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CONSULTING ENGINEERS

flood risk assessment

PROJECT
Lanwades Woodland Park and former Animal Health Trust Research site

REFERENCE
CCE/ZF261/FRAB-02

DATE
May 2025

FOR
Lochailort Kentford Ltd

Document Review Sheet:

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Reference	Date	Author	Checked
CCE/ZF261/FRAB-01	February 2025	JH	RT
CCE/ZF261/FRAB-02	May 2025	JH	

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Summary Table

Site location	South of Bury Road/B1506, Kentford, Suffolk CB8 7UU. Grid reference – 569420, 266130
Planning application	Hybrid
Existing site	Mixed, brownfield and grassland with wooded areas.
Application site area	Approximately 31.3 ha
Proposed development	Residential led mixed use (860 dwellings), school, store, care home, employment hub and community building.
Flooding from rivers and sea	None.
Reservoir Inundation Zone	None
Other sources of flooding	Areas of high, medium and low risk surface water flooding.
Surface water management	Infiltration sized to manage the 1 in 100 annual probability storm plus climate change and creep allowances.

1.0 Introduction

1.1 This Flood Risk Assessment (FRA) has been prepared on behalf of Lochailort Kentford Ltd to support a hybrid planning application for development of land to the south of Bury Road/the B1506, Kentford, Suffolk CB8 7UU. (refer to Figure 1 for the site location).

1.2 The hybrid development proposal is for the redevelopment of the former Animal Health Trust research site, It is proposed to deliver circa 860 residential units, a 90 bed care home, a 1FE primary school, alongside retail/ local shop, and commercial and community facilities within the existing listed stables block, and further employment floorspace. The full and outline elements of the scheme are as follows:

Full element – eastern site

- 302 Dwellings.
- 1 x Shop 386sq.m.
- 1 x Community Hub (Existing Listed Visitor Centre).

Outline element – western site

- 558 Dwellings.
- 1 x 90 Bed Care Home.
- 1 x School.
- Employment Area.

1.3 This assessment takes account of the National Planning Policy Framework (NPPF) and the definitions of sources of flooding within the Flood and Water Management Act (FWMA) 2010. The report has been prepared following several site visits, infiltration testing at the site, and the results of other intrusive testing.

1.4 The site lies on the western edge of Kentford village and is approximately centred on Ordnance Survey grid reference 569420, 266130. The site is bounded by Bury Road/the B1506 to the north, Chippenham Road to the west, residential development and Sire Lane to the east, and open, rural land to the south.

1.5 The site extends to approximately 31.3 ha. The east of the site (the area which is subject to the full element of the planning application) is currently developed and was formerly the site of the Animal Health Trust (AHT). The site is laid to buildings and hardstanding (comprising formal sealed surfaces and less formal gravelled areas). The total existing impermeable area is circa 3.7 ha. The west of the site (the subject of the outline element of the planning application) is undeveloped and laid to open grassland, wooded areas, and access tracks.

1.6 The dominant downward slope direction of the site is northwards, with cross falls 'outwards' to the west and east. Existing ground levels range from approximately 59.0 m AOD a third of the way along the southern boundary to approximately 42.5 m AOD in the north-western corner of the site and approximately 33.6 m AOD in the north-eastern corner of the site (at

the Sire Lane junction with Bury Road/the B1506. Ground levels at the existing access (Sir Graham Kirkham Avenue) are approximately 36.0 m AOD. Refer to the topographical survey in Appendix A.

1.7 The nearest mapped watercourse is the River Kennett some 500 m to the east of the site. The channel is a designated Main River and flows broadly north-eastwards (from Moulton), through Kentford and beneath the A14 (road). There is a floodplain associated with the watercourse (refer to Figure 2), but this does not affect the site.

1.8 There is a water supply pipe cutting across the north-western corner of the site (see Image 1.1 below). The pipe is part of the infrastructure which helps transfer untreated (raw) water from the Ely Ouse to Essex. The pipe conveys flow from the pumping station in Kennett (circa 2.0 km to the north of the site) to the Kirtling Brook at Kirtling Green some 10.0 km to the south. The water goes on to flow into the River Stour before being extracted, treated, and enter the Essex water supply infrastructure. The pipe has been accounted for in the illustrative layout of the outline element of the scheme with built development kept out of the area and only landscaping and road crossings proposed on or near to the pipe.

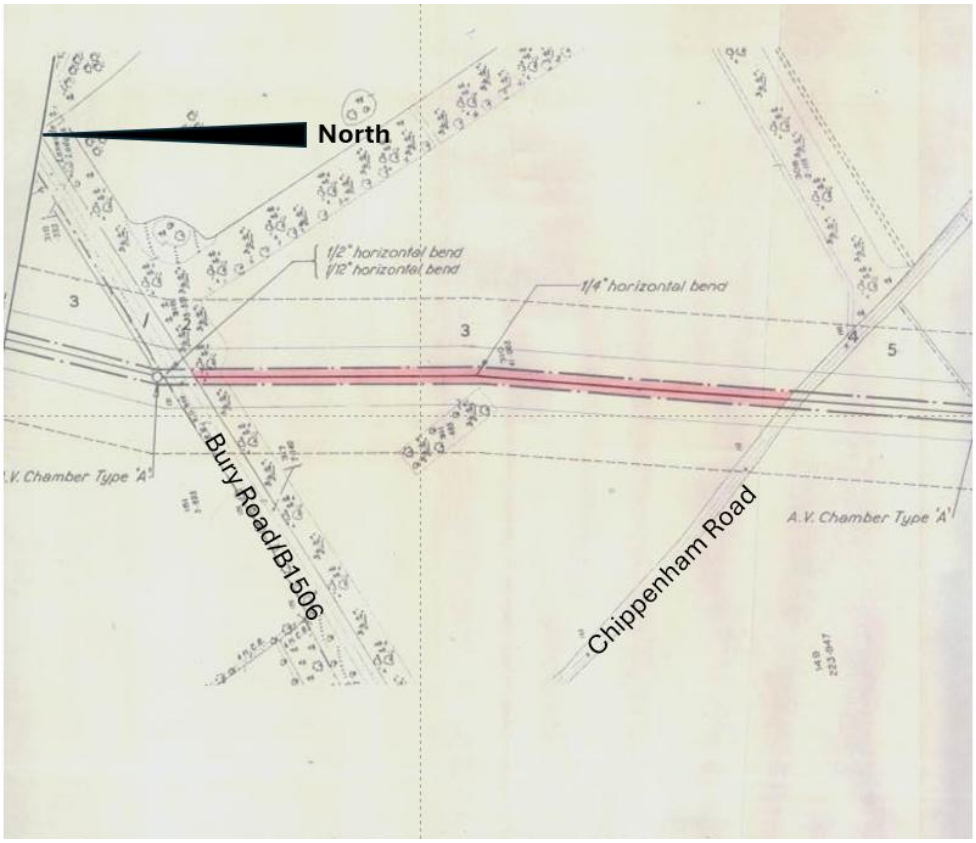

Image 1.1 showing the approximate position of the water supply pipe (in red).

1.9 The topographical survey shows a drainage inlet/outlet in the wooded strip of land in the north-western corner of the site. The connectivity of the channel has not been proven but it

appears to be linked to the drainage gully at the corner of Chippenham Road and Bury Road/the B1506 and serve as a localised infiltration feature.

1.10 Geological mapping (refer to appended British Geological Survey report) shows that the site is underlain by the Hollywell Chalk formation (bedrock), with a limited area of superficial sands and gravels in the south. Shallow groundwater is not expected to occur throughout the majority of the site.

1.11 An intrusive investigation (refer to the Soiltechnics Ground Investigation Report reference STU5875-R01 Rev B and the trial pit logs in Appendix A of this report) confirmed the presence of the Chalk and superficial deposits (superficial deposits were more extensive than expected based on the published geology) as well as made ground. Groundwater was not encountered in the majority of the excavations. The exception is seepage which was noted in borehole WS07 and attributed to a confined area of permeable material. In the context of this site groundwater is most likely the result of the saturation of the more granular superficial material rather than true groundwater associated with rising levels in the underlying Chalk.

1.12 The site lies in groundwater source protection zone 3, the total catchment area (refer to Figure 3).

2.0 Forms of Flooding

Watercourses

2.1 The site is not shown to be affected by flooding from a watercourse (refer to Figure 2).

Surface Water

2.2 The surface water flood map for the site (Figure 4) shows limited patches of surface water pooling in the north of the site. The most notable areas are in the north-east and north-west of the site. The patches are associated with topographical low spots and are likely the result of relatively localised runoff generated from the site itself. The mapping also shows some pooling around two of the existing buildings. This represents runoff being intercepted by and pooling up against the building walls as it flows from adjacent hardstanding and higher ground.

2.3 Images 2.1 and 2.2 overleaf show extracts from the 2040-2060 depth of surface water flooding maps. The extracts are from the 200 mm depth data set. It is worth noting that this is labelled as the "up to 200 mm" depth data set on the web-based mapping but from context (and discussion with the JBA Consulting flood modelling team) it actually shows the likelihood of depths of 200 mm or more occurring. The images overleaf show that only small areas of the site are expected to experience flood depths of more than 200 mm.

2.4 It is worth noting that predicted surface water flooding will in part be managed by the installation of the proposed surface water management strategy (refer to Section 3 and Appendix B). The proposed network will intercept runoff from the developed areas of the site and direct it into infiltration facilities (basins and soakaways). The overall effect will be to reduce the total catchment area (rural and urban) which can currently contribute to overland flow running northwards through the site.

2.5 Based on the location, extent, depth, and likelihood of the predicted surface wate flooding, combined with the probable reduction associated with installation of a modern surface water drainage network, the risk posed by surface water flooding to the proposed development is not significant.

2.6 By the same token, the risk of displacement of surface water flooding is also low. The outline element of the application (the west of the site) indicates an area of development and a potential access from Bury Road/the B1506 in an area of predicted surface water flooding. If the predicted flooding is not removed or at least significantly reduced once the proposed surface water management scheme is taken into account (which we would suggest can be secured through a planning condition requiring a development catchment flood modelling exercise), then the layout allows for sufficient space to provide compensatory flood storage.

Image 2.1 chance of flooding (in excess of 200 mm) mm 2040-2060, taken from the long term flood risk maps (February 2025) © Crown copyright and database rights 2025 Ordnance Survey 100047325

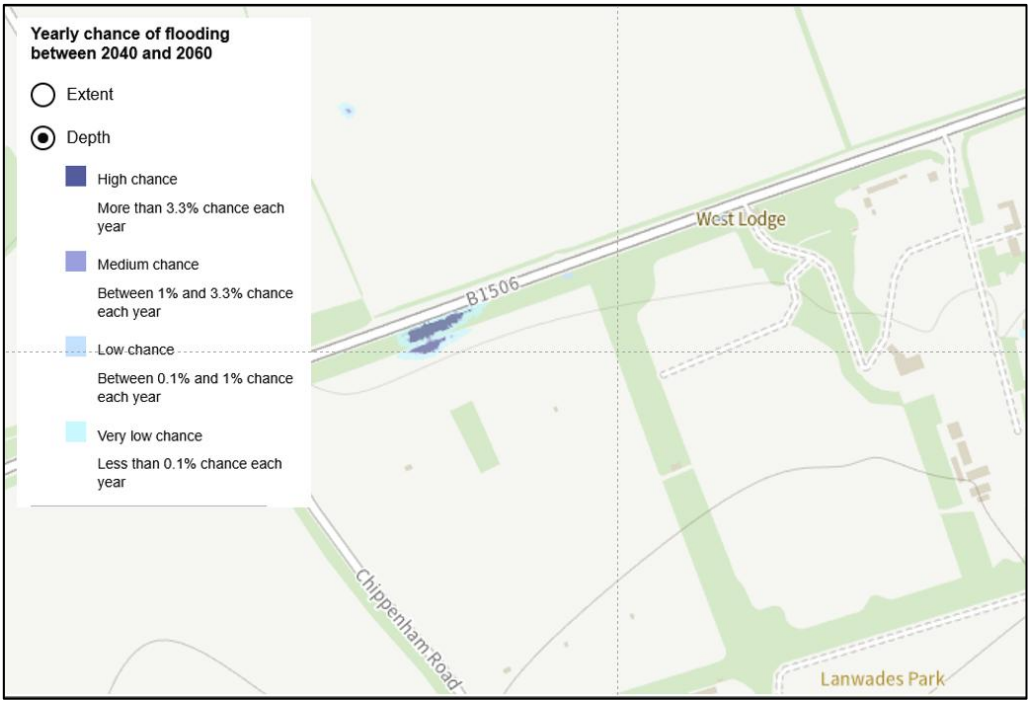

Image 2.2 chance of flooding (in excess of 200 mm) mm 2040-2060, taken from the long term flood risk maps (February 2025) © Crown copyright and database rights 2025 Ordnance Survey 100047325

Groundwater

2.7 As discussed, the likelihood of 'true' groundwater flooding (i.e. rising groundwater levels in the Chalk) is considered unrealistic.

2.8 In the event that a localised buildup of groundwater in localised pockets of confined permeable material results in groundwater being expressed at the surface, then it would tend to follow ground levels and exit the site as shallow sheet flow rather than entering any buildings.

2.9 In light of the above groundwater flooding is not considered a notable of unmanageable risk.

Adopted Surface Water Sewers

2.10 Anglian Water records (included in Appendix A) show only wastewater sewers in the area. This is consistent with the ability of the geology to support the disposal of surface wate via infiltration (as is the case for the Larnach Drive development which relies on shared crated soakaways in the rear gardens).

2.11 From observations, Bury Road/the B1506 to a highway drainage network (on either side of the road) as well as running overland eastwards. This may contribute to the locally reported pooling of runoff at the Bell Public House following during intense rainfall events.

