

Hele View

Nutrient Neutrality
Assessment & Mitigation
Strategy (NNAMS)

for

Hazel Walker

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1 INTRODUCTION

WCI have been appointed by Hazel Walker to prepare a nutrient neutrality assessment and mitigation strategy to support a revised planning application for the approved dwelling to amend the current consents reference 20/00599/PNCOU on the 10th June 2020 together with second application for change of use of land to domestic garden and 2 buildings for ancillary residential use reference 20/00607/FUL at Hele View, Clayhanger, Devon, EX16 7NZ.

It is important to note that the current consents could be implemented without the requirement to undertake assessment in accordance with the Habitats Regulations Assessment (HRA).

This assessment aims to identify the current and proposed total phosphorous (TP) levels of the site, and report on the feasibility of various mitigation options available to achieve nutrient neutrality, relative to total phosphorous levels associated with occupancy and land usage, as measured in kg/year.

Phosphate neutrality is a requirement of Natural England (NE) for river catchment areas affected by high levels of phosphorous.

2 SITE DESCRIPTION

2.1 Proposed Development

The proposed development extends current Class Q planning rights for the conversion of an agricultural unit to a dwellinghouse.

The Class Q permitted development allows for the conversion of the agricultural unit to a dwellinghouse with a total of 156.2m² of floor space within a domestic curtilage totalling 922.91m² all served by a package sewage treatment plant for the treatment of foul waste. This is considered the extant development.

The proposed development extends the extant permissions. The development will continue to consist of a single domestic dwellinghouse with an extended domestic curtilage to reflect hedge patterns together with extended landscaping.

2.2 Location

The site is located in a rural settling in Clayhanger, Devon centred on NGR ST02962352.

2.3 Statutory Designations

The site is located within the hydrological catchment of the River Tone.



Figure 1: Operation Hydrological Catchment GIS (in red)

Following advice from Natural England in March 2020, before determining a planning application that may give rise to additional phosphates within the catchment, competent authorities should undertake Habitats Regulations Assessment (HRA). Permission may only be given if the assessment ascertains that the plan will not have an adverse effect on the integrity of the Somerset Levels and Moors RAMSAR.

The site is not subject to any additional statutory designations.

2.4 Public Sewers

The site is not served by any public foul or stormwater sewers.

2.5 Existing Drainage Arrangements

The site currently drains to an existing culvert which carries both foul and surface water to discharge to a watercourse to the south of the site. The culvert carries spring water from the site constantly year round.

The extant consent for the dwelling, associated land and buildings approved under Part Q, envisages the installation of a package sewage treatment plant for the treatment of foul waste

