MEC Consulting Group

FLOOD RISK & DRAINAGE

Land off Bosworth Lane, Newbold Verdon
Flood Risk Assessment
May 2025

Report Ref: 28945-FLD-0102 Rev C

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REGISTRATION OF AMENDMENTS

Date	Rev	Comment	Prepared By	Checked By	Approved By
February 2025	-	First issue	**Zoe Jordan BSc (Hons)** Flood Risk Engineer	**Ryan Chafer BSc (Hons)** Senior Flood Risk Engineer	**Tim Rose BA (Hons), MCIHT, MTPS** Regional Director
April 2025	A	Updated drainage strategy and revised framework plan	**Zoe Jordan BSc (Hons)** Flood Risk Engineer	**Ryan Chafer BSc (Hons)** Senior Flood Risk Engineer	**Tim Rose BA (Hons), MCIHT, MTPS** Regional Director
April 2025	B	Updates based on client's comments	**Zoe Jordan BSc (Hons)** Flood Risk Engineer	**Ryan Chafer BSc (Hons)** Senior Flood Risk Engineer	**Alexander Bennett BSc (Hons), MCIHT, MTPS** Managing Director
May 2025	C	Updated masterplan	**Zoe Jordan BSc (Hons)** Flood Risk Engineer	**Ryan Chafer BSc (Hons)** Senior Flood Risk Engineer	**Alexander Bennett BSc (Hons), MCIHT, MTPS** Managing Director

EXECUTIVE SUMMARY

Site Address	Land off Bosworth Lane, Newbold Verdon, Leicestershire, LE9 9PY, E:444167, N:304180
Site Description and Setting	The site measures approximately 8.40ha and consists of a single large field located on the northwestern edge of Newbold Verdon, approximately 700m from the village centre. The B585 immediately binds the site to the north with residential developments to the east including application 20/00143/FUL, which is currently under construction. To the south is Newbold Verdon Primary School and to the west lies existing agricultural land.
Proposed Development	Erection of up to 200 dwellings, a community health and well-being hub (Use Class E(e)) or community shop (Use Class E(a)) of up to 108 sqm gross external area and provision of up to 0.5 hectares of school playing fields and sport pitches, together with landscaping, open space, infrastructure and other associated works'
Flood Risk Information	The Flood Map for Planning shows the site is located within Flood Zone 1. Flood Zone 1 is defined as land assessed as having an annual probability of river flooding of less than 1%. The Environment Agency Flood Risk from Surface Water Map, which includes climate change for the 2050's epoch (2022 to 2060) indicates that the majority of the site is designated to be at low risk from surface water flooding. There are isolated areas at medium to high risk of surface water flooding within the western boundary of the site. No development is located within areas at medium – high risk of surface water flooding. Groundwater flood maps indicate that the site is generally in an area of 25 - 50% susceptibility to groundwater flooding. During Soil Infiltration Rate Testing five trial pits were advanced to depths of up to 3.40m bgl to confirm the potential impact of groundwater levels on soil infiltration potential. Groundwater was not encountered within the trial pits and therefore, it is assumed the risk of groundwater flooding is low.
Surface Water Drainage	In accordance with the National SuDS standards, surface water flows generated by the impermeable area of 3.432ha (including a 10% uplift for urban creep) will outfall to the proposed infiltration basin in the south of the site. MEC have taken a conservative approach to the drainage design and utilised the rate of 2.32 x 10^{-6} m/s within the drainage calculations, based on infiltration rate testing completed in February and March 2025. Due to the safety factor applied and the conservative infiltration rate, the infiltration basin exceeds the 24-hour criteria. It has therefore been modelled on the basis of the volume required for the 1%AEP40CC event to identify a maximum water level, followed immediately by a 3.3%AEP35CC storm event A storage volume of 5,486.96m^3 is required within the infiltration basin to allow sufficient time for water to discharge into the ground and cater for all events up to and including the 1%AEP40CC followed by the 3.3%AEP35CC event.
Foul Water Drainage	Sewer records and a developer enquiry have been obtained from STW that show there are no sewers within the development area. There is an existing surface water sewer network, foul water sewer network and foul water rising main within the recently developed residential developments (planning application 20/00143/FUL) to the east. These sewers are currently undergoing the Section 104 process. There are also foul water sewers within Moat Close and Dragon Lane. Foul water generated by the adjacent development is pumped to the existing foul sewer within Moat Close. Due to the levels on site a gravity connection cannot be achieved and therefore a pumped solution has been proposed. Foul water within the site will be pumped to the new gravity system before outfalling into the existing network Moat Close at Manhole 2200 as agreed by STW.
Conclusions	As such, the proposed development is unlikely to have an adverse impact on flood risk issues on site or the wider area.
This summary should be read in conjunction with the full report and reflects an assessment of the site based on information received by MEC at the time of production.	

CONTENTS

APPENDICES

1.0 INTRODUCTION

1.1 MEC Consulting Group Ltd (MEC) has been commissioned by J S Bloor (hereafter referred to as 'the Client') to undertake a Flood Risk Assessment to support a proposed residential development on Land off Bosworth Lane, Newbold Verdon (hereafter referred to as 'the Site'). A site location plan is provided in **Appendix A** and indicative framework plan is contained in **Appendix B**.

1.2 The development description is as follows:

Erection of up to 200 dwellings, a community health and well-being hub (Use Class E(e)) or community shop (Use Class E(a)) of up to 108 sqm gross external area and provision of up to 0.5 hectares of school playing fields and sport pitches, together with landscaping, open space, infrastructure and other associated works'

1.3 The assessment has been undertaken to ascertain the constraints of the development to the site and assess the impact of the design, concerning flood risk.

1.4 A review of relevant information and guidance from a range of sources has been undertaken and includes the following key documents;

- National Planning Policy Framework (NPPF) - December 2024
- Flood Risk and Coastal Change Planning Practice Guidance (PPG) - August 2022
- Environment Agency Flood Map for Planning and Risk of Flooding from Surface Water datasets from the DEFRA Spatial Data Catalogue
- DEFRA Magic Map, 2024
- British Geological Survey Geology Viewer, 2024
- Hinckley and Bosworth Borough Local Plan – December 2009
- Leicestershire County Council Preliminary Flood Risk Assessment – June 2011
- Leicestershire County Council Local Flood Risk Management Strategy – February 2024
- Hinckley and Bosworth Borough Council Strategic Flood Risk Assessment – July 2019
- Good Design Guide, Supplementary Planning Document for Hinckley and Bosworth Borough Council - 2020

1.5 The Local Planning Authority for the site is Hinckley and Bosworth Borough Council (HBBC) and the Lead Local Flood Authority for the site is Leicestershire County Council (LCC). The site falls within the Severn Trent Water (STW) Catchment.

Disclaimer

1.6 MEC has completed this report for the benefit of the individuals referred to in paragraph 1.1 and any relevant statutory authority which may require reference in relation to approvals for the proposed development. Other third parties should not use or rely upon the contents of this report unless explicit written approval has been gained from MEC.

1.7 MEC accepts no responsibility or liability for:

- The consequence of this documentation being used for any purpose or project other than that for which it was commissioned;
- The issue of this document to any third party with whom approval for use has not been agreed.

2.0 POLICY CONTEXT

National Planning Policy Framework

2.1 The National Planning Policy Framework (NPPF) was published and updated most recently in December 2024 by the Ministry of Housing, Communities and Local Government.

2.2 The NPPF is the primary source of national planning guidance in England, setting out the Government's planning policies for England, and how they are expected to be applied by local councils.

2.3 'Chapter 14: Meeting the challenge of climate change, flooding, and coastal change' outlines the guiding principles for managing flood risk as part of the planning process, notably paragraphs 161 - 186.

2.4 The Planning Practice Guidance (PPG) sets out the vulnerability to flooding of different land uses. It encourages development to be in areas of lower flood risk where possible and stresses the importance of preventing increases in flood risk off site to the wider catchment.

2.5 The PPG also states that alternative sources of flooding, other than fluvial (river flooding), should be considered when preparing an FRA. The document also includes a series of tables that define Flood Zones, the flood risk vulnerability classification of development land use, and 'compatibility' of development within the defined Flood Zones.

2.6 Therefore, this FRA has been completed in line with the guidance and requirements of the NPPF and PPG.

Local Plan

2.7 The Hinckley and Bosworth Local Plan was adopted by the Borough Council in December 2009. The Local Plan Core Strategy sets out how land within the authorities' boundaries can be used and developed, providing policies which the Council uses to determine planning applications. The plan aims to ensure future growth and changes to the district are appropriate to local needs now and in the future.

2.8 More generally, the Core Strategy also lists policies that guide the design and principles of all development within the authority's land. Those relevant to this FRA are summarised as follows;

- Policy 8 – Key Rural Centres Relating to Leicester.
- Policy 20 – Green Infrastructure

Local SFRA

2.9 The Hinckley and Bosworth Level 1 Strategic Flood Risk Assessment (SFRA) for the area was published in July 2019. The SFRA was produced to provide an appropriate evidence base for the Local Plan and provide a summary of flood risk across the district.

2.10 Appropriate background information has been used to inform this FRA and will be referenced accordingly.

Local PFRA

2.11 The Leicestershire County Council Preliminary Flood Risk Assessment (PFRA) was published in June 2011 and was prepared to assist Leicestershire County Council meet its duties to manage local flood risk, and the delivery of any legal requirements placed on it as Lead Local Flood Authority (LLFA) under the Flood Risk Regulations 2009.

2.12 Appropriate background information has been used to inform this FRA and will be referenced accordingly.

Local Flood Risk Management Strategy

2.13 The Leicestershire County Council Local Flood Risk Management Strategy (LFRMS) was published in February 2024 to comply with Section 9 of the Flood and Water Management Act 2010 and aims to provide a framework for meeting its requirements to develop, maintain, apply, and monitor a local strategy for flood risk management and how Leicestershire County Council aim to achieve this.

2.14 The LFRMS provides further information regarding surface water runoff, groundwater and sewer flooding and flood risk around the County and the introduction of flood risk alleviation schemes at various scales, including SuDS.

Supplementary Planning Document

2.15 The Good Design Guide is a Supplementary Planning Document (SPD) for Hinckley and Bosworth Borough Council, which was published in February 2022. This SPD was produced to provide developers with information on all aspects of development they will be required to meet as part of an application.

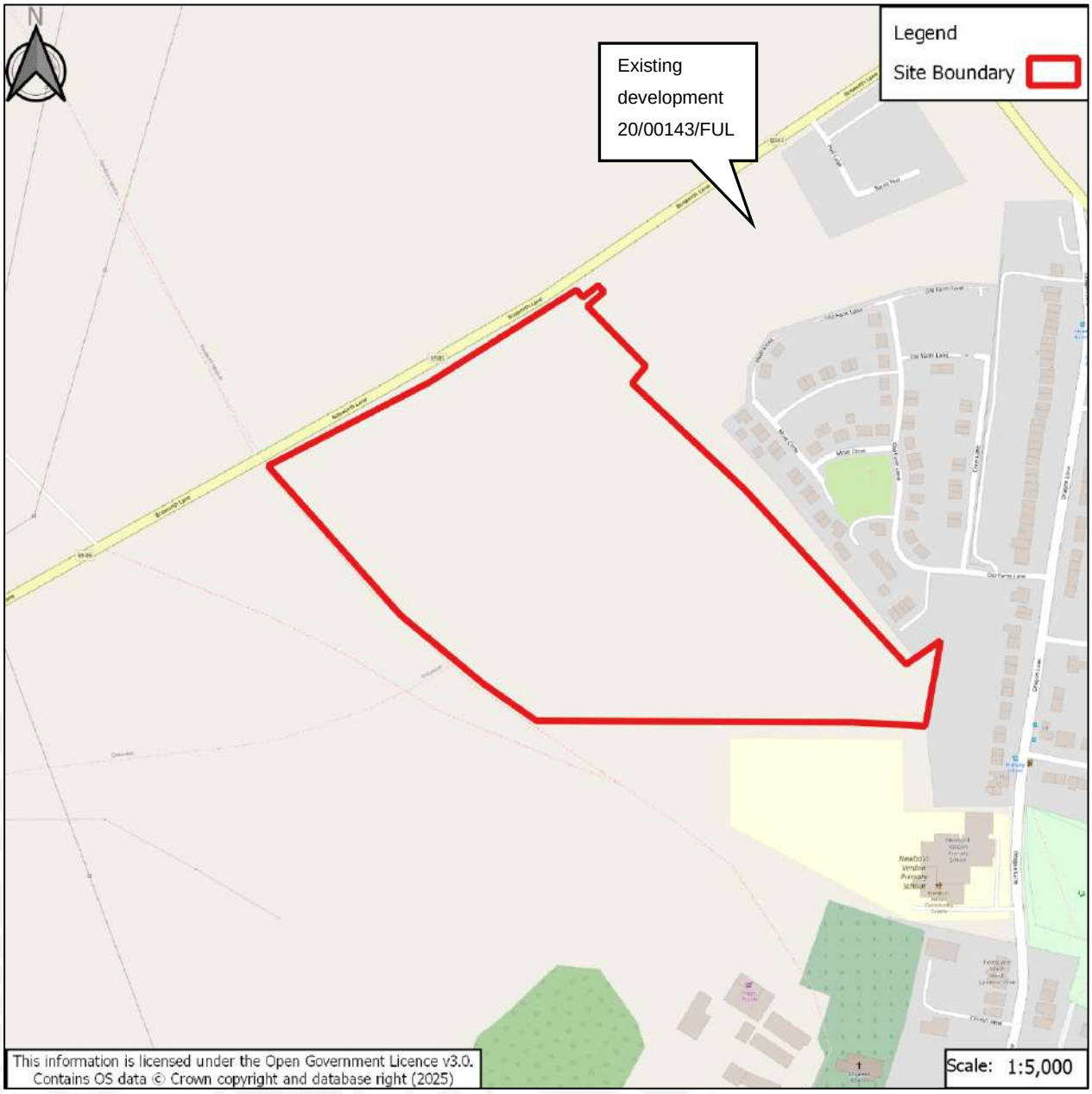
2.16 Specially for this FRA, this SPD contains information on managing flood risk and the water environment within Newbold Verdon, along with information surrounding SuDS, flood mitigation and how they should be incorporated into designs.

3.0 SITE DESCRIPTION

Site Location and Features

3.1 The site measures approximately 8.40ha and consists of a single large field located on the northwestern edge of Newbold Verdon, approximately 700m from the village centre. The B585 immediately binds the site to the north with residential developments to the east, including application 20/00143/FUL, which is currently under construction. To the south is Newbold Verdon Primary School and to the west is existing agricultural land. The site location is shown in Figure 3.1.

Figure 3.1: Site Location Plan



Topographic Data

3.2 Full details of the topographical survey are included in **Appendix C**. The information indicates that the site generally slopes from north to south with levels ranging from around 136.19m AOD to 132.33m AOD.

Flood Zone Maps & Flood Defence Data

3.3 Information relating to the current flood risk to the application site has been obtained from the Environment Agency and gov.uk websites. There is no recorded evidence of flood defences in the vicinity of the site.

Watercourses & Hydrology

3.4 The nearest surface water feature is a pond located approximately 120m southwest.

3.5 There are no open watercourses within the site or the surrounding area. The closest designated Main River is the Rothley Brook, located approximately 3.43km northeast of the site.

Historic Flooding

3.6 The EA historical map shows that there are no known flood incidences within the vicinity of the site. The proposed site is situated within the Thurlaston Brook Catchment. Leicestershire County Council as the Lead Local Flood Authority (LLFA) have no records of any flood incidents within close proximity to the site.

Geological Data

3.7 British Geological Survey (BGS) mapping indicates that the site is underlain directly by bedrock of the Gunthorpe Member, consisting of Mudstone. The southern area of the site (approximately 50% of the proposed development area) has underlying superficial deposits of Glaciofluvial Deposits (Mid Pleistocene) composed of Sand and Gravel. The northern area of the site has underlying superficial deposits of Oadby Member, composed of Diamicton.

Sewers

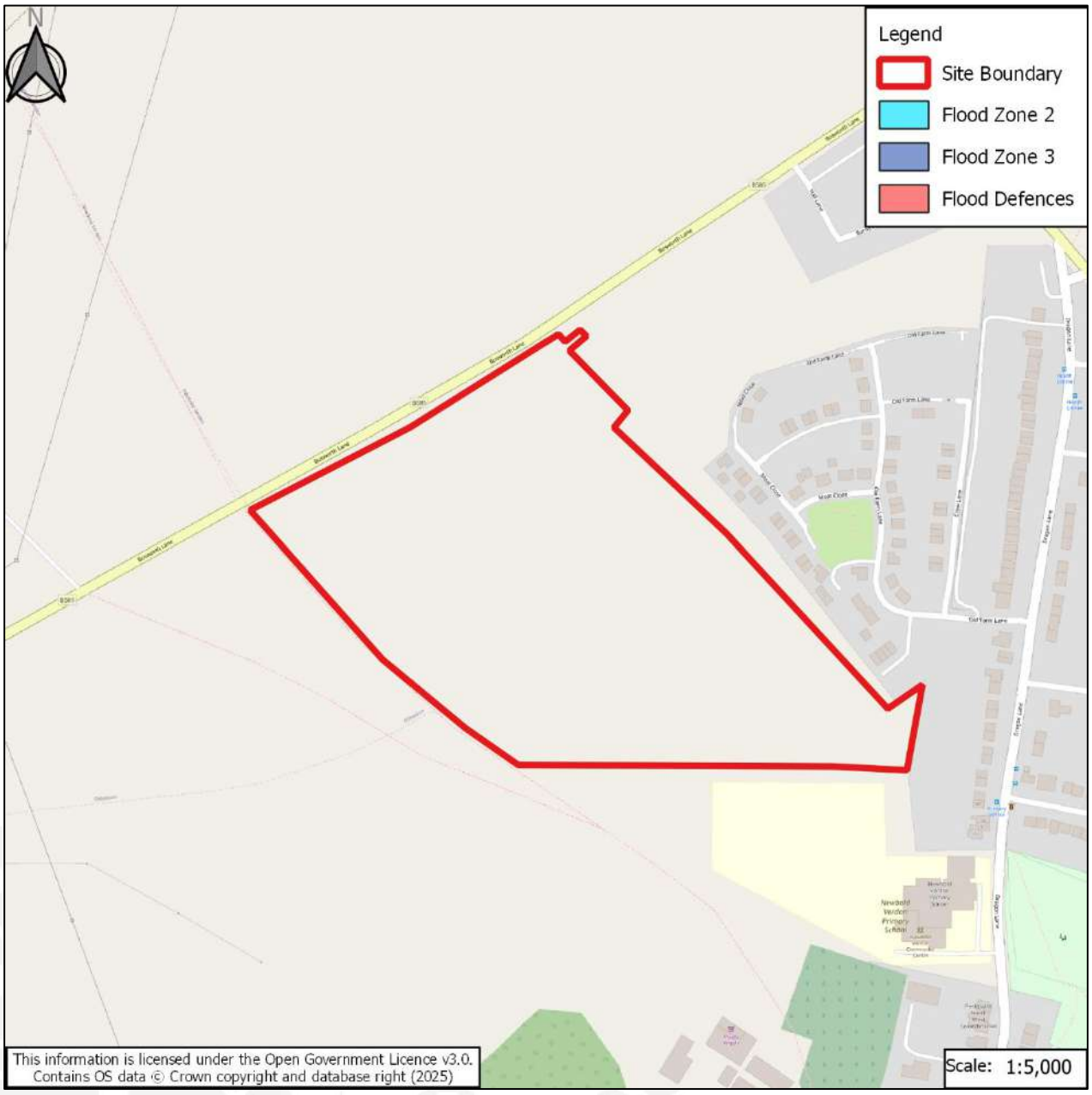
3.8 Sewer records and a developer enquiry have been obtained from STW see **Appendix D.** The records show there are no sewers within the development area. There is an existing surface water sewer network, foul water sewer network and foul water rising main within the residential developments to the east. These sewers are currently undergoing the Section 104 process. There are also foul water sewers within Moat Close and Dragon Lane. Foul water generated by the adjacent development is pumped to the existing foul sewer within Moat Close.

4.0 FLOOD RISK TO SITE

Flood Zone Allocation

4.1 The Flood Map for Planning is shown in Figure 4.1. The map shows the site is located within Flood Zone 1 (FZ1). FZ1 is defined as land assessed as having an annual probability of river flooding of less than 1%.

Figure 4.1: Extract from Environment Agency's Flood Map for Planning (Rivers and Sea).

