Dated 25TH SEPTEMBER 2024

BROADLAND DISTRICT COUNCIL

-and-

[redacted]

-and-

LENDINVEST LOANS LIMITED

DEED OF PLANNING OBLIGATION UNDER SECTION 106 OF THE TOWN AND COUNTRY PLANNING ACT 1990

relating to land at Hill House, Hall Lane Drayton NR8 6HH

JTH/17548050
Confidential
Confidential

THIS DEED is dated 25TH day of SEPTEMBER 2024

PARTIES:

(1) **BROADLAND DISTRICT COUNCIL,** of The Horizon Centre, Peachman Way, Broadland Business Park, Norwich, NR7 0WF (referred to as "the Council")

(2) [redacted] of Hill House, Hall Lane, Drayton, Norwich NR8 6HH (referred to as "the Owner")

(3) **LENDINVEST LOANS LIMITED,** of Two Fitzroy Place, 8 Mortimer Street, London, United Kingdom, W1T 3JJ, Company number 09971600 (referred to as "the Mortgagee")

together referred to as 'the Parties'

INTRODUCTION

(A) The Council is a local planning authority for the purposes of this Deed for the area within which the Site is located.

(B) The Application has been submitted to the Council in relation to the Development and the Council has resolved to grant the Permission provided the Parties enter into this Deed.

(C) The Owner owns the freehold of the Site which is registered at the Land Registry under title number NK118897 and held free from encumbrances other than the matters referred to below.

(D) The Mortgagee has a charge over the Site.

1. DEFINITIONS

In this Deed the following expressions have the following meanings:

Act	The Town and Country Planning Act 1990 as amended
Application	The full planning application submitted to the Council and allocated reference 20220546 for the Development

	pursuant to the Permission
Care Centre	The C2 residential institution care centre to be built on the Site as part of the Development.
Commencement	The date on which a material operation as defined in Section 56(4) of the Act is first carried out, except (for the purposes of this Deed only) operations consisting of: • site clearance • demolition • archaeological investigations • ground surveys • removal of contamination or other adverse ground conditions • erection of temporary fences • temporary display of site notices and/or advertisements and 'Commence' and 'Commenced' will be construed accordingly
Development	The development of the Site for the change of use and extension of dwelling to Care Centre and installation of a public footpath
Nominated Officer	The senior officer of the Council responsible for development management or other officer of the Council notified to the Owner

Occupation	Occupation of the Site, or any part of it, for any purpose authorised by the Permission, but excluding occupation for the purposes of: construction internal and external refurbishment decoration fitting-out marketing and 'Occupy', 'Occupied' and "Occupier" will be construed accordingly
Permission	The planning permission to be granted by the Council in accordance with the Application
Site	The land known as Hill House, Hall Lane Drayton NR8 6HH and registered at HM Land Registry under title number NK118897 shown edged red on the Site Plan
Site Plan	The site location plan reference number *21-036753-0001-A* attached to this Deed at Appendix 1
Trigger	The Commencement date and any trigger or threshold in this Deed linked to the taking of specified steps, payment of money, or linked to the prohibition of a specified action
Unit	means a unit of residential accommodation within the Care Centre

2. LEGAL BASIS

2.1. This Deed is made pursuant to Section 106 of the Act and, to the extent that it does not contain planning obligations, under Section 111 of the Local Government Act 1972, Section 1 of the Localism Act 2011, and all other enabling powers.

2.2. The covenants and obligations contained in this Deed create planning obligations for the purposes of section 106 of the Act enforceable by the Council and relate to the Site.

2.3. Covenants given by more than one party can be enforced against them individually or jointly.

2.4. A reference to an act of Parliament includes any later modification or re-enactment, including any statutory instruments made under that act, and reference to a gender or person includes all genders or classes of person.

2.5. Any covenant in this Deed not to do something includes an obligation not to allow or permit it to be done.

2.6. References to any party to this Deed shall include successors in title to that party and to any person deriving title through or under that party and in the case of the Council the successor to its statutory functions.

2.7. For the period of 90 years from the date that the package treatment plant is first installed pursuant to the obligations in paragraph 1 of Part 1 of the Schedule or until such time the Council has confirmed in writing that the obligations in the Schedule have otherwise been discharged or are no longer applicable representatives of the Council may enter the Site at any reasonable time to ascertain whether the terms of this Deed are being or have been complied with provided that:

2.7.1. they do not enter any individual Unit; and

2.7.2. they adhere to all reasonable health and safety requirements.

3. CONDITIONALITY

This Deed is conditional upon:

3.1. The grant of the Permission; and

3.2. The Commencement of Development.

Save for the provisions of this clause and clauses 2, 4.2, 5, 6, 7, 8 and 9 which shall come into effect immediately on completion of this Deed and any obligation contained in this Deed which must be performed prior to Commencement of the Development which shall come into effect immediately on the grant of the Permission.

4. COVENANTS

4.1. The Owner covenants with the Council for himself and his successors in title to observe and perform the obligations and stipulations contained in this Deed (including the Schedule).

4.2. The Council covenants with the Owner to comply with their respective requirements contained in this Deed (including the Schedule).

5. OTHER PROVISIONS

5.1. No person will be liable for any breach of this Deed if he no longer has an interest in the Site (unless the breach occurred before he disposed of his interest).

5.2. The Owner confirms that they are the owner of the Site with full power to enter into this Deed and that there is no person or body (other than the Mortgagee) with an interest in the Site whose consent is necessary to make this Deed binding on all interests in the Site.

5.3. The covenants, restrictions and requirements contained in this Deed shall not be enforceable against:

5.3.1. any statutory undertaker or other person who acquires any part of the Site or an interest in it for the purposes of the supply of electricity gas water telecommunications or highways in connection with the Development of the Site; or

5.3.2. any individual Occupier of a Unit constructed on the Site pursuant to the Permission; or

5.3.3. any mortgagee or chargee of the whole or any part of the Owner's interest in the Site unless such mortgagee or chargee takes possession of the Site or part thereof in which case pursuant to Clause 4.1 it will be bound by the obligations as a person deriving title from the Owner.

5.4. On completion the Owner will pay the Council's reasonable legal costs in connection with this Deed.

5.5. No provisions of this Deed shall be enforceable under the Contracts (Rights of Third Parties) Act 1999.

5.6. If any provision of this Deed is held to be invalid, illegal or unenforceable it will not affect the remaining provisions.

5.7. No waiver, express or implied, by the Council of any breach or failure to perform or observe any of the covenants, terms or conditions of this Deed constitutes a continuing waiver, nor prevents the Council from enforcing any of the provisions in this Deed.

5.8. This Deed will cease to have effect (insofar as it has not already been complied with) and save for clause 5.4 if the Permission is quashed revoked or expires before Commencement.

5.9. Subject to clause 5.10, nothing in this Deed prohibits or limits the right to develop any part of the Site in accordance with a planning permission (other than the Permission) granted after the date of this Deed.

5.10. If the Permission is subject to an application under Section 73 of the Act for the removal or amendment of any condition attached to the Permission then the obligations in this Deed shall also apply to the new planning permission resulting from such application if so agreed by the Council (acting in its absolute discretion).

5.11. This Deed is registrable as a local land charge.

5.12. Following the performance and satisfaction of all the obligations contained in this Deed the Council will, upon the written request of the Owner, cancel all relevant entries contained in the Register of Local Land Charges.

5.13. An agreement, approval, consent, certification or expression of satisfaction required by the Owner from the Council under the terms of this Deed must be given in writing and shall not be unreasonably withheld or delayed.

5.14. The provisions of this Deed (other than this clause which takes immediate effect) will be of no effect until this Deed has been dated.

5.15. Nothing contained or implied in this Deed will fetter, prejudice or affect the rights, discretions, powers, duties and obligations of the Council in the exercise

of any of its functions as local authority.

6. DISPUTES

6.1. If any dispute is not resolved between the Parties, any of the Parties may refer it for determination by an expert. The expert will be appointed by agreement between the parties or, in default of agreement, by the President for the time being of the Royal Institution of Chartered Surveyors and the expert's decision shall be final and binding.

6.2. The expert is to be replaced by a fresh appointee in the event that he becomes at any time unable or unwilling for any reason to proceed to discharge his functions. The fresh appointee is to be appointed in the manner prescribed in this clause.

6.3. The expert is to make his decision within 6 weeks of being appointed.

6.4. The costs of appointing the expert are to be shared equally by the parties to the dispute except where the expert takes the view that one party has acted unreasonably. In that case the expert has binding discretion as to apportionment of the costs.

6.5. Nothing in this clause will apply to the recovery of liquidated sums or prevent the parties from commencing or continuing court proceedings.

7. NOTIFICATIONS

7.1. Any notice or written communication given under this Deed is validly given if hand delivered or sent by recorded delivery post to the address set out at the beginning of this Deed, unless written notification of another address has been received.

7.2. The Owner will notify the Nominated Officer in writing of the relevant

7.2.1. anticipated Triggers three days in advance of each anticipated date,

7.2.2. actual Triggers within fourteen days of each actual date.

7.3. If the Owner disposes of his interest in all or part of the Site he will notify the Nominated Officer within 7 days of the name and address of the new owner and sufficient details to identify the Site or part of the Site AND FOR THE AVOIDANCE OF DOUBT this Clause 7.3 shall not apply to any disposals of all

or part of the Site to a statutory undertaker or any agreement between the Owner and an Occupier of a Unit provided the obligations contained in this Deed have been complied with or are being complied with at the point of the disposal to an Occupier of a Unit (as the case may be).

8. MORTGAGEE CONSENT

The Mortgagee consents to this Deed so that its interest in the Site is bound by the obligations contained in this Deed and agrees that its security over the Site takes effect subject to the provisions of this Deed PROVIDED THAT the Mortgagee is not required to observe or perform the obligations in this Deed unless it takes possession of the Site (for the avoidance of doubt any person acquiring title to all or part of the Site as a result of the Mortgagee enforcing its security will be bound by the terms of this Deed).

9. JURISDICTION

This Deed is governed by and interpreted in accordance with the law of England and Wales.

SCHEDULE

Nutrient Mitigation

Part 1 – Owner's obligations

In this Schedule (and elsewhere in this Deed where the context permits) the following words and phrases shall have the following meaning:

Term	Definition
Business Days	means any day other than a Saturday, Sunday or any statutory bank holiday
Catchment Area	means the fluvial catchment area of the River Bure upstream of the Protected Site
Works Monitoring Fee	The sum of £4,500 Four Thousand Five Hundred Pounds payable to the Council in respect of its duties and reasonable costs of monitoring compliance with the obligations contained within this Deed
Completion Notice	means the notice submitted to the Council confirming that the Property PTP has been installed and is operational, such notice to include a copy of the building control certificate which approves the installation of the Property PTP
Habitats Regulations	means the Conservation of Habitats and Species Regulations 2017 (as amended)
Nitrogen Mitigation	means measures to reduce the discharge of the nitrogen to the Catchment Area to mitigate the effects of increased nitrogen levels in the Protected Site caused by the Development in line with Natural England requirements at the point the Permission is granted
Nutrient Neutrality Assessment and Mitigation Report	means a report substantially in the form set out in Appendix 2 of this Deed which contains the assessment methodology and location for the Property PTP and the calculation of the volume of Nitrogen Mitigation and Phosphorus Mitigation provided by the installation of the Property PTP and which may be revised from time to time subject to the Council's approval
Protected Site	means the Broads SAC/Broadland Ramsar site

PTP	means a package treatment plant
Property PTP	means the package treatment plant to be installed at the Property in accordance with the Property PTP Specification
Property PTP Specification	means the detailed specification for the installation and management of the Property PTP which is appended hereto at Appendix 3 together with any revisions to the specification as may be agreed in writing between the Council and the Owner
Property PTP Maintenance and Monitoring Report	means the report to be prepared by the Owner which has been submitted to and approved by the Council in accordance with paragraph 1.2 of Schedule to secure the details of the measures required for maintaining and monitoring the Property PTP until the expiry of the Management Period
Phosphorous Mitigation	means measures to reduce the discharge of phosphorus to the Catchment Area to mitigate the effects of increased phosphorus levels in the Protected Site caused by the Development in line with Natural England requirements at the point the Permission is granted
Service Engineer	means a suitably qualified service engineer in accordance with the requirements and recommendations of the Installation and User Manual
Management Period	means a period of 90 (ninety) years from the date of first Occupation of the Development (unless otherwise agreed in writing with the Council)
Natural England	means the public body known as Natural England or any successor body which acts as the Government's adviser for the natural environment in England

1. The Owner covenants with the Council so as to bind the Site not to cause or permit Occupation unless and until:

1.1. The Completion Notice has been submitted to the Council; and

1.2. The Property PTP Maintenance and Monitoring Report has been submitted to the Council and the Council has approved in writing the Property PTP Maintenance and Monitoring Report which shall be implemented accordingly; and

1.3. Paid to the Council the Works Monitoring Fee

2. The Owner covenants with the Council so as to bind the Property from the date of the installation of the Property PTP until the expiration of the Management Period as follows (unless otherwise agreed in writing with the Council):

2.1. to operate and maintain the Property PTP in accordance with the Property PTP Specification and ensure that its operation meets the level of Phosphorus Mitigation and Nitrogen Mitigation indicated in the Nutrient Neutrality Assessment and Mitigation Report unless otherwise agreed in writing with the Council;

2.2. Subject to paragraph 2.8 of this Part 1 of this Schedule, not to do anything which may cause or permit the Property PTP to function less effectively or cease functioning;

2.3. Procure and maintain servicing of the Property PTP (at least once every six months or such other period as specified by the approved Property PTP Maintenance and Monitoring Report) by an appropriately qualified Service Engineer to ensure that its operation meets the level of Phosphorus Mitigation and Nitrogen Mitigation indicated in the Nutrient Neutrality Assessment and Mitigation Report unless otherwise agreed in writing with the Council;

2.4. Keep up-to-date record of all maintenance and monitoring undertaken to the Property PTP by the Owner and the appointed qualified Service Engineer in

accordance with the Property PTP Specification and submit any information required to be submitted to the Council in terms of on-going monitoring of the performance of the Property PTP as set out in the approved Property PTP Maintenance and Monitoring Report to the Council together with any other records which may reasonably be required by the Council on an annual basis unless otherwise agreed in writing by the Council;

2.5. Provide any other information reasonably required by the Council on request which relates to the installation, operation, management and maintenance of the Property PTP;

2.6. If the Owner becomes aware that the Property PTP is failing to meet the level of Phosphorus Mitigation and/or Nitrogen Mitigation indicated in the Nutrient Neutrality Assessment and Mitigation Report, the Owner shall remedy the said failure within 30 Business Days of becoming aware of such failure;

2.7. Renew or replace the Property PTP at the end of its operational life with an alternative package treatment plant in accordance with paragraph 2.8 of this Schedule 2

2.8. To retain the Property PTP as installed and not to replace the Property PTP with another package treatment plant or any other form of Phosphorus Mitigation or Nitrogen Mitigation unless:

2.8.1. The Owner has submitted a plan for another package treatment plant or any other form of Phosphorus Mitigation or Nitrogen Mitigation Replacement Plan to the Council which demonstrates that any such Replacement Plan and/or its implementation shall provide at least the same amount of Phosphorus Mitigation and

Nitrogen Mitigation indicated in the Nutrient Neutrality Assessment and Mitigation Report as the Property PTP at the date of Council's approval of the Replacement Plan; and

2.8.2. The Council has approved in writing the plan for the Replacement Plan submitted by the Owner.

2.9. Where a plan for a Replacement Plan is approved in writing by the Council, reference in this Schedule to the Property PTP shall where appropriate if the Replacement Plan provides for another package treatment plan be read as reference to the Replacement Plan or, where more than one plan for a Replacement Plan is approved in writing by the Council, reference in this Schedule to the Property PTP shall be read as reference to the latest Replacement Plan as approved by the Council.

