Canham Consulting

Structural Civil Building Engineers

Nutrient Neutrality Assessment and Mitigation Strategy



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Site:	**Millshop Ebridge Mill, Happisburgh Road, White Horse Common, North Walsham, NR28 9LJ**
Client:	**Mr G Trevatt**
Prepared By:	**Matthew Herring MEng CEng MICE**
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The table below provides a record of document issue and revision history:

Revisions					
Rev	**Description**	**Prepared By**	**Checked By**	**Approved By**	**Date**
P01	Approval	MH	JL	MH	22/04/24
P02	Approval	MH	JL	MH	26/04/24

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1 INTRODUCTION

Canham Consulting Ltd have been commissioned to produce a Nutrient Neutrality Assessment and Mitigation Strategy in support of the conversion of The Millshop to a Dwelling in relation to Ebridge Mill. A plan of the development can be found in Appendix A.

The site location can be seen in Figure 1 below.

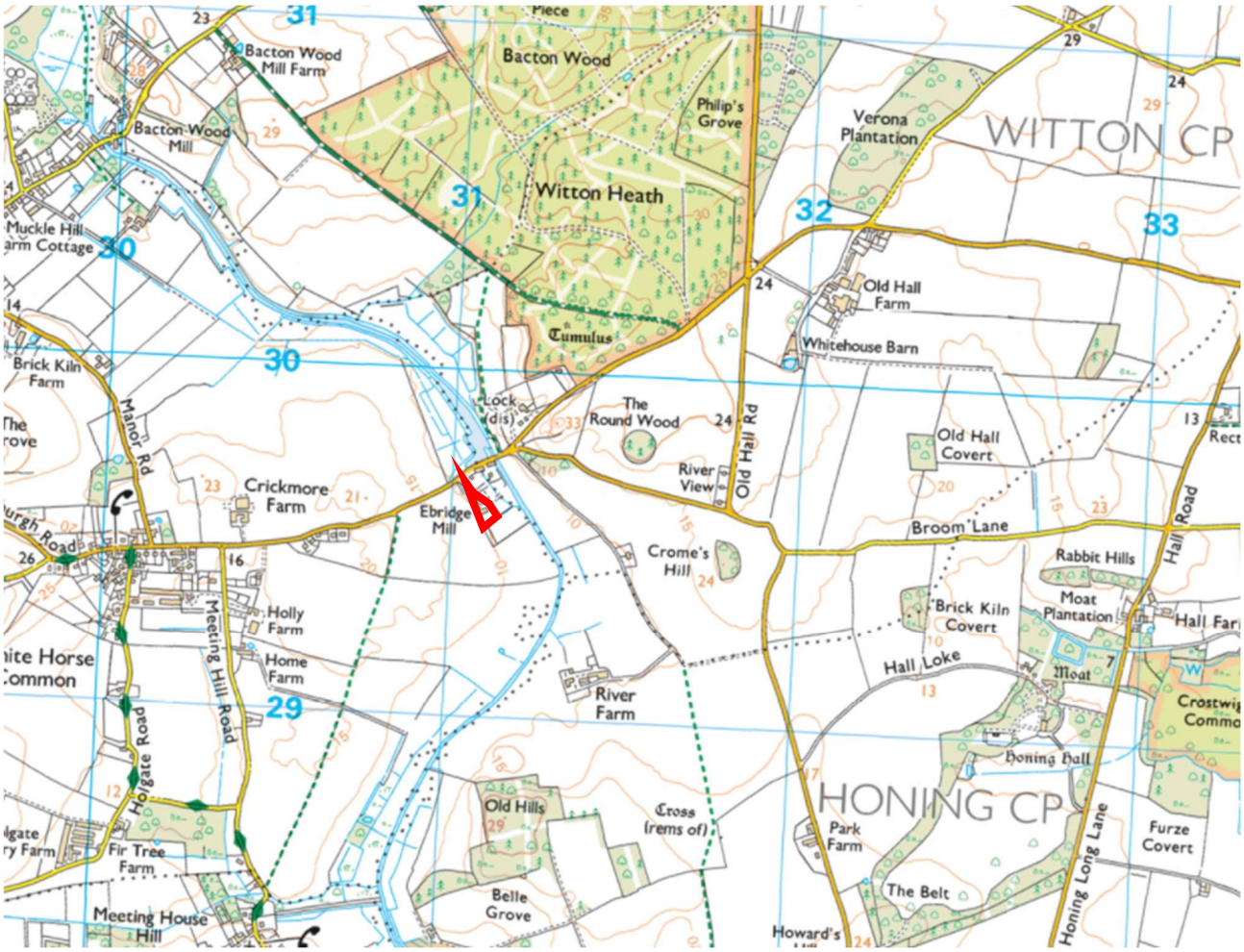


Figure 1 – Site Location

The site is adjacent to the North Walsham and Dilham Canal which is in the catchment of The River Bure and based on the purpose as a single dwelling, is therefore subject to nutrient neutrality requirements relating to phosphorus and nitrogen.

