LAND OFF HEMINGFIELD ROAD, HEMINGFIELD, BARNSLEY

FLOOD RISK AND DRAINAGE ASSESSMENT

Final Report v1.2
6 February 2024

This document covers the following reports as described in the Council's validation requirements: Flood Risk Assessment and Sequential Test, and SuDS/Foul and Surface Water Drainage details.

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Report Title	**Land off Hemingfield Road, Hemingfield, Barnsley** Flood Risk and Drainage Assessment Final Report v1.2
Client	Ptarmigan Land North Ltd
Date of issue	6 February 2024

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1 INTRODUCTION

1.1 Purpose of Report

Weetwood Services Ltd ('Weetwood') has been instructed by Ptarmigan Land North Ltd to prepare a Flood Risk and Drainage Assessment (FRDA) report to accompany an outline planning application for the proposed development of land off Hemingfield Road, Hemingfield (“the Site”) for residential use (refer to **Section 2.2** for full description).

The assessment has been undertaken in accordance with the requirements of the revised National Planning Policy Framework (NPPF) updated on 20 December 2023 and the Planning Practice Guidance (PPG) updated on 20 November 2023.

1.2 Structure of the Report

The report is structured as follows:

Section 1	Introduction and report structure
Section 2	Provides background information relating to the development site
Section 3	Presents national and local flood risk and drainage planning policy
Section 4	Assesses the potential risk of flooding to the development site
Section 5	Presents an illustrative surface water drainage scheme
Section 6	Presents an illustrative foul water drainage scheme
Section 7	Presents a summary of key findings and the recommendations

1.3 Relevant Documents

The assessment has been informed by the following documents:

- Barnsley Local Plan 2019-2033, adopted January 2019
- Local Flood Risk Management Strategy - Barnsley Metropolitan Borough Council, September 2017
- South Yorkshire Interim Local Guidance for Sustainable Drainage Systems, June 2015
- Preliminary Flood Risk Assessment, Barnsley Metropolitan Borough Council, June 2011
- South Yorkshire Residential Design Guide, January 2011
- Strategic Flood Risk Assessment, Barnsley Metropolitan Borough Council, June 2010

2 SITE DETAILS AND PROPOSED DEVELOPMENT

2.1 Site Location

The approximately 6.78 ha site is located to the north and east of Hemingfield Road and south of Dearne Valley Parkway (A165), Hemingfield, Barnsley at Ordnance Survey National Grid Reference SE 393 018, as shown in **Figure 1.**

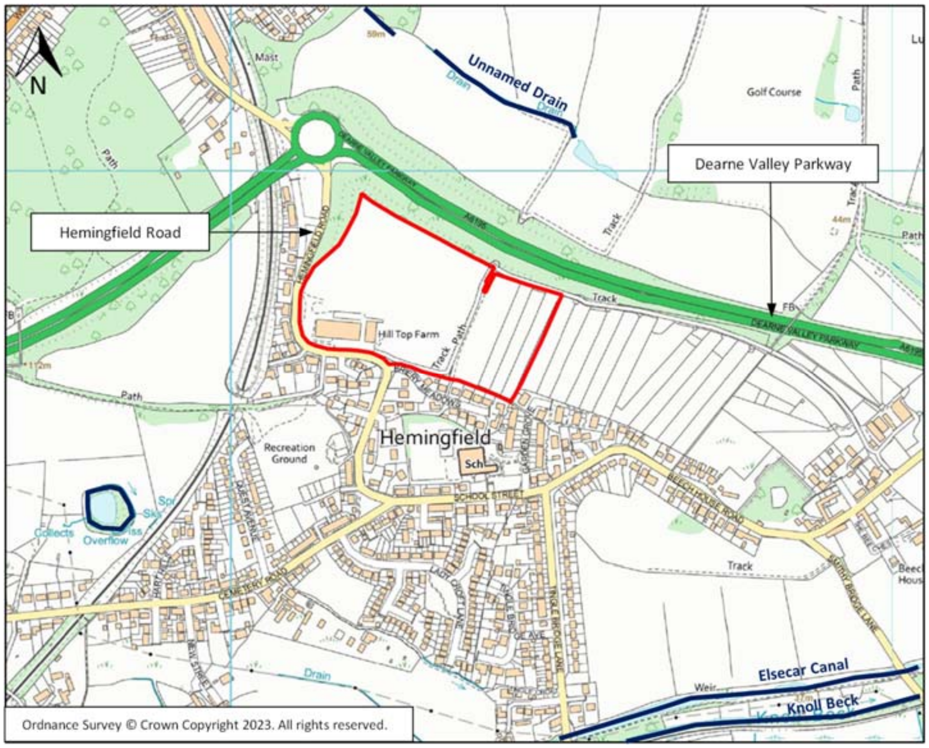

Figure 1: Site Location and Location of Surface Waterbodies

2.2 Existing and Proposed Development

The site is predominantly greenfield comprising of agricultural fields with two agricultural buildings and associated hardstanding located towards the south-western corner of the site.

The development proposals are as follows: *"Application for outline planning for the demolition of existing structures and the erection of residential dwellings with associated infrastructure and open space. All matters reserved except for means of access to, but not within, the site."*

Vehicular access will be provided via Hemingfield Road to the west of the site.

The proposed site plan is provided in **Appendix A**.

The NPPF[1] classifies residential development as More Vulnerable to Flood Risk.

2.3 Surface Waterbodies in the Vicinity of the Site

There are no surface waterbodies on site.

An unnamed drain flows in an open channel in a south-easterly direction approximately 190 m to the north of Dearne Valley Parkway.

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[1] https://www.gov.uk/guidance/national-planning-policy-framework/annex-3-flood-risk-vulnerability-classification

Elsecar Canal is located, at its closest point, approximately 510 m south-east of the site and is operated and maintained by the Canal and River Trust.

Knoll Beck, a designated main river, flows in a north-easterly direction approximately 540 m to the south-east of the site.

A pond is located approximately 360 m to the south-west of the site.

2.4 Topographic Levels

A topographic survey of the site has been undertaken by Redbox Surveys (**Appendix B**) and LiDAR data has been used to develop a digital terrain model of the site and surrounding area as illustrated in **Figure 2**.

Site levels are indicated to be in the region of 62.5 to 86.5 m AOD with levels falling in a north-easterly/easterly direction.

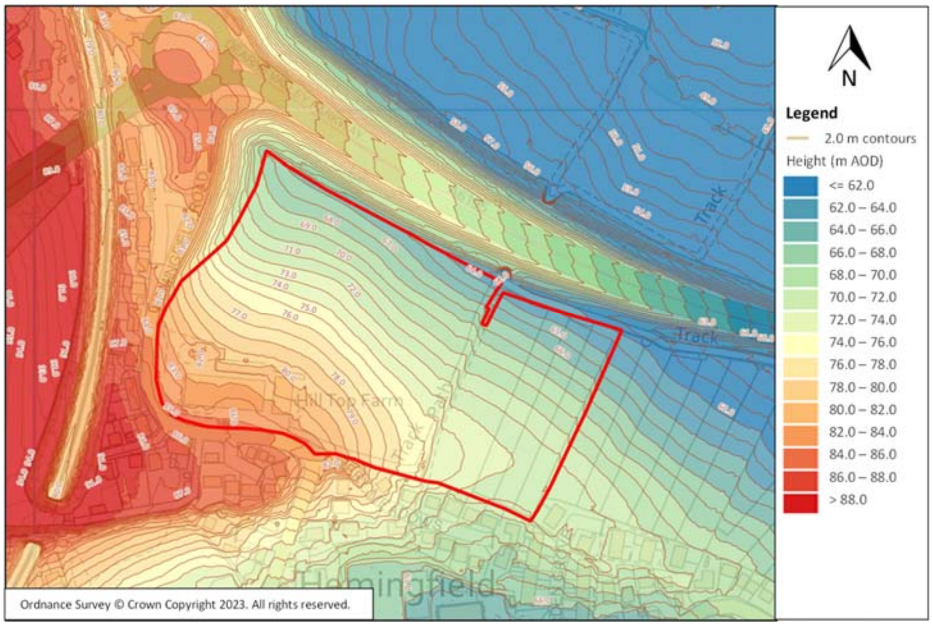

Figure 2: Digital Terrain Model from LiDAR Data

2.5 Ground Conditions

Soakaway testing has been undertaken in accordance with BRE365[2] by Sirius Geotechnical Ltd on 15 November 2023 (refer to **Appendix C**). Testing was carried out in three trial pits (SA-A, SA-B and SA-C) up to a depth of 2.1 m bgl. Ground conditions were generally reported to comprise of top soil up to depths of 0.4 m underlain by a narrow band of sand (SA-B and SA-C only) and sandstone up to the base of all trial pits. Due to exceptionally wet conditions during the preceding weeks, the site was noted to be wet at surface; however, no groundwater was encountered during the testing.

The results indicate that infiltration rates range between 1.92×10^{-4} to 1.96×10^{-4} (SA-A), 4.04×10^{-4} to 5.99×10^{-4} m/s (SA-B) and 3.03×10^{-4} to 3.87×10^{-4} (SA-C).

According to the Soilscapes soils dataset produced by the Cranfield Soil and AgriFood Institute[3], soil conditions at the site and within the surrounding area are described predominantly as freely draining loamy soils, with conditions within the south-eastern corner of the site described as slowly permeable loamy and clayey soils with impeded drainage.

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[2] BRE Digest 365 Soakaway Design, Building Research Establishment, 2016

[3] www.landis.org.uk/soilscapes/

British Geological Survey mapping of surface geology[4] indicates the underlying bedrock formation comprises Woolley Edge Rock- Sandstone with nearby bands of coal. No superficial deposits are recorded.

According to the MAGIC website[5], the underlying bedrock is classified as a Secondary A aquifer. These are defined by the EA as “permeable layers that can support local water supplies, and may form an important source of base flow to rivers”. The site is not shown to be in any designated groundwater source protection zones.

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[4] https://www.bgs.ac.uk/map-viewers/geoindex-onshore/

[4] https://magic.defra.gov.uk/MagicMap.aspx

3 PLANNING POLICY AND GUIDANCE

3.1 National Planning Policy and Policy Guidance

The thrust of national planning policy, as articulated in the NPPF is that inappropriate development in areas at risk of flooding should be avoided where possible, as summarised below:

- Inappropriate development in areas at risk of flooding should be avoided and that development should be directed away from areas at highest risk (whether existing or future), but where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere (NPPF para. 165).
- The policy of seeking to steer development to areas with the lowest risk of flooding, from any source, is implemented through the application of the flood risk Sequential Test. Development should not be allocated or permitted if there are reasonably available sites, appropriate for the proposed development in areas with a lower risk of flooding. The sequential approach should be used in areas known to be at risk now or in the future from any form of flooding (NPPF para. 168).
- If it is not possible for development to be located in zones with a lower risk of flooding (taking into account wider sustainable development objectives) the Exception Test may have to be applied. The need for the test will depend on the potential vulnerability of the site and of the development proposed (as set out in Annex 3 of NPPF; also PPG Table 2) (NPPF para. 169). For example, the Exception Test need not be applied for less vulnerable development in any flood zone, or for more vulnerable development in flood zones 1 or 2.
- Where the Exception Test must be applied, application of the test for development proposals at the application stage should be informed by a site-specific flood risk assessment. For the test to be passed it should be demonstrated that: (a) the development would provide wider sustainability benefits to the community that outweigh the flood risk; (b) and the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall (NPPF para. 170). Both elements of the test should be satisfied for the development to be permitted (NPPF para. 171).
- A site-specific flood risk assessment should be provided for all development in flood zones 2 and 3 [whilst] in flood zone 1, an assessment should accompany all proposals involving: sites of 1 ha or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use (NPPF para. 173 and footnote 59).
- Development should not increase flood risk elsewhere (NPPF para. 173).
- Development should only be allowed in areas at risk of flooding where the flood risk assessment (and the sequential and exception tests, as applicable), demonstrate that: a) within the site, the most vulnerable development is located in areas of lowest flood risk (unless there are overriding reasons to prefer a different location); b) the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment; c) the development incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate; d) any residual (flood) risk can be safely managed; and e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan (NPPF para.173).
- Applications for some minor development and changes of use should not be subject to the sequential or exception tests (NPPF para. 174). The exceptions are stated in Footnote 60.
- Major development should incorporate sustainable drainage systems unless there is clear evidence that this would be inappropriate. The systems should: a) take account of advice from the lead local flood authority; b) have appropriate proposed minimum operational standards; c) have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development; and d) where possible, provide multifunctional benefits (NPPF para. 175).

Guidance on application of the sequential and exception test is provided in the PPG. For example:

- The approach is designed 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 (i.e. taking climate change into account) medium and high flood risk areas considering all sources of flooding including areas at risk of surface water flooding (PPG para. 023).

- Where it is not possible to locate development in low risk areas, the Sequential Test should go on to compare reasonably available sites within medium risk areas and then, only where there are no reasonably available sites in low and medium risk areas, within high risk areas (PPG para. 024).
- Initially, the presence of existing flood risk management infrastructure should be ignored, as the long-term funding, maintenance and renewal of this infrastructure is uncertain. Climate change will also impact upon the level of protection infrastructure will offer throughout the lifetime of development (PPG para. 024).
- The Sequential Test should be applied to 'Major' and 'Non-major development' proposed in areas at risk of flooding, but it will not be required where; the site has been allocated for development and subject to the test at the plan making stage (provided the proposed development is consistent with the use for which the site was allocated and provided there have been no significant changes to the known level of flood risk to the site, now or in the future which would have affected the outcome of the test); the site is in an area at low risk from all sources of flooding, unless the Strategic Flood Risk Assessment, or other information, indicates there may be a risk of flooding in the future; the application is for a development type that is exempt from the test, as specified in footnote 60 of the NPPF (PPG para. 027).
- For individual planning applications subject to the Sequential Test, the area to apply the test will be defined by local circumstances relating to the catchment area for the type of development proposed. For some developments this may be clear, for example, the catchment area for a school. In other cases, it may be identified from other Plan policies. For example, where there are large areas in Flood Zones 2 and 3 (medium to high probability of flooding) and development is needed in those areas to sustain the existing community, sites outside them are unlikely to provide reasonable alternatives. Equally, a pragmatic approach needs to be taken where proposals involve comparatively small extensions to existing premises (relative to their existing size), where it may be impractical to accommodate the additional space in an alternative location. For nationally or regionally important infrastructure the area of search to which the Sequential Test could be applied will be wider than the local planning authority boundary (PPG para. 027).
- 'Reasonably available sites' are those in a suitable location for the type of development with a reasonable prospect that the site is available to be developed at the point in time envisaged for the development. These could include a series of smaller sites and/or part of a larger site if these would be capable of accommodating the proposed development. Such lower-risk sites do not need to be owned by the applicant to be considered 'reasonably available' (PPG para. 028).
- The Exception Test should only be applied as set out in Table 2 [of the PPG ("Flood Risk Vulnerability and Flood Zone Incompatibility")] and only if the Sequential Test has shown that there are no reasonably available, lower risk sites, suitable for the proposed development, to which the development could be steered (PPG para. 032).

