Site: Provision of Additional Poultry Buildings and Associated Infrastructure off Stoke Road, Martock, Somerset (Planning ref. 20/03004/FUL)

Item: Shadow Habitats Regulations Assessment

Client: Mr T Martin

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SUMMARY

Hopkins Ecology Ltd was appointed by ACORUS on behalf of Mr T Martin to prepare a shadow Habitats Regulations Assessment (HRA) for a proposed broiler breeder chickens facility on land off Stoke Road, Martock. The Site is within the catchment of the River Parrett, within which there are Ramsar / Nature Directives sites.

This document also covers Sites of Special Scientific Interest (SSSIs) and Local Wildlife Sites (LWSs).

The shadow HRA and SSSI / LWS impact assessment are informed as required by earlier feedback on the scheme form Natural England, an air quality modelling report for ammonia-related impacts, plus scheme documents.

SHADOW HRA (RAMSAR AND NATURE DIRECTIVES SITES)

The only pathway of impact, in accordance with Natural England guidance on nutrient neutrality, is phosphorous-related eutrophication.

Impacts on the Somerset Moors and Levels SPA can be screened out. Impacts on the Somerset Moors and Levels Ramsar Site are taken to Appropriate Assessment.

Mitigation can be considered at the Appropriate Assessment stage. The proposed mitigation is to take off-Site manure, wash down water and other nutrient-laden material, and out of the catchment by a registered carrier. The removal of the material from the catchment constitutes mitigation for the River Parret catchment. However, Natural England have expressed concern regarding other sensitive catchments and also to some aspects of the process. The following points are identified as providing confidence in that mitigation can be delivered, is viable and feasible, and can be enforced:

- A sufficiently large on-Site storage tank and other aspects of drainage can be conditioned. An outline drainage plan has been prepared and there is very high confidence that the detailed design can be delivered to avoid local loss and discharge of nutrient-laden material.
- Technical aspects of anaerobic digestion are ‘industry standard’ activities, in terms of the quality of feedstock (i.e. manure and wash down water quality [composition / ‘contamination’]). Given the current trends in anaerobic digestion capacity and national policies, it is extremely unlikely that the capacity for anaerobic digestion will decrease and therefore there will be a destination for manures and wash down water.
- Spreading to land of manure and digestate are activities that are controlled by various rule and regulations relating to farming activities. Specifically for locations within Nitrogen Vulnerable Zone, these must comply with various rules including manure storage and application, or follow the guidance of the Code of Good Agricultural Practice (COGAP). Compliance with The Farming Rules for Water and the Reduction and Prevention of Agricultural Diffuse Pollution (England) Regulations 2018 are monitored by the Environment Agency, who have enforcement powers.

There is therefore high confidence that the mutation is deliverable and can be enforced, such that it can be concluded that the scheme will not have in isolation impacts on the site integrity.

There are various residential scheme in the parish of Martock for >130 dwellings that have been consented since 2018 or are to be determined. This includes a linked dwelling under separate application. While mitigation may or may not have been identified for these schemes,

and indeed others in the catchment, they will need to comply with nutrient neutrality guidance. On this basis, these other schemes plus the current scheme will not generate an increase in phosphorous inputs into the Somerset Moors and Levels Ramsar Site and in combination impacts can be concluded to be negligible. As such the it can be concluded that the scheme will not have in combination impacts on the site integrity of the Somerset Moors and Levels Ramsar Site.

SITES OF SPECIAL SCIENTIFIC INTEREST

The pathway of potential impact to SSSI are ammonia-related, mainly via direct toxicity.

The screening threshold for potential impacts on SSSIs is set at 4% of the Critical Level and Critical Load for maximum ammonia concentrations and nitrogen deposition respectively.

For all SSSIs the air quality modelling shows that at all SSSIs the process constructions are <1% of the Critical Levels:

- Ammonia process contribution levels are <1% of the Critical Level at all SSSIs, with the highest level being 0.4% at West Moor SSSI.
- Nitrogen deposition process contribution is <1% of the Critical Load at all SSSIs, with the highest level being 0.6% at West Moor SSSI.

The process contributions are <1% of the Critical Level and Load, therefore It can be concluded therefore that there is sufficient evidence to conclude that ammonia level and nitrogen deposition will not impact SSSIs.

LOCAL WILDLIFE SITES

The pathway of potential impact to LWSs are ammonia-related, via both direct toxicity and nitrogen deposition.

The screening threshold for potential impacts on LWS is set at process contribution to be 100% of the Critical Level / Load. The 100% figure is taken from the air quality modelling report as informed by cited Environment Agency guidance.

The detailed modelling results show:

- Ammonia process contribution levels are between 5.0 and 5.6% of the Critical Level.
- Nitrogen process contribution deposition is 3.9-4.4% of the Critical Load.

The process contributions are <100% of Critical Levels and Loads. The actual percentage levels are only a little higher (up to 1.6% higher) than the thresholds for SSSIs. It can therefore be concluded therefore that there is sufficient evidence to conclude that ammonia level and nitrogen deposition will not impact LWSs.

1. INTRODUCTION

BACKGROUND

1.1 Hopkins Ecology Ltd was appointed by ACORUS on behalf of Mr T Martin to prepare a shadow Habitats Regulations Assessment (HRA) for a proposed broiler breeder chicken facility on land off Stoke Road, Martock.

1.2 The Site is within the catchment of the River Parrett, within which there are Ramsar / Nature Directives sites.

1.3 In terms of the scope of this document:

- A Habitats Regulations Assessment specifically considers designated sites that are together termed as either Ramsar or Nature Directives sites.
- However, for thoroughness, this document provides additional sections to assess the impacts on Sites of Special Scientific Interest (SSSI) (which may or may not be component sites of Ramsar / Nature Directives sites), and also Local Wildlife Sites (LWS).

1.4 The document is informed by an air quality modelling report, plus wider literature and evidence. For clarity the layout of different Sections of this report are as follows:

- First, general background information is provided to introduce the scheme and context.
- Then, later sections provide additional information on:
    - Ammonia-related pathways for all types of sites from the poultry scheme.
    - Pathways related to liquid run-off from the poultry scheme, including an exploration of the mitigation options.
    - Pathways related to waste water and surface run-off from the new dwelling, including mitigation options.
- The formal shadow HRA is then provided, divided into the Test of Likely Significant Effect and Appropriate Assessment stages as required, covering all pathways relevant to the Ramsar / Nature Directive sites.
- An impact assessment for SSSIs is then provided.
- An impact assessment for LWS is then provided.

LEGISLATION AND PLANNING POLICY

1.5 A Habitats Regulations Assessment specifically considers designated sites that are together termed as international or Nature Directives sites:

- Special Protection Areas (SPA) and Special Areas of Conservation (SACs). Together these are the Nature Directives sites, and SPAs are designated for birds while SACs are variously designated for other animals, plants, vegetation and habitats. SPAs are not considered further here.
- Ramsar sites are designated by international treaty and their designated features may variously include birds, other animals, plants, vegetation and habitats.

1.6 The following key pieces of nature conservation legislation are relevant to Ramsar sites and Nature Directives sites with statutory protection (with a more detailed description in Appendix 1), and in practice the legislation remains unchanged following Brexit[1]:

- The Conservation of Habitats and Species Regulations 2017 ('the Habitats Regulations'). This legislation requires the local planning authority (or competent authority) to have sufficient confidence that a project will not impact the integrity of Ramsar site or Nature Directives sites. If a project is likely to affect such a site, then the developer must provide sufficient information to enable the decision maker to make an appropriate assessment of impacts, if required.

1.7 The National Planning Policy Framework (MHCLG, 2023[2]) re-iterates the protection afforded to both Nature Directives and Ramsar sites.

[1] https://www.gov.uk/government/publications/changes-to-the-habitats-regulations-2017/changes-to-the-habitats-regulations-2017

[2] MHCLG (2023) *National Planning Policy Framework.* Ministry for Housing, Communities and Local Government, London.

2. METHODS

PERSONNEL

2.1 This assessment was prepared by Dr Graham Hopkins FRES CEnv MCIEEM. He has 20 years of consultancy experience and has prepared a number of HRA screening reports and has liaised with competent authorities over data requirements and analyses for Appropriate Assessments. He also has particular knowledge of the assessment of impacts from schemes with the potential to generate nutrient pollution, including liquid and gaseous sources.

