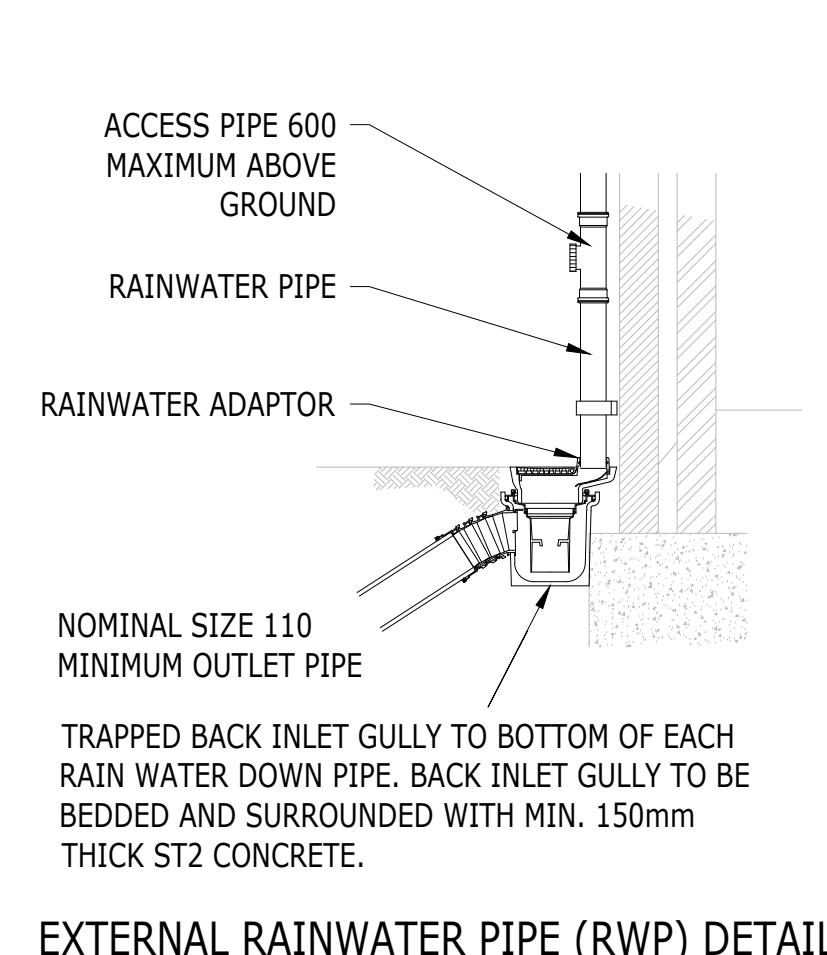
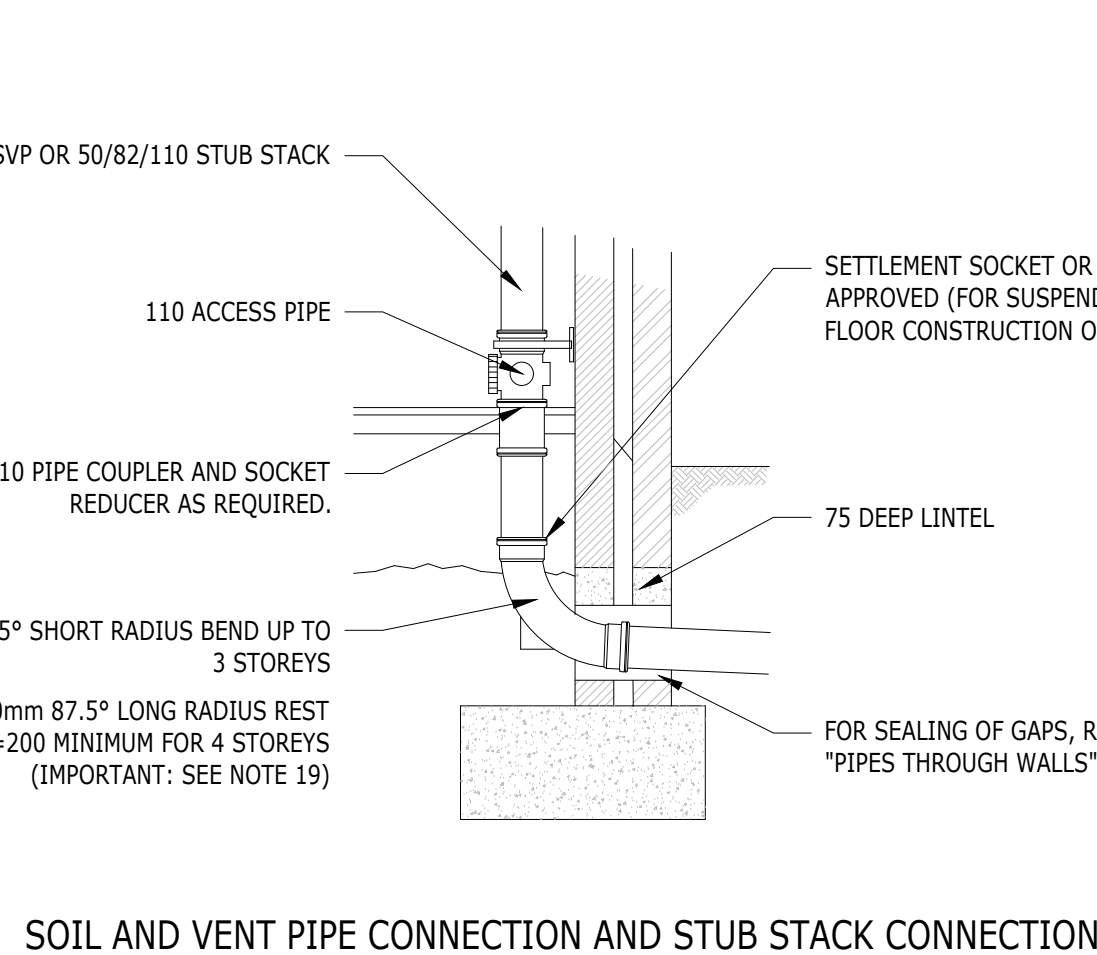
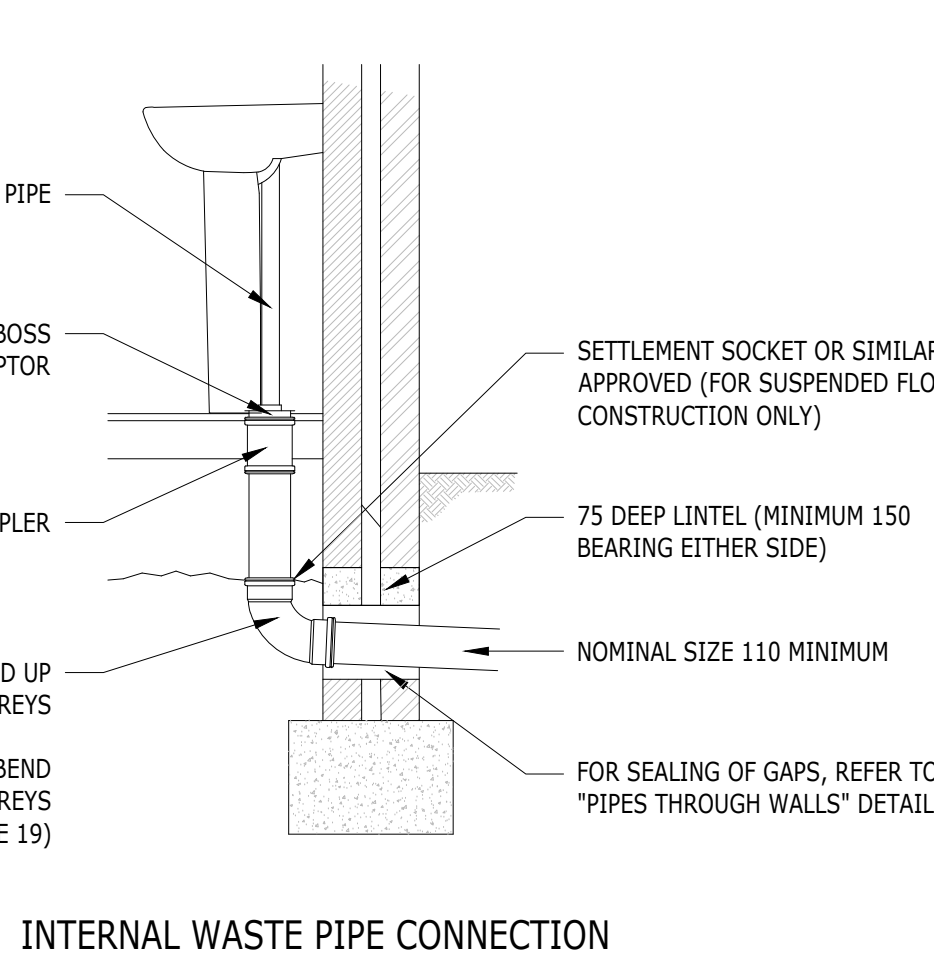
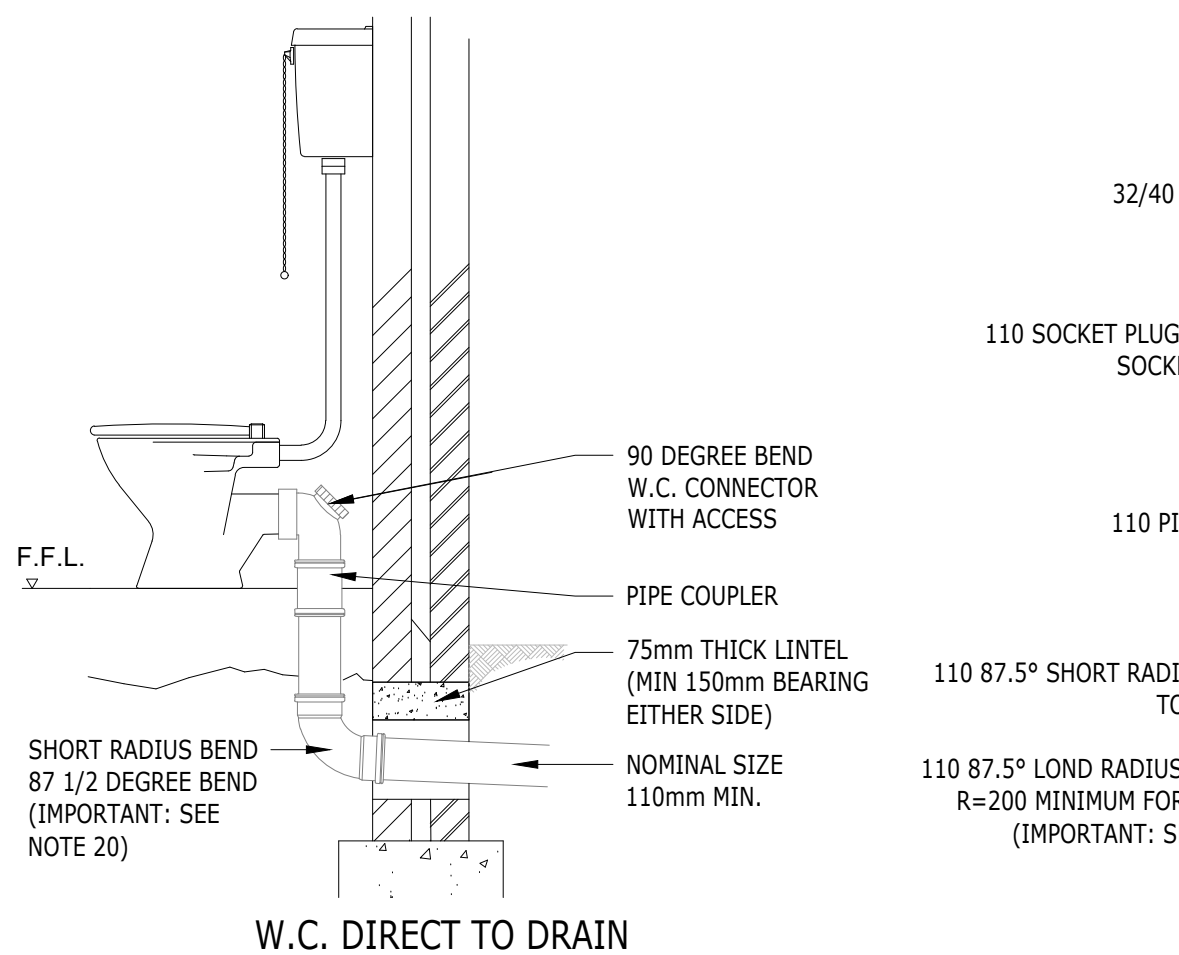
- PIPES LAID WITHIN ROAD LIMITS, CONCRETE BED AND SURROUND IS TO BE USED WHERE COVER TO PIPE CROWN IS LESS THAN 1.2m OR LESS THAN 1.0m BELOW ROAD FORMATION LEVEL.
- PIPE LAID OUTSIDE ROAD LIMITS E.G. GARDENS, FIELDS, CONCRETE BED AND SURROUND TO BE USED WHERE COVER TO PIPE CROWN IS LESS THAN 0.9m.
- RIGID PIPES ENCASED IN CONCRETE SHALL HAVE A MOVEMENT JOINT CONSISTING OF 18mm THICK COMPRESSIBLE BOARD AROUND THE SPIGOT - EITHER AT EACH JOINT OR NOT EXCEEDING 5.0m.
- FOR PIPE BEDDING MATERIALS, SEE ALSO IG1 4-08-01.