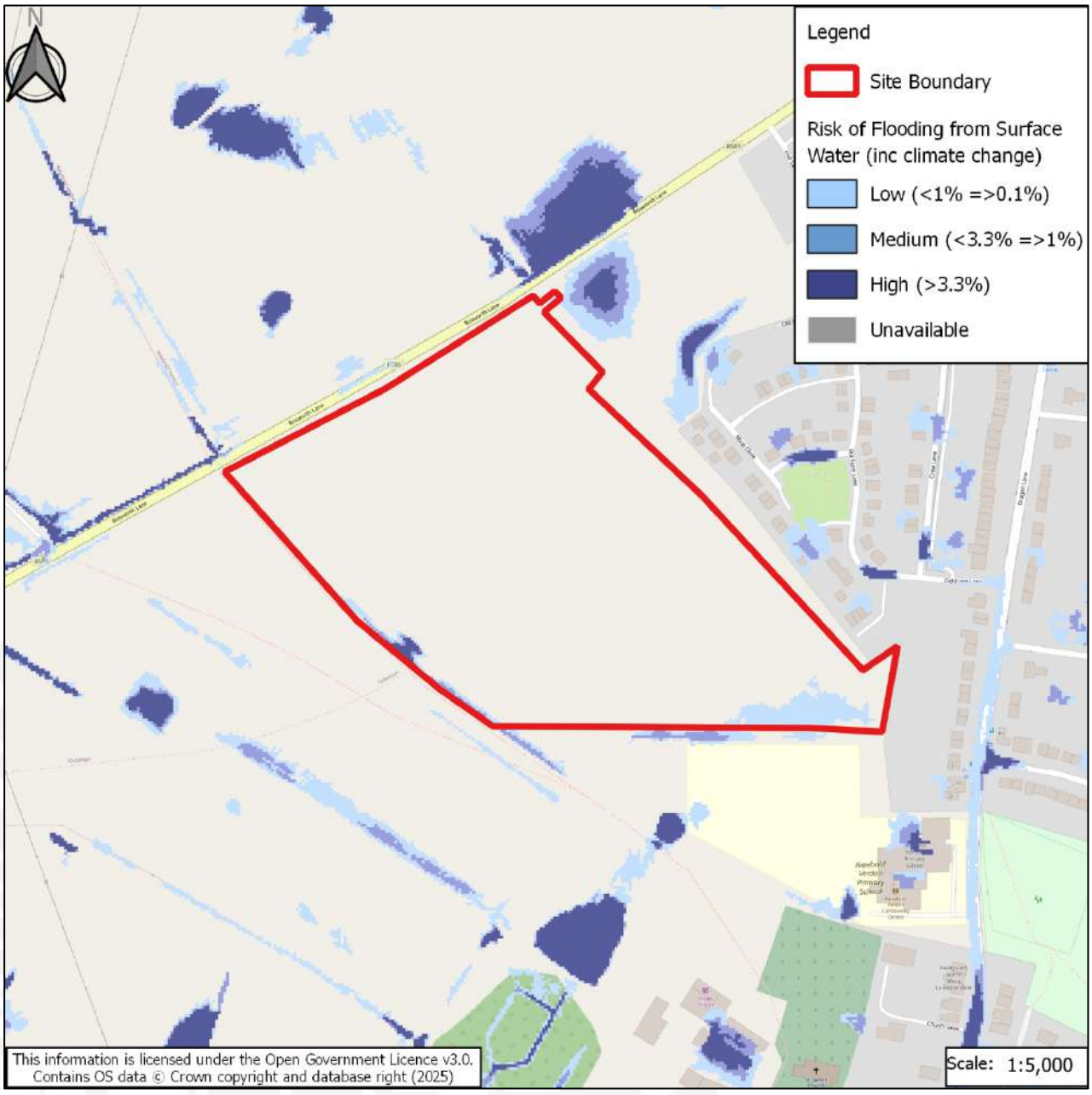


Surface Water Flooding Risk Allocation

4.2 The Environment Agency Flood Risk from Surface Water Map, which includes climate change for the 2050's epoch (2022 to 2060) (refer to Figure 4.2) indicates that the majority of the site is designated to be at low risk from surface water flooding. There are isolated areas at medium to high risk of surface water within the western boundary of the site. No development is located within areas at medium – high risk of surface water flooding.

4.3 It should be noted that the mapping used by the EA to provide the risk of flooding from surface water does not consider continual losses to the ground through infiltration.

Figure 4.2: Environment Agency's Flood Risk from Surface Water Extents Map including climate change for the 2050's epoch.



Other Flooding Risk

4.4 The Environment Agency Mapping shows that the site is not at risk of reservoir flooding, as such, the risk of flooding from reservoirs is low.

4.5 The superficial Oadby Member, glaciofluvial deposits and Edwalton Member bedrock are classified as Secondary B aquifers. Secondary B Aquifers are described by the Environment Agency as 'predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localized features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.

4.6 Groundwater flood maps available in thE Hinckley and Bosworth Level 1 SFRA, indicate that the site is predominately in an area of generally 25%-50% susceptibility to groundwater flooding. The nearest BGS borehole record to the site identifies groundwater at a depth of 1.80m – 2.25m. Soil Infiltration rate testing was undertaken by MEC in February 2025 and March 2025, see **Appendix E**. These pits were advanced to depths of up to 3.40m bgl. Groundwater was not encountered within the trial pits and therefore the risk of groundwater flooding is low is considered to be low..

4.7 According to the HBBC SFRA there is no evidence of any flooding from sewers within the area, therefore, the risk can be considered low.

5.0 FLOOD RISK ASSESSMENT

Flood Risk Assessment Methodology & Objectives

5.1 It is recognised that developments that are designed without regard to flood risk may endanger lives, damage property, cause disruption to the wider community, damage the environment, be difficult to insure and require additional expense on remedial works. Current guidance on development and flood risk identifies several key aims for development to ensure that it is sustainable in flood risk terms.

5.2 These aims are as follows:

- The development should not be at significant risk of flooding and should not be susceptible to damage due to flooding;
- The development should not be exposed to flood risk such that the health, safety and welfare of the users of the development, or the population elsewhere, are threatened;
- Safe access/egress to and from the development should be possible during flood events;
- The development should not increase flood risk elsewhere;
- The development should not prevent safe maintenance of watercourses or maintenance and operation of flood defences;
- The development should not be associated with an onerous or difficult operation and maintenance regime to manage flood risk. The responsibility for any operation and maintenance required should be clearly defined;
- Future users of the development should be made aware of any flood risk issues relating to the development;
- The development should not lead to the degradation of the environment; and
- The development should meet all of the above criteria for its entire lifetime, including consideration of the potential effects of climate change.

5.3 This Flood Risk Assessment is undertaken with due consideration of these sustainability aims and has been prepared to inform the proposed scheme.

Project Scope

5.4 In order to achieve the aims outlined above, this Flood Risk Assessment has been undertaken in accordance with current best-practice guidance, including the National Planning Practice Guidance. A scoping study was initially undertaken to identify all potential sources of flooding at the site, which may warrant further consideration. Any potential flooding issues identified in the scoping study have subsequently been considered within this Flood Risk Assessment. The aim of the scoping study is to review all available information and provide a qualitative assessment of the flood risk to the site and the impact of the site on flood risk elsewhere. The report has been undertaken with due regard to the EA's National Standing Advice on Development and Flood Risk.

Scoping Study

5.5 All potential sources of flooding must be considered for any proposed development.

5.6 Using the EA Flood Zone mapping, topographical survey and Ordnance Survey maps, a summary of the potential sources of flooding and a review of the potential risk posed by each source on the development area of the application site is presented in Table 5.1.

Table 5.1: Potential Risks posed by Flooding Sources in accordance with the gov.uk Long-Term Flood Risk Map

Source	Risk		
	High	Medium	Low
Fluvial			✓
Tidal			✓
Surface Water			✓
Groundwater			✓
Sewer			✓
Artificial water bodies			✓

Flood Risk Mitigation

5.7 It is vital that the correct mitigation is put in place to minimise the flood risk to the development. In accordance with the NPPF, this includes preventing harm from occurring to the users of the site as well as ensuring the development itself is protected.

Fluvial Flood Risk Mitigation

5.8 The proposed development falls entirely in Flood Zone 1. Given the site is in Flood Zone 1 and at very low risk of fluvial flooding, there would be no requirements to provide any further formal mitigation at this development site.

Surface Water Flood Risk Mitigation

5.9 The majority of the site is designated to be at low risk from surface water flooding. There are isolated areas at medium to high risk of surface water within the western boundary of the site. The layout has been designed sequentially so that all dwellings, roads and associated infrastructure have been located outside of any areas identified at risk of flooding. In accordance with the NPPF, finished floor levels will be set to a minimum of 150mm above the adjacent site levels. Permeable paving could be utilised to avoid any ponding of surface water above the ground. Surface water is likely to be collected by the proposed site-wide drainage infrastructure and conveyed to a proposed discharge point on site. Based on the above, the risk of flooding will be managed at the development site post-development and the remaining risk will be low

Vulnerability Classification of Proposed Development

5.10 The National Planning Practice Guidance: Flood Zone and Flood Risk Tables provide information on the vulnerability classification of various developments. The proposed residential development end use of this site falls in the “more vulnerable” classification. A comparison of the “more vulnerable” use with the development proposals within Flood Zone 1 areas shows development proposals are acceptable and in accordance with NPPF, as shown in Table 5.2.

Table 5.2: Flood risk vulnerability and flood zone 'compatibility' from Flood Risk and Coastal Change – Planning Practice Guidance

Flood Risk Vulnerability classification		Essential Infrastructure	Water compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test Required	✓	✓
	Zone 3a	Exception Test required	✓	x	Exception Test Required	✓
	Zone 3b 'Functional Floodplain'	Exception Test Required	✓	x	x	x

Key: ✓ Development is appropriate X Development should not be permitted

Sequential Test

5.11 The Sequential Test gives preference for locating new developments in low-risk areas from all sources of flooding. The PPG states the aim of the sequential test is to:

"… ensure that areas at little or no risk of flooding from any source are developed in preference to areas at higher risk. This means avoiding, so far as possible, development in current and future medium and high flood risk areas considering all sources of flooding including areas at risk of surface water flooding".

5.12 Paragraph 175 of the NPPF states:

"The sequential test should be used in areas known to be at risk now or in the future from any form of flooding, except in situations where a site-specific flood risk assessment demonstrates that no built development within the site boundary, including access or escape routes, land raising or other potentially vulnerable elements, would be located on an area that would be at risk of flooding from any source, now and in the future (having regard to potential changes in flood risk)."

5.13 All development is located within Flood Zone 1 and within areas of low surface water risk. In accordance with the NPPF and PPG, the development has taken a sequential approach to design and is deemed that the sequential test will not be required.

Exception Test

5.14 Based on the above the proposed development is in accordance with paragraphs 161 to 186 of the NPPF, as such an exception test is not required.

6.0 SURFACE WATER MANAGEMENT STRATEGY

6.1 It is essential that the proposed development does not increase flood risk to adjacent land or downstream of the site and protects the development from flooding itself. To ensure that the flood risk is minimised, the drainage design will incorporate the following flood mitigation measures:

- Site levels will be designed 150mm above the adjacent road levels and to direct all overland surface water flows away from the dwellings, by following the natural topography and any proposed green corridors.
- The proposed development will include a surface water drainage system that will intercept runoff generated within the development. This will minimise the risk of flooding to the new buildings and also reduce the incidence of overland flows.
- The surface water drainage system will convey flows to the infiltration basin on site. The surface water flows generated within the development up to and including a 1%AEP40CC will be stored on-site.

Surface Water Outfall

6.2 Surface water arising from developed sites should, as far as practical, be managed in a sustainable manner to mimic the surface water flows arising from the undeveloped site. When considering the surface water discharge the SuDS hierarchy needs to be adhered to. The SuDS hierarchy states that the options below must be adhered to in order of sustainability or evidenced otherwise before moving down to a less sustainable discharge method;

- Discharge at source (soakaway)
- Watercourse or waterbody
- Public Sewer

Discharge at Source

6.3 British Geological Survey (BGS) mapping indicates that the site is underlain directly by bedrock of the Gunthorpe Member, consisting of Mudstone. The southern area of the site (approximately 50% of the proposed development area) has underlying superficial deposits of Glaciofluvial Deposits (Mid Pleistocene) composed of Sand and Gravel. The northern area of the site has underlying superficial deposits of Oadby Member, composed of Diamicton.

6.4 MEC undertook Soil Infiltration rate testing at the site in two phases, see **Appendix E**. Initial testing was completed in February 2025 in four locations and supplementary testing was completed in March 2025 including repeat tests within SA02 and two additional locations.

6.5 The tests completed in February 2025 derived rates in the range 1.21×10^{-5} m/s to 1.41×10^{-5} m/s. The lowest rate of 1.21×10^{-5} m/s would be sufficient for design purposes at this specific location. Additional testing was undertaken in March 2025 and derived rates in the range 2.32×10^{-6} m/s to 3.10×10^{-6} m/s. For robustness and to ensure a conservative approach, the lowest rate (2.32×10^{-6} m/s) has been applied to the drainage calculations.

6.6 Additional soakage testing and groundwater monitoring should be undertaken in due course.

Discharge to Watercourse

6.7 In accordance with the drainage hierarchy, surface water will discharge via infiltration at a conservative rate of 2.32x 10^{-6} m/s.

6.8 The nearest surface water feature is a pond located approximately 120m southwest.

6.9 There are no open watercourses within the site or the surrounding area. The closest designated Main River is the Rothley Brook, located approximately 3.43km northeast of the site.

Discharge to Sewers

6.10 In accordance with the drainage hierarchy, surface water will discharge via infiltration at a conservative rate of 2.32 x 10^{-6} m/s.

6.11 Sewer records have been obtained from STW see **Appendix D.** There are no sewers within the vicinity of the site. There are multiple sewers to the east of the site currently undergoing the Section 104 process. There are also existing foul sewers within Moat Close, which flow out of the existing development and onto Dragon Lane.

Land Use

6.12 In order to calculate the drainage requirements an understanding of the land use on-site needs to be known. Table 6.1, below summarises the proposed land uses within the site. The site currently consists of open green space and the current land use has been calculated using the existing site plan and the post-development land use has been measured from the illustrative layout. The impermeable areas for the site have been based on a net developable area of 5.20ha.

Table 6.1: Land Use Summary

Land Use Type	Existing Site Areas		Proposed Site Areas	
	ha	%	ha	%
Impermeable Areas	0.00	0	3.12	37
Green Landscape / Permeable areas	8.40	100	5.28	63
Total	**8.40**	**100**	**8.40**	**100**

Urban Creep Allowances

6.13 Urban creep is the conversion of permeable surfaces to impermeable ones over time, e.g., extensions to existing buildings. It has been shown that, over the lifetime of development, urban creep can increase impermeable areas by as much as 10%. An allowance of 10% for increases in the impermeable area due to urban creep over the lifetime of the development will be included within the drainage calculations. The impermeable area is therefore adjusted to 3.43ha.

Climate Change Allowances

6.14 The influence of climate change on rivers and watercourses is likely to increase the frequency of flood events and the overall volume of water that passes the site. When considering surface water runoff from the site, the increase in peak rainfall intensity varies over the lifetime of the development. Where residential developments with a lifetime beyond the 2070s are proposed the Flood Risk Assessments: Climate Change Allowances Guidance requires the use of the Upper-End Allowance for the 2070s epoch (2061 to 2125), the upper end gives an expected increase of 40%, refer to Table 6.2.

Table 6.2: Peak Rainfall intensity allowance in small and urban catchments from the Flood Risk Assessments: Climate Change Allowances Guidance

	Total potential change anticipated for the '2050s' (2022 to 2060)		Total potential change anticipated for the '2070s' (2061 to 2125)	
Annual Exceedance Probability	Central	Upper End	Central	Upper End
3.3 % AEP	20%	35%	25%	35%
1 % AEP	20%	40%	25%	40%

Drainage Strategy

6.15 The overall drainage strategy has been based on the land use table, discharge rates table and the current site layout presented in **Appendix B**. In accordance with the National SuDS Standards, the strategy involves conveying surface water flows to an infiltration basin on-site at a soakage rate of 2.32 x 10^{-6} m/s based on a conservative rate derived from infiltration testing completed within the site.

6.16 The CIRIA SuDS Manual C753 indicates uncertainty around the long-term infiltration rate of infiltration system, as this rate may reduce over time, especially if effective pre-treatment is inadequate or maintenance of the features is poor. To account for this, a factor of safety is introduced to reduce the value of the infiltration rate. The factor of safety used depends on the consequence of the system failure and engineering judgement. The factor of safety (F) is suggested in Table 6.3 below.

Table 6.3: Factors of safety, F, for use in hydraulic design of infiltration systems. (Extract from CIRIA 753 Table 25.2)

Size of area to be drained	Consequences of Failure		
	No Damage or Inconvenience	Minor damage to external areas or inconvenience (eg surface water on car part)	Damage to buildings or structures, or major inconveniences (eg flooding of roads)
< 100m^2	1.5	2	10
100-1000m^2	1.5	3	10
> 1000m^2	1.5	5	10

6.17 The factor of safety factors (F) shown in the table above is derived from a Volumetric Runoff Coefficient (Cv) of 1.0. Typically, when designing SuDS features the Cv values for both summer and winter profiles are set to 0.75 for summer and 0.84 for winter. As such the factor of safety needs to correctly be calculated.

6.18 For an area greater than 1000m^2 where the consequence of failure is likely to be minor, the factor of safety for the design of infiltration systems is 5 for the volumetric runoff coefficient of Cv = 1. For a Cv of 0.84 (winter event), the factor of safety is 5.95 (5 divided by 0.84). To make sure the site and surrounding areas are protected for the duration of their lifetime a factor of safety of 6.0 has been applied.

6.19 Due to the safety factor applied and the conservative infiltration rate, the infiltration basin exceeds the 24-hour criteria. It has therefore been modelled on the basis of the volume required for the 1%AEP40CC event to identify a maximum water level, followed immediately by a 3.3%AEP35CC storm event. This provides a peak water level for the basin from the two consecutive storm events and the cumulative level of storage has been calculated for each basin.

6.20 Surface water flows for an impermeable area, plus urban creep of 3.432ha including urban creep will be conveyed to the proposed infiltration basin onsite. A storage volume of 5,486.96m^3 is required within the infiltration basin to allow sufficient time for water to discharge into the ground and cater for all events up to and including the 1%AEP40CC followed by the 3.3%AEP35CC event. The attenuation basin has been designed to accommodate a 1:4 gradient for the internal slopes with a 1:4 gradient for the external batter slopes. The basin will include a 5m easement/maintenance strip around the outside.

6.21 Additional drainage features such as permeable paving, swales and rain gardens could be included as part of the proposed development to provide extra storage and provide a first treatment stage for any runoff. These features have been excluded from the calculations at this stage. The proposed attenuation calculations can be found in **Appendix F** and the drainage strategy is included in **Appendix G.**

Applicable SuDS Techniques

6.22 The National Standards for Sustainable Drainage Systems that deals with SuDS cover a whole range of sustainable approaches to surface water drainage management including:

- source control measures including rainwater recycling and drainage;
- filter strips and swales, which are vegetated features that hold and drain water downhill mimicking natural drainage patterns;
- filter drains and porous pavements to allow rainwater and run-off to infiltrate into permeable material below ground and provide storage if needed; and
- basins and ponds to hold excess water after rain and allow controlled discharge that avoids flooding.

6.23 Each of the five SuDS considerations listed above is discussed below in Table 6.4, with reference to their suitability for the proposed development.

Table 6.4: Suitability of SuDS techniques

	COMPONENT	SUITABILITY	REASON
Source Control	Rainwater Harvesting	Yes	Water butts could be used to store run-off from roofs before discharge into the drainage system. Any storage is not to be included in calculations.
	Green Roofs	No	This would not be appropriate given the scope and scale of the development.
	Bio-retention Systems/ Rain Gardens	No	More appropriate SuDS features can be accommodated within the development and are preferred.
Proprietary Systems	Proprietary bio-retention systems	No	More appropriate SuDS features can be accommodated within the development and are preferred.
Infiltration Devices	Permeable Paving	Yes	Permeable paving could be considered for the proposed development within private roads and parking spaces.
	Infiltration trenches/ Soakaways	Yes	A conservative infiltration rate derived from testing in March 2025 has been used to design the infiltration basin.
Filtration	Open Swales, Filter Strips/ Drains	No	More appropriate SuDS features can be accommodated within the development and are preferred.
Retention/ Detention	Detention Basin, Attenuation Pond/ Tanks	No	Infiltration has been deemed feasible onsite and therefore detention basins are not required.

Surface Water Quality

6.24 The CIRIA SuDS Manual C753, indicates the minimum treatment indices appropriate for contributing pollution hazards for different land use classifications. To deliver adequate treatment, the selected SuDS components should have a total pollution mitigation index (for each contaminant) that equals or exceeds the pollution hazard index.

6.25 When using more than one SuDS component in series the mitigation indices are multiplied by a factor of 0.5. This is to account for the reduced performance of secondary or tertiary components associated with the already reduced inflow concentrations. The SuDS Mitigation Index from the additional components will be added together up to a maximum value of 0.95, regardless of the number of components in series.

6.26 Surface water runoff from residential roofs will have a very low pollution hazard level, whilst the residential parking areas will have a low pollution hazards index.

6.27 The pollution hazard indices, mitigation indices of each SuDS component and the accompanying calculations are provided in Table 6.5.

Table 6.5: SuDS Mitigation Indices (from CIRIA SuDS Manual)

SuDS Component	Mitigation Indices		
	Total Suspended Solids	***Metal***	***Hydrocarbons***
Residential Roofs	0.2	0.2	0.05
Residential Parking Areas	0.5	0.4	0.4
Permeable Paving	0.7	0.6	0.7
Layer of dense vegetation underlain by soil with good contaminant attenuation potential at least 300mm depth	0.6	0.5	0.6
Mitigation Calculation	0.7 + 0.6 (0.5)	0.6 + 0.5 (0.5)	0.7 + 0.6 (0.5) + 0.6 (0.5)
SuDS Mitigation Index	**0.95**	**0.85**	**0.95**
Mitigation Requirement Met?	**Yes**	**Yes**	**Yes**

6.28 For the very low to low pollution hazard levels generated at the site, the proposals as outlined would provide sufficient treatment in accordance with the Simple Index Approach.

Exceedance and Flow Routing

6.29 The risk of overland flooding from adjacent land to dwellings is very low. The design of levels and features on the site will follow best practice by ensuring any overland flow on the site is routed safely away from dwellings and to areas of lowest risk on site. Any surcharging and subsequent flooding of sewers on or in the vicinity of the site will also be mitigated by the flood routing described above. As such the risk of flooding on site from exceedance events and flood flow routes is very low.