Part 2 – Council's obligations

1. The Council covenants with the Owner as follows:

   1.1. The Council shall confirm to the Owner in writing whether or not a Property PTP Maintenance and Monitoring Report submitted to the Council for approval under paragraph 1.2 of Part 1 of this Schedule is approved by the Council within 10 Business Days of receipt of such a proposed Property PTP Maintenance and Monitoring Report and in the event the Council considers that a submitted Property PTP Maintenance and Monitoring Report is not satisfactory the Council shall provide the Owner with written reasons for not considering a submitted Property PTP Maintenance and Monitoring Report to be satisfactory.

   1.2. Following the receipt of a Replacement Plan from the Owner pursuant to Part 1 of this Schedule the Council shall confirm to the Owner in writing whether or not the Replacement Plan is approved within 30 Business Days receiving the Replacement Plan from the Owner and in the event the Council does not approve the Replacement Plan the Council shall provide the Owner with written reasons for not approving the Replacement Plan.

   1.3. The Council will hold any Works Monitoring Fee received under this Deed in an interest bearing account and apply the same (together with any interest accrued) towards the purposes for which they were paid under this Deed.

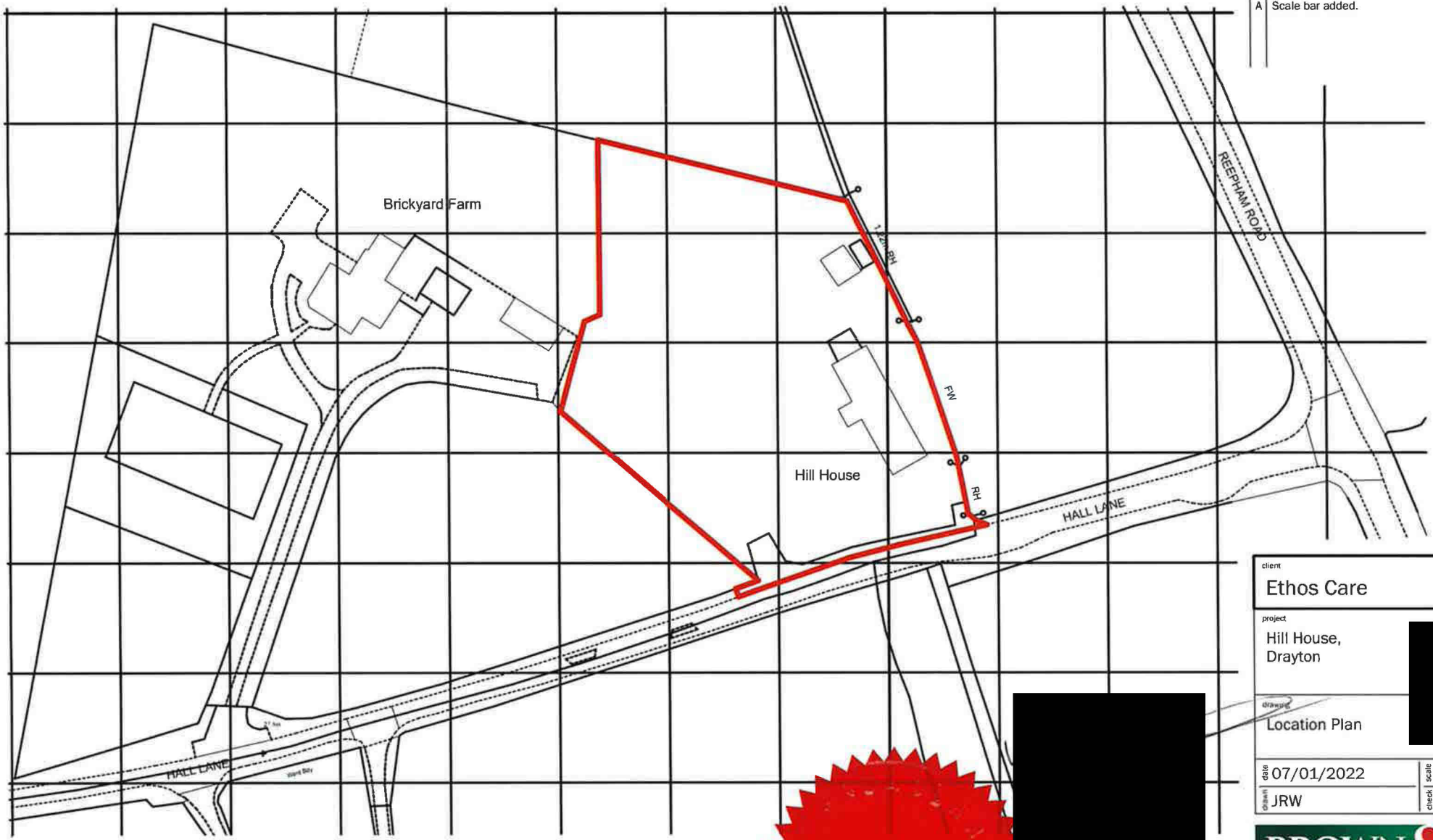
APPENDIX 1

The Site Plan

Issue Status

PLANNING

Revision		Drawn	Check	Date
A	Scale bar added.	JW	FH	19.04.22



SCALE 1:1250

0 10 20 30 40 50 60m

[redacted]

Deputy Monitoring Officer

Sinead Carey

[redacted]

[redacted]

client

Ethos Care

project

Hill House, Drayton

[redacted]

Drawing

Location Plan

date	07/01/2022	scale	1:1250 @ A4
drawn	JRW	check	FIH

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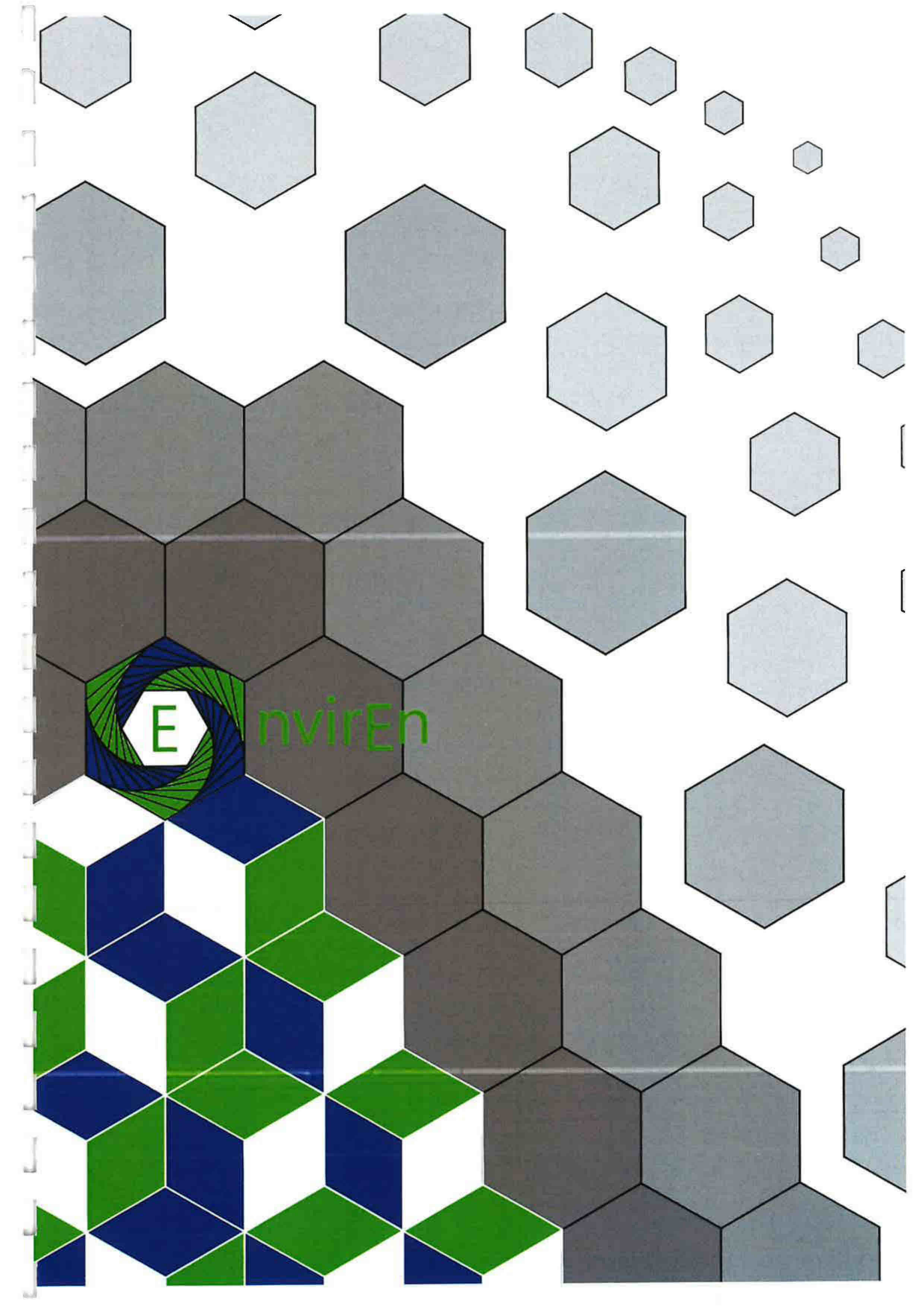
APPENDIX 2

Nutrient Neutrality Assessment and Mitigation Report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Nutrient Neutrality Assessment and Mitigation Strategy (NNAMS)

Hill House, Drayton

Z. Simmonds

22 September 2023

Document Ref: 230043-NNAMS

Document Control

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DOCUMENT REVISION RECORD

Issue	Date	Revision Details
1.1	11/04/2023	First Issue
1.2	12/04/2023	Amended to suit client's comments.
1.3	28/04/2023	Amended to suit council's comments.
1.4	22/09/2023	Council comments incorporated.

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This report has been prepared by Enviren Ltd solely for use as part of the planning application associated with the conversion of an existing dwelling to a care home off Hall Lane in Drayton (Grid reference: TG 19322 13994). This report is not issued to and cannot be relied upon by any other business, person or entity for any other grounds without the prior permission of Enviren Ltd. Enviren Ltd will not accept liability or responsibility for the use of this report or its findings (permitted or not) except for the aforementioned project, being the reason it was initially drafted and compiled. In the production of this report, Enviren Ltd relied upon information obtained and provided by others. The accuracy and completeness of this information cannot be guaranteed by Enviren Ltd; however all reasonable measures have been implemented to ensure that the data/information is accurate and that the observations made regarding the information are precise. This being said, Enviren Ltd cannot be made liable for any omissions or errors or for any losses/consequential losses following decisions made based on this report's findings.

Executive Summary

This report has been compiled for the support of the conversion of a dwelling to a 16 bedroom care home off Hall Lane in Drayton (Planning application reference: 20220546). The proposal is for the conversion of an existing dwelling to a care home along with associated works to the surrounding grounds and infrastructure.

This report demonstrates that the development will achieve Nutrient Neutrality through the replacement of an existing Package Treatment Plant serving the existing dwelling with high functioning Package Treatment Plants to serve the care home along with the introduction of a vertical and horizontal flow filter beds to provide final cleansing.

The land currently constitutes an existing dwelling, garden space, a garage and small areas of hardstanding with flows currently directed into Hall Lane. The proposals are for the conversion of the existing dwelling and therefore shall not increase nutrient discharge as a result of surface water runoff.

Contents

1. Introduction

1.1. This report has been prepared for Gerald Eve LLP to support a planning application for the conversion of a dwelling into a 16 bedroom care home off Hall Lane in Drayton and demonstrates that through the installation of appropriately specified Package Treatment Plants (PTPs) and filter beds the development shall achieve nutrient neutrality. The development footprint is roughly 0.760Ha (7,600m^2) and currently constitutes a dwelling, garden space, outbuildings and some hardstanding. The conversion to a care home would result in an increase in nutrients discharging into the surrounding water network due to foul water discharge from the proposed property if mitigation were not to take place (see **Appendix A** and **Appendix B**).

(Note: although being separate entities nitrogen and nitrates & phosphorus and phosphates have been used interchangeably throughout this report and to suit the specific usage in background information and reports)

2. Background Information

Site Location

2.1. The site is located on the north-eastern edge of Drayton to the north of Hall Lane. Drayton is located to the northwest of Norwich on the way to Taverham. The site is located 2.8km to the east of Taverham centre, 6.7km to the northwest of Norwich centre and 3.1km to the northeast of Costessey centre. The exact location can be found in **Figure 2.1**:

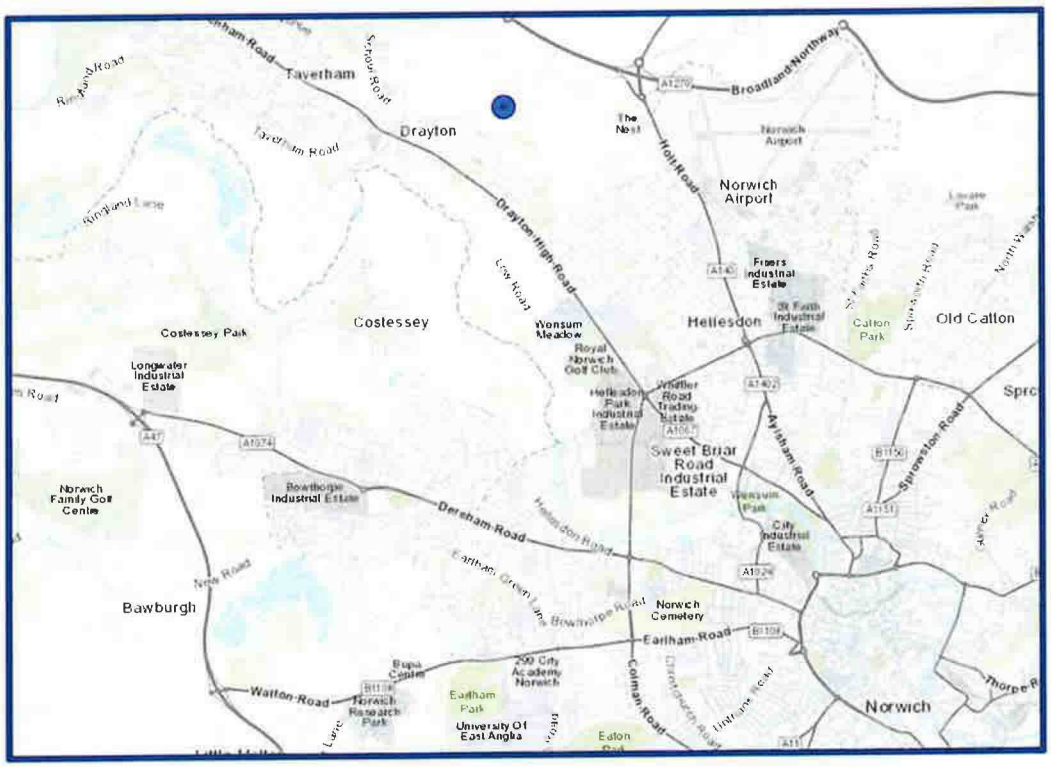


Figure 2.1 – Site Location

2.2. The development sits within the hydrological catchment of the Norfolk Broads Special Area of Conservation (SAC) and Ramsar Site, as well as the River Wensum SAC, as indicated in **Figure 2.2**.

Figure 2.2 – Hydrological Catchment Plan

Site Hydrology

2.3. Interrogation of local topographical information around the development parcel identifies that the River Wensum is present to the south of Drayton which accepts surface water runoff from Drayton, Taverham and the surrounding land. The River Wensum runs in a winding south-easterly direction passing through the centre of Norwich. From here the River Wensum joins the River Yare which flows to the southeast passing the settlements of Brundall, Surlingham and Limpenhoe and eventually turning in a north-easterly direction at Reedham. From here the river runs through a number of Special Areas of Conservation (SAC), Special Protected Areas (SPA), Sites of Special Scientific Interest (SSSI) and Ramsar Sites associated with the Norfolk Broads before discharging to the North Sea at Great Yarmouth/Gorleston-on-Sea. Further investigation of the course of the River Yare demonstrates that the river discharges to the North Sea approximately 33.8km to the east of the development.