PIPES THROUGH WALLS
(BUILDING REGS PART H1 - DIAGRAM 7)



SHALLOW INSPECTION CHAMBER FOR USE IN SOFT AREAS, ACCESS PATHS AND DRIVEWAYS ONLY
SCALE 1:20



BOX NOTE 1 - ALL DRAINAGE WORKS SHALL COMPLY WITH THE REQUIREMENTS OF 'SEWERAGE SECTOR GUIDANCE APPENDIX C, NOVEMBER 2023'.

BOX NOTE 2: ALL PIPES ENTERING OR LEAVING MANHOLES SHALL HAVE A FLEXIBLE JOINT WITHIN 600mm - 1200mm OF THE INSIDE FACE OF THE MANHOLE (DEPENDING ON PIPE SIZE, SEE TABLE 2 ON DRAWING 2408140-ACE-XX-XX-DR-C-1241).

NOTES

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CDM NOTES

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- WORKS WITHIN AND ABUTTING THE EXISTING HIGHWAY WILL ENTAIL TRAFFIC HAZARDS AND ALL APPROPRIATE SAFETY MEASURES INCLUDING BARRIERS, SIGNS AND LIGHTING MUST BE UNDERTAKEN TO THE APPROVAL OF THE LOCAL AUTHORITY, THE HIGHWAY AUTHORITY AND THE POLICE DEPARTMENT.
- HAZARDOUS MATERIALS INCLUDING CEMENT AND BITUMINOUS MATERIALS ARE SPECIFIED AND THE MANUFACTURERS ADVICE ON SAFE HANDLING PROCEDURES MUST BE OBTAINED AND MADE CLEAR TO ALL OPERATIVES.
- THE CONTRACTOR WILL BE RESPONSIBLE FOR LOCATING ALL EXISTING SERVICES WITHIN THE VICINITY OF THE WORKS. HAND DUG AND ENSURE THESE ARE PROTECTED THROUGHOUT THE DURATION OF THE WORKS. ALL UTILITY PLANT SHOULD BE CLEARLY MARKED ON THE GROUND PRIOR TO COMMENCEMENT OF THE WORKS.
- THE CONTRACTOR MUST ENSURE ALL WORKING AREAS ARE FULLY SECURE.

"DCG" MANHOLE REFERENCES
TYPE A - REFER TO TYPE A, FIGURE B0
TYPE B - REFER TO TYPE B, FIGURE B10
TYPE C - REFER TO TYPE C, FIGURE B15

ALL COVER TO BE D400 UNLESS NOTED OTHERWISE

DOI	PRELIMINARY ISSUE	KC	MAC	BW	27.10.25
Rev/	Description	Drn	Chk	App	Date
Purpose:	PRELIMINARY	Status:	NOT YET APPROVED		
ARDENT CONSULTING ENGINEERS AN EMPLOYEE OWNED COMPANY					
Third Floor The Halkmark Building 52-56 Leadenhall Street London EC3M 5JE Tel: 020 7680 4088 Web: www.ardent-ce.co.uk E-mail: enquiries@ardent-ce.co.uk					
Client: JONES HOMES					
Project Title: FOLDERS GROVE 2					
Drawing Title: DRAINAGE CONSTRUCTION DETAILS (SHEET 4 OF 4)					
Drawn by	Checked by	Approved by	Revision		
MAC	MAC	BW		PO1	
Scale	Date				
AS SHOWN	OCT 2025				
Drawing Number:	2408140-ACE-XX-XX-DR-C-1244				