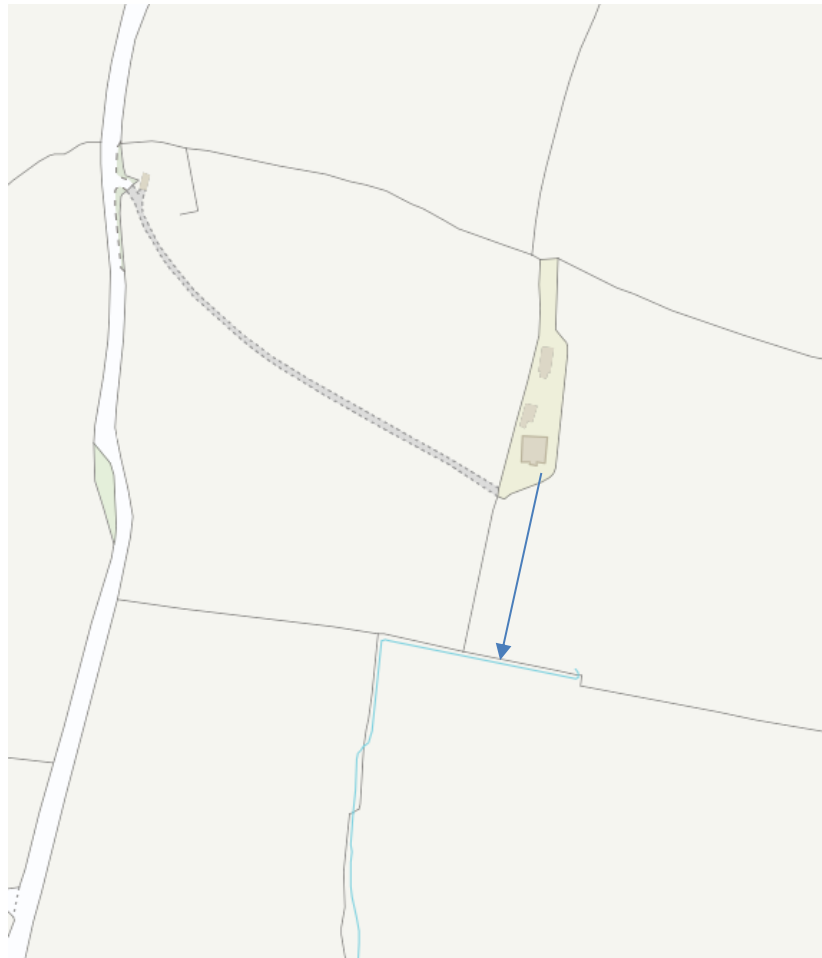


Figure 2: Existing Drainage to Watercourse

2.6 Proposed Drainage Strategy

A BS EN12566-3 certified package sewage treatment plant (PSTP) with enhanced phosphate reduction performance will be installed to treat foul waste from the development prior to discharge to the existing combined culvert. The PSTP will not incorporate any form of chemical dosing. *See Appendix A for PIA Certificate.*

As the discharge of treated effluent is to a watercourse than normally has flow throughout the year and the discharge is for less than 5m³ per day, the discharge is compliant with General Binding Rules under the Environmental Permitting Regulations 2015 and does not require an Environmental Permit.

See Appendix B for Drainage Layout

3 PHOSPHATE BALANCE

3.1 Basis for Calculation

A 'Total Phosphorus' (TP) balance has been produced to determine the implied phosphate load on the Somerset Levels and Moors RAMSAR. Mid-Devon County Council have not yet produced a 'Phosphate Balance Calculator' and the enclosed phosphate balance has been produced using references to the Somerset Councils Phosphate Balance Calculator (PBC) and Natural England guidance "natural-england-generic-catchment-calculator-march-2022".

3.2 Phosphate Balance

The proposed development, relative to extant permissions, does not increase the overnight occupancy of the site and no additional phosphate load arises due to occupation.

The extant land use comprises 0.092ha of 'urban' use and 0.576ha of lowland grazing. The proposed development will increase the 'urban' use (interpreted as meaning the domestic curtilage) by 88.1m² while transferring 0.567ha of lowland grazing to beneficial woodland and 'unmanaged open space'.

See Appendix C for Land Use Layout

A 'precautionary' approach has been adopted in the interpretation of the assorted guidance and phosphate load criteria in determining the phosphate balance for the site.

- a. While Natural England's accepted baseline performance for phosphate reduction from a PSTP is 9.7 mg/l, it is assumed that the PSTP phosphate reduction performance is not improved by the proposed development. It should be noted that the proposed PSTP is certified to deliver 1.6 mg/l and represents a significant performance increase over the allowable baseline and the PSTP which could be installed to serve the extant development rights.
- b. While the proposed land use transfers lowland grazing to woodland (including orchards) and open greenfield, both of which have advantageous phosphate loads per hectare, the change of land use has been defined as lowland grazing to 'meadow'. This recognises the potential delay in of achieving the full phosphate reduction potential as woodland matures.


With the adoption of this precautionary approach, the proposed development, through change of land use from lowland grazing to lower phosphate land use, reduces the overall phosphate load of the site by 0.01 kg/yr (-1.6% reduction).