2.12 Neither if the above present a realistic flood risk to the proposed development (or the site) as levels dictate that any floodwater arising from either source would flow away from and past the site, rather than spilling onto the proposed development.

Artificial Water Bodies

2.13 The site does not lie in a reservoir inundation zone (refer to Figure 2).

Off-site Improvements

2.14 As part of the outline proposals some potential improvements to the Bury Road drainage network have been identified. Improving the drainage would help reduce/remove the periodic pooling of runoff which is reported on the southern side of the road following heavy rainfall. Appendix C includes a sketch of some suggested improvements which would be subject to later stage discussion with Suffolk County Council Highways. The measures focus on adding some localised SuDS components in the existing verge to convey water from the road more efficiently.

3.0 Surface Water Management

3.1 Infiltration testing in the north of the site (refer to Appendix A) demonstrates that the Chalk beneath the site will support the disposal of surface water runoff by infiltration. The proposed surface water management scheme therefore relies entirely on infiltration. The testing found infiltration rates of between 9.56 x 10^{-6} and 5.80 x 10^{-4} m/s depending on location. As discussed, based on the investigations to date, shallow groundwater is not expected at the site (although monitoring would be pursued at the later Discharge of Conditions stage).

3.2 As recommend in the Soiltechnics Ground Investigation Report no infiltration is proposed within 10 m of existing and proposed buildings and roads.

3.3 The appended calculations have been run for the 1 in 2, 1 in 30, and 1 in 100 annual probability storms. Urban creep has been applied as 5 % to the total catchment area as this is representative of a 10 % urban creep rate being applied to just the residential plots (as per guidance). Climate change of 35 % and 40 % has been applied to the 1 in 30 and 1 in 100 annual probability storms respectively. The calculations assume a runoff coefficient of 1.0 (i.e. no losses from the system).

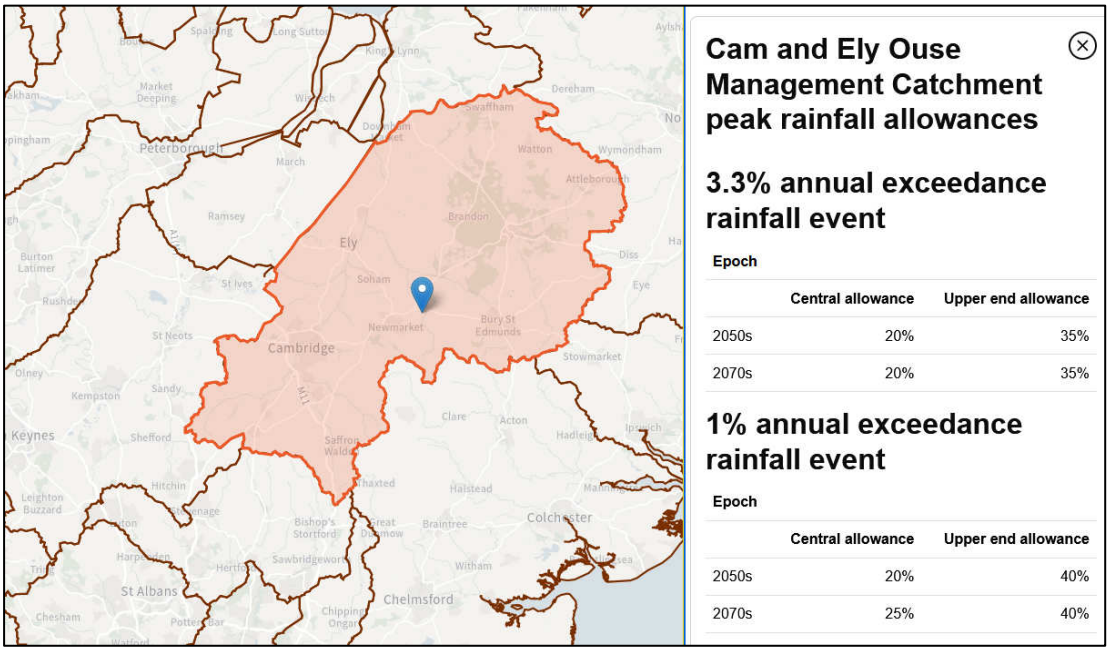

Image 3.1 – extract from the climate change allowances mapping. © Crown copyright and database rights 2025 Ordnance Survey 100047325

Full element (eastern site)

3.4 Runoff from the majority of the site will be conveyed to a perforated carrier pipe network through permeable/porous hardstanding. Currently this is proposed as permeable block paving for driveways and parking areas, with porous asphalt for the majority of the proposed roads. Sealed, or impermeably surfaced service strips would be included on the 'high side' of

the roads in order to allow for simpler maintenance of services (excavation and replacement of impermeable surfaces being less onerous). Roofwater will either be discharged onto the permeable surfaces (spilling onto driveways for example) or connected via diffuser boxes, wrapped permeable pipe stubs etc, to the permeable sub-base. Currently it is proposed to line areas of permeable sub base with an impermeable membrane to prevent infiltration in areas other than the basins and crated soakaways.

3.5 The exception to the above is the length of existing access road (Graham Kirkham Avenue) which will remain impermeably surfaced (as existing). Currently the road has no apparent formal drainage scheme aside from a number of traditional gullies at the junction with Bury Road/the B1506. As part of the redevelopment of the site a filter drain and shallow rill (500 mm wide by 200 mm deep) will be included along the eastern edge of the road to accept overland flow and convey it northwards. At the northern end of the rill flows will pass through a linear SuDS filter (a planted area of shallow SuDS soil, lined with an impermeable membrane), before entering the infiltration basin in the north of the site.

3.6 The twin outfall from the perforated piped network will be protected with a gabion debris filter.

3.7 The proposed infiltration basin is 1.5 m deep, with a maximum water level of a little over 900 mm in the 1 in 100 annual probability storm with creep and climate change. The basin is a two stage basin (with a 1.5 m wide shelf at 600 mm above the bed) and is augmented by an infiltration blanket wrapping around it's southern edge, to maximise the area over which infiltration can occur. Side slopes within the basin are 1 in 4, with 1 in 3 banking back to surrounding ground levels. The time to half empty is circa 100 minutes. The modelled infiltration rate from the basin is 1.31×10^{-4} m/s (the lowest of the three test results for test location TP01).

Outline element (western site)

3.8 The outline element of the scheme is divided into several sub-catchments each of which is served by an infiltration facility. Depending on location and infiltration rates, the proposed sub-catchments will drain to either a basin or a cellular crated soakaway. Constraints associated with existing trees, site slopes, ground levels, and proposed land uses means that infiltration features are unlikely to be suitable for all sub-catchments.

3.9 Each of the sub-catchment facilities has been modelled using the infiltration rate for the nearest location drawing a straight line from the facility, northwards to the test location. More locations will be investigated at the later Discharge of Condition stage so facilities are subject to change.

3.10 Interception and conveyance SuDS features (permeable and porous surfaces, SuDS planters, vegetated filter drains, rills (planted and bare), tree pits/green gullies) will be included in the later Reserved Matters/Discharge of Conditions stage.

3.11 The infiltration facilities for each of the sub-catchments are summarised below, and shown on the outline surface water strategy plan in Appendix C (along with supporting calculations). All of the outline facilities have a half drain down time of less than 24 hours.

- Catchment O1, residential, including care home, served by an infiltration basin, 65.5 % impermeable allowance
- Catchment O2, residential, served by crated soakaway, 65 % impermeable allowance
- Catchment O3, residential, served by an infiltration basin, 65 % impermeable allowance
- Catchment O4, residential and employment, served by crated soakaway, 70 % impermeable allowance
- Catchment 05, residential, served by crated soakaway, 65.0 % impermeable allowance
- School catchment - served by a crated soakaway, 50 % impermeable allowance

Treatment – full element (eastern site)

3.12 The highest pollution hazard level for the site (from Table 26.2 in The SuDS Manual, C753) is Medium. This would be associated with the higher trafficked roads which serve more than circa 50 to 60 dwellings (i.e. more than the 300 vehicle movements).

3.13 The pollution scores for the Medium hazard category (Table 26.2) are 0.7, 0.6, and 0.7 (for suspended solids, metals and hydrocarbons respectively).

3.14 Treatment scores from Table 26.3 are relevant to the SuDS techniques upstream of the infiltration basin and blanket. Treatment scores from Table 26.4 are relevant for the basin and blanket. Scores are summarised below.

- Permeable paving, porous surface – 0.7, 0.6, 0.7
- Filter strip – 0.4, 0.4, 0.5
- Briorention (applicable to the linear SuDS filter) – 0.8, 0.8, 0.8
- Infiltration basin assuming dense vegetation over 'SuDS soil' – 0.6, 0.5, 0.6
- Infiltration blanket fed from the basin and underlain by 300 mm of 'SuDS soil' – 0.4, 0.3, 0.3

3.15 Treatment scores for the proposed combination of SuDS techniques are all greater than the respective pollution scores:

- Permeable paving, porous surface + infiltration basin + blanket = 0.7 + 0.3 (1.0), 0.6 + 0.25 (0.85), 0.7 + 0.3 (1.0)
- Filter strip + rill (no treatment) + linear SuDS filter + basin = 0.4 + 0.4 + 0.3 (1.1), 0.4 + 0.4 + 0.25 (1.05), 0.5 + 0.4 + 0.3 (1.2).

Treatment – outline element (western site)

3.16 The highest pollution score for the outline element is also Medium (based on the higher traffic roads). As with the full element, sufficient upstream/roadside SuDS techniques will be included upstream of the sub-catchment infiltration facilities in order to match, or better the pollution score of 0.7, 0.6, and 0.7. In the case of the sub-catchments served by infiltration basins this would be readily achievable with permeable/porous surfacing, vegetated filter drains, SuDS planters, green gullies etc (all of which would have treatment scores part way between filter drains and bioretention facilities). For those sub-catchments served by crated soakaways (which offer little in the way of treatment at the point of discharge) two or more upstream SuDS features will be provided.

Maintenance

3.17 All proposals are subject to detailed design and the approval of relevant parties. Currently all roads are proposed as remaining unadopted by the County Council and hence they can be permeably surfaced. Maintenance of the private roads would be undertaken by a private management company (communally funded).

3.18 Maintenance of private on-plot features (permeably paved driveways) would be the responsibility of the respective homeowners. This responsibility would be included in the home buyers pack.

3.19 Maintenance of the network, upstream SuDS features, and infiltration features, will be undertaken by a private management company and/or sewerage undertaker or independent body under a NAV.

3.20 Suggested maintenance activities (to be built on at the later discharge of Conditions stage) are included in Appendices B and C.

4.0 Conclusions

4.1 The site is not at risk of flooding from a watercourse and is not considered to be at a significant or unmanageable risk of flooding from any of the other sources listed in the Flood and Water Management Act.

4.2 Surface water runoff will be treated and discharged via on-site infiltration via a number of sub-catchment SuDS components. The features are sized to manage the 1 in 100 annual probability storm inclusive of 40 % climate change allowance and urban creep. Half drain down times are within the 24 hour recommendation.

4.3 The surface water scheme will be maintained either privately (as part of a communally funded management company) and/or by the sewerage undertaker or independent body under a NAV.

Figures

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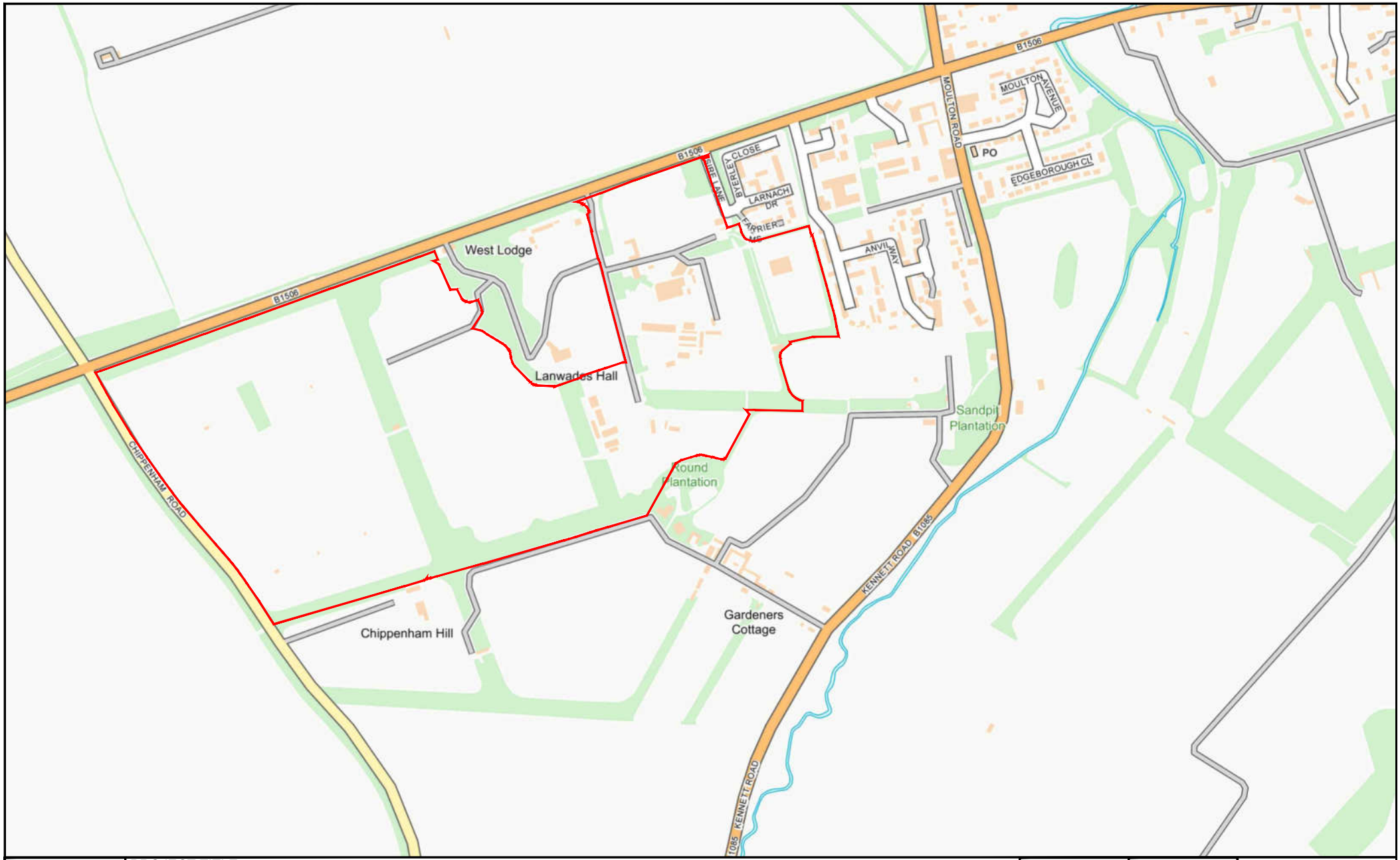