2.4. Inspection of UK Topographical Information[1] data shows a definite hydraulic gradient of the River Wensum in a south-easterly direction. The River Yare flows into the North Sea to the east with levels falling from circa 36m AOD within the development parcel to circa 6m AOD at the edge of the River Wensum (see **Figure 2.3**). The River Wensum joins the River Yare at approximately 3m AOD. The level at the edge of the River Yare drops little and remains at circa 3m AOD at the settlement of Reedham. The level of the river continues to fall before reaching Gorleston-on-Sea at sea level. The River Yare, being the principal local river, flows from the parish of Shipdham, through the Norfolk Broads Ramsar Site and several SSSIs (Sites

[1] TessaDEM – Satellite Contoured Mapping.

of Special Scientific Interest) including the Halvergate Marshes, Breydon Water and the Cantley Marshes before discharging into the sea at Gorleston-on-Sea[2]. The River Yare downstream of the development first enters the Norfolk Broads Ramsar site at the Broadland Ramsar site to the north of Surlingham through a series of dykes and ditches. The River Wensum SAC is present immediately to the southwest of Drayton.

Figure 2.3 – OSTerrain50 Contour Data – Site Hydrology
(Contains information from TessaDEM, which is made available here under the Open Database License (ODbL).)

2.5. A review of Anglian Water sewer information indicates that the nearest foul water sewer is present approximately 500m to the west of the development site within Drayton Lane. This foul sewer then transports foul water into the wider sewer network. As per the EA's General Binding Rules[3] and the provisions of Part H of the Building Regulations[4], connection to this sewer is unreasonable owing to distance and therefore onsite mitigation methods have been pursued.

Site Description

2.6. The area to be developed is to be 7,600m^2 in plan area including the property, gardens, hardstanding and infrastructure (see **Figure 2.4**).

2.7. The area to be developed currently constitutes an existing dwelling as well as garden space, outbuildings and some hardstanding. The site is bordered to the west by an adjacent dwelling and beyond this agricultural land. To the north sits a small copse and beyond this further agricultural land. To the south sits Hall Lane and beyond this further properties. To the east sits further agricultural land and beyond this Reepham Road.

2.8. As displayed on the mapping in **Figure 2.4**, the site consists of a dwelling, urban land and hardstanding as well as outbuildings. The site is bounded on all sides by trees and hedging, with walling to the south separating the development from Hall Lane. The current land use is described in more detail in **Section 5**.

[2] Norfolk Rivers Trust – River Yare (Link-to-source)
[3] Environment Agency – General binding rules for small sewage discharges (SSDs)(Link-to-source)
[4] The Building Regulations - Drainage and waste disposal: Approved Document H (Link-to-source)

Figure 2.4 – Aerial Reconnaissance Photography

Regional Background and Context

2.9. Following the ruling on the "Dutch N" (Case C-293/17 and C-294/17)[5] in November 2018 through the Court of Justice of the European Union (CJEU), as well as several other lower profile cases in Ireland, Natural England wrote a letter[6] to the affected Council in March 2022 identifying unacceptable phosphate and nitrate levels within the waterways of the Broads Special Area of Conservation and Ramsar Site and requested greater scrutiny of planning applications going forward which would increase nutrient loads into the water system[7], resulting in the Protected Area (SAC, SPA or Ramsar Site) reaching a point where the ability to return the site to favourable conditions would be compromised or necessarily limit the conservation objectives of the area. Mitigation measures are to be put in place that would result in "Nutrient Neutrality", these mitigation measures are discussed in **Section 6** below.

2.10. As identified the site benefits from a pathway into the River Wensum SAC and subsequently into the River Yare which is hydraulically connected to the Broads Special Area of Conservation and Ramsar Site, this area is protected as an SAC (Special Area of Conservation) under the Habitat Regulations 2017, as well as being listed as a Ramsar Site (RS) under the Ramsar Convention (effective from December 1975), the Ramsar Convention being an international, intergovernmental treaty, provides a framework for cooperation and national action for the proper use and conservation of wetlands and their resources, this is ratified by UK planning law under paragraph 176 of the NPPF . The SAC and RS cover roughly the same area, however the SAC particularly pertains to the conservation of the habitats and species of the area, whereas the Ramsar protection covers the wetlands as well as the biodiversity in the contributing rhynes, ditches and waterways, including the floristic and

[5] C-293/17 - Coöperatie Mobilisation for the Environment and Vereniging Leefmilieu (Link-to-source)
[6] Natural England Letter to affected Councils - Advice for development proposals with the potential to affect water quality resulting in adverse nutrient impacts on habitats sites. (Link-to-source)
[7] Reg. 63 of the Habitats Regulations 2017.

invertebrate diversity. This is shared as a Designated Feature underpinning Sites of Special Scientific Interest (SSSI).

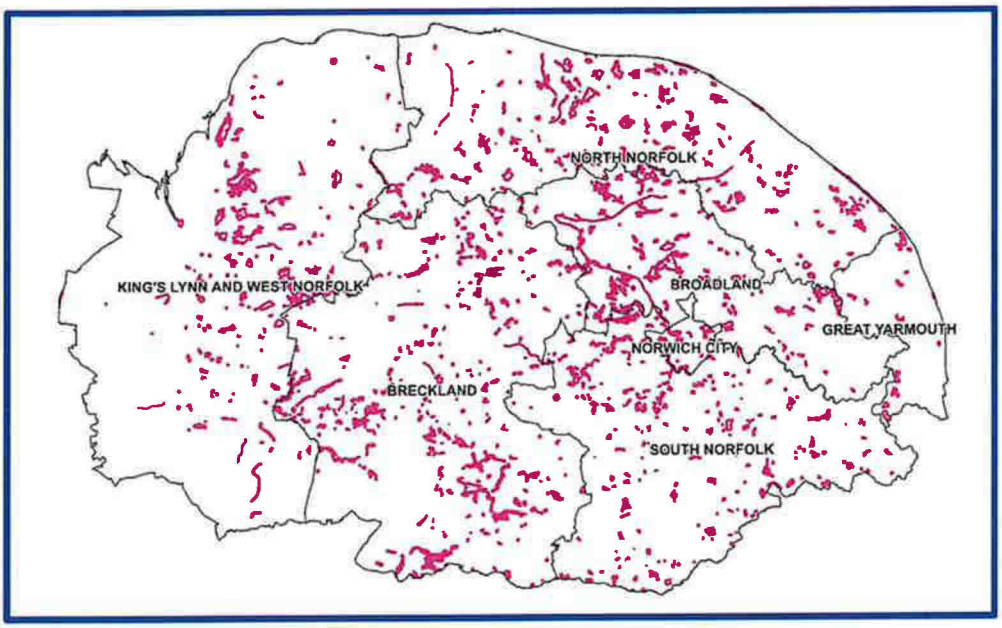


Figure 2.5 – County Wildlife Sites Systems in Norfolk[8].

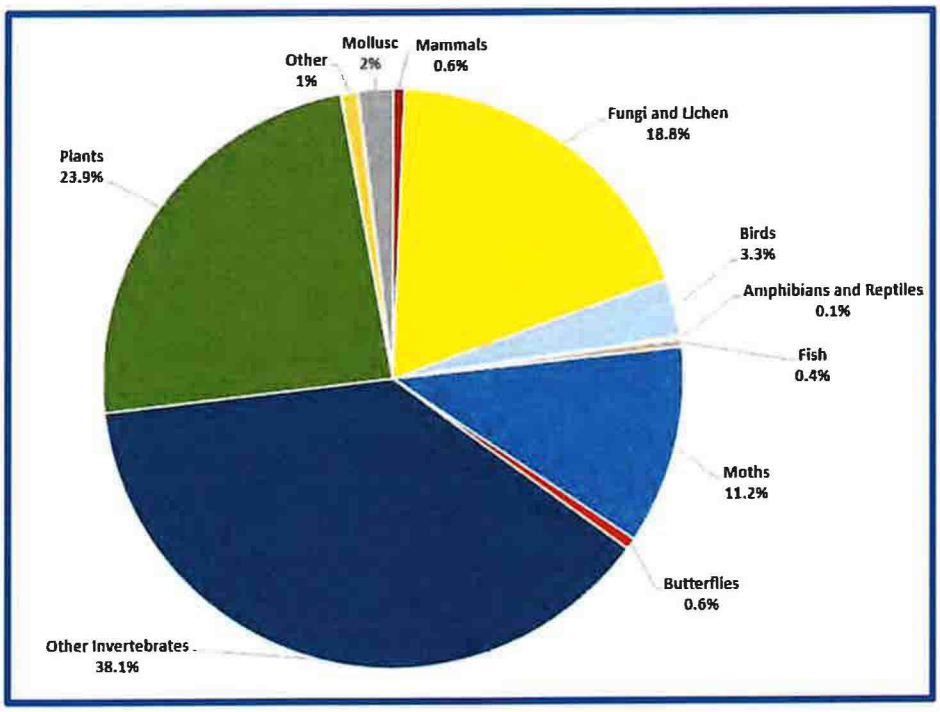


Figure 2.6 – Species distribution of South Yare[9].

[8] Norfolk Biodiversity Information Service – County Wildlife Sites (Link-to-source)
[9] South Yare Wildlife Group – State of the Natural Environment Report (Link-to-source)

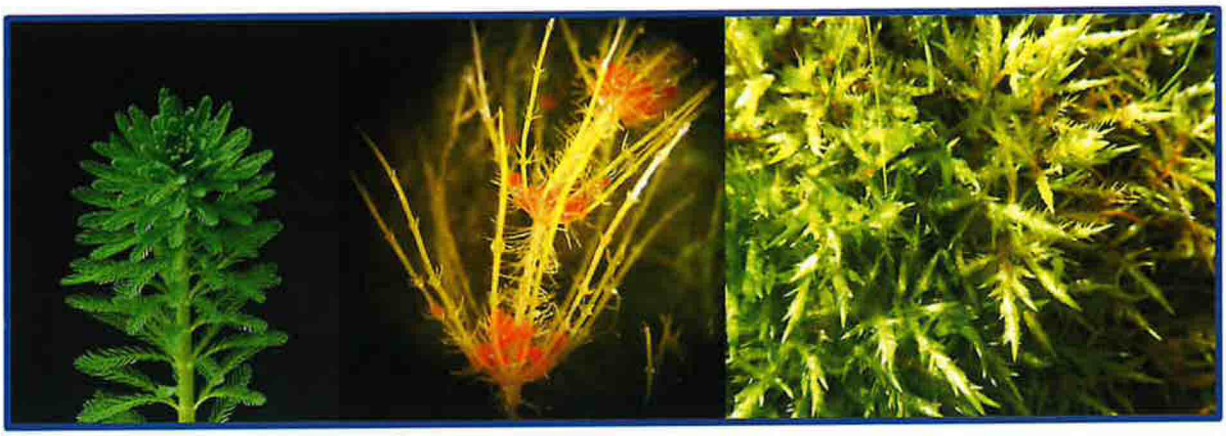


Figure 2.7 – Species of The Broads waterways. From left to right: Watermilfoils, Chara Aspera and Pointed Spear-moss.

3. The Underlying Science

3.1. Phosphorus is an essential nutrient for the continued and healthy growth of flora, including crops, garden plants and flowers. Phosphates provide the sugar-phosphate backbone for DNA and RNA and therefore are essential for reproduction, they also are essential for photosynthesis and are required for energy transfer in cells, forming an integral part of ATP (Adenosine Triphosphate) and ADP (Adenosine Diphosphate). Nitrogen is a key component of chlorophyll which allows plants to photosynthesise, as well as this it is a major constituent of amino acids, the building blocks of proteins. Additionally, Nitrogen is a key component of the nucleic bases that form DNA.

3.2. Phosphorus and Nitrogen are contained in large concentrations in NPK fertilisers used by farmers to ensure high crop yields and healthy plant growth, compensating for the loss of soil productivity associated with modern agricultural practises and the relative loss of the O-Horizon[10]. The relative lack of naturally occurring phosphorus and the disruption in the natural phosphorus cycle require phosphorus to be extracted from raw phosphate rock (a finite resource), this disturbs the natural balance of the region and often leads to nutrient pollution[11]. Nitrogen is typically produced artificially through the Haber-Bosch process which involves creating Ammonia (a key source of Nitrogen) through a reaction between Natural Gas and Air (which is principally made-up of Nitrogen)[12]. Beyond the cultivation of crops, phosphates and nitrates are found further down the supply chain in commercial waste associated with food production and processing. Phosphates are also useful additives in household detergents as they chelate calcium and magnesium ions preventing the deposition of limescale[13]. However the principal share of domestic phosphorus output comes from human waste as can be seen in **Figure 3.1**.

[10] O-Horizon – Britannica (Link-to-source)
[11] Environment Agency - Phosphorous and Freshwater Eutrophication Pressure Narrative (Link-to-source)
[12] Brittanica – Haber-Bosch process
[13] European Commission - Phosphates and Alternative Detergent Builders (Link-to-source)

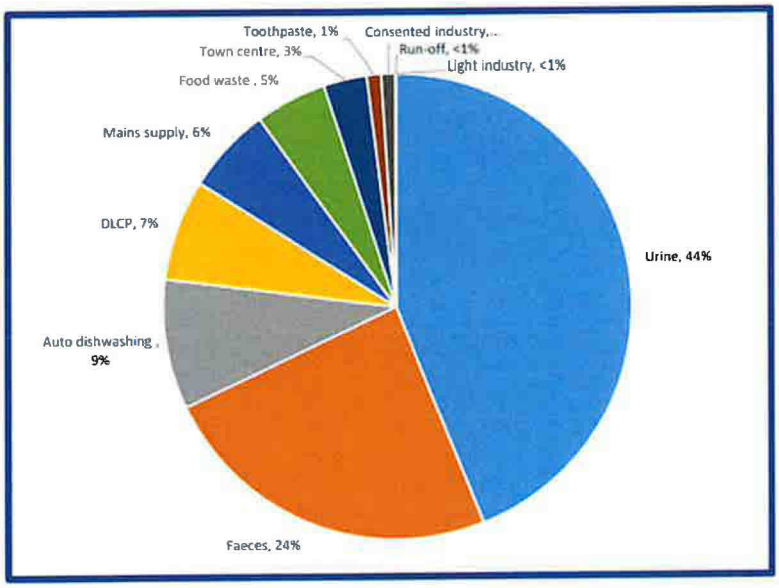


Figure 3.1 – Breakdown of Phosphorus Arisings from Domestic Sources[14].

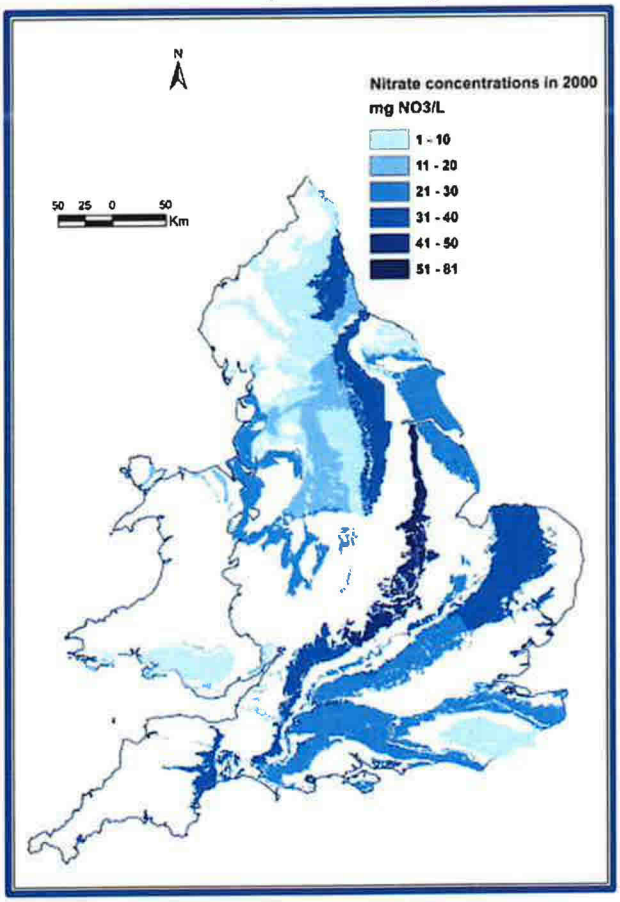


Figure 3.2 – Nitrate Concentrations in Major Aquifers of England and Wales[15].