DATA SEARCH

2.2 Data on designated sites locally were taken from the Multi-Agency Geographic Information for the Countryside website[3] ('MAGIC').

HABITATS REGULATIONS ASSESSMENT

2.3 The background to the legal basis and process for undertaking the HRA is given in Appendix 2. In summary, and following standard methods (Tyldesley, 2011[4]), the process is potentially divided into three distinct stages as required (Table 1).

Table 1. The stages of a Habitats Regulations Assessment.

Task	Requirements
Stage 1	The 'test of likely significant effect' or 'screening'. Establishing whether a plan is 'likely to have a significant effect' on a Nature Directives site, and therefore whether or not Appropriate Assessment is required.
Stage 2	Appropriate Assessment of whether there is an effect on site integrity. This is potentially a two-stage process, with a consideration of whether there are likely to be effects, followed, if necessary, by a detailed consideration of site-specific factors. The Appropriate Assessment can consider mitigation.
Stage 3	If there is an effect on site integrity, then the project should be re-assessed with the inclusion of compensation and a repeat of Stage 2.

[3] www.magic.gov.uk

[4] Tyldesley, D. (2011) *Assessing Projects under the Habitats Directive: Guidance for Competent Authorities.* Report to the Countryside Council for Wales, Bangor.

3. GENERAL BACKGROUND INFORMATION

THE SCHEME

3.1 The site consists of a former poultry site with a large poultry building, ancillary buildings, areas of rank modified grassland, ruderal vegetation, dense scrub and piles of rubbish and rubble (Richard Green Ecology, 2020[5]).

3.2 There is currently one poultry house at Stoke Road, Martock, which is used to rear up to 40,000 broiler chickens and is ventilated by high-speed ridge fans. It is proposed that the existing poultry house be refurbished and two new poultry houses be constructed adjacent to it. The three poultry houses would then be used to accommodate up to 39,600 broiler breeder chickens, which would produce fertilised eggs to be transferred to hatcheries elsewhere.

KEY DOCUMENTS

3.3 The Site is within an area identified by Natural England (2020[6]) as relevant to nutrient impacts on the Somerset Levels and Moors Protected Sites, with developments requiring to implement a nutrient neutrality approach. Agricultural schemes such as livestock housing are among the type of schemes identified as relevant. The Natural England guidance letter identified phosphate as the nutrient driving eutrophication, and that relevant site is the Somerset Moors and Levels Ramsar Site. Nitrogen and its forms are not identified as being covered by this guidance.

3.4 The correspondence from Natural England (2022[7]) in relation to the current application is summarized below (Table 2), which raises three points relating to the export of animal waste, the nutrient budget for the proposed scheme and SSSI impacts from ammonia-related pathways.

Table 2. Summary of Natural England's objection of 2 December 2022.

Topic	Comment
Disposal of animal waste	Export of waste to anaerobic digestion is proposed, but the named plants are themselves within sensitive catchments. Evidence is required to demonstrate that the additional phosphorus loads that will result from the development can be utilised without leading to a further intensification of agriculture within the catchment resulting in an increase in phosphorus loads reaching the Ramsar sites.
Sites of Special Scientific Interest (SSSIs)	The interest features of designated sites Wet Moor and West Moor SSSIs may be sensitive to impacts from aerial pollutants, such as those emitted from this proposed development. We advise you to obtain an assessment of air quality

[5] Richard Green Ecology (2020) *Ecological Appraisal. Stoke Road, Martock*. Unpublished report to inform 20/03004/FUL.

[6] Natural England (2020) *Matters Regarding Development in Relation to the Somerset Levels and Moors Ramsar Site.* Available from: https://somersetcc.sharepoint.com/sites/SCCPublic/Planning%20and%20Land/Forms/AllItems.aspx?id=%2Fsites%2FSCCPublic%2FPlanning%20and%20Land%2FSW%26T%20Natural%20England%20Advice%20to%20LPAs%20on%20Nutrients%20in%20the%20Somerset%20Levels%20and%20Moors%20%2817%20Aug%202020%29%2Epdf&parent=%2Fsites%2FSCCPublic%2FPlanning%20and%20Land&p=true&ga=1

[7] Natural England (2022) *Letter dated 22 December 2022.* Available from: https://ssdc.somerset.gov.uk/my-requests/document-viewer?DocNo=11303588

Topic	Comment
	impacts (SCAIL assessment) in order to assess potential impacts of the proposal on these designated sites.

PATHWAYS OF POTENTIAL IMPACT

3.5 The pathways of potential impact are therefore summarised below and in Table 3 but noting that only phosphorous is identified as a source of eutrophication:

- Phosphorous-related eutrophication from manures via leaching and transport by water.
- Direct impacts from ammonia at discrete sites, including toxicity from atmospheric ammonia, nitrogen deposition and acidification.

Table 3. Summary of the pathways of potential impact.

Pathway of potential impact	Receptor	Comment
Phosphorous, via general run-off of liquids plus leaching from manures etc	Ramsar Site and SPA	The justification for considering only phosphorous as a source of eutrophication is based on the Natural England guidance of 2020 in relation to 'nutrient neutrality' where only phosphorous and not nitrogen is identified. This is re-iterated in the Natural England response to the scheme (2022).
Nitrogen, via impacts from ammonia at discrete sites, including toxicity from atmospheric ammonia, nitrogen deposition and acidification.	SSSIs and LWSs	As identified in the Natural England response to these chem ammonia-related impacts primarily concern toxicity rather than as a source of eutrophication.

RAMSAR AND NATURE DIRECTIVES SITES

3.6 The scoping covers sites that are potentially relevant to phosphate via liquid run-off and are those within the catchment of the River Parrett. A broad catchment map is provided by Natural England (2022[8]), however it is not sufficiently refined in relation to the sub-catchments of the River Parrett, therefore Figure 1 shows relevant component sites of the Somerset Moors and Levels Ramsar Site and Somerset Moors and Levels SPA. Of the component sites (Table 4) these fall into three categories of site according to their connection to the River Parrett:

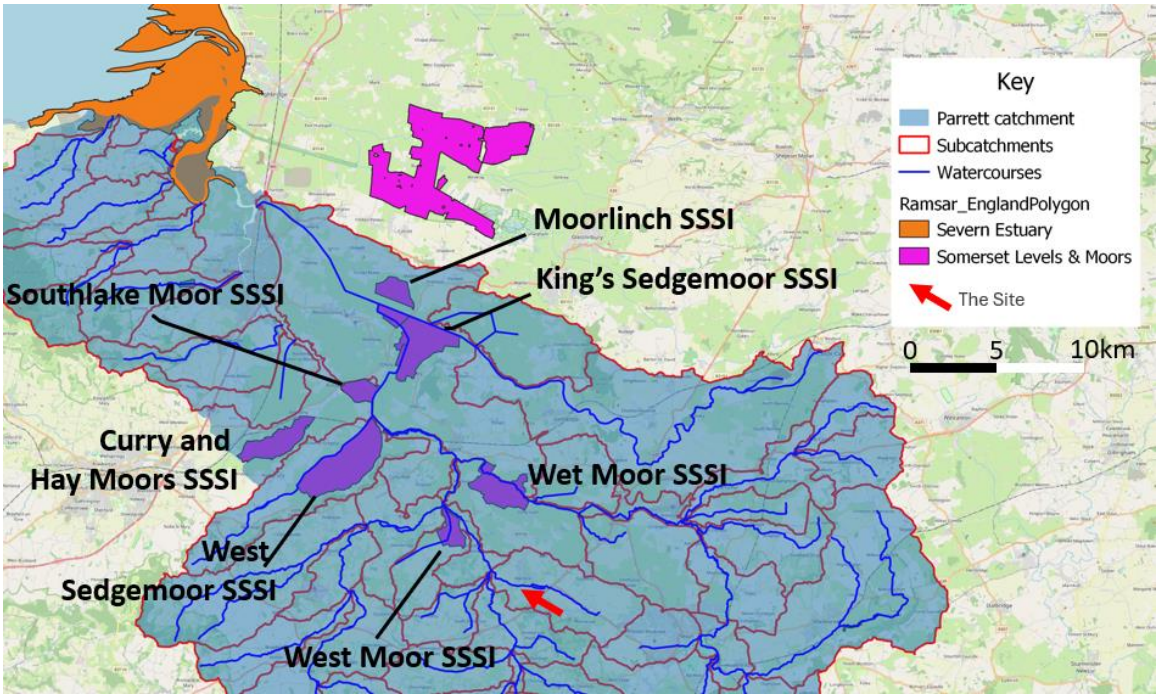
- The sites clearly connected are: King's Sedgemoor SSSI.
- Possibly connected, most likely during flood (the lack of clarity relates to the extent of flow into drainage ditches from the main channel): Moorlinch SSSI, Southlake Moor SSSI, West Sedgemoor SSSI, and West Moor SSSI.
- Sites clearly not connected to the River Parrett downstream: Wet Moor SSSI and Curry and Hay Moors SSSI.