Maintenance and Management

6.30 An integrated approach to the maintenance and management of SuDS systems is a requirement of the NPPF and by the Flood & Water Management Act 2010. The aim of a maintenance and management plan is to ensure that there is a clear understanding of drainage responsibilities and that a maintenance regime is implemented for all new drainage systems for the lifetime of the development, so they can continue to function as required.

6.31 Surface water drainage shall be offered to STW for adoption.

6.32 All private drainage systems, will be maintained by individual occupiers and landowners, or an appointed management company.

6.33 A proposed maintenance schedule that breaks down the maintenance requirements of the various proposed assets can be found in **Appendix G** and is in accordance with CIRIA C753 SuDS Manual guidance.

7.0 FOUL WATER STRATEGY

7.1 According to The Building Regulations (2010), foul water drainage from new developments should be discharged into the following in order of priority:

- A public sewer, or;
- A private sewer communicating with a public sewer, or;
- A septic tank which has an appropriate form of secondary treatment, or;
- A cesspool.

7.2 Sewer records and a developer enquiry have been obtained from STW see **Appendix D.** The records show there are no sewers within the development area. There is an existing surface water sewer network, foul water sewer network and foul water rising main within the recently developed residential developments (planning application 20/00143/FUL) to the east. These sewers are currently undergoing the Section 104 process. There are also foul water sewers within Moat Close and Dragon Lane. Foul water generated by the adjacent development is pumped to the existing foul sewer within Moat Close.

7.3 Due to the levels on site, a gravity connection into the existing foul water sewer within Moat Close cannot be achieved and therefore a pumped solution is required. Foul water within the site will be pumped to the new gravity system before outfalling into the existing network Moat Close at Manhole 2200 as agreed by STW.

7.4 The proposed foul water drainage options can be seen on drawing 28945_01_230_01c in **Appendix G**. Full details of the design will be confirmed at the detailed design stage.

7.5 All foul connections to the existing public sewerage system will need to be approved by STW in accordance with Section 106 of the Water Industry Act. An application for the connections will need to be submitted to STW in due course to obtain approvals prior to the commencement of works.

8.0 CONCLUSION AND SUMMARY

8.1 MEC has been commissioned by J S Bloor to undertake a Flood Risk Assessment to support a proposed residential development on Land off Bosworth Lane, Newbold Verdon. This assessment has been undertaken to ascertain the constraints of the development to the site and to assess the impact of the design, with respect to flood risk.

- The Flood Map for Planning shows the site is located within Flood Zone 1.
- The Environment Agency Flood Risk from Surface Water Map indicates that the majority of the site is designated to be at low risk from surface water flooding. There are isolated areas at medium to high risk of surface water within the western boundary of the site. Development will not be located within areas at medium to high risk of surface water flooding.
- Groundwater flood maps indicate that the site is predominately in an area of generally 25%-50% susceptibility to groundwater flooding. During Soil Infiltration Rate Testing five trial pits were advanced to depths of up to 3.40m bgl. Groundwater was not encountered within the trial pits.
- The site is considered to be at low risk of flooding from all other sources.
- Infiltration rate testing was undertaken by MEC February 2025 and March 2025, comprising 6 trial pits. MEC have taken a conservative approach to the drainage design and utilised the rate of 2.32×10^{-6} m/s within the drainage calculations.
- Due to the safety factor applied and the conservative infiltration rate, the infiltration basin exceeds the 24-hour criteria. It has therefore been modelled on the basis of the volume required for the 1%AEP40CC event to identify a maximum water level, followed immediately by a 3.3%AEP35CC storm event.
- Surface water flows for an impermeable area, plus urban creep of 3.432ha including urban creep will be conveyed to the proposed infiltration basin onsite. A storage volume of 5,486.96m^3 is required within the infiltration basin to allow sufficient time for water to discharge into the ground and cater for all events up to and including the 1%AEP40CC followed by the 3.3%AEP35CC event.
- Additional drainage features such as permeable paving could be considered across the site to provide extra storage and water treatment on-site.
- Given the levels on site a gravity connection into the existing foul water sewer within Moat Close cannot be achieved and therefore a pumped solution is required. Foul water within the site will be pumped to the new gravity system before outfalling into the existing network Moat Close, as agreed with STW.

8.2 With the above measures in place, the development of the site will not create any flood risk issues to the wider area.

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APPENDICES

APPENDIX A

MEC Consulting Group Ltd
The Old Chapel
Station Road
Hugglescote
Leicestershire
LE67 2GB

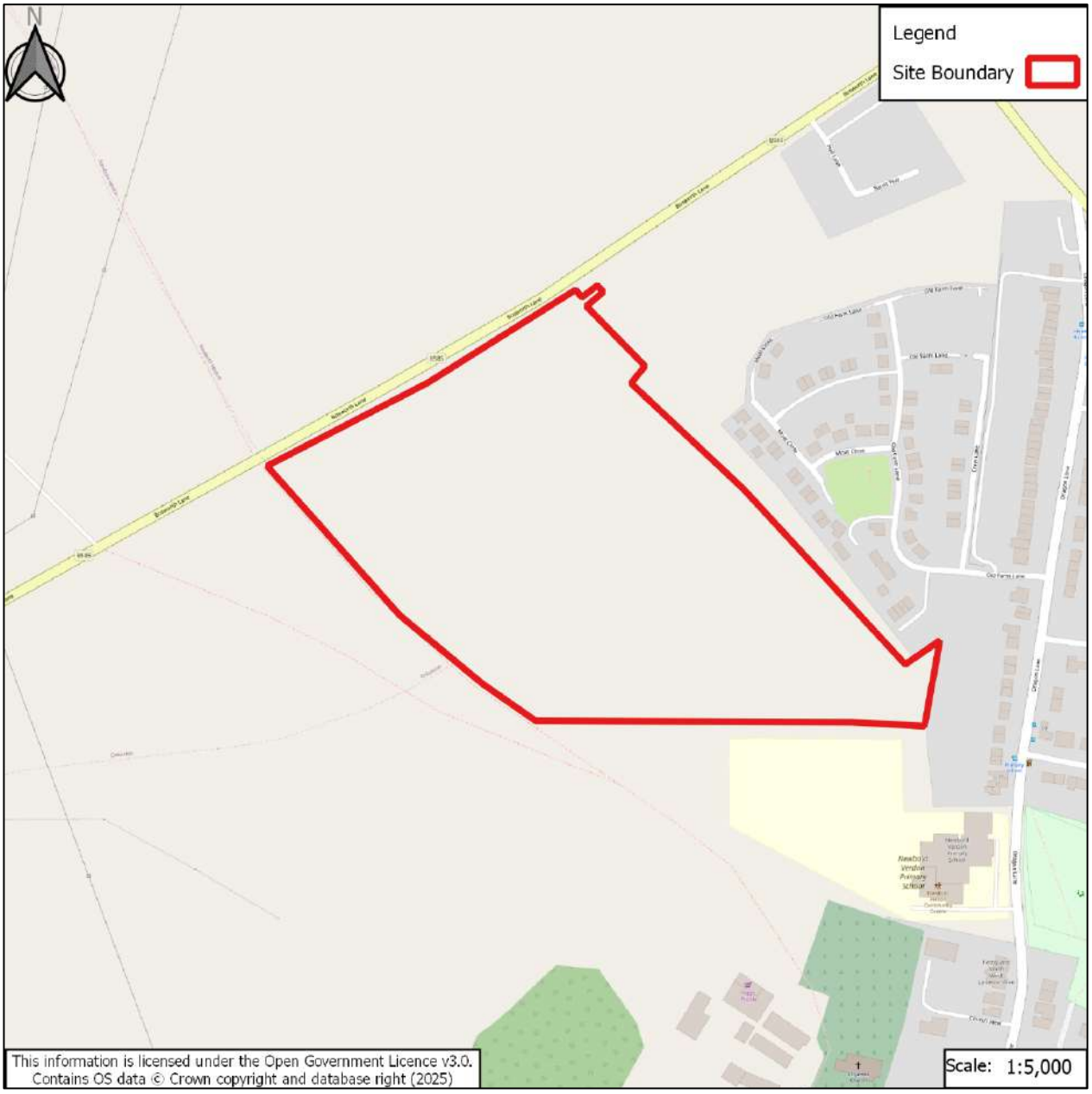
SITE LOCATION PLAN

Project: Land off Bosworth Lane, Newbold Verdon

File Ref: 28945

O.S. Grid Ref: E:444167, N:304180

Postcode: LE9 9PY



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APPENDICES

APPENDIX B

0 20m 40m 60m 80m 100m

Status **Planning**

Notes:
The copyright of this drawing belongs to Marrons and should not be copied or reproduced without written consent.
This drawing is for planning purposes only and is not to be used as a basis for construction.
Do not scale from this drawing - use figured dimensions only.

Client: Bloor Homes - East Midlands

Project title: Land South of Bosworth Lane, Newbold Verdon

Drawing title: Indicative Framework Plan

Scale:	1:1500 (A2)
Date:	January 2025
Drawn by:	JMP
Checked by:	LH
Drawing no.:	2508709.11.03
Revision:	F

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Birmingham
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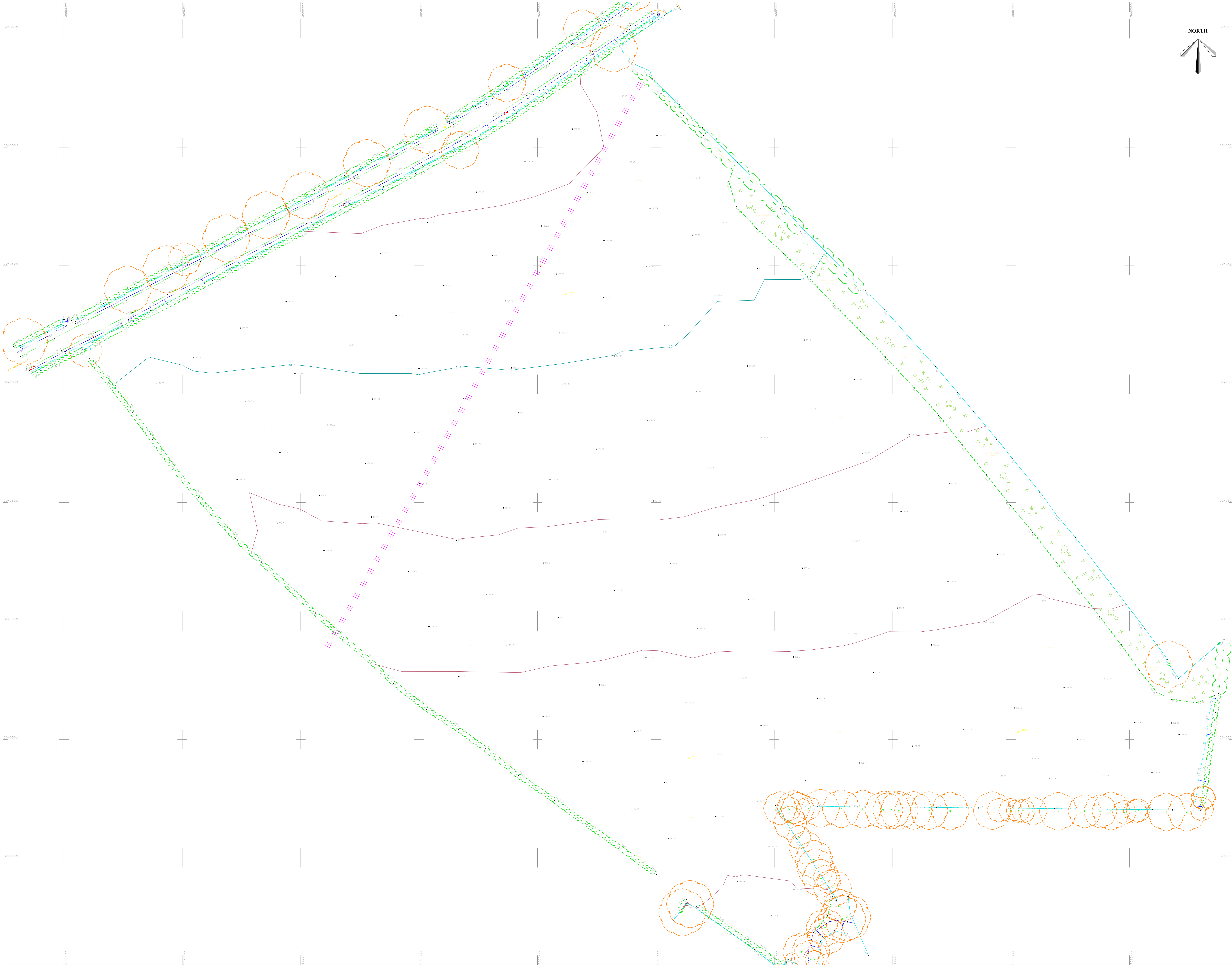
Consulting Group

APPENDICES

APPENDIX C



NOTES

GENERAL NOTES :-

ALL LEVELS ARE IN METRES DERIVED FROM GPS TRANSFORMATION.

GRID COORDINATES ARE ORDNANCE SURVEY NATIONAL GRID DERIVED FROM GPS TRANSFORMATION. GPS COORDINATES AND LEVELS SET AT ST01

THIS DRAWING HAS BEEN PRODUCED WITH A PLOT SCALE ACCURACY OF 1:500

SERVICE COVERS INDICATED WHERE VISIBLE. PIPE INVERTS / DETAILS SURVEYED FROM SURFACE INSPECTION ONLY. GENERALLY DAMAGED COVERS AND COVERS WITHIN HIGHWAYS WILL NOT BE LIFTED

TREE SPECIES SHOULD BE CONFIRMED BY TREE SPECIALIST IF CRITICAL.

OVERHEAD CABLES ARE INDICATED USING REMOTE SURVEY METHODS AND ARE SUBJECT TO SEASONAL VARIATION, AND SHOULD BE TREATED AS APPROXIMATE.

SERVICE COVERS LOCATED UNDER PARKED VEHICLES/MOBILE STRUCTURES MAYBE OMITTED.

BURIED SERVICE COVERS WILL NOT BE INDICATED.

TOPOGRAPHICAL SURVEY/UTILITY KEY :-

(ht) – height
ø – diameter
● – pea trap
a/g – above ground
a/r – assumed route
av – air valve
bb – belisha beacon
bd – back drop
bl – bed level
boll – bollard
bos – bottom of shaft
bt – telecom
c/b fence – closeboard fence
c/box – control box
catv – cable television
cl – cover level
con – conifer
cr – cable riser
cws – combined water sewer
d/chan – drainage channel
ejb – electric junction box
elec – electric
eot – end of trace
ep – electric pole
er – earth rod
f/bed – flower bed
fh – fire hydrant
fl – floor level
fs – fire switch
fws – foul water sewer
g – gully
g/run – gully run
gr – gas riser
h/chestnut – horse chestnut
h/thorn – hawthorn
ic – inspection cover
il – invert level
ill – illuminated
int – interceptor
lp – lamp post
mh – manhole cover
mkr – marker
o/h – over head
ol – off let
osa – off survey area
OSBM – ordnance survey bench mark
p & r fence – post & rail fence
pd – pit depth
pr – pipe riser
ptg – pipe to ground
pts – pipe to surface
re – rodding eye
ret wall – retaining wall
rs – road sign
rwp – rain water pipe
s/birch – silver birch
s/p – safety paving
sap – sapling
sec fence – security fence
sfc – soil filled chamber
sl – spot light
sp – soil pipe
st – stop tap
sv – stop valve
svp – soil vent pipe
sws – storm water sewer
TBM – temporary bench mark
tfr – taken from records
tl – threshold level
toc – top of cap
top – top of pipe
tot – top of tank
tp – telecom pole
ts – traffic signal
t/s – trench scar
u/s – underside
utl – unable to lift
utr – unable to rod
uts – unable to survey
utt – unable to trace
vp – vent pipe
wfc – water filled chamber
wl – water level
wm – water meter
wp – waste pipe
wr – water riser

SURVEY CONTROL :-

STATION	EASTINGS	NORTHINGS	LEVEL
ST01	444163.844	304041.992	132.696
ST02	444302.955	304053.198	132.699
ST03	444112.076	304237.975	135.530
ST04	444061.070	304308.552	137.298

SHEET LAYOUT :-

DISCLAIMER :-

Electromagnetic techniques have been used in the location of underground services. The results are not infallible and trial excavations should be carried out to confirm service identification, positions and particularly depths, where these are critical. The completeness of the underground services information cannot be guaranteed.

This method of survey does not differentiate between live and dead services, and as such all services should be treated as live. This drawing may not include the location of all public services that may cross the site, therefore the relevant service drawings should be obtained from the appropriate utility company and used in conjunction with this drawing.

Private service pipes and cables in highways are not shown, but there presence should be anticipated.

Additional below ground structures or obstructions not shown on this drawing may be present. Reference should be made to historical plans and as-built drawings. Excavations in the vicinity of services should be carried out with due diligence ref: HSG47 document avoiding dangers from underground services

Please note that factors such as ground conditions, proximity of other utilities, material and method of construction have an influence on the quality of the data collected on site.

TSA Standards – "Even an appropriate and professionally executed survey may not be able to achieve a 100% detection rate."

UTILITY NOTES

0 5 10 20 30 40 50

TAG SURVEYS

UNIT 1, ACCESS HOUSE, SHERWOOD ROAD, BROMSGROVE, B60 3DR
WWW.TAGSURVEYS.CO.UK
INFO@TAGSURVEYS.CO.UK

Client	BLOOR HOMES EAST MIDLANDS
Project	LAND OFF BOSWORTH LANE, NEWBOLD VERDON, LE9
Title	TOPOGRAPHICAL SURVEY
Date	FEBRUARY 2024
Scale	1:500@A0
Dwg No	T0545 – 1
Surveyor	SMc
Checked	SB

Revisions

TOPOGRAPHICAL (LAND) SURVEYORS / UTILITY SURVEYORS
BUILDING MEASUREMENT SURVEYORS / 3D LASER SCANNING

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APPENDICES

APPENDIX D

Severn Trent Water Limited, Severn Trent Centre, 2 St John's Street, Coventry, CV1 2LZ

Date of Issue: **26 February 2024**

SEWER RECORD Land at, Bosworth Lane, Newbold Verdon, LEICESTER, LE9 9NL

Severn Trent Water Limited, Severn Trent Centre, 2 St John's Street, Coventry, CV1 2LZ

Date of Issue: **26 February 2024**

WATER RECORD Land at, Bosworth Lane, Newbold Verdon, LEICESTER, LE9 9NL

WONDERFUL ON TAP

SEVERN TRENT

Severn Trent Water Ltd
Oxley Moor Road
Wolverhampton
WV9 5HN

www.stwater.co.uk
network.solutions@severntrent.co.uk

Contact: Michael Taylor
Tel. 07769881839
Your ref:
Reference: 1142057

MEC Consulting Group Ltd
The Old Chapel
Station Road
Hugglescote
LE67 2GB

25th February 2025

Dear Emma

Proposed Development: 200 Dwellings plus 1 Commercial building (Health Hub) Bosworth Lane Newbold Verdon- x-444160 y-304118

I refer to your 'Development Enquiry Request' for the proposed development of 200 dwellings and 1 commercial property in respect of the above-named site. Please find enclosed the sewer records that are included in the fee together with the Supplementary Guidance Notes (SGN) which refer to surface water disposal from development sites.

Public Sewers in Site – Required Protection

Due to a change in legislation on 1 October 2011 there may be former private sewers on the site which have transferred to the responsibility of Severn Trent Water Ltd, which are not shown on the statutory sewer records, but are in your client's land. These sewers would require protective strips of 3 metres either side of the sewer's centreline that we will not allow to be built over. If such sewers are identified to be present on the site, please contact us for further guidance. Our records various public foul and surface water sewers crossing the various development sites, The following easements apply to each sewer.

Foul Water Drainage

The development for 200 dwellings and 1 health Hub would generate approx. 3.5/s 2xdwf gravity flows.

A pumped connection with flows around 6l/s(pumped flows) to m/h 2200 150mm foul sewer located within the highway Moat Close to the east, due to site topography it

would appear that a pumped solution maybe be required, The network upstream of m/h 2200 is currently a private network under a S104 agreement, if you wished to consider this network as a possible connection alternative you would need to have the full approval of the developer.

Due to surcharge levels and the expected additional flows into the network downstream then additional investigation/modelling will be required.
Due to the performance of the downstream network, further modelling may be required to better understand the impact of the additional properties on the public network.

In a change to our previous process, we no longer charge developers for the hydraulic modelling service. We will liaise with you over time with regards to the outcome of our investigations and any impact that may have on the planning status, occupation, or phasing of the site. However, while we can provide a summary of our findings if you need us to, we will no longer provide the full external capacity assessment report.

From the application you have submitted, I am assuming that the development has not been granted planning approval. In the meantime, the site will be added to our modelling tracker and reviewed regularly until the site can be progressed for sewer modelling.

We are undergoing a prioritisation process of all investment requirements and emerging risks from growth on our network and treatment works as we build our plan for the coming Asset Management Plan period (2025-2030) and beyond.
We will pass details of your site over for consideration and feedback if anything arises which is of concern. We will let you know as soon as possible if anything will affect your connection points and timescales, should we need to make representation to the Planning Authority to apply conditions relating to phasing or occupation of the site. it's more to allow us to understand whether what system improvements will be required as a result of your proposed development drainage scheme.
From the application you have submitted, I am assuming that the development has not been granted planning approval. In the meantime, the site will be added to our modelling tracker and reviewed regularly until the site can be progressed for sewer modelling. I would therefore be grateful if you would forward as soon as possible the following details.