[14] Environment Agency - Phosphorous and Freshwater Eutrophication Pressure Narrative (Link-to-source)
[15] ScienceDirect – The changing trend in nitrate concentrations in major aquifers due to historical nitrate loading from agricultural land across England and Wales from 1925 to 2150 (Link-to-source)

3.3. When nutrients are over sprayed due to variations in soil quality and the need to ensure proper nutrient spread, the excess is washed off the land by overland flows, these are either taken up by surface water sewer systems or discharged directly into local irrigation channels/open water courses[16]. Domestic nutrient arisings are usually taken away by foul/combined sewers into Wastewater Treatment Works (WwTWs), the treatment works employ Appropriate Treatment, Secondary Treatment or Advanced Treatment depending on the Population Equivalent of the Agglomeration they serve, the Downstream Receptor and depending on the quantity of Industrial Waste they are expected to accept. The treated water is then discharged into an appropriate receiving body, often rivers or watercourses[17]. Alternatively residential effluent is treated by a Package Treatment Plant and discharged into a watercourse directly or discharged to ground through a suitable Secondary Treatment Measure.

3.4. When nutrients enter the watercourse, they are taken up by aquatic plants which benefit in the same way as land based plants. However, high nutrient loads attract rapidly propagating plants such as Algae and Duckweed (*Genus Lemna*), which in the case of the former form dense monocultures called Algal Blooms (often called HABs – Harmful Algal Blooms)[18], this excessive plant/algal growth is called **Eutrophication**, the particular concern of Natural England is so called "Hyper Eutrophication".

Figure 3.3 – Example of at Surface Eutrophication.

3.5. Eutrophication is an excessive growth of filamentous Algae/Lemna which form in "mats" on the surface, these mats produce effects such as shading and smothering, which prevents sunlight reaching submerged oxygenating plants, which in turn die off and reduce the dissolved oxygen in the water body, additionally once the nutrient concentrations reduce there is a die-back of the Algal Blooms, which degrade at the bottom of the waterbody, this degradation is highly oxygen intensive and further removes dissolved oxygen. This lack of oxygen causes anoxia/hypoxia to species within the eco-system, which the environment can take years to recover from, if at all.

[16] HR Wallingford – Greenfield Runoff Rate Estimation (Link-to-source)
[17] UK Government - Waste water treatment works: treatment monitoring and compliance limits (Link-to-source)
[18] UK Government – Algal Blooms (Link-to-source)

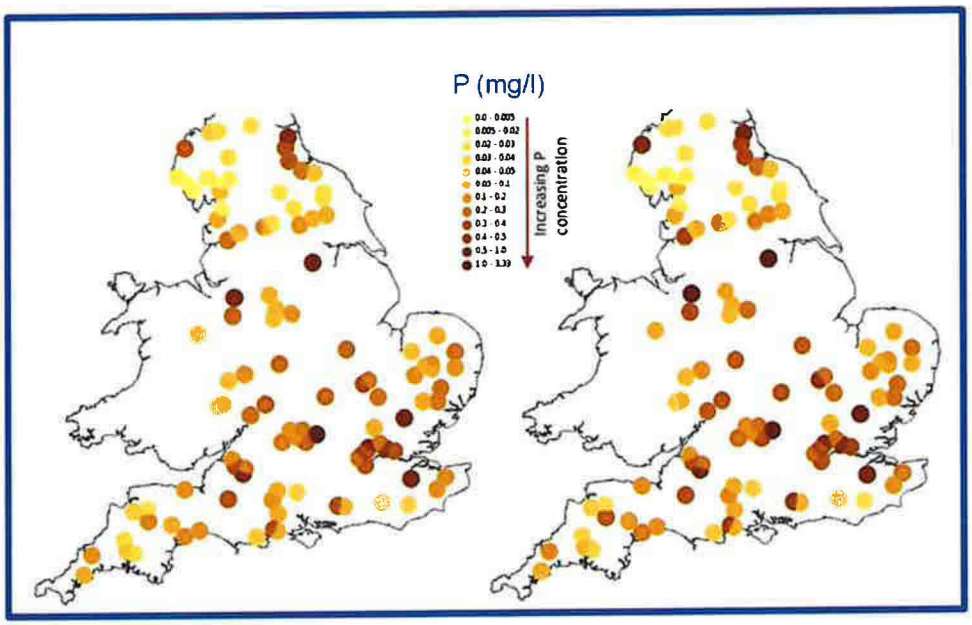


Figure 3.4 – Estimated Phosphorus Concentrations for Study Sites as per Environment 2050s phosphorus concentrations Agency Report[19].

4. Development Proposals

4.1. The development is to consist of 1 no. 16 bedroom care home which is to replace the existing dwelling. As the footprint currently comprises urban land the conversion of the existing dwelling to a care home would not lead to an increase in surface water discharge.

4.2. The foul water drainage from the proposed care home will discharge firstly to GRAF One2Clean Package Treatment Plants located a minimum of 7m away from the care homes, beyond these the effluent from the care home shall be treated by a Primary Filter Bed (Vertical Flow [VF] reedbed), treated effluent from the PTP shall feed into a manifold of distributor pipes which will evenly distribute the liquid effluent over the filter bed (see **Appendix C**). The filter bed will be filled with a graded distribution of sands and gravels to provide intensive treatment of the effluent.

4.3. Downstream of the Primary Filter Bed will be an intermediary Humus Chamber which will ensure that any organic matter from the Primary Filter Bed does not enter the Secondary Filter Bed (Horizontal Flow [HF] reedbed). This Humus Chamber will consist of two dip pipes that will ensure that the humus remains as a film on the water's surface. After the Humus Chamber the effluent will reach a T piece fitted with a perforated pipe. The treated effluent from the Primary Filter Bed will drain into a stone margin at the upstream end of the Secondary Filter Bed. The water will then run through the gravel body before discharging into a Variable Outlet Chamber, which will have an adjustable inlet so the level of the water in the Secondary Filter Bed can be adjusted. Beyond this a piped connection will be made to the adjacent watercourse. Mitigation options are discussed in more details in **Section 6**.

[19] Environment Agency - Climate change and eutrophication risk in English rivers (Link-to-source)

5. Nutrient Calculator – Observations influencing Results

5.1. The direct print of the Nutrient Budget Calculator is given in **Appendix A** and **Appendix B**. This section shall outline the observations made on the site, including calculations of filter bed sizes and nutrient removal efficiency as per BRE guidance and CIRIA C753[20] guidance and shall discuss the results generated by the Nutrient Budget Calculator.

Stage 1a – Existing Package Treatment Plant Nutrient Arisings

5.2. To determine the nutrient budget for the development it is essential to determine the predevelopment nutrient budget. The existing dwelling has been assumed to have an occupancy of 1.88 persons, as recommended by the Royal Haskoning calculator. The specification of the existing Package Treatment Plant is unknown; however, the unit is not a high performing unit and was installed some time ago, therefore *"Default package treatment plant"* has been selected in the calculator. The results of this section show that the existing dwelling shall generate 0.73kg/year of total phosphorus and 5.49kg/year of total nitrogen (see **Appendix A**).

Table 5.1 – Existing Nutrient Arisings

Nutrient	Annual Load Generated (kg/year)
Total Phosphorus	0.73
Total Nitrogen	5.49

Stage 1b – Proposed GRAF One2Clean Nutrient Arisings

5.3. The number of bedrooms in the care home is 16. Based on a review of the Nutrient Budget Calculator prepared by Royal Haskoning DHV[21] the population has been determined based on the *"Number of additional rooms above 6 residents (sui generis) for houses in multiple occupation"* section. Based on an additional 10 rooms above the capacity for 6 residents this leads to an increase of 22.5 persons (6 + (10 x 1.65)) (based on Office for National Statistics (ONS) information).

5.4. The sewage is to be handled by a Package Treatment Plant, the reason that a connection will not be made to a public sewer and why sewage will not be handled by a Wastewater Treatment Works (WwTW) is discussed in **Section 6 – Mitigation Methods**.

5.5. In the first instance the effluent shall be treated by two GRAF One2Clean Package Treatment Plants, sized to accommodate the proposed population. These units have a phosphorus removal efficiency of 80.2% (1.6mg/l) and a nitrogen removal efficiency of 87.0% (7.9mg/l) (see **Appendix D**), without the need for chemical dosing with metallic salts. The GRAF One2Clean is an example of a Sequencing Batch Reactor (SBR) PTP (see **Section 6** for PTP options).

5.6. The results of this section show that the proposed care home shall generate 1.45kg/year of total phosphorus and 7.14kg/year of total nitrogen (see **Appendix B**). This is summarised in **Table 5.2**.

[20] CIRIA C753 – The SuDS Manual

[21] Royal Haskoning DHV/Norfolk Councils – Nutrient Budget Calculator v1.0

Table 5.2 – Proposed Nutrient Arisings	
Nutrient	**Annual Load Generated (kg/year)**
Total Phosphorus	1.45
Total Nitrogen	7.14

Stage 1c – Proposed Primary Filter Bed Nutrient Arisings

5.7. The effluent from the PTP will then be discharged to the Primary Filter Bed. The bed has been sized as per equation 1 of the BRE GBG42 which states:

$$A = 3.5P^{0.35} + 0.6P$$

Where:

A = The area of the proposed filter bed.

P = The maximum number of people that could be served by the filter bed (assumed as 34, this being conservative and assuming each room shall have 1.65 persons and there being 7 members of staff).

$$A = 3.5(34^{0.35}) + 0.6(34)$$
$$A = 32.45m^2$$

The proposed filter is to be 3.0 x 11.0m, giving an aspect ratio of 1:4 as advised by BRE guidance and giving a plan area of 33.0m². The filter bed will be a minimum of 1m deep (as shown in **Appendix C**). The treatment capacity of the filter bed has been taken from Table 18.1 of CIRIA C753 and is based on the treatment efficiency of similar bioretention systems utilising well graded granular soil layers as per the FAWB study[22] and the International BMP International Stormwater Database[23]. The stated treatment efficiency is >80% with respect to phosphorus and 50% with respect to nitrogen. 80% has been considered as the base treatment capacity for phosphorus; however, as this is a secondary treatment measure, this will need to be factored to account for the reduced performance capacity owing to reduced influent concentrations.

TABLE 18.1 **Pollution removal for bioretention systems designed to FAWB guidelines (after FAWB, 2009)**

Pollutant	Typical removal efficiency
TSS	> 90%
Total phosphorous	> 80%
Nitrogen	50% on average
Metals (zinc, lead, cadmium)	> 90%
Metals (copper)	up to 60%

Figure 5.1 – Nutrient removal efficiency of bioretention systems as per CIRIA C753.

5.8. As discussed with Natural England, the performance of secondary and tertiary treatment measures has a reduced performance capacity owing to the influent being previously treated and owing to reduced influent concentrations. The Simple Index Approach[24] has been

[22] Facility for Advancing Water Biofiltration - Guidelines for filter media in biofiltration systems
[23] International Stormwater BMP Database
[24] CIRIA C753 – Chapter 26 -

applied in this instance which states that secondary and tertiary treatment measures should be factored by a half to accommodate the reduced performance:

$$Total\ Mitigation\ Index = Mitigation\ Index_1 + 0.5(Mitigation\ Index_2) \ldots$$

5.9. The factored nutrient removal efficiency of the filter bed is therefore 40% with respect to phosphorus and 25% with respect to nitrogen.

5.10. The results of this section show that the proposed care home shall, post filter bed, generate 0.87kg/year of total phosphorus and 5.36kg/year of total nitrogen. This is summarised in **Table 5.3**.

Table 5.3 – Proposed Nutrient Arisings (Post Primary Filter Bed)

Nutrient	Annual Load Generated (kg/year)
Total Phosphorus	0.87
Total Nitrogen	5.36

Stage 1d – Proposed Secondary Filter Bed Phosphorus Arisings

5.11. The same methodology has been applied to the Secondary Filter Bed as applied in Stage 1c. The Filter Bed has been sized in accordance with BRE guidance for a tertiary treatment measure being $1m^2$ per person resulting in a minimum area of $34m^2$. The factored nutrient removal efficiency of the filter bed is similarly 40% with respect to phosphorus and 25% with respect to nitrogen.

5.12. The results of this section show that the proposed care home shall, post filter bed, generate 0.52kg/year of total phosphorus and 4.01kg/year of total nitrogen (see **Appendix B**). This is summarised in **Table 5.4**.

Table 5.4 – Proposed Nutrient Arisings (Post Secondary Filter Bed)

Nutrient	Annual Load Generated (kg/year)
Total Phosphorus	0.52
Total Nitrogen	4.01

Stage 2 – Total Phosphorus and Nitrogen from Current Land Use

5.13. The previous use of the land was for a dwelling, which also comprised garden areas, stores and hardstanding. Surface water runoff generated by the existing area would runoff to the southwest and eventually into the River Wensum. The area of the development is 0.760 hectares and can be classified as Low density residential land. The Soilscape Map[25] has been used to provide details of the underlying soil at the site location:

[25] Cranfield Soil and Agri-food Institute 2020 – Soilscape Mapping (Link-to-source)

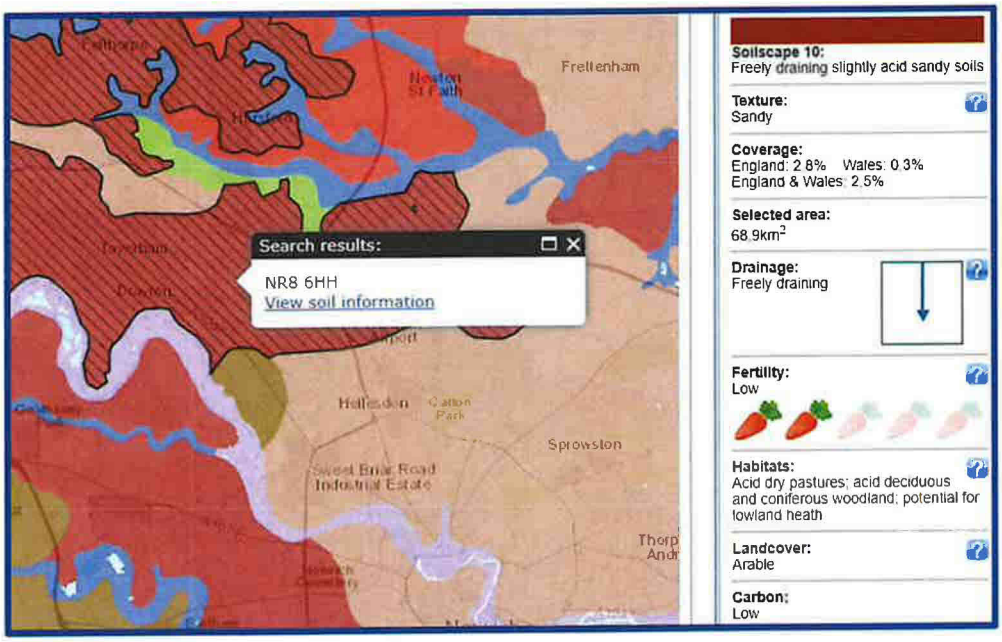


Figure 5.2 – Soilscape Results.

