Sheringham Waste Recycling Centre
Holt Road Norfolk

Flood Risk Assessment and

Surface Water Drainage Strategy

March 2024

On behalf of **Norfolk County Council**

Project Ref: 332249868/4001 | Rev: R5 | Date: March 2024

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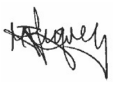
Approved by:	*Matthew Ingrey*	*Director*		*10/01/2023*
For and on behalf of Stantec UK Limited				

Revision	***Date***	***Description***	***Prepared***	***Reviewed***	***Approved***
R1	*August 23*	*Updated FRA in response to LLFA comments*	*SL/RO*	*TB/LF*	*LF*
R2	*Sept 23*	ISSUED AS DRAFT VERSION FOR CLIENT REVIEW	*SL*	*TB*	*MI*
R3	*Oct 23*	Final issue following client comment	*SL*	*TB*	*MI*
R4	*Jan 24*	Amendment to drawing revisions	*RO*	*TB*	*MI*
R5	*Mar 24*	Amendment for LLFA comments	*SL*	*TB*	*MI*

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Executive Summary

This Flood Risk Assessment (FRA) has been prepared by Stantec on behalf of our client, Norfolk County Council, to accompany a full planning application for the relocation of Sheringham Recycling Centre in Sheringham, Norfolk. The proposal includes the construction of:

- Vehicle access road
- Associated footpaths
- Service area

In accordance with the fundamental objectives of the National Planning Policy Framework (NPPF), the FRA demonstrates that:

(i) The development is safe

(ii) The development does not increase flood risk; and

(iii) The development does not detrimentally affect third parties.

The Environment Agency (EA) Flood Zone map shows the site lies within Flood Zone 1 (as defined in NPPF Planning Practice Guidance (PPG) 'Flood Risk and Coastal Change' Table 1) as follows:

- Flood Zone 1 'Low Probability' (less than 1 in 1,000 (0.1%) annual probability of river or seas flooding)
- Flood Zone 2 'Medium Probability' (between a 1 in 100 (1%) and 1 in 1,000 (0.1%) annual probability of river flooding; or land having between a 1 in 200 (0.5%) and 1 in 1,000 (0.1%) annual probability of sea flooding)
- Flood Zone 3 'High Probability' (greater than 1 in 100 (1%) annual probability of river flooding, or greater than 1 in 200 (0.5%) annual probability of sea flooding)

The proposed relocated recycling centre and associated development are considered to be 'less vulnerable' development. A sequential approach, as advocated by national planning policy, has been followed such that all proposed development will be located in Flood Zone 1. All proposed development is considered appropriate within Flood Zone 1 (ref: National Planning Policy Framework (NPPF) Planning Practice Guidance (PPG) 'Flood Risk and Coastal Change' Table 1).

Since the proposed development is to be located entirely within Flood Zone 1 (i.e., having a 'Low Probability' of flooding), it passes the Sequential Test and does not require the Exception Test.

As such, the FRA confirms that the development is safe, it does not increase flood risk and does not detrimentally affect third parties, in accordance with the objectives of the NPPF and the requirements of national and local planning policy.

1 Introduction

1.1 Scope of Report

1.1.1 This Flood Risk Assessment (FRA) has been prepared by Stantec on behalf of our client, Norfolk County Council, to accompany a full planning application for the relocation of Sheringham Recycling Centre in Sheringham, Norfolk. The Norfolk County Council planning application reference is FUL/2023/0005. A previous iteration of the FRA was submitted with the original planning application in early 2023. This was subsequently reviewed with comments from stakeholders received, culminating in the preparation of this FRA revision.

1.1.2 This FRA is based on the available flood risk information for the site as detailed in Section 1.2 and prepared in accordance with the planning policy requirements set out in Section 1.3.
The scope of the FRA is consistent with the 'Site-specific Flood Risk Assessment Checklist' from the National Planning Policy Framework (NPPF) Planning Practice Guidance.

1.1.3 Stantec has many years of experience in, amongst other areas, the assessment of flood risk, hydrology, flood defence and river engineering. The authors and reviewers of the document are all experienced engineers and members of chartered institutions such as the Chartered Institution of Water and Environmental Management (CIWEM) or the Institution of Civil Engineers (ICE).

1.2 Sources of Information

1.2.1 The FRA has been prepared based on the following sources of information:

- Development layout proposals by Eunomia Research & Consulting,
- **Environment Agency (EA) published 'Open Data' datasets** available online, reproduced with OS mapping under licence to Stantec (contains Ordnance Survey data © Crown copyright and database right [2019], contains Environment Agency information © Environment Agency and database right)
- The Environment Agency (EA) online flood maps at https://flood-map-for-planning.service.gov.uk/ and https://flood-warning-information.service.gov.uk/long-term-flood-risk/
- North Norfolk District Council North Norfolk Strategic Flood Risk Assessment, Final Report: Level 1 (November 2017)
- North Norfolk District Council Addendum Report for the North Norfolk Strategic Flood Risk Assessment, Version 1 (12th April 2018)
- Norfolk County Council Norfolk Local Flood Risk Management Strategy, Post Consultation Final (31st July 2015)
- Norfolk County Council, Lead Local Flood Authority Statutory Consultee for Planning, Guidance Document (Version 6.1, October 2022)

1.2.2 Consultation with Norfolk County Council (NCC) in its role as Lead Local Flood Authority (LLFA), the EA and Anglian Water (AW) regarding existing flood risk issues has been undertaken by means of email enquiries. This has included extensive liaison and dialogue with the LLFA on the surface water drainage strategy, and this report seeks to address their comments.

1.3 Relevant Planning Policy

1.3.1 This FRA has been prepared in accordance with the relevant national, regional and local planning policy and statutory authority guidance as follows:

- National policy contained within the revised National Planning Policy Framework (NPPF) dated February 2019, issued by Ministry of Housing, Communities and Local Government, with reference to Section 14 'Meeting the challenge of climate change, flooding and coastal change'
- The NPPF Planning Practice Guidance (PPG) released in March 2014 ('Flood Risk and Coastal Change' section) and updated in July 2020 to incorporate the EA 'Flood Risk Assessments: Climate Change Allowances' guidance
- DEFRA Non-statutory Technical Standards for Sustainable Drainage Systems (March 2015)
- The SuDS Manual (C753), CIRIA (2015)
- Sewerage Sector Guidance (SSG) (June 2022) and the associated Design & Construction Guidance (DCG) (November 2023)
- BS 8582:2013 Code of practice for surface water management for development sites (November 2013)
- Environment Agency Rainfall run-off management for developments, Report SC030219 (October 2016)
- Local planning policy contained within the North Norfolk District Council (NNDC) North Norfolk Local Development Framework Core Strategy, adopted September 2008, principally

  - Policy EN 10 – Development and Flood Risk which states:

  *"The sequential test will be applied rigorously across North Norfolk and most new development should be located in **Flood Risk Zone 1**. New development in **Flood Risk Zones 2 and 3a** will be restricted to the following categories:*

  - *water compatible uses*
  - *minor development*
  - *changes of use (to an equal or lower risk category in the flood risk vulnerability classification) where there is no operational development; and*
  - *'Less vulnerable' uses where the sequential test has been passed.*

  *New development in **Flood Zone 3b** will be restricted to water compatible uses only.*

  The Strategic Flood Risk Assessment defines zones 2, 3a and 3b in parts of North Norfolk and this will be used to inform the application of the sequential test. Where this information is not available, the Environment Agency Flood Risk Zones and a site-specific Flood Risk Assessment will be used to apply the sequential test.

  A site-specific Flood Risk Assessment which takes account of future climate change must be submitted with appropriate planning applications in Flood Zones 2, 3a and 3b and for development proposals of 1 hectare or greater in Flood Zone 1.

Land in Flood Zone 1 that is surrounded by areas of Flood Zones 2 or 3 will be treated as if it is in the higher risk zone and a Flood Risk Assessment will be required to prove that safe access / egress exists for the development or that the land will be sustainable for the duration of the flood period.

Appropriate surface water drainage arrangements for dealing with surface water run-off from new development will be required. The use of Sustainable Drainage Systems will be the preference unless, following an adequate assessment, soil conditions and / or engineering feasibility dictate otherwise."

- Local planning policy contained within the NNDC North Norfolk Local Plan 2016-2036, First Draft Local Plan (Part 1), consultation period 7 May to 19 June 2019, principally:

  - Policy SD 10 – Flood Risk & Surface Water Drainage which states:

  "All new development will:

  - *be located to minimise the risk of flooding, mitigating any such risk through avoidance, design of mitigation and include sustainable drainage (SuDS) principles*
  - *not materially increase the flood risk to other areas and incorporate appropriate surface water drainage mitigation measures to minimise its own risk of flooding*
  - *have regard to climate change, the NNDC Strategic Flood Risk Assessment, 2017 and subsequent updates.*

  Developers will be required to show that the proposed development:

  1. *complies with national policy including where appropriate the sequential and exceptions tests*
  2. *does not increase green field run off rates and vulnerability of the site, or the wider catchment, to flooding from surface water run-off from existing or predicted water flows*
  3. *wherever practicable, has a positive impact on the risk of surface water flooding on site and in the surrounding area adjacent to the development; and,*
  4. *addresses the potential impact of infiltration upon groundwater Source Protection Zones and/or Critical Drainage Catchments.*

  Where SuDS are proposed, development proposals should be an integral part of the green infrastructure framework of the site and seek to provide multi-functional benefits by combining water management with open space with benefits for amenity, recreation and wildlife.

  The approach to surface water drainage should be based on evidence of an assessment of site conditions and national guidance, reflecting best practice. Developers should provide the appropriate information required to assist in the determination of such application as issued by the LLFA. Detailed maintenance and management arrangements for the lifetime of the development should be submitted. Funding will be via planning conditions and or planning obligations.

  Where drainage proposals are submitted which consider flood risk and proposed sustainable drainage systems, a Flood Risk Assessment, FRA and drainage strategy should be submitted. This includes the requirement to provide at the pre application and outline stage details of a drainage strategy/statement showing at least one achievable drainage solution with evidence and sketch layout plan including proposed means of

adoption and maintenance of the systems over the lifetime of the development. In adherence with LLFA guidance, drainage strategies must also consider the potential increase in the volume of runoff from a development as a result of increases in the area of impermeable surfaces along with water quality and exceedance issues.

Surface water should be managed at the source, with reduced transfer and discharge elsewhere following the hierarchy of drainage options as reasonably practicable, firstly:

1. into the ground (shallow infiltration); then

2. to a surface water body; then

3. to a surface water sewer, highway drain, or another drainage system, then

4. to a combined sewer.

Evidence of how the hierarchy could be achieved is required and where it cannot be provided, evidence of an alternative plan should be submitted. Where there is no alternative option but to discharge surface water into a combined sewer, developers will need to engage with the appropriate bodies and demonstrate why there is no alternative. Clear evidence depicting the above and that the discharge of surface water will be limited to attenuation rate, including climate change allowance, will need to be submitted.

New residential development on sites not allocated in this Local Plan or a Neighbourhood Plan will not be permitted on sites at risk from flooding from any sources except where it can be demonstrated that wider sustainability benefits outweigh flood risk."

1.4 Caveats and Exclusions

1.4.1 This FRA has been prepared in accordance with the NPPF and Local Planning Policy. The proposed flood management and surface water management strategies are based on the relevant British Standards (BS8533), the standing advice provided by the EA, or based on common practice.

1.4.2 The Construction (Design and Management) Regulations 2015 (CDM Regulations) will apply to any future development of this site which involves "construction" work, as defined by the CDM Regulations. As such it is the responsibility of the proposed developer (ultimate client) to fulfil its duties under the CDM Regulations.

1.4.3 The findings of this FRA are based on data available at the time of the study and on the subsequent assessment that has been undertaken in relation to the development proposals as outlined in Section 5.

1.4.4 It should be noted that the insurance market applies its own tests in terms of determining premiums and the insurability of properties for flood risk. Those undertaking development in areas which may be at risk of flooding are advised to contact their insurers or the Association of British Insurers (ABI) to seek further guidance prior to commencing development. Stantec does not warrant that the advice in this report will guarantee the availability of flood insurance either now or in the future.

2 Site Setting

2.1 Site Description

2.1.1 The existing Sheringham Recycling Centre (approximately 600m^2) is operated by Norfolk County Council and located south of Holt Road, East Beckham, Sheringham, NR26 8TW.

2.1.2 The proposed relocation site (the 'Site') is located immediately northeast of the existing recycling centre, on the northern side of Holt Road, as shown in Figure 2.1 below. The Ordnance Survey grid reference for the centre of the site is E616271, N341031. A site location plan is included in **Appendix A**.

2.1.3 The site currently comprises 0.366 hectares (ha) of cultivated agricultural land and is bound to the north, east, south, and west by woodland and agricultural land.

Contains Ordnance Survey data © Crown copyright and database right 2021.

Figure 2.1: Location Plan

2.2 Hydrological Setting

2.2.1 The closest ordinary watercourse to the site is located in Sheringham Wood (Old Wood) approximately 400m to the west, as shown in Figure 2.2 below. This watercourse flows northwards towards Sheringham Wood and Sheringham further north.

2.2.2 There are no other watercourses or waterbodies within the immediate vicinity of the site.

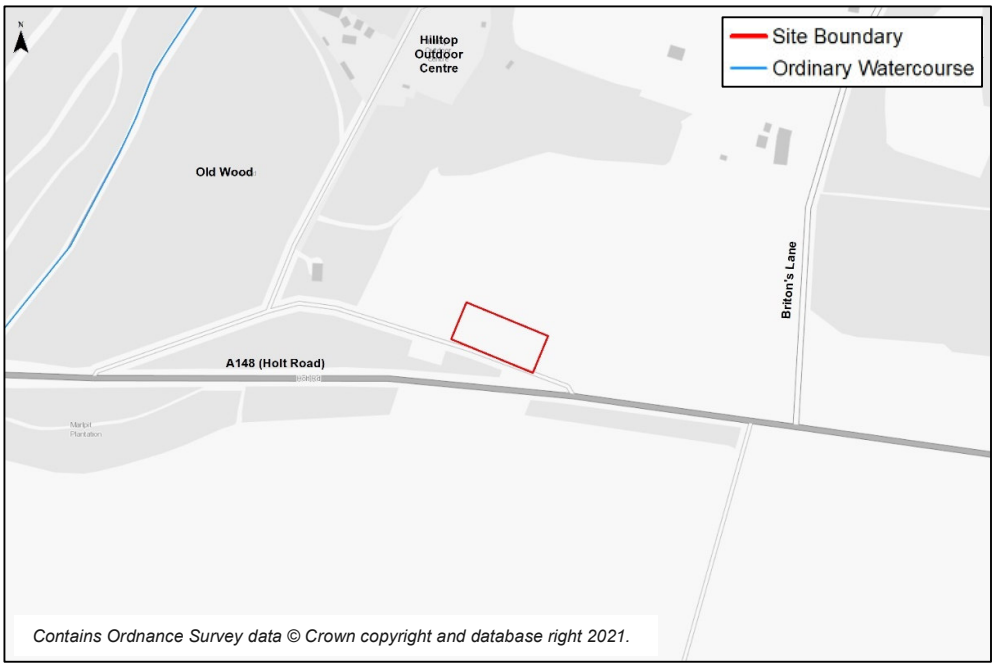


Figure 2.2: Drainage Features

2.3 Topography

2.3.1 LiDAR data indicates the site falls gently to the east with higher ground located to the west. Levels range between ~90m AOD at the high point to ~89m AOD along the eastern boundary.

2.3.2 A topographical plan of the site, based on opensource data, is included in **Appendix A** and shown in Figure 2.3 below.

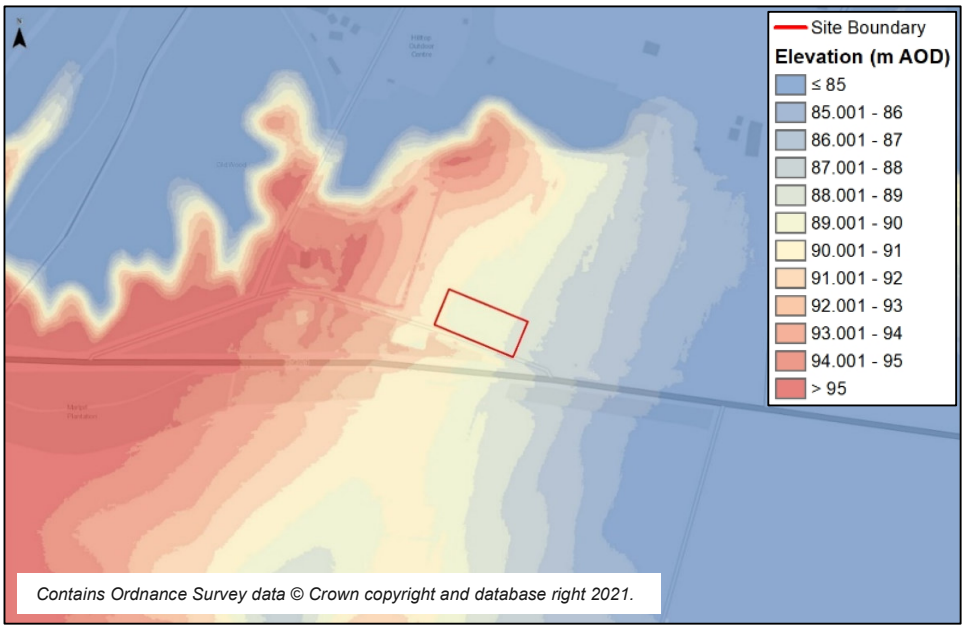


Figure 2.3: Site Topography (LiDAR)

2.4 Geology and Hydrogeology

2.4.1 From a review of the 1:50,000 scale geology map from the British Geological Survey (BGS) online digital viewer, the bedrock beneath the site comprises the Wroxham Crag Formation (Sand and Gravel) bedrock overlain with superficial deposits comprising the Briton's Lane Sand and Gravel Member (Sand and Gravel).

2.4.2 BGS borehole data from ~300m east of the site (borehole BGS ID. 515139 TG14SE39) gives a standing groundwater level approximately 35 metres below ground level (referenced in 2.3.1) at 46.63m Above Ordnance Datum (AOD). EA groundwater data for a borehole located approximately 1.2km north of the site (Ref. Sheringham and Beeston TG14_624) shows groundwater levels around 35.5m AOD.

2.4.3 The bedrock is designated as a 'Principal' aquifer and the superficial deposits are designated as a 'Secondary A' aquifer.

2.4.4 The National Soil Resources Institute (NSRI) 'Soilscapes for England and Wales' viewer indicates that the site is located on 'freely draining slightly acid sandy soils' with 'freely draining slightly acid loamy soils' further to the east.

2.4.5 The site is located within Source Protection Zone 3, as designated by the EA. The boundary between Source Protection Zone 3 and Source Protection Zone 2 (Outer Protection Zone) is located approximately 135m north of the site.

2.4.6 A site investigation was undertaken in June 2022 (**Appendix G**), and additional infiltration testing was undertaken in June 2023 (**Appendix H**). No groundwater was encountered up to the maximum test depth of 15.45m below ground level (Borehole 09, **Appendix G**).

2.5 Existing Drainage Arrangements

On-Site Drainage

2.5.1 The site consists primarily of open agricultural land, such that surface water would predominately drain via natural infiltration into the ground or would drain via overland flow to the east.

2.5.2 The existing Sheringham Household Waste Recycling Centre (i.e., located to the southwest of the proposed site) is drained via a piped network in the southeast corner of the site which discharges into an infiltration ditch (Figure 2.4). Note, this is not part of the proposed new site.

2.5.3 In May 2013, Mott MacDonald produced a Drainage Feasibility Study and Risk Assessment report, in which Mott MacDonald undertook an assessment of the groundwater pollution risk from the existing site and proposed upgrades to the drainage layout to manage pollution risk. These drainage upgrades now form the existing drainage layout as descried in paragraph 2.5.2.

2.5.4 Mott MacDonald reviewed water quality samples collect from the site in April 2010, highlighting that filtration removes most contaminants from the surface water runoff. Mott MacDonald undertook an assessment using Consim version 2.5 to evidence that the remaining contaminants will not adversely affect the groundwater at water table level (Drainage Feasibility Study and Risk Assessment, May 2013).

2.5.5 Mott MacDonald provided a design for the filtration of surface water runoff in accordance with their assessment (Figure 2.5). Mott MacDonald proposed to discharge runoff into an infiltration ditch with 400mm (minimum depth) compost mix overlying 400mm (minimum depth) of Type B filter material.

2.5.6 The proposed infiltration ditch by Mott MacDonald has helped to inform the design of the surface water drainage system for the proposed Waste Recycling Centre (Section 7).

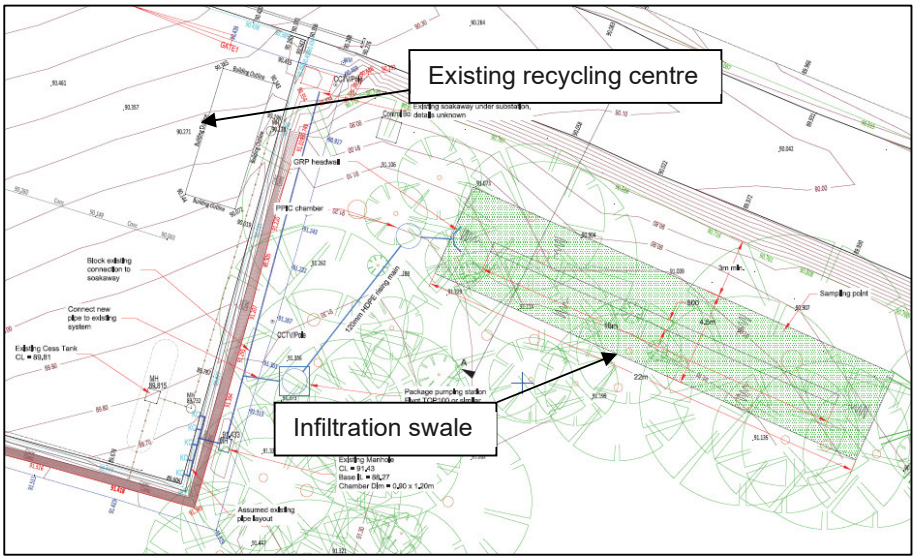


Figure 2.4: Existing Recycling Centre Drainage Arrangement as per Mott MacDonald Report (May 2013), Appendix G.

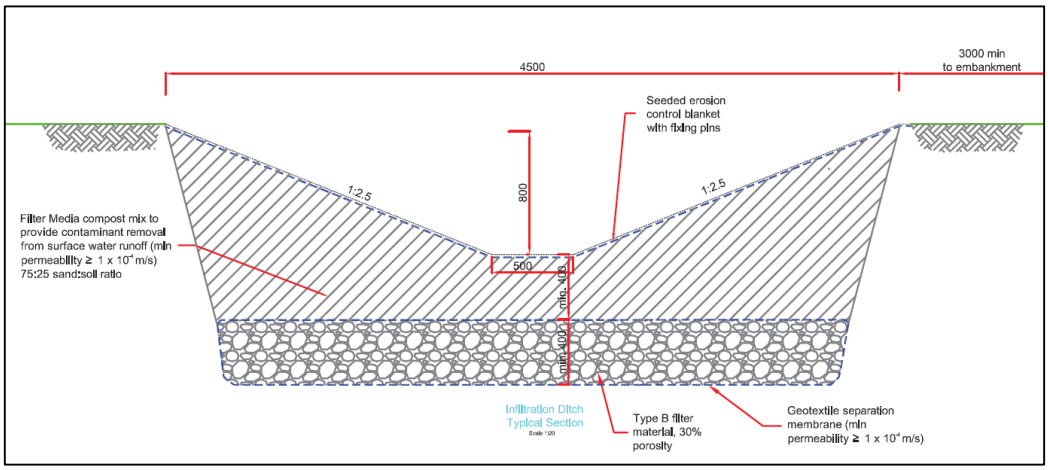


Figure 2.5: Existing Recycling Centre Infiltration Ditch as per Mott MacDonald Report (May 2013), Appendix G.

3 Overview of Flood Risk

3.1 Introduction

3.1.1 The following section has been determined with support from the Stantec GIS flood maps in **Appendix A** based on the EA Opendata datasets available online and reproduced with OS mapping under licence to Stantec.

3.2 Flood Zone Map for Planning

3.2.1 The first phase in identifying whether a site is potentially at risk of flooding is to consult the EA's Flood Zone maps, available on the EA's website. This provides an initial indication of the extent of the Flood Zones. The Flood Zones are defined in Table 1 of the NPPF PPG ('Flood Risk and Coastal Change' section) as follows:

- Flood Zone 1 'Low Probability' – land at less than 1 in 1000 (0.1%) annual probability of river or sea flooding
- Flood Zone 2 'Medium Probability' – land between 1 in 100 (1%) and 1 in 1000 (0.1%) annual probability of river flooding, or between 1 in 200 (0.5%) and 1 in 1000 (0.1%) annual probability of sea flooding
- Flood Zone 3 'High Probability' – land at 1 in 100 (1%) or greater annual probability of river flooding, or 1 in 200 (0.5%) or greater annual probability of sea flooding.

3.2.2 A copy of the current EA Flood Map (2021) for the site is included in Figure 3.1 and Figure GIS003 of **Appendix A**.

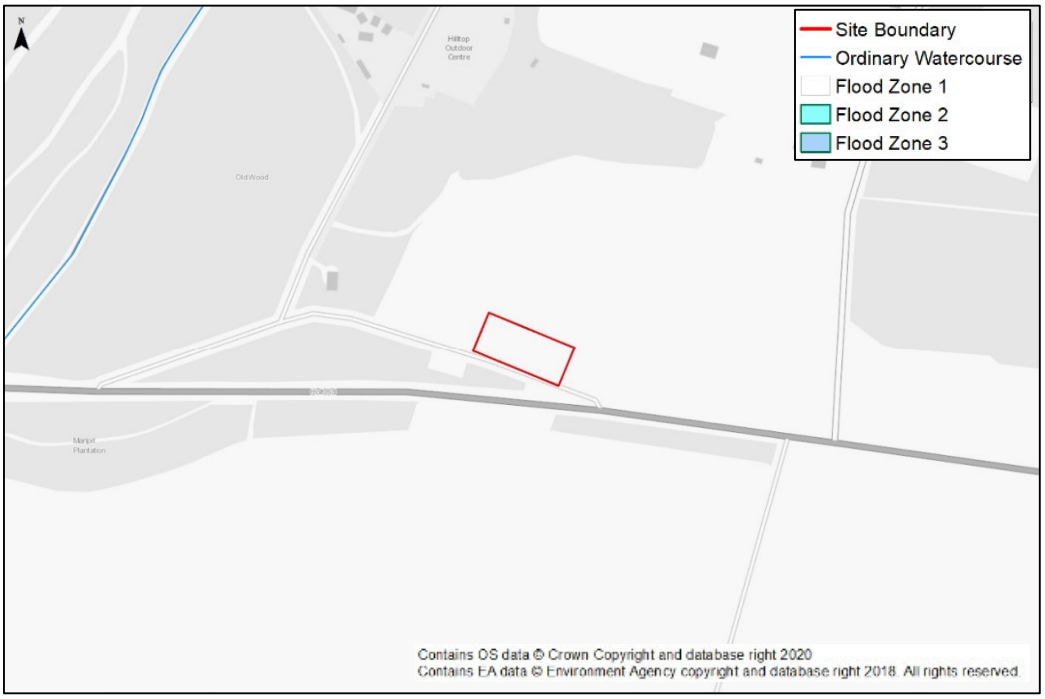


Figure 3.1: EA Flood Map for Planning

3.2.3 The site is shown by the EA's 'Flood Map for Planning' to lie wholly within Flood Zone 1 'Low probability', as can be seen in Figure 3.1 above.

3.3 Flood Risk from Surface Water

3.3.1 The EA 'updated Flood Map for Surface Water' ('uFMfSW') shows where areas could be potentially susceptible to surface water flooding in an extreme rainfall event. The latest mapping assesses flooding resulting from severe rainfall events based on the following three scenarios:

- 1 in 30 (3.3%) annual probability rainfall event ('High' risk)
- 1 in 100 (1%) annual probability rainfall event ('Medium' risk)
- 1 in 1000 (0.1%) annual probability rainfall event ('Low' risk)

3.3.2 Land at lower than 1 in 1000 (0.1%) annual probability of flooding is considered to be 'Very Low' risk of flooding.

3.3.3 An extract of the Updated Flood Map for Surface Water for the site is shown in Figure 3.2. A copy of the map is also included in Figure GIS004 of **Appendix A**, with Figures GIS005, GIS007 and GIS009 showing predicted flood depths for each of the three risk scenarios.

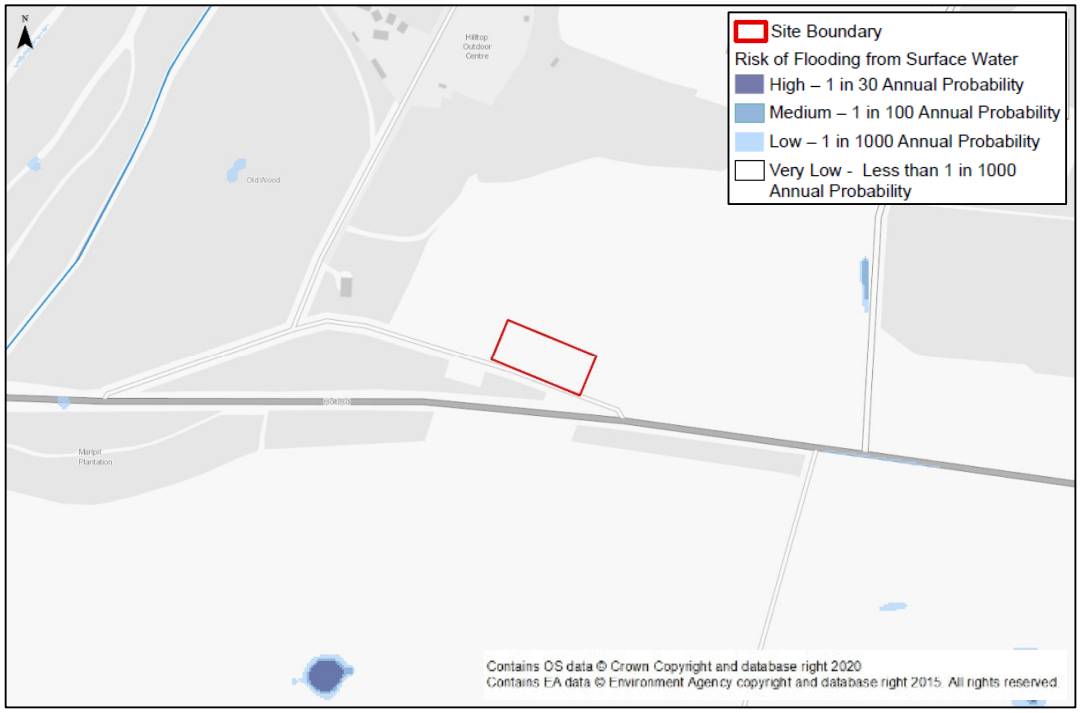


Figure 3.2: EA Updated Flood Map for Surface Water

3.3.4 It should be noted that the surface water maps are generated using a generic methodology on a national scale, whereby rainfall is routed over a ground surface model. The analysis does not take account of any specific local information on below-ground drainage infrastructure and infiltration, although an adjustment is included in urban areas to account for the impact of sewerage and a standard infiltration allowance based on soil type. Consequently, the mapping provides a guide to potentially vulnerable areas based on the general topography of an area.

3.3.5 The Surface Water Flood Map indicates that the whole site has a 'Very Low' risk of surface water flooding. Further to the south and east the maps show areas of 'Low' 'Medium' and 'High' risk with some isolated areas of risk, associated with low-lying topography.

3.4 Historic Flood Map

3.4.1 The EA 'Historic Flood Map' is an open-source online dataset showing the maximum extent of all individual recorded flood outlines from river, the sea and groundwater and shows areas of land that have previously been subject to flooding.

3.4.2 The mapping indicates that there have been no historic incidents of flooding on site. There are also no records of flooding on site within the NNDC SFRA (2017).

3.5 Groundwater Flood Risk

3.5.1 NNDC SFRA includes mapping in **Appendix A** which show Areas Susceptible to Groundwater Flooding (AStGWf). These maps are strategic-scale and show groundwater flood areas on a 1km square grid, where geological and hydrogeological conditions indicate that groundwater might emerge. The maps do not show the likelihood of groundwater flooding occurring, nor do they account for the chance of flooding from groundwater rebound.

3.5.2 Appendix A Index Grid: NN_14 in the SFRA indicates that the site is not susceptible to groundwater flooding, as shown in Figure 3.3 below.

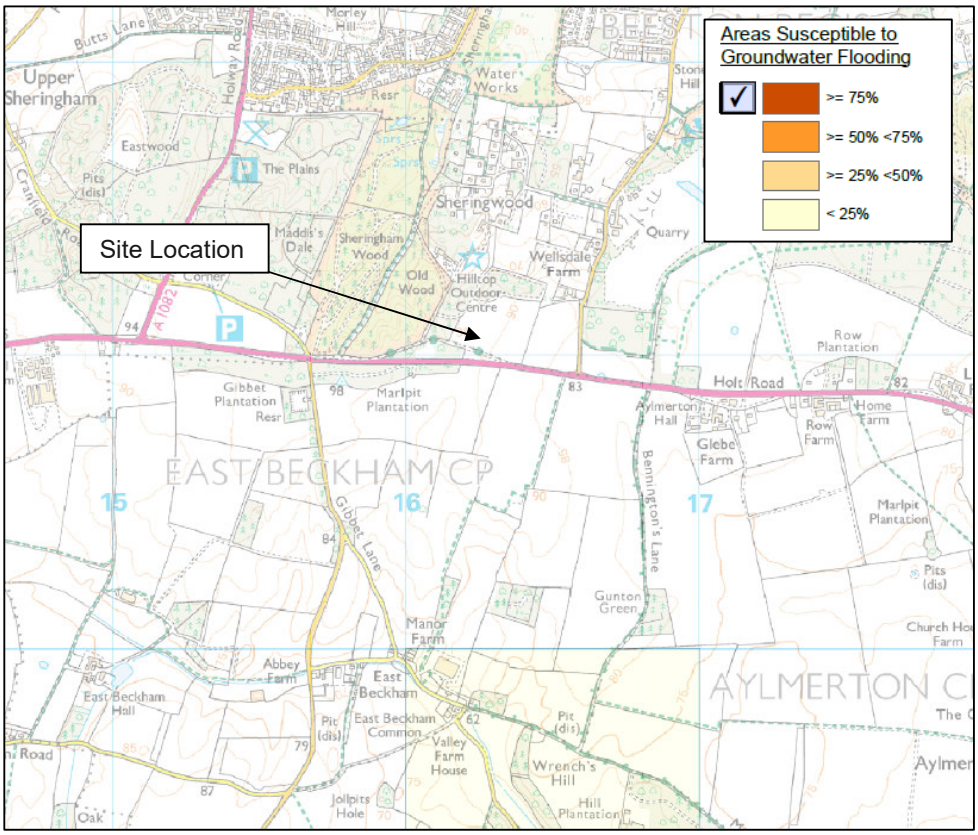


Figure 3.3: AStGWf mapping (NNDC SFRA, 2017).

3.6 EA Flood Risk from Reservoirs Map

3.6.1 The EA provides maps showing the risk of flooding in the event of a breach from reservoirs, based only on large reservoirs (over 25,000 cubic metres of water).

3.6.2 It should be emphasised that the likelihood of flooding from reservoir breach is very small in any case; the EA is the enforcement authority for the Reservoirs Act (1975) and all large, raised reservoirs are inspected and supervised by reservoir panel engineers. The EA's website states:

> *'Reservoir flooding is extremely unlikely to happen. There has been no loss of life in the UK from reservoir flooding since 1925. All large reservoirs must be inspected and supervised by reservoir panel engineers. As the enforcement authority for the Reservoirs Act 1975 in England, we ensure that reservoirs are inspected regularly and essential safety work is carried out'.*

3.6.3 This mapping shows that the site is not in an area potentially at risk in the event of a reservoir breach.

3.7 Strategic Flood Risk Assessment

3.7.1 Information contained in the NNDC SFRA Final Report Level 1 (2017) and the NNDC Addendum SFRA (2018), has been reviewed as part of this study. Groundwater flood risk is highlighted in Section 6.8 of the SFRA (2017) and discussed in Section 3.5 above.

3.7.2 Appendix A of the SFRA includes interactive Flood Risk Mapping (Index Grid: NN_14) which includes:

- Fluvial Flood Zones – SFRA map indicates that the site is located within Flood Zone 1, as per the current EA maps in Section 3.2**.**
- Surface water flooding extents - SFRA map indicates that the site is wholly located within an area of 'very low' flood risk, as per the current EA maps in Section 3.3.
- Reservoir flooding – SFRA Map indicates the site is not within an area at risk of reservoir flooding, as per the current EA maps described in Section 3.6.

3.8 Flooding from sewers

3.8.1 Anglian Water Services (AWS) were consulted about records of historic flooding and confirmed in their response (dated 23rd July 2019) "*we have no records of flooding in the vicinity that can be attributed to capacity limitations in the public sewerage system*" (**Appendix D**). However, AWS utility plans do not show any sewers within the vicinity of the site.

3.8.2 A copy of AWS utility plans is included in **Appendix C**.

3.9 Summary of Flood Risk

3.9.1 Table 3-1 provides an overview of the flood risk to the site, based on the information obtained and detailed in Section 3.

Table 3-1: Summary of Sources of Flood Risk

Source of Flooding	Risk of Flooding to Site	Comment/Justification	Source of data	Mitigation requirements for new development (see Section 7)	Risk of Flooding to Site after mitigation
Fluvial		The whole site is located within Flood Zone 1.	SFRA EA Flood Map for Planning (see Section 3.2)	n/a	
Surface Water (Pluvial)		The whole site has a 'Very Low' susceptibility to surface water flooding.	EA surface water flood maps (See Section 3.3) SFRA	Surface water drainage strategy has been prepared following liaison with NCC. (See Section 7)	
Ground water		The NNDC SFRA AStGWf mapping in Appendix A show the whole site has a 'negligible' risk. BGS boreholes show groundwater elevations more than 10m below ground level. No mention of historic groundwater flooding incidents on site in the SFRA.	SFRA BGS Viewer Soilscapes website	n/a	
Reservoir, Canals, Ponds and Other Artificial Sources		The site is not within an area at risk in the event of a reservoir breach.	Flood Risk from Reservoirs Map (see Section 3.6)	n/a	
Sewers		The SFRA does not have any information relating to flooding from sewers or water mains on site. Correspondence with AW indicates there have been incidents of flooding within the vicinity of the site but their asset maps show there are no sewers on site or within the vicinity. Therefore, the risk is considered to be 'low'.	SFRA Anglian Water asset maps	n/a	
Key:		**Low/Negligible Risk** – No noticeable impact to site and not considered to be a constraint to development			
		Medium Risk – Issue requires consideration but not a significant constraint to development			
		High Risk – Major constraint to development requiring active consideration in mitigation proposals			

4 Impact of Climate Change

4.1.1 In considering flood risk to the site, it is necessary to fully consider the potential impacts of climate change for the lifetime of the development within the mitigation measures. The EA has released the latest guidance on the application of climate change allowances in flood risk assessments[1].

4.1.2 Based on the sites location and topography it is unlikely that climate change will have an impact on the risk of fluvial flooding.

4.1.3 Based on the lates EA guidance, increase in rainfall intensities has been considered in the development of the surface water drainage strategy as detailed in Table 4-1 and is discussed in Section 7.

Table 4-1: Climate Change – Broadland Rivers Management Catchment Peak Rainfall Allowances[1]

Annual Exceedance Rainfall Event	Worst-Case Allowance for the '2050s' and '2070s' (development lifetime between 2061 to 2125)	
	Central	Upper End
3.3%	+20%	+40%
1%	+20%	+45%

[1] https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances.

5 Proposed Development and Sequential Test

5.1 Proposed Development

5.1.1 The proposed development entails the relocation of an existing recycling centre that is located opposite the proposed site. The site is located immediately northeast of the existing recycling centre, on the northern side of Holt Road. The purpose of the relocation is to provide a new waste recycling facility, with the old one being decommissioned.

The new facility consists of:

- service area
- customer access road
- associated parking
- swale, bioretention basin, rain garden and landscaped areas for surface water drainage

5.1.2 A plan of the proposed development is included in **Appendix B**.

5.2 Flood Risk Vulnerability

5.2.1 NPPF PPG 'Flood Risk and Coastal Change' Table 2 confirms the *'Flood risk vulnerability classification'* of a site, depending upon the proposed usage. This classification is subsequently applied to PPG Table 3 to determine whether:

- the existing development is suitable for the flood zone in which it is located, and
- whether an Exception Test is required for the existing development.

5.2.2 The proposed development is classified as 'less vulnerable' development and will be located wholly within **Flood Zone 1**.

5.3 NPPF Sequential and Exception Test

5.3.1 The NPPF follows a sequential risk-based approach in determining the suitability of land for development in flood risk areas, with the intention of steering all new development to the lowest flood risk areas.

5.3.2 The Sequential Test is a planning exercise to consider whether there are 'reasonably available' alternative sites at lower probability of flooding that would be suitable for the existing development.

5.3.3 Since all development will be in Flood Zone 1 and are already located in the area at lowest probability of flooding, the Sequential Test has been passed and the Exception Test is not required.

6 Flood Mitigation Strategy

6.1 Surface Water

6.1.1 The site is located on a ridge of high ground, as described in Sections 2.3 and 2.5, hence there is no risk from overland flows (from offsite) as the only runoff is generated from within the site itself. As the majority of the site is being developed any existing surface water flood risk will be mitigated as all post development site runoff will be captured in the proposed surface water management strategy outlined in Section 7.

6.2 Sequential Approach

6.2.1 The NPPF encourages the application of the 'sequential approach' in new developments, i.e., locating the more sensitive/vulnerable elements of new development in the areas which lie at lowest probability of flooding and, conversely, reserve the areas of the site at greatest risk of flooding for the least vulnerable elements of the development (or, preferably, leave such areas undeveloped).

6.2.2 All proposed development for this site is in Flood Zone 1 and there are no other Flood Zones present on site, hence the sequential approach is achieved by default.

6.3 Safe Access

6.3.1 It is necessary to consider and incorporate safe access arrangements as part of the mitigation, to ensure the users/occupants of the development are safe in times of flooding.

6.3.2 As the entire site lies within Flood Zone 1, it is considered that access and egress to and from the site will be safe.

7 Surface Water Management Strategy

7.1 Overview

7.1.1 As of April 2015, the LLFA has become a statutory consultee on planning applications for surface water management. As the LLFA, Norfolk County Council are responsible for the approval of surface water drainage systems for new major development. Major development consists of any of the following:

(a) the provision of dwelling houses where residential development of 10 or more units; or where the development is to be carried out on a site having an area of 0.5 hectares or more and the number of units is not known

(b) the provision of a building or buildings where the floor space to be created by the development is 1,000 square metres or more, or

(c) development carried out on a site having an area of 1 hectare or more.

7.1.2 With a total development area of 0.366ha and total proposed floor space less than 1,000m^2, the proposed development is a 'non-major development'.

7.1.3 The proposed drainage design (Section 7.3) will discharge runoff within the site boundary; hence, there will be no increased flood risk to external receptors as part of the development proposals.

7.2 Design Principles

7.2.1 The NPPF recognises that flood risk and other environmental damage can be managed by minimising changes in the volume and rate of surface runoff from development sites and recommends that priority is given to the use of Sustainable Drainage Systems (SuDS) in new development, this being complementary to the control of development within the floodplain.

7.2.2 The Non-Statutory Technical Standards for SuDS set out general recommendations for control of development runoff, including the requirement to ensure that runoff from the site is not increased by development, and the requirement to manage surface water runoff for events up to the 1 in 100-year Return Period (1% AEP) event, including an additional allowance for the projected impacts of climate change.

7.2.3 PPG advises that climate change allowances should be determined with reference to the guidance provided in the EA document 'Flood Risk Assessments: Climate Change Allowances (February 2016). As most of the site is proposed for household waste purposes, with an assumed design life of 75 years, an additional allowance on rainfall intensity has been incorporated into the surface water management strategy, as discussed in Section 4.

7.2.4 As the intention of SuDS is to mimic the natural drainage regime of the undeveloped site, the NPPF PPG states the following (consistent with the Building Regulations H3 hierarchy):

The aim should be to discharge surface water runoff as high up the following hierarchy of drainage options as reasonably practicable:

- *- into the ground (infiltration),*
- *- to a surface water body,*
- *- to a surface water sewer, highway drain or another drainage system,*
- *- to a combined sewer*

7.2.5 Further to the drainage hierarchy in paragraph 7.2.4, the Water UK Design and Construction Guidance (November 2023) provides the following hierarchy to demonstrate that the collection of rainwater for use is preferable over the options for discharge.

The government guidance to local authorities includes a hierarchy of connection, which can be summarised as follows:

a) surface water runoff is collected for use;

b) discharge into the ground via infiltration;

c) discharge to a watercourse or other surface water body;

d) discharge to a surface water sewer, highway drain or other drainage system, discharging to a watercourse or other surface water body;

e) discharge to a combined sewer.

7.2.6 DEFRA guidance document 'Sustainable drainage systems: non-statutory technical standards' (March 2015) sets out the following clauses which are relevant to the design of this site and have been achieved through the proposed drainage design:

- S7: The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the site for a 1 in 30-year rainfall event.
- S8: The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur during a 1 in 100-year rainfall event in any part of: a building (including a basement); or in any utility plant susceptible to water (e.g. pumping station or electricity substation) within the development.
- S9: The design of the site must ensure that, so far as is reasonably practicable, flows resulting from rainfall in excess of a 1 in 100-year rainfall event are managed in exceedance routes that minimise the risks to people and property.
- S12: Pumping should only be used to facilitate drainage for those parts of the site where it is not reasonably practicable to drain water by gravity.

7.2.7 CIRIA C753, the 'SuDS Manual' sets out four key principles of Sustainable (urban) Drainage Systems (SuDS) that have been taken into account in this drainage design. These are referred to as the four pillars of SuDS, and are as follow:

- Water Quantity
- Water Quality
- Biodiversity
- Amenity

7.2.8 The design objectives for each of the four pillars of SuDS are set out in Table 7-1.

Table 7-1: Design Objectives for the Four Pillars of SUDS

Pillar	Design Objectives
Water quantity	1. Use surface water runoff as a resource. 2. Support the management of flood risk in the receiving catchment. 3. Protect morphology and ecology in receiving surface waters. 4. Preserve and protect natural hydrological systems on the site. 5. Drain the site effectively. 6. Manage on-site flood risk. 7. Design system flexibility/adaptability to cope with future change.
Water quality	1. Support the management of water quality in the receiving surface waters and groundwaters. 2. Design system resilience to cope with future change.
Amenity	1. Maximise multi-functionality. 2. Enhance visual character. 3. Deliver safe surface water management systems. 4. Support development resilience/adaptability to future change. 5. Maximise legibility. 6. Support community environmental learning
Biodiversity	1. Support and protect natural local habitats and spaces. 2. Contribute to the delivery of local biodiversity objectives. 3. Contribute to habitat connectivity. 4. Create diverse, self-sustaining, and resilient ecosystems.

7.3 Proposed Surface Water Drainage Strategy

7.3.1 The proposed drainage strategy is to collect the majority of surface water runoff in gullies and convey the runoff via a pipe and catchpit network into infiltration SuDS on the northern and eastern boundaries of the site. The infiltration SuDS will attenuate and treat the surface water runoff as the runoff soaks away through the permeable soils underlying the site. The onsite roads adjacent to the infiltration SuDS will runoff directly into the infiltration features through gaps in the kerb. Runoff from the roof of the welfare unit will be positively drained into a raingarden before discharging in the infiltration SuDS along the northern site boundary.

7.3.2 The proposed drainage design is set out in the following Stantec drawings (**Appendix B**):

- 49868_2001_161 – Site Sections
- 49868_2001_501– Drainage Layout
- 49868_2001_503 – Catchment Plan
- 49868_2001_521 – Construction Details
- 49868_2001_530 – Flood Exceedance Plan

7.3.3 Rainwater harvesting has been considered for this scheme in accordance with the drainage connection hierarchy in the Water UK Design and Construction Guidance (paragraph 7.2.5). However, rainwater harvesting has been discounted due to the low water consumption for operational waste recycling sites and the relative high cost of implementing the required storage and treatment to use rainwater.

7.3.4 Infiltration design has been considered and implemented for the site in accordance with the drainage hierarchy in the NPPF (paragraph 7.2.4) and Water UK Design and Construction Guidance (paragraph 7.2.5). Soakage testing across the site has evidenced that infiltration design is suitable for this development. Further details on infiltration testing are provided in Section 7.6.

7.4 Catchment Areas

7.4.1 The site is divided into 2no. catchment areas based on the site topography, proposed layout, and the required surface water treatment processes (see Section 7.10)

7.4.2 7.10). Runoff from the service yard requires a higher level of treatment then runoff from the rest of the development. Therefore, the service yard forms the majority of one catchment area (hereon in referred to as the 'Service Yard' catchment) and the second catchment area takes the reminder of the site (hereon in referred to as the 'Access Road' catchment) as per Stantec drawing 49868/2001/503 (**Appendix B**).

7.4.3 The 'Service Yard' catchment will be positively drained via gullies and a pipe network, which will outfall into the infiltration basin on the eastern boundary of the site. The infiltration basin will contain a layer of bio-retention soil to treat the runoff. The pipe network in the 'Service Yard' catchment will include catch pits and a proprietary water management product to provide further treatment. Justifications for these treatment measures are provided in Section 7.10.

7.4.4 Runoff from the 'Access Road' catchment will be collected, treated, attenuated and discharged within the proposed infiltration swale along the northern edge of the development. The infiltration swale will contain a layer of bio-retention soil to treat the runoff. The 'Access Road' catchment includes a small rain garden (area 5m^2) which will attenuate roof runoff from the welfare unit, whilst watering the attractive planting in the proposed raingarden.

7.4.5 The total area within the red line boundary is 0.366ha. The total area that will contribute to the proposed surface water drainage network is 0.327ha. The remaining 0.039ha is non-positively drained, open green space around the perimeter of the development; rainwater falling on these areas will infiltrate in-situ or dissipate via evapotranspiration.

7.4.6 For the purposes of the drainage calculations, the Percentage Impermeable Area (PIMP) for all contributing areas is 100%.

7.4.7 The 2no. catchment areas are broken down into contributing areas to model the proposed drainage network. Table 7-2 and Stantec drawing 49868/2001/503 (**Appendix B**) show the contributing areas, which correspond with the areas modelled in InfoDrainage (**Appendix E**).

Table 7-2: Summary of Surface Water Drainage Contributing Areas.

Contributing Area Reference	Contributing to (Feature / Pipe Reference)	Catchment type	Contributing Area (ha)	Site Catchment Area	Outfall Point
CA_1	S1.000	Paved Surface / Roof Area	0.027	Service Yard	Infiltration Basin
CA_2	S1.000		0.013		
CA_3	S1.001		0.016		
CA_4	S1.002		0.024		
CA_5	S1.002		0.062		
CA_6	S1.003		0.009		
CA_7	S1.003		0.007		
CA_8	Infiltration Basin		0.040		
CA_9	Infiltration Swale		0.025	Access Road	Infiltration swale
CA_10	Infiltration Swale		0.034		
CA_11	S2.000		0.009		
CA_12	Rain Garden		0.002		
CA_13	Infiltration Swale	Open SuDS Feature	0.024		
CA_14	Rain Garden		0.001		
CA_15	Infiltration Basin		0.032	Service Yard	Infiltration Basin
TOTAL	-	-	**0.327**	-	-

7.5 Infiltration SuDS Layout Design

7.5.1 The proposed infiltration SuDS are detailed on Stantec drawings 49868_2001_501 and 49868_2001_521 (**Appendix B**). The constraints and considerations which informed the design of the infiltration SuDS include the following.

- Drainage calculations using a computer-based hydraulic design software (InfoDrainage) to confirm the required hydraulic capacity (Section 7.7 and **Appendix E**) with the design infiltration rates (Section 7.6).
- Site layout constraints, including workable area for recycling centre and site levels.
- Safety for maintenance access.
- Erosion control.
- SuDS design best practice from CIRIA C753 (the 'SuDS Manual').

7.5.2 To accommodate the site layout and drainage system constraints, the proposed infiltration SuDS include gradients that are outside the recommended values in CIRIA C753. This section sets out the key dimensional parameters of the proposed SuDS (Table 7-3) and provides design justifications where values exceed the recommended values in C753.

Table 7-3: Dimensions of Proposed Infiltration SuDS Features.

Feature	Infiltration Swale	Infiltration Basin
Depth (mm)	412	1315
Infiltration soil depth (mm). I.e., bio-retention soil / filter medium underlying feature	1000	800
Base Width (mm)	500	Varies (min. 950)
Side Slope Gradient	1:2.5. See paragraph 7.5.3.	Average 1:1.74. See paragraph 7.5.4 and paragraph 7.5.5.
Longitudinal Gradient	1:100	Flat
Design Freeboard	None	302mm
Feature Exceedance Level (m AOD)	89.224	89.164
Maximum Design Flood Level in 1% AEP event including 45% for climate change (m AOD).	89.427. See paragraph 7.5.6.	88.862. See paragraph 7.5.6.
Maximum Storage Volume (m^3)	36	165. See paragraph 7.5.6.

7.5.3 The side slope gradient is steeper than the recommended steepest gradient of 1:3 in CIRIA C753 due to site development constraints and the required storage capacity within the swale. The safety of the swale is reasonable due to the shallow depth of the feature. Any personnel accessing the feature for maintenance should be able to step out of the feature. In the unlikely scenario that a member of the public accesses the swale, they should be able to egress from the swale with relative ease.

7.5.4 The infiltration basin has been designed with a side slope gradient of 1:2.5 along the western bank, a soil-retained face on the eastern bank, and 1:3 gradients at the northern and southern ends. As InfoDrainage models a single gradient, an average gradient of 1:1.74 is shown in the InfoDrainage model to represent the basin profile. The top area of 270.06m^2 and base area of 82.94m^2 are consistent between the InfoDrainage model and design layout.

7.5.5 The infiltration basin design includes the following considerations to mitigate the risk of harm due to the depth and gradients of the feature.

- A timber rail fence is proposed along the western edge to deter public access. Gates are provided at the northern and southern ends of the basin for maintenance access. The side slope gradients have been softened to 1:3 and the northern and southern ends of the feature for maintenance access. Maintenance personnel who require access to the feature should enter via either end of the feature. We have discussed the proposals with the proposed maintenance firm, Norfolk County Council, who have confirmed acceptance of the proposed SuDS arrangements for maintenance.

- The northern, southern and western edges of the infiltration basin are adjacent to the security fence on the site perimeter, so access from these sides is extremely unlikely.

- Vegetation is proposed within the SuDS features to help maintain soil banks and protect against erosion. Bio-degradable matting is proposed for erosion protection whilst vegetation establishes. The matting will biodegrade over a period of 18 months according to advice from the manufacturer.

7.5.6 In the maximum design storm event, surface water runoff will overtop the infiltration swale and flow directly into the infiltration basin without leaving the site. The InfoDrainage model indicates that a maximum of 10.183m^3 of runoff water will be exchanged from the infiltration swale to the infiltration basin. The maximum flood level and maximum storage volume in the infiltration basin allow for the additional 10.183m^3 from the infiltration swale by an addition of 55mm of storage water in the Infiltration basin. This has been calculated by dividing the storage volume (10.183m^3) by the surface area of the maximum water storage level (185m^2).

7.6 Proposed Infiltration Rates

7.6.1 On site Ground Investigation (GI) was undertaken in June 2022 and June 2023. The onsite GI included 12no. trial pits with 6no. soakage tests, and 1no. borehole and is summarised in Stantec drawing 49868_2001_103 (**Appendix G**). The GI demonstrates that a homogeneous band of the Britons Lane Sand and Gravel underlies the site to a depth of at least 8m, with some limited presence of silt and clay. The full onsite GI reports are provided in **Appendix H** (June 2022) and **Appendix I** (June 2023).

7.6.2 Soil logs taken from the surrounding area support the homogeneity on the Britons Lane Sand and Gravel. 3no. soil logs from the existing Sheringham Waste Recycling Centre (June 2009) indicate sand to a depth of 4m (**Appendix J**). 2no. soil logs from the Hilltop Outdoor Centre (February 2022), located 300m north of the site, indicate sand to a depth of 15m (**Appendix K**).

7.6.3 The soakage tests in accordance with BRE 365 were undertaken in June 2022 (**Appendix H**) and June 2023 (**Appendix I**), and have been used to determine the design infiltration rates for the infiltration swale and the infiltration basin (Table 7-4). Soakage tests TP01 – TP03 were undertaken within the footprint of the proposed infiltration swale whilst soakage tests TP04, TP07, and TP08 were undertaken within the footprint of the proposed infiltration basin, as indicated on Stantec drawing 49868/2001/501 (**Appendix B**).

Table 7-4: Summary of Infiltration Test Results

Trial Pit Reference	Date of Testing	Depth (m bgl)	Test 1 (m/s)	Test 2 (m/s)	Test 3 (m/s)	Design Rate (m/hr)
TP01	June 2023	0.75	1.7×10^{-4}	9.2×10^{-5}	8.2×10^{-5}	0.295
TP02	June 2023	0.75	3.2×10^{-6}	3.2×10^{-6}	3.1×10^{-6}	0.011
TP03	June 2023	0.75	1.4×10^{-4}	6.8×10^{-5}	5.9×10^{-5}	**0.212**
TP04	June 2023	1.00	5.1×10^{-5}	3.5×10^{-5}	3.8×10^{-5}	**0.126**
TP07	June 2022	2.9	8.0×10^{-5}	4.8×10^{-5}	4.2×10^{-5}	0.162
TP08	June 2022	3.0	6.5×10^{-5}	4.8×10^{-5}	3.5×10^{-5}	0.126

7.6.4 The lowest infiltration rates from each test location are considered as highlighted in orange in Table 7-4.

7.6.5 The test rates from TP02 are significantly lower than the other test rates and, therefore, testing from TP02 is anomalous. Furthermore, the soil log for TP02 indicates the presence of silt, which is not consistent with the soil logs both onsite and in nearby offsite locations, which show a consistent superficial geology of sand and gravel.

7.6.6 The selected design rate for the infiltration swale is 0.212m/hr, which is the second lowest test result from TP01 – TP03. The lowest test rate of 0.011m/hr from TP02 is anomalous. The second lowest test rate is representative of the underlying ground conditions and, therefore, provides an appropriate design value on which to base the design.

7.6.7 The selected design rate for the infiltration basin is 0.126m/hr, which is the lowest test result from tests TP04, TP07, and TP08.

7.6.8 The depths of tests TP01 – TP03 (750mm) are representative of the proposed infiltration swale depth (1400mm to natural ground).

7.6.9 The depths of soakage tests in the infiltration basin vary from 1,000mm (TP04) to 2,900mm (TP07), and 3,000mm (TP08). Although these tests vary around the infiltration basin design depth of 2,115mm, they are considered to provide representative infiltration test rates for the design of the basin. TP04 provides evidence for infiltration at a shallow depth and the soil logs in TP07 and TP08 show a consistent band of the Brintons Lane Sand and Gravel below a depth of 300mm (**Appendix H**).

7.6.10 The selected design rate for the rain garden is 0.295m/hr, which is the taken from the nearest soakage test to the raingarden, TP01 (distance of 6m).

7.6.11 In accordance with Table 25.2 in the SuDS Manual, a Factor of Safety of 1.5 is applied in the InfoDrainage calculations for both the proposed infiltration swale and proposed infiltration basin. The consequences of failure are low; any flooding as a result of a reduction in infiltration performance will be directed into open green space. Adherence to the maintenance schedules set out in Section 7.11 will help to ensure the future performance of the proposed infiltration features.

7.7 Modelling

7.7.1 The proposed drainage network and SuDS have been modelled using InfoDrainage, a computer-based hydraulic modelling software (**Appendix E**). The proposed design has been modelled for the 15 – 5760-minute storm durations using FEH13 data and for the following return periods.

- 50% Annual Exceedance Probability (AEP) i.e., 1 in 2-year Return Period.
- 3.3% AEP (1 in 30-year Return Period) plus an additional rainfall allowance of 40% for climate change.
- 1% AEP (1 in 100-year Return Period) plus an additional rainfall allowance of 45% for climate change.
- 3.3% AEP (1 in 30-year Return Period) excluding any additional rainfall allowance for climate change. This has been modelled as a sensitivity analysis for infiltration swale.

7.7.2 The pipe network has been modelled in accordance with the design levels and gradients in Stantec drawing 49868_2001_501 (**Appendix B**), with the exception of pipes S2.000 and S2.001. Pipes S2.000 and S2.001 have been raised in the InfoDrainage model by 330mm and

377mm, respectively, as InfoDrainage software does not allow for drainage connections into the filter medium layer of a swale. This modification in the InfoDrainage design is required to undertake the modelling and is a conservative approach; the levels in the proposed design layout allow for greater capacity in pipes S2.000 and S2.001.

7.7.3 The model simulation results show no surcharging in the pipe network for the 50% AEP event, with the exception of surcharging in pipes S2.000, and S2.001 due to the throttling effect from the infiltration swale. There is no flooding in the pipe network for the 1% AEP event (including 45% rainfall allowance for climate change).

7.7.4 The model simulation results show no flooding in the infiltration basin and the rain garden for the 1% AEP storm event (including 45% rainfall allowance for climate change).

7.7.5 The model simulation results show no flooding in the infiltration swale for the 3.3% AEP storm event excluding any rainfall allowance for climate change.

7.7.6 The model simulations results show flood volumes of 3.856m^3 and 10.183m^3 in the infiltration swale for the 3.3% AEP storm event (including 40% rainfall allowance for climate change) and the 1% AEP storm event (including 45% rainfall allowance for climate change). The site levels have been designed to direct flooding from the infiltration swale directly into the infiltration basin which has sufficient capacity for the additional water volume from the infiltration swale.

7.7.7 The infiltration swale flood volumes (paragraph 7.7.6) in the 3.3% AEP storm event (including 40% rainfall allowance for climate change) and the 1% AEP storm event (including 45% rainfall allowance for climate change) last for a maximum for 55 minutes and 135 minutes, respectively, according to the InfoDrainage model (**Appendix E**). The flood volumes will flow directly into the infiltration basin and, therefore, have a negligible impact on the operation of the site.

7.7.8 The maximum half drain down time is 213 minutes for the infiltration basin during the 1% AEP storm event (including 45% rainfall allowance for climate change). Including the additional volume of 10.183m^3 for the infiltration swale, the half drain down time is calculated as 227 minutes assuming that the basin drains at a constant rate. This is well within the acceptance criteria of draining down the feature by half within 24 hours.

7.7.9 The modelling confirms that the design includes a minimum of 300mm freeboard from all parts of the drainage network to the finished floor levels of the proposed site buildings (Table 7-5) as well as 300mm freeboard in the infiltration basin (Table 7-6). The finished floor levels of the welfare unit and shop unit are 90.575m AOD and 90.363m AOD, respectively.

Table 7-5: Summary of Freeboards for the 1% AEP Event (Including +45% Climate Change Allowance).

Connection / Feature Reference	Max. Water Level (m AOD)	Cover Level (m AOD)	Freeboard to Welfare Unit (mm)	Freeboard to Shop Unit (mm)
S1.000	89.886	90.218	689	477
S1.001	89.711	89.908	864	652
S1.002	89.225	89.679	1350	1138
S1.003	88.942	89.663	1633	1421
S1.004	88.846	89.507	1729	1517
S2.001	89.779	90.200	796	584
S2.000	89.850	90.100	725	513
Infiltration Swale (US)**	89.653	90.000	922	710
Infiltration Swale (DS)**	89.427	89.224	1148	936
Rain Garden	90.255	90.275	320	*108

*The proposed rain garden is located next to the welfare unit. Any exceedance flooding from the rain garden will flow towards the northern boundary of the development and away from the shop unit, as shown on Stantec drawing 49868/2001/530 (**Appendix B**).

**Upstream (US) and Downstream (DS) freeboards provided for the infiltration swale.

Table 7-6: Summary of Freeboard for the 1% AEP Event (Including +45% Climate Change Allowance).

Max. Water Level (m AOD)	Top of Bank Level (m AOD)	Infiltration Basin Freeboard (mm)	Freeboard to Welfare Unit (mm)	Freeboard to Shop Unit (mm)
88.862*	89.164	302	1713	1501

*Note that the maximum water level in the InfoDrainage model for the 1% AEP storm event (including +45% climate change allowance) is 88.807m AOD. The maximum water level of 88.862m AOD includes an additional 55mm of storage due to 10.183m^3 of flood water entering the basin from the infiltration swale. The 55mm of storage is spread over an area of 187m^2.

7.8 Exceedance

7.8.1 In the event of rainfall in exceedance of the maximum design storm (1% AEP +45% for climate change), the proposed surface levels on the site will direct flood water away from site buildings and car parking areas and towards the infiltration basin along the eastern edge of the site.

7.8.2 Any exceedance runoff that exceeds the 300mm freeboard in the infiltration basin will flow into the open field adjacent to the eastern boundary of the site. The proposed site levels direct exceedance runoff away from southern boundary to avoid impacting the adjacent access road and nearby A148 highway.

7.8.3 The design flood exceedance routes are shown on Stantec drawing 49868/2001/530.

7.9 Comparison to Greenfield Rates and Volumes

7.9.1 The greenfield runoff rates have been calculated for the site using the FEH methodology (**Appendix F**). Note: the site area is rounded up to 0.4ha in the calculations. The calculated runoff rates are presented in Table 7-7 below alongside the design discharge rates for the proposed drainage design.

Table 7-7: Greenfield Runoff Rates and Comparison.

Annual Exceedance Probability Event	Greenfield Runoff Rate (l/s)	Max. Design Discharge Rate (l/s)			
		Infiltration Swale	Infiltration Basin	Rain Garden	Total
50%	0.2	2.8	3.5	0.3	**6.6**
3.3%*	0.4	4.8	5.9	0.3	**11**
1%*	0.6	5.9	7.4	0.3	**13.6**

*Design rates include allowances for climate change of 40% (3.3% AEP) and 45% (1% AEP).

7.9.2 The greenfield runoff volumes have been calculated for the site using the FEH methodology (Table 7-8). Note: the site Area is rounded up to 0.37ha for the greenfield volume calculation.

Table 7-8: Greenfield Runoff Volumes and Comparison.

Annual Exceedance Probability Event	Greenfield Runoff Volume (m^3)	Design Discharge Volume (m^3)			
		Infiltration Swale	Infiltration Basin	Rain Garden	Total
50%	-	5.9	38.6	0.1	**44.6**
3.3%*	5	25.2	70.4	0.7	**96.3**
1%*	14	55.4	172.3	0.8	**228.5**

*Design volumes include allowances for climate change of 40% (3.3% AEP) and 45% (1% AEP).

7.10 Water Quality

7.10.1 In May 2013, Mott MacDonald prepared the Drainage Feasibility Study and Risk Assessment report for the existing Household Waste Recycling Centre to report on the pollution risk from the waste recycling centre and propose pollution mitigation measures for the surface water drainage network (Section 2.5).

7.10.2 In July 2023, Stantec UK produced the Hydrogeological Risk Assessment (HRA) report to aid with the application for discharge to ground consent for the proposed site. The assessment modelled the expected pollutants from the proposed service yard and determined that the potential risks to groundwater are acceptable under the requirement of the environmental permit application.

7.10.3 To further assess pollution risk from the development, the Simple Index Approach has been undertaken in accordance with the 'SuDS Manual' (CIRIA C753, 2015). This section outlines the Simple Index Approach calculation to assess the pollution hazard level for total suspended solids (TSS), heavy metals and hydrocarbons.

Pollution Hazard

7.10.4 The Pollution Hazard level has been assessed for both catchments (from 'Very Low' to 'High'), based on the descriptions provided in Table 26.2 of the 'SuDS Manual' (see Table 7-9 below).

Treatment Train 1 – Service Yard Catchment

7.10.5 Runoff from the service yard is likely to have a 'High' risk of pollution due to the frequent movement and storage of household waste material, and frequent movement of heavy goods vehicles in this area. Possible surface water pollution could come from the following sources.

- Frequent operation of heavy goods vehicles, due to exhaust products; wear and corrosion; and leaks or spillages of fuel or oil.
- Leaks and spillages from waste storage containers due to overfilling, movement of containers, and wear & tear of the containers.
- Animal faeces from wild animals and the disposal of pet bedding (vegetarian animals).
- Litter from site users.

7.10.6 The Pollution Hazard Level for Treatment Train 1 will be 'High'.

Treatment Train 2 – Access Road Catchment

7.10.7 The runoff from the proposed customer access road and car parking is likely to have a 'Low' risk of pollution. Possible sources of pollution in these areas include the following.

- Customer vehicles, due to exhaust products; wear and corrosion; and leaks or spillages of fuel or oil. Average daily traffic movements are predicted to be less than 300 movements per day and, therefore, the 'Low' risk criteria will apply as per Table 26.2 in the SuDS Manual (see Table 7-9 below).
- Faeces from wild animals.
- Litter from site users.
- Spillage of household waste in the car parking area as customers remove waste items from their cars.

7.10.8 The Pollution Hazard Level for Treatment Train 2 will be 'Low'. However, acknowledging that customers may occasionally spill household waste within the Access Road Catchment, the 'medium' Pollution Hazard Level will also be considered.

7.10.9 The Pollution Hazard Indices corresponding to the Pollution Hazard Level will be used for the Simple Index Approach calculation (Table 7-9).

Table 7-9: Pollution Hazard Indices as per CIRIA C753, Table 26.2

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways[1]	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways[1]	High	0.8[2]	0.8[2]	0.9[2]

Pollution Mitigation

7.10.10 Pollution mitigation has been assessed using the Pollution Mitigation Indices stated in Table 26.4 in the 'SuDS' Manual and information from product suppliers (**Appendix L**). As the management systems are used in sequence, a factor 0.5 is used to account for the reduced performance of secondary or tertiary components associated with already reduced inflow concentrations (Equation 1).

Equation 1: Total SuDS mitigation index = mitigation index$_1$ + 0.5 (mitigation index$_2$) + 0.5 (mitigation index$_3$)

Treatment Train 1 – Service Yard Catchment

7.10.11 The treatment train for the Service Yard Catchment consists of the V-Septor Hydrodynamic Separator by ACO (paragraph 7.10.12) and the bio-retention soil filtration layer in the infiltration basin (paragraph 7.10.13). Table 7-10 shows the pollution mitigation calculation in accordance with the Simple Index approach to demonstrate that sufficient mitigation measures have been proposed.

7.10.12 Catch pit CP5 is to be fitted with the V-Septor Hydrodynamic Separator by ACO, a proprietary water treatment system, to remove some pollutants before the runoff enters the infiltration basin. The V-Septor allows suspended solids to settle down into an internal chamber and can capture light liquids and debris at the surface of the water.

7.10.13 The surface of the infiltration basin includes a layer of bio-retention soil, with a minimum depth of 400mm, to provide additional treatment as water percolated through the soil in the basin. The surface of the bio-retention soil is to be vegetated.

7.10.14 Surface water runoff from the service yard will be drained by a series of gullies. Although gully sumps will capture some pollutants, they are not considered in the Simple Index calculation and, therefore, provide additional treatment beyond that demonstrated by the Simple Index approach.