[8] Natural England (2022) *Somerset Levels and Moors Ramsar Catchment Map. First published November 2022. Natural England Technical Information Note TIN213.* Available from: https://publications.naturalengland.org.uk/publication/4562978707079168

Table 4. The Ramsar / Nature Directives sites scoped in (see Appendix 2 for the designated features).

Site	Component site	Euclidean distance to the Site	Connection to the River Parrett	Designated feature
Somerset Moors and Levels Ramsar Site	Moorlinch SSSI	17.4km north-west	Possibly connected, but unclear	Birds plus its internationally important wetland features including the floristic and invertebrate diversity and species of its ditches.
	King's Sedgemoor SSSI	13.9km north-west	Connected via the River Parrett	
	Southlake Moor SSSI	14.1km north-west	Possibly connected, but unclear	
	Curry and Hay Moors SSSI	15.4km north-west	Not connected via the River Parrett	
	West Sedgemoor SSSI	11.1km north-west	Possibly connected, but unclear	
	West Moor SSSI	4.1km north-west	Possibly connected, but unclear	
	Wet Moor SSSI	4.5km north	Not connected via the River Parrett	
Somerset Moors and Levels SPA	As for the Ramsar site	As for the Ramsar site	As for the Ramsar site	Birds

Figure 1. The Site (red arrow) in relation to component sites of the Ramsar site / SPA in the River Parrett catchment.



SITES OF SPECIAL SCIENTIFIC INTEREST (SSSI)

3.7 SSSIs within the vicinity are listed below, which are scoped in on the basis of those within 10km and those which are relevant components of the Somerset Levels and Moors Ramsar Site (Table 5). This includes the identification of sites in relation to the pathways of potential impact.

3.8 For all sites, ammonia-related pathways are scoped in and those for phosphorous are those identified as components of the Ramsar Site only.

Table 5. SSSIs considered in relation to phosphate and ammonia-related pathways.

Site	Pathway:		Location	Designated feature
	Liquid phosphate	Ammonia-related		
Moorlinch SSSI	X	X	17.4km north-west	Extensive grazing marsh grassland and ditch system.
King's Sedgemoor SSSI	X	X	13.9km north-west	Extensive grazing marsh grassland and ditch system.
Southlake Moor SSSI	X	X	14.1km north-west	Extensive grazing marsh grassland and ditch system.
Curry and Hay Moors SSSI	X	X	15.4km north-west	Extensive grazing marsh grassland and ditch system.
West Sedgemoor SSSI	X	X	11.1km north-west	Numerous small, low lying fields and meadows separated by narrow water-filled rhynes and ditches.
West Moor SSSI	X	X	4.1km north-west	Extensive grazing marsh grassland and ditch system.
Wet Moor SSSI	-	X	4.5km north	Extensive grazing marsh grassland and ditch system.
Lanport Railway Cutting SSSI	-	X	9.2km north-west	Geological features.
Hurcott Lane Cutting SSSI	-	X	6.9km south-west	Geological features.
Seavington St Mary SSSI	-	X	7.7km south-west	Geological features.
Millwater SSSI	-	X	8.9km south-west	A complex mosaic of pasture, wet grassland, tall-herb fen, standing and running water, and carr.
Hardington Moor SSSI	-	X	7.6km south-east	Unimproved, species-rich, neutral grassland
Grove Farm SSSI	-	X	9.1km south	Unimproved mesotrophic grassland.
Ham Hill SSSI	-	X	2.6km south-east	Geological features.

LOCAL WILDLIFE SITES

3.9 The Local Wildlife Sites considered are those identified by numbered referencing in the air quality modelling (see Section 5; Table 6).

Table 6. Local Wildlife Sites identified by the Air Quality Modelling.

Reference in the air quality modelling	Name	Location
1	-	3.0 km south-east
2	-	2.9km south-east
3	-	1.9km south-west

4. PHOSPHOROUS AND THE RAMSAR SITE

INTRODUCTION

4.1 The *a prior* expectation is that any inputs into the catchment of poultry manure, litter or wastewater would lead to eutrophication of the Somerset Levels and Moors Ramsar Site, as outlined by Natural England (2020):

> *Any significant additional sources of phosphorus within the catchment will further exacerbate the current surplus of agricultural phosphorus hampering efforts to reduce overall phosphorus loads to a level that will restore the ecological condition of the Somerset Levels and Moors Ramsar site.*

4.2 Therefore, in the context of nutrient neutrality guidance any increase is not acceptable and full mitigation is required. A more sophisticated impact assessment is very unlikely to alter this conclusion.

NATURAL ENGLAND'S COMMENTS

4.3 As outlined in initial documentation, the mitigation for phosphate from manure, litter and waste water is for these to be removed from the Site. However, Natural England (2022) commented:

> *In order to manage phosphorus loads the scheme proposes to remove its waste (including waste water) to one of two Anaerobic Digesters (AD) located out of catchment. However, both the named AD plants put forward for the disposal of the facility's waste lie within the catchment of international wetlands (i.e. Somerset Levels (Frogmary Farm) and the River Axe (Tiverton)). Given that the AD plants mentioned lie within sensitive catchments further information is needed on how the scheme will ensure that an overall increase in phosphorus loads in the catchment(s) are avoided.*

4.4 The specific points relate to:

- Understanding of the phosphorus generated and within the anaerobic digestion digestate.
- Confidence that the use of digestate for manure will not displace other manures as fertilizer.
- Information on storage and transport of waste water and its suitability for use for anaerobic digestion.
- Confidence that the manures and waste water will be managed as described.

IN COMBINATION SCHEMES

4.5 Residential development can generate phosphorous discharges via waste / foul water. In compliance with nutrient neutrality guidance such generation old require mitigation. In identifying possible in combination schemes a review of planning applications was made for the parish of Martock on the South Somerset planning portal. There are roughly 131 post-2018 residential units either consented or to be determined including the linked proposal for the new agricultural dwelling associated with this application[9].

[9] 20/02991/FUL

4.6 In practice, the majority of schemes in the River Parrett catchment would require mitigation to achieve nutrient neutrality, including the linked dwelling.

PROPOSED MITIGATION

Farm Management and Cleaning

4.7 The proposed mitigation is for the manure and waste materials to be taken away from the Site for use in anaerobic digestion and agricultural use (ACORUS, 2020[10]):

- The waste bedding is contained in the buildings during the life of the poultry crop. Once the birds are removed at the end of crop, there is a 3-4 week cleanout period prior to the introduction off the next crop. The waste bedding is removed from within the buildings by skid steer at the end of the crop and taken by tractor and sealed trailer off-site and outside of the catchment area by contractors (Tone Valley Services).
- Any wash water during this process is treated as fouled water and is diverted by a series of drains to a containment tank. This is emptied when necessary by a tanker and, similar to above, taken by contractor outside of the catchment area for spreading.

4.8 The points regarding disposal have been broadly confirmed by a contracted manure management company, Tone Valley Services (2021)[11]. In terms of the ability to find a company capable of undertaking the litter and waste removal:

- Tone Valley Services are a registered waste carrier (carrier, broker, dealer – upper tier) operating under registration CBDU292371[12]. Tone Valley Services are a reputable and long-established company (incorporated 2012) and undertake a wide range of agricultural operations[13].
- A brief search for poultry house cleaning companies in the south-west and cross-referencing to Environment Agency registration for waste carriers identified 20+ similar companies. While Tone Valley Servies are the identified carrier, there are plenty of other alternatives in the vicinity.