If a gravity connection is possible.
Pumped flows if this is the only option.
Proposed timescales and phase details for the construction.
Planning status
.

For any new connections (including the re-use of existing connections) to the public sewerage system, the developer will need to submit a Section 106 application form.

WONDERFUL ON TAP

SEVERN TRENT

Surface Water Drainage

Under the terms of Section H of the Building Regulations 2000, the disposal of surface water by means of soakaways should be considered as the primary method. If these are found to be unsuitable, satisfactory evidence will need to be submitted. The evidence

should be either percolation test results or by the submission of a statement from the SI consultant (extract or a supplementary letter).

Should Soakaways prove to be unfeasible for the development, then a connection to local watercourse/Pools to the West/South of the site would be appropriate
All flows should be in line with Greenfield rates of 5l/s/ha. And agreed with the LLFA.

For any new connections (including the re-use of existing connections) to the public sewerage system, the developer will need to submit a Section 106 application form. Our Developer Services department are responsible for handling all new connections enquiries and applications. To contact them for an application form and associated guidance notes please call 0800 7076600 or download from www.stwater.co.uk.

Please quote reference 1142057 in any future correspondence (including e-mails) with STW Limited. Please note that Developer Enquiry responses are only valid for 6 months from the date of this letter.

Yours sincerely

Michael Taylor

Senior Evaluation Technician
Network Solutions

MEC
Consulting Group

APPENDICES

APPENDIX E

The Old Chapel, Station Road, Hugglescote, Leicestershire LE67 2GB
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Email group@m-ec.co.uk
www.m-ec.co.uk

Doc. Ref.	28945-CALC-0401
Sheet	1
Engineer	JM
Date	01.04.2025
Revision	A

SOIL INFILTRATION CALCULATIONS FRONT SHEET

SCHEME	Land off Bosworth Lane, Newbold Verdon
CLIENT	J S Bloor
ASPECTS OF SCHEME TO BE DESIGNED	Soil Infiltration Rate Testing
CODES OF PRACTICE, DESIGN SPECIFICATIONS & BRITISH STANDARDS	Soil Infiltration Rate testing and calculations completed in general accordance with BRE Digest 365 utilising the gravel fill method.
NOTES	Soil infiltration rate testing has been undertaken at the site in two phases. Initial testing was completed in February 2025 in SA01, SA02, SA03 and SA04 and supplementary testing was completed in March 2025 including repeat tests within SA02 and additional tests within SA05-SA06. Five additional trial pits (TP01-TP05) were advanced to depths of up to 3.40m bgl to confirm the potential impact of groundwater levels on soil infiltration potential. Groundwater was not encountered within the trial pits. Soil infiltration test pits and trial pits positions, as shown on the attached exploratory hole location plan, were positioned to target proposed attenuation features and other areas as specified by the drainage engineer. Three tests were completed in February 2025 within SA01 and infiltration rates were derived in the range 1.21×10^{-5} m/s to 1.42×10^{-5} m/s. The lowest value of 1.21×10^{-5} m/s would be applicable for design purposes, at this specific location. Insufficient soakage was recorded in SA02 during the first test conducted in February 2025 to derive an infiltration rate although the test was terminated due to time restrictions marginally above the 25% effective storage depth. During the second test, an infiltration rate of 3.07×10^{-6} m/s was calculated and a similar value can be projected for the first, incomplete test. The additional testing undertaken in SA02 in March 2025, derived soil infiltration rates in the range 2.32×10^{-6} m/s to 3.10×10^{-6} m/s. The lowest value of 2.32×10^{-6} m/s, was calculated from the first test although there was a gap in the monitoring period as the test was left to run overnight. This value may therefore be conservative, however it does fall within the range of other results calculated from this location. Insufficient soakage was recorded in SA03 and SA04 in February 2025 to enable calculation of infiltration rates in accordance with BRE 365. Water levels were monitored for more than 20 hours at these locations and it is suggested that infiltration is limited by the presence of a significant proportion of relatively fine grained cohesive material (clay and silt) within the Glaciofluvial Deposits. Three tests were undertaken in each of SA05 and SA06 in March 2025. Infiltration rates were derived in the range 5.54×10^{-5} m/s to 6.92×10^{-5} m/s within SA05 and 8.68×10^{-6} m/s to 3.12×10^{-5} m/s within SA06. The lowest values of 3.41×10^{-5} m/s in SA05 and 5.29×10^{-6} m/s in SA06 would be applicable for design purposes. The infiltration rates reported apply to the specific depth ranges at the test locations as stated on the calculation sheets.

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MEC Consulting Group

INDEX

(Value in bold represents lowest calculated value applicable to design at each location.)

GENERAL NOTES

1. DO NOT SCALE THIS DRAWING.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS, ARCHITECTS AND SPECIALIST DESIGN DRAWINGS AND DETAILS.
3. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
4. THIS DRAWING IS FOR STRATEGY PURPOSES ONLY AND IS NOT TO BE USED FOR CONSTRUCTION PURPOSES.

KEY

TP01 TRIAL PIT LOCATION

SA01 SOIL INFILTRATION TEST PIT LOCATION

SITE BOUNDARY

REV:	AMENDMENTS:	DRN:	CHK:	APP:	DATE:
A	ADDITIONAL SOIL INFILTRATION RATE TESTING LOCATIONS	JM	CW	DT	24.03.25
-		JM	CW	DT	20.02.25

PROJECT:
LAND OFF BOSWORTH LANE
NEWBOLD VERDON

DRAWING TITLE:
EXPLORATORY HOLE
LOCATION PLAN

CLIENT:
J S BLOOR

DRAWING NUMBER:
28945_04_140_01

REVISION:	SHEET SIZE:	SCALE:
A	A1	1:1000

STATUS:
FOR INFORMATION / APPROVAL

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Consulting Group
Birmingham | Brighton | Leicester

Telephone: 01530 264 753
Email: group@m-ec.co.uk
Website: www.m-ec.co.uk

MEC Consulting Group Ltd
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Scheme	**Land off Bosworth Lane, Newbold Verdon**	**Page No.**	4
Client	**J S Bloor**	**Calcs by**	JM
Job ref.	**28945**	**Checked By**	DT
		Date	21.02.25

Soil Infiltration Test - Gravel Filled Method

(In general accordance with BRE Digest 365, 2016, Soakaway Design)

Soakaway pit ref. **SA01** **Test** 1
Length **1.80** m
Width **0.60** m
Depth **2.00** m
Ground water level **Not encountered**
Ground conditions

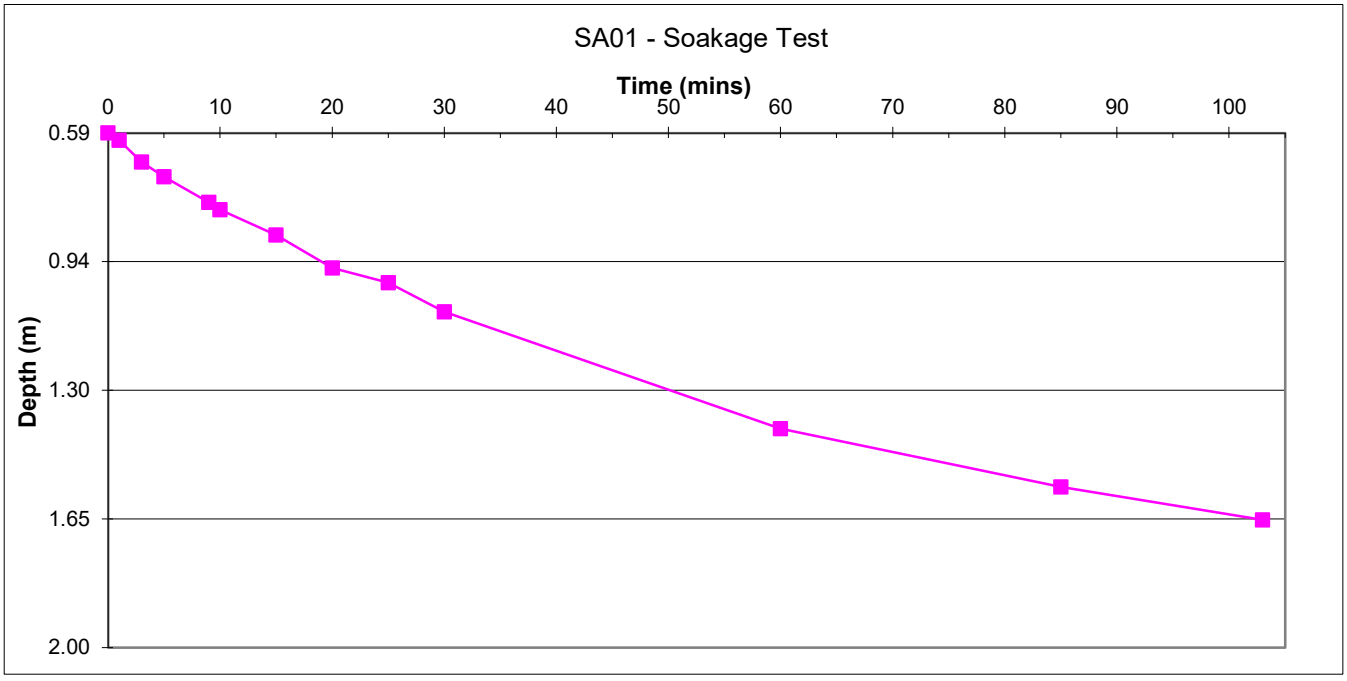
0.00-0.30m **Crop over dark brown, slightly sandy, silty clay TOPSOIL with gravel sized fragments of quartzite and sandstone.**

0.30-1.10m **Reddish brown, sandy, gravelly, slightly cobbly, silty CLAY. Gravels comprise subangular to subrounded, fine to coarse, quartzite, sandstone, and chert. Cobbles comprise subrounded quartzite and sandstone. (OADBY MEMBER).**

1.10-2.00m **Brown, clayey, slightly silty, very sandy, slightly cobbly, subangular to subrounded, fine to coarse GRAVEL comprising quartzite, sandstone, chert, and rare coal. Cobbles comprise subrounded quartzite and sandstone. (GLACIOFLUVIAL DEPOSITS).**

Time (mins)	Depth to water (m bgl)
0	0.59
1	0.61
3	0.67
5	0.71
9	0.78
10	0.80
15	0.87
20	0.96
25	1.00
30	1.08
60	1.40
85	1.56
103	1.65

Effective storage depth =	1.41	m
75% effective storage depth =	1.06	m
(ie depth below GL) =	0.94	m
25% effective storage depth =	0.35	m
(ie depth below GL) =	1.65	m
effective storage depth 75%-25% =	0.71	m
Time to fall to 75% effective depth =	19	mins
Time to fall to 25% effective depth =	103	mins
Void Ratio =	40%	
V (75%-25%) =	0.30	m^3
a (50%) =	4.46	m^2
t (75%-25%) =	84.00	mins
SOIL INFILTRATION RATE =	**1.35E-05**	**m/s**



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Scheme	**Land off Bosworth Lane, Newbold Verdon**	**Page No.**	5
Client	**J S Bloor**	**Calcs by**	JM
Job ref.	**28945**	**Checked By**	DT
		Date	21.02.25

Soil Infiltration Test - Gravel Filled Method

(In general accordance with BRE Digest 365, 2016, Soakaway Design)

Soakaway pit ref. **SA01** **Test** 2
Length **1.80** m
Width **0.60** m
Depth **2.00** m
Ground water level **Not encountered**
Ground conditions

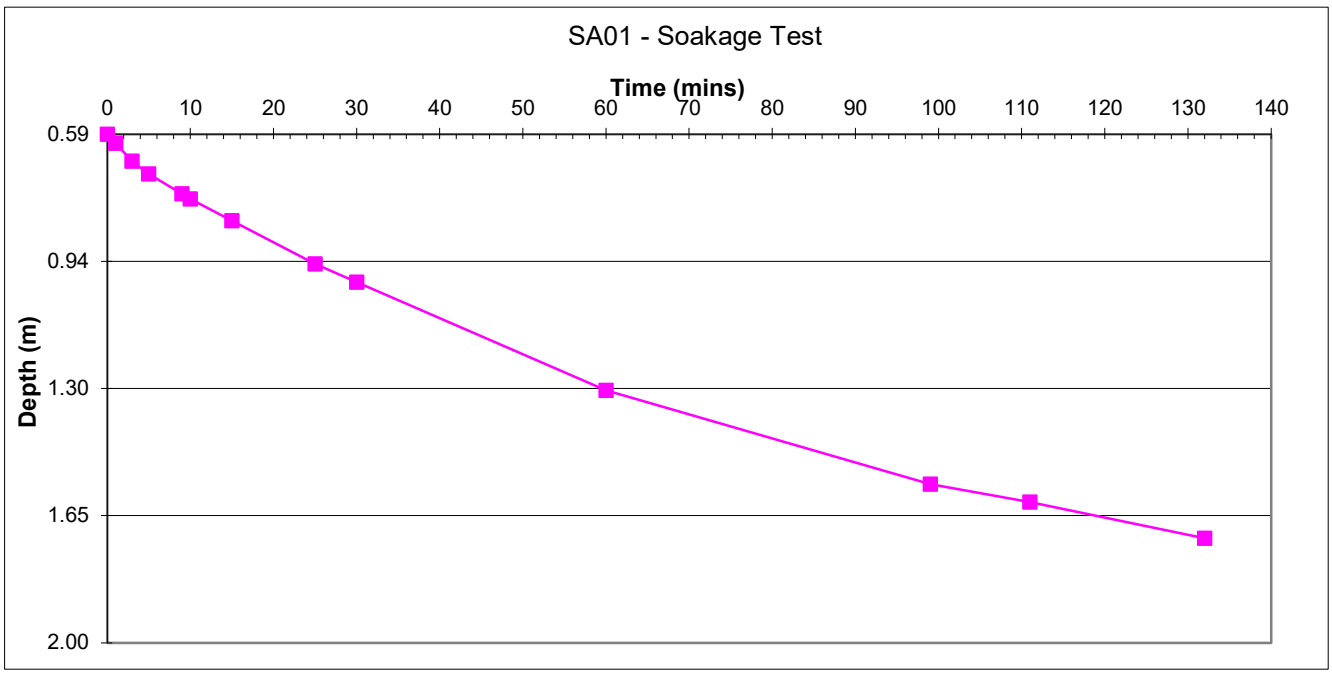
0.00-0.30m **Crop over dark brown, slightly sandy, silty clay TOPSOIL with gravel sized fragments of quartzite and sandstone.**

0.30-1.10m **Reddish brown, sandy, gravelly, slightly cobbly, silty CLAY. Gravels comprise subangular to subrounded, fine to coarse, quartzite, sandstone, and chert. Cobbles comprise subrounded quartzite and sandstone. (OADBY MEMBER).**

1.10-2.00m **Brown, clayey, slightly silty, very sandy, slightly cobbly, subangular to subrounded, fine to coarse GRAVEL comprising quartzite, sandstone, chert, and rare coal. Cobbles comprise subrounded quartzite and sandstone. (GLACIOFLUVIAL DEPOSITS).**

Time (mins)	Depth to water (m bgl)
0	0.59
1	0.62
3	0.67
5	0.70
9	0.76
10	0.77
15	0.83
25	0.95
30	1.00
60	1.30
99	1.56
111	1.61
132	1.71

Effective storage depth =	1.41	m
75% effective storage depth =	1.06	m
(ie depth below GL) =	0.94	m
25% effective storage depth =	0.35	m
(ie depth below GL) =	1.65	m
effective storage depth 75%-25% =	0.71	m
Time to fall to 75% effective depth =	24	mins
Time to fall to 25% effective depth =	118	mins
Void Ratio =	40%	
V (75%-25%) =	0.30	m^3
a (50%) =	4.46	m^2
t (75%-25%) =	94.00	mins
SOIL INFILTRATION RATE =	**1.21E-05**	**m/s**



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Scheme	**Land off Bosworth Lane, Newbold Verdon**	**Page No.**	6
Client	**J S Bloor**	**Calcs by**	JM
Job ref.	**28945**	**Checked By**	DT
		Date	21.02.25

Soil Infiltration Test - Gravel Filled Method

(In general accordance with BRE Digest 365, 2016, Soakaway Design)

Soakaway pit ref. **SA01** **Test** 3
Length **1.80** m
Width **0.60** m
Depth **2.00** m
Ground water level **Not encountered**
Ground conditions

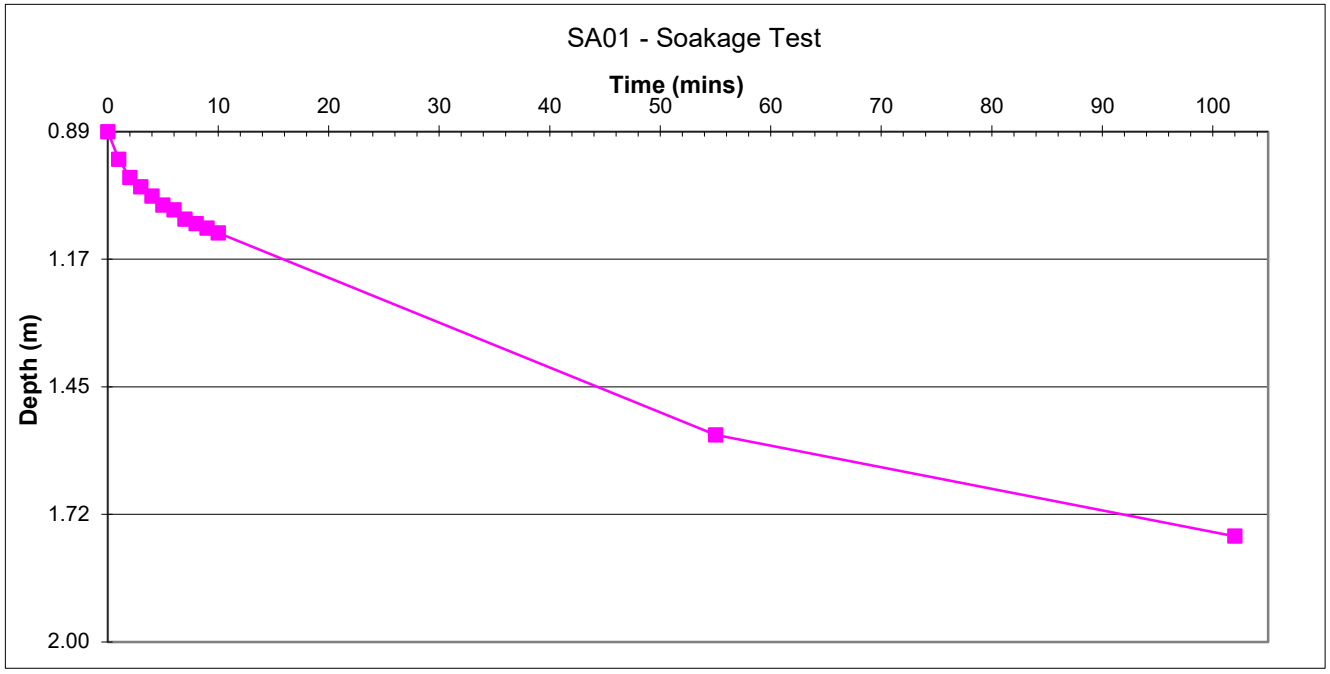
0.00-0.30m **Crop over dark brown, slightly sandy, silty clay TOPSOIL with gravel sized fragments of quartzite and sandstone.**

0.30-1.10m **Reddish brown, sandy, gravelly, slightly cobbly, silty CLAY. Gravels comprise subangular to subrounded, fine to coarse, quartzite, sandstone, and chert. Cobbles comprise subrounded quartzite and sandstone. (OADBY MEMBER).**

1.10-2.00m **Brown, clayey, slightly silty, very sandy, slightly cobbly, subangular to subrounded, fine to coarse GRAVEL comprising quartzite, sandstone, chert, and rare coal. Cobbles comprise subrounded quartzite and sandstone. (GLACIOFLUVIAL DEPOSITS).**

Time (mins)	Depth to water (m bgl)
0	0.89
1	0.95
2	0.99
3	1.01
4	1.03
5	1.05
6	1.06
7	1.08
8	1.09
9	1.10
10	1.11
55	1.55
102	1.77

Effective storage depth =	1.11	m
75% effective storage depth =	0.83	m
(ie depth below GL) =	1.17	m
25% effective storage depth =	0.28	m
(ie depth below GL) =	1.72	m
effective storage depth 75%-25% =	0.56	m
Time to fall to 75% effective depth =	16	mins
Time to fall to 25% effective depth =	91	mins
Void Ratio =	40%	
V (75%-25%) =	0.24	m^3
a (50%) =	3.74	m^2
t (75%-25%) =	75.00	mins
SOIL INFILTRATION RATE =	**1.42E-05**	**m/s**



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Scheme	**Land off Bosworth Lane, Newbold Verdon**	**Page No.**	7
Client	**J S Bloor**	**Calcs by**	JM
Job ref.	**28945**	**Checked By**	DT
		Date	21.02.25