3.2 Local Planning Policy

Barnsley Local Plan was adopted by Barnsley Metropolitan Borough Council in January 2019. The following policies are relevant in respect of flood risk and drainage:

Policy CC1 Climate Change

We will seek to reduce the causes of and adapt to the future impacts of climate change by:

Stem 3) *Locating and designing development to reduce the risk of flooding*
Stem 4) *Promoting the use of Sustainable Drainage Systems (SuDS)*

Policy CC3 Flood Risk

The extent and impact of flooding will be reduced by:

- *Not permitting new development where it would be at an unacceptable risk of flooding from any sources of flooding or would give rise to flooding elsewhere.*

- *Ensuring that in the Functional Floodplain (Flood Zone 3b), only water compatible development or essential infrastructure (subject to the flood risk exception test) will be allowed. In either case it must be demonstrated that there would not be a harmful effect on the ability of this land to store floodwater;*
- *Requiring developers with proposals in Flood Zones 2 and 3 to provide evidence of the sequential test and exception test where appropriate.*
- *Requiring site-specific Flood Risk Assessments (FRAs) for proposals over 1 hectare in Flood Zone 1 and all proposals in Flood Zones 2 and 3;*
- *Expecting proposals over 1000 m^2 floor space or 0.4 hectares in Flood Zone 1 to demonstrate how the proposal will make a positive contribution to reducing or managing flood risk; and Expecting all development proposals on brownfield sites to reduce surface water run-off by at least 30% and development on greenfield sites to maintain or reduce existing run-off rates requiring development proposals to use Sustainable Drainage Systems (SuDS) in accordance with policy CC4; and*
- *Using flood resilient design in areas of high flood risk.*

Policy CC4 Sustainable Drainage Systems (SuDS)

All major developments will be expected to use [SuDS] to manage surface water drainage, unless it can be demonstrated that all types of SuDS are inappropriate.

The Council will also promote the use of SuDS on minor development.

To enable the Council to determine the suitability of a proposed SuDS scheme:

- *Outline Planning applications must be supported by a conceptual drainage plan and SuDS design statement; and*
- *Detailed Planning applications must be supported by a detailed drainage plan and SuDS design statement, which should contain information on how the SuDS will operate, be managed and maintained for the lifetime of the development.*

Policy CC5 Water Resource Management

To conserve and enhance the Boroughs water resources proposals will be supported which:

a. *Do not result in the deterioration of water courses and which conserve and enhance,*
    i. *The natural geomorphology of water courses;*
    ii. *Water quality; and*
    iii. *The ecological value of the water environment, including watercourse corridors.*

b. *Make positive progress towards achieving "good" status or potential under the Water Framework Directive [WFD] in the boroughs surface and ground water bodies;*
c. *Manage water demand and improve water efficiency through appropriate water conservation techniques including rainwater harvesting and grey-water recycling; and*
d. *Dispose of surface water appropriately and improve water quality through the incorporation of SuDS, in accordance with Policy CC4.*

3.3 Drainage Technical Guidance

Non-statutory technical standards for sustainable drainage published by DEFRA in March 2015 set out how surface water runoff generated during the present day 1 in 30 and 1 in 100 annual exceedance probability (AEP) rainfall events and for events exceeding the present day 1 in 100 AEP event should be managed, how peak runoff rates should be restricted and how runoff volumes should be controlled.

3.4 Water Framework Directive

The WFD provides a legal framework for the protection, improvement and sustainable use of inland surface waters, groundwater, transitional waters, and coastal waters across England, and seeks to:

- Prevent deterioration in the status of aquatic ecosystems, protect them and improve the ecological condition of waters

- Achieve at least ‘good’ status for all waterbodies by 2015
- Promote the sustainable use of water as a natural resource
- Conserve habitats and species that depend directly on water
- Progressively reduce or phase out the release of individual pollutants or groups of pollutants that present a significant threat to the aquatic environment
- Progressively reduce the pollution of groundwater and prevent or limit the entry of pollutants; and
- Contribute to mitigating the effects of floods and droughts.

The WFD applies to any proposed development which has the potential to impact on a waterbody. Where this is the case, the Environment Agency may require evidence demonstrating that the proposed development does not compromise the aims of the WFD.

4 REVIEW OF FLOOD RISK

4.1 Historical Records of Flooding

The Environment Agency Historic Flood Map (**Figure 3**) and Map 2 of the Barnsley Metropolitan Borough Council 2010 Strategic Flood Risk Assessment ("Historical Flood Extents") record no flood events at the site. As indicated in **Figure 3**, flooding is shown to have occurred approximately 500 m to the south-east of the site during June 2007. It is assumed that the source of flooding is from Knoll Beck and Elsecar Canal. A comparison of ground levels and the flood extent in this region indicates that the flood level during this flood event was circa 40 m AOD. This is a minimum of 22.5 m below the height of the site and, as such, the site would not have been at risk of flooding from this source in June 2007.

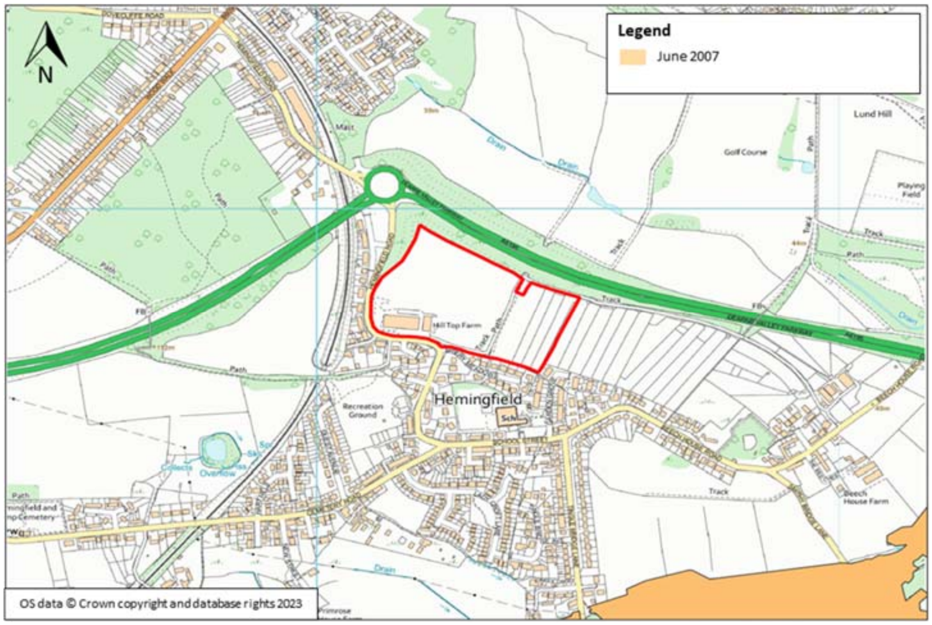

Figure 3: Historic Flood Map
Source: gov.uk website; Accessed: January 2024

4.2 Flood Risk from Rivers (Fluvial)

The Environment Agency Flood Map for Planning (Rivers and Sea)[6] (**Figure 4**) indicates that the site is located in flood zone 1. This is reiterated on Maps 3,4 and 6 of the Barnsley Metropolitan Borough Council 2010 Strategic Flood Risk Assessment ("Flood Zone 1, Flood Zone 2 and Flood Zone 3").

Table 1 of the PPG defines flood zones within the vicinity of the site as follows[7]:

- Flood zone 1: Low Probability. Land having a less than 1 in 1,000 annual probability of river flooding
- Flood zone 2: Medium Probability. Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding.
- Flood zone 3a: High Probability. Land having a 1 in 100 or greater annual probability of river flooding
- Flood zone 3b: Functional Floodplain. Land where water from rivers has to flow or be stored in times of flood. Land having a 1 in 30 or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively or land that is designed to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as a 1 in 1,000 annual probability of flooding).

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[6] https://flood-map-for-planning.service.gov.uk/

[7] https://www.gov.uk/guidance/flood-risk-and-coastal-change#flood-zone-and-flood-risk-tables

The zones do not take account of the possible impacts of climate change and consequent changes in the future probability of flooding. However, given the distance (approximately 500 m) between the site and flood zone 3 and flood zone 2 and that the site is approximately a minimum of 22.5 m above the height of the flood extents, the site is assessed to not be at risk of flooding from fluvial sources when taking climate change into account.

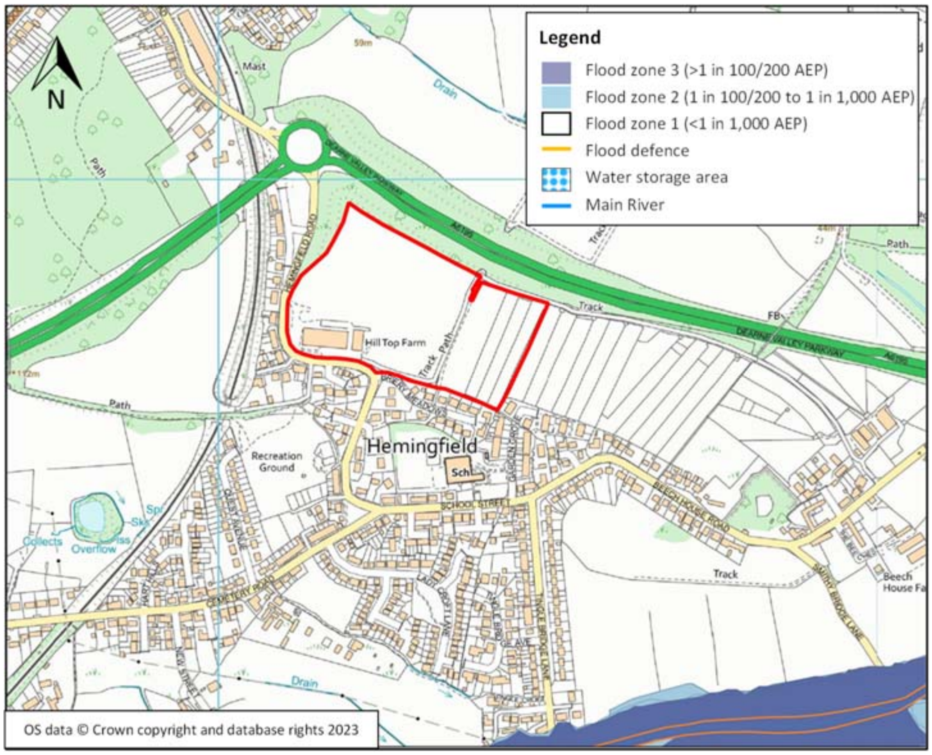


Figure 4: Flood Map for Planning
Source: gov.uk website; Accessed: January 2024

4.3 Flood Risk from Small Watercourses and Surface Water (Pluvial)

As detailed in **Section 2.3**, an unnamed drain is located approximately 250 m to the north of the site. No modelled information is available for this watercourse. The Flood Risk from Surface Water map (**Figure 5**) has therefore been utilised to assess the risk of flooding from this source. This mapping indicates that the site is not at risk of flooding from the unnamed drain.

This mapping also indicates the presence of a surface water flow path abutting the northern boundary of the site, with surface water flowing towards the unnamed drain via the underpass below Dearne Valley Parkway due to ground levels. However, the site itself is indicated to be at a Very Low risk of flooding from pluvial surface water.

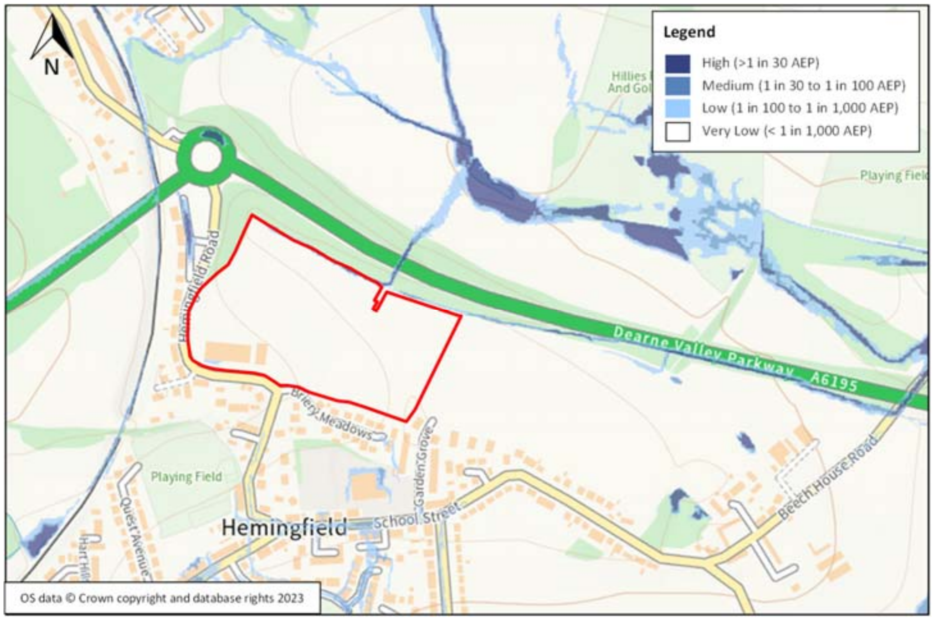


Figure 5: Flood Risk from Surface Water
Source: gov.uk website; Accessed: January 2024

4.4 Flood Risk from Reservoirs, Canals, and Other Water Impounding Structures

The site is approximately 25 m above the elevation of Elsecar Canal, and as such, is assessed to not be at risk of flooding from this source. Any flooding from the pond to the south-west of the site would be expected to be localised, with floodwater flowing in a south-easterly direction away from the site. In addition, the Flood Risk from Surface Water map (**Figure 5**) indicates that the site is not at risk of flooding from the pond. The Flood Risk from Reservoirs map **(Figure 6**) indicates that the site is not at risk of flooding from such sources.

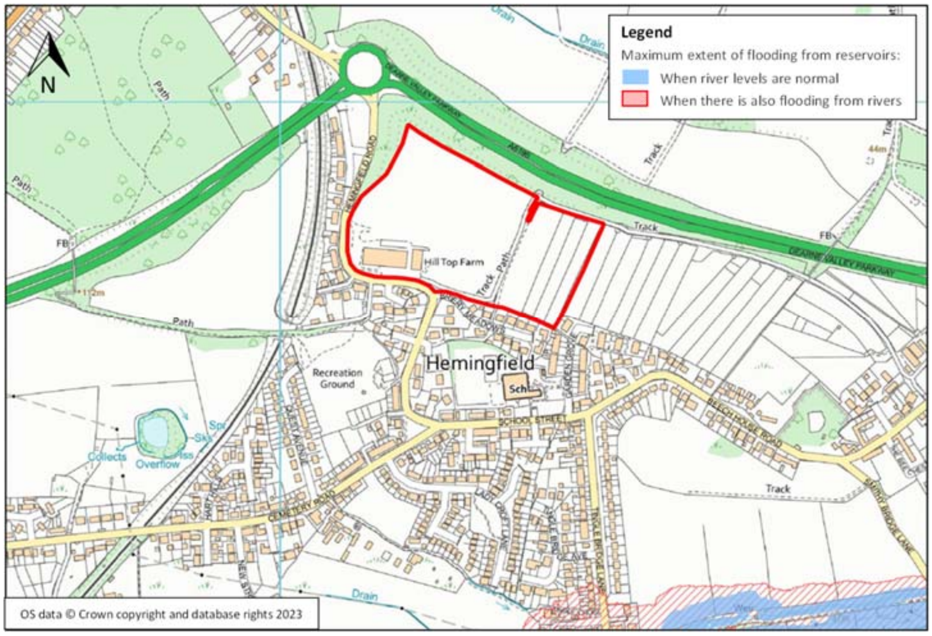
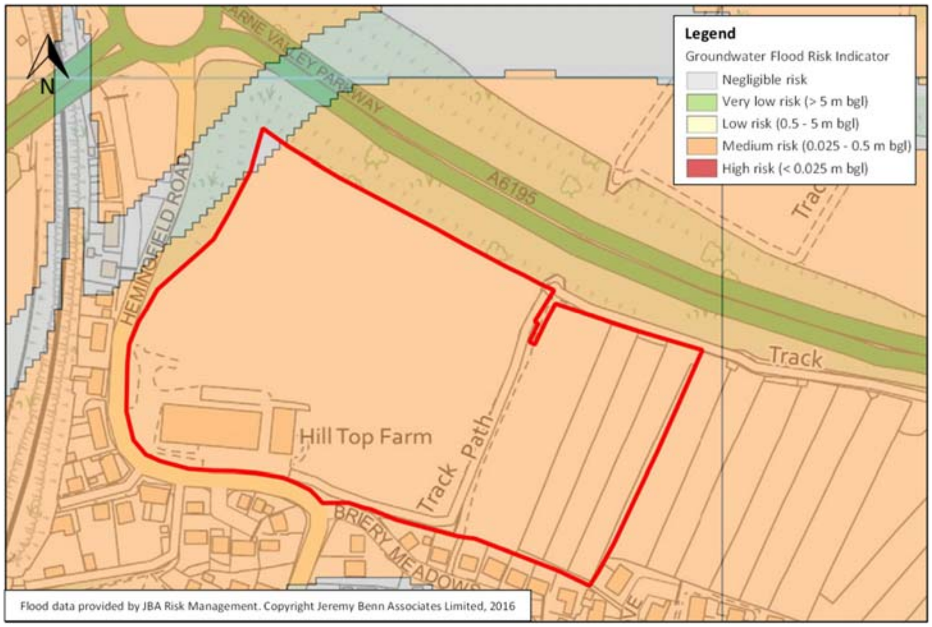


Figure 6: Flood Risk from Reservoirs
Source: gov.uk website; Accessed: January 2024

4.5 Flood Risk from Groundwater

The JBA Groundwater Flood Risk Indicator map (**Figure 7**) indicates that groundwater levels at the site may be 0.025 – 0.5m bgl (defined as Medium risk) during a 1 in 100 AEP groundwater flood event. However, given the sloping nature of the site and that groundwater was not encountered during soakaway testing, the risk of flooding from groundwater is assessed to be Low.