4.9 The design of the scheme includes a drainage layout that clearly identifies the routes for waste water drainage from the scheme including sheds and areas of hardstanding to the dirty water tank. All areas where manure and wash down water will originate are covered by this drainage to the dirty water tank. This has been designed professionally[14].

Destinations for Manure and Digestate

4.10 In terms of the location where digestate and untreated manure and waste material will be disposed of, the assurance is that this will be outside of the River Parrett catchment, or other

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[10] ACORUS (2020) *Design and Access Statement. Provision of Additional Poultry Buildings and Associated Infrastructure. Stoke Road, Martock, Somerset*. Unpublished report to inform 20/03004/FUL.

[11] Tone Valley Services (2021) Letter dated 14 May 2021 to T Martin.

[12] https://environment.data.gov.uk/public-register/waste-carriers-brokers/registration/CBDU292371?__pageState=result-waste-carriers-brokers

[13] https://tonevalleyservices.com/

[14] ACORUS (2020) *Proposed Poultry Unit Propose Drainage Plan. Drawing 200-005*. Unpublished plant to inform 20/03004/FUL

catchments where nutrient inputs into Ramsar / Nature Directives sites might be relevant. The queries raised also concern the phosphate content of the anaerobic feedstocks and resultant digestates.

4.11 In effect the management of manure would take it out of the River Parrett catchment. While concerns are expressed that the use would be within a different catchment albeit with nutrient neutrality requirements it would be used as a replacement for existing fertilizer use. If it was spread to land within a different sensitive catchment then its use would need to comply with:

- Nitrogen Vulnerable Zone[15] rules and compliance, including manure storage and application, or the Code of Good Agricultural Practice (COGAP) for Ammonia Emissions[16].
- Farming Rules for Water[17] and associated diffuse pollution regulations[18], which requires that the applications are proportionate to the cropping requirements and are particularly relevant to phosphorous.

4.12 To ensure that spreading to land would not generate diffuse pollution there would be requirement for manure applications would be informed by one of the following:

- A manual such as AHDB's nutrient management guide (RB209).
- Farm software such as PLANET, MANNER-NPK or nutrient management tools such as those provided by Tried and Tested.
- A suitably qualified professional, such as an agronomist or FACTS adviser.

4.13 Further, the applications would take into account:

- The results of soil sampling and analysis.
- The nutrient content of the applied organic manures and manufactured fertilisers.

4.14 The farm using such manure as fertiliser would apply the manure according to a plan subject to annual review, and this would be enforceable by the Environment Agency with the power to impose civil or criminal sanctions as defined by the Reduction and Prevention of Agricultural Diffuse Pollution (England) Regulations 2018.

4.15 The application of digestate to land falls under the same restrictions as untreated manures as defined by the Reduction and Prevention of Agricultural Diffuse Pollution (England) Regulations 2018:

> *"organic manure" means fertiliser derived from one or more animal, plant or human source, including anaerobic digestates and liquors.*

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[15] https://www.gov.uk/government/collections/nitrate-vulnerable-zones

[16] DEFRA (2018) Code *of Good Agricultural Practice (COGAP) for Reducing Ammonia Emissions*. Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/729646/code-good-agricultural-practice-ammonia.pdf

[17] https://www.gov.uk/government/publications/applying-the-farming-rules-for-water/applying-the-farming-rules-for-water

[18] *The Reduction and Prevention of Agricultural Diffuse Pollution (England) Regulations 2018.* Available from: https://www.legislation.gov.uk/uksi/2018/151/made

Technicalities of Anaerobic Digestion

4.16 It is expected that there will be sufficient anaerobic digestion capacity to take waste from the scheme and there is a very low likelihood of anaerobic digestors not wishing to take the feedstock: In broad terms, biogas is an important part of the UK's strategy to achieve net zero and it is very unlikely that the UKs capacity for biogas generation will decrease in the short or medium terms. (Liebetrau et al., 2021[19]). There is an observed continuing increase in the capacity of the anaerobic digestion sector, having grown 11% in the year to 2021 and with continued growth expected (Farmers Weekly, 2021[20]) with a resultant continuing increase in demand for feedstock. In terms of ecological impacts, the location of the anaerobic digestion plan is not of particular importance, rather it is the location for the disposal of digestate.

4.17 Also, a series of technical questions were raised regarding whether disinfectants and other materials could limit the ability of waste water to be used for anerobic digestion. Dry chicken manure is an effective source of substrate for anerobic digestion (Shapovalov et al., 2020[21]) and wash water is also a suitable feedstock (Vaishnav et al., 2023[22]). Many disinfectants do not affect anaerobic digestion in the concentrations found in waste water (Poels et al., 1984[23]), but conversely the literature also describes both disinfectants and antibiotics as potentially inhibiting chemicals (e.g. Liu et al., 2021[24]). However, there is also clear evidence that there are a range of viable control strategies for such compounds (Shao, et al., 2021[25]; Serrano-Meza et al., 2020[26]; Tawfik et al., 2023[27]). In practice, almost certainly any such concerns can be overcome and there are active commercial digestors which use only poultry waste as

[19] Liebetrau, J., Ammenberg, J., Gustafsson, M., Pelkmans, L., Murphy, J.D. (2022) The role of biogas and biomethane in pathway to net zero. Murphy, J.D (Ed.) *IEA Bioenergy Task* 37, 2022: 12

[20] Farmers Weekly (2021) Is there still a future for AD plants in the UK? Available from: https://www.fwi.co.uk/business/diversification/farm-energy/is-there-still-a-future-in-ad-plants-for-uk-farmers

[21] Shapovalov, Y., Zhadan, S., Bochmann, G., Salyuk, A., & Nykyforov, V. (2020) Dry anaerobic digestion of chicken manure: A review. *Applied Sciences*, *10*(21), 7825.

[22] Vaishnav, S., Saini, T., Chauhan, A., Gaur, G. K., Tiwari, R., Dutt, T., & Tarafdar, A. (2023) Livestock and poultry farm wastewater treatment and its valorization for generating value-added products: Recent updates and way forward. *Bioresource Technology*, 129170.

[23] Poels, J., P. Van Assche, and W. Verstraete (1984) Effects of disinfectants and antibiotics on the anaerobic digestion of piggery waste. *Agricultural wastes* 9.4: 239-247.

[24] Liu, Y., Li, X., Tan, Z., & Yang, C. (2021) Inhibition of tetracycline on anaerobic digestion of swine wastewater. *Bioresource Technology*, *334*, 125253.

[25] Shao, Z., Guo, X., Qu, Q., Kang, K., Su, Q., Wang, C., & Qiu, L. (2021) Effects of chlorine disinfectants on the microbial community structure and the performance of anaerobic digestion of swine manure. *Bioresource technology*, *339*, 125576.

[26] Serrano-Meza, A., Garzón-Zúñiga, M. A., Barragán-Huerta, B. E., Estrada-Arriaga, E. B., Almaraz-Abarca, N., & García-Olivares, J. G. (2020) Anaerobic digestion inhibition indicators and control strategies in processes treating industrial wastewater and wastes. *Revista Mexicana de Ingeniería Química*, *19*(Sup. 1), 29-44.

[27] Tawfik, A., Eraky, M., Osman, A. I., Ai, P., Zhou, Z., Meng, F., & Rooney, D. W. (2023) Bioenergy production from chicken manure: a review. *Environmental Chemistry Letters*, 1-21.

feedstock (Linden, 2018[28], see also Stream Bioenergy, 2203[29]). There is therefore very high confidence that the technical aspects of using the waste for anaerobic digestion is feasible and viable.

4.18 A technical comment is also made regarding capacity of the on-Site waste water storage tank. This seems a straightforward matter and ensuring a large enough tank can be secured via condition.

Confidence in the Mitigation

4.19 The mitigation proposed represents 'industry standard measures' which are realistic and feasible. Where required their implementation is covered by relevant rules and regulations with enforcement by the Environment Agency. Technical matters are also considered to have readily implemented solutions (e.g., management of feedstock quality for anaerobic digestion) or otherwise solutions integrated into the scheme (e.g., site drainage for waste water). There is high confidence that there is sufficient long-term security to the mitigation, and that it is technically feasible and is enforceable.

4.20 The specific points raised by Natural England are addressed in turn below (Table 7), but the key points are that there are no technical constraints to the removal and use of the waste materials, and the ultimate use / application of the waste will be regulated under existing rules and permitting regimes.

