

Flood Risk Assessment & Drainage Strategy

Title	Former Woodlands Hotel
Client	Country Court Care Homes 5 Limited
Location	Coupals Road, Sturmer, Haverhill, Essex
Project number	22-0364
BIM reference	WHCH-BSP-XX-XX-T-W-0001-P05_Flood_Risk_Assessment
Date	6 JUL 2023

Authorisation Sheet & Revisions Record

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Rev:	Issue Date:	Description:	Prepared:	Checked:	Authorised:
P01	20/02/2023	Initial issue	AKS	SCB	TG
P02	31/03/2023	Updated site plan & drainage strategy	SCB	TG	TG
P03	12/04/2023	Updated site plan	SCB	TG	TG
P04	02/05/2023	Updated landscape strategy plan	SCB	TG	TG
P05	06/07/2023	Updated site plan	SCB	TG	TG

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Executive Summary

Introduction	BSP Consulting has been commissioned by Country Court Care Homes 5 Limited to undertake a Flood Risk Assessment and Drainage Strategy for a new older persons care home (Use Class C2) at the Former Woodlands Hotel, Coupals Road, Sturmer, Haverhill, Essex. This Flood Risk Assessment has been prepared in accordance with the Technical Guidance to the National Planning Policy Framework.
Existing Site Conditions	The site currently comprises a vacant hotel which is in a poor state of repair, towards the centre of the site, with an existing tarmac-surfaced car park fronting Coupals Road to the south of the site. The rest of the site currently comprises tall grasses and overgrown vegetation. Site levels are shown to generally fall from around 78.41mAOD in the north to approximately 66.66mAOD in the south-western corner of the site.
Development Description and Planning Context	Development proposals are for a new older persons care home with associated access, car parking, soft landscaped areas, and supporting infrastructure. In accordance with the NPPF, the project falls under the more vulnerable category in terms of flood risk.
Definition of Flood Hazard	Stour Brook is the nearest source of fluvial flood risk to the site and is located approximately 240m to the south of the site at its nearest point. Stour Brook is an EA Main River that drains from northwest to southeast and discharges into the River Stour approximately 1.9km to the southeast of the site.
Probability (Rivers/fluvial)	The EA Risk of Flooding from Rivers and Sea mapping indicates that the proposed development site has less than a 1 in 1,000 annual probability of flooding from rivers or the sea. This map shows the indicative extent of the natural floodplain if there were no flood defences or certain other manmade structures.
Climate Change	The implications of climate change of up to 40% have been considered in this assessment and mitigation measures have been determined accordingly.
Development Proposals	The technical guidance to the NPPF states that developments of a more vulnerable category such as the proposed residential use are appropriate within Flood Zone 1, without being subject to the application of the Sequential Test.
Off-Site Impacts	Surface water from the proposed care home development will be retained on-site for reuse by the development, with external impermeable surface water runoff to be managed via source control and percolation methods. Therefore, the development will bring about improvements to the surface water regime in the area, and hence will not increase flooding adjacent to or downstream of the site for the lifetime of the development.

Residual Risks	The investigations carried out as part of this flood risk assessment and flood risk management measures proposed have demonstrated that the development will be safe, without increasing flood risk elsewhere.
Recommendations	<ul style="list-style-type: none">• The proposed surface water drainage system should be designed to accommodate the 1 in 30-year rainfall event without any surface water flooding and should be capable of retaining the 1 in 100-year plus climate change (40%) storm event on site without flooding any buildings.• Infiltration testing has demonstrated that drainage via formal soakaways will not be feasible. As such, the proposed care home will utilise a green roof and subsequent water storage for full reuse where appropriate. External surfaces, such as car parking and access driveways, are proposed to discharge to ground via limited percolation into the top soil layers.• The proposed development foul water should discharge via gravity to the Anglian Water public foul sewer located in Coupals Road. This sewer is approximately 100m away from the site and feasibility of a connection will depend upon suitable levels and off-site works. Where a connection to the public sewer is not feasible, a new private package treatment works or cesspit will be required to serve foul water flows from the proposed care home development.

1.0 Introduction

1.1 Terms of Reference

1.1.1 BSP Consulting has been commissioned by Country Court Care Homes 5 Limited to undertake a Flood Risk Assessment and Drainage Strategy for a new older persons care home (Use Class C2) at the Former Woodlands Hotel, Coupals Road, Sturmer, Haverhill, Essex.

1.1.2 This Flood Risk Assessment has been prepared in accordance with the Department for Communities and Local Government (DCLG) Planning Practice Guidance website section on 'Flood Risk and Coastal Change' and the Site-Specific Flood Risk Assessment Checklist.

1.1.3 This report has been produced on behalf of the Client, Country Court Care Homes 5 Limited, and no responsibility is accepted to any third party for all or any part. This report should not be relied upon or transferred to any other parties without the express written authorisation of BSP Consulting. If any unauthorised third party comes into possession of this report, they rely on it at their own risk and the authors owe them no duty of care or skill.

1.2 Legislation & Guidance

National Planning Policy Framework

1.2.1 The National Planning Policy Framework (NPPF) was published on 27 March 2012, with the latest update published in July 2021. This replaces Planning Policy Statement 25: Development and Flood Risk.

1.2.2 Planning Practice Guidance to the NPPF regarding Flood Risk and Coastal Change has been published and this site-specific Flood Risk Assessment is written in compliance with this guidance.

1.2.3 The NPPF, and supporting technical guidance, can be downloaded free of charge from the internet at the following link:

<http://www.communities.gov.uk/publications/planningandbuilding/nppf>

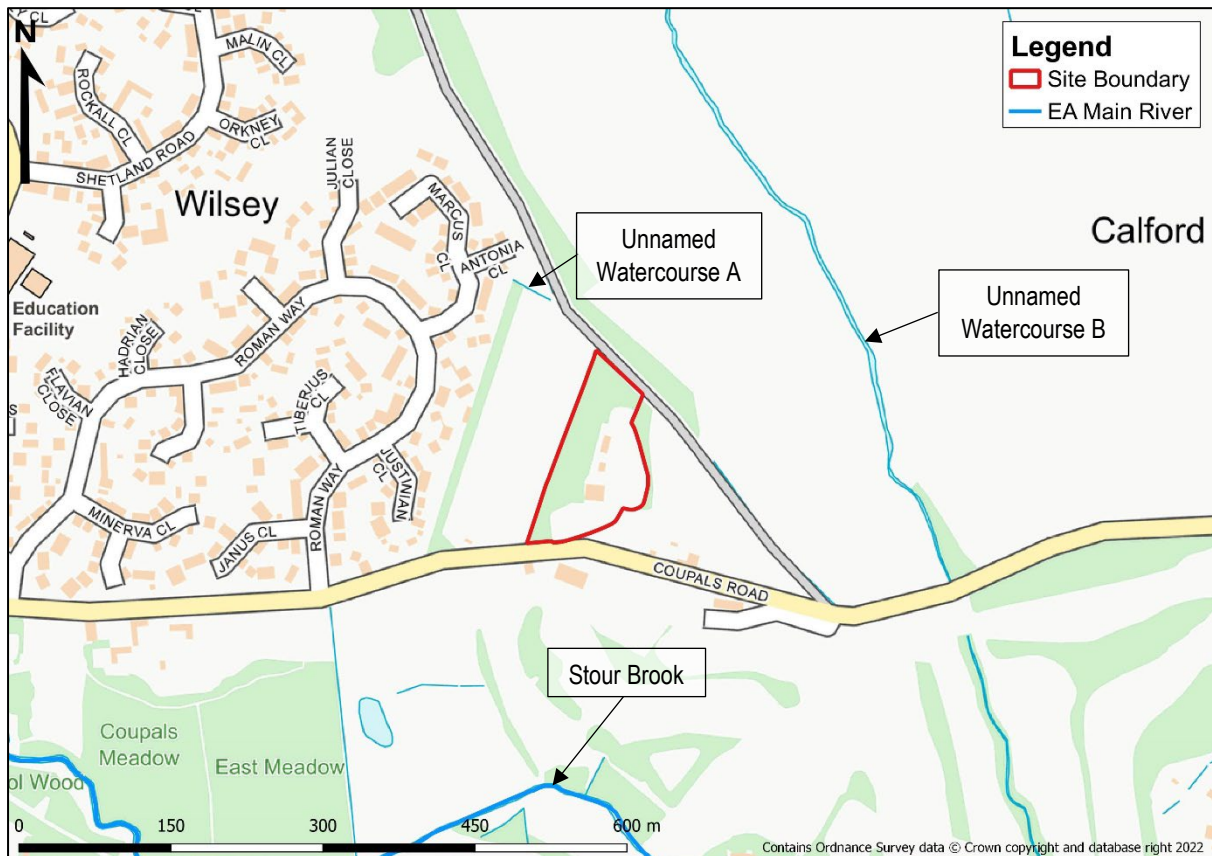
Flood & Water Management Act

1.2.4 The Flood & Water Management Act (F&WMA) was passed in 2010, and aims to reduce the flood risk associated with extreme weather, compounded by climate change. This act established the EA as responsible for flood risk related to Main Rivers. In this instance, Essex County Council, as Lead Local Flood Authority (LLFA), are responsible for local sources of flood risk (that being from ordinary watercourses, surface water run-off and groundwater). As Local Planning Authority, Braintree District Council has due regard for drainage and flood risk in accordance with local and national guidance and responses from statutory consultees.

2.0 Background Information

2.1 Site Details

2.1.1 Figure 2.1 below indicates the location of the site. A range of sources have been used to assess the local topography, local watercourses and current site use.



*Figure 2.1 Former Woodlands Hotel
– Site Location Plan*

2.1.2 The proposed development site occupies an area of approximately 1.28 hectares and is located on the south-eastern fringe of the town of Haverhill, to the north of Haverhill Golf Club, centred on OSNGR 569121E, 244967N.

2.1.3 The site is bounded by a farm access track to the north, with greenfield agricultural land beyond, a small grassed area and then an existing residential dwelling to the east, Coupals Road and then Haverhill Golf Club to the south, and a grassed field belonging to Haverhill Golf Club which is used for driving practice to the west, with existing residential development beyond.

2.1.4 The site currently comprises a vacant hotel which is in a poor state of repair, towards the centre of the site, with an existing tarmac-surfaced car park fronting Coupals Road to the south of the site. The rest of the site currently comprises tall grasses and overgrown vegetation.

2.1.5 A topographical survey of the site has been included in **Appendix A**. Site levels are shown to generally fall from around 78.41mAOD in the north to approximately 66.66mAOD in the south-western corner of the site.

Table 2.1: Overall Catchment Context and Local Watercourse Classifications

Classification	Name	Description
Main Rivers	Stour Brook	Stour Brook is an EA Main River located approx. 240m to the south of the site which drains from northwest to southeast and discharges into the River Stour approx. 1.9km to the southeast of the site.
Ordinary Watercourses	Unnamed Watercourse A	Unnamed Watercourse A is an Ordinary Watercourse in the form of a ditch located approx. 70m to the northwest of the site. This watercourse possibly drains under the farm access track, across the neighbouring field and towards Unnamed Watercourse B.
	Unnamed Watercourse B	Unnamed Watercourse B is an Ordinary Watercourse located approx. 230m to the east of the site at its closest point. This watercourse drains in a general south-easterly direction, discharging into Stour Brook approx. 895m to the southeast of the site.
Manmade Watercourses	N/A	There are no Manmade Watercourses located in close proximity to the site.

2.1.6 The locations of the above watercourses are indicated on Figure 2.1 above.

2.2 Approach to the Assessment

2.2.1 This study has been supplemented by information from the Environment Agency (EA) and Anglian Water (AW), and additional information contained on the British Geological Society (BGS) website, the DEFRA MagicMap website, the Cranfield Soil and Agrifood Institute Soilscales website and the Ordnance Survey website.

2.2.2 This assessment seeks to draw together the relevant data information from these sources and to collate this with the findings of our investigations and discussions to assess the flood risk and drainage strategy for this site.

3.0 Flood Risk Assessment

3.1 Development Description and Planning Context

3.1.1 Development proposals are for a new older persons care home with associated access, car parking, soft landscaped areas, and supporting infrastructure. The proposed site plan is included in **Appendix B**.

3.1.2 The local area benefits from a Strategic Flood Risk Assessment. This assessment is the West Suffolk Council SFRA (WSCSFRA) (2021). The WSCSFRA recommends that for sites downstream of the A1307, as this site is, the EA's Flood Map for Planning flood zones should be used. This mapping notes the site to be located in Flood Zone 1.

3.1.3 In accordance with the NPPF, the proposed residential use falls under the **more vulnerable** category in terms of flood risk.

3.2 Sequential and Exception Tests

3.2.1 The Sequential Test is designed to steer development towards areas of lower flood risk and is required to be completed for development within Flood Zone 2 and 3. As the site is located within Flood Zone 1 the Sequential Test is not required.

3.2.2 The Exception Test is designed to require evidence of how flood risk will be managed on the proposed development site, ensuring that it is safe for its lifetime and will not increase flood risk elsewhere. Table 3.1 below indicates whether developments, based on their vulnerability classification, are permitted within each Flood Zone and whether the Exception Test is required. The NPPF states that developments of the more vulnerable category are suitable within Flood Zone 1 without the requirement of an Exception Test, as is the case for this site.

