CALCULATION RECORD

Job Name: Bridge Farm, Twyford

Job No: 332610041/3501

Note No: TN001

Date: September 2023

Prepared By: K Thistlethwaite

Subject: **Initial Nutrient Budget Calculation Record**

1 Overview

1.1 Introduction

1.1.1 This Calculation Record has been prepared by Stantec, on behalf of Croudace Homes Group Ltd, to provide guidance in support of development proposals at Bridge Farm, Twyford.

1.1.2 This initial nutrient budget calculation is based upon the masterplan available at the time of preparing this Calculation Record. The information given within this calculation record is based on publicly available data at the time of writing, and no discussions with consultees have been undertaken.

1.2 Context

1.2.1 The current planning consent conditions (48 and 49) associated with the nutrient impact, specifically nitrates, on the groundwater. It is understood that both conditions were requested by Thames Water in respect of matters relating to the site being located within a Groundwater Safeguarding zone for the protection of a pumping station used by Thames Water for the supply of potable water situated about 1.0 km of the north of the site. Conditions state the following:

> 48. Development here by approved shall not commence until a 'Phase II' contaminated land risk assessment has been submitted to and approved by,the local planning authority in consultation with the water undertaker. The risk assessment shall document the nutrient impact to ground water abstraction as a result of the development and propose mitigation and monitoring to ensure that at least 'nutrient neutrality' is achieved. The development shall be constructed in line with the recommendations of the Risk Assessment.
>
> *Reason:To ensure that the water resource is not detrimentally affected by the development.*
>
> 49. Development hereby approved shall not commence until a Source Protection Strategy, detailing how the developer intends to ensure the water abstraction source is not detrimentally affected by the proposed development both during and after its construction, has been submitted to and approved by the local planning authority in consultation with the water undertaker. The development shall be constructed in line with the recommendations of the strategy.
>
> *Reason:To ensure that the water resource is not detrimentally affected by the development*

1.2.2 In accordance with the guidance provided by Natural England (NE), at present the proposed development lies outside of a defined nutrient neutrality catchment. As such, guidance from the nearest catchment which considers nitrates neutrality will be applied within this assessment as the

most suitable alternative in the absence of specific guidance. The NE guidance applied in this assessment has been taken from River Itchen SAC.

