

## Project Note

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**Project:** Berewood **Date:** 31<sup>st</sup> October 2019

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**Subject:** **DRAFT:** Nitrogen neutrality calculations **Author:** Jeff Picksley

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### 1.0 Introduction

- 1.1. This briefing note has been prepared to test whether the approved Berewood outline application would achieve nitrogen neutrality if assessed under the current nitrogen neutrality model developed by Natural England.
- 1.2. Natural England has developed a model for the Solent sites that specifically addresses the nitrogen balance relevant to development proposals<sup>1</sup>. Natural England are advising Local Planning Authorities to use this model when undertaking appropriate assessments under the Habitats Regulations.
- 1.3. Individual development parcels within the approved outline application boundary are unlikely to be able to demonstrate nitrogen neutrality due to the nature of the applications. Large areas of strategic green space are being delivered outside the development parcels and these are being progressed through separate planning applications.
- 1.4. The information within this briefing note is intended to demonstrate that the overall scheme can achieve nitrogen neutrality. This note provides background information about the contribution made by the strategic greenspaces approved under the outline planning permission towards achieving overall nitrogen neutrality across the scheme. This will provide the context needed when competent authorities assess reserved matters applications for housing under Regulation 63 of the Conservation of Habitats and Species Regulations 2017 (the Habitats Regulations).
- 1.5. This note sets out the results of the nitrogen neutrality calculations using the Solent nitrogen reduction methodology for Welborne.

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<sup>1</sup> Advice on achieving nutrient neutrality for new development in the Solent region for Local Planning Authorities. Version 2. June 2019. Natural England.

## **2.0 Nitrogen neutrality calculations for Berewood using the revised Solent methodology**

### **Nitrogen neutrality calculation with water use at 110 litres per person per day**

- 2.1. These calculations have been undertaken using information contained in chapter 9 of the submitted ES (the Phase 1 Habitat survey), the schedule of accommodation that formed part of the consented outline application and mapping showing areas of built development, infrastructure and SuDS alongside and future development areas as of October 2019. Only occupants of housing and the proposed hotel are included in the assessment, in line with Natural England guidance. The inclusion of occupants of other land uses such as the schools and businesses is likely to result in double counting by including people resident off-site within the catchment or capturing residents who live and work on site.
- 2.2. It is assumed that all waste water from the development will flow to Budds Farm Waste Water Treatment Works (WWTW). Budds Farm WWTW has already been upgraded to achieve a level of 9.7mg/l (total nitrogen of treated water) following a Habitat Directive Review of Consents in 2012.
- 2.3. Land where no changes in current land use are proposed have been excluded from the calculations. This excluded land covers retained farmland within the red line, including the brent goose compensation area, and areas of established woodland. The developed area of Plant Farm and the gas compound have also been excluded.
- 2.4. The following assumptions are used for calculations to establish the amount of land required to off-set nitrogen produced by development (see Box 1):
  - Natural England and the Environment Agency have agreed to use 90% of the consent value for the neutrality calculations
  - Budds Farm WWTW consented discharge level is 9.7mg/l
  - 2.4 occupants per house (the same occupancy figure is used for flats)
  - Maximum hotel occupancy of 100 people
  - Water use of 110 litres per day per person.
  - A general cropping figure of 25.4kg/N/ha/yr has been applied to the pre-development improved grassland areas. The fields were used for finishing beef cattle and show evidence of agricultural improvement including reseeded and application of fertiliser
  - Post development land use changes (loss of arable, improved grassland and small areas of other habitats) assumed to have post-development leaching rate of 14.3kg/N/ha/yr (urban land)
  - Post development leaching rate of 5kg/N/ha/yr for the community nature reserves (CNR)/other semi-neutral greenspaces (OSNG)/SUDS/informal open space
  - Post development leaching rate of 26.9kg/N/ha/yr for allotments
- 2.5. Box 1, sets out the relevant calculations.

**Box 1: Berewood amount of land required to off-set nitrogen produced by development using the Solent method**

**Stage 1 – Total nitrogen load from new development**

**Total number of new residents at Berewood**

2646 dwellings x 2.4 occupants per dwelling = 6350 occupants  
Additional hotel occupancy = 100 occupants

Total new occupants of Berewood (6350 + 100) = 6450 occupants

**Total annual post treatment discharge of N on completion of development**

$6.19431912 \times 365 = 2261 \text{ kg/N/yr}$

**Stage 2 – Total nitrogen load from current land use**

Land use – nitrogen leaching for cereals =  $31.2 \text{ kg/N/ha/yr}$

Land use – nitrogen leaching for general cropping (improved grassland) =  $25.4 \text{ kg N/ha/yr}$

Conversion of arable to urban: 104.48ha

Conversion of improved grassland to urban: 28.61ha

Conversion of arable to CNR/OSNGS = 28.01ha

Conversion of improved grassland to CNR/OSNG = 9.4ha

Total loss of arable land = 132.49ha

Total loss of improved grassland = 38.01ha

**Total nitrogen load from current land use lost to development = 5099.142 kg/N/yr.**

**Stage 3 – Total nitrogen load accounting for post-development land uses**

Nitrogen leaching from urban land =  $14.3 \text{ kg/N/ha/yr}$

Nitrogen leaching from CNR/OSNGS =  $5 \text{ kg/N/ha/yr}$

Nitrogen leaching from allotments =  $26.9 \text{ kg/N/ha/yr}$

New urban area (converted from all habitats) = 140.54ha\*

New CNR/OSNGS area (converted from arable and improved grassland) = 38.14ha

Conversion of arable and improved grassland to urban/CNR/OSNG: 179.96ha

Allotment area = 1.28ha

**Total nitrogen load from proposed land uses = 2234.854 kg/N/yr.**

**Stage 4 – Calculate nitrogen load offset**

Stage 2 minus Stage 3

5099.142 kg/N/yr - 2234.854 kg/N/yr = -2864.288 kg/N/yr.  
Post development run-off is less than current land use run-off resulting in a negative as the change in land use will generate less nitrogen

**Stage 5 – Nitrogen budget**

Stage 4 plus Stage 1

-2864.288 kg/N/yr + 2261 kg/N/yr = -603.288kg/N/yr

**Stage 6 – Application of 20% buffer**

-603.288kg/N/yr - -120.6576 = -482.6304 kg/N/yr

**\* Figure includes land converted from other habitats**

- 2.6 Box 1 demonstrates that the approved outline scheme at Berewood not only achieves nitrogen neutrality but actually delivers a reduction in the amount of nitrogen entering the European sites compared to the baseline conditions.

**3.0 Summary**

- 3.1 The modelling work undertaken using the latest Solent methodology shows that the approved Berewood development will result in a reduction in nitrogen entering the European sites along the Solent.
- 3.2 Under the scenario assessed, all waste water from Berewood will be treated at Budds Common. The approved outline development will achieve better than nitrogen neutrality without the need for additional mitigation measures.
- 3.3 Any changes to the assumptions regarding treatment of waste water used in this paper will require reconsultation with Natural England.

**4.0 References**

Anon (2016) Nitrate vulnerable zone (NVZ) designation 2017 – Eutrophic Waters (Estuaries and Coastal Waters). Portsmouth Harbour, Langstone Harbour and Chichester Harbour. Environment Agency.

Anon (2019) Advice on achieving nutrient neutrality for new development in the Solent Region for Local Planning Authorities. Natural England.