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SCALE @ A4 SIZE: D.N.S	SITE LOCATION PLAN			

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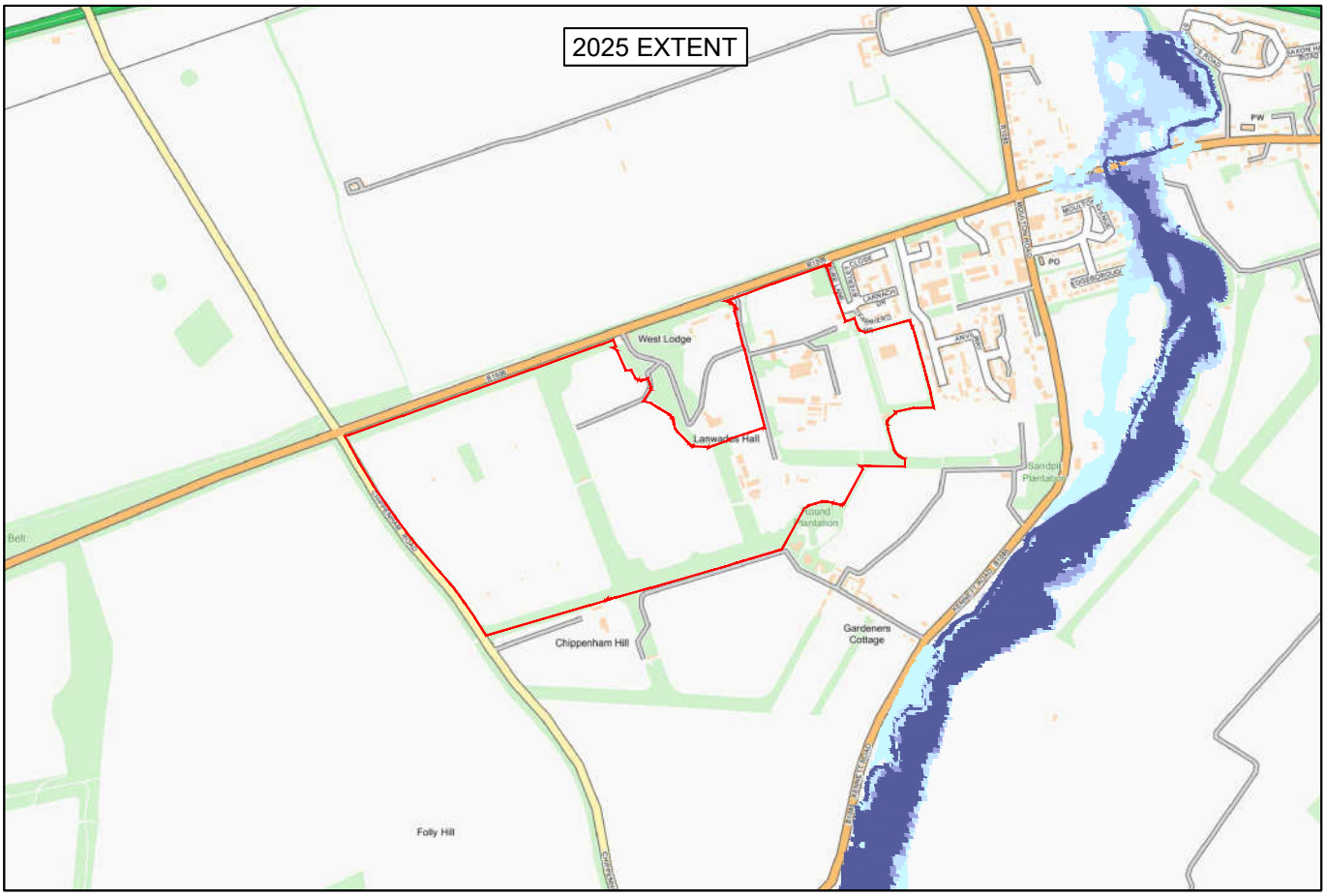

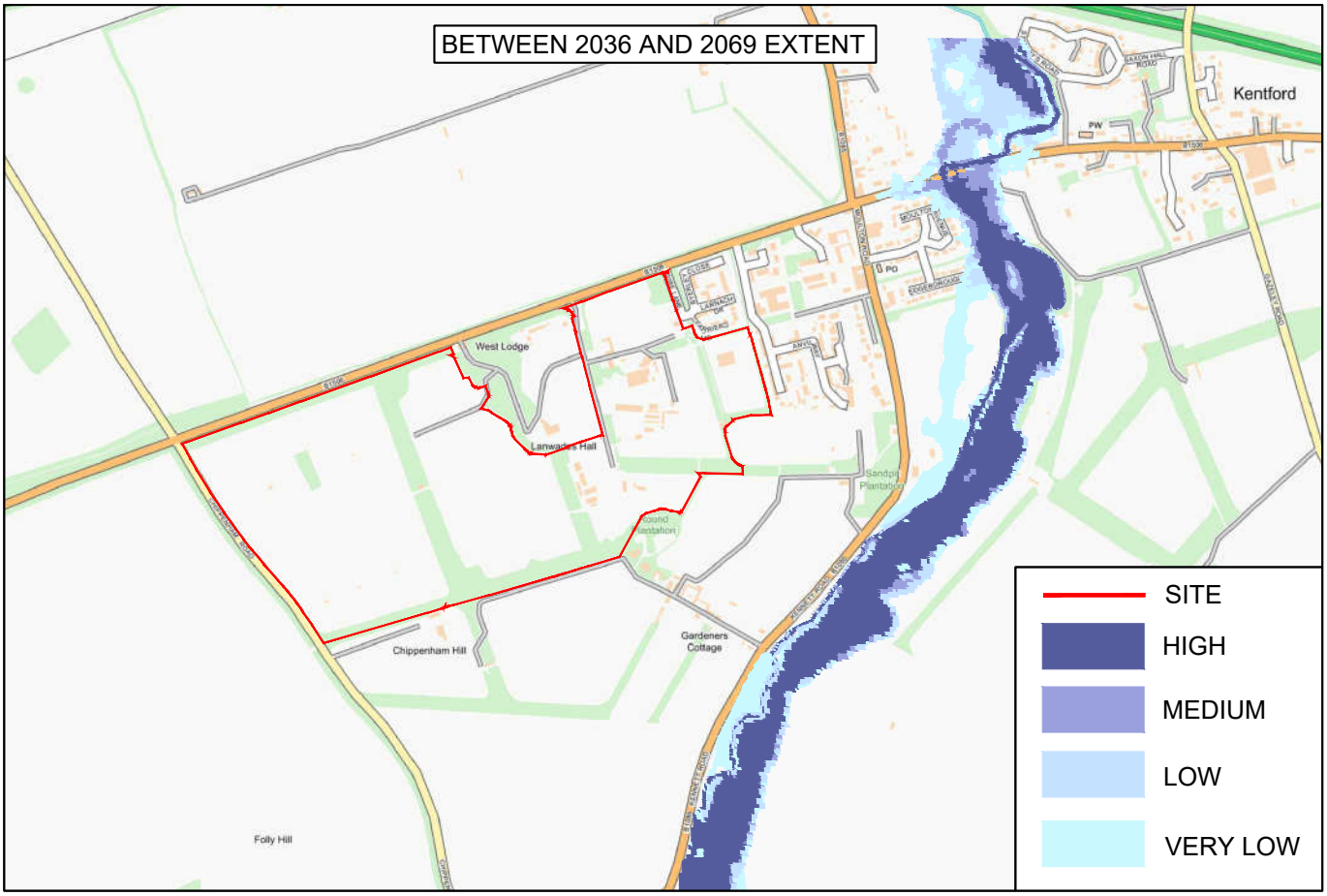

DATE 27.02.25	PROJECT TITLE LANWADES WOODLAND PARK, KENTFORD	DRAWING NUMBER	PROJECT NO.
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SCALE @ A4 SIZE D.N.S			cannon CONSULTING ENGINEERS

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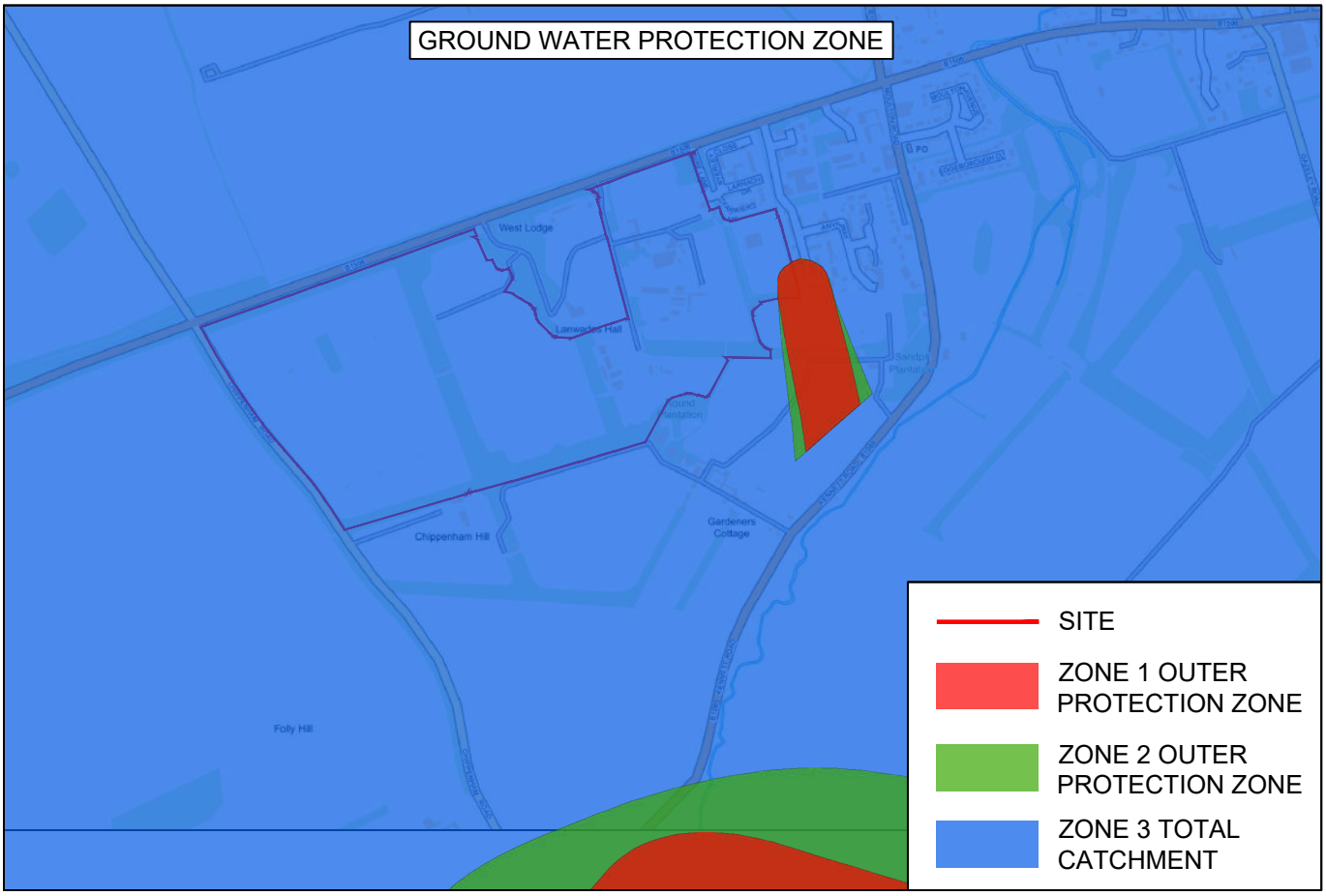