Table 7. Responses to Natural England's specific queries.

Natural England query	Response
The total phosphorus load per annum that would be generated by the proposals.	The amount generated is not relevant given an appropriate mitigation package, which requires the appropriate use of manures when used as fertilizer
The total phosphorus load per annum that would result in the AD plant's digestate.	The amount generated is not relevant given an appropriate mitigation package, which requires the appropriate use of manures when used as fertilizer.
Consideration should also be given as to whether the phosphorus concentrations within the digestate will increase as a result of using chicken manures as opposed to other feed stock.	This is a technical point relating to the anaerobic digestion process. The composition of digestate will vary according to the feedstock, however it is expected that the application would also vary in accordance with the composition of the feedstock to comply with the relevant rules and regulations.
Information to demonstrate that the resulting digestate from the AD plant can be used for crop need without displacing current use of slurries and manures already generated in the catchment.	It would be extremely difficult to demonstrate whether or not the manures and digestate from this scheme could displace existing manures, e.g., by being cheaper, such that these existing manures could not be disposed of. However, given the requirement for manures to be disposed of correctly (i.e., according to rules and regulations) it would be expected that this would not generate impacts on sites.

[28] Linden, J. (2018) World's first poultry litter anaerobic digester up and running. *WattPoultry*, available from: https://www.wattagnet.com/broilers-turkeys/article/15524431/worlds-first-poultry-litter-anaerobic-digester-up-and-running-wattagnet

[29] https://streambioenergy.ie/projects/

Natural England query	Response
	It is also very relevant to note that the total phosphate (P_2O_5) added as fertilizer in 2021 in Great Britain was roughly 100,000 tonnes (AIC, 2023[30]), therefore the scheme is unlikely to generate an imbalance in the fertilizer market or otherwise displace alternatives.
The information provided states that the waste water collected within the facility will also be transported to the AD plant. Your authority should be satisfied that the proposed waste water storage tank is suitably sized for the water generated, that transport to the AD plant is feasible and that the AD plant (s) will be able to accommodate the volumes that will be generated. Further information will also be needed on any harmful effects of the waste water on the AD process. Natural England is concerned that the waste water used for washing out the facility is likely to be contaminated with high levels of disinfectants and potentially pharmaceuticals that may be harmful to the AD plant. Clarification is therefore also needed of the sensitivity of the AD plant to this type of waste water.	The size of the waste water tank can be secured by condition, and ensuring a sufficiently large tank is likely to be standard practice and readily achievable. The transport of materials will be by a registered carrier meeting Environment Agency requirements in terms of its lorries and tanks. Waste water (wash water) is an accepted feedstock for anaerobic digestion and its use is not unusual. While it is likely that not all anaerobic digestion plants will take wash water, the continuing demand for feedstock (see below) provides high confidence that there are suitable destinations for the waste water. If there is a problem with the composition, then the use of disinfectants and pharmaceuticals could be modified.
The scheme is reliant on a third party's AD facility. Your Authority's AA will therefore need to consider what safe guards will be in place should at any point during the operational phase of the scheme the AD plant refuses to process the waste and waste water from the facility.	First, biogas is an important part of the UK's strategy to achieve net zero. It is very unlikely that the UKs capacity for biogas generation will increase in the short and medium terms at least. Continued growth is expected, following on from 11% increase in UK capacity in the year to 2021. In terms of ecological impacts, the location of the anaerobic digestion plan is not of particular importance, rather it is the location for the disposal of digestate.
Information on how the disposal of the waste from the facility will be monitored during the lifetime of the development and how the authority will enforce against any unauthorised disposal of waste within the catchment.	The field spreading of manures is covered by a range of rules and regulations including the Reduction and Prevention of Agricultural Diffuse Pollution (England) Regulations 2018. The Environment Agency has enforcement powers if required, with farmers required to undertake annual reviews of their plans.
What safeguards will be in place to prevent contaminated waste water (including lightly fouled water) from the facility being discharged to ground or surface water. This should include measures to ensure that all areas in contact with manure, bedding or washings are sealed and covered with all resulting waste water collected.	The design of the scheme includes a drainage layout that clearly identifies the routes for waste water drainage from the scheme including sheds and areas of hardstanding to the dirty water tank. All areas where manure and wash down water will originate travel by this drainage to the dirty water tank.

[30] AIC (2023) *Fertiliser Statistics, 2023*. Available from: https://www.agindustries.org.uk/resource/aic-fertiliser-statistics-report-2023-pdf.html

5. INFORMATION ON AIR QUALITY MODELLING AND SSSIS

INTRODUCTION

5.1 The assessment of air quality impacts only relates to SSSI features, as informed by the Natural England guidance (2020) letter which identifies the Ramsar site features as being in unfavourable condition due only to phosphorous.

AIR QUALITY ASSESSMENT GUIDANCE

5.2 To inform the HRA, reference is made to various guidance documents relating to ammonia dispersion and deposition as cited below (Table 8).

Table 8. Guidance documents.

Author	Reference
Institute of Air Quality Management	IAQM (2019) *A Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites*. Available from: https://iaqm.co.uk/text/guidance/air-quality-impacts-on-nature-sites-2019.pdf
Chartered Institute of Ecology and Environmental Management	CIEEM (2021) *Advice on Ecological Assessment of Air Quality Impacts.* Chartered Institute of Ecology and Environmental Management. Winchester, UK.
Natural England	Natural England (2018) *Natural England's Approach to Advising Competent Authorities on Road Traffic Emissions Under the Habitats Regulations.* Available at http://publications.naturalengland.org.uk/publication/4720542048845824
Environment Agency	Environment Agency (2018) *Intensive Farming Risk Assessment for your Environmental Permit.* Available from: https://www.gov.uk/guidance/intensive-farming-risk-assessment-for-your-environmental-permit
Joint Nature Conservancy Committee	JNCC (2021) *Guidance on Decision-making Thresholds for Air Pollution*. Available from: https://data.jncc.gov.uk/data/6cce4f2e-e481-4ec2-b369-2b4026c88447/JNCC-Report-696-Main-FINAL-WEB.pdf

5.3 Key points from the guidance are summarised below (Table 9) but it is important to note that *"the exceedance of a threshold is not decisive in and of itself, …. merely indicates a need for further assessment effort"* (JNCC loc. cit.). The screening thresholds are taken to be:

- 1% for Natura Directives sites.
- 4% for SSSIs.

5.4 The 1% threshold is mainly to provide reassurance that sources which could result in harm or damage to a designated site alone or in-combination will not be missed from an assessment. Additional reasons are to allow for circumstances where higher thresholds would not be sufficiently protective, and for alignment with other sources of emissions and other UK countries.

5.5 The reference to the JNCC Decision Making Thresholds (DMT) is provided for reference but is not used within this assessment, and indeed these are not believed to be currently endorsed by Natural England. Where the process contribution exceeds the DMT there are two possible outcomes:

- Where site-relevant thresholds have been derived these can be applied to see if it is possible to avoid further assessment effort on the basis of site-specific circumstances.

- If site-relevant thresholds have not yet been derived, further assessment in combination with other plans and projects is required.

Table 9. Summary of thresholds.

Organisation	Sites	Summary
Natural England	Nature Directives / Ramsar sites and	A process contribution of >1% of relevant Critical Levels / Load as a screening threshold.
	SSSI	A process contribution of >4% of relevant Critical Levels / Load as a screening threshold.
Environment Agency	Nature Directives / Ramsar sites	Process contribution that are <4% of the Critical Levels / Load as not requiring further assessment, with the inference that such values will not impact sites.
	SSSIs	<20% of the Critical Levels / Load as not requiring further assessment, with the inference that such values will not impact sites.
	County Wildlife Sites	<100% of the Critical Levels / Load as not requiring further assessment, with the inference that such values will not impact sites.
JNCC Decision Making Thresholds	Lichens and bryophytes	0.08%, 0.20%, 0.34% and 0.75% of the Critical Level for high, medium, low and very low development density areas, respectively.
	Higher plants	0.08%, 0.20%, 0.34% and 0.75% of the Critical Level for high, medium, low and very low development density areas, respectively.
	Woodland	Critical Load 10 kg-N/ha/y) - 0.13%, 0.34%, 0.57% and 1.30% of the Critical Level for high, medium, low and very low development density areas, respectively.
	Grassland	Critical Load 10 kg-N/ha/y) 0.09%, 0.24%, 0.40% and 0.88% of the Critical Level for high, medium, low and very low development density areas, respectively.

