

Nutrient Balancing Assessment



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Client:	Barratt David Wilson Homes
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Introduction

WYG was commissioned by Barratt Homes in June 2018, to prepare a report to inform a Habitats Regulations Assessment for the proposed development for Sinah Lane, Hayling Island (hereafter referred to as 'the site'). This included calculations to assess the potential impacts of nitrogen discharge from the site.

The calculations are required in response to recent consultation with Natural England on residential projects in the vicinity of the Solent following the findings of the Integrated Water Management Study for South Hampshire, published by the Partnership for Urban South Hampshire¹. The calculator was used to establish the Total Nitrogen (TN) for the proposed development and also the maximum TN load as a result of land use changes associated with the development proposals.

Due to the uncertainty over whether new development can be accommodated by existing wastewater treatment infrastructure without causing harm to coastal European sites, Natural England advise that all residential development should achieve nitrogen neutrality.

The Report to Inform a Habitats Regulations Assessment (WYG, 2019) concluded there was no potential for an adverse effect on the integrity of any European site from nutrient output. This report sets out updated calculations in line with the latest guidance from Natural England.

Methodology

To make the assessment, Version 5 of Natural England's *Advice on Achieving Nutrient Neutrality for New Development in the Solent Region*² for calculating nitrogen budgets was used.

This assessment is based on submission layout.

¹ PUSH, (2020), *Integrated Water Management Study*, [online] Available at PUSH, (2020), *Integrated Water Management Study*, [online] Available at <https://www.push.gov.uk/wp-content/uploads/2020/03/Advice-on-Achieving-Nutrient-Neutrality-for-New-Development-in-the-Solent-Region-March-2020.pdf>, Accessed October 2020.

² Natural England, (2020), *Advice on Achieving Nutrient Neutrality for New Development in the Solent Region for Local Planning Authorities*.

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Assumptions

The assumptions relevant to this project in addition to those included in the Natural England methodology are provided in Table 1.

Table 1: Project Assumptions

Number of proposed units:	195 units
The total site area:	12.64 ha
The current land uses are:	12.64 ha agricultural land (cereals)
The future land uses will be:	5.31 ha urban 7.33 ha Public Open Space (PoS) / Winter Bird Refuge
The waste water from the site will be treated at this wastewater treatment works (WwTW):	Budds Farm WwTW
The consent limit for the WwWT is:	9.7 mg/l TN

Results and Summary

The results using the method for determining the nitrogen budget for the proposals are provided in Table 2. The full workings are shown in Appendix C.

Table 2: Summary of the results

Calculating Total Nitrogen (TN) Load From Development Wastewater	Calculating TN Load From Current Land Use	Calculating TN Load From Future Land Uses	Calculating Net Change in TN From the Development
Stage 1	Stage 2	Stage 3	Stage 4
113.812 Kg/TN/yr	394.368 Kg/TN/yr	112.583 Kg/TN/yr	-167.973 Kg/TN/yr

The calculations show that the development would result in a decrease in TN budget of **-167.973 Kg/yr TN**.

It is therefore considered that there is no potential for an adverse effect on the integrity of any European site in relation to nutrient output.

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Quality Control		
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Version:	Date:	Updated by:	Verified by:	Description of changes:

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Appendix A: Report Conditions

Appendix B: Nutrient Balancing Calculations



Appendix A: Report Conditions

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The report refers, within the limitations stated, to the environment of the site in the context of the surrounding area at the time of the inspections'. Environmental conditions can vary and no warranty is given as to the possibility of changes in the environment of the site and surrounding area at differing times. No investigative method can eliminate the possibility of obtaining partially imprecise, incomplete or not fully representative information. Any monitoring or survey work undertaken as part of the commission will have been subject to limitations, including for example timescale, seasonal and weather-related conditions. Actual environmental conditions are typically more complex and variable than the investigative, predictive and modelling approaches indicate in practice, and the output of such approaches cannot be relied upon as a comprehensive or accurate indicator of future conditions. The "shelf life" of the Report will be determined by a number of factors including; its original purpose, the Client's instructions, passage of time, advances in technology and techniques, changes in legislation etc. and therefore may require future re-assessment.

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Appendix B: Nutrient Balancing Calculations

Table 2: Calculating Total Nitrogen (TN) Load From Development Wastewater (Stage 1)

Step	Measurement	Value	Unit	Explanation
Development proposal	Development types that would increase the population served by a wastewater system	195.000	Residential dwellings	Number of dwellings
1	Additional population	468.000	Persons	Uses an average household size of 2.4 x number of dwellings
2	Wastewater volume generated by development	51480.000	L/day	Persons x 110 litres/day. Where relevant, deduct wastewater volume of population displaced by the proposed development.
3	Receiving WwTW environmental TN permit limit. Assume discharge to be at 90% of consent limit	9.700	mg/l TN	Consent limit for WwWT x 0.9.
4	Deduct acceptable TN loading (@ 2 mg/l TN) (as defined in Paragraph 4.40)	6.730	mg/l TN	Step 3 – 2 mg/l TN
5	TN discharged after WwTW	311814.360	mg/TN/day	Step 2 x Step 4
6	Convert mg/TN to Kg/TN per day	0.312	Kg/TN/day	Step 5 divided by 1,000,000
7	Convert Kg/TN per day to Kg/TN per year	113.812	Kg/TN/yr	Step 6 x 365 days
Total TN load from wastewater 113.812 Kg/TN/yr				

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Table 3: Calculating TN Load From Current Land use (Stage 2)

Step	Measurement	Land use	Value	Unit	Explanation
1	Area of existing Land Use Type 1	Cereals	12.64	ha	Area of land lost to development
2	TN leachate value for Land Use Type 1	Cereals	31.20	Kg/ha/yr	-
3	TN leachate value for area of Land use Type 1	Cereals	394.368	Kg/TN/yr	Step 1 x Step 2
Total TN Leachate value for current land use 394.368 Kg/TN/yr					

Table 4: Calculating TN Load From Future Land Uses (Stage 3)

Step	Measurement	Value	Unit	Explanation
1	New urban land use area	5.310	ha	Area of development that will change to urban land use
2	TN leachate value from new urban area	75.933	Kg/TN/yr	Step 1 x 14.3 Kg/TN/yr
3	New / retained woodland, PoS or SANG	7.330	ha	Area of development that will be woodland, PoS or SANG
4	TN leachate value from woodland / Pos / SANG area	36.650	Kg/TN/yr	Step 3 x 5 Kg/TN/yr
5	Combined TN leachate values from future land uses	112.583	Kg/TN/yr	Step 2 + Step 4
Total TN Leachate value for future land use 112.583 Kg/TN/yr				

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Table 5: Calculating TN Budget for the Development Proposals (Stage 4)

Step	Measurement	Value	Unit	Explanation
1	Identify TN loads from wastewater	113.812	Kg/TN/yr	Stage 1
2	Calculate the net change in TN leachate value due to land use change	281.785	Kg/TN/yr	Stage 3 – Stage 2
3	Determine nitrogen budget	-167.973	Kg/TN/yr	Step 1 – Step 2
4	Where TN budget is positive add 20% precautionary buffer	N/A	Kg/TN/yr	Step 3 + 20%
Total TN Budget -167.973 Kg/TN/yr				



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