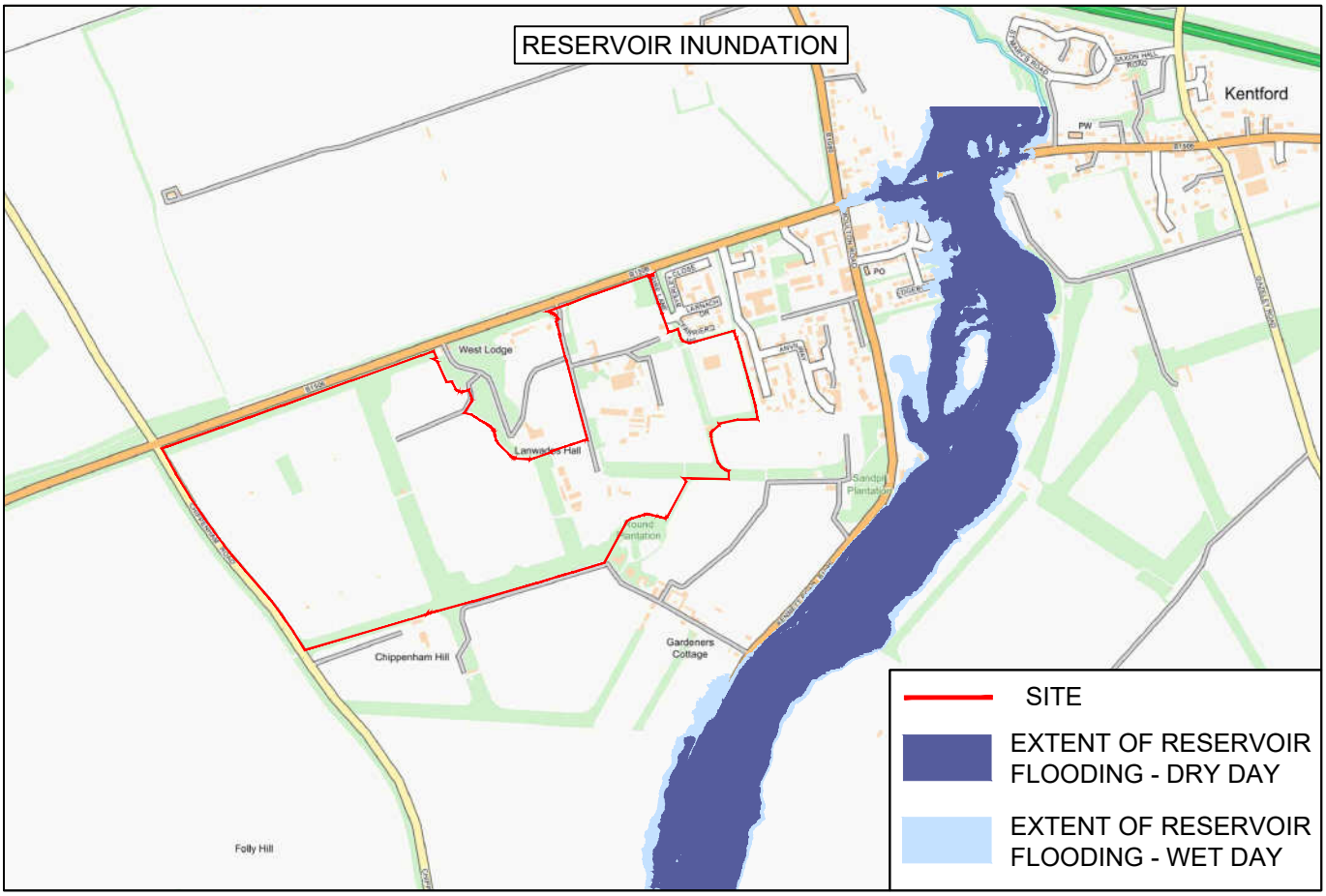

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SCALE @ A4 SIZE: D.N.S				

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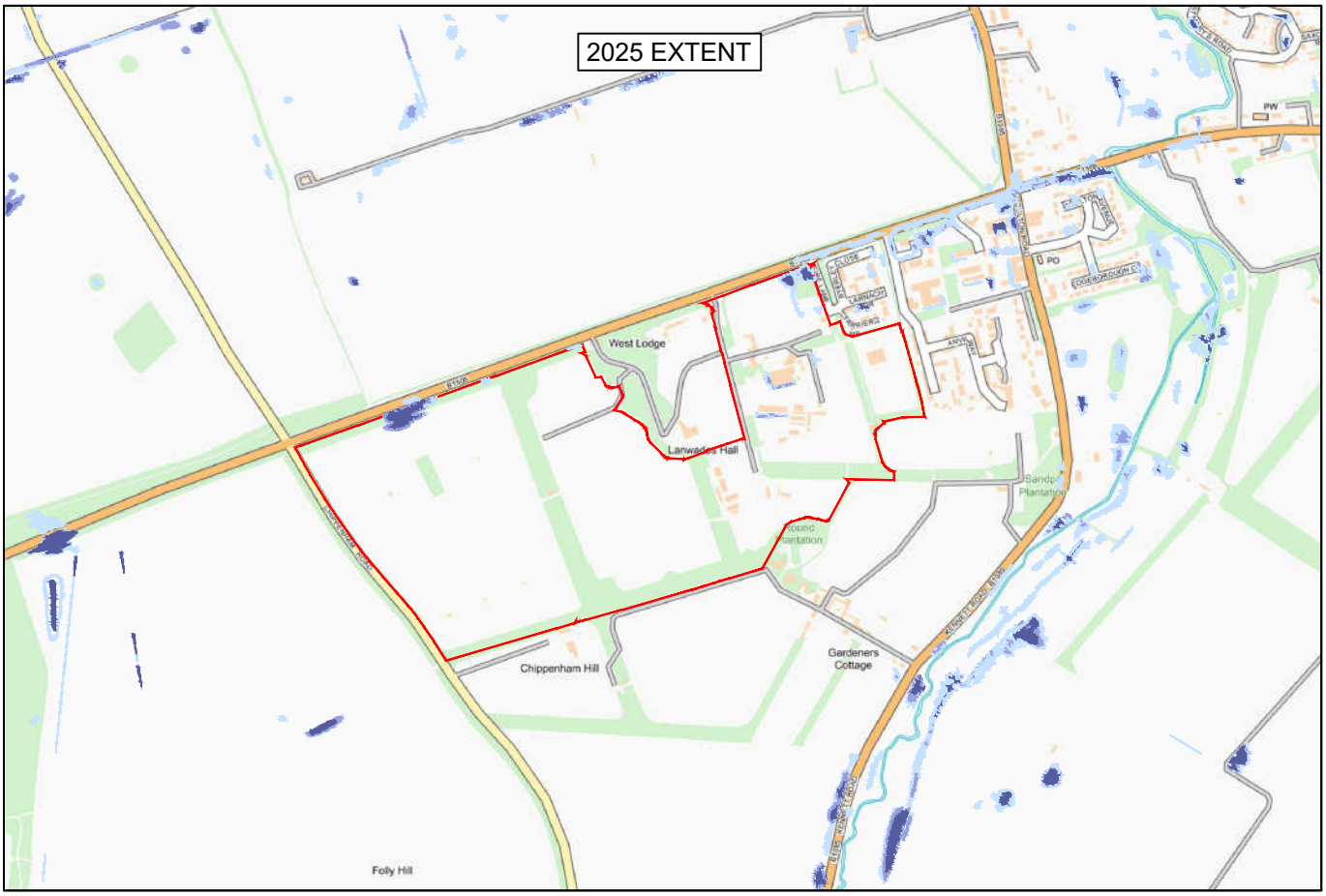

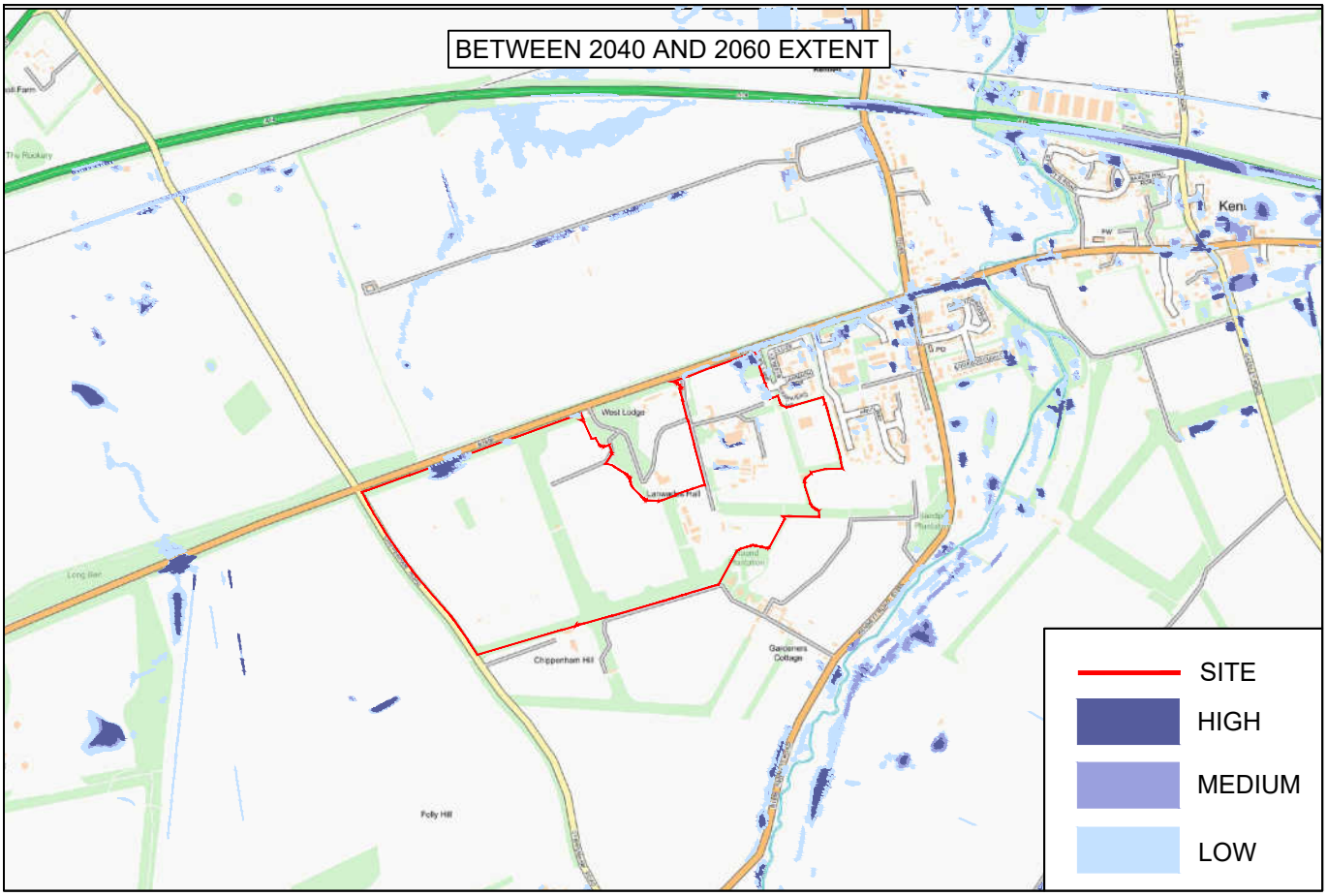

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DRAWN BY: JTH	FIGURE TITLE: SURFACE WATER FLOOD MAP			
SCALE @ A4 SIZE: D.N.S				

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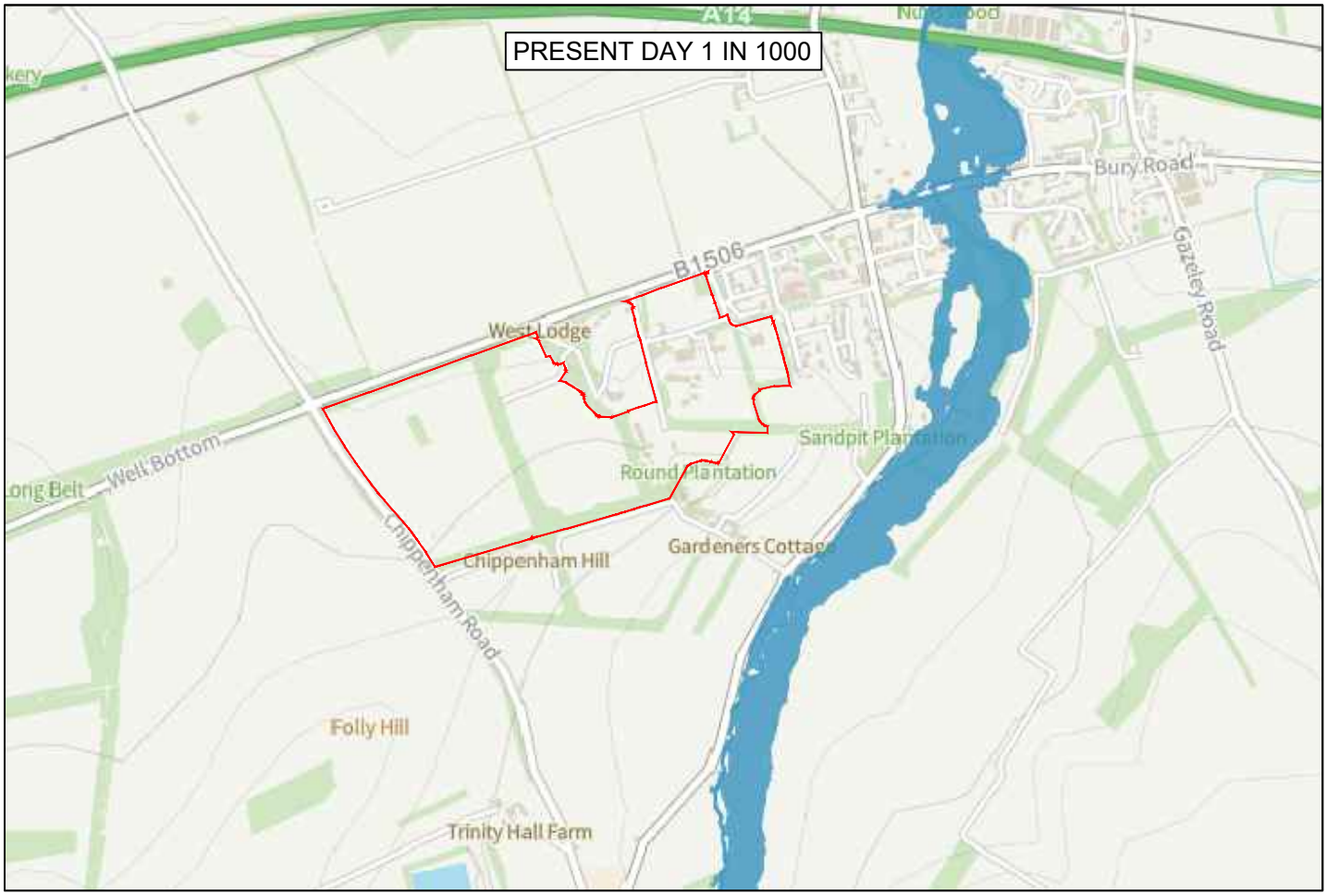