Free draining		
Colour	ID	Name
	3	Shallow lime-rich soils over chalk or limestone
	4	Sand dune soils
	5	Freely draining lime-rich loamy soils
	6	Freely draining slightly acid loamy soils
	7	Freely draining slightly acid but base-rich soils
	10	Freely draining slightly acid sandy soils
	11	Freely draining sandy Breckland soils
	12	Freely draining floodplain soils
	13	Freely draining acid loamy soils over rock
	14	Freely draining very acid sandy and loamy soils

Impermeable		
Colour	ID	Name
	1	Saltmarsh soils
	2	Shallow very acid peaty soils over rock
	8	Slightly acid loamy and clayey soils with impeded drainage
	9	Lime-rich loamy and clayey soils with impeded drainage
	15	Naturally wet very acid sandy and loamy soils
	16	Very acid loamy upland soils with a wet peaty surface
	17	Slowly permeable seasonally wet acid loamy and clayey soils
	18	Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils
	19	Slowly permeable wet very acid upland soils with a peaty surface
	20	Loamy and clayey floodplain soils with naturally high groundwater
	21	Loamy and clayey soils of coastal flats with naturally high groundwater
	22	Loamy soils with naturally high groundwater
	23	Loamy and sandy soils with naturally high groundwater and a peaty surface
	24	Restored soils mostly from quarry and opencast spoil
	25	Blanket bog peat soils
	26	Raised bog peat soils
	27	Fen peat soils

Figure 5.3 – Soilscape/Royal Haskoning Soil Classifications

5.14. As can be seen in **Figure 5.2** and **Figure 5.3**, the soil falls into Soil ID 10, this value has been entered into the spreadsheet. The results from the Soilscape Map tally with the observations made in this report as well as the findings from local BGS Borehole Records[26]. The rainfall quantity at the site is determined to be 750-800mm/year as per NRFA Catchment Data. The results from this section show that the existing land yields a 0.18 kg/year Total Phosphorus load and a 4.02 kg/year Total Nitrogen Load.

Stage 3 – Total Phosphorus and Nitrogen from Proposed Land Use

5.15. The land use shall remain as Low density residential land and therefore the amount of phosphorus and nitrogen generated shall remain the same.

Stage 4 – Calculate Net Change in Nutrient Load

5.16. Stage 4 is an Auto-Input based on the previous stages, the nutrient budget for the development is presented and a 20% uplift is applied acting as a precautionary buffer owing to uncertainties inherent in the Calculator. The guidance notes state that the user: "*...has the option to change this buffer should this be appropriate.*", however the Factor of Safety

[26] BGS – GeoIndex Onshore Borehole and Waterwell Record Mapping.

supplied has merit and has been included in the calculations. As the development shall result in a reduction in phosphorus and nitrogen generated, this stage need not be applied.

6. Mitigation Methods

On-site Mitigation

6.1. The intention of the applicant is to install Package Treatment Plants compliant with BS EN 12566 serving the proposed care home with a secondary treatment system. There are a number of Package Treatment Plants commercially available as presented in **Table 6.1**.

Table 6.1 – Analysis of PTP Systems Commercially Available

PTP System	Description	Phosphorus and Nitrogen Removal Efficiency	Acceptability
Activated Sludge Process (ASP)	This usually consists of a primary aerobic settlement tank often called a biozone which contains microorganisms that break down the phosphorus, these are then transferred to an anaerobic zone where the bacteria settles to the bottom as a sludge which is pumped back into the first chamber.	40-55%	☑
Fixed Bed Reactor (FBR)	Similar to the ASP method, however, comprising of 3 zones: a primary settlement zone, a biozone and then a secondary settlement zone.	Similar to ASP (Circa 40-55%)	☑
Non-Electric Filter (NEF)	A settlement tank connected to a secondary tank containing a filter media which removes the phosphorus. Removal efficiencies can be high but this system usually has a pumped element or deep outlet and the media needs to be replaced.	Can be as high as 87%	☑
Rotating Biological Contactor (RBC)	This is again similar to an ASP system; however the unit contains an innovative system of rotating biodiscs which oxygenate the bacteria in a similar way to an aerated system.	53-55%	☑

Sequencing Batch Reactor (SBR)	These are a more intensive evolution of the ASP system. They utilise an aeration system originating from the base, which not only activates the bacteria but helps to break up the solids, this is an EBPR (Enhanced Biological Phosphorus Removal) system which can yield very high phosphorus removal.	80-95%	☑
Submerged Aeration Filter (SAF)	This is similar to an FBR system; however, the media is loose in the biozone rather than dissolved.	Similar to ASP (Circa 50-55%)	☑
Chemical Dosing Solution	A system that causes the precipitation of phosphorus through coagulation with metallic salts, usually Aluminium or Iron based. This precipitation method yields very high removal efficiencies.	>95%.	☒

6.2. The PTPs to be used are GRAF One2Clean Sequencing Batch Reactor (SBR) treatment plants which utilises only biological treatment processes, whilst still achieving an 80.2% treatment efficiency for phosphorus and an 87.0% TP removal for nitrogen (see **Appendix D**).

6.3. To ensure that the proposed treatment train will work effectively and will not cause pollution to the downstream water network the development must adequately demonstrate Nutrient Neutrality for a minimum of 80-125 years. This will be achieved by following the manufacturers maintenance recommendations for the PTP and the maintenance regime outlined in **Table 6.2** which complies with the recommendations of BRE GBG 42.

Table 6.2 – Maintenance regime for Filter beds.

Task to be undertaken	Frequency
Weeding	Weekly check and weed as appropriate.
Cutting of plants	Annually
General care of system	Regularly
Fence erection (where there will be adjacent livestock)	At establishment stage. Condition of fence to be regularly checked.
Emptying of Humus chamber	Regular checks and emptying once every three months.
Cleaning and checking distributor pipes	Regular checks and cleaning as appropriate.

6.4. To ensure that any future operator/resident is aware of and keeps up maintenance of the entirety of the treatment train a sign shall be fixed within the building stating:

"The foul drainage system from this building discharges to a Package Treatment Plant and constructed filter beds. The Package Treatment Plant requires regular maintenance and

clearing of sludge to the manufacturer's recommendations. The constructed filter beds require weekly weed checks and weeding where appropriate, annual cutting and trimming of plants and the regular cleaning of the distributor pipes."

6.5. The use of a Package Treatment Plant connection to an open watercourse largely complies with the EA's general binding rules[27]; however, a permit will likely be required for the development owing to the volume of wastewater generated, evidenced in **Table 6.3**:

Table 6.3 – EA General Binding Rules for discharged to Surface Water

Rules	Description	Site Condition	Compliance
Rule 1	N/A	N/A	N/A
Rule 2	The discharge must be 5 cubic metres or less per day in volume.	The total daily discharge has been calculated using British Water Flows and Loads and . The results for the proposed 16 bedroom care home is: 12.46m^3/day, this figure should be confirmed with the Package Treatment Plant supplier or permitting specialist.	☒
Rule 3	The sewage must only be domestic.	Only domestic sewage shall be discharged.	☑
Rule 4	The discharge must not cause pollution of surface water or groundwater.	A high functioning PTP is to be installed.	☑
Rule 5	N/A	N/A	N/A
Rule 6	The sewage must receive treatment from a sewage treatment plant.	A high functioning PTP is to be installed.	☑
Rule 7	N/A	N/A	N/A
Rule 8	For discharges in tidal waters, the discharge outlet must be below the mean spring low water mark.	The development is not within a tidal area.	☑
Rule 9	All works and equipment used for the treatment of sewage effluent and its discharge must comply with the relevant design and manufacturing standards i.e. the British Standard that was in force at the time of the installation,	The proposed PTP conforms to BS EN 12566-3.	☑

[27] EA – General binding rules: small sewage discharge to a surface water

	and guidance issued by the appropriate authority on the capacity and installation of the equipment.		
Rule 10	The system must be installed and operated in accordance with the manufacturer's specification.	The One2Clean system is suitable for up to 18 inhabitants and two shall be installed to serve the care home.	☑
Rule 11	Maintenance must be undertaken by someone who is competent.	The system shall be maintained to the manufacturer's recommendations.	☑
Rule 12	Waste sludge from the system must be safely disposed of by an authorised person.	The system shall be emptied as per the manufacturer's instructions.	☑
Rule 13	If a property is sold, the operator must give the new operator a written notice stating that a small sewage discharge is being carried out and giving a description of the wastewater system and its maintenance requirements.	This will be done in writing if the applicant sells the property.	☑
Rule 14	The operator must ensure the system is appropriately decommissioned where it ceases to be in operation so that there is no risk of pollutants or polluting matter entering groundwater, inland fresh waters or coastal waters.	Maintenance company advice will be sought in this instance.	☑
Rule 15	N/A	N/A	N/A
Rule 16	N/A	N/A	N/A
Rule 17	N/A	N/A	N/A
Rule 18	N/A	N/A	N/A
Rule 19	N/A	N/A	N/A
Rule 20	N/A	N/A	N/A
Rule 21	N/A	N/A	N/A

Notes on Discharge to Ground

6.6. A discharge to ground has not been considered appropriate as a mitigation strategy as the overall daily discharge shall exceed the permitted daily volumetric allowance ($2m^3$/day).

7. Conclusion

7.1. As can be seen in this report, the nutrient arisings associated with the development have been extensively considered, along with off-site and on-site mitigation methods. The applicant shall replace the existing Package Treatment Plant (PTP) serving the existing dwelling with high-functioning Package Treatment Plants and install filter beds to provide final cleansing. The applicant shall achieve Nutrient Neutrality through the proposals and therefore nutrient arisings should not prevent planning permission being granted.

Table 7.1 – Pre and Post Mitigation Risk Assessment

Pre Mitigation Risk				
Risk	**Description**	**Probability**	**Severity**	**Action to minimise risk**
Pollution of downstream water bodies.	Phosphorus and Nitrogen discharged from the proposed development causing eutrophication downstream.	Looking at the hydraulic/ hydrological pathways, there is a medium likelihood of nutrient contamination.	Arisings from the development will be low; however, these need to be considered in-combination.	Provide mitigation measures either through site controls or nutrient offsetting.
Post Mitigation Risk				
Risk	**Description**	**Probability**	**Severity**	**Action to minimise risk**
Pollution of downstream water bodies.	Phosphorus and Nitrogen discharged from the proposed development causing eutrophication downstream.	Looking at the hydraulic/ hydrological pathways, there is a medium likelihood of nutrient contamination.	Arisings will be lower than existing through the installation of a higher functioning PTP and filter bed system.	No further action required.
High		Medium		Low

Appendix A Phosphate and Nitrate Calculator Direct Output for Existing Dwelling

(Press Alt + Left Arrow to return if using Hyperlinks)

Stage 1 — **Calculate nutrient load (Kg/year) derived from the development as a result of increased population**

Note: This calculation should only include the additional units resulting from the proposed development, including any development that will result in overnight accommodation. For land not currently in residential use, this will be the total units proposed by the development. However, for land already in residential use, this should only be the increase in units.

The user should input the relevant number of dwellings into options a, b or c below. In the case of residential developments, only option a is required.

1.	Calculate the additional population	Value	Unit
a	Number of dwellings proposed	1	dwellings
	Average occupancy	1.88	persons/dwelling
b	Number of additional rooms above 6 residents (sui generis) for houses in multiple occupation		dwellings
	Average occupancy	1.65	persons/dwelling
c	Number of rooms in a hotel or guest house proposed		dwellings
	Average occupancy	1.65	persons/dwelling
	Number of weeks open per year (1-52)		Weeks
	Average occupancy rate (1-100)		%
d	Number of bedspaces in student accommodation		dwellings
	Average occupancy	1	persons/dwelling
	Number of weeks open per year (1-52)		Weeks
	Average occupancy rate (1-100)		%
	Total population increase generated by the development	**2**	**Persons**

2.	Wastewater volume generated		
	Water use per person	110	Litres/person/day
	Wastewater volume generated by the development	**206**	**Litres/day**

Please select how the sewage from the proposed development will be handled, noting that a development must be handled by either a water recycling centre or onsite treatment plants, and cannot be handled by both. Consideration of wastewater loading is not required where a site drains to a WRC that does not drain in to the River Wensum or the Broads catchments

Is sewage to be handled by water recycling centre? **No**

Is sewage to be handled by Onsite treatment plants? **Yes**

3a. TP budget that would exit the Water Recycling Centre (WRC) after treatment

Note: If the sewage is to be treated by WRCs then the user should select "Yes" in the list above. If package treatment plants are to be used instead, then the user should select "No" above.

This is the process of collecting wastewater from houses and guiding it, via the sewage network, to a WRC (also known as sewage works). The nutrient concentration of the influent is calculated by multiplying the number of people by the expected water usage per day. The nutrient concentration within the effluent is calculated by applying the discharge level of the appropriate WRC. The nutrient loading is expressed in kg/year.

Confirm receiving WRC and discharge level	Value		Unit
Select the WRC the development will connect to	Aldborough Water Recycling Centre		
	Current discharge	Post 2030 discharge	
Phosphorus WRC discharge level	1.57	1.57	mg/l
Nitrogen WRC discharge level	25.00	25.00	mg/l

Note: Please use the drop down lists to select the WRC that the proposed development will be connected to. If the WRC is not known, then please select 'Unknown' from the drop down list.

The 2030 permit limits are included for guidance purposes only and cannot be relied upon until the Levelling Up and Regeneration Bill is passed into legislation.

Calculate the nutrient load discharged by the WRC	Value		Unit
	Current discharge	Post 2030 discharge	
TP discharged by WRC	0.00	0.00	kg/year
TN discharged by WRC	0.00	0.00	kg/year

3b. TP budget for Onsite treatment plants

Note: If the sewage is to be treated by on-site treatment plants then the user should select "Yes" in the list above. If wastewater treatment works are to be used instead, then the user should select "No" above.

On-site treatment plants are pre-manufactured treatment facilities used to treat wastewater in smaller communities or on individual properties. This concept is defined as decentralized wastewater treatment. The nutrient influent is calculated by multiplying the number of people by the expected loading per person. The nutrient effluent is calculated by applying the reduction efficiency. The nutrient loading is expressed in kg/year.

Calculate nutrient load after treatment	Value	Unit
Select the type of On-site treatment works	Default package treatment plant	
Phosphorus discharge level	9.70	mg/l
Nitrogen discharge level	72.90	mg/l

Note: The user must input the reduction efficiency of the PTP. The efficiency of the PTP used must be evidenced. The evidence should include the test result documents from the lab (in English) and/ or measured effluent concentrations from real world applications. If the efficiency is unknown then a precautionary default value can be used

Calculate loading from wastewater with onsite treatment plants	Value	Unit
TP discharged by on-site treatment plant	0.73	kg/year
TN discharged by on-site treatment plant	5.49	kg/year

4.	Additional population load	Value		Unit
		Current	Post 2030	
	TP load from additional population	**0.73**	**0.73**	**Kg/year**
	TN load from additional population	**5.49**	**5.49**	**Kg/year**

Appendix B Phosphate and Nitrate Calculator Direct Output for Proposed Care Home

(Press Alt + Left Arrow to return if using Hyperlinks)

Stage 1 **Calculate nutrient load (Kg/year) derived from the development as a result of increased population**

*Note: This calculation should only include the **additional** units resulting from the proposed development, including any development that will result in overnight accommodation. For land not currently in residential use, this will be the total units proposed by the development. However, for land already in residential use, this should only be the increase in units.*

The user should input the relevant number of dwellings into options a, b or c below. In the case of residential developments, only option a is required.

		Value	Unit
1.	Calculate the additional population		
a	Number of dwellings proposed		dwellings
	Average occupancy	1.88	persons/dwelling
b	Number of **additional** rooms above 6 residents (sui generis) for houses in multiple occupation	10	dwellings
	Average occupancy	1.65	persons/dwelling
c	Number of rooms in a hotel or guest house proposed		dwellings
	Average occupancy	1.65	persons/dwelling
	Number of weeks open per year (1-52)		Weeks
	Average occupancy rate (1-100)		%
d	Number of bedspaces in student accommodation		dwellings
	Average occupancy	1	persons/dwelling
	Number of weeks open per year (1-52)		Weeks
	Average occupancy rate (1-100)		%
	Total population increase generated by the development	**23**	**Persons**
2.	Wastewater volume generated		
	Water use per person	**110**	Litres/person/day
	Wastewater volume generated by the development	**2475**	**Litres/day**

Please select how the sewage from the proposed development will be handled, noting that a development must be handled by either a water recycling centre or onsite treatment plants, and cannot be handled by both. Consideration of wastewater loading is not required where a site drains to a WRC that does not drain in to the River Wensum or the Broads catchments

Is sewage to be handled by water recycling centre? **No**

Is sewage to be handled by Onsite treatment plants? **Yes**

3a. TP budget that would exit the Water Recycling Centre (WRC) after treatment

Note: If the sewage is to be treated by WRCs then the user should select "Yes" in the list above. If package treatment plants are to be used instead, then the user should select "No" above.