The building was last used in 2020, prior to COVID lock-down, in connection with the sale of pet foods. The use of the building as a shop was in operation in August 2018. The building has a long history of retail use, having been built for the sale of animal feeds in connection with Ebridge Mill. The site can be considered as Commercial/Industrial across the area of 320m^2. The wider site will not change.

The site area under consideration for Nutrient Neutrality covers the full area; for Nutrient Neutrality purposes we have considered the proposed development as Low Density Residential use based on the single plots across over the area.

2 NUTRIENT NEUTRALITY CALCULATION

Based on the Cranfield University Soilscapes webtool as recommended by the Norfolk Calculator, the soils at site sits over two classifications, Soilscape 6 and 23 (Freely draining slightly acid loamy soils and Loamy and sandy soils with naturally high groundwater and a peaty surface respectively). Neither classification has an impact on the overall calculator figures.

The annual rainfall for this site was sourced from the Norfolk Calculator at 625-650mm/yr and the site is considered to be within a Nitrate Vulnerable Zone.

The proposed site layout is shown on the layout in Appendix A.

A Nutrient calculation was undertaken via v2.1 of the the Norfolk Calculator. The results of the calculator is included in Appendix B but the key aspects are as outlined in the Sections below.

2.1 Basis of Assessment

The development consists of a single new dwelling. The Calculator suggests we base our assessment on a water usage of 110 litres/person/day which is reliant on the developer ensuring that water saving devices are installed as such however, we have used 120 litres/person/day which is the accepted default in the Natural England calculator which has been confirmed as appropriate from a legal standpoint.

The site will be connected to an existing sewage treatment plant on site which is a Harlequin Biocap 25 which has an exemption from the requirement for an Environmental Permit (see Appendix E). The plant is serviced on a regular basis and the evidence of this is provided within Appendix E. The Harlequin Biocap 25 delivers treatment of the Nitrogen and Phosphorus concentrations as outlined in the data sheet and calculations included within the appendices. This plant needs no chemical dosing through its use and as such, Natural England should be supportive of the use of this plant with low maintenance obligations over the long term with maintenance requirements to be picked up by the landowner for both.

2.2 Proposed Scenario

The proposed site will feature the Low Density Residential area replacing Commercial/Industrial use across the area of 310m^2.

These figures were inputted into Stage 3 of the Norfolk Calculator and resulted in the Stage 4 outputs as follows below.

Detail	Current/Post-2030	
	TP (kg/yr)	TN (kg/yr)
TP/TN Loading from additional population	0.35	1.86
TP/TN load from land use change	-0.03	-0.06
TP/TN budget for site	0.33	1.80
Total TP/TN Budget for site (inc 20% buffer)	0.39	2.15

Table 1: Stage 4 Norfolk Calculator Outputs

Based on the output from the Norfolk Calculator as evidenced in Appendix B, there is a need for some form of mitigation for the current and post 2030 scenario; with mitigation needed for Phosphorus and Nitrogen with 0. 93kg/year and 2.15kg/year respectively requiring mitigation based on the current scenario.

In the next Section, we will explore how to address the Nitrogen and Phosphorus Mitigation.

3 MITIGATION

The proposed mitigation strategy is to upgrade an existing donor septic tank to Graf One2Clean sewage treatment plant which does not need chemical dosing and therefore has a lesser maintenance obligation than some alternative sewage treatment plants on the market.

This system will result in treatment of the following amounts of nitrogen and phosphorus (the Graf One2Clean performance certificate is included in Appendix C):

- Phosphorus Discharge Level - 1.6mg/l
- Nitrogen Discharge Level – 7.9mg/l

The developers have reached an agreement with the property owners 1.7km to the north-east based on the property being upstream in the same catchment for replacement of their septic tank. This would be secured via a Section 106 agreement. The donor property is highlighted in Figure 2 with the orange mark with the developer site shown by the red highlight.