7.10.15 Catch Pit CP S4 is fitted with a penstock valve which is to be left open during normal operation of the site. In the event of firefighting or significant pollution occurring on site, the penstock valve will be closed to prevent highly polluted runoff from entering the infiltration basin. The runoff will be collected in the fire tank underlying the service yard and then be disposed of appropriately following the fire / pollution event.

7.10.16 Sampling points are to be installed at strategic locations within the infiltration basin so that the quality of treated surface water runoff can be monitored during the operation of the waste recycling centre.

7.10.17

Table 7-10: Pollution Mitigation Indices – Treatment Train 1 - Service Yard Catchment

Management Component (in Sequence)	*Information Source*	*Pollution Mitigation Indices*		
		TSS	***Metals***	***Hydrocarbons***
Hydrocarbon and contaminant filter system	ACO V-Septor Hydrodynamic Separator	0.5	0.4	0.5
Bioretention Soil	CIRIA C753, Table 26.4 (300mm min soil with good contaminant attenuation potential)	0.8	0.8	0.8
Total Mitigation Indices (as per Equation 1)		**0.9**	**0.8**	**0.9**
Pollution Hazard Indices ('High')		**0.8**	**0.8**	**0.9**
Pollution Mitigation Index ≥ Pollution Hazard Index		**Yes**	**Yes**	**Yes**

Treatment Train 2 – Access Road Catchment

7.10.18 Runoff from the customer access road and associated parking will be drained via dropped kerb drainage inlets along the length of the access road into the infiltration swale. The infiltration swale includes a layer of bio-retention soil to remove pollutants as the surface water runoff percolates into the underlying natural soils. The Simple Index Approach calculation in Table 7-11 demonstrates that sufficient treatment is provided in the infiltration swale.

Table 7-11: Pollution Mitigation Indices – Treatment Train 2 - Access Road Catchment.

Management Component (In Sequence)	*Information Source*	*Pollution Mitigation Indices*		
		TSS	***Metals***	***Hydrocarbons***
Infiltration Swale	CIRIA C753, Table 26.4 A layer of dense vegetation underlain by a soil with good contaminant attenuation potential of at least 300mm in depth	0.8	0.8	0.8
Total Mitigation Indices (as per Equation 1)		**0.8**	**0.8**	**0.8**
Pollution Hazard Indices ('Low')		**0.5**	**0.4**	**0.4**
Pollution Hazard Indices ('Medium')		**0.7**	**0.6**	**0.7**
Pollution Mitigation Index ≥ Pollution Hazard Index		**Yes**	**Yes**	**Yes**

7.11 Maintenance

7.11.1 The whole site will be managed throughout the operational phase under an environmental permit. As such, measures will be in place to remove litter across the site and mitigate the risk of pollution spillage. This section outlines the maintenance requirements regarding the proposed drainage features.

7.11.2 The following maintenance should be programmed and undertaken for all parts of the drainage infrastructure.

ACO V-Septor Hydrodynamic Separator (ACO)

7.11.3 To ensure the reliable functioning of separators and ongoing environmental protection, the separator requires regular maintenance and servicing. This will be undertaken by Norfolk County Council or a specialist contractor procured by Norfolk County Council.

7.11.4 The unit should be inspected every 6 months, and the oil and floatable chamber and sludge trap emptied every 6 months to 3 years depending on pollution load.

7.11.5 Following the first two years of operation, the maintenance requirements for the ACO product should be reviewed and amended as required (i.e., maintenance periods can vary depending on pollutant load).

7.11.6 The ACO V-Septor Chamber is a Confined Space. It is not necessary to enter for routine maintenance. The flow breaker floor can be lifted using the lifting wire supplied (which should be extended according to the overall chamber depth. Local regulations must be fully observed in the event of planned or unplanned entry. If in doubt, consult with a professional Engineer or other competent person who can advise.

Gullies, Catch Pits and Pipework

7.11.7 The gully grates and sumps should be inspected weekly or as required. The gratings should be cleared of all material that is blocking the flow of surface water. If the gully sumps look like they are becoming full, they should be emptied using suitable sump cleaning equipment and waste material from the sumps should be disposed of offsite to an approved site.

7.11.8 The maintenance of this network will be carried out on a yearly basis, or as deemed necessary. It will be undertaken by the site operator who is responsible for running the site.

Spent Fire Water

7.11.9 Additionally, a penstock valve has been proposed for the discharge point into the network (Stantec drawing 49868/2001/501 in **Appendix B**). In the case of firefighting activity, or a major pollution spill event, the penstock valve will be closed to prevent polluted water entering the infiltration basin. The penstock valve is to be closed when / if safe to do so prior to extinguishing fires. A specialist contractor will collect the residual firefighting water on the site prior to reopening the penstock valves, and discharge appropriately.

Infiltration Swale and Infiltration Basin

7.11.10 Maintenance of the swale and basin features will be as per the schedules in Table 7-12 and Table 7-13.

7.11.11 As discussed in Section 7.5, the swale and basin both have gradients steeper than the typical steepest gradient of 1 in 3. Access to the basin for maintenance is provided at the northern end of the basin, which has been designed with a 1:3 gradient.

7.11.12 The swale is 400mm deep and, therefore, deemed shallow enough for ingress / egress.

7.11.13 Maintenance of the proposed SuDS will be carried out by Norfolk County Council or the maintenance contractor appointed by Norfolk County Council.

Table 7-12: Infiltration Swale Maintenance Schedule

Operation and Maintenance Requirements for Infiltration Swale		
Maintenance schedule	**Required action**	**Typical frequency**
Regular maintenance	Remove litter and debris	Daily
	Cut grass – to retain grass height within specified design range	Every 5 weeks
	Manage other vegetation and remove nuisance plants	Monthly at start, then as required
	Inspect inlets, outlets and overflows for blockages and clear if required	Weekly
	Inspect infiltration surfaces for ponding, compaction, silt accumulation, record areas where water is ponding for >48 hours	Monthly, or when required
	Inspect vegetation coverage	Inspection every 5 weeks, re-planting as required and during planting season.
	Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies	Half yearly
Occasional maintenance	Reseed areas of poor vegetation growth, alter plant types to better suit conditions, if required	As required or if bare soil is exposed over 10% or more of the swale treatment area
Remedial actions	Repair erosion or other damage by re-turfing or re-seeding	As required
	Relevel uneven surfaces and reinstate design levels	As required
	Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of the soil surface	As required once erosion matting has biodegraded.
	Remove build-up of sediment on inlet structures.	As required
	Remove and dispose of oils or petrol residues using safe standard practices	As required. Spill procedures in places across site. SuDS management for oil / petrol as additional management procedure.

Table 7-13: Infiltration Basin Maintenance Schedule

Operation and Maintenance Requirements for Bioretention		
Maintenance schedule	**Required action**	**Typical frequency**
Regular inspections	Inspect infiltration surfaces for silting and ponding, record de-watering time of the facility and assess standing water levels in underdrain (if appropriate) to determine if maintenance is necessary.	Every 6 months
	Check operation of underdrains by inspection of flows after rain	Annually
	Assess plants for disease infection, poor growth, invasive species etc and replace as necessary during growing season.	Assessment of plants every 5 weeks. Replacement during growing season, as required.
	Inspect inlets and outlets for blockages	Weekly
	Remove litter and surface debris (daily), and weeds (every 5 weeks)	As stated, to left.
	Replace plants to maintain planting density	During planting season
	Remove sediment, litter and debris build-up from around inlets or from forebays	As required
	Check gabion basket mesh (every 6 months) for signs of degradation, repair as required. Gabion rock should be replaced where lost due to degradation of the mesh.	As stated, to left.
	Check gabion baskets for accumulation of silt, litter, and other debris (every 6 months). Jet wash / clean as required.	As stated, to left.
	Check soil and landscaping at the toe of the gabion baskets and replace any lost soil / grass cover as required (every 6 months).	As stated, to left.
	Check baskets for the ingress of any plant roots and remove plant routes as required.	As stated, to left.
	Check the gabion basket and soil surrounding the baskets for any sign of movement. Immediately inform Site Management / Site Owner if any signs of movement have been observed. Specialist advice should be sought.	Daily
Occasional maintenance	Infill any holes or scour in the filter medium, improve erosion protection if required	During first year of operation, as required.
	Repair minor accumulations of silt by raking away surface mulch, scarifying surface of medium and replacing mulch	As required, following biodegradation of erosion matting.
Remedial actions	Remove and replace filter medium and vegetation above	As required but likely to be >20 years

7.12 Foul Water Drainage Strategy

7.12.1 A foul water drainage network has been proposed to serve the two proposed buildings for the waste recycling facility. The proposed Welfare unit is to include 1no. kitchen sink, 1no. bathroom sink and 1no. WC connection, and the proposed Re-Use Shop and Storage Space unit is to include 1no. potential sink connection.

7.12.2 The proposed foul network will convey effluent to the proposed cesspool located in front of the proposed Storage Space building. The cesspool is easily accessible for HGVs via the main access route, allowing the cesspool to be maintained and emptied at regular intervals or as required.

7.12.3 This strategy has been taken as there are no nearby foul sewers to which the site can discharge, as shown on existing Anglian Water sewer records (**Appendix C**).

7.12.4 For the proposed foul drainage layout, refer to Stantec drawing 49868/2001/501 (**Appendix B**).

8 Residual Risk

8.1.1 The proposed drainage design has been modelled and designed for no flooding in the 100-year (plus 45% for climate change) rainfall event. In the event of rainfall event greater that the 100-year (plus 45% for climate change) rainfall event, flood water is to be directed away from site buildings and car parking areas. Exceedance flood waters will flow towards the eastern end of the site into the infiltration basin; when the infiltration basin overflows, the exceedance flood waters will flow into the open field adjacent to the site. Proposed levels across the site will direct exceedance flows away from the access road adjacent to the southern site boundary.

8.1.2 Regular inspection and maintenance of any drainage systems should also be undertaken to further mitigate this residual risk.

8.1.3 A construction methodology and Construction Environmental Management Plan (CEMP) is to be provided and implemented prior to any construction being undertaken.

8.1.4 As such, the residual risk is considered to be acceptable for the lifetime of the development.

9 Conclusion

9.1.1 This Flood Risk Assessment (FRA) has been prepared by Stantec on behalf of our client, Norfolk County Council, to accompany a full planning application for a proposed Recycling Centre, on Holt Road in Sheringham. Norfolk.

9.1.2 This FRA concludes that:

- The Environment Agency's Flood Map for Planning confirms the existing site is located within Flood Zone 1
- The proposed agricultural development is classified as 'less vulnerable' development and will be located wholly within Flood Zone 1
- The surface water drainage proposals for the site are detailed in the separate 'Drainage Strategy Report' (Stantec, February 2021) but based on on-site attenuation and infiltration within the site boundary.

9.1.3 In conclusion, the future occupants and users of the operational site will be safe from flooding and there will be no detrimental impact on third parties. The proposal complies with the National Planning Policy Framework (NPPF) and local planning policy with respect to flood risk and is an appropriate development at this location.

9.1.4 In summary, the proposed surface water treatment systems have been assessed using the Simple Index Approach, as per the 'SuDS Manual', specifically in response to comments from Norfolk Country Council, as Lead Local Flood Authority. The proposed surface water management systems provide adequate surface water treatment for the expected pollution hazards for the proposed development based on the Simple Index Approach. In line with Table 4.3 of the SuDS Manual (Minimum water quality management requirements for discharge to receiving surface waters and groundwater) a detailed Risk Assessment and Groundwater Activity Permit will be submitted to the Environment Agency as the Environmental Regulator and should be referred to alongside this report.

Appendix A Location Plans & Flood Risk Maps

Stantec	Client: Norfolk County Council	**SHERINGHAM RECYCLING CENTRE** Site Location	0 125 250 m Contains OS data © Crown Copyright and database right 2020	1:2,500 @ A3	Date: 25/02/2021
				Drawn: MD	Checked: RL
				Figure 49868/4001/GIS001a	Rev A

Document Path: \\pba.int\cam\Projects\49868 Sheringham Recycling Centre\GIS\Workspaces\49868 2002 GIS001a Site Location.mxd

Stantec

Client
Norfolk County Council

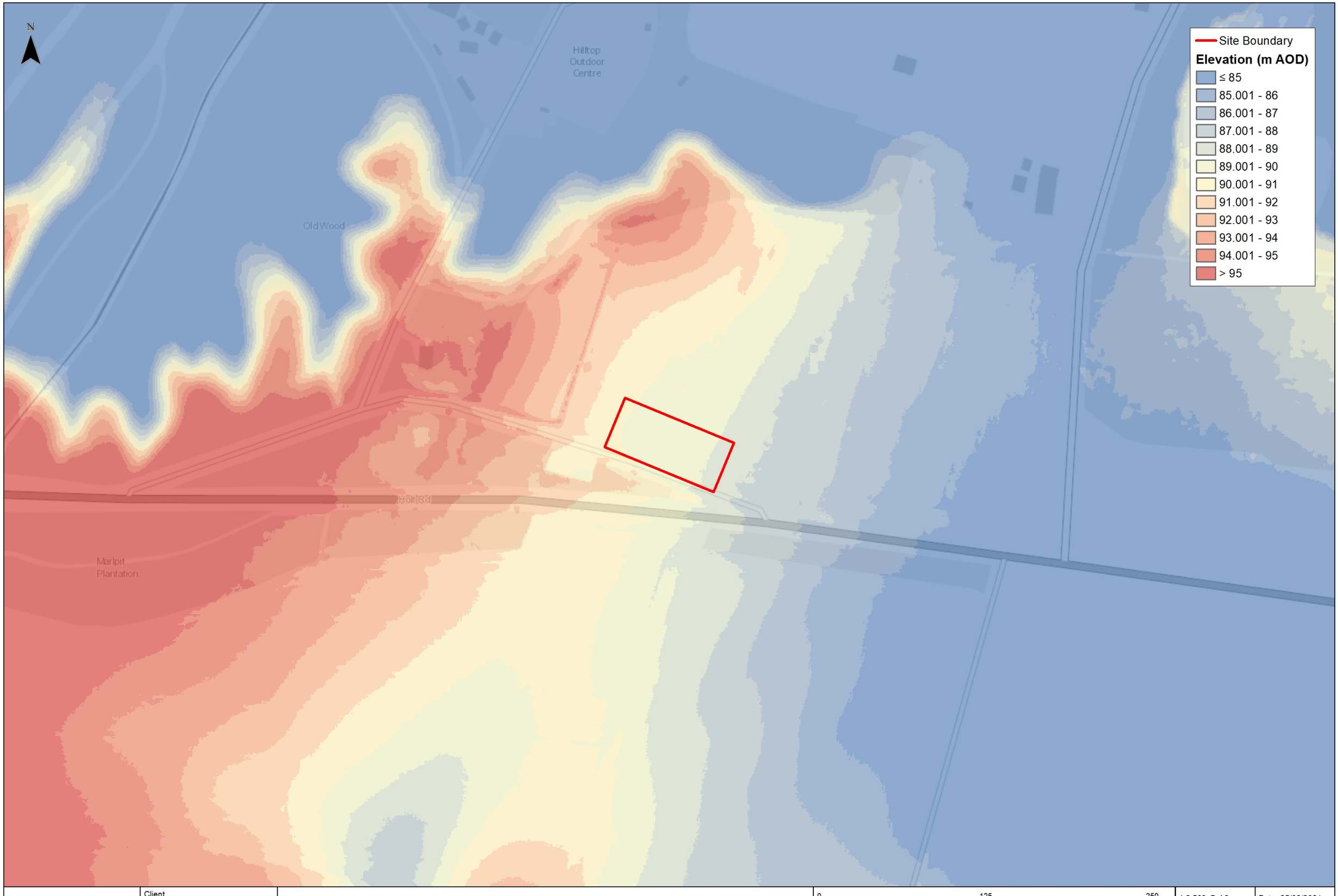
SHERINGHAM RECYCLING CENTRE
Site Location (Aerial)

0 125 250 m

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1:2,500 @ A3	Date: 25/02/2021
Drawn: MD	Checked: RL
Figure 49868/4001/GIS001b	Rev A

Document Path: J:\49868 Sheringham Recycling Centre\GIS\Workspaces\49868 2002 GIS001b Site Location (Aerial).mxd



Stantec

Client: Norfolk County Council

SHERINGHAM RECYCLING CENTRE

Site Topography (1m LiDAR)

0 125 250 m

1:2,500 @ A3 | Date: 25/02/2021

Drawn: MD | Checked: RL

Figure 49868/4001/GIS002 | Rev A

Document Path: J:\49868 Sheringham Recycling Centre\GIS\Workspaces\49868 2002 GIS002 Topography.mxd

Stantec

Client: Norfolk County Council

SHERINGHAM RECYCLING CENTRE

Environment Agency Flood Zones for Planning

0 125 250 m

1:2,500 @ A3	Date: 25/02/2021
Drawn: MD	Checked: RL
Figure 49868/4001/GIS003	Rev A

Document Path: J:\49868 Sheringham Recycling Centre\GIS\Workspaces\49868 2002 GIS003 Flood Zones.mxd

Stantec	Client: Norfolk County Council	**SHERINGHAM RECYCLING CENTRE** Flood Risk from Surface Water (Flood Extents)	0 125 250 m Contains OS data © Crown Copyright and database right 2020 Contains EA data © Environment Agency copyright and database right 2015. All rights reserved.	1:2,500 @ A3	Date: 25/02/2021
				Drawn: MD	Checked: RL
				Figure 49868/4001/GIS004	Rev A

Document Path: J:\49868 Sheringham Recycling Centre\GIS\Workspaces\49868 2002 GIS004 Flood Risk from Surface Water (Flood Extents).mxd

Stantec

Client: Norfolk County Council

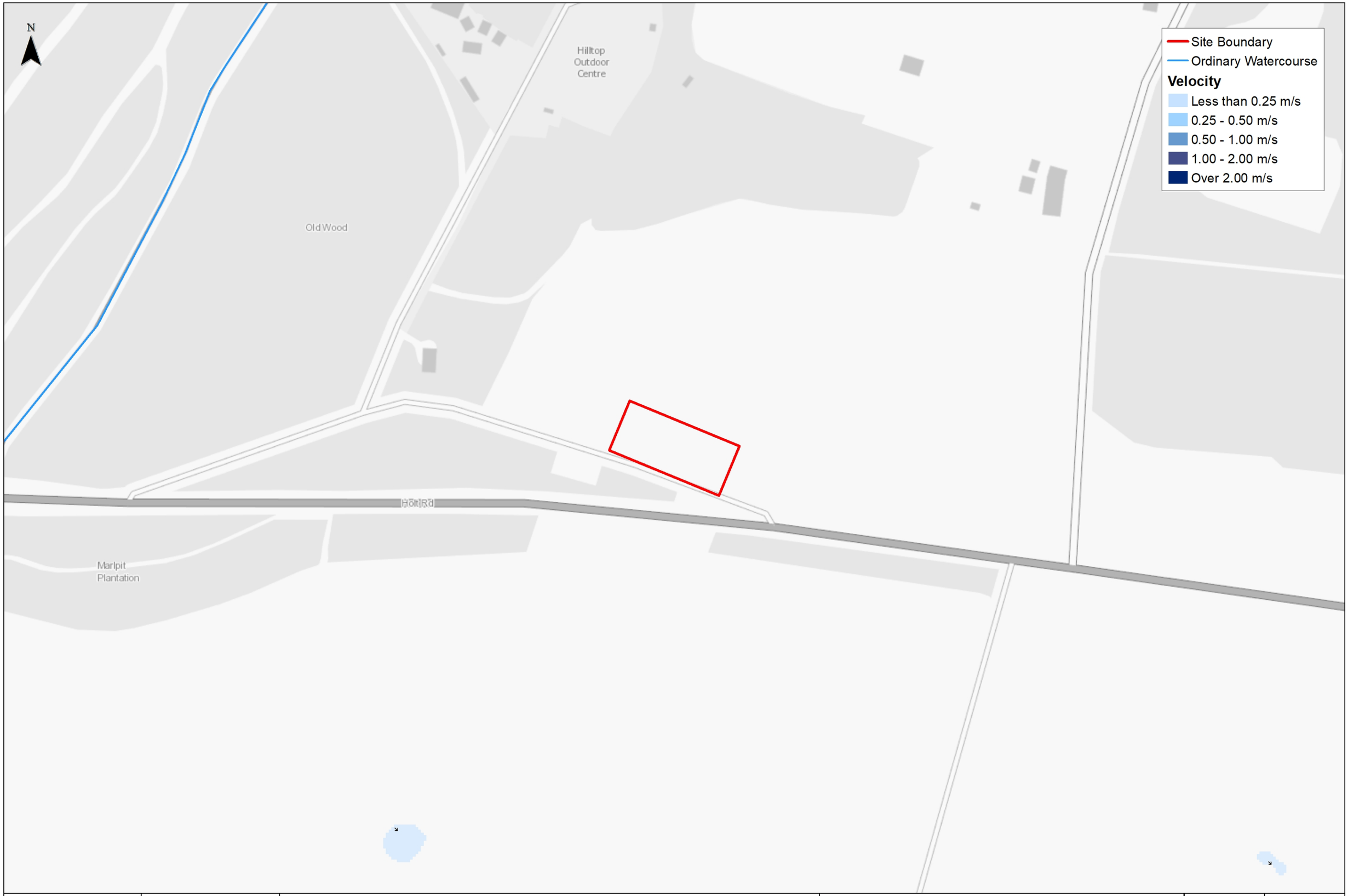
SHERINGHAM RECYCLING CENTRE

Flood Risk from Surface Water
(High Risk Depth)

0 125 250 m

1:2,500 @ A3	Date: 25/02/2021
Drawn: MD	Checked: RL
Figure 49868/4001/GIS005	Rev A

Document Path: J:\49868 Sheringham Recycling Centre\GIS\Workspaces\49868 2002 GIS005 Flood Risk from Surface Water (High Risk Depth).mxd



Stantec

Client: Norfolk County Council

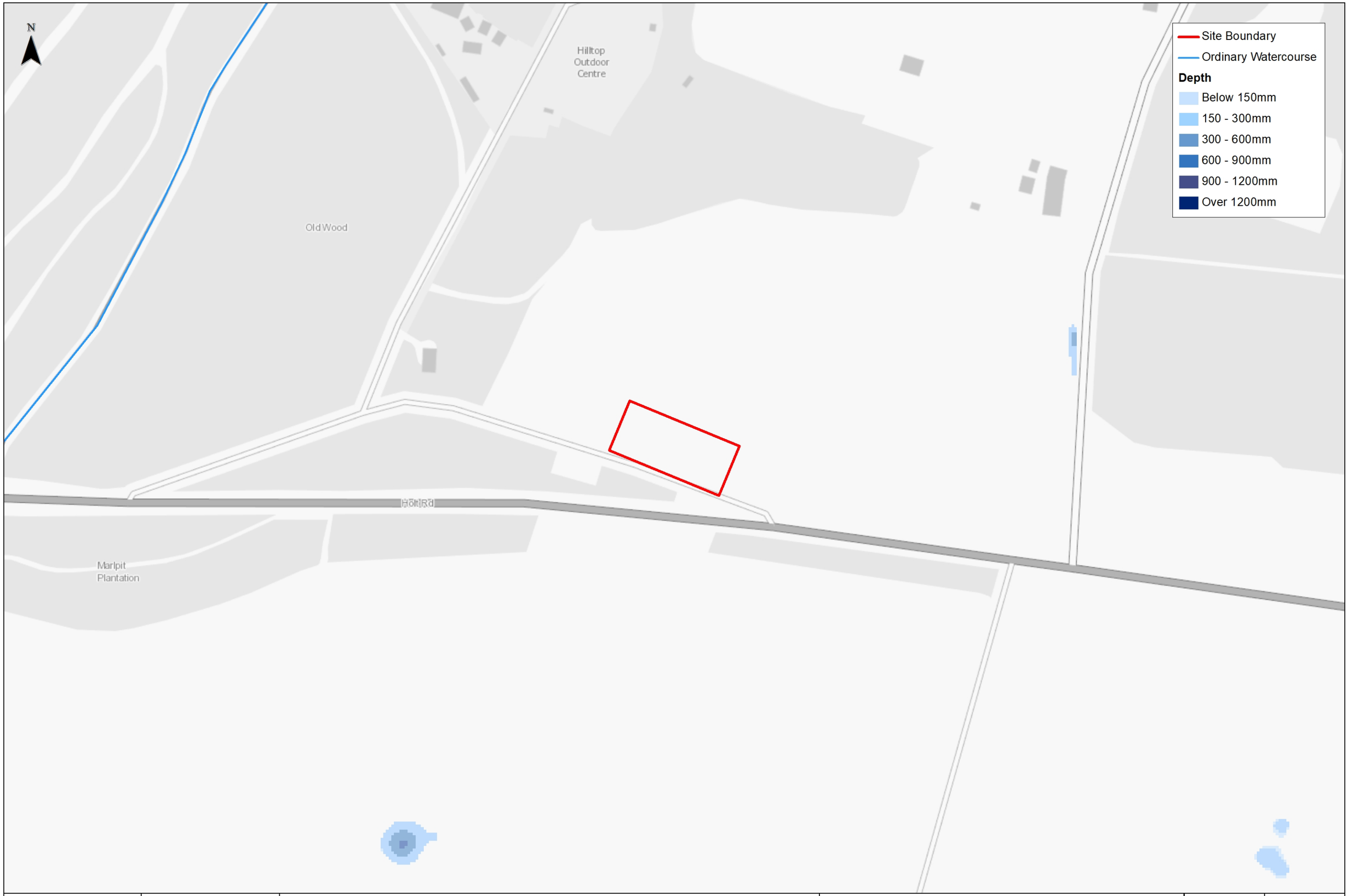
SHERINGHAM RECYCLING CENTRE

Flood Risk from Surface Water
(High Risk Velocity)

0 125 250 m

1:2,500 @ A3	Date: 25/02/2021
Drawn: MD	Checked: RL
Figure 49868/4001/GIS006	Rev A

Document Path: \\pba.int\cam\Projects\49868 Sheringham Recycling Centre\GIS\Workspaces\49868 2002 GIS006 Flood Risk from Surface Water (High Risk Velocity).mxd



Stantec

Client: Norfolk County Council

SHERINGHAM RECYCLING CENTRE

Flood Risk from Surface Water
(Medium Risk Depth)

0 125 250 m

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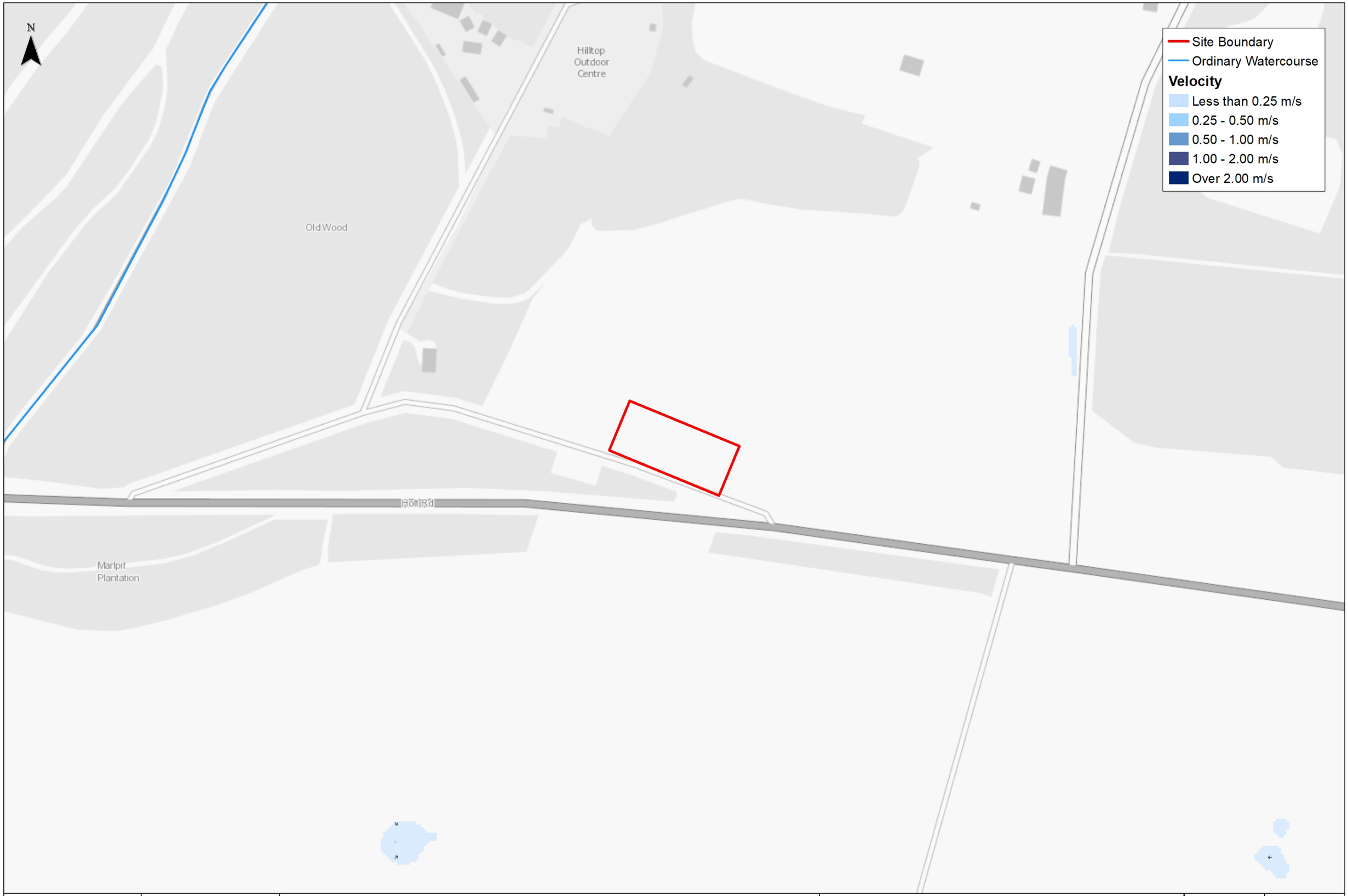
Drawn: MD	Checked: RL
Figure 49868/4001/GIS007	Rev A

Document Path: J:\49868 Sheringham Recycling Centre\GIS\Workspaces\49868 2002 GIS007 Flood Risk from Surface Water (Medium Risk Depth).mxd



Stantec

Client: Norfolk County Council

SHERINGHAM RECYCLING CENTRE

Flood Risk from Surface Water
(Medium Risk Velocity)

0 125 250 m

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Figure 49868/4001/GIS008	Rev A

Document Path: \\pba.int\cam\Projects\49868 Sheringham Recycling Centre\GIS\Workspaces\49868 2002 GIS008 Flood Risk from Surface Water (Medium Risk Velocity).mxd

Stantec

Client: Norfolk County Council

SHERINGHAM RECYCLING CENTRE

Flood Risk from Surface Water
(Low Risk Depth)

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Drawn: MD	Checked: RL
Figure 49868/4001/GIS009	Rev A

Document Path: J:\49868 Sheringham Recycling Centre\GIS\Workspaces\49868 2002 GIS009 Flood Risk from Surface Water (Low Risk Depth).mxd

Stantec

Client: Norfolk County Council

SHERINGHAM RECYCLING CENTRE

Flood Risk from Surface Water
(Low Risk Velocity)

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Drawn: MD	Checked: RL
Figure 49868/4001/GIS010	Rev A

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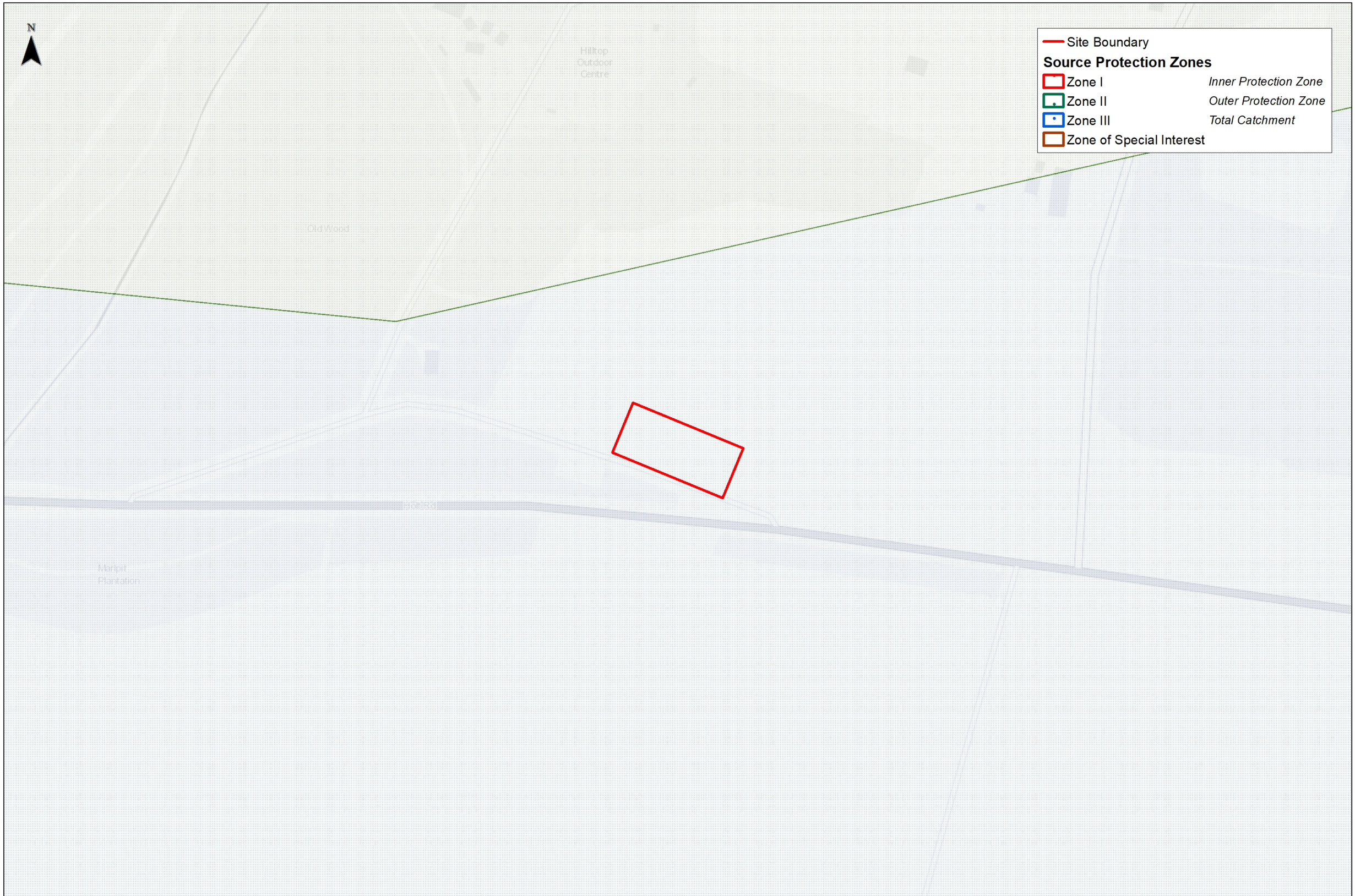

Stantec

Client: Norfolk County Council

SHERINGHAM RECYCLING CENTRE

Source Protection Zones

0 125 250 m

1:2,500 @ A3	Date: 25/02/2021
Drawn: MD	Checked: RL
Figure 49868/4001/GIS014	Rev A

Document Path: J:\49868 Sheringham Recycling Centre\GIS\Workspaces\49868 2002 GIS014 Source Protection Zones.mxd

Appendix B Development Plans

ALIGNMENT_MAIN SITE LINE
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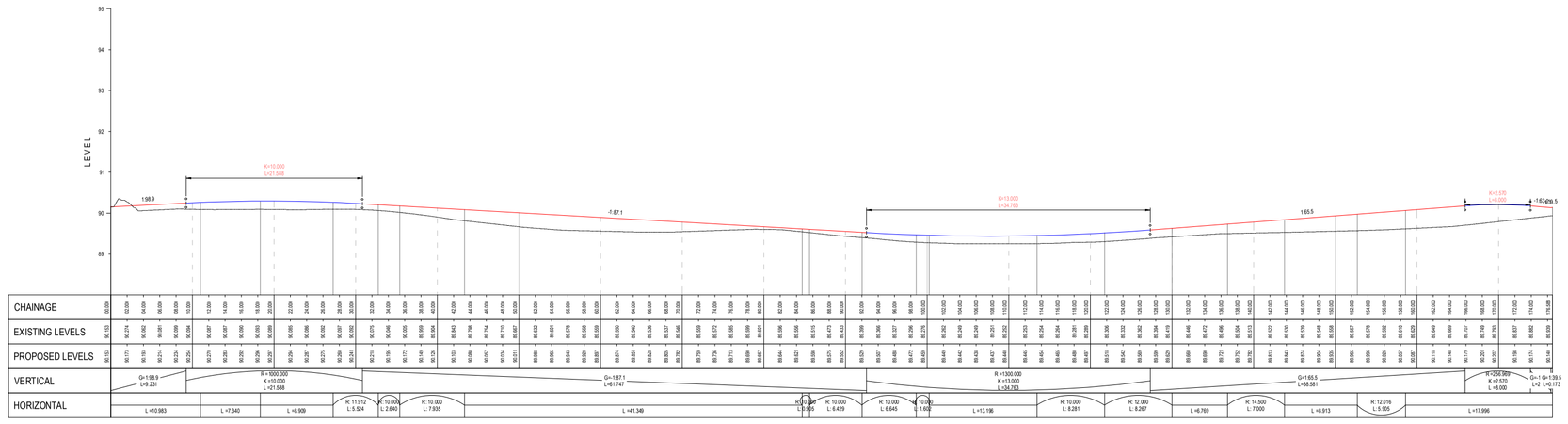

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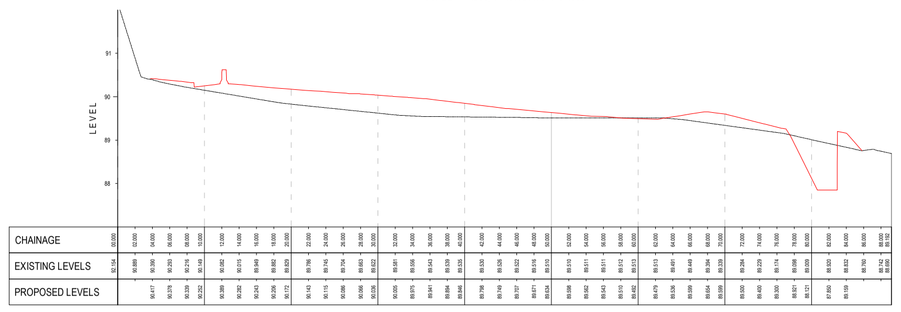

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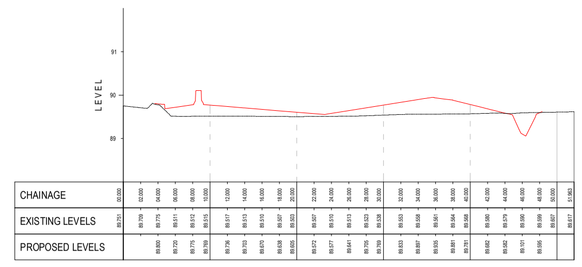

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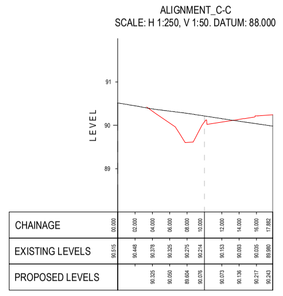

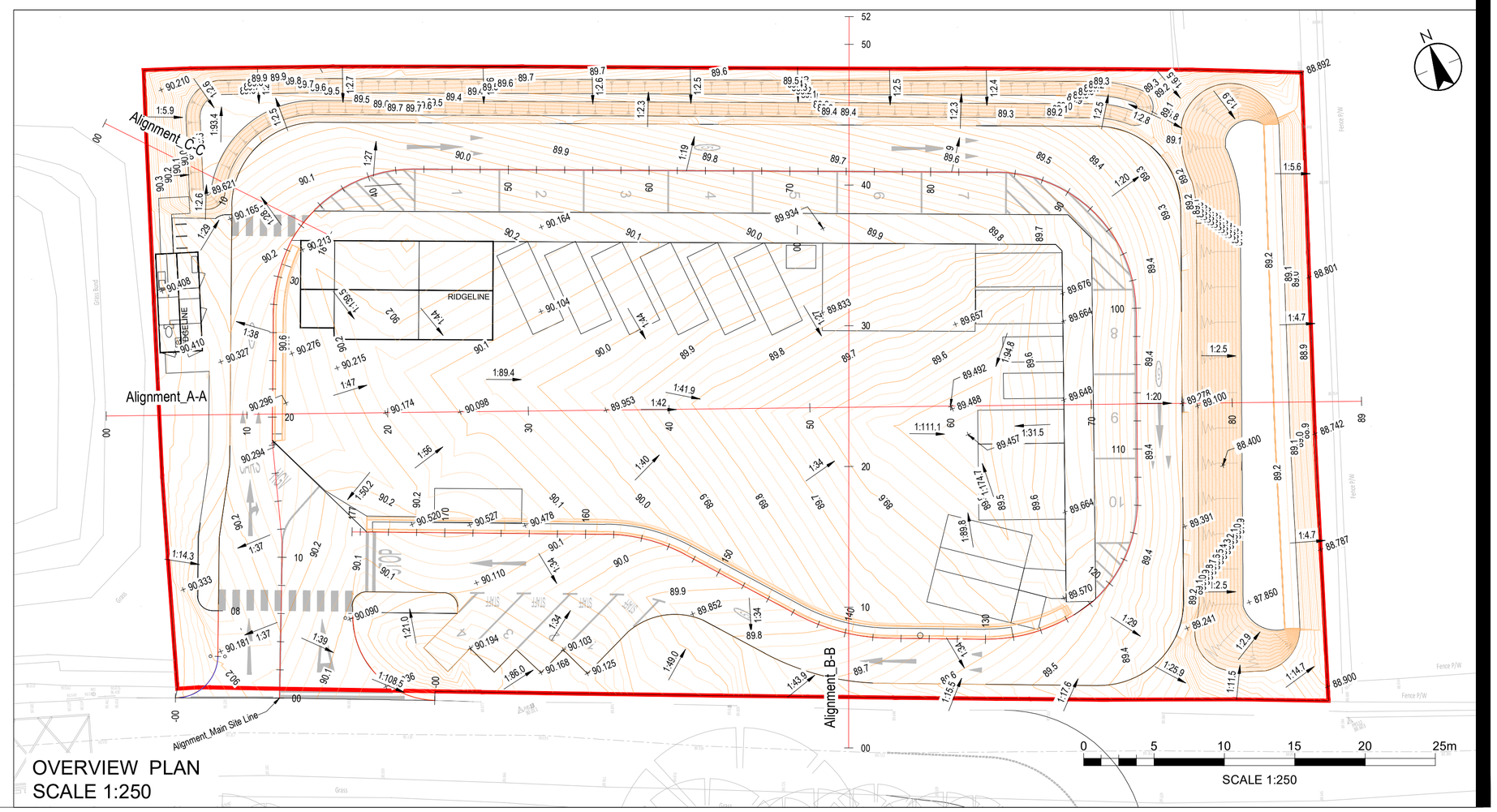

OVERVIEW PLAN
SCALE 1:250

Plotted: 21.03.2024 10:04:03 21:19:23 PM By: O'Callaghan, Rhys
C:\Users\rhys.ocallaghan\Documents\49868 sheringham recycling centre\civil\civil dwgs\2001 civil 49868_2001_IA1 - site sections

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www.stantec.com/uk

Notes

UTILITIES NOTE: The position of any existing public or private sewers, utility services, plant or apparatus shown on this drawing is believed to be correct, but no warranty to this is expressed or implied. Other such plant or apparatus may also be present but not shown. The Contractor is therefore advised to undertake their own investigation where the presence of any existing sewers, services, plant or apparatus may affect their operations.

1. All dimensions are in millimetres unless noted otherwise.
2. All levels are in metres relative to Ordnance Datum Newlyn unless noted otherwise.
3. All coordinates are in metres relative to Ordnance Survey National Grid.
4. The Contractor is to verify all dimensions on site before commencing work or preparing shop drawings.
5. This drawing is to be read in conjunction with all Engineers and Architects drawings and specifications.

Issued/Revision		By	Appd	YYYY.MM.DD
P07 UPDATED FOR LLFA COMMENTS	SL	TB		2024.03.22
P06 SITE LAYOUT UPDATED	DF	TB		2023.08.11
P05 BACKGROUND INFORMATION UPDATED	DF	TB		2023.02.02
P04 ISSUE STATUS AND DESIGN AMENDED	DF	TB		2023.01.09
P03 SITE LEVEL DESIGN AMENDED	DF	WW		2022.12.16
P02 LEVEL DESIGN AMENDED	DF	TB		2022.11.15
	DF	RZ	TB	2022.10.04
	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Issue Status

PLANNING APPROVAL

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Norfolk County Council

Client/Project

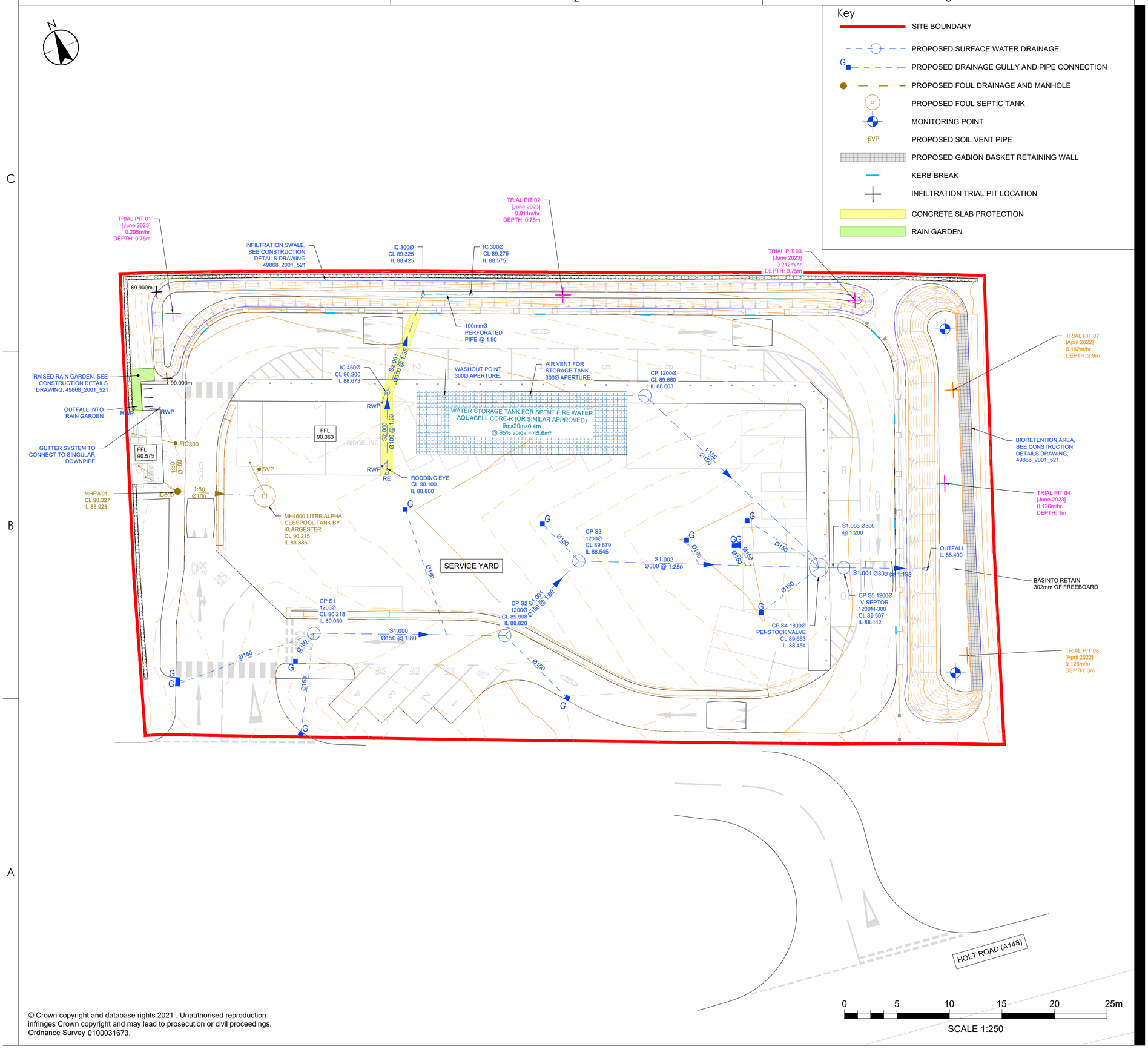
NORFOLK COUNTY COUNCIL

SHERINGHAM RECYCLING CENTRE

Title

PROPOSED SITE SECTIONS

Project No.	Scale
49868	A1 @ 1:500
Revision	**Drawing No.**
P07	**49868/2001/161**



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CAMBRIDGE
50/60 Station Road, Cambridge, CB1 2JH
Tel: +44 1223 882 000
www.stantec.com/uk

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P09 UPDATED FOR LLFA COMMENTS		SL	TB	2024.03.22
Issued/Revision		By	Appd	YYYY.MM.DD
	DF	-	TB	2022.09.23
	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Issue Status

PLANNING APPROVAL

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Client/Project

NORFOLK COUNTY COUNCIL

SHERINGHAM RECYCLING CENTRE

Title

PROPOSED DRAINAGE LAYOUT

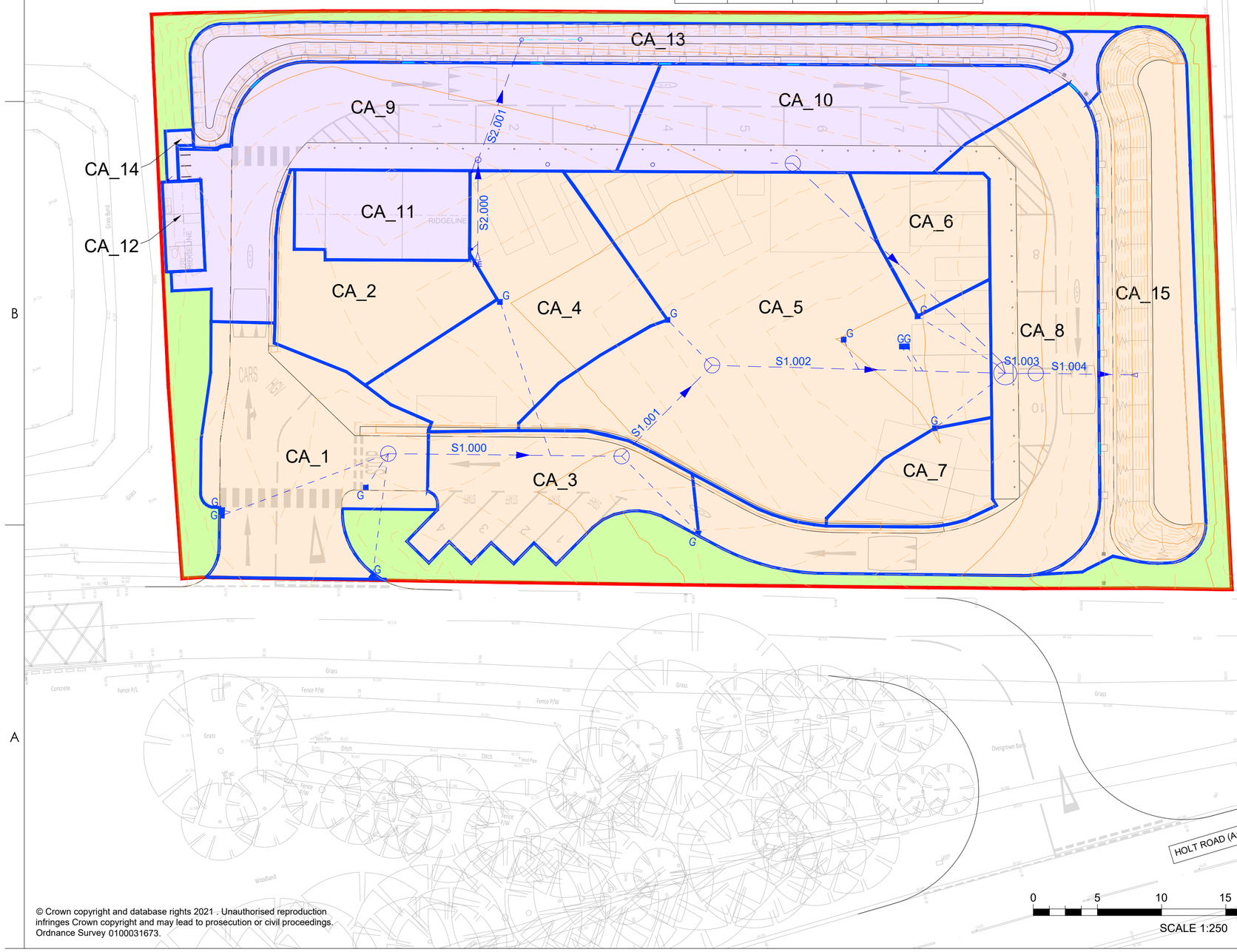
Project No.	Scale
49868	1:250 @ A2
Revision	**Drawing No.**
P09	**49868/2001/501**

Plotted: 21.03.2024 2024.03.21 1:17:47 PM By: O'Callaghan, Rhys
ORIGINAL SHEET - ISO A2 \\corn-vfps-001\corn\projects\49868 sheringham recycling centre\cad\dwgs\2001_civil\49868_2001_501 - drainage layout

Contributing Area Reference	Contributing to (Feature / Pipe Reference)	Catchment type	Contributing Area (ha)	Site Catchment Area	Outfall Point
CA_1	S1.000	Paved Surface / Roof Area	0.027	Service Yard	Infiltration Basin
CA_2	S1.000		0.013		
CA_3	S1.001		0.016		
CA_4	S1.002		0.024		
CA_5	S1.002		0.062		
CA_6	S1.003		0.009		
CA_7	S1.003		0.007		
CA_8	Infiltration Basin		0.040		
CA_9	Infiltration Swale		0.025	Access Road	Infiltration swale
CA_10	Infiltration Swale		0.034		
CA_11	S2.000		0.009		
CA_12	Rain Garden		0.002		
CA_13	Infiltration Swale	Open SuDS Feature	0.024		
CA_14	Rain Garden				
CA_15	Infiltration Basin			Service Yard	Infiltration Basin
TOTAL	-	-	**0.327**	-	-

Key

- SITE BOUNDARY
- DRAINAGE GULLY AND PIPE CONNECTION
- PROPOSED SURFACE WATER DRAINAGE
- KERB BREAK
- ACCESS ROAD CATCHMENT AREA
- SERVICE YARD CATCHMENT AREA
- OPEN GREEN SPACE AREA TO DRAIN IN-SITU - WILL NOT BE POSITIVELY DRAINED VIA NETWORK



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P06 UPDATED FOR LLFA COMMENTS		SL	TB	2024.03.22
Issued/Revision		By	Appd	YYYY.MM.DD
	DF	RZ	TB	2022.12.16
	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

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NORFOLK COUNTY COUNCIL

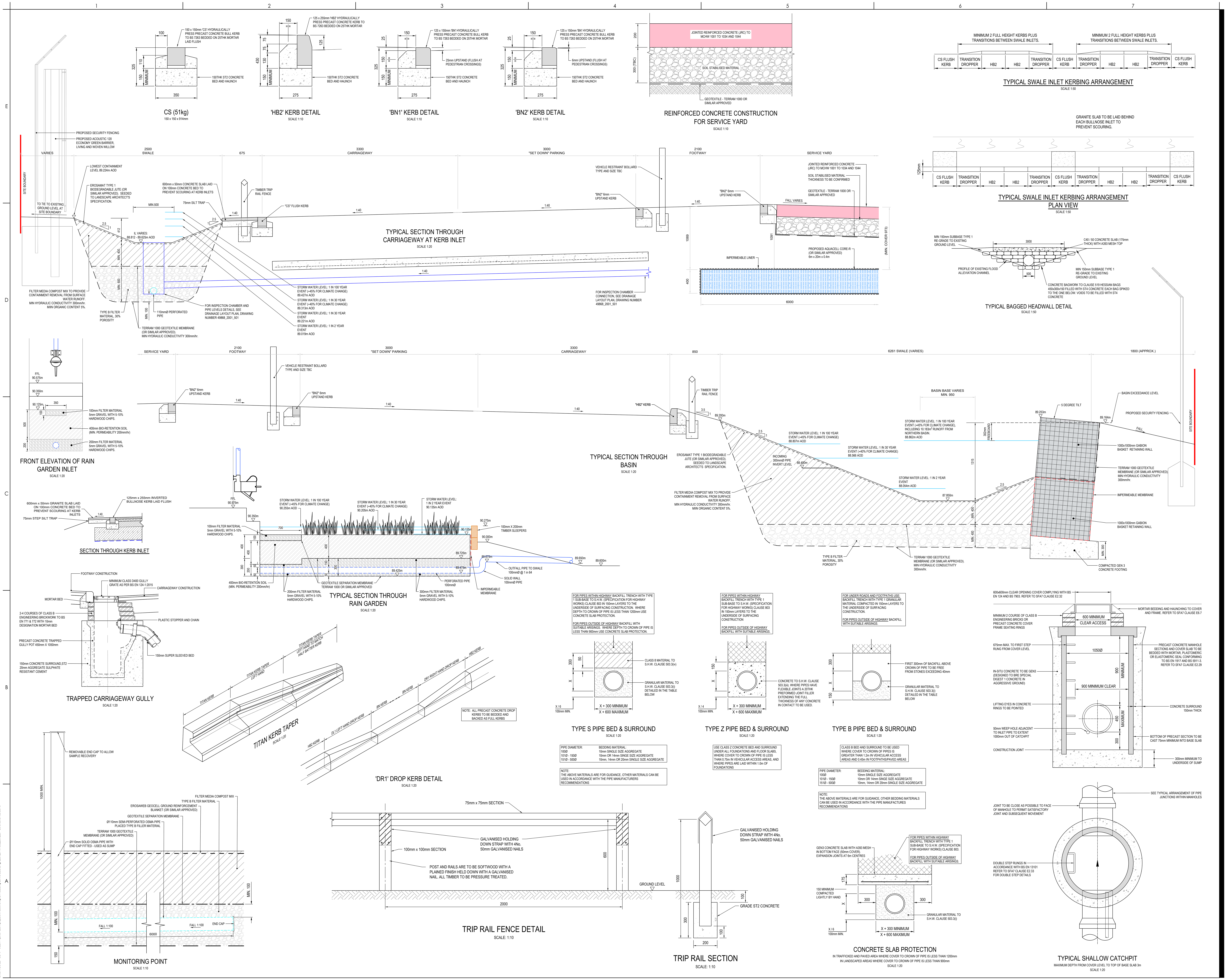
SHERINGHAM RECYCLING CENTRE

Title

CATCHMENT PLAN

Project No.	Scale
49868	1:250 @ A2
Revision	Drawing No.
P06	**49868/2001/503**

Plotted: 21.03.2024 2024.03.21 1:32:52 PM By: O'Callaghan, Rhys
ORIGINAL SHEET - ISO A2 \\cam-vfps.001\cam\projects\49868 sheringham recycling centre\cad\dwgs\2001_civ\49868_2001_503 - catchment plan



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Issued/Revision		By	Appd	YYYY.MM.DD
P08	UPDATED FOR LLFA COMMENTS	RO	TB	2024.03.22
P07	DETAILS UPDATED FOLLOWING COMMENTS	DF	SL	2023.09.21
P06	TYPICAL SECTION UPDATED AND ADDED	RO	DF/TB	2023.08.11
P05	TYPICAL SECTIONS UPDATED	DF	TB	2023.04.28
P04	ISSUE STATUS UPDATED	DF	TB	2023.01.09
P03	TYPICAL SECTIONS DRAINAGE DITCHES UPDATED	DF	WW	2022.12.16
P02	UPDATES FOLLOWING COMMENTS	DF	TB	2022.11.18
P01	UPDATES FOLLOWING COMMENTS	DF	TB	2022.11.15

Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
DF	-	TB	2022.10.04

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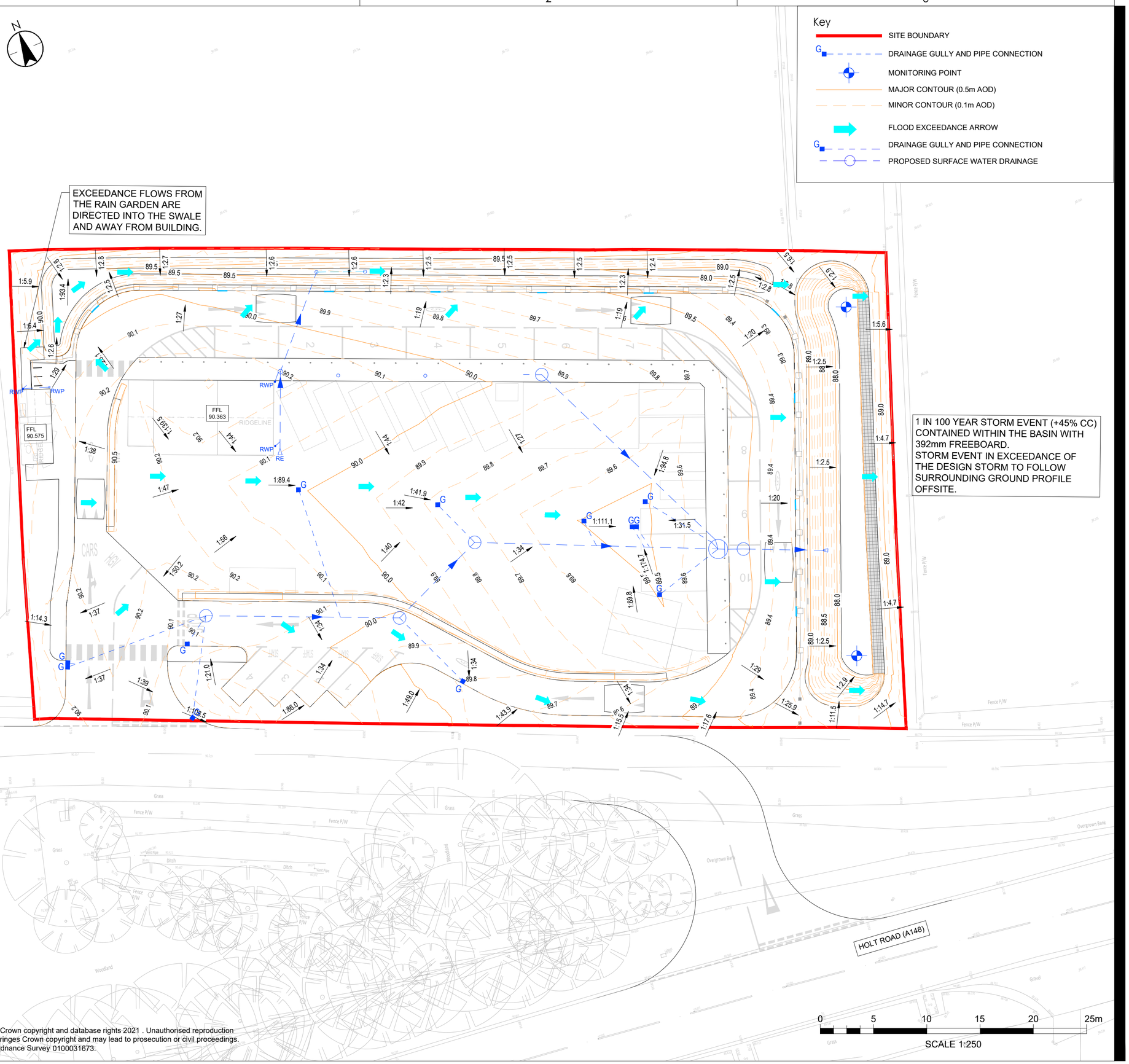
SHERINGHAM RECYCLING CENTRE

Title
CONSTRUCTION DETAILS

Project No. 49868
Scale AS SHOWN @ A0
Revision P08
Drawing No. 49868_2001_521



Plotted: 21.03.2024 2024.03.21 1:23:16 PM By: O'Callaghan, Rhys
ORIGINAL SHEET - ISO A2 \\corn-vfps-001\corn\projects\49868 sheringham recycling centre\cad\dwgs\2001_civ\49868_2001_530 - flood exceedance plan

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P01 UPDATED FOR LLFA COMMENTS		SL	TB	2024.03.22
Issued/Revision		By	Appd	YYYY.MM.DD
	RO	SL	TB	2023.07.20
	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

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SHERINGHAM RECYCLING CENTRE

Title
PROPOSED FLOOD EXCEEDANCE PLAN

Project No.	Scale
49868	1:250 @ A2
Revision	Drawing No.
P01	**49868/2001/530**

Appendix C Anglian Water Plans

Laker, Richard

From: Planning Liaison <planningliaison@anglianwater.co.uk>
Sent: 25 February 2021 12:44
To: Davison, Max
Cc: Laker, Richard
Subject: RE: Flood Risk Enquiry - Sheringham Recycling Centre

Follow Up Flag: Follow up
Flag Status: Flagged

Good afternoon Max

Thank you for your email regarding Holt Road south of Sheringham, Norfolk, NR26 8TW

Anglian Water is able to confirm that there have been instances of flooding within the vicinity of the proposed development. It is also possible that other flooding may have occurred that we do not have records of, other organisations such as the Local Lead Planning Authority, Local Planning Authorities Internal Drainage Board or the Environment Agency may have records. We recommend you submit a pre planning application form to enable Anglian Water to advise you of any suitable connection points for the proposed development and identify any mitigation that would be required. Further details including the application form can be found on our website https://www.anglianwater.co.uk/developing/planning--capacity/

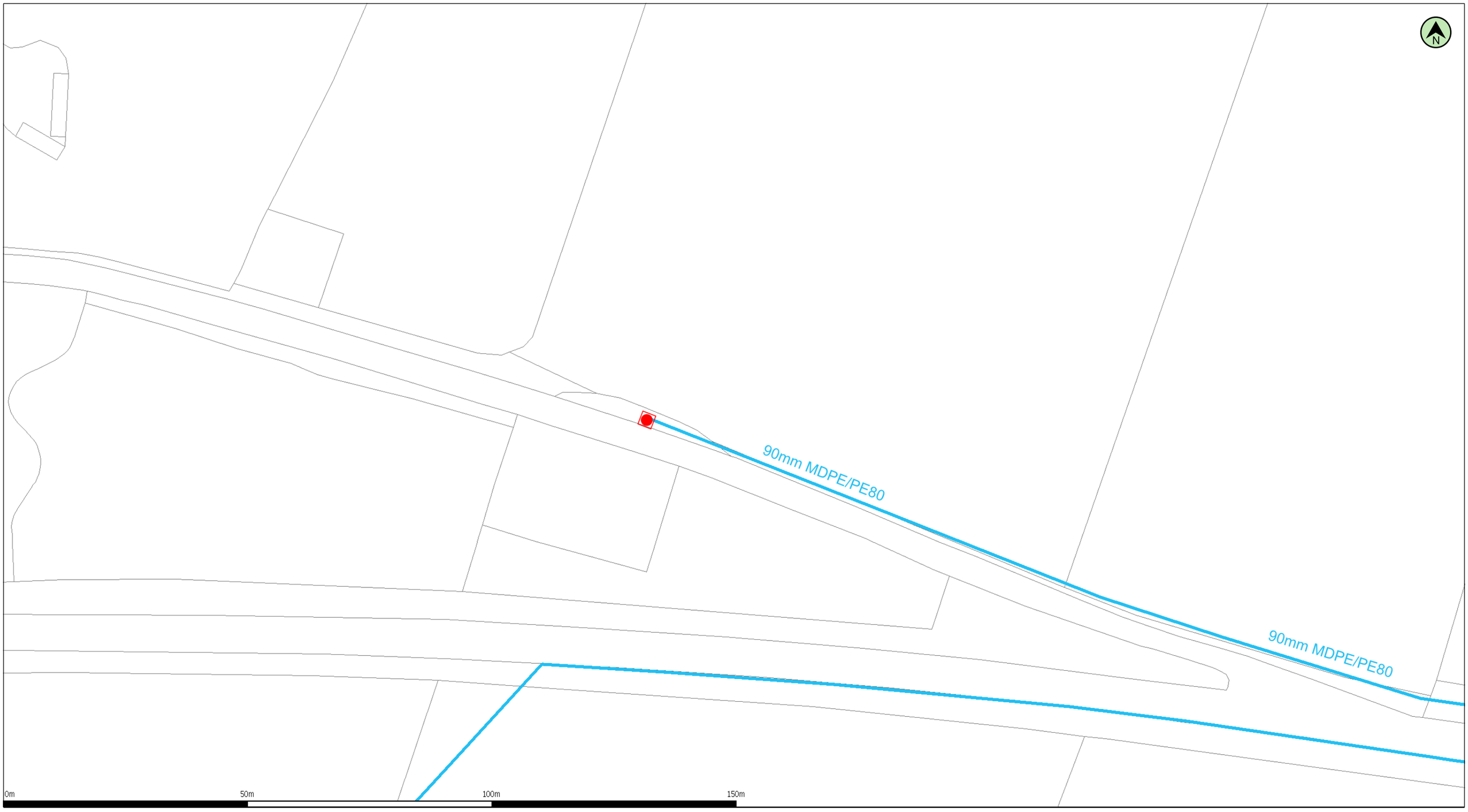
Kind regards

Sandra

Sandra De Olim
Planning & Capacity - Development Services
Mobile: 07929804300
Telephone: 07929786955
Anglian Water Services Limited
Thorpe Wood House, Thorpe Wood, Peterborough,
Cambridgeshire, PE3 6WT

From: Davison, Max <Max.Davison@stantec.com>
Sent: 24 February 2021 15:07
To: Planning Liaison <planningliaison@anglianwater.co.uk>
Cc: Laker, Richard <Richard.Laker@stantec.com>
Subject: Flood Risk Enquiry - Sheringham Recycling Centre

Dear Sir/Madam,



 Date: 24/03/21 Scale: 1:748 Map Centre: 616254,341028 Data updated: 28/02/21 Clean Water Plan A3

Potable Water
Raw Water
Decommissioned Water
Fitting
Hydrant

victoria.mason2@norfolk.gov.uk

love every drop anglianwater

(c) Crown copyright and database rights 2021 Ordnance Survey 100022432 | Date: 24/03/21 | Scale: 1:748 | Map Centre: 616254,341028 | Data updated: 28/02/21 | Wastewater Plan A3

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

*(Colour denotes effluent type)

victoria.mason2@norfolk.gov.uk

love every drop anglianwater

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

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Important Information - please read The purpose of this plan is to identify Virgin Media apparatus. We have tried to make it as accurate as possible but we cannot warrant its accuracy. In addition, we caution that within Virgin Media apparatus there may be instances where mains voltage power cables have been placed inside green, rather than black ducting. Further details can be found using the "Affected Postcodes.pdf", which can be downloaded from this website. Therefore, you must not rely solely on this plan if you are carrying out any excavation or other works in the vicinity of Virgin Media apparatus. The actual position of any underground service must be verified by cable detection equipment, etc. and established on site before any mechanical plant is used. Accordingly, unless it is due to the negligence of Virgin Media, its employees or agents, Virgin Media will not have any liability for any omissions or inaccuracies in the plan or for any loss or damage caused or arising from the use of and/or any reliance on this plan. This plan is produced by Virgin Media Limited (c) Crown copyright and database rights 2021 Ordnance Survey 100019209.