Flood data provided by JBA Risk Management. Copyright Jeremy Benn Associates Limited, 2016

Figure 7: JBA Groundwater Flood Risk Indicator Map
Source: Blue Sky Maps; Accessed: December 2023

4.6 Flood Risk Mitigation

The risk of flooding to the proposed development from all identified sources is assessed to be low. As such, no specific flood risk mitigation measures are proposed. Notwithstanding this, finished floor levels should typically be set at least 0.15 m above adjacent ground levels following any reprofiling of the site, with ground levels sloping down from the dwellings in accordance with general practice.

This measure will, subject to the implementation of an appropriately designed surface water drainage scheme (**Section 5**), enable any potential overland flows to be conveyed safely across the site without affecting property.

4.7 Flood Risk Sequential and Exception Test

The site is located within flood zone 1 and is assessed to be at a low risk of flooding from other sources. As such, it is concluded that the proposals satisfy the requirements of the flood risk Sequential Test.

The Exception Test need not be applied for 'More Vulnerable' development within flood zone 1. Notwithstanding this, the assessment presented in this report demonstrates that the proposed development passes element (b) of the test, i.e. the development will be safe for its lifetime taking account of the vulnerability of its users and will not increase flood risk elsewhere.

5 SURFACE WATER MANAGEMENT

5.1 Surface Water Drainage at the Existing Site

The majority of the site is undeveloped greenfield. Given site topography and ground conditions, surface water runoff would be expected to infiltrate where conditions allow and flow overland in a north-easterly/easterly direction.

The south-western portion of the site comprises two agricultural buildings and associated hardstanding. A site visit indicates that surface water runoff from the existing buildings is drained via rainwater down pipes with runoff being directed either into the ground or overground with flows determined by topography.

Based on the above, the site is taken to be undeveloped greenfield land. The greenfield surface water runoff rates for the site, calculated using the UK SuDS greenfield runoff tool are presented in **Table 1**. Details of the input parameters and the output results are provided in **Appendix D**.

Table 1: Greenfield Runoff Rate

AEP of Rainfall Event	Greenfield Runoff Rate (l/s/ha)	Greenfield Runoff Rate for 6.7 ha Site (l/s)
1 in 1	1.4	9.4
QBAR	1.6	10.7
1 in 30	2.8	18.8
1 in 100	3.4	22.8

5.2 Surface Water Drainage at the Developed Site

5.2.1 Disposal of Surface Water

In accordance with PPG para. 056, surface water runoff should be disposed of according to the following hierarchy: Into the ground (infiltration); To a surface water body; To a surface water sewer, highway drain, or another drainage system; or, To a combined sewer.

As detailed in **Section 2.5**, soakaway testing has been undertaken by Sirius Geotechnical Ltd in accordance with the guidelines in BRE365[8]. As reported by Sirius Geotechnical Ltd, it is considered that soakaway drainage is likely to be suitable at the site (refer to **Appendix C**).

5.2.2 Post Development Impermeable Area

Based on the development proposals (**Appendix A**), the area of impermeable surfaces within the proposed development has been estimated to be 2.53 ha including a 10% allowance for urban creep.

5.2.3 Infiltration Rate

Based on the infiltration testing undertaken by Sirius Geotechnical Ltd (**Appendix C**), and adopting a conservative approach for robustness, the lowest observed infiltration rate of 1.92×10^{-4} m/s (0.69 m/hr) has been used.

5.2.4 Attenuation Storage

Attenuation storage will be provided to store surface water runoff generated across roofs and hardstanding.

The attenuation storage facility has been modelled using the Source Control module of MicroDrainage (**Appendix E**). The required storage volume has been sized to store the 1 in 100 AEP rainfall event including a 40% increase in rainfall intensity to allow for climate change in accordance with Environment Agency guidance[9].

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[8] BRE Digest 365 Soakaway Design, Building Research Establishment, 2016

[9] Flood Risk Assessments: climate change allowances (https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances)

Assuming an infiltration rate of 0.69 m/hr, a total storage volume of 784.6 m³ would be required. This could be accommodated within an infiltration basin with an area of 1,232.0 m² and a depth of 1.3 m.

During the 1 in 100 AEP rainfall event plus 40% climate change, the half drain time is 61 minutes, As such, the proposed infiltration basin has sufficient capacity to accommodate additional rainfall events.

An illustrative surface water drainage layout is provided in **Appendix F**.

5.2.5 Exceedance Routes

Flows resulting from rainfall in excess of the 1 in 100 AEP rainfall event including an allowance for climate change will be managed in exceedance routes. As the development proposals progress, the design of the site would ensure flood flows are directed towards carriageways, with the site being profiled to ensure that flood flows are directed away from built development.

5.2.6 Pollution Control

Table 26.2 of the CIRIA SuDS Manual and Table G3.1 of the Statutory Standards for SuDS identifies residential roofs and low traffic roads as having a very low to low pollution hazard level.

Table 26.2 of the CIRIA SuDS Manual 2015 indicates that the pollution hazard indices for total suspended solids, hydrocarbons and metals are 0.20, 0.20 and 0.05, and 0.50, 0.40 and 0.40 for residential roofs and low traffic roads respectively.

Infiltration basins can provide water quality benefits via the settlement of pollutants in still or slow moving water, adsorption by the soil, and biological activity. The proposed infiltration basin will consist of a layer of dense vegetation underlain by a soil with good contaminant attenuation potential of at least 300 mm in depth. Table 26.4 of the CIRIA SuDS Manual 2015 indicates that the SuDS mitigation indices for an infiltration structure with a layer of such dense vegetation for total suspended solids, hydrocarbons and metals are 0.60, 0.50 and 0.60 respectively.

The potential for additional SuDS features to be utilised at the site would be investigated further at the detailed design stage. SuDS features may include for example, house soakaways, permeable paving, rain gardens/bioretention areas, filter drains and swales.

As the site is not underlain by a Principal aquifer, the above measures are appropriate.

5.2.7 Adoption and Maintenance of SuDS

The pipe network, designed in accordance with the Design and Construction Guidance[10], may be adopted by Yorkshire Water. Alternatively, the pipe network may remain private and would be maintained by a management company. SuDS elements within the curtilage of residential dwellings would be the responsibility of the owner of the property. SuDS in open spaces (including the infiltration basin itself) may be maintained by a management company or Yorkshire Water if adopted.

An indicative maintenance schedule is presented in **Table 2**.

Table 2: Maintenance Requirements

Schedule	Required action	Frequency
Infiltration Basin		
Regular maintenance	Remove litter, debris and trash	Monthly
	Cut grass	Monthly during grow season Or as required)
	Manage other vegetation and remove nuisance plants	Monthly at start, then as required
Occasional maintenance	Reseed areas of poor vegetation growth	As required
	Prune and trim any trees and remove cuttings	

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[10] Design and Construction Guidance for foul and surface water sewers offered for adoption under the Code for adoption agreements for water and sewerage companies operating wholly or mainly in England ("the Code"), Approved Version 2.0, 10 March 2020

Schedule	Required action	Frequency
	Remove sediments from pre-treatment system when 50% full	Every two years, or as required
Remedial actions	Repair erosion or other damage by reseeding or re-turfing	As required
	Realignment of rip-rap	
	Repair/rehabilitation of inlets/outlets and overflows	
	Rehabilitate infiltration surface using scarifying and spiking techniques if performance deteriorates	
	Relevel uneven surface and reinstate design levels	
Monitoring	Inspect inlets, outlets and overflows for blockages, and clear if required	Monthly
	Inspect banksides, structures, pipework etc for evidence of physical damage	Monthly
	Inspect inlets and pre-treatment systems for silt accumulation; establish appropriate silt removal frequencies	Half yearly
	Inspect infiltration surfaces for compaction and ponding	Monthly

6 FOUL WATER MANAGEMENT

6.1 Existing Assets

An extract of the public sewer records obtained from Yorkshire Water is provided in **Appendix G**. This indicates that the following wastewater assets are present within/adjacent to the site boundary:

- A 300 mm diameter public combined sewer flowing in an easterly direction through the centre of the site and the north-east portion of the site
- A 225 mm diameter public combined sewer flowing in a northerly direction in Hemingfield Road adjacent to the western boundary of the site. The sewer flows into the aforementioned sewer
- A network of public foul water and surface water sewers that serve the residential estate to the south-east of the site.

6.2 New Connections

The anticipated domestic foul loading from the site has been calculated in accordance with Design and Construction Guidance[11]. The expected total peak flow rate from the development would be 9.3 l/s based on 200 dwellings[12].

Under the Water Industry Act (1991), developers have a right to connect foul water flows from new developments to public sewer. The Act places a general duty on sewerage undertakers to provide the additional capacity that may be required to accommodate additional flows and loads arising from new domestic development.

Yorkshire Water has advised, by way of a pre-planning sewerage enquiry response (**Appendix H**), that there is existing capacity in the local sewerage network to receive and treat domestic foul water from the proposed development and that foul water can discharge without restriction into the 300 mm diameter combined sewer crossing the site.

An illustrative foul water drainage layout is provided in **Appendix F**.

6.3 Easements and Diversions

Yorkshire Water has advised that no buildings, or other obstructions, are to be erected within 3 m either side of the sewer centre-line, and that no trees are to be planted within 5 m of this sewer. This has been taken into account on the illustrative site layout plan (**Appendix A**).

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[11] Sewerage Sector Guidance Appendix C, Water UK, Approved Version 2.0, March 2020

[12] Foul loadings have been calculated based on 200 dwellings as to provide a conservative estimate for peak foul flows

7 SUMMARY AND RECOMMENDATIONS

This report has been prepared on behalf of Ptarmigan Land North Ltd and relates to the proposed development of land off Hemingfield Road, Hemingfield for residential use.

The Environment Agency Flood Map for Planning indicates the site to be located in flood zone 1.

An assessment of flood risk from all identified potential sources of flooding has been undertaken using best available information. On the basis of the assessment, it is concluded that the site is at a low risk of flooding from all identified sources and that the proposals satisfy the requirements of the Sequential Test.

The Exception Test need not be applied for 'More Vulnerable' development within flood zone 1. Based on the assessment of flood risk, it is concluded that no specific measures need be implemented to mitigate flood risk, although finished floor levels should be set at least 0.15 m above adjacent ground levels with ground levels sloping down from the dwellings, in accordance with best practice.

The proposed development would not have an adverse impact on flood risk elsewhere.

The assessment presents a preliminary scheme for the management of surface water from the proposed development. The assessment has been undertaken in accordance with the requirements of national and local planning policy. A summary of the principal findings and proposals is provided below:

- The disposal of surface water via infiltration is assessed to be feasible based on the results of soakaway testing.
- Attenuation storage could be accommodated within an infiltration basin located towards the north-east corner of the site. Additional SuDS features such as house soakaways, permeable paving, rain gardens/bioretention areas, filter drains and swales, would be investigated further at the detailed design stage.
- The pipe network within the surface water drainage system may be adopted by Yorkshire Water or maintained privately by a management company. SuDS elements within the curtilage of residential dwellings would be the responsibility of the owner of the property, whilst SuDS in open spaces may be maintained by a management company or adopted by Yorkshire Water.

Yorkshire Water has advised that there is existing capacity in the local foul sewerage network to receive and treat domestic foul water from the proposed development and that foul water can discharge without restriction into the 300 mm diameter combined sewer crossing the site.

In conclusion, this report demonstrates that the proposed development may be completed in accordance with the requirements of national and local planning policy.

APPENDIX A

Proposed Site Plan

PTARMIGAN

Notes:

This drawing, design and concept are copyright of STEN Architecture.

All Dimensions are to be verified on site before any work commences. If any discrepancies, errors or emissions are noted, these are to be reported to STEN Architecture immediately.

If any other drawings are referenced within this layout, please refer to the specific detailed drawing for design, materials and specific working practices.

① PRIMARY VEHICULAR ENTRANCE FROM HEMINGFIELD ROAD

② RETAINED WALKING ROUTE THROUGH THE CENTRE OF THE SITE AND CONNECTION TO THE NORTH. THIS ROUTE IS SET IN A PLEASANT GREEN CORRIDOR WITH THE POTENTIAL TO INCLUDE NEW NATIVE PLANTING AND TREES

③ RETAINED PUBLIC RIGHTS OF WAY (FOOTPATH 17 AND 18)

④ ATTRACTIVE GREENSPACE AT THE DEVELOPMENT ENTRANCE

⑤ PROPOSED DRAINAGE BASIN

⑥ FEATURE SPACES AND GATEWAY BUILDINGS

⑦ POTENTIAL ACCESS TO ADJACENT LAND

⑧ RETAINED HEDGEROW ALONG THE EASTERN BOUNDARY

⑨ DEDICATED WALKING ROUTE

⑩ PROPOSED EQUIPPED PLAY AREA

- DEVELOPMENT PARCELS
- FRONTAGE AND BUILT FORM
- KEY PEDESTRIAN ROUTES
- VEHICLE ROUTES
- REAR BOUNDARIES
- EXISTING SEWER AND EASEMENT (subject to detailed survey)

NB:-

A) Proposed Landscaping is shown indicatively and subject to detailed design and recommendations from Ecology, Landscape, and Arboriculture consultants.

B) Proposed highways and footpaths are shown indicatively. All streets and routes will comply with Local Authority Guidance.

- Primary Streets will mainly comprise 5.5m highway, flanked by 2m footpaths.
- Shared Surfaces will be a maximum overall width of 7.2m including appropriate service margins.
- Private Drives will be a maximum of 5.5m.