Once woodlands mature and existing phosphates in the open space are sequestered, the change of land use will result in a 0.08 kg/yr (-18.9%) reduction over extant rights.

See Appendix D for Precautionary Phosphate Calculations & Appendix E for Matured Phosphate Calculations

4 APPENDICES

4.1 APPENDIX A – PIA 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 | m ³ /d | |
| Material | polypropylene | | |
| Treatment efficiency (nominal sequences) | COD | Efficiency | Effluent |
| | BOD ₅ | 94.2 % | 43 mg/l |
| | SS | 98.0 % | 7 mg/l |
| | NH ₄ -N** | 96.3 % | 14 mg/l |
| | N _{tot} ** | 98.3 % | 0.5 mg/l |
| | P _{tot} | 87.0 % | 7.9 mg/l |
| | | 80.2 % | 1.6 mg/l |
| Electrical consumption | 0.63 | kWh/d | |

*at a test influent of ≥ 300 mg/l BOD₅ (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



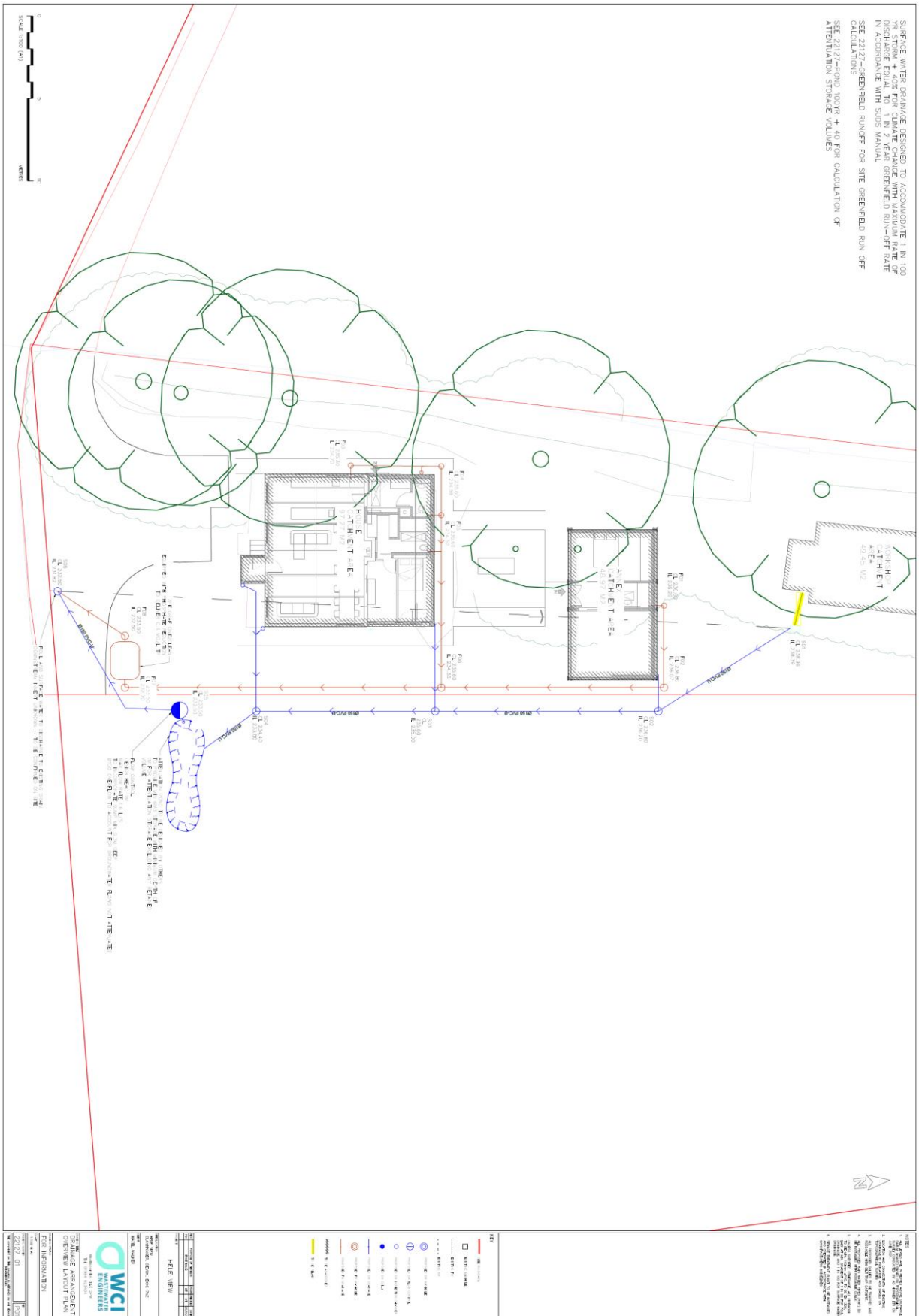


Deutsche
Akkreditierungsstelle
D-PL-17712-01-00

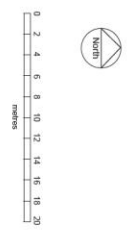
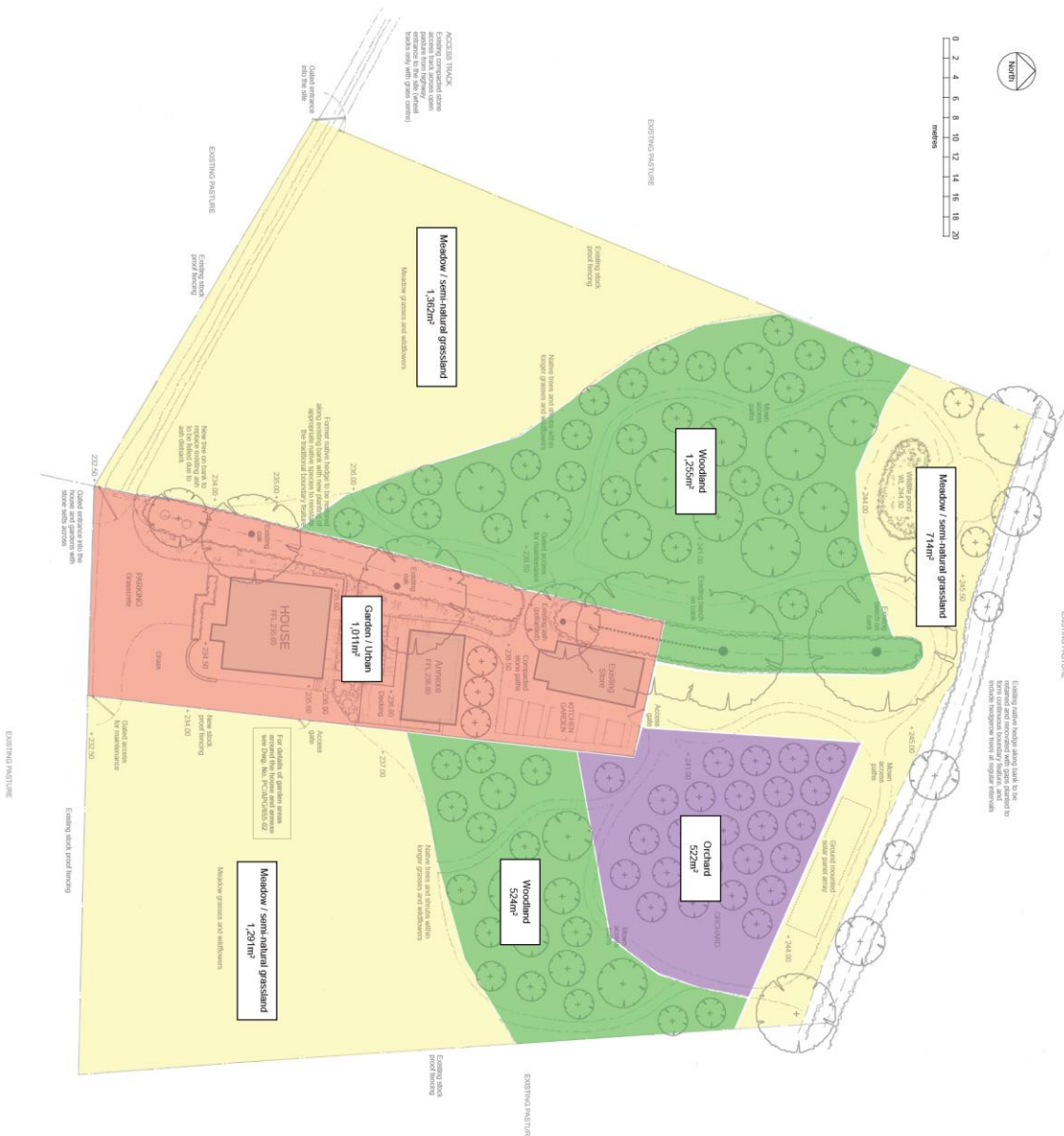