Table 3.1: Flood Risk Vulnerability and Flood Zone Compatibility (Source: NPPF)

Flood Risk Vulnerability Classification		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test Required	✓	✓
	Zone 3a	Exception Test Required	✓	X	Exception Test Required	✓
	Zone 3b Functional Floodplain	Exception Test Required	✓	X	X	X

3.3 Definition of Flood Hazard

Historic Flooding

- 3.3.1 The Environment Agency's Historic Flood Map indicates that the development site has not flooded previously. The dataset shows the maximum extent of all individual recorded flood outlines that have occurred as a result of flooding from rivers, the sea and groundwater sources since records began 1946. The dataset does not account for flooding from other sources, such as sewer flooding or surface water flooding, nor is it exhaustive as it may not include all previous flooding incidents and does not provide information regarding event dates. However, the dataset does provide an insight into the potential for flooding from nearby sources.

The potential sources of flooding in the vicinity of the site are as detailed below:

Fluvial Flood Risk

- 3.3.2 Stour Brook is the nearest source of fluvial flood risk to the site and is located approximately 240m to the south of the site at its nearest point. Stour Brook is an EA Main River that drains from northwest to southeast and discharges into the River Stour approximately 1.9km to the southeast of the site.
- 3.3.3 The EA Risk of Flooding from Rivers and Sea mapping, shown below in Figure 2.1, indicates that the proposed development site has less than a 1 in 1,000 annual probability of flooding from Rivers and Sea. This map shows the indicative extent of the natural floodplain, if there were no flood defences or certain other manmade structures, such as surface water sewers, and channel improvements.

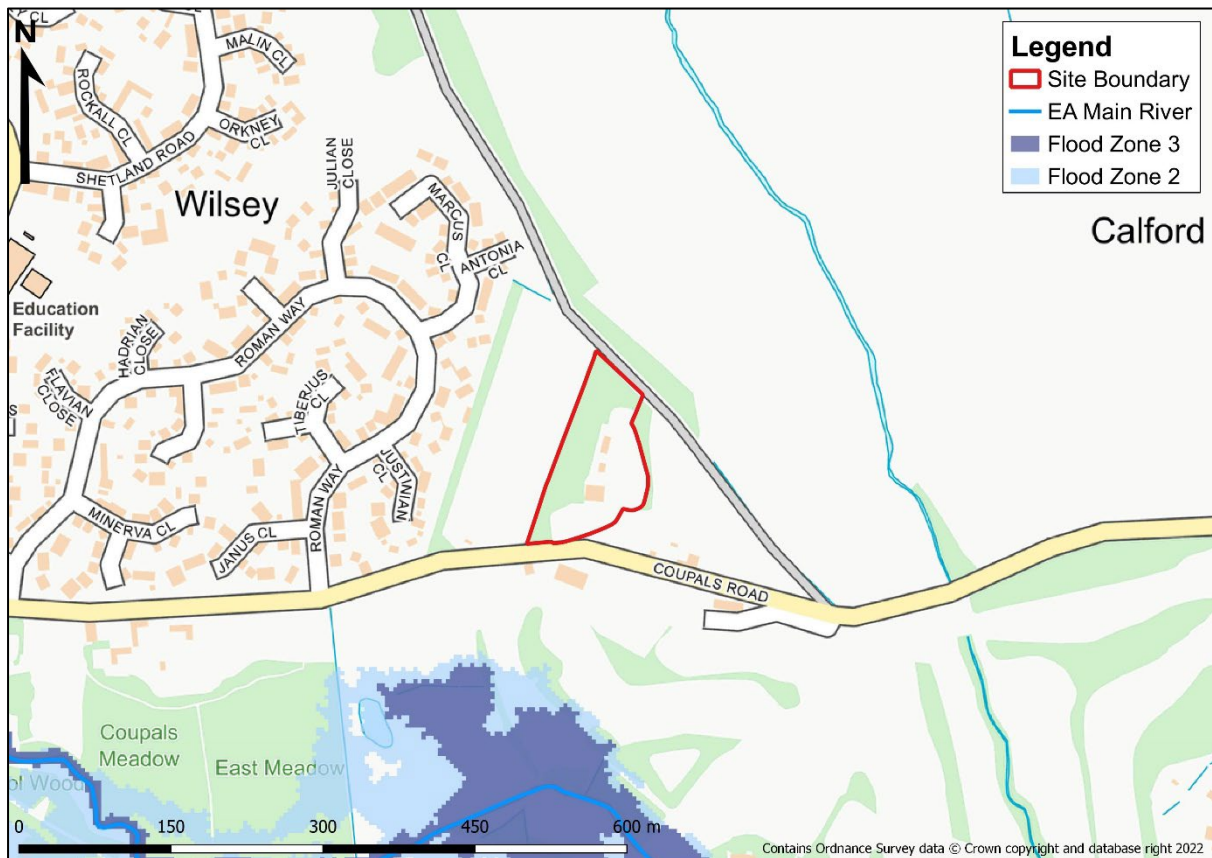


Figure 3.2 Former Woodlands Hotel
 – Risk of Flooding from Rivers and the Sea (Source: EA)

Tidal Flood Risk

3.3.4 Stour Brook is a non-tidal EA Main River and, therefore, the site is not at risk of flooding from tidal sources.

Surface Water Flood Risk

3.3.5 The site comprises a steady fall in levels from north to south, with the south-western corner of the site being the lowest point. As such, any surface water runoff which exceeds the infiltration capacity of the soils can be assumed to flow across the site in a south to south-westerly direction.

3.3.6 Figure 3.2 below shows the Risk of Flooding from Surface Water mapping and indicates that the whole site and immediately surrounding area is at a very low risk of surface water flooding (<0.1% AEP). A very minor low risk (0.1% AEP) surface water flood flow path is indicated to the north of access track adjacent to the northern boundary of the site. However, this is not shown to affect the site.

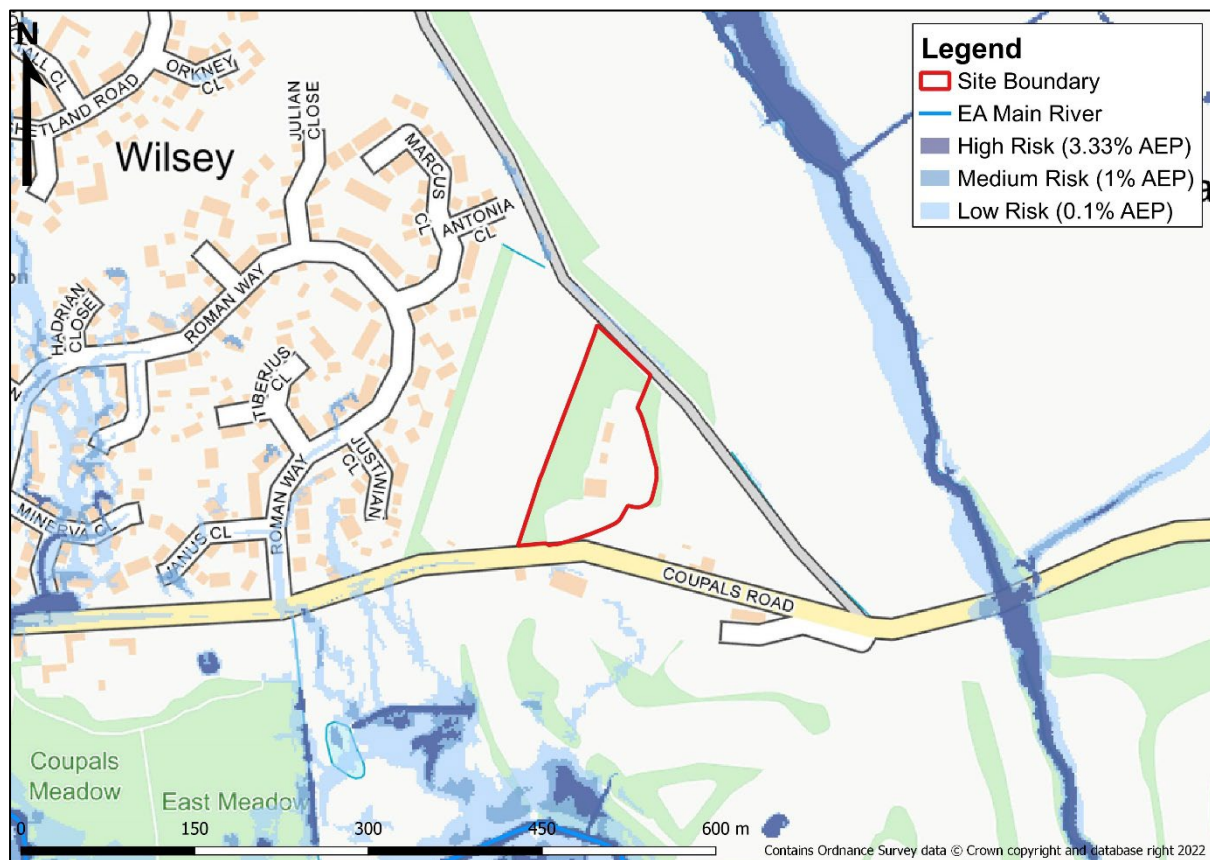


Figure 3.2 Former Woodlands Hotel
 – Risk of Flooding from Surface Water (Source: EA)

Flood Risk from Ground Water

- 3.3.7 The British Geological Survey’s Geology of Britain mapping indicates that the site lies upon bedrock geology consisting of Lewes Nodular Chalk Formation and Seaford Chalk Formation (Undifferentiated) – Chalk, and superficial deposits consisting of Lowestoft Formation – Diamicton. Lewes Nodular Chalk Formation and Seaford Chalk Formation is generally classed as highly productive aquifer.
- 3.3.8 The Environment Agency Aquifer Designation Map identifies the site as being situated on bedrock classed as Principal aquifer: geology that exhibit high permeability and/or provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. The superficial drift below the site is classed as Secondary (undifferentiated) aquifer, whereby it has not been possible to attribute either category A or B to a rock type.
- 3.3.9 The WSCSFRA (2021) does not include mapping of areas which are susceptible to groundwater flooding. However, the SFRA does state that the groundwater susceptibility mapping supplied by the British Geological Society indicates that much of West Suffolk has a low potential for groundwater flooding.

3.3.10 Due to the nature of groundwater flooding, the associated risk is likely to be heavily influenced by the local watercourses, underlying site geology, and topography of the surrounding area. Although the site is indicated to be situated on permeable soils which can provide a high level of water storage, the site lies outside of any fluvial floodplains, as indicated by the EA's Risk of Flooding from Rivers and Sea mapping (Fig. 3.2). Therefore, local watercourses, such as Stour Brook, are considered to have minimal influence on groundwater levels at the site. Moreover, the proposed development site is located on relatively high ground, with levels falling away to the west, east and south. As such, any local rises in groundwater levels are unlikely to permeate to the surface on-site or cause flooding.

3.3.11 Based on the information from the above sources, the site is considered to be at low risk of flooding from groundwater sources.

Flood Risk from Sewers and Infrastructure

3.3.12 The local sewers are operated and maintained by Anglian Water (AW). AW sewer records indicate no public wastewater sewers in the immediate vicinity of the site. The nearest public sewers are located approximately 100m to the southwest of the site, within Coupals Road. At this location, a public surface water sewer of unknown size, and a public foul sewer of unknown size are present, both of which drain in a westerly direction away from the site. Correspondence with AW and a copy of the sewer record plan is included in **Appendix C**. AW have not raised any concerns regarding existing flood issues or capacity problems.

3.3.13 As the site is occupied by a former hotel, there is likely a private wastewater drainage arrangement present on-site. A number of manholes have been identified on the topographical survey included in **Appendix A**. However, no further information regarding the existing drainage infrastructure on-site is available at the time of writing this report. It is likely a private cesspit/septic tank or package treatment plant was previously used by the hotel, although this is likely in a poor state of repair. Nonetheless, as any private drainage system would have been suitably sized for the previous development and is no longer utilised, it does not pose a risk of flooding to this site.

3.3.14 The EA's Flood Risk from Reservoir mapping indicates that the site lies outside of the predicted maximum flood extents in the unlikely event that all upstream large, raised reservoirs and dams simultaneously fail and release the water they hold; both on a 'dry day', if reservoir flooding were to occur when river levels are at normal levels, and on a 'wet day', should reservoir breach occur if a river is already experiencing an extreme natural flood. Therefore, the site is not considered to be at risk of flooding from reservoirs.

3.3.15 Haverhill Water Recycling Centre is located approximately 895m to the west of the site. As this wet process industrial works is located downstream of the site on lower land, this infrastructure does not pose a risk of flooding to the proposed development site.

3.3.16 There are no canals or other Manmade Watercourses within close proximity of the site. The sewers and infrastructure flood risk source can therefore be discounted as a significant source of flood risk to the site.