STEN ARCHITECTURE

SITE:
HEMINGFIELD, BARNSLEY

TITLE:
ILLUSTRATIVE MASTERPLAN

SCALE AT A2:	DATE:	DRAWN:	CHECKED:
1:1250	DEC 2023	SSH	
PROJECT NO:	DRAWING NO:		REVISION:
2344	2344:01		C

APPENDIX B

Topographic Survey

Topographical Survey Abbreviations

AC	AIR CONDITIONING UNIT	LP	LAMP POST
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Floor Plan Abbreviations

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BL 53.69	BEAM LEVEL
CL 54.42	CEILING LEVEL

▨	BUILDINGS
▨	OPEN SIDED BUILDINGS
○	TREE SPREAD & DIA. TO SCALE

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redbox SURVEYS

Client:

Matthew Bagley

Project:

Hilltop Farm
Hemingfield Road, Hemingfield
Barnsley, S73 0PZ

Drawing Title:

Topographical Survey

Rev.	Description	Surveyed	Approved	Date

Surveyor:	Checked By:	Approved By:	Date of Survey:	Date of Issue:
VM/NE	AJS	ART	02/12/20	27/10/22

Drawing Status:	Scale:	Paper Size:	Sheet No:
Final	1:200	A0	1 of 4

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RBS - 22/2948	RBS - 22/2948/002	-

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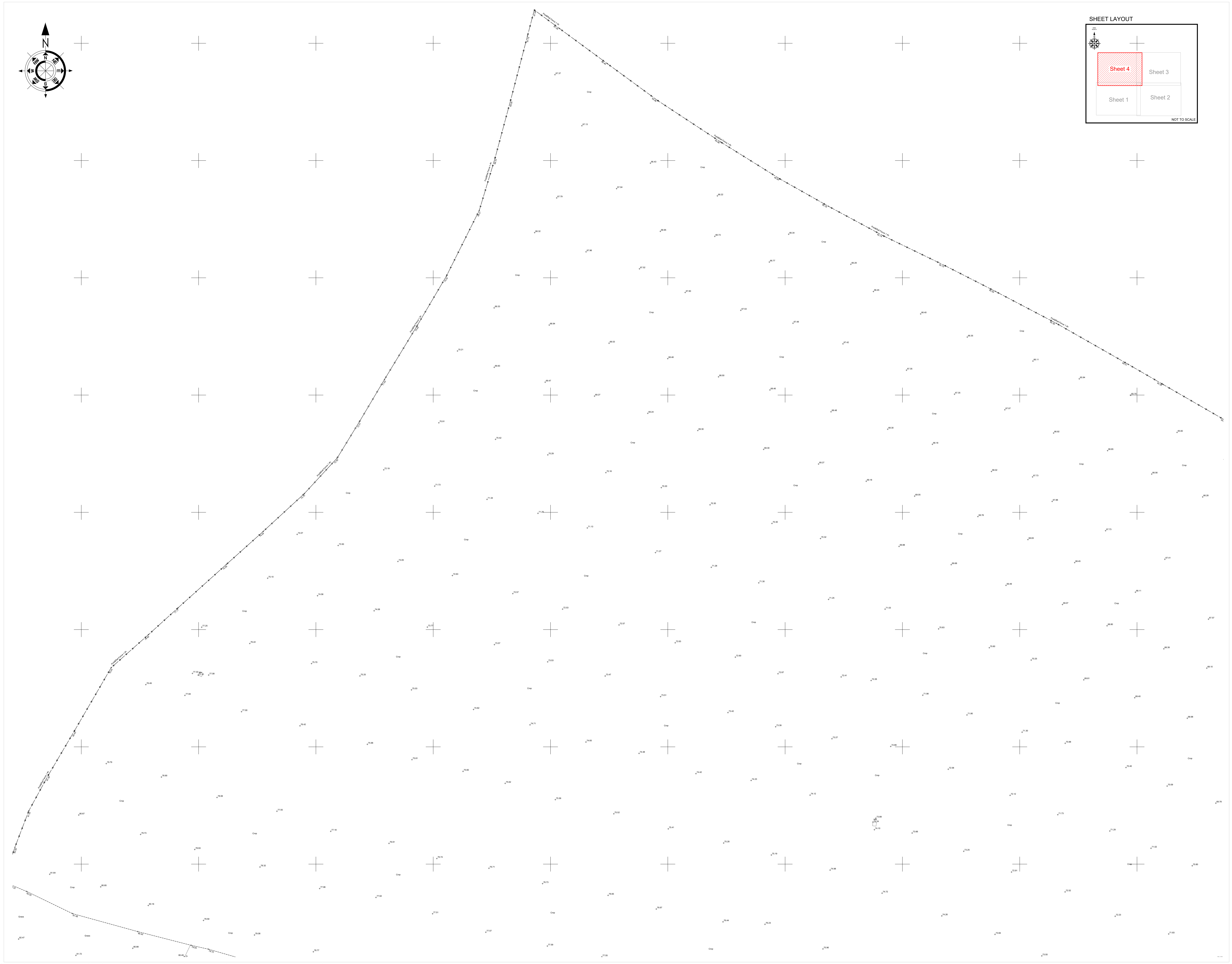

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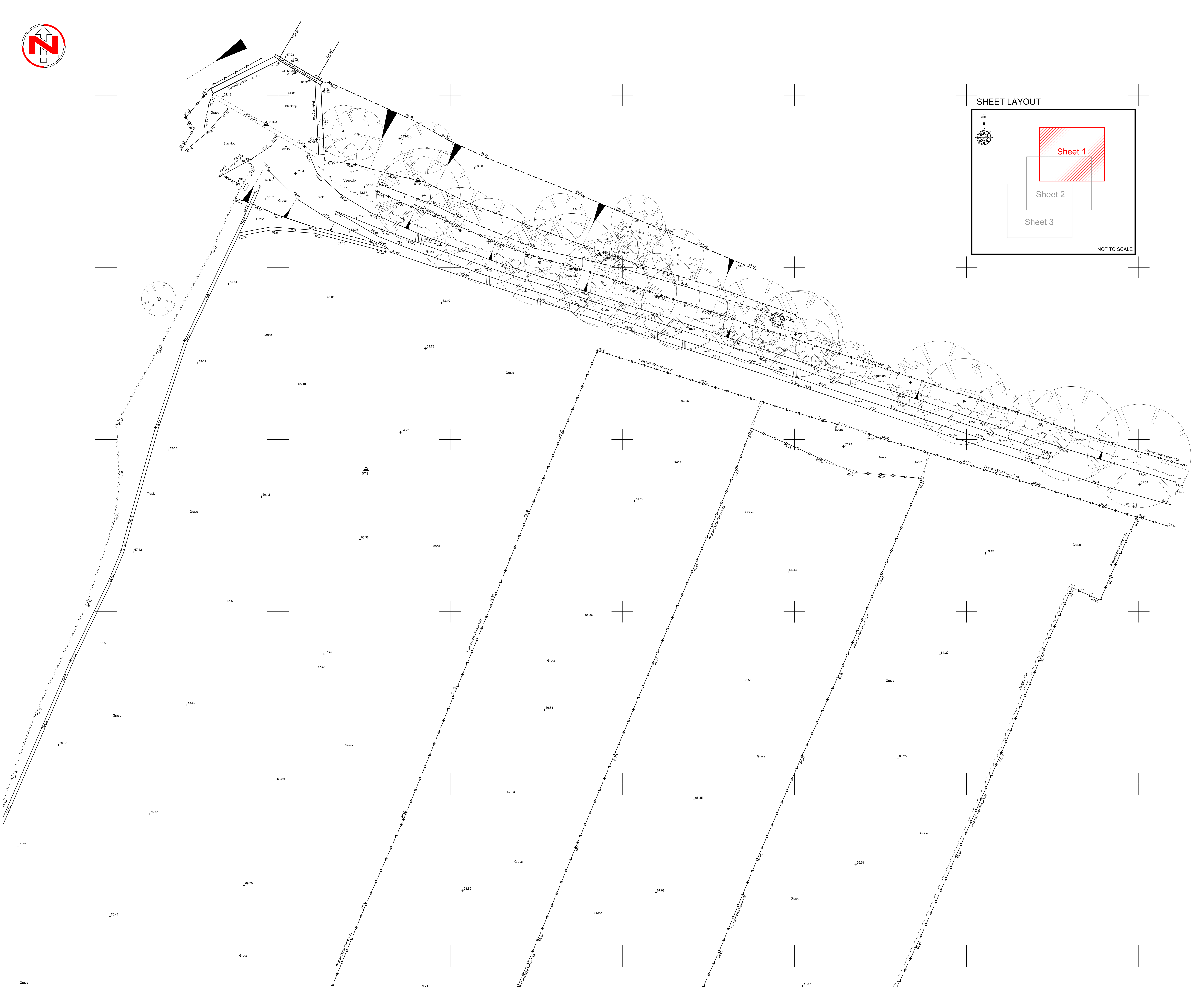

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COL	COLUMN	SCAM	SECURITY CAMERA
CP	CATCH PIT	SG	STRIP GULLY
DP	RAIN WATER DOWN PIPE	SP	SIGN POST
EC	ELECTRIC CABLE	SV	STOP VALVE
EL	ELECTRIC COVER	TAP	WATER TAP
EP	ELECTRIC POLE	TCB	TELEPHONE CALL BACK
ER	EARTH ROD	THL	THRESHOLD LEVEL
FFL	FINISHED FLOOR LEVEL	TL	TRAFFIC LIGHT
FH	FIRE HYDRANT	TOF	TOP OF FENCE LEVEL
FLT	FLOODLIGHT	TOW	TOP OF WALL LEVEL
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IC	INSPECTION CHAMBER	WLV	WATER LEVEL
IL	INVERT LEVEL	WM	WATER METER
KO	KERB OUTLET	WO	WASH OUT
LB	LITTER BIN		

▨	BUILDINGS
⬚	OPEN SIDED BUILDINGS
◌	TREE SPREAD & DIA. TO SCALE

Technical Notes:

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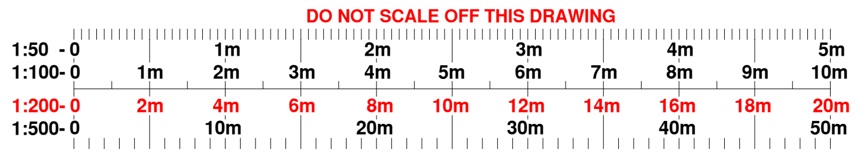
SURVEY STATIONS

Name	Easting	Northing	Height
STN1	439410.216	401816.535	65.649
STN2	439381.076	401739.059	71.692
STN3	439398.602	401856.658	62.118
STN4	439416.244	401850.132	61.857
STN5	439437.318	401841.469	61.776

DO NOT SCALE OFF THIS DRAWING



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EMAIL: INFO@REDBOXSURVEYS.CO.UK

Client:

Matthew Bagley

Project:

Hilltop Farm
Hemingfield Road, Hemingfield
Barnsley, S73 0PZ

Drawing Title:

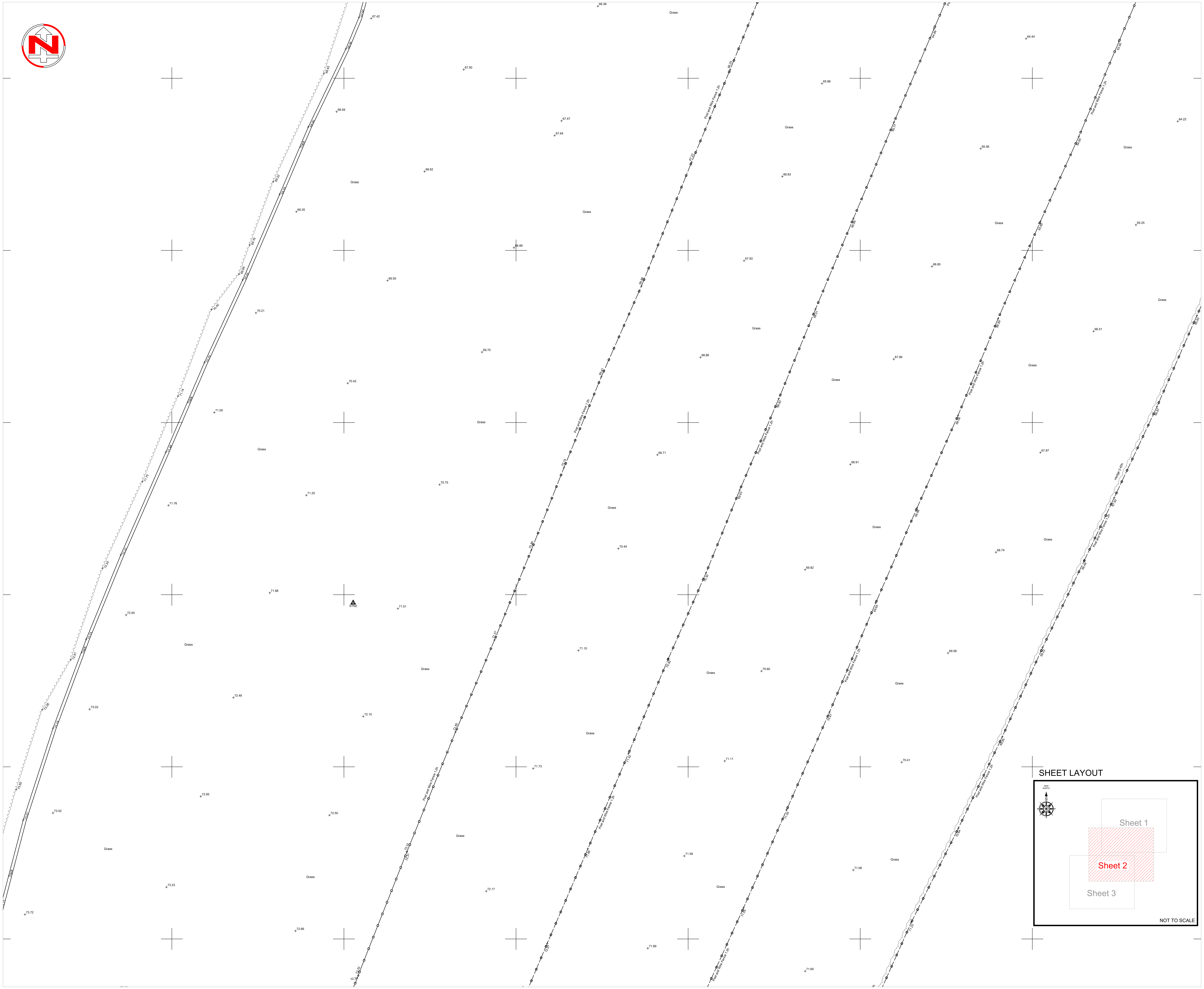
TOPOGRAPHICAL SURVEY

Rev.	Description	Surveyed	Approved	Date

Surveyor:	Checked By:	Approved By:	Date of Survey:	Date of Issue:
NE	AJS	ART	20/10/22	27/10/22

Drawing Status:	Scale:	Paper Size:	Sheet No:
Final	1:200	A1	1 of 3

Project No:	Drawing No:	Revision:
RBS - 22/2948	RBS - 22/2948/001	-



Topographical Survey Abbreviations

AC	AIR CONDITIONING UNIT	LP	LAMP POST
B	BOLLARD	MKR	MARKER POST
BB	BELISHA BEACON	MH	MANHOLE
BED	BED LEVEL	OHC	OVERHEAD CABLE
BH	BOREHOLE (WITH No.)	PM	PARKING METER
BS	BUS STOP	P	POST
BT	BRITISH TELECOM COVER	RE	RODDING EYE
CATV	CABLE TELEVISION COVER	RS	ROAD SIGN
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DO NOT SCALE OFF THIS DRAWING

1:50 - 0 1m 2m 3m 4m 5m
1:100- 0 1m 2m 3m 4m 5m 6m 7m 8m 9m 10m
1:200- 0 2m 4m 6m 8m 10m 12m 14m 16m 18m 20m
1:500- 0 10m 20m 30m 40m 50m

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redbox SURVEYS

Client:

Matthew Bagley

Project:

Hilltop Farm
Hemingfield Road, Hemingfield
Barnsley, S73 0PZ

Drawing Title:

TOPOGRAPHICAL SURVEY

Rev.	Description	Surveyed	Approved	Date

Surveyor: NE
Checked By: AJS
Approved By: ART
Date of Survey: 20/10/22
Date of Issue: 27/10/22
Drawing Status: Final
Scale: 1:200
Paper Size: A1
Sheet No: 2 of 3
Project No: RBS - 22/2948
Drawing No: RBS - 22/2948/001
Revision: -

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▨ BUILDINGS

▨ OPEN SIDED BUILDINGS

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1:200- 0	2m	4m	6m	8m	10m	12m	14m	16m	18m	20m
1:500- 0		10m		20m		30m		40m		50m

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NE	AJS	ART	20/10/22	27/10/22

Drawing Status:	Scale:	Paper Size:	Sheet No:
Final	1:200	A1	3 of 3

Project No:	Drawing No:	Revision:
RBS - 22/2948	RBS - 22/2948/001	-

APPENDIX C

Soakaway Testing

Sirius Geotechnical Ltd
4245 Park Approach
Thorpe Park
Leeds
LS15 8GB

0113 264 9960
www.thesiriusgroup.com

Mr Craig Woolmer
Ptarmigan Land North Ltd
Studio 2
Marlborough House
Westminster Place
York Business Park
York
YO26 6RW

27th November 2023

Ref: 10342/C9756B/AL

Dear Craig,

Land off Hemingfield Road, Hemingfield – Soakaway Infiltration Testing Letter Report

Introduction

Further to the issue of our Preliminary Appraisal (PA) report for the above site (Sirius report ref. C9756, dated April 2023), we have carried out infiltration testing to assess the viability of using soakaway drainage at the site. This letter report summarises the results obtained in November 2023 by Sirius.

