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NPPF: Flood Risk Assessment & Outline Drainage Strategy

Halterworth Lane, Romsey

Gladman Developments Ltd

SHF.1132.258.HY.R.001.B

'Experience and expertise working in union'

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Halterworth Lane, Romsey

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Executive Summary

This report presents a Flood Risk Assessment in accordance with the National Planning Policy Framework and National Planning Practice Guidance: Flood Risk and Coastal Change ID: 7 guidance, for a proposed residential development located on land east of Halterworth Lane, Romsey, Hampshire.

The report includes an assessment of the surface water and foul drainage requirements of the Site and details the flood risk and how this could be managed and mitigated to allow the Site to be developed in support of the outline planning application.

The FRA has demonstrated the following:

- The 12.8-hectare (ha) Site is comprised of two agricultural (grassed) land parcels.
- The Northern Parcel slopes in a west/north-west direction and the Southern Parcel falls in a west/south-west direction. The Site is underlain by freely draining soils and bedrock with mixed infiltration potential.
- The risk of flooding is assessed as follows:
  - The risk of fluvial flooding is assessed as negligible.
  - The risk of surface water flooding is assessed as negligible for most of the Site but low associated with areas of ponding.
  - The risk of flooding from sewers is assessed as negligible for most of the Site but low but low along any overland flow pathways.
  - The risk of groundwater flooding is assessed as negligible above ground and low below ground.
  - The risk of flooding from all other sources is assessed as negligible.
- Flood risk from identified sources can be mitigated to a negligible level through the following approach:
  - No below surface habitable buildings (i.e. basements).
  - Set finished floor levels a minimum height above external levels.
  - Adoption of a surface water management strategy.
  - Provide a development free easement along onsite public foul water sewer assets, or re-direct through the Site boundary.
- The proposed residential use is classified as more vulnerable. More vulnerable uses are considered acceptable in terms of flood risk in Flood Zone 1 (low risk). There is however a risk of flooding from other sources. Subject to the implementation of the above mitigation measures, the Sequential Test would be passed, and the Exception Test would not be required.
- The FRA has considered the potential impact of the development on surface water runoff rates, given the increase in impermeable areas post-development. These rates have been calculated, and it has been demonstrated that surface water can be managed, such that flood risk to and from the Site following development will not increase. This will be achieved through restricted discharge rates and appropriately sized attenuation, comprising infiltration basins.
- It is proposed that foul flows will discharge to Halterworth Lane via a pumped connection.

The FRA demonstrates the proposed development would be operated with minimal risk from flooding and would not increase flood risk elsewhere. The development should therefore not be precluded on the grounds of flood risk, as well as surface water and foul drainage.

1.0 Introduction

1.1 Background

1.1.1 Enzygo Ltd was commissioned by Gladman Developments Ltd to carry out a site-specific Flood Risk Assessment (FRA), including an outline surface water and foul drainage strategy, in support of an outline application for a proposed residential development. The Site is located on land east of Halterworth Lane, Romsey, Hampshire (the 'Site').

1.1.2 The proposal is for an outline planning application of up to 270 dwellings on the 12.8ha Site, including affordable housing, with land for the potential future expansion of Halterworth Primary School, public open space, structural planting and landscaping, sustainable drainage system (SuDS) and vehicular access points. All matters reserved except for means of vehicular access.

1.1.3 A site-specific FRA assesses the current and future flood risk to and from a development site. It demonstrates how flood risk will be managed now and over the development's lifetime, taking climate change, drainage, and the vulnerability of its intended users into account.

1.1.4 The objectives of a site-specific FRA are to:

- Assess whether a proposed development is likely to be affected by current or future flooding from a range of sources.
- Assess whether the development will increase flood risk elsewhere.
- Decide on measures to deal with these effects and risks and assess their appropriateness.
- Provide enough evidence for the local planning authority to apply (if necessary) the Sequential Test.
- Decide whether the development will be safe and will pass the Exception Test if applicable.

1.1.5 In England, planning applications for development need an FRA[1] for most developments including:

- In Flood Zones 2 and 3 including minor development and change of use.
- Sites of 1ha or larger in Flood Zone 1.
- Sites of less than 1ha in Flood Zone 1, including change of use to a more vulnerable class (for example from commercial to residential), and where they could be affected by sources of flooding other than rivers and the sea.
- Land in Flood Zone 1 in a Critical Drainage Area (CDA) as notified by the Environment Agency.
- Land in Flood Zone 1 identified in a strategic flood risk assessment as being at increased flood risk in future.

[1] Department for Environment, Food & Rural Affairs and Environment Agency (published March 2014 and update February 2017). Flood Risk Assessments if You're Applying for Planning Permission [https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications].

1.1.6 An FRA is required for this development, as initial screening using Environment Agency online indicative flood mapping shows the Site is in Flood Zone 1 (low risk) but is more than 1ha and is at risk of surface water flooding.

1.1.7 The purpose of this FRA is to assess the risk of flooding to the proposed development and where possible provide sufficient mitigation to demonstrate that future users of the development would remain safe throughout its lifetime, that the development would not increase flood risk on Site and elsewhere and, where practicable, would reduce flood risk overall.

1.2 Scope

1.2.1 Government policy on development and flood risk is set out in the National Planning Policy Framework (NPPF)[2] and is supported by National Planning Practice Guidance: Flood Risk and Coastal Change [NPPG ID7][3].

1.2.2 NPPF paragraphs 158-175 set out the need for an appropriate assessment of flood risk at all levels of the planning process and require the application of a sequential risk-based approach to assess the suitability of land for development in flood risk areas.

1.2.3 The FRA should also make allowances for climate change[4] to minimise vulnerability and provide resilience to flooding and coastal change in the future. The allowances are predictions of anticipated change in:

- Peak river flow by river basin district.
- Peak rainfall intensity.
- Sea level rise.
- Offshore wind speed and extreme wave height.

1.2.4 The allowances are based on climate change projections and different scenarios of carbon dioxide emissions to the atmosphere. There are different allowances for different periods of time over the next century.

1.2.5 Site-specific FRAs are categorised according to level. Simple Level 1 Screening studies give a general indication of the potential flood risk to a site and identify whether more detailed Level 2 assessment is required or not. A Level 2 assessment is a qualitative appraisal to develop understanding of flood risk to a site and the effects of the site on flooding elsewhere including recommended mitigation measures. Level 3 assessments are more detailed quantitative studies, for example modelling to establish flood levels at a site in the absence of Environment Agency or other data or providing detailed outline drainage designs.

1.2.6 This report is a Level 2 qualitative FRA, which includes a Level 3 assessment of the surface water and foul drainage requirements for the proposed development.

[2] Ministry of Housing, Communities & Local Government (published March 2012 and updated December 2023). National Planning Policy Framework [https://www.gov.uk/government/publications/national-planning-policy-framework--2].
[3] Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government (published March 2014 and updated August 2022). Planning Practice Guidance ID7-030-20140306; Flood Risk & Coastal Change [https://www.gov.uk/guidance/flood-risk-and-coastal-change].
[4] Environment Agency (published February 2016 and updated May 2022). Flood Risk Assessments: Climate Change Allowances [https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances].

1.3 Aims

1.3.1 This FRA aims to provide enough flood risk information to satisfy the requirements of the NPPF, PPG ID7 and regional/local government plans and policies. It describes the potential for the Site to be impacted by flooding, the impacts of the proposed development on flooding elsewhere near the Site, and the proposed measures that could be incorporated into the development to mitigate the identified risks.

1.4 Planning Context

National Policy

1.4.1 The FRA was prepared in accordance with the NPPF and NPPG ID7.

Regional/Local Policy

1.4.2 The FRA considers the following policies within the Test Valley Borough Council Local Plan (2011 to 2029)[5]:

- Policy E7: Water Management – *Development will be permitted provided that it complies with national policy and guidance in relation to flood risk, and it does not risk the quality of groundwater.*

1.4.3 This FRA also considers the following flood risk and drainage guidance documents:

- Test Valley Borough Council Local Development Scheme (2022)[6].
- Test Valley Borough Council Strategic Flood Risk Assessment (SFRA) and associated mapping[7].

1.5 Report Structure

1.5.1 This report is structured as follows:

- Section 2 identifies the sources of information that were consulted.
- Section 3 describes the existing Site.
- Section 4 outlines the flood risk to the existing site and proposed development.
- Section 5 details the proposed mitigation measures against identified flooding sources.
- Section 6 assesses the surface water drainage requirements of the proposed development.
- Section 7 presents a summary and conclusions.

[5] https://www.testvalley.gov.uk/planning-and-building/planningpolicy/local-development-framework/dpd
[6] https://www.testvalley.gov.uk/planning-and-building/planningpolicy/lds
[7] https://www.testvalley.gov.uk/assets/attach/2619/tvbc-sfra-main-report.pdf

2.0 Sources of Information

2.1 Sources of Information

2.1.1 The following information was consulted:

- Ordnance Survey mapping (Drawings 001 and 002).
- Detailed topographic survey (Appendix 1).
- Environment Agency online mapping (Flood Map for Planning[8], Long Term Flood Risk Assessment for Locations in England[9], Catchment Data Explorer[10] and Main River Map[11]).
- Environment Agency Reduction in Risk of Flooding from Rivers and Sea online mapping[12].
- Online mapping for Climate Change Allowances for Peak River Flow and Peak Rainfall in England online mapping[13].
- National Soils Resources Institute (NSRI): Soilscapes online mapping[14].
- British Geological Survey [BGS] Geology Viewer online mapping[15].
- British Geological Survey [BGS] Borehole Records online mapping[16].
- Landmark's Promap: Flood Data package (see Drawings).
- Geosmart 1 in 100-year groundwater flood risk map (see Drawings).
- DEFRA's Magic Map for identifying Designated Sites[17].
- River Levels UK for identifying Flood Alert and Flood Warning areas[18].

2.2 Consultation and Discussion with Regulators

2.2.1 Consultation and discussions were undertaken with the relevant water regulators.

Environment Agency

2.2.2 The Environment Agency is a statutory consultee on flood risk and planning and is directly responsible for the prevention, mitigation, and remediation of flood damage for main rivers and coastal areas; and it has a strategic overview for all forms of flooding.

2.2.3 Environment Agency Standing Advice[19] and the NPPF/PPG ID: 7 was consulted and reviewed.

[8] https://flood-map-for-planning.service.gov.uk/
[9] https://flood-warning-information.service.gov.uk/long-term-flood-risk/
[10] http://environment.data.gov.uk/catchment-planning/
[11] https://environment.maps.arcgis.com/apps/webappviewer/index.html?id=17cd53dfc524433980cc333726a56386
[12] ArcGIS - My Map
[13] https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances
[14] https://www.landis.org.uk/soilscapes/
[15] https://www.bgs.ac.uk/map-viewers/bgs-geology-viewer/
[16] https://www.bgs.ac.uk/information-hub/borehole-records/
[17] https://magic.defra.gov.uk/magicmap.aspx
[18] https://riverlevels.uk/flood-map#.XclKwPn7RPZ
[19] Environment Agency and Department for Environment, Food & Rural Affairs (published April 2012 and updated February 2022). Preparing a Flood Risk Assessment: Standing Advice [https://www.gov.uk/guidance/flood-risk-assessment-standing-advice].

2.2.4 Correspondence with the Environment Agency is included in Appendix 3.

Lead Local Flood Authority

2.2.5 Hampshire County Council as the Lead Local Flood Authority (LLFA) is responsible for local flood risk management in their area and for maintaining a register of flood risk assets. They also have lead responsibility for managing the risk of flooding from surface water, groundwater, and ordinary watercourses.

2.2.6 Hampshire County Council online policies and guidance were consulted in order to inform this report. The surface water checklist and guidance were also checked.

Water Utility

2.2.7 Drainage and sewerage services in the UK are provided by a number of water and sewerage companies. Southern Water is responsible for sewerage within the area of the Site.

2.2.8 All sewerage undertakers maintain the 'DG5 register' of properties and external areas (such as gardens, highways, open spaces) which have suffered flooding from public foul/combined sewers. It does not include flooding caused by blockages.

2.2.9 Southern Water asset plans and pre-development enquiry response is included in Appendix 2.

2.3 Site Walkover

2.3.1 Enzygo staff carried out a walkover of the Site during March 2021. Observations made were used to inform the Site description.

3.0 Site Location and Description

3.1 Location

3.1.1 The Site is located on land east of Halterworth Lane, Romsey, Hampshire, SO51 9AE.

3.1.2 The Site is centred on National Grid Reference (NGR) 437481, 121399.

3.1.3 The 12.8ha Site location is shown in Drawing 001 and in more detail in Drawing 002.

3.2 Land Use

3.2.1 The land use is comprised of two agricultural (grassed) land parcels (Figures 3.1 and 3.2), hereafter referred to as the 'northern parcel' and the 'southern parcel'.

3.2.2 The Site is bounded by residential dwellings and Halterworth Lane to the west; residential dwellings and Halterworth Primary School to the south; and agricultural land to the north and east.

3.2.3 Vehicle access is currently via a gate off Halterworth Lane along the north-west and south-west of the Site. A footpath is also oriented west to east through the northern extents.

Figure 3.1: Photographs of the Site

Left: View looking north from the southern boundary. Right: View looking north-west from the north.

Figure 3.2: Aerial Photograph of the Site

Image © 2024 Digital Globe.

3.3 Topographic Information

3.3.1 A detailed topographic survey was carried out during June 2021 and a copy is included in Appendix 1.

3.3.2 The Northern Parcel generally falls in a west/north-west direction from 39.98 metres Above Ordnance Datum (m AOD) in the south-west corner, to 36.57m AOD in the north-west corner. The fall of 3.41m over 290m gives a gradient of 1:85.

3.3.3 The Southern Parcel generally falls west/south-west from 39.78m AOD along the eastern boundary, to 38.12m AOD along the south-west boundary. The fall of 1.66m over 313m gives a gradient of 1:189.

Figure 3.3: Summary of Site Topography

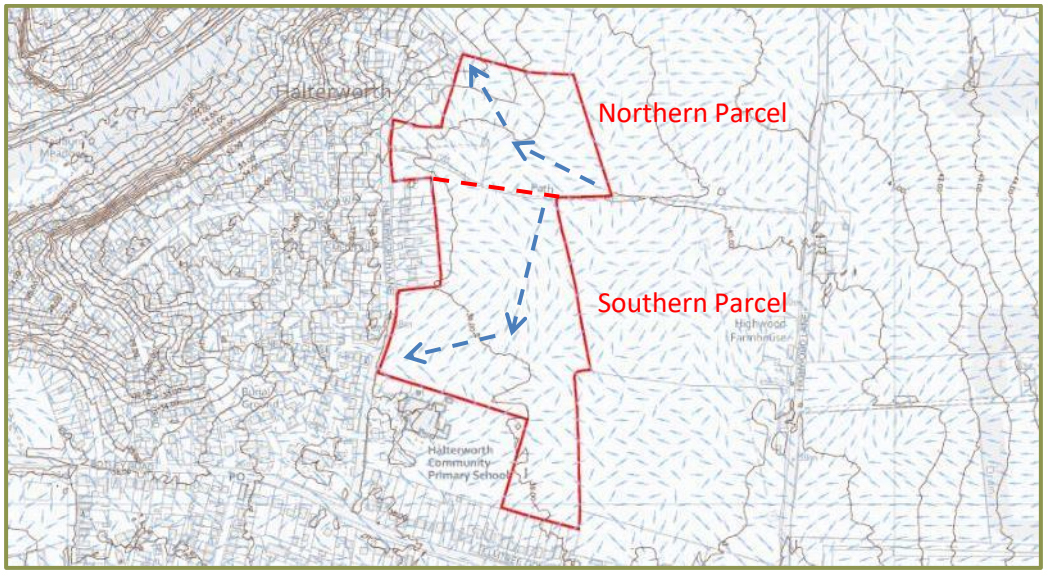


Table 3.1: Summary of Site Topography

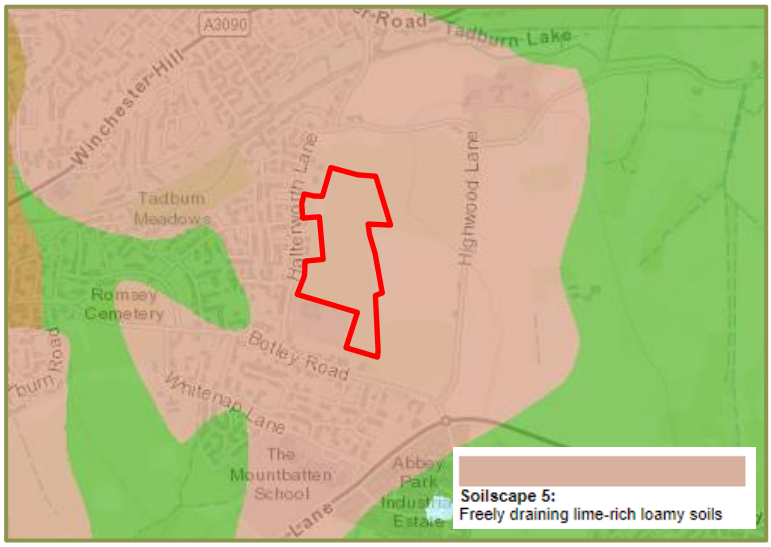
Land Parcel Reference	Direction of Fall	Maximum Elevation (m AOD)	Minimum Elevation (m AOD)	Distance (m)	Average Gradient Across Land Parcel
Northern	West/north-west	39.98	36.57	290	1:85
Southern	South/south-west	39.78	38.12	313	1:189

3.4 Soils and Geology

Soils Mapping

3.4.1 The online NSRI Soilscapes mapping (Figure 3.4) shows the Site is underlain by freely draining loamy soils.

Figure 3.4: Soils Mapping



Soils Data © Cranfield University (NSRI) and for the Controller of HMSO [2024].