3.4 **Climate Change**

3.4.1 The implications of climate change should be taken into account in relation to surface water drainage. Guidance from the EA advises that for longer lifetime residential developments, the upper end allowances for both the 1 in 30-year (3.3% AEP) and 1 in 100-year (1% AEP) events should be assessed, with the development designed to ensure that there is no increase in flood risk elsewhere and the development will be safe from surface water flooding during the 1 in 100-year event when the upper end allowance for climate change is applied. In this instance, peak rainfall intensity for longer lifetime residential developments within the Combined Essex Management Catchment are estimated to increase by 35% for the 3.3% AEP event and 40% for the 1% AEP event. Therefore, it is recommended that the upper end allowance of 40% is applied to design rainfall intensity to allow for the potential implications of climate change.

3.5 **Detailed Development Proposals**

3.5.1 The proposed development and vulnerability classification are discussed in Section 3.1 above.

3.5.2 The technical guidance to the NPPF states that developments of a more vulnerable category such as the proposed residential use are appropriate within Flood Zone 1, without being subject to the application of the Sequential Test.

4.0 Sustainable Drainage Strategy

4.1.1 The development proposals are for a new older persons care home with associated access, car parking, soft landscaped areas, and supporting infrastructure.

4.2 Surface Water Drainage

Sustainable Drainage Systems

4.2.1 Part H of the Building Regulations 2010 recommends that surface water run-off shall discharge to one of the following, listed in order of priority:

- a) an adequate soakaway or some other adequate infiltration system, or where that is not reasonably practicable.
- b) a watercourse, or, where that is not reasonably practicable.
- c) a sewer.

4.2.2 It is necessary to identify the most appropriate method of controlling and discharging surface water. The design should seek to improve the local run-off profile by using systems that can either attenuate run-off and reduce peak flow rates or positively impact on the existing flood profile.

Infiltration Based Systems

4.2.3 The British Geological Survey's Geology of Britain mapping indicates that the site lies upon bedrock geology consisting of Lewes Nodular Chalk Formation and Seaford Chalk Formation (Undifferentiated) – Chalk, and superficial deposits consisting of Lowestoft Formation – Diamicton.

4.2.4 The Cranfield Soil and Agrifood Institute's Soilscales mapping indicates the entirety of the site to be situated on soils categorised as Soilscale 9: Lime-rich loamy and clayey soils with impeded drainage.

4.2.5 Infiltration testing to BRE 365 specification has been completed by Evolve Geo-Environmental in March 2023 in which three infill tests were carried out at three trial pit locations on-site. Ground conditions at these locations generally comprised made ground underlain by gravelly clays and, as such, each test failed to complete. The results of the infiltration testing are included in **Appendix D**.

4.2.6 Based on the above information, permeable ground conditions are not present at the site. As such, the disposal of surface water runoff via infiltration has been ruled out.

4.2.7 Surface water runoff from the proposed care home is intended to be harvested for re-use. As such, rainwater recycling is the main strategy for surface water drainage from this site. However, external ground level hard surfaced areas will need to be drained and, while formal infiltration systems will not be

possible, it is still likely that high-level filtration SuDS will be the most effective method for draining these areas.

Open Watercourses

- 4.2.8 As it is proposed to harvest rainwater for re-use and it is deemed possible to dispose of surface water runoff to ground via infiltration-based systems, it will not be necessary to discharge to an open watercourse.

Sewers

- 4.2.9 As it is proposed to harvest rainwater for re-use and infiltration is deemed to be possible, it will not be necessary to discharge to an a sewer.

SuDS Option Feasibility

- 4.2.10 A range of SuDS options have been considered for use within the context of the proposed development site, in-line with CIRIA guidance. Table 4.1 below provides a summary of the options considered for this site.

Table 4.1: Sustainable Urban Drainage Systems Options

SuDS Category	SuDS Technique	Viability	Explanation
Infiltration/ Filtration	Infiltration Trenches	✗	Based upon the results of the infiltration testing, drainage via formal infiltration methods will not be feasible. However, it will still be feasible to achieve high-level filtration for surface water runoff from external surfaces provided such methods are spatially distributed rather than concentrated within one location. Preference should be to utilise source control features such as permeable paving or bioretention features.
	Infiltration Basins	✗	
	Soakaways	✗	
	Bioretention/Filter Strips	✓	
	Pervious Pavements	✓	
Source Control	Green Roofs	✓	The proposed care home has been designed to incorporate a green roof, with excess water proposed to be harvested for re-use within the care home itself – e.g., for toilet flushing. As such, rainwater harvesting should be the primary strategy for draining surface water from the proposed care home.
	Rainwater Harvesting	✓	
Conveyance	Swales	✓	Conveyance features could be incorporated as part of the surface water drainage design for the site although source control features are preferable. Any
	Filter Drains	✓	

	Channels/Rills	✓	conveyance features would serve better as infiltration-devices, for example a bio-swales could be used. However, due to the nature of the proposed development careful consideration will need to be given to the location of these features to ensure they do not pose a health and safety risk to any users of the site. Any features will have to be shallow and located away from the main building and resident gardens.
Retention/ Detention	Detention Basin	✗	As rainwater harvesting and infiltration are proposed as part of the surface water drainage strategy for the site, it will not be necessary to provide a separate attenuation volume. Rainwater harvesting and infiltration features will need to be designed to store the required volume for the design rainfall event as necessary.
	Retention Pond	✗	
	Subsurface Storage	✗	
	Wetlands	✗	

Runoff Assessment

4.2.11 The proposed development site has an area of 1.28ha which comprises brownfield land. The existing development on-site is in a poor state of repair and is assumed to no longer be positively drained. Therefore, for the purpose of this runoff assessment the site has been treated as greenfield land. As such, the ICP SUDS and IH124 (Flood Studies Report) methods have been used to calculate surface water runoff from a small (<50ha) greenfield site, which are detailed below:

$$QBAR_{RURAL} = 0.00108 \times (0.01 \times AREA)^{0.89} \times SAAR^{1.17} \times SPR^{2.17} \quad \text{Where} \quad AREA = \text{Area (ha)}$$

SAAR = Standard Average Annual Rainfall (mm, 1941-1970)

SPR = Standard Percentage Runoff Coefficient

4.2.12 With a site area of 1.28ha and using Flood Studies Report values for SAAR (600mm) and SPR (0.4), this results in a $QBAR_{RURAL}$ rate of **3.6l/s** and discharge rates for the following return periods:

1 in 1-year	3.2l/s
1 in 30-year	8.7l/s
1 in 30-year + 35% Climate Change	11.7l/s

1 in 100-year	12.9l/s
1 in 100-year + 40% Climate Change	18.1l/s

4.2.13 Greenfield runoff calculations are provided in **Appendix E**.

Return Period Design

4.2.14 The proposed surface water drainage system should be designed to accommodate the 1 in 30-year rainfall event without any surface water flooding and should be capable of retaining the 1 in 100-year plus climate change (40%) storm event on site without flooding any buildings.

Drainage Proposals – Main Strategy & Attenuation Volume

4.2.15 The proposed development will comprise of an impermeable footprint of approximately 0.4ha. The proposed care home is proposed to comprise a green roof which will offer water quality benefits and temporary water storage while also encouraging evapotranspiration. Excess surface water runoff from the roofs is then proposed to be harvested for re-use. This strategy is subject to detailed drainage design and input from a Mechanical & Electrical Consultant to provide a suitable design with overflow arrangement.

4.2.16 For the external ground level hard surfaced areas where rainwater harvesting will not be suitable, permeable paving should be utilised for car parking spaces and pedestrian walkways. Where permeable paving is not suitable, such as on vehicle access driveways, impermeable surfaces should be drained to features such as bioretention areas, roadside swales and gravel filter drains which can collect and retain surface water before allowing it to dissipate via high-level filtration and evapotranspiration. These methods will act to increase the rainfall-runoff response time by intercepting rainfall at or close to source while also providing improvements to water quality.

4.2.17 The surface water discharge rate and proposed drainage strategy will be subject to an agreement with Essex County Council as Lead Local Flood Authority (LLFA).

4.3 Water Quality

Simple Index Approach

4.3.1 In order to determine whether the proposed SuDS features for the development will be sufficient at removing pollutants from surface water runoff, the CIRIA SuDS Manual (2015) Simple Index Approach has been applied. This approach provides pollution hazard levels and indices to relevant pollutants based upon contributing hardstanding surfaces.

4.3.2 Table 4.2 below provides an extract of the land use types and pollutant indices from the CIRIA SuDS Manual which are relevant to the proposed development.

Table 4.2: Pollution hazard indices for different land use classifications (Source: CIRIA SuDS Manual 2015)

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Residential roofs	Very Low	0.2	0.2	0.05
Individual property driveways, residential car parks, low traffic roads and non-residential car parking with infrequent change	Low	0.5	0.4	0.4

4.3.3 Based upon the above, the worst case indices for the development are 0.5 (Total Suspended Solids), 0.4 (Metals) and 0.4 (Hydrocarbons). Table 4.3 below indicates the mitigation indices for different types of SuDS components, with only those relevant to the development included. Under the Simple Index Approach, in order to suitably mitigate surface water pollutants, the total combined indices for any SuDS components will need to be greater than the worst case indices above. Where multiple SuDS components are proposed, the primary component is given its full indices, while subsequent component indices are applied with a factor of 50%.

Table 4.3: Indicative SuDS mitigation indices for discharges to ground (Source: CIRIA SuDS Manual 2015)

Type of SuDS Component	Mitigation Indices		
	TSS	Metals	Hydrocarbons
Constructed permeable pavement underlain by soil with good contaminant attenuation potential of at least 300mm in depth	0.7	0.6	0.7
Bioretention underlain by a soil with good contaminant attenuation potential of at least 300mm in depth	0.8	0.8	0.8

4.3.5 Based upon the above, either the proposed permeable paving and bioretention areas alone will be sufficient in mitigating surface water runoff pollution from the proposed development. Where further SuDS

components are included in the development proposals these will offer even greater mitigation against surface water runoff pollution.

4.4 Maintenance

4.4.1 The proposed surface water drainage system will require routine maintenance to ensure it remains fully operational and effective. The proposed permeable paving, bioretention and rainwater harvesting system will be maintained by a private management company and should be inspected and maintained regularly.

4.5 Foul Water Drainage

4.5.1 The nearest public sewers are located approximately 100m to the southwest of the site, within Coupals Road. AW have confirmed that the local network can receive the predicted foul flows from the development. However, before the viability of connecting to the public foul sewer in Coupals Road can be confirmed, survey of the manhole cover level and invert level should be confirmed. Where levels do not suit a connection to the public foul sewer, or where off-site works are not possible, it will be more suitable to install a new private package treatment works or cesspit to serve the proposed care home development. In the event of a private system being utilised, a minimum suitable distance of 5m should be allowed between the proposed care home building and the proposed foul solution.

5.0 Off-Site Impacts

5.1.1 Surface water from the proposed care home development will be retained on-site for reuse by the development, with external impermeable surface water runoff to be managed via source control and percolation methods. Therefore, the development will bring about improvements to the surface water regime in the area, and hence will not increase flooding adjacent to or downstream of the site for the lifetime of the development.

6.0 Overland Flow & Flood Routing Considerations

6.1.1 The routing of potential surface water runoff, should the capacity of the proposed drainage system be exceeded, needs to be built into the layout of the site such that the residual risk of flooding from this element can be easily mitigated.

6.1.2 Careful attention will need to be paid to the proposed site levels to ensure that overland flow routes are maintained, and localised low spots are not created.

7.0 Residual Risks

7.1.1 The investigations carried out as part of this flood risk assessment and flood risk management measures proposed have demonstrated that the development will be safe, without increasing flood risk elsewhere.

8.0 Recommendations

The following recommendations are made to ensure flood risk at this site is minimised:

- The proposed surface water drainage system should be designed to accommodate the 1 in 30-year rainfall event without any surface water flooding and should be capable of retaining the 1 in 100-year plus climate change (40%) storm event on site without flooding any buildings.
- Infiltration testing has demonstrated that drainage via formal soakaways will not be feasible. As such, the proposed care home will utilise a green roof and subsequent water storage for full reuse where appropriate. External surfaces, such as car parking and access driveways, are proposed to discharge to ground via limited percolation into the top soil layers.
- The proposed development foul water should discharge via gravity to the Anglian Water public foul sewer located in Coupals Road. This sewer is approximately 100m away from the site and feasibility of a connection will depend upon suitable levels and off-site works. Where a connection to the public sewer is not feasible, a new private package treatment works or cesspit will be required to serve foul water flows from the proposed care home development.

Disclaimer

We would note that all comments made in this report are based on the sources stated in Section 1.1. This report and its recommendations are intended for the use of Country Court Care Homes 5 Limited for the above site only.