IN COMBINATION CALCULATIONS

5.6 Based on a review of the South Somerset planning portal with the parish of Martock as the search area, no schemes relevant to in combination impacts have been identified.

THE SCHEME AND MODELLING METHODS

5.7 A separate air quality report (AS Modelling, 2023[31]) is provide separately and key information is extracted from that and summarised here:

- There is currently one poultry house at Stoke Road, Martock, which is used to rear up to 40,000 broiler chickens and is ventilated by high-speed ridge fans. It is proposed that the existing poultry house be refurbished and two new poultry houses be constructed adjacent to it. The three poultry houses would then be used to accommodate up to 39,600 broiler breeder chickens, which would produce fertilised eggs to be transferred to hatcheries elsewhere. The bird's droppings would collect within the house and be cleared at the end of the egg production period, which would be approximately once per year.
- The APIS figures for background ammonia concentration for the area around the poultry house at Stoke Road, Martock is 2.51 µg-NH3/m3. The background nitrogen

[31] AS Modelling (2023) *A Report on the Modelling of the Dispersion and Deposition of Ammonia from the Existing Broiler Rearing House and the Proposed Broiler Breeder Egg-Laying Chicken Houses at Stoke Road, Martock, near to Yeovil in Somerset*. Unpublished report to inform 20/03004/FUL

deposition rate to woodland is 33.29 kg-N/ha/y and to short vegetation is 18.64 kg-N/ha/y. The background acid deposition rate to woodland is 2.42 keq/ha/y and to short vegetation is 1.35 keq/ha/y.

- The emission factor for the egg-laying chickens is 0.21 kg-NH_3/place/year and the emissions rate is 0.263518 g-NH_3/s. The existing facility for broilers has an emission factor of 0.034 kg-NH_3/place/year and the emissions rate is 0.0.043096 g-NH_3/s.
- The modelling was undertaken with the Atmospheric Dispersion Modelling System (ADMS) ADMS 5. This includes assumption about emission sources and building structures, plus the terrain and its roughness.

MODELLING RESULTS

5.8 The detailed modelling results are presented for the existing facility and then for the proposed scheme including the existing facility. For Wet Moor SSSI and West Mood SSSI four receptor locations were used; not all SSSIs are included, due to distance and / or their features being geological. The results are summarised in Table 10 and the key points are that at all sites the process constructions are <1% of the Critical Levels and Loads (with the screening percentage being 4% for SSSIs):

- Ammonia levels are <1% of the Critical Level at all SSSIs, with the highest level being 0.4% at West Moor SSSI.
- Nitrogen deposition is <1% of the Critical Load at all SSSIs, with the highest level being 0.6% at West Moor SSSI.

Table 10. Summary of detailed modelling for the existing and proposed facility.

SSSI	Receptor number	Site Parameters			Maximum annual ammonia concentration		Maximum annual nitrogen deposition rate	
		Deposition Velocity	Ammonia Critical Level (µg/m^3)	Nitrogen Critical Load (kg/ha)	Process Contri-bution (µg/m^3)	%age of Critical Level	Process Contri-bution (kg/ha)	%age of Critical Load
Moorlinch SSSI		-	-	-	-	-	-	-
King's Sedgemoor SSSI		-	-	-	-	-	-	-
Southlake Moor SSSI		-	-	-	-	-	-	-
Curry and Hay Moors SSSI		-	-	-	-	-	-	-
West Sedgemoor SSSI		-	-	-	-	-	-	-
West Moor SSSI	6	0.02	3.0	10.0	0.007	0.2%	0.037	0.4%
	7	0.02	3.0	10.0	0.006	0.2%	0.032	0.3%
	8	0.02	3.0	10.0	0.004	0.1%	0.021	0.2%
	9	0.02	3.0	10.0	0.011	0.4%	0.057	0.6%
Wet Moor SSSI	10	0.02	3.0	10.0	0.009	0.3%	0.046	0.5%
	11	0.02	3.0	10.0	0.007	0.2%	0.034	0.3%
	12	0.02	3.0	10.0	0.007	0.2%	0.039	0.4%
	13	0.02	3.0	10.0	0.005	0.2%	0.028	0.3%

SSSI	Receptor number	Site Parameters			Maximum annual ammonia concentration		Maximum annual nitrogen deposition rate	
		Deposition Velocity	Ammonia Critical Level (µg/m^3)	Nitrogen Critical Load (kg/ha)	Process Contri-bution (µg/m^3)	%age of Critical Level	Process Contri-bution (kg/ha)	%age of Critical Load
Lanport Railway Cutting SSSI	14	-	-	-	-	-	-	-
Hurcott Lane Cutting SSSI	15	-	-	-	-	-	-	-
Seavington St Mary SSSI	16	-	-	-	-	-	-	-
Millwater SSSI	17	0.02	3.0	-	0.004	0.1	0.019	-
Hardington Moor SSSI	18	0.02	3.0	10.0	0.008	0.3	0.039	0.4
Grove Farm SSSI	19	0.02	3.0	10.0	0.006	0.2	0.029	0.3
Ham Hill SSSI	-	-	-	-	-	-	-	-

6. INFORMATION ON AIR QUALITY MODELLING AND LOCAL WILDLIFE SITES

MODELLING RESULTS

6.1 The detailed modelling results are presented for the existing facility and then for the proposed scheme including the existing facility. For The results are summarised in Table 11 and the key points are that:

- Ammonia levels are between 5.0 and 5.6% of the Critical Level.
- Nitrogen deposition is 3.9-4.4% of the Critical Load.

Table 11. Summary of detailed modelling for the existing and proposed facility.

LWS	Receptor number	Site Parameters			Maximum annual ammonia concentration		Maximum annual nitrogen deposition rate	
		Deposition Velocity	Ammonia Critical Level (µg/m^3)	Nitrogen Critical Load (kg/ha)	Process Contri-bution (µg/m^3)	%age of Critical Level	Process Contri-bution (kg/ha)	%age of Critical Load
1	1	0.03	1.0	10.0	0.056	5.6%	0.440	4.4%
2	2	0.03	1.0	10.0	0.052	5.2%	0.405	4.0%
3	3	0.03	1.0	10.0	0.050	5.0%	0.391	3.9%

7. SHADOW HABITATS REGULATIONS ASSESSMENT

INTRODUCTION

7.1 This Section present the shadow HRA, divided into the screening stage and then the Appropriate Assessment stage. Only Ramsar and Nature Directives sites are considered here, with SSSIs and LWSs considered in Sections 8 and 9.

TEST OF LIKELY SIGNIFICANT EFFECT

7.2 The Test of Likely Significant Effect is presented below (Table 12), considering the only pathway of potential impact identified within the Natural England guidance (2020) on nutrient neutrality, namely phosphorus-related eutrophication. Impacts on the Somerset Moors and Levels SPA are screened out, but the Somerset Moors and Levels Ramsar Site requires consideration at the Appropriate Assessment stage.

Table 12. The Test of Likely Significant Effect.

Pathway	Relevant sites	Assessment	Conclusion
In Isolation			
Phosphorous-related eutrophication	Somerset Moors and Levels Ramsar Site	The Ramsar site is identified as being vulnerable to eutrophication from phosphorous (i.e., eutrophication from phosphorous is a cause of unfavourable condition).	Cannot be screened out. Taken to Appropriate Assessment.
Phosphorous-related eutrophication	Somerset Moors and Levels SPA	The SPA features are identified as not being vulnerable to eutrophication from phosphorous	No impact on site integrity. Screened out.
In combination			
Phosphorous-related eutrophication	Somerset Moors and Levels Ramsar Site	The Ramsar site is identified as being vulnerable to eutrophication from phosphorous (i.e., eutrophication from phosphorous is a cause of unfavourable condition).	Cannot be screened out. Taken to Appropriate Assessment.
Phosphorous-related eutrophication	Somerset Moors and Levels SPA	The SPA features are identified as not being vulnerable to eutrophication from phosphorous	No impact on site integrity. Screened out.