It is understood that consideration is being given by Ptarmigan Land North Ltd (Ptarmigan) to development of the site for residential use, although no proposed development layout or levels have been provided at the time of writing.

Whilst this letter discusses pertinent findings of the PA, it should be read in conjunction with the previous PA report, which presents in detail the site setting.

Site Description

Topographically, the site slopes down from the southwest to the northeast, with a change in elevation across the site of c. 20m.

The west of the site mostly comprises a single field, with an area of farm buildings in the southwest. At the time of the fieldworks, the field had been recently cultivated and planted with a crop. A farm track and hedgerow are present along the eastern boundary of this field, with a public footpath on the eastern side. The track leads to an underpass that provides access to farm machinery and pedestrians to the northern side of the Dearne Valley Parkway. The eastern third of the site comprises an area of short grass, with the easternmost part divided into paddocks for horses, with electric fences at their boundaries.

Geological Setting

Mapping provided by the British Geological Survey (BGS) shows that there are no recorded areas of made ground, or superficial deposits, present at the site (although some made ground is likely to be present associated with the developed area of the site).

The majority of the site is shown to be underlain by the Woolley Edge Rock, a named sandstone unit of the Pennine Middle Coal Measures Formation (PMCMF), with a small area in the northwest of the site shown as being underlain by undifferentiated PMCMF strata (likely to comprise mainly mudstone).

Fieldworks

Initial soakaway test locations were selected by Ptarmigan's appointed consultant drainage engineer (Weetwood), with amendments made by Sirius, which were agreed with Weetwood prior to works commencing, as described below. Given that the recorded geology is shown to be relatively similar across the site, the initial locations were chosen in order to target the lowest areas of the site (i.e., adjacent to the site's northern boundary), with one location positioned to target the centre of the site.

Prior to the soakaway testing, Sirius undertook a walkover survey of the site in order to assess potential access restrictions. Observations made at this time showed that the main field in the west of the site was newly cultivated, with bare soil present at surface. Due to exceptionally wet conditions during the preceding weeks, the site was noted to be wet at surface, and therefore it was proposed and agreed that the pits in the western field should be relocated adjacent to the stone access track, so as to minimise damage to the site and to avoid the possibility of plant becoming bogged down in the waterlogged soil.

The soakaway testing was carried out in three locations (SA-A to SA-C) on 15th November 2023. The soakaway test pits were dug with a JCB-3CX backhoe excavator to depths of 1.9m to 2.1m below ground level (bgl), to represent typical soakaway invert depths.

The soakaway testing locations are shown Drawing No. C9756B/01, included within Attachment A to this letter.

Upon completion of excavation, the test pits were installed with 50mm slotted HDPE pipe and backfilled with 10mm washed gravel, in general accordance with BRE Digest 365 (Soakaway Design). Water was added to the test pits using a tractor-towed bowser.

Soakaway tests were undertaken within competent Woolley Edge Rock sandstone. Due to the rapid rate of infiltration, three repeat tests were completed within all soakaway test pits over the course of one day on site.

Following completion of the testing, each soakaway test pit was reinstated by excavating out the gravel, removing the installed pipes, and replacing the excavated materials in the approximate order of excavation, with topsoil replaced at surface.

Ground Conditions

Ground conditions encountered within the soakaway test locations are summarised in the table below. Trial pit logs are provided as Attachment B to this letter.

All trial pits remained dry and stable during excavation.

Table 1.1 - Summary of Ground Conditions

Strata	Depth Range (Thickness Range)	Description and Comments
Topsoil	Ground level (0.4m)	Dark brown slightly gravelly sandy clayey topsoil was encountered within each trial pit.
Residual Soils	0.4m bgl (0.1m)	A thin layer of orangish brown clayey gravelly sand (originating from weathering of the underlying bedrock) was found to underlie topsoil in SA-B and SA-C.
Woolley Edge Rock	0.4m to 0.5m bgl (Depth to base not proven)	Moderately weak yellow sandstone was encountered in each trial pit. The rock became medium strong and difficult to excavate at depths of 1.7m to 2.0m bgl.

A summary of the testing results is provided in Table 1.2. The full testing results are provided as Attachment C.

Table 1.2 - Summary of Soakaway Test Results

Soakaway Location	Test No.	Test Depths (m bgl)	Ground Conditions	Infiltration Rate (m/s)
SA-A	1	0.84 – 1.90	Sandstone	1.94×10^{-4}
	2	0.73 – 1.72		1.96×10^{-4}
	3	0.80 – 1.71		1.92×10^{-4}
SA-B	1	0.62 – 2.00	Sandstone	4.14×10^{-4}
	2	0.87 – 2.00		5.99×10^{-4}
	3	0.74 – 2.00		4.04×10^{-4}
SA-C	1	0.86 – 2.10	Sandstone	3.87×10^{-4}
	2	0.80 – 2.10		3.25×10^{-4}
	3	0.82 – 2.10		3.03×10^{-4}

Conclusions and Recommendations

In accordance BRE Digest 365, the lowest infiltration rate recorded at each location should be used as the design rate.

Based on the results of the infiltration testing, it is considered that soakaway drainage is likely to be suitable into the sandstone bedrock at the site.

It is recommended that a site-wide intrusive site investigation is undertaken in order to confirm that ground conditions suitable for soakaways are present across the site, or otherwise identify areas of potentially unsuitable ground conditions (e.g., low permeability clay and mudstone).

The suitability and final design of soakaway drainage for the site should be confirmed by a suitably qualified engineer as part of the drainage strategy.

The conclusions and recommendations presented in this letter report are considered reasonable based on the findings of the work described. However, these cannot be guaranteed to gain regulatory or other approvals and, therefore, the report should be passed by the client to the appropriate regulatory authorities and/or other appropriate organisations for their comment and approval prior to undertaking any development works at the site.

Yours sincerely,

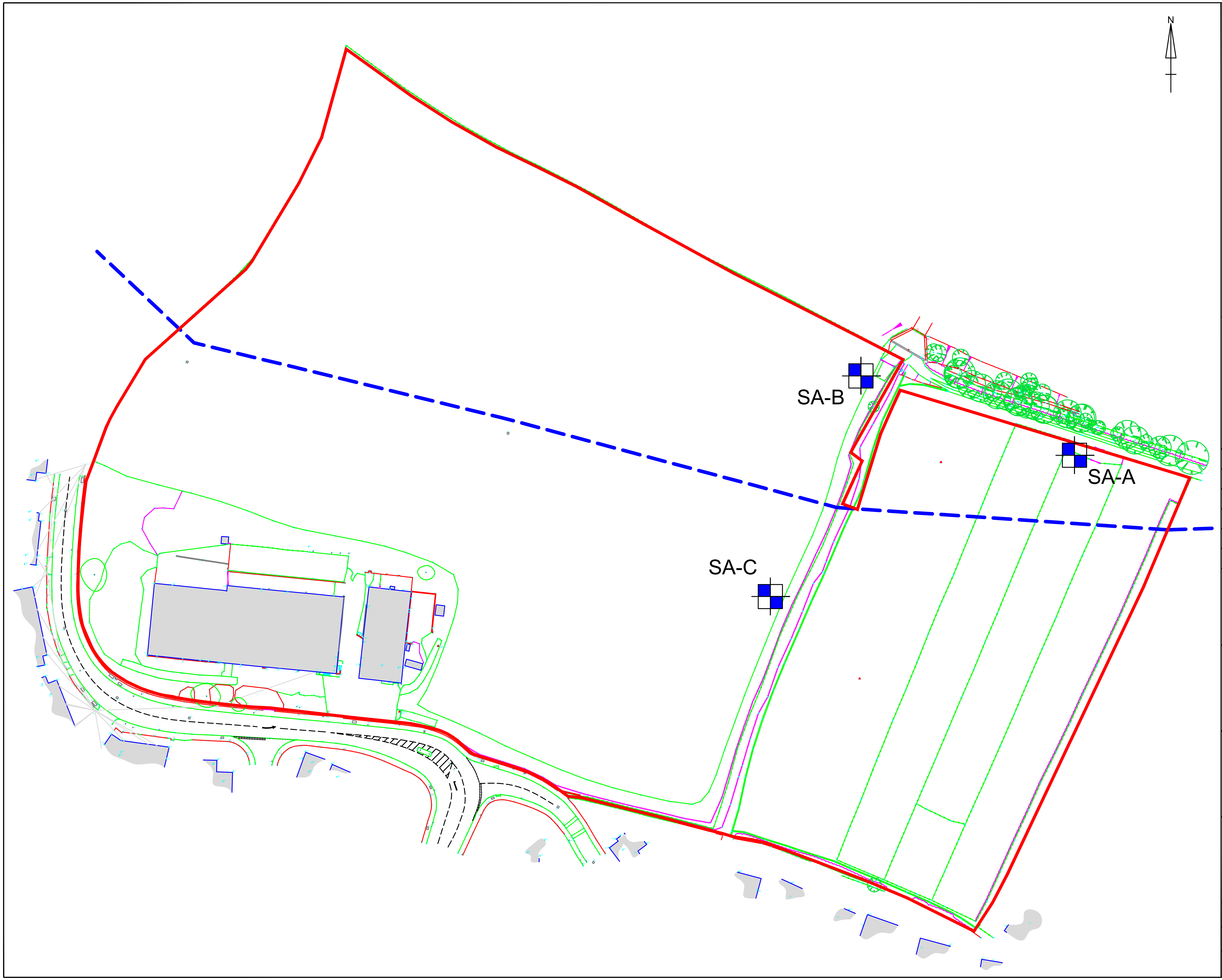
Andrew Lake
Senior Engineer

For and on behalf of
Sirius Geotechnical Ltd

Enc.: Attachment A. Drawings
Attachment B. Trial Pit Logs
Attachment C. Soakaway Testing Results

ATTACHMENT A

DRAWING



KEY

- Approximate site boundary
- Indicative route of underground sewer
- Soakaway Test Pit Location

Notes

1. This drawing should not be viewed in isolation from the accompanying report.
2. The locations of services shown on this drawing are approximate and are based on utility plans provided by the client. Locations of services are given for the purposes of indicating constraints to the site investigation only. Reference should be made to original utility plans and HSG47 for locating of services within the site.
3. All marked site features (including historical features, potential contaminant constraints, and any other potential constraint or feature of note) shown on this drawing are given for indicative purposes only. This drawing should not be underlaid in isolation to determine proposed development layouts. Reference should be made to the accompanying report for commentary on the potential location of these features including coordinates if available and any further works required to locate features if required.

REVISION		BY	DATE
0	For Information	AL	15/11/23
A	>>	>>	>>
B	>>	>>	>>
C	>>	>>	>>
D	>>	>>	>>

SIRIUS
GEOTECHNICAL LTD
4245 Park Approach,
Thorpe Park,
Leeds
LS15 8GB
www.thesiriusgroup.com
TEL: 0113 264 9960
FAX: 0113 264 9962

CLIENT

Ptarmigan Land North Ltd

SITE

Hemingfield Road, Hemingfield

DRAWING TITLE

Soakaway Test Pit Location Plan

DRAWING NO.
C9756B/01

REVISION NO.
0

DRAWN BY
AL

APPROVED BY
AMG

DATE
November 2023

SCALE
1:1,250

PAPER SIZE
A3

ATTACHMENT B

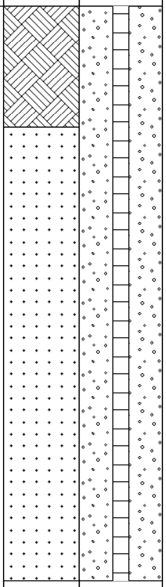
TRIAL PIT LOGS

TRIAL PIT RECORD

TP No. **SA-A**
Sheet 1 of 1

Site: Hemingfield Road, Hemingfield
Contract No: C9756
Client: Ptarmigan Land North Ltd
Date: 15/11/2023
Method: JCB 3CX excavator with 600mm toothed bucket
Scale: 1:25
Logged By: J.C
Checked By: AMG

SAMPLE DETAILS				STRATA RECORD				
Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)	Legend	Backfill
				Dark brown slightly gravelly sandy clayey TOPSOIL. Gravel is angular to subrounded fine to medium of sandstone and quartz.	0.40	63.10		
				Moderately weak yellowish brown SANDSTONE. Recovered as slightly clayey sandy angular to subangular fine to coarse gravel. [WOOLLEY EDGE ROCK] *From 1.70m bgl: Becoming medium strong.*	1.90	61.60		
				End of trial pit at 1.90m				



Depth scale: 1, 2, 3, 4, 5

Remarks and Groundwater Observations

1. Trial pit refusal on bedrock at 1.90m bgl. 2. Remained dry and stable throughout excavation. 3. Installed as soakaway test pit, with 50mm slotted monitoring pipe and backfilled with pea gravel. 4. Coordinates and elevation estimated from topographic survey.

GL (m AOD)
63.50
Easting:
439458.00
Northing:
401819.00

Fig No.
SA-A

TRIAL PIT RECORD

Site:	Hemingfield Road, Hemingfield	TP No.	**SA-B** Sheet 1 of 1
Client:	Ptarmigan Land North Ltd	Contract No:	C9756
Method:	JCB 3CX excavator with 600mm toothed bucket	Date:	15/11/2023
		Scale:	1:25
		Logged By: J.C	Checked By: AMG

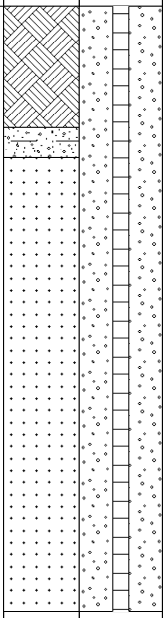
SAMPLE DETAILS

STRATA RECORD

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)
				Dark brown slightly gravelly sandy clayey TOPSOIL. Gravel is angular to subrounded fine to medium of sandstone, mudstone, quartz and rare brick.	0.40	64.10
				Orangish brown clayey gravelly fine to coarse SAND. Gravel is angular to subrounded fine to medium of sandstone. [RESIDUAL WOOLLEY EDGE ROCK]	0.50	64.00
				Moderately weak yellow SANDSTONE. Recovered as slightly clayey sandy angular to subangular fine to coarse gravel. [WOOLLEY EDGE ROCK] *From 1.80m bgl: Becoming medium strong.*	2.00	62.50
				End of trial pit at 2.00m		

Depth scale: 1, 2, 3, 4, 5

Legend | Backfill



Remarks and Groundwater Observations

1. Trial pit refusal on bedrock at 2.00m bgl. 2. Remained dry and stable throughout excavation. 3. Installed as soakaway test pit, with 50mm slotted monitoring pipe and backfilled with pea gravel. 4. Coordinates and elevation estimated from topographic survey.

GL (m AOD)	64.50
Easting:	439381.00
Northing:	401847.00

Fig No.