Elmar Lancé
November 2014

4.2 APPENDIX B – Drainage Layout



4.3 APPENDIX C – Land Use



KEY

- Existing tree to be retained
- Proposed new tree (indicative positions)

| Proposed land use: | Total area (m ²) |
|---------------------------------|------------------------------|
| Garden / Urban | 1,011 |
| Meadow / semi-natural grassland | 3,967 |
| Woodland | 1,779 |
| Orchard | 522 |

NOTES
 Existing trees to be retained and new trees to be planted to be shown on the site plan. Land use areas based on Natural England definitions.

DRAFT
28 April 2022

eden design
 landscape architecture and garden design
 9 Ashcroft Lane, Broomfield, Essex, SS16 5NF
 01204 714344 | www.edendesign.co.uk

Client: Hazen Walker
Project: Hele View
Designer: Chaynanger
Drawn: Davon

PROPOSED LAND USE PLAN

| | |
|-------|-------------------|
| Title | 1:500 @ A1 |
| Date | April 2022 |
| Drawn | PC / ARS / 655_03 |

4.4 APPENDIX D – Precautionary Phosphate Calculations

| | | | | | |
|---|--|-------------------|------------|--|--|
| CURRENT USE | TOTAL PHOSPHOROUS LOAD DUE TO CURRENT OCCUPANCY | | | | References |
| | Residential Units | | | | |
| | Number of Units | | 1 | | |
| | Av Persons per Unit | | 2.4 | | Phosphate Balance Calculator 3.1 (PBC 3.1) |
| | Total Persons | | 2.4 | | |
| | Total Persons | | 2 | | |
| | Flow per Person per Day | | 110 l/day | | |
| | Total Daily Flow | | 264 L | | |
| | Annual Flow | | 96,360 L | | |
| | Total P (Concentration) | | 24.66 mg/l | | |
| Total P (per Person p.a.) | | 0.99 kg/yr | | Phosphate Balance Calculator 3.1 (PBC 3.1) | |
| Total P (Pre-Treatment) | | 2.38 kg/yr | | | |
| WwTW Treatment Efficiency | 93.5% | 1.60 mg/l | | Natural England Baseline | |
| TOTAL P DUE TO CURRENT OCCUPATION | | 0.15 kg/yr | | 1 | |
| TOTAL PHOSPHOROUS LOAD DUE TO CURRENT LAND USE | | | | | |
| Existing Land Use | | | | | |
| Urban Use | 0.092 ha | 0.83 TP/ha | | Load from PBC 3.1 | |
| Lowland Grazing | 0.576 ha | 0.22 TP/ha | | Load from PBC 3.1 | |
| Total | 0.668 ha | | | | |
| Total P from Current Land Use | | 0.20 kg/yr | | | |
| TOTAL P DUE TO CURRENT LAND USE | | 0.20 kg/yr | | 2 | |
| TOTAL PHOSPHOROUS LOAD PRE-DEVELOPMENT | | | | | |
| Total Load from Land Use and Occupation | | 0.36 kg/yr | | | |
| 20% Safety Factor | | 0.07 kg/yr | | Phosphate Balance Calculator 3.1 (PBC 3.1) | |
| TOTAL P LOAD PRE-DEVELOPMENT | | 0.43 kg/yr | | 3 (1 + 2) | |