APPROPRIATE ASSESSMENT

In Isolation

7.3 As stated by Natural England (2020), compliance with nutrient neutrality guidance with regard to phosphorous is required for schemes in the River Parret catchment, and as such mitigation is required in relation to the management of mature and related products such as wash down water.

7.4 The scheme will have on-Site storage tanks for wash down water, taking all waster from the sheds and associated hardstanding where manures or nutrient rich materials deposited. The manure and wash down water will be taken off-Site and out of the River Parret catchment by a registered carrier and taken to an anaerobic digestor or for land spreading without treatment.

7.5 The removal of the material from the catchment constitutes mitigation for the River Parret catchment. However, Natural England have expressed concern regarding other sensitive catchments and also to some aspects of the process. The following points are identified as providing confidence in that mitigation can be delivered, is viable and feasible, and can be enforced:

- A sufficiently large on-Site storage tank and other aspects of drainage can be conditioned. An outline drainage plan has been prepared and there is very high confidence that the specific design can be delivered to avoid local loss and discharge of nutrient-laden material.
- Technical aspects of anaerobic digestion are 'industry standard' activities, in terms of the quality of feedstock (i.e. manure and wash down water quality [composition / 'contamination']). Given the current trends in anaerobic digestion capacity and national policies, it is extremely unlikely that the capacity for anaerobic digestion will decrease and therefore there will be a destination for manures and wash down water.
- Spreading to land of manure and digestate are activities that are controlled by various rule and regulations relating to farming activities. Specifically for locations within Nitrogen Vulnerable Zone, these must comply with various rules including manure storage and application, or follow the guidance of the Code of Good Agricultural Practice (COGAP). Compliance with The Farming Rules for Water and the Reduction and Prevention of Agricultural Diffuse Pollution (England) Regulations 2018 are monitored by the Environment Agency, who have enforcement powers.

7.6 There is therefore high confidence that the mutation is deliverable and can be enforced, sch that it can be concluded that the scheme will not have in isolation impacts on the site integrity of the Somerset Moors and Levels Ramsar Site.

In Combination

7.7 There are various residential scheme in the parish of Martock for >130 dwellings that have been consented since 2018 or are to be determined. This includes a linked dwelling under separate application. Mitigation will be required for these schemes, but this are not necessarily identified.

7.8 While mitigation may or may not have been identified for these schemes, and indeed others in the catchment, they will need to comply with nutrient neutrality guidance. On this basis, these other schemes plus the current scheme will not generate an increase in phosphorous inputs into the Somerset Moors and Levels Ramsar Site and in combination impacts can be concluded to be negligible. As such the it can be concluded that the scheme will not have in combination impacts on the site integrity of the Somerset Moors and Levels Ramsar Site.

8. ASSESSMENT OF SSSI IMPACTS

INTRODUCTION

8.1 This Section present an assessment for ammonia-related impacts on SSSIs. Such pathways were identified by Natural England (2022) as relevant to SSSIs including those which are components of the Somerset Mors and Levels Ramsar Site. While nitrogen deposition can result in eutrophication, the principal concern identified was direct toxicity from ammonia.

SCREENING

8.2 The screening threshold for potential impacts on SSSIs is set at 4% of the Critical Level and Critical Load for maximum ammonia concentrations and nitrogen deposition respectively.

8.3 For all SSSIs the air quality modelling shows that at all SSSIs the process constructions are <1% of the Critical Levels and Loads (with the screening percentage being 4% for SSSIs):

- Ammonia process contribution levels are <1% of the Critical Level at all SSSIs, with the highest level being 0.4% at West Moor SSSI.
- Nitrogen deposition process contribution is <1% of the Critical Load at all SSSIs, with the highest level being 0.6% at West Moor SSSI.

8.4 The process contributions are <1% of the Critical Level and Load, therefore It can be concluded therefore that there is sufficient evidence to conclude that ammonia level and nitrogen deposition will not impact SSSIs.

9. ASSESSMENT OF LOCAL WILDLIFE SITE IMPACTS

INTRODUCTION

9.1 This Section present an assessment for ammonia-related impacts on Local Wildlife Sites (LWS). Both eutrophication via nitrogen deposition and direct toxicity from ammonia are potentially relevant pathways.

SCREENING

9.2 The screening threshold for potential impacts on LWS is set at process contribution to be 100% of the Critical Level / Load (compared to 4% for SSSIs). The 100% figure is taken from the air quality modelling report as informed by cited Environment Agency guidance.

6.2 The detailed modelling results show:

- Ammonia process contribution levels are between 5.0 and 5.6% of the Critical Level.
- Nitrogen process contribution deposition is 3.9-4.4% of the Critical Load.

6.3 The process contributions are <100% of Critical Levels and Loads. The actual percentage levels are only a little higher (up to 1.6% higher) than the thresholds for SSSIs. It can therefore be concluded therefore that there is sufficient evidence to conclude that ammonia level and nitrogen deposition will not impact LWSs.

10. CONCLUSIONS

10.1 Within the shadow HRA the only pathway of potential impact is phosphorous-related eutrophication. Impacts on the Somerset Moors and Levels SPA can be screened out. Impacts on the Somerset Moors and Levels Ramsar Site are taken to Appropriate Assessment where mitigation is identified as the removal of nutrient-laden material off-Site. The ultimate destination would be to anaerobic and land spreading, and the rules and regulations for farm spreading are identified as providing security that the mitigation would not impact other sites. These include the Farming Rules for Water and the Reduction and Prevention of Agricultural Diffuse Pollution (England) Regulations 2018, which are monitored and enforced by the Environment Agency. It is concluded the scheme will not have in isolation impacts on the site integrity of Ramsar / Nature Directives sites.

10.2 The pathway of potential impact to SSSIs are ammonia-related, mainly via direct toxicity. The process contributions are <1% of the Critical Level and Load, therefore It can be concluded therefore that there is sufficient evidence to conclude that ammonia level and nitrogen deposition will not impact SSSIs.

10.3 The pathway of potential impact to LWSs are ammonia-related, via both direct toxicity and nitrogen deposition. The process contributions are <100% of Critical Levels and Loads. The actual percentage levels are only a little higher (up to 1.6% higher) than the thresholds for SSSIs. It can therefore be concluded therefore that there is sufficient evidence to conclude that ammonia level and nitrogen deposition will not impact LWSs.

11. APPENDIX 1: HABITATS REGULATIONS ASSESSMENT LEGISLATION

INTRODUCTION

Post-Brexit the policy context and underpinning legislation with respect to Habitats Regulations Assessment remains unchanged, with the group term of European sites now replaces with Nature Directives sites. The

Within the Conservation of Habitats and Species Regulations 2017 (Regulation 63) it states that "A competent authority, before deciding to undertake, or give any consent, permission or other authorisation for, a plan or project which (a) is likely to have a significant effect on a European site or a European offshore marine site (either alone or in combination with other plans or projects), and (b) is not directly connected with or necessary to the management of that site, must make an appropriate assessment of the implications of the plan or project for that site in view of that site's conservation objectives". Further, "In the light of the conclusions of the assessment, and subject to Regulation 64, the competent authority may agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the European site".

The Habitats Regulations Assessment relates to Special Protection Areas (SPAs), Special Areas of Conservation (SACs) and Ramsar Sites.

SPAs are sites classified in accordance with Article 4 of the EC Directive on the conservation of wild birds (79/409/EEC), more commonly known as the Birds Directive. They are classified for rare and vulnerable birds, listed in Annex I to the Birds Directive, and for regularly occurring migratory species.

SACs are classified in accordance with EC Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive). Article 3 of this Directive requires the establishment of a European network of important high-quality conservation sites that will make a significant contribution to conserving the 189 habitat types and 788 species identified in Annexes I and II of the Directive.

These sites are known as the Natura 2000 network and are commonly referred to as European sites.

Ramsar Sites qualify under the International Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention, Iran 1971 and amended by the Paris Protocol 1992). Although Ramsar Sites are not protected in law by the Birds and Habitats Directives as a matter of policy, government – reiterated in the National Planning Policy Framework has decreed that, unless otherwise specified, procedures relating to SPAs and SACs will also apply to Ramsar Sites. The term 'international sites' is used in this report to refer to all three of these qualifying sites.