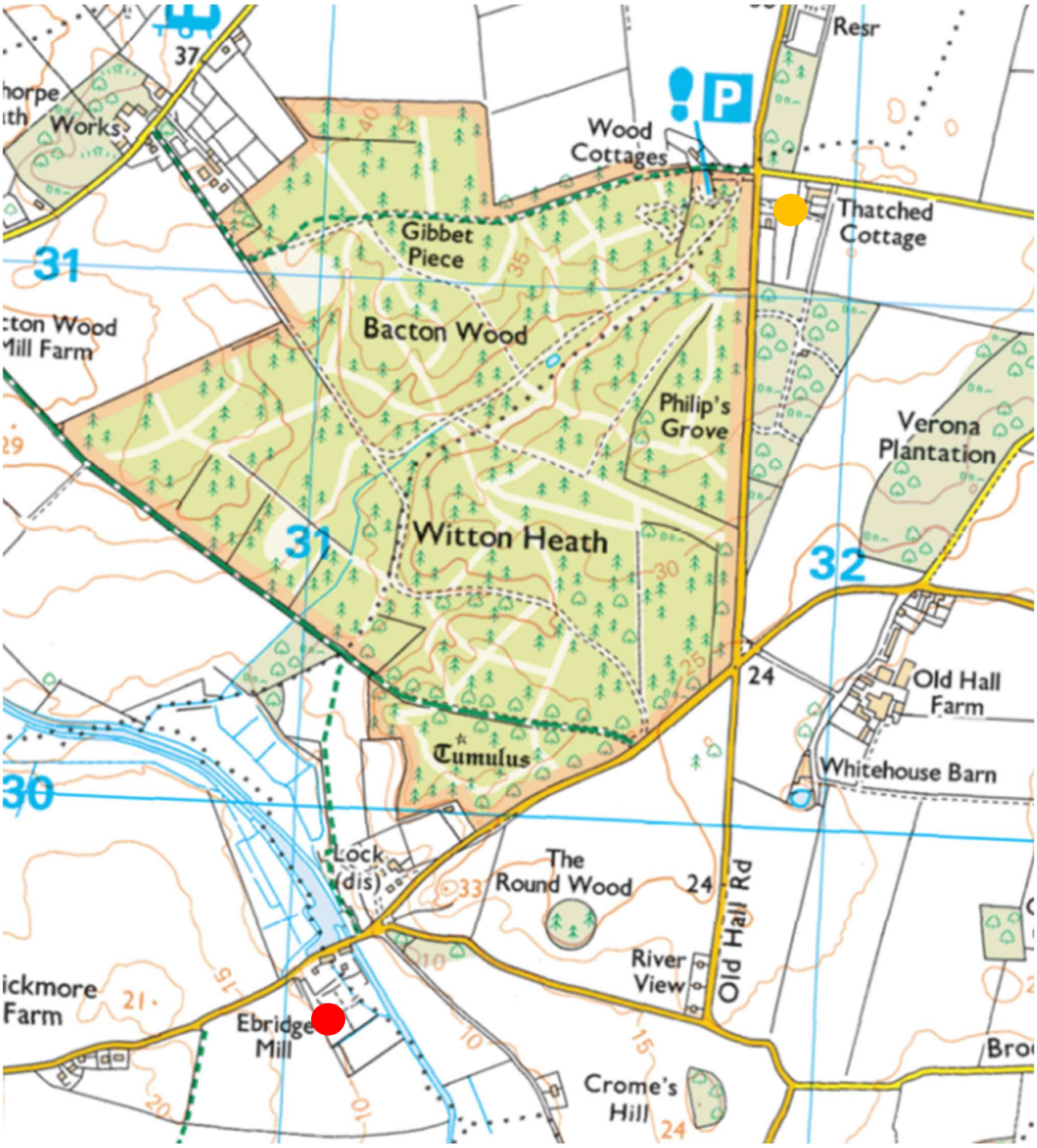


Figure 2 – Donor and Development Site Locations

Upgrading of a septic tank to a higher specification system with the ability to establish nutrient removal is an acceptable mitigation strategy as agreed previously between Nutrient Neutral, Natural England and Wiltshire LPA (January 2022) for Planning Application number 20/06557/OUT.

Both sites are currently served by septic tanks and in each instance, the fluids percolate into the ground and the solid elements are removed via tanker and there is no direct contact between the tank and any surface water body.

Installation of the Graf One2Clean in place of the septic tank will clearly benefit both phosphorus and nitrogen discharges and the installation would be like for like with the discharge going to ground as is presently the case.

The existing septic tank used to offset the nutrient load needs to be demonstrated as not having no Likely Significant Effect in line with Annex F of the Natural England Advice issued in March 2022.

The list from Annex F which would define a septic tank as having no Likely Significant Effect is as below. The septic tank would be judged as not having no Likely Significant Effect if any of the items can be judged as not being in place in the present scenario.

a) *The drainage field is more than 50m from the designated site boundary (or sensitive interest feature) and;*
b) *The drainage field is more than 40m from any surface water feature e.g. ditch, drain, watercourse, and;*
c) *The drainage field in an area with a slope no greater than 15%, and;*
d) *The drainage field is in an area where the high water table groundwater depth is at least 2m below the surface at all times and;*
e) *The drainage field will not be subject to significant flooding, e.g. it is not in flood zone 2 or 3 and;*
f) *There are no other known factors which would expedite the transport of phosphorus for example fissured geology, insufficient soil below the drainage pipes, known sewer flooding, soil/geology type and its ability for P sorption/mineralisation or presence of conditions would cause remobilisation phosphorus, presence of mineshafts, etc and;*
g) *To ensure that there is no significant in combination effect, the discharge to ground should be at least 200m from any other discharge to ground.*

The donor plots is adjacent to a neighbouring site with a discharge to ground and as such, list item g can be considered as not having been adhered to and as such, the replacement of the septic tank is an appropriate way forward.

Picking up on the above, the septic tank at the donor site can not be confirmed as having no Likely Significant Effect and is appropriate for replacement in line with the guidance in Annex F.