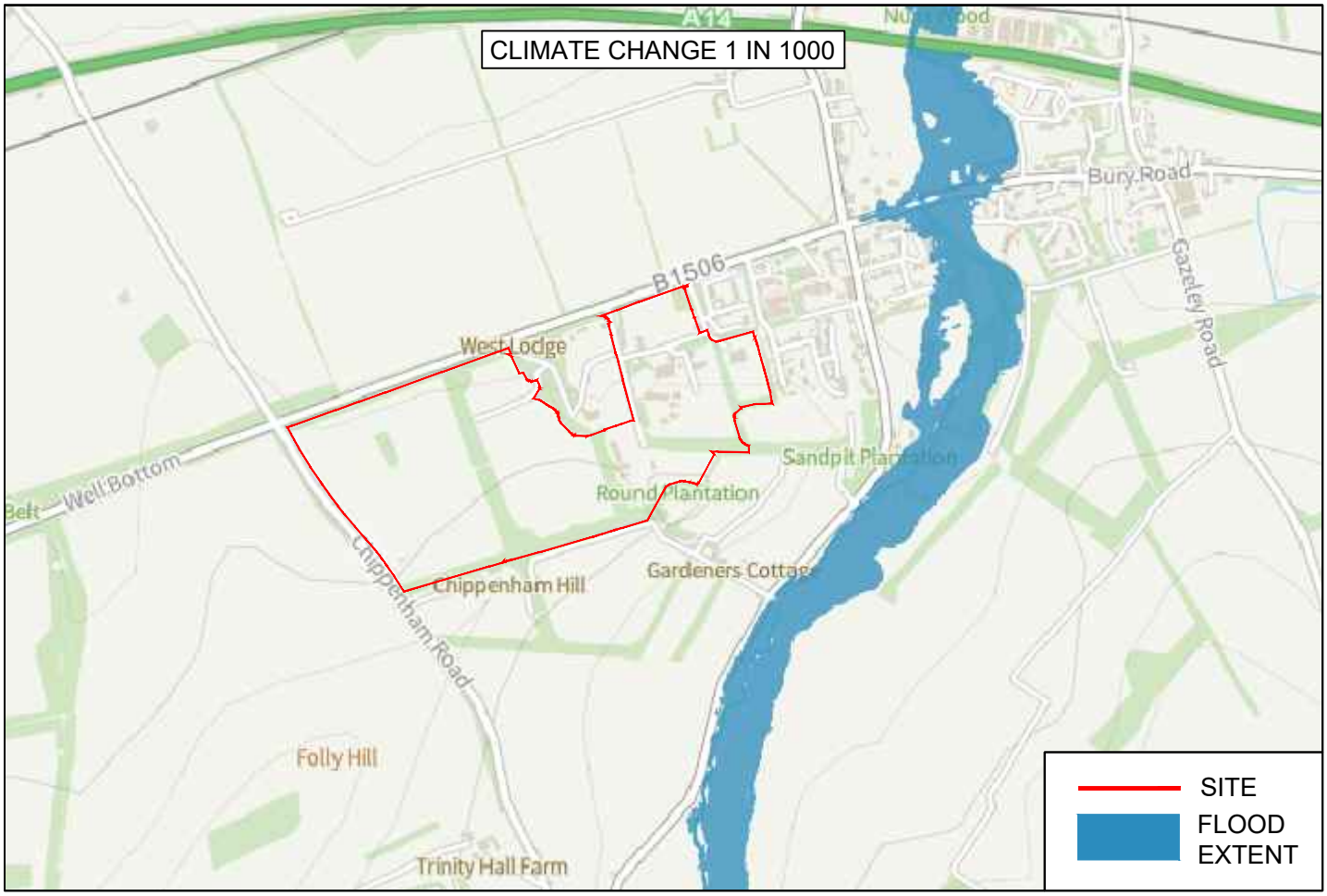

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DRAWN BY JTH	FIGURE TITLE	5	ZF261	cannon CONSULTING ENGINEERS
SCALE @ A4 SIZE D.N.S	FLOOD MAP FOR PLANNING RIVER AND SEA			

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Appendix A Existing Site

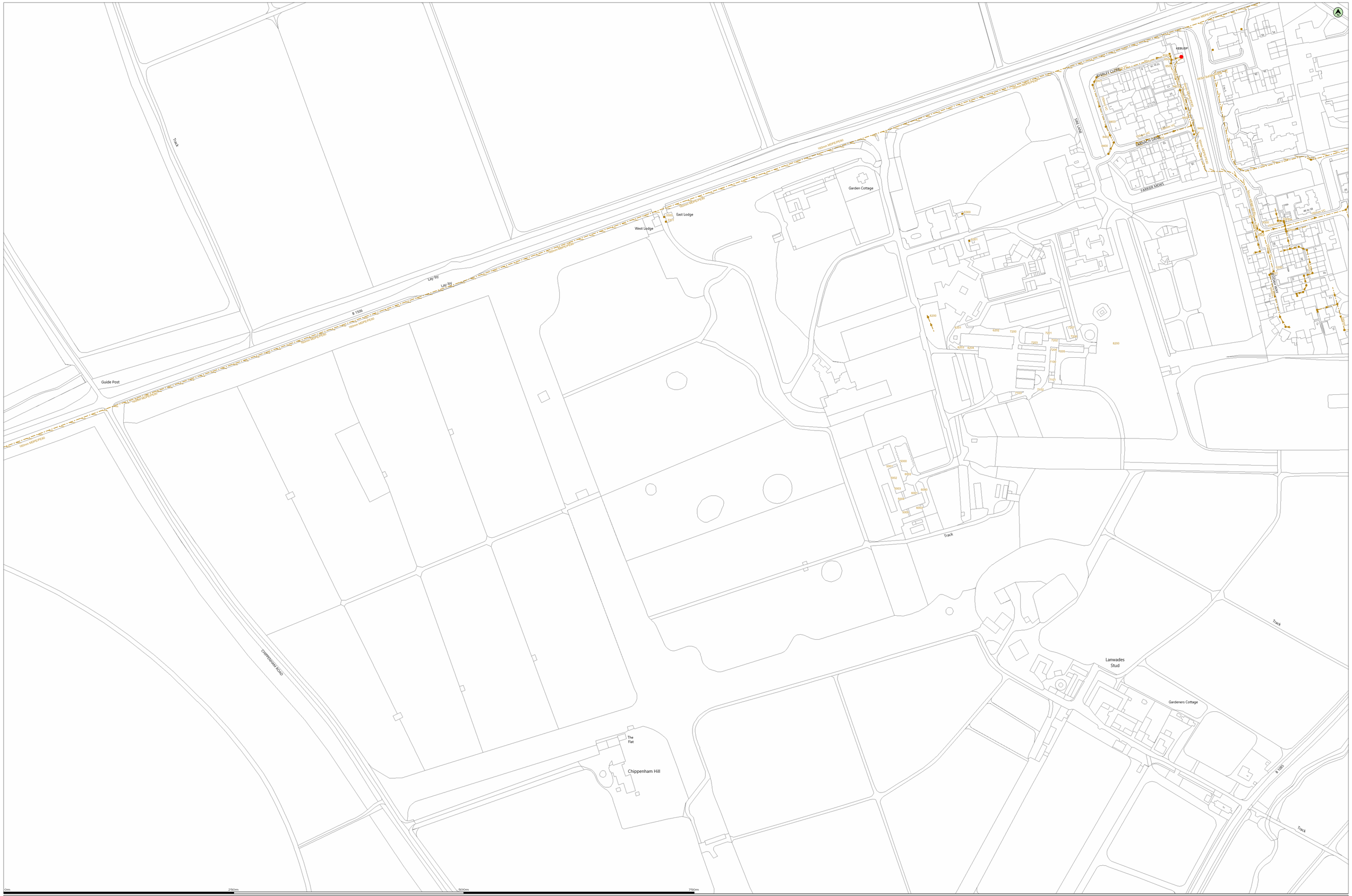
Topographical survey

Adopted sewer plans

Infiltration tests

British Geological Survey report

Lymeswes Business Park
Farm Cottage
Farm Cottage
Farm Cottage
Lymeswes Hall
Lymeswes Hall
Stable Yard
Stable Yard
Stable Yard



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Date: 05/12/24

Scale: 1:1250

Map Centre: 569356,266102

Data updated: 30/11/24

Our Ref: 1634593 - 1

Wastewater Plan AD
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Foul Sewer	Outfall*	Sewage Treatment Works	
Surface Sewer	Inlet*	Public Pumping Station	
Combined Sewer	Manhole*	Decommissioned Pumping Station	
Final Effluent			
Rising Main*			
Private Sewer*			
Decommissioned Sewer*			

*(Colour denotes effluent type)

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Animal Health Trust

love every drop
anglianwater

GEOSPHERE ENVIRONMENTAL

Our Ref: 9153,SK,Ltr01,JK,RS,24-01-25,V1 - Draft

Lochailort Kentford Ltd
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24 January 2025

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INFILTRATION TESTING AT LANWADES COUNTRY PARK, NEWMARKET, CB8 7UU

1. INTRODUCTION

This letter report has been prepared on behalf of Cannon Consulting Engineers for Lochailort Kentford Ltd.

The primary objective of this ground investigation was to assess the infiltration potential of the natural soils beneath the site.

This was achieved by:

- Excavating a number of machine-dug trial pits across the site.
- Undertaking soakage testing in line with BRE Digest 365 guidance.
- Undertaking infiltration calculations to allow for an assessment of the suitability of soakaways or infiltration techniques for the future development of the site.

It is assumed that the proposed development will comprise residential housing.

The purpose of this letter report is to provide factual data only.

2. SITE WORKS

2.1 Methodology

This ground investigation was carried out on the basis of the practices set out in BRE Digest 365, 'Soakaway Design'. 2016, which requires, in summary, a total of three infiltration tests to be undertaken in succession over a 24 hour period or tests to be undertaken on consecutive days.

The exploratory holes were positioned at Client supplied locations.

In general, where a test location showed limited or no infiltration, it was allowed to continue for circa 24 hours, the data obtained, and the test ceased. Where a test exhibited appreciable infiltration and the "75%" infiltration level was achieved, a further infiltration "run", or more was undertaken.

2.2 Scope

Site works were carried out between 8th and 9th January 2025, and comprised the following:

- Excavation of five machine excavated trial pits, (TP01 to TP05), to a maximum depth of 2.00mbgl.
- Undertaking infiltration testing in line with BRE Digest 365 guidance.
- Undertaking infiltration calculations to allow for an assessment of the suitability of soakaways for the future development of the site.

An Exploratory Hole Location Plan, Drawing ref. 9153,SK/001/Rev0, is presented at the end of this letter report in Appendix 4.

2.3 Ground Conditions Encountered

The sequence of the strata encountered during the investigation generally confirms the anticipated geology as interpreted from geological mapping.

The sequence and indicative thickness of strata are summarised in Table 1 overleaf, with the Exploratory Hole Logs provided in Appendix 2:

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Table 1 – Ground Conditions				
Strata	Depth Encountered (mgl)		Strata Thickness (m)	Location and Composition
	From	To		
Topsoil	0.00	0.32 – 0.40	0.32 – 0.40	**All exploratory locations:** A dark brown clayey gravelly organic sand. Gravel of fine and medium sub-angular and sub-rounded flint.
Superficial Deposits (Sand)	0.32 – 0.40	0.60 – 1.10	0.20 – 0.78	**All exploratory locations:** Orangish brown clayey gravelly sand. Gravel of fine and medium sub-angular and sub-rounded flint and chalk.
Chalk	0.60 – 1.10	2.00	Unproven	**All exploratory locations:** White structureless chalk, recovered as a gravel of medium sub-angular and sub-rounded chalk in a clay matrix.

2.4 Groundwater

No groundwater was encountered in any of the exploratory holes during the intrusive investigation.

2.5 Infiltration Testing Results

Soil infiltration testing was undertaken in accordance with BRE 365, 2016. The results are summarised in Table 2 below and are provided in full in Appendix 3, presented at the end of this letter report:

Table 2 – Summary of Soil Infiltration Results				
Location	Test 1 (m/s)	Test 2 (m/s)	Test 3 (m/s)	Notes
TP01	1.91x10-04	1.31x10-04	1.97x10-04	None
TP02	5.83x10-04	7.04x10-04	5.80x10-04	None
TP03	4.31x10-05	3.44x10-05	2.43x10-05	None
TP04	1.77x10-05	1.42x10-05	9.56x10-06	None
TP05	3.26x10-04	2.28x10-04	1.78x10-04	None

We trust the above is clear and acceptable. If you have any questions, please do not hesitate to contact us.

Yours sincerely

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Enclosures:

Appendix 1 – Report Limitations and Conditions
Appendix 2 – Exploratory Hole Logs
Appendix 3 – Infiltration Test Results
Appendix 4 – Drawings

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APPENDICES

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Appendix 1 – Report Limitations and Conditions

This report refers, within the limitations stated, to the condition of the site at the time of the inspections. No warranty is given as to the possibility of future changes in the condition of the site.

This report has been prepared for the sole use of the Client for the purposes described and no extended duty of care to any third party is implied or offered. Third parties using any information contained within this report do so at their own risk.