Project Number: 22-0364
Project Title: Former Woodlands Hotel
Location: Coupals Road, Sturmer, Haverhill, Essex
BSP Document Ref: WHCH-BSP-XX-XX-T-W-0001-P05_Flood_Risk_Assessment



Appendix A

Topographical Survey

Project Number: 22-0364
Project Title: Former Woodlands Hotel
Location: Coupals Road, Sturmer, Haverhill, Essex
BSP Document Ref: WHCH-BSP-XX-XX-T-W-0001-P05_Flood_Risk_Assessment



Appendix B

Proposed Site Plan

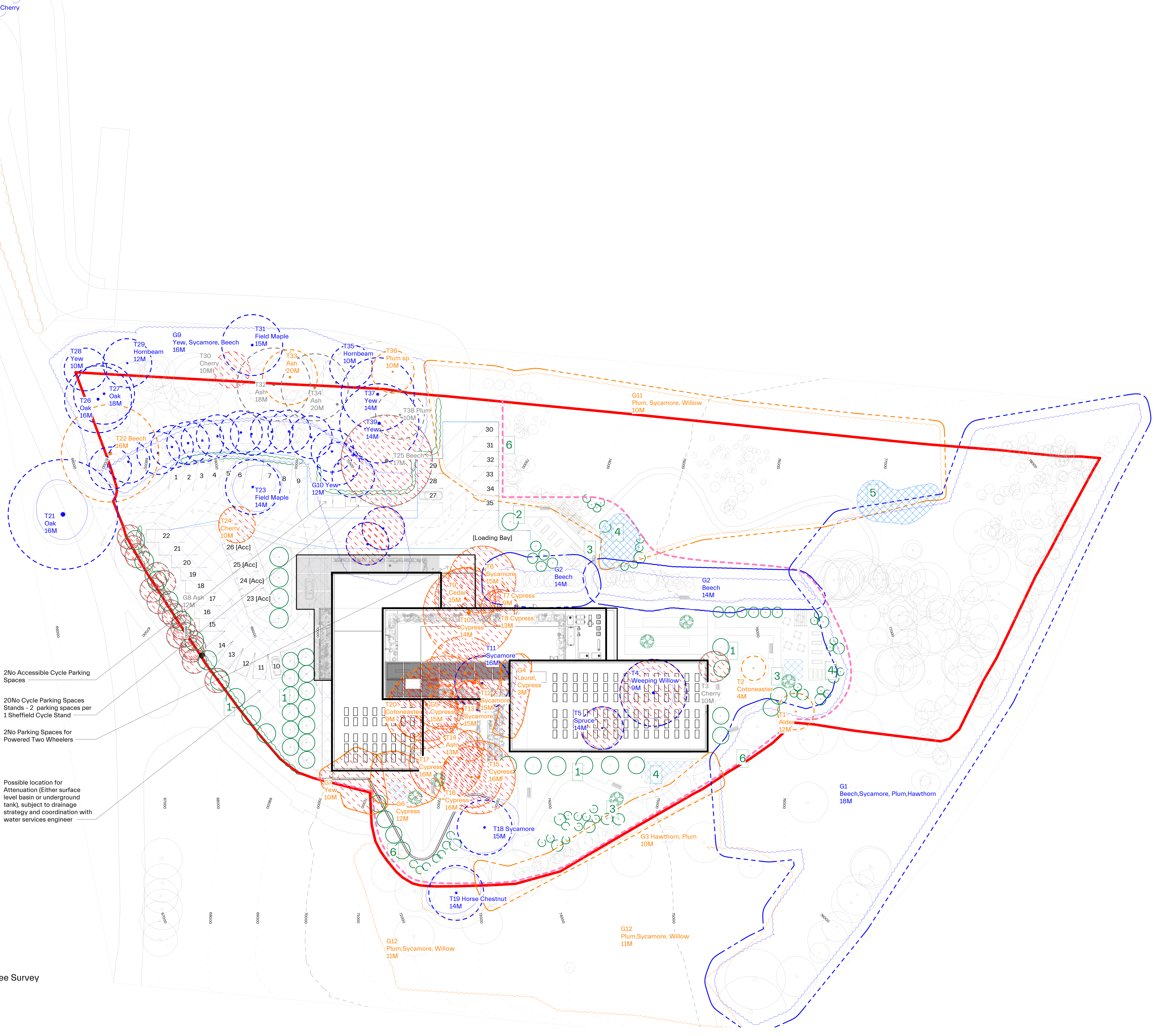


Revision	Date	Drawn	Approved	Notes
-	04.08.22	MS	PW	For information
A	10.08.22	CP	PW	Excising trees
B	06.10.22	CP	PW	Removed trees
C	27.01.23	MS	CP	Updates
D	02.02.23	MS	CP	Updates
E	10.02.23	MS	CP	Coordination
F	07.03.23	MS	CP	Design Updates
G	05.04.23	CP	CP	Design Updates



Do not scale. Use figured dimensions only.
Confirm all dimensions on site

- Key
- Site Boundary
 - - - Secure Garden Boundary
 - Category U tree
RPA shown dashed
 - Category U tree
RPA shown dashed
 - Category U tree
RPA shown dashed
 - T1 Tree reference ID
Tree species
Height
 - Tree to be removed
 - Hard Landscaping / Main
vehicle access route
 - Soft Landscaping /
Shared Surface
 - Habitat Swales /
Wet Habitat Areas
 - 1 Tree Avenue as per FPCR
information
 - 2 External Pedestrian and
Maintenance Access to Garden
as per FPCR information
 - 3 Single Surface Garden Footpath
as per FPCR information
 - 4 Habitat Swales - with
underground connections as per
FPCR information
 - 5 Wet Habitat Area (according to
levels of vegetation) as per
FPCR information
 - 6 Secure Garden Boundary as per
FPCR information



2No Accessible Cycle Parking Spaces

20No Cycle Parking Spaces
Stands - 2 parking spaces per
1 Sheffield Cycle Stand

2No Parking Spaces for
Powered Two Wheelers

Possible location for
Attenuation (Either surface
level basin or underground
tank), subject to drainage
strategy and coordination with
water services engineer

Proposed Site Plan / Tree Survey

Project
421 Haverhill

Drawing Number
421_PL_00_100

Revision
A

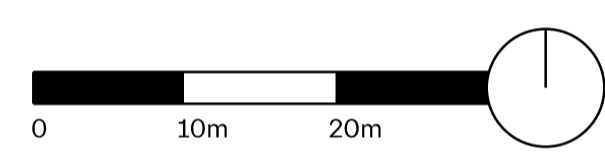
Drawing
Proposed Site / Block Plan

Scale
1:500 @ A1, 1:1000 @ A3

Drawing Category
General arrangement drawing

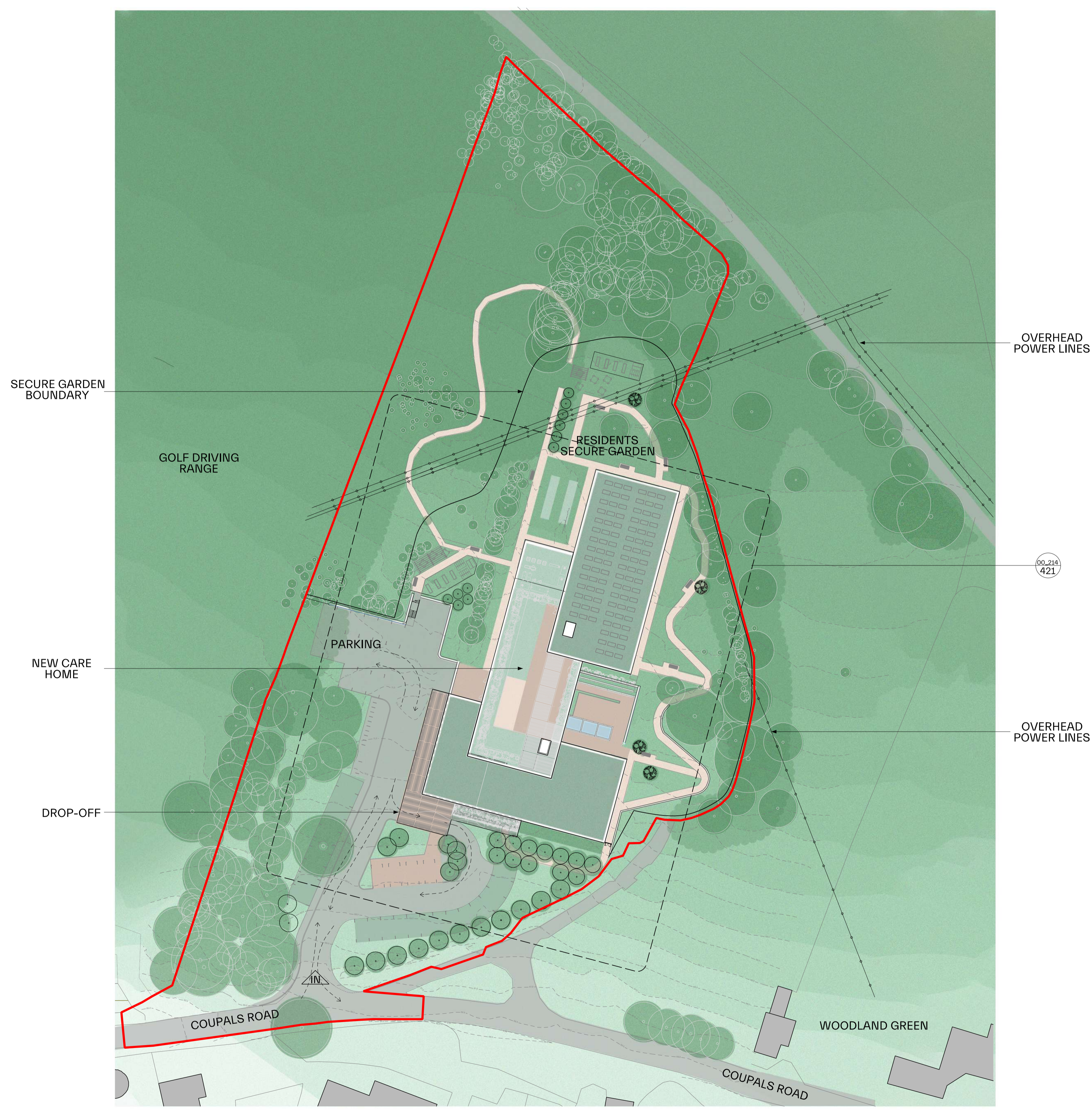
Drawing Status
PLANNING

Revision	Date	Drawn	Approved
-	02.09.22	MS	CP
Notes For Information			
A	01.06.23	MS	CP
Notes For Information			
B	12.06.23	CP	PW
Notes For Information			



Do not scale, except for planning purposes. Use figured dimensions only; confirm all dimensions on site.

Key
Application Boundary



Proposed Site / Block Plan

Project Number: 22-0364
Project Title: Former Woodlands Hotel
Location: Coupals Road, Sturmer, Haverhill, Essex
BSP Document Ref: WHCH-BSP-XX-XX-T-W-0001-P05_Flood_Risk_Assessment



Appendix C

Anglian Water Correspondence & Sewer Records



Pre-Planning Assessment Report

Former Woodlands Hotel

InFlow Reference: PPE-0160764

Assessment Type: Used Water

Report published: 24/01/2023



Thank you for submitting a pre-planning enquiry.

This has been produced for BSP Consulting Ltd.

Your reference number is **PPE-0160764**.

This report can be submitted as a drainage strategy for the development should it seek planning permission.

If you have any questions upon receipt of this report, you can submit a further question via InFlow. Alternatively, please contact the Planning & Capacity team on **07929 786 955** or email planningliaison@anglianwater.co.uk

Section 1 - Proposed development

The response within this report has been based on the following information which was submitted as part of your application:

List of planned developments	
Type of development	No. Of units
Residential institution	1

The anticipated residential build rate is:

Year	Y1
Build rate	1

Development type: Brownfield

Planning application status: Unknown

Site grid reference number: TL6911244995

The comments contained within this report relate to the public water mains and sewers indicated on our records.

Your attention is drawn to the disclaimer in the useful information section of this report.

Section 2 - Assets affected

Our records indicate that there are no public water mains/public sewers or other assets owned by Anglian Water within the boundary of your development site. However, it is highly recommended that you carry out a thorough investigation of your proposed working area to establish whether any unmapped public or private sewers and lateral drains are in existence.

Due to the private sewer transfer in October 2011 many newly adopted public used water assets and their history are not indicated on our records. You also need to be aware that your development site may contain private water mains, drains or other assets not shown on our records. These are private assets and not the responsibility of Anglian Water but that of the landowner.

Section 3 - Water recycling services

In examining the used water system we assess the ability for your site to connect to the public sewerage network without causing a detriment to the operation of the system. We also assess the receiving water recycling centre and determine whether the water recycling centre can cope with the increased flow and effluent quality arising from your development.

Water recycling centre

The foul drainage from the proposed development is in the catchment of Haverhill Water Recycling Centre, which currently has capacity to treat the flows from your development site.

Anglian Water cannot reserve capacity and the available capacity at the water recycling centre can be reduced at any time due to growth, environmental and regulation driven changes.

Used water network

Our assessment has been based on development flows connecting to the nearest foul water sewer of the same size or greater pipe diameter to that required to drain the site. The infrastructure to convey foul water flows to the receiving sewerage network is assumed to be the responsibility of the developer. Conveyance to the connection point is considered as Onsite Work and includes all work carried out upstream from of the point of connection, including making the connection to our existing network. This connection point has been determined in reference to the calculated discharge flow and on this basis, a 150mm internal diameter pipe is required to drain the development site. The nearest practicable connection is to the 150mm diameter sewer at manhole 9801 in Coupals Road at National Grid Reference NGR TL 68933 44877. Anglian water has assessed the impact of gravity flows from the planned development to the public foul sewerage network. We can confirm that this is acceptable as the foul sewerage system, at present, has available capacity for your site. Please note that Anglian Water will request a suitably worded condition at planning application stage to ensure this strategy is implemented to mitigate the risk of flooding.