An appropriate assessment is a decision by a 'competent authority', as to whether the proposed plan or project can be determined as not having an adverse effect on the integrity of any European sites. An adverse effect on integrity is likely to be one that prevents the site from maintaining the same contribution to favourable status for the relevant feature(s), as it did when the site was qualifying. Only where a plan or project can be determined by the competent authority as not having an adverse effect on site integrity can it be allowed to proceed.

The favourable conservation status of the site is defined through the site's conservation objectives and it is against these objectives that the effects of the plan or project must be assessed. Regulation 63(2) requires that a person applying for any such consent, permission or other authorisation must provide such information as the competent authority may reasonably require for the purposes of the assessment or to enable them to determine whether an appropriate assessment is required.

PROCESS

The Appropriate Assessment process is outlined in Table A1, presented for illustrative purposes, outlining the steps required to be undertaken by the competent authority when considering projects that may impact on European sites.

Table A1. The stages of a Habitat Regulations Assessment.

Task	Requirements
Evidence Gathering	Collation of documentation relating to the project. Collecting information on relevant European sites, their conservation objectives and characteristics.
Stage 1	The 'test of likely significant effect'

Task	Requirements
	Establishing whether a plan is 'likely to have a significant effect' on a European site, and therefore requiring the Appropriate Assessment.
Stage 2	Assessment of whether there is an effect on site integrity This is potentially a two-stage process, with a consideration of whether there are likely to be effects, followed if necessary, by a detailed consideration of site-specific factors. This stage can consider mitigation.
Stage 3	If there is an effect on site integrity then the project should be re-assessed with the inclusion of compensation and a repeat of stage 2.

An important part of this HRA is the significance of mitigation and compensation; these are defined below (Mitigation Versus Compensatory Measures). Following Tyldesley (loc. cit.) it is considered that compensatory measures may be proposed if the project is permitted under the provisions of regulations 49 and 53, but rather than forming part of the Appropriate Assessment they are included in Stage 3; in contrast, mitigation measures may form part of the Appropriate Assessment (i.e. Stage 2).

SITE INTEGRITY

Following English Nature (2004)[32] and based on definitions within Article 1 of the Habitats Directive, site integrity is defined below.

For habitats:

- Their range and area must be stable or increasing;
- The species structure and functions necessary for long-term maintenance exist and are likely to continue to exist for the foreseeable future; and
- The status of the typical species is considered to be favourable.

For species:

- The population dynamics data on the species indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- The natural range is stable and likely to continue to be, and there is and will probably continue to be a sufficiently large habitat to maintain its population on a long-term basis.

English Nature (1999[33]) proposes a checklist of questions as a pragmatic approach to identifying likely effects and to potential mechanisms that may affect site integrity. Where each answer is 'yes', then it can be concluded that there are no adverse effects. Thus, for the assessment to conclude that there are no adverse effects then it is required to show that:

- The area of Annex I habitats (or composite features) will not be reduced;
- There will be no direct effect on the population of the species for which the site was Qualifying or classified;
- There will be no indirect effects on the populations of species for which the site was Qualifying or classified due to loss or degradation of their habitat (quantity/quality);
- There will be no changes to the composition of the habitats for which the site was Qualifying (e.g. reduction in species structure, abundance or diversity that comprises the habitat over time); and
- That there will be no interruption or degradation of the physical, chemical or biological processes that support habitats and species for which the site was Qualifying or classified.

[32] English Nature (2004) *Internal Guidance to Decisions on 'Site Integrity': A Framework for Provision of Advice to Competent Authorities.* English Nature, Peterborough.

[33] English Nature (1999) *Habitats Regulations Guidance Note*. English Nature, Peterborough.

If the answer is 'no' to any of these or if there is uncertainty, then it is necessary to consider further site-specific factors in order to reach a decision.
The key site-specific factors that need to be considered when forming judgments on site integrity are:

- Scale of impact,
- Long term effects and sustainability,
- Duration of impact and recovery/reversibility,
- Dynamic systems,
- Conflicting feature requirements,
- Off-site impacts, and
- Uncertainty in cause and effect relationships and a precautionary approach.

MITIGATION VERSUS COMPENSATORY MEASURES

There are three types of counteracting measures to reduce impacts: avoidance and reduction (which are grouped together as mitigation) and then compensatory measures. "Mitigation (avoidance and reduction) measures (are) built into the project and form(ing) part of the project as proposed or applied for"; compensatory measures are those which "do not already form part of the project but may be applied as additional conditions or restrictions (Tyldesley loc. cit.; pp13).
The distinction is:

- Mitigation measures are those measures which aim to minimise, or even cancel, the negative impacts on a site that are likely to arise as a result of the implementation of a plan or project. These measures are an integral part of the specifications of a plan or project.
- Compensatory measures in the strict sense are independent of the project (including any associated mitigation measures). They are intended to offset the negative effects of the plan or project so that the overall ecological coherence of the Natura 2000 Network is maintained.

As recently ruled within the European Court of Justice[34] mitigation measures included as part of a scheme can only be considered within the Appropriate Assessment and not at the screening stage.

[34] InfoCuria - Case-law of the Court of Justice Case C-323/17, Screening in order to determine whether or not it is necessary to carry out an assessment of the implications, for a special area of conservation, of a plan or project.

12. APPENDIX 2: DESIGNATED FEATURES

SOMERSET LEVELS AND MOORS RAMSAR

Qualification criteria as taken from:

- JNCC (1997) *Somerset Levels and Moors Special Protection Area Information Sheet on Ramsar Wetlands (RIS).* Available from: https://jncc.gov.uk/jncc-assets/RIS/UK11064.pdf

Ramsar criterion 2

- Supports 17 species of British Red Data Book invertebrates.

Ramsar criterion 5:

- Assemblages of international importance: Species with peak counts in winter: 97155 waterfowl (5 year peak mean 1998/99-2002/2003).

Ramsar criterion 6 – species/populations occurring at levels of international importance:

- Tundra swan, *Cygnus columbianus bewickii*
- Eurasian teal, *Anas crecca*
- Northern lapwing, *Vanellus vanellus*

Species/populations identified subsequent to designation for possible future consideration under criterion 6. Species with peak counts in winter:

- Mute swan, *Cygnus olor*
- Eurasian wigeon, *Anas penelope*
- Northern pintail, *Anas acuta*
- Northern shoveler, *Anas clypeata*

Also:

- Noteworthy flora: Nationally important species occurring on the site. Higher plants - *Althaea officinalis, Persicaria laxiflora, Lathyrus palustris, Peucedanum palustre, Potamogeton coloratus, Potamogeton trichoides, Sium latifollum, Wolffia arrhizal,*
- Noteworthy fauna:
    - Birds. Species currently occurring at levels of national importance: gadwall, *Anas strepera strepera*; water rail , *Rallus aquaticus*; European golden plover, Pluvialis *apricaria apricaria* and *P. a. altifrons*; ruff , *Philomachus pugnax*; common snipe, *Gallinago gallinago gallinago.*
    - Nationally important invertebrates occurring on the site. Invertebrates. *Hydrochara caraboides, Bagous nodulosus, Odontomyia angulata, Oulema erichsoni, Valvata macrostoma, Odontomyia ornata, Stethophyma grossum, Pteromicra leucopeza, Lejops vittata, Cantharis fusca, Paederus caligatus, Hydaticus transversalis, Dytiscus dimidiatus, Hydrophilus piceus, Limnebus aluta, Laccornis oblongus*

SOMERSET LEVELS AND MOORS SPECIAL PROTECTION AREA

Conservation objectives as taken from:

- Natural England (214) *European Site Conservation Objectives for Somerset Levels & Moors SPA (UK9010031).* Available from: https://publications.naturalengland.org.uk/publication/4598158654963712

With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified (the 'Qualifying Features' listed below), and subject to natural change:

- Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;
- The extent and distribution of the habitats of the qualifying features;
- The structure and function of the habitats of the qualifying features;
- The supporting processes on which the habitats of the qualifying features rely;
- The population of each of the qualifying features, and,
- The distribution of the qualifying features within the site.

Qualifying Features:

- A037 *Cygnus columbianus bewickii*; Bewick's swan (Non-breeding)
- A052 *Anas crecca*; Eurasian teal (Non-breeding)
- A140 *Pluvialis apricaria*; European golden plover (Non-breeding)
- A142 *Vanellus vanellus*; Northern lapwing (Non-breeding)
- Waterbird assemblage