Duct, Trench | Chamber | Cabinet

victoria.mason2@norfolk.gov.uk

Virgin media

Appendix D Environment Agency Correspondence

Hartley, Michael

From: Anglian Water <planningliaison@anglianwater.co.uk>
Sent: 23 July 2019 10:50
To: Hartley, Michael
Subject: Holt Road, Sheringham, East Beckham Flood Risk Query Response

Michael Hartley,

Thank you for your Flood Risk Query you submitted for Holt Road, Sheringham, East Beckham.

Our response to this is: Anglian Water is able to confirm that we have no records of flooding in the vicinity that can be attributed to capacity limitations in the public sewerage system. It is possible that other flooding may have occurred that we do not have records of, other organisations such as the Local Authority, Internal Drainage Board or the Environment Agency may have records.

Should you have any questions relating to this please contact 0345 606 6087 Option 1. Your reference for this enquiry is 00031034.

Kind Regards
Growth and Planning Services Team

Appendix E InfoDrainage Calculations

Sheringham Recycling Centre: Surface Water Drainage 1 in 2, 30 (+40% CC) and 100 (+45% CC) RP	Date: 20/03/2024		
	Designed by: SL / RO	Checked by:	Approved By:
Report Details: Type: Inflows Storm Phase: Phase	Stantec UK Ltd: 3rd Floor, Station Road, Cambridge CB1 2JH		

CA_1

Type : Catchment Area

Area (ha)	0.027

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	5
Percentage Impervious (%)	100

CA_2

Type : Catchment Area

Area (ha)	0.013

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	5
Percentage Impervious (%)	100

CA_3

Type : Catchment Area

Area (ha)	0.016

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	5
Percentage Impervious (%)	100

CA_4

Type : Catchment Area

Area (ha)	0.024

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	5
Percentage Impervious (%)	100

CA_5

Type : Catchment Area

Area (ha)	0.062

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	5
Percentage Impervious (%)	100

CA_6

Type : Catchment Area

Area (ha)	0.009

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	5
Percentage Impervious (%)	100

CA_7

Type : Catchment Area

Area (ha)	0.007

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	5
Percentage Impervious (%)	100

CA_8

Type : Catchment Area

Area (ha)	0.04

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	5
Percentage Impervious (%)	100

CA_11

Type : Catchment Area

Area (ha)	0.009

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

CA_12

Type : Catchment Area

Area (ha)	0.002

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

CA_15

Type : Catchment Area

Area (ha)	0.032

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

CA_14

Type : Catchment Area

Area (ha)	0.001

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

CA_10

Type : Catchment Area

Area (ha)	0.034

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

CA_9

Type : Catchment Area

Area (ha)	0.025

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

CA_13

Type : Catchment Area

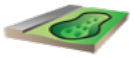
Area (ha)	0.024

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Sheringham Recycling Centre: Surface Water Drainage 1 in 2, 30 (+40% CC) and 100 (+45% CC) RP	Date: 20/03/2024		
	Designed by: SL / RO	Checked by:	Approved By:
Report Details: Type: Junctions Storm Phase: Phase	Stantec UK Ltd: 3rd Floor, Station Road, Cambridge CB1 2JH		

Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)	Invert Level (m)	Chamber Shape	Diameter (m)	Manhole Locked	Access Required	Easting (m)	Northing (m)
CP S1	Manhole	616262.891	341024.746	90.218	1.168	89.050	Circular	1.200	☐	☐		
CP S2	Manhole	616279.735	341017.896	89.908	1.088	88.820	Circular	1.200	☐	☐		
CP S3	Manhole	616288.890	341021.904	89.679	1.134	88.545	Circular	1.200	☐	☐		
CP S4	Manhole	616309.916	341012.954	89.663	1.209	88.454	Circular	1.800	☐	☐		
CP S5	Manhole	616312.130	341012.081	89.507	1.065	88.442	Circular	1.200	☐	☐		
IC	Manhole	616278.657	341043.260	90.200	1.150	89.050	Circular	0.450	☑	☐		
RE	Simple Junction	616275.706	341035.870									



Bioretention Basin

Type : Bioretention

Ponding Area

Exceedence Level (m)	89.154
Depth (m)	1.304
Base Level (m)	87.850
Top Area (m²)	270.06
Side Slope (1:x)	1.74
Base Area (m²)	82.94
Freeboard (mm)	300
Porosity (%)	100
Length (m)	41.342
Long. Slope (1:x)	0.00
Filtration Rate (m/hr)	0.3
Friction Scheme	Manning's n
n	0.045
Total Volume (m³)	175.501

Filter Area

Base Level (m)	87.050

Filtration Layers

Use	Name	Filtration Layer Depth (mm)	Porosity (%)	Conductivity (m/hr)	Soil Type
☐	Soil	0	0	0.0	Soil Type
	Storage	800	30	0.3	

Sheringham Recycling Centre: Surface Water Drainage 1 in 2, 30 (+40% CC) and 100 (+45% CC) RP	Date: 20/03/2024		
	Designed by: SL / RO	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase	Stantec UK Ltd: 3rd Floor, Station Road, Cambridge CB1 2JH		

Advanced

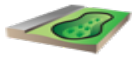
Safety Factor	1.5

Ponding Area

Side Infiltration Rate (m/hr)	0.126
Base Perimeter (m)	86.697
Top Perimeter (m)	95.749

Filter Area

Base Infiltration Rate (m/hr)	0.126
Side Infiltration Rate (m/hr)	0.126



Rain Garden

Type : Bioretention

Sheringham Recycling Centre: Surface Water Drainage 1 in 2, 30 (+40% CC) and 100 (+45% CC) RP	Date: 20/03/2024		
	Designed by: SL / RO	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase	Stantec UK Ltd: 3rd Floor, Station Road, Cambridge CB1 2JH		

Ponding Area

Exceedence Level (m)	90.275
Depth (m)	0.150
Base Level (m)	90.125
Top Area (m²)	4.99
Side Slope (1:x)	0.007
Base Area (m²)	4.98
Freeboard (mm)	0
Porosity (%)	100
Length (m)	4.508
Long. Slope (1:x)	0.00
Filtration Rate (m/hr)	0.295
Friction Scheme	Manning's n
n	0.045
Total Volume (m³)	1.818

Filter Area

Base Level (m)	89.425

Under Drain

Height Above Base (m)	0.050
Diameter (mm)	100
No. of Barrels	1
Friction Scheme	Manning's n
n	0.015
Release Height (m)	0.100

Filtration Layers

Use	Name	Filtration Layer Depth (mm)	Porosity (%)	Conductivity (m/hr)	Soil Type
☑	Soil	400	30	0.2	Soil Type
	Storage	300	30	10.0	

Sheringham Recycling Centre: Surface Water Drainage 1 in 2, 30 (+40% CC) and 100 (+45% CC) RP	Date: 20/03/2024		
	Designed by: SL / RO	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase	Stantec UK Ltd: 3rd Floor, Station Road, Cambridge CB1 2JH		

Advanced

Safety Factor	1.5

Ponding Area

Base Perimeter (m)	11.225
Top Perimeter (m)	11.230

Filter Area

Base Infiltration Rate (m/hr)	0.295

Infiltration Swale

Type : Swale

Swale

Exceedence Level (m)	89.224
Depth (m)	0.412
Base Level (m)	88.812
Top Width (m)	2.560
Side Slope (1:x)	2.50
Base Width (m)	0.500
Freeboard (mm)	0
Length (m)	77.363
Long. Slope (1:x)	102.40
Filtration Rate (m/hr)	0.3
Friction Scheme	Manning's n
n	0.045
Total Volume (m^3)	60.371

Trench

Trench Depth (m)	1.000
Trench Porosity (%)	30

Advanced

Safety Factor	1.5

Swale

Side Infiltration Rate (m/hr)	0.212
Porosity (%)	100

Trench

Base Infiltration Rate (m/hr)	0.212
Side Infiltration Rate (m/hr)	0.212
Trench Conductivity (m/hr)	0.3

Sheringham Recycling Centre: Surface Water Drainage 1 in 2, 30 (+40% CC) and 100 (+45% CC) RP	Date: 20/03/2024		
	Designed by: SL / RO	Checked by:	Approved By:
Report Details: Type: Connections Storm Phase: Phase	Stantec UK Ltd: 3rd Floor, Station Road, Cambridge CB1 2JH		

Name	Length (m)	Connection Type	Slope (1:x)	Manning's n	Colebrook-White Roughness (mm)	Diameter / Base Width (mm)	Upstream Cover Level (m)	Upstream Invert Level (m)	Downstream Cover Level (m)	Downstream Invert Level (m)
S1.000	18.184	Pipe	80.105		0.6	150	90.218	89.050	89.908	88.823
S1.001	9.993	Pipe	79.947		0.6	150	89.908	88.820	89.679	88.695
S1.002	22.852	Pipe	251.119		0.6	300	89.679	88.545	89.663	88.454
S1.003	2.380	Pipe	198.341		0.6	300	89.663	88.454	89.507	88.442
S1.004	8.102	Pipe	192.911		0.6	300	89.507	88.442	88.900	88.400
S2.001	8.611	Pipe	89.944		0.6	100	90.200	89.050	89.925	88.954
S2.000	7.957	Pipe	99.465		0.6	100	90.100	89.130	90.200	89.050

Sheringham Recycling Centre: Surface Water Drainage 1 in 2, 30 (+40% CC) and 100 (+45% CC) RP	Date: 20/03/2024		
	Designed by: SL / RO	Checked by:	Approved By:
Report Details: Type: Network Design Criteria Storm Phase: Phase	Stantec UK Ltd: 3rd Floor, Station Road, Cambridge CB1 2JH		

Flow Options

Peak Flow Calculation	(UK) Modified Rational Method
Min. Time of Entry (mins)	5
Max. Travel Time (mins)	30

Pipe Options

Lock Slope Options	Slopes and Invert Levels
Use Flow Restriction	☐
Reduce Channel Depths	☐

Manhole Options

Apply Offset	☐
Synchronise Manhole Invert Levels	☑

Sheringham Recycling Centre: Surface Water Drainage 1 in 2, 30 (+40% CC) and 100 (+45% CC) RP	Date: 20/03/2024		
	Designed by: SL / RO	Checked by:	Approved By:
Report Details: Type: Rainfall Analysis Criteria	Stantec UK Ltd: 3rd Floor, Station Road, Cambridge CB1 2JH		

Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Default
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Rainfall

Sheringham Recycling Centre: Surface Water Drainage 1 in 2, 30 (+40% CC) and 100 (+45% CC) RP	Date: 20/03/2024		
	Designed by: SL / RO	Checked by:	Approved By:
Report Details: Type: Rainfall Analysis Criteria	Stantec UK Ltd: 3rd Floor, Station Road, Cambridge CB1 2JH		

FEH

Type: FEH

Site Location	GB 616285 341035 TG 16285 41035
Rainfall Version	2013
Data Type	Point
Summer	☑
Winter	☑

Return Period

Return Period (years)	Increase Rainfall (%)
2.0	0
30.0	40
100.0	45
30.0	0

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
240	480
360	720
480	960
960	1920
1440	2880

Sheringham Recycling Centre: Surface Water Drainage 1 in 2, 30 (+40% CC) and 100 (+45% CC) RP	Date: 20/03/2024		
	Designed by: SL / RO	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Stantec UK Ltd: 3rd Floor, Station Road, Cambridge CB1 2JH		

FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)	Status
Bioretention Basin	FEH: 2 years: +0 %: 120 mins: Summer	88.054	88.054	1.004	1.004	20.5	27.271	0.000	38.542	0.0	0.000	81	84	OK
Infiltration Swale	FEH: 2 years: +0 %: 30 mins: Winter	89.622	89.019	1.054	1.207	9.7	4.458	0.000	5.902	0.0	0.972	25	93	OK
Rain Garden	FEH: 2 years: +0 %: 15 mins: Winter	90.135	90.129	0.710	0.704	0.4	0.147	0.000	0.113	0.0	0.000	10	92	OK

Sheringham Recycling Centre: Surface Water Drainage 1 in 2, 30 (+40% CC) and 100 (+45% CC) RP	Date: 20/03/2024		
	Designed by: SL / RO	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Stantec UK Ltd: 3rd Floor, Station Road, Cambridge CB1 2JH		

FEH: 30 years: Increase Rainfall (%): +40: Critical Storm Per Item

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)	Status
Bioretention Basin	FEH: 30 years: +40 %: 120 mins: Winter	88.566	88.566	1.516	1.516	45.0	102.671	0.000	68.380	0.0	0.000	180	41	OK
Infiltration Swale	FEH: 30 years: +40 %: 60 mins: Winter	89.656	89.313	1.088	1.501	23.1	22.919	3.856	25.181	0.0	0.943	48	62	Flood
Rain Garden	FEH: 30 years: +40 %: 30 mins: Winter	90.205	90.205	0.780	0.780	0.9	0.521	0.000	0.734	0.0	0.000	17	71	OK

Sheringham Recycling Centre: Surface Water Drainage 1 in 2, 30 (+40% CC) and 100 (+45% CC) RP	Date: 20/03/2024		
	Designed by: SL / RO	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Stantec UK Ltd: 3rd Floor, Station Road, Cambridge CB1 2JH		

FEH: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)	Status
Bioretention Basin	FEH: 100 years: +45 %: 240 mins: Winter	88.807	88.806	1.757	1.756	39.4	154.345	0.000	161.910	0.0	0.432	213	12	OK
Infiltration Swale	FEH: 100 years: +45 %: 120 mins: Winter	89.653	89.427	1.085	1.615	21.5	35.650	10.183	55.372	0.0	0.934	70	41	Flood
Rain Garden	FEH: 100 years: +45 %: 30 mins: Winter	90.255	90.255	0.830	0.830	1.2	0.774	0.000	0.831	0.0	0.000	27	57	OK

Sheringham Recycling Centre: Surface Water Drainage 1 in 2, 30 (+40% CC) and 100 (+45% CC) RP	Date: 20/03/2024		
	Designed by: SL / RO	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Stantec UK Ltd: 3rd Floor, Station Road, Cambridge CB1 2JH		

FEH: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)	Status
Bioretention Basin	FEH: 30 years: +0 %: 120 mins: Winter	88.364	88.364	1.314	1.314	32.2	69.663	0.000	58.094	0.0	0.000	142	60	OK
Infiltration Swale	FEH: 30 years: +0 %: 60 mins: Winter	89.641	89.221	1.073	1.409	16.5	14.913	0.000	19.669	0.0	0.937	36	75	OK
Rain Garden	FEH: 30 years: +0 %: 15 mins: Winter	90.169	90.169	0.744	0.744	1.0	0.344	0.000	0.355	0.0	0.000	31	81	OK

Sheringham Recycling Centre: Surface Water Drainage 1 in 2, 30 (+40% CC) and 100 (+45% CC) RP	Date: 20/03/2024		
	Designed by: SL / RO	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase	Stantec UK Ltd: 3rd Floor, Station Road, Cambridge CB1 2JH		

FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
S1.000	FEH: 2 years: +0 %: 15 mins: Summer	Pipe	CP S1	CP S2	90.2	89.103	0.068	2.396	0.7	0.27	5.3	OK
S1.001	FEH: 2 years: +0 %: 15 mins: Summer	Pipe	CP S2	CP S3	89.9	88.904	0.081	4.963	1.1	0.54	10.6	OK
S1.002	FEH: 2 years: +0 %: 15 mins: Summer	Pipe	CP S3	CP S4	89.7	88.684	0.145	12.479	0.8	0.39	26.9	OK
S1.003	FEH: 2 years: +0 %: 15 mins: Summer	Pipe	CP S4	CP S5	89.7	88.604	0.142	13.832	0.9	0.36	28.4	OK
S1.004	FEH: 2 years: +0 %: 15 mins: Summer	Pipe	CP S5	Bioretention Basin	89.5	88.575	0.127	13.818	1.0	0.34	27.4	OK
S2.001	FEH: 2 years: +0 %: 15 mins: Summer	Pipe	IC	Infiltration Swale	90.2	89.635	0.100	0.974	0.2	0.24	1.6	Surcharged
S2.000	FEH: 2 years: +0 %: 15 mins: Winter	Pipe	RE	IC	90.1	89.639	0.100	0.174	0.2	0.26	1.6	Surcharged

Sheringham Recycling Centre: Surface Water Drainage 1 in 2, 30 (+40% CC) and 100 (+45% CC) RP	Date: 20/03/2024		
	Designed by: SL / RO	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase	Stantec UK Ltd: 3rd Floor, Station Road, Cambridge CB1 2JH		

FEH: 30 years: Increase Rainfall (%): +40: Critical Storm Per Item

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
S1.000	FEH: 30 years: +40 %: 15 mins: Summer	Pipe	CP S1	CP S2	90.2	89.411	0.150	7.825	0.8	0.69	13.6	Surcharged
S1.001	FEH: 30 years: +40 %: 15 mins: Summer	Pipe	CP S2	CP S3	89.9	89.289	0.150	16.199	1.6	1.46	29.1	Surcharged
S1.002	FEH: 30 years: +40 %: 15 mins: Summer	Pipe	CP S3	CP S4	89.7	88.962	0.300	40.701	1.2	1.19	82.9	Surcharged
S1.003	FEH: 30 years: +40 %: 15 mins: Summer	Pipe	CP S4	CP S5	89.7	88.801	0.300	45.195	1.3	1.15	90.3	Surcharged
S1.004	FEH: 30 years: +40 %: 15 mins: Summer	Pipe	CP S5	Bioretention Basin	89.5	88.741	0.265	45.182	1.3	1.11	88.4	OK
S2.001	FEH: 30 years: +40 %: 15 mins: Winter	Pipe	IC	Infiltration Swale	90.2	89.733	0.100	0.746	0.5	0.59	3.8	Surcharged
S2.000	FEH: 30 years: +40 %: 15 mins: Winter	Pipe	RE	IC	90.1	89.775	0.100	1.734	0.5	0.69	4.2	Surcharged

Sheringham Recycling Centre: Surface Water Drainage 1 in 2, 30 (+40% CC) and 100 (+45% CC) RP	Date: 20/03/2024		
	Designed by: SL / RO	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase	Stantec UK Ltd: 3rd Floor, Station Road, Cambridge CB1 2JH		

FEH: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
S1.000	FEH: 100 years: +45 %: 15 mins: Summer	Pipe	CP S1	CP S2	90.2	89.886	0.150	10.624	1.0	0.85	17.0	Surcharged
S1.001	FEH: 100 years: +45 %: 15 mins: Summer	Pipe	CP S2	CP S3	89.9	89.711	0.150	21.985	2.1	1.84	36.5	Flood Risk
S1.002	FEH: 100 years: +45 %: 15 mins: Summer	Pipe	CP S3	CP S4	89.7	89.225	0.300	55.184	1.5	1.56	108.7	Surcharged
S1.003	FEH: 100 years: +45 %: 15 mins: Summer	Pipe	CP S4	CP S5	89.7	88.942	0.300	61.212	1.7	1.51	118.6	Surcharged
S1.004	FEH: 100 years: +45 %: 15 mins: Summer	Pipe	CP S5	Bioretention Basin	89.5	88.846	0.300	61.060	1.7	1.47	117.1	Surcharged
S2.001	FEH: 100 years: +45 %: 15 mins: Winter	Pipe	IC	Infiltration Swale	90.2	89.779	0.100	0.969	0.6	0.78	4.9	Surcharged
S2.000	FEH: 100 years: +45 %: 15 mins: Winter	Pipe	RE	IC	90.1	89.850	0.100	2.530	0.7	0.91	5.5	Surcharged

Sheringham Recycling Centre: Surface Water Drainage 1 in 2, 30 (+40% CC) and 100 (+45% CC) RP	Date: 20/03/2024		
	Designed by: SL / RO	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase	Stantec UK Ltd: 3rd Floor, Station Road, Cambridge CB1 2JH		

FEH: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
S1.000	FEH: 30 years: +0 %: 15 mins: Summer	Pipe	CP S1	CP S2	90.2	89.139	0.150	5.584	0.7	0.6	11.9	OK
S1.001	FEH: 30 years: +0 %: 15 mins: Summer	Pipe	CP S2	CP S3	89.9	89.064	0.150	11.564	1.4	1.21	24.1	Surcharged
S1.002	FEH: 30 years: +0 %: 15 mins: Summer	Pipe	CP S3	CP S4	89.7	88.804	0.261	29.060	0.9	0.88	61.5	OK
S1.003	FEH: 30 years: +0 %: 15 mins: Summer	Pipe	CP S4	CP S5	89.7	88.716	0.246	32.256	1.1	0.84	65.7	OK
S1.004	FEH: 30 years: +0 %: 15 mins: Summer	Pipe	CP S5	Bioretention Basin	89.5	88.671	0.213	32.241	1.2	0.8	63.8	OK
S2.001	FEH: 30 years: +0 %: 15 mins: Winter	Pipe	IC	Infiltration Swale	90.2	89.695	0.100	0.642	0.3	0.42	2.7	Surcharged
S2.000	FEH: 30 years: +0 %: 15 mins: Winter	Pipe	RE	IC	90.1	89.718	0.100	1.094	0.4	0.5	3.0	Surcharged

Sheringham Recycling Centre: Surface Water Drainage 1 in 2, 30 (+40% CC) and 100 (+45% CC) RP	Date: 20/03/2024		
	Designed by: SL / RO	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Phase	Stantec UK Ltd: 3rd Floor, Station Road, Cambridge CB1 2JH		

Infiltration Swale
FEH: 30 years: Increase Rainfall (%): +40: 60 mins: Winter

Type : Swale

Tables

Time (mins)	Total Inflow (L/s)	US Depth (Swale)(m)	DS Depth (Swale)(m)	Total Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	1.000	1.000	0.000	0.000	0.0
5	2.4	1.017	1.000	0.171	0.000	0.7
10	4.0	1.024	1.000	0.405	0.000	1.0
15	4.7	1.033	1.000	0.969	0.000	1.6
20	8.6	1.051	1.043	2.377	0.000	2.4
25	15.6	1.071	1.157	5.176	0.000	3.1
30	22.9	1.087	1.288	9.906	0.000	3.9
35	23.1	1.088	1.390	15.555	0.000	4.6
40	16.1	1.074	1.461	20.022	2.035	4.9
45	9.0	1.054	1.492	22.297	3.398	5.0
50	5.2	1.039	1.501	22.919	3.849	5.0
55	4.5	1.035	1.501	22.862	3.856	5.0
60	2.8	1.027	1.498	22.469	3.714	4.9
65	0.2	1.009	1.490	21.469	3.350	4.8
70	0.0	1.000	1.478	20.081	2.784	4.6
75	0.0	1.000	1.465	18.725	2.207	4.4
80	0.0	1.000	1.452	17.507	1.636	3.7
85	0.0	1.000	1.438	16.414	1.072	3.6
90	0.0	1.000	1.425	15.333	0.506	3.5
95	0.0	1.000	1.411	14.288	0.000	3.4
100	0.0	1.000	1.397	13.291	0.000	3.3
105	0.0	1.000	1.383	12.317	0.000	3.2
110	0.0	1.000	1.369	11.380	0.000	3.0
115	0.0	1.000	1.355	10.503	0.000	2.9
120	0.0	1.000	1.341	9.694	0.000	2.5

Sheringham Recycling Centre: Surface Water Drainage 1 in 2, 30 (+40% CC) and 100 (+45% CC) RP	Date: 20/03/2024		
	Designed by: SL / RO	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Phase	Stantec UK Ltd: 3rd Floor, Station Road, Cambridge CB1 2JH		

Infiltration Swale
FEH: 100 years: Increase Rainfall (%): +45: 120 mins: Winter

Type : Swale

Tables

Time (mins)	Total Inflow (L/s)	US Depth (Swale)(m)	DS Depth (Swale)(m)	Total Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	1.000	1.000	0.000	0.000	0.0
5	1.3	1.008	1.000	0.091	0.000	0.5
10	3.0	1.021	1.000	0.265	0.000	0.7
15	3.5	1.021	1.000	0.468	0.000	1.1
20	3.8	1.030	1.000	1.019	0.000	1.6
25	4.1	1.033	1.026	1.606	0.000	2.2
30	4.8	1.035	1.067	2.250	0.000	2.4
35	6.4	1.043	1.105	3.165	0.000	2.6
40	8.8	1.052	1.158	4.592	0.000	3.0
45	12.0	1.061	1.229	6.748	0.000	3.4
50	15.5	1.069	1.294	9.775	0.000	3.9
55	18.9	1.078	1.362	13.677	0.000	4.5
60	21.4	1.084	1.432	18.308	0.788	4.9
65	21.5	1.085	1.491	23.221	3.366	5.3
70	19.1	1.080	1.538	27.689	5.581	5.6
75	15.7	1.072	1.572	31.216	7.326	5.8
80	12.2	1.063	1.595	33.664	8.557	5.9
85	9.0	1.053	1.609	35.079	9.620	5.9
90	6.5	1.043	1.615	35.650	10.163	5.9
95	4.9	1.036	1.615	35.606	10.183	5.8
100	4.1	1.032	1.612	35.204	9.919	5.8
105	3.9	1.030	1.608	34.657	9.527	5.8
110	3.9	1.030	1.604	34.095	9.115	5.8
115	3.3	1.028	1.599	33.451	8.747	5.7
120	1.6	1.019	1.592	32.502	8.383	5.6
125	0.1	1.005	1.581	31.068	7.820	5.5

Sheringham Recycling Centre: Surface Water Drainage 1 in 2, 30 (+40% CC) and 100 (+45% CC) RP	Date: 20/03/2024		
	Designed by: SL / RO	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Phase	Stantec UK Ltd: 3rd Floor, Station Road, Cambridge CB1 2JH		

Time (mins)	Total Inflow (L/s)	US Depth (Swale)(m)	DS Depth (Swale)(m)	Total Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
130	0.0	1.000	1.569	29.456	7.174	5.3
135	0.0	1.000	1.557	27.904	6.551	5.1
140	0.0	1.000	1.544	26.424	5.928	4.7
145	0.0	1.000	1.532	25.107	5.319	4.3
150	0.0	1.000	1.520	23.842	4.715	4.2
155	0.0	1.000	1.507	22.602	4.116	4.1
160	0.0	1.000	1.494	21.383	3.522	4.0
165	0.0	1.000	1.481	20.191	2.936	3.9
170	0.0	1.000	1.468	19.046	2.368	3.8
175	0.0	1.000	1.455	17.916	1.800	3.8
180	0.0	1.000	1.442	16.777	1.220	3.7
185	0.0	1.000	1.428	15.688	0.658	3.6
190	0.0	1.000	1.414	14.619	0.099	3.5
195	0.0	1.000	1.401	13.621	0.000	3.4
200	0.0	1.000	1.387	12.601	0.000	3.2
205	0.0	1.000	1.373	11.670	0.000	3.1
210	0.0	1.000	1.359	10.756	0.000	2.9
215	0.0	1.000	1.345	9.913	0.000	2.5
220	0.0	1.000	1.331	9.177	0.000	2.4
225	0.0	1.000	1.317	8.468	0.000	2.3
230	0.0	1.000	1.303	7.787	0.000	2.2
235	0.0	1.000	1.289	7.133	0.000	2.1
240	0.0	1.000	1.275	6.502	0.000	2.0

Appendix F Greenfield Runoff Calculations

Soils BFI Calculation

3rd Floor
50-60 Station Road
Cambridge
Cambridgeshire
CB1 2JH

Client	Norfolk County Council
Job Title	Sheringham
Job No.	49868

Method (1): From Soil Association map:

Look up HOST classes for each Soil Association Type in Appendix B of IH126

	Fraction of site area	SOIL class	HOST classes	% in each HOST clas	BFI value
Soil Association 1:	1	551g	5	100	0.9
			0	0	0
			0	0	0
			0	0	0
				Total =	0.9

	Fraction of site area	SOIL class	HOST classes	% in each HOST clas	BFI value
Soil Association 2:	0	0	0	0	0
			0	0	0
			0	0	0
			0	0	0
				Total =	0

	Fraction of site area	SOIL class	HOST classes	% in each HOST clas	BFI value
Soil Association 3:	0	0	0	0	0
			0	0	0
			0	0	0
			0	0	0
				Total =	0

Total = 1 ***Must add to one***

BFI = 0.90

DOCUMENT ISSUE RECORD

Calculation Ref	Rev	Date	Prepared	Checked	Reviewed (Discipline Lead)	Approved (Project Director)
-	-	04/08/2023	SL	-	-	-

FEH Greenfield Runoff
Per Hectare

Using 2008 QMED Equation

Project Title	Sheringham Waste Recycling Centre
Project No	49868

Methodology as set out in SuDS Manual 24.3.2 — SUDS Manual Chapter 24

1 Retrieve FEH Catchment Information

Export catchment data from FEH CDROM as .csv file and save in FEH data export

Catchment Descriptors	**BFIHOST**	0.900		*see note 1*
	SAAR	647.0		*see note 1*
	FARL	1.00		*see note 2*

2 Derive QBAR (mean annual flood)

Define area	**Site Area**	0.4	ha	
	Applied Area	50.0	ha	*see note 3*
FEH Index Flood (SuDS Manual Equation 24.2)	**QMED (Q_2)**	0.2	l/s	*see note 4*
Calculate QBAR by dividing QMED by 2yr growth factor	**QBAR**	0.2	l/s	*see note 5*

3 Select appropriate growth factors

FSR Hydrological Region		5
100yr Growth Curve Factor	**GQ_{100}**	3.56
30yr Growth Curve Factor	**GQ_{30}**	2.55
10yr Growth Curve Factor	**GQ_{10}**	1.65
2yr Growth Curve Factor	**GQ_2**	0.89
1yr Growth Curve Factor	**GQ_1**	0.87

(refer to FSR Hydrological Region tab)

Figure 24.1 Hydrological areas

4 Derive Flood Frequency

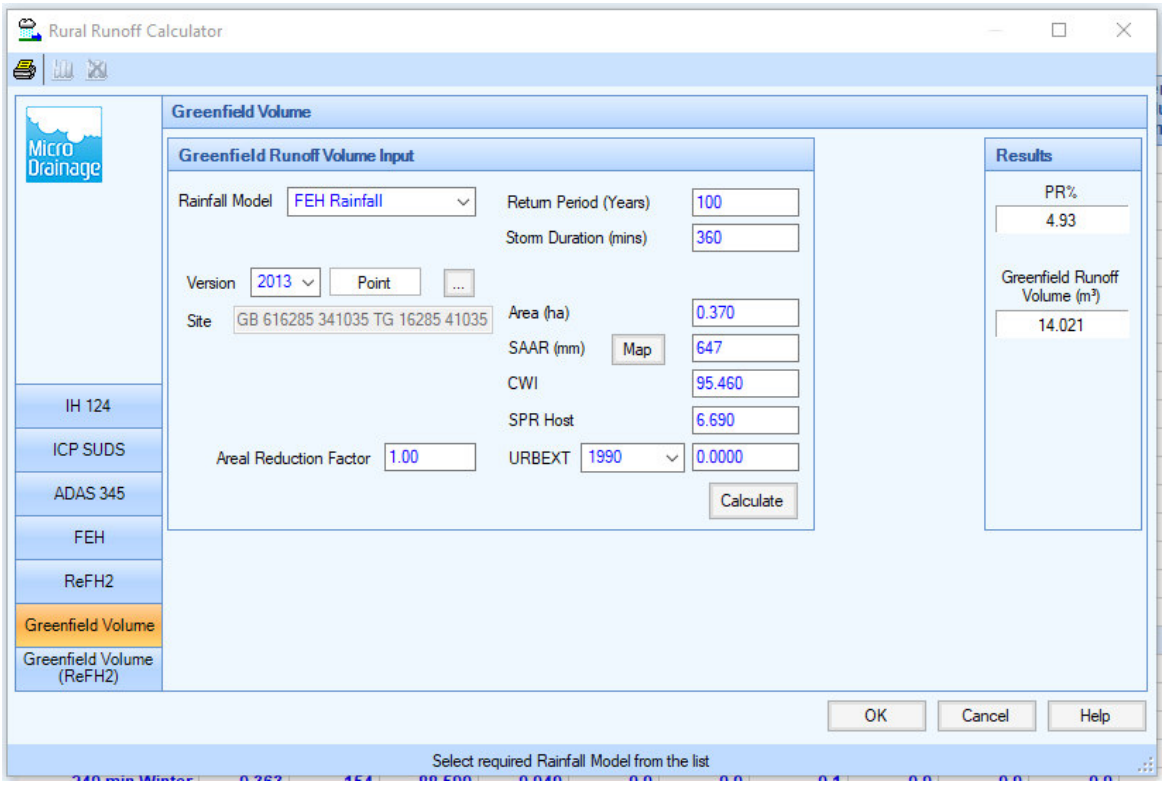
Greenfield Runoff per 1ha

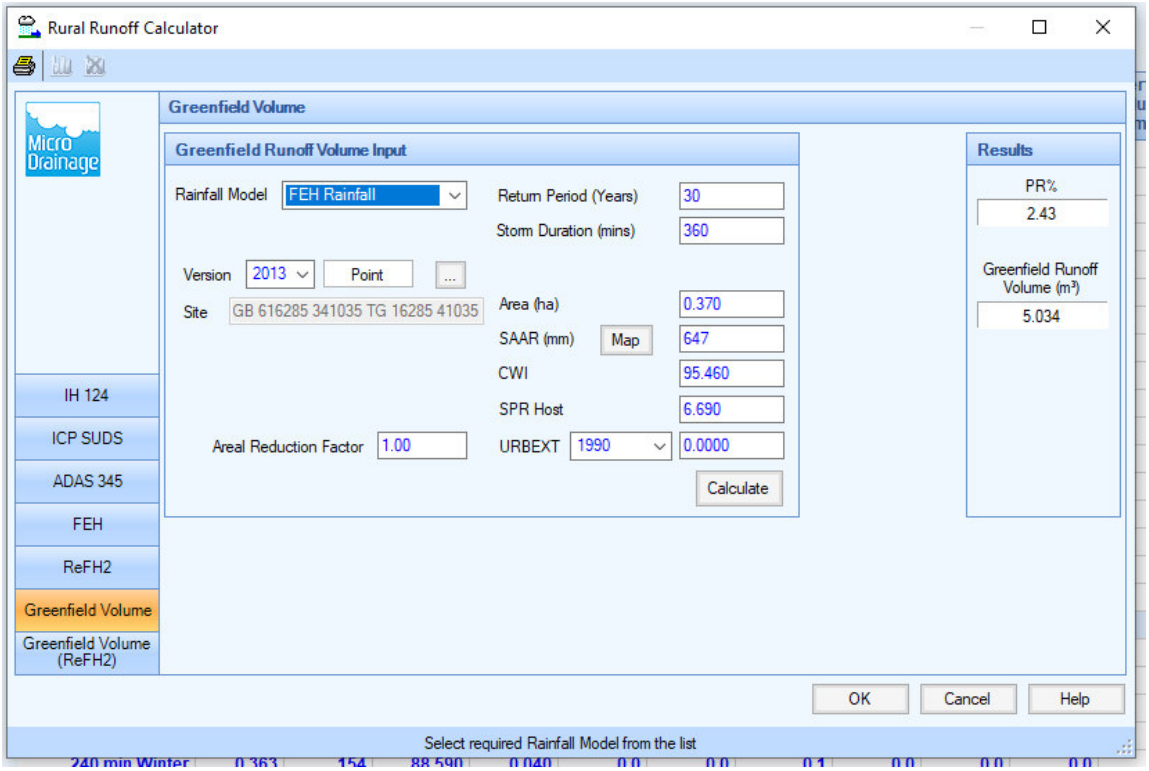
100yr Peak Runoff Rate	**Q_{100}**	0.6	l/s	**Q_{100}**	1.68	l/s/ha
30yr Peak Runoff Rate	**Q_{30}**	0.4	l/s	**Q_{30}**	1.20	l/s/ha
10yr Growth Curve Factor	**Q_{10}**	0.3	l/s	**Q_{10}**	0.78	l/s/ha
QBAR Peak Runoff Rate	**QBAR**	0.2	l/s	**Q_{BAR}**	0.47	l/s/ha
2yr Peak Runoff Rate	**Q_2**	0.2	l/s	**Q_2**	0.42	l/s/ha
1yr Peak Runoff Rate	**Q_1**	0.2	l/s	**Q_1**	0.41	l/s/ha

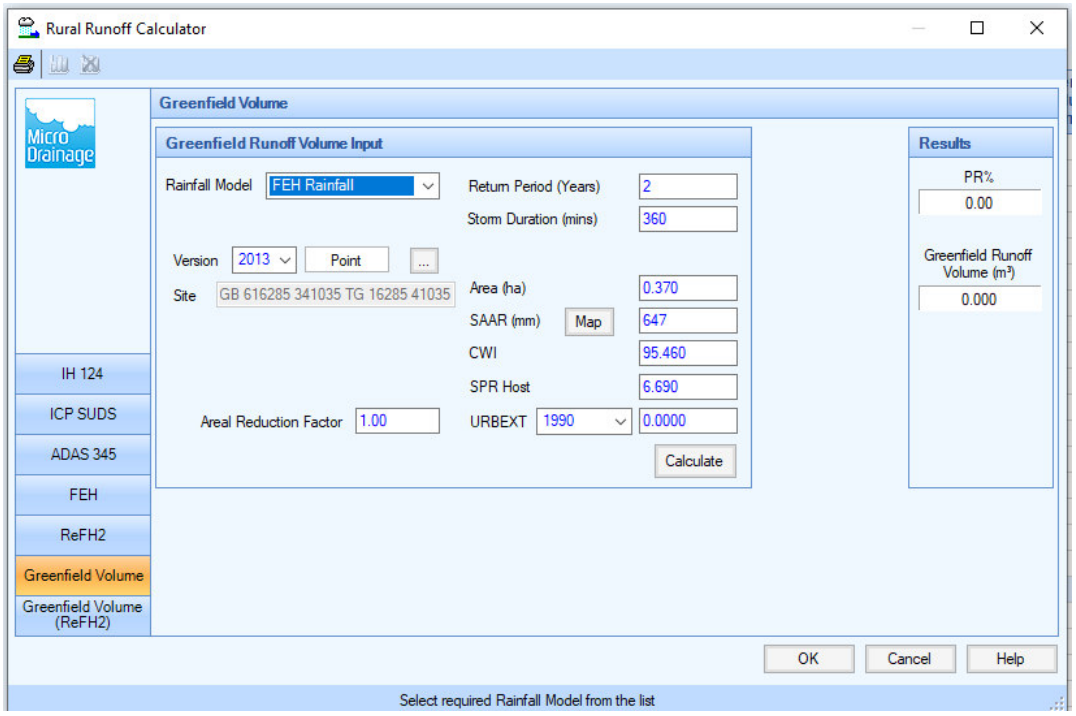
DOCUMENT ISSUE RECORD

Rev	Comments	Prepared	Date	Checked	Date
-	Greenfield rate for Planning Submission	SL	10/08/2023	-	-

Greenfield Volume Calculations



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Micro Drainage
Greenfield Volume
Greenfield Runoff Volume Input
Rainfall Model
FEH Rainfall
Return Period (Years)
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Storm Duration (mins)
360
Version
2013
Point
...
Site
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Area (ha)
0.370
SAAR (mm)
Map
647
CWI
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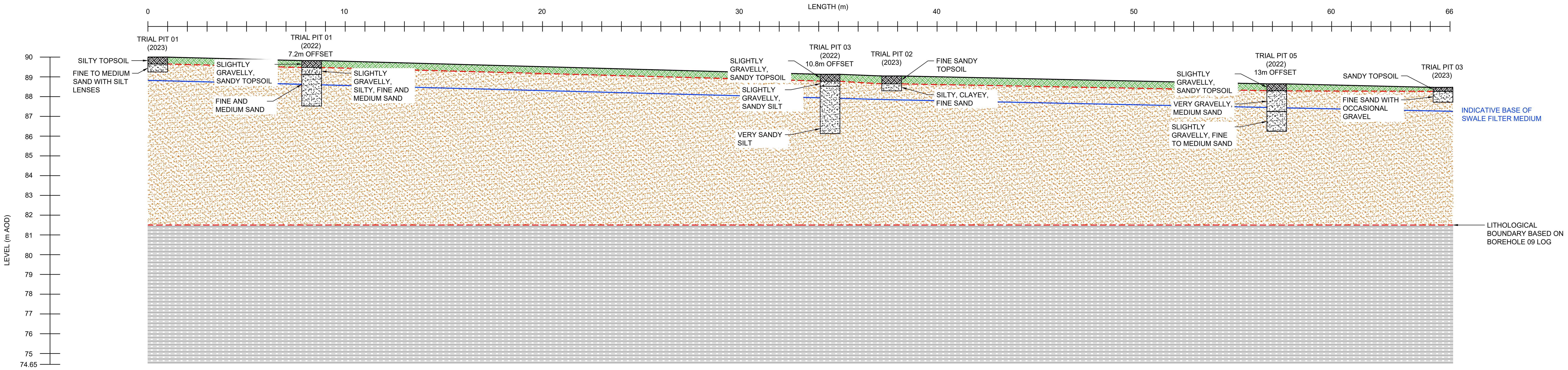
SPR Host
6.690
Areal Reduction Factor
1.00
URBEXT
1990
0.0000
Calculate
Results
PR%
0.00
Greenfield Runoff Volume (m³)
0.000
IH 124
ICP SUDS
ADAS 345
FEH
ReFH2
Greenfield Volume
Greenfield Volume (ReFH2)
OK
Cancel
Help
Select required Rainfall Model from the list

Appendix G Stantec Drawing 49868_2001_103 Conceptual Geological Model



SECTION A-A INFILTRATION SWALE

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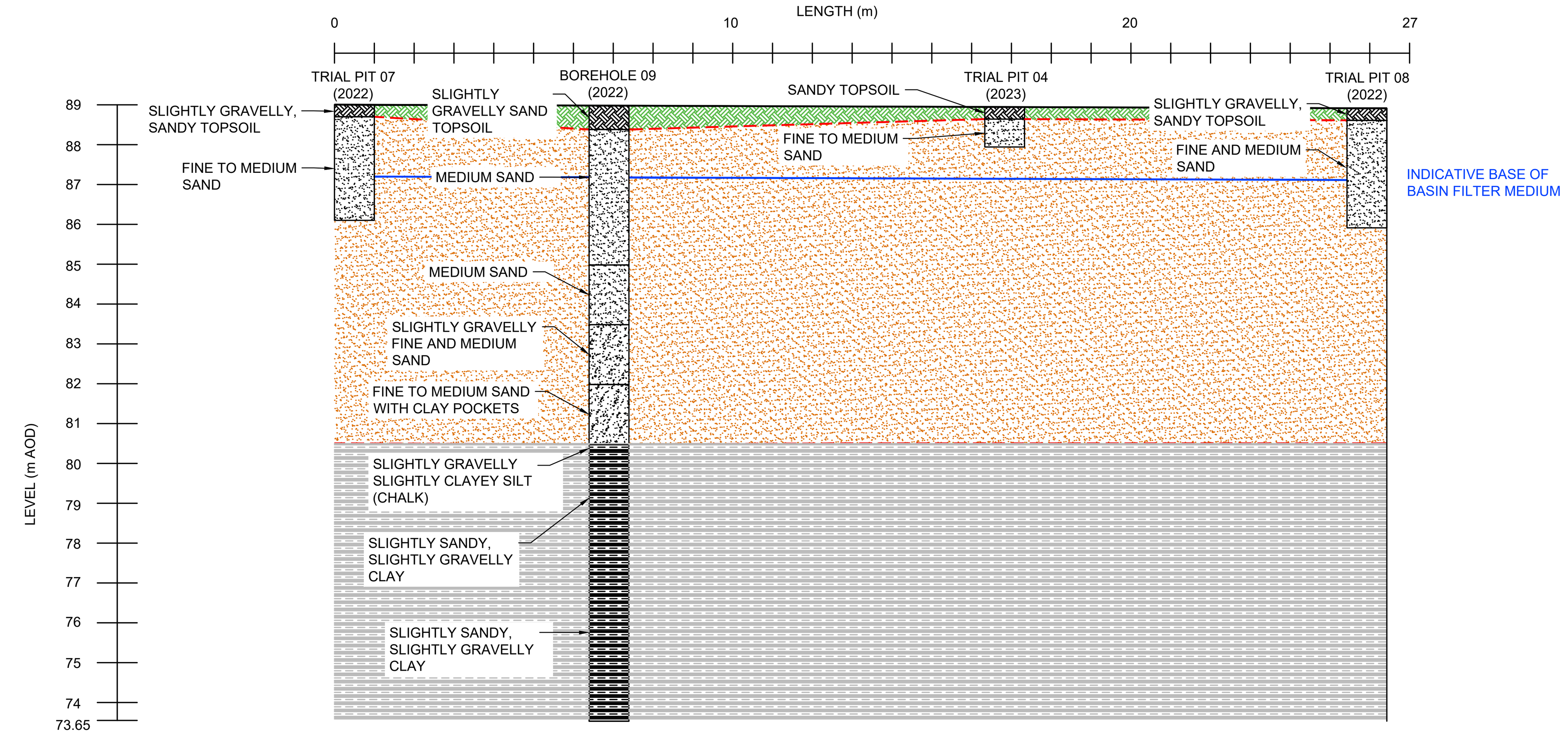
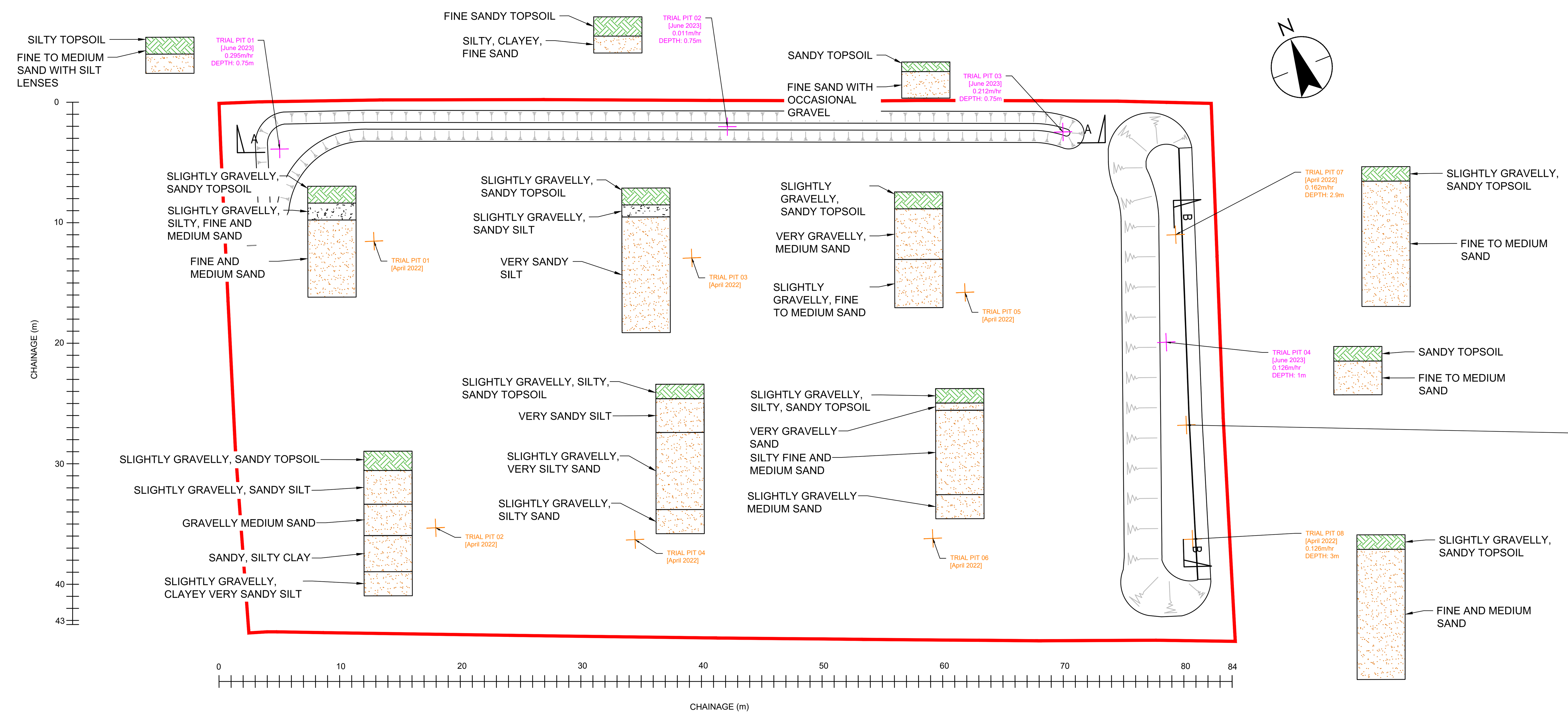
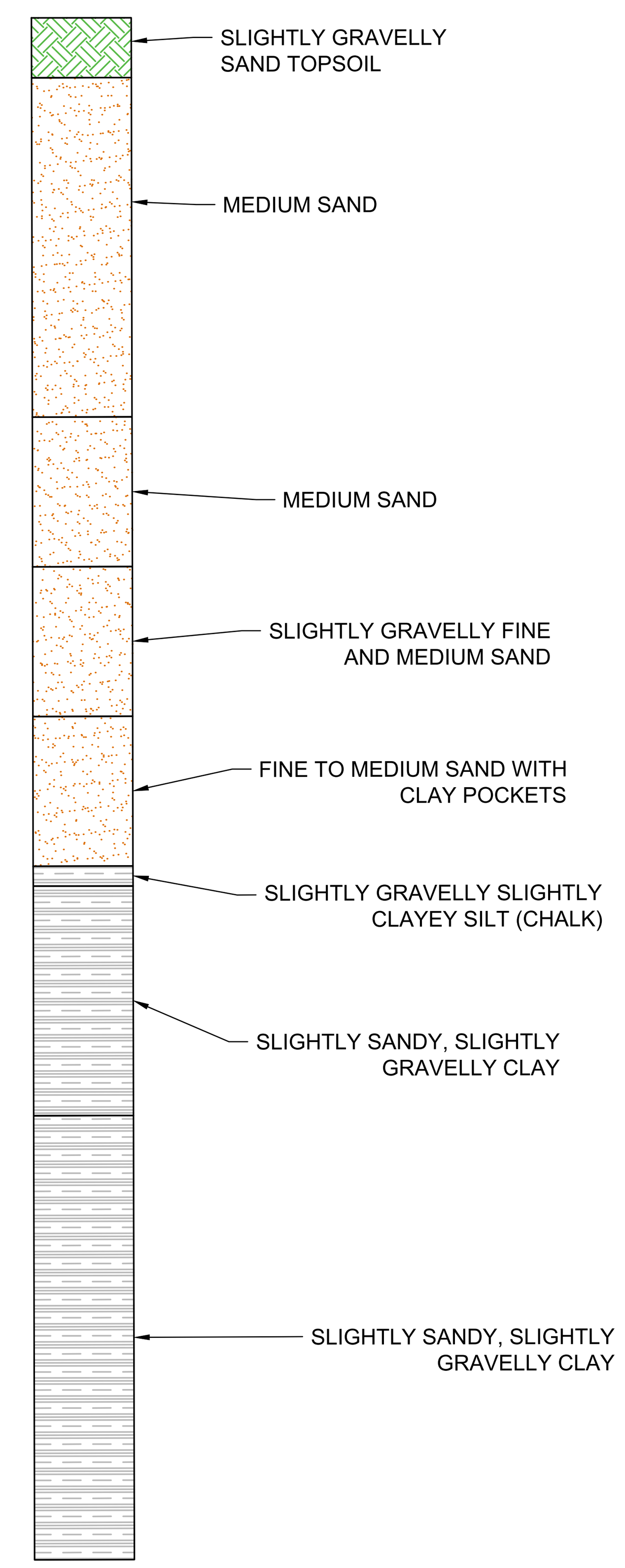


SECTION B-B INFILTRATION BASIN

1:125





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Notes

UTILITIES NOTE: The position of any existing public or private sewers, utility services, plant or apparatus shown on this drawing is believed to be correct, but no warranty to this is expressed or implied. Other such plant or apparatus may also be present but not shown. The Contractor is therefore advised to undertake their own investigation where the presence of any existing sewers, services, plant or apparatus may affect their operations.

Notes

1. WATER LEVEL IS APPROXIMATELY 35m BELOW GROUND LEVEL. FOR REFERENCE, SEE FLOOD RISK ASSESSMENT AND SURFACE WATER DRAINAGE STRATEGY REPORT, PARAGRAPH 2.4.2.

Key

- TOPSOIL
- BRITONS LANE SAND AND GRAVEL
- BACTON GREEN TILL

0 5 10 15 20 25m
SCALE 1:250

P01 UPDATE FOLLOWING NCC CIMMENTS	RO	SL	2024.03.22
Issued/Revision	By	Appd	YYYY.MM.DD

RO	RO	SL	2024.03.14
Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Issue Status

PLANNING APPROVAL

This document is suitable only for the purpose noted above. Use of this document for any other purpose is not permitted.

Client/Project Logo

Norfolk County Council

Client/Project

NORFOLK COUNTY COUNCIL

SHERINGHAM RECYCLING CENTRE

Title

CONCEPTUAL GEOLOGICAL MODEL

Project No. 49868 | A1 Scale AS SHOWN

Revision P01 | Drawing No. 49868/2001/103

Appendix H Site Infiltration Testing - June 2022

Norfolk Partnership Laboratory
Part of the Norse Group

Prepared by:
Norfolk Partnership Laboratory, Norse Eastern Ltd, Martineau Lane, Norwich, Norfolk, NR1 2SG
Telephone (01603) 578389

Site Investigation
Factual Report
Sheringham
Household Waste Recycling Centre
Holt Road, Sheringham
Norfolk
102894
June 2022

Client:
Community & Environmental Services
Norfolk County Council
County Hall
Martineau Lane
Norwich
NR1 2SG

NR26 8WB

Norfolk Partnership Laboratory
Part of the Norse Group

Prepared by:
Norfolk Partnership Laboratory, Norse Eastern Ltd, Martineau Lane, Norwich, Norfolk, NR1 2SG
Telephone (01603) 578389

Factual Report
Sheringham
Household Waste Recycling Centre
Holt Road, Sheringham
Norfolk
102894
June 2022

Rev	Date	Originator	Checker	Approver	Description
A	09/06/2022	J Robinson	M L Bumstead	I D Brown	

Appendices

ii) Distribution

Community and Environmental Services	1 copy
Norfolk Partnership Laboratory	1 copy

1.0 Executive Summary

<table>
<tr><td>Site Location</td><td colspan="3">• Land located north of the eastern end of the access road to Sheringham Household Waste Recycling Centre (HWRC) on the A148 Holt Road in Sheringham.
• National Grid Reference 616300,341025</td></tr>
<tr><td>Current Land Use</td><td colspan="3">• The site comprises arable land.</td></tr>
<tr><td>Historical Land Use</td><td colspan="3">• The site is shown as a field on the Tithe Map (1836-1850), as it is currently.</td></tr>
<tr><td>Proposed End Use</td><td colspan="3">• It is proposed to construct a new Household Waste Recycling Centre.</td></tr>
<tr><td rowspan="4">Anticipated Geology</td><td>Chrono-stratigraphic system</td><td>Litho-stratigaphic Unit</td><td>Thickness (m)</td></tr>
<tr><td>Pleistocene</td><td>Britons Lane Sand and Gravel</td><td>0-40m</td></tr>
<tr><td>Pleistocene</td><td>Bacton Green Till</td><td>10-15m</td></tr>
<tr><td>Pleistocene</td><td>Wroxham Crag Formation</td><td>20m</td></tr>
<tr><td>Geology Encountered</td><td colspan="3">• Topsoil – encountered in all Trial Pits and Borehole 09 to a maximum depth of 0.60m bgl, comprising brown, dark brown or dark greyish brown sandy, slightly gravelly Topsoil.
• Head – encountered in all TP03 to a maximum depth of 0.60m bgl, comprising of dark brown, slightly gravelly, sandy Silt.
• Brittons Lane Sand and Gravel - encountered in all Trial Pits and Borehole 09, comprising of brown, light brown, orangey brown, yellowish brown and orange gravelly, silty fine to coarse Sand, brown, orangey brown or light brown clayey sandy gravelly Silt and firm orangey brown sandy silty Clay. The maximum depth observed was 8.50m bgl in BH09
• Bacton Green Till - encountered Borehole 09, comprising of soft to firm and stiff light brown slightly sandy, slightly gravelly Clay. The maximum depth observed was 15.45m bgl.
• Crag No encountered during this investigation.</td></tr>
<tr><td>Groundwater</td><td colspan="3">Not encountered to 15.45 metres depth. Hydrogeological Map of East Anglia indicates that the water table is at approximately 45m AOD, therefore 44m BGL.</td></tr>
<tr><td>Contamination Issues</td><td colspan="3">None encountered</td></tr>
</table>

Table 1: **Executive Summary**

2.0 Introduction

2.1 Scope and objectives of report

The objective of this Factual Report is to provide geotechnical information for a proposed new residential development, in particular for drainage and pavement design.

The report undertakes an assessment of all geotechnical aspects of the scheme, including:

- The results of recent investigation.

This report is written to conform to the requirements of Eurocode 7: Geotechnical Design, Part 1: General Rules, BS EN 1997-1:2004.

Norfolk Partnership Laboratory provides a service within Norse Highways, a division of Norse Eastern Ltd.

The purpose of this investigation was to ascertain ground conditions so that options for the design of a drainage system can be considered and highways designed.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

Although every effort has been made to give a true assessment of the condition of the site, it is possible that different ground conditions may exist in parts of the site that is neither recorded nor visible.

2.2 Description of project

The project is to construct a new household waste recycling centre to replace the existing one located just to the south west. The site is located 3.5 km to the south of Sheringham. The site is centred approximately on Ordnance Survey Grid Reference 616300 341025. The site location is shown on the plan in Appendix A.

2.2.1 Current Land Use

The land is currently agricultural and is in set aside.

2.2.2 Surrounding Land Use

The land is bounded to the north west by an arable field and agricultural storage area and to the south east by an arable field. South of the site is the service road leading to Sheringham Household Waste Recycling Centre, and beyond that the A148 with further arable fields on the other side. To the north, beyond the remainder of the arable field in which the site is situated, is a wooded area which forms part of the Hilltop Outdoor Centre.

2.2.3 Potential Sources of Contamination

The potential sources of contamination and background levels of any existing contamination were covered in previous reports by others, comments are made on any potential contamination encountered.

2.3 Geotechnical category of the project

The project is classed as Geotechnical Category 2 under Eurocode 7, which is defined as conventional types of structure and foundations, with no exceptional risk or difficult soil or loading conditions.

2.4 Other Relevant Information

2.4.1 Natural and manmade Cavities

This site is outside the area of known mining activity.

2.4.2 Landslides

Landslides do not pose a major risk at this site.

2.4.3 Erosion and Deposition

No erosion or deposition features were noted within the site.

2.4.4 Seismic

There are no known historical fault lines that affect the site.

3.0 Existing Information

3.1 Previous investigations.

There are no known previous investigations associated with this site.

3.2 Geology

According to British Geological Survey mapping, the geology of the region may be summarised as follows:

Chrono-stratigraphic system	Litho-stratigraphic Unit	Summary Description	Thickness (m)
Holocene	Head	**Head** comprises poorly sorted and poorly stratified deposits formed by the mass movement of superficial materials on sloping ground. The mass movement processes include hillwash and soil creep as well as solifluction, an important mode of sediment transport in periglacial conditions. Head occurs as a veneer up to a metre or so thick lining the floors and/or lower flanks of the tributary valleys of the district. Head ranges from yellow-brown to dark brown to grey-black and comprises mainly sand with varying proportions of clay, silt, gravel of pebble grade (mostly flint) and sporadic larger rock clasts.	Variable
Pleistocene	Britons Lane Sand and Gravel	**Briton's Lane Sand and Gravel** member consists mainly of planer cross bedding that comprises of gravels and cobbles, with lenses of sand. Lithologically the deposits have a high percentage of flint (78-85%). The parent rock of the Briton's Lane Sand and Gravel is the Briton's Lane Formation, which extends throughout most of north Norfolk. The underlying boundary is well defined with sands and gravels upon the erosional surface of the Sheringham Cliffs Formation.	0-40
Pleistocene	Bacton Green Till	The Bacton Green Till Member forms an extensive diamicton complex that consists of a stratified assemblage of stony diamicton with beds/laminae of sorted material including sand, silt and clay. It has been interpreted as being a subaqueous till deposited by melt-out and gravity flows (Lunkka, 1994; Lee et al., 2004). The calcium carbonate content of the matrix of the diamicton beds is typically within the region of 10-12% and is some 20% lower than tills from the underlying Lowestoft Formation.	10-15
Pleistocene	Wroxham Crag	The **Wroxham Crag** was formed when, after a long period of standing above sea level, the area was submerged by a marine transgression caused by movements of the sea floor during a period of coastal instability in the region. The deposits are a variable series of yellowish or reddish brown sands, laminated clays and pebbly gravels. In places they are highly fossiliferous, shell fragments being especially prolific.	5-60

Table 2: Geological succession of the area of the scheme (based on available literature)

Geology plan extracts from the BGS web site can be found in Appendix B.

3.3 Hydrology and Hydrogeology

According to the Regional Hydrogeology Map of Northern East Anglia, the Norwich Crag is the principle aquifer for the area. The estimated minimum hydrostatic level of the Crag water table in the vicinity of the site is 45 metres above Ordnance Survey Datum. Ground level in the area is around 89 metres above Ordnance Survey Datum. Groundwater is therefore approximately 44 metres below existing ground level.

4.0 Fieldwork

4.1 Description of Fieldwork

As part of the current phase of work, the following investigation took place on the 4 to 6 April 2022, with the Trial pits being excavated on 4 April and the Borehole starting on 5 April.

Eight Trial Pits were excavated to a maximum depth of 3.10 metres. These are referred to as TP01 to TP08.

One Borehole was excavated to a depth of 15.45 metres. This is referred to as BH09

The location of the Trial Pits and Borehole are shown on the location plan in Appendix C.

Within this investigation a number of small, bulk and disturbed samples were taken from the holes, in accordance with BS5930: 2015+A1:2020. The number and depths of these samples along with the details of thickness of strata encountered are set out in Appendices D and E of this report.

4.2 Ground Investigation Report

All data regarding the recent intrusive ground investigation is contained within this report. The Borehole log is located in Appendix D while Trial Pit logs are located in Appendix E of this report

4.3 Geophysical Surveys

No geophysical surveys were carried out as part of this investigation other than Ground Penetrating Radar (GPR) and Cable Avoidance Tool (CAT) scanning for the location of underground utilities

4.4 Pile Tests

No pile testing was undertaken as part of the investigation.

4.5 Other Field Work

No other fieldwork was undertaken.

4.6 Laboratory Investigation

4.6.1 Description of Geotechnical Tests

A laboratory testing schedule were drawn up to assist classification of the soils and to determine their physical and chemical properties. Norfolk Partnership Laboratory is a UKAS TESTING laboratory No. 0920.

The following tests were carried out in-house: -

a) The determination of Natural Moisture Content by oven drying (BS1377:1990:Part 2: Clause 3).
b) The determination of Liquid Limit using the four point cone penetrometer method (BS 1377: 1990: Part 2: Clause 4).
c) The determination of the Plastic Limit (BS1377: 1990: Part 2: Clause 5).
d) The determination of Plasticity Index (BS 1377: 1990: Part 2: Clause 5).
e) The determination of Particle Size Distribution by wet sieving (BS1377: 1990: Part 2: Clause 9.2).
f) The determination of the Moisture Content / Density Relationship (BS1377: Part 4: 1990: Clause 3).
g) The determination Moisture Condition Value (BS 1377: Part 4: Clause 5)

Copies of the geotechnical test results from the recent phase of investigation are contained within of Appendix F of this report.

4.6.2 Description of Geoenvironmental Tests

a) Suite ST: Determination of water soluble Ammonium, Chloride, Nitrate, Sulphate and Magnesium; acid soluble Sulphate and total Sulphur. (BRE Digest SD1).

b) Standard screening suite (Suite SB): Total Sulphate, Boron, Water Soluble, Arsenic, Cadmium, Chromium III, Chromium VI, Copper, Lead, Mercury, Nickel, Selenium, Zinc, Acid Soluble Sulphide, Phenols (Monohydric), Total Cyanide, Elemental Sulphur, pH Value, PAH Total, Speciated PAH , Soil Organic Matter (SOM)

c) Asbestos

d) Speciated TPH (UKCWG)

5.0 Investigation Results

5.1 Ground conditions

Within this and the following section of the report the geological materials encountered are discussed in turn, and their geotechnical material properties assessed. The ground conditions and material properties derived then form the basis of the geotechnical design criteria described in the Geotechnical Design Report.

5.1.1 Topsoil

Topsoil was found as a surface deposit in all excavations. It is generally described as (common variations in brackets):

(Dark, greyish) brown slightly gravelly sandy silty TOPSOIL.

The thickness found was between 0.00 and 0.60 metres in BH09. A mean thickness of 0.33 metres was found to be present in Trial Pits 01 to 08. This material appears visually to be suitable for reuse.

5.1.2 Head

Head deposits were positively identified in TP03, beneath the Topsoil. It is described as:

Dark brown, slightly gravelly, sandy SILT.

This horizon was encountered at a depth of 0.35 metres with the base at 0.60 metres, giving a revealed thickness of 0.25 metres.

5.1.3 Britons Lane Sand and Gravel

The Britons Lane Sand and Gravel was encountered in all Trial Pits and BH09. This horizon was encountered below the Topsoil in all excavations except TP03 where it is encountered below the Head. It is described variously as (common variations in brackets) -

(Light, orangey, yellowish) brown or (yellowish, reddish) orange (very) silty, (slightly) gravelly fine to coarse (medium) SAND. Gravel is fine to medium angular to sub rounded flint.

or

Firm orangey brown, sandy, silty CLAY, with large lenses of firm to stiff, light brown, gravelly, very clayey SILT. Gravel is sub-angular to sub -rounded, fine and medium chalk and flint.

Or
(Light) brown (slightly gravelly, clayey) very sandy SILT. Gravel is sub-angular to rounded fine to medium chalk and flint, (with lenses of yellowish brown, fine and medium SAND).

This horizon was encountered at depths of between 0.30 metres in TPs 04, 06, 07 and 08 to 0.60 metres in TP03 and BH09. The base of the horizon was not proven in any of the Trial Pits but was proven in BH09 at 8.50 metres. The maximum revealed thickness was 7.90 metres in BH09.

5.1.3 Bacton Green Till

The Bacton Green Till was only encountered BH09. This horizon was encountered below the Britons Lane Sand and Gravel. It is described as (common variations in brackets) -

Stiff (soft to firm) light brown, slightly sandy, slightly gravelly CLAY. Gravel is sub-angular to sub-rounded, fine to medium chalk and flint, with pockets of orange sand. Occasional chalk boulders were also encountered.

This horizon was encountered at depths of between 0.85 metres and 15.45 metres. The base of the horizon was not proven.

5.2 Engineering properties

5.2.1Topsoil

Topsoil should be removed from beneath all road and housing foundations. Subject to verification it could either be reused on site or disposed of off-site.

5.2.2 Head

No geotechnical laboratory testing was carried out on the Head as part of this investigation. Head should be removed from beneath all road and housing foundations.

5.2.3 Britons Lane Sand and Gravel

The Britons Lane Sand and Gravel was encountered in all Trial pits and Borehole 9

Four Atterberg Limit test was undertaken on a sample from the Britons Lane Sand and Gravel.

The results are tabulated below:

Location	Depth (m)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Modified PI (%)	Moisture Content (%)	BS Classification	NHBC Classification
TP02	2.7	45	16	29	27	7.8	CI	Medium
TP03	0.6	26	18	8	7	17	CL	Non Shrinkable
TP03	2.7	47	16	31	27	23	CI	Medium
TP04	0.7	26	14	11	11	14	CL	Low

Table 3: Summary of Atterburg Limits in Britons Lane Sand and Gravel.

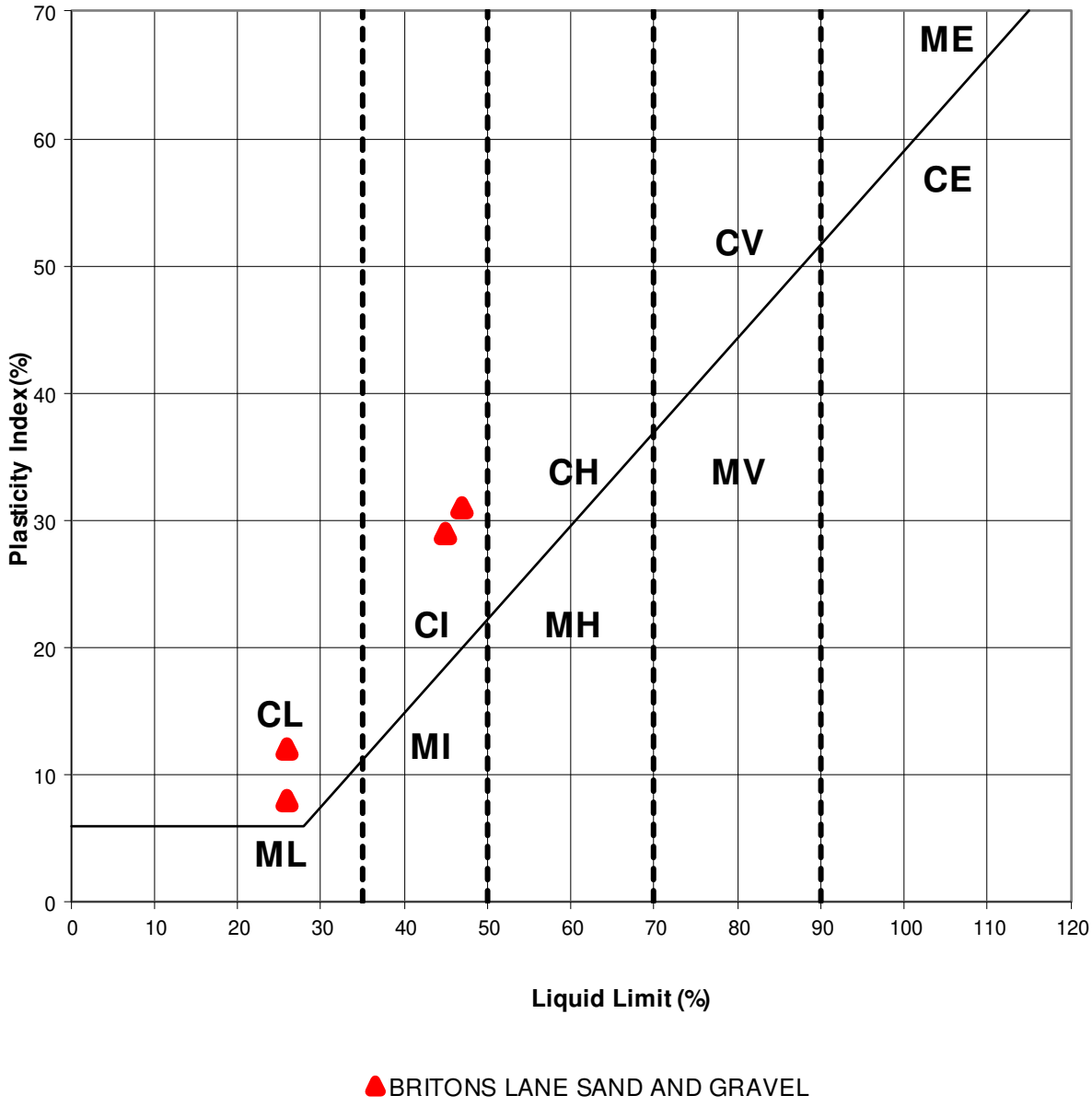

Figure 1: Atterberg Limits A line plot – Britons Lane Sand and Gravel

Twenty two Particle Size Distribution tests were carried out on the Briton's Lane Sand and Gravel and fall within the following grading envelope.