Soil Infiltration Test - Gravel Filled Method

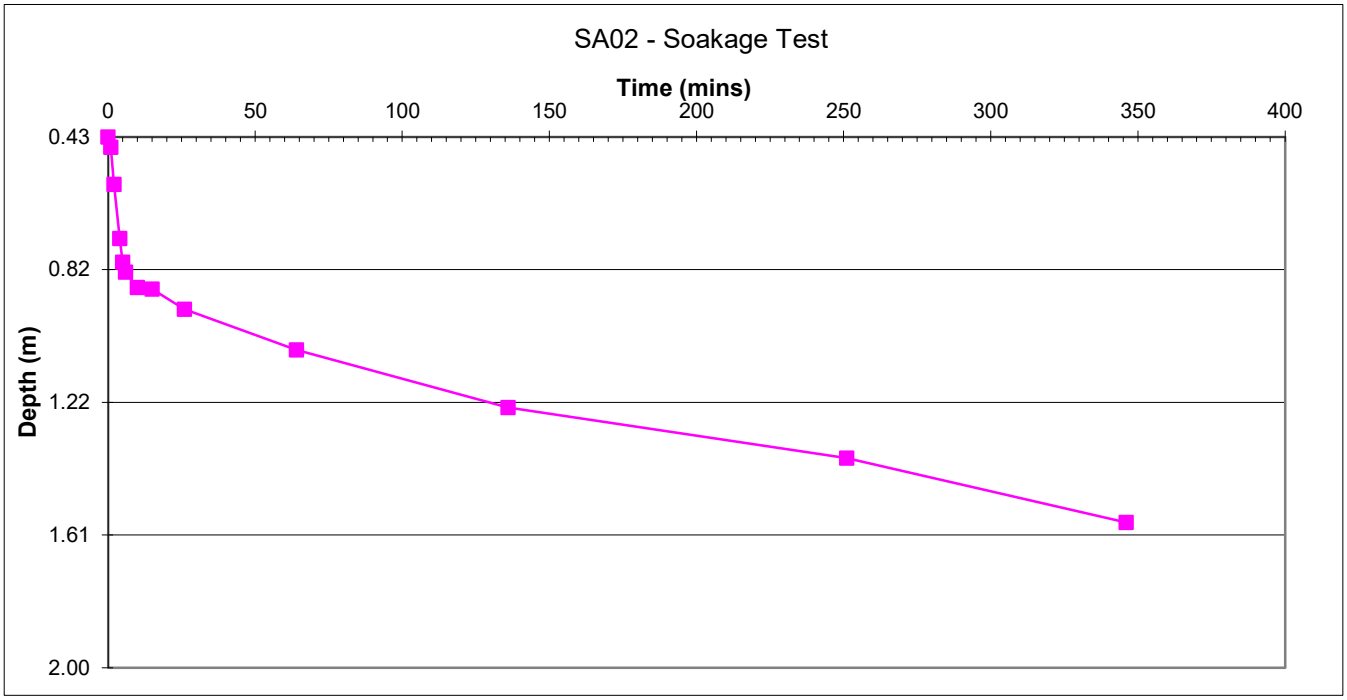
(In general accordance with BRE Digest 365, 2016, Soakaway Design)

Soakaway pit ref. **SA02** **Test** 1 (February)
Length **1.80** m
Width **0.60** m
Depth **2.00** m
Ground water level **Not encountered**
Ground conditions **0.00-0.30m** **Crop over dark brown, slightly sandy, silty clay TOPSOIL with gravel sized fragments of quartzite and sandstone.**
0.30-2.00m **Brown, clayey, slightly silty, very sandy, slightly cobbly, subangular to subrounded, fine to coarse GRAVEL comprising quartzite, sandstone, chert, and rare coal. Cobbles comprise subrounded quartzite and sandstone. (GLACIOFLUVIAL DEPOSITS).**

Time (mins)	Depth to water (m bgl)
0	0.43
1	0.46
2	0.57
4	0.73
5	0.80
6	0.83
10	0.88
15	0.88
26	0.94
64	1.06
136	1.23
251	1.38
346	1.57

Effective storage depth =	1.57	m
75% effective storage depth =	1.18	m
(ie depth below GL) =	0.82	m
25% effective storage depth =	0.39	m
(ie depth below GL) =	1.61	m
effective storage depth 75%-25% =	0.79	m
Time to fall to 75% effective depth =	5.5	mins
Time to fall to 25% effective depth =	n/a	mins
Void Ratio =	40%	
V (75%-25%) =	0.34	m^3
a (50%) =	4.85	m^2
t (75%-25%) =	n/a	

Insusfficient soakage recorded to calculate infiltration rate.



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Scheme	**Land off Bosworth Lane, Newbold Verdon**	**Page No.**	8
Client	**J S Bloor**	**Calcs by**	JM
Job ref.	**28945**	**Checked By**	DT
		Date	21.02.25

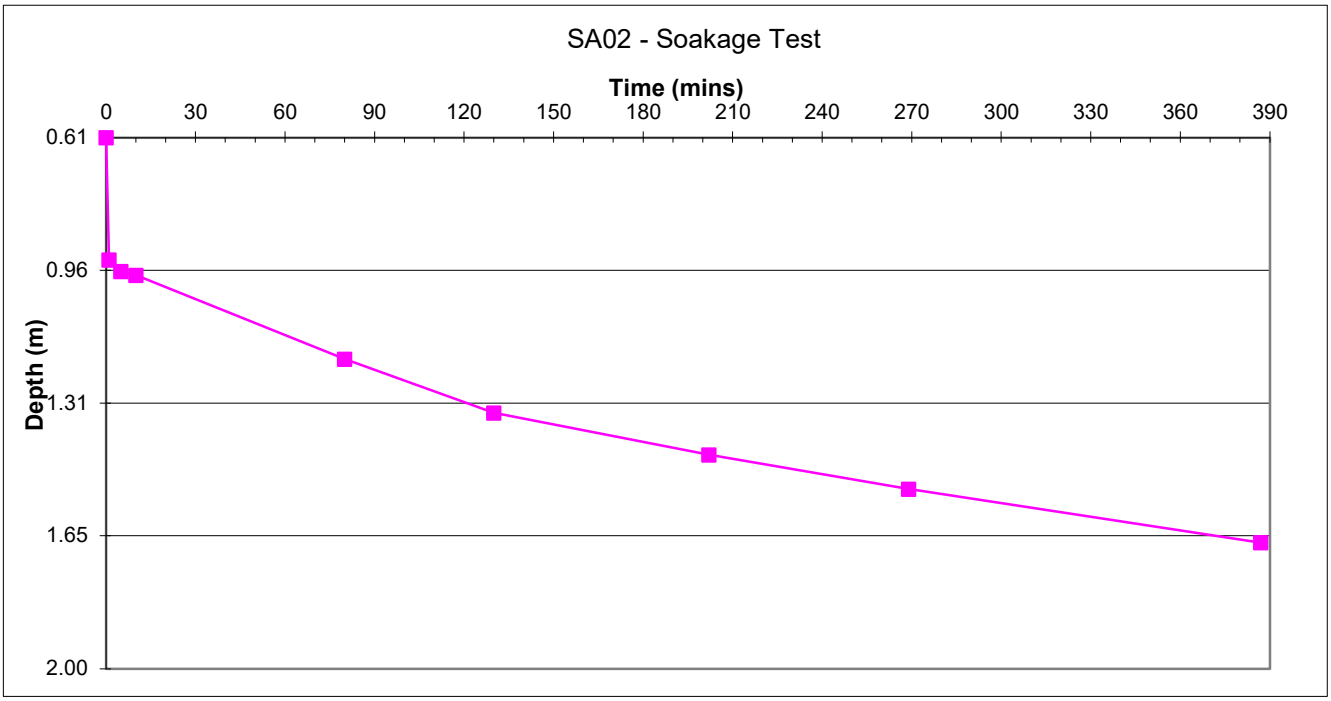
Soil Infiltration Test - Gravel Filled Method

(In general accordance with BRE Digest 365, 2016, Soakaway Design)

Soakaway pit ref. **SA02** **Test** 2 (February)
Length **1.80** m
Width **0.60** m
Depth **2.00** m
Ground water level **Not encountered**
Ground conditions **0.00-0.30m** **Crop over dark brown, slightly sandy, silty clay TOPSOIL with gravel sized fragments of quartzite and sandstone.**
0.30-2.00m **Brown, clayey, slightly silty, very sandy, slightly cobbly, subangular to subrounded, fine to coarse GRAVEL comprising quartzite, sandstone, chert, and rare coal. Cobbles comprise subrounded quartzite and sandstone. (GLACIOFLUVIAL DEPOSITS).**

Time (mins)	Depth to water (m bgl)
0	0.61
1	0.93
5	0.96
10	0.97
80	1.19
130	1.33
202	1.44
269	1.53
387	1.67

Effective storage depth =	1.39	m
75% effective storage depth =	1.04	m
(ie depth below GL) =	0.96	m
25% effective storage depth =	0.35	m
(ie depth below GL) =	1.65	m
effective storage depth 75%-25% =	0.70	m
Time to fall to 75% effective depth =	5	mins
Time to fall to 25% effective depth =	374	mins
Void Ratio =	40%	
V (75%-25%) =	0.30	m^3
a (50%) =	4.42	m^2
t (75%-25%) =	369.00	
SOIL INFILTRATION RATE =	**3.07E-06**	**m/s**



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Scheme	**Land off Bosworth Lane, Newbold Verdon**	**Page No.**	9
Client	**J S Bloor**	**Calcs by**	JM
Job ref.	**28945**	**Checked By**	DT
		Date	20.03.25

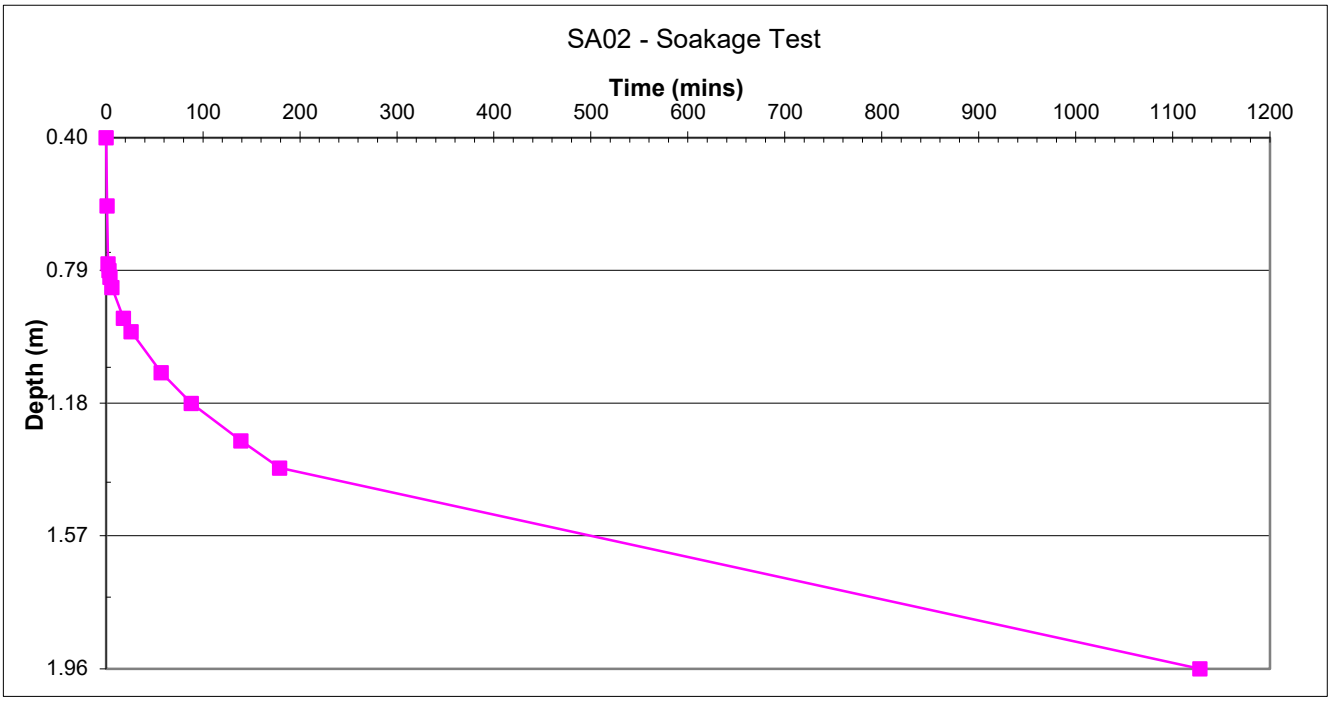
Soil Infiltration Test - Gravel Filled Method

(In general accordance with BRE Digest 365, 2016, Soakaway Design)

Soakaway pit ref. **SA02** **Test** 1 (March)
Length **1.80** m
Width **0.60** m
Depth **1.96** m
Ground water level **Not encountered**
Ground conditions **0.00-0.30m** **Crop over dark brown, slightly sandy, silty clay TOPSOIL with gravel sized fragments of quartzite and sandstone.**
0.30-2.00m **Brown, clayey, slightly silty, very sandy, slightly cobbly, subangular to subrounded, fine to coarse GRAVEL comprising quartzite, sandstone, chert, and rare coal. Cobbles comprise subrounded quartzite and sandstone. (GLACIOFLUVIAL DEPOSITS).**

Time (mins)	Depth to water (m bgl)
0	0.40
1	0.60
2	0.77
3	0.79
4	0.81
6	0.84
18	0.93
26	0.97
57	1.09
88	1.18
139	1.29
179	1.37
1128	1.96

Effective storage depth =	1.56	m
75% effective storage depth =	1.17	m
(ie depth below GL) =	0.79	m
25% effective storage depth =	0.39	m
(ie depth below GL) =	1.57	m
effective storage depth 75%-25% =	0.78	m
Time to fall to 75% effective depth =	3	mins
Time to fall to 25% effective depth =	504.2	mins
Void Ratio =	40%	
V (75%-25%) =	0.34	m^3
a (50%) =	4.82	m^2
t (75%-25%) =	501.20	
SOIL INFILTRATION RATE =	**2.32E-06**	**m/s**



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Scheme	**Land off Bosworth Lane, Newbold Verdon**	**Page No.**	10
Client	**J S Bloor**	**Calcs by**	RF
Job ref.	**28945**	**Checked By**	DT
		Date	20.03.25

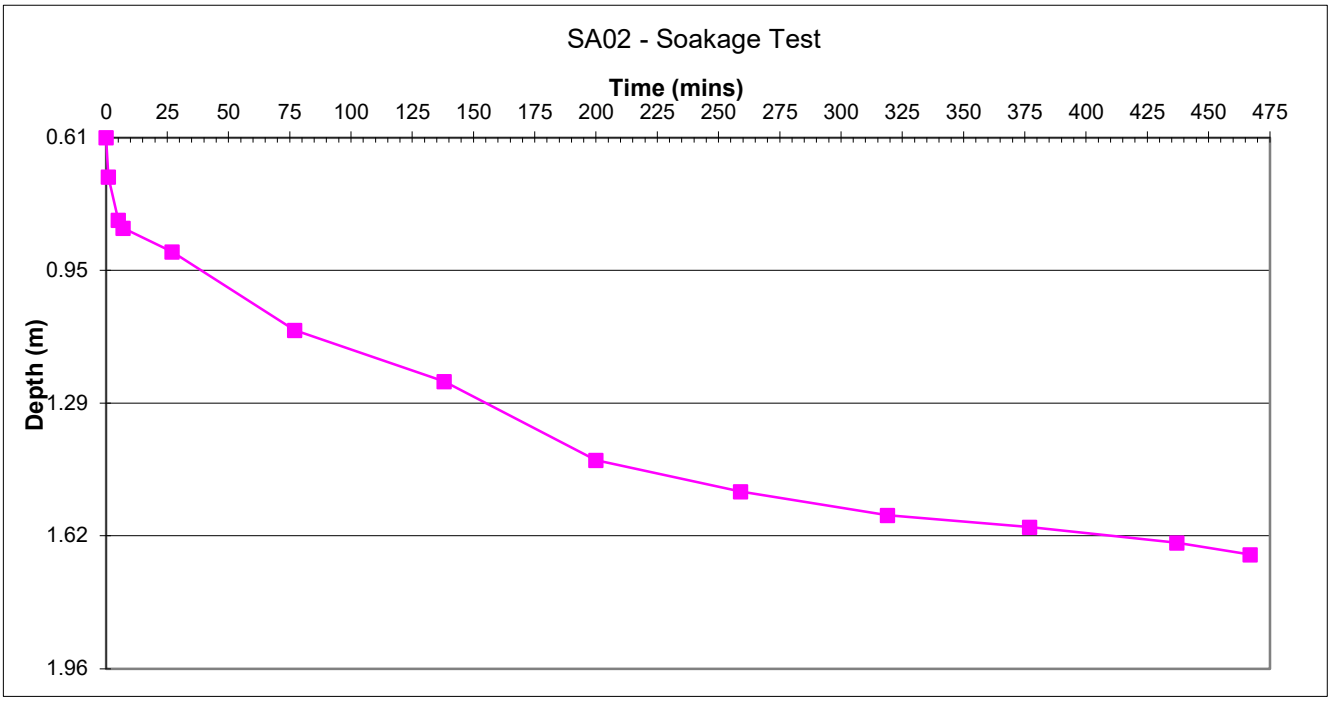
Soil Infiltration Test - Gravel Filled Method

(In general accordance with BRE Digest 365, 2016, Soakaway Design)

Soakaway pit ref. **SA02** **Test** 2 (March)
Length **1.80** m
Width **0.60** m
Depth **1.96** m
Ground water level **Not encountered**
Ground conditions **0.00-0.30m** **Crop over dark brown, slightly sandy, silty clay TOPSOIL with gravel sized fragments of quartzite and sandstone.**
0.30-2.00m **Brown, clayey, slightly silty, very sandy, slightly cobbly, subangular to subrounded, fine to coarse GRAVEL comprising quartzite, sandstone, chert, and rare coal. Cobbles comprise subrounded quartzite and sandstone. (GLACIOFLUVIAL DEPOSITS).**

Time (mins)	Depth to water (m bgl)
0	0.61
1	0.71
5	0.82
7	0.84
27	0.90
77	1.10
138	1.23
200	1.43
259	1.51
319	1.57
377	1.60
437	1.64
467	1.67

Effective storage depth =	1.35	m
75% effective storage depth =	1.01	m
(ie depth below GL) =	0.95	m
25% effective storage depth =	0.34	m
(ie depth below GL) =	1.62	m
effective storage depth 75%-25% =	0.68	m
Time to fall to 75% effective depth =	39	mins
Time to fall to 25% effective depth =	410	mins
Void Ratio =	40%	
V (75%-25%) =	0.29	m^3
a (50%) =	4.32	m^2
t (75%-25%) =	371.00	
SOIL INFILTRATION RATE =	**3.03E-06**	**m/s**



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Scheme	**Land off Bosworth Lane, Newbold Verdon**	**Page No.**	11
Client	**J S Bloor**	**Calcs by**	RF
Job ref.	**28945**	**Checked By**	DT
		Date	20.03.25

Soil Infiltration Test - Gravel Filled Method

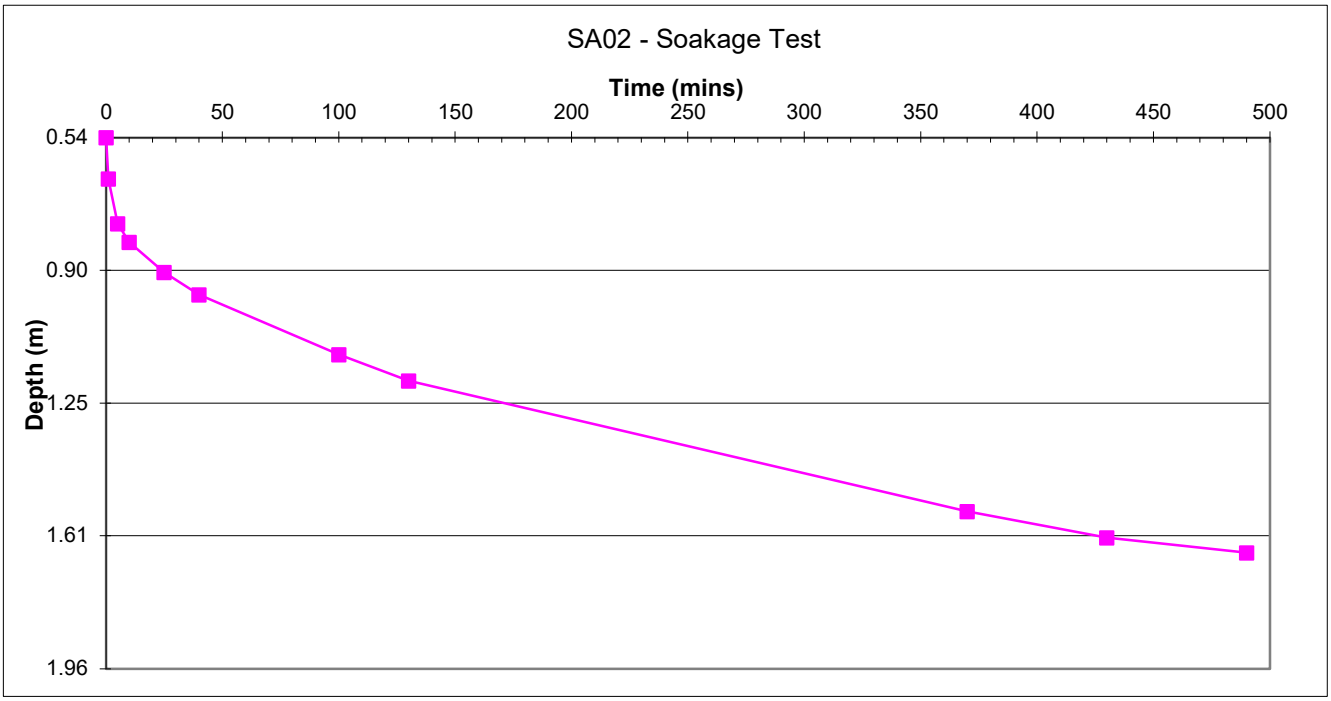
(In general accordance with BRE Digest 365, 2016, Soakaway Design)