Installation of a Graf One2Clean unit in place of a septic tank will clearly benefit both phosphorus and nitrogen discharges in each instance. The magnitude of saving has been established as shown in Table 2 below. Discharge concentrations from the septic tank are based on Stages 1 and 4 from the Norfolk Calculator using the Graf One2Clean concentration is from the test certificate included as Appendix C.

The magnitude of saving has been established as shown in Table 2 below. Discharge concentrations from the default single-source septic tank are based on the default concentrations provided within the Natural England generic calculator guidance document and the Graf One2Clean concentration is from the test certificate included as Appendix D.

Item	Phosphorus Load (kg/yr)	Nitrogen Load (kg/yr)
Septic Tank	0.95	7.92
Graf One2Clean	0.13	0.65
Saving Due to Upgrade	Phosphorus Reduction (kg/yr)	Nitrogen Reduction (kg/yr)
	0.82	7.27

Table 2: Nutrient Savings Due to Upgrade

The wastewater upgrade outlined in Table 2 is based on a load of 120 litres/person/day assuming that none of the existing property infrastructure upstream of the plant will be modified. The calculation is included in Appendix D to back up the numbers in Table 2. This gives rise to the following values for Total Phosphorus and Nitrogen.

Item	Total Phosphorus (kg/year)	Total Nitrogen (kg/year)
Total Budget (Table 1)	0.39	2.15
Total Mitigation/Saving (Table 2)	0.82	7.27
Net Total	-0.43	-5.12

Table 3: Net Totals per Year

The ultimate result of comparing the calculated figures from Tables 1 and 2 shows that the Total Phosphorus and Total Nitrogen would both be below zero as a result of this mitigation requiring three septic tank donors and therefore in line with the Nutrient Neutrality requirements, delivering more credit than required to achieve neutrality overall.

4 SEWAGE TREATMENT PLANT MAINTENANCE/MANAGEMENT

The aspects outlined below will be applicable to the Graf One2Clean plant to be installed at the donor property.

4.1 Graf One2Clean System Installation

On installation the new package treatment system will comply with current British Standards (BS EN 12566 for small sewage treatment plants) and shall be installed in compliance with current building regulations (Building Regulations Part H2: wastewater treatment systems and cesspools) and any manufacturer guidelines.

4.2 System Maintenance

The treatment system will be managed in accordance with the Environment Agency requirements and will be undertaken by each individual landowner; by way of third party agreements with a specialist.

The treatment plant will be desludged every two years, in line with manufacturer guidelines unless more frequent desludging is needed; this process will be undertaken by an appropriately registered waste carrier.

At the time of desludging, the package treatment plant will be subject to an inspection of the condition to ensure they are functioning appropriately in line with manufacturer recommendations. The inspections will be carried out by a competent person, ideally an individual or company registered on the British Water's list of accredited service engineers.

4.3 Transfer of Ownership

If the donor property is sold, the new operators (the owner or person responsible for the sewage treatment plant) will be informed in writing that a sewage discharge is in place and is related to a phosphorus mitigation strategy as part of Nutrient Neutrality requirements. The following details will be transferred:

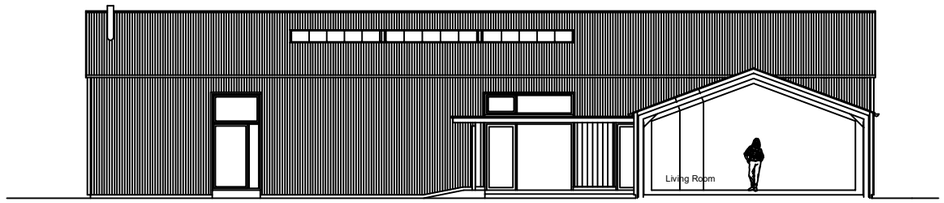
- Description and location of the treatment plant, drainage system and sampling point.
- Details of any testing and maintenance undertaken.
- Details of maintenance requirements.
- Any records of correspondence relating to the system.

5 SUMMARY

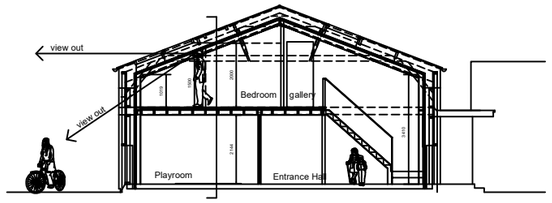
The proposed development of the property at Ebridge Mill will be able to demonstrate Nutrient Neutrality through installation of a Graf One2Clean sewage treatment plant at a single donor property alongside a connection to a treatment plant on the development site. The new plant will be in place of the current septic tank and will therefore enable greater nutrient capture.

The installations will be in the same catchment as the development site with the donor plant being upstream in the catchment.