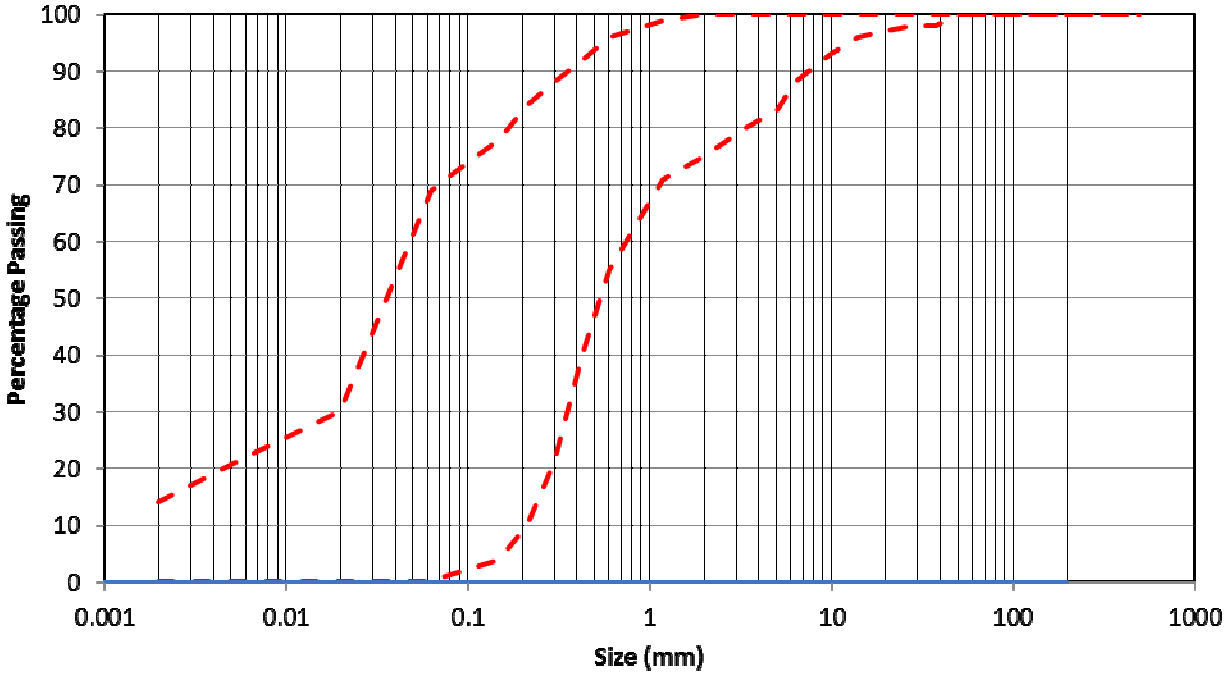

Figure 2: PSD envelope – Britons Lane Sand and Gravel.

Eight CBR tests were carried out in the Britons Lane Sand and Gravel as part of this investigation. Results are summarised below:

Location	Depth (m)	CBR (Top) (%)	CBR (Bottom) (%)	CBR (Design) (%)
TP01	0.70	14	16	15
TP02	0.70	18	22	21*
TP03	0.60	1.7	1.5	1.6
TP04	0.70	4.3	5.7	5.3*
TP05	0.70	10	15	14*
TP06	0.70	13	19	18*
TP07	0.60	13	16	15*
TP08	0.70	24	34	32*

*The design CBR calculation is outside the British Standard where top and bottom values are not within 10%.

Table 4: CBR summary – Britons Lane Sand and Gravel

The CBR values vary from 1.6% to 32%. It is recommended that a design CBR value of 5% is adopted for pavement design, this will however require further investigation of the area around TP03 to delineate both the vertical and horizontal extent of the soft spot. This should then be removed if present at formation and replaced with suitable material to achieve the design CBR value.

The samples were then tested at a series of moisture contents to establish the Dry Density/Moisture Content Relationship. The results are summarised below.

Location	Depth (m)	Max Dry Density (Mg/m^3)	Optimum Moisture Content (%)
TP01	1.80	1.72	16.6
TP02	0.70	1.89	12.9
TP03	0.60	1.87	10.0
TP04	0.70	2.01	10.5
TP05	1.70	1.83	15.8
TP06	0.70	1.73	6.7
TP07	1.70	1.66	7.4
TP08	1.70	1.73	8.0

Table 5: CBR summary – Britons Lane Sand and Gravel

5.2.3 Bacton Green Till

The Bacton Green Till was only encountered in Borehole 09.

No geotechnical laboratory testing was carried out on the Bacton Green Till as part of this investigation. Head should be removed from beneath all road and housing foundations.

5.3 Geoenvironmental testing

5.3.1 Geoenvironmental Soils testing

5.3.1 Samples tested

The schedule of geoenvironmental testing can be seen tabulated below.

Location	Depth (m)	Tests
1	0.1	Suite SB, Speciated TPH, Asbestos
1	0.7	Suite ST
2	0.1	Suite SB, Speciated TPH, Asbestos
2	1.4	Suite ST
3	0.1	Suite ST
3	0.6	Suite SB, Speciated TPH, Asbestos
4	0.1	Suite SB, Speciated TPH, Asbestos
4	0.7	Suite ST
5	0.1	Suite SB, Speciated TPH Asbestos
6	0.7	Suite SB, Speciated TPH, Asbestos
6	2.4	Suite ST
7	0.1	Suite SB, Speciated TPH, Asbestos
7	0.6	Suite ST
8	0.1	Suite SB, Speciated TPH, Asbestos
8	2.8	Suite ST
9	5.0 - 5.5	Suite ST

Table 6: Geoenvironmental soil test schedule summary

Suite SB = General contamination suite including testing for: Total Sulphate, Boron, Water Soluble, Arsenic, Cadmium, Chromium III, Chromium VI, Copper, Lead, Mercury, Nickel, Selenium, Zinc, Acid Soluble Sulphide, Phenols (Monohydric), Total Cyanide, Elemental Sulphur, pH Value, PAH Total, Speciated PAH , Soil Organic Matter (SOM).

Suite ST - Determination of water soluble Ammonium, Chloride, Nitrate, Sulphate and Magnesium; acid soluble Sulphate and total Sulphur. (BRE Digest SD1).

A total of eight samples were tested in accordance with BRE Special Digest 1 (SD1) (NPL Suite ST) and a further eight samples were tested as part of Suite SB to check for the presence of sulphates. Results are summarised below:

Determinant	No of tests	Min	Max	Characteristic value
pH	16	7.2	8.46	7.33
Ammonium (mg/l)	8	<1.0	1.27	1.26
Chloride (mg/l)	8	<7	<7	7
Nitrate (mg/l)	8	<0.4	13.3	7.4
Sulphate (Water sol) (mg/l)	16	<10	18	13
Sulphate (Acid sol) (%)	16	<0.02	0.03	0.03
Sulphur (%)	8	<0.01	0.02	0.02
Magnesium (mg/l)	8	<1	13	10.5

Table 7: BRE SD1 Result summary

Complete geoenvironmental test results are contained in Appendix G.

5.4 Infiltration Testing

Infiltration testing was carried out in two trial pits in accordance with BRE365. Three runs were carried out in all pits. Results are summarised below, full results can be found in Appendix H.

Location	Run 1 (m/sec)	Run 2 (m/sec)	Run 3 (m/sec)	Accepted result (m/sec)
TP07	8.0×10^{-5}	4.8×10^{-5}	4.2×10^{-5}	4.2×10^{-5}
TP08	6.5×10^{-5}	4.8×10^{-5}	3.5×10^{-5}	3.5×10^{-5}

Table 8: Trial Pit Infiltration test summary

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5.5 In Situ Tests

No in situ testing was carried out as part of this investigation.

5.6 Groundwater observations

No groundwater was encountered as part of this investigation.

5.7 Ground gas observations

No ground gas monitoring was carried out as part of this investigation.

Norfolk Partnership Laboratory

Site Investigation Section

This report was prepared under the direction of

Lead Engineer

Ian Brown

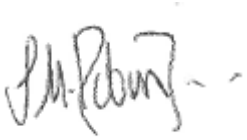
Report checked by

Geotechnical Services Manager

M L Bumstead
MSC BSc FGS

Author of report

Project Engineer



Jill Robinson

Date: 09/06/2022

Appendix A

Norfolk County Council

DRAWING TITLE

SHERINGHAM HWRC
GROUND INVESTIGATION
SITE LOCATION PLAN

Tom McCabe
Executive Director of
Community and Environmental Services
Norfolk County Council
County Hall
Martineau Lane
Norwich NR1 2SG

REV.	DESCRIPTION	DRAWN	CHECKED	DATE

	INIT.	DATE
SURVEYED BY	OS	2022
DESIGNED BY	JR	05/22
DRAWN BY	JR	05/22
CHECKED BY	MB	05/22

DRAWING No. 102894-1

PROJECT TITLE SHERINGHAM HWRC

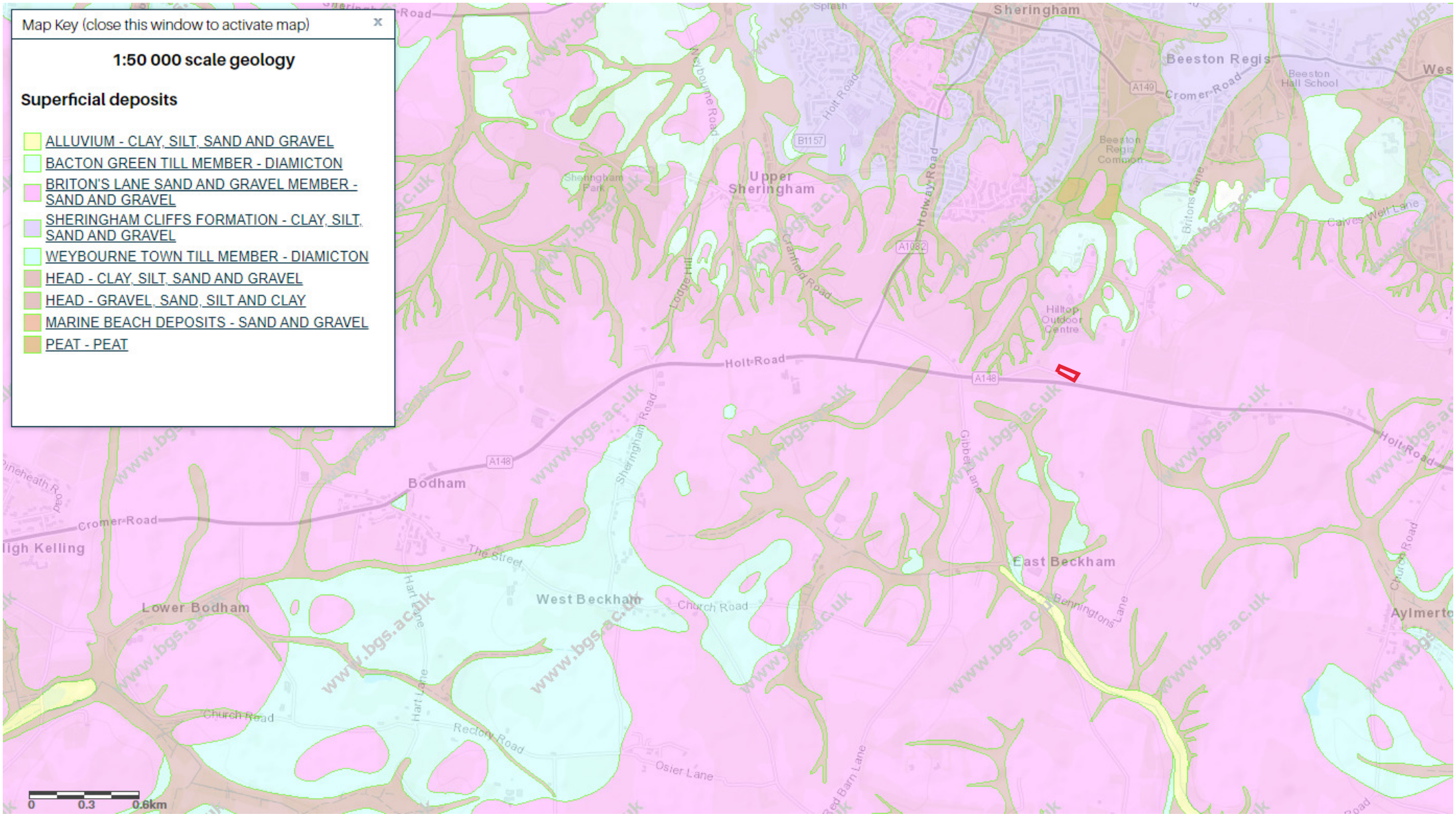
SCALE N.T.S @ A4

FILE No. 102894

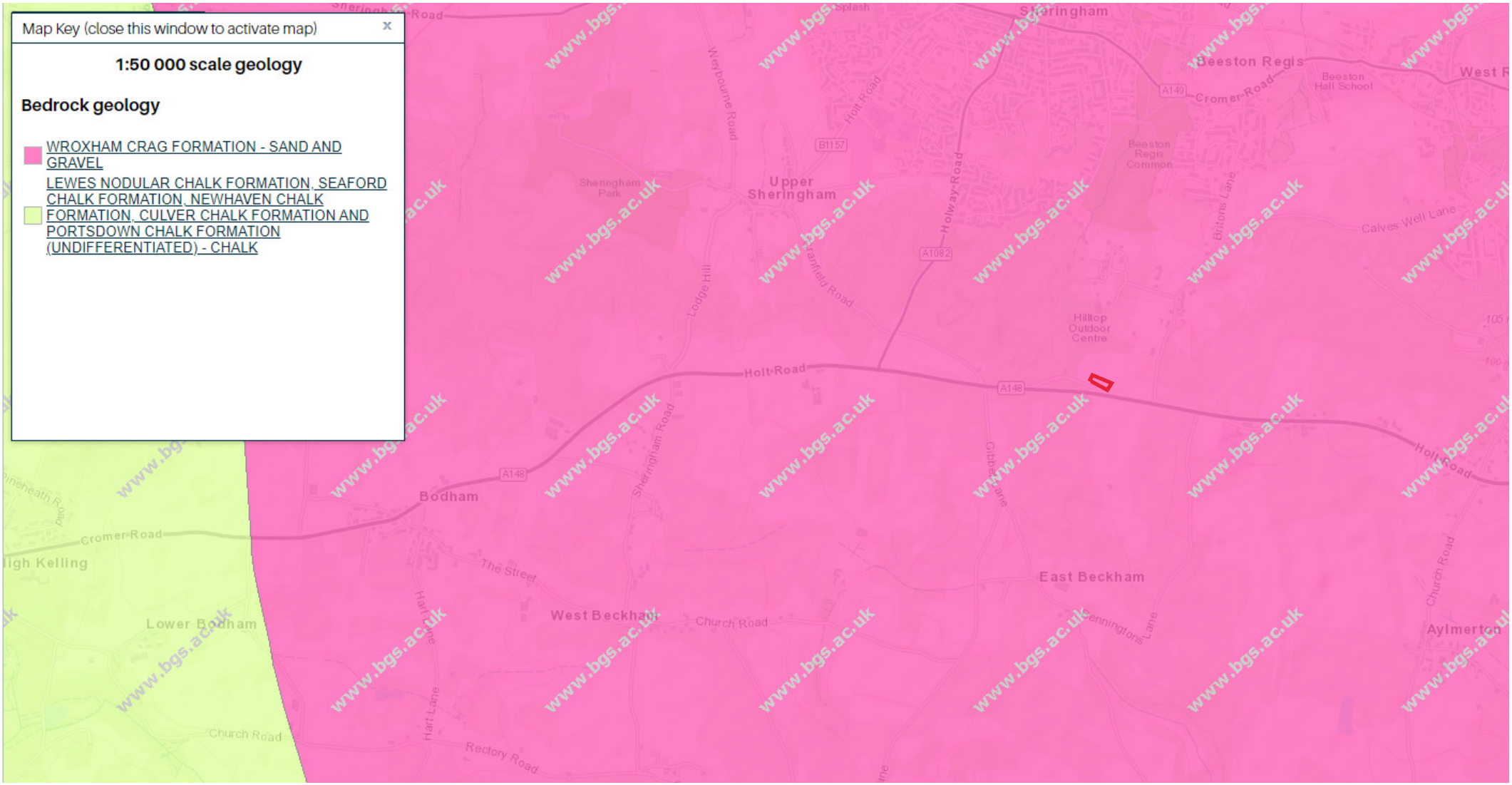
ORIGINAL SIZE: A4

IG 12/10/16

Appendix B

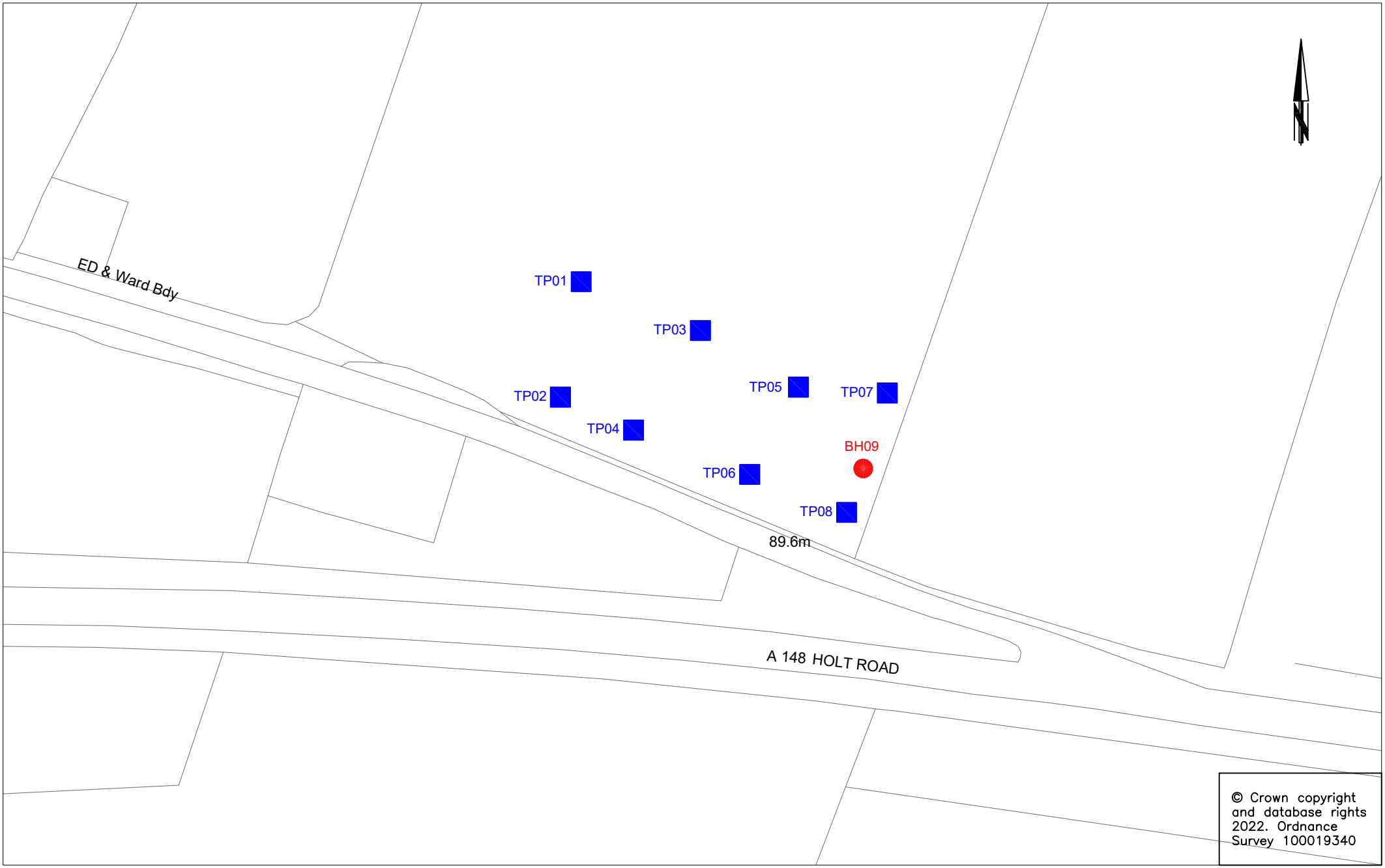


SUPERFICIAL GEOLOGY



BEDROCK GEOLOGY

Appendix C



Norfolk County Council

Tom McCabe
Executive Director of
Community and Environmental Services
Norfolk County Council
County Hall, Martineau Lane
Norwich NR1 2SG

DRAWING TITLE

SHERINGHAM HWRC
GROUND INVESTIGATION
TP AND BH LOCATION PLAN

REV.	DESCRIPTION	DRAWN BY	CHECKED	DATE

	INITIALS	DATE
SURVEYED BY	OS/BB	2022
DESIGNED BY	JR	05/22
DRAWN BY	JR	05/22
CHECKED BY	MB	05/22

DRAWING No. 102894-2

PROJECT TITLE: SHERINGHAM HWRC

SCALE: 1:1000 @ A4

FILE No. 102894

ORIGINAL SIZE: A4

IG 12/10/16

Appendix D

NORFOLK PARTNERSHIP LABORATORY

Borehole Log

Sheet 1 of 2

Scheme	Sheringham Recycling Centre	Job No.	102894	Borehole No.	09
Carried out for	Community & Environmental Services	Date Started	05/04/2022	Date Finished	06/04/2022
Remarks:	Dry	Type of Rig	CP	Logged by	Alan Glossop
		Depth (m)	15.45	Ground Level (m AOD)	88.92	Drawn by	CRV
		Co-ords	616323 - 341009	Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample Type	Sample No.	Field Tests	Laboratory Tests MC%	LL	PL	MPI	Org.	CBR
			Firm brown, slightly gravelly, fine to coarse SAND with occasional roots. Gravel is angular to sub-angular, fine to coarse flint. TOPSOIL												
			Medium dense yellowish orange, medium SAND. BRITONS LANE SAND AND GRAVEL		0.60										
			With many large lenses of reddish brown SILT from 1.00-1.20m.			1.00		01							
								02	S 23						
						2.00		03							
								04	S 14						
			With some small to medium lenses of reddish brown SILT from 3.00-3.50m.			3.00		05							
								06	S 17						
			Medium dense yellowish orange, medium SAND. BRITONS LANE SAND AND GRAVEL		4.00	4.00		07							
			Becoming fine to coarse SAND from 4.00-4.50m.					08	S 21						
			Becoming fine and medium SAND from 5.00-5.50m.			5.00		09							
								10	S 20						
			Medium dense light brown, slightly gravelly, fine and medium SAND. Gravel is sub-angular to sub-rounded, fine to medium flint. BRITONS LANE SAND AND GRAVEL		5.50	6.00		11							
								12	S 19						
			Medium dense reddish orange fine to medium SAND with occasional clay pockets, becoming more red in colour with depth. BRITONS LANE SAND AND GRAVEL		7.00	7.00		13							
								14	S 24						
						8.00		15							
								16	S 9						
			Structureless CHALK composed of cream slightly gravelly slightly clayey SILT. Gravel is weak, medium density, white and fine to medium and angular to sub-angular. Low flint content (Grade Dm). BACTON GREEN TILL		8.50 8.70			17							
			Soft to firm light brown, slightly sandy, slightly gravelly CLAY. Gravel is sub-angular to sub-rounded, fine and medium chalk with numerous chalk gravel, and orange sand pockets. BACTON GREEN TILL			9.00		19 18	S 10						

NORFOLK PARTNERSHIP LABORATORY

Borehole Log

Sheet 2 of 2

Scheme	Sheringham Recycling Centre	Job No.	102894	Borehole No.	09
Carried out for	Community & Environmental Services	Date Started	05/04/2022	Date Finished	06/04/2022
Remarks:	Dry	Type of Rig	CP	Logged by	Alan Glossop
		Depth (m)	15.45	Ground Level (m AOD)	88.92	Drawn by	CRV
		Co-ords	616323 - 341009	Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample Type	Sample No.	Field Tests	Laboratory Tests MC%	LL	PL	MPI	Org.	CBR
			Soft to firm light brown, slightly sandy, slightly gravelly CLAY. Gravel is sub-angular to sub-rounded, fine and medium chalk with numerous chalk gravel, and orange sand pockets. BACTON GREEN TILL					20							
								21							
			Stiff light brown, slightly sandy, slightly gravelly CLAY. Gravel is sub-angular to sub-rounded, fine to medium chalk and flint., with pockets of orange SAND. BACTON GREEN TILL		11.00	11.00		23	22	S 24					
						12.00		24							
								25							
								26							
						13.00		28	27	S 27					
						14.00		29							
								30							
								31							
						15.00		32		S 33					
					15.45										
						16.00									
						17.00									
						18.00									
						19.00									

NORFOLK PARTNERSHIP LABORATORY

TRIAL PIT LOG

Sheet 1 of 1

Scheme	Sheringham Recycling Centre	Job No.	102894	Trial Pit No.	01
Carried out for	Community & Environmental Services	Date Started	08/04/2022	Date Finished	04/04/2022
Dimensions:	0.45m x 1.60m	Type of Rig	JCB 3CX	Logged by	MLB
Remarks:	Abandoned due to collapse. Dry.	Depth (m)	2.30	Ground Level (m AOD)	89.95
		Co-ords	616266 - 341048	Drawn by	CRV
				Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample Type	Sample No.	Field Tests	Laboratory Tests MC%	LL	PL	MPI	Org.	CBR
			Dark brown, slightly gravelly, sandy TOPSOIL. Gravel is angular to sub-angular, fine and medium flint. TOPSOIL												
			Brown, slightly gravelly, silty, fine and medium SAND. Gravel is angular to sub-rounded, fine and medium flint. BRITONS LANE SAND AND GRAVEL		0.35										
			Orangey brown, fine and medium SAND. BRITONS LANE SAND AND GRAVEL		0.70			2							
			Becoming yellow from 1.80-2.30m.			1.00		3							
					2.30	2.00									
						3.00									
						4.00									

NORFOLK PARTNERSHIP LABORATORY

TRIAL PIT LOG

Sheet 1 of 1

Scheme	Sheringham Recycling Centre	Job No.	102894	Trial Pit No.	02
Carried out for	Community & Environmental Services	Date Started	08/04/2022	Date Finished	04/04/2022
Dimensions:	0.45m x 1.80m	Type of Rig	JCB 3CX	Logged by	MLB
Remarks:	Dry and stable.	Depth (m)	3.00	Ground Level (m AOD)	89.90
		Co-ords	616262 - 341024	Drawn by	CRV
				Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample Type	Sample No.	Field Tests	Laboratory Tests MC%	LL	PL	MPI	Org.	CBR
			Brown, slightly gravelly, sandy TOPSOIL. Gravel is angular to sub-angular, fine and medium flint. TOPSOIL					1							
			Yellowish brown, medium SAND. BRITONS LANE SAND AND GRAVEL		0.40			2							
			Yellowish brown gravelly, medium SAND. Gravel is sub-angular to rounded, fine and medium flint. BRITONS LANE SAND AND GRAVEL		1.10	1.00		3							
			Firm orangey brown, sandy, silty CLAY, with large lenses of firm to stiff, light brown, gravelly, very clayey SILT. Gravel is sub-angular to sub -rounded, fine and medium chalk and flint. BRITONS LANE SAND AND GRAVEL		1.75	2.00									
			Firm to stiff light brown, slightly gravelly, clayey very sandy SILT. Gravel is sub-angular to rounded fine to medium chalk and flint, with lenses of yellowish brown, fine and medium SAND. BRITONS LANE SAND AND GRAVEL		2.50			4		8	45	16	29		
					3.00	3.00									
						4.00									

NORFOLK PARTNERSHIP LABORATORY

TRIAL PIT LOG

Sheet 1 of 1

Scheme	Sheringham Recycling Centre	Job No.	102894	Trial Pit No.	03
Carried out for	Community & Environmental Services	Date Started	08/04/2022	Date Finished	04/04/2022
Dimensions:	0.45m x 1.70m	Type of Rig	JCB 3CX	Logged by	MLB
Remarks:	Dry and stable.	Depth (m)	3.00	Ground Level (m AOD)	89.53
		Co-ords	616290 - 341037	Drawn by	CRV
				Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample Type	Sample No.	Field Tests	Laboratory Tests MC%	LL	PL	MPI	Org.	CBR
			Dark greyish brown, slightly gravelly, silty,. sandy TOPSOIL. Gravel is rounded to angular, fine to coarse flint. TOPSOIL					1							
			Dark brown, slightly gravelly, sandy SILT. Gravel is angular to sub-angular, fine to coarse flint. HEAD		0.35										
			Brown, very sandy SILT. BRITONS LANE SAND AND GRAVEL		0.60			2		17	26	18	8		
			Becoming slightly gravelly from 1.60-3.00m. Gravel is angular to sub-angular, fine and medium flint.			1.00									
			With large lenses of firm light brown, gravelly CLAY from 1.80-3.00. Gravel is sub-angular to sub-rounded, fine and medium chalk and flint.			2.00									
			Boulder of chalk in south end of pit at 2.30.												
								3		23	47	16	31		
					3.00	3.00									
						4.00									

NORFOLK PARTNERSHIP LABORATORY

TRIAL PIT LOG

Sheet 1 of 1

Scheme	Sheringham Recycling Centre	Job No.	102894	Trial Pit No.	04
Carried out for	Community & Environmental Services	Date Started	08/04/2022	Date Finished	04/04/2022
Dimensions:	0.45m x 1.70m	Type of Rig	JCB 3CX	Logged by	MLB
Remarks:	Dry and stable.	Depth (m)	3.10	Ground Level (m AOD)	89.61
		Co-ords	616277 - 341017	Drawn by	CRV
				Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample Type	Sample No.	Field Tests	Laboratory Tests MC%	LL	PL	MPI	Org.	CBR
			Brown, slightly gravelly, silty, sandy TOPSOIL. Gravel is sub-rounded to angular, fine and medium flint. TOPSOIL					1							
			Light brown, very sandy SILT. BRITONS LANE SAND AND GRAVEL		0.30										
								2		14	26	14	11		
			Light brown, slightly gravelly, very silty, fine to medium SAND. Gravel is sub-rounded to rounded, fine and medium flint. BRITONS LANE SAND AND GRAVEL		1.00	1.00									
								3							
						2.00									
			Orangey brown, slightly gravelly, silty, fine and medium SAND. Gravel is sub-rounded to rounded, fine and medium flint. BRITONS LANE SAND AND GRAVEL		2.60										
			Boulder of chalk, medium and coarse flint cobbles is north face of pit at 2.70m.					4							
						3.00									
					3.10										
						4.00									

NORFOLK PARTNERSHIP LABORATORY

TRIAL PIT LOG

Sheet 1 of 1

Scheme	Sheringham Recycling Centre	Job No.	102894	Trial Pit No.	05
Carried out for	Community & Environmental Services	Date Started	08/04/2022	Date Finished	04/04/2022
Dimensions:	0.45m x 1.70m	Type of Rig	JCB 3CX	Logged by	MLB
Remarks:	Abandoned due to collapse. Dry.	Depth (m)	2.40	Ground Level (m AOD)	89.51
		Co-ords	616310 - 341026	Drawn by	CRV
				Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample Type	Sample No.	Field Tests	Laboratory Tests MC%	LL	PL	MPI	Org.	CBR
			Dark brown, slightly gravelly, sandy TOPSOIL. Gravel is angular to sub-angular, fine to coarse flint. TOPSOIL												
			Orange, very gravelly, medium SAND. Gravel is angular to sub-rounded, fine and medium flint. BRITONS LANE SAND AND GRAVEL		0.35			1							
								2							
						1.00									
			Yellowish brown slightly gravelly, fine to medium SAND. Gravel is angular to sub-rounded, fine and medium flint. BRITONS LANE SAND AND GRAVEL		1.40										
								3							
						2.00									
								4							
					2.40										
						3.00									
						4.00									

NORFOLK PARTNERSHIP LABORATORY

TRIAL PIT LOG

Sheet 1 of 1

Scheme	Sheringham Recycling Centre	Job No.	102894	Trial Pit No.	06		
Carried out for	Community & Environmental Services	Date Started	08/04/2022	Date Finished	04/04/2022		
Dimensions:	0.45m x 1.70m	Type of Rig	JCB 3CX			Logged by	MLB
Remarks:	Abandoned at 2.70m sue to collapse. Dry.	Depth (m)	2.70	Ground Level (m AOD)	89.48	Drawn by	CRV
		Co-ords	616300 - 341008			Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample Type	Sample No.	Field Tests	Laboratory Tests MC%	LL	PL	MPI	Org.	CBR
			Brown, slightly gravelly, silty, sandy TOPSOIL. Gravel is angular to rounded, fine to coarse flint. TOPSOIL												
			Orange, very gravelly, fine to coarse SAND. Gravel is sub-angular to rounded, fine to coarse flint. BRITONS LANE SAND AND GRAVEL		0.30			1							
			Orange silty fine and medium SAND. BRITONS LANE SAND AND GRAVEL		0.45			2							
						1.00									
						2.00									
			Orange, slightly gravelly, medium SAND. Gravel is angular to rounded, fine and medium flint. BRITONS LANE SAND AND GRAVEL		2.20			3							
					2.70										
						3.00									
						4.00									

Appendix E

NORFOLK PARTNERSHIP LABORATORY

TRIAL PIT LOG

Sheet 1 of 1

Scheme	Sheringham Recycling Centre	Job No.	102894	Trial Pit No.	07
Carried out for	Community & Environmental Services	Date Started	08/04/2022	Date Finished	04/04/2022
Dimensions:	0.45m x 1.70m	Type of Rig	JCB 3CX	Logged by	MLB
Remarks:	Dry, some minor instability.	Depth (m)	2.90	Ground Level (m AOD)	89.04
		Co-ords	616328 - 341024	Drawn by	CRV
				Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample Type	Sample No.	Field Tests	Laboratory Tests MC%	LL	PL	MPI	Org.	CBR
			Brown, slightly gravelly, sandy TOPSOIL. Gravel is angular to sub-angular, fine and medium flint. TOPSOIL												
			Orange, fine and medium SAND. BRITONS LANE SAND AND GRAVEL		0.30			1							
			Becoming yellow from 1.40-2.90m.					2							
						1.00									
								3							
						2.00									
								4							
					2.90										
						3.00									
						4.00									

NORFOLK PARTNERSHIP LABORATORY

TRIAL PIT LOG

Sheet 1 of 1

Scheme	Sheringham Recycling Centre	Job No.	102894	Trial Pit No.	08
Carried out for	Community & Environmental Services	Date Started	08/04/2022	Date Finished	04/04/2022
Dimensions:	0.45m x 1.70m	Type of Rig	JCB 3CX	Logged by	MLB
Remarks:	Dry and stable.	Depth (m)	3.00	Ground Level (m AOD)	88.91
		Co-ords	616320 - 341000	Drawn by	CRV
				Checked by	MLB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample Type	Sample No.	Field Tests	Laboratory Tests MC%	LL	PL	MPI	Org.	CBR
			Brown, slightly gravelly, sandy TOPSOIL. Gravel is angular to sub-angular, fine to coarse flint. TOPSOIL												
			Orangey brown, fine and medium SAND. BRITONS LANE SAND AND GRAVEL		0.30			1							
			Becoming yellow from 1.30-3.00m.			1.00		2							
						2.00		3							
					3.00	3.00		4							
						4.00									

Appendix F

Norfolk Partnership Laboratory
Part of the Norse Group

County Hall, Martineau Lane
NORWICH, Norfolk NR1 2SG
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Email: civil.laboratory@norsegroup.co.uk

Community & Environmental Services

FAO N Young
Norfolk County Council
County Hall
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Our Reference No.	NNPL2022040810
Our Project No	102894
Your Sample Ref	B4
Your Project or Order No.	708523
Date Report Issued	31 May 2022

Determination of Liquid Limit to BS1377-2:1990 Cl 4.3 Cone Penetrometer (Definitive Method) (Withdrawn) and Determination of Plasticity Index to BS1377-2:1990 Cl 5 (Withdrawn)

Scheme	Sheringham HWRC		
Location	TP02	**Depth**	2.7m
Date sampled	05 Apr 2022	**Date received**	05 Apr 2022
Sampled by	KN (NPL Staff)	**Date tested**	27 Apr 2022
Sample type	Bulk Disturbed	**Sample Mass (g)**	494

If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Material	Soil
Description	Firm to stiff light brown, slightly gravelly, silty, very sandy CLAY. Gravel is sub-angular to rounded, fine and medium, flint and chalk.
Supplier	Not applicable
Source	Ex site

	Test Specimen
Location	Not applicable
Orientation	Not applicable
	Preparation Details
Method of Division	Quartering
Preparation Method	Wet sieving
Retained 425µm (%)	7.4
Natural MC (%)	7.8
Drying Temp. (ºC)	105-110
Liquid Limit (%)	45
Plastic Limit (%)	16
Plasticity Index (%)	29
Modified PI *(%)	27
BS Soil Classification	**C I**

*BRE Digest 240:1993.
This calculation is outside the scope of UKAS accreditation.

Remarks NHBC Volume change potential classification is medium.

Please be aware that we only report compliance with specifications using 'simple acceptance' as a guide as the specifications for the material as well as the methodology for testing are well established and take into account uncertainty in their formulation.

Test Code =604

UKAS TESTING 0920

Jim Elliott (Lead Technical Support Tech.)

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Community & Environmental Services

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Our Reference No.	NNPL2022040812
Our Project No	102894
Your Sample Ref	B2
Your Project or Order No.	708523
Date Report Issued	31 May 2022

Determination of Liquid Limit to BS1377-2:1990 Cl 4.3 Cone Penetrometer (Definitive Method) (Withdrawn) and Determination of Plasticity Index to BS1377-2:1990 Cl 5 (Withdrawn)

Scheme	Sheringham HWRC		
Location	TP03	**Depth**	0.6m
Date sampled	05 Apr 2022	**Date received**	05 Apr 2022
Sampled by	KN (NPL Staff)	**Date tested**	27 Apr 2022
Sample type	Bulk Disturbed	**Sample Mass (g)**	496

If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Material	Soil
Description	Orangish brown, gravelly, sandy, CLAY. Gravel is angular to subrounded fine flint.

Supplier	Not applicable	**Source**	Ex site

	Test Specimen
Location	Not applicable
Orientation	Not applicable
	Preparation Details
Method of Division	Quartering
Preparation Method	Wet sieving
Retained 425µm (%)	10.0
Natural MC (%)	17
Drying Temp. (ºC)	105-110
Liquid Limit (%)	26
Plastic Limit (%)	18
Plasticity Index (%)	8
Modified PI *(%)	7
BS Soil Classification	**CL**

*BRE Digest 240:1993.
This calculation is outside the scope of UKAS accreditation.

Remarks NHBC Volume change potential classification is non-shrinkable

Please be aware that we only report compliance with specifications using 'simple acceptance' as a guide as the specifications for the material as well as the methodology for testing are well established and take into account uncertainty in their formulation.

Test Code =604

UKAS TESTING 0920

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Community & Environmental Services

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Our Reference No.	NNPL2022040813
Our Project No	102894
Your Sample Ref	B3
Your Project or Order No.	708523
Date Report Issued	31 May 2022

Determination of Liquid Limit to BS1377-2:1990 Cl 4.3 Cone Penetrometer (Definitive Method) (Withdrawn) and Determination of Plasticity Index to BS1377-2:1990 Cl 5 (Withdrawn)

Scheme	Sheringham HWRC		
Location	TP03	**Depth**	2.7m
Date sampled	05 Apr 2022	**Date received**	05 Apr 2022
Sampled by	KN (NPL Staff)	**Date tested**	27 Apr 2022
Sample type	Bulk Disturbed	**Sample Mass (g)**	456

If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Material	Soil
Description	Dark reddish brown slightly gravelly slightly sandy silty CLAY. Gravel is angular to subrounded fine chalk and flint.
Supplier	Not applicable
Source	Ex site

Test Specimen

Location	Not applicable
Orientation	Not applicable

Preparation Details

Method of Division	Quartering
Preparation Method	Wet sieving
Retained 425µm (%)	11.6

Natural MC (%)	23	
Drying Temp. (ºC)	105-110	
Liquid Limit (%)	47	
Plastic Limit (%)	16	
Plasticity Index (%)	31	
Modified PI *(%)	27	*BRE Digest 240:1993. *This calculation is outside the scope of UKAS accreditation.*
BS Soil Classification	**C I**	

Remarks NHBC Volume change potential classification is medium.

Please be aware that we only report compliance with specifications using 'simple acceptance' as a guide as the specifications for the material as well as the methodology for testing are well established and take into account uncertainty in their formulation.

Test Code =604

UKAS TESTING 0920

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Community & Environmental Services

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Our Reference No.	NNPL2022040815
Our Project No	102894
Your Sample Ref	B2
Your Project or Order No.	708523
Date Report Issued	31 May 2022

Determination of Liquid Limit to BS1377-2:1990 Cl 4.3 Cone Penetrometer (Definitive Method) (Withdrawn) and Determination of Plasticity Index to BS1377-2:1990 Cl 5 (Withdrawn)

Scheme	Sheringham HWRC		
Location	TP04	**Depth**	0.7m
Date sampled	05 Apr 2022	**Date received**	05 Apr 2022
Sampled by	KN (NPL Staff)	**Date tested**	14 Apr 2022
Sample type	Bulk Disturbed	**Sample Mass (g)**	530

If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Material	Soil
Description	Light brown, slightly gravelly very sandy, silty CLAY. Gravel is angular to subrounded fine flint and quartz.

Supplier	Not applicable	**Source**	Ex site

	Test Specimen
Location	Not applicable
Orientation	Not applicable
	Preparation Details
Method of Division	Quartering
Preparation Method	Wet sieving
Retained 425µm (%)	5.6
Natural MC (%)	14
Drying Temp. (ºC)	105-110
Liquid Limit (%)	26
Plastic Limit (%)	14
Plasticity Index (%)	11
Modified PI *(%)	11
BS Soil Classification	**CL**

*BRE Digest 240:1993.
This calculation is outside the scope of UKAS accreditation.

Remarks NHBC Volume change potential classification is low.

Please be aware that we only report compliance with specifications using 'simple acceptance' as a guide as the specifications for the material as well as the methodology for testing are well established and take into account uncertainty in their formulation.

Test Code =604

UKAS TESTING 0920

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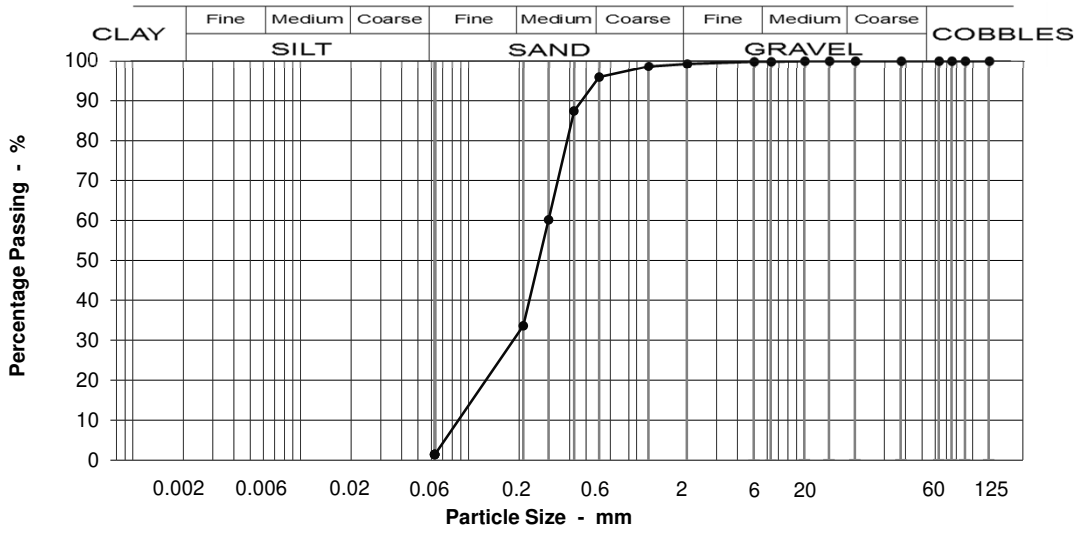
Our reference No. NNPL202204085-612
Our Project No. 102894
Your Sample Ref. 2
Your Order No. 708523
Date Tested 18/05/2022
Date Report Issued 24 May 2022

Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9 (Withdrawn)

Scheme: Sheringham HWRC
Location and orientation within sample not applicable

Location: TP01 @ 0.7 - 0.9m
Bulk disturbed sample



If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Sieving

Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	99
0.600	96
0.425	87
0.300	60
0.212	34
0.063	1

Specification for Highway Works Classification

Table 6/2

This material complies with the following material classes 1B, 6E/6R, 6M.

Please be aware that we only report compliance with specifications using 'simple acceptance' as a guide as the specifications for the material as well as the methodology for testing are well established and take into account uncertainty in their formulation.

Moisture content % 3.4
(BS1377-Part 2, 1990)

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	3
Medium SAND	62
Fine SAND	32
Silt & Clay	1

Grading Analysis	
D100	6
D60	0.30
D10	0.10
Uniformity Coefficient[1]	3

Description
Orangey-brown, fine to medium SAND.

Test Code = 612

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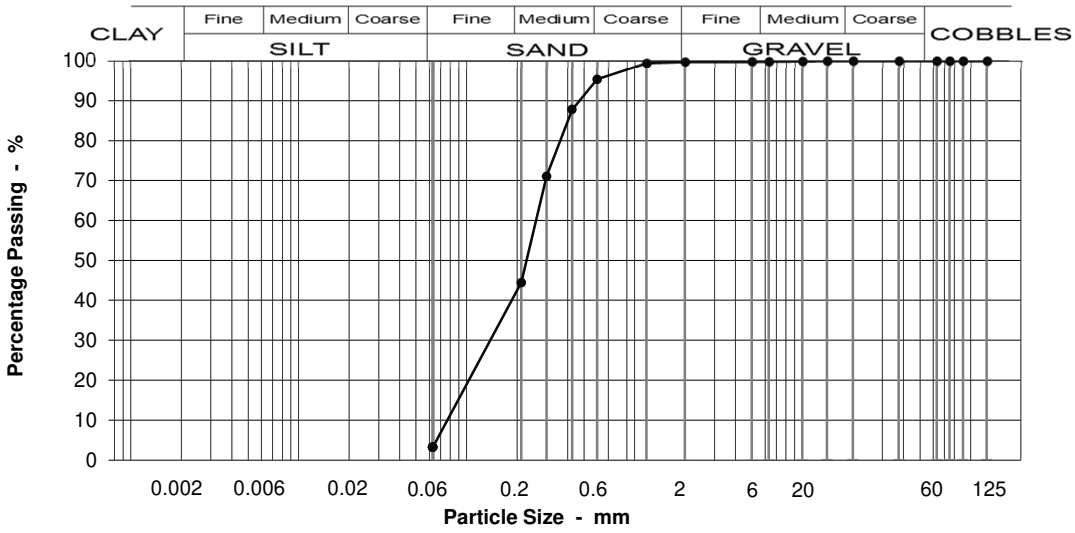
Our reference No. NNPL202204086-612
Our Project No. 102894
Your Sample Ref. 3
Your Order No. 708523
Date Tested 19/05/2022
Date Report Issued 24 May 2022

Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9 (Withdrawn)

Scheme: Sheringham HWRC
Location and orientation within sample not applicable

Location: TP01 @ 1.8 - 2m
Bulk disturbed sample



If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Sieving

Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	100
1.18	99
0.600	95
0.425	88
0.300	71
0.212	44
0.063	3

Specification for Highway Works Classification

Table 6/2

This material complies with the following material classes 1B, 6E/6R, 6M.

Please be aware that we only report compliance with specifications using 'simple acceptance' as a guide as the specifications for the material as well as the methodology for testing are well established and take into account uncertainty in their formulation.

Moisture content % 5
(BS1377-Part 2, 1990)

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	0
Coarse SAND	4
Medium SAND	51
Fine SAND	41
Silt & Clay	3

Grading Analysis	
D100	10
D60	0.26
D10	0.09
Uniformity Coefficient[1]	3

Description
Orangey-brown, fine to medium SAND.

Test Code = 612

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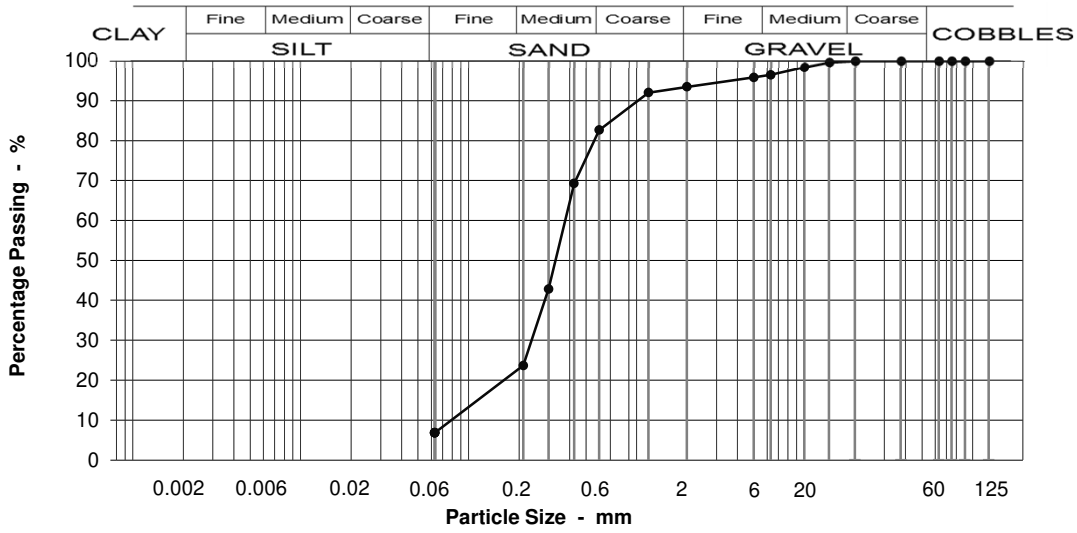
Our reference No. NNPL202204088-612
Our Project No. 102894
Your Sample Ref. 2
Your Order No. 708523
Date Tested 18/05/2022
Date Report Issued 24 May 2022

Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9 (Withdrawn)

Scheme: Sheringham HWRC
Location and orientation within sample not applicable

Location: TP02 @ 0.7 - 0.9m
Bulk disturbed sample



If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Sieving

Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	98
6.3	96
5	96
2	93
1.18	92
0.600	83
0.425	69
0.300	43
0.212	24
0.063	7

Specification for Highway Works Classification

Table 6/2

This material complies with the following material classes 1B, 6E/6R, 6M.

Please be aware that we only report compliance with specifications using 'simple acceptance' as a guide as the specifications for the material as well as the methodology for testing are well established and take into account uncertainty in their formulation.

Moisture content % 4.2
(BS1377-Part 2, 1990)

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	4
Fine GRAVEL	3
Coarse SAND	11
Medium SAND	59
Fine SAND	17
Silt & Clay	7

Grading Analysis	
D100	14
D60	0.38
D10	0.09
Uniformity Coefficient[1]	4

Description
Yellowish brown, medium SAND.

Test Code = 612

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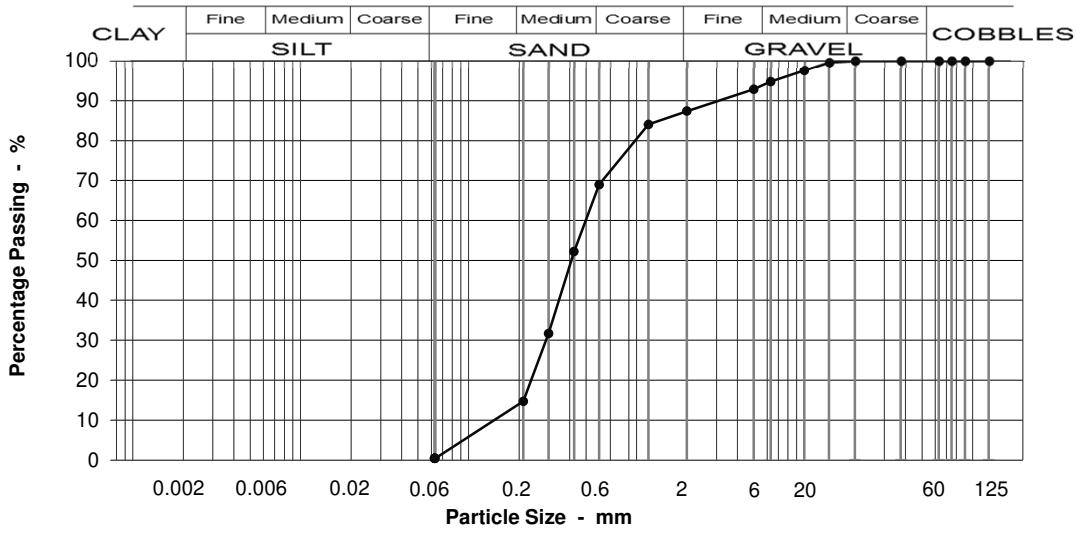
Our reference No. NNPL202204089-612
Our Project No. 102894
Your Sample Ref. 3
Your Order No. 708523
Date Tested 24/05/2022
Date Report Issued 09 Jun 2022

Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9 (Withdrawn)

Scheme: Sheringham HWRC
Location and orientation within sample not applicable

Location: TP02 @ 1.4 - 1.7m
Bulk disturbed sample



If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Sieving

Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	98
6.3	95
5	93
2	87
1.18	84
0.600	69
0.425	52
0.300	32
0.212	15
0.063	0

Specification for Highway Works Classification

Table 6/2

This material complies with the following material classes 1B, 6E/6R, 6M.

Please be aware that we only report compliance with specifications using 'simple acceptance' as a guide as the specifications for the material as well as the methodology for testing are well established and take into account uncertainty in their formulation.

Moisture content % 4.1
(BS1377-Part 2, 1990)

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	5
Fine GRAVEL	7
Coarse SAND	18
Medium SAND	54
Fine SAND	14
Silt & Clay	0

Grading Analysis	
D100	14
D60	0.506
D10	0.163
Uniformity Coefficient[1]	3

Description
Yellowish brown, gravelly, medium SAND. Gravel is sub-angular to rounded, fine and medium flint.

Test Code = 612

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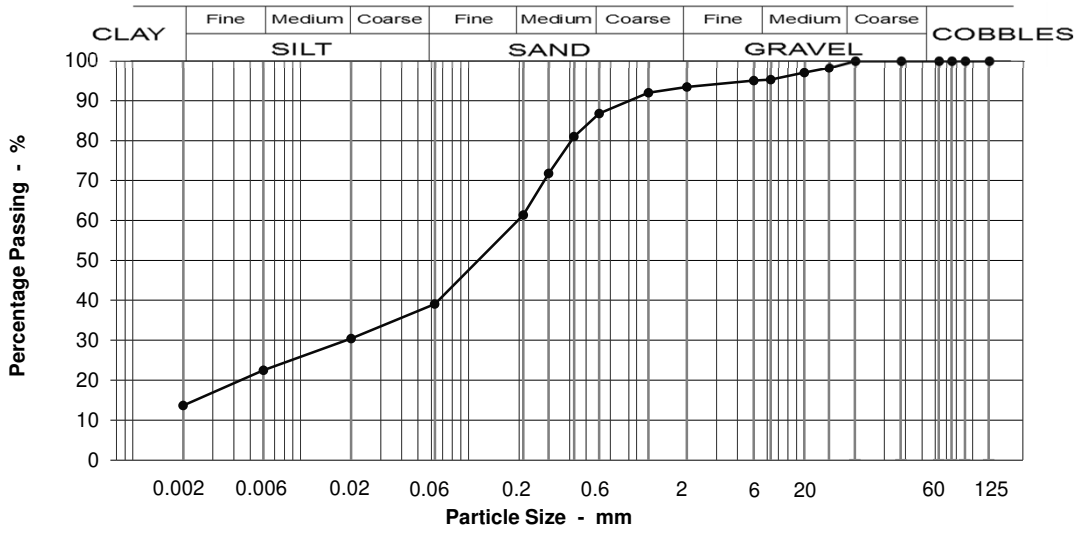
Our reference No. NNPL2022040810-612
Our Project No. 102894
Your Sample Ref. 4
Your Order No. 708523
Date Tested 26/04/2022
Date Report Issued 09 Jun 2022

Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9 (Withdrawn)

Scheme: Sheringham HWRC
Location and orientation within sample not applicable

Location: TP02 @ 2.7 - 3m
Bulk disturbed sample



If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Sieving

Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	98
10	97
6.3	95
5	95
2	93
1.18	92
0.600	87
0.425	81
0.300	72
0.212	61
0.063	39
0.020	30
0.006	22
0.002	14

Specification for Highway Works Classification

Table 6/2

This material complies with the following material classes 2A/2B, 2A/2B.

Please be aware that we only report compliance with specifications using 'simple acceptance' as a guide as the specifications for the material as well as the methodology for testing are well established and take into account uncertainty in their formulation.

Moisture content % 8.3
(BS1377-Part 2, 1990)

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	5
Fine GRAVEL	2
Coarse SAND	7
Medium SAND	25
Fine SAND	22
Silt & Clay	39

Grading Analysis	
D100	14
D60	0.203
D10	0.002
Uniformity Coefficient[!]	>10 *

Description
Firm to stiff light brown, slightly gravelly, silty, very sandy CLAY. Gravel is sub-angular to rounded, fine and medium, flint and chalk.

* Uniformity coefficient extrapolated

! UC to Spec. For Highway Works, table 6/1 footnote 5

Test Code = 612

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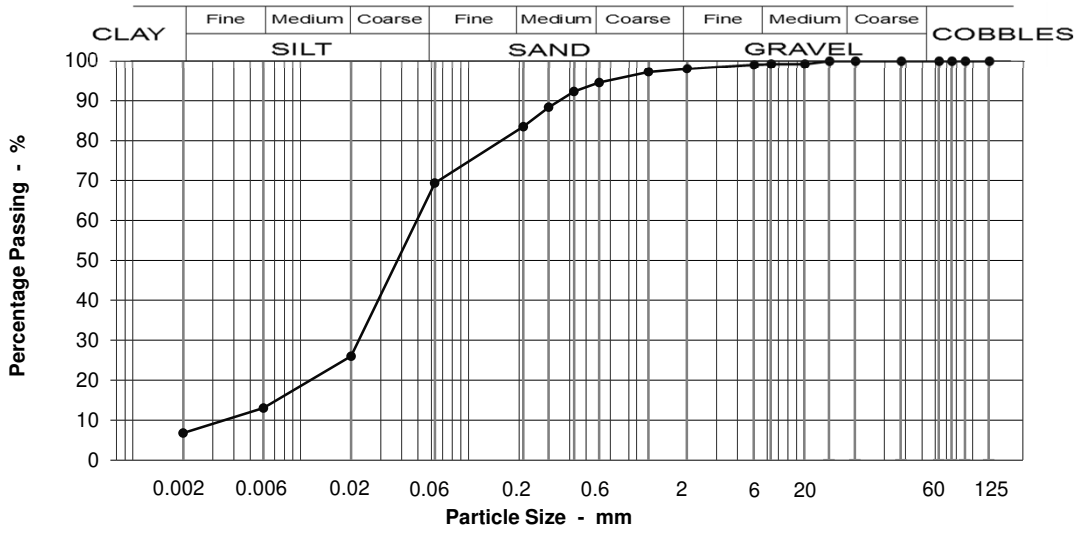
Our reference No. NNPL2022040812-612
Our Project No. 102894
Your Sample Ref. 2
Your Order No. 708523
Date Tested 03/05/2022
Date Report Issued 09 Jun 2022

Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9 (Withdrawn)

Scheme: Sheringham HWRC
Location and orientation within sample not applicable

Location: TP03 @ 0.6 - 0.8m
Bulk disturbed sample



If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Sieving

Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	99
6.3	99
5	99
2	98
1.18	97
0.600	95
0.425	92
0.300	88
0.212	84
0.063	69
0.020	26
0.006	13
0.002	7

Specification for Highway Works Classification

Table 6/2

This material complies with the following material classes 2A/2B, 2A/2B.

Please be aware that we only report compliance with specifications using 'simple acceptance' as a guide as the specifications for the material as well as the methodology for testing are well established and take into account uncertainty in their formulation.

Moisture content % 18
(BS1377-Part 2, 1990)

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	1
Coarse SAND	3
Medium SAND	11
Fine SAND	14
Silt & Clay	69

Grading Analysis	
D100	10
D60	0.054
D10	0.004
Uniformity Coefficient[!]	>10 *

Description
Orangish brown, gravelly, sandy, CLAY. Gravel is angular to subrounded fine flint.

* Uniformity coefficient extrapolated

! UC to Spec. For Highway Works, table 6/1 footnote 5

Test Code = 612

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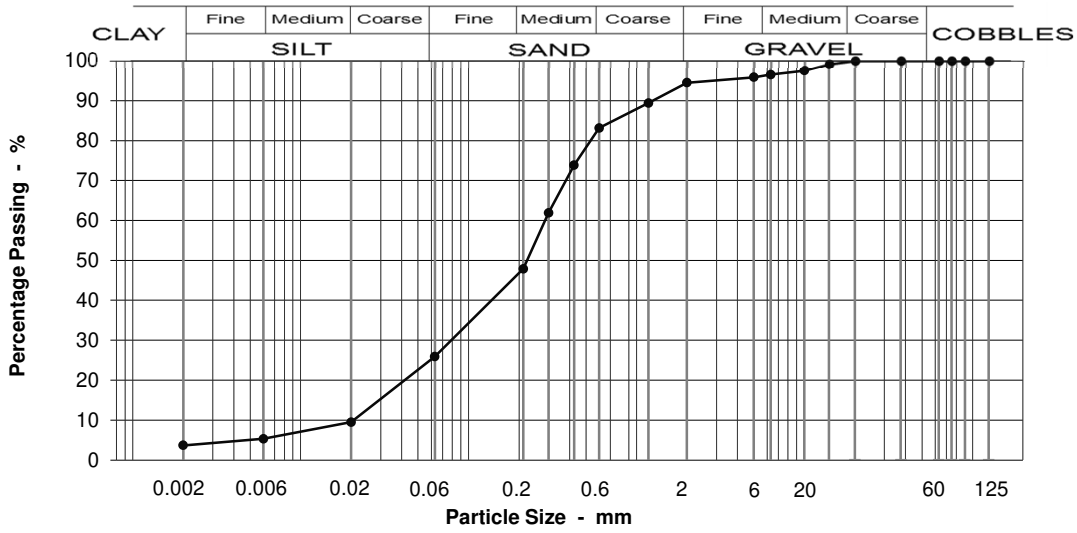
Our reference No. NNPL2022040813-612
Our Project No. 102894
Your Sample Ref. 3
Your Order No. 708523
Date Tested 27/05/2022
Date Report Issued 09 Jun 2022

Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9 (Withdrawn)

Scheme: Sheringham HWRC
Location and orientation within sample not applicable

Location: TP03 @ 2.7 - 3m
Bulk disturbed sample



If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Sieving

Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	99
10	98
6.3	97
5	96
2	95
1.18	89
0.600	83
0.425	74
0.300	62
0.212	48
0.063	26
0.020	9
0.006	5
0.002	4

Specification for Highway Works Classification

Table 6/2

This material complies with the following material classes 2A/2B, 2A/2B.

Please be aware that we only report compliance with specifications using 'simple acceptance' as a guide as the specifications for the material as well as the methodology for testing are well established and take into account uncertainty in their formulation.

Moisture content % 21
(BS1377-Part 2, 1990)

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	3
Fine GRAVEL	2
Coarse SAND	11
Medium SAND	35
Fine SAND	22
Silt & Clay	26

Grading Analysis	
D100	14
D60	0.288
D10	0.021
Uniformity Coefficient[!]	13 *

Description
Dark reddish brown slightly gravelly slightly sandy silty CLAY. Gravel is angular to subrounded fine chalk and flint.

* Uniformity coefficient extrapolated

! UC to Spec. For Highway Works, table 6/1 footnote 5

Test Code = 612

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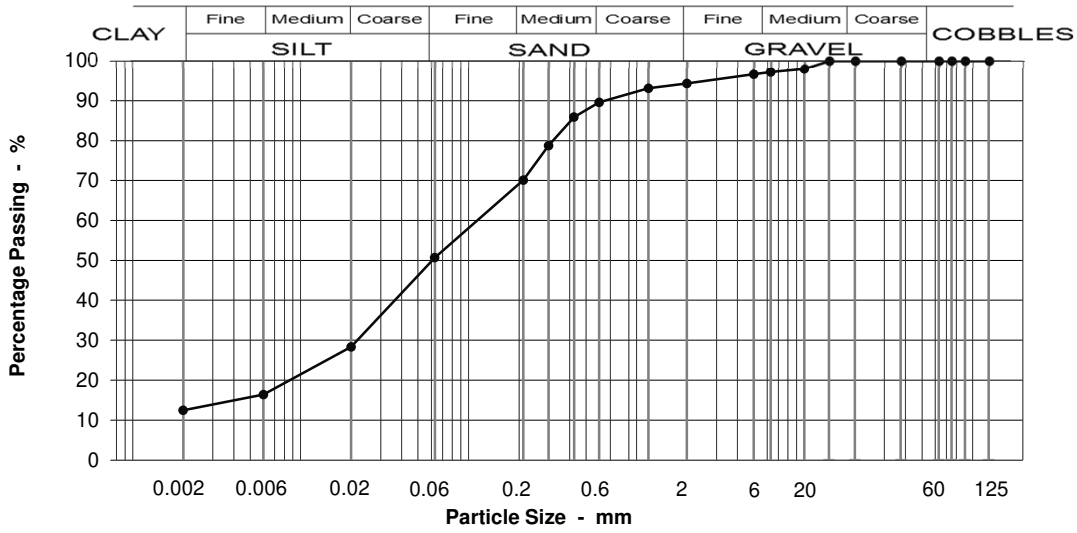
Our reference No. NNPL2022040815-612
Our Project No. 102894
Your Sample Ref. 2
Your Order No. 708523
Date Tested 03/05/2022
Date Report Issued 09 Jun 2022

Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9 (Withdrawn)

Scheme: Sheringham HWRC
Location and orientation within sample not applicable

Location: TP04 @ 0.7 - 0.9m
Bulk disturbed sample



If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Sieving

Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	98
6.3	97
5	97
2	94
1.18	93
0.600	90
0.425	86
0.300	79
0.212	70
0.063	51
0.020	28
0.006	16
0.002	12

Specification for Highway Works Classification

Table 6/2

This material complies with the following material classes 2A/2B, 2A/2B.

Please be aware that we only report compliance with specifications using 'simple acceptance' as a guide as the specifications for the material as well as the methodology for testing are well established and take into account uncertainty in their formulation.

Moisture content % 12
(BS1377-Part 2, 1990)

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	3
Fine GRAVEL	3
Coarse SAND	5
Medium SAND	19
Fine SAND	19
Silt & Clay	51

Grading Analysis	
D100	10
D60	0.134
D10	0.003
Uniformity Coefficient[!]	>10 *

Description
Light brown, slightly gravelly very sandy, silty CLAY. Gravel is angular to subrounded fine flint and quartz.

* Uniformity coefficient extrapolated

! UC to Spec. For Highway Works, table 6/1 footnote 5

Test Code = 612

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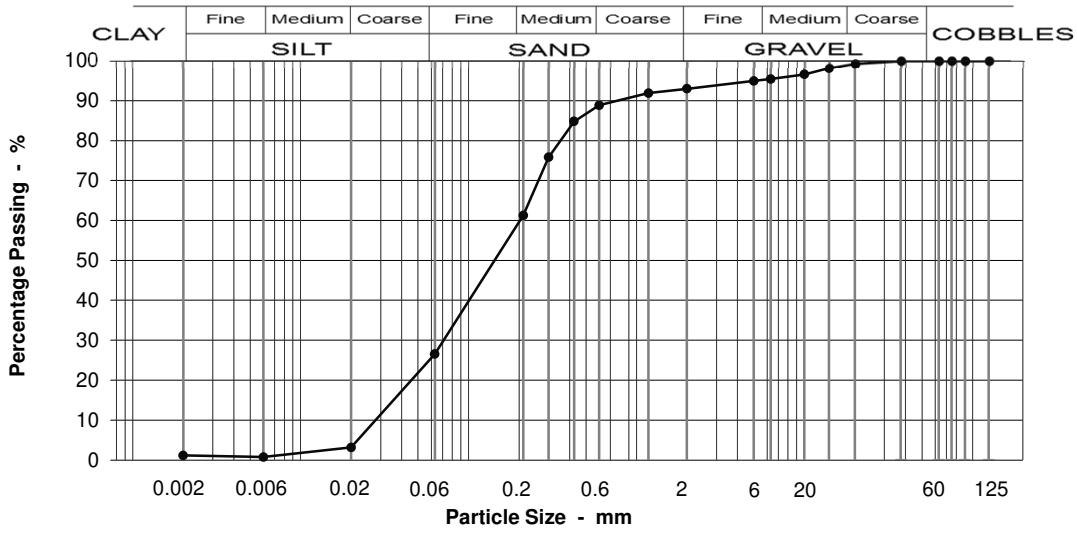
Our reference No. NNPL2022040816-612
Our Project No. 102894
Your Sample Ref. 3
Your Order No. 708523
Date Tested 19/05/2022
Date Report Issued 09 Jun 2022

Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9 (Withdrawn)

Scheme: Sheringham HWRC
Location and orientation within sample not applicable

Location: TP04 @ 1.7 - 1.9m
Bulk disturbed sample



If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Sieving

Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	99
14	98
10	97
6.3	95
5	95
2	93
1.18	92
0.600	89
0.425	85
0.300	76
0.212	61
0.063	27
0.020	3
0.006	1
0.002	1

Specification for Highway Works Classification

Table 6/2

This material complies with the following material classes 2A/2B.

Please be aware that we only report compliance with specifications using 'simple acceptance' as a guide as the specifications for the material as well as the methodology for testing are well established and take into account uncertainty in their formulation.

Moisture content % 10
(BS1377-Part 2, 1990)

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	1
Medium GRAVEL	4
Fine GRAVEL	2
Coarse SAND	4
Medium SAND	28
Fine SAND	35
Silt & Clay	27

Grading Analysis	
D100	20
D60	0.207
D10	0.033
Uniformity Coefficient[!]	6 *

Description
Light brown, gravelly, slightly silty, fine to medium SAND. Gravel is sub-rounded to rounded, fine and medium flint.