| | | | | |
|--|---|------------|--|--|
| POST-DEVELOPMENT | TOTAL PHOSPHOROUS LOAD DUE TO PROPOSED OCCUPANCY | | | |
| | Residential Units | | | References |
| | Number of Units | | 1 | |
| | Av Persons per Unit | | 2.4 | Phosphate Balance Calculator 3.1 (PBC 3.1) |
| | Total Persons | | 2.4 | |
| | Total Persons | | 2 | |
| | Flow per Person per Day | | 110 l/day | |
| | Total Daily Flow | | 264 L | |
| | Annual Flow | | 96,360 L | |
| | Total P (Concentration) | | 24.66 mg/l | |
| Total P (per Person p.a.) | | 0.99 kg/yr | Phosphate Balance Calculator 3.1 (PBC 3.1) | |
| Total P (Pre-Treatment) | | 2.38 kg/yr | | |
| WWTW Treatment Efficiency | 93.5% | 1.60 mg/l | Otto Graf PIA Certificate | |
| TOTAL P DUE TO PROPOSED OCCUPATION | | | 0.15 kg/yr 4 | |
| TOTAL PHOSPHOROUS LOAD DUE TO PROPOSED LAND USE | | | | |
| Proposed Land Use | | | | |
| Urban Use | 0.101 ha | 0.83 TP/ha | Load from PBC 3.1 | |
| Woodland | 0.000 ha | 0.02 TP/ha | Load from PBC 3.2 | |
| Meadow | 0.567 ha | 0.2 TP/ha | Load from PBC 3.3 | |
| Open Space | 0.000 ha | 0.14 TP/ha | Load from PBC 3.4 | |
| Total | 0.668 ha | | | |
| Total P from Proposed Land Use | | | 0.20 kg/yr | |
| TOTAL P DUE TO PROPOSED LAND USE | | | 0.20 kg/yr 5 | |
| TOTAL PHOSPHOROUS LOAD POST-DEVELOPMENT | | | | |
| Total Load from Land Use and Occupation | | | 0.35 kg/yr | |
| 20% Safety Factor | | | 0.07 kg/yr | |
| TOTAL P LOAD POST-DEVELOPMENT | | | 0.42 kg/yr 6 (4 + 5) | |
| TP BALANCE | NET TOTAL PHOSPHORUS DUE TO DEVELOPMENT | | | |
| | Pre-Development Phosphorus Balance | | 0.43 kg/yr | from 3 |
| | Post-Development Phosphorus Balance | | 0.42 kg/yr | from 6 |
| | TP LOAD FROM PROPOSED DEVELOPMENT | | -0.01 kg/yr 7 | |
| | | -1.6% | | |