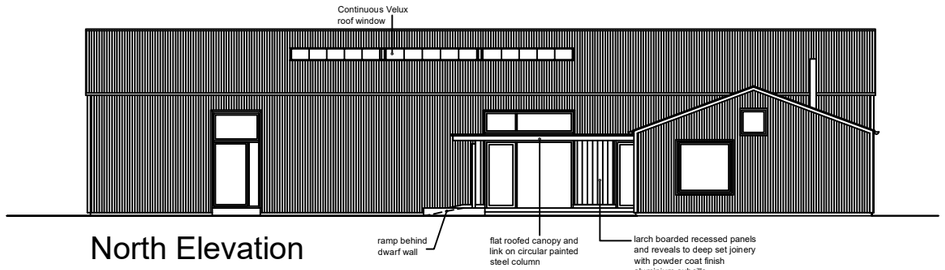
Appendix A
Proposed Development Plan



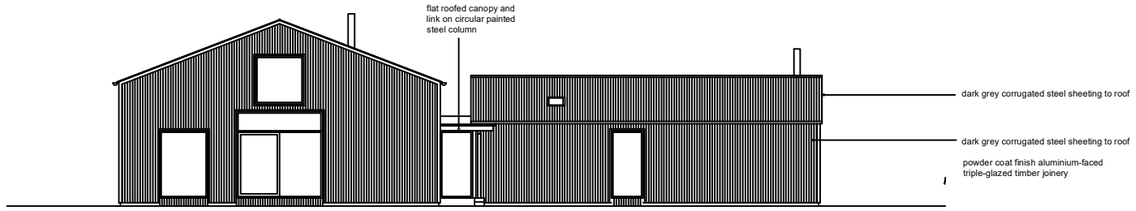
North Elevation & Section AA



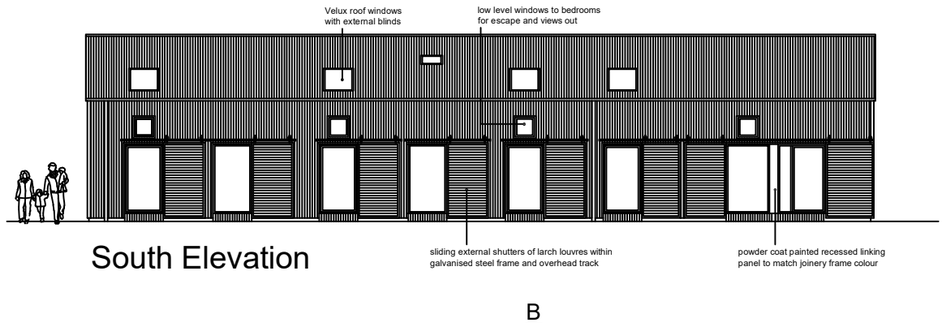
Section BB



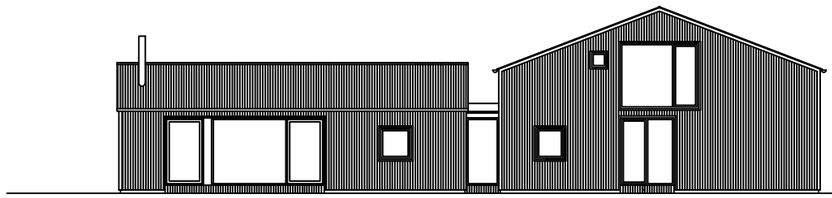
North Elevation



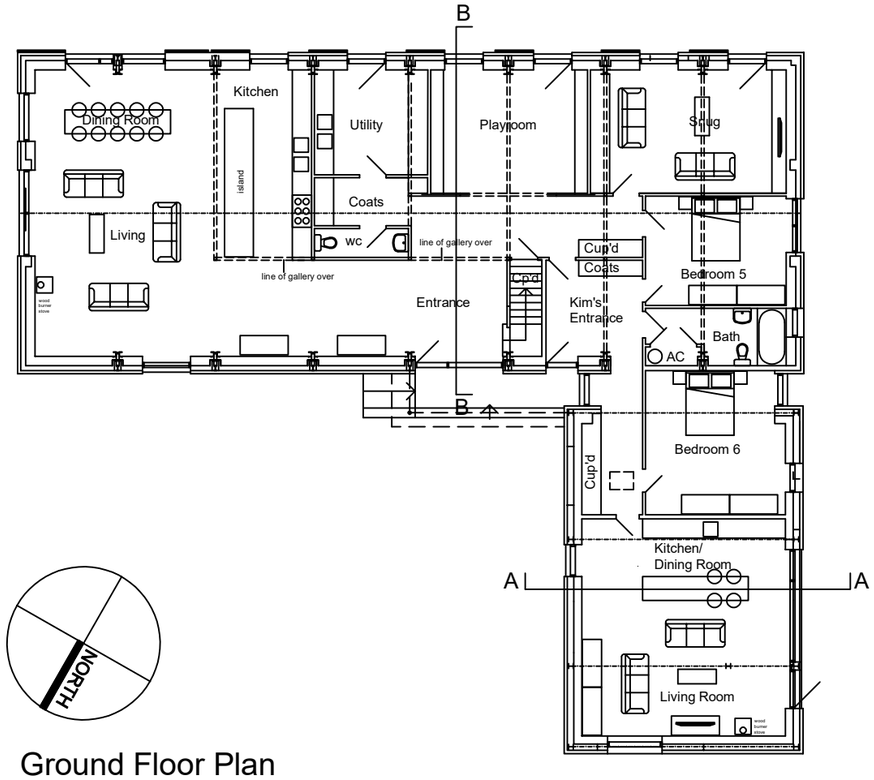
East Elevation



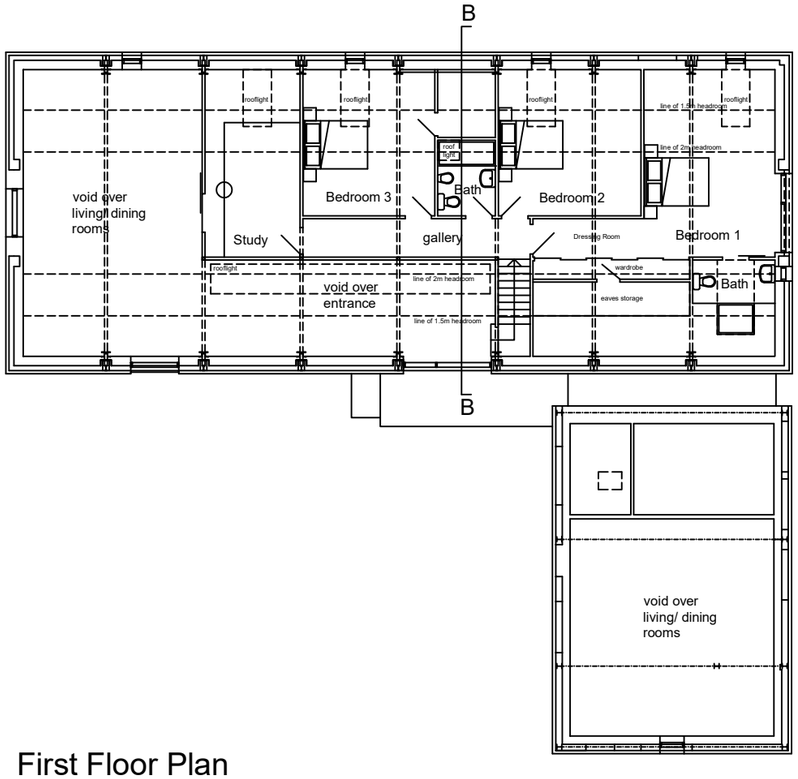
South Elevation



West Elevation



Ground Floor Plan



First Floor Plan

REVISION	DATE	DRAWN	DESCRIPTION
B	April 2024	MR	Further revisions to glazing as requested by clients
A	April 2024	MR	Glazed area increased and door added adjacent dining room. Shutters adjusted to suit.

Michael REYNOLDS architecture

CLIENT
Glen & Charlotte Trevatt

DATE
March 2024

DRAWN BY
MR

PROJECT NAME
The Millshop Ebridge Mill White Horse Common North Walsham NR28 9NG

STATUS
Planning

SCALE
1:100 @ A1

DRAWING TITLE
Proposals
Plans, sections and elevations

JOB NO.
2305

DRAWING NO.
10

REV
B

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Appendix B
Norfolk Calculator Outputs

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	**120**	Litres/person/day
	Wastewater volume generated by the development	**225**	**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	0.80	kg/year
TN discharged by on-site treatment plant	5.99	kg/year

4.	Additional population load	Value Current	Post 2030	Unit
	TP load from additional population	**0.80**	**0.80**	**Kg/year**
	TN load from additional population	**5.99**	**5.99**	**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	Bure	
Select the soil drainage type	Freely draining	