This is the process of collecting wastewater from houses and guiding it, via the sewage network, to a WRC (also known as sewage works). The nutrient concentration of the influent is calculated by multiplying the number of people by the expected water usage per day. The nutrient concentration within the effluent is calculated by applying the discharge level of the appropriate WRC. The nutrient loading is expressed in kg/year.

Confirm receiving WRC and discharge level	Value		Unit
Select the WRC the development will connect to	Aldborough Water Recycling Centre		
	Current discharge	Post 2030 discharge	
Phosphorus WRC discharge level	1.57	1.57	mg/l
Nitrogen WRC discharge level	25.00	25.00	mg/l

Note: Please use the drop down lists to select the WRC that the proposed development will be connected to. If the WRC is not known, then please select 'Unknown' from the drop down list.

The 2030 permit limits are included for guidance purposes only and cannot be relied upon until the Levelling Up and Regeneration Bill is passed into legislation.

Calculate the nutrient load discharged by the WRC	Value		Unit
	Current discharge	Post 2030 discharge	
TP discharged by WRC	0.00	0.00	kg/year
TN discharged by WRC	0.00	0.00	kg/year

3b. TP budget for Onsite treatment plants

Note: If the sewage is to be treated by on-site treatment plants then the user should select "Yes" in the list above. If wastewater treatment works are to be used instead, then the user should select "No" above.

On-site treatment plants are pre-manufactured treatment facilities used to treat wastewater in smaller communities or on individual properties. This concept is defined as decentralized wastewater treatment. The nutrient influent is calculated by multiplying the number of people by the expected loading per person. The nutrient effluent is calculated by applying the reduction efficiency. The nutrient loading is expressed in kg/year.

Calculate nutrient load after treatment	Value		Unit
Select the type of On-site treatment works	Package treatment plant (user-defined)		
Phosphorus discharge level	Please enter effluent concentration in cell to right:	1.60	mg/l
Nitrogen discharge level	Please enter effluent concentration in cell to right:	7.90	mg/l

Note: The user must input the reduction efficiency of the PTP. The efficiency of the PTP used must be evidenced. The evidence should include the test result documents from the lab (in English) and/ or measured effluent concentrations from real world applications. If the efficiency is unknown then a precautionary default value can be used

Calculate loading from wastewater with onsite treatment plants	Value	Unit
TP discharged by on-site treatment plant	1.45	kg/year
TN discharged by on-site treatment plant	7.14	kg/year

4.	Additional population load	Value Current	Post 2030	Unit
	TP load from additional population	**1.45**	**1.45**	**Kg/year**
	TN load from additional population	**7.14**	**7.14**	**Kg/year**

Stage 1 **Calculate nutrient load (Kg/year) derived from the development as a result of increased population**

*Note: This calculation should only include the **additional** units resulting from the proposed development, including any development that will result in overnight accommodation. For land not currently in residential use, this will be the total units proposed by the development. However, for land already in residential use, this should only be the increase in units.*

The user should input the relevant number of dwellings into options a, b or c below. In the case of residential developments, only option a is required.

		Value	Unit
1.	Calculate the additional population		
a	Number of dwellings proposed		dwellings
	Average occupancy	1.88	persons/dwelling
b	Number of **additional** rooms above 6 residents (sui generis) for houses in multiple occupation	10	dwellings
	Average occupancy	1.65	persons/dwelling
c	Number of rooms in a hotel or guest house proposed		dwellings
	Average occupancy	1.65	persons/dwelling
	Number of weeks open per year (1-52)		Weeks
	Average occupancy rate (1-100)		%
d	Number of bedspaces in student accommodation		dwellings
	Average occupancy	1	persons/dwelling
	Number of weeks open per year (1-52)		Weeks
	Average occupancy rate (1-100)		%
	Total population increase generated by the development	**23**	**Persons**
2.	Wastewater volume generated		
	Water use per person	**110**	Litres/person/day
	Wastewater volume generated by the development	**2475**	**Litres/day**

Please select how the sewage from the proposed development will be handled, noting that a development must be handled by either a water recycling centre or onsite treatment plants, and cannot be handled by both. Consideration of wastewater loading is not required where a site drains to a WRC that does not drain in to the River Wensum or the Broads catchments

Is sewage to be handled by water recycling centre? **No**

3a. TP budget that would exit the Water Recycling Centre (WRC) after treatment

Note: If the sewage is to be treated by WRCs then the user should select "Yes" in the list above. If package treatment plants are to be used instead, then the user should select "No" above.

This is the process of collecting wastewater from houses and guiding it, via the sewage network, to a WRC (also known as sewage works). The nutrient concentration of the influent is calculated by multiplying the number of people by the expected water usage per day. The nutrient concentration within the effluent is calculated by applying the discharge level of the appropriate WRC. The nutrient loading is expressed in kg/year.

Confirm receiving WRC and discharge level	Value		Unit
Select the WRC the development will connect to	Aldborough Water Recycling Centre		
	Current discharge	Post 2030 discharge	
Phosphorus WRC discharge level	1.57	1.57	mg/l
Nitrogen WRC discharge level	25.00	25.00	mg/l

Note: Please use the drop down lists to select the WRC that the proposed development will be connected to. If the WRC is not known, then please select 'Unknown' from the drop down list.

The 2030 permit limits are included for guidance purposes only and cannot be relied upon until the Levelling Up and Regeneration Bill is passed into legislation.

Calculate the nutrient load discharged by the WRC	Value		Unit
	Current discharge	Post 2030 discharge	
TP discharged by WRC	0.00	0.00	kg/year
TN discharged by WRC	0.00	0.00	kg/year

Is sewage to be handled by Onsite treatment plants? **Yes**

3b. TP budget for Onsite treatment plants

Note: If the sewage is to be treated by on-site treatment plants then the user should select "Yes" in the list above. If wastewater treatment works are to be used instead, then the user should select "No" above.

On-site treatment plants are pre-manufactured treatment facilities used to treat wastewater in smaller communities or on individual properties. This concept is defined as decentralized wastewater treatment. The nutrient influent is calculated by multiplying the number of people by the expected loading per person. The nutrient effluent is calculated by applying the reduction efficiency. The nutrient loading is expressed in kg/year.

Calculate nutrient load after treatment	Value		Unit
Select the type of On-site treatment works	Package treatment plant (user-defined)		
Phosphorus discharge level	Please enter effluent concentration in cell to right:	0.58	mg/l
Nitrogen discharge level	Please enter effluent concentration in cell to right:	4.44	mg/l

Note: The user must input the reduction efficiency of the PTP. The efficiency of the PTP used must be evidenced. The evidence should include the test result documents from the lab (in English) and/ or measured effluent concentrations from real world applications. If the efficiency is unknown then a precautionary default value can be used

Calculate loading from wastewater with onsite treatment plants	Value	Unit
TP discharged by on-site treatment plant	0.52	kg/year
TN discharged by on-site treatment plant	4.01	kg/year

4.	Additional population load	Value Current	Post 2030	Unit
	TP load from additional population	**0.52**	**0.52**	**Kg/year**
	TN load from additional population	**4.01**	**4.01**	**Kg/year**

Stage 2 **Calculate existing (pre-development) nutrient load from current land use of the development**

Note: Where development sites include existing areas that are to be retained, these areas can be excluded from the calculations in both Stages 2 and 3.

1. Identify current land uses of the development site

The user should select the value from the following drop-down list that applies to the development. Use the links below or navigate to the 'Introduction' tab to find instructions on how this information can be acquired.

	Value	Unit
Select the Catchment	Wensum	
Select the soil drainage type	Freely draining	
Select annual average rainfall band	750-800	mm/yr
Within Nitrate Vulnerable Zone (NVZ)	Yes	

Note: Use the Link in the introduction tab to find the appropriate catchment

Note: Use the criteria table in the introduction tab to identify if the soil type

Note: Rainfall can be identified using the map on the Rainfall tab

Note: Use the Link in the introduction tab to find out whether the development is in a Nitrate Vulnerable Zone (NVZ)

2. Input the area of the existing land use type(s)

			TP loading	TN loading	
High density residential	0.760	Hectares	0.00	0.00	Kg/yr
Medium density residential		Hectares	0.00	0.00	Kg/yr
Low density residential		Hectares	0.18	4.02	Kg/yr
Commercial / Industrial		Hectares	0.00	0.00	Kg/yr
Urban open space		Hectares	0.00	0.00	Kg/yr
Dairy		Hectares	0.00	0.00	Kg/yr
Lowland grazing		Hectares	0.00	0.00	Kg/yr
Mixed		Hectares	0.00	0.00	Kg/yr
Poultry		Hectares	0.00	0.00	Kg/yr
Pigs		Hectares	0.00	0.00	Kg/yr
Horticulture		Hectares	0.00	0.00	Kg/yr
Cereals		Hectares	0.00	0.00	Kg/yr
General arable		Hectares	0.00	0.00	Kg/yr
Allotments and city farms		Hectares	0.00	0.00	Kg/yr
Woodland (e.g. conifer, mixed, broad-leaved)		Hectares	0.00	0.00	Kg/yr
Greenspace		Hectares	0.00	0.00	Kg/yr
Shrub / heathland / bracken / bog		Hectares	0.00	0.00	Kg/yr
Water		Hectares	0.00	0.00	Kg/yr
Sum total	**0.760**	**Hectares**	**0.18**	**4.02**	**Kg/yr**

3. Calculate loading from current land usage

	Value	Unit
TP load from proposed land usage	**0.18**	**Kg/yr**
TN load from proposed land usage	**4.02**	**Kg/yr**

Stage 3 **Calculate nutrient load for the proposed development**

Note: This section should include all land uses within the proposed development. Where the proposed scheme is to create new wetlands, woodlands, nature reserves, etc. within the development site area, then this should be included within this section. Any offsite mitigation should not be included below, and should instead be inputted in the mitigation stages (if mitigation is required).

1.	Identify proposed land uses of the development site	Value	Unit
	High intensity urban land		Hectares
	Medium intensity urban land		Hectares
	Low intensity urban land	0.760	Hectares
	Commercial / Industrial		Hectares
	Open urban space		Hectares
	Allotments and city farms		Hectares
	Woodland (e.g. conifer, mixed, broad-leaved)		Hectares
	Green space		Hectares
	Shrub / heathland / bracken / bog		Hectares
	Water		Hectares

2.	Designed Wetlands / SuDS		
	Wetland / SuDS area		Hectares
	TP Banking coefficient		kg/ha/year
	TN Banking coefficient		kg/ha/year

Note: Please input the banking coefficient (i.e. the nutrient removal amount in kg/ha/yr) calculated for the designed wetland / SuDS. The calculated value should be justifiable with supporting evidence.

Sum total of land uses	**0.760**	**Hectares**

Note: The sum total of land uses must equal the development site area inputted in Stage 2 - the box will colour red if the areas do not match. Wetland refers to specific wetland related to a watercourse. For more information, please refer to the land use definitions in the help tab.

3.	Calculate loading from proposed land usage	Value	Unit
	TP load from proposed land usage	**0.18**	**kg/year**
	TN load from proposed land usage	**4.02**	**kg/year**

Stage 4 **Calculate the net change in nutrient load from the proposed development**

Note: This stage calculates the net change in TP and TN load to the catchment from the proposed development. This is derived by calculating the difference between the load calculated for the proposed development (wastewater, urban area, open space, etc.) and that for the existing land uses. The nutrient budget for the site has been calculated under current and post-2025 WRC permit levels, where applicable. The nutrient budgets under proposed Post 2030 permit limits are for guidance purposes only until the permit limits are put into legislation.

		Current	Post 2030	
1.	Identify the load from additional population	Value	Value	Unit
	TP Loading from additional population	**0.52**	**0.52**	**kg/year**
	TN Loading from additional population	**4.01**	**4.01**	**kg/year**
2.	Calculate net change in nutrient load from land use change	Value	Value	Unit
	TP load from land use change	**0.00**	**0.00**	**kg/year**
	TN load from land use change	**0.00**	**0.00**	**kg/year**
3.	Calculate nutrient budget for the development site	Value	Value	Unit
	TP budget for the site	**0.52**	**0.52**	**kg/year**
	TN budget for the site	**4.01**	**4.01**	**kg/year**
4.	Calculate precautionary buffer	Value	Value	Unit
	Buffer amount	20	20	%
	TP Precautionary buffer	**0.10**	**0.10**	**kg/year**
	TN Precautionary buffer	**0.80**	**0.80**	**kg/year**

Summary

No. of dwellings	10
Onsite treatment plant	Package treatment plant (user-defined)
Current TP discharge concentr	0.58
Current TN discharge concentr	4.44
Post 2030 TP discharge concer	0.58
Post 2030 TN discharge concei	4.44
TP current land use	0.18
TP proposed land use	0.18
TN current land use	4.02
TN proposed land use	4.02

Note: The figures used throughout this model are based on scientific research, evidence and modelled catchments and represent the best available evidence. However, it is important that a precautionary buffer is used that recognises the uncertainty with these figures and ensures, with reasonable certainty, that there will be no adverse effect on site integrity. As such, a 20% precautionary buffer added to the nutrient budget.

		Value		Unit
5.	**Total nutrient budget for the development site**			
	Total Phosphorus budget for the site	**0.62**	**0.62**	**Kg/year**
	Total Nitrogen budget for the site	**4.82**	**4.82**	**Kg/year**

Current TP loading

Development will generate additional Phosphate (Mitigation required) - Please progress to 'Mitigation current' tab

Post 2030 TP loading

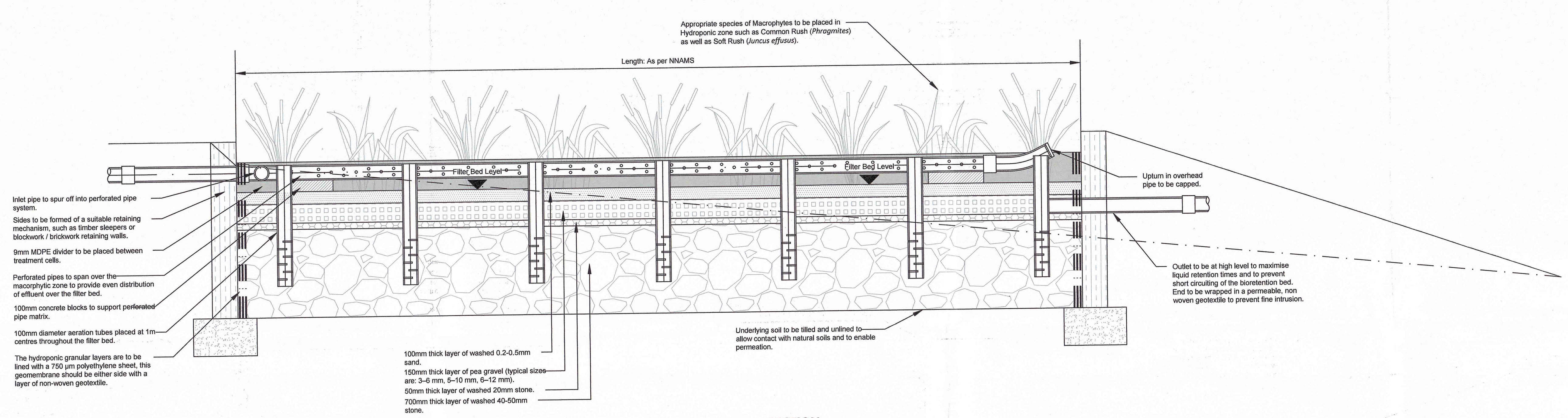
Development will generate additional Phosphate (Mitigation required) - Please progress to 'Mitigation - post 2030' tab