* Uniformity coefficient extrapolated

! UC to Spec. For Highway Works, table 6/1 footnote 5

Test Code = 612

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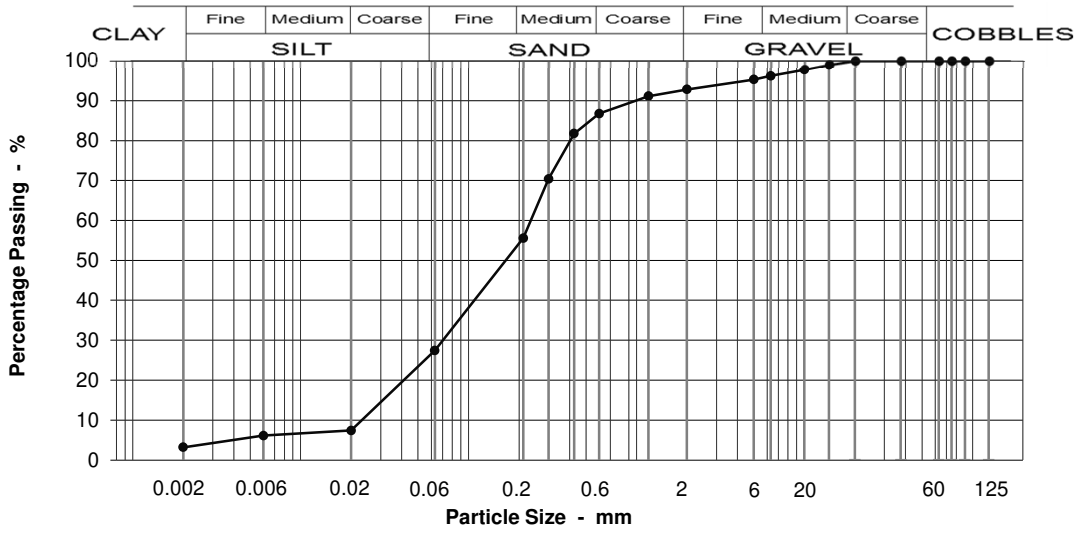
Our reference No. NNPL2022040817-612
Our Project No. 102894
Your Sample Ref. 4
Your Order No. 708523
Date Tested 14/05/2022
Date Report Issued 09 Jun 2022

Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9 (Withdrawn)

Scheme: Sheringham HWRC
Location and orientation within sample not applicable

Location: TP04 @ 2.7 - 3m
Bulk disturbed sample



If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Sieving

Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	99
10	98
6.3	96
5	95
2	93
1.18	91
0.600	87
0.425	82
0.300	70
0.212	56
0.063	27
0.020	7
0.006	6
0.002	3

Specification for Highway Works Classification

Table 6/2

This material complies with the following material classes 2A/2B, 2A/2B.

Please be aware that we only report compliance with specifications using 'simple acceptance' as a guide as the specifications for the material as well as the methodology for testing are well established and take into account uncertainty in their formulation.

Moisture content % 10
(BS1377-Part 2, 1990)

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	4
Fine GRAVEL	3
Coarse SAND	6
Medium SAND	31
Fine SAND	28
Silt & Clay	27

Grading Analysis	
D100	14
D60	0.238
D10	0.026
Uniformity Coefficient[!]	9 *

Description
Orangey brown, slightly gravelly, silty, fine and medium SAND. Gravel is sub-rounded to rounded, fine and medium flint.

* Uniformity coefficient extrapolated

! UC to Spec. For Highway Works, table 6/1 footnote 5

Test Code = 612

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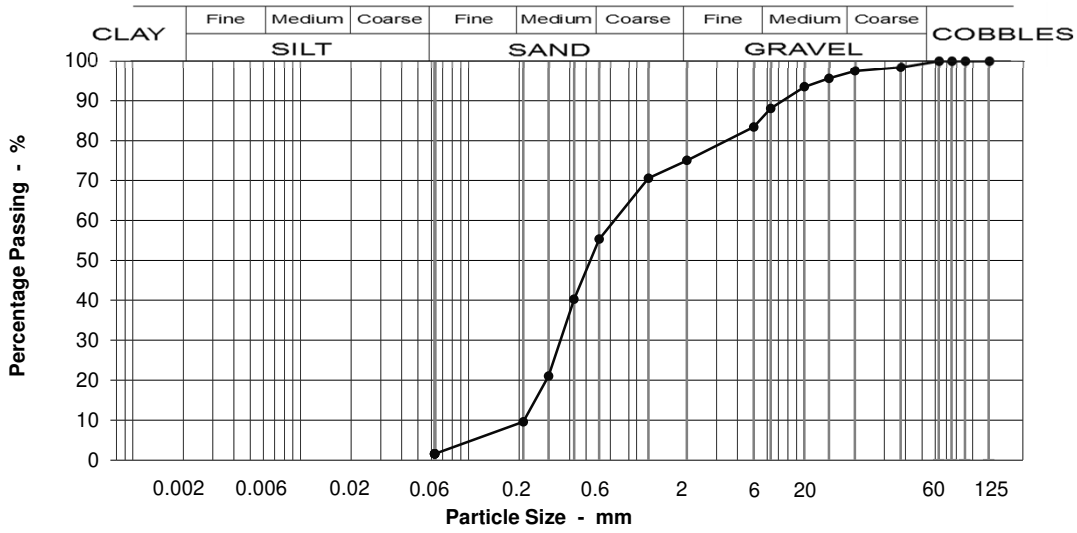
Our reference No. NNPL2022040819-612
Our Project No. 102894
Your Sample Ref. 2
Your Order No. 708523
Date Tested 18/05/2022
Date Report Issued 09 Jun 2022

Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9 (Withdrawn)

Scheme: Sheringham HWRC
Location and orientation within sample not applicable

Location: TP05 @ 0.7 - 0.9m
Bulk disturbed sample



If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Sieving

Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	98
20	97
14	96
10	93
6.3	88
5	83
2	75
1.18	71
0.600	55
0.425	40
0.300	21
0.212	10
0.063	2

Specification for Highway Works Classification

Table 6/2

This material complies with the following material classes 1B, 6E/6R, 6M.

Please be aware that we only report compliance with specifications using 'simple acceptance' as a guide as the specifications for the material as well as the methodology for testing are well established and take into account uncertainty in their formulation.

Moisture content % 3.2
(BS1377-Part 2, 1990)

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	3
Medium GRAVEL	9
Fine GRAVEL	13
Coarse SAND	20
Medium SAND	46
Fine SAND	8
Silt & Clay	2

Grading Analysis	
D100	38
D60	0.778
D10	0.215
Uniformity Coefficient[1]	4

Description
Orange, very gravelly, medium SAND. Gravel is angular to sub-rounded, fine to medium flint.

Test Code = 612

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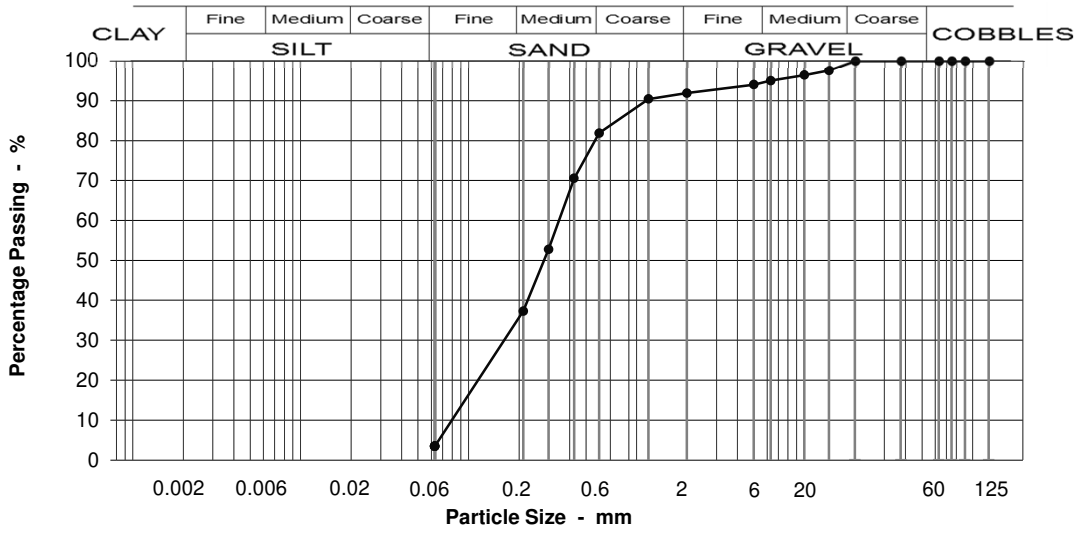
Our reference No. NNPL2022040821-612
Our Project No. 102894
Your Sample Ref. 4
Your Order No. 708523
Date Tested 03/05/2022
Date Report Issued 24 May 2022

Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9 (Withdrawn)

Scheme: Sheringham HWRC
Location and orientation within sample not applicable

Location: TP05 @ 2.2 - 2.4m
Bulk disturbed sample



If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Sieving

Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	98
10	96
6.3	95
5	94
2	92
1.18	90
0.600	82
0.425	71
0.300	53
0.212	37
0.063	3

Specification for Highway Works Classification

Table 6/2

This material complies with the following material classes 1B, 6E/6R, 6M.

Please be aware that we only report compliance with specifications using 'simple acceptance' as a guide as the specifications for the material as well as the methodology for testing are well established and take into account uncertainty in their formulation.

Moisture content % 5.9
(BS1377-Part 2, 1990)

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	5
Fine GRAVEL	3
Coarse SAND	10
Medium SAND	45
Fine SAND	34
Silt & Clay	3

Grading Analysis	
D100	14
D60	0.35
D10	0.09
Uniformity Coefficient[1]	4

Description
Yellowish-brown, slightly gravelly, fine to medium SAND. Gravel is angular to sub-rounded, fine to medium flint.

Test Code = 612

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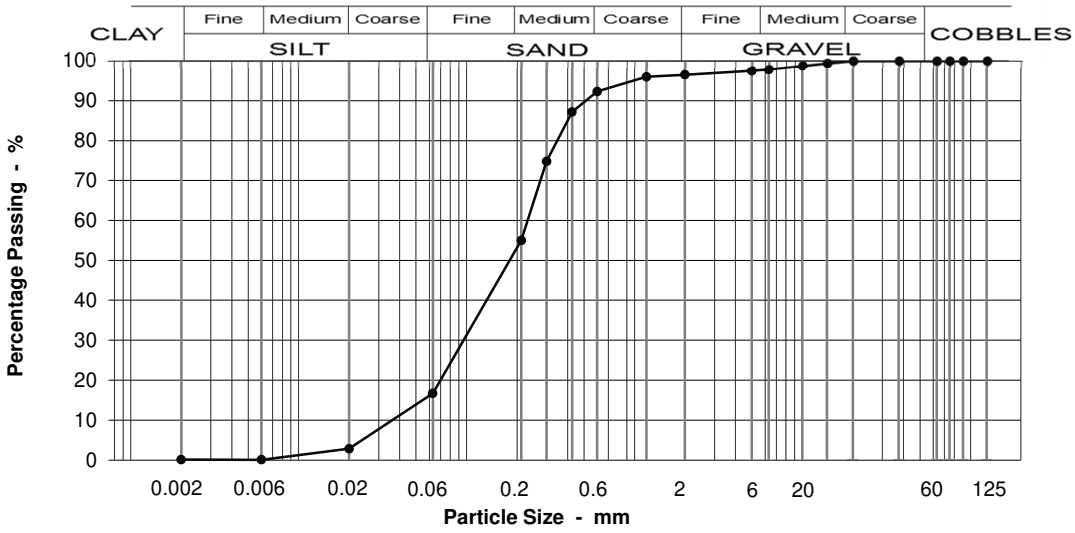
Our Project No. 102894
Your Sample Ref. 2
Your Order No. 708523
Date Tested 18/05/2022
Date Report Issued 09 Jun 2022

Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9 (Withdrawn)

Scheme: Sheringham HWRC
Location and orientation within sample not applicable

Location: TP06 @ 0.7 - 0.9m
Bulk disturbed sample



If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Sieving

Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	99
10	99
6.3	98
5	98
2	97
1.18	96
0.600	92
0.425	87
0.300	75
0.212	55
0.063	17
0.020	3
0.006	0
0.002	0

Specification for Highway Works Classification

Table 6/2

This material complies with the following material classes 2A/2B.

Please be aware that we only report compliance with specifications using 'simple acceptance' as a guide as the specifications for the material as well as the methodology for testing are well established and take into account uncertainty in their formulation.

Moisture content % 4.9
(BS1377-Part 2, 1990)

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	2
Fine GRAVEL	1
Coarse SAND	4
Medium SAND	37
Fine SAND	38
Silt & Clay	17

Grading Analysis	
D100	14
D60	0.234
D10	0.042
Uniformity Coefficient[!]	6 *

Description
Orange, silty fine to medium SAND.

* Uniformity coefficient extrapolated

! UC to Spec. For Highway Works, table 6/1 footnote 5

Test Code = 612

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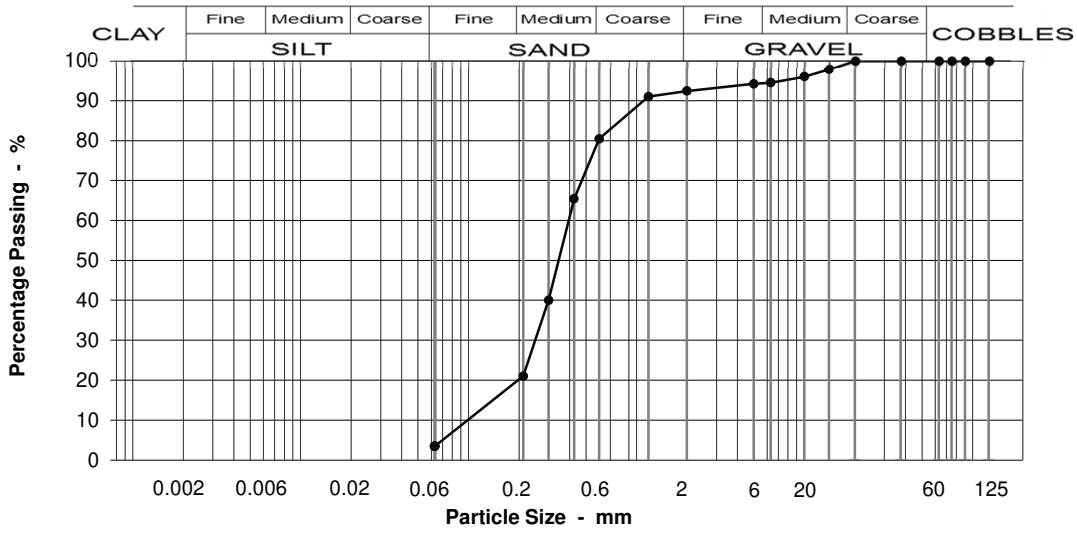
Our Project No. 102894
Your Sample Ref. 3
Your Order No. 708523
Date Tested 03/05/2022
Date Report Issued 24 May 2022

Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9 (Withdrawn)

Scheme: Sheringham HWRC
Location and orientation within sample not applicable

Location: TP06 @ 2.4 - 2.6m
Bulk disturbed sample



If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Sieving

Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	98
10	96
6.3	95
5	94
2	92
1.18	91
0.600	80
0.425	65
0.300	40
0.212	21
0.063	3

Specification for Highway Works Classification

Table 6/2

This material complies with the following material classes 1B, 6E/6R, 6M.

Please be aware that we only report compliance with specifications using 'simple acceptance' as a guide as the specifications for the material as well as the methodology for testing are well established and take into account uncertainty in their formulation.

Moisture content % 3.7
(BS1377-Part 2, 1990)

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	5
Fine GRAVEL	2
Coarse SAND	12
Medium SAND	59
Fine SAND	18
Silt & Clay	3

Grading Analysis	
D100	14
D60	0.40
D10	0.12
Uniformity Coefficient[1]	3

Description
Orange, slightly gravelly, medium SAND. Gravel is angular to rounded, fine to medium flint.

Test Code = 612

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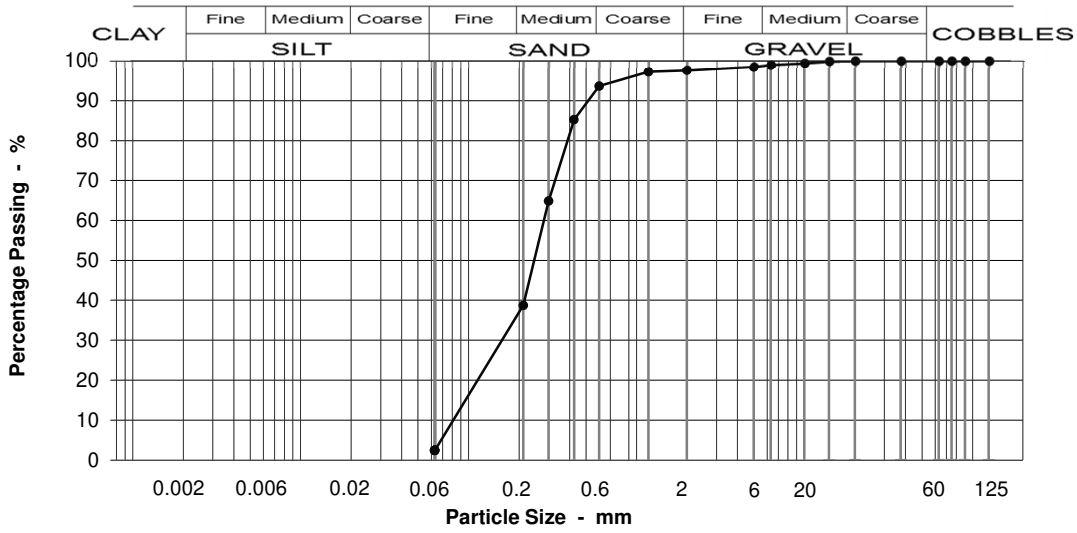
Our Project No. 102894
Your Sample Ref. 2
Your Order No. 708523
Date Tested 18/05/2022
Date Report Issued 24 May 2022

Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9 (Withdrawn)

Scheme: Sheringham HWRC
Location and orientation within sample not applicable

Location: TP07 @ 0.6 - 0.8m
Bulk disturbed sample



If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Sieving

Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	99
6.3	99
5	98
2	98
1.18	97
0.600	94
0.425	85
0.300	65
0.212	39
0.063	2

Specification for Highway Works Classification

Table 6/2

This material complies with the following material classes 1B, 6E/6R, 6M.

Please be aware that we only report compliance with specifications using 'simple acceptance' as a guide as the specifications for the material as well as the methodology for testing are well established and take into account uncertainty in their formulation.

Moisture content % 3.6
(BS1377-Part 2, 1990)

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	1
Coarse SAND	4
Medium SAND	55
Fine SAND	36
Silt & Clay	2

Grading Analysis	
D100	14
D60	0.28
D10	0.09
Uniformity Coefficient[1]	3

Description
Orange, fine to medium SAND.

Test Code = 612

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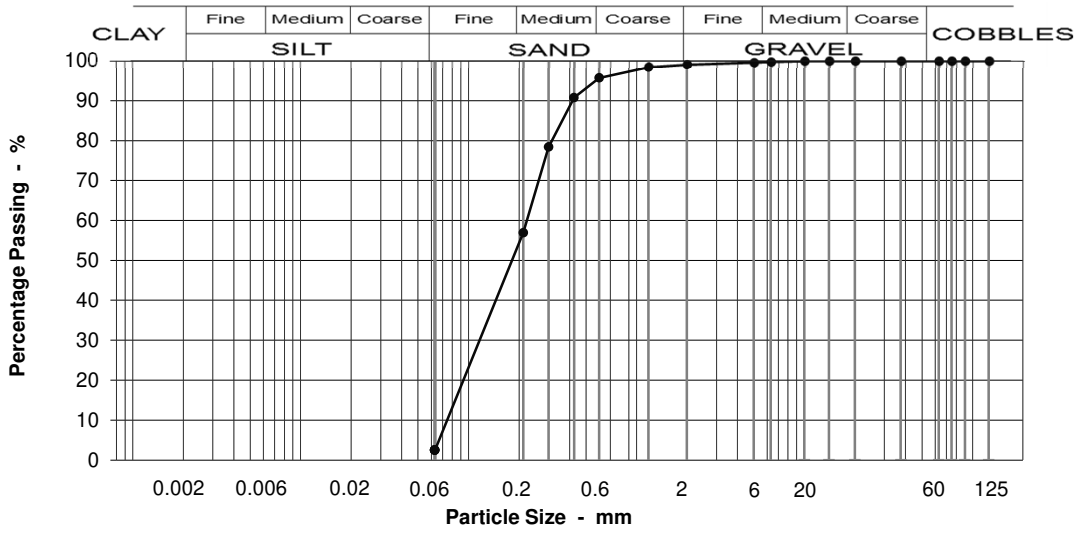
Our Project No. 102894
Your Sample Ref. 4
Your Order No. 708523
Date Tested 03/05/2022
Date Report Issued 24 May 2022

Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9 (Withdrawn)

Scheme: Sheringham HWRC
Location and orientation within sample not applicable

Location: TP07 @ 2.7 - 2.9m
Bulk disturbed sample



If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Sieving

Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	100
5	100
2	99
1.18	98
0.600	96
0.425	91
0.300	78
0.212	57
0.063	2

Specification for Highway Works Classification

Table 6/2

This material complies with the following material classes 1B, 6E/6R, 6M.

Please be aware that we only report compliance with specifications using 'simple acceptance' as a guide as the specifications for the material as well as the methodology for testing are well established and take into account uncertainty in their formulation.

Moisture content % 3.4
(BS1377-Part 2, 1990)

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	0
Fine GRAVEL	1
Coarse SAND	3
Medium SAND	39
Fine SAND	54
Silt & Clay	2

Grading Analysis	
D100	6
D60	0.22
D10	0.08
Uniformity Coefficient[1]	3

Description
Yellow, fine to medium SAND.

Test Code = 612

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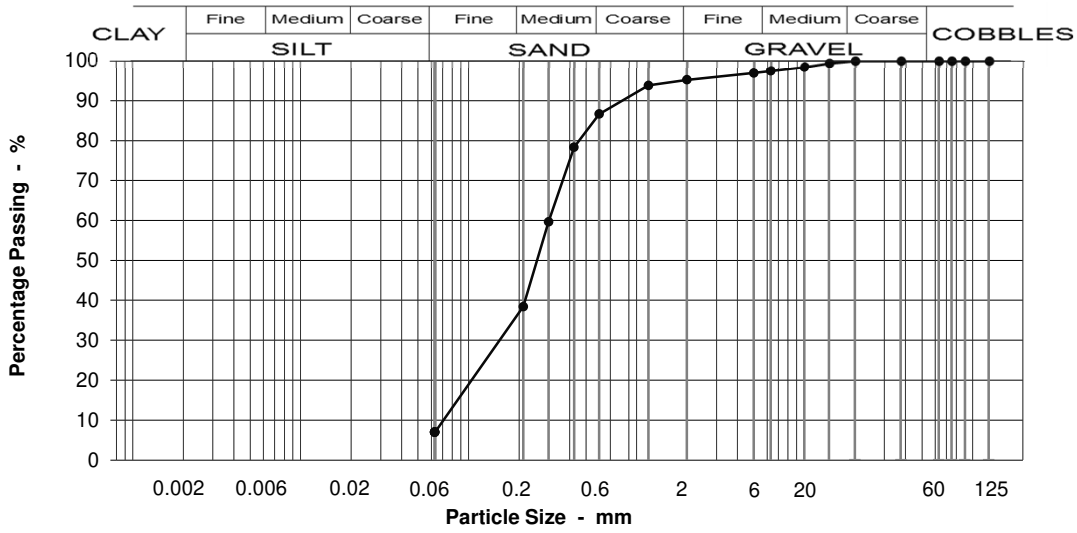
Your Order No. 708523
Date Tested 18/05/2022
Date Report Issued 24 May 2022

Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9 (Withdrawn)

Scheme: Sheringham HWRC
Location and orientation within sample not applicable

Location: TP08 @ 0.7 - 0.9m
Bulk disturbed sample



If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Sieving

Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	99
10	98
6.3	97
5	97
2	95
1.18	94
0.600	87
0.425	78
0.300	60
0.212	38
0.063	7

Specification for Highway Works Classification

Table 6/2

This material complies with the following material classes 1B, 6E/6R, 6M.

Please be aware that we only report compliance with specifications using 'simple acceptance' as a guide as the specifications for the material as well as the methodology for testing are well established and take into account uncertainty in their formulation.

Moisture content % 5.5
(BS1377-Part 2, 1990)

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	3
Fine GRAVEL	2
Coarse SAND	9
Medium SAND	48
Fine SAND	31
Silt & Clay	7

Grading Analysis	
D100	14
D60	0.30
D10	0.08
Uniformity Coefficient[1]	4

Description
Orangey-brown, fine to medium SAND.

Test Code = 612

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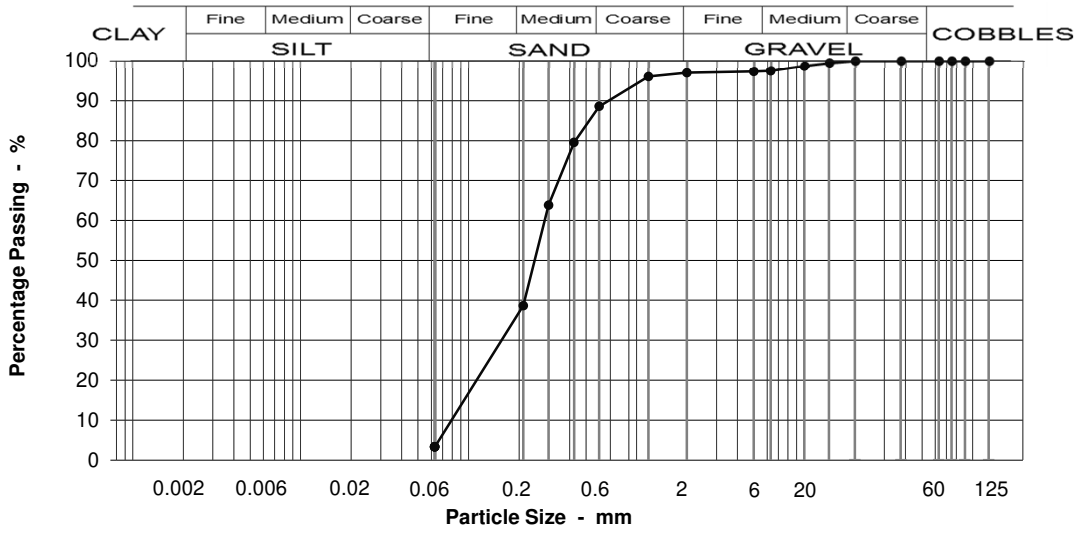
Your Sample Ref. 4
Your Order No. 708523
Date Tested 03/05/2022
Date Report Issued 24 May 2022

Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9 (Withdrawn)

Scheme: Sheringham HWRC
Location and orientation within sample not applicable

Location: TP08 @ 2.8 - 3m
Bulk disturbed sample



If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Sieving

Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	99
10	99
6.3	98
5	97
2	97
1.18	96
0.600	89
0.425	80
0.300	64
0.212	39
0.063	3

Specification for Highway Works Classification

Table 6/2

This material complies with the following material classes 1B, 6E/6R, 6M.

Please be aware that we only report compliance with specifications using 'simple acceptance' as a guide as the specifications for the material as well as the methodology for testing are well established and take into account uncertainty in their formulation.

Moisture content % 4.5
(BS1377-Part 2, 1990)

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	2
Fine GRAVEL	0
Coarse SAND	8
Medium SAND	50
Fine SAND	35
Silt & Clay	3

Grading Analysis	
D100	14
D60	0.29
D10	0.09
Uniformity Coefficient[1]	3

Description
Yellow, fine to medium SAND.

Test Code = 612

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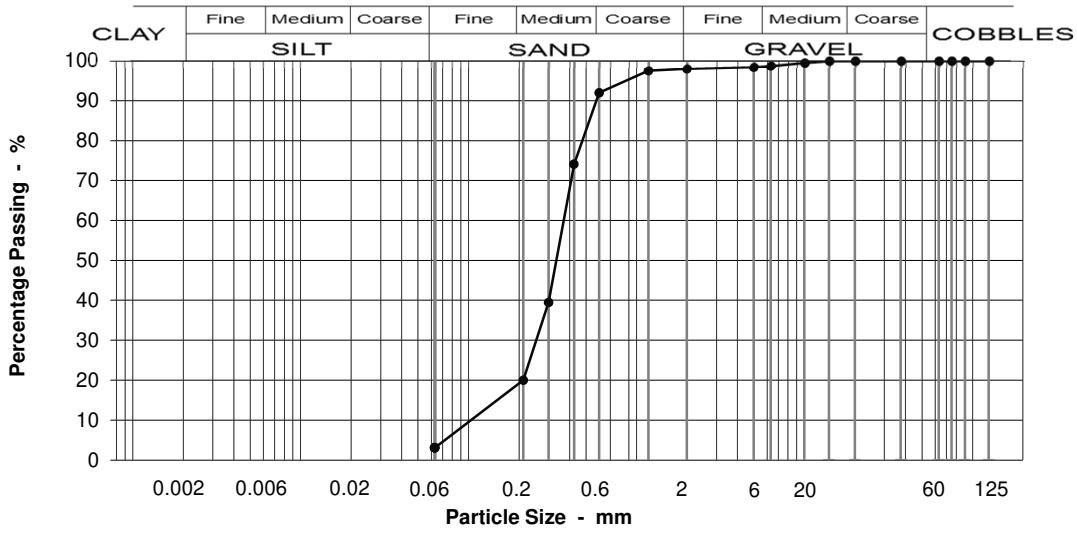
Your Sample Ref. 4
Your Order No. 708523
Date Tested 19/05/2022
Date Report Issued 24 May 2022

Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9 (Withdrawn)

Scheme: Sheringham HWRC
Location and orientation within sample not applicable

Location: BH09 @ 2 - 2.5m
Bulk disturbed sample



If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Sieving

Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	99
5	98
2	98
1.18	98
0.600	92
0.425	74
0.300	39
0.212	20
0.063	3

Specification for Highway Works Classification

Table 6/2

This material complies with the following material classes 1B, 6E/6R, 6M.

Please be aware that we only report compliance with specifications using 'simple acceptance' as a guide as the specifications for the material as well as the methodology for testing are well established and take into account uncertainty in their formulation.

Moisture content % 1051
(BS1377-Part 2, 1990)

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	1
Coarse SAND	6
Medium SAND	72
Fine SAND	17
Silt & Clay	3

Grading Analysis	
D100	10
D60	0.37
D10	0.12
Uniformity Coefficient[1]	3

Description
Yellowish-orange, medium SAND.

S

Test Code = 612

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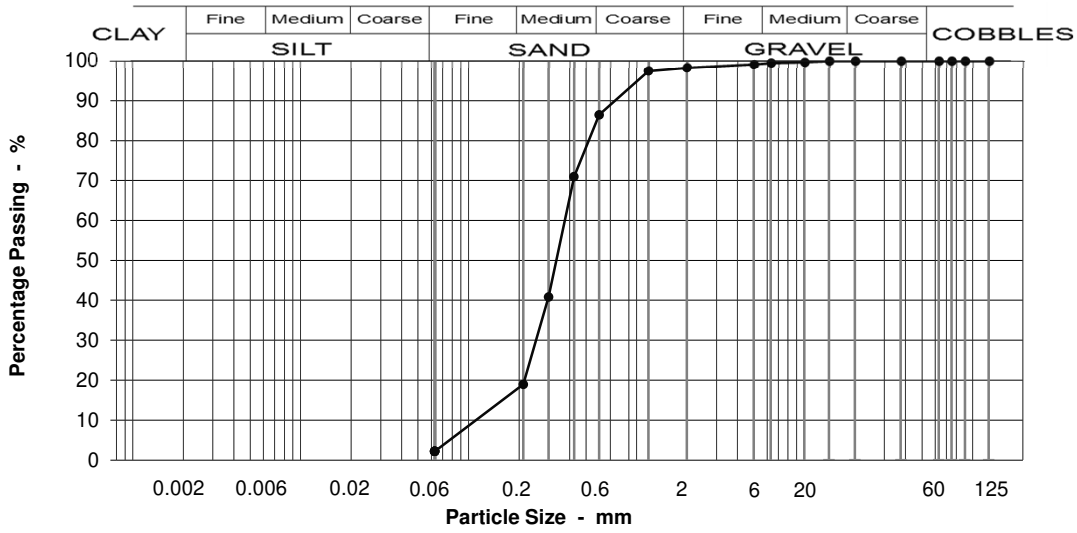
Our Project No. 102894
Your Sample Ref. 8
Your Order No. 708523
Date Tested 09/05/2022
Date Report Issued 24 May 2022

Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9 (Withdrawn)

Scheme: Sheringham HWRC
Location and orientation within sample not applicable

Location: BH09 @ 4 - 4.5m
Bulk disturbed sample



If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Sieving

Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	99
5	99
2	98
1.18	97
0.600	86
0.425	71
0.300	41
0.212	19
0.063	2

Specification for Highway Works Classification

Table 6/2

This material complies with the following material classes 1B, 6E/6R, 6M.

Please be aware that we only report compliance with specifications using 'simple acceptance' as a guide as the specifications for the material as well as the methodology for testing are well established and take into account uncertainty in their formulation.

Moisture content % 5.6
(BS1377-Part 2, 1990)

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	1
Coarse SAND	12
Medium SAND	68
Fine SAND	17
Silt & Clay	2

Grading Analysis	
D100	10
D60	0.38
D10	0.13
Uniformity Coefficient[1]	3

Description
Yellowish-orange, medium SAND.

S

Test Code = 612

UKAS TESTING 0920

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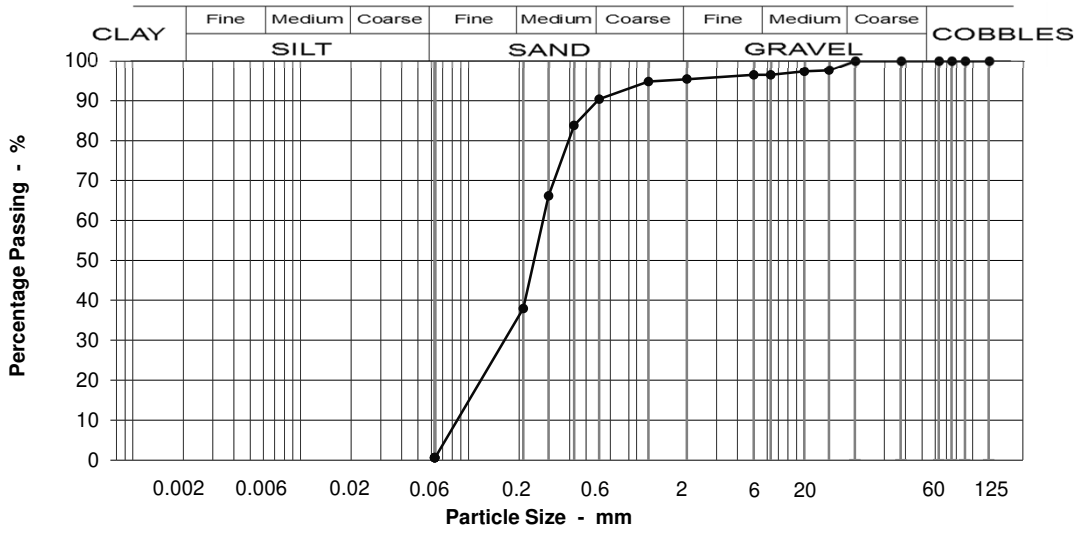
Our reference No. 0000-BH09-B12-612
Our Project No. 102894
Your Sample Ref. 12
Your Order No. 708523
Date Tested 03/05/2022
Date Report Issued 09 Jun 2022

Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9 (Withdrawn)

Scheme: Sheringham HWRC
Location and orientation within sample not applicable

Location: BH09 @ 6 - 6.5m
Bulk disturbed sample



If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Sieving

Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	98
10	97
6.3	96
5	96
2	95
1.18	95
0.600	90
0.425	84
0.300	66
0.212	38
0.063	1

Specification for Highway Works Classification

Table 6/2

This material complies with the following material classes 1B, 6E/6R, 6M.

Please be aware that we only report compliance with specifications using 'simple acceptance' as a guide as the specifications for the material as well as the methodology for testing are well established and take into account uncertainty in their formulation.

Moisture content % 16
(BS1377-Part 2, 1990)

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	4
Fine GRAVEL	1
Coarse SAND	5
Medium SAND	52
Fine SAND	37
Silt & Clay	1

Grading Analysis	
D100	14
D60	0.281
D10	0.101
Uniformity Coefficient[1]	3

Description
Light brown, slightly gravelly, fine and medium SAND. Gravel is sub-angular to sub-rounded, fine and medium flint.

S

Test Code = 612

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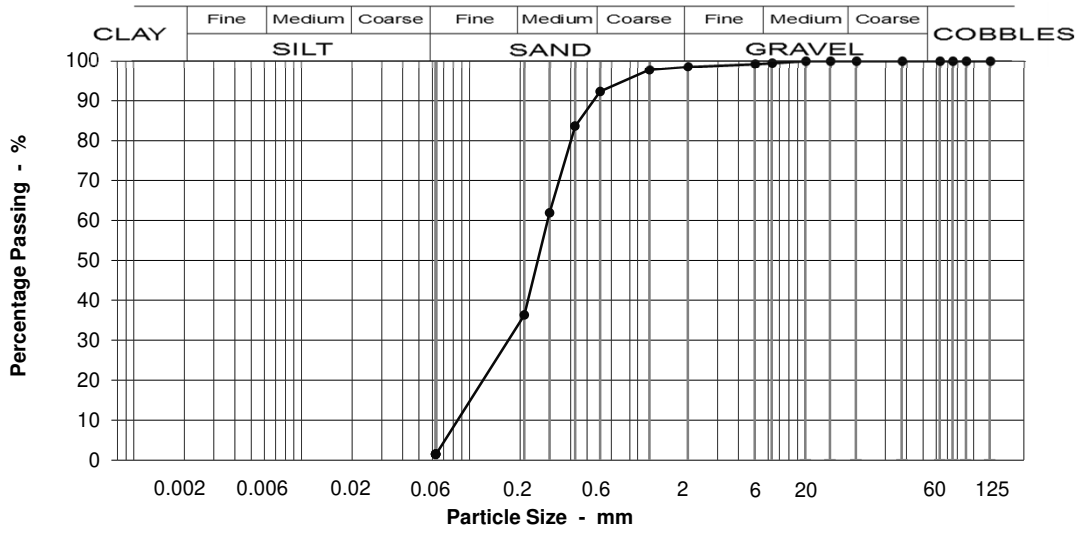
Our reference No. 0000-BH09-B16-612
Our Project No. 102894
Your Sample Ref. 16
Your Order No. 708523
Date Tested 03/05/2022
Date Report Issued 24 May 2022

Particle Size Distribution to BS 1377 : Part 2 :1990 Section 9 (Withdrawn)

Scheme: Sheringham HWRC
Location and orientation within sample not applicable

Location: BH09 @ 8 - 8.5m
Bulk disturbed sample



If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Sieving

Particle Size mm	% Passing
125	100
90	100
75	100
63	100
37.5	100
20	100
14	100
10	100
6.3	99
5	99
2	99
1.18	98
0.600	92
0.425	84
0.300	62
0.212	36
0.063	1

Specification for Highway Works Classification

Table 6/2

This material complies with the following material classes 1B, 6E/6R, 6M.

Please be aware that we only report compliance with specifications using 'simple acceptance' as a guide as the specifications for the material as well as the methodology for testing are well established and take into account uncertainty in their formulation.

Moisture content % 24
(BS1377-Part 2, 1990)

Sample Proportions	
BOULDERS	0
COBBLES	0
Coarse GRAVEL	0
Medium GRAVEL	1
Fine GRAVEL	1
Coarse SAND	6
Medium SAND	56
Fine SAND	35
Silt & Clay	1

Grading Analysis	
D100	6
D60	0.29
D10	0.10
Uniformity Coefficient[1]	3

Description
Red, fine to medium SAND.

S

Test Code = 612

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Our Project No	102894
Our Report and sample No	NNPL202204085-
Your Sample Ref	B2
Your Project or Order No	708523
Date Report Issued	01 June 2022
Date Tested	24 May 2022

Determination of the California Bearing Ratio to BS 1377 : Part 4 : 1990 (Withdrawn)

Scheme	Sheringham HWRC		
Location	TP01 @ 0.7m Specimen: 1		
Date sampled	05 April 2022	**Date received**	05 April 2022
Sampled by	KN (NPL Staff)	**Sample Mass**	17.545kg

If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Material	Soil	**Sample type**	Bulk Disturbed
Description	Orangey-brown, fine to medium SAND.		
Supplier	Not applicable	**Source**	Ex site

Test Specimen Preparation details

Location	Not applicable	**Method of Division**	Quartering
Orientation	Not applicable	**Preparation Method**	Sieving, Natural Moisture Content
Retained 37.5mm	0.0 **%**	**Retained 20mm**	0.0 **%**
BS Method	3.4, 2.5kg Rammer	**Grading zone**	1
Number of layers	3	**Bulk Density**	1.72 Mg/m³
Blows per layer	62 Blows	**Dry Density**	1.66 Mg/m³
Condition	Unsoaked	**Init. Moisture Content**	3.7 **%**

Test Results

	CBR Value	Surface Modulus $
	%	Mpa
Top	**14**	>85
Bottom	**16**	>85
Mean Value	**15**	>85

$ The calculation of Surface Modulus is not covered by UKAS accreditation

Moisture Content Method		Oven dried @ 105-110°C			
Moisture Content Top	%	**3.5**	**Moisture Cont. Bottom**	%	**3.3**

Remarks

Test Code =644

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Our Project No	102894
Our Report and sample No	NNPL202204088-
Your Sample Ref	B2
Your Project or Order No	708523
Date Report Issued	01 June 2022
Date Tested	13 May 2022

Determination of the California Bearing Ratio to BS 1377 : Part 4 : 1990 (Withdrawn)

Scheme	Sheringham HWRC		
Location	TP02 @ 0.7m Specimen: 1		
Date sampled	05 April 2022	**Date received**	05 April 2022
Sampled by	KN (NPL Staff)	**Sample Mass**	25.82kg

If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Material	Soil	**Sample type**	Bulk Disturbed
Description	Yellowish brown, medium SAND.		
Supplier	Not applicable	**Source**	Ex site

Test Specimen Preparation details

Location	Not applicable	**Method of Division**	Quartering
Orientation	Not applicable	**Preparation Method**	Sieving, Natural Moisture Content
Retained 37.5mm	0.0 **%**	**Retained 20mm**	0.0 **%**
BS Method	3.4, 2.5kg Rammer	**Grading zone**	1
Number of layers	3	**Bulk Density**	1.89 Mg/m³
Blows per layer	62 Blows	**Dry Density**	1.80 Mg/m³
Condition	Unsoaked	**Init. Moisture Content**	4.7 **%**

Test Results

	CBR Value	Surface Modulus $	
	%	Mpa	
Top	**18**	>85	$ The calculation of Surface Modulus is not covered by UKAS accreditation
Bottom	**22**	>85	

Moisture Content Method		Oven dried @ 105-110°C			
Moisture Content Top	%	**4.7**	**Moisture Cont. Bottom**	%	**4.7**

Remarks

Test Code =644

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Our Project No	102894
Our Report and sample No	NNPL2022040812-
Your Sample Ref	B2
Your Project or Order No	708523
Date Report Issued	01 June 2022
Date Tested	26 April 2022

Determination of the California Bearing Ratio to BS 1377 : Part 4 : 1990 (Withdrawn)

Scheme	Sheringham HWRC		
Location	TP03 @ 0.6m Specimen: 2		
Date sampled	05 April 2022	**Date received**	05 April 2022
Sampled by	KN (NPL Staff)	**Sample Mass**	20.01kg

If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Material	Soil	**Sample type**	Bulk Disturbed
Description	Orangish brown, gravelly, sandy, CLAY. Gravel is angular to subrounded fine flint.		
Supplier	Not applicable	**Source**	Ex site

Test Specimen Preparation details

Location	Not applicable	**Method of Division**	Quartering
Orientation	Not applicable	**Preparation Method**	Sieving, Natural Moisture Content
Retained 37.5mm	0.0 **%**	**Retained 20mm**	1.1 **%**
BS Method	3.4, 2.5kg Rammer	**Grading zone**	2
Number of layers	3	**Bulk Density**	2.15 Mg/m³
Blows per layer	62 Blows	**Dry Density**	1.82 Mg/m³
Condition	Soaked	**Init. Moisture Content**	18 **%**

Test Results

	CBR Value	Surface Modulus $
	%	Mpa
Top	**1.7**	<25
Bottom	**1.5**	<25
Mean Value	**1.6**	<25

$ The calculation of Surface Modulus is not covered by UKAS accreditation

Moisture Content Method		Oven dried @ 105-110°C			
Moisture Content Top	%	**18**	**Moisture Cont. Bottom**	%	**18**

Remarks

Test Code =644

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Our Project No	102894
Our Report and sample No	NNPL2022040815-
Your Sample Ref	B2
Your Project or Order No	708523
Date Report Issued	17 May 2022
Date Tested	26 April 2022

Determination of the California Bearing Ratio to BS 1377 : PART 4 : 1990 (Withdrawn)

Scheme	Sheringham HWRC		
Location	TP04 @ 0.7m Specimen: 2		
Date sampled	05 April 2022	**Date received**	05 April 2022
Sampled by	KN (NPL Staff)	**Sample Mass**	22.86kg

If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Material	Soil	**Sample type**	Bulk Disturbed
Description	Light brown, sandy SILT.		
Supplier	Not applicable	**Source**	Ex site

Test Specimen Preparation details

Location	Not applicable	**Method of Division**	Quartering
Orientation	Not applicable	**Preparation Method**	Sieving, Natural Moisture Content
Retained 37.5mm	0.0 **%**	**Retained 20mm**	0.0 **%**
BS Method	3.4, 2.5kg Rammer	**Bulk Density**	2.19 Mg/m³
Number of layers	3	**Dry Density**	1.94 Mg/m³
Blows per layer	62 Blows	**Init. Moisture Content**	14 **%**
Condition	Soaked		

Test Results

	CBR Value	Surface Modulus $
	%	Mpa
Top	**4.3**	45
Bottom	**5.7**	54

$ The calculation of Surface Modulus is not covered by UKAS accreditation

Moisture Content Method		Oven dried @ 105-110°C			
Moisture Content Top	%	**13**	**Moisture Cont. Bottom**	%	**13**

Remarks

Test Code =644

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Our Project No	102894
Our Report and sample No	NNPL2022040819-
Your Sample Ref	B2
Your Project or Order No	708523
Date Report Issued	01 June 2022
Date Tested	24 May 2022

Determination of the California Bearing Ratio to BS 1377 : Part 4 : 1990 (Withdrawn)

Scheme	Sheringham HWRC		
Location	TP05 @ 0.7m Specimen: 1		
Date sampled	05 April 2022	**Date received**	05 April 2022
Sampled by	KN (NPL Staff)	**Sample Mass**	21.215kg

If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Material	Soil	**Sample type**	Bulk Disturbed
Description	Orange, very gravelly, medium SAND. Gravel is angular to sub-rounded, fine to medium flint.		
Supplier	Not applicable	**Source**	Ex site

Test Specimen Preparation details

Location	Not applicable	**Method of Division**	Quartering
Orientation	Not applicable	**Preparation Method**	Sieving, Natural Moisture Content
Retained 37.5mm	4.8 **%**	**Retained 20mm**	6.7 **%**
BS Method	3.4, 2.5kg Rammer	**Grading zone**	4
Number of layers	3	**Bulk Density**	1.83 Mg/m³
Blows per layer	62 Blows	**Dry Density**	1.78 Mg/m³
Condition	Unsoaked	**Init. Moisture Content**	3.0 **%**

Test Results

	CBR Value	Surface Modulus $	
	%	Mpa	
Top	**10.0**	77	$ The calculation of Surface Modulus is not covered by UKAS accreditation
Bottom	**15**	>85	

Moisture Content Method		Oven dried @ 105-110°C			
Moisture Content Top	%	**2.9**	**Moisture Cont. Bottom**	%	**2.9**

Remarks

Test Code =644

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Our Project No	102894
Our Report and sample No	NNPL2022040823-
Your Sample Ref	B2
Your Project or Order No	708523
Date Report Issued	01 June 2022
Date Tested	24 May 2022

Determination of the California Bearing Ratio to BS 1377 : Part 4 : 1990 (Withdrawn)

Scheme	Sheringham HWRC		
Location	TP06 @ 0.7m Specimen: 1		
Date sampled	05 April 2022	**Date received**	05 April 2022
Sampled by	KN (NPL Staff)	**Sample Mass**	19.035kg

If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Material	Soil	**Sample type**	Bulk Disturbed
Description	Orange, silty fine to medium SAND.		
Supplier	Not applicable	**Source**	Ex site

Test Specimen Preparation details

Location	Not applicable	**Method of Division**	Quartering
Orientation	Not applicable	**Preparation Method**	Sieving, Natural Moisture Content
Retained 37.5mm	0.0 **%**	**Retained 20mm**	0.0 **%**
BS Method	3.4, 2.5kg Rammer	**Grading zone**	1
Number of layers	3	**Bulk Density**	1.73 Mg/m³
Blows per layer	62 Blows	**Dry Density**	1.65 Mg/m³
Condition	Unsoaked	**Init. Moisture Content**	5.5 **%**

Test Results

	CBR Value	Surface Modulus $	
	%	Mpa	
Top	**13**	>85	$ The calculation of Surface Modulus is not covered by UKAS accreditation
Bottom	**19**	>85	

Moisture Content Method		Oven dried @ 105-110°C			
Moisture Content Top	%	**4.9**	**Moisture Cont. Bottom**	%	**4.9**

Remarks

Test Code =644

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Our Project No	102894
Our Report and sample No	NNPL2022040826-
Your Sample Ref	B2
Your Project or Order No	708523
Date Report Issued	01 June 2022
Date Tested	13 May 2022

Determination of the California Bearing Ratio to BS 1377 : Part 4 : 1990 (Withdrawn)

Scheme	Sheringham HWRC		
Location	TP07 @ 0.6m Specimen: 1		
Date sampled	05 April 2022	**Date received**	05 April 2022
Sampled by	KN (NPL Staff)	**Sample Mass**	18.925kg

If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Material	Soil	**Sample type**	Bulk Disturbed
Description	Orange, fine to medium SAND.		
Supplier	Not applicable	**Source**	Ex site

Test Specimen Preparation details

Location	Not applicable	**Method of Division**	Quartering
Orientation	Not applicable	**Preparation Method**	Sieving, Natural Moisture Content
Retained 37.5mm	0.0 **%**	**Retained 20mm**	0.0 **%**
BS Method	3.4, 2.5kg Rammer	**Grading zone**	1
Number of layers	3	**Bulk Density**	1.79 Mg/m³
Blows per layer	62 Blows	**Dry Density**	1.71 Mg/m³
Condition	Unsoaked	**Init. Moisture Content**	4.5 **%**

Test Results

	CBR Value	Surface Modulus $
	%	Mpa
Top	**13**	>85
Bottom	**16**	>85

$ The calculation of Surface Modulus is not covered by UKAS accreditation

Moisture Content Method		Oven dried @ 105-110°C			
Moisture Content Top	%	**4.5**	**Moisture Cont. Bottom**	%	**4.6**

Remarks

Test Code =644

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Our Project No	102894
Our Report and sample No	NNPL2022040830-
Your Sample Ref	B2
Your Project or Order No	708523
Date Report Issued	01 June 2022
Date Tested	24 May 2022

Determination of the California Bearing Ratio to BS 1377 : Part 4 : 1990 (Withdrawn)

Scheme	Sheringham HWRC		
Location	TP08 @ 0.7m Specimen: 1		
Date sampled	05 April 2022	**Date received**	05 April 2022
Sampled by	KN (NPL Staff)	**Sample Mass**	21.535kg

If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Material	Soil	**Sample type**	Bulk Disturbed
Description	Orangey-brown, fine to medium SAND.		
Supplier	Not applicable	**Source**	Ex site

Test Specimen Preparation details

Location	Not applicable	**Method of Division**	Quartering
Orientation	Not applicable	**Preparation Method**	Sieving, Natural Moisture Content
Retained 37.5mm	4.0 **%**	**Retained 20mm**	4.9 **%**
BS Method	3.4, 2.5kg Rammer	**Grading zone**	4
Number of layers	3	**Bulk Density**	1.89 Mg/m³
Blows per layer	62 Blows	**Dry Density**	1.79 Mg/m³
Condition	Unsoaked	**Init. Moisture Content**	6.0 **%**

Test Results

	CBR Value	Surface Modulus $
	%	Mpa
Top	**24**	>85
Bottom	**34**	>85

$ The calculation of Surface Modulus is not covered by UKAS accreditation

Moisture Content Method		Oven dried @ 105-110°C			
Moisture Content Top	%	**5.5**	**Moisture Cont. Bottom**	%	**5.4**

Remarks

Test Code =644

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Our Project No	102894
Our Report No. No	04086-
Your Sample Ref	B3
Your Project or Order No	708523
Date Report Issued	09 Jun 2022

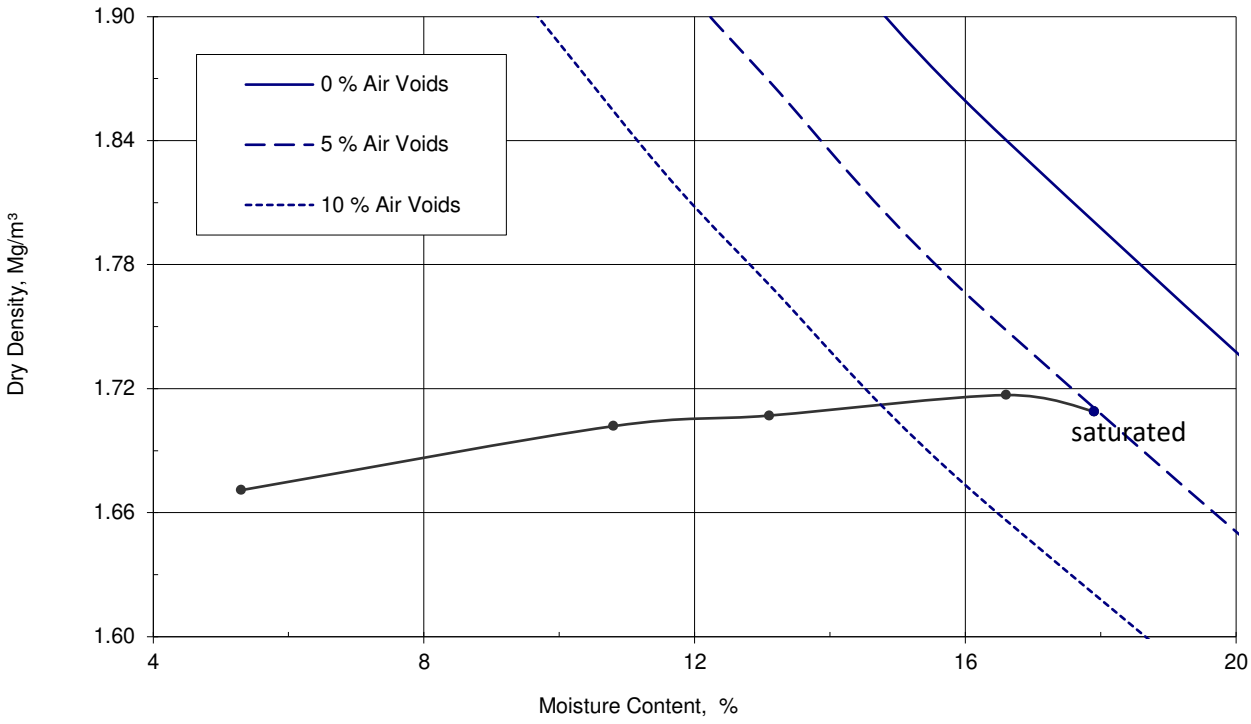
Determination of Dry Density/Moisture Content Relationship to BS 1377- 4 : 1990 : Section 3 (Withdrawn)

Scheme	Sheringham HWRC		
Location	TP01	**Depth**	1.8m
Date received	05 April 2022	**Date tested**	09 May 2022
Sample type	Bulk Disturbed	**Sample Mass**	12kg
Date Sampled	05 April 2022	**Sampled by**	KN (NPL Staff)
Grading zone	1		

If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Description Orangey-brown, fine to medium SAND.

Supplier NCC **Source** Ex site



Method of division	**Quartering**	**Retained on 37.5 mm Sieve**	%	**0.0**
Preparation	**Natural**	**Retained on 20.0 mm Sieve**	%	**0.0**
Test Method	**3.3 2.5kg**	**Particle Density (Assumed)**	Mg/m³	**2.65**
Mould Type	**1 litre**	**Maximum Dry Density**	Mg/m³	**1.72**
Samples Used	**Separate**	**Optimum Moisture Content**	%	**16.6**

Remarks

Test Code = 640

UKAS TESTING
0920

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Our Project No	102894
Our Report No. No	04088-
Your Sample Ref	B2
Your Project or Order No	708523
Date Report Issued	26 Apr 2022

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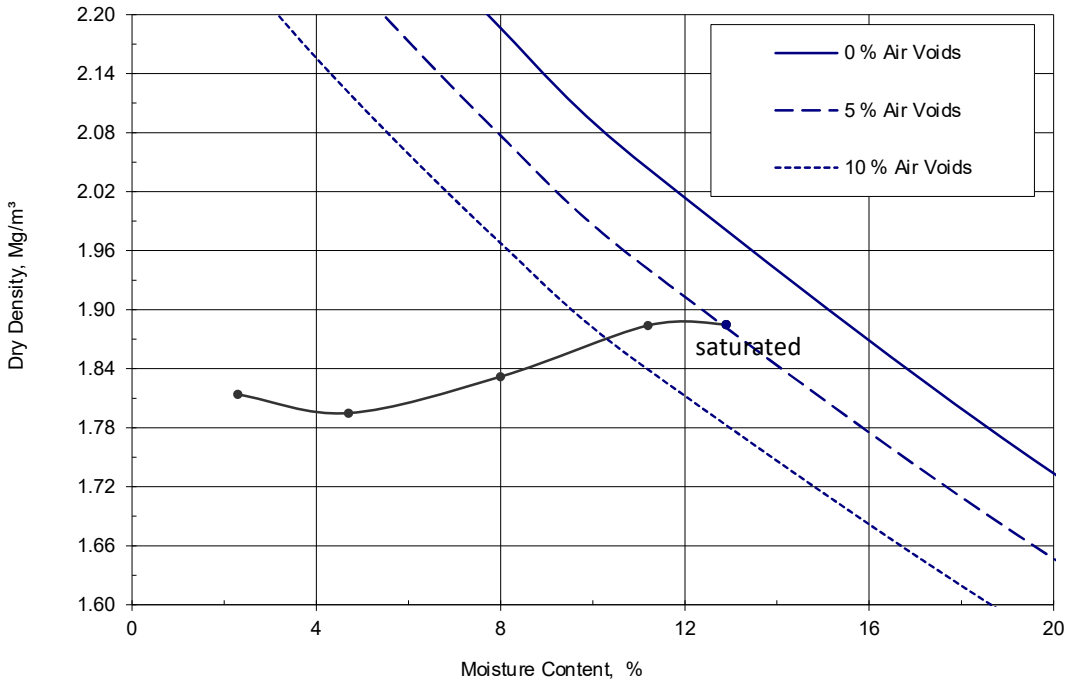
Determination of Dry Density/Moisture Content Relationship to BS 1377 : Part 4 : 1990 : Section 3

Scheme	Sheringham HWRC		
Location	TP02	**Depth**	0.7m
Date received	05 April 2022	**Date tested**	22 April 2022
Sample type	Bulk Disturbed	**Sample Mass**	15kg
Date Sampled	05 April 2022	**Sampled by**	KN (NPL Staff)

If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Description Yellowish brown fine and medium SAND

Supplier NCC **Source** Ex site



Method of division	**Quartering**	**Retained on 37.5 mm Sieve**	%	**0.0**
Preparation	**Natural**	**Retained on 20.0 mm Sieve**	%	**0.0**
Test Method	**3.3 2.5kg**	**Particle Density (Assumed)**	Mg/m³	**2.65**
Mould Type	**1 litre**	**Maximum Dry Density**	Mg/m³	**1.89**
Samples Used	**Separate**	**Optimum Moisture Content**	%	**12.9**

Remarks

Test Code = 640

UKAS TESTING
0920

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Our Project No	102894
Our Report No. No	40812-
Your Sample Ref	B2
Your Project or Order No	708523
Date Report Issued	09 Jun 2022

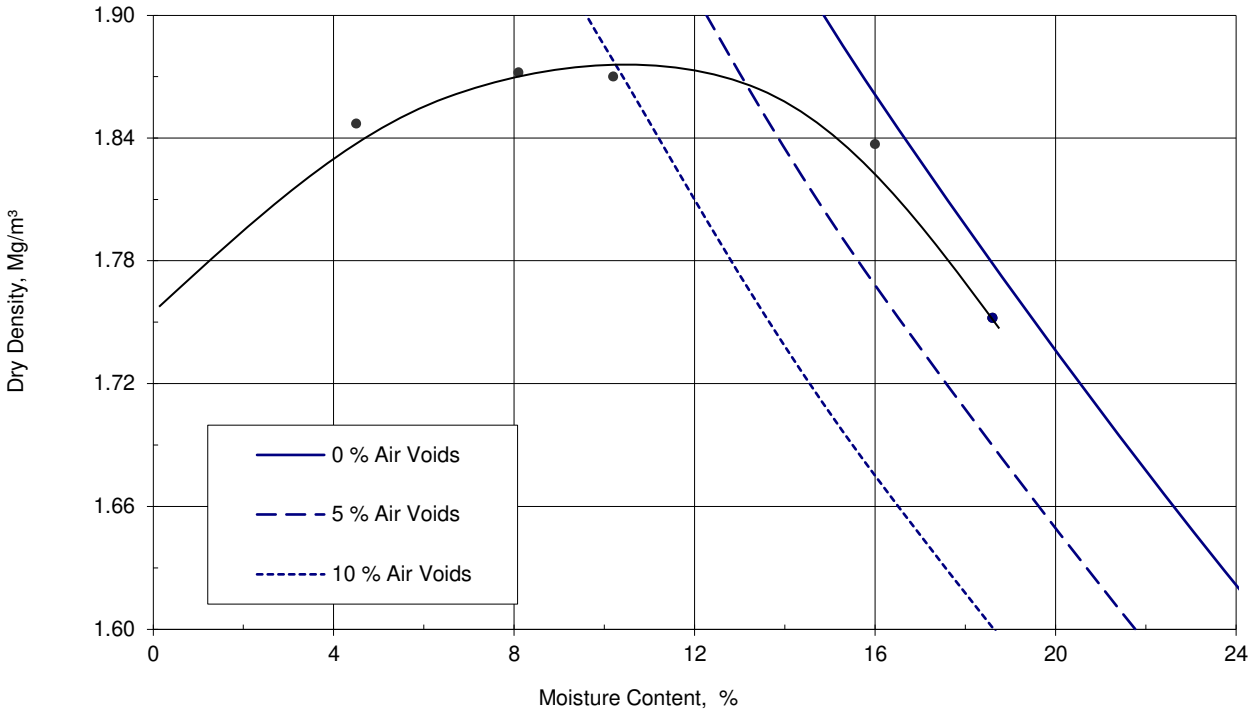
Determination of Dry Density/Moisture Content Relationship to BS 1377- 4 : 1990 : Section 3 (Withdrawn)

Scheme	Sheringham HWRC		
Location	TP03	**Depth**	0.6m
Date received	05 April 2022	**Date tested**	04 May 2022
Sample type	Bulk Disturbed	**Sample Mass**	0kg
Date Sampled	05 April 2022	**Sampled by**	KN (NPL Staff)
Grading zone	1		

If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Description Orangish brown, gravelly, sandy, CLAY. Gravel is angular to sub-rounded fine flint.

Supplier NCC **Source** Ex site



Method of division	**Quartering**	**Retained on 37.5 mm Sieve**	%	**0.0**
Preparation	**Natural**	**Retained on 20.0 mm Sieve**	%	**0.0**
Test Method	**3.3 2.5kg**	**Particle Density (Assumed)**	Mg/m³	**2.65**
Mould Type	**1 litre**	**Maximum Dry Density**	Mg/m³	**1.87**
Samples Used	**Separate**	**Optimum Moisture Content**	%	**10.0**

Remarks

UKAS TESTING 0920

Test Code = 640

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Our Project No	102894
Our Report No. No	40815-
Your Sample Ref	B2
Your Project or Order No	708523
Date Report Issued	09 Jun 2022

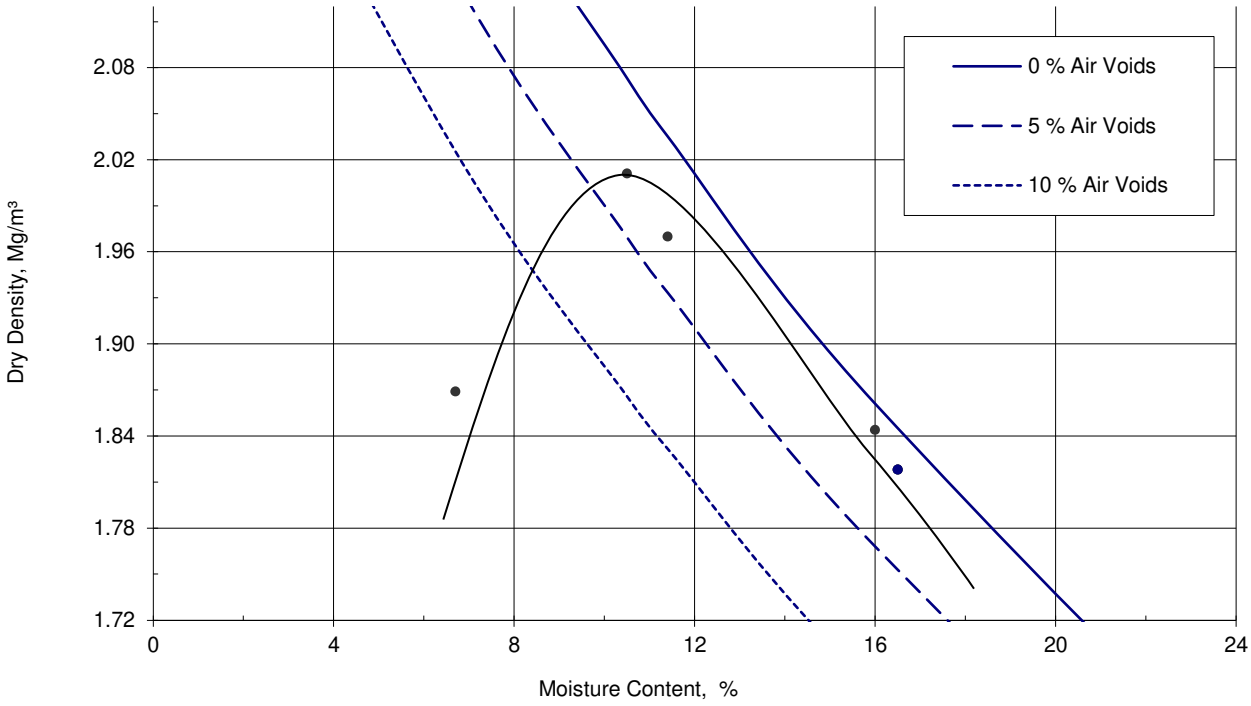
Determination of Dry Density/Moisture Content Relationship to BS 1377- 4 : 1990 : Section 3 (Withdrawn)

Scheme	Sheringham HWRC		
Location	TP04	**Depth**	0.7m
Date received	05 April 2022	**Date tested**	24 April 2022
Sample type	Bulk Disturbed	**Sample Mass**	15kg
Date Sampled	05 April 2022	**Sampled by**	KN (NPL Staff)
Grading zone	1		

If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Description Light brown, slightly gravelly very sandy, silty CLAY. Gravel is angular to sub-rounded fine flint and quartz.

Supplier NCC **Source** Ex site



Method of division	Quartering	**Retained on 37.5 mm Sieve**	%	0.0
Preparation	Natural	**Retained on 20.0 mm Sieve**	%	0.0
Test Method	3.3 2.5kg	**Particle Density (Assumed)**	Mg/m³	2.65
Mould Type	1 litre	**Maximum Dry Density**	Mg/m³	2.01
Samples Used	Separate	**Optimum Moisture Content**	%	10.5

Remarks

Test Code = 640

UKAS TESTING
0920

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Our Project No	102894
Our Report No. No	40820-
Your Sample Ref	B3
Your Project or Order No	708523
Date Report Issued	09 Jun 2022

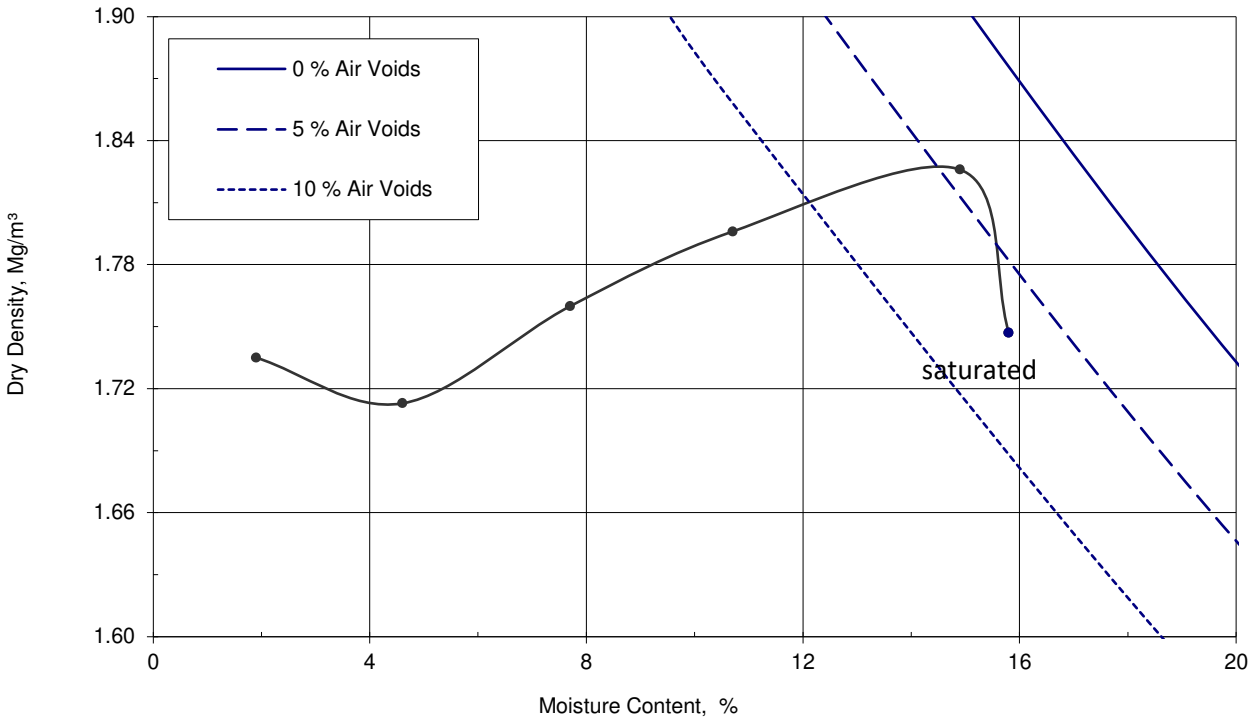
Determination of Dry Density/Moisture Content Relationship to BS 1377- 4 : 1990 : Section 3 (Withdrawn)

Scheme	Sheringham HWRC		
Location	TP05	**Depth**	1.7m
Date received	05 April 2022	**Date tested**	
Sample type	Bulk Disturbed	**Sample Mass**	0kg
Date Sampled	05 April 2022	**Sampled by**	KN (NPL Staff)
Grading zone	1		

If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Description Yellowish-brown, slightly gravelly, fine to medium SAND. Gravel is angular to sub-rounded, fine to medium flint.