Select annual average rainfall band	625-650	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		Hectares	0.00	0.00	Kg/yr
Medium density residential		Hectares	0.00	0.00	Kg/yr
Low density residential		Hectares	0.00	0.00	Kg/yr
Commercial / Industrial	0.031	Hectares	0.03	0.20	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	**0.031**	**Hectares**	**0.03**	**0.20**	**Kg/yr**

3. Calculate loading from current land usage

	Value	Unit
TP load from proposed land usage	**0.03**	**Kg/yr**
TN load from proposed land usage	**0.20**	**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	0.031	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	**0.031**	**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	**0.01**	**kg/year**
	TN load from proposed land usage	**0.13**	**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	**0.80**	**0.80**	**kg/year**
	TN Loading from additional population	**5.99**	**5.99**	**kg/year**
2.	Calculate net change in nutrient load from land use change	Value	Value	Unit
	TP load from land use change	**-0.03**	**-0.03**	**kg/year**
	TN load from land use change	**-0.06**	**-0.06**	**kg/year**
3.	Calculate nutrient budget for the development site	Value	Value	Unit
	TP budget for the site	**0.77**	**0.77**	**kg/year**
	TN budget for the site	**5.93**	**5.93**	**kg/year**
4.	Calculate precautionary buffer	Value	Value	Unit
	Buffer amount	20	20	%
	TP Precautionary buffer	**0.15**	**0.15**	**kg/year**
	TN Precautionary buffer	**1.19**	**1.19**	**kg/year**
5.	**Total nutrient budget for the development site**	Value		Unit
	Total Phosphorus budget for the site	**0.93**	**0.93**	**Kg/year**
	Total Nitrogen budget for the site	**7.12**	**7.12**	**Kg/year**

