BROOKBANKS

10815 Land off Rockfield Road, Monmouth

Technical Note 1 Rv1: Nutrient Assessment
31st August 2021

1 Introduction

1.1 Brookbanks is appointed by Hallam Land Management to complete an initial appraisal of the phosphorus budget for a proposed development of up to 130 dwellings at Land off Rockfield Road, Monmouth and analyse options for providing a phosphorus neutral development.

1.2 It is important that a nutrient neutral site can be delivered in response to guidance from Natural Resources Wales (NRW) that raises concerns over the water quality in the Gwy riverine Special Area of Conservation (SAC). Therefore, NRW seeks for the developer to prove that direct or indirect discharges from the proposed development must be able to demonstrate phosphate neutrality or betterment to the Afon Gwy SAC.

Background Information

1.3 **Figure 1-1** shows the location of the proposed development site. The application Site boundary totals 4.33ha and currently exists as a general crop farm. The Site is bound to the northeast by the Rockfield Road, to the southeast and southwest existing residential properties. Agricultural fields bound the northwest side of the Site.

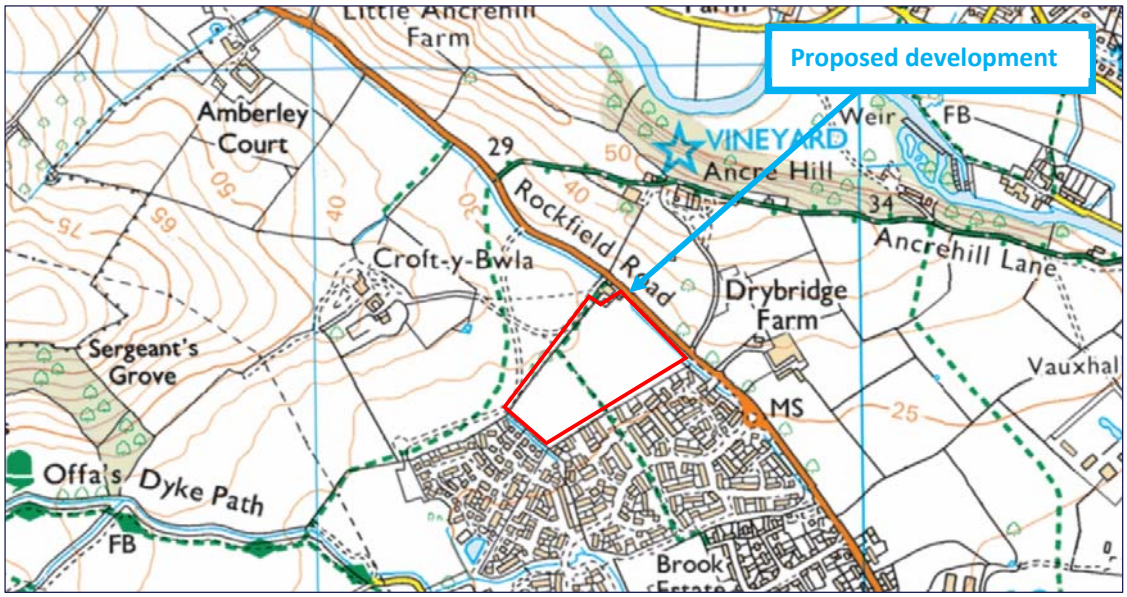

Figure 1-1: Site Location

2 Catchment Analysis

2.1 **Figure 2-1** identifies that surface water from proposed development discharges into the Afon Mynwy, which subsequently flows into the Afon Gwy.

2.2 The Gwy riverine Special Area of Conservation (SAC) must be protected under the Conservation of Habitats and Species Regulations 2017 (the Habitats Regulations).

Figure 2-1: Catchment Analysis

2.3 The surface runoff catchment area totals approximately 102.8ha.

2.4 Wastewater from the proposed development will be treated at Monmouth Wastewater Treatment Works (WwTW), which discharges directly into the Afon Gwy.