Soakaway pit ref. **SA02** **Test** 3 (March)
Length **1.80** m
Width **0.60** m
Depth **1.96** m
Ground water level **Not encountered**
Ground conditions **0.00-0.30m** **Crop over dark brown, slightly sandy, silty clay TOPSOIL with gravel sized fragments of quartzite and sandstone.**
0.30-2.00m **Brown, clayey, slightly silty, very sandy, slightly cobbly, subangular to subrounded, fine to coarse GRAVEL comprising quartzite, sandstone, chert, and rare coal. Cobbles comprise subrounded quartzite and sandstone. (GLACIOFLUVIAL DEPOSITS).**

Time (mins)	Depth to water (m bgl)
0	0.54
1	0.65
5	0.77
10	0.82
25	0.90
40	0.96
100	1.12
130	1.19
370	1.54
430	1.61
490	1.65

Effective storage depth =	1.42	m
75% effective storage depth =	1.07	m
(ie depth below GL) =	0.90	m
25% effective storage depth =	0.36	m
(ie depth below GL) =	1.61	m
effective storage depth 75%-25% =	0.71	m
Time to fall to 75% effective depth =	25	mins
Time to fall to 25% effective depth =	430	mins
Void Ratio =	40%	
V (75%-25%) =	0.31	m^3
a (50%) =	4.49	m^2
t (75%-25%) =	405.00	

SOIL INFILTRATION RATE = 2.81E-06 m/s



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Scheme	**Land off Bosworth Lane, Newbold Verdon**	**Page No.**	12
Client	**J S Bloor**	**Calcs by**	JM
Job ref.	**28945**	**Checked By**	DT
		Date	21.02.25

Soil Infiltration Test - Gravel Filled Method

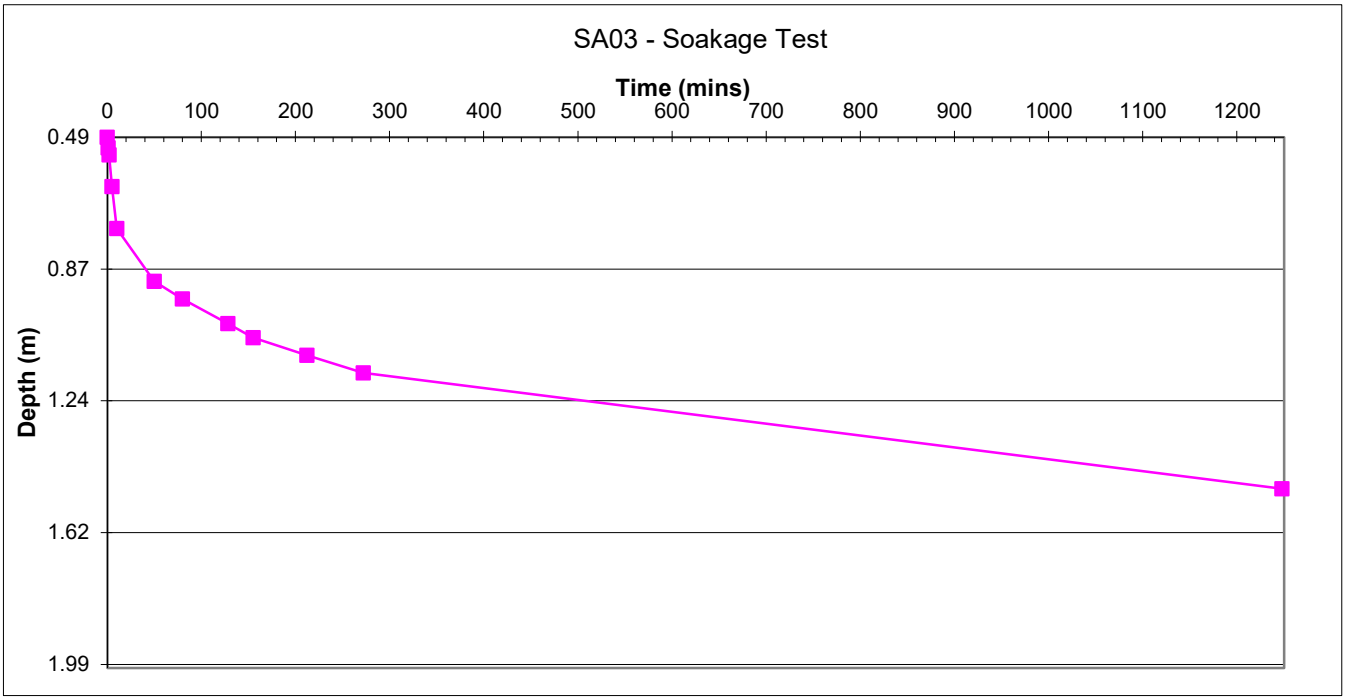
(In general accordance with BRE Digest 365, 2016, Soakaway Design)

Soakaway pit ref.	**SA03**	**Test** 1
Length	**1.80** m	
Width	**0.60** m	
Depth	**2.00** m	
Ground water level	**Not encountered**	
Ground conditions	**0.00-0.30m**	**Crop over dark brown, slightly sandy, silty clay TOPSOIL with gravel sized fragments of quartzite and sandstone.**
	0.30-2.00m	**Brown, clayey, slightly silty, very sandy, slightly cobbly, subangular to subrounded, fine to coarse GRAVEL comprising quartzite, sandstone, chert, and rare coal. Cobbles comprise subrounded quartzite and sandstone. (GLACIOFLUVIAL DEPOSITS).**

Time (mins)	Depth to water (m bgl)
0	0.49
1	0.52
2	0.54
5	0.63
10	0.75
50	0.90
80	0.95
128	1.02
155	1.06
212	1.11
272	1.16
1248	1.49

Effective storage depth =	1.51	m
75% effective storage depth =	1.13	m
(ie depth below GL) =	0.87	m
25% effective storage depth =	0.38	m
(ie depth below GL) =	1.62	m
effective storage depth 75%-25% =	0.76	m
Time to fall to 75% effective depth =	43	mins
Time to fall to 25% effective depth =	n/a	mins
Void Ratio =	40%	
V (75%-25%) =	0.33	m^3
a (50%) =	4.70	m^2
t (75%-25%) =	n/a	

Insusfficient soakage recorded to calculate infiltration rate.



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Scheme	**Land off Bosworth Lane, Newbold Verdon**	**Page No.**	13
Client	**J S Bloor**	**Calcs by**	JM
Job ref.	**28945**	**Checked By**	DT
		Date	21.02.25

Soil Infiltration Test - Gravel Filled Method

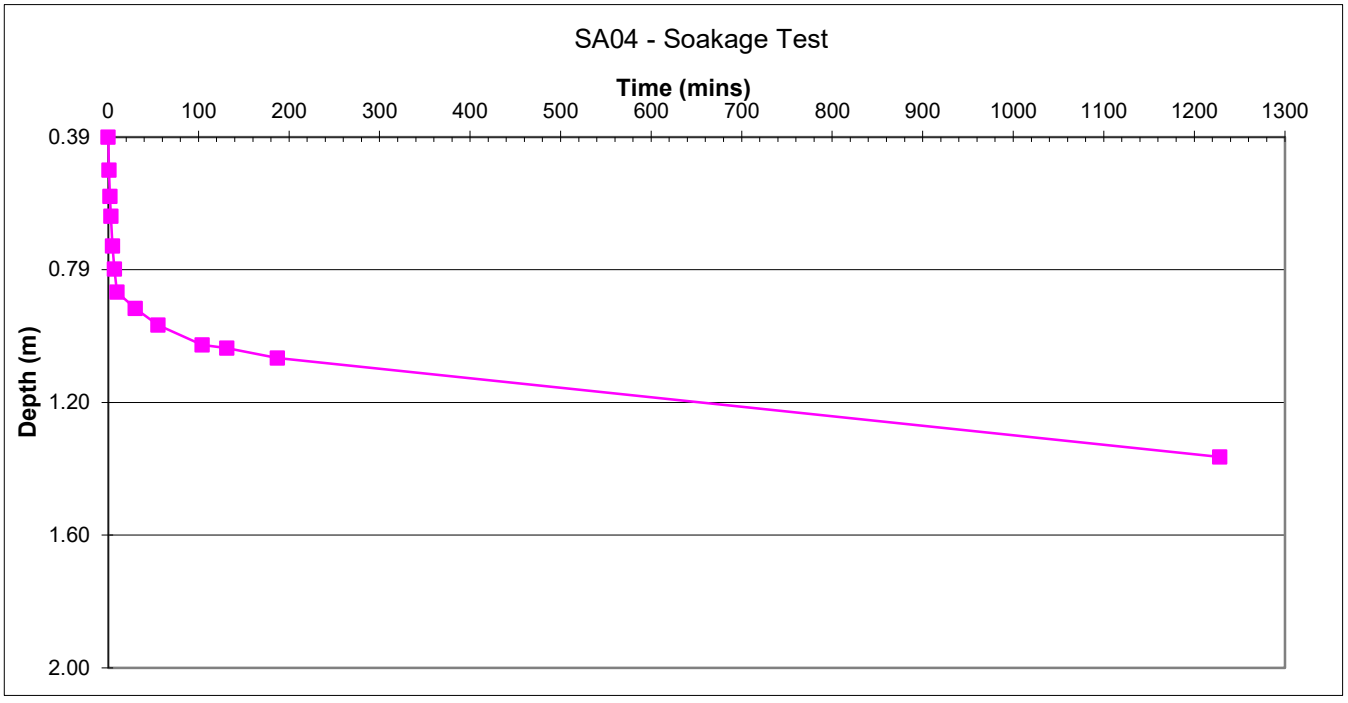
(In general accordance with BRE Digest 365, 2016, Soakaway Design)

Soakaway pit ref.	**SA04**	**Test** 1
Length	**1.80** m	
Width	**0.60** m	
Depth	**2.00** m	
Ground water level	**Not encountered**	
Ground conditions	**0.00-0.30m**	**Crop over dark brown, slightly sandy, silty clay TOPSOIL with gravel sized fragments of quartzite and sandstone.**
	0.30-2.00m	**Brown, clayey, slightly silty, very sandy, slightly cobbly, subangular to subrounded, fine to coarse GRAVEL comprising quartzite, sandstone, chert, and rare coal. Cobbles comprise subrounded quartzite and sandstone. (GLACIOFLUVIAL DEPOSITS).**

Time (mins)	Depth to water (m bgl)
0	0.39
1	0.49
2	0.57
3	0.63
5	0.72
7	0.79
10	0.86
30	0.91
55	0.96
104	1.02
131	1.03
187	1.06
1228	1.36

Effective storage depth =	1.61	m
75% effective storage depth =	1.21	m
(ie depth below GL) =	0.79	m
25% effective storage depth =	0.40	m
(ie depth below GL) =	1.60	m
effective storage depth 75%-25% =	0.81	m
Time to fall to 75% effective depth =	7	mins
Time to fall to 25% effective depth =	n/a	mins
Void Ratio =	40%	
V (75%-25%) =	0.35	m^3
a (50%) =	4.94	m^2
t (75%-25%) =	n/a	

Insusfficient soakage recorded to calculate infiltration rate.



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Scheme	**Land off Bosworth Lane, Newbold Verdon**	**Page No.**	14
Client	**J S Bloor**	**Calcs by**	JM
Job ref.	**28945**	**Checked By**	DT
		Date	20.03.25

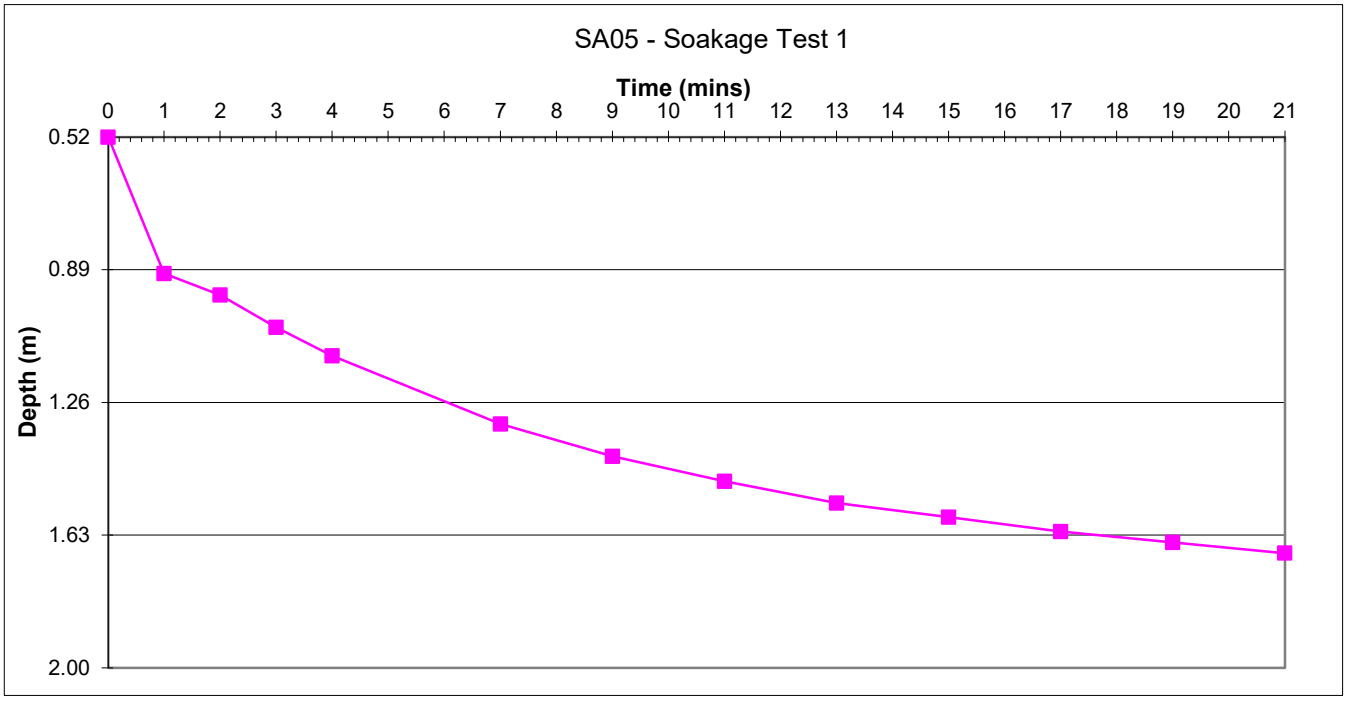
Soil Infiltration Test - Gravel Filled Method

(In general accordance with BRE Digest 365, 2016, Soakaway Design)

Soakaway pit ref.	**SA05**	**Test** 1
Length	**1.90** m	
Width	**0.60** m	
Depth	**2.00** m	
Ground water level	**Not encountered**	
Ground conditions	**0.00-0.40m**	**Crop over brown, slightly clayey, silty, sand TOPSOIL with gravel sized fragments of quartzite.**
	0.40-2.00m	**Reddish brown, slightly clayey, silty, very gravelly fine to medium SAND. Gravel comprises angular to subrounded, fine to coarse quartzite, flint and siltstone (GLACIOFLUVIAL DEPOSITS).**

Time (mins)	Depth to water (m bgl)
0	0.52
1	0.90
2	0.96
3	1.05
4	1.13
7	1.32
9	1.41
11	1.48
13	1.54
15	1.58
17	1.62
19	1.65
21	1.68

Effective storage depth =	1.48	m
75% effective storage depth =	1.11	m
(ie depth below GL) =	0.89	m
25% effective storage depth =	0.37	m
(ie depth below GL) =	1.63	m
effective storage depth 75%-25% =	0.74	m
Time to fall to 75% effective depth =	1	mins
Time to fall to 25% effective depth =	17.8	mins
Void Ratio =	40%	
V (75%-25%) =	0.34	m^3
a (50%) =	4.84	m^2
t (75%-25%) =	16.80	
SOIL INFILTRATION RATE =	**6.92E-05**	**m/s**



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Scheme	**Land off Bosworth Lane, Newbold Verdon**	**Page No.**	15
Client	**J S Bloor**	**Calcs by**	JM
Job ref.	**28945**	**Checked By**	DT
		Date	20.03.25

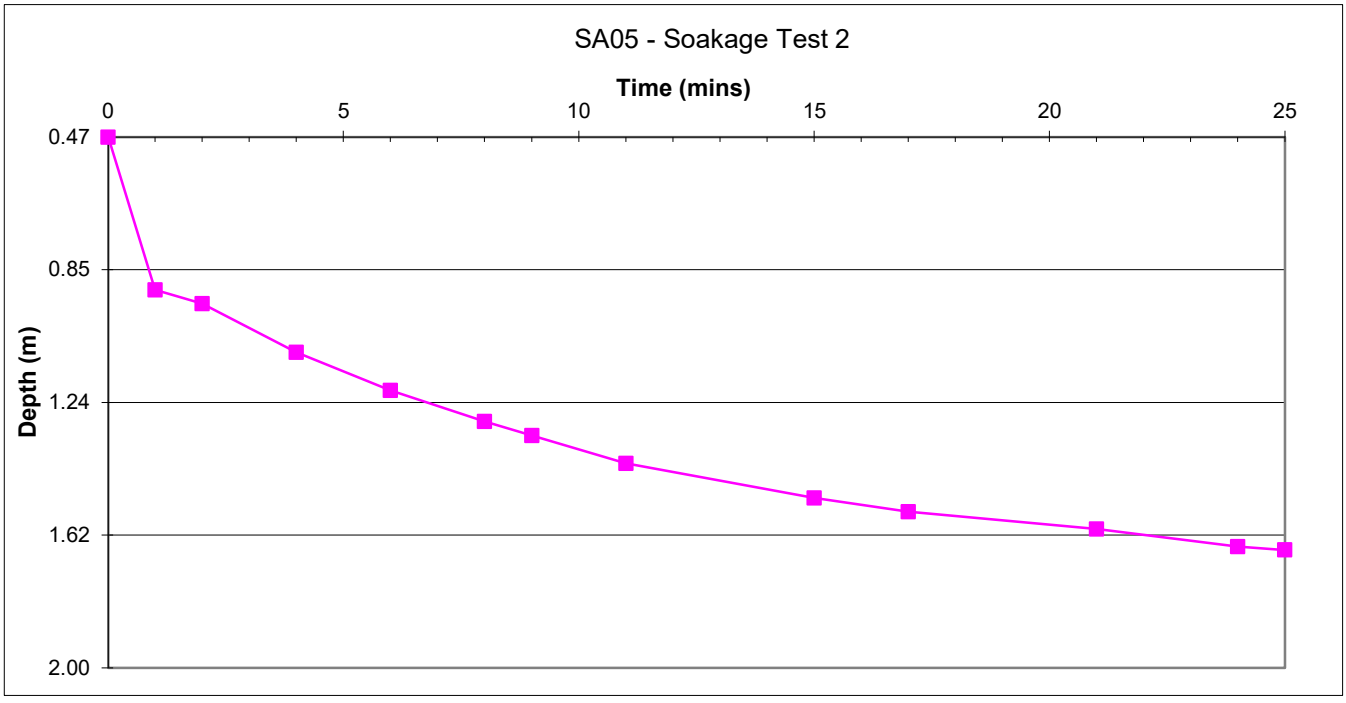
Soil Infiltration Test - Gravel Filled Method

(In general accordance with BRE Digest 365, 2016, Soakaway Design)

Soakaway pit ref.	**SA05**	**Test** 2
Length	**1.90** m	
Width	**0.60** m	
Depth	**2.00** m	
Ground water level	**Not encountered**	
Ground conditions	**0.00-0.40m**	**Crop over brown, slightly clayey, silty, sand TOPSOIL with gravel sized fragments of quartzite.**
	0.40-2.00m	**Reddish brown, slightly clayey, silty, very gravelly fine to medium SAND. Gravel comprises angular to subrounded, fine to coarse quartzite, flint and siltstone (GLACIOFLUVIAL DEPOSITS).**

Time (mins)	Depth to water (m bgl)
0	0.47
1	0.91
2	0.95
4	1.09
6	1.20
8	1.29
9	1.33
11	1.41
15	1.51
17	1.55
21	1.60
24	1.65
25	1.66

Effective storage depth =	1.53	m
75% effective storage depth =	1.15	m
(ie depth below GL) =	0.85	m
25% effective storage depth =	0.38	m
(ie depth below GL) =	1.62	m
effective storage depth 75%-25% =	0.77	m
Time to fall to 75% effective depth =	0.87	mins
Time to fall to 25% effective depth =	22	mins
Void Ratio =	40%	
V (75%-25%) =	0.35	m^3
a (50%) =	4.97	m^2
t (75%-25%) =	21.13	
SOIL INFILTRATION RATE =	**5.54E-05**	**m/s**



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Scheme	**Land off Bosworth Lane, Newbold Verdon**	**Page No.**	16
Client	**J S Bloor**	**Calcs by**	JM
Job ref.	**28945**	**Checked By**	DT
		Date	20.03.25