Supplier NCC **Source** Ex site



Method of division	**Quartering**	**Retained on 37.5 mm Sieve**	%	**0.0**
Preparation	**Natural**	**Retained on 20.0 mm Sieve**	%	**0.0**
Test Method	**3.3 2.5kg**	**Particle Density (Assumed)**	Mg/m³	**2.65**
Mould Type	**1 litre**	**Maximum Dry Density**	Mg/m³	**1.83**
Samples Used	**Separate**	**Optimum Moisture Content**	%	**15.8**

Remarks

Test Code = 640

UKAS TESTING
0920

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Our Project No	102894
Our Report No. No	40823-
Your Sample Ref	B2
Your Project or Order No	708523
Date Report Issued	26 Apr 2022

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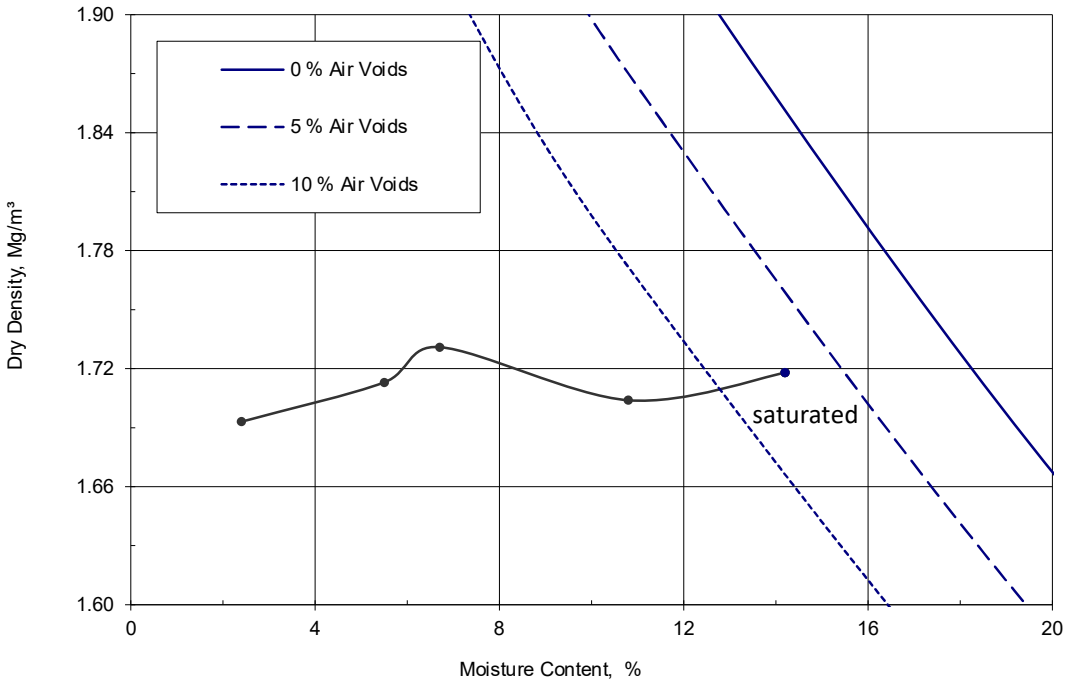
Determination of Dry Density/Moisture Content Relationship to BS 1377 : Part 4 : 1990 : Section 3

Scheme	Sheringham HWRC		
Location	TP06	**Depth**	0.7m
Date received	05 April 2022	**Date tested**	22 April 2022
Sample type	Bulk Disturbed	**Sample Mass**	15kg
Date Sampled	05 April 2022	**Sampled by**	KN (NPL Staff)

If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Description Orange slightly gravelly fine to coarse SAND. Gravel is angular to rounded fine to coarse flint.

Supplier NCC **Source** Ex site



Method of division	**Quartering**	**Retained on 37.5 mm Sieve**	%	**0.0**
Preparation	**Natural**	**Retained on 20.0 mm Sieve**	%	**0.5**
Test Method	**3.3 2.5kg**	**Particle Density (Assumed)**	Mg/m³	**2.60**
Mould Type	**1 litre**	**Maximum Dry Density**	Mg/m³	**1.73**
Samples Used	**Separate**	**Optimum Moisture Content**	%	**6.7**

Remarks

Test Code = 640

UKAS TESTING
0920

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Our Project No	102894
Our Report No. No	40827-
Your Sample Ref	B3
Your Project or Order No	708523
Date Report Issued	09 Jun 2022

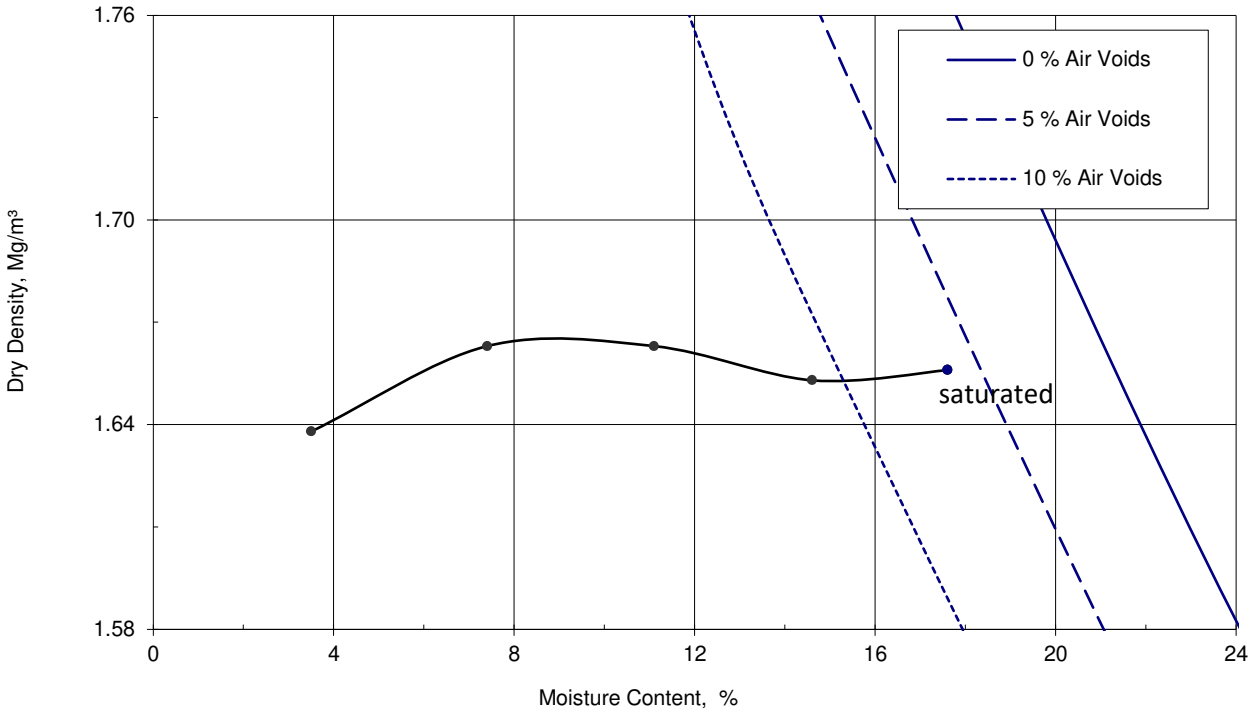
Determination of Dry Density/Moisture Content Relationship to BS 1377- 4 : 1990 : Section 3 (Withdrawn)

Scheme	Sheringham HWRC		
Location	TP07	**Depth**	1.7m
Date received	05 April 2022	**Date tested**	04 May 2022
Sample type	Bulk Disturbed	**Sample Mass**	13kg
Date Sampled	05 April 2022	**Sampled by**	KN (NPL Staff)
Grading zone	1		

If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Description Yellowish-brown slightly gravelly fine to coarse SAND. Gravel is angular to sub-rounded fine and medium flint.

Supplier NCC **Source** Ex site



Method of division	**Quartering**	**Retained on 37.5 mm Sieve**	%	**0.0**
Preparation	**Natural**	**Retained on 20.0 mm Sieve**	%	**0.0**
Test Method	**3.3 2.5kg**	**Particle Density (Assumed)**	Mg/m³	**2.65**
Mould Type	**1 litre**	**Maximum Dry Density**	Mg/m³	**1.66**
Samples Used	**Separate**	**Optimum Moisture Content**	%	**7.4**

Remarks

UKAS TESTING
0920

Test Code = 640

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Our Project No	102894
Our Report No. No	40831-
Your Sample Ref	B3
Your Project or Order No	708523
Date Report Issued	09 Jun 2022

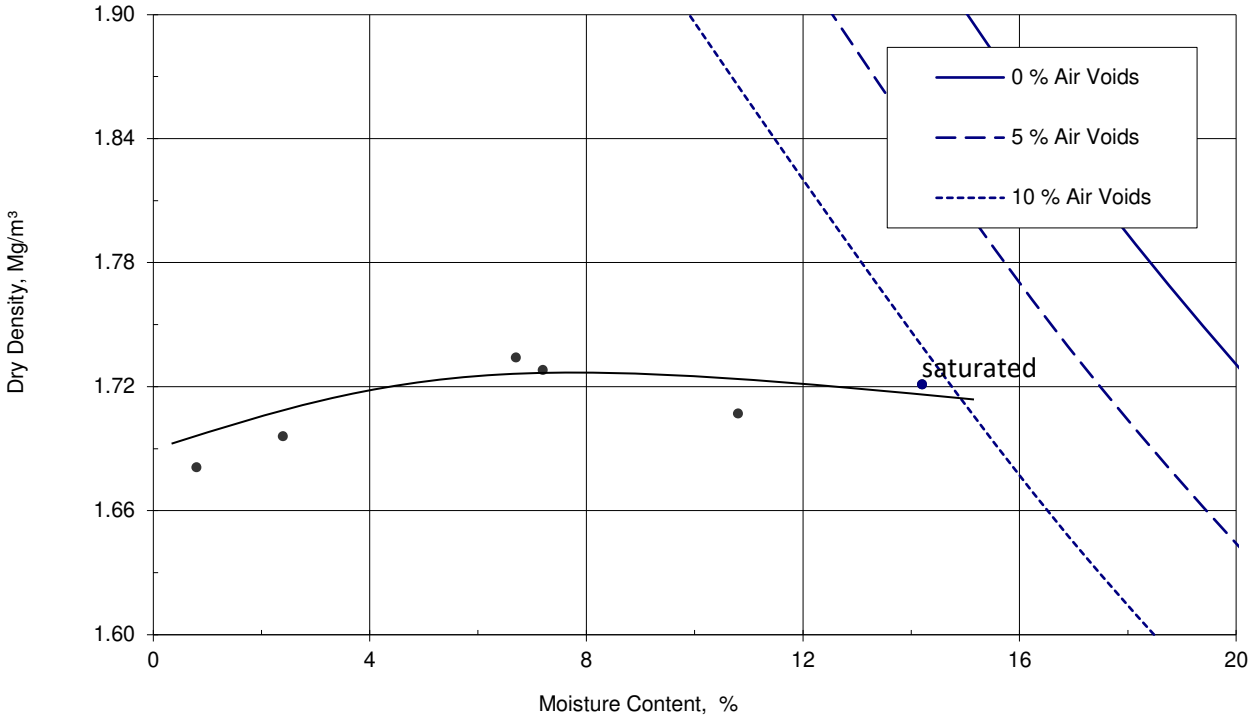
Determination of Dry Density/Moisture Content Relationship to BS 1377- 4 : 1990 : Section 3 (Withdrawn)

Scheme	Sheringham HWRC		
Location	TP08	**Depth**	1.7m
Date received	05 April 2022	**Date tested**	13 May 2022
Sample type	Bulk Disturbed	**Sample Mass**	11kg
Date Sampled	05 April 2022	**Sampled by**	KN (NPL Staff)
Grading zone	2		

If a sample certificate was provided, it is available for inspection. The accuracy of any information provided by third parties cannot be guaranteed. These results only relate to the sample tested.

Description Orangey-brown slightly gravelly fine and medium SAND. Gravel is angular to sub-angular fine and medium flint.

Supplier NCC **Source** Ex site



Method of division	Quartering	**Retained on 37.5 mm Sieve**	%	0.0
Preparation	Natural	**Retained on 20.0 mm Sieve**	%	1.3
Test Method	3.3 2.5kg	**Particle Density (Assumed)**	Mg/m³	2.65
Mould Type	1 litre	**Maximum Dry Density**	Mg/m³	1.73
Samples Used	Separate	**Optimum Moisture Content**	%	6.7

Remarks

Test Code = 640

UKAS TESTING
0920

Simon Holden (Operations Manager)

Appendix G

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

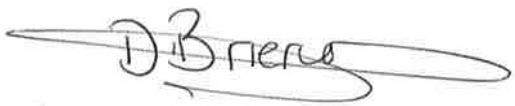
FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 22/03570
Issue Number: 1 **Date:** 25 April, 2022

Client: Norse Eastern Ltd t/a Norse Highways
280 Fifers Lane
Norwich
Norfolk
NR6 6EQ

Project Manager: Josh Thompson/Sharon Woods; Simon Holden
Project Name: Sheringham HWRC
Project Ref: 102894
Order No: PN05037679
Date Samples Received: 12/04/22
Date Instructions Received: 12/04/22
Date Analysis Completed: 25/04/22

Approved by:



Danielle Brierley
Deputy Client Services Supervisor

Envirolab Job Number: 22/03570

Client Project Name: Sheringham HWRC

Client Project Ref: 102894

Lab Sample ID	22/03570/1	22/03570/2	22/03570/3	22/03570/4	22/03570/5	22/03570/6	22/03570/7	Units	Limit of Detection	Method ref
Client Sample No	1	2	1	3	1	2	1			
Client Sample ID	TP01	TP01	TP02	TP02	TP03	TP03	TP04			
Depth to Top	0.10	0.70	0.10	1.40	0.10	0.60	0.10			
Depth To Bottom										
Date Sampled	05-Apr-22	05-Apr-22	05-Apr-22	05-Apr-22	05-Apr-22	05-Apr-22	05-Apr-22			
Sample Type	Soil - ES	Soil - B	Soil - ES	Soil - B	Soil - ES	Soil - B	Soil - ES			
Sample Matrix Code	6AE	1	6A	1A	6A	6	6AE			
% Stones >10mm$_A$	<0.1	<0.1	10.7	<0.1	3.8	<0.1	<0.1	% w/w	0.1	A-T-044
Asbestos in soil$_D^{\#}$	NAD	-	NAD	-	-	NAD	NAD			A-T-045
Asbestos Matrix (visual)$_D$	-	-	-	-	-	-	-			A-T-045
Asbestos Matrix (microscope)$_D$	-	-	-	-	-	-	-			A-T-045
Asbestos ACM - Suitable for Water Absorption Test?$_D$	N/A	-	N/A	-	-	N/A	N/A			A-T-045
pH$_D^{M\#}$	7.65	-	7.69	-	-	8.11	7.37	pH	0.01	A-T-031s
pH BRE$_D^{M\#}$	-	8.18	-	8.14	7.74	-	-	pH	0.01	A-T-031s
Ammonium NH4 BRE (water sol 2:1)$_D$	-	<1.00	-	<1.00	1.25	-	-	mg/l	1	A-T-033s
Chloride BRE, SO4 equiv. (water sol 2:1)$_D^{M\#}$	-	<7	-	<7	<7	-	-	mg/l	7	A-T-026s
Nitrate BRE, SO4 equiv. (water sol 2:1)$_D$	-	<0.4	-	0.8	13.3	-	-	mg/l	0.4	A-T-026s
Sulphate (water sol 2:1)$_D^{M\#}$	<0.01	-	<0.01	-	-	<0.01	<0.01	g/l	0.01	A-T-026s
Sulphate BRE (water sol 2:1)$_D^{M\#}$	-	<10	-	<10	<10	-	-	mg/l	10	A-T-026s
Sulphate (acid soluble)$_D^{M\#}$	230	-	<200	-	-	<200	280	mg/kg	200	A-T-028s
Sulphate BRE (acid sol)$_D^{M\#}$	-	<0.02	-	<0.02	0.03	-	-	% w/w	0.02	A-T-028s
Sulphur BRE (total)$_D$	-	<0.01	-	<0.01	0.02	-	-	% w/w	0.01	A-T-024s
Magnesium BRE (water sol 2:1)$_D$	-	2	-	2	13	-	-	mg/l	1	A-T-SOLMETS
Cyanide (total)$_A^{M\#}$	<1	-	<1	-	-	<1	<1	mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC$_A$	<0.2	-	<0.2	-	-	<0.2	<0.2	mg/kg	0.2	A-T-050s
Sulphide$_A$	<5	-	<5	-	-	<5	<5	mg/kg	5	A-T-043-s
Sulphur (elemental)$_D^{M\#}$	<5	-	<5	-	-	<5	<5	mg/kg	5	A-T-029s
Organic matter Default$_D^{M\#}$	1.3	-	1.0	-	-	0.5	1.8	% w/w	0.1	A-T-032 OM
Arsenic$_D^{M\#}$	3	-	3	-	-	3	4	mg/kg	1	A-T-024s
Boron (water soluble)$_D$	<1.0	-	<1.0	-	-	<1.0	<1.0	mg/kg	1	A-T-027s
Cadmium$_D^{M\#}$	<0.5	-	<0.5	-	-	<0.5	<0.5	mg/kg	0.5	A-T-024s
Copper$_D^{M\#}$	9	-	5	-	-	5	12	mg/kg	1	A-T-024s
Chromium$_D^{M\#}$	9	-	7	-	-	13	9	mg/kg	1	A-T-024s
Chromium (hexavalent)$_D$	<1	-	<1	-	-	<1	<1	mg/kg	1	A-T-040s
Lead$_D^{M\#}$	14	-	11	-	-	9	19	mg/kg	1	A-T-024s
Mercury$_D$	<0.17	-	<0.17	-	-	<0.17	<0.17	mg/kg	0.17	A-T-024s
Nickel$_D^{M\#}$	5	-	4	-	-	8	6	mg/kg	1	A-T-024s
Selenium$_D^{M\#}$	<1	-	<1	-	-	<1	<1	mg/kg	1	A-T-024s
Zinc$_D^{M\#}$	35	-	23	-	-	32	42	mg/kg	5	A-T-024s

Envirolab Job Number: 22/03570

Client Project Name: Sheringham HWRC

Client Project Ref: 102894

Lab Sample ID	22/03570/1	22/03570/2	22/03570/3	22/03570/4	22/03570/5	22/03570/6	22/03570/7	Units	Limit of Detection	Method ref
Client Sample No	1	2	1	3	1	2	1			
Client Sample ID	TP01	TP01	TP02	TP02	TP03	TP03	TP04			
Depth to Top	0.10	0.70	0.10	1.40	0.10	0.60	0.10			
Depth To Bottom										
Date Sampled	05-Apr-22	05-Apr-22	05-Apr-22	05-Apr-22	05-Apr-22	05-Apr-22	05-Apr-22			
Sample Type	Soil - ES	Soil - B	Soil - ES	Soil - B	Soil - ES	Soil - B	Soil - ES			
Sample Matrix Code	6AE	1	6A	1A	6A	6	6AE			
PAH-16MS										
Acenaphthene$_A^{M\#}$	<0.01	-	<0.01	-	-	<0.01	<0.01	mg/kg	0.01	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	-	<0.01	-	-	<0.01	0.02	mg/kg	0.01	A-T-019s
Anthracene$_A^{M\#}$	<0.02	-	<0.02	-	-	<0.02	0.04	mg/kg	0.02	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	<0.04	-	0.12	-	-	<0.04	0.19	mg/kg	0.04	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	<0.04	-	0.14	-	-	<0.04	0.25	mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	<0.05	-	0.17	-	-	<0.05	0.32	mg/kg	0.05	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05	-	0.08	-	-	<0.05	0.14	mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	-	<0.07	-	-	<0.07	0.13	mg/kg	0.07	A-T-019s
Chrysene$_A^{M\#}$	<0.06	-	0.15	-	-	<0.06	0.25	mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	-	<0.04	-	-	<0.04	<0.04	mg/kg	0.04	A-T-019s
Fluoranthene$_A^{M\#}$	<0.08	-	0.27	-	-	<0.08	0.42	mg/kg	0.08	A-T-019s
Fluorene$_A^{M\#}$	<0.01	-	<0.01	-	-	<0.01	<0.01	mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	<0.03	-	0.09	-	-	<0.03	0.15	mg/kg	0.03	A-T-019s
Naphthalene $_A^{M\#}$	<0.03	-	<0.03	-	-	<0.03	<0.03	mg/kg	0.03	A-T-019s
Phenanthrene$_A^{M\#}$	<0.03	-	0.09	-	-	<0.03	0.14	mg/kg	0.03	A-T-019s
Pyrene$_A^{M\#}$	<0.07	-	0.23	-	-	<0.07	0.35	mg/kg	0.07	A-T-019s
Total PAH-16MS$_A^{M\#}$	<0.08	-	1.34	-	-	<0.08	2.40	mg/kg	0.01	A-T-019s

Envirolab Job Number: 22/03570

Client Project Name: Sheringham HWRC

Client Project Ref: 102894

Lab Sample ID	22/03570/1	22/03570/2	22/03570/3	22/03570/4	22/03570/5	22/03570/6	22/03570/7	Units	Limit of Detection	Method ref
Client Sample No	1	2	1	3	1	2	1			
Client Sample ID	TP01	TP01	TP02	TP02	TP03	TP03	TP04			
Depth to Top	0.10	0.70	0.10	1.40	0.10	0.60	0.10			
Depth To Bottom										
Date Sampled	05-Apr-22	05-Apr-22	05-Apr-22	05-Apr-22	05-Apr-22	05-Apr-22	05-Apr-22			
Sample Type	Soil - ES	Soil - B	Soil - ES	Soil - B	Soil - ES	Soil - B	Soil - ES			
Sample Matrix Code	6AE	1	6A	1A	6A	6	6AE			
TPH UKCWG with Clean Up *C1										
Ali >C5-C6$_A^{\#}$	<0.01	-	<0.01	-	-	<0.01	<0.01	mg/kg	0.01	A-T-022s
Ali >C6-C8$_A^{\#}$	<0.01	-	<0.01	-	-	<0.01	<0.01	mg/kg	0.01	A-T-022s
Ali >C8-C10$_A$	<1	-	<1	-	-	<1	<1	mg/kg	1	A-T-055s
Ali >C10-C12$_A^{M\#}$	<1	-	<1	-	-	<1	<1	mg/kg	1	A-T-055s
Ali >C12-C16$_A^{M\#}$	<1	-	<1	-	-	<1	<1	mg/kg	1	A-T-055s
Ali >C16-C21$_A^{M\#}$	<1	-	<1	-	-	<1	<1	mg/kg	1	A-T-055s
Ali >C21-C35$_A^{M\#}$	6	-	2	-	-	<1	7	mg/kg	1	A-T-055s
Ali >C35-C44$_A$	<1	-	<1	-	-	<1	1	mg/kg	1	A-T-055s
Total Aliphatics$_A$	6	-	2	-	-	<1	8	mg/kg	1	A-T-055s
Aro >C5-C7$_A^{\#}$	<0.01	-	<0.01	-	-	<0.01	<0.01	mg/kg	0.01	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01	-	<0.01	-	-	<0.01	<0.01	mg/kg	0.01	A-T-022s
Aro >C8-C10$_A$	<1	-	<1	-	-	<1	<1	mg/kg	1	A-T-055s
Aro >C10-C12$_A$	<1	-	<1	-	-	<1	<1	mg/kg	1	A-T-055s
Aro >C12-C16$_A$	<1	-	<1	-	-	<1	<1	mg/kg	1	A-T-055s
Aro >C16-C21$_A^{M\#}$	<1	-	<1	-	-	<1	7	mg/kg	1	A-T-055s
Aro >C21-C35$_A$	<1	-	4	-	-	<1	27	mg/kg	1	A-T-055s
Aro >C35-C44$_A$	<1	-	<1	-	-	<1	<1	mg/kg	1	A-T-055s
Total Aromatics$_A$	<1	-	4	-	-	<1	34	mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C44)$_A$	6	-	6	-	-	<1	42	mg/kg	1	A-T-055s
BTEX - Benzene$_A^{\#}$	<0.01	-	<0.01	-	-	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01	-	<0.01	-	-	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01	-	<0.01	-	-	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01	-	<0.01	-	-	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01	-	<0.01	-	-	<0.01	<0.01	mg/kg	0.01	A-T-022s
MTBE$_A^{\#}$	<0.01	-	<0.01	-	-	<0.01	<0.01	mg/kg	0.01	A-T-022s

Envirolab Job Number: 22/03570

Client Project Name: Sheringham HWRC

Client Project Ref: 102894

Lab Sample ID	22/03570/8	22/03570/9	22/03570/10	22/03570/11	22/03570/12	22/03570/13	22/03570/14	Units	Limit of Detection	Method ref
Client Sample No	2	1	2	3	1	2	1			
Client Sample ID	TP04	TP05	TP06	TP06	TP07	TP07	TP08			
Depth to Top	0.70	0.10	0.70	2.40	0.10	0.60	0.10			
Depth To Bottom										
Date Sampled	05-Apr-22	05-Apr-22	05-Apr-22	05-Apr-22	05-Apr-22	05-Apr-22	05-Apr-22			
Sample Type	Soil - B	Soil - ES	Soil - B	Soil - B	Soil - ES	Soil - B	Soil - ES			
Sample Matrix Code	6A	6AE	1	1A	6AE	1	6AE			
% Stones >10mm$_A$	<0.1	7.6	<0.1	<0.1	9.2	<0.1	8.9	% w/w	0.1	A-T-044
Asbestos in soil$_D^{\#}$	-	NAD	NAD	-	NAD	-	NAD			A-T-045
Asbestos Matrix (visual)$_D$	-	-	-	-	-	-	-			A-T-045
Asbestos Matrix (microscope)$_D$	-	-	-	-	-	-	-			A-T-045
Asbestos ACM - Suitable for Water Absorption Test?$_D$	-	N/A	N/A	-	N/A	-	N/A			A-T-045
pH$_D^{M\#}$	-	7.20	8.08	-	7.41	-	7.73	pH	0.01	A-T-031s
pH BRE$_D^{M\#}$	8.11	-	-	8.21	-	7.96	-	pH	0.01	A-T-031s
Ammonium NH4 BRE (water sol 2:1)$_D$	<1.00	-	-	1.27	-	1.17	-	mg/l	1	A-T-033s
Chloride BRE, SO4 equiv. (water sol 2:1)$_D^{M\#}$	<7	-	-	<7	-	<7	-	mg/l	7	A-T-026s
Nitrate BRE, SO4 equiv. (water sol 2:1)$_D$	1.5	-	-	0.4	-	<0.4	-	mg/l	0.4	A-T-026s
Sulphate (water sol 2:1)$_D^{M\#}$	-	<0.01	<0.01	-	<0.01	-	<0.01	g/l	0.01	A-T-026s
Sulphate BRE (water sol 2:1)$_D^{M\#}$	<10	-	-	<10	-	<10	-	mg/l	10	A-T-026s
Sulphate (acid soluble)$_D^{M\#}$	-	<200	<200	-	<200	-	200	mg/kg	200	A-T-028s
Sulphate BRE (acid sol)$_D^{M\#}$	<0.02	-	-	<0.02	-	<0.02	-	% w/w	0.02	A-T-028s
Sulphur BRE (total)$_D$	<0.01	-	-	<0.01	-	<0.01	-	% w/w	0.01	A-T-024s
Magnesium BRE (water sol 2:1)$_D$	8	-	-	2	-	6	-	mg/l	1	A-T-SOLMETS
Cyanide (total)$_A^{M\#}$	-	<1	<1	-	<1	-	<1	mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC$_A$	-	<0.2	<0.2	-	<0.2	-	<0.2	mg/kg	0.2	A-T-050s
Sulphide$_A$	-	<5	<5	-	10	-	95	mg/kg	5	A-T-043-s
Sulphur (elemental)$_D^{M\#}$	-	<5	<5	-	<5	-	<5	mg/kg	5	A-T-029s
Organic matter Default$_D^{M\#}$	-	1.0	<0.1	-	1.2	-	0.9	% w/w	0.1	A-T-032 OM
Arsenic$_D^{M\#}$	-	4	5	-	4	-	4	mg/kg	1	A-T-024s
Boron (water soluble)$_D$	-	<1.0	<1.0	-	<1.0	-	<1.0	mg/kg	1	A-T-027s
Cadmium$_D^{M\#}$	-	<0.5	<0.5	-	<0.5	-	<0.5	mg/kg	0.5	A-T-024s
Copper$_D^{M\#}$	-	10	2	-	9	-	8	mg/kg	1	A-T-024s
Chromium$_D^{M\#}$	-	6	4	-	7	-	6	mg/kg	1	A-T-024s
Chromium (hexavalent)$_D$	-	<1	<1	-	<1	-	<1	mg/kg	1	A-T-040s
Lead$_D^{M\#}$	-	12	2	-	12	-	13	mg/kg	1	A-T-024s
Mercury$_D$	-	<0.17	<0.17	-	<0.17	-	<0.17	mg/kg	0.17	A-T-024s
Nickel$_D^{M\#}$	-	4	4	-	5	-	5	mg/kg	1	A-T-024s
Selenium$_D^{M\#}$	-	<1	<1	-	<1	-	<1	mg/kg	1	A-T-024s
Zinc$_D^{M\#}$	-	31	9	-	31	-	26	mg/kg	5	A-T-024s

Envirolab Job Number: 22/03570

Client Project Name: Sheringham HWRC

Client Project Ref: 102894

Lab Sample ID	22/03570/8	22/03570/9	22/03570/10	22/03570/11	22/03570/12	22/03570/13	22/03570/14	Units	Limit of Detection	Method ref
Client Sample No	2	1	2	3	1	2	1			
Client Sample ID	TP04	TP05	TP06	TP06	TP07	TP07	TP08			
Depth to Top	0.70	0.10	0.70	2.40	0.10	0.60	0.10			
Depth To Bottom										
Date Sampled	05-Apr-22	05-Apr-22	05-Apr-22	05-Apr-22	05-Apr-22	05-Apr-22	05-Apr-22			
Sample Type	Soil - B	Soil - ES	Soil - B	Soil - B	Soil - ES	Soil - B	Soil - ES			
Sample Matrix Code	6A	6AE	1	1A	6AE	1	6AE			
PAH-16MS										
Acenaphthene$_A^{M\#}$	-	<0.01	<0.01	-	<0.01	-	<0.01	mg/kg	0.01	A-T-019s
Acenaphthylene$_A^{M\#}$	-	<0.01	<0.01	-	<0.01	-	<0.01	mg/kg	0.01	A-T-019s
Anthracene$_A^{M\#}$	-	<0.02	<0.02	-	<0.02	-	<0.02	mg/kg	0.02	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	-	<0.04	<0.04	-	<0.04	-	0.05	mg/kg	0.04	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	-	<0.04	<0.04	-	<0.04	-	0.06	mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	-	<0.05	<0.05	-	<0.05	-	0.09	mg/kg	0.05	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	-	<0.05	<0.05	-	<0.05	-	<0.05	mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	-	<0.07	<0.07	-	<0.07	-	<0.07	mg/kg	0.07	A-T-019s
Chrysene$_A^{M\#}$	-	<0.06	<0.06	-	<0.06	-	0.07	mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	-	<0.04	<0.04	-	<0.04	-	<0.04	mg/kg	0.04	A-T-019s
Fluoranthene$_A^{M\#}$	-	<0.08	<0.08	-	<0.08	-	0.12	mg/kg	0.08	A-T-019s
Fluorene$_A^{M\#}$	-	<0.01	<0.01	-	<0.01	-	<0.01	mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	-	<0.03	<0.03	-	<0.03	-	0.04	mg/kg	0.03	A-T-019s
Naphthalene $_A^{M\#}$	-	<0.03	<0.03	-	<0.03	-	<0.03	mg/kg	0.03	A-T-019s
Phenanthrene$_A^{M\#}$	-	<0.03	<0.03	-	<0.03	-	0.05	mg/kg	0.03	A-T-019s
Pyrene$_A^{M\#}$	-	<0.07	<0.07	-	<0.07	-	0.10	mg/kg	0.07	A-T-019s
Total PAH-16MS$_A^{M\#}$	-	<0.08	<0.08	-	<0.08	-	0.58	mg/kg	0.01	A-T-019s

Envirolab Job Number: 22/03570

Client Project Name: Sheringham HWRC

Client Project Ref: 102894

Lab Sample ID	22/03570/8	22/03570/9	22/03570/10	22/03570/11	22/03570/12	22/03570/13	22/03570/14	Units	Limit of Detection	Method ref
Client Sample No	2	1	2	3	1	2	1			
Client Sample ID	TP04	TP05	TP06	TP06	TP07	TP07	TP08			
Depth to Top	0.70	0.10	0.70	2.40	0.10	0.60	0.10			
Depth To Bottom										
Date Sampled	05-Apr-22	05-Apr-22	05-Apr-22	05-Apr-22	05-Apr-22	05-Apr-22	05-Apr-22			
Sample Type	Soil - B	Soil - ES	Soil - B	Soil - B	Soil - ES	Soil - B	Soil - ES			
Sample Matrix Code	6A	6AE	1	1A	6AE	1	6AE			
TPH UKCWG with Clean Up *C1										
Ali >C5-C6$_A^{\#}$	-	<0.01	<0.01	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
Ali >C6-C8$_A^{\#}$	-	<0.01	<0.01	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
Ali >C8-C10$_A$	-	<1	<1	-	<1	-	<1	mg/kg	1	A-T-055s
Ali >C10-C12$_A^{M\#}$	-	<1	<1	-	<1	-	<1	mg/kg	1	A-T-055s
Ali >C12-C16$_A^{M\#}$	-	<1	<1	-	<1	-	<1	mg/kg	1	A-T-055s
Ali >C16-C21$_A^{M\#}$	-	<1	<1	-	<1	-	<1	mg/kg	1	A-T-055s
Ali >C21-C35$_A^{M\#}$	-	3	3	-	3	-	2	mg/kg	1	A-T-055s
Ali >C35-C44$_A$	-	<1	<1	-	<1	-	<1	mg/kg	1	A-T-055s
Total Aliphatics$_A$	-	3	3	-	3	-	2	mg/kg	1	A-T-055s
Aro >C5-C7$_A^{\#}$	-	<0.01	<0.01	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
Aro >C7-C8$_A^{\#}$	-	<0.01	<0.01	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
Aro >C8-C10$_A$	-	<1	<1	-	<1	-	<1	mg/kg	1	A-T-055s
Aro >C10-C12$_A$	-	<1	<1	-	<1	-	<1	mg/kg	1	A-T-055s
Aro >C12-C16$_A$	-	<1	<1	-	<1	-	<1	mg/kg	1	A-T-055s
Aro >C16-C21$_A^{M\#}$	-	<1	<1	-	<1	-	2	mg/kg	1	A-T-055s
Aro >C21-C35$_A$	-	<1	<1	-	<1	-	2	mg/kg	1	A-T-055s
Aro >C35-C44$_A$	-	<1	<1	-	<1	-	<1	mg/kg	1	A-T-055s
Total Aromatics$_A$	-	<1	<1	-	<1	-	4	mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C44)$_A$	-	3	3	-	4	-	6	mg/kg	1	A-T-055s
BTEX - Benzene$_A^{\#}$	-	<0.01	<0.01	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
BTEX - Toluene$_A^{\#}$	-	<0.01	<0.01	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	-	<0.01	<0.01	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	-	<0.01	<0.01	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
BTEX - o Xylene$_A^{\#}$	-	<0.01	<0.01	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s
MTBE$_A^{\#}$	-	<0.01	<0.01	-	<0.01	-	<0.01	mg/kg	0.01	A-T-022s

Envirolab Job Number: 22/03570

Client Project Name: Sheringham HWRC

Client Project Ref: 102894

Lab Sample ID	22/03570/15							Units	Limit of Detection	Method ref
Client Sample No	4									
Client Sample ID	TP08									
Depth to Top	2.80									
Depth To Bottom										
Date Sampled	05-Apr-22									
Sample Type	Soil - B									
Sample Matrix Code	1A									
% Stones >10mm$_A$	<0.1							% w/w	0.1	A-T-044
pH BRE$_D$$^{M\#}$	8.13							pH	0.01	A-T-031s
Ammonium NH4 BRE (water sol 2:1)$_D$	<1.00							mg/l	1	A-T-033s
Chloride BRE, SO4 equiv. (water sol 2:1)$_D$$^{M\#}$	<7							mg/l	7	A-T-026s
Nitrate BRE, SO4 equiv. (water sol 2:1)$_D$	0.5							mg/l	0.4	A-T-026s
Sulphate BRE (water sol 2:1)$_D$$^{M\#}$	<10							mg/l	10	A-T-026s
Sulphate BRE (acid sol)$_D$$^{M\#}$	<0.02							% w/w	0.02	A-T-028s
Sulphur BRE (total)$_D$	<0.01							% w/w	0.01	A-T-024s
Magnesium BRE (water sol 2:1)$_D$	2							mg/l	1	A-T-SOLMETS

REPORT NOTES

General

This report shall not be reproduced, except in full, without written approval from Envirolab.
The results reported herein relate only to the material supplied to the laboratory.
The residue of any samples contained within this report, and any received with the same delivery, will be disposed of six weeks after initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of six months after the initial Asbestos testing is completed.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.
The Client Sample No, Client Sample ID, Depth to Top, Depth to Bottom and Date Sampled were all provided by the client.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample, 9 = INCINERATOR ASH.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve
EPH CWG results have humics mathematically subtracted through instrument calculation
TPH results "with Cleanup" indicates results cleaned up with Silica during extraction

EPH CWG GCxGC ID from TPH CWG

Where we have identified humic substances in any ID's from TPH CWG with Clean Up please note that the concentration of these humic substances is not included in the quantified results and are included in the ID for information.

Please contact us if you need any further information.

v2

Envirolab Analysis Dates

Lab Sample ID	22/03570/1	22/03570/2	22/03570/3	22/03570/4	22/03570/5	22/03570/6	22/03570/7	22/03570/8	22/03570/9	22/03570/10	22/03570/11	22/03570/12
Client Sample No	1	2	1	3	1	2	1	2	1	2	3	1
Client Sample ID/Depth	TP01 0.10m	TP01 0.70m	TP02 0.10m	TP02 1.40m	TP03 0.10m	TP03 0.60m	TP04 0.10m	TP04 0.70m	TP05 0.10m	TP06 0.70m	TP06 2.40m	TP07 0.10m
Date Sampled	05/04/22	05/04/22	05/04/22	05/04/22	05/04/22	05/04/22	05/04/22	05/04/22	05/04/22	05/04/22	05/04/22	05/04/22
A-T-019s	20/04/2022		20/04/2022			20/04/2022	20/04/2022		20/04/2022	20/04/2022		20/04/2022
A-T-022s	21/04/2022		21/04/2022			21/04/2022	21/04/2022		21/04/2022	21/04/2022		21/04/2022
A-T-024s	21/04/2022	21/04/2022	21/04/2022	21/04/2022	21/04/2022	21/04/2022	21/04/2022	21/04/2022	21/04/2022	21/04/2022	21/04/2022	21/04/2022
A-T-026s	22/04/2022	22/04/2022	22/04/2022	22/04/2022	22/04/2022	22/04/2022	22/04/2022	22/04/2022	22/04/2022	22/04/2022	22/04/2022	22/04/2022
A-T-027s	22/04/2022		22/04/2022			22/04/2022	22/04/2022		22/04/2022	22/04/2022		22/04/2022
A-T-028s	22/04/2022	22/04/2022	22/04/2022	22/04/2022	22/04/2022	22/04/2022	22/04/2022	22/04/2022	22/04/2022	22/04/2022	22/04/2022	22/04/2022
A-T-029s	21/04/2022		21/04/2022			20/04/2022	20/04/2022		21/04/2022	21/04/2022		21/04/2022
A-T-031s	21/04/2022	21/04/2022	21/04/2022	21/04/2022	21/04/2022	21/04/2022	21/04/2022	21/04/2022	21/04/2022	21/04/2022	21/04/2022	21/04/2022
A-T-032 OM	22/04/2022		22/04/2022			22/04/2022	22/04/2022		22/04/2022	22/04/2022		22/04/2022
A-T-033s		25/04/2022		25/04/2022	25/04/2022			25/04/2022			25/04/2022	
A-T-040s	22/04/2022		22/04/2022			22/04/2022	22/04/2022		22/04/2022	22/04/2022		22/04/2022
A-T-042sTCN	21/04/2022		21/04/2022			21/04/2022	21/04/2022		21/04/2022	21/04/2022		21/04/2022
A-T-043-s	22/04/2022		22/04/2022			22/04/2022	22/04/2022		22/04/2022	22/04/2022		22/04/2022
A-T-044	14/04/2022	14/04/2022	14/04/2022	14/04/2022	14/04/2022	14/04/2022	14/04/2022	14/04/2022	14/04/2022	14/04/2022	14/04/2022	14/04/2022
A-T-045	14/04/2022		14/04/2022			14/04/2022	14/04/2022		14/04/2022	14/04/2022		14/04/2022
A-T-050s	20/04/2022		20/04/2022			20/04/2022	20/04/2022		20/04/2022	20/04/2022		20/04/2022
A-T-055s	21/04/2022		21/04/2022			21/04/2022	21/04/2022		21/04/2022	21/04/2022		21/04/2022
A-T-SOLMETS		21/04/2022		21/04/2022	21/04/2022			21/04/2022			21/04/2022	

Lab Sample ID	22/03570/13	22/03570/14	22/03570/15
Client Sample No	2	1	4
Client Sample ID/Depth	TP07 0.60m	TP08 0.10m	TP08 2.80m
Date Sampled	05/04/22	05/04/22	05/04/22
A-T-019s		20/04/2022	
A-T-022s		21/04/2022	
A-T-024s	21/04/2022	21/04/2022	21/04/2022
A-T-026s	22/04/2022	22/04/2022	25/04/2022
A-T-027s		22/04/2022	
A-T-028s	22/04/2022	22/04/2022	22/04/2022
A-T-029s		21/04/2022	
A-T-031s	21/04/2022	21/04/2022	21/04/2022
A-T-032 OM		22/04/2022	
A-T-033s	25/04/2022		25/04/2022
A-T-040s		22/04/2022	
A-T-042sTCN		21/04/2022	
A-T-043-s		22/04/2022	
A-T-044	14/04/2022	14/04/2022	14/04/2022
A-T-045		14/04/2022	
A-T-050s		20/04/2022	
A-T-055s		21/04/2022	
A-T-SOLMETS	21/04/2022		21/04/2022

The above dates are the analysis completion dates, please note that these are not necessarily the date that the analysis was weighed/extracted.

End of Report

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

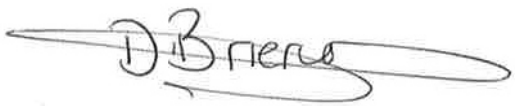
FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 22/03873
Issue Number: 1 **Date:** 04 May, 2022

Client: Norse Eastern Ltd t/a Norse Highways
280 Fifers Lane
Norwich
Norfolk
NR6 6EQ

Project Manager: Civil Lab/Josh Thompson/Sharon Woods; Simon Holden
Project Name: Sheringham HWRC
Project Ref: 102894
Order No: PN05037954
Date Samples Received: 22/04/22
Date Instructions Received: 22/04/22
Date Analysis Completed: 04/05/22

Approved by:



Danielle Brierley
Deputy Client Services Supervisor

Envirolab Job Number: 22/03873

Client Project Name: Sheringham HWRC

Client Project Ref: 102894

Lab Sample ID	22/03873/1							Units	Limit of Detection	Method ref
Client Sample No	10									
Client Sample ID	09									
Depth to Top	5									
Depth To Bottom	5.5									
Date Sampled	05-Apr-22									
Sample Type	Soil - B									
Sample Matrix Code	1A									
% Stones >10mm$_A$	<0.1							% w/w	0.1	A-T-044
pH BRE$_D$$^{M\#}$	8.46							pH	0.01	A-T-031s
Ammonium NH4 BRE (water sol 2:1)$_D$	<1.00							mg/l	1	A-T-033s
Chloride BRE, SO4 equiv. (water sol 2:1)$_D$$^{M\#}$	<7							mg/l	7	A-T-026s
Nitrate BRE, SO4 equiv. (water sol 2:1)$_D$	<0.4							mg/l	0.4	A-T-026s
Sulphate BRE (water sol 2:1)$_D$$^{M\#}$	18							mg/l	10	A-T-026s
Sulphate BRE (acid sol)$_D$$^{M\#}$	<0.02							% w/w	0.02	A-T-028s
Sulphur BRE (total)$_D$	<0.01							% w/w	0.01	A-T-024s
Magnesium BRE (water sol 2:1)$_D$	<1							mg/l	1	A-T-SOLMETS

REPORT NOTES

General

This report shall not be reproduced, except in full, without written approval from Envirolab.
The results reported herein relate only to the material supplied to the laboratory.
The residue of any samples contained within this report, and any received with the same delivery, will be disposed of six weeks after initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of six months after the initial Asbestos testing is completed.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.
The Client Sample No, Client Sample ID, Depth to Top, Depth to Bottom and Date Sampled were all provided by the client.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample, 9 = INCINERATOR ASH.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve
EPH CWG results have humics mathematically subtracted through instrument calculation
TPH results "with Cleanup" indicates results cleaned up with Silica during extraction

EPH CWG GCxGC ID from TPH CWG

Where we have identified humic substances in any ID's from TPH CWG with Clean Up please note that the concentration of these humic substances is not included in the quantified results and are included in the ID for information.

Please contact us if you need any further information.

v2

Envirolab Analysis Dates

Lab Sample ID	22/03873/1
Client Sample No	10
Client Sample ID/Depth	09 5-5.5m
Date Sampled	05/04/22
A-T-024s	28/04/2022
A-T-026s	04/05/2022
A-T-028s	03/05/2022
A-T-031s	27/04/2022
A-T-033s	29/04/2022
A-T-044	28/04/2022
A-T-SOLMETS	03/05/2022

The above dates are the analysis completion dates, please note that these are not necessarily the date that the analysis was weighed/extracted.

End of Report

Appendix H

Run 1

Results from Site Observation

Scheme:	**Sheringham**
Project No	**102894**
Trial Pit No.	7
Depth of Trial Pit (m)=	3.00
Length of Trial Pit (m)=	1.30
Breadth of Trial Pit (m)=	0.45
No of runs	3
Pipe upstand (m)	0.000

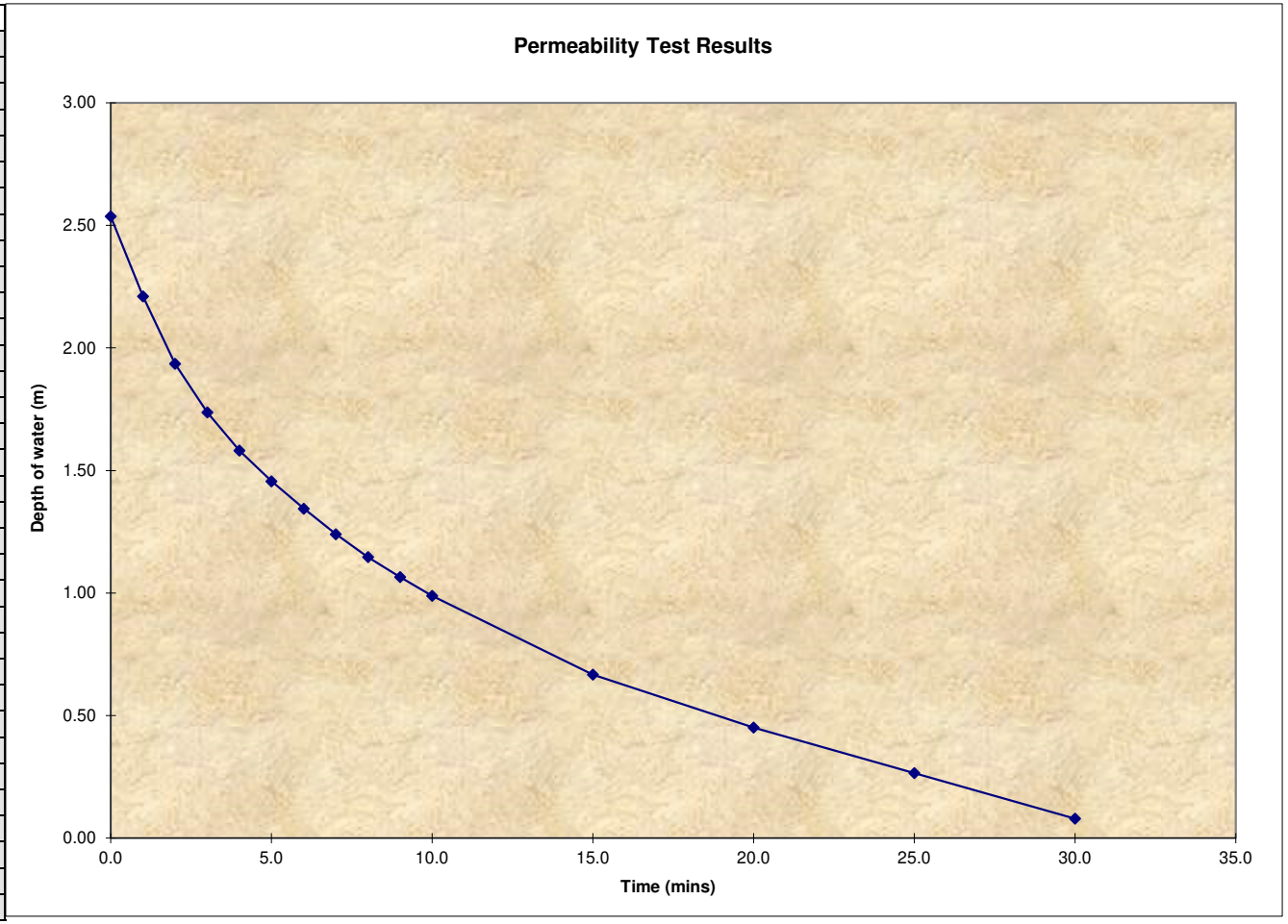
Time of Emptying of Soakaway
(Values to be checked on chart)

% Full	25% Empty	50% Empty	75% Empty
Depth of Water (m)	1.9030	1.2687	0.6343
Time (mins)	2	7	16

Gravel fill	Yes
Voids %	44.2

Infiltration Rate
8.0E-05 m/sec

Minutes	Depth of Water (m)	Depth Below E.G.L.(m)	Depth to water (m)
0.0	2.54	0.46	0.463
1.0	2.21	0.79	0.789
2.0	1.94	1.06	1.064
3.0	1.74	1.26	1.263
4.0	1.58	1.42	1.419
5.0	1.46	1.54	1.544
6.0	1.34	1.66	1.655
7.0	1.24	1.76	1.760
8.0	1.15	1.85	1.854
9.0	1.07	1.93	1.935
10.0	0.99	2.01	2.012
15.0	0.67	2.33	2.333
20.0	0.45	2.55	2.549
25.0	0.26	2.74	2.735
30.0	0.08	2.92	2.921



Run 2

Results from Site Observation

Scheme:	**Sheringham**
Project	**102894**
Trial Pit No.	7
Depth of Trial Pit (m)=	3.00
Length of Trial Pit (m)=	1.30
Breadth of Trial Pit (m)=	0.45
No of runs	3
Pipe upstand (m)	0.000

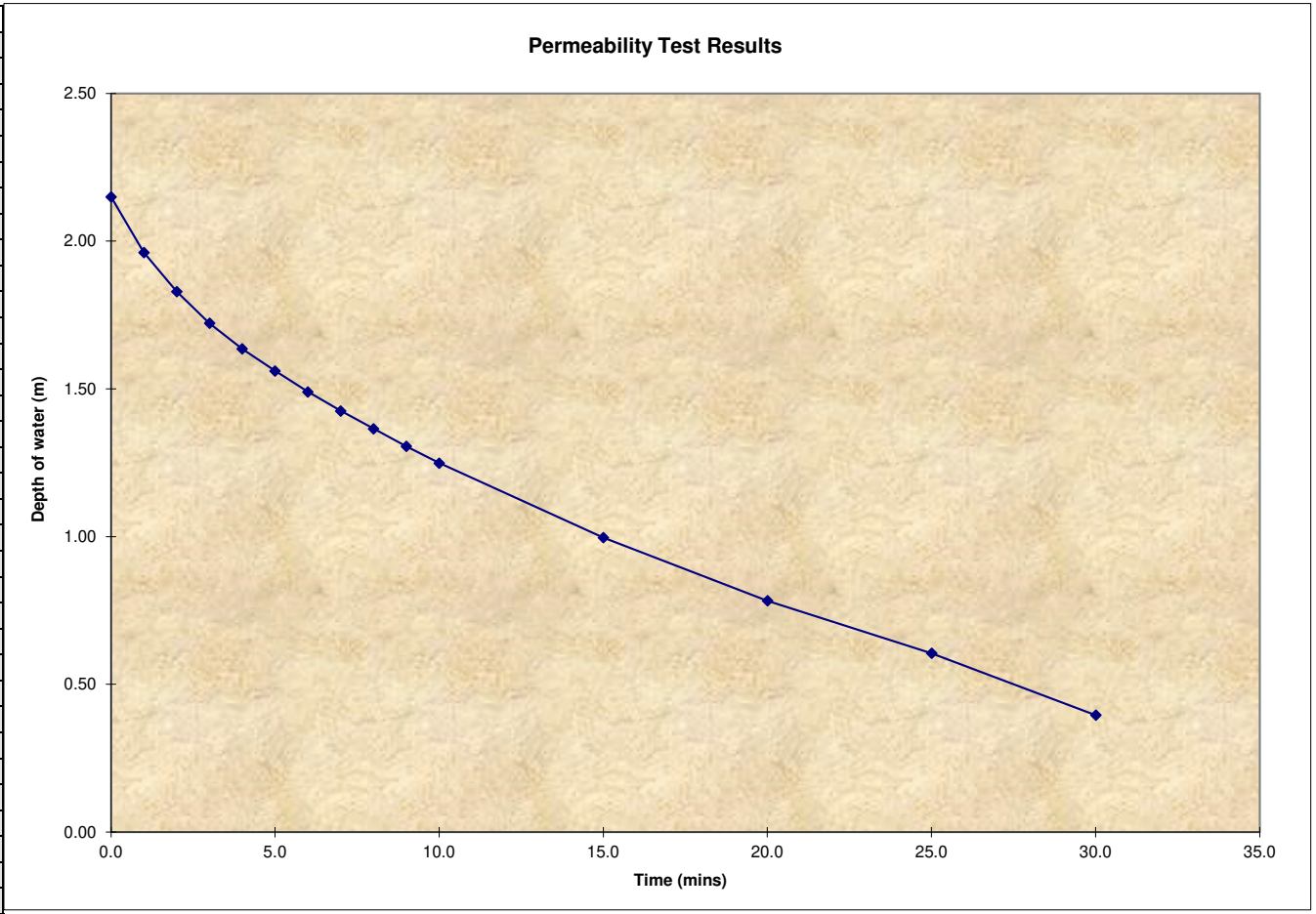
Time of Emptying of Soakaway
(Values to be checked on chart)

% Full	25% Empty	50% Empty	75% Empty
Depth of Water (m)	1.6129	1.0753	0.5376
Time (mins)	4	13	27

Gravel fill	Yes
Voids %	44.2

Infiltration Rate
4.8E-05 m/sec

Minutes	Depth of Water (m)	Depth Below E.G.L.(m)	Depth to water (m)
0.0	2.15	0.85	0.850
1.0	1.96	1.04	1.038
2.0	1.83	1.17	1.170
3.0	1.72	1.28	1.277
4.0	1.64	1.36	1.365
5.0	1.56	1.44	1.439
6.0	1.49	1.51	1.510
7.0	1.43	1.57	1.574
8.0	1.37	1.63	1.635
9.0	1.31	1.69	1.694
10.0	1.25	1.75	1.751
15.0	1.00	2.00	2.003
20.0	0.78	2.22	2.217
25.0	0.61	2.39	2.394
30.0	0.40	2.60	2.604



Run 3

Results from Site Observation

Scheme:	**Sheringham**
Project	**102894**
Trial Pit No.	7
Depth of Trial Pit (m)=	3.00
Length of Trial Pit (m)=	1.30
Breadth of Trial Pit (m)=	0.45
No of runs	3
Pipe upstand (m)	0.000

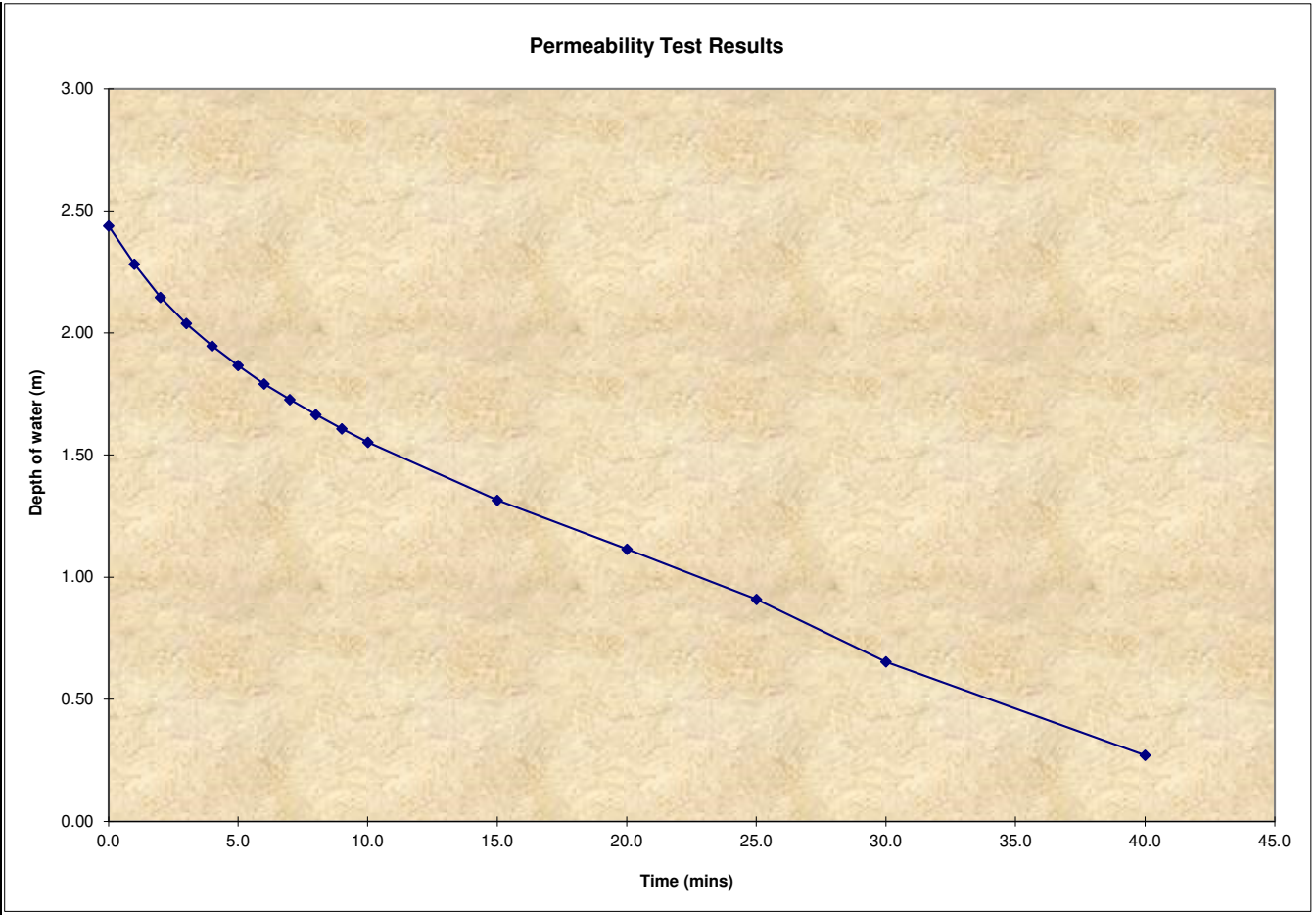
Time of Emptying of Soakaway
(Values to be checked on chart)

% Full	25% Empty	50% Empty	75% Empty
Depth of Water (m)	1.8292	1.2195	0.6097
Time (mins)	5	17	31

Gravel fill	Yes
Voids %	44.2

Infiltration Rate	Mean
4.2E-05	5.3E-05 m/sec

Minutes	Depth of Water (m)	Depth Below E.G.L.(m)	Depth to water (m)
0.0	2.44	0.56	0.561
1.0	2.28	0.72	0.718
2.0	2.15	0.85	0.854
3.0	2.04	0.96	0.961
4.0	1.95	1.05	1.053
5.0	1.87	1.13	1.134
6.0	1.79	1.21	1.208
7.0	1.73	1.27	1.273
8.0	1.67	1.33	1.335
9.0	1.61	1.39	1.392
10.0	1.55	1.45	1.447
15.0	1.32	1.68	1.685
20.0	1.11	1.89	1.885
25.0	0.91	2.09	2.091
30.0	0.65	2.35	2.347
40.0	0.27	2.73	2.730



Run 1

Results from Site Observation

Scheme:	**Sheringham**
Project No	**102894**
Trial Pit No.	8
Depth of Trial Pit (m)=	3.00
Length of Trial Pit (m)=	1.50
Breadth of Trial Pit (m)=	0.45
No of runs	3
Pipe upstand (m)	0.000

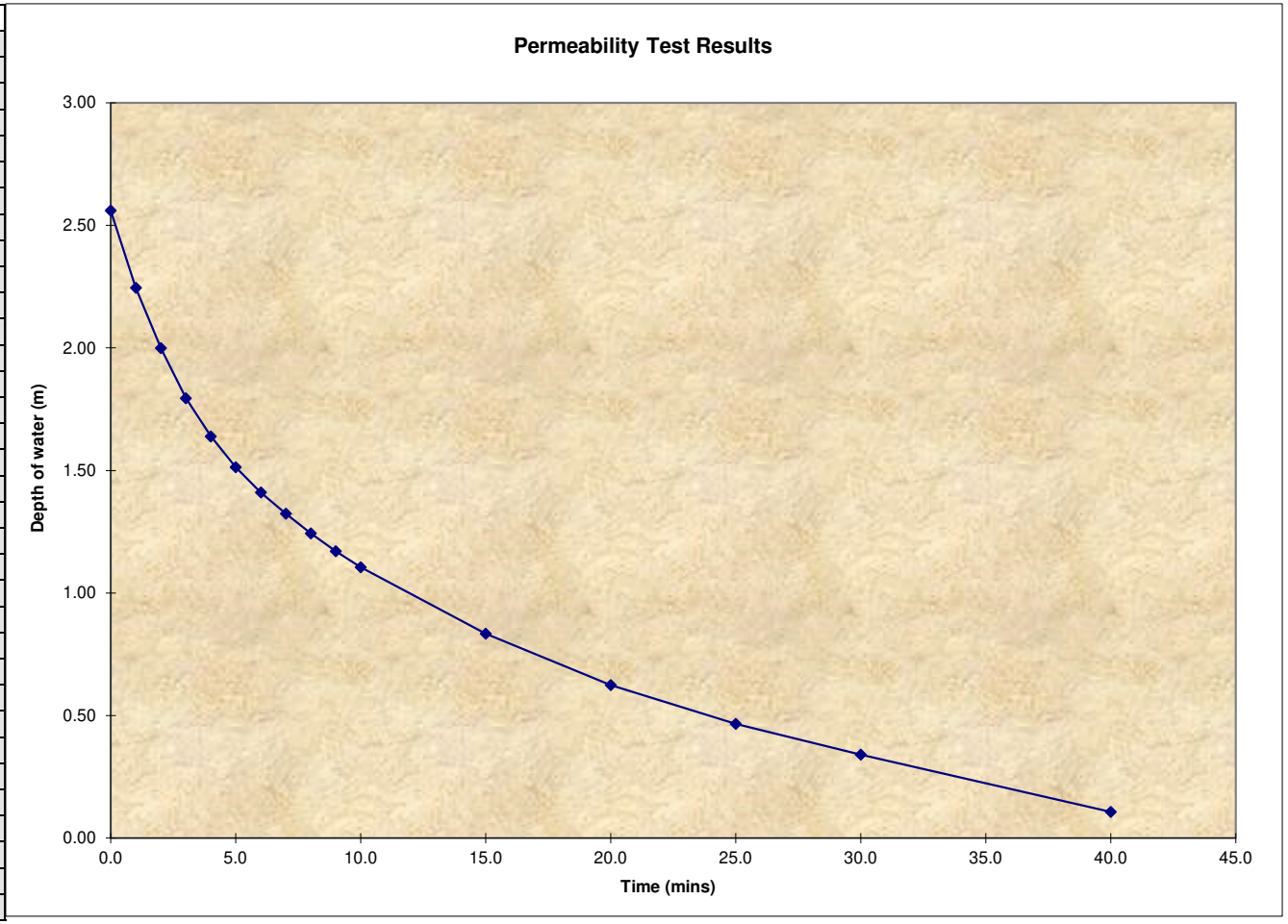
Time of Emptying of Soakaway
(Values to be checked on chart)

% Full	25% Empty	50% Empty	75% Empty
Depth of Water (m)	1.9208	1.2805	0.6403
Time (mins)	2	8	20

Gravel fill	Yes
Voids %	44.2

Infiltration Rate
6.5E-05 m/sec

Minutes	Depth of Water (m)	Depth Below E.G.L.(m)	Depth to water (m)
0.0	2.56	0.44	0.439
1.0	2.25	0.75	0.754
2.0	2.00	1.00	1.000
3.0	1.80	1.20	1.205
4.0	1.64	1.36	1.360
5.0	1.51	1.49	1.486
6.0	1.41	1.59	1.589
7.0	1.32	1.68	1.676
8.0	1.24	1.76	1.756
9.0	1.17	1.83	1.830
10.0	1.11	1.89	1.895
15.0	0.83	2.17	2.166
20.0	0.62	2.38	2.375
25.0	0.47	2.53	2.534
30.0	0.34	2.66	2.659
40.0	0.11	2.89	2.893



Run 2

Results from Site Observation

Scheme:	**Sheringham**
Project	**102894**
Trial Pit No.	8
Depth of Trial Pit (m)=	3.00
Length of Trial Pit (m)=	1.50
Breadth of Trial Pit (m)=	0.45
No of runs	3
Pipe upstand (m)	0.000

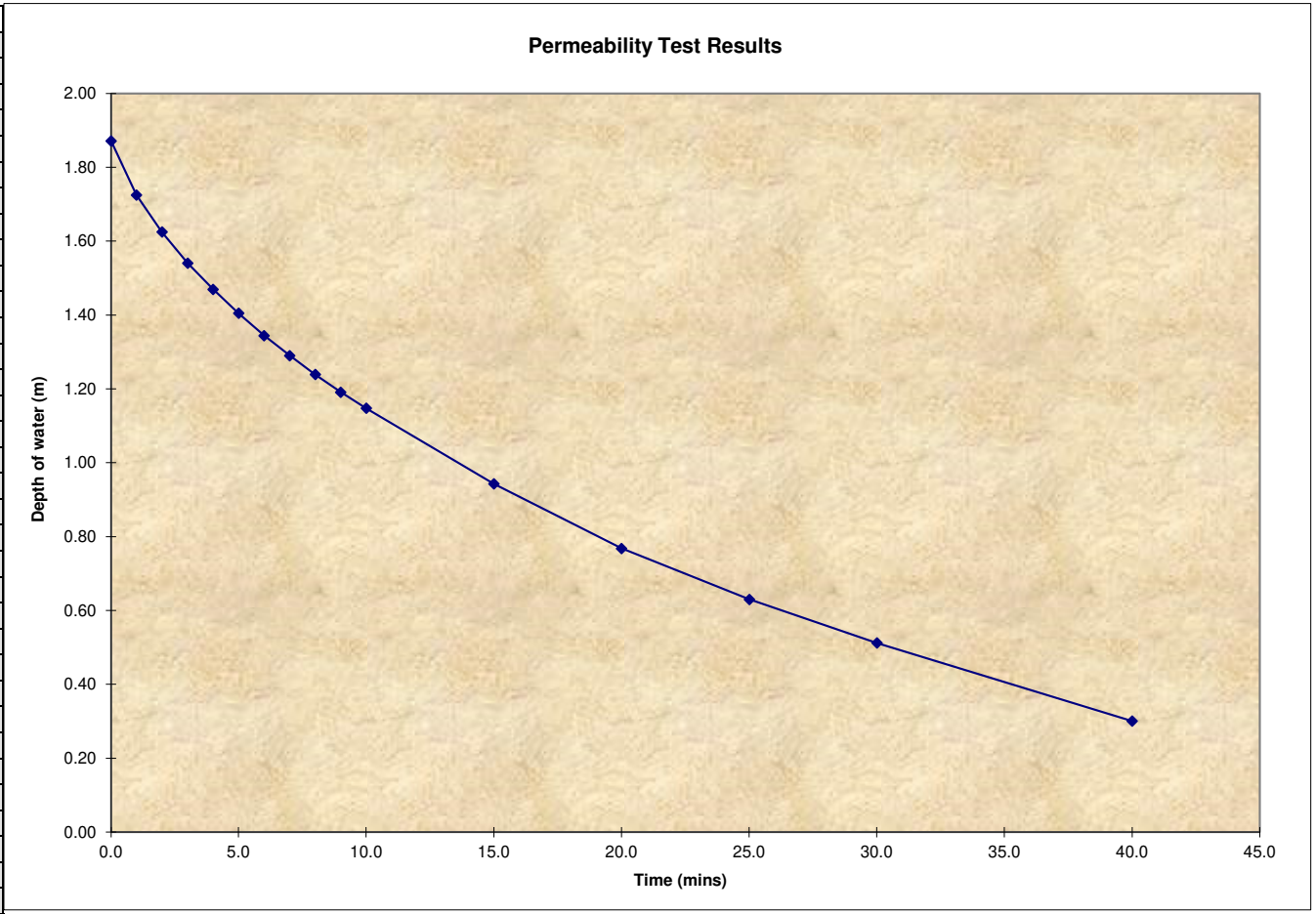
Time of Emptying of Soakaway
(Values to be checked on chart)

% Full	25% Empty	50% Empty	75% Empty
Depth of Water (m)	1.4036	0.9358	0.4679
Time (mins)	5	15	32

Gravel fill	Yes
Voids %	44.2

Infiltration Rate
4.0E-05 m/sec

Minutes	Depth of Water (m)	Depth Below E.G.L.(m)	Depth to water (m)
0.0	1.87	1.13	1.129
1.0	1.72	1.28	1.275
2.0	1.63	1.37	1.375
3.0	1.54	1.46	1.459
4.0	1.47	1.53	1.530
5.0	1.41	1.60	1.595
6.0	1.34	1.66	1.656
7.0	1.29	1.71	1.710
8.0	1.24	1.76	1.761
9.0	1.19	1.81	1.809
10.0	1.15	1.85	1.852
15.0	0.94	2.06	2.057
20.0	0.77	2.23	2.232
25.0	0.63	2.37	2.370
30.0	0.51	2.49	2.488
40.0	0.30	2.70	2.699



Run 3

Results from Site Observation

Scheme:	**Sheringham**
Project	**102894**
Trial Pit No.	8
Depth of Trial Pit (m)=	3.00
Length of Trial Pit (m)=	1.50
Breadth of Trial Pit (m)=	0.45
No of runs	3
Pipe upstand (m)	0.000

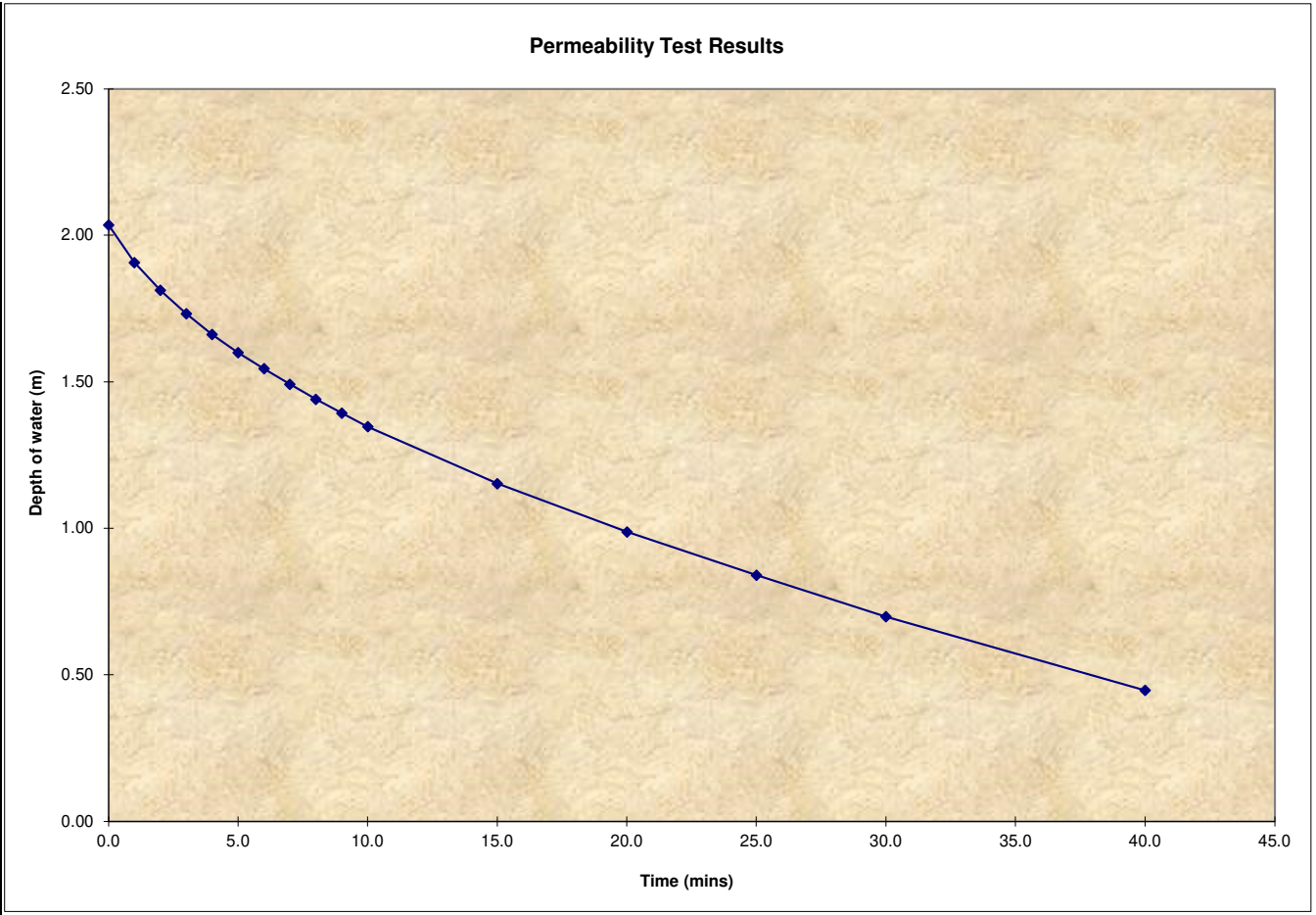
Time of Emptying of Soakaway
(Values to be checked on chart)

% Full	25% Empty	50% Empty	75% Empty
Depth of Water (m)	1.5264	1.0176	0.5088
Time (mins)	6	19	38

Gravel fill	Yes
Voids %	44.2

Infiltration Rate	Mean
3.5E-05	4.3E-05 m/sec

Minutes	Depth of Water (m)	Depth Below E.G.L.(m)	Depth to water (m)
0.0	2.04	0.96	0.965
1.0	1.91	1.09	1.093
2.0	1.81	1.19	1.188
3.0	1.73	1.27	1.267
4.0	1.66	1.34	1.338
5.0	1.60	1.40	1.401
6.0	1.54	1.46	1.455
7.0	1.49	1.51	1.508
8.0	1.44	1.56	1.560
9.0	1.39	1.61	1.607
10.0	1.35	1.65	1.653
15.0	1.15	1.85	1.847
20.0	0.99	2.01	2.012
25.0	0.84	2.16	2.160
30.0	0.70	2.30	2.302
40.0	0.45	2.55	2.553



Appendix I Site Infiltration Testing - June 2023

Prepared by:
Norfolk Partnership Laboratory, Norse Eastern Ltd, Martineau Lane, Norwich, Norfolk, NR1 2SG
Telephone (01603) 578389

Factual Permeability Report
Holt Road HWRC
Sheringham
Norfolk
104494
June 2023

Client:
Community and Environmental Services
Norfolk County Council
County Hall
Martineau Lane
Norwich
NR1 2SG

Registered office: 280 Fifers Lane, Norwich, NR6 6EQ
Registered in England and Wales No. 07445476
Norfolk Partnership Laboratory is part of Norse Eastern Limited a subsidiary of the Norse Group, a company wholly owned by Norfolk County Council

i) Contents

Appendices

ii) Distribution

Community and Environmental Services	1 copy
Norfolk Partnership Laboratory	1 copy

1.0 Introduction

This permeability investigation was carried out on land to the north of the eastern end of the access road to Sheringham Household Waste Recycling Centre (HWRC) on the A148 Holt Road, Sheringham, Norfolk (OSGR 616280 / 341026). Ms K Lange of Community and Environmental Services instructed Norfolk Partnership Laboratory (NPL) to carry out the work after acceptance of NPL's quotation. NPL provides a service within Norse Eastern Ltd.