2.5 Any offsite mitigation land should fall within the River Gwy or River Mynwy catchment and fall upstream of the Gwy riverine SAC.

2.6 However, it should be noted that leachate figures for the River Mynwy catchment are lower than those of the River Gwy catchment, according to Herefordshire Council Calculator (see point 3.3 and 3.4 below). Therefore, **it is recommended that any offsite mitigation land for fallowing should fall within the River Gwy catchment upstream of the confluence of the River Gwy or Mynwy to maximise fallowing potential.**

3 Nutrient Budget Analysis

3.1 Natural Resources Wales (NRW) provided documentation in January 2021 outlining their concerns of increased Phosphate levels for all river Special Area of Conservation (SAC) across Wales.

3.2 NRW are in the process of providing clear guidance on increase phosphate as a result of new developments and have produced the note "NRW interim advice for planning applications that have the potential to increase phosphate levels in river SAC's" which sets out confirmation that new developments will need to assess phosphate impact on their development. As outlined previously NRW also state that proposed development must be able to demonstrate phosphate neutrality or betterment.

3.3 In the absence of a calculation methodology from NRW to assess phosphate loading of a site, this section applies a four-stage methodology outlined by Natural England (NE) guidance, within the Herefordshire Council (HC) provided Nutrient Budget Calculator, to assess the phosphate status for the proposed development at Land off Rockfield Road, Monmouth.

3.4 Following examination of a few calculators produced by several entities, the HC calculator is considered to be the most accurate representation of the TP load and loss from land use given its proximity to the LPA area and that rainfall data for specific development zones can be applied.

3.5 **Table 3-1** sets out the assumptions applied for up to 130 dwellings at the proposed development site based on the latest masterplan.

RM Application Site: Calculation Assumptions		
Number of dwellings - Houses	130	Dwellings
Average occupancy	2.4	Persons per dwelling
Wastewater generated	110	Litres/person/day
Total Site Area	4.33	ha
Current Land Usage	4.33	General crop (ha)
Future Land Usage	0.80	Public open space (ha)
	3.23	Urban (ha)
	0.30	Wetland / SuDs (ha)
Treatment Works for Foul Water Discharge	Monmouth	
Phosphorus Consent Limit at WwTW	5	mg/l (assumed as no permit)
Soil Type	Freely draining floodplain soil	

Table 3-1: Development Assumptions for the RM Application Site

Total Phosphorus Baseline Conditions

3.6 Based on the assumptions set out in **Table 3-1** above, **Table 3-2** sets out the phosphate budget baseline conditions for the proposed development site.

Natural England Guidance Stage		(kgP/year)	Explanation
1	**Wastewater Total Phosphates from Proposed Development**	56.41	
2	**Phosphate Load from Existing Land Use**	0.42	General crop leachate rate on freely draining 0.10kgP/ha/year
3	**Phosphate Load from Proposed Future Land Use**	5.79	
	Wetland Removal of Future Land Uses	-2.90	Wetland treatment 50% of future urban runoff
	Overall Phosphate Load from Future Land Uses	2.91	
4	**Total Phosphate Budget**	58.91	Stage 1 + (Stage 3 – Stage 2)
Phosphate Budget (with 20% buffer where positive)		**70.69**	**KgP/year**

Table 3-2: Total Phosphate Budget

3.7 Due to the positive budget resulting from change in land use at the site, mitigation measures will be required to offset additional **70.69kgP/year** discharged from the proposed 130 dwellings.

4 Mitigation

4.1 Due to constraints at the proposed development site, it is necessary to examine options for mitigation offsite.

4.2 In order to mitigate the additional **70.69kgP/year** discharged from the proposed development; initial calculations suggest the following options.