This report is prepared and written for the use stated herein; it should not be used for any other purposes without reference to Geosphere Environmental Limited. The report has been prepared in relation to the proposed end-use, should another end-use be intended, a further re-assessment may be required. It is likely that over time practises will improve and the relevant guidance and legislation be amended or superseded, which may necessitate a re-assessment of the site.

The accuracy of any map extracts cannot be guaranteed. It is possible that different conditions existed on site, between and subsequent to the various map surveys appended.

Whilst the report may express an opinion on possible configurations of strata between or beyond exploratory holes discussed or on the possible presence of features based on visual, verbal or published evidence, this is for guidance only and no liability can be accepted for its accuracy.

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Appendix 2 – Exploratory Hole Logs

Trial Pit Logs

TP01 – TP05

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Geosphere Environmental Ltd
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IP10 0BJ
Telephone: 01603 298076

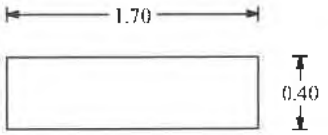
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Lanwades Country Park	Lochailort Kentford Ltd	TP01

Job No	Date	Ground Level (m)	Coordinates/Grid Reference ()
9153,SK	08-01-25	39.00	TL 69705 66458

Fieldwork By	Logged By	Sheet
GEL	FW	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.32	Dark brown slightly silty gravelly ORGANIC SAND. Sand is fine and medium, gravel of fine and medium sub-angular and sub-rounded flint with fine active and inactive roots. [TOPSOIL]				
0.32-1.10	Dark orangish brown slighty gravelly SAND. Sand is fine and medium, gravel of fine and medium sub-rounded and sub-angular flint and chalk.				
1.10-2.00	Off-white structureless CHALK recovered as a slightly clayey sandy gravel of chalk.				
2.00	END OF EXPLORATORY HOLE				



Shoring/Support: GRAVEL
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used 2.7T Mechanical Excavator	Checked By JK

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GEL AGS TP BETA 9153.SK. LANWADES COUNTRY PARK.GPJ GINT STD AGS 3_1.GDT 24/1/25

Geosphere Environmental Ltd
Unit 11 Brightwell Barns
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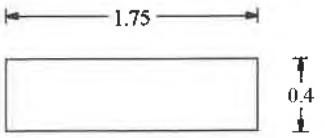
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Lanwades Country Park	Lochailort Kentford Ltd	TP02

Job No	Date	Ground Level (m)	Coordinates/Grid Reference ()
9153,SK	08-01-25	39.00	TL 69626 66433

Fieldwork By	Logged By	Sheet
GEL	FW	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.36	Dark brown slightly silty gravelly ORGANIC SAND. Sand is fine and medium, gravel of fine and medium sub-angular and sub-rounded flint with fine active and inactive roots. [TOPSOIL]				
0.36-0.68	Dark orangish brown slighty gravelly SAND. Sand is fine and medium, gravel of fine and medium sub-rounded and sub-angular flint and chalk.				
0.68-2.00	Off-white and light brown structureless CHALK recovered as a slightly sandy slightly clayey putty matrix. Gravel of fine and medium sub-angular and sub-rounded flint.				
2.00	END OF EXPLORATORY HOLE				



Shoring/Support: GRAVEL
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used 2.7T Mechanical Excavator	Checked By JK

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GEL AGS TP BETA 9153.SK, LANWADES COUNTRY PARK.GPJ GINT STD AGS 3_1.GDT 24/1/25

Geosphere Environmental Ltd
Unit 11 Brightwell Barns
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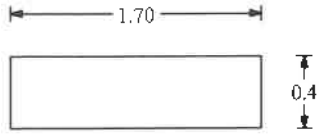
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Lanwades Country Park	Lochailort Kentford Ltd	TP03

Job No	Date	Ground Level (m)	Coordinates/Grid Reference ()
9153,SK	08-01-25	41.00	TL 69301 66285

Fieldwork By	Logged By	Sheet
GEL	FW	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.38	Dark brown slightly gravelly slightly clayey ORGANIC SAND. Sand is fine and medium, gravel of fine and medium sub-angular and sub-rounded flint with fine active and inactive roots. [TOPSOIL]				
0.38-1.00	Light orangish brown slightly clayey gravelly SAND. Sand is fine and medium, gravel of fine to coarse sub-rounded and sub-angular flint and chalk.				
1.00-2.00	Off-white structureless CHALK, recovered as a fine to coarse sub-angular and sub-rounded gravel of chalk in a clay matrix.				
2.00	END OF EXPLORATORY HOLE				



Shoring/Support: GRAVEL
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used 2.7T Mechanical Excavator	Checked By JK

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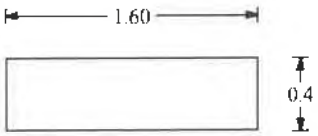
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Lanwades Country Park	Lochailort Kentford Ltd	TP04

Job No	Date	Ground Level (m)	Coordinates/Grid Reference ()
9153,SK	08-01-25	41.00	TL 69030 66179

Fieldwork By	Logged By	Sheet
GEL	FW	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.40	Dark brown slightly gravelly slightly clayey ORGANIC SAND. Sand is fine and medium, gravel of fine and medium sub-angular and sub-rounded flint with fine active and inactive roots. [TOPSOIL]				
0.40-0.60	Dark orangish brown slightly clayey slightly gravelly SAND. Sand is fine and medium, gravel of fine to coarse sub-rounded and sub-angular flint and chalk.				
0.60-1.20	Off white mottled light brown structureless CHALK recovered as a sandy gravel of chalk in a putty matrix. Occasional medium sub-angular and sub-rounded flint gravel.				
1.20-2.00	White structureless CHALK recovered as a gravel of medium sub-angular and sub-rounded chalk in a clay matrix (dm).				
2.00	END OF EXPLORATORY HOLE				



Shoring/Support: GRAVEL
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used 2.7T Mechanical Excavator	Checked By JK

GEL AGS TP BETA 9153,SK, LANWADES COUNTRY PARK.GPJ GINT STD AGS 3 1.GDT 24/1/25

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Geosphere Environmental Ltd
Unit 11 Brightwell Barns
IP10 0BJ
Telephone: 01603 298076

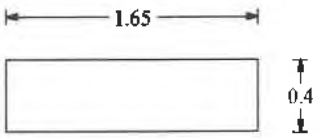
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Lanwades Country Park	Lochailort Kentford Ltd	TP05

Job No	Date	Ground Level (m)	Coordinates/Grid Reference ()
9153,SK	08-01-25	41.00	TL 68865 66121

Fieldwork By	Logged By	Sheet
GEL	FW	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.40	Dark brown slightly gravelly slightly clayey ORGANIC SAND. Sand is fine and medium, gravel of fine and medium sub-angular and sub-rounded flint with fine active and inactive roots. [TOPSOIL]				
0.40-0.60	Dark orangish brown slightly clayey slightly gravelly SAND. Sand is fine and medium, gravel of fine to coarse sub-rounded and sub-angular flint and chalk.				
0.60-1.40	Off white mottled light brown structureless CHALK recovered as a sandy gravel of chalk in a putty matrix. Occasional medium sub-angular and sub-rounded flint gravel.				
1.40-2.00	White structureless CHALK recovered as a gravel of medium sub-angular and sub-rounded chalk in a clay matrix (dm).				
2.00	END OF EXPLORATORY HOLE				



Shoring/Support: GRAVEL
Stability: STABLE

All dimensions in metres Scale 1:20.8333333333333	Method Trial Pit/trench	Plant Used 2.7T Mechanical Excavator	Checked By JK

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GEL AGS TP BETA 9153.SK LANWADES COUNTRY PARK.GPJ GINT STD AGS 3_1.GDT 24/1/25

Appendix 3 – Infiltration Test Results

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TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 9153,SK

Date: 22/01/2025

Project Name: Lanwades Country Park, Newmarket, CB8 7UU

Time [min]	Depth to Water [mbgl]
0	1.50
0.5	1.68
1	1.73
1.5	1.77
2	1.81
2.5	1.84
3	1.88
3.5	1.90
4	1.91

Pit Size [m]		
Length	Width	Depth
1.70	0.40	2.00

Infiltration Rate Calculations		
Parameter	Unit	Result
	height	
h_{75}	[m]	1.875
h_{25}	[m]	1.625
$h_{75}-h_{25}$	[m]	0.250
	time	
t_{75}	[s]	174.00
t_{25}	[s]	19.80
$t_{75} - t_{25}$	[s]	154.20
	effective volume	
v_{75-25}	[m^3]	0.051
	effective area	
ap_{50}	[m^2]	1.730
	soil infiltration rate	
f	[m/s]	1.91E-04

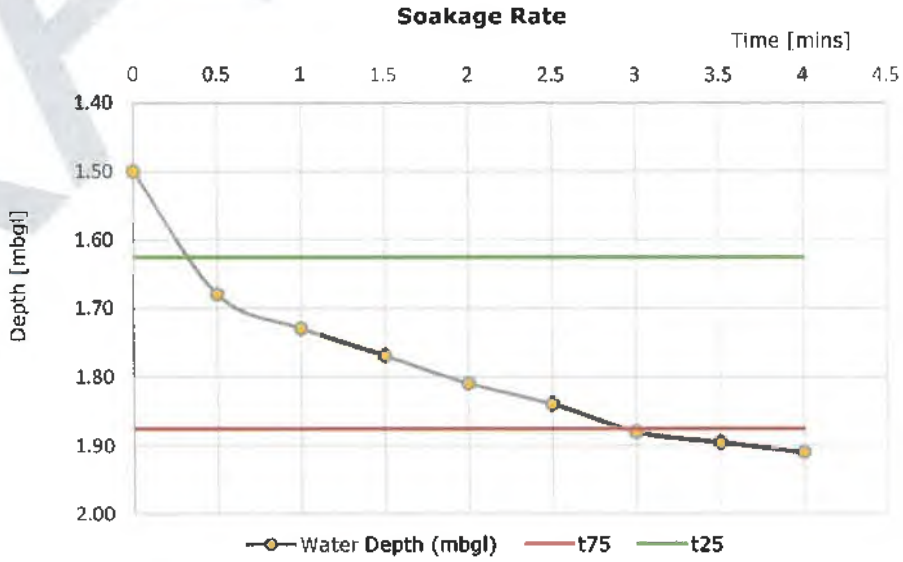
Trial Pit TP01

Run 1 of 3

Test Date 08/01/2025

Groundwater Encountered: N/A

Remarks: Backfilled with gravel. Effective volume multiplied by the voids ratio of the gravel (0.3).



Calculated by: JK

Checked by: RS

DRAFT

TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 9153,SK

Date: 22/01/2025

Project Name: Lanwades Country Park, Newmarket, CB8 7UU

Time [min]	Depth to Water [mbgl]
0	1.50
0.5	1.56
1	1.65
1.5	1.72
2	1.75
2.5	1.79
3	1.82
3.5	1.84
4	1.85
4.5	1.87
5	1.90

Pit Size [m]		
Length	Width	Depth
1.70	0.40	2.00

Infiltration Rate Calculations		
Parameter	Unit	Result
	height	
h_{75}	[m]	1.875
h_{25}	[m]	1.625
$h_{75}-h_{25}$	[m]	0.250
	time	
t_{75}	[s]	276.00
t_{25}	[s]	51.00
$t_{75} - t_{25}$	[s]	225.00
	effective volume	
v_{75-25}	[m³]	0.051
	effective area	
ap_{50}	[m²]	1.730
	soil infiltration rate	
f	[m/s]	1.31E-04

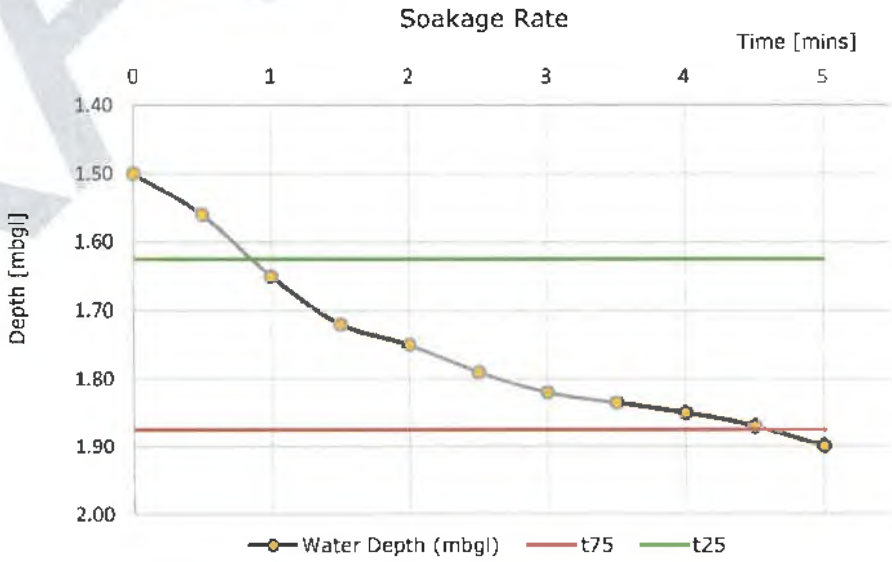
Trial Pit TP01

Run 2 of 3

Test Date 08/01/2025

Groundwater Encountered: N/A

Remarks: Backfilled with gravel. Effective volume multiplied by the voids ratio of the gravel (0.3).