Current TN loading

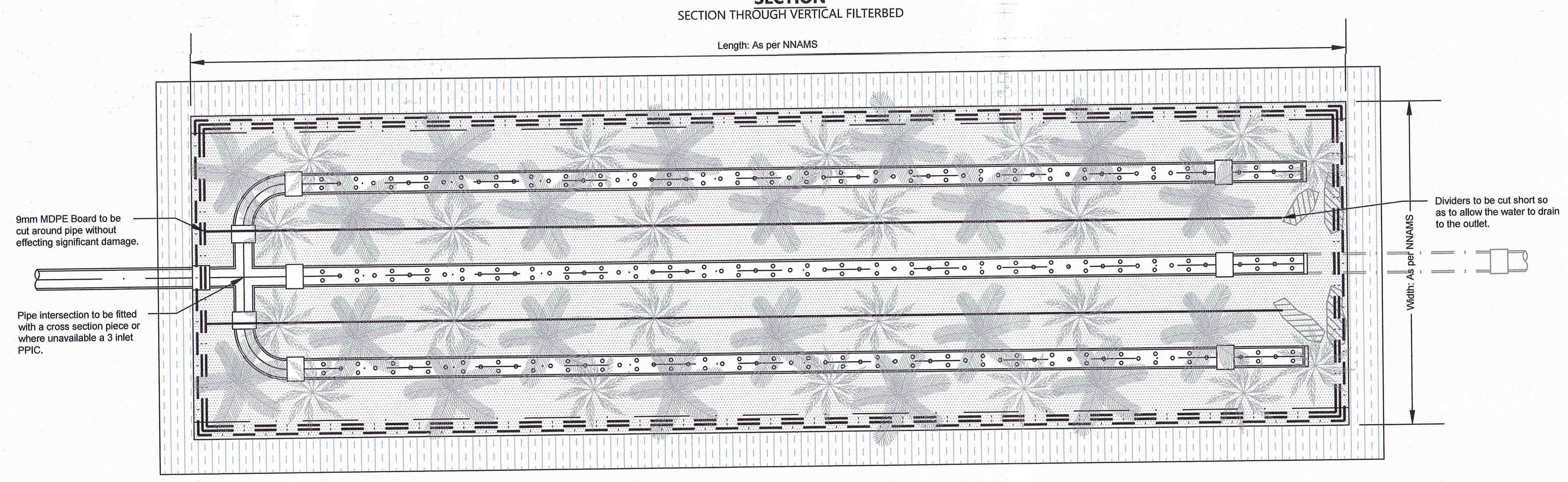
Development will generate additional Nitrate (Mitigation required) - Please progress to 'mitigation - current' tab

Post 2030 TN loading

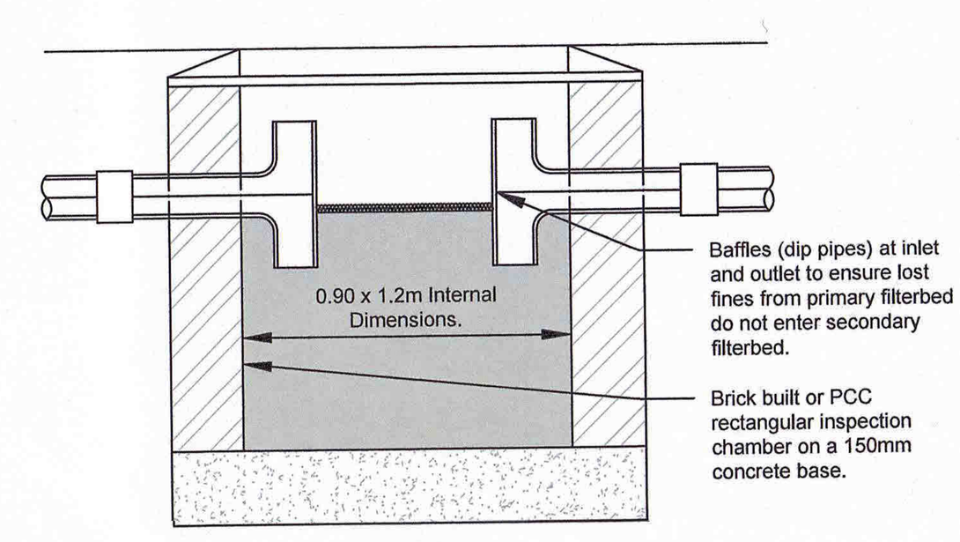
Development will generate additional Nitrate (Mitigation required) - Please progress to 'Mitigation - post 2030' tab



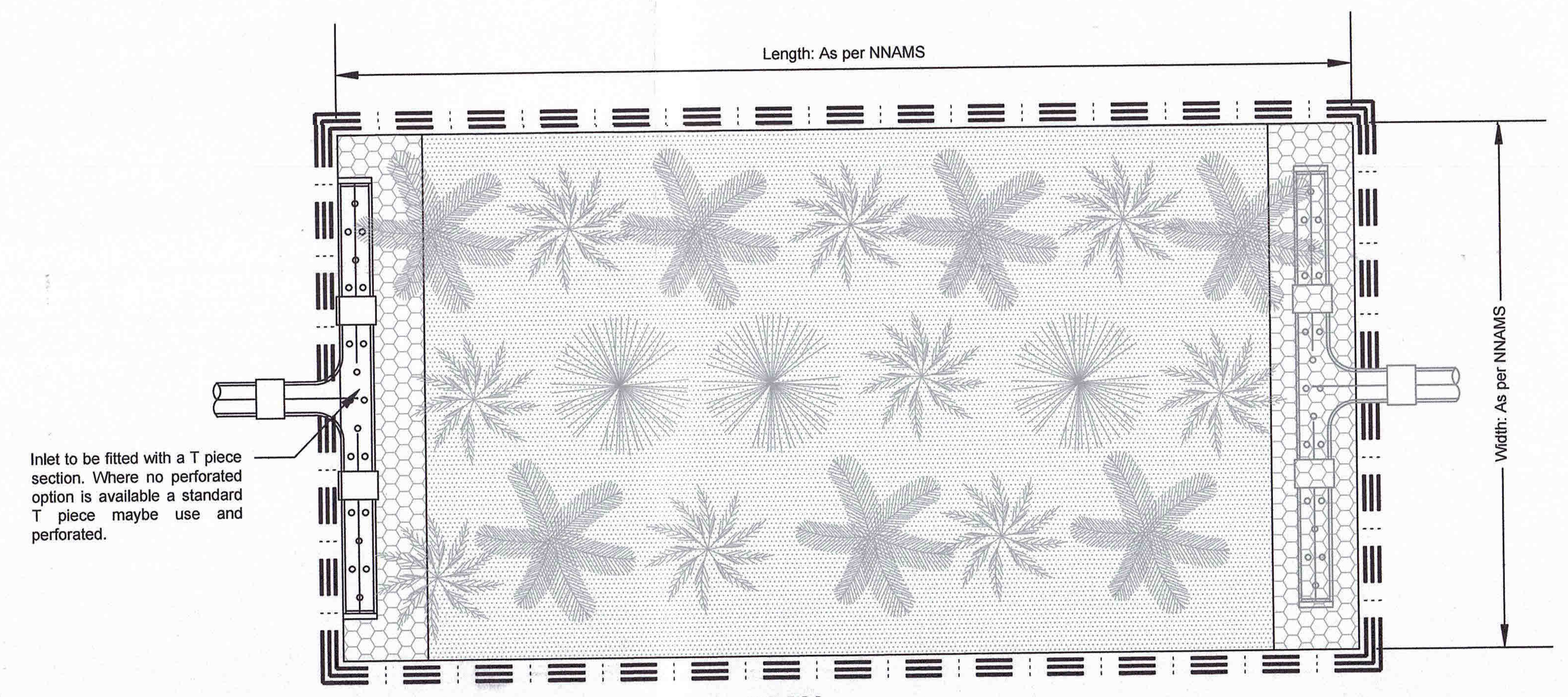
SECTION
SECTION THROUGH VERTICAL FILTERBED



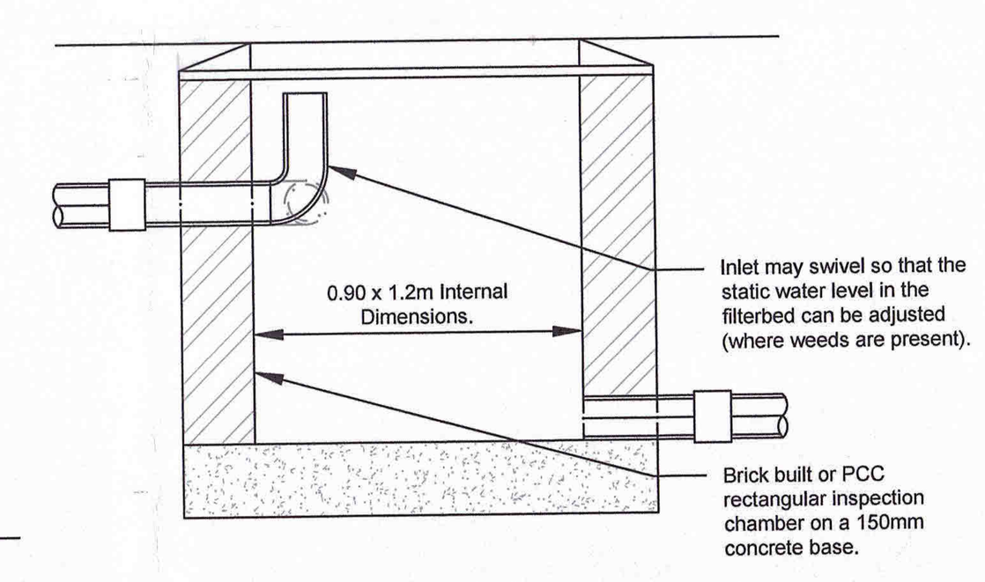
PLAN
PLAN VIEW OF VERTICAL FILTERBED



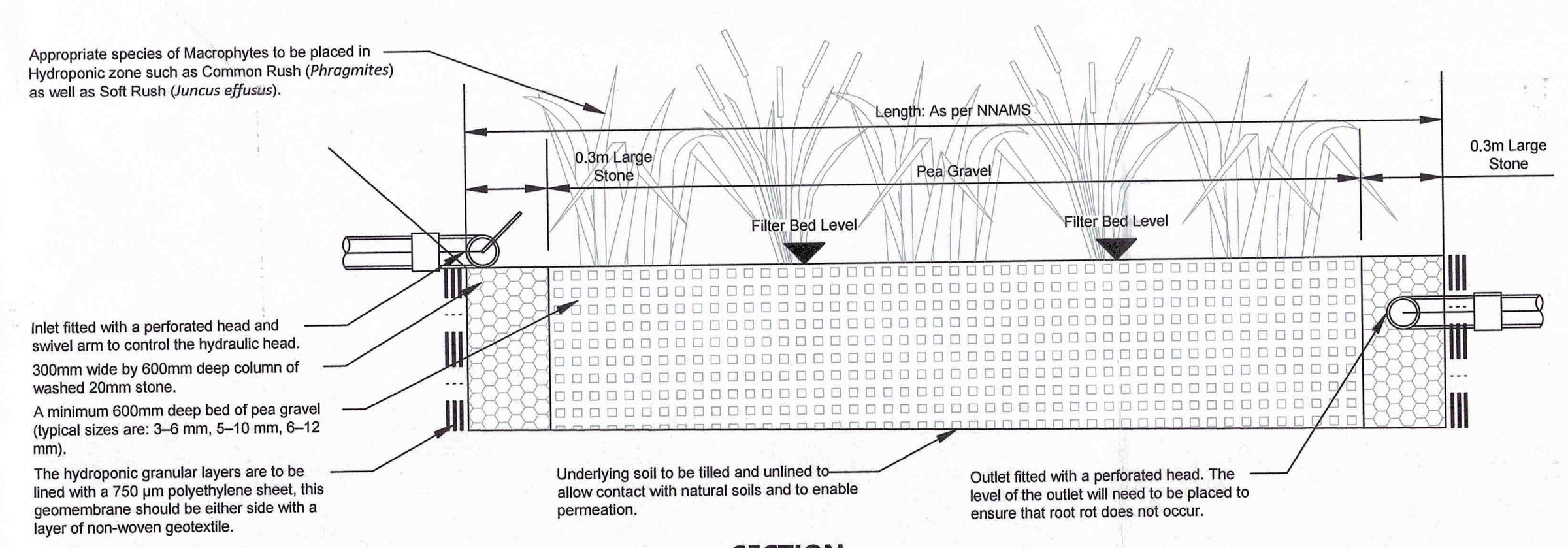
DETAIL
DETAILED SECTION OF INTERMEDIARY HUMUS CHAMBER



PLAN
PLAN VIEW OF HORIZONTAL FILTERBED



DETAIL
DETAILED SECTION OF OUTLET CHAMBER DOWNSTREAM OF THE HORIZONTAL FILTERBED



SECTION
SECTION THROUGH HORIZONTAL FILTERBED

A1

General Notes

1. This drawing is for planning purposes only and cannot be relied upon as construction information. Detailed levels information will be required for construction drawings.
2. All installed pipework and drainage infrastructure must be installed inline with the relevant Approved Document and British Standard to the satisfactions of the Building Control Officer and any other relevant inspector.

Drawing Reference Table

21036753-0003	Site Plan As Proposed

REV.	REVISION DETAILS	DATE	INITIAL
1.2	Horizontal Filter Bed added.	28.04.2023	ZS
1.1	First Issue.	11.04.2023	ZS

EnvirEn

Hill House, Drayton

Filter Bed Construction Detailing

PLANNING — Drawn by: ZS

Drawing Scale: 1:20 — First issued: 11.04.2023

Drawing No.: 230043-1101 — Revision Letter: 1.2

Appendix C Filter Bed Detailing

(Press Alt + Left Arrow to return if using Hyperlinks)

Appendix D GRAF One2Clean Nutrient Removal Efficiency

(Press Alt + Left Arrow to return if using Hyperlinks)

Prüfinstitut für Abwassertechnik GmbH

PERFORMANCE RESULTS

Otto Graf GmbH
Carl-Zeiss-Str. 2 - 6, 79331 Teningen, Germany

EN 12566-3
Small wastewater treatment systems for up to 50 PT

Small wastewater treatment system one2clean
SBR plant in one two-zone polypropylene tank

Test report PIA2014-216B14.01.e

Nominal organic daily load*	0.27	kg/d	
Nominal hydraulic daily load	0.75	m³/d	
Material	polypropylene		
Treatment efficiency (nominal sequences)		Efficiency	Effluent
	COD	94.2 %	43 mg/l
	BOD_5	98.0 %	7 mg/l
	SS	96.3 %	14 mg/l
	NH_4-N**	98.3 %	0.5 mg/l
	N_{tot}**	87.0 %	7.9 mg/l
	P_{tot}	80.2 %	1.6 mg/l
Electrical consumption	0.63	kWh/d	

**at a test influent of ≥ 300 mg/l BOD_5 (mean)*
***determined for temperatures ≥ 12°C in the bioreactor*

Performance tested by:

PIA – Prüfinstitut für Abwassertechnik GmbH
(PIA GmbH)
Hergenrather Weg 30
52074 Aachen, Germany

This document replaces neither the declaration of performance nor the CE marking.

Notified Body No 1739

Certified according to ISO 9001:2008

DAkkS Deutsche Akkreditierungsstelle D-PL-17712-01-00

Prüfinstitut für Abwassertechnik GmbH
geprüft - tested - testé

Elmar Lancé November 2014

Appendix E Proposed Site Plan

(Press Alt + Left Arrow to return if using Hyperlinks)

Issue Status

PLANNING

Revision		Drawn	Check	Date
A	Layout revised. Colour hatching added.	JRW	FIH	30.03.22
B	Scale bar added.	JRW	FIH	19.04.22

N

1:200
0 2 4 6 8 10 12 14

client
Ethos Care

project
Hill House,
Drayton

drawing
Site Plan As Proposed

Date	07/01/2022	Scale	1:200 @ A1
Drawn	JRW	Check	FIH

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21	036753	0003	B

Appendix F FDA1 Form

(Press Alt + Left Arrow to return if using Hyperlinks)

Foul Drainage Assessment Form (FDA)

Please note: You should only use this form for planning related queries. You cannot use it to apply for an Environmental Permit but you may submit a copy of the information you have provided for planning purposes in support of your Environmental Permit application. Further information on how to apply for an environmental permit and general binding rules applicable to small discharges of domestic sewage effluent is available on the gov.uk website.