SA-B

TRIAL PIT RECORD

TP No. **SA-C**
Sheet 1 of 1

Site: Hemingfield Road, Hemingfield	Contract No: C9756
Client: Ptarmigan Land North Ltd	Date: 15/11/2023
Method: JCB 3CX excavator with 600mm toothed bucket	Scale: 1:25

Logged By: J.C Checked By: AMG

SAMPLE DETAILS STRATA RECORD

Type	Depth From - To(m)	Vane Results (kN/m2) {}{ppm}	Ground -water	Description	Depth (m)	Level (m AOD)
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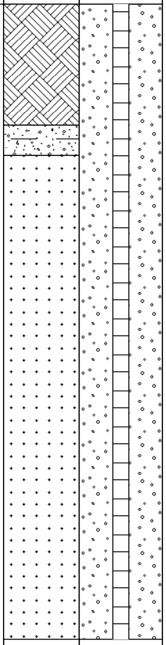
				Orangish brown clayey gravelly fine to coarse SAND. Gravel is angular to subrounded fine to medium of sandstone. [RESIDUAL WOOLLEY EDGE ROCK]	0.50	71.50
				Moderately weak yellow SANDSTONE. Recovered as slightly clayey sandy angular to subangular fine to coarse gravel. [WOOLLEY EDGE ROCK] *From 2.00m bgl: Becoming medium strong.*	2.10	69.90
				End of trial pit at 2.10m		



Remarks and Groundwater Observations

1. Trial pit refusal on bedrock at 2.10m bgl. 2. Remained dry and stable throughout excavation. 3. Installed as soakaway test pit, with 50mm slotted monitoring pipe and backfilled with pea gravel. 4. Coordinates and elevation estimated from topographic survey.

GL (m AOD)
72.00
Easting:
439349.00
Northing:
401768.00

Fig No.
SA-C

ATTACHMENT C

SOAKAWAY TESTING RESULTS

SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 2016

Client: **Ptarmigan Land North Ltd**
Site: **Hemingfield Road, Hemingfield**
Job No: **C9756** **Test No:** **SAA - Test 1**

CALCULATION OF SOIL INFILTRATION RATE

Time (min)	Depth (mm)
0	840
1	1100
2	1300
3	1430
4	1500
5	1590
6	1680
10	1900

Size of Soakaway

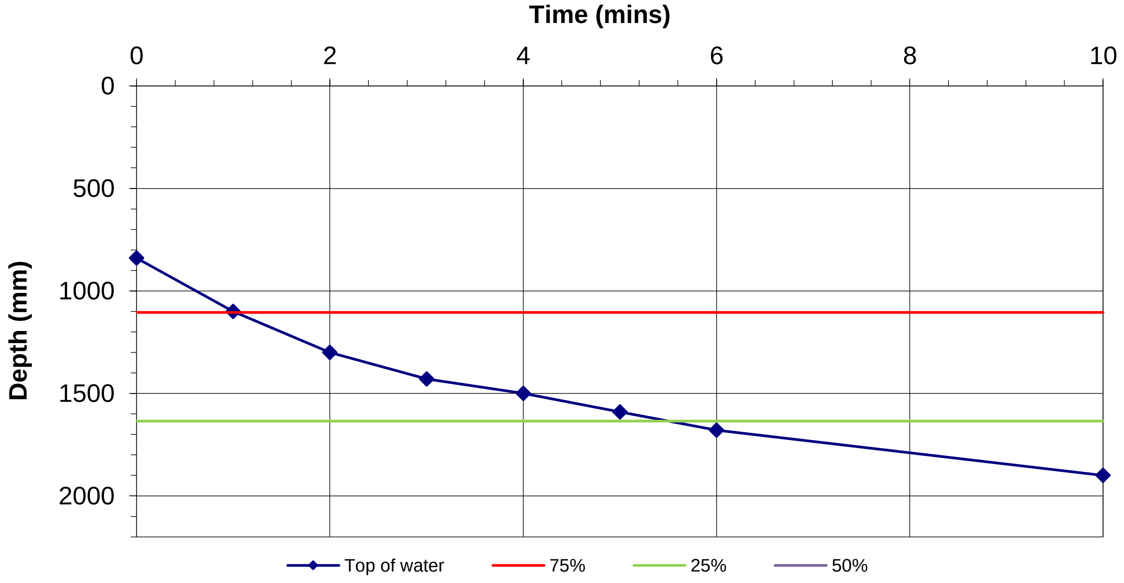
Length (m) =	2.05
Width (m) =	0.70
Depth (m) =	1.90

Depth at start of test (mm)= 840mm
Depth of trial pit (mm)= 1900mm
75% effective depth (mm)= 1105mm
50% effective depth = 1370mm
25% effective depth = 1635mm
Assumed Void Ratio in Pit = 0.3
Base area of pit (m^2) = 1.435
Effective area of loss 50% (m^2) = 4.350
Volume outflow 75 - 25% (m^3) = 0.228

From the graph:
tp 75 (min) = 1.1
tp 25 (min) = 5.6

Soil infiltration rate, f, (m/s) = **1.94E-04**

Input by: **JC** **Date:** **15/11/2023**
Checked by: **AMG** **Date:** **17/11/2023**



SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 2016

Client: Ptarmigan Land North Ltd
Site: Hemingfield Road, Hemingfield
Job No: C9756 **Test No:** SAA - Test 2

CALCULATION OF SOIL INFILTRATION RATE

Time (min)	Depth (mm)
0	730
1	940
2	1120
3	1380
4	1480
5	1550
6	1610
7	1720

Size of Soakaway

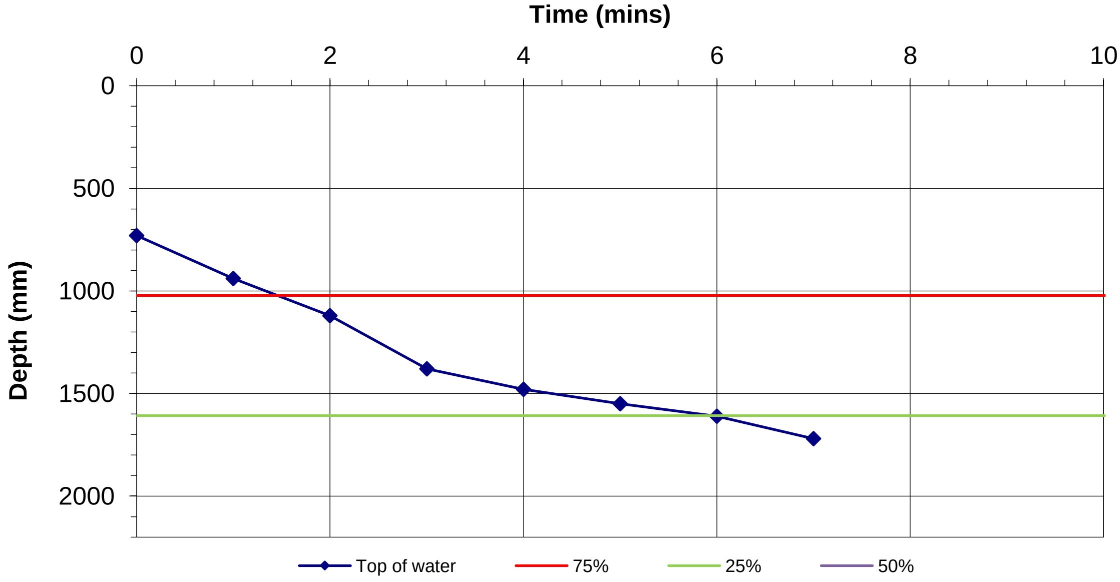
Length (m) =	2.05
Width (m) =	0.70
Depth (m) =	1.90

Depth at start of test (mm)= 730mm
Depth of trial pit (mm)= 1900mm
75% effective depth (mm)= 1023mm
50% effective depth = 1315mm
25% effective depth = 1608mm
Assumed Void Ratio in Pit = 0.3
Base area of pit (m^2) = 1.435
Effective area of loss 50% (m^2) = 4.653
Volume outflow 75 - 25% (m^3) = 0.252

From the graph:
tp 75 (min) = 1.4
tp 25 (min) = 6

Soil infiltration rate, f, (m/s) = **1.96E-04**

Input by:	**JC**	**Date:**	**15/11/2023**
Checked by:	**AMG**	**Date:**	**17/11/2023**



SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 2016

Client: Ptarmigan Land North Ltd
Site: Hemingfield Road, Hemingfield
Job No: C9756 **Test No:** SAA - Test 3

CALCULATION OF SOIL INFILTRATION RATE

Time (min)	Depth (mm)
0	800
1	1000
2	1170
3	1340
4	1460
5	1570
6	1630
7	1710

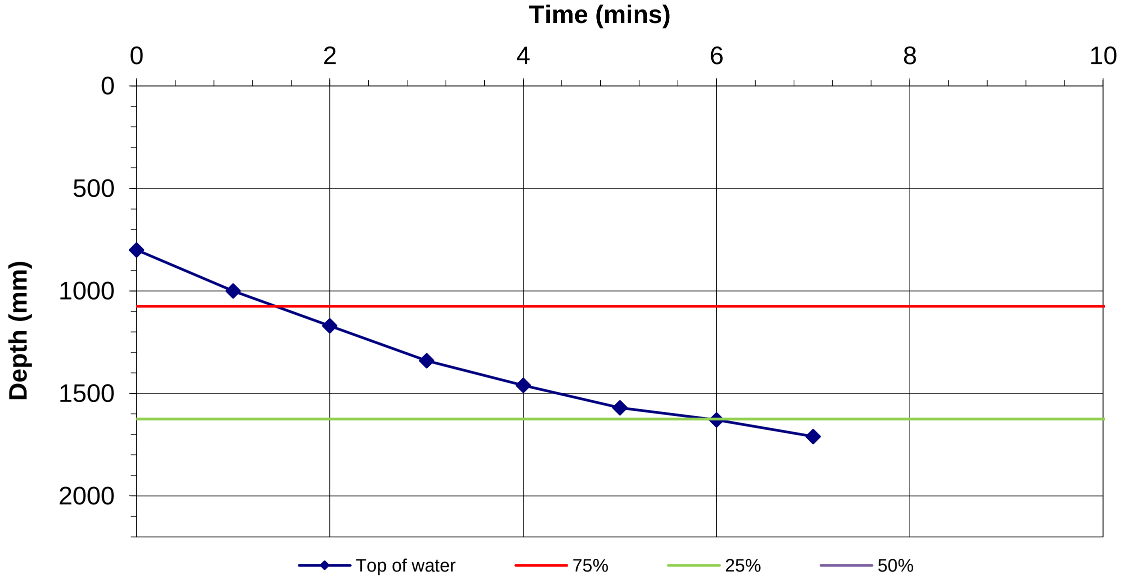
Size of Soakaway	Length (m) =	2.05
	Width (m) =	0.70
	Depth (m) =	1.90

Depth at start of test (mm)= 800mm
Depth of trial pit (mm)= 1900mm
75% effective depth (mm)= 1075mm
50% effective depth = 1350mm
25% effective depth = 1625mm
Assumed Void Ratio in Pit = 0.3
Base area of pit (m^2) = 1.435
Effective area of loss 50% (m^2) = 4.460
Volume outflow 75 - 25% (m^3) = 0.237

From the graph:
tp 75 (min) = 1.5
tp 25 (min) = 6.1

Soil infiltration rate, f, (m/s) = **1.92E-04**

Input by:	**JC**	**Date:**	**15/11/2023**
Checked by:	**AMG**	**Date:**	**17/11/2023**



SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 2016

Client: Ptarmigan Land North Ltd

Site: Hemingfield Road, Hemingfield

Job No: C9756 **Test No:** SAB - Test 1

CALCULATION OF SOIL INFILTRATION RATE

Time (min)	Depth (mm)
0	620
1	1100
2	1400
3	1640
4	2000

Size of Soakaway		
	Length (m) =	2.13
	Width (m) =	0.70
	Depth (m) =	2.00

Depth at start of test (mm)= 620mm

Depth of trial pit (mm)= 2000mm

75% effective depth (mm)= 965mm

50% effective depth = 1310mm

25% effective depth = 1655mm

Assumed Void Ratio in Pit = 0.3

Base area of pit (m^2) = 1.491

Effective area of loss 50% (m^2) = 5.396

Volume outflow 75 - 25% (m^3) = 0.309

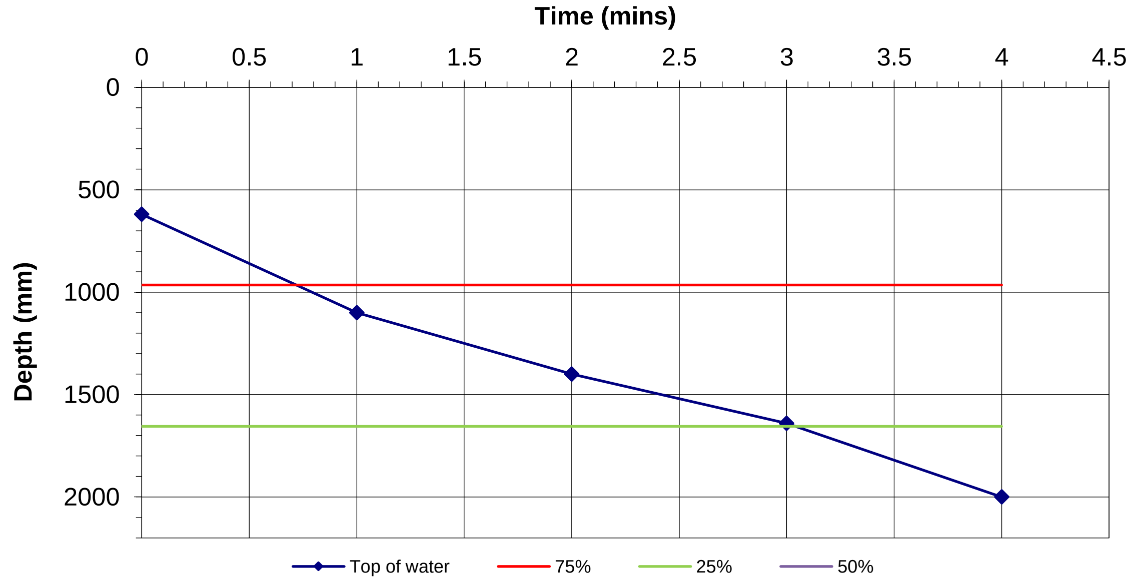
From the graph:

tp 75 (min) = 0.8

tp 25 (min) = 3.1

Soil infiltration rate, f, (m/s) = **4.14E-04**

Input by:	**JC**	**Date:**	**15/11/2023**
Checked by:	**AMG**	**Date:**	**17/11/2023**



SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 2016

Client: Ptarmigan Land North Ltd
Site: Hemingfield Road, Hemingfield
Job No: C9756 **Test No:** SAB - Test 2

CALCULATION OF SOIL INFILTRATION RATE

Time (min)	Depth (mm)
0	870
1	1230
2	1640
3	2000

Size of Soakaway

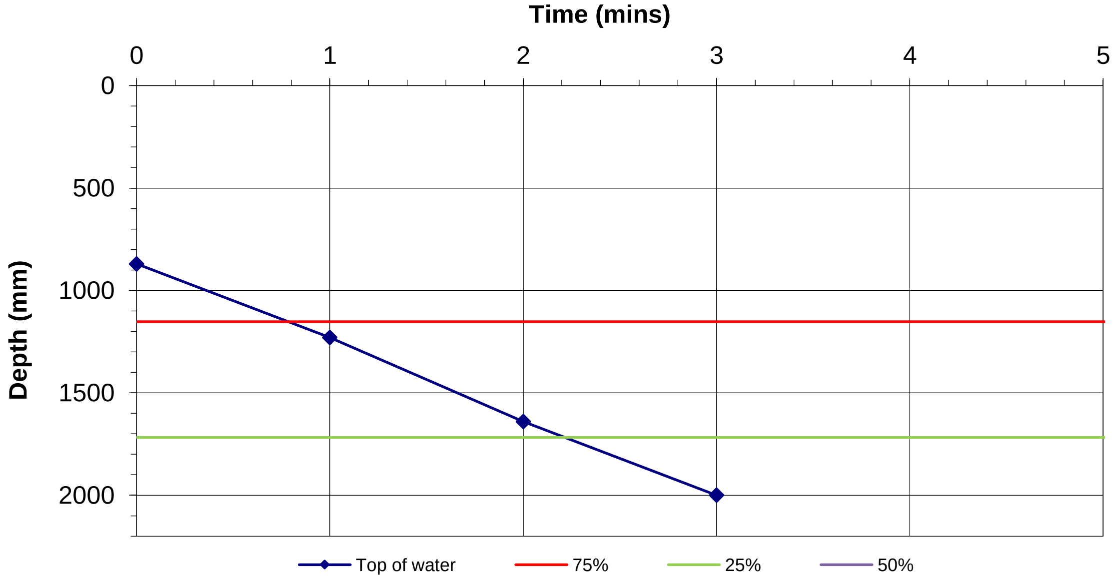
Length (m) =	2.13
Width (m) =	0.70
Depth (m) =	2.00

Depth at start of test (mm)= 870mm
Depth of trial pit (mm)= 2000mm
75% effective depth (mm)= 1153mm
50% effective depth = 1435mm
25% effective depth = 1718mm
Assumed Void Ratio in Pit = 0.3
Base area of pit (m^2) = 1.491
Effective area of loss 50% (m^2) = 4.689
Volume outflow 75 - 25% (m^3) = 0.253

From the graph:
tp 75 (min) = 0.8
tp 25 (min) = 2.3

Soil infiltration rate, f, (m/s) = **5.99E-04**

Input by: **JC** **Date:** **15/11/2023**
Checked by: **AMG** **Date:** **17/11/2023**



SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 2016

Client: Ptarmigan Land North Ltd
Site: Hemingfield Road, Hemingfield
Job No: C9756 **Test No:** SAB - Test 3

CALCULATION OF SOIL INFILTRATION RATE

Time (min)	Depth (mm)
0	740
1	1190
2	1520
3	1700
4	1920
5	2000

Size of Soakaway

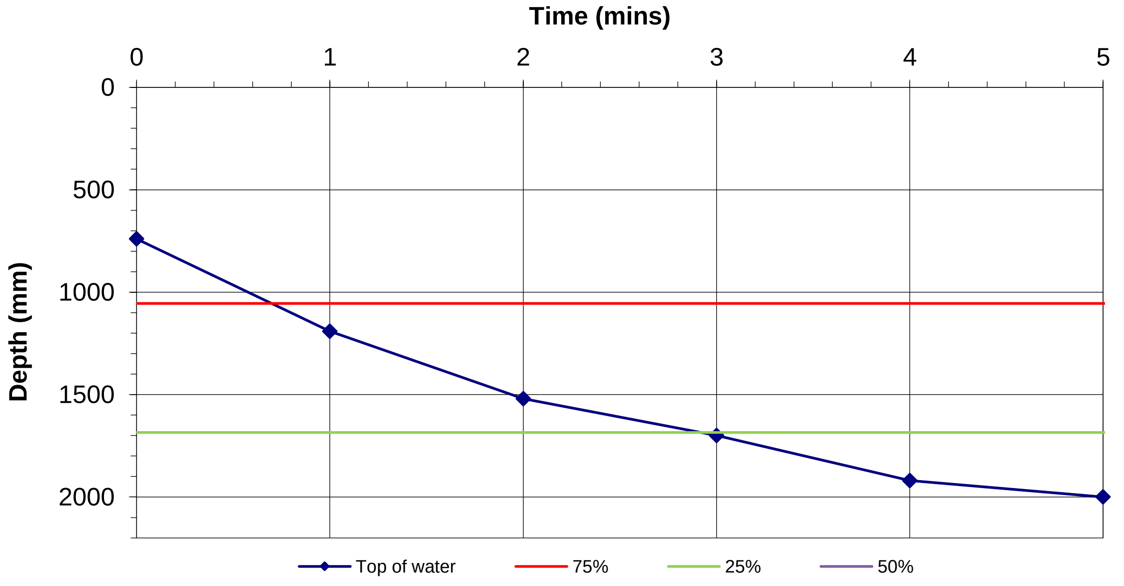
Length (m) =	2.13
Width (m) =	0.70
Depth (m) =	2.00

Depth at start of test (mm)= 740mm
Depth of trial pit (mm)= 2000mm
75% effective depth (mm)= 1055mm
50% effective depth = 1370mm
25% effective depth = 1685mm
Assumed Void Ratio in Pit = 0.3
Base area of pit (m^2) = 1.491
Effective area of loss 50% (m^2) = 5.057
Volume outflow 75 - 25% (m^3) = 0.282

From the graph:
tp 75 (min) = 0.7
tp 25 (min) = 3

Soil infiltration rate, f, (m/s) = **4.04E-04**

Input by: **JC** **Date:** **15/11/2023**
Checked by: **AMG** **Date:** **17/11/2023**



SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 2016

Client: **Ptarmigan Land North Ltd**

Site: **Hemingfield Road, Hemingfield**

Job No: **C9756** **Test No:** **SAC - Test 1**

CALCULATION OF SOIL INFILTRATION RATE

Time (min)	Depth (mm)
0	860
1	1240
2	1470
3	1730
4	2000
5	2100

Size of Soakaway		
	Length (m) =	2.20
	Width (m) =	0.70
	Depth (m) =	2.10

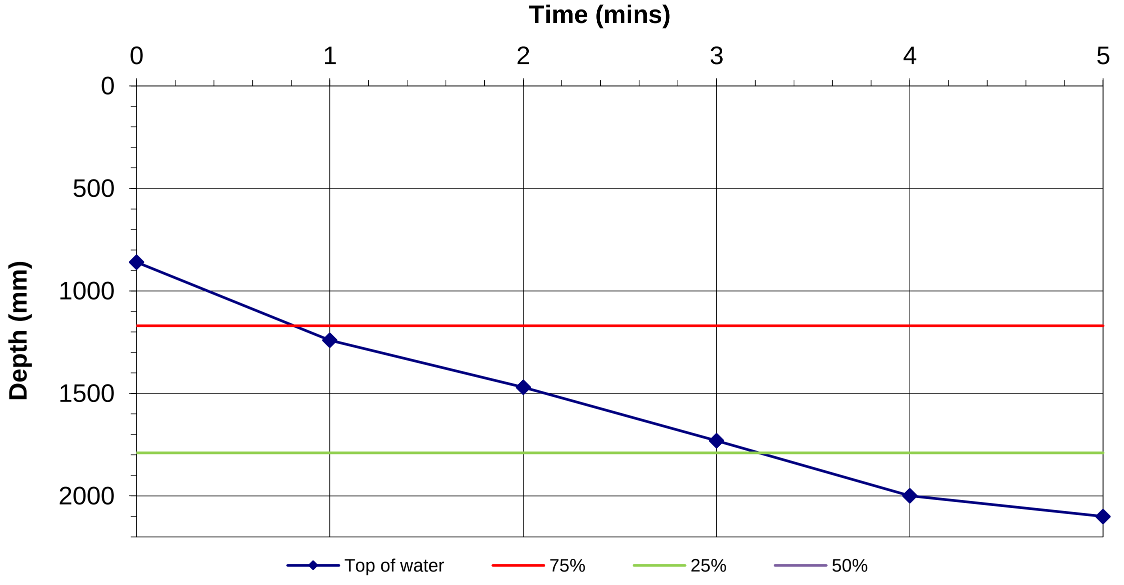
Depth at start of test (mm)=	860mm
Depth of trial pit (mm)=	2100mm
75% effective depth (mm)=	1170mm
50% effective depth =	1480mm
25% effective depth =	1790mm
Assumed Void Ratio in Pit =	0.3
Base area of pit (m^2) =	1.540
Effective area of loss 50% (m^2) =	5.136
Volume outflow 75 - 25% (m^3) =	0.286

From the graph:

tp 75 (min) =	0.9
tp 25 (min) =	3.3

Soil infiltration rate, f, (m/s) = **3.87E-04**

Input by:	**JC**	**Date:**	**15/11/2023**
Checked by:	**AMG**	**Date:**	**17/11/2023**



SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 2016

Client: Ptarmigan Land North Ltd
Site: Hemingfield Road, Hemingfield
Job No: C9756 **Test No:** SAC - Test 2

CALCULATION OF SOIL INFILTRATION RATE

Time (min)	Depth (mm)
0	800
1	1190
2	1390
3	1660
4	1870
5	2100

Size of Soakaway

Length (m) =	2.20
Width (m) =	0.70
Depth (m) =	2.10

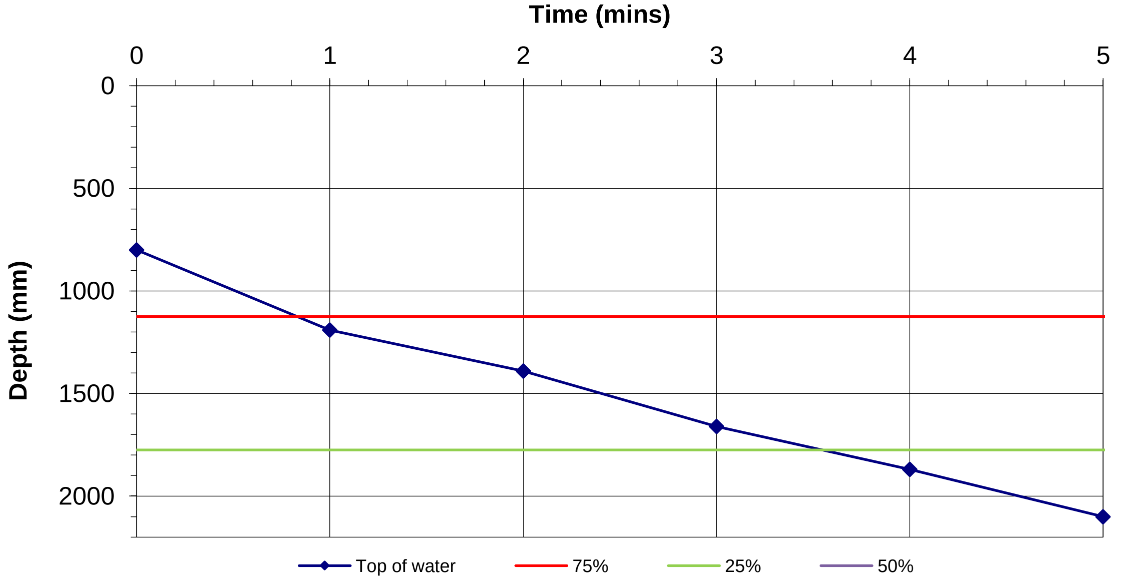
Depth at start of test (mm)=	800mm
Depth of trial pit (mm)=	2100mm
75% effective depth (mm)=	1125mm
50% effective depth =	1450mm
25% effective depth =	1775mm
Assumed Void Ratio in Pit =	0.3
Base area of pit (m^2) =	1.540
Effective area of loss 50% (m^2) =	5.310
Volume outflow 75 - 25% (m^3) =	0.300

From the graph:

tp 75 (min) =	0.8
tp 25 (min) =	3.7

Soil infiltration rate, f, (m/s) = **3.25E-04**

Input by:	**JC**	**Date:**	**15/11/2023**
Checked by:	**AMG**	**Date:**	**17/11/2023**



SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 2016

Client: Ptarmigan Land North Ltd
Site: Hemingfield Road, Hemingfield
Job No: C9756 **Test No:** SAC - Test 3

CALCULATION OF SOIL INFILTRATION RATE

Time (min)	Depth (mm)
0	820
1	1120
2	1330
3	1590
4	1770
5	1920
6	2100

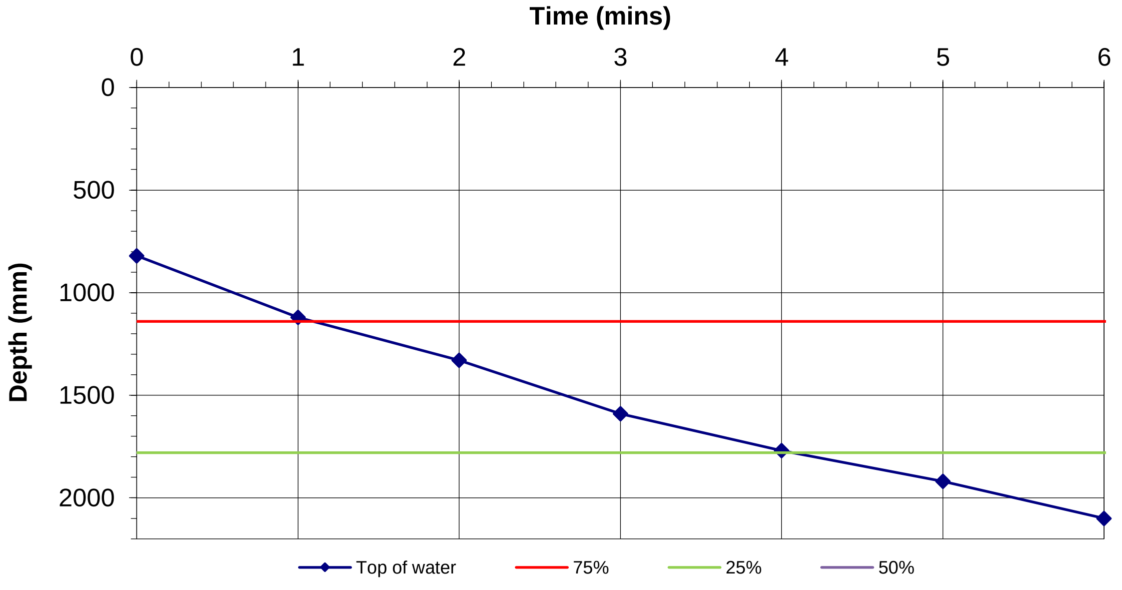
Size of Soakaway		
	Length (m) =	2.20
	Width (m) =	0.70
	Depth (m) =	2.10

Depth at start of test (mm)= 820mm
Depth of trial pit (mm)= 2100mm
75% effective depth (mm)= 1140mm
50% effective depth = 1460mm
25% effective depth = 1780mm
Assumed Void Ratio in Pit = 0.3
Base area of pit (m^2) = 1.540
Effective area of loss 50% (m^2) = 5.252
Volume outflow 75 - 25% (m^3) = 0.296

From the graph:
tp 75 (min) = 1
tp 25 (min) = 4.1

Soil infiltration rate, f, (m/s) = **3.03E-04**

Input by:	**JC**	**Date:**	**15/11/2023**
Checked by:	**AMG**	**Date:**	**17/11/2023**



APPENDIX D

Greenfield Runoff Calculations

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by: Keely Bonser

Site name: 6041 Hemingfield Road

Site location:

Site Details

Latitude: 53.51140° N

Longitude: 1.40904° W

Reference: 4076324892

Date: Oct 09 2023 11:15

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

Runoff estimation approach

IH124

Site characteristics

Total site area (ha): 1

Methodology

Q_{BAR} estimation method: Calculate from SPR and SAAR

SPR estimation method: Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	2	2
HOST class:	N/A	N/A
SPR/SPRHOST:	0.3	0.3

Hydrological characteristics

	Default	Edited
SAAR (mm):	631	631
Hydrological region:	3	3
Growth curve factor 1 year:	0.86	0.86
Growth curve factor 30 years:	1.75	1.75
Growth curve factor 100 years:	2.08	2.08
Growth curve factor 200 years:	2.37	2.37

Notes

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

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

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

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

(3) Is SPR/SPRHOST ≤ 0.3?

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

Greenfield runoff rates

	Default	Edited
Q_{BAR} (l/s):	1.61	1.61
1 in 1 year (l/s):	1.39	1.39
1 in 30 years (l/s):	2.82	2.82
1 in 100 year (l/s):	3.36	3.36
1 in 200 years (l/s):	3.83	3.83

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement , which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

APPENDIX E

Surface Water Attenuation - Storage Volume Calculation

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 61 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	0.669	0.669	117.9	0.0	117.9	491.0	O K
30 min Summer	0.805	0.805	131.2	0.0	131.2	617.1	O K
60 min Summer	0.874	0.874	137.9	0.0	137.9	683.6	O K
120 min Summer	0.875	0.875	138.0	0.0	138.0	685.0	O K
180 min Summer	0.839	0.839	134.5	0.0	134.5	649.4	O K
240 min Summer	0.796	0.796	130.3	0.0	130.3	608.2	O K
360 min Summer	0.713	0.713	122.2	0.0	122.2	530.9	O K
480 min Summer	0.639	0.639	115.0	0.0	115.0	464.5	O K
600 min Summer	0.572	0.572	108.6	0.0	108.6	407.0	O K
720 min Summer	0.512	0.512	102.9	0.0	102.9	357.1	O K
960 min Summer	0.409	0.409	93.3	0.0	93.3	275.7	O K
1440 min Summer	0.255	0.255	79.1	0.0	79.1	163.4	O K
2160 min Summer	0.111	0.111	66.2	0.0	66.2	68.0	O K
2880 min Summer	0.049	0.049	59.3	0.0	59.3	29.3	O K
4320 min Summer	0.036	0.036	43.0	0.0	43.0	21.1	O K
5760 min Summer	0.029	0.029	34.4	0.0	34.4	17.0	O K
7200 min Summer	0.024	0.024	28.9	0.0	28.9	14.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	126.113	0.0	598.0	21
30 min Summer	84.299	0.0	799.5	33
60 min Summer	53.779	0.0	1020.1	52
120 min Summer	33.149	0.0	1257.7	86
180 min Summer	24.624	0.0	1401.5	122
240 min Summer	19.809	0.0	1503.2	156
360 min Summer	14.513	0.0	1652.0	222
480 min Summer	11.640	0.0	1766.6	286
600 min Summer	9.801	0.0	1859.4	350
720 min Summer	8.511	0.0	1937.8	412
960 min Summer	6.807	0.0	2066.5	534
1440 min Summer	4.960	0.0	2258.3	774
2160 min Summer	3.606	0.0	2463.2	1128
2880 min Summer	2.873	0.0	2616.3	1468
4320 min Summer	2.082	0.0	2843.9	2200
5760 min Summer	1.655	0.0	3013.6	2912
7200 min Summer	1.384	0.0	3150.3	3552

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
8640 min Summer	0.021	0.021	24.7	0.0	24.7	12.4	O K
10080 min Summer	0.019	0.019	22.2	0.0	22.2	11.0	O K
15 min Winter	0.741	0.741	124.9	0.0	124.9	556.2	O K
30 min Winter	0.893	0.893	139.9	0.0	139.9	703.3	O K
60 min Winter	0.973	0.973	147.8	0.0	147.8	784.6	O K
120 min Winter	0.967	0.967	147.2	0.0	147.2	778.5	O K
180 min Winter	0.912	0.912	141.7	0.0	141.7	722.1	O K
240 min Winter	0.848	0.848	135.4	0.0	135.4	658.6	O K
360 min Winter	0.728	0.728	123.6	0.0	123.6	544.2	O K
480 min Winter	0.623	0.623	113.5	0.0	113.5	450.4	O K
600 min Winter	0.531	0.531	104.7	0.0	104.7	372.8	O K
720 min Winter	0.451	0.451	97.2	0.0	97.2	308.2	O K
960 min Winter	0.318	0.318	84.9	0.3	84.9	208.5	O K
1440 min Winter	0.135	0.135	68.4	0.2	68.4	83.4	O K
2160 min Winter	0.045	0.045	54.2	0.3	54.2	26.6	O K
2880 min Winter	0.036	0.036	43.0	0.3	43.0	21.2	O K
4320 min Winter	0.026	0.026	31.3	0.4	31.3	15.5	O K
5760 min Winter	0.021	0.021	25.3	0.3	25.3	12.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
8640 min Summer	1.195	0.0	3264.7	4400
10080 min Summer	1.057	0.0	3368.3	5104
15 min Winter	126.113	0.0	669.8	22
30 min Winter	84.299	0.0	895.5	33
60 min Winter	53.779	0.0	1142.6	56
120 min Winter	33.149	0.0	1408.7	92
180 min Winter	24.624	0.0	1569.7	130
240 min Winter	19.809	0.0	1683.7	166
360 min Winter	14.513	0.0	1850.3	236
480 min Winter	11.640	0.0	1978.6	302
600 min Winter	9.801	0.0	2082.5	366
720 min Winter	8.511	0.0	2170.4	430
960 min Winter	6.807	0.0	2314.4	552
1440 min Winter	4.960	0.0	2529.4	786
2160 min Winter	3.606	0.0	2758.8	1084
2880 min Winter	2.873	0.0	2930.4	1452
4320 min Winter	2.082	0.0	3185.2	2180
5760 min Winter	1.655	0.0	3375.4	2928

Summary of Results for 100 year Return Period (+40%)

Storm Event	**Max Level (m)**	**Max Depth (m)**	**Max Infiltration (l/s)**	**Max Control (l/s)**	**Max Σ Outflow (l/s)**	**Max Volume (m³)**	**Status**
7200 min Winter	0.018	0.018	21.0	0.3	21.0	10.4	O K
8640 min Winter	0.015	0.015	18.0	0.3	18.0	9.0	O K
10080 min Winter	0.014	0.014	16.3	0.8	16.3	8.0	O K

Storm Event	**Rain (mm/hr)**	**Flooded Volume (m³)**	**Discharge Volume (m³)**	**Time-Peak (mins)**
7200 min Winter	1.384	0.0	3528.1	3656
8640 min Winter	1.195	0.0	3656.4	4296
10080 min Winter	1.057	0.0	3772.3	5080

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Shortest Storm (mins)	15
Ratio R	0.362	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 2.530

Time From:	**(mins) To:**	**Area (ha)**	**Time From:**	**(mins) To:**	**Area (ha)**	**Time From:**	**(mins) To:**	**Area (ha)**
0	4	1.000	4	8	1.000	8	12	0.530

Model Details

Storage is Online Cover Level (m) 1.300

Infiltration Basin Structure

Invert Level (m) 0.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.69120 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.69120

Depth (m)	**Area (m²)**	**Depth (m)**	**Area (m²)**
0.000	588.0	1.300	1232.0

Pump Outflow Control

Invert Level (m) 0.000

Depth (m)	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**
0.100	0.0000	0.900	0.0000	1.700	0.0000	2.500	0.0000
0.200	0.0000	1.000	0.0000	1.800	0.0000	2.600	0.0000
0.300	0.0000	1.100	0.0000	1.900	0.0000	2.700	0.0000
0.400	0.0000	1.200	0.0000	2.000	0.0000	2.800	0.0000
0.500	0.0000	1.300	0.0000	2.100	0.0000	2.900	0.0000
0.600	0.0000	1.400	0.0000	2.200	0.0000	3.000	0.0000
0.700	0.0000	1.500	0.0000	2.300	0.0000		
0.800	0.0000	1.600	0.0000	2.400	0.0000		

APPENDIX F

Illustrative Drainage Layout

PUBLIC SEWER EASEMENT

NO BUILDINGS 3m EITHER SIDE OF SEWER CENTRE-LINE (SHOWN)
NO TREES PLANTED WITHIN 5m OF THE SEWER

TOTAL IMPERMEABLE AREA = 2.530 ha (55% OF TOTAL 4.6 ha DEVELOPABLE AREA)

INFILTRATION BASIN

INFILTRATION RATE = 1.92×10^{-4} m/s (0.6912 m/hr)
TOTAL IMPERMEABLE AREA = 2.530 ha

TOP AREA = 1,232.0 m²
BASE AREA = 588.0 m²
SIDE SLOPES = 1:4
DEPTH = 1.3 m

1 IN 100 +40%CC AEP RAINFALL EVENT MAX.
WATER LEVEL = 0.973 m
(0.327 m FREEBOARD)

KEY

—	EXISTING PUBLIC COMBINED SEWER
●	EXISTING PUBLIC COMBINED MANHOLE
🟦	EXISTING WATERCOURSE/POND
🟨	PUBLIC SEWER EASEMENT
- · -	PROPOSED FOUL WATER SEWER
- - -	PROPOSED SURFACE WATER SEWER
🔴	PROPOSED COMBINED MANHOLE
🟤	PROPOSED FOUL WATER MANHOLE
○	PROPOSED SURFACE WATER MANHOLE
▨	PROPOSED INFILTRATION BASIN
🟥	SITE BOUNDARY

NOTES

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT WEETWOOD DRAWINGS.
2. EXISTING DRAINAGE INFORMATION TAKEN FROM YORKSHIRE WATER SEWER RECORDS (MAP REF: SE3901NW, OCT 2023).
3. EXISTING LEVEL INFORMATION TAKEN FROM LiDAR DATA AND REDBOX SURVEYS' 'TOPOGRAPHICAL SURVEY' (REF: RBS - 22/2948, OCT 2022).
4. PROPOSED SITE LAYOUT TAKEN FROM STEN ARCHITECTURE'S 'ILLUSTRATIVE MASTERPLAN' (REF: 2344:01 REV C, RECEIVED FEB 2024).

REV	DATE	DESCRIPTION	DRAWN	CHECK
P3	06.02.24	REVISED SITE PLAN ADDED	TB	DH
P2	19.01.24	REVISED SITE PLAN ADDED	TB	DH
P1	17.01.24	INITIAL ISSUE	TB	DH

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Byrnwr Gwair, Mold
CH7 1FQ
Tel 01352 700045
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www.weetwood.net

Client
PTARMIGAN PLANNING 4 LTD

Drawing Status	PRELIMINARY
Date	JAN 2024
Scale (A0)	1:500
Project	HEMINGFIELD ROAD HEMINGFIELD BARNSLEY
Drawn	TB
Checked	DH
Project No	6041
Title	ILLUSTRATIVE DRAINAGE LAYOUT
Drawing No	104
Revision	P3

THIS DRAWING MUST BE READ IN CONJUNCTION WITH THE SPECIFICATION AND ALL OTHER RELEVANT DRAWINGS. DO NOT SCALE FROM THIS DRAWING.

APPENDIX G

Yorkshire Water Public Sewer Record

439343 : 401797	Map Name : SE3901NW	Title

Yorkshire Water,
PO Box 500,
Halifax Road,
Bradford BD6 2LZ
Contact Name :
G Mullaney
Contact Tel :

Notes

Partial Key

Foul Sewer = F
Combined Sewer = C
Surface Water Sewer = SW
Trade Sewer = TD
Partially Separate = PS

This plan is furnished as a general guide only and no warranty as to its correctness is given or implied. This plan must not be relied upon in the event of excavations or other works made in the vicinity of public sewers. No house or property connections are shown.

Date Req : 27/10/2023, 11:54:39

Date Gen : 27/10/2023, 11:56:42

Source : Sewer Network Enquiry

UPN: Undefined

Originator: G Mullaney, ,

APPENDIX H

Yorkshire Water Pre-Planning Enquiry

YorkshireWater

Yorkshire Water Services
Developer Services
Pre-Development Team
PO BOX 52
Bradford
BD3 7AY

Tel: 0345 120 8482
Fax:

Email:
technical.sewerage@yorkshirewater.co.uk

For telephone enquiries ring:
George Mullaney on 0345 120 8482

Weetwood Services
22C Josephs Well
Hanover Walk
Leeds
LS3 1AB
tim.brook@weetwood.net

Your Ref:
Our Ref: Z005292

27th October 2023

Dear Mr Brook,

Land off Hemingfield Road, Hemingfield, Barnsley, S73 0QW - Pre-planning Enquiry V292199

Thank you for your recent enquiry and remittance. Our official VAT receipt has been sent to you under separate cover. Please find enclosed a complimentary extract from the Statutory Sewer Map which indicates the recorded position of the public sewers. Please note that as of October 2011 and the private to public sewer transfer, there are many uncharted Yorkshire Water assets currently not shown on our records.

The following comments reflect our view, with regard to the public sewer network only, based on a 'desk top' study of the site and are valid for a maximum period of twelve months:

Existing Infrastructure

There is a 300mm diameter public combined sewer recorded crossing the site. No buildings, or other obstructions, are to be erected within 3 (three) metres is required at each side of the sewer centre-line, no trees planted within 5 (five) metres of this public sewer. It may not be acceptable to raise or lower ground levels over the sewer, nor to restrict access to the manholes on the sewer. If you wish to have this sewer diverted under Section 185 of the Water Industry Act 1991 an application should be made in writing. To discuss this matter, please telephone 0345 120 84 82.

Foul Water

Development of the site should take place with separate systems for foul and surface water drainage. The separate systems should extend to the points of discharge to be agreed.

Foul water domestic waste can discharge to the 300 mm diameter public combined sewer recorded crossing the site.

Surface Water

The developer's attention is drawn to Requirement H3 of the Building Regulations 2010. This establishes a preferred hierarchy for surface water disposal. Consideration should firstly be given to discharge to soakaway, infiltration system and watercourse in that priority order.

Sustainable Drainage Systems (SuDS), for example the use of soakaways and/or permeable hardstanding etc, may be a suitable solution for surface water disposal appropriate in this situation. You are advised to seek comments on the suitability of SuDS in this instance from the appropriate authorities.

As the proposed site is currently undeveloped no surface water is known to have previously discharged to the public sewer network.

As such, the local public sewer network does not have capacity to accept any surface water from the proposed site. If SuDS are not viable, the developer is advised to contact the Environment Agency/local Land Drainage Authority/Internal Drainage Board* with a view to establishing a suitable watercourse for discharge.

It is understood that watercourses are located to the north and east of the site. This appears to be the obvious place for surface water disposal (if SuDS are not viable). Please note Yorkshire Water cannot provide plans of culverted watercourses or highway drains. To obtain plans please contact the Lead Local Flood Authority for more details.

Other Observations

Any new connection to an existing public sewer will require the prior approval of Yorkshire Water. You may apply online or obtain an application form from our website (www.yorkshirewater.com/developers/sewerage/sewerage-connections/) or by telephoning 0345 120 84 82.

Under the provisions of section 111 of the Water Industry Act 1991 it is unlawful to pass into any public sewer (or into any drain or private sewer communicating with the public sewer network) any items likely to cause damage to the public sewer network or interfere with the free flow of its contents or affect the treatment and disposal of its contents. Amongst other things this includes fat, oil, nappies, bandages, syringes, medicines, sanitary towels and incontinence pants. Contravention of the provisions of section 111 is a criminal offence.

Prospectively adoptable sewers and pumping stations must be designed and constructed in accordance with the Code for Adoption, pursuant to an agreement under Section 104 of the Water Industry Act 1991. We are happy to offer pre-development technical advice on any prospective sites that you would like to put forward for adoption, prior to submission of your adoption application.

An application to enter into a Section 104 agreement must be made in writing prior to any works commencing on site. Please contact our Sewer Adoption, Diversion and Requisition (telephone 0345 120 84 82) or email technical.sewerage@yorkshirewater.co.uk or visit - https://www.yorkshirewater.com/developers/sewerage/sewer-adoptions/ for further information.

All the above comments are based upon the information and records available at the present time and is subject to formal planning approval agreement. The information contained in this letter together with that shown on any extract from the Statutory Sewer Map that may be enclosed is believed to be correct and is supplied in good faith. Please note that capacity in the public sewer network is not reserved for specific future development. It is used up on a 'first come, first served' basis. You should visit the site and establish the line and level of any public sewers affecting your proposals before the commencement of any design work.

Yours sincerely

George Mullaney
Development Services Technician

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Flood Risk Assessments
Flood Consequences Assessments
Surface Water Drainage
Foul Water Drainage
Environmental Impact Assessments
River Realignment and Restoration
Water Framework Directive Assessments
Environmental Permit and Land Drainage Applications
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