It is assumed that the developer will provide the necessary infrastructure to convey flows from the site to the network. Consequently, this report does not include any costs for the conveyance of flows.

Surface water disposal

You indicated on the Pre-Planning Application form that a connection to the public surface water sewer network is not required as infiltration techniques can be utilised. Therefore a capacity assessment has not been made on the public surface water network.

As you may be aware, Anglian Water will consider the adoption of SuDs provided that they meet the criteria outline in our SuDs adoption manual. This can be found on our [website](#). We will adopt features located in public open space that are designed and constructed, in conjunction with the Local Authority and Lead Local Flood Authority (LLFA), to the criteria within our SuDs adoption manual. Specifically, developers must be able to demonstrate:

1. Effective upstream source control,
2. Effective exceedance design, and
3. Effective maintenance schedule demonstrating that the assets can be maintained both now and in the future with adequate access.

If you wish to look at the adoption of any SuDs then an expression of interest form can be found on our [website](#)

As the proposed method of surface water disposal is not relevant to Anglian Water; we suggest that you contact the relevant Local Authority, Lead Local Flood Authority, the Environment Agency or the Internal Drainage Board, as appropriate.

Trade Effluent

We note that you do not have any trade effluent requirements. Should this be required in the future you will need our written formal consent. This is in accordance with Section 118 of the Water Industry Act (1991).

Used Water Budget Costs

Your development site will be required to pay an Infrastructure charge for each new property connecting to the public water and sewerage network that benefits from Full planning permission. The infrastructure charge replaces the zonal charge as previously identified.

You will be required to pay an infrastructure charge upon connection for each new plot on your development site. The infrastructure charge are types of charges set out in Section 146(2) of the Water Industry Act 1991.

The charge should be paid by anyone who wishes to build or develop a property and is payable upon request of connection.

- The Infrastructure Charge is based on the cost of any reinforcement and upgrades to our existing network (“Network Reinforcements”), whether designed to address strategic or local capacity issues. For more information on our Infrastructure Charge, please see the ‘Useful Information’ section of this report.

Infrastructure charges are raised on a standard basis of one charge per new connection (one for water and one for sewerage).

The Water Recycling Infrastructure charge for your dwellings is:

Infrastructure charge	Number of units	Total
£ 490	0	To be confirmed during the connection application stage

Please note that you should also budget for infrastructure charges on non-household premises where applicable and these will be calculated according to the number and type of water fittings in the premises. This is called the “relevant multiplier” method of calculating the charge and the relevant multiplier will be applied to the figures set out in our 2022-23 Developer Charging Arrangements to arrive at the amount payable. Details of the relevant multiplier for each fitting can be found on our [website](#).

Section 5 - Useful information

Water Industry Act – Key used water sections

Section 98:

This provides you with the right to requisition a new public sewer. The new public sewer can be constructed by Anglian Water on your behalf. Alternatively, you can construct the sewer yourself under section 30 of the Anglian Water Authority Act 1977.

Section 102:

This provides you with the right to have an existing sewerage asset vested by us. It is your responsibility to bring the infrastructure to an adoptable condition ahead of the asset being vested.

Section 104:

This provides you with the right to have a design technically vetted and an agreement reached that will see us adopt your assets following their satisfactory construction and connection to the public sewer.

Section 106:

This provides you with the right to have your constructed sewer connected to the public sewer.

Section 185

This provides you with the right to have a public sewerage asset diverted.

Details on how to make a formal application for a new sewer, new connection or diversion are available on our [website](#) or via our Development Services team on **0345 60 66 087**.

Sustainable drainage systems

Many existing urban drainage systems can cause problems of flooding, pollution or damage to the environment and are not resilient to climate change in the long term. .

Our preferred method of surface water disposal is through the use of Sustainable Drainage Systems or SuDS.

SuDS are a range of techniques that aim to mimic the way surface water drains in natural systems within urban areas. For more information on SuDS, please visit our [website](#)

We recommend that you contact the Local Authority and Lead Local Flood Authority (LLFA) for your site to discuss your application.

Private sewer transfers

Sewers and lateral drains connected to the public sewer on the 1 July 2011 transferred into Water Company ownership on the 1 October 2011. This follows the implementation of the Floods and Water Management Act (FWMA). This included sewers and lateral drains that were subject to an existing Section 104 Adoption Agreement and those that were not. There were exemptions and the main non-transferable assets were as follows:

Surface water sewers and lateral drains that do not discharge to the public sewer, e.g. those that discharged to a watercourse.

Foul sewers and lateral drains that discharged to a privately owned sewage treatment/collection facility.

Pumping stations and rising mains will transfer between 1 October 2011 and 1 October 2016.

The implementation of Section 42 of the FWMA will ensure that future private sewers will not be created. It is anticipated that all new sewer applications will need to have an approved section 104 application ahead of a section 106 connection.

It is anticipated that all new sewer applications will need to have an approved Section104 application ahead of a Section 106 connection

Encroachment

Anglian Water operates a risk based approach to development encroaching close to our used water infrastructure. We assess the issue of encroachment if you are planning to build within 400 metres of a water recycling centre or, within 15 metres to 100 metres of a pumping station. We have more information available on our [website](#)

Locating our assets

Maps detailing the location of our water and used water infrastructure including both underground assets and above ground assets such as pumping stations and recycling centres are available from [digdat](#)

All requests from members of the public or non-statutory bodies for maps showing the location of our assets will be subject to an appropriate administrative charge.

We have more information on our [website](#)

Charging arrangements

Our charging arrangements and summary for this year's water and used water connection and infrastructure charges can be found on our [website](#)

Section 6 - Disclaimer

The information provided in this report is based on data currently held by Anglian Water Services Limited ('Anglian Water') or provided by a third party. Accordingly, the information in this report is provided with no guarantee of accuracy, timeliness, completeness and is without indemnity or warranty of any kind (express or implied).

This report should not be considered in isolation and does not nullify the need for the enquirer to make additional appropriate searches, inspections and enquiries. Anglian Water supports the plan led approach to sustainable development that is set out in the National Planning Policy Framework ('NPPF') and any infrastructure needs identified in this report must be considered in the context of current, adopted and/or emerging local plans. Where local plans are absent, silent or have expired these needs should be considered against the definition of sustainability holistically as set out in the NPPF.

Whilst the information in this report is based on the presumption that proposed development obtains planning permission, nothing in this report confirms that planning permission will be granted or that Anglian Water will be bound to carry out the works/proposals contained within this report.

No liability whatsoever, including liability for negligence is accepted by Anglian Water or its partners, employees or agents, for any error or omission, or for the results obtained from the use of this report and/or its content.

Furthermore, in no event will any of those parties be liable to the applicant or any third party for any decision made or action taken as a result of reliance on this report.

This report is valid from the date issued and the enquirer is advised to resubmit their request for an up to date report should there be a delay in submitting any subsequent application for water supply/sewer connection(s). Our pre-planning reports are valid for 12 months, however please note Anglian Water cannot reserve capacity and available capacity in our network can be reduced at any time due to increased requirements from existing businesses and houses as well as from new housing and new commercial developments.

Project Number: 22-0364
Project Title: Former Woodlands Hotel
Location: Coupals Road, Sturmer, Haverhill, Essex
BSP Document Ref: WHCH-BSP-XX-XX-T-W-0001-P05_Flood_Risk_Assessment



Appendix D

Evolve Infiltration Testing Report



e  **olve**
G E O - E N V I R O N M E N T A L

BRE365 Factual Infiltration Report

Woodlands, Haverhill

EGE Project No. EGE-23-01-07-01

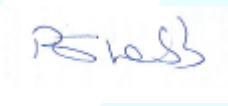


Country Court Care Homes



Report Details

Project Name	Woodlands, Haverhill
Client	Country Court Care Homes
Service	BRE365 Infiltration Testing
Date of Issue	21 st March 2023
Project number	EGE-23-01-07-01

Author Details

Prepared By	Philip Webb Associate	
Checked By	Paul Huteson Director	
Authorised By	Paul Bennett Director	

Quality Control

Revision	Date	Made by	Description
00	21 st March 2023	PW	-

This Report has been prepared by Evolve Geo-Environmental Limited with all reasonable skill, care and diligence, within the terms of the Offer and Services, agreed with the Client. This Report is confidential to the Client and Evolve Geo-Environmental Limited accepts no liability of whatever nature to third parties to whom this Report, or any part thereof, is made known, unless formally agreed by Evolve Geo-Environmental Limited. No part of this document may be reproduced without the prior written consent of Evolve Geo-Environmental Limited.

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- Drawing II - Proposed Development Plan

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- Figure I - Approximate Intrusive Location Plan

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- Appendix I - Standard Limitations
- Appendix II - Intrusive Logs
- Appendix III - BRE365 Calculation Spreadsheets



1.0 Authorisation, Context and Purpose

1.1 Authorisation

Evolve Geo-Environmental Limited (EGE) was instructed by BSP Consulting on behalf of Country Court Care Homes (the 'Client') to undertake soil infiltration testing in general accordance with BRE365 methodology at land known as the Former Woodlands Hotel, Coupals Road, Haverhill (the 'Site').

A Client provided topographical survey is included as Drawing I.

1.2 Context and Purpose

The Site is currently occupied by a former hotel, which is in a poor state of disrepair. Proposals are for the existing hotel to be demolished and replaced by a care home.

As such, the purpose of these works were to provide factual soil infiltration rates to support drainage design, by others.

These works were undertaken in general accordance with BRE Digest 365, Soakaway Design, dated 1991, revised 2016.

1.3 Limitations

The EGE standard limitations are included as Appendix I.

In addition, the following specific limitations were applicable to this investigation:

- ▽ The information presented in this Report is factual information only for the infiltration rates of the soils identified beneath the Site to support a third-party drainage design strategy. EGE does not and cannot design soakaways;
- ▽ The locations of the infiltration tests were sited in accessible areas of the Site. The buildings and surroundings were fenced off for security purposes which allowed test locations with machinery to be completed within the south of the Site only. Additional hand pits (HP101 and HP102) were undertaken in proposed infiltration test locations in the north to confirm the geology was consistent with that identified as part of the BRE365 infiltration testing completed in the south; and
- ▽ All BRE365 infiltration test failed to reach 25% effective depth during the first fill given the cohesive Geology (chalky clays of the Lowestoft Formation). As such, all test locations were deemed failed tests.



2.0 Environmental Setting

Current Site Use	<p>The Site is currently occupied by former hotel buildings and associated woodland/ landscaping. The buildings and surrounding land are bound by a metal fence. The Site is accessed from Coupals Road in the south into the former asphalt car park of the hotel, which was noted to have a number of bulk bags of gravel to prevent unlawful access.</p> <p>The northern part of the Site was overgrown with large trees, brambles and hedgerows.</p>
Anticipated/Known Geology	<p>Reference to the British Geological Survey (BGS) online viewer indicates that the Site is underlain by superficial Lowestoft Formation (Diamicton) which is in turn underlain by Lewes Nodular Chalk Formation and Seaford Chalk Formation bedrock.</p> <p>An historic BGS borehole, ref (TL64SE18), available for the golf course approximately 30 m to the south-west of the Site, identified clay with chalk and flint to 13.00 m underlain by chalk to the base of the hole at 50.00 m.</p>
Hydrology	<p>There is an unnamed watercourse/ stream approximately 300 m east of the Site.</p>



3.0 Scope of Works

EGE attended the Site on the 16th March 2023 to undertake the following scope of works:

- ▼ Advancement of three (3 no.) infiltration tests (SA101 and SA103) to maximum depth of 1.50 m bgl;
- ▼ Infiltration testing in general accordance with BRE365 methodology;
- ▼ Excavation of two (2 no.) hand dug trial pits (HP101 and HP102) to confirm the geology across the wider Site area; and
- ▼ Factual Reporting.

An approximate intrusive location plan is included as Figure I.

The trial pit logs are included as Appendix II and the infiltration testing results are included as Appendix III.



4.0 Findings

The findings of the investigation are provided within the following Sections below.

4.1 Ground Conditions

The ground conditions typically comprised a topsoil to a maximum depth of 0.30 m bgl in SA101, underlain by Made Ground of sandstone (SA101 and SA102) to a maximum depth of 0.50 m or clay and bricks (SA103). Underlying the Made Ground was the Lowestoft Formation comprising clay with flint and chalk gravel.

Due to access restrictions, it was not possible to position an excavator in all areas of the Site, and as such two hand dug pits were excavated in the north of the Site to confirm the geology was similar to that in the south. The strata in the pits comprised 0.20 m of Topsoil overlying the Lowestoft Formation comprising gravelly clay. This confirmed that the geology in the northern part of the Site is consistent to that within trial pits SA101 to SA103 in the south.

No groundwater was encountered within soakaway locations.