1.2.3 The guidance provided by NE is formed of four stages as represented in the following schematic (Figure 1.1)

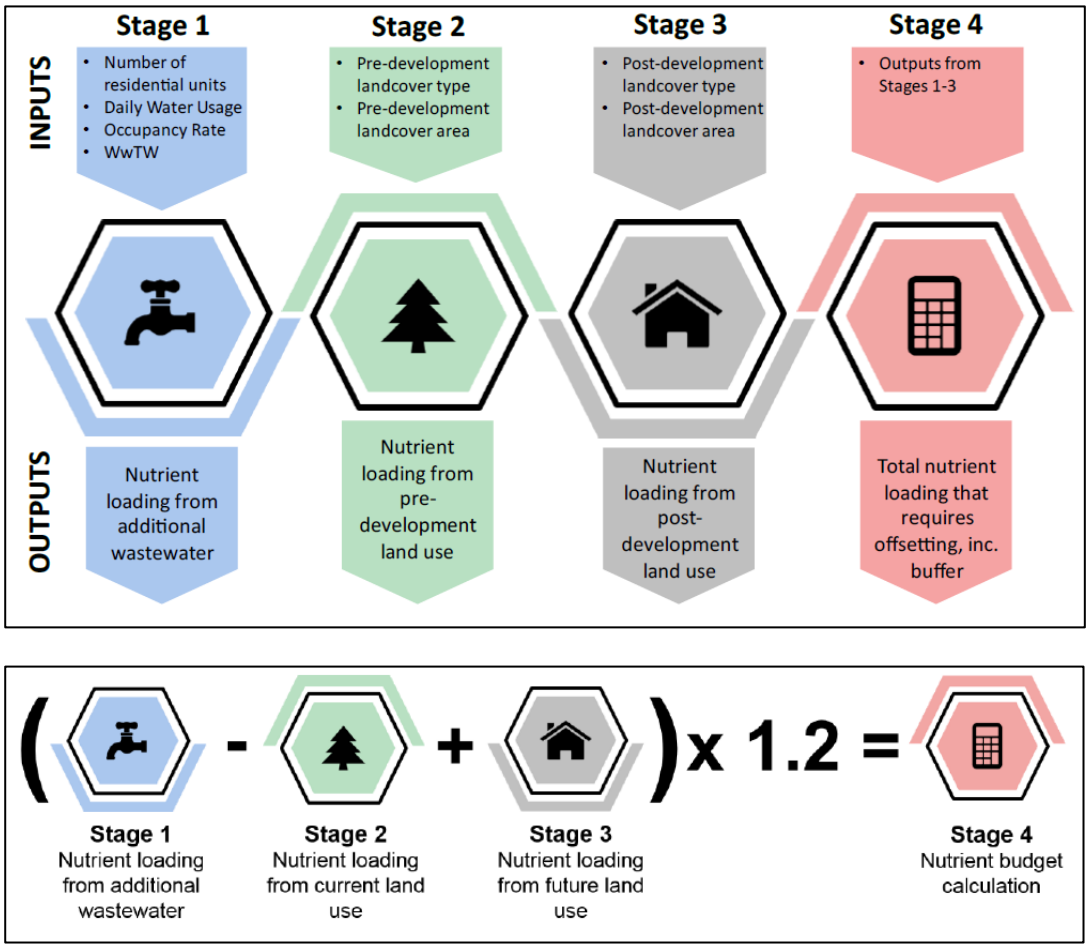

Figure 1.1 NE methodology schematic (Extract from *Nutrient Budget Calculator Guidance Document*, NE, 2022)

1.2.4 Based on the conditions of the proposed development at Bridge Farm, Twyford, Stage 1 (wastewater impact) on the NE methodology is not relevant. Therefore, this calculation record will apply Stages 2 - 4, considering the pre- and post-development nutrient loading for the site only.

1.2.5 Stage 4 includes the application of a precautionary buffer (20%) to recognise uncertainty within the data and ensure a precautionary approach. In accordance with NE guidance, this buffer is only applicable where developments result in a nutrient surplus.

1.3 Development Proposals

1.3.1 This Calculation Record will review the initial nutrient budget for Bridge Farm as shown in Figure 1.2 (**Appendix A**). The proposals are for 200 units across 12.13ha, with surface water discharging via infiltration.

Figure 1.2 Illustrative Land Use Plan

2 Initial Nutrient Budget

2.1 Parameters

2.1.1 To calculate an initial nutrient budget a series of parameters have been defined, based on the hydrological setting of the site and development proposals. These are presented in **Table 2.1.**

2.1.2 One of the parameters within the assessment criteria is defining the operational river catchment. However, as outlined in Section 1.2 the guidance from River Itchen SAC is used in the absence of catchment specific methodology as such it is not possible to select the operational river catchment that the site lies in. The River Itchen operational catchment has been used as a suitable donor in absence of catchment specific methodology.

2.1.3 To determine the pre-development land use a review has been undertaken using the historical aerial imagery and Crop Map of England (CROME) over the last 10 years (where available) which indicated a mixture of uses within red line over time. Therefore, adopting the precautionary approach preferred by NE, the pre-development land use has been defined entirely as 'lowland' which has the lowest annual nitrogen nutrient export.

Parameter			Information Source
Soil drainage type		Freely Draining	Soilscapes by Cranfield University [1]
Annual Average Rainfall (mm)		650-675	UK Centre for Ecology and Hydrology
Presence in Nitrate Vulnerable Zone		Yes	UK Soil Observatory[2]
Site Area (ha)		12.13ha	Accommodation Schedule (Dated March 2022)
Pre-Development Land use	Lowland	12.13ha	Historic aerial imagery, CROME Mapping
Post-Development Land use	Open Urban Land	4.95ha	Illustrated Land Use Plan (Dated December 2022)
	Residential urban Land	7.18ha	

Table 2.1: Initial Calculation Parameters

2.2 Outcomes

2.2.1 Outcomes of the initial nutrient budget calculations are presented in Table 2.2, and a copy of the calculation is appended.

Calculation Stage	Calculation Output	TN
Stage 2	Pre-development Annual Nutrient Export (kg/yr)	159.27
Stage 3	Post-development Total Annual Nutrient Export (kg/yr)	136.41
Stage 4	Nutrient Budget (kg/yr)	-22.86

Table 2.2: Initial Nutrient Budget

2.2.2 The initial nutrient budget for the proposed development is calculated as -22.86kgTN/yr; as there is no nutrient surplus, the precautionary buffer in not required following NE guidance.

2.2.3 As a sensitivity test, because of using a donor calculator, the same calculations have been undertaken with the Solent NE calculator as an alternative suitable donor calculator. This application again indicated a negative budget (-31.34kgTN/yr) and thus no nutrient surplus.