Summary

No. of dwellings	1
Onsite treatment plant	Default package treatment plant
Current TP discharge concentr	9.70
Current TN discharge concentr	72.90
Post 2030 TP discharge concer	9.70
Post 2030 TN discharge concer	72.90
TP current land use	0.03
TP proposed land use	0.01
TN current land use	0.20
TN proposed land use	0.13

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.

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

Appendix C
Graf One2Clean Performance Certificate

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 D
Septic Tank to Graf One2Clean Comparison

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	**120**	Litres/person/day
	Wastewater volume generated by the development	**225**	**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 single-source septic tank	
Phosphorus discharge level	11.60	mg/l
Nitrogen discharge level	96.30	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	0.95	kg/year
TN discharged by on-site treatment plant	7.92	kg/year

4.	Additional population load	Value Current	Post 2030	Unit
	TP load from additional population	**0.95**	**0.95**	**Kg/year**
	TN load from additional population	**7.92**	**7.92**	**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.

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	**120**	Litres/person/day
	Wastewater volume generated by the development	**225**	**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	0.13	kg/year
TN discharged by on-site treatment plant	0.65	kg/year

4.	Additional population load	Value Current	Post 2030	Unit
	TP load from additional population	**0.13**	**0.13**	**Kg/year**
	TN load from additional population	**0.65**	**0.65**	**Kg/year**

Appendix E
Harlequin Biocap 25 Performance Certificate

CAP25 Wastewater Treatment Plant

The Harlequin CAP25 is a compact sewage treatment plant designed specifically for larger domestic or small commercial installations of up to 25 people.

It is a continuous aeration plant which operates using a unique bio-media system and delivers a pollutant removal level of 96.2% whilst also combatting common problems associated with small packaged domestic plants.

Standard Features:

- Moulded from durable medium density polyethylene material
- 110mm inlet and outlet connections
- 110mm services duct
- Integrated lifting eyes for ease of handling and installation
- Fully secured 450mm diameter pedestrian duty, flush fitting manhole covers comply with statutory regulations
- Above ground air blower housing delivers more reliable and efficient operation, and allows easy access for maintenance
- Easy access to the bubble diffuser within the tank
- A MBBR system - there is no fixed media, eliminating blockages
- Virtually silent operation
- Compact size and light weight reduces installation costs
- Mechanically reliable with no moving parts or electrics within the tank
- Certified to EN12566-3

CAP25 Wastewater Treatment Plant

Optional Equipment:

- Air blower function alarm
- Pumped outlet
- 300mm manhole riser(s). Max 3 risers (*800mm*) on a gravity tank or 2 risers (*550mm*) on a pumped outlet[+]

[+] *Maximum invert level 2m. Use 1200mm concrete rings to achieve inverts below max. number of risers.*

Technical Data:

		Efficiency	*Effluent*
Treatment Efficiency	COD	92.6%	64.0 mg/l
	BOD_5	96.2%	13.0 mg/l
	NH_4-N	71.9%	11.2 mg/l
	N_{TOT}	58.2%	22.6 mg/l
	Phosphorus	41.0%	4.3 mg/l
	SS	96.8%	12.0 mg/l
Nominal hydraulic daily load	3,750 Litres / day		
Nominal organic daily load	1,335g BOD_5 / day		
Inhabitants served	19 - 25		
Desludging interval	6 months *		
Electrical consumption	2.7 kWh / day		
Power requirements	230V 112W 1.0A (start-up current)		
Volumes (at operational height)	Primary settlement – 3700 Litres Aeration chamber – 2400 Litres Final settlement – 2280 Litres		
Overall dimensions	L 5680 W 1400 H 2560 mm		
Standard inlet depth	1090 mm		
Standard outlet depth	1140 mm		
Depth from invert to base	1470 mm		
Pipe diameter	110 mm		
Net Weight	700 kg		

* *de-sludge interval up to 6 months depending on the number of inhabitants*

Issued By:
Harlequin Manufacturing Limited
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T: +44 (0)28 9261 1077
W: www.harlequin-mfg.com
E: info@harlequin-mfg.com

Mr Adrian Jones
Tunstead Road,
Hoveton,
NORWICH,
NR12 8QT,
England

Our ref: SEWQ Issue

Your ref:

Reg. Customer I.D. No: a001041729

Date: 29/07/2014

Dear Mr Jones

Environmental Permitting (England and Wales) Regulations 2010
Registering an exempt Water Discharge Activity

Exemption Ref:	EPR/KF0639JH/A001
Location:	Ebridge Mill, White Horse Common, NORTH WALSHAM, Norfolk, NR28 9NH, England

Thank you for sending us the details for your proposed registration.