4.3 If offsite mitigation land were to be located in the **Mynwy catchment**, the following would be required:

- Fallow **93.10ha** of Existing Lowland Grazing
- Or Fallow **96.85ha** of Existing General Crop Land
- Or Install a **5.90ha** highly functioning constructed wetland

4.4 If offsite mitigation land were to be located in the **Gwy catchment**, where leachate figures are approximately 50% higher, the following would be required:

- Fallow **50.9ha** of Existing Lowland Grazing
- Or Fallow **52.40ha** of Existing General Crop Land
- Or Install a **5.90ha** highly functioning constructed wetland

4.5 Any mitigation land should be located within the **Gwy or Mynwy catchment,** upstream of the confluence with the River Mynwy and Gwy and should be **impermeable land.**

Package Treatment Plant (PTP)

4.6 As both fallowing and creating a wetland are unfeasible for achieving site neutrality. It is proposed that a PTP is installed in order to treat the wastewater produced on the development.

4.7 This Treatment Plant would have a TP permit of 0.5mg/l (instead of 5mg/l) with an effective 90% permit discharge. This would give a final TP limit of 0.45mg/l, which has been used in the following calculations.

4.8 **Table 3-1** outlines the phosphate budget baseline conditions for the development (130 dwellings) boundary with the installation of a PTP.

Natural England Guidance Stage		(kgP/year)	Explanation
1	**Wastewater Total Phosphates from Proposed Development**	5.08	
2	**Phosphate Load from Existing Land Use**	0.42	General crop leachate rate on freely draining 0.10kgP/ha/year
3	**Phosphate Load from Proposed Future Land Use**	5.79	
	Wetland Removal of Future Land Uses	-2.90	Wetland treatment 50% of future urban runoff
	Overall Phosphate Load from Future Land Uses	2.91	
4	**Total Phosphate Budget**	7.57	Stage 1 + (Stage 3 – Stage 2)
Phosphate Budget (with 20% buffer where positive)		**9.09**	**KgP/year**

Table 4-3: Total Phosphate Budget

4.9 Due to the positive budget resulting from change in land use at the site, mitigation measures will be required to offset additional **9.09kgP/year** discharged from the site.

4.10 Again, due to constraints at the proposed development site, it is necessary to examine options for mitigation offsite.

4.11 In order to mitigate the additional **9.09kgP/year** discharged from the proposed development; initial calculations suggest the following options.

4.12 If offsite mitigation land were to be located in the **Mynwy catchment**, the following would be required:

- Fallow **12.00ha** of Existing Lowland Grazing
- Or Fallow **12.50ha** of Existing General Crop Land
- Or Install a **0.76ha** highly functioning constructed wetland

4.13 If offsite mitigation land were to be located in the **Gwy catchment**, where leachate figures are approximately 50% higher, the following would be required:

- Fallow **6.55ha** of Existing Lowland Grazing
- Or Fallow **6.75ha** of Existing General Crop Land
- Or Install a **0.76ha** highly functioning constructed wetland

4.14 Any mitigation land can be located within the **Gwy or Mynwy catchment,** upstream of the confluence with the River Mynwy and Gwy and should be **impermeable land.**

5 Summary and Limitations

5.1 This note has set out an initial appraisal of the phosphorus budget for the proposed development off Rockfield Road, Monmouth.

5.2 It has been determined that the proposed development will result in a positive TP budget of **70.69kgP/year**. Therefore, options for offsite mitigation have been explored in order to offset this budget and provide a phosphate neutral development.

5.3 With the introduction of a PTP fallowing of between **6.55ha** and **12ha** of general cropland or the introduction of a wetland of **0.76ha** would offer nutrient neutrality for the proposed development.

5.4 **It is important that any offsite mitigation land is located within the Afon Mynwy or Afon Gwy catchment and upstream of the Gwy riverine SAC and on impermeable land.**

Limitations

5.5 The conclusions and recommendations contained herein are limited to those given the general availability of background information and the planned usage of the site.

5.6 Third party information has been used in the preparation of this report, which Brookbanks, by necessity assumes is correct at the time of writing. While all reasonable checks have been made on data sources and the accuracy of data, Brookbanks accepts no liability for same.

5.7 The benefits of this report are provided solely to Hallam Land Management for the proposed development Land at Rockfield Road, Monmouth.

5.8 Brookbanks excludes third party rights for the information contained in the report.