2.2.4 From the assessment undertaken, the pre development nutrient load is greater than the proposed land uses and therefore the outcomes demonstrate that in relation to nutrient impact the water resource would not be detrimentally affected by the land use changed associated with the development.

[1] Soilscapes soil types viewer - Cranfield Environment Centre. Cranfield University (landis.org.uk)
[2] UK Soil Observatory (bgs.ac.uk)

CALCULATION RECORD

Appendix

Illustrative Land Use Plan

Nutrient Budget Calculation Sheet

DOCUMENT ISSUE RECORD

Technical Note No	Rev	Date	Prepared	Checked	Reviewed (Discipline Lead)	Approved (Project Director)
332610041/3501/TN001	-	01/09/23	KT	AJ	AJ	

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N

Loddon Park Farm

Loddon Nurseries

Proposed Secondary Site Access

Existing Site Access for Pedestrian use only

Proposed Main Site Access

NEW BATH ROAD

BM 42.21m

BM 35.87m

Loddon Acres

New Public Open Space

RIVER LODDON

OLD RIVER

YEWHURST CLOSE

LLEWELLYN PARK

The Denes

WARGRAVE ROAD

BM 39.11m

38.7m

MP 31.75

36.3m

BM 36.32m

Wythe Cottage

Cedar Park

El Sub Sta

SP

Boat House

Bridge House

Coach House

BRIDGE PARK

HIGH STREET

The Old Silk Mill

The Waggon and Horses

PH

Waterside Court

OLD BATH ROAD

White Bridge

36.0m

36.6m

BM 37.28m

MS

Warehouse

Garage

Works

Scrub

Water Marsh

Orch

Track

Drain

Water

A 321

A4

GP

FB

LB

MP 31.5

A 3032

KEY

Site Boundary - 12.13Ha.

New Public Open space to include play area, informal recreation, bio-diversity net gain and decorative planting - 4.95Ha.

Landscape buffer along the boundary with the A4 New Bath Road.

Line of 1-in-a-1000 year flood zone shown dotted.

Development areas to include residential buildings, private gardens, parking, infrastructure and decorative planting - 7.18Ha.

Land reserved for infrastructure, main pedestrian & cycle route,main vehicular routes & parking.

Garden set-back along the boundary of the railway land.

Line of existing agricultural track.

County Highway owned land.

Existing trees retained

Proposed barrier to prevent southern access use as a main route for new housing. (Location to be agreed).

Rev:E 07/12/2022 OS plan updated along High Street & Wargrave Road.
Rev:D 18/03/2021 Garden set-back & A4 buffer revised. Overall areas amended to suit.
Rev:C 24/06/2021 Further notes revised, barrier location added.
Rev:B 23/06/2021 Drawing renamed illustrative. Further descriptions added.
Rev:A 15/06/2021 Red line boundary amended to include highway land. Land areas updated.

Croudace HOMES.CO.UK

Paul Brown RIBA
Chartered Architect
07443 417 952

Bridge Farm, TWYFORD

1:1250 @ A1 0 10 20 30 40 50 Metres

Illustrative Land Use Plan

Ref: PRB/TWY/013E March 2021

Stage 2

User Inputs

Catchment:	Itchen
Soil drainage type:	Freely draining
Annual average rainfall (mm)**:**	700.1 - 750
Within Nitrate Vulnerable Zone (NVZ):	Yes

Existing land use type(s)	**Area** (ha)	**Annual phosphorus nutrient export** (kg TP)	**Annual nitrogen nutrient export** (kg TN)
Lowland	12.13	0.73	159.27
Total:	**12.13**	**0.73**	**159.27**

Stage 3

User Inputs

New land use type(s)	**Area** (ha)	**Annual phosphorus nutrient export** (kg TP)	**Annual nitrogen nutrient export** (kg TN)
Open urban land	4.95	**3.85**	**39.42**
Residential urban land	7.18	**10.41**	**96.99**
Total:	**12.13**	**14.27**	**136.41**

Stage 2

User Inputs

Catchment:	Itchen
Soil drainage type:	Freely draining
Annual average rainfall (mm)**:**	650.1 - 675
Within Nitrate Vulnerable Zone (NVZ):	Yes

Existing land use type(s)	**Area** (ha)	**Annual nitrogen nutrient export** (kg TN)
Lowland	12.13	155.60
Total:	**12.13**	**155.60**

In the absence of real world data, this figure has been generated using the most relevant average nutrient reduction coefficient.

Stage 3

User Inputs

New land use type(s)	**Area** (ha)	**Annual nitrogen nutrient export** (kg TN)
Open urban land	4.95	35.91
Residential urban land	7.18	88.36
Total:	**12.13**	**124.26**