I am pleased to confirm that we have registered your activity as exempt from requiring an Environmental Permit. Details of your registration are included in the attached schedule.

Please remember that your exemption is only valid if you adhere to our conditions. Failure to do so is an offence. A full list of conditions is available on our website

http://www.environment-agency.gov.uk/homeandleisure/118753.aspx

If the activity you have registered is also controlled by an existing permit (or discharge consent) you need to tell us if you wish to surrender the permit. You should use form E1

http://www.environment-agency.gov.uk/business/topics/permitting/117672.aspx

Alternatively, a paper copy of the form is available on request. You can contact us on 03708 506 506*, we are available Monday to Friday, from 8am to 6pm.

Yours sincerely

Jo Price
Customer Operations Manager

*Calls to 03 numbers cost no more than a national rate call to an 01 or 02 number and normally count towards any inclusive minutes in the same way as 01 and 02 calls. These rules apply to calls from any type of line including mobile, BT, other fixed line or payphone.

The Environment Agency does not endorse any commercial business so you cannot use our logo on your website or promotional literature. However you can state that you are registered as exempt by the Environment Agency, if this is the case, and have a link to our website.

Environment Agency, National Customer Contact Centre, 99 Parkway Avenue, Parkway Business Park, Sheffield, S9 4WF
Customer Services Line: 03708 506 506
Fax: 01142 626 697
Email: enquiries@environment-agency.gov.uk

Schedule of exempt operations

Name:	BARN SYE CONVERSIONS LTD
Trading name (if any):	
Address:	Two Saints Barn Tunstead Road, Hoveton, NORWICH, England. NR12 8QT
Exemption Ref No:	KF0639JH
Address where the operation can be carried out:	Edinge Mill White Horse Common, NORTH WALSHAM, Norfolk, England, NR28 9NH
National Grid Reference:	Tg3094929753

Activity Number & Description:

2 Operations

2.1 Permitted activities

2.1.1 002 - Discharge of sewage effluent to surface water of five cubic metres per day or less. First made before 6 April 2010.

2.2 The Site

2.2.1 The maximum daily volume of the discharge shall be 5 cubic metres or less per day as calculated by the method specified in the sewage treatment plant manufacturer's and installer industry Code of Practice 'Flows and Loads 3'.

2.2.2 The sewage shall be solely domestic in origin and contain no trade effluent.

2.2.3 Prior to the discharge, the sewage must have received treatment from a sewage treatment plant producing an effluent of suitable quality to prevent pollution of controlled waters and designed and constructed according to the relevant British Standard design requirements in force at the time of installation.

2.2.4 The sewage treatment plant must be installed in accordance with the manufacturer's specification issued at the time of installation or to the guidance given in the appropriate industry operating Code of Practice.

2.2.5 In tidal locations the discharge must made below the Mean Low Water Springs tide mark.

2.2.6 The sewage treatment system shall be operated and maintained in accordance with a maintenance plan as specified within the manufacturer's maintenance instructions or other maintenance schedule adopted by the occupier, or manufacturing industry Code of Practice guides.

2.2.7 Maintenance should be undertaken by those who are competent in respect of the responsibilities to maintain and service the sewage treatment system.

2.2.8 Waste sludge removed from the sewage treatment system must be safely disposed of in an appropriate or controlled manner using [illegible]

2.2.9 Records demonstrating compliance with the maintenance and desludging requirements shall be in a legible format and retained for at least 5 years from the date when the records were made.

2.2.10 The discharge must not cause pollution of surface or groundwater.

2.2.11 Details of this registration and associated conditions should be stored in a safe place, and provided to next occupier on change of ownership.

Date of issue: 29/07/2014

From: Keith Codling kcwastewater@gmail.com
Subject: Mill Side treatment plant service invoice
Date: 12 Nov 2023 at 20:25:00
To: GRAHAM MOORHOUSE
grahammoorhouse@aol.com

Hi,

Please see attached invoice and service report from my recent visits to site any questions please don't hesitate to contact me.

Regards

Keith

INVOICE

KC Wastewater Engineering
Weavers Cottage Church Rd
Felmingham NR28 0LQ
United Kingdom

Bill To

Millside
Ebridge Mill

Invoice#	00386
Invoice Date	12 Nov 2023
Due Date	19 Nov 2023

Item Name	Quantity	Rate	Amount
08/11/23 carry out 12 month service to treatment plant	1	90	90.00
		Subtotal	**90.00**
		Total	**£90.00**

Notes

Payment details
Cheques made payable to Mr Keith Codling or BACS transfer to account 48781327 sort code 09-01-29

Powered by Zoho invoice

Millside Ebridge mill 2023
.docx
23 KB

Canham Consulting

Structural Civil Building Engineers

Canham Consulting Ltd
Second Floor, 69-75 Thorpe Road,
Norwich, NR1 1UA

Tel: 01603 430650
Email: clientservice@canhamconsulting.co.uk
www.canhamconsulting.co.uk