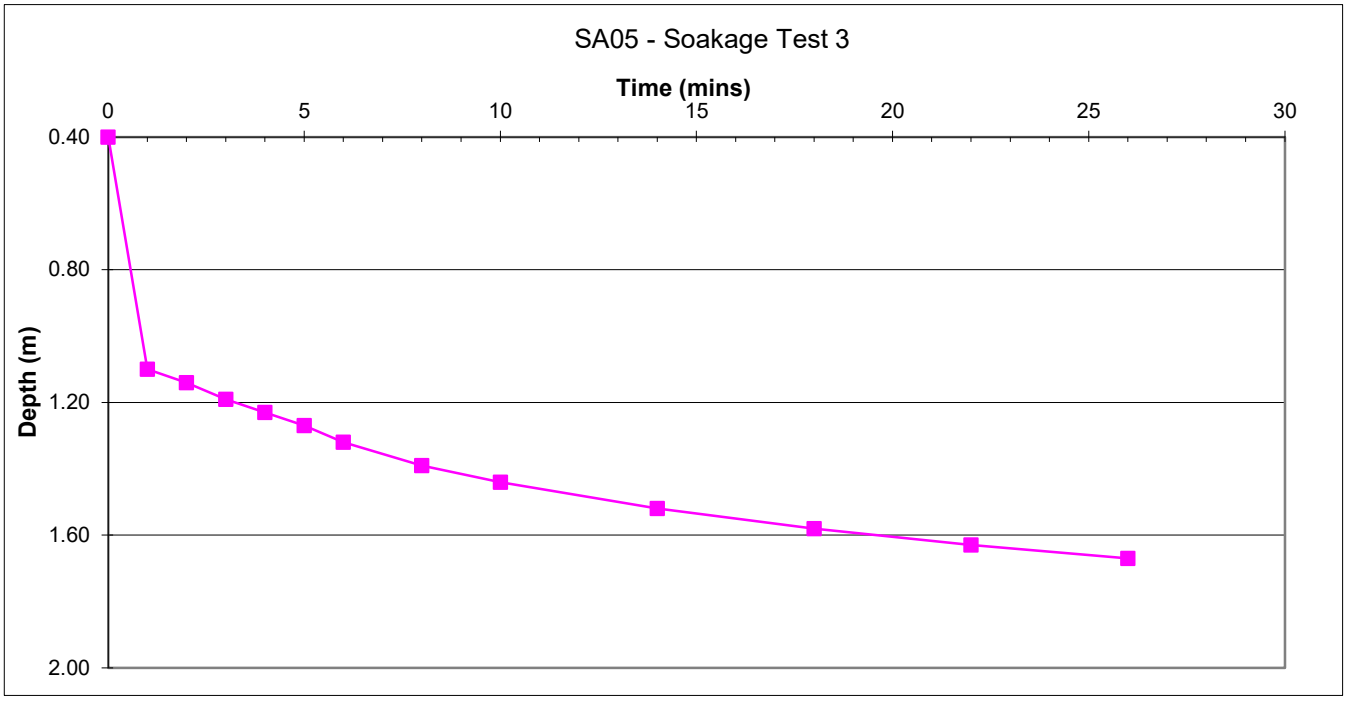
Soil Infiltration Test - Gravel Filled Method

(In general accordance with BRE Digest 365, 2016, Soakaway Design)

Soakaway pit ref.	**SA05**	**Test** 3
Length	**1.90** m	
Width	**0.60** m	
Depth	**2.00** m	
Ground water level	**Not encountered**	
Ground conditions	**0.00-0.40m**	**Crop over brown, slightly clayey, silty, sand TOPSOIL with gravel sized fragments of quartzite.**
	0.40-2.00m	**Reddish brown, slightly clayey, silty, very gravelly fine to medium SAND. Gravel comprises angular to subrounded, fine to coarse quartzite, flint and siltstone (GLACIOFLUVIAL DEPOSITS).**

Time (mins)	Depth to water (m bgl)
0	0.40
1	1.10
2	1.14
3	1.19
4	1.23
5	1.27
6	1.32
8	1.39
10	1.44
14	1.52
18	1.58
22	1.63
26	1.67

Effective storage depth =	1.60	m
75% effective storage depth =	1.20	m
(ie depth below GL) =	0.80	m
25% effective storage depth =	0.40	m
(ie depth below GL) =	1.60	m
effective storage depth 75%-25% =	0.80	m
Time to fall to 75% effective depth =	0.58	mins
Time to fall to 25% effective depth =	20	mins
Void Ratio =	40%	
V (75%-25%) =	0.36	m^3
a (50%) =	5.14	m^2
t (75%-25%) =	19.42	
SOIL INFILTRATION RATE =	**6.09E-05**	**m/s**



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Scheme	**Land off Bosworth Lane, Newbold Verdon**	**Page No.**	17
Client	**J S Bloor**	**Calcs by**	JM
Job ref.	**28945**	**Checked By**	DT
		Date	20.03.25

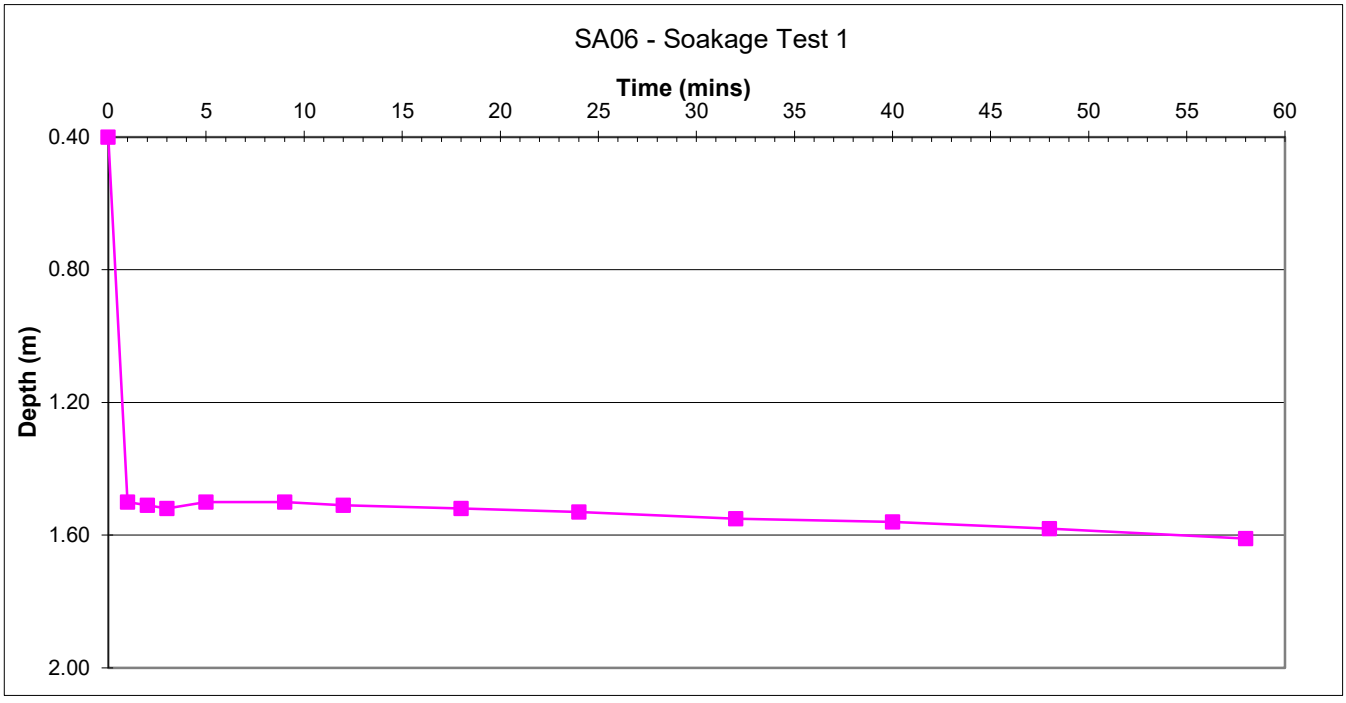
Soil Infiltration Test - Gravel Filled Method

(In general accordance with BRE Digest 365, 2016, Soakaway Design)

Soakaway pit ref. **SA06** **Test** 1
Length **2.00** m
Width **0.60** m
Depth **2.00** m
Ground water level **Not encountered**
Ground conditions **0.00-0.35m** **Crop over brown, slightly clayey, silty, sand TOPSOIL with gravel sized fragments of quartzite.**
0.35-2.00m **Orangish brown becoming reddish brown, slightly clayey, silty, very gravelly fine to medium SAND. Gravel comprises angular to subrounded, fine to coarse quartzite, flint and siltstone (GLACIOFLUVIAL DEPOSITS).**

Time (mins)	Depth to water (m bgl)
0	0.40
1	1.50
2	1.51
3	1.52
5	1.50
9	1.50
12	1.51
18	1.52
24	1.53
32	1.55
40	1.56
48	1.58
58	1.61

Effective storage depth =	1.60	m
75% effective storage depth =	1.20	m
(ie depth below GL) =	0.80	m
25% effective storage depth =	0.40	m
(ie depth below GL) =	1.60	m
effective storage depth 75%-25% =	0.80	m
Time to fall to 75% effective depth =	0.35	mins
Time to fall to 25% effective depth =	54.5	mins
Void Ratio =	40%	
V (75%-25%) =	0.38	m^3
a (50%) =	5.36	m^2
t (75%-25%) =	54.15	
SOIL INFILTRATION RATE =	**2.21E-05**	**m/s**



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Scheme	**Land off Bosworth Lane, Newbold Verdon**	**Page No.**	18
Client	**J S Bloor**	**Calcs by**	JM
Job ref.	**28945**	**Checked By**	DT
		Date	20.03.25

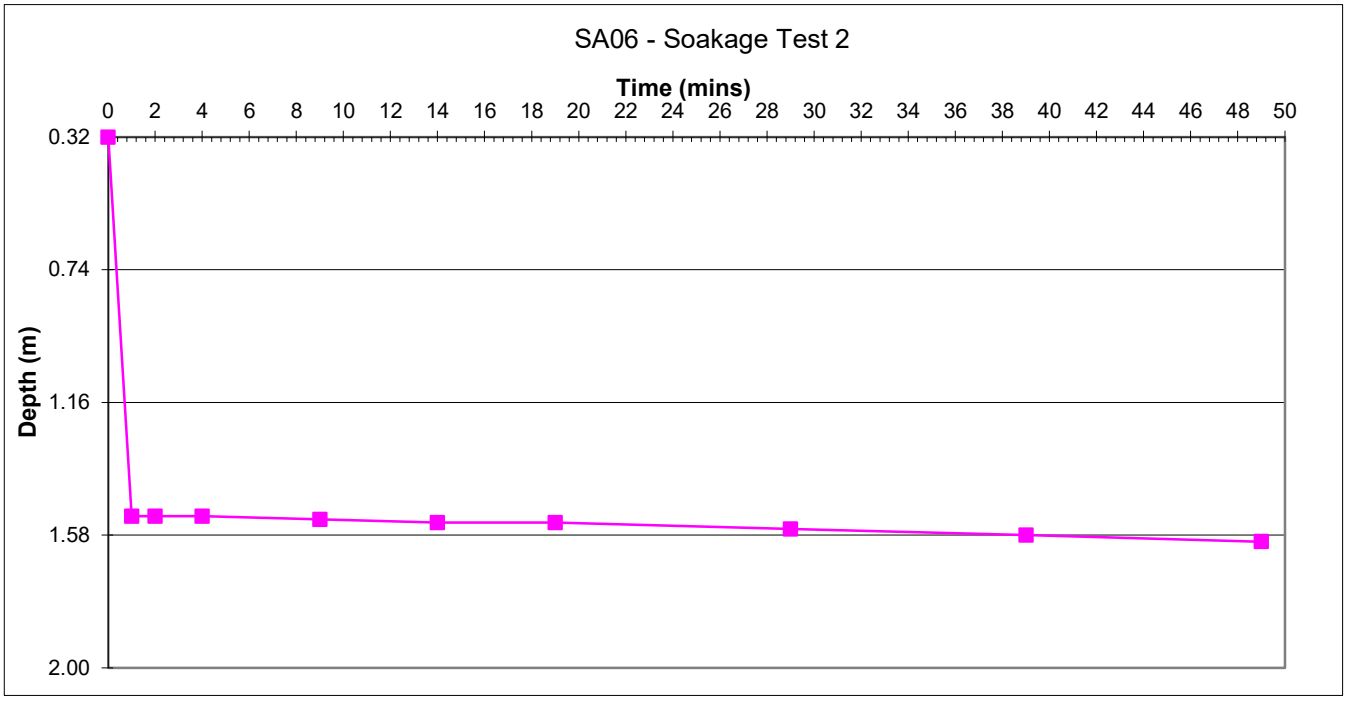
Soil Infiltration Test - Gravel Filled Method

(In general accordance with BRE Digest 365, 2016, Soakaway Design)

Soakaway pit ref.	**SA06**	**Test** 2
Length	**2.00** m	
Width	**0.60** m	
Depth	**2.00** m	
Ground water level	**Not encountered**	
Ground conditions	**0.00-0.35m**	**Crop over brown, slightly clayey, silty, sand TOPSOIL with gravel sized fragments of quartzite.**
	0.35-2.00m	**Orangish brown becoming reddish brown, slightly clayey, silty, very gravelly fine to medium SAND. Gravel comprises angular to subrounded, fine to coarse quartzite, flint and siltstone (GLACIOFLUVIAL DEPOSITS).**

Time (mins)	Depth to water (m bgl)
0	0.32
1	1.52
2	1.52
4	1.52
9	1.53
14	1.54
19	1.54
29	1.56
39	1.58
49	1.60

Effective storage depth =	1.68	m
75% effective storage depth =	1.26	m
(ie depth below GL) =	0.74	m
25% effective storage depth =	0.42	m
(ie depth below GL) =	1.58	m
effective storage depth 75%-25% =	0.84	m
Time to fall to 75% effective depth =	0.3	mins
Time to fall to 25% effective depth =	39	mins
Void Ratio =	40%	
V (75%-25%) =	0.40	m^3
a (50%) =	5.57	m^2
t (75%-25%) =	38.70	
SOIL INFILTRATION RATE =	**3.12E-05**	**m/s**



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Exploratory Hole ID: SA01

Sheet 1 of 1

Project:	Land off Bosworth Lane	Project No. 28945	Start Date: 20/02/2025	End Date: 20/02/2025	Plant Used: JCB 3CX
Location:	Newbold Verdon	Logged By: JM	Easting and Northing Co-ordinates: 444064.71 304087.60		Elevation (m AOD): 133.10
Client:	J S Bloor	Approved By: DT			

Strata Description	Legend	Depth (m)	Level (m AOD)	Samples Type	Samples Depth	Tests	Groundwater (m)
Crop over dark brown, slightly sandy, silty clay TOPSOIL with gravel sized fragments of quartzite and sandstone.		0.30	132.80				
Reddish brown, sandy, slightly gravelly, slightly cobbly, silty CLAY. Gravels comprise subangular to subrounded, fine to coarse quartzite and sandstone. Cobbles comprise subrounded quartzite and sandstone. OADBY MEMBER.		1.10	132.00				
Brown, clayey, slightly silty, very sandy, slightly cobbly, subangular to subrounded, fine to coarse GRAVEL comprising quartzite, chert, sandstone, and rare coal. Cobbles comprise subrounded quartzite and sandstone. GLACIOFLUVIAL DEPOSITS		2.00	131.10				
End of Trial Pit							

Remarks:

Exploratory hole location scanned with Cable Avoidance Tool and Signal Generator.
Descriptions based on visual inspection by a Geo-environmental engineer.
Groundwater was not encountered.
Visual or olfactory evidence of contamination was not observed.
Soil infiltration rate testing completed at location.
Co-ordinates and elevations estimated from the topographical survey.

Stability: Stable

Dimensions:

Length: 1.80m
Width: 0.60m
Depth: 2.00m

Key:

B - Bulk Sample
D - Disturbed Sample
ES - Environmental Sample
W - Water Sample
PID - PID Reading
HSV - Hand Shear Vane Reading

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Exploratory Hole ID:	SA02
	Sheet 1 of 1

Project:	Land off Bosworth Lane	Project No. 28945	Start Date: 20/02/2025	End Date: 20/02/2025	Plant Used: JCB 3CX
Location:	Newbold Verdon	Logged By: JM	Easting and Northing Co-ordinates: 444127.44 304043.69		Elevation (m AOD): 132.44
Client:	J S Bloor	Approved By: DT			

Strata Description	Legend	Depth (m)	Level (m AOD)	Samples Type	Samples Depth	Tests	Groundwater (m)
Crop over dark brown, slightly sandy, silty clay TOPSOIL with gravel sized fragments of quartzite and sandstone.		0.30	132.14				
Brown, clayey, slightly silty, very sandy, slightly cobbly, subangular to subrounded, fine to coarse GRAVEL comprising quartzite, chert, sandstone, and rare coal. Cobbles comprise subrounded quartzite and sandstone. GLACIOFLUVIAL DEPOSITS							
End of Trial Pit		2.00	130.44				

Remarks:

Exploratory hole location scanned with Cable Avoidance Tool and Signal Generator.
Descriptions based on visual inspection by a Geo-environmental engineer.
Groundwater was not encountered.
Visual or olfactory evidence of contamination was not observed.
Soil infiltration rate testing completed at location.
Co-ordinates and elevations estimated from the topographical survey.

Stability: Stable

Dimensions:

Length: 1.80m
Width: 0.60m
Depth: 2.00m

Key:

B - Bulk Sample
D - Disturbed Sample
ES - Environmental Sample
W - Water Sample
PID - PID Reading
HSV - Hand Shear Vane Reading

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Exploratory Hole ID:	SA03
	Sheet 1 of 1

Project:	Land off Bosworth Lane	Project No. 28945	Start Date: 20/02/2025	End Date: 20/02/2025	Plant Used: JCB 3CX
Location:	Newbold Verdon	Logged By: JM	Easting and Northing Co-ordinates: 444278.51 304034.23		Elevation (m AOD): 132.55
Client:	J S Bloor	Approved By: DT			

Strata Description	Legend	Depth (m)	Level (m AOD)	Samples Type	Samples Depth	Tests	Groundwater (m)
Crop over dark brown, slightly sandy, silty clay TOPSOIL with gravel sized fragments of quartzite and sandstone.		0.30	132.25				
Brown, clayey, slightly silty, very sandy, slightly cobbly, subangular to subrounded, fine to coarse GRAVEL comprising quartzite, chert, sandstone, and rare coal. Cobbles comprise subrounded quartzite and sandstone. GLACIOFLUVIAL DEPOSITS							
End of Trial Pit		2.00	130.55				

Remarks:

Exploratory hole location scanned with Cable Avoidance Tool and Signal Generator.
Descriptions based on visual inspection by a Geo-environmental engineer.
Groundwater was not encountered.
Visual or olfactory evidence of contamination was not observed.
Soil infiltration rate testing completed at location.
Co-ordinates and elevations estimated from the topographical survey.

Stability: Stable

Dimensions:

Length: 1.80m
Width: 0.60m
Depth: 2.00m

Key:

B - Bulk Sample
D - Disturbed Sample
ES - Environmental Sample
W - Water Sample
PID - PID Reading
HSV - Hand Shear Vane Reading

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Exploratory Hole ID:	SA04
	Sheet 1 of 1

Project:	Land off Bosworth Lane	Project No. 28945	Start Date: 20/02/2025	End Date: 20/02/2025	Plant Used: JCB 3CX
Location:	Newbold Verdon	Logged By: JM	Easting and Northing Co-ordinates: 444364.12 304036.77		Elevation (m AOD): 132.50
Client:	J S Bloor	Approved By: DT			

Strata Description	Legend	Depth (m)	Level (m AOD)	Samples Type	Samples Depth	Tests	Groundwater (m)
Crop over dark brown, slightly sandy, silty clay TOPSOIL with gravel sized fragments of quartzite and sandstone.		0.30	132.20				
Brown, clayey, slightly silty, very sandy, slightly cobbly, subangular to subrounded, fine to coarse GRAVEL comprising quartzite, chert, sandstone, and rare coal. Cobbles comprise subrounded quartzite and sandstone. GLACIOFLUVIAL DEPOSITS							
End of Trial Pit		2.00	130.50				

Remarks:

Exploratory hole location scanned with Cable Avoidance Tool and Signal Generator.
Descriptions based on visual inspection by a Geo-environmental engineer.
Groundwater was not encountered.
Visual or olfactory evidence of contamination was not observed.
Soil infiltration rate testing completed at location.
Co-ordinates and elevations estimated from the topographical survey.

Stability: Stable

Dimensions:

Length: 1.80m
Width: 0.60m
Depth: 2.00m

Key:

B - Bulk Sample
D - Disturbed Sample
ES - Environmental Sample
W - Water Sample
PID - PID Reading
HSV - Hand Shear Vane Reading

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Exploratory Hole ID:	SA05
	Sheet 1 of 1

Project:	Land off Bosworth Lane	Project No. 28945	Start Date: 17/03/2025	End Date: 17/03/2025	Plant Used: JCB 3CX
Location:	Newbold Verdon	Logged By: DW	Easting and Northing Co-ordinates: 444036.17 304112.29		Elevation (m AOD): 133.46
Client:	J S Bloor	Approved By: DT			

Strata Description	Legend	Depth (m)	Level (m AOD)	Samples Type	Samples Depth	Tests	Groundwater (m)
Crop over dark brown, slightly clayey silty sand TOPSOIL with gravel sized fragments of quartzite.		0.40	133.06				
Reddish brown, slightly clayey, silty, very gravelly fine to medium SAND. Gravels comprise angular to subrounded, fined to coarse, quartzite, flint, and siltstone. GLACIOFLUVIAL DEPOSITS							
End of Trial Pit		2.00	131.46				

Remarks:

Exploratory hole location scanned with Cable Avoidance Tool and Signal Generator.
Descriptions based on visual inspection by a Geo-environmental engineer.
Groundwater was not encountered.
Visual or olfactory evidence of contamination was not observed.
Co-ordinates and elevations estimated from the topographical survey.