APPLICANT DETAILS
Name Mark Balaj (completed on his behalf by Zak Simmonds)
Address Land off Hill House, Hall Lane, Drayton, Norwich, NR8 6HH
Telephone No 01275 560427
e-mail zak.simmonds@enviren.co.uk

We will use the information you provide on this form to establish whether non-mains drainage, either a new system or connection to an existing system, would be acceptable. It is important that you provide full and accurate information. Failure to do this will delay the processing of your application.

You must provide evidence that a connection to the public sewer is not feasible.

Other than in very exceptional circumstances, we will not allow the use of non-mains drainage as part of your Planning or Building Regulation application unless you can prove that a connection to the public sewer is not feasible. We do not consider non-mains drainage systems to be environmentally acceptable in locations where it is feasible to connect to a public sewer. Please note that a lack of capacity in, or other operating problems with, the public sewer are not valid reasons to use a non-mains drainage system where it is otherwise feasible to connect to a public sewer.

Where connection to the public sewer is feasible, you may need to get the agreement of either the owners of any land through which the drainage will run or, if you intend to connect via an existing private drain, the owner of that private drain.

The National Planning Practice Guidance and Building Regulations Approved Document H give a hierarchy of drainage options that must be considered and discounted in the following order:

1 Connection to the public sewer
2 Package sewage treatment plant (which can be offered to the Sewerage Undertaker for adoption)
3 Septic Tank
4 If none of the above are feasible a cesspool

You must respond to all the following questions. If you wish to submit additional information please do so, marked clearly "Additional Information". **In some cases you will be required to provide further information in order to demonstrate that any non-mains foul drainage system proposed is acceptable.**

Feasibility of mains foul sewer connection	YES	NO
Have you provided a written explanation of why it is not feasible to connect to the public foul sewer with this form? *This must include a scaled map showing the nearest public foul sewer connection point - check with your local sewerage undertaker.*	✓	
Is the distance from your site to the closest connection point to the public foul sewer less than the number of properties to be built on the site multiplied by 30m? *(see Guidance Note 2)*		✓
Does your proposal form part of a phased development or planned development of a wider area? *If YES, please provide further details including references of any planning permissions already granted.*		✓

Non-mains connection

Please provide a plan with dimensions that clearly shows the location of the whole system in relation to the proposed development and the position of the key elements e.g. septic tank, drainage fields and points of discharge.

1. Existing system	YES	NO
Do you intend to use an existing non-mains foul drainage system?		✓
If YES, does the system already have an Environmental Permit issued by the Environment Agency? *(In the case of a cesspool write N/A)* If YES, please provide Environmental Permit reference number.....	N/A	N/A

2. Discharge	YES	NO
Do you propose to use a package treatment plant?	✓	
Do you propose to use a septic tank?		✓
Do you propose to use a cesspool? *If YES go to Q4*		✓
Have you considered having your system adopted by the sewerage undertaker? *(see Guidance Note 7).*		✓
Will all, or any part of, the discharge go to a drainage field or soakaway? *(see Guidance Note 3)* - this includes systems that combine a drainage field with a high level overflow to watercourse *If YES go to Q3.*		✓
Do you intend to use a system that discharges solely to watercourse? *(see Guidance Note 3) If YES go to Q9.*	✓	

3. Water abstraction	YES	NO
Do you receive your water from the public mains supply?	✓	
If not, where do you get your water supply from?	N/A	N/A

4. Cesspools *(For methods other than cesspools write N/A)*	YES	NO
Have you provided written justification for the use of a cesspool in preference to more sustainable methods of foul drainage disposal? *(see Guidance Note 4)*	N/A	N/A

5. Drainage field design *(For cesspools write N/A)*	YES	NO
Will the system discharge to a drainage field designed and constructed in accordance with British Standard BS6297:2007? If not, why not?	N/A	N/A
Will the discharge from the system be located in a Source Protection Zone 1 (SPZ1)?	N/A	N/A

6. **Ground Conditions** *(For cesspools write N/A)*	YES	NO
6a. Have you submitted a copy of the percolation test results with this form *(see Guidance Note 6)?* 6b. If NO please explain the justification for not undertaking or submitting these tests.	N/A	N/A
6c. Is any part of the system in land which is marshy, water logged or subject to flooding?	N/A	N/A
6d. Will the soakaway be located on artificially raised, made-up ground or ground likely to be contaminated? *If YES please provide details as additional information.*	N/A	N/A
6e. Have you submitted the results of a trial hole at the site to establish that the proposed drainage field will be above any standing groundwater *(see Guidance Note 6)?*	N/A	N/A

7. **Available Land**	YES	NO
Is the application site plus any available area for a soakaway less than 0.025 hectares ($250m^2$)?		✓

8. **Siting of drainage field/soakaway discharge from a septic tank or package treatment plant or other secondary treatment.** *You may need to make local enquiries to get a full answer to these questions.*	YES	NO
Will it be at least **10m** from a watercourse, permeable drain or land drain?	N/A	N/A
Will it be at least **50m** from any point of abstraction from the ground for a drinking water supply (e.g. well, borehole or spring)? *This includes your own or a neighbour's supply.*	N/A	N/A
Will the discharge be within a groundwater Source Protection Zone 1? *If yes, you will need to apply for an environmental permit*	N/A	N/A
Are there any drainage fields/soakaways within **50m**? *This includes any foul drainage discharge system (other than the subject of this application) or surface water soakaway on either your own or a neighbour's property.*	N/A	N/A
Will it be at least **15m** from any building?	N/A	N/A
Will there be any water supply pipes or underground services within the disposal system, other than those required by the system? *(For cesspools write N/A)*	N/A	N/A
Will there be any access roads, driveways or paved areas within the disposal area? *(For cesspools write N/A)*	N/A	N/A

9. **Siting of treatment plant, septic tank or cesspool**	YES	NO
Is it at least **7m** from the habitable part of a building?	✓	
Will there be vehicular access for emptying within **30m?**	✓	
Can the plant, tank or cesspool be maintained or emptied without the contents being taken through a dwelling or place of work?	✓	

10.Expected flow

Please estimate the total flow in litres per day *(see Guidance Note 5).*	***2,550 litres***

11. **General Binding Rules for Small Sewage Discharges**	YES	NO
Does the system meet the requirements of the General Binding Rules for small sewage discharges?	✓	

12. Maintenance

How do you propose to maintain the system?

The system shall be maintained in line with the manufacturer's recommendations.

13. Declaration

I declare that the above information is factually correct.

Name	Signature	Date
Mark Balaj (completed on his behalf by Zak Simmonds)	Zak Simmonds	11/04/2023

GUIDANCE NOTES:

1) This form is for use with *the National Planning Practice Guidance, British Standard BS6297:2007 and Building Regulations Approved Document H*. It is intended to help Local Planning Authorities establish basic information about your non-mains drainage system and decide whether you need to submit a more detailed site assessment. If a detailed site assessment is requested but not submitted, your planning application might be refused.

2) Where the distance from a site to the closest point of connection to the foul sewer is less than the number of properties that are proposed to be built on that site multiplied by 30m an Environmental Permit will be required and an applicant will need to demonstrate as part of any application for such a permit why connection to the public foul sewer is not feasible.

Number of domestic properties served by the sewage treatment system [1] x 30 metres = Answer [30] metres

3) In addition to Planning Permission and Building Regulation approval **you may also require an Environmental Permit from the Environment Agency (EA). Please note that the granting of Planning Permission or Building Regulation approval does not guarantee the granting of an Environmental Permit. Upon receipt of a correctly filled in application form the EA will carry out an assessment. It can take up to 4 months before the Agency is in a position to decide whether to grant a permit or not**.

4) The use of cesspools is an option of last resort as set out in the non-mains drainage hierarchy of preference in Building Regulations Approved Document H. In principle, a properly constructed and maintained cesspool, being essentially a holding tank with no discharges, should not lead to environmental, amenity or public health problems. However, in practice, it is known that such problems occur as a result of frequent overflows due to poor maintenance, irregular emptying, lack of suitable vehicular access for emptying and even through inadequate capacity. In addition to this the requirement for frequent emptying is usually carried out by a contractor involving road transport with associated environmental costs. For these reasons, the use of cesspools will not normally be considered to be a long-term foul sewage disposal solution. In view of the environmental risks associated with their use, any proposal to use cesspools must be fully justified to the Local Planning Authority

5) Package treatment plants and septic tanks should be designed and sized according to the advice given in the current edition of Flows and Loads, published by British Water. Volumes for larger systems should be calculated based on expected flows arising from the development.

6) You should refer to Building Regulations Approved Document H2 with regard to the general requirements for construction of non mains sewerage systems. **Sections 1.33 to 1.38** deal with the test requirements for trial holes and percolation tests and for convenience the text of these sections is repeated below:

1.33 A trial hole should be dug to determine the position of the standing groundwater table. The trial hole should be a minimum of 1m² in area and 2m deep, or a minimum of 1.5m

below the invert of the proposed drainage field pipework. The ground water table should not rise to within 1m of the invert level of the proposed effluent distribution pipes. If the test is carried out in summer, the likely winter groundwater levels should be considered. A percolation test should then be carried out to assess the further suitability of the proposed area.

1.34 *Percolation test method – A hole 300mm square should be excavated to a depth 300mm below the proposed invert level of the effluent distribution pipe. Where deep drains are necessary the hole should conform to this shape at the bottom, but may be enlarged above the 300mm level to enable safe excavation to be carried out. Where deep excavations are necessary a modified test procedure may be adopted using a 300mm earth auger. Bore the test hole vertically to the appropriate depth taking care to remove all loose debris.*

1.35 *Fill the 300mm square section of the hole to a depth of at least 300mm with water and allow it to seep away overnight.*

1.36 *Next day, refill the test section with water to a depth of at least 300mm and observe the time, in seconds, for the water to seep away from 75% full to 25% full level (i.e. a depth of 150mm). Divide this time by 150mm. The answer gives the average time in seconds (Vp) required for the water to drop 1mm.*

1.37 *The test should be carried out at least three times with at least two trial holes. The average figure from the tests should be taken. The test should not be carried out during abnormal weather conditions such as heavy rain, severe frost or drought.*

1.38 *Drainage field disposal should only be used when percolation tests indicate average values of V_p of between 12 and 100 and the preliminary site assessment report and trial hole tests have been favourable. This minimum value ensures that untreated effluent cannot percolate too rapidly into groundwater. Where V_p is outside these limits effective treatment is unlikely to take place in a drainage field. However, provided that an alternative form of secondary treatment is provided to treat the effluent from the septic tanks, it may still be possible to discharge the treated effluent to a soakaway.*

N.B. When determining whether a discharge may be made under statutory General Binding Rules one of the requirements is that any drainage field must be designed and constructed in accordance with BS6297:2007. This specifies that the minimum percolation rate under that standard is 15s/mm and any discharge made to ground where the percolation rate is less than 15s/mm is subject to the granting of an Environmental Permit.

7) Developers may requisition a sewer from the Sewerage Undertaker to connect their development to the public sewer. Should this not be feasible on the grounds of cost and practicability, on site treatment in the form of package plants and their associated sewers (if constructed to an acceptable standard) can be offered to the sewerage undertaker for adoption. This approach is in support of advice from the Government contained in the National Planning Practice Guidance Developers are urged to discuss their requirements with the Sewerage Undertaker at the earliest possible opportunity.

8) Glossary

Package treatment plant
A package treatment plant is a system which offers varying degrees of biological sewage treatment and involves the production of an effluent which can be disposed of to ground via a drainage field or direct to a watercourse. There are many varieties of package treatment plant but all involve settling the solids before and/or after a biological treatment stage and almost all use electricity. Package treatment plants usually treat sewage to a higher standard than septic tanks but are vulnerable in the event of power failures and require more regular servicing and maintenance to ensure that they work effectively. The type of system chosen should be appropriate to the type of development proposed and take account of variations in flow and periods of inactivity, for example where the system will serve holiday accommodation where occupation and maintenance may be more irregular.

Septic tank
A septic tank is a two or three chamber system, which retains sewage from a property for sufficient time to allow the solids to form into sludge at the base of the tank, where it is partially

broken down. The remaining liquid in the tank then drains from the tank by means of an outlet pipe.

Effluent from a septic tank is normally disposed of to ground via a drainage field and receives further treatment in the soils surrounding that drainage field, so that it does not generate a pollution risk to surface waters or groundwater resources (underground water). The most commonly used form of drainage field is a subsurface irrigation area, comprising a herringbone pattern of interconnecting dispersal pipes laid in shallow, shingle filled trenches. The dispersal pipes within the drainage field should be located at as shallow a depth as possible, usually within 1 metre of the ground surface. A septic tank typically needs to be desludged at least once a year in order to ensure that it continues to work effectively.

Cesspool

A cesspool is a covered watertight tank used for receiving and storing sewage and has no outlet. It relies on road transport for the removal of raw sewage and is therefore the least sustainable option for sewage disposal. It is essential that a cesspool is, and remains, impervious to the ingress of groundwater or surface water.

APPENDIX 3

Property PTP Specification

General Notes

1. This drawing is for planning purposes only and cannot be relied upon as construction information. Detailed levels information will be required for construction drawings.
2. All levels are to an assumed adjacent datum based on local mapping information. Actual levels on-site will vary and will need further investigation. Slab and Spot levels shown on this layout are indicative and act as a minimum level in relation to adjacent spot levels.
3. All installed pipework and drainage infrastructure must be installed inline with the relevant Approved Document and British Standard to the satisfactions of the Building Control Officer and any other relevant inspector.

Key

- Foul Water Sewer
- Root Protection Zone
- Clancy Consulting Drainage Information
- Inspection Chamber
- Proposed Package Treatment Plant
- Drainage Field
- Drainage Field 15m offset requirement
- Package Treatment Plan 7m offset requirement

Drawing Reference Table

1102	Foul Drainage Strategy Plan

REV.	REVISION DETAILS	DATE	INITIAL
1.4	Cover levels and invert levels added.	26.01.2024	ZS
1.3	Drainage field position updated.	23.01.2024	ZS
1.2	Filter beds replaced with SPEL filters.	10.01.2024	ZS
1.1	First Issue.	24.10.2023	ZS

EnvirEn

Hill House,
Drayton

Foul Drainage Strategy Plan

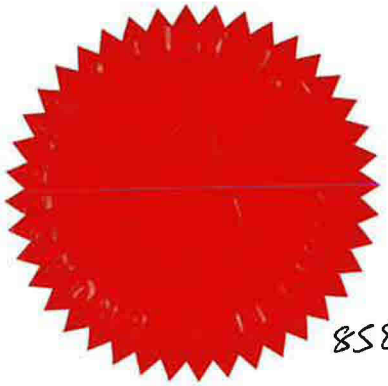
PLANNING

Drawn by: ZS
Drawing Scale: NTS
First Issued: 24.10.2023
Drawing No.: 230043-1102
Revision Letter: 1.4

A1

IN WITNESS whereof the parties hereto have executed this document as a Deed on the day and year first before written.

THE COMMON SEAL OF)
Broadland District Council)
was affixed hereto in the presence of: [redacted])



Authorised Signatory: Deputy Monitoring Officer [redacted]

and this Deed has been duly and properly executed
in accordance with the constitution of Broadland District Council

EXECUTED AS A DEED)
by [redacted])
in the presence of:)

Signature of witness: [redacted]
Name of witness (block capitals). [redacted]
Witness address.. [redacted]
Witness occupation. [redacted].....

EXECUTED AS A DEED)
by [redacted])
in the presence of:)

Signature of witne [redacted]
Name of witness
Witness address.. [redacted]
Witness occupation.. [redacted]..

Signed as a deed by

[redacted]

as attorney for

LendInvest Loans Limited

[redacted]

as attorney for LendInvest Loans Limited.

in the presence of-

[redacted]

Witness Signature

Witness Name

Witness Address

Birketts LLP
Kingfisher House,
1 Gilders Way,
Norwich,
NR3 1UB