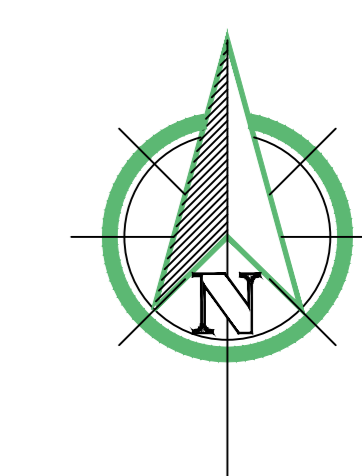
4.2 BRE365 Infiltration Results

The results of the BRE365 infiltration Testing are presented below:

Infiltration Test Location	Testing Depth (m bgl)	Geology	Calculated infiltration Result (m/s)
SA101	0.70 - 1.50	Lowestoft Formation (Gravelly Clay)	Failed test
SA102	0.70 - 1.50		Failed test
SA103	0.70 - 1.50		Failed test

Drawings

Drawing I - Client Provided Topographical Drawing



KEY:

CL	Contour Line	MB	Manhole	DB	Drainage Ditch
CP	Contour Point	AB	Air Valve	CB	Covering Cover
CD	Contour Ditch	BB	Block Box	EB	Electric Box
CE	Contour Edge	DB	Ditch Box	FB	Fencing Box
CF	Contour Fence	EB	Electric Box	GB	Gate Box
CG	Contour Gate	FB	Fencing Box	HB	High Post
CH	Contour Hill	GB	Gate Box	IB	Iron Pipe
CI	Contour Inlet	HB	High Post	JB	Joint Box
CJ	Contour Junction	IB	Iron Pipe	KB	Kiln Box
CK	Contour Kerb	JB	Joint Box	LB	Lime Box
CL	Contour Line	KB	Kiln Box	MB	Manhole
CM	Contour Mound	LB	Lime Box	NB	Natural Bank
CN	Contour Nook	MB	Manhole	OB	Overhead
CO	Contour Obstacle	NB	Natural Bank	PB	Pipe Box
CP	Contour Point	OB	Overhead	QB	Quarry Box
CQ	Contour Quarry	PB	Pipe Box	RB	Road Box
CR	Contour Road	QB	Quarry Box	SB	Sewer Box
CS	Contour Stream	RB	Road Box	TB	Tank Box
CT	Contour Trench	SB	Sewer Box	UB	Underground
CU	Contour Upland	TB	Tank Box	VB	Valve Box
CV	Contour Valley	UB	Underground	WB	Water Box
CW	Contour Wall	VB	Valve Box	XB	Water Box
CX	Contour Wall	WB	Water Box	YB	Water Box
CY	Contour Wall	XB	Water Box	ZB	Water Box
CZ	Contour Wall	YB	Water Box		
CA	Contour Wall	ZB	Water Box		

Station	Easting (m)	Northing (m)	Level (m)
STN01	5490716.861	244913.443	68.500
STN02	5491405.071	244894.509	68.100
STN03	5491271.405	244920.044	69.100
STN04	5491138.405	244974.937	74.014
STN05	5491005.405	244929.414	68.944
STN06	5490972.405	244884.789	64.600
STN07	5490839.405	244939.212	71.100
STN08	5490706.405	244894.509	78.600
STN09	5490573.405	244849.509	77.684

Survey Coordinates and Grid
Please note that the grid shown on this drawing is as follows:

- Arbitrary
- Arbitrary but approx. related to North
- Best fit to an Ordnance Survey Digital Sheet
- Related to the Ordnance Survey National GPS Network

Levels
Please note that the levels shown on this drawing are as follows:

- Arbitrary
- Related to an Ordnance Survey Bench Mark
- Related to the Ordnance Survey National GPS Network

Survey Hub Nottingham | Manchester | London
Head Office: 0115 7511323
mail@surveyhub.co.uk
www.surveyhub.co.uk

Client: Dukesmead Property Holdings
Project: Woodlands Hotel, Coupsals Road Haverhill, CB9 7UW
Title: Topographical Survey

Surveyed SP/HM Checked NS Date: 21/08/2019
Sheet No: 2 of 2 Scale: 1:200@A0

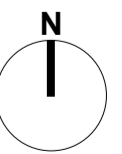
Job No. 3931 Rev. -

NOTES:
All critical measurements should be checked on site prior to design.
No liability will be taken for the accuracy of ground or 3D point cloud data.
The client is responsible for the accuracy of the data provided.
The survey is for information only and does not constitute a design.
The survey is for information only and does not constitute a design.
The survey is for information only and does not constitute a design.

Drawing II - Proposed Development Plan



- ① Proposed Care Home
- ② Proposed Car Park
- ③ Porous Surface Parking Bays
- ④ Tree Avenues
- ⑤ External Pedestrian and Maintenance to Garden
- ⑥ Single Surface Garden Footpath
- ⑦ Informal Footpath Route through Woodland
- ⑧ Existing Trees / Woodland (retained and enhanced)
- ⑨ Varied Grass Mixes and Mowing Regimes
- ⑩ Outdoor Shelter and Seating
- ⑪ Outdoor Activity Areas (Greenhouse, Seating, Shelter, Raised Beds and Sheds)
- ⑫ Seating alongside Footpath
- ⑬ Habitat Swales - with underground connections
- ⑭ Wet Habitat Area (according to levels and vegetation)
- ⑮ Shrub, Grasses and Perennial Planting
- ⑯ Secure Garden Boundary



Figures

Figure I - Approximate Intrusive Location Plan



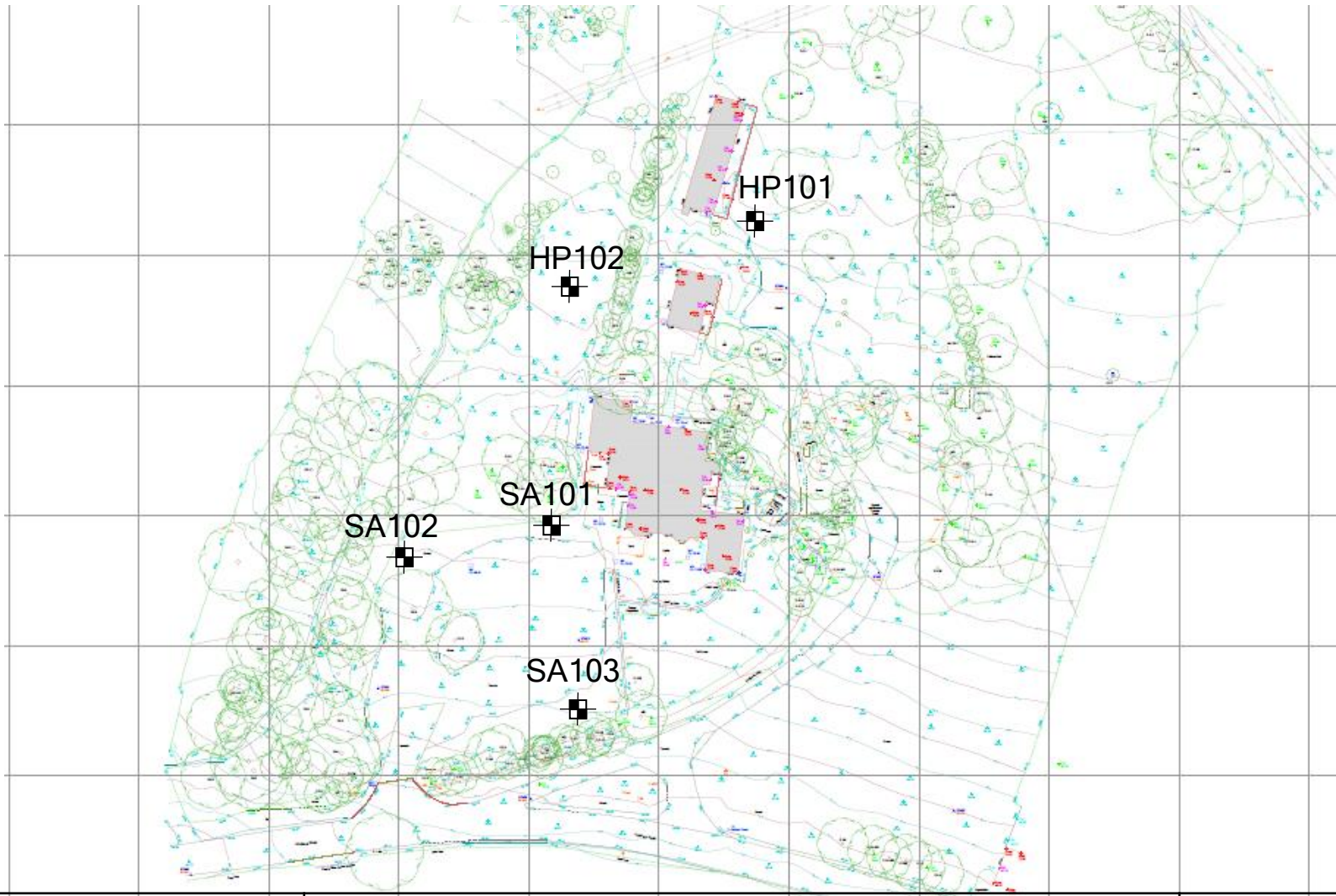


Figure No. and Title	I - Approximate Intrusive Location Plan
Project Name	Woodlands Hotel, Haverhill
Client	Country Court Care Homes 5 Limited
Service	Soakaways
Date of Issue	March 2023
Project number	EGE-23-01-07-01



Appendices

Appendix I - Standard Limitations

Limitations

The conclusions and recommendations made in this Report are limited to those that can be made based on the findings of the investigation and in the context of the proposed development.

Where comments are made based on information obtained from third parties, EGE assumes that all third party information is true and correct. No independent action has been undertaken to validate the findings of third parties, unless specifically stated.

This Report has been prepared in accordance with our understanding of current best practice. However changes to best practice, guidance or legislation may necessitate revision of this Report after the date of issue.

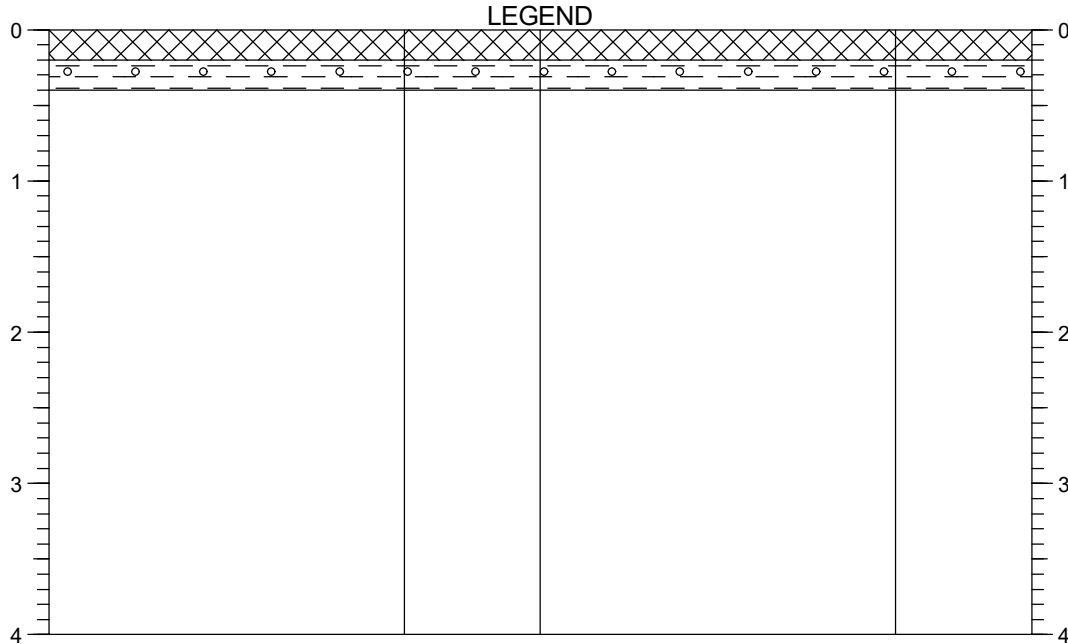
EGE has prepared this Report for the sole use and reliance of the Client, in accordance with our Standard Conditions and Limitations issued with the proposal. This Report may not be used or relied upon by any unauthorised third party without the explicit written agreement of EGE. Third parties use the information at their own risk.