Calculated by: JK

Checked by: RS

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TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

GEO

Project Number: 9153,SK

Date: 22/01/2025

Project Name: Lanwades Country Park, Newmarket, CB8 7UU

Time [min]	Depth to Water [mbgl]
0	1.50
0.5	1.56
1	1.65
1.5	1.71
2	1.75
2.5	1.79
3	1.84
3.5	1.89
4	1.92
4.5	1.94

Pit Size [m]		
Length	Width	Depth
1.70	0.40	2.00

Infiltration Rate Calculations		
Parameter	Unit	Result
	height	
h_{75}	[m]	1.875
h_{25}	[m]	1.625
h_{75}-h_{25}	[m]	0.250
	time	
t_{75}	[s]	198.00
t_{25}	[s]	48.00
t_{75} - t_{25}	[s]	150.00
	effective volume	
v_{75-25}	[m^3]	0.051
	effective area	
ap_{50}	[m^2]	1.730
	soil infiltration rate	
f	[m/s]	1.97E-04

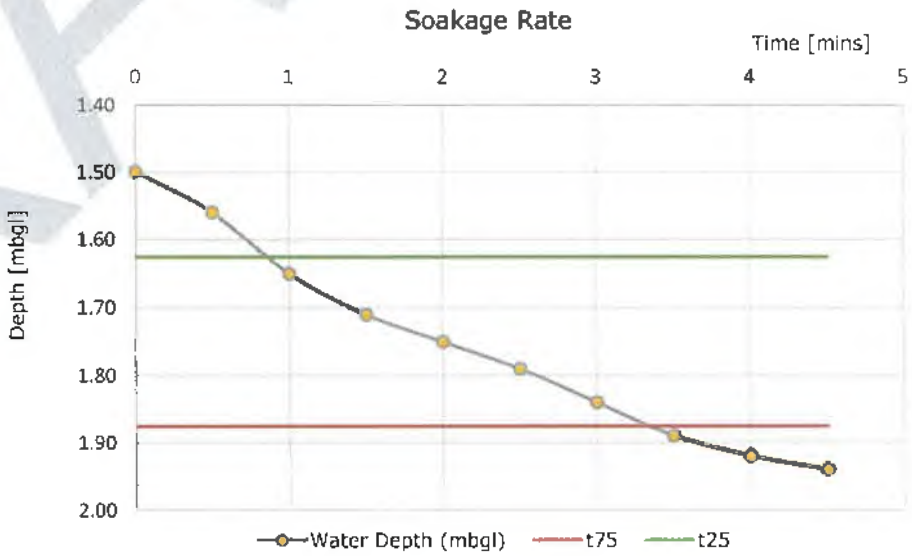
Trial Pit TP01

Run 3 of 3

Test Date 09/01/2025

Groundwater Encountered: N/A

Remarks: Backfilled with gravel. Effective volume multiplied by the voids ratio of the gravel (0.3).



Calculated by: JK

Checked by: RS

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TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 9153,SK

Date: 22/01/2025

Project Name: Lanwades Country Park, Newmarket, CB8 7UU

Time [min]	Depth to Water [mbgl]
0	1.50
0.5	1.66
1	1.81
1.5	1.96

Pit Size [m]		
Length	Width	Depth
1.75	0.40	2.00

Infiltration Rate Calculations		
Parameter	Unit	Result
	height	
h_{75}	[m]	1.875
h_{25}	[m]	1.625
h_{75}-h_{25}	[m]	0.250
	time	
t_{75}	[s]	73.50
t_{25}	[s]	22.80
t_{75} - t_{25}	[s]	50.70
	effective volume	
v_{75-25}	[m^3]	0.053
	effective area	
ap_{50}	[m^2]	1.775
	soil infiltration rate	
f	[m/s]	5.83E-04

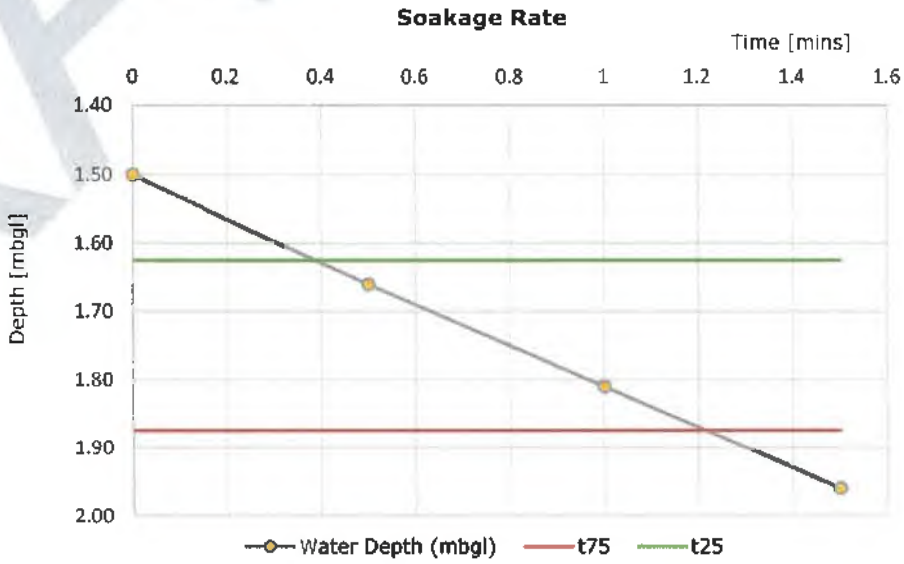
Trial Pit TP02

Run 1 of 3

Test Date 09/01/2025

Groundwater Encountered: N/A

Remarks: Backfilled with gravel. Effective volume multiplied by the voids ratio of the gravel (0.3).



Calculated by: JK

Checked by: RS

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TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 9153,SK

Date: 22/01/2025

Project Name: Lanwades Country Park, Newmarket, CB8 7UU

Time [min]	Depth to Water [mbgl]
0	1.50
0.33	1.59
0.66	1.71
1	1.83
1.33	1.94

Pit Size [m]		
Length	Width	Depth
1.75	0.40	2.00

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
h_{75}	[m]	1.875
h_{25}	[m]	1.625
h_{75}-h_{25}	[m]	0.250
time		
t_{75}	[s]	67.20
t_{25}	[s]	25.20
t_{75} - t_{25}	[s]	42.00
effective volume		
V_{75-25}	[m^3]	0.053
effective area		
ap_{50}	[m^2]	1.775
soil infiltration rate		
f	[m/s]	7.04E-04

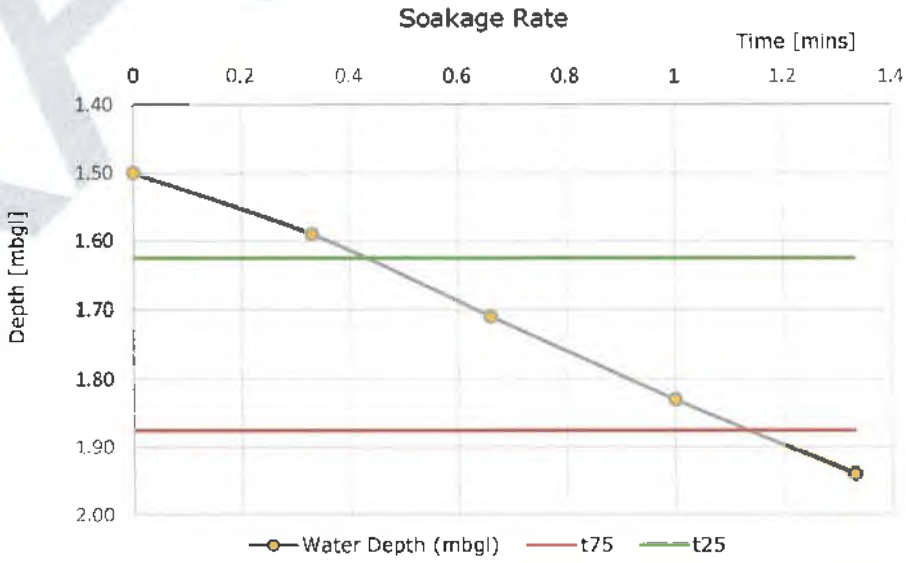
Trial Pit TP02

Run 2 of 3

Test Date 09/01/2025

Groundwater Encountered: N/A

Remarks: Backfilled with gravel. Effective volume multiplied by the voids ratio of the gravel (0.3).



Calculated by: JK

Checked by: RS

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TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

GEO

Project Number: 9153,SK

Date: 22/01/2025

Project Name: Lanwades Country Park, Newmarket, CB8 7UU

Time [min]	Depth to Water [mbgl]
0	1.50
0.16	1.56
0.33	1.62
0.5	1.66
0.66	1.71
0.83	1.76
1	1.81
1.16	1.86
1.33	1.91
1.5	1.96
1.66	2.00

Pit Size [m]		
Length	Width	Depth
1.75	0.40	2.00

Infiltration Rate Calculations		
Parameter	Unit	Result
	height	
h_{75}	[m]	1.875
h_{25}	[m]	1.625
h_{75}-h_{25}	[m]	0.250
	time	
t_{75}	[s]	72.00
t_{25}	[s]	21.00
t_{75} - t_{25}	[s]	51.00
	effective volume	
v_{75-25}	[m^3]	0.053
	effective area	
ap_{50}	[m^2]	1.775
	soil infiltration rate	
f	[m/s]	5.80E-04

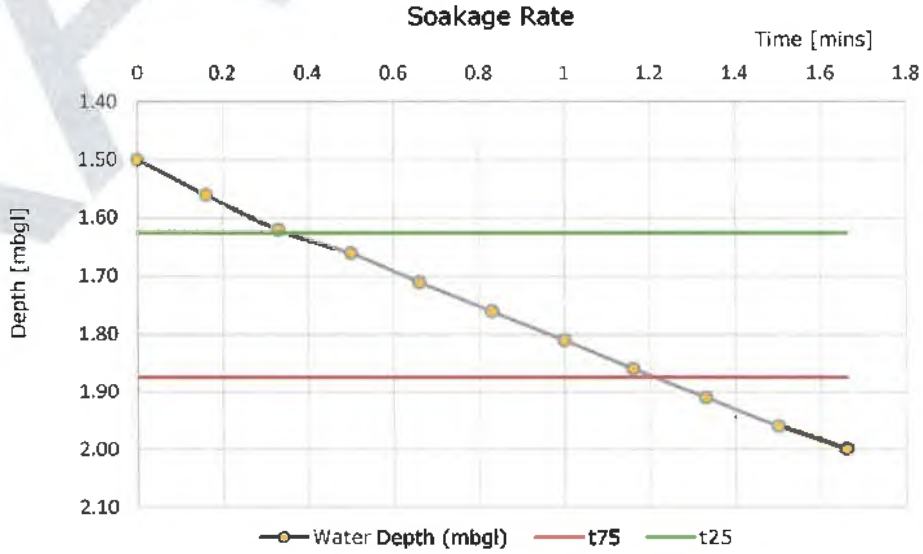
Trial Pit TP02

Run 3 of 3

Test Date 09/01/2025

Groundwater Encountered: N/A

Remarks: Backfilled with gravel. Effective volume multiplied by the voids ratio of the gravel (0.3).



Calculated by: JK

Checked by: RS

DRAFT

TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 9153,SK

Date: 22/01/2025

Project Name: Lanwades Country Park, Newmarket, CB8 7UU

Time [min]	Depth to Water [mbgl]
0	1.50
0.5	1.58
1	1.62
2	1.67
3	1.72
4	1.75
5	1.77
10	1.85
14	1.89

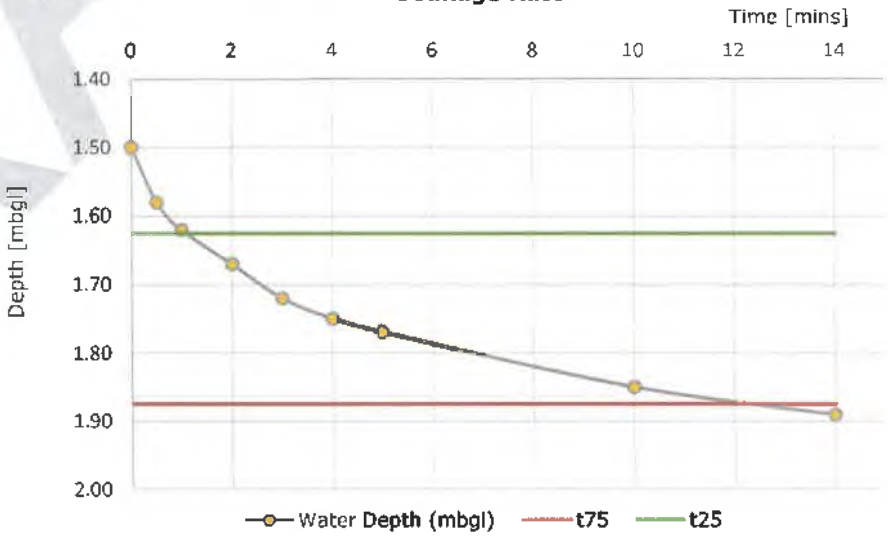
Pit Size [m]		
Length	Width	Depth
1.70	0.40	2.00

Infiltration Rate Calculations		
Parameter	Unit	Result
	height	
h_{75}	[m]	1.875
h_{25}	[m]	1.625
h_{75}-h_{25}	[m]	0.250
	time	
t_{75}	[s]	750.00
t_{25}	[s]	66.00
t_{75} - t_{25}	[s]	684.00
	effective volume	
V_{75-25}	[m³]	0.051
	effective area	
ap_{50}	[m²]	1.730
	soil infiltration rate	
f	[m/s]	4.31E-05

Trial Pit	TP03
Run	1 of 3
Test Date	09/01/2025
Groundwater Encountered:	N/A

Remarks: Backfilled with gravel. Effective volume multiplied by the voids ratio of the gravel (0.3).