The aim of this investigation was to determine the infiltration rates at various locations across the site advised by the client.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

Although every effort has been made to give a true assessment of the condition of the site, it is possible that different ground conditions may exist in parts of the site that are neither recorded nor visible.

2.0 Geology

The geology of the region may be summarised as follows:

Pleistocene : Briton's Lane Sand and Gravel
: Wroxham Crag Formation

The **Wroxham Crag Formation** comprises of a sheet of interbedded gravels, sands, silts and clays. The gravels are dominated by flint (up to c.80%) and by quartz and quartzite (up to c.60%), with far-travelled minor lithogies including Carboniferous chert, Rhaxella chert, Greensand chert, Spilsby Sandstone and felsic volcanic rocks from North Wales. The deposits are interpreted as estuarine and near-shore marine.

The **Britions Lane Sand and Gravel** which consists of horizontal, massive and low angle planar cross-bedded gravels and cobble gravels with thin seams of horizontal and rippled sand. The lithology has a distinctive high flint content (c.85-89%) of which the majority is of non-chatter marked variety (c.78-85%). The gravels also contain a wide range of far-travelled crystalline erratics including rocks of British and Scandinavian provenance.

3.0 Site Investigation

3.1 Investigation Objectives

The aim of this investigation is to obtain infiltration information on the site.

3.2 Preparatory Enabling Works

No preparatory enabling works were required.

3.3 Works undertaken

On 26 June 2023, four trial pits were excavated to a maximum depth of 1.00 metre. Infiltration testing in accordance with BRE 365 was carried out in all four pits.

The trial pits are numbered 1 to 4.

The locations of these excavations are shown on the plan in Appendix B.

3.4 Site Investigation Strategy

The site investigation was to obtain infiltration information on the site.

3.5 Site Sampling Strategy

No samples were retrieved from the trial pits.

3.6 Geotechnical Testing

No geotechnical testing was carried out as part of this investigation.

3.7 Pollution prevention measures

No pollution prevention measures were required on this site. The four trial pits were backfilled with gravel to enable the testing to be carried out.

4.0 Investigation Results

4.1 Ground conditions

4.1.1 Topsoil

Topsoil was recorded as the surface deposit in all of the Trial Pits. The topsoil was brown in colour and sandy. The thickness of the topsoil ranged from 0.20 metre in TP03 to 0.40 metre in TP04.

4.1.2 Britons Lane Sand and Gravel

Britons Lane Sand and Gravel was encountered below the Topsoil in all Trial Pit locations. The deposit comprised of yellowish brown, orangey brown and brown fine sand with some silt and clay. The thickness of the deposit ranged from 0.35 metre in TP02 to 0.70 metre in TP04. The Britons Lane Sand and Gravel was not proven at a maximum depth of 1.00 metre in TP04.

More detail can be seen on the Trial Pit Logs in Appendix C

4.1.3 Wroxham Crag

No Wroxham Crag deposits were positively identified during this investigation.

4.2 Groundwater conditions

No groundwater was encountered during the investigation.

5.0 Infiltration Results

Infiltration testing in accordance with BRE 365 was undertaken in TP01 to TP04. The results are tabulated below:

Trial Pit	Depth (bglm)	Run 1 m/sec	Run 2 m/sec	Run 3 m/sec	Mean m/sec
01	0.75	1.7×10^{-4}	9.2×10^{-5}	8.2×10^{-5}	1.0×10^{-4}
02	0.75	3.2×10^{-6}	3.2×10^{-6}	3.1×10^{-6}	3.1×10^{-6}
03	0.75	1.4×10^{-4}	6.8×10^{-5}	5.9×10^{-5}	7.7×10^{-5}
04	1.00	5.1×10^{-5}	3.5×10^{-5}	3.8×10^{-5}	3.8×10^{-5}

Norfolk Partnership Laboratory

Site Investigation Section

This report was prepared under the direction of

Lead Engineer

I D Brown

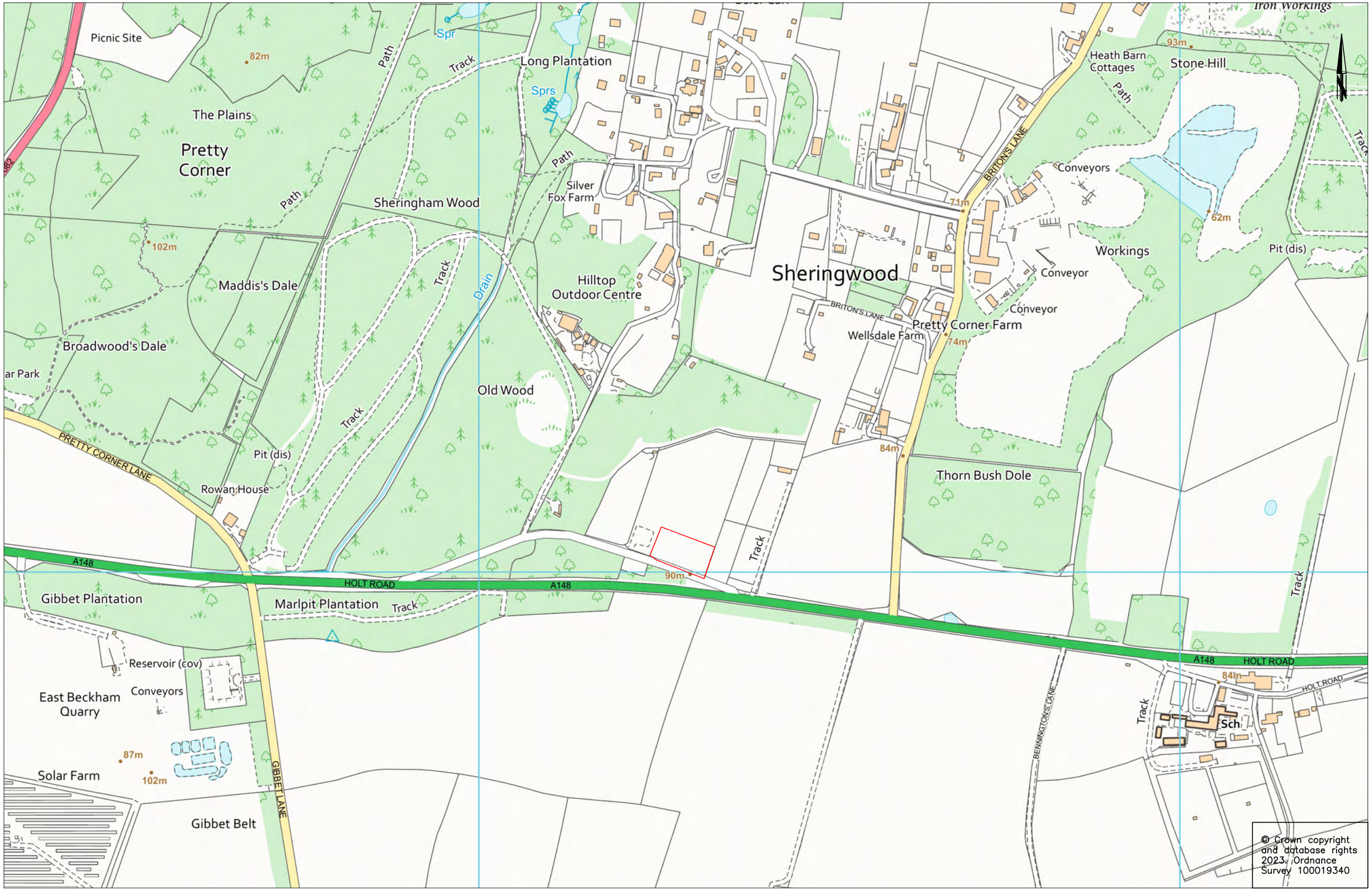
Author of report

Assistant Engineer

J Price

Date: 30/06/2023

Appendix A



Norfolk County Council

Tom McCabe
Executive Director of
Community and Environmental Services
Norfolk County Council
County Hall, Martineau Lane
Norwich NR1 2SG

DRAWING TITLE
104494 Sheringham HWRC Holt Road
Site Investigation
Site Location Plan

REV.	DESCRIPTION	DRAWN BY	CHECKED	DATE

	INITIALS	DATE
SURVEYED BY	OS	06/23
DESIGNED BY	JP	06/23
DRAWN BY	JP	06/23
CHECKED BY	IDB	06/23

DRAWING No. 104494-002

PROJECT TITLE
Sheringham HWRC Holt Road
Site Investigation

SCALE 1: 5000 @A3

FILE No. 104242

ORIGINAL SIZE: A3

Appendix B

Norfolk County Council

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Norwich NR1 2SG

DRAWING TITLE
104494 Sheringham HWRC Holt Road
Site Investigation
Trial Pit Location Plan

REV.	DESCRIPTION	DRAWN BY	CHECKED	DATE

	INITIALS	DATE
SURVEYED BY	OS	06/23
DESIGNED BY	JP	06/23
DRAWN BY	JP	06/23
CHECKED BY	IDB	06/23

DRAWING No. 104494-002
PROJECT TITLE
Sheringham HWRC Holt Road
Site Investigation
SCALE 1: 1000 @A3
FILE No. 104242

ORIGINAL SIZE: A3

Appendix C

NORFOLK PARTNERSHIP LABORATORY

TRIAL PIT LOG

Sheet 1 of 1

Scheme	Sheringham New HWRC Supp Perm	Job No.	104494	Trial Pit No.	TP01
Carried out for	Community and Environmental Services	Date Started	26/06/2023	Date Finished	26/06/2023
Dimensions:	0.45m x 1.50m	Type of Rig	JCB 3CX	Logged by	KN
Remarks:		Depth (m)	0.75	Ground Level (m AOD)	Drawn by JP
		Co-ords	616261 - 341058		Checked by IDB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample Type	Sample No.	Field Tests	Laboratory Tests MC%	LL	PL	MPI	Org.	CBR
			Brown silty TOPSOIL. TOPSOIL												
			Yellow, orangey brown and brown fine to medium SAND with some silt lenses. BRITONS LANE SAND AND GRAVEL		0.35 0.75	1.00 2.00 3.00 4.00									

NORFOLK PARTNERSHIP LABORATORY

TRIAL PIT LOG

Sheet 1 of 1

Scheme	Sheringham New HWRC Supp Perm	Job No.	104494	Trial Pit No.	TP02
Carried out for	Community and Environmental Services	Date Started	26/06/2023	Date Finished	26/06/2023
Dimensions:	0.45m x 1.50m	Type of Rig	JCB 3CX	Logged by	KN
Remarks:		Depth (m)	0.75	Ground Level (m AOD)	Drawn by JP
		Co-ords	616297 - 341047		Checked by IDB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample Type	Sample No.	Field Tests	Laboratory Tests MC%	LL	PL	MPI	Org.	CBR
			Brown fine sandy TOPSOIL. TOPSOIL												
			Yellow, orangey brown and brown silty, clayey, fine SAND. BRITONS LANE SAND AND GRAVEL		0.40 0.75	1.00 2.00 3.00 4.00									

NORFOLK PARTNERSHIP LABORATORY

TRIAL PIT LOG

Sheet 1 of 1

Scheme	Sheringham New HWRC Supp Perm	Job No.	104494	Trial Pit No.	TP03
Carried out for	Community and Environmental Services	Date Started	26/06/2023	Date Finished	26/06/2023
Dimensions:	0.45m x 1.50m	Type of Rig	JCB 3CX	Logged by	KN
Remarks:		Depth (m)	0.75	Ground Level (m AOD)	Drawn by JP
		Co-ords	616322 - 431035		Checked by IDB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample Type	Sample No.	Field Tests	Laboratory Tests MC%	LL	PL	MPI	Org.	CBR
			Brown sandy TOPSOIL. TOPSOIL												
			Yellowish brown fine SAND with occasional gravel. Gravel is fine to medium, sub-angular to sub-rounded flint. BRITONS LANE SAND AND GRAVEL		0.20 0.75	1.00 2.00 3.00 4.00									

NORFOLK PARTNERSHIP LABORATORY

TRIAL PIT LOG

Sheet 1 of 1

Scheme	Sheringham New HWRC Supp Perm	Job No.	104494	Trial Pit No.	TP04
Carried out for	Community and Environmental Services	Date Started	26/06/2023	Date Finished	26/06/2023
Dimensions:	0.45m x 1.50m	Type of Rig	JCB 3CX	Logged by	KN
Remarks:		Depth (m)	1.00	Ground Level (m AOD)	Drawn by JP
		Co-ords	616324 - 341016		Checked by IDB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample Type	Sample No.	Field Tests	Laboratory Tests MC%	LL	PL	MPI	Org.	CBR
			Brown sandy TOPSOIL. TOPSOIL												
			Orangey brown fine to medium SAND. BRITONS LANE SAND AND GRAVEL *Some fine to fine to coarse, sub-angular to sub-rounded flint gravel between 0.4m to 0.5m.*		0.30										
					1.00	1.00									
						2.00									
						3.00									
						4.00									

Appendix D

Run 1

Results from Site Observation

Scheme:	**Sheringham HWRC**
Project No	**104494**
Trial Pit No.	TP01
Depth of Trial Pit (m)=	0.75
Length of Trial Pit (m)=	1.50
Breadth of Trial Pit (m)=	0.45
No of runs	3
Pipe upstand (m)	

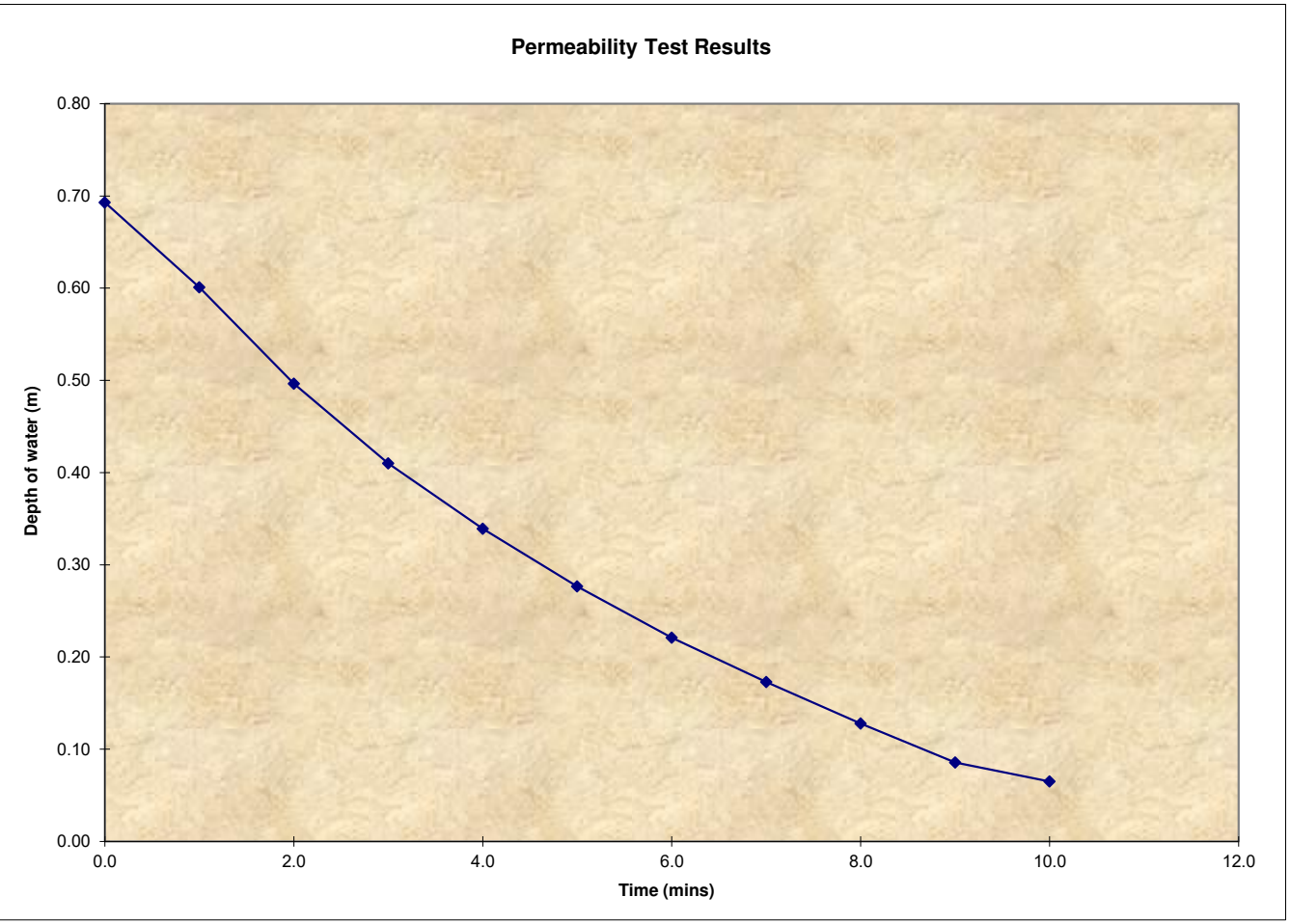
Time of Emptying of Soakaway
(Values to be checked on chart)

% Full	25% Empty	50% Empty	75% Empty
Depth of Water (m)	0.5198	0.3465	0.1733
Time (mins)	2	4	7

Gravel fill	Yes
Voids %	45.2

Infiltration Rate
1.7E-04 m/sec

Minutes	Depth of Water (m)	Depth Below E.G.L.(m)	Depth to water (m)
0.0	0.69	0.06	0.057
1.0	0.60	0.15	0.149
2.0	0.50	0.25	0.254
3.0	0.41	0.34	0.340
4.0	0.34	0.41	0.411
5.0	0.28	0.47	0.473
6.0	0.22	0.53	0.529
7.0	0.17	0.58	0.577
8.0	0.13	0.62	0.622
9.0	0.09	0.66	0.664
10.0	0.06	0.69	0.685



Run 2

Results from Site Observation

Scheme:	**Sheringham HWRC**
Project	**104494**
Trial Pit No.	TP01
Depth of Trial Pit (m)=	0.75
Length of Trial Pit (m)=	1.50
Breadth of Trial Pit (m)=	0.45
No of runs	3
Pipe upstand (m)	0.000

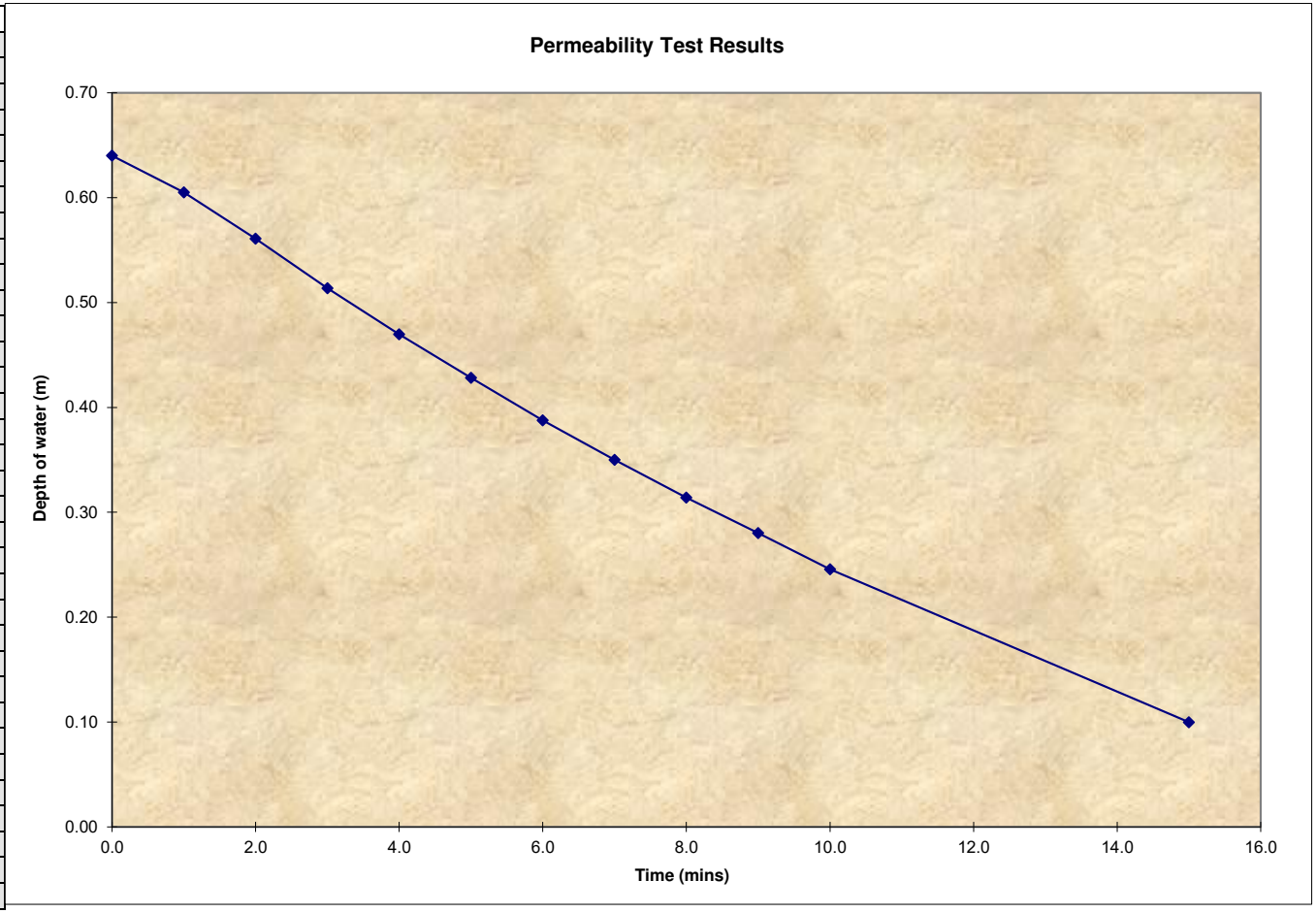
Time of Emptying of Soakaway
(Values to be checked on chart)

% Full	25% Empty	50% Empty	75% Empty
Depth of Water (m)	0.4800	0.3200	0.1600
Time (mins)	4	8	13

Gravel fill	Yes
Voids %	45.2

Infiltration Rate
9.2E-05 m/sec

Minutes	Depth of Water (m)	Depth Below E.G.L.(m)	Depth to water (m)
0.0	0.64	0.11	0.110
1.0	0.61	0.14	0.145
2.0	0.56	0.19	0.189
3.0	0.51	0.24	0.236
4.0	0.47	0.28	0.280
5.0	0.43	0.32	0.322
6.0	0.39	0.36	0.362
7.0	0.35	0.40	0.400
8.0	0.31	0.44	0.436
9.0	0.28	0.47	0.470
10.0	0.25	0.50	0.504
15.0	0.10	0.65	0.650



Run 3

Results from Site Observation

Scheme:	**Sheringham**
Project	**104494**
Trial Pit No.	TP01
Depth of Trial Pit (m)=	0.75
Length of Trial Pit (m)=	1.50
Breadth of Trial Pit (m)=	0.45
No of runs	3
Pipe upstand (m)	0.000

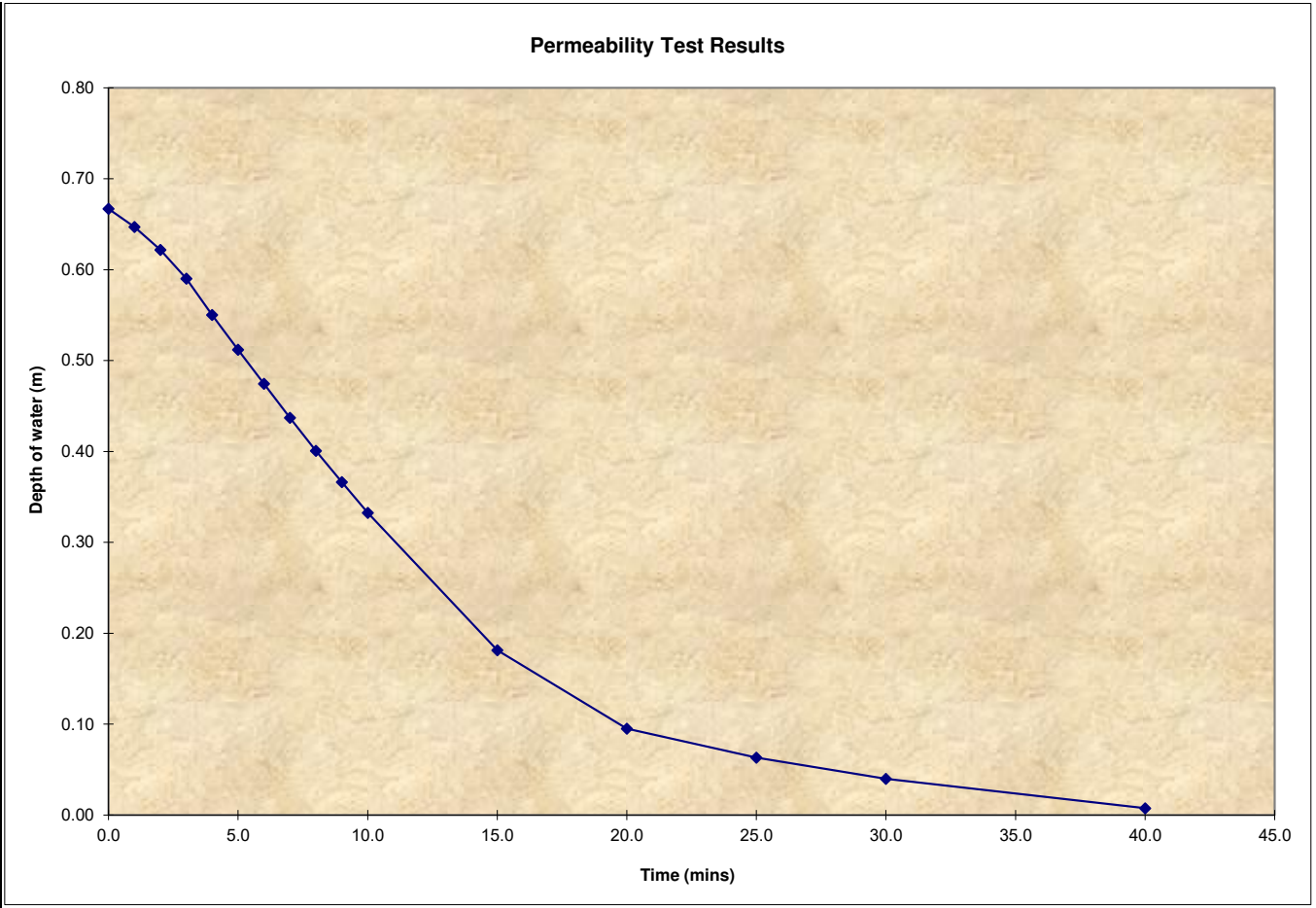
Time of Emptying of Soakaway
(Values to be checked on chart)

% Full	25% Empty	50% Empty	75% Empty
Depth of Water (m)	0.5002	0.3335	0.1667
Time (mins)	5	10	16

Gravel fill	Yes
Voids %	45.2

Infiltration Rate	Mean
8.2E-05	1.0E-04 m/sec

Minutes	Depth of Water (m)	Depth Below E.G.L.(m)	Depth to water (m)
0.0	0.67	0.08	0.083
1.0	0.65	0.10	0.103
2.0	0.62	0.13	0.128
3.0	0.59	0.16	0.160
4.0	0.55	0.20	0.200
5.0	0.51	0.24	0.238
6.0	0.47	0.28	0.275
7.0	0.44	0.31	0.313
8.0	0.40	0.35	0.349
9.0	0.37	0.38	0.384
10.0	0.33	0.42	0.417
15.0	0.18	0.57	0.569
20.0	0.10	0.66	0.655
25.0	0.06	0.69	0.687
30.0	0.04	0.71	0.710
40.0	0.01	0.74	0.742



Run 1

Results from Site Observation

Scheme:	**Sheringham HWRC**
Project No	**104494**
Trial Pit No.	TP02
Depth of Trial Pit (m)=	0.75
Length of Trial Pit (m)=	1.50
Breadth of Trial Pit (m)=	0.45
No of runs	3
Pipe upstand (m)	

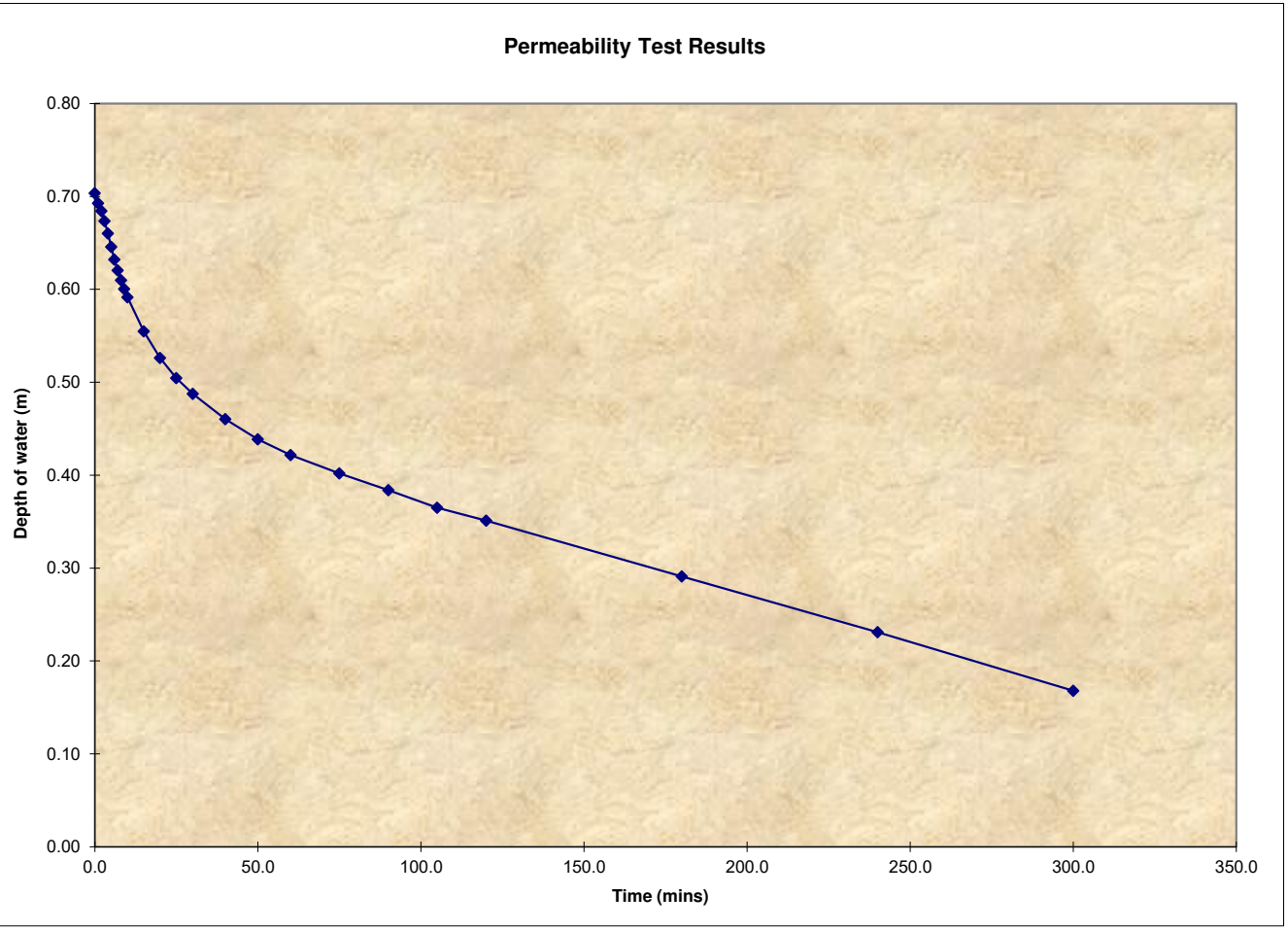
Time of Emptying of Soakaway
(Values to be checked on chart)

% Full	25% Empty	50% Empty	75% Empty
Depth of Water (m)	0.5276	0.3517	0.1759
Time (mins)	20	119	293

Gravel fill	Yes
Voids %	45.2

Infiltration Rate
3.2E-06 m/sec

Minutes	Depth of Water (m)	Depth Below E.G.L.(m)	Depth to water (m)
0.0	0.70	0.05	0.047
1.0	0.69	0.06	0.057
2.0	0.68	0.07	0.066
3.0	0.67	0.08	0.077
4.0	0.66	0.09	0.090
5.0	0.65	0.10	0.104
6.0	0.63	0.12	0.118
7.0	0.62	0.13	0.130
8.0	0.61	0.14	0.140
9.0	0.60	0.15	0.150
10.0	0.59	0.16	0.159
15.0	0.55	0.20	0.195
20.0	0.53	0.22	0.224
25.0	0.50	0.25	0.245
30.0	0.49	0.26	0.263
40.0	0.46	0.29	0.290
50.0	0.44	0.31	0.311
60.0	0.42	0.33	0.328
75.0	0.40	0.35	0.348
90.0	0.38	0.37	0.366
105.0	0.37	0.39	0.385
120.0	0.35	0.40	0.399
180.0	0.29	0.46	0.459
240.0	0.23	0.52	0.519
300.0	0.17	0.58	0.582



Run 2

Results from Site Observation

Scheme:	**Sheringham HWRC**
Project	**104494**
Trial Pit No.	TP02
Depth of Trial Pit (m)=	0.75
Length of Trial Pit (m)=	1.50
Breadth of Trial Pit (m)=	0.45
No of runs	3
Pipe upstand (m)	0.000

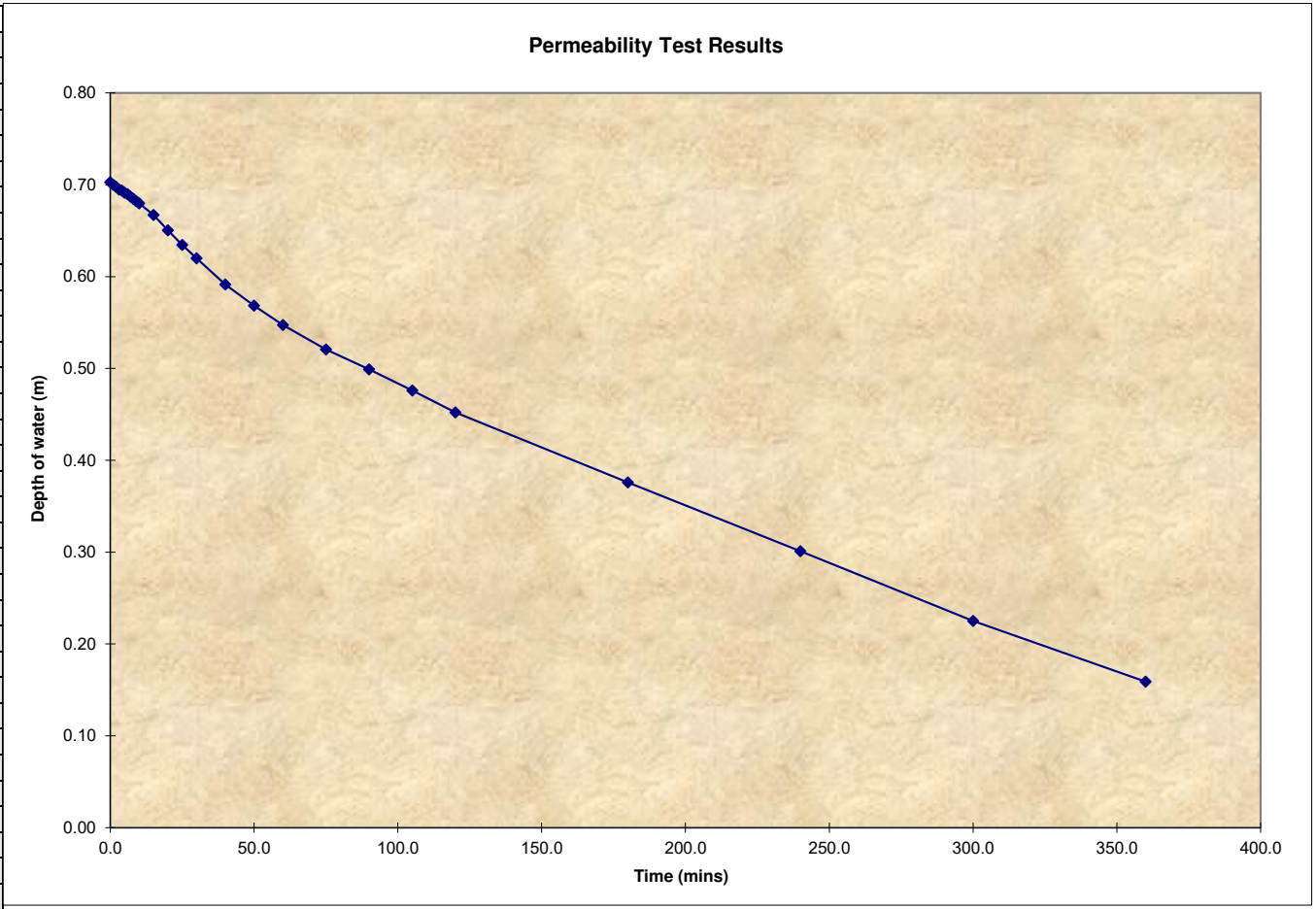
Time of Emptying of Soakaway
(Values to be checked on chart)

% Full	25% Empty	50% Empty	75% Empty
Depth of Water (m)	0.5270	0.3513	0.1757
Time (mins)	72	200	345

Gravel fill	Yes
Voids %	45.2

Infiltration Rate
3.2E-06 m/sec

Minutes	Depth of Water (m)	Depth Below E.G.L.(m)	Depth to water (m)
0.0	0.70	0.05	0.047
1.0	0.70	0.05	0.050
2.0	0.70	0.05	0.052
3.0	0.69	0.06	0.055
4.0	0.69	0.06	0.056
5.0	0.69	0.06	0.059
6.0	0.69	0.06	0.060
7.0	0.69	0.06	0.063
8.0	0.68	0.07	0.065
9.0	0.68	0.07	0.068
10.0	0.68	0.07	0.070
15.0	0.67	0.08	0.083
20.0	0.65	0.10	0.100
25.0	0.63	0.12	0.116
30.0	0.62	0.13	0.130
40.0	0.59	0.16	0.159
50.0	0.57	0.18	0.182
60.0	0.55	0.20	0.203
75.0	0.52	0.23	0.229
90.0	0.50	0.25	0.251
105.0	0.48	0.27	0.274
120.0	0.45	0.30	0.298
180.0	0.38	0.37	0.374
240.0	0.30	0.45	0.449
300.0	0.23	0.53	0.525
360.0	0.16	0.59	0.591



Run 3

Results from Site Observation

Scheme:	**Sheringham**
Project	**104494**
Trial Pit No.	TP02
Depth of Trial Pit (m)=	0.75
Length of Trial Pit (m)=	1.50
Breadth of Trial Pit (m)=	0.45
No of runs	3
Pipe upstand (m)	0.000

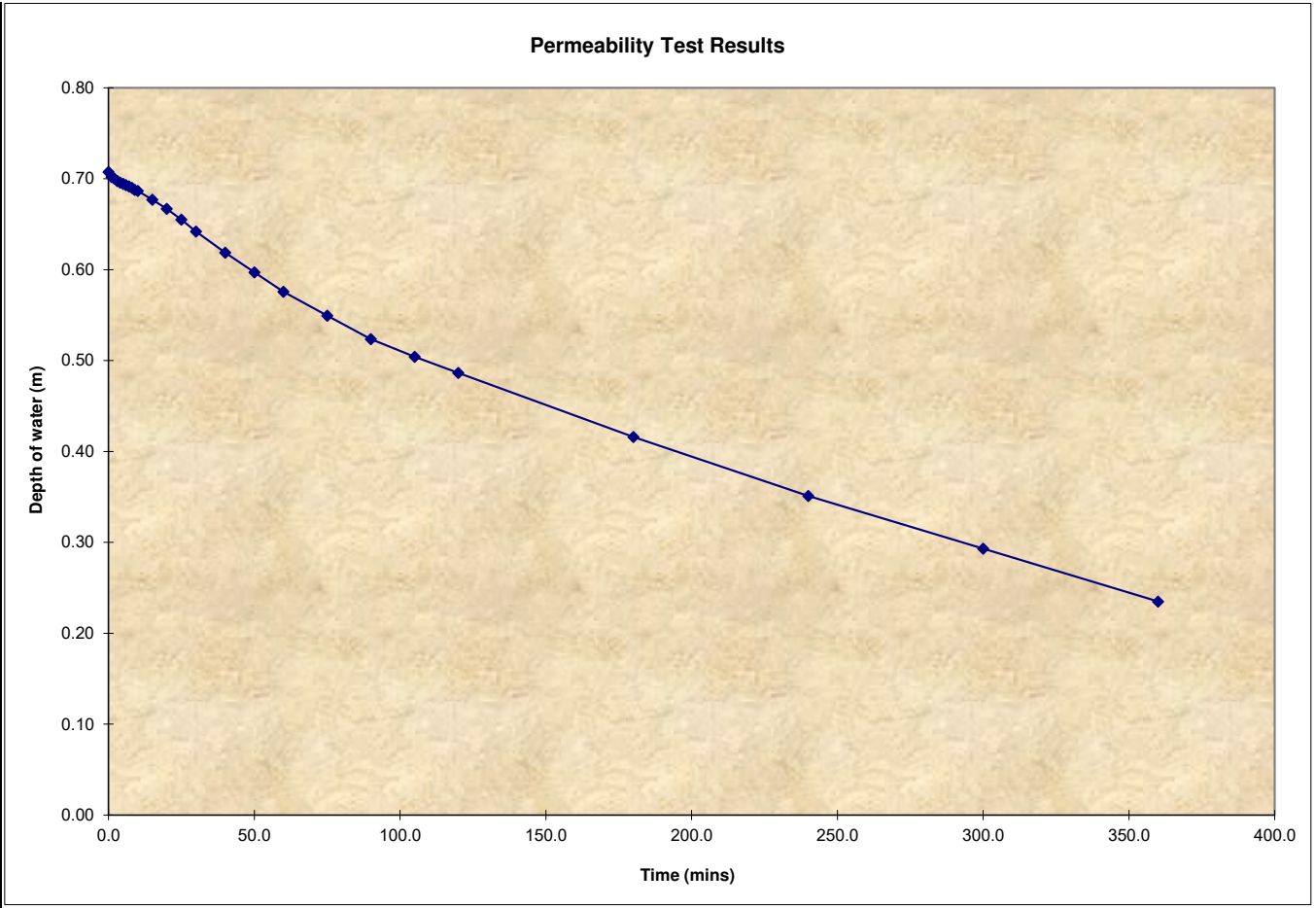
Time of Emptying of Soakaway
(Values to be checked on chart)

% Full	25% Empty	50% Empty	75% Empty
Depth of Water (m)	0.5306	0.3538	0.1769
Time (mins)	86	232	382

Gravel fill	Yes
Voids %	45.2

Infiltration Rate	Mean
3.0E-06	3.1E-06 m/sec

Minutes	Depth of Water (m)	Depth Below E.G.L.(m)	Depth to water (m)
0.0	0.71	0.04	0.043
1.0	0.70	0.05	0.048
2.0	0.70	0.05	0.050
3.0	0.70	0.05	0.053
4.0	0.70	0.05	0.054
5.0	0.69	0.06	0.056
6.0	0.69	0.06	0.057
7.0	0.69	0.06	0.058
8.0	0.69	0.06	0.060
9.0	0.69	0.06	0.062
10.0	0.69	0.06	0.063
15.0	0.68	0.07	0.073
20.0	0.67	0.08	0.083
25.0	0.66	0.09	0.095
30.0	0.64	0.11	0.108
40.0	0.62	0.13	0.131
50.0	0.60	0.15	0.153
60.0	0.58	0.17	0.174
75.0	0.55	0.20	0.201
90.0	0.52	0.23	0.227
105.0	0.50	0.25	0.246
120.0	0.49	0.26	0.264
180.0	0.42	0.33	0.334
240.0	0.35	0.40	0.399
300.0	0.29	0.46	0.457
360.0	0.24	0.52	0.515



Run 1

Results from Site Observation

Scheme:	**Sheringham HWRC**
Project No	**104494**
Trial Pit No.	TP03
Depth of Trial Pit (m)=	0.75
Length of Trial Pit (m)=	1.50
Breadth of Trial Pit (m)=	0.45
No of runs	3
Pipe upstand (m)	

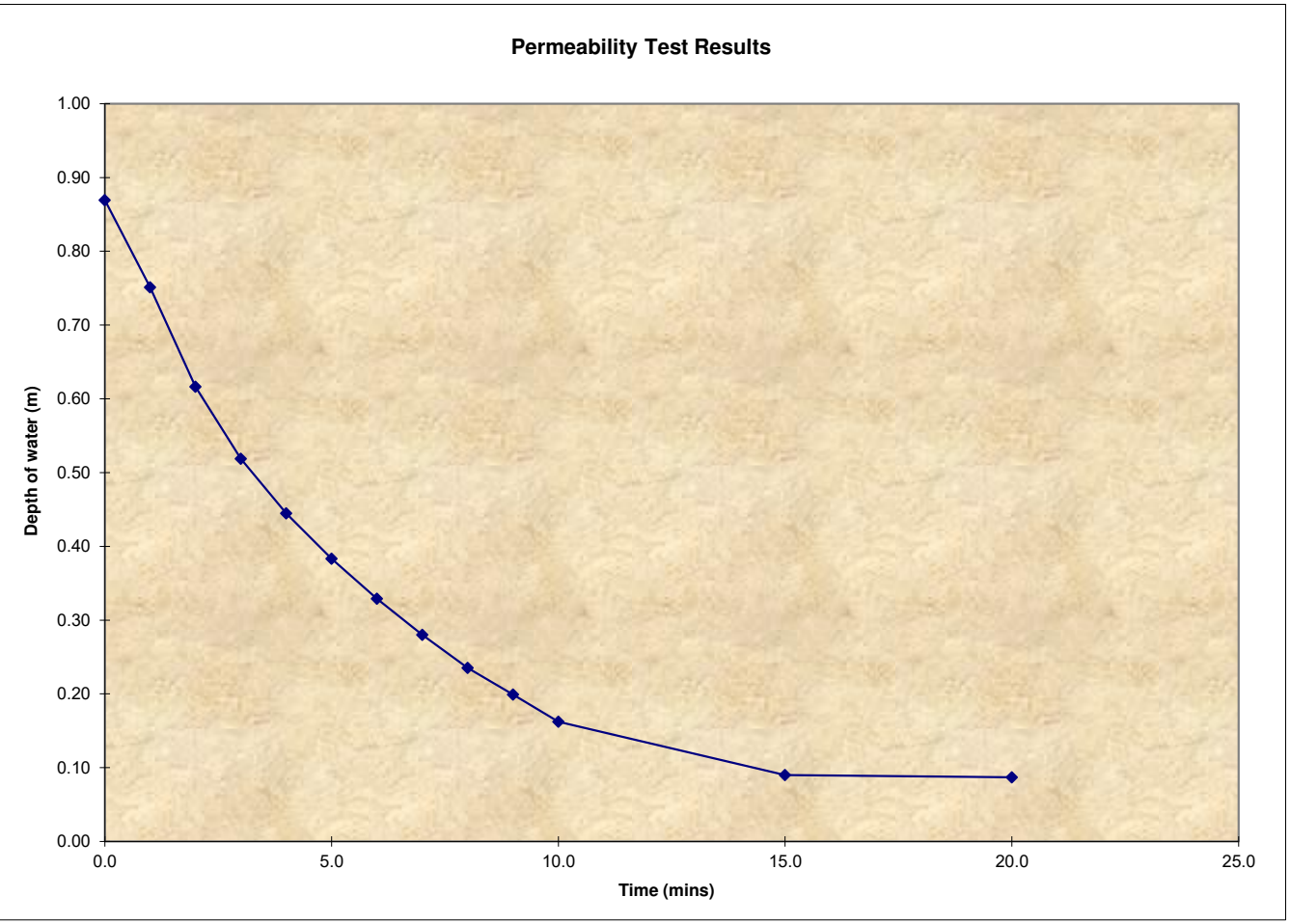
Time of Emptying of Soakaway
(Values to be checked on chart)

% Full	25% Empty	50% Empty	75% Empty
Depth of Water (m)	0.6521	0.4347	0.2174
Time (mins)	2	4	8

Gravel fill	Yes
Voids %	45.2

Infiltration Rate
1.4E-04 m/sec

Minutes	Depth of Water (m)	Depth Below E.G.L.(m)	Depth to water (m)
0.0	0.87	-0.12	-0.119
1.0	0.75	0.00	-0.001
2.0	0.62	0.13	0.134
3.0	0.52	0.23	0.231
4.0	0.44	0.31	0.305
5.0	0.38	0.37	0.367
6.0	0.33	0.42	0.421
7.0	0.28	0.47	0.470
8.0	0.24	0.51	0.515
9.0	0.20	0.55	0.551
10.0	0.16	0.59	0.588
15.0	0.09	0.66	0.660
20.0	0.09	0.66	0.663



Run 2

Results from Site Observation

Scheme:	**Sheringham HWRC**
Project	**104494**
Trial Pit No.	TP03
Depth of Trial Pit (m)=	0.75
Length of Trial Pit (m)=	1.50
Breadth of Trial Pit (m)=	0.45
No of runs	3
Pipe upstand (m)	0.000

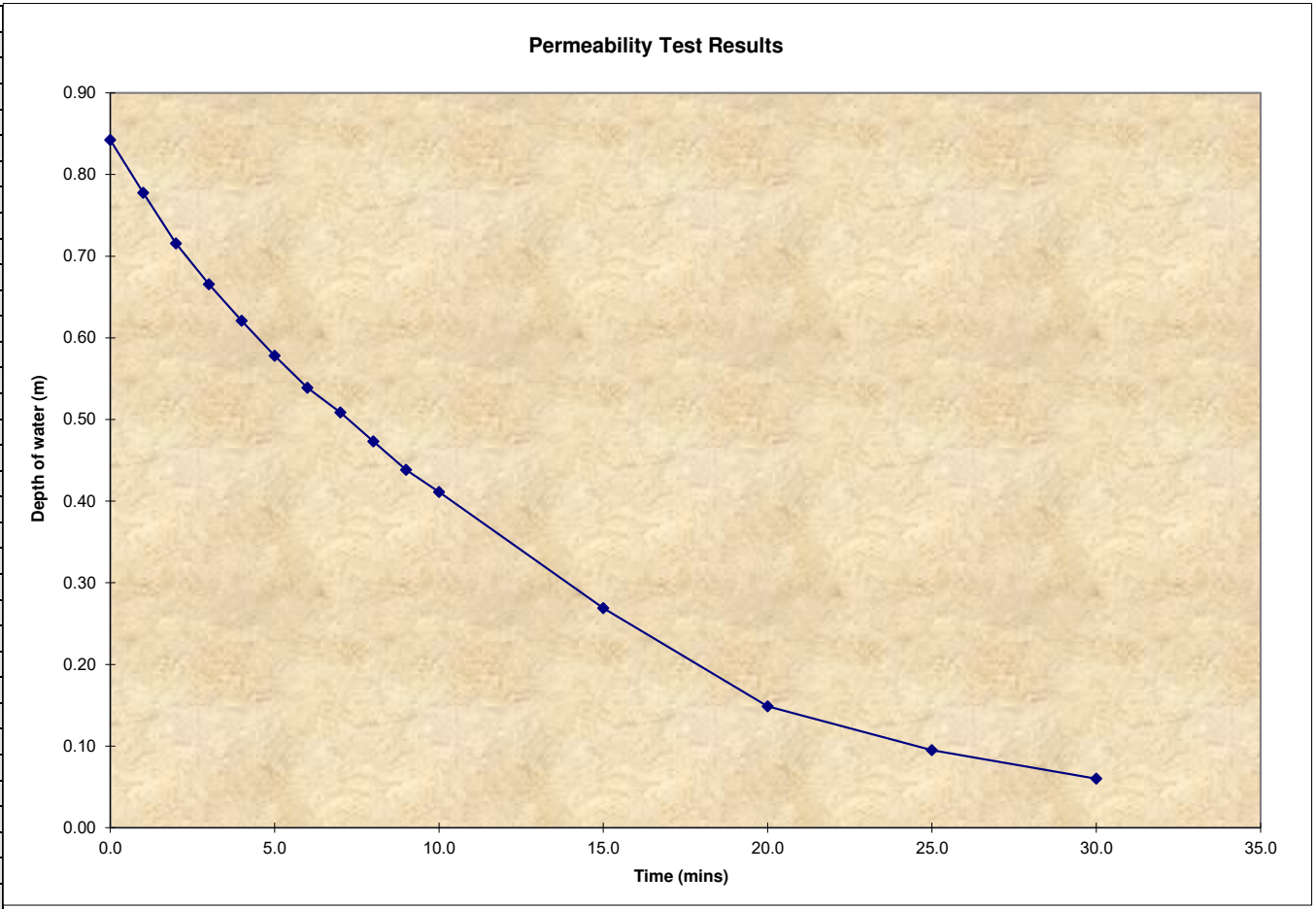
Time of Emptying of Soakaway
(Values to be checked on chart)

% Full	25% Empty	50% Empty	75% Empty
Depth of Water (m)	0.6317	0.4212	0.2106
Time (mins)	4	10	17

Gravel fill	Yes
Voids %	45.2

Infiltration Rate
6.8E-05 m/sec

Minutes	Depth of Water (m)	Depth Below E.G.L.(m)	Depth to water (m)
0.0	0.84	-0.09	-0.092
1.0	0.78	-0.03	-0.028
2.0	0.72	0.03	0.034
3.0	0.67	0.08	0.085
4.0	0.62	0.13	0.129
5.0	0.58	0.17	0.172
6.0	0.54	0.21	0.211
7.0	0.51	0.24	0.241
8.0	0.47	0.28	0.277
9.0	0.44	0.31	0.312
10.0	0.41	0.34	0.339
15.0	0.27	0.48	0.481
20.0	0.15	0.60	0.601
25.0	0.10	0.65	0.655
30.0	0.06	0.69	0.690



Run 3

Results from Site Observation

Scheme:	**Sheringham**
Project	**104494**
Trial Pit No.	TP03
Depth of Trial Pit (m)=	0.75
Length of Trial Pit (m)=	1.50
Breadth of Trial Pit (m)=	0.45
No of runs	3
Pipe upstand (m)	0.000

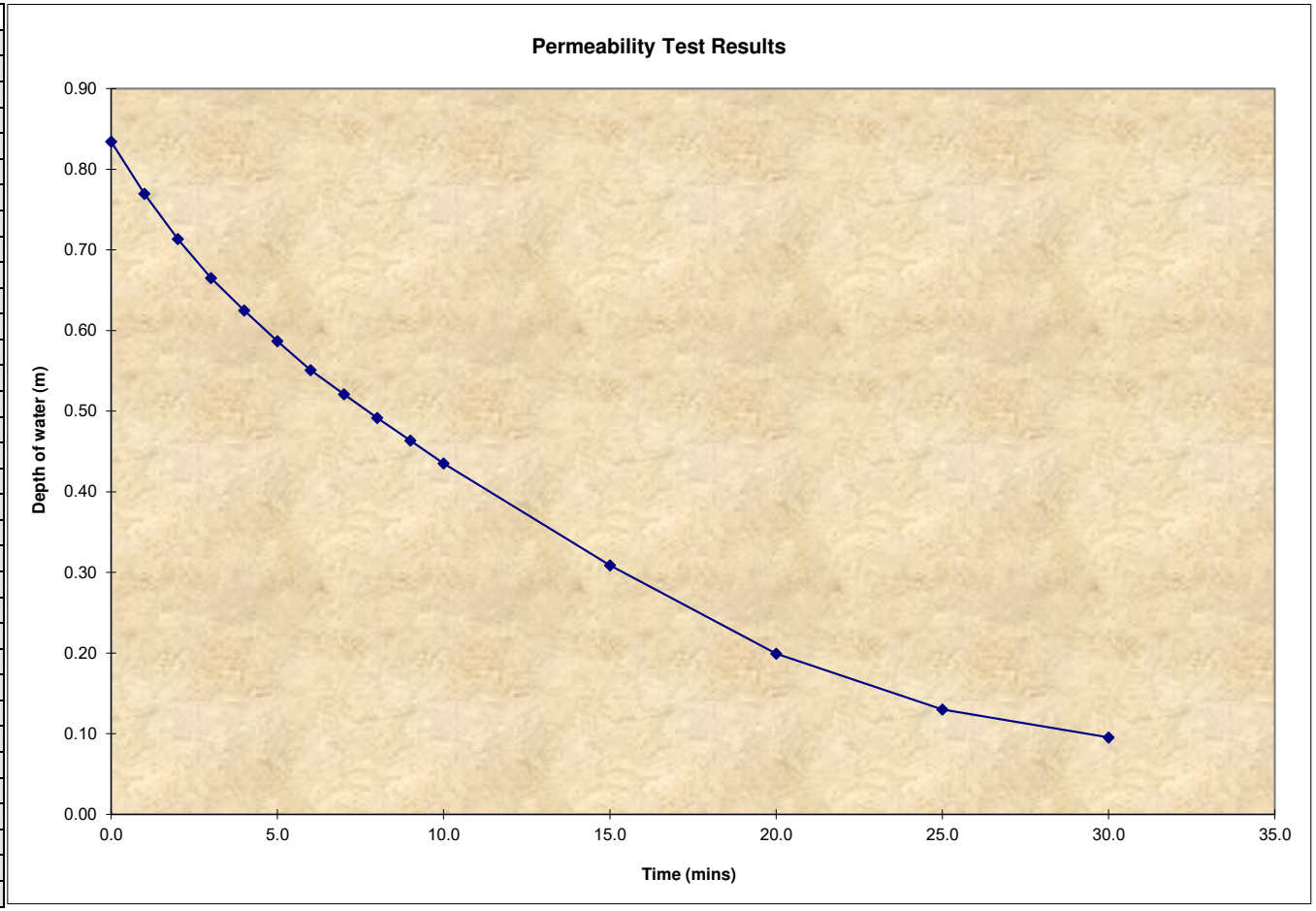
Time of Emptying of Soakaway
(Values to be checked on chart)

% Full	25% Empty	50% Empty	75% Empty
Depth of Water (m)	0.6257	0.4172	0.2086
Time (mins)	4	11	20

Gravel fill	Yes
Voids %	45.2

Infiltration Rate	Mean
5.9E-05	7.7E-05 m/sec

Minutes	Depth of Water (m)	Depth Below E.G.L.(m)	Depth to water (m)
0.0	0.83	-0.08	-0.084
1.0	0.77	-0.02	-0.020
2.0	0.71	0.04	0.037
3.0	0.67	0.08	0.085
4.0	0.62	0.13	0.125
5.0	0.59	0.16	0.163
6.0	0.55	0.20	0.199
7.0	0.52	0.23	0.229
8.0	0.49	0.26	0.258
9.0	0.46	0.29	0.286
10.0	0.44	0.31	0.315
15.0	0.31	0.44	0.441
20.0	0.20	0.55	0.551
25.0	0.13	0.62	0.620
30.0	0.10	0.65	0.655



Run 1

Results from Site Observation

Scheme:	**Sheringham HWRC**
Project No	**104494**
Trial Pit No.	TP04
Depth of Trial Pit (m)=	1.00
Length of Trial Pit (m)=	1.50
Breadth of Trial Pit (m)=	0.45
No of runs	3
Pipe upstand (m)	

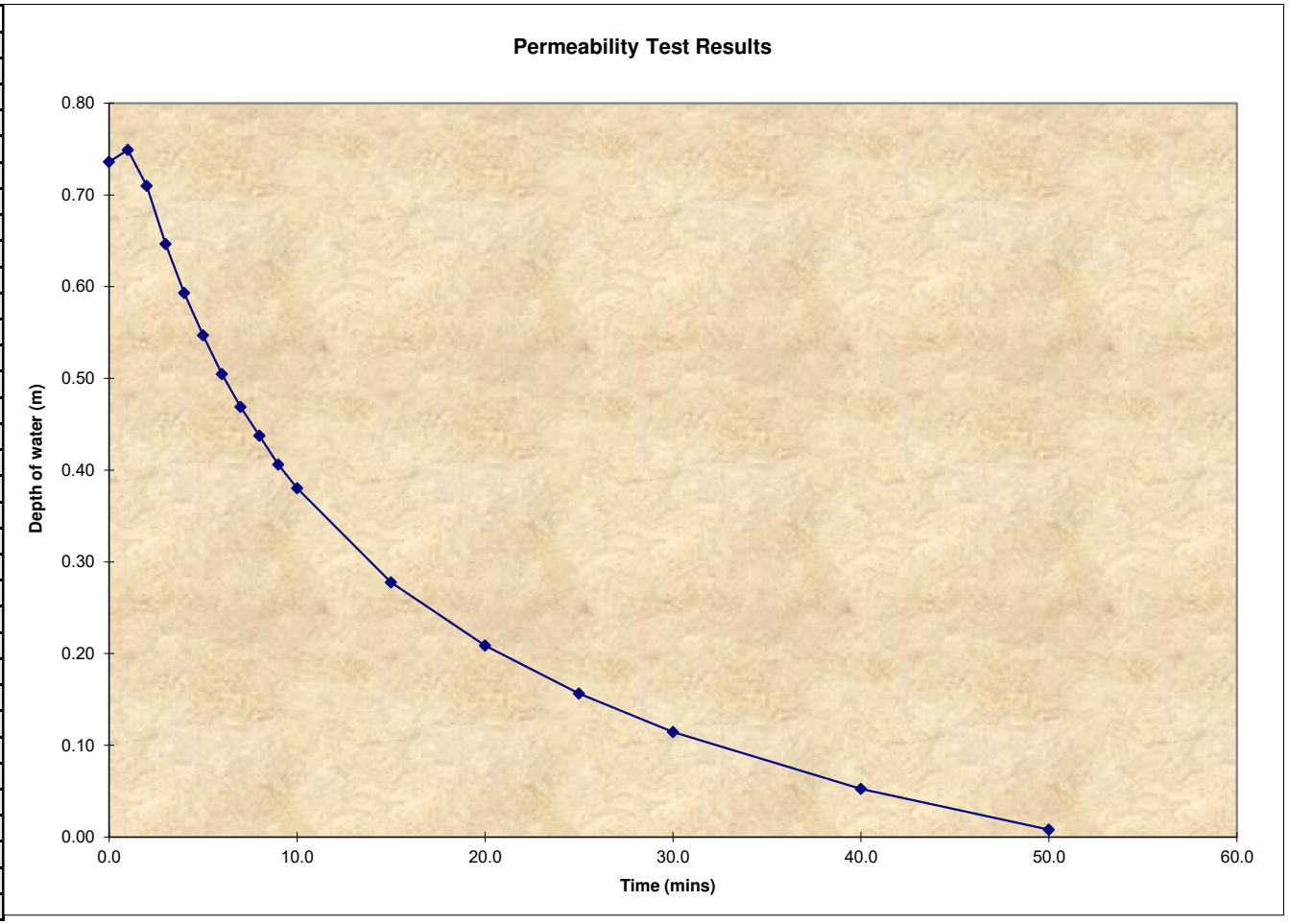
Time of Emptying of Soakaway
(Values to be checked on chart)

% Full	25% Empty	50% Empty	75% Empty
Depth of Water (m)	0.5519	0.3680	0.1840
Time (mins)	5	11	22

Gravel fill	Yes
Voids %	45.2

Infiltration Rate
5.1E-05 m/sec

Minutes	Depth of Water (m)	Depth Below E.G.L.(m)	Depth to water (m)
0.0	0.74	0.26	0.264
1.0	0.75	0.25	0.251
2.0	0.71	0.29	0.290
3.0	0.65	0.35	0.354
4.0	0.59	0.41	0.407
5.0	0.55	0.45	0.453
6.0	0.50	0.50	0.495
7.0	0.47	0.53	0.531
8.0	0.44	0.56	0.563
9.0	0.41	0.59	0.594
10.0	0.38	0.62	0.620
15.0	0.28	0.72	0.722
20.0	0.21	0.79	0.791
25.0	0.16	0.84	0.844
30.0	0.11	0.89	0.886
40.0	0.05	0.95	0.948
50.0	0.01	0.99	0.992



Run 2

Results from Site Observation

Scheme:	**Sheringham HWRC**
Project	**104494**
Trial Pit No.	TP04
Depth of Trial Pit (m)=	1.00
Length of Trial Pit (m)=	1.50
Breadth of Trial Pit (m)=	0.45
No of runs	3
Pipe upstand (m)	0.000

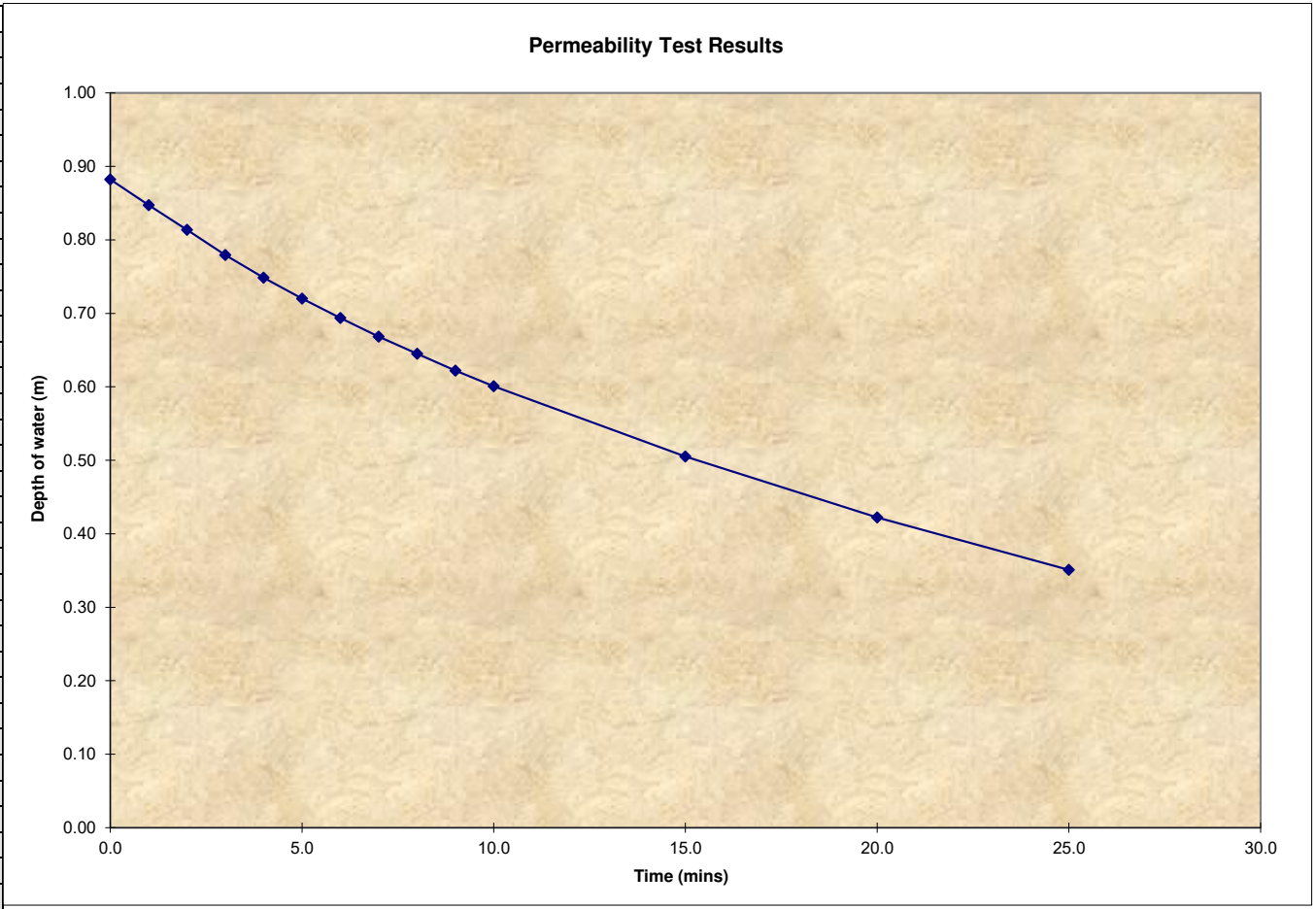
Time of Emptying of Soakaway
(Values to be checked on chart)

% Full	25% Empty	50% Empty	75% Empty
Depth of Water (m)	0.6617	0.4411	0.2206
Time (mins)	7	19	34

Gravel fill	Yes
Voids %	45.2

Infiltration Rate
3.5E-05 m/sec

Minutes	Depth of Water (m)	Depth Below E.G.L.(m)	Depth to water (m)
0.0	0.88	0.12	0.118
1.0	0.85	0.15	0.153
2.0	0.81	0.19	0.187
3.0	0.78	0.22	0.221
4.0	0.75	0.25	0.251
5.0	0.72	0.28	0.280
6.0	0.69	0.31	0.306
7.0	0.67	0.33	0.332
8.0	0.64	0.36	0.355
9.0	0.62	0.38	0.378
10.0	0.60	0.40	0.399
15.0	0.51	0.49	0.495
20.0	0.42	0.58	0.578
25.0	0.35	0.65	0.649



Run 3

Results from Site Observation

Scheme:	**Sheringham**
Project	**104494**
Trial Pit No.	TP04
Depth of Trial Pit (m)=	1.00
Length of Trial Pit (m)=	1.50
Breadth of Trial Pit (m)=	0.45
No of runs	3
Pipe upstand (m)	0.000

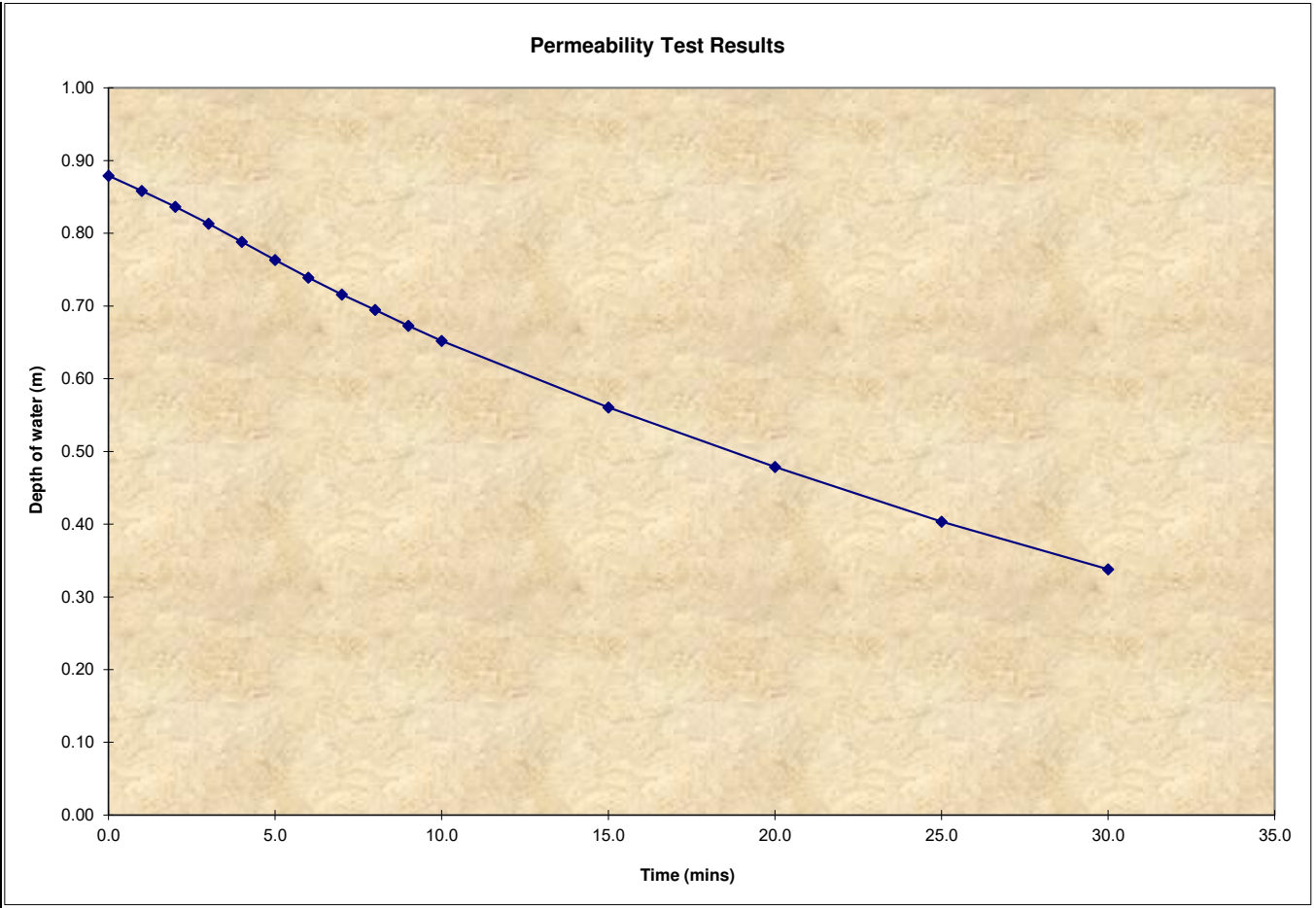
Time of Emptying of Soakaway
(Values to be checked on chart)

% Full	25% Empty	50% Empty	75% Empty
Depth of Water (m)	0.6594	0.4396	0.2198
Time (mins)	10	23	39

Gravel fill	Yes
Voids %	45.2

Infiltration Rate	Mean
3.2E-05	3.8E-05 m/sec

Minutes	Depth of Water (m)	Depth Below E.G.L.(m)	Depth to water (m)
0.0	0.88	0.12	0.121
1.0	0.86	0.14	0.142
2.0	0.84	0.16	0.163
3.0	0.81	0.19	0.187
4.0	0.79	0.21	0.212
5.0	0.76	0.24	0.237
6.0	0.74	0.26	0.261
7.0	0.72	0.28	0.284
8.0	0.69	0.31	0.305
9.0	0.67	0.33	0.327
10.0	0.65	0.35	0.348
15.0	0.56	0.44	0.439
20.0	0.48	0.52	0.521
25.0	0.40	0.60	0.597
30.0	0.34	0.66	0.662



Appendix J Ground Investigation at Existing Sheringham Waste Recycling Centre (June 2009)

Norfolk County Council
at your service

Prepared by:
Norfolk Partnership Laboratory, County Hall, Martineau Lane, Norwich, Norfolk, NR1 2SG
Telephone (01603) 222416

Site Investigation
Sheringham HWRC
Norfolk
LAB0000724
June 2009

Client:
Environment & Waste
Planning & Transportation
County Hall
Norwich
Norfolk
NR1 2SG

i) Contents

Appendices

Appendix A Site location plan

Appendix B Geology map

Appendix C Window Sample and Dynamic Probe logs and Equivalent SPT 'N'Values graph

Appendix D Chain of custody sheets and contamination test reports

ii) Distribution

Environment & Waste, Norfolk County Council	2 copies
Mott MacDonald	1 copy
Norfolk Partnership Laboratory	1 copy

1.0 Introduction

1.1 General

This report by Norfolk Partnership Laboratory was instigated at the request of Mr M Kurek of Norfolk County Council Planning & Transportation Programme Management. Norfolk Partnership Laboratory provides a service within the Highways Operations Group of the Department of Planning and Transportation of Norfolk County Council.