Appendix II - Intrusive Logs

Evolve Geo-Environmental
 C/O 15 Newland, LN1 1XG
 Tel: 07946 041571
 Email: paulh@evolvegeo-env.co.uk



Project:	Woodlands, Haverhill	Project No:	EGE-23-01-07	Hole ID:	HP101
	TRIAL PIT LOG	Date:	16/03/2023	Client:	Country Court Care Homes



STRATA			SAMPLES		TESTS	
Depth	No	DESCRIPTION	Depth	No	Depth	Results
0.20		MADE GROUND: Dark brown slightly gravelly CLAY. Gravel is fine to coarse angular to subrounded charcoal				
0.40		Firm light brown gravelly CLAY. Gravel is subangular to rounded fine to medium flint and chalk. (LOWESTOFT FORMATION)				

Shoring/Support:
Stability:

REMARKS :

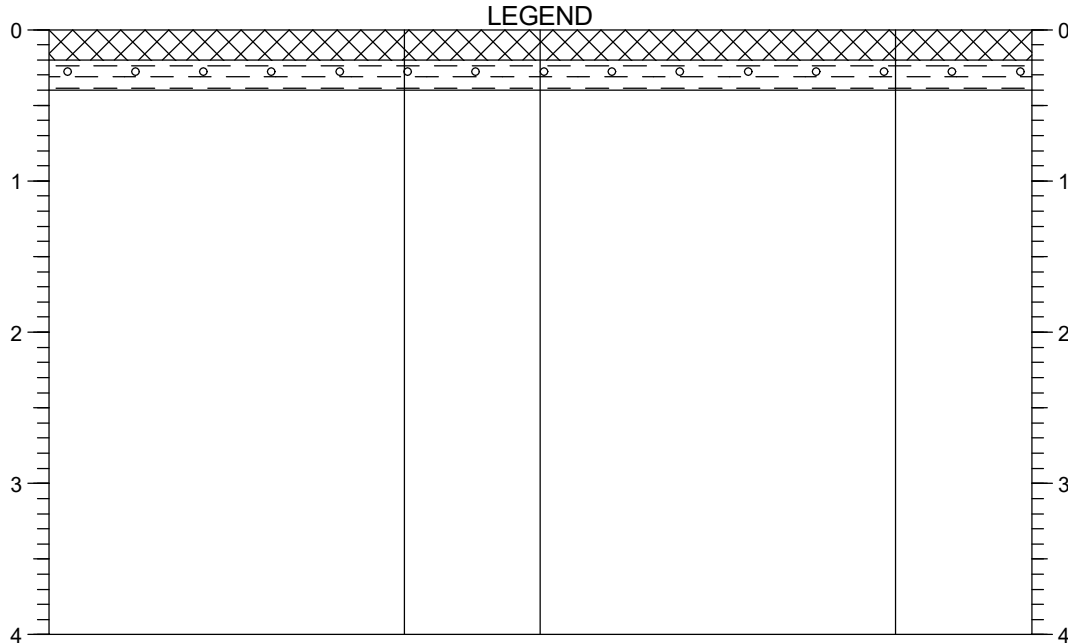
- Hole logged in general accordance with BS5930:2015+A1:2020.
- Sides stable during excavation.
- Backfilled with arisings.
- Coordinates from handheld GPS.

All measurements in metres unless otherwise stated	10m/page	Scale: 1:50	Coordinates to Local Grid No Datum Information Available		
Plant Used: Hand Tools	Coordinates / Level (mAOD): E: 244985 N: 569127	Logged By: PW	Checked By: PH	Approved By: PB	

Evolve Geo-Environmental
 C/O 15 Newland, LN1 1XG
 Tel: 07946 041571
 Email: paulh@evolvegeo-env.co.uk

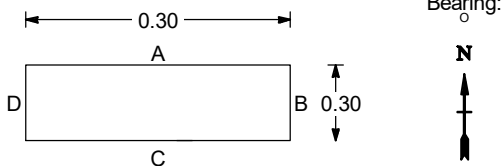


Project:	Woodlands, Haverhill	Project No:	EGE-23-01-07	Hole ID:	HP102
	TRIAL PIT LOG	Date:	16/03/2023	Client:	Country Court Care Homes



STRATA			SAMPLES		TESTS	
Depth	No	DESCRIPTION	Depth	No	Depth	Results
0.20		MADE GROUND: Dark brown slightly gravelly CLAY. Gravel is angular fine to medium brick and concrete.				
0.40		Firm light brown gravelly CLAY. Gravel is subangular to rounded fine to medium flint and chalk. (LOWESTOFT FORMATION)				

Shoring/Support:
 Stability:



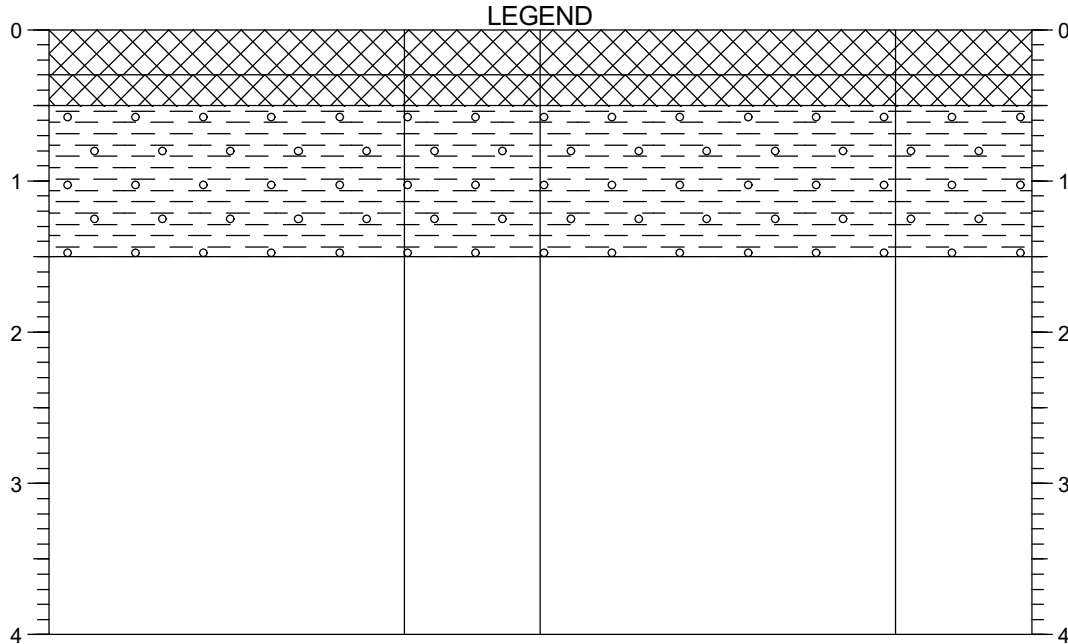
REMARKS :
 1. Hole logged in general accordance with BS5930:2015+A1:2020.
 2. Sides stable during excavation.
 3. Backfilled with arisings.
 4. Coordinates from handheld GPS.

All measurements in metres unless otherwise stated	10m/page Scale: 1:50	Coordinates to Local Grid No Datum Information Available			
Plant Used: Hand Tools	Coordinates / Level (mAOD): E: 244978 N: 569109	Logged By: PW	Checked By: PH	Approved By: PB	

Evolve Geo-Environmental
 C/O 15 Newland, LN1 1XG
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 Email: paulh@evolvegeo-env.co.uk



Project:	Woodlands, Haverhill	Project No:	EGE-23-01-07	Hole ID:	SA101
	TRIAL PIT LOG	Date:	16/03/2023	Client:	Country Court Care Homes



STRATA			SAMPLES		TESTS	
Depth	No	DESCRIPTION	Depth	No	Depth	Results
0.30		MADE GROUND: Dark brown slightly gravelly silty CLAY with frequent roots. Gravel is angular fine to medium brick and concrete.				
0.50		MADE GROUND: Orange gravelly SAND. Gravel is angular tabular sandstone.				
(1.00)		Light grey gravelly CLAY. Gravel is angular to subrounded fine to coarse chalk. (LOWESTOFT FORMATION)				
1.50						

Shoring/Support: Stability:	REMARKS : 1. Hole logged in general accordance with BS5930:2015+A1:2020. 2. Hole scanned for services prior to excavation. 3. Sides stable during excavation. 4. Hole turned into soakaway test. 5. Backfilled with arisings, left mounded on completion.
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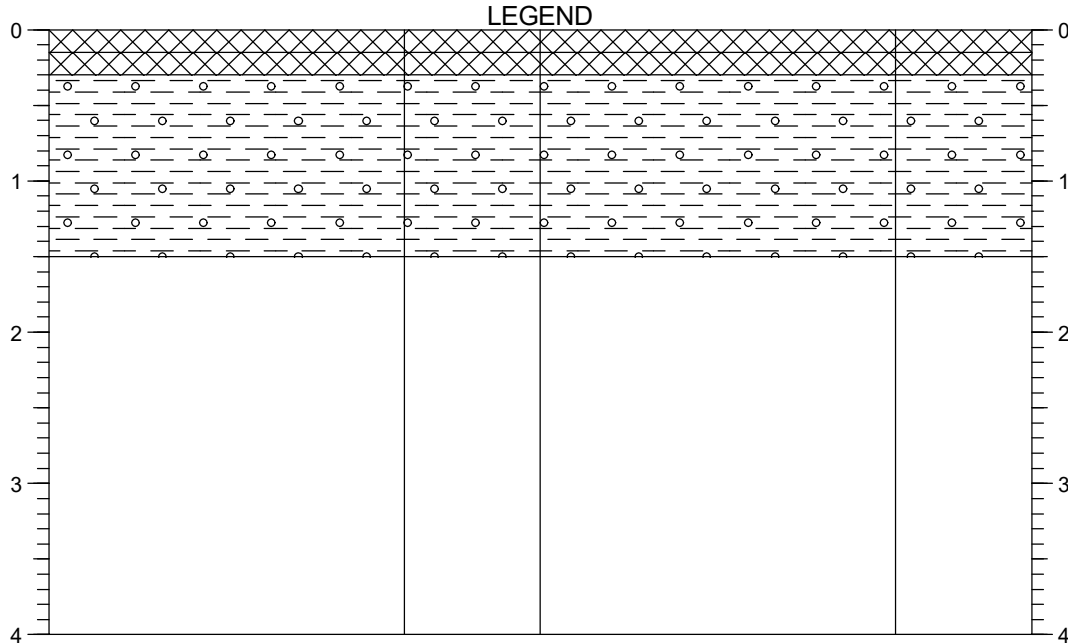
Bearing:

All measurements in metres unless otherwise stated		10m/page	Scale: 1:50	Coordinates to Local Grid Ground Level to Local Datum	
Plant Used: 5t Excavator	Coordinates / Level (mAOD): E: 244939.781 N: 569097.853 Level: 70.633	Logged By: PW	Checked By: PH	Approved By: PB	

Evolve Geo-Environmental
 C/O 15 Newland, LN1 1XG
 Tel: 07946 041571
 Email: paulh@evolvegeo-env.co.uk

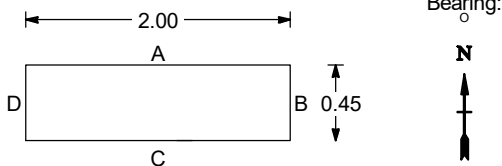


Project:	Woodlands, Haverhill	Project No:	EGE-23-01-07	Hole ID:	SA102
TRIAL PIT LOG		Date:	16/03/2023	Client:	Country Court Care Homes



STRATA			SAMPLES		TESTS	
Depth	No	DESCRIPTION	Depth	No	Depth	Results
0.15		MADE GROUND: Dark brown sandy CLAY with frequent roots.				
0.30		MADE GROUND: Orange sandy GRAVEL of angular tabular sandstone.				
(1.20)		Firm light grey gravelly CLAY. Gravel is angular to rounded fine to coarse flint and chalk. (LOWESTOFT FORMATION)				
1.50						

Shoring/Support:
 Stability:



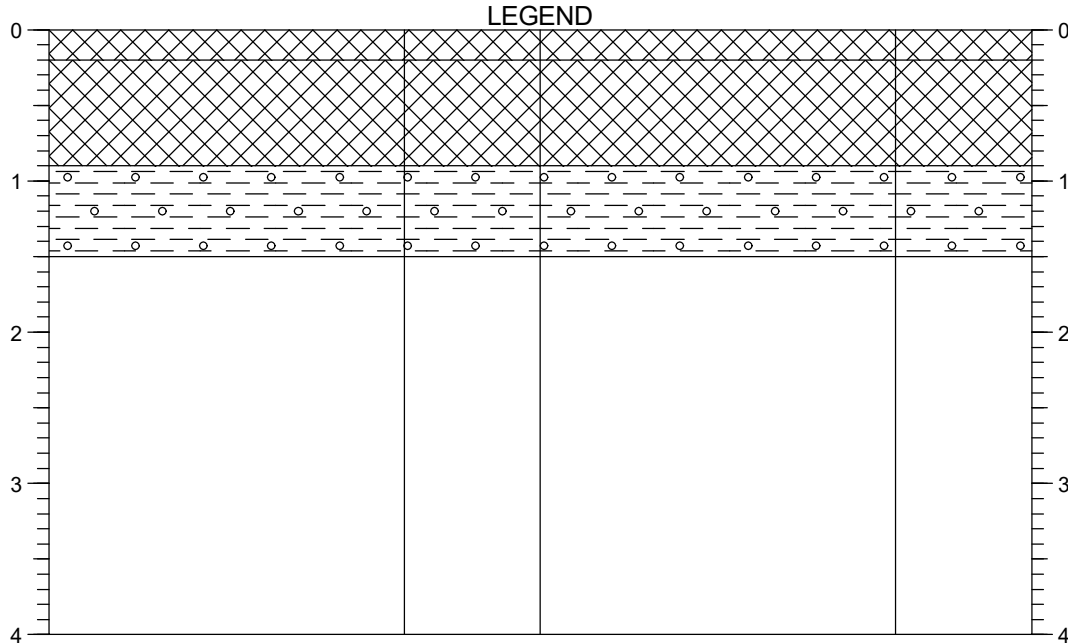
- REMARKS :**
1. Hole logged in general accordance with BS5930:2015+A1:2020.
 2. Hole scanned for services prior to excavation.
 3. Sides stable during excavation.
 4. Hole turned into soakaway test.
 5. Backfilled with arisings, left mounded on completion.