Soakage Rate



Calculated by: JK

Checked by: RS

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TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 9153,SK

Date: 22/01/2025

Project Name: Lanwades Country Park, Newmarket, CB8 7UU

Time [min]	Depth to Water [mbgl]
0	1.50
1	1.61
2	1.67
3	1.71
4	1.74
5	1.76
10	1.83
15	1.87
19	1.90

Pit Size [m]		
Length	Width	Depth
1.70	0.40	2.00

Infiltration Rate Calculations		
Parameter	Unit	Result
	height	
h_{75}	[m]	1.875
h_{25}	[m]	1.625
$h_{75}-h_{25}$	[m]	0.250
	time	
t_{75}	[s]	930.00
t_{25}	[s]	72.00
$t_{75} - t_{25}$	[s]	858.00
	effective volume	
v_{75-25}	[m³]	0.051
	effective area	
ap_{50}	[m²]	1.730
	soil infiltration rate	
f	[m/s]	3.44E-05

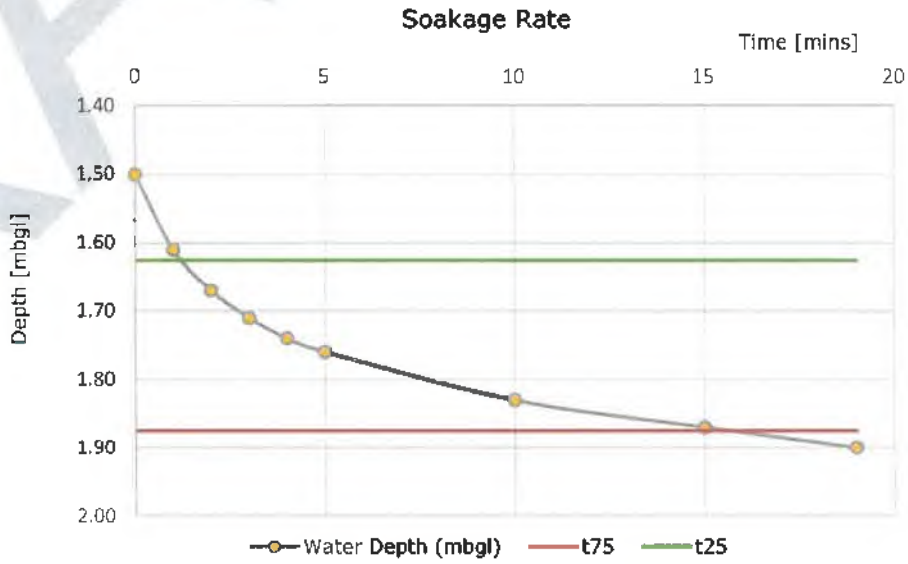
Trial Pit TP03

Run 2 of 3

Test Date 09/01/2025

Groundwater Encountered: N/A

Remarks: Backfilled with gravel. Effective volume multiplied by the voids ratio of the gravel (0.3).



Calculated by: JK

Checked by: RS

DRAFT

TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 9153,SK

Date: 22/01/2025

Project Name: Lanwades Country Park, Newmarket, CB8 7UU

Time [min]	Depth to Water [mbgl]
0	1.50
1	1.58
2	1.64
3	1.67
4	1.70
5	1.73
10	1.80
15	1.84
20	1.86
25	1.90

Pit Size [m]		
Length	Width	Depth
1.70	0.40	2.00

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
h_{75}	[m]	1.875
h_{25}	[m]	1.625
h_{75}-h_{25}	[m]	0.250
time		
t_{75}	[s]	1320.00
t_{25}	[s]	108.00
t_{75} - t_{25}	[s]	1212.00
effective volume		
V_{75-25}	[m³]	0.051
effective area		
ap_{50}	[m²]	1.730
soil infiltration rate		
f	[m/s]	2.43E-05

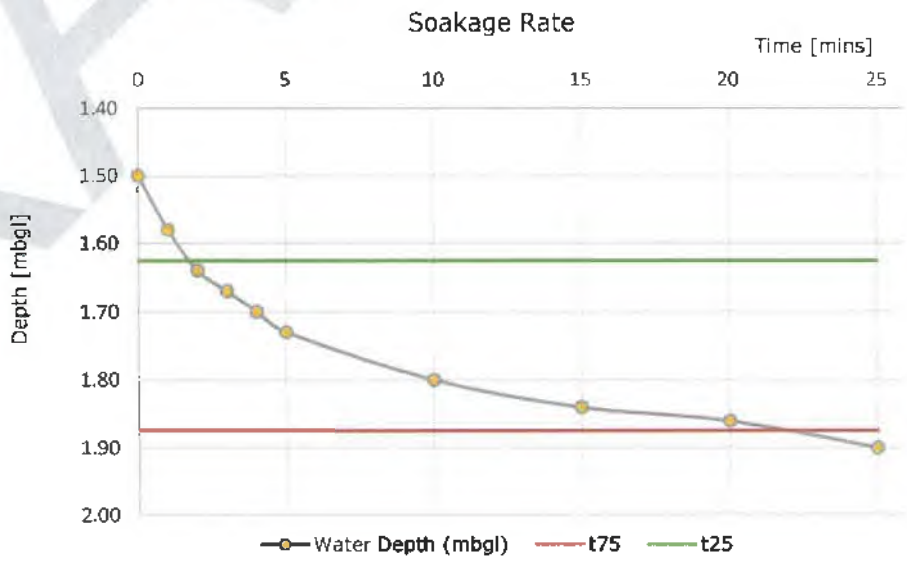
Trial Pit TP03

Run 3 of 3

Test Date 09/01/2025

Groundwater Encountered: N/A

Remarks: Backfilled with gravel. Effective volume multiplied by the voids ratio of the gravel (0.3).



Calculated by: JK

Checked by: RS

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TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

GEO

Project Number: 9153,SK

Date: 22/01/2025

Project Name: Lanwades Country Park, Newmarket, CB8 7UU

Time [min]	Depth to Water [mbgl]
0	1.50
1	1.56
2	1.61
3	1.64
4	1.67
5	1.71
10	1.74
15	1.79
20	1.82
25	1.85
30	1.88
32	1.89

Pit Size [m]		
Length	Width	Depth
1.60	0.40	2.00

Infiltration Rate Calculations		
Parameter	Unit	Result
	height	
h_{75}	[m]	1.875
h_{25}	[m]	1.625
$h_{75}-h_{25}$	[m]	0.250
	time	
t_{75}	[s]	1800.00
t_{25}	[s]	150.00
$t_{75} - t_{25}$	[s]	1650.00
	effective volume	
v_{75-25}	[m³]	0.048
	effective area	
ap_{50}	[m²]	1.640
	soil infiltration rate	
f	[m/s]	1.77E-05

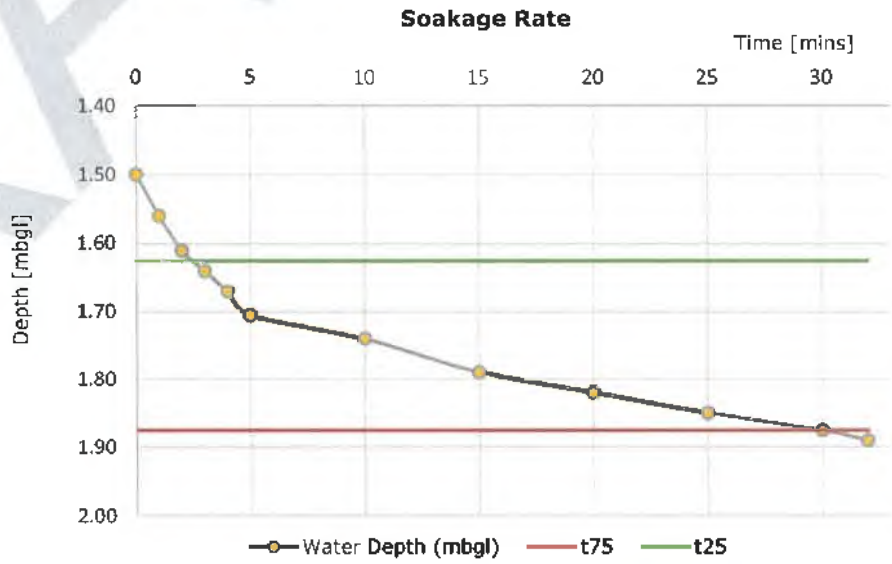
Trial Pit TP04

Run 1 of 3

Test Date 09/01/2025

Groundwater Encountered: N/A

Remarks: Backfilled with gravel. Effective volume multiplied by the voids ratio of the gravel (0.3).



Calculated by: JK

Checked by: RS

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TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 9153,SK

Date: 22/01/2025

Project Name: Lanwades Country Park, Newmarket, CB8 7UU

Time [min]	Depth to Water [mbgl]
0	1.50
1	1.56
2	1.60
3	1.64
4	1.66
5	1.68
10	1.72
15	1.76
30	1.85
38	1.88
40	1.90

Pit Size [m]		
Length	Width	Depth
1.60	0.40	2.00

Infiltration Rate Calculations		
Parameter	Unit	Result
height		
h_{75}	[m]	1.875
h_{25}	[m]	1.625
$h_{75}-h_{25}$	[m]	0.250
time		
t_{75}	[s]	2220.00
t_{25}	[s]	156.00
$t_{75} - t_{25}$	[s]	2064.00
effective volume		
v_{75-25}	[m^3]	0.048
effective area		
ap_{50}	[m^2]	1.640
soil infiltration rate		
f	[m/s]	1.42E-05

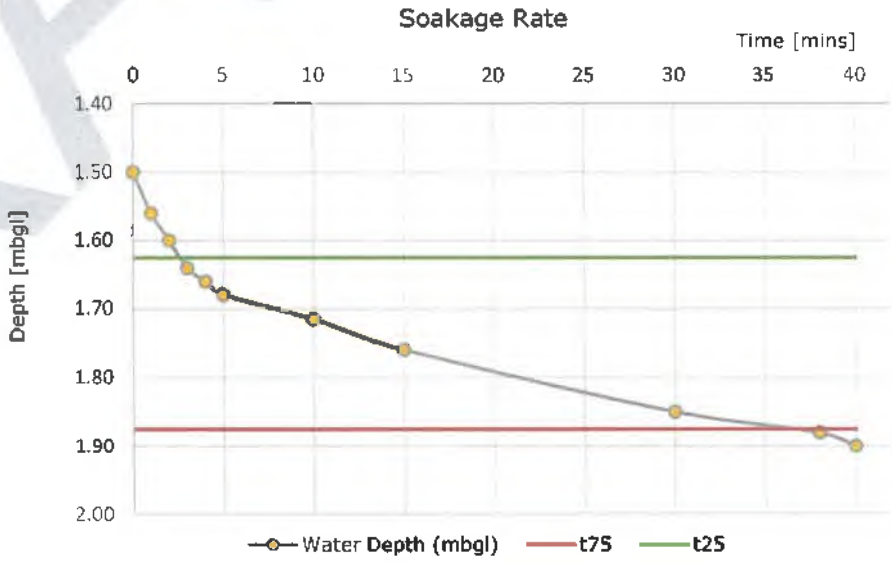
Trial Pit TP04

Run 2 of 3

Test Date 09/01/2025

Groundwater Encountered: N/A

Remarks: Backfilled with gravel. Effective volume multiplied by the voids ratio of the gravel (0.3).



Calculated by: JK

Checked by: RS

DRAFT

TRIAL PIT INFILTRATION TEST - BRE DIGEST 365

Project Number: 9153,SK

Date: 22/01/2025

Project Name: Lanwades Country Park, Newmarket, CB8 7UU

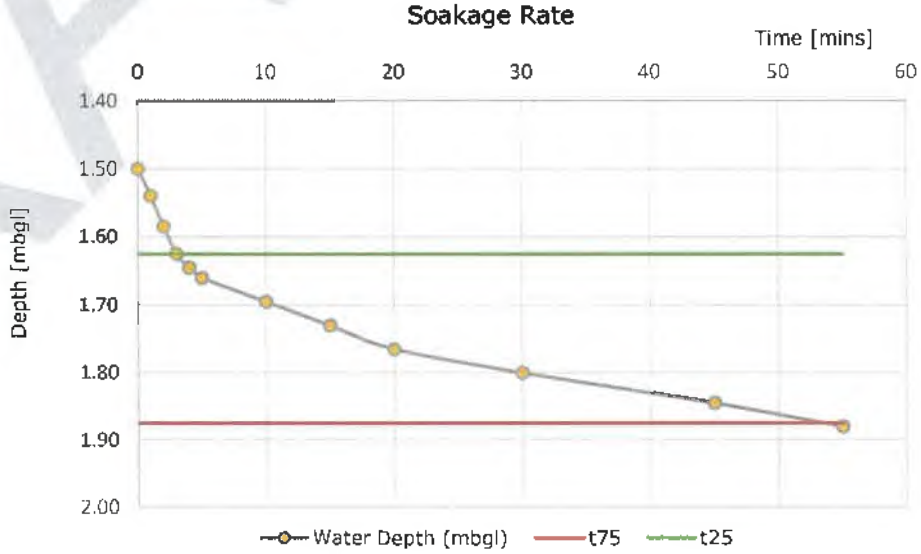
Time [min]	Depth to Water [mbgl]
0	1.50
1	1.54
2	1.59
3	1.63
4	1.65
5	1.66
10	1.70
15	1.73
20	1.77
30	1.80
45	1.85
55	1.88

Pit Size [m]		
Length	Width	Depth
1.60	0.40	2.00

Infiltration Rate Calculations		
Parameter	Unit	Result
	height	
h_{75}	[m]	1.875
h_{25}	[m]	1.625
h_{75}-h_{25}	[m]	0.250
	time	
t_{75}	[s]	3240.00
t_{25}	[s]	180.00
t_{75} - t_{25}	[s]	3060.00
	effective volume	
v_{75-25}	[m^3]	0.048
	effective area	
ap_{50}	[m^2]	1.640
	soil infiltration rate	
f	[m/s]	9.56E-06

Trial Pit	TP04
Run	3 of 3
Test Date	09/01/2025
Groundwater Encountered:	N/A

Remarks: Backfilled with gravel. Effective volume multiplied by the voids ratio of the gravel (0.3).



Calculated by: JK

Checked by: RS

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