It is proposed to construct new welfare facilities within the existing household waste recycling centre. This will include a flushing toilet and foul water storage.

1.2 Report objectives

The objectives of these works are to assess whether any contamination may be present either within the site boundaries or just outside the site. Standard contamination testing has been undertaken to ascertain if the site poses a risk to the construction worker or the end user. In addition Waste Acceptance Criteria testing has been carried out to allow any surplus soil to be disposed of to a suitable licensed facility. The report also provides geotechnical parameters for building foundations.

In addition this report investigated issues highlighted by the initial desk study titled "Sheringham Desk Study Report, Report No. 233904/0A18" dated October 2008 undertaken by Messrs Mott MacDonald, Sheffield.

1.3 Site location

The site lies on land approximately 20 metres to the north of the A148 Holt Road and approximately 2 kilometres south of Sheringham town centre (OSGR 616223 / 341009). Sheringham is located approximately 35 kilometres to the north of Norwich city centre. The area of the site is approximately 90 metres above Ordnance Survey Datum.

A site location plan is given in Appendix A of this report.

1.4 Site layout

The site is a household waste recycling centre consisting of a temporary cabin, several large skips and numerous bins / containers. The site is rectangular in shape and covers an area of approximately 0.08 hectares. The site is accessed from the northern side of the site.

1.5 Planning application

The site is subject to North Norfolk District Council planning conditions.

2.0 Geology

The geology of the region may be summarised as follows:

Recent	: Made Ground
	: Head
Pleistocene	: Corton Formation
	: Lowestoft Till
	: Norwich Crag
Cretaceous	: Upper Chalk

Upper Chalk is a soft white or off white limestone that contains flints. Chalk was deposited in a warm sea close to a low lying landmass that remained free from the deposition of detritus for a long period of time.

The **Norwich Crag** was formed when, after a long period of standing above sea level, the area was submerged by a marine transgression caused by movements of the sea floor during a period of coastal instability in the region. The deposits are a variable series of yellowish or reddish brown sands, laminated clays and pebbly gravels. In places they are highly fossiliferous, shell fragments being especially prolific. The thickness of these deposits are variable between 5 and 60 metres.

Lowestoft Till is a heterogeneous mass of rock fragments, mainly chalk and flint, but with some material from further afield, suspended in a groundmass of grey sand, silt and clay which is usually derived from local sources. The glaciers which formed this material advanced from the west or north-west.

The **Corton Formation** which incorporates the **Overstrand Sand and Gravels** and the **Britons Lane Sands** is probably glacio-marine in origin and comprises of orange to buff, mostly fine grained sand with subordinate gravel, often gravely towards the base. A widespread sandy clay or till occurs at the base and is known as the **Cromer Till** in North Norfolk.

Head comprises poorly sorted and poorly stratified deposits formed by the mass movement of superficial materials on sloping ground. The mass movement processes include hillwash and soil creep as well as solifluction, an important mode of sediment transport in preglacial conditions. Head occurs as a veneer up to a metre or so thick lining the floors and/or lower flanks of the tributary valleys of the district. Head ranges from yellow-brown to dark brown to grey-black and comprises mainly sand with varying proportions of clay, silt, gravel of pebble grade (mostly flint) and sporadic larger rock clasts.

A geology report can be found in Appendix B.

3.0 Fieldwork

3.1 Investigation Objectives

The aim of this investigation was to determine whether any contamination exists on the site and to obtain geotechnical information. In the event of contamination being found then it should be quantified as far as possible.

3.2 Preparatory Enabling Works

Diamond coring holes were undertaken through the existing intact concrete surfacing.

3.3 Works undertaken

On the 26 March 2009 three window sample holes were undertaken to a maximum depth of 4.00 metres and one dynamic probe to a maximum depth of 7.90 metres. In addition a permanent water / gas monitoring point was installed in WS 1.

The locations of these investigative holes are shown in Appendix A.

3.4 Site Investigation Strategy

The site investigation was to target the area of the proposed new welfare facility and cess pool to obtain geotechnical and geoenvironmental information.

Hole ID	Reason for location
WS 1	Possible contamination, water / gas monitoring point / geotechnical
WS 2	Possible contamination / geotechnical
DP 3	Foundation design
WS 4	Geotechnical

3.5 Site Sampling Strategy

A number of disturbed samples were taken from the holes in accordance with BS 5930: 1999. The number and depths of these samples along with the details of thickness of strata encountered are set out in Appendix C of this report.

3.6 In-situ and Geotechnical Testing

Dynamic probing was undertaken in accordance with BS 5930 to gather information for the foundation design.

3.7 Pollution prevention measures

No particular pollution prevention measures were required on this site. No material was removed with the exception of samples for testing. Due diligence was employed to prevent any possible cross contamination of material. The window sample holes that did not contain permanent water / gas monitoring points and the dynamic probe hole were backfilled with bentonite and capped with concrete.

4.0 Investigation Results

4.1 Ground conditions

4.1.1 Surface Deposits

Concrete was recorded as the surface deposit in all window sample holes to a maximum recorded depth of 230 mm. Testing on similar grade concrete cores from household waste recycling centre locations reveal the concrete to have a strength in the region of 50 N/mm^2.

4.1.2 Made Ground

Made Ground was recorded beneath the concrete in all window sample holes. The deposit comprised fine, medium and coarse concrete and flint gravel in a matrix of grey fine, medium and coarse sand. A geogrid was noted at the base of the Made Ground in WS's 1 and 2.

The thickest Made Ground deposit revealed in WS 2 was 320mm. The base of the Made Ground was proven in all window sample holes at a maximum recorded depth of 0.55 metre.

Equivalent SPT 'N' Values indicate the sub base material to be very loose.

4.1.3 Head

No Head deposits were positively identified during this investigation.

4.1.4 Corton Formation

The Corton Formation was recorded in all window sample holes. This material was encountered in the form of Britons Lane Sands and Gravels. This deposit varied with predominantly sands recorded. Silty sand, sandy silty clay and silt were also noted within this deposit. The clay horizon noted in WS 4 was firm in strength. Colours recorded included beige, brown, light brown, orangey brown and yellowish brown. Clast content within the horizon ranged from none to much of fine and medium flint gravel. The deposit was revealed at depths of 0.45 metre in WS 1 up to 0.55 metre in WS 2 and was not proven in any of the window sample holes.

Problems may occur with the excavation of pipe runs or manholes in these materials. There may be a risk of collapse in deeper excavations. It is possible that water seepages may occur within this material.

Equivalent SPT 'N' Values generally classify the material as medium dense. Dense material is encountered between depths of 3 and 5 metres. It should be noted that some of the shallower material within this deposit classifies as loose. More detail can be seen on the Equivalent SPT 'N' Value graphs in Appendix C.

4.1.5 Lowestoft Till

No Lowestoft Till was positively identified during this investigation.

4.1.6 Norwich Crag

No Norwich Crag was positively identified during this investigation.

4.1.7 Upper Chalk

No Upper Chalk was positively identified during this investigation.

4.2 Surface water and groundwater conditions

No groundwater strikes were recorded during the investigation.

Groundwater levels were subsequently monitored in the permanent installation in WS 1. These results can be seen tabulated below.

Location	**02/04/09**	**09/04/09**
Depth below ground level (m)		
WS1	Dry	Dry

5.0 Contamination Investigation

The following soil samples were tested for the parameters shown.

Location	Depth (m)	Tests
WS 1	0.50	Suite SB
WS 2	0.60	Suite SB
WS 2	0.60	Waste Acceptance Criteria B

Suite SB = General contamination suite including testing for: Total Sulphate, Boron, Water Soluble, Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Zinc, Acid Soluble Sulphide, Phenols (Monohydric), Total Cyanide, Elemental Sulphur, pH Value, PAH Total.

5.1 Soil Test results summary

The samples indicated in Section 5.0 were sent to ALcontrol Geochem for testing.

Chain of custody sheets and test results are included in Appendix D.

These samples were tested for the contaminants of concern.

Parameter	Minimum	Maximum	Units + LOD
Total Sulphate	<100	210	<100 mg/kg
Boron Water Soluble	<3.5	<3.5	<3.5mg/kg
Arsenic	5	5	<3 mg/kg
Cadmium	<0.2	0.2	<0.2 mg/kg
Chromium	5.4	7.3	<4.5mg/kg
Copper	<6	<6	<6mg/kg
Lead	6	8	<2 mg/kg
Mercury	<0.4	<0.4	<0.4 mg/kg
Nickel	6.1	6.4	<0.9 mg/kg
Selenium	<3	<3	<3 mg/kg
Zinc	8.9	15	<2.5 mg/kg
Easily Liberated Sulphide	<15	<15	<15 mg/kg
Total Organic Carbon	<0.2	<0.2	<0.2%
Phenols Monohydric	<0.15	<0.15	<0.15mg/kg
Total Cyanide	<1	<1	<1 mg/kg
Elemental Sulphur	<70	<70	<70 mg/kg
pH Value	8.36	8.79	<1.00 pH Units
Mineral Oil	11	11	<1 mg/kg
PAH Total 17 (inc Coronene)	<10	<10	<10 mg/kg
Naphthalene	<9	<9	<9 ug/kg
Acenaphthylene	<12	15	<12 ug/kg
Acenaphthene	<8	<8	<8 ug/kg
Fluorene	<10	<10	<10 ug/kg
Phenanthrene	<15	43	<15 ug/kg
Anthracene	<16	17	<16ug/kg

Fluoranthene	<17	120	<17 ug/kg
Pyrene	<15	110	<15 ug/kg
Benz(a)anthracene	<14	66	<14 ug/kg
Chrysene	<10	66	<10 ug/kg
Benzo(b)fluoranthene	<15	70	<15 ug/kg
Benzo(k)fluoranthene	<14	41	<14 ug/kg
Benzo(a)pyrene	<15	59	<15 ug/kg
Indeno(123cd)pyrene	<18	48	<18 ug/kg
Dibenzo(ah)anthracene	<23	<23	<23 ug/kg
Benzo(ghi)perylene	<24	70	<24 ug/kg
PAH 16 Total	<118	720	<118ug/kg

All the samples tested were found to be within Atkins Atrisk SSV's derived using CLEA Version 1.04 guidance thresholds for commercial development. It is therefore concluded that the material poses no risk to the construction worker or the end user.

The Waste Acceptance Criteria testing undertaken from WS 2 indicates that the material can be removed from site under the classification of inert material.

Chain of custody sheets and test results are included in Appendix D.

5.2 Naturally occurring gases

	02/04/09				09/04/2009			
Test Location	Pressure (mb)	O_2 (%)	$C0_2$ (%)	CH_4 (%)	Pressure (mb)	O_2 (%)	$C0_2$ (%)	CH_4 (%)
WS1	1011	20.7	0.0	0.0	997	19.5	0.7	0.0

Although measured no methane or flow was recorded.

Carbon Dioxide

The maximum recorded Carbon Dioxide reading was 0.7%.

Using Ciria report C665; Table 8.5 and the worst case reading of 0.7% CO_2 the site can be classified as characteristic situation 1. This is indicative of negligible gas regime and requires no protection measures.

In accordance with C665 the Gas Screening Value (GSV) is calculated by multiplying the maximum recorded gas concentration by the maximum flow rate recorded. No flow was recorded. Therefore the limit of detection value 0.1 l/hr on the gas detector is used in the subsequent calculation.

GSV = 0.007 x 0.1 = 0.0007 l/hr

This is indicative of negligible gas regime and requires no gas protection measures.

6.0 Recommendations

6.1 Foundation Design

It is recommended that the designers investigate the possibility of re using the intact concrete slab insitu. A new concrete plinth could be constructed on top of the existing slab to reduce the risk of differential settlement occurring at the joints. Construction would be carried out from this plinth. If the design allows it may be possible to tailor the construction to be situated on individual concrete slabs. Alternatively design detail may be altered to reduce imposed loads from the proposed building. The advantages of this method are numerous, they include

1) Cost saving on construction of raft foundation.
2) No requirement to penetrate through slab to area with potential Methane and Carbon Dioxide and therefore reduced health and safety risk to construction worker.
3) Low permeability gas membrane can be incorporated within floor screed.
4) No requirement for spoil disposal.
5) Services can be located in surface ducts. Therefore standard materials can be used, ie. PE water service pipe.

6.2 Other information

It may be prudent to undertake a service scan of the site to determine the type and location of all services present.

Norfolk Partnership Laboratory

Site Investigation Section

This report was prepared under the direction of

the Laboratory Manager

.....R. J. Noakes

BSc. C Eng. M.I.C.E

and under the supervision of the

GeoEnvironmental Engineer

.....I D Brown

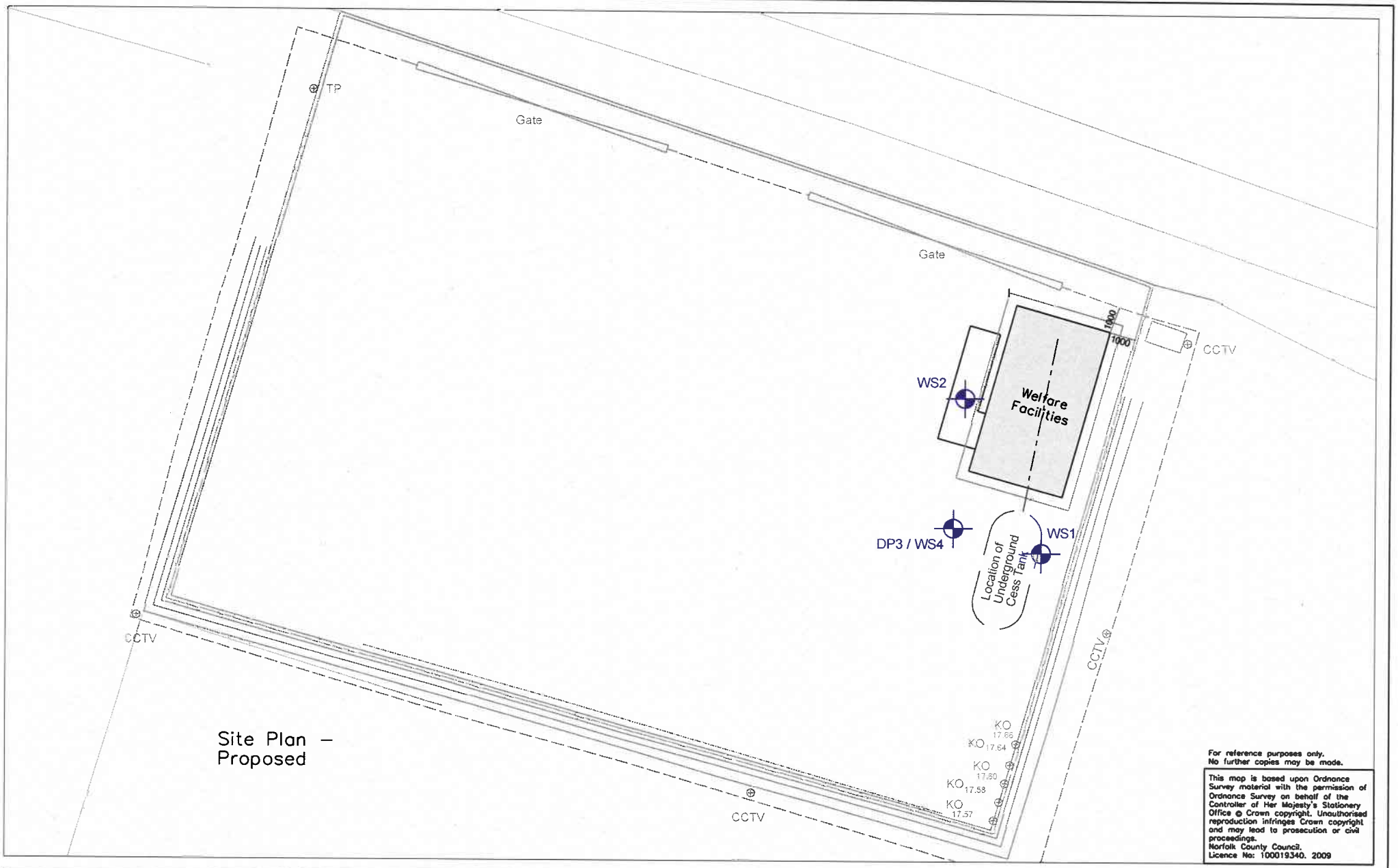
Author of report

Assistant GeoEnvironmental Engineer

.....G J Watson

Date: 12/06/09

APPENDIX A



Site Plan – Proposed

Norfolk County Council
working with
Mott MacDonald
MAYGURNEY

Mike Jackson
Director of Planning and Transportation
Norfolk County Council
County Hall
Martineau Lane
Norwich NR1 2SG

DRAWING TITLE

Window Sample and Dynamic Probe Location Plan
Sheringham Household Waste Recycling Centre

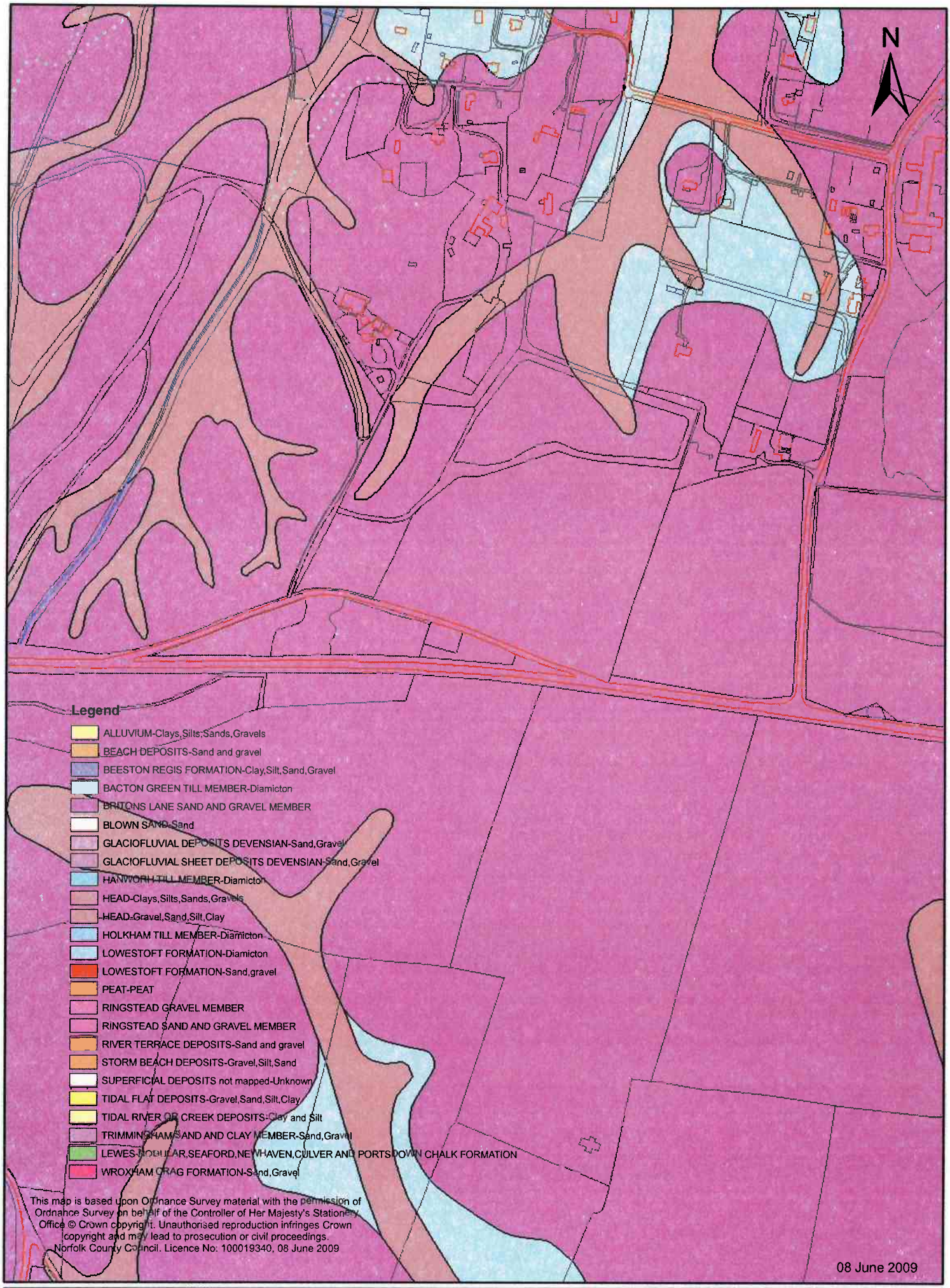
REV.	DESCRIPTION	CHECKED	DATE

	INIT.	DATE
SURVEYED BY	DJ	04/09
DESIGNED BY		
DRAWN BY	GW	06/09
CHECKED BY	IB	06/09

DRAWING No. LAB0000724/001
PROJECT TITLE Sheringham HWRC
SCALE 1:200
FILE No. LAB0000724

ORIGINAL SIZE: A1

APPENDIX B



Sheringham HWRC LAB0000724

Extract from Geological Map

Norfolk County Council

Planning & Transportation GIS

Scale 1: 5000 Centred on 616259 341001

APPENDIX C

NORFOLK PARTNERSHIP LABORATORY

WINDOW SAMPLER LOG

Sheet 1 of 1

Scheme Sheringham HWRC	Job No. LAB0000724	Hole No.	WS1
Carried out for Norfolk County Council	Date Started 26/03/2009	Date Finished	26/03/2009
Diameter 128.0 mm	Type of Sampler Dando Terrier		
Remarks: Dry.	Depth 4.00	Height Unknown	Logged by DJ / Drawn by GJW / Checked by MB
	Co-ords 616236E - 341007N		

Backfill	Water	Description	Legend	Depth (m)	Sample Type	Sample No.	Field Tests	Laboratory Tests: MC%	ρ_s	SO_3	Cl-	pH	Org.	CBR	Other
		CONCRETE				001									
		MADE GROUND : fine, medium and coarse flint and concrete gravel (crushed concrete) in a matrix of grey fine, medium and coarse sand Geogrid at base		0.50											
		Light brown and yellowish brown fine, medium and coarse SAND		1.00		002									
				1.50											
		Brown fine, medium and coarse SAND with laminae of orangey brown silty fine and medium sand													
		Soft orangey brown and brown SILT		2.00		003									
		Beige and light brown fine and medium SAND		2.50											
				3.00		004									
				3.50											
		Brown silty fine and medium SAND													
		End of Window Sampler at 4.00 m		4.00											
				4.50											

FIG 1

NORFOLK PARTNERSHIP LABORATORY

WINDOW SAMPLER LOG

Sheet 1 of 1

Scheme Sheringham HWRC	Job No. LAB0000724	Hole No.	WS2
Carried out for Norfolk County Council	Date Started 26/03/2009	Date Finished	26/03/2009
Diameter 128.0 mm	Type of Sampler Dando Terrier		
Remarks: Dry.	Depth 3.00	Height Unknown	Logged by DJ
	Co-ords 616233E - 341012N		Drawn by GJW
			Checked by MB

Backfill	Water	Description	Legend	Depth (m)	Sample Type	Sample No.	Field Tests	Laboratory Tests MC%	ρ_s	SO_3	Cl-	pH	Org.	CBR	Other
		CONCRETE				001									
		MADE GROUND : fine, medium and coarse concrete and flint gravel (crushed concrete) in a matrix of grey fine, medium and coarse sand Geogrid at base		0.50											
		Orangey brown fine, medium and coarse SAND													
		Beige and light brown fine, medium and coarse SAND		1.00		002									
		Brown fine, medium and coarse SAND with occasional laminae of orangey brown slightly silty fine, medium and coarse sand		1.50											
		Beige and light brown medium and coarse SAND with a little fine and medium rounded subangular flint gravel		2.00		003									
		Orangey brown coarse SAND with much fine and medium rounded to subangular flint gravel		2.50											
		End of Window Sampler at 3.00 m		3.00											
				3.50											
				4.00											
				4.50											

FIG 2

NORFOLK PARTNERSHIP LABORATORY

DYNAMIC PROBE LOG

Sheet 1 of 1

Scheme Sheringham HWRC	Job No. LAB0000724	Borehole No. DP3	
Carried out for Norfolk County Council	Date Started 26/03/2009	Date Finished 26/03/2009	
Dimensions: 50.00 mm	Type of Rig Dando Terrier		
Remarks:	Depth 7.90	Height Unknown	Logged by DJ
	Co-ords 616232E - 341006N		Drawn by GJW
			Checked by MB

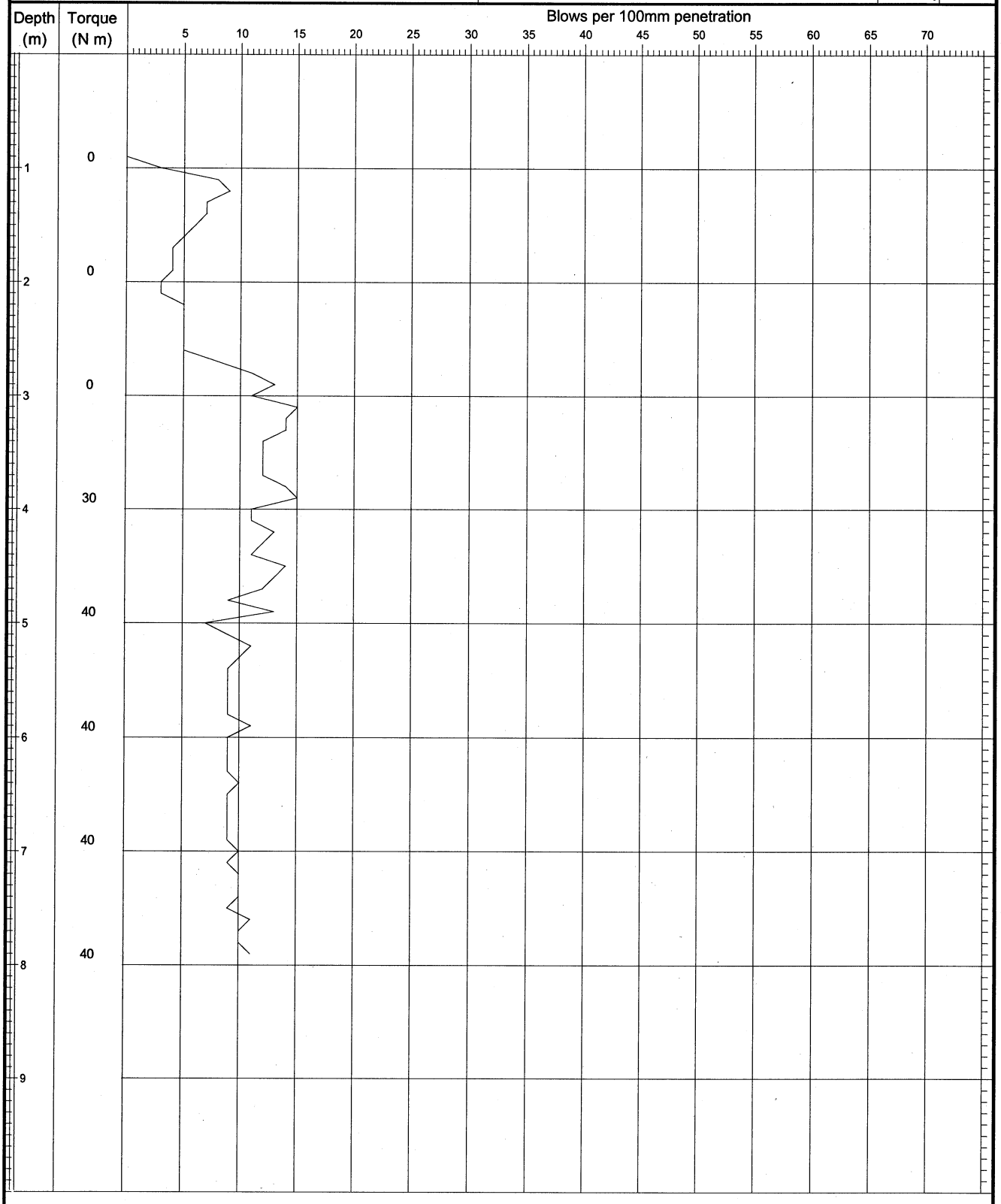
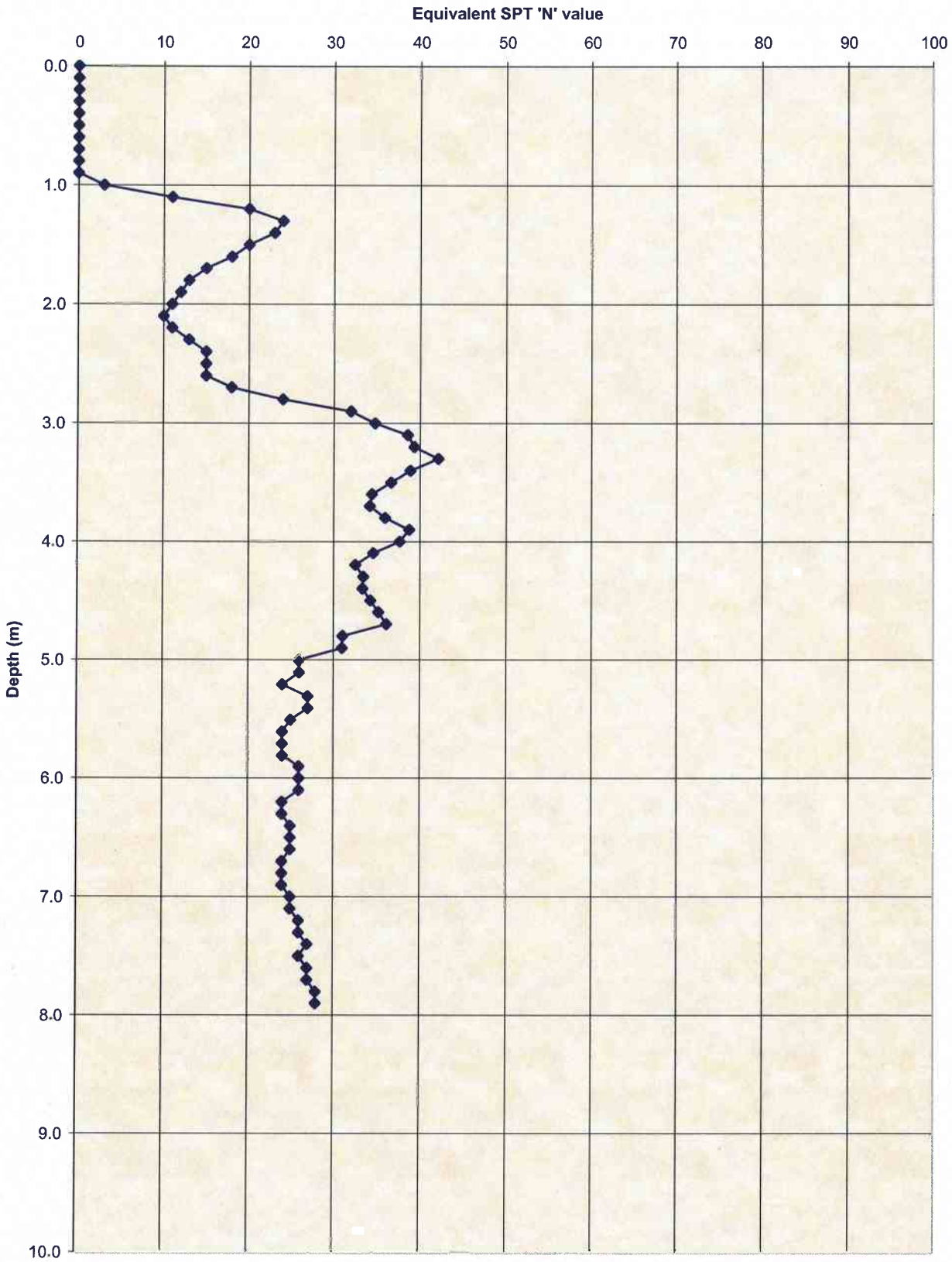


FIG 3

Sheringham HWRC
Dynamic Probe 3



NORFOLK PARTNERSHIP LABORATORY

WINDOW SAMPLER LOG

Sheet 1 of 1

Scheme Sheringham HWRC	Job No. LAB0000724	Hole No.	WS4
Carried out for Norfolk County Council	Date Started 26/03/2009	Date Finished	26/03/2009
Diameter 128.0 mm	Type of Sampler Dando Terrier		
Remarks: Dry.	Depth 1.00	Height Unknown	Logged by DJ
	Co-ords 616232E - 341007N		Drawn by GJW
			Checked by MB

Backfill	Water	Description	Legend	Depth (m)	Sample Type	Sample No.	Field Tests	Laboratory Tests MC%	ρ_s	SO_3	Cl-	pH	Org.	CBR	Other
		CONCRETE				001									
		MADE GROUND : fine, medium and coarse concrete and flint gravel (crushed concrete) in a matrix of grey fine, medium and coarse sand		0.50											
		Orange fine and medium slightly clayey SAND													
		Firm brown and orangey brown very sandy silty CLAY		1.00											
		Yellow fine SAND													
		End of Window Sampler at 1.00 m		1.50											
				2.00											
				2.50											
				3.00											
				3.50											
				4.00											
				4.50											

FIG 4

APPENDIX D

ALcontrol Laboratories Analytical Services
Sample Descriptions

Job Number: 09/04469/02/01
Client: Norfolk County Council
Client Ref : LAB0000724

Grain sizes

<0.063mm	Very Fine
0.1mm - 0.063mm	Fine
0.1mm - 2mm	Medium
2mm - 10mm	Coarse
>10mm	Very Coarse

Sample Identity	Depth (m)	Colour	Grain Size	Description	Batch
WS1	0.5	Brown	0.1mm - 2mm	Sand with some Stones	1
WS2	0.6	Brown	0.1mm - 0.063mm	Silt	1
WS2 - D2	0.6	Brown	0.1mm - 0.063mm	Silt	1

* These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials-whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.
Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.
[1] Sample Description supplied by client

Validated ☑
Preliminary ☐

ALcontrol Laboratories Analytical Services
Table Of Results

ISO 17025 accredited
M MCERTS accredited
* Subcontracted test
» Shown on prev. report

Job Number: 09/04469/02/01 **Matrix:** SOLID
Client: Norfolk County Council **Location:** SHERINGHAM RECYCLING CENTRE
Client Ref. No.: LAB0000724 **Client Contact:** Simon Holden

Sample Identity	WS1	WS2	WS2 - D2							Method Code	LoD/Units
Depth (m)	0.5	0.6	0.6								
Sample Type	SOLID	SOLID	SOLID								
Sampled Date	25.03.09	25.03.09	25.03.09								
Sample Received Date	01.04.09	01.04.09	01.04.09								
Batch	1	1	1								
Sample Number(s)	1-2	3-4	5-6								
Total Sulphate	<100	210	-							TM129#M	<100 mg/kg
Boron Water Soluble	<3.5	<3.5	-							TM129#M	<3.5 mg/kg
Arsenic	5	5	-							TM129#M	<3.0 mg/kg
Cadmium	<0.2	<0.2	-							TM129	<0.2 mg/kg
Chromium	5.4	7.3	-							TM129#M	<4.5 mg/kg
Copper	<6	<6	-							TM129#M	<6 mg/kg
Lead	6	8	-							TM129#M	<2 mg/kg
Mercury	<0.4	<0.4	-							TM129#M	<0.4 mg/kg
Nickel	6.1	6.4	-							TM129#M	<0.9 mg/kg
Selenium	<3	<3	-							TM129#M	<3 mg/kg
Zinc	8.9	15	-							TM129#M	<2.5 mg/kg
Easily Liberated Sulphide	<15	<15	-							TM180#	<15 mg/kg
Total Organic Carbon	-	-	<0.2							TM132#M	<0.2 %
Phenols Monohydric	<0.15	<0.15	-							TM062#M	<0.15 mg/kg
Total Cyanide	<1	<1	-							TM153#M	<1 mg/kg
Elemental Sulphur	<70	<70	-							TM136#M	<70 mg/kg
Loss on Ignition	-	-	1.7							LPH16.4	<0.1 %
pH Value	8.79	8.54	8.36							TM133#M	<1.00 pH Units
Mineral Oil	-	-	11							TM061#	<1 mg/kg
Mineral Oil % Surrogate Recovery	-	-	100							TM061#	%
PAH Total 17 (inc Coronene)	-	-	<10							TM213	<10 mg/kg

All results expressed on a dry weight basis.

Date 09.04.2009

Validated ☑
Preliminary ☐

ALcontrol Laboratories Analytical Services
Table Of Results

ISO 17025 accredited
M MCERTS accredited
* Subcontracted test
» Shown on prev. report

Job Number: 09/04469/02/01 **Matrix:** SOLID
Client: Norfolk County Council **Location:** SHERINGHAM RECYCLING CENTRE
Client Ref. No.: LAB0000724 **Client Contact:** Simon Holden

Sample Identity	WS1	WS2	WS2 - D2							Method Code	LoD/Units
Depth (m)	0.5	0.6	0.6								
Sample Type	SOLID	SOLID	SOLID								
Sampled Date	25.03.09	25.03.09	25.03.09								
Sample Received Date	01.04.09	01.04.09	01.04.09								
Batch	1	1	1								
Sample Number(s)	1-2	3-4	5-6								
PAH by GCMS											
Naphthalene-d8 -Surrogate Recovery	84	84	-							TM218#M	%
Acenaphthene-d10 -Surrogate Recovery	85	85	-							TM218#M	%
Phenanthrene-d10 -Surrogate Recovery	83	84	-							TM218#M	%
Chrysene-d12 -Surrogate Recovery	84	86	-							TM218#M	%
Perylene-d12 -Surrogate Recovery	73	75	-							TM218#M	%
Naphthalene	<9	<9	-							TM218#M	<9 ug/kg
Acenaphthylene	<12	15	-							TM218#M	<12 ug/kg
Acenaphthene	<8	<8	-							TM218#M	<8 ug/kg
Fluorene	<10	<10	-							TM218#M	<10 ug/kg
Phenanthrene	<15	43	-							TM218#M	<15 ug/kg
Anthracene	<16	17	-							TM218#M	<16 ug/kg
Fluoranthene	<17	120	-							TM218#M	<17 ug/kg
Pyrene	<15	110	-							TM218#M	<15 ug/kg
Benz(a)anthracene	<14	66	-							TM218#M	<14 ug/kg
Chrysene	<10	66	-							TM218#M	<10 ug/kg
Benzo(b)fluoranthene	<15	70	-							TM218#M	<15 ug/kg
Benzo(k)fluoranthene	<14	41	-							TM218#M	<14 ug/kg
Benzo(a)pyrene	<15	59	-							TM218#M	<15 ug/kg
Indeno(123cd)pyrene	<18	48	-							TM218#M	<18 ug/kg
Dibenzo(ah)anthracene	<23	<23	-							TM218#M	<23 ug/kg
Benzo(ghi)perylene	<24	70	-							TM218#M	<24 ug/kg
PAH 16 Total	<118	720	-							TM218#M	<118 ug/kg

All results expressed on a dry weight basis.

Date 09.04.2009

Validated ☑
Preliminary ☐

ALcontrol Laboratories Analytical Services
Table Of Results

ISO 17025 accredited
M MCERTS accredited
* Subcontracted test
» Shown on prev. report

Job Number: 09/04469/02/01 **Matrix:** SOLID
Client: Norfolk County Council **Location:** SHERINGHAM RECYCLING CENTRE
Client Ref. No.: LAB0000724 **Client Contact:** Simon Holden

Sample Identity	WS1	WS2	WS2 - D2							Method Code	LoD/Units
Depth (m)	0.5	0.6	0.6								
Sample Type	SOLID	SOLID	SOLID								
Sampled Date	25.03.09	25.03.09	25.03.09								
Sample Received Date	01.04.09	01.04.09	01.04.09								
Batch	1	1	1								
Sample Number(s)	1-2	3-4	5-6								
PCB 7 Congeners											
PCB congener 28	-	-	<3							TM168#	<3 ug/kg
PCB congener 52	-	-	<3							TM168#	<3 ug/kg
PCB congener 101	-	-	<3							TM168#	<3 ug/kg
PCB congener 118	-	-	<3							TM168#	<3 ug/kg
PCB congener 153	-	-	<3							TM168#	<3 ug/kg
PCB congener 138	-	-	<3							TM168#	<3 ug/kg
PCB congener 180	-	-	<3							TM168#	<3 ug/kg
Total of 7 Congener PCBs	-	-	<3							TM168#	<3 ug/kg

All results expressed on a dry weight basis.

Date 09.04.2009

ALcontrol Laboratories Analytical Services

CEN 10:1 CUMULATIVE TWO STAGE BATCH TEST

WAC ANALYTICAL RESULTS REF:CEN12457-3

Mass Sample taken (kg) =	0.18295	Moisture Content Ratio (%) =	4.41
Mass of dry sample (kg) =	0.175	Dry Matter Content Ratio (%) =	95.78
Particle Size <4mm =	>95%		

Job Number	**200904469**
Batch	**1**
Sample Number(s)	**5-6**
Sampled Date	**25/03/09**
Sample Identity	**WS2 - D2**
Depth (m)	**0.6**

Solid Waste Analysis		**Landfill Waste Acceptance Criteria Limits**		
		Inert Waste Landfill	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon (%)	<0.2	3	5	6
Loss on Ignition (%)	-	-	-	10
Sum of BTEX (mg/kg)	-	6	-	-
Sum of 7 PCBs (mg/kg)	<0.003	1	-	-
Mineral Oil (mg/kg)	11	500	-	-
PAH Sum of 17(mg/kg)	<10	100	-	-
pH (pH Units)	8.36	-	>6	-
ANC to pH 7 (mol/kg)	-	-	to be evaluated	to be evaluated
ANC to pH 4 (mol/kg)	-	-	to be evaluated	to be evaluated

Eluate Analysis	**Conc^n in 2:1 eluate**	**Conc^n in 8:1 eluate**	**2:1 conc^n leached**	**Cumulative conc^n leached**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
	C_2	C_8	A_2	$A_{2\text{-}10}$			
	mg/l		mg/kg				
Arsenic	0.0036	0.0025	0.0072	0.027	0.5	2	25
Barium	0.006	0.002	0.01	0.03	20	100	300
Cadmium	<0.00022	<0.00022	<0.00044	<0.0022	0.04	1	5
Chromium	<0.001	<0.001	<0.002	<0.01	0.5	10	70
Copper	0.0018	<0.0016	0.004	<0.016	2	50	100
Mercury	<0.00001	<0.00001	<0.00002	<0.0001	0.01	0.2	2
Molybdenum	<0.001	0.001	<0.002	0.01	0.5	10	30
Nickel	<0.0015	<0.0015	<0.003	<0.015	0.4	10	40
Lead	0.0036	<0.0004	0.007	0.005	0.5	10	50
Antimony	0.0018	0.0068	0.0036	0.062	0.06	0.7	5
Selenium	0.002	<0.001	<0.002	<0.01	0.1	0.5	7
Zinc	<0.005	<0.005	<0.01	<0.05	4	50	200
Chloride	7	<1	14	<10	800	15000	25000
Fluoride	<0.5	<0.5	<1	<5	10	150	500
Sulphate as SO_4	8	<3	16	<30	1000	20000	50000
Total Dissolved Solids	72	15	140	220	4000	60000	100000
Phenols Monohydric	<0.01	<0.01	<0.02	<0.1	1	-	-
Dissolved Organic Carbon	6	<3	12	<30	500	800	1000

Leach Test Information		
Date Prepared	02/04/09	02/04/09
pH (pH Units)	8.42	8.806
Conductivity (µS/cm)	132.6	32.4
Temperature (°C)	19.0	19.5
Volume Leachant (Litres)	0.342	1.4
Volume of Eluate VE1 (Litres)	0.22	

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable

Stated limits are for guidance only and ALcontrol cannot be held responsible for any discrepencies with current legislation

ALcontrol Laboratories Analytical Services

CEN 10:1 CUMULATIVE TWO STAGE BATCH TEST

WAC ANALYTICAL RESULTS — REF:CEN12457-3

Mass Sample taken (kg) =	0.18295	Moisture Content Ratio (%) =	4.41
Mass of dry sample (kg) =	0.175	Dry Matter Content Ratio (%) =	95.78
Particle Size <4mm =	>95%		

Job Number	**200904469**	**Landfill Waste Acceptance Criteria Limits**		
Batch	**1**			
Sample Number(s)	**5-6**	**Inert Waste Landfill**	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Sample Identity	**WS2 - D2**			
Depth (m)	**0.6**			
Solid Waste Analysis				
Total Organic Carbon (%)	-	-	-	-
Loss on Ignition (%)	-	-	-	-
Sum of BTEX (mg/kg)	-	-	-	-
Sum of 7 PCBs (mg/kg)	-	-	-	-
Mineral Oil (mg/kg)	-	-	-	-
PAH Sum of 17(mg/kg)	-	-	-	-
pH (pH Units)	-	-	-	-
ANC to pH 7 (mol/kg)	-	-	-	-
ANC to pH 4 (mol/kg)	-	-	-	-

Eluate Analysis	Conc^{n} in 2:1 eluate	Conc^{n} in 8:1 eluate	2:1 conc^{n} leached	Cumulative conc^{n} leached	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
	C_2	C_8	A_2	$A_{2\text{-}10}$			
	mg/l		mg/kg				
Boron Dissolved (CEN 10:1C) (ICP-MS)	<0.02	<0.02	<0.04	<0.2	-	-	-
					-	-	-
					-	-	-
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					-	-	-
					-	-	-

Leach Test Information		
Date Prepared	02/04/09	02/04/09
pH (pH Units)	8.42	8.806
Conductivity (µS/cm)	132.6	32.4
Temperature (°C)	19.0	19.5
Volume Leachant (Litres)	0.342	1.4
Volume of Eluate VE1 (Litres)	0.22	

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable

Stated limits are for guidance only and ALcontrol cannot be held responsible for any discrepencies with current legislation

Supplemental Report

ALcontrol Laboratories Analytical Services
Table Of Results - Appendix

Job Number: 09/04469/02/01
Client: Norfolk County Council
Client Ref. No.: LAB0000724

Report Key :

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03×10^{-7}

NDP	No Determination Possible	*	Subcontracted test
ACM	Asbestos Containing Materia	»	Result previously reported (Incremental reports only)
#	ISO 17025 accredited	M	MCERTS Accredited
		EC	Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control.

Summary of Method Codes contained within report :

Method No.	Reference	Description	ISO 17025 Accredited	MCERTS Accredited	Wet/Dry Sample [1]	Surrogate Corrected
LPH16.4	LPH METHOD 16.4	Loss on Ignition BG method			DRY	
TM061	Method for the Determination of EPH,Massachusetts Dept.of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)	✓		DRY	
TM062	MEWAM BOOK 124 1988.HMSO/ Method 17.7, Second Site property, March 2003	Determination of Phenolic compounds by HPLC with electro-chemical detection			NA	
TM062	MEWAM BOOK 124 1988.HMSO/ Method 17.7, Second Site property, March 2003	Determination of Phenolic compounds by HPLC with electro-chemical detection	✓	✓	WET	
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water			NA	
TM097	Modified: US EPA Method 325.1 & 325.2	Determination of Chloride using the Kone Analyser			NA	
TM098	Method 4500E, AWWA/APHA, 20th Ed., 1999	Determination of Sulphate using the Kone Analyser			NA	
TM104	Method 4500F, AWWA/APHA, 20th Ed., 1999	Determination of Fluoride using the Kone Analyser			NA	
TM123	BS 2690: Part 121:1981	The Determination of Total Dissolved Solids in Water			NA	
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer			DRY	
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer	✓	✓	DRY	
TM132	In - house Method	ELTRA CS800 Operators Guide	✓	✓	DRY	
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter	✓	✓	WET	
TM136	Method 17.10, Second Site property, March 2003	Determination of Sulphur by HPLC	✓	✓	DRY	

[1] Applies to Solid samples only. **DRY** indicates samples have been dried at 35°C. **NA** = not applicable.
WET indicates samples analysed as submitted.

ALcontrol Laboratories Analytical Services
Table Of Results - Appendix

Job Number: 09/04469/02/01
Client: Norfolk County Council
Client Ref. No.: LAB0000724

Report Key :

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03×10^{-7}

NDP	No Determination Possible	*	Subcontracted test
ACM	Asbestos Containing Materia	»	Result previously reported (Incremental reports only)
#	ISO 17025 accredited	M	MCERTS Accredited
		EC	Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control.

Summary of Method Codes contained within report :

Method No.	Reference	Description	ISO 17025 Accredited	MCERTS Accredited	Wet/Dry Sample [1]	Surrogate Corrected
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS			NA	
TM153	Method 4500A,B,C, I, M AWWA/APHA, 20th Ed., 1999	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate using the "Skalar SANS+ System" Segmented Flow Analyser	✓	✓	WET	
TM168		Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils	✓		DRY	
TM180	Sulphide in waters and waste waters 1991 ISBN 01 175 7186 SCA rec. 2007 (unpublished)'	The Determination Of Easily Liberated Sulphide In Soil Samples by Ion Selective Electrode Technique	✓		WET	
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry			NA	
TM213	In-house Method	Rapid Determination of PAHs by GC-FID			WET	
TM218		Microwave extraction - EPA method 3546	✓	✓	WET	

[1] Applies to Solid samples only. **DRY** indicates samples have been dried at 35°C. **NA** = not applicable.
WET indicates samples analysed as submitted.

ALcontrol Laboratories Analytical Services
Sample Descriptions

Job Number: 09/04469/02/01
Client: Norfolk County Council
Client Ref : LAB0000724

Grain sizes

<0.063mm	Very Fine
0.1mm - 0.063mm	Fine
0.1mm - 2mm	Medium
2mm - 10mm	Coarse
>10mm	Very Coarse

Sample Identity	Depth (m)	Colour	Grain Size	Description	Batch
WS2 - D2	0.6	Beige	0.1mm - 2mm	Sandy Clay with some Stones	2

* These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials-whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.
Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.
[1] Sample Description supplied by client

Validated ☑
Preliminary ☐

ALcontrol Laboratories Analytical Services
Table Of Results

ISO 17025 accredited
M MCERTS accredited
* Subcontracted test
» Shown on prev. report

Job Number: 09/04469/02/01 **Matrix:** SOLID
Client: Norfolk County Council **Location:** SHERINGHAM RECYCLING CENTRE
Client Ref. No.: LAB0000724 **Client Contact:** Simon Holden

Sample Identity	WS2 - D2										Method Code	LoD/Units
Depth (m)	0.6											
Sample Type	SOLID											
Sampled Date												
Sample Received Date	03.04.09											
Batch	2											
Sample Number(s)	7											
GRO (C4-C10)	<10										TM089	<10 ug/kg
GRO (C10-C12)	<10										TM089	<10 ug/kg
Benzene	<10										TM089#M	<10 ug/kg
Toluene	<10										TM089#M	<10 ug/kg
Ethyl benzene	<10										TM089#M	<10 ug/kg
m & p Xylene	<10										TM089#M	<10 ug/kg
o Xylene	<10										TM089#M	<10 ug/kg
Sum m&p and o Xylene	<10										TM089	<10 ug/kg
Sum of BTEX	<10										TM089	<10 ug/kg
MTBE	<10										TM089#	<10 ug/kg

All results expressed on a dry weight basis.

Date 14.04.2009

ALcontrol Laboratories Analytical Services
Table Of Results - Appendix

Job Number: 09/04469/02/01
Client: Norfolk County Council
Client Ref. No.: LAB0000724

Report Key :

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03×10^{-7}

NDP	No Determination Possible	*	Subcontracted test
ACM	Asbestos Containing Materia	»	Result previously reported (Incremental reports only)
#	ISO 17025 accredited	M	MCERTS Accredited
		EC	Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control.

Summary of Method Codes contained within report :

Method No.	Reference	Description	ISO 17025 Accredited	MCERTS Accredited	Wet/Dry Sample [1]	Surrogate Corrected
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)			WET	
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)	✓		WET	
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)	✓	✓	WET	

[1] Applies to Solid samples only. **DRY** indicates samples have been dried at 35°C. **NA** = not applicable.
WET indicates samples analysed as submitted.

Appendix K Ground Investigation at Hilltop Outdoor Centre (February 2022)

Norfolk County Council

DRAWING TITLE

Borehole Location Plan

Tom McCabe
Executive Director of
Community and Environmental Services
Norfolk County Council
County Hall
Martineau Lane
Norwich NR1 2SG

REV.	DESCRIPTION	DRAWN	CHECKED	DATE

	INIT.	DATE
SURVEYED BY		
DESIGNED BY		
DRAWN BY	SPB	02/22
CHECKED BY	IDB	02/22

DRAWING No. 102805 - 01

PROJECT TITLE Sheringham Hilltops

SCALE 1:1000@ A4

FILE No. 102805

ORIGINAL SIZE: A4

IG 12/10/16

NORFOLK PARTNERSHIP LABORATORY

Borehole Log

Sheet 1 of 2

Scheme	Sheringham, Hilltops	Job No.	102805	Borehole No.	NORTH
Carried out for	Community & Environmental Services	Date Started	15/02/2022	Date Finished	16/02/2022
Remarks:	Dry	Type of Rig	Rotary	Logged by	AG
		Depth (m)	15.00	Ground Level (m AOD)	Drawn by	CRV
		Co-ords	616257 - 341415		Checked by	IDB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample Type	Sample No.	Field Tests	Laboratory Tests MC%	LL	PL	MPI	Org.	CBR
			Brown gravelly clayey TOPSOIL with occasional roots TOP												
			Medium dense yellowish orange, slightly gravelly, fine medium SAND. Gravel is sub-angular to sub-rounded, fine to coarse flint. SD		0.90	1.00									
			Medium dense orange, gravelly, fine to coarse SAND. Gravel is sub-angular to sub-rounded, fine to coarse flint and chalk. SD		1.60	2.00 3.00 4.00 5.00 6.00 7.00 8.00 9.00									

NORFOLK PARTNERSHIP LABORATORY

Borehole Log

Sheet 2 of 2

Scheme	Sheringham, Hilltops	Job No.	102805	Borehole No.	NORTH
Carried out for	Community & Environmental Services	Date Started	15/02/2022	Date Finished	16/02/2022
Remarks:	Dry	Type of Rig	Rotary	Logged by	AG
		Depth (m)	15.00	Ground Level (m AOD)	Drawn by	CRV
		Co-ords	616257 - 341415		Checked by	IDB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample Type	Sample No.	Field Tests	Laboratory Tests MC%	LL	PL	MPI	Org.	CBR
			Medium dense orange, gravelly, fine to coarse SAND. Gravel is sub-angular to sub-rounded, fine to coarse flint and chalk. SD			11.00									
			Medium dense orange, gravelly, fine to coarse SAND. Gravel is sub-angular to sub-rounded, fine to coarse flint and chalk, with occasional cobble content. SD		11.20	12.00									
						13.00									
						14.00									
					15.00	15.00									
						16.00									
						17.00									
						18.00									
						19.00									

NORFOLK PARTNERSHIP LABORATORY

Borehole Log

Sheet 1 of 2

Scheme	Sheringham, Hilltops	Job No.	102805	Borehole No.	SOUTH
Carried out for	Community & Environmental Services	Date Started	15/02/2022	Date Finished	15/02/2022
Remarks:	Dry	Type of Rig	Rotary	Logged by	AG
		Depth (m)	15.00	Ground Level (m AOD)	Drawn by	CRV
		Co-ords	616159 - 341320		Checked by	IDB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample Type	Sample No.	Field Tests	Laboratory Tests MC%	LL	PL	MPI	Org.	CBR
			Brown, sandy, gravelly clayey TOPSOIL TOP												
			Loose yellowish orange, fine medium SAND. SD		0.70	1.00									
			Loose to medium dense orange, slightly gravelly, fine to coarse SAND. Gravel is sub-angular to sub-rounded, fine chalk. SD		1.50	2.00 3.00 4.00 5.00 6.00 7.00 8.00 9.00									

NORFOLK PARTNERSHIP LABORATORY

Borehole Log

Sheet 2 of 2

Scheme	Sheringham, Hilltops	Job No.	102805	Borehole No.	SOUTH
Carried out for	Community & Environmental Services	Date Started	15/02/2022	Date Finished	15/02/2022
Remarks:	Dry	Type of Rig	Rotary	Logged by	AG
		Depth (m)	15.00	Ground Level (m AOD)	Drawn by	CRV
		Co-ords	616159 - 341320		Checked by	IDB

Backfill	Water	Casing	Description	Legend	Depth (m)	Scale	Sample Type	Sample No.	Field Tests	Laboratory Tests MC%	LL	PL	MPI	Org.	CBR
			Loose to medium dense orange, slightly gravelly, fine to coarse SAND. Gravel is sub-angular to sub-rounded, fine chalk. SD												
			Medium dense orange, slightly gravelly, fine to coarse SAND. Gravel is sub-angular to sub-rounded, fine to coarse flint and chalk. SD		10.30										
					15.00	11.00 12.00 13.00 14.00 15.00 16.00 17.00 18.00 19.00									

Appendix L Proprietary Product Information

ACO. creating

the future of drainage

ACO V-Septor – Hydrodynamic Separator

The ACO V-Septor is an advanced hydrodynamic separator that removes sediment bound contaminants. Its design enables removal of pollutants by means of settlement and the capture of floatables.

The ACO V-Septor is available in a range of sizes to accommodate small to large sites and can be custom made for demanding installations.

The ACO V-Septor retains solid pollution and oil. It also forms part of the SuDS management train as it removes over 50% of fine Total Suspended Solids as well as sediment bound metals and hydrocarbons.

Benefits

- Removes solid pollution – from plastic rubbish to fine silt
- Forms part of the SuDS management train
- Delivered fitted in a HDPE chamber with lifting eyes, and straps supplied for ease of installation
- Easily accessible for maintenance

ACO V-Septor

Hydrocarbons	Total suspended solids	Metals
0.5	0.5	0.4

Liquid hydrocarbons	Sediment bound hydrocarbons
0.8	0.5

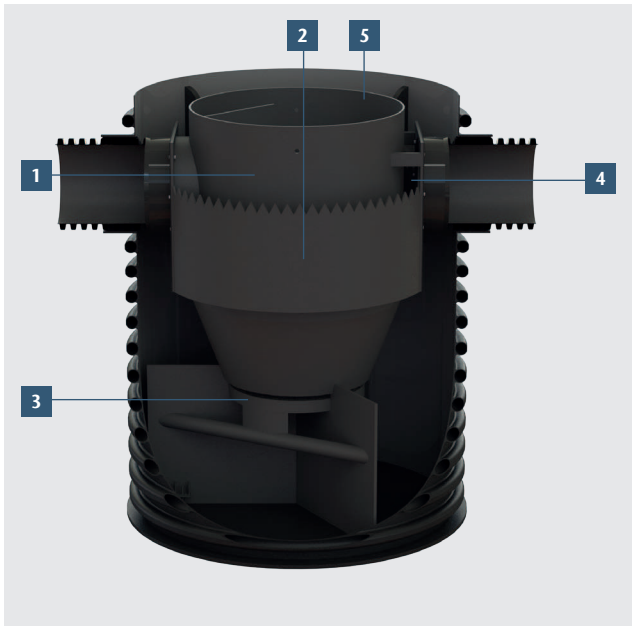
Details available on request

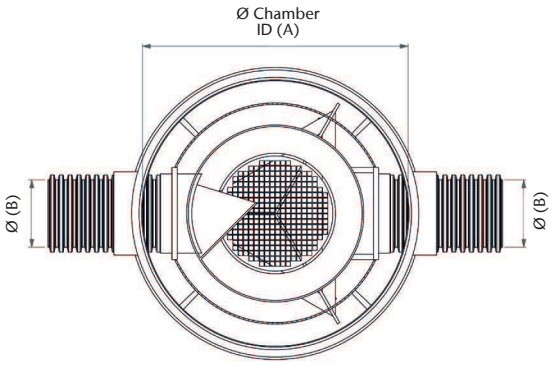
V-Septor 750 | V-Septor 1000 | V-Septor 1200 | V-Septor 1500 | V-Septor 2000 | V-Septor 2500

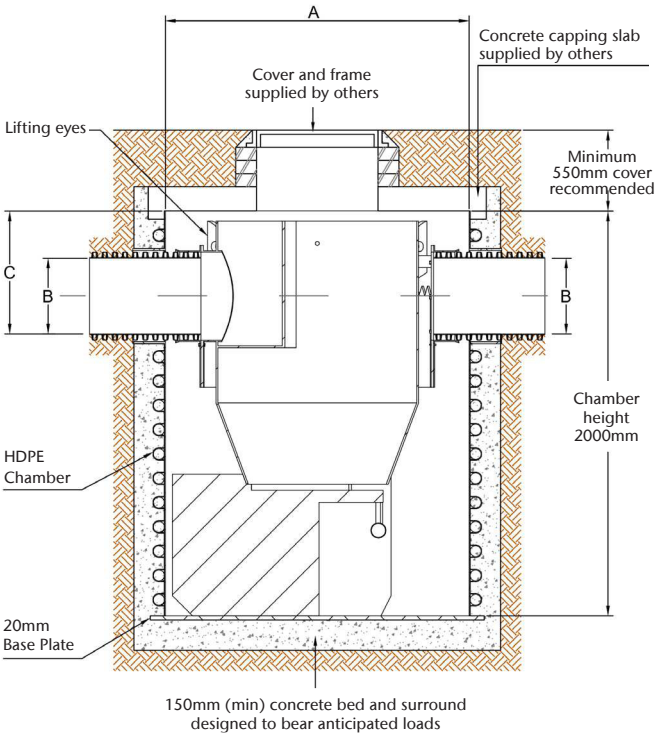
Product name	Product code	Chamber diameter (A)	Pipe connections (B)	Top to invert (C)	Sediment storage capacity	Oil / debris storage capacity	Typical treatment flow rate (fine)	Typical treatment flow rate (coarse)	Typical non remobilisation flow rate (coarse)
		mm	mm	mm	m^3	l	l/s	l/s	l/s
ACO V-Septor - Hydrodynamic Separator Range									
V-Septor 750	40995	750	150	375	0.4	49	11	14	37
V-Septor 1000	41000	1050	225	483	0.6	335	20	25	67
V-Septor 1200	41003	1200	300	550	0.86	397	29	37	98
V-Septor 1500	41005	1500	375	608	1.2	785	45	57	151
V-Septor 2000	41009	2100	500	700	2.2	1130	80	102	269
V-Septor 2500	41013	2400	600	850	3.5	2010	125	159	421

How it works

1. The deflection plate directs the incoming stormwater to create a vertical vortex.
2. Suspended solids settle down in the sludge chamber. Light liquids and debris are captured at the surface.
3. Radial flow baffles create isolated zones to retain sediments in the sludge chamber and prevent remobilisation of sediments during peak flow events.
4. Cleaned water flows up the outer chamber and over the balancing weir and then passes through the outlet to discharge to the water environment.
5. Captured solids and debris can easily be removed by suction hose during maintenance.







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