All measurements in metres unless otherwise stated	10m/page Scale: 1:50	Coordinates to Local Grid Ground Level to Local Datum		
Plant Used: 5t Excavator	Coordinates / Level (mAOD): E: 244933.161 N: 569081.963 Level: 69.96	Logged By: PW	Checked By: PH	Approved By: PB

Evolve Geo-Environmental
 C/O 15 Newland, LN1 1XG
 Tel: 07946 041571
 Email: paulh@evolvegeo-env.co.uk



Project:	Woodlands, Haverhill	Project No:	EGE-23-01-07	Hole ID:	SA103
TRIAL PIT LOG		Date:	16/03/2023	Client:	Country Court Care Homes



STRATA			SAMPLES		TESTS	
Depth	No	DESCRIPTION	Depth	No	Depth	Results
0.20		MADE GROUND: Dark brown slightly gravelly clayey SAND with frequent roots.				
(0.70)		MADE GROUND: Brown slightly sandy gravelly CLAY. Gravel is whole and part bricks				
0.90						
(0.60)		Firm light brown gravelly CLAY with rare roots. Gravel is angular to subangular flint and chalk. (LOWESTOFT FORMATION)				
1.50						

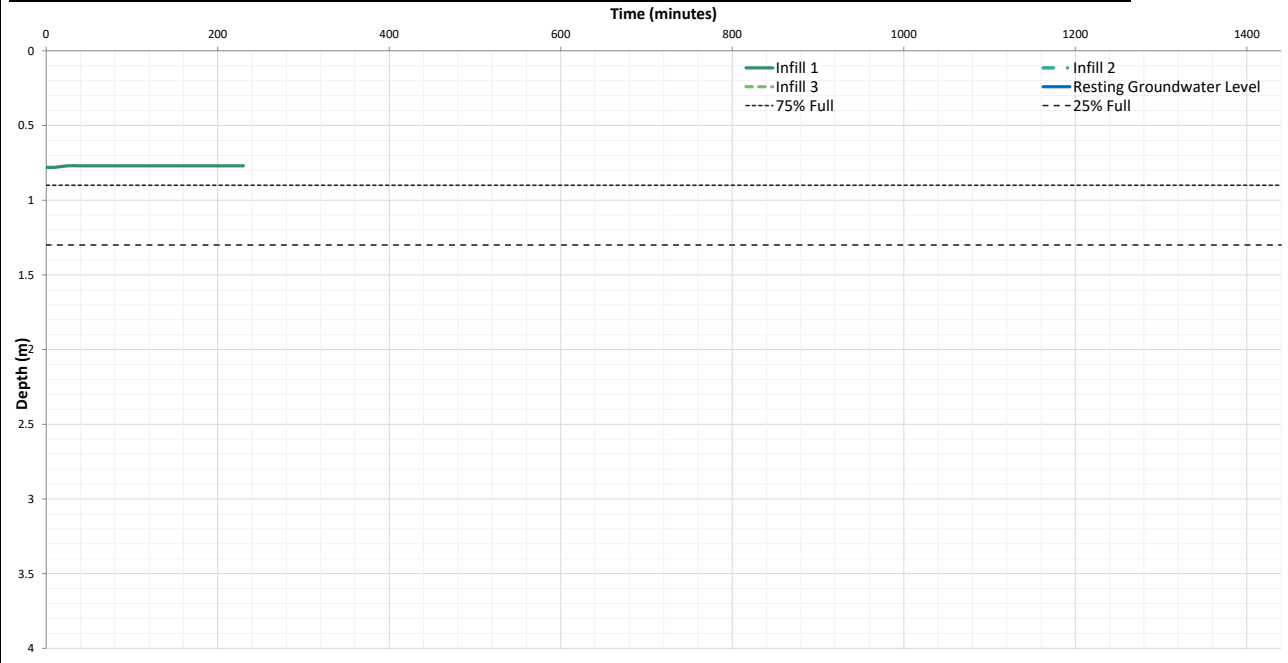
Shoring/Support: Stability:				REMARKS : 1. Hole logged in general accordance with BS5930:2015+A1:2020. 2. Hole scanned for services prior to excavation. 3. Sides stable during excavation. 4. Hole turned into soakaway test. 5. Backfilled with arisings, left mounded on completion.	
All measurements in metres unless otherwise stated		10m/page Scale: 1:50		Coordinates to Local Grid Ground Level to Local Datum	
Plant Used: 5t Excavator	Coordinates / Level (mAOD): E: 244906.638 N: 569103.103 Level: 68.317	Logged By: PW	Checked By: PH	Approved By: PB	

Appendix III - BRE365 Calculation Spreadsheets

	units	Infill 1	Infill 2	Infill 3
Length	m	2.30		
Width	m	0.45		
Depth	m	1.50		
Gravel type		20mm single size		
Voids ratio		0.40		
Resting groundwater level at time of testing	m	5.00		
Depth of first reading	m	0.78	0.00	0.00
Depth of final reading	m	0.78	0.00	0.00
Did soakage test reach 25% of maximum fill depth?		No	No	No
Did soakage test reach near empty?		No	No	No
Depth at 75% full/effective depth	m	0.78	0.00	0.00
Depth at 25% full/effective depth	m	0.78	0.00	0.00
Time at 75% full/effective depth	mins	#DIV/0!	#N/A	#N/A
Time at 25% full/effective depth	mins	#DIV/0!	#N/A	#N/A
Vp75 - 25 (volume outflowing between 75% and 25% full/effective depth)	m ³	0.00	0.00	0.00
Mean surface area for outflow (50% full/effective depth)	m ²	1.04	1.04	1.04
tp75 (time for the water level to fall from 75% to 25% full/effective depth)	mins	#DIV/0!	#N/A	#N/A
Soil infiltration rate, f =	m/s	Failed Test	Failed Test	Failed Test
or	m/s	Failed Test	Failed Test	Failed Test

Recommended soil infiltration rate	
Failed Test	m/s

Note:
Where water level reaches nearly empty (5% full), soil infiltration based on 'Full' depth. Where water level did not reach nearly empty (5% full), soil infiltration rate is based on 'Effective' drainage achieved only. Where water level did not fall below 25% of the maximum fill level, this is considered to be a 'Failed' test.



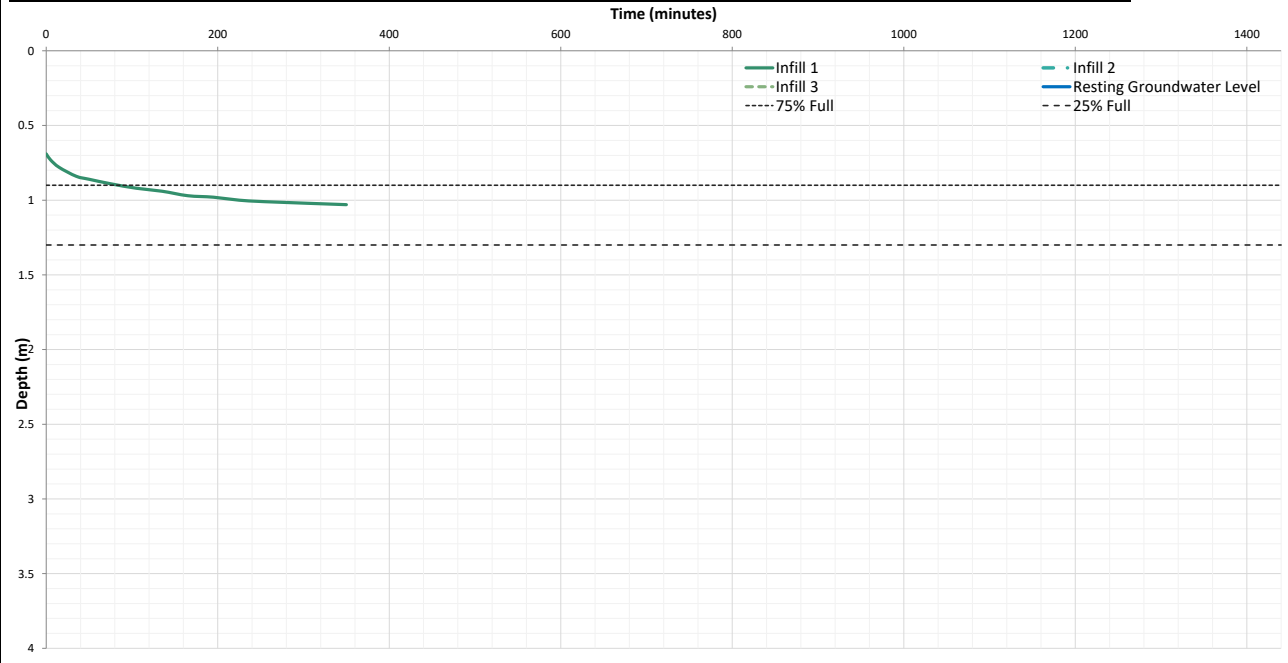
LOG		BACKFILL	
DEPTH (m)		DEPTH (m)	
0.0	Topsoil	0.0	Arisings
0.3	sandstone gravel		
0.5	light brown chalky CLAY		
		0.7	Gravel
1.5		1.5	

	TITLE: Soakaway Test Results The Woodlands, Haverhill Country Court Care Homes	<i>In general accordance with BRE Digest 365 (2016)</i>	DRAWN BY: PH	SCALE: Not to Scale	PROJECT NUMBER: EGE 23-01-07-01
			CHECKED BY: PB	REVISION: 1	SOAKAWAY NUMBER: SA101
			DATE: 16/03/2023		

	units	Infill 1	Infill 2	Infill 3
Length	m	2.30		
Width	m	0.45		
Depth	m	1.50		
Gravel type		20mm single size		
Voids ratio		0.40		
Resting groundwater level at time of testing	m	5.00		
Depth of first reading	m	0.69	0.00	0.00
Depth of final reading	m	1.03	0.00	0.00
Did soakage test reach 25% of maximum fill depth?		No	No	No
Did soakage test reach near empty?		No	No	No
Depth at 75% full/effective depth	m	0.78	0.00	0.00
Depth at 25% full/effective depth	m	0.95	0.00	0.00
Time at 75% full/effective depth	mins	14.00	#N/A	#N/A
Time at 25% full/effective depth	mins	140.00	#N/A	#N/A
Vp75 - 25 (volume outflowing between 75% and 25% full/effective depth)	m ³	0.07	0.00	0.00
Mean surface area for outflow (50% full/effective depth)	m ²	1.97	1.04	1.04
tp75 (time for the water level to fall from 75% to 25% full/effective depth)	mins	126.00	#N/A	#N/A
Soil infiltration rate, f =	m/s	Failed Test	Failed Test	Failed Test
or	m/s	Failed Test	Failed Test	Failed Test

Recommended soil infiltration rate	
Failed Test	m/s

Note:
Where water level reaches nearly empty (5% full), soil infiltration based on 'Full' depth. Where water level did not reach nearly empty (5% full), soil infiltration rate is based on 'Effective' drainage achieved only. Where water level did not fall below 25% of the maximum fill level, this is considered to be a 'Failed' test.



LOG		BACKFILL	
DEPTH (m)		DEPTH (m)	
0.0	Topsoil	0.0	Arisings
0.2	Gravelly CLAY with bricks	0.7	Gravel
0.9	Light brown chalky CLAY	1.5	


	TITLE: Soakaway Test Results The Wood lands, Haverhill Country Court Care Homes	In general accordance with BRE Digest 365 (2016)	DRAWN BY: PH	SCALE: Not to Scale	PROJECT NUMBER: EGE 23-01-07-01
			CHECKED BY: PB	REVISION: 1	SOAKAWAY NUMBER: SA103
			DATE: 16/03/2023		

Project Number: 22-0364
Project Title: Former Woodlands Hotel
Location: Coupals Road, Sturmer, Haverhill, Essex
BSP Document Ref: WHCH-BSP-XX-XX-T-W-0001-P05_Flood_Risk_Assessment



Appendix E

Greenfield Runoff Calculation

BSP Consulting		Page 1
12 Oxford Street Nottingham NG1 5BG	22-0364 Former Woodlands Hotel, Haverhill, Essex	
Date 14/02/2023 File Greenfield_Runoff_P01_0....	Designed by AKS Checked by SCB	
Innovyze	Source Control 2020.1.3	

ICP SUDS Mean Annual Flood

Input

Return Period (years) 1 SAAR (mm) 600 Urban 0.000
Area (ha) 1.280 Soil 0.400 Region Number Region 5

Results 1/s

QBAR Rural 3.6
QBAR Urban 3.6

Q1 year 3.2

Q1 year 3.2
Q30 years 8.7
Q100 years 12.9



Nottingham

12 Oxford Street
Nottingham
NG1 5BG

0345 413 4000

Derby

5 Pride Point Drive
Pride Park
Derby
DE24 8BX

0345 413 4000

Leicester

Floor 4
24 De Montfort St
Leicester
LE1 7GB

0345 413 4000

Sheffield

Smithy Wood House
Smithy Wood Cres
Sheffield
S8 0NU

0345 413 4000

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