Stability: Stable

Dimensions:

Length: 2.00m
Width: 0.60m
Depth: 2.00m

Key:

B - Bulk Sample
D - Disturbed Sample
ES - Environmental Sample
W - Water Sample
PID - PID Reading
HSV - Hand Shear Vane Reading

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Exploratory Hole ID:	SA06
	Sheet 1 of 1

Project:	Land off Bosworth Lane	Project No. 28945	Start Date: 17/03/2025	End Date: 17/03/2025	Plant Used: JCB 3CX
Location:	Newbold Verdon	Logged By: DW	Easting and Northing Co-ordinates: 444116.72 304054.65		Elevation (m AOD): 132.44
Client:	J S Bloor	Approved By: DT			

Strata Description	Legend	Depth (m)	Level (m AOD)	Samples Type	Samples Depth	Tests	Groundwater (m)
Crop over dark brown, slightly clayey silty sand TOPSOIL with gravel sized fragments of quartzite.							
		0.35	132.09				
Orangish brown becoming reddish brown, slightly clayey, silty, very gravelly fine to medium SAND. Gravels comprise angular to subrounded, fined to coarse, quartzite, flint, and siltstone. GLACIOFLUVIAL DEPOSITS							
End of Trial Pit		2.00	130.44				

Remarks:

Exploratory hole location scanned with Cable Avoidance Tool and Signal Generator.
Descriptions based on visual inspection by a Geo-environmental engineer.
Groundwater was not encountered.
Visual or olfactory evidence of contamination was not observed.
Co-ordinates and elevations estimated from the topographical survey.

Stability: Stable.

Dimensions:

Length: 2.00m
Width: 0.60m
Depth: 2.00m

Key:

B - Bulk Sample
D - Disturbed Sample
ES - Environmental Sample
W - Water Sample
PID - PID Reading
HSV - Hand Shear Vane Reading

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Exploratory Hole ID: **TP01**

Sheet 1 of 1

Project:	Land off Bosworth Lane	Project No. 28945	Start Date: 20/02/2025	End Date: 20/02/2025	Plant Used: JCB 3CX
Location:	Newbold Verdon	Logged By: JM	Easting and Northing Co-ordinates: 444097.74 304067.56		Elevation (m AOD): 132.70
Client:	J S Bloor	Approved By: DT			

Strata Description	Legend	Depth (m)	Level (m AOD)	Samples Type	Samples Depth	Tests	Groundwater (m)
Crop over dark brown, slightly sandy, silty clay TOPSOIL with gravel sized fragments of quartzite and sandstone.		0.30	132.40				
Reddish brown, sandy, slightly gravelly, slightly cobbly, silty CLAY. Gravels comprise subangular to subrounded, fine to coarse quartzite, chert, and sandstone. Cobbles comprise subrounded quartzite and sandstone. OADBY MEMBER.		0.80	131.90				
Brown, clayey, slightly silty, very sandy, slightly cobbly, subangular to subrounded, fine to coarse GRAVEL comprising quartzite, chert, sandstone, and rare coal. Cobbles comprise subrounded quartzite and sandstone. GLACIOFLUVIAL DEPOSITS		1.80	130.90				
Brown, clayey, slightly silty, gravelly, slightly cobbly SAND. Gravels comprise subangular to subrounded, fine to coarse quartzite, chert, and sandstone. GLACIOFLUVIAL DEPOSITS		2.60	130.10				
Brown, clayey, slightly silty, very sandy, slightly cobbly, subangular to subrounded, fine to coarse GRAVEL comprising quartzite, chert and sandstone, and rare coal. Cobbles comprise subrounded quartzite and sandstone. GLACIOFLUVIAL DEPOSITS		3.20	129.50				
End of Trial Pit							

Remarks:

Exploratory hole location scanned with Cable Avoidance Tool and Signal Generator.
Descriptions based on visual inspection by a Geo-environmental engineer.
Groundwater was not encountered.
Visual or olfactory evidence of contamination was not observed.
Co-ordinates and elevations estimated from the topographical survey.

Stability: Stable.

Dimensions:

Length: 2.50m
Width: 0.60m
Depth: 3.20m

Key:

B - Bulk Sample
D - Disturbed Sample
ES - Environmental Sample
W - Water Sample
PID - PID Reading
HSV - Hand Shear Vane Reading

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TP02

Sheet 1 of 1

Exploratory Hole ID:

Project:	Land off Bosworth Lane	Project No. 28945	Start Date: 20/02/2025	End Date: 20/02/2025	Plant Used: JCB 3CX
Location:	Newbold Verdon	Logged By: JM	Easting and Northing Co-ordinates: 444188.80 304066.03		Elevation (m AOD): 132.60
Client:	J S Bloor	Approved By: DT			

Strata Description	Legend	Depth (m)	Level (m AOD)	Samples Type	Samples Depth	Tests	Groundwater (m)
Crop over dark brown, slightly sandy, silty clay TOPSOIL with gravel sized fragments of quartzite and sandstone.		0.30	132.30				
Brown, clayey, slightly silty, very sandy, slightly cobbly, subangular to subrounded, fine to coarse GRAVEL comprising quartzite, chert, sandstone, and rare coal. Cobbles comprise subrounded quartzite and sandstone. GLACIOFLUVIAL DEPOSITS							
End of Trial Pit		3.40	129.20				

Remarks:

Exploratory hole location scanned with Cable Avoidance Tool and Signal Generator.
Descriptions based on visual inspection by a Geo-environmental engineer.
Groundwater was not encountered.
Visual or olfactory evidence of contamination was not observed.
Co-ordinates and elevations estimated from the topographical survey.

Stability: Stable

Dimensions:

Length: 2.50m
Width: 0.60m
Depth: 3.40m

Key:

B - Bulk Sample
D - Disturbed Sample
ES - Environmental Sample
W - Water Sample
PID - PID Reading
HSV - Hand Shear Vane Reading

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Exploratory Hole ID:	TP03
	Sheet 1 of 1

Project:	Land off Bosworth Lane	Project No. 28945	Start Date: 20/02/2025	End Date: 20/02/2025	Plant Used: JCB 3CX
Location:	Newbold Verdon	Logged By: JM	Easting and Northing Co-ordinates: 444121.58 304125.28		Elevation (m AOD): 133.70
Client:	J S Bloor	Approved By: DT			

Strata Description	Legend	Depth (m)	Level (m AOD)	Samples Type	Samples Depth	Tests	Groundwater (m)
Crop over dark brown, slightly sandy, silty clay TOPSOIL with gravel sized fragments of quartzite and sandstone.		0.30	133.40				
Reddish brown, sandy, slightly gravelly, slightly cobbly, silty CLAY. Gravels comprise subangular to subrounded, fine to coarse quartzite and sandstone. Cobbles comprise subrounded quartzite and sandstone. OADBY MEMBER.		1.05	132.65				
Brown, clayey, slightly silty, very sandy, slightly cobbly, subangular to subrounded, fine to coarse GRAVEL comprising quartzite, chert, sandstone, and rare coal. Cobbles comprise subrounded quartzite and sandstone. GLACIOFLUVIAL DEPOSITS							
End of Trial Pit		3.20	130.50				

Remarks:

Exploratory hole location scanned with Cable Avoidance Tool and Signal Generator.
Descriptions based on visual inspection by a Geo-environmental engineer.
Groundwater was not encountered.
Visual or olfactory evidence of contamination was not observed.
Co-ordinates and elevations estimated from the topographical survey.

Stability: Stable

Dimensions:

Length: 2.50m
Width: 0.60m
Depth: 3.20m

Key:

B - Bulk Sample
D - Disturbed Sample
ES - Environmental Sample
W - Water Sample
PID - PID Reading
HSV - Hand Shear Vane Reading

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Exploratory Hole ID: **TP04**

Sheet 1 of 1

Project:	Land off Bosworth Lane	Project No. 28945	Start Date: 20/02/2025	End Date: 20/02/2025	Plant Used: JCB 3CX
Location:	Newbold Verdon	Logged By: JM	Easting and Northing Co-ordinates: 444219.39 304186.79		Elevation (m AOD): 134.40
Client:	J S Bloor	Approved By: DT			

Strata Description	Legend	Depth (m)	Level (m AOD)	Samples Type	Samples Depth	Tests	Groundwater (m)
Crop over dark brown, slightly sandy, silty clay TOPSOIL with gravel sized fragments of quartzite and sandstone.		0.30	134.10				
Reddish brown, sandy, slightly gravelly, slightly cobbly, silty CLAY. Gravels comprise subangular to subrounded, fine to coarse quartzite and sandstone. Cobbles comprise subrounded quartzite and sandstone. OADBY MEMBER.		0.90	133.50				
Brown, clayey, slightly silty, very sandy, slightly cobbly, subangular to subrounded, fine to coarse GRAVEL comprising quartzite, chert, sandstone, and rare coal. Cobbles comprise subrounded quartzite and sandstone. GLACIOFLUVIAL DEPOSITS							
End of Trial Pit		3.00	131.40				

Remarks:

Exploratory hole location scanned with Cable Avoidance Tool and Signal Generator.
Descriptions based on visual inspection by a Geo-environmental engineer.
Groundwater was not encountered.
Visual or olfactory evidence of contamination was not observed.
Co-ordinates and elevations estimated from the topographical survey.

Stability: Stable

Dimensions:

Length: 2.50m
Width: 0.60m
Depth: 3.00m

Key:

B - Bulk Sample
D - Disturbed Sample
ES - Environmental Sample
W - Water Sample
PID - PID Reading
HSV - Hand Shear Vane Reading

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Exploratory Hole ID: **TP05**

Sheet 1 of 1

Project:	Land off Bosworth Lane	Project No. 28945	Start Date: 20/02/2025	End Date: 20/02/2025	Plant Used: JCB 3CX
Location:	Newbold Verdon	Logged By: JM	Easting and Northing Co-ordinates: 444269.61 304121.51		Elevation (m AOD): 133.20
Client:	J S Bloor	Approved By: DT			

Strata Description	Legend	Depth (m)	Level (m AOD)	Samples Type	Samples Depth	Tests	Groundwater (m)
Crop over dark brown, slightly sandy, silty clay TOPSOIL with gravel sized fragments of quartzite and sandstone.							
		0.30	132.90				
Brown, clayey, slightly silty, very sandy, slightly cobbly, subangular to subrounded, fine to coarse GRAVEL comprising quartzite, chert, sandstone, and rare coal. Cobbles comprise subrounded quartzite and sandstone. GLACIOFLUVIAL DEPOSITS							
End of Trial Pit		3.00	130.20				

Remarks:

Exploratory hole location scanned with Cable Avoidance Tool and Signal Generator.
Descriptions based on visual inspection by a Geo-environmental engineer.
Groundwater was not encountered.
Visual or olfactory evidence of contamination was not observed.

Stability: Stable

Dimensions:

Length: 2.50m
Width: 0.60m
Depth: 3.00m

Key:

B - Bulk Sample
D - Disturbed Sample
ES - Environmental Sample
W - Water Sample
PID - PID Reading
HSV - Hand Shear Vane Reading

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APPENDICES

APPENDIX F

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Doc. Ref.	28945-CALC-0101
Sheet	1 of 5
Engineer	Z. Jordan
Date	25 Apr 25
Revision	A

DESIGN CALCULATIONS FRONT SHEET

SCHEME	Land off Bosworth Lane, Newbold Verdon
CLIENT	J S Bloor
ASPECTS OF SCHEME TO BE DESIGNED	Surface water attenuation design and simulation results for the 50%AEP, 3.3%AEP35CC and 1%AEP40CC event for the development site.
CODES OF PRACTICE, DESIGN SPECIFICATIONS & BRITISH STANDARDS	• Design and analysis of urban storm drainage. Wallingford Procedure Vol.1 • Sustainable Drainage Systems- Non-Statutory technical standards for Sustainable drainage systems- 2015 • The SuDS Manual – CIRIA C753
NOTES	Soil Infiltration Rate Testing was completed in February 2025 in four locations and supplementary testing was completed in March 2025 including repeat tests within SA02 and two additional locations. The tests completed in February 2025 derived rates in the range 1.21 x 10^{-5} m/s to 1.41 x 10^{-5} m/s. The lowest rate of 1.21 x 10^{-5} m/s would be sufficient for design purposes at this specific location. However, insufficient soakage rates were recorded in SA02 during initial testing in February, although the test was terminated due to time restrictions. During the second test, an infiltration rate of 3.07 x 10^{-6} m/s was calculated. Additional testing was undertaken in SA02 in March 2025 and derived rates in the range 2.32 x 10^{-6} m/s to 3.10 x 10^{-6} m/s. The lowest value of 2.32 x 10^{-6} m/s was calculated from the first test, although there was a gap in the monitoring period and the test was left to run overnight. This value may therefore be conservative, but it falls within the range of other results calculated from this location. MEC have taken a conservative approach to the drainage design and utilised the rate of 2.32 x 10^{-6} m/s within the drainage calculations. Due to the safety factor applied and the conservative infiltration rate, the infiltration basin exceeds the 24-hour criteria. It has therefore been modelled on the basis of the volume required for the 1%AEP40CC event to identify a maximum water level, followed immediately by a 3.3%AEP35CC storm event. This provides a peak water level for the basin from the two consecutive storm events and the cumulative level of storage has been calculated for each basin. Drainage design calculations have been carried out using Flow Causeway.

INDEX

Pages	Calculations	Checked by	Date
2 - 5	Surface Water Sewer design details for the 50%, 3.3%AEP35CC and 1%AEP40CC simulation results	RC	25.04.2025

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	0.750	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	100.0		

Nodes

Name	Area (ha)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
Infiltration Basin	3.432	132.700	1200	304081.829	304081.783	1.500

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Additional Storage (m³/ha)	0.0
Summer CV	0.750	Skip Steady State	x	Check Discharge Rate(s)	x
Winter CV	0.840	Drain Down Time (mins)	240	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 %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0	100	40	0	0
30	35	0	0				

Node Infiltration Basin Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00835	Safety Factor	6.0	Invert Level (m)	131.200
Side Inf Coefficient (m/hr)	0.00835	Porosity	1.00	Time to half empty (mins)	18026

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	4224.0	4224.0	1.500	6178.0	12025.5

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	Infiltration Basin	1410	131.408	0.208	29.8	906.3925	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)
1440 minute winter	Infiltration Basin	Infiltration	2.0

Results for 30 year +35% CC Critical Storm Duration. Lowest mass balance: 99.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	Infiltration Basin	1440	131.726	0.526	74.5	2401.3960	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)
1440 minute winter	Infiltration Basin	Infiltration	2.6

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	Infiltration Basin	1440	131.863	0.663	94.9	3085.5640	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)
1440 minute winter	Infiltration Basin	Infiltration	2.9

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APPENDICES

APPENDIX G

NOTES:

1. DO NOT SCALE THIS DRAWING.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ENGINEERS, ARCHITECTS AND SPECIALIST DESIGN DRAWINGS AND DETAILS.
3. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE. ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.
4. THIS DRAWING IS FOR STRATEGY PURPOSES ONLY AND IS NOT TO BE USED FOR CONSTRUCTION PURPOSES.
5. DESIGN BASED ON EXISTING LEVELS AND SUBJECT TO CHANGE WITH EXTERNAL WORKS DESIGN / CONFIRMATION OF FFLS.
6. DRAINAGE STRATEGY IS SUBJECT TO AGREEMENT WITH RELEVANT THIRD PARTIES, INCLUDING ENVIRONMENT AGENCY, LOCAL PLANNING AUTHORITY, LEAD LOCAL FLOOD AUTHORITY AND WATER AUTHORITY.
6. CONCRETE PROTECTION TO BE PROVIDED TO ANY PIPES WITH LOW COVER.
7. THE DRAINAGE STRATEGY WILL NEED UPDATING IF THE LAYOUT IS REVISED.
8. SURFACE WATER FLOWS FROM THE SITE WILL DISCHARGE INTO THE GROUND AT A CONSERVATIVE DISCHARGE RATE OF 2.32 x 10^{-6}m/s.
9. THE SOIL INFILTRATION RATE DERIVED DOES NOT SATISFY THE HALF DRAIN TIMES REQUIRED. THEREFORE, TO ENSURE A ROBUST APPROACH THE INFILTRATION BASIN HAS BEEN DESIGNED TO ACCOMMODATE TWO CONSECUTIVE STORM EVENTS (1%AEP40CC FOLLOWED BY THE 3.3%AEP35CC EVENT).
10. FOUL WATER FROM THE DEVELOPMENT WILL BE PUMPED TO AN AREA WITHIN MOAT CLOSE PRIOR TO DISCHARGING VIA GRAVITY INTO THE EXISTING FOUL WATER MANHOLE, SUBJECT TO AGREEMENT WITH SEVERN TRENT WATER.

KEY

- SITE BOUNDARY
- PROPOSED SURFACE WATER SEWER
- PROPOSED FOUL WATER SEWER
- PROPOSED FOUL WATER RISING MAIN
- EXISTING FOUL WATER SEWER
- EXISTING SURFACE WATER SEWERS UNDERGOING SECTION 104
- EXISTING FOUL SEWERS UNDERGOING SECTION 104
- EXISTING FOUL RISING MAIN UNDERGOING SECTION 104
- PROPOSED INFILTRATION BASIN
- PROPOSED ADOPTABLE FOUL WATER PUMPING STATION WITH 15m EASEMENT

REV:	AMENDMENTS:	DRN:	CHK:	APP:	DATE:
D	UPDATED SITE LAYOUT	ZJ	RC	AB	21.05.25
C	UPDATED SITE LAYOUT	ZJ	TS	AB	25.04.25
B	UPDATED BASIN ON NEW SOAKAGE RATES	ZJ	TS	AB	15.04.25
A	UPDATED BASIN	ZJ	BO	AB	10.03.25
-	FIRST ISSUE	ZJ	RC	AB	11.02.25

PROJECT:
LAND OFF BOSWORTH LANE, NEWBOLD VERDON

DRAWING TITLE:
OUTLINE DRAINAGE STRATEGY

CLIENT:
J S BLOOR

DRAWING NUMBER:
28945_01_230_01

REVISION:	SHEET SIZE:	SCALE:
D	A1	1:1000

STATUS:
FOR INFORMATION / APPROVAL

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APPENDICES

APPENDIX H

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MAINTENANCE AND MANAGEMENT

A proposed maintenance plan is shown in the table below and breaks down the maintenance requirements of the various proposed assets in accordance with the CIRIA C753 SuDS Manual guidance.

Table 1.1: Proposed Maintenance Regime

Drainage Asset	Responsible Organisation	Maintenance Work	Frequency
Pipework / Manholes	Private Ownership / Management Company	Inspect pipework and clear blockages	Annually or after severe storms.
		Inspect manholes and clear blockages	
		Repair any defects in the network	
		Inspect flow control, ensure operating freely and pivoting bypass door and penstock valve operating correctly	
Headwalls	Private Ownership / Management Company	Inspect the structure and remove any debris/litter on the structure.	Annually or after severe storms
		Replace malfunctioning parts or structures	As required
Catchpits	Private Ownership / Management Company	Inspect structure and remove any debris/litter on structure	Annually or after severe storms
		Replace malfunctioning parts or structures	As required
Gullies	Private Ownership / Management Company	Inspect structure and remove any debris/litter on structure	Annually or after severe storms
		Replace malfunctioning parts or structures	As required
Foul Pumping Station	Private Ownership / Management Company	Inspect wet well, kiosk and valve chamber	Annually or after severe storms
		Inspect structure and remove any debris from the wet well	
		Replace malfunctioning parts or structures	As required
Infiltration Basins	Private Ownership / Management Company	Remove litter, debris and trash	Monthly
		Cut grass – for landscaping and access routes, as well as meadow grass in and around the basin	Monthly/6 monthly or as required
		Manage other vegetation and remove nuisance plants	Monthly then as required
		Reseed areas of poor vegetation growth	Annually or as required
		Prune and trim trees and remove cuttings	As required
		Remove the sediment from pre-treatment systems when 50% full	
		Repair erosion or other damage by reseeding or re-turfing	
		Realign the rip-rap	
		Repair or rehabilitate inlets, outlets and overflows	
		Rehabilitate infiltration surface using scarifying and spiking techniques if performance deteriorates	

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		Relevel uneven surfaces and reinstate design levels	
		Inspect inlets, outlets and overflows for blockages, and clean if required	Monthly/ 6 monthly
		Inspect banksides, structures, pipework etc for evidence of physical damage	
		Inspect inlets and pre-treatment systems for silt accumulation, establish appropriate silt removal frequencies	
		Inspect infiltration surfaces for compaction and ponding	
Permeable Pavements	Private Ownership / Management Company	Brushing and vacuuming (standard cosmetic sweep over the whole surface)	Once a year after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging of manufacturer's recommendations.
		Stabilise and mow contributing and adjacent areas	As required
		Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than sweeping	
		Remediate any landscaping which, through vegetation maintenance of soil slip, has been raised to within 50 mm of the level of the paving	
		Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users and replace lost jointing material	
		Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required
		Initial inspection	Monthly for 3 months after installation
		Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	3 monthly, 48 hours after large storms in first 6 months
		Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
		Monitor inspection chambers	

- CIVIL ENGINEERING
- TRANSPORT
- FLOOD RISK & DRAINAGE
- STRUCTURES
- GEO-ENVIRONMENTAL
- ACOUSTIC AIR
- UTILITIES
- GEOMATICS
- LIGHTING
- EXPERT WITNESS

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