4.5 APPENDIX E – Matured Phosphate Calculations

| | | | | |
|---|--|------------|--|--|
| CURRENT USE | TOTAL PHOSPHOROUS LOAD DUE TO CURRENT OCCUPANCY | | | |
| | Residential Units | | | References |
| | Number of Units | | 1 | |
| | Av Persons per Unit | | 2.4 | Phosphate Balance Calculator 3.1 (PBC 3.1) |
| | Total Persons | | 2.4 | |
| | Total Persons | | 2 | |
| | Flow per Person per Day | | 110 l/day | |
| | Total Daily Flow | | 264 L | |
| | Annual Flow | | 96,360 L | |
| | Total P (Concentration) | | 24.66 mg/l | |
| | Total P (per Person p.a.) | | 0.99 kg/yr | Phosphate Balance Calculator 3.1 (PBC 3.1) |
| | Total P (Pre-Treatment) | | 2.38 kg/yr | |
| | WwTW Treatment Efficiency | 93.5% | 1.60 mg/l | Natural England Baseline |
| | TOTAL P DUE TO CURRENT OCCUPATION | | | 0.15 kg/yr ¹ |
| | TOTAL PHOSPHOROUS LOAD DUE TO CURRENT LAND USE | | | |
| Existing Land Use | | | | |
| Urban Use | 0.092 ha | 0.83 TP/ha | Load from PBC 3.1 | |
| Lowland Grazing | 0.576 ha | 0.22 TP/ha | Load from PBC 3.1 | |
| Total | 0.668 ha | | | |
| Total P from Current Land Use | | | 0.20 kg/yr | |
| TOTAL P DUE TO CURRENT LAND USE | | | 0.20 kg/yr ² | |
| TOTAL PHOSPHOROUS LOAD PRE-DEVELOPMENT | | | | |
| Total Load from Land Use and Occupation | | | 0.36 kg/yr | |
| 20% Safety Factor | | | 0.07 kg/yr | |
| | | | Phosphate Balance Calculator 3.1 (PBC 3.1) | |
| TOTAL P LOAD PRE-DEVELOPMENT | | | 0.43 kg/yr ^{3 (1 + 2)} | |

| | | | | |
|--|---|--------------------|--|--|
| POST-DEVELOPMENT | TOTAL PHOSPHOROUS LOAD DUE TO PROPOSED OCCUPANCY | | | References |
| | Residential Units | | | |
| | Number of Units | | 1 | |
| | Av Persons per Unit | | 2.4 | Phosphate Balance Calculator 3.1 (PBC 3.1) |
| | Total Persons | | 2.4 | |
| | Total Persons | | 2 | |
| | Flow per Person per Day | | 110 l/day | |
| | Total Daily Flow | | 264 L | |
| | Annual Flow | | 96,360 L | |
| | Total P (Concentration) | | 24.66 mg/l | |
| Total P (per Person p.a.) | | 0.99 kg/yr | Phosphate Balance Calculator 3.1 (PBC 3.1) | |
| Total P (Pre-Treatment) | | 2.38 kg/yr | | |
| WWTW Treatment Efficiency | 93.5% | 1.60 mg/l | Otto Graf PIA Certificate | |
| TOTAL P DUE TO PROPOSED OCCUPATION | | 0.15 kg/yr | 4 | |
| TOTAL PHOSPHOROUS LOAD DUE TO PROPOSED LAND USE | | | References | |
| Proposed Land Use | | | | |
| Urban Use | 0.101 ha | 0.83 TP/ha | Load from PBC 3.1 | |
| Woodland | 0.230 ha | 0.02 TP/ha | Load from PBC 3.2 | |
| Meadow | 0.000 ha | 0.2 TP/ha | Load from PBC 3.3 | |
| Open Space | 0.337 ha | 0.14 TP/ha | Load from PBC 3.4 | |
| Total | 0.668 ha | | | |
| Total P from Proposed Land Use | | 0.14 kg/yr | | |
| TOTAL P DUE TO PROPOSED LAND USE | | 0.14 kg/yr | 5 | |
| TOTAL PHOSPHOROUS LOAD POST-DEVELOPMENT | | | | |
| Total Load from Land Use and Occupation | | 0.29 kg/yr | | |
| 20% Safety Factor | | 0.06 kg/yr | | |
| TOTAL P LOAD POST-DEVELOPMENT | | 0.35 kg/yr | 6 (4 + 5) | |
| TP BALANCE | NET TOTAL PHOSPHORUS DUE TO DEVELOPMENT | | | |
| | Pre-Development Phosphorus Balance | 0.43 kg/yr | from 3 | |
| | Post-Development Phosphorus Balance | 0.35 kg/yr | from 6 | |
| | TP LOAD FROM PROPOSED DEVELOPMENT | -0.08 kg/yr | 7 | |
| | | -18.9% | | |