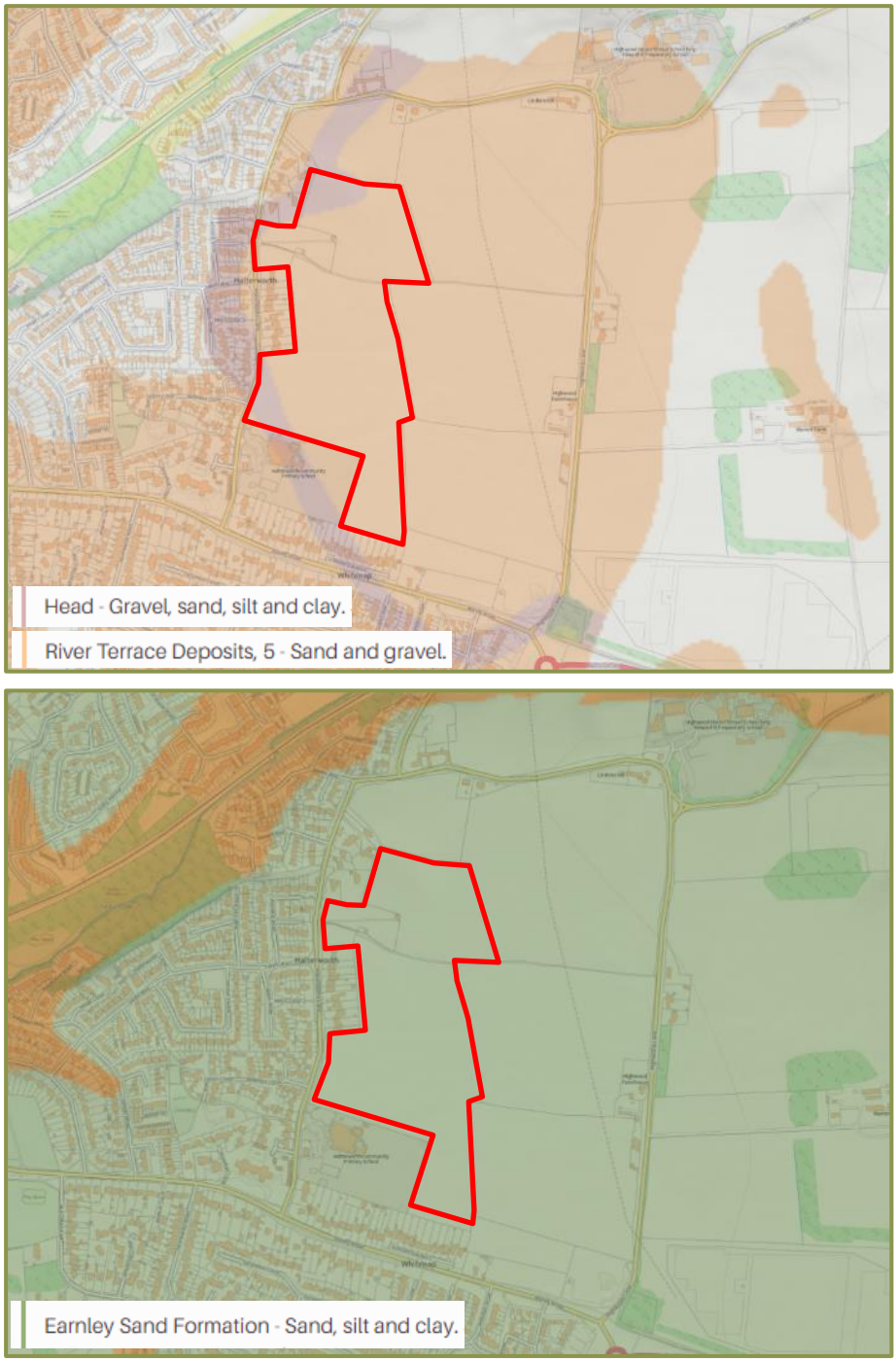
Geology Mapping

3.4.2 The online BGS Geology Viewer (Figure 3.5) shows most of the Site is underlain by River Terrace Deposits 5 - sand and gravel (superficial deposits). The south-west and north-west corners of the Site are underlain by a small band of Head - Gravel, sand, silt and clay.

3.4.3 The bedrock beneath the entire Site is Earnley Sand Formation - Sand, silt, and clay.

3.4.4 The geology mapping is indicative and there may be localised variation.

Figure 3.5: Geology Mapping

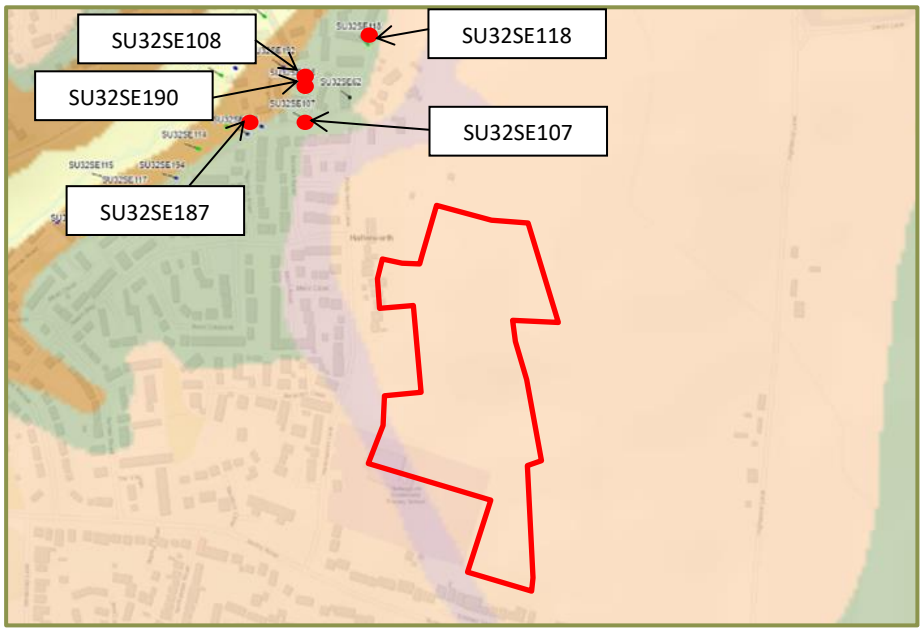


Top: Superficial deposits. Bottom: Bedrock geology. Contains British Geological Survey materials © NERC [2024].

BGS Borehole Records

3.4.5 The BGS Borehole Records online mapping (Figure 3.6) shows there are no historical boreholes located within the same mapped geology of the Site. There are however five borehole records within the same bedrock to the west of the Site, albeit in different superficial deposits. As such, only the groundwater depth has been noted (Table 3.2).

Figure 3.6: Borehole Mapping



Contains British Geological Survey materials © NERC [2024].

Table 3.2: BGS Borehole Data

Reference	Depth (m bgl)	Groundwater Depth (m bgl)
SU32SE107	10.95	16
SU32SE108	10	2.4
SU32SE118	10	1.3
SU32SE187	5.7	1.00 - 3.00
SU32SE190	2.5	Not Encountered

Contains British Geological Survey materials © NERC [2024].

Soakaway Testing

3.4.6 Soakaway testing was undertaken in accordance with DG365 'Soakaway Design' methodology guidance, during October 2023. A copy of the Soakaway Testing Results is included in Appendix 5.

3.4.7 A total of nine soakaway test pits and three boreholes were established across the Site, with focus on the topographic low point, where SuDS attenuation features would be positioned (Figure 3.7).

3.4.8 The borehole records confirm the soils and geology as depicted by the soils and geology mapping.

Figure 3.7: Trial Pit Location Plan

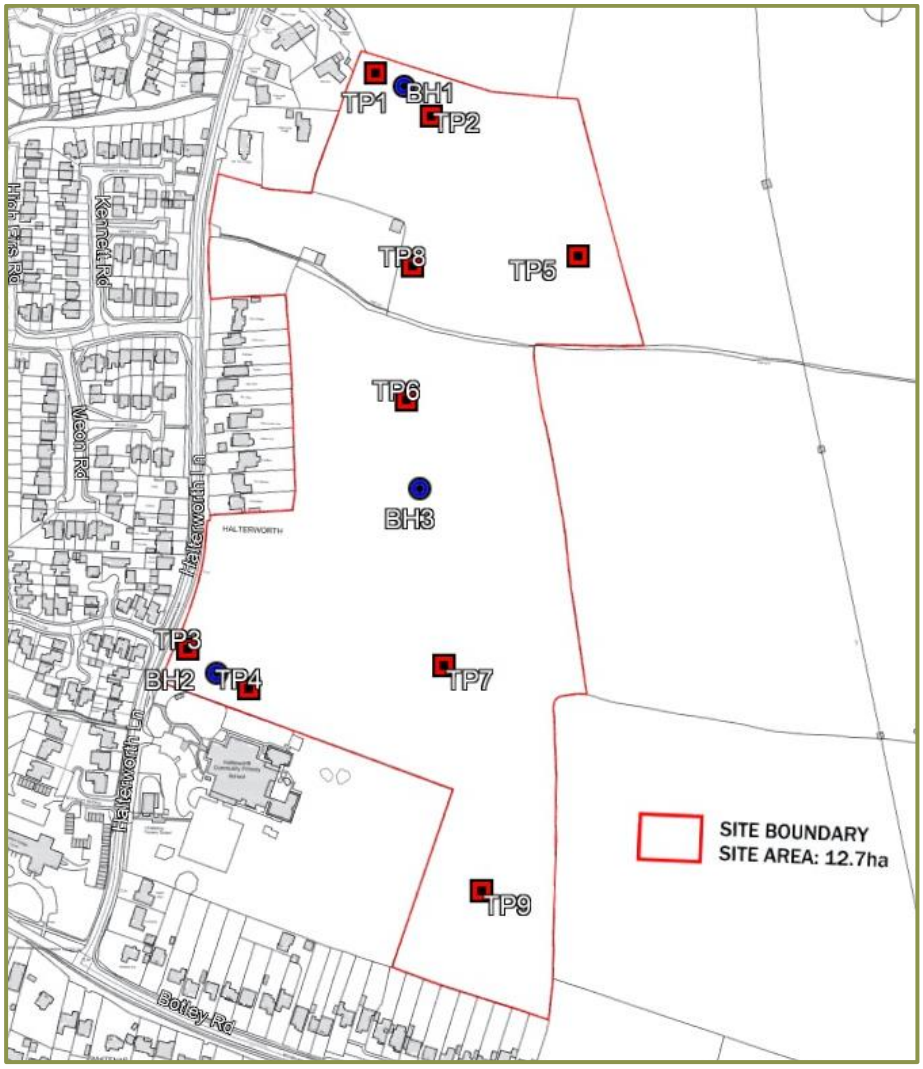


Table 3.3: Soakaway Data

Trial Pit	Depth (m bgl)	Soil Infiltration Rate (m/s)			Comments
		Test 1	Test 2	Test 3	
TP1	1.6	1.37E-04	1.43E-04	1.37E-04	Perched Groundwater at 1.5m bgl. Sand and sandstone deposits. Pit stable. Soil Horizon 0.3m.
TP2	1.5	n/a	n/a	n/a	Perched groundwater 1.2m - Pit unstable. Sandstone gravel and sand deposits. Water strike and pit collapse led to no infiltration calculations.
TP3	1.7	9.64E-04	6.46E-04	5.79E-04	Groundwater N/A. Sandstone gravel, clay and sand deposits with mudstone, siltstone and sandstone. Pit stable. Soil Horizon 0.25m.
TP4	1.6	4.09E-04	3.58E-04	2.63E-04	Groundwater N/A. Sandstone gravel, clay and sand deposits with mudstone, siltstone

					and sandstone. Pit stable. Soil Horizon 0.3m.
TP5	1.7	n/a	n/a	n/a	Groundwater N/A. Sandstone gravel, clay and sand deposits with mudstone, siltstone and sandstone. Pit stable. Soil Horizon 0.3m.
TP6	1.8	2.70E-05	2.23E-05	1.80E-05	Groundwater N/A. Sandstone gravel, clay and sand deposits with mudstone, siltstone and sandstone. Pit stable. Soil Horizon 0.2m.
TP7	1.6	1.52E-04	1.13E-04	1.00E-04	Groundwater N/A. Sandstone gravel, clay and sand deposits with mudstone, siltstone and sandstone. Pit stable. Soil Horizon 0.25m.
TP8	1.8	n/a	n/a	n/a	Groundwater N/A. Sandstone gravel, clay and sand deposits with mudstone, siltstone and sandstone. Pit stable. Soil Horizon 0.3m.
TP9	1.6	1.78E-04	1.43E-04	1.37E-04	Groundwater N/A. sandstone gravel, sand and silty sand. Pit stable. Soil Horizon 0.2m.
BH1	12	Test not run	n/a	n/a	Perched groundwater at 3m bgl, groundwater table at 12m bgl. Silty sand, gravel, clay, sand. Soil Horizon 0.4m.
BH2	7	2.82E-07	n/a	n/a	Perched groundwater at 4m bgl, groundwater table struck at 9m bgl. Sands and clays, mudstone, siltstone, sandstone. Pit stable. Tests 2 and 3 had insufficient uptake to calculate infiltration.
BH3	9	3.88e-07	n/a	n/a	Perched groundwater 4m bgl. Groundwater at 9.2m bgl. Sands, clays, and limestone gravel. Pit stable. Tests 2 and 3 had insufficient uptake to calculate infiltration.

3.5 Hydrogeology

Infiltration Potential

3.5.1 The SuDS Infiltration Potential Mapping (Drawing 005) shows most of the Site is in the mapped extent indicative of high potential. The north-west and south-west corners of the Site are in the mapped extent of moderate infiltration. The south-east corner is in the mapped extent of low infiltration potential.

3.5.2 The freely draining soils are indicative of high infiltration potential, but the infiltration potential of the bedrock is dependent on the composition of the sandstone and groundwater levels.

3.5.3 The north-west corner and south-east corners of the Site are within the mapped extent of moderate potential. The south-east corner is within the mapped extent of low potential.

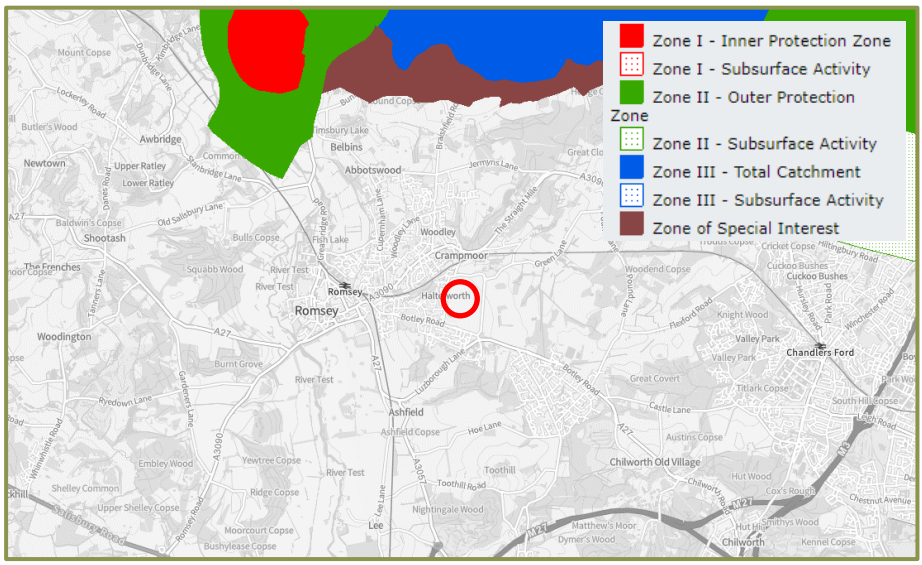
3.5.4 Shallow soakaway testing demonstrated infiltration to be viable across most of the Site, with three successful runs undertaken in accordance with DG: 365 in TP1, TP3, TP4, TP6, TP7 and TP9.

3.5.5 Groundwater was encountered in BH1, BH2, BH3 and TP2. The initial groundwater was struck at depths of between 1.2-4m bgl, but it is noted that this is perched groundwater within the superficial deposits. The groundwater table was encountered between 9-12m bgl.

Defra Magic Map

3.5.6 The online Defra Magic Map mapping (Figure 3.8) shows the Site is not located in a groundwater Source Protection Zone (SPZ).

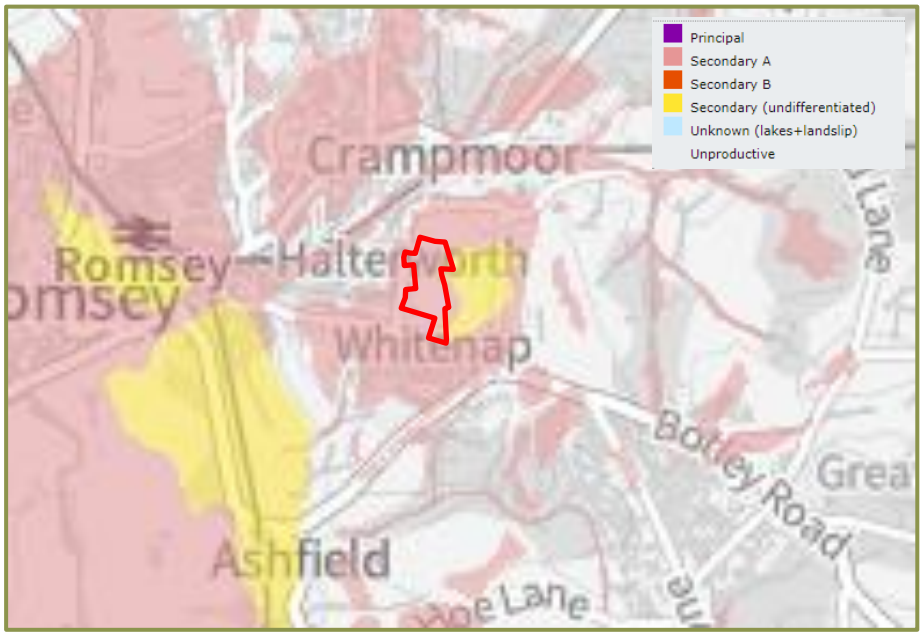
Figure 3.8: Source Protection Zone Map

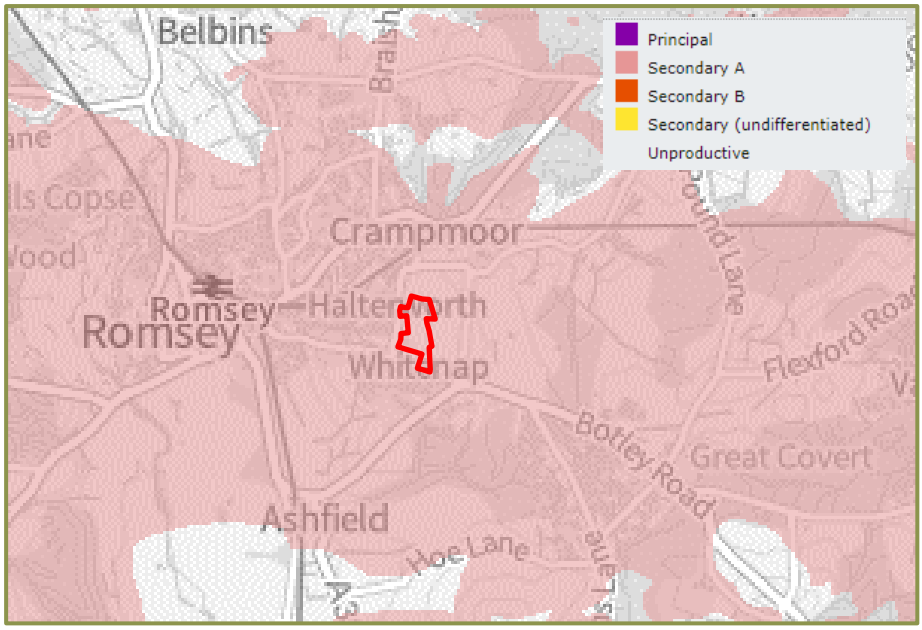


From Magic Map. Contains Environment Agency information © Environment Agency and database right [2024].

3.5.7 The Site is not located above a Principal Aquifer (bedrock designation) (Figure 3.9). The Site is however located above a Secondary A Aquifer (bedrock designation) and a Secondary A Aquifer (superficial drift). The eastern boundary is above a Secondary Undifferentiated Aquifer (superficial drift).

Figure 3.9: Aquifer Designation Map





Top: Aquifer Designation (superficial deposits). Bottom: Aquifer Designation (bedrock). From Magic Map. Contains Environment Agency information © Environment Agency and database right [2024].

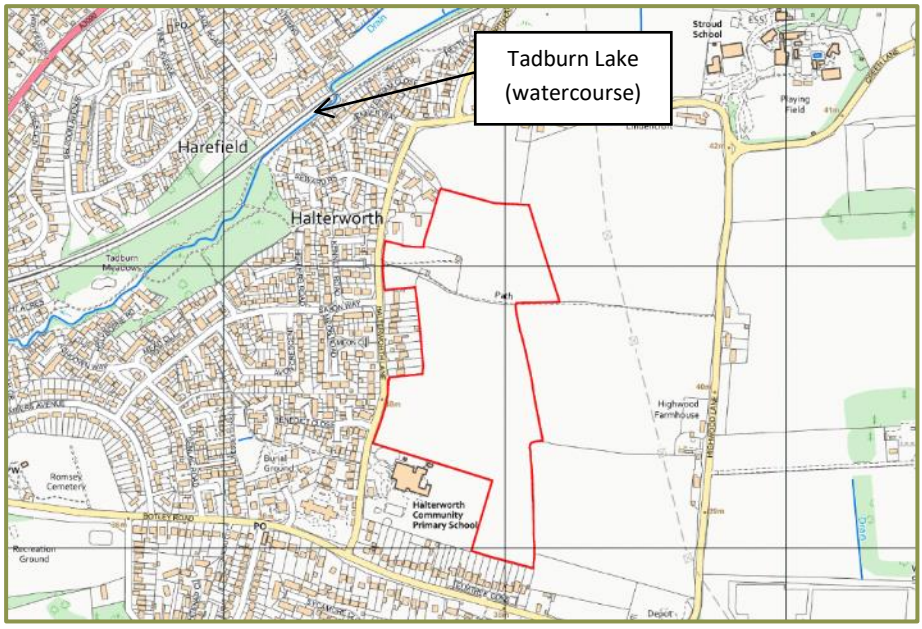
3.6 Catchment Hydrology

OS Mapping and Site Walkover Observations

3.6.1 OS mapping (Figure 3.10) shows Tadburn Lake (watercourse) conveying flows south-west, approximately 250m north-west of the Site at its closest point.

3.6.2 The Site walkover did not observe any onsite or bounding watercourses.

Figure 3.10: Map of Watercourses

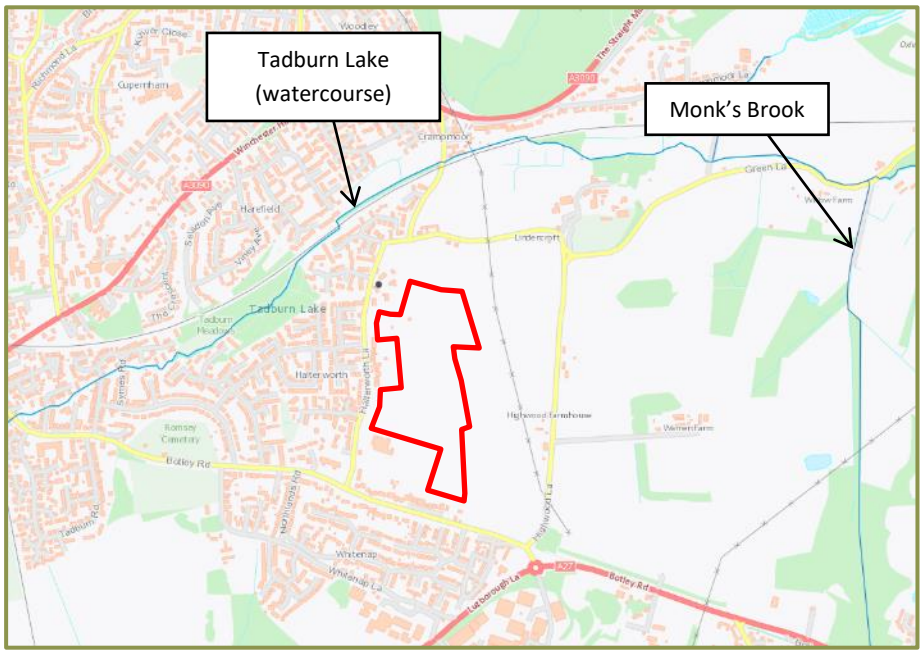


Main River Map

3.6.3 The Environment Agency online main river map (Figure 3.11) identifies the Tadburn Lake 'main river' approximately 250m north-west of the Site. Monk's Brook 'a main river' is located approximately 1.2km east of the Site. Monks Brook is a tributary of Tadburn Lake.

3.6.4 A main river is a watercourse where flood risk work is carried out by the Environment Agency.

Figure 3.11: Main River Map

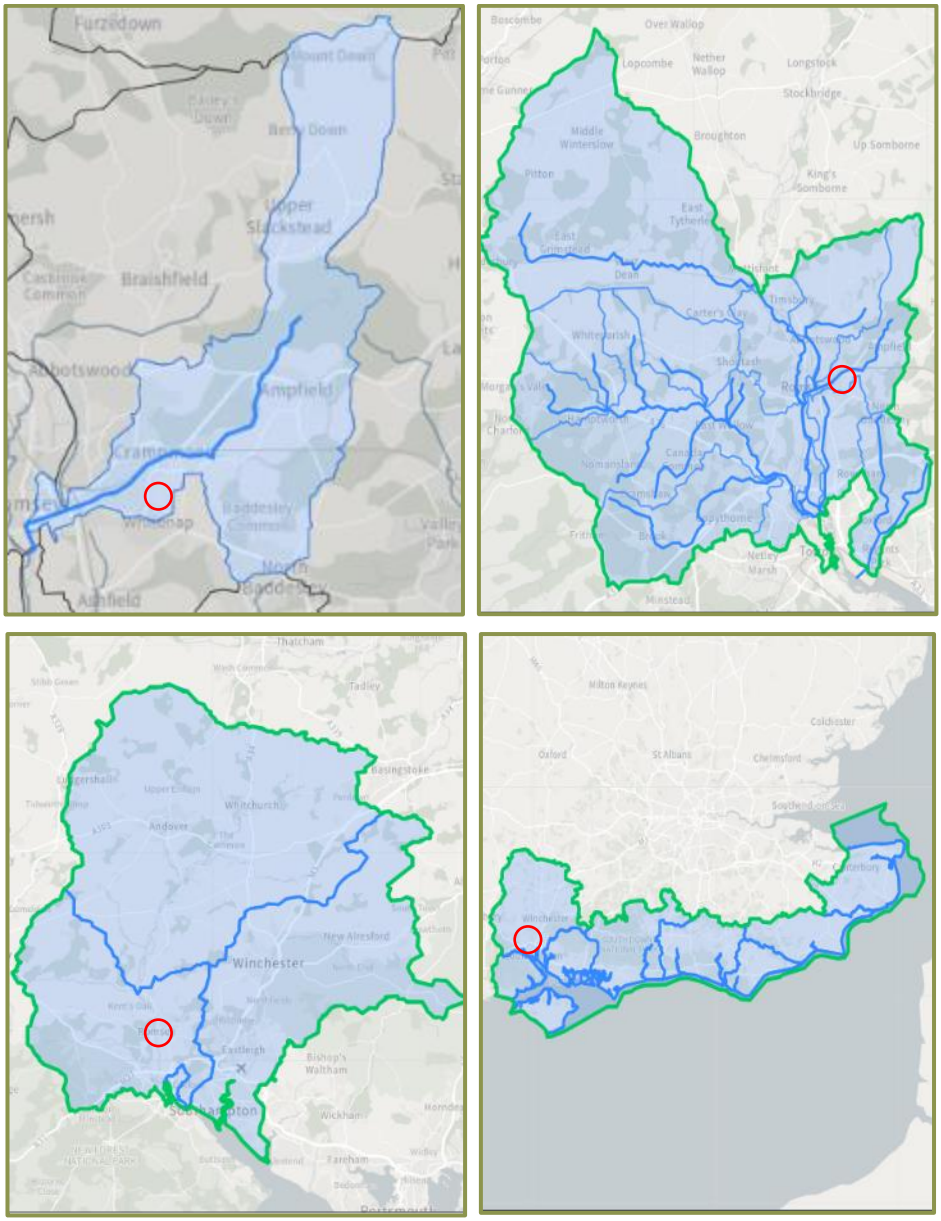


Contains Environment Agency information © Environment Agency and database right [2024].

Environment Agency Catchment Data Explorer Mapping

3.6.5 The Site resides within the Tadburn Lake Water Body (Figure 3.12), which is in the Test Lower and Southampton Streams Operational Catchment, Test and Itchen Management Catchment, and South East River Basin District.

Figure 3.12: Catchment Data Explorer



Top Left: Tadburn Lake Water Body. Top Right: Test Lower and Southampton Streams Operational Catchment. Bottom Left: Test and Itchen Management Catchment. Bottom Right: South East River Basin District. Contains Environment Agency information © Environment Agency and database right [2024].

3.7 Sewerage Assets

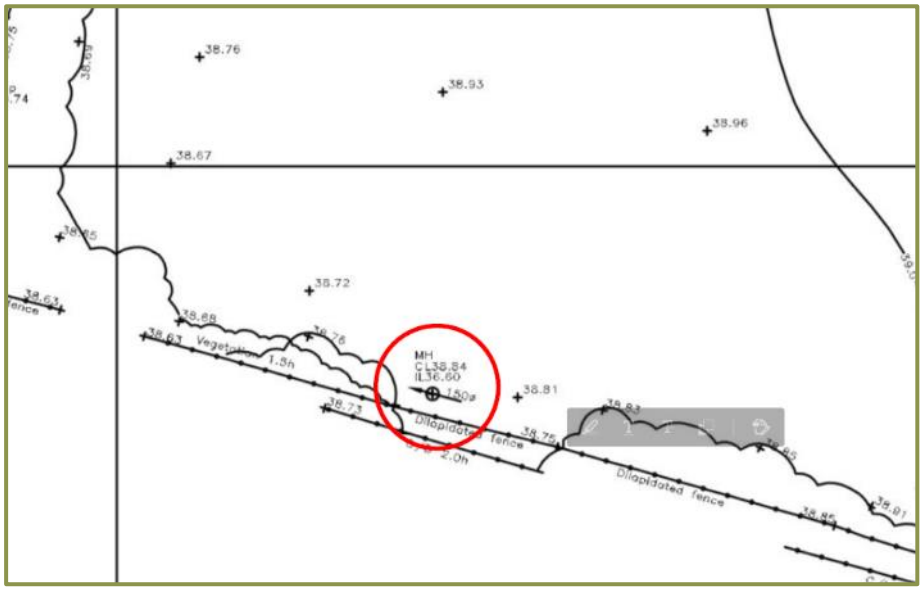
Public Assets

3.7.1 Southern Water assets plans show there is a Ø150mm public foul sewer network serving the residential dwellings to the west of the Site. The foul sewer is oriented north to south beneath Halterworth Lane.

3.7.2 The residential development west of Halterworth Lane is served by another Ø150mm public foul sewer network and a Ø150mm and Ø225mm public surface water network orientated east to west.

3.7.3 The residential dwellings to the south of the Site are served by a Ø150mm foul sewer. The topographic survey shows a manhole associated with this sewer (Figure 3.13), oriented north-west, just within the southern boundary of the Site.

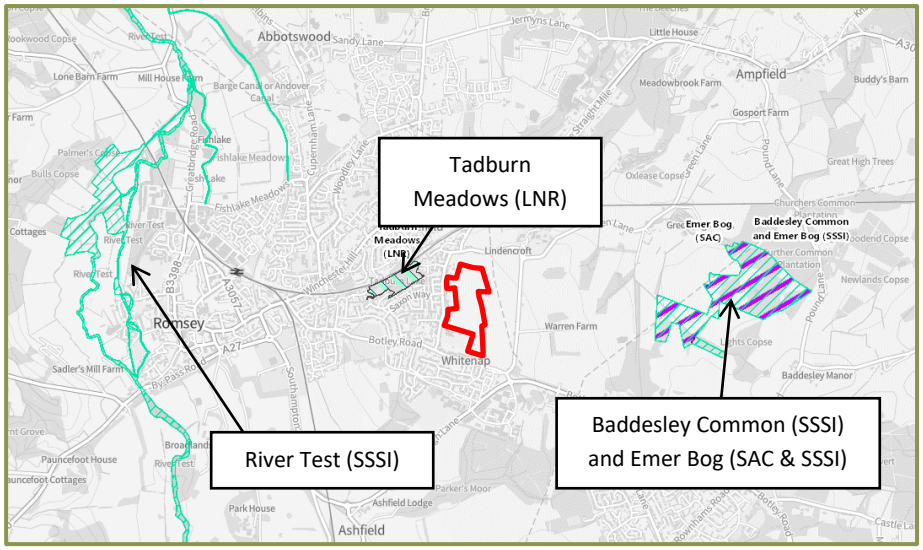
Figure 3.13: Topographic Survey Manhole



3.8 Designated Sites

3.8.1 The online Defra Magic Map mapping (Figure 3.14) shows the nearest designated sites include Tadburn Meadows (Local Nature Reserve [LNR]) located, located approximately 165m west of the Site, Baddesley Common and Emer Bog (Special Area of Conservation [SAC] & Site of Special Scientific Interest [SSSI]) located approximately 1.3km to the east of the Site, and the River Test (SSSI), located approximately 2.4km to the west of the Site. The Site is not hydrologically connected to either of these sites including downstream (from a flood risk and drainage perspective).

Figure 3.14: Designated Sites



From Magic Map. Contains Environment Agency information © Environment Agency and database right [2024].

4.0 Flood Risk Assessment

4.1 Potential Sources of Flooding

4.1.1 A summary of the potential sources of flooding and the potential risk posed by each source at the Site is presented in Table 4.1. Each source of flooding and level of risk is then assessed in further detail.

Table 4.1: Potential Risk Posed by Flooding Sources

Flooding Source	Potential Flood Risk at Application Site (Yes/No)	Potential Source	Data Sources
Fluvial	No	Tadburn Lake	Environment Agency consultation response (Appendix 3) and Environment Agency Flood Zone mapping (Drawing 003).
Tidal	No	None identified	Environment Agency consultation response (Appendix 3) and Environment Agency Flood Zone mapping (Drawing 003).
Groundwater	Yes	Secondary A Aquifer	Geosmart Groundwater (Drawing 004) and BGS Borehole Records (Appendix 4).
Surface Water	Yes	Site topography	Environment Agency Complex Surface Water Flood Mapping (Drawings 006.1 to 006.4).
Sewers and Mains	Yes	Public sewers	Southern Water asset plans (Appendix 2), and topographic survey (Appendix 1).
Infrastructure Failure	No	None identified	OS mapping (Drawings 001 to 002) and Environment Agency online mapping: Long Term Flood Risk Assessment for Locations in England.

4.2 Fluvial Flooding

Environment Agency Flood Zone Mapping

4.2.1 The Environment Agency Flood Zones are the current best information on the extent of the extremes of flooding from rivers or the sea that would occur without the presence of flood defences, since these can be breached, overtopped and may not be in existence for the lifetime of a development.

4.2.2 The Environment Agency Flood Zone mapping (Drawing 003) shows the Site is in Flood Zone 1, which is land outside the 1 in 1000-year 0.1% Annual Exceedance Probability [AEP]) extent of fluvial (river) flooding, at 'low' risk.

Modelled Flood Levels and Flood Outline Mapping

4.2.3 The Environment Agency provided modelled flood levels for Tadburn Lake sourced from the Romsey Model (2011). A range of return periods were provided, including the 1 in 100-year and 1000-year event, for nodes adjacent to the Site.

4.2.4 The model shows the Site is not inundated and sits at a minimum level of 36.57m AOD, which is 11.94m above the worse-case (1 in 100-year) modelled flood level.

Flood History

4.2.5 Correspondence with the Environment Agency (Appendix 3) reported no historical fluvial flooding incidents within the Site boundary or immediate vicinity.

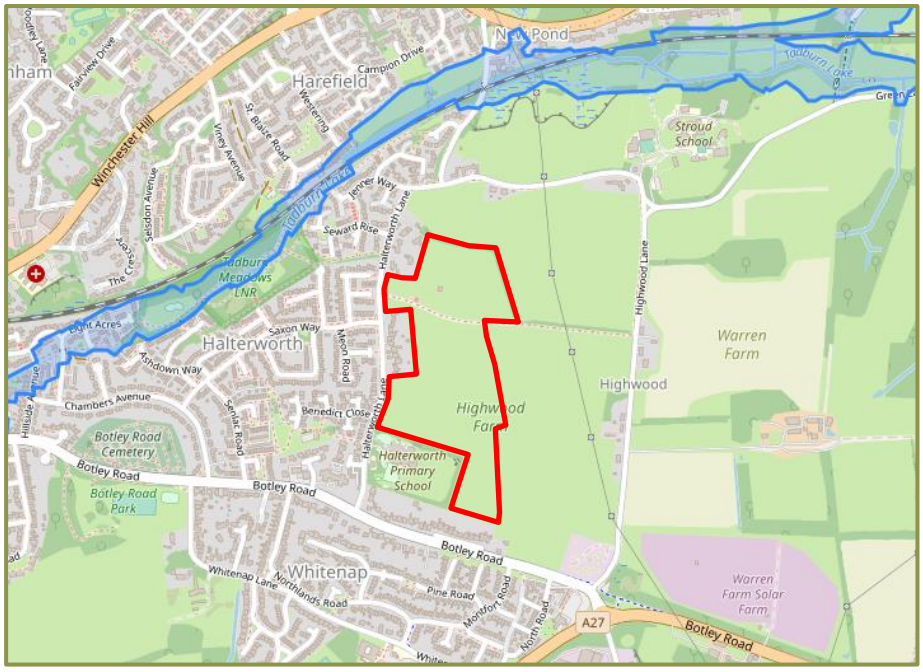
Flood Defences

4.2.6 The Environment Agency Reduction in Risk of Flooding from Rivers and Sea online mapping shows the Site does benefit from flood defences.

Flood Warning Service

4.2.7 The River Levels UK website (Figure 4.1) shows the Site is not within an area which receives flood warnings. The area along the reach of Tadburn Lake does receive flood warnings.

Figure 4.1: Flood Warning Areas



River Levels UK [2024].

Flood Risk Summary

4.2.8 The risk of fluvial flooding is assessed as negligible.

4.3 Tidal Flooding

Environment Agency Flood Zone Mapping

4.3.1 The Environment Agency Flood Zone mapping (Drawing 003) shows the Site is in Flood Zone 1, which is land outside the 1 in 1000-year 0.1% Annual Exceedance Probability [AEP]) extent of tidal (sea) flooding, at 'low' risk.

Flood Risk Summary

4.3.2 The risk of tidal flooding is assessed as negligible.

4.4 Groundwater Flooding

Introduction

4.4.1 Groundwater flooding occurs when subsurface water emerges either at surface or in made ground or in subsurface structures such as basements and services ducts. It occurs as diffuse seepage, emergence from new point source springs or an increase in flow from existing springs. It results from aquifer recharge from infiltrating rainfall, from sinking streams entering aquifers from adjacent non-aquifers, or from high river levels or tides driving water through near surface deposits. It tends to occur with a delay following rainfall and can last for several weeks or months. Groundwater flooding or shallow water tables also prevent or reduce infiltration and so can worsen surface water flooding.

Geosmart Groundwater Flood Risk Map

4.4.2 The Geosmart 1 in 100-year groundwater flood risk map (Drawing 004) shows the Site is at negligible risk of groundwater flooding and falls within Risk Class 4 (Table 4.2).

4.4.3 Mapped classes combine understanding of likelihood, model and data uncertainty, and possible severity. Likelihood is ranked according to whether we expect groundwater flooding at a site due to extreme elevated groundwater levels with an annual probability of occurrence greater than 1%, considering model and data uncertainty. Severity relates to expectations of the amount of property damage or other harm that groundwater flooding at that location might cause (Table 4.2).

Table 4.2: Groundwater Flood Risk Classification

Risk Class	Probability of Groundwater Flooding	Effect
4: Negligible	Annual probability less than 1%.	Negligible unless unusually sensitive use.
3: Low	Annual probability greater than 1%.	Remote possibility of damage to property or harm to sensitive receptors Flooding likely to be limited to seepages and waterlogged ground, damage to basements and subsurface infrastructure, and should pose no significant risk to life. Surface water flooding may be worsened.
2: Moderate	Annual probability greater than 1%.	Significant possibility of damage to property or harm to other sensitive receptors at or near this location. flooding is likely to be in the form of shallow pools or streams. Surface water flooding and failure of drainage systems may be worsened when groundwater levels are high.
1: High	Annual probability greater than 1%.	Groundwater flooding will occur which could lead to damage to property or harm to other sensitive receptors at or near this location. Flooding may result in damage to property, road, or rail closures and, in exceptional cases, may pose a risk to life.

Risk Class	Probability of Groundwater Flooding	Effect
		Surface water flooding and failure of drainage systems may be worsened when groundwater levels are high.

Borehole Records and Soakaway Testing Results

4.4.1 BGS online borehole mapping recorded groundwater ingress at depths between 1.3m bgl to 10.05m bgl in the bedrock deposits.

4.4.2 Soakaway testing encountered perched groundwater ingress in one pit at 1.2m bgl.

4.4.3 Borehole monitoring encountered perched groundwater between 3 and 4m bgl but the groundwater table sat between 9m and 12m bgl.

Flood Risk Summary

4.4.4 The risk of groundwater flooding is assessed as low below ground but negligible above ground.

4.5 Surface Water Flooding

Introduction

4.5.1 Surface water flooding occurs following rainfall on ground where infiltration rates are less than the rainfall precipitation rate. This can occur when either:

- Soils or ground materials are naturally of low permeability or have been compacted (infiltration excess runoff).
- Soils or ground materials are saturated from previous rainfall either directly or from upslope (saturation excess runoff and return flow) or from high groundwater levels.

Environment Agency Complex Surface Water Flood Mapping

4.5.2 The Environment Agency Complex Surface Water Flood Mapping (Drawings 006.1 to 006.4) shows most of the Site is located outside the mapped extent of surface water flooding.

4.5.3 There is an area of surface water ponding in the south-west extent of the Site associated with the 1 in 1000-year event. Flood depths are up to 0.30m, velocities are up to 0.25m/s and the hazard is assessed as 'low' (0.50-0.75). Surface water ponding is associated with a topographic low spot.

Flood Risk

4.5.4 The risk of surface water flooding is assessed as negligible for most of the Site, with an area of low risk associated with surface water ponding.

4.5.5 Mitigation measures against surface water flooding are discussed in Section 5.

4.6 Sewer Flooding

Introduction

4.6.1 Sewer flooding occurs when urban drainage networks become overwhelmed after heavy or prolonged rainfall due to restrictions or blockage in the sewer network or if the volume of water draining into the system exceeds the sewer design capacity.

4.6.2 New adoptable sewers are built to have a minimum design standard up to and including the 1 in 30-year rainfall event. Older sewers were not designed to any standard. Modern sewer systems will only surcharge during rainstorm events with a return period greater than 1 in 30-years (e.g. 1 in 100-years).

Asset Plans

4.6.3 Southern Water asset plans (Appendix 2) show there is a Ø150mm public foul sewer orientated north-west just within the southern boundary of the Site. Any surcharged flows would be shallow (<150mm) and would shed overland, following the localised topography (Drawing 007).

Flood Risk

4.6.4 The risk of flooding from sewers is assessed as negligible for most of the Site but low along any overland flow pathways.

4.7 Flooding from Infrastructure Failure

Reservoir Failure

4.7.1 The Environment Agency online flood mapping shows the Site is outside the extent of flooding sourced from reservoirs. The risk of flooding from reservoirs is assessed as negligible.

5.0 Flood Risk Mitigation Measures

5.1 Introduction

5.1.1 The following sources of flooding were identified:

- Groundwater flooding (below ground).
- Surface water flooding (ponding).
- Sewer flooding (surcharged flows from public assets).

5.2 Mitigation Measures

Groundwater Flooding

- No below surface habitable buildings (i.e. basements).
- Set finished floor levels as per above.
- Set finished floor levels a minimum of +150mm above external levels.

Surface Water Flooding

- Adoption of a surface water management strategy.
- Set finished floor levels as per above.

Sewer Flooding

- Provide a development free easement (3m either side) of onsite public foul water sewer assets, or re-direct through the Site boundary.

5.3 Summary of Flood Risk

5.3.1 Table 5.1 summarises the probability and level of risk, both with and without mitigation measures.

Table 5.1: Probability and Consequences of All Sources of Flooding

Flooding Source	Potential Source	Probability	Consequence & Impact Without Mitigation	Consequence & Impact with Mitigation
Fluvial	Tadburn Lake	Negligible	Negligible	Negligible
Tidal	None identified	Negligible	Negligible	Negligible
Groundwater	Secondary A Aquifer	Low below ground but Negligible above ground	Low below ground but Negligible above ground	Negligible
Surface Water	Site Topography	Negligible for most of the Site but Low where there is surface water ponding	Negligible for most of the Site but Low where there is surface water ponding	Negligible

Sewers and Mains	Public Sewers	Negligible for most of the Site but Low along overland flow pathways	Negligible for most of the Site but Low along overland flow pathways	Negligible
Infrastructure Failure	None identified	Negligible	Negligible	Negligible

Key: Green - Negligible, Yellow - Low, Orange - Medium and Red - High; based on consequence and impact with mitigation from each flooding source.

5.4 Flood Guidance and Sequential Test

5.4.1 The proposal is for a residential development. The PPG ID: 7 (not included in this report) classifies the proposed use as 'more vulnerable'.

5.4.2 The Environment Agency Flood Zones and acceptable development types are listed in Table 5.2. All development types (including residential uses) are acceptable in Flood Zone 1 (low risk). There is however a risk of flooding from other sources. Subject to the above mitigation measures, the Sequential Test would be passed and the Exception Test would not be required as indicated in Table 5.3.

Table 5.2: Environment Agency Flood Zones and Appropriate Land Use

Flood Zone	Probability	Explanation	Appropriate Land use
Zone 1	Low	Less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%).	All development types generally acceptable.
Zone 2	Medium	Between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% - 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% 0.1%) in any year.	Most development type are generally acceptable.
Zone 3a	High	A 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.	Some development types not acceptable.
Zone 3b	'Functional Floodplain'	Land where water must flow or be stored in times of flood. SFRAs should identify this zone (land which would flood with an annual probability of 1 in 30 (3.33%) or greater in any year or is designed to flood in an extreme (0.1% flood, or at another probability to be agreed between the LPA and the Environment Agency, including water conveyance routes).	Some development types not acceptable.

Note: The Flood Zones are the current best information on the extent of the extreme flood from rivers or the sea that would occur without the presence of flood defences, because these can be breached, overtopped and may not be in existence for the lifetime of the development. The identified risk of fluvial flooding is highlighted green.

Table 5.3: Vulnerability and Flood Zone 'Compatibility' as Identified in Table 2 of PPG ID: 7

Flood Risk Vulnerability classification (see Table 1 of PPG ID: 7)	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Zone 1	Yes	Yes	Yes	Yes	Yes
Zone 2	Yes	Yes	Exception test required	Yes	Yes
Zone 3a	Exception test required	Yes	No	Exception test required	Yes
Zone 3b 'Functional Floodplain'	Exception test required	Yes	No	No	No

Key: Yes: Development is appropriate, No: Development should not be permitted. The identified risk of fluvial flooding is highlighted green.

6.0 Site Drainage

6.1 Surface Water Drainage

6.1.1 Consideration of flood issues is not confined to the floodplain. This is recognised in the NPPF and associated guidance where all proposed development of 1ha or more in Flood Zone 1 and so outside the floodplain nevertheless requires an FRA. The alteration of natural surface water flow patterns through development can lead to problems elsewhere in a catchment, particularly flooding downstream, and the replacement of permeable vegetated areas by low-permeability roofs, roads and other paved surfaces will increase the speed, volume, and peak flow of surface water runoff. So, the NPPF and associated guidance require an FRA for all proposed development of 1ha or more outside the floodplain in Flood Zone 1.

6.1.2 A surface water management strategy for the development is proposed to manage and reduce the flood risk posed by surface water runoff from the Site. The developer will be required to ensure that any scheme for surface water management should build in enough capacity for the entire Site.

6.1.3 The surface water drainage arrangements for any development Site should be such that the volume and peak flow rates of surface water leaving a developed Site are no greater than the rates prior to the proposed development unless specific off-Site arrangements are made and result in the same net effect.

6.1.4 An assessment of the surface water runoff rates was undertaken to determine the surface water options and attenuation requirements for the Site.

6.2 Existing Drainage System

6.2.1 The 12.8ha Site is comprised of two agricultural (grassed) land parcels.

6.2.2 The Site is underlain by freely draining loamy soils above River Terrace Deposits 5 - Sand and gravel. Drainage will initially be infiltration until the soil infiltration capacity is exceeded or perched groundwater is raised in the superficial deposits, and overland flow is generated. Overland flows would follow the topography of the Site towards the topographic low points.

6.3 Developable and Impermeable Areas

6.3.1 The proposal is for residential development, with land for the potential future expansion of Halterworth Primary School, public open space, structural planting and landscaping, sustainable drainage system (SuDS) and vehicular access points.

6.3.2 The proposal is for an outline planning application of up to 270 dwellings on the 12.8ha Site, including affordable housing, with land for the potential future expansion of Halterworth Primary School, public open space, structural planting and landscaping, sustainable drainage system (SuDS) and vehicular access points.

6.3.3 An allowance of 55% impermeable area (inclusive of 10% urban creep) was applied to the 7.26ha residential developable area. The existing and proposed impermeable areas are shown in table 6.1.

6.3.4 The proposed development will increase the impermeable surfaces and so increase the amount of runoff.

Table 6.1: Impermeable Area

Area	Existing Buildings and Hardstanding	Proposed Buildings and Hardstanding	Difference
Area (ha)	0	3.99	+3.99
Percentage of Total Site Area (%)	0	31.2	+31.2

6.4 Greenfield Runoff Rates

6.4.1 An assessment of greenfield runoff rates was undertaken to determine the attenuation requirements for the proposed development.

6.4.2 The runoff rates were calculated using the HRWallingford UKSuDS online tool, with FEH method inputs (descriptors obtained from the FEH webservice[20]). This is a recommended methodology for Sites up to 50ha in area and the ap/proach is in line with the current 'industry best practice' guidelines as outlined in the Interim Code of Practice for SuDS[21], and Environment Agency Report SC030219 - Rainfall runoff management for developments.

6.4.3 It is anticipated that the area for expansion of the school development will be left as open space for the time being, any future development / expansions would be served by a specific drainage system installed as part of the future works. Therefore, it has been classified as greenfield land for the purposes of this assessment.

6.4.4 The following parameters were used in the runoff calculations:

- Developable Area: 7.26ha (includes parking and access roads).
- Average Annual Rainfall (SAAR): 788mm/year
- Region No.: 7
- BFIHOST19: 0.573

6.4.5 BFIHOST was updated to BFIHOST19 (November 2019) since a number of issues were identified with BFIHOST, which including a tendency to underestimate BFI in clay-dominated catchments.

6.4.6 BFIHOST19 is the baseflow index developed using the Hydrology of Soil Types (HOST) classification and is the baseflow proportion of the flow on average. It is estimated based on the daily mean flow data. Baseflow comprises water entering the watercourse through shallow subsurface flow and groundwater flow (mechanisms other than direct surface runoff); hence permeable soils and geology tend to yield a higher baseflow.

6.4.7 The Soilscapes online soils map viewer and Geology of Britain online map viewer identified the following, which were confirmed by soakaway testing trial pit logs (Appendix 5):

- Soils: freely draining loamy soils
- Superficial Deposits: River Terrace Deposits 5 - Sand and gravel
- Bedrock: Earnley Sand Formation - Sand, silt, and clay

6.4.8 BFIHOST19 value assigned by the FEH webservice is considered to replicate on-site conditions.

[20] Centre for Ecology and Hydrology, Flood Estimation Handbook Web Service [https://fehweb.ceh.ac.uk/].
[21] Office of the Deputy Prime Minister, National SuDS Working Group (July 2004) Interim Code of Practice for Sustainable Drainage Systems [https://www.susdrain.org/files/resources/other-guidance/nswg_icop_for_suds_0704.pdf].

6.4.9 Table 6.2 shows the calculated greenfield runoff rates. Runoff calculations are included in Appendix 6.

Table 6.2: Greenfield Runoff Rates

Annual Probability (Return Period, Years)	Greenfield Runoff (l/s)
QBAR	25.7
100% (1)	21.8
3.33% (30)	59.0
1% (100)	81.8
1% Plus Climate Change	114.5

Note: 45% climate change added. The 1 in 1-year, 30-year and 100-year annual probability events are of importance to the Water Companies and the Environment Agency when looking at sewage discharge and flood risk.

6.5 Sustainable Drainage Options (SuDS)

Feasibility of SuDS

6.5.1 Shallow and borehole soakaway testing was undertaken during October 2023. A copy of the soakaway testing is included in Appendix 6. Findings demonstrate good infiltration potential in the shallow soakaways and a groundwater table between 9-12m bgl.

6.5.2 Perched groundwater was encountered between 1.2m bgl and 3m bgl. Perched groundwater would be considered a construction risk rather than a design consideration. Due to the nature perched water is anticipated to be encountered locally in pockets rather than extend throughout the Site. Any excess water would need to be pumped during construction. The actual soakage testing shows acceptable levels of infiltration for the design proposals. The actual groundwater table was encountered at between 9 and 12m bgl, therefore there is no anticipated recharge of shallow perched groundwater. It may be prudent to undertake full scale infiltration testing prior to construction.

Choice of SuDS Options

6.5.3 Sustainable water management measures should be used to control the surface water runoff from the proposed development Site, thereby managing the flood risk to the Site and surrounding areas from surface water runoff. These measures will also improve the quality of water discharged from the Site.

6.5.4 Current guidance promotes sustainable water management using SuDS. Options applicable to this Site are identified in Table 6.3.

Table 6.3: SuDS Options

Green roofs	Infiltration basins
Water butts	Detention basins
Permeable paving	Oversized pipes
Rainwater harvesting	Brown roofs
Filter strips	Swales
Wetland Areas	Cellular Storage

Note: SuDS appropriate to the development are highlighted green.

6.5.5 A hierarchy of SuDS techniques is identified[22]:

1. **Prevention** - the use of good Site design and housekeeping measures on individual Sites to prevent runoff and pollution (e.g. minimise areas of hard standing).
2. **Source Control** - control of runoff at or very near its source (such as the use of rainwater harvesting).
3. **Site Control** - management of water from several sub-catchments (including routing water from roofs and car parks to one/several large soakaways for the whole Site).
4. **Regional Control** - management of runoff from several Sites, typically in a detention pond or wetland.

6.5.6 Using SuDS as opposed to conventional drainage systems provides several benefits by:

- Reducing peak flows to watercourses or sewers and potentially reducing the risk of flooding downstream.
- Reducing the volumes and frequency of water flowing directly to watercourses or sewers from developed Sites.
- Improving water quality over conventional surface water sewers by removing pollutants from diffuse pollutant sources.
- Reducing potable water demand through rainwater harvesting.
- Improving amenity through the provision of public open spaces and wildlife habitat.
- Replicating natural drainage patterns, including the recharge of groundwater so that base flows are maintained.

SuDS Maintenance

6.5.7 Two infiltration basins will form the main attenuation feature within the development Site.

6.5.8 Maintenance of the SuDS features would be in line with the SuDS Manual (CIRIA C753, 2015), as detailed in Figure 6.1. It is standard for SuDS features within a new development to be maintained by a private maintenance company unless the council adopt it. This will ensure maintenance throughout the lifetime of the development.

[22] CIRIA (2004) Report C609, Sustainable Drainage Systems – Hydraulic, Structural and Water Quality advice.

6.5.9 Details of other SuDS features and maintenance would be considered further at detailed design when a detailed layout has been produced. The level of detailed provided within this FRA should be sufficient at outline stage to demonstrate that SuDS would be deliverable.

Figure 6.1: Infiltration Basin Operation and Maintenance Requirements (Table 13.2 of the SuDS Manual)

TABLE 13.2 Operation and maintenance requirements for infiltration basins		
Maintenance schedule	**Required action**	**Typical frequency**
Regular maintenance	Remove litter, debris and trash	Monthly
	Cut grass – for landscaped areas and access routes	Monthly (during growing season) or as required
	Cut grass – meadow grass in and around basin	Half yearly: spring (before nesting season) and autumn
	Manage other vegetation and remove nuisance plants	Monthly at start, then as required
Occasional maintenance	Reseed areas of poor vegetation growth	Annually, or as required
	Prune and trim trees and remove cuttings	As required
	Remove sediment from pre-treatment system when 50% full	As required
Remedial actions	Repair erosion or other damage by reseeding or re-turfing	As required
	Realign the rip-rap	As required
	Repair or rehabilitate inlets, outlets and overflows	As required
	Rehabilitate infiltration surface using scarifying and spiking techniques if performance deteriorates	As required
	Relevel uneven surfaces and reinstate design levels	As required
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

Drainage Design Summary

6.5.10 Surface water runoff would be directed to the drainage system through drainage gullies located around the perimeter of the buildings and through contouring of the hardstanding areas.

6.5.11 Landscaped areas should be incorporated into the layout where possible, and the associated gardens of each unit will allow a proportion of the rainfall to infiltrate into the soil substrate.

6.5.12 Surface water will be directed to onsite infiltration basins, positioned to achieve a gravity connection from the developable area.

6.5.1 An indicative drainage layout is included in Drawing ENZ-XX-XX-DR-D-0001.

Attenuation Requirements

6.5.2 Attenuation storage is required to reduce the post-application surface water runoff from the Site to calculated greenfield runoff rates, up to and including the 1 in 100-year (+45%CC) rainfall event.

6.5.3 Infiltration testing was carried out across the Site. The two basins have been positioned in the topographically low points of the Site to allow for a gravity network, hereafter referred to as the 'northern basin' and 'southern basin'. Soakaway Test results from the respective basin positions have been utilised for the scaling of the attenuation feature. The testing was undertaken in accordance with DG:365 and the 'worst-case' infiltration rate from each of the three runs is the one utilised.

6.5.4 The Site naturally drains in two directions with a ridge line roughly in the centre of the Site. As such 55% of the catchment drains in a northerly direction and 45% in a southerly direction. This has been replicated in the drainage strategy to replicate existing conditions and provide a gravity system.

6.5.5 The following input parameters were assumed in the calculations:

- Impermeable Area: 4ha (38.2%);
  - Northern Basin: 2.2ha
  - Southern Basin: 1.8ha
- Cv (proportion of rainfall forming surface water runoff): 75% summer, 84% winter;
- Infiltration losses:
  - Northern Basin: $1.37E^{-04}$m/s (TP1).
  - Southern Basin: $2.63E^{-04}$m/s (TP4).

6.5.6 The attenuation volume for the 1 in 100-year event (plus climate change) is 2377m^3.

- Northern Basin: 1389m^3
- Southern Basin: 988m^3

6.5.7 Attenuation calculations are included in Appendix 6. The calculated runoff rates and attenuation volumes will be reviewed at detailed design stage.

6.6 Exceedance Routes

6.6.1 The infiltration basin will be designed with a capacity up to a 1 in 100-year (plus 45% climate change) event, with a +300mm freeboard allowance, based on the worst-case infiltration rate in the position situated. This provides a betterment (reduction) in runoff when compared to existing undeveloped conditions, where runoff is uncontrolled across all return periods.

6.6.2 A storm event in excess of this design standard would be extreme and would cause the infiltration basin to surcharge and overtop (with no sudden deluge) and would then shed overland following the topography, as per existing conditions (Drawing 007).

6.6.3 Finished floor levels of new dwellings will be set above external levels, which will mitigate the residual risk of overtopping.

6.7 Foul Drainage

6.7.1 It is proposed that foul flow is discharged to the Ø150mm public foul sewer along Halterworth Lane at MH2503. The topography of the Site would require a pumped connection.

6.7.2 Correspondence with Southern Water confirmed that there is adequate capacity in the local sewerage network to accommodate a foul flow of 3.44l/s at manhole 2503. There is not currently capacity at manholes 2101 or 4901.

6.7.3 An outline foul drainage layout is in Drawing ENZ-XX-XX-DR-D-0001.

6.7.4 All foul sewerage should be designed in accordance with Building Regulations Part H[23]. In areas where sewers are to be adopted by Southern Water, sewerage should be designed in accordance with Design and Construction Guidance document and supplemented with additional standards provided by Southern Water. An application to enter into a Section 104 agreement for sewer adoption must be made in writing to Southern Water prior to any works commencing on Site. A connection point should be agreed with Southern Water.

[23] HM Government (published 2002 and updated October 2015) The Buildings Regulations 2010 - Drainage and Waste Disposal: Part H [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/442889/BR_PDF_AD_H_2015.pdf].

7.0 Summary and Conclusions

7.1 Introduction

7.1.1 A site-specific Flood Risk Assessment (FRA) has been undertaken for a proposed residential development, located on a 12.8ha Site located on land east of Halterworth Lane, Romsey, Hampshire.

7.2 Flood Risk

7.2.1 The risk of flooding is assessed as follows:

- The risk of surface water flooding is assessed as negligible for most of the Site, with an area of low risk associated with surface water ponding.
- The risk of groundwater flooding is assessed as negligible above ground but low above ground.
- The risk of flooding form sewers is assessed as negligible for most of the Site but low along any overland flow pathways .
- The risk of flooding from all other sources is assessed as negligible.

7.3 Mitigation Measures

7.3.1 Flood risk can be mitigated to a negligible level through the following approach:

- Set finished floor levels above external levels.
- Adoption of a surface water management strategy.
- Provide a development free easement along onsite public foul water sewer assets, or re-direct through the Site boundary.
- No below surface habitable buildings (i.e., basements).

7.4 Flood Guidance

7.4.1 The proposed residential use is classified as more vulnerable. More vulnerable uses are considered acceptable in terms of flood risk in Flood Zone 1 (low risk). There is however a risk of flooding from other sources. Subject to the implementation of the above mitigation measures, the Sequential Test would be passed, and the Exception Test would not be required.

7.5 Site Drainage

Surface Water

7.5.1 The proposed development will increase the area of impermeable surfaces and therefore increase the amount of runoff without mitigation.

7.5.2 Surface water runoff from the proposed development would be attenuated on-site, in infiltration basins, up to and including the 1 in 100-year event, plus 45% climate change. This approach offers a betterment to existing conditions with uncontrolled runoff across all return periods.

7.5.3 A SuDS drainage scheme is proposed to manage excess runoff from the development, comprising infiltration basins, designed to maintain runoff at pre-development rates.

Foul Water

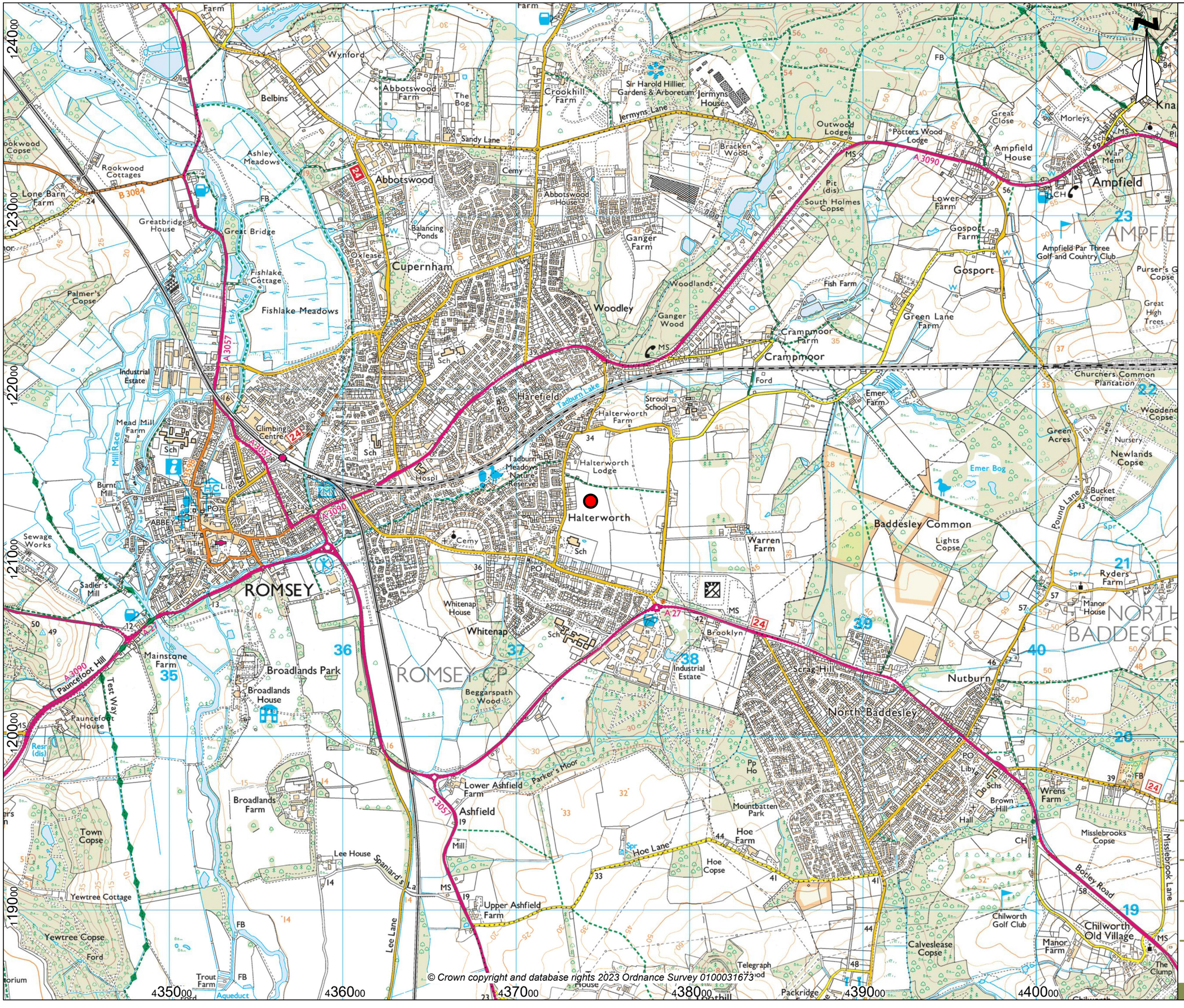
7.5.4 It is proposed that foul flows will discharge to Halterworth Lane via a pumped solution.

7.6 Conclusion

7.6.1 This FRA demonstrates the proposed development would be operated with minimal risk from flooding, would not increase flood risk elsewhere and is compliant with the requirements of national policy and guidance.

7.6.2 The development should therefore not be precluded on the grounds of flood risk, as well as surface water and foul drainage.

DRAWINGS



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environmental consultants

Samuel House, 5 Fox Valley Way, Stocksbridge, Sheffield, S36 2AA

CLIENT: Gladman Developments Ltd

SCALE: 1:20,000@A3

PROJECT REF: SHF.1132.258

DRAWN: LW

CHECKED: DA

DATE: Sept 2023

PROJECT: Halterworth Lane, Romsey

TITLE: Site Location Plan

DRAWING NO: SHF.1132.258.HY.D.001

Key

- Site Boundary
- Surface Water Features

N

Harefield
Halterworth
Whitenap
Tadburn Meadows
Highwood House (Sch)
Cornerways
Highwood Farmhouse
Halterworth Community Primary School
Romsey Cemetery
Burial Ground
Recreation Ground
Depot
Warren Solar Farm
Bryn Fryd
The Quadrangle
Path
Drain
PO
PW
LC
ESS
37m
40m
41m
42m
38m
36m
39m
HALTERWORTH LANE
GREEN LANE
HIGHWOOD LANE
BOTLEY ROAD
LUZBOROUGH LANE
A27
JENNER WAY
FELTHAM CLOSE
HESTIA CL
SEWARD RS
HIGH FIRS ROAD
KENNETT ROAD
SAXON WAY
MEON CL
MEON ROAD
AVON CRES
BENEDICT CLOSE
ELMTREE GDNS
SYCAMORE CLOSE
WHITENAP LANE
NORTHLANDS ROAD
PINE ROAD
MONTFORT ROAD
BIRCH CLOSE
POTTENGER ROAD
NORTH STREET
ROWAN CL
ALDER CL
ASH CL
WHITENAP CL
WALNUT CL
SENLAC ROAD
WESSEX GDNS
THE COVERT
FIVE ELMS DR
THE THICKET
PREMIER WAY
ST BLAZE ROAD
CLOVER WAY
VINEY AVENUE
WINDFIELD DR
THE CRESCENT
SELSDON AVENUE
HOLYBORNE RD
MEAD CL
ASHDOWN WAY
ALLAN GR
CHAMBERS AVENUE
1215 00
1210 00
4370 00
4375 00
4380 00

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CLIENT: Gladman Developments Ltd

SCALE: 1:5,000@A3

PROJECT REF: SHF.1132.258

DRAWN: LW

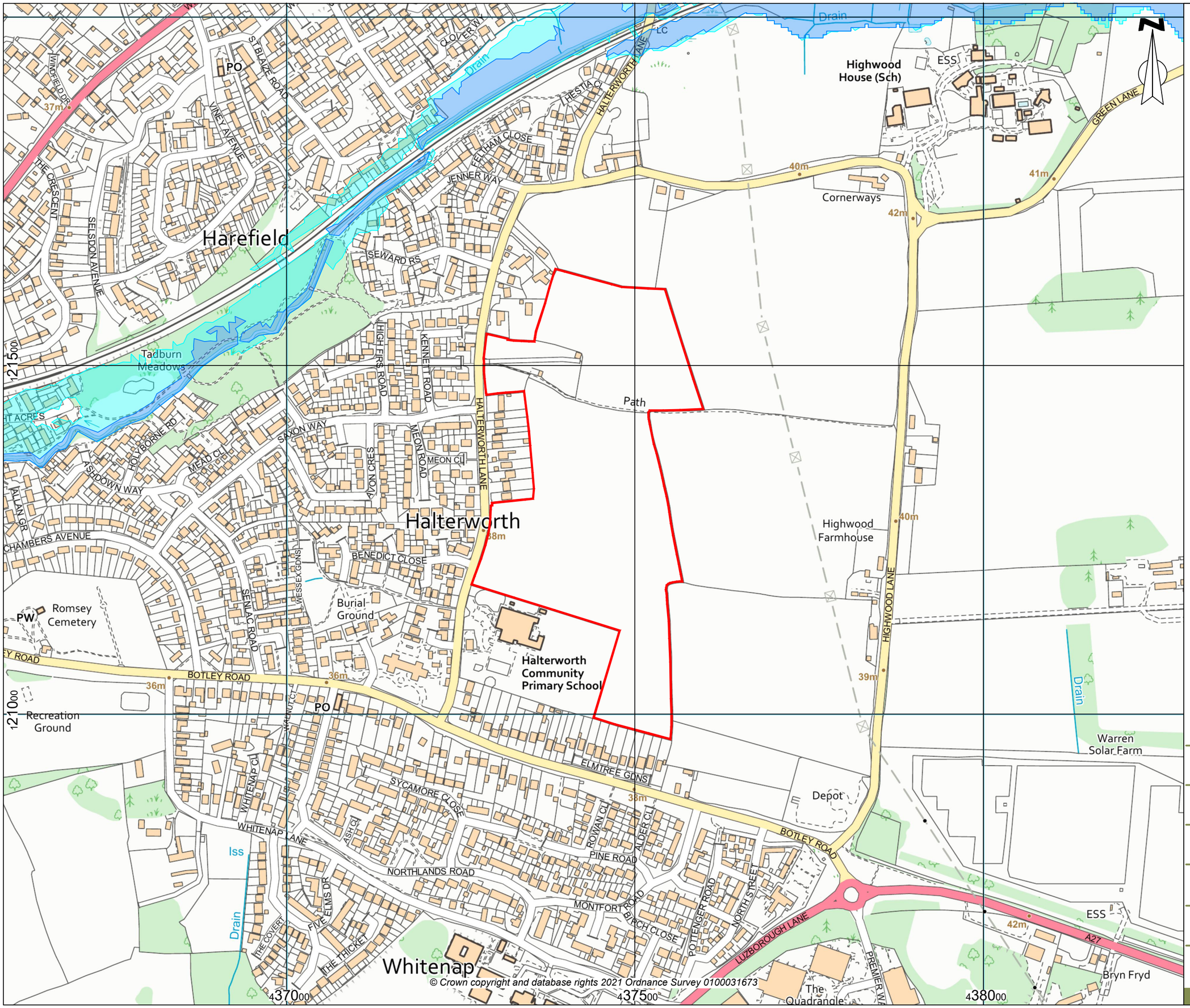
CHECKED: DA

DATE: Sept 2023

PROJECT: Halterworth Lane, Romsey

TITLE: Surface Water Features

DRAWING NO: SHF.1132.258.HY.D.002



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Samuel House, 5 Fox Valley Way, Stocksbridge, Sheffield, S36 2AA

CLIENT: Gladman Developments Ltd

SCALE: 1:5,000@A3

PROJECT REF: SHF.1132.258

DRAWN: LW

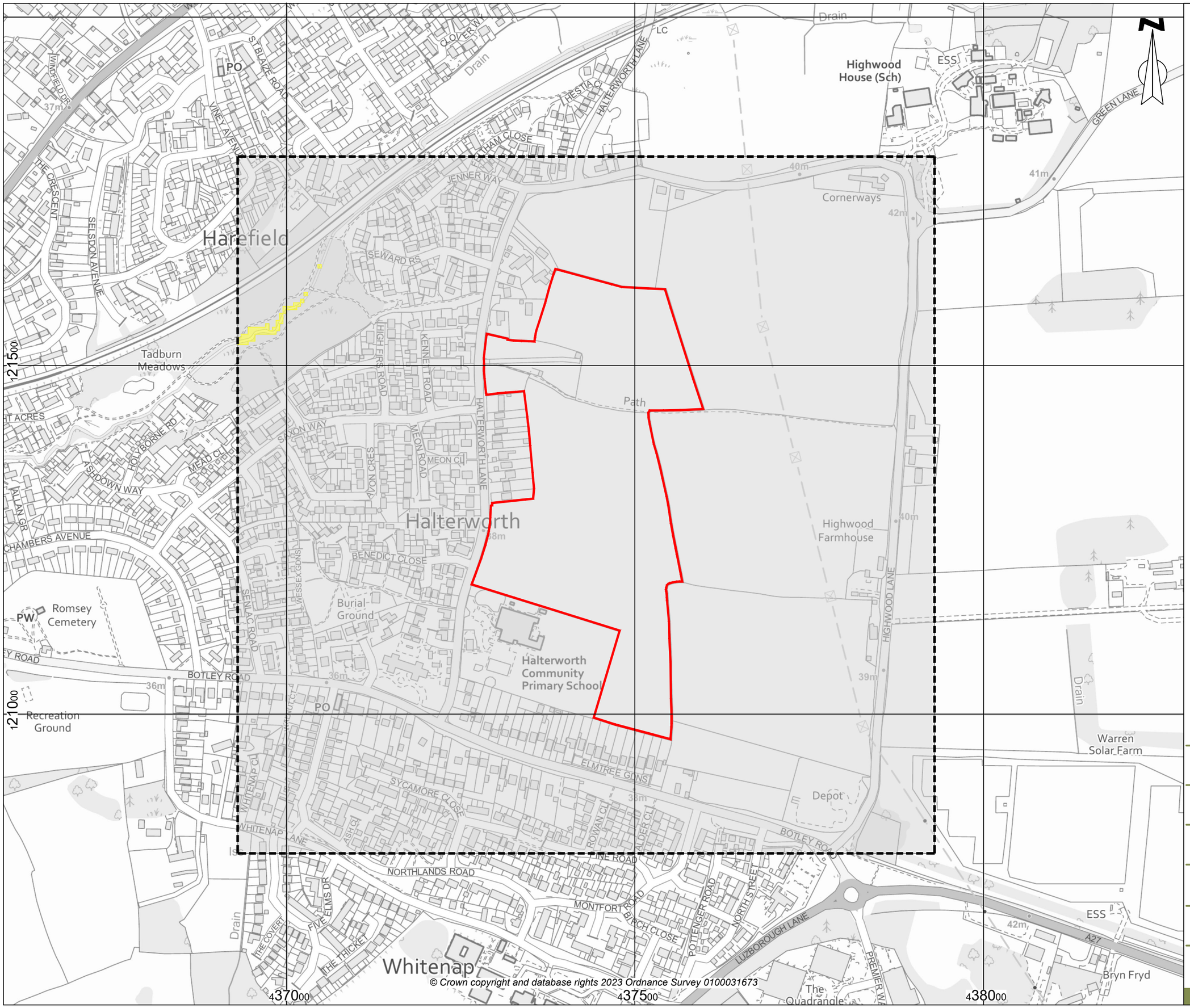
CHECKED: DA

DATE: Sept 2023

PROJECT: Halterworth Lane, Romsey

TITLE: Environment Agency Flood Zones

DRAWING NO: SHF.1132.258.HY.D.003



Key

- Site Boundary
- Search Extent
- Class 1 - High Risk
- Class 2 - Moderate Risk
- Class 3 - Low Risk
- Class 4 - Negligible Risk

Notes:

GEOSMART GROUNDWATER FLOOD RISK MAP GW5
Version 2.4© - www.geosmartinfo.co.uk

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Samuel House, 5 Fox Valley Way, Stocksbridge, Sheffield, S36 2AA

CLIENT: Gladman Developments Ltd

SCALE: 1:5,000@A3

PROJECT REF: SHF.1132.258

DRAWN: LW

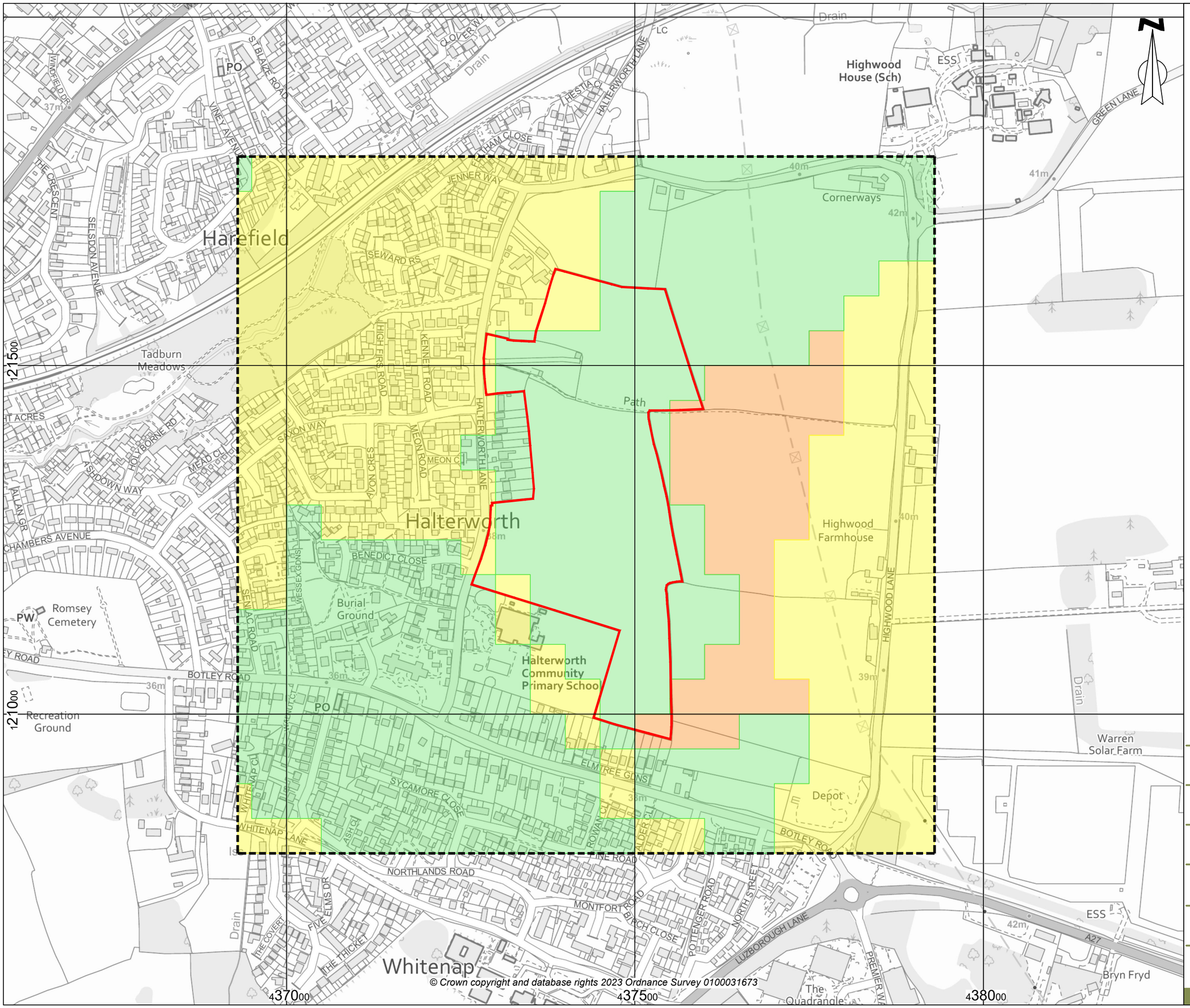
CHECKED: DA

DATE: Sept 2023

PROJECT: Halterworth Lane, Romsey

TITLE: Groundwater Flood Risk Map

DRAWING NO: SHF.1132.258.HY.D.004



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Samuel House, 5 Fox Valley Way, Stocksbridge, Sheffield, S36 2AA

CLIENT: Gladman Developments Ltd

SCALE: 1:5,000@A3

PROJECT REF: SHF.1132.258

DRAWN: LW

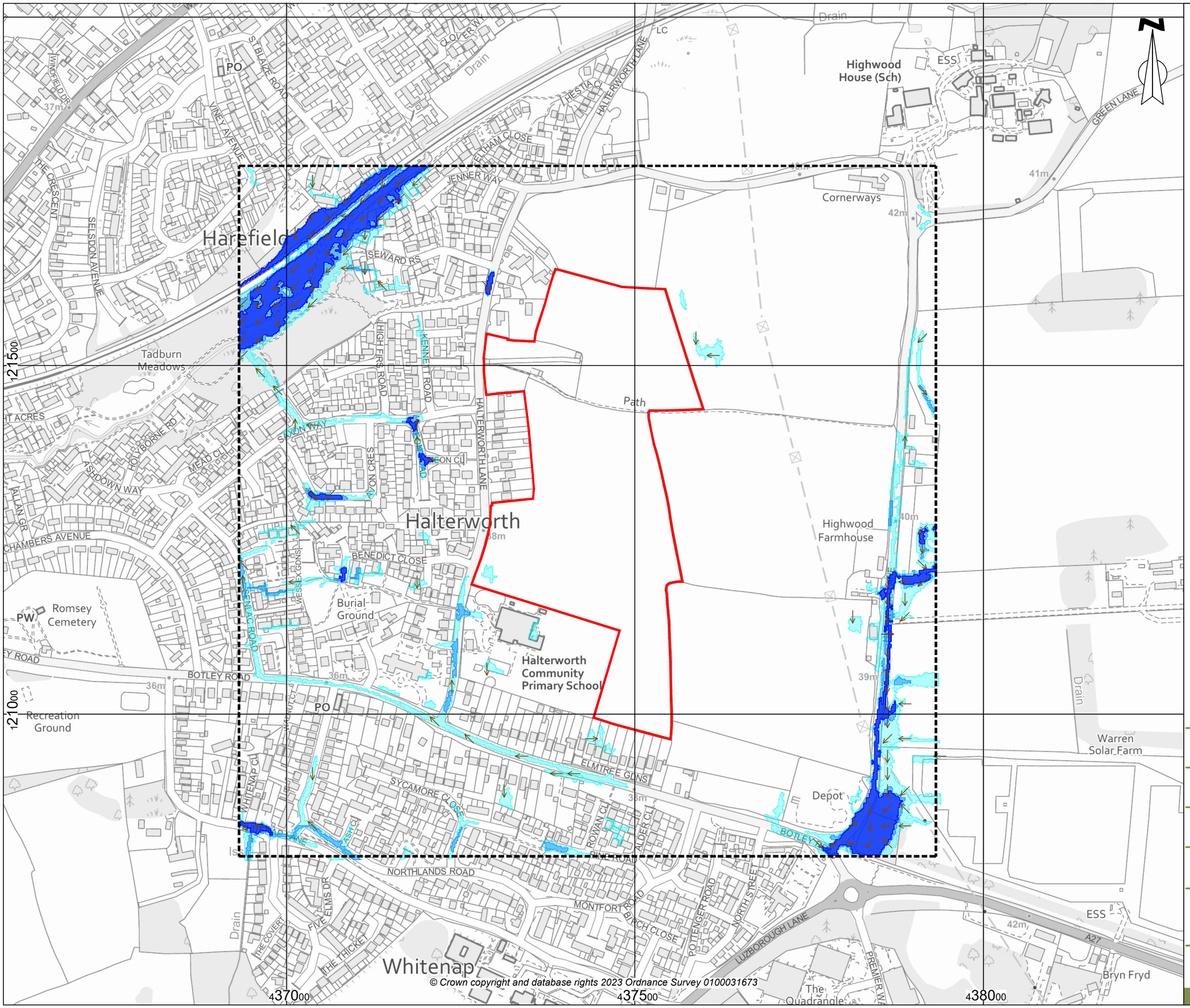
CHECKED: DA

DATE: Sept 2023

PROJECT: Halterworth Lane, Romsey

TITLE: SuDS Infiltration Potential Map

DRAWING NO: SHF.1132.258.HY.D.005



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environmental consultants

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CLIENT: Gladman Developments Ltd

SCALE: 1:5,000@A3

PROJECT REF: SHF.1132.258

DRAWN: LW

CHECKED: DA

DATE: Sept 2023

PROJECT: Halterworth Lane, Romsey

TITLE: Environment Agency Surface Water Flow Paths

DRAWING NO: SHF.1132.258.HY.D.006.1

Key

- Site Boundary
- Search Extent
- Depth greater than 1.20 (m)
- Depth 0.90 - 1.20 (m)
- Depth 0.60 - 0.90 (m)
- Depth 0.30 - 0.60 (m)
- Depth 0.15 - 0.30 (m)
- Depth 0.0 - 0.15 (m)

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CLIENT: Gladman Developments Ltd

SCALE: 1:5,000@A3

PROJECT REF: SHF.1132.258

DRAWN: LW

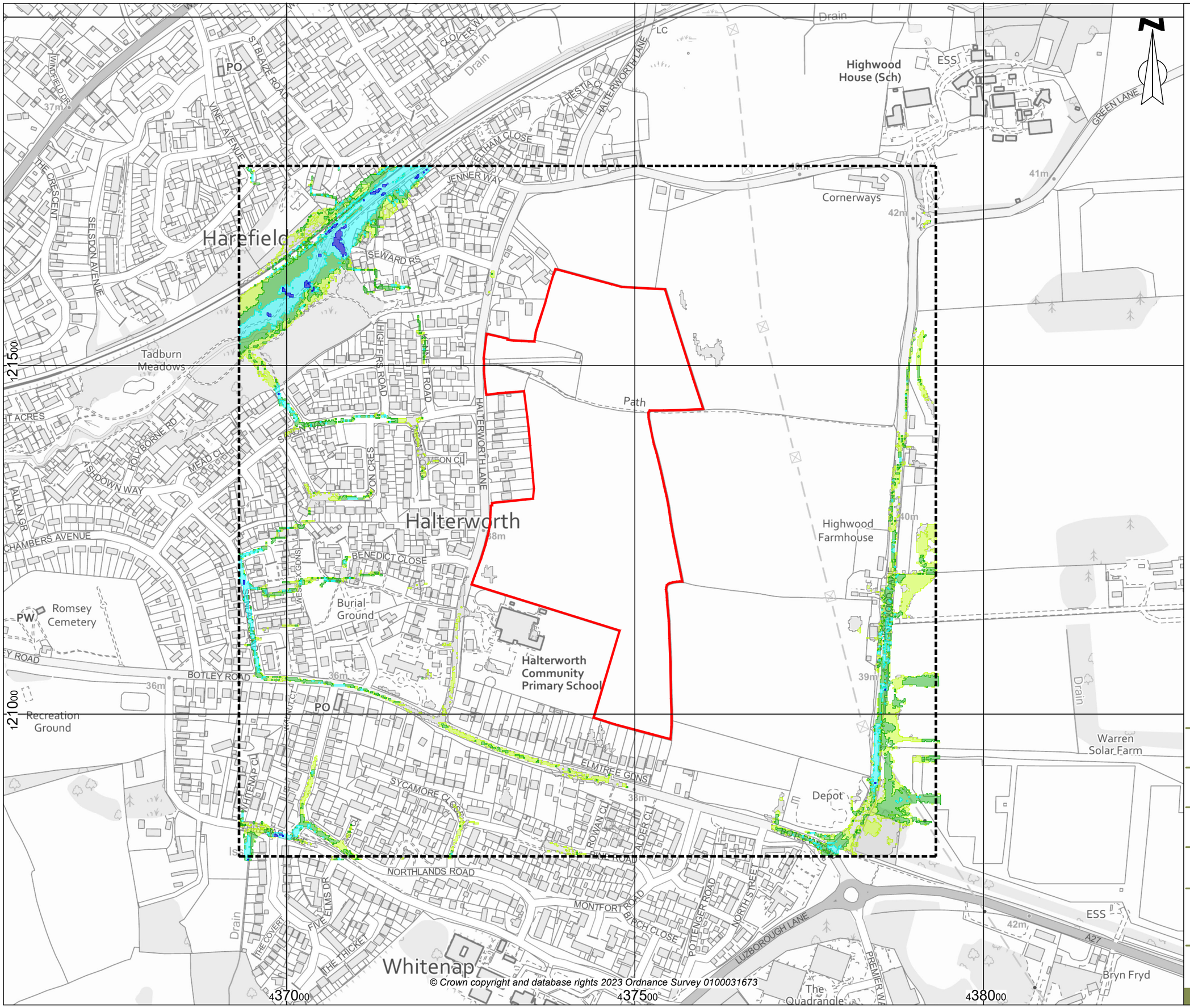
CHECKED: DA

DATE: Sept 2023

PROJECT: Halterworth Lane, Romsey

TITLE: Environment Agency 1 in 1000 Year Surface Water Depth

DRAWING NO: SHF.1132.258.HY.D.006.2



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environmental consultants

Samuel House, 5 Fox Valley Way, Stocksbridge, Sheffield, S36 2AA

CLIENT: Gladman Developments Ltd

SCALE: 1:5,000@A3

PROJECT REF: SHF.1132.258

DRAWN: LW

CHECKED: DA

DATE: Sept 2023

PROJECT: Halterworth Lane, Romsey

TITLE: Environment Agency 1 in 1000 Year Surface Water Velocity

DRAWING NO: SHF.1132.258.HY.D.006.3

Key

- Site Boundary
- Search Extent
- Extreme Hazard (> 2.0)
- Significant Hazard (1.25 - 2.00)
- Moderate Hazard (0.75 - 1.25)
- Low Hazard (0.50 - 0.75)

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CLIENT: Gladman Developments Ltd

SCALE: 1:5,000@A3

PROJECT REF: SHF.1132.258

DRAWN: LW

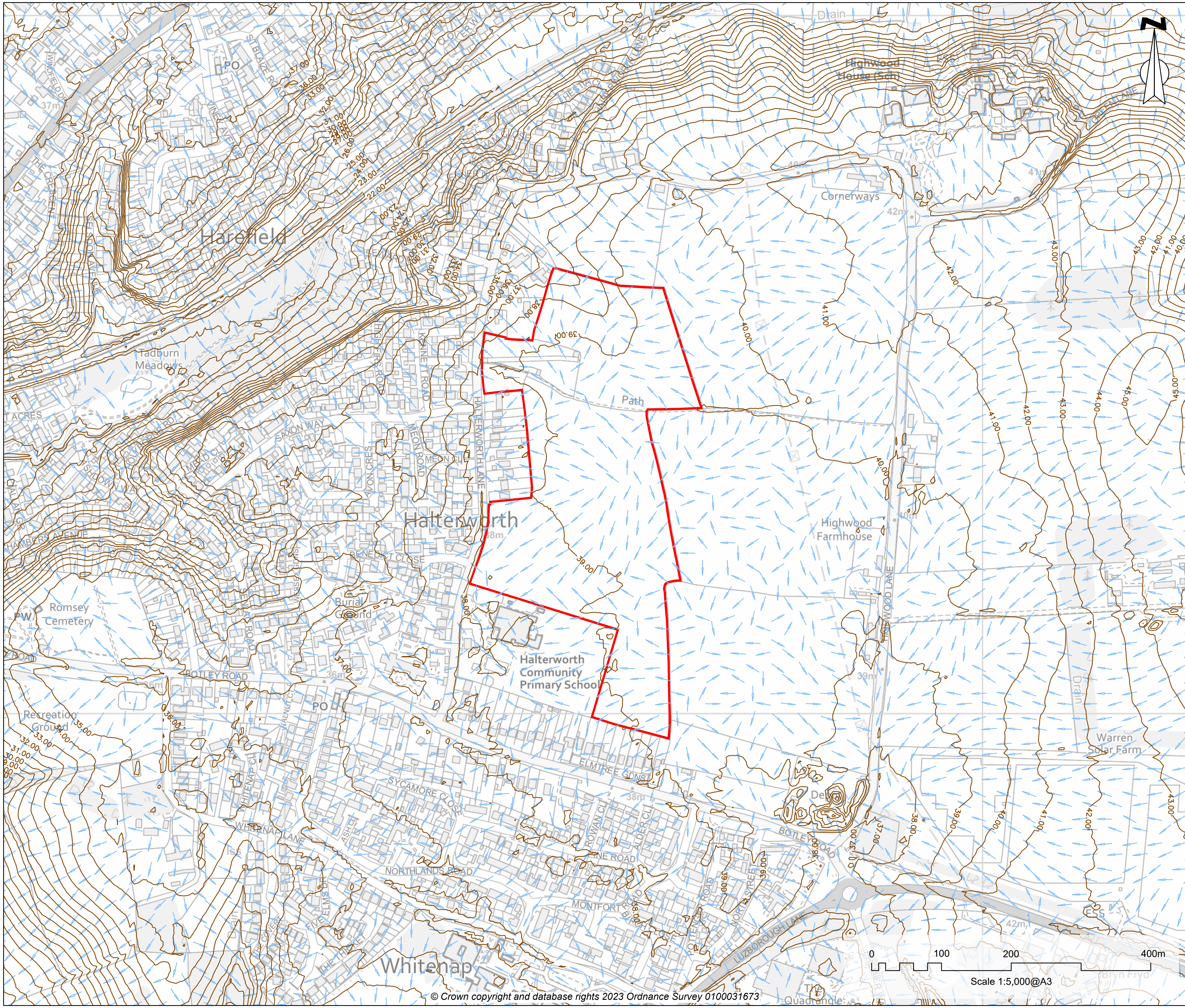
CHECKED: DA

DATE: Sept 2023

PROJECT: Halterworth Lane, Romsey

TITLE: Environment Agency Surface Water 1000 Year Hazard Rating

DRAWING NO: SHF.1132.258.HY.D.006.4



Key

- Site Boundary
- Contours
  1.0m Intervals (mAOD)
- Surface Water Flow Path

Notes:

Ground Model Specification: 2m DTM LIDAR data

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CLIENT:
Gladman Developments Ltd

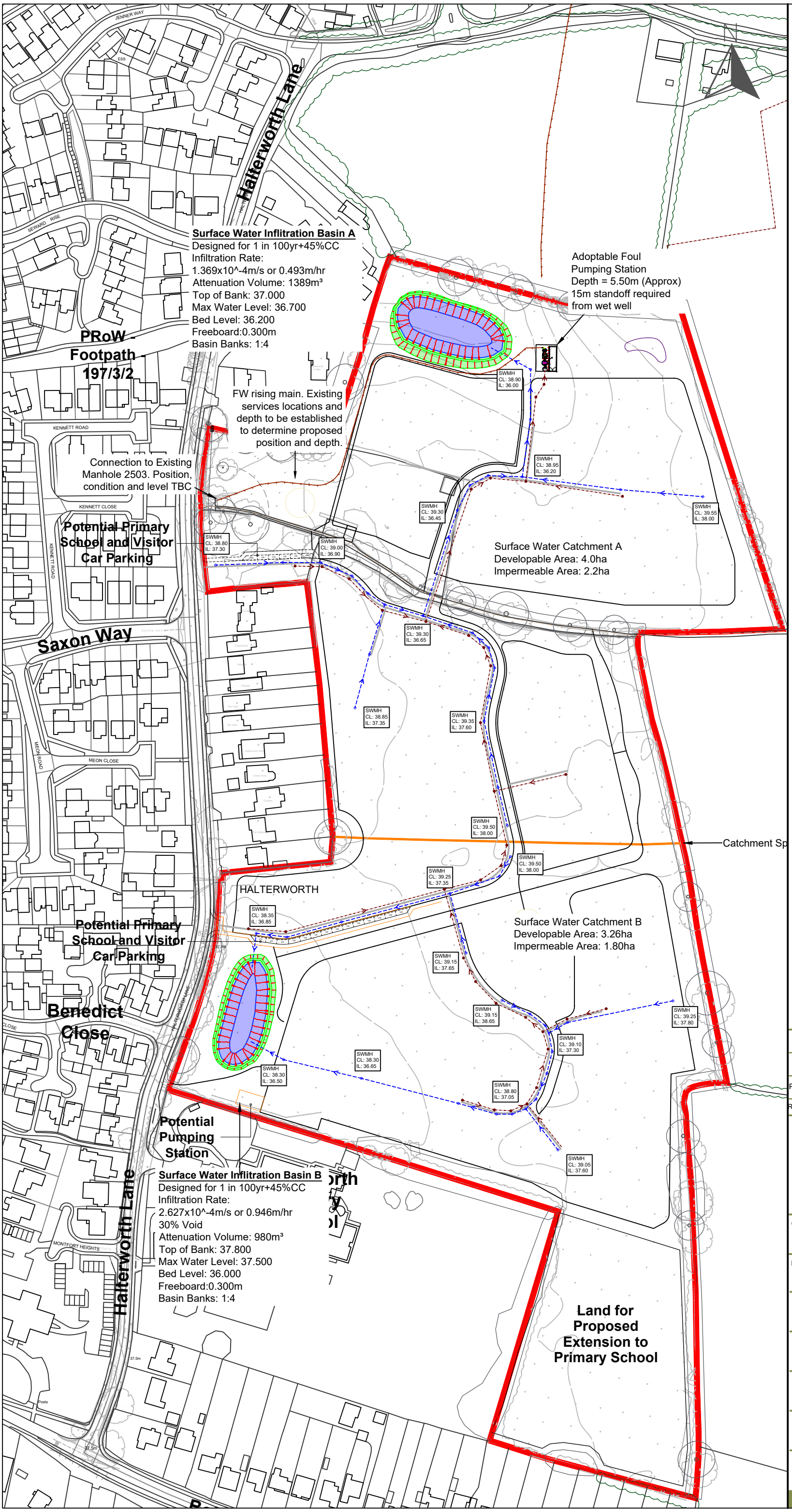
SCALE:	PROJECT REF:
1:5,000@A3	SHF.1132.258

DRAWN:	CHECKED:	DATE:
LW	DA	Sept 2023

PROJECT:
Halterworth Lane, Romsey

TITLE:
Exceedance Routes

DRAWING NO:
SHF.1132.258.HY.D.007



NOTES

1. Do not scale from this drawing
2. All dimensions are in meters unless stated otherwise
3. This drawing is to be read in conjunction with all relevant drawings and documents associated with this project.
4. All surveyed information including levels and layout is provided by others
5. All existing and proposed dimensions, levels and locations to be checked and verified by the main contractor on site prior to the commencement of the works and any anomalies reported to the engineer.
6. All works, workmanship and materials on private drainage to be in accordance with the civil engineering specification for water industry 7th edition published by the water research council.

Key

- Site Boundary
- Surface Water Sewer
- Foul Water Sewer
- Foul Rising Main

REV:	DATE:	DETAIL:	DES:	CHK:	APP:
P01	22/12/23	First Issue	RB	EOC	EOC

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CLIENT: Gladman Developments Ltd

PROJECT: Halterworth Lane, Romsey

DRAWING TITLE: Drainage Strategy

DRAWN:	DESIGNED:	CHECKED:	APPROVED:
RB	RB	EOC	EOC

DATE:	SCALE @ A3:
22/12/2023	1:2000

PROJECT NO.:	DRAWING NO.:
SHF.1132.258	ENZ-XX-XX-DR-D-0001

DRAWING STATUS:	ISSUE:
Preliminary	P01

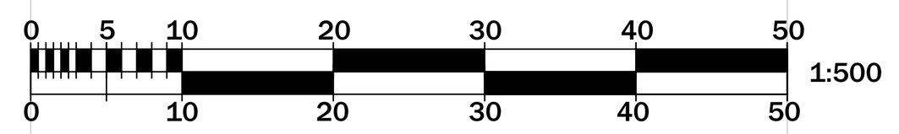
APPENDICES

Appendix 1 – Topographic Survey

TREE SCHEDULE

No.	DIAM.	SPREAD Ø	HEIGHT
TE/1	0.65	16	16
TE/2	1.10	20	18
TE/3	1.30	20	20
TE/4	1.60	14	20
TE/5	1.10	20	16
TE/6	0.80	16	16
TE/7	0.40	8	16
TE/8	0.40	12	16
TE/9	0.65	15	17
TE/10	0.65	15	17
TE/11	0.65	15	17
TE/12	0.95	18	17
TE/13	0.70	18	16
TE/14	0.40	4	3
TE/15	0.40	4	3
TE/16	0.15	4	6
TE/17	0.20	6	6
TE/18	0.50	4	6
TE/19	0.35	10	6
TE/20	0.20	8	6
TE/21	0.20	8	6
TE/22	0.20	8	6
TE/23	0.50	12	8
TE/24	0.20	8	8
TE/25	0.20	8	8
TE/26	0.20	8	8
TE/27	0.20	4	6
TE/28	0.20	4	6
TE/29	0.15	4	6
TE/30	0.15	4	6
TE/31	0.20	6	6
TE/32	0.20	4	3
TE/33	0.30	8	10
TE/34	0.20	8	6
TE/35	0.20	8	6
TE/36	0.20	8	6
TE/37	0.20	8	6
TE/38	0.20	8	6
TE/39	0.20	8	6
TE/40	0.20	6	6
TE/41	0.15	4	6
TE/42	0.15	4	6
TE/43	0.15	4	6
TE/44	0.15	4	6
TE/45	0.20	6	8
TE/46	0.20	6	8
TE/47	0.20	4	6
TE/48	0.20	4	6
TE/49	0.20	6	6
TE/50	0.20	6	6
TE/51	0.65	14	12
TE/52	0.40	6	8
TE/53	0.20	4	6
TE/54	0.95	22	19
TE/55	0.80	10	10
TE/56	0.65	20	12
TE/57	0.20	4	6
TE/58	0.20	4	6
TE/59	0.20	4	6
TE/60	0.20	4	6
TE/61	0.20	4	6
TE/62	0.35	10	6
TE/63	0.25	6	6
TE/64	0.30	10	10
TE/65	0.70	14	14
TE/66	1.40	24	18
TE/67	1.00	18	18
TE/68	0.80	16	8
TE/69	0.60	8	8
TE/70	1.20	18	15
TE/71	1.30	14	14
TE/72	1.30	22	17
TE/73	0.90	22	17
TE/74	0.90	16	16
TE/75	0.90	16	16
TE/76	1.00	22	18
TE/77	1.00	18	18
TE/78	1.20	16	18
TE/79	1.00	14	12
TE/80	0.60	14	16
TE/81	0.80	20	16
TE/82	0.70	8	10
TE/83	0.15	4	10
TE/84	0.15	4	10
TE/85	0.15	4	10
TE/86	0.15	4	10
TE/87	0.50	16	14
TE/88	0.80	20	18
TE/89	0.60	18	18
TE/90	0.90	22	18
TE/91	1.00	22	18
TE/92	0.80	16	10
TE/93	0.40	8	8
TE/94	0.45	8	8
TE/95	0.40	8	8
TE/96	0.40	8	8
TE/97	0.65	8	8
TE/98	0.65	8	8
TE/99	0.30	5	5
TE/100	0.70	12	10
TE/101	0.40	8	10
TE/102	0.85	12	10
TE/103	0.40	10	10
TE/104	0.55	12	10
TE/105	0.80	16	12
TE/106	0.40	10	10
TE/107	0.35	8	8
TE/108	1.50	28	18
TE/109	1.20	14	14
TE/110	1.30	20	16
TE/111	0.30	8	8
TE/112	1.00	22	16

TREE DIAMETER MEASURED APPROXIMATELY 1.5M ABOVE GROUND LEVEL. TREE SPREADS ARE SYMBOLIC ONLY AND ARE REPRESENTATIVE OF THE GENERALISED CANOPY SIZE. TREE BOLE MAY NOT SIT CENTRALLY TO THE CANOPY. TREE HEIGHT ESTIMATED FROM GROUND LEVEL.



N

NOTES

THIS SURVEY IS ORIENTATED TO ORDNANCE SURVEY GRID NORTH. THE SURVEY IS TO A PLANE GRID. HORIZONTAL MEASUREMENTS TAKEN FROM THIS SURVEY WILL BE GROUND DISTANCES.

SITE CENTRE: E 437424, N 121309

LOCAL SCALE FACTOR: 0.9996185

ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM GENERATED BY ACTIVE GPS NETWORK.

DRAINAGE:-

NO ALLOWANCE HAS BEEN MADE FOR SUB SURFACE ACCESS TO MANHOLES OR CHAMBERS. ANY PIPE SIZES, DEPTHS OR BELOW GROUND DIMENSIONS ARE TAKEN FROM THE SURFACE AND THUS WILL ONLY BE APPROXIMATE. ANY FLOW TYPES (FOUL WATER, SURFACE WATER OR COMBINED) ARE ASSUMED AND THEREFORE REQUIRE VERIFICATION.

ROAD MARKINGS:-

ROAD MARKINGS DISPLAYED ARE SYMBOLIC. LENGTH, SPACING AND THICKNESS ETC. ARE INDICATIVE ONLY.

LEGEND

- 30.29 + SPOT LEVEL
- SURVEY STATION
- SAPLING
- BUSHES/SHRUB
- TREE (INDICATIVE ONLY)
- HEDGE/AREA OF UNDERGROWTH
- 99.90 CONTOUR
- GATE
- OVERHEAD CABLE
- FENCE
- 1 PHOTOGRAPH LOCATION AND NUMBER

ABBREVIATIONS

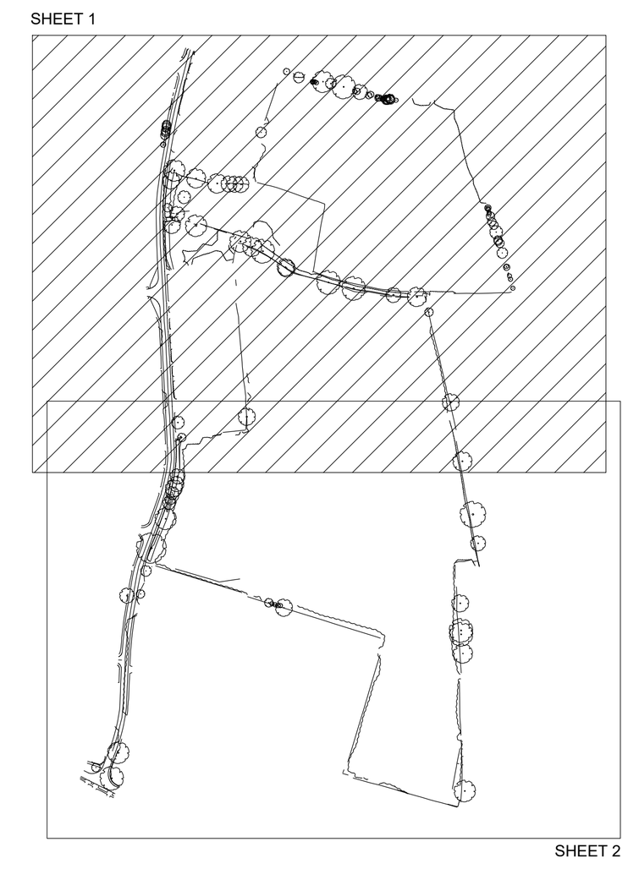
ArL	ARCH LEVEL	LB	LETTER BOX
AV	AIR VALVE	LP	LAMPOST
B	BOLLARD	MH	MANHOLE
BB	BELISHA BEACON	MKR	MARKER
BH	BOREHOLE	OHC	OVERHEAD CABLE
BL	BED LEVEL	OpL	OPENING LEVEL
BS	BUS STOP	OSBM	OS BENCHMARK
BT	BT COVER	P	POST
C/B	CLOSED BOARD FENCE	P/R	POST AND RAIL FENCE
C/L	CHAIN LINK FENCE	P/W	POST AND WIRE FENCE
CATV	CABLE TELEVISION COVER	PEC	PEDESTRIAN CROSSING
CC	CONTROL CABIN	PM	PARKING METER
COL	COLUMN	RE	RODDING EYE
Conc/p	CONCRETE PANEL FENCE	RWL	RETAINING WALL
CPY	CANOPY	SAP	SAPLING
CrL	CROWN LEVEL	SEC	SECURITY CAMERA
Csty	CABLE STAY	SGY	STRIP GULLY
CTV	CABLE TELEVISION POINT	SoL	SOFFIT LEVEL
CYR	CYCLE RACK	SP	SIGNPOST
DK	DROPPED KERB	SpL	SPRINGING LEVEL
DP	DOWNPIPE	SV	STOP VALVE
EiP	ELECTRIC INLET POINT	Tac	TACTILE PAVING
EL	ELECTRIC INSPECTION COVER	TCB	TELEPHONE BOX
EP	ELECTRICITY SUPPLY POLE	TE/?	TREE + NUMBER
ER	EARTH ROD	THL	THRESHOLD LEVEL
FH	FIRE HYDRANT	TL	TRAFFIC LIGHT
G	GULLY	ToF	TOP OF FENCE
G/DP	GULLY AND DOWNPIPE	ToW	TOP OF WALL
GP	GATE POST	TP	TELEPHONE POLE
Gpi	GAS PIPE	W/M	WIRE MESH FENCE
GV	GAS VALVE	W/P	WOODEN PANEL FENCE
IC	INSPECTION CHAMBER	WLV	WATER LEVEL
IL	INVERT LEVEL	WM	WATER METER
I/R	IRON RAILING FENCE	WO	WASH OUT
KO	KERB OUTLET		

STATION CO-ORDINATES

STATION	EASTING	NORTHING	LEVEL	DESCRIPTION
STN/1	437287.33	121504.25	38.05	Survey Nail
STN/4	437270.29	121504.24	37.78	Survey Nail
STN/8	437252.01	121188.89	37.73	Survey Nail
STN/9	437285.71	121609.09	34.27	Survey Nail
STN/10	437274.65	121408.18	38.22	Survey Nail
STN/11	437287.29	121309.89	38.11	Survey Nail
STN/12	437270.86	121239.79	37.97	Survey Nail
STN/13	437243.15	121044.46	37.68	Survey Nail
STN/14	437219.25	120980.24	37.69	Survey Nail

PLOT LOCATIONS

SHEET 1



SHEET 2

Rev	Date	Revision notes	By
*	*	*	*

DO NOT SCALE

Status

INFORMATION

Project

Halterworth Lane, Romsey.

Title

TOPOGRAPHICAL SURVEY
AS OF 08.06.21
SHEET 1 OF 2

GLADMAN
Gladman House, Alexandria Way
Congleton Business Park
Congleton, Cheshire
CW12 1LB
Tel: 01260 288800
Fax: 01260 288801
www.gladman.co.uk

Drawn By	Publish Date	Scale(s)	Sheet Size
JW/JH	15.06.21	1:500	A0

Project no.	Drawing no.	Revision
2016-136	Topo_01_2D	0

TREE SCHEDULE

No.	DIAM.	SPREAD Ø	HEIGHT
TE/1	0.65	16	16
TE/2	1.10	20	18
TE/3	1.30	20	20
TE/4	1.60	14	20
TE/5	1.10	20	16
TE/6	0.80	16	16
TE/7	0.40	8	16
TE/8	0.40	12	16
TE/9	0.65	15	17
TE/10	0.65	15	17
TE/11	0.65	15	17
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TE/22	0.20	8	6
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TE/38	0.20	8	6
TE/39	0.20	8	6
TE/40	0.20	6	6
TE/41	0.15	4	6
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TE/51	0.65	14	12
TE/52	0.40	6	8
TE/53	0.20	4	6
TE/54	0.95	22	19
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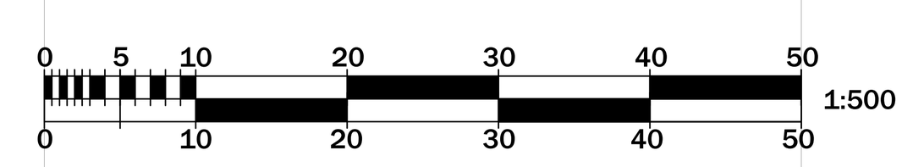
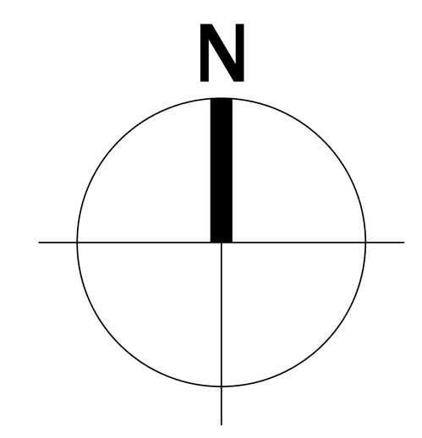
TE/62	0.35	10	6
TE/63	0.25	6	6
TE/64	0.30	10	10
TE/65	0.70	14	14
TE/66	1.40	24	18
TE/67	1.00	18	18
TE/68	0.80	16	8
TE/69	0.60	8	8
TE/70	1.20	18	15
TE/71	1.30	14	14
TE/72	1.30	22	17
TE/73	0.90	22	17
TE/74	0.90	16	16
TE/75	0.90	16	16
TE/76	1.00	22	18
TE/77	1.00	18	18
TE/78	1.20	16	18
TE/79	1.00	14	12
TE/80	0.60	14	16
TE/81	0.80	20	16
TE/82	0.70	8	10
TE/83	0.15	4	10
TE/84	0.15	4	10
TE/85	0.15	4	10
TE/86	0.15	4	10
TE/87	0.50	16	14
TE/88	0.80	20	18
TE/89	0.60	18	18
TE/90	0.90	22	18
TE/91	1.00	22	18
TE/92	0.80	16	10
TE/93	0.40	8	8
TE/94	0.45	8	8
TE/95	0.40	8	8
TE/96	0.40	8	8
TE/97	0.65	8	8
TE/98	0.65	8	8
TE/99	0.30	5	5
TE/100	0.70	12	10
TE/101	0.40	8	10
TE/102	0.85	12	10
TE/103	0.40	10	10
TE/104	0.55	12	10
TE/105	0.80	16	12
TE/106	0.40	10	10
TE/107	0.35	8	8
TE/108	1.50	28	18
TE/109	1.20	14	14
TE/110	1.30	20	16
TE/111	0.30	8	8
TE/112	1.00	22	16

TREE DIAMETER MEASURED APPROXIMATELY 1.5M ABOVE GROUND LEVEL. TREE SPREADS ARE SYMBOLIC ONLY AND ARE REPRESENTATIVE OF THE GENERALISED CANOPY SIZE. TREE BOLE MAY NOT SIT CENTRALLY TO THE CANOPY. TREE HEIGHT ESTIMATED FROM GROUND LEVEL.





NOTES

THIS SURVEY IS ORIENTATED TO ORDNANCE SURVEY GRID NORTH. THE SURVEY IS TO A PLANE GRID. HORIZONTAL MEASUREMENTS TAKEN FROM THIS SURVEY WILL BE GROUND DISTANCES.

SITE CENTRE: E 437424, N 121309

LOCAL SCALE FACTOR: 0.9996185

ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM GENERATED BY ACTIVE GPS NETWORK.

DRAINAGE:-

NO ALLOWANCE HAS BEEN MADE FOR SUB SURFACE ACCESS TO MANHOLES OR CHAMBERS. ANY PIPE SIZES, DEPTHS OR BELOW GROUND DIMENSIONS ARE TAKEN FROM THE SURFACE AND THUS WILL ONLY BE APPROXIMATE. ANY FLOW TYPES (FOUL WATER, SURFACE WATER OR COMBINED) ARE ASSUMED AND THEREFORE REQUIRE VERIFICATION.

ROAD MARKINGS:-

ROAD MARKINGS DISPLAYED ARE SYMBOLIC. LENGTH, SPACING AND THICKNESS ETC. ARE INDICATIVE ONLY.

LEGEND

- 30.29 — SPOT LEVEL
- SURVEY STATION
- SAPLING
- BUSHES/SHRUB
- TREE (INDICATIVE ONLY)
- HEDGE/AREA OF UNDERGROWTH
- 99.90 — CONTOUR
- GATE
- OVERHEAD CABLE
- FENCE
- 1 — PHOTOGRAPH LOCATION AND NUMBER

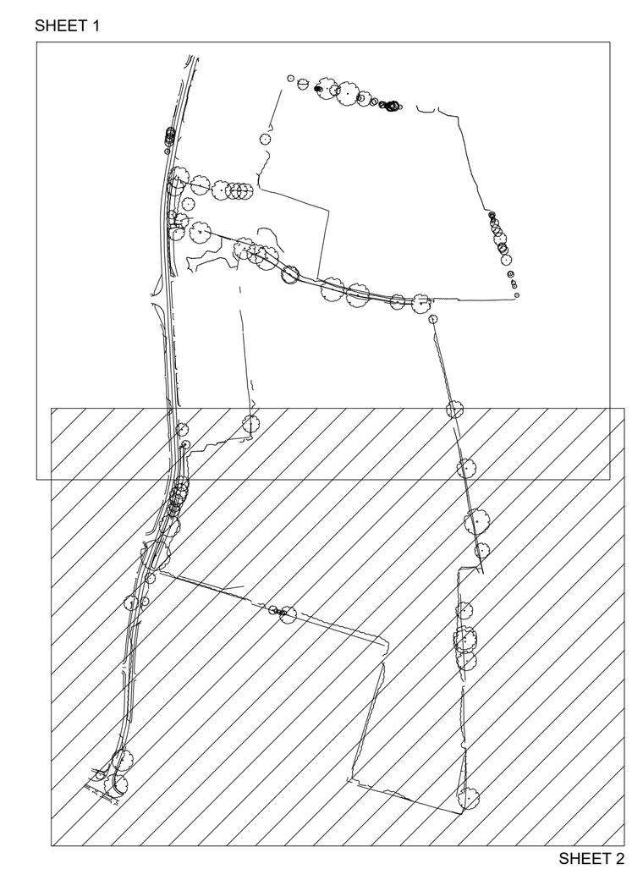
ABBREVIATIONS

ArL	ARCH LEVEL	LB	LETTER BOX
AV	AIR VALVE	LP	LAMPOST
B	BOLLARD	MH	MANHOLE
BB	BELISHA BEACON	MKR	MARKER
BH	BOREHOLE	OHC	OVERHEAD CABLE
BL	BED LEVEL	OpL	OPENING LEVEL
BS	BUS STOP	OSBM	OS BENCHMARK
BT	BT COVER	P	POST
C/B	CLOSED BOARD FENCE	P/R	POST AND RAIL FENCE
C/L	CHAIN LINK FENCE	P/W	POST AND WIRE FENCE
CATV	CABLE TELEVISION COVER	PEC	PEDESTRIAN CROSSING
CC	CONTROL CABIN	PM	PARKING METER
COL	COLUMN	RE	RODDING EYE
Conc/p	CONCRETE PANEL FENCE	RWL	RETAINING WALL
CPY	CANOPY	SAP	SAPLING
CrL	CROWN LEVEL	SEC	SECURITY CAMERA
Csty	CABLE STAY	SGY	STRIP GULLY
CTV	CABLE TELEVISION POINT	SoL	SOFFIT LEVEL
CYR	CYCLE RACK	SP	SIGNPOST
DK	DROPPED KERB	SpL	SPRINGING LEVEL
DP	DOWNPIPE	SV	STOP VALVE
EiP	ELECTRIC INLET POINT	Tac	TACTILE PAVING
EL	ELECTRIC INSPECTION COVER	TCB	TELEPHONE BOX
EP	ELECTRICITY SUPPLY POLE	TE/?	TREE + NUMBER
ER	EARTH ROD	THL	THRESHOLD LEVEL
FH	FIRE HYDRANT	TL	TRAFFIC LIGHT
G	GULLY	ToF	TOP OF FENCE
G/DP	GULLY AND DOWNPIPE	ToW	TOP OF WALL
GP	GATE POST	TP	TELEPHONE POLE
Gpi	GAS PIPE	W/M	WIRE MESH FENCE
GV	GAS VALVE	W/P	WOODEN PANEL FENCE
IC	INSPECTION CHAMBER	WLV	WATER LEVEL
IL	INVERT LEVEL	WM	WATER METER
I/R	IRON RAILING FENCE	WO	WASH OUT
KO	KERB OUTLET		

STATION CO-ORDINATES

STATION	EASTING	NORTHING	LEVEL	DESCRIPTION
STN/1	437287.33	121504.25	38.05	Survey Nail
STN/4	437270.29	121504.24	37.78	Survey Nail
STN/8	437252.01	121188.89	37.73	Survey Nail
STN/9	437285.71	121609.09	34.27	Survey Nail
STN/10	437274.65	121408.18	38.22	Survey Nail
STN/11	437287.29	121309.89	38.11	Survey Nail
STN/12	437270.86	121239.79	37.97	Survey Nail
STN/13	437243.15	121044.46	37.68	Survey Nail
STN/14	437219.25	120980.24	37.69	Survey Nail

PLOT LOCATIONS



Rev	Date	Revision notes	By
*	*	*	*

DO NOT SCALE

Status

INFORMATION

Project

Halterworth Lane, Romsey.

Title

TOPOGRAPHICAL SURVEY AS OF 08.06.21 SHEET 2 OF 2

GLADMAN
Gladman House, Alexandria Way
Congleton Business Park
Congleton, Cheshire
CW12 1LB
Tel: 01260 288800
Fax: 01260 288801
www.gladman.co.uk

Drawn By	Publish Date	Scale(s)	Sheet Size
JW/JH	15.06.21	1:500	A0

Project no.	Drawing no.	Revision
2016-136	Topo_02_2D	0

Appendix 2 – Southern Water Correspondence

Order received: 4 April 2019
Order completed: 5 April 2019

Drainage and water enquiry

Commercial

Order reference: LS/U1430652
Your reference: SF27619971000 LKS/Romsey 2016-136

Search address:

Land at Halterworth Lane
Romsey
Hampshire
SO51 9AE

Ordered by:

Searchflow
42 Kings Hill Avenue
West Malling
Kent
ME19 4AJ

For enquiries regarding the information provided in this report, please contact the LandSearch team:

Tel: 0845 270 0212
0330 303 0276 (individual consumers)

Email: searches@southernwater.co.uk

Web: www.southernwater.co.uk

LandSearch
Southern Water Services
Southern House
Capstone Road
Chatham
Kent

COMMERCIALDW
DRAINAGE AND WATER ENQUIRY

Southern Water

Order received: 4 April 2019
Order completed: 5 April 2019

ME5 7QA

COMMERCIALDW
DRAINAGE AND WATER ENQUIRY

Southern Water

What you need to know about...

Private sewer transfer

On 1 October 2011, ownership of private sewers and lateral drains changed in accordance with The Water Industry (Schemes for Adoption of Private Sewers) Regulations 2011. The contents of this search may not reflect these changes.

For further information please visit our website: www.southernwater.co.uk/sewer-ownership-changes.

Records searched

The following records were searched in compiling this report: the Map of Public Sewers, the Map of Waterworks, water and sewerage records, the Register of Properties subject to Internal Foul Flooding, the Register of Properties subject to Poor Water Pressure and the Drinking Water Register. Should the property not fall entirely within Southern Water's region, a copy of the records held by the relevant water company was searched.

Competition in the non-household retail market

From April 2017 non-household customers in England can choose their retailer. 'Retail' refers to the way in which customers are billed for their water and sewerage as well as customer services including meter reading.

The 'wholesale' part of the water industry was not opened for competition in April 2017. This means Southern Water continues to look after the pipes and infrastructure for all its customers across Kent, Sussex, Hampshire and the Isle of Wight.

Moving

There can be a lot to do and remember when you're moving. Whether you are moving within our area, moving into our area or moving out of the area please let your retailer know.

Your order summary

	Maps	
1.1	Where relevant, please include a copy of an extract from the public sewer map.	Map provided
1.2	Where relevant, please include a copy of an extract from the map of waterworks	Map provided
	Drainage	
2.1	Does foul water from the property drain to a public sewer?	No
2.2	Does surface water from the property drain to a public sewer?	No
2.3	Is a surface water drainage charge payable?	See answer
2.4	Does the public sewer map indicate any public sewer, disposal main or lateral drain within the boundaries of the property?	Yes
2.4.1	Does the public sewer map indicate any public pumping station or any other ancillary apparatus within the boundaries of the property?	No
2.5	Does the public sewer map indicate any public sewer within 30.48 metres (100 feet) of any buildings within the property?	No
2.5.1	Does the public sewer map indicate any public pumping station or any other ancillary apparatus within 50 metres of any buildings within the property?	No
2.6	Are any sewers or lateral drains serving, or which are proposed to serve the property, the subject of an existing adoption agreement or an application for such an agreement?	No
2.7	Has any sewerage undertaker approved or been consulted about any plans to erect a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain?	No
2.8	Is the building which is or forms part of the property at risk of internal flooding due to overloaded public sewers?	No
2.9	Please state the distance from the property to the nearest boundary of the nearest sewage treatment works.	See answer
	Water	
3.1	Is the property connected to mains water supply?	No
3.2	Are there any water mains, resource mains or discharge pipes within the boundaries of the property?	No
3.3	Is any water main or service pipe serving, or which is proposed to serve the property, the subject of an existing adoption agreement or an application for such an agreement?	No
3.4	Is the property at risk of receiving low water pressure or flow?	No
3.5	What is the classification of the water supply for the property?	See answer
3.6	Is there a meter installed at this property?	See answer
	Charging	
4.1.1	Who is responsible for providing the sewerage services for the property?	Southern Water
4.1.2	Who is responsible for providing the water services for the property?	Southern Water
4.2	Who bills the property for sewerage services?	See answer
4.3	Who bills the property for water services?	See answer
	Trade effluent information	
4.4	Is there a consent on this property to discharge trade effluent under Section 118 of the Water Industry Act (1991) into the public sewerage system?	No

Maps

Public sewer map

Q. 1.1: Where relevant, please include a copy of an extract from the public sewer map.

A.: A copy of an extract from the public sewer map is provided.

Guidance notes:

The Water Industry Act 1991 defines public sewers as those which the Company has responsibility for. Other assets and rivers, watercourses, ponds, culverts or highway drains may be shown for information purpose only.

Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an "as constructed" record. It is recommended these details be checked with the developer.

Map of waterworks

Q. 1.2: Where relevant, please include a copy of an extract from the map of waterworks.

A.: A copy of an extract of the map of waterworks is provided.

Guidance notes:

Assets other than vested water mains may be shown on the plan for information only.

The Company is not responsible for private supply pipes connecting the property to the public water main and does not hold details of these. These may pass through land outside of the control of the seller, or may be shared with adjacent properties. The buyer may wish to investigate whether separate rights or easements are needed for their inspection, repair or renewal.

If an extract of the public water main record is enclosed, this will show known public water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network.

Drainage

Foul water

Q. 2.1: Does foul water from the property drain to a public sewer?

A.: The Company's records indicate that foul water from the property does not drain to the public sewerage system.

Guidance notes:

The Company is not responsible for private drains and sewers that connect the property to the public sewerage system and does not hold details of these.

The property owner will normally have sole responsibility for private drains serving the property and may have shared responsibility, with other users, if the property is served by a private sewer which also serves other properties. These may pass through land outside of the control of the seller and the buyer may wish to investigate whether separate rights or easements are needed for their inspection, repair or renewal.

An extract from the public sewer map is enclosed. This will show known public sewers in the vicinity of the property and it should be possible to estimate the likely length and route of any private drains and/or sewers connecting the property to the public sewerage system.

If foul water does not drain to the public sewerage system the property may have private facilities in the form of a cesspit, septic tank or other type of treatment plant.

Surface water

Q. 2.2: Does surface water from the property drain to a public sewer?

A.: The Company's records indicate that surface water from the property does not drain to the public sewerage system. If the property was constructed after 6 April 2015 the surface water drainage may be served by a Sustainable Drainage System. Further information may be available from the developer.

Guidance notes:

The Company is not responsible for private drains and sewers that connect the property to the public sewerage system and does not hold details of these.

The property owner will normally have sole responsibility for private drains serving the property and may have shared responsibility, with other users, if the property is served by a private sewer which also serves other properties. These may pass through land outside of the control of the seller and the buyer may wish to investigate whether separate rights or easements are needed for their inspection, repair or renewal.

An extract from the public sewer map is enclosed. This will show known public sewers in the vicinity of the property and it should be possible to estimate the likely length and route of any private drains and/or sewers connecting the property to the public sewerage system.

In some cases company records do not distinguish between foul and surface water connections to the public sewerage system. If on inspection the buyer finds that the property is not connected for surface water drainage, the property may be eligible for a rebate of the surface water drainage charge. Details can be obtained from the Company.

If surface water does not drain to the public sewerage system the property may have private facilities in the form of a